DRAFT
ENVIRONMENTAL IMPACT REPORT
for
Cañada Woods North
SCH# 96061076

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September 1996

Prepared for:
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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1.0 INTRODUCTION

1.1 PURPOSE

This Environmental Impact Report (EIR) addresses the potential environmental effects of a proposed combined development permit for a vesting tentative map to create 34 residential lots; 10 parcels for recreational and open space uses; a use permit to allow a golf course and accessory uses including a clubhouse and 12 member suites; a use permit for equestrian and recreational uses; 5 employee housing units; and a use permit for a waiver for development on slopes exceeding 30%. The project also includes inclusion in two proposed County service areas. A full description of the project is presented in the Project Description section of this document.

This EIR has been prepared for Monterey County, which is the lead agency for the project. Potentially significant impacts that are evaluated in this EIR include geotechnical and soils constraints; drainage and water quality; water supply; wastewater disposal; biotic resources; aesthetics; traffic and access; air quality; noise; public services; and land use issues. The EIR Notice of Preparation and Initial Study, included in Appendix A, provides further discussion of these issues.

This EIR has been prepared in accordance with the California Environmental Quality Act (CEQA) as amended, and State and County CEQA Guidelines. As stated in the CEQA Guidelines, an EIR is an "informational document" with the intended purpose to: "inform public agency decision-makers and the public generally of the significant environmental effects of a project, identify possible ways to minimize the significant effects, and describe reasonable alternatives to the project." Although the EIR does not control the ultimate decision on the project, the County must consider the information in the EIR and respond to each significant effect identified in the EIR.

"Significant effect on the environment" is defined in CEQA (Public Resources Code section 21068) as a "substantial, or potentially substantial, adverse change in the environment." Further definition is provided in the CEQA Guidelines, in which a "significant effect on the environment" is:

> ... a substantial or potentially substantial, adverse change in any of the physical conditions within the area affected by the project including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance. An economic or social change by itself shall not be considered a significant effect on the environment. A social or economic

change related to a physical change may be considered in determining whether the physical change is significant.

Social, economic, or beneficial impacts are not considered significant adverse impacts under CEQA and are not considered in this EIR.

1.2 EIR PROCESS

A Notice of Preparation (NOP) for this EIR was circulated on June 25, 1996 to State, regional, and local agencies and to interested community organizations and individuals. A 30-day comment period on the NOP provided agencies the opportunity to identify issues and/or concerns that should be addressed during the preparation of the Draft EIR.

This Draft EIR will be published and circulated for review and comment by the public and other interested parties, agencies, and organizations for a 45-day review period. Following the public review, a Final EIR (FEIR) will be prepared that includes responses to comments received during the public review period. The Final EIR will then be presented to the City Planning Commission and County Board of Supervisors. The Board of Supervisors must ultimately certify that it has reviewed and considered the information in the EIR and that the EIR has been completed in conformity with the requirements of CEQA.

1.3 REPORT ORGANIZATION

Each topical section in this EIR presents information in three parts. The Environmental Setting sections provide a general overview of the conditions on and adjacent to the project site. Local, State, and federal regulations area also identified and discussed, when relevant.

A Relevant Project Characteristics section provides a description of the elements of the project that are relevant to the impact analysis for a particular topic. Relevant project information may relate to the size, characteristics, and/or location of facilities and other plan elements, such as landscaping and design guidelines. Project elements that may cause impacts, as well as those that may serve to minimize impacts, will be identified.

The Environmental Impacts and Mitigation Measures section provides a brief description of standards used to evaluate whether an impact is considered significant based on standards identified in the California Environmental Quality Act (CEQA), State CEQA Guidelines, agency policy or regulations and/or professional judgement to further define what actions may cause significant effects. Significant impacts are identified and analyzed. Mitigation measures that would reduce significant impacts are identified. The significance of the impact after mitigation is also identified. For impacts found to be less-than-significant, mitigation measures are not required, but where relevant, the EIR may recommend project modifications or Conditions of Approval to assure that impacts remain less-than-significant.

1.4 PREVIOUS EIR ANALYSES

The Monterra Ranch EIR was certified by the Monterey County Board of Supervisors in October 1987. The proposed project reduces the number of approved residential lots, and will result in a reconfiguration of lot patterns with the addition of a golf course and other limited recreational components. The County has determined that preparation of an EIR is required. The EIR will update and/or revise the analysis which was prepared in the Monterra Ranch EIR based on the newly proposed site plan.

Portions of the proposed project utilize infrastructure/services that have been previously analyzed. This includes wastewater treatment facilities proposed as part of the adjacent approved Cañada Woods subdivision which were evaluated in the *Final Environmental Impact Report for the Cañada Woods Subdivision Preliminary Project Review Map* (Denise Duffy & Associates, February 18, 1993). Water service is planned as part of the Cañada Woods Water Company. An environmental analysis was provided in the "Final Expanded Initial Study for the Amended Cañada Woods Subdivision" (Denise Duffy & Associates, February 14, 1995). These two environmental documents are hereby incorporated by reference in accordance with provisions of the California Environmental Quality Act and are available for review at the Monterey County Planning and Building Inspection Department, located at 240 Church Street, North Wing, Monterey County Court, Salinas, California between the hours of 8:30 AM and 4:30 PM, except between 12 and 1 PM on Tuesday and Thursday.

2.0 SUMMARY OF ENVIRONMENTAL IMPACTS

2.1 INTRODUCTION

This summary provides a brief description of the proposed project, known areas of concern, project alternatives, and all potentially significant impacts identified during the course of this environmental analysis. This summary is intended as an overview and should be used in conjunction with a thorough reading of the EIR. The text of this report, including figures, tables and appendices, serves as the basis for this summary.

State law requires that a public agency adopt a monitoring program to ensure that mitigation measures that have been required or incorporated into a project have been implemented. Monitoring actions and responsibilities will be included in the Final EIR.

2.2 SUMMARY OF PROPOSED PROJECT

The proposed Cañada Woods North Project application includes a combined development permit for a vesting tentative map to create 34 residential lots and 10 parcels for recreational and open space uses; a use permit to allow an 18-hole golf course and accessory uses including a clubhouse and 12 member suites; a use permit for equestrian and recreational uses; 5 employee housing units; and a use permit for a waiver for development on slopes exceeding 30%. The project also includes inclu[illegible]in two proposed County service areas. See Section 3.0 -- Project Description -- for f[illegible]

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2.3 AREAS OF CONCERN

Monterey County, as the Lead Agency, has identified areas of concern based on the Initial Study and Notice of Preparation (see Appendix A). Responses to the Notice of Preparation

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The residential lots are located within areas previously approved for development as part of the Monterra Ranch Subdivision approval. The project site includes 19 lots of record and 120 approved lots as part of the approved Monterra Ranch Subdivision. The Cañada Woods North developer will either extinguish or reconfigure a total of 112 lots (Lombardo, written communication, July 19, 1996). The remaining 27 lots in the existing Monterra approval would be located in the Phase 3 final map area of the existing Monterra Ranch Subdivision (Ibid.). The proposed lot reconfiguration would result in a net reduction of 78 lots, including reduction of the 19 existing lots to 5 lots.

2.3 AREAS OF CONCERN

Monterey County, as the Lead Agency, has identified areas of concern based on the Initial Study and Notice of Preparation (see Appendix A). Responses to the Notice of Preparation also are included in the Appendix A. Issues of expressed concern include: water supply, water quality, wastewater disposal, biotic resources, public services, and traffic.

2.4 SUMMARY OF ALTERNATIVES

CEQA Guidelines require that an EIR describe and evaluate alternatives to the project which could eliminate significant adverse project impacts or reduce them to a less-than-significant level. The following alternatives are evaluated in this EIR in Section 5.0 -- CEQA Considerations.

Alternative 1: No Project - Development Under Existing Approved Monterra Subdivision

The identification and analysis of this alternative is required by CEQA. Typically, the No Project alternative would result in no development of the site until such time as another development proposal is submitted in accordance with County General Plan and zoning designations and regulations. However, the project site currently has 19 legal lots of record and 120 additional approved lots for which a final map could be filed. If the proposed project is denied, development consistent with the existing approved Monterra Ranch Tentative Map would be reasonably expected to occur. As there is a legal entitlement for development on the site, the No Project Alternative would result in development of 139 residential lots, unless otherwise modified by Conditions of Approval, as discussed below. As indicated in the Project Description, 27 of the 139 lots are planned to be developed on the remainder of the Monterra site, resulting in a net development potential of 112 lots on the project site under the No Project Alternative.

Alternative 2: Modified Site Plan

Under this alternative, the proposed site plan would be modified with regards to siting of building envelopes, access and water service. It is assumed that physical distribution of building envelopes would be somewhat reduced in size and clustered in specific areas. For this alternative, a greater concentration of clustered units could be sited in the areas of Via Cinquenta (where the existing 19 lots are located) and in the area of Malpaso Place and Via Malpaso Way.

Access would be provided only from Olmsted Road. The adjacent Cañada de la Segunda Road would be available only for emergency fire protection purposes. Water supply would be provided from onsite wells rather than the adjacent Cañada Woods Water Company, although wastewater treatment would continue to be provided at the adjacent Cañada Woods treatment plant in order to provided reclaimed water for golf course irrigation.

Alternative 3: Residential Uses Only

Under this alternative, the project would be modified to include only residential lots with the accessory recreational and equestrian areas. The golf course and Clubhouse would be eliminated from this alternative. This alternative assumes development of approximately 44 residential lots of approximately the same size as those proposed which would be sited in the general golf course area. Access, water service and wastewater treatment would be the same as with the proposed project. The equestrian and other onsite recreational facilities also would be retained. This alternative would not meet the project objectives of development of a golf course.

2.5 SUMMARY OF IMPACTS AND MITIGATION MEASURES

All impacts identified during the course of this environmental analysis are summarized in this section. This summary groups impacts of similar ranking together, beginning with significant unavoidable impacts, followed by significant impacts that can be mitigated, followed by impacts not found to be significant.

Significant Unavoidable Impacts

The EIR did not identify any significant and unavoidable project impacts.

Significant Impacts

The following impacts have been identified as being significant which can be mitigated to a less-than-significant level with implementation of recommended mitigation measures.

Geology and Soils

Impact #1: Future residents may be subject to seismic hazards relating primarily to groundshaking from a large magnitude earthquake along regional and vicinity faults, as well as potential onsite fault rupture, which could result in damage to project facilities and potential injuries.

Mitigation

1-1 Observe setbacks from active or potentially active faults as stipulated in the project geologic report and addendum letter by Terratech (1996a; 1996b). Design underground utilities that cross the mapped traces of active or potentially active faults to be fitted with flexible couplings and shut-off valves; this would provide an additional margin of safety in the unlikely event of surface rupture.

1-2 Follow recommended ground crack hazard evaluation protocol for lots 1-3, 7-16, 19-22, 29-33 (Terratech 1996a; 1996b). This evaluation should include trenching of the building area to identify areas where soil filled fissures have occurred in the past. If such fissures are found, the building should be relocated to an area free of fissures, or it should be designed to accommodate movement on the fissures without significant damage. Trenches should be excavated perpendicular to prevailing structural trends or the prevailing trends of topographic lineaments.

1-3 Design structures in accordance with recommendations of site-specific soils report with regard to foundation design and seismic design parameters.

Impact #2: Construction in areas of potentially unstable slopes, known landslides or steep slopes could result in slope instability and/or structural damage. This is considered a significant impact.

Mitigation

2-1 Set back all habitable structures 25 feet or more from slopes exceeding 50% gradient unless a site-specific geotechnical evaluation proves otherwise.

2-2 Review all proposed building sites along the southern property boundary for exposure to debris flow hazard at the time of development. At a minimum, all building envelopes in this area should conform to recommendations contained in the Rogers Johnson and Associates debris flow hazard evaluation for the area (Johnson and Associates, 1990a), unless site specific investigations refute the findings of the previous reports. These recommendations include avoiding areas of identified debris flow hazard or construction of debris flow protection structures.

2-3 Require further evaluation of landslide stability in the area of the Equestrian center and Employee Housing, if this area is considered for development of habitable structures or if it will be used for sole access to any proposed residences or facilities. If found to be active or potentially active, implement measures to stabilize the landslide or relocate or eliminate proposed structures.

2-4 Construct structures located within old landslide deposits at or very near the natural grade to reduce cut slopes. Limited cut slopes can be created for access roadways, and should be constructed at slopes no greater than 2:1 and should not exceed heights of 15 feet.

2-5 Implement all recommendations set forth in the 1996 Terratech geotechnical report, including construction of cut and fill slopes, control cut and fill earthwork that may destabilize portions of the landslide, and minimize surface water infiltration into the landslide deposit.

Impact #3: Expansive soils could damage building foundations and/or roadways. This is considered a potentially significant impact.

Mitigation

3-1 Remove expansive soils from areas where buildings, slabs-on-grade, and pavements are to be constructed and/or construct foundations in accordance with recommendations of lot specific soils report.

Impact #4: Project grading associated with the golf course construction could result in an increase in erosion if not property controlled.

Mitigation

4-1 Revise and implement proposed Erosion Control Plan to include identification of the specific types and locations of areas of disturbance, erosion control measures to be utilized, including silt fencing and temporary diversion structures to protect drainages, sediment detention basins, and revegetation specifications, as well as, a schedule for completion of grading activities and implementation of site stabilization component. Stabilize all cut and fill slopes as soon as possible with native vegetation cover, temporary vegetation, seeding, mulching, or other approved landscaping.

4-2 Prohibit golf course grading during the winter rainy season unless specifically permitted by the Monterey County Planning and Building Department, and implement erosion control on exposed slopes prior to the onset of the rainy season by mulching and/or other effective means of soil protection.

4-3 Require inspection and maintenance as needed, on a regular basis to assure their continued effectiveness. These drainage structures should be cleared of debris and sediment whenever substantial accumulation is noted. Typically, inspection and maintenance would occur in late September, prior to the on-set of fall rains, after the first two rainfall-runoff events of the year, and after every large storm event.

Hydrology and Water Quality

Impact #6: Project development could result in a degradation of stormwater runoff quality as a result of the introduction of fertilizers, pesticides, and contaminants associated with motor vehicles (such as gasoline, oil, grease, lead, rubber, etc.) without proper management.

Mitigation

6-1 Implement Best Management Practices (BMPs) identified in the Questa Engineering *Environmental Management Plan for the Cañada Woods North Golf Course* (July 8, 1996) to control non-point source water pollution. Measures included, but are not limited to:

- Create vegetated buffers to provide a catchment area for settling, filtering and uptake of fertilizer or pesticide residue that may be carried from the turf area by runoff;
- Use drainage swales to convey and disperse runoff from parking lots and other paved surfaces, to attenuate the runoff and allow for maximum pollutant absorption in the soil;
- Utilize subsurface drains beneath tees, greens and sand traps to disperse percolate to the vegetated buffer areas for filtering and absorption of any nitrate or pesticide residue;
- Select areas along the seasonal drainages through the golf course for enhancement through native plantings and irrigation to provide uptake and removal of nitrate in the shallow groundwater zone;
- Utilize fertilizer control measures to minimize the transport of fertilizers from the golf course into local drainages and downstream receiving waters, as well as to minimize nitrate additions to groundwater; and
- Utilize pesticide control measures to minimize the use and potential release of pesticides into surface water or groundwater, including the incorporation of integrated pest management (IPM), which is an ecologically-based pest management strategy that provides long-term prevention or suppression of pest problems with minimum impact on human health, the environment and nontarget organisms;
- Install oil and grease/silt traps at the parking lots and maintenance yard to intercept and contain oily residue and debris washed from vehicle areas before dispersal to the grass swales;
- Install a wastewater collection, treatment and recycle system at the maintenance area to collect and remove pollutants from the washdown of mowers and other equipment; the system would recycle the washwater for continual use;
- Avoid excessive irrigation and soil moisture by use of a sophisticated irrigation control system and on-site weather station to achieve high application efficiencies. This would reduce potential leaching to the subsoil and deep aquifer, as well as reduce potential surface runoff from irrigation application.

6-2 Implement program for maintenance activities to include provision that all paved roads and parking areas are mechanically swept at least once per year, prior to the start of the rainy season; catch basins should also be cleaned periodically, as planned.

6-3 Conduct periodic monitoring of surface water and groundwater for possible effects of the golf course operations with regard to nitrate, salinity, and pesticides.

Wastewater Treatment

Impact #10: The proposed project would result in the generation of increased wastewater flows that can be accommodated by the proposed wastewater collection, treatment, and disposal facilities of wastewater. However, some adverse impacts to public health or safety could result if facilities are not properly maintained.

Mitigation

10-1 Design, construct and operate the proposed wastewater collection, treatment, and disposal facilities in accordance with all applicable state and county requirements, as planned, including but not limited to:

- For individual residences, a minimum 1,500 gallon septic tank should be installed to provide primary treatment, with tank sizes increasing by 500 gallons for each additional bedroom over and above three;
- Nitrate-nitrogen limit of 6 mg/l shall be required for the tertiary effluent;
- Short-term storage requirement of 300,000 gallons of raw wastewater shall be provided in strategically-located tanks within the collection system, with appropriate pumping and odor control facilities;
- Long-term, wet-weather storage requirements of 120 days of average flow, plus incident rainfall (approximately 45 AF total) shall be provided in lined storage ponds;
- Setback requirements from areas where reclaimed water is being spray irrigated include 25 feet from property lines and 100 feet from streams and wells (no streams exist in the project vicinity);

10-2 Prohibit discharge of toxic substances or of substances into the wastewater system that would adversely affect the collection, treatment or disposal of the wastewater.

10-3 Operate the reclaimed water storage reservoir(s) to ensure the protection of public health and the environment, including implementation of the following measures:

- plant vegetation around the perimeter of the pond to act as a visual barrier and to limit public access;
- control algae by a combination of aeration, addition of non-toxic chemicals, and promotion of duck weed.

Biotic Resources

Impact #11: Construction of site improvements and ultimate development of homes will result in an incremental loss of and disruption to onsite coastal prairie grassland habitat, an identified sensitive habitat.

Implementation of Mitigation Measures 11-1 through 11-4 will reduce impact to a less-than-significant level, provided that the long-term restoration plan can be successfully implemented.

11-1 Modify building envelopes to reduce development in native grasslands to avoid and/or minimize loss of native grasslands on proposed lots.

11-2 Develop and implement a grassland enhancement program that consists of measures to reestablish native grasses, including native grassland restoration at a 3:1 ratio. The program shall outline details pertaining to onsite and off-site restoration areas, plant salvage, seeding and planting specifications, maintenance, monitoring, and performance criteria reporting. Require restored grasslands to maintained and managed as open space in perpetuity. Conduct appropriately timed surveys to better document the extent of native grasslands to better refine habitat loss and restoration areas.

11-3 Develop and implement a native grassland enhancement and management program for all remaining native grasslands and chaparral invaded grasslands. The program shall be specific regarding timing and frequency of mowing, burning and enhancement by seeding and planting activities, including measurement criteria related to percent cover, diversity and exotic plant removal. Maintain preserved and restored native prairie grasslands by mowing in early spring and later in the year prior to seed establishment to control undesirable introduced non-native species.

11-4 Develop and implement exotic plant control program targeting the annual control and reduction of exotic species on onsite grasslands.

Impact #12: Project development will result in conversion of limited areas of Monterey pine forest and oak woodland habitat and individual trees, which is not considered significant on a regional basis, but indirect impacts could degrade remaining habitat areas.

Mitigation

12-1 Require tree removal permits and tree replacement for removal of any oaks that may occur as part of future lot construction, pursuant to County regulations.

Require oak pine tree replacement on a 2-to-1 ratio, as recommended in the project *Forest Management Plan.*

12-2 Implement Best Management Practices for removal of Monterey pines, consistent with practices recommended by the Pitch Canker Task Force, in effect at the time of removal, and with consideration of the extent of infestation in the area. If replanting is recommended, require use of Monterey pines grown from seed collected in locations bordering the tree clusters from which the trees were removed, in accordance with the Guidelines.

12-3 Require preparation of forest management plans for proposed golf course guest suites, Lots 7, 8, 10, 14, 20, 21 and 33 where tree cover is extensive, in accordance with County regulations prior to issuance of building permits.

12-4 Require protection of oak and Monterey pine trees located outside designated development envelopes, unless proven to be diseased or unhealthy as determined by a qualified arborist.

12-5 Prohibit vegetation removal or alteration outside the building envelope, unless trees are removed in accordance with County regulations and issuance of tree removal permits as may be required. Prohibit introduction of nonnative invasive plant species within any portion of proposed lots (such as acacia, French or Scotch broom, pampas grass), and prohibit introduction of any nonnative species outside the development envelope.

12-6 Limit use of fencing to immediate building areas within designated development envelopes, but prohibit fencing of parcel boundaries in order to maintain areas for wildlife movement.

Impact #13: Ultimate building construction and golf course development may result in loss of special status plant species (i.e., *Allium hickmanii, Trifolium buckwestiorum*).

Mitigation

13-1 Conduct a plant survey during flowering season, in accordance with California Department of Fish and Game survey guidelines, to ascertain presence or absence of special status species within proposed development areas. If any are found, modify and/or relocate building envelopes to avoid the plants and provide a buffer to protect plants from indirect impacts. Avoid plants potentially found on the golf course by redesign and/or configuration. If golf course cannot be redesigned, prepare and implement a plant mitigation plan approved by the California

Department of Fish and Game that outlines a mitigation strategy of salvage, transplanting, and/or compensation.

13-2 Provide exclusionary fencing around the known occurrence of Carmel Valley bush mallow and design the roadway to avoid take of the population.

Impact #14: Site preparation and future home construction may damage undisturbed oak trees due to potential soil disturbance and compaction from construction activities, including grading and filling, as well as introduction of landscaping and irrigation as part of future home construction.

Mitigation

14-1 Prohibit grading, filling and all subdivision construction activity within the dripline of oak trees, where possible. Each tree or group of trees in the construction area designated to remain shall be protected by an enclosure (five foot fence), prior to the beginning of construction. The location of the fence is normally at the dripline of the tree.

14-2 Wherever possible, future homes should be sited outside of the dripline of any oak. Project CC&Rs shall include measures for protection of oak trees on individual lots as part of future home construction, as well as guidelines for appropriate landscaping management to protect remaining oaks. Generally, irrigation should be prohibited within an area 1/3 larger than the dripline of oak trees.

Impact #15: Project construction and operations could result in degradation of breeding areas and disruption of upland habitat for the California tiger salamander.

Mitigation

15-1 Restrict runoff entering each pond to maintain existing hydrology to prevent additional runoff from development including the golf course and housing sites to enter these areas. Increased erosion and subsequent siltation of the ponds should be avoided by maintaining existing vegetation in each pond's watershed. Irrigation from the golf course should not be allowed to enter the ponds.

15-2 Prohibit use of pesticides, herbicides and fertilizers in the upland habitat surrounding each pond and in other designated habitat areas.

15-3 Prohibit human activities such as dumping, introduction of fish, crayfish, and bullfrog and capture of salamanders.

15-4 Monitor breeding ponds on an annual basis to aid in determining continued presence and viability of the population. Ponds should be seined for presence of larva and adult salamanders as well as potential predators. Environmental conditions such as temperature, turbidity, oxygen concentration and sedimentation should be tested.

15-5 Prohibit construction activities within 150 feet of each pond.

15-6 Provide appropriate signs on ponds to explain the life cycle of native amphibians, the threats posed by bullfrogs and exotic fish, and an explanation of why the ponds are dry for a time during the dry season. Inform Cañada Woods North homeowners each year at the start of the rainy season via mailers and notices, that bullfrogs and fish are a threat to native amphibians. Enlist their help in preventing releases of non-native amphibians and fish in any streams or ponds on project site.

15-7 Protect upland habitat within 1/4 mile of each potential or known breeding pond with an emphasis on removing impacts within the immediate vicinity of each pond. Reduce all development in grassland habitat within 1/4 mile of all ponds to less than 20% and development in all other habitat within 1/4 mile to less than 25%, including but not limited to the following measures:

- Reduce the size of Fairway 16 by 50% and maintain a 150-foot buffer or undisturbed coastal prairie grassland between the fairway and Pond 2.

- Minimize building envelopes in native grassland areas.

- Site development as far away from ponds as possible (i.e. 500+ feet).

- Relocate Malpaso Road in the area of Fairway 16 to the north and away from Pond 1.

15-8 Maintain all undeveloped habitat in its current natural condition and manage grassland habitat to ensure the continued presence of small mammal burrows that would provide cover for California tiger salamanders. All grassland habitat should be mowed to mimic grazing and promote the presence of ground squirrels, gophers and other burrowing mammals. Prohibit use of pesticides or other measures to control small mammal populations in open space areas.

15-9 Restrict construction grading between December through February within 1/2 mile of each pond. Restrict construction grading and other ground disturbing activities within 1/4 miles of each pond to the spring season prior to the time that salamanders exist breeding ponds. Minimize areas of construction disturbance, such as staging areas, off-road access and grading soil overflow within the area to reduce impacts to non-developed upland habitat.

15-10 Prohibit off-road vehicles within the designated upland habitat areas.

15-11 Construct tiger salamander barriers on all roads within 3/4 miles of breeding ponds to prevent salamanders crossing roads. Construct tunnels with drift fences to safely funnel tiger salamanders beneath roads. These tunnels should be equipped with grill covers and placed every 300 feet.

15-12 Design all internal project roads within designated migration corridors with rounded curbs to prevent salamanders from becoming trapped on roads if they should circumvent the salamander barriers.

15-13 Design all golf course fairways to not impede salamander migration. Edges between turf and native habitat should be gently sloped and no barriers should in placed that would interfere with salamander movements.

15-14 Mortality of migrating salamanders crossing roads should be evaluated after the initiation of the rainy season. This monitoring will indicate location of upland habitat, patterns of movement of California tiger salamanders, and the effectiveness of the salamander barriers. Migration tunnels should monitored and maintained to allow for unobstructed passage.

15-15 Construct additional pond(s) in the vicinity of each of the known breeding ponds, based on results of site specific surveys that determine presence or absence of salamanders in existing onsite ponds, to enhance the breeding potential of the tiger salamander population and safeguard against human induced or natural events that would extirpate the population from the project site. Each pond will mimic the characteristics of the most suitable breeding ponds that currently exist on the site. Special attention should be given to hydrological conditions and compliance with other mitigation measures for existing ponds. Introduction of California tiger salamanders will be accomplished by transport of individuals from existing onsite ponds and will follow CDFG guidelines.

Aesthetics

Impact #16: Project development will result in some alteration of the Highway 68 and 218 viewshed due to construction of several homesites and one member suite on the frontal slopes of the site. However, the project, with mitigation, will not result in ridgeline development, and residential units and suites constructed on slopes will be of limited visibility.

Mitigation

16-1 Establish building envelopes on proposed Lots 12, 30, 31, 32 and one of the member suites in order to define the building area that results in minimal grading and protects the public viewshed by avoiding ridgeline development and preserving existing screening vegetation.

16-2 Require use of nonreflective materials, subdued colors, and lighting that does not create off-site glare from construction of buildings.

Traffic and Circulation

Impact #18: When considering the proposed project with planned and/or approved development in the area, the project will contribute to cumulative traffic increases that will result in a decrease in level of service to unacceptable levels at the Highway 68/Highway 218, Highway 68/York Road and Highway 1/Carmel Valley Road intersections.

Mitigation

18-1 Prohibit project access to the Monterra Subdivision - Highway 218 entrance.

18-2 Require payment of pro-rata Highway 68 impact fees in accordance with County requirements.

Air Quality

Impact #19: Construction of the proposed facilities will result in a short-term, localized decrease in air quality due to dust generated during site preparation and construction.

Mitigation

19-1 Require implementation of "Best Management" construction practices that include the following measures:

- Water all active construction areas at least twice daily and more frequently during periods of high winds; prohibit grading during periods of high wind (over 15 miles per hour).
- Cover stockpiles of debris, soil and other materials which can become windblown.
- Initiate revegetation and erosion control immediately upon completion of grading and prior to the winter season.

Less-Than-Significant Impacts

The following impacts were found to be less-than-significant. Mitigation measures are not required, but in some instances recommendations are included.

Hydrology and Water Quality

Impact #5: Project development would result in an increase in the rate and amount of surface runoff as a result of an increase in impervious surfaces, but would not exceed storm facility capacities with proper sizing, as planned.

Mitigation

None required.

Impact #7: The proposed project would result in a decreased nitrate loading to the groundwater. This is considered a less-than-significant impact.

Mitigation

None required, because the proposed action would reduce the existing nitrate loading, and would be well within established nitrate loading criteria. However, it is recommended that regular collection and disposal of horse manure be considered to reduce the nitrate loading from the pastured horses.

Impact #8: Use of reclaimed wastewater for golf course irrigation could contribute to buildout of salts, but would not create water quality or vegetation impacts with the level of treatment and salt tolerant turfgrasses proposed for use on the golf course.

Mitigation

None required, but the following is recommended.

8-1 Restrict water softening units to those which utilize offsite regeneration technology.

Water Supply

Impact #9: The proposed project would result in an increase in potable and irrigation water demand, which can met with existing approved water sources and onsite wells without exceeding planned system capacities or significantly affecting groundwater supplies.

Mitigation

Implementation of Mitigation Measures 9-1 and 9-2 will insure that impacts remains at a less-than-significant level.

9-1 Drill and install additional wells on the Canada Woods North site to alleviate the short-term impacts both on and offsite during project start-up due to the fact that bedrock groundwater demand will initially be a significant percentage of annual recharge with declining demand following buildout. Consider reducing start-up year pumping by pumping groundwater during low demand months (i.e. winter) prior to completion of the golf course for storage in the reclaimed water reservoir which would help alleviate drawdown around bedrock wells during summer months during start-up.

9-2 Utilize well pumping with less reliance on the Water Tower and Parcel N wells.

Traffic and Circulation

Impact #17: The proposed project will result in 57 AM peak hour trips and 75 PM peak hour trips, but this project traffic would not cause any study intersection to drop to unacceptable levels.

Mitigation

None required.

Public Services

Impact #20: Buildout of the project would incrementally increase the need for fire protection services, but not to the extent that additional equipment or staff would be required.

Mitigation

None required.

Impact #21: Buildout of the project area would increase the potential for urban/wildland fires resulting from buildings located in a residential area, which can be minimized with appropriate building designs and compliance with Fire District design requirements.

Mitigation

None required.

Impact #22: The proposed project would create the need for 0.306 acres of parkland.

Mitigation

None required.

Impact #23: The proposed project will result in an incremental increased demand for police protection services, but will not require additional equipment or staff.

Mitigation

None required.

Impact #24: Development of the proposed Cañada Woods North project would increase the number of students attending schools in the Monterey Peninsula Unified School District.

Mitigation

None required.

3.0 PROJECT DESCRIPTION

3.1 PROJECT LOCATION

The project site (portion of Assessor's Parcel Number 259-091-014 and 259-111-001 through 259-111-019) is located in the unincorporated area of Monterey County east of the City of Monterey (See Figure 1). The site consists of an approximately 1,060 acre portion of the approved Monterra Ranch Subdivision which is located south of Highway 68 between Highway 218 and York Road as shown on Figure 1. The project site consists of that portion of the approved Monterra Ranch Subdivision which lies primarily within the Carmel Valley watershed. The site is located north of and adjacent to the approved Cañada Woods subdivision, located north of Carmel Valley Road. Adjacent uses include Jack's Peak Park and undeveloped property to the west, the remainder of the Monterra subdivision to the north, and undeveloped property to the east.

The project site is located in the northernmost mountains of the Santa Lucia Range which extends approximately 140 miles south from Monterey Bay. The site consists primarily of open, gently rolling grasslands with occasional wooded areas consisting of primarily oak and Monterey pine trees. The Monterra Ranch property, including the Cañada Woods North site, has historically been used for grazing.

Several existing dirt roads traverse the site, including a dirt road that provides access through the site and connects from Highway 68 to the undeveloped Cañada de la Segunda Road which connects to Carmel Valley Road. The site is undeveloped, and is currently used for grazing of approximately 150 cattle. The California American Water Company (Cal-Am) has access easements on the site and water line facilities, including a water transmission line from Carmel Valley Road to Highway 68.

3.2 PROJECT HISTORY

As indicated above, the proposed project site is located within the approved Monterra Ranch subdivision and is located north of the approved Cañada Woods subdivision, as shown on Figure 1. An overview of these projects is provided below.

Monterra Ranch

A tentative subdivision map for Monterra Ranch was approved by the Monterey County Board of Supervisors in October 1987. The approval included subdivision of approximately 2,911 acres into 283 lots ranging in size from 2 to 60 acres to be developed in three phases; a 47-acre parcel for development of a 42-unit inclusionary housing planned unit development; recreational and equestrian uses; and dedication of 115 acres of land contiguous to Jack's Peak County Park. A final map has been recorded for 83 lots in Phase 1. In 1992, the Board approved relocation of the inclusionary units to the western portion of the site and creation of three new lots in exchange for deletion of three market rate lots. The existing approved lots on Monterra Ranch are shown on Figure 2.

A lot line adjustment application has been approved which would adjust the boundaries between approved Ranch Lot 2, Lot 74, and the remainder lot on Monterra in order to create the proposed project site as shown on Figure 3, and complete the applicant's purchase of the property. The project site consists of 19 legal lots of record from the Monterra Ranch Phase I final maps (Lots 68 through 86) and a 1,000±-acre portion of the remainder parcel.

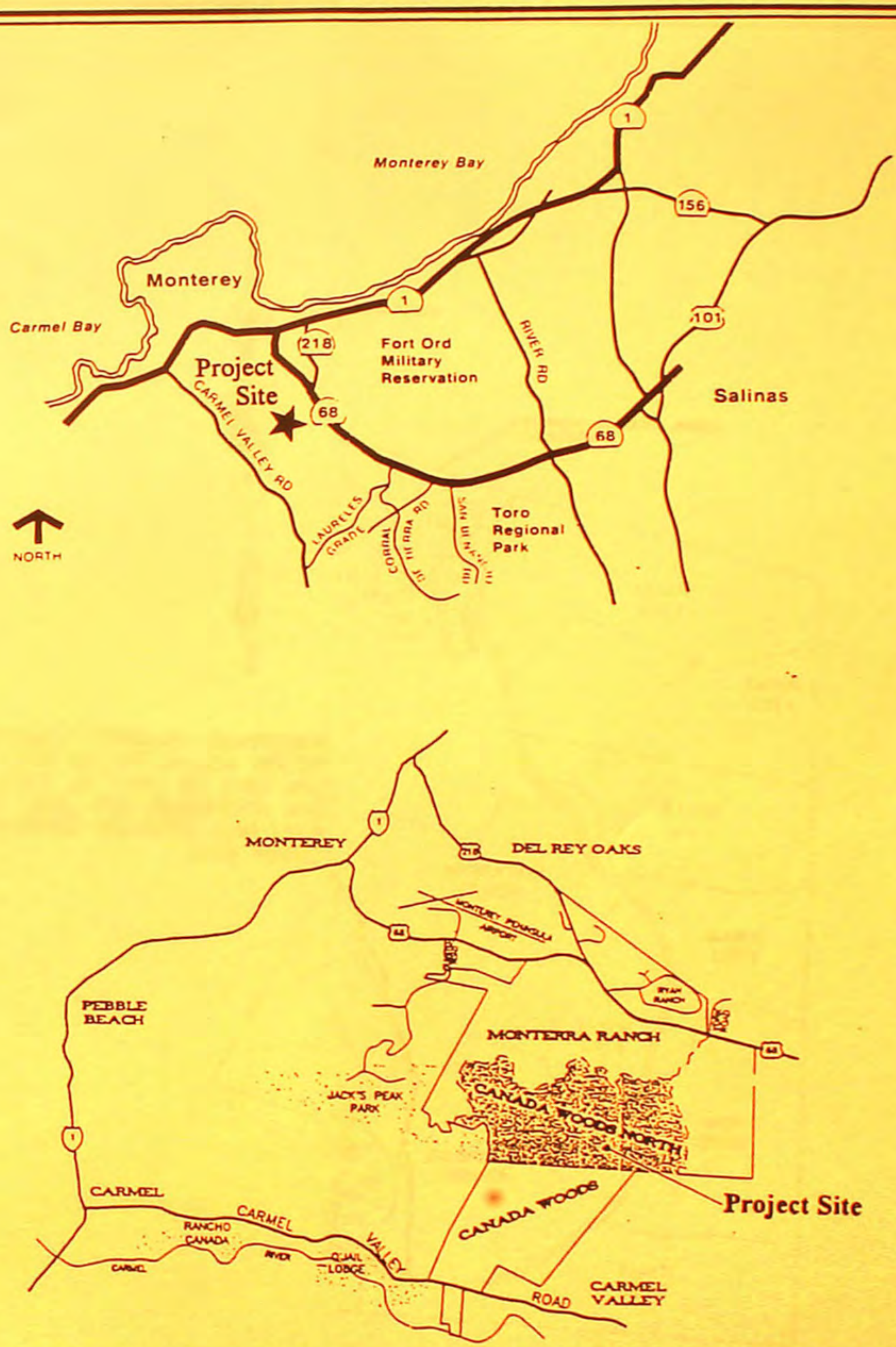
Cañada Woods

A tentative subdivision map for the Cañada Woods project was approved by the Monterey County Board of Supervisors in August 1995. (This includes the original Cañada Woods application in combination with 10 lots on the Cañada Woods East site.) The approval includes 54 residential lots north of Carmel Valley Road which range in size from 3 to 26 acres; 4 commercial lots, totaling 10 acres, south of Carmel Valley Road; 15 employee housing units; and approximately 40 acres of agricultural preserve and drainage easements.

The Cañada Woods project also included formation of a County Service Area for provision of drainage and wastewater services, including maintenance and operation of an onsite tertiary wastewater treatment plant. The project will be provided water service via creation of mutual water company or public utility, in accordance with amended County conditions of approval and state requirements.

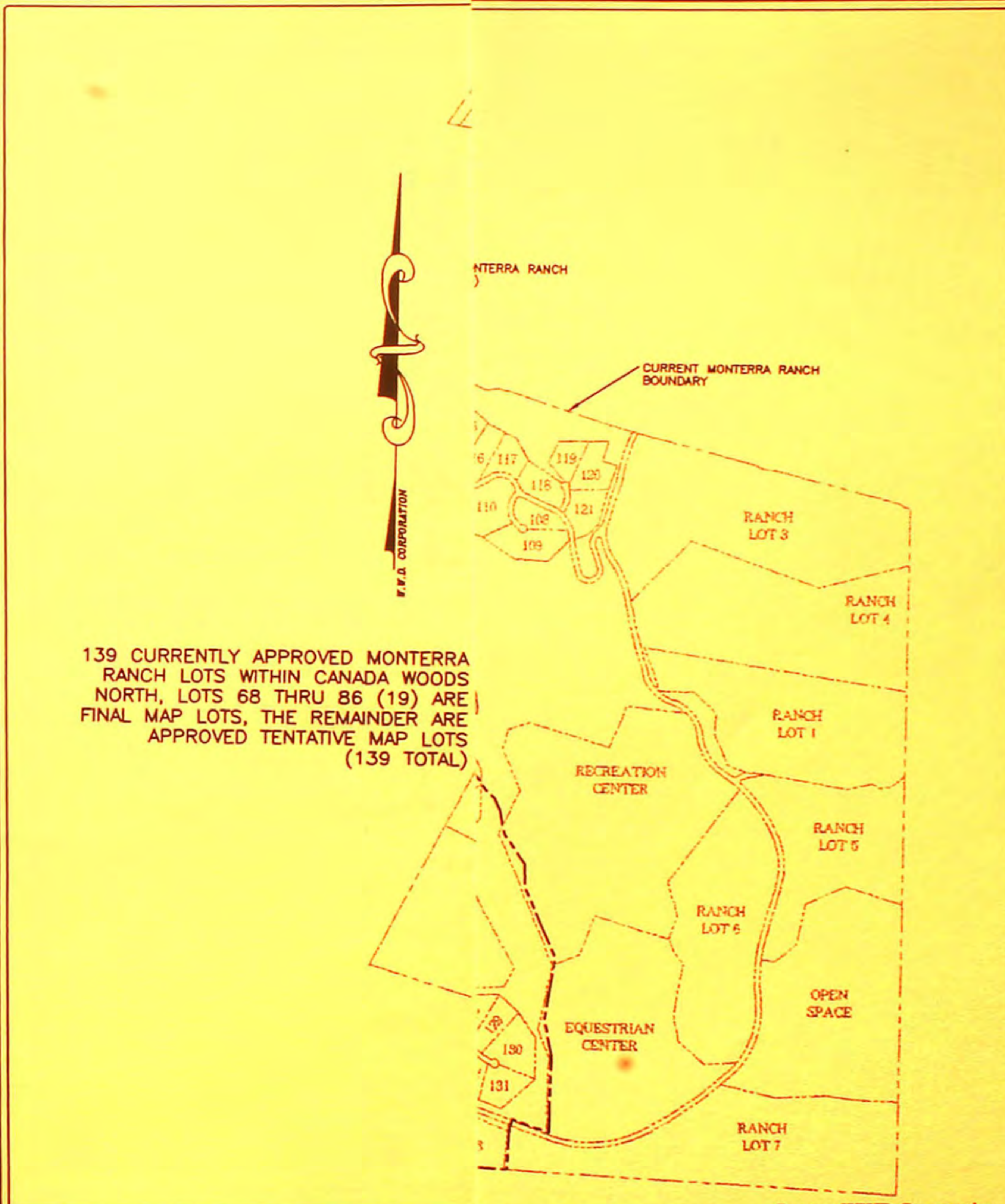
3.3 PROJECT DESCRIPTION

The proposed Cañada Woods North Project application includes a combined development permit for a vesting tentative map to create 34 residential lots; 10 parcels for recreational and open space uses; a use permit to allow a golf course and accessory uses including a clubhouse and 12 member suites; a use permit for equestrian and recreational uses; 5 employee housing units; and a use permit for a waiver for development on slopes exceeding 30%. The project also includes inclusion in two proposed County service areas as described further below. Project elements are described below.



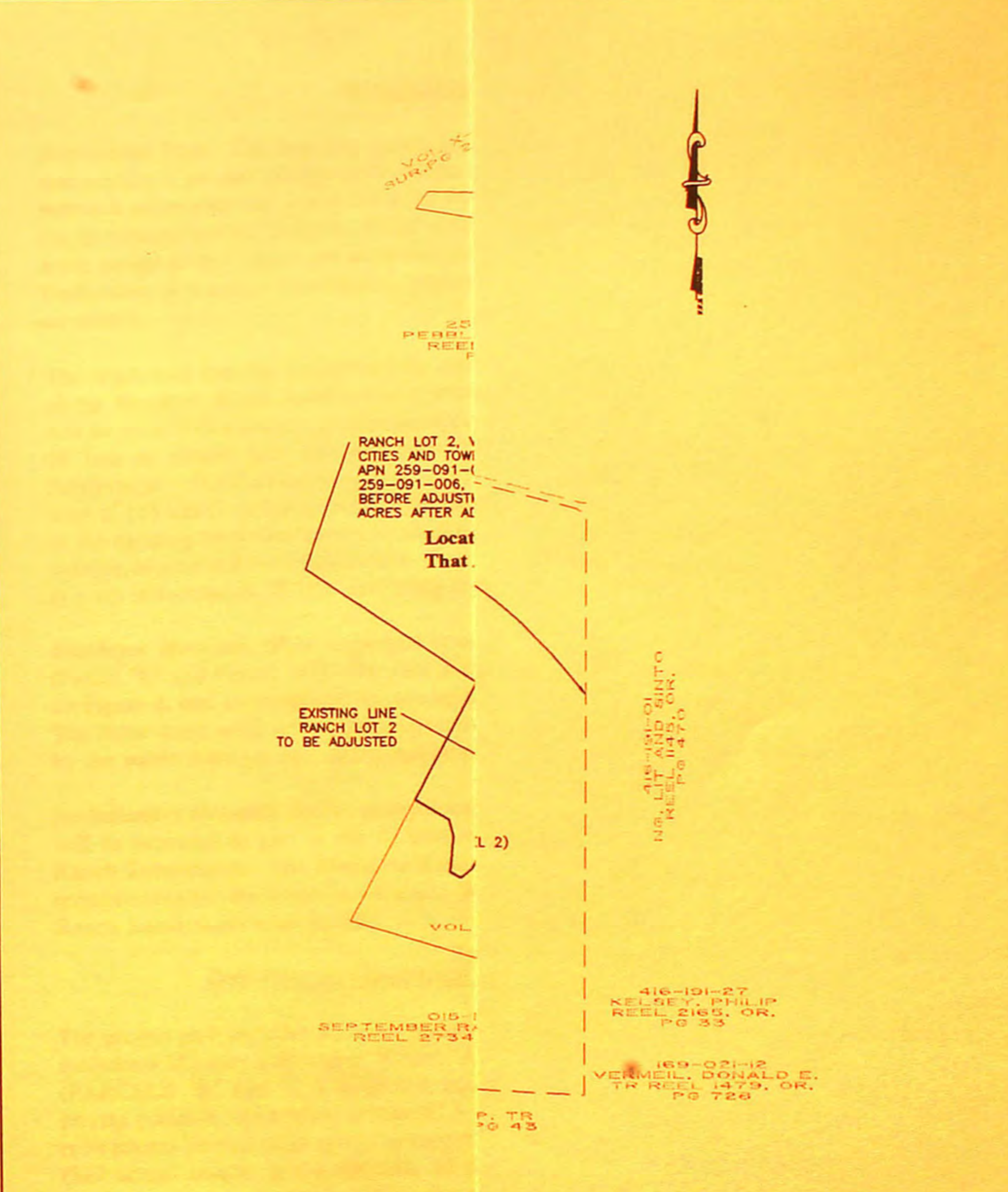
Project Location

Figure
1



Source: WWD Corporation

Figure 2



Source: WWD Corporation

Figure
3

Residential Development

Residential Lots. The tentative subdivision map proposes creation of 34 residential lots surrounding a private 18-hole golf course, as shown on Figure 4. Proposed lot sizes range between approximately 3 and 30 acres with a development envelope designated on each lot, as summarized on Table 1. All development will be restricted to the building envelope areas except access driveways and underground utilities between the road and the envelope. Dedication of a scenic easement is proposed over all residential lots, except the building envelopes.

The residential lots are located within areas previously approved for development as part of the Monterra Ranch subdivision approval, except for 4 lots (Lots 9, 13, 20, 34) which will be located in areas not previously approved for development. The project site includes 19 lots of record and 120 approved lots as part of the approved Monterra Ranch Subdivision. The Cañada Woods North developer will either extinguish or reconfigure a total of 112 lots (Lombardo, written communication, July 19, 1996). The remaining 27 lots in the existing Monterra approval would be located in the Phase 3 final map area of the existing Monterra Ranch Subdivision (Ibid.). The proposed lot reconfiguration would result in a net reduction of 78 lots, including reduction of the 19 existing lots to 5 lots.

Employee Housing. Five employee housing units are proposed on two 1.2-acre parcels (Parcel "E" and Parcel "F"). Two units are located adjacent to the 3rd fairway, as shown on Figure 4, and are proposed for use by the greenskeeper and other golf course personnel. The other three units are located adjacent to the equestrian facility and may be occupied by the stable manager and additional employees of the golf course or recreation facilities.

Inclusionary Housing. Inclusionary housing in accordance with the County's requirements will be provided as part of the 42 units that have been approved as part of the Monterra Ranch Subdivision. The Monterra Ranch inclusionary housing development exceeds the requirements for the combined Cañada Woods North project and the remaining Monterra Ranch Subdivision entitlements.

Golf Course, Equestrian Center, and Open Space Uses

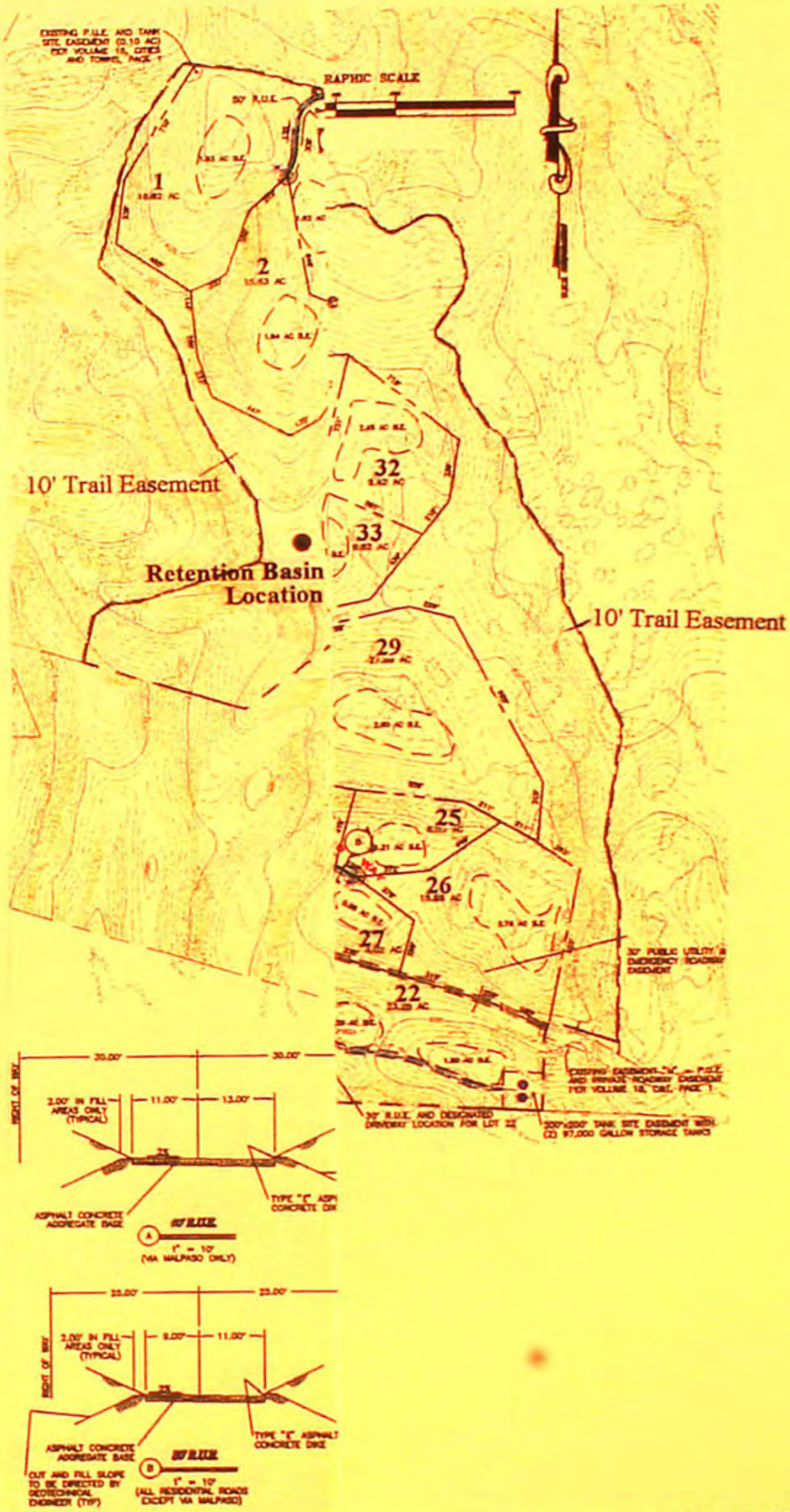
The project plan includes eight recreational parcels, totaling approximately 650 acres. This includes a 183-acre golf course (Parcel "A"), approximately 7 acres of recreational facilities (PARCELS "B" and "C"), a 68-acre equestrian center (PARCEL "D") and 390 acres of private common open space (PARCELS "G", "H", "I", "J"). Planned open space on these recreational parcels (630 acres) in combination with private open space on residential lots (327 acres) results in the majority of the site (90%) being maintained in open space. Scenic easements are proposed on the planned Open Space Parcels G through J and in areas outside building envelopes on the residential lots. The common open space area will be owned and maintained by a Homeowners Association under provisions of the project

Covenants, Conditions, and Restrictions (CC&Rs). Private open space owned by individual lot owners will be maintained by the lot owners with enforcement of applicable CC&Rs by the Homeowners Association.

TABLE 1
PROPOSED LOT SIZES

LOT	Lot Size	Building Envelope Size	LOT	Lot Size	Building Envelope Size
1	16.82	1.93	18	14.82	1.49
2	15.63	1.94	19	12.53	1.98
3	12.78	1.62	20	25.29	4.8*
4	8.73	1.92	21	30.82	5.88
5	8.20	1.67	22	23.38	2.78
6	7.82	2.32	23	6.45	1.65
7	8.35	1.50	24	4.06	1.33
8	5.59	1.86	25	6.03	1.21
9	15.97	3.7*	26	15.88	2.76
10	7.21	1.7	27	4.02	0.98
11	3.34	0.77	28	3.72	1.13
12	5.56	0.75	29	27.88	2.90
13	5.53	1.66	30	15.17	6.19
14	10.18	1.11	31	7.29	2.44
15	24.94	3.8*	32	9.42	2.45
16	16.07	1.98*	33	8.62	2.10
17	11.36	1.45	34	9.64	1.28
			TOTAL	**409**	**75.03**

All sizes in acreages
* Includes more than 1 identified building envelope



Source: WWD Corporation

Figure 4

Proposed private recreational uses include a golf course with Clubhouse and guest suites and an equestrian and recreational facilities. A hiking trail was previously approved as part of the Monterra Subdivision. The Cañada Woods North project proposes to realign and construct this trail around the perimeter of the project site, as shown on Figure 4. The location would extend from the southwestern portion of the site adjacent to Jack's Peak Park to the southeastern portion of the site which would connect to planned trails east of the project site. The trail is planned as 6-feet wide within a 10-foot easement.

Golf Course. The proposed 18-hole golf course is located on approximately 183 acres in the central portion of the site in an area previously approved for residential lots. The golf course has been designed to take advantage of existing topography so that grading is minimized; hilly terrain is used to accentuate play and a links style course has been designed that fits the undulating topography (Questa Engineering, 1996a).

The facility is proposed as a private club with a maximum of 300 members. According to information provided by the applicant, it is anticipated that approximately 40% of the membership will be local, of which 25% (or 10% of the total) are likely to be residents of the project site or adjacent Cañada Woods or Monterra sites. It is estimated that golf course operations would not exceed 16,000 rounds annually which is similar to the private 250-member Cypress Point golf course.

Planned facilities include a driving range and clubhouse on the north side of course and 12 member suites located adjacent to the driving range, 18th fairway, and 9th green. The clubhouse and guest suites will be available only to the golf course members. The clubhouse will offer dining, banquet facilities, meeting rooms, lockers, and a pro-shop within a planned 52,500±-square foot facility with underground parking to accommodate 108 vehicles.

Equestrian and Recreational Facilities. The equestrian center consists of a 12 to 24 stall barn and approximately 68 acres of pasture located on the southeast portion of the site as shown on Figure 4. The recreational facilities are located on approximately 7 acres in the northern portion of the site, as shown on Figure 4. Planned recreational uses include pool, and a 10,000± square foot recreation building. The equestrian and recreational facilities are for the exclusive use of the Cañada Woods North and Cañada Woods residents and golf course members.

Access and Improvements

Access and Circulation. Access to the site will be provided from Olmstead Road off of Highway 68. Secondary access for project residents and golf club members could be provided through the adjacent Cañada Woods project via Cañada de la Segunda Road off Carmel Valley Road to the south. This secondary access would be a private, gated road.

The primary project road, Via Malpaso, is a 24-foot wide road which will provide access to the golf course, recreational areas, and some of the residential lots. Several cul-de-sac roads extend from Via Malpaso to provide access to project lots.

Water Supply. Domestic water supply for the project is proposed to be provided by the proposed Cañada Woods Water Company rather than using onsite wells as previously proposed for the Monterra subdivision. This will result in the proportional reduction of domestic supply water impacts identified in the 1987 Monterra EIR. Water will be provided via two or more wells south of Carmel Valley Road with a water treatment plant, all of which are located on the Cañada Woods site.

The Cañada Woods Water Company is proposed as a privately owned public water utility that derives its water from the Carmel River underflow under the authority of Permit Nos. 20831 and 20832 issued by the State Water Resources Control Board and a Water Distribution System Permit issued by the Monterey Peninsula Water Management District (MPWMD). Expansion of the service area of the Cañada Woods Water Company to include the project site will require approval of the California Public Utilities Company, State Water Resources Control Board, the Division of Environmental Health and MPWMD.

Reclaimed wastewater will be used for golf course irrigation as further described below. Non-alluvial groundwater from 1 well on the project site and 2 wells on the Cañada Woods site will be used to supplement reclaimed water for golf course irrigation.

Wastewater Disposal. Wastewater will be collected and treated at the tertiary treatment wastewater treatment facility serving the approved Cañada Woods Subdivision. The project also proposes extension of sewer service to all of the Monterra Ranch property, thereby eliminating the need for septic systems.

The treatment plant and existing approved wet weather storage pond will remain in the location previously approved in 1995 as part of the Cañada Woods Subdivision. The planned treatment plant will require additional treatment and disposal capacity to accommodate the increased flows generated by the proposed project. The 3-day emergency pond and the wet weather storage pond will be enlarged to accommodate the increased flows. The project also proposes to locate an additional wet weather storage pond on the golf course parcel, east of the 14th fairway and near the 11th fairway.

The treated wastewater will be used for irrigation of the proposed golf course. Additional water which may be required for golf course irrigation will be provided by adjacent groundwater wells on the project site within the Cañada Woods Subdivision, all of which draw water from the Monterey Shale bedrock.

Expansion of the County Service Area (CSA) serving Cañada Woods to include the proposed Cañada Woods North site, as well as the entire Monterra Ranch, is planned in order to provided for maintenance and operation of the sewage treatment facilities. The CSA developed for drainage facilities within Cañada Woods will be expanded to include the proposed Cañada Woods North site.

Slope Permit

Slightly less than one half of the site (513 acres) contains slopes that exceed 30%. Limited areas of development, primarily for road alignment, encroach within these areas. The project application includes a slope permit request to widen the existing ranch road, realign existing access, provide driveway access to several lots, and for the golf course, including some areas for the cart paths, as shown on Figure 5.

3.4 AREA PLANS AND ZONING

Monterey County Plans

The project site is designated "Residential, Rural Density, 10-acre minimum" in the Monterey County General Plan and Monterey Peninsula Area Plan. The site is zoned RDR/10-UR-VS, which is the Rural Density Residential district, 10-acre minimum, with "Visual Sensitivity" and "Urban Reserve" combining districts. The purpose of the "VS" district is to provide for development review in areas that could potentially create adverse visual impacts when viewed from a common viewing area. Visual impacts are analyzed in Section 4.7 -- Aesthetics -- of this EIR. The purpose of the Urban Reserve district is to identify those areas which are to be, at some time, annexed and developed in a phase manner as part of an incorporated city. The site is located within the City of Monterey's sphere of influence and General Plan area as described below.

The proposed residential lots range in size from approximately 3 to 30 acres with designated building envelopes. The proposed density is consistent with land use designations in the *Greater Monterey Peninsula Area Plan*. The Land Use section of this EIR further reviews project consistency with County and regional land use plans.

City of Monterey Plans

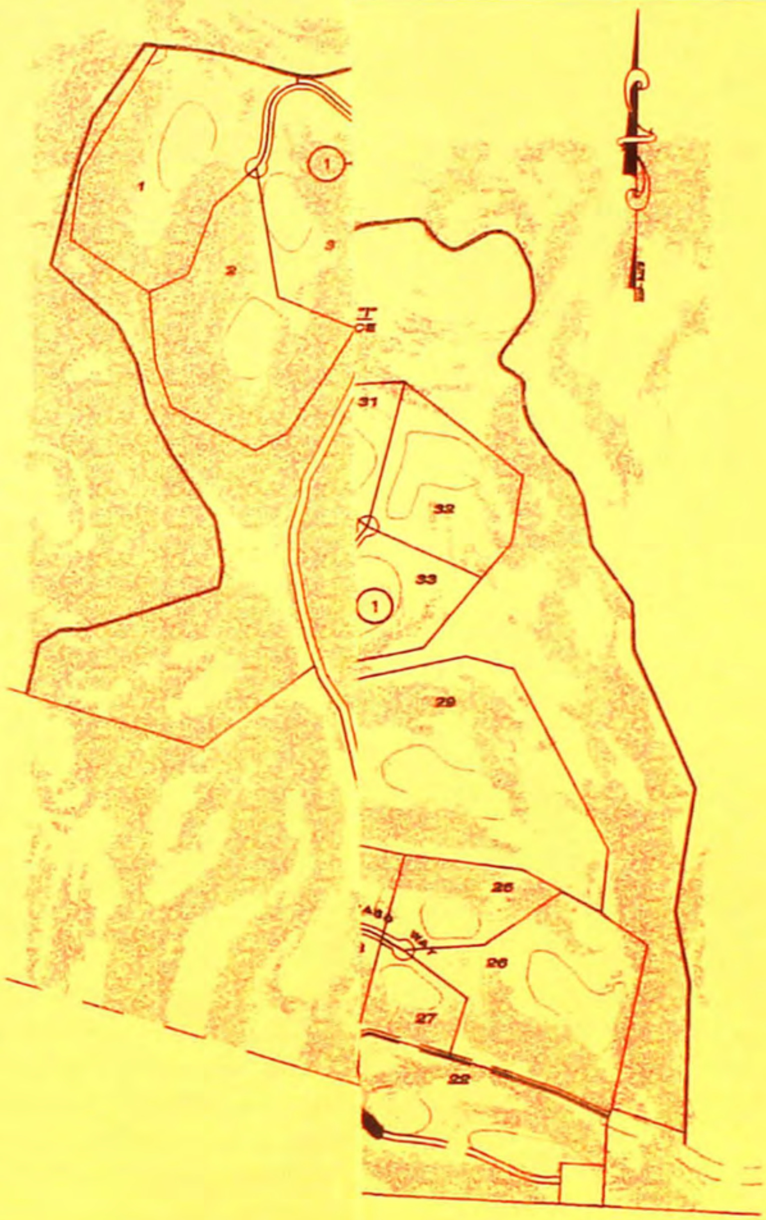
The project site, as part of the overall Monterra site, is included within the City of Monterey's sphere of influence and is included within the City's General Plan. The site is within the City's *Highway 68 Area Plan* (November 1994) boundaries. The Plan identifies policies for protection of resources and designates development densities for properties along Highway 68. The Monterra property is the largest property in the Highway 68 Area Plan. The Plan permits a maximum of 1,700 dwelling units on the entire Monterra property to increase City housing supply. The proposed project comprises a portion of the Monterra property with a density consistent with existing County rural designations. Project consistency with this Plan is further reviewed in the Land Use section of this EIR.

3.5 INTENDED USES OF EIR

As indicated in the Introduction, this EIR is an information document for both agency decision makers and the public. The County of Monterey is the lead agency responsible for certification of this EIR and approval of project permits. County permit approvals and other agencies that have permit or regulatory jurisdiction over the project are summarized in Table 2. These agencies are expected to use this EIR as part of their decision-making process.

TABLE 2
REQUIRED PROJECT APPROVALS

Agency	Required Permit/Approval
Monterey County	Approval of Vesting Tentative Map, Use Permit, Sewage Disposal Approval, Slope Waiver Permit
Monterey County Local Agency Formation Commission (LAFCO)	Approval of Annexation and Formation of Community Service Areas
Monterey Peninsula Water Management District	Approval of expansion of Cañada Woods Water Company service area
California Regional Water Quality Control Board, Central Coast Region	Approval of Wastewater Discharge and Reclamation Permit and Review of Construction "Stormwater Pollution Prevention Plan"
California Public Utilities Commission	Approval of expansion of Cañada Woods Water Company service area
California Water Resources Control Board	Approval of amended appropriate water right permits to allow expanded Cañada Woods Water Company service area
Monterey County Department of Health	Approval of amended Water System Permit for expansion of Cañada Woods Water Company service area



SE NOTE

ÈEA NOT SHOWN BUT WILL BE
ÙUGHOUT THE GOLF COURSE AREA
. BE INSTALLED ON SLOPES OVER
MIT APPLICATION INCLUDES THE
) ALLOW GOLF CART PATHS TO BE
ÙUGHTOUT THE GOLF COURSE AREA
R 30% SLOPES.

Source: WWD Corporation

Figure 5

DENISE DUFFY & ASSOCIATES

4.0 ENVIRONMENTAL SETTING, IMPACTS AND MITIGATION MEASURES

4.1 REGIONAL SETTING

The 1,060-acre project site is located on the southern side of Highway 68 on the eastern outskirts of the City of Monterey. The property is located between Del Rey Oaks, Seaside, Fort Ord and Marina on the north; Carmel Valley on the south; Monterey, Pacific Grove and Carmel on the west; and the rural Highway 68 corridor, Salinas and greater Salinas Valley on the east.

The Monterey Peninsula is located on the northern end of the Santa Lucia Mountain Range within the Coastal Ranges Geomorphic Province of California. This province is a linear system of more or less parallel and discontinuous mountain ranges and intervening vallies trending northwest/southeast. The geologic structure of the Coastal Range is highly complex (LLS Planning Associates, February 1986).

A major feature of the Coastal Ranges is the numerous northwest-trending, active faults, dominated by the San Andreas Fault which extends for more than 600 miles. These faults often follow the boundaries of mountain valleys for a short distance and then cut obliquely across the topography to adjacent mountain fronts (Ibid.).

The project is located in an area of rugged topography near the crest of the drainage divide between Canyon Del Rey and Carmel Valley at an elevation of 700 to 1,000 feet msl. The project area is situated on a topographically and geologically complex mountain block which trends east-west. Elevations range from about 300 feet (above mean sea level) near the southwest portion of the site, to nearly 1,000 feet near the central portion of the site. The site consists of broad gently sloping lands, breaking to moderate to steep slopes along drainage swales with some incised drainage ways.

The site is located in the upper portion of a watershed of the Carmel River. There are no perennial creeks in this watershed. The Cañada de la Segunda watershed drainage area covers approximately 1,867 acres, about 810 acres of which constitute the project site (Questa Engineering, July 8, 1996). Approximately 250 acres of the site drain north into the Canyon del Rey drainage. Onsite drainages are intermittent/ephemeral. The onsite drainages converge near the southern property line into the main Cañada de la Segunda drainage following the Cañada Woods project access road (Ibid.). Soils in the watershed are generally pervious, particularly on the well vegetated northern slopes and the more gently sloping swale areas, permitting high infiltration rates.

4.2 GEOLOGY AND SOILS

This section is based on review of geologic and geotechnical studies conducted on the site including a recent study prepared for the applicant by Terratech (July 18, 1996). The Terratech report evaluates the overall geologic feasibility of the proposed development, and provides geotechnical engineering recommendations for site development. The Terratech study was based on a review of available information, including a number of geotechnical and geologic reports prepared for the Monterra Ranch Subdivision, air photo and reconnaissance geologic mapping, and limited backhoe exploration within the project area. This section has been prepared in consultation with Nolan Associates who provided a peer review of the Terratech study.

ENVIRONMENTAL SETTING

Regional Geology

The project site is located near the northern terminus of the Santa Lucia mountain range, which extends approximately 140 miles southward. The range terminates approximately 3 miles north of the project site along the south side of the Salinas Valley. The overall orientation of the Santa Lucia Range follows the northwest structural trend defined by the San Andreas fault system (Terratech, 1996).

The Santa Lucia Range consists primarily of Mesozoic-age granitic and metamorphic rock. The mountains within which the project site is situated (Sierra de Salinas) are immediately underlain by the Monterey Formation, a marine sedimentary deposit of Miocene (Tertiary) age. In the project vicinity, the Monterey Formation is primarily siliceous shale, siltstone, and claystone that is white to light brown to grayish-orange on weathered surfaces exposed in outcrops and road cuts. Bedding is well-developed, with thicknesses ranging from very thin (one inch) to thick (three feet or more). Regional folding and faulting have resulted in fracturing across bedding planes of the brittle shale. The rocks are moderately to intensely fractured along fold axes and near faults, and moderately fractured elsewhere.

Site Geology

The areal distribution of geologic units within the project site is shown on Figure 6. The geologic units present at the project site include the Monterey Formation (Tm), which is overlain locally by Paso Robles Formation (QTp), landslide deposits (Qls), alluvium (Qal) and colluvium (not shown). Earth materials encountered on the site can be divided into two general categories, bedrock units and surficial units (Terratech, 1996).

Bedrock Units. The Aquajito Shale Member of the Monterey Formation (Tm) underlies most of the project site and is primarily a thin-bedded, siliceous shale that is moderately- to well-indurated and moderately hard to hard. It is typically moderately to closely fractured. Most of the existing exposures of Monterey shale occur in low road cuts that generally stand at near-vertical or vertical inclinations, except where bedding dips out of slope (Ibid.).

A stratigraphically higher portion of the Monterey Formation named the Canyon del Rey Diatomite Member (Tmd) has been mapped at the extreme northwest portion of the project site. This material tends to be softer than the typical Monterey Formation found in the project (Ibid.).

Bedding within the project site has been measured as ranging from horizontal to dipping as steeply as 65 degrees. The generally gently-dipping shale beds have been folded into a series of broad northwest-to west-trending folds. Near surface bedding and bedding exposed in road cuts is generally locally rotated downslope as a result of creep (Ibid.).

Surficial Geologic Units. Surficial geologic units on the site include alluvium and landslide deposits, both of Quaternary age, and the older Paso Robles Formation of Quaternary and Tertiary (Pliocene) age. The distribution of these surficial units is shown on Figure 6. A thin blanket of colluvium or colluvial soils cover most of the site but were not mapped.

The Paso Robles Formation (QTp) has been mapped in the vicinity of the project site as generally flat-lying deposits capping hills and ridges. On the project site, subangular to subrounded sand- and gravel-size clasts of Monterey Shale make up a substantial percentage of these deposits. Due to similarities of age and origin, the Paso Robles Formation is difficult to differentiate from higher alluvial terrace deposits that become prominent south of the project site.

Alluvium (Qal) is unconsolidated mixtures of clay, silt, sand, and gravel deposited by flowing water. Alluvial deposits are present in limited quantities in most of the major drainages at the site, but are often narrow, and are not shown on Figure 6.

Colluvium (Qc) is an unconsolidated mixture of soil and fragments of weathered bedrock formed by the downslope creeping, tumbling, and washing of exposed earth material. It forms a thin mantle, generally a few inches to a few feet thick over the hilly portions of the site, and collects in deposits thicker than this at the bases of steep slopes and in the bottoms of swales. Colluvium is often interbedded with alluvial deposits at the base of hillslopes.

Note: Legend is on the following page (Figure 6B)

TERRATECH, INC.

Figure
6A

MAP UNITS

af — *Artificial fill* - man-made deposits of dumped and engineered fill; includes dam embankments, and road fill greater than about 2 feet in thickness.

Qal — *Alluvium* - stream deposits of clay, silt, sand, and gravel located within the Holocene flood plain; most materials derived from the Monterey Formation; includes some colluvium at the base of hillslopes and perhaps some older alluvium on higher ground.

Qls — *Landslide debris* - soil and rock that have moved downslope as a result of stresses exceeding the material's strength; in some cases, the stresses were the result of past climatic variation that are no longer in effect; queried where identification is uncertain.

Qtp — *Paso Robles Formation* - Older alluvium capping ridgecrests and hilltops in the area. Generally composed of interbedded deposits of gravel, sand and clay.

Tm — *Monterey Formation, Aguajito shale member of Bowen, 1965* - shale and siltstone bedrock underlying the entire site; the rock is generally closely fractured and moderately folded.

Tmd — *Monterey Formation, Canyon Del Ray diatomite member of Bowen, 1965* - silty

MAP SYMBOLS

Geologic contact, dashed where approximately located; queried where uncertain.

Fault, approximately located; dotted beneath younger, unbroken material; queried where uncertain; U on upthrown side; D on downdropped side; arrow indicates dip of fault.

Anticline (a convex upward fold in strata), approximately located regional structure; dotted beneath younger, unfolded material.

Syncline (a concave upward fold in strata), approximately located regional structure; dotted beneath younger, unfolded material.

Scarp formed on undisturbed ground at the periphery of a landslide; barbs on the downslope side; a solid line indicates the scarp is clearly visible on the aerial photos; a dashed line indicates the scarp is no longer sharp and would only be approximately located.

Direction of landslide movement

Strike and dip of bedding

Strike and dip of fault or shear

Enclosed depression

Exploratory drill hole

HK-1	Haro & Kasunich
LS-5	Rogers Johnson & Associates
AH-11	Brown and Caldwell

Backhoe test pit

TP-15	Rogers Johnson & Associates (no logs available)
TP-a	Haro & Kasunich
TT-4	Terratech

Trench

TR-a	Haro & Kasunich
ST-7	Rogers Johnson & Associates

Recommended Habitable Structure Exclusion Zone. further study may redefine boundaries

NOTES

1.) Topographic base map provided by WWD Corporation, 1 inch = 400 feet, undated.

2.) Geology modified by Terratech field exploration and air photo interpretation from Brown and Caldwell (1990), Clark and others (1974), and numerous unpublished reports by Rogers Johnson and Associates.

3.) Logs of test pits excavated by Rogers Johnson & Associates were not available for review during preparation of this report.

Legend for Site Geology

Figure 6B

Landslide deposits (Qls) mapped on the site include several ancient-looking, complex landslide deposits. These landslides were initially mapped from aerial photographs, in which landslides can generally be distinguished by their hummocky topography and lobate shape beneath a rounded headscarp. The Terratech study indicates that none of the mapped landslides showed signs of recent activity, and all were generally subdued features that could not be positively identified as landslides. See further discussion below.

Slope Stability and Landslide Deposits

The project site is characterized by steeply-sloped ravines and ridges.. Elevations within the site range from about 300 feet above sea level near the southwest portion to about 922 feet in the central portion of the site. Less than one half of the site (513 acres) contains slopes that exceed 30%, as shown on Figure 5 in the Project Description section of this EIR (Section 3.0).

As indicated above, a landslide deposit has been mapped on the site in the location of the proposed Equestrian Center. This landslide is approximately 3,000 feet long and 1,000 feet wide. Air photo interpretation and field reconnaissance suggests the landslide is a rotational slump or block slide. According to the Terratech study it appears stable, but should be investigated in more detail prior to final design (Terratech, 1996).

The southeastern portion of the site (Lots 28 through 34) consists of a series of east-west trending dissected ridges with a distinctive topography from the rest of the site. Rogers Johnson (1986) originally mapped this area as a complex of "backslides" associated with a hypothesized large block slide underlying the site. Conversely, the alignment of the ridges with the trend of regional folding may reflect development of the topography along a series of minor folds in the area. Review by Terratech concludes that even if the area were underlain by a slide complex, there is little chance of reactivation since the deposit now occupies a topographic depression (Ibid.).

Regional Faults and Seismicity

Regional Seismicity. The project site is located within the seismically active Monterey Bay region. Most seismic activity in the region has been clustered along the San Andreas and Calaveras fault zones, although seismic activity has also occurred along coastal fault zones in the vicinity. Table 3 summarizes vicinity faults and recurrence levels.

The active fault closest to the project site is the Navy fault, two branches of which pass through the southwest portion of the property in an area not proposed for development (see Figure 6). The Navy fault is a northwest-striking, steeply southwest-dipping, strikeslip fault that extends from Carmel Valley northwest to Monterey Bay, and may be continuous with the Tularcitos fault. The Navy fault likely extends offshore to merge with the Monterey

Bay fault zone. The Navy fault should be considered active for purposes of project design, with a "Maximum Credible Earthquake" (MCE) conservatively estimated at Richter Magnitude (RM) 6.7. However, because no Holocene surface rupture has been identified, the Navy fault is considered less likely to produce strong ground shaking at the project site than the Palo Colorado-San Gregorio or San Andreas faults (Terratech, 1996).

TABLE 3
VICINITY FAULTS

Fault	Distance (Miles/km)	Magnitude (MCE)	PRA	PGA
Palo Colorado-San Gregorio	8/12.9	7.5	0.37	0.34
San Andreas	24/38.6	8.3	0.22	0.21
Navy	0/0	6.7	0.77	0.69
Monterey Bay Fault Zone	4.5/7.2	6.7	0.41	0.37
Calaveras Fault	27/43.5	7.5	0.12	0.12

- Peak rock acceleration (PRA) values computed using relationship of Campbell (1988)
- Peak ground acceleration (PGA) values computed using relationship of Seed and Idriss (1982) for stiff soils

SOURCE: Terratech, 1996

Estimates of ground response characteristics at this site indicate that the highest predicted peak bedrock accelerations can be expected as a result of an MCE event on the Navy fault, which would produce a peak ground acceleration of 0.69g at the project site. This fault is probably less likely to rupture during the design life of the project than the Palo Colorado or San Andreas: however, for conservative design purposes, it is recommended that the Navy fault be considered the governing causative fault relative to seismic design. Normally, 2/3 of the predicted peak horizontal ground acceleration, or 0.5g, would be used for design purposes (Ibid.).

The Berwick Canyon fault is located along the southeastern portion of the property boundary. It is a northwest-trending fault that is projected from its known location south through a saddle in the high ridge at the head of the Berwick Canyon landslide. Previous field mapping did not reveal evidence of northwestward continuation through the site, although the fault may be obscured by landslide deposits (Ibid.).

The Monterey Bay fault zone is a diffuse zone of numerous short, parallel faults beneath Monterey Bay, the closest trace being offshore, about 5 miles northwest of the project site; this fault is considered active. The Chupines and Seaside faults are located about 1,100 feet and 1,800 feet north of the project site at their closest approach; both of these faults are considered potentially active, but do not cross the project site and are less likely to produce strong ground shaking than the faults discussed above.

Onsite Seismic Conditions. The Monterey Formation strata that underlie the entire site record a history of folding and uplift. Two regional-scale folds cross the site in an east-west direction (see Figure 6) Smaller, local folds can also be identified crossing the regional trend at an oblique angle. The majority of this folding occurred in Pliocene time (between 2 and 5 million years ago) following deposition of the marine Monterey Formation and prior to deposition of the terrestrial Paso Robles Formation (Terratech, 1996).

Two strands of the Navy fault have been mapped as crossing the southwestern portion of the project site (see Figure 6) These traces have not been located by trenching; however, much of the trend of the Navy fault is well defined by the topography. The mapped trace of the Navy fault does not cross any of the proposed lots on the project site (Ibid.).

Soils

The U.S. Department of Agriculture Soil Conservation Service Soil Survey (SCSS) identifies two major soil types on the site: Santa Lucia-Reliz Association and Santa Lucia-Shaley Clay Loam. The Santa Lucia-Reliz Association is found on slopes between 30 and 75%. These are shallow (less than two-feet deep), relatively infertile shaley loams and clay loams overlying fractured, weathered bedrock. The soils tend to be shallowest on the high points of the ridgecrests and deepest at the base of the drainage ways. In most areas the larger shrubs and tree roots are able to exploit the soil moisture contained within the rock fractures. Because of the relative steepness of these slopes, runoff is very rapid and the potential for erosion hazard is high.

The Santa Lucia-Shaley Clay Loam is found on three different slope ranges: 20 to 15%; 15 to 30% and 30 to 50%. As the slope increases, so does the erosion hazard potential and runoff rate.

RELEVANT PROJECT CHARACTERISTICS

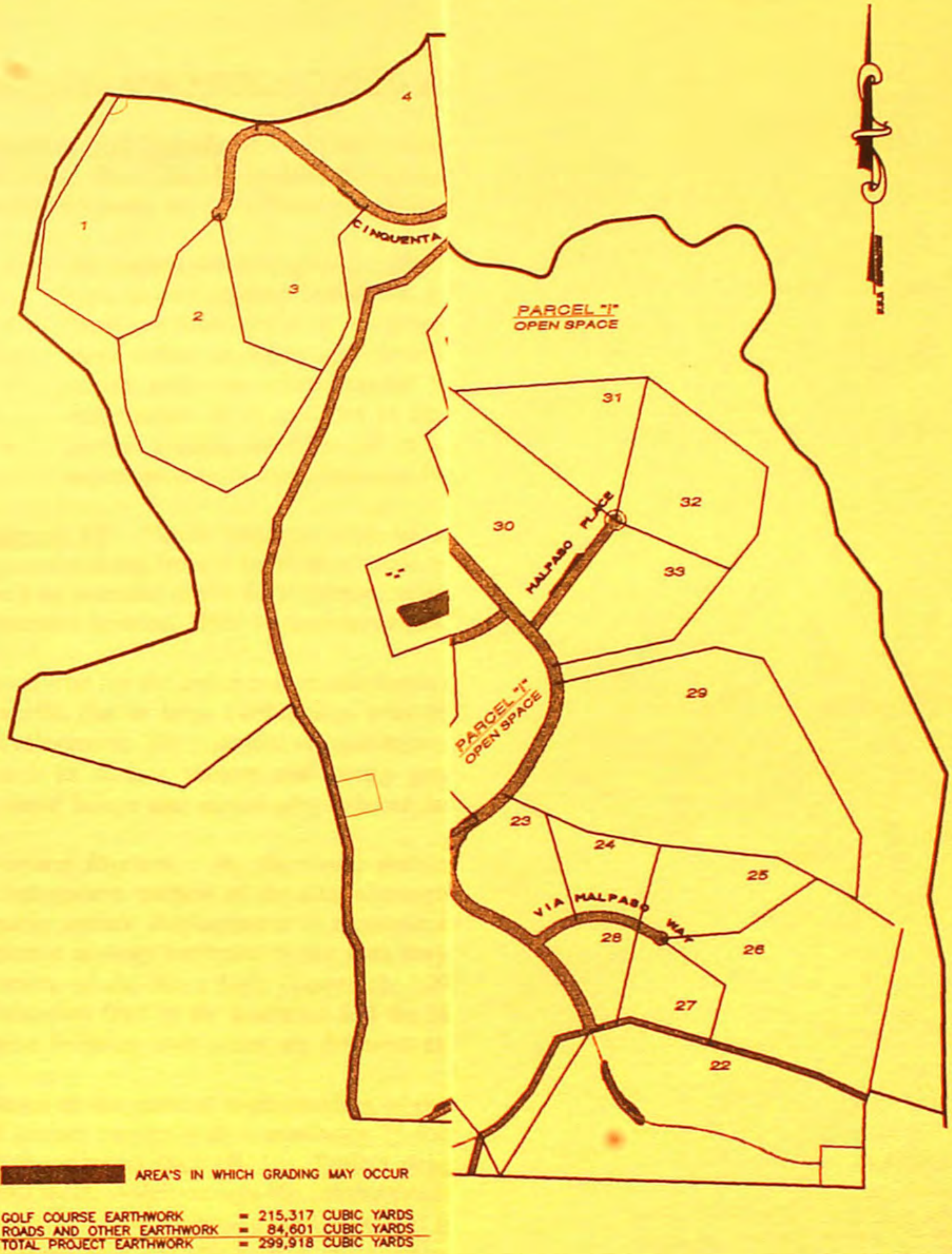
The proposed project consists of creation of 34 residential lots, an 18-hole golf course with guest suites, and recreational and equestrian facilities. Building envelopes are designated on each proposed lot, but future homes will be built by individual lot owners. Other planned structural development includes a 30,500 square foot Golf Course Clubhouse with underground parking, 12 guest suites (approximately 3,400 square feet each), a 8,600 square foot recreational facility, and 5 employee housing units.

Road alignment generally follows existing grades, and building areas are mostly sited on slopes less than 30%. Earthwork will be required for the development of the golf course to form the tees and greens. A preliminary Concept Grading Plan has been submitted by the applicant and is shown of Figure 7. Areas of potential grading are shown and general calculations of estimated earthwork excavation are provided. The majority of grading will occur with the golf course construction in which approximately 215,000 cubic yards of material will be moved to construct the golf course. There will be cut and fill required to contour the fairways in the more hilly portions of the site. All cut and fill is planned to be locally balanced at the project site. Roadways and other grading are expected to result in approximately 85,000 cubic yards of grading.

Areas of the site which contain 30+% slopes are shown on Figure 5 in the Project Description section of this EIR. Golf cart paths are not shown, but will be installed throughout the golf course area and some will likely cross slopes over 30%. The project permit application includes a request to allow installation of paths in areas over 30% slopes.

A Preliminary Erosion Control Report has been prepared as part of the Vesting Tentative Map application. The Plan indicates that project grading will incorporate the recommendations of the geotechnical consultant with regards to soils conditions, grading, and the steepness of the cut and fill slopes. Disturbed slopes will be protected with vegetative cover and, where necessary, with a properly designed surface drainage system to control water runoff and to prevent ponding above slopes or next to buildings.

Erosion control measures will be implemented, consistent with the policies of the *Greater Monterey Peninsula Area Plan* and with the requirements of Monterey County's Erosion Control Ordinance. According to the Preliminary Erosion Control Plan, the smallest practical area of land will be exposed at one time, and the length of exposure will be kept to a minimum. The erosion control plan specifies temporary and permanent vegetation strategies to protect disturbed slopes and implementation of temporary and permanent sedimentation and drainage controls. The Plan indicates that no grading should occur during the rainy season, unless specifically permitted by the Monterey County Planning and Building Inspection Department, and disturbed surfaces should be protected during the rainy season.



Source: WWD Corporation

Figure 7

IMPACTS AND MITIGATION MEASURES

Standards of Significance. In accordance with the California Environmental Quality Act (CEQA), State CEQA Guidelines, and agency and professional standards, a project impact would normally be considered significant if:

- the project would expose people, structures, or property to major geologic hazards such as earthquakes, landslides, ground failure, or coastal bluff erosion;
- there is evidence that development on steep slopes and/or grading could result in slope failure or substantial erosion;
- onsite soils are characterized by shrink/swell potential that could result in deformation of foundations or damage to structures; or
- project grading would result in a substantial increase in erosion, and subsequent sedimentation in local drainage facilities and water bodies.

Impact #1: Future residents may be subject to seismic hazards relating primarily to groundshaking from a large magnitude earthquake along regional and vicinity faults, as well as potential onsite fault rupture, which could result in damage to project facilities and potential injuries. This is considered a significant impact.

As is true for the entire region, moderate to severe ground shaking and associated seismic hazards due to large earthquakes may be experienced during the design lifetime of the development. The potential seismic hazards at the project site, include both primary effects (such as surface rupture and strong ground shaking) and secondary effects (including ground failure and seismically-induced landsliding) are discussed below.

Surface Rupture. As discussed previously, two traces of the Navy fault cross the southwestern portion of the site, although there is no geomorphic evidence that suggests recent surface displacement or movement along the fault. However, some of the recent seismic activity recorded in the area may be a result of movement along the subsurface portion of the Navy fault (Terratech, 1996a). Additionally, its near alignment with the Tularcitos fault to the southeast and the Monterey Bay fault zone to the north suggest that these faults or fault zones are different expressions of the same feature.

Based on the present understanding of the Navy fault, it is considered active for purposes of project design, with a minimum 75-foot setback for residential dwellings on each side of the mapped trace (Ibid.). Project designs have avoided siting structures on the Navy fault trace, which crosses the southwestern portion of the project site; the closest structure would be located approximately 400 feet from the fault trace, which is considered adequate to avoid potential effects of surface rupture (Ibid.).

Three additional potentially active faults have been identified on the subject property based on site investigations by Terratech (1996) and Rogers Johnson and Associates (1986; 1987; 1990a). These faults include two faults in the area of lots 30-33 and one fault in the area of lots 13-16. Setbacks from all three of these faults have been stipulated for future development by Terratech as shown on Figure 6 (1996).

There were several other faults mapped in previous site investigations by Rogers E. Johnson Associates (1986; 1987) and by Terratech (1996). These faults, as a group, appear to be associated with extensional movement (pulling apart) rather than differential displacement (one side sliding past the other) that is more typically associated with faulting. The open gaps in bedrock associated with this extensional movement have been filled with soil. The Terratech report postulated that these features could be occurring as a result of extensional forces associated with folding. Rogers Johnson and Associates attributed them to dilation accompanying a large block slide (landslide) that involved most of the subject property. A third explanation that is credible given observations made in the Santa Cruz Mountains following the 1989 Loma Prieta earthquake is ridge top spreading (visible as ground cracking) accompanying strong seismic shaking.

Each of these three explanations have different implications in terms of activity and risk to the proposed development. According to Johnson and Associates, the block slide is of great age, based on the degree of geomorphic dissection, and is presently buttressed (stabilized) at its toe by valley fill in Canyon Del Rey. They therefore concluded that the ground cracks were of great age and are unlikely to move at the present time. If the extensional features originate due to folding, they would develop at a rate comparable to the rate of folding, a slow process. Movement on these features would therefore be expected to occur very infrequently, but could nevertheless occur at any time. If the cracks open in response to a seismic shaking, they could be expected to move every time there is a sufficiently large earthquake in the area. If they move in response to magnitude 7.2-7.9 earthquakes on the San Gregorio fault, which is possible, they could be expected to move as often as once every 300 to 600 years. If they move during large earthquakes on the Tularcitos-Navy fault, they would be expected to move every few thousand years.

Terratech has stated that they consider these features, whatever their origin, to be inactive. There is, however, no compelling evidence for activity or inactivity at the present time. Terratech (1996b) stated that "Although we did not date the soils overlying the bedrock in test pit TT-2, we feel that local stratigraphic relationships indicate that the soil exposed on the north end of the trench may be pre-Holocene in age." By extension, this statement can also be interpreted to mean that they may also be Holocene in age, which would imply activity under present regulatory standards. In terms of indirect geologic evidence for activity, these features are commonly associated with geomorphic expression (steps in the ground surface caused by movement on the features) and are soil filled, both of which indicate geologically youthful, although not necessarily Holocene activity.

In the opinion of Nolan Associates, these features should not be considered faults in the typical sense, since their movement appears to be extensional rather than differential, and their surface expression typically persists only for a short distance. At the same time, movement on one of these extensional fissures under a building would severely damage or destroy the structure, as was observed during the Loma Prieta earthquake. Consequently, it is the opinion of Nolan Associates that these features need not be associated with the setback zones usually associated with faults, but that potential hazards associated with these features should be mitigated. Terratech has recommended that select lots be evaluated for co-seismic (earthquake induced) ridge top ground cracking hazard by trenching prior to construction of structures intended for human occupancy. Should such older soil filled fissures be identified under the structure during the trenching, the structure may be relocated to an area free of fissuring, or it may be designed to accommodate the magnitude of displacement shown by the fissures without significant structural damage. This requirement for site investigations on lots 1-3, 7-16, 19-22, and 26-33, if competently carried out, will successfully mitigate that potential hazards posed by these structures.

Ground Shaking. It is very likely that moderate to severe ground shaking due to a large earthquake on one of the nearby active faults will be experienced during the design lifetime of the proposed development. The most likely earthquake sources will be the Palo Colorado-San Gregorio, Calaveras, or the San Andreas faults. There is a smaller likelihood that strong ground shaking at the site would result from earthquakes along the Monterey Bay fault zone, the onsite Navy fault, or other nearby faults. The Navy fault is considered the governing fault for design purposes; an MCE of RM 6.7 would produce a peak ground acceleration of 0.69g at the project site, which is considered a conservative design parameter. Review by Nolan Associates indicates that the MACE specified for the Navy Fault may be entirely appropriate. The most recent study of the Tularcitos-Navy fault by the Mark Group (1995) assigned a maximum credible event of moment magnitude 6.8 to the fault. Although this magnitude is slightly higher than the Richter magnitude 6.7 listed by Terratech, the practical difference to the project design is not significant.

Without mitigation, strong seismic shaking in the project vicinity would produce serious damaging effects. The effects of ground shaking on future planned structures and other improvements can be reduced by earthquake-resistant design in accordance with the latest edition of the Uniform Building Code, and by incorporation of seismic design criteria. A site-specific geotechnical investigation will be required to characterize soil and bedrock conditions in the vicinity of each proposed building site so that suitable seismic foundation design can be provided. Seismic design criteria shall include shall include a 0.5g lateral force requirement (Terratech, 1996).

Ground Failure. Ground failures are secondary seismic effects related to soil, bedrock and groundwater conditions. These ground failures may occur in several forms. Lurch cracking occurs when sections of the ground move laterally towards an open face, as a result of ground shaking. It is anticipated that minor lurch cracking within the near-surface soils and shale may occur along oversteepened road cuts and swale banks.

Ground cracking, such as that observed during the Loma Prieta earthquake in the epicentral area in the Santa Cruz Mountains, appears as open fissures or cracks in the ground occurred along the crests of ridges. The exact mechanism that causes co-seismic (earthquake induced) ground cracks is not always clear. However, these fissures can severely damage or destroy a building during an earthquake. Terratech (1996b) recommended that the potential for earthquake induced ground fissuring or cracking be investigated on specific lots prior to development. The type of soil filled crack or fissure that was identified in trench TT-2 by Terratech (1996a) and by Rogers Johnson and Associates (1986) resemble the subsurface expression of fissures that occurred during the 1989 Loma Prieta earthquake, suggesting that co-seismic fissuring may be a significant hazard at this site.

Liquefaction occurs when generally loose, saturated, cohesionless soils (i.e., poorly graded sands) compact and decrease in volume under the effects of seismic shaking, in which the soil loses all its shear strength and behaves as a liquid. There appears to be a low potential for liquefaction in the onsite alluvium (Ibid.). Because of this low potential for liquefaction and because no development is planned for the alluvial areas, this impact is considered less-than significant (Terratech, 1996).

Seismically-Induced Landsliding. This refers to landslides that occur on otherwise stable slopes due to strong earthquake shaking. There is a low potential for seismically-induced landsliding to occur within the areas of proposed development at the project site based on the relative competence of the underlying bedrock and the relatively few older landslides visible on slopes in the areas proposed for development. Most hilltops and hillslopes are underlain by strong and competent shale, which does not appear susceptible to slope instabilities (Ibid.). Presently, only the Equestrian Center is located on or near mapped landslide deposits. This landslide deposit appears to be similar to other "ancient" landslides mapped in the vicinity, which has a low potential for seismically-induced landsliding or reactivation. (See impact discussion below for further details.)

Seismically-induced shallow soil failures or debris flows may occur on steep slopes (on the order of 2:1 or steeper) underlain by thick topsoil and colluvium. However, with the exception of access roads, no construction is planned on such slopes and, therefore, the shallow soil failures would not substantially affect the proposed development; this impact is therefore considered less-than significant (Ibid.).

Mitigation

Implementation of Mitigation Measures 1-1 through 1-3 will reduce impact to a less-than-significant level.

1-1 Observe setbacks from active or potentially active faults as stipulated in the project geologic report and addendum letter by Terratech (1996a; 1996b). Design underground utilities that cross the mapped traces of active or potentially active faults to be fitted with flexible couplings and shut-off valves; this would provide an additional margin of safety in the unlikely event of surface rupture.

1-2 Follow recommended ground crack hazard evaluation protocol for lots 1-3, 7-16, 19-22, 29-33 (Terratech 1996a; 1996b). This evaluation should include trenching of the building area to identify areas where soil filled fissures have occurred in the past. If such fissures are found, the building should be relocated to an area free of fissures, or it should be designed to accommodate movement on the fissures without significant damage. Trenches should be excavated perpendicular to prevailing structural trends or the prevailing trends of topographic lineaments.

1-3 Design structures in accordance with recommendations of site-specific soils report with regard to foundation design and seismic design parameters.

Impact #2: Construction in areas of potentially unstable slopes, known landslides or steep slopes could result in slope instability and/or structural damage. This is considered a significant impact.

Most of the residential construction would be located on flat or gently sloping terrain (on slopes less than 30%). Therefore, cut and fill slopes associated with lot development would be limited. Areas where development may encroach into steeper slopes include golf cart paths in the golf course area. Although most of the areas proposed as building envelopes have relatively gentle slopes, the edges of the building envelopes frequently verge on steep to very steep slopes. Structures can be sited away from portions of building envelopes near the steep slopes, thus preventing potential slope stability issues.

There is a low potential for slope stability problems in most areas of the project site (Terratech, 1996a). All slopes underlain by shale bedrock, as shown on Figure 6, appear relatively stable and should not adversely impact the proposed development as presently planned (Ibid.). It is anticipated that construction of roadways, residential lots, and associated drainage systems would act to divert surface waters so as to reduce the amount of water infiltration into the slide to less than that which occurs under present conditions. Despite the effect of roadways, etc., in diverting surface water, development typically increases recharge to ground water due to irrigation, particularly where golf courses are planned. Such increased recharge can cause stability problems in areas of marginal stability.

According to the Terratech geotechnical report, the mapped landslide area at the planned Equestrian Center has a low potential for reactivation, but the report recommends a site-specific geotechnical investigation for the ancient landslide area where the Equestrian Center and Employee Housing are proposed to be located. This investigation would include a drilling program to identify the bottom of the landslide, and an assessment of the recency of movement and the degree of stability. In the event that this area is shown to be less stable than presently believed, the employee housing should be relocated to a more stable area. It is the opinion of Nolan Associates that the stability of the landslide be analyzed only if: habitable structures are planned for the landslide or movement of the landslide will interdict sole access to a homesite (this does not preclude a stability analysis to protect otherwise valuable, non-habitable structures). If a stability analysis is not performed, utility corridors should be planned to avoid the landslide area.

Landslides typically are weakened when saturated; however, irrigation of the golf course is not expected to adversely affect the landslide. At a minimum, the Equestrian Center area should not be substantially altered by mass grading during construction, and concentrated water infiltration should not be introduced into the landslide mass. Pastures located above the landslide areas shall not be irrigated. Two small mapped landslides exist near Fairways 12 and 15, but would not threaten any habitable structures.

The building envelope on lot 13 lies on an area formerly mapped as landslide by Rogers Johnson and Associates (1986). Terratech remapped this landslide based on their own work. Their interpretation of the landslide area shows the building envelope on lot 13 located upslope from the landslide area. Review by Nolan Associates supports the Terratech mapping of the landslide. Site development should include a minimum setback of 50 feet from the headscarp of the landslide situated downhill.

Under certain conditions, steep terrain underlain by Monterey shale is susceptible to debris flows, or the rapid downslope movement of saturated soil. Debris flows usually occur during or shortly after intense rainfall, particularly when previous rainfall has already deeply infiltrated the slope materials. Debris flows occur most frequently in hillside swales that have a surficial cover of relatively permeable, colluvial deposits overlying denser, less permeable soil or bedrock. Structures located in these areas can be damaged or destroyed by the impact of the moving material.

Review by Nolan Associates indicates that there is a steep slope along the southern property line that has been a source of debris flows and small landslides. The debris flow potential of this slope has been studied in detail by Rogers E. Johnson and Associates. One of the designated building sites on lot 21 is located within an area of recognized debris flow hazard, as is the proposed access road. Any prospective building envelopes on parcels along the southern property line (parcels 20, 21, and 22) should be evaluated for debris flow hazard prior to approval.

Local soil creep may be occurring within topsoil and colluvial deposits on moderate to steep slopes inclined greater than about 3:1, but because these deposits are generally very thin (on the order of 1 to 4 feet thick), is not considered a significant problem to the proposed development (Terratech, 1996). Building envelopes indicate building areas that are largely confined to level or gently sloping terrain outside of areas susceptible to local soil creep.

<u>Mitigation</u>

Implementation of Mitigation Measures 2-1 through 2-5 will reduce the impact to a less-than significant level.

2-1 Set back all habitable structures 25 feet or more from slopes exceeding 50% gradient unless a site-specific geotechnical evaluation proves otherwise.

2-2 Review all proposed building sites along the southern property boundary for exposure to debris flow hazard at the time of development. At a minimum, all building envelopes in this area should conform to recommendations contained in the Rogers Johnson and Associates debris flow hazard evaluation for the area (Johnson and Associates, 1990a), unless site specific investigations refute the findings of the previous reports. These recommendations include avoiding areas of identified debris flow hazard or construction of debris flow protections structures.

2-3 Require further evaluation of landslide stability in the area of the Equestrian center and Employee Housing, if this area is considered for development of habitable structures or if it will be used for sole access to any proposed residences or facilities. If found to be active or potentially active, implement measures to stabilize the landslide or relocate or eliminate proposed structures.

2-4 Construct structures located within old landslide deposits at or very near the natural grade to reduce cut slopes. Limited cut slopes can be created for access roadways, and should be constructed at slopes no greater than 2:1 and should not exceed heights of 15 feet.

2-5 Implement all recommendations set forth in the 1996 Terratech geotechnical report, including construction of cut and fill slopes, control cut and fill earthwork that may destabilize portions of the landslide, and minimize surface water infiltration into the landslide deposit.

Impact #3: Expansive soils could damage building foundations and/or roadways. This is considered a potentially significant impact.

Most of the hillside portion of the project site is covered with a thin veneer of topsoil and colluvium comprised of light brown to black sandy clay to clayey silt. These soils, derived from the weathering of the Monterey Formation, generally are moderately to highly plastic, but low to moderate in expansion potential. However, soils developed as a result of weathering of the Monterey Formation can be highly expansive. Expansive soils could impact building foundations and/or road pavement if unmitigated.

Most of the proposed development is located along drainage divides where these soils are generally thinnest, on the order of 0 to 2 feet. Because of their shallow extent here, the expansive soils would not be expected to substantially affect the proposed development, provided the materials are cleared from the building areas prior to foundation construction. In areas of closed depressions, expansive soils are generally thicker, but since these areas are not proposed for development, they should not adversely affect development.

Mitigation

Implementation of Mitigation Measure 3-1 will reduce the impact to a less-than-significant level.

3-1 Remove expansive soils from areas where buildings, slabs-on-grade, and pavements are to be constructed and / or construct foundations in accordance with recommendations of lot specific soils report.

Impact #4: Project grading associated with construction of the golf course, roadways, and homesites could result in an increase in erosion if not property controlled. This is considered a potentially significant impact.

Soils on the project site consist primarily of Monterey Shale, which underlies alluvium and terrace deposits to a depth of about one to four feet. The potential for erosion is largely dependent on slope, ranging from low in the flatter areas to high in the steeper terrain. At present, no substantial erosion exist on the site.

Overall, an estimated 300,000 cubic yards of earth would be moved during the construction of the proposed project. Disturbed soils are subject to the erosive forces of wind and rain. The proposed development would result in soil disturbance over approximately 10% of the project site, with the remaining 90% being left as open space. Most of the development is proposed for flat terrain on broad hilltops or flat benches. The road system and utility routing has been designed to follow the existing dirt roads as much as possible, thereby minimizing further disturbance of the natural terrain.

Construction of the golf course and associated facilities would involve earthwork for roads, pipelines, a reclaimed water irrigation storage pond, and general site grading. Large portions of the project site are characterized by nearly level or gently sloping meadows, but there are areas of moderately to steeply sloping terrain as well as two seasonal drainages. Although the steeper portions of the site would not be graded, potential erosion hazards and slope instability would still exist during the construction phase of the project.

Soil erosion can cause numerous types of impacts. Eroded soil contains nitrogen, phosphorus, and other nutrients that, when carried into water bodies, can stimulate algae growth that reduce water clarity, deplete oxygen and create odors. The greatest soil erosion hazard exists during and immediately following construction. The completed project would not cause erosion and sediment discharges to downstream water bodies because of the planting and maintenance of turf grass and native vegetation replacement in areas of soil disturbance. The project would result in an overall decrease in long-term erosion and sedimentation rates through both the elimination of the current grazing operation (which contributes to localized channel and hillslope erosion as well as nitrogen loading), and the overall enhancement and management of drainage ways and adjoining vegetated buffers.

Erosion and sedimentation impacts from the construction of the golf course and support facilities are expected to be confined predominantly to the construction phases of the project. However, without mitigation, there is a high potential for significant erosion for a project with earthmoving activities of this scale.

Mitigation

Implementation of Mitigation Measures 4-1 through 4-3 will reduce the potential impact to a less-than significant level.

4-1 Revise and implement proposed Erosion Control Plan to include identification of the specific types and locations of areas of disturbance, erosion control measures to be utilized, including silt fencing and temporary diversion structures to protect drainages, sediment detention basins, and revegetation specifications, as well as a schedule for completion of grading activities and implementation of site stabilization component. Stabilize all cut and fill slopes as soon as possible with native vegetation cover, temporary vegetation, seeding, mulching, or other approved landscaping.

4-2 Prohibit golf course grading during the winter rainy season unless specifically permitted by the Monterey County Planning and Building Department, and implement erosion control on exposed slopes prior to the onset of the rainy season by mulching and/or other effective means of soil protection.

4-3 Require inspection and maintenance as needed, on a regular basis to assure their continued effectiveness. These drainage structures should be cleared of debris and sediment whenever substantial accumulation is noted. Typically, inspection and maintenance would occur in late September, prior to the on-set of fall rains, after the first two rainfall-runoff events of the year, and after every large storm event.

4.3 HYDROLOGY AND WATER QUALITY

This section addresses the surface hydrology, water quality, and groundwater issues related to increased stormwater runoff, degradation of runoff water quality, and irrigation with reclaimed wastewater. Additional detail on the proposed collection, treatment, and disposal of wastewater is contained in Section 4.5 -- Wastewater Treatment. Additional detail regarding water supply conditions are presented in Section 4.4 -- Water Supply.

ENVIRONMENTAL SETTING

Surface Hydrology

The project site covers approximately 1,060 acres. Elevations within the project site range from about 300 feet above mean sea level (msl) near the southwest portion of the site, to nearly 1,000 feet msl near the central portion of the site. The majority of the site (810 acres) drains south to Carmel Valley via the Cañada de la Segunda watershed, while the remaining 250 acres drain to the north to the Canyon del Rey watershed (WWD, 1996). The Cañada de la Segunda watershed drainage area covers approximately 1,900 acres, but there are no perennial creeks in this watershed. The Canyon Del Rey watershed encompasses an area of 16.8 square miles. It is drained by Canyon del Rey Creek which drains northwestward to the Pacific Ocean at Monterey Bay via Canyon del Rey, Laguna Grande and Roberts Lake. Vicinity drainage patterns and basins are shown on Figure 8.

The project site consists of broad gently sloping lands, breaking to moderate to steep slopes along drainage swales, with some incised drainage ways. The drainage ways are intermittent/ephemeral (run only immediately following seasonal storms) and are generally poorly defined, with no real flow lines or distinctive vegetation differences separating the drainage bottoms from the adjacent hillslope. Intermittent periods of flow occur after storm events between November and May in a typical rainfall year. However, several small undrained depressions, probably associated with the ancient landslide topography of this area, pond water during the winter months.

Mean annual precipitation within the area is about 17 inches. Incident rainfall generally does not produce large quantities of runoff. Soils in the watershed are generally pervious, particularly on the well-vegetated northern slopes and the more gently sloping swale areas, permitting high infiltration rates. Most of the precipitation from smaller, frequently occurring storms infiltrates into the soils where it flows slowly beneath the ground surface in fractures in the rock. The pervious surficial soils in some areas of the watershed are shallow and underlain by impervious shale bedrock. During large infrequent storms when there has been substantial antecedent precipitation, the surface soils become saturated and a much larger portion of the precipitation runs off in the drainage ways. The drainage ways converge near the southern property line into the main Cañada de la Segunda drainage, which follows the Cañada Woods project access road. This drainage way is currently being reconstructed and improved. Upon intersection with Carmel Valley Road, the surface drainage travels easterly in a road-side ditch and crosses under Carmel Valley Road in a concrete culvert, then continues to flow to its eventual discharge to the Carmel River (Questa Engineering, 1996a).

Under existing conditions, the portion of rainfall that results in site runoff ("C" value in the rational formula) is estimated at 15% (C=0.15). For existing conditions, a 10-year, 1-hour storm would produce an estimated peak runoff of 99 cubic feet per second (cfs), while a 100-year, 1-hour storm would produce an estimated peak runoff of 148 cfs (WWD, 1996).

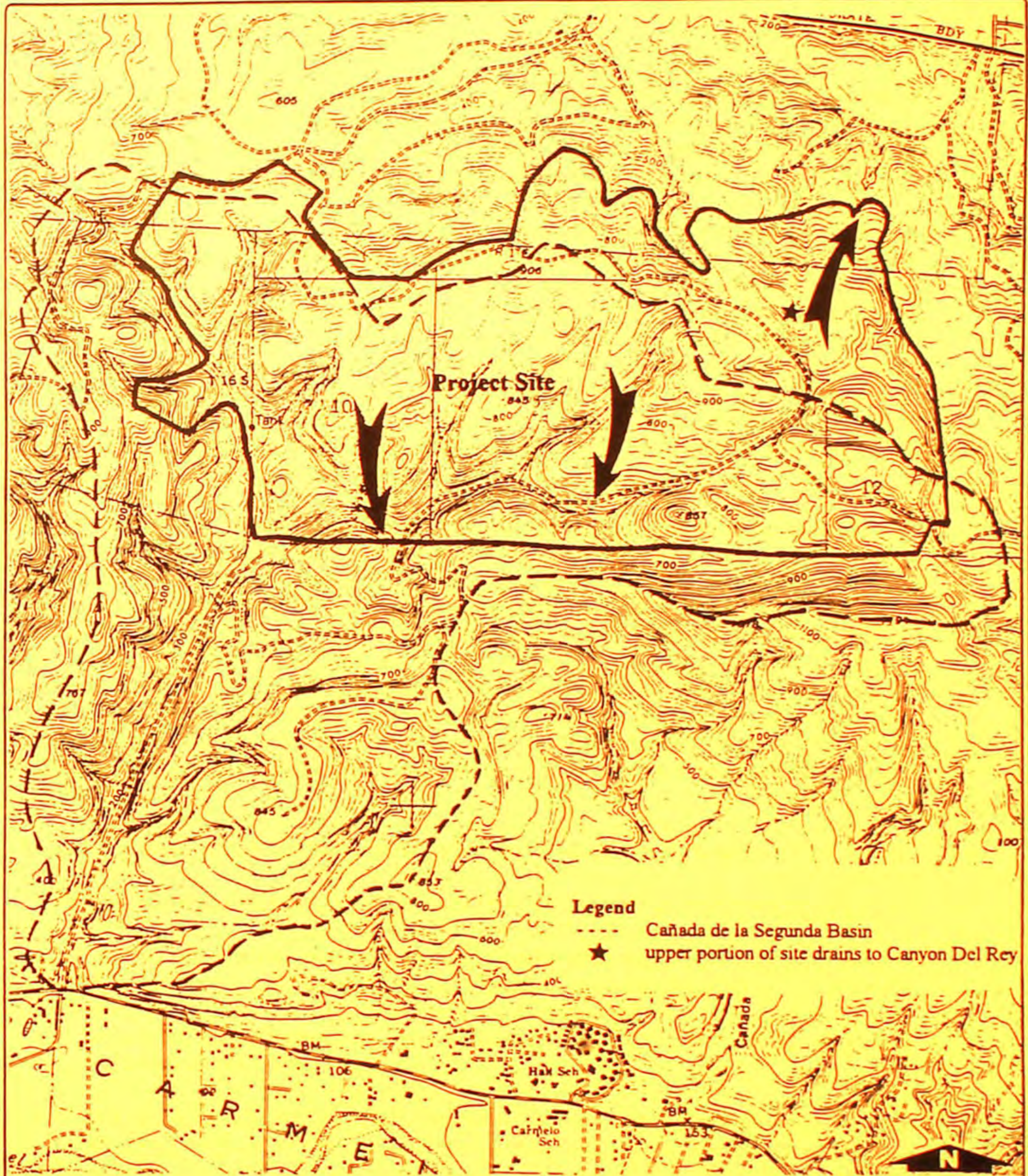
Groundwater Resources

Groundwater resources within the project area are contained within the open fractures and bedding planes of the Monterey shale bedrock, and to a lesser extent in the pores in the rock. There are 3 existing wells (2 on the Cañada Woods site and 1 on Cañada Woods North site) that draw their water supply from these bedrock formations. These wells range in depth from about 300 to 700 feet, and are sealed over the upper 50 to 80 feet. Water contained in the Monterey shale aquifer is of fair quality, with elevated levels of electrical conductivity, total dissolved solids, sodium, and chloride levels (generally referred to as salts). Further description of groundwater sources and supplies is provided in the Section 4.4 --Water Supply -- of this EIR.

The modern bed and flood plain of the Carmel River consists of a loose mixture of sand, gravel, boulders, silt and clay, known as the Carmel Valley alluvial aquifer. Wells operated by Cal-Am in the Carmel Valley provide a large portion of the Monterey Peninsula's water supply. The Cañada Woods Water Company (CWWC) owns four high production wells that draw their supply from the Carmel River alluvial aquifer. The wells have been used historically as the irrigation water supply for agricultural uses, for which the State Water Control Board (SWRCB) has issued appropriate water permits for 160 AFY. Pumpage from the Carmel Alluvial Aquifer is limited to 147 AFY until the Los Padres dam, or other similar water project, is constructed. The water quality is suitable for domestic uses, but requires treatment for removal of iron and manganese. Further description of groundwater sources and supplies is provided in the Section 4.4 --Water Supply -- of this EIR.

Water Quality

Nitrate Loading to Groundwater. One of the critical water quality concerns in the Carmel Valley, as well as throughout other areas of Monterey County, is the concentration of



	Vicinity Drainage Basins	Figure 8

nitrate in groundwater. Nitrate in drinking water can have serious health effects, and is addressed through primary drinking water standards; the limit is 45 mg/l, as NO_3 (nitrate), and 10 mg/l, as N[1] (nitrogen). The Carmel Valley alluvial groundwater basin serves as a primary source of water supply for much of the Monterey Peninsula.

Sewage disposal to land, along with livestock wastes and fertilizer applications on cropland golf courses, are the principal sources of nitrate in the Carmel Valley affecting groundwater quality. In order to assure protection of groundwater resources against affects from sewage disposal, Monterey County authorized the *Carmel Valley Wastewater Study* (CVWS) in 1981 (Montgomery, 1982). One of the products of this study was the establishment of maximum wastewater loading rates (from septic systems) throughout the Carmel Valley to prevent groundwater nitrate concentrations from rising above a given level (30 mg/l, as NO_3) that would threaten its use for drinking water. The recommendations of this study were subsequently adopted by the Monterey County Board of Supervisors, and incorporated as a policy of the *Carmel Valley Master Plan*.

The CVWS divided the Carmel Valley into 48 hydrologic sub-basins to simplify the accounting of nitrate loads and projected effects on water quality. Within each sub-basin, geographical areas were defined based on soil, hydrologic and topographic factors; recommended maximum wastewater loading rates were then allocated, in terms of gallons per day (gpd) per acre, in rates that would protect the water quality of the Carmel Valley alluvial aquifer. The assigned loading rates vary from 80 to 300 gpd per acre. These are understood to represent the subsurface discharge of septic tank effluent, with a corresponding total nitrogen concentration averaging 40 mg/l (as N). The allowable daily discharge rate (in gpd) multiplied by the assumed total nitrogen concentration of the final effluent (mg/l) yields the allowable mass loading of nitrate in each geographical area and sub-basin.

In applying these nitrate loading criteria, other key assumptions include:

- Use of average residential wastewater flow, as opposed to maximum design flow;
- The nitrate loading rates assume exclusively rural residential land uses with a nominal amount of landscaping and domestic animals; therefore, the combined nitrate contribution from fertilizer sources, domestic wastewater, and animal wastes should all be accounted for, and compared with the nitrate loading allocation indicated in the CVWS; and
- All of the nitrate loading is assumed to reach the Carmel River alluvium by way of direct recharge or shallow zone groundwater flow through tributary areas.

Note: 1.0 mg/l, as N is equal to 4.43 mg/l, as NO_3.

In addition to Carmel Valley nitrate loading criteria, region-wide and site-specific nitrate criteria of the Regional Water Quality Control Board (RWQCB) must also be complied with for any new wastewater treatment and disposal facilities. The RWQCB's Basin Plan specifies a maximum nitrogen loading of 40 grams (gm) per acre per day, which roughly equates to a density of one house per acre. In establishing final Waste Discharge Requirements, the RWQCB would also examine the localized nitrate impacts on groundwater quality from a central wastewater treatment/disposal facility, such as that proposed to serve Cañada Woods North, to assure against adverse impacts to drinking water supplies in the immediate vicinity of the project.

In 1991, Monterey County adopted Code Chapter 15.23, which sets a limit of 6 mg/l nitrate-nitrogen for effluent from wastewater reclamation facilities; this may represent a more stringent requirement than either the CVWS or the RWQCB criteria. See Section 4.5 -- Wastewater Treatment for additional detail regarding the proposed wastewater collection, treatment, and disposal facilities.

A survey by Questa Engineering of well water quality of wells in the project vicinity shows no existing nitrate contamination. The nitrate (as NO_3) data for nearby wells is listed below.

• Cañada Woods Wells	
N-1 Well	<1 mg/l
Panel N Well	6 mg/l
Water Tower Well	<1 mg/l
• Cal-Am Wells	
Cypress	1.1 mg/l
Carlos	1.9 mg/l
Cañada	0.9 mg/l
• September Ranch	
SR1	1.4 mg/l

Surface Water Quality. The RWQCB administers a statewide General Stormwater Permit regarding management of stormwater runoff from construction sites. Any project over 5 acres (including the proposed project) will be required to file a "Notice of Intent: with the RWCQB with preparation and submittal of a stormwater pollution prevention plan (SWPPP). The SWPP will specify "Best Management Practices" (BMPs) that will be implemented to prevent water quality degradation and achieve compliance with water quality standards.

RELEVANT PROJECT CHARACTERISTICS

The proposed project includes 34 residential lots; an 18-hole golf course with associated facilities, including driving range, clubhouse, 12 member guest suites, and maintenance facility; recreational fitness center; an equestrian area with up to 24 stalls. Storm drainage would be provided by gutter flow over the roadways, which would then discharge to the natural drainageways located on the project site; storm drainage from homes would be directed to natural drainage channels. The proposed golf course would have a separate drainage system, described below.

Runoff storage will be provided for the difference between pre- and post-development conditions for the 100-year storm flows for one-hour duration. An estimated 120,000 cubic feet of storage capacity would be required. The proposed retention facility is located on the southern portion of the site adjacent to lot 20, as shown in Figure 4 in the Project Description section.

Questa Engineering Corporation has prepared an Environmental Management Plan that provides a strategy for constructing and operating the proposed golf course in such a way as to minimize any adverse effects to hydrology and water quality (Questa, 1996). The following discussion summarizes the key aspects of the proposed golf course operation as to how water quality impacts would be minimized.

Golf Course Drainage. For the golf course, the project proposes to maintain existing seasonal drainage channels as part of the course design. These drainages will be protected and enhanced with native grassland planting as part of project development. Project facilities that create impervious surfaces will require drainage improvements, such as ditches, swales and, possibly, buried storm drains which will convey runoff to native grass swales to remove sediments before draining into the main Cañada de la Segunda drainage way. Some of the runoff may be collected and drained to shallow gravel-filled pits for infiltration into the soil. Maintenance roads and cart paths throughout the golf course may also require drainage improvements such as culverts, and curbs. Roadway and cart path drainage will be directed through buffer strips planted with native grasses, as needed for sediment removal, before being discharged into seasonal drainage channels (Questa Engineering, 1996a).

A treatment unit will be provided to cleanse the washdown water from maintenance equipment in the maintenance area. Oil and grease/sediment traps will be installed and maintained to cleanse runoff in the clubhouse, equestrian, maintenance yard and parking areas.

Irrigation With Reclaimed Water. The golf course would be irrigated with groundwater obtained from onsite wells in the Monterey shale formation and with reclaimed water from the Cañada Woods Wastewater Treatment Facility. Both water sources contain a moderate load of salts and sodium (from a landscape irrigation perspective), but relatively low amounts of nutrients and metals. Turf irrigation would be managed to prevent salt build-up in the surface soils and deep leaching of the irrigation percolate (potentially containing dissolved constituents inherent in the water supply and applied agrochemicals). Golf course irrigation will be controlled to ensure efficient and minimal watering and to minimize runoff from the site.

Golf Course Turf Maintenance/Management. Golf course fairways and greens are fertilized regularly, but typically not during the rainy season. Management of fertilizer application is proposed to assure proper application rates, timing, and the form of application to prevent water quality degradation. The final golf course design and operation would minimize the opportunity for runoff of fertilizer residue by using native grassland vegetated buffers. The golf course plan also seeks to minimize the use of chemical pesticides with use Integrated Pest Management practices. Various technologies are typically used by golf courses to control or reduce the adverse effects of pests. Close mowing and poor management favor the occurrence of infectious diseases. These problems would be minimized by the use of good cultivation practices (irrigation and mowing) and use of disease-resistant turfgrasses. All maintenance aspects of the golf course turf which are capable of biological management will incorporate environmentally sensitive technologies. The Golf Course Environmental Management Plan (Questa Engineering) provides a detailed discussion of these methods, which is summarized below.

The Environmental Management Plan sets forth guidelines regarding pesticide application rates, timing, and methods. Pesticides would be applied selectively based on scientific monitoring, and would be applied much less frequently than fertilizers. The pesticides selected for use have been carefully screened and are not highly mobile nor persistent, to minimize impacts to non-target vegetation as well as to surface and groundwater.

Important elements of the proposed golf course operation are the Nutrient and Pest Management Plans, which are incorporated in the overall Environmental Management Plan. These plans detail the procedures to construct and maintain a chemical storage, mixing and handling area, as well as information on actual application use, and disposal. The document provides technical information regarding pesticides, fertilizers and other chemicals to be used on the golf course, as well as methods of application and handling. It includes key water quality protection provisions, such as the use of vegetated buffers, vertical separation between greens and localized, shallow seasonal groundwater, and use of subsurface drainage to collect excess runoff and trap pollutants.

Measures to minimize fertilizer transport include preparation of a nitrogen control plan, monitoring of fertilizer application rates, use of slow release nitrogen, computerized sensing to minimize irrigation applications, and optimize applications. Measures to minimize pesticide impacts include application by a licensed Pesticide Applicator in accordance with all applicable laws, use of proper equipment and preparation in a controlled and designated area, selection of less toxic, less mobile, and less persistent pesticides where possible, appropriate timing and scheduling, and buffering to avoid application in identified sensitive areas.

The project also proposes to consider and, as their effectiveness is demonstrated, employ new and emerging technologies to provide environmental and landscape management that is effective and safe. These include, for example, use of a BioJect fermentation unit, which is attached to the irrigation system. The BioJect injects live, naturally occurring soil bacteria (*Pseudomonas aureofaciens, Bacillus thuringensis* and other microbial agents) into the soil, which aid in control of leaf pathogens in turfgrass. The golf course is committed to being at the cutting edge regarding application of new and emerging technologies that minimize the use of broad spectrum synthetic chemicals in favor of ecologically-based management that uses cultural and biological controls and selective, narrow spectrum pesticides (Questa Engineering, 1996a).

Monitoring. The monitoring of soils, vegetation irrigation water use, chemical use, and groundwater and surface water quality is an important component of on-going golf course management. Some of the monitoring is required by law or regulations, (e.g., pesticide use, reclaimed water irrigation system), and other monitoring will be voluntary as part of good management and operational practice for the facility. See Technical Appendix III for further details.

The proposed reclaimed water irrigation facilities will be operated under a waste discharge permit issued by the Regional Water Quality Control Board and in accordance with other conditions that may be added by the Monterey County Health Department. This will require regular inspection and monitoring of the facilities, and filing of monthly and annual "Self-Monitoring Reports" with the Central Coast Regional Board and in accordance with any other conditions that may be added by the Monterey County Health Department. It is anticipated that the monitoring program will include sampling and analysis of surface water and groundwater monitoring wells. The sampling locations and frequency of sampling will be determined by the Regional Board.

Water quality sampling for pesticides is proposed to include two specific additions to the required surface and groundwater sampling program.

- <u>Annual Sampling</u>. An annual water sample will be taken from the most downstream surface water location and down gradient of groundwater monitoring well for pesticide analysis. Depending upon the results and trends over time, the sampling frequency and chemicals sampled may be adjusted.

- Contingency Storm Event Sampling. In the event that an off-season storm occurs shortly following pesticide application, analyses will be performed on samples of the surface water at the downstream limit of the golf course to determine whether there is any pesticide residue in the runoff. The results will be used in deciding which pesticides to continue to use selectively and which pesticides should be placed on the restricted list and replaced with a different method of control, either biological or chemical.

IMPACTS AND MITIGATION MEASURES

Standards of Significance. In accordance with the California Environmental Quality Act (CEQA), State CEQA Guidelines, and agency and professional standards, a project impact would normally be considered significant if:

- the project would increase stormwater runoff volumes to the point of exceeding storm drainage facility capacity, or increasing the risk or severity of flooding in downstream areas;
- project facilities would be located in flood-prone areas;
- surface discharges exceed established water quality standards, result in increased erosion and sedimentation, or adversely affect aquatic habitats; or
- the project substantially degrades groundwater quality.

None of the proposed homes or structures are located in flood-prone areas, or areas subject to inundation in a 100-year storm event.

Impact #5: Project development would result in an increase in the rate and amount of surface runoff as a result of an increase in impervious surfaces, but would not exceed storm facility capacities with proper sizing, as planned. This is considered a less-than-significant impact.

Implementation of the proposed project would result in the conversion of an estimated 33 acres of presently pervious surface to impervious surfaces, from the paving of roads, driveways, and parking lots, and the construction of homes and recreational and equestrian facilities. Of these 33 acres, approximately one-third (11 acres) would be located within the Canyon del Rey watershed, while the remaining two-thirds (22 acres) would be located within the Cañada de la Segunda watershed. For the portion of the project within the Cañada de la Segunda watershed, the post-development runoff coefficient would be an estimated 17.2% (C=0.172); this would increase the 10-year peak runoff rate from approximately 99 cfs to 113 cfs, and the 100-year peak runoff from approximately 148 cfs to 170 cfs.

Monterey County prohibits any increase in the rate of runoff from a project site after development. Therefore, for the portion of the project site within the Cañada de la Segunda watershed runoff storage will be provided for the difference between pre- and post-development conditions for the 100-year storm flows for one-hour duration. An estimated 80,000 cubic feet of storage capacity would be required; the proposed location of the retention basin is shown in Figure 4 in Section 3.0 -- Project Description. Implementation of the specified volume of storage would eliminate any increase in peak runoff that would result from an increase in impermeable surfaces from the project, thereby reducing the potential impacts to a less-than significant level. It should be noted that this estimate of 80,000 cubic feet is considered conservative, and represents the upper limit of storage volume required to prevent an increase in runoff from the site. This estimate may be revised downward during final design of the drainage facilities.

This estimate of the increase in runoff from the project site neglects any effects from the construction of the golf course, which could act to increase the amount of percolation over its surface, thereby offsetting a portion of the increase in impermeable surfaces in other areas of the project site. Infiltration rates would also likely be increased on the surrounding natural areas as grazing animals (and the trampled, compacted soil conditions they cause) are removed and the area is converted to managed native grassland and woodland with improved soil conditions.

Runoff from the northern 250-acre portion of the site will flow north toward the Canyon Del Rey drainage. This area includes runoff from all of lots 11, 12, 13, 14, 15, 39, 40, 41, 43, and the 12 member suites and approximately half of the building sites on lots 4, 5, 37, 38 and 42. The 11 acres of impermeable surfaces will result in a minor increase in peak flows within this watershed. The proposed level of development would be of lower density than would occur under the approved Monterra Subdivision. Retention facilities have been constructed as part of Monterra Phase 1 that would partially accommodate the increased runoff from the project site. If necessary, a small retention basin could be constructed downstream of the northern portion of the project site within the Canyon del Rey to accommodate all increased runoff.

Mitigation

None required.

Impact #6: Project development could result in a degradation of stormwater runoff quality as a result of the introduction of fertilizers, pesticides, and contaminants associated with motor vehicles (such as gasoline, oil, grease, lead, rubber, etc.) without proper management. This is considered a potentially significant impact.

Application of golf course fertilizers and pesticides represent a potential non-point (i.e., diffuse) source of water pollution. Non-point pollution is that primarily associated with rainfall-runoff or percolation into the ground. Golf course fairways and greens are fertilized regularly, and the fertilizers generally are applied several times per year to avoid heavy doses of nutrients that could exceed the rate of plant uptake. The planned golf course buffer areas may undergo a one-time fertilization during construction; subsequent fertilization is on a rare, as needed basis to maintain a healthy ground cover of native annual and perennial grasses and forbs.

Nitrogen is the primary fertilizing agent and is of potential water quality concern for downstream surface waters and groundwater. The greatest concern is that applied nitrogen fertilizers may be transported by surface runoff before it is absorbed and utilized by the vegetation. The usable groundwater in the project area occurs in the Monterey shale, at depths of 200 or more feet, and is unlikely to be substantially affected by the irrigation percolate; however, BMPs for turf management would be implemented irrespective of the lack of potential to adversely affect groundwater supplies.

A variety of factors influence the transport of nitrogen from turf areas to surface waters, including climate, rainfall intensity and duration, soil texture, management practices, plant uptake ability, volatilization, and soil moisture conditions. The greatest concern is that of nitrogen fertilizer being transported by surface runoff from the area of application before it is absorbed and utilized by the vegetation. The majority of nitrogen that is transported to surface water sources consists of sediment-bound nitrogen. The increased nitrogen delivered to a surface water body can serve as a nutrient enrichment, causing stimulation of aquatic growth and, possibly, increased eutrophication of the water body (Questa, 1996).

The layout of the golf course has avoided the placement of fairways, tees and greens where unfiltered runoff can directly enter any of the seasonal drainages on the site. This would greatly reduce the potential for runoff of residual nitrogen from fertilizer applications. Where artificial ponds are proposed to be constructed as water hazards, these may be sited close to turf areas. Special care is needed in the final golf course turf design and operations to minimize the opportunity for golf course runoff to enter natural water bodies without first passing through a vegetated buffer area (i.e., buffer grasses, rough or transition area). Natural and enhanced stream corridors have the ability to absorb and remove a substantial amount of nitrate-nitrogen through plant uptake and denitrification; soil nitrogen removal rates are typically in the range of 20 to 60 pounds N/acre/year. Potential impacts to water quality from golf course operations would be mitigated by a strict adherence to the recommendations contained in the Environmental Management Plan prepared by Questa Engineering Corporation.

While there are no streams at the Cañada Woods North project site, enhancing and maintaining a healthy drainage corridor within and adjacent to the playing areas can be a very effective water quality management tool for golf courses. The primary natural drainage way in the golf course area is the upper part of the Cañada de la Segunda Canyon. The 2 mile distance between golf course and Carmel River and the time required for travel from the project site to the Carmel Valley aquifer would virtually eliminate any adverse impacts to the alluvial aquifer.

Operation of motor vehicles over paved roads and parking areas can introduce pollutants such as gasoline, oil, grease, lead, copper, and rubber into stormwater runoff. While these contaminants can have significant water quality impacts, the limited amount of proposed roadways and parking areas would not be expected to introduce a significant source of pollutants to the watershed.

<u>Mitigation</u>

Implementation of Mitigation Measures 6-1 through 6-3 will reduce the impact to a less-than-significant level.

6-1 Implement Best Management Practices (BMPs) identified in the Questa Engineering *Environmental Management Plan for the Cañada Woods North Golf Course* (July 8, 1996) to control non-point source water pollution. Measures include, but are not limited to:

- Create vegetated buffers to provide a catchment area for settling, filtering and uptake of fertilizer or pesticide residue that may be carried from the turf area by runoff;

- Use drainage swales to convey and disperse runoff from parking lots and other paved surfaces, to attenuate the runoff and allow for maximum pollutant absorption in the soil;

- Utilize subsurface drains beneath tees, greens and sand traps to disperse percolate to the vegetated buffer areas for filtering and absorption of any nitrate or pesticide residue;

- Select areas along the seasonal drainages through the golf course for enhancement through native plantings and irrigation to provide uptake and removal of nitrate in the shallow groundwater zone;

- Utilize fertilizer control measures to minimize the transport of fertilizers from the golf course into local drainages and downstream receiving waters, as well as to minimize nitrate additions to groundwater; and

- Utilize pesticide control measures to minimize the use and potential release of pesticides into surface water or groundwater, including the incorporation of integrated pest management (IPM), which is an ecologically-based pest management strategy that provides long-term prevention or suppression of pest problems with minimum impact on human health, the environment and nontarget organisms;

- Install oil and grease/silt traps at the parking lots and maintenance yard to intercept and contain oily residue and debris washed from vehicle areas before dispersal to the grass swales;

- Install a wastewater collection, treatment and recycle system at the maintenance area to collect and remove pollutants from the washdown of mowers and other equipment; the system would recycle the washwater for continual use;

- Avoid excessive irrigation and soil moisture by use of a sophisticated irrigation control system and on-site weather station to achieve high application efficiencies. This would reduce potential leaching to the subsoil and deep aquifer, as well as reduce potential surface runoff from irrigation application.

6-2 Implement program for maintenance activities to include provision that all paved roads and parking areas are mechanically swept at least once per year, prior to the start of the rainy season; catch basins should also be cleaned periodically, as planned.

6-3 Conduct periodic monitoring of surface water and groundwater for possible effects of the golf course operations with regard to nitrate, salinity, and pesticides.

Impact #7: The proposed project would result in a decreased nitrate loading to the groundwater. This is considered a less-than-significant impact.

Nitrates and metals in wastewater could adversely impact surface water and groundwater from runoff or deep percolation. However, because only domestic wastewater would be treated by the proposed facilities (no industrial discharges would be allowed), the potential for metals contamination is extremely low.

An analysis of existing, allowable, and projected nitrate loading rates was performed by Questa Engineering to determine project compliance with the CVWS and RWQCB requirements. For the proposed project, the major sources of nitrates would be from irrigation with reclaimed water, fertilizer application to the golf course, and from the 24 pastured horses. The loading for each component was calculated separately, and a summary comparison of the results is presented in Table 4. As shown, the proposed project would result in a nitrate loading of about 18% of the allocation allowed by the CVWS, and less than 10% of that allowed by the Basin Plan. Thus, the criteria are met with an ample margin of safety. Nitrate loading calculations are presented in Appendix B and the technical Questa Engineering wastewater study is presented in Technical Appendix V.

TABLE 4
SUMMARY COMPARISON OF NITRATE LOADINGS

Source	Total Nitrate Loading (grams per day)
Proposed Project	
• Irrigation with reclaimed water	733
• Golf course fertilizer	650
• Pastured horses (24)	1,938
TOTAL, PROPOSED PROJECT	**3,321**
Allowable Loading, CVWS Criteria (%)	18,680 (18%)
Allowable Loading, RWQCB Criteria (%)	42,400 (7.8%)
Loading for Approved Development (%)	4,239 (23%)
Existing Loading (%)	4,542 (24%)
SOURCE: Questa Engineering Corporation, 1996	

The analysis includes a "worst case" assumption regarding nitrate loading from the pasturing of 24 horses. Moreover, the overall actual nitrate impact is likely to be reduced even further due to uptake of nitrate by native vegetation within and around the golf course. The golf course is located approximately two miles from the Carmel Valley, and is situated outside of the alluvial aquifer; the water quality impact on the Carmel Valley aquifer would therefore be insignificant.

The Cañada Woods North project falls within hydrologic sub-basin 31, as defined in the CVWS. Of the 810 acres of the project site that are tributary to the Carmel Valley, 593 acres would have an allowable septic tank loading of 200 gpd/ac, 16 would have an allowable loading of 300 gpd/ac, and the remainder would not be allowed to have septic systems due to slope, soils, or other constraints. These allowable loading rates were determined by Montgomery Engineers as part of the *Carmel Valley Wastewater Study* and were adopted as a policy of the *Carmel Valley Master Plan*. Therefore, according to the CVWS criteria, the total allowable loading for the project would be the equivalent of 123,400 gpd of septic tank effluent, or 18,690 grams per day of nitrogen (assuming septic tank effluent with 40 mg/l of nitrogen). According to RWQCB criteria, the allowable loading would be 42,400 grams per day for the 1,060 acre project. It should be noted that the existing cattle grazing operations result in an estimated nitrate loading of 6,056 grams per day.

The Questa nitrate loading analysis evaluated the existing conditions on the property, assuming all of the cattle grazing occurs on the project site. While the cattle operations is centered on this part of the property (i.e., water, feed and salt licks are located here), the cattle are not prevented from grazing on the remaining portion of the ranch, outside of the Carmel Valley watershed. The major contribution of nitrate from livestock occurs where the animals congregate, e.g., for feeding, watering, etc. The contribution from rangeland is generally considered to be minor due to uptake and assimilation of the nitrate by the vegetation and soils. A reasonable assumption in this case is that 50% of the nitrate loading is associated with the feeding and watering areas on the Cañada Woods North site, and the remaining 50% from grazing is split 50-50 between the Carmel Valley watershed side (Cañada Woods North) and the portion of the ranch to the north. Thus, about 75% of the nitrate loading from the existing cattle operation is assumed to occur on the Cañada Woods North project site. Incorporating this assumption in the previous nitrate loading calculations reduces the estimate of nitrate loading for existing conditions by 25%, as follows:

- Cattle grazing: average of (0.75)(150) = 112.5 head
- Total nitrogen for 112.5 animals at 161.5 gms/day; 18,169 gms/day
- Fraction Leached (0.25)(18,169) = 4,542 gms/day

Based on this revised calculation, the projected nitrate loading from the project (3,321 gms/day) is estimated to be about 25-30% less than the loading under the existing conditions, considering only the Carmel Valley watershed portion of Monterra Ranch.

As discussed in the Environmental Setting section, review of vicinity wells shows no existing nitrate contamination. Based on the above data and the projected nitrate loading from the project there is no significant nitrate concern in the project area. Monitoring of project effects can be made by measuring nitrate levels at the existing bedrock wells and by establishing one additional shallow monitoring well in channel alluvium of Cañada de la Segunda Canyon.

Mitigation

None required because the proposed action would reduce the existing nitrate loading, and would be well within established nitrate loading criteria. However, it is recommended that regular collection and disposal of horse manure be considered to reduce the nitrate loading from the pastured horses.

Impact #8: Use of reclaimed wastewater for golf course irrigation could contribute to buildup of salts, but would not create water quality or vegetation impacts with the tertiary level of treatment and salt tolerant turfgrasses proposed for use on the golf course. This is considered a less-than significant impact.

Water quality is an important consideration for irrigation because of potential effects on soil drainage and vegetation. In addition to nitrates, as discussed above, reclaimed wastewater typically has some limitations for horticultural uses, including high sodium, boron, or salt levels, as measured by total dissolved solids (TDS). Long-term soil permeability and drainage can be adversely affected by sodium and salt build-up from irrigation waters. However, the project site does not contain soils that are highly expansive and clayey, and, therefore are not subject to development of drainage, compaction, or aeration problems. Crops, turfgrass and other vegetation need to be protected from immediate/acute salt shock and toxicity effects at high levels of TDS from single time applications, as well as such effects as discoloration, leaf drop and stunted growth from long-term build-up of salt, boron, and sodium in the soils.

With respect to the reclaimed water sources for golf course irrigation purposes, available data show that salt and sodium levels (as measured by the adjusted sodium absorption ratio or SAR) are moderate, and of potential concern in golf course turf management. Onsite groundwater from the deep Monterey shale aquifer is expected to have higher salt (TDS of 1,000 to 1,200 mg/l) and sodium levels than the reclaimed wastewater (Questa Engineering, 1996a). Nitrate levels are restricted to a maximum of 6 mg/l in the wastewater (per Monterey County Code Chapter 15.23), and are also low in Carmel Valley aquifer water as well as in the bedrock groundwater.

The quality of the Cañada Woods North irrigation water was analyzed, with the TDS and salt content being of special concern. The data collected on groundwater quality, combined with projections for reclaimed wastewater, indicate that the SAR of the blended water would not adversely affect the turf. Whereas most turfgrasses are unaffected by salinity of up to 3 mmho/cm, in this case the salinity is expected to be approximately 2 mmho/cm (Questa, 1996). The micro-climate at the project site allows for the use of more salt-tolerant grasses (Hantzche, personal communication, July 1996).

Surface Water Quality Impacts. Under proper operation, the proposed disposal of reclaimed wastewater to land would not result in any noticeable impacts on surface water quality in local drainages or downstream in the Carmel River, because direct surface water disposal to any river or tributary streams is prohibited. Spray irrigation would be limited to non-rainfall periods, with application rates matched to soil properties and turf water demand; this would preclude surface runoff from irrigated areas. Turf nitrogen requirements and the nitrogen in the reclaimed water would also be considered in making fertilizer applications. Holding ponds would provide for effluent storage during the winter months to comply with the discharge requirements. Effects on surface waters would be less-than significant.

Groundwater Quality Impacts. The key constituents of concern in analyzing potential impacts of reclaimed water application on groundwater quality include nitrates and salts. Nitrates are discussed above in the previous impact discussion. The project would contribute salts to the groundwater as a by-product of golf course irrigation. Salts (i.e., total dissolved solids) contained in the water used for irrigation would accumulate in the soil, while most of the water is taken up by plants or evaporated. The salts are then transported with percolating rainfall and the small fraction (approximately 10%) of irrigation water that recharges either the deep bedrock groundwater or joins the shallow alluvium.

The TDS concentration of this percolate was estimated from a simple mass balance equation to be approximately 710 mg/l, considering the various sources of recharge water (i.e., rainfall, reclaimed water, and bedrock groundwater) and their associated TDS concentrations. This mass balance indicates a combined percolate TDS concentration lower than the naturally occurring background conditions in the Monterey Shale bedrock. However, with continued downward percolation, the water would continue to leach salts from the bedrock, eventually reaching equilibrium with the native groundwater. This analysis assumes uniform mixing of percolating water; TDS concentrations above and below that predicted by the simplified mass-balance equations would be expected. However, the effects of salt buildup would be considered less-than significant (Questa Engineering, July 1996a). Furthermore, the TDS concentration of reclaimed water is less than that occurring in the onsite well based on water quality sampling (Questa Engineering, July 1996 c).

In general, water quality concerns resulting from irrigation with reclaimed water are mitigated by the proper design and operation of the irrigation system. As proposed, the impacts to water quality would be less-than significant; thus, adherence to the guidelines presented in Questa's Environmental Management Plan shall be required to minimize impacts to water quality.

Good irrigation system design and construction are heavily dependent upon use of experienced professionals. To insure quality design and workmanship, irrigation plans shall be prepared by a California licensed Landscape Architect, and installation shall be performed by a California licensed Landscape Contractor, with construction inspection and system testing by the project landscape architect. New and innovative methods of irrigation design and management should be encouraged.

Salt and Sodium Effects on Turf Grass. Irrigation of several Monterey Peninsula golf courses with reclaimed water has resumed in turfgrass management problems due to accumulation of sodium and/or soluble salts in the soil from high levels of these constituents in the irrigation water. This has caused brown spots and burning of the turfgrass.

Project reclaimed water is expected to be of better quality than other sources of reclaimed water used on the Peninsula. One of the primary contributors to high salt and sodium levels in wastewater is domestic water softeners that use salt as the exchanger. although local ordinances generally preclude installation of new traditional water softeners that use sodium chloride, many older homes still have such units and adversely affect reclaimed water quality. Prohibitions against installation of such units will be strictly enforced in the Cañada Woods North water and wastewater service area.

Several other management techniques will be used to control and minimize potential salt and sodium problems in turfgrass areas. These will include:

a. Pre-conditioning the soils with gypsum and/or lime at the time of turfgrass site preparations, to counter balance long term effects from sodium build-up in the soil. Soil pH/salinity/sodicity monitoring will be used to determine when additional lime or gypsum needs to be injected in the soil through the irrigation system, or applied as a top dressing.

b. The Bioject System proposed for biological turfgrass pest control also provides the opportunity to inject weak acids and bases into the soils. These compounds react with either naturally occurring (to the soil) or injected calcium and magnesium carbonates and sulfates, and release calcium and magnesium ions that displace more damaging sodium ions absorbed on the soil. The sodium ions are then leached out of the soil in subsequent irrigations, or by rainfall.

c. Turfgrasses will be selected for sodium, salt, and drought tolerance. In general, this will mean that fescues, ryegrasses, and some kinds of bentgrasses will be favored, and bluegrasses and other salt sensitive grasses will be avoided.

d. Irrigation management will be carefully controlled to meet turfgrass evapotranspiration needs and avoid frequent, light, mid-day, water applications (a practice that can lead to salt and sodium accumulation) in favor of less frequent, deeper, evening watering that minimizes salt loading and keeps salts at manageable depths below the root zone until they are flushed naturally with winter rains.

Mitigation

None required, but the following is recommended.

8-1 Restrict water softening units to those which utilize offsite regeneration technology.

4.4 WATER SUPPLY

This section discusses the proposed project water supply plan and analyzes the effects of the plan on the local and regional water resources based on review of a project water supply report prepared by Questa Engineering Corporation. The report is included in Technical Appendix IV. Review of bedrock groundwater conditions was provided by Todd Engineers as part of this EIR.

ENVIRONMENTAL SETTING

The project site encompasses approximately 1,060 acres in the unincorporated area of Monterey County, California. The site consists of that portion of the Monterra Ranch which lies primarily within the Carmel Valley watershed. Project water supply would be met by a combination of groundwater and reclaimed water. There are two distinct aquifer systems, the Carmel Valley alluvial aquifer (which is a source of potable water supply) and onsite bedrock wells located in the Monterey Formation (which is a source of non-potable water supply).

Carmel Valley Alluvial Aquifer

Regional Conditions. The modern bed and floodplain of the Carmel River consists of a loose mixture of sand, gravel, boulders, silt, and clay, known as the Carmel Valley alluvial aquifer. Near the project site, this material is between 200 and 300 feet deep at the deepest point in the valley. The Carmel Valley aquifer in the project vicinity is shown on Figure 9.

The Monterey Peninsula Water Management District (MPWMD) is responsible for regional water supply planning within a 170 square-mile area, consisting primarily of the Monterey Peninsula and the Carmel Valley. The Monterey Peninsula region depends solely upon local resources to meet its water supply needs. The California-American Water Company (Cal-Am) supplies most of the customers within the MPWMD's boundaries. Cal-Am obtains its water by diversion from San Clemente Reservoir and from wells in the Carmel Valley and Seaside, of which the Carmel Valley wells provide a large portion of the Peninsula's water supply.

Complaints have been filed before the State Water Resources Control Board (SWRCB) alleging that Cal-Am does not have a legal right to take water from the Carmel River basin, and that pumping of municipal water wells causes environmental damage to the river. The SWRCB is the authority that determines who has the legal right to take water in California, and how much is allowed to be used. The SWRCB has determined that Cal-Am is diverting 10,730 AFY from the Carmel River basin without a valid water right, corresponding to roughly 70% of the water supply for the Monterey Peninsula. The SWRCB has therefore ordered Cal-Am to develop a water conservation plan and to reduce water use. In water year 1996, Cal-Am is limited to 11,990 AFY from the Carmel River basin; this amount is further reduced to 11,285 AFY in water year 1997, and will be reduced each year until the entire 10,730 AF are replaced.

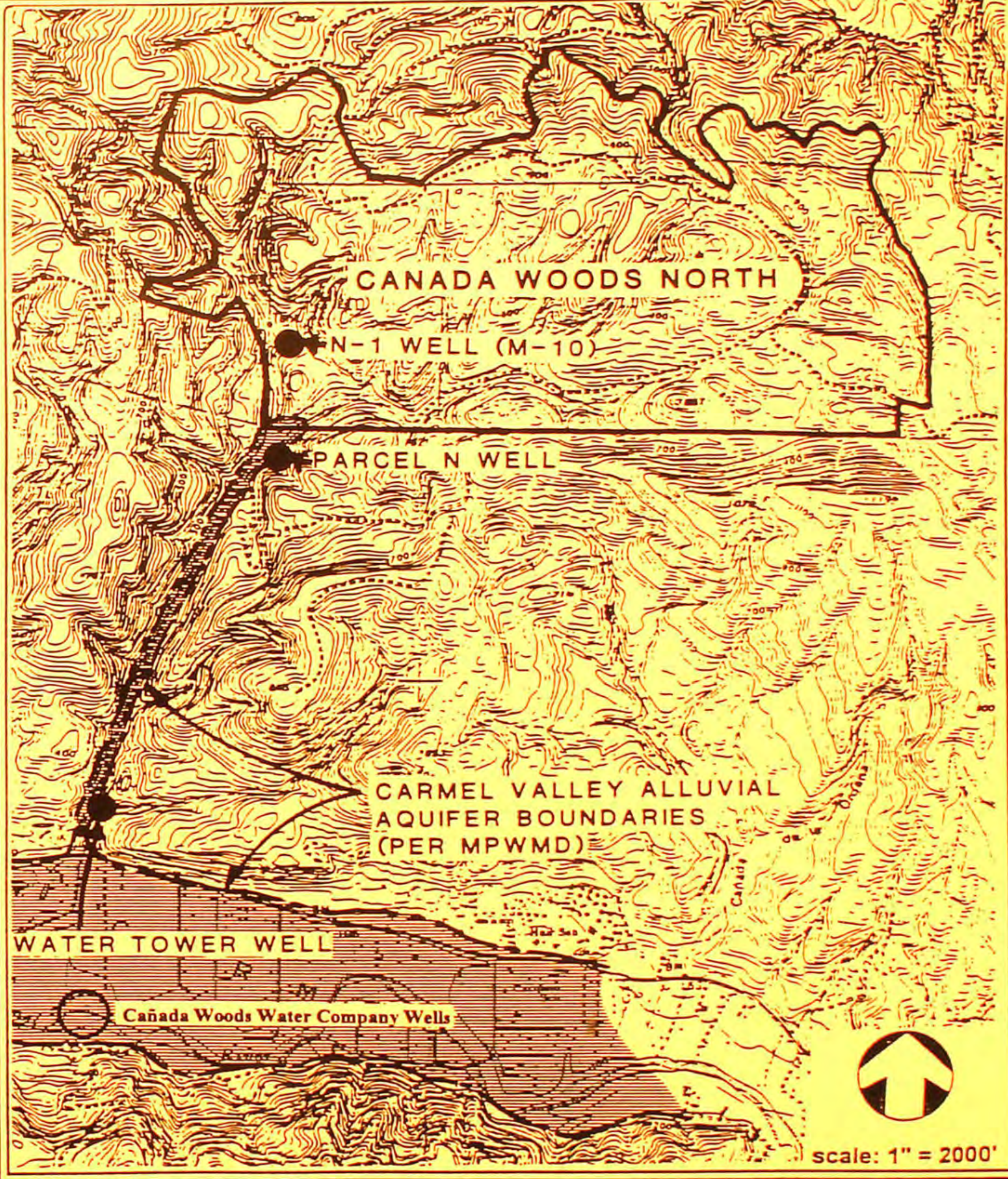
Vicinity Conditions. Potable water supply is proposed to be provided to the adjacent approved Cañada Woods project and the proposed project (as described below) by the Cañada Woods Water Company (CWWC). The CWWC is a privately owned water company seeking certification from the Public Utilities Commission. Water Company approval was granted for operation of the CWWC within the Cañada Woods Subdivision by the Monterey County Health Department and by the MPWMD for distribution in 1995.

The CWWC owns 4 wells on the south side of Carmel Valley Road (see Figure 9) that make up the existing approved supply for the Cañada Woods project. These are high production wells that draw their supply from the Carmel River alluvial aquifer. The wells have been used historically as the irrigation water supply for agricultural uses on this portion of the Cañada Woods site (Williams parcel).

The approved capacity of these wells is 160 acre-feet per year (AFY); this is specified in water right permits No. 20831 and 20832, issued by the State Water Resources Control Board (SWRCB), Division of Water Rights, dated March 29, 1996. Water rights permits were required to be obtained for this well water because it is classified as subterranean flow of the Carmel River and, as such, subject to the same appropriation requirements as surface waters. The SWRCB permits allow a maximum diversion of 160 AFY, but the diversion has been limited to 147 AFY until the proposed New Los Padres Reservoir (or some other water supply project) is completed. The SWRCB permits also limit use of the water to the Cañada Woods site ("place of use") unless proposed transfers are approved by the SWRCB. The SWRCB decision has been legally challenged. Under State law, a permit is valid until revoked, and thus, the applicant's appropriative water permits are valid, notwithstanding legal challenge.

The water quality is suitable for domestic uses, but requires treatment for removal of iron and manganese. The total dissolved solids (TDS) concentrations of the alluvial groundwater is typically in the range of 250 to 500 mg/l (Questa Engineering, 1996).

The CWWC water treatment and distribution system is presently under development, and will include a water treatment plant, water lines, storage tanks, pressure reducers, fire hydrants and booster pumps. Two of the Carmel Valley alluvial aquifer wells will be interconnected by distribution lines to a central water treatment facility for iron and manganese removal. The treated water would supply domestic/potable uses.



	Carmel Valley Alluvial Aquifers and Cañada Woods Wells	Figure 9

Separate distribution lines from the wells would continue to provide untreated water for irrigation of the open space agricultural lands within the approved Cañada Woods project. Under the presently approved plan, the retained farmland (approximately 40 acres) within the Cañada Woods Subdivision is intended to utilize water from one or more of the Carmel Valley wells, as well as be able to use reclaimed water from the proposed onsite wastewater treatment system for crop irrigation. Reclaimed water could also be used for landscaping.

Onsite Bedrock Wells

There are 3 existing wells (2 on the Cañada Woods site and 1 on Cañada Woods North) that draw their water supply from the bedrock Monterey formations outside of the Carmel River Alluvium. The location of these wells is shown in Figure 9. The water from these wells is not subject to water rights appropriation, as are the four CWWC wells on the south side of Carmel Valley Road. This determination was made by the SWRCB, Division of Water Rights, in response to a water permit application filed for the most southerly located "water tower" well (SWRCB, 1992). Review of existing groundwater and well data was conducted and supplemented by Todd Engineers as a part of this EIR and is summarized below.

Physical Characteristics. The existing wells range in depth from about 300 to 720 feet, are sealed over the upper 50 to 80 feet, and draw water from the fracture zones of the lower siliceous shale member of the Monterey Formation that underlies this area. Bedrock aquifers typically have greater hydraulic conductivity values near the surface and gradually decreasing values with depth. This is due in part to greater weathering of near surface bedrock and greater overburden pressures at depth which limit fracture openings (Davis and DeWiest, 1966; Freeze and Cherry, 1979; Bedinger, et.al., 1986). Because it is unlikely that a continuous zone of high permeability at depth is overlain by a continuous relatively low permeability zone near the surface, the Monterey Formation on the property can be classified as an unconfined aquifer. Recharge supplying bedrock wells would occur as rainfall percolating through soil and bedrock over the entire site.

Groundwater storage was estimated for the area encompassed in the water balance. The groundwater storage calculation was made as follows:

Groundwater Storage = Area x Saturated Thickness x Specific Yield

The following values were used in the calculation:

Area = 1,609 acres
Saturated Thickness = 400 feet
Specific Yield = 0.02

Inserting these values in the groundwater storage equation yields a groundwater storage of approximately 12,870 acre-feet.

Well Yields. Pumping tests were conducted in June 1996 for the Canada Woods (Water Tower Well and Parcel N Well) and Canada Woods North (Well N-1) well. Step-drawdown tests were conducted for the Canada Woods wells for a period of 5 days, and a constant rate test was conducted for the Canada Woods North well for 4 days. Results are summarized on Table 5.

TABLE 5
PUMPING TEST DATA FOR BEDROCK WELLS

Test	Well N-1 (M-10)	Parcel N Well	Water Tower Well
Total Pumping Duration (hours)	94.5	126.4	122.5
Total Volume Pumped (gallons)	251,896	845,064	1,226,514
Average Pumping Rate (gpm)	44.4	111.2	166.4
Initial Depth to Water (feet)	25.1	48.0	29.7
Water Level at End of Test (feet)	176.0	222.1	160.8
Maximum Drawdown Achieved (feet)	150.9	174.1	131.1

SOURCE: Questa Engineering, July 9, 1996

The constant rate test conducted on well N-1 provides a reasonable basis for evaluating potential well yield. The time-drawdown curve for N-1 does not indicate the presence of any discharge (barrier) boundaries. Therefore, a well yield estimate of 38 gallons per minute can be obtained as a product of the 24-hour specific capacity (0.28 gpm/ft) times available drawdown (135 feet). However, although the available data indicate a recovery exceeding 80% of total drawdown, the data were insufficient to provide additional confirmation of this well yield.

The pumping tests on the Water Tower and Parcel N wells included two to three different steps (i.e. pumping rates) in the first day followed by 4 days of pumping at a relatively constant rate. A review of the step-drawdown data did not provide all of the necessary drawdown and recovery data to estimate well yields. However, the data do provide a preliminary basis for evaluating the anticipated well yields of 160 gpm and 128 gpm for the Water Tower and Parcel N wells, respectively (Questa Engineering, 1996).

Step-drawdown data for the Water Tower well indicate the possibility of a discharge (barrier) boundary occurring after 2.5 days of pumping. Although this apparent boundary may be due to other reasons such as overpumping, well inefficiencies, and/or decreasing saturated thickness, additional constant rate testing would be needed to further evaluate the cause of this phenomenon. Nonetheless, a maximum potential well yield of 104 gpm can be calculated as the product of the 24-hour specific capacity (1.30 gpm/ft) times the available drawdown (80 feet). Recovery data are generally lacking but available data do indicate a recovery in excess of 90%. Confirmation of this well yield would be subject to additional constant rate testing (drawdown and recovery) to determine the nature of the apparent discharge boundary.

Step-drawdown data for the Parcel N well also indicate the possibility of a discharge boundary or serious well inefficiencies at pumping rates of 100 gpm or more. Thus, the estimated well yield for the Parcel N well should not exceed 100 gpm, and would be subject to further evaluation by constant rate pumping to collect drawdown and recovery data.

The operation mode of each well when the project is implemented should include a maximum pumping time of 12 hours per day.

Recharge. Recharge of groundwater was evaluated by Todd Engineers as part of the EIR with the preparation of a water balance. A water balance describes the inflows and outflows of water from the area. The sole inflow of water is rainfall, which averages approximately 16 to 17 inches/year. Of this rainfall, some is intercepted by plants and trees or consumed by plants through evapotranspiration. The remainder, termed the water yield, runs off as streamflow or percolates as groundwater recharge.

The water balance methodology and data are detailed in Appendix F. The water balance was computed for the project site, encompassing 1,060 acres, plus the Cañada Woods site, encompassing 550 acres, that provides recharge to the two bedrock wells on the Cañada Woods site. The total area for the water balance is approximately 1,600 acres.

The water balance was evaluated for water years 1961 through 1992. The rainfall over this period approximates long-term average conditions, and includes two significant droughts, the extreme drought in 1976 and 1977 and the prolonged, severe drought of 1987 through 1990.

The results indicate that average annual recharge is estimated to be 196 acre-feet/year, with a possible range of 154 to 358 acre-feet/year. These values represent average conditions; as with rainfall and runoff, groundwater recharge also is variable. As detailed in Appendix F, estimated recharge ranges from over 1,000 acre-feet in a year to zero in drought years.

Inserting these values in the groundwater storage equation yields a groundwater storage of approximately 12,870 acre-feet.

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As indicated, most droughts with zero recharge occur only for one year, with the notable exception of the recent 1987-1990 four-year drought.

Water Quality. The water quality from these wells tapping the Monterey shale is distinctly different from the Carmel Valley alluvial groundwater. The TDS levels are typically in the range of 1,000 to 1,200 mg/l, more than double the TDS concentrations in the alluvial groundwater. Chloride, sodium, sulfate, and bicarbonate levels are also substantially higher in the bedrock wells, reflecting the mineralization of the shale.

Interconnection Between Carmel Valley Aquifer and Monterey Formation

The Carmel River alluvial aquifer boundary encompasses the Carmel Valley proper, and extends up several side tributary canyons, including Cañada de la Segunda. This mapped area overlaps the two bedrock wells on the Cañada Woods site, as shown on Figure 9. However, these wells are sealed through the topsoil and loose surficial material that are part of the alluvium in this canyon. These wells are screened in the Monterey Formation and draw water from fracture zones within the bedrock.

The MPWMD water resource system boundary in Cañada de la Segunda coincides specifically with the area mapped as "alluvium" on geologic maps of the area, presumably signifying that water in the tributary alluvium is an extension of and/or contributor to the Carmel River alluvial aquifer. The designation does not extend to deep groundwater found in the shale bedrock in the canyon, since the Monterey formation extends broadly throughout this area. There is no apparent geological correspondence between the Monterey shale and the Cañada de la Segunda canyon that would warrant the bedrock being designated as part of the Carmel Valley alluvial aquifer in this specific narrow area. During the analysis of the proposed Cañada Reservoir, the Corps of Engineers analyzed and field inspected the entire length of the Cañada Canyon and concluded that it is not a stream or tributary to the Carmel River: they found no definable channel, and thereby issued a 404 nationwide permit for the reservoirs, based upon that investigation and conclusion (Questa Engineering, 1996c).

The Monterey Formation in Cañada de la Segunda watershed forms an unconfined fractured bedrock aquifer. In comparison to Carmel Valley alluvium, the fractured bedrock aquifer has a significantly lower hydraulic conductivity and porosity as well as different water quality. Therefore, the bedrock and alluvium form two distinct aquifers.
However, a hydraulic connection does exist between the bedrock and alluvial aquifers. Groundwater in the fractured bedrock aquifer generally flows towards and eventually discharges to Carmel Valley alluvium. A portion of the bedrock groundwater may also discharge to alluvium of tributaries within the watershed and subsequently flow towards Carmel Valley alluvium.

An estimate of groundwater discharge from the fractured bedrock to Carmel Valley alluvium was calculated by Todd Engineers as follows:

$$Q = KiA$$

where Q = groundwater discharge;
K = hydraulic conductivity;
i = groundwater gradient; and
A = cross-sectional area perpendicular to groundwater flow.

The hydraulic conductivity was estimated using the geometric average (0.16 feet/day) of well N-1 (0.39 feet/day) located on-site and well R-11 (0.06 feet/day) located approximately 10,000 feet southwest of Canada de la Segunda watershed at Rancho San Carlos (Camp, Dresser & McKee, et al., 1994). Both of these wells are screened to depths of approximately 400 feet in Monterey Formation. The groundwater gradient (0.05) was estimated by assuming a depth of 200 feet to groundwater in the upper reaches of the watershed, a water table depth near the surface (within 50 feet) at the Monterey Formation/Carmel alluvium boundary, and a flow path distance of 10,500 feet. The cross-sectional area of flow (1,800,000 square feet) was estimated to be 4,500 feet wide times 400 feet saturated thickness. Inserting these values into the equation provides an estimate of 120 AFY of groundwater discharge from fractured bedrock to Carmel Valley alluvium. This compares closely to a groundwater recharge estimate of 196 AFY from the water balance.

RELEVANT PROJECT CHARACTERISTICS

It is proposed that the Cañada Woods Water Company (CWWC) would supply domestic water to meet the demand of the project's 34 residential units and the domestic uses appurtenant to the golf course, recreation facility, and equestrian area. Water-conserving plumbing fixtures and landscaping and irrigation practices will be utilized to the maximum extent feasible, as required by County regulations. Expansion of the CWWC boundaries to serve the project site will require approval of an amended Water Distribution System from the MPWMD, County Health Department approval for expansion of the service area, and modification of point of use for appropriative water rights permit issued by the SWRCB.

The Cañada Woods Water Company (CWWC) will serve its customers via a series of pumping stations and ground level storage tanks. The distribution system consists of 4 lift (pressure) zones. Each is designed to deliver domestic potable water demand as well as provide fireflow storage. Operating pressures will be sufficient to provide a minimum of 40 psi at each meter during periods of maximum demand and a minimum of 20 psi residual pressure at a fire flow of 750 GPM. the entire water supply, treatment and distribution system is designed in conformance with PUC General Order 103 which is the standard adopted by the California State Public Utility Commission.

At full buildout, water for golf course irrigation would be provided primarily through treatment and reclamation of wastewater generated by commercial and residential uses within the existing Cañada Woods Subdivision, the proposed Cañada Woods North project, and Monterra Ranch Subdivisions. Additional water required for golf course irrigation would be provided by the 3 bedrock wells within the Cañada Woods Subdivision and the project site. The onsite wells would be used for all irrigation until the wastewater treatment plant is operating at full capacity.

Reclaimed wastewater irrigation is anticipated for use during an 8-month period (April through November). During the dry season, irrigation will occur as required to meet the actual turfgrass water requirements of the greens, tees, fairways and irrigated roughs. During the spring and fall (low rainfall) months, the greens will be irrigated every day, but at a reduced rate of application. Tees and fairway/roughs would be irrigated every other day at the most. During the winter months when the rainfall meets or exceeds the need for irrigation, the irrigation will be reduced significantly to an "as needed" basis only. This might be one day per week or less. All schedules will be adjusted as necessary (Questa Engineering, 1996c).

Actual irrigation requirements will be adjusted on a daily basis. All data obtained will be loaded automatically into the computerized central control and the adjusted irrigation schedules put into operation for the following day. Golf course irrigation will be accomplished by using a fully automated sprinkler system comprised of the latest state-of-the-art components and technology, to provide maximum water management capability. Low pressure sprinklers will be used throughout the golf course. The sprinklers will be equipped with internal pressure regulators to maintain all sprinklers at a predetermined constant operating pressure and flow rate to better conserve water. Sprinklers around greens will be spaced at approximately 50 to 60 feet to maximize coverage. Fairway sprinklers will be spaced between 65 and 75 feet. These spacings are necessary to avoid delivering irrigation water into areas which require very little irrigation or into areas which do not require irrigation at all (Questa Engineering, 1996a).

IMPACTS AND MITIGATION MEASURES

Standards of Significance. In accordance with the California Environmental Quality Act (CEQA), State CEQA Guidelines, and agency and professional standards, a project impact to water resources would normally be considered significant if:

- the project would substantially increase the consumption of limited potable water supplies;
- the projected water demand exceeds the capacity of the water supply or infrastructure system, or would require a substantial expansion of water supply, treatment, or distribution facilities;
- the project substantially degrades or depletes groundwater resources, contributes to groundwater overdraft, or substantially interferes with groundwater recharge; or
- considering the SWRCB ruling regarding Cal-Am's pumping of the Carmel Valley alluvial aquifer, any increase in Cal-Am's pumping of the Carmel Valley aquifer would be considered significant.

<u>**Impact #9**</u>: The proposed project would result in a potable and irrigation water demand, which can be met with existing approved water sources and onsite wells without exceeding planned system capacities or significantly affecting groundwater supplies. This is considered a less-than significant impact.

The Cañada Woods North project would require water supply for potable and non-potable (i.e., golf course irrigation) uses. The potable supply is intended to be provided by CWWC by extending the service from the Cañada Woods project. At buildout, the golf course irrigation supply is intended to come primarily from reclaimed water, but groundwater pumped from the bedrock wells on the Cañada Woods site and on the project site will provide additional water as required. Water demand for the project is presented here in terms of long-term annual demand, peak flow requirements, and interim development needs.

<u>Project Water Demand and Supplies</u>

Potable Water Demand. Table 6 presents the projected annual water demand for ultimate build-out of Cañada Woods North, along with the corresponding estimates of water demand for the existing Cañada Woods project. These estimates were originally are based on an average water use factor of 0.379 AFY, applied to each of the proposed 34 single-family residences, consistent with water use rates developed by the Monterey Peninsula Water Management District (MPWMD). However, the project water supply plan and this EIR increased this rate to 0.5 AFY based on rates applied elsewhere in the region for large lot projects and suggested rates used by Monterey County Water Resources and Environmental Health Department. This results in a total project residential water demand of 17.0 AFY.

The project would include 12 member suites for overnight lodging and 5 onsite employee houses. Water demand for these uses was estimated using MPWMD factors. The water demand estimate for the golf clubhouse includes the potable uses associated with the clubhouse restaurant, locker room and restrooms, the swim/tennis/equestrian facilities and the golf course maintenance building(s). The water demand is estimated to be 1.25 times the estimated wastewater flow for these facilities (6,750 gpd); this amounts to a conservative water demand of about 8,450 gpd or 9.80 AFY.

TABLE 6
WATER DEMAND -- CAÑADA WOODS NORTH AND CAÑADA WOODS PROJECTS

Land Use	Units	Use Factor (AFY/unit)	Alluvial Aquifer Demand (AFY)	Bedrock Well Demand (AFY)
POTABLE DEMAND				
Cañada Woods North				
• Residential Lots	34	0.5	17.0	
• Employee/Member Suites	17	0.21	3.57	
• Clubhouse/Recreation	*	*	9.80	
• System Losses @ 7%			2.29	
Total			**32.66**	
Approved Cañada Woods Project				
• Residential Lots	55	0.5	27.5	
• Employee Apartments	15	0.21	3.15	
• Commercial	*	*	5.7	
• System Losses @7%			2.74	
Total			**34.09**	
TOTAL POTABLE DEMAND			**66.75**	
NON-POTABLE DEMAND				
Cañada Woods				
• Agriculture	40 AC	2.5	73.25	26.75**
Cañada Woods North				
• Golf Course Irrigation	50 AC	3.0		150
• Less Reclaimed Water Supply				<112>
Total				**38**
TOTAL NON-POTABLE DEMAND			**73.25**	**38**
TOTAL GROUNDWATER DEMAND			**147.0**	**38**

* Based on estimates developed by Questa Engineering
** Or supplemented with reclaimed water

A 7% factor is added to the potable water demand to account for water system losses associated with fire flows, leaks, line bleeding and other miscellaneous (unmetered) uses. The losses are computed as 7% of the total water production (not 7% of the consumptive demand).

Project potable water demand totals 32.6 AFY and 71.75 AFY with the approved Cañada Woods project factored into demands. This leaves a CWWC approved capacity of 75.25 acre-feet for irrigation of agricultural lands on the approved Cañada Woods site. The project included 40 acres with an estimated water demand of 2.5 AFY/acre for existing crops, resulting in a demand of 100 AFY. Thus, total potable demand within the existing and planned CWWC boundaries can be met with the existing 147 AF/YR approved supply, although agricultural irrigation may need to be supplemented with reclaimed water. As agricultural irrigation rates vary with crop type, crops with lower irrigation requirements than previously identified in the Cañada Woods EIR, could be selected. All development will be required to install water conserving fixtures and devices in accordance with County requirements.

Non-Potable Uses. The golf course irrigation water requirement is estimated to total 150 AFY; this estimate is based on an assumed 50 acres of turf grass and a unit factor of 3.0 AFY/acre. The golf course irrigation water estimate includes the calculated evapotranspiration requirement for "cool-season" turf grass, plus a 20% factor for system losses and irrigation inefficiencies.

The project proposes to utilize reclaimed water from the Cañada Woods onsite wastewater reclamation plant to supply most of the irrigation water for the golf course (75%). The reclaimed wastewater volume is estimated to be approximately 112 AFY at full buildout, based on a wastewater system design flow of 100,000 gpd.

As shown in Table 6, the non-potable water supply for golf course irrigation would require an estimated 13 to 38 AFY to be supplied from bedrock wells that tap the Monterey Shale formation beneath the project site and Cañada Woods. The required supply from these wells would be greater during the initial development years, before the reclaimed water supply reaches its full potential, as discussed below. Pumping tests of 4 to 5 days duration have demonstrated the adequacy of the 3 existing bedrock wells to produce the required volume of water for golf course irrigation, with the 3 wells, limited to 12 hours of pumping per day, having a total estimated yield of 258 AFY. Thus, the anticipated pumping requirements are well within the estimated yield of the resource. This yield also is adequate for supplemental agricultural irrigation demands on the adjacent Cañada Woods project, if needed as supplemental water.

Peak Flow Requirements. The water demand for the potable supply and golf course irrigation varies according to the time of year and time of day. Peak flow for the potable supply is typically estimated to be about 2.5 times the average daily demand. For the Cañada Woods North project, the average daily potable water demand is estimated to be 0.067 AF/day; therefore, the peak daily demand would be about 0.167 AF/day or about 54,400 gpd. Source capacity (CWWC wells) is more than adequate to meet this flow requirement. The treatment, storage and distribution facilities would also be designed to accommodate this peak condition.

The peak irrigation requirements for the golf course is estimated to be about 1.06 AFY during July. This equates to a flow rate of about 240 gpm over a 24-hour period, or approximately 720 gpm over an 8-hour irrigation cycle. This irrigation system would draw from water stored in the reclamation and golf course ponds to supply fluctuating irrigation requirements.

Project Impacts

Carmel Valley Aquifer Groundwater Impacts. The CWWC has an appropriative water permit for 147 AFY which will increase to 160 AFY in the future upon construction of the Los Padres Reservoir (or other water supply project). Approval of CWWC to serve the project site must be granted by the SWRCB to extend the boundaries of the CWWC because existing permits only allow use on the Cañada Woods site. The total approved appropriation would be adequate to serve both the approved Cañada Woods site and proposed project site. Except for 4 proposed lots (Lots 10 through 13), all of the proposed project site is within the Carmel Valley watershed.

The Final Environmental Assessment of the Cañada Woods Public Water System revised February 10, 1995 is the environmental document used by the SWRCB in approving water rights Permits 20831 and 20832, and is incorporated by reference in this EIR. (See Section 1.0 -- Introduction -- of this EIR.) This document which evaluates impacts to groundwater supplies and adjacent wells, was approved by Monterey County as an addendum to the Cañada Woods Subdivision Final EIR. This document analyzed the environmental impacts of a water system based upon a range of water uses, and up to 188 AFY maximum. the analysis concluded that there would be no adverse effects anticipated as a result of continuing to exercise this water right because the proposed project would not result in increase pumping by Cal-Am nor result in an increase in the amount of historically water pumped from these wells.

It should be noted that the *Water Allocation Program Final EIR* was incorporated into the CWWS environmental document by reference to cover the potential cumulative impacts of that project. Cal-Am water production and non-Cal-Am production which rely on the Monterey Peninsula Water Resource System (MPWRS) were evaluated in the Water Allocation FEIR and its subsequent environmental analyses conducted by the MPWMD upon adoption of ordinances 70 and 84 which amended Cal-Am production limits. Review of the analyses confirmed that the proposed water system would not have a significant effect on the water resources of the MPWRS since the project would not result in any additional environmental effects above and beyond those analyzed in the Allocation EIR.

Interim Development Needs. The development of the Cañada Woods North project, as well as Cañada Woods and Monterra Ranch, would occur over a number of years. The water supply requirements would differ during the interim development years, as would the generation of wastewater, which makes up a large portion of the irrigation supply for the golf course.

With respect to the golf course, the worse-case scenario assumes that the course would be built in the early stages of the development and would exert its full water demand immediately. Also, the "net" demand for golf course irrigation would increase, because reclaimed water would not be available at the full projected amount of 112 AFY until full build-out. In the most conservative analysis (i.e., the golf course is built before any houses) the net golf course irrigation requirement would be 150 AFY at the start of the interim development period, declining over time to the projected 38 AFY, as the wastewater flows increase to their projected design value of 100,000 gpd (or 112 AFY). According to the Questa report usage could be as high as 195 AFY.

Bedrock Groundwater Impacts. Pumping of bedrock wells will draw groundwater from the fractured bedrock aquifer. This groundwater is derived from storage in the bedrock aquifer which is ultimately replenished by recharge. Recharge may occur both directly and indirectly to the bedrock aquifer. Direct recharge is that portion of rainfall falling on the Monterey Formation and percolating to the bedrock water table. This groundwater subsequently flows to the bedrock pumping well.

Indirect recharge may occur if groundwater in the canyon alluvium is induced to flow into the bedrock well. Induced recharge may occur if the hydraulic head in the bedrock aquifer is substantially lowered below the hydraulic head in the alluvium. Groundwater may enter the canyon alluvium in three ways: rainfall on the alluvium which subsequently percolates to the canyon alluvium water table, percolating streamflow, or groundwater flow entering the alluvium from adjacent bedrock. The extent of groundwater in alluvium is not well defined in Cañada de la Segunda watershed.

The impact from pumping bedrock wells is somewhat difficult to define given the lack of a water table map and unknown extent of groundwater in alluvium. In general, water pumped from the bedrock wells will ultimately result in less water flowing down-gradient to the Carmel Valley alluvial aquifer. This will occur as a reduced amount of groundwater flow through the Monterey Formation discharging directly to Carmel Valley alluvium, and/or as reduced groundwater flow through tributary alluvium to Carmel Valley alluvium.

Depending on the location and distribution of pumpage from bedrock wells, the initial impacts would be primarily limited to onsite groundwater storage. Over time a new equilibrium would be established and a reduced amount of groundwater would flow off-site. The reduced off-site flow would be approximately equivalent to the net consumption of groundwater derived from bedrock wells (net consumption is pumpage minus return flows). This reduced offsite flow of 13 to 38 AFY is considered relatively insignificant (less than 1%) compared to groundwater in Carmel Valley alluvium.

A comparison of bedrock groundwater pumpage to estimated annual recharge shows that 87 to 100% of annual recharge would be pumped during the start-up year. Bedrock groundwater demand would subsequently decrease to 7 to 20% of annual recharge for ultimate development, indicating that sufficient groundwater recharge is available over the long-term. However, this comparison indicates that bedrock groundwater supplies during start-up would be dependent upon sufficient groundwater storage, particularly if the start-up occurs during a drought. According to the Questa report, the start-up year demand is approximately 165 to 190 AFY which represents approximately 1.5% of total groundwater storage. Groundwater recharge and storage appear sufficient to accommodate start-up and ultimate development plans, provided that the listed mitigation measures are implemented, and that start-up demand of 165 to 190 AFY does not exceed approximately 3 years (which equates to less than 5% of total groundwater storage).

Ultimately, the bedrock groundwater demand of 13 to 38 AFY per year is a sufficiently small percentage (7 to 20%) of annual recharge in the Cañada de la Segunda watershed and will have a relatively insignificant impact to Carmel Valley alluvial aquifer. However, prior to start-up mitigation should be implemented to better capture onsite recharge and spread out impacts to on-site groundwater storage. This will be particularly important in the event that start-up coincides with a drought wherein groundwater recharge may be zero and all groundwater pumped by wells is derived from storage.

Effects on Adjacent Wells. There are no other known bedrock wells in the vicinity of the Cañada Woods and Cañada Woods North wells. The bedrock wells serving Monterra Ranch are located north of the watershed divide and would not be impacted due to the distance from project wells. Additionally, the proposed project would result in a decrease in Monterra project water demand, as detailed in the No Project discussion in Section 5.0 of this EIR.

The wells for the adjacent September Ranch (to the west of the site and the Cañada de la Segunda watershed) are replenished by the watershed which encompasses the September Ranch site (Todd Engineers, "Evaluation of Groundwater Resources for September Ranch, Carmel Valley, California"). According to information in the Todd report other wells in the immediate vicinity of September Ranch draw their supply from the Carmel Valley alluvium or from the separate terrace aquifer where the September Ranch wells are located. None of these wells draw from the Monterey Shale formation.

Mitigation

Implementation of Mitigation Measures 9-1 and 9-2 will insure that impacts remains at a less-than-significant level.

9-1 Drill and install additional wells on the Canada Woods North site to alleviate the short-term impacts both on and offsite during project start-up due to the fact that bedrock groundwater demand will initially be a significant percentage of annual recharge with declining demand following buildout. Consider reducing start-up year pumping by pumping groundwater during low demand months (i.e. winter) prior to completion of the golf course for storage in the reclaimed water reservoir which would help alleviate drawdown around bedrock wells during summer months during start-up.

9-2 Utilize well pumping with less reliance on the Water Tower and Parcel N wells.

This mitigation measure, in combination with additional well installations, will serve to alleviate potential short-term impacts to Carmel Valley alluvial aquifer during project start-up when bedrock water demand is greatest. The initial impact to Carmel Valley will be delayed by redistributing pumpage further to the north away from Carmel Valley until a new equilibrium is established between recharge and build-out groundwater demand.

4.5 WASTEWATER TREATMENT

This section is based on review of a feasibility study prepared as part of the project application by Questa Engineering Company (July 8, 1996). The Questa report presents the background data, analysis and description of recommended wastewater facilities to serve the proposed Cañada Woods North project, and is intended to serve as a wastewater feasibility analysis for use in final project planning, review by the County of Monterey and the Central Coast Regional Water Quality Control Board (RWQCB), and as a basis for ultimate wastewater system design. The full report is included in Technical Appendix V.

ENVIRONMENTAL SETTING

Site Characteristics

The project site is located in the upper portion of a watershed tributary to the Carmel River and is located primarily within the Carmel Valley watershed. There are no perennial or seasonal streams in this watershed; runoff is collected and conveyed in several seasonal drainage channels. The drainages converge near the southern property line into Cañada Segunda, following the Cañada Woods project access road. Soils in the watershed are generally pervious, particularly on the well-vegetated northern slopes and the more gently sloping swale areas, permitting high infiltration rates.

Wastewater collection/treatment facilities do not presently serve the site. A tertiary wastewater treatment facility is planned on the adjacent approved Cañada Woods Subdivision site. Existing subdivision approvals on the Monterra Ranch (including the proposed project site) assumed use of onsite septic systems and leachfields.

Wastewater Treatment and Disposal Regulatory Requirements

Wastewater treatment and disposal in the Carmel Valley watershed is governed by a variety of policies and regulations established by the Central Coast Regional Water Quality Control Board (RWQCB) and the Monterey County Health Department. The key requirements affecting the proposed wastewater facilities for the Cañada Woods North project are contained in the following regulations:

- Monterey County Code Chapter 15.20-Sewage Disposal and Chapter 15.23-Sewage Treatment and Reclamation Facilities;

- Carmel Valley Master Plan (incorporating 1981 Carmel Valley Wastewater Study);

- Water Quality Control Plan ("Basin Plan") for the Central Coast Region (Central Coast RWQCB); and

- Title 22, Division 4, California Administrative Code - Wastewater Reclamation Criteria (including pending revisions).

The requirements pertaining to the various elements of the planned wastewater system are briefly described below.

Treatment Facilities

On-lot Septic Tanks. Onsite septic tanks would provide the first stage of treatment function, and the sizing requirements are set forth in Monterey County Code Chapter 15.20. For single-family residential systems, the septic tank is sized according to the number of bedrooms, with the minimum size (for a three-bedroom residence with garbage grinder) being 1,500 gallons and increasing by 500 gallons for each additional bedroom. For commercial and multi-family facilities, septic tank size is based upon the estimated maximum daily wastewater flow, to achieve roughly one to two days of detention time in the septic tank.

Central Treatment Plant. Requirements for centralized treatment facilities in Monterey County are established principally by the RWQCB, with provision for additional conditions that may be imposed by the Monterey County Health Department and Public Works Department. The requirements are formalized as permit conditions in what are termed "Waste Discharge Requirements", issued by the RWQCB for the individual facility. The requirements typically specify final effluent quality and mass pollutant loadings, based upon the ultimate method and location for disposal. Treatment requirements for wastewater reclamation uses are specified in Title 22 (California Administrative Code) and are typically incorporated by the RWQCB as permit conditions. The Title 22 Wastewater Reclamation Criteria are presently in the process of being amended. Use of wastewater for unrestricted golf course turf irrigation (e.g., where homes closely adjoin the course) requires that the effluent be adequately oxidized, coagulated, clarified, filtered and disinfected, or be treated by an equivalent sequence of unit processes; this constitutes tertiary treatment. Technically, where homes are set back from the golf course (as for the proposed project), secondary effluent quality would be acceptable under Title 22.

The County of Monterey also regulates wastewater reclamation facilities in the Monterey County, via Code Chapter 15.23, adopted in 1991. Chapter 15.23 requires an initial application and annual renewal of an operating permit for all reclamation facilities. The key technical provision of Chapter 15.23 requires that the final effluent quality (for water that percolates into the ground) not contain nitrate-nitrogen at concentrations greater than 6 mg/l. This code was implemented to deal specifically with the increasing incidents of groundwater nitrate contamination in various areas of Monterey County. This is above and beyond the normal emergency provisions required by Title 22, and will be applicable to the proposed project.

Wastewater and Reclaimed Water Storage

Short-Term Emergency Storage. State Wastewater Reclamation Criteria (Title 22) require provision for emergency storage. This is a contingency feature needed for the eventuality of malfunction(s) in the treatment process. Short-term emergency storage is normally provided by a small holding pond or tanks. Title 22 requires a minimum short-term storage capacity equivalent to 24 hours (one day) of average sewage flow. The County of Monterey has routinely required that short-term emergency storage be increased to three days of average flow for wastewater reclamation facilities; this exceeds the normal emergency provisions required by Title 22, and will be applicable to the proposed project.

Long-Term Storage. Long-term storage (or an alternate form of discharge) is also required for wastewater reclamation facilities. Long-term storage is needed for containment of treated wastewater during wet weather periods or other times when irrigation is not needed or possible. This storage may be provided by ponds and reservoirs or by alternate disposal methods, including percolation systems. Title 22 requires a minimum of 20 days long-term storage. Monterey County has increased this requirement to up to 120 days for local facilities in the County; this requirement will be applicable to the proposed project.

Disposal

Requirements for spray disposal of treated wastewater are primarily set by the RWQCB, with input from the County Health Department. Spray disposal facilities are permitted based upon evidence of adequate terrain, soils and groundwater conditions that assure absorption of the applied effluent by the soil and plants without threatening contamination of groundwater. Unlike septic tank-leachfields, there are no specific soil depth or percolation standards that apply to spray disposal, as the spray disposal operations are confined to the irrigation season when essentially all of the reclaimed water would be absorbed and utilized by the vegetation. Additionally, tertiary treated wastewater is of very high quality and suitable for direct re-use.

Setbacks from spray disposal areas are 10 to 25 feet from property lines, although such setbacks can be varied on a case-by-case basis. Setbacks of 50 to 100 feet from streams and wells are also typically required. The pending changes to Title 22 Wastewater Reclamation Criteria specify a 50-foot setback between water supply wells and areas irrigated with tertiary treated effluent. Additionally, the spray field must be on property controlled by the owners/operators of the wastewater facility (i.e., the discharger); this may be satisfied with long-term contract arrangements.

Monterey County has two specific requirements pertaining to spray disposal facilities, both of which pertain to the nitrate loading effects. One requirement (Code Chapter 15.23) applies county-wide to all reclamation facilities. It mandates a maximum nitrate-nitrogen concentration of 6 mg/l in wastewater effluent disposed into soils at reclamation facilities. This code section also requires a discharge monitoring program to be approved by the Director of Environmental Health prior to beginning discharge from the facility.

The other pertinent disposal requirement applies only to the Carmel Valley area and was derived from the 1981 Carmel Valley Wastewater Study. It consists of a limitation of the amount of and distribution of sewage via septic systems throughout Carmel Valley, the chief purpose being to limit the loading of nitrate-nitrogen into the groundwater system. The nitrate loading limits for septic systems in Carmel Valley would also apply to community wastewater facilities, such as that proposed to serve the Cañada Woods North project. This topic is discussed in detail in the Hydrology and Water Quality section of this EIR.

RELEVANT PROJECT CHARACTERISTICS

The proposed Cañada Woods North project includes 34 custom residential lots, an 18-hole golf course and clubhouse, 12 member suites at the golf course, five employee housing units, golf course maintenance facilities, swim, tennis and fitness facility, and equestrian (12 to 24-stall) facilities. All facilities are planned to be served by a central wastewater treatment system that also serves the adjacent approved Cañada Woods project and the residential development for the existing approved Monterra Ranch project. Wastewater generated by project uses will be collected and conveyed to a tertiary treatment plant approved on the adjacent Cañada Woods site to the south. Treated effluent will be used to irrigate the proposed golf course.

The County Service Area serving Cañada Woods is proposed to be expanded to include the proposed project and Monterra Ranch, as well as the approved Cañada Woods Subdivision. Expansion of this County Service Area would eliminate the individual and community leachfield systems previously approved for the Monterra Ranch Subdivision.

The proposed wastewater collection, treatment, and disposal facilities were designed to meet all state and county requirements. The basic wastewater facilities for the Cañada Woods North project will consist of: (1) a Septic Tank Effluent Pump (STEP) collection system; (2) a central enclosed treatment plant providing tertiary level reclaimed effluent quality, plus nitrogen removal; (3) 120-day wet-weather storage of treated effluent by means of one or more lined irrigation ponds at the proposed golf course and/or a wastewater storage pond on Parcel A-1 of the approved Cañada Woods Subdivision; (4) final effluent disposal by means of spray irrigation of golf course turf areas; and, (5) 3-day emergency storage facilities for raw sewage. The key proposed facilities are described below.

Collection System. A Septic Tank Effluent Pump (STEP) collection system, utilizing onlot septic tanks and pumps (as required) will serve individual residences and other buildings in which each house or building is provided with a septic tank where primary effluent treatment (i.e., sedimentation) occurs. The effluent from the tank is then routed to the main collection system, which is comprised of a network of 2- to 4-inch diameter plastic (PVC) pipes. The flow from the septic tank to the collection system is generally by gravity, but also includes some pump systems. The collected flows will be conveyed to the tertiary treatment (reclamation) plant via a 6-inch transmission line.

Treatment. Construction of a tertiary treatment plant is planned on Parcel H on the adjacent approved Cañada Woods project site to the south within the same general building footprint as approved as part of the adjacent Cañada Woods subdivision. The treatment system will consist of: (a) below ground, built-in-place concrete vaults for sedimentation and clarification; (b) oxidation process for secondary treatment; (c) coagulation and sand filtration; and, (d) disinfection system. The facility will be entirely enclosed for security reasons and to prevent the release of odors. Facility design is in process, but the facility has not been constructed.

The proposed plant would employ a sequencing batch reactor (SBR) technology that would be supplemented with coagulation, filtration, and disinfection processes to produce tertiary effluent suitable for unrestricted irrigation uses. Final effluent treatment is planned to meet the strictest treatment standards for wastewater reclamation contained in the California Administration Code, Title 22, and the Monterey County Code, Chapter 15.23. Sodium hypochlorite would be used for disinfection. The plant will be designed and operated to meet the Monterey County nitrate-nitrogen limit of 6 mg/l in the treated effluent.

The plant has been designed for continuous, reliable performance with contingency provisions for component malfunction; all critical mechanical components in the process stream will have duplex or redundant units to allow bypass for routine maintenance and repair while maintaining full compliance with effluent discharge specifications. Stand-by power will be provided along with a fully automated control system; in the event of a power failure, the standby power unit will automatically start and provide power to all treatment units.

The treatment plant was originally planned as a 30,000 gpd facility to serve the Cañada Woods project and is proposed to be expanded to a 100,000 gpd capacity to serve the proposed Cañada Woods North project, as well as the Monterra Ranch project. The increased capacity can be accommodated using the same basic treatment plant design (SBR system) located within the general building footprint as approved for Cañada Woods on Parcel H (Questa Engineering, July 1996b).

Wastewater Storage. Short-term emergency storage (3 days of design flow or 300,000 gallons) would be provided by a series of tanks located strategically throughout the collection system. Each of the pump stations in the collection system will also have emergency storage capacity, roughly equal to 1 day of sewage flow from the respective service area that will make-up part of the emergency storage capacity (Ibid.).

Long-term, wet weather storage of treated water would be provided by irrigation reservoirs at the proposed golf course (see Figure 4 in the Project Description section of this EIR), as well as a storage pond on Parcel A-1 as part of the approved Cañada Woods project. These ponds would have a total storage capacity of approximately 45 acre-feet, which would allow for compliance with the 120-day storage requirement while still providing 2 feet of freeboard.

Disposal. Final treated effluent disposal would occur by means of spray irrigation of the adjacent Cañada Woods agricultural parcel and the proposed golf course turf areas, which are estimated to total about 50 acres, including tees, greens, fairways, and maintenance rough with an estimated 8-month irrigation season (April through November). Reclaimed water would provide about 75% of the golf course irrigation needs, with the remaining irrigation demands being met by bedrock wells (see Water Supply section of this EIR for additional detail).

Setbacks from the disposal area (golf course) and property lines would be at least 50 feet, and setbacks from building envelopes would be at least 150 feet, compared to a State standard of 10 to 25 feet. Setbacks from the non-potable wells would be at 1,000 feet, while setbacks from the potable wells would be approximately 2 miles, compared to a State standard of 50 to 100 feet.

Operation and Maintenance. Operation and maintenance (O&M) of the wastewater facilities would be carried out by the Monterey County Department of Public Works, under the authority of a County Service Area. Individual septic tanks and pump stations would be inspected annually and pumped on an as-needed basis, about every 3 to 5 years. These inspections can either be carried out by County Public Works maintenance staff or by a contractor, such as the homeowner's association or a private plumbing/sewer contractor. Tank maintenance will require a formal access easement/agreement with each of the property owners.

Sludge from both the treatment plant and the septage pumped from the individual septic tanks would be hauled to a treatment plant for treatment and disposal. At full development, the sludge production is estimated, conservatively, to be about 50,000 gallons per year, which will be disposed of by hauling to the Monterey Regional Water Pollution Control Agency (MRWPCA) facility in Marina, the Watsonville sewage treatment plant, or another receiving facility. Pumpout and hauling would be done on a monthly or bi-monthly basis, depending upon the actual sludge volumes generated.

O&M for the treatment plant consists of visual checks of treatment processes for problems, performance of preventive maintenance on equipment, replenishing chemical supplies, repair of any malfunctioning equipment, sample collection and analysis, general housekeeping, and monthly report preparation. All of these tasks shall be carried out by a certified treatment plant operator (or operators).

The spray disposal operations are proposed to be managed under contract with the County. The County would be responsible for facilities up to the irrigation ponds. The contract operator of the golf course shall be responsible for managing the ponds and irrigation system for the golf course; this entails normal maintenance of pumps, storage tanks, valves and pipelines.

IMPACTS AND MITIGATION MEASURES

Standards of Significance. In accordance with the California Environmental Quality Act (CEQA), State CEQA Guidelines, and agency and professional standards, a project impact from wastewater treatment would normally be considered significant if:

- the project's wastewater flows exceed sewer line or treatment plant capacity, contribute substantial increases in flows to existing overloaded sewer lines, or require substantial expansion of wastewater collection or treatment facilities;
- the project design would not comply with applicable Monterey County, Carmel Valley, or State criteria;
- the project's treatment and disposal facilities would be inconsistent with the Regional Water Quality Control Board's Central Coast Basin Plan; or
- wastewater treatment or disposal would result in substantial water quality degradation.

Section 4.3 -- Hydrology and Water Quality -- discusses impacts of use of reclaimed wastewater on surface and groundwater quality.

Impact #10: The proposed project would result in the generation of wastewater flows that can be accommodated by the proposed wastewater collection, treatment, and disposal facilities of wastewater. However, some adverse impacts to public health or safety could result if facilities are not properly maintained. This is considered a potentially significant impact.

The total projected wastewater flow from the proposed Cañada Woods North project would be approximately 18,300 gallons per day (gpd), or approximately 50% of the flows that would be generated under the approved Monterra Subdivision (see "No Project Alternative" discussion in Section 5.0 -- CEQA Considerations). The remainder of the Monterra Subdivision and the Cañada Woods project sites also will be served by the wastewater treatment plant. Monterra Ranch has a projected flow of 49,650 gpd, while Cañada Woods has a projected flow of 23,000 gpd. Including a contingency of approximately 10%, the total design flow for the wastewater treatment and disposal facilities would be 100,000 gpd. Flow projections are summarized in Table 7. These estimates are considered adequate for planning purposes, but further refinement of the flow projections may be required during final system design.

TABLE 7
PROJECTED WASTEWATER FLOWS

Project Element	Number of Units	Average Flow Rate (gpd)	Total (gpd)
Cañada Woods North			
Residences	34	250	8,500
Swim/Tennis/Fitness Facilities	100 visitors	15	1,500
Golf Course Clubhouse*	--	--	5,250
Member Suites	12	150	1,800
Equestrian Facilities	25 people	10	250
Employee Housing Units	5	200	1,000
Subtotal - Cañada Woods North			**18,300**
Monterra Ranch			
Residences	165	250	41,250
Inclusionary Housing	42	200	8,400
Subtotal - Monterra Ranch			**49,650**
Cañada Woods			
Residences	56	250	14,000
Employee/Inclusionary Housing	15	200	3,000
Commercial Development	--	--	6,000
Subtotal - Cañada Woods			**23,000**
Total Projected Flow			**90,950**
Contingency (approximately 10%)			**9,050**
Total Design Flow			**100,000**

*Includes employees, golfers, restaurant, and maintenance
SOURCE: Questa Engineering Corporation, 1996

The proposed wastewater facilities have been designed to meet or exceed all applicable standards and, with proper ongoing operation and maintenance, would have no adverse environmental impacts. The proposed project would reduce the nitrate loading to groundwater because of the elimination of existing cattle grazing and approved septic systems for the Monterra Ranch project, as discussed in detail in the Hydrology and Water Quality section of this EIR. The treated effluent quality will be in accordance with State and County requirements. All required setbacks from disposal areas will be met or exceeded. With respect to streams, there are no definable water courses in or around the golf course. At best, the existing drainage channels would be classified as grassed "swales." The golf course plan avoids these swales through the use of buffer areas, which would not be irrigated with reclaimed water. Generally, a distance of 50 feet or more would be maintained between irrigated areas and these "swales."

The environmental impacts associated with the treatment plant were addressed previously in the 1994 Cañada Woods EIR. There will be a change in the size of the treatment plant to accommodate the increased wastewater flows from Cañada Woods North and Monterra Ranch, but there will be no other change in impacts associated with the treatment plant.

The reclaimed water storage ponds will be located well outside of any floodplain areas and will be properly sized and will be lined with clay, gunite, or other suitable impermeable membrane. The ponds will be designed with a two-foot freeboard as a standard added precaution against overtopping. There will be one or more ponds at the golf course site, plus another pond on the agricultural-open space portion of the approved Cañada Woods subdivision. There is ample area between these two areas to meet the County's 120-day wet weather storage requirement.

The three-day emergency storage of wastewater will be provided by tanks located at various points in the collection system. These tanks will be water tight, concrete vaults, or approved equal. During an emergency requiring treatment plant shut-down, the flow in the sewer system will be automatically (or manually) directed to these storage tanks, and returned (by pumping or gravity flow) after the emergency situation is over.

The reclaimed water storage reservoir is located between the golf course Fairway 14 and proposed lot 8. It is in an open-space area and could pose an attractive nuisance to children and a potential drowning hazard. The hazard would be reduced to a less-than-significant level by the design of the pond to minimize steep banks, and possibly by planting vegetation around the perimeter of the pond to discourage the curious and also act as a partial visual barrier.

One reclaimed water storage pond also has the potential to be a breeding site for mosquitoes, which are a nuisance and potential public health problem. During the irrigation season, the water would be circulated through the pond with a portion removed each day for irrigation. The turnover and movement of water would interfere with the mosquito breeding cycle during the warm months. The mosquito problem is also minimized to some extent by the relatively remote location of the storage pond, although 2 or 3 residences will be located within a few hundred feet of the pond. The combination of the pond site and normal design and maintenance measures will reduce the mosquito breeding hazard to a less-than-significant level. Introduction of the mosquito fish, *Gambusia*, also can be utilized.

Nutrient laden water (such as reclaimed water) in the presence of sunlight in a pond is conducive to the growth of algae. As the algae die and decay, objectionable odors result and oxygen in the water is depleted. In addition, high concentrations of algae detract from the visual appearance of the water and in extreme cases could contribute to fouling problems in the irrigation system. To reduce algal growth and its associated effects, possible control measures recommended for consideration during facility design include: (a) aeration of the wastewater pond; (b) addition of chemicals such as non-toxic dyes; and, (c) promotion of duck week to block light penetration. With proper maintenance attention, these measures can be effective in reducing algae problems to a less-than-significant level.

The reservoir will need to be lined with an impermeable material in accordance with requirements of the RWQCB and the Monterey County Health Department; and this will be exposed from time-to-time as wastewater is pumped-in and withdrawn for irrigation. Additionally, the water in the reservoir can be expected to take on a greenish color from the growth of algae. This is due to the warm climate and high clarity and nutrient characteristics of the reclaimed water. Any or all of these factors could be considered a visual concern to the adjoining residents, but can be minimized with proper vegetative screening.

There is always the possibility of an overflow from a wastewater storage reservoir during exceptionally high rainfall years, if the reservoir capacity is exceeded. To minimize or eliminate this possibility, the proposed reservoir will be sized to include 120 days storage capacity (adding 100 days surplus storage capacity beyond that required by the State to account for extreme wet-weather effects) and two-foot of freeboard in the pond above the projected maximum water depth. In total, these add a substantial factor of safety against a pond overflow.

The areas planned for spray disposal of treated effluent include all of the golf course turf and adjacent offsite agricultural areas. These areas will have unrestricted access for golfing activities, and there are also homes proposed along the borders of some portions of the golf course. As such, irrigation water is required to be tertiary-treated and disinfected reclaimed wastewater. The potential impacts of the spray disposal operations are discussed below.

The use of reclaimed wastewater for golf course irrigation would expose humans to possible physical contact with treated wastewater. State Wastewater Reclamation Criteria recognize golf course irrigation as a suitable use for treated wastewater, and contain standards to protect against unacceptable risks to public health. For the proposed project, the treatment of wastewater will be to a tertiary level, which meets reclaimed wastewater standards for unrestricted golf course irrigation. The treatment system planned for the project has a good track record in producing reclaimed wastewater, and, with diligent compliance with waste discharge requirements, the risks to public health should be minimal. The golf course should be posted with appropriate signs indicating the irrigation with reclaimed water.

The operation and maintenance (O&M) of the wastewater facilities for the Cañada Woods North development is proposed to be incorporated into a County Service Area (CSA) serving the Cañada Woods, Cañada Woods North, and Monterra Ranch projects. The same CSA would maintain the stormwater drainage facilities as well as the wastewater collection and treatment system, and would be staffed by the Monterey County Public Works Department. The County presently operates other facilities in the Carmel Valley and elsewhere in Monterey County.

The proposed reclaimed water irrigation facilities would be operated under the terms and conditions imposed by Waste Discharge Regulations (WDRs) issued by the RWQCB, and in accordance with other conditions that may be added by the Monterey County Health Department. This would require regular inspection and monitoring of the facilities, and filing of monthly and annual "Self-Monitoring Reports." Inspection work would involve periodic (e.g., monthly) checks on all irrigation, piping, pumps, controls, and reclaimed water storage areas to assure proper operations and early detection and correction of any problems. The monitoring work would be conducted by golf course maintenance personnel as part of routine duties, with oversight and direction from a qualified engineering contractor or consultant.

Additionally, based on the requirements for other similar facilities, it is anticipated that the monitoring program would include sampling and analysis of surface water and groundwater monitoring wells. Analyses would likely be required for coliform bacteria, nitrate-nitrogen, pH, TDS, and selected metals. The sampling locations and frequency of sampling would be determined by the RWQCB. The final monitoring program, developed in coordination with the RWQCB and Monterey County would include:

- A map of surface water sampling stations and monitoring wells;
- Frequency of sampling; and
- Specific sampling and analytical methods (following EPA guidelines).

An annual self-monitoring report would be submitted to the RWQCB, with copies also made available to Monterey County.

Sludge would be pumped periodically from the bottom of the SBR tanks, and thickened in a totally enclosed receiving tank. Sludge production at the reclamation facility would be minimal (estimated at 50,000 gallons per year) because the on-lot septic tanks would provide primary treatment. Septage from the pumping of septic tanks and sludge from the tertiary treatment facility would be hauled to either the MRWPCA facility in Marina or to the Watsonville facility. No adverse environmental effects would occur from this sludge disposal method.

Mitigation

Implementation of Mitigation Measures 10-1 through 10-3 will reduce the impact to a less-than significant level.

10-1 Design, construct and operate the proposed wastewater collection, treatment, and disposal facilities in accordance with all applicable state and county requirements, as planned, including but not limited to:

- For individual residences, a minimum 1,500 gallon septic tank should be installed to provide primary treatment, with tank sizes increasing by 500 gallons for each additional bedroom over and above three;
- Nitrate-nitrogen limit of 6 mg/l shall be required for the tertiary effluent;
- Short-term storage requirement of 300,000 gallons of raw wastewater shall be provided in strategically-located tanks within the collection system, with appropriate pumping and odor control facilities;
- Long-term, wet-weather storage requirements of 120 days of average flow, plus incident rainfall (approximately 45 AF total) shall be provided in lined storage ponds;
- Setback requirements from areas where reclaimed water is being spray irrigated include 25 feet from property lines and 100 feet from streams and wells (no streams exist in the project vicinity);

10-2 Prohibit discharge of toxic substances or of substances into the wastewater system that would adversely affect the collection, treatment or disposal of the wastewater.

10-3 Operate the reclaimed water storage reservoir(s) to ensure the protection of public health and the environment, including implementation of the following measures:

- plant vegetation around the perimeter of the pond to act as a visual barrier and to limit public access;
- control algae by a combination of aeration, addition of non-toxic chemicals, and promotion of duck weed.

4.6 BIOTIC RESOURCES

ENVIRONMENTAL SETTING

A biotic resource investigation was conducted for the Monterra Ranch by LSA in June 1985. A supplemental project site reconnaissance was conducted for the applicant by Vern Yadon in June 1996, and a Smith's Blue Butterfly survey was conducted by Thomas Reid Associates in June 1996, both of which are included in Appendix C. This section was prepared in conjunction with EcoSystems West, who reviewed existing reports and conducted a reconnaissance site survey for this EIR. This section also reviews and incorporates findings of a Forest Management Plan prepared for the applicant by Hugh E. Smith.

Vegetation Types

The literature review and field surveys identified the following habitat types on the project site: coastal prairie grassland, coastal sage scrub, poison oak chaparral, coast live oak woodland, coast live oak-Monterey pine woodland, and Monterey pine forest. One ephemeral pond, 2 farm ponds, an ephemeral swale, and a small area of arroyo willow riparian habitat also are located on the site. Descriptions of onsite vegetation types are presented below, and the onsite distribution of these habitats is illustrated on Figure 10. Onsite habitat acreages are summarized in Table 8. Species lists are provided in Appendix C.

Coastal prairie grassland. Approximately one-third of the site contains grassland habitat. Coastal prairie grassland comprises the north-central portion of the project site on the upper, flatter slopes. This grassland community is dominated by native perennial grasses, with associated native herb species and non-native annual grasses. The native coastal prairie grasslands are composed of native needlegrasses (*Nasella* spp.), California oatgrass (*Danthonia californica*), introduced non-native annual grasses, and native wildflowers, such as sky lupine (*Lupinus nanus*) and California poppies (*Eschscholtzia californica*). Compositionally, the onsite grassland resembles grasslands on adjacent sites (LSA, June 1985).

In late August 1996, reconnaissance-level surveys of the project site were conducted by Paul Kephart and Mark Stromberg to delineate coastal prairie grasslands and ruderal grasslands. The survey distinguished 2 types of coastal prairie grassland based on dominance of perennial grass species: California oak grass series (Danthonia) and purple needlegrass series. Table 8 provides an acreage calculation of ruderal grasslands and coastal prairie grasslands.

Coastal sage scrub. Coastal sage scrub is widespread throughout the project site, generally occurring on relatively exposed slopes, and often occurring on upper slopes above forest stands on the lower slopes. The soils underlying coastal scrub stands are generally, but not always, thinner and rockier than those underlying nearby forest. Prominent shrubs include California sagebrush (*Artemesia californica*), sticky monkey-flower (*Mimulus aurantiacus*), and black sage (*Salvia mellifera*). On ridgetops and upper slopes there is a transition between coastal scrub and coast live oak forest characterized by shrubs and herbs of the coastal scrub habitat type interspersed with individual trees or small groves of coast live oak (*Quercus agrifolia*) and associate shrubs and herbs characteristic of the coast live oak forest.

TABLE 8
ONSITE HABITAT ACREAGES

Habitat Type	Total Acreage
Grassland	
• Needlegrass Coastal Prairie	176.5
• Oat grass Coastal Prairie	34.5
Total Coastal Prairie	*210.0*
• Ruderal Grassland	135.5
TOTAL GRASSLAND	345.5
Coastal Sage Scrub	293.4
Coast Live Oak Woodland	174.8
Coast Live Oak-Monterey Pine Forest	57.9
Monterey Pine Forest	32.5
Poison Oak Chaparral	154.9
Eucalyptus Grove	0.85
Habitat map by Vern Yadon; calculations provided by WWD Engineering	

Poison Oak Chaparral. Poison oak chaparral is a habitat that slowly advances into grasslands in the absence of fire or some other type of intervention, such as mowing. Species characterizing this habitat, in addition to poison oak (*Toxicodendron diversilobum*), include the sticky monkey-flower, coyote brush (*Baccharis pilularis*), bush honeysuckle (*Lonicera hispidula* var. *vacillans*), chamise (*Adenostoma fasciculatum*), and California coffeeberry (*Rhamnus californicus*).

Source: Vern Yadon/WWD Corporation

Figure 10

Coast live oak woodland. Coast live oak forest occurs throughout the project site, consisting of all age groups. Approximately 283 onsite acres are estimated to be oak woodland (Smith, June 26, 1996). Coast live oak forms pure stands in some areas; in other areas it is associated with such other tree species as Monterey pine (*Pinus radiata*), and California buckeye (*Aesculus californica*). Near the tee of proposed fairway #12 is a row of eucalyptus (*Eucalyptus globulus*) with diameters of about 60 inches. The shrub layer is quite variable, ranging from almost non-existent (where the canopy cover is high) to locally dense. Important shrub species include poison oak, Mexican elderberry (*Sambucus mexicana*), snowberry (*Symphoricarpos albus* var. *laevigatus*), fuchsia flowered gooseberry (*Ribes speciosum*), California coffeeberry, redberry (*Rhamnus crocea*), and wood rose (*Rosa gymnocarpa*). A large number of herbaceous species are associated with this habitat type, as further described in Appendix C.

Coast live oak-Monterey Pine Forest. This habitat is transitional between Monterey pine forest and coast live oak forest. It is a dense to somewhat open forest with Monterey pine and coast live oak as codominants. The associate tree, shrub, and herb species are those found in the coast live oak woodland habitat described above. The most extensive stands of this habitat type are found on the north-facing slopes just north of the northern property boundary and on the canyon slopes on the southern boundary of the property. Other patches of this habitat are found on knolls in proposed parcel numbers 15 through 19.

Monterey Pine Forest. The Monterey pine forest is dominated by Monterey pine (*Pinus radiata*) at varying canopy densities. The Monterey Pines that are standing on the project site are not extensive and generally occur on the northern portion of the site generally on north-facing slopes. Approximately 48 acres of the site are estimated to contain Monterey Pine habitat (Ibid.). Several shrub species form dense understory stands in same areas.

Arroyo Willow Drainage. A small stand of arroyo willow (*Salix lasiolepis*) occurs in the bottom of the large canyon on the southern boundary of the property. This stand occurs at the bottom of the slope below a Monterey pine stand. It occurs in a dense thicket of poison oak and poison-hemlock (*Conium maculatum*). The drainage in this location is not well defined and overgrown. The water table appears to be near the surface almost year-round as evidenced by standing water present in a recently excavated shallow pit just west of the willow stand. An area adjacent to the stand were bladed as part of recent ranch road maintenance.

The drainage becomes more prominent as it proceeds downslope to the west. Along this section of the drainage occur large specimen trees of coast live oak and California buckeye.

Vernal Pond and Stock Ponds. Three small stock ponds and one ephemeral swale occur on the Canada Woods North project lands. Two of the stock ponds, one near the intersection of Cinquenta and Via Malpaso Drive and the other adjacent to the south perimeter unimproved road and just south of proposed Parcel D were artificially created by berm construction. A third ephemeral pond occurs in a natural basin just south of proposed Via Malpaso Drive between lots 6 and 7 and proposed fairways 13, 14, and 16. This pond forms a shallow, oval-shaped pool with a stony and mud mixed bottom and no emergent vegetation. The shallow slopes adjacent to the pool support closely cropped annual grasses like prickle grass (*Crypsis vaginiflora*) and rabbit's-foot grass (*Polypogon monspessulanus*). In addition, annual forbs occur in early spring such as stipitate allocarya (*Plagiobothrys stipitatus* var. *micranthus*) and vernal water-starwort (*Callitriche verna*). It has been suggested that this pond might have been a vernal pool at one time. However, it appears that the basin was enlarged and excavated to create a longer period in which water is available for the cattle operation which has historically existed on the site. Therefore, inundation of the plain above the rim of the pond may not be inundated as frequently to provide the appropriate habitat conditions for vernal pool plant species. This pond was found to support California tiger salamanders in July of 1996.

A small, shallow-basined swale occurs in a grassland terrace just north of the natural pond in the area proposed as fairway for hole No. 16. This depression supports scattered individuals of fiddle dock (*Rumex pulcher*) and rush (*Juncus* spp.). No water was observed during the course of survey in July 1996.

Wildlife Habitat

The site supports a wide variety of wildlife species; species use on the project site is listed in Appendix C. The following is a brief summary of the dominant wildlife habitat types that occur on the property.

Grassland. The onsite grasslands serve as breeding habitat for small birds and mammals, and feeding and hunting habitat for others. Resident bird species in the grassland include the lark sparrow and horned lark. These species serve as the prey base for a variety of predators, including raptors such as the red-tailed hawk, American kestrel, white-tailed kite and great horned owl. Grassland supports resident populations of small rodents including California ground squirrel, Botta's pocket gopher, California meadow mouse, and western harvest mouse. Mammalian predators which hunt the grassland include the gray fox, coyote, long-tailed weasel, striped skunk and bobcat (LSA and Associates, June 1985). Reptiles found in the grassland habitat include western skink, western fence lizard, southern alligator lizard, common kingsnake, western rattlesnake and gopher snake. Amphibians that occur in association with seasonal pools on the project site and grassland habitats include the Pacific treefrog and the California tiger salamander.

Mixed chaparral and coastal scrub. Mixed chaparral and coastal scrub tend to be drier than woodlands on the site but can provide dense cover for a wide variety of reptile, bird and mammal species. Open patches of ground are larger and a sparse cover of grasses, bare soil, or rock are often interspersed throughout these brush stands. Bird species found on these slopes include poor-will, roadrunner, wrentit and rufous sided-towhee and rufous-crowned sparrow. Mammals found in the scrub include Monterey dusky-footed woodrat, California mouse, and white-footed mouse. The drier conditions provided by the shrub habitat type limits amphibian species with ensatina, Pacific slender salamander and Pacific treefrog the most likely species to occur. Reptiles that occur in this habitat include western skink, striped racer and western rattlesnake.

Scrub stands are often found adjacent to grassland which attracts a number of species dependent on the presence of both habitat types and their juxtaposition. Many of these "edge" species feed primarily in the grassland and seek cover in the shrub. Bird species include California quail, brown towhee, dark-eyed junco, white-crowned sparrow, and golden-crowned sparrow. Mammals include brush rabbit, gray fox, and bobcat. Reptiles include western fence and side-blotched lizard.

Coastal oak woodland. Coastal oak woodlands provide cover, breeding habitat and food for a large number of species. Acorns are an important food resource for quail, squirrels and deer, often regulating their population levels. Oak woodlands provide important nesting, roosting and foraging habitat to a large number of common birds. Acorn woodpeckers, Downey woodpeckers, California quail, great-horned owls, Anna's hummingbird, Pacific slope flycatcher, scrub jays, plain titmouse nest in this habitat. Cooper's hawk may use this habitat for nesting and foraging. The oak woodlands in Monterey County attract a large diversity of small, common mammals including Botta's pocket gopher, California mouse, Monterey dusky-footed woodrat, deer mouse, and brush mouse. Large mammals that will use this habitat include coyote, gray fox, striped skunk, bobcat, and black-tailed deer. The moist understory of oak woodlands provides suitable habitat for several species of amphibians and reptiles including Pacific slender salamander, ensatina, arboreal salamander, western fence lizard, western skink, southern alligator lizard and ringneck snake.

Monterey Pine. Monterey pine often occurs in association with oak on the property providing a layered habitat. When combined with the presence of snags this diversity of structure can support a high diversity of wildlife. Birds occurring here include hairy woodpecker, olive-sided flycatcher, Steller's jay, chestnut-backed chickadee, and pygmy nuthatch. Purple martin may use snags for nesting in this habitat. Raptors such as American kestrel and red-tailed hawk and Cooper's hawk will nest in this habitat. Mammal species occurring here include gray squirrel, opossum, broad-footed mole, Monterey dusky-footed woodrat, raccoon and gray fox. Amphibians and reptiles that find moisture and concealment under the logs include ensatina, arboreal salamander, Pacific slender salamander, western fence lizard, northern alligator lizard and ringneck snake.

Sensitive Habitats

Sensitive habitats are defined by local, state, or federal agencies as those habitats that support special status species, provide important habitat values for wildlife, represent areas of unusual or regionally restricted habitat types, and/or provide high biological diversity. Sensitive habitats include high priority habitat types as defined by inclusion in the California Natural Diversity Data Base (CNDDB) and listed by the California Natural Heritage Program as endangered and of limited distribution in California. Generally wetland and riparian communities are considered sensitive habitat due to their value to wildlife, limited distribution, and decreasing acreages statewide.

Sensitive habitats recognized within the project site include Monterey pine forest, coastal prairie grassland, and coast live oak woodland. The site supports a small area of riparian habitat which is located outside planned development areas. With the exception of the pond areas described above, no onsite wetlands have been identified.

Coastal Prairie Grassland. Coastal prairie is a grassland community largely dominated by native perennial grasses. It is considered a sensitive habitat because coastal prairie grasslands have declined greatly since European settlement in California due to urbanization, conversion to intensive agriculture, overgrazing, the introduction of weedy non-native species, and the cessation of frequent fires. Most of the native coastal perennial grassland habitats of central California have been fragmented through attempts at farming and other development. According to the CDFG Natural Diversity Data Base, coastal terrace prairie is classified as a threatened habitat.

Ecological succession takes place at the edge of coastal prairie grasslands in the absence of fire or other intervention, in which the advancement of undesirable weedy forbs and elements of other habitat types occurs. On the project site, non-native annual grasses have encroached into the perennial native grasslands with the potential of reducing their diversity. Some parts of the site show evidence of being old fields in which introduced annual grasses are found. If cleared grasslands are not maintained by some process (i.e. fire), coyote brush and scrub associations advance and reestablish themselves. This is particularly true in the lower portions of parcel D, the proposed Equestrian parcel, and the lower elevations of lot 21; very few native bunch grasses can be found in these locations (Yadon, personal communication, August 1996). In absence of spring field surveys to determine the extent of non-native annual grasslands compared to native perennial grasslands, all onsite grassland habitat has been classified as coastal prairie.

Monterey Pine Forest. Although Monterey Pine is widely planted as an ornamental, it is endemic to the Monterey Peninsula and a few sites on the central California Coast. Native Monterey pine forest stands are considered a sensitive habitat type because of their limited occurrence in only three areas (the Monterey Peninsula, near Cambria in San Luis Obispo

County, and near Año Nuevo Point in Santa Cruz and San Mateo Counties) and because urbanization and, to some extent, clearing for pasture have reduced their area of distribution. The CNDDB characterizes this habitat as rare and declining and recognizes Monterey pine as a highly rare and endangered species.

Oak Woodland. In California, oak woodlands are considered one of the most important wildlife habitats. Oak woodlands support a wide diversity of wildlife, providing both a food source and shelter to a variety of species. The statewide loss of oak woodlands over the past 50 years and decline of regeneration of some oak species has become a growing concern to resource agencies. The California Department of Fish and Game (CDFG) has been directed by the State Legislature to preserve and conserve oak woodlands where CDFG has direct permit or licensing authority over projects. CDFG typically encourages no net loss to oak habitat as part of development projects.

Riparian Habitat. The riparian plant community has been identified by the CDFG as a habitat of special concern. Riparian habitat is considered to be valuable because it supports a high density and diversity of wildlife species and because it is a diminishing habitat statewide. No development is proposed in the area of riparian vegetation located in the southwestern corner of the project site.

Special Status Species

Special status species include species listed by the U.S. Fish and Wildlife Services as Endangered, Threatened, Rare or are Proposed and Candidate Species for listing. The California Department of Fish and Games special status species include Endangered, Threatened, and wildlife Species of Special Concern. Additional plant species include those listed on List 1 or 2 of the California Native Plant Society's (CNPS) *Inventory of Rare and Endangered Vascular Plants of California.* Only those species which have been listed by the State or Federal government as endangered, threatened or rare fall under Federal or state regulatory authority and impacts generally require specific mitigation considerations. Species listed on List 3 or List 4 of the CNPS *Inventory* are considered to be of lower sensitivity than species in the first category and do not generally require specific mitigation measures.

Plants. The property was surveyed by LSA in 1985 with updated survey in June 1996 by Vern Yadon. A computer search of the California Natural Diversity Data Base (CNDDB) and review of other studies conducted in close proximity of the Canada Woods North provided identification of special-status plant species with potential to occur in the project area. These potential species are listed and summarized in Appendix C. The following special status species are believed to have the most potential for occurring on-site: Pacific Grove Clover (*Trifolium polyodon*), a California Rare species; Santa Cruz clover (*Trifolium buckwestiorum*), a CNPS 1b species; Hickman's Onion (*Allium hickmanii*), a CNPS List

1B species; Seaside bird's-beak (*Cordylanthus rigidus* var. *littoralis*), a State Endangered species; Santa Cruz microseris (*Microseris decipiens*), a CNPS List 1B species; Carmel Valley bush mallow (*Malacothamnus palmeri* var. *involucratus*), a CNPS List 1B species; Monterey pine, a CNPS List 1B species; and Yadon's Piperia (*Piperia yadonii*), a Federal Proposed Endangered species.

Several other species are known to exist in the vicinity but are not expected to occur onsite as summarized in Appendix C because no maritime chaparral habitat is located on the site. These species include Eastwood's goldenbush, sandmat manzanita, Hutchinson's larkspur, fragrant fritillary, and Hooker's manzanita. Other California Native Plant Society-listed plants which were searched for but not found are: *Arctostaphylos hookeri* ssp. *hookeri*, *Archtostaphylos montereyensis*, *Arctostaphylos pumila*, *Chorizanthe pungens* var. *pungens*, and *Cordylanthus rigidus* ssp. *littoralis*. These plants would have been visible during the course of the June 1996 survey had they been on the site (Yadon, personal communication, 1996).

Of the species that may occur on the project area, only Monterey pine and Carmel Valley bush mallow were found on the project site. However, surveys were not conducted during the flowering season of the other species, except for Seaside bird's-beak, Yadon's piperia, and Hutchinson's larkspur. Populations of Yadon's piperia (*Piperia yadonii*), proposed for federal listing, have been found in the project vicinity, but were not observed on the property during the 1996 June and August surveys which was conducted during the flowering period for these species.

Pacific Grove Clover and Hickman's onion have been found in the area of the adjacent Monterra Ranch site. Pacific Grove Clover occurs in closed-cone forests, coastal prairie, and mesic meadows below 300 feet. It has been documented in mesic grasslands with scattered vernal pools on Tarpy Flats. Santa Cruz clover occurs in mesic coastal prairie habitat. It was also documented in mesic grassland at Tarpy Flats. Santa Cruz Microseris on open sandy or shaley substrates in closed-cone forests, chaparral, coastal prairies and coastal scrub habitats. An occurrence of Santa Cruz microseris was documented near Highway 68 in the Laguna Seca Recreation Area.

Annual monitoring and a management plan for Hickman's onion were required as conditions of approval of the Monterra Ranch Subdivision approval process under Monterey County. Hickman's onion has been transplanted from the site under a 1989 program initiated pursuant to this condition requirement and undertaken by Vern Yadon. The results of this transplant effort have not been demonstrated to be successful. The initial effort consisted of collection of approximately 35 bulbs along with numerous seeds. According to annual progress reports submitted to Monterey County Planning Department, these plants have been maintained in pots following their habitat requirements (i.e. wet during the growing season and dry during the summer months). During the spring of 1990 and 1991, additional seed were collected from Monterra Ranch. It is estimated that 1,500 bulbs have been grown from the original 35 collected.

A population of *Malacothamnus palmeri* var. *involucratus*, a CNPS List 1B species, occurs just north of a fenceline around the California-American Water Company water tank at the southwestern corner of the project site. The various coastal chaparrals and closed-coned forest are potential habitat for the sensitive Carmel Valley bush mallow. No other occurrences of this species were observed during June surveys on the property.

Wildlife. The property was surveyed for wildlife by LSA in 1985 and updated in June 1996 by Vern Yadon and in July 1996 by Ecosystems West. Literature on the wildlife of the region, including their status, habitat relationships and management recommendations was collected from various sources, including Remsen (1978), Williams (1986) Jennings and Hayes (1994) and California Department of Fish and Game (1994); see References in Appendix C. A computer search of the California Natural Diversity Data Base and a review of the California Wildlife Habitat Relationships (CWHR) species-habitat models (Zeiner et al. 1988, 1990a and 1990b) assisted in preparing a list of potentially occurring special status species (see Wildlife Table in Appendix C). Surveys were then conducted to evaluate potential for these special status species to occur.

No Federal or State listed threatened, endangered, or rare species of animals appear to occur on the project site. Suitable habitat for the California Red-legged frog does not exist on the property. The aquatic sites on the project site were not suitable for red-legged frogs and southwestern pond turtles due to each pond's ephemeral nature, complete lack of emergent and shoreline vegetation for cover, and lack of basking sites and proximity to a more suitable perennial water source. Surveys for Smith's Blue Butterfly were performed and no butterflies or suitable habitat were encountered (see below). Black swift habitat breeding habitat does not occur on the property as they prefer steep cliffs near water falls or coastline spray zones. In addition, known swift breeding range does not overlap with the project site.

Suitable habitat does exist for other special status wildlife species. Observations during site surveys include California tiger salamander, Cooper's hawk, white-tailed kite, and Monterey dusky-footed woodrat (nest). In addition, potential habitat covering a wide range of suitability was observed for sharp-shinned hawk, golden eagle, Townsend's western big-eared bat and pallid bat. The quality of habitat and likelihood of occurrence is discussed below.

<u>Smith's blue butterfly</u> (*Euphilotes enoptes smithi*): Smith's blue butterfly is a Federally listed Endangered Species. This species typically occurs in coastal locations but can also occur on inland sites. Dune buckwheat (*Eriogonum parvifolium*) is the host plant for the butterflies. Adults feed on the flowers' nectar and larvae consume the flower heads.

Smith's blue colonies generally are located in response to the distribution of dune buckwheat.

Site-specific occurrence. On the project site, dune buckwheat is found in several small locations. Surveys for the Smith's blue butterfly were conducted by Thomas Reid Associates in June 1996. The field work was scheduled to coincide with favorable weather conditions and the flowering cycle period for the dune buckwheat. No evidence of the butterfly was found in the several small patches of buckwheat. Prior to the survey, it was verified that the Smith's blue butterfly was in its adult flight elsewhere in its range (Sand City). Based on the survey and the known information about Smith's blue butterfly populations, the site does not support this species. The patches of dune buckwheat appear to be too isolated from other known nearby locations (Garland Park) and contain too few plants to support the butterfly.

California tiger salamander (*Ambystoma californiense*). The California tiger salamander is a Federal Candidate and State Species of Special Concern. It ranges from Sonoma County south to the Santa Hills in Santa Barbara County and east to the foothills of the Sierra Nevada (Jennings and Hayes 1994). Tiger salamanders frequent the quiet water of small ponds, temporary rain or vernal pools and slow-moving streams. Adults spend most of the dry season in burrows dug by squirrels and other small mammals (Shaffer et al. 1993). They emerge after the first heavy rains in late fall or early winter traveling at night in search of breeding pools. Breeding pools are likely to occur in annual grassland and oak savannas (Stebbins 1985).

Eggs are deposited singly or in small groups of 2-4 submerged in the relatively shallow water of the pools (Storer 1925). A minimum of 10 weeks is required to complete development through metamorphosis but larvae and adults may occupy ponds longer if water remains (Anderson 1968, Feaver 1971). Over-summering of larvae in pools is unusual as the temporary pools occupied by this species generally dry up in the summer months. Following metamorphosis, juveniles emigrate in mass at night from the drying breeding site to dry season refuge sites (Zeiner et al 1988). Juveniles have been found to migrate up to one mile from breeding sites to refuge sites, although higher densities of salamanders will likely occur close to the breeding pools if suitable cover exists (Shaffer pers. com).

Site specific occurrence. California tiger salamanders adults and larvae were observed during the site visit on July 22, 1996. They were captured with a dip net in a stock pond near the north central end of the project area (see Figure 10). Three other ponds, as shown on Figure 10, (two currently with water and one dry) also were surveyed, but no salamanders were found. However, since the time of year is outside of the normal breeding period (winter and spring), surveys will be necessary to determine presence or absence. Without surveys to verify presence or absence, presence is assumed.

Golden eagle (*Aquila chrysaetos*). The golden eagle is a State Species of Special Concern. It hunts in open areas sometimes preying exclusively on ground squirrels (Palmer 1988). Golden eagles nest either on cliffs or in large trees; open, rugged habitats containing canyons or escarpments are preferred (Palmer 1988 and Zeiner et al. 1990a).

Site specific occurrence. No golden eagles were observed nesting on the project site during biological surveys. There does not appear to be a high density of ground squirrels, indicating low suitability foraging habitat. No nesting sites are known to occur on the site

Sharp-shinned hawk (*Accipiter striatus*). The sharp-shinned hawk is a State Species of Special Concern. It generally nests in dense, even-aged single-layered forest canopy, and winters in woodlands (Zeiner et al., 1990a). Nesting habitat is often adjacent to clearings, brushy areas, or open deciduous woodland. Preferred wintering habitat includes areas where trees or brush provide concealment for the hawks, allowing them to capture their prey at short range (Palmer 1988).

Site specific occurrence. The project site is outside the general breeding range of sharp-shinned hawks (Palmer 1988) although there are nesting records in the river bottom along the Carmel river (Grinnell and Miller 1944) and Hastings Reservation (Davis et al. 1980). It is likely to occur on the property as a winter migrant.

Cooper's hawk (*Accipiter cooperi*). The Cooper's hawk is a State Species of Special Concern. In California, it nests primarily in oak woodland where the trees are dense, the canopy closed, and the understory relatively open (Asay 1987). The Cooper's hawk was once a common nester throughout California (Grinnell and Miller 1944) In Monterey County it is now a rare summer resident in woodlands (Roberson 1985).

Site specific occurrence. Potential breeding and foraging habitat occurs on the project area in the oak and pine woodlands. A Cooper's hawk was observed on the property during the breeding season near the southern boundary of the project. It is not known if this individual was breeding on the project site. The most suitable habitat exists in oak woodlands along the southern portion of the project area. Suitable nesting habitat will not be subject to development, therefore there are no significant impacts anticipated.

White-tailed kite (*Elanus caeruleus*). Although not a State listed or Species of Special Concern the white-tailed kite (formerly black-shouldered kite) is on the Special Animals list (CDFG 1994) because it is threatened by development and modification of habitat. White-tailed kites are yearlong residents in coastal and valley lowlands and are rarely found away from agricultural areas. It mostly inhabits open cultivated and marshy bottomlands with scattered tall trees, grassy foothill slopes interspersed with oaks, orchard and roadside edges (Small 1994). These kites have increased in number in Monterey County since the

1960s, although their abundance varies with the numbers of California voles, which is their main prey (Roberson 1985).

Site specific occurrence. White-tailed kites have been observed foraging on the grassland portion of the project site. No nests were observed during surveys.

Purple Martin (*Progne subis*). The purple martin is a State Species of Special Concern. Although formerly a fairly common breeder in California (Grinnell and Miller 1944), a decline was noted starting in the mid-1960s (Remsen, 1978). In Monterey County, they are now considered uncommon, occurring especially on ridges with dead snags (Roberson 1985), where they build their nests in old woodpecker holes.

Site-specific occurrence. Purple martins have not been observed nesting on the site, but suitable habitat could occur in the pine or oak woodland habitats. Purple martins are not known to nest in the immediate vicinity of the project site (Zeiner et all 1990a). Potential habitat on the property will not be impacted by the project.

Townsend's western big-eared bat (*Plecotus townsendii townsendii*). The Townsend's western big-eared bat is a State Species of Special Concern. It is widely distributed throughout California including coastal forests and woodlands. There are some historic records from Monterey County and indications are that they may use coastal redwoods for roosting sites on nearby Rancho San Carlos (BioSystems 1993). Townsend's big-eared bats are primarily a cave dweller but may also inhabit man-made roosts that provide cave-like spaces such as mine tunnels or dark attics of abandoned buildings (Kunz and Martin 1982, Pierson et al 1991). This bat forages in wooded canyons and over small wetland areas (Pierson pers. comm.).

Site specific occurrence. Appropriate roosting sites do not occur on the project site. Appropriate foraging habitat occurs in woodland habitat along the southern portion of the project area. The project will have no negative impacts on this species as suitable roosting habitat does not occur on the project site.

Pallid bat (*Antrozous pallidus*). The pallid bat is a State Species of Special Concern. It is widely distributed in California from the deserts to the high Sierra but is most common in the low to mid-elevation oak woodlands of central California. Pallid bats in northern and central California are closely associated with oak woodlands. They will used hollows in mature oaks for roosting. They also use crevices and small concealed cavities in rock outcrops as roost sites (Orr 1954.)

Site-specific occurrence. The most suitable habitat on the project site is mature stands of oak woodland that provide hollows for roosting.

Monterey dusky-footed woodrat (*Neotoma fuscipes luciana*). This subspecies of the dusky-footed woodrat is a State Species of Special Concern. It occurs in the coastal hills and mountains from Monterey Bay to Morro Bay. It is common to abundant in forest and woodland habitats of moderate canopy and moderate to dense understory. It also can be abundant in chaparral habitats (Zeiner et al. 1990b). Houses are built of sticks and leaves at the base of, or in a tree, around a shrub or at the base of a hill.

Site specific occurrence. Monterey dusky-footed woodrat nests were observed and suitable habitat exists throughout the woodland and chaparral habitats on the project site.

County Policies and Regulations

Under County regulations (Chapter 16.60 of the County Code), no oak, madrone or redwood tree six inches or more in diameter two feet above ground level shall be removed in the Carmel Valley Master Plan area without approval of a tree removal permit. Chapter 16.60 also indicates that no landmark oak tree shall be removed in any area except as may be approved by the Director of Planing and Building Inspection. Landmark oak trees are those trees which are 24 inches or more in diameter when measure two feet above the ground, or trees which are visually significant, historically significant, or exemplary of their species. Removal of more than three protected trees on a lot in a one year period requires preparation and approval of a forest management plan and approval of a use permit by the Monterey County Planning Commission. Additionally, removal of protected trees requires relocation or replacement on a one-to-one basis.

RELEVANT PROJECT CHARACTERISTICS

The proposed project includes resubdivision of 19 existing and 120 approved residential lots to 34 lots surrounding a private 18-hole golf course with private equestrian and recreational facilities. Building envelopes are established on each lot. Approximately 90% of the project site will remain in open space. This includes 630 acres of designated open space, 327 acres of private open space on proposed lots, and the planned golf course and recreational facilities, excluding all structures, roads and utilities.

The golf course parcel is sited on 183 acres and consists of 18 fairways separated by native grasses, "roughs." The golf course playing surfaces are estimated to cover approximately 50 acres (Questa Engineering, 1996a). The golf course will be irrigated using primarily reclaimed wastewater (see EIR section 4.5--Wastewater Treatment). Golf course fairways and greens will be fertilized regularly, but not during the rainy season. Application of Best Management Practices (BMPs) will control runoff and include the use of buffer areas and drainage swales. A Management Plan prepared for the golf course (Questa Engineering, 1996a) also includes measures to minimize pesticide use on the turf areas.

Planned vegetation within the golf course playing areas include turfgrass cultivars that are hardy, low in disease susceptibility, and resistant to pests. Planned species include those with fibrous root systems capable of supporting large microbial populations which absorb fertilizers and break down pesticides (Ibid.). The following turf cultivars and seeding rates are currently proposed:

- *Greens:* Colonial Bentgrass and Kentucky Bluegrass, 2 pounds per 1000 square feet

- *Tees:* Colonial Bentgrass and Kentucky Bluegrass, 5 pounds per 1000 square feet

- *Fairways:* Colonial Bentgrass and Ryegrass, 400 pounds per acre

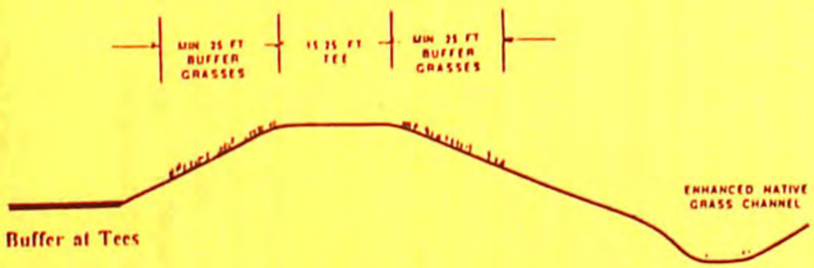
- *Maintained Roughs:* Native grasses including the following:
    1. California oat grass - *Danthenia californica*
    2. Western ryegrass - *Elymus glacus*
    3. Purple needlegrass - *Nasella pulchra*
    4. California fescue - *Festuca californica*
    5. Creeping wildrye - *Lemus triticoides*

- *Managed Open Space:* Existing Grasses and Vegetation; will be restored over time to native species where possible.

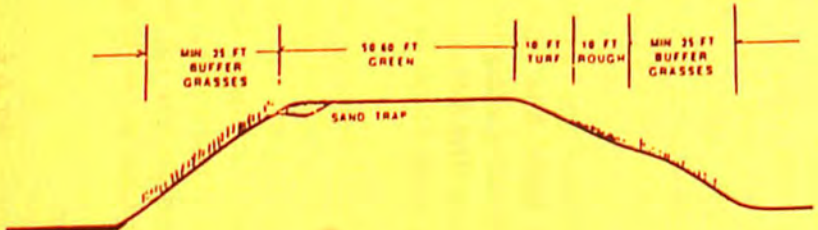
The proposed project also incorporates the use of vegetative buffers and gently sloped berms to separate golf course use areas from sensitive habitat areas (i.e., Monterey pine woodlands and ponds) and open grassland areas of the site. The specific buffer criteria incorporated into the golf course design are as follows and are illustrated in Figure 11. As shown, a minimum 25-foot buffer of native grasses will be provided at the tees and greens with a 25-foot maintained "rough" area adjacent to the fairways.

A minimum 25-foot "Total Buffer" generally will be maintained between the edge of seasonal drainage channels and trees/greens/fairways. The buffer includes the maintained rough, buffer grasses, and other habitats. The rough areas will receive low rates of fertilizer application, and may be treated selectively with pesticides/herbicides. Buffer grasses may be irrigated, but will generally not be treated with fertilizers or pesticides/herbicides, except during initial planting.

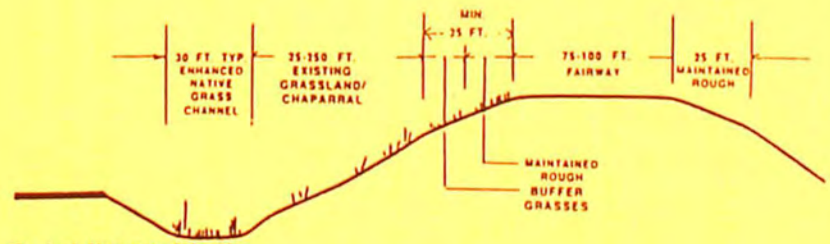
A Preliminary Forest Management Plan has been prepared for the applicant by Hugh E. Smith. The plan identifies potential loss of trees due to road construction, and recommends replanting at a 2:1 replacement ratio for trees removed. Replacement trees will be planted using onsite seed sources.



Buffer at Tees

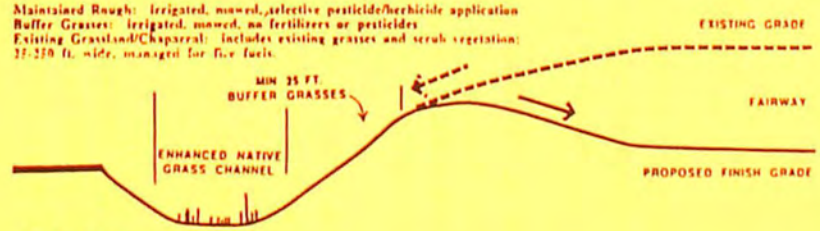


Buffer at Greens



Typical Vegetated Buffer

Maintained Rough: irrigated, mowed, selective pesticide/herbicide application
Buffer Grasses: irrigated, mowed, no fertilizers or pesticides
Existing Grassland/Chaparral: includes existing grasses and scrub vegetation; 25-250 ft. wide, managed for fire fuels.



Hydrologic Buffer

Where total buffer is less than 50 feet, slope to avoid direct runoff into drainages. Disperse into areas where 50 ft. buffer is provided, or to selectively located shallow rock drains.

not to scale

Source: Questa Engineering

Golf Course Planting and Buffer Concepts

Figure 11

IMPACTS AND MITIGATION MEASURES

Standards of Significance. In accordance with the California Environmental Quality Act (CEQA), State CEQA Guidelines, and agency and professional standards, the project would be considered to have a significant impact if it would:

- adversely affect significant riparian, wetland, or other sensitive wildlife habitat, including fragmentation or isolation of sensitive wildlife habitat;
- result in substantial reduction in fish or wildlife habitat;
- reduce the number or restrict the range of a rare, threatened, or endangered plant or animal species;
- cause a fish or wildlife population to drop below self-sustaining levels;
- substantially interfere with or eliminate important wildlife migration routes or movement corridors; or
- result in substantial disturbance to wildlife resulting from construction or human activities.

Impact #11: Construction of site improvements and ultimate development of homes will result in an incremental loss of and disruption to onsite coastal prairie grassland habitat, an identified sensitive habitat. This is considered a significant impact.

The proposed project would result in conversion of approximately 99 acres of existing onsite grassland habitat due to development of the golf course fairways and associated structures, roads and future homes. Additionally, areas in between the fairways likely will be disturbed during the grading process. Of these 99 acres, approximately 70 acres will be removed from coastal prairie grassland habitat. This represents approximately 33% of the existing onsite coastal prairie grassland areas. Due to the recognized sensitivity of coastal prairie grasslands, this is considered a significant impact.

Figure 12 illustrates areas of onsite grassland and locations of proposed development. The onsite survey conducted by Paul Kephart and Mark Stromberg delineated needlegrass grasslands separately from California oat grass grasslands, but both types are considered a form of coastal prairie grassland. The project will result in conversion of 10 acres of the California oat grass series and 60 acres of needlegrass grassland.

Approximately 135.5 acres of ruderal grassland are present on the site, of which approximately 28 acres will be developed, resulting in a remaining 107± acres that would be available for native grassland restoration. The grassland specialists also have estimated that approximately 15 acres of poison oak chaparral adjacent to grassland areas also would be available for restoration sites. Thus, approximately 115 onsite acres would be available for restoration. At typically requested 3:1 replacement ratios, approximately 186 acres would be needed to mitigation the loss of onsite native grasslands, exceeding the amount of onsite ruderal grasslands potentially available for restoration. Therefore, in order to achieve the total acres necessary for 3:1 replacement, off-site mitigation will be required.

It should be noted that there are no examples where native grassland restoration has been successfully completed for an area approaching 200 acres. To date, restoration efforts have primarily been conducted on smaller areas of 10-20 acres.

Existing onsite coastal prairie grassland habitat will be retained in open space and as "rough" areas between the golf course fairways, although some disturbances may occur during grading of fairways. The rough areas are proposed to be periodically mowed at heights of approximately 6 inches to help to control invasive weeds and brush species and allow the native grasses to reestablish. The elimination of grazing, with associated management (i.e. mowing), could increase density and diversity of native grasses.

Mitigation

Implementation of Mitigation Measures 11-1 through 11-4 will reduce impact to a less-than-significant level, provided that the long-term restoration plan can be successfully implemented.

11-1 Modify building envelopes to reduce development in native grasslands to avoid and/or minimize loss of native grasslands on proposed lots.

11-2 Develop and implement a grassland enhancement program that consists of measures to reestablish native grasses, including native grassland restoration at a 3:1 ratio. The program shall outline details pertaining to onsite and off-site restoration areas, plant salvage, seeding and planting specifications, maintenance, monitoring, and performance criteria reporting. Require restored grasslands to maintained and managed as open space in perpetuity. Conduct appropriately timed surveys to better document the extent of native grasslands to better refine habitat loss and restoration areas.

11-3 Develop and implement a native grassland enhancement and management program for all remaining native grasslands and chaparral invaded grasslands. The program shall be specific regarding timing and frequency of mowing, burning and enhancement by seeding and planting activities, including measurement criteria related to percent cover, diversity and exotic plant removal. Maintain preserved and restored native prairie grasslands by mowing in early spring and later in the year prior to seed establishment to control undesirable introduced non-native species.

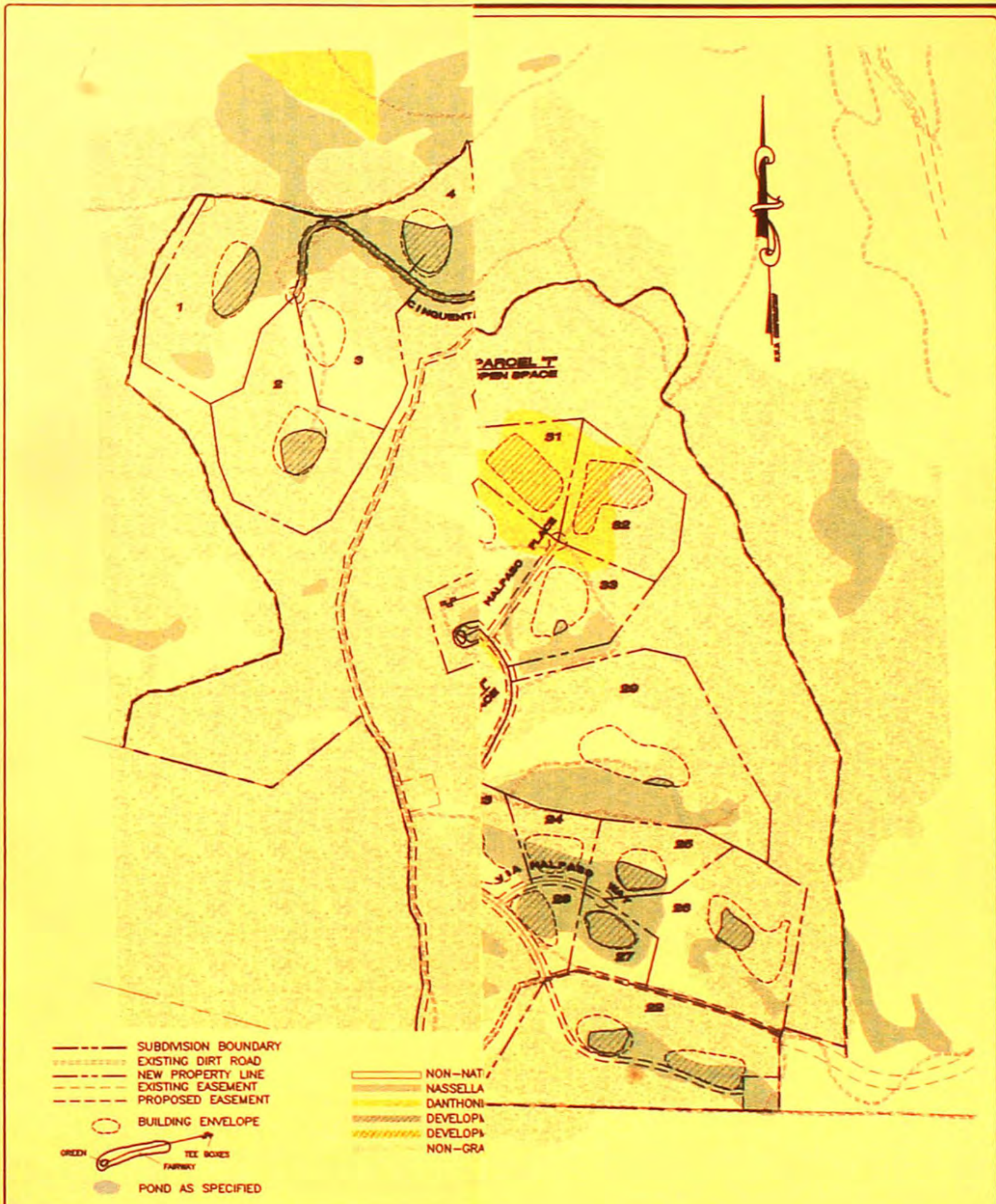

PARCEL "I"
OPEN SPACE
CINQUENTA
MALPASO
VIA MALPASO WAY
SUBDIVISION BOUNDARY
EXISTING DIRT ROAD
NEW PROPERTY LINE
EXISTING EASEMENT
PROPOSED EASEMENT
BUILDING ENVELOPE
GREEN
TEE BOXES
FAIRWAY
POND AS SPECIFIED
NON-NAT
NASSELLA
DANTHONI
DEVELOPM
DEVELOPM
NON-GRA

Figure
12

A program of occasional burning of portions of the grasslands under carefully controlled conditions, especially where scrub succession is advancing into the grasslands, can be beneficial in reestablishing native grasses. An alternate method would be the use of mechnical brush-removing equipment. Early mowing will benefit native perennial grasslands and inhibit annual weedy grasses. Both burning and mowing will control newly emerging brush species.

11-4 Develop and implement exotic plant control program targeting the annual control and reduction of exotic species on onsite grasslands.

Impact #12: Project development will result in conversion of limited areas of Monterey pine forest and oak woodland habitat and individual trees, which is not considered significant on a regional basis, but indirect impacts could degrade remaining habitat areas. This is considered a significant impact.

Proposed residential, golf course, equestrian and recreational uses would result in development of approximately 110 acres with approximately 950 acres remaining in open space. In general, the proposed project would result in minimal conversion of native habitat. The designated building envelopes on each residential lot with dedication of a scenic easement on the remainder of the lot will prevent direct disturbance or removal of native vegetation outside the building areas. Large contiguous expanses of open space throughout the proposed subdivision and between development envelopes will allow for continued wildlife movement through the site. However, areas outside the building envelopes may be subject to vegetation removal and/or alteration if not specifically prohibited.

The majority of the project facilities and homesites is sited outside locations of the sensitive Monterey pine forest habitat. The proposed golf course guest suites are sited within the Monterey pine forest habitat, and construction would involve removal of individual trees, as well as approximately 1.3 acres of habitat. Portions of building envelopes on proposed lots 2, 13 and 15 also encroach into Monterey Pine Forest. Assuming a worse-case scenario where all the designated building envelope is cleared, approximately 4.5 of the estimated 58± acres of onsite Monterey pine forest would be removed. However, it is likely that homes can be sited to avoid or minimize tree removal on these lots.

Potential conversion of onsite Monterey pine forest (less than 5 acres) is not considered significant when assessed in terms of the amount of regional acreage and distribution of this habitat. Monterey pine forest is common on the Peninsula--approximately 4,400 acres (Jones & Stokes, September 1994); however, it is considered unique since the Monterey Bay region is one of only three known places in the world where it naturally occurs. Project plans include replanting Monterey Pines on a 2:1 basis using onsite seed stock.

Approximately 11 building envelopes encroach into areas of oak woodland and/or oak-pine forest (Lots 1, 7, 8, 13, 14, 15, 16, 19, 20, 21, 22 and 33). Assuming the entire building envelope is utilized for building construction and removal of vegetation, the project would result in loss of approximately 7.2 acres of oak woodland and 3.3 acres of oak pine forest. This potential conversion of 10.5 acres of woodland represents 4.5% of the estimated onsite acreage. However, it is likely that homes can be sited to avoid or minimize tree removal on these lots.

The Preliminary Forest Management Plan prepared for the applicant indicates removal of 23 oak trees and 10 pine trees due to road construction. Table 9 compares an estimate of existing trees and trees to be removed. Additional trees may be removed for construction of golf course and recreational facilities (guest suites and pool building area) and future homesites on Lots 1, 2, 7, 8, 10, 13, 14, 15, 16, 19, 20, 22, and 33, depending on ultimate siting of structures. An additional survey conducted by Hugh Smith in August 1996 estimated that approximately 54 Monterey Pine trees and 43 oaks could be removed due to proposed residential and other structural development. Preparation of a Forest Management Plan was recommended for lots 7, 14, 21 and 33.

Tree removal is regulated by the County, and a permit is required where removal involves more than 3 trees over 12 inches in diameter. Preparation of forest management plans will be required with oak tree removal permits to specify tree replacement. Thus overall habitat modification would be reduced as any tree removal will be replaced at a similar or greater ratio. These requirements, in conjunction with protection of habitat outside of the building envelopes, will also minimize habitat disruption.

Mitigation

Implementation of Mitigation Measures 12-1 through 12-6 will reduce impact to a less-than-significant level.

12-1 Require tree removal permits and tree replacement for removal of any oaks that may occur as part of future lot construction, pursuant to County regulations. Require oak pine tree replacement on a 2-to-1 ratio, as recommended in the project *Forest Management Plan*.

12-2 Implement Best Management Practices for removal of Monterey pines, consistent with practices recommended by the Pitch Canker Task Force, in effect at the time of removal, and with consideration of the extent of infestation in the area. If replanting is recommended, require use of Monterey pines grown from seed collected in locations bordering the tree clusters from which the trees were removed, in accordance with the Guidelines.

TABLE 9
ONSITE TREES

Diameter class	Number	Indicated for removal**
Oaks		
6-11	41,480	16
12-19	16,915	6
20-23	897	1
24-29	448	0
30-39	43	0
Totals	**59,783**	**23** (= .00038)
Pines		
6-11	574	6
12-19	478	2
20-23	382	2
24-29	186	0
30-39	90	0
Totals	**1,710**	**10** (= .0058)

** Tree removal identified only for roadway construction; see EIR text for discussion of other areas
SOURCE: Hugh E. Smith, June 26, 1996

12-3 Require preparation of forest management plans for proposed golf course guest suites, Lots 7, 8, 10, 14, 20, 21 and 33 where tree cover is extensive, in accordance with County regulations prior to issuance of building permits.

12-4 Require protection of oak and Monterey pine trees located outside designated development envelopes, unless proven to be diseased or unhealthy as determined by a qualified arborist.

12-5 Prohibit vegetation removal or alteration outside the building envelope, unless trees are removed in accordance with County regulations and issuance of tree removal permits as may be required. Prohibit introduction of nonnative invasive plant species within any portion of proposed lots (such as acacia, French or Scotch broom, pampas grass), and prohibit introduction of any nonnative species outside the development envelope.

12-6 Limit use of fencing to immediate building areas within designated development envelopes, but prohibit fencing of parcel boundaries in order to maintain areas for wildlife movement.

Impact #13: Ultimate building construction and golf course development may result in loss of special status plant species (i.e., *Allium hickmanii, Trifolium buckwestiorum*). This is considered a significant impact.

Potential habitat exists onsite for several special status plant species, including Hickman's onion, Pacific Grove clover, Santa Cruz clover, Santa Cruz microseris, and Yadon's piperia. Onsite surveys have not been completed during the flowering season, and should be conducted during the early spring to confirm the presence or absence of these and other early flowering species prior to finalization of the project facility plans. Should any of these species be found in a proposed development site, mitigation would be provided that avoids and/or minimizes take and provides buffered avoidance from the development.

Carmel Valley Bush Mallow (*Malacothamnus palmeri* var. *involucratus*) may occur in a number of chaparral types and that of coastal sage scrub. One more or less single population grows on both sides of the access roadway at the site of the Cal Am Water Company storage tank. Care should be taken to not remove this stand during road improvement activities.

Mitigation

Implementation of Mitigation Measures 13-1 and 13-2 will reduce impact to a less-than-significant level.

13-1 Conduct a plant survey during flowering season, in accordance with California Department of Fish and Game survey guidelines, to ascertain presence or absence of special status species within proposed development areas. If any are found, modify and/or relocate building envelopes to avoid the plants and provide a buffer to protect plants from indirect impacts. Avoid plants potentially found on the golf course by redesign and/or configuration. If golf course cannot be redesigned, prepare and implement a plant mitigation plan approved by the California Department of Fish and Game that outlines a mitigation strategy of salvage, transplanting, and/or compensation.

13-2 Provide exclusionary fencing around the known occurrence of Carmel Valley bush mallow and design the roadway to avoid take of the population.

Impact #14: Site preparation and future home construction may damage undisturbed oak trees due to potential soil disturbance and compaction from construction activities, including grading and filling, as well as introduction of landscaping and irrigation as part of future home construction. This is considered a potentially significant impact.

Two kinds of activities are particularly damaging to oaks. One is excavation within the dripline; the other is soil compaction due to grading and/or use of heavy equipment. Oaks have very fine roots near the surface which would be damaged by either of these activities.

Mitigation

Implementation of Mitigation Measures 14-1 and 15-2 will reduce impact to a less-than-significant level.

14-1 Prohibit grading, filling and all subdivision construction activity within the dripline of oak trees, where possible. Each tree or group of trees in the construction area designated to remain shall be protected by an enclosure (five foot fence), prior to the beginning of construction. The location of the fence is normally at the dripline of the tree.

14-2 Wherever possible, future homes should be sited outside of the dripline of any oak. Project CC&Rs shall include measures for protection of oak trees on individual lots as part of future home construction, as well as guidelines for appropriate landscaping management to protect remaining oaks. Generally, irrigation should be prohibited within an area 1/3 larger than the dripline of oak trees.

Impact #15: Project construction and operations could result in degradation of breeding areas and disruption of upland habitat for the California tiger salamander. This is considered a potentially significant habitat.

One special status species could be affected by the project -- the California tiger salamander -- a State Species of Special Concern and a federal Candidate species. Other special status wildlife species potentially using the site would be impacted. The Smith's Blue butterfly does not appear to occur on the site based on field studies, and no project impacts are expected to occur. Conversion of grassland is unlikely to impact golden eagle or white-tailed kite due to the low suitability of onsite habitat for foraging for the eagle and minor foraging habitat loss for the kite. There will be limited impacts to oak woodland habitat by development, and no significant effects are expected to potential roosting habitat for the pallid bat. Similarly, only a small amount of Monterey dusky-footed woodrat habitat will be lost as most oak woodland and pine forest areas will not be disturbed. Impacts to this species would not be significant given the limited area of disturbance and mitigation with tree replanting so some habitat.

The California tiger salamander uses two distinct habitats on the property: existing pond(s) for breeding and adjacent upland habitat for dry season refuge sites. In addition, upland habitat may also serve as a migration corridor among breeding populations that use ponds both on and off-site. Inter-pool migration and subsequent interbreeding of populations is important in maintaining their viability. Juveniles have been known to migrate up to a mile from breeding sites although suitable refuge sites within close proximity to breeding ponds are probably used to a greater extent than those that occur at a longer distance from these ponds (Shaffer pers. comm.). It is not unusual at some sites to find California tiger salamanders ¼ mile or more from their breeding ponds (Allabach pers. comm.). For purposes of this mitigation it will be assumed that all habitat within ¼ mile of each pond is California tiger salamander upland habitat.

Impacts to Breeding Ponds. As currently proposed, all onsite ponds will be protected, except Pond 2 is located within Golf Course Fairway 16. It is not known whether the pond would be incorporated into the golf course design. The project has the potential to indirectly impact California tiger salamander breeding pond hydrology by increased runoff or diversion of water normally draining into ponds. Both increasing and decreasing the period in which the pond contains water could have detrimental effects on breeding California tiger salamanders. Degradation of water quality in breeding ponds due to runoff of contaminants and increased siltation from the golf course or other development are additional concerns. Contaminants and siltation could damage egg masses and impede or prevent larval development.

Impacts to Upland Habitat. Destruction of upland habitat (particularly grassland) could result from development. Golf course construction and housing development in these habitats would permanently remove dry season refuge sites for this species. Increased off-road vehicle use could also damage upland habitat. Rodent control and removal of burrows along with additional disturbance on the golf course would eliminate habitat. Rodent control measures could reduce habitat quality in undeveloped areas as well. California tiger salamanders use small mammal burrows in grassland and open woodlands for upland refuge sites. In addition, they have been known to use moist duff and exposed roots for cover in tree and shrub habitats (Jennings pers. comm.).

Table 10 identifies existing upland habitat around each onsite pond and potential losses. The greatest habitat loss is around Pond 1.

Impacts to Migration Routes. Disruption of migration routes could result due to placement of roads and housing development. Current migrations to and from the stock pond breeding sites may be blocked by roads and buildings constructed on the project site. These obstacles may prevent successful breeding and threaten population viability. One of the current problems threatening viability of California tiger salamander populations is continued isolation of populations through conversion of adjacent habitat and the subsequent reduction of gene flow through reduced interbreeding. Isolated populations are vulnerable to elimination and the natural recolonization of habitat is less likely if migration is restricted by barriers.

TABLE 10
CALIFORNIA TIGER SALAMANDER UPLAND HABITAT LOSS

Habitat	Ephemeral Pond 1 (south of Via Malpaso)	Ephemeral Pond 2 (north of Via Malpaso)	Farm Pond	Pond / Reservoir	Total
EXISTING HABITAT* WITHIN 1/4 MILE OF POND (EXCLUDING LANDS OUTSIDE PROPERTY LINE)					
Grassland	45.9	32.5	52.4	57.2	188.0
Coastal Sage Scrub	13.7	13.2	1.7	2.2	30.8
Coast Live Oak Woodland	8.4	10.6	2.3	12.4	33.7
Oak-Pine Forest	16.5	15.9	9.0	0	41.4
Monterey Pine Forest	11.7	13.1	2.6	0	27.4
Poison Oak Chaparral	23.6	21.5	13.1	45.0	103.2
TOTAL	**119.8**	**106.8**	**81.1**	**116.8**	**424.5**
TOTAL UPLAND HABITAT LOSS* DUE TO PROJECT (Total Grassland Habitat Loss)					
Building Areas	16.2 (5.8)	10.6 (2.6)	11.4 (5.2)	16.2 (3.8)	54.4 (17.4)
Roads	4.3 (1.9)	4.0 (1.8)	3.0 (2.1)	1.2 (0.1)	12.5 (5.9)
Golf Course	13.3 (8.9)	5.6 (4.0)	6.7 (5.6)	0 (0)	25.6 (18.5)
TOTAL	**33.8 (16.6)**	**20.2 (8.4)**	**21.1 (12.9)**	**17.4 (3.9)**	**92.5 (41.8)**
PERCENTAGE OF UPLAND HABITAT LOSS WITHIN 1/4 MILE OF EACH POND					
% of Total Habitat Loss within 1/4 mile	28%	19%	26%	15%	22%
% of Total Grassland Habitat Loss within 1/4 mile (and onsite)	36% (5%)	26% (2%)	25% (4%)	7% (1%)	22% (12%)

* In acres
Upland habitat as measured within 1/4 mile of each onsite pond; includes only onsite acreages

Impacts Due to Direct Mortality. Increased mortality of individuals may occur during and after project construction. California tiger salamanders occupying dry season burrows may be crushed or otherwise disturbed by construction activities such as grading, paving and home construction. Salamanders could be crushed by motor vehicles while attempting to cross roads during their seasonal migrations. Pets and wildlife that increase in numbers with human presence such as raccoons would increase predation pressures on tiger salamanders.

Greater human presence would increase the likelihood of the introduction of predators such as fish, crayfish and bullfrogs into salamander breeding ponds. Introduction of predators could result in reduction in breeding success. There is also a potential for pond degradation through dumping of trash, soil and the removal of larvae or adult salamanders.

Mitigation

Implementation of Mitigation Measures 15-1 through 15-15 will reduce impact to a less-than-significant level.

Mitigation for California Tiger Salamander Breeding Ponds. Because surveys haven't been performed at potential on-site breeding ponds during the appropriate season, all four known ponds will be assumed to be suitable California tiger salamander habitat. Specific protection measures for these ponds should include:

15-1 Restrict runoff entering each pond to maintain existing hydrology to prevent additional runoff from development including the golf course and housing sites to enter these areas. Increased erosion and subsequent siltation of the ponds should be avoided by maintaining existing vegetation in each pond's watershed. Irrigation from the golf course should not be allowed to enter the ponds.

15-2 Prohibit use of pesticides, herbicides and fertilizers in the upland habitat surrounding each pond and in other designated habitat areas.

15-3 Prohibit human activities such as dumping, introduction of fish, crayfish, and bullfrog and capture of salamanders.

15-4 Monitor breeding ponds on an annual basis to aid in determining continued presence and viability of the population. Ponds should be seined for presence of larva and adult salamanders as well as potential predators. Environmental conditions such as temperature, turbidity, oxygen concentration and sedimentation should be tested.

15-5 Prohibit construction activities within 150 feet of each pond.

15-6 Provide appropriate signs on ponds to explain the life cycle of native amphibians, the threats posed by bullfrogs and exotic fish, and an explanation of why the ponds are dry for a time during the dry season. Inform Cañada Woods North homeowners each year at the start of the rainy season via mailers and notices, that bullfrogs and fish are a threat to native amphibians. Enlist their help in preventing releases of non-native amphibians and fish in any streams or ponds on project site.

Mitigation for California tiger salamander upland refuge sites.

15-7 Protect upland habitat within 1/4 mile of each potential or known breeding pond with an emphasis on removing impacts within the immediate vicinity of each pond. Reduce all development in grassland habitat within 1/4 mile of all ponds to less than 20% and development in all other habitat within 1/4 mile to less than 25%, including but not limited to the following measures:

- Reduce the size of Fairway 16 by 50% and maintain a 150-foot buffer or undisturbed coastal prairie grassland between the fairway and Pond 2.
- Minimize building envelopes in native grassland areas.
- Site development as far away from ponds as possible (i.e. 500+ feet).
- Relocate Malpaso Road in the area of Fairway 16 to the north and away from Pond 1.
- Relocate Maintenance area to underground garage.

15-8 Maintain all undeveloped habitat in its current natural condition and manage grassland habitat to ensure the continued presence of small mammal burrows that would provide cover for California tiger salamanders. All grassland habitat should be mowed to mimic grazing and promote the presence of ground squirrels, gophers and other burrowing mammals. Prohibit use of pesticides or other measures to control small mammal populations in open space areas.

15-9 Restrict construction grading between December through February within 1/2 mile of each pond. Restrict construction grading and other ground disturbing activities within 1/4 miles of each pond to the spring season prior to the time that salamanders exist breeding ponds. Minimize areas of construction disturbance, such as staging areas, off-road access and grading soil overflow within the area to reduce impacts to non-developed upland habitat.

15-10 Prohibit off-road vehicles within the designated upland habitat areas.

Mitigation for California tiger salamander migration corridors.

15-11 Construct tiger salamander barriers on all roads within 3/4 miles of breeding ponds to prevent salamanders crossing roads. Construct tunnels with drift fences to safely funnel tiger salamanders beneath roads. These tunnels should be equipped with grill covers and placed every 300 feet.

15-12 Design all internal project roads within designated migration corridors with rounded curbs to prevent salamanders from becoming trapped on roads if they should circumvent the salamander barriers.

15-13 Design all golf course fairways to not impede salamander migration. Edges between turf and native habitat should be gently sloped and no barriers should in placed that would interfere with salamander movements.

15-14 Mortality of migrating salamanders crossing roads should be evaluated after the initiation of the rainy season. This monitoring will indicate location of upland habitat, patterns of movement of California tiger salamanders, and the effectiveness of the salamander barriers. Migration tunnels should monitored and maintained to allow for unobstructed passage.

Mitigation measures to enhance existing California tiger salamander habitat.

15-15 Construct additional pond(s) in the vicinity of each of the known breeding ponds, based on results of site specific surveys that determine presence or absence of salamanders in existing onsite ponds, to enhance the breeding potential of the tiger salamander population and safeguard against human induced or natural events that would extirpate the population from the project site. Each pond will mimic the characteristics of the most suitable breeding ponds that currently exist on the site. Special attention should be given to hydrological conditions and compliance with other mitigation measures for existing ponds. Introduction of California tiger salamanders will be accomplished by transport of individuals from existing onsite ponds and will follow CDFG guidelines.

4.7 AESTHETICS

ENVIRONMENTAL SETTING

Vicinity Viewshed

The project site is located in the vicinity of the Monterey Peninsula, an area noted for its unique and attractive visual character. The dominant visual elements of this area are the crescent shaped coastline of Monterey Bay and the central wooded ridge that extends through the peninsula separating the City of Monterey and State Route 68 corridor from Del Monte Forest, Carmel and Carmel Valley. A series of wooded canyons radiate from the ridge to the bay. Mesas occur between these canyons, supporting a variety of land uses. State Route 68, a designated state scenic highway, winds through one of these canyons, Canyon Del Rey, from the City of Monterey to the Salinas Valley. The road is bordered by pastoral, semi-rural land, consisting of open, rolling grassland, oak and pine woodlands, and prominent wooded ridges.

Distant views of ridgetops in the project area are available from portions of State Route 68 not in the immediate project vicinity, Seaside, downtown Monterey, and the Ryan Ranch, and rural residential areas. The ridges provide an aesthetic backdrop for the city and pleasant contrast to the level parts of the peninsula and bay. Views of the site's interior are largely blocked by ridges to the west. Although the project site is part of the peninsula ridges, it is not readily identifiable in these distant, regional views of the ridgeline. Also, views of the site from Carmel Valley Road are largely blocked by intervening ridges.

View corridors, which are more local in nature, include Olmsted Road, York Road, Jacks Peak Park, Ryan Ranch, Ragsdale Road, Upper and Lower Ragsdale, York School, Laguna Seca residential area, Laguna Seca Golf Ranch, Hidden Hills residential area and some residences at the end of Tierra Grande Drive in Carmel Valley.

Site Visibility

The entire Monterra Ranch property consists of a series of visually prominent ridges and canyons, ranging in elevation from 100 feet near the intersection of State Routes 68 and 218 to over 1,000 feet in the southeast corner of the site. The site supports a variety of natural vegetative patterns, including open rolling grassland dotted with Coast Live Oak or Monterey pine trees, denser oak or pine woodland, and steep brush covered slopes.

Limited views of the project site are available from Highway 68. Views of the site are mostly screened in the westbound approach due to existing vegetation and topographical changes. Portions of the upper portion of the site's north facing slopes are visible in the eastbound direction. Photo locations are shown on Figure 13, and views of the site are shown on Figure 14. The upper The project site is directly visible to persons driving along Highways 68 and 218 for approximately 1 minute, assuming a driving speed of 45 miles per hour. Bicyclists and pedestrians, as well as motorists waiting at the intersections of Highway 68 and Highway 218, Olmstead Road, and driveways off of State Route 68, view the site for longer durations. From the roadway, the steep wooded and brush covered slopes are readily apparent, with some relatively level grassland and trees along the roadway in the foreground.

Views of the site's north-facing slopes are available from all portions of York Road, Ryan Ranch development, Ragsdale, and Upper and Lower Ragsdale. The upper elevations of the Laguna Seca residential area and Laguna Seca Golf Ranch have more distant views of the site's wooded ridges along the State Route 68 corridor. Similar, but more distant, views are available from the golf ranch. Also, some residences at thee upper elevations in the Hidden Hills area (east of the project site) and at the end of Tierra Grande Drive (southeast of the site, off Carmel Valley Road) also view small portions of the site ridges, but to a much lesser extent. The site is not visible from Carmel Valley Road due to intervening topographical changes.

From the site's ridgetops, scenic areawide vistas of the Monterey Bay region are available. Unlike much of wooded Jack's Peak park, the site has many open ridgetops which are unique, especially valuable vantage points because of the panoramic views they provide. Views to the north include the largely undeveloped portion of the former Fort Ord, the Monterey Airport, City of Seaside, and Monterey Bay with the site's rolling oak studded grassland in the foreground. To the west, nearby wooded ridges, including Jack's Peak park are dominant. To the south the Crest Ridge and distant ridges south of Carmel Valley are apparent. The rural interior of the site itself is a visual asset. The varying topographic relief and patterns of vegetation provide a pleasant pastoral landscape.

County Visual Analysis Guidelines

The Greater Monterey Peninsula Area Plan (GMPAP) establishes a number of policies to protect scenic resources and includes an inventory and map of visually sensitive areas. Additionally, Highway 68 from Highway 1 in the City of Monterey to the Salinas River, a distance of 13.9 miles, was designated as a Scenic Highway in 1968.

Visually sensitive areas are those scenic resources visible from existing, potential and proposed scenic routes. Criteria for visual sensitivity included duration of view, degree of variety involved and uniqueness of view. Areas identified as "highly sensitive" are defined as possessing those scenic resources which are most unique and which have regional or countywide significance. The areas identified below are considered highly sensitive and in close to proximity to the project site.

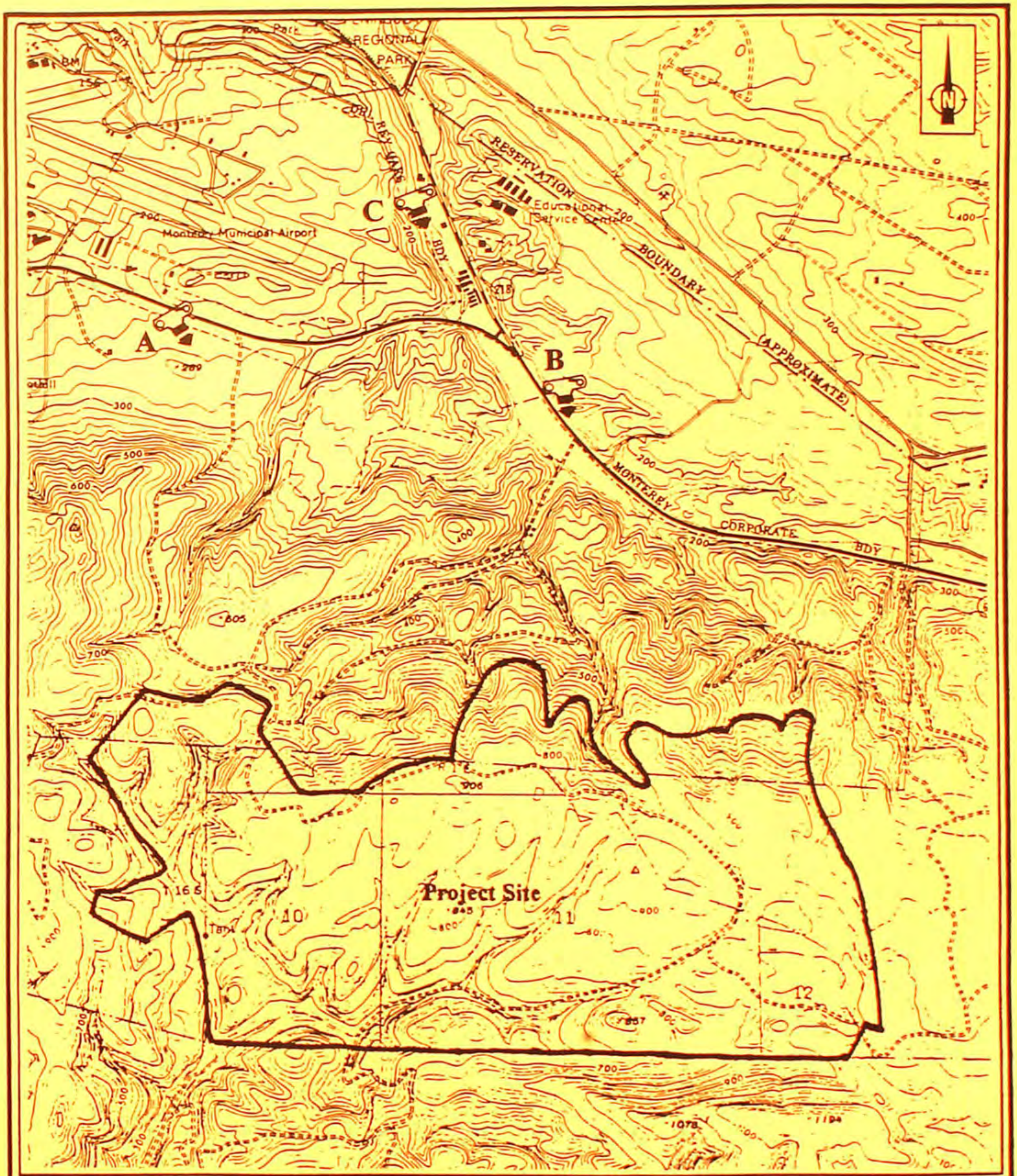


Figure 13

Photo Locations

Location A: Distant View of Site Fr

hway 68

Figure
14

DENISE DUFFY & ASSOCIATES

a) The peninsula ridgeline separating the Monterey area from the Carmel area;

b) South side of the Highway 68 corridor from the highway to the visible ridgeline and from Laureles Grade to Olmstead Road;

c) Southerly portion of Laguna Seca Recreation Area, including the freshwater interior wetlands located on-site.

Areas in close proximity to the project identified as "sensitive" possess scenic resources which have local or community significance. The areas in close proximity to the project site are identified as "sensitive".

a) Areas immediately adjacent to Laureles Grade Road.

b) The frontal portion of Laguna Seca Ranch from Laguna Seca Ranch Estates No. 1 to the easterly property line, for a depth of approximately 1,000 feet.

c) The east valley of Laguna Seca Ranch, portions of Laguna Seca Recreation Area and portions of Fort Ord adjacent to these two areas.

The GMPAP visual study and the visual sensitivity map do not identify the project site as a visually sensitive area. Ridgeline development as defined by the Monterey County Code 21.66.010 states that the ridgeline development as conditioned by permit, will not create a substantially adverse visual impact when viewed from a common public viewing area. Ridgeline development as defined by the Monterey County Board of Supervisors includes:

> Development on the crest of a hill which has the potential to create a silhouette or other substantially adverse impact when viewed form a common public viewing area. A public viewing area, for the purpose of determining ridgeline development, is a publicly maintained road. The common public roads in this area are Highway 68, Highway 218, Ragsdale Road, Upper and Lower Ragsdale, and York Road.

RELEVANT PROJECT CHARACTERISTICS

The proposed project consists of resubdivison and reconfiguration of 139 residential lots to 34 residential lots surrounding an 18-hole golf course. Planned common open space (630 acres) in combination with private open space on residential lots (327 acres) results the majority of the site (90%) being maintained in open space. Structural development will include residential homes built within designated building envelopes and recreational facilities. Golf course facilities include a clubhouse on the north side of course and 12 member guest suites located adjacent to the driving range, 18th fairway, and 9th green. The clubhouse is planned as a 52,500±-square foot facility with underground parking to accommodate 108 vehicles. Planned recreational facilities include pool, tennis courts, equestrian center and a 10,000± square foot recreation building. Figure 15 presents elevations of the Clubhouse and Member Suites.

IMPACTS AND MITIGATION MEASURES

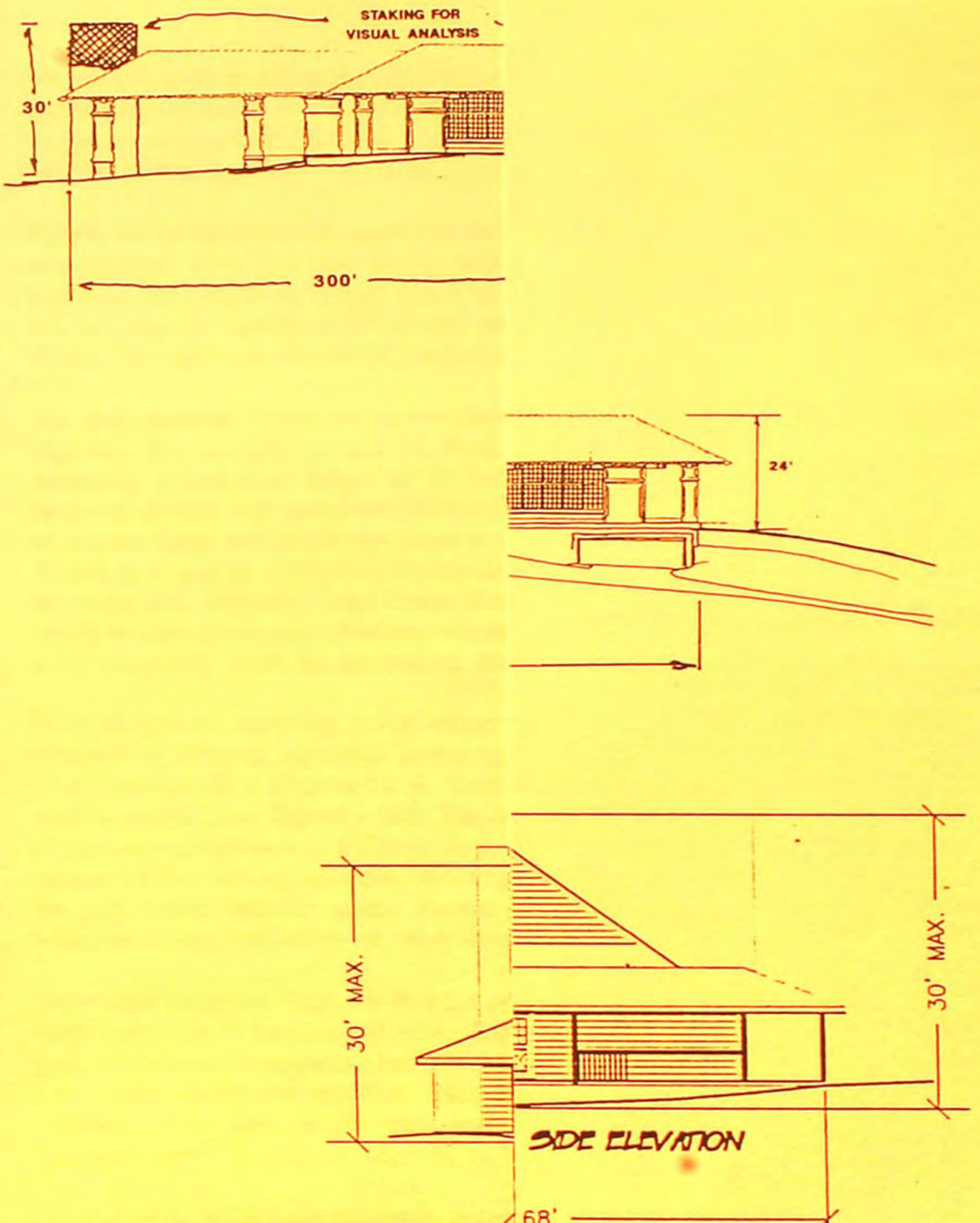
Standards of Significance: In accordance with the California Environmental Quality Act (CEQA), State CeQA Guidelines, and agency and professional standards, a project impact would be considered significant if development would:

- eliminate or substantially alter significant visual features, view corridors, or public vista points;
- introduce development within a designated scenic corridor without design mitigations;
- result in visual ridgetop development;
- be incompatible with the scale or visual character of the surrounding area; or
- create significant light and glare.

Impact #16: Project development will result in some alteration of the Highway 68 and 218 viewshed due to construction of several homesites and one member suite on the frontal slopes of the site. However, the project, with mitigation, will not result in ridgeline development, and residential units and suites constructed on slopes will be of limited visibility. Therefore, this is considered a less-than-significant impact.

The majority of the project site is not visible from public viewpoints. The closest portion of the site is located approximately 3,000 feet from Highway 68. Potentially visible portions of the site include upper portions of frontal slopes, including portions of proposed lots 12, 30, 31, and 34 and one member suite. Due to existing site topography, the southern portion of the site is not visible from the Highway 68.

In order to help assess the visual impact of ultimate construction of homes, the applicant erected staking on the newly created lots not included in the Monterra Ranch subdivision (Lots 13, 34, the Clubhouse and member suites) to help simulate potential building heights. The staking consisted of plywood structures approximately 12-15 in width with bright orange mesh netting extending across the width of the structure. The heights of the staking varied between 18 and 30 feet. On-site inspection of each stake was conducted as part of the preparation of this EIR to confirm staking dimensions and locations.



Carmel Development Company

Figure 15

Viewpoints from major public viewpoints were inspected to determine visibility of staking and to help ascertain the degree of visual impact that could result from future construction due to overall scale and massing typical of homes in the area. These viewpoints included two locations along Highway 68, Highway 218, Ragsdale Drive, and York Road.

Figure 14 presents photos, showing visible portions of the project site, and indicates development areas that may be potentially visible. Long-range views of the site are available from Highway 68 and Highway 218. From the vantage points shown on Figure 14, the edge of staking of lot 34 and staking for one guest cottage unit were partially visible, but only with the aid of binoculars.

The only proposed development envelopes that would be visible from Highway 68 and Highway 218 are lots 30 and 31 along eastbound Highway 68 and southbound 218. Assuming a maximum height of 24 feet, a residence on lot 30 would be provided a backdrop of trees and would not create a silhouette against the ridge line. Lot 31 is located on a lower knoll and would not create a silhouette against the ridge line. Homes on Lots 30 and 31 would be visible to a limited degree for a short-term duration along southbound Highway 218. Although large homes likely would be built given residential development trends in area, residential structures would not appear as a significant visible feature from most viewpoints given the intervening distance.

Development on other lots on or above the site's north-facing slopes would be mostly screened by existing vegetation and/or topography and would not be prominently visible from Highway 68 or Highway 218. Construction of homes on proposed Lot 32 would be slightly visible from Highway 218. The home on Lot 11 would appear against a backdrop of trees as a component of a distant view. The development envelope on Lot 10 would be nestled within existing oak trees. Existing vegetation also blocks views of the Lot 12 and the golf course member suites, except for potentially one suite, as described above. However, if trees are removed, these development areas may be potentially visible.

From York Road and Ragsdale Road, a portion of proposed Lots 12, 13, 30, 31, and 32 is visible as a distant background view. Existing trees on Lot 10 and the members cottages generally provide a vegetative background, so that construction of a home would not create a silhouette against the ridgeline. However, trees are located on Lot 10, 11, 12 and the members suites sites, which may necessitate reconfiguration of the building lot and establishment of appropriate controls, to insure that these trees will not be removed.

In conclusion, the project will result in some limited visibility of 4 to 5 buildings, although the project will not result in apparent ridgeline development. Structures located on the frontal slopes of proposed Lots 12, 30, 31, 32 and one of the member suites, would be somewhat visible, but would not create a significant alteration of the surrounding viewshed due to the limited building massing and bulk that would be expected with construction of a single-family residence and suites. Although new development would be introduced into an undisturbed area, it would not create a significant visual feature or degrade the rural qualities of the area. In comparison, development on approximately 10 lots would be visible with development under the approved Monterra Subdivision. Limitation of building heights in accordance with staking limits, use of non-reflective building materials and colors, and prohibition of lighting that would create substantial light during the night time, will further assure that project impacts will be minimized.

Mitigation

Implementation of Mitigation Measures 16-1 and 16-2 will insure that impacts remain at a less-than-significant level.

16-1 Establish building envelopes on proposed Lots 12, 30, 31, 32 and one of the member suites in order to define the building area that results in minimal grading and protects the public viewshed by avoiding ridgeline development and preserving existing screening vegetation.

16-2 Require use of nonreflective materials, subdued colors, and lighting that does not create off-site glare from construction of buildings.

4.8 TRAFFIC AND CIRCULATION

A traffic analysis was prepared by Barton-Aschman for the applicant and is included in Appendix D. The analysis was reviewed as a part of this EIR by Dowling Associates. Technical traffic data is provided in Technical Appendix VI.

ENVIRONMENTAL SETTING

Vicinity Road System

The project site is located ½ to 1 mile south of Highway 68 between Olmsted Road and York Road and one mile north of Carmel Valley Road between Valley Greens Drive and Schulte Road. The project site, however, does not front either Highway 68 or Carmel Valley Road. The primary access to the project site is Olmsted Road via Highway 68. Secondary access from Highway 1 would be provided off of Carmel Valley Road via Cañada de la Segunda through the adjacent Cañada Woods project. The vicinity road system is shown on Figure 16 and is further described below.

Highway 68 is the primary east-west link between the Monterey Peninsula and Salinas. The highway was originally built in 1928 and became a State Highway in 1933. Highway 68 is an east-west rural highway with a posted speed limit of 55 miles per hour (mph), and also is designated as a state Scenic Highway.

Highway 68 is a five-lane conventional road from Blanco Road to Foster Road. It becomes a four-lane freeway for the next 1.3 miles. The remaining distance west to Highway 1 is a two-lane road with left-turn channelization at major intersections. Signalized intersections along Highway 68 in the project vicinity include Olmsted Road, Highway 218, and York Road. Existing peak-hour and two-way average annual daily traffic (AADT) volumes in the vicinity of the project are summarized on Table 11.

Highway 218 is a two-lane roadway north of Highway 68 through the City of Del Rey Oaks. It becomes a 4-lane road at Fremont Boulevard in the City of Seaside and connects to Highway 1. Highway 218, also known as Canyon del Rey Boulevard, serves as a connector between Del Rey Oaks and Seaside. Average annual traffic volumes are summarized on Table 11.

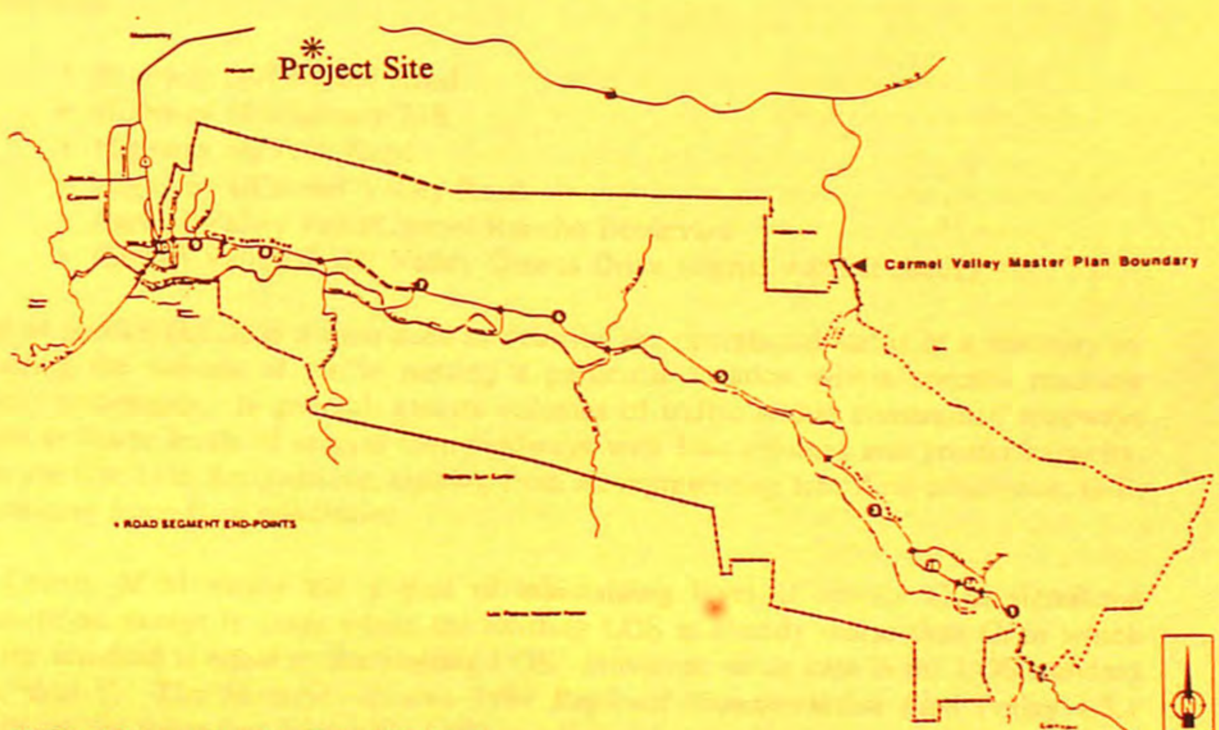
Highway 1 serves traffic traveling north and south along the coast. At Highway 68, Highway 1 is a 4-lane freeway to San Luis Avenue in the Carmel area. Highway 1 is a four-lane undivided highway to Ocean Avenue, where the highway begins tapering into a 2-lane undivided highway. Traffic in the vicinity of Highway 1 and Carmel Valley Road is often congested, with long delays during the morning and evening peak periods. Average annual traffic volumes are summarized on Table 11.

TABLE 11 EXISTING ROADWAY TRAFFIC VOLUMES, 1994		
	Caltrans Estimate	
Highway Segment	Peak Hour	AADT
Highway 68, east of 218	2,350	22,200
Highway 68, west of 218	2,250	20,300
Highway 68, west of Olmsted	2,350	22,200
Highway 218, north of 68	870	7,700
Highway 1, north of 68	5,800	61,000
Highway 1, Carmel (north of Ocean)	5,800	53,000
Highway 1, South of Carmel Valley Road	2,600	24,000
Highway 68, north of Hwy 1	2,550	26,500
Carmel Valley Road at Valley Greens Drive	1,370	14,970
Olmsted Road, south of Highway 68	210	1,500
SOURCE: Caltrans, 1994, Traffic Volumes on California Highway System		

Olmsted Road is a two-lane collector street that provides access to the Monterey Peninsula Airport and Garden Road business area to the north of Highway 68. To the south of Highway 68, the road name changes to Jack's Peak Road and provides access to Jacks Peak Regional Park.

Carmel Valley Road is 2 lanes between Highway 1 and Carmel Rancho Boulevard, 4 lanes between Carmel Rancho Boulevard and Via Petra, and 2 lanes east of Via Petra. The road serves as the primary access for local circulation within Carmel Valley and has numerous driveways and intersections with minor cross streets. All intersections are unsignalized, except for the Highway 1/Carmel Valley Road and Carmel Valley Road/Carmel Rancho Boulevard intersections and a newly installed traffic signal at Carmel Middle School. The *Carmel Valley Master Plan* identifies roadway segments on Carmel Valley Road within the planning area, as shown on Figure 16.

Source:Barton-Aschman Associates



SOURCE: CARMEL VALLEY MASTER PLAN EIR. PAD 1986

Carmel Valley Road Segments

	Vicinity Circulation System	Figure 16

Monterey County has established a threshold number of average daily trips (ADT) for Carmel Valley Road segment based on analysis contained in the *Carmel Valley Master Plan EIR* (Keith B. Higgins & Associates, March 1986) and in the *Carmel Valley Road Improvement Plan EIR* (Barton-Aschman Associates, December 1990). The threshold represents the traffic volume that will cause a degradation in level of service on the road segment to an unacceptable level. Annual monitoring of traffic levels on CVR indicates that traffic is currently below the threshold volume on all segments. The Board of Supervisors has approved a Traffic Impact Fee Program and Action Plan which will accommodate future development anticipated under the CVMP.

Carmel Rancho Boulevard is a four-lane north-south arterial that provides access to the commercial shopping centers situated between Carmel Valley Road and Rio Road. Rio Road connects the commercial areas at the mouth of the Valley to Highway 1 and the City of Carmel-by-the-Sea to the west. The intersection of Rio Road and Highway 1 is controlled by a signal.

Intersection Levels of Service

The traffic analysis focuses on peak-hour traffic conditions at the following vicinity intersections:

- Highway 68/Olmsted Road
- Highway 68/Highway 218
- Highway 68/York Road
- Highway 1/Carmel Valley Road
- Carmel Valley Road/Carmel Rancho Boulevard
- Carmel Valley Road/ Valley Greens Drive (signal warrant check)

Level of service (LOS) is a term used to describe the operational status of a roadway by measuring the volume of traffic passing a particular location within specific roadway capacity constraints. In general, greater volumes of traffic within constrained roadways operate at lower levels of service than roadways with low volumes and greater capacity. There are five LOS designations, ranging from A, representing free flow conditions, to F, representing force-flow conditions.

The County of Monterey has a goal of maintaining level of service C at signalized intersections, except in cases where the existing LOS is already worse than C, in which case the standard is equal to the existing LOS. However, in no case is the LOS standard worse than E. The *Monterey County 1994 Regional Transportation Plan* Policy 1.2.1 establishes the following applicable LOS standards:

Congestion management program in Figure 1 1997 - Cal-Trans agrees with it.

- No degradation below LOS D for those urban roads now operating at LOS D or better.
- No degradation below LOS C for those rural roads now operating at LOS C or better.
- No degradation below existing LOS for all other roads.

A Level of Service analysis was conducted by Barton-Aschman Associates for each intersection, based on existing counts and updated, where necessary, with traffic counts taken in June or July of 1996. Existing AM and PM peak hour levels of service at study intersections are summarized on Table 12. Further discussion is provided in Appendix D of this document; technical calculation data is included in Technical Appendix VI.

TABLE 12
1996 EXISTING PEAK HOUR INTERSECTION LEVELS OF SERVICE

Intersection	AM Peak Hour		PM Peak Hour	
	LOS**	Delay*	LOS	Delay*
Highway 68/Olmsted Road	C	16	D	27
Highway 68/Highway 218	B	14	B	13
Highway 68/York Road	C	19	B	9
Highway 1/Carmel Valley Road	B	9	E-F ~~E~~ F	42
Carmel Valley Road/Carmel Rancho Blvd	B	11	D	27

* Average delay in seconds.
** See Highway Capacity Manual, Special Report 209, Transportation Research Board, 1994.

SOURCE: Barton-Aschman Associates, Inc. July 31, 1996 - GARY BLACK -

The results indicate that the Highway 1/Carmel Valley Road intersection currently operates at a substandard LOS E during the PM peak hour. The Carmel Valley Road/Carmel Rancho and Highway 68/Olmsted Road intersections operate at LOS D during the PM peak hour. This is considered acceptable under Monterey County standards. All other study intersections currently operate at an acceptable level of service.

The traffic analysis also evaluated the unsignalized intersection of Carmel Valley Road and Valley Greens Drive for the purpose of a signal warrant check based on traffic counts conducted during the AM and PM peak hours on July 23, 1996. The analysis indicates that the existing volume (27 vehicles/hour) does not reach the threshold volume (75 vehicles/hour) to meet a peak hour signal warrant (Barton-Aschman, July 1996); see Appendix D for further discussion.

Planned Road Improvements

An official plan line has been adopted for the future construction of Highway 68 to freeway standards with an interchange for Highway 218. Because of the limitation of available funds from both state and local funding sources, construction of the freeway is not likely to occur for many years. Another alternative under consideration is widening Highway 68 to 4 lanes which would improve the existing LOS to A and maintain LOS C or better for the next 15 to 20 years (EMC Planning Group, September 1995). Caltrans also is considering a possible route through the Fort Ord property to help alleviate congestion on Highway 68. No money, currently 700,000-820000 in arrears. Recent TAMC meeting last week 1 billion - 270 million

FEIR according to Cal Trans fact

A program has been initiated by Caltrans to make safety improvements along Highway 68. Completed improvement projects include signalization at the Highway 68 intersection at Olmsted Road, York Road, San Benancio Canyon Road, and Laureles Grade. The signal at Highway 68/Highway 218 was funded in part by Monterra Ranch as part of the Phase 1 final map. Improvements also include left turn channelization at several locations.

Monterey County has begun assessing impact fees as part of new development along Highway 68 to help fund long-term improvements to this roadway. Currently residential development is assessed approximately $9,750 per unit. 670-950 per unit

The County of Monterey also implements a traffic impact fee program to fund Carmel Valley Road improvements, including intersection channelization and passing lanes on Segments 6 and 7. The impact fees are assessed on all new developments in accordance with the development's relative contribution to traffic increases on Carmel Valley Road. The County determines which improvements need to be implemented and the timing.

The Hatton Canyon freeways has been a long-planned improvement for Highway 1 in the Carmel area, but has been subject to much debate and litigation. In April 1994, the California Transportation Commission (CTC) affirmed support and funding for the Hatton Canyon Parkway. In addition, the CTC directed Caltrans to pursue 12 candidate operational improvement projects as an interim project until such time that the Hatton Canyon Parkway can be built. The operational improvements were developed by Monterey County, in conjunction with Caltrans, and serve as a program of short-range improvements to address the LOS deficiencies on Highway 1. The options under consideration include the following: DEAD

1. Construct second westbound through lane at Rio Road
2. Construct dual left-turn lane southbound to eastbound at Carmel Valley Road; synchronize signals
3. Construct a northbound climbing lane from Carmel Valley Road to Morse Drive
4. Construct dual right-turn lane westbound to northbound at Carmel Valley Road

5. Construct exclusive right-turn lane to southbound at Ocean Avenue
6. Extend right-turn lane southbound westbound at Ocean Avenue
7. Extend distance to southbound lane reduction south of Ocean Avenue to Mesa Drive
8. Extend storage length for eastbound moves Carpenter Street; improve bus pullout area
9. Construct park-and-ride/shuttle lot at quadrant at Ocean Avenue
10. Construct left-turn channelization to westbound at Handley Drive
11. Construct northbound lane through Carpenter Street from south of Carpenter Street to Route 68

Since the list of operational improvements was originally prepared, Caltrans has determined that the climbing lane (number 3 on the above list), as well as certain other improvements must be reviewed for environmental clearance. However, certain projects are going forward under a separate environmental review process. Caltrans is presently implementing Operational Improvement No. 2 which includes the construction of a second left-turn lane from southbound Highway 1 onto eastbound Carmel Valley Road as well as a second eastbound receiving lane on Carmel Valley Road from Highway 1 easterly to Carmel Rancho Boulevard. These improvements will occur within the existing rights-of-way of Highway 1 and Carmel Valley Road. The Highway 1/Carmel Valley Road intersection will be modified to accommodate the widening. Additionally, the following interim improvements at the intersection of Highway 1/Carmel Valley Road are the subject of an environmental assessment/negative declaration from the County of Monterey:

a) An additional westbound lane on Carmel Valley Road westerly from Carmel Rancho Boulevard to Highway 1;

b) A second right turn lane from westbound Carmel Valley Road onto northbound Highway 1 and a constrained northbound merging lane;

c) Modify the existing traffic signals at the Highway 1/Carmel Valley Road and Carmel Valley Road/Carmel Rancho Boulevard intersections as necessary to accommodate the highway widening.

According to schedules approved by the CTC as part of the 1996 State Transportation Improvement Program, completion of interim improvements is expected during 1997 and 1998. The Hatton Canyon project is expected to commence in the fall of 1998 with advertisement of bids.

Transit Service

Transit service is not provided directly to the project site, but in the vicinity is provided on Highway 68 and Carmel Valley Road. Monterey-Salinas Transit (MST) operates a route once per hour along Highway 68 and another route (Line 24) once per hour on Carmel Valley Road as far east as Carmel Valley Village.

Area Transportation Plans

Monterey County 1994 Regional Transportation Plan. The Regional Transportation Plan (RTP) is prepared by the Transportation Agency for Monterey County in accordance with requirements of State law, to guide the development of regional and state transportation improvement plans that establish funding priorities. The 1994 RTP establishes policy guidance, programs, and transportation improvements for a 20-year period. The RTP identifies regional transportation problems, considers all modes of travel, and proposes actions to increase the efficiency of the transportation system in addition to recommending selected capacity improvements on state highways and major arterials. The RTP consists of four major elements: a short-range Congestion Management Program; a Policy Element; a long-range Action Element; and a Financial Element.

The proposed project is located in a rural setting, and represents a reduction in residential lots over what is currently approved for the site. As indicated in the traffic analysis below, the project will result in less traffic than would occur with currently approved subdivision plans for the Monterra Subdivision. As discussed in the Impact section below, the project will not result in unacceptable levels of service, and would be consistent with RTP policies. As a residential project, there are no other specific RTP policies that are relevant to the proposed project.

Monterey County 1994 Congestion Management Plan. State legislation preparation of a Congestion Management Program (CMP) which by State law must contain the following elements: designation of the CMP road network, including all state highways and principal arterials; road and transit level of service standards; a trip reduction and travel demand element to promote alternative modes of transportation; a land use impact analysis; an ongoing monitoring program; and a 7-year capital improvement program. Preparation and implementation of "Deficiency Plans" are required for those roadways and transit services which do not meet the level of service standards defined in the CMP. Annual monitoring of implementation of CMP elements is required.

The CMP identifies a LOS goal of "C" for rural roads and LOS "D" for urbanized area roads on the CMP network, although the Plan also encourages local agencies to avoid, where feasible, unacceptable environmental or cost consequences, that may result from construction of improvements needed to meet this goal. LOS standards are established for specific roadways at their existing levels of service. The CMP requires preparation of Deficiency Plans to correct LOS problems on the CMP network. Deficiency Plans develop a program of transportation demand measures that shift trips to alternative modes in addition to operational improvements. A Deficiency Plan has been prepared for Highway 1 and Carmel Valley Road with interim improvements identified as described above.

Vicinity roads included within the CMP are the following road segments: Highway 68 between Monterey and Salinas, Highway 1, Highway 218, and Carmel Valley Road between Highway 1 to Carmel Rancho Boulevard.

RELEVANT PROJECT CHARACTERISTICS

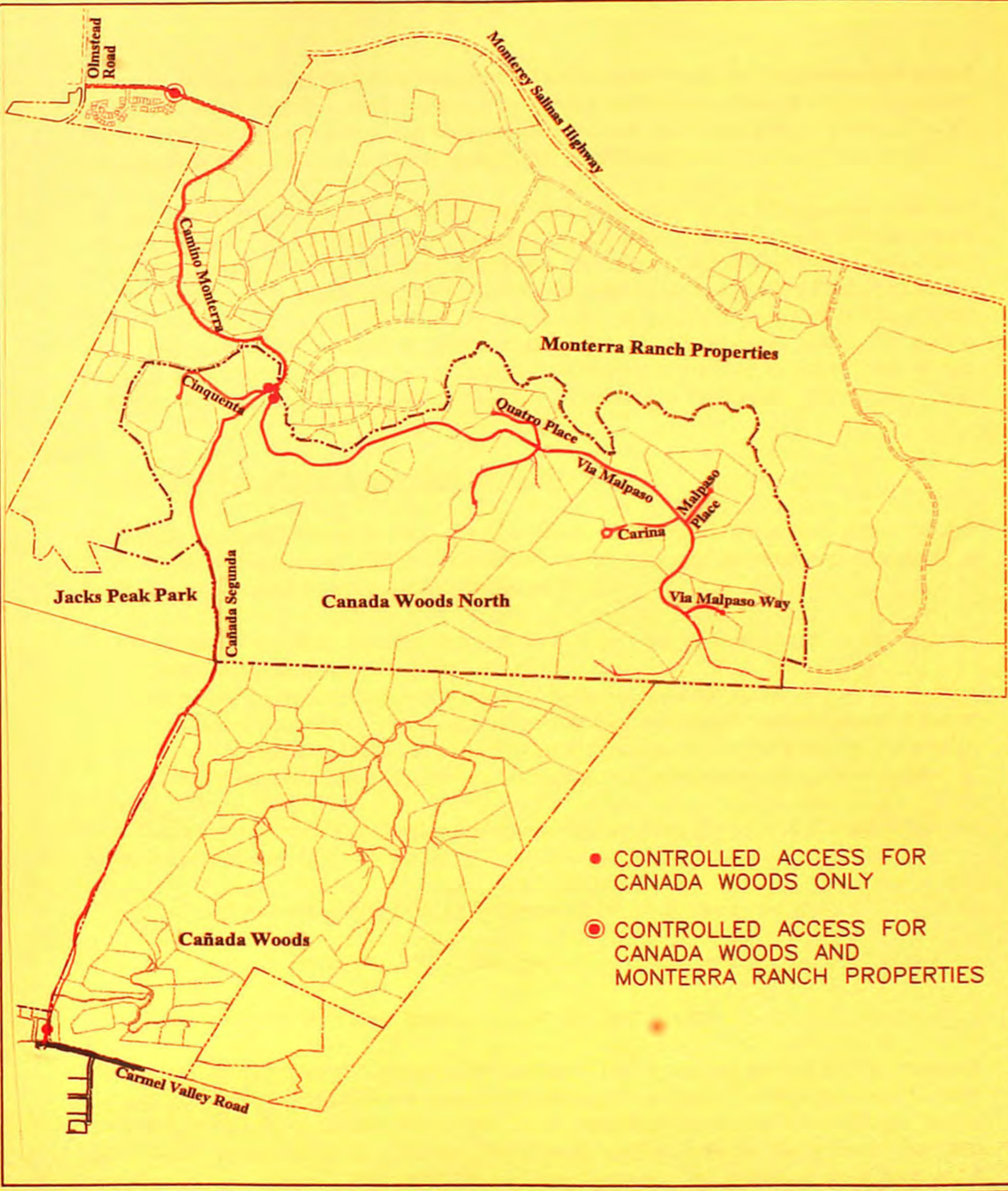
The proposed project would be built on a portion of the Monterra Ranch subdivision, on which 19 existing and 93 approved lots are located. The project consists of 34 residential lots, golf course and recreational facilities, replacing the previously approved Monterra subdivision on the site. The recreational uses would be private and available only to members and homeowners. Proposed uses include the following:

- Golf Course, including 12 guest units, restaurant, banquet room
- Fitness Center, up to 8 tennis courts
- Equestrian Center, 24 stalls
- 5 Employee homes

The golf course is planned to have 300 members. According to information provided by the applicant, it is anticipated that approximately 40% of the membership will be local, of which 25% (or 10% of the total) are likely to be residents of the project site or adjacent Cañada Woods or Monterra sites. It is estimated that golf course operations would not exceed 16,000 rounds annually which is similar to the private 250-member Cypress Point golf course.

Primary access to the project is planned off of Olmsted Road via a private, gated road. Project access from Olmsted Road to the site would be provided via an access easement on the planned Monterra Ranch road that extends from Olmsted Road. Currently, the proposed project does not have access easements for any other Monterra Ranch roads, including the planned access at Highway 218. Project access and onsite circulation is shown on Figure 17.

Secondary access for project residents and golf club members would be provided through the adjacent Cañada Woods project via Cañada de la Segunda Road off Carmel Valley Road to the south. This secondary access would be a private, gated road, that would be available not only to residents of the proposed project and golf course members, but also to adjacent Cañada Woods residents. This internal road, however, will not be available for use by Monterra Ranch residents. The secondary access would also be available for emergency access.



Project Access and Circulation

Figure 17

The proposed internal project roadway system has one main road, Via Malpaso, that begins at Olmsted Road and ultimately ends in a cul-de-sac with an emergency access easement. The golf course, fitness center, and some residential lots have access from the main road. All other lots and uses have access from 1 of 5 planned cul-de-sac roads off Via Malpaso.

The proposed project includes realignment and relocation of a hiking trail that was previously approved as part of the Monterra Subdivision. The Cañada Woods North project proposes to construct this trail around the perimeter of the project site. The location would extend from the southwestern portion of the site adjacent to Jack's Peak Park to the southeastern portion of the site which would connect to planned trails east of the project site. The trail would connect to existing planned trails on adjacent sites. No public entrance would be available on the project site. The trail is planned as 6-feet wide within a 10-foot easement. (See Section 4.10 -- Public Services -- for further discussion.)

IMPACTS AND MITIGATION MEASURES

Standards of Significance: *In accordance with the California Environmental Quality Act (CEQA) State and County CEQA Guidelines, and agency and professional standards, a project impact would be considered significant if:*

- *it would result in a traffic increase that is substantial in relation to the existing traffic load and capacity of the street system;*
- *it would cause existing intersection or highway roadway levels of service to drop to unacceptable levels or substantially contribute to a significant cumulative impact;*
- *create unsafe conditions or require a new signal or major revisions to a signal;*
- *the project circulation design is inadequate to accommodate increased traffic.*

The Monterey County 1994 Regional Transportation Plan Policy 1.2.1 establishes the following applicable LOS standards:

- *No degradation below LOS D for those urban roads now operating at LOS D or better.*
- *No degradation below LOS C for those rural roads now operating at LOS C or better.*
- *No degradation below existing LOS for all other roads.*

Project traffic increases and impacts are discussed below, as is a review of the proposed project circulation. The proposed site circulation and road design is consistent with County standards. According to the Monterey County roadway standards, Via Malpaso would come under the category of a Private, Rural road. Since it would carry fewer than 800 vehicles per day, it would fall under the Tertiary category. The minimum pavement width in this category is 20 feet. Via Malpaso would exceed this standard since it is planned to be 24 feet wide. It should be noted that the Monterra Ranch development included a road connecting Olmsted and York Roads; Via Malpaso would not serve this function and would not be extended. The cul-de-sac streets in the project come under the category of Private, Rural, Cul-de-sac roads in the County standards. None would serve more than 7 lots. They are required to be at least 18 feet wide; the plan calls for them to be 20 feet wide, which exceeds the standards.

Impact #17: The proposed project will result in 57 AM peak hour trips and 75 PM peak hour trips, but this project traffic would not cause any study intersection to drop to unacceptable levels. This is considered a less-than-significant impact.

Trip Generation

An estimate of trips generated by the proposed development was made using trip generation research data reported by the Institute of Transportation Engineers (ITE) in *Trip Generation Manual, Fifth Edition* and data developed by Barton-Aschman Associates. The trip generation rates for the residential and fitness center uses come from the Institute of Transportation Engineers (ITE) manual *Trip Generation, 5th Edition.* A small internal discount factor is used for the homes to represent trips to the onsite recreational facilities. Discount factors are also applied to the recreational facilities to represent the other end of those same internal trips. The employee homes were assumed to involve predominantly internal trips during peak hours because working onsite will be a requirement for living there. Trip generation is shown on Table 13.

The golf course trip generation rate was calculated by Barton-Aschman Associates and is derived from a traffic count at the Cypress Point Golf Course in Pebble Beach. This course is considered similar to what is being proposed since it is private, has 250 members, and includes a restaurant, banquet room, and 6 guest units. Barton-Aschman conducted AM and PM peak hour traffic counts (7-9 AM and 5-6 PM) at the entrance to the Cypress Point Golf Course on 6-19-96. During both peak hours the course was found to generate 14 trips (see Table 14). These trips were factored up to 28 trips for the proposed Cañada Woods course because it is expected to have more frequent use of facilities, 50 more members and 6 more guest units.

Project Trip Distribution

The estimated Cañada Woods North project trip distribution pattern is shown on Figure 18 Trip distribution is based on the estimate prepared for the original Monterra Ranch subdivision. It has been modified to reflect the secondary access to Carmel Valley Road which would provide direct access to Carmel Valley. It would also provide a shorter (in distance) connection to Carmel, but due to the slower travel speed, the Highway 68 to

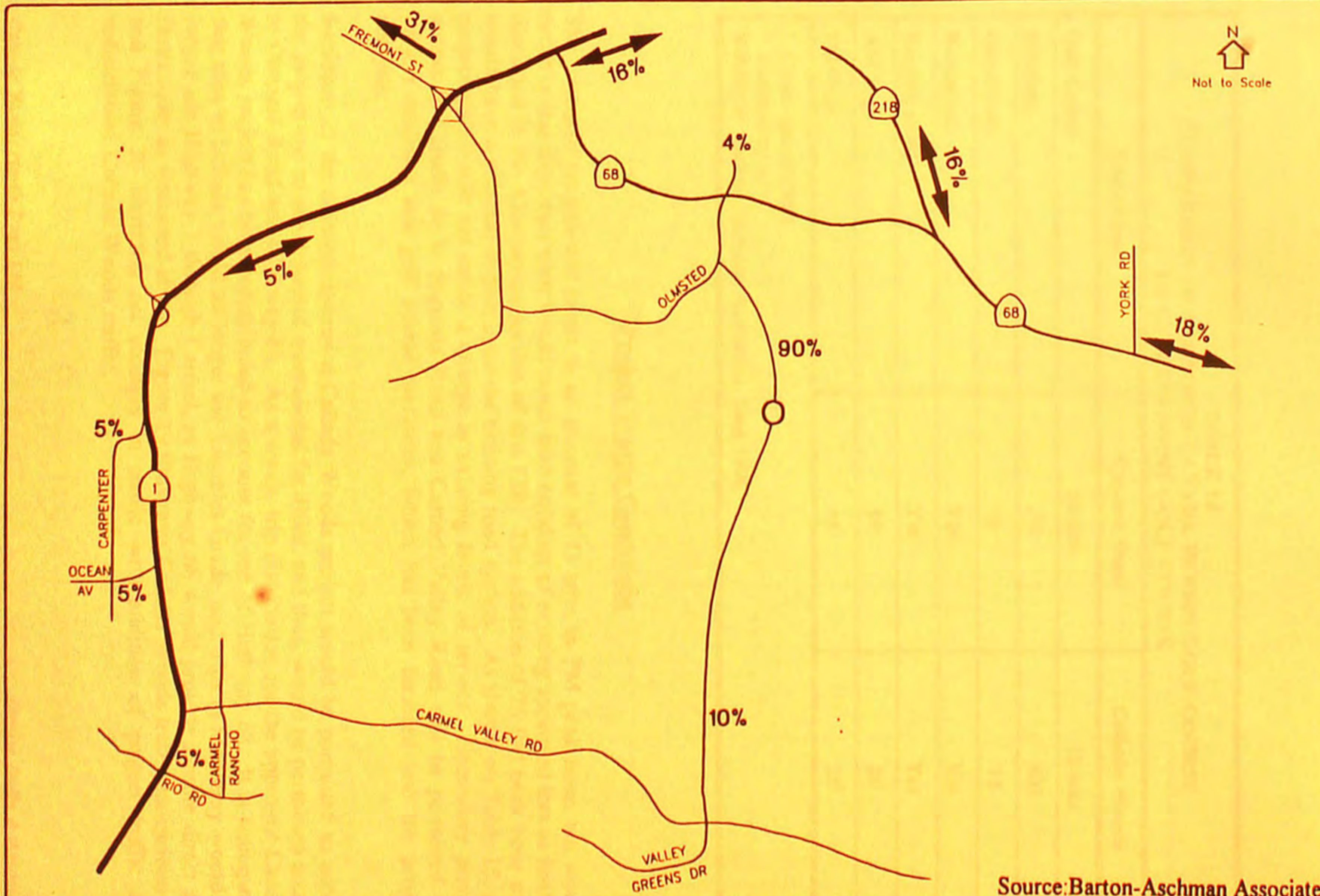
Highway 1 route would be equivalent in time (Barton-Aschman, July 26, 1996). However, it is anticipated that a portion of resident shopping trips would be oriented toward Carmel Valley; most other trips would be oriented to Monterey, Salinas or Carmel. A travel route comparison is included in Appendix D.

TABLE 13
CAÑADA WOODS NORTH PROJECT TRIP GENERATION

Component	Rate		Source	Internal Discount	Trips	
	AM	PM			AM	PM
Golf Course (includes guest units, restaurant, banquet room)	28	28	Cypress Point count	20%	24	24
34 Homes	0.75	0.98	ITE	5%	24	32
Fitness Center (8 tennis courts)	1.4	3.9	ITE	50%	6	16
Equestrian Center (24 stalls)	0.2	0.2	BAA estimate	50%	2	2
Employee Homes (5 units)	0.75	0.98	ITE	100%	1	1
TOTAL					**57**	**75**

SOURCE: Barton-Aschman Associates, August 1996

As previously indicated, the signal at the Highway 68/Highway 218 intersection was partially funded by the Monterra Ranch subdivision as part of conditions of approval. The signal installation also includes a fourth approach lane into the approved Monterra subdivision to connect a new road that would be built along the south side of Highway 68, linking Olmsted Road to the Highway 68/Highway 218 intersection. The Monterra road is not yet constructed, and the connection at Highway 218 is not open. At this time, the proposed Cañada Woods project does not have an access easement to use the Monterra road that connects to Highway 218.



Source:Barton-Aschman Associates

Project Trip Distribution

Figure 18

DENISE DUFFY & ASSOCIATES

TABLE 14 COMPARISON OF PROPOSED CAÑADA WOODS GOLF COURSE TO CYPRESS POINT GOLF COURSE		
Component	**Cypress Point**	**Cañada Woods**
Golf Course	18-hole	18-hole
Members	250	300
Guest Units	6	12
Restaurant	Yes	Yes
Banquet room	Yes	Yes
AM Trips	14[1]	28[2]
PM Trips	14[1]	28[2]

[1] Count date 6/19/96
[2] Factored by 1.3
SOURCE: Barton-Aschman Associates, June 1996

Project Traffic Conditions

The proposed project will result in an increase of 75 trips in PM peak hour, but would result in less trips than what would result with buildout of existing approved lots as further discussed in the Alternatives section of this EIR. The addition of 75 PM peak hour trips would have a minimal impact upon the existing road system. As shown on Table 15, the project traffic will not cause a change in existing levels of service. Secondary private access to Cañada de la Segunda Road and Carmel Valley Road will be permitted for project residents and golf course members, which has been factored into the project analysis.

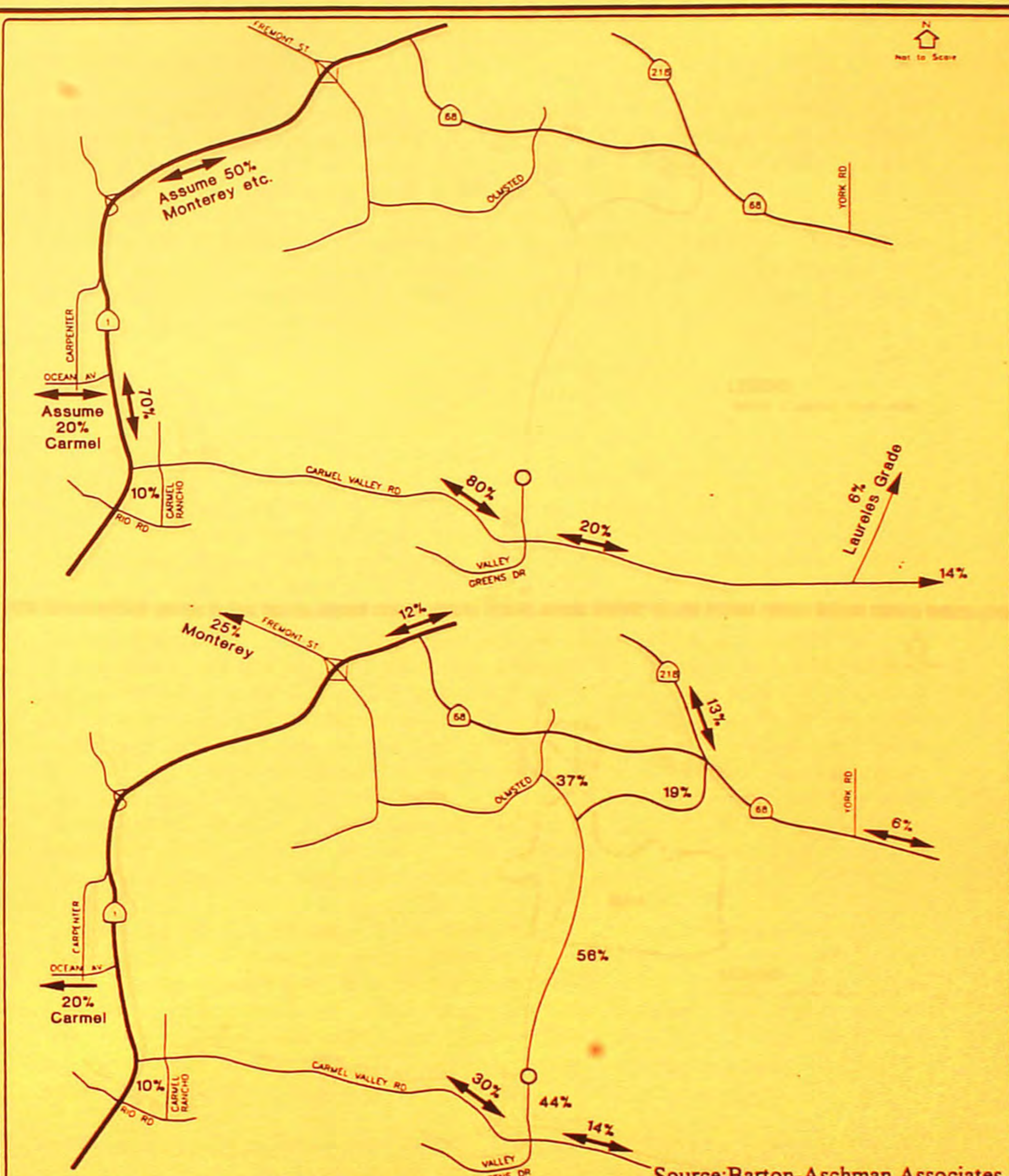
Residents of the adjacent approved Cañada Woods project would be permitted to access the project site to use proposed recreational facilities, and thus, would be permitted access to Olmsted Road and Highway 68. As a result, trip distribution for the approved Cañada Woods project has been redistributed to account for use of Highway 68. It is anticipated that trips to Salinas would no longer use Laureles Grade, and trips to Monterey would no longer use Highway 1 through Carmel, as Highway 68 would provide a more direct and faster route as discussed above. Figure 19 illustrates Cañada Woods traffic redistribution, and Figure 20 identifies net changes in traffic with addition of project traffic and redistributed Cañada Woods traffic.

TABLE 15 PEAK HOUR INTERSECTION LEVELS OF SERVICE WITH PROJECT[1]										
Intersection	**Existing**		**Existing + Project**		**Existing + Project + Cañada Woods**		**Existing + Project + Cañada Woods + Monterra**		**Cumulative**	
	AM	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
Highway 68/Olmsted Road	C/16	D/27	C/16	D/27	C/16	D/28	C/17	D/25	C/21	D/33
Highway 68/Highway 218	B/14	B/13	B/14	B/13	B/14	B/13	D/34	D/30	E/44	E/44
Highway 68/York Road	C/19	B/9	C/19	B/9	C/19	B/9	D/31	C/22	E/49	D/38
Highway 1/Carmel Valley Road	B/9	E/42	B/9	E/42	B/7[2]	D/36[2]	B/7[2]	D/37[2]	B/9[2]	E/48[2]
Carmel Valley Road/Carmel Rancho Blvd	B/11	D/27	B/11	D/27	B/11[3]	B/15[3]	B/11[3]	B/15[3]	B/11[3]	C/15[3]

1 LOS/Average delay in second
2 Assumes double southbound left-turn on Highway 1
3 Assumes second eastbound through lane

SOURCE: Barton-Aschman Associates, Inc., August 1996

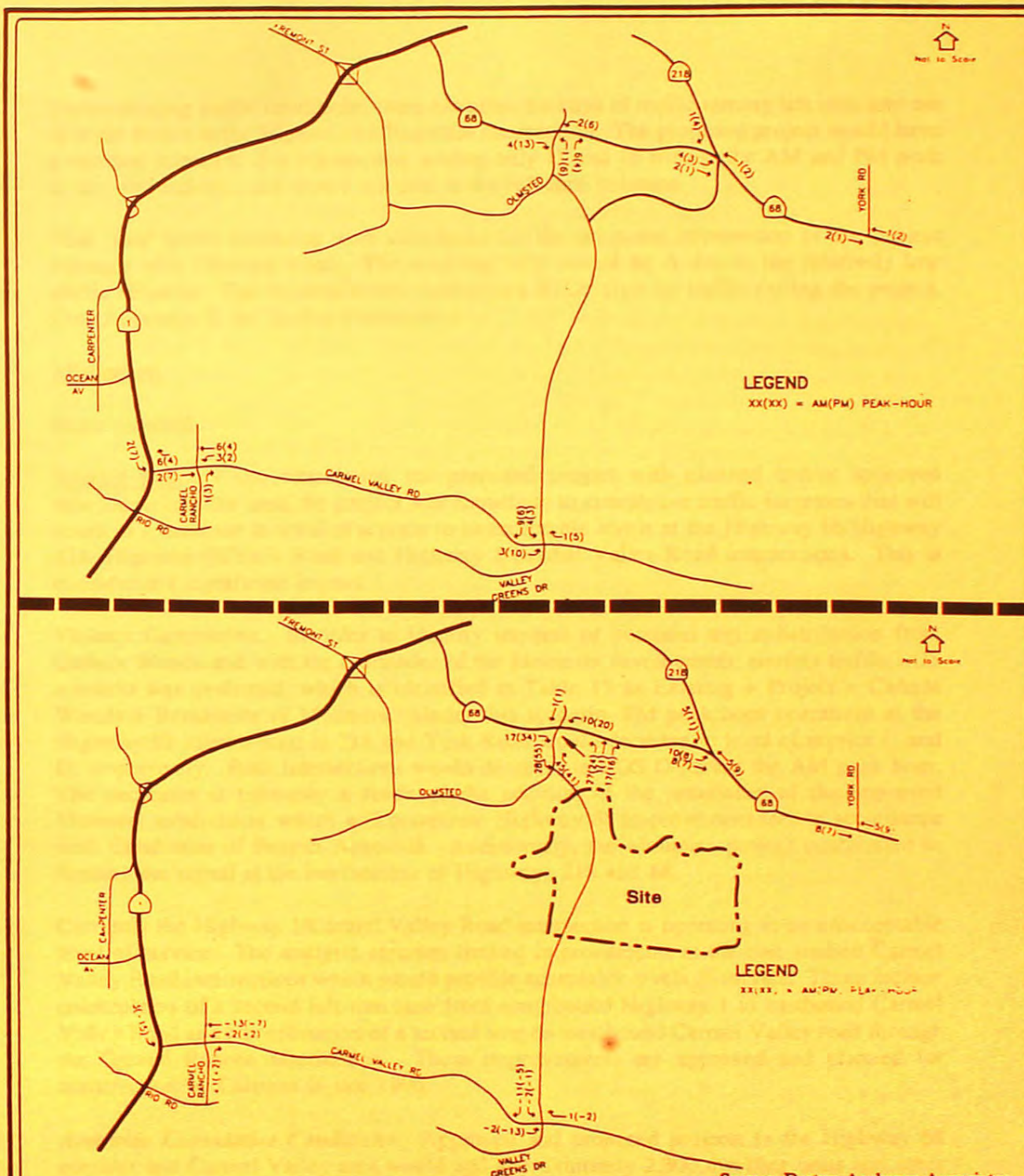
According to traffic analyses conducted by Barton-Aschman Associates, the availability of access to Highway 68 via the project road would result in a trip redistribution for the approved Cañada Woods project from 100% on Carmel Valley Road to 44% on Carmel Valley Road and 56% via the project site to Highway 68. The analysis concludes that this would serve to reduce traffic on Carmel Valley Road with an estimated net decrease of approximately 15 trips during the PM peak hour. Traffic would increase on Olmsted Road and at the Highway 68/Olmsted Road intersection, but as shown on Table 15, there would be no decreases in LOS.



Source:Barton-Aschman Associates

Cañada Woods Trip Redistribution

Figure 19



Source: Barton-Aschman Associates

Project Traffic with Reassigned Cañada Woods Traffic

Figure 20

Under existing traffic conditions, there are often backups of traffic turning left onto and out of Ryan Ranch at the Highway 68/Ragsdale intersection. The proposed project would have a minimal impact to this intersection, adding only 13 and 16 trips in the AM and PM peak hours, respectively, and would not add to the left-turn volumes.

Peak hour traffic estimates were calculated for the proposed intersection of the project entrance with Olmsted Road. The resulting LOS would be A due to the relatively low traffic volumes. The required traffic control is a STOP sign for traffic exiting the project. (See Appendix D for further discussion.)

Mitigation

None required.

Impact #18: When considering the proposed project with planned and/or approved development in the area, the project will contribute to cumulative traffic increases that will result in a decrease in level of service to unacceptable levels at the Highway 68/Highway 218, Highway 68/York Road and Highway 1/Carmel Valley Road intersections. This is considered a significant impact.

Vicinity Cumulative. In order to identify impacts of potential trip redistribution from Cañada Woods and with the remainder of the Monterra development, another traffic LOS scenario was evaluated, which is identified in Table 15 as Existing + Project + Cañada Woods + Remainder of Monterra. Under this scenario, PM peak hour operations at the Highway 68 intersections at 218 and York Road would decrease to level of service C and D, respectively. Both intersections would decrease to LOS D during the AM peak hour. The decreases is primarily a result of the addition of the remainder of the approved Monterra subdivision, which will contribute Highway 68 improvement fees in accordance with Conditions of Project Approval. Additionally, the Monterra project contributed to funding the signal at the intersection of Highways 218 and 68.

Currently the Highway 1/Carmel Valley Road intersection is operating at an unacceptable level of service. The analysis assumes limited improvements at the two studied Carmel Valley Road intersections which would provide acceptable levels of service. These include construction of a second left-turn lane from southbound Highway 1 to eastbound Carmel Valley Road and a continuation of a second lane on westbound Carmel Valley road through the Carmel Rancho intersection. These improvements are approved and planned for construction by Caltrans in late 1996.

Areawide Cumulative Conditions. Approved and proposed projects in the Highway 68 corridor and Carmel Valley area would add approximately 2,300 dwelling units and other commercial uses in addition to the 34 residential units and golf course proposed by the project. Table 20 in the Cumulative Section of this EIR provides a full listing of projects. (See Section 5.3 -- Cumulative Impacts -- of this EIR for a listing of cumulative projects).

Table 15 identifies LOS under cumulative conditions. The following intersection LOS would decrease to unacceptable levels at the following intersections: Highway 68/Highway 218, Highway 68/York Road, and Highway 1/Carmel Valley Road. Even though the project would generate less traffic than the approved development it replaces, it would still contribute to a cumulative impact along Highway 68. The project's contribution to cumulative traffic, in conjunction with reassigned Cañada Woods traffic, is approximately 15%, of the incremental increase. In accordance with County policy, the project would be required to contribute Highway 68 impact fees.

Although cumulative traffic at the Highway 1/Carmel Valley Road intersection would operate at unacceptable levels during the PM peak period, the traffic analysis concluded that the proposed project would result in reduced traffic on Carmel Valley Road (see analysis above) due to the available secondary project access. Although the approved Cañada Woods project is subject to Carmel Valley Road and Highway 1 fees, this traffic analysis recommends that the proposed Cañada Woods North project not contribute to these Carmel Valley fees. An option to consider would be transference of the pro-rata Cañada Woods fees to the Highway 68 fee account.

Mitigation

Implementation of Mitigation Measures 18-1 and 18-2 will reduce impact to a less-than-significant level.

18-1 Prohibit project access to the Monterra Subdivision - Highway 218 entrance.

18-2 Require payment of pro-rata Highway 68 impact fees in accordance with County requirements.

4.9 AIR QUALITY

ENVIRONMENTAL SETTING

Regulatory Setting

The project site is located within the North Central Coast Air Basin, one of the fourteen statewide basins designated by the California Air Resources Board (CARB). This basin includes Monterey, Santa Cruz, and San Benito Counties. The Monterey Bay Unified Air Pollution Control District (MBUAPCD) is responsible for local control and monitoring of criteria air pollutants. The MBUAPCD monitors air quality at stations located in Salinas, Hollister, Carmel Valley, Monterey, Santa Cruz, Davenport, Watsonville and Scotts Valley.

Criteria Pollutants

Potential sources of pollutants are categorized as stationary (i.e., industrial or institutional uses) or mobile (i.e., vehicular uses). Criteria pollutants are those contaminants that the federal Clean Air Act specifically regulates through the setting of National Ambient Air Quality Standards (NAAQS). NAAQS define contaminant levels that are acceptable for all segments of the public and which will have no long-term undesirable effects. Air quality standards also have been established at the state level. Where differences occur between state and national standards, California's standards are generally more stringent.

The types of criteria pollutants monitored by the MBUAPCD include ozone, nitrogen dioxide, and total suspended particulates; carbon monoxide, sulfur dioxide and hydrocarbon data is reported where the instrumentation is available. As State standards for ozone and fine particulates (PM_{10}) are currently exceeded, these pollutants are of particular concern in the North Central Coast Air Basin. The following is a brief description of each criteria pollutant:

- *Ozone*. The monitoring of ozone provides a measurement of the primary oxidant "smog" components, produced by chemical reactions involving reactive organic gases (ROG) and nitrogen oxide (NO_x) in the presence of sunlight. The primary sources of ROG and NO_x within the Basin are motor vehicles, organic solvents, the petroleum industry, power plants, and pesticides.

- *PM_{10}*. Atmospheric particulate matter is comprised of finely divided solids or liquids such as dust, soot, aerosols, fumes and mists. Particulates of primary concern are those less than ten microns in diameter (PM_{10}), as they have the greatest likelihood of being inhaled deep into the lungs. Particulate matter results from agriculture, industry, fossil fuel combustion, construction and demolition, road dust, wind-blown dust, wildfires, and salt from sea spray.

- *Carbon Monoxide.* Carbon monoxide (CO) is heavily dependent upon vehicle emissions and weather. Other sources of carbon monoxide include fuel combustion in stationary sources and agricultural burning. Because local ventilation is good and traffic modest, CO is not monitored in the area, except at Salinas. Carbon monoxide, hydrocarbon and oxides of nitrogen emissions have been reduced dramatically by improved emission controls on new automobiles in recent years.

Local Air Quality

The pollutants most often exceeding the air quality standards are particulates and those contributing to ozone and thus smog formation (i.e., nitrogen oxides, hydrocarbons). The North Central Coast Air Basin currently is a non-attainment area for ozone under federal regulations and for ozone and PM_{10} under State regulations. Since 1985 there have been no violations of the federal ozone standard at any MBUAPCD monitoring stations except for 1 day in Carmel Valley in 1989. However, air quality is monitored by the National Park Service at Pinnacles National Monument, which has repeatedly exceeded the federal standard since 1987.

In 1985 the MBUAPCD requested redesignation of the North Central Coast Air Basin from nonattainment to attainment for the federal ozone standards since violations of the standard had not been recorded at District stations between 1981 and 1985. This request was denied based on recorded violations of the standard at the Pinnacles National Monument. Violations of the federal ozone standard were recorded on 95 days between 1987 and 1994 at the Pinnacles National Monument with violations of 5 days in 1994.

Violations of the State standards for ozone have occurred at all monitoring stations within the last 5 years as shown on Table 16, with the most violations experienced at the Pinnacles Station. In 1994, the State standard was violated only at the Pinnacles and Hollister monitoring stations. Additionally, in 1994 the State 24-hour PM_{10} standard was exceeded at the Watsonville station. A district that is nonattainment for the state ozone standard is designated "nonattainment-transitional" if the standard is not exceeded more than three times at any monitoring location.

Although most of California still does not attain the State ozone standard, improved air quality was achieved between 1981 and 1993 (*1994 Air Quality Management Plan*, Appendix E, November 1995). As documented in Appendix E for the *1994 Air Quality Management Plan for the Monterey Bay Region*, ozone concentrations were somewhat lower in 1993 than they were in 1982 in this Basin. Most areas of the State have better ozone air quality today than in 1981, and for many areas the improvements have been substantial. The North Central Coast Air Basin has no large population centers and the climatic conditions favor rapid dispersion of air pollutants. As a result, the MBUAPCD is close to attainment for the state ozone standard (Ibid.).

TABLE 16
SUMMARY OF EXCEEDANCES OF STATE OZONE STANDARD (1985-1994)

Station	1985-1989 Days	1985-1989 (Hours)	1990-1994 Days	1990-1994 (Hours)
Carmel Valley	4	(9)	5	(11)
Davenport	N/A		3	(5)
Hollister	24	(42)	8	(13)
Monterey	0	(0)	1	(1)
Pinnacles	55	(149)	40	(76)
Santa Cruz	2	(6)	2	(4)
Scotts Valley	N/A		6	(11)
Watsonville	N/A		1	(2)

N/A = Not Available, no exceedances and/or station not in operation.
SOURCE: Monterey Bay Unified Air Pollution Control District.

Air Quality Management Plan

The MBUAPCD's *1994 Air Quality Management Plan* (AQMP) establishes programs to meet air quality standards and to reduce air pollution in the Monterey Bay Region. The Plan presents regional control measures and strategies for both stationary and mobile emission sources to reduce air pollutants which are precursors to ozone formation. Implementation of the regional control measures by a variety of local, regional and State agencies would ultimately result in the District's attainment of the State ozone standard.

Projects related directly to population growth will generate population-related emissions that have been forecast in the AQMP using population forecasts adopted by AMBAG. According to AMBAG, the proposed project is consistent with AQMP forecasts (see consistency determination in Appendix E).

RELEVANT PROJECT CHARACTERISTICS

The proposed project will result in the ultimate construction of 34 residential units, private golf course, and recreational facilities. Golf course grading will result in excavation of approximately 300,000 cubic yards of material. Construction of the golf course and recreational facilities is expected to be the first phase of development. Residential development will occur over time as lots are sold.

IMPACTS AND MITIGATION MEASURES

Standards of Significance. *In accordance with the California Environmental Quality Act (CEQA), State CEQA Guidelines, and agency and professional standards, a project impact would be considered significant if it would:*

- *result in a violation of ambient air quality standards;*
- *contribute substantially to an existing or projected air quality violation;*
- *expose sensitive receptors to substantial pollutant concentrations;*
- *result in the generation of emissions of 150 pounds per day for ROG or NO_x, 550 pounds per day of carbon monoxide, and/or 82 pounds per day of PM_{10} due to long-term operations; or*
- *result in short-term construction emissions of 82 pounds per day of PM_{10} or cause a violation of PM_{10} standards at existing sensitive receptors.*

The project is consistent with the Air Quality Management Plan, would not exceed or approach emissions thresholds contained in the Plan, and would not result in violations of ambient air quality standards. Estimates of project emissions were prepared by Donald Ballanti, using the URBEMIS-5 program developed by the California Air Resources Board (see Appendix E for more details). Project-related traffic would generate the following daily new emission levels:

- reactive organic gases (ROG) - 11.3 lb/day
- nitrogen oxides - 13.1 lb/day
- particulate matter - 1.7 lb/day

The indirect project emissions are not considered significant as they would not exceed approach thresholds that are established in the MBUAPCD's "CEQA Air Quality Guidelines" for ROG or NO_x (150 lb/day), carbon monoxide (150 lb/day) or particulate matter (82 lb/day).

The CALINE-4 computer model was used by Donald Ballanti to calculate indirect emissions of carbon monoxide along roadway segments or intersections. The model predicts pollutant concentrations that would be experienced by receptors located within approximately 450 feet of the roadway. Intersections were selected for analysis based on MBUAPCD Guidelines (October 1995) as follows:

- Intersections or road segments that operate at LOS D or better that would operate at LOS E or F with the project's traffic, or
- Intersections or road segments that operate at LOS E or F where the volume-to-capacity (V/C) ratio would increase 0.05 or more with the project traffic, or
- Intersections that operate at E or F where delay would increase by 10 seconds or more with the project traffic.

A review of the impacts of project traffic and project traffic together with that from the Cañada Woods and Monterra developments revealed no intersections or road segments requiring modeling of CO impacts according to the MBUAPCD criteria. Based on cumulative traffic conditions, two intersections would CO modeling: Highway 68 at Highway 218 and Highway 68 at York Road. CALINE-4 modelling conducted for these intersections indicates that no violations of either the 1-hour or 8-hour standards would result from cumulative traffic at these intersections. Predicted concentrations are well below the applicable state and federal ambient air quality standards. (See Appendix E for further details).

<u>**Impact #19**</u>: Construction of the proposed facilities will result in a short-term, localized decrease in air quality due to dust generated during site preparation and construction. This is considered a potentially significant impact.

Construction of the proposed facilities would result in the short-term generation of particulate emissions (PM_{10}) caused primarily by clearing, excavation, and grading operations associated with golf course construction. Accurate estimates of the construction-related PM_{10} concentrations that would occur on or near the project site are difficult to obtain because such concentrations are very sensitive to local meteorology, local topography, variations in soil silt, soil moisture content, and the level of equipment use. The United States Environmental Protection Agency (EPA) data does, however, provide a rough indication of the maximum rate of particulate emissions. Measurements indicate that up to 1.2 tons of dust are emitted per acre per month from construction activity. About 45% of this dust is comprised of large particles which would settle out rapidly on nearby horizontal surfaces; the remainder would be composed of PM_{10}. Large particles would be of concern only as a soiling nuisance, but PM_{10} could cause impacts if dust-suppression measures are not implemented.

According to the Air District's "CEQA Air Quality Guidelines," generation of 82 lb/day of PM_{10} or grading 1.2 acres per day, could result in significant impacts. Given the fact that over 50 acres will be graded for the golf course in a worst-case scenario, project grading could exceed the MBAPCD's thresholds without mitigation. On a short-term basis, violations of the federal and State 24-hour average PM_{10} standards on the proposed project site may result if dust-suppression measures are not implemented. Such short-term exposure would be minimized if dust-suppression measures are implemented.

Mitigation

Implementation of Mitigation Measure 19-1 will reduce the impact to a less-than-significant level.

19-1 Require implementation of "Best Management" construction practices that include the following measures:

- Water all active construction areas at least twice daily and more frequently during periods of high winds; prohibit grading during periods of high wind (over 15 miles per hour).
- Cover stockpiles of debris, soil, and other materials which can become windblown.
- Initiate revegetation and erosion control immediately upon completion of grading and prior to the winter season.

4.10 PUBLIC SERVICES

This section contains an analysis of potential impacts to public services that would be extended to the project site, including fire protection, police protection, and schools. This analysis is based on consultation with the County of Monterey Sheriffs Department, the Monterey Peninsula Unified School District, the Salinas Rural Fire Protection District, as well as review of technical documents and reports. Water supply and wastewater collection and treatment are considered in separate sections of this report.

ENVIRONMENTAL SETTING

Fire Protection

Fire protection service for the project site is currently provided by the Salinas Rural Fire Protection District (Fire District). The District provides both fire protection and emergency medical response to the unincorporated Monterey County in the northern Salinas Valley, the Highway 68 corridor, and the community of Chualar. The Fire District's Laureles Station is located at the intersection of Highway 68 and Laureles Grade Road and will be the "first-in" station for this project. The "second-in" station is the Toro Station located at 19900 Portola Drive, Salinas. The project area was annexed into the Fire District in April 1989. Projects such as the proposed Cañada Woods North subdivision typically generate calls for medical emergencies, traffic accidents and brush fires in greenbelt areas. According to the Greater Monterey Peninsula Area Plan, the project site is located within a wildland area and has increased potential for urban/wildland fires.

Each station is currently staffed by two full-time staff members on duty 24-hours per day. Additional apparatus is staffed by off-duty personnel and volunteer firefighters during emergency responses. A Duty Chief Officer is also available 24 hours per day. The Fire District's equipment includes one structure engine, one wildland engine, and one water tender at the Toro Station; one structure engine, one wildland engine, and one breathing support unit at the Chualar Station; and one structure engine, one wildland engine and one breathing support unit at the Laureles Station.

The Insurance Services Office (ISO), a private operation, rates fire protection services for insurance purposes as a part of a national standard, providing an equal rating of fire protection services within different jurisdictions. The ISO provides its rating based on the District's fire station(s) location, personnel, and equipment (50 percent of score), water supply and fire flow capacity (40 percent of score), and communications capabilities (10 percent of score). The undeveloped project site carries an ISO rating of "9". After fire hydrants and water tanks are installed and approved, the rating will be "6".

The District has an average response time of 7 minutes and estimates a response of 7 to 10 minutes to the project site. The District has not established a policy defining an "acceptable response time."

New structures within the proposed Cañada Woods North project will be required to meet a number of design criteria including fire flow, water storage, hydrant space, and access in order to insure maximum protection from the hazard of fire. The Fire District has set emergency access standards for road access, road width, surface, grades, and radius', and gate entrance standards. District staff have met with the project applicant to discuss emergency access, signing and building numbering, emergency water standards, and fuel modification standards.

The water distribution system will be designed to meet Uniform Fire Code Appendix II-A requirements. Due to several mitigating factors, such as fuel modification and residential fire sprinklers, the fire flow has been reduced to the following: one and two family dwelling areas, fire flow shall be a minimum of 500 gpm @ 20 psi residual pressure for a duration of two hours. Hydrant outlets shall be two 2 1/2 inch and one 4 1/2 inch NST outlets. Buildings other than one and two-family dwelling units - fire flow shall be a minimum of 750 gpm @ 20 psi residual pressure for a duration of 2 hours. Hydrant outlets shall be two 2 1/2 inch and one 4 1/2 inch NST. Hydrant locations have been reviewed and approved by the SRFPO.

Law Enforcement

The Cañada Woods North property is located within the jurisdiction of the Monterey County Sheriff's Department. The closest Monterey County substation is located on Aguajito Road in Monterey. The Cañada Woods North project site is located within a existing patrol beat 8 which covers the length of Carmel Valley Road from Rancho San Carlos Road to the Cahoon summit, approximately 35 miles from the mouth of Carmel Valley, and over Laureles Grade to Hidden Hills.

Response time to the site is heavily dependent on the location of the patrol unit but is estimated at 20 minutes or less. Traffic congestion during peak hours on the two main thoroughfares--Carmel Valley Road and Highway 1-- contributes to a longer response time. If a unit from another beat is closer to a call, that unit may be redirected to respond. (Palmer, personal communication, May 1996).

Schools

The proposed Cañada Woods North project site is located within the boundaries of the Monterey Peninsula Unified School District. The Monterey Peninsula Unified School District (District) serves grades K-12. The MPUSD serves Monterey, Seaside, Marina, Sand

City, and adjacent unincorporated areas with a total 1991 enrollment of 14,152 students, with a capacity of 17,606 (Source: Fort Ord Reuse Plan Draft EIR May 1996). The closest schools to the Cañada Woods North project site are the Foothill Elementary School, Colton Middle School, King Middle School, Seaside High School and Monterey High School. See Table 17 for school enrollment and capacities.

TABLE 17
SCHOOL ENROLLMENT AND CAPACITIES

Name of School	Current Enrollment	School Capacity
Foothill Elementary School	579 students	644 students
Colton Middle School	720 students	750 students
Martin Luther King Jr. Middle School	717 students	745 students
Seaside High School	1009 students	1344 students
Monterey High School	1249 students	1400 students

Source: Monterey Peninsula Unified School District, Foothill Elementary School, Colton Middle School, Martin Luther King Jr. Middle School.

Parks and Recreation

The project site is located east of Jack's Peak Park, on which existing and planned trails exist. The parks and recreation requirements contained in Section 19.12.010 of the Subdivision Ordinance (Title 21, Monterey County Code) state that as a condition of approval of a tentative map, the applicant shall dedicate land, pay an in-lieu fee for park or recreational purposes. The portion of the formula applicable to the proposed development formula is as follows: single family dwelling unit = 0.009 acres of park per dwelling unit.

RELEVANT PROJECT CHARACTERISTICS

The project consists of reconfiguration and reduction of 112 existing and approved residential lots to 34 residential lots located to a golf course. Access will be provided via private, gated roads from Olmsted Road off Highway 68 and Cañada de la Segunda from Carmel Valley Road. The primary onsite access road will be 24 feet wide; residential roads will be 20 feet wide.

Water Distribution and Fire Suppression Measures

The water distribution system consists of four lift (pressure) zones. Each zone is designed to deliver domestic potable water demand as well as provide storage and fire flow to supply a minimum of 750 gallons per minute (GPM) for a two-hour duration. The highest storage tanks are located on Lot 22. The alternative location (higher elevation) is lot 26. Fire Protection for each pressure zone will include a minimum of two 48,000 gallon storage tanks, 10" diameter water lines through the primary road, Via Malpaso, with 6" to 8" diameter elsewhere. Approximately 46 fire hydrants are located throughout the project per Fire Department requirements.

The buildings and attached garages will be fully protected with an automatic fire sprinkler system. Non-residential buildings with 50 or more fire sprinklers will be protected with an automatic fire alarm system. The additional water features for the Golf Course (one or more irrigation ponds) would provide further resources for the Fire Department for fire protection.

Proposed Recreational Facilities and Trail

The applicant proposes to provide a private golf course, equestrian facilities, and a clubhouse for the residents of the subdivision. The project also includes the proposed project also includes realignment and relocation of a public hiking and equestrian trail that was previously approved as part of the Monterra Subdivision. The Cañada Woods North project proposes to construct a public hiking and equestrian trail around the perimeter of the project site. The location would extend from the southwestern portion of the site adjacent to Jack's Peak Park to the southeastern portion of the site which would connect to planned trails east of the project site, as shown on Figure 21. No public entrance would be available on the project site. The trail is planned as approximately 8 to 10 feet wide within an approximately 10 foot easement.

The trail is proposed to connect to Jack's Peak Park via the 115 acre site dedicated from the Monterra subdivision. The trail would also connect to the planned trail alignment on Highway 68 at York Road which will be coordinated to access future BLM public trails, the Toro Park trail system and inland areas via South Boundary Road on former Fort Ord property. The proposed trail also proposes to access the Hidden Hills area over existing trail easements. However, it is not know if a usable trail link actually exists. This will give limited public access to existing and planned trails in the Laureles Grade Road area.

The project applicant proposes to construct the trail in compliance with standards agreed upon by the Monterey County Parks Department. After construction and dedication of the trail to the County, the trail would be maintained by the Parks Department.

Figure 21

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IMPACTS AND MITIGATION MEASURES

Standards of Significance. In accordance with the California Environmental Quality Act (CEQA), State CEQA Guidelines, and agency and professional standards, a project impact would be considered significant if:

- the project would requirement additional fire or police protection staff, equipment, and/or facilities to maintain acceptable service levels and response times;
- required fire flows cannot be met; or
- student enrollments would cause school capacities to be exceed or would substantially increase existing overcrowded conditions.

Impact #20: Buildout of the project would incrementally increase the need for fire protection services, but not to the extent that additional equipment or staff would be required. This is considered a less-than-significant impact.

The project area was annexed into the District in April 1989. The owner was required to pay an annexation fee per building site upon recording of the Final Map. The first phase of the map was recorded and fees for 19 lots of that phase have been applied to the proposed project. The project applicant is still responsible for the annexation fees for the remaining lots. Additionally, the District has established a Fire Mitigation fee for new construction. The District believes that the above financing methods will take care of any capital needs.

The District is requesting information relative to the increase in property taxes the District would receive to help plan for additional staffing needed as a result of the cumulative impact of all the projects in the area.

Mitigation

None required.

Impact #21: Buildout of the project area would increase the potential for urban/wildland fires resulting from buildings located in a residential area, which can be minimized with appropriate building designs and compliance with Fire District design requirements. This is a less-than-significant impact.

The project applicant has met with the Salinas Valley Rural Fire District to address emergency access, signing and building numbering, emergency water standards, and fuel modification standards. The buildings and attached garages will be fully protected with an automatic fire sprinkler system. Non-residential buildings with 50 or more fire sprinklers will be protected with an automatic fire alarm system. The additional water features for the Golf Course (one or more irrigation ponds) would provide further resources for the Fire Department for fire protection.

Mitigation

None required.

Impact #22: The proposed project would create the need for 0.306 acres of parkland, which is considered a less-than-significant impact.

The applicant proposes to provide a private golf course, equestrian facilities, and a clubhouse for the residents of the subdivision. These active recreational facilities should meet the requirements set forth in Section 19.12.010 of the Subdivision Ordinance (Brandau, Personal Communication, August 1996).

Mitigation

None required.

Impact #23: The proposed project will result in an incremental increased demand for police protection services, but will not require additional equipment or staff. This is considered a less-than-significant impact.

The Sheriff's Department expects to receive approximately three calls per week from projects such as the proposed Cañada Woods North subdivision. During construction, calls would likely be related to thefts of tools, construction materials and appliances. After residents have moved in calls would be expected regarding landscape plant thefts, disputes over fences and dogs, and domestic difficulties between children and their parents. At this point in time, burglaries are uncommon (Palmer, personal communication, May 1996).

Development of Cañada Woods North will place an added requirement for police services due to the limited staff and limited access to the site during peak traffic hours. However, the original Cañada Woods Project was approved with a mitigation measures which ensured that a commercial lot would be available to the Monterey County Sheriff's Department for installation of a sub-station for the Department. The following measures are recommended by the Sheriffs Department in order to aid the Department in case calls for service do occur.

- Levels of lighting, although muted to conform to the rural residential character of the setting should be incorporated into the project design to facilitate patrol performance.

- Landscaping should not limit visibility of homes for patrol purposes and residential security.

- Numbering should be consistent and a street guide should be provided at the entrance to the project.

- Numbering of homes should be at least four inches in size and provide a light-on-dark or dark-on-light contrast for visibility.

- Doors surrounded by glass should be equipped with double deadbolts. Single-cylinder deadbolts should be placed on all other doors. Sliding glass doors should have auxiliary locks and window construction should also incorporate a secondary auxiliary locking device.

- Residents who intend to incorporate alarm systems into their homes should, from the outset, be advised of Sheriff's Department and Communication Department policies and asked to consult with representatives of these two department prior to installation of such systems. According to County ordinance, alarm systems must be registered with the Sheriff's Department prior to installation.

<u>**Mitigation**</u>

None required.

<u>**Impact #24**</u>: Development of the proposed Cañada Woods North project would increase the number of students attending schools in the Monterey Peninsula Unified School District. This is a less-than-significant impact.

The proposed project includes 34 dwelling units. The statewide generation rate yield factor of 0.8 students per dwelling unit was used to determine the number of students generated from the proposed project. At this rate the proposed project could be expected to generate 27 students. Approximately 27 students will be generated by buildout of the project; 12 in grades K-5, 7 in grades 6-8 and 8 in grades 9-12. At the elementary, middle and high school levels, capacity is currently available to serve the anticipated number of students from the proposed project. It is recommended that the proposed project be made subject to measures the Monterey Peninsula Unified School District has in force at the time of issuance of building permits, in accordance with Section 65996 of the Government Code.

<u>**Mitigation**</u>

None required.

4.11 LAND USE

This section reviews project consistency with pertinent area plans and policies, including Monterey County's *Greater Monterey Peninsula Area Plan*, city of Monterey *Highway 68 Area Plan*, and the Monterey Peninsula Airport's *Land Use Compatibility Plan*.

RELEVANT PROJECT CHARACTERISTICS

The site consists of an approximately 1,060 acre portion of the approved Monterra Ranch Subdivision which is located south of Highway 68 between Highway 218 and York Road. A tentative subdivision map for Monterra Ranch was approved by the Monterey County Board of Supervisors in October 1987. The approval included subdivision of approximately 2,911 acres into 283 lots ranging in size from 2 to 60 acres to be developed in three phases; a 47-acre parcel for development of a 42-unit inclusionary housing planned unit development; recreational and equestrian uses; and dedication of 115 acres of land contiguous to Jack's Peak County Park. A final map has been recorded for 83 lots in Phase 1.

The proposed tentative map will result in a resubdivision of 19 legal lots of record (Lots 68 through 89 of Monterra Ranch Phase I) and reconfiguration of 93 approved lots. (The project site includes 19 lots of record and 120 approved lots, but the applicant proposes to either extinguish or reconfigure a total of 112 lots. The remaining 27 lots in the existing Monterra approval would be located in the third phase final for the existing Monterra. See Project Description for further details.)

The proposed lot reconfiguration would result in a net reduction of 78 lots, including a new reduction of the 19 existing lots to 5 lots. The project also will result in the relocation and redesign of subdivision layout and addition of private golf course, equestrian facility, and tennis courts. The proposed project represents a reduction in the total number of approved lots for this portion of the Monterra Ranch. The proposed layout is compatible with the remaining approved Monterra subdivision to the north and west, and the approved Cañada Woods subdivision to the south.

PROJECT CONSISTENCY WITH AREA PLANS

Monterey County General Plan

The project site is designated "Residential, Rural Density, 10-acre minimum" in the Monterey County General Plan and *Greater Monterey Peninsula Area Plan* (GMPAP). The project's gross density is consistent with this designation, with a gross density of 1 lot per 31 acres, although 18 of the proposed 34 lots are less than 10 acres in size. However, the GMPAP indicates that where clustering is allowed, minimum lot sizes may be reduced, but the total site density shall not exceed the density allowed by the land use designation. The proposed project would be consistent with this interpretation.

The proposed building envelope sizes are consistent with cross slope formulas included in GMPAP Policy 3.2.4.1. Policy 36.0.4.1 further defines maximum density based on slope formula calculations. According to information provided by the applicant, 513 acres exceed 30% slope, resulting in 213 acres between 20-30% and 335 acres between 0-20% which would be available for development. Less than one-half of the project site contains slopes greater than 30%. The maximum allowable number of residences per the slope density formulas is 441.

GMPAP policies that are pertinent to the project are identified on Table 18, which also indicates whether or not the project is consistent. As can be seen, the proposed project incorporates design elements and/or features that are consistent with GMPAP policies, or the project can be consistent with implementation of mitigation measures included in this EIR. GMPAP policies call for protection of redwood forest and wetland areas, but none have been identified on the project site, except for existing stock ponds as discussed in Section 4.6 -- Biotic Resources -- of this EIR.

The site is not within a mapped visual sensitivity area. However, visual impacts are reviewed in this EIR and were found to be limited with design controls on lots 12, 30, 31 32, and one member suite, including refinement of ultimate building envelopes to minimize grading and potentially visible development, as well as, use of non-reflective materials, subdued colors and lighting that does not create offsite glare. Parcel H and Parcel I are located on the northern knolls and visible from facing Highway 68, Highway 218, Ryan Ranch, and York Road. These parcels will be kept in open space. The project is consistent with Policy 26.1.6.1 and 26.1.6.2. Scenic easements are planned on residential lots outside of designated building envelopes.

The site plan will be consistent with Policies 17.3.12, 17.3.1.3, and 17.4.13 as required by the Fire District. All structures will be equipped with sprinklers, Class A non-combustible roofs, non-combustible decks/patios, and agreed upon setbacks.

The project site also has an "Urban Reserve" overlay, which is used to denote areas which the County believes can be annexed and developed in a phased manner to an incorporated city to ensure effective provision of urban services. The site is also included in the City of Monterey Sphere of Influence and Highway 68 Area Plan as described below. While the County General Plan identifies potential future urban level development, the existing land use designations and resource policies would suggest a rural designation within unincorporated Monterey County is more appropriate for the site.

City of Monterey Plans

The project site, as part of the overall Monterra site, is included within the City of Monterey's sphere of influence and is included within the City's General Plan. The City Council of Monterey approved the Highway 68 Area Plan on June 19, 1984. The need for this plan arose with the passage, by City voters, of Measure "M" in February 1982. Measure "M" repealed the previous Monterey II Plan and required that prior to City approval of any land use change in the Highway 68 area, "the proposed plan must be approved by the voters of the City of Monterey". The Highway 68 Area Plan was approved by city voters in November 1984.

The project site is within the City's *Highway 68 Area Plan* (November 1994) boundaries. The Plan identifies policies for protection of resources and designates development densities for properties along Highway 68. The Monterra property is the largest property in the Highway 68 Area Plan. The Plan permits a maximum of 1,700 dwelling units on the entire Monterra property to increase City housing supply. The proposed project comprises a portion of the Monterra property with a density consistent with existing County rural designations.

The Highway 68 Area Plan contains specific policies for the Monterra property which would allow a maximum of 1700 residential units, and neighborhood shopping areas to meet the basic needs of future residents. This Area Plan also contains policies related to environmental resources, social needs, economic issues, and facilities, utilities and services, which apply to the entire Monterey II Area. Table 19 provides reviews project consistency with relevant policies of the Area Plan.

Comprehensive Land Use Plan for Monterey Peninsula Airport

According to the Comprehensive Land Use Plan for Monterey Peninsula Airport prepared in June 1987, the Cañada Woods North project site is not located within the existing or future Monterey Peninsula Airport Clear Zone, Community Noise Equivalent Level (CNEL) contours, or approach zones. A 1,200 strip of land fronting Highway 68 in the Monterra Ranch subdivision will be affected by aircraft generated noise. However, the project site is partially within the flight track for Runway 28, and may be subject to some aircraft noise, but is not located in CNEL-noise contour areas which would require special noise attenuation measures. No significant impacts from aircraft noise are anticipated for the proposed project.

TABLE 18
PROJECT CONSISTENCY WITH POLICIES IN THE GREATER MONTEREY PENINSULA AREA PLAN

Policy #	Policy	Project Consistency
3.1.1.1	Establish and enforce erosion control for all projects	Project proposes erosion control measures which are supplemented with EIR mitigation measures
3.2.4.1	Establish residential density of 1 building site per 1 acre where cross slope is between 0 and 19.9% and 2 acres where cross slope is between 20 and 29.9%	Consistent - see text discussion on page 4.11-2
5.1.3	Encourage development projects to be served by water from public utilities or mutual water companies	Consistent as proposed
7.2.3	Use plant materials to integrate manmade and natural environment, to screen development and provide diversity in developed areas	Consistent with mitigation
9.1.1.1	Include diversity of habitats in open space areas with special protection given to ecologically important zones	Consistent with mitigation
11.1.6	Protect environmentally sensitive areas shown on GMPAP Map	None identified for project site
15.1.11.1	Require detailed geological investigation and soils report as condition of approval in high seismic and geologic hazard areas	Consistent with mitigation
17.3.1.1	All new development shall be required to provide an adequate road for fire protection	Consistent
17.3.1.2	In areas of high and extreme wildland fire hazard, no dead-end or cul-de-sac road should be over 1,000 feet in length unless secondary access is provided in consultation with the local fire protection agency	Consistent per consultation with Fire District
17.3.1.3	In high and extreme fire hazards areas, development should be clustered and separated from wildland by fuel modification zones	Consistent per consultation with Fire District
17.4.13	If a fuel modification zone is established, provision must be made for its permanent maintenance	Consistent per consultation with Fire District
20.2.3.1	Development in the vicinity of the Monterey Peninsula Airport should be sited, designed, and/or constructed to minimize noise hazards from aircraft	Consistent

TABLE 18
PROJECT CONSISTENCY WITH POLICIES IN THE GREATER MONTEREY PENINSULA AREA PLAN

Policy #	Policy	Project Consistency
26.1.6.1	Development should include compatible open space areas located between other developed areas to maintain a rural atmosphere and protect scenic resources	Consistent
26.1.6.2	Open space, low intensity educational and recreational uses should be considered uses in areas of high visual sensitivity	Consistent
26.1.9.1	Development on canyon edges and hilltops shall be designed to minimize visual impact	Consistent with mitigation
36.0.4.1	Maximum density based on land use designations and slope density formulas	See text discussion
39.2.5.1	To minimize traffic safety hazards, prohibit new access points onto Highway 68	Consistent
40.2.5	Encourage dedication of scenic easements over visually sensitive areas	Consistent as proposed
40.2.6	Preserve highly sensitive visual areas as open space	Consistent with mitigation
40.2.9	New development to be located in mapped visual sensitivity areas and visible from a scenic route shall maintain the visual character of the area	Consistent with mitigation
51.1.4	County priority given to trail systems, including easterly ridgeline trail from Jacks Peak Park to Laureles Grade	Project is consistent with proposed trail realignment and construction on ridgeline
51.2.1.1	Evaluate development proposals to determine extent to which development helps further County park and recreation goals	Consistent, see above

TABLE 19
PROJECT CONSISTENCY WITH POLICIES IN THE CITY OF MONTEREY HIGHWAY 68 AREA PLAN

Policy	Project Consistency
Development should be oriented to the natural terrain by encouraging innovation in site design, grading techniques, building types, and spacing of buildings.	Consistent with mitigation.
The prevailing slope of land shall be used as a criterion in evaluating land use activities. No building construction shall take place on slopes over 25%.	Potentially inconsistent, but EIR did not identify any impacts.
New housing development in the Highway 68 Area should be sensitive to the physical environment - viewsheds, hillside areas, vegetation, and watersheds.	Consistent with mitigation.
Recreational trails for biking, hiking, or riding horses shall be planned.	Consistent.
No new development will be permitted once level of service D is reached unless increased capacity is provided.	Consistent with mitigation.
A connecting road from Carmel Valley through Monterra to Highway 68 may be considered	Policy is inconsistent with existing County policy
Housing for a variety of incomes should be provided on Monterra. No less than 15% of the dwelling units shall be moderate-income housing. Lower-income housing shall be encouraged and may be substituted for moderate-income housing. Development of such units shall be proportionately phased in with the development of other dwelling units.	Consistent
Viewsheds seen from Highway 68 toward all sections of Monterra shall be preserved.	Consistent with mitigation.
Roads in the Monterra area shall be screened from Highway 68.	Consistent.
All buildings shall be screened from Highway 68 and Olmstead Road.	Consistent with mitigation.
Development in ridge line areas shall not silhouette against the skyline and shall be substantially screened form public viewing areas.	Consistent with mitigation.
Development in forested areas should not create obvious gaps in the wooded foothills and skylines.	Consistent with mitigation.
Full roadway improvements on Highway 68 and Olmstead Road shall be provided to meet existing and anticipated traffic demands of Monterra.	Consistent with mitigation.

5.0 CEQA CONSIDERATIONS

5.1 UNAVOIDABLE ADVERSE IMPACTS

For the purpose of this section, unavoidable significant adverse impacts are those effects of the project which would significantly affect either natural systems or other community resources and cannot be mitigated to a less-than-significant level. The EIR did not identify any significant unavoidable project impacts.

5.2 GROWTH INDUCEMENT

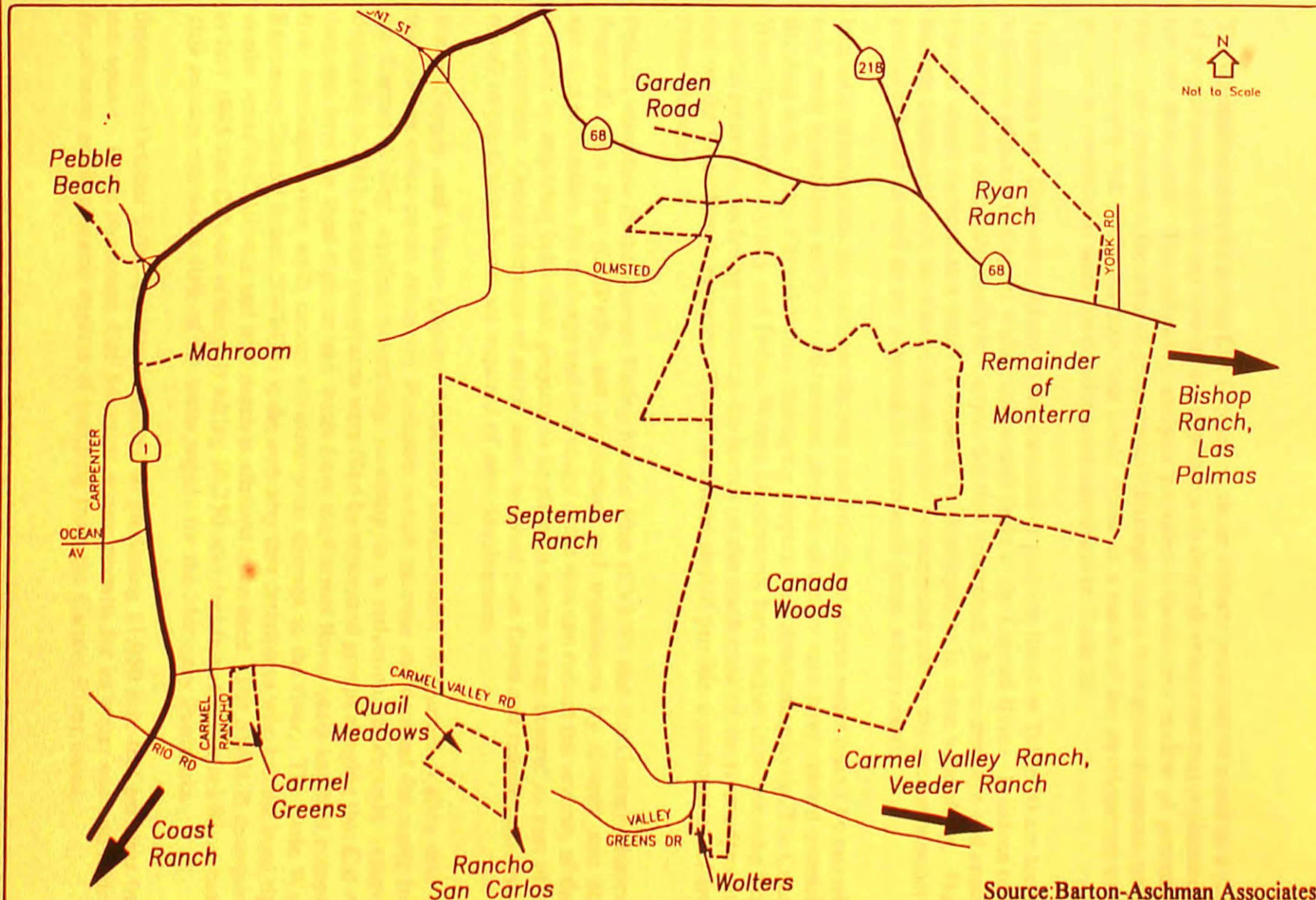
CEQA requires that any growth-inducing aspect of a project be discussed in an EIR. This discussion should include consideration of ways in which the project could directly or indirectly foster economic or population growth in adjacent and/or surrounding areas. Projects which could remove obstacles to population growth (such as a major public service expansion) must also be considered in this discussion. According to CEQA, it must not be assumed that growth in any area is necessarily beneficial, detrimental or of little significance to the environment.

The proposed project represents a reduction in the number of lots that could be developed under existing and approved subdivision plans, and thus will result in less population growth than might otherwise occur. The project proposes using wastewater treatment facilities and domestic water service as provided by the adjacent Cañada Woods treatment plant and Cañada Woods Water Company. This will result in extension of infrastructure lines onto the project site. The Water Company boundaries are proposed to be expanded to serve only the proposed project, whereas the entire Monterra site is proposed to be served by the planned wastewater treatment plant on the Cañada Woods site. In either case, the extension of infrastructure would not be considered growth inducing as subdivision plans have already been approved for the site.

5.3 CUMULATIVE IMPACTS

An evaluation of cumulative impacts is required by CEQA when they are significant, but need not be as detailed as the discussion of project impacts. Table 20 and Figure 22 identify approved and proposed projects in the vicinity. In the immediate Highway 68 area, cumulative projects include continued commercial development at Ryan Ranch and on Garden Road in the city of Monterey, as well as the remainder of the approved Monterra subdivision and development further east, including Bishop Ranch and Las Palmas. In the Carmel Valley vicinity, approved and pending development includes 885 residential units.

TABLE 20 CUMULATIVE PROJECTS			
Project	Area	Dwelling Units	Other Uses
UNDER CONSTRUCTION			
1. Ryan Ranch	City of Monterey		139,210 sf office/commercial
APPROVED			
2. Monterra Ranch (excluding proposed project site)	Monterey County (Highway 68)	247	
3. Ryan Ranch	City of Monterey (Hwy 68)		2,500 sf office & Corp Yard
4. Bishop Ranch	Monterey County (Hwy 68)	253	Golf Course
5. Las Palmas Phase II	Monterey County (Toro)	515	
6. Cañada Woods	Carmel Valley	69	80,000 sf commercial
7. Rancho San Carlos	Carmel Valley	350	150 visitor units, Golf Course
8. Quail Meadows	Carmel Valley	65	40-room inn
9. Carmel Valley Ranch	Carmel Valley	64	44-room inn
10. Mahroom	Carmel Valley	36	
11. Coast Ranch	Carmel Valley	67	
PROPOSED			
12. Garden Road	City of Monterey		7,600 sf commercial
13. September Ranch	Carmel Valley	117	
14. Wolters	Carmel Valley		10,000 sf commercial
15. Carmel Greens	Carmel Valley	88	
16. Veeder Ranch	Carmel Valley	29	
17. Pebble Beach Lot Program	Pebble Beach	403	
18. Walgreen's Drug Store	Seaside		Commercial
TOTAL		**2,303**	**239,310 sf commercial; 234 visitor rooms; 2 golf courses**
SEE FIGURE 22 for locations; Dwelling unit counts include inclusionary units			



Source:Barton-Aschman Associates

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Cumulative Projects

Figure 22

The cumulative analysis in this EIR focuses on those impacts projected to occur as a result of project construction and operations, together with other development that is planned but not yet developed. The following analysis provides a qualitative review of potentially significant impacts in the areas of geotechnical/drainage issues, biological resources, traffic, water supply and public services, that could occur as a result of the development of the project in conjunction with the development identified in Table 20.

Hydrology and Drainage. Many of the cumulative projects listed in Table 20 are located within or adjacent to Carmel Valley and would drain to the Carmel River. Buildout of the Monterra area drains ultimately to Canyon del Rey watershed. Storm drainage and erosion hazards would increase as a result of cumulative development in these watersheds. Flood hazards associated with the Carmel River would be increased due to the greater number of people exposed as well as the potential for increased storm water runoff.

Increased urbanization can increase the rate and volume of storm water runoff by covering land with impervious surfaces. Extended periods of heavy rain have caused extensive flooding in the lower Carmel Valley, damaging property and threatening lives. The County Water Resources Agency and Public Works Department have begun implementing flood control measures, including removing the levees on the south bank of the river adjacent to and on the Coast Ranch property. These measures should provide significant relief from future flooding.

Policies identified in the Carmel Valley Master Plan (CVMP) and the Greater Monterey Peninsula Area Plan (GMPAP), and ordinances and regulations by County and state agencies responsible for drainage and hydrology in the area can reduce the severity of these impacts by requiring individual projects to implement storm water control as part of site development. Onsite retention of storm water to avoid peak flows and reduce post-project runoff to pre-project levels are required of new development.

Water Supply and Water Quality. Increased development in Carmel Valley and the surrounding cities on the Monterey Peninsula would increase the demand for water from the Carmel Valley aquifer, potentially resulting in a reduction in drought reserves. Beginning in 1987, formal complaints were filed by concerned groups alleging that Cal-Am does not have the legal right to take water from the Carmel River basin and that pumping from municipal water wells causes environmental damage to the river. The State Water Resources Control Board (SWRCB) is the authority that determines who has the legal right to take water in California and how much is allowed to be used. The SWRCB determined in July 1995 that Cal-Am is illegally taking 10,730 acre-feet from the Carmel River basin. This amount represents 70% of the water supply for the Monterey Peninsula.

Starting in October 1996, Cal-Am is limited to producing 11,950 acre-feet per year from this source. In the meantime, Cal-Am must secure permits for its water use and address the adverse environmental impacts of pumping from the Carmel River basin.

In November 1995, the MPWMD asked the voters within the District to approve a revenue bond to pay for a 24,000 acre-foot reservoir to replace the existing Los Padres Dam in response to the Monterey Peninsula's long-standing water supply problems. The bond measure did not pass and as a result, both the MPWMD and Cal-Am are in the process of reviewing alternatives to the proposed dam. Water supply alternatives selected must satisfy existing and projected water demand, satisfy minimum requirements for Carmel River rehabilitation, and respond to the SWRCB order regarding pumping of the Carmel Valley aquifer.

Approved, but not yet developed projects shown on Table 20 have proven sources of water as a condition of approval. Proposed projects may not yet have a secured source of potable water. In some cases, these projects will result in low density residential uses replacing agricultural uses which cause the overall net consumptive uses of water decreases when the land is converted. Both the MPWMD and the County Water Resources Agency have established policies and regulations that require development to achieve a net water savings. The MPWMD reviews each proposal on a case-by-case basis. The County requires a 10% water savings relative to predevelopment conditions on the site.

In the Highway 68 area, cumulative impacts on groundwater quantity and quality would not be significant as cumulative projects are located in at least four separate groundwater basins, including the Laguna Seca, the El Toro subarea, or the Ryan Ranch groundwater subareas (EMC Planning Group, September 1995). The Laguna Seca, El Toro, and Ryan Ranch subarea are all included in the same groundwater basin; the Monterra groundwater basin is separate (Ibid.).

A water supply assessment (Staal Gardner & Dunne Inc., 1991) identified a groundwater surplus of 160.5 acre-feet per year (AFY) after buildout of the Laguna Seca Subarea (Ibid.). Taken into consideration were the current groundwater supply and demand, buildout demand (including the proposed project), local and artificial recharge, inflow from the El Toro Area groundwater basin (Corral de Tierra subarea), and outflow to the Ryan Ranch subarea. Additionally, the assessment identified no water quality problems with the subarea. It was concluded that there was adequate water supply to serve the approved Laguna Seca (i.e. Bishop Ranch) projects without significant cumulative impacts to the Laguna Seca groundwater basin (Ibid.).

Concern has been expressed regarding cumulative impacts on the steelhead fishery in Carmel River due to the project and cumulative diversions. Steelhead trout is currently being proposed for listing as a federally endangered species. Assessments of instream flow requirements for maintenance of the steelhead fishery are made by the California Department of Fish and Game and Monterey Peninsula Water Management District (MPWMD). The MPWMD evaluated a worse-case scenario of pumping impacts in its *Water Allocation Program EIR*.. Base don the assumption that the DFG's instream flow recommendations are adequate for maintaining fishery habitat, and the ongoing fishery monitoring, rescue and riparian enhancement program established by the MPWMD is continued, there is no significant cumulative impact anticipated for the production by non-Cal-Am pumpers, including the proposed project.

Biological Resources. The encroachment of residential and commercial development on natural open space would result in a cumulative reduction in wildlife habitat and native vegetation. In addition, wildlife mobility throughout the adjacent open space lands could be affected unless corridors are provided to connect established open space lands. Cumulative development also will result in potential loss of native communities such as oak and Monterey pine woodlands, coastal terrace prairie, and riparian and wetland habitats.

The Highway 68 corridor is largely open space and rural lands with pockets of residential and commercial development. The terrain varies from level meadows with some wetlands, to rolling hills with oak woodlands, to steeper hillsides with chaparral vegetation. Several stream corridors and drainage channels are also present in this corridor. All of these resources provide habitat for wildlife in the area. Golden eagles, as well as other birds of prey, are known to utilize the entire Highway 68 corridor for hunting and nesting. As development continues within the Highway 68 corridor, the loss of wildlife and wildlife habitat, even that which is currently not classified as special status (e.g. central maritime chaparral) could become a significant cumulative impact. Development proposals will be evaluated by the County for site-specific impacts and mitigation measures.

GMPAP and Carmel Valley Master Plan policies require that biotic assessments be conducted where environmentally sensitive habitats may occur. The plans also set forth policies regarding tree removal and replacement. The County requires permits to remove trees from individual lots.

Traffic. The Traffic and Circulation section of this EIR reviews cumulative traffic impacts and identifies impacts along Highway 68. Widening Highway 68 to 4 lanes along the - existing alignment would cost significantly less and have far fewer environmental impacts than replacing the existing highway with a freeway. Cumulative projects, including the proposed project, impacting this travel corridor should be responsible for paying a proportional share of the cost of traffic improvements either through traffic impact fees, right-of-ways, or other means determined appropriate by the County and Caltrans.

Traffic growth on Highway 1 under cumulative conditions was analyzed in the *Carmel Valley Master Plan Traffic Analysis Report* and the *Regional Transportation Plan EIR*. Cumulative growth included buildout of the CVMP and projected growth on the Monterey Peninsula through 2006. The projected traffic growth on Highway 1 under cumulative conditions was about 50%. This agrees with recent forecasts by the Transportation Agency for Monterey County (TAMC) that project a 57.5% increase through 2013.

The cumulative traffic growth could not be accommodated on Highway 1 with only the short-range operational improvements. TAMC has adopted a policy of endorsing Hatton Canyon Freeway as a long-range solution for this area to accommodate the cumulative growth. The Hatton Canyon Freeway is funded, but has been delayed due to local opposition. The short-term operational improvements to the existing highway are also approved by the California Transportation Commission (CTC) to be funded and programmed for completion by Caltrans in 1998. The freeway endorsed as the preferred long-range solution by Caltrans and CTC is programmed for completion in 1998 as well.

Air Quality. A contribution to air emissions in the North Central Coast Air Basin is projected due to cumulative development in the study area. Traffic generated by the cumulative projects would be the most significant source of air pollutants. Planning for attainment of state standards is embodied in the 1994 Air Quality Management Plan (AQMP). The 1994 AQMP demonstrates that the 20% reduction target in ozone precursor emissions from the 1987 baseline has been met and that no new control measures (contingency measures) are needed beyond those already in the plan. The AQMP stipulates that if existing control measures are implemented and if land use projections remain consistent with the adopted plan, the federal ozone standard should be maintained and violations of the state ozone standard should be less frequent throughout the air basin.

Buildout of the study area is assumed to be in compliance with the AQMP if the projected additional population plus existing city population would not exceed population projections in the AQMP for various designated years. As long as development within the study area is phased such that those projections are maintained, cumulative impacts to regional air quality are less-than-significant. As noted in section 4.9 -- Air Quality, the proposed project is consistent with the 1994 AQMP.

Public Services. In addition to public service improvements noted in the traffic and water service discussions in this section, cumulative development throughout the GMPAP and CVMP areas will require increases in manpower and equipment for the Sheriff's Department, the Salinas Rural Fire Protection District, Mid-Valley Fire Protection District and area schools. Levels of Service may decrease as population grows and spreads into previously unpopulated areas of the County. Because of the close proximity of this project to urban areas that are well patrolled, levels of service will likely be maintained at current levels.

Cumulative development will contribute to a significant demand for school facilities in the Monterey Peninsula Unified School District and Carmel Unified School District. The school district does not currently collect school impact fees from new development. It is likely that in the future, the school district may require new development to pay impact fees to the greatest extent allowed by state law. Most of the new development within the planning area will be marketed toward upper income buyers. Demographics of families in this market suggest that the number of school-aged children will be low and that private schools are popular alternatives to public schools. Therefore, additional mitigation may not be necessary for cumulative conditions.

5.4 PROJECT ALTERNATIVES

This section evaluates alternatives to the proposed project as required by the California Environmental Quality Act (CEQA). The State CEQA Guidelines (Section 15126) require that an EIR describe and evaluate the comparative merits of a range of reasonable alternatives to the project which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project. The Guidelines further require that the discussion focus on alternatives capable of eliminating significant adverse impacts of the project, or reducing them to a level of insignificance even if these alternatives would impede to some degree the attainment of the project objectives, or would be more costly. According to the CEQA Guidelines, the range of alternatives required in an EIR is governed by "rule of reason" that requires the EIR to set forth only those alternatives necessary to permit a reasoned choice.

The alternatives analysis should also identify any significant effects that may result from a given alternative. Additionally, the CEQA Guidelines indicate that an environmentally superior alternative should be identified. If the environmentally superior alternative is the "no project" alternative, the EIR must also identify an environmentally superior alternative from among the other alternatives.

The following alternatives are evaluated in this section, including a description of the alternative, identification of whether significant project impacts would be eliminated or substantially lessened, and identification of significant impacts arising from the alternative.

- Alternative 1: No Project - Development under Existing Approved Monterra Subdivision
- Alternative 2: Modified Site Plan
- Alternative 3: Residential Uses Only

Significant project impacts identified in this EIR are summarized below. All impacts can be reduced to a less-than-significant level with implementation of measures outlined in this EIR.

- exposure to seismic and landslide hazards
- increased erosion
- damage to buildings due to shrink-swell soil conditions
- water quality degradation due to road and golf course runoff
- Public health and safety issues if the planned wastewater treatment plant is not properly maintained

- biotic resource impacts including loss of coastal terrace prairie habitat, loss of special status species and habitat, tree removal, and indirect damages to oak trees
- limited potential ridgetop development visibility

Alternative 1: No Project - Development Under Existing Approved Monterra Subdivision

Description. The identification and analysis of this alternative is required by CEQA. Typically, the No Project alternative would result in no development of the site until such time as another development proposal is submitted in accordance with County General Plan and zoning designations and regulations. However, the project site currently has 19 legal lots of record and 120 additional approved lots for which a final map could be filed. If the proposed project is denied, development consistent with the existing approved Monterra Ranch Tentative Map would be reasonably expected to occur. As there is a legal entitlement for development on the site, the No Project Alternative would result in development of 139 residential lots, unless otherwise modified by Conditions of Approval, as discussed below. As indicated in the Project Description, 27 of the 139 lots are planned to be developed on the remainder of the Monterra site, resulting in a net development potential of 112 lots on the project site under the No Project Alternative.

Environmental Impacts. Overall, the No Project Alternative would result in more significant impacts than identified for the project, with regards to grading, drainage, water supply, wastewater disposal, aesthetics, biotic resources, traffic, and public services. Impacts related to seismic and landslide hazard exposure and grading would likely be similar to or greater than the proposed project, as described below.

<u>Geology/Soils</u>. In general, geologic effects of the proposed action would be less than for the approved Monterra Ranch project because the development density of the proposed project is substantially lower, thereby allowing more flexibility in the siting of individual structures to avoid areas of geologic hazards such as landslides and steep slopes. However, under the No Project alternative, additional field investigations would be required in accordance with the mitigation measures in the 1987 EIR and Project Conditions of Approval. The purpose would be to clearly delineate potential fault zones on the site from the Navy and/or Berwick faults, as well as the Berwick Canyon slide area, and reconfigure or eliminate lots as may be necessary to avoid seismic and geologic hazards. Conditions of Approval specify a 100-foot minimum setback from identified hazards.

According to the Monterra Ranch EIR, approximately 26 lots were identified as being potentially exposed to fault rupture and/or landslide hazards. Thus, it would be expected that there would be some reduction in the total number of lots as there would be some lot reconfiguration or consolidation, and, in a worst-case, elimination of all 26 lots. However, the exact number of potential lot reduction is not known. The No Project Alternative would result in similar impacts related to exposure to fault rupture and landslide hazard as the proposed project, as lots sited on or within these areas would be eliminated or modified.

The No Project Alternative would result in the same exposure to seismic groundshaking as the proposed project and the entire region, except that more lots would be developed under this alternative, with a greater number of residents than under the proposed project. Individual structures would be required to have geotechnical studies performed prior to final design, and all structures would be required to adhere to the Uniform Building Code's seismic design criteria.

The No Project Alternative would result in grading and land disturbance of an area similar to or greater than the proposed project. There would be more grading for the residential component under the No Project Alternative than the proposed project with respect to roads and lot development; roads would be approximately 12 miles compared to 4.5 under the proposed project, and 112 home sites (less lots reconfigured as described above) would be constructed compared to 34 with the proposed project. Many lots under the approved plan are located in areas of steep slopes which have been avoided with the proposed project.

The proposed project would result in grading for a golf course that was not included in the approved Monterra Ranch project, although grading would not occur uniformly throughout the site and also would occur on flatter slopes. However, erosion impacts under the No Project Alternative would be greater than the proposed project due to higher density of development and development on steeper slopes than would occur with the proposed project. Implementation of erosion control measures would be needed under the No Project alternative, as with the proposed project. With implementation of erosion control measures, significant impacts could be reduced to a less-than-significant level.

Hydrology. The No Project Alternative would result in increased development with associated impermeable surfaces and thus generation of an increased volume and rate of runoff than would occur with the proposed project. Increased runoff would be mitigated through the use of onsite retention facilities, designed with appropriate capacities to accommodate the project.

The No Project Alternative would result in a greater level of urban pollutants associated with road and driveway runoff than the proposed project, due to a greater number of developed homesites and more roadways. This alternative would eliminate water quality runoff impacts associated with the proposed golf course. However, as discussed in this EIR, this impact can be reduced to a less-than-significant level with implementation of mitigation measures for the proposed golf course, which would provide that the course be managed in a manner that provides substantial protection of water quality.

Both the No Project Alternative and the proposed project would eliminate the current condition of cattle grazing, along with its nitrogen loading and erosion impacts. However, each of the 139 lots of the No Project Alternative would be served with onsite septic systems and full leachfields, potentially resulting in greater nitrate loading than would occur with the proposed project. This is discussed further below under Wastewater.

Water Supply. Water demand would be greater under the No Project Alternative than for the proposed project at buildout. Assuming a demand rate of 0.5 acre-feet per year (AFY) per residential lot, this alternative would generate a potable water demand of approximately 70 AFY for 139 lots and 56 AFY for 112 lots, compared to approximately 33 AFY for the proposed project. Thus, total groundwater demand under this alternative would range between 56 and 70 AFY.

This alternative would increase pumping from onsite wells by 18 AFY over the proposed project, in which approximately 38 AFY from onsite wells has been estimated for non-potable golf course irrigation at buildout conditions and to supplement agricultural irrigation on the adjacent Cañada Woods site. However, initially, the proposed project would pump a greater amount of water than this alternative (up to 150-195 AFY) for golf course irrigation until the wastewater treatment plant is producing reclaimed water at full capacity. It is assumed that the No Project Alternative would not utilize any water from the Carmel Valley aquifers. It should be noted, however, subsequent to the approval process for Monterra Subdivision, the Monterra developers requested an amendment to the conditions of approval to allow a Cal-Am hook-up for emergency purposes.

Under the No Project Alternative, water supply would be provided by the onsite bedrock wells. The onsite wells and water supply is adequate to serve the site without adversely affecting other adjacent areas because of the generally isolated nature of this aquifer. However, this water would require treatment to reduce iron and manganese concentrations and salinity content. Although impacts to groundwater supply and quality were not found to be significant for the approved Monterra project, a greater level of groundwater use would be required under the No Project Alternative than with the proposed project under buildout conditions.

Wastewater. The approved Monterra Ranch project consists of 139 housing units on the project site with wastewater treatment and disposal provided by individual septic systems. The remainder of Monterra Ranch includes 171 residential lots and 42 units of inclusionary housing, with wastewater treatment and disposal to be provided by a community septic (inclusionary only) system. While septic systems can provide a low-cost, environmentally acceptable method of waste disposal, centralized treatment and reclamation facilities generally provide superior wastewater treatment and disposal performance. This is largely the result of having a modern, centralized facility with which to treat the wastewater, which provides a greater degree of control over the treatment and disposal process. Therefore, from an operational perspective, the reclamation plant that is part of the proposed project would provide a greater assurance that no adverse effects would occur to the environment or public health from the wastewater treatment and disposal process.

The proposed wastewater facilities would eliminate the planned and approved use of individual septic systems at the project site and at the Monterra Ranch subdivision, resulting in a substantial reduction in nitrate loading in the area. The proposed reclamation facility associated with the Cañada Woods North project would substantially reduce the nitrate loading on the local groundwater compared to both the Monterra Ranch project (septic systems) and the existing condition (cattle grazing). See also Section 4.3 -- Hydrology and Water Quality -- for additional discussion.

The No Project Alternative would contribute an estimated 4,239 grams of nitrates per day with use of onsite individual septic systems which is higher than the proposed project nitrate loading of 3,321 grams per day. However, the No Project Alternative would contribute less nitrate than existing conditions; the cattle grazing operation contributes an estimated 6,056 grams per day of nitrate.

<u>Biotic Resources</u>. This alternative would result in development of more residential lots of a greater density than would occur with the proposed project, although both projects are located within the same general area. However, more development and land disturbance would occur under this alternative with development of more concentrated residential lots. Increased associated population-related impacts and disturbances would occur within individual lots. Thus a greater impact upon the coastal prairie habitat and associated special status species would occur than with the proposed project. Due to greater development intensity and residential population that would result under the No Project Alternative, biotic impacts would be greater than with the proposed project with regards to overall habitat loss, including greater disturbances to grassland, oak woodland and Monterey pine forest habitats, with increased associated tree removal.

As a project is already approved for the site, the only mitigation that would be required is a mitigation monitoring program for Hickman's onion. Under this program, specific mitigation measures would be required to reduce impacts and allow long-term maintenance of the habitat with an assessment to determine compliance. Conditions of Approval also specify that 4 lots of the original Monterra Ranch Subdivision may potentially be relocated if mitigation is not demonstrated to be successful at the end of the second phase of development.

As an approved subdivision, the No Project Alternative would result in impacts to breeding and upland habitat of the California tiger salamander. As this not a state or federally listed endangered species, development could proceed under this alternative without further surveys or mitigation. The concentration and intensity of development would be greater than under the proposed project, and thus the No Project Alternative would result in greater impacts to the habitat of this species.

<u>Aesthetics</u>. The No Project alternative would result in development of up to approximately 10 lots on the ridgeline with resulting visibility from limited areas of Highway 68. This

would result in greater visual impacts than under the proposed project in which development on 4 lots would be potentially visible from Highway 68. The EIR for the approved subdivision suggests sensitive siting, design and color use to minimize impacts, but there are no specific required Conditions of Approval with regards to structural siting and design in this area.

Traffic. The currently approved Monterra Ranch Subdivision includes 283 market-rate lots and 42 inclusionary lots, of which 139 lots are located on the project site. Trip generation, using Institute of Traffic Engineers Trip Generation Manual, yields a rate of 0.75 trips per unit in the AM peak period and 0.98 trips per unit in the PM peak period. Under this alternative, traffic that would be generated includes 104 AM and 136 PM peak hour with development of 139 lots and 84 AM and 111 PM peak hour trips with development of 112 lots. Either scenario results in a higher level of traffic generation than would occur with the proposed project (57 AM and 75 PM peak hour trips).

Table 21 compares AM and PM peak hour traffic with development of 112 lots under this alternative and with the proposed project. The results indicate comparable levels of service as with the proposed project. However, level of service at the Highway 68/Highway 218 intersection would worsen due to this being a primary access under the No Project alternative.

Public Services. The No Project Alternative would increase police and fire protection service demands over what would occur with the proposed project due to increased residential units and population under this alternative.

Alternative 2: Modified Site Plan

Description. Under this alternative, the proposed site plan would be modified with regards to siting of building envelopes, access and water service. It is assumed that physical distribution of building envelopes would be somewhat reduced in size and clustered in specific areas. For this alternative, a greater concentration of clustered units could be sited in the areas of Via Cinquenta (where the existing 19 lots are located) and in the area of Malpaso Place and Via Malpaso Way.

Access would be provided only from Olmsted Road. The adjacent Cañada de la Segunda Road would be available only for emergency fire protection purposes. Water supply would be provided from onsite wells rather than the adjacent Cañada Woods Water Company, although wastewater treatment would continue to be provided at the adjacent Cañada Woods treatment plant in order to provided reclaimed water for golf course irrigation.

Environmental Impacts. Under this alternative, the intensity of development would not change from the proposed project, although some site layouts would be modified to provide more clustered homesites. Potential exposure to geotechnical constraints could be slightly lessened with this alternative with clustering of homesites, as clustering would allow greater opportunities for avoidance of geotechnical hazard areas. Site-specific geotechnical testing would still be required to determine foundation design.

TABLE 21
PEAK HOUR INTERSECTION LEVELS OF SERVICE WITH NO PROJECT

Intersection	Existing		Existing + Original Monterra		Existing + Project	
	AM	PM	AM	PM	AM	PM
Highway 68/Olmsted Road	C/16	D/27	C/17	D/31	C/16	D/28
Highway 68/Highway 218	B/14	B/13	B/13	D/29	B/14	B/13
Highway 68/York Road	C/19	B/9	D/31	C/22	C/19	B/9
Highway 1/Carmel Valley Road	B/9	E/42	B/7[1]	D/39[1]	B/7[1]	D/36[1]
Carmel Valley Road/Carmel Rancho Blvd	B/11	D/27	B/11[2]	B/15[2]	B/11[2]	B/15[2]

LOS/Average delay in second
[1] Assumes double southbound left-turn on Highway 1
[2] Assumes second eastbound through lane

SOURCE: Barton-Aschman Associates, Inc. July 25, 1996

Clustering would help provide further habitat protection by concentrating development in designated areas, thus providing greater distance of open space and potentially lessening biotic impacts. For example, with clustering, building envelopes on lots 6, 7, 8, 14, 15 could be shifted to provide a greater buffer to the known California tiger salamander habitat, although the recommended 1/4 mile setback would not be fully achieved. This reconfiguration and clustering could reduce potential tree removal on some of these lots. Depending on the location and siting, this alternative may reduce in potential oak and/or Monterey pine tree removal in other areas. Depending upon building site locations, this alternative would also reduce impacts related to loss of coastal prairie grassland habitat. Further studies would continue to be needed, to determine the amount and extent of special status plant and wildlife habitat.

Other impacts related to erosion, runoff, water quality and wastewater generation would remain comparable to the proposed project. This alternative would result in the same level of development as the proposed project, with somewhat less grading of driveways because of common driveways serving clustered areas. Thus, erosion impacts would be similar to the proposed project, requiring implementation of erosion control measures. There would be no change in the level of impacts related to water quality associated with urban runoff, golf course runoff or nitrate loading to groundwater. Wastewater treatment service would continue to be provided by the Cañada Woods treatment plant as with the proposed project, with use of reclaimed water for golf course irrigation.

Under this alternative, potable water would be provided by onsite wells, rather than by connecting to the Cañada Woods Water Company which draws its supply from the Carmel River aquifer. The Water Company could continue to pump its permitted and allocated 147 AFY for the adjacent approved Cañada Woods project and agricultural irrigation.

Potable water for the Cañada Woods North project would be provided by onsite wells, as would supplemental water for golf course irrigation, with a total demand of 70 AFY, as shown on Table 22. Onsite wells have a capacity to meet domestic demand under this alternative, and non-potable demand of 38 AFY at buildout without adverse impacts to groundwater supplies or recharge. However, prior to buildout of the site and adjacent properties, there may not be enough reclaimed wastewater to meet estimated golf course irrigation demand. Thus golf course irrigation would be supplemented with onsite wells for a total of up to 150 AFY. As previously indicated, subsequent to the approval process for Monterra Subdivision, the Monterra developers requested an amendment to the conditions of approval to allow a Cal-Am hook-up for emergency purposes. Presumably this would also be allowed under this alternative, which has been cited as a concern due to the serious water supply issues within the Cal-Am system.

There has been concern about the water quality of onsite wells to provide domestic water supply. The use of onsite water would require treatment due to high levels of iron, manganese and total dissolved solids (TDS) or salts. The use of reclaimed wastewater would result in lower nitrate loading than with the use of individual septic systems as would be used in the No Project Alternative (see Table 22). Given this consideration and the level of planned treatment, there would not be any adverse effects to groundwater that would be used for domestic supplies.

Traffic and aesthetic impacts would be slightly altered with use of only Olmsted Road. Traffic would slightly increase at Highway 68/Olmsted Road, but this would not be considered significant as only 10% of the project traffic was distributed to Carmel Valley Road via the secondary access. The slightly reduced traffic at the Highway 1/Carmel Valley Road intersection with redistribution of the approved Cañada Woods project would not occur under this alternative.

Depending on the area of clustering, visual impacts along the ridgeline could increase. However, it would be expected that any clustering would be sited to avoid potentially visible areas.

TABLE 22 COMPARISON OF KEY IMPACTS				
Issue	**Proposed Project**	**No Project**	**Modified Site Plan**	**Residential Uses Only**
Domestic Water Demand	33 AFY	56-70 AFY	33 AFY	30 AFY
Non-Potable Water Demand	150 AFY	0	150 AFY	0
Wastewater Generation	18,300 gpd	28,000 gpd	18,300 gpd	13,900 gpd
Nitrate Loading	3,321 grams/day	4,239 grams/day	3,321 grams/day	2,888 grams/day
PM Peak Trips	75	111	75	61

Alternative 3: Residential Uses Only

Description. Under this alternative, the project would be modified to include only residential lots with the accessory recreational and equestrian areas. The golf course and Clubhouse would be eliminated from this alternative. This alternative assumes development of approximately 44 residential lots of approximately the same size as those proposed, which would be sited in the general golf course area. The equestrian and other onsite recreational facilities also would be retained. Access, water service and wastewater treatment would be the same as with the proposed project. This alternative would not meet the project objectives of development of a golf course.

Environmental Impacts. Under this alternative, elimination of the golf course would significantly reduce grading and land disturbances which would be partially offset with grading associated with additional homesite and driveway development. This would result in reduced impacts related to erosion, water quality and disruption of habitat areas. Water quality impacts related to golf course runoff would be eliminated, although these potentially significant project impacts would be reduced to a less-than-significant level with implementation of recommended mitigation measures.

Potable water demand would increase slightly with addition of 10 homesites, but overall would be less than the proposed project with elimination of the Clubhouse and golf course guest suites. Non-potable demand from onsite wells would be eliminated.

As currently proposed, the Cañada Woods North project, the adjacent approved Cañada Woods project and the remaining approved Monterra project would be served by the planned wastewater treatment facility. Based on estimated wastewater generation as described in this EIR, approximately 102 AFY of reclaimed wastewater would be generated. However, the elimination of the golf course would result in elimination of a disposal area for the reclaimed wastewater. It is assumed that the reclaimed wastewater would be used for agricultural irrigation of the adjacent agricultural fields as part of the Cañada Woods project under this alternative.

Traffic would be reduced be reduced with this alternative. PM peak hour traffic would be reduced from 75 to 61 trips. Traffic distribution patterns would remain the same under this alternative as compared to the No Project Alternative.

Exposure to seismic and geologic hazard areas would continue to be an issue with siting of building envelopes and site specific soils analyses. Siting of proposed building envelopes remains unchanged in this alternative, although 10 new lots would be added, but not within identified geological hazard zones. Visual impacts also remain the same as with the proposed project, although the addition of lots would create internal visual considerations.

Environmentally Superior Alternative

CEQA requires that an environmentally superior alternative be selected among the alternatives analyzed. In general, the environmentally superior alternative as defined by CEQA is supposed to minimize adverse impacts to the project site and its surrounding environment. In accordance with the CEQA Guidelines, if the environmentally superior alternative is the "No Project" alternative, the EIR shall also identify an environmentally superior alternative among the other alternatives.

In comparing the No Project Alternative against the proposed project, it is clear that the No Project development under the approved Monterra Subdivision plan would have greater impacts in the areas of traffic, water use, nitrate loading, habitat loss (particularly the habitat of the California tiger salamander and loss of Monterey pines), grading, erosion, and viewshed.

Modified Site Plan Alternative reduces impacts associated with biological habitat, but does not result in significant reduction of impacts over the proposed project. Although project traffic increases at the Highway 68/Olmsted Road intersection under this alternative, it does not result in a significant project traffic impact. The Modified Site Plan Alternative also assumes a potential for Cal-Am hook-up for emergency conditions, an issue that has been cited as a concern due to this system's water supply deficiencies. The Residential Only Alternative has less overall water demand, nitrate loading, grading and traffic generation, but does not meet the project objectives. The proposed project, as evaluated in this EIR, can reduce impacts to a less-than-significant level. However, of the alternatives considered, the Modified Site Plan Alternative is considered the environmentally superior alternative.

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APPENDIX A
Notice of Preparation and Initial Study

MONTEREY COUNTY

PLANNING AND BUILDING INSPECTION DEPARTMENT
P.O. BOX 1208 SALINAS, CALIFORNIA 93902 (408) 755-5025

ROBERT SLIMMON, JR.
DIRECTOR OF PLANNING AND BUILDING INSPECTION

NOTICE OF PREPARATION OF AN ENVIRONMENTAL IMPACT REPORT
Cañada Woods North Project

TO: Interested Agencies and Persons

The County of Monterey, as the lead agency, is preparing an Environmental Impact Report on the project described herein. Please respond with written comments regarding the scope and content of the EIR as it may relate to your agency's area of statutory responsibility or your areas of concern or expertise. Your agency will need to use the EIR prepared by our agency when considering your permit or other approvals for the project, if any is required. *Responses are due within 30 days of the receipt of this Notice, as provided by State law.* The contact person's name and address are listed below. Please include the name and phone number of a contact person at your agency in your response.

Project Location. The project site consists of an approximately 1,060 acre portion of the Monterra Ranch Subdivision which is located east of the City of Monterey and south of Highway 68. The site is located north of and adjacent to the approved Cañada Woods subdivision located north of Carmel Valley Road.

Project History and Description. The proposed Cañada Woods North Project application includes a combined development permit for a vesting tentative map to create 34 residential lots; 10 parcels for recreational and open space uses; a use permit to allow a golf course and accessory uses including a clubhouse and 12 member suites; a use permit for equestrian and recreational uses; 5 employee housing units; and a use permit for a waiver for development on slopes exceeding 30%. See attached Initial Study for details.

EIR Scope of Work. The Monterra Ranch EIR was certified by the Monterey County Board of Supervisors in October 1987. The proposed project reduces the number of approved residential lots, but will result in a reconfiguration of lot patterns with the addition of a golf course and other limited recreational components. The County has determined that preparation of an EIR is required. The EIR will update and/or revise the analysis which was prepared in the Monterra Ranch EIR based on the newly proposed site plan. Issues are identified in the attached Initial Study.

Contact Person at Monterey County. All responses and any questions regarding the Notice of Preparation should be directed to: Brian Foucht, (408) 755-5025 at:

Monterey County Planning Department
P.O. Box 1208
Salinas, CA 93902

MONTEREY COUNTY

PLANNING AND BUILDING INSPECTION DEPARTMENT

P.O. BOX 1208, SALINAS, CALIFORNIA 93902 [illegible]

ROBERT SLIMMON, JR.

DIRECTOR OF PLANNING AND BUILDING INSPECTION

NOTICE OF PREPARATION OF AN ENVIRONMENTAL IMPACT REPORT

Cañada Woods North Project

TO: Interested Agencies and Persons

The County of Monterey, as the lead agency, is preparing an Environmental Impact Report on the project described herein. Please respond with written comments regarding the scope and content of the EIR as it may relate to your agency's area of statutory responsibility or your areas of concern or expertise. Your agency will need to use the EIR prepared by our agency when considering your permit or other approvals for the project, if any is required. Responses are due [illegible] of the Notice, or [illegible]. The contact person's name and address are listed below. Please include the name and phone number of a contact person at your agency in your response.

Project Location. The project site consists of an approximately 1,000-acre portion of the Monterra Ranch subdivision, which is located east of the City of Monterey and south of Highway 68. The site is located north [illegible] adjacent to the approved Cañada Woods subdivision located north of Carmel Valley Road.

Project History and Description. The proposed Cañada Woods North Project application includes [illegible] to create 34 residential lots, 18 parcels for recreational and open space uses, [illegible] golf course and accessory uses including a clubhouse and [illegible] employee housing units, and a use permit for development on slopes exceeding 30%. See attached Initial Study for details.

EIR Scope of Work. The Monterra Ranch EIR was certified by the Monterey County Board of Supervisors in [illegible]. The proposed project reduces the number of approved residential lots and will result in [illegible] with the addition of a golf course and [illegible]. [illegible] of an EIR is required. The EIR will [illegible] Monterra Ranch EIR [illegible] the attached Initial Study.

Contact Person at Monterey County. All [illegible] regarding the Notice of Preparation should be [illegible] (408) [illegible] at:

Monterey County Planning Department
P.O. Box 1208
Salinas, CA 93902

COUNTY OF MONTEREY
Environmental Checklist and Initial Study

I. BACKGROUND

PROJECT TITLE: Cañada Woods North

LEAD AGENCY NAME AND ADDRESS:
County of Monterey Planning and Building Department
P.O. Box 1208
Salinas, CA 93902

CONTACT PERSON & PHONE NUMBER: Brian Foucht, (408) 755-5025

PROJECT APPLICANT NAME AND ADDRESS:
Clinton Eastwood and Margaret Eastwood
c/o Carmel Development Company
P.O. Box 450
Carmel, CA 93921

PROJECT LOCATION: The site (portion of Assessor's Parcel Number 259-091-014 and 259-111-001 through 259-111-019) is located in the unincorporated area of Monterey County east of the City of Monterey. The project site consists of an approximately 1,060 acre portion of the Monterra Ranch Subdivision which is located south of Highway 68 between Highway 218 and York Road. The site is located north of and adjacent to the approved Cañada Woods and Cañada Woods East subdivisions, which is located north of Carmel Valley Road. The project site consists of that portion of the approved Monterra Ranch Subdivision which lies within the Carmel Valley watershed. Project location is shown on Figure 1.

GENERAL PLAN DESIGNATION: Residential, Rural Density, 10-acre minimum

ZONE DISTRICT: RDR/10-UR-VS

PROJECT HISTORY: The proposed project site is located within the approved Monterra Ranch subdivision. The project also is located north of the approved Cañada Woods and Cañada Woods East subdivisions. An overview of these projects is provided below.

Monterra Ranch. A tentative subdivision map for Monterra Ranch was approved by the Monterey County Board of Supervisors in October 1987. The approval included subdivision of approximately 2,911 acres into 283 lots ranging in size from 2 to 60 acres to be developed in three phases; a 47-acre parcel for development of a 42-unit inclusionary housing planned unit development; recreational and equestrian uses; and dedication of 115 acres of land contiguous to Jack's Peak County Park. A final map has been recorded for 83 lots in Phase 1. In 1992, the Board approved relocation of the inclusionary units to the western portion of the site and creation of three new lots in exchange for deletion of three market rate lots. The existing approved lots on Monterra Ranch are shown on Figure 2.

A lot line adjustment application is pending which would adjust the boundaries between approved Lot 2, Lot 74, and the remainder lot on Monterra in order to create the proposed project site as shown on Figure 3, and complete the applicant's purchase of the property. The project site will consist of 19 legal lots of record from the Monterra Ranch Phase I final maps (Lots 68 through 86), and a 1,000±-acre portion of the remainder parcel.

Cañada Woods. A tentative subdivision map for the Cañada Woods project was approved by the Monterey County Board of Supervisors in August 1995. (This includes the original Cañada Woods application in combination with 10 lots on the Cañada Woods East site.) The approval includes 54 residential lots north of Carmel Valley Road which range in size from 3 to 26 acres; 4 commercial lots, totaling 10 acres, south of Carmel Valley Road; 15 employee housing units; and approximately 40 acres of agricultural preserve and drainage easements.

The Cañada Woods project also included formation of the Cañada Woods County Service Area for provision of drainage and wastewater services, including maintenance and operation of an onsite tertiary wastewater treatment plant. The project will be provided water service via creation of mutual water company or public utility, in accordance with amended County conditions of approval and state requirements.

PROJECT DESCRIPTION: The proposed Cañada Woods North Project application includes a combined development permit for a vesting tentative map to create 34 residential lots; 10 parcels for recreational and open space uses; a use permit to allow a golf course and accessory uses including a clubhouse and 12 member suites; a use permit for equestrian and recreational uses; 5 employee housing units; a use permit for a waiver for development on slopes exceeding 30%; and a use permit for water system. Project elements are described below. The project also includes annexation to the Salinas Rural Fire Protection District and inclusion in two proposed community service areas as described below.

Residential Development. The proposed subdivision and site plan are shown on Figure 4. The tentative map is designed with the 34 lots surrounding a private 18-hole golf course. The residential lots are located within areas previously approved for development as part of the Monterra Ranch subdivision approval, except for 4 lots (Lots 9, 13, 20, 24) which will located in areas not previously proposed for development. Proposed lot sizes range between approximately 3 and 30 acres with a development envelope designated on each lot. The 5 proposed employee housing units are located adjacent to the golf course and equestrian center as shown on Figure 4.

Golf Course, Equestrian Center, and Open Space Uses. The remainder of the site (87% of the site) is proposed for open space and private recreational uses, including a golf course with Clubhouse and guest suites and an equestrian and recreational facilities as described below. A hiking trail was previously approved as part of the Monterra Subdivision. The Cañada Woods North project proposes to realign and construct the trail from the western portion of the site adjacent to Jack's Peak Park to Highway 68 at York Road as shown on Figure 4.

The proposed 18-hole golf course is located on approximately 182 acres in the central portion of the site in an area previously approved for residential lots. The facility is proposed as a private club with a maximum of 300 members including a driving range and clubhouse on the north side of course and 12 member suites located adjacent to the driving range, 18th fairway, and 9th green.

The equestrian center consists of a 12 stall barn and approximately 68 acres of pasture located on the southeast portion of the site as shown on Figure 4. The recreational facilities, as shown on Figure 4, consists of tennis, weights, aerobics and swimming. The equestrian and recreational facilities are for the exclusive use of the Cañada Woods North and Cañada Woods residents and golf course members.

Access and Improvements. Access to the site will be provided primarily from Olmstead Road off of Highway 68. Secondary access may be provided via Cañada de la Segunda Road off Carmel Valley Road on the south. Domestic water service will be supplied by the proposed Cañada Woods Water Company that is being developed to serve the Cañada Woods project; expansion of its service area is proposed for to include Cañada Woods North.

Wastewater will be collected and treated at the approved Cañada Woods tertiary treatment plant. The planned treatment plant and holding pond/tank capacities will require expansion to serve the proposed project. The project also proposes extension of sewer service to al of the Monterra Ranch property, thereby eliminating the need for septic systems. The treated wastewater will be used for irrigation of the proposed golf course. Additional water which may be required for golf course irrigation will be provided by adjacent groundwater wells within the Cañada Woods Subdivision, drawing water from outside the Carmel Valley alluvium.

Expansion of the Cañada Woods County Service Area (CWCSA) to include the proposed Cañada Woods North site, as well as the entire Monterra Ranch, is planned in order to provided for maintenance and operation of the sewage treatment facilities. The CSA developed for drainage facilities will be expanded to include the proposed Cañada Woods North site.

ENVIRONMENTAL REVIEW: The Monterra Ranch EIR was certified by the Monterey County Board of Supervisors in October 1987. The proposed project reduces the number of approved residential lots, but will result in a reconfiguration of lot patterns with the addition of a golf course and other limited recreational components. The County has determined that preparation of an EIR is required to update and/or revise the analyses prepared in the Monterra Ranch EIR based on the newly proposed site plan.

AGENCY APPROVALS:

- Monterey County: Approval of Preliminary Project Review Map, Amended Vested Tentative Map, Use Permit, Sewage Disposal Approval
- LAFCO: Approval of Annexation to Salinas Rural Fire District and approval of Wastewater and Drainage
- Monterey Peninsula Water Management District: Approval of expansion of Cañada Woods Water Company service area
- Regional Water Quality Control Board: Approval of Wastewater Discharge Permit
- California Public Utilities Commission: Approval of expansion of Cañada Woods Water Company service area

II. ENVIRONMENTAL SETTING

The project site is located in the northernmost mountains of the Santa Lucia Range which extends approximately 140 miles south from Monterey Bay. The site consists primarily of open, gently rolling grasslands with occasional wooded areas consisting of primarily oak and Monterey pine trees. The Monterra Ranch property, including the Cañada Woods North site, has historically been used for grazing. Several existing dirt roads traverse the site, including a dirt road provides that provides access to the site from Highway 68 and the undeveloped Cañada de la Segunda Road which provides access from Carmel Valley Road.

III. ENVIRONMENTAL CHECKLIST RESPONSES

The attached Environmental Checklist identifies potentially significant impacts. A brief explanation is required for all answers except "No Impact" answers that are adequately supported by the information sources cited in the parentheses following each question on the Checklist. The Sources are identified in Section V. -- Source List. According to CEQA Guidelines, a "No Impact" answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g., the project falls outside a fault rupture zone) or supporting documentation is provided. Narrative explanations are provided in Section VI. which follows the checklist.

EVALUATION OF ENVIRONMENTAL IMPACTS

Issues (and Supporting Information Sources):	Potentially Significant Impact	Potentially Significant Unless Mitigated	Less than Significant Impact	No Impact
1. LAND USE and PLANNING. *Would the proposal:*				
a. Conflict with general plan designation or zoning? (Source #(s): (V.1)	☐	☐	☐	☒
b. Conflict with applicable environmental plans or policies adopted by agencies with jurisdiction over the project?	☐	☐	☐	☒
c. Affect agricultural resources or operations (e.g. impacts to soils or farmlands, or impacts from incompatible land uses)? (V.1.)	☐	☐	☐	☒
d. Disrupt or divide the physical arrangement of an established community (including a low-income or minority community)? (V.1)	☐	☐	☐	☒
2. POPULATION and HOUSING. *Would the proposal:*				
a. Cumulatively exceed official regional or local population projections? (V.1)	☐	☐	☐	☒
b. Induce substantial growth in an area either directly or indirectly (e.g. through projects in an undeveloped area or extension of major infrastructure)? (V.1)	☐	☐	☐	☒
c. Displace existing housing, especially affordable housing? (V.1)	☐	☐	☐	☒
3. GEOPHYSICAL. *Would the proposal result in or expose people to potential impacts involving:*				
a. Seismicity: fault rupture? (V.2)	☒	☐	☐	☐
b. Seismicity: ground shaking or liquefaction? (V.2)	☐	☒	☐	☐
c. Seismicity: seiche or tsunami? (V.1)	☐	☐	☐	☒
d. Landslides or mudslides? (V.2)	☒	☐	☐	☐
e. Erosion, changes in topography or unstable soil conditions from excavation, grading or fill? (V.2)	☒	☐	☐	☐
f. Subsidence of the land? (V.1)	☐	☐	☐	☒
g. Expansive soils? (V.2)	☐	☐	☐	☒
h. Unique geologic or physical features?	☐	☐	☐	☒
4. WATER. *Would the proposal result in:*				
a. Changes in absorption rates, drainage patterns, or the rate and amount of surface runoff?	☒	☐	☐	☐
b. Exposure of people or property to water-related hazards such as flooding? (V.1, V.2)	☐	☐	☐	☒
c. Discharge into surface waters or other alteration of surface water quality (e.g. temperature, dissolved oxygen or turbidity)?	☐	☒	☐	☐

		Potentially Significant Impact	Potentially Significant Unless Mitigated	Less than Significant Impact	No Impact
d.	Changes in the amount of surface water in any water body? (V.1)	☐	☐	☐	☒
e.	Changes in currents, or the course or direction of water movements? (V.1)	☐	☐	☐	☒
f.	Change in the quantity of ground waters, either through direct additions or withdrawals, or through interception of an aquifer by cuts or excavations? (V.1)	☒	☐	☐	☐
g.	Altered direction or rate of flow of groundwater? (V.1)	☒	☐	☐	☐
h.	Impacts to groundwater quality? (V.1)	☒	☐	☐	☐
5.	**AIR QUALITY.** *Would the proposal:*				
a.	Violate any air quality standard or contribute to an existing or projected air quality violation?	☒	☐	☐	☐
b.	Expose sensitive receptors to pollutants? (V.1)	☐	☐	☐	☒
c.	Alter air movement, moisture, or temperature, or cause any change in climate? (V.1)	☐	☒	☐	[2]
d.	Create objectionable odors? (V.1)	☐	☐	☐	☒
6.	**TRANSPORTATION/CIRCULATION.** *Would the proposal result in:*				
a.	Increased vehicle trips or traffic congestion? ( )	☒	☐	☐	☐
b.	Hazards to safety from design features (e.g. sharp curves or dangerous intersections) or incompatible uses (e.g. farm equipment)? ( )	☐	☐	☐	☒
c.	Inadequate emergency access or access to nearby uses?	☐	☒	☐	☐
d.	Insufficient parking capacity on-site or off-site? ( )	☐	☐	☐	☒
e.	Hazards or barriers for pedestrians or bicyclists?	☐	☐	☐	☒
f.	Conflicts with adopted policies supporting alternative transportation (e.g. bus turnouts, bicycle racks)? (V.1)	☐	☐	☐	☒
g.	Rail, waterborne or air traffic impacts?	☐	☐	☐	☒
7.	**BIOLOGICAL RESOURCES.** *Would the proposal result in impacts to:*				
a.	Endangered, threatened or rare species or their habitats (including but not limited to plants, fish, insects, animals, and birds)? (V.1)	☒	☐	☐	☐
b.	Locally designated species (e.g. heritage trees)? (V.1)	☒	☐	☐	☐

	Potentially Significant Impact	Potentially Significant Unless Mitigated	Less than Significant Impact	No Impact
c. Locally designated natural communities (e.g. oak forest, coastal habitat, etc.)? (V.1)	☒	☐	☐	☐
d. Wetland habitat (e.g. marsh, riparian and vernal pool)? (V.2)	☒	☐	☐	☐
e. Wildlife dispersal or migration corridors? (V.1. V.2)	☒	☐	☐	☐
8. ENERGY and MINERAL RESOURCES. *Would the proposal:*				
a. Conflict with adopted energy conservation plans? (V.1)	☐	☐	☐	☒
b. Use non-renewable resources in a wasteful and inefficient manner? (V.1)	☐	☐	☐	☒
9. HAZARDS. *Would the proposal involve:*				
a. A risk of accidental explosion or release of hazardous substances (including, but not limited to: oil, pesticides, chemicals or radiation)?	☐	☐	☐	☒
b. Possible interference with an emergency response plan or emergency evacuation plan? (V.1)	☐	☐	☐	☒
c. The creation of any health hazard or potential health hazard?	☐	☐	☐	☒
d. Exposure of people to existing sources of potential health hazards?	☐	☐	☐	☒
e. Increased fire hazard in areas with flammable brush, grass, or trees? (V.1)	☒	☐	☐	☐
10. NOISE. *Would the proposal result in:*				
a. Increases in existing noise levels?	☐	☐	☐	☒
b. Exposure of people to severe noise levels? (V.1)	☐	☒	☐	☐
11. PUBLIC SERVICES. *Would the proposal have an effect upon, or result in a need for new or altered government services in any of the following area:*				
a. Fire protection? (V.1, V.2)	☒	☐	☐	☐
b. Police protection? (V.1, V.2)	☒	☐	☐	☐
c. Schools? (V.1)	☒	☐	☐	☐
d. Maintenance of public facilities, including roads? (V.1, V.2)	☐	☐	☒	☐
e. Other governmental services? (V.2)	☐	☐	☒	☐

12. UTILITIES and SERVICE SYSTEMS. *Would the proposal result in a need for new systems, or substantial alterations to the following utilities:*

	Potentially Significant Impact	Potentially Significant Unless Mitigated	Less than Significant Impact	No Impact
a. Power or natural gas? (V.1)	☐	☐	☒	☐
b. Communications systems (V.1)	☐	☐	☒	☐
c. Local or regional water treatment or distribution facilities? (V.1)	☒	☐	☐	☐
d. Sewer or septic tanks? (V.1)	☒	☐	☐	☐
e. Storm water drainage? (V.1)	☒	☐	☐	☐
f. Solid waste disposal? (V.1)	☐	☐	☒	☐

13. AESTHETICS. *Would the proposal:*

	Potentially Significant Impact	Potentially Significant Unless Mitigated	Less than Significant Impact	No Impact
a. Affect a scenic vista or scenic highway?	☒	☐	☐	☐
b. Have a demonstrable negative aesthetic effect?	☒	☐	☐	☐
c. Create light or glare? (V.1)	☒	☐	☐	☐

14. CULTURAL RESOURCES. *Would the proposal:*

	Potentially Significant Impact	Potentially Significant Unless Mitigated	Less than Significant Impact	No Impact
a. Disturb paleontological resources? (V.2)	☐	☐	☐	☒
b. Disturb archaeological resources?	☐	☐	☐	☒
c. Affect historical resources? (V.2)	☐	☐	☐	☒
d. Have the potential to cause a physical change which would affect unique ethnic cultural values? (V.1)	☐	☐	☐	☒
e. Restrict existing religious or sacred uses within the potential impact area? (V.1)	☐	☐	☐	☒

15. RECREATION. *Would the proposal:*

	Potentially Significant Impact	Potentially Significant Unless Mitigated	Less than Significant Impact	No Impact
a. Increase the demand for neighborhood or regional parks or other recreational facilities? (V.1)	☐	☐	☒	☐
b. Affect existing recreational opportunities? (V.1)	☐	☐	☒	☐

	Potentially Significant Impact	Potentially Significant Unless Mitigated	Less than Significant Impact	No Impact
16. MANDATORY FINDINGS OF SIGNIFICANCE.				
a. Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☒	☐	☐	☐
b. Does the project have the potential to achieve short-term, to the disadvantage of long-term, environmental goals?	☐	☐	☐	☒
c. Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probably future projects.)	☒	☐	☐	☐
d. Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☒	☐	☐	☐

IV. DETERMINATION

On the basis of this Initial Study:

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☐ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because mitigation measures described on the attached sheet have been added to the project. A NEGATIVE DECLARATION will be prepared.

☒ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required. Issues to be Addressed Include:

- Geology and Soils
- Water Supply / Groundwater Quality
- Traffic / Circulation
- Noise
- Public Services
- Drainage and Water Quality
- Air Quality
- Biological Resources
- Aesthetics
- Land Use

☐ I find that the proposed project MAY have a significant effect(s) on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets, if the effect is a "potentially significant impact" or "potentially significant unless mitigated." An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, there WILL NOT be a significant effect in this case because all potentially significant effects (a) have been analyzed adequately in an earlier EIR pursuant to applicable standards and (b) have been avoided or mitigated pursuant to that earlier EIR, including revisions or mitigation measures that are imposed upon the proposed project.

Brian Foucht Jr.	June 25, 1996
Signature	Date
Brian Foucht	Senior Planner
Printed Name	Title

V. SOURCE LIST

1. Monterey County. Adopted December 17, 1984, Amended March 30, 1993. *Greater Monterey Peninsula Area Plan.*

2. LLS Planning Associates. February 1996. *Final Environmental Impact Report for the Monterra Ranch Subdivision.*

3. Denise Duffy & Associates. February 18, 1993. *Final Environmental Impact Report for the Cañada Woods Subdivision Preliminary Project Review Map.*

Initial Study Preparation: Denise Duffy and Associates, Stephanie Strelow

VI. EXPLANATION OF ENVIRONMENTAL CHECKLIST RESPONSES

1. <u>Land Use and Planning</u>.

Land Use Plans. The proposed residential lots range in size from approximately 3 to 30 acres with designated building envelopes. The proposed density is consistent with land use designations in the *Greater Monterey Peninsula Area Plan*. The EIR will further review project consistency with County and regional land use plans and policies, including, but not limited to the County's *Greater Monterey Peninsula Area Plan*, the City of Monterey's *Highway 68 Area Plan*, and the Monterey Peninsula Airport's *Land Use Compatibility Study*.

Agricultural Resources. Although the site has been used for grazing in the past, it is not designated for agricultural use. Agricultural resources would not be directly or indirectly affected by the proposal.

Land Use Compatibility. The proposed tentative map will result in a resubdivision of 19 legal lots of record (Lots 68 through 89 of Monterra Ranch Phase I) and reconfiguration of 15 approved lots. The project will result in the following changes in the approved Monterra subdivision: a net reduction of 79 lots; relocation and redesign of subdivision layout; and addition of private golf course, equestrian facility, and tennis courts. The proposed project represents a reduction in the total number of approved lots for this portion of the Monterra Ranch. The proposed layout is compatible with the remaining approved Monterra subdivision to the north and west, and the approved Cañada Woods subdivision to the south.

2. <u>Population and Housing</u>. Buildout of the proposed project will result in a reduction in population than would have occurred with the development of the approved Monterra subdivision. The proposal is consistent with County General Plan designations and densities, and would not exceed regional population forecasts. Adjacent sites have been approved for residential development, and the project would not result in growth inducement pressures upon adjacent sites. There are no existing residential or other uses on the site that would be displaced.

3. Geology and Soils.

Seismicity and Landslides. The site is located in a seismically active region and in a moderate to high seismic hazard area as mapped in the County General Plan. The 1987 Monterra EIR indicates that the Navy and Berwick Canyon faults or traces traverse portions of the entire Monterra site, and additional field work, including trenching, was recommended to ascertain fault location and potential seismic activity. The 1987 Monterra EIR also identified areas of landslides throughout the Monterra site. A geotechnical report has been prepared for the applicant, analyzing seismic hazards (including trenching to determine fault location/activity), landslide hazards, and slope stability will be reviewed with other existing data, and supplemented, if necessary, to evaluate potential fault rupture, seismic and landslide hazards to the proposed reconfigured lots, and slope stability issues.

Soils and Erosion. The 1987 Monterra EIR identified erosion impacts due to the high erodibility of onsite soils. Analysis of erosion impacts based on the current proposal and associated grading will be provided.

4. Water.

Drainage and Water Quality. The project site is part of the Cañada de la Segunda drainage basin. The 1987 Monterra EIR identified significant impacts related to drainage system capacities and erosion. The proposed project will result in a reduction of lots and impervious surfacing from the previously approved Monterra project. The EIR will update and supplement the 1987 EIR with regards to proposed project drainage and water quality impacts.

Runoff and water quality issues associated with design, construction, and operation of the proposed golf course will be evaluated. Technical reports prepared for the applicant will be reviewed and supplemented in the EIR, if necessary, to evaluate water quality impacts related to golf course irrigation. Issues to be addressed include: peak runoff; annual runoff and recharge (using a water balance analysis); construction-related and long-term erosion potential; and stormwater runoff quality and quality from roads, parking, and maintenance areas. Water quality impacts associated with the use of fertilizers, insecticides and herbicides on the golf course will be addressed, including a water-chemical mass balance analysis of nitrate loading from fertilizers and reclaimed wastewater application on the golf course.

Water Supply and Groundwater Quality. Domestic water supply for the project is proposed to be provided by the proposed Cañada Woods Water Company rather than using onsite wells as previously proposed for the Monterra subdivision. This will result in the elimination of domestic supply water impacts identified in the 1987 Monterra EIR. The Cañada Woods Water Company is a proposed privately owned public water utility that derives its water from the Carmel River underflow under the authority of Permit Nos. 20831 and 20832 issued by the State Water Resources Control Board and a Water Distribution System Permit issued by the Monterey Peninsula Water Management District (MPWMD). Water will be provided via two wells south of Carmel Valley Road with a water treatment plant, all of which are located on the Cañada Woods site. Non-alluvial groundwater from the project site and the adjacent Cañada Woods site will be used to supplement the use of reclaimed water for golf course irrigation.

The EIR will identify the proposed sources and method of water supply (for domestic, irrigation, and fire protection) with description of major facilities, e.g. wells, treatment systems, transmission lines, storage tanks/reservoirs, etc. The hydrologic relationship of the project site to the Carmel River and Carmel Valley aquifer will be evaluated. The EIR will document water supply availability and project demand. The water demand for the project will be estimated for domestic (potable) needs, irrigation demand, and fire flow requirements. A water balance analysis will be completed to estimate the effect of the project on local and regional water resources. Water quality information for the various water sources will be presented and evaluated with respect to compliance with domestic and irrigation water supply criteria, as applicable. The proposed treatment facilities will be described. Technical reports prepared for the applicant and previously prepared environmental documents regarding the water company will be reviewed, and supplemented in the EIR, if necessary, to evaluate water supply and quality impacts. The section will review compliance with applicable water allocation and water conservation policies.

Wastewater Treatment and Groundwater Quality. Wastewater from the project will be treated at the approved Cañada Woods tertiary wastewater treatment plant. The proposed project will eliminate groundwater impacts identified in the 1986 Monterra EIR with respect to nitrate loading from use of individual septic systems. The EIR will review plant capacities, expansion, treatment requirements, and disposal issues. Regulatory requirements of Monterey County and the Regional Water Quality Control Board will be discussed, including short-term emergency storage of sewage, long-term storage of treated wastewater, treatment standards for wastewater reclamation, disposal area requirements and restrictions, and operations, maintenance, and monitoring provisions based on review of technical reports prepared for the applicant.

The potential environmental impacts of the proposed wastewater disposal facilities will be reviewed. The key issues to be considered include public health, surface water and groundwater quality, nitrate loading, odors, visual appearance, construction erosion, and water conservation. Special attention will be given to nitrate loading effects on groundwater. This will include a chemical-water balance analysis for comparison with established criteria for the Carmel Valley watershed. The EIR will review reclaimed water supply availability, irrigation demand, and water quality issues related both to golf course use (vegetation) and groundwater issues. The evaluation will be based on review of technical reports prepared for the applicant, and supplemented, if needed in the EIR.

5. **Air Quality**. The project will result in a reduction of total approved lots, and thus, will result in a decreased population and emissions than identified in the 1987 EIR. Dust and exhaust emissions resulting from construction activities related to grading of roads, golf course and building sites may cause temporary air quality impacts unless mitigated. Project consistency with the Monterey Bay Unified Air Pollution Control District's *Air Quality Management Plan* will be updated.

6. **Transportation / Circulation.** Primary access to the site will be provided by Highway 68 with potential secondary access from Carmel Valley Road. The EIR will update the project trip generation rates included in 1987 Monterra EIR based on a reduction of residential lots and addition of a private golf course and accessory facilities. Project trip distribution will be identified based on review of technical reports prepared for the applicant. Existing traffic conditions and levels of service on Highway 68 an Carmel Valley Road and vicinity intersections will be identified based on existing data. Project impacts upon vicinity roads will be evaluated.

7. **Biological Resources.** The project site consists of gently sloping grasslands and steeper slopes vegetated with oak and pine trees. The 1987 Monterra EIR identified significant impacts related to special status species and general habitat loss. This will be updated to include identification of special status species listed since 1986 (including, but not limited to the federally listed Smith's Blue Butterfly), other potentially sensitive habitat (i.e. Monterey pine forest), and project impacts to plants or wildlife based on the proposed lot reconfiguration. Tree removal also will be evaluated based on review of a forestry management plan prepared as part of the application.

8. **Energy and Mineral Resources.** The proposed project will result in a net reduction in residential lots over the existing approved Monterra subdivision. Future home construction and accessory recreational structures will be constructed in conformance with energy conservation requirements of the Uniform Building Code. Given the southern exposure of the site, all proposed building lots could accommodate homesites that could be oriented to maximize use of passive solar energy opportunities.

9. **Hazards.** As a residential project within a rural residential area, the proposed project will not result in creation of risks associated with hazardous material use, exposure to health hazards, creation of a health hazard or interference with an emergency response plan. The site is located in a fire hazard area. The project site is located in areas of wildland fire hazards and could expose residents to fire hazards without proper management. Provision of fire protection services, and reduction of onsite wildland fire hazards will be reviewed.

10. **Noise.** As a residential project within a rural residential neighborhood, the proposed project will result in noise levels typical of large lot residential development and will not create significant noise increases to other adjacent approved residential developments. The 1986 Monterra EIR identified significant impacts related to exposure to noise from Highway 68 traffic and Monterey Peninsula Airport. The 1987 EIR identified Highway 68 noise exposure as occurring 1,200 feet south of the roadway. The proposed project is located approximately three-quarters of a mile from Highway 68 and would not be exposed to significant traffic noise levels.

    The site is located less than one mile from the Monterey Peninsula Airport. Although the site is not within the airport clear zones or direct flight pattern areas, some residential units are potentially subject to aircraft noise.

Buildout of the proposed project will occur over time as lots are sold. Construction activities will be conducted in accordance with County building permit requirements and noise ordinances. As there are no existing developments surrounding the site, construction noise is not expected to result in significant impacts to adjoining properties.

11-12. <u>Public Services and Utilities</u>. The proposed project will result in a net reduction in residential lots over the existing approved Monterra subdivision, and thus will result in a reduced demand for public services. However, the EIR will update the 1986 EIR regarding service capacities, capabilities, and project demands with regards to water supply and wastewater (as described above under 4--Water), fire protection services, police protection, and schools. Drainage will be addressed as described above under 4--Water. The site will be included within planned County Service Areas to fund maintenance and operation of drainage and wastewater treatment facilities. Existing power and communication systems will be extended onto the site in accordance with private utility requirements.

13. <u>Aesthetics</u>. The 1987 Monterra EIR identified potential visual impacts related to change in visual character and ridgetop development. The proposed project site appears to be outside major public view corridors of Highway 68 or Carmel Valley Road. The EIR will update the visual analysis based on the proposed site plan. Potential visibility from Highway 68 will be reviewed.

14. <u>Cultural Resources</u>. The 1987 EiR did not identify any archaeological resources within the project site. An updated investigation was provided by Archaeological Consulting which included a field reconnaissance of the project site. The site reconnaissance did not reveal any indications of archaeological resources within the project site. However, conditions of project approval should include the standard measure to halt work within 50 meters (150 feet) if archaeological resources or human remains are discovered during construction, until a qualified archaeologist can ascertain the significance of the find and recommend mitigation measures, if necessary.

15. <u>Recreation</u>. The reduction in residential lots will reduce recreational demands from the previously approved subdivision, and the low intensity nature of the proposal (34 lots) will not result in significant increased recreational demands in the vicinity. Furthermore, onsite recreational facilities are provided for project residents.

16. <u>Mandatory Findings of Significance</u>. The EIR will update analyses regarding cumulative impacts, growth inducement, and the issues identified in this Initial Study.

ATTACH FIGURES:

FIGURE 1 - VICINITY LOCATION

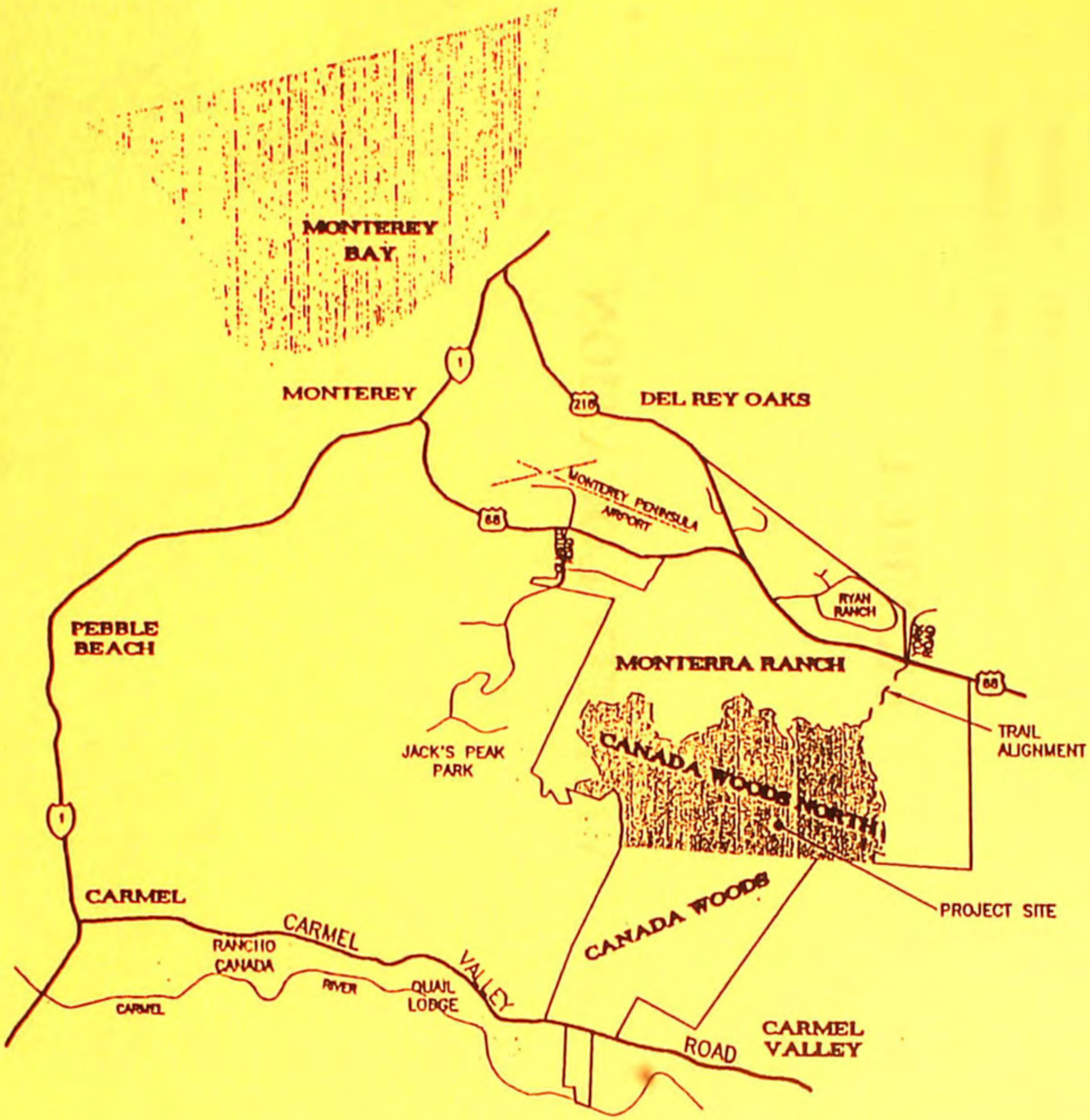
FIGURE 2 - APPROVED MONTERRA LOTS

FIGURE 3 - PENDING LOT LINE ADJUSTMENT

FIGURE 4 - PROPOSED PROJECT SITE PLAN

FIGURE 1

VICINITY LOCATION



W.R.D. CORPORATION

VICINITY & TRAIL PLAN

1" = 6000'

FIGURE 2

APPROVED MONTERRA LOTS

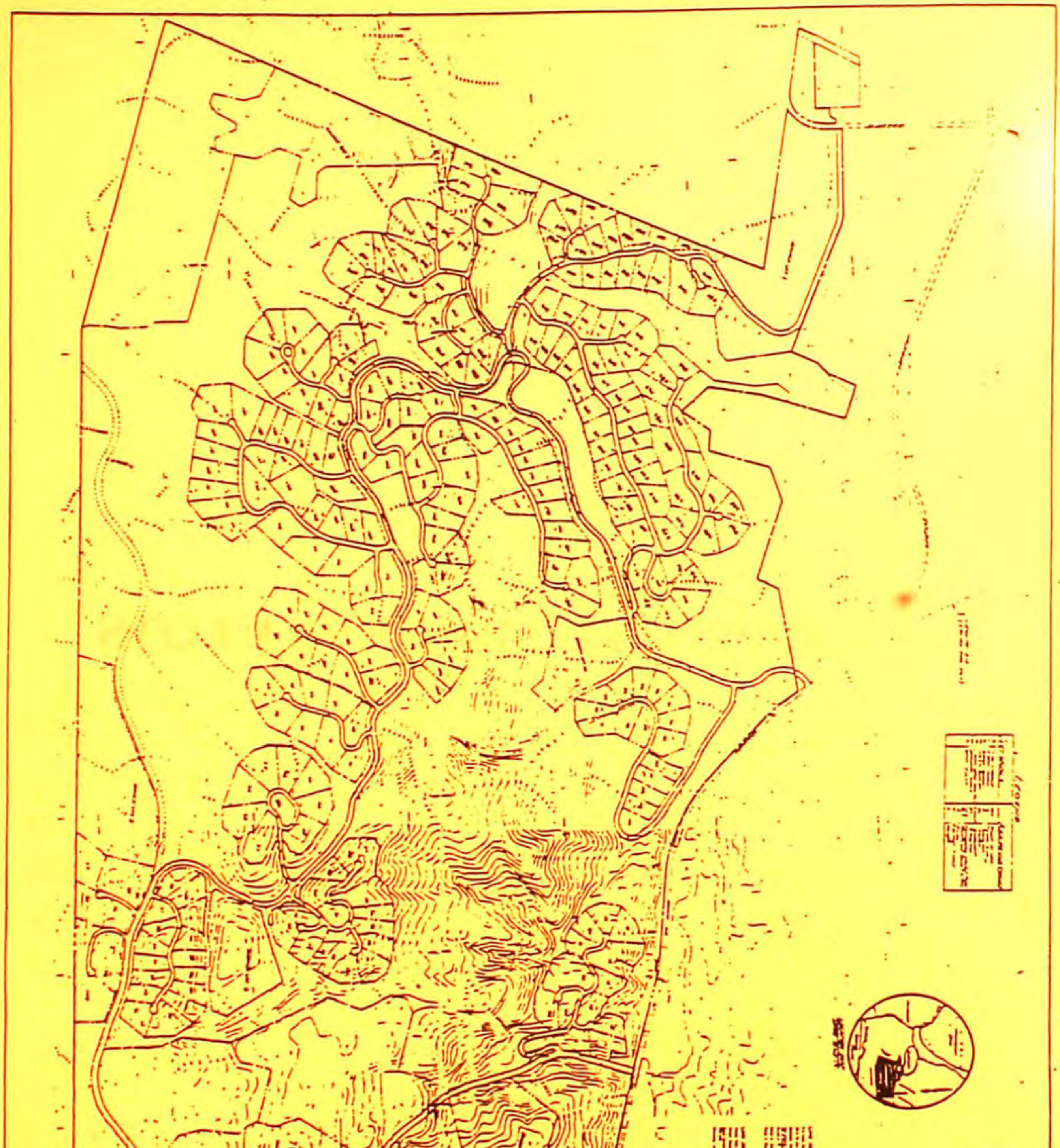

TENTATIVE MAP
MONTERRA RANCH
WWD

FIGURE 3

PENDING LOT LINE ADJUSTMENT

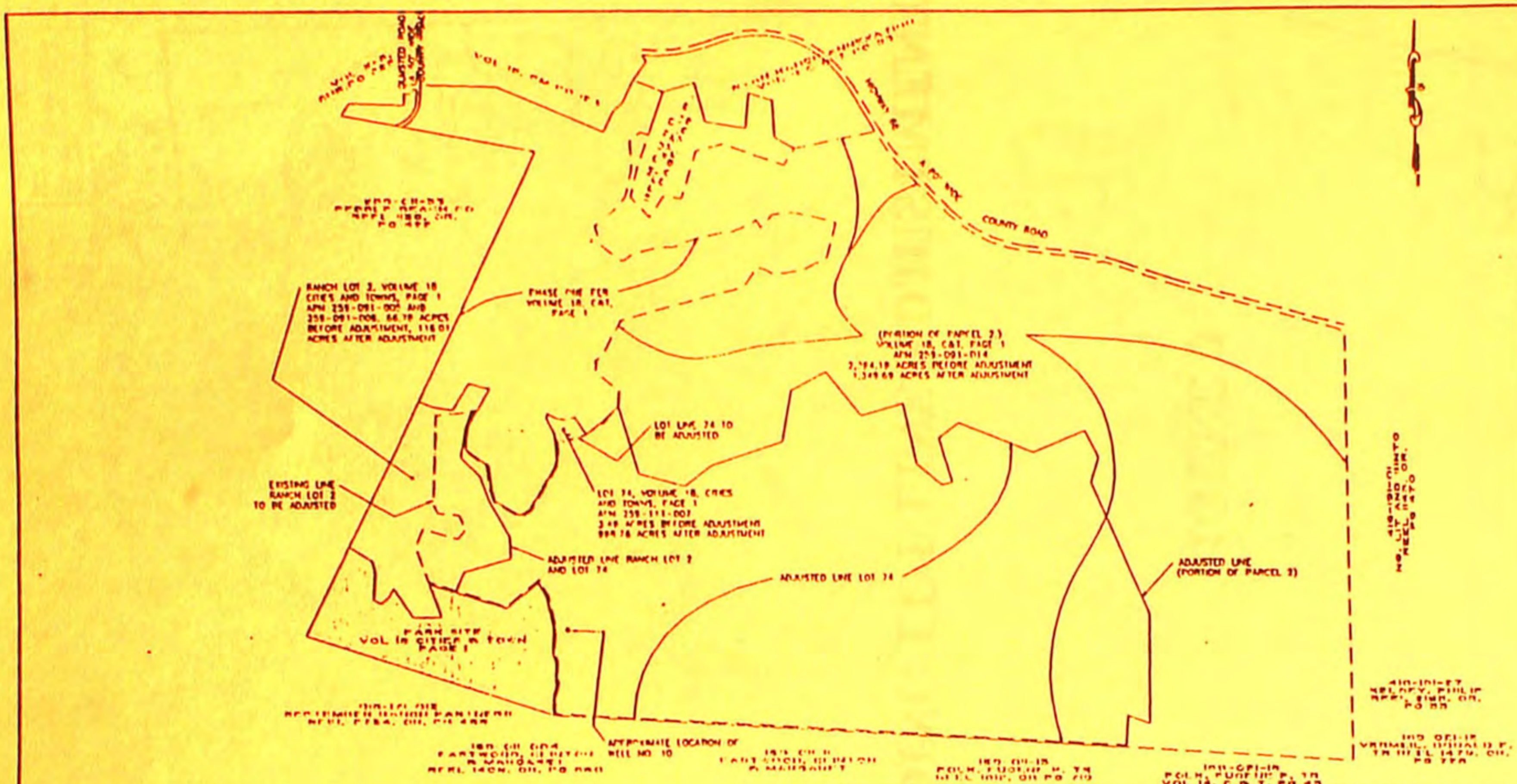


EXHIBIT B

LOT LINE ADJUSTMENT

MONTERRA RANCH

IN THE COUNTY OF MONTEREY, STATE OF CALIFORNIA

SHOWING LOT LINE ADJUSTMENTS BETWEEN THE FOLLOWING PARCELS LOT 74 AND LOT 2 OF TRACT 1177, VOLUME 18, CITIES AND TOWNS, PAGE 1 AND A PORTION OF PARCEL 2, (VOLUME 15, PARCEL MAPS, PAGE 123) AS SHOWN ON VOL 18 CITIES AND TOWNS PAGE 1

MAY 31, 1996

PREPARED BY:

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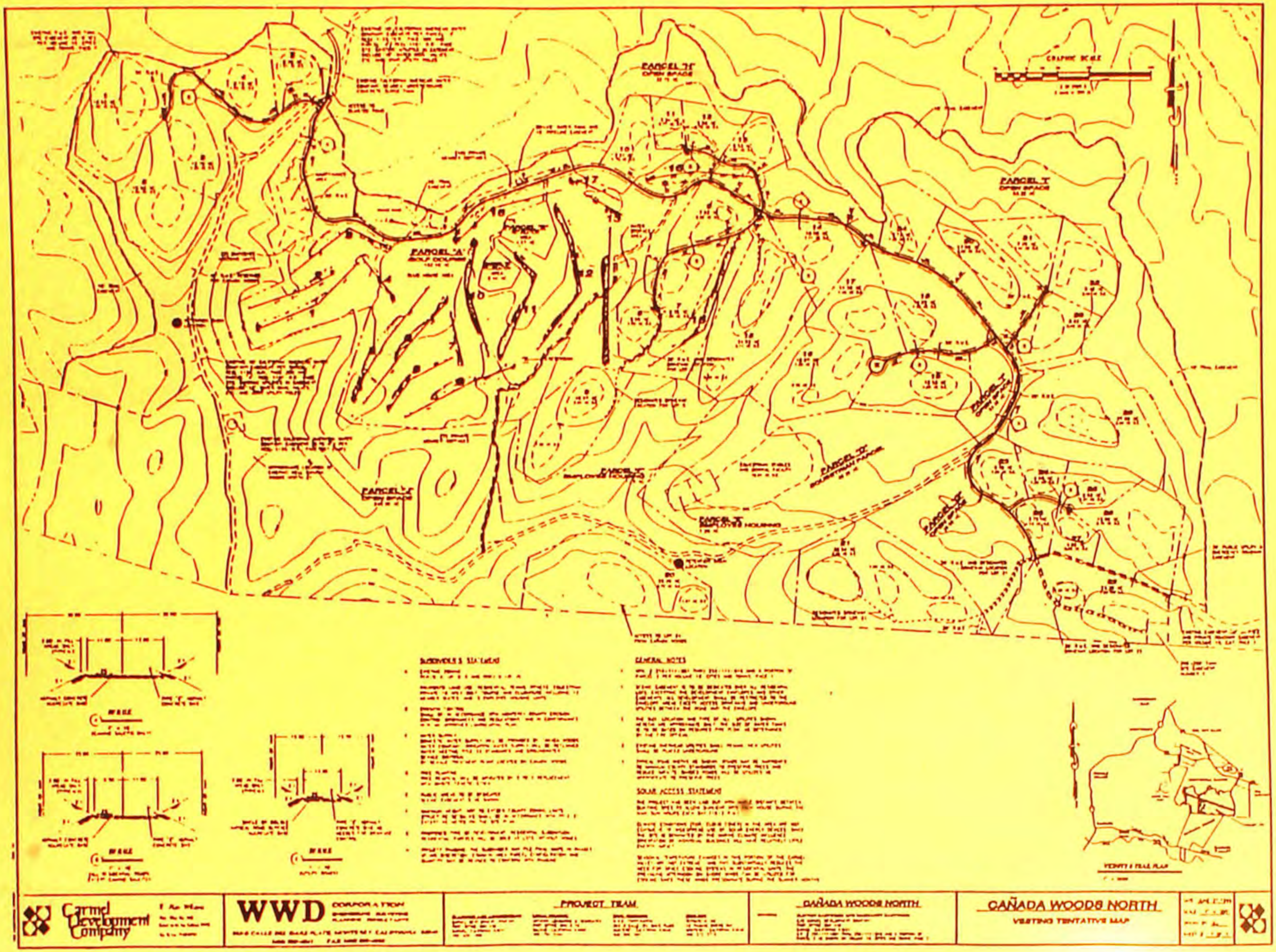
PREPARED FOR:

CAÑADA WOODS, TRUST
C/O CARMEL DEVELOPMENT COMPANY
POST OFFICE BOX 450
CARMEL, CALIFORNIA
93921

SHEET 1 OF 1

FIGURE 4

PROPOSED PROJECT SITE PLAN



PARCEL "A"
PARCEL "B"
PARCEL "C"
PARCEL "D"
PARCEL "E"
PARCEL "F"
PARCEL "G"
OPEN SPACE
EMPLOYEE HOUSING
GRAPHIC SCALE
SUBDIVIDER'S STATEMENT
GENERAL NOTES
SOLAR ACCESS STATEMENT
VICINITY & KEY MAP
Carmel Development Company
WWD CORPORATION
PROJECT TEAM
CAÑADA WOODS NORTH
CAÑADA WOODS NORTH
VESTING TENTATIVE MAP

APPENDIX B
Nitrate Loading Calculations -- Questa Engineering

NITRATE LOADING ASSESSMENT

From *Wastewater Feasibility Study for Cañada Woods North* by Questa Engineering, July 8,1996

Background

One of the critical water quality concerns in the Carmel Valley, as well as throughout other areas of Monterey County, is the concentration of nitrate in groundwater. Nitrate in drinking water can have serious health effects; and it is addressed through primary drinking water standards; the limit is 45 mg/l, as NO_3, and 10 mg/l, as N[1]. Since the Carmel Valley groundwater basin serves as a primary source of water supply for most of the Monterey Peninsula, nitrate effects from sewage disposal are of additional concern in the project area.

Sewage disposal to land, along with livestock wastes and fertilizer applications on cropland and (possibly) golf courses, are the principal sources of nitrate in the Carmel Valley affecting groundwater quality. In order to assure protection of groundwater resources against affects from sewage disposal, Monterey County authorized the Carmel Valley Wastewater Study in 1981 (5). One of the products of this study was the establishment of maximum wastewater loading rates (from septic systems) throughout the Carmel Valley to prevent groundwater nitrate concentrations from rising above a given level (30 mg/l, as NO_3) that would threaten its use for drinking water. The recommendations of this study were subsequently adopted by the Monterey County Board of Supervisors, and incorporated as a policy of the Carmel Valley Master Plan (7).

The Wastewater Study divided the Carmel Valley into 48 hydrologic sub-basins to simplify the accounting of nitrate loads and projected effects on water quality. Within each sub-basin geographical areas were defined based on soil, hydrologic and topographic factors; and recommended maximum wastewater loading rates, in terms of gallons per day (gpd) per acre, were assigned. The assigned loading rates vary from 80 to 300 gpd per acre. These are understood to represent the subsurface discharge of septic tank effluent, with a corresponding total nitrogen concentration averaging 40 mg/l (as N). The allowable daily discharge rate (in gpd) multiplied by the assumed total nitrogen concentration of the final effluent (mg/l), thus, yields the allowable mass loading of nitrate in each geographical area and sub-basin.

In applying these nitrate loading criteria two other assumptions embodied in the Wastewater Study should be noted:

- Average residential wastewater flow (estimated at the time to be about 250 gpd), as opposed to maximum design flow, was assumed for the nitrate loading study. (**Note**: The study pre-dated the current requirement for ultra-low flow toilets and other water conserving devices.)

- The nitrate loading rates assume exclusively rural residential land uses with a nominal amount of landscaping and domestic animals. They do not anticipate or account for agricultural operations or golf courses and their corresponding nitrate load associated with fertilizer applications. Therefore, where a golf course and agricultural operations occur along with residential development (as in the Cañada Woods/Cañada Woods North), the combined nitrate contribution from fertilizer sources, domestic sewage and animal wastes should be determined for comparison with the nitrate loading allocation indicated in the Wastewater Study; this is done in the analysis for the Cañada Woods/Cañada Woods North project which is described below.

- All of the nitrate contained in percolating effluent is assumed to reach the Carmel River alluvium by way of direct recharge or shallow zone groundwater flow through tributary areas. To be conservative, the Wastewater Study did not assume the loss of nitrate to the deep, bedrock groundwater which is not a significant source of recharge to the Carmel Valley alluvial aquifer.

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[1]Note: 1.0 mg/l, as N is equal to 4.43 mg/l, as NO_3.

In addition to Carmel Valley nitrate loading criteria, region-wide and site specific nitrate criteria of the Regional Water Board must also be complied with for any new wastewater facilities. The Regional Board's Basin Plan specifies a maximum nitrogen loading of 40 grams (g) per acre per day, which roughly equates to a density of one house per acre (2). In establishing final Waste Discharge Requirements, the Regional Water Board would also examine the localized nitrate impacts on groundwater quality from a central wastewater treatment-disposal facility, such as that which will serve Cañada Woods North, to assure against adverse impacts to drinking water supplies in the immediate vicinity of the project.

Finally, in 1991 Monterey County adopted Code Chapter 15.23 which sets a limit of 6 mg/l nitrate-nitrogen for effluent from wastewater reclamation facilities. This requirement would not apply to the project if on-site septic systems were to be proposed. However, since the project will be served by a community wastewater reclamation plant, the discharge limit of 6 mg/l must be met; and this may be a more stringent requirement than either the Carmel Valley or the Regional Water Board criteria.

Cumulative Groundwater Nitrate Impact

The Cañada Woods North project falls within hydrologic sub-basin 31, defined in the Carmel Valley Wastewater Study. Following is the analysis of nitrate loading to verify compliance with the Carmel Valley Wastewater Study limits for the property.

1. **Approach.** The procedures for determining the nitrate loading from the proposed project and comparing them with the limitations as set forth in the Carmel Valley Wastewater Study were as follows:

- Determine the mass nitrate-nitrogen loading (in grams/day) for the entire property based on the acreage and assigned wastewater loading rates shown on the Carmel Valley Wastewater Study map adopted by Monterey County. The portion of the map covering Cañada Woods North is shown in **Figure 6**.

- Determine the total mass loading of nitrate-nitrogen (also in grams/day) from wastewater spray disposal on the golf course turf areas, which will occur in sub-basin 31; the mass loading is based on the average daily flow rate (for Cañada Woods North, Monterra Ranch and Cañada Woods) and the associated effluent concentration. This analysis takes into consideration a required effluent concentration of 6 mg/l, plus additional removal of nitrate (e.g., due to denitrification plant uptake) irrigation storage pond and during spray irrigation operations.

- Determine the mass nitrate-nitrogen loading (the "leached" fraction) from the golf course fertilizer applications.

- Determine the mass nitrate-nitrogen loading from the livestock (i.e., horses) proposed for pasturing at the Cañada Woods North project site.

- Sum the nitrate-nitrogen loading from wastewater disposal, golf course fertilizer, and animal wastes and compare the total with the allowable loading as permitted by the Carmel Valley Wastewater Study and the Regional Water Board criteria.

2. **Assumptions.** The following key assumptions were made in carrying out this nitrate loading analysis:

- Wastewater flow is 100,000 gpd.

- Total nitrogen concentration in septic tank effluent (per Carmel Valley Wastewater Study assumptions) is estimated to be 40 mg/l; and this is expected to convert entirely to nitrate through percolation below leachfield systems (3, 5, 8, 10).

- Total nitrogen concentration in effluent from the proposed tertiary treatment facility is 6 mg/l (as required by Monterey Code Chapter 5.23).

- Nitrate-nitrogen removal (by denitrification) from storage of treated wastewater in irrigation reservoir is 40 percent (12, 14).

- Nitrate-nitrogen removal rate achieved through spray irrigation of the golf course is 65 percent of the applied nitrogen (12).

- Annual golf course fertilizer application rates are 5 lbs/1,000 ft^2 for tees and greens, 3 lbs/1,000 ft^2 for fairways, and 1 lb/1,000 ft^2 for maintained rough (see Environmental Management Plan for Cañada Woods North Golf Course).

- Golf course fertilizer fraction leached to groundwater is 10 percent of applied rate (15, 17).

- Total nitrogen loading contained in the manure from pastured horses is 130 lb/year (6).

- Nitrogen removal, via dentrification and ammonia volatilization, from animal wastes is estimated at 50 percent (6).

3. **Calculations**. The calculations of the projected nitrate-nitrogen loading from the proposed project are included in **Appendix B**. In summary, they show the following:

- Allowable loading for Cañada Woods North per Carmel Valley Wastewater Study Criteria:

  - Cañada Woods North:18,680gms/day

- Allowable loading per Regional Board Basin Plan Criteria:

  - Cañada Woods North: 1,060 acres @ 40 gms/acre = 42,400 gms/day

- Project Nitrate Loading:

  Cañada Woods North Property

  ✓ Wastewater-733gms/day
  ✓ Golf Course Fertilizer-650gms/day
  ✓ Pastured Horses (24)-<u>1,938gms/day</u>

  TOTAL 3,321gms/day

- Project Loading as Compared With Carmel Valley and Basin Plan Criteria:

  - Carmel Valley Criteria:3,321/18,680 = 17.8% of the allowable loading
  - Basin Plan Criteria:3,321/42,400 = 7.8% of the allowable loading

As indicated, the proposed project will result in a nitrate loading of about one-sixth of the allocation according to the Carmel Valley Wastewater Study, and less than 10 percent of that in the Basin Plan. Thus, the criteria are met with an ample margin of safety. The analysis includes a "worst case" assumption regarding nitrate loading from the pasturing of 24 horses. This is likely to be much lower, due to fewer animals pastured and regular collection and disposal manure. Moreover, the overall actual nitrate impact is likely to be reduced even further due to uptake of nitrate by native vegetation within and around the golf course. The impact on the Carmel Valley Aquifer will be negligible.

One additional benefit of this proposal in that all of the reclaimed water is being applied to the golf course which is located approximately two miles from the Carmel Valley. Previously, the reclaimed water was to be applied to crops located on farmland directly over the Carmel Valley alluvial aquifer. The relocation of the wastewater disposal (i.e., reclamation) away from the Carmel Valley groundwater basin provides an additional safety factor.

This proposal would eliminate the current condition of cattle grazing, along with its nitrogen loading. Also it eliminates the existing approval project part of Monterra, which allows 112 homes with full leachfields on this same area. Hence this impacts are reduced considerably.

Comparison of Three Nitrate Loading Alternatives

As a final point of comparison, nitrate nitrogen loading calculations have been made for the project site under: (a) existing conditions of cattle grazing; and, (b) the approved development of 112 residences using individual septic tank-leachfield systems (as part of the Monterra Ranch Subdivision). The calculations are provided at the end of **Appendix B** and show the following:

- Nitrate Loading for Proposed Project: 3,321 gms/day
- Nitrate Loading for Existing Conditions (Cattle Grazing): 6,056 gms/day
- Nitrate Loading for Approved Development (112 septic systems): 4,239 gms/day

As indicated by these results, the proposed project will reduce the nitrate-nitrogen loading on the project site as compared with the existing conditions and the existing approvals by approximately 45 percent and 22 percent, respectively.

APPENDIX B

Cañada Woods North
Nitrate Loading Calculations

NITRATE LOADING ASSUMPTIONS

- Wastewater Flow: 100,000 gpd
- Total Nitrogen in Septic Tank Effluent: 40 mg/l
- Total Nitrogen in Tertiary Treated Effluent: 6 mg/l
- Wastewater Nitrogen Reduction Through Irrigation of Golf Course Turf Grass: 65%
- Wastewater Nitrogen Reduction through Pond Storage: 40%
- Fraction of Golf Course Fertilizer Leached: 10%
- Nitrogen Loading from Livestock (horses, cattle): 130 lbs/yr = 161.5 gms/day per animal
- Nitrogen Loss Due to Ammonia Volitization and Dentrification of Applied Animal Wastes: 50% for horses, 25% for cattle grazing

CARMEL VALLEY WASTEWATER STUDY CRITERIA

- Nitrogen Allocation to Cañada Woods North (see **Figure 6** in report):

  - Wastewater Discharge via Leachfields:

593 acres @ 200 gpd/acre =	118,600	gpd
16 acres @ 300 gpd/acre =	4,800	gpd
TOTAL	123,400	gpd

  - Implied Mass Nitrogen Loading:
    (123,400 gpd) (40 mg/l) (3.785 l/gal) / 1,000 mg/gm = 18,680 gms/d

REGIONAL BOARD BASIN PLAN NITRATE CRITERIA

- Limit: 40 gms/acre per day
- Allocation to Cañada Woods North property
  1,060 acres @ 40 gms/acre-day = 42,400 gms/day

NITRATE LOADING FOR PROPOSED PROJECT CONDITIONS

- Wastewater component:

- Irrigation period: 245 days

- Annual wastewater volume:
(100,000 gpd) (365 days) = 36,500,000 gal

- Average daily discharge during irrigation season:
36,500,000 gal/ 245 days = 148,980 gpd

- Nitrate-nitrogen concentration of percolating reclaimed wastewater:
(6 mg/l) (1-0.65)(1-0.4) = 1.3 mg/l

- Mass Loading of Nitrate-Nitrogen:
(148,980 gpd) (1.3 mg/l) (3.785 l/gal)/ 1,000 mg/gms = 733 mg/l

- Golf Course Fertilizer Component:

  - Applied Fertilizer:

✓ Tees & Greens: 5 acres @ 5 lbs/1,000 ft^2 =	1,089	lbs/year
✓ Fairways: 25 acres @ 3 lbs/1,000 ft^2 =	3,267	lbs/year
✓ Rough & Driving Range: 20 acres @ 1 lbs/1,000 ft^2 =	871	lbs/year
TOTAL		5,227lbs/year

  - Leached Fraction (@ 10%):
(0.10)(5,227 lbs/year) = 523 lbs/year

  - Converted to gms/day:
(523 lbs/year)(454 gms/lb)/(365 days/year) = 650 gms/day

- Pastured horses:

  - Total nitrogen for 24 horses @ 161.5 gms/day = 3,876 gms/day

  - Fraction leached to groundwater:
(0.5)(3,876) = 1,938 gms/day

Total Loading (average daily during irrigation season):

- 733 + 650 + 1,938 gms/day = 3,321 gms/day

Percentage of Established Criteria:

- Carmel Valley Wastewater Study : 3,321/18,680 = 17.8%

- Regional Water Board Criteria: 3,321/18,680 = 7.7%

COMPARISON TO EXISTING CONDITIONS AND CURRENT APPROVALS:

Nitrate Loading at Project Site under Existing Conditions

- Cattle grazing: average of 150 head

- Total nitrogen for 150 animals at 161.5 gms/day = 24,225 gms/day
- Fraction leached: (0.25)(24,225) = 6,056 gms/day

Nitrate loading at project site under existing approvals:

- 112 approved lots as part of Monterra Ranch with leachfields;
- 250 gpd/leachfield at 40 mg/l total N;
- Assumed 25% reduction through assimilation by soil;
- Total daily nitrogen loading from 112 leachfields:
  = (112)(250 gpd)(40 mg/l)(3.785 liters/gal) ÷ (1,000 mg/gm) = 4,239 gms/day

Comparisons for Cañada Woods North site:

- Project loading at site: 3,321 gms/day
- Existing conditions at site: 6,056 gms/day
- Approved development at site: 4,239 gms/day

Conclusion

The Cañada Woods North project will result in a net decrease in nitrate loading at the project site as compared both: (a) with the existing cattle grazing (about 45 percent reduction); and, (b) with the existing approval for 112 residences using individual septic systems (about 22 percent reduction).

APPENDIX C
Biotic Resources Data

Table 1. Special-status plant species with potential to occur in the Canada Woods North project area.

Scientific Name Common Name	Listing Status Federal/State/CNPS List/ R-E-D	Habitat	Period Identifi-able	Distribution by County
Allium hickmanii Hickman's onion	-/-/1B 2-2-3	Closed-cone conifer forest, chaparral, and grasslands	April	MNT SLO
Arctostaphylos hookeri ssp. *hookeri* Hooker's manzanita	-/-/1B 2-2-3	Chaparral, closed-cone coniferous forest, and coastal scrub	Year round	MNT SCR
Arctostaphylos montereyensis Monterey manzanita	-/-/1B 3-2-3	Chaparral, oak woodland, and coastal scrub	Year round	MNT
Arctostaphylos pumilla (A. uva-ursi var. *pumila)* Sandmat manzanita	-/-/1B 3-2-3	Closed-cone conifer forest, coastal scrub, and coastal dunes	Year round	MNT
Astragalus tener var. *tener* Alkali milkvetch	-/-/1B 3-2-3	Vernal pools (alkaline), valley grassland (adobe clay)	March-June	ALA* CCA* MER MNT* NAP* SBT* SCL* SFO* SJQ* SOL SON* STA* YOL
Ceanothus cuneatas var. *rigidus* Monterey ceanothus	-/-/4 1-2-3	Widespread in maritime chaparral; closed-cone conifer forest on sandy hills and flats	Year round	MNT SLO SCR*
Chorizanthe douglasii Douglas' spineflower	-/-/4 1-1-3	*Cismontane* woodland and lower coniferous forest on sandy or gravelly slopes	April-June	MNT SBT SLO
Chorizanthe pungens var. *pungens* Monterey spineflower	T/-/1B 2-2-3	Chaparral, oak woodland, and grassland	April-June	MNT SCR
Chorizanthe robusta var. *robusta* Robust spineflower	E/-/4 3-3-3	Coastal dunes and scrub on dry, sandy places	May-September	ALA* MNT SCL* SCR SMT*
Clarkia lewisii Lewis' clarkia	-/-/4 1-1-3	Coastal scrub	May	MNT SBT

Table 1. (Continued)

Cordylanthus rigidus var. *littoralis* Seaside bird's-beak	-/E/1B 2-3-3	Coastal scrub, closed-cone conifer forest, oak woodland, and chaparral on dry, sandy soils below 3,000 feet	August-September	MNT SBA
Delphinium hutchinsoniae Hutchinson's larkspur	-/-/1B 3-2-3	Coastal scrub, coastal prairie, and mixed evergreen forest	March-June	MNT
Eriastrum virgatum Virgate eriastrum	-/-/4 1-1-3	Coastal dunes, chaparral (sandy)	April-June	MNT SBT
Ericameria fasiculata Eastwood's ericameria	-/-/1B 3-3-3	Closed-cone coniferous forest, chaparral, and coastal scrub	July-October	MNT
Fritillaria liliacea Fragrant fritillary	-/-/1B 1-2-3	Coastal scrub and grassland, often on ultramafic soils	February-April	ALA CCA MNT MRN SBT SCL SFO SMT
Hemizonia parryi ssp. *congdonii* Congon's tarplant	-/-/1B 3-3-3	Valley and foothill grasslands (alkaline)	June-November	ALA* CCA* MNT SCL(*?) SCR* SLO SOL*
Horkelia cuneata ssp. *sericea* Kellogg's horkelia	-/-/1B 3-3-3	Sandy and gravellly places in coastal scrub and closed-cone coniferous forest	April-September	ALA* MRN* MNT SBA SCR SFO* SLO SMT
Lomatium parvifolium Small-leaved lomatium	-/-/4 1-2-3	Closed-cone coniferous forest	February-June	MNT SCR SLO

Table 1. (Continued)

Malacothamnus palmeri var. *involucratus* Carmel Valley bush mallow	-/-/1B 1-2-3	Cismontane woodland, chaparral	May-August	MNT SLO
Malacothrix saxatilis var. *arachnoidea* Carmel Valley cliff-aster	-/-/1B 3-2-3	Rocky open banks of chaparral and mixed evergreen forest	May-September	MNT SBA
Microseris decipiens (Stebbinsoseris decipiens) Santa Cruz microseris	-/-/1B 2-2-3	Mixed evergreen forest, closed-cone pine forest, chaparral, coastal prairies, coastal scrub, and grasslands	April-May	MNT MRN SCR
Monardella undulata var. *undulata* Curly-leaved monardella	-/-/4 1-2-3	Chaparral and coastal dunes and scrub	May-July	MNT MRN SBA SCR SFO SLO SMT SON
Ophioglossum californicum California adder's-tongue	-/-/4 1-2-2	Vernal pools, valley grassland	December-May	AMA BUT MER MNT* MPA ORA SBD SDG STA TUO BA
Perideridia gairdneri ssp. *gairdneri* Gairdner's yampah	-/-/4 1-2-3	Chaparral and broadleafed upland forest, typically on wet, heavy soils	June-October	DNT HUM KRN LAS LAX* MEN MNT MOD MRN NAP ORA* SBT SCL SCR SDG* SIS SLO SMT(*?) SOL SON TRI
Pinus radiata Monterey pine	-/-/1B 3-2-2	Closed-cone conifer forest	N/A	MNT SCR SLO SMT BA GU
Piperia yadoni Yadon's piperia	-/-/1B 3-3-3	Chaparral and coastal scrub	May-August	MNT
Piperia michaelii Michael's rein orchid	PE/-/4 1-2-3	Coastal bluff scrub	May-September	ALA CCA HUM MNT MRN SBT SCR SCZ SFO SLO SMT
Psilocarphus tenellus var. *globiferus* Round wooly-marbles	-/-/4 1-2-1	Vernal pools	April-May	CAL FRE KRN MER MNT MRN SLO STA TUL SA
Sidalcea hickmanii Hickman's checkerbloom	-/-/1B 2-1-3	Hillsides in chaparral	June-July	MNT

Table 1. (Continued)

Malacothamnus palmeri var. *involucratus* Carmel Valley bush mallow	-/-/1B 1-2-3	Cismontane woodland, chaparral	May-August	MNT SLO
Malacothrix saxatilis var. *arachnoidea* Carmel Valley cliff-aster	-/-/1B 3-2-3	Rocky open banks of chaparral and mixed evergreen forest	May-September	MNT SBA
Microseris decipiens (Stebbinsoseris decipiens) Santa Cruz microseris	-/-/1B 2-2-3	Mixed evergreen forest, closed-cone pine forest, chaparral, coastal prairies, coastal scrub, and grasslands	April-May	MNT MRN SCR
Monardella undulata var. *undulata* Curly-leaved monardella	-/-/4 1-2-3	Chaparral and coastal dunes and scrub	May-July	MNT MRN SBA SCR SFO SLO SMT SON
Ophioglossum californicum California adder's-tongue	-/-/4 1-2-2	Vernal pools, valley grassland	December-May	AMA BUT MER MNT* MPA ORA SBD SDG STA TUO BA
Perideridia gairdneri ssp. *gairdneri* Gairdner's yampah	-/-/4 1-2-3	Chaparral and broadleafed upland forest, typically on wet, heavy soils	June-October	DNT HUM KRN LAS LAX* MEN MNT MOD MRN NAP ORA* SBT SCL SCR SDG* SIS SLO SMT(*?) SOL SON TRI
Pinus radiata Monterey pine	-/-/1B 3-2-2	Closed-cone conifer forest	N/A	MNT SCR SLO SMT BA GU
Piperia yadoni Yadon's piperia	PE. /-/1B 3-3-3	Chaparral and coastal scrub	May-August	MNT
Piperia michaelii Michael's rein orchid	-/-/4 1-2-3	Coastal bluff scrub	May-September	ALA CCA HUM MNT MRN SBT SCR SCZ SFO SLO SMT
Psilocarphus tenellus var. *globiferus* Round wooly-marbles	-/-/4 1-2-1	Vernal pools	April-May	CAL FRE KRN MER MNT MRN SLO STA TUL SA
Sidalcea hickmanii Hickman's checkerbloom	-/-/1B 2-1-3	Hillsides in chaparral	June-July	MNT

Table W-1. Special-status wildlife species with a potential to occur due to geographic range overlap with the project area.

Common Name	Scientific Name	Federal Status	State Status
Invertebrates			
Smith's blue butterfly	*Euphilotes enoptes smithi*	E	-
Amphibians			
California tiger salamander	*Ambystoma californiense*	C	SC
California red-legged frog	*Rana aurora draytonii*	T	SC
Foothill yellow-legged frog	*Rana boylii*		SC
Reptiles			
Southwestern pond turtle	*Clemmys marmorata marmorata*	-	SC
California horned lizard	*Phrynosoma coronatum frontale*	-	SC
Birds			
Great blue heron (rookery)	*Ardea herodias*	-	*
Great egret (rookery)	*Casmerodius albus*	-	*
Snowy egret (rookery)	*Egretta thula*	-	*
Black-crowned night heron (rookery)		-	*
Sharp-shinned hawk	*Accipiter striatus*	-	SC
Cooper's hawk	*Accipiter cooperi*		SC
Golden eagle (nesting)	*Aquila chrysaetos*		SC
Northern harrier (nesting)	*Circus cyaneus*	-	SC
White-tailed kite	*Elanus caeruleus*	-	*
Merlin	*Falco columbarius*	-	SC
Peregrine falcon	*Falco peregrinus anatum*	E	E
Prairie falcon (nesting)	*Falco mexicanus*	-	SC
Short-eared owl (nesting)	*Asio flammeus*	-	SC
Burrowing owl (burrow sites)	*Speotyto cunicularia*		SC
California spotted owl	*Strix occidentalis occidentalis*	-	SC
Black swift (nesting)	*Cypseloides niger*	-	SC
Willow flycatcher (nesting)	*Empidonax traillii*	-	E
California horned lark	*Eremophila alpestris actia*	-	SC
Purple martin (nesting)	*Progne subis*	-	SC
Tricolored blackbird	*Agelaius tricolor*	-	SC
Yellow warbler (nesting)	*Dendroica petechia brewsteri*	-	SC
Yellow-breasted chat (nesting)	*Icteria virens*	-	SC

Table 1. (Continued)

Trifolium buckwestiorum Santa Cruz clover	-/-/1B 3-3-3	Coastal prairie (margins)	May-October	SCR MNT
Trifolium polyodon Pacific Grove clover	-/R/1B 3-3-3	Closed-cone conifer forest, coastal prairie (mesic)	May-June	MNT

[1] Hickman (1993), Skinner and Pavlik (1994)
[2] U.S. Fish and Wildlife Service (Federal Register, February 1996; CDFG Special Plants List, January, 1994).
E = Endangered.
T = Threatened
PE = Proposed Endangered
C = Taxa for which the Service has on file sufficient information on biological vulnerability and threat(s) to support proposals to list as endangered or threatened species.
- = No current federal listing status.
[3] Section 1904, California Fish and Game Code (CDFG Special Plants List; August 1993, January 1994).
E = Endangered.
R = Rare.
- = No current state listing status.
[4] CNPS *Fifth Edition, Inventory of Rare and Endangered Vascular Plants of California* (Skinner and Pavlik 1994)
List 1B = Plants rare, threatened, or endangered in California and elsewhere.
List 4 = Plants of limited distribution — a watch list.
The R-E-D numbers are encoded as follows:
Rarity: 1 - Rare, but found in sufficient numbers and distributed widely enough that the potential for extinction or extirpation is low at this time; 2 - occurrence confined to several populations or to one extended population; 3 - occurrence limited to one or a few highly restricted populations, or present in such small numbers that it is seldom reported.
Endangerment: 1 - not endangered; 2 - endangered in a portion of its range; 3 - endangered throughout its range.
Distribution: 1 - widespread outside California; 2 - rare outside California; 3 - endemic to California.
[5] Final Listing Federal Register 4 February 1994; effective 7 March 1994

County Key:

ALA ..... Alameda
AMA ..... Amador
BA ..... Baja California
BUT ..... Butte
CAL ..... Calaveras
CCA ..... Contra Costa
DNT ..... Del Norte
GU ..... Isla Guadalupe, Baja California
HUM ..... Humboldt
KRN ..... Kern
LAS ..... Lassen
LAX ..... Los Angeles
MEN ..... Mendocino
MER ..... Merced
MNT ..... Monterey
MOD ..... Modoc
MPA ..... Mariposa
MRN ..... Marin
NAP ..... Napa
ORA ..... Orange
SA ..... South America
SBA ..... Santa Barbara
SBD ..... San Bernardino
SBT ..... San Benito
SCL ..... Santa Clara
SCR ..... Santa Cruz
SCZ ..... Santa Cruz Island
SDG ..... San Diego
SFO ..... San Francisco
SIS ..... Siskiyou
SJQ ..... San Joaquin
SLO ..... San Luis Obispo
SMT ..... San Mateo
SOL ..... Solano
SON ..... Sonoma
SRO ..... Santa Rosa Island
STA ..... Stanislaus
TRI ..... Trinity
TUL ..... Tulare
TUO ..... Tuolumne
YOL ..... Yolo

* next to county indicates that the species has been extirpated from the county.

Table W-1. continued.

Common Name	Scientific Name	Federal Status	State Status
Mammals			
Townsend's western big-eared bat	*Plecotus townsendii townsendii*	-	SC
Pallid bat	*Antrozous pallidus*	-	SC
Mastiff bat	*Eumops perotis*	-	SC
Monterey dusky-footed woodrat	*Neotoma fuscipes luciana*		SC

Notes:

This table lists the endangered, threatened and sensitive wildlife species that use or could potentially use the project area. The principle source of information for status designation is California Department of fish and Game Natural Diversity Data Base (NDDB) 1994, "Special Animals". These wildlife species represent animal and bird species that meet the criteria for consideration as a threatened or endangered wildlife species, or are of particular concern to natural resource management agencies and potentially occur within the study area. Under Section 15380 of the California Environmental Quality Act (CEQA), a species not included in any listing identified by the state "shall nevertheless be considered rare or endangered if the species can be shown to meet the criteria" for listing. Thus animal species of special concern (Remsen 1978, Williams 1986, and Jennings and Hayes 1994) are included in the list. The US Fish and Wildlife Service encourages the consideration of proposed and candidate species in environmental planning such as environmental impact analysis under the National Environmental Policy Act of 1969.

The wildlife status definition and governing agencies follow:

U.S. Fish and Wildlife Service (Federal)

E = Endangered : Any species which is in danger of extinction throughout all or a significant portion of its range.

T = Threatened: Any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

PT = Proposed Threatened: Proposed to be listed as an endangered species.

FT = Threatened: Proposed to be listed as a threatened species.

C = Taxa which are under review, and for which sufficient biological information exists to support a proposal to list as an endangered or threatened species.

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June 24, 1996

Michael Waxer
Vice President
Carmel Development Company
P.O. Box 450
Carmel, CA 93921

Dear Mr. Waxer:

At your request I surveyed two sites on the Cañada Woods property in Carmel Valley to determine if the *Eriogonum parvifolium* that is present on the two sites supports the federally listed endangered Smith's blue butterfly (*Euphilotes enoptes smithi*). My colleague, Robert Langston, and I surveyed those same two sites in 1990 as part of the reservoir project. We did not find Smith's blue there during the 1990 surveys. The project vicinity is shown on Figure 1 and the two sites surveyed are shown in Figure 2.

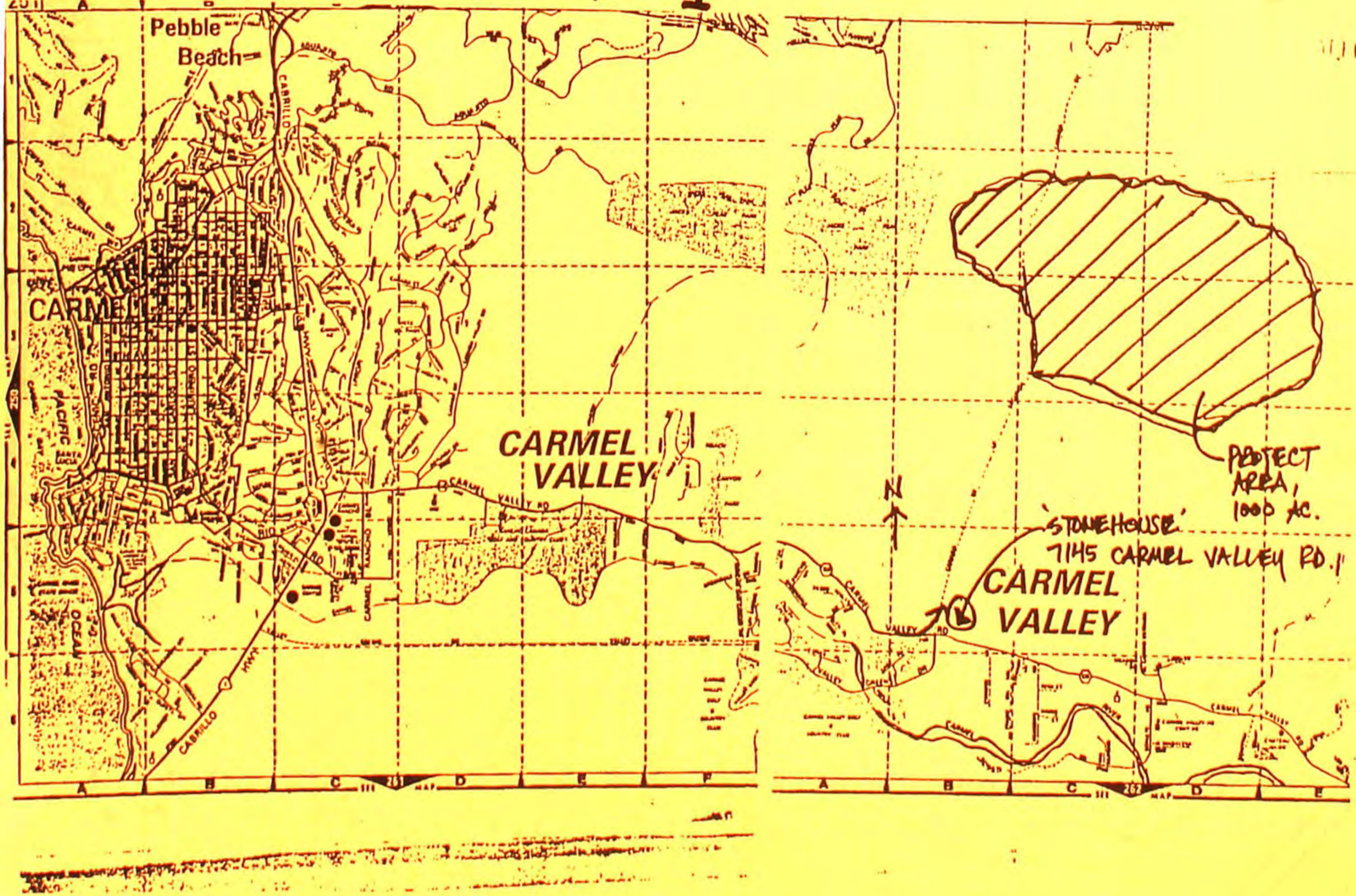
My survey, conducted on June 21st, consisted of checking each *E. parvifolium* plant on the two sites for presence of the Smith's blue. I did not find Smith's blue on either site during my survey. Before the survey, I had verified that the Smith's blue is in its adult flight elsewhere in its range (Sand City).

Based on my survey and known information about Smith's blue populations, I believe the two sites on the Cañada Woods property do not support the Smith's blue butterfly. The patches of *Eriogonum* are too isolated from other known nearby locations (Garland Park) and contain too few plants to support the butterfly.

Sincerely,

Victoria Harris
Senior Associate

FIGURE 1



Pebble Beach
CARMEL
PACIFIC
OCEAN
CABRILLO
CARMEL VALLEY
CARMEL VALLEY RD
N
PROJECT AREA, 1000 AC.
'STONEHOUSE' 7145 CARMEL VALLEY RD.
CARMEL VALLEY

FIGURE 2

Areas containing Eriogonum parvifolium Surveyed for Smith's Blue 6/21/96
Source: Victoria Haines

VERNAL L. YADON
1119 Buena Vista Avenue
Pacific Grove, California 93950

A Botanical/Biological Report for Cañada Woods North Located in a Portion of the Approved Monterra Ranch, South of Highway 68, in the Unincorporated Area of Monterey County

(A portion of APN 259-091-014 and APN'S 259-111-001 to 259-111-019)

By

Vernal L. Yadon
June --, 1996
(Field work: June 8, 10, 11, 24, & July 2, 1996)

Signed Vern Yadon Date August 6, 1996

This report adds updated botanical/biological information to an Environmental Impact Report conducted for The Monterra Ranch Subdivision prepared by LLS Associates and accepted by Monterey County in 1986. It adds information concerning sensitive species and proposes mitigations. The report discusses the possibility of the following species being present: Pacific Grove Clover Trifolium polyodon, a California Rare/Federal Candidate species; Hickman's Onion Allium hickmanii a California/Federal Candidate species; and Yadon's Piperia, Piperia yadonii a California/Federal candidate species, none of which were found, but, excepting the Piperia, must be looked for again at the appropriate spring season. Mitigations are offered should any of the above be found. The Carmel Valley Bush Mallow, a California/Federal C2 species was found and is discussed with mitigations proposed. Monterey Pine is present and listed as 1B endangered by the California Native Plant Society. While the pine is unlisted in the California/Federal regulations, it must be discussed to conform with CEQA. A recent addition to the protected list i.e the Red-Legged Frog is discussed, however the latter species was not found.

The habitats where development is proposed is primarily native coastal prairie grasslands, intruded with coastal sage scrub, Poison Oak Chaparral, Live oak woodland and fragments of Monterey pine forest. The combination Coast live oak woodland-Monterey pine forest is also present. One type-converted vernal pool is present.

Prepared for
Mr. Michael Waxer
Carmel Development Company
P. O. Box 450
Carmel, California 93921

Introduction

This Botanical/Biological Report was conducted primarily to review and update previous work that was performed and reported by LLS Planning Associates in a Final Environmental Impact Report for the Monterra Ranch Subdivision, prepared for and certified by the Monterey County Board of Supervisors in October 1987. This report adds to the plant list and discusses species of concern.

Cañada Woods North consists of that portion of the Monterra Ranch Subdivision which lies primarily within the Carmel Valley watershed. The site is located approximately three miles up Carmel Valley, and includes the upper slopes northerly from the approved Cañada Woods project.

The proposed project involves approximately 1060 acres of land. It resubdivides the property resulting in 34 residential lots, reduced from 112 previously approved. The project further calls for tennis, fitness and equestrian uses, an 18 hole golf course with accessory uses including 12 member suites and 5 employee housing units.

The survey method used was to walk over the property while noting areas proposed for each type of development. The configuration of the land was noted along with the natural features present. A plant list was developed and wildlife species were recorded for comparison with those indicated in the Monterra Ranch EIR list. Consideration was given to impacts that may occur as a result of the proposed project.

As stated by the Project Planners, the intention is to confine developments to promontories and edges of grassland where views are maximized and visibility is minimized. Native grassland open space is to be protected and enhanced, where possible, using accepted management techniques such as mowing and possibly controlled burning on a small scale. The vernal pool site and the two farm ponds are to remain with no development proposed in their immediate vicinity. Additional ponds are planned on and near the golf course, enhancing habitat for species which require this type of habitat. Existing roads will be used for major entry and exit. Access roads to home sites will be kept to a minimum.

Regional Setting

Cañada Woods North consists of that portion of the Monterra Ranch Subdivision which lies primarily within the Carmel Valley watershed. When viewed from highway 68 the development will be beyond the ridge summit and consequently out of view. From lower Carmel Valley road, the project is to the north and out of view. The site of Cañada Woods North was formerly range land and may have had an early home site.

Description of the Local Vegetation

The habitats presented at the site are native Coastal Prairie Grasslands, Poison Oak Chaparral, Coastal Sage Scrub, Coast Live Oak Woodland, and fragments of Monterey Pine Forest. One type-converted Vernal Pool is present along with two farm ponds.

The native coastal prairie grasslands are composed of native needlegrasses, California oatgrass, introduced non-native annual grasses and native wildflowers, such as sky lupine and California poppies. Most of the native coastal perennial grassland habitats of central California have been fragmented through attempts at farming and other development. Those that remain are infrequently encountered and are largely overlooked, causing many people to believe that such habitat no longer exists. The occurrence of this habitat, especially in units as large as those on this property, must be considered rare by today's standards. The soils of the grasslands are of various thicknesses so that some hardpan is showing thereby providing a habitat which may contain rare flora. The soil thickness, its drainage and direction of slope allows for the accumulation and retention of moisture in certain areas promoting Danthonia grassland meadows of which there are several on the property. These areas should be reviewed again in the spring, prior to the beginning of construction, to determine if earlier maturing listed plant species may be present.

Poison oak chaparral is a habitat that slowly advances into grasslands in the absence of fire or some other type of intervention, such as mowing. Species characterizing this habitat, in addition to poison oak, include the bush monkey flower, Coyote Brush, bush honeysuckle chamise etc. The various coastal chaparrals along with coastal sage scrub are habitat for the sensitive Carmel Valley bush mallow.

Coastal sage scrub is characterized by California sage brush, Paint brush, black sage, native giant wild rye, june grass and the like.

Live oak woodland harbors a number of species which benefit from the rich humus that develops from the leaf duff. California fescue, native bentgrass and a number of small herbs live under this canopy.

The Monterey pine-coast live oak woodland contributes to the shade-loving species. Copious amounts of poison oak can be found under these trees along with a number of shrub species which may be destined to loose the battle for light as Monterey pine continues its advance on to some of the shrub-covered locations.

Rare and Endangered Species and Habitats

No rare and endangered species were found on the project site, however in the inclusionary housing area of Monterra Ranch Subdivision, Trifolium polyodon Pacific Grove Clover, a California Rare/Federal Candidate species was found along with Allium hickmanii Hickman's onion, a California/Federal candidate species. This makes it necessary to search all appropriate habitats on Cañada Woods North for these species during mid April, when they are most apt to bloom. Pacific Grove Clover has rather precise environmental needs and has thus far been found only on lower coastal wave terraces where heavy soils maintain a winter-wet condition. Hickman's onion has a wider distribution, sometimes occurring in dense populations. On this property, it is expected to be present as an occasional plant in the grasslands. It may be present in larger numbers where soils are thin and winter moisture is abundant. Mitigation is proposed should plants be found on the project site.

On the Monterra Ranch subdivision, mitigation for Hickman's onion consisted of selecting a suitable site for replacement planting. Winter runoff will be captured in an impoundment to create the winter-wet conditions necessary for this plant. Replacement plants have been grown from seed collected from the property. They are currently being successfully maintained for reintroduction. If found on Cañada Woods North construction sites, the replacement program proposed under mitigations will be adequate to mitigate potentially significant impacts to a level of less than significant.

A population of Malacothamnus palmeri var. involucratus formerly California/Federal candidate species (status now uncertain) occurs in and around an easement owned by the California-American Water Company. The roadway entry of necessity will displace some of this population. A proposed replacement plan for this displacement will adequately mitigate this potentially significant impact to a level less than significant.

In the near vicinity of the project site are populations of Piperia yadonii. Yadon's piperia is listed as a Federal endangered species. These were searched for but not found on the property.

Pinus radiata Monterey pine is listed as 1B endangered by the California Native Plant Society. Because of this listing, CEQA requires discussion of impacts and proposed mitigations as was done on the approved Cañada Woods project. For the latter project, seeds were collected and propagated from trees to be removed thereby preserving the native gene pool. Replanting is proposed at a 2 for 1 ratio. The Forest Management Plan will discuss these issues for Monterey Pine.

Stebbinsoseris decipiens is a California Native Plant Society list 1B species which has been found near this site close to the intersection of Canyon Del Rey and Highway 68. This species was searched for but not found on the property.

Other California Native Plant Society listed plants searched for but not found are: Arctostaphylos hookeri ssp. hookeri, Arctostaphylos montereyensis, Arctostaphylos pumila, Chorizanthe pungens var. pungens and Cordylanthus rigidus ssp. littoralis. These plants would have been visible had they been on the site.

Rare and Endangered Animal Species

The California Red-legged Frog, Federal endangered, is most likely to occur near bodies of permanent moving water, such as along the Carmel River. Appropriate habitat for this species is not duplicated on Cañada Woods North. The California Red-legged Frog was considered when the vernal pool and farm pond sites were reviewed. The species was not found.

Threatened species

No threatened species were found.

Impact Assessment and Mitigation Measures

The single sensitive species found on the site was Malacothamnus palmeri var. involucratus Carmel Valley Bush Mallow. This species may occur in a number of chaparral types and that of coastal sage scrub. On Cañada Woods North a more or less single population grows on both sides of the access roadway at the site of the Cal Am Water Company storage tank. The roadway will have to be improved and widened as development proceeds. Since this species is easily grown from rhizomatous offshoots or cuttings, I suggest that a qualified botanist remove and grow eight five-gallon containers of this species. Six containers will be used for reintroduction to replace those lost from roadway improvements and the remaining two would be used to establish a new population at the edge of a chaparral location, out of the way of all development. Planting of the containerized plants would take place in late November or early December after the onset of winter rains. These populations would be considered established if still growing two years after being reintroduced. Relocation of this species would serve to mitigate potentially significant impacts to this species to a level of less than significant.

The sites where Pacific Grove Clover and Allium Hickmanii are likely to grow have already been avoided by moving house sites and roadway accesses away from winter-wet locations where these species occur. However, not withstanding the above, should one or both of these species be found in a proposed development site, mitigation would be provided by collecting seed and establishing new populations of these species at one of the other winter wet locations on the property such as the vernal pool site that has been type converted and thereby is missing its normal species compliment. The clover would be reestablished by growing a seed source under cultivated conditions, collecting seed from the cultivated plants and planting them during the appropriate winter season. The size of area for reestablishment would be one for one. Hickman's onion would be reestablished by collecting seed for reestablishment and growing bulbs for out planting at an appropriate location. A home site with less than 5 Hickman's onions would not be considered as needing mitigation. Relocation of the onion and clover species should be supervised by a qualified botanist. Assessment of each development area should occur in the spring prior to the beginning of construction activity. Reestablishment of these species in accordance with the methods described above will serve to mitigate potentially significant impacts to less than significant.

Should Piperia yadonii be found on the property, this species would be moved out of the way of the development. Yadon's piperia is not difficult to move if the plant and surrounding soil are moved as a unit. This can be accomplished with a garden shovel where the rootball is lifted intact from the soil. The habitat preference is filtered shade such as under Monterey pines, manzanitas or chaparral plants. The Yadon's piperia should be moved as early in the spring as possible. Moving the forementioned plants out of the way of planned construction would mitigate potentially significant impacts to less than significant. All relocation work considered for this species should be supervised by a qualified botanist, familiar with this species.

Monterey pines are addressed under the forest Management Plan. In no instance should cultivated Monterey pine from imported nursery stock be out planted on the property.

The type converted vernal pool and its immediate surroundings should be dedicated as open space. The planners have already proposed that the appropriate vernal pool species, which are now missing, be returned to the site. Presumably sometime in the past, a previous owner may have attempted to farm the location of this pool or may have had a corral of horses or other livestock at the site. There is little other explanation for its location, configuration and lack of appropriate vernal species. The introduction of an introduced grass Crypsis vaginiflora, may have contributed to the failure of appropriate species reestablishing themselves naturally. Prior to attempting reestablishment of appropriate species, the Crypsis should be killed with an application of roundup. This should be done while the plants are young and not yet at the flowering stage.

The vernal pool must be allowed to fill with water from winter rains and then dry with the onset of summer. For that reason, all diversion of natural occurring water should be prohibited. Roadway construction within 50 feet and all building construction within 100 feet of this sensitive habitat should be prohibited. Excess water from the golf course should be diverted away from this pool to avoid converting it to a freshwater marsh. Pesticide and herbicide use on the golf course should be at sufficiently low levels that contamination of the vernal pool will not result. Annual mowing of the grassy areas surrounding the pool will help control invasive weeds and unwanted shrub species while maintaining the natural character. Mowing should be done at a 6 inch level. Following the above procedures will result in no significant impacts.

Overall Impacts

The golf course, club house, driving range and other recreational uses will promote the need for parking and vehicle accommodation. This will increase the impacts on the native grasslands by reducing the overall grassland habitat. Drainage courses and runoff may create erosion problems which can be mitigated with proper engineering. Road widening and road cuts are inevitable improvements which will reduce the habitat even farther. The inevitable importation and increase of invasive weed species such as star, bull, milk and Italian thistles plus other invasive noxious species such as pampas grass, genista and poison hemlock are likely to proliferate if left uncontrolled. Invasive weeds, especially those mentioned, could greatly reduce the beauty of the landscape and seriously impact the native prairie grasslands. Seedlings of the eucalyptus trees, planted around an old home site, are beginning to reproduce and will expand indefinitely into the chaparral and grasslands unless controlled.

Overall Mitigations

The reduction of approved units from 112 to 34 greatly lessens the overall impacts of this development allowing much of the important native grassland slopes and chaparral-covered wildlife corridors to be left in dedicated open space. It is important that the remaining grasslands in fact be dedicated as native grassland preserves and not converted to something else, such as landscaped features. As the property usage matures, there may be pressures to alter the open space grasslands. The planners intention of integrating the native prairie grasslands into the golf usage by maintaining them as rough is a beneficial use of habitat. The rough areas should be periodically mowed at heights of approximately 6 inches. This will help control invasive weeds and brush species. Managing the dedicated grasslands to preserve and enhance the native species richness and complexity, while inhibiting the non-native invasives, would result in an overall benefit.

One of the overall considerations of the planners is to reseed roadcuts with local native grasses and wildflowers. A list of desirable wildflower species will be prepared for this use.

Drainage will be channeled into natural drainage courses. Water impoundments will lessen the eroding force of increased water flow and will allow settling of eroded debris.

It is important that weed eradication be part of the overall management plan of the property. At present the above named noxious plants are just beginning to follow the roadways onto the property. A modest amount of effort can easily control them at present. Since all but the genista are annuals, control is best effected by not letting them produce seed. Excepting the entry roadways, some of the noxious weeds presently occur in populations as few as three or four per acre. Target weeds should be made known to workman; so that they can effectively control these unwanted plants before their numbers increase.

Currently the property enjoys a fine compliment of wildlife species. California Quail are common there. Bobcats and gray foxes are known to be present (one of each was seen during the biological review). Hawks and owls are also present. If these native species are to remain on the property, it is important that wildlife corridors be left intact and nesting sites for hole nesters be retained. Once the property is developed, there may be pressures to convert wildlife corridors by having them grubbed out and nesting and denning trees cleared away. It may be helpful to inform buyers of home sites that the above features have wildlife uses.

While the biological review was being conducted grasshopper sparrows, lark sparrows and horned larks were to be seen occupying territories on the grassland features. With careful development these species should be able to remain on the property

While the development of any property produces impacts which are unavoidable, following the above suggestions will lessen these impacts toward being insignificant.

Plant List

Trees

Eucalyptus globulus* Blue Gum
Pinus radiata Monterey Pine
Quercus agrifolia var. agrifolia Coast Live Oak
Salix laevigata Red Willow
Salix lasiolepis Arroyo Willow

Shrubs

Artemesia californica California Sagebrush
Adenostoma fasciculatum Chamise
Baccharis pilularis Dwarf Chaparral Broom (includes var. consanguinea)
Eriogonum parvifolium ssp. parvifolium Dune Eriogonum

Genista monspessulana* French Broom (Cytisus monspessulana*)
Holodiscus discolor Cream Bush
Lotus scoparius var. scoparius Deer Weed
Malacothamnus palmeri var. involucratus Carmel Valley Bush Mallow
Mimulus aurantiacus Northern Sticky Monkey-flower
Oemleria cerasiformis Oso Berry (Osmoronia cerasiformis)
Rhamnus californica ssp. californica Coffeeberry
Rhamnus crocea Redberry
Ribes speciosum Fuchsia-flowered Gooseberry
Sambucus mexicana Blue Elderberry
Symphoricarpos mollis Creeping Snowberry
Toxicodendron diversilobum Poison-Oak (Rhus diversiloba)

Forbs

Acaena pinnatifida var. californica (Acaena californica)
Achillia millefolium White Yarrow (A. borealis ssp. arenicola, ssp. californica)
Agoseris grandiflora Large-flowered Agoseris
Agoseris heterophylla Mountain Dandelion
Agrostis pallens (Agrostis diegoensis)
Aira caryophyllea* Hair Grass
Anagallis arvensis* Pimpernel, Poor Man's Weather-glass
Artemisia douglasiana California Mugwort
Avèna barbata* Slinder Oat
Avena fatua* Wild Oat
Azolla filiculoides Water or Duck Fern
Brassica rapa Field Mustasrd
Briza maxima* Rattlesnake Grass
Briza minor* Little Quaking Grass
Bromus carinatus var. carinatus California Brome
Bromus diandrus* Ripgut Brome
Bromus hordeaceus* Soft Chess (Bromus mollis*)
Bromus madritensis ssp. rubens* Red Brome (Bromus rubens*)
Calochortus albus White Globe Lily
Calochortus luteus Yellow Mariposa
Calystegia macrostegia ssp. cyclostegia Coast Morning-glory (Convolvulus cyclostegius)
Calystegia malacophylla ssp. pedicellata Wooly Morning-glory
Camissonia ovata Sun Cup Oenothera.ovata
Carduus pycnocephalus* Italian Thistle
Carex spp.
Castilleja affinis ssp. affinis Indian Paint Brush
Castilleja exerta ssp. exerta Owls Clover, Escobita (Orthocarplus purpurascens)
Centaurea melitensis* Tocalote, Yellow Star Thistle
Chamomilla suaveolens* Pineapple Weed (Matricaria. matricarioides)
Chlorogalum pomeridianum var. pomeridianum

Cirsium brevistylum Indian Thistle
Cirsium occidentale var. venustum Venus Thistle (C. proteanum)
Cirsium vulgare* Bull Thistle
Clarkia lewisii (Clarkia bottae)
Claytonia perfoliata ssp. perfoliata Miner's Lettuce (Montia.perfoliata)
Conium maculatum* Poison-hemlock
Cotula coronopifolia* Brass Buttons
Crassula aquatica Water Pygmyweed (Tillaea aquatica)
Crypsis vaginiflora*
Cynosurus echinatus* Dogtail Grass
Danthonia californica var. californica California Oat-grass
Daucus pusillus Rattlesnake Weed
Delphinium californicum ssp. californicum Coast Larkspur
Dichondra donelliana California Dichondra
Dryopteris arguta California Wood Fern
Dudleya lanceolata (Dudleya cymosa ssp. minor)
Elymus glaucus var. glaucus Western Ryegrass
Erechtites minima* Toothed Coast Fireweed (Erechtites prenanthoides*)
Eremocarpus setigerus Turkey Mullein
Erodium botrys* Long-beaked Filaree
Erodium circutarium* Red-stemmed Filaree
Eschscholzia californica California Poppy
Festuca arundinacea* Reed Fescue
Festuca californica California Fescue
Filago gallica* Narrow-leaved Filago
Fragaria vesca California Strawberry (Fragaria californica)
Galium californicum ssp. californicum California Bedstraw
Galium porrigens Climbing Bedstraw (Galium nuttallii)
Gastridium ventricosum* Nitgrass
Gnaphalium californicum California Everlasting
Gnaphalium purpureum Purple Cudweed
Hemizonia corymbosa spp. corymbosa Coast Tarweed
Hirschfeldia incana* Summer Mustard (Brassica geniculata*)
Hordeum branchyantherum ssp. branchyantherum Meadow Barley
Hordeum marinum ssp. gussoneanum* Mediterranean Barley (Hordeum geniculatum*)
Hordeum murinum ssp. leporinum* Barnyard Foxtail (Hordeum leporinum*)
Hydrocotyle verticillata Whorled Marsh Pennywort
Hypochaeris glabra* Smooth Cat's Ear
Hypochaeris radicata* Hairy Cat's Ear
Juncus bufonius var. bufonius Toad Rush
Juncus effusus var. pacificus
Juncus phaeocephalus var. paniculatus
Koeleria macrantha (K. cristata)
Lathyrus vestitus var. ochropetalus
Lemna minor Duckweed
Leymus condensatus Giant Wild Rye

Linum bienne* Narrow-leaved Flax
Lolium multiflorum* Italian Ryegrass
Lolium perenne* Lawn Ryegrass
Lotus corniculatus* Bird's-foot Trefoil
Lupinus nanus Sky Lupine
Luzula comosa Woodrush (Luzula subsessilis)
Lythrum hyssopifolium* Wallow Poly
Madia gracilis Slender Tarweed
Madia sativa Coast Tarweed
Marah fabaceus Common Manroot
Marrubium vulgare* White Horehound
Medicago polymorpha* Calif. Bur-clover (Medicago hispida)
Nassella cernua (Stipa.cernua)
Nassella lepida (Stipa.lepida)
Nassella pulchra (Stipa.pulchra)
Navarretia squarrosa Skunkweed
Osmorhiza chilensis Wood Cicely
Pentagramma triangularis Goldback Fern
Phacelia nemoralis ssp. nemoralis Shade Phacelia
Plantago coronopus* Cut-leaved Plantain
Plantago erecta (Plantago hookeriana)
Plantago lanceolata* Ribwort
Polygonum arenastrum* (P. aviculare)
Polypogon monspeliensis* Rabbitfoot Grass
Potentilla glandulosa ssp. glandulosa Sticky Cinquefoil
Pteridium aquilinum var. pubescens Western Bracken
Ranunculus californicus California Buttercup
Rubus ursinus California Blackberry
Rumex acetosella* Sheep Sorrel
Rumex pulcher* Fiddle Dock
Salvia mellifera Black Sage
Sanicula crassicaulis Gambleweed
Satureja douglasii Yerba Buena
Scrophularia californica ssp. californica Coast Figwort
Senecio vulgaris* Common Groundsel
Sidalcea malvaeflora.ssp.malvaeflora Checker Bloom
Silene gallica* Common Catchfly
Silybum marianum* Milk Thistle
Sisyrinchium bellum Blue-eyed Grass
Sonchus asper* Prickly Sow-thistle
Sonchus oleraceus* Common Sow-thistle
Soliva sessilis
Spergularia macrotheca var. macrotheca Large-flowered Sand Spurrey
Spergularia rubra* Purple Sand Spurrey
Stachys bullata Hedge Nettle
Stebbinsoseris heterocarpa Derived Microseris (Microseris heterocarpa)

Stephanomeria virgata ssp. pleurocarpa
Trifolium barbigerum var. barbigerum Colony Clover
Trifolium dubium* Shamrock
Trifolium gracilentum var. gracilentum Pin-point Clover
Trifolium variegatum var. variegatum White-tipped Clover
Triteleia ixioides ssp. ixioides Golden Brodiaea (Brodiaea lutea)
Urtica dioica ssp. holosericea Hoary Nettle (Urtica.holosericea)
Urtica urens* Dwarf Nettle
Verbena bracteata
Verbena lasiostachys var. lasiostachys
Viola pedunculata Wild Pansy
Vulpia myuros var. myuros* (Festuca megalura*)
Xanthium strumarium Cocklebur
Zigadenus fremontii Star-lily

* Non-native Introduced Plants

Additions to the Bird List

Wild Turkey*
Grasshoper Sparrow
Great Blue Heron

* Non-native Introduced

APPENDIX D
Traffic Report

TRAFFIC IMPACT ANALYSIS

CAÑADA WOODS NORTH PROJECT

Prepared for

Denise Duffy & Associates

Prepared by

Barton-Aschman Associates, Inc.

August 27, 1996

Contents

Chapters

Tables

Contents (Continued)

Figures

Executive Summary

The traffic impact of the Cañada Woods North project was compared to the impact of the approved 112 units of the Monterra Ranch Subdivision that it would be replacing. The Cañada Woods North Project includes 34 residential lots, 5 employee units, a private golf course or fitness center, and equestrian center.

The Cañada Woods North project would have less impact than the approved subdivision it is replacing. Even though it would have less impact, Cañada Woods would still contribute to LOS D conditions on Highway 68 at Olmsted, and to cumulative LOS E operations at the intersections with Highway 218 and with York Road. As mitigation, the project should pay into the Highway 68 improvement account commensurate with its trip generation. The improvement account, which already has funding from other projects, could be used to widen Highway 68 to four lanes at Olmsted, which would ameliorate the LOS D condition there.

The project also includes a private road over-the-hill that would connect to the approved 54-lot Cañada Woods development. The road would be gated and only used by Cañada Woods and Cañada Woods North residents and golf course members. This road would allow Cañada Woods residents to access Highway 68, which would reduce previously documented impacts to Highway 1 and to Carmel Valley Road.

Table ES-1
Existing Plus Project Plus Remainder Monterra (213 Lots) Intersection Levels of Service

		Existing		Existing Plus 325 Monterra		Existing Plus Project Plus 213 Monterra	
Intersection	Peak Hour	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
Olmsted and Highway 68[a]	AM	16	C	17	C	17	C
	PM	27	D	31	D	25	D
Highway 218 and Highway 68	AM	14	B	34	D	34	D
	PM	13	B	29	D	30	D
York and Highway 68	AM	19	C	31	D	31	D
	PM	9	B	22	C	22	C
Highway 1 and Carmel Valley Road	AM	9	B	7	B[b]	7	B[b]
	PM	42	E[d]	39	D[b]	37	D[b]
Carmel Rancho and Carmel Valley Road	AM	11	B	11	B[c]	11	B[c]
	PM	27	D	15	B[c]	15	B[c]

[b] Assumes double left-turn lane SB Highway 1
[c] Assumes second EB through lane

1. Introduction

The Carmel Development Company has applied to Monterey County to develop the Cañada Woods North project off of Olmsted Road near Highway 68. The project would consist of 34 residential lots and an 18-hole golf course to be built on a portion of the already-approved Monterra Ranch subdivision (see detailed project description below). This report describes the traffic impact of the project.

Project Description

The proposed project consists of 34 residential lots: 5 employee dwelling units: an 18-hole golf course including 12 member suites. a club house. and maintenance facility: a fitness center: 8 tennis courts: and an equestrian center with 12 to 24 stalls. The golf course will be a private facility and limited to 300 members.

Primary access to the project site would be from Olmsted Road via a private. gated road. Secondary access would be available over-the-hill through the approved Cañada Woods project to and from Carmel Valley Road. opposite Valley Greens Drive. This secondary access would also be a private. gated road. Both the primary and secondary access roads would be available only to Cañada Woods North residents and golf course members as well as to the original Cañada Woods development residents.

The project site occupies a portion of the previously-approved Monterra Ranch Subdivision. The portion of the Monterra Ranch Subdivision proposed as the project site for Cañada Woods North consists of 19 lots of record created by the Phase I final map and 120 approved tentative map lots for the Monterra Ranch Subdivision. totaling 139 entitlements. For purposes of comparative impact analysis. however. the Cañada Woods North project will be considered to be replacing 112 residential lots. and 27 density units will be considered transferred to the remaining Monterra Ranch site.

Traffic Study Scenarios

This traffic study considers many scenarios, as follows.

Scenario 1: *Existing.* Current traffic conditions based on traffic counts no more than two years old.

Scenario 2: *Existing Plus Project.* Existing traffic counts plus the Cañada Woods North project and the reassigned Cañada Woods traffic as a result of the over-the-hill road.

Scenario 3: *Existing Plus Part of Monterra.* Existing traffic counts plus the 112 Monterra lots that the project would replace. This scenario represents the "No-Project" condition for impact comparisons.

Scenario 4: *Existing Plus Approved Monterra and Cañada Woods.* Existing traffic counts plus the 325 lots approved for all of Monterra Ranch (283 market rate plus 42 inclusionary) plus the 54 lots approved for Cañada Woods. This scenario is included for comparison purposes to assess the impact of the over-the-hill road.

Scenario 5: *Existing Plus Project Plus Remainder of Monterra Plus Cañada Woods.* Existing traffic count plus the project plus 213 units on the remainder of Monterra (325 minus 112) plus the 54 units of Cañada Woods. This scenario can be compared to the previous scenario to assess the impact both of the project and the over-the-hill road.

Scenario 6: *Cumulative.* The same as Scenario 5 plus the addition of traffic from all approved and proposed development in the area (see Figure 2).

Study Roads and Intersections

This study focuses on peak-hour traffic conditions at intersections because that is generally how Monterey County evaluates impacts. The study includes both the AM and PM peak hours. The list of study intersections is based on the likely locations where impacts would occur both from the project and from the over-the-hill road. Other intersections may also experience some project traffic, but the volumes would be so minor as to be negligible. In addition to intersections, the study also assesses daily traffic on Carmel Valley Road, as is the accepted methodology in the Carmel Valley Master Plan.

List of Intersections

Olmsted Road and Highway 68
Highway 218 and Highway 68
York Road and Highway 68
Highway 1 and Carmel Valley Road
Carmel Rancho Boulevard and Carmel Valley Road
Valley Greens Drive and Carmel Valley Road (signal warrant check)

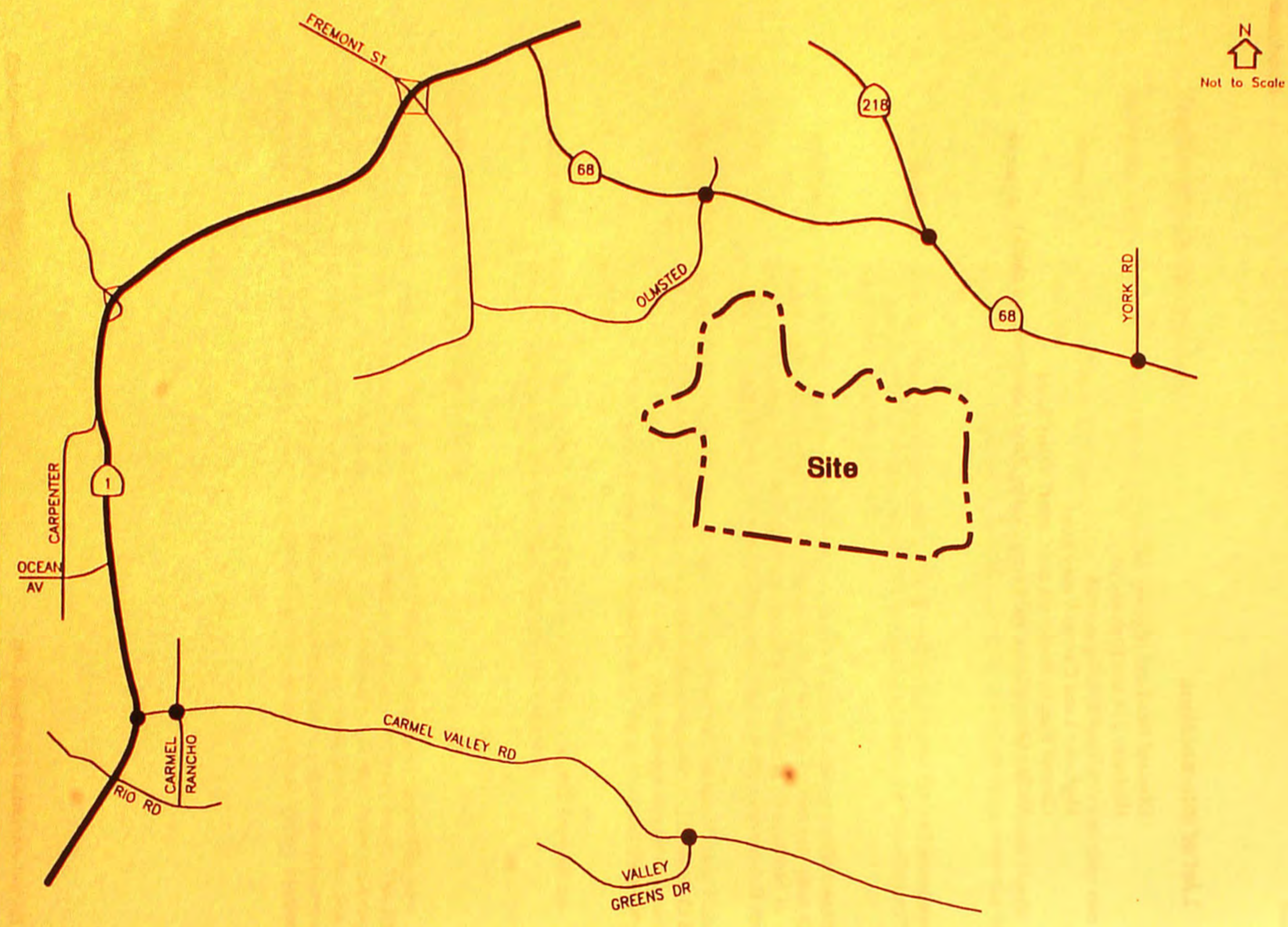


Figure 1
SITE LOCATION AND STUDY INTERSECTIONS

Barton-Aschman Associates, Inc.

Canada Woods North

(3)

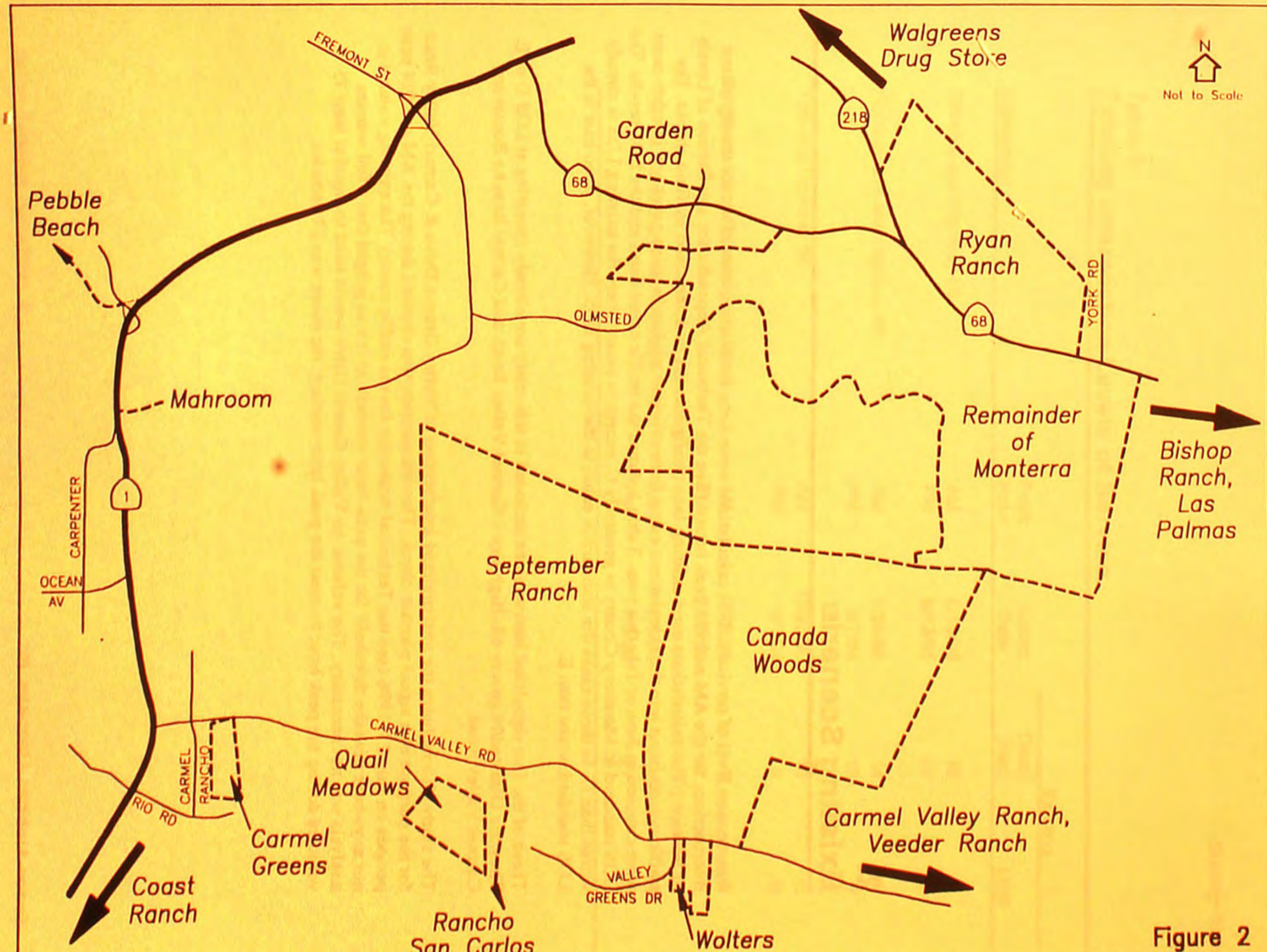


Figure 2
OTHER APPROVED OR PROPOSED PROJECTS

2.
Existing Scenario

Intersection level of service (LOS) calculations were done for existing conditions for the signalized intersections for the AM and PM peak hours. (See the Technical Appendix for a definition of Levels of Service.) The calculations used existing lane configurations as determined by field checks. The traffic counts input into the calculations came from previous studies in some cases and in other cases were counted in June or July this year. Table 1 shows the traffic count dates and the LOS results. The LOS standard in Monterey County is generally C, except in cases where the existing LOS is already worse than C. In those cases the standard is equal to the existing LOS. However, in no case is the LOS standard worse than E.

Three of the five signalized intersections included in this study are already operating at LOS D or E. They are Olmsted/Highway 68, Highway 1/Carmel Valley Road, and Carmel Rancho Boulevard/ Carmel Valley Road.

The study also includes the unsignalized intersection of Valley Greens Drive & Carmel Valley Road for the purpose of a signal warrant check. This intersection was counted during the AM and PM peak periods on July 23, 1996 (see the Technical Appendix for the traffic count). The existing volume is not anywhere near the threshold for the peak-hour warrant, so it was judged that a full warrant analysis was not necessary. The volume on Valley Greens Drive would need to equal at least 75 vehicles during the peak hour to meet the peak hour warrant; the count was 27 vehicles.

Table 1
Existing Intersection Levels of Service

Intersection	Peak Hour	Count Date	Existing Delay (sec)	Existing LOS
Olmsted and Highway 68	AM	6/19/96	16	C
	PM	9/13/95	27	D
Highway 218 and Highway 68	AM	7/24/96	14	B
	PM	9/7/94	13	B
York and Highway 68	AM	10/25/90	19	C
	PM	9/1/94	9	B
Highway 1 and Carmel Valley Road	AM	7/23/96	9	B
	PM	7/23/96	42	E
Carmel Rancho and Carmel Valley Road	AM	7/6/94	11	B
	PM	7/6/94	27	D

3.
Existing Plus Project Scenario

The peak-hour traffic that would be generated by the project was added to the existing traffic counts, and resulting levels of service were calculated. The project was estimated to generate 46 trips during the AM peak hour and 64 during the PM peak hour (see Table 2). The trip generation rates for the residential and fitness center uses come from the Institute of Transportation Engineers (ITE) *Trip Generation* manual, 5th Edition. A small internal discount factor is used for the homes to represent trips to the on-site recreational facilities. Discount factors are also applied to the recreational facilities to represent the other end of those same internal trips. The employee homes will involve mostly internal trips during peak hours because working on-site will be a requirement for living there.

The golf course trip generation rate comes from a traffic count at the Cypress Point Golf Course in Pebble Beach. That course is similar to what is being proposed since it is private, has 250 members, and includes a restaurant, banquet room, and six guest units. Barton-Aschman conducted AM and PM peak-hour traffic counts (7:00 AM to 9:00 AM and 4:00 PM to 6:00 PM) at the entrance to the Cypress Point Golf Course on Wednesday June 19, 1996. During both peak hours the course was found to generate 14 trips (see Table 3). To be conservative, these were factored up to 28 trips for the proposed Cañada Woods North course.

The estimated Cañada Woods North trip distribution pattern is shown in Figure 3. This pattern is based on the estimate done for Monterra Ranch (refer to Figure 4 taken from the *Monterra Ranch Traffic Impact Analysis*, July 26, 1984, by LSA). It is modified to reflect the presence of the proposed over-the-hill road that will give direct access to Carmel Valley Road. As shown in Table 4, the over-the-hill road would provide a shorter connection to Carmel Valley than would otherwise be available. It is anticipated that a portion of shopping trips would be oriented toward Carmel Valley. Most other trips would be oriented toward Monterey, Salinas, or Carmel. The over-the-hill road would also provide a shorter (in distance) connection to Carmel, but due to the slower travel speed, the Highway 68 to Highway 1 route would be equivalent in time.

Table 2
Cañada Woods North Trip Generation

	Rate				Trips	
Component	AM	PM	Source	Internal Discount	AM	PM
Golf Course (includes guest units, restaurant, banquet room)	28	28	Cypress Point count	15%	24	24
34 Homes	0.75	0.98	ITE	5%	24	32
Fitness Center (8 tennis courts)	1.4	3.9	ITE	50%	6	16
Equestrian Center (24 stalls)	0.2	0.2	BA estimate	50%	2	2
Employee Homes (5 units)	0.75	0.98	ITE	75%	1	1
Total					57	75

Table 3
Comparison of Proposed Cañada Woods Golf Course to Cypress Point

Component	Cypress Point	Cañada Woods
Golf Course	18-hole	18-hole
Members	250	300
Guest Units	6	12
Restaurant	Yes	Yes
Banquet Room	Yes	Yes
AM Trips	14[a]	28[b]
PM Trips	14[a]	28[b]

Notes:
[a] Count date June 19, 1996
[b] Factored by 2.0

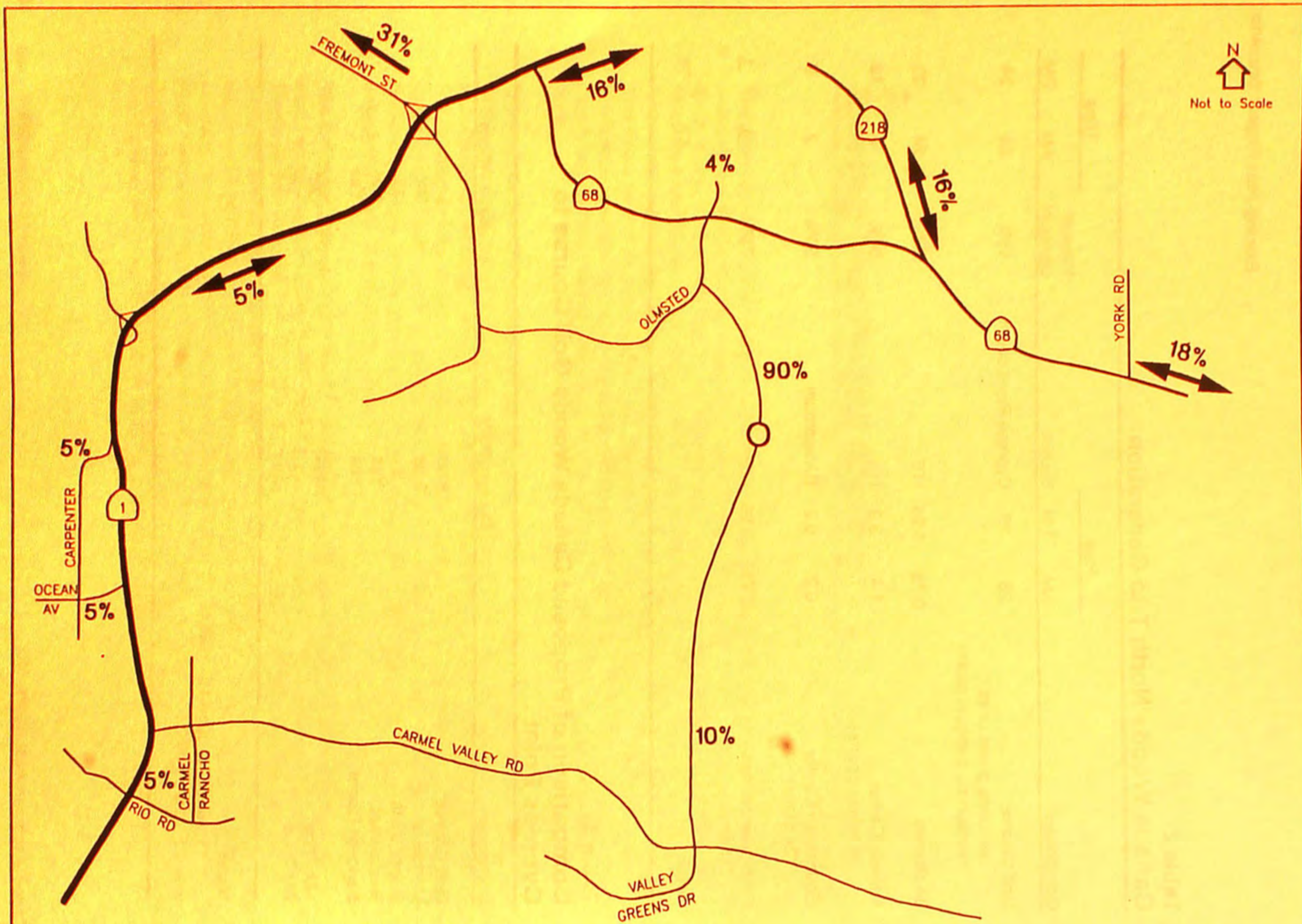


Figure 3

CAÑADA WOODS NORTH TRIP DISTRIBUTION

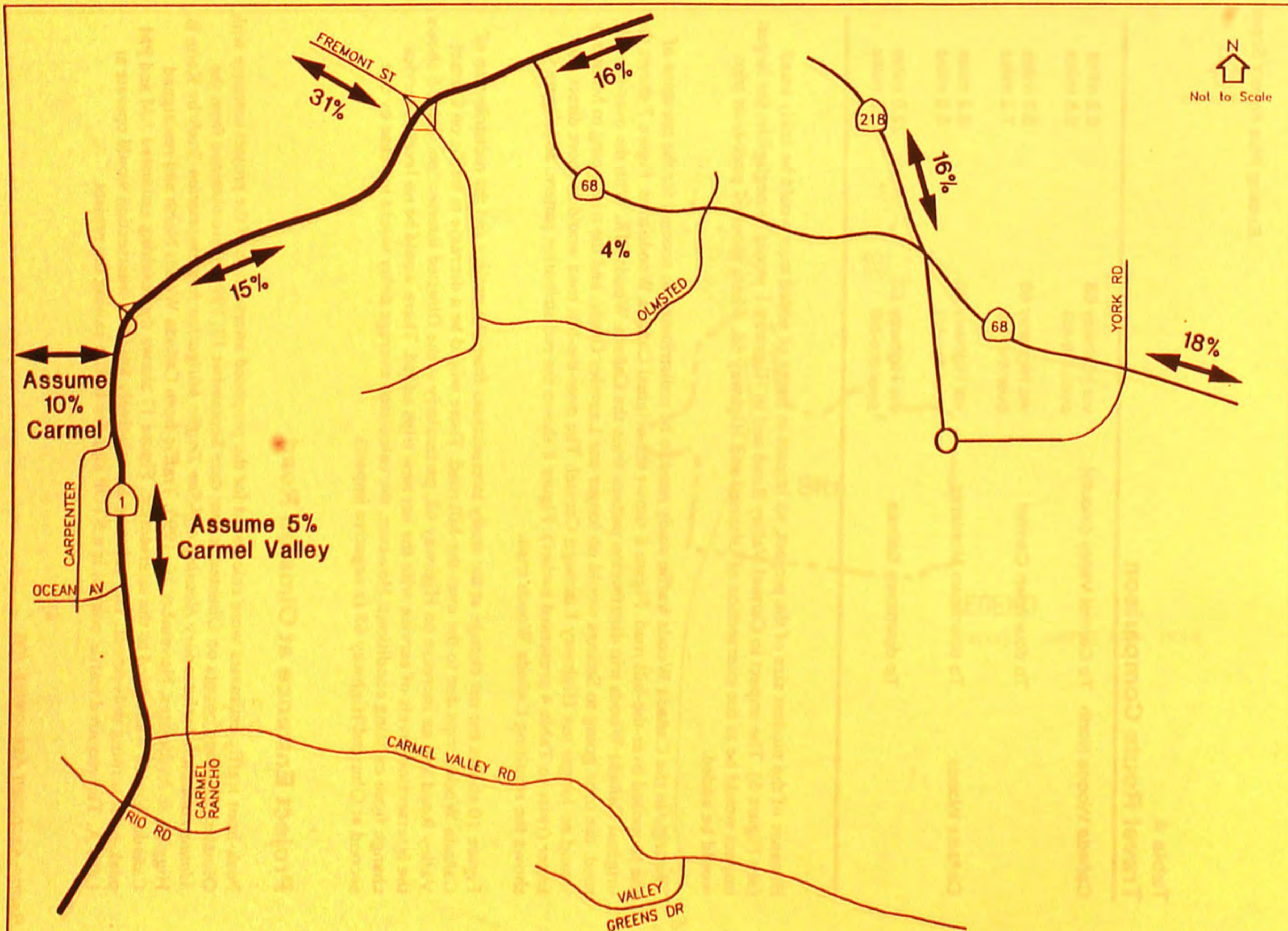


Figure 4
ORIGINAL MONTERRA DISTRIBUTION
(from TIA by LSA 7/26/84)

Table 4
Travel Route Comparison

Cañada Woods North	To Carmel Valley (mouth)	via Highway 68	8.2 miles
		over-the-hill	5.5 miles
	To downtown Carmel	via Highway 68	8.2 miles
		over-the-hill	7.2 miles
Cañada Woods	To downtown Monterey	via Highway 68	8.2 miles
		over-the-hill	5.8 miles
	To downtown Salinas	via Highway 68	22.9 miles
		over-the-hill	17.5 miles

Because of the modest size of the project, its impact in terms of added trips would be fairly small (see Figure 5). The impact to Carmel Valley Road and to Highway 1 would be negligible; the largest impact would be to the intersection of Olmsted and Highway 68, where about 67 peak-hour trips would be added.

The trips in the Cañada Woods traffic study need to be redistributed to account for the presence of the proposed over-the-hill road. Figure 6 shows the original Cañada Woods trips. Figure 7 shows the original Cañada Woods trip distribution pattern from the Cañada Woods EIR. With the over-the-hill road, the trips going to Salinas would no longer use Laureles Grade, and the trips going to Monterey would no longer use Highway 1 through Carmel. The over-the-hill road would be more direct and faster (refer to Table 4 presented earlier). Figure 8 shows the redistribution pattern, and Figure 9 shows the resulting Cañada Woods trips.

Figure 10 shows the net change at the study intersections from the project and the redistribution of Cañada Woods trips due to the over-the-hill road. There would be a decrease in traffic on Carmel Valley Road and an increase on Highway 68, particularly at the Olmsted intersection. Table 5 shows the intersection levels of service with the net new trips added. There would be no level of service change from existing conditions. However, the calculated average delay would increase by one second at Olmsted/Highway 68 (a negative impact).

Project Entrance at Olmsted Road

Peak-hour traffic estimates were calculated for the proposed intersection of the project entrance with Olmsted. Existing counts on Olmsted (count date September 13, 1995) were obtained from the *Monterra Ranch Inclusionary Housing Off-Site Traffic Mitigation Implementation Study* by Keith B. Higgins & Associates, November 10, 1995. Traffic from Cañada Woods North and reassigned Cañada Woods was added to the intersection. Figure 11 shows the resulting estimated AM and PM peak-hour turning movement. The volumes are relatively low; this intersection would operate at LOS A. The required traffic control is a STOP sign for traffic exiting the project.

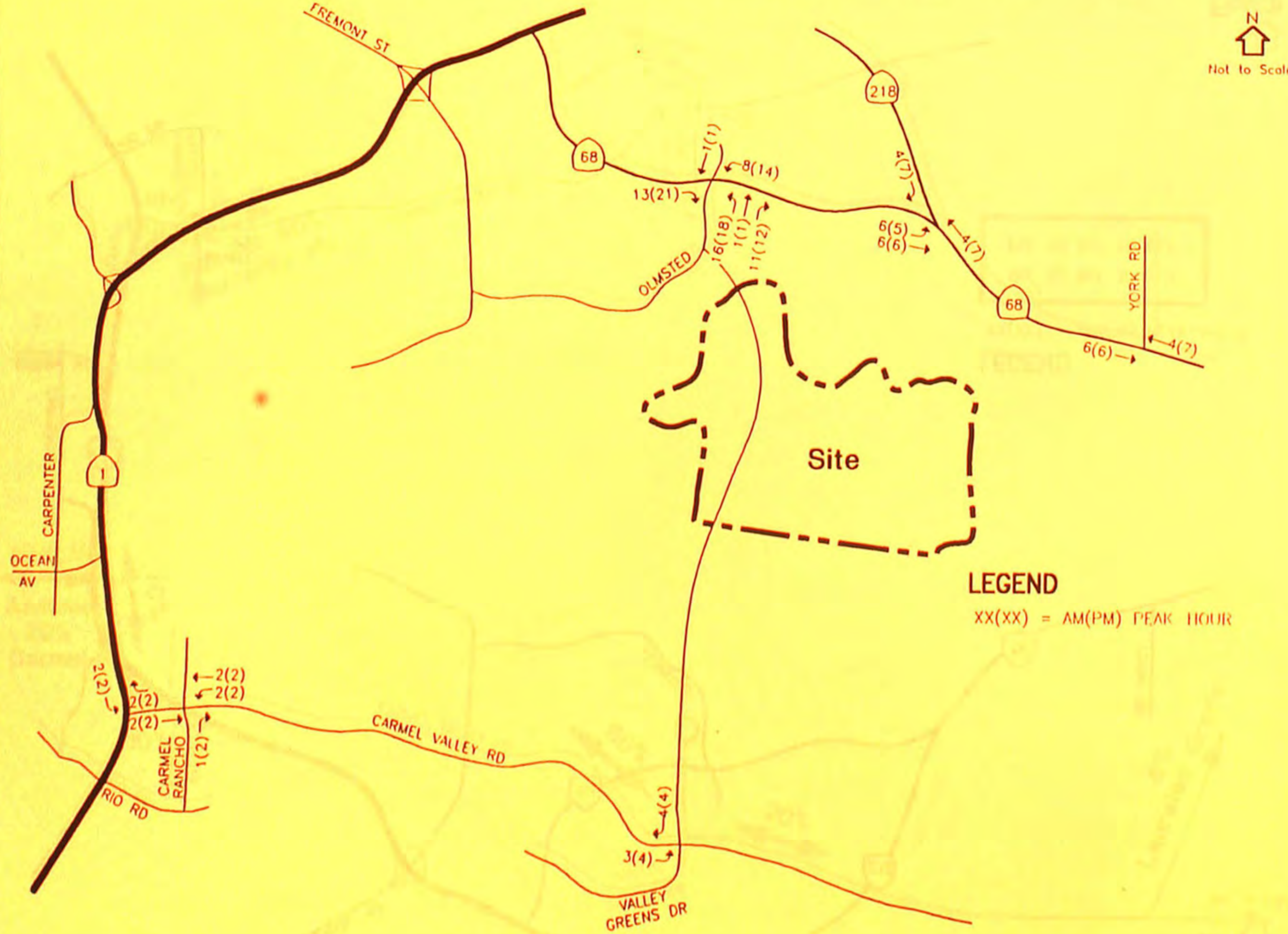


Figure 5
CAÑADA WOODS NORTH TRIPS

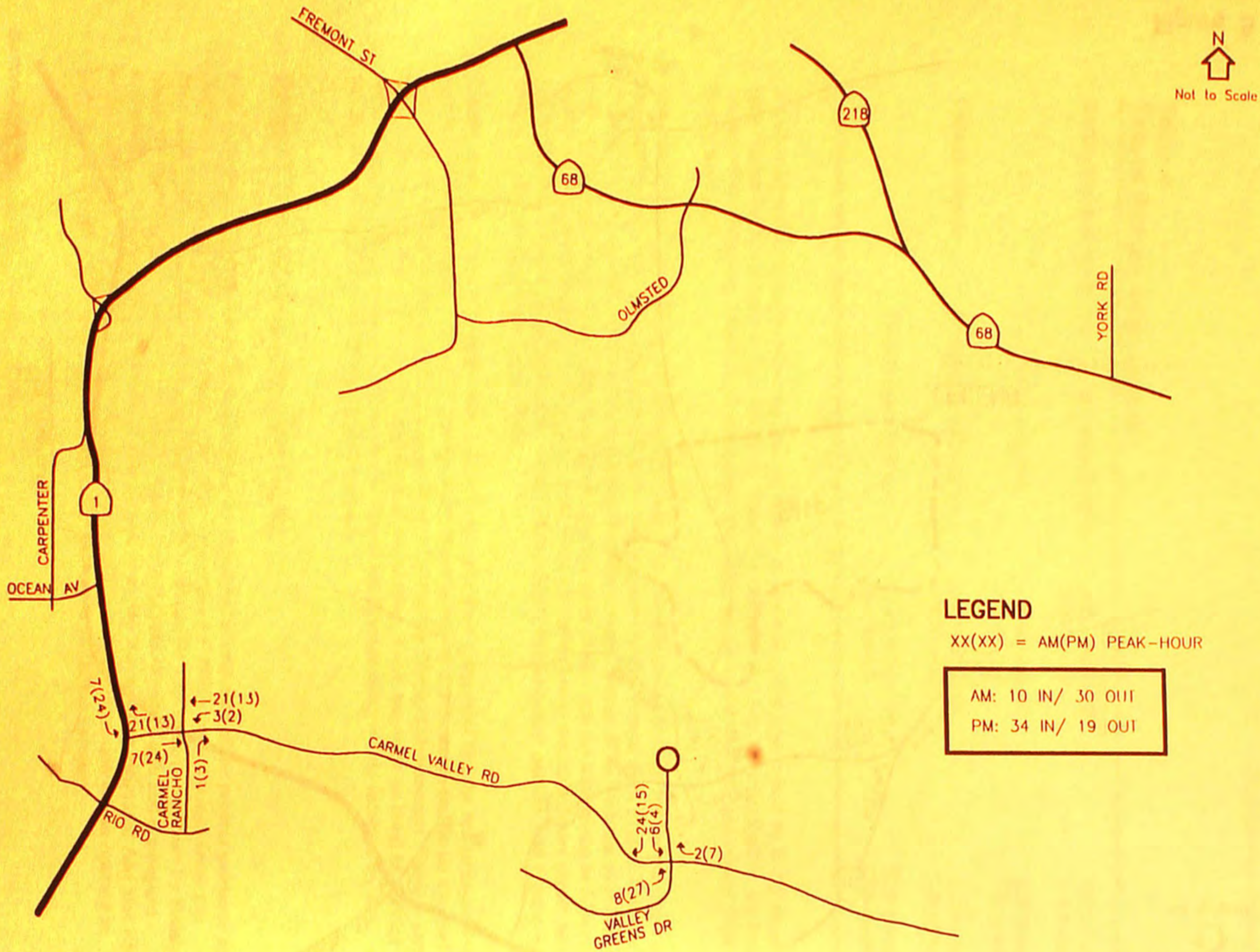


Figure 6
ORIGINAL CAÑADA WOODS TRIPS

Figure 7
ORIGINAL CAÑADA WOODS TRIP DISTRIBUTION
(from Cañada Woods EIR)

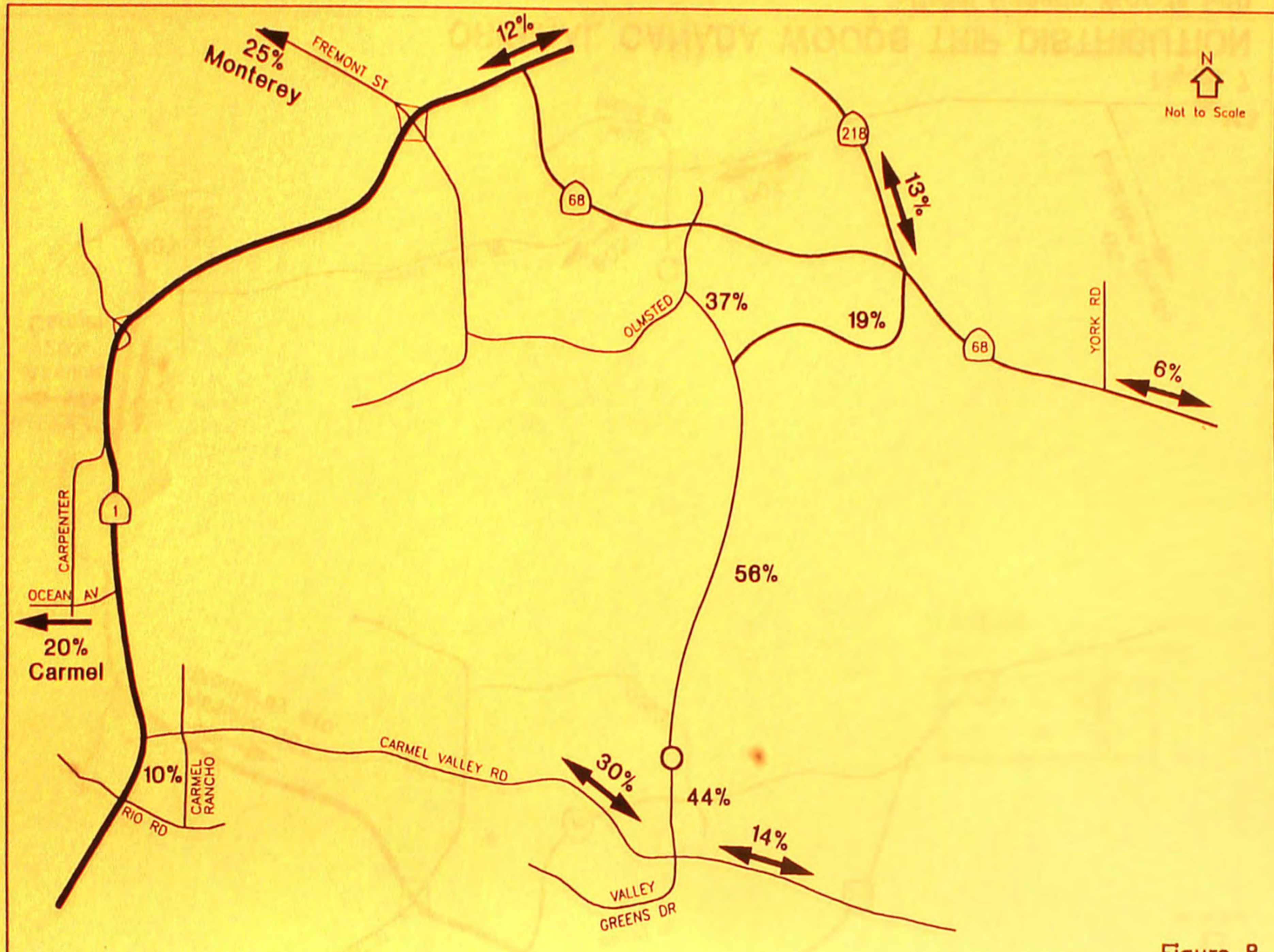


Figure 8
CAÑADA WOODS REDISTRIBUTION
(assuming 68 connection)

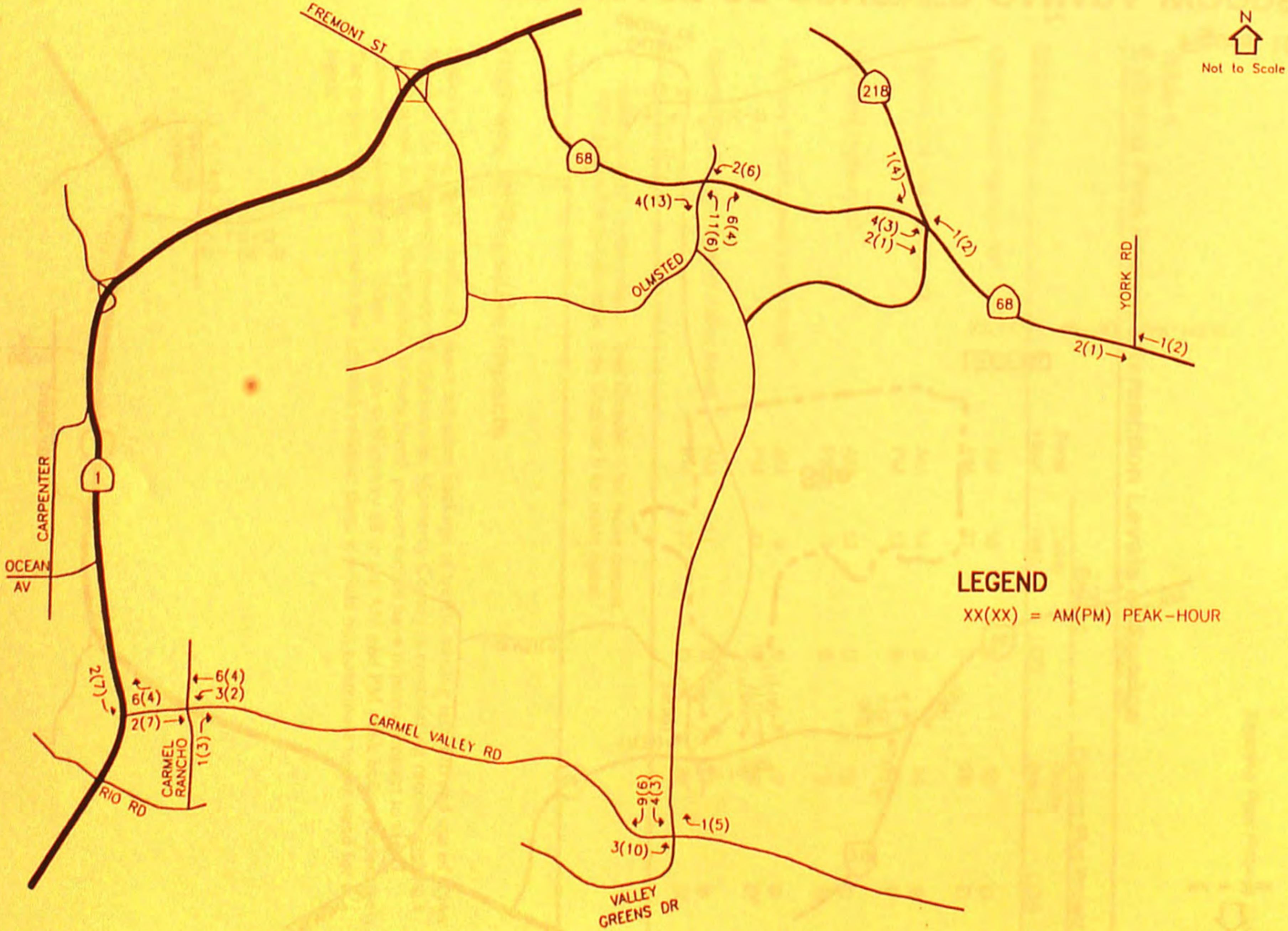


Figure 9
REASSIGNED CAÑADA WOODS TRIPS

Figure 10

NET IMPACT OF COMBINED CAÑADA WOODS NORTH AND REASSIGNED CAÑADA WOODS TRIPS

Table 5
Existing Plus Project Intersection Levels of Service

Intersection	Peak Hour	Existing Delay (sec.)	Existing LOS	Existing Plus Project Delay (sec.)	Existing Plus Project LOS
Olmsted and Highway 68[a]	AM	16	C	16	C
	PM	27	D	28	D
Highway 218 and Highway 68	AM	14	B	14	B
	PM	13	B	13	B
York and Highway 68	AM	19	C	19	C
	PM	9	B	9	B
Highway 1 and Carmel Valley Road	AM	9	B	7	B
	PM	42	E[d]	36	D[b]
Carmel Rancho and Carmel Valley Road	AM	11	B	11	B
	PM	27	D	15	B[c]

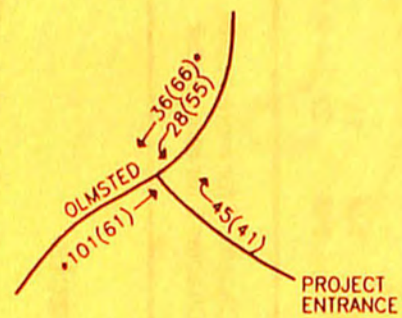
[a] With planned improvements. See Chapter 5 for more details.
[c] With planned improvements. See Chapter 5 for more detail.

Highway 68/Ragsdale Impacts

Under existing traffic conditions, there are often backups of traffic turning left into and out of Ryan Ranch at the Ragsdale/Highway 68 intersection. Monterey County is considering recommending a signal at that location. The Cañada Woods North project would have minimal impact to that intersection, adding only 13 and 16 trips to Highway 68 in the AM and PM peak hours, respectively. The project would not add to the left-turn volume; thus, it would not contribute to the need for a signal.

N

Not to Scale



LEGEND

XX(XX) = AM(PM) PEAK-HOUR

• Volumes taken from "Monterra Ranch Inclusionary Housing Off-Site Traffic Mitigation Implementation Study" Keith B. Higgins & Associates, Nov 10, 1995.

Figure 11

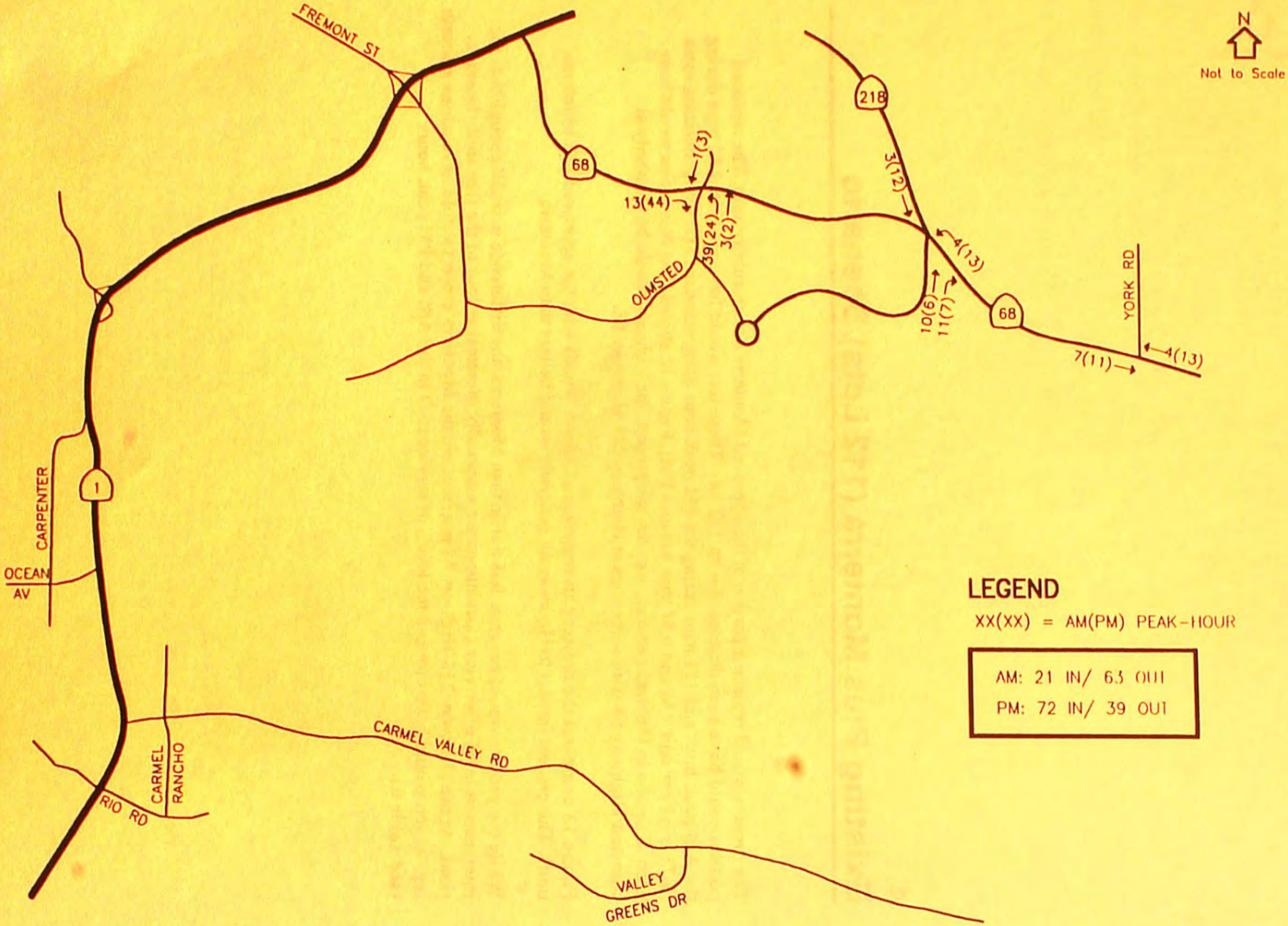
ESTIMATED TRAFFIC AT PROJECT ENTRANCE

4.
Existing Plus Monterra (112 Lots) Scenario

The project would replace a portion of the approved Monterra Ranch subdivision. The replaced portion could have been developed with 112 lots. These lots would have generated 84 trips during the AM peak hour and 111 trips during the PM peak hour using standard ITE trip generation rates (0.75 trips per unit AM and 0.98 trips per unit PM). Figure 12 shows how these trips would have been assigned to the road network. As with the project, their impact would be primarily at Olmsted/Highway 68 with some trips at Highway 218/Highway 68.

Figure 13 compares the project plus reassigned Cañada Woods with the approved 112 Monterra units. The project impact to Highway 68 generally would be less than Monterra.

While the project would generate less traffic than Monterra, the difference is small enough that the intersection level of service calculations are essentially identical at four of the five study intersections. At the Highway 218/Highway 68 intersection, the Monterra project would have added a fourth leg, which would have dropped the levels of service to D in the AM and PM peak hours (see Table 6).



LEGEND

XX(XX) = AM(PM) PEAK-HOUR

AM: 21 IN/ 63 OUT
PM: 72 IN/ 39 OUT

Figure 12

MONTERRA 112 UNITS TRIPS

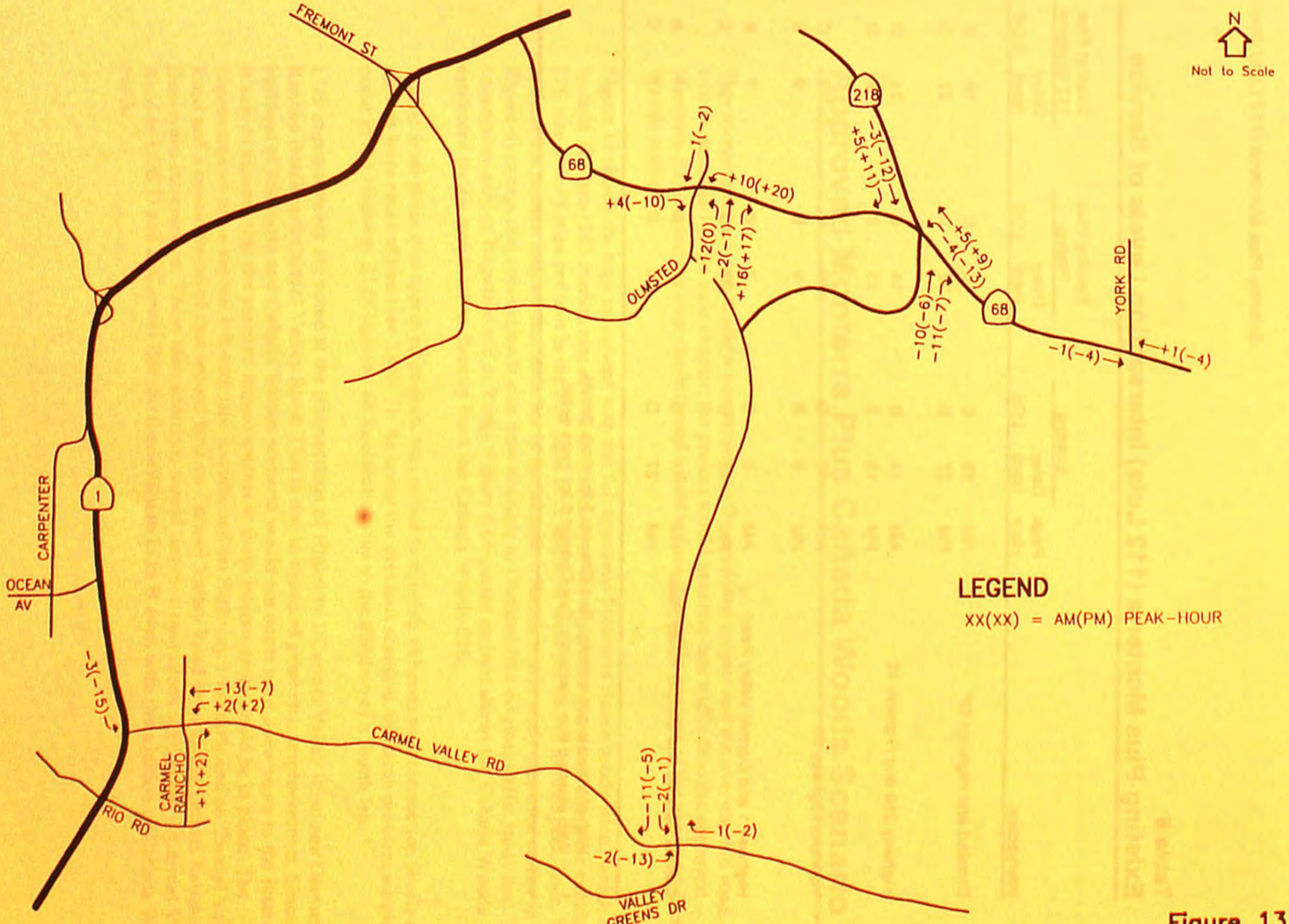


Figure 13

NET IMPACT OF CAÑADA WOODS NORTH AND REASSIGNED CAÑADA WOODS COMPARED TO 112 UNITS MONTERRA

Table 6
Existing Plus Monterra (112 Lots) Intersection Levels of Service

Intersection	Peak Hour	Existing Delay (sec)	Existing LOS	Existing Plus Project Delay (sec)	Existing Plus Project LOS	Existing Plus 112 Monterra Delay (sec)	Existing Plus 112 Monterra LOS
Olmsted and Highway 68[a]	AM	16	C	16	C	16	C
	PM	27	D	28	D	27	D
Highway 218 and Highway 68	AM	14	B	14	B	31	D
	PM	13	B	13	B	28	D
York and Highway 68	AM	19	C	19	C	19	C
	PM	9	B	9	B	9	B
Highway 1 and Carmel Valley Road	AM	9	B	7	B	7	B
	PM	42	E[a]	36	D[b]	36	D
Carmel Rancho and Carmel Valley Road	AM	11	B	11	B	11	B
	PM	27	D	15	B[c]	15	C

[b] With planned improvements. See Chapter 5 for more details.
[c] With planned improvements. See Chapter 5 for more detail.

5.
Approved Monterra Plus Cañada Woods Scenario

This scenario is included to allow comparison to the proposed project and the over-the-hill road. As will be described in the next chapter, the project would generate less traffic than the approved Monterra Ranch, and the over-the-hill road would reduce the traffic impacts of the approved Cañada Woods project.

Figure 14 shows the trips associated with the full approved Monterra Ranch subdivision, which could include 325 lots (283 market rate and 42 inclusionary). The trips were generated using the standard ITE rate of 0.75 trips per unit in the AM peak hour and 0.98 trips per unit in the PM peak hour. The assignment pattern follows that included in the Monterra Ranch traffic study (depicted earlier in Figure 4) except that connection is also now possible to Olmsted (the original traffic study had connection only to Ragsdale and to York). Figure 6 (depicted earlier) shows the Cañada Woods estimated traffic and is taken directly from the Cañada Woods EIR.

Traffic from these two approved projects was added to existing volumes and intersection levels of service were recalculated (see Table 7). As under the previous scenario, the same problem would occur at the Highway 218/Highway 68 intersection due to the addition of a fourth leg.

LOS improvements are noted at the intersections of Highway 1/Carmel Valley Road and Carmel Rancho Boulevard/Carmel Valley Road. This is due to assumed geometric improvements. Since this buildout of Monterra and Cañada Woods scenario would not occur until a few years in the future, it is safe to assume that the planned improvements at these intersections would be in place. The improvements are a second left-turn lane southbound on Highway 1 to eastbound on Carmel Valley Road and a continuation of that second lane on Carmel Valley Road through the Carmel Rancho Boulevard intersection. These lane additions would improve operations at Highway 1/Carmel Valley Road to LOS D and at Carmel Rancho Boulevard to LOS B even with the addition of Cañada Woods traffic.

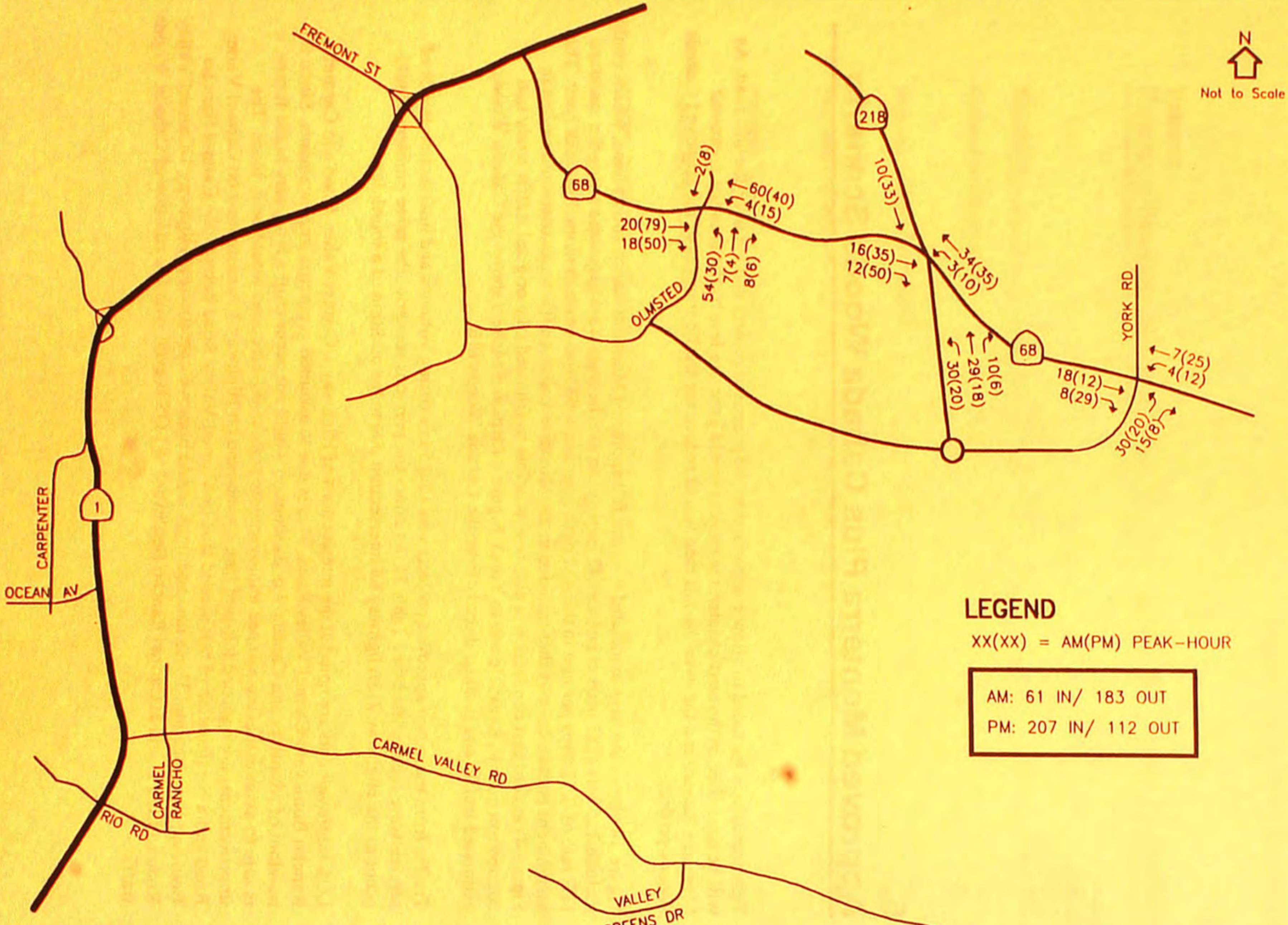


Figure 14
ORIGINAL MONTERRA TRIPS
325 units (283+42)

Table 7
Existing Plus Original Monterra (325 Lots) Intersection Levels of Service

Intersection	Peak Hour	Existing Delay (sec)	Existing LOS	Existing Plus 325 Monterra Delay (sec)	Existing Plus 325 Monterra LOS
Olmsted and Highway 68[a]	AM	16	C	17	C
	PM	27	D	31	D
Highway 218 and Highway 68	AM	14	B	34	D
	PM	13	B	29	D
York and Highway 68	AM	19	C	31	D
	PM	9	B	22	C
Highway 1 and Carmel Valley Road[d]	AM	9	B	7	B[b]
	PM	42	E	39	D[b]
Carmel Rancho and Carmel Valley Road	AM	11	B	11	B[c]
	PM	27	D	15	B[c]

[b] Assumes double left-turn lane SB Highway 1.
[c] Assumes second EB through lane.

6. Project Plus Remainder of Monterra and Cañada Woods Scenario

This scenario depicts the impact of the project in the context of approved developments on adjacent parcels. These approved developments are Cañada Woods immediately south of the project and the remainder of Monterra Ranch, north and west of the project. After removing the 112 lots that would be replaced with the project, the remainder of Monterra could accommodate 213 lots, including the inclusionary units. Cañada Woods has been approved for 54 lots.

The remaining 213 lots of Monterra would generate 160 AM peak-hour trips and 208 PM peak-hour trips using the standard ITE rates. Figure 15 shows how these trips would be distributed to the roadways based on the trip distribution pattern in the Monterra traffic study.

The redistributed Cañada Woods trips (Figure 9) were added to the Cañada Woods North trips (Figure 5) and to the Remainder of Monterra trips (Figure 14) to come up with a total depiction of trips that would be added to the area with the proposed project and its associated over-the-hill road. These were then compared to the "No-Project" scenario of Monterra plus Cañada Woods without the over-the-hill road (described in Chapter 5).

The bottom line is that the project plus the road would result in fewer trips at every intersection (see Figure 16). This result is due to two factors: one is that the project would generate less traffic than the portion of Monterra it replaces, and second is that the over-the-hill road would take Cañada Woods traffic off of Carmel Valley Road and off of Highway 1.

Table 8 shows the difference that the lesser traffic volume would make in the intersection levels of service. The change in intersection LOS would be minor but still an improvement compared to the "No Project" conditions.

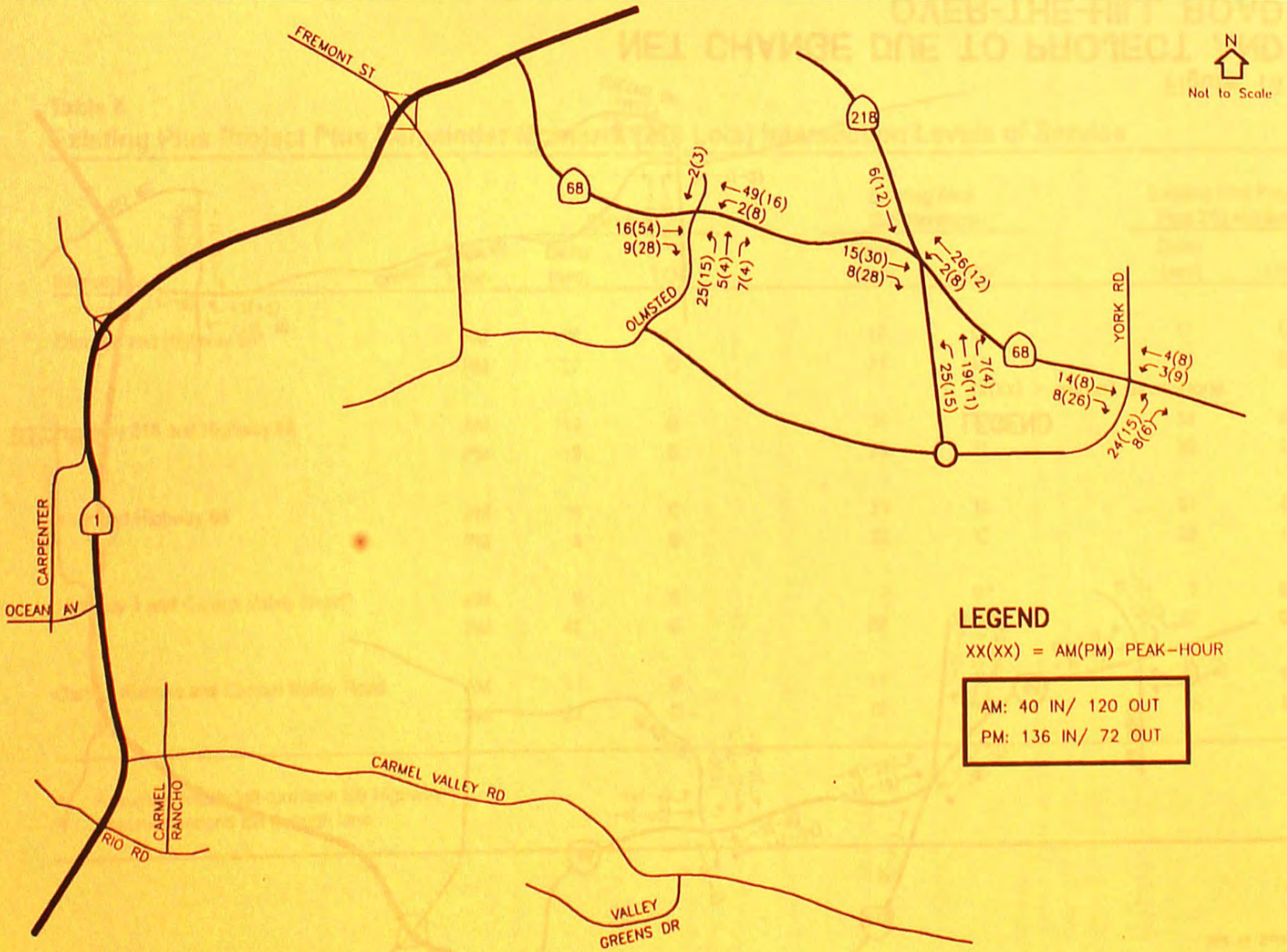


Figure 15
MONTERRA 213 UNITS TRIPS

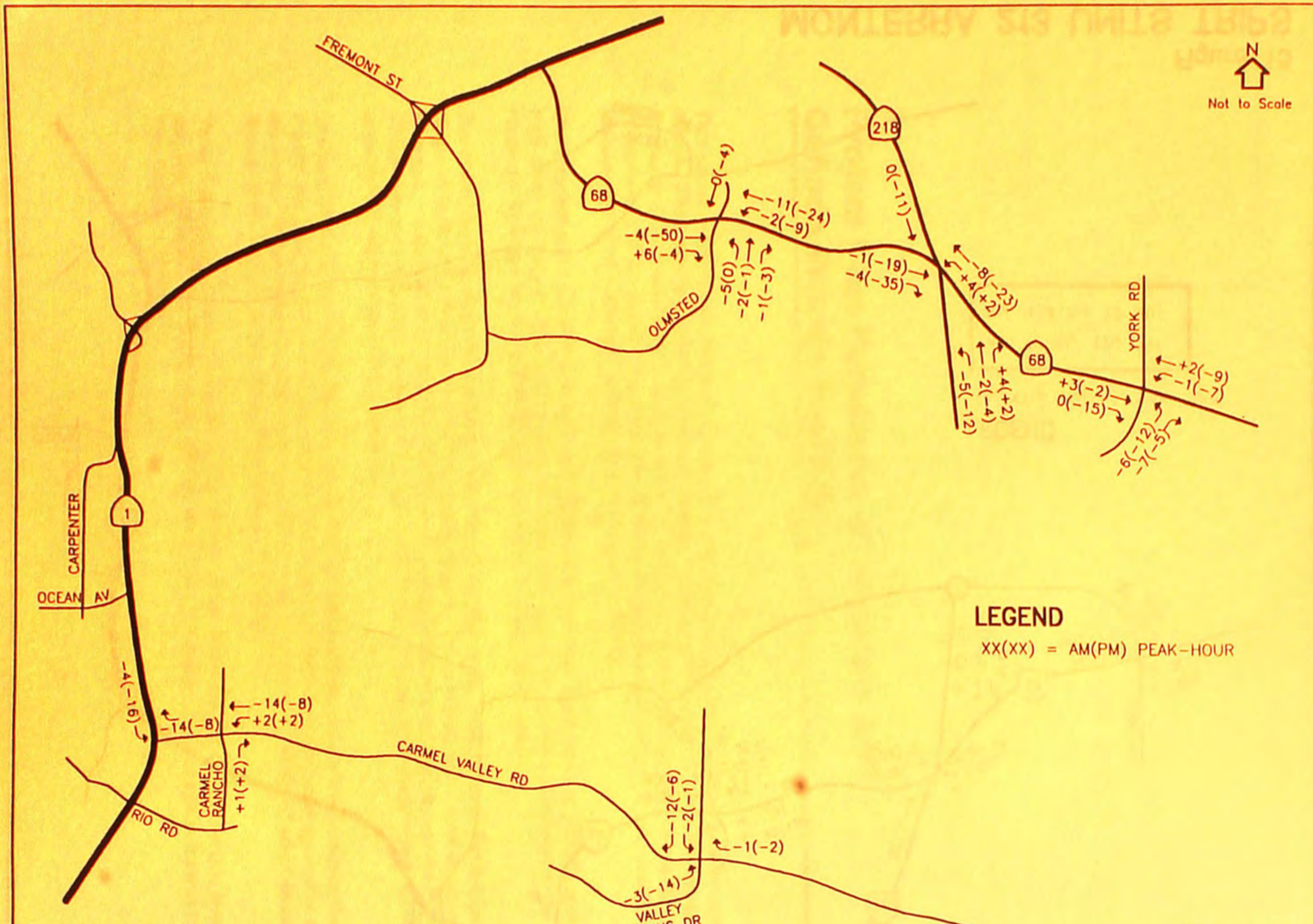


Figure 16
NET CHANGE DUE TO PROJECT AND OVER-THE-HILL ROAD

Table 8
Existing Plus Project Plus Remainder Monterra (213 Lots) Intersection Levels of Service

Intersection	Peak Hour	Existing Delay (sec)	Existing LOS	Existing Plus 325 Monterra Delay (sec)	Existing Plus 325 Monterra LOS	Existing Plus Project Plus 213 Monterra Delay (sec)	Existing Plus Project Plus 213 Monterra LOS
Olmsted and Highway 68[a]	AM	16	C	17	C	17	C
	PM	27	D	31	D	25	D
Highway 218 and Highway 68	AM	14	B	34	D	34	D
	PM	13	B	29	D	30	D
York and Highway 68	AM	19	C	31	D	31	D
	PM	9	B	22	C	22	C
Highway 1 and Carmel Valley Road[d]	AM	9	B	7	B[b]	7	B[b]
	PM	42	E	39	D[b]	37	D[b]
Carmel Rancho and Carmel Valley Road	AM	11	B	11	B[c]	11	B[c]
	PM	27	D	15	B[c]	15	B[c]

[b] Assumes double left-turn lane SB Highway 1

[c] Assumes second EB through lane

Impact to Carmel Valley Road

The over-the-hill road included as part of the Cañada Woods North project would result in a net reduction of traffic on Carmel Valley Road. The added access to Carmel Valley Road from Cañada Woods North would be more than offset by the Cañada Woods traffic that would access Highway 68 directly.

Impact to Highway 1

The same result would occur to Highway 1. The over-the-hill road would result in a net decrease in traffic on Highway 1.

Valley Greens Drive/Carmel Valley Road Signal Warrant Check

This intersection does not meet warrants with existing traffic nor would it meet warrants with the Cañada Woods traffic added. The over-the-hill road would reduce traffic at the intersection, so warrants would continue to be unmet.

7. Cumulative Scenario

There are several other developments in the area that are either approved or proposed. These are analyzed in the cumulative scenario. Table 9 lists the cumulative developments. Their locations were depicted earlier in Figure 2. The trips associated with these developments were taken from their respective traffic studies and added to the volumes in the Project scenario described in Chapter 6.

Table 10 shows intersection levels of service under cumulative conditions. The following intersections would operate worse than the level of service standard: Highway 218/Highway 68, York/Highway 68, Highway 1/Carmel Valley Road.

Even though the project would generate less traffic than the approved development it replaces, it would still contribute to a cumulative impact along Highway 68. In accordance with the past practice in Monterey County, the project should pay into a fund for improvements to Highway 68, such improvements to be decided at a later date by the county in conjunction with Caltrans. The fee should be commensurate with the project's trip generation.

Inasmuch as the project would reduce traffic on Carmel Valley Road and on Highway 1, it should not pay the fees that have been established for road improvements in those corridors. The fees that have already been paid by Cañada Woods for impacts to Carmel Valley Road could be transferred to the Highway 68 account in light of the differential impacts created by the over-the-hill road.

Table 9
Cumulative Projects

Project	Area	Dwelling Units	Other Uses
Under Construction			
1. Ryan Ranch	City of Monterey		139,210 s.f. Office/Commercial
Approved			
2. Monterra Ranch (excluding proposed project site)	Monterey County (Highway 68)	247	
3. Ryan Ranch	City of Monterey (Highway 68)		2,500 s.f. Office and Corporation Yard
4. Bishop Ranch	Monterey County (Highway 68)	253	Golf Course
5. Las Palmas Phase II	Monterey County (Toro)	515	
6. Cañada Woods	Carmel Valley	69	80,000 s.f. Commercial
7. Rancho San Carlos	Carmel Valley	350	150 Visitor Units, Golf Course
8. Quail Meadows	Carmel Valley	65	40-Room Inn Convention Center
9. Carmel Valley Ranch	Carmel Valley	64	44-Room Inn
10. Mahroom	Carmel Valley	36	
11. Coast Ranch	Carmel Valley	67	
Proposed			
12. Garden Road	City of Monterey		7,600 s.f. Commercial
13. September Ranch	Carmel Valley	117	
14. Wolters*	Carmel Valley		10,000 s.f. Commercial
15. Carmel Gardens*	Carmel Valley	88	
16. Veeder Ranch*	Carmel Valley	29	
17. Pebble Beach Lot Program	Pebble Beach	403	
18. Walgreens Drug Store	Seaside		Commercial
Total		2,309	239,310 s.f. Commercial 234 Visitor Rooms 2 Golf Courses

* Applications have been withdrawn.

See Figure 2 for locations.
Dwelling unit counts include approved and inclusionary units.

Table 10
Cumulative Intersection Levels of Service

Intersection	Peak Hour	Existing Delay (sec)	Existing LOS	Existing Plus 325 Monterra Delay (sec)	Existing Plus 325 Monterra LOS	Existing Plus Project Plus 325 Monterra Delay (sec)	Existing Plus Project Plus 325 Monterra LOS	Cumulative Delay (sec)	Cumulative LOS
Olmsted and Highway 68[a]	AM	16	C	17	C	17	C	21	C
	PM	27	D	31	D	25	D	33	D
Highway 218 and Highway 68	AM	14	B	34	D	34	D	44	E
	PM	13	B	29	D	30	D	44	E
York and Highway 68	AM	19	C	31	D	31	D	49	E
	PM	9	B	22	C	22	C	38	D
Highway 1 and Carmel Valley Road[d]	AM	9	B	7	B[b]	7	B[b]	9	B[b]
	PM	42	E	39	D[b]	37	D[b]	48	E[b]
Carmel Rancho and Carmel Valley Road	AM	11	B	11	B[c]	11	B[c]	11	B[c]
	PM	27	D	15	D[c]	15	B[c]	15	C[c]

[b] Assumes double left-turn lane SB Highway 1
[c] Assumes second EB through lane

8.
Conclusions

The traffic impact of the Cañada Woods North project was compared to the impact of the approved 112 units of the Monterra Ranch Subdivision that it would be replacing. The Cañada Woods North Project includes 34 residential lots, 5 employee units, a private golf course or fitness center, and equestrian center.

The Cañada Woods North project would have less impact than the approved subdivision it is replacing. Even though it would have less impact, Cañada Woods would still contribute to LOS D conditions on Highway 68 at Olmsted, and to cumulative LOS E operations at the intersections with Highway 218 and with York Road. As mitigation, the project should pay into the Highway 68 improvement account commensurate with its trip generation. The improvement account, which already has funding from other projects, could be used to widen Highway 68 to four lanes at Olmsted, which would ameliorate the LOS D condition there.

The project also includes a private road over-the-hill that would connect to the approved 54-lot Cañada Woods development. The road would be gated and only used by Cañada Woods and Cañada Woods North residents and golf course members. This road would allow Cañada Woods residents to access Highway 68, which would reduce previously documented impacts to Highway 1 and to Carmel Valley Road.

APPENDIX E
Air Quality Reviews

AMBAG

ASSOCIATION OF MONTEREY BAY AREA GOVERNMENTS

(408) 883-3750 *FAX (408) 883-3755*

Office Location: 445 Reservation Road, Suite G, Marina
P.O. Box 809, Marina, CA 93933-0809

August 23, 1996

RECEIVED
AUG 26 1996
DENISE DUFFY & ASSOCIATES

Mary Bilse
Denise Duffy & Associates
546-A Hartnell Street
Monterey, CA 93940

Re: AQMP Consistency Determination for Cañada Woods North Project

Dear Ms. Bilse,

This letter is in response to your request for an Air Quality Management Plan (AQMP) consistency determination for the *Cañada Woods North* project. According to information provided by you, the proposed project will include a total of 34 units to be constructed in the unincorporated portion of Monterey County (Carmel Valley area). You project that 16 of these units will be constructed between the years 2000 and 2005, and that the remaining 18 units will be constructed between 2005 and 2010.

According to estimates for 1996 by the State Department of Finance (DOF), the unincorporated portion of Monterey County has an average of 2.714 persons per housing unit (including both occupied and unoccupied units). Using this average we estimate that the Cañada Woods North project will generate a population increase in the unincorporated portion of Monterey County of 43 persons by the year 2005, and 49 additional persons by 2010.

AQMP consistency is determined by adding the above population figures to the estimated population increase that will result from construction of approved and pending building permits for the unincorporated area of the county. Using building permit information obtained from the Transportation Agency for Monterey County (TAMC), we estimate that 1,870 new housing units will be built and be ready for occupancy in the unincorporated portion of Monterey County by the year 2000. Using the DOF average persons per housing unit figure from above, this should generate an additional population of approximately 5,075 persons. Using the TAMC information, by the year 2005 we estimate that an additional 346 units will be built, generating approximately 939 additional persons in the unincorporated portion of the County.

Adding the new estimated 5,075 persons to be generated by new development between now and the year 2000 to the DOF estimated 1996 population of 99,417 for the unincorporated portion of Monterey County yields a total of 104,492 persons. Adding the estimated 939 persons to be generated by new development between 2000 and 2005 to the 104,492 population level from above yields a total of 105,431 persons in the unincorporated portion of Monterey County by 2005. The estimated additional 43 persons that would be living in the Cañada Woods North project by 2005 boost the total to 105,474 persons in the unincorporated area by 2005. Since this figure is <u>lower</u> than the AMBAG forecasted population of 109,129 for the unincorporated area in the year 2005 *the sixteen units to be built as part of the Cañada Woods North project between 2000 and 2005 are* ***consistent*** *with the 1994 AQMP for the Monterey Bay Region.*

The eighteen units to be built as part of the Cañada Woods North project between 2005 and 2010 would also be ***consistent*** *with the 1994 AQMP for the Monterey Bay Region since they would not result in a population increase that would cause the unincorporated portion of Monterey County to exceed the AMBAG forecasted population of 113,080 for the unincorporated area in 2010.*

If you have any questions regarding this consistency determination, please do not hesitate to call Frank Barron of the AMBAG staff.

Sincerely,

Nicolas Papadakis
Executive Director

cc: Doug Quetin, MBUAPCD

NP:fb\aqmp\n-cañada.let

APPENDIX

AIR QUALITY METHODOLOGY AND ASSUMPTIONS

CALINE-4 Carbon Monoxide Modeling

The CALINE-4 model is a fourth-generation line source air quality model that is based on the Gaussian diffusion equation and employs a mixing zone concept to characterize pollutant dispersion over the roadway.[1] Given source strength, meteorology, site geometry and site characteristics, the model predicts pollutant concentrations for receptors located with 150 meters of the roadway. The CALINE-4 model allows roadways to be broken into multiple links that can vary in traffic volume, emission rates, height, width, etc..

The CEQA Air Quality Guidelines[2] issued by the Monterey Bay Unified Air Pollution Control District recommends modeling of carbon monoxide concentrations when certain peak-hour traffic conditions exist such that potentially significant impact could exist. According to MBUAPCD guidance, the following would represent a potentially significant impact to intersections or road segments:

- Intersections or road segments that operate at LOS D or better that would operate at LOS E or F with the project's traffic, or

- Intersections or road segments that operate at LOS E or F where the volume-to-capacity (V/C) ratio would increase 0.05 or more with the project's traffic, or

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1 California Department of Transportation, CALINE-4 - A Dispersion Model for Predicting Air Pollutant Concentrations Near Roadways, Report No. FHWA/CA/TL-84-15, 1984.

2 Monterey Bay Unified Air Pollution Control District, CEQA Air Quality Guidelines, October 1995.

- Intersections or road segments that operate at LOS E or F where delay would increase by 10 seconds or more with the project's traffic, or

- Unsignalized intersections which operate at LOS E or F where the reserve capacity would decrease by 50 or more with the project's traffic, based on the turning movement with the worst reserve capacity, or

- Project would generate substantial heavy duty truck traffic or generate substantial traffic along urban street canyons or near a major stationary source of CO.

A review of the impacts of project traffic and project traffic together with that from the Canada Woods and Monterra developments revealed no intersections or road segments requiring modeling of CO impacts according to the MBUAPCD criteria.

These same criteria are also to be applied to cumulative traffic analyses. Based on cumulative traffic conditions, two intersections would require CO modeling in the cumulative case: Highway 68 at Highway 218 and Highway 68 at York Road. For both these intersections, the cumulative case LOS in the AM peak traffic hours would deteriorate from LOS D or better to LOS E. Also, in the PM peak traffic hour Level of Service would decrease from the existing LOS B to LOS F at the Highway 168/Highway 218 intersection.

The intersection models extended 200 meters in all directions. Receptors (locations where the model calculates concentrations) were located at a distance of 20 feet from the roadway edge for all four corners of the intersection and at locations 50 feet in either direction, for a total of 12 receptors. Figure 1 is a schematic diagram showing the location of receptors.

As per MBUAPCD guidance, the intersection mode of the CALINE-4 program was not used. Deceleration and acceleration links were defined for each approach/departure to the intersection, and an emission factor was calculated for each link based on the average speed. Speed was estimated using relationships between volume, free-flow average speed and percent red time provided in MBUAPCD guidance.

The worst case mode of the CALINE-4 model was employed. In this mode the wind direction is varied to determine which wind direction results in the highest concentrations for each receptor. Emission factors, ambient temperatures, surface roughness, windspeed and other assumptions were consistent with MBUAPCD guidance.[3]

The CALINE-4 model calculates the local contribution of nearby roads to the total concentration. The other contribution is the background level attributed to more distant traffic. The year 2000 1-hour background level was taken as 4.1 PPM, while the 8-hour background concentration was taken as 1.9 PPM.[4]

To calculate 8-hour concentrations from the 1-hour output of the CALINE-4 model a persistence factor of 0.7 was employed.

Table 1 shows the maximum predicted carbon monoxide concentrations for the two intersections modeled.. Projected concentrations are to be compared to the federal and state standards, which are 35 PPM (federal) and 20 PPM (state) for the 1-hour averaging time and 9 PPM (state/federal) for the 8-hour averaging time. Predicted concentrations are well below the applicable state and federal ambient air quality standards.

New Vehicle Travel Emissions

Estimates of regional emissions generated by project traffic were made using a program called

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3 Monterey Bay Unified Air Pollution Control District, CEQA Air Quality Guidelines, October 1995.

4 Ibid.

URBEMIS-5.[5] URBEMIS-5 is a program which estimates the emissions that result from various land use development projects. Land use projects can include residential uses such as single-family dwelling units, apartments and condominiums, and nonresidential uses such as shopping centers, office buildings, and industrial parks. URBEMIS-5 contains default values for much of the information needed to calculate emissions. However, project-specific, user-supplied information can also be used when it is available.

Inputs to the URBEMIS-5 program include trip generation rates, vehicle mix, average trip length by trip type and average speed. Average trip lengths and vehicle mix for Monterey County were used. Average speed for all types of trips was assumed to be 35 MPH.

The URBEMIS-5 runs assumed summertime conditions (70 degrees F ambient temperature) for the calculation of ROG, Nox and PM-10. Default values for cold-start percentages were used. The URBEMIS-5 program provides emission rates for Total Organic Gases (TOG). The TOG emission was multiplied by 0.909 to estimate Reactive Organic Gases (ROG).

Table 2 shows the new emissions of regional pollutants that would result from the proposed project center. Also shown are the Monterey Bay Unified Air Pollution Control District's thresholds of significance.[6] The URBEMIS-5 printout is included as Attachment 1.

Construction Equipment and Vehicle Emissions

During construction emissions would be created by equipment and vehicles on the project site. While the emissions created on a single day is quite variable, data does exist regarding overall emissions during the entire period of construction. Factors for construction emissions per 1000 square feet of

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5 California Air Resources Board, URBEMIS-5 Computer Program Version 5.0 User Guide, July 1995.

6 Monterey Bay Unified Air Pollution Control District, CEQA Air Quality Guidelines, October 1995.

residential and resort center construction were multiplied by the amount of new construction proposed to obtain estimates of total construction emissions that would occur through project buildout for these portions of the project. Emission factors for golf course construction are not available, so a general fugitive dust factor of 51 pounds per acre per day (uncontrolled) during active construction. Assuming that any section of the golf course would by under active construction for a period of 1 month, the total PM-10 emissions from the 183-acre golf course was calculated. The resulting emissions were 6,795 pounds of ROG, 99,888 pounds of NOx, 21,718 pounds of carbon monoxide and 288,912 pounds of PM-10.

Table 1

PREDICTED WORST-CASE 1-HOUR AND 8-HOUR CARBON MONOXIDE CONCENTRATIONS IN PPM

Intersection	Cumulative Year 2000 (AM Peak Hour)		Cumulative Year 2000 (PM Peak Hour)	
	1-Hour	8-Hour	1-Hour	8-Hour
Highway 68/ Highway 218	7.2	4.1	7.7	4.4
Highway 68/ York Road	7.3	4.1	N.A.	N.A.
Most Stringent Standard	20.0	9.0	20.0	9.0

N.A. = Not applicable, MBUAPCD criterion for modeling not met.

Table 2

PROJECT REGIONAL EMISSIONS, IN POUNDS PER DAY

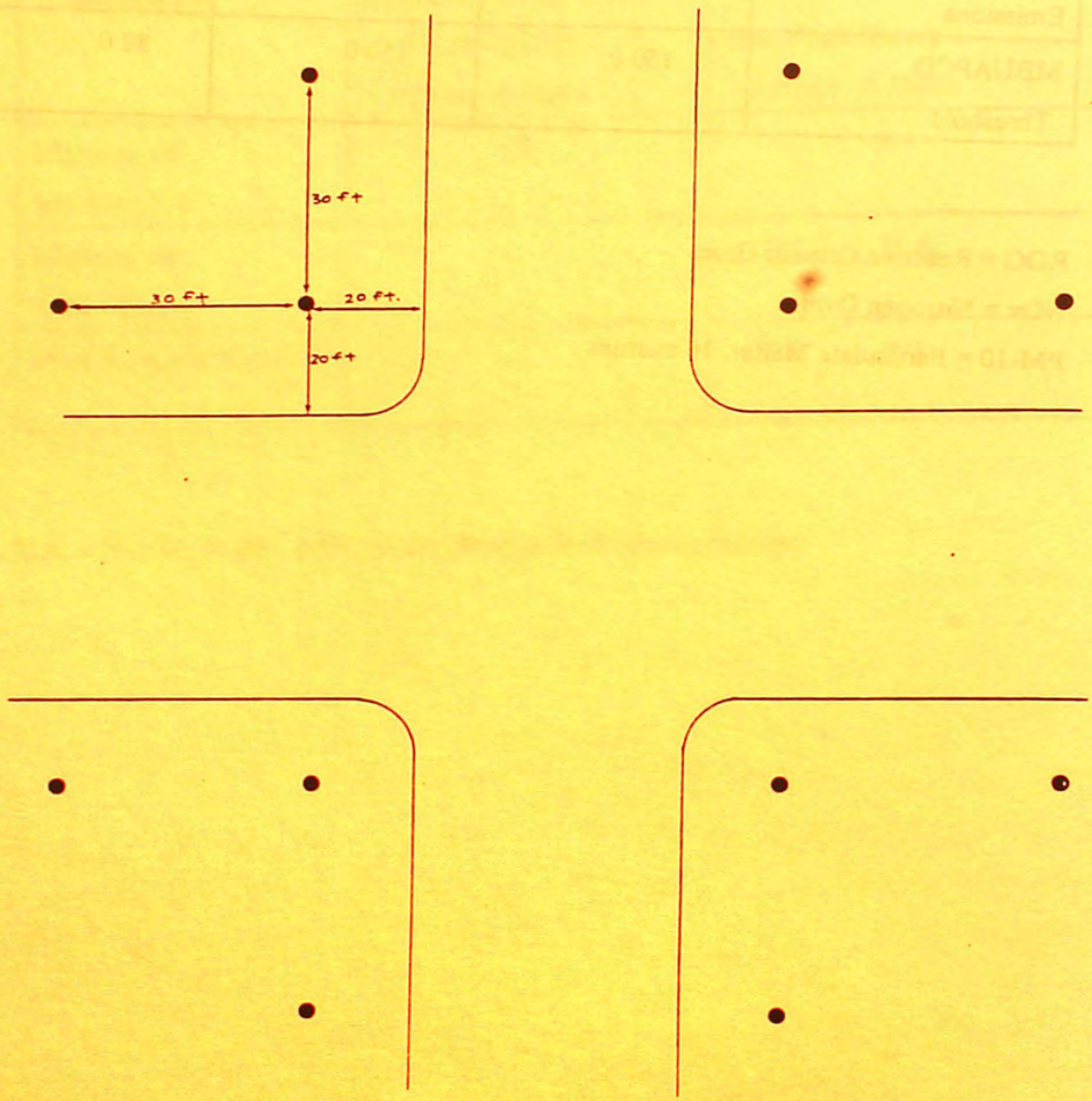
	ROG	**Nox**	**PM-10**
Project Vehicle Emissions	11.3	13.1	1.7
MBUAPCD Threshold	150.0	150.0	82.0

ROG = Reactive Organic Gases

NOx = Nitrogen Oxides

PM-10 = Particulate Matter, 10 microns

Figure 1: CALINE-4 Receptor Locations



Attachment 1: URBEMIS-5 Printout

PROJECT NAME: CANADA WOODS NORTH Date: 08-09-1996

Project Area: North Central Coast (Monterey Bay)

Analysis Year: 1999 Temperature (F): 70 . Season: Summer

EMFAC Version: Emfac7f1.1(12/93)

Summary of Land Uses:

Unit Type	Trip Rate	Size	Tot Trips
RESIDENCES	10.0/Unit	39	390
GOLF COURSE/FITNESS/EQUESTRIAN	42.0/1000 Sqft	10	420

Vehicle Assumptions:

Fleet Mix:

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Duty Autos	70.2	1.4	98.3	0.3
Light Duty Trucks	17.7	0.3	99.3	0.4
Medium Duty Trucks	5.8	1.5	98.5	0.0
Heavy Duty Trucks	2.5	21.2	78.8	N/A
Heavy Duty Trucks	0.8	N/A	N/A	100.0
Motorcycles	3.0	100.0	N/A	N/A

Travel Conditions:

	Residential			Commercial	
	Home-Work	Home-Shop	Home-Other	Work	Non-Work
Trip Length	8.9	8.9	8.9	8.9	8.9
% Started Cold	88.6	40.4	58.8	77.8	27.6
Trip Speed	35	35	35	35	35
Percent Trip	27.3	21.2	51.5		

Project Emissions Report in Lb/Day:

Unit Type	TOG	CO	NOx
RESIDENCES	6.92	49.33	6.43
GOLF COURSE/FITNESS/EQUESTRIAN	5.51	41.30	6.65
TOTALS	12.43	90.63	13.08

Project Emissions Report in Lb/Day (Continued)

Unit Type	FUEL (Gal.)	PM10	SOx
RESIDENCES	163.3	0.82	0.53
GOLF COURSE/FITNESS/EQUESTRIAN	175.8	0.88	0.57
TOTALS	339.1	1.70	1.10

APPENDIX F
Groundwater - Water Balance Data

APPENDIX F
Groundwater - Water-Balance Data

APPENDIX F

Water Balance for Cañada Woods North Project

Prepared by Todd Engineers

Recharge of groundwater was evaluated by Todd Engineers as part of the EIR with the preparation of a water balance. A water balance describes the inflows and outflows of water from the area. The sole inflow of water is rainfall, which averages approximately 16 to 17 inches/year. Of this rainfall, some is intercepted by plants and trees or consumed by plants through evapotranspiration. The remainder, termed the water yield, runs off as streamflow or percolates as groundwater recharge.

<u>Water Balance Methodology</u>

The water balance was calculated using a two-step process. In the first step, interception and evapotranspiration were estimated and subtracted from rainfall. Water held in soil moisture storage during and after the rainy season was also used to satisfy the evapotranspiration losses. The amount of water remaining after interception and evapotranspiration is termed the water yield. In the second step, surface runoff was estimated and subtracted from water yield. The remaining water is groundwater recharge.

The water balance was computed for the Canada Woods North area, encompassing 1,060 acres, plus the Canada Woods area of 550 acres that provides recharge to the two bedrock wells on the Canada Woods site. Accordingly, the total area for the water balance is 1,609 acres.

The water balance was evaluated for water years 1961 through 1992. The rainfall over this period approximates long-term average conditions, and includes two significant droughts, the extreme drought in 1976 and 1977 and the prolonged, severe drought of 1987 through 1990.

<u>Water Balance Components</u>

The first step of the water balance evaluation accounts for rainfall, interception, soil moisture storage, and evapotranspiration. Average annual rainfall at Monterra Ranch is about 16 to 17 inches. To compute water balances over the period 1961 through 1992, monthly rainfall totals were derived by averaging the rainfall amounts at Big Sur State Park and San Clemente Dam. These two stations represent coastal and inland conditions and effectively bracket Monterra Ranch. This regional rainfall was then adjusted to represent the 16-inch rainfall at Monterra Ranch by multiplying the 31-inch regional average by factor of 0.52. In order to evaluate a reasonable range of values for the water balance, water balances also were computed using a 17-inch rainfall.

Interception occurs when rainfall is intercepted by trees and shrubs and evaporated. Interception was assumed to be six percent of the gross rainfall for the Monterra area.

Soil moisture storage is the amount of water held in soil that is available to plants. The soil moisture holding capacity of the predominant Santa Lucia soils is about 0.12 inches/inch (see Soils). Soil moisture storage was computed for two plant rooting depths. For relatively shallow rooted plants (grassland and scrub) a two-foot (24-inch) rooting depth was assumed. This rooting depth has an estimated soil moisture holding capacity of 2.88 inches (0.12 inches/inch * 24 inches). Larger plants, including chaparral, oaks, and pines, have greater rooting depths and are able to use moisture in the fractured and weathered bedrock. For these plants, a four-foot rooting depth was assumed with a soil moisture holding capacity of 5.76 inches (0.12 inches/inch * 48 inches).

Potential evapotranspiration is the amount of water consumed by plants if ample moisture is available year-round. Potential evapotranspiration was estimated for Monterra Ranch based on regional estimates of evapotranspiration developed by the California Department of Water Resources (Calif. DWR, April 1975). The DWR established zones of similar potential evapotranspiration, including two describing coastal valleys and interior valleys for the Central Coast area. The potential evapotranspiration for these two zones are 41.3 and 48.3 inches, respectively. These evapotranspiration values were used to estimate potential evapotranspiration for Rancho San Carlos, located south of Carmel Valley, where estimated evapotranspiration ranges from 30 to 47 inches (Camp Dresser & McKee, et al., 1994). For Monterra Ranch, two estimates of evapotranspiration, were used in order to evaluate a reasonable range of values. An evapotranspiration value of about 47 inches/year for Monterra Ranch was adapted from the evapotranspiration estimate for Hitchcock Canyon, a relatively small watershed on the south side of Carmel Valley. The 47-inch value is higher than values used in studies of some nearby areas, such as the El Toro area, where a value of 37.7 inches was used (Staal, Gardner & Dunne, 1991). However, the Monterra Ranch value is comparable to potential evapotranspiration computed by the Monterey Peninsula Water Management District for the Lower Carmel Valley weather station, which averaged 46.3 inches for the period September 1985 through May 1992. In addition, a lower potential evapotranspiration rate amounting to 41.4 inches/year also was used to compute the water balance.

Actual evapotranspiration is the actual amount of water consumed by plants limited by the availability of rainfall and soil moisture. Actual evapotranspiration was computed for both shallow-rooted and deep-rooted vegetation types at Monterra Ranch. The annual water balances for the relatively shallow-rooted grassland and scrub vegetation are shown in Table 1, while the water balances for the deep-rooted chaparral, oak and pine vegetation are shown in Table 2.

For the relatively shallow-rooted grassland and scrub, and using the potential evapotranspiration rate of 47 inches, the actual evapotranspiration averaged about 12.2

inches/year, and for the deeper-rooted chaparral and trees amounted to 13.7 inches/year. For the Monterra Ranch as a whole, actual evapotranspiration averaged 12.8 inches/year; adding in interception losses results in total consumptive losses of 13.8 inches. This value, representing 86 percent of the 16-inch rainfall, slightly exceeds the evapotranspiration rate previously estimated for Monterra Ranch as eighty percent of rainfall (12.8 inches or 0.8 * 16 inches; Anderson-Nichols, July 1985).

In order to evaluate a range of values for the water balance, water balances also were computed using a 17-inch rainfall and potential evapotranspiration rate of 41.4 inches/year. This computation resulted in an actual evapotranspiration rate of 12.7 inches/year, or essentially the same value as with the lower rainfall and higher potential evapotranspiration. The use of higher rainfall and lower evapotranspiration rates, however, did result in a significant increase in the water yield. The water yield (indicated as Qgen in Tables 1 and 2) is the output of these water balances, or the water remaining after interception and evapotranspiration losses. Water yield occurs as surface runoff and groundwater recharge. Use of the 16-inch rainfall and 47-inch potential evapotranspiration rates resulted in an estimated water yield from the 1609-acre Monterra area of 286 acre-feet/year, while use of the 17-inch rainfall and 41.4-inch potential evapotranspiration rates resulted in a water yield of 451 acre-feet/year.

Water Yield

The second step of the water balance evaluation is to estimate the portion of water yield that occurs as surface runoff. The remaining water then constitutes groundwater recharge. The second step of the water balance computation using the 16-inch rainfall and 47-inch potential evapotranspiration is summarized in Table 3 for grassland and scrub vegetation, and in Table 4 for chaparral, oak, and pine habitats. As shown in both tables, the water balances are summarized for each year from 1961 to 1992, along with average annual values. The four columns from the left document the rainfall, actual evapotranspiration (ET), and estimated yield values derived from Table 1 and 2, while the columns on the right present information on the evaluation of water outflows, namely streamflow and groundwater recharge.

As described in Surface Hydrology, no perennial creeks exist in the watershed and runoff occurs only following major storms. The amount of runoff that occurs was evaluated based on studies of nearby watersheds. Runoff was gaged in the Arroyo del Rey watershed from October 1966 to September 1978. This runoff amounted to 485 acre-feet/year from a watershed of 13.8 square miles, and thus amounts to a runoff yield of 0.66 inches from the watershed. Based on this information, the runoff yield of Monterra Ranch was estimated previously as 0.7 inches (Anderson-Nichols, July 1985). This runoff value appears to be low, but is similar to measured runoff from the El Toro watershed, which averaged about 0.9 inches/year. For the purposes of the Monterra water balance, runoff yield was first assumed to average about 0.7 inches/year, and then was estimated more conservatively (in terms of groundwater recharge) to be 1.0 inch/year.

Review of Tables 3 and 4 reveal that rainfall and water yield vary significantly from year to year. Accordingly, runoff also is variable. The variation of runoff from the Monterra watershed was simulated for the period 1961 through 1992 through correlation with estimated streamflow for Hitchcock Canyon on the south side of Carmel Valley. Hitchcock Canyon watershed is similar in size and vegetation to the Monterra area, but has higher rainfall and runoff. Accordingly, in Tables 3 and 4, the annual Hitchcock streamflow amounts were adjusted downward to match the overall average runoff yield of 0.7 inches/year for Monterra. In Table 3, representing the 927 acres of grassland and scrub, Hitchcock streamflow was reduced systematically to derive a correlated annual streamflow for Monterra averaging 0.8 inches. This value is higher than the Monterra overall average of 0.7 inches, reflecting the generally higher runoff yields of grassland and small scrub relative to chaparral and woodland. In Table 4, representing the 682 acres of chaparral, oak, and pine habitats, Hitchcock streamflow was reduced to derive a correlated annual streamflow for Monterra averaging 0.48 inches. This value is relatively low, reflecting generally smaller runoff from chaparral and woodland relative to grassland. Combination of the 0.8- and 0.48-inch runoff rates results in the average runoff rate of about 0.7 inches for the entire watershed.

The correlation of Monterra with Hitchcock Canyon was limited by the fact that Hitchcock Canyon is characterized by greater streamflow that can persist from year to year. As a result, analysis of the Monterra water balance could indicate little or zero water yield, while correlation with Hitchcock suggested a larger amount of streamflow. In such relatively dry years (e.g., 1976 and 1977), Monterra streamflow was corrected to match the estimated yield.

As shown in Tables 3 and 4, runoff from Monterra is estimated to be 87 acre-feet/year, with about two-thirds of the runoff (62 acre-feet/year) coming from the grassland and scrub, and one-third
(25 acre-feet/year) generated by chaparral and woodland.

Groundwater recharge, shown in the column on the far right of Tables 3 and 4, was computed as Monterra estimated water yield minus estimated streamflow. As indicated, average annual groundwater recharge amounts to 152 acre-feet/year from grassland and scrub, and 46 acre-feet/year from chaparral and woodland, for an estimated total of 198 acre-feet/year.

As noted previously, use of a higher 17-inch rainfall rate and lower 41.4 potential evapotranspiration rate resulted in a relatively high water yield of 451 acre-feet/year. Using an overall runoff factor of 0.7 inches, estimated streamflow amounted to 93 acre-feet/year, while estimated recharge was 358 acre-feet/year.

To further explore the reasonable range of water balance results, the second step of the water balance analysis also was conducted assuming an overall runoff rate of 1.0 inches instead of the 0.7-inch runoff rate. This analysis resulted in a runoff of 132 acre-feet/year from Monterra, and a total estimated recharge of 154 acre-feet/year.

Water Balance Results

The results of the water balance analysis to estimate groundwater recharge are shown in Table 5. Average annual recharge is estimated to be 196 acre-feet/year, with a possible range of 154 to 358 acre-feet/year.

These values represent average conditions; as with rainfall and runoff, groundwater recharge also is variable. Review of Table 3 indicates that estimated recharge ranges from over 1,000 acre-feet in a year to zero in drought years. As indicated, most droughts with zero recharge occur only for one year, with the notable exception of the recent 1987-1990 four-year drought.

TABLE 1

WATER BALANCES
MONTERRA RANCH
1961 – 1992

Data used for calculations:
- Rooting depth: 2 feet
- Soil moisture capacity: 2.88 inches
- Potential evapotranspiration: 46.9 inches per year
- Average annual rainfall: 16 inches

Definition of terms:
- Pg = Precipitation, gross regional. Average of San Clemente and Big Sur stations, 1958 – 1992 = 31 inches.
- Pg* = Precipitation, gross Monterra. Derived from Pg and 0.52 rainfall factor based on isohyetal map.
- Li = Interception losses. Assumed as six percent of Pg(0.52).
- Pn = Net Precipitation. Precipitation after interception losses.
- PET = Potential evapotranspiration.
- AET = Actual evapotranspiration.
- QSM1 = Soil moisture at the beginning of the month.
- QSM2 = Soil moisture at the end of the month.
- Qgen = Water yield generated.

Water Year 1960 – 1961	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTA
Pg	0.09	5.10	2.60	3.20	1.30	3.20	1.00	0.50	0.10	0.00	0.00	0.10	17.1
Pg*	0.05	2.65	1.35	1.66	0.68	1.66	0.52	0.26	0.05	0.00	0.00	0.05	8.9
Li	0.00	0.00	0.16	0.08	0.10	0.04	0.10	0.03	0.02	0.00	0.00	0.00	0.5
Pn	0.04	0.04	2.49	1.27	1.56	0.64	1.56	0.49	0.24	0.05	0.00	0.00	8.4
PET	3.60	2.20	1.40	1.50	2.00	3.20	4.20	5.60	6.10	6.50	5.90	4.70	46.9
AET	0.04	0.04	1.40	1.50	2.00	1.06	1.56	0.49	0.24	0.05	0.00	0.00	8.4
QSM1	0.00	0.00	0.00	1.09	0.86	0.43	0.00	0.00	0.00	0.00	0.00	0.00	
QSM2	0.00	0.00	1.09	0.86	0.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Qgen	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0

Water Year 1961 – 1962	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTA
Pg	0.12	3.60	2.60	3.00	16.60	3.70	0.40	0.30	0.10	0.00	0.00	0.00	30.4
Pg*	0.06	1.87	1.35	1.56	8.63	1.92	0.21	0.16	0.05	0.00	0.00	0.00	15.
Li	0.00	0.11	0.08	0.09	0.52	0.12	0.01	0.01	0.00	0.00	0.00	0.00	0.9
Pn	0.06	1.76	1.27	1.47	8.11	1.81	0.20	0.15	0.05	0.00	0.00	0.00	14.8
PET	3.60	2.20	1.40	1.50	2.00	3.20	4.20	5.60	6.10	6.50	5.90	4.70	46.9
AET	0.06	1.76	1.27	1.47	2.00	3.20	1.68	0.15	0.05	0.00	0.00	0.00	11.
QSM1	0.00	0.00	0.00	0.00	0.00	2.88	1.49	−0.00	0.00	0.00	0.00	0.00	
QSM2	0.00	0.00	0.00	0.00	2.88	1.49	−0.00	0.00	0.00	0.00	0.00	0.00	
Qgen	0.00	0.00	0.00	0.00	3.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.2

Water Year 1962 – 1963	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOT
Pg	5.00	0.20	4.20	9.60	8.10	6.00	7.60	0.40	0.10	0.00	0.00	0.10	41.
Pg*	2.60	0.10	2.18	4.99	4.21	3.12	3.95	0.21	0.05	0.00	0.00	0.05	21.
Li	0.16	0.01	0.13	0.30	0.25	0.19	0.24	0.01	0.00	0.00	0.00	0.00	1.2
Pn	2.44	0.10	2.05	4.69	3.96	2.93	3.71	0.20	0.05	0.00	0.00	0.05	20.1
PET	3.60	2.20	1.40	1.50	2.00	3.20	4.20	5.60	6.10	6.50	5.90	4.70	46.
AET	2.44	0.10	1.40	1.50	2.00	3.20	4.20	2.32	0.05	0.00	0.00	0.05	17.
QSM1	0.00	0.00	0.00	0.65	2.88	2.88	2.61	2.13	−0.00	0.00	0.00	0.00	
QSM2	0.00	0.00	0.65	2.88	2.88	2.61	2.13	−0.00	0.00	0.00	0.00	0.00	
Qgen	0.00	0.00	0.00	0.97	1.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.9

Water Year 1963 – 1964	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOT
Pg	2.40	7.30	0.40	4.80	0.40	3.70	0.70	2.00	0.60	0.00	0.00	0.30	22
Pg*	1.25	3.80	0.21	2.50	0.21	1.92	0.36	1.04	0.31	0.00	0.00	0.16	11.
Li	0.07	0.23	0.01	0.15	0.01	0.12	0.02	0.06	0.02	0.00	0.00	0.01	0.7
Pn	1.17	3.57	0.20	2.35	0.20	1.81	0.34	0.98	0.29	0.00	0.00	0.15	11.0
PET	3.60	2.20	1.40	1.50	2.00	3.20	4.20	5.60	6.10	6.50	5.90	4.70	46.
AET	1.17	2.20	1.40	1.50	1.21	1.81	0.34	0.98	0.29	0.00	0.00	0.15	11.
QSM1	0.00	0.00	1.37	0.16	1.01	−0.00	−0.00	0.00	0.00	0.00	0.00	0.00	
QSM2	0.00	1.37	0.16	1.01	−0.00	−0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Qgen	0.00	0.00	0.00	−0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	−0.0

Water Year 1964 – 1965	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOT
Pg	1.90	4.90	9.40	5.70	1.40	3.60	3.80	0.10	0.01	0.00	0.20	0.00	31.
Pg*	0.99	2.55	4.89	2.96	0.73	1.87	1.98	0.05	0.01	0.00	0.10	0.00	16.1
Li	0.06	0.15	0.29	0.18	0.04	0.11	0.12	0.00	0.00	0.00	0.01	0.00	0.9
Pn	0.93	2.40	4.59	2.79	0.68	1.76	1.86	0.05	0.00	0.00	0.10	0.00	15.
PET	3.60	2.20	1.40	1.50	2.00	3.20	4.20	5.60	6.10	6.50	5.90	4.70	46.
AET	0.93	2.20	1.40	1.50	2.00	3.20	1.98	0.05	0.00	0.00	0.10	0.00	13.
QSM1	0.00	0.00	0.20	2.88	2.88	1.56	0.12	0.00	0.00	0.00	0.00	0.00	
QSM2	0.00	0.20	2.88	2.88	1.56	0.12	0.00	0.00	0.00	0.00	0.00	0.00	
Qgen	0.00	0.00	0.51	1.29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.

WATER BALANCES
MONTERRA RANCH
1961 – 1992

Water Year 1965 – 1966	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Pg	0.20	10.80	6.40	2.80	3.30	0.50	0.60	0.00	0.04	0.20	0.00	0.20	25.04
Pg*	0.10	5.62	3.33	1.46	1.72	0.26	0.31	0.00	0.02	0.10	0.00	0.10	13.02
Li	0.01	0.34	0.20	0.09	0.10	0.02	0.02	0.00	0.00	0.01	0.00	0.01	0.78
Pn	0.10	5.28	3.13	1.37	1.61	0.24	0.29	0.00	0.02	0.10	0.00	0.10	12.24
PET	3.60	2.20	1.40	1.50	2.00	3.20	4.20	5.60	6.10	6.50	5.90	4.70	46.90
AET	0.10	2.20	1.40	1.50	2.00	2.61	0.29	0.00	0.02	0.10	0.00	0.10	10.31
QSM1	0.00	0.00	2.88	2.88	2.75	2.36	−0.00	0.00	0.00	0.00	0.00	0.00	
QSM2	0.00	2.88	2.88	2.75	2.36	−0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Qgen	0.00	0.20	1.73	0.00	−0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.93

Water Year 1966 – 1967	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Pg	0.00	6.70	9.20	10.00	0.80	7.60	9.60	0.40	0.80	0.00	0.00	0.20	45.30
Pg*	0.00	3.48	4.78	5.20	0.42	3.95	4.99	0.21	0.42	0.00	0.00	0.10	23.56
Li	0.00	0.21	0.29	0.31	0.02	0.24	0.30	0.01	0.02	0.00	0.00	0.01	1.41
Pn	0.00	3.27	4.50	4.89	0.39	3.71	4.69	0.20	0.39	0.00	0.00	0.10	22.14
PET	3.60	2.20	1.40	1.50	2.00	3.20	4.20	5.60	6.10	6.50	5.90	4.70	46.90
AET	0.00	2.20	1.40	1.50	2.00	3.20	4.20	2.47	0.39	0.00	0.00	0.10	17.46
QSM1	0.00	0.00	1.07	2.88	2.88	1.27	1.79	2.28	−0.00	0.00	0.00	0.00	
QSM2	0.00	1.07	2.88	2.88	1.27	1.79	2.28	−0.00	0.00	0.00	0.00	0.00	
Qgen	0.00	0.00	1.29	3.39	0.00	0.00	−0.00	0.00	0.00	0.00	0.00	0.00	4.68

Water Year 1967 – 1968	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Pg	0.30	1.50	3.50	5.80	2.60	3.50	1.00	0.50	0.06	0.00	0.10	0.00	18.86
Pg*	0.16	0.78	1.82	3.02	1.35	1.82	0.52	0.26	0.03	0.00	0.05	0.00	9.81
Li	0.01	0.05	0.11	0.18	0.08	0.11	0.03	0.02	0.00	0.00	0.00	0.00	0.59
Pn	0.15	0.73	1.71	2.84	1.27	1.71	0.49	0.24	0.03	0.00	0.05	0.00	9.22
PET	3.60	2.20	1.40	1.50	2.00	3.20	4.20	5.60	6.10	6.50	5.90	4.70	46.90
AET	0.15	0.73	1.40	1.50	2.00	2.63	0.49	0.24	0.03	0.00	0.05	0.00	9.22
QSM1	0.00	0.00	0.00	0.31	1.65	0.92	0.00	0.00	0.00	0.00	0.00	0.00	
QSM2	0.00	0.00	0.31	1.65	0.92	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Qgen	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Water Year 1968 – 1969	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Pg	1.10	2.60	6.20	19.30	14.40	2.30	3.00	0.11	0.09	0.00	0.00	0.06	49.16
Pg*	0.57	1.35	3.22	10.04	7.49	1.20	1.56	0.06	0.05	0.00	0.00	0.03	25.56
Li	0.03	0.08	0.19	0.60	0.45	0.07	0.09	0.00	0.00	0.00	0.00	0.00	1.53
Pn	0.54	1.27	3.03	9.43	7.04	1.12	1.47	0.05	0.04	0.00	0.00	0.03	24.03
PET	3.60	2.20	1.40	1.50	2.00	3.20	4.20	5.60	6.10	6.50	5.90	4.70	46.90
AET	0.54	1.27	1.40	1.50	2.00	3.20	2.27	0.05	0.04	0.00	0.00	0.03	12.31
QSM1	0.00	0.00	0.00	1.63	2.88	2.88	0.80	0.00	0.00	0.00	0.00	0.00	
QSM2	0.00	0.00	1.63	2.88	2.88	0.80	0.00	0.00	0.00	0.00	0.00	0.00	
Qgen	0.00	0.00	0.00	6.68	5.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.72

Water Year 1969 – 1970	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Pg	1.40	1.80	7.30	11.10	3.20	4.10	0.90	0.04	0.30	0.00	0.00	0.00	30.1
Pg*	0.73	0.94	3.80	5.77	1.66	2.13	0.47	0.02	0.16	0.00	0.00	0.00	15.6
Li	0.04	0.06	0.23	0.35	0.10	0.13	0.03	0.00	0.01	0.00	0.00	0.00	0.9
Pn	0.68	0.88	3.57	5.43	1.56	2.00	0.44	0.02	0.15	0.00	0.00	0.00	14.7
PET	3.60	2.20	1.40	1.50	2.00	3.20	4.20	5.60	6.10	6.50	5.90	4.70	46.9
AET	0.68	0.88	1.40	1.50	2.00	3.20	1.69	0.02	0.15	0.00	0.00	0.00	11.5
QSM1	0.00	0.00	0.00	2.17	2.88	2.44	1.25	−0.00	0.00	0.00	0.00	0.00	
QSM2	0.00	0.00	2.17	2.88	2.44	1.25	−0.00	0.00	0.00	0.00	0.00	0.00	
Qgen	0.00	0.00	0.00	3.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.2

Water Year 1970 – 1971	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Pg	0.60	9.00	8.50	2.10	0.80	2.70	1.60	0.50	0.00	0.00	0.02	0.20	26.0
Pg*	0.31	4.68	4.42	1.09	0.42	1.40	0.83	0.26	0.00	0.00	0.01	0.10	13.5
Li	0.02	0.28	0.27	0.07	0.02	0.08	0.05	0.02	0.00	0.00	0.00	0.01	0.
Pn	0.29	4.40	4.15	1.03	0.39	1.32	0.78	0.24	0.00	0.00	0.01	0.10	12.7
PET	3.60	2.20	1.40	1.50	2.00	3.20	4.20	5.60	6.10	6.50	5.90	4.70	46.
AET	0.29	2.20	1.40	1.50	2.00	2.12	0.78	0.24	0.00	0.00	0.01	0.10	10.
QSM1	0.00	0.00	2.20	2.88	2.41	0.80	−0.00	0.00	0.00	0.00	0.00	0.00	
QSM2	0.00	2.20	2.88	2.41	0.80	−0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Qgen	0.00	0.00	2.07	−0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.

Water Year 1971 – 1972	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOT
Pg	0.20	2.50	9.40	1.30	2.00	0.04	1.20	0.09	0.09	0.00	0.00	0.10	16.
Pg*	0.10	1.30	4.89	0.68	1.04	0.02	0.62	0.05	0.05	0.00	0.00	0.05	8.
Li	0.01	0.08	0.29	0.04	0.06	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.
Pn	0.10	1.22	4.59	0.64	0.98	0.02	0.59	0.04	0.04	0.00	0.00	0.05	8.
PET	3.60	2.20	1.40	1.50	2.00	3.20	4.20	5.60	6.10	6.50	5.90	4.70	46
AET	0.10	1.22	1.40	1.50	2.00	1.01	0.59	0.04	0.04	−0.00	0.00	0.05	7.
QSM1	0.00	0.00	0.00	2.88	2.02	0.99	−0.00	−0.00	−0.00	−0.00	0.00	0.00	
QSM2	0.00	0.00	2.88	2.02	0.99	−0.00	−0.00	−0.00	−0.00	0.00	0.00	0.00	
Qgen	0.00	0.00	0.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0

WATER BALANCES
MONTERRA RANCH
1961 – 1992

Water Year 1972 – 1973	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Pg	4.00	10.20	2.60	10.70	13.20	5.40	0.27	0.01	0.00	0.00	0.00	0.10	46.[illegible]
Pg*	2.08	5.30	1.35	5.56	6.86	2.81	0.14	0.01	0.00	0.00	0.00	0.05	24.1[illegible]
LI	0.12	0.32	0.08	0.33	0.41	0.17	0.01	0.00	0.00	0.00	0.00	0.00	1.45
Pn	1.96	4.99	1.27	5.23	6.45	2.64	0.13	0.00	0.00	0.00	0.00	0.05	22.72
PET	3.60	2.20	1.40	1.50	2.00	3.20	4.20	5.60	6.10	6.50	5.90	4.70	46.9[illegible]
AET	1.96	2.20	1.40	1.50	2.00	3.20	2.45	0.00	0.00	0.00	0.00	0.05	14.7[illegible]
QSM1	0.00	0.00	2.79	2.66	2.88	2.88	2.32	0.00	0.00	0.00	0.00	0.00	
QSM2	0.00	2.79	2.66	2.88	2.88	2.32	0.00	0.00	0.00	0.00	0.00	0.00	
Qgen	0.00	0.00	0.00	3.51	4.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	7.96

Water Year 1973 – 1974	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Pg	3.20	6.50	7.60	7.00	0.80	11.20	3.80	0.00	0.50	0.40	0.00	0.00	41.0[illegible]
Pg*	1.66	3.38	3.95	3.64	0.42	5.82	1.98	0.00	0.26	0.21	0.00	0.00	21.32
LI	0.10	0.20	0.24	0.22	0.02	0.35	0.12	0.00	0.02	0.01	0.00	0.00	1.28
Pn	1.56	3.18	3.71	3.42	0.39	5.47	1.86	0.00	0.24	0.20	0.00	0.00	20.0[illegible]
PET	3.60	2.20	1.40	1.50	2.00	3.20	4.20	5.60	6.10	6.50	5.90	4.70	46.9[illegible]
AET	1.56	2.20	1.40	1.50	2.00	3.20	4.20	0.54	0.24	0.20	0.00	0.00	17.0[illegible]
QSM1	0.00	0.00	0.98	2.88	2.88	1.27	2.88	0.54	0.00	0.00	0.00	0.00	
QSM2	0.00	0.98	2.88	2.88	1.27	2.88	0.54	0.00	0.00	0.00	0.00	0.00	
Qgen	0.00	0.00	0.41	1.92	0.00	0.67	0.00	0.00	0.00	0.00	0.00	0.00	3.00

Water Year 1974 – 1975	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Pg	1.90	1.60	6.70	1.30	9.10	9.90	2.10	0.01	0.02	0.06	0.16	0.00	32.8[illegible]
Pg*	0.99	0.83	3.48	0.68	4.73	5.15	1.09	0.01	0.01	0.03	0.08	0.00	17.08
LI	0.06	0.05	0.21	0.04	0.28	0.31	0.07	0.00	0.00	0.00	0.00	0.00	1.02
Pn	0.93	0.78	3.27	0.64	4.45	4.84	1.03	0.00	0.01	0.03	0.08	0.00	16.0[illegible]
PET	3.60	2.20	1.40	1.50	2.00	3.20	4.20	5.60	6.10	6.50	5.90	4.70	46.9[illegible]
AET	0.93	0.78	1.40	1.50	2.00	3.20	3.91	0.00	0.01	0.03	0.08	0.00	13.8[illegible]
QSM1	0.00	0.00	0.00	1.87	1.01	2.88	2.88	−0.00	0.00	0.00	0.00	0.00	
QSM2	0.00	0.00	1.87	1.01	2.88	2.88	−0.00	0.00	0.00	0.00	0.00	0.00	
Qgen	0.00	0.00	0.00	0.00	0.58	1.64	0.00	0.00	0.00	0.00	0.00	0.00	2.2[illegible]

Water Year 1975 – 1976	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Pg	3.00	0.60	0.40	0.14	1.90	3.00	2.30	0.03	0.18	0.00	1.80	1.20	14.55
Pg*	1.56	0.31	0.21	0.07	0.99	1.56	1.20	0.02	0.09	0.00	0.94	0.62	7.57
LI	0.09	0.02	0.01	0.00	0.06	0.09	0.07	0.00	0.01	0.00	0.06	0.04	0.45
Pn	1.47	0.29	0.20	0.07	0.93	1.47	1.12	0.01	0.09	0.00	0.88	0.59	7.1[illegible]
PET	3.60	2.20	1.40	1.50	2.00	3.20	4.20	5.60	6.10	6.50	5.90	4.70	46.9[illegible]
AET	1.47	0.29	0.20	0.07	0.93	1.47	1.12	0.01	0.09	0.00	0.88	0.59	7.1[illegible]
QSM1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
QSM2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Qgen	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0[illegible]

Water Year 1976 – 1977	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Pg	1.10	1.00	2.10	2.50	0.70	2.60	0.00	1.40	0.06	0.00	0.00	1.10	12.56
Pg*	0.57	0.52	1.09	1.30	0.36	1.35	0.00	0.73	0.03	0.00	0.00	0.57	6.53
LI	0.03	0.03	0.07	0.08	0.02	0.08	0.00	0.04	0.00	0.00	0.00	0.03	0.3[illegible]
Pn	0.54	0.49	1.03	1.22	0.34	1.27	0.00	0.68	0.03	0.00	0.00	0.54	6.1[illegible]
PET	3.60	2.20	1.40	1.50	2.00	3.20	4.20	5.60	6.10	6.50	5.90	4.70	46.9[illegible]
AET	0.54	0.49	1.03	1.22	0.34	1.27	0.00	0.68	0.03	0.00	0.00	0.54	6.14
QSM1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
QSM2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Qgen	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	.0[illegible]

Water Year 1977 – 1978	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Pg	0.21	1.70	10.40	12.90	9.90	8.80	5.90	0.10	0.00	0.00	0.00	0.50	50.41
Pg*	0.11	0.88	5.41	6.71	5.15	4.58	3.07	0.05	0.00	0.00	0.00	0.26	26.2[illegible]
LI	0.01	0.05	0.32	0.40	0.31	0.27	0.18	0.00	0.00	0.00	0.00	0.02	1.5[illegible]
Pn	0.10	0.83	5.08	6.31	4.84	4.30	2.88	0.05	0.00	0.00	0.00	0.24	24.[illegible]
PET	3.60	2.20	1.40	1.50	2.00	3.20	4.20	5.60	6.10	6.50	5.90	4.70	46.9[illegible]
AET	0.10	0.83	1.40	1.50	2.00	3.20	4.20	1.61	−0.00	0.00	0.00	0.24	15.09
QSM1	0.00	0.00	0.00	2.88	2.88	2.88	2.88	1.56	−0.00	0.00	0.00	0.00	
QSM2	0.00	0.00	2.88	2.88	2.88	2.88	1.56	−0.00	0.00	0.00	0.00	0.00	
Qgen	0.00	0.00	0.80	4.81	2.84	1.10	0.00	0.00	0.00	0.00	0.00	0.00	9.[illegible]

Water Year 1978 – 1979	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Pg	0.00	5.60	1.70	7.50	6.60	5.80	0.90	0.20	0.00	0.20	0.02	0.00	28.52
Pg*	0.00	2.91	0.88	3.90	3.43	3.02	0.47	0.10	0.00	0.10	0.01	0.00	14.[illegible]
LI	0.00	0.17	0.05	0.23	0.21	0.18	0.03	0.01	0.00	0.01	0.00	0.00	0.[illegible]
Pn	0.00	2.74	0.83	3.67	3.23	2.84	0.44	0.10	0.00	0.10	0.01	0.00	13.[illegible]
PET	3.60	2.20	1.40	1.50	2.00	3.20	4.20	5.60	6.10	6.50	5.90	4.70	46.90
AET	0.00	2.20	1.37	1.50	2.00	3.20	2.95	0.10	0.00	0.10	0.01	0.00	13.43
QSM1	0.00	0.00	0.54	−0.00	2.17	2.88	2.52	0.00	0.00	0.00	0.00	0.00	
QSM2	0.00	0.54	−0.00	2.17	2.88	2.52	0.00	0.00	0.00	0.00	0.00	0.00	
Qgen	0.00	0.00	0.00	−0.00	0.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.[illegible]

WATER BALANCES
MONTERRA RANCH
1961 – 1992

Water Year 1979 – 1980	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Pg	2.50	4.20	6.50	9.60	10.90	4.00	2.50	0.70	0.10	0.48	0.00	0.00	41.48
Pg*	1.30	2.18	3.38	4.99	5.67	2.08	1.30	0.36	0.05	0.25	0.00	0.00	21.57
Li	0.08	0.13	0.20	0.30	0.34	0.12	0.08	0.02	0.00	0.01	0.00	0.00	1.29
Pn	1.22	2.05	3.18	4.69	5.33	1.96	1.22	0.34	0.05	0.23	0.00	0.00	20.28
PET	3.60	2.20	1.40	1.50	2.00	3.20	4.20	5.60	6.10	6.50	5.90	4.70	46.90
AET	1.22	2.05	1.40	1.50	2.00	3.20	2.86	0.34	0.05	0.23	0.00	0.00	14.86
QSM1	0.00	0.00	0.00	1.78	2.88	2.88	1.64	0.00	0.00	0.00	0.00	0.00	
QSM2	0.00	0.00	1.78	2.88	2.88	1.64	0.00	0.00	0.00	0.00	0.00	0.00	
Qgen	0.00	0.00	0.00	2.09	3.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.42

Water Year 1980 – 1981	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Pg	0.01	0.08	3.20	8.60	2.40	7.50	0.50	0.03	0.00	0.00	0.00	0.00	22.32
Pg*	0.01	0.04	1.66	4.47	1.25	3.90	0.26	0.02	0.00	0.00	0.00	0.00	11.61
Li	0.00	0.00	0.10	0.27	0.07	0.23	0.02	0.00	0.00	0.00	0.00	0.00	0.70
Pn	0.00	0.04	1.56	4.20	1.17	3.67	0.24	0.01	0.00	0.00	0.00	0.00	10.91
PET	3.60	2.20	1.40	1.50	2.00	3.20	4.20	5.60	6.10	6.50	5.90	4.70	46.90
AET	0.00	0.04	1.40	1.50	2.00	3.20	2.75	0.01	0.00	0.00	0.00	0.00	10.91
QSM1	0.00	0.00	0.00	0.16	2.87	2.04	2.51	−0.00	0.00	0.00	0.00	0.00	
QSM2	0.00	0.00	0.16	2.87	2.04	2.51	−0.00	0.00	0.00	0.00	0.00	0.00	
Qgen	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Water Year 1981 – 1982	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Pg	2.70	9.70	4.40	10.50	3.40	7.30	7.60	0.04	0.60	0.00	0.00	1.80	48.04
Pg*	1.40	5.04	2.29	5.46	1.77	3.80	3.95	0.02	0.31	0.00	0.00	0.94	24.98
Li	0.08	0.30	0.14	0.33	0.11	0.23	0.24	0.00	0.02	.0.00	0.00	0.06	1.50
Pn	1.32	4.74	2.15	5.13	1.66	3.57	3.71	0.02	0.29	0.00	0.00	0.88	23.48
PET	3.60	2.20	1.40	1.50	2.00	3.20	4.20	5.60	6.10	6.50	5.90	4.70	46.90
AET	1.32	2.20	1.40	1.50	2.00	3.20	4.20	2.41	0.29	−0.00	0.00	0.88	19.41
QSM1	0.00	0.00	2.54	2.88	2.88	2.54	2.88	2.39	−0.00	−0.00	0.00	0.00	
QSM2	0.00	2.54	2.88	2.88	2.54	2.88	2.39	−0.00	−0.00	0.00	0.00	0.00	
Qgen	0.00	0.00	0.41	3.63	−0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	4.07

Water Year 1982 – 1983	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Pg	2.40	8.40	7.20	11.70	10.60	15.40	6.50	0.80	0.20	0.00	0.10	2.30	65.60
Pg*	1.25	4.37	3.74	6.08	5.51	8.01	3.38	0.42	0.10	0.00	0.05	1.20	34.11
Li	0.07	0.26	0.22	0.37	0.33	0.48	0.20	0.02	0.01	0.00	0.00	0.07	2.05
Pn	1.17	4.11	3.52	5.72	5.18	7.53	3.18	0.39	0.10	0.00	0.05	1.12	32.07
PET	3.60	2.20	1.40	1.50	2.00	3.20	4.20	5.60	6.10	6.50	5.90	4.70	46.90
AET	1.17	2.20	1.40	1.50	2.00	3.20	4.20	2.25	0.10	0.00	0.05	1.12	19.19
QSM1	0.00	0.00	1.91	2.88	2.88	2.88	2.88	1.86	−0.00	0.00	0.00	0.00	
QSM2	0.00	1.91	2.88	2.88	2.88	2.88	1.86	−0.00	0.00	0.00	0.00	0.00	
Qgen	0.00	0.00	1.15	4.22	3.18	4.33	0.00	0.00	0.00	0.00	0.00	0.00	12.87

Water Year 1983 – 1984	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Pg	1.50	9.30	7.70	0.20	2.20	1.80	0.60	0.03	0.07	0.02	0.02	0.10	23.54
Pg*	0.78	4.84	4.00	0.10	1.14	0.94	0.31	0.02	0.04	0.01	0.01	0.05	12.24
Li	0.05	0.29	0.24	0.01	0.07	0.06	0.02	0.00	0.00	0.00	0.00	0.00	0.73
Pn	0.73	4.55	3.76	0.10	1.08	0.88	0.29	0.01	0.03	0.01	0.01	0.05	11.51
PET	3.60	2.20	1.40	1.50	2.00	3.20	4.20	5.60	6.10	6.50	5.90	4.70	46.90
AET	0.73	2.20	1.40	1.50	2.00	1.43	0.29	0.01	0.03	0.01	0.01	0.05	9.68
QSM1	0.00	0.00	2.35	2.88	1.48	0.55	−0.00	0.00	0.00	0.00	0.00	0.00	
QSM2	0.00	2.35	2.88	1.48	0.55	−0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Qgen	0.00	0.00	1.83	−0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-1.83

Water Year 1984 – 1985	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Pg	2.00	7.20	2.90	0.80	2.80	5.50	0.60	0.05	0.14	0.00	0.00	0.36	22.35
Pg*	1.04	3.74	1.51	0.42	1.46	2.86	0.31	0.03	0.07	0.00	0.00	0.19	11.6
Li	0.06	0.22	0.09	0.02	0.09	0.17	0.02	0.00	0.00	0.00	0.00	0.01	0.7
Pn	0.98	3.52	1.42	0.39	1.37	2.69	0.29	0.02	0.07	0.00	0.00	0.18	10.9
PET	3.60	2.20	1.40	1.50	2.00	3.20	4.20	5.60	6.10	6.50	5.90	4.70	46.9
AET	0.98	2.20	1.40	1.50	1.60	2.69	0.29	0.02	0.07	0.00	0.00	0.18	10.9
QSM1	0.00	0.00	1.32	1.34	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
QSM2	0.00	1.32	1.34	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Qgen	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0

Water Year 1985 – 1986	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTA
Pg	1.00	6.30	3.20	5.70	14.30	9.70	1.00	0.20	0.00	0.03	0.00	1.40	42.8
Pg*	0.52	3.28	1.66	2.96	7.44	5.04	0.52	0.10	0.00	0.02	0.00	0.73	22.2
Li	0.03	0.20	0.10	0.18	0.45	0.30	0.03	0.01	0.00	0.00	0.00	0.04	1.3
Pn	0.49	3.08	1.56	2.79	6.99	4.74	0.49	0.10	0.00	0.01	0.00	0.68	20.9
PET	3.60	2.20	1.40	1.50	2.00	3.20	4.20	5.60	6.10	6.50	5.90	4.70	46.9
AET	0.49	2.20	1.40	1.50	2.00	3.20	3.37	0.10	0.00	0.01	0.00	0.68	14.9
QSM1	0.00	0.00	0.88	1.04	2.33	2.88	2.88	0.00	0.00	0.00	0.00	0.00	
QSM2	0.00	0.88	1.04	2.33	2.88	2.88	0.00	0.00	0.00	0.00	0.00	0.00	
Qgen	0.00	0.00	0.00	0.00	4.44	1.54	0.00	0.00	0.00	0.00	0.00	0.00	5.

Water Year 1986 – 1987	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTA
Pg	0.00	0.60	3.00	3.60	7.00	6.10	0.90	0.20	0.00	0.00	0.00	0.00	21.
Pg*	0.00	0.31	1.56	1.98	3.64	3.17	0.47	0.10	0.00	0.00	0.00	0.00	11.2
LI	0.00	0.02	0.09	0.12	0.22	0.19	0.03	0.01	0.00	0.00	0.00	0.00	0.6
Pn	0.00	0.29	1.47	1.86	3.42	2.98	0.44	0.10	0.00	0.00	0.00	0.00	10.5
PET	3.60	2.20	1.40	1.50	2.00	3.20	4.20	5.60	6.10	6.50	5.90	4.70	46.9
AET	0.00	0.29	1.40	1.50	2.00	3.20	2.07	0.10	0.00	0.00	0.00	0.00	10.5
QSM1	0.00	0.00	0.00	0.07	0.42	1.85	1.63	0.00	0.00	0.00	0.00	0.00	
QSM2	0.00	0.00	0.07	0.42	1.85	1.63	0.00	0.00	0.00	0.00	0.00	0.00	
Qgen	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0

Water Year 1987 – 1988	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTA
Pg	1.50	2.00	7.80	3.30	1.20	0.40	2.90	0.80	0.30	0.00	0.00	0.00	20.2
Pg*	0.78	1.04	4.06	1.72	0.62	0.21	1.51	0.42	0.16	0.00	0.00	0.00	10.5
LI	0.05	0.06	0.24	0.10	0.04	0.01	0.09	0.02	0.01	0.00	0.00	0.00	0.6
Pn	0.73	0.98	3.81	1.61	0.59	0.20	1.42	0.39	0.15	0.00	0.00	0.00	9.6
PET	3.60	2.20	1.40	1.50	2.00	3.20	4.20	5.60	6.10	6.50	5.90	4.70	46.9
AET	0.73	0.98	1.40	1.50	2.00	1.31	1.42	0.39	0.15	0.00	0.00	0.00	9.6
QSM1	0.00	0.00	0.00	2.41	2.53	1.11	−0.00	−0.00	0.00	0.00	0.00	0.00	
QSM2	0.00	0.00	2.41	2.53	1.11	−0.00	−0.00	0.00	0.00	0.00	0.00	0.00	
Qgen	0.00	0.00	0.00	−0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	−0.0

Water Year 1988 – 1989	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTA
Pg	0.00	3.00	6.30	1.90	2.50	5.70	0.90	0.26	0.00	0.00	0.00	0.90	21.4
Pg*	0.00	1.56	3.28	0.99	1.30	2.96	0.47	0.14	· 0.00	0.00	0.00	0.47	11.1
LI	0.00	0.09	0.20	0.06	0.08	0.18	0.03	0.01	0.00	0.00	0.00	0.03	0.6
Pn	0.00	1.47	3.08	0.93	1.22	2.79	0.44	0.13	0.00	0.00	0.00	0.44	10.4
PET	3.60	2.20	1.40	1.50	2.00	3.20	4.20	5.60	6.10	6.50	5.90	4.70	46.
AET	0.00	1.47	1.40	1.50	2.00	3.12	0.44	0.13	0.00	0.00	0.00	0.44	10.4
QSM1	0.00	0.00	0.00	1.68	1.11	0.33	−0.00	0.00	0.00	0.00	0.00	0.00	
QSM2	0.00	0.00	1.68	1.11	0.33	−0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Qgen	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0

Water Year 1989 – 1990	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTA
Pg	2.40	1.90	0.10	4.40	3.70	2.10	0.80	1.70	0.00	0.00	0.00	0.40	17.5
Pg*	1.25	0.99	0.05	2.29	1.92	1.09	0.42	0.88	0.00	0.00	0.00	0.21	9.1
LI	0.07	0.06	0.00	0.14	0.12	0.07	0.02	0.05	0.00	0.00	0.00	0.01	0.5
Pn	1.17	0.93	0.05	2.15	1.81	1.03	0.39	0.83	0.00	0.00	0.00	0.20	8.
PET	3.60	2.20	1.40	1.50	2.00	3.20	4.20	5.60	6.10	6.50	5.90	4.70	46.
AET	1.17	0.93	0.05	1.50	2.00	1.49	0.39	0.83	0.00	0.00	0.00	0.20	8.5
QSM1	0.00	0.00	0.00	0.00	0.65	0.46	0.00	0.00	0.00	0.00	0.00	0.00	
QSM2	0.00	0.00	0.00	0.65	0.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Qgen	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.

Water Year 1990 – 1991	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTA
Pg	0.04	0.49	1.92	0.44	3.76	15.84	0.86	0.19	0.96	0.00	0.05	0.00	24.5
Pg*	0.02	0.25	1.00	0.23	1.96	8.24	0.45	0.10	0.50	0.00	0.03	0.00	12.7
LI	0.00	0.02	0.06	0.01	0.12	0.49	0.03	0.01	0.03	0.00	0.00	0.00	0.
Pn	0.02	0.24	0.94	0.22	1.84	7.74	0.42	0.09	0.47	0.00	0.02	0.00	12.0
PET	3.60	2.20	1.40	1.50	2.00	3.20	4.20	5.60	6.10	6.50	5.90	4.70	46.
AET	0.02	0.24	0.94	0.22	1.84	3.20	3.30	0.09	0.47	0.00	0.02	0.00	10.3
QSM1	0.00	0.00	0.00	0.00	0.00	0.00	2.88	0.00	0.00	0.00	0.00	0.00	
QSM2	0.00	0.00	0.00	0.00	0.00	2.88	0.00	0.00	0.00	0.00	0.00	0.00	
Qgen	0.00	0.00	0.00	0.00	0.00	1.66	0.00	0.00	0.00	0.00	0.00	0.00	−1.

Water Year 1991 – 1992	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTA
Pg	1.89	0.55	6.09	2.78	10.99	5.08	0.23	0.00	0.00	0.28	0.01	0.00	27.
Pg*	0.98	0.29	3.17	1.45	5.71	2.64	0.12	0.00	0.00	0.15	0.01	0.00	14.
LI	0.06	0.02	0.19	0.09	0.34	0.16	0.01	0.00	0.00	0.01	0.00	0.00	0.
Pn	0.92	0.27	2.98	1.36	5.37	2.48	0.11	0.00	0.00	0.14	0.00	0.00	13.
PET	3.60	2.20	1.40	1.50	2.00	3.20	4.20	5.60	6.10	6.50	5.90	4.70	46.
AET	0.92	0.27	1.40	1.50	2.00	3.20	2.28	0.00	0.00	0.14	0.00	0.00	11.
QSM1	0.00	0.00	0.00	1.58	1.44	2.88	2.16	0.00	0.00	0.00	0.00	0.00	
QSM2	0.00	0.00	1.58	1.44	2.88	2.16	0.00	0.00	0.00	0.00	0.00	0.00	
Qgen	0.00	0.00	0.00	0.00	1.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.

TABLE 2

WATER BALANCES
MONTERRA RANCH
1961 – 1992

Data used for calculations:

- Rooting depth: 4 feet
- Soil moisture capacity: 5.76 inches
- Potential evapotranspiration: 46.9 inches per year
- Average annual rainfall: 16 inches

Definition of terms:

- Pg = Precipitation, gross regional. Average of San Clemente and Big Sur stations, 1958 – 1992 = 31 inches.
- Pg* = Precipitation, gross Monterra. Derived from Pg and 0.52 rainfall factor based on isohyetal map.
- Li = Interception losses. Assumed as six percent of Pg(0.52).
- Pn = Net Precipitation. Precipitation after interception losses.
- PET = Potential evapotranspiration.
- AET = Actual evapotranspiration.
- QSM1 = Soil moisture at the beginning of the month.
- QSM2 = Soil moisture at the end of the month.
- Qgen = Water yield generated.

Water Year 1960 – 1961

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Pg	0.09	5.10	2.60	3.20	1.30	3.20	1.00	0.50	0.10	0.00	0.00	0.10	17.19
Pg*	0.05	2.65	1.35	1.66	0.68	1.66	0.52	0.26	0.05	0.00	0.00	0.05	8.94
Li	0.00	0.00	0.16	0.08	0.10	0.04	0.10	0.03	0.02	0.00	0.00	0.00	0.54
Pn	0.04	0.04	2.49	1.27	1.56	0.64	1.56	0.49	0.24	0.05	0.00	0.00	8.40
PET	3.60	2.20	1.40	1.50	2.00	3.20	4.20	5.60	6.10	6.50	5.90	4.70	46.90
AET	0.04	0.04	1.40	1.50	2.00	1.06	1.56	0.49	0.24	0.05	0.00	0.00	8.40
QSM1	0.00	0.00	0.00	1.09	0.86	0.43	0.00	0.00	0.00	0.00	0.00	0.00	
QSM2	0.00	0.00	1.09	0.86	0.43	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Qgen	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Water Year 1961 – 1962

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Pg	0.12	3.60	2.60	3.00	16.60	3.70	0.40	0.30	0.10	0.00	0.00	0.00	30.42
Pg*	0.06	1.87	1.35	1.56	8.63	1.92	0.21	0.16	.0.05	0.00	0.00	0.00	15.82
Li	0.00	0.11	0.08	0.09	0.52	0.12	0.01	0.01	0.00	0.00	0.00	0.00	0.95
Pn	0.06	1.76	1.27	1.47	8.11	1.81	0.20	0.15	0.05	0.00	0.00	0.00	14.87
PET	3.60	2.20	1.40	1.50	2.00	3.20	4.20	5.60	6.10	6.50	5.90	4.70	46.90
AET	0.06	1.76	1.27	1.47	2.00	3.20	4.20	0.51	0.05	0.00	0.00	0.00	14.52
QSM1	0.00	0.00	0.00	0.00	0.00	5.76	4.37	0.36	0.00	0.00	0.00	0.00	
QSM2	0.00	0.00	0.00	0.00	5.76	4.37	0.36	0.00	0.00	0.00	0.00	0.00	
Qgen	0.00	0.00	0.00	0.00	0.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.35

Water Year 1962 – 1963

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Pg	5.00	0.20	4.20	9.60	8.10	6.00	7.60	0.40	0.10	0.00	0.00	0.10	41.30
Pg*	2.60	0.10	2.18	4.99	4.21	3.12	3.95	0.21	0.05	0.00	0.00	0.05	21.48
Li	0.16	0.01	0.13	0.30	0.25	0.19	0.24	0.01	0.00	0.00	0.00	0.00	1.29
Pn	2.44	0.10	2.05	4.69	3.96	2.93	3.71	0.20	0.05	0.00	0.00	0.05	20.19
PET	3.60	2.20	1.40	1.50	2.00	3.20	4.20	5.60	6.10	6.50	5.90	4.70	46.90
AET	2.44	0.10	1.40	1.50	2.00	3.20	4.20	5.20	0.05	0.00	0.00	0.05	20.14
QSM1	0.00	0.00	0.00	0.65	3.85	5.76	5.49	5.01	−0.00	0.00	0.00	0.00	
QSM2	0.00	0.00	0.65	3.85	5.76	5.49	5.01	−0.00	0.00	0.00	0.00	0.00	
Qgen	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04

Water Year 1963 – 1964

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Pg	2.40	7.30	0.40	4.80	0.40	3.70	0.70	2.00	0.60	0.00	0.00	0.30	22.60
Pg*	1.25	3.80	0.21	2.50	0.21	1.92	0.36	1.04	0.31	0.00	0.00	0.16	11.75
Li	0.07	0.23	0.01	0.15	0.01	0.12	0.02	0.06	0.02	0.00	0.00	0.01	0.71
Pn	1.17	3.57	0.20	2.35	0.20	1.81	0.34	0.98	0.29	0.00	0.00	0.15	11.05
PET	3.60	2.20	1.40	1.50	2.00	3.20	4.20	5.60	6.10	6.50	5.90	4.70	46.90
AET	1.17	2.20	1.40	1.50	1.21	1.81	0.34	0.98	0.29	0.00	0.00	0.15	11.05
QSM1	0.00	0.00	1.37	0.16	1.01	−0.00	−0.00	0.00	0.00	0.00	0.00	0.00	
QSM2	0.00	1.37	0.16	1.01	−0.00	−0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Qgen	0.00	0.00	0.00	−0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	−0.00

Water Year 1964 – 1965

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Pg	1.90	4.90	9.40	5.70	1.40	3.60	3.80	0.10	0.01	0.00	0.20	0.00	31.01
Pg*	0.99	2.55	4.89	2.96	0.73	1.87	1.98	0.05	0.01	0.00	0.10	0.00	16.13
Li	0.06	0.15	0.29	0.18	0.04	0.11	0.12	0.00	0.00	0.00	0.01	0.00	0.97
Pn	0.93	2.40	4.59	2.79	0.68	1.76	1.86	0.05	0.00	0.00	0.10	0.00	15.16
PET	3.60	2.20	1.40	1.50	2.00	3.20	4.20	5.60	6.10	6.50	5.90	4.70	46.90
AET	0.93	2.20	1.40	1.50	2.00	3.20	3.78	0.05	0.00	0.00	0.10	0.00	15.16
QSM1	0.00	0.00	0.20	3.39	4.68	3.36	1.92	−0.00	0.00	0.00	0.00	0.00	
QSM2	0.00	0.20	3.39	4.68	3.36	1.92	−0.00	0.00	0.00	0.00	0.00	0.00	
Qgen	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

WATER BALANCES
MONTERRA RANCH
1961 – 1992

Water Year 1965 – 1966	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTA
Pg	0.20	10.60	6.40	2.80	3.30	0.50	0.60	0.00	0.04	0.20	0.00	0.20	25.0
Pg*	0.10	5.62	3.33	1.46	1.72	0.26	0.31	0.00	0.02	0.10	0.00	0.10	13.0
Li	0.01	0.34	0.20	0.09	0.10	0.02	0.02	0.00	0.00	0.01	0.00	0.01	0.7
Pn	0.10	5.28	3.13	1.37	1.61	0.24	0.29	0.00	0.02	0.10	0.00	0.10	12.2
PET	3.60	2.20	1.40	1.50	2.00	3.20	4.20	5.60	6.10	6.50	5.90	4.70	46.9
AET	0.10	2.20	1.40	1.50	2.00	3.20	1.63	0.00	0.02	0.10	0.00	0.10	12.2
QSM1	0.00	0.00	3.08	4.81	4.68	4.29	1.33	0.00	0.00	0.00	0.00	0.00	
QSM2	0.00	3.08	4.81	4.68	4.29	1.33	0.00	0.00	0.00	0.00	0.00	0.00	
Qgen	0.00	0.00	−0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	−0.0

Water Year 1966 – 1967	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTA
Pg	0.00	6.70	9.20	10.00	0.80	7.60	9.60	0.40	0.80	0.00	0.00	0.20	45.3
Pg*	0.00	3.48	4.78	5.20	0.42	3.95	4.99	0.21	0.42	0.00	0.00	0.10	23.5
Li	0.00	0.21	0.29	0.31	0.02	0.24	0.30	0.01	0.02	0.00	0.00	0.01	1.4
Pn	0.00	3.27	4.50	4.89	0.39	3.71	4.69	0.20	0.39	0.00	0.00	0.10	22.1
PET	3.60	2.20	1.40	1.50	2.00	3.20	4.20	5.60	6.10	6.50	5.90	4.70	46.9
AET	0.00	2.20	1.40	1.50	2.00	3.20	4.20	5.35	0.39	0.00	0.00	0.10	20.3
QSM1	0.00	0.00	1.07	4.17	5.76	4.15	4.67	5.16	−0.00	0.00	0.00	0.00	
QSM2	0.00	1.07	4.17	5.76	4.15	4.67	5.16	−0.00	0.00	0.00	0.00	0.00	
Qgen	0.00	0.00	0.00	1.80	−0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.8

Water Year 1967 – 1968	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTA
Pg	0.30	1.50	3.50	5.80	2.60	3.50	1.00	0.50	0.06	0.00	0.10	0.00	18.8
Pg*	0.16	0.78	1.82	3.02	1.35	1.82	0.52	0.26	0.03	0.00	0.05	0.00	9.81
Li	0.01	0.05	0.11	0.18	0.08	0.11	0.03	0.02	0.00	0.00	0.00	0.00	0.5
Pn	0.15	0.73	1.71	2.84	1.27	1.71	0.49	0.24	0.03	0.00	0.05	0.00	9.2
PET	3.60	2.20	1.40	1.50	2.00	3.20	4.20	5.60	6.10	6.50	5.90	4.70	46.9
AET	0.15	0.73	1.40	1.50	2.00	2.63	0.49	0.24	0.03	0.00	0.05	0.00	9.2
QSM1	0.00	0.00	0.00	0.31	1.65	0.92	0.00	0.00	0.00	0.00	0.00	0.00	
QSM2	0.00	0.00	0.31	1.65	0.92	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Qgen	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0

Water Year 1968 – 1969	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTA
Pg	1.10	2.60	6.20	19.30	14.40	2.30	3.00	0.11	0.09	0.00	0.00	0.06	49.1
Pg*	0.57	1.35	3.22	10.04	7.49	1.20	1.56	0.06	0.05	0.00	0.00	0.03	25.5
Li	0.03	0.08	0.19	0.60	0.45	0.07	0.09	0.00	0.00	0.00	0.00	0.00	1.5
Pn	0.54	1.27	3.03	9.43	7.04	1.12	1.47	0.05	0.04	0.00	0.00	0.03	24.0
PET	3.60	2.20	1.40	1.50	2.00	3.20	4.20	5.60	6.10	6.50	5.90	4.70	46.9
AET	0.54	1.27	1.40	1.50	2.00	3.20	4.20	1.00	0.04	0.00	0.00	0.03	15.1
QSM1	0.00	0.00	0.00	1.63	5.76	5.76	3.68	0.95	−0.00	0.00	0.00	0.00	
QSM2	0.00	0.00	1.63	5.76	5.76	3.68	0.95	−0.00	0.00	0.00	0.00	0.00	
Qgen	0.00	0.00	0.00	3.80	5.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.8

Water Year 1969 – 1970	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTA
Pg	1.40	1.80	7.30	11.10	3.20	4.10	0.90	0.04	0.30	0.00	0.00	0.00	30.1
Pg*	0.73	0.94	3.80	5.77	1.66	2.13	0.47	0.02	0.16	0.00	0.00	0.00	15.6
Li	0.04	0.06	0.23	0.35	0.10	0.13	0.03	0.00	0.01	0.00	0.00	0.00	0.9
Pn	0.68	0.88	3.57	5.43	1.56	2.00	0.44	0.02	0.15	0.00	0.00	0.00	14.7
PET	3.60	2.20	1.40	1.50	2.00	3.20	4.20	5.60	6.10	6.50	5.90	4.70	46.9
AET	0.68	0.88	1.40	1.50	2.00	3.20	4.20	0.39	0.15	−0.00	0.00	0.00	14.4
QSM1	0.00	0.00	0.00	2.17	5.76	5.32	4.13	0.37	−0.00	−0.00	0.00	0.00	
QSM2	0.00	0.00	2.17	5.76	5.32	4.13	0.37	−0.00	−0.00	0.00	0.00	0.00	
Qgen	0.00	0.00	0.00	0.33	0.00	−0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.3

Water Year 1970 – 1971	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTA
Pg	0.60	9.00	8.50	2.10	0.80	2.70	1.60	0.50	0.00	0.00	0.02	0.20	26.0
Pg*	0.31	4.68	4.42	1.09	0.42	1.40	0.83	0.26	0.00	0.00	0.01	0.10	13.5
Li	0.02	0.28	0.27	0.07	0.02	0.08	0.05	0.02	0.00	0.00	0.00	0.01	0.8
Pn	0.29	4.40	4.15	1.03	0.39	1.32	0.78	0.24	0.00	0.00	0.01	0.10	12.7
PET	3.60	2.20	1.40	1.50	2.00	3.20	4.20	5.60	6.10	6.50	5.90	4.70	46.9
AET	0.29	2.20	1.40	1.50	2.00	3.20	1.77	0.24	0.00	0.00	0.01	0.10	12.7
QSM1	0.00	0.00	2.20	4.95	4.48	2.87	0.99	0.00	0.00	0.00	0.00	0.00	
QSM2	0.00	2.20	4.95	4.48	2.87	0.99	0.00	0.00	0.00	0.00	0.00	0.00	
Qgen	0.00	0.00	−0.00	−0.00	−0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	−0.0

Water Year 1971 – 1972	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTA
Pg	0.20	2.50	9.40	1.30	2.00	0.04	1.20	0.09	0.09	0.00	0.00	0.10	16.9
Pg*	0.10	1.30	4.89	0.68	1.04	0.02	0.62	0.05	0.05	0.00	0.00	0.05	8.8
Li	0.01	0.08	0.29	0.04	0.06	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.5
Pn	0.10	1.22	4.59	0.64	0.98	0.02	0.59	0.04	0.04	0.00	0.00	0.05	8.2
PET	3.60	2.20	1.40	1.50	2.00	3.20	4.20	5.60	6.10	6.50	5.90	4.70	46.9
AET	0.10	1.22	1.40	1.50	2.00	1.33	0.59	0.04	0.04	−0.00	0.00	0.05	8.2
QSM1	0.00	0.00	0.00	3.19	2.33	1.31	−0.00	−0.00	−0.00	−0.00	0.00	0.00	
QSM2	0.00	0.00	3.19	2.33	1.31	−0.00	−0.00	−0.00	−0.00	0.00	0.00	0.00	
Qgen	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0

WATER BALANCES
MONTERRA RANCH
1961 – 1992

Water Year 1972 – 1973

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Pg	4.00	10.20	2.60	10.70	13.20	5.40	0.27	0.01	0.00	0.00	0.00	0.10	46.48
Pg*	2.08	5.30	1.35	5.56	6.86	2.81	0.14	0.01	0.00	0.00	0.00	0.05	24.17
Li	0.12	0.32	0.08	0.33	0.41	0.17	0.01	0.00	0.00	0.00	0.00	0.00	1.45
Pn	1.96	4.99	1.27	5.23	6.45	2.64	0.13	0.00	0.00	0.00	0.00	0.05	22.72
PET	3.60	2.20	1.40	1.50	2.00	3.20	4.20	5.60	6.10	6.50	5.90	4.70	46.90
AET	1.96	2.20	1.40	1.50	2.00	3.20	4.20	1.14	−0.00	0.00	0.00	0.05	17.64
QSM1	0.00	0.00	2.79	2.66	5.76	5.76	5.20	1.13	−0.00	0.00	0.00	0.00	
QSM2	0.00	2.79	2.66	5.76	5.76	5.20	1.13	−0.00	0.00	0.00	0.00	0.00	
Qgen	0.00	0.00	0.00	0.63	4.45	0.00	−0.00	0.00	0.00	0.00	0.00	0.00	5.08

Water Year 1973 – 1974

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Pg	3.20	6.50	7.60	7.00	0.80	11.20	3.80	0.00	0.50	0.40	0.00	0.00	41.00
Pg*	1.66	3.38	3.95	3.64	0.42	5.82	1.98	0.00	0.26	0.21	0.00	0.00	21.32
Li	0.10	0.20	0.24	0.22	0.02	0.35	0.12	0.00	0.02	0.01	0.00	0.00	1.28
Pn	1.56	3.18	3.71	3.42	0.39	5.47	1.86	0.00	0.24	0.20	0.00	0.00	20.04
PET	3.60	2.20	1.40	1.50	2.00	3.20	4.20	5.60	6.10	6.50	5.90	4.70	46.90
AET	1.56	2.20	1.40	1.50	2.00	3.20	4.20	3.42	0.24	0.20	0.00	0.00	19.92
QSM1	0.00	0.00	0.98	3.29	5.21	3.60	5.76	3.42	0.00	0.00	0.00	0.00	
QSM2	0.00	0.98	3.29	5.21	3.60	5.76	3.42	0.00	0.00	0.00	0.00	0.00	
Qgen	0.00	0.00	0.00	−0.00	−0.00	0.12	0.00	0.00	0.00	0.00	0.00	0.00	0.12

Water Year 1974 – 1975

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Pg	1.90	1.60	6.70	1.30	9.10	9.90	2.10	0.01	0.02	0.06	0.16	0.00	32.85
Pg*	0.99	0.83	3.48	0.68	4.73	5.15	1.09	0.01	0.01	.0.03	0.08	0.00	17.08
Li	0.06	0.05	0.21	0.04	0.28	0.31	0.07	0.00	0.00	0.00	0.00	0.00	1.02
Pn	0.93	0.78	3.27	0.64	4.45	4.84	1.03	0.00	0.01	0.03	0.08	0.00	16.06
PET	3.60	2.20	1.40	1.50	2.00	3.20	4.20	5.60	6.10	6.50	5.90	4.70	46.90
AET	0.93	0.78	1.40	1.50	2.00	3.20	4.20	1.93	0.01	0.03	0.08	−0.00	16.06
QSM1	0.00	0.00	0.00	1.87	1.01	3.46	5.10	1.92	−0.00	−0.00	−0.00	−0.00	
QSM2	0.00	0.00	1.87	1.01	3.46	5.10	1.92	−0.00	−0.00	−0.00	−0.00	0.00	
Qgen	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Water Year 1975 – 1976

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Pg	3.00	0.60	0.40	0.14	1.90	3.00	2.30	0.03	0.18	0.00	1.80	1.20	14.55
Pg*	1.56	0.31	0.21	0.07	0.99	1.56	1.20	0.02	0.09	0.00	0.94	0.62	7.57
Li	0.09	0.02	0.01	0.00	0.06	0.09	0.07	0.00	0.01	0.00	0.06	0.04	0.45
Pn	1.47	0.29	0.20	0.07	0.93	1.47	1.12	0.01	0.09	0.00	0.88	0.59	7.11
PET	3.60	2.20	1.40	1.50	2.00	3.20	4.20	5.60	6.10	6.50	5.90	4.70	46.90
AET	1.47	0.29	0.20	0.07	0.93	1.47	1.12	0.01	0.09	0.00	0.88	0.59	7.11
QSM1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
QSM2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Qgen	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Water Year 1976 – 1977

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Pg	1.10	1.00	2.10	2.50	0.70	2.60	0.00	1.40	0.06	0.00	0.00	1.10	12.56
Pg*	0.57	0.52	1.09	1.30	0.36	1.35	0.00	0.73	0.03	0.00	0.00	0.57	6.53
Li	0.03	0.03	0.07	0.08	0.02	0.08	0.00	0.04	0.00	0.00	0.00	0.03	0.39
Pn	0.54	0.49	1.03	1.22	0.34	1.27	0.00	0.68	0.03	0.00	0.00	0.54	6.14
PET	3.60	2.20	1.40	1.50	2.00	3.20	4.20	5.60	6.10	6.50	5.90	4.70	46.90
AET	0.54	0.49	1.03	1.22	0.34	1.27	0.00	0.68	0.03	0.00	0.00	0.54	6.14
QSM1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
QSM2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Qgen	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Water Year 1977 – 1978

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Pg	0.21	1.70	10.40	12.90	9.90	8.80	5.90	0.10	0.00	0.00	0.00	0.50	50.41
Pg*	0.11	0.88	5.41	6.71	5.15	4.58	3.07	0.05	0.00	0.00	0.00	0.26	26.21
Li	0.01	0.05	0.32	0.40	0.31	0.27	0.18	0.00	0.00	0.00	0.00	0.02	1.57
Pn	0.10	0.83	5.08	6.31	4.84	4.30	2.88	0.05	0.00	0.00	0.00	0.24	24.64
PET	3.60	2.20	1.40	1.50	2.00	3.20	4.20	5.60	6.10	6.50	5.90	4.70	46.90
AET	0.10	0.83	1.40	1.50	2.00	3.20	4.20	4.49	0.00	0.00	0.00	0.24	17.97
QSM1	0.00	0.00	0.00	3.68	5.76	5.76	5.76	4.44	0.00	0.00	0.00	0.00	
QSM2	0.00	0.00	3.68	5.76	5.76	5.76	4.44	0.00	0.00	0.00	0.00	0.00	
Qgen	0.00	0.00	0.00	2.73	2.84	1.10	0.00	0.00	0.00	0.00	0.00	0.00	6.67

Water Year 1978 – 1979

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Pg	0.00	5.60	1.70	7.50	6.60	5.80	0.90	0.20	0.00	0.20	0.02	0.00	28.52
Pg*	0.00	2.91	0.88	3.90	3.43	3.02	0.47	0.10	0.00	0.10	0.01	0.00	14.83
Li	0.00	0.17	0.05	0.23	0.21	0.18	0.03	0.01	0.00	0.01	0.00	0.00	0.89
Pn	0.00	2.74	0.83	3.67	3.23	2.84	0.44	0.10	0.00	0.10	0.01	0.00	13.94
PET	3.60	2.20	1.40	1.50	2.00	3.20	4.20	5.60	6.10	6.50	5.90	4.70	46.90
AET	0.00	2.20	1.37	1.50	2.00	3.20	3.47	0.10	0.00	0.10	0.01	0.00	13.94
QSM1	0.00	0.00	0.54	−0.00	2.17	3.39	3.03	0.00	0.00	0.00	0.00	0.00	
QSM2	0.00	0.54	−0.00	2.17	3.39	3.03	0.00	0.00	0.00	0.00	0.00	0.00	
Qgen	0.00	0.00	0.00	−0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	−0.00

WATER BALANCES
MONTERRA RANCH
1961 – 1992

Water Year 1979 – 1980

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Pg	2.50	4.20	6.50	9.60	10.90	4.00	2.50	0.70	0.10	0.48	0.00	0.00	41.4
Pg*	1.30	2.18	3.38	4.99	5.67	2.08	1.30	0.36	0.05	0.25	0.00	0.00	21.5
Li	0.08	0.13	0.20	0.30	0.34	0.12	0.08	0.02	0.00	0.01	0.00	0.00	1.2
Pn	1.22	2.05	3.18	4.69	5.33	1.96	1.22	0.34	0.05	0.23	0.00	0.00	20.2
PET	3.60	2.20	1.40	1.50	2.00	3.20	4.20	5.60	6.10	6.50	5.90	4.70	46.9
AET	1.22	2.05	1.40	1.50	2.00	3.20	4.20	1.88	0.05	0.23	0.00	0.00	17.7
QSM1	0.00	0.00	0.00	1.78	4.97	5.76	4.52	1.54	0.00	0.00	0.00	0.00	
QSM2	0.00	0.00	1.78	4.97	5.76	4.52	1.54	0.00	0.00	0.00	0.00	0.00	
Qgen	0.00	0.00	0.00	0.00	2.54	−0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.5

Water Year 1980 – 1981

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Pg	0.01	0.08	3.20	8.60	2.40	7.50	0.50	0.03	0.00	0.00	0.00	0.00	22.3
Pg*	0.01	0.04	1.66	4.47	1.25	3.90	0.26	0.02	0.00	0.00	0.00	0.00	11.6
Li	0.00	0.00	0.10	0.27	0.07	0.23	0.02	0.00	0.00	0.00	0.00	0.00	0.7
Pn	0.00	0.04	1.56	4.20	1.17	3.67	0.24	0.01	0.00	0.00	0.00	0.00	10.9
PET	3.60	2.20	1.40	1.50	2.00	3.20	4.20	5.60	6.10	6.50	5.90	4.70	46.9
AET	0.00	0.04	1.40	1.50	2.00	3.20	2.75	0.01	0.00	0.00	0.00	0.00	10.9
QSM1	0.00	0.00	0.00	0.16	2.87	2.04	2.51	−0.00	0.00	0.00	0.00	0.00	
QSM2	0.00	0.00	0.16	2.87	2.04	2.51	−0.00	0.00	0.00	0.00	0.00	0.00	
Qgen	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0

Water Year 1981 – 1982

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Pg	2.70	9.70	4.40	10.50	3.40	7.30	7.60	0.04	0.60	0.00	0.00	1.80	48.0
Pg*	1.40	5.04	2.29	5.46	1.77	3.80	3.95	0.02	0.31	0.00	0.00	0.94	24.9
Li	0.08	0.30	0.14	0.33	0.11	0.23	0.24	0.00	0.02	0.00	0.00	0.06	1.5
Pn	1.32	4.74	2.15	5.13	1.66	3.57	3.71	0.02	0.29	0.00	0.00	0.88	23.4
PET	3.60	2.20	1.40	1.50	2.00	3.20	4.20	5.60	6.10	6.50	5.90	4.70	46.9
AET	1.32	2.20	1.40	1.50	2.00	3.20	4.20	5.29	0.29	−0.00	0.00	0.88	22.2
QSM1	0.00	0.00	2.54	3.29	5.76	5.42	5.76	5.27	−0.00	−0.00	0.00	0.00	
QSM2	0.00	2.54	3.29	5.76	5.42	5.76	5.27	−0.00	−0.00	0.00	0.00	0.00	
Qgen	0.00	0.00	0.00	1.16	−0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	1.1

Water Year 1982 – 1983

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Pg	2.40	8.40	7.20	11.70	10.60	15.40	6.50	0.80	0.20	0.00	0.10	2.30	65.6
Pg*	1.25	4.37	3.74	6.08	5.51	8.01	3.38	0.42	0.10	0.00	0.05	1.20	34.1
Li	0.07	0.26	0.22	0.37	0.33	0.48	0.20	0.02	0.01	0.00	0.00	0.07	2.0
Pn	1.17	4.11	3.52	5.72	5.18	7.53	3.18	0.39	0.10	0.00	0.05	1.12	32.0
PET	3.60	2.20	1.40	1.50	2.00	3.20	4.20	5.60	6.10	6.50	5.90	4.70	46.9
AET	1.17	2.20	1.40	1.50	2.00	3.20	4.20	5.13	0.10	0.00	0.05	1.12	22.0
QSM1	0.00	0.00	1.91	4.03	5.76	5.76	5.76	4.74	−0.00	0.00	0.00	0.00	
QSM2	0.00	1.91	4.03	5.76	5.76	5.76	4.74	−0.00	0.00	0.00	0.00	0.00	
Qgen	0.00	0.00	0.00	2.48	3.16	4.33	−0.00	0.00	0.00	0.00	0.00	0.00	9.9

Water Year 1983 – 1984

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Pg	1.50	9.30	7.70	0.20	2.20	1.80	0.60	0.03	0.07	0.02	0.02	0.10	23.5
Pg*	0.78	4.84	4.00	0.10	1.14	0.94	0.31	0.02	0.04	0.01	0.01	0.05	12.2
Li	0.05	0.29	0.24	0.01	0.07	0.06	0.02	0.00	0.00	0.00	0.00	0.00	0.7
Pn	0.73	4.55	3.76	0.10	1.08	0.88	0.29	0.01	0.03	0.01	0.01	0.05	11.5
PET	3.60	2.20	1.40	1.50	2.00	3.20	4.20	5.60	6.10	6.50	5.90	4.70	46.9
AET	0.73	2.20	1.40	1.50	2.00	3.20	0.36	0.01	0.03	0.01	0.01	0.05	11.5
QSM1	0.00	0.00	2.35	4.71	3.31	2.38	0.06	0.00	0.00	0.00	0.00	0.00	
QSM2	0.00	2.35	4.71	3.31	2.38	0.06	0.00	0.00	0.00	0.00	0.00	0.00	
Qgen	0.00	0.00	−0.00	−0.00	−0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	−0.0

Water Year 1984 – 1985

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Pg	2.00	7.20	2.90	0.80	2.80	5.50	0.60	0.05	0.14	0.00	0.00	0.36	22.3
Pg*	1.04	3.74	1.51	0.42	1.46	2.86	0.31	0.03	0.07	0.00	0.00	0.19	11.6
Li	0.06	0.22	0.09	0.02	0.09	0.17	0.02	0.00	0.00	0.00	0.00	0.01	0.7
Pn	0.98	3.52	1.42	0.39	1.37	2.69	0.29	0.02	0.07	0.00	0.00	0.18	10.9
PET	3.60	2.20	1.40	1.50	2.00	3.20	4.20	5.60	6.10	6.50	5.90	4.70	46.9
AET	0.98	2.20	1.40	1.50	1.60	2.69	0.29	0.02	0.07	0.00	0.00	0.18	10.9
QSM1	0.00	0.00	1.32	1.34	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
QSM2	0.00	1.32	1.34	0.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Qgen	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0

Water Year 1985 – 1986

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Pg	1.00	6.30	3.20	5.70	14.30	9.70	1.00	0.20	0.00	0.03	0.00	1.40	42.8
Pg*	0.52	3.28	1.66	2.96	7.44	5.04	0.52	0.10	0.00	0.02	0.00	0.73	22.2
Li	0.03	0.20	0.10	0.18	0.45	0.30	0.03	0.01	0.00	0.00	0.00	0.04	1.3
Pn	0.49	3.08	1.56	2.79	6.99	4.74	0.49	0.10	0.00	0.01	0.00	0.68	20.9
PET	3.60	2.20	1.40	1.50	2.00	3.20	4.20	5.60	6.10	6.50	5.90	4.70	46.9
AET	0.49	2.20	1.40	1.50	2.00	3.20	4.20	2.15	−0.00	0.01	0.00	0.68	17.6
QSM1	0.00	0.00	0.88	1.04	2.33	5.76	5.76	2.05	−0.00	0.00	0.00	0.00	
QSM2	0.00	0.88	1.04	2.33	5.76	5.76	2.05	−0.00	0.00	0.00	0.00	0.00	
Qgen	0.00	0.00	0.00	0.00	1.56	1.54	0.00	0.00	0.00	0.00	0.00	0.00	3.1

WATER BALANCES
MONTERRA
1961 – 1992

Water Year 1986 – 1987	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Pg	0.00	0.60	3.00	3.80	7.00	6.10	0.90	0.20	0.00	0.00	0.00	0.00	21.60
Pg*	0.00	0.31	1.56	1.98	3.64	3.17	0.47	0.10	0.00	0.00	0.00	0.00	11.23
Li	0.00	0.02	0.09	0.12	0.22	0.19	0.03	0.01	0.00	0.00	0.00	0.00	0.67
Pn	0.00	0.29	1.47	1.86	3.42	2.98	0.44	0.10	0.00	0.00	0.00	0.00	10.56
PET	3.60	2.20	1.40	1.50	2.00	3.20	4.20	5.60	6.10	6.50	5.90	4.70	46.90
AET	0.00	0.29	1.40	1.50	2.00	3.20	2.07	0.10	0.00	0.00	0.00	0.00	10.56
QSM1	0.00	0.00	0.00	0.07	0.42	1.85	1.63	0.00	0.00	0.00	0.00	0.00	
QSM2	0.00	0.00	0.07	0.42	1.85	1.63	0.00	0.00	0.00	0.00	0.00	0.00	
Qgen	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Water Year 1987 – 1988	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Pg	1.50	2.00	7.80	3.30	1.20	0.40	2.90	0.80	0.30	0.00	0.00	0.00	20.20
Pg*	0.78	1.04	4.06	1.72	0.62	0.21	1.51	0.42	0.16	0.00	0.00	0.00	10.50
Li	0.05	0.06	0.24	0.10	0.04	0.01	0.09	0.02	0.01	0.00	0.00	0.00	0.63
Pn	0.73	0.98	3.81	1.61	0.59	0.20	1.42	0.39	0.15	0.00	0.00	0.00	9.87
PET	3.60	2.20	1.40	1.50	2.00	3.20	4.20	5.60	6.10	6.50	5.90	4.70	46.90
AET	0.73	0.98	1.40	1.50	2.00	1.31	1.42	0.39	0.15	0.00	0.00	0.00	9.87
QSM1	0.00	0.00	0.00	2.41	2.53	1.11	−0.00	−0.00	0.00	0.00	0.00	0.00	
QSM2	0.00	0.00	2.41	2.53	1.11	−0.00	−0.00	0.00	0.00	0.00	0.00	0.00	
Qgen	0.00	0.00	0.00	−0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	−0.00

Water Year 1988 – 1989	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Pg	0.00	3.00	6.30	1.90	2.50	5.70	0.90	0.26	0.00	0.00	0.00	0.90	21.46
Pg*	0.00	1.56	3.28	0.99	1.30	2.96	0.47	0.14	0.00	0.00	0.00	0.47	11.16
Li	0.00	0.09	0.20	0.06	0.08	0.18	0.03	0.01	0.00	0.00	0.00	0.03	0.67
Pn	0.00	1.47	3.08	0.93	1.22	2.79	0.44	0.13	0.00	0.00	0.00	0.44	10.49
PET	3.60	2.20	1.40	1.50	2.00	3.20	4.20	5.60	6.10	6.50	5.90	4.70	46.90
AET	0.00	1.47	1.40	1.50	2.00	3.12	0.44	0.13	0.00	0.00	0.00	0.44	10.49
QSM1	0.00	0.00	0.00	1.68	1.11	0.33	−0.00	0.00	0.00	0.00	0.00	0.00	
QSM2	0.00	0.00	1.68	1.11	0.33	−0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Qgen	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Water Year 1989 – 1990	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Pg	2.40	1.90	0.10	4.40	3.70	2.10	0.80	1.70	0.00	0.00	0.00	0.40	17.50
Pg*	1.25	0.99	0.05	2.29	1.92	1.09	0.42	0.88	0.00	0.00	0.00	0.21	9.10
Li	0.07	0.06	0.00	0.14	0.12	0.07	0.02	0.05	0.00	0.00	0.00	0.01	0.55
Pn	1.17	0.93	0.05	2.15	1.81	1.03	0.39	0.83	0.00	0.00	0.00	0.20	8.55
PET	3.60	2.20	1.40	1.50	2.00	3.20	4.20	5.60	6.10	6.50	5.90	4.70	46.90
AET	1.17	0.93	0.05	1.50	2.00	1.49	0.39	0.83	0.00	0.00	0.00	0.20	8.55
QSM1	0.00	0.00	0.00	0.00	0.65	0.46	0.00	0.00	0.00	0.00	0.00	0.00	
QSM2	0.00	0.00	0.00	0.65	0.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
Qgen	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Water Year 1990 – 1991	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Pg	0.04	0.49	1.92	0.44	3.76	15.84	0.86	0.19	0.96	0.00	0.05	0.00	24.55
Pg*	0.02	0.25	1.00	0.23	1.96	8.24	0.45	0.10	0.50	0.00	0.03	0.00	12.77
Li	0.00	0.02	0.06	0.01	0.12	0.49	0.03	0.01	0.03	0.00	0.00	0.00	0.77
Pn	0.02	0.24	0.94	0.22	1.84	7.74	0.42	0.09	0.47	0.00	0.02	0.00	12.00
PET	3.60	2.20	1.40	1.50	2.00	3.20	4.20	5.60	6.10	6.50	5.90	4.70	46.90
AET	0.02	0.24	0.94	0.22	1.84	3.20	4.20	0.86	0.47	−0.00	0.02	0.00	12.00
QSM1	0.00	0.00	0.00	0.00	0.00	0.00	4.54	0.76	0.00	−0.00	0.00	0.00	
QSM2	0.00	0.00	0.00	0.00	0.00	4.54	0.76	0.00	−0.00	0.00	0.00	0.00	
Qgen	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Water Year 1991 – 1992	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL
Pg	1.89	0.55	6.09	2.78	10.99	5.08	0.23	0.00	0.00	0.28	0.01	0.00	27.90
Pg*	0.98	0.29	3.17	1.45	5.71	2.64	0.12	0.00	0.00	0.15	0.01	0.00	14.51
Li	0.06	0.02	0.19	0.09	0.34	0.16	0.01	0.00	0.00	0.01	0.00	0.00	0.87
Pn	0.92	0.27	2.98	1.36	5.37	2.48	0.11	0.00	0.00	0.14	0.00	0.00	13.64
PET	3.60	2.20	1.40	1.50	2.00	3.20	4.20	5.60	6.10	6.50	5.90	4.70	46.90
AET	0.92	0.27	1.40	1.50	2.00	3.20	4.20	0.00	0.00	0.14	0.00	0.00	13.64
QSM1	0.00	0.00	0.00	1.58	1.44	4.81	4.09	0.00	0.00	0.00	0.00	0.00	
QSM2	0.00	0.00	1.58	1.44	4.81	4.09	0.00	0.00	0.00	0.00	0.00	0.00	
Qgen	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

TABLE 3

SUMMARY OF WATER BALANCES
MONTERRA
1961–1992

927 acres, grassland and scrub with two-foot rooting depth

Water Year	Regional Rainfall (inches)	Monterra Gross Rainfall (inches)	Monterra Actual ET (inches)	Monterra Estimated Yield (acre-feet)	Monterra Estimated Yield (inches)	Estimated Outflows: Streamflow Hitchcock (acre-feet)	Streamflow Hitchcock (inches)	Correlated Streamflow Monterra (acre-feet)	Correlated Streamflow Monterra (inches)	Groundwater Recharg[e] Monterra (acre-feet)	Groundwater Recharg[e] Monterra (inches)
1961	17.19	8.94	8.40	0	0.00	7	0.06	0	0.00	0	0.00
1962	30.42	15.82	11.64	250	3.23	167	1.50	40	0.52	209	2.7
1963	41.30	21.48	17.26	226	2.92	314	2.82	75	0.98	150	1.94
1964	22.60	11.75	11.05	0	0.00	37	0.33	0	0.00	0	0.00
1965	31.01	16.13	13.36	139	1.80	103	0.92	25	0.32	114	1.48
1966	25.04	13.02	10.31	149	1.93	42	0.38	10	0.13	139	1.80
1967	45.30	23.56	17.46	362	4.68	398	3.57	96	1.24	266	3.44
1968	18.86	9.81	9.22	0	0.00	13	0.12	0	0.00	0	0.00
1969	49.16	25.56	12.31	905	11.72	961	8.62	231	2.99	675	8.73
1970	30.14	15.67	11.52	248	3.21	142	1.27	34	0.44	214	2.77
1971	26.02	13.53	10.64	160	2.07	58	0.52	14	0.18	146	1.8
1972	16.92	8.80	7.96	24	0.31	20	0.18	5	0.06	19	0.25
1973	46.48	24.17	14.76	615	7.96	410	3.68	98	1.27	517	6.69
1974	41.00	21.32	17.04	232	3.00	249	2.23	60	0.77	172	2.23
1975	32.85	17.08	13.84	171	2.22	309	2.77	74	0.96	97	1.2
1976	14.55	7.57	7.11	0	0.00	3	0.03	0	0.00	0	0.00
1977	12.56	6.53	6.14	0	0.00	1	0.01	0	0.00	0	0.00
1978	50.41	26.21	15.09	738	9.55	669	6.00	161	2.08	577	7.47
1979	28.52	14.83	13.43	39	0.51	97	0.87	23	0.30	16	0.27
1980	41.48	21.57	14.86	419	5.42	735	6.59	176	2.28	242	3.1
1981	22.32	11.61	10.91	0	0.00	96	0.86	0	0.00	0	0.00
1982	48.04	24.98	19.41	314	4.07	508	4.56	122	1.58	192	2.4
1983	65.60	34.11	19.19	994	12.87	1982	17.78	476	6.16	519	6.7
1984	23.54	12.24	9.68	141	1.83	200	1.79	48	0.62	93	1.2
1985	22.35	11.62	10.92	0	0.00	32	0.29	0	0.00	0	0.00
1986	42.83	22.27	14.95	462	5.98	700	6.28	168	2.17	294	3.8
1987	21.60	11.23	10.56	0	0.00	23	0.21	0	0.00	0	0.0
1988	20.20	10.50	9.87	0	0.00	9	0.08	0	0.00	0	0.0
1989	21.46	11.16	10.49	0	0.00	9	0.08	0	0.00	0	0.00
1990	17.50	9.10	8.55	0	0.00	10	0.09	0	0.00	0	0.00
1991	24.55	12.77	10.34	128	1.66	73	0.65	18	0.23	111	1.4
1992	27.90	14.51	11.71	149	1.93	145	1.30	35	0.45	114	1.4
Average	30.62	15.92	12.19	214.54	2.78	266.31	2.39	62.12	0.80	152.42	1.97

TABLE 4

SUMMARY OF WATER BALANCES
MONTERRA
1961 – 1992

682 acres, chaparral, oaks and pines with four – foot rooting depth

Water Year	Regional Rainfall (inches)	Monterra Gross Rainfall (inches)	Monterra Actual ET (inches)	Monterra Estimated Yield (acre–feet)	Monterra Estimated Yield (inches)	Estimated Outflows: Streamflow Hitchcock (acre–feet)	Streamflow Hitchcock (inches)	Correlated Streamflow Monterra (acre–feet)	Correlated Streamflow Monterra (inches)	Groundwater Recharge Monterra (acre–feet)	Groundwater Recharge Monterra (inches)
1961	17.19	8.94	8.40	0	0.00	7	0.06	0	0.00	0	0.00
1962	30.42	15.82	14.52	20	0.35	167	1.50	20	0.35	0	−0.00
1963	41.30	21.48	20.14	2	0.04	314	2.82	2	0.04	0	0.00
1964	22.60	11.75	11.05	0	0.00	37	0.33	0	0.00	0	0.00
1965	31.01	16.13	15.16	0	0.00	103	0.92	0	0.00	0	0.00
1966	25.04	13.02	12.24	0	0.00	42	0.38	0	0.00	0	0.00
1967	45.30	23.56	20.34	102	1.80	398	3.57	48	0.84	55	0.96
1968	18.86	9.81	9.22	0	0.00	13	0.12	0	0.00	0	0.00
1969	49.16	25.56	15.19	502	8.84	961	8.62	115	2.03	387	6.81
1970	30.14	15.67	14.40	19	0.33	142	1.27	17	0.30	2	0.03
1971	26.02	13.53	12.72	0	0.00	58	0.52	0	0.00	0	0.00
1972	16.92	8.80	8.27	0	0.00	20	0.18	0	0.00	0	0.00
1973	46.48	24.17	17.64	289	5.08	410	3.68	49	0.87	240	4.21
1974	41.00	21.32	19.92	7	0.12	249	2.23	7	0.12	0	−0.00
1975	32.85	17.08	16.06	0	0.00	309	2.77	0	0.00	0	0.00
1976	14.55	7.57	7.11	0	0.00	3	0.03	0	0.00	0	0.00
1977	12.56	6.53	6.14	0	0.00	1	0.01	0	0.00	0	−0.00
1978	50.41	26.21	17.97	379	6.67	669	6.00	80	1.41	299	5.26
1979	28.52	14.83	13.94	0	0.00	97	0.87	0	0.00	0	0.00
1980	41.48	21.57	17.74	144	2.54	735	6.59	88	1.55	56	0.99
1981	22.32	11.61	10.91	0	0.00	96	0.86	0	0.00	0	0.00
1982	48.04	24.98	22.29	68	1.19	508	4.56	61	1.07	7	0.12
1983	65.60	34.11	22.07	568	9.99	1982	17.78	238	4.18	330	5.81
1984	23.54	12.24	11.51	0	0.00	200	1.79	0	0.00	0	0.00
1985	22.35	11.62	10.92	0	0.00	32	0.29	0	0.00	0	0.00
1986	42.83	22.27	17.83	176	3.10	700	6.28	84	1.48	92	1.62
1987	21.60	11.23	10.56	0	0.00	23	0.21	0	0.00	0	0.00
1988	20.20	10.50	9.87	0	0.00	9	0.08	0	0.00	0	0.00
1989	21.46	11.16	10.49	0	0.00	9	0.08	0	0.00	0	0.00
1990	17.50	9.10	8.55	0	0.00	10	0.09	0	0.00	0	0.00
1991	24.55	12.77	12.00	0	0.00	73	0.65	0	0.00	0	0.00
1992	27.90	14.51	13.64	0	0.00	145	1.30	0	0.00	0	0.00
Average	30.62	15.92	13.71	71.13	1.25	266.31	2.39	25.31	0.45	45.84	0.81

TABLE 5

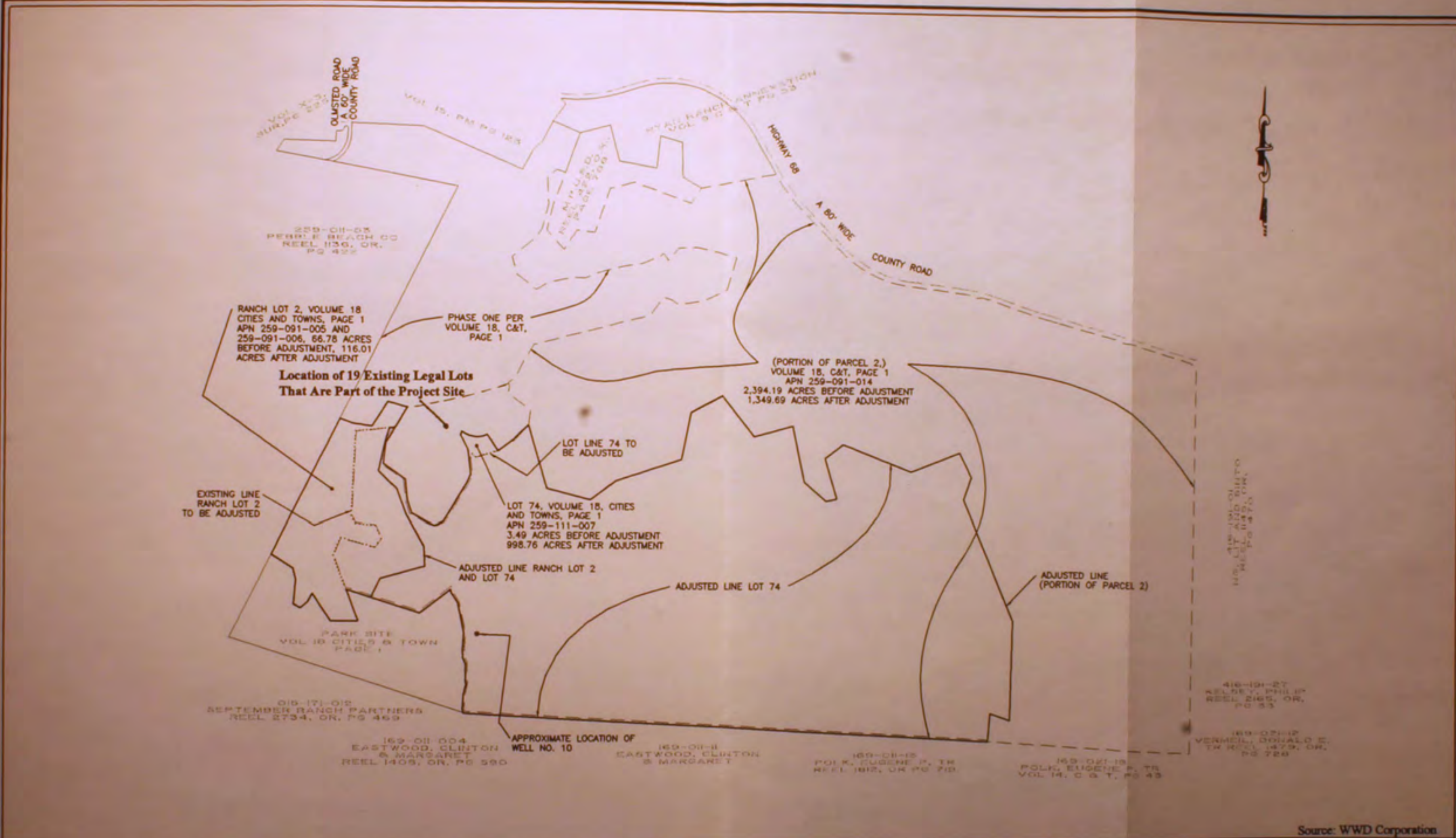
SUMMARY OF WATER BALANCES
MONTERRA
1961–1992
1609 acres

Water Year	Gross Rainfall (inches)	Water Yield (acre–feet)	Streamflow (acre–feet)	Recharge (acre–feet)
1961	8.9	0	0	0
1962	15.8	269	60	209
1963	21.5	228	77	150
1964	11.8	0	0	0
1965	16.1	139	25	114
1966	13.0	149	10	139
1967	23.6	464	143	321
1968	9.8	0	0	0
1969	25.6	1408	346	1062
1970	15.7	267	51	216
1971	13.5	160	14	146
1972	8.8	24	5	19
1973	24.2	904	148	756
1974	21.3	239	67	172
1975	17.1	171	74	97
1976	7.6	0	0	0
1977	6.5	0	0	0
1978	26.2	1117	241	876
1979	14.8	39	23	16
1980	21.6	563	265	298
1981	11.6	0	0	0
1982	25.0	382	183	199
1983	34.1	1562	714	848
1984	12.2	141	48	93
1985	11.6	0	0	0
1986	22.3	638	252	386
1987	11.2	0	0	0
1988	10.5	0	0	0
1989	11.2	0	0	0
1990	9.1	0	0	0
1991	12.8	128	18	111
1992	14.5	149	35	114
Average	15.9	286	87	198

Source: WWD Corporation

Approved Monterra Ranch Subdivision

Figure 2



Lot Line Adjustment

Figure 3

ned by individual
pplicable CC&Rs

Building Envelope Size
1.49
1.98
4.8*
5.88
2.78
1.65
1.33
1.21
2.76
0.98
1.13
2.90
6.19
2.44
2.45
2.10
1.28
75.03

Source: WWD Corporation

Proposed Vesting Tentative Subdivision Map	Figure 4

the Land Use section

nent for both agency
d agency responsible
permit approvals and
oject are summarized
their decision-making

roval
Permit, Sewage Dis-
f Community Service
Water Company
Reclamation Permit and llution Prevention Plan"
Water Company
right permits to allow y service area
mit for expansion of area

LEGEND

OVER 30%

GENERAL NOTES

(1) SLOPE PERMIT TO WIDEN THE EXISTING ROAD AS REQUIRED FOR SUBDIVISION IMPROVEMENTS.

(2) SLOPE PERMIT TO REALIGN EXISTING ACCESS – REALIGNMENT WILL HAVE LESS IMPACT THAN WIDENING THE EXISTING ACCESS.

(3) SLOPE PERMIT FOR SINGLE LANE DRIVEWAY ACCESS TO THE BUILDING ENVELOPE.

(4) SLOPE PERMIT FOR DRAINAGE DETENTION FACILITIES.

(5) SLOPE PERMIT FOR GOLF COURSE (SEE GOLF COURSE NOTE).

GOLF COURSE NOTE

1.) CART PATHS AREA NOT SHOWN BUT WILL BE INSTALLED THROUGHOUT THE GOLF COURSE AREA AND SOME WILL BE INSTALLED ON SLOPES OVER 30%. THIS PERMIT APPLICATION INCLUDES THE APPLICATION TO ALLOW GOLF CART PATHS TO BE INSTALLED THROUGHTOUT THE GOLF COURSE AREA ON AREAS OVER 30% SLOPES.

Source: WWD Corporation

Slope Permit Map

Figure 5

Clubhouse with
each), a 8,600

mostly sited on
f the golf course
een submitted by
own and general
y of grading will
0 cubic yards of
d fill required to
fill is planned to
xpected to result

5 in the Project
will be installed
0%. The project
areas over 30%

Vesting Tentative
incorporate the
nditions, grading,
be protected with
e drainage system
buildings.

cies of the *Greater*
County's Erosion
Plan, the smallest
osure will be kept
manent vegetation
ry and permanent
ding should occur
ounty Planning and
otected during the

Source: WWD Corporation

Preliminary Grading Concept

Figure 7

...ct site, generally
...pes above forest
...enerally, but not
...nt shrubs include
...*ulus aurantiacus*),
...re is a transition
... and herbs of the
...oves of coast live
... the coast live oak

...al Acreage
176.5 34.5 *210.0* 135.5
345.5
293.4
174.8
57.9
32.5
154.9
0.85

...t slowly advances into
...ntion, such as mowing.
...*odendron diversilobum*),
...*laris*), bush honeysuckle
...*culatum*), and California

Source: Vern Yadon/WWD Corporation

Site Vegetation

Figure 10

efore, in order to
will be required.

storation has been
ration efforts have

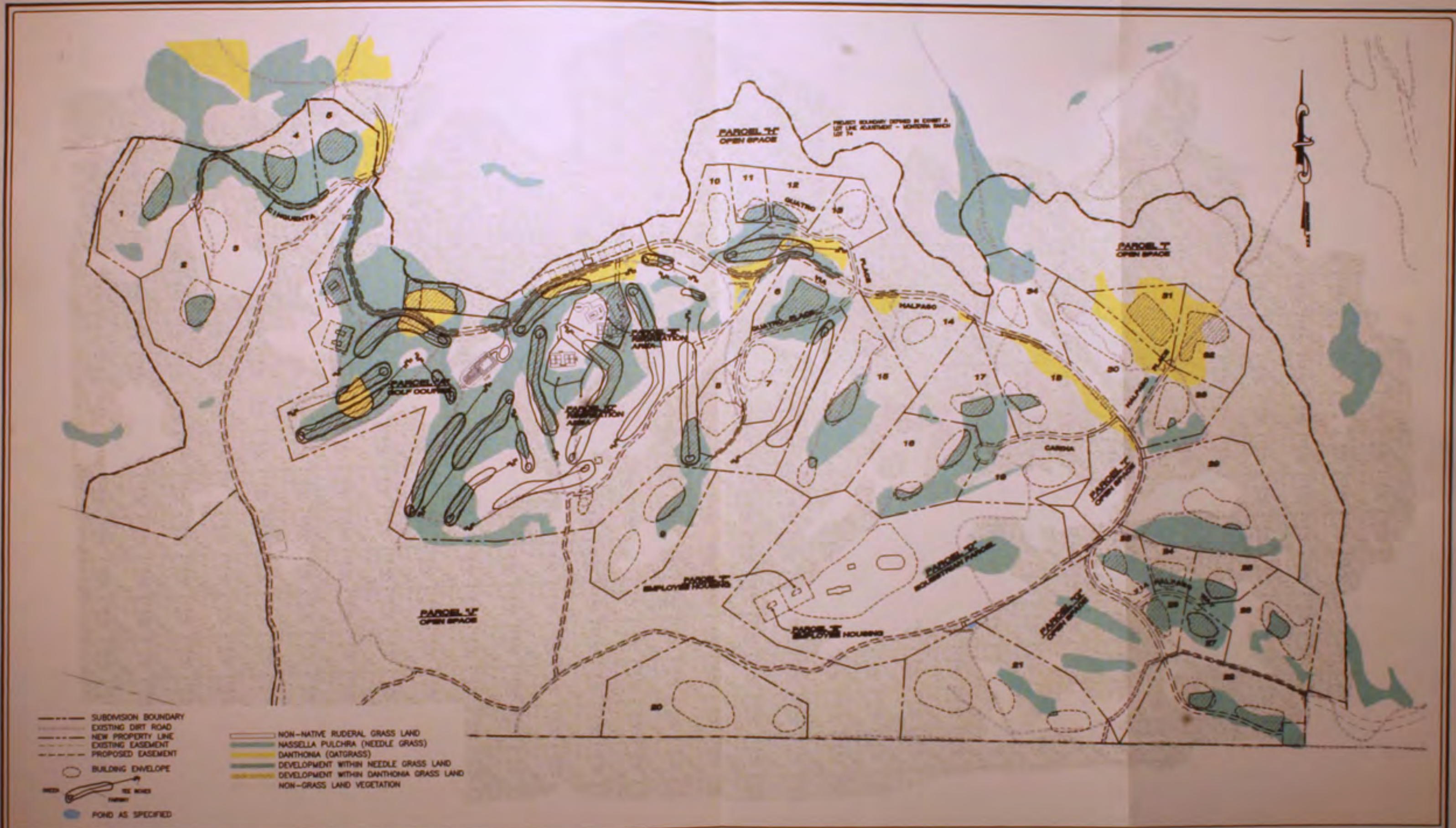
pen space and as
bances may occur
odically mowed at
brush species and
, with associated
ive grasses.

e impact to a less-
an be successfully

grasslands to avoid

consists of measures
ation at a 3:1 ratio.
ite restoration areas,
ce, monitoring, and
to maintained and
ned surveys to better
t loss and restoration

nanagement program
slands. The program
owing, burning and
measurement criteria
aintain preserved and
and later in the year
l non-native species.



Onsite Grassland Impact Areas

Figure 12

Location A: Distant View of Site From Eastbound Highway 68

Location B: View of Site from Highway 68

Location C: View of Site from Southbound Highway 218

	Views of Site and Map	Figure 14

DENISE DUFFY & ASSOCIATES

ge, 18th fairway, and 9th green
lity with underground parking to
ties include pool, tennis courts,
n building. Figure 15 presents

rnia Environmental Quality Act
ional standards, a project impact

atures, view corridors, or public

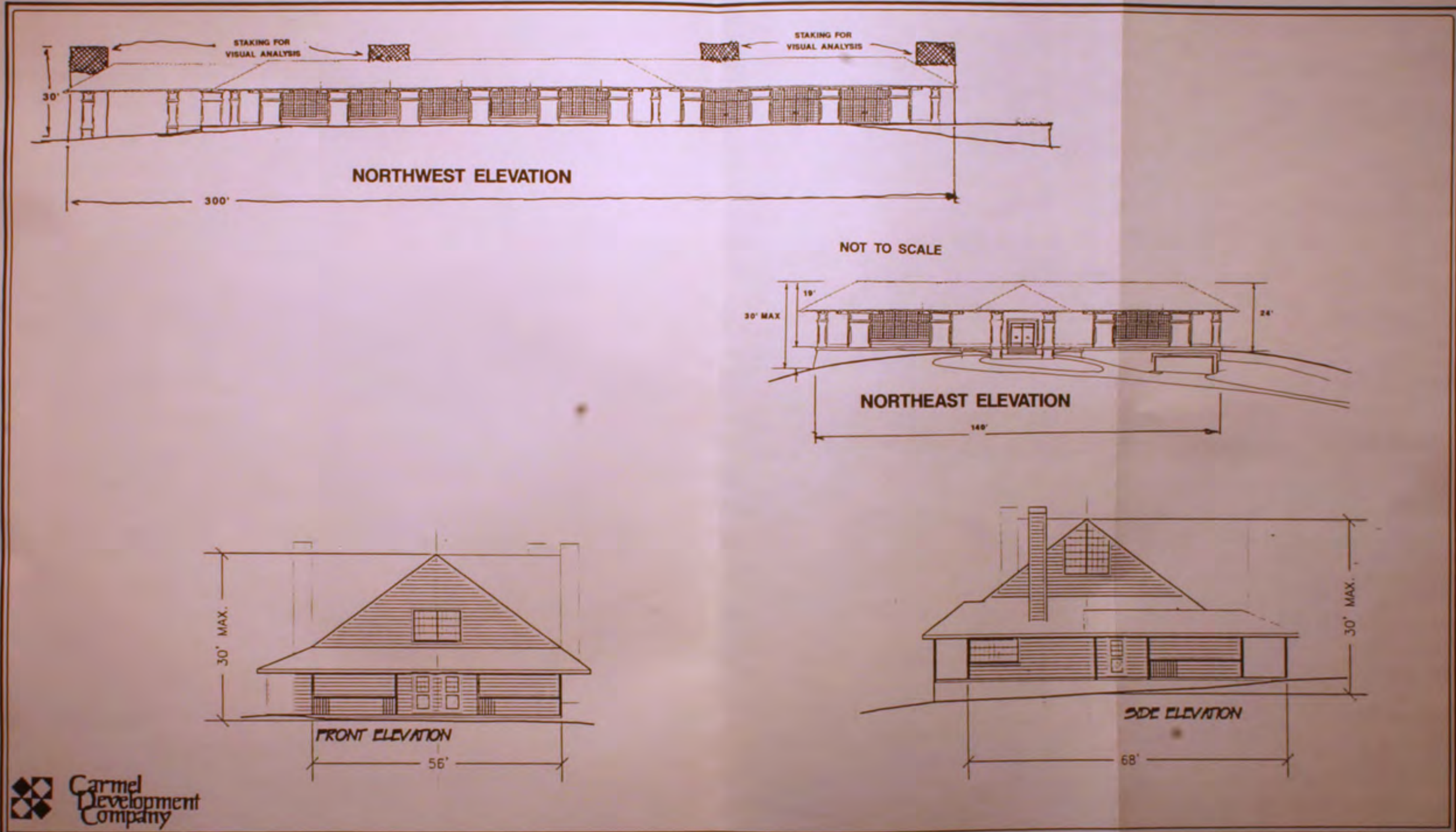
enic corridor without design

of the surrounding area; or

eration of the Highway 68 and
one member suite on the frontal
n, will not result in ridgeline
on slopes will be of limited
cant impact.

ewpoints. The closest portion
hway 68. Potentially visible
ncluding portions of proposed
existing site topography, the
68.

ction of homes, the applicant
Monterra Ranch subdivision
ate potential building heights.
12-15 in width with bright
e. The heights of the staking
ke was conducted as part of
d locations.



Clubhouse and Member Suite Elevations

Figure 15

es. Each zone is designed
storage and fire flow to
hour duration. The highest
higher elevation) is lot 26.
f two 48,000 gallon storage
ia Malpaso, with 6" to 8"
l throughout the project per

an automatic fire sprinkler
lers will be protected with
s for the Golf Course (one
he Fire Department for fire

equestrian facilities, and a
also includes the proposed
ing and equestrian trail that
The Cañada Woods North
ail around the perimeter of
western portion of the site
site which would connect
No public entrance would
ximately 8 to 10 feet wide

15 acre site dedicated from
planned trail alignment on
s future BLM public trails.
y Road on former Fort Ord
den Hills area over existing
k actually exists. This will
Laureles Grade Road area.

iance with standards agreed
uction and dedication of the
s Department.

Existing and Proposed Trails

Figure 21