CITY OF FORT BRAGG
Incorporated August 5, 1889
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MITIGATED NEGATIVE DECLARATION

PROJECT TITLE: Hare Creek Center

APPLICATIONS: Coastal Development Permit 8-13 (CDP 8-13), Design Review 7-13 (DR 7-13), Use Permit 5-13 (USP 5-13), Boundary Line Adjustment 1-14 (BLA 1-14)

LEAD AGENCY: City of Fort Bragg
416 North Franklin Street
Fort Bragg, CA 95437

CONTACT: Marie Jones
Community Development Director
Community Development Department
(707) 961-2827 ext. 108

OWNER: Bill Patton (FYI – County shows property ownership as Allan B & Lois G Carlson TTEES)

APPLICANT: Group II Real Estate

AGENT: Debra Lennox

PROJECT: New shopping center consisting of three buildings, including: Building A at 15,000 square feet, Building B at 10,000 square feet and Building C at 4,500 square feet, for a total of 29,500 square feet of retail space. The project would be served by a new access road, proposed for the west edge of the development that would connect Bay View Avenue (CR #439A) to the southwest to Ocean View Drive at the intersection of Ocean View and Harbor Avenue. The project also includes a new 99 space parking lot, loading zones, pedestrian improvements, rainwater storage tanks, utilities, drainage improvements, and associated landscaping.

The project includes a boundary line adjustment between parcels 018-450-40 and 018-450-41, adding 32,586 square feet (0.75 acres) to parcel 018-450-40 (currently 2.42 acres); the combined parcel would be 3.16 acres. The boundary line adjustment is proposed so that the proposed development is on one parcel.

LOCATION:	1250 Del Mar Drive; APN 018-450-40 & 018-450-41.
ZONING:	Highway and Visitor Serving Commercial (CH) in the Coastal Zone.
APNS:	018-450-40 & 018-450-41
LOT SIZE:	2.42 Acres (3.16 acres after LLA)

Hare Creek Center

PROJECT LOCATION

The proposed 3.16 acre project site is located at 1250 Del Mar Drive on Todd Point within the City of Fort Bragg city limits just north and west of the Highway 20/Highway 1 intersection. The parcel is located within the coastal zone.

Figure 1: Project Site

The site is bounded to the north by a hotel and mini-golf course, to the east by Highway 1 and to the south and west by undeveloped property.

PROJECT PURPOSE

The purpose of the proposed project is to develop a shopping mall to accommodate the retailer Discount Grocery, four unidentified retail tenants, and one unidentified restaurant.

PROJECT CHARACTERISTICS

The project consists of grading the site and constructing a regional shopping center and related improvements, each of which is described in detail below.

Grading

Grading will consist of clearing and grubbing, and grading and compaction of soils for stormwater, utility, parking lot and building improvements. Approximately 20,229 cubic yards

(cy) of soil will be graded to re-contour the site so that it can accommodate the proposed project. The existing site includes a small knoll where the elevation rises from about 96 feet to 120 feet above sea level. The grading plan includes re-contouring the site so that the finish grade ranges between 104 and 110 feet in elevation. The proposed project would include fairly steep re-contouring of the hillside immediately to the west of the proposed road. The approximately 18,553 cy of site soil will either be cut and stored on an adjoining parcel, also owned by the applicant, or hauled off site. If retained on the adjoining parcel the soil would be stockpiled into a 3 foot high rectangular berm (408 feet on a side) to be used either on or off site for future projects that require fill dirt. The project will also include reuse of 2,199 cubic yards of top soil on site in the landscaped areas and importation of 2,095 cubic yards of fill material.

A one-to-two (1 horizontal: 2 vertical) slope is proposed for the embankment to the west of the proposed Bay View Drive. The embankment height will range from grade to about 10 feet above grade at the mid-point of the knoll and west of the proposed parking lot. The berm would be hydro-seeded once grading is complete.

Auto Access & Parking

The proposed project would be accessed from Highway 1 via Ocean View Drive and a new proposed access road (Bay View Drive) that would extend south from Ocean View Drive. The proposed parking lot for the project would include 99 parking spaces with two suitable for motor homes and eight ADA accessible spaces. The project also includes a loading dock for trucks on the north side of Buildings A and C and on the south side of Building B.

Pedestrian, Bicycle and Transit Access

The project includes a system of crosswalks and bulb-outs to provide pedestrian connectivity between the buildings, parking lot and sidewalks. A total of 18 bicycle spaces are proposed on nine bike racks (three bike racks per retail building). A transit stop is proposed for Bay View Drive adjacent to Building B. A canopy is proposed to cover bicycle parking and the pedestrian access from the bicycles to the front door of each retail space.

Retail Buildings

The proposed project includes the construction of three buildings: Building A at 15,000 square feet, Building B at 10,000 square feet and Building C at 4,500 square feet, for a total of 29,500 square feet of retail space. The floor plan of Building A includes a significant area dedicated to freezer and cooler space. The building exteriors include a combination of trellises, murals, pediments and parapets. The buildings are oriented on an east west axis and include two photovoltaic systems: Building A would have an 85,945 kWh system and Buildings B & C would have an 82,241 kWh system. The systems would generate about $24,000 in electricity per year. The project also includes 13 skylights to provide daylight for the interior of the buildings and reduce lighting loads. Additionally, transom windows located throughout the southern elevation of all three buildings provide additional daylighting of the building interior.

Stormwater Management

The project includes seven cisterns which can hold a total of 60,000 gallons of water. The cisterns would be utilized to capture stormwater for reuse for landscape irrigation. The project also includes some Low Impact Development (LID) features such as curbless landscaped strips in the parking lot to encourage stormwater infiltration and permeable paving for about 40% of the parking lot.

Signage

Six foot tall monument signs are proposed for both the west and east side of the parking lot. The buildings also include backlit cutout letter signage.

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED

The following environmental factors listed below would be affected by this project, as discussed in the checklist on the following pages:

☑ Aesthetics	☐ Agricultural Resources	☑ Air Quality
☑ Biological Resources	☑ Cultural Resources	☑ Geology/Soils
☐ Hazards & Hazardous Materials	☑ Hydrology/Water Quality	☐ Land Use/Planning
☐ Mineral Resources	☐ Noise	☐ Population/Housing
☑ Public Services	☐ Recreation	☑ Transportation/Traffic
☑ Utilities/Service Systems	☐ Mandatory Findings of Significance	☑ Greenhouse Gas Emissions

DETERMINATION

On the basis of this initial evaluation:

☐ 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 revisions in the project have been made by or agreed to by the project proponent. A MITIGATED 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.

☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact 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. 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, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

_____ _____

Signature *Date*

Marie R. Jones, Community Development Director City of Fort Bragg

Printed Name

ENVIRONMENTAL ISSUES

I. Aesthetics

Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a. Have a substantial adverse effect on a scenic vista?		X		
b. Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?		X		
c. Substantially degrade the existing visual character or quality of the site and its surroundings?		X		
d. Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?				X

DISCUSSION OF IMPACTS

a) *Would the project have a substantial adverse effect on a scenic vista?*

A scenic vista can be defined as the view of an area that is visually or aesthetically pleasing. Aesthetic components of a scenic vista include: 1) scenic quality, 2) sensitivity level, and 3) view access. A scenic vista often includes natural visual elements that can be seen from a distance. A development project can have visual impacts by either directly diminishing the scenic quality of the vista or by blocking the view corridors or "vista" of the scenic resource.

The proposed development is within a potential scenic view area, as shown on Map CD-1, "Potential Scenic Views Toward the Ocean or the Noyo River" (**Figure 2)**. As the proposed project is located within a Scenic Review area, Policy CD-1.3 of the City's General Plan requires a Visual Analysis of the project as part of the Coastal Development Permit review for this project.

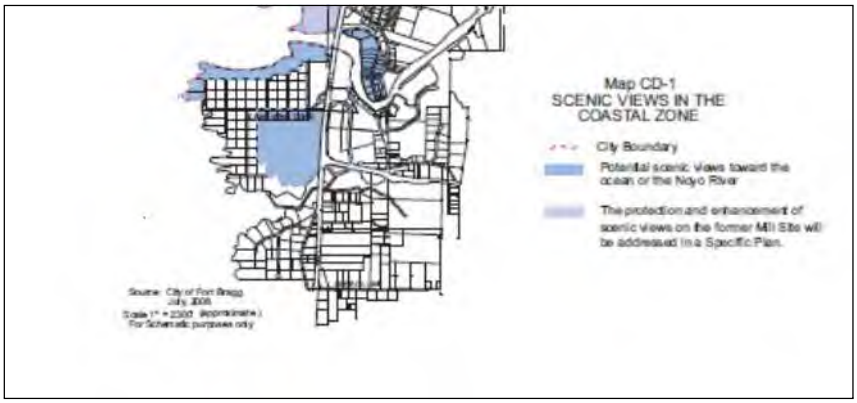

Figure 2: Potential scenic views toward the ocean or Noyo River

The applicant's architect has prepared a visual analysis for the site which illustrates how the project would impact views to and along Highway 1. In order to approve a Coastal Development Permit (CDP) for a project that is located "along Highway 20 and Highway 1 on sites with views to the ocean" or in an "area designated Potentially Scenic Views Toward the Ocean on Map CD-1" the review authority must first make the following findings that the proposed project:

1. Minimize the alteration of natural landforms;
2. Is visually compatible with the character of the surrounding area;
3. Is sited and designed to protect views to and along the ocean and scenic coastal areas; and
4. Restores and enhances visual quality in visually degraded area, where feasible.

Each of these issues is analyzed in further detail in the sections below.

b) Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?

The project is not visible from any State Scenic Highway, as neither Highway 20 nor Highway 1 are designated State Scenic Highways. However, the project will result in an impact to scenic resources viewed from Highway 1. These impacts would stem from: 1) the removal of four mature and four immature trees visible from Highway 1 for a total of eight (8) trees removed; 2) the construction of the proposed retail center and associated parking; and 3) the grading and partial removal of an existing knoll visible from Highway 1. The proposed project landscaping plan includes the installation of five Shore Pines, 23 flowering trees, three Monterey Cypress, and five medium shade trees. The extensive use of trees in the landscaping plan will reduce some of the impacts of the project, especially those related to the parking lot. However, the tree list shall be modified as requested in the Department of Fish and Wildlife letter (Attachment 5) and by Mitigation Measure 1 and Mitigation Measure 12.

c) Would the project substantially degrade the existing visual character or quality of the site and its surroundings?

The proposed project site is best characterized as a softly rolling meadow, interrupted with a few coastal pines, as shown in Photos 1 through 4 below.

Photo 1: View of project site from Highway 1 directly to the west.

Photo 2: View to the project site from Highway 1 on the north edge of the parcel.

Photo 3: View to the project site from the interchange of Highways 1 and 20

Photo 4 Distant views to the site from Highway 20

The project will include the removal of eight trees, extensive site grading, and construction of a shopping mall with associated improvements. Views to the ocean are possible only from the top of the hill on Highway 20 (as shown in Photo 4) adjacent to the Hare Creek Nursery. This location is outside of the City Limits.

The project architect prepared photographic renderings of the development to illustrate the visual character of the development, and the visual impacts of the project if it is constructed.

Figure 2: Photographic Rendering of Project from northbound Highway 1 looking west

Figure 3: Photographic Rendering of North Building of Project from southbound Highway 1 looking west

Figure 4: Photographic Rendering of South Building of Project from Highway 1 Southbound

As illustrated by the renderings, the parking lot would be partially screened from the highway viewshed by trees proposed in the landscaping plan. As trees are slow to grow on the coast, and as many non-native varieties do not do well given the strong coastal winds, staff recommends Mitigation Measure 1 below, to ensure that the applicant selects native coastal trees that will provide effective visual screening of the parking lot.

The eastern face of Building A, which faces Highway 1, has been treated with architectural details such as: a trellis pediment, three trellises, and eleven windows. This architectural detailing would provide a visual reference for people driving along Highway 1. The visual impact of the eastern face of Buildings B & C have been treated with a number of trellises, windows, back doors with store signs, and the stormwater catchment tanks.

Mitigation Measure 1 includes a requirement that climbing plants be identified that are appropriate to our coastal environment for all of the trellises.

> **Mitigation Measure 1: Prior to issuance of the Building Permit, the applicant shall resubmit the landscaping plan, for approval by the Community Development Director, illustrating: 1) nine Shore Pines (or coastal native tree equivalents) along the eastern edge of the proposed parking lot; 2) local coastal trees for the remainder of the landscaping plan; 3) the plant variety proposed for the trellis shown on the eastern edge of the parcel; and 4) types and locations of climbing plants that are appropriate to the coastal environment for all trellises of the project.**

Both buildings are located relatively close to the highway, in comparison to other buildings along this corridor, which are set back further from the highway. As shown in Table 1 below, the proposed Hare Creek Center is considerably closer to the highway than many nearby commercial developments.

Table 1: Building Distance From Edge of Highway 1

	Distance (ft)
West Side of Road	
Cliff House Restaurant	10
Fort Bragg Outlet	78
Dolphin Inn	70
Mini Golf Building	60
East Side of Road	
Q Restaurant	26
Riverview Professional Office	228
McDonalds	70
Surf Motel	65
Boatyard Shopping Center	40
Todd Point U Haul Rental	32
Average	**67.9**
Proposed Project	36

The visual quality of the proposed project is similar in character to the other large format retail shopping center in the immediate vicinity.

Initially, the project applicant proposed to orient the buildings along the highway on a north-south axis. However, staff requested that the buildings be re-oriented on an east-west axis and split into two separate buildings to reduce the visual bulk of the buildings from the public right of way. As proposed at its nearest point to the highway, the project is 15 feet and 9 inches from the public ROW, and the CLUDC requires a minimum setback of 15 feet from arterial streets. As 10 feet of the ROW is not currently developed, Building C is set back from Highway 1 a total of

36 feet at its closest point. A service road is located between Building C and the future sidewalk along Highway 1, leaving no space for landscaping to provide visual treatment of this edge. By comparison, the visual impacts of the adjacent Boatyard Shopping Center are screened both by topography and a variety of trees and shrubs. **Mitigation Measure** 2 is required to reduce visual impacts to a less than significant level.

> **Mitigation Measure 2: Prior to issuance of the Building Permit, the applicant shall revise the Project Site Plan to set back the east face of Building C by an additional 5 feet and shall submit a landscaping plan to include installation of a five foot wide vegetative area along the east face (highway facing) elevation of Building C.**

Additionally, the project as originally submitted included rainwater catchment tanks along the highway side of the development. Staff asked that the rainwater catchment tanks be relocated in a less prominent location, and the applicant resubmitted the proposal with new locations for the tanks. As proposed, the rainwater catchment tanks are made of galvanized metal, which can be reflective and visually jarring, and which are likely to succumb fairly quickly to the corrosive powers of the salt mist from the ocean. Therefore, staff recommends that the applicant use a non-metal tank for these cisterns. Furthermore, staff recommends that the applicant paint a mural on the southernmost tank on the east side of the property and the northernmost tank on the west side of the property in order to reduce the visual impact of these features, as summarized in **Mitigation Measure** 3 below.

> **Mitigation Measure 3: The rainwater catchment tank shall be of a non-reflective material in a natural and neutral tone. Prior to approval of the Building Permit, the applicant shall submit the colors for the cisterns and a mural design for the southernmost rainwater catchment tank on the east side of the property and the northernmost rainwater catchment tank on the west side of the property, for review and approval by the Director of Community Development. The mural shall depict a historic, cultural or natural theme related to the Mendocino Coast.**

The inclusion of **Mitigation Measures 1, 2 and 3** will reduce the visual impact of the overall project to a level that is less than significant.

d) Would the project create a new source of substantial light or glare that would adversely affect day or nighttime views in the area?

The project includes outdoor lighting as follows:

1. Seven double light poles in the parking lot.
2. Seven single standard light poles around the project perimeter.
3. Building A includes 12 downward-facing wall-mounted LED lights and 20 LED canopy ceiling lights.
4. Building B includes 16 downward-facing wall-mounted LED lights and 21 LED canopy ceiling lights.
5. Building C includes 12 downward-facing wall-mounted LED lights and 5 LED canopy ceiling lights.

The proposed lighting is all downward facing, energy conserving LED lighting. The applicant submitted a lighting plan that clearly illustrates that the lighting will not leave the property.

The project does not include significant sources of glare that would be visible from neighboring properties or the public right of way. **No impact** is expected as a result of new light or glare sources.

II. Agricultural Resources

Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a. Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?				X
b. Conflict with existing zoning for agricultural use, or a Williamson Act contract?				X
c. Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use?				X

DISCUSSION OF IMPACTS

a) *Would the project convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?*

According to the California Department of Conservation Important Farmland Map (January 2009), farmland throughout Mendocino County is primarily mapped as grazing land. Prime Farmland, Unique Farmland, and Farmland of Statewide Importance are concentrated around the Eel, Russian, and Navarro Rivers. The proposed project is located on a vacant parcel zoned Highway and Visitor Serving Commercial (CH). The project site has not been used as an agricultural resource for more than 25 years. While crop production, horticulture, orchards, and vineyards are permitted uses within the CH zoning district, the parcel has not been used for and is not considered prime farmland, unique farmland, or farmland of statewide importance per the Farmland Mapping and Monitoring Program. As implementation of the project will not result in the conversion of any farmland to non-agricultural uses, the project is considered to have **no impact** to farmland.

b) *Would the project conflict with existing zoning for agricultural use, or a Williamson Act contract?*

The proposed project is located within a parcel zoned as Highway and Visitor Serving Commercial (CH). No agricultural uses currently exist or are planned on the site. The project would not infringe upon any lands with Williamson Act contracts. Therefore, the project will have **no impact** with agricultural zoning or Williamson Act contracts.

c) *Would the project involve other changes in the existing environment, which, due to their location or nature, could result in conversion of Farmland to non-agricultural use?*

Surrounding land is primarily commercial development and vacant land that is zoned for multifamily residential. Although the project will create changes to the existing environment, the proposed project will not result in the conversion of farmland to non-agricultural use.

III. Air Quality

Where available, the significance criteria by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a. Conflict with or obstruct implementation of the applicable air quality plan?				X
b. Violate any air quality standard or contribute substantially to an existing or projected air quality violation?				X
c. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?		X		
d. Expose sensitive receptors to substantial pollutant concentrations?				X
e. Create objectionable odors affecting a substantial number of people?				X

DISCUSSION OF IMPACTS

c) *Would the project result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?*

The City of Fort Bragg is located in the North Coast Air Basin and is within the jurisdiction of the Mendocino County Air Quality Management District. Mendocino County is designated attainment or unclassified for all air quality standards except the state standards for Particulate Matter less than 10 microns in size (PM-10). Development within Mendocino County is required to comply with all applicable provisions of the Particulate Matter Attainment Plan adopted by the Mendocino County Air Quality Management District on March 15, 2005.

Temporary construction impacts are subject to Air Quality Management District Regulation 1 Rule 430 which requires dust control during construction activities.

Section 17.30.080.D of the Coastal Land Use and Development Code outlines municipal standards for dust management as follows:

> **Dust**. Activities that may generate dust emissions (e.g., construction, grading, commercial gardening, and similar operations) shall be conducted to limit the emissions beyond the site boundary to the maximum extent feasible. Appropriate methods of dust management shall include the following, subject to approval by the City Engineer.
>
> 1. **Scheduling.** Grading shall be designed and grading activities shall be scheduled to ensure that repeat grading will not be required, and that completion of the dust-generating activity (e.g., construction, paving or planting) will occur as soon as possible.
> 2. **Operations during high winds.** Clearing, earth-moving, excavation operations or grading activities shall cease when the wind speed exceeds 25 miles per hour averaged over one hour.
> 3. **Limiting the area of disturbance.** The area disturbed by clearing, demolition, earth-moving, excavation operations or grading shall be minimized at all times.
> 4. **Dust control.** Dust emissions shall be controlled by watering a minimum of two times each day, paving or other treatment of permanent on-site roads and construction roads, the covering of trucks carrying loads with dust content, and/or other dust-preventive measures (e.g., hydroseeding, etc.).
> 5. **Revegetation.** Graded areas shall be revegetated as soon as possible, but within no longer than 30 days, to minimize dust and erosion. Disturbed areas of the construction site that are to remain inactive longer than three months shall be seeded and watered until grass cover is grown and maintained; and
> 6. **Containment.** Appropriate facilities shall be constructed to contain dust within the site as required by the City Engineer.

Additionally, Section 17.62.020 of the Coastal Land Use and Development Code requires a Dust Prevention and Control Plan to be submitted in conjunction with the grading plan. The required plan content is outlined in Section 17.62.020.B of the Coastal Land Use and Development Code as follows:

> **Dust prevention and control plan.** A Dust Prevention and Control Plan shall be submitted in conjunction with a grading plan or other plan involving the movement of dirt. The City Engineer may also require the submittal of a Dust Prevention and Control Plan for other development deemed necessary.
>
> **Plan content.** The plan shall demonstrate that the discharge of dust from the construction site will not occur, or can be controlled to an acceptable level depending on the particular site conditions and circumstances.
>
> a. The plan shall address site conditions during construction operations, after normal working hours, and during various phases of construction.
> b. The plan shall include the name and the 24 hour phone number of a responsible party in case of emergency.
> c. If the importing or exporting of dirt is necessary as demonstrated by the cut and fill quantities on the grading plan, the plan shall also include the procedures necessary to keep the public streets and private properties along the haul route free of dirt, dust, and other debris.
> d. When an entire project is to be graded and the subsequent construction on the site is to be completed in phases, the portion of the site not under construction shall be treated with dust preventive substance or plant materials and an irrigation system.

e. All phased projects shall submit a plan demonstrating that dust will not be generated from future phase areas.

Mitigation Measure 4 is included to ensure construction activities do not result in significant impacts resulting from a non-attainment pollutant (particulate matter) and includes language to ensure that the requirements of the Coastal Land Use and Development Code pertaining to dust control, as outlined above, are addressed:

> **Mitigation Measure 4: In order to minimize dust and keep dust from leaving the project site, a dust prevention and control plan shall be submitted for approval by the City Engineer in conjunction with the Storm Water Pollution Prevention Plan (SWPPP). The dust prevention and control plan shall demonstrate that the discharge of dust from the construction site will not occur, or can be controlled to an acceptable level depending on the particular site conditions and circumstances. The plan shall include the following information and provisions:**
>
> 1. **The plan shall address site conditions during construction operations, after normal working hours, and during various phases of construction.**
> 2. **The plan shall include the name and the 24 hour phone number of a responsible party in case of emergency.**
> 3. **If the importing or exporting of dirt is necessary as demonstrated by the cut and fill quantities on the grading plan, the plan shall also include the procedures necessary to keep the public streets and private properties along the haul route free of dirt, dust, and other debris.**
> 4. **When an entire project is to be graded and the subsequent construction on the site is to be completed in phases, the portion of the site not under construction shall be treated with dust preventive substance or plant materials and an irrigation system.**
> 5. **Grading shall be designed and grading activities shall be scheduled to ensure that repeat grading will not be required, and that completion of the dust-generating activity (e.g., construction, paving or planting) will occur as soon as possible.**
> 6. **The area disturbed by clearing, demolition, earth-moving, excavation operations or grading shall be minimized.**
> 7. **All visibly dry disturbed soil road surfaces shall be watered to minimize fugitive dust emissions. Dust emissions shall be controlled by watering a minimum of two times each day, paving or other treatment of permanent on-site roads and construction roads, the covering of trucks carrying loads with dust content, and/or other dust-preventive measures (e.g., hydroseeding, etc.).**
> 8. **All unpaved surfaces shall have a posted speed limit of 10 miles per hour.**
> 9. **Earth or other material that has been transported by trucking or earth moving equipment, erosion by water, or other means onto paved streets shall be promptly removed.**
> 10. **Water or suitable chemicals shall be applied on materials stockpiles, and other surfaces that can give rise to airborne dusts.**
> 11. **All earthmoving activities shall cease when sustained winds exceed 20 miles per hour.**
> 12. **The operator shall take reasonable precautions to prevent the entry of unauthorized vehicles onto the site during non-work hours.**

An Air Quality Management District grading permit will be needed, since the project area of disturbance is greater than one acre. Compliance with the permit process will assure impacts to air quality are less than significant.

IV. Biological Resources

Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a. Have a substantial adverse effect, either directly or through habitat modification, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or US Fish and Wildlife Service?			X	
b. Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or US Fish and Wildlife Service?				X
c. Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?				X
d. Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?		X		
e. Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?				X
f. Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?				X

DISCUSSION OF IMPACTS

a) *Would the project have a substantial adverse effect, either directly or through habitat modification, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or US Fish and Wildlife Service?*

Botanical, biological and wetland surveys were conducted by WRA Environmental Consultants in 2014, as documented in the report *Coastal Act Compliance Report*. The report analyzed a Study Area that is larger than the project site, and includes approximately 18.5 acres. It notes that portions of the Study Area are currently minimally developed in dirt parking lots and roads;

however, no structures exist in the Study Area. Land uses include short-term parking, dog-walking, community events, and recreation.

The report indicates that the project has no potential to impact special status plants, fish, wetlands or wildlife, because no special status plants, wetlands, fish or wildlife were found or known to exist in the site, with one exception, the White-Tailed Kite. The kite was not seen on the site, but has a moderate potential to occur within the study area for foraging; however, nesting is unlikely on the site given the habitual disturbances from frequent and intensive use of the site by dogs and people. The project will not, therefore, have significant impacts on any special status plants, wetlands, fish, or wildlife and no mitigation measures are required for sensitive species.

The applicant has proposed to stockpile a 408' by 40' berm of soil that is 3' deep on the adjoining property. The botanical study analyzed the entire Hare Creek property and found no environmentally sensitive habitat area (ESHA) on the site. The berm would be revegetated with native grasslands which could continue to provide foraging habitat to the only special status animals that have the potential to occur on the site, namely the white-tailed kite. Thus, the proposed berm will not have a significant effect on botanical or biological resources.

b) ***Would the project have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or US Fish and Wildlife Service?***

c) ***Would the project have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?***

Wetland surveys were conducted by WRA Environmental Consultants in 2014, as documented in the report *Coastal Act Compliance Report*. The report analyzed a Study Area that is larger than the project site, and includes approximately 18.5 acres. No wetlands were identified on site, and therefore, the project would not have adverse impacts on wetlands.

d) Would the project interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?

As the project has the potential to impact breeding birds, which are not special status species but are protected under the migratory bird treaty, **Mitigation Measure 5** is recommended to ameliorate any impacts on breeding birds.

Mitigation Measure 5: Minimize Potential Disturbance of Breeding Birds through the following techniques:

1. **Work Windows. Conduct as much ground disturbance and vegetation (tree and shrub) removal as is feasible between September 1 and January 15, outside of the breeding season for most bird species.**
2. **Preconstruction Surveys. If ground disturbance or removal of vegetation occurs between January 16 and August 31, preconstruction surveys will be performed prior to such disturbance to determine the presence and location of nesting bird species.**

3. **Buffers. If nests are present, establishment of temporary protective breeding season buffers will avoid direct mortality of these birds. The appropriate buffer distance is species specific and will be determined by a qualified biologist as appropriate to prevent nest abandonment and direct mortality during construction.**

e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

The proposed project would not conflict with local policies or ordinances protecting biological resources as the City does not have a tree preservation policy and the site is not habitat to any botanical or animal resources protected by the Coastal Act, the LCP, or CEQA.

f) Conflict with the provisions of an adopted Habitat Conservation Plan, NaturalCommunity Conservation Plan, or other approved local, regional, or state habitat conservation plan?

There is no habitat conservation plan associated with this site and/or the habitat of the site, so there is no conflict between the proposed project and any conservation plans.

V. Cultural Resources

Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a. Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5?				X
b. Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?		X		
c. Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?				X
d. Disturb any human remains, including those interred outside of formal cemeteries?				X

DISCUSSION OF IMPACTS

a. Cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5?

The site is undeveloped, and there are no known historical resources on the site.

b. Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?

A confidential archaeological study was performed for the project, by Flynn and Roop. The study covered the entire 18.5 acre site and identified no cultural resources. The California Historical Resources Information System indicated that no further study is necessary for the site. The City requested comments from the Sherwood Band of Pomo Indians and in a letter dated August 4, 2014, the Tribal Chairman requested that a Tribal Monitor be present during ground disturbing activities (grading and trenching). While the record does not indicate that cultural resources are present on the site, the site is located near sites with cultural resources and the Tribe has special knowledge that such resources might exist on the site. To ensure that impacts do not occur to cultural resources during ground disturbing activities **Mitigation Measure 6** has been added.

> **Mitigation Measure 6: A Native American monitor shall be present during all ground disturbing activities. Additionally the project applicant shall provide five day notice to the Sherwood Valley Band of Pomo Indians in advance of ground disturbing activities on the site so the SVBP can schedule a Native American monitor for the site. If any cultural resources are discovered during construction activities the applicant shall follow state and local laws requiring that the following actions shall be taken: 1) cease and desist from all further excavation and disturbances within 25 feet of the discovery; 2) notify the Fort Bragg Community Development Department immediately of the discovery; and 3) retain a professional archaeologist to determine appropriate action in consultation with the Sherwood Valley Band of Pomo.**

c. Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

There are no known paleontological resources in Fort Bragg. The site does not include unique geologic features. No impacts are anticipated and no mitigations are necessary for these resources.

d. Disturb any human remains, including those interred outside of formal cemeteries?

There are no known human remains on this site, however excavation activities can uncover human remains. If such a discovery is made the applicant shall follow

> **Mitigation Measure 7: If human remains are identified during project construction that applicant shall follow the following procedures. All development shall cease immediately and shall not commence until so directed by the Community Development Director. The Director and county corner shall be notified immediately. The applicant shall follow the procedure defined in 17.50.030E of the Coastal Land Use and Development Code.**

VI. Geology and Soils

Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a. Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i. Rupture of known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.				X
ii. Strong seismic ground shaking?		X		
iii. Seismic-related ground failure, including liquefaction?		X		
iv. Landslides?		X		
b. Result in substantial soil erosion or the loss of topsoil?		X		
c. Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?		X		
d. Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?				X
e. Have soils incapable of adequately supporting the use of septic tanks or alternative water disposal systems where sewers are not available for the disposal of waste water?				X

DISCUSSION OF IMPACTS

a) i. Would the project expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving rupture of known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault?

The City of Fort Bragg is located along the central Mendocino coast, an area that is known for its seismic activity. Based on published fault maps, there are no active or potentially active faults

known to traverse the City. There are four active or potentially active faults that are located within a 60 mile radius of the City. These include: the San Andreas Fault approximately 6 miles offshore of Fort Bragg and the most likely source of earthshaking; the Maacama Fault zone approximately 21 miles to the east of the City which has the potential to generate strong shaking in the City; the Mendocino Fault zone approximately 60 miles to the northwest which is an extremely active structure; and the Pacific Star Fault which is located between the towns of Fort Bragg and Westport and is currently under study. However, adherence to **Mitigation Measure 8** will reduce this potential impact to a level that is less than significant.

a) ii. Would the project expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving strong seismic ground shaking?

As the City of Fort Bragg is in an area known for seismic activity, the project could be subject to strong seismic ground shaking. However, adherence to **Mitigation Measure 8** will reduce this potential impact to a level that is less than significant.

a) ***iii. Would the project expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving seismic-related ground failure, including liquefaction?***

A geotechnical investigation of the site was completed by Krazen & Associates in 1995, and the study is located in the project file that includes a number of recommendations, which must be implemented in order to limit the possibilities for seismic related ground failures.

> **Mitigation Measure 8: The recommendations of the Krazen & Associates geotechnical report shall be followed for site grading, compaction and preparation of engineered fill.**

a) ***iv. Would the project expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving landslides?***

A geotechnical investigation of the site was completed by Krazen & Associates in 1995, and the study is located in the project file that includes a number of recommendations, one of which is that no un-reinforced slope of more than 2:1 should occur on the project site. The project plans include a slope of 1:2, which is less than the study's recommendation, and thus, the project will not expose anyone or any property to landslides.

b) ***Would the project result in substantial soil erosion or the loss of topsoil?***

The project requires removal of vegetation over a three acre area currently covered in a meadow with eight trees. The site will be graded, with topsoil removed and stockpiled onsite. During grading and construction, Best Management Practices (BMPs) will be implemented to minimize erosion and prevent sedimentation per the SWPPP for the project. After construction, additional BMPs will be implemented to stabilize all disturbed areas of soil and the stockpiled cut soil from the project.

Because more than an acre of soil disturbance will occur, a National Pollutant Discharge and Elimination System (NPDES) permit will be required to assure the project is consistent with the Clean Water Act. The North Coast Regional Water Quality Control Board is the permitting agency for the NPDES permit. A Storm Water Pollution Prevention Plan (SWPPP) is a sediment

and erosion control plan specific to the project which describes the pollution prevention activities and practices that will be implemented on the site. The SWPPP includes a description of the site, and of each major phase of the plan, the roles and responsibilities of contractors and subcontractors, and the inspection schedules and logs. It is also where changes and modifications to the construction plan and the associated pollution prevention activities are documented. A SWPPP is required for the NPDES permit. An NPDES permit will be obtained by the applicant prior to commencement of the project. **Mitigation Measure 9** below requires the applicant to obtain all necessary permits for the project from all applicable federal, state and local agencies.

> **Mitigation Measure 9: The Applicant shall secure all necessary permits for the proposed development from City and State agencies having jurisdiction, including a Grading Permit, NPDES Permit, Building Permit and others as required.**

The project, as conditioned, is not expected to result in substantial soil erosion or loss of topsoil.

c) ***Would the project be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?***

The project geotechnical report notes that the project site is susceptible to some level of subsidence due to the uneven bedrock under the site, water and organic matter content of soils, and varying soil conditions across the site. Therefore, all recommendations from the report must be implemented in order to reduce the risk of subsidence and potential damage to foundations and structures. **Mitigation Measure 8** will reduce this potential impact to less than significant.

d) ***Would the project be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?***

The project is not located on expansive soil.

e) ***Would the project have soils incapable of adequately supporting the use of septic tanks or alternative water disposal systems where sewers are not available for the disposal of waste water?***

No septic system is included or needed for the project. The project will connect to a municipal sewer system.

VII. Greenhouse Gas Emissions

Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a. *Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?*		X		
b. *Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?*				X

DISCUSSION OF IMPACTS

a) Would the project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

The Global Warming Solutions Act (AB 32), which passed on August 31, 2006, requires that the state's greenhouse gas (GHG) emissions be reduced by 10% below the 1990 GHG level by 2020. The California Environmental Quality Act (CEQA) guidelines were amended in December of 2009 to require GHG impacts to be considered. The Mendocino County Air Quality Management District defers to the Bay Area Air Quality Management District (BAAQMD) CEQA thresholds as an interim measure until the Mendocino County Air Quality Management District (AQMD) develops its own thresholds. A 2010 Air Quality memorandum clarifies how the thresholds differ for our area based on local air quality, and how the thresholds are actually recommended guidance rather than requirements.

The District does not have an adopted Threshold of Significance for construction-related GHG emissions. However, the District recommends that the Lead Agency quantify and disclose GHG emissions that would occur during construction, and make a determination on the significance of these construction generated GHG emission impacts in relation to meeting AB 32 GHG reduction goals. The Lead Agency is encouraged to incorporate best management practices to reduce GHG emissions during construction, as feasible and applicable (BAAQMD). The aspects of the proposed development that would contribute toward greenhouse gas emissions include: transportation of construction materials, heavy equipment use at the site during construction, operation of the facility, auto traffic related with customer visits to the site. Staff prepared an Urbemis analysis of the entire project (construction & operations) to determine the net GHG emissions produced by construction of the project and operation and use of the facility once it is open to the public. The results of the analysis are summarized in

Table 2 below and would result in 3,040 metric tons of GHG equivalents per year.

Table 2: GHG Emissions - Hare Creek Center

	GHG Emissions (Unmitigated)
Project Construction	108 Metric Tons (one time)
Customers' Vehicle Emissions	2,975 Metric Tons
Supermarket Operation 15,000 SF	528 Metric Tons
Other Retail Operation 14,900 SF	144 Metric Tons

	3,647 Metric Tons annual

As made clear by the table, the primary contributor to GHG emissions for this facility would be the vehicular emissions associated with customer visits. The project includes extensive bicycle racks and a transit stop to encourage alternative transportation to the site. However, pedestrian access to the site could be improved and could thereby reduce GHG emissions slightly for the operation of this facility. **Mitigation Measure 17** (discussed later in this MND) will help ensure that adequate pedestrian access is provided by the project. Further reductions in the GHG emissions generated by customers will come from federal legislation regarding CAFE standards for vehicles. The only remaining mechanisms to reduce GHG emission is through conservation and on-site sustainable energy production. Both are discussed below.

The commercial refrigeration and freezer units for the supermarket component of the project are one of the largest contributors to operational GHG emissions. For the typical large supermarket, refrigeration uses the most electricity (41%) and contributes the most GHG emissions.

The following practices, which are incorporated as part of the proposed project, will reduce greenhouse gas emissions from project operation to a less than significant level:

1. Use of Daylighting;
2. LED lighting for all external lighting sources;
3. Photovoltaics to produce 168,000 kWh of power per year; and
4. Use of Energy Star refrigeration and freezer equipment.

Daylighting will reduce the overall lighting requirements of the buildings during daytime operations, but this savings is anticipated to be minor. The photovoltaics will produce an estimated 168,000 kWh of electricity annually. This PV system will mitigate for 116 metric tons of CO2 per year of the approximately 3,647 metric tons per year which will be generated from the operation of the Hare Creek Center.

b) Would the project conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

The City of Fort Bragg adopted a Climate Action Plan in 2012. The plan sets greenhouse gas reduction goals including a 30% reduction in greenhouse gasses for the municipality by 2020, and a 7% reduction goal for the community by 2020.

With the implementation of the photovoltaics and other energy saving features describe above, the project will result in a net 2.5% increase of the total GHGs produced (138,824 MTCO2E) by the Fort Bragg Community. The project may result in greenhouse gas impacts that could conflict with the 2012 City of Fort Bragg Climate Action Plan, which calls for a reduction of GHG emissions by 7% by 2020. However, the project will have a less than significant impact on climate change in the world as a whole.

VIII. Hazards and Hazardous Materials

Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a. Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?			X	
b. Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?			X	
c. Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?				X
d. Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?				X
e. For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport, would the project result in a safety hazard for people residing or working in the project area.				X
f. For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?				X
g. Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?				X
h. Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?				X

DISCUSSION OF IMPACTS

a) Would the project create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?

The project does not require routine transport, use or disposal of hazardous materials for operations or maintenance.

Heavy equipment utilizes fuels, lubricants and oils with the potential for soil contamination during construction activities. A hazardous materials management plan will be required as a part of the Storm Water Pollution Prevention Plan. This requirement is outlined in **Mitigation Measure 10**.

Mitigation Measure 10: **Prior to issuance of the Building Permit, the applicant shall submit a Storm Water Pollution Prevention Plan for review and approval by the Community Development Director, that shall include measures for prevention of gasoline, oil and lubricant spills, and an action plan for clean-up of any accidental fluids or other contaminants spilled or encountered during conversion and construction activities.**

b) Would the project create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?

There are no reasonably foreseeable upset or accident conditions involving release of hazardous materials into the environment in association with this project, with the exception of potential accidental contamination of soils from fuels, oils or lubricants from heavy equipment operation or maintenance in association with conversion of the property or construction of the project. Mitigation Measure 10 would reduce the potential effect of such hazards to a level of less than significant. The project would have less than a significant impact on hazards with mitigations incorporated.

c) Would the project omit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?

The project site is not located within ¼ mile of any existing or proposed school.

d) Would the project be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?

According to the Water Board's GeoTracker system and the Department of Toxics and Substance Control Envirostor system there are no hazardous materials sites located within the project area.

e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport, would the project result in a safety hazard for people residing or working in the project area?

The project is not located within an airport land use plan or within two miles of a public airport.

f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?

There are no private airstrips in the project vicinity. There is a private helipad located on Highway 20 approximately 2.8 miles from the site and a private hospital helipad is located approximately 0.6 miles from the site. This is a sufficient distance from the project that it would not result in a safety hazard for people residing or working in the project area.

g) Would the project impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

The project would not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan. The project would not block any evacuation paths.

h) Would the project expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?

The project is not located in an area adjacent to wildlands and therefore the project will not expose people or structures to a risk of loss, injury or death involving wildland fires.

IX. Hydrology and Water Quality

Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a. Violate any water quality standards or waste discharge requirements?		X		
b. Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?			X	
c. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?			X	
d. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?			X	
e. Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?				X
f. Otherwise substantially degrade water quality?				X
g. Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?				X
h. Place within a 100-year flood hazard area structures which would impede or redirect flood flows?				X

i.	*Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?*				X
j.	*Inundation by seiche, tsunami, or mudflow?*				X

DISCUSSION OF IMPACTS

a) Would the project violate any water quality standards or waste discharge requirements?

The project is subject to permits from the North Coast Regional Water Quality Control Board (NCRWQCB) and State Water Resources Control Board (SWRCB). A National Pollution Discharge Elimination System (NPDES) permit will be needed from the NCRWQCB to ensure the project does not result in pollution to Hare Creek or the Pacific Ocean.

Compliance with permit requirements of the NCRWQCB and City of Fort Bragg Coastal Land Use and Development Code will assure the project does not violate water quality standards or waste discharge requirements. **Mitigation Measure 9** is included to ensure all necessary permits are secured as required for the project, which includes obtaining an NPDES permit and preparing a SWPPP.

b) Would the project substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?

The project would cover approximately three acres of meadow. The project design includes a variety of Low Impact Development stormwater infiltration techniques to reuse, clean and infiltrate stormwater to recharge groundwater suppliers. Additionally the project includes water catchment for landscape watering, permeable pavement, bioswales, installation of an infiltration trench, and rain gardens for bio-filtration and ground water recharge.

The project must be found consistent with Program OS-2.2.2 which is specific to development that might have an impact on aquifers in Todd Point.

> Program OS-2.2.2: Prior to consideration of any new development on the Todd Point aquifer, a project-specific hydrologic design analysis shall be prepared by the project applicant to recommend specific mitigation measures to minimize runoff from the site in order to retain existing levels of groundwater recharge. (Examples of such measures include establishment of retention basins, establishment of percolation chambers, use of permeable paving materials, etc.)
>
> If the design analysis concludes that the project will result in a net decrease in groundwater recharge from the project site, then a supplemental hydrologic analysis shall be prepared by the applicant which evaluates cumulative hydrologic impacts. The study shall establish a baseline of aquifer supply to existing residential wells on Todd Point and evaluate cumulative impacts to aquifer recharge from all projected development on Todd Point.
>
> If the supplemental hydrologic analysis shows that the cumulative development would adversely impact existing Todd Point wells, then the study shall establish the nexus for new development, both in the City and

in the County, to pay its pro rata share of the costs of extending City water service to the affected existing residences.

Prior to new development, the City will establish a program that identifies how fees will be collected to extend City water, what existing residences will be served, and when the water service would be extended.

The cost of preparing the cumulative hydrologic study will be borne by the first application received which triggers this requirement, and all future applicants for new development on Todd Point will be required to reimburse the original applicant their fair share of the hydrologic study.

A hydrologic study entitled Groundwater Recharge and Water Balance Evaluation was produced by Nolan Associates for this property (for the K-Mart proposal in 1995). The evaluation noted used 24 borings and records from 12 well logs to determine that the site is covered in weathered Franciscan bedrock and Heeser sandy loam soils (located on top of the bedrock). These soils have the capacity to produce 8.7 and 13.7 gallons per minute (gpm) for wells located in each layer. Generally wells in the area range in depth from 85 feet to 144 feet in depth and thereby residents are able to harvest water from both sources. The Heeser sandy loam soil appears to act as a water reservoir and discharges water into the Franciscan bedrock formation. The amount of water that is absorbed into the Heeser loam soils and later discharged into the Franciscan bedrock can be calculated based on the amount of rainfall and subtracting out water that is lost to evapotranspiration and runoff. The Nolan report made the following conservative assumptions in their water balance analysis:

1. The Franciscan bedrock would only be recharged through water flowing through the Heeser sandy loam soil and not from underground water sources such as underwater streams.
2. A runoff coefficient of 20% (though various studies point to a coefficient of 10 to 20%); and
3. An annual transpiration rate of 26 inches (this is rainwater lost to plants).

Nolan calculates that about 12.20” are recharged to ground water each year throughout the area of Todd Point that is unpaved and undeveloped. This translates into approximately 141 acre feet of groundwater recharged per year from rainfall alone into the Todd Point area. The analysis also looked at existing water use by Todd Point residents and conservatively assumed that:

- Each residence would use 300 gallons of water per day (though average use in Fort Bragg is 158 gallons per day);
- Fifty percent of Todd Point residential water use would be for indoor use, which would recharge the groundwater via the septic system.

This results in an estimated total water use of 0.17 acre feet per resident per year or 6.1 acre feet/year for all 36 existing well using residences on Todd Point. The report notes that there are 32 vacant lots which, if added to the total demand upon eventual development, results in 11.6 acre feet of water use per year.

The analysis calculated a maximum storage capacity in the Heeser soils of 348 acre feet of water.

If the proposed project were developed without the proposed rainwater catchment system, bioswales, and permeable paving, it would result in approximately 90% reduction in recharge for the 3 acre site, which would mean a net loss to recharge of about 2.74 acre feet per year. This

would reduce net annual recharge from 141 acre feet per year to 138 acre feet per year, well in excess of the 6.1 acre feet per year that could be withdrawn from the aquifer at maximum build out of all residential parcels that could utilize wells.

However, the architect and civil engineer of the project designed the project to provide maximum recharge through the following techniques: 1) use of rainwater capture for landscape irrigation; 2) use of pervious pavement, bioswales, retention basins and infiltration drains for stormwater capture and infiltration. With these additional water recharge friendly design elements, the project will have a less than significant impact on groundwater recharge.

Additionally, as this project is defined as a project of "special water quality concern" due to its size (greater than 10,000 SF of impervious surface) and the size of the parking lot (greater than 5,000 SF of parking), the project will have to conform to extensive additional water quality regulations including: submittal of a Water Quality Management Plan and implementation of treatment control BMPs that comply with the 85% storm standard.

c) Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?

d) Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?

e) Would the project create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?

f) Would the project otherwise substantially degrade water quality?

The project will alter the existing drainage pattern of the site; however the proposed design will slow the time to concentration of stormwater flows through the utilization of a cistern system to catch the first flush of storms and the installation of an infiltration trench, permeable pavement and bioswales. Additionally, during construction the applicant will implement best management practices (BMPs) to reduce erosion and siltation off site through the implementation of the required SWPPP. As this project is defined as a project of "special water quality concern" due to its size (greater than 10,000 SF of impervious surface) and the size of the parking lot (greater than 5,000 SF of parking), and the project will have to conform to extensive additional water quality regulations including: submittal of a Water Quality Management Plan and implementation of treatment control BMPs that comply with the 85% storm standard. Thus, the proposed project will not result in substantial erosion or siltation on- or off-site, surface runoff, exceed the capacity of existing stormwater systems, contribute to pollution, or degrade water quality.

g) ***Would the project place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?***

h) Would the project place within a 100-year flood hazard area structures which would impede or redirect flood flows?

The project does not include housing and is not located within a 100 year flood hazard area, per FEMA Flood Insurance Rate Map 06045C1017F, Effective Date June 2, 2011.

i) Would the project expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?

The project does not include a levee or dam nor is it the floodplain of one.

j) Would the project result in inundation by seiche, tsunami, or mudflow?

The project is not located in or near a tsunami zone or near a lake (required for a seiche) and would not result in mudflow.

k) Would the project substantially alter the existing drainage pattern of the site or area, or add water features that could increase habitat for mosquitos and other vectors as a potential for increased pesticide use?

The project will include bioswales, which if allowed to become plugged could result in standing water after a storm event and the potential for flooding of portions of the parking lot and Building C. In order for bioswales to work effectively, the area should not be heavily compacted during construction and grading activities. Mitigation Measure 11 has been added to address these concerns.

> **Mitigation Measure 11: During construction the areas slated for bioswales will be protected from excessive grading and compaction with construction fencing. The efficacy of the bioswales will be demonstrated prior to final of the building permit, by testing the permeability of the soil with a perc test. Once the Hare Creek Center is operational, the bioswales will be inspected for clogging at least monthly. If clogging is identified it shall be addressed immediately to ensure the effective operation of this stormwater system.**

X. Land Use and Planning

Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a. Physically divide an established community?				X
b. Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?				X
c. Conflict with any applicable habitat conservation plan or natural community conservation plan?				X

DISCUSSION OF IMPACTS

a) Would the project physically divide an established community?

The proposed project site is an open meadow just west of Highway 1; undeveloped property is located to the west and south of the site. The project will not physically divide a community.

b) Would the project conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?

The project is consistent with the ESHA policies of the Coastal General Plan that were adopted for the purpose of avoiding/mitigating an environmental effect. The project is consistent with the ESHA policies (Policy OS-1.1 through Policy OS-1.16) because the project site does not include any ESHA.

Policy OS-5.4 requires projects to be conditioned to prohibit the planting of invasive plants.

> Policy OS-5.4: Condition development projects, requiring discretionary approval to prohibit the planting of any species of broom, pampas grass, gorse, or other species of invasive non-native plants deemed undesirable by the City.

The landscaping plan does include one invasive plant, namely Monterey Cypress. The City received a letter of comment from Department of Fish and Wildlife and they objected to landscaping with Monterey Cypress on the site (see Attachment 6). **Mitigation Measure 12** has been added to ensure compliance with this policy and DFW's request.

> **Mitigation Measure 12: The project landscaping plan shall not include any species of broom, pampas grass, gorse, or other species of invasive non-native plants, such as Monterey Cypress deemed undesirable by the City or other regulatory agency. Nor will the applicant plant any of these invasive plants on the property now or in the future.**

The project as designed and conditioned complies with Policy OS-6.1 through Policy OS-6.3 regarding energy conservation and alternative energy, see the discussion regarding climate change for further discussion and analysis on this topic.

The project, as mitigated, complies with Policy OS-7.2 regarding air quality, see the MND section on air quality for further discussion.

The project, as mitigated, will comply with water quality policies OS-9.1 through OS-14.5. Please see water quality section of this MND for further discussion.

The project, as mitigated, will comply with water quality Program OS-2.2.2, please see Hydrology section of this MND for further discussion.

c) Would the project conflict with any applicable habitat conservation plan or natural community conservation plan?

There are no habitat conservation plans or natural community conservation plans associated with this property or habitats or communities located upon this property. The project would not conflict with any habitat conservation plans or natural community conservation plans.

XI. Mineral Resources

Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a. Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?				X
b. Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?				X

DISCUSSION OF IMPACTS

The site does not contain any known mineral resources and construction of the project would not result in the loss of any locally important mineral resources delineated in the Fort Bragg General Plan or any other land use document.

XII. Noise

Would the project result in:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a. Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?		X		
b. Exposure of persons to or generation of excessive ground borne vibration or ground borne noise levels?		X		
c. A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?			X	
d. A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?		X		
e. For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?				X
f. For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?				X

DISCUSSION OF IMPACTS

a) ***Would the project result in exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance or of applicable standards of other agencies?***

Construction of the proposed project will generate a temporary increase in ambient noise due to the use of heavy equipment for grading activities. Tractors typically generate about 104 dB. However, the temporary impact of this noise source on businesses, the college and residents in the area can be mitigated to a less than significant level through the implementation of Mitigation Measure 13.

> **Mitigation Measure 13: Grading and earthwork activity shall be limited to the hours of 8:00am to 5:00pm Monday through Friday.**

The Coastal General Plan indicates that normally acceptable noise levels in a commercial area are levels at or below 70 dB. The College of the Redwoods is considered a sensitive noise receptor in the Coastal General Plan (Map N-1). Projects adjacent to sensitive noise receptors should not exceed 60 dB.

The long term operation of the facility will not produce noise levels above 60 dB, as operational noise will consist largely of noise generated by additional traffic to the site. The noise generated by traffic is a function of its speed, the road surface, and the type of traffic. The 2011 traffic noise levels at the corner of Highways 1 and 20 are 72 dB 50 feet from the centerline. This traffic noise falls to 60 dB when one is located 300 feet from the centerline. The proposed project will have significantly lower levels of noise than that found at the corner of Highway 1 and Highway 20. A more likely comparison would be the noise level on Franklin Street between Chestnut and Oak Streets which is 60 dB. The proposed project is located more than 400 feet from the College of the Redwoods, more than 400 feet to the nearest residence, and 300 feet to the nearest hotel. Therefore, the project will have a less than significant impact on noise.

b) ***Would the project result in exposure of persons to or generation of excessive ground borne vibration or ground borne noise levels?***

Construction will result in temporary ground borne vibration and noise of more than 60 dB. **Mitigation Measure 13** will minimize impacts to neighbors to a less than significant level.

c) ***Would the project result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?***

No, see discussion above under a).

d) ***Would the project result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?***

Temporary noise impacts normally associated with construction projects are expected during project construction. **Mitigation Measure 13** will reduce the impact of these noises to a level that is less than significant.

e) ***For a project located within an airport land use plan area or, where such a plan has not been adopted, within two miles of a public airport or a public use airport, would the project expose people residing or working in the project area to excessive noise levels?***

The proposed project would not be located in an airport land use plan area or within two miles of a public airport.

f) ***For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?***

There are no private airstrips within the vicinity of the project area and therefore, there would be no impact.

XIII. Population and Housing

Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a. Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?				X
b. Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?				X
c. Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?				X

DISCUSSION OF IMPACTS

a) Would the project induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?

The proposed project would provide retail services to the Mendocino Coast retail market area, which includes about 16,000 residents between the communities of Elk and Westport. The primary limitation on population growth in this area is job opportunity. The proposed project will provide a limited number of jobs, as the standard jobs per number of retail space ratio is one job per 500 to 700 SF of retail. This would translate to between 40 and 60 jobs for the site. This is not a significant growth inducement for the community.

b) Would the project displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?

The project site is undeveloped.

c) Would the project displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?

The project site is undeveloped. People will not be displaced by the construction of the project.

XIV. Public Services

Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, the need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
Fire protection?				X
Police protection?				X
Schools?				X
Parks?				X
Other public facilities?				X

DISCUSSION OF IMPACTS

Fire protection
The project was referred to the Fort Bragg Fire Department and the Fire Marshal did not identify special concerns related to the project. The project will include automatic sprinklers as required by the California Building Code. The project could result in additional calls for service, however the site can be adequately served by existing fire stations and no new facilities are required.

Police protection
The project was referred to the Fort Bragg Police Department and no specific concerns were identified by the police. The project design includes sufficient lighting to enable effective law enforcement in the evening. The proposed project may result in an increase in calls for service related to expansion of commercial uses at the site, however it would not result in any increased need for additional police stations.

Schools
The project will not result in sufficient job or residential growth. Therefore, it will not have a significant impact on the provision of school services for the proposed project's employees.

Parks
The project will not result in sufficient job or residential growth to result in any environmental impacts related with the provision of park services for the proposed project or its employees.

Other Public Facilities
The project is not anticipated to result in any impacts to any other public facilities.

XV. Recreation

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a. *Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?*			X	
b. *Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?*				X

DISCUSSION OF IMPACTS

The site is used informally for passive recreational uses such as dog walking and Frisbee throwing by individuals who are trespassing. Upon development these activities might continue on the adjacent vacant parcels or could be displaced to existing City or State parks. However, the informal use of this area as a passive recreational area is somewhat limited, as shown by the number of volunteer trails on site (see Figure 5).

Figure 5: Aerial View of proposed Project Site

The nearby Hare Creek trail (owned by the Mendocino Land Trust) is impacted by homeless use. Ready access to shopping carts from this facility could add to the burdens of cleaning up after this homeless population. **Mitigation Measure 14** is recommended to address this impact on a local park.

> **Mitigation Measure 14: Shopping Carts at the Hare Creek Center shall include lock out technology so that the carts cannot be removed from the parking lot.**

The project does not include recreational facilities nor would it require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment.

XVI. Transportation/Traffic

Would the project result in:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a. Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections?		X		
b. Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?				X
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?				X
d. Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?				X
e. Result in inadequate emergency access?				X
f. Result in inadequate parking capacity?				X
g. Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?		X		

DISCUSSION OF IMPACTS

a) Would the project cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?

The consulting firm GHD prepared a traffic study for the project (see project file), which analyzed project impacts on existing levels of service (LOS) at four key intersections, as well as how the project would contribute to future LOS after additional development occurs within Fort Bragg. The analysis looked at four intersections, namely: Highway 20 and Boatyard Drive, Highway 20 and Highway 1, Highway 1 and Ocean View Drive, and Highway 1 and the unnamed driveway to the commercial area directly southwest of the Noyo Bridge.

The traffic study indicates that the 29,500 SF retail center will generate 3,090 vehicular trips per day, with a peak AM trip rate of 76 trips, and a peak PM trip rate of 398 trips.

The project description, analyzed in the traffic study, included widening the eastbound approach at Highway 1 and Ocean View Drive to add a right turn only lane (southbound onto Highway 1). While this is part of the project description in the traffic study, it is not part of the project description submitted by the applicant. In order for the traffic study to have any relevance to the project, this right turn lane must be added to the project and be constructed as part of the

project. Indeed the author of the traffic study indicated that installation of the right turn only lane is necessary for the traffic flow to work effectively, and that is why they included it in the base case analysis.

Therefore, **Mitigation Measure 15** has been added to ensure that these improvements are completed as part of the project.

> **Mitigation Measure 15: Prior to issuance of the Building Permit, the applicant shall submit plans to the Director of Public Works for review and approval for: 1) widening the eastbound approach of Ocean View Drive (at Highway 1 and Ocean View Drive); 2) adding a right turn only lane, and; 3) completing related relocation/redesign of sidewalks and signals. The right turn only lane shall be of a length, determined by the Director of Public Works, to ensure effective queuing of traffic prior to turn movements. Prior to the final approval of the Building Permit, the Director of Public Works shall confirm that the plans for widening Ocean View Drive and adding the right turn only lane and relocating sidewalks and other infrastructure have been completed as approved by the Director of Public Works.**

Project Impact on Existing Traffic. The analysis found that the project would reduce the level of service at some intersections as shown in Table 17, page 40 of the traffic study. The report identified three intersections that would be impacted by the project such that the level of service would fall either to an LOS C or lower and these include:

1. Westbound driveway (from The Q Restaurant and adjacent businesses) for left, through and right turns at Highway 1. The level of service here would fall from an LOS D to an LOS E (for existing traffic and the project) and to an LOS F (for project plus future development).
2. Eastbound driveway (from the Cliff House Restaurant and adjacent business) for left, through and right turns at Highway 1. The level of service here would fall from an LOS D to an LOS E (for existing traffic and the project) and to an LOS F (for project plus future development).
3. Boatyard Drive and Highway 20, left (eastbound) turn onto Boatyard Drive would fall from an LOS D to an LOS E (for existing traffic and the project and for project plus future development).

Even with **Mitigation Measure 15** (installation of a right turn only lane eastbound on Ocean Drive), the impacts of this project on already underperforming driveway/highway intersections may be problematic. However, both driveways (at The Q Restaurant and the Cliff House) have alternative exits onto the signalized Ocean View Drive/Highway 1 exit, and drivers may choose to use these alternative exits more often, if the project is approved and the LOS drops to an LOS of E at these driveway intersections. Additionally, the City does not include performance measures in terms of LOS for private driveways, therefore, this impact is less than significant from a CEQA perspective. As part of the recent Riverview Subdivision, the property owner of the driveway at The Q Restaurant was required to install a right hand turn only sign at the driveway exit onto Main Street, which will eliminate much of the wait time at this driveway, as people will no longer be able to turn left (south) out of the driveway and this is the turn movement that results in a longer wait.

b) Would the project exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?

The City of Fort Bragg Coastal General Plan's Policy C-1.1 sets the level of service standard for intersections in Fort Bragg as follows.

Policy C-1.1 Level of Service Standards: Establish the following Level of Service (LOS) standards:

Signalized and All-Way-Stop Intersections Along Highway One	LOS D
Side Street Stop Sign Controlled Intersections Along Highway One (Side Street Approach)	LOS D, or LOS F if there are less than 15 vehicles/hour left turns plus through movements from the side street and the volumes do not exceed Caltrans rural peak hour signal warrant criteria levels.
Signalized and All-Way Stop Intersections Not Along Highway One	LOS C
Side Street Stop Sign Controlled Intersections Not Along Highway One (Side Street Approach)	LOS C, or LOS E if there are less than 15 vehicles/hour left turns plus through movements from the side street and the volumes do not exceed Caltrans rural peak hour signal warrant criteria levels.

- If volumes at an unsignalized intersection are increased to meet or exceed Caltrans rural peak hour signal Warrant #11 criteria levels and the intersection is operating at an unacceptable level of service, then signalization of the intersection is warranted.

According to the traffic study none of the **signalized intersections** will exceed an LOS of C after the project is constructed, even when future development is figured into the analysis.

According to the traffic study, there are no street intersections that will achieve an unacceptable level of service. There are two **non-signalized driveway intersections** (that are not regulated by the CLUDC or Policy C-1) that will achieve an LOS E with just this project (not considering future development). Additionally, the traffic study analyzed these driveway intersections and determined that they would not qualify for a signalization warrant per Caltrans requirements (see page 36 of the traffic study), and therefore signalization of this intersection is not warranted per Caltrans. As there are no performance requirements for driveway intersections in the CLUDC, the project will not result in significant impacts on Levels of Service for automobiles making turn or through movements on STREET intersections.

c) Would the project 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?

The project does not include any components that would impact air traffic patterns.

d) Would the project substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

The project does not include design features that would increase hazards.

e) Would the project result in inadequate emergency access?

The project was referred to the Fort Bragg Fire Department and no emergency access issues were identified. However, the Fire Department indicated that two hydrants should be added to the project. One should be located between Building A and Bayview Drive and the other should be located between Building B and Bayview Drive; see **Mitigation Measure 16** below.

> **Mitigation Measure 16: Prior to approval of the Building Permit, the applicant shall submit a new site plan to the Community Development Director illustrating the addition of two fire hydrants: one to be located between Building A and Bayview Drive and the other hydrant located between Building B and Bayview Drive.**

f) Would the project result in inadequate parking capacity?

The proposed project includes 99 parking spaces and complies with the City's Coastal Land Use and Development Code and so will provide sufficient parking for the proposed retail and restaurant uses.

g) Would the project conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?

The project includes a bus stop and 18 bicycle spaces and therefore does not conflict with any adopted policies, plans or programs supporting alternative transportation. The South Fort Bragg Pedestrian Access Plan includes the addition of a bicycle lane and sidewalk improvements to the west of the project area, however the applicant has only included these in the plans as a "Future Sidewalk." However, installation of this sidewalk should be completed as part of required frontage improvements for this project in order to reduce potential safety issues for pedestrians associated with pedestrian access to the site from Highway 1. The current submittal illustrates the location of the sidewalk improvement within the Caltrans right of way. Therefore, the applicant will either have to obtain an encroachment permit from Caltrans and install the sidewalk within Caltrans' right of way, or the applicant will have to redesign the project to include space for the required pedestrian improvements along the eastern edge of their property. Caltrans submitted comments on this project on October 23, 2014 and recommended as a condition of permit approval that the developer be required to construct a sidewalk along the southbound segment of Highway 1 in the project area to mitigate pedestrian traffic generated by the retail development. Caltrans noted in their letter that the embankment adjacent to southbound Highway 1 has a vertical height of 1 to 8 ft and that construction of the sidewalk adjacent to the Highway 1 shoulder may require retaining walls. Caltrans further noted that the proposed sidewalk could be constructed on top of the embankment either on the developer's property or in the Caltrans ROW. Work within the Caltrans ROW would require an encroachment permit.

With the implementation of **Mitigation Measure 17**, the impact will be reduced to a less than significant level.

> **Mitigation Measure 17: Prior to issuance of the Building Permit, the applicant shall submit a new site plan to the Community Development Director illustrating the sidewalk improvements along Highway 1 as part of this project. The sidewalk improvements will**

conform with the requirements of the South Fort Bragg Pedestrian Access Plan, which include a sidewalk of at least 6 feet in width with a 5 foot landscaped buffer between the sidewalk and the Highway 1 right of way. If the sidewalk is located within the Caltrans ROW, the applicant shall obtain an encroachment permit prior to approval of the Building Permit for the Hare Creek Center.

XVII. Utilities and Service Systems

Would the project:	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
a. Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?			X	
b. Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?			X	
c. Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?			X	
d. Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?			X	
e. Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?			X	
f. Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?			X	
g. Comply with federal, state, and local statutes and regulations related to solid waste?			X	

DISCUSSION OF IMPACTS

a) Would the project exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?

The project is a retail facility and will have limited impacts to the wastewater treatment system associated with restroom operations and disposal of liquid food waste from the grocery store and other potential tenants. The Public Works Department has indicated that the project will not have a significant impact on the wastewater treatment plant.

b) Would the project require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?

Water Analysis. The proposed project includes a 29,500 square foot stormwater catchment area (building roofs) that would fill on-site water tanks totaling 60,000 gallons. The project includes 0.36 acres of landscaped area. The project architect has estimated that the project would require 134,400 gallons of water each year for irrigation. While the majority of this irrigation load would be during summer months (May to September) and would amount to 89,000 gallons, the water catchment tanks have sufficient capacity to meet all of the watering needs due to the ability to catch small amounts of precipitation even in the summer months, which recharge the catchment tanks. Landscape watering in the wetter winter months will also come from the catchment tanks and the tanks would refill prior to the summer months when they will be drawn down. Due to the water catchment system and the use of low water use native plants, there would be no net water demand on the City's water system from landscaping watering.

The proposed retail facilities would, however, have an impact on the City's water supply. The project architect prepared a water budget for the project utilizing water use statistics for supermarkets in the Western United States from the US Department of Energy Data Book. According to this analysis the project would use **1,935,916** gallons of water per year for internal operations (restrooms, sinks, drinking fountains, etc.). This water use would consist of:

1. 960,000 gallons for a grocery store in building A,
2. 375,306 gallons per year for a generic 10,0000 SF retail use in Building B, and
3. 294,840 for three 1,800 SF generic retail spaces and 305,760 gallons for a small restaurant with 400 SF service area in Building C.

Staff analyzed current water use by two large format grocery stores in Fort Bragg and found that annual water use for these facilities was in line with that estimated by the architect. Specifically total water use was 1,797,444 gallons for a 35,360 SF grocery store (50 gallons/SF) and 2,471,392 for a 41,000 square foot grocery store (60 gallons/SF), netting an average of 55 gallons per square foot for a grocery store. If this figure is applied to the proposed 15,000 SF grocery store, it would use a total of 825,000 gallons of water per year. The other water use rates are reasonable given water use by comparable businesses within Fort Bragg.

However, given that the proposed project would not utilize water for landscaping, the actual net water use would likely be **1,935,916** gallons minus the 89,000 gallons of summer water use for landscaping, resulting in a total water use estimate of 1,846,916 gallons per year.

The proposed shopping center project can be served by existing water sources and storage as shown in the analysis below. Water availability under severe drought conditions is the primary constraint for City utility service for a project of this size. In 2010, City staff completed a water supply analysis that found that the City could increase water use by 8% over existing water use in a severe drought (such as the 1977 drought) and continue to serve all customers without falling below the 5 million gallon reserve required to maintain adequate pressure in the system for fire flows. Since that time the City has approved projects that would utilize 3.6% of the 8% of available water capacity (2.8% for North Coast Brewery Expansion, 0.6% for the Cottages at Cypress Street, 0.1% Taco Bell, and 0.1% for Brewery Restaurant expansion). At 1.8 million gallons per year, the proposed Hare Creek project would increase water use by 1% over current use, bringing the total water use, since the water analysis was completed, to 4.6%. This additional use is within the 8% limit, but leaves only 3.4% of water capacity available for other new projects. There is one priority use project, the Avalon Hotel, in the permitting pipeline at this time and water service capacity would need to be reserved for this use as required by Coastal

General Plan Policy PF -1.3 which requires that "adequate services capacity would be retained to accommodate existing, authorized, and probably priority uses upon completion." The Avalon Hotel is a proposed 64 room conference facility with a restaurant and bar north of Pudding Creek. The hotel's water budget is anticipated at 70 gallons per room per day or 1.5 million gallons of water per year. The restaurant would use an additional 300,000 gallons, bringing total water use to 1.8 million gallons for the Avalon hotel. The Avalon would also use about 1% of the remaining water serving capacity, however, this hotel could be served in addition to the Hare Creek project without running out of water service capacity.

KASL Engineering was hired to complete a water pressure analysis to determine if the project would result in water pressure issues in the vicinity of the project. The study found that even with peak water flows at the center of 16.1 gpm the proposed project would result in an insignificant difference on pressure of 0.1 psi for the existing water system. Likewise, the study found no significant difference in pressure at fire hydrants with and without the project. For hydrants with available fire flow of less than 1,600 gpm, the impact of the project on fire flow was 3 gpm. For projects with available fire flows of more than 1,500 gpm, the impact of the project on fire flow was 16 gpm. This is not a significant difference and does not require mitigation.

Sewer Analysis. Staff spoke with the Director of the Waste Water Treatment Facility, John Smith, who determined that the project would not have a significant impact on the WWTF.

The applicant will be required to pay capacity charges as part of the Building Permit process to pay for the project's fair share of past City investments in the water and sewer infrastructure.

Mitigation Measure 18: Prior to issuance of the building permit, the applicant shall pay all capacity charges associated with the project.

c) Would the project require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?

The project will result in a significant increase of impervious surfaces in this undeveloped site, including 29,511 SF of buildings and 65,790 SF of hardscape (parking lot, sidewalks, etc.). The project has been designed so that most of the stormwater that falls to the roof surfaces (29,500 SF) would be captured onsite in water storage tanks for reuse to irrigate site landscaping. The net runoff from the rooftops that will not flow into the water storage tanks is estimated at 296,000 gallons/year out of a total of 637,090 gallons/year. So in total, the stormwater capture system will result in 47% (296,000 gallons) of the stormwater that hits the building footprints running off the site. Fifty-three percent of the stormwater that falls on the rooftops will be captured and reused for landscaping, which will eventually infiltrate the site or be lost to evapotranspiration (plant sweating). The remaining stormwater will be infiltrated on site through the installation of an infiltration trench of 1,000 ft in length. The trench will be three feet deep and include an 18 inch perforated drain on top of infiltration rock. The trench will be covered with earth. An easement will need to be recorded on the adjacent parcel, the future home of the infiltration trench per **Mitigation Measure 19** below.

Mitigation Measure 19: Prior to issuance of a final on the Building permit, the applicant shall record an easement for the infiltration trench.

The parking lot and other hardscape components of the project include 7 drainage areas that total 65,790 SF of hardscape (as shown on Plan set Page G5). This impervious area will result in stormwater flow of 1,277 gallons/hour in an 85th percentile storm and 4.6 cubic feet per second in a ten year storm.

A portion of this project would drain into Drainage Area H of the City of Fort Bragg. According to the 2004 Storm Drain Master Plan the drainage ditches on both sides of Ocean View Drive need to be cleaned and re-graded. Additionally, the existing culverts on this drainage are undersized for current development. As shown on the map for Drainage Basin H in the Storm Drainage Master Plan, most of the culverts are undersized and provide for flows of 2, 7 and 3 cubic Feet per second. These culverts may be overwhelmed by the additional stormwater flows from the developed site in a ten year storm. The Master Plan recommends upgrading four culverts (H-1.0, H-1.2, H-1.4 to 30" culverts and H-1.6 to a 24" culvert). In order to reduce the impacts of the proposed project to a less than significant level on the City's storm drain system and outflow that would serve this development, **Mitigation Measure 20** shall be implemented.

Mitigation Measure 20: Prior to approval of the Building Permit, the City of Fort Bragg shall prepare a study at the applicant's expense which will determine the fair share cost to upgrade the four culverts and outfall and to re-grade the drainage ditch along Ocean View Drive if needed to accommodate additional stormwater from the site. Prior to the approval of the Building Permit, the applicant will either pay the City for the applicant's proportional share of the cost for the improvements or install the improvements.

d) Would the project have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?

As noted above in b) the project will be adequately served by existing water entitlements, sources and storage facilities.

e) Would the project result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?

The project will result in an increase in demand on wastewater treatment facilities. The Public Works Department has determined that the Wastewater Treatment Facility has adequate capacity to serve the proposed development.

f) Would the project be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?

The project will contribute to an increase in solid waste. Solid waste from the City of Fort Bragg is currently trucked to Redwood Landfill, which has sufficient capacity to handle the additional solid waste from this facility.

g) Would the project comply with federal, state, and local statutes and regulations related to solid waste?

The City of Fort Bragg has a Construction and Demolition Recycling ordinance to which the project will have to comply. Additionally, the project site plan includes designated locations for recyclables storage and handling. The State will require segregation and recycling of compostable materials by 2016, therefore the project should include a location to collect compostable materials from the restaurant, grocery store and any other facilities that would generate compostable materials. **Mitigation Measure 21** would reduce the solid waste impacts to a less than significant level.

Mitigation Measure 21: Prior to issuance of the Building Permit, the applicant shall submit a revised site plan to the Community Development Director illustrating a recycling enclosure for segregation of green and food waste (compostable materials) for both the restaurant and the grocery store.

XVIII. Mandatory Findings of Significance

	Potentially Significant Impact	Less than Significant with Mitigation Incorporated	Less than Significant Impact	No Impact
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?*		X		
b. *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 probable future projects)?*			X	
c. *Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?*			X	

DISCUSSION OF IMPACTS

With incorporation of the following 20 mitigation measures into the project, all potential impacts would be reduced to a level of less than significant.

Mitigation Measure 1: Prior to issuance of the Building Permit, the applicant shall resubmit the landscaping plan, for approval by the Community Development Director, illustrating: 1) nine Shore Pines (or coastal native tree equivalents) along the eastern edge of the proposed parking

lot; 2) local coastal trees for the remainder of the landscaping plan; 3) the plant variety proposed for the trellis shown on the eastern edge of the parcel; and 4) types and locations of climbing plants that are appropriate to the coastal environment for all trellises of the project.

Mitigation Measure 2: Prior to issuance of the Building Permit, the applicant shall revise the Project Site Plan to set back the east face of Building C by an additional 5 feet and shall submit a landscaping plan to include installation of a five foot wide vegetative area along the east face (highway facing) elevation of Building C.

Mitigation Measure 3: The rainwater catchment tank shall be of a non-reflective material in a natural and neutral tone. Prior to approval of the Building Permit, the applicant shall submit the colors for the cisterns and a mural design for the southernmost rainwater catchment tank on the east side of the property and the northernmost rainwater catchment tank on the west side of the property, for review and approval by the Director of Community Development. The mural shall depict a historic, cultural or natural theme related to the Mendocino Coast.

Mitigation Measure 4: In order to minimize dust and keep dust from leaving the project site, a dust prevention and control plan shall be submitted for approval by the City Engineer in conjunction with the Storm Water Pollution Prevention Plan (SWPPP). The dust prevention and control plan shall demonstrate that the discharge of dust from the construction site will not occur, or can be controlled to an acceptable level depending on the particular site conditions and circumstances. The plan shall include the following information and provisions:

1. The plan shall address site conditions during construction operations, after normal working hours, and during various phases of construction.
2. The plan shall include the name and the 24 hour phone number of a responsible party in case of emergency.
3. If the importing or exporting of dirt is necessary as demonstrated by the cut and fill quantities on the grading plan, the plan shall also include the procedures necessary to keep the public streets and private properties along the haul route free of dirt, dust, and other debris.
4. When an entire project is to be graded and the subsequent construction on the site is to be completed in phases, the portion of the site not under construction shall be treated with dust preventive substance or plant materials and an irrigation system.
5. Grading shall be designed and grading activities shall be scheduled to ensure that repeat grading will not be required, and that completion of the dust-generating activity (e.g., construction, paving or planting) will occur as soon as possible.
6. The area disturbed by clearing, demolition, earth-moving, excavation operations or grading shall be minimized.
7. All visibly dry disturbed soil road surfaces shall be watered to minimize fugitive dust emissions. Dust emissions shall be controlled by watering a minimum of two times each day, paving or other treatment of permanent on-site roads and construction roads, the covering of trucks carrying loads with dust content, and/or other dust-preventive measures (e.g., hydroseeding, etc.).
8. All unpaved surfaces shall have a posted speed limit of 10 miles per hour.
9. Earth or other material that has been transported by trucking or earth moving equipment, erosion by water, or other means onto paved streets shall be promptly removed.
10. Water or suitable chemicals shall be applied on materials stockpiles, and other surfaces that can give rise to airborne dusts.
11. All earthmoving activities shall cease when sustained winds exceed 20 miles per hour.

12. The operator shall take reasonable precautions to prevent the entry of unauthorized vehicles onto the site during non-work hours.

Mitigation Measure 5: Minimize Potential Disturbance of Breeding Birds through the following techniques:

1. Work Windows. Conduct as much ground disturbance and vegetation (tree and shrub) removal as is feasible between September 1 and January 15, outside of the breeding season for most bird species.
2. Preconstruction Surveys. If ground disturbance or removal of vegetation occurs between January 16 and August 31, preconstruction surveys will be performed prior to such disturbance to determine the presence and location of nesting bird species.
3. Buffers. If nests are present, establishment of temporary protective breeding season buffers will avoid direct mortality of these birds. The appropriate buffer distance is species specific and will be determined by a qualified biologist as appropriate to prevent nest abandonment and direct mortality during construction.

Mitigation Measure 6: A Native American monitor shall be present during all ground disturbing activities. Additionally the project applicant shall provide five day notice to the Sherwood Valley Band of Pomo Indians in advance of ground disturbing activities on the site so the SVBP can schedule a Native American monitor for the site. If any cultural resources are discovered during construction activities the applicant shall follow state and local laws requiring that the following actions shall be taken: 1) cease and desist from all further excavation and disturbances within 25 feet of the discovery; 2) notify the Fort Bragg Community Development Department immediately of the discovery; and 3) retain a professional archaeologist to determine appropriate action in consultation with the Sherwood Valley Band of Pomo.

Mitigation Measure 7: If human remains are identified during project construction that applicant shall follow the following procedures. All development shall cease immediately and shall not commence until so directed by the Community Development Director. The Director and county corner shall be notified immediately. The applicant shall follow the procedure defined in 17.50.030E of the Coastal Land Use and Development Code.

Mitigation Measure 8: The recommendations of the Krazen & Associates geotechnical report shall be followed for site grading, compaction and preparation of engineered fill.

Mitigation Measure 9: The Applicant shall secure all necessary permits for the proposed development from City and State agencies having jurisdiction, including a Grading Permit, NPDES Permit, Building Permit and others as required.Error! Reference source not found.

Mitigation Measure 10**:** Prior to issuance of the Building Permit, the applicant shall submit a Storm Water Pollution Prevention Plan for review and approval by the Community Development Director, that shall include measures for prevention of gasoline, oil and lubricant spills, and an action plan for clean-up of any accidental fluids or other contaminants spilled or encountered during conversion and construction activities.

Mitigation Measure 11: During construction the areas slated for bioswales will be protected from excessive grading and compaction with construction fencing. The efficacy of the bioswales will be demonstrated prior to final of the building permit, by testing the permeability of the soil with a perc test. Once the Hare Creek Center is operational, the bioswales will be inspected for

clogging at least monthly. If clogging is identified it shall be addressed immediately to ensure the effective operation of this stormwater system.

Mitigation Measure 12: The project landscaping plan shall not include any species of broom, pampas grass, gorse, or other species of invasive non-native plants, such as Monterey Cypress deemed undesirable by the City or other regulatory agency. Nor will the applicant plant any of these invasive plants on the property now or in the future.

Mitigation Measure 13: Grading and earthwork activity shall be limited to the hours of 8:00am to 5:00pm Monday through Friday.

Mitigation Measure 14: Shopping Carts at the Hare Creek Center shall include lock out technology so that the carts cannot be removed from the parking lot.

Mitigation Measure 15: Prior to issuance of the Building Permit, the applicant shall submit plans to the Director of Public Works for review and approval for: 1) widening the eastbound approach of Ocean View Drive (at Highway 1 and Ocean View Drive); 2) adding a right turn only lane, and; 3) completing related relocation/redesign of sidewalks and signals. The right turn only lane shall be of a length, determined by the Director of Public Works, to ensure effective queuing of traffic prior to turn movements. Prior to the final approval of the Building Permit, the Director of Public Works shall confirm that the plans for widening Ocean View Drive and adding the right turn only lane and relocating sidewalks and other infrastructure have been completed as approved by the Director of Public Works.

Mitigation Measure 16: Prior to approval of the Building Permit, the applicant shall submit a new site plan to the Community Development Director illustrating the addition of two fire hydrants: one to be located between Building A and Bayview Drive and the other hydrant located between Building B and Bayview Drive**.**

Mitigation Measure 17: Prior to issuance of the Building Permit, the applicant shall submit a new site plan to the Community Development Director illustrating the sidewalk improvements along Highway 1 as part of this project. The sidewalk improvements will conform with the requirements of the South Fort Bragg Pedestrian Access Plan, which include a sidewalk of at least 6 feet in width with a 5 foot landscaped buffer between the sidewalk and the Highway 1 right of way.

Mitigation Measure 18: Prior to issuance of the building permit, the applicant shall pay all capacity charges associated with the project.

Mitigation Measure 19: Prior to issuance of a final on the Building permit, the applicant shall record an easement for the infiltration trench.

Mitigation Measure 20: Prior to approval of the Building Permit, the City of Fort Bragg shall prepare a study at the applicant's expense which will determine the fair share cost to upgrade the four culverts and outfall and to re-grade the drainage ditch along Ocean View Drive if needed to accommodate additional stormwater from the site. Prior to the approval of the Building Permit, the applicant will either pay the City for the applicant's proportional share of the cost for the improvements or install the improvements.

Mitigation Measure 21: Prior to issuance of the Building Permit, the applicant shall submit a revised site plan to the Community Development Director illustrating a recycling enclosure for segregation of green and food waste (compostable materials) for both the restaurant and the grocery store.

Tables Figures and Attachments

Table 1: Building Distance From Edge of Highway 1

Table 2: GHG Emissions - Hare Creek Center

Figure 1: Project Site
Figure 2: Photographic Rendering of Project from northbound Highway 1 looking west
Figure 3: Photographic Rendering of North Building of Project from southbound Highway 1 looking west
Figure 4: Photographic Rendering of South Building of Project from Highway 1 Southbound
Figure 5: Aerial View of proposed Project Site

Attachment 1 Project Plans
Attachment 2 WRA, Coastal Act Compliance Report for Hare Creek Center, March, 2014
Attachment 3 Urbemis, *Combined Annual Emissions Report*, July 30, 2014
Attachment 4 Nolan *Associates, Groundwater Recharge and Water Balance Evaluation*, August 23, 1995
Attachment 5 Angela Liebenberg, email, July 31, 2014
Attachment 6 GHD, Hare Creek Commercial Center Project Traffic Impact Study Report, March 2014
Attachment 7 KASL Consulting Engineers. *Water Model Study for 1250 Del Mar Drive Proposed Retail Shopping Center*, Oct 2014

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HARE CREEK CENTER

Hare Creek Center Landscape Plan
Rainwater Harvest System Sizing Calculator - TWDB

Catchment Area (sq. ft.)	29,500
Monthly Indoor Demand (gals)	
Outdoor Demand (gals)	0
Water in Storage to Begin (gal)	0
Tank Size (gal)	60,000

Indoor Water Use

Water useage per person/day	0
Number of Persons in House Hold	0
Household - annual	**0**
Household - monthly	**0**

Water Usage for Landscapes

Landscape Area (acres)	0.36
Annual Water Use	0
Monthly Water Use	0
Number of Months Requiring Irrigation	
low water usage (gal/sq.ft./year)	
high water usage (gal/sq.ft./year)	
turf usage (gal/sq.ft./year)	

acre-inch per gallon 3.68266E-05

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Hare Creek Center Landscape Plan

	Indoor demand	Irrigation Cultural	Irrigation Native	Winter Discharge	Total demand	Average rainfall
January	0	2,038	647	40,000	42,685	8.50
February	0	3,286	1,042	40,000	44,329	6.81
March	0	6,282	1,992	20,000	28,274	5.44
April	0	9,651	3,061	20,000	32,712	2.76
May	0	12,438	3,945		16,384	1.37
June	0	14,560	4,618		19,178	0.59
July	0	16,598	5,265		21,863	0.08
August	0	14,622	4,638		19,260	0.15
September	0	10,774	3,417		14,192	0.63
October	0	6,989	2,217	30,000	39,206	2.36
November	0	2,954	937	30,000	33,890	5.19
December	0	1,914	607	20,000	22,521	6.86
Totals	0	**102,107**	**32,387**	**200,000**	**334,494**	**40.74**

	Winter Discharge gallons	**Winter Discharge inches**
January	40,000	4.1
February	40,000	4.1
March	20,000	2.1
April	20,000	2.1
May	0	0.0
June	0	0.0
July	0	0.0
August	0	0.0
September	0	0.0
October	30,000	3.1
November	30,000	3.1
December	20,000	2.1
		20.7

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Collection surface size	Gallons/ft^2 collection coefficient	Runoff Coefficient	Safety Factor	Rainfall collected	Surplus or deficit	End of month storage (starting with water in storage)	missed runoff
29,500	0.62	0.90	0.95	132,923	150,238	60,000	90,238
29,500	0.62	0.90	0.95	106,494	122,166	60,000	62,166
29,500	0.62	0.90	0.95	85,070	116,796	60,000	56,796
29,500	0.62	0.90	0.95	43,161	70,448	60,000	10,448
29,500	0.62	0.90	0.95	21,424	65,040	60,000	5,040
29,500	0.62	0.90	0.95	9,226	50,048	50,048	0
29,500	0.62	0.90	0.95	1,251	29,436	29,436	0
29,500	0.62	0.90	0.95	2,346	12,521	12,521	0
29,500	0.62	0.90	0.95	9,852	8,181	8,181	0
29,500	0.62	0.90	0.95	36,906	5,882	5,882	0
29,500	0.62	0.90	0.95	81,161	47,271	47,271	0
29,500	0.62	0.90	0.95	107,276	132,026	60,000	72,026
				637,090			296,715

Percent capture and used	**53%**
Percent discharge to stormwater system	**47%**
Percentage of Irrigation for Cultural Landscape	**100%**
Percentage of Irrigation for Native Landscape	**100%**

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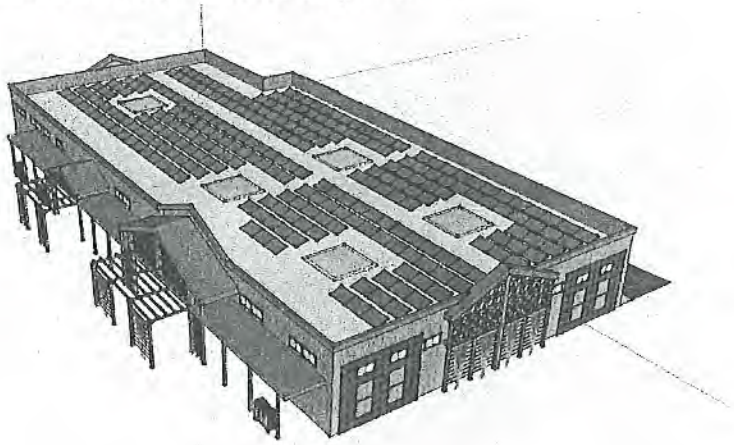
HARE CREEK CENTER

Hare Creek Photovoltaic Solar Production Estimate:

-Production estimates made using NREL PVWatts Calculator

Bldg. A (180degree azimuth):

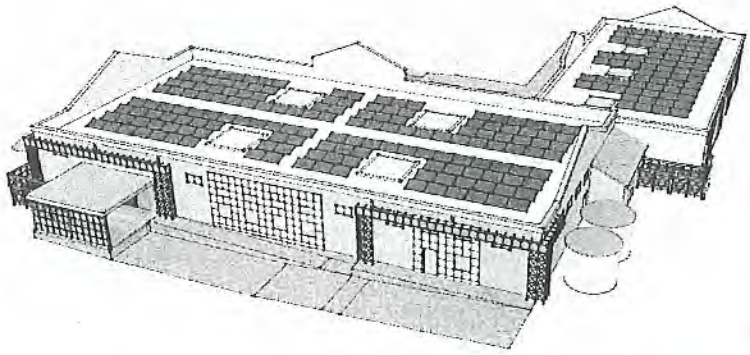
(232) Solar Modules @ 270w each = **62,640 watts DC power**



At **20 degrees tilt** on flat roof: **85,945 kWh** AC Energy per year
(**$12,559/year** value at $0.15/kWh local electricity rates)

Bldgs. B&C (180degree azimuth):

(222) Solar Modules @ 270w each = **59,940 watts DC power**



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At **20 degrees tilt** on flat roof: **82,241 kWh** AC Energy per year
(**$12,018/year** value at $0.15/kWh local electricity rates)

Total Estimated Yearly Production of Both Buildings = 168,186 kWh/year

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NREL

Caution: Photovoltaic system performance predictions calculated by PVWatts® include many inherent assumptions and uncertainties and do not reflect variations between PV technologies nor site-specific characteristics except as represented by PVWatts® inputs. For example, PV modules with better performance are not differentiated within PVWatts® from lesser performing modules. Both NREL and private companies provide more sophisticated PV modeling tools (such as the System Advisor Model at https://sam.nrel.gov) that allow for more precise and complex modeling of PV systems.

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RESULTS

82,241 kWh per Year

Month	Solar Radiation (kWh / m² / day)	AC Energy (kWh)	Energy Value ($)
January	2.79	3,708	542
February	3.25	3,785	553
March	5.28	7,032	1,028
April	6.47	8,175	1,195
May	7.45	9,639	1,409
June	7.76	9,567	1,398
July	8.03	9,980	1,458
August	7.49	9,370	1,369
September	6.22	7,533	1,101
October	4.67	6,045	883
November	2.97	3,714	543
December	2.84	3,691	539
Annual	5.43	82,241	$ 12,018

Location and Station Identification

Requested Location	95437
Weather Data Source	UKIAH MUNICIPAL AP, CALIFORNIA (TMY3)
Latitude	39.13° N
Longitude	123.2° W

PV System Specifications *(Residential)*

DC Rating	59.94 kW
DC to AC Derate Factor	0.77
Array Type	Fixed (open rack)
Array Tilt	20°
Array Azimuth	180°

Initial Economic Comparison

Average Cost of Electricity Purchased from Utility	0.15 $/kWh
Cost of Electricity Generated by System	0.22 $/kWh

These values can be compared to get an idea of the cost-effectiveness of this system. However, system costs, system financing options (including 3rd party ownership) and complex utility rates can significantly change the relative value of the PV system.

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RESULTS

85,945 kWh per Year

Month	Solar Radiation (kWh / m² / day)	AC Energy (kWh)	Energy Value ($)
January	2.79	3,875	566
February	3.25	3,956	578
March	5.28	7,348	1,074
April	6.47	8,544	1,248
May	7.45	10,074	1,472
June	7.76	9,998	1,461
July	8.03	10,429	1,524
August	7.49	9,792	1,431
September	6.22	7,873	1,150
October	4.67	6,317	923
November	2.97	3,882	567
December	2.84	3,858	564
Annual	5.43	85,945	$ 12,559

Location and Station Identification

Requested Location	95437
Weather Data Source	UKIAH MUNICIPAL AP, CALIFORNIA (TMY3)
Latitude	39.13° N
Longitude	123.2° W

PV System Specifications *(Residential)*

DC Rating	62.64 kW
DC to AC Derate Factor	0.77
Array Type	Fixed (open rack)
Array Tilt	20°
Array Azimuth	180°

Initial Economic Comparison

Average Cost of Electricity Purchased from Utility	0.15 $/kWh
Cost of Electricity Generated by System	0.22 $/kWh

These values can be compared to get an idea of the cost-effectiveness of this system. However, system costs, system financing options (including 3rd party ownership) and complex utility rates can significantly change the relative value of the PV system.

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Coastal Act Compliance Report

Hare Creek Center and Hare Creek Subdivision
Fort Bragg, Mendocino County, California

Prepared For:
Group II Commercial Real Estate, Inc.
818 Grayson Road Suite 100
Pleasant Hill, CA 94523

Contact:
Matt Richmond
richmond@wra-ca.com

Date:
March 2014

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APPENDIX B – Potential for Special-status species to occur in the Study Area
APPENDIX C – Observed Species within the Study Area
APPENDIX D – Representative Photographs of the Study Area

1.0 INTRODUCTION

On March 22, May 11, June 12, and July 11, 2012, WRA, Inc. performed an Environmentally Sensitive Habitat Area (ESHA) survey and assessment at the proposed Hare Creek Center development (Project) (APN 018-450-40) in Fort Bragg, in Mendocino County, California (Study Area, Figure 1). The proposed project (Sheet G2) also includes a lot line adjustment of APN 018-450-41 and a future subdivision of APN 018-450-41. The approximately 18.5-acre Study Area is located on California Highway 1 south of the Noyo River Bridge and immediately north of Hare Creek, immediately west of the intersection of California Highway 1 and California Highway 20. The purpose of this study was to identify and map areas within a the Study Area that are potential environmentally sensitive habitat areas (ESHA), as defined by the California Coastal Commission (CCC) and Fort Bragg Local Coastal Program (LCP).

2.0 REGULATORY BACKGROUND AND ESHA DEFINITIONS

The California Coastal Act (CCA) and Fort Bragg LCP define an ESHA as follows:

> *Environmentally sensitive habitat area' means any area in which plant or animal life or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem and which could be easily disturbed or degraded by human activities and developments.*

Additionally, the Fort Bragg LCP cites:

> *Protection of environmentally sensitive habitat areas is one of the essential aspects of the Coastal Act. Fort Bragg has several environmentally sensitive habitat areas including, but not limited to, portions of coastal bluffs, biologically rich tide pools, nesting grounds, kelp beds, wetlands, riparian habitats, and rare, threatened, or endangered plants or plant communities.*

The Fort Bragg LCP and California Coastal Commission (CCC) Guidelines contain definitions for specific types of ESHAs, including: wetlands, estuaries, streams and rivers, lakes, open coastal waters and coastal waters, riparian habitats, other resource areas, and special-status species and their habitats. For the purposes of this report, WRA has taken into consideration any areas that may meet the definition of ESHA as defined by the CCA, CCC guidelines, or the Fort Bragg LCP.

The Fort Bragg LCP outlines the following when determining an ESHA:

> *Policy OS-1.2: <u>Determination of ESHA</u>. The determination of what constitutes ESHA shall not be limited by what is mapped and not all parcels that are mapped necessarily contain ESHA. Map OS-1 serves to identify those general areas known to potentially contain ESHA and for which a biological report is required consistent with Policy OS-1.7 to substantiate the presence or absence of ESHA on any particular parcel. Any area not designated on LUP Map OS-1 that meets the ESHA definition is ESHA and shall be accorded all the protection provided for ESHA in the LCP. All habitat maps shall include a note that states that "the maps may be updated as appropriate and may not include all areas that constitute ESHA." The following areas shall be considered ESHA:*

Figure 1. Location of Study Area

Mendocino County, California

N
W E
S

0 500 1,000 2,000

Feet

wra
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Date: September 2012
Map By: Michael Rochelle
Base Source: Bing Maps

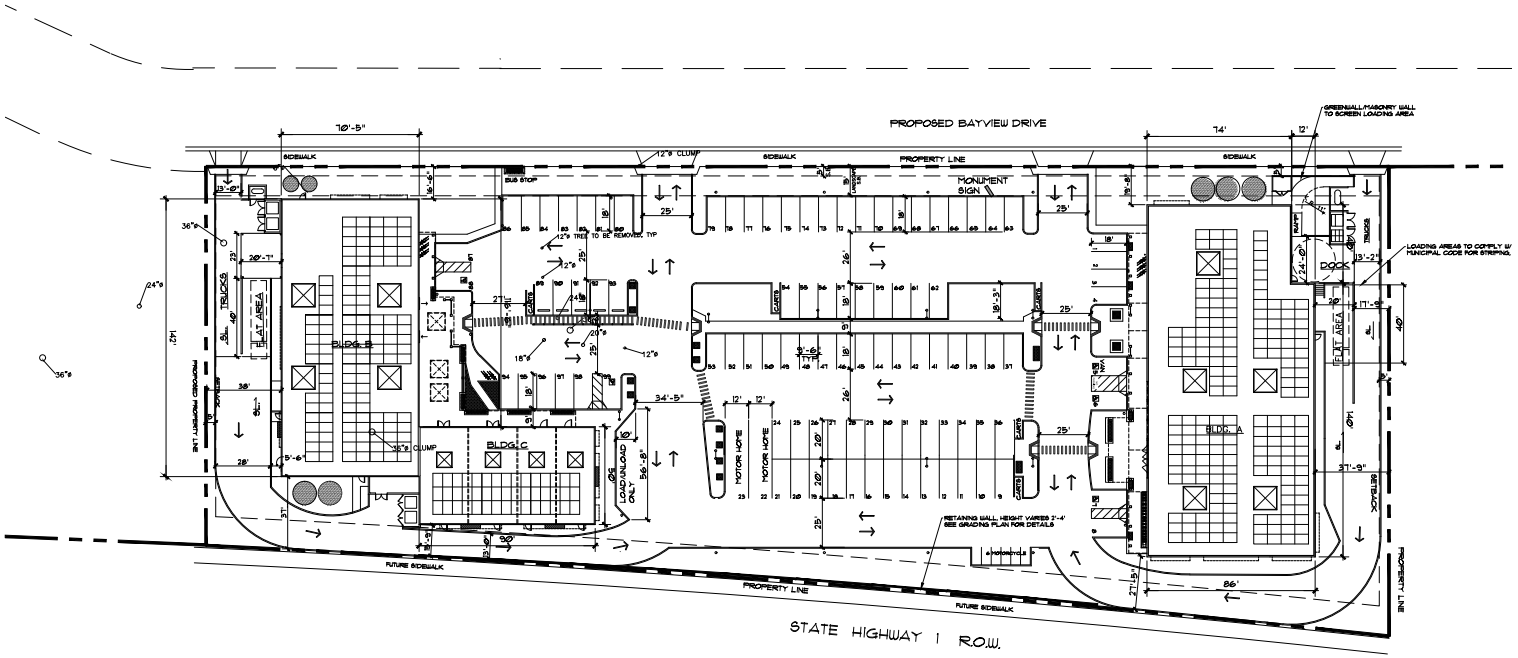
Path: L:\Acad 2000 Files\21000\21163\gis\arcmap\Location.mxd

PLAN BASED ON INFO BY
I.L.WELTY & ASSOCIATES

LEGEND:
- MONUMENT SIGN
- RAIN WATER TANK
- SINGLE LIGHT POLE
- DOUBLE LIGHT POLE
- CROSS WALK

NOTE: PARKING LOT LIGHTING TO BE LED DOWNCAST, SHIELDED "EUROTIQUE MUNICH SERIES OR EQUIVALENT. SEE ATTACHMENT FOR SPECS. SEE SHEETS A1.1-A1.3 FOR BLDG LIGHTING LOCATIONS

PARKING: 99 SPACES
REQUIRED: 99
1 SPACE FOR 300 S.F.
HANDICAP: 5 SPACES (1 VAN)
MOTORCYCLE: 6
MULTIPLE CYCLE RACKS



NORTH

SITE PLAN

SCALE: 1" = 30'

ART & ARCHITECTURE

Martha Hill
32510 Pearl Dr., Fort Bragg, CA 95437
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LEED A/P
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TITLE: SITE PLAN

PROJECT: HARE CREEK CENTER
GROUP II COMMERCIAL REAL ESTATE; INC.
1250 DEL MAR DRIVE
FORT BRAGG, CALIFORNIA
APN.# 018-450-41

DATE: 6/18/2014
SCALE: 1" = 30'
DRAWN: MGH
DWG.: A1 SITE PLAN

SHEET
A1.0
OF x SHEETS

- *Any habitat area that is rare or especially valuable because of their special nature or role in an ecosystem and is easily degraded or disturbed by human activities or developments.*
- *Any habitat area or animal species designated as rare, threatened, or endangered under State or Federal Law.*
- *Any habitat area of species designated as Fully Protected or Species of Special Concern under State law or regulations.*
- *Any habitat area of plant species for which there is compelling evidence of rarity, for example, those designated 1b (Rare or endangered in California and elsewhere) or 2 (rare, threatened or endangered in California but more common elsewhere) by the California Native Plant Society.*

Specific to land division projects, the Fort Bragg LCP contains the following policy:

Policy OS-1-11: Land Division and ESHA. Prohibit new land divisions creating new parcels located entirely within an environmentally sensitive habitat area or buffer area unless the parcel to be created is restricted at the time of its creation solely for open space, public recreation, or conservation.

The following definitions guided the assessment of potential ESHA observed in the Study Area:

2.1 Wetlands

The California Coastal Act and Fort Bragg LCP define wetlands as:

> *Wetland means lands within the Coastal Zone which may be covered periodically or permanently with shallow water and include saltwater marshes, freshwater marshes, open or closed brackish water marshes, swamps, mudflats, and fens.*
>
> Public Resources Code Section 30121

CCC Administrative Regulations (Section 13577 (b)) provide a more explicit definition:

> *Wetlands are lands where the water table is at, near, or above the land surface long enough to promote the formation of hydric soils or to support the growth of hydrophytes, and shall also include those types of wetlands where vegetation is lacking and soil is poorly developed or absent as a result of frequent or drastic fluctuations of surface water levels, wave action, water flow, turbidity or high concentrations of salt or other substance in the substrate. Such wetlands can be recognized by the presence of surface water or saturated substrate at some time during each year and their location within, or adjacent to, vegetated wetlands or deepwater habitats.*

The CCC considers this definition as requiring the observation of one diagnostic feature of a wetland, such as wetland hydrology, dominance by wetland vegetation (hydrophytes), or presence of hydric soils, as a basis for asserting jurisdiction under the CCA.

In addition to the above definition, the *Statewide Interpretive Guidelines for Identifying and Mapping Wetlands and Other Wet Environmentally Sensitive Habitat Areas* (CCC 1981) provide technical criteria for use in identifying and delineating wetlands and other ESHAs within the Coastal Zone. The technical criteria presented in the guidelines are based on the CCA

definition and indicate that wetland hydrology is the most important parameter for determining a wetland, recognizing that:

> *". . . the single feature that most wetlands share is soil or substrata that is at least periodically saturated with or covered by water, and this is the feature used to describe wetlands in the Coastal Act. The water creates severe physiological problems for all plants and animals except those that are adapted for life in water or in saturated soil, and therefore only plants adapted to these wet conditions (hydrophytes) could thrive in these wet (hydric) soils. Thus, the presence or absence of hydrophytes and hydric soils make excellent physical parameters upon which to judge the existence of wetland habitat areas for the purposes of the Coastal Act, but they are not the sole criteria."*

The Technical Criteria requires that saturation of soil in a wetland must be at or near the surface continuously for a period of time. The meaning of "at or near the surface" generally is considered to be approximately one-foot from the surface or less (the root zone), and the saturation must be continuously present for a period of time (generally more than two weeks) in order to create the necessary soil reduction (anaerobic) processes that create wetland conditions. For example, water from rain during a storm that causes saturation near the surface but then evaporates or infiltrates to 18 inches or deeper below the surface shortly after the storm does not meet the generally accepted criteria for wetland hydrology.

The presence of wetland classified plants or the presence of hydric soils (generally referred to as the "one parameter approach") can be used to identify an area as a wetland in the Coastal Zone. There is a correlation between the presence of wetland plants, wetland hydrology, and/or hydric soils occurring together, especially in natural undisturbed areas, and in many cases where one of these parameters is found (e.g., wetland plants), the other parameters will also occur. But there are situations which can result in the presence of wetland classified plants without wetland conditions, and these areas are not wetlands. Where these conditions occur, the delineation study must carefully scrutinize whether the wetland classified plants present are growing as hydrophytes, reducing (anaerobic) conditions caused by the presence of wetland hydrology, or for some other (non-wetland) reason. Examples may include wetland-classified plants which are also salt-tolerant (e.g., alkali heath) that may be responding to either wetland conditions or saline soil conditions, but not necessarily both, and deep-rooted trees (e.g., willows) which are able to tap into deep groundwater sources and can grow in dry surface soils, but are also found in wetland conditions where surface water is present.

Hydric soils can also occur in upland areas, especially in areas where historic disturbances may have exposed substratum, or in densely vegetated grasslands (Mollisols). Similarly, the delineation must determine if the hydric soil indicators are the result of frequent anaerobic conditions or of non-wetland conditions.

2.2 Riparian Habitats

The CCA and Fort Bragg LCP define riparian habitats as follows:

> *“A riparian habitat is an area of riparian vegetation. This vegetation is an association of plant species which grows adjacent to freshwater watercourses, including perennial and intermittent streams, lakes, and other bodies of freshwater.”*

The Statewide Interpretive Guidelines (CCC 1981) state:

> *"For the purpose of interpreting Coastal Act policies, another important distinction is between "wetland" and "riparian habitat." While the Service's classification system includes riparian areas as a kind of wetland, the intent of the Coastal Act was to distinguish these two areas. "Riparian habitat" in the Coastal Act refers to riparian vegetation and the animal species that require or utilize these plants. The geographic extent of a riparian habitat would be the extent of the riparian vegetation.*
>
> *. . . Unfortunately, a complete and universally acceptable definition of riparian vegetation has not yet been developed, so determining the geographic extent of such vegetation is rather difficult. The special case of determining consistent boundaries of riparian vegetation along watercourses throughout California is particularly difficult. In Southern California these boundaries are usually obvious; the riparian vegetation grows immediately adjacent to watercourses and only extends a short distance away from the watercourse. . .*
>
> *. . . For the purposes of this guideline, riparian vegetation is defined as that association of plant species which grows adjacent to freshwater watercourses, including perennial and intermittent streams, lakes, and other freshwater bodies. Riparian plant species and wetland plant species either require or tolerate a higher level of soil moisture than dryer upland vegetation, and are therefore generally considered hydrophytic. However, riparian vegetation may be distinguished from wetland vegetation by the different kinds of plant species. . ."*

The guidelines include a list of representative riparian plants that are meant to help distinguish wetland areas from riparian areas. The list includes many common riparian trees and shrubs such as willows, cottonwood, alders, and sycamores. Therefore, under the Coastal Act, riparian areas do not have to be wetlands, and are determined based primarily on vegetation and that vegetation's ability to provide habitat for animal species.

2.3 Streams, Rivers, and Anadromous Fish Habitats

The CCA and Fort Bragg LCP define Streams, Rivers and Anadromous Fish habitats as follows:

> *"A stream or a river is a natural watercourse as designated by a solid line or dash and three dots symbol shown on the United States Geological Survey map most recently published, or any well-defined channel with distinguishable bed and bank that shows evidence of having contained flowing water as indicated by scour or deposit of rock, sand, gravel, soil, or debris."*
>
> *"Freshwater streams used as migration corridor or spawning or nursery habitat by fish, such as salmon and steelhead trout, that live most of their adult lives in saltwater."*

2.4 Special-status Species

Special-status species and their habitats are defined as ESHA by the CCA and Fort Bragg LCP. Special-status species include those species that have been formally listed, are proposed as endangered or threatened, or are candidates for such listing by the U.S. Fish and Wildlife Service (USFWS) or California Department of Fish and Game (CDFG). In addition, CDFG Species of Special Concern are given special consideration under the California Environmental Quality Act (CEQA). However, these Species of Special Concern may only be protected as

ESHAs if they are ranked by CDFG as imperiled globally or in California (G2 S2 or rarer). Plant species on California Native Plant Society (CNPS) Ranks 1 or 2 are also considered special-status species and are protected as ESHA.

2.5 Other ESHA

The CCA and Fort Bragg LCP define other resource areas as follows:

> *"Other designated resource areas include: State parks and reserves, underwater parks and reserves, areas of special biological significance, natural areas, special treatment areas, fishing access points, areas of special biological importance, significant California ecosystems, and coastal marine ecosystems."*

Other resource areas considered ESHA include CDFG rare natural communities ranked as imperiled globally or in California (G2S2 or rarer), as noted in the California Natural Diversity Database (CNDDB). These communities have been classified and described by various references, including the *List of Vegetation Alliances and Associations* (CDFG 2010), Holland (1986), and Sawyer et al. (2009).

3.0 METHODS

Prior to conducting field surveys, available reference materials were reviewed, including the Soil Survey of Mendocino County, Western Part (USDA 2005), the Fort Bragg 7.5' quadrangle topographic map (USGS 1978), and available aerial photographs. Field surveys were conducted by WRA on March 22, May 11, June 12, and July 11, 2012 to identify and delineate potential ESHAs within the Study Area. The methodology of the surveys is described below. ESHA boundaries were mapped using sub-meter accuracy Global Positioning System (GPS). The following sections detail the methods utilized to delineate the potential ESHA within the Study Area; however, methods utilized for delineating ESHA that do not have the potential to occur (e.g. sand dunes in interior settings) or are not located within in the Study Area are not included herein.

3.1 Wetlands

The CCC uses a broad wetland definition, in which the presence of any one of the wetland parameters may indicate presence of a wetland. The CCC presumes that the area is a wetland if one of the wetland parameters is present. However, there may be exceptions to this presumption if there is strong positive evidence of upland conditions, as opposed to negative evidence of wetland conditions. Positive evidence of upland hydrology might be the observation that a given area saturates only ephemerally following significant rainfall, that the soil is very permeable with no confining layer, or that the land is steep and drains rapidly. Positive evidence of upland conditions should be obtained during the wet season. Based on these facts, when conducting parallel transects, this delineation study identified areas within the Study Area that had wetland plants, hydric soils, or wetland hydrology indicators.

The methodology for identifying wetland indicators followed the one described in the Regional Supplement to the Corps of Engineers Wetland Delineation Manual Western Mountains, Valleys, and Coast Region Version 2.0 (Corps 2010). This document uses several new wetland hydrology indicators not specified in the 1987 Corps Manual. The Study Area was surveyed for indicators of wetland hydrology. Positive indicators of wetland hydrology can

include direct evidence (primary indicators), such as visible inundation or saturation, surface sediment deposits, oxidized root channels, and drift lines, or indirect indicators (secondary indicators) such as algal mats, shallow restrictive layers in the soil, or vegetation meeting the FAC-neutral test. Depressions, seeps, and topographic low areas were examined for these hydrological indicators.

Soils in the Study Area were examined for hydric soil indicators according to Natural Resources Conservation Service guidelines (USDA 2010). Soils formed under wetland (anaerobic) conditions generally have a low chroma matrix color, designated 0, 1, or 2, and contain mottles or other redoximorphic features. Soil profiles were characterized by depth, color, redoximorphic features, and texture. Soil color and chroma were determined using a Munsell soil color chart (Gretag Macbeth 2000) to determine if the soils in a particular area could be considered hydric.

Plant species within potential wetlands were assigned a wetland status according to the Corps list of plant species that occur in wetlands (Lichvar and Kartesz 2009). This wetland plant classification system is based on the expected frequency of occurrence of each species in wetlands. The classification system has the following categories, which determine the frequency with which plants occur in wetlands:

OBL	Obligate, almost always found wetlands	>99% frequency
FACW	Facultative wetland, usually found in wetlands	67-99%
FAC	Facultative, equal in wetland or non-wetlands	34-67%
FACU	Facultative upland, usually found in non-wetlands	1-33%
UPL/NL	Not found in local wetlands	<1%
NI	Wetland preference unknown	

Species with OBL, FACW, and FAC classifications are considered hydrophytic vegetation. If more than 50 percent of the dominant plant species are hydrophytic, the area meets the wetland vegetation criterion and is presumed to be a jurisdictional wetland under the CCA.

Potential wetlands were assessed on June 12, 2012 in the field by Matt Richmond and Aaron Arthur, botanists with 40-hour Corps approved delineation training. All sample point data are illustrated in Figure 2, were recorded on CCC/WMVC data sheets in the field and are included in Appendix A.

3.2 Special-status Species Surveys

3.2.1 Special-status Plant Species

Potential occurrence of special-status plants in the Study Area was evaluated by first determining which special-status species occur in the vicinity of the Study Area or in similar biological communities through a literature and database search (Appendix B). A list of target plant species with potential to occur in the Study Area was generated, which guided subsequent field surveys. Special-status plant surveys were conducted by Matt Richmond and Aaron Arthur of WRA during visits on March 22, May 11, June 12, and July 11, 2012. A total of 16 survey hours were spent conducting special-status plant surveys. Additionally, 25 hours of surveys were conducted by Redwood Coast Associates in the Study Area on May 13, June 26, 2004; February 3, April 10, July 20 2006; and August 21, 2007.

Surveys were conducted by wandering transects in areas most likely to support special-status plant species. All plants were recorded and identified using the *Jepson Manual 2nd Edition* (Baldwin et al. 2012) to the level necessary to determine rarity.

3.2.2 Special-status Wildlife Species

Potential occurrence of special-status wildlife in the Study Area was evaluated by WRA by determining which special-status species occur in the vicinity of the Study Area or in similar biological communities through a literature and database search. Records from the CNDDB (CDFG 2012) and the USFWS Species list for Mendocino County (USFWS 2012) were reviewed to determine which special-status wildlife species have been documented to occur in the vicinity of the Study Area (Appendix B). A site visit was conducted by WRA wildlife biologist Jason Yakich accompanied by WRA botanists Matt Richmond and Aaron Arthur on March 22, 2012 to evaluate potentially suitable habitat characteristics for special-status species in the Study Area.

3.3 Other ESHA

The Study Area was evaluated for the presence of other ESHA as defined in the CCA and the Fort Bragg LCP, as well as natural communities designated in the CNDDB as G2 S2 or rarer (CDFG 2010). The presence of rare natural communities was determined by WRA, based on vegetation community classifications given in the *Preliminary Descriptions of the Terrestrial Natural Communities of California* (Holland 1986), the *Manual of California Vegetation 2nd Edition* (Sawyer et al. 2009), and the *List of Vegetation Alliances and Associations* (CDFG 2010).

4.0 STUDY AREA DESCRIPTION

Within a given location, physical characteristics (e.g. topography, soils, climate) and land-use history (e.g. disturbance regime, built environment) influence the distribution and composition of the biotic environment, including the potential presence of sensitive vegetation communities, wetlands and non-wetland water habitats, and special-status plant and wildlife species. Therefore, the following section is a review of the physical and land-use factors, as well as the existing vegetation types, within the Study Area necessary to assess the potential for ESHA to be present.

4.1 Land-use History

The Study Area is an approximately 18.5-acre parcel located adjacent to California Highway 1, south of the Noyo River Bridge and immediately north of Hare Creek, in the City of Fort Bragg, Mendocino County, California (Figure 1). Portions of the Study Area are minimally developed in dirt parking lots and roads; however, no structures exist in the Study Area. Land uses include short-term parking, dog-walking, community events, and recreation.

Adjacent parcels are developed, vacant lots, a Frisbee golf park, College of the Redwoods, and a vegetated cliff face of the north bank of Hare Creek. The two parcels within the Study Area are zoned Highway Visitor Commercial and High Density Residential (Fort Bragg 2008).

4.2 Topography and Soils

The Study Area is situated on an historic marine terrace between Hare Creek to the south and Noyo River to the north. The topography is relatively flat (2 to 7 percent slopes) with a small hillock in the center of the Study Area, and a slight, wooded bluff face in the southern portion that falls into Hare Creek outside of the Study Area. Elevations range from 55 to 125 above mean sea level.

The *Soil Survey of Mendocino County, Western Part* (USDA 1999) indicates that the Study Area contains three native soil types, Biaggi loam, Heeser sandy loam, and Dystropepts. These soil types are described below.

Biaggi loam, 5 to 15 percent slopes: This series consists of moderately deep loam soils of residuum weathered from sandstone and shale located on uplifted marine terraces at elevations ranging from 100 to 400 feet. These soils are considered hydric, and are well drained with very slow to medium runoff, and moderate permeability (USDA 2010, USDA 1999). Native and naturalized vegetation consists of perennial and annual grasses and forbs, and utilization is primarily for livestock grazing (USDA 1999). Biaggi loam is mapped in the center of the Study Area forming a small hillock.

A representative pedon of this series contains an A-horizon of very strongly acid (pH 5.0) very dark brown (10YR 2/2) to very dark grayish brown (10YR 3/2), when moist, loam from 0 to 23 inches depth. This is underlain by an R-horizon of hard fractured sandstone (USDA 1999). These soils have the potential to support wetlands when located in closed depressions due to their hydric rating and a relatively shallow profile to bedrock (R-horizon). Additionally, these soils have the potential to support special-status plant species and sensitive vegetation communities with an affinity for high acid environments. These soils have a high potential to support wetlands in areas of restricted flow such as narrow channels or closed depressions due to the presence of a relatively shallow depth to bedrock (approximately 23 inches).

Heeser sandy loam, 2 to 15 percent slopes: This series consists of very deep sandy loam soils of eolian sands derived from sandstone located on uplifted marine terraces at elevations ranging from 20 to 240 feet. These soils are not considered hydric, and are somewhat excessively drained with very slow to medium runoff and moderately rapid permeability (USDA 2010, USDA 1999). Native and naturalized vegetation associated with these soils include perennial and annual grasslands (USDA 1999).

A representative pedon of this series contains an A-horizon of strongly to slightly acid (pH 5.5 to 6.2) black (10YR 2/1) to very dark brown (10YR 2/2), when moist, with no redoximorphic mottling sandy loam from approximately 0 to 34 inches depth. This is underlain by an AC-horizon and C-horizon of slightly acid (pH 6.2) dark yellowish brown (10YR 3/6) sandy loam from approximately 34 to 65 inches depth (USDA 1999). Heeser sandy loam is the dominant soil type, and is mapped in the flatter portions of the Study Area. These soils have the potential to support special-status plant species and sensitive vegetation communities with an affinity for high acid environments. These soils have a very slight to moderate potential to support wetlands in areas of restricted flow due to the large texture and high porosity of the profile.

Dystropepts, 30 to 75 percent slopes: These soils are young, maturing soils derived from sandstone on marine terraces. These soils are not considered hydric, excessively drained with very slow to medium runoff and moderately rapid permeability. Representative profiles are not described; however, these soils contain substantial bedrock (C-horizon) and a poorly developed or absent B-horizon (USDA 1999). Dystropepts are mapped southern edge of the Study Area where the site falls into Hare Creek. These soils have the potential to support special-status

plant species and sensitive vegetation communities with an affinity for rocky substrate in maritime locations. The soils have the potential to support wetlands only as seep springs; however, these areas are typically extremely limited and all other wetland types have no potential due the extreme slopes.

4.3 Climate and Hydrology

The Study Area is located in the coastal fog belt of Mendocino County. Average annual precipitation for Fort Bragg is 41.25 inches, with the majority falling as rain and fog drip in the winter months (December through March). The mean daily low and high temperatures in degrees Fahrenheit range from 39.5 in December to 66.4 in August/September (USDA 2012). Monthly precipitation for Fort Bragg, at the time of the site assessment in March and July, was above normal (11.70 inches) to normal (0.16 inch) respectively, while annual precipitation was within the range of normal (36.58 inches) (Appendix A) (NOAA 2012). Therefore, observations of hydrologic conditions for wetland sampling as well as native vegetative growth were conducted in an appropriate period.

Although the Study Area experiences substantial rainfall events, evidence of surface ponding, repeated directional flow, perched water table, and/or saturated substrates for extended periods (14 days or greater) are not present. Precipitation appears to permeate vegetated areas rapidly, while most areas with impermeable surfaces (e.g. roads) eventually drain or are shunted to adjacent vegetated areas.

4.4 Vegetation

WRA mapped all vegetation communities within the Study Area (Figure 2) and recorded all plant species observed (Appendix C). The potential ESHA status of these communities and plant species is discussed in Section 5.0. Vegetation communities and dominant plant species are described below.

Non-native Grassland: This vegetation community is characteristic of non-native grassland as described in Holland (1986), and common velvet grass grassland (*Holcus lanatus* Herbaceous Alliance) as described in Sawyer et al. (2009). Coastal terrace prairies contains the highest plant species diversity of all North American grasslands (Stromberg et al. 2002); however, the grasslands within the Study Area are dominated by non-native perennial and annual grasses, and contain very little native species cover and diversity. Additionally, Kraft et al. indicate that "No sampling and analysis has been done of natural variation along the coast of middle North Coast Ranges north of Point Reyes…There are many transitional types of vegetation, but it is not clear that they meet the criteria of being true coastal terrace prairie" (Kraft et al. 2007). Non-native grassland is located throughout the Study Area with the exception of a narrow band of ruderal scrub on the southern boundary where the property slopes to Hare Creek (Figure 2).

The vertical structure of this community is very limited with scattered beach pines (*Pinus contorta* ssp. *contorta*), Bishop pine (*P. muricata*), and occasional individuals of coyote brush (*Baccharis pilularis*). The primary structure of this community is composed of herbs dominated by the perennial non-native grasses and forbs of sweet vernal grass (*Anthoxanthum odoratum*), soft chess (*Bromus hordeaceus*), rattlesnake grass (*Briza maxima*), English plantain (*Plantago lanceolata*), and wild radish (*Raphanus sativus*). Subdominants include Italian rye grass (*Festuca perennis*), silver hair grass (*Aira caryophyllea*), and common velvet grass (*Holcus lanatus*), rough cat's-ear (*Hypochaeris radicata*) and hawkbit (*Leontodon saxatilis*). Remnant native species include blue-eyed grass (*Sisyrinchium bellum*), California poppy (*Eschscholzia californica*), common yarrow (*Achillea millefolium*), Douglas iris (*Iris douglasiana*), and dwarf checkerbloom (*Sidalcea malviflora* ssp. *malviflora*).

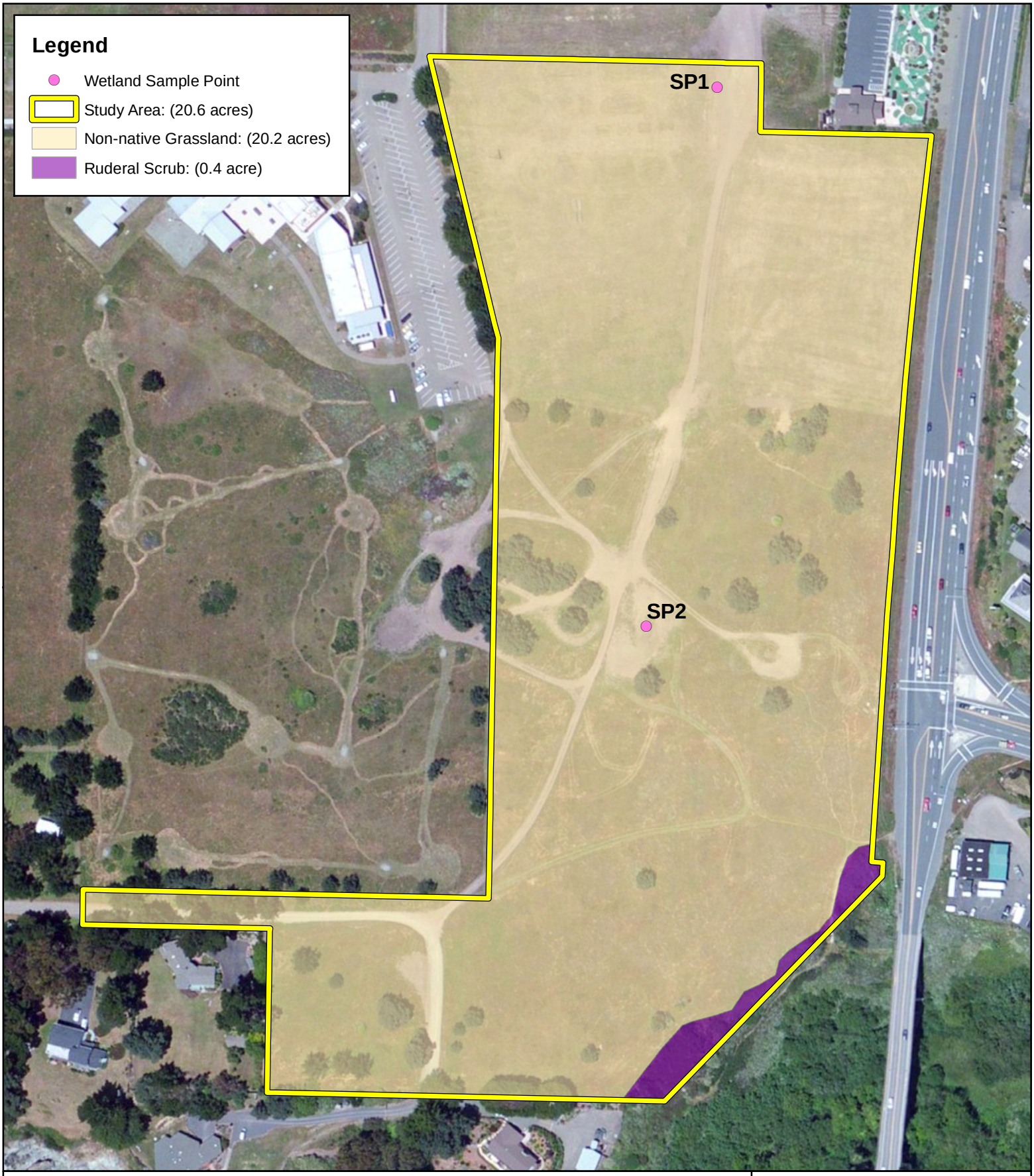

Figure 2. Vegetation Communities within the Study Area

Mendocino County, California

N
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0 100 200 400
Feet

wra
ENVIRONMENTAL CONSULTANTS

Date: February 2013
Map By: Michael Rochelle
Base Source: Bing Maps

Path: L:\Acad 2000 Files\21000\21163\gis\arcmap\VegComm.mxd

Ruderal Scrub: This vegetation community is characteristic of broom scrub as described in Holland (1986), and broom thickets (*Cytisus scoparius-Genista monspessulana* Semi-natural Shrubland Stands) as described in Sawyer et al. (2009). Areas dominated by invasive shrubs are known throughout coastal and cismontane California, particularly in areas with recent disturbance (e.g. logging roads, rural-urban interface). Within the Study Area, ruderal scrub is located in a narrow band on the southern boundary.

The vertical structure of this community is limited to three to six foot tall shrubs with minimal herbaceous understory. Dominant species include Scotch broom (*Cytisus scoparius*) and French broom (*Genista monspessulana*), with subdominant Himalayan blackberry (*Rubus armeniacus*). A few individuals of native shrubs include California coffeeberry (*Frangula californica*), red elderberry (*Sambucus racemosa*), and coyote brush. The herbaceous layer is dominated by invasive species including fennel (*Foeniculum vulgare*), poison hemlock (*Conium maculatum*), and English ivy (*Hedera helix*).

5.0 RESULTS

The Study Area is not located with Open Space and Environmentally Sensitive Habitat Areas according to Map OS-1 of the Fort Bragg Coastal General Plan Element (Fort Bragg 2008); and no ESHA were identified and mapped within the Study Area. The following sections contain a description of ESHA documented during WRA's assessments and surveys. Figure 5 illustrates all ESHA observed in the Study Area. Representative photographs of the Study Area are included in Appendix D.

5.1 Wetlands

A routine CCC/WMVC wetland delineation resulted in negative findings of features sufficient to meet the definitions of CCC/WMVC wetlands or non-wetland waters within the Study Area (Appendix A).

5.2 Other Resource Areas and Natural Communities

Although Bishop pine and beach pine trees are present in the Study Area, these trees appear to be even-age mature trees with no recruitment in the understory, very little vertical structure (i.e. no saplings or shrub layer), contain non-native herbaceous understory, are singular trees not forming a contiguous canopy, and receive periodic maintenance. Therefore, WRA mapped these areas as non-native grassland, and did not consider them a potential ESHA.

5.3 Special-status Species

5.3.1 Special-status Plant Species

Thirteen special-status plant species were determined to have a potential to occur within the Study Area; however, protocol-level surveys conducted by WRA in March, May, and July resulted in negative findings for these species. Figure 3 illustrates special-status plant species occurrences within five miles of the Study Area and Appendix B summarizes the potential for these species to occur.

The thirteen species with a potential to occur in the Study Area include Blasdale's bent grass (*Agrostis blasdalei*, Rank 1B), Point Reyes blennosperma (*Blennosperma nanum* var. *robustum*, Rank 1B), coastal bluff morning glory (*Calystegia purpurata* ssp. *saxicola,* Rank 1B), supple daisy (*Erigeron supplex*, Rank 1B), Pacific gilia (*Gilia capitata* ssp. *pacifica*, Rank 1B), white seaside tarplant (*Hemizonia congesta* ssp. *congesta,* Rank 1B), short-leaved evax (*Hesperevax sparsiflora* var. *brevifolia*, Rank 1B), Point Reyes horkelia (*Horkelia marinensis*, Rank 1B), harlequin lotus (*Hosackia gracilis*, Rank 4), coast lily (*Lilium maritimum,* Rank 1B), Wolf's evening-primrose (*Oenothera wolfii*, Rank 1B), coastal triquetrella (*Triquetrella californica*, Rank 1B), and western dog violet (*Viola adunca*, no Rank). Each was determined to have a moderate potential to occur due to the presence of grassland habitat and the vegetated cliff on the southern edge of the Study Area; however, the degree of disturbance and density of non-native species precluded any of these species from having a high potential to occur.

The remaining 35 special-status plant species documented within the greater vicinity of the Study Area have no potential or were unlikely to occur due to:

- The species has a very limited range of endemism and has not been documented in the immediate vicinity;
- Common plant species and vegetation communities associated with the species which indicate suitable, intact native habitat, are absent;
- Specific edaphic conditions, such as soils derived from serpentine or volcanic, are absent;
- Specific hydrologic conditions, such as saline perennial inundation, are absent;
- Specific pH conditions, such as alkali scalds or acidic bogs, are absent;
- The assessed area is outside of the documented elevation range of the species;
- The degree of disturbance/land management, such as herbicide treatments, soil alteration, or hydrologic alteration, precludes the presence of the species.

5.3.2 Special-status Wildlife Species

Figure 4 illustrates CNDDB occurrences for special-status wildlife species within five miles of the Study Area. These and a variety of other special-status wildlife species known from the region are listed and evaluated in Appendix B. No special-status wildlife species were observed within the Study Area during the March site visit. One of the species evaluated, the white-tailed kite (*Elanus leucurus*; CDFG Fully Protected Species), has a moderate potential to occur within the Study Area. This raptor (bird of prey) is resident in open, lowland habitats throughout much of California, and typically nests in relatively isolated trees or tree stands. While the kite may forage within the Study Area, nesting is unlikely given the habitual disturbances from frequent and intensive use by people and dogs. Kites

The other special-status wildlife species evaluated are unlikely or have no potential to occur, principally because they are associated with specific habitat types that are not present within the Study Area.

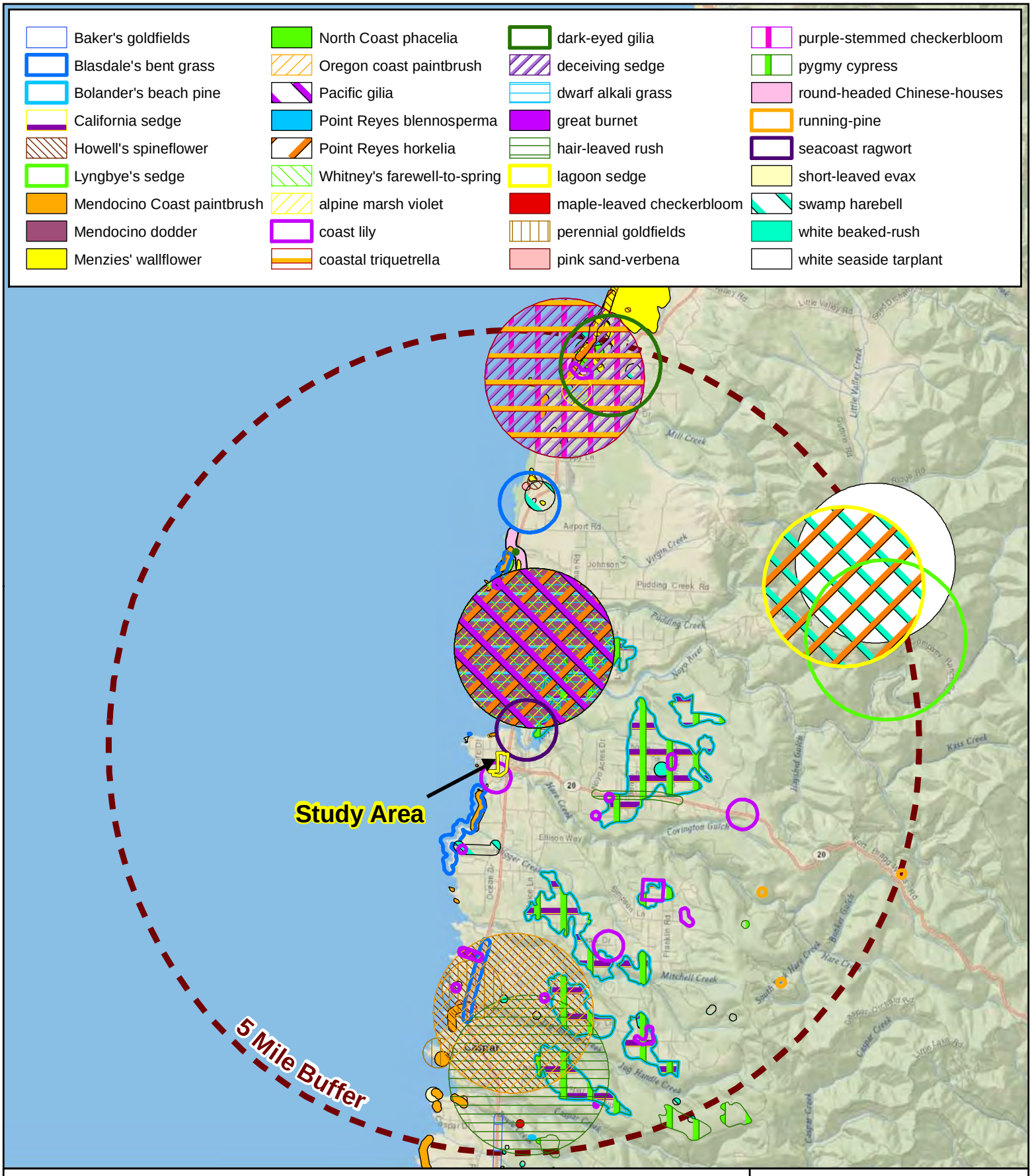

Figure 3. Special-status Plant Species within 5 Miles of the Study Area

Mendocino County, California

N
W E
S

0 0.5 1 2
Miles

wra
ENVIRONMENTAL CONSULTANTS

Date: September 2012
Map By: Michael Rochelle
Base Source: National Geographic

Path: L:\Acad 2000 Files\21000\21163\gis\arcmap\CNDDB_Plants.mxd

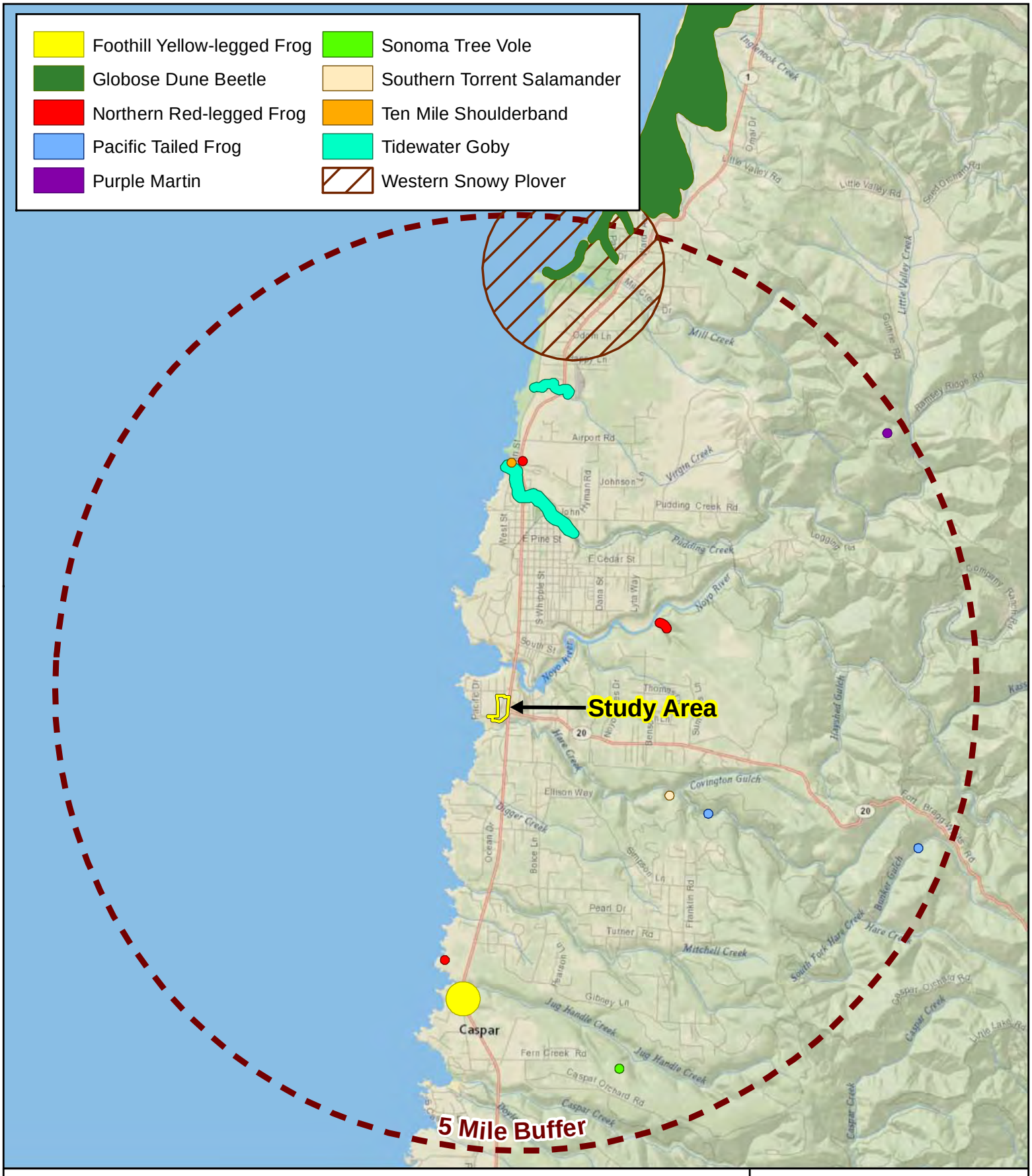

Figure 4. Special-status Wildlife Species within 5 Miles of the Study Area

Mendocino County, California

N
W E
S

0 0.5 1 2
Miles

wra
ENVIRONMENTAL CONSULTANTS

Date: September 2012
Map By: Michael Rochelle
Base Source: National Geographic

Path: L:\Acad 2000 Files\21000\21163\gis\arcmap\CNDDB_Wildlife.mxd

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APPENDIX A

CCC Wetland Delineation Data Sheets and Climate Data for Fort Bragg (Station CA3161)

California Coastal Act Wetland Data Sheet

Project Name: Hare Creek Village
City/Location: Fort Bragg, CA
Applicant/Owner: Group II
WRA Investigator(s): Matt Richmond, Aaron Arthur
Date: 6/12/2012

County: Mendocino
LCP (if applicable): Fort Bragg
☑ LRR A (Western Mts., Valley, and Coast [WMVC])
☐ LRR C (Arid West)

SAMPLE POINT ID: P1
HABITAT: Bishop pine forest (edge)

CCC/LCP WETLAND DETERMINATION

Meets CCC or LCP vegetation criteria? ☐ Yes ☑ No
Meets CCC or LCP hydric soil criteria? ☐ Yes ☑ No
Meets CCC or LCP hydrology criteria? ☐ Yes ☑ No
CCC/LCP WETLAND? ☐ Yes ☑ No

Comments: Data point was taken on compacted area along gravel road. A local water main travels underground within the vicinity.

VEGETATION

*indicator status from the USFWS 1996 National List of wetland species

TREES - Plot size:	% Cover	Status*	Dominant?
TOTAL			

50% of stratum cover = *20% =*

SAPLING/SHRUBS - Plot size: 20	% Cover	Status*	Dominant?
TOTAL			

50% of stratum cover = *20% =*

HERBACEOUS - Plot size: 10	% Cover	Status*	Dominant?
Matricaria discoidea	30	FACU	yes
Festuca perennis	20	FAC	yes
Plantago coronopus	2	FACW	no
Plantago lanceolata	2	FACU	no
Spergularia rubra	2	FAC	no
Soliva sessilis	1	FAC	no
TOTAL	57.0		2

50% of stratum cover = *28.5* *20% =* *11.4*

Dominance Test:

Total # of dominant species across all strata: 2

Total # of dominants that are hydrophytic (status of OBL, FACW, or FAC): 1

Percentage of dominants that are hydrophytic: 50%

[Meets dominance test if >50%]

Prevalence Index:

Total % cover of species across all strata:

OBL: _____ x 1 = _____
FACW: _____ x 2 = _____
FAC: _____ x 3 = _____
FACU: _____ x 4 = _____
UPL: _____ x 5 = _____

Total: _____ (A) _____ (B)

Prevalence Index (B/A) = _____

[Hydrophytic vegetation dominant if B/A ≤ 3.0]

Meets CCC or LCP hydrophytic vegetation criteria? ☐ Yes ☑ No

Comments: The sample point does not meet the hydrophytic vegetation criteria.

Project Name: Hare Creek Village Sample Point ID: P1

SOILS Slope (%): 2-3% Soil map unit: _____

SOIL PROFILE

Depth	Matrix Color	Redox Color	% and contrast	Redox type	Texture	Comments
0-14"	10YR 3/2				gravelly loam	small gravel in top 6"

All soils:
- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) *[Arid West only]*
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ **Other (explain below)**

Loamy and clayey soils only:
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9) *[Arid West only]*

Sandy soils only:
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)

Meets CCC or LCP hydric soil criteria? ☐ Yes ☑ No

Comments: Does not meet any of the NRCS hydric soil indicators

HYDROLOGY (indicators from Corps Regional Supplements, applicable to coastal California only)

Primary indicators (only 1 needed to meet criteria):
- ☐ Surface water (A1) *Depth (in.):* _____
- ☐ High water table (A2) *Depth (in.):* _____
- ☐ Soil saturation (A3) *Depth (in.):* _____
- ☐ Water marks (B1) *[if in Arid West: Nonriverine only]*
- ☐ Sediment deposits (B2) *[if in Arid West: Nonriverine only]*
- ☐ Drift deposits (B3) *[if in Arid West: Nonriverine only]*
- ☐ Algal mat or crust (B4) *[WMVC only; see B12]*
- ☐ Iron deposits (B5) *[WMVC only]*
- ☐ Surface soil cracks (B6)
- ☐ Inundation visible on aerial imagery (B7)
- ☐ Sparsely vegetated concave surface (B8) *[WMVC only]*
- ☐ Water-stained leaves (B9) *[Arid West and MLRA 5 only]*
- ☐ Salt crust (B11)
- ☐ Biotic Crust (B12) *[Arid West only; see B4]*
- ☐ Aquatic invertebrates (B13)
- ☐ Hydrogen sulfide odor (C1)
- ☐ Oxidized rhizospheres (C3)
- ☐ Presence of reduced iron (C4)
- ☐ Recent iron reduction in tilled soils (C6)
- ☐ Stunted or stressed plants (D1) *[WMVC only]*

Secondary indicators (need 2+ to meet criteria):
- ☐ Water marks (B1) *[Arid West riverine only]*
- ☐ Sediment deposits (B2) *[Arid West riverine only]*
- ☐ Drift deposits (B3) *[Arid West riverine only]*
- ☐ Water-stained leaves (B9) *[WMVC:MLRA 4B only]*
- ☐ Drainage patterns (B10)
- ☐ Dry-season water table (C2)
- ☐ Thin muck surface (C7) *[Arid West only]*
- ☐ Crayfish burrows (C8) *[Arid West only]*
- ☐ Saturation visible on aerial imagery (C9)
- ☐ Geomorphic position (D2) *[WMVC only]*
- ☐ Shallow aquitard (D3)
- ☐ Frost-heave hummocks (D4) *[WMVC only]*
- ☐ Raised ant mounds (D6) *[WMVC only]*
- ☐ **FAC-neutral test (D5)** ☐ (Does not meet test)

☐ **Other (explain below)**

Meets CCC or LCP wetland hydrology criteria? ☐ Yes ☑ N

Comments: Does not meet any of the wetland hydrology indicators.

California Coastal Act Wetland Data Sheet

Project Name: Hare Creek Village
City/Location: Fort Bragg, CA
Applicant/Owner: Group II
WRA Investigator(s): Matt Richmond, Aaron Arthur
Date: 6/12/2012

County: Mendocino
LCP (if applicable): Fort Bragg
☑ LRR A (Western Mts., Valley, and Coast [WMVC])
☐ LRR C (Arid West)

SAMPLE POINT ID: P2
HABITAT: Bishop pine forest

CCC/LCP WETLAND DETERMINATION

Meets CCC or LCP vegetation criteria? ☐ Yes ☑ No
Meets CCC or LCP hydric soil criteria? ☐ Yes ☑ No
Meets CCC or LCP hydrology criteria? ☐ Yes ☑ No
CCC/LCP WETLAND? ☐ Yes ☑ No

Comments: Data point was taken on steep hillslope in Bishop pine forest in eastern portion of the Study Area. The vegetation is not dominated by hydrophytes, and no hydric soils or evidence of primary/secondary hydrology were observed.

VEGETATION

*indicator status from the USFWS 1996 National List of wetland species

TREES - Plot size:	% Cover	Status*	Dominant?
TOTAL			

50% of stratum cover = *20% =*

SAPLING/SHRUBS - Plot size: 20	% Cover	Status*	Dominant?
Lupinus littoralis	1	NL	yes
TOTAL	1.0		1

50% of stratum cover = *0.5* *20% =* *0.2*

HERBACEOUS - Plot size: 10	% Cover	Status*	Dominant?
Plantago coronopus	60	FACW	yes
Plantago lanceolata	10	FACU	no
Briza maxima	5	NL	no
Holcus lanatus	5	FAC	no
Festuca perennis	5	FAC	no
Hypochaeris radicata	2	FACU	no
Anthoxanthum odoratum	1	FACU	no
Linum bienne	1	NL	no
Rumex acetosella	1	FACU	no
TOTAL	90.0		1

50% of stratum cover = *45.0* *20% =* *18.0*

Dominance Test:

Total # of dominant species across all strata: 2

Total # of dominants that are hydrophytic (status of OBL, FACW, or FAC): 1

Percentage of dominants that are hydrophytic: 50%

[Meets dominance test if >50%]

Prevalence Index:

Total % cover of species across all strata:

OBL: _____ x 1 = _____
FACW: _____ x 2 = _____
FAC: _____ x 3 = _____
FACU: _____ x 4 = _____
UPL: _____ x 5 = _____

Total: _____ (A) _____ (B)

Prevalence Index (B/A) = _____

[Hydrophytic vegetation dominant if B/A ≤ 3.0]

Meets CCC or LCP hydrophytic vegetation criteria? ☐ Yes ☑ No

Comments: The sample point does not meet the hydrophytic vegetation criteria.

Project Name: Hare Creek Village Sample Point ID: P2

SOILS Slope (%): 2-3% Soil map unit: _____

SOIL PROFILE

Depth	Matrix Color	Redox Color	% and contrast	Redox type	Texture	Comments
0-14"	10YR 3/2	100			gravelly sandy loam	

All soils:
- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5) *[Arid West only]*
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ **Other (explain below)**

Loamy and clayey soils only:
- ☐ Loamy Mucky Mineral (F1)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)
- ☐ Vernal Pools (F9) *[Arid West only]*

Sandy soils only:
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)

Meets CCC or LCP hydric soil criteria? ☐ Yes ☑ No

Comments: Does not meet any of the NRCS hydric soil indicators

HYDROLOGY (indicators from Corps Regional Supplements, applicable to coastal California only)

Primary indicators (only 1 needed to meet criteria):
- ☐ Surface water (A1) *Depth (in.):* _____
- ☐ High water table (A2) *Depth (in.):* _____
- ☐ Soil saturation (A3) *Depth (in.):* _____
- ☐ Water marks (B1) *[if in Arid West: Nonriverine only]*
- ☐ Sediment deposits (B2) *[if in Arid West: Nonriverine only]*
- ☐ Drift deposits (B3) *[if in Arid West: Nonriverine only]*
- ☐ Algal mat or crust (B4) *[WMVC only; see B12]*
- ☐ Iron deposits (B5) *[WMVC only]*
- ☐ Surface soil cracks (B6)
- ☐ Inundation visible on aerial imagery (B7)
- ☐ Sparsely vegetated concave surface (B8) *[WMVC only]*
- ☐ Water-stained leaves (B9) *[Arid West and MLRA 5 only]*
- ☐ Salt crust (B11)
- ☐ Biotic Crust (B12) *[Arid West only; see B4]*
- ☐ Aquatic invertebrates (B13)
- ☐ Hydrogen sulfide odor (C1)
- ☐ Oxidized rhizospheres (C3)
- ☐ Presence of reduced iron (C4)
- ☐ Recent iron reduction in tilled soils (C6)
- ☐ Stunted or stressed plants (D1) *[WMVC only]*

Secondary indicators (need 2+ to meet criteria):
- ☐ Water marks (B1) *[Arid West riverine only]*
- ☐ Sediment deposits (B2) *[Arid West riverine only]*
- ☐ Drift deposits (B3) *[Arid West riverine only]*
- ☐ Water-stained leaves (B9) *[WMVC:MLRA 4B only]*
- ☐ Drainage patterns (B10)
- ☐ Dry-season water table (C2)
- ☐ Thin muck surface (C7) *[Arid West only]*
- ☐ Crayfish burrows (C8) *[Arid West only]*
- ☐ Saturation visible on aerial imagery (C9)
- ☐ Geomorphic position (D2) *[WMVC only]*
- ☐ Shallow aquitard (D3)
- ☐ Frost-heave hummocks (D4) *[WMVC only]*
- ☐ Raised ant mounds (D6) *[WMVC only]*
- ☐ **FAC-neutral test (D5)** ☐ (Does not meet test)

☐ **Other (explain below)**

Meets CCC or LCP wetland hydrology criteria? ☐ Yes ☑ N

Comments: Does not meet any of the wetland hydrology indicators.

Table A-1. Climate Data for Fort Bragg, Mendocino County, California (Station ID# CA3161), Water Year 2012

Month / Year	Precipitation (inches)				Temperature (Fahrenheit)					
	2011-2012	Below Normal	Normal	Above Normal	2011-2012			Average		
					High	Mean	Low	High	Mean	Low
OCT 2011	6.12	1.10	2.57	3.13	71	54	37	63.7	55.0	46.2
NOV 2011	4.47	2.81	5.42	6.62	70	52	34	58.5	50.6	42.6
DEC 2011	1.48	3.60	6.45	7.86	60	46	31	55.0	47.3	39.5
JAN 2012	5.43	3.98	7.32	8.94	61	45	29	55.2	47.6	40.0
FEB 2012	2.94	4.46	6.98	8.42	65	48	30	56.5	48.8	41.0
MAR 2012	11.70	4.24	6.36	7.62	59	45	30	57.8	49.8	41.9
APR 2012	2.94	1.64	2.85	3.47	68	50	31	59.9	51.4	43.0
MAY 2012	0.52	0.55	1.59	1.94	68	53	37	62.0	53.7	45.4
JUN 2012	0.55	0.15	0.41	0.50	72	56	39	64.4	56.2	47.9
JUL 2012	0.16	0.05	0.15	0.19	71	58	44	66.2	57.8	49.5
AUG 2012	0.12	0.06	0.35	0.39	69	56	43	66.4	58.1	49.9
SEP 2012	0.15	0.17	0.78	0.92	70	55	40	66.4	57.8	49.2
TOTAL	**36.58**	**32.87**	**41.25**	**45.05**	**67**	**51**	**35**	**61.0**	**52.8**	**44.7**

APPENDIX B

Potential for Special-status Species to Occur in the Study Area

Table B-1. Special-status plant species habitat suitability and survey results for the Study Area. List compiled from California Department of Fish and Game (CDFG) Natural Diversity Database (CNDDB), California Native Plant Society (CNPS) Electronic Inventory searches (May 2012), and Consortium of California Herbaria (CCH) of the Dutchman's Knoll, Fort Bragg, Inglenook, Mathison Peak, Mendocino, and Noyo Hill USGS 7.5' quadrangles). Several additional regionally significant species are listed based on potential to occur in coastal Mendocino.

SPECIES	STATUS*	HABITAT REQUIREMENTS	POTENTIAL TO OCCUR IN STUDY AREA	SURVEY RESULTS
pink sand verbena *Abronia umbellata* var. *breviflora*	Rank 1B	Coastal dune, coastal strand; located on foredunes and interdunes with low vegetation cover. Elevation range: 0 – 35 feet. Blooms: June – October.	**No Potential.** The Study Area does not contain coastal dune or coastal strand habitat necessary to support this species.	**Not Present.** No suitable habitat present.
Blasdale's bent grass *Agrostis blasdalei*	Rank 1B	Coastal dune, coastal bluff scrub, coastal prairie; located on sandy to gravelly substrate close to rocks of bluff faces; typically located in nutrient poor areas with sparse vegetation cover. Elevation range: 15 – 490 feet. Blooms: May – July.	**Moderate Potential.** The Study Area contains grassland habitat that may support this species; however, the degree of disturbance and land-use reduces the potential presence.	**Not Present.** Rare plant surveys in May and July resulted in negative findings of this species.
pygmy manzanita *Arctostaphylos nummularia* ssp. *mendocinensis*	Rank 1B	Closed-cone coniferous forest; located acidic, sandy clay substrate in pygmy forest stands. Elevation range: 290 – 600 feet. Blooms: January.	**No Potential.** The Study Area does not contain pygmy forest habitat necessary to support this species.	**Not Present.** No suitable habitat present.
Humboldt County milk-vetch *Astragalus agnicidus*	SE; Rank 1B	Broadleaf upland forest, redwood forest; located in disturbed openings in timber lands, on south-facing aspects, and along ridgelines. Elevation range: 585 – 2600 feet. Blooms: April – September.	**No Potential.** The Study Area does not contain broadleaf upland or redwood forest habitat necessary to support this species.	**Not Present.** No suitable habitat present.

SPECIES	STATUS*	HABITAT REQUIREMENTS	POTENTIAL TO OCCUR IN STUDY AREA	SURVEY RESULTS
Point Reyes Blennosperma *Blennosperma nanum* var. *robustum*	SR; Rank 1B	Coastal prairie, coastal scrub; located on open coastal hills underlain by sandy substrate. Elevation range: 30 – 475 feet. Blooms: February – April.	**Moderate Potential.** The Study Area contains grassland habitat that may support this species; however, the degree of disturbance and land-use reduces the potential presence.	**Not Present.** Aare plant survey in March resulted in negative findings of this species.
Thurber's reed grass *Calamagrostis crassiglumis*	Rank 2	Coastal scrub, freshwater marsh; typically located in marshy swales surrounded by grasslands or coastal scrub. Elevation range: 30 – 150 feet. Blooms: May – July.	**No Potential.** The Study Area does not contain perennial wetland (marsh) habitat necessary to support this species.	**Not Present.** No suitable habitat present.
coastal bluff morning glory *Calystegia purpurata* ssp. *saxicola*	Rank 1B	Coastal dunes, coastal scrub, coastal prairie; located on coastal bluffs. Elevation range: 30 – 330 feet. Blooms: May – September.	**Moderate Potential.** The Study Area contains grassland habitat and a vegetated cliff face that may support this species; however, the degree of disturbance and density of non-native shrubs on the cliff face reduce the potential presence.	**Not Present.** Rare plant surveys in May and July resulted in negative findings of this species.
swamp harebell *Campanula californica*	Rank 1B	Bogs and fens, closed-cone coniferous forest, coastal prairie, meadows, freshwater marsh, North Coast coniferous forest; typically located in wetlands within a variety of surrounding habitats. Elevation range: 3 – 1320 feet. Blooms: June – October.	**No Potential.** The Study Area does not contain bog or marsh habitat necessary to support this species.	**Not Present.** No suitable habitat present.

SPECIES	STATUS*	HABITAT REQUIREMENTS	POTENTIAL TO OCCUR IN STUDY AREA	SURVEY RESULTS
California sedge *Carex californica*	Rank 2	Bogs and fens, closed-cone coniferous forest, coastal prairie, meadows, marshes and swamps; located in drier areas of swamps, bogs, and marsh margins. Elevation range: 290 – 1090 feet. Blooms: May – August.	**No Potential.** The Study Area does not contain bog or marsh habitat necessary to support this species.	**Not Present.** No suitable habitat present.
lagoon sedge *Carex lenticularis* var. *limnophila*	Rank 2	Bogs and fens, marshes and swamps, North Coast coniferous forest; located on lakeshores and beaches. Elevation range: 0 – 20 feet. Blooms: June – August.	**No Potential.** The Study Area does not contain bog or marsh habitat necessary to support this species.	**Not Present.** No suitable habitat present.
livid sedge *Carex livida*	Rank 1A	Bogs and fens; historically known from sphagnum bogs. Elevation range: unknown. Blooms: June.	**No Potential.** The Study Area does not contain bog habitat necessary to support this species.	**Not Present.** No suitable habitat present.
Lyngbye's sedge *Carex lyngbyei*	Rank 2	Marshes and swamps; brackish to freshwater. Elevation range: 0 – 35 feet. Blooms: April – August.	**No Potential.** The Study Area does not contain coastal brackish marsh habitat necessary to support this species.	**Not Present.** No suitable habitat present.
deceiving sedge *Carex saliniformis*	Rank 1B	Coastal prairie, coastal scrub, meadows and seeps, coastal salt marshes and swamps; located in mesic sites. Elevation range: 10 – 750 feet. Blooms: June – July.	**Unlikely.** Although the Study Area contains grassland habitat, there is no perennial wetland habitat necessary to support this species.	**Not Present.** No suitable habitat present.

SPECIES	STATUS*	HABITAT REQUIREMENTS	POTENTIAL TO OCCUR IN STUDY AREA	SURVEY RESULTS
green yellow sedge *Carex viridula* var. *viridula*	Rank 2	Bogs and fens, freshwater marshes and swamps, North Coast coniferous forest; located in mesic sites. Elevation range: 0 – 5200 feet. Blooms: June – November.	**No Potential.** The Study Area does not contain bog or perennial wetland in North Coast coniferous forest habitat necessary to support this species.	**Not Present.** No suitable habitat present.
Oregon coast paintbrush *Castilleja affinis* ssp. *littoralis*	Rank 2	Coastal bluff scrub, coastal dune, coastal scrub; located on sandy substrate. Elevation range: 45 – 325 feet. Blooms: June.	**Unlikely.** The Study Area does not contain open, partially vegetated coastal bluff habitat necessary to support this species.	**Not Present.** No suitable habitat present.
Humboldt Bay owl's-clover *Castilleja ambigua* ssp. *humboldtiensis*	Rank 1B	Coastal salt marsh; located in marshes associated with salt grass, cordgrass, pickleweed, and jaumea. Elevation range: 0 – 10 feet. Blooms: April – August.	**No Potential.** The Study Area does not contain coastal salt marsh habitat necessary to support this species.	**Not Present.** No suitable habitat present.
Mendocino Coast paintbrush *Castilleja mendocinensis*	Rank 1B	Coastal bluff scrub, coastal scrub, coastal prairie, closed-cone coniferous forest, coastal dune; typically located on open sea bluffs and cliffs. Elevation range: 0 – 520 feet. Blooms: April – August.	**Unlikely.** The Study Area does not contain open, partially vegetated coastal bluff habitat necessary to support this species.	**Not Present.** No suitable habitat present.
Howell's spineflower *Chorizanthe howellii*	FE; ST; Rank 1B	Coastal dunes, coastal prairie, coastal scrub; located on sand dunes, sandy slopes, and sandy areas in coastal prairie. Elevation range: 0 – 115 feet. Blooms: May – July.	**No Potential.** The Study Area does not contain coastal dune or coastal strand habitat necessary to support this species.	**Not Present.** No suitable habitat present.

SPECIES	STATUS*	HABITAT REQUIREMENTS	POTENTIAL TO OCCUR IN STUDY AREA	SURVEY RESULTS
Whitney's farewell-to-spring *Clarkia amoena* ssp. *whitneyi*	Rank 1B	Coastal bluff scrub, coastal scrub. Elevation range: 30 – 325 feet. Blooms: June – August.	**Unlikely.** The vegetated cliff on the edge of the Study Area contains a high density of non-native shrubs which likely precludes the presence of this species.	**Not Present.** No suitable habitat present.
round-headed Chinese houses *Collinsia corymbosa*	Rank 1B	Coastal dunes, coastal prairie. Elevation range: 0 – 65 feet. Blooms: April – June.	**No Potential.** The Study Area does not contain coastal dune or coastal strand habitat necessary to support this species.	**Not Present.** No suitable habitat present.
Oregon goldthread *Coptis laciniata*	Rank 2	North Coast coniferous forest, meadows and seeps; located in mesic sites, roadsides, and streamsides. Elevation range: 0 – 3250 feet. Blooms: March – April.	**No Potential.** The Study Area does not contain North Coast coniferous forest or forested meadow habitat necessary to support this species.	**Not Present.** No suitable habitat present.
Mendocino dodder *Cuscuta pacifica* var. *papillata*	Rank 1B	Coastal dunes; located in interdune depressions; likely hosts on lupines, catchflies, and cudweeds. Elevation range: 0 – 165 feet. Blooms: July – October.	**No Potential.** The Study Area does not contain coastal dune or coastal strand habitat necessary to support this species.	**Not Present.** No suitable habitat present.
supple daisy *Erigeron supplex*	Rank 1B	Coastal bluff scrub, coastal prairie; typically located in grassy sites along the coastline. Elevation range: 30 – 165 feet. Blooms: May – July.	**Moderate Potential.** The Study Area contains grassland habitat that may support this species; however, the degree of disturbance and land-use reduces the potential presence.	**Not Present.** Rare plant surveys in May and July resulted in negative findings of this species.

SPECIES	STATUS*	HABITAT REQUIREMENTS	POTENTIAL TO OCCUR IN STUDY AREA	SURVEY RESULTS
Menzies' wallflower *Erysimum menziesii* ssp. *menziesii*	FE; SE; Rank 1B	Coastal dune; located on stabilized and shifting dunes and coastal strand. Elevation range: 0 – 115 feet. Blooms: March – June.	**No Potential.** The Study Area does not contain coastal dune or coastal strand habitat necessary to support this species.	**Not Present.** No suitable habitat present.
Pacific gilia *Gilia capitata* ssp. *pacifica*	Rank 1B	Coastal bluff scrub, coastal prairie, valley and foothill grassland. Elevation range: 15 – 3090 feet. Blooms: April – August.	**Moderate Potential.** The Study Area contains grassland habitat that may support this species; however, the degree of disturbance and land-use reduces the potential presence.	**Not Present.** Rare plant surveys in May and July resulted in negative findings of this species.
dark-eyed gilia *Gilia millefoliata*	Rank 1B	Coastal dune. Elevation range: 5 – 100 feet. Blooms: April – July.	**No Potential.** The Study Area does not contain coastal dune or coastal strand habitat necessary to support this species.	**Not Present.** No suitable habitat present.
white seaside tarplant *Hemizonia congesta* ssp. *congesta*	Rank 1B	Coastal scrub, valley and foothill grassland; located in grassy valleys and hills, often fallow fields. Elevation range: 65 – 1820 feet. Blooms: April – November.	**Moderate Potential.** The Study Area contains grassland habitat that may support this species; however, the degree of disturbance and land-use reduces the potential presence.	**Not Present.** Rare plant surveys in May and July resulted in negative findings of this species.
short-leaved evax *Hesperevax sparsiflora* var. *brevifolia*	Rank 1B	Coastal bluff scrub, coastal dune; located on sandy bluffs and flats near the immediate coastline. Elevation range: 0 – 700 feet. Blooms: March – June.	**Moderate Potential.** The Study Area contains grassland habitat that may support this species; however, the degree of disturbance and land-use reduces the potential presence.	**Not Present.** Rare plant surveys in March and May resulted in negative findings of this species.

SPECIES	STATUS*	HABITAT REQUIREMENTS	POTENTIAL TO OCCUR IN STUDY AREA	SURVEY RESULTS
pygmy cypress *Hesperocyparis pygmaea*	Rank 1B	Closed-cone coniferous forest; located on podzol-like soils (Blacklock series). Elevation range: 100 – 1950 feet.	**No Potential.** The Study Area does not contain pygmy forest habitat necessary to support this species.	**Not Present.** No suitable habitat present.
Point Reyes horkelia *Horkelia marinensis*	Rank 1B	Coastal dunes, coastal prairie, coastal scrub; located on sandy flats and dunes near the coast; in open grassy sites within scrub. Elevation range: 15 – 1140 feet. Blooms: May – September.	**Moderate Potential.** The Study Area contains grassland habitat that may support this species; however, the degree of disturbance and land-use reduces the potential presence.	**Not Present.** Rare plant surveys in May and July resulted in negative findings of this species.
Harlequin lotus *Hosackia gracilis*	Rank 4; (butterfly host plant)	Broadleaf upland forest, coastal bluff scrub, closed-cone coniferous forest, cismontane woodland, coastal prairie, coastal scrub, meadows and seeps, marshes and swamps, North Coast coniferous forest, valley and foothill grassland; located in wetlands and along roadside, particularly ditches. Elevation range: 0 – 2275 feet. Blooms: March – July.	**Moderate Potential.** The vegetated cliff on the edge of the Study Area may support this species; however, the density of the non-native shrubs reduces the potential presence.	**Not Present.** Rare plant surveys in March, May, and July resulted in negative findings of this species.
hair-leaved rush *Juncus supiniformis*	Rank 2	Marshes and swamps, bogs and fens; located in sites near the coast. Elevation range: 65 – 325 feet. Blooms: April – June.	**No Potential.** The Study Area does not contain marsh or bog habitat necessary to support this species.	**Not Present.** No suitable habitat present.
Baker's goldfields *Lasthenia californica* ssp. *bakeri*	Rank 1B	Closed-cone coniferous forest, coastal scrub; located in openings in scrub and coastal forest habitat. Elevation range: 195 – 1690 feet. Blooms: April – October.	**Unlikely.** The Study Area does not contain intact coniferous forest or coastal scrub habitat necessary to support this species.	**Not Present.** No suitable habitat present.

SPECIES	STATUS*	HABITAT REQUIREMENTS	POTENTIAL TO OCCUR IN STUDY AREA	SURVEY RESULTS
perennial goldfields *Lasthenia californica* ssp. *macrantha*	Rank 1B	Coastal bluff scrub, coastal dune, coastal scrub. Elevation range: 15 – 1690 feet. Blooms: January – November.	**Unlikely.** The Study Area does not contain coastal dune habitat, and the vegetated cliff on the edge of the Study Area contains a density of the non-native shrubs that likely precludes the presence of this diminutive forb.	**Not Present.** No suitable habitat present.
coast lily *Lilium maritimum*	Rank 1B	Closed-cone coniferous forest, coastal prairie, coastal scrub, broadleaf upland forest, North Coast coniferous forest; typically located on sandy soils, often in raised hummocks or bogs, and roadside ditches. Elevation range: 15 – 1545 feet. Blooms: May – August.	**Moderate Potential.** The Study Area contains elements of scrub habitat that may support this species; however, the degree of disturbance and density of non-native shrubs reduces the potential presence.	**Not Present.** Rare plant surveys in May and July resulted in negative findings of this species.
northern microseris *Microseris borealis*	Rank 2	Bogs and fens, meadows and seeps, lower montane coniferous forest. Elevation range: 3250 – 6500 feet. Blooms: June – September.	**No Potential.** The Study Area does not contain montane coniferous forest, seep, or bog habitat necessary to support this species, and it is below the documented elevation range of this species.	**Not Present.** No suitable habitat present.
Wolf's evening-primrose *Oenothera wolfii*	Rank 1B	Coastal bluff scrub, coastal dune, coastal prairie, lower montane coniferous forest; located on sandy substrates in mesic sites. Elevation range: 10 – 2600 feet. Blooms: May – October.	**Moderate Potential.** The Study Area contains grassland habitat that may support this species; however, the degree of disturbance and land-use reduces the potential presence.	**Not Present.** Rare plant surveys in May and July resulted in negative findings of this species.

SPECIES	STATUS*	HABITAT REQUIREMENTS	POTENTIAL TO OCCUR IN STUDY AREA	SURVEY RESULTS
seacoast ragwort *Packera bolanderi* var. *bolanderi*	Rank 2	Coastal scrub, North Coast coniferous forest. Elevation range: 100 – 2115 feet. Blooms: January – July.	**No Potential.** This species is closely associated with forest and scrub habitats that are not present, nor were likely historically present in the Study Area.	**Not Present.** No suitable habitat present.
North Coast phacelia *Phacelia insularis* var. *continentis*	Rank 1B	Coastal bluff scrub, coastal dune; located on open maritime bluffs underlain by sandy substrate. Elevation range: 30 – 555 feet. Blooms: March – May.	**Unlikely.** The cliff face on the edge of the Study Area contains a high density of non-native shrubs that likely preclude the presence of this diminutive forb.	**Not Present.** No suitable habitat present.
Bolander's pine *Pinus contorta* ssp. *bolanderi*	Rank 1B	Closed-cone coniferous forest; located on podzol-like soils (Blacklock series), closely associated with Bishop pine and pygmy cypress. Elevation range: 240 – 815 feet.	**No Potential.** The Study Area does not contain pygmy forest habitat necessary to support this species.	**Not Present.** No suitable habitat present.
dwarf alkali grass *Puccinellia pumila*	Rank 2	Meadows and seeps, marshes and swamps; located in mineral spring meadows and coastal salt marshes. Elevation range: 1 – 35 feet. Blooms: July.	**No Potential.** The Study Area does not contain mineral spring-fed meadows or coastal salt marsh habitat necessary to support this species.	**Not Present.** No suitable habitat present.
white beaked-rush *Rhynchospora alba*	Rank 2	Bogs and fens, meadows and seeps, marshes and swamps; located in freshwater perennial wetlands and sphagnum bogs. Elevation range: 195 – 6630 feet. Blooms: July – August.	**No Potential.** The Study Area does not contain bog or freshwater marsh habitat necessary to support this species.	**Not Present.** No suitable habitat present.

SPECIES	STATUS*	HABITAT REQUIREMENTS	POTENTIAL TO OCCUR IN STUDY AREA	SURVEY RESULTS
great burnet *Sanguisorba officinalis*	Rank 2	Bogs and fens, meadows and seeps, broadleaf upland forest, marshes and swamps, North Coast coniferous forest, riparian forest; located on rocky serpentine seeps and streams. Elevation range: 195 – 4550 feet. Blooms: July – October.	**No Potential.** The Study Area does not serpentine seep or stream habitat necessary to support this species.	**Not Present.** No suitable habitat present.
purple-stemmed checkerbloom *Sidalcea malviflora* ssp. *purpurea*	Rank 1B	Broadleaf upland forest, coastal prairie. Elevation range: 45 – 280 feet. Blooms: May – June.	**Moderate Potential.** The Study Area contains grassland habitat that may support this species; however, the degree of disturbance and land-use reduces the potential presence.	**Not Present.** Rare plant surveys in May and July resulted in negative findings of this species.
Monterey clover *Trifolium trichocalyx*	FE; SE; Rank 1B	Closed-cone coniferous forest; located on poorly drained, nutrient-deficient soils with a hardpan; often in openings and burned areas. Elevation range: 95 – 780 feet. Blooms: April – June.	**No Potential.** The Study Area does not contain closed-cone coniferous forest with a podsol soils necessary to support this species.	**Not Present.** No suitable habitat present.
coastal triquetrella *Triquetrella californica*	Rank 1B	Coastal bluff scrub, coastal scrub, valley and foothill grassland; grows within 100 feet of the coastline in scrub and grasslands on open gravel substrates of roads, hillsides, bluffs, and slopes. Elevation range: 30 – 325 feet.	**Moderate Potential.** The Study Area contains grassland habitat that may support this species; however, the degree of disturbance and land-use reduces the potential presence.	**Not Present.** Rare plant surveys in March, May, and July resulted in negative findings of this species.

SPECIES	STATUS*	HABITAT REQUIREMENTS	POTENTIAL TO OCCUR IN STUDY AREA	SURVEY RESULTS
western dog violet *Viola adunca*	none; (butterfly host plant)	Streambanks, meadow-forest edges in a wide variety of forest types, coastal prairie; typically located in mesic areas. Host plant for Behren's silverspot butterfly (*Speyeria zerene behrensii*). Elevation range: 10 – 11605 feet. Blooms: April – August.	**Moderate Potential.** The Study Area contains grassland habitat that may support this species; however, the degree of disturbance and land-use reduces the potential presence.	**Not Present.** Rare plant surveys in May and July resulted in negative findings of this species.
alpine marsh violet *Viola palustris*	Rank 2	Coastal scrub, bogs and fens; located in swampy and shrubby places in coastal scrub or bog habitat. Elevation range: 0 – 490 feet. Blooms: March – August.	**No Potential.** The Study Area does not contain wetland habitat in coastal scrub habitat necessary to support this species.	**Not Present.** No suitable habitat present.

***Key to status codes:**

FE	Federal Endangered
FT	Federal Threatened
FC	Federal Candidate
FD	Federal De-listed
BCC	USFWS Birds of Conservation Concern
SE	State Endangered
SD	State Delisted
ST	State Threatened
SR	State Rare
SSC	CDFG Species of Special Concern
CFP	CDFG Fully Protected Animal
WBWG	Western Bat Working Group High or Medium Priority species
Rank 1A	CNPS Rank 1A: Plants presumed extinct in California
Rank 1B	CNPS Rank 1B: Plants rare, threatened or endangered in California and elsewhere
Rank 2	CNPS Rank 2: Plants rare, threatened, or endangered in California, but more common elsewhere

Species Evaluations:

No Potential. Habitat on and adjacent to the site is clearly unsuitable for the species requirements (cover, substrate, elevation, hydrology, plant community, site history, disturbance regime).

Unlikely. Few of the habitat components meeting the species requirements are present, and/or the majority of habitat on and adjacent to the site is unsuitable or of very poor quality. The species is not likely to be found on the site.

Moderate Potential. Some of the habitat components meeting the species requirements are present, and/or only some of the habitat on or adjacent to the site is unsuitable. The species has a moderate probability of being found on the site.

High Potential. All of the habitat components meeting the species requirements are present and/or most of the habitat on or adjacent to the site is highly suitable. The species has a high probability of being found on the site.

Present. Species was observed on the site or has been recorded (i.e. CNDDB, other reports) on the site recently.

Table B-2. Special-status wildlife species habitat suitability and survey results for the Study Area. List compiled from California Department of Fish and Game (CDFG) Natural Diversity Database (CNDDB), of the Dutchman's Knoll, Fort Bragg, Inglenook, Mathison Peak, Mendocino, and Noyo Hill USGS 7.5' quadrangles).

SPECIES	STATUS*	HABITAT REQUIREMENTS	POTENTIAL TO OCCUR IN STUDY AREA
Mammals			
Antrozous pallidus pallid bat	SSC	Found in deserts, grasslands, shrublands, woodlands, and forests. Most common in open, dry habitats with rocky areas for roosting. Roosts must protect bats from high temperatures. Very sensitive to disturbance of roosting sites.	**Unlikely.** Suitable roosting sites are not present in the Study Area, although this species may occasionally forage over the Study Area.
Aplodontia rufa nigra Point Arena mountain beaver	FE, SSC	Live in underground burrow systems with openings under vegetation, often on steep north-facing slopes or in gullies. The burrows are found in moist areas with well-drained soil.	**No Potential.** The Study Area is not within the documented range for this species.
Arborimus pomo Sonoma tree vole	SSC	Occurs in old-growth and other forests, mainly Douglas fir, redwood, and montane hardwood-conifer habitats. Feeds only on conifer leaves, almost exclusively on Douglas fir.	**Unlikely.** Suitable forested / closed-canopy habitat is not present within the Study Area.
Corynorhinus townsendii townsendii Townsend's big-eared bat	SSC, WBWG High	Primarily found in rural settings in a wide variety of habitats including oak woodlands and mixed coniferous-deciduous forest. Day roosts highly associated with caves and mines. Very sensitive to human disturbance.	**Unlikely.** Suitable roosting sites are not present, although this species may occasionally forage over the Study Area.
Eumetopias jubatus steller [northern] sea lion	FT	Breeds on Año Nuevo, San Miguel and Farallon islands, Point Saint George, and Sugarloaf. Hauls-out on islands and rocks. Needs haul-out and breeding sites with unrestricted access to water, near aquatic food supply and with no human disturbance.	**No potential.** The Study Area does not contain any coastal or marine habitat.

SPECIES	STATUS*	HABITAT REQUIREMENTS	POTENTIAL TO OCCUR IN STUDY AREA
Martes pennanti pacifica Pacific fisher	FC, SSC	Intermediate to large-tree stages of coniferous forests and deciduous-riparian areas with high percent canopy closure. Use cavities, snags, logs and rocky areas for cover and denning. Need large areas of mature, dense forest.	**No Potential.** The Study Area is not within the documented range of this species and provides no suitable coniferous forest habitat.
Myotis thysanodes fringed myotis	WBWG High Priority	Associated with a wide variety of habitats including mixed coniferous-deciduous forest and redwood groves. Buildings, mines and large snags are important day and night roosts.	**Unlikely.** Suitable roosting sites are not present, although this species may occasionally forage over the Study Area.
Myotis volans long-legged myotis	WBWG High Priority	Generally associated with woodlands and forested habitats. Large hollow trees, rock crevices and buildings are important day roosts. Other roosts include caves, mines and buildings.	**Unlikely.** Suitable roosting sites are not present, although this species may occasionally forage over the Study Area.
Phoca vitulina richardsi Pacific harbor seal	MMPA	In the San Francisco Bay region, seals have been observed as far upstream as Grizzly Island, but little regular use seems to be evident currently north of the Corte Madera marshes.	**No potential. T**he Study Area does not contain any coastal or marine habitat.
Zalophus californianus California sea lion	MMPA	Occurs from Vancouver Island, British Columbia to the southern tip of Baja California in Mexico. Breeds on offshore islands, from the Channel Islands south.	**No potential.** The Study Area does not contain any coastal or marine habitat.
Birds			
Accipiter gentilis northern goshawk	SC, SSC	Year-round resident within and on the edges of mixed and coniferous forests. Hunts medium-sized birds.	**Unlikely.** The Study Area provides no forest habitat, and this species is unlikely to occur even as a non-breeding transient.

SPECIES	STATUS*	HABITAT REQUIREMENTS	POTENTIAL TO OCCUR IN STUDY AREA
Agelaius tricolor tricolored blackbird	SSC	Resident though wanders during the non-breeding season. Highly colonial when breeding. Usually nests over or near freshwater in dense cattails, tules, or thickets of willow, blackberry, wild rose or other tall herbs.	**Unlikely.** The Study Area does not provide suitable nesting or foraging habitat (perennial cattail-bulrush-tule wetlands).
Aquila chrysaetos golden eagle	CFP	Found in rolling foothill and mountain areas, sage-juniper flats, and dessert. Cliff-walled canyons provide nesting habitat in most parts of range; also nests in large, often isolated trees.	**Unlikely.** The Study Area is too open and disturbed to provide any typical nesting or foraging habitat for this species. May rarely occur in the vicinity during dispersal or other movements.
Asio flammeus short-eared owl	SSC	Resident and winter visitor. Found in open, treeless areas (e.g. marshes, grasslands) with elevated sites for foraging perches and dense vegetation for roosting and nesting.	**Unlikely.** Although relatively open, the Study Area contains no marsh or suitable grassland habitat for this species.
Asio otus long-eared owl	SSC	Largely resident. Nests in a variety of woodland habitats, including oak and riparian. Requires adjacent open land for foraging, and the presence of old nests of other birds for nesting.	**Unlikely.** The Study Area does not contain woodland or riparian habitat for roosting or nesting. May occasionally forage over the Study Area.
Athene cunicularia hypogea western burrowing owl	SSC	Occurs in open grasslands and shrublands with sparse vegetation. Roosts and nests in mammal burrows, typically those of ground squirrels. Preys upon insects and small vertebrates.	**No Potential.** Although the Study Area contains grassland habitat, the habitat has been substantially altered and the presence of human and canine disturbance would limit this species nesting potential. Additionally, the Study Area is outside of its range per a recent monograph in Shuford and Gardali (2008).

SPECIES	STATUS*	HABITAT REQUIREMENTS	POTENTIAL TO OCCUR IN STUDY AREA
Brachyramphus marmoratus marbled murrelet	FT, SE	Coastal marine habitats for much of the year. Breeds in old-growth conifer stands (e.g. redwood, Douglas fir) containing platform-like branches along the coast.	**Unlikely.** The Study Area contains no old-growth forest, precluding the presence of this species. This species may be rarely observed flying over this site during daily forage migrations.
Buteo regalis ferruginous hawk	BCC	Winter visitor. Found in open habitats including grasslands, sagebrush flats, desert scrub and low foothills surrounding valleys.	**Unlikely.** Habitual human and canine disturbance likely preclude the presence of this species during the winter.
Chaetura vauxi Vaux's swift	SSC	Summer resident. Forages high in the air over various habitats but prefers rivers/lakes. Typically breeds in tree snags, open rock cliffs; often roosts in brick chimneys.	**Unlikely.** The Study Area contains no forest habitat and features limited tree cavities. May soar or forage over the Study Area during migration.
Charadrius alexandrinus nivosus western snowy plover	FT, SSC	Resident and winter visitor. Found on sandy beaches, salt pond levees and shores of large alkali lakes. Need sandy gravelly or friable soils for nesting.	**No Potential.** The Study Area does not contain beach, levee, or shore habitat necessary to support for this species.
Circus cyaneus northern harrier	SSC	Resident and winter visitor. Found in open grasslands, prairies, marshes and agricultural areas. Nests in dense vegetation on the ground, typically near water.	**Unlikely.** This species may forage over the Study Area, but the degree of human and canine disturbance as well as lack of tall dense vegetation likely precludes nesting and roosting opportunities.
Contopus cooperi olive-sided flycatcher	SSC	Summer resident. Breeds in montane coniferous forests, as well as mixed forests along the coast. Often associated with edge habitats.	**Unlikely.** The Study Area contains no forest or woodland habitat. May occasionally occur during migration.

SPECIES	STATUS*	HABITAT REQUIREMENTS	POTENTIAL TO OCCUR IN STUDY AREA
Cypseloides niger black swift	SSC	Summer resident. Coastal belt of Santa Cruz and Monterey County; central and southern Sierra Nevada; San Bernardino and San Jacinto Mountains. Breeds in small colonies on cliffs behind or adjacent to waterfalls, in deep canyons and sea-bluffs above surf. Forages widely.	**Unlikely.** The Study Area contains no suitable breeding habitat for this species and is outside of its breeding range per a recent monograph in Shuford and Gardali (2008). May fly over the site occasionally during migration.
Dendroica petechia yellow warbler	SSC	Summer resident. Nests in riparian stands of willows, cottonwoods, aspens, sycamores, and alders. Also nests in montane shrubbery in open conifer forests.	**Unlikely.** The Study Area contains no suitable riparian habitat for this species. May occur occasionally during migration.
Diomedea albatrus short-tailed albatross	FE, SSC	Pelagic; comes to land only when nesting. Nests on Pacific islands. Rare in the eastern Pacific.	**No potential.** This species is entirely pelagic within the coastal California region.
Elanus leucurus white-tailed kite	CFP	Resident in coastal and valley lowlands with scattered trees and large shrubs, including grasslands, marshes and agricultural areas. Preys on small diurnal mammals and other vertebrates.	**Moderate potential.** This species may forage within the Study Area. However, breeding is unlikely due to habitual human and canine disturbance.
Falco peregrinus anatum American peregrine falcon	FD, SE, CFP	Resident and winter visitor. Typically found near water, including rivers, lakes, wetlands and the ocean. Requires protected cliffs, ledges or anthropogenic structures for nesting. Forages widely, feeding on a variety of avian prey, mostly waterbirds.	**Unlikely.** The Study Area contains no cliffs or anthropogenic structures typically used for nesting. May occasionally forage over the site.
Fratercula cirrhata tufted puffin	SSC	Pelagic and coastal marine. Nests along the coast on islands, islets, or (rarely) isolated mainland cliffs. Require sod or earth into which the birds can burrow. Forages at sea, primarily for fish.	**No potential.** The Study Area contains no coastal marine habitat.
Gavia immer common loon	SSC	Winter visitor, found in estuarine and subtidal marine habitats along the coast. Also occurs on large inland water bodies.	**No potential.** The Study Area contains no suitable aquatic habitat for this species.

SPECIES	STATUS*	HABITAT REQUIREMENTS	POTENTIAL TO OCCUR IN STUDY AREA
Haliaeetus leucocephalus bald eagle	FD, SE, CFP, BCC	Primary a winter visitor, with limited breeding in the region. Requires large bodies of water, or free-flowing rivers with abundant fish adjacent snags or other perches. Nests in large, old-growth, or dominant live tree with open branchwork.	**Unlikely.** The Study Area contains no large bodies of water and thus provides no typical habitat or foraging resources for this species. May occasionally fly over the area.
Histrionicus histrionicus harlequin duck	SSC	Winter visitor to marine waters along the coast; breeds inland along streams in the northern Sierra Nevada.	**No Potential.** The Study Area contains no coastal marine habitat.
Lanius ludovicianus loggerhead shrike	SSC	Resident in open habitats with scattered shrubs, trees, posts, etc. from which to forage for large insects and small vertebrates. Nest well concealed above ground in densely-foliaged shrub or tree.	**No Potential.** Although open, the Study Area is outside of its range per a recent monograph in Shuford and Gardali (2008).
Melanerpes lewis Lewis's woodpecker	BCC	Winter visitor, occurring in oak savannahs and various open woodland habitats. Often associated with recently-burned areas.	**No Potential.** The Study Area does not contain woodland or savannah habitat to support this species.
Numenius americanus long-billed curlew	BCC	Winter visitor. Winters in large coastal estuaries, upland herbaceous areas, and croplands. Breeds in northeastern California in wet meadow habitat.	**Unlikely.** Though Study Area provides potentially suitable upland foraging habitat, this is species is unlikely to have more than an incidental presence due to habitual human and canine disturbance.
Oceanodroma homochroa ashy storm petrel	SSC	Pelagic and coastal marine. Breeds on the Farallon Islands off of the San Francisco/Marin Coast.	**No Potential.** The Study Area contains no pelagic or coastal marine habitat.
Pelecanus occidentalis californicus California brown pelican	FE, SE, CFP	Winter/non-breeding visitor to estuarine, marine subtidal, and marine pelagic waters along the coast. Nests on offshore islands of southern California.	**Unlikley.** The Study Area contains no coastal marine habitat. May occasionally soar over the Study Area.

SPECIES	STATUS*	HABITAT REQUIREMENTS	POTENTIAL TO OCCUR IN STUDY AREA
Progne subis purple martin	SSC	Summer resident. In northwestern California, typically breeds in coniferous forest and woodlands. Nest in tree cavities, usually high off the ground, and in the cavities of human-made structures (e.g. bridges, utility poles).	**Unlikely.** The Study Area does not contain coniferous forest habitat to support this species. May occasionally fly over the Study Area during migration.
Riparia riparia bank swallow	ST	Summer resident in lowland habitats in western California. Nests in areas with vertical cliffs and bands with fine-textured or sandy soils in which to burrow, typically riparian areas or coastal cliffs.	**No Potential.** The Study Area provides no suitable nesting habitat and is outside of this species' known breeding range in the state.
Selasphorus rufus rufous hummingbird	BCC	Summer resident in northwestern California. Breeds in a wide variety of habitats that provide nectar-producing flowers. Occurs widely throughout most of the state during migration.	**Unlikely.** The Study Area is south of this species' breeding range. May occur occasionally during migration.
Selasphorus sasin Allen's hummingbird	BCC	Summer resident along the California coast. Breeds in a wide variety of habitats that provide nectar-producing flowers, including parks and gardens. Migration generally limited to the coastal zone.	**Unlikely.** The Study Area has limited nectar sources**,** and this conspicuous species was not observed during the site visit. May occur occasionally during migration.
Strix occidentalis caurina northern spotted owl	FT, SSC	Resident. Typically occurs in large patches of old-growth coniferous forest. Prefers dense, structurally complex canopies with large trees for foraging and roosting. Nests on horizontal substrates in dense canopy, e.g. large cavities and broken tree tops.	**No Potential.** The Study Area does not contain old-growth coniferous forest necessary to support this species' nesting and foraging requirements.
Synthliborampus hypoleucus Xantus's murrelet	ST	Pelagic and coastal marine. Breads on offshore islands of southern California. Strays to northern California at sea during the non-breeding season.	**No Potential.** The Study Area contains no pelagic or coastal marine habitat.

SPECIES	STATUS*	HABITAT REQUIREMENTS	POTENTIAL TO OCCUR IN STUDY AREA
Reptiles and Amphibians			
Actinemys marmorata Pacific pond turtle	SSC	Occurs in perennial ponds, lakes, rivers and streams with suitable basking habitat (mud banks, mats of floating vegetation, partially submerged logs) and submerged shelter.	**No potential.** The Study Area does not contain suitable aquatic habitat necessary to support this species.
Ascaphus truei Pacific tailed frog	SSC	Permanent streams of low temperature in forested areas of high precipitation(>=100cm).	**No potential.** The Study Area does not contain stream habitat to support this species.
Rana aurora northern red-legged frog	SSC	Associated with quiet perennial to intermittent ponds, stream pools and wetlands. Prefers shorelines with extensive vegetation. Documented to disperse through upland habitats after rains.	**Unlikely.** The Study Area does not contain any suitable aquatic habitat for this species, and does not like within a logical dispersal corridor.
Rana boylii foothill yellow-legged frog	SSC	Found in or near rocky streams in a variety of habitats. Feed on both aquatic and terrestrial invertebrates.	**No potential.** The Study Area does not contain suitable stream habitat for this species.
Rhyacotriton variegatus southern torrent salamander	SSC	Cold, permanent seeps and small streams with rocky substrate.	**No potential.** The Study Area does not contain suitable stream habitat for this species.
Fish			
Tidewater Goby *Eucyclogobius newberryi*	FE, SSC	Brackish water habitats along the California coast from Agua Hedionda Lagoon, San Diego County to the mouth of the Smith River. Found in shallow lagoons and lower stream reaches. Requires fairly still but not stagnant water and high oxygen levels.	**No Potential.** The Study Area does not contain stream, river, marine, or estuarine habitat.

SPECIES	STATUS*	HABITAT REQUIREMENTS	POTENTIAL TO OCCUR IN STUDY AREA
Chinook Salmon - CA Coast ESU *Oncorhynchus tshawytscha*	FT, RP, NMFS	The California Coastal (CC) Chinook salmon ESU includes all naturally spawned populations of Chinook salmon from rivers and streams south of the Klamath River (exclusive) to the Russian River (inclusive). Adult numbers depend on pool depth and volume, amount of cover, and proximity to gravel. Water temps great than 27 degrees Celsius lethal to adults.	**No Potential.** The Study Area does not contain stream, river, marine, or estuarine habitat.
Steelhead - Northern CA ESU *Oncorhynchus mykiss*	FT, NMFS, SSC	The federal designation refers populations occurring below impassable barriers in coastal basins from Redwood Creek to, and including, the Gualala River. Adults migrate upstream to spawn in cool, clear, well-oxygenated streams. Juveniles remain in fresh water for 1 or more years before migrating downstream to the ocean.	**No Potential.** The Study Area does not contain stream, river, marine, or estuarine habitat.
Invertebrates			
Danaus plexippus monarch butterfly	None (winter roosts monitored by CDFG)	Winter roost sites located in wind-protected tree groves (typically eucalyptus, Monterey pine or Monterey cypress), with nectar and water sources nearby. Individual butterflies occur widely.	**Unlikely.** While individual monarchs may pass through the Study Area, typical habitat for communal roosting is not present.
Lycaiedes argyrognomon lotis Iotis blue butterfly	FE	Known from sphagum-willow bogs in association with Bishop pine, pygmy forests and similar habitats. *Lotus formosissimus* is the suspected host plant.	**Unlikely.** The suspected host plant has not been identified within the Study Area, and this species has not been observed anywhere since 1994.

SPECIES	STATUS*	HABITAT REQUIREMENTS	POTENTIAL TO OCCUR IN STUDY AREA
Speyeria zerene behrensii Behren's silverspot butterfly	FE	Inhabits coastal terrace prairie habitat. Host plant is *Viola sp.*	**Unlikely.** The Study Area does not contain intact coastal terrace prairie habitat dominated by native plant species, and the host plant was not observed during protocol-level rare plant surveys.

*** Key to status codes:**

FE	Federal Endangered
FT	Federal Threatened
FC	Federal Candidate
FD	Federal De-listed
BCC	USFWS Birds of Conservation Concern
SE	State Endangered
SD	State Delisted
ST	State Threatened
SR	State Rare
SSC	CDFG Species of Special Concern
CFP	CDFG Fully Protected Animal
WBWG	Western Bat Working Group High or Medium Priority species
Rank 1A	CNPS Rank 1A: Plants presumed extinct in California
Rank 1B	CNPS Rank 1B: Plants rare, threatened or endangered in California and elsewhere
Rank 2	CNPS Rank 2: Plants rare, threatened, or endangered in California, but more common elsewhere

Species Evaluations:

No Potential. Habitat on and adjacent to the site is clearly unsuitable for the species requirements (cover, substrate, elevation, hydrology, plant community, site history, disturbance regime).

Unlikely. Few of the habitat components meeting the species requirements are present, and/or the majority of habitat on and adjacent to the site is unsuitable or of very poor quality. The species is not likely to be found on the site.

Moderate Potential. Some of the habitat components meeting the species requirements are present, and/or only some of the habitat on or adjacent to the site is unsuitable. The species has a moderate probability of being found on the site.

High Potential. All of the habitat components meeting the species requirements are present and/or most of the habitat on or adjacent to the site is highly suitable. The species has a high probability of being found on the site.

Present. Species was observed on the site or has been recorded (i.e. CNDDB, other reports) on the site recently.

APPENDIX C

Species Observed in the Study Area

Table C-1. Plant species observed in the Project Area, March 22, May 11, June 12, and July 11, 2012

Family	Scientific name	Common name	Life form	Origin	Rare Status[1]	Invasive Status[2]	Wetland indicator[3]
Adoxaceae	*Sambucus racemosa*	red elderberry	deciduous shrub	native	--	--	FACU
Alliaceae	*Allium triquetrum*	three-corner leek	perennial forb	non-native	--	assessed	NL
Anacardiaceae	*Toxicodendron diversilobum*	poison oak	deciduous shrub	native	--	--	NL
Apiaceae	*Conium maculatum*	poison hemlock	perennial forb	non-native	--	moderate	FAC
Apiaceae	*Daucus carota*	wild carrot	perennial forb	non-native	--	assessed	FACU
Apiaceae	*Daucus pusillus*	American wild carrot	annual forb	native	--	--	NL
Apiaceae	*Foeniculum vulgare*	fennel	perennial forb	non-native	--	high	NL
Apocynaceae	*Vinca major*	big-leaf periwinkle	perennial forb	non-native	--	--	NL
Aquifoliaceae	*Ilex aquifolium*	English holly	evergreen tree	non-native	--	moderate	NL
Araliaceae	*Hedera helix*	English ivy	evergreen vine	non-native	--	high	NL
Asteraceae	*Achillea millefolium*	common yarrow	perennial forb	native	--	--	FACU
Asteraceae	*Anaphalis margaritacea*	pearly everlasting	perennial forb	native	--	--	NL
Asteraceae	*Anthemis cotula*	stinking chamomile	annual forb	non-native	--	assessed	FACU
Asteraceae	*Baccharis pilularis*	coyote brush	evergreen shrub	native	--	--	NL
Asteraceae	*Bellis perennis*	English lawn daisy	perennial forb	non-native	--	assessed	NL
Asteraceae	*Carduus pycnocephalus*	Italian thistle	annual forb	non-native	--	moderate	NL
Asteraceae	*Cirsium quercetorum*	brownie thistle	perennial forb	native	--	--	NL
Asteraceae	*Cirsium vulgare*	bull thistle	perennial forb	non-native	--	moderate	FACU
Asteraceae	*Helenium bolanderi*	Bolander's sneezeweed	perennial forb	native	--	--	FACW
Asteraceae	*Helminthotheca echioides*	bristly ox-tongue	perennial forb	non-native	--	limited	FAC
Asteraceae	*Hypochaeris glabra*	smooth cat's-ear	annual forb	non-native	--	limited	NL
Asteraceae	*Hypochaeris radicata*	rough cat's-ear	perennial forb	non-native	--	moderate	FACU
Asteraceae	*Leontodon saxatilis*	hawkbit	annual forb	non-native	--	--	FACU
Asteraceae	*Leucanthemum vulgare*	ox-eye daisy	perennial forb	non-native	--	moderate	FACU
Asteraceae	*Madia sativa*	coast tarweed	annual forb	native	--	--	NL
Asteraceae	*Matricaria discoidea*	pineapple weed	annual forb	non-native	--	--	FACU
Asteraceae	*Pseudognaphalium luteoalbum*	Jersey cudweed	annual forb	non-native	--	--	FACW
Asteraceae	*Pseudognaphalium stramineum*	cotton-batting plant	perennial forb	native	--	--	FAC

Family	Scientific name	Common name	Life form	Origin	Rare Status[1]	Invasive Status[2]	Wetland indicator[3]
Asteraceae	*Senecio jacobaea*	stinking Willie	perennial forb	non-native	--	limited	FACU
Asteraceae	*Senecio minimus*	coastal burnweed	annual forb	non-native	--	moderate	NL
Asteraceae	*Senecio sylvaticus*	woodland ragwort	annual forb	non-native	--	--	FACU
Asteraceae	*Soliva sessilis*	burweed	annual forb	non-native	--	--	FAC
Asteraceae	*Sonchus asper* ssp. *asper*	prickly sow thistle	annual forb	non-native	--	assessed	FACU
Asteraceae	*Sonchus oleraceus*	common sow thistle	annual forb	non-native	--	--	NL
Asteraceae	*Symphyotrichum chilense*	Pacific aster	perennial forb	native	--	--	FAC
Asteraceae	*Taraxacum officinale*	common dandelion	perennial forb	non-native	--	assessed	FACU
Betulaceae	*Alnus rubra*	red alder	deciduous tree	native	--	--	FAC
Brassicaceae	*Brassica nigra*	black mustard	annual forb	non-native	--	moderate	NL
Brassicaceae	*Brassica oleracea*	cabbage	annual forb	non-native	--	--	NL
Brassicaceae	*Brassica rapa*	field mustard	annual forb	non-native	--	limited	FACU
Brassicaceae	*Raphanus raphanistrum*	wild radish	perennial forb	non-native	--	--	NL
Brassicaceae	*Raphanus sativus*	wild radish	perennial forb	non-native	--	limited	NL
Caryophyllaceae	*Cerastium arvense*	field chickweed	perennial forb	native	--	--	NL
Caryophyllaceae	*Spergularia media*	coast sandspurry	annual forb	non-native	--	--	NL
Caryophyllaceae	*Spergularia rubra*	red sandspurry	perennial forb	non-native	--	--	FAC
Caryophyllaceae	*Stellaria media*	common chickweed	annual forb	non-native	--	--	FACU
Convolvulaceae	*Calystegia macrostegia* ssp. *cyclostegia*	island false bindweed	perennial vine	native	--	--	NL
Convolvulaceae	*Calystegia purpurata* ssp. *purpurata*	Pacific false bindweed	perennial vine	native	--	--	NL
Convolvulaceae	*Convolvulus arvensis*	field bindweed	perennial forb	non-native	--	assessed	NL
Crassulaceae	*Crassula connata*	sand pygmyweed	annual forb	native	--	--	FAC
Cucurbitaceae	*Marah oregana*	coast manroot	perennial vine	native	--	--	NL
Cupressaceae	*Hesperocyparis macrocarpa*	Monterey cypress	evergreen tree	native	Rank 1B*	--	NL
Cyperaceae	*Carex harfordii*	Harford's sedge	perennial graminoid	native	--	--	OBL
Cyperaceae	*Carex tumulicola*	slender sedge	perennial graminoid	native	--	--	FACU
Dennstaedtiaceae	*Pteridium aquilinum* var. *pubescens*	hairy brackenfern	perennial fern	native	--	--	FACU
Dipsacaceae	*Dipsacus fullonum*	Fuller's teasel	perennial forb	non-native	--	--	FAC
Dryopteridaceae	*Polystichum munitum*	western swordfern	perennial fern	native	--	--	FACU

Family	Scientific name	Common name	Life form	Origin	Rare Status[1]	Invasive Status[2]	Wetland indicator[3]
Ericaceae	*Vaccinium ovatum*	evergreen huckleberry	evergreen shrub	native	--	--	FACU
Fabaceae	*Acmispon americanus* var. *americanus*	American lotus	annual forb	native	--	--	NL
Fabaceae	*Acmispon parviflorus*	small flowered lotus	annual forb	native	--	--	NL
Fabaceae	*Cytisus scoparius*	Scotch broom	evergreen shrub	non-native	--	high	NL
Fabaceae	*Genista canariensis*	Canary broom	evergreen shrub	non-native	--	--	NL
Fabaceae	*Genista monspessulana*	French broom	evergreen shrub	non-native	--	high	NL
Fabaceae	*Lathyrus latifolius*	perennial pea	perennial forb	non-native	--	--	NL
Fabaceae	*Lotus corniculatus*	bird's-foot trefoil	perennial forb	non-native	--	assessed	FAC
Fabaceae	*Lupinus littoralis*	seashore lupine	evergreen shrub	native	--	--	NL
Fabaceae	*Lupinus rivularis*	river lupine	perennial forb	native	--	--	FAC
Fabaceae	*Lupinus variicolor*	many-colored lupine	evergreen shrub	native	--	--	NL
Fabaceae	*Trifolium depauperatum*	balloon sack clover	annual forb	native	--	--	FAC
Fabaceae	*Trifolium dubium*	Shamrock clover	annual forb	non-native	--	--	FACU
Fabaceae	*Trifolium repens*	white clover	perennial forb	non-native	--	--	FAC
Fabaceae	*Trifolium subterraneum*	subterranean clover	annual forb	non-native	--	--	NL
Fabaceae	*Trifolium wormskioldii*	cows clover	perennial forb	native	--	--	FACW
Fabaceae	*Vicia sativa* ssp. *nigra*	garden vetch	annual forb	non-native	--	--	UPL
Fabaceae	*Vicia sativa* ssp. *sativa*	pubescent common vetch	annual forb	non-native	--	--	UPL
Fabaceae	*Vicia villosa ssp. villosa*	winter vetch	annual forb	non-native	--	--	NL
Geraniaceae	*Erodium botrys*	longbeak stork's bill	annual forb	non-native	--	--	FACU
Geraniaceae	*Erodium cicutarium*	redstem stork's bill	annual forb	non-native	--	--	NL
Geraniaceae	*Erodium moschatum*	musky stork's bill	annual forb	non-native	--	assessed	NL
Geraniaceae	*Geranium carolinianum*	Carolina geranium	annual forb	native	--	--	NL
Geraniaceae	*Geranium core-core*	Chilean geranium	annual forb	non-native	--	--	NL
Geraniaceae	*Geranium molle*	woodland geranium	perenial forb	non-native	--	--	NL
Hypericaceae	*Hypericum anagalloides*	tinker's penny	perennial forb	native	--	--	OBL
Iridaceae	*Iris douglasiana*	Douglas' iris	perennial forb	native	--	--	NL
Juncaceae	*Juncus effusus* ssp. *pacificus*	Pacific rush	perennial graminoid	native	--	--	FACW
Juncaceae	*Juncus patens*	common rush	perennial graminoid	native	--	--	FACW

Family	Scientific name	Common name	Life form	Origin	Rare Status[1]	Invasive Status[2]	Wetland indicator[3]
Juncaceae	*Luzula comosa*	Pacific woodrush	perennial graminoid	native	--	--	FAC
Lamiaceae	*Stachys rigida* var. *quercetorum*	rough hedgenettle	perennial forb	native	--	--	FACW
Linaceae	*Linum bienne*	pale flax	annual forb	non-native	--	--	NL
Malvaceae	*Sidalcea malviflora* ssp. *malviflora*	dwarf checkerbloom	perennial forb	native	--	--	FACW
Melanthiaceae	*Toxicoscordion fremontii*	Fremont's star lily	perennial forb	native	--	--	NL
Myrsinaceae	*Anagallis arvensis*	scarlet pimpernel	annual forb	non-native	--	--	NL
Myrtaceae	*Eucalyptus globulus*	blue gum	evergreen tree	non-native	--	moderate	NL
Orobanchaceae	*Triphysaria pusilla*	dwarf owl's clover	annual forb	native	--	--	NL
Orobanchaceae	*Triphysaria versicolor* ssp. *versicolor*	yellowbeak owl's clover	annual forb	native	--	--	NL
Oxalidaceae	*Oxalis corniculata*	yellow sorrel	perennial forb	non-native	--	--	FACU
Oxalidaceae	*Oxalis pes-caprae*	Bermuda buttercup	perennial forb	non-native	--	--	NL
Papaveraceae	*Eschscholzia californica*	California poppy	perennial forb	native	--	--	NL
Pinaceae	*Pinus contorta* ssp. *contorta*	beach pine	evergreen tree	native	--	--	FAC
Pinaceae	*Pinus muricata*	Bishop pine	evergreen tree	native	--	--	NL
Pinaceae	*Pinus radiata*	Monterey pine	evergreen tree	native	Rank 1B*	limited	NL
Pinaceae	*Pseudotsuga menziesii* var. *menziesii*	Douglas fir	evergreen tree	native	--	--	FACU
Plantaginaceae	*Plantago coronopus*	buckhorn plantain	annual forb	non-native	--	--	FACW
Plantaginaceae	*Plantago erecta*	foothill plantain	annual forb	native	--	--	NL
Plantaginaceae	*Plantago lanceolata*	English plantain	perennial forb	non-native	--	limited	FACU
Plantaginaceae	*Plantago major*	common plantain	perennial forb	non-native	--	--	FAC
Poaceae	*Agrostis capillaris*	colonial bent	perennial graminoid	non-native	--	--	FAC
Poaceae	*Agrostis gigantea*	redtop	perennial graminoid	non-native	--	--	FAC
Poaceae	*Agrostis pallens*	seashore bentgrass	perennial graminoid	native	--	--	UPL
Poaceae	*Aira caryophyllea*	silver hairgrass	annual graminoid	non-native	--	assessed	FACU
Poaceae	*Anthoxanthum odoratum*	sweet vernalgrass	perennial graminoid	non-native	--	moderate	FACU
Poaceae	*Avena barbata*	slender oat	perennial graminoid	non-native	--	moderate	NL
Poaceae	*Avena fatua*	wild oat	annual graminoid	non-native	--	moderate	NL
Poaceae	*Briza maxima*	big quakinggrass	annual graminoid	non-native	--	limited	NL

Family	Scientific name	Common name	Life form	Origin	Rare Status[1]	Invasive Status[2]	Wetland indicator[3]
Poaceae	*Briza minor*	little quakinggrass	annual graminoid	non-native	--	--	FAC
Poaceae	*Bromus carinatus*	California brome	perennial graminoid	native	--	--	NL
Poaceae	*Bromus diandrus*	ripgut brome	annual graminoid	non-native	--	moderate	NL
Poaceae	*Bromus hordeaceus*	soft chess	annual graminoid	non-native	--	limited	FACU
Poaceae	*Bromus vulgaris*	Columbia brome	annual graminoid	native	--	--	FACU
Poaceae	*Cortaderia jubata*	Pampas grass	perennial graminoid	non-native	--	high	FACU
Poaceae	*Cynodon dactylon*	Bermuda grass	perennial graminoid	non-native	--	moderate	FACU
Poaceae	*Cynosurus echinatus*	annual dogtail grass	annual graminoid	non-native	--	moderate	NL
Poaceae	*Dactylis glomerata*	orchard grass	perennial graminoid	non-native	--	--	FACU
Poaceae	*Danthonia californica*	California oat grass	perennial graminoid	native	--	--	FAC
Poaceae	*Elymus glaucus* ssp. *glaucus*	blue wildrye	perennial graminoid	native	--	--	FACU
Poaceae	*Festuca bromoides*	brome fescue	perennial graminoid	non-native	--	--	FACU
Poaceae	*Festuca myuros*	rattail fescue	perennial graminoid	non-native	--	moderate	FACU
Poaceae	*Festuca perennis*	Italian rye grass	annual graminoid	non-native	--	moderate	FAC
Poaceae	*Gastridium phleoides*	nit grass	annual graminoid	non-native	--	--	FACU
Poaceae	*Holcus lanatus*	common velvet grass	perennial graminoid	non-native	--	moderate	FAC
Poaceae	*Hordeum brachyantherum*	meadow barley	perennial graminoid	native	--	--	FACW
Poaceae	*Hordeum murinum*	mouse barley	annual graminoid	non-native	--	moderate	FAC
Poaceae	*Paspalum dilatatum*	dallis grass	perennial graminoid	non-native	--	--	FAC
Poaceae	*Poa annua*	annual bluegrass	annual graminoid	non-native	--	--	FAC
Poaceae	*Polypogon interruptus*	ditch rabbit's-foot grass	perennial graminoid	non-native	--	--	FACW
Poaceae	*Rytidosperma penicillatum*	hairy oat	perennial graminoid	non-native	--	--	NL
Poaceae	*Triticum aestivum*	bread wheat	annual graminoid	non-native	--	--	NL
Polemoniaceae	*Navarretia squarrosa*	skunkbush	annual forb	native	--	--	FACU
Polygonaceae	*Rumex acetosella*	common sheep sorrel	perennial forb	non-native	--	moderate	FACU
Polygonaceae	*Rumex crispus*	curly dock	perennial forb	non-native	--	limited	FAC
Rhamnaceae	*Ceanothus thyrsiflorus* var. *griseus*	Carmel ceanothus	evergreen shrub	native	--	--	NL
Rhamnaceae	*Frangula californica*	California coffeeberry	evergreen shrub	native	--	--	NL
Rosaceae	*Cotoneaster pannosus*	silverleaf cotoneaster	evergreen shrub	non-native	--	moderate	NL

Family	Scientific name	Common name	Life form	Origin	Rare Status[1]	Invasive Status[2]	Wetland indicator[3]
Rosaceae	*Fragaria chiloensis*	beach strawberry	perennial forb	native	--	--	NL
Rosaceae	*Rubus armeniacus*	Himalayan blackberry	evergreen shrub	non-native	--	--	FACU
Rosaceae	*Rubus ursinus*	California blackberry	evergreen shrub	native	--	--	FACU
Rubiaceae	*Galium aparine*	stickywilly	annual forb	native	--	--	FACU
Scrophulariaceae	*Myoporum laetum*	lollypop tree	evergreen shrub	non-native	--	--	UPL
Solanaceae	*Solanum dulcamara*	climbing nightshade	perennial vine	non-native	--	--	FAC
Tropaeolaceae	*Tropaeolum majus*	nasturtium	annual vine	non-native	--	--	NL
Urticaceae	*Urtica dioica*	stinging nettle	perennial forb	native	--	--	FAC
Woodsiaceae	*Athyrium filix-femina* var. *cyclosorum*	subarctic lady fern	perennial fern	native	--	--	FAC

All species identified using the *Jepson Manual* (Hickman 1993) and *Jepson Manual II: Vascular Plants of California* (Baldwin et al. 2012)
Nomenclature follows *Jepson Manual II: Vascular Plants of California* (Baldwin et al. 2012)
[1]Rare Status: The CNPS Inventory of Rare and Endangered Plants (CNPS 2012)
*Considered rare in native stands in Central Coast, California
[2]Invasive Status: California Invasive Plant Inventory (Cal-IPC 2006)
[3]Wetland Status: National List of Plant Species that Occur in Wetlands in the Western Mountains, Valleys, and Coasts Region (Lichvar and Kartesz 2009)

APPENDIX D

Representative Photographs of the Study Area

Top: Study Area in central portion, note: low-growing non-native grassland and individuals of pine (view: northeast).

Bottom: Study Area in central portion, note: low-growing non-native grassland and individuals of pine (view: west).

Photographs taken March 22, 2012

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ENVIRONMENTAL CONSULTANTS

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Urbemis 2007 Version 9.2.4

Combined Annual Emissions Reports (Tons/Year)

File Name: Z:\Community Development\2014 CDD FILES\Agenda Summary Reports\Hare Creek Center CDP 8-13 DR 7-13\Hare Creek Center Urbemis Report.urb924

Project Name: Hare Creek Center

Project Location: California State-wide

On-Road Vehicle Emissions Based on: Version : Emfac2007 V2.3 Nov 1 2006

Off-Road Vehicle Emissions Based on: OFFROAD2007

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Summary Report:

CONSTRUCTION EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2
2007 TOTALS (tons/year unmitigated)	0.04	0.34	0.18	0.00	0.07	0.02	0.09	0.02	0.02	0.03	27.04
2008 TOTALS (tons/year unmitigated)	0.47	1.07	0.74	0.00	0.03	0.07	0.10	0.01	0.06	0.07	107.93

AREA SOURCE EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (tons/year, unmitigated)	0.06	0.06	0.46	0.00	0.00	0.00	64.27

OPERATIONAL (VEHICLE) EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (tons/year, unmitigated)	1.46	1.70	14.45	0.01	2.98	0.57	1,675.09

SUM OF AREA SOURCE AND OPERATIONAL EMISSION ESTIMATES

	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
TOTALS (tons/year, unmitigated)	1.52	1.76	14.91	0.01	2.98	0.57	1,739.36

Construction Unmitigated Detail Report:

CONSTRUCTION EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

	ROG	NOx	CO	SO2	PM10 Dust	PM10 Exhaust	PM10	PM2.5 Dust	PM2.5 Exhaust	PM2.5	CO2

2007	0.04	0.34	0.18	0.00	0.07	0.02	0.09	0.02	0.02	0.03	27.04
Fine Grading 11/30/2007-01/11/2008	0.04	0.33	0.17	0.00	0.07	0.02	0.09	0.02	0.02	0.03	25.84
Fine Grading Dust	0.00	0.00	0.00	0.00	0.07	0.00	0.07	0.02	0.00	0.02	0.00
Fine Grading Off Road Diesel	0.04	0.33	0.16	0.00	0.00	0.02	0.02	0.00	0.02	0.02	24.72
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.12
Asphalt 12/28/2007-01/11/2008	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.19
Paving Off-Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.98
Paving On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04
Paving Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.18

2008	0.47	1.07	0.74	0.00	0.03	0.07	0.10	0.01	0.06	0.07	107.93
Asphalt 12/28/2007-01/11/2008	0.01	0.06	0.04	0.00	0.00	0.01	0.01	0.00	0.00	0.00	5.38
Paving Off-Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Paving Off Road Diesel	0.01	0.06	0.03	0.00	0.00	0.01	0.01	0.00	0.00	0.00	4.41
Paving On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17
Paving Worker Trips	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.80
Fine Grading 11/30/2007-01/11/2008	0.02	0.13	0.07	0.00	0.03	0.01	0.04	0.01	0.01	0.01	10.57
Fine Grading Dust	0.00	0.00	0.00	0.00	0.03	0.00	0.03	0.01	0.00	0.01	0.00
Fine Grading Off Road Diesel	0.01	0.13	0.06	0.00	0.00	0.01	0.01	0.00	0.01	0.01	10.11
Fine Grading On Road Diesel	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fine Grading Worker Trips	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.46
Building 01/11/2008-08/22/2008	0.12	0.88	0.63	0.00	0.00	0.05	0.06	0.00	0.05	0.05	91.60
Building Off Road Diesel	0.11	0.84	0.41	0.00	0.00	0.05	0.05	0.00	0.05	0.05	71.92
Building Vendor Trips	0.00	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.90
Building Worker Trips	0.01	0.01	0.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	15.78
Coating 08/08/2008-09/05/2008	0.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.38
Architectural Coating	0.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Coating Worker Trips	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.38

Phase Assumptions

Phase: Fine Grading 11/30/2007 - 1/11/2008 - Default Fine Site Grading Description

Total Acres Disturbed: 1.38

Maximum Daily Acreage Disturbed: 0.34

Fugitive Dust Level of Detail: Default

20 lbs per acre-day

On Road Truck Travel (VMT): 0

Off-Road Equipment:

1 Graders (174 hp) operating at a 0.61 load factor for 6 hours per day

1 Rubber Tired Dozers (357 hp) operating at a 0.59 load factor for 6 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

1 Water Trucks (189 hp) operating at a 0.5 load factor for 8 hours per day

Phase: Paving 12/28/2007 - 1/11/2008 - Default Paving Description

Acres to be Paved: 0.34

Off-Road Equipment:

4 Cement and Mortar Mixers (10 hp) operating at a 0.56 load factor for 6 hours per day

1 Pavers (100 hp) operating at a 0.62 load factor for 7 hours per day

1 Rollers (95 hp) operating at a 0.56 load factor for 7 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 7 hours per day

Phase: Building Construction 1/11/2008 - 8/22/2008 - Default Building Construction Description

Off-Road Equipment:

1 Cranes (399 hp) operating at a 0.43 load factor for 4 hours per day

2 Forklifts (145 hp) operating at a 0.3 load factor for 6 hours per day

1 Tractors/Loaders/Backhoes (108 hp) operating at a 0.55 load factor for 8 hours per day

Phase: Architectural Coating 8/8/2008 - 9/5/2008 - Default Architectural Coating Description

Rule: Residential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Rule: Residential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Rule: Nonresidential Interior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

Rule: Nonresidential Exterior Coatings begins 1/1/2005 ends 12/31/2040 specifies a VOC of 250

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Area Source Unmitigated Detail Report:

AREA SOURCE EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

Source	ROG	NOx	CO	SO2	PM10	PM2.5	CO2
Natural Gas	0.00	0.05	0.04	0.00	0.00	0.00	63.51
Hearth							
Landscape	0.03	0.01	0.42	0.00	0.00	0.00	0.76
Consumer Products	0.00						
Architectural Coatings	0.03						
TOTALS (tons/year, unmitigated)	0.06	0.06	0.46	0.00	0.00	0.00	64.27

Area Source Changes to Defaults

Operational Unmitigated Detail Report:

OPERATIONAL EMISSION ESTIMATES Annual Tons Per Year, Unmitigated

Source	ROG	NOX	CO	SO2	PM10	PM25	CO2
Free-standing discount store	0.36	0.42	3.55	0.00	0.73	0.14	412.93
Strip mall	0.14	0.16	1.34	0.00	0.28	0.05	155.00
Supermarket	0.96	1.12	9.56	0.01	1.97	0.38	1,107.16
TOTALS (tons/year, unmitigated)	1.46	1.70	14.45	0.01	2.98	0.57	1,675.09

Operational Settings:

Includes correction for passby trips

Does not include double counting adjustment for internal trips

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Analysis Year: 2016 Season: Annual

Emfac: Version : Emfac2007 V2.3 Nov 1 2006

Summary of Land Uses

Land Use Type	Acreage	Trip Rate	Unit Type	No. Units	Total Trips	Total VMT
Free-standing discount store		56.02	1000 sq ft	10.00	560.20	2,333.77
Strip mall		42.94	1000 sq ft	5.00	214.70	875.38
Supermarket		102.24	1000 sq ft	15.00	1,533.60	6,252.85
					2,308.50	9,462.00

Vehicle Fleet Mix

Vehicle Type	Percent Type	Non-Catalyst	Catalyst	Diesel
Light Auto	48.4	0.2	99.6	0.2
Light Truck < 3750 lbs	10.8	0.9	95.4	3.7
Light Truck 3751-5750 lbs	21.9	0.0	100.0	0.0
Med Truck 5751-8500 lbs	9.7	0.0	100.0	0.0
Lite-Heavy Truck 8501-10,000 lbs	1.7	0.0	76.5	23.5
Lite-Heavy Truck 10,001-14,000 lbs	0.7	0.0	57.1	42.9
Med-Heavy Truck 14,001-33,000 lbs	1.0	0.0	20.0	80.0
Heavy-Heavy Truck 33,001-60,000 lbs	0.9	0.0	0.0	100.0
Other Bus	0.1	0.0	0.0	100.0
Urban Bus	0.1	0.0	0.0	100.0
Motorcycle	3.6	47.2	52.8	0.0
School Bus	0.1	0.0	0.0	100.0
Motor Home	1.0	0.0	90.0	10.0

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Travel Conditions

	Residential			Commercial		
	Home-Work	Home-Shop	Home-Other	Commute	Non-Work	Customer
Urban Trip Length (miles)	10.8	7.3	7.5	9.5	7.4	7.4
Rural Trip Length (miles)	16.8	7.1	7.9	14.7	6.6	6.6
Trip speeds (mph)	35.0	35.0	35.0	35.0	35.0	35.0
% of Trips - Residential	32.9	18.0	49.1			
% of Trips - Commercial (by land use)						
Free-standing discount store				2.0	1.0	97.0
Strip mall				2.0	1.0	97.0
Supermarket				2.0	1.0	97.0

Geology • Hydrogeology

Nolan Associates

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August 23, 1995

JOB# 95MD-001

Mr. Scott Mommer
Lars Andersen and Associates
4630 W. Jacquelyn Ave. Suite 119
Fresno, California 93722

Re: Groundwater Recharge and Water Balance Evaluation
Proposed Kmart Project
Todd Point Area
Mendocino County, California

Dear Mr. Mommer:

At your request, we have evaluated groundwater recharge potential for the Todd Point area, located on the south side of the City of Fort Bragg, California. The purpose of this investigation was to provide an evaluation of local groundwater recharge from precipitation in order to assess the impacts of the proposed Kmart project on local groundwater supply. It is our understanding that this impact analysis will be used as a technical appendix for the project's environmental impact report.

Our scope of services included:

1. Review of geologic and hydrogeologic literature for the project area.

2. Review of the a soils engineering report prepared for the project by Krazan and Associates, dated April 10, 1995.

3. Geologic reconnaissance of the Todd Point area on July 17 and 18, 1995.

4. Calculation of expected average annual groundwater recharge for the area, existing and expected future groundwater use in the area, and evaluation of the impact of the proposed Kmart project on groundwater recharge.

5. Summary of our findings and conclusions in this report.

Project Description

The **project site** is a 20.876 acre parcel located adjacent to and west of State Highway 1 in the southern portion of the City of Fort Bragg, California (Figure 1, Geologic Index Map). Based on project plans provided to us by Lars Andersen and Associates (plans dated 8-15-95), the project will consist of a Kmart store, additional retail and commercial space, a 60-unit motel, paved parking, landscaping, and a 59-unit multifamily residential development. Of the total project acreage, 13.167 acres will consist of building and paved areas, 3.015 acres will be landscaped, and 4.694 acres will be divided among the residential lots.

Geologic Setting

The **study area** for this groundwater recharge evaluation is the Todd Point area, herein defined as the flat topped coastal bluff situated between the Noyo River and Hare Creek, stretching inland from the Pacific Ocean about 3500 feet to the vicinity of the Trailer Cove Trailer Park ("Trailer Park" noted on Figure 1). Bedrock in the study area is the Coastal Belt Franciscan Formation, described by Kramer (1976) as consisting of hard, variably fractured sandstone, shale, and minor conglomerate. These rocks stretch for over 170 miles along the Northern California coast and include the entire Fort Bragg area.

Krazan and Associates (1995) performed 24 soil borings on the project site and identified highly weathered Franciscan bedrock. During our site reconnaissance, we identified two outcrops on the project site consisting of hard, fractured sandstone of the Franciscan Formation (Figure 1).

In the study area, a layer of ancient beach and nearshore marine deposits covers the bedrock, extending from the ground surface down to the top of bedrock (Kramer, 1976; Scott, et al, 1982). These beach and nearshore marine sediments were deposited at a time when sea level was higher relative to the land than now and are referred to as marine terrace deposits. Figure 2 is a geologic cross section through the Todd Point area showing the relationship of the terrace deposits to the Franciscan bedrock. The location of the cross section line is indicated on Figure 1.

Based on boring data from Krazan and Associates (1995), the terrace deposits on the project site consist generally of fine to coarse-grained sand, becoming silty near the modern ground surface, and range in thickness from less than 3 feet to about 18.5 feet thick. Average terrace deposit thickness taken from all 24 borings by Krazan and Associates (1995) is 8.5 to 9 feet. Scott, et al (1982), in their report on coastal groundwater resources, show terrace deposit thicknesses for Todd Point ranging from 0 to about 23 feet thick from widely scattered well locations (measured from Cross Section C-C', Figure 12; Scott, et al 1982). For this study, we also reviewed twelve water well logs distributed over the portion of the Todd Point area located northwest and west of

the project site (for summary of well information, see Appendix A). Terrace deposit thicknesses interpreted from these water well logs ranged from 4 to 24 feet thick, with an average thickness of 14.9 to 17.6 feet. Soil borings drilled for the College of the Redwoods campus only penetrated 7 to 8 feet and did not encounter bedrock (Taber Consultants, 1985).

In our geologic reconnaissance of the Todd Point area we observed terrace deposits exposed in the sea cliff. The deposits consisted of fine to coarse-grained sand and sandy gravels. The terrace deposits cover an old bedrock surface that is uneven, with many ridges and valleys, similar to the modern coastline and offshore area. The terrace deposits tend to fill the valleys with relatively thick deposits, but thin over the bedrock ridges. Figure 3A is a photograph of the seacliff. In the photo, the bedrock appears as a white and gray, craggy material. The terrace deposits are light brown or yellowish brown with a surficial layer of dark gray soil. Figure 3B is the same photo as 3A, but it has the terrace deposit and bedrock units drawn in for illustrative purposes. The photo shows thick wedges of terrace deposits between intervening bedrock highs. The green bushes that seem to follow the contact between the terrace deposits and the bedrock are probably encouraged by water seeping from the base of the terrace deposits and from fractures or weathered zones in bedrock. Because of the irregularities in the bedrock surface, the thickness of the terrace deposits can vary significantly from place to place. On the project site, the boring data from Krazan and Associates (1995) shows a bedrock high underlying the north-central portion of the site. The bedrock slopes away from this high point to the north, west, east and south.

The surficial layer of the terrace deposits, the uppermost three to five feet, has formed a soil horizon due to weathering of the near surface materials, as can be seen on Figure 3. The U.S. Soil Conservation Service (SCS, 1987) performed a soil survey of western Mendocino County that includes the Todd Point area. They classified the soil in the study area as Heeser sandy loam, a deep, somewhat excessively drained soil formed on marine terraces. This soil type is consistent with soil descriptions noted in the Krazan and Associates (1995) report and observed by ourselves in the field. The Heeser sandy loam is characterized by moderately rapid to rapid permeability and moderate available water capacity. Because of its rapid permeability, the Heeser sandy loam is considered to have poor filtration capability for septic disposal. In their report, the Soil Conservation Service recommends that areas of moderate to high housing density be served by community sewage systems due to the potential for failure of septic tank absorption fields.

Hydrogeologic Setting

The water bearing properties of the two earth material units in the study area, the Franciscan bedrock and the terrace deposits, are described in Scott, et al (1982). The Franciscan bedrock is considered a poor water producing unit by Scott, et al (1982), with average well production rates of 8.7 gallons per minute (gpm). To quote Scott, et al (1982), " The Coastal Belt Franciscan

rocks are considered non-water bearing... ground water contained in these rocks exists only in the soil, weathered rock, or in secondary openings formed by fractures, joints, and shear zones." The terrace sediments are considered superior for water production, but are of limited thickness and lateral extent. In the study area, the terrace sediments are unbounded on three sides where the deposits are exposed in bluffs along the adjacent streams and the ocean. Average well production from the terrace deposits in this area is 13.7 gpm (Scott, et al, 1982).

Although the Franciscan bedrock is considered "non-water bearing" by Scott, et al (1982), we would like to point out that the average well production rate for bedrock, 8.7 gpm, does not differ greatly from the average well production rate in terrace deposits, 13.7 gpm. However, water production from the Franciscan bedrock depends on intercepting fractures or weathered zones suitable for producing water. Therefore, although water production from the bedrock may be feasible in many locations, water production from bedrock is not as predictable as from the terrace deposits. For this reason, it is the terrace deposits that are most commonly exploited for water production. The five wells shown in the Todd Point area by Scott, et al (1982) ranged in depth from 85 to 144 feet, much deeper than 0 to 24 foot depth of the terrace deposits. It is probable that water is being produced from both the terrace sediments and bedrock in many of the wells.

For the purposes of the following evaluation of aquifer recharge and local water balance, we will only consider the terrace deposit aquifer, since the hydrogeologic properties of the bedrock are not well known. Including the bedrock aquifer in the analysis would result in an increase in water storage and production capacity estimates because it would effectively increase the size of the reservoir being examined. In addition, the bedrock can be recharged by lateral flow from the Noyo River and Hare Creek, rather than relying only on direct rainfall for recharge, as is the case for the terrace deposit aquifer. Therefore, bedrock may represent a more dependable water supply, especially in times of low rainfall. By not including bedrock in the evaluation, we are of the opinion that this is a very conservative (i.e. worst case) evaluation of local water balance.

As discussed in the section on geologic setting, above, the terrace deposits cover an irregular bedrock surface. For this reason, the terrace deposits are of variable thickness and the direction of ground water flow in the terrace deposits is controlled, at least in part, by irregularities in the bedrock surface. Figure 1 depicts areas where bedrock crops out at the surface in the vicinity of Highway 1. We mapped bedrock outcrops on the north central portion of the project site and on the eastern side of Highway 1 adjacent to the project site (Figure 1). These outcrops indicate areas of shallow bedrock that form an impediment to westward flow of groundwater across the project site from areas to the east. The bedrock high indicated by the bedrock outcrop in the north-central portion of the site appears to form a local groundwater divide. North of the bedrock outcrop, groundwater flows west or northwest. South of the bedrock outcrop, the boring data from the project site (Krazan and Associates, 1995) show that the bedrock surface underneath the

terrace deposits slopes southward towards Hare Creek. Groundwater flow in the terrace deposits in this area is therefore generally towards the south and this portion of the aquifer is semi-isolated from the larger portion of the aquifer to the north and west.

Groundwater levels in the terrace deposits vary with the seasonal rainfall, declining during the dry summer months. Scott, et al (1982) found an average decline in water level between spring and fall for the Todd Point and inland area of six and one-half feet. Water in the terrace deposits drains from the faces of the bounding bluffs, or recharges the bedrock through fractures and weathered zones. The 24 exploratory borings made by Krazan and Associates (1995) on the project site were drilled in December of 1994 and March of 1995, and therefore should reflect winter water table conditions. Out of 24 borings, 20 penetrated the entire thickness of the terrace deposits (average thickness of 8.5 to 9 feet) and extended down into the Franciscan bedrock. Only one boring (boring T-13, Krazan and Associates, 1995), located on the extreme northwest edge of the subject property, encountered groundwater. This boring was drilled following a period of heavy rainfall in March of 1995.

The following sections estimate average annual groundwater recharge to the terrace deposits, water demand of the existing and potential future development, water storage capacity of the terrace deposits, and potential impact of the proposed development on groundwater resources.

Annual Recharge

Recharge of groundwater to an unconfined aquifer occurs by infiltration of precipitation into the ground and percolation of the infiltrated water down to the water table. However, the majority of precipitation is lost to surface runoff or to the atmosphere due to transpiration by plants and direct evaporation of soil moisture before it has a chance to percolate to the water table. Therefore, to calculate recharge, one must estimate the amount of precipitation lost to surface runoff, evaporation, and transpiration.

The effects of evaporation and transpiration are usually considered together and are termed evapotranspiration. We have calculated evapotranspiration for the study area using the method outlined by Mather (1978), summarized in Table 1. The calculations from Mather (1978) are done using units of millimeters. Quantities listed in Table 1 are therefore expressed in millimeters, unless stated otherwise. As shown on Table 1, the estimated annual actual evapotranspiration for the study area is 489.35 millimeters ($\sim$19.3 inches) of water (found under the Annual column heading, Table 1).

Actual evapotranspiration is derived from potential evapotranspiration (PE, Table 1), which is the amount of evaporation and transpiration that would occur if there was always an abundance of

TABLE 1: Average Annual Evapotranspiration for the Fort Bragg Area Based on the method of Mather (1978)

month	January	February	Mareh	April	May	June	July	Aug	September	October	November	December	ANNUAL
Ave. Air Temp (C)[1]	9.28	9.72	10.17	11.00	12.06	13.50	14.06	14.28	14.50	13.06	11.28	9.00	11.83
I[2]	2.55	2.7	2.93	3.3	3.79	4.5	4.78	4.9	5.01	4.28	3.43	2.44	44.61
UnPE[3]	1.3	1.4	1.4	1.6	1.7	2	2.1	2.1	2.2	1.9	1.6	1.2	
MPMDS[4]	25.4	25.1	30.9	33.3	37	37.3	37.9	35.4	31.2	28.8	25.1	24.5	
Ave. Precip. (mm)[5]	188.98	149.10	148.08	69.60	32.26	10.41	2.79	9.14	16.76	67.56	137.16	169.67	1001.52
PE[6] (mm)	33.02	35.14	43.26	53.28	62.9	74.6	79.59	74.34	68.64	54.72	40.16	29.4	649.05
P-PE[7] (mm)	155.96	113.96	104.82	16.32	-30.64	-64.19	-76.80	-65.20	-51.88	12.84	97.00	140.27	
ST[8] (mm)	150	150	150	150	122	79	47	30	21	33.84	130.84	150	
Del ST[9](mm)	0	0	0	0	-28	-43	-32	-17	-9	12.84	97	19.16	
Actual Evapotrans.[10] (mm)	33.02	35.14	43.26	53.28	60.258	53.414	34.794	26.144	25.764	54.72	40.16	29.4	489.35
Surplus Water	155.96	113.96	104.82	16.32	0	0	0	0	0	0	0	121.12	512.17

[1] average monthly air temperature for Fort Bragg, from Western Regional Climatic Data Center, Reno, NV

[2] monthly heat index, from table A-2 of Mather (1978)

[3] unadjusted potential daily evapotranspiration (mm) from Table A-3 of Mather (1978)

[4] mean possible monthly duration of sunlight in units of 12 hours, from Table A-4 of Mather (1978)

[5] average monthly precipitation from Western Regional Climatic Data Center, Reno, NV

[6] potential evapotranspiration (UnPE x MPMDS)

[7] average monthly precipitation less potential evapotranspiration

[8] soil moisture stored in root zone, based on sandy loam soil and moderately deep rooted vegetation, retained moisture amounts during dry months based on table A-7 of Mather (1978)

[9] change in soil moisture storage from month to month

[10] Actual Evapotranspiration, equals PE when soil moisture is at maximum value, equals precipitation plus amount of soil moisture removed from storage otherwise.

water available to plants and soil. In California, rainfall is seasonal; the soil dries out in the summer time and vegetation wilts or goes dormant. Therefore, during the drier months, the actual amount of evapotranspiration is less than the potential evapotranspiration. As a cross check on our method of calculating evapotranspiration, we compared the annual potential evapotranspiration calculated by Mather's (1978) method, 25.55 inches (converted from 649.05 mm annual PE in Table 1), to the annual potential evapotranspiration value published for northern coastal California by the California Department of Water Resources, 26.1 inches (DWR, 1975). The DWR evapotranspiration rate is for cool season turf and is based on empirical observation of pan evaporation rates and climatic conditions along this portion of the coast. The two numbers are in very close agreement.

We have estimated the amount of runoff by considering several sources (Scott, et al, 1982; McCuen, 1972; Rantz, 1971; Dunne and Leopold, 1978; Winzler and Kelly, 1985). The Heeser sandy loam is characterized as having moderately rapid to rapid permeability and slow to medium surface runoff, indicating that a significant amount of precipitation is likely to soak into the soil. Dunne and Leopold (1978) published a summary of runoff coefficients from a variety of sources. Runoff coefficients express runoff as a fraction of total rainfall and are used to estimate runoff quantities. Dunne and Leopold (1985) give a range of runoff coefficients for sandy soils of 0.1 to 0.2; that is, for every inch of rain that falls, 0.1 to 0.2 inches (10% to 20%) is lost as direct runoff. Winzler and Kelly (1985), in their storm drainage master plan for Fort Bragg, give a runoff coefficient of 0.2 for "agricultural open space", the category in their report that is closest to conditions at Todd Point. These runoff coefficients are intended to be used for calculations of runoff during peak storms and they therefore tend to overestimate runoff for average annual conditions. The runoff coefficients listed by Dunne and Leopold (1985) apply to storms with recurrence intervals of 5 to 10 years and are much higher than the runoff from occasional, or low intensity storms.

Runoff calculations using the Soil Conservation Service methodology, as summarized in McCuen (1972), calculate runoff percentages that vary with the amount of daily rainfall during a storm. Runoff values calculated by this method for soil types found in the Todd Point area vary from essentially no runoff for two inches of rain or less, to about 20% runoff for four inches of rain and 30% runoff for six inches of (daily) rain, assuming "average" pre-storm soil moisture conditions.

In our opinion, a range of annual runoff coefficients for the study area of 0.1 to 0.2 is reasonable. For our recharge calculations, we have conservatively assumed a runoff coefficient of 0.2 (this runoff amount includes only direct runoff during rainfall and does not include groundwater outflow from the aquifer). Annual precipitation for the area is based on rainfall records for Fort Bragg from the National Climatic Data Center in Reno, Nevada.

Annual recharge is calculated as follows:

Average Annual Rainfall, Fort Bragg	39.4"
Annual Evapotranspiration (Table 1)	-19.3"
Annual Runoff (20% of 39.4")	- 7.9"
Annual Recharge to Groundwater	12.20" = 1.02 feet/year

This figure compares favorably to the average annual recharge estimate of 12 inches/year made by Scott, et al (1982).

Total recharge to the terrace deposit aquifer is simply the surface area multiplied by the recharge per unit area. We have estimated the recharge area for Todd Point from the Fort Bragg 7½' topographic quadrangle map as 174 acres. Of this area, a portion is paved or covered by buildings and is unavailable for direct recharge. We have estimated that 36 acres (about 20%) of the area is presently covered by impermeable surface based on inspection of a color aerial photograph of the Todd Point area (Figure 4). Total surface area available for recharge is therefore:

174 acres - 36 acres = 138 acres

Annual Recharge = 138 acres x 1.02 feet/year recharge = 140.89 acre feet/year
~141 acre feet/year

In fact, a portion of the runoff from impermeable surfaces ends up as recharge anyway, since the water from streets and roofs often spills onto the ground and soaks in. However, we have not included any runoff from impermeable surfaces in the recharge estimate. The recharge estimate calculated by this method is therefore a minimum value.

Water Use By Local Residences

The City of Fort Bragg Water Department quoted a water use rate of 60 to 70 gallons per day per person for a typical household. Average household size for the Fort Bragg area in 1990 was 2.63 persons (DWR, 1994), corresponding to a range of 158 to 184 gallons per day per household using the 60 to 70 gallon per day figure. For comparison, the City of Santa Cruz, California, Municipal Water Department (Toby Goddard, 1995) calculates an average daily use per household of about 180 gallons per day based on a use rate of 74 gallons per day per person and an occupancy rate of 2.5 persons per household. The California-American Water Company, serving

the Monterey/Carmel area, reports average household use of about 312 gallons per day. This larger number may reflect larger homes and lots in the Monterey area and drier climatic conditions. Since the lots in the Todd Point area are semi-rural and thus may be expected to use more water than city lots for landscaping, we have conservatively elected to use a rate of 300 gal/day/household. This use rate amounts to annual use of about 0.34 acre-feet per year per household. This average use rate for households should not to be confused with average per capita water consumption for Fort Bragg, which includes all commercial, industrial, and government water use as well (DWR, 1994).

Along the northern California coast, approximately 26% of the annual household water use is ascribed to "seasonal demand", that is, the amount considered to be used outdoors for landscape watering, car washing, etc. (DWR, 1994). The balance is used indoors. In areas where homes use septic systems, almost all the water used indoors (for showers, toilet flushes, dish and clothes washing, etc.) is returned to groundwater via the septic system, and therefore does not represent a net use of groundwater. For calculation purposes, we will assume that all the water used outdoors is lost to evapotranspiration, which is a conservative assumption, since some of this water normally soaks into the ground and flows back to the groundwater table. We also assume that 50% of daily household water use is for landscaping and other outdoor activities, instead of the 26% "seasonal demand" water use figures cited by the Department of Water Resources (DWR, 1994). This assumption is conservative from the point of view of estimating water use, since it increases the amount of water that is considered to be lost to the atmosphere rather than returned to the groundwater table through the septic system. Of the water used indoors, most returns to groundwater via the septic system and does not result in a net consumption of ground water.

300 gallons per day per residence = 150 gallons per day for indoor use, returned to groundwater via the septic system
+ 150 gallons per day for outdoor use, lost to evapotranspiration

Franks (1993) quotes an average daily flow to septic systems of 50 gallons per day per person. The 150 gallon per day return flow estimated above is therefore comparable to an average three person household.

Based on the water use estimates presented above, approximately 50% of the domestic water used in area homes is returned to groundwater through septic leach fields. Therefore, annual consumptive water use per household is on the order of 150 gallons per day, or 0.17 acre feet per year.

0.34 acre feet per year annual water use
less 50% x 0.34 acre feet per year returned to groundwater via septic system

---

= 0.17 acre feet per year per household consumptive use.

According to records provided by the Mendocino County Planning department, there are presently 36 residences occupying the Todd Point Area, with an additional 32 vacant lots of record available for development. Therefore, annual consumptive use of groundwater is:

Existing use: 36 residences x 0.17 af/y ~ 6.1 acre feet per year

If an additional 32 residences served by wells are constructed on existing vacant lots at Todd Point, there will be 68 residences served by individual wells.

Future use: 68 residences x 0.17 af/y ~ 11.6 acre feet per year

In addition to the 36 residences, we have identified only one other point of groundwater use in the study area: a well located in the Trailer Cove trailer park ("Trailer Park", Figure 1). According to the manager of the trailer park, this well formerly served the Surf Motel, the trailer park, and the Todd Farmhouse. However, all these facilities are presently supplied by city water and the well is now used only for minor irrigation in the trailer park. Because of its low utilization and distance from other groundwater points of use, we have not included this well in our water balance calculations.

Estimate of Storage Capacity of Terrace Deposit Aquifer

Because of the variable thickness of the terrace deposits, we estimate water storage capacity for the terrace sediments using an approximate thickness based on a qualitative assessment of the limited data at hand. The average thickness of the terrace deposits from water well data for the Todd Point area is on the order of 15-17 feet. The average thickness measured in borings on the project site is 8.5 to 9 feet. Visual inspection of the sea cliff exposures and geologic reconnaissance of Highway 1 road cuts revealed large areas with no terrace deposits and highly variable thicknesses elsewhere, ranging from 0 to about 17 feet. Based on this data, and for the purpose of estimating storage, we make the following estimates of the terrace deposit aquifer characteristics:

A). Average thickness of the terrace deposits based on data summarized above is estimated to be 10 to 12 feet. Using this estimate, we assume a maximum **saturated** thickness of 8 feet for the terrace deposit aquifer, since the upper few feet of soil loses

water rapidly to plant uptake and evaporation. Actual saturated thickness will vary greatly over the course of a year and from year to year, based on rainfall amounts. The boring data for the project site (Krazan, 1995) revealed little saturated thickness during the winter rainy season. These borings are situated at a higher elevation than most of the Todd Point terrace deposits in an area of generally thinner terrace sediments and are not considered representative of the aquifer as a whole. The review of well logs for the Todd Point Area revealed little or no saturated thickness in wells at the time they were drilled (Table A1, Appendix A). However, water level data recorded during drilling and development of wells may be inaccurate for a variety of reasons and therefore the water well data were not given much weight for the present analysis (if accurate, these data would indicate that most well water is being produced from bedrock). For the computation of storage capacity, we will use a maximum average saturated thickness of 8 feet, although this number may be larger than the amount that is typically stored in the aquifer, judging from well and boring data.

B). The terrace sediments have an average 25% specific yield. The specific yield is a measure of how much water a given volume of aquifer will yield under normal conditions. A 25% specific yield implies that one cubic foot of aquifer will yield 0.25 cubic feet of water to a well. This estimate is based on observed soil textures from Krazan (1995) and typical soil textures from the Soil Conservation Service soil survey (SCS, 1987), typified by fine to coarse-grained sand and silty sand, and average specific yields for different sediment types from Johnson (1967) .

Based on these estimates and a total aquifer surface area of 174 acres, estimated storage capacity of the terrace deposit aquifer is:

0.25 (Specific Yield) x 8' (average saturated thickness)
= 2 feet of water per unit surface area of aquifer.
2 feet x 174 acres
= **348 acre feet of storage**.

In our opinion, this figure represents a maximum storage capacity for the terrace deposit aquifer. Actual storage may be less.

Loss of Groundwater Recharge Due to the Proposed Kmart Development

Based on our communications with Lars Andersen and Associates, we understand that the non-residential portion of the proposed development will consist of 13.17 acres of impermeable

surface, consisting of area covered by buildings and paved surfaces. There will be an additional approximate 2.58 acres of impermeable surface associated with the residential portion of the project, assuming a 55% impermeable coverage for the 4.69 acres allotted for residential development. These two figures combine for a total of 15.75 acres of impermeable surface. If we assume that all rain falling on impermeable surfaces is lost as runoff to storm sewers, the net loss of recharge for the project can be calculated as:

Net Loss of Recharge

15.75 acres x 1.02 feet/square foot annual recharge ~16 acre feet/year.

The existing annual recharge for the terrace deposit aquifer, calculated in a preceding section, is 141 acre feet per year. After construction, this amount will be reduced by about 16 acre feet/year, or about 11%, according to the above calculations.

141 acre feet/year - 16 acre feet/year = 125 acre feet per year

The post-construction annual recharge to the study area as a whole will therefore exceed existing annual consumption of 6.1 acre feet per year by about 119 acre feet/year.

Potential Impacts of Future Development

For the purpose of evaluating cumulative impacts of development of the Todd Point area, we have evaluated a development scenario that consists of:

1. buildout of existing lots, to consist of 32 additional residences

2. expansion of the College of the Redwoods facility, and

3. construction of the proposed Kmart project.

Construction of 32 additional residences relying on wells will result in increased water consumption of about 5.4 acre feet per year (32 residences x 0.17 acre feet/year per household), and a decrease in available recharge due to the accompanying increase in impermeable surface area. For the purpose of these calculations, we estimate that: (1) each new home will be associated with an increase of 5,000 square feet (0.115 acre) of impermeable area (a 4000 square foot house/garage and a 20' x 50' paved driveway) and (2) about half (50%) of the runoff from the impermeable surfaces associated with these residences will end up as groundwater recharge. The 50% runoff estimate is based on the fact that much

of the runoff from impermeable surfaces associated with a single family residence in this area will spill directly onto the ground rather than be captured by storm sewers. The resulting decrease in annual recharge will amount to about 1.9 acre feet per year, calculated as follows:

5000 square feet = 0.115 acre

32 homes x 0.115 acre of impermeable area x 1.02 acre foot annual recharge x 0.50
~1.9 acre feet

Based on conversations with Mr. William Lex, associate vice president of the College of the Redwoods, there are no pending plans for enlarging the college facility due to the limited size of the local student population. However, for calculation purposes, we have assumed that eventual expansion results in doubling of the size of the facility. We have estimated the present impermeable area associated with the campus at 2.65 acres, based on scaling from the color aerial photo shown on Figure 4. Doubling this area would result in an increase in impermeable surface of 2.65 acres and a decrease in recharge of 2.7 acre feet per year.

2.65 acres x 1.02 acre feet/year annual recharge ~2.7 acre feet/year

Because of the facility's size, we expect that a storm drainage system will be implemented and essentially all runoff from impermeable surfaces will be piped offsite. The facility is presently served by city water and the increase in size is not expected to increase water demand from the aquifer.

Adding the results of the additional building of residential lots and expansion of the College of the Redwoods to the results of the Kmart project;

post-development recharge = 141 acre feet/year
less 16 acre feet/year(Kmart project)
less 1.9 acre feet/year (construction of additional 32 homes)
less 2.7 acre feet/year (expansion of College of the Redwoods)

= 120.4 acre feet/year

post-development groundwater demand for 68 homes (from previous section)
= 11.6 acre feet/year.

Under this cumulative development scenario, annual recharge at buildout, 120.4 acre feet/year, will exceed expected annual consumption of 11.6 acre feet/year.

DISCUSSION

Table 2, below, presents a summary of our groundwater recharge and groundwater use estimates for the Todd Point study area.

TABLE 2: Summary of recharge and water demand estimates

Development Scenario	Estimated Recharge in Todd Point Study Area	Estimated Water Use From Todd Point Wells	Net Groundwater Recharge Surplus or (Deficit)
Existing	141 acre-feet/year	6.1 acre-feet/year	134.9 acre-feet/year
Existing plus Kmart Project	125 acre-feet/year	6.1 acre-feet/year	118.9 acre-feet/year
Existing plus Kmart project, plus 32 additional homes and expansion of College of the Redwoods	120.4 acre-feet/year	11.6 acre-feet/year	108.8 acre-feet/year

1. The groundwater recharge and water use calculations summarized in Table 2 indicate that even with future development of the proposed Kmart project, 32 additional single family residences and expansion of the College of the Redwoods facility, there will still be a substantial groundwater recharge surplus in the Todd Point area.

2. The proposed impervious area that will be created by the project is about 11% of existing terrace deposit surface area. However, the boring data (Krazan, 1995) indicate that the terrace deposits are relatively thin under the site (average thickness less than 9 feet) in comparison to the range of terrace deposit thicknesses reported by Scott, et al (1982) and thicknesses shown by the water well logs(Appendix A). In addition, there was no standing water table in the terrace sediments under most of the site, even though the borings were drilled in the winter rainy season of 1994-1995. These observations indicate that little groundwater is stored in the portion of the terrace deposits underlying the project. In our opinion, the project will not significantly reduce the storage capacity of the terrace deposit aquifer for the Todd Point area as a whole, nor will it have a significant effect on area wide groundwater gradients.

3. Maximum aquifer storage capacity, 348 acre feet as estimated here, is only about twice the size of estimated 120.4 to 141 acre feet annual recharge. This observation indicates that groundwater is flushed rapidly through the terrace deposit aquifer system.

4. Future residential development of the Todd Point area may be complicated by two factors. First, future development using septic systems could impact groundwater quality. As noted in the Soil Conservation Service report (SCS, 1987), the soils in the area do not provide optimum filtration capacity for septic leach fields. The addition of 32 more houses on septic systems could result in a decline in well water quality due to recycling of septic leachate through wells. In addition, newer wells are also required to have a 20-foot sanitary seal, meaning that the upper 20 feet of the well bore is sealed against entry of water. Most of the well logs we reviewed indicated that the wells had sanitary seals (Appendix A). The purpose of the sanitary seal is to prevent easily contaminated surface waters from entering the well. Since the terrace deposits in many areas are less than 20 feet thick, this requirement may preclude using water from the terrace deposits for future development on many sites.

5. Given the calculated annual recharge of about 12 inches of water, a one acre lot receives an annual recharge of about 1 acre foot of water. This amount of recharge is more than five times as large as the annual water requirement of about 0.17 acre feet for a home on that lot.

6. Although annual groundwater recharge is much greater than existing or expected future demand, local variations in the distribution of that recharge could result in impacts for specific locations. The bedrock high on the project site forms a groundwater divide, with groundwater flow north of the bedrock high flowing west or northwest and groundwater flow south of the bedrock high flowing south, towards Hare Creek.

It is our opinion that the project will have little or no impact on groundwater supplies for most of the Todd Point alluvial aquifer. However, the project could impact groundwater supply in the relatively restricted portion of the terrace deposit aquifer between the bedrock high on the project site and Hare Creek by reducing the amount of groundwater flowing towards wells located along the southern project boundary. There are three properties located along the southern project boundary, identified by assessor's parcel numbers 018-450-22, -23, and -24. Although these properties receive enough recharge during the rainy season to supply household needs, this water may be depleted early in the dry season by outflow from the nearby cliff face. If recharge from uphill areas is reduced, available water during the latter part of the dry season could be reduced.

We spoke with Mr. James Cummings, the owner of parcels 018-450-22 and -23. According to Mr. Cummings, he is presently using a well located in the Hare Creek drainage to serve these

properties. Judging from its reported location, this well draws on water from the alluvial aquifer in Hare Creek and should not be impacted by the project.

Boring data on the project site indicate that terrace deposits in this area are on the order of 10 feet thick. Newer wells with the required 20 foot sanitary seal are therefore sealed off from the terrace deposit aquifer and from the weathering horizon formed at the upper surface of the bedrock. It is likely that wells of this sort are producing from bedrock rather than from the terrace deposits and are unlikely to be significantly affected by reductions in recharge to the terrace deposits.

IMPACTS

PROJECT IMPACTS

Based on the findings presented above, it is our opinion that the proposed Kmart project will not have a significant impact on groundwater availability for existing domestic use in the Todd Point area, although a potential adverse impact could occur with respect to water wells located along the southern property boundary (APNs 018-450-22, -23, and -24), to the extent that those wells draw water solely or principally from terrace deposits.

CUMULATIVE IMPACTS

The future development scenario considered here, to include the proposed Kmart shopping center, construction of 32 additional residences, and doubling of the facility size at the College of the Redwoods will still have a surplus annual groundwater recharge many times larger than expected groundwater demand. In our opinion, surplus recharge under these conditions will be sufficient to maintain an adequate domestic water supply for the Todd Point area.

This concludes our report. If you have any questions, please do not hesitate to contact me.

Very truly yours,
Nolan Associates

Jeffrey M. Nolan
Principal Geologist
CEG #1537

Attachments: Figure 1: Geologic Index Map
Figure 2: Geologic Cross Section A-A'
Figure 3: Photographs of Terrace Deposits Exposed in the Seacliff
Figure 4: Color aerial photograph of the Todd Point area.

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APPENDIX A

Table A1: Summary of Water Well Data, Todd Point Study Area
All wells located in T18N, R18W, Section 13
Wells identified by Water Well Driller's Report Number[1]

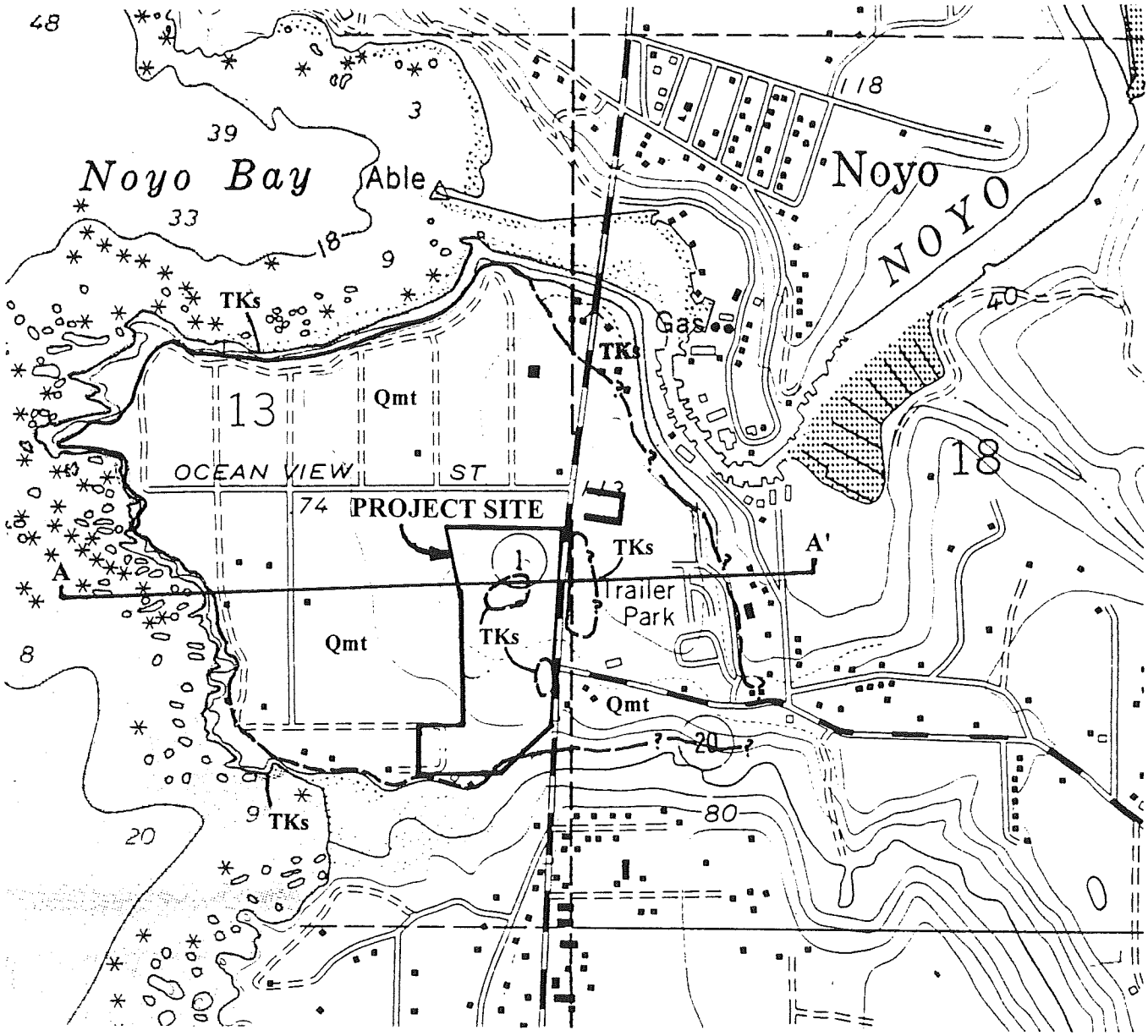
Reference Number	State Water Well Driller's Report Number	Total Depth of Well (feet)	Depth to Bedrock[2] (terrace deposit thickness) (feet)	Depth to Water Table[3] (feet)	Depth of Sanitary Seal
1	68662	60	7-12	22	10
2	056448	166	18	20	20
3	13205	70	24	21	15
4	215923	110	18	20/18	20
5	131672	100	16-19	29/20	20
6	141000	100	10	-	20
7	135988	98	11	40/25	20
8	056269	159	17	10	11
9	105132	144	18	15	19
10	140906	140	16	85-90	20
11	123282	56	4-28	33-37/47	20
12	126035	95	20	38	20

Average thickness = 14.9' to 17.6'

[1] State well numbers not listed on well logs

[2] A depth range is listed where the driller's log is ambiguous. Depth range shows minimum and maximum reasonable depths given the information on the drillers log.

[3] 20/18 = water level before/after development of well



ref: Topography from Fort Bragg 7½' topographic quadrangle
Geology modified from Kramer, 1976; Scott et al, 1982; Krazan, 1995

Explanation

Geologic Contact, dashed where approximate, queried where uncertain

Qmt — Marine Terrace Deposits (Quaternary), fine to coarse grained sand and silty sand

TKs — Coastal Belt Franciscan Formation (Cretaceous-Eocene), sandstone, shale, and minor conglomerate

Bedrock Outcrop (TKs)

A — A' Geologic Cross Section A-A'

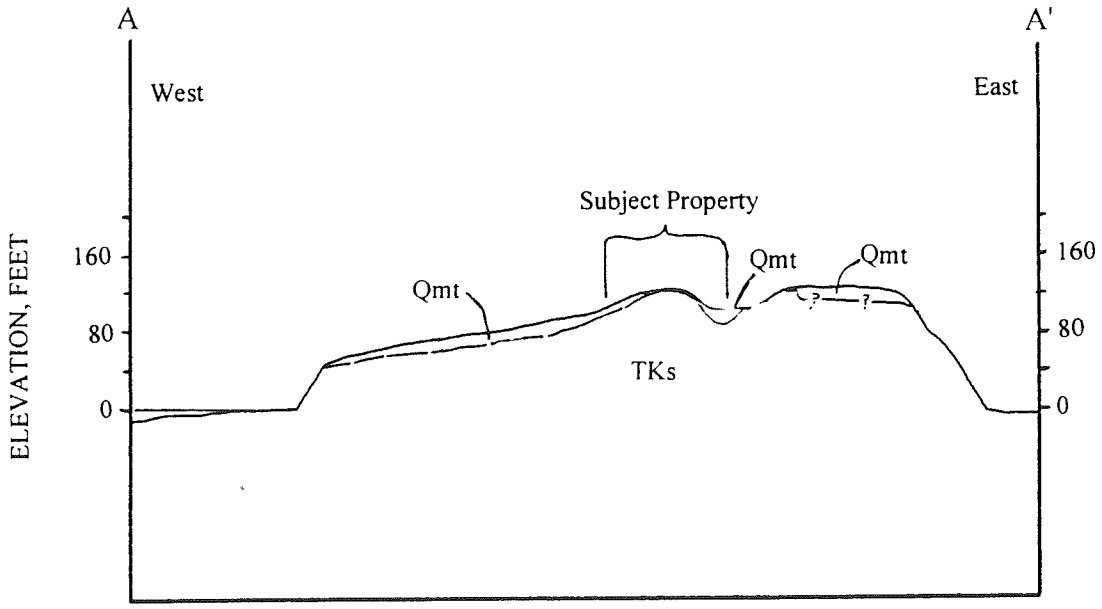
N

scale 1" = 1000'

GEOLOGIC INDEX MAP
Todd Point Study Area
Proposed Kmart Project
City of Fort Bragg, California

Geology · Hydrogeology
Nolan Associates
331 Harrison Avenue, Santa Cruz, CA 95062

Figure 1



scale 1" = 1000'

vertical exaggeration 5x

ref: Fort Bragg 7½' topographic quadrangle

Explanation

Geologic Contact, dashed where approximate, queried where uncertain

Qmt — Marine Terrace Deposits (Quaternary), fine to coarse grained sand and silty sand

TKs — Coastal Belt Franciscan Formation (Cretaceous-Eocene), sandstone, shale, and minor conglomerate

GEOLOGIC CROSS SECTION A-A'
Proposed Kmart Shopping Center
City of Fort Bragg, California

Geology · Hydrogeology
Nolan Associates
331 Harrison Avenue, Santa Cruz, CA 95062

Figure 2

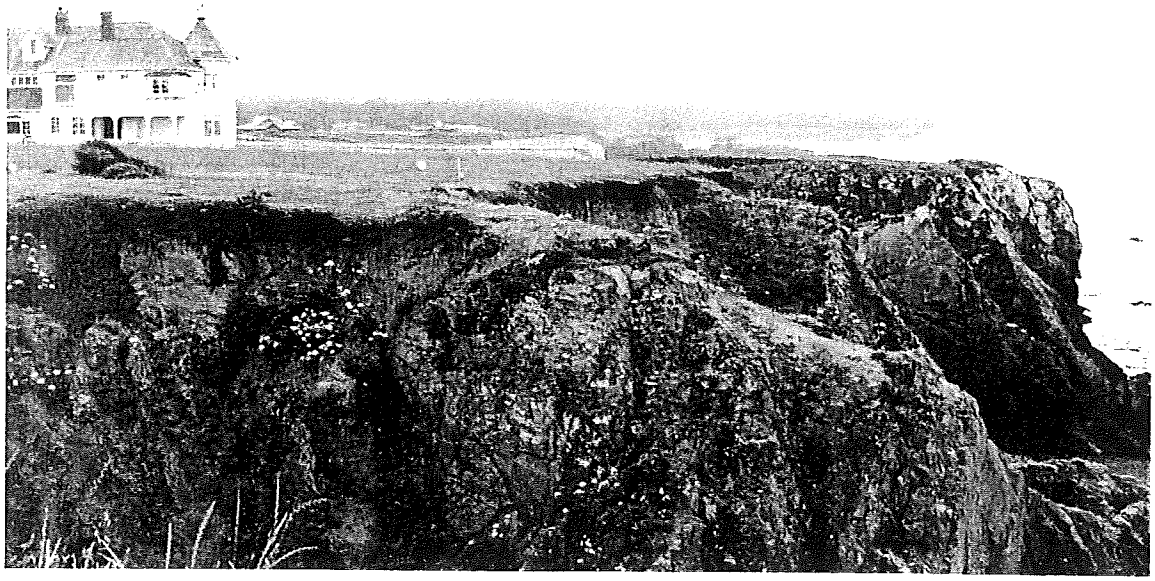


Figure 3A

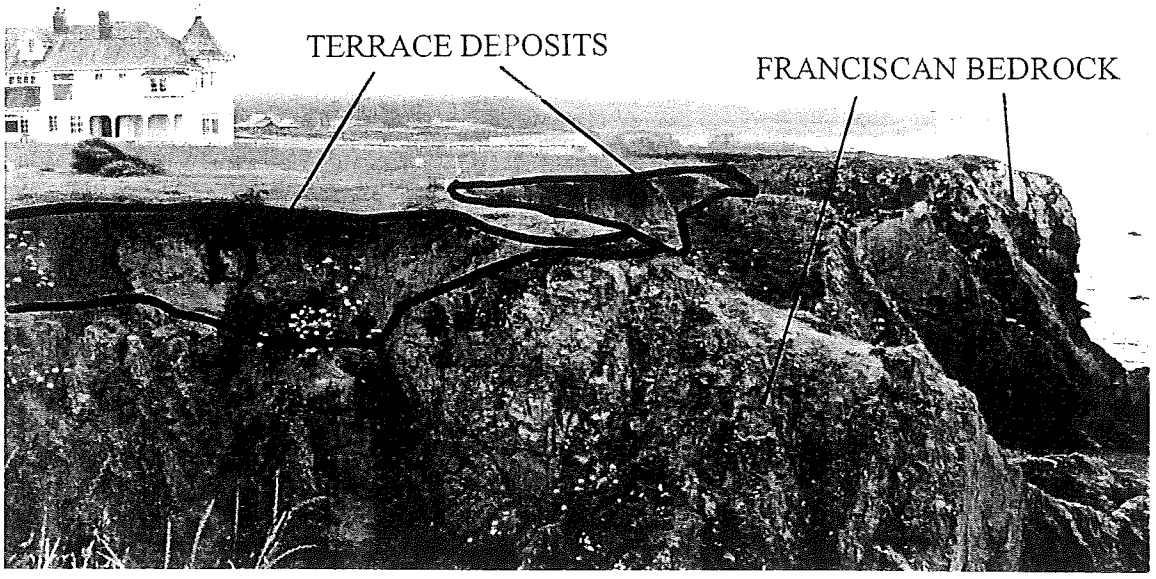
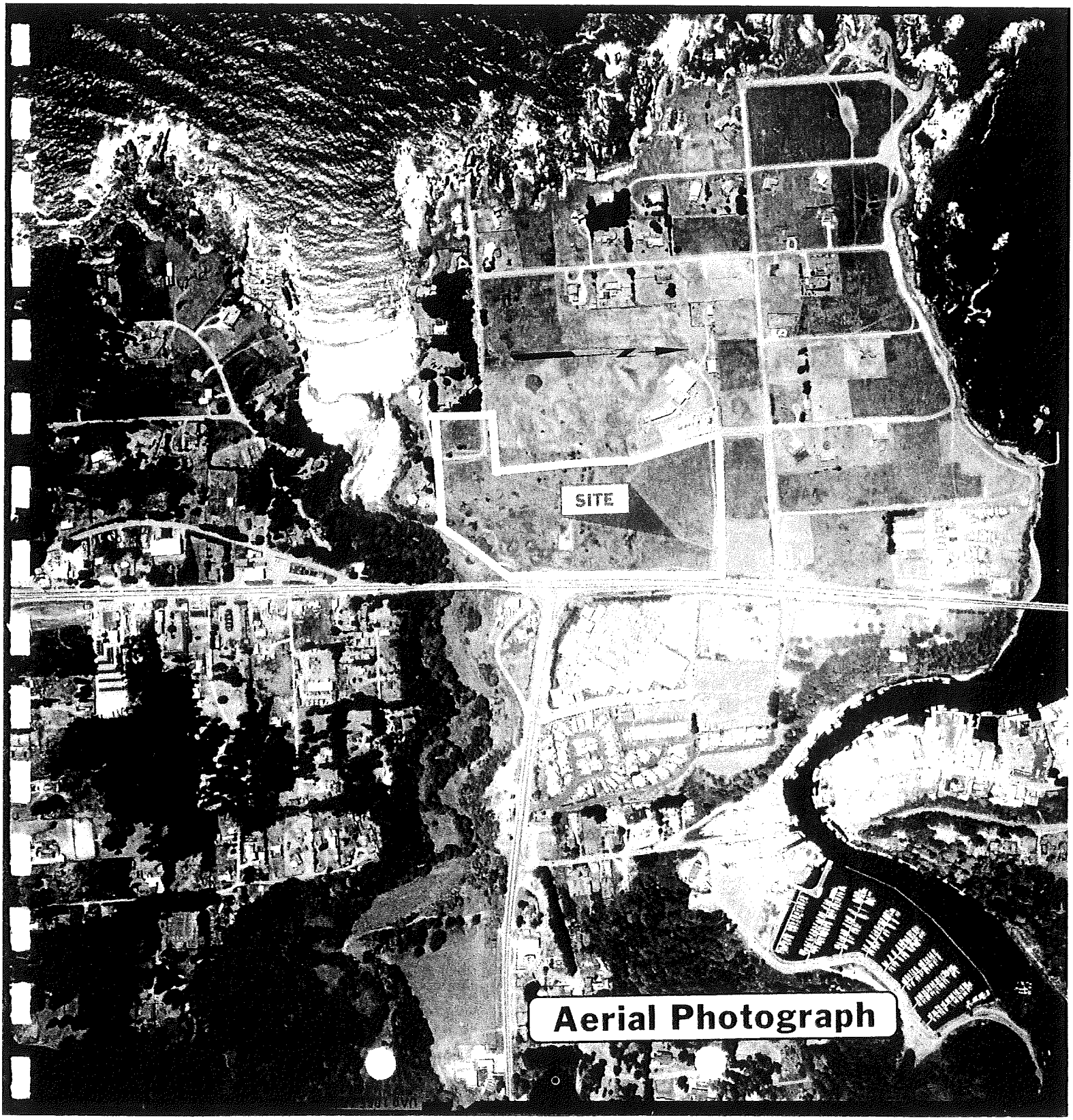


Figure 3B

PHOTOGRAPHS OF TERRACE DEPOSITS EXPOSED IN THE SEACLIFF
Proposed Kmart Project
City of Fort Bragg, California

Figure 3

Geology · Hydrogeology
Nolan Associates
331 Harrison Avenue, Santa Cruz, CA 95062



AERIAL PHOTOGRAPH OF THE TODD POINT STUDY AREA
Proposed Kmart Project
City of Fort Bragg, California

*N*olan *A*ssociates

Jones, Marie

From: Liebenberg, Angela@Wildlife <Angela.Liebenberg@wildlife.ca.gov>
Sent: Thursday, July 31, 2014 1:07 PM
To: Jones, Marie
Cc: Macedo, Richard@Wildlife
Subject: CDP #8-2013 comments

Marie –

This is in response to the Request for Comments on Coastal Development Permit (CDP) #8-2013. The project is a proposed shopping center consisting of three separate buildings, totaling 29,500 square feet of building space. Additional development would include a new access road, parking lot, pedestrian improvements, rain water storage tanks, utility connections and landscaping.

The biological scoping surveys and associated Coastal Act Compliance Report prepared by WRA Environmental Consultants did not identify Environmentally Sensitive Habitat Areas, special status species or their habitats on the project site. Vegetation communities reported include non-native grassland and ruderal scrub. Areas with shore pine and Bishop pine trees were observed, but were not classified as forest habitat due to their scattered distribution and lack of understory recruitment. Native shrubs and forbs were also observed.

Project design sheets show many reduced-impact elements, such as solar panels, rainwater storage tanks, vegetated areas to infiltrate water runoff, and use of native plants for landscaping.

The City of Fort Bragg (City) currently provides municipal water from three surface water sources (Noyo River, Newman Gulch, and Waterfall Gulch) which are experiencing low flows due in part to continuing and historic drought conditions. Independent of drought conditions, the City has experienced water-related shortfalls and issues including potential violations of its appropriative water right and failure to notify the Department of Fish and Wildlife as required under section 1602 of the Fish and Game Code (FGC). To fully address potential impacts to surface water sources, the CDP should include: a) a detailed water budget for the entire project and b) a detailed assessment documenting how water will be provided to this project in a manner that does not result in new or continuing violations of the FGC and other related laws and regulations.

Storage and use of rainwater is an increasingly important strategy for maximizing existing water supplies. Details were not provided regarding the expected water demand of the project in relation to the volume of rainwater that will be used and stored. In order to minimize the amount of water to be supplied by the City, the rainwater storage and use system should be designed with the capacity to provide as much of the expected water demand as is feasible.

Layout of landscaping and vegetated “bio-filtration” areas are shown in the Landscape plan, but Monterey cypress and shore pine are the only species identified. Monterey cypress trees should not be used because this species may become invasive in parts of California outside of its native range on the Monterey coast. Other plant species selected for landscaping should be native, or if not native, non-invasive, and preferably drought-tolerant.

Within the shopping center complex, permeable pavers are specified. Where feasible, other surfaces such as the new access road, sidewalk and walkway areas should be constructed using permeable paving. Where permeable surfaces are not feasible, runoff should be directed into or across vegetated areas to help filter runoff and encourage groundwater recharge.

My recommendations are as follow:

1. The CDP should include: a) a detailed water budget for the entire project and b) a detailed assessment documenting how water will be provided to this project in a manner that does not result in new or continuing violations of the Fish and Game Code and other related laws and regulations.

2. If feasible, rainwater storage and use system should be designed with the capacity to meet or exceed expected water demand.

3. Species used for landscaping and revegetation should preferably be native, or if non-native, should be non-invasive. Drought-tolerant species are preferable. No known invasive species should be used. Exotic plant species to avoid include those identified in the California Invasive Plant Council's database, which is accessible at: http://www.cal-ipc.org/paf/.

4. Permeable surfaces should be used wherever feasible. Otherwise, runoff should be directed into or across properly vegetated areas.

These comments and recommendations are not making a determination that the proposed project is consistent with the certified City of Fort Bragg LCP or certified Mendocino County LCP.

Thank you for the opportunity to comment. If you have any questions, please feel free to contact me at (707) 964-4830 or angela.liebenberg@wildlife.ca.gov.

- Angela

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HARE CREEK COMMERCIAL CENTER PROJECT

TRAFFIC IMPACT STUDY REPORT

Draft: March 2014

TRAFFIC IMPACT STUDY REPORT
FOR HARE CREEK COMMERCIAL CENTER

Project No. 11596-8410749

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1. Study Introduction & Analysis Summary

1.1 Study Introduction

This report presents an analysis of the traffic impacts that would be expected from the development of the Hare Creek Commercial Center, a project comprised of retail uses in the City of Ft. Bragg (City). The traffic study was completed in accordance with standard criteria, in coordination with City Staff, and is consistent with California Department of Transportation District 1 (Caltrans) *Guide for the Preparation of Traffic Impact* Studies and *District 1 Supplement* (Caltrans, 2008) and standard traffic engineering techniques. The traffic impact analysis provides an evaluation of operating conditions during the weekday morning and evening peak periods and weekend midday peak periods under Existing, Existing plus Project, Future, and Future plus Project Conditions. Where the Future Condition scenario represent the 20-year growth in traffic to year 2033 based on the *2014 Growth Factors* (Caltrans District 1, 2014) developed from California Air Resources Board (ARB) traffic growth projections and historic traffic growth data.

1.2 Project Summary

The Hare Creek Commercial Center (Project or project) contains a mixture of retail development on approximately 5 acres, bounded by State Route 1 (SR 1 or Hwy 1) to the east and Ocean View Drive to north. The project location is near the intersection of SR 1 and State Route 20 (SR 20 or Hwy 20); however, direct access will not be provided from SR 1 to the project site. The Project proposes to extend a “New Road” from Ocean View Drive to the project access driveways. Upon completion, the Project would comprise approximately 29,500 square feet of commercial related retail uses.

The current project site plan is included in Appendix A.

1.3 Analysis Summary

Five (5) intersections were selected for analysis as the locations most likely to experience impacts due to the project-generated trips. Study intersections were evaluated for four conditions: existing, existing + project, future, and future + project. Anticipated operations and intersection levels of service were assessed for potential impacts using on measures of effectiveness and thresholds of significance established by the California Department of Transportation (Caltrans) and the City of Fort Bragg (City). When evaluated using these criteria, all of the study intersections are expected to operate at acceptable levels during all study conditions and with proposed project improvements to the roadway network.

2. Study Parameters

2.1 Prelude

The purpose of a traffic impact study is to provide State and City staff and policy makers such as Planning Commissioners and Council members with data that they can use to make an informed decision regarding the potential traffic impacts of a proposed project, and any associated improvements that would be required in order to mitigate these impacts to a level of insignificance as defined by the *City of Fort Bragg Coastal General Plan* (City of Fort Bragg, 2008), or other policies, including *Caltrans Guide for the Preparation of Traffic Impact Studies* (Caltrans, 2002), as the intersections evaluated in this study are within the State right-of-way along State Route (SR) 1 and SR 20. The traffic impacts are typically evaluated by determining the number of trips the new use would be expected to generate, distributing the new trips to the surrounding street system based on existing travel patterns or anticipated travel patterns specific to a proposed project, then analyzing the impact the new traffic would be expected to have on critical intersections included in the study.

2.2 Study Intersections and Periods

The intersections analyzed in this study are listed below in Table 1. Intersections have been numbered for ease of reference in the remainder of this report.

Table 1 Study Intersections

	Intersection	Jurisdiction
1.	SR 1/Driveways at Harbor Dr. (near Noyo River Bridge)	Caltrans
2.	SR 1/Ocean View Drive	Caltrans
3.	SR 1/SR 20	Caltrans
4.	SR 20/Boatyard Drive	Caltrans
5.	SR 1/ Simpson Lane	Caltrans

The driveways indicated as Intersection No. 1 are located just south of the Noyo River Bridge, and were analyzed at the request of Caltrans and the City. These driveways are not an actual intersection, and are not considered an intersection henceforth. Further, SR 1 is not striped or marked as an intersection at the location of these driveways. The eastbound driveway approach is stop-controlled and the westbound driveway approach is uncontrolled. Alternate ingress/egress travel routes to these driveways exist, connecting to Boatyard Drive on the east side of SR 1 and Ocean View Drive on the west side.

Traffic conditions at the remaining intersections were analyzed for the weekday a.m. and p.m. peak hours and weekend mid-day peak hour of traffic. The a.m. peak hour of traffic is generally between 7:00 and 9:00 a.m. and the p.m. peak hour is generally between 4:00 and 6:00 p.m., while the weekend mid-day peak hour is generally between 11:00 a.m. and 2:00 p.m. It is during the peak hour of traffic that the most congested traffic conditions generally occur on an average day.

2.3 Study Scenarios

Four scenarios were evaluated in this study, which are Existing Conditions, Existing plus Project Conditions, Future Conditions, and Future plus Project Conditions.

Scenario 1: Existing Conditions. This scenario represents current traffic operations based on data collected in the field in August 2013.

Scenario 2: Existing plus Project Conditions. This scenario presents an evaluation of the potential traffic impacts that would be expected to occur with the addition of project-generated traffic to Scenario 1 – Existing Conditions.

Scenario 3: Future Conditions. This scenario represents traffic operations based on existing traffic volumes factored to the year 2033 utilizing Caltrans *District 1 20-year Growth Factors* (Caltrans, 2014), and including potential growth in surrounding areas.

Scenario 4: Future plus Project Conditions. This scenario presents an evaluation of the potential impacts that would be expected to occur with the addition of project-generated traffic to Scenario 3 – Future Conditions.

2.4 Data Requirements

The data requirements for the traffic impact analysis include:

- Existing traffic volumes; including new turning movement counts and 24-hour average daily traffic (ADT) vehicle classification counts.
- Intersection geometry and configuration.
- Caltrans District 1 Traffic Signals on State Highways Supplement to the Guide for the Preparation of Traffic Signals and Additions to the Supplement (included in Appendix B)

GHD's traffic data collection subconsultant, Counts Unlimited, Inc., collected existing traffic volumes at all study locations on Thursday, August 22 and Saturday, August 24, 2013. These counts consisted of both turning movement counts taken at all study intersections and 24-hour ADT vehicle classification counts at the following locations:

- SR 1, south of SR 1 and SR 20 intersection
- SR 1, south of Noyo River Bridge
- SR 20, east of SR 1 and SR 20 intersection

The 24 hour ADT vehicle classification counts were utilized in examining existing traffic patterns for project trip generation, distribution and assignment and to calculate heavy vehicle percentages. All intersection turning movement counts and 24-hour ADT vehicle classification counts are included in Appendix C.

2.5 Measures of Effectiveness

Caltrans maintains jurisdiction over the operation of highways and intersections in the study area. Caltrans uses measures of effectiveness (MOEs) to describe the measures best suited for analyzing State highway facilities. MOEs are calculated performance measures that reflect the operating conditions of a facility, given a set of roadway, traffic, and control conditions. These measures are also

recommended for City and County facilities. The City has jurisdiction over streets and intersections within city limits and outside the Caltrans right-of-way (ROW). The County has jurisdiction over streets and intersections outside City limits and Caltrans ROW. Table 2 summarizes the MOEs by facility type recommended by Caltrans, and the MOEs used in this study.

Table 2 Measures of Effectiveness (MOE) by Facility Type

Type of Facility	Caltrans MOE[1]	Study MOE
Signalized Intersections	Control Delay per Vehicle (sec/veh)	Control Delay per Vehicle (sec/veh)
Un-signalized Intersections	Control Delay per Vehicle (sec/veh)	Control Delay per Vehicle (sec/veh)
Roundabouts	None	Control Delay per Vehicle (sec/veh)

[1]Source: (Caltrans, 2002).

2.6 Thresholds of Significance

Title 14, Chapter 3 Article 20 §§15382 of the California Code of Regulations defines a *significant effect on the environment* as a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project. Thresholds of significance are principally used to determine whether a project may have a significant environmental effect. A threshold of significance is a quantitative or qualitative standard, or set of criteria from which the significance of a given environmental effect may be determined. In the context of traffic, levels of service based standards are typically used to establish thresholds of significance and qualify potential impacts.

2.6.1 City of Fort Bragg

The *City of Fort Bragg Coastal General Plan* (General Plan) (City of Fort Bragg, 2008) establishes minimum level of service standards (per Policy C-1.1) for the following:

- Signalized and All-Way-Stop Intersections along SR 1: LOS D
- Side Street Stop Sign Controlled Intersections along SR 1: LOS D, or LOS F if there is less than 15 veh./hr. left turns plus through movements from side street and the volumes do not exceed Caltrans rural peak hour signal warrant criteria levels.
- Signalized and All-Way-Stop Intersections not along SR 1: LOS C
- Side Street Stop Sign Controlled Intersections not along SR 1: LOS C, or LOS E if there is less than 15 veh./hr. left turns plus through movements from the side street and the volumes do not exceed Caltrans rural peak hour signal warrant criteria levels.

Additionally, the City's General Plan includes the following provision that is applicable to the study area:

- If volumes at an unsignalized intersection are increased to meet or exceed Caltrans rural peak hour signal Warrant [3] criteria levels and the intersection is operating at an unacceptable level of service, then signalization of the intersection is warranted.

The following goals and policies are established within the Circulation Element of the General Plan:

Goal C-1 Coordinate land use and transportation planning:

- *Policy C-1.2 – Coordinate Land Use and Transportation: Ensure that the amount and phasing of development can be adequately served by transportation facilities.*
    a) *Program C-1.2.1: Review development proposals for their direct and cumulative effects of roadway Level of Service standards. During the development review process, City staff will determine whether traffic studies need to be carried out and the scope of such studies.*
- *Policy C-1.3 – Do not permit new development that would result in the exceedance of roadway and intersection Levels of Service standards unless one of the following conditions is met:*
    a) *Revisions are incorporated in the proposed development project which prevent the Level of Service from deteriorating below the adopted Level of Service standards; or*
    b) *Funding of prorata share of the cost of circulation improvements and/or the construction of roadway improvements needed to maintain the established Level of Service is included as a condition or development standard of project approval.*
- *Policy C-1.4 – Include specific time frames for the funding and completion of roadway improvements for projects which cause adopted roadway and intersection Level of Service standards to be exceeded. Require security, bonding or other means acceptable to the City to ensure the timely implementation of roadway mitigations.*
- *Policy C-1.5 – Traffic Impact Fees. When traffic impact fees are collected, established a schedule from the date of collection of said fee for the expenditure of funds to construct roadway improvements that meets project needs. Where a project would cause a roadway or intersection to operate below the adopted Level of Service standards, the roadway or intersection improvements should be completed in a timely manner but no later than five years after project completion.*

Goal C-2 Develop and manage a roadway system that accommodates future growth and maintains acceptable Levels of Service while considering the other policies and programs of the Coastal General Plan.

- *Policy C-2.1 – Roadway Improvements. In coordination with Caltrans and Mendocino County, plan for and seek funding for on-going improvements to the local and regional road system to ensure that the roadway system operates safely and efficiently and to ensure that SR1 in rural areas outside the Mendocino County urban/rural boundary will remain a scenic two-lane road consistent with Section 30254 of the Coastal Act. Project applicants are fiscally responsible for their fair share of roadway improvements necessary to serve their projects.*
- *Policy C-2.2 – Improvements to major road intersections for public safety or increased vehicle capacity shall be permitted, as necessary, in existing developed areas and where such improvements are sited and designated to be consistent with all policies of the LCP.*
- *Policy C-2.3 – Design Roadways to Protect Scenic Views. In scenic areas, roadway improvements, including culverts, bridges or overpasses, shall be designed and constructed to protect public views and avoid or minimize visual impacts and to blend in with the natural setting to the maximum extent feasible.*
    - *Program C-2.3.1: When traffic analysis of levels of service and/or safety hazards indicates the need, construct the following roadway improvements where such roadway improvements are found to be consistent with all applicable policies of the LCP including, but not limited to, the wetland, environmentally sensitive habitat area, public access and visual protection policies:*
        - *Reconstruct the Main Street/Ocean View Drive intersection at time of development of the property between the College of the Redwoods and Main Street [SR 1]. Require a traffic engineering analysis of the intersection to determine appropriate geometrics and signal timing. Construct turning lane mitigations as needed.*

- *Policy C-2.6 – Traffic Studies for High Trip Generating Uses: Traffic studies shall be required for all major development proposals, including but not limited to, drive-through facilities, fast food outlets, convenience markets, major tourist accommodations, shopping centers, commercial development, residential subdivisions, and other generators of high traffic volumes that would affect a Level of Service. Traffic studies shall identify, at a minimum:*
    - *The amount of traffic to be added to the street system by the proposed development;*
    - *Other known and foreseeable projects and their effects on the street system;*
    - *The direct, indirect and cumulative adverse impacts of project traffic on street system operations, safety and public access to the coast;*
    - *Mitigation measures necessary to provide for project traffic while maintaining City Level of Service standards;*
    - *The responsibility of the developer to provide improvements; and*
    - *The timing of all improvements.*
- *Policy C-2.8 – Continuation of Streets: Require the continuation of streets and bicycle and pedestrian paths through new developments wherever possible.*

2.6.2 Caltrans

The *Guide for the Preparation of Traffic Impact Studies* (Caltrans, 2002) is intended to provide a consistent basis for evaluating traffic impacts to State facilities. Caltrans strives to maintain service levels at the transition between LOS C and LOS D. In cases where this LOS is not feasible the lead agency should consult with Caltrans to establish an appropriate LOS threshold. If an existing State highway facility is operating worse than the appropriate target LOS, the existing Measure of Effectiveness (MOE) should be maintained.

2.7 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, LOS A represents free flow conditions and LOS 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 and/or volume to capacity ratios.

2.7.1 Intersection Level of Service Methodologies

The study intersections were analyzed using methodologies from the *HCM2010 Highway Capacity Manual – Volume 3 Interrupted Flow* (HCM2010) (Transportation Research Board, 2010). This source contains methodologies for various types of intersection control, including signalized intersections, two-way stop-controlled (TWSC) intersections and roundabouts.

The analysis level in this study is recognized as planning and preliminary engineering. The “analysis level” describes the level of detail used when the methodology is applied. The “planning and preliminary engineering level” of analysis requires only the most fundamental types of information. Default values are then used as substitutes for other input data.

The methodologies utilized in this study are for the automobile mode, although other modes are discussed.

Synchro 8 (Synchro) with SimTraffic software was used for the traffic analysis in this study.

2.7.2 Signalized Intersections

The signalized methodology for the automobile mode is based on input data requirements for traffic characteristics, geometric design, signal control and other factors including analysis period duration and approach speed limit.

Traffic characteristic inputs include (among others) demand flow rate, percent heavy vehicles, peak hour factors and base saturation flow rate.

Geometric design inputs include the number of lanes, average lane width, number of receiving lanes, turn bay (or pocket) lengths, presence of on-street parking and approach grade.

Signal control inputs include the type of signal control, phase sequence, protected for permissive left-turn operations, maximum green time, minimum green time, yellow change interval, red clearance, walk time, pedestrian clear time and phase recall.

Computed control delay per vehicle in seconds is used as the basis for evaluation in this LOS methodology to describe the signalized intersection operation as a whole. The ranges of delay associated with the various signalized levels of service are summarized in Table 3.

2.7.3 Two-way Stop-Controlled Intersections

The two-way stop-controlled (TWSC) (unsignalized) intersection methodology for motor vehicles is determined by the computed or measured control delay and the volume-to-capacity ratio. For motor vehicles, LOS is determined for each minor-street movement (or shared movement) as well as major-street left turns by using the criteria shown in Table 4. LOS for TWSC intersections is not defined for the intersection as a whole or for major-street approaches.

The input data required for evaluation of TWSC intersections includes the number and configuration of lanes on each approach; percent heavy vehicles for each movement; demand flow rate for each entering vehicular movement and each pedestrian crossing movement during the peak hour; peak hour factor; existence of a two-way left-turn lane (TWLTL) or raised or striped median storage (or both); approach grades; existence of flared approaches on the minor street; and existence of upstream traffic signals.

Computed control delay per vehicle in seconds and volume-to-capacity (v/c) ratio are used as the basis for evaluation in this LOS methodology to describe each minor-street movement and major-street left-turn movement. LOS F is assigned if the v/c ratio of a movement exceeds 1.0. The ranges of delay associated with the TWSC levels of service are indicated in Table 4.

2.7.4 Roundabouts

The roundabout intersection methodology for motor vehicles is determined by computed control delay per vehicle in seconds for approaches and intersection wide assessment.

The input data required to analyze a roundabout includes the number and configuration of lanes on each approach; demand volume and each pedestrian crossing movement during the peak hour; peak hour factors; percentage heavy vehicles; and volume distribution across lanes for multi-lane entries.

The ranges of delay associated with the roundabout levels of service are indicated in Table 4.

2.8 Vehicle Queuing

Vehicle queuing analysis is completed for all signalized intersections to assess the capacity of intersections to accommodate the number of vehicles expected to wait at the intersections before being able to pass through or turn. This analysis is important because if there is not enough queuing space between intersections, in left-turn or right-turn pockets, the overflow of vehicles can obstruct the operations of the roadway.

The Synchro software program was used to determine the 50th percentile vehicle queue, which is the maximum back of queue on a typical cycle, and the 95th percentile queue which is the maximum back of queue with 95th percentile traffic volumes. The queue analysis will determine the 50th and 95th percentile movement queue lengths based on HCM2010 methodology.

Table 3 Signalized Level of Service

Level of Service	Description	Control Delay (Seconds Per Vehicle)
A	Operations with very low delay occurring with favorable progression and/or short cycle lengths.	< 10
B	Operations with low delay occurring with good progression and/or short cycle lengths.	>10 to 20
C	Operations with average delays resulting from fair progression and/or longer cycle lengths. Individual cycle failures begin to appear.	>20 to 35
D	Operations with longer delays due to a combination of unfavorable progression, long cycle lengths, and/or high volume-to-capacity (V/C) ratios. Many vehicles stop and individual cycle failures are noticeable.	>35 to 55
E	Operations with high delay values indicating poor progression, long cycle lengths, and high V/C ratios. Individual cycle failures are frequent occurrences. This is considered to be the limit of acceptable delay.	>55 to 80
F	Operation with delays unacceptable to most drivers occurring due to oversaturation, poor progression, or very long cycle lengths.	> 80

Source: 2010 Highway Capacity Manual (Transportation Research Board, 2010).

Table 4 TWSC Intersection or Roundabout Level of Service

Level of Service	Description	Control Delay (Seconds Per Vehicle)	LOS by v/c Ratio ≤ 1.0
A	Little or no delay	< 10	A
B	Short traffic delays	>10 to 15	B
C	Average traffic delays	>15 to 25	C
D	Long traffic delays	>25 to 35	D
E	Very long traffic delays	>35 to 50	E
F	Extreme traffic delays with intersection capacity exceeded (for an all-way stop), or with approach/turn movement capacity exceeded (for a side street stop controlled intersection)	> 50.0	≥ 1.0 F

Source: 2010 Highway Capacity Manual (Transportation Research Board, 2010).

3. Existing Conditions

This section describes the existing conditions at the study intersections and roadways during both the weekday a.m. and p.m. peak hours and weekend mid-day peak hour based on peak hour traffic conditions. Also included is a discussion of transportation facilities in the project area, including the roadway network, transit services, and bicycle and pedestrian facilities.

3.1 Study Area

The Hare Creek Commercial Center is to be located on a new road that extends south from Ocean View Drive. Primary access will be from the intersection of SR 1 and Ocean View Drive. At this time, there is no plan to provide direct access to the Hare Creek Commercial Center from SR 1. The study area and intersection locations are shown in Figure 1.

The roadways analyzed in this study are functionally classified by the *City of Fort Bragg Coastal General Plan*, 2008 (General Plan). These classifications are *Highways*, *Arterials, Major collectors, Minor collectors, and Local Streets*. Highways are high speed limited access roadways serving primarily regional and county-wide travel. Arterials are medium-speed, medium capacity roadways that provide travel and access within the City and access to highways. Major Collectors are relatively low-speed, streets that provides access within and between neighborhoods. Minor Collectors are relatively low-speed streets that provide connections between Arterials and Major Collectors and direct access to parcels. The function of local streets is to provide access to adjacent properties.

State Route (SR) 1 is a four-lane or two-lane highway in the vicinity of the proposed Project site. It runs in a north/south direction and passes through the City of Fort Bragg. From the north side of the Hare Creek Bridge SR 1 is a two-lane divided highway. North of the Hare Creek Bridge it widens to a four-lane divided highway. A two-way left-turn lane (TWLTL) is present north of the intersection of SR 1 and Ocean View Drive (Intersection No. 2). The Project site is located adjacent to and west of SR 1. The posted speed limit is 40 miles per hour (mph). Current access to the Project site from SR 1 is by Ocean View Drive.

SR 20 is two-lane east/west highway which terminates at SR 1. A two-way left-turn lane (TWLTL) is present east of the intersection of SR 20 and Boatyard Drive (Intersection No. 4). The posted speed limit is 45 mph.

Ocean View Drive is a two-lane local street providing access to the Todd's Point area from SR 1 (Intersection No. 2). It has a posted speed limit of 25 mph.

Boatyard Drive is a two-lane local street that loops between SR 1 at Ocean View Drive (Intersection No. 2) and SR 20 (Intersection No. 4). It has a posted speed limit of 25 mph, and provides access to the Boatyard Shopping Center.

Harbor Drive is a two-lane frontage road that is located on the west side of SR 1 between Intersection No. 1 and Ocean View Drive. Harbor Drive is a local street that provides access to businesses and residences. It has a speed limit of 25 mph.

The *Hare Creek Bridge*, also known as the Sergeant Emil H. Evensen Memorial Bridge, is a two-lane bridge on SR 1 crossing Hare Creek approximately 300 feet south of Intersection No. 3.

The *Noyo River Bridge*, which was recently widened to four lanes by Caltrans, is located north of Intersection No. 1 on SR 1. The Noyo River Bridge includes striped median separating northbound and southbound lanes. Class II bike lanes are present on both sides. Pedestrian walkways separated from vehicular and bicycle traffic are also present on both sides of the bridge.

3.1.1 Transit Service

The Mendocino Transit Authority provides regional transit service to the City of Fort Bragg Monday through Saturday. Transit Route 5 (BraggAbout) provides local service in and around the City of Fort Bragg. There are two bus stops for Transit Line 5 in the study area, one at College of the Redwoods off of Ocean View Drive and one at the Boatyard Shopping Center off of Boatyard Drive. Transit Route 60 (The Coaster) provides regional service between Fort Bragg and Mendocino/Navarro River. Transit Line 60 connects with Transit Lines 5 and 65 at the College of the Redwoods and Boatyard Shopping Center stops. Transit Line 65 (CC Rider) provides regional service between Fort Bragg, Willits, Ukiah and Santa Rosa.

3.1.2 Rail Service

The Skunk Train is a scenic tourist train that runs between Willits and Fort Bragg seven days a week. Trains depart daily in the morning, with the trip taking approximately 3.5 hours. This rail line is not a commuter rail.

3.1.3 Bicycle and Pedestrian Facilities

Class III bike routes are present along both sides of SR 1 and SR 20 as a paved shoulder separated from vehicular traffic by a striped edge of travel way line. Class III bikeways are unmarked bicycle routes which share the road with other vehicles. The bikeway is generally between 4-ft and 6-ft wide.

Pedestrian facilities in the study area are limited and consist primarily of sidewalks and crosswalks at or near intersections, with exceptions to the Noyo River Bridge and sections of Boatyard Drive (near the Boatyard shopping center). Sidewalks, curb ramps and marked cross walks are present at Intersection No. 2 – Ocean View Dr. and SR 1, No. 3 – SR 1 and SR 20, No. 4 – SR 20 and Boatyard Drive and No. 5 – SR 1 and Simpson Lane.

3.2 Study Intersections

The following intersections (including traffic control type) were identified for analysis as the locations most likely to experience impacts due to the project-generated traffic. The intersections and study area context map are provided in Figure 1.

1. SR 1 and Driveways at Harbor Drive TWSC
2. SR 1 and Ocean View Drive Signalized
3. SR 1 and SR 20 Signalized
4. SR 20 and Boatyard Drive TWSC

5. SR 1 and Simpson Lane Roundabout

Existing intersection lane configurations are shown on Figure 2.

3.2.1 Existing Sight Distance

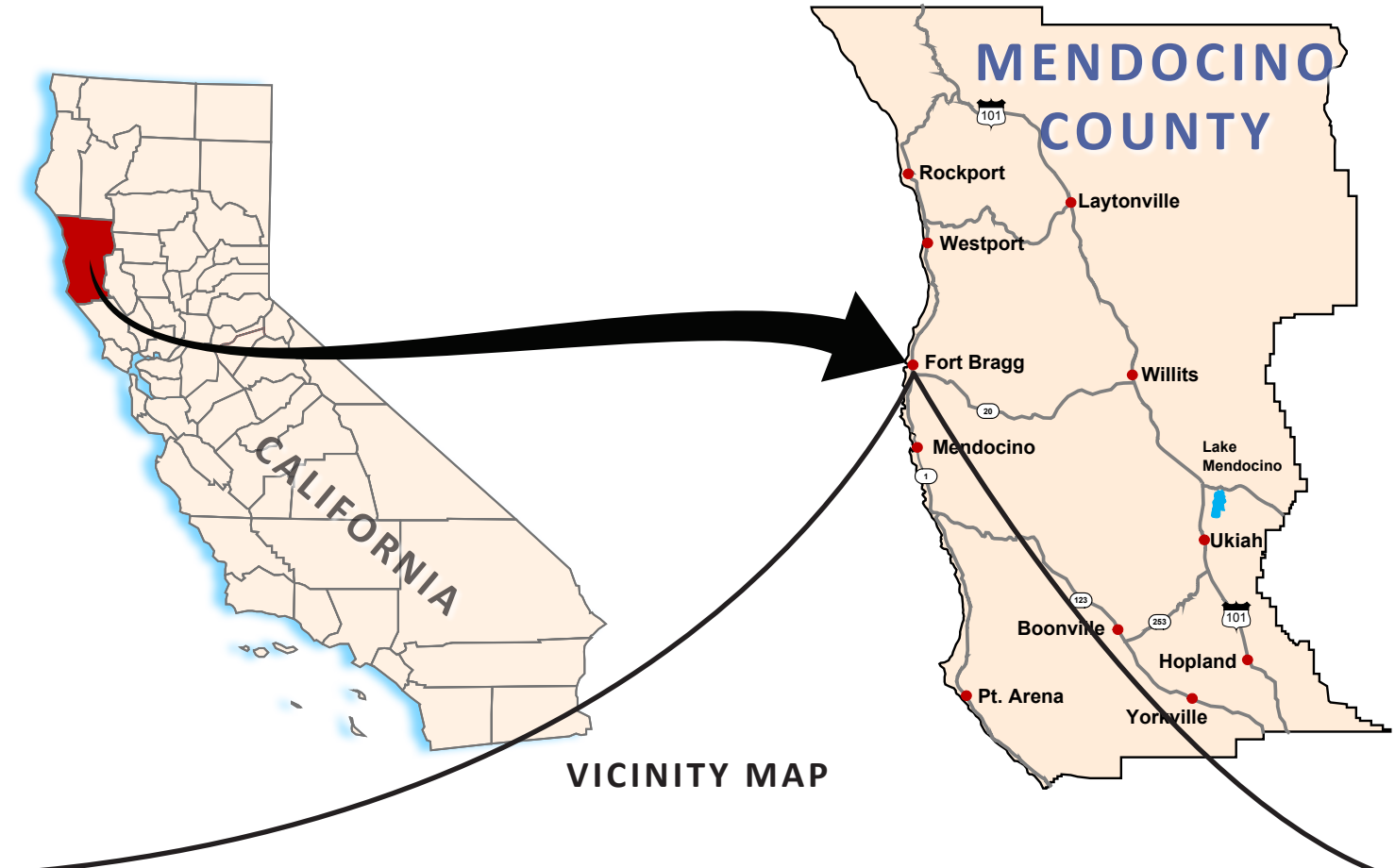
Intersection sight distance is the measurement of the clear line of sight between the driver of a vehicle waiting at the crossroad and the driver of an approaching vehicle. The design standards for intersection sight distance applicable to this study are provided in the Caltrans *Highway Design Manual* (Caltrans, 2012b) and are summarized in Table 5.

Table 5 Intersection Corner Sight Distance1

Design Speed	Sight Distance
25 mph	275-ft
30 mph	330-ft
35 mph	385-ft
40 mph	440-ft
45 mph	495-ft

[1]Source: Caltrans (2012b).

The values for sight distance given above should be applied at all study intersections. These sight distance values were evaluated at all signalized and unsignalized intersections whenever possible. Unanticipated vehicle conflicts can occur due to signal malfunctions, violations of signals, right turns on red, and right of way failures. A review of the existing study intersections indicates that the minimum sight distances are provided based on intersection geometry and posted speed limits.



VICINITY MAP

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Project Vicinity and Location Map

Figure 1

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North

Not to Scale

Pacific Ocean

College of the Redwoods Campus

Bay View Ave.

Ocean View Dr.

Monterey Ave.

Del Mar Dr.

Harbor Ave.

Cypress Rd.

Old Coast Hwy

STATE ROUTE 1

Hare Creek Bridge

PROPOSED PROJECT SITE

Simpson Ln.

Colling Ln.

Hare Creek Rd.

Hare Creek

Harbor Dr.

S. Main St.

Noyo Bridge

Boatyard Dr.

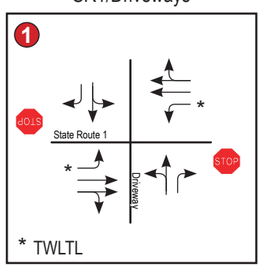
Noyo River

STATE ROUTE 20

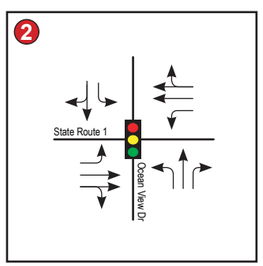
S. Harbor Dr.

N. Harbor Dr.

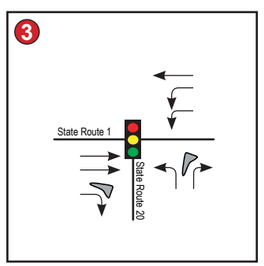
SR1/Driveways



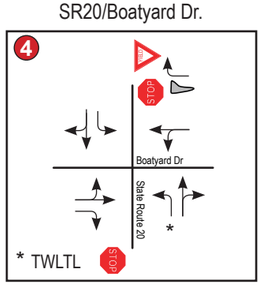
SR1/Ocean View Dr.



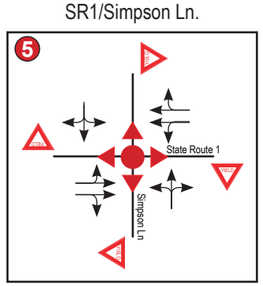
SR1/SR20



SR20/Boatyard Dr.



SR1/Simpson Ln.



Legend

- 1 Study Intersection
- STOP Stop Sign
- Signal
- Roundabout
- Yield Sign
- Approximate City Limits
- Channelized Right Turn

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Existing Intersection Lane Geometry and Traffic Controls

Figure 2

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3.3 Traffic Volumes

Peak weekday a.m. and p.m. and peak weekend midday traffic counts were collected as part of this study on Thursday, August 22, 2013 and Saturday, August 24, 2013, respectively. Traffic data is included in Appendix C.

3.3.1.1 24-hour ADT Classification Volume

24 hour ADT counts were included in the analysis to assist with project trip generation, distribution and assignment purposes and to compile general statistics about existing traffic volumes, including heavy vehicle percentage.

Table 6 summarizes the ADT and the heavy vehicles percentage along SR 1 (at two locations) and SR 20 (at one location). The ADT count locations are shown on Figure 3.

Table 6 ADT and Heavy Vehicle Summary

Location	NB/EB		SB/WB		Total	
	ADT (veh./day)	Hvy Veh (%)	ADT (veh./day)	Hvy Veh. (%)	ADT (veh./day)	Hvy Veh. (%)
SR 1 - s/o SR 1/SR 20 Int.	8,839	11.2%	8,975	8.1%	17,814	9.6%
SR 1 - s/o Noyo River Bridge	12,906	10.6%	13,220	14.6%	26,126	12.6%
SR 20 - e/o of SR 1/SR 20 Int.	4,177	17.6%	4,434	11.9%	8,611	14.7%

The heavy vehicle percentages from the ADT summary were applied and used in the traffic analysis.

3.3.1.2 Intersection Turning Movement Volumes

Peak weekday a.m. and p.m. and peak weekend midday intersection turning movement volumes are indicated in Figure 3.

3.4 Existing Conditions Intersection Level of Service Analysis

The results of the intersection level of service analysis based on existing turning movement traffic volumes are summarized in Table 7. The analysis finds that all study intersections are operating acceptably based on Caltrans and City significance thresholds.

Intersection No. 4 – SR 20 / Boatyard Drive exceeds the City thresholds of significance for “Side Street Stop Sign Controlled Intersections not along SR 1” (LOS C, min. per Policy C-1.1). While the combined total left turn plus through movement volume exceed 15 vehicles per hour, the rural peak hour Signal Warrant 3 criteria is not met, therefore this intersection approach operates at an acceptable LOS D or better.

The unsignalized intersections were evaluated using the rural Signal Warrant 3, per the City of Fort Bragg thresholds of significance, which is discussed under the Section 8 of this report. Signal Warrant 3 analysis results are included in Appendix J.

The Existing Conditions Scenario Level of Service calculations are provided in Appendix D.

Table 7 Existing Conditions Scenario Intersection Level of Service

No.	Intersection	Weekday				Weekend	
		a.m.		p.m.		midday	
		Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
1	SR 1 / Commercial Driveways[1]						
	Northbound left	*9.5*	*A*	*11.9*	*B*	*10.7*	*B*
	Eastbound left-thru-right	*25.9*	*D*	***>50.0***	***F***	***36.3***	***E***
	Westbound left-thru-right	*23.2*	*C*	***30.3***	***D***	***32.2***	***D***
	Southbound left	*10.1*	*B*	*11.6*	*B*	*11.4*	*B*
2	SR 1 / Ocean View Drive[2]	12.0	B	19.3	B	15.9	B
3	SR 1 / SR 20[2]	10.1	B	15.0	B	12.9	B
4	SR 20 / Boatyard Drive[1]						
	Northbound left-thru	*15.1*	*C*	*19.5*	*C*	*21.3*	*C*
	Northbound right	*0.0*	*A*	*9.8*	*A*	*10.1*	*B*
	Eastbound left	*8.2*	*A*	*8.7*	*A*	*8.7*	*A*
	Westbound left	*0.0*	*A*	*0.0*	*A*	*8.0*	*A*
	Southbound left-thru	*15.5*	*C*	*22.4*	*C*	***25.5***	***D***
	Southbound right	*10.1*	*B*	*11.4*	*B*	*11.2*	*B*
5	SR 1 / Simpson Lane[3]	6.6	A	9.6	A	8.9	A

Notes: Delay is calculated in average seconds per vehicle in queue
LOS = Level of Service
Bold = results exceed acceptable LOS
[1]LOS based on HCM2010 method of analysis for TWSC intersections.
[2]LOS based on HCM2010 method of analysis for Signalized intersections.
[3]LOS based on HCM2010 method of analysis for Roundabouts.

3.5 Existing Conditions Signalized Intersections Queue Analysis

Existing traffic volumes were applied to signalized study intersections and the peak hour demand 50th and 95th percentile queue lengths were reviewed against the existing lane storage capacity at the intersections.

The Existing Peak Hour Intersection Queue Analysis is summarized in Table 8. Detailed results are provided in Appendix D.

Peak hour 50th and 95th percentile queue lengths are within existing storage lane capacity at all signalized intersections.

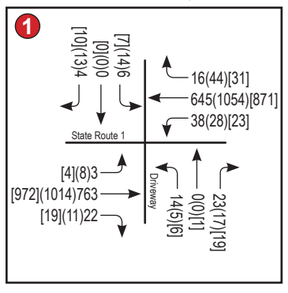
Table 8 Summary of Existing Peak Hour Intersection Queue Analysis

Movement	Lanes / Avail. Storage	Queue Length - 50th / 95th (feet/feet)					
		a.m.		p.m.		midday	
Intersection No. 2 - SR 1 / Ocean View Drive							
EBL	1 / 110 ft	10	33	23	57	15	44
EBTR	1 / 110 ft	3	24	5	27	5	29
WBL	1 / 120 ft	9	31	7	27	13	40
WBT	1 / 120 ft	4	19	5	22	6	23
WBR	1 / 120 ft	7	33	31	85	26	73
NBL	1 / 350 ft	7	26	11	40	7	27
NBTR	2 / 350 ft	103	160	126	192	111	172
SBL	1 / 400 ft	37	90	79	226	63	173
SBTR	2 / 400 ft	37	124	70	207	46	154
Intersection No. 3 - SR 1 / SR 20							
WBL	1 / 220 ft	19	52	68	150	50	109
WBR	1 / 120 ft	0	46	0	49	0	40
NBT	2 / 170 ft	30	106	94	160	82	145
NBR	1 / 120 ft	0	22	0	33	0	35
SBL	2 / 320 ft	26	60	48	132	35	97
SBT	1 / 320 ft	62	136	177	344	108	240

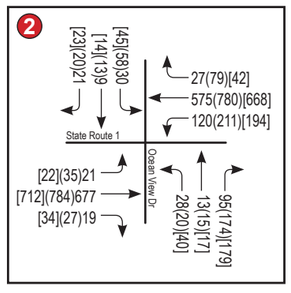
Notes: Queue shown is maximum after two cycles

~ - Volume exceeds capacity, queue is theoretically infinite
# - 95th percentile volume exceeds capacity, queue may be longer
M – Volume for 95th percentile queue is metered by upstream signal
Bold = results where available storage is exceeded by more than one standard vehicle, 25 ft.

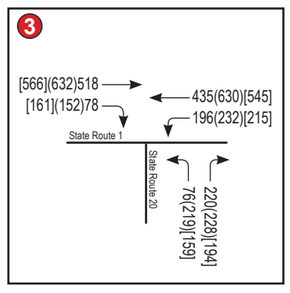
SR1/Driveways



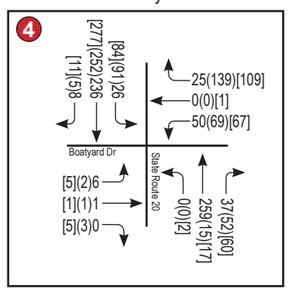
SR1/Ocean View Dr.



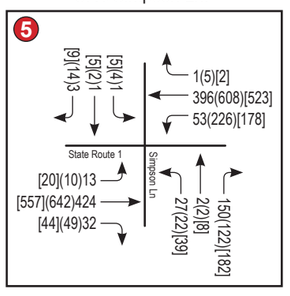
SR1/SR20



SR20/Boatyard Dr.



SR1/Simpson Ln.



Legend

1	Study Intersection
XX	AM Peak Hour Volume
(XX)	PM Peak Hour Volume
[XX]	Weekend Mid-Day Peak Hour Volume
NB	Northbound
SB	Southbound
EB	Eastbound
WB	Westbound
- - -	Approximate City Limits

Average Daily Traffic (ADT)

1	NB	8,839
	SB	8,975
	Total:	17,814
2	NB	12,906
	SB	13,220
	Total:	26,126
3	EB	4,177
	WB	4,434
	Total:	8,611

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Existing Conditions Intersection & ADT Traffic Volumes

Figure 3

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4. Project Trip Generation, Distribution and Assignment

This section discusses the methods and analysis conducted in selecting trip generation rates and assigning Project trips to the existing roadway network. The magnitude of traffic produced by the proposed project and the locations where that traffic would appear is estimated using the three step process of trip generation, trip distribution and trip assignment. The number of project trips generated during the weekday a.m. and p.m. peak hour and weekend (Saturday) midday peak hour were estimated using standard Institute of Transportation Engineers (ITE) *Trip Generation Manual 9th Edition* (ITE, 2012) rates for the Project land use type. This standard reference is used by jurisdictions throughout the country, and is based on actual trip generation studies performed at numerous locations in areas of various populations.

The proposed Hare Creek Commercial Center project site plan is included in Appendix A. An additional element of the project is the widening of the eastbound approach at Intersection No. 2 – SR 1 / Ocean View Drive to add a right turn lane. This geometric change is considered part of the roadway geometry for the Existing Plus Project and Future Plus Project conditions.

All project trips will access the Hare Creek Commercial Center via Intersection No. 2 – SR 1 / Ocean View Drive to a "new road" extension.

4.1 Trip Generation

For the analysis of potential Project-related traffic impacts a trip generation rate was selected for the project based on ITE trip generation rates. Several potential trip generation rates were reviewed for the proposed 39,500 gross square foot retail center. The *Guidelines for Estimating Trip Generation* from ITE *Trip Generation Manual 9th Edition* (ITE, 2012) were utilized in selecting the appropriate trip generation rates. It is important to note that the land use types described in the ITE Trip Generation Manual are not directly related to land use types described in the City's General Plan, municipal code, or zoning ordinance. The classifications are based on specific sites and data collected over years of study for the purpose of estimating trip generation for specific land usages.

The ITE trip generation rates under the "Retail" land use category (and ITE land use code) selected for evaluation included:

- Shopping Center (820) – "A shopping center is an integrated group of commercial establishments that is planned, developed, owned and managed as a unit. A shopping center's composition is related to its market area in terms of size, location, ad type of store. A shopping center also provides on-site parking facilities sufficient to serve its own parking demands. Shopping centers, including neighborhood centers, community centers, regional centers and super regional centers were surveyed for this land use."

The "best fit" regression equation was used to establish the total trip generation for the Shopping Center (820) land use. The Hare Creek Commercial Center includes the following uses, which all meet the definition of uses typically included in Shopping Center (820):

- Hare Creek Center – Retail 13,235 gross leasable area (GLA)
- Grocery Outet 15,000 gross floor area (GFA)
- Restaurant 1,265 gross floor area (GFA)

The entire retail center includes 29,500 GLA.

Table 9 shows the trip generation rates and corresponding trips generated for the project for the weekday a.m. and p.m. peak hour and the weekend midday peak hour. Appendix E includes the full trip generation calculation.

Table 9 Project Trip Generation

Land Use (#)	Units (ksf)	Daily		a.m. Peak Hour		p.m. Peak Hour		Weekend Peak Hour	
		Rate	Trips	Rate	Trips	Rate	Trips	Rate	Trips
Shopping Center (820)	29.50	104.73	3,090	2.53	76	9.01	267	13.48	398
Total Project New Trips			**3,090**		**76**		**267**		**398**

4.2 Discussion about Pass-By Trips

It is acknowledged that the total number of generated trips may be different from the amount of new traffic added to the street system; however, pass-by and diverted linked trips were not evaluated for the Project trip generation as they are not expected to significantly change results of the study.

Retail-oriented developments such as shopping centers often locate adjacent to busy streets in order to attract motorists already on the roadway. These sites attract a portion of their trips from traffic passing the site on the way from an origin to an ultimate destination. These trips are called “pass-by,” which are one component of the trip generation for the site. Trip generation can be broken down into pass-by trips and non-pass-by trips.

Pass-by trips are intermediate stops “on the way” from an origin to a primary destination at the site from a direct driveway access or an adjacent roadway that offers access. The Hare Creek Commercial Center does not intend to provide a driveway to SR 1, which may be prohibited by Caltrans District 1 along this segment of SR 1.

While there will be a percentage of pass-by trips already on the roadway network, the component of the trips is not expected to significantly change the study results; therefore, the study provides a conservative confidence level of the potential impacts from the Project, if any.

4.3 Trip Distribution and Assignment

Trip distribution was based on existing traffic patterns established from the existing 24-hour ADT classification counts and intersection turning movement counts.

The project-generated trips were distributed to the surrounding roadway system based on probable origins and destinations together with existing traffic patterns in the study area. The trip assignment was

based on an assumed distribution of approximately 50 percent of the traffic to and from the south (SR 1) and east (SR 20) and 50 percent of the traffic to and from the north (SR 1). Trip distribution percentages are shown in Figure 4 and project trips assigned to each intersection are shown graphically in Figure 5.

Legend

- 1 — Study Intersection
- XX% → Exiting Trip Distribution Percentage
- (XX%) → Entering Trip Distribution Percentage
- Approximate City Limits

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Project Trip Distribution — Figure 4

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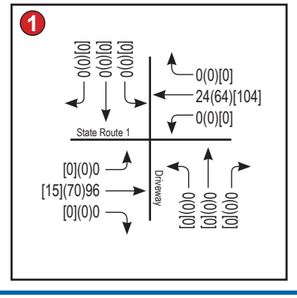
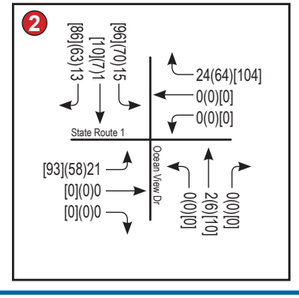
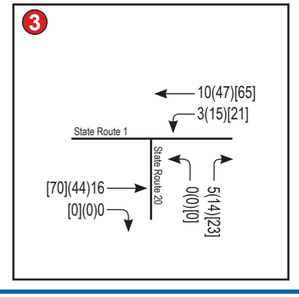
SR1/Driveways



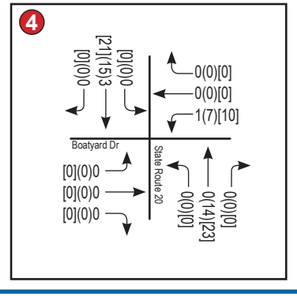
SR1/Ocean View Dr.



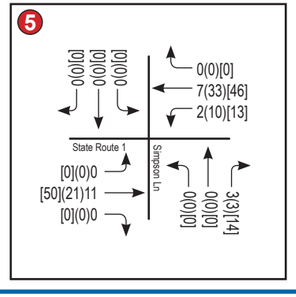
SR1/SR20



SR20/Boatyard Dr.



SR1/Simpson Ln.



Legend

- 1 Study Intersection
- XX AM Peak Hour Volume
- (XX) PM Peak Hour Volume
- [XX] Weekend Mid-Day Peak Hour Volume
- Approximate City Limits

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Project Trip Assignment Traffic Volumes

Figure 5

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5. Existing plus Project Conditions

This section describes the Existing plus Project Conditions Scenario, potential impacts and recommended mitigation measures, if any, at the study intersections during the weekday a.m. and p.m. and weekend midday peak hour.

5.1 Existing Plus Project Conditions Traffic Volumes

Existing plus Project Conditions traffic volumes are shown in Figure 6. Existing plus project traffic volumes are represented by existing traffic volumes with the addition of project related trips assigned to the roadway network, as discussed in Section 4. The roadway network includes the widening of the eastbound approach at Intersection No. 2 – SR 1 / Ocean View Drive to add a right turn lane, which is part of the project.

5.2 Existing Plus Project Conditions Intersection Level of Service Analysis

The results of the intersection level of service analysis based on existing plus project turning movement traffic volumes are summarized in Table 10. Based on this analysis, all of the study intersections are operating acceptably based on City and Caltrans thresholds of significance.

Intersection No. 4 – SR 20 / Boatyard Drive exceeds the City thresholds of significance for “Side Street Stop Sign Controlled Intersections not along SR 1” (LOS C, min. per Policy C-1.1). While the combined total left turn plus through movement volume exceed 15 vehicles per hour, the rural peak hour Signal Warrant 3 criteria is not met, therefore this intersection approach operates at an acceptable LOS D or better.

The unsignalized intersections were evaluated using the rural Signal Warrant 3, per the City of Fort Bragg thresholds of significance, which is discussed under the Section 8 of this report. Signal Warrant 3 analysis results are included in Appendix J.

Results of the Existing plus Project Conditions Scenario Level of Service calculations are provided in Appendix F.

Table 10 Existing Plus Project Scenario Intersection Level of Service

No.	Intersection	Weekday				Weekend	
		a.m.		p.m.		midday	
		Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
1	SR 1 / Commercial Driveways[1]						
	Northbound left	*9.6*	*A*	*12.3*	*B*	*11.4*	*B*
	Eastbound left-thru-right	*27.4*	*D*	***>50.0***	***F***	***48.2***	***E***
	Westbound left-thru-right	*24.1*	*C*	***35.4***	***E***	***42.1***	***E***
	Southbound left	*10.2*	*B*	*12.1*	*B*	*12.1*	*B*
2	SR 1 / Ocean View Drive[2]	12.7	B	24.9	C	21.0	C
3	SR 1 / SR 20[2]	10.2	B	16.1	B	13.6	B
4	SR 20 / Boatyard Drive[1]						
	Northbound left-thru	*15.2*	*C*	*20.2*	*C*	*22.9*	*C*
	Northbound right	*0.0*	*A*	*9.9*	*A*	*10.3*	*B*
	Eastbound left	*8.3*	*A*	*8.7*	*A*	*8.8*	*A*
	Westbound left	*0.0*	*A*	*0.0*	*A*	*8.1*	*A*
	Southbound left-thru	*15.7*	*C*	***25.2***	***D***	***31.6***	***D***
	Southbound right	*10.1*	*B*	*11.5*	*B*	*11.4*	*B*
5	SR 1 / Simpson Lane[3]	6.7	A	10.1	B	9.6	A

Notes: Delay is calculated in average seconds per vehicle in queue
LOS = Level of Service
Bold = results exceed acceptable LOS
[1]LOS based on HCM2010 method of analysis for TWSC intersections.
[2]LOS based on HCM2010 method of analysis for Signalized intersections.
[3]LOS based on HCM2010 method of analysis for Roundabouts.

5.3 Existing Plus Project Conditions Signalized Intersections Queue Analysis

Existing plus Project traffic volumes were applied to signalized study intersections and the peak hour demand 50th and 95th percentile queue lengths were reviewed against the existing lane storage capacity the intersections.

The queue analysis is summarized in Table 11, and also included in Appendix F.

The expected peak hour demand 50th and 95th percentile queue lengths are within existing storage lane capacity at all signalized intersections.

Table 11 Summary of Existing Plus Project Peak Hour Intersection Queue Analysis

Movement	Lanes / Avail. Storage	Queue Length - 50th / 95th (feet/feet)					
		a.m.		p.m.		midday	
Intersection No. 2 - SR 1 / Ocean View Drive							
EBL	1 / 110 ft	15	44	62	113	53	119
EBT	1 / 110 ft	3	16	9	27	8	30
EBR	1 / 110 ft	0	4	0	30	0	39
WBL	1 / 120 ft	9	31	8	28	14	44
WBT	1 / 120 ft	5	21	9	29	9	32
WBR	1 / 120 ft	7	34	40	91	29	82
NBL	1 / 350 ft	14	43	40	114	43	133
NBTR	2 / 350 ft	105	165	142	224	127	206
SBL	1 / 400 ft	38	93	103	270	75	227
SBTR	2 / 400 ft	84	135	180	271	138	227
Intersection No. 3 - SR 1 / SR 20							
WBL	1 / 220 ft	19	54	80	150	52	115
WBR	1 / 120 ft	0	48	1	51	2	47
NBT	2 / 170 ft	63	111	103	172	96	163
NBR	1 / 120 ft	0	22	0	33	0	34
SBL	2 / 320 ft	26	63	58	142	40	118
SBT	1 / 320 ft	64	141	201	393	132	283

Notes: Queue shown is maximum after two cycles

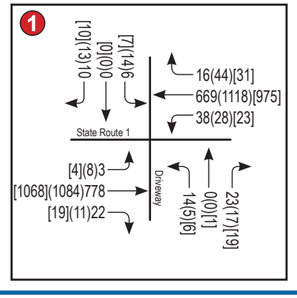
~ - Volume exceeds capacity, queue is theoretically infinite

- 95th percentile volume exceeds capacity, queue may be longer

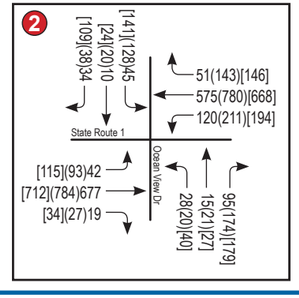
M – Volume for 95th percentile queue is metered by upstream signal

Bold = results where available storage is exceeded by more than one standard vehicle, 25 ft.

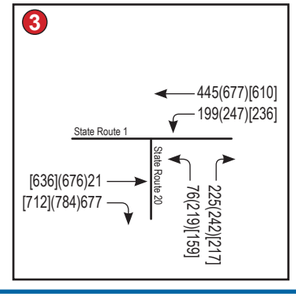
SR1/Driveways



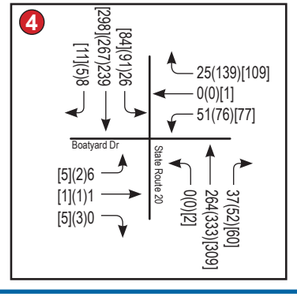
SR1/Ocean View Dr.



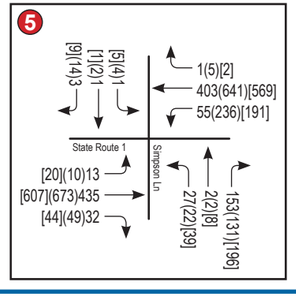
SR1/SR20



SR20/Boatyard Dr.



SR1/Simpson Ln.



Legend

- 1 Study Intersection
- XX AM Peak Hour Volume
- (XX) PM Peak Hour Volume
- [XX] Weekend Mid-Day Peak Hour Volume
- Approximate City Limits

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Existing Plus Project Conditions Intersection Traffic Volumes

Figure 6

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6. Future Conditions

The potential cumulative impacts of 20-year regional growth to the transportation network were evaluated under the Future Conditions Scenario. The forecasted traffic volumes at each of the study intersections for year 2033 were estimated based applying established growth factors to existing traffic turning movement counts from 2013. The 20-year growth factors were obtained from the Caltrans *2014 Growth Factors* (Caltrans, 2014) developed from California Air Resources Board (ARB) traffic growth projections and historic traffic growth data.

Existing traffic volumes on State Route 1 and State Route 20 were factored upward by 1.15 and 1.05, respectively. The *2014 Growth Factors* (Caltrans, 2014) are included in Appendix G.

The Future Conditions Scenario does not include any planned changes to the roadway network.

6.1 Future Conditions Traffic Volumes

Future traffic volumes are shown in Figure 7. These traffic volumes are represented by the projected future traffic volumes in the year 2033 applied to the existing roadway network and geometry.

6.2 Future Conditions Intersection Level of Service Analysis

The results of the intersection level of service analysis based on future turning movement traffic volumes are summarized in Table 12. Based on this analysis, all of the study intersections are operating acceptably at the threshold between LOS C and LOS D or better during all peak periods for Caltrans facilities.

It is noted that while Intersection No. 2 – SR 1 / Ocean View Drive operates acceptably, the northbound and southbound left turn lanes operate at less than acceptable levels of service during the weekday p.m. and weekend mid-day peak hours based on Caltrans thresholds of significance. Mainline movements and the overall intersection operate acceptably.

It is also noted that while Intersection No. 3 – SR 1 / SR 20 operates acceptably, the southbound left turn lanes operate at less than acceptable level of service during the PM peak hour based on Caltrans thresholds of significance. Mainline movements and the overall intersection operate acceptably.

Intersection No. 4 – SR 20 / Boatyard Drive exceeds the City thresholds of significance for “Side Street Stop Sign Controlled Intersections not along SR 1” (LOS C, min. per Policy C-1.1). While the combined total left turn plus through movement volume exceed 15 vehicles per hour, the rural peak hour Signal Warrant 3 criteria is not met, therefore this intersection approach operates at an acceptable LOS D or better.

The unsignalized intersections were evaluated using the rural Signal Warrant 3, which is discussed under the Section 8 of this report per the City of Fort Bragg thresholds of significance.

Results of the Future Conditions Scenario Level of Service calculations are provided in Appendix H.

Table 12 Future Conditions Scenario Intersection Level of Service

No.	Intersection	Weekday				Weekend	
		a.m.		p.m.		midday	
		Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
1	SR 1 / Commerical Driveways[1]						
	Northbound left	*10.0*	*B*	*13.2*	*B*	*11.6*	*B*
	Eastbound left-thru-right	*34.4*	*D*	***>50.0***	***F***	***>50.0***	***F***
	Westbound left-thru-right	*32.0*	*D*	***48.9***	***E***	***>50.0***	***F***
	Southbound left	*10.8*	*B*	*12.8*	*B*	*12.6*	*B*
2	SR 1 / Ocean View Drive[2]	13.0	B	27.7	C	19.0	B
3	SR 1 / SR 20[2]	10.5	B	18.8	B	14.2	B
4	SR 20 / Boatyard Drive[1]						
	Northbound left-thru	*15.7*	*C*	*20.8*	*C*	*22.9*	*C*
	Northbound right	*0.0*	*A*	*9.9*	*A*	*10.2*	*B*
	Eastbound left	*8.3*	*A*	*8.8*	*A*	*8.8*	*A*
	Westbound left	*0.0*	*A*	*0.0*	*A*	*8.1*	*A*
	Southbound left-thru	*16.2*	*C*	***25.2***	***D***	***28.8***	***D***
	Southbound right	*10.2*	*B*	*11.6*	*B*	*11.4*	*B*
5	SR 1 / Simpson Lane[3]	7.2	A	11.4	B	10.2	B

Notes: Delay is calculated in average seconds per vehicle in queue
LOS = Level of Service
Bold = results exceed acceptable LOS
[1]LOS based on HCM2010 method of analysis for TWSC intersections.
[2]LOS based on HCM2010 method of analysis for Signalized intersections.
[3]LOS based on HCM2010 method of analysis for Roundabouts.

6.3 Future Conditions Intersection Queue Analysis

Future Conditions traffic volumes were applied to signalized study intersections and the peak hour demand 50th and 95th percentile queue lengths were reviewed against the existing lane storage capacity the intersections.

The Future Conditions Peak Hour Intersection Queue Analysis is summarized in Table 13, and copies are provided in Appendix H.

The expected peak hour demand 50th and 95th percentile queue lengths are within existing storage lane capacity at all signalized intersections, with the exception of the following locations:

3. SR 1 / SR 20
   - Southbound Thru Lane (p.m. peak hour / 95th percentile)

The reported available storage for the southbound thru lane at Intersection No. 3 – SR 1 / SR 20 is approximately the length of the southbound left turn lanes. Should the queue exceed this length it will continue to extend on the mainline.

Table 13 Summary of Future Conditions Peak Hour Intersection Queue Analysis

Movement	Lanes / Avail. Storage	Queue Length - 50th / 95th (feet/feet)					
		a.m.		p.m.		midday	
Intersection No. 2 - SR 1 / Ocean View Drive							
EBL	1 / 110 ft	12	39	32	68	19	53
EBTR	1 / 110 ft	3	27	7	31	6	34
WBL	1 / 120 ft	11	37	10	31	17	49
WBT	1 / 120 ft	5	22	8	26	7	27
WBR	1 / 120 ft	15	51	58	118	43	106
NBL	1 / 350 ft	8	30	16	48	9	31
NBTR	2 / 350 ft	125	190	156	232	135	205
SBL	1 / 400 ft	47	111	123	289	82	228
SBTR	2 / 400 ft	45	147	175	256	57	184
Intersection No. 3 - SR 1 / SR 20							
WBL	1 / 220 ft	20	57	90	158	57	124
WBR	1 / 120 ft	0	49	3	53	0	43
NBT	2 / 170 ft	71	125	115	191	101	170
NBR	1 / 120 ft	0	23	0	35	0	36
SBL	2 / 320 ft	31	86	75	158	44	130
SBT	1 / 320 ft	76	169	233	**521**	142	300

Notes: Queue shown is maximum after two cycles

~ - Volume exceeds capacity, queue is theoretically infinite

- 95th percentile volume exceeds capacity, queue may be longer

M – Volume for 95th percentile queue is metered by upstream signal

Bold = results where available storage is exceeded by more than one standard vehicle, 25 ft.

North
Not to Scale

Pacific Ocean

College of the Redwoods Campus

Bay View Ave.

Cypress Rd.

Old Coast Hwy

Ocean View Dr.

Monterey Ave.

Del Mar Dr.

Harbor Ave.

PROPOSED PROJECT SITE

Hare Creek Bridge

STATE ROUTE 1

Simpson Ln.

Colling Ln.

Hare Creek Rd.

Hare Creek

Harbor Dr.
S. Main St.

Noyo Bridge

Boatyard Dr.

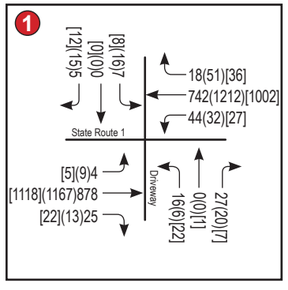
Noyo River

STATE ROUTE 20

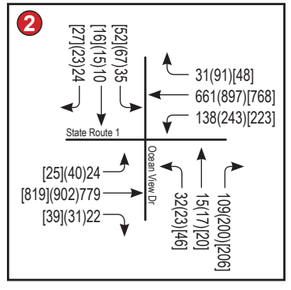
S. Harbor Dr.

N. Harbor Dr.

SR1/Driveways



SR1/Ocean View Dr.



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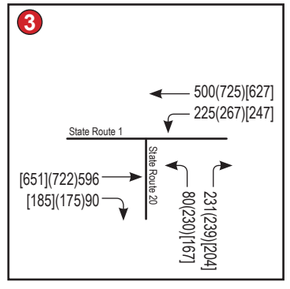

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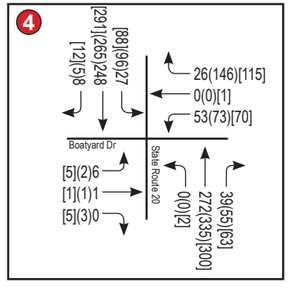
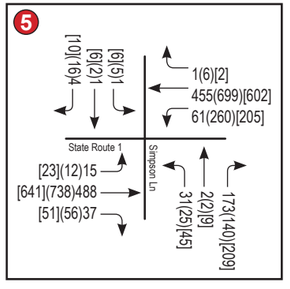


SR1/Simpson Ln.



Legend

- 1 Study Intersection
- XX AM Peak Hour Volume
- (XX) PM Peak Hour Volume
- [XX] Weekend Mid-Day Peak Hour Volume
- Approximate City Limits

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Future Conditions Intersection Traffic Volumes

Figure 7

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7. Future Plus Project Conditions

This section describes the Future plus Project Conditions Scenario, potential significant impacts and recommended mitigation measures, if any, at the study intersections during the weekday a.m. and p.m. and weekend midday peak hour.

7.1 Future Plus Project Conditions Traffic Volumes

Future plus Project traffic volumes are shown in Figure 8. These traffic volumes are represented by the projected future traffic volumes in the year 2033 with the addition of project generated trips assigned to the roadway network as discussed in Section 4. The roadway network includes the widening of the eastbound approach at Intersection No. 2 – SR 1 / Ocean View Drive to add a right turn lane, which is part of the projectg.

7.2 Future Conditions Intersection Level of Service Analysis

The results of the intersection level of service analysis based on future turning movement traffic volumes are summarized in Table 14. Based on this analysis, all of the study intersections are operating acceptably at the threshold requirements or better during all peak periods.

It is noted that while Intersection No. 2 – SR 1 / Ocean View Drive operates acceptably, the northbound and southbound left turn lanes operate at less than acceptable levels of service during the weekday p.m. and weekend mid-day peak hours. These movements also operate unacceptably without the project. Mainline movements and the overall intersection operate acceptably.

It is also noted that while Intersection No. 3 – SR 1 / SR 20 operates acceptably, the southbound left turn lanes operate at a less than acceptable level of service during the PM peak hour. This movement also operates unacceptably without the project. Mainline movements and the overall intersection operate acceptably.

Intersection No. 4 – SR 20 / Boatyard Drive exceeds the City thresholds of significance for “Side Street Stop Sign Controlled Intersections not along SR 1” (LOS C, min. per Policy C-1.1). While the combined total left turn plus through movement volume exceed 15 vehicles per hour, the rural peak hour Signal Warrant 3 criteria is not met, therefore this intersection approach operates at an acceptable LOS E or better.

The unsignalized intersections were evaluated using the rural Signal Warrant 3, per the City of Fort Bragg thresholds of significance, which is discussed under the Section 8 of this report. Signal Warrant 3 analysis results are included in Appendix J.

Results of the Future plus Project Conditions Scenario Level of Service calculations are provided in Appendix I.

Table 14 Future Plus Project Conditions Scenario Intersection Level of Service

No.	Intersection	Weekday				Weekend	
		a.m.		p.m.		midday	
		Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
1	SR 1 / Commerical Driveways[1]						
	Northbound left	*10.1*	*B*	*13.7*	*B*	*12.4*	*B*
	Eastbound left-thru-right	***36.4***	***E***	***>50.0***	***F***	***>50.0***	***F***
	Westbound left-thru-right	***33.5***	***D***	***>50.0***	***F***	***>50.0***	***F***
	Southbound left	*10.9*	*B*	*13.4*	*B*	*13.4*	*B*
2	SR 1 / Ocean View Drive[2]	13.6	B	35.0	C	25.8	C
3	SR 1 / SR 20[2]	10.6	B	21.7	C	15.4	B
4	SR 20 / Boatyard Drive[1]						
	Northbound left-thru	*15.8*	*C*	*21.6*	*C*	*24.7*	*C*
	Northbound right	*0.0*	*A*	*10.0*	*B*	*10.4*	*B*
	Eastbound left	*8.3*	*A*	*8.8*	*A*	*8.9*	*A*
	Westbound left	*0.0*	*A*	*0.0*	*A*	*8.2*	*A*
	Southbound left-thru	*16.5*	*C*	***28.5***	***D***	***36.7***	***E***
	Southbound right	*10.3*	*B*	*11.8*	*B*	*11.7*	*B*
5	SR 1 / Simpson Lane[3]	7.4	A	12.1	B	11.4	B

Notes: Delay is calculated in average seconds per vehicle in queue
LOS = Level of Service
Bold = results exceed acceptable LOS
[1]LOS based on HCM2010 method of analysis for TWSC intersections.
[2]LOS based on HCM2010 method of analysis for Signalized intersections.
[3]LOS based on HCM2010 method of analysis for Roundabouts.

7.3 Future Plus Project Conditions Intersection Queue Analysis

Future plus Project Conditions traffic volumes were applied to signalized study intersections and the peak hour demand 50th and 95th percentile queue lengths were reviewed against the existing lane storage capacity the intersections.

The Future Conditions Peak Hour Intersection Queue Analysis is summarized in Table 15, and copies are provided in Appendix I.

The expected peak hour demand 50th and 95th percentile queue lengths are within existing storage lane capacity at all signalized intersections, with the exception of the following locations;

3. SR 1 / SR 20
   - Southbound Thru Lane (p.m. peak hour / 95th percentile)
   - Southbound Thru Lane (weekend midday peak hour / 95th percentile)

The reported available storage for the southbound through lane at Intersection No. 3 – SR 1 / SR 20 is approximately the length of the southbound left turn lanes. Should the queue exceed this length it will continue to extend on the mainline.

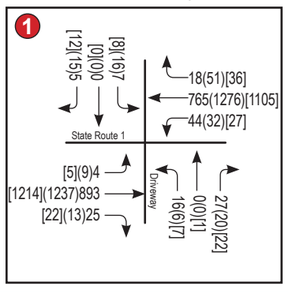
Table 15 Summary of Future plus Project Conditions Peak Hour Intersection Queue Analysis

Movement	Lanes / Avail. Storage	Queue Length - 50th / 95th (feet/feet)					
		a.m.		p.m.		midday	
Intersection No. 2 - SR 1 / Ocean View Drive							
EBL	1 / 110 ft	18	50	76	119	62	131
EBT	1 / 110 ft	4	19	11	29	10	33
EBR	1 / 110 ft	0	5	0	30	0	41
WBL	1 / 120 ft	11	37	11	30	18	51
WBT	1 / 120 ft	6	24	12	32	12	37
WBR	1 / 120 ft	15	51	67	115	49	115
NBL	1 / 350 ft	15	49	48	123	49	146
NBTR	2 / 350 ft	128	195	175	274	157	246
SBL	1 / 400 ft	48	114	163	318	99	284
SBTR	2 / 400 ft	103	158	227	338	171	273
Intersection No. 3 - SR 1 / SR 20							
WBL	1 / 220 ft	21	58	89	158	60	126
WBR	1 / 120 ft	0	50	11	66	11	62
NBT	2 / 170 ft	74	129	118	205	116	192
NBR	1 / 120 ft	0	23	0	35	0	36
SBL	2 / 320 ft	34	#89	~76	168	51	145
SBT	1 / 320 ft	79	174	254	**578**	172	**355**

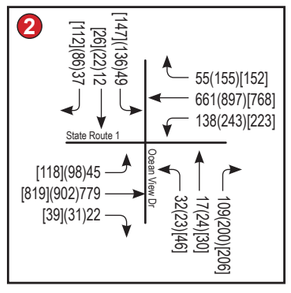
Notes: Queue shown is maximum after two cycles

~ - Volume exceeds capacity, queue is theoretically infinite
# - 95th percentile volume exceeds capacity, queue may be longer
M – Volume for 95th percentile queue is metered by upstream signal
Bold = results where available storage is exceeded by more than one standard vehicle, 25 ft.

SR1/Driveways



SR1/Ocean View Dr.



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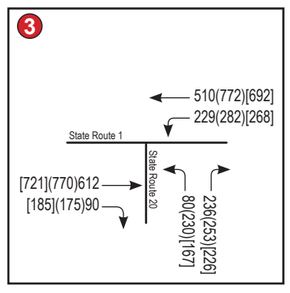

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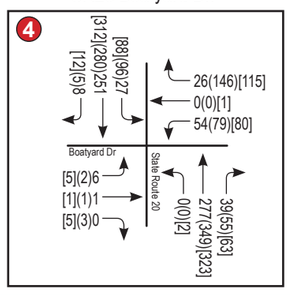
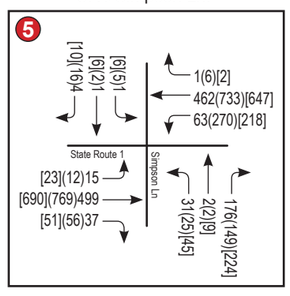


SR1/Simpson Ln.



Legend

- 1 Study Intersection
- XX AM Peak Hour Volume
- (XX) PM Peak Hour Volume
- [XX] Weekend Mid-Day Peak Hour Volume
- Approximate City Limits

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Future Plus Project Conditions Intersection Traffic Volumes

Figure 8

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8. Peak Hour Traffic Signal Warrant 3

The section presents an evaluation of "rural" Signal Warrant 3 for the peak hour for unsignalized intersections in all scenarios to determine if the warrant is met.

8.1 Peak Hour Signal Warrant 3 Methodology

Traffic Signal Warrant 3 is based on the latest edition of the *California Manual on Uniform Traffic Control Devices* (CAMUTCD) (Caltrans, 2012a). It is noted that Warrant 3 should only be applied in unusual cases, such as at facilities that attract or discharge large amounts of vehicles over short periods of time.

Warrant 3 has two Parts, A and B, which must be met to justify the potential need for a signal based on the peak hour. Part A contains three conditions, which are:

1. The total delay experience by traffic on one minor street approach (one direction only) controlled by a STOP sign equals or exceeds four vehicle-hours for one lane approach, or five vehicle-hours for a two-lane approach; AND
2. The volume on the same minor street approach (one direction only) equals or exceeds 75 vph for one moving lane of traffic or 100 vph for two moving lanes (base on City of Ft. Bragg population and speed limit on major street approaches); AND
3. The total entering volume serviced during the hour equals or exceeds 800 vph for the intersection with four or more approaches or 650 vph for intersections with three approaches.

Part B of the Traffic Signal Warrant 3 contains figures that plot minor street versus major street approaches for urban and rural areas. The entire Signal Warrant 3 is included in Appendix J.

Intersections No. 1 and No. 4 meet the definition of "rural."

The satisfaction of a traffic signal warrant or warrants does not in itself require the installation of a traffic signal, however, the City General Plan Policy C-1.1 states:

> *If volumes at an unsignalized intersection are increased to meet or exceed Caltrans rural peak hour signal Warrant [3] criteria levels and the intersection is operating at an unacceptable level of service, then signalization of the intersection is warranted.*

8.2 Peak Hour Signal Warrant 3 Analysis

Table 16 summarizes the results of the Warrant 3 analysis. Part B is evaluated under "rural" conditions.

Intersection No. 4 – SR 20 / Boatyard Drive is not met presently and will not be met in the future, with or without the addition of project trips.

Because the Warrant 3 is not met under any of the project conditions, there are no project impacts.

Table 16 Summary of Rural Traffic Signal Warrant 3 for Various Conditions Scenarios

Conditions	Part A				Part B
	1	2	3		
Intersection	Total Delay (veh-hrs)	Highest Minor Appr. Volume (veh)	Total Entering Volume (veh)	Met (Y/N)	Met (Y/N)
Existing Conditions Scenario					
No. 1 - SR 1 / Commercial Driveways	0.55	27	2,208	N	N
No. 4 - SR 20 / Boatyard Drive	0.96	177	908	N	Y
Existing Plus Project Conditions Scenario					
No. 1 - SR 1 / Commercial Driveways	0.69	27	2,342	N	N
No. 4 - SR 20 / Boatyard Drive	1.24	187	961	N	Y
Future Conditions Scenario					
No. 1 - SR 1 / Commercial Driveways	1.48	31	2,540	N	N
No. 4 - SR 20 / Boatyard Drive	1.17	219	980	N	**Y**
Future Plus Project Conidtions Scenario					
No. 1 - SR 1 / Commercial Driveways	2.15	31	2,674	N	N
No. 4 - SR 20 / Boatyard Drive	1.46	196	1,007	N	**Y**

Notes: **Bold** = results where Part A and Part B are met; Warrant 3 met.

9. Conclusions

This section summarizes the conclusions regarding the proposed project and its potential traffic impacts.

9.1 Existing plus Project

9.1.1 Intersection Operations

Intersection No. 4 – SR 20 / Boatyard Drive exceeds the City thresholds of significance for "Side Street Stop Sign Controlled Intersections not along SR 1" (LOS C, min. per Policy C-1.1). The southbound left-thru approach operates at an LOS D during the weekday p.m. and weekend mid-day peak hours. Since the combined total left turn plus through movement volume exceed 15 vehicles per hour but the rural peak hour Signal Warrant 3 criteria is not met, this intersection approach operates at an acceptable LOS D or better. This facility is located within the State right-of-way, and the major mainline movements operate acceptably.

9.1.2 Vehicle Queuing

The expected peak hour demand 50th and 95th percentile queue lengths are within existing storage lane capacity at all signalized intersections.

9.2 Future plus Project

9.2.1 Intersection Operations

Intersection No. 4 – SR 20 / Boatyard Drive exceeds the City thresholds of significance for "Side Street Stop Sign Controlled Intersections not along SR 1" (LOS C, min. per Policy C-1.1). The southbound left-thru approach operates at an LOS D during the weekday p.m. peak hour and LOS E during weekend mid-day peak hour. Since the combined total left turn plus through movement volume exceed 15 vehicles per hour but the rural peak hour Signal Warrant 3 criteria is not met, the intersection approach operates at an acceptable LOS E or better. This facility is located within the State right-of-way, and the major mainline movements operate acceptably.

9.2.2 Vehicle Queuing

The expected peak hour demand 50th and 95th percentile queue lengths are within existing storage lane capacity at all signalized intersections, with the exception of Intersection No. 3:

3. SR 1 / SR 20
    - Southbound Thru Lane (p.m. peak hour / 95th percentile)
    - Southbound Thru Lane (weekend midday peak hour / 95th percentile)

The reported available storage for the southbound through lane at Intersection No. 3 – SR 1 / SR 20 is approximately the length of the southbound left turn lanes. Should the queue exceed this length it will continue to extend on the mainline without causing any traffic safety or operational issues.

9.3 Summary

Table 17 summarizes the level of service calculation results for the study roadway network with and without project-generated trips. In conclusion, this study finds that the proposed Project would not be expected to contribute significantly to the potential deterioration of traffic operations or queuing levels in the study area for the conditions analyzed in this study. Each of the study intersections is expected to operate acceptably with or without the project under each of the study scenarios and with the addition of proposed project improvements to the roadway network. Additionally, queue lengths are expected to remain at acceptable levels with or without the Project.

Table 17 Summary of Peak Hour Intersection Level of Service Calculations

No.	Intersections	Existing			Existing plus Project			Future (2033)			Future plus Project		
		a.m.	p.m.	W. E. midday	a.m.	p.m.	W.E. midday	a.m.	p.m.	W.E. midday	a.m.	p.m.	W.E. midday
1	SR 1 / Comm. Driveways[1]												
	Northbound left	*9.5/A*	*11.9/B*	*10.7/B*	*9.6/A*	*12.3/B*	*11.4/B*	*10.0/B*	*13.2/B*	*11.6/B*	*10.1/B*	*13.7/B*	*12.4/B*
	Eastbound left-thru-right	*25.9/D*	***>50.0/F***	***36.3/E***	*27.4/D*	***>50.0/F***	***48.2/E***	*34.4/D*	***>50.0/F***	***>50.0/F***	***36.4/E***	***>50.0/F***	***>50.0/F***
	Westbound left-thru-right	*23.2/C*	*30.3/D*	*32.2/D*	*24.1/C*	***35.4/E***	***42.1/E***	*32.0/D*	***48.9/E***	***>50.0/F***	*33.5/D*	***>50.0/F***	***>50.0/F***
	Southbound left	*10.1/B*	*11.6/B*	*11.4/B*	*10.2/B*	*12.1/B*	*12.1/B*	*10.8/B*	*12.8/B*	*12.6/B*	*10.9/B*	*13.4/B*	*13.4/B*
2	SR 1 / Ocean View Drive[2]	12.0/B	19.3/B	15.9/B	12.8/B	25.3/C	21.4/C	13.0/B	27.7/C	19.0/B	13.7/B	**35.5/D**	26.4/C
3	SR 1 / SR 20[2]	10.1/B	15.0/B	12.9/B	10.2/B	16.1/B	13.6/B	10.5/B	18.8/B	14.2/B	10.6/B	21.7/C	15.4/B
4	SR 20 / Boatyard Drive[1]												
	Northbound left-thru	*15.1/C*	*19.5/C*	*21.3/C*	*15.2/C*	*20.2/C*	*22.9/C*	*15.7/C*	*20.8/C*	*22.9/C*	*15.8/C*	*21.6/C*	*24.7/C*
	Northbound right	*0.0/A*	*9.8/A*	*10.1/B*	*0.0/A*	*9.9/A*	*10.3/B*	*0.0/A*	*9.9/A*	*10.2/B*	*0.0/A*	*10.0/B*	*10.4/B*
	Eastbound left	*8.2/A*	*8.7/A*	*8.7/A*	*8.3/A*	*8.7/A*	*8.8/A*	*8.3/A*	*8.8/A*	*8.8/A*	*8.3/A*	*8.8/A*	*8.9/A*
	Westbound left	*0.0/A*	*0.0/A*	*8.0/A*	*0.0/A*	*0.0/A*	*8.1/A*	*0.0/A*	*0.0/A*	*8.1/A*	*0.0/A*	*0.0/A*	*8.2/A*
	Southbound left-thru	*15.5/C*	*22.4/C*	***25.5/D***	*15.7/C*	***25.2/D***	***31.6/D***	*16.2/C*	***25.5/D***	***28.8/D***	*16.5/C*	***28.5/D***	***36.7/E***
	Southbound right	*10.1/B*	*11.4/B*	*11.2/B*	*10.1/B*	*11.5/B*	*11.4/B*	*10.2/B*	*11.6/B*	*11.4/B*	*10.3/B*	*11.8/B*	*11.7/B*
5	SR 1 / Simpson Lane[3]	6.6/A	9.6/A	8.9/A	6.7/A	10.1/B	9.6/A	7.2/A	11.4/B	10.2/B	7.4/A	12.1/B	11.4/B

Notes: Delay is calculated in average seconds per vehicle in queue

LOS = Level of Service

Bold = results exceed acceptable LOS

[1]LOS based on HCM2010 method of analysis for TWSC intersections.

[2]LOS based on HCM2010 method of analysis for Signalized intersections.

[3]LOS based on HCM2010 method of analysis for Roundabouts.

References

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Appendices

Water Model Study for 1250 Del Mar Drive Proposed Retail Shopping Center

Fort Bragg Water Model

Proposed Project Description

PROJECT NAME: Hare Creek Center

DESCRIPTION: The purpose of the proposed project is to develop a shopping mall to accommodate the retailer Discount Grocery, four unidentified retail tenants, and one unidentified restaurant. New shopping center consisting of three buildings, including: Building A at 15,000 square feet, Building B at 10,000 square feet and Building C at 4,500 square feet of retail space. The project would be served by a new access road, proposed for the west edge of the development that would connect Bay View Avenue (CR #439A) to the southwest to Ocean View Drive at the intersection of Ocean View and Harbor Avenue. The project also includes a new 99 space parking lot, loading zones, pedestrian improvements, rainwater storage tanks, utilities, drainage improvements and associated landscaping.

The project includes a boundary line adjustment between parcels 018-450-40 and 018-450-41, adding 32,586 square feet (0.75 acres) to parcel 018-450-40 (currently 2.42 acres), the combined parcel would be 3.16 acres. The boundary line adjustment is proposed so that the proposed development is on one parcel.

LOCATION: The proposed 3.16 acre project site is located at 1250 Del Mar Drive on Todd Point within the City of Fort Bragg city limits just north and west of the Highway 20/Highway 1 intersection. The parcel is located within the coastal zone. APN 018-450-40 & 018-450-41. The site is bounded to the north by a hotel and mini-golf course, to the east by Highway 1 and to the south and west by undeveloped property. The Project is approximately three quarters of a mile west of the existing Highway 20 water tank.

Figure 1: Project Site

Estimated Water Demands

Estimated water demands for the Project were determined by comparing four different resources. See Table 1: Estimated Water Demands for Proposed 1250 Del Mar Drive Retail Center. Estimated demands applied to the node closest to the Project are as follows:

Average Day Demand:	8,260 gpd (5.7 gpm)
Maximum Day Demand:	16,520 gpd (11.5 gpm)
Peak Hour Demand:	23,128 gpd (16.1 gpm)

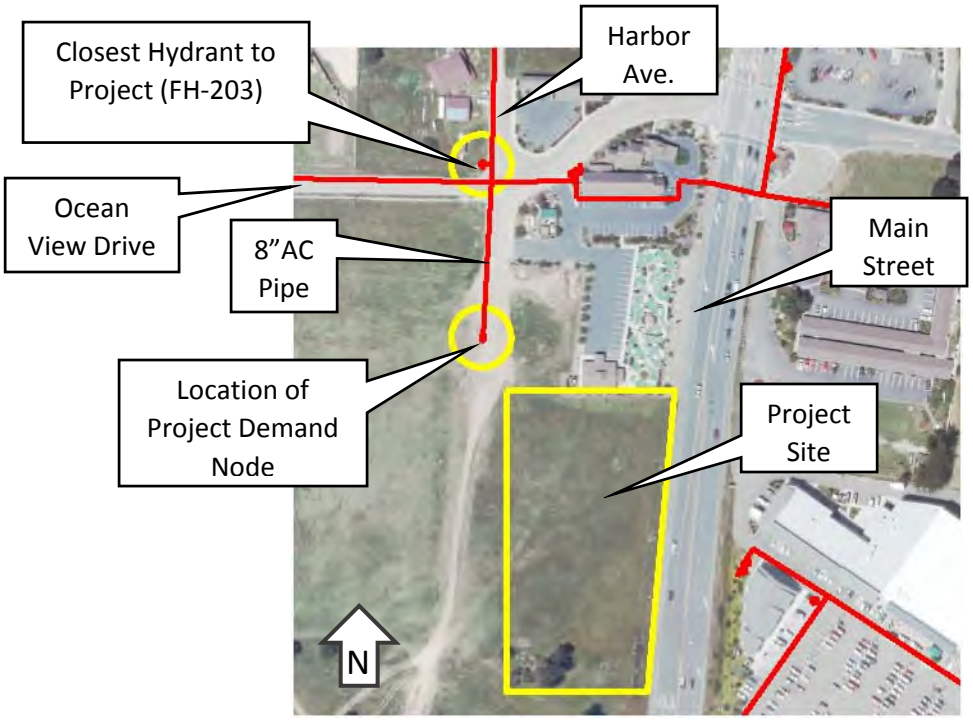

Figure 2: Existing Water System Near Project

Existing system demands were taken from the City of Fort Bragg, Phase 1 Water Facilities Study: Existing Water Collection, Distribution and Capacity, Nov. 2013 (Phase 1 Water Study). The existing system was modeled with the projected demands for 2022.

Model Results

To determine the impact of the Project on the City's water system, six different scenarios were modeled:

1) 2022 Maximum Day Demands, Existing System without Project
2) 2022 Maximum Day Demands, Existing System plus Project
3) 2022 Peak Hour Demands, Existing System without Project
4) 2022 Peak Hour Demands, Existing System plus Project
5) Fire Flow Analysis, 2022 Maximum Day Demands, Existing System without Project

6) Fire Flow Analysis, 2022 Maximum Day Demands, Existing System plus Project

See model results in Table 2, Water Model Results and Comparison. Results are shown for Scenarios 1) through 4) as the difference between the pressure at each hydrant of the existing system before the Project and the existing system plus the Project. Similarly, fire flow analysis results for 5) and 6) results are shown as the difference in available fire flow. Available fire flow is defined in the appendix titled "Description of Fire Flows in Hydraulic Modeling". Also see the Phase 1 Water Study referenced above for a further explanation of available fire flow as well as detailed explanations of the water model developed for the City of Fort Bragg.

2022 MAXIMUM DAY DEMANDS PRESSURE DIFFERENCE

Results from the hydraulic model show no significant difference in pressure between the existing water system with and without the Project. A maximum difference of 0.1 psi is observed. These results are presented in Table 2.

2022 PEAK HOUR DEMANDS PRESSURE DIFFERENCE

Similar to the 2022 maximum day demands comparison, results from the hydraulic model show no significant difference in pressure between the existing water system with and without the Project. A maximum difference of 0.1 psi is observed. These results are also presented in Table 2.

2022 MAXIMUM DAY DEMANDS FIRE FLOW ANALYSIS, AVAILABLE FIRE FLOW DIFFERENCE

Per the Phase 1 Water Study, the required minimum fire flow is 1,500 gpm. As explained in the Phase 1 Water Study, not all of the existing Fort Bragg hydrants meet minimum fire flow requirements. Improvements to the water system were recommended in the Phase 1 Water Study to improve the system's fire flows.

Results from the hydraulic model show no significant difference in pressure between the existing water system with and without the Project. For hydrants with available fire flow less than 1,500 gpm, the maximum flow difference is 3 gpm. For hydrants with available fire flows above 1,500 gpm, the maximum flow difference is 16 gpm, or less than 1% change. These results are presented in Table 2.

Summary

Using the calibrated Fort Bragg network hydraulic model and with input from the water system staff at the City of Fort Bragg, no significant changes to the existing water system are anticipated with the addition of the proposed project at 1250 Del Mar Drive.

Table 1: Estimated Water Demands for Proposed 1250 Del Mar Drive Retail Center

Fort Bragg Water Model

Building Area	29,500	SF
Parcel Size (After LLA)	3.16	AC
Assumed Building Frontage	200	ft

Resource 1: Phase 1 Water Study [1]

Ave. Day Demand / SF	0.28	gpd/SF, Table 1
Ave. Day Demand	**8,260**	**gpd**
Max. Day Factor	2	
Max. Day Demand / SF	0.56	gpd/SF
Max. Day Demand	**16,520**	**gpd**

Resource 2: West Yost Study [2]

Ave. Day Demand / AC	2,520	gpd/AC, p.4
Ave. Day Demand	**7,963**	**gpd**
Max. Day Factor	2	, p.5
Max. Day Demand / AC	5,040	gpd/AC, p.4
Max. Day Demand	**15,926**	**gpd**

Resource 3: Water Capital Improvement Fee Study [3]

Ave. Day Demand / SF	0.11	gpd/SF
Ave. Day Demand	**3,245**	**gpd**
Assumed Max. Day Factor	2	
Assumed Max. Day Demand / SF	0.22	gpd/SF
Max. Day Demand	**6,490**	**gpd**

Resource 4: Wastewater Engineering, Metcalf & Eddy [4]

Ave. Day Demand	450	gpd for first 25' of frontage
	400	gpd for each additional 25' of frontage
Ave. Day Demand	**3,250**	**gpd**
Assumed Max. Day Factor	2	
Max. Day Demand	**6,500**	**gpd**

Water Demands Selected for 1250 Del Mar Drive Retail Center

Average Day Demand	8,260	gpd	5.7	gpm
Maximum Day Demand	16,520	gpd	11.5	gpm
Peak Hour Demand (1.4 * MDD)	23,128	gpd	16.1	gpm

(1) City of Fort Bragg, Phase 1 Water Facilities Study: Existing Water Collection, Distribution and Capacity, Nov. 2013, KASL Engineers

(2) Technical Memorandum No. 1, Georgia-Pacific Fort Bragg Mill Site Redevelopment Project - GP and City of Fort Bragg Potable Water Demand and Supply Projections, Jan. 10, 2011, West Yost

(3) Water Capital Improvement Fee Study, 2000, Bartle Wells Associates

(4) Wastewater Engineering, Metcalf & Eddy, Inc. McGraw-Hill, Table 2-6, 1972

Table 2: Water Model Results and Comparison for Proposed 1250 Del Mar Dr. Retail Center

Fort Bragg Water Model

Minimum Desired Available Fire Flow (gpm): 1,500

Model Hydrant Label	Max Day 2022 (926 gpm) Pressure (psi)	Max Day 2022 Plus 1250 Del Mar Dr. (937 gpm) Pressure (psi)	Max Day 2022 Press. Difference Pressure (psi)	Peak Hour 2022 (1296 gpm) Pressure (psi)	Peak Hour 2022 1250 Del Mar Dr. (1313 gpm) Pressure (psi)	Peak Hour 2022 Pressure Difference Pressure (psi)	Max Day 2022 Available Fire Flow Flow (gpm) [1][3]	Max Day 2022 + 1250 Del Mar Dr. Available Fire Flow Flow (gpm) [1][3]	Max Day 2022 Available Fire Flow Difference Flow (gpm) [2]
FH-1	21.4	21.4	0	21.4	21.4	0	2,500	2,500	0
FH-2	51.1	51.1	0	51.1	51.1	0	**538**	**538**	0
FH-2A	52	52	0	51.9	51.9	0	**538**	**538**	0
FH-3	53.2	53.2	0	53.2	53.2	0	**877**	**877**	0
FH-4	53.1	53.1	0	53.1	53.1	0	**877**	**877**	0
FH-5	52.9	52.9	0	52.8	52.8	0	**509**	**509**	0
FH-5A	55.8	55.8	0	55.8	55.8	0	**547**	**547**	0
FH-6	57.4	57.4	0	57.4	57.4	0	**549**	**549**	0
FH-7	57.7	57.7	0	57.7	57.7	0	**833**	**833**	0
FH-8	35.3	35.3	0	35.2	35.2	0	2,376	2,368	-8
FH-8A	60.8	60.8	0	60.8	60.8	0	**943**	**943**	0
FH-9	58.2	58.2	0	58.2	58.2	0	**1,423**	**1,423**	0
FH-10	59.1	59.1	0	59	59	0	1,971	1,970	-1
FH-11	57.8	57.8	0	57.8	57.8	0	1,715	1,715	0
FH-12	55.9	55.9	0	55.9	55.9	0	**1,388**	**1,388**	0
FH-13	54	54	0	54	54	0	**1,222**	**1,222**	0
FH-14	52.7	52.7	0	52.6	52.6	0	**1,150**	**1,150**	0
FH-15	52	52	0	52	52	0	**1,123**	**1,123**	0
FH-16	53.1	53.1	0	53.1	53.1	0	**1,291**	**1,291**	0
FH-17	56.4	56.4	0	56.4	56.4	0	**1,468**	**1,468**	0
FH-18	57.3	57.3	0	57.3	57.3	0	1,603	1,603	0
FH-19	57.4	57.4	0	57.3	57.3	0	1,650	1,650	0
FH-20	50.6	50.6	0	50.5	50.5	0	**978**	**978**	0
FH-21	50.1	50.1	0	50.1	50.1	0	**994**	**994**	0
FH-22	60.4	60.4	0	60.4	60.4	0	1,583	1,583	0
FH-23	51.5	51.5	0	51.5	51.5	0	**1,436**	**1,436**	0
FH-24	50.5	50.5	0	50.4	50.4	0	**939**	**939**	0
FH-25	39.2	39.2	0	39	39	0	**668**	**668**	0
FH-26	39.4	39.4	0	39.2	39.2	0	**851**	**849**	**-2**
FH-26A	38.1	38.1	0	37.9	37.9	0	**800**	**798**	**-2**
FH-27	62.2	62.2	0	62.2	62.2	0	2,035	2,035	0
FH-28	61.7	61.7	0	61.7	61.7	0	2,035	2,035	0
FH-29	61.6	61.6	0	61.6	61.6	0	2,007	2,007	0
FH-30	60.4	60.4	0	60.4	60.4	0	2,023	2,023	0
FH-31	60.3	60.3	0	60.2	60.2	0	2,028	2,027	-1
FH-32	61	61	0	61	61	0	1,992	1,991	-1
FH-33	59.5	59.5	0	59.5	59.5	0	2,009	2,009	0

Model Hydrant Label	Max Day 2022 (926 gpm) Pressure (psi)	Max Day 2022 Plus 1250 Del Mar Dr. (937 gpm) Pressure (psi)	Max Day 2022 Press. Difference Pressure (psi)	Peak Hour 2022 (1296 gpm) Pressure (psi)	Peak Hour 2022 1250 Del Mar Dr. (1313 gpm) Pressure (psi)	Peak Hour 2022 Pressure Difference Pressure (psi)	Max Day 2022 Available Fire Flow Flow (gpm) [1][3]	Max Day 2022 + 1250 Del Mar Dr. Available Fire Flow Flow (gpm) [1][3]	Max Day 2022 Available Fire Flow Difference Flow (gpm) [2]
FH-34	58.5	58.5	0	58.4	58.4	0	1,991	1,991	0
FH-35	53.4	53.4	0	53.4	53.4	0	1,879	1,879	0
FH-35A	51.4	51.4	0	51.4	51.4	0	1,758	1,757	-1
FH-36	52.3	52.3	0	52.3	52.3	0	**892**	**892**	0
FH-37	55.7	55.7	0	55.7	55.7	0	**1,261**	**1,261**	0
FH-38	55.2	55.2	0	55.2	55.2	0	**1,367**	**1,367**	0
FH-39	39.5	39.5	0	39.4	39.4	0	**612**	**612**	0
FH-40	40.7	40.7	0	40.6	40.6	0	**691**	**690**	**-1**
FH-41	38.4	38.4	0	38.3	38.3	0	2,087	2,080	-7
FH-42	61.5	61.5	0	61.5	61.5	0	1,973	1,973	0
FH-43	41.1	41.1	0	40.9	40.9	0	**991**	**989**	**-2**
FH-44	63	63	0	63	63	0	2,099	2,098	-1
FH-45	61.6	61.6	0	61.6	61.6	0	**1,023**	**1,023**	0
FH-46	56.5	56.5	0	56.5	56.5	0	1,893	1,892	-1
FH-47	58.2	58.2	0	58.1	58.1	0	1,582	1,582	0
FH-48	41.4	41.4	0	41.2	41.2	0	**1,136**	**1,133**	**-3**
FH-49	40.6	40.6	0	40.4	40.4	0	**1,220**	**1,219**	**-1**
FH-50	41	41	0	40.8	40.8	0	**1,237**	**1,236**	**-1**
FH-51	65.4	65.4	0	65.4	65.4	0	**1,171**	**1,171**	0
FH-52	64.5	64.5	0	64.5	64.5	0	1,980	1,980	0
FH-53	41.9	41.9	0	41.7	41.7	0	1,805	1,803	-2
FH-54	67.8	67.8	0	67.8	67.8	0	**1,378**	**1,378**	0
FH-55	61.6	61.6	0	61.6	61.6	0	2,109	2,101	-8
FH-56	58.9	58.9	0	58.9	58.9	0	2,109	2,101	-8
FH-57	58.4	58.4	0	58.3	58.3	0	2,109	2,101	-8
FH-58	33.8	33.8	0	33.5	33.5	0	**986**	**984**	**-2**
FH-59	68.2	68.2	0	68.2	68.2	0	1,685	1,685	0
FH-60	43.7	43.7	0	43.5	43.5	0	2,105	2,098	-7
FH-61	42.4	42.4	0	42.1	42.1	0	1,833	1,828	-5
FH-62	43.1	43.1	0	42.8	42.8	0	**1,360**	**1,358**	**-2**
FH-63	42.2	42.2	0	41.9	41.9	0	**638**	**638**	0
FH-64	43.2	43.2	0	42.8	42.8	0	**1,349**	**1,347**	**-2**
FH-65	41.2	41.2	0	40.9	40.9	0	**808**	**807**	**-1**
FH-66	43.9	43.9	0	43.6	43.6	0	**1,081**	**1,080**	**-1**
FH-66A	41.8	41.8	0	41.5	41.5	0	**927**	**925**	**-2**
FH-67	42.5	42.5	0	42.3	42.2	-0.1	**573**	**572**	**-1**
FH-68	37.9	37.9	0	37.6	37.6	0	**554**	**554**	0
FH-69	45.3	45.3	0	45	44.9	-0.1	2,160	2,152	-8
FH-70	44.4	44.4	0	44.1	44.1	0	**1,244**	**1,243**	**-1**
FH-71	38.8	38.8	0	38.5	38.5	0	**1,231**	**1,228**	**-3**

Model Hydrant Label	Max Day 2022 (926 gpm) Pressure (psi)	Max Day 2022 Plus 1250 Del Mar Dr. (937 gpm) Pressure (psi)	Max Day 2022 Press. Difference Pressure (psi)	Peak Hour 2022 (1296 gpm) Pressure (psi)	Peak Hour 2022 1250 Del Mar Dr. (1313 gpm) Pressure (psi)	Peak Hour 2022 Pressure Difference Pressure (psi)	Max Day 2022 Available Fire Flow Flow (gpm) [1][3]	Max Day 2022 + 1250 Del Mar Dr. Available Fire Flow Flow (gpm) [1][3]	Max Day 2022 Available Fire Flow Difference Flow (gpm) [2]
FH-72	40.8	40.8	0	40.4	40.4	0	**893**	**891**	**-2**
FH-73	43.8	43.8	0	43.5	43.4	-0.1	**1,093**	**1,091**	**-2**
FH-74	52	52	0	51.7	51.7	0	**1,105**	**1,103**	**-2**
FH-75	45.4	45.4	0	45.1	45.1	0	2,129	2,122	-7
FH-76	45.1	45.1	0	44.7	44.7	0	2,137	2,131	-6
FH-77	44.2	44.2	0	43.8	43.8	0	2,145	2,138	-7
FH-78	45.5	45.5	0	45.1	45.1	0	2,149	2,142	-7
FH-79	48.8	48.8	0	48.5	48.5	0	1,575	1,574	-1
FH-80	38.8	38.8	0	38.5	38.5	0	**1,153**	**1,151**	**-2**
FH-81	46.1	46.1	0	45.8	45.8	0	**1,255**	**1,252**	**-3**
FH-82	41.1	41	-0.1	40.7	40.7	0	**953**	**951**	**-2**
FH-83	45.3	45.3	0	45	44.9	-0.1	**1,128**	**1,126**	**-2**
FH-84	48.9	48.9	0	48.6	48.5	-0.1	2,006	1,999	-7
FH-85	47.2	47.2	0	46.9	46.9	0	1,625	1,624	-1
FH-86	46.3	46.3	0	46	46	0	2,145	2,138	-7
FH-87	46.7	46.7	0	46.4	46.4	0	**1,368**	**1,366**	**-2**
FH-88	46.5	46.5	0	46.2	46.2	0	**1,387**	**1,386**	**-1**
FH-89	44.7	44.7	0	44.3	44.3	0	2,144	2,135	-9
FH-90	49.1	49.1	0	48.8	48.7	-0.1	**1,491**	**1,490**	**-1**
FH-91	44.6	44.6	0	44.3	44.2	-0.1	**804**	**802**	**-2**
FH-92	40.2	40.2	0	39.9	39.8	-0.1	**625**	**624**	**-1**
FH-93	47.7	47.7	0	47.4	47.3	-0.1	1,546	1,541	-5
FH-94	48.8	48.8	0	48.4	48.4	0	1,604	1,600	-4
FH-95	49.8	49.8	0	49.5	49.4	-0.1	1,821	1,820	-1
FH-96	47.5	47.5	0	47.2	47.2	0	2,146	2,137	-9
FH-97	49.1	49.1	0	48.8	48.8	0	1,513	1,511	-2
FH-98	51	51	0	50.6	50.6	0	1,616	1,615	-1
FH-99	51.2	51.2	0	50.9	50.9	0	1,952	1,944	-8
FH-100	43.9	43.9	0	43.6	43.6	0	**852**	**850**	**-2**
FH-101	51	51	0	50.7	50.7	0	1,754	1,748	-6
FH-102	51	51	0	50.6	50.6	0	2,134	2,125	-9
FH-103	50.5	50.5	0	50.2	50.2	0	1,755	1,754	-1
FH-104	53.6	53.6	0	53.3	53.3	0	1,879	1,878	-1
FH-105	49	49	0	48.7	48.6	-0.1	**1,383**	**1,381**	**-2**
FH-106	45	45	0	44.7	44.7	0	**1,083**	**1,082**	**-1**
FH-107	50.2	50.2	0	49.9	49.9	0	1,717	1,714	-3
FH-108	51.9	51.9	0	51.6	51.6	0	1,813	1,806	-7
FH-109	51.7	51.7	0	51.3	51.3	0	1,894	1,887	-7
FH-110	51.5	51.4	-0.1	51.1	51.1	0	1,908	1,906	-2
FH-111	50.8	50.8	0	50.5	50.5	0	1,566	1,565	-1

Model Hydrant Label	Max Day 2022 (926 gpm) Pressure (psi)	Max Day 2022 Plus 1250 Del Mar Dr. (937 gpm) Pressure (psi)	Max Day 2022 Press. Difference Pressure (psi)	Peak Hour 2022 (1296 gpm) Pressure (psi)	Peak Hour 2022 1250 Del Mar Dr. (1313 gpm) Pressure (psi)	Peak Hour 2022 Pressure Difference Pressure (psi)	Max Day 2022 Available Fire Flow Flow (gpm) [1][3]	Max Day 2022 + 1250 Del Mar Dr. Available Fire Flow Flow (gpm) [1][3]	Max Day 2022 Available Fire Flow Difference Flow (gpm) [2]
FH-112	54.2	54.2	0	53.9	53.9	0	1,745	1,744	-1
FH-113	53.6	53.6	0	53.3	53.3	0	2,003	1,995	-8
FH-114	49.6	49.6	0	49.2	49.2	0	2,139	2,131	-8
FH-115	55.4	55.4	0	55	55	0	2,118	2,110	-8
FH-116	54.2	54.2	0	53.9	53.9	0	2,119	2,111	-8
FH-117	55.1	55.1	0	54.8	54.8	0	2,059	2,058	-1
FH-118	50.9	50.9	0	50.6	50.6	0	**1,446**	**1,445**	**-1**
FH-119	51.6	51.6	0	51.3	51.2	-0.1	**1,299**	**1,298**	**-1**
FH-120	53.9	53.9	0	53.6	53.6	0	1,949	1,942	-7
FH-121	57.3	57.3	0	56.9	56.9	0	1,954	1,947	-7
FH-122	57.7	57.7	0	57.4	57.4	0	1,954	1,946	-8
FH-123	53.9	53.9	0	53.6	53.5	-0.1	2,004	2,003	-1
FH-124	50.8	50.8	0	50.5	50.5	0	2,074	2,065	-9
FH-125	53.3	53.3	0	53	53	0	1,702	1,701	-1
FH-126	56.5	56.5	0	56.2	56.1	-0.1	1,860	1,859	-1
FH-127	56.4	56.4	0	56.1	56.1	0	2,028	2,019	-9
FH-128	56.9	56.9	0	56.6	56.5	-0.1	1,676	1,674	-2
FH-129	56.6	56.6	0	56.3	56.3	0	1,942	1,934	-8
FH-130	58.9	58.9	0	58.6	58.6	0	2,107	2,099	-8
FH-131	54.5	54.5	0	54.1	54.1	0	2,074	2,065	-9
FH-132	55.4	55.4	0	55	55	0	2,088	2,079	-9
FH-133	58	58	0	57.6	57.6	0	2,093	2,084	-9
FH-134	57.3	57.3	0	57	57	0	2,038	2,030	-8
FH-135	59.8	59.8	0	59.5	59.5	0	1,818	1,817	-1
FH-136	62.1	62.1	0	61.8	61.7	-0.1	1,768	1,767	-1
FH-137	61.8	61.8	0	61.4	61.4	0	2,020	2,012	-8
FH-138	59	58.9	-0.1	58.6	58.6	0	2,008	1,999	-9
FH-139	55.1	55.1	0	54.8	54.8	0	2,005	1,997	-8
FH-140	50.5	50.5	0	50.2	50.1	-0.1	2,036	2,028	-8
FH-141	48.1	48.1	0	47.8	47.8	0	**1,407**	**1,405**	**-2**
FH-142	47.4	47.4	0	47.1	47.1	0	**1,343**	**1,341**	**-2**
FH-143	48.7	48.7	0	48.4	48.4	0	2,129	2,120	-9
FH-144	50.5	50.5	0	50.1	50.1	0	2,021	2,012	-9
FH-145	48.9	48.9	0	48.6	48.6	0	2,010	2,002	-8
FH-145A	47	47	0	46.7	46.6	-0.1	1,633	1,631	-2
FH-146	48.1	48.1	0	47.8	47.8	0	1,708	1,705	-3
FH-147	50.6	50.6	0	50.3	50.3	0	1,502	1,500	-2
FH-148	53.4	53.4	0	53.1	53.1	0	1,613	1,611	-2
FH-149	57.6	57.6	0	57.3	57.3	0	1,747	1,744	-3
FH-150	50.8	50.7	-0.1	50.4	50.4	0	1,647	1,644	-3

Model Hydrant Label	Max Day 2022 (926 gpm) Pressure (psi)	Max Day 2022 Plus 1250 Del Mar Dr. (937 gpm) Pressure (psi)	Max Day 2022 Press. Difference Pressure (psi)	Peak Hour 2022 (1296 gpm) Pressure (psi)	Peak Hour 2022 1250 Del Mar Dr. (1313 gpm) Pressure (psi)	Peak Hour 2022 Pressure Difference Pressure (psi)	Max Day 2022 Available Fire Flow Flow (gpm) [1][3]	Max Day 2022 + 1250 Del Mar Dr. Available Fire Flow Flow (gpm) [1][3]	Max Day 2022 Available Fire Flow Difference Flow (gpm) [2]
FH-151	45.6	45.6	0	45.3	45.3	0	1,558	1,555	-3
FH-152	45.1	45.1	0	44.8	44.7	-0.1	1,500	**1,497**	**-3**
FH-153	46.4	46.4	0	46	46	0	1,808	1,805	-3
FH-153A	48.6	48.6	0	48.3	48.2	-0.1	2,021	2,013	-8
FH-154	45	45	0	44.7	44.7	0	1,792	1,788	-4
FH-155	45.4	45.4	0	45.1	45.1	0	1,660	1,659	-1
FH-156	44.9	44.8	-0.1	44.5	44.5	0	1,513	1,510	-3
FH-157	46.5	46.5	0	46.2	46.2	0	**1,317**	**1,315**	**-2**
FH-158	45.6	45.6	0	45.3	45.3	0	**1,424**	**1,422**	**-2**
FH-159	45.2	45.2	0	44.9	44.9	0	2,069	2,064	-5
FH-160	45.8	45.7	-0.1	45.4	45.4	0	1,510	1,508	-2
FH-161	48.6	48.6	0	48.3	48.3	0	1,942	1,939	-3
FH-162	47.4	47.4	0	47.1	47.1	0	1,765	1,762	-3
FH-163	57.3	57.3	0	57.1	57.1	0	2,500	2,500	0
FH-163A	76	76	0	75.8	75.8	0	2,500	2,500	0
FH-164	90.4	90.4	0	90.2	90.2	0	2,500	2,500	0
FH-165	90.4	90.4	0	90.2	90.2	0	2,500	2,500	0
FH-166	90.1	90.1	0	89.9	89.9	0	2,500	2,500	0
FH-167	89.9	89.9	0	89.6	89.6	0	2,500	2,500	0
FH-168	89.9	89.9	0	89.6	89.6	0	2,500	2,500	0
FH-169	56.4	56.4	0	56	56	0	2,072	2,064	-8
FH-170	60.1	60.1	0	59.7	59.7	0	2,095	2,086	-9
FH-171	60.8	60.8	0	60.5	60.4	-0.1	1,905	1,904	-1
FH-172	61	60.9	-0.1	60.6	60.5	-0.1	**1,441**	**1,441**	0
FH-173	62.3	62.3	0	61.9	61.9	0	**1,449**	**1,449**	0
FH-174	63.6	63.6	0	63.3	63.2	-0.1	1,836	1,835	-1
FH-175	54.5	54.5	0	54.2	54.2	0	2,031	2,022	-9
FH-176	48.6	48.6	0	48.3	48.3	0	2,194	2,185	-9
FH-177	62.2	62.2	0	61.9	61.9	0	2,043	2,035	-8
FH-178	64.5	64.5	0	64.2	64.1	-0.1	2,037	2,028	-9
FH-179	60	60	0	59.7	59.7	0	2,022	2,014	-8
FH-180	52	52	0	51.6	51.6	0	2,040	2,032	-8
FH-181	47.6	47.6	0	47.3	47.3	0	2,090	2,081	-9
FH-182	49.3	49.3	0	49	49	0	**1,258**	**1,257**	**-1**
FH-183	51.4	51.4	0	51.1	51.1	0	**887**	**886**	**-1**
FH-184	59.7	59.7	0	59.4	59.4	0	2,271	2,255	-16
FH-185	49.9	49.9	0	49.6	49.6	0	1,832	1,819	-13
FH-185A	59.8	59.8	0	59.5	59.5	0	1,868	1,855	-13
FH-186	51.3	51.3	0	51	51	0	1,758	1,745	-13
FH-187	44.5	44.5	0	44.2	44.2	0	1,618	1,609	-9

Model Hydrant Label	Max Day 2022 (926 gpm) Pressure (psi)	Max Day 2022 Plus 1250 Del Mar Dr. (937 gpm) Pressure (psi)	Max Day 2022 Press. Difference Pressure (psi)	Peak Hour 2022 (1296 gpm) Pressure (psi)	Peak Hour 2022 1250 Del Mar Dr. (1313 gpm) Pressure (psi)	Peak Hour 2022 Pressure Difference Pressure (psi)	Max Day 2022 Available Fire Flow Flow (gpm) [1][3]	Max Day 2022 + 1250 Del Mar Dr. Available Fire Flow Flow (gpm) [1][3]	Max Day 2022 Available Fire Flow Difference Flow (gpm) [2]
FH-188	44.1	44.1	0	43.8	43.8	0	1,579	1,568	-11
FH-189	43.2	43.2	0	43	43	0	1,605	1,600	-5
FH-190	44.8	44.7	-0.1	44.6	44.5	-0.1	1,846	1,839	-7
FH-191	47.6	47.6	0	47.4	47.4	0	2,029	2,022	-7
FH-192	46.6	46.5	-0.1	46.4	46.4	0	**1,494**	**1,491**	**-3**
FH-193	45.3	45.3	0	45.1	45.1	0	1,655	1,652	-3
FH-194	54	54	0	53.9	53.9	0	2,432	2,423	-9
FH-194A	53.5	53.5	0	53.3	53.3	0	2,500	2,500	0
FH-194B	53	53	0	52.9	52.9	0	2,500	2,500	0
FH-195	51.7	51.7	0	51.5	51.5	0	2,500	2,500	0
FH-196	75.3	75.3	0	75.1	75	-0.1	1,979	1,979	0
FH-198	45.4	45.4	0	45.2	45.2	0	2,500	2,500	0
FH-198A	43.4	43.4	0	43.2	43.2	0	**1,371**	**1,368**	**-3**
FH-199	37.5	37.5	0	37.4	37.4	0	2,500	2,500	0
FH-200	26.7	26.7	0	26.6	26.6	0	2,500	2,500	0
FH-201	19.3	19.3	0	19.3	19.3	0	2,500	2,500	0
FH-202	46.5	46.5	0	46.2	46.1	-0.1	1,544	1,533	-11
FH-203 [4]	48.6	48.6	0	48.3	48.3	0	1,584	1,573	-11
FH-204	51.5	51.5	0	51.2	51.2	0	1,744	1,731	-13
FH-205	53.7	53.7	0	53.4	53.3	-0.1	1,578	1,566	-12
FH-205A	59.2	59.2	0	59	58.9	-0.1	1,578	1,566	-12
FH-206	63.6	63.6	0	63.2	63.2	0	2,057	2,048	-9
FH-207	59.4	59.4	0	59.1	59.1	0	2,073	2,064	-9
FH-208	58	58	0	57.6	57.6	0	2,082	2,073	-9
FH-209	58.8	58.8	0	58.4	58.4	0	2,087	2,078	-9
FH-210	60	60	0	59.6	59.6	0	2,092	2,084	-8
FH-211	63.7	63.7	0	63.3	63.3	0	1,708	1,707	-1
FH-212	61.7	61.7	0	61.3	61.3	0	1,755	1,754	-1
FH-213	68.5	68.5	0	68.1	68.1	0	2,052	2,044	-8
FH-214	65.2	65.2	0	64.9	64.8	-0.1	2,010	2,009	-1
FH-215	68	68	0	67.7	67.6	-0.1	2,057	2,048	-9
FH-216	65.5	65.5	0	65.2	65.2	0	2,062	2,054	-8
FH-217	61.8	61.8	0	61.5	61.4	-0.1	2,069	2,060	-9
FH-218	59.6	59.6	0	59.3	59.2	-0.1	2,036	2,034	-2
FH-219	59.4	59.4	0	59	59	0	2,086	2,078	-8
FH-220	60.4	60.4	0	60.1	60.1	0	2,092	2,084	-8
FH-221	60.7	60.7	0	60.4	60.4	0	2,092	2,084	-8
FH-222	62.3	62.3	0	61.9	61.9	0	1,915	1,914	-1
FH-223	63.7	63.7	0	63.3	63.3	0	1,763	1,762	-1
FH-224	65.5	65.5	0	65.1	65.1	0	**1,027**	**1,027**	0

Model Hydrant Label	Max Day 2022 (926 gpm) Pressure (psi)	Max Day 2022 Plus 1250 Del Mar Dr. (937 gpm) Pressure (psi)	Max Day 2022 Press. Difference Pressure (psi)	Peak Hour 2022 (1296 gpm) Pressure (psi)	Peak Hour 2022 1250 Del Mar Dr. (1313 gpm) Pressure (psi)	Peak Hour 2022 Pressure Difference Pressure (psi)	Max Day 2022 Available Fire Flow Flow (gpm) [1][3]	Max Day 2022 + 1250 Del Mar Dr. Available Fire Flow Flow (gpm) [1][3]	Max Day 2022 Available Fire Flow Difference Flow (gpm) [2]
FH-225	67.2	67.2	0	66.8	66.8	0	1,547	1,547	0
FH-226	80.1	80.1	0	79.6	79.6	0	**793**	**793**	0
FH-227	75.6	75.6	0	75.1	75.1	0	**866**	**865**	**-1**
FH-228	76.7	76.7	0	76.1	76.1	0	**783**	**783**	0
FH-229	82.8	82.8	0	82.3	82.3	0	**608**	**608**	0
FH-230	80.8	80.8	0	80.3	80.2	-0.1	**578**	**578**	0
FH-231	79.1	79.1	0	78.5	78.5	0	**568**	**568**	0
FH-232	74.4	74.4	0	73.8	73.8	0	**553**	**552**	**-1**
FH-232A	73.4	73.4	0	72.8	72.8	0	**542**	**542**	0
FH-232B	70.3	70.3	0	69.8	69.7	-0.1	**568**	**568**	0
FH-233	74.2	74.2	0	73.7	73.7	0	**1,055**	**1,055**	0
FH-234	61.2	61.2	0	60.8	60.8	0	2,089	2,081	-8
FH-235	67.5	67.5	0	67.1	67.1	0	1,729	1,728	-1
FH-236	66.3	66.3	0	65.9	65.9	0	1,746	1,746	0
FH-237	69.3	69.3	0	68.9	68.9	0	1,646	1,645	-1
FH-238	67.9	67.9	0	67.5	67.5	0	1,686	1,685	-1
FH-239	68.8	68.7	-0.1	68.3	68.3	0	1,657	1,656	-1
FH-240	69.6	69.6	0	69.2	69.2	0	1,664	1,663	-1
FH-241	69.7	69.7	0	69.3	69.3	0	1,798	1,797	-1
FH-242	69.8	69.8	0	69.4	69.4	0	1,726	1,725	-1
FH-243	71.8	71.8	0	71.4	71.4	0	1,738	1,737	-1
FH-244	71.3	71.3	0	70.9	70.9	0	1,724	1,724	0
FH-245	70	70	0	69.6	69.6	0	1,680	1,679	-1
FH-246	70.9	70.9	0	70.5	70.5	0	1,564	1,564	0
FH-247	72.6	72.6	0	72.2	72.2	0	**1,469**	**1,469**	0
FH-248	64.4	64.4	0	64	64	0	2,003	2,002	-1
FH-249	67.1	67.1	0	66.7	66.7	0	2,092	2,084	-8
FH-250	62.6	62.6	0	62.2	62.2	0	2,091	2,082	-9
FH-251	64.1	64.1	0	63.8	63.7	-0.1	2,092	2,083	-9
FH-252	65.3	65.3	0	64.9	64.9	0	1,953	1,952	-1
FH-253	67.4	67.4	0	67	67	0	2,048	2,047	-1
FH-500	50.3	50.3	0	50	50	0	1,986	1,984	-2
FH-501	61.1	61.1	0	60.7	60.7	0	1,624	1,623	-1
FH-WARF1-2.5	67.9	67.9	0	67.5	67.5	0	2,055	2,047	-8

Notes:
(1) Values highlighted in red indicate hydrants whose available fire flow is less than the desired 1,500 gpm.
(2) Values highlighted in red indicate hydrants whose available fire flow is less than the desired 1,500 gpm, and the difference between pre-project vs. post-project is greater than 0.
(3) Tank levels conservatively estimated at 0 volume for fire flow tests.
(4) FH-203 is the closest hydrant to the Project. See Figure 2.

Appendix: Description of Fire Flows in Hydraulic Modeling

1. Field measured fire flow

- Hydrant flow is measured with flow meter
- 2.5” opening vs. 4.5” opening will give different flow results

2. Modeled Automated Fire Flow Analysis (Available fire flow)

- Available flow values indicate the maximum flow at each hydrant such that residual pressures at the hydrant stay above 20 PSI and all system components stay above 35 PSI during maximum day demands
- Available fire flows are computed by iteratively assigning demands and computing system pressures at each demand increment. For example:

  Hydrant A is being tested.

  1. 1 GPM is added to Hydrant A.
  2. All other pressures in the system are checked to see if they are above 35 PSI.
  3. Hydrant A is checked to see if its own pressure is above 20 PSI.
  4. If both 2. and 3. pass the test, then another 1 GPM is added to Hydrant A, and the system pressures are checked again.
  5. If both 2. and 3. do not pass the test, the available flow total is stopped and reported.
- All hydrants can be checked at once using the automated fire flow analysis.
- Automated Fire Flow Analysis does not take into account losses in the hydrant.

3. Modeled discharge to atmosphere fire flow (Simulates field measured fire flow)

- Emitter coefficient is assumed for each hydrant type. Assumed emitter coefficients:
  - 150 - 180 for 2.5” outlets
  - 167 - 185 for 2 - 2.5” outlets
  - 380 - 510 for the 4.5” outlets
- Pressure head is converted to velocity at outlet
- Each hydrant needs to be modeled separately
- Discharge to atmosphere fire flow does take into account losses in the hydrant.