IV. ENVIRONMENTAL IMPACT ANALYSIS
J. TRANSPORTATION/TRAFFIC

INTRODUCTION

The information and analysis in this section was prepared by Whitlock & Weinberger Transportation, Inc.

Study Scenarios

The following three traffic study scenarios have been developed and analyzed:

1. Existing Conditions. This scenario reflects conditions based on current traffic volumes within the study area.
2. Project Conditions (Existing plus Project). Project trips are estimated based on the proposed land use and are then added to the Existing Conditions traffic in order to obtain the Project Conditions traffic scenario.
3. Near-Term Cumulative Conditions (Existing plus Project plus Future Development). Cumulative traffic is that traffic expected to be present within the next five years. It consists of existing traffic plus trips from the proposed project as well as near-term future development projects within the study area.

Level of Service Methodologies

Level of Service (LOS) is used to rank traffic operation on various types of facilities based on traffic volumes and roadway capacity using a series of letter designations ranging from A to F. Generally, Level of Service A represents free flow conditions and Level of Service F represents forced flow or breakdown conditions. The LOS designation for intersections is generally accompanied by a unit of measure which indicates a level of delay.

Intersection Level of Service Methodologies

The study intersections were analyzed using the unsignalized methodology from the *Highway Capacity Manual*. This source contains methodologies for various types of intersection control, all of which are related to a measurement of delay in average number of seconds per vehicle. For side street stop controls the method determines a level of service for each minor turning movement by estimating the level of average delay in seconds per vehicle. The ranges of delay associated with the various unsignalized levels of service are indicated in Table IV.J-1.

Table IV.J-1
Unsignalized Intersection Level of Service Definitions

Level of Service	Unsignalized Intersection	Average Control Delay (sec/veh)
A	No delay for stop-controlled approaches.	0 - 10
B	Operations with minor delay.	> 10 – 15
C	Operations with moderate delays.	> 15 – 25
D	Operations with some delays.	> 25 - 35
E	Operations with high delays, and long queues.	> 35 – 50
F	Operation with extreme congestion, with very high delays and long queues unacceptable to most drivers.	> 50

Source: Highway Capacity Manual, Transportation Research Board, 2000.

Traffic Index Methodology

Traffic Index (TI) is a measure of the deteriorating effects that truck traffic has on asphalt concrete pavement and is based on the number of equivalent single axle loads (ESALS) expected in the traffic lane over the design life of the pavement. While this information is typically used to determine the structural section that is needed to accommodate the type of traffic using the roadway, for this analysis the TI was calculated to determine whether or not the truck traffic added by the project would significantly impact the roadway by changing the minimum design standard that should be applied. The Traffic Indices for the study roadways were calculated using the methodology from the *Caltrans Highway Design Manual.* The TI is rounded to the nearest 0.5.

ENVIRONMENTAL SETTING

Roadway Network

Glenwood Avenue between Upper Road and Lagunitas Drive is a two-lane local residential roadway in hilly terrain. It is rural in nature, with no amenities such as sidewalks, shoulders, or bicycle facilities along the roadway.

Upper Road between Glenwood Avenue and Upper Road West is also a two-lane local residential roadway with a rural character. It has no centerline striping, sidewalks, shoulders, or bicycle facilities.

Study Intersections

The study area includes the following two intersections, which also comprised the study area for the *Draft Subsequent Environmental Impact Report on the Upper Road Land Division*, Donaldson Associates, December 4, 2006:

1. Lagunitas Road/Glenwood Avenue is a four-legged all-way stop-controlled intersection with one lane on each approach.
2. Upper Road/Glenwood Avenue is a tee-intersection with a stop control on the eastbound Upper Road approach only.

Consideration was given to expanding the study area beyond that previously used (e.g., the intersections of Sir Francis Drake Boulevard/Bolinas Avenue, Bolinas Avenue/Glenwood Avenue, etc.); however, given the very low number of trips associated with the project and the fact that the volumes that would affect a given intersection reduced further once the trips are distributed among route options, it was decided that it can reasonably be assumed that the project's impact beyond this would be imperceptible. It is further noted that the trips associated with the proposed project are below the threshold set by many agencies as the minimum number of new trips that would require any kind of traffic analysis.

The roadway network, study intersection locations and existing lane configurations are illustrated in Figure IV.J-1.

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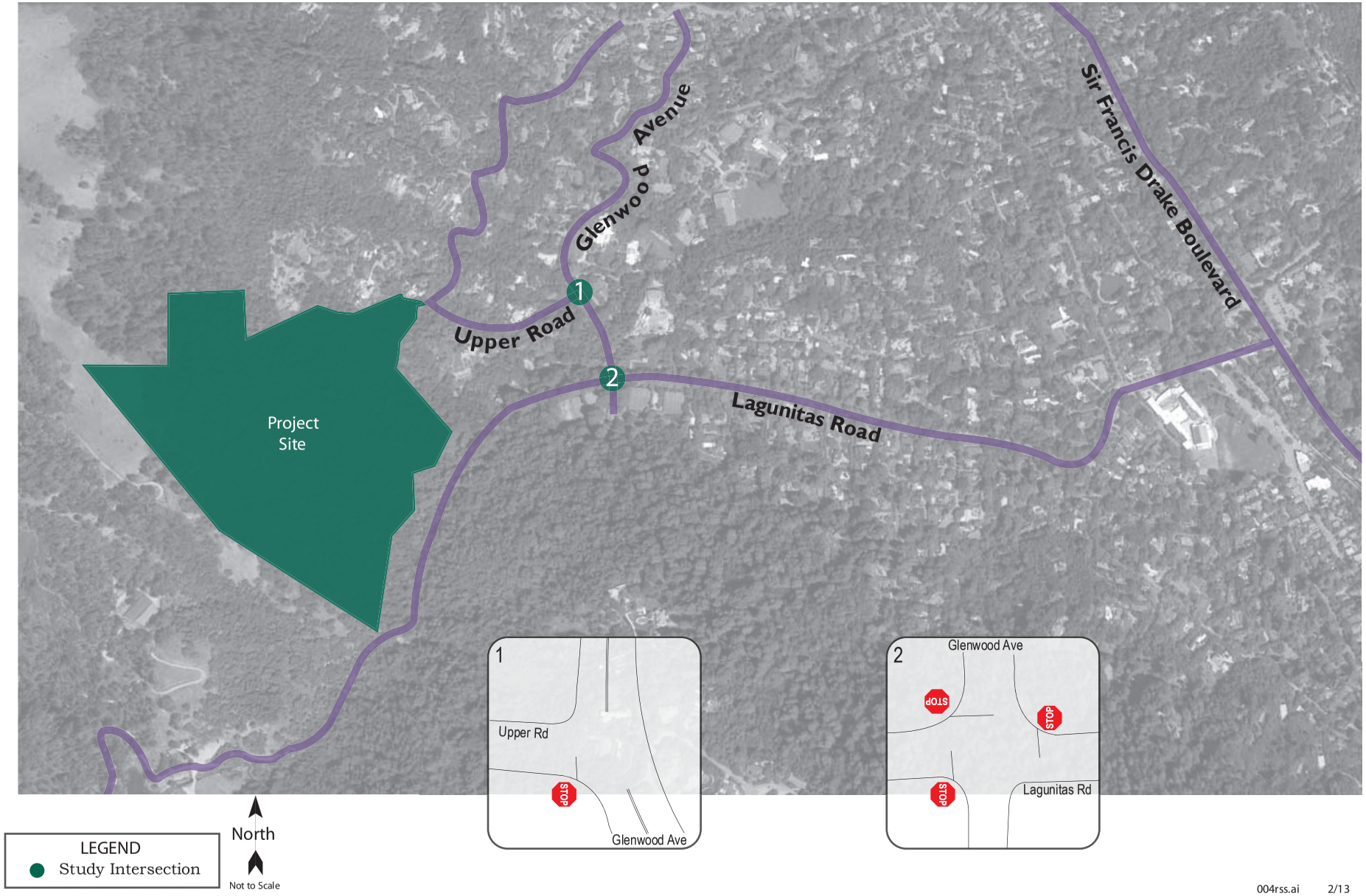

Figure IV.J-1 Study Area and Lane Configuration

Upper Road Land Division Project
Town of Ross, California

wra
ENVIRONMENTAL CONSULTANTS

Date: 2013
Source: W-Trans

Existing Conditions Levels of Service

Intersections

Level of Service information presented in the *Draft Subsequent Environmental Impact Report on the Upper Road Land Division*, indicate that both of the study intersections operate at LOS A. Observations of current operation at the intersections together with recent traffic counts indicate that it is reasonable to expect that the intersections continue to operate at LOS A, with minimal delays even during peak conditions.

Roadways

Traffic volumes were collected using machine counters for a week between November 10 and December 2, 2012 on Glenwood Avenue and Upper Road, including vehicle classification data. The Traffic Index (TI) that would be needed to accommodate the existing volume of heavy vehicle traffic was calculated for the study roadways considering the pavement design life to be 20 years. Under Existing Conditions, the appropriate TI for Glenwood Avenue is 5.5 and for Upper Road, based on current usage, the TI is 5.0.

No design information is available for these roads, so it is unknown whether the structural sections are sufficient to meet the minimum TI values identified.

Safety Review

The collision history for the study area was reviewed to determine any trends or patterns that may indicate a safety issue. Collision rates were calculated based on records available from the California Highway Patrol as published in their Statewide Integrated Traffic Records System (SWITRS) reports. The most current five-year period available is July 2006 through June 2011. It was determined that there was one collision reported at the intersection of Lagunitas Road/ Glenwood Avenue during the five-year study period, and none at Upper Road/Glenwood Avenue.

As presented in Table IV.J-2, the calculated collision rates for the study intersections were compared to average collision rates for similar facilities statewide, as indicated in *2009 Collision Data on California State Highways*, California Department of Transportation, 2009. Though there was only one crash, because of the very low volumes that these intersections serve the calculated collision rate is higher than the statewide average at Lagunitas Road/Glenwood Avenue. With no reported collisions, the rate was lower than the statewide average at Upper Road/Glenwood Avenue. Although the calculated collision rate was higher than the statewide average at Lagunitas Road/Glenwood Avenue, with only one collision there were no apparent trends or patterns that might indicate a safety concern.

Table IV.J-2
Collision Rates at the Study Intersection

Study Intersection	Number of Collisions (2006-2011)	Calculated Collision Rate (c/mve)	Statewide Average Collision Rate (c/mve)
1. Lagunitas Rd/Glenwood Ave	1	**0.83**	0.25
2. Upper Rd/Glenwood Ave	0	0.00	0.15

*Note: c/mve = collisions per million vehicles entering; **Bold** values indicate calculated collision rate above statewide average*

Alternative Modes

Pedestrian facilities in the study area include a dirt path along the south side of Lagunitas Road near Glenwood Avenue. No other pedestrian facilities exist in the study area. There are no existing bicycle or transit facilities serving the roadway network in the project study area.

Class III Bike Routes are planned for Lagunitas Road between the Town's western limits and Shady Lane, and also along the entire length of Glenwood Avenue. No pedestrian or transit facilities are proposed in the project study area.

REGULATORY SETTING

General Plan Policies

The *Town of Ross General Plan 2007-2025* contains the following policies that are intended to keep streets and walkways safe for adults, children, pedestrians, bikers and the disabled.

7.1 Safe Streets. Provide streets that are as user-friendly and safe as possible for motorists, pedestrians and bicyclists.

7.2 Traffic Level of Service Standards. Sir Francis Drake Boulevard will not be widened to accommodate additional vehicular traffic. Establish a level of service (LOS) "D" along Sir Francis Drake Boulevard and level of service "C" on local streets during weekday mornings and evening peak hours using procedures from the most recent Highway Capacity Manual.

7.3 Traffic Diversions. Minimize diversion of Sir Francis Drake Boulevard traffic onto local streets, and reduce incidents of speeding and other unsafe behavior.

7.4 Traffic Impacts. Ensure that full CEQA review is undertaken of significant development proposals in Ross, in nearby areas and along the Sir Francis Drake Boulevard corridor that may impact traffic operations, safety, air quality and other environmental conditions.

7.5 Pavement Management. Maintain acceptable pavement management on all public streets and mitigate roadway impacts due to construction activities for aesthetic, structural and acoustical reasons. Hold developers responsible for pavement degradation caused by construction vehicles.

7.6 Parking Program. Address on-site and street parking needs through adequate parking standards and enforcement. Limit on-street and overnight parking.

7.7 Transit and Carpools. Encourage carpooling and transit use, including handicapped-accessible transit service, commuter service and local service.

7.8 Bicycle and Pedestrian Travel. Encourage travel via bicycle and walking by providing and maintaining safe pedestrian and bicycle routes along main arteries in Ross. Consider links with Town destinations, surrounding area destinations and regional trails and bicycle systems. Participate in the Safe Routes to Schools Program.

ENVIRONMENTAL IMPACTS

Thresholds of Significance

The CEQA Guidelines includes provisions for significance criteria related to traffic and circulation impacts. In accordance with Appendix G of the CEQA Guidelines, the proposed project could have a significant environmental impact if it were to:

a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths and mass transit;

b) Conflict with an applicable congestion management program, including but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways;

c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks;

d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment);

e) Result in inadequate emergency access;

f) Conflict with adopted policies, plans or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities.

Transportation and Traffic Impacts not Further Analyzed

The following issues were addressed in the Initial Study (see Appendix A) and Section IV.A of the Draft SEIR and were determined to result in no impact or a less-than-significant impact and not warrant further analysis:

- Result in a Change in Air Traffic Patterns

PROJECT IMPACTS AND MITIGATION MEASURES

Project Vehicle Trip Generation

The anticipated trip generation for the proposed project was estimated using standard rates published by the Institute of Transportation Engineers (ITE) *Trip Generation, 9th Edition,* 2012 for a "Single-Family Detached Housing (ITE Land USE 210)". The proposed project is expected to generate an average of 30 trips on a daily basis, including 3 new vehicle trips during the morning peak hour and 3 new vehicle trips during the afternoon peak traffic hour. The AM Peak Hour is generally between 7 AM and 9 AM and the PM Peak Hour is generally between 4 PM and 6 PM. The trip generation summary for the proposed project is presented in Table IV.J-3.

Table IV.J-3
Project Vehicle Trip Generation

Land Use	Size	Units	Daily			AM Street Peak Hour			PM Street Peak Hour		
			In	Out	Total	In	Out	Total	In	Out	Total
Single Family Dwellings	3	DU	15	15	30	1	2	3	2	1	3

Note: DU=dwelling units

Project Vehicle Trip Distribution

Project trips were assigned to the roadway network based on the most likely path of travel, which includes Upper Road, Glenwood Avenue and Lagunitas Road to reach Sir Francis Drake Boulevard, which then connects to the regional transportation network. Because of the circuitous routing and slower travel speeds that would be required to travel northerly towards Bolinas Avenue via either Upper Road or Glenwood Avenue, project traffic is not expected to use this route.

Existing plus Project Conditions Level of Service

Upon adding project-generated trips, the study intersections are expected to continue operating acceptably, with minimal delay. Given that the project would add only one or two vehicles to any single approach or movement, it is reasonable to expect that this would result in no perceptible changes to operation.

Impact TRAFFIC-1 Construction Traffic Impacts

Construction traffic would be temporary in nature lasting only for the duration of the construction activity. The first stage of the proposed project would include grading of the site and construction of the access road and drainage and utility improvements. During the grading and construction phases, construction traffic would primarily consist of worker vehicles and trucks that would enter and exit the project site. The staging of construction equipment would occur on the project site while parking for construction worker vehicles would be expected to occur off-site. It is anticipated that the workers and trucks would each have a nine-hour work day schedule between 8:00 AM to 5:00 PM on a typical weekday. Some of the worker trips and truck trips would occur during off-peak hours.

As proposed, there will be seven workers, including six construction crew employees and one general contractor. It is understood that the six construction crew workers would be shuttled to and from the project site, resulting in a total of four trip ends per weekday (two round trips). The general contractor would typically use his own vehicle to access the project site, and assuming two visits daily, would generate four trips per weekday. The total worker trips generated based on the above assumption would be eight trips per weekday. However, it was conservatively assumed that all seven workers would each use their own vehicle to access the project site, and based on an assumed average of three trip ends each, a total of 21 worker trips per weekday were assumed for analysis purposes.

The project objectives of balancing cut and fill on-site and reducing road grades is proposed to be accomplished by taking the cut material from the road system and incorporating it into a single fill pad on Parcel 1 with irregular contours which preserve the adjacent Redwood grove and swales. A series of six terraced concrete retaining walls of approximately six feet in height would also be constructed on Parcel 1 to buttress the fill material. The result is that no material would be off-hauled by truck through Town roads.

The increase in delay associated with adding the minimal number of project construction trips is expected to be imperceptible, with operation remaining well above the threshold of LOS C. Therefore, project traffic impacts during construction associated with the added trips would be ***less than significant*** and no mitigation is required.

Consideration was also given to the effect truck traffic has on the pavement. Traffic Index (TI) is a measure of the deteriorating effects that truck traffic has on asphalt concrete pavement and is based on the number of equivalent single axle loads (ESALS) expected in the traffic lane over the design life of the pavement. While this information is typically used to determine the

structural section that is needed to accommodate the type of traffic using the roadway, for this analysis the TI was calculated to determine whether or not the construction truck traffic added by the project would significantly impact the roadway by changing the minimum design standard that should be applied. The Traffic Indices for the study roadways were calculated using the methodology from the Caltrans Highway Design Manual. The TI is rounded to the nearest 0.5.

To determine whether the project would have a significant impact on the pavement for the study roadways, Traffic Indices (TI) were estimated. Because the project has no off-haul of dirt, it would be expected to generate less than one truck trip per day on average. The TI values that would be used to design the roadway under Existing Conditions and Existing plus project Conditions are summarized in Table VI.J-4.

Table VI.J-4
Project Vehicle Traffic Index

Roadways	Existing Conditions	Existing plus Project Conditions
	Traffic Index (TI)	
Glenwood Avenue		
Northbound	5.5	5.5
Southbound	5.5	5.5
Upper Road		
Eastbound	5.0	5.0
Southbound	5.0	5.0

Because the truck trips added by the project do not result in the need for any change to the structural section, the impact due to adding construction truck traffic would be ***less than significant*** and no mitigation is required.

Impact TRAFFIC-2 Existing Plus Project Intersection Operation Impacts

The increase in delay associated with adding the minimal number of operational project generated trips is expected to be imperceptible, with operation remaining well above the threshold of LOS C. Therefore, impacts would be ***less than significant*** and no mitigation is required.

Impact TRAFFIC-3 Site Access

Access Route and Movements

The proposed project does not include any changes in circulation patterns, street design changes, or changes in access. Access to and from the project site would be primarily via Lagunitas Road and Glenwood Avenue. Emergency access to and from the project site is expected to remain the same. Because of the minimal number of trips that the project is expected to generate, neither project-related trips nor construction-related trips would create any significant delay to emergency vehicle access.

Additionally, during construction, trucks entering and leaving the project site would reach the project site via Lagunitas Road, Glenwood Avenue, and Upper Road only. No other routes are proposed for use by construction vehicles. Construction of the planned project is expected to utilize trucks no larger than thirty feet in length. The existing roadway and the proposed driveway modifications were evaluated for adequate maneuverability, including room to turn around, for passenger vehicles, emergency vehicles, and thirty-foot construction trucks. Through the use of the AutoTurn software application it was determined that typical passenger vehicles, emergency vehicles, and construction trucks would be able to access the project site driveway from the existing roadway network, maneuver through the entire length of the driveway, and turn around using the proposed hammerhead turnaround design at the end of the driveway.

Sight Distance

Sight distance from the proposed driveway on Upper Road at the project location would normally be based on sight distance standards contained in the *Highway Design Manual* published by Caltrans. However, because vehicles travelling on Upper Road are generally travelling at speeds of less than 20 mph, the minimum speed for which the stopping sight distance is defined in the *Highway Design Manual*, stopping sight distance criteria found in *A Policy on Geometric Design on Highways and Streets* published by the American Association of State Highway and Transportation Officials (AASHTO) was used instead. The recommended sight distances for driveways are based on stopping sight distance, a minimum distance for drivers to react and slow the car to a stop. The criteria for stopping sight distance uses the approach travel speeds as the basis for determining the recommended sight distance.

Sight distance at the proposed driveway was field calculated. Based on the location of the proposed driveway relative to a sharp turn along Upper Road, drivers approaching the driveway and the sharp turn were observed to travel between 6 and 10 mph. For a design speed of 10 mph the stopping sight distance required is 50 feet. Based on a site visit performed, the available sight distance is approximately 50 to 60 feet in each direction, which is adequate for the conditions in that location.

Impacts related to site access would therefore be ***less than significant*** and no mitigation measures are required.

Impact TRAFFIC-4 Circulation

The proposed project would include an on-site access driveway that would provide residents and emergency vehicles access to the homes. As indicated above, the driveway was evaluated for adequate maneuverability using the AutoTurn software application where it was determined that typical passenger vehicles, emergency vehicles, and construction trucks would be able to maneuver through the project site. Therefore, impacts related to on-site circulation would be ***less than significant*** and no mitigation measures are required.

Impact TRAFFIC-5 Pedestrian and Bicycle Facilities

Existing and proposed pedestrian and bicycle facilities in the vicinity of the proposed project are limited to an existing pathway on the south side of Lagunitas Road and a proposed bike route on Glenwood Avenue. The proposed project does not include any changes to the roadway network that would impact the existing pedestrian path along Lagunitas Road or conflict with the Town's proposed bicycle route on Glenwood Avenue. Therefore, impacts related to pedestrian and bicycle facilities would be ***less than significant*** and no mitigation measures are required.

CUMULATIVE IMPACTS

Cumulative Conditions Scenario

The Cumulative Conditions scenario includes conditions that are expected to occur within the next 3-5 years. Because the project site and study area are located in an area with limited development potential, there is unlikely to be any substantial change to either traffic volumes or operation into the foreseeable future. However, the Town has identified one project nearby that was considered for this near-term cumulative scenario. The San Francisco Theological Seminary Master Plan Amendment Campus would allow renovations including 9,007 square feet of new construction at 105 Seminary Road. A letter report from Mr. Robert L. Harrison to Mr. Rob Hart dated March 11, 2011, indicates that the Seminary project was expected to generate 933 new trips daily, including 97 during the AM peak hour and 98 during the PM peak hour. However, given that the most convenient and fastest route from the Seminary site to Sir Francis Drake Boulevard is via Bolinas Avenue, it is unlikely that any of these project trips would impact the study intersections along Glenwood Avenue.

Impact TRAFFIC-7 Cumulative Conditions Levels of Service

The study intersections are not expected to see any substantial increase in traffic volumes or delay under Near-Term Cumulative Conditions. Therefore, cumulative traffic impacts would be ***less than significant*** and no mitigation measures are required.

LEVEL OF SIGNIFICANCE AFTER MITIGATION

All project impacts related to traffic and transportation were found to be ***less than significant*** and therefore no mitigation measures are required.