

CALIFORNIA COASTAL COMMISSION

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 Commission Action:

STAFF REPORT: REGULAR CALENDAR

APPLICATION NUMBER: 5-99-377

APPLICANT: California Department of Transportation

AGENT: Anthony Cole, Caltrans Dist. #7

PROJECT LOCATION: Vincent Thomas Bridge, Port of Los Angeles,

PROJECT DESCRIPTION: Permanent installation of 120 (200 to 1,125- watt) floodlights; four (7,000-watt) Xenon fixed beam Skytracker lights; and eight 8-foot in diameter parabolic reflective discs to an existing bridge (Vincent Thomas Bridge) that spans the northern portion of the main channel of the Los Angeles Harbor.

LOCAL APPROVALS RECEIVED: N/A

SUBSTANTIVE FILE DOCUMENTS: *Technical Report to Assess the potential impacts of the Vincent Thomas Bridge Lighting Project*, by California Department of Transportation, District 7; Categorical Exemption No. 991008 (CEQA).

SUMMARY OF STAFF RECOMMENDATION:

Staff is recommending approval of the proposed development with special conditions addressing protection of fauna and marine resources by limiting the duration of the skyward projecting lights to one evening only and ensuring that all lighting is directly focused on the bridge.

STAFF NOTE: The proposed coastal development permit application has been submitted to the Commission because the project is not listed in the port master plan as a permitted use. Since the project is not listed in the port master plan the Commission has permit authority. The proposed project is located within the jurisdictional boundary of the Port of Los Angeles and, as an improvement to an existing road or highway which is not principally for internal circulation within the port boundaries, is an appealable project under Section 3015(a)(3). Therefore, the

project will be evaluated for conformance with the Coastal Act by using the applicable Chapter 3 and Chapter 8 policies of the Coastal Act.

STAFF RECOMMENDATION:

The staff recommends that the Commission adopt the following resolution:

I. APPROVAL WITH CONDITIONS

The Commission hereby **GRANTS** a permit, subject to the conditions below, for the proposed development on the grounds that the development will be in conformity with the provisions of Chapter 3 and Chapter 8 of the California Coastal Act of 1976, and will not have any significant adverse effects on the environment within the meaning of the California Environmental Quality Act.

II. STANDARD CONDITIONS:

1. Notice of Receipt and Acknowledgment. The permit is not valid and development shall not commence until a copy of the permit, signed by the permittee or authorized agent, acknowledging receipt of the permit and acceptance of the terms and conditions, is returned to the Commission office.
2. Expiration. If development has not commenced, the permit will expire two years from the date this permit is reported to the Commission. Development shall be pursued in a diligent manner and completed in a reasonable period of time. Application for extension of the permit must be made prior to the expiration date.
3. Compliance. All development must occur in strict compliance with the proposal as set forth in the application for permit, subject to any special conditions set forth below. Any deviation from the approved plans must be reviewed and approved by the staff and may require Commission approval.
4. Interpretation. Any questions of intent or interpretation of any condition will be resolved by the Executive Director or the Commission.
5. Inspections. The Commission staff shall be allowed to inspect the site and the project during its development, subject to 24-hour advance notice.
6. Assignment. The permit may be assigned to any qualified person, provided assignee files with the Commission an affidavit accepting all terms and conditions of the permit.
7. Terms and Conditions Run with the Land. These terms and conditions shall be perpetual, and it is the intention of the Commission and the permittee to bind all future owners and possessors of the subject property to the terms and conditions.

III. SPECIAL CONDITIONS

1. Period of Operation of the Xenon Skytracker Lights

Prior to the issuance of the permit the applicant shall agree in writing, subject to the review and approval of the Executive Director, that the four Xenon Skytracker lights, or similar skyward projecting lights, located at the top of each tower, shall operate only between the hours of 9:00 p.m. on December 31, 1999 to 6:00 a.m. on January 1, 2000. After that time, the lights may not be operated unless the Commission has approved an amendment to this permit to authorize such use. In order that the Commission may file the application for the amendment as complete, the applicant shall file the following information with the amendment:

(a) a detailed study, conducted by a qualified ornithologist or biologist with expertise in Southern California migratory birds, to identify the number of birds and the species that migrate through the area. The study shall address the impacts the high intensity lights may have on the migratory and resident birds of the area.

(b) written review and approval by the California Department of Fish and Game and the United States Fish and Wildlife Service or a statement in a form and content acceptable to the Executive Director that no approval is required.

2. Future Amendment Agreement

Prior to issuance of the permit the applicant shall agree in writing, subject to the review and approval of the Executive Director, that any future amendment, for the operation of Xenon Skytracker lights, or similar skyward projecting lights, will be based on Chapter 3 and Chapter 8 impacts and, therefore will not be based on the fact that the applicant will have already expended funds for the installation of the lights.

3. Future Bird Mortality

The applicant shall agree in writing, subject to the review and approval of the Executive Director, if any significant mortality of birds is observed, the lights shall be turned off immediately until the Coastal Commission, California Department of Fish and Game, and the U.S. Fish and Wildlife Service are notified and an appropriate course of action is identified. Based on the course of action identified by the agencies, the Executive Director shall determine if an amendment to this permit is required.

IV. FINDINGS AND DECLARATIONS:

The Commission hereby finds and declares:

A. Project Description and Location

The applicant is proposing to permanently install 120 (200 to 1,125-watt) floodlights; four (7,000-watt) Xenon fixed beam Skytracker lights; and eight 8-foot in diameter parabolic reflective discs to an existing bridge (Vincent Thomas Bridge) that spans the northern portion of the main channel of the Los Angeles Harbor (see Exhibit No. 1 & 2).

The four 7,000-watt Xenon Skytracker lights will be located at the top of each bridge tower. The Xenon lights will be stationary, sending a vertical beam of light directly overhead into the night sky. In addition, at the top of each tower, there will be a sculptural element containing four (two per tower column or spire) 8-foot in diameter parabolic discs designed to reflect the light of the sun during the day and artificial light at night (see Exhibit No. 5).

The remaining floodlights will consist of individual and banks of lights at three separate locations along the towers; the base, the lower horizontal strut, and mid-tower levels (see Exhibit No. 3 & 4). The location and direction of the lighting, as proposed, will result in the illumination of the entire length of each tower. All proposed lighting is for decorative purposes to visually enhance the bridge at night.

The Bridge expands over the northern portion of the Los Angeles Main Channel in an east-west direction, connecting the San Pedro area of the City of Los Angeles with Terminal Island in the Port of Los Angeles (see Exhibit No.1). The Vincent Thomas Bridge is a 4-lane suspension bridge. The bridge is 1,500 feet long between towers, with back spans of approximately 506 feet on either side (see Exhibit No. 2). The two bridge towers, each tower consisting of two columns or spires, are located on land on either side of the Los Angeles Main Channel. The towers extend to a height of 335 feet above ground level (335 feet above sea level). The area immediately surrounding the bridge is primarily industrial, with cruise ship docks, cargo loading and storage yards and other port related facilities.

The bridge is part of State Route 47, which is under the jurisdiction of the California Department of Transportation, who is the applicant of this project. As an improvement to an existing road or highway, which is not principally for internal circulation within the port boundaries, the project is an appealable project under Section 3015(a)(3) of the Coastal Act. As an appealable project and a project located within the jurisdiction of the port, the project will be evaluated for conformance with the Coastal Act by using the applicable Chapter 3 and Chapter 8 policies of the Coastal Act.

The sponsors of the project are the City of Los Angeles, Los Angeles Harbor Department, Department of Water and Power, Vincent Thomas Bridge Lighting Committee, and the Shuwa Corporation.

The initial lighting ceremony is scheduled to occur at 9:00 p.m. on December 31, 1999 in conjunction with the City of Los Angeles' millennium celebration. The lights will be a permanent installation, with the lights intended to be on nightly after the initial lighting from approximately sunset to sunrise. The proposed project has been scheduled for the November 1999, hearing at the request of the applicant, due to timing concerns on the part of the applicant. As a result of the limited time, Commission staff has not received written input from the California Department of Fish and Game or the United States Fish and Wildlife Service. Commission staff has spoken to the Dept. of Fish and Game and the Fish and Wildlife Service and they have both expressed initial concern with the lighting of the bridge and the potential adverse impact on birds. The Dept. of Fish and Game, however, has not had sufficient time to adequately review the project.

B. Public Comments

The South Coast District staff has spoken with The Urban Wildlands Group, Inc, who are opposed to the proposed project. The group is concerned with the impact the entire lighting project will have on migratory birds and other birds that frequent the area. They feel that the project is not necessary for the functioning of the bridge and the risk to birds is too great to allow lighting that is strictly for decorative purposes only. The group is preparing a letter for submittal to the Commission, however, because of the timing of this project, the letter was not ready for inclusion with this report.

Commission staff has also spoken to the local chapter of the Audubon Society. They are also opposed to the project for the same reasons and they are also preparing a letter for submittal to the Commission.

C. Environmental Resources

Chapter 3 Polices

Section 30230 of the Coastal Act states:

Marine resources shall be maintained, enhanced, and where feasible, restored. Special protection shall be given to areas and species of special biological or economic significance. Uses of the marine environment shall be carried out in a manner that will sustain the biological productivity of coastal waters and that will maintain healthy populations of all species of marine organisms adequate for long-term commercial, recreational, scientific, and educational purposes.

Section 30240 of the Coastal Act states in part:

(a) Environmentally sensitive habitat areas shall be protected against any significant disruption of habitat values, and only uses dependent on those resources shall be allowed within those areas.

(b) Development in areas adjacent to environmentally sensitive habitat areas and parks and recreation areas shall be sited and designed to prevent impacts which would significantly degrade those areas, and shall be compatible with the continuance of those habitat and recreation areas.

Chapter 8 Polices

Section 30708 (a) of the Coastal Act states:

All port-related developments shall be located, designed, and constructed so as to:

(a) Minimize substantial adverse environmental impacts.

The issue the proposed project raises is the potential impact the lights may have on the various bird species that migrate through the harbor, resident bird species, and to fish within the harbor.

The harbor and surrounding area is located along the Pacific Flyway. The Pacific Flyway is the path that migratory birds follow along the Pacific Coast during their annual migrations. Millions of shorebirds and waterfowl travel between northern breeding grounds and southern wintering sites. The Pacific Flyway originates in Western Alaska, around the Yukon River Delta, and extends as far south as Latin America. The peak periods for migration through southern California are March through May and August through October.

Both migratory shorebirds and neotropical songbirds either come to this area to breed or pass through here on their way to other locations. While the majority of shorebirds migrate during the day, there are some that fly at night. Most songbirds are nocturnal migrants. Wetlands and coastal bays are stopover sites for resting and feeding birds. Although there are no available studies about the nocturnal migrants that fly over the harbor area, approximately 100,000 to 1,000,000 birds use Seal Beach, which is approximately 20 miles to the south, as a major stopover, according to the Caltrans technical report (see Attachment No. 1).

The bridge itself is also home to a pair of American peregrine falcons (*falco peregrinus*). According to the Caltrans report the peregrines nest/roost on the steel-girders below the bridges' roadway between the two towers.

The peregrine was recently removed from the federal endangered list. However, the peregrine is still protected under the federal Migratory Bird Treaty Act. As such, it is considered illegal to harm, harass or kill individuals of this species. The peregrine is also on the State's endangered list. The state Endangered Species Act protects listed species from being killed or harmed.

There have been many studies and reports that indicate that lights on tall structures can pose a problem for night migrating birds and cause mortalities among these birds (i.e.

Collision Course: The Hazards of Lighted Structures and Windows to Migrating Birds, L.J.E. Ogden, September 1996; *The Effects of Overcast Skies on the Orientation of Free-flying Nocturnal Migrants*, K.P. Able, 1982; *The mechanisms of the trapping effect of artificial light sources upon animals*, F.J. Verheijen, Netherlands Journal of Zoology, 1958). However, studies that have been done are generally associated with tall (over 200 feet) communications towers. Mortalities associated with tall structures are referred to as tower-kills. These tower-kills have also been known to involve lighted monuments (e.g. the Washington Monument), smoke stacks and airport ceilometers. Most of the reports from the United States come from the eastern and central part of the county. There is no documentation regarding lighted bridges over waterways and the impacts to birds. However, this could be due to birds hitting bridge structures and falling into the water or being removed quickly by scavengers. Therefore, any mortality may go unnoticed.

According to reports the birds most affected by lit towers are the neotropical migratory songbirds, in particular thrushes, vireos, and warblers. According to existing reports, there are two mechanisms for bird mortality that occur at communication towers. The first is when birds flying in poor visibility do not see the structure. Communication towers that are lighted at night for aviation safety may help reduce bird collisions caused by poor visibility, but the lights bring about a second mechanism for mortality. When there is a low cloud ceiling or foggy conditions, lights on a tower refract off water particles in the air creating an illuminated area around the tower. Migrating birds have lost their stellar cues for nocturnal migration in these weather conditions. When passing the lighted area, the increased visibility around the tower may become the strongest cue the birds have for navigation, and thus they tend to remain in the lighted space by the tower. Mortality may occur when they run into the structure and its guy wires, or even other migrating birds as more and more passing birds cram into the relatively small, lighted space. Other birds may fly around in circles around the light source until they become exhausted and fall from the sky.

The exact magnitude of the problem is unknown. The Caltrans report states that on January 22, 1998, in western Kansas, an estimated 10,000 Lapland lonspurs were killed at, and in the vicinity of, three towers and a natural gas pumping facility.

In Florida, a 25-year study on bird mortality associated with a communication tower just north of Lake Iamonia, was conducted by ornithologists stationed at a nearby research station. Over the 25-year period, 42,386 birds were found scattered beneath the tower (*Blinking lights mark scenes of death for birds*, by Jim Cox, Tallahassee Democrat). The Caltrans report states that:

Many other incidents involving up to, and in some cases more than, 1,000 birds are noted in an annotated bibliography prepared by the U.S. Fish and Wildlife Service's (the Service) Office of Migratory Bird Management (Trapp, 1998). In 1979, the Service estimated an annual mortality at around 1.4 million birds (Manville, 1999). Today's conservative estimate is upwards of 4 million birds killed per year.

The bridge is currently lit with flashing red navigational lights on the top of each bridge tower. According to reports, birds are thought to be less sensitive to flashing red lights than to other forms of light. The Caltrans report indicates that bridge maintenance crews have not reported finding any dead birds near the bridge. However, the report further states that it is possible that any existing problem would go unnoticed because the birds could fall in the water or be removed by scavengers.

Lights similar to the ones proposed at the top of the towers, that will shine a beam of light directly into the night sky, are used on the City of Long Beach's Landmark Square Building. The building is located approximately 3 miles to the southeast. The approximately 25-story building has four 3,000-watt Xenon lights on the roof directed straight up. The lights have been in operation since 1991 and operate between sunset and midnight. There have been no reported problems with bird kills.

As stated, the Port of Los Angeles is developed with numerous industrial and port related facilities. With such development there are numerous lights throughout the Port area. These lights are located on/in buildings, cranes, and parking and cargo storage lots. The area surrounding the two towers is well lit. Therefore, the addition of lights directed toward the existing structure will not significantly add to the ambient illumination of the area. However, the high intensity Skytrackers that direct light directly into the night sky will increase the illumination of the night sky above the bridge during inclement weather, which occurs quite frequently within the Los Angeles harbor area. The applicant has not provided any specific documentation regarding the number and type of migratory birds that fly over the area nor have they submitted any substantial information with regards to the impact the high intensity lights or the floodlights will have on the birds that use the area.

The impact to the peregrine should not be significant since the birds nest/roost under the roadway within the bridge girders which will not be illuminated. The Caltrans report states that a peregrine expert and consultant/monitor for the Vincent Thomas Bridge seismic retrofit project, indicated that the proposed lighting would not adversely impact the peregrines.

Another concern is adverse impacts to fish in the channel. Increased lighting may attract mid-water column dwelling fish, such as bass (calico and spotted bass). This may increase predation by sea lions, night herons, gulls and other predators. According to the applicant all lights will be directed onto the tower structures, except for the Skytrackers, and no lights will be directed over the water. Therefore, the potential impact to fish would be nominal.

At this time Commission staff has not received any written comments from the California Department of Fish and Game or from the U.S. Fish & Wildlife Service. The Dept. of Fish and Game has not had adequate time to adequately review the project. Commission staff has verbally communicated with both the Dept. of Fish and Game and the U.S. Fish & Wildlife Service and they have initially expressed concern with the lighting and the impact the lighting will have on migratory birds and the peregrines.

Although it is not known for certain why birds fly into tall lighted structures there is a significant amount of data that indicates that tall lighted structures cause bird kills. The cumulative impact of illuminating additional structures in a highly developed and lighted area is also not known at this time. However, the additional lights will add to the illumination of the area and may add to the cumulative adverse impacts that lights have on migratory birds and resident birds. Therefore, as a condition of this permit, the high intensity Xenon Skytracker lights located at the top of each tower shall be limited to one night only, between the hours of 9:00 p.m. on December 31, 1999 to 6:00 a.m. on January 1, 2000, until a study is conducted on the migratory birds of the area and the potential impact the high intensity lights will have on the birds and an amendment to this permit has been approved. Furthermore, the study shall be reviewed and approved by the Department of Fish and Game and the U.S. Fish and Wildlife Service, or provide a statement from the agencies stating that no approval is required, prior to the submittal of an amendment. The applicant shall also agree in writing that approval of an amendment for the operation of the Xenon Skytracker lights, or similar skyward projecting lights, will be based on Chapter 3 and Chapter 8 impacts and therefore will not be based on the fact that the applicant will have already expended funds for the installation of the lights. A third condition requiring that if any significant mortality of birds is observed, the lights shall be turned off immediately until the Coastal Commission, the California Department of Fish and Game and the U.S. Fish and Wildlife Service are notified and an appropriate course of action is identified is necessary.

The Commission finds that, only as conditioned by this permit, will the project minimize any substantial adverse environmental impacts and be consistent with Section 30230, 30240 and 30708(a) of the Coastal Act.

D. California Environmental Quality Act

Section 13096 of the Commission's regulations requires Commission approval of Coastal Development Permit applications to be supported by a finding showing the application, as conditioned by any conditions of approval, to be consistent with any applicable requirements of the California Environmental Quality Act (CEQA). Section 21080.5(d)(2)(i) of CEQA prohibits a proposed development from being approved if there are feasible alternatives or feasible mitigation measures available, which would substantially lessen any significant adverse effect which the activity may have on the environment.

The proposed project, as conditioned, has been found to be consistent with the Chapter 8 policies of the Coastal Act. All adverse impacts have been mitigated by conditions of approval and there are no feasible alternatives or feasible mitigation measures available which would lessen any significant adverse impact the activity may have on the environment. Therefore, the Commission finds that the proposed project, only as conditioned, is consistent with CEQA and the policies of the Coastal Act.

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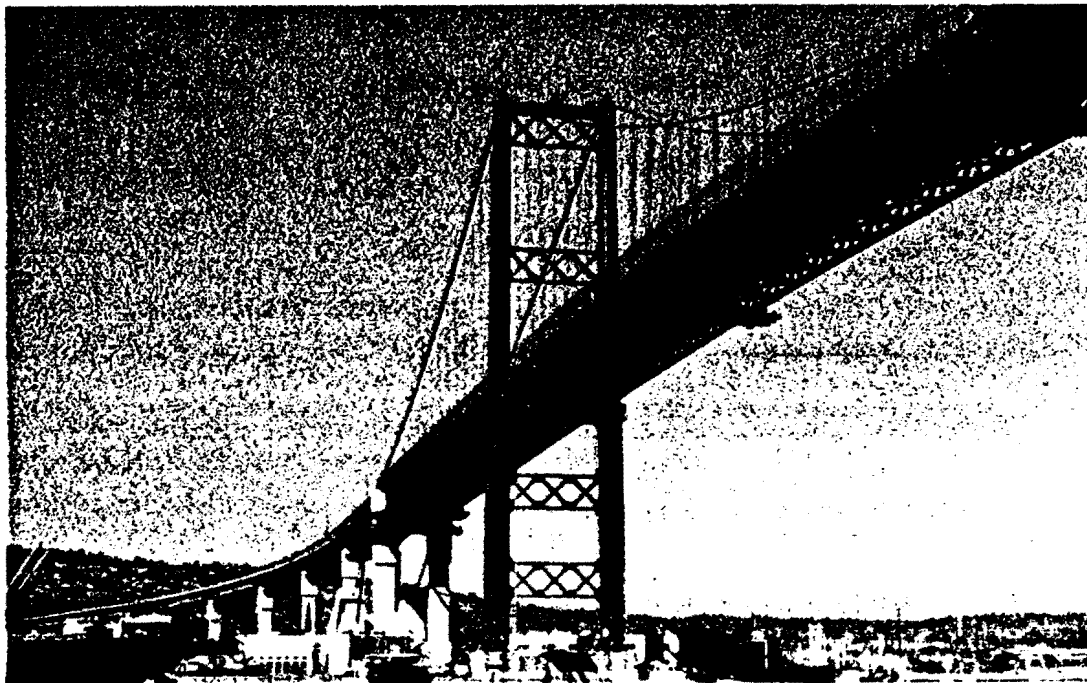
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CALIFORNIA
COASTAL COMMISSION

Technical Report

Attachment No. 1
Application Number 5-99-377
Caltrans technical Report
California Coastal Commission

to Assess the potential impacts of the
Vincent Thomas Bridge Lighting Project



Prepared by:

California Department of Transportation
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Introduction

Approximately 12 years ago, the Vincent Thomas Bridge Lighting Committee was formed by a group of San Pedro residents to promote the placement of decorative lighting on the bridge. As a major landmark in the Los Angeles Harbor area, the intent was to transform the bridge into a grand entrance to Los Angeles for people arriving via the Harbor.

The project has been endorsed by the City of Los Angeles, with the Cultural Affairs Department serving as its primary advocate. And, the California Department of Transportation (Caltrans), as the owner and operator of the bridge, has signed a Memorandum of Understanding with the City agreeing to the placement of the lights on the bridge. Although the project has progressed at varying rates of speed over the past 12 years, the approaching turn of the century has provided renewed interest in seeing it move to completion in time for a millenium celebration on December 31, 1999.

This Technical Report has been prepared as part of the environmental documentation required for clearance under the California Environmental Quality Act (CEQA). Its goal is to address the potential environmental impacts of the project, assess the significance of those impacts and identify alternatives for avoiding, minimizing or mitigating those impacts.

Project Description

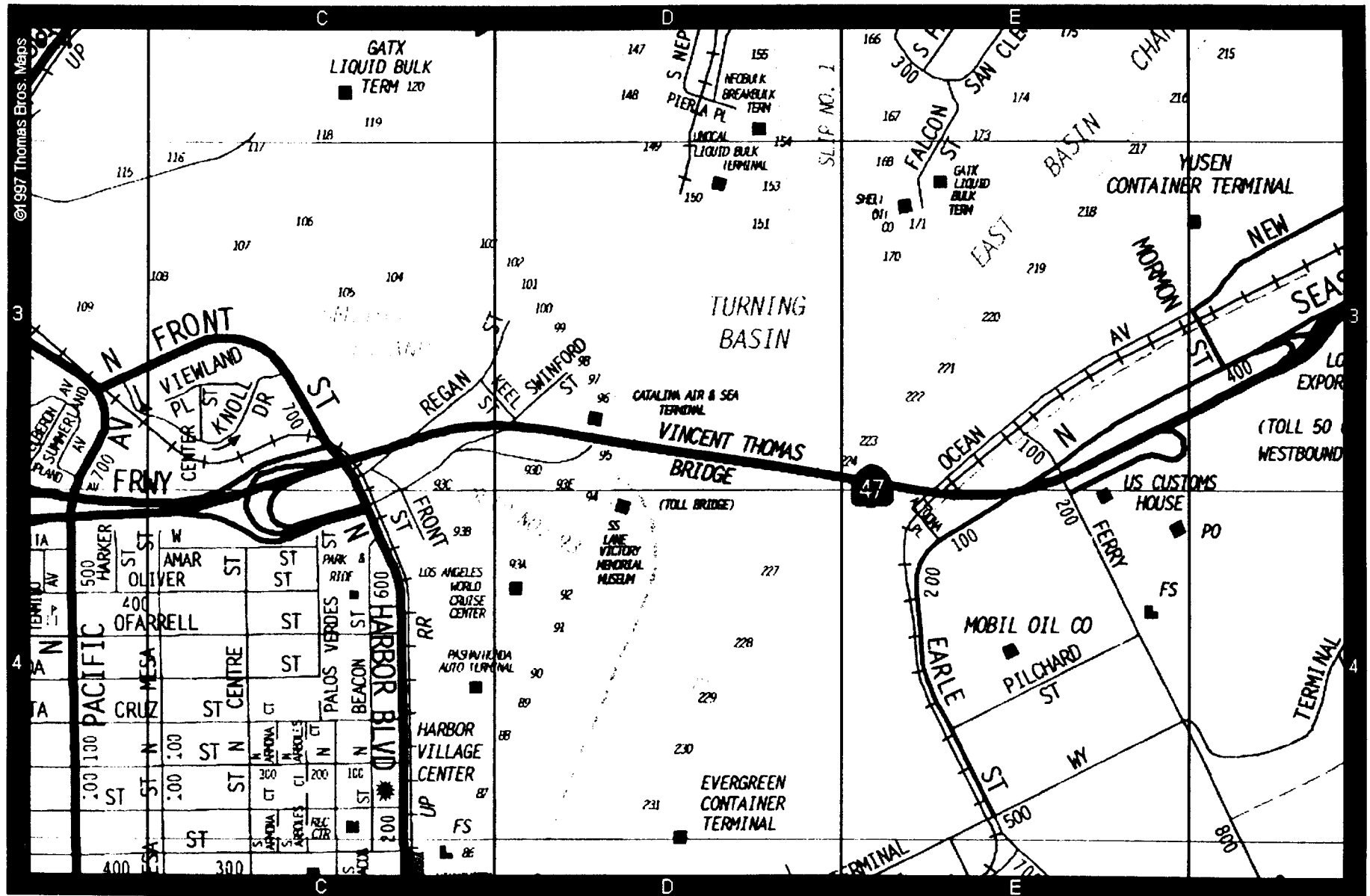
This project involves the installation of lighting on the two bridge towers, which are located on either side of the Los Angeles Main Channel. These towers extend to a height of 335 feet above ground level (335 feet above sea level). The lighting will consist of banks of lights at the base and mid-tower levels that will result in the illumination of the entire length of each tower. In addition, two 7000-watt xenon lights will be located at the top of each tower; these will be stationary, sending vertical beams of light directly overhead to form a visual continuation of the bridge towers into the night sky. Also at the top of each tower will be a sculptural element containing four 8 foot-diameter parabolic discs designed to reflect the light of the sun during the day and artificial light at night.

The initial lighting ceremony is scheduled to occur at 9:00 PM on December 31, 1999 in conjunction with the City of Los Angeles' millenium celebration. This is a permanent installation, with the lights intended to be on nightly after that from approximately sunset to sunrise.

Environmental Setting

The Vincent Thomas Bridge is located in the southern part of Los Angeles and connects the community of San Pedro with Terminal Island in the Port of Los Angeles (PoLA). As shown on the area map, the bridge runs in an east-west direction and spans the Los Angeles Main Channel. The Port of Long Beach is located to the east of, and adjacent to, the PoLA. The area immediately surrounding the bridge is primarily industrial, with cruise ship docks, cargo loading and storage areas and other facilities associated with

Vicinity Map for Vincent Thomas Bridge



operating the West Coast's busiest port. The nearest residential areas of San Pedro are located approximately ½ mile to the southwest.

The industrial nature of the PoLA has resulted in the presence of a highly disturbed and artificial landscape. There is no native vegetation in the vicinity of the bridge.

There are numerous lights throughout the combined Ports of Los Angeles and Long Beach. Many of these lights, which are located in parking and cargo lots, on/in buildings and on cranes and other equipment/facilities, are left on throughout the night. The weather conditions within the Ports often have the effect of magnifying this light. The late night and early morning low clouds and fog that are typical of coastal southern California often result in a yellowish glow throughout much of the land portion of the ports.

This area is located along the Pacific Flyway, the coastal migratory path used by many shorebirds. Seal Beach, a major stopover point for between 100,000 and 1,000,000 birds each spring, is about 20 miles to the south. The harbor area is also along the broad-band migratory path of many neotropical songbirds.

Sensitive Resources

Several sensitive resources have been identified as being potentially affected by this project. These are described below:

Peregrine Falcons

The Vincent Thomas Bridge has been the year-round home for a pair of American peregrine falcons (*Falco peregrinus*) for the past several years. Although their nesting/roosting locations vary from year to year, they can frequently be found on the steel-girder structure below the roadway between the two towers.

This species was recently removed from the federal endangered species list; however, it is still listed as endangered at the state level. The state Endangered Species Act protects listed species from being killed or harmed. However, personnel from the Department of Fish and Game have indicated that the definition of harm includes only physically harming the birds or removing their nest. Neither of these will occur as a result of this project.

The peregrine is also still protected under the federal Migratory Bird Treaty Act (it is considered a migratory species, despite being a year-round resident at this location), meaning that it is illegal to harm, harass or kill individuals of this species. In this case, harassment could occur if the nighttime illumination of the bridge sufficiently disturbed the birds to cause them to leave the bridge. This could be especially dangerous because peregrines do not have good night vision; forcing them to fly at night could result in collisions with other objects, causing injury or death.

A related concern is that any disturbance to the peregrines might result in increased predation on the California least tern (*Sterna antillarum brownii*) (state and federal endangered) and western snowy plover (*Charadrius alexandrinus nivosus*) (federal threatened, state species of concern). Both of these species have breeding colonies nearby on Terminal Island. Any harm to them would be in violation of the Endangered Species Acts.

To address these concerns, the project was discussed with Carl Thelander, a peregrine expert and consultant/monitor for the Vincent Thomas Bridge seismic retrofit project. Based on the project description and his familiarity with peregrines in general, and the resident birds in particular, it is his belief that the project will not pose a problem for the birds.

One additional concern is the potential conflict that might arise between the peregrines and barn owls and great horned owls that live in the harbor area. It is possible that the lights might have the effect of extending the daylight hours in the vicinity of the bridge. If this results in the peregrines being active after the nocturnal owls have begun to hunt, a conflict between these species might arise. Although this is probably a minor problem, it might still be advisable to ensure that the lights are turned on no sooner than 30 minutes after sunset and turned off no later than 30 minutes before sunrise to ensure that potential conflicts between these species are avoided.

Migratory Birds

Bird Migration:

Coastal southern California is along the migratory path of numerous species of birds. Both shorebirds and neotropical songbirds either come to this area to breed or pass through here on their way to other locations. While the majority of shorebirds migrate during the day, there are some that fly at night. Most songbirds are nocturnal migrants. Although the broadband migration of songbirds doesn't concentrate these birds along the immediate coast, there are still many species and many individuals that do move through this area.

Migration occurs mostly in a south to north direction during the spring as birds move from their winter homes in the more tropical latitudes toward their breeding grounds. In the fall, this direction is reversed as the birds return to their wintering grounds. The peak periods for migration through southern California are March through May and August through October.

The elevation at which birds migrate varies enormously and depends on such factors as the species, location, geographic features, season, time of day and weather conditions. However, as a group, songbirds tend to fly at relatively low levels.

It appears that there have been no studies from coastal southern California from which we can extrapolate much detailed information about the nocturnal migrants that fly over the harbor area. Although the presence of certain species is either known or can be assumed,

a detailed species list as well as an estimate of the numbers of individuals for each species is lacking. A list of species that might pass through the harbor area is shown below and is based on information gathered from the Pt. Reyes Bird Observatory.

Common Name	Scientific Name	Protected Status	Comments
Bell's vireo	<i>Vireo bellii</i>	-	
Warbling vireo	<i>Vireo gilvus</i>	-	Is being considered for CSC
Southwestern willow flycatcher	<i>Empidonax traillii extimus</i>	FE	
Olive-sided flycatcher	<i>Contopus borealis</i>	MNBMC	
Brewer's sparrow	<i>Spizella breweri</i>	-	
Bell's sage sparrow	<i>Amphispiza belli belli</i>	FSC, CSC, MNBMC	
Yellow warbler	<i>Dendroica petechia brewsteri</i>	CSC	
Black-headed grossbeak	<i>Pheucticus melanocephalus</i>	-	
Common yellowthroat	<i>Geothlypis trichas</i>	-	
Townsend's warbler	<i>Dendroica townsendi</i>	-	
Hermit warbler	<i>Dendroica occidentalis</i>	MNBMC	
Lewis' woodpecker	<i>Melanerpes lewis</i>	-	
Band-tailed pigeon	<i>Columba fasciata</i>	-	
Eastern wood pewee	<i>Contopus virens</i>	-	Migrate in large numbers
Western flycatcher	<i>Empidonax difficilis</i>	-	Migrate in large numbers
Swainson's thrush	<i>Catharus ustulatus</i>	-	
Wilson's warbler	<i>Wilsonia pusilla</i>	-	Fall migration is primary concern
Yellow-breasted chat	<i>Icteria virens</i>	CSC	
Blue grossbeak	<i>Guiraca caerulea</i>	-	
Grasshopper sparrow	<i>Ammodramus savannarum</i>	MNBMC	
Western meadowlark	<i>Sturnella neglecta</i>	-	
White-crowned sparrow	<i>Zonotrichia leucophrys</i>	-	Migrate in large numbers. Susceptible to light

- FE - Federal endangered
- FSC - Federal Species of Concern
- CSC - California Species of Concern
- MNBMC - Migratory Non-game Bird of Management Concern

This list contains several species that have state or federal protected status. It is by no means complete, and there is a high probability that additional sensitive species pass through the area.

The Problem:

There have been many studies and reports that indicate that lights on tall structures can pose a problem for night migrating birds (Manville, 1999). Although the earliest reports dating back to the 1880s involved lighthouses, more recent reports (since the late 1940s) have been associated with tall (over 200 feet) communications towers. These so-called tower kills, in which large numbers of migrating birds are killed in a single incident, have also been known to involve lighted monuments (e.g., the Washington Monument), smoke stacks and airport ceilometers. Most of the reports from the United States come from the eastern and central part of the country. Although there is not much documentation of problems associated with lighted bridges, this could be because most birds hitting a bridge would fall into the water or be removed by scavengers and would therefore not be noticed (Measure, pers. Com.).

Of the birds reportedly killed by lit towers, the 350 species of neotropical migratory songbirds, and in particular thrushes, vireos and warblers, seem to be most vulnerable (Manville, 1999). They are especially susceptible when foggy, misty or low-cloud-ceiling nights occur during their migrations.

The exact mechanism behind the attraction of birds to lighted structures is still unclear (WWFC, 1996). Studies tend to support the theory, however, that migrant birds are not attracted to the lights from a distance. Instead it is believed that those birds passing by on cloudy nights enter an illuminated area that they are reluctant to leave: when the birds approach the edge of the illuminated area, they are hesitant to fly into the darkness beyond and instead fly back toward the light. This sets up a pattern of birds circling around the lit area. As more birds enter this limited space, the likelihood of collisions between birds or between birds and other obstructions increases. Those birds that aren't killed in collisions frequently fly around in circles until they become exhausted and simply fall from the sky.

One indication of the magnitude of the problem comes from a recent (January 22, 1998) event in western Kansas in which an estimated 10,000 Lapland Longspurs were killed at, and in the vicinity of, three towers and a natural gas pumping facility (Manville, 1999). Many other incidents involving up to, and in some cases more than, 1000 birds are noted in an annotated bibliography prepared by the U.S. Fish and Wildlife Service's (the Service) Office of Migratory Bird Management (Trapp, 1998). In 1979, the Service estimated an annual mortality at around 1.4 million birds (Manville, 1999). Today's conservative estimate is upwards of 4 million birds killed per year.

This Project:

In order to assess whether or not this project will present a potential problem to migratory birds, the existing conditions were documented, similar local and distant projects were reviewed, and the project was discussed with experts familiar with this issue.

As mentioned previously, the harbor area where the bridge is located is fairly well lit at night. Low clouds and fog frequently move into the area at night, resulting in a yellowish

glow above the harbor. One would have to wonder if the lights proposed for this bridge would really stand out enough to attract birds as they pass by. On the other hand, it could be the nights without low clouds and fog that would pose greater concern; it may be those times when the lights would stand out the most. Without conducting a test with the lights in place, it is difficult to know which situation, if any, would pose a significant threat to birds flying by.

One thing that is known is that there currently is a flashing red navigational light on the top of each bridge tower. Birds are thought to be less sensitive to flashing red lights than to other forms of light. Also, the maintenance crew at the bridge have not reported finding any dead birds near the bridge. However, it is possible that any existing problem would go unnoticed because the birds could fall in the water or be removed by scavengers.

A situation similar to what is being proposed, in which high intensity lights are directed into the sky, can be found nearby. The Landmark Square Building is located in Long Beach approximately 3 miles away from the Vincent Thomas Bridge and just a few blocks from the ocean. It has 4 (four) 3000 watt xenon lights pointing straight up from the roof. These lights, which have been in operation since 1991, are on year-round for four nights per week between sunset and midnight. According to Sam de Lemos, the building's chief engineer, these lights are inspected weekly and there has been no indication that birds have been killed. This is the best, and certainly the closest, example of a lighting situation that is similar to what is being proposed. And, it is promising that no problems have been reported. However, it does not demonstrate conclusively that this project will not cause a problem because the majority of tower kills (bird deaths) occur between 11pm and sunrise (Measure, 1999).

Another building with a high intensity light (the Sky Beam) on top is the Luxor Hotel in Las Vegas. According to John Listiner, who is in charge of the Technical Division which oversees the Sky Beam, they have not reported any bird kills since the hotel opened in 1993. However, the Las Vegas area seldom has the low cloud cover conditions that are common during bird kill events.

There is very little information available concerning lights on bridges. One project that was noted, however, involved a proposal to install floodlighting on the Humber Bridge in northeastern England. This bridge runs across major east-west and north-south migration routes and is a Ramsar site and Special Protection Area. The sensitive nature of this bridge's location led to the abandonment of the project earlier this year. While it is important to point out that the Los Angeles Harbor is not as environmentally significant as a Ramsar site, it should be noted that this issue is considered important by the world environmental community.

Finally, this project was discussed with several experts familiar with the issue of lights and birds. Many of these people were invited speakers at a session entitled "Avian

Mortality at Communications Towers” held at this year’s 117th Meeting of the American Ornithologists’ Union. Their key comments are shown below:

Kimball Garrett, ornithologist with the Los Angeles Natural History Museum

- lights are mainly a problem when they’re surrounded by darkness.
- since the Harbor is so well lit, he didn’t feel that the lights were likely to cause a major problem.
- most songbirds don’t move along the coast, but there will still be many individuals of many different species that do.

Robert Beason, biology professor at the State University of New York in Geneseo

- floodlighting is the major concern, especially during times of low cloud cover.

Michael Mesure, founding member of the Fatal Light Awareness Program (FLAP)

- the lighting on the bridge will be comparable to the communications towers that have been studied.
- the spot lights directed into the air are the worst part of the project.
- he suggested that we try to accomplish the intended effect without using lights or by modifying the lights (using strobe lights or less intense lights).
- if lights must be used, pointing them down from the top would be less harmful to migratory birds.
- birds “caught” by the lights may send out distress calls that attract more birds.
- shorebirds can also be attracted by the lights.
- there is not a lot of documentation concerning lights on bridges, possibly because most birds fall into the water or are taken by scavengers.
- the majority of collisions occur between 11:00pm and sunrise.
- one night with the right conditions could result in a significant bird kill.

Ronald Larkin, Illinois Natural History Survey

- the severity of the problem will depend on the number of days that low clouds and fog are present during the migration season and on the number of birds that migrate along the coast.
- the bridge is high enough to pose a problem.
- the lights shining straight up are “such a bad idea.”

Jeff Geupal, Program director for terrestrial birds at Pt. Reyes Bird Observatory and state coordinator for Partners-in-Flight

- provided a list of species that might be impacted.
- indicated concern about bird species declining statewide and thought that this project could inhibit their recovery.
- felt that the fall migration is more critical because juveniles suffer higher tower kill mortality than adults and that could jeopardize the population recovery for species of concern.

Sidney Gauthreaux, Jr., biology professor at Clemson University

- indicated that some birds fly in vertical circles and actually fly into the lights.
- stated that the project would be creating hazardous conditions for migratory birds.

Albert Manville, Director of the U.S. Fish and Wildlife Service's Office of Migratory Bird Management

- birds are more sensitive to the red end of the color spectrum.
- white strobe lights with a long dark period might have the least negative effect.
- we need to consider potential impacts to listed species, species covered by the Migratory Bird Treaty Act, non-game species of management concern and other migratory species.
- he stated that "incidental take" permits are not issued for migratory birds and that the project proponents could be legally liable in the event of a large bird kill. Liability would also be encountered if a listed threatened or endangered species is killed.
- he stated that a large bird kill would result very bad publicity.
- he suggested that further study of the issue might be warranted if the impacts are unknown. A better indication of what species and how many individuals migrate through the area can be obtained using radar imagery, acoustic chirp calls, night vision equipment and ground truthing.
- he also suggested that perhaps the lights should be turned off during the migrating season.

In summary, all but one person contacted expressed serious concern about the project and its potential effect on migratory birds. Most people also indicated that the Skytracker lights at the top of each tower presented the most serious potential for harm.

Fish

Concerns have been raised about the possibility that the increase in nighttime lighting will be detrimental to fish in the channel. In particular, it is feared that certain mid-water column dwelling fish, such as various species of basses (calico bass, spotted sand bass) might be attracted to the water's surface by the light. Once there, they might be susceptible to predation by sea lions, night herons, gulls or other predators.

This issue was raised at a time when the project included additional lighting that would have illuminated a large portion of the underside of the bridge over the channel. Although all lights were (and still are) to be directed away from the water, and though some areas of the water's surface are already lit by numerous existing lights, it was thought that these additional lights might have added sufficient illumination to the water to cause a problem.

It is believed that the current lighting plan, which only includes lighting the towers, will not result in a significant lighting of the water beyond the existing conditions. It will therefore probably have only a minimal impact, if any, on fish in the channel. However, without knowing how deep the light will penetrate the water column, it is not possible to conclude that there will be no impact.

Other Issues

Light Pollution

Another issue that has been raised by some people familiar with this project is that of light pollution. Michael Mesure of F.L.A.P. and Robert Gent of the International Dark-Sky Association have pointed out that these lights will add to this growing problem and that it will reduce our ability to enjoy the night sky. Because the light from the floodlights is more diffuse, they represent a greater light pollution problem than do the tightly focused Skytracker lights. Mr. Gent suggested that the flood lights be directed down from the top of the towers or that they be replaced with lower intensity Christmas-type tracer lights along the bridge structure.

To address this concern, it is important to remember what the ambient conditions in the harbor are. It is already a very well lit area. While the additional lights from this project may have an effect on the viewing quality of the night sky, the degree of impact is probably minimal. It is also likely that any noticeable impact would only be visible from the immediately surrounding area.

Energy Consumption

The additional energy required to run these lights has also been raised as an issue. According to Ron Merlo, Director of Corporate Assets for the City of Los Angeles' Department of Water and Power (DWP), the project is anticipated to use approximately 30 million KWHr/Yr (or about 82,192 KWHr/day). This compares to DWP's total sale of 23 billion KWHr/Yr (or 63 million KWHr/day). So, it is clear that the energy used by this project will amount to a small fraction of the total output from DWP. In addition, this energy will be utilized during off-peak hours. This project will therefore not require an expansion of DWP's energy generating capacity.

Potential Mitigation Measures to Avoid or Minimize Impacts

The following options have been developed and considered in order to avoid or minimize potential

impacts. These measures, singly or in combination, will allow the project to move forward and meet its goal of having the lights operational by December 31, 1999:

1. Turn the lights on at least 30 minutes after sunset and off at least 30 minutes before sunrise to avoid inducing conflicts between peregrines and owls.
2. Leave the lights on year-round and monitor the surrounding area during the migrating season for evidence of bird mortality. The effectiveness of this monitoring would be hampered by the presence of water under the bridge and scavengers and by the fact that there is no way to predict how long it would take (how many years?) before any mortality occurred. If mortality is observed, the lights will be turned off and the U.S. Fish and Wildlife Service and California Department of Fish and Game will be consulted to identify an appropriate course of action.

3. Turn the lights off completely during the migrating season (March through May and August through October).
4. Turn the lights off from 11:00pm to sunrise during the migrating season (March through May and August through October). This will avoid what seems to be the most sensitive time for tower kills.
5. Conduct a detailed study to identify the number of birds and the species that migrate through the area. This could include the use of acoustic chirp calls, radar imagery, night vision scopes, and ground truthing, among other techniques. This would provide useful background information that could be used to make appropriate adjustments to the lighting schedule.
6. Use the most tightly focused beam possible and glare shields on the Skytracker lights to help minimize the spread of light and help the beam penetrate the fog and low clouds.
7. In the event that any light-related mortality of birds is observed, the lights should be turned off immediately until the California Department of Fish and Game and the U.S. Fish and Wildlife Service are notified and an appropriate course of action is identified.

Summary of Potential Impacts and Mitigation

The table below provides a summary of the key information provided in the text above. It contains a brief description of the potential impacts, an assessment of their probability of occurrence, their potential significance and information on potential mitigation measures.

Potential Impact	Probability of Occurrence	Potential Significance	Mitigation
Peregrine falcons			
Harassment by nighttime lighting could result in injury or death	Low	Low	Not needed
Harassment of peregrines could result in increased predation on CA least terns and western snowy plover	Low	Low	Not needed
Conflict between peregrines and owls	Low to Moderate	Significant, if it results in death of a peregrine or owl	Yes, #1
Migratory Birds			
Tower kill of migratory birds	Unknown	Potentially significant	Yes, #2,3, or 4 5,6, and 7
Tower kill of migratory state or federally listed threatened or endangered species	Unknown	Potentially significant	Yes, #2,3 or 4 5,6, and 7
Could inhibit the recovery of declining bird populations statewide	Unknown	Probably minor	Yes, #2,3 or 4 5,6, and 7
Fish			
Could increase the susceptibility of mid-water column dwelling fish to predation	Probably low	Probably minor	Not needed
Light Pollution			
Could increase light pollution in the immediate area	Low to moderate	Probably minor	Not needed
Energy Consumption			
Will increase energy consumption and the need for additional generating capacity	Low	Low	Not needed

Recommendations

The objective of this project is to provide lighting which will identify the Vincent Thomas Bridge as a gateway landmark for the Port and City of Los Angeles and to have this lighting operational in time for the millenium celebration scheduled for 9:00pm on December 31, 1999. This report has identified potential impacts associated with the project and potential methods to avoid or minimize those impacts while allowing the project's stated objective to be met.

Because there is insufficient information available to conclusively determine that significant impacts will not occur to migratory birds, including threatened or endangered species, the following recommendations are made. They are based on the best information that is available at this time.

1. The lights can be turned on year-round, but should be turned off between 11:00pm and sunrise during the migrating season (March through May and August through October).
2. The lights should be turned on a minimum of 30 minutes after sunset and turned off a minimum of 30 minutes before sunrise.
3. Use the most tightly focused beam possible and glare shields on the Skytracker lights to help minimize the spread of light and help the beam penetrate the fog and low clouds.
4. Additional research to identify the number of birds and the species that migrate through the harbor area should be conducted. This could include the use of acoustic chirp calls, radar imagery, night vision scopes, and ground truthing, among other techniques. This would provide useful background information that could be used to make appropriate adjustments to the lighting schedule.
5. In the event that any light-related mortality of birds is observed, the lights should be turned off immediately until the California Department of Fish and Game and the U.S. Fish and Wildlife Service are notified and an appropriate course of action is identified.

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Vicinity Map for Vincent Thomas Bridge

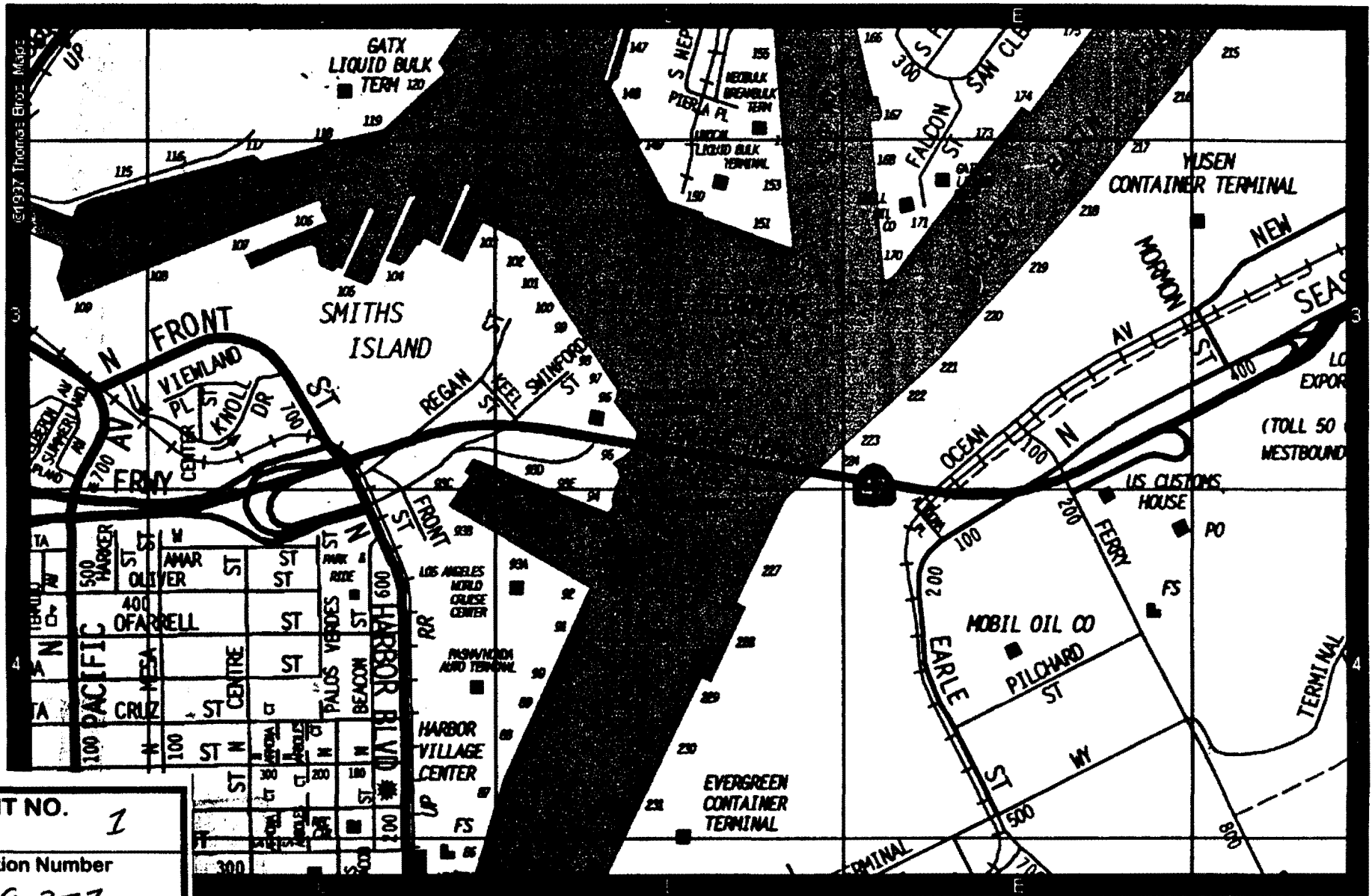
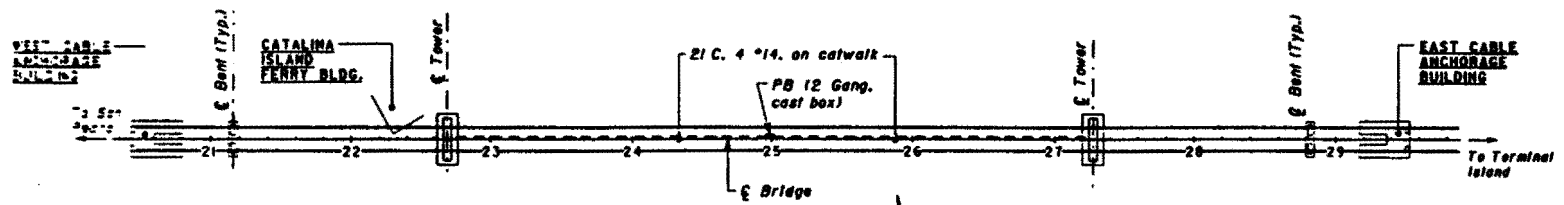
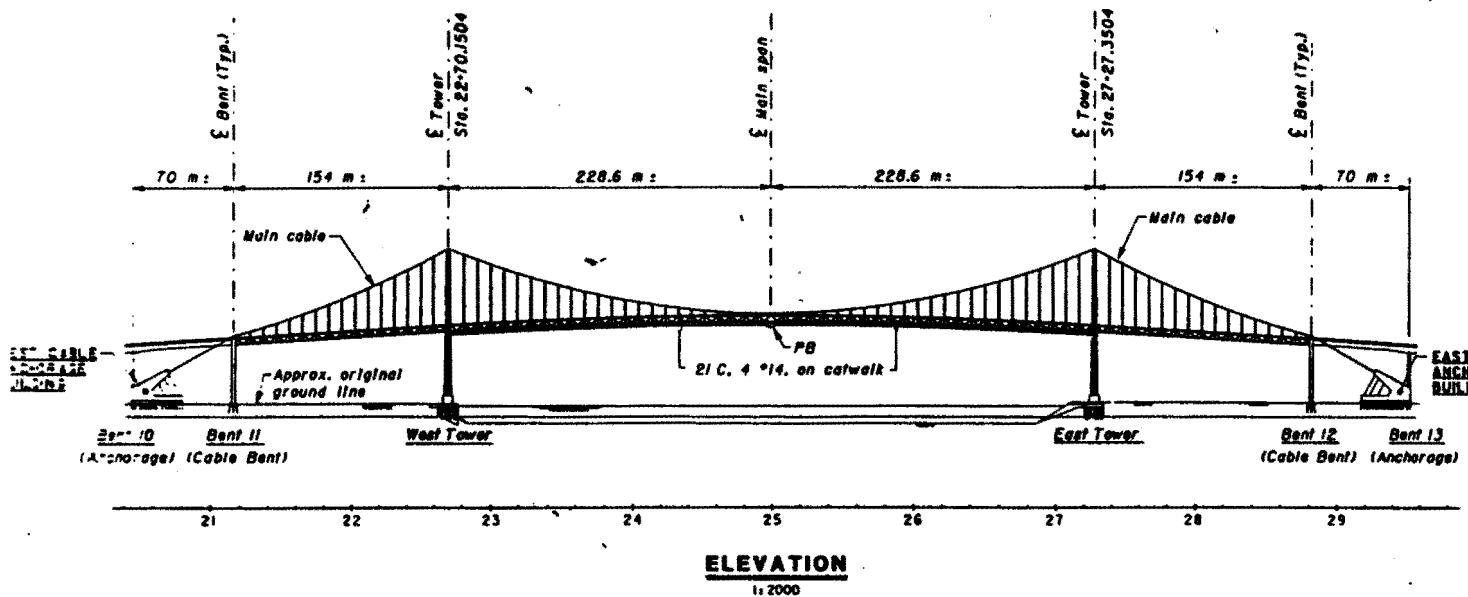


EXHIBIT NO.	1
Application Number	5-99-377
Vicinity Map	



COMPLETE PLAN FOR EACH TRAY
 3-OUT-4IN
 N=30
 DATE OF SUBMITTAL
 DATE OF REVISION

DET.	COUNTY	ROUTE	BLK. TOTAL
07	LA	47	
REGISTERED ENGINEER-ELECTRICAL			
PLANS APPROVAL DATE			
The State of California or its officers and agents shall not be responsible for the or consequences of electrical codes or			

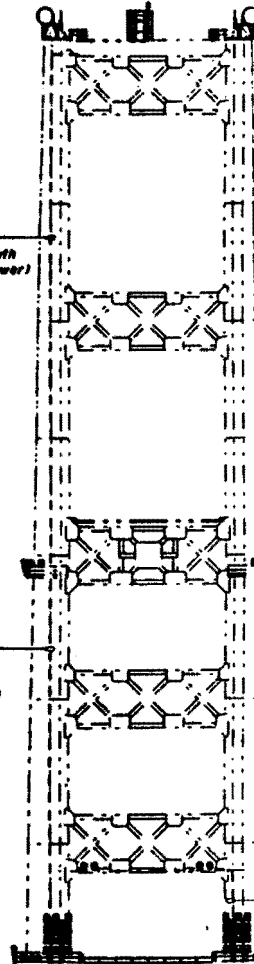


ACCEPTABLE EQUIVALENT TRADE SIZE DESIGNATION FOR ELECTRICAL EQUIPMENT	
METRIC SIZE	EQUIV. TRADE SIZE
3mm x 16mm x 40mm	2" x 3" x 1 1/2" Box
102mm x 102mm x 40mm	4" x 4" x 1 1/2" Box
4mm x 4mm Const. Channel	1 1/2" x 1 1/2" Const. Channel
19mm Ground Rod	3/4-inch Ground Rod
	10 feet
	0.040-inch Thick
	1/2-inch
	3/4-inch
	1-inch
	1 1/4-inch
	1 1/2-inch
	2-inch
	3-inch
	4-inch

EXHIBIT NO. **2**
 Application Number
5-99-377
 Bridge Elevation

California Coastal Commission

PLAN
 1:2000



TOWER ELEVATION
 NO SCALE

(East tower shown, west tower similar)

ALL DIMENSIONS SHOWN IN MILLIMETERS, EXCEPT

DESIGN	Michael Travis	DATE	X	STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	DIVISION OF STRUCTURES ELECTRICAL-MECHANICAL-WATER AND WASTEWATER DESIGN	PROJECT NO. 53-1471 REV. POST	VINCENT THOMAS BRIDGE LIGHT
DETAILS	Andreasen/Nanson	DATE	Michael Travis				
QUANTITIES	Michael Travis	DATE	X				
ORIGINAL SCALE IN MILLIMETERS FOR REDUCED PLANS				CU 07	EA 937181	REVISION DATES (PRELIMINARY STAGE)	
TIME PLOTTED 1:41:30				10 20 30 40 50 60 70 80 90 100	FILE 117-0005143000	REVISION DATES (PRELIMINARY STAGE)	

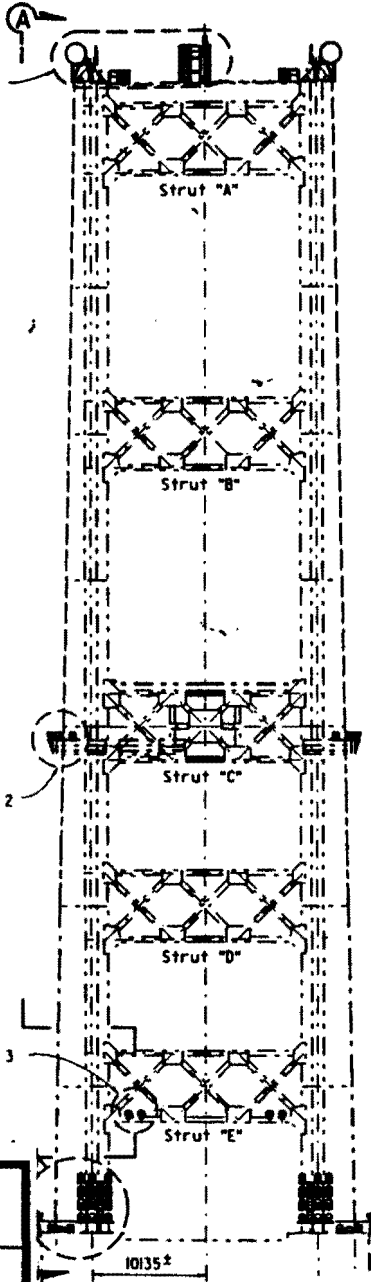
Main Spcn

Artwork & Lighting

Terminal Island Tower

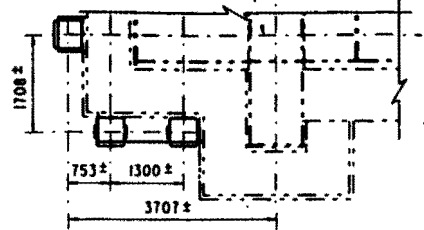
Top of Guard Rail

Bottom Chord

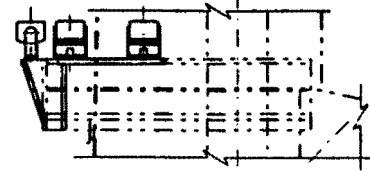


TOWER ELEVATION
1:250

Lighting sym about Tower Leg Tower Leg

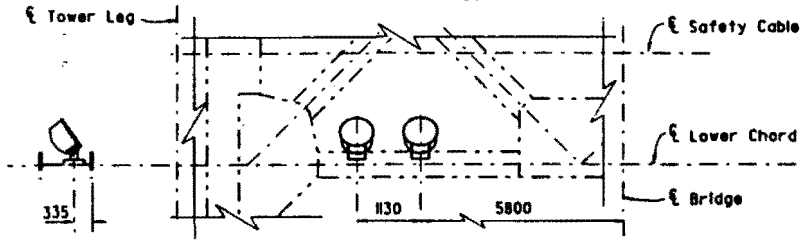


PLAN



ELEVATION

LOCATION 2
1:50



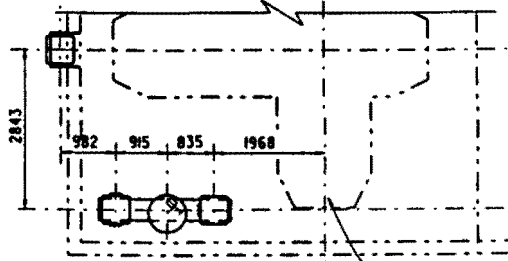
SECTION

ELEVATION

LOCATION 3
1:50

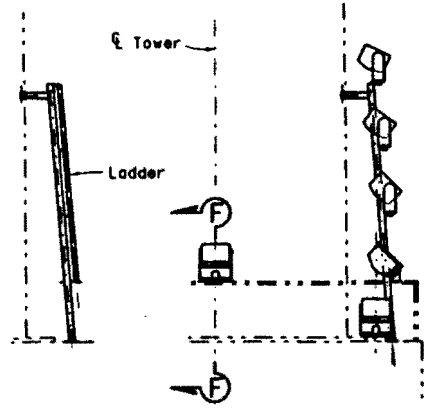
Notes:

- Indicates existing.
- Superstructure not shown.
- Terminal Island Tower (Tower 2) shown, San Pedro Tower (Tower 1) similar.
- For Location 1 details, see "Beacon Platform Details" Sheet.
- For Location 2 details and "Section F-F", see "Light Platforms" Sheet.
- For Location 3 details, see "Light Mounting Channel & Cable" Sheet.
- For Location 4 details, see "Ladder & Light Rack Details" Sheet.



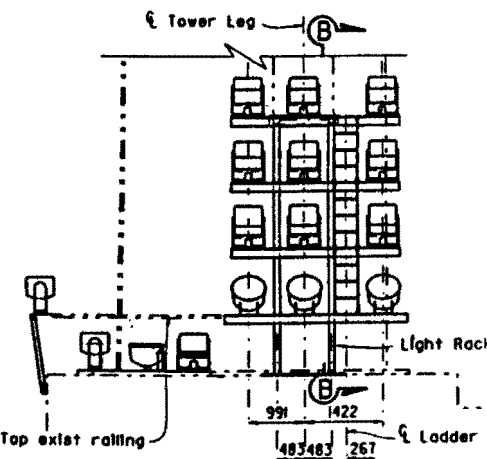
PLAN

Light Rack or on rack not



SECTION B-B

SIDE VIEW



LOCATION 4 ELEVATION
1:50

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

EXHIBIT NO. 3

Application Number
5-99-377

Tower Elevation

California Coastal Commission

DESIGN	BY Bateman/Carter	DRAWN Matt Lee	STATE OF CALIFORNIA	DIVISION OF STRUCTURES	BRIDGE NO. 53-1471	VINCENT THOMAS BRIDGE - LIGHTING LOCATION
DETAILS	BY K. Endow	DRAWN Matt Lee	DEPARTMENT OF TRANSPORTATION	STRUCTURE MAINTENANCE	SCALE 1:30	
QUANTITIES	BY R. Carter	DRAWN Matt Lee				

ORIGINAL SCALE IN MILLIMETERS FOR REVISION PLANS

CU 07381 EA 4A7301

FILE # 10005172750

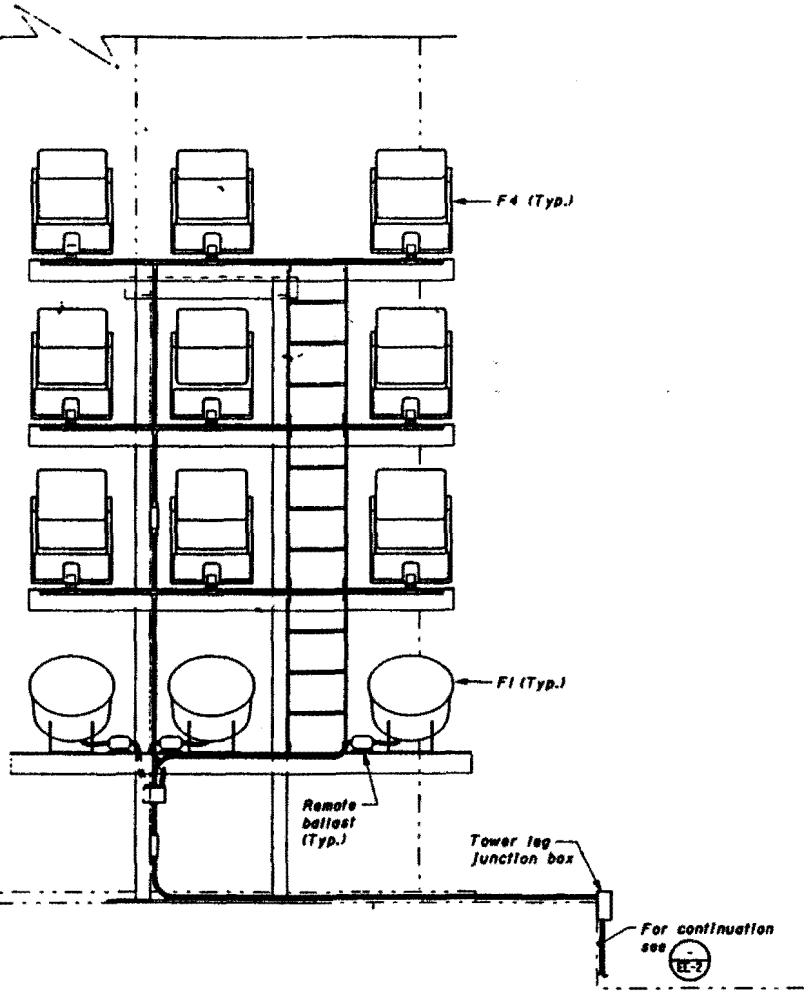
NOTE: THE CONTRACTOR SHALL VERIFY ALL CONTROLLING FIELD DIMENSIONS BEFORE ORDERING OR FABRICATING ANY MATERIAL.



DISTRICT	ROUTE	KILOMETER POST	TOTAL PROJECT
07	47		
REGISTERED CIVIL ENGINEER			
PLANS APPROVAL DATE			
The State of California or its officers or agents shall not be responsible for the accuracy or completeness of any data or facts on this plan sheet.			

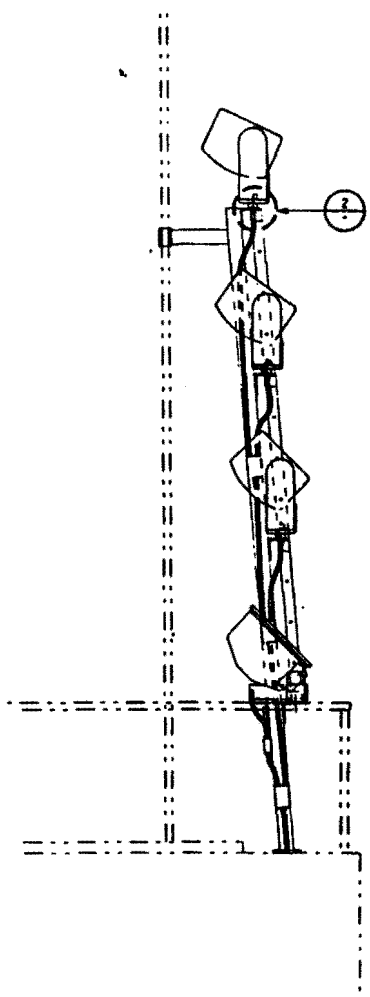


DIST.	COUNTY	ROUTE
07	LA	47
REGISTERED ENGINEER-ELECTRICAL		
PLANS APPROVAL DATE		
The State of California or its officers shall not be responsible for the consequences of electronic use.		

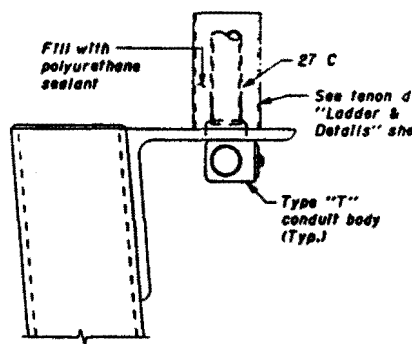


ELEVATION

(North leg shown; south leg opposite hand)



SIDE



2 **DETAIL**
NO SCALE

General Note:

Conduit on tower base 11gth 21 mm, all Type 1 except for remote ballast, which is

1 **TOWER BASE LIGHT RACK**

1:20

(East tower shown; west tower similar)

EXHIBIT NO.	4
Application Number	5-99-377
Light Rack	
California Commission	

DESIGN	BY Michael Travis	CHECKED X	STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	DIVISION OF STRUCTURES ELECTRICAL-MECHANICAL-WATER AND WASTEWATER DESIGN	PROJECT NO. 53-1471	VINCENT THOMAS BRIDGE LIGHT RACK DETAILS
DETAILS	BY Kathi Andreasen	CHECKED Michael Travis		CU 07 EA 937181	DISCARD PRINTS BEARING EARLIER REVISION DATES	
QUANTITIES	BY Michael Travis	CHECKED X		FILE 99-1111-000305-2455		

ALL DIMENSIONS SHOWN IN MILLIMETERS. EXCEPT AS NOTED

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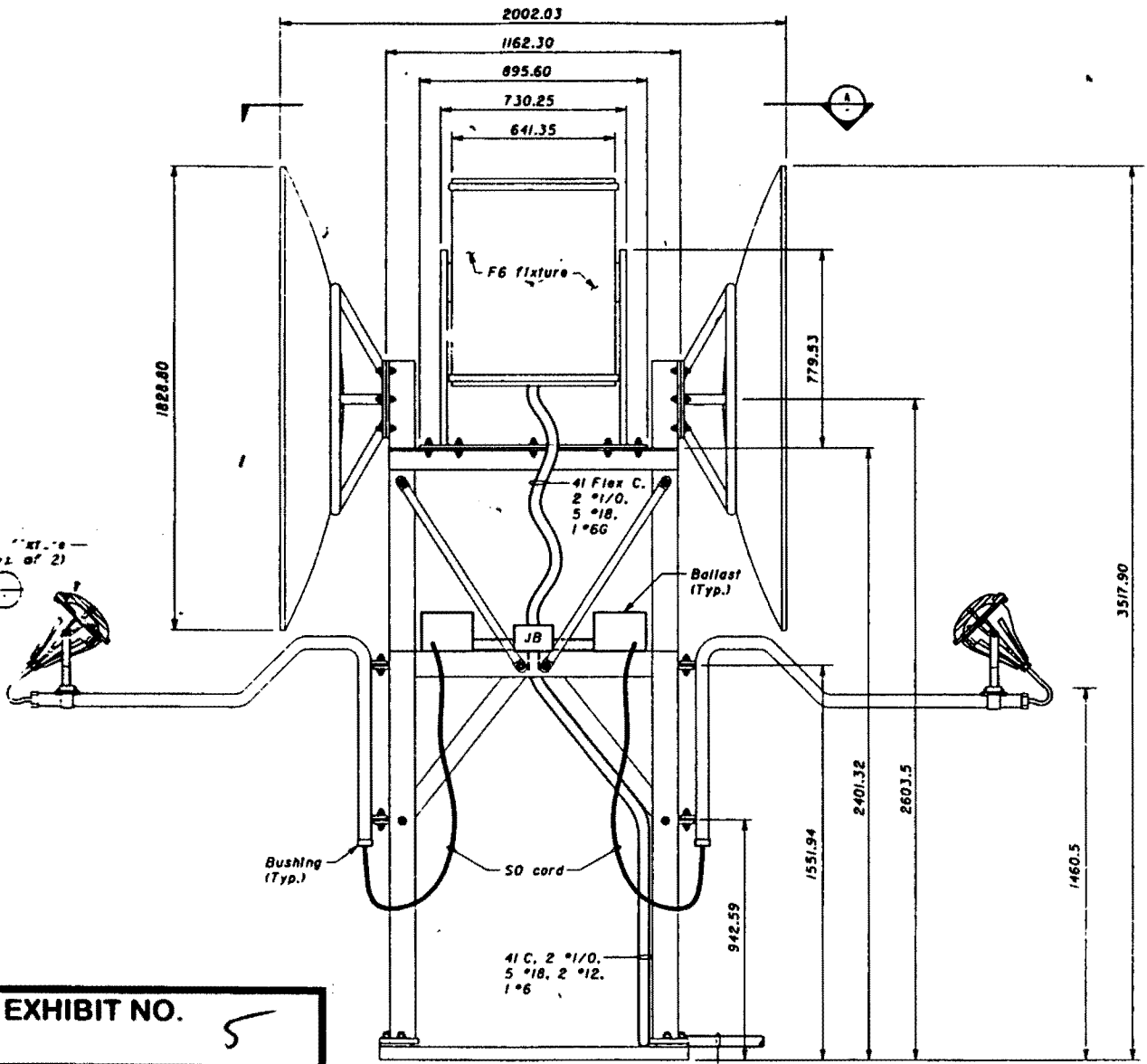
ORIGINAL SCALE IN MILLIMETERS FOR REQUED PLANS



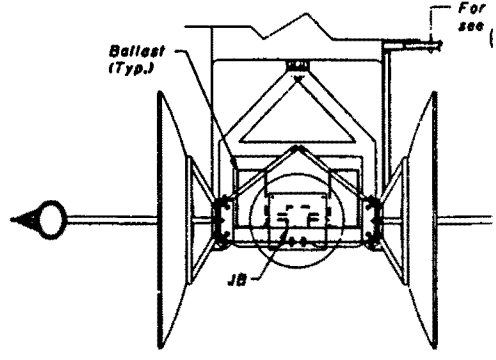
REVISION DATES: PRELIMINARY 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100



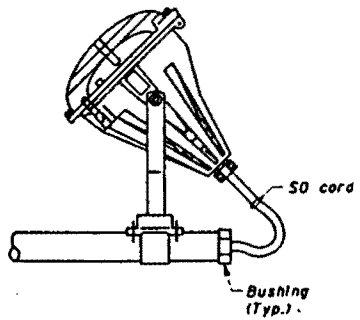
COUNTY	ROUTE	BLK. TOTAL
07	LA 47	
REGISTERED ENGINEER-ELECTRICAL		
PLANS APPROVAL DATE		
The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this drawing.		



A ELEVATION
1:10



A PLAN
1:20



F2 FIXTURE
1 DETAIL
NO SCALE

EXHIBIT NO. 5
Application Number
 5-99-377
Reflector Elevation
California Coastal Commission

ALL DIMENSIONS SHOWN IN MILLIMETERS, EXCEPT

DESIGN	BY Michael Travis	CHECKED X	STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	DIVISION OF STRUCTURES	PROJECT NO. 53-1471	VINCENT THOMAS BRIDGE LIGHT TOWER TOP DETAILS
DETAILS	BY Kathi Andreassen	CHECKED Michael Travis		ELECTRICAL-MECHANICAL-WATER AND WASTEWATER DESIGN	DATE FOR POST	
QUANTITIES	BY Michael Travis	CHECKED X		CU 07 EA 937181	REVISION DATES (PRELIMINARY STAGE)	
#5257 DEC-1999 TIME PLOTTED 03:14:53			ORIGINAL SCALE IN MILLIMETERS FOR REDUCED PLANS	0 10 20 30 40 50 60 70 80 90 100	DESIGNER PRINTS BEARING EARLIER REVISION DATES	

FILE # 53-1471-001-05145257

