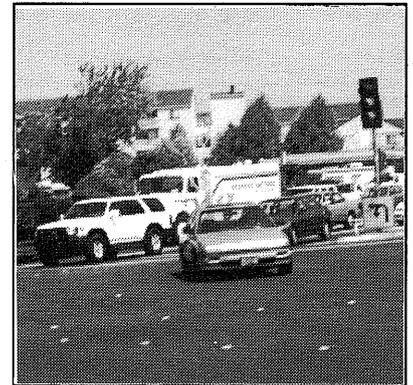




Transportation Noise

Transportation noise causes most of the ambient noise in Sunnyvale. It is the most difficult noise to control and regulate. This discussion of transportation noise focuses on traffic, aircraft, train and light rail noise issues.

The major noise contributors to residential areas in Sunnyvale are all transportation-related: the freeway systems, Mathilda Avenue, Wolfe Road, Lawrence Expressway, El Camino Real and Homestead Road, the CALTRAIN Railroad and Moffett Federal Airfield. Although Mary Avenue, Hollenbeck Road, Fremont Avenue, and Remington Drive are relatively quiet roads, they do affect a large number of residences. Sunnyvale-Saratoga Road is not considered a major noise contributor to residential areas because sound walls have been installed that protect the homes along this roadway from excessive noise exposure. Since Central Expressway is mostly below grade, it is not considered a substantial noise contributor.



The major noise contributors to residential areas in Sunnyvale are all transportation-related.

TRAFFIC NOISE CONDITIONS

Major roadways cause most of the transportation noise in Sunnyvale. Sunnyvale has an interstate, three highways, two expressways, and numerous arterial and collector streets within its borders. Virtually all existing homes next to freeways and expressways are protected by sound walls or depressed grades.

The Noise Condition Map in Appendix A shows noise levels adjacent to the major roadways. All major roadways in Sunnyvale have an Ldn of at least 60dB. Ldns between 60-75 dBA are defined as "conditionally acceptable" by the State Noise Guidelines for Land Use Planning (see Table 2). In 1986, approximately 40% (8630) of single-family homes were exposed to "conditionally acceptable" noise levels. In the year 2010, this percentage is predicted to decrease to 20%, or 5343 single-family homes (based on ABAG dwelling unit projections and 2010 noise predicted conditions). A Ldn above 75dBA is considered to be "unacceptable" for



residential uses by the State Noise Guidelines because prolonged exposure may cause hearing damage. In 1986, before sound walls were installed, 1% (270) of single-family homes were exposed to "unacceptable" noise levels. The number of single-family homes exposed to various noise levels was counted using the GIS database. More than 50% of a single-family land parcel had to be included within the noise contour before it was included in that particular noise level category. In the year 2010, this percentage is predicted to be reduced to less than .1%, or 24 single-family homes (based on ABAG dwelling unit projections and 2010 predicted noise conditions). Traffic noise is generally not an issue for commercial, office and industrial uses.



Due to the lack of alternative locations, most new residential projects are being developed near major roadways.

Despite the traffic noise, noise levels in residential areas are acceptable for most existing homes. The quietest places in Sunnyvale are the centers of residential neighborhoods. A noise level of 50 dBA Leq was measured over a 15-minute period in daytime hours in a quiet neighborhood in southern Sunnyvale. However, relatively quiet streets can be impacted by single-event noises such as faulty mufflers, racing engines, and squealing tires or brakes.

Historically, the City's demand for housing has been great. Due to the lack of alternative locations, most new residential projects are being developed near major roadways. These environments are noisy, but they comply with Title 24 (State Noise Insulation Requirements) and State Noise Guidelines for Land Use Planning.

FUTURE TRAFFIC NOISE CONDITIONS

Based on roadway traffic projections, noise levels throughout Sunnyvale are not predicted to change significantly due to increases in roadway traffic. A 3dB Ldn change in noise level is considered "significant" because it is considered the amount of increase were the change in noise level is just a noticeable difference. Most homes will continue to have acceptable noise levels in the future. New residential uses will conform to upper limits of the noise guidelines. Nonresidential uses will generally be unaffected by current and future traffic noise.



Several significant roadway projects are under consideration which could affect noise. Available information (as of May 1996) about the noise impacts of these projects is as follows:

- The interchange of Highway 101 and Lawrence Expressway will be reconstructed. Sound walls will be installed, where appropriate, to mitigate traffic noise.
- The possible addition of two lanes on Central Expressway would increase noise levels by less than 3dB Ldn. This project is considered a long range improvement and is currently unfunded.
- The effects of the possible Mary Avenue extension would be insignificant close to its alignment with Highways 101 and 237. This insignificance is due to high ambient noise levels near these highways. However, the extension would generate more traffic and noise (3 to 4dB) on Mary Avenue. This noticeable increase will expose some homes to upper limits of acceptable noise. This project is considered a long range improvement and is currently unfunded.

Because of uncertainties about traffic volumes, speeds and truck percentages of these projects, the potential noise impacts from these projects will need to be evaluated in detail.

MOFFETT FEDERAL AIRFIELD - EXISTING CONDITIONS⁴

In 1994, the Navy ceased its operations at Moffett Naval Air Station. The facility became one of three federal airfields in the United States. Moffett Federal Airfield (MFA) is now operated by the National Aeronautics and Space Administration (NASA).

⁴ Based on a letter to Sunnyvale residents "Moffett Federal Airfield Fact Sheet" dated February, 1996.



In 1995, approximately 24,000 annual aircraft flight operations (a take-off and a landing are each considered to be one flight operation) occurred at MFA. Other noise sources at MFA include wind tunnel facilities and the Outdoor Aerodynamic Research Facility (OARF).

Regulating Noise at Moffett Federal Airfield

There are no federal regulations that apply to aircraft noise at Moffett Federal Airfield.

Since MFA is a federal facility, it is not subject to State or local aircraft noise control regulations. There are no federal regulations that apply to aircraft noise at Moffett Federal Airfield. Whenever possible, NASA considers, on an advisory basis, the Noise Elements of the General Plans of the Cities of Sunnyvale, Mountain View and Santa Clara County as a measure of significance when evaluating the environmental impacts of a proposed project.

In addition, the following plans and regulations (advisory only) guide the operation of MFA under NASA's stewardship:

- Federal Aviation Regulations (FAR) Part 150 - Airport Noise Compatibility and Land Use Planning. Because NASA operates MFA, the airfield is not considered a military facility. When NASA became the steward of MFA in 1994, the agency made a management commitment to use FAA regulations for civil airports as a guide. For a discussion of FAR Part 150, see section titled "*Regulating Noise - Federal Authority*", in this Sub-Element.
- Comprehensive Use Plan (CUP). A Comprehensive Use Plan (CUP) was developed in 1994 by NASA in order to effectively implement the transfer of stewardship of MFA to NASA. The CUP considers future development projects and provides information on the proposed future uses at MFA by NASA and other tenants of MFA up to the year 2010. Future development and operations of MFA are to remain consistent with the CUP. The 2010 forecast conditions in the CUP



for the airfield are 80,000 annual flight operations, including 60,000 aircraft operations and 20,000 overflights. The CUP 2010 forecast is the same, with regard to number of flight operations and overflights, as the peak use of Moffett in 1990 by the Navy.

For the purpose of establishing baseline conditions against which to compare project impacts, NASA has not used the recent lower activity levels since flight operations could return to the historically higher levels at any time without further environmental review. A projected activity level of 80,000 annual flight operations, as defined by the 1994 CUP, is used as a baseline to compare project impacts.

- Airfield Operations Manual. The Airfield Operations Manual provides general instruction pertaining to the operation of aircraft at MFA, including navigation, air traffic control, noise abatement, and arrival and departure instructions. All aircraft using MFA must adhere to the rules, procedures and guidelines in this document.
- California Division of Aeronautics, Noise Guidelines. In 1970 these regulations established the noise descriptor method, Community Noise Equivalent Level (CNEL). The regulations require airports to operate without incompatible land uses inside the 65 dB CNEL contour unless the airport requests a Variance from the California Division Aeronautics.
- California State Noise Guidelines for Land Use Planning. For a discussion of these guidelines, see section titled "Regulating Noise - State Authority", of this Sub-Element.
- U.S. Air Force Family Housing Guide. This guide applies only to family housing located on Air Force bases.



The 2010 forecast is the same as peak year 1990 by the Navy, with regard to number of flight operations and overflights.

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- Housing and Urban Development (HUD) Noise Criteria. This requires that federally funded residential development must meet established noise criteria.

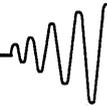
If Moffett Federal Airfield were to convert to a commercial or general aviation airfield at some point in the future, different regulations would apply.

THE FUTURE OF MOFFETT FEDERAL AIRFIELD

The future use of Moffett Federal Airfield will have a significant effect on the noise environment in Sunnyvale. Potential future noise impacts of Moffett Federal Airfield (MFA) are shown in Appendix B, "*Mitigated Year 2010 Forecast Noise Exposure Conditions (CNEL)*". According to NASA, to sustain Moffett as a federal airfield, additional federal revenues must be found to eliminate or reduce Moffett's annual operating revenue shortfall. No other federal agency appears likely to take over NASA's role as the operator of Moffett Federal Airfield. In 1996, the only users NASA can consider to supplement revenues must be federal or federally sponsored airfield users. In late 1996, NASA was reviewing alternatives to determine what federal programs can be identified to provide additional revenues to Moffett Federal Airfield.

General Aviation at Moffett Federal Airfield

The transfer of Moffett Field to NASA's jurisdiction does not include a "re-use" option for general aviation. NASA has stated that there will be no space available for any general aviation or other non-federal entities at Moffett Field. In addition, NASA has stated that civil aviation is not compatible with federal operations at Moffett Field (1992 letters from NASA Ames Director, Dale Compton to City of Sunnyvale Mayor Castillo and the City Council, and City of San Jose Mayor, Susan Hammer). Despite NASA's stated policy, the City of San Jose, the Santa Clara County Transit District and several aviation organizations have urged that the Moffett facilities be made available to general aviation aircraft. Because of the uncertainties in air traffic volumes,



air space considerations, and type of aircraft, it is difficult to predict the noise impacts associated with general aviation at MFA.

Commercial Operations and the Future of Moffett Federal Airfield

Moffett's status as a federal airfield does not allow for commercial operations. If NASA were to leave Moffett and dispose of the facility, the current federal property disposal process could result in a change of status to a commercial airport. A commercial airport at Moffett may have a capacity of up to 800 daily flight operations (300,000) annually, depending on the mix of aircraft used⁵. However, airspace considerations, which are not known at this time, would probably impose some limitations on this capacity.⁵

The City of Sunnyvale does not have authority to determine what NASA will ultimately decide to do with the future use of Moffett Federal Airfield. NASA has the authority to make final decisions on Moffett's operations. Any policies adopted by the City are advisory in nature and are not binding in the federal decision making process. However, NASA has been responsive to the community concerns raised by the Cities of Sunnyvale and Mountain View. The City of Sunnyvale should continue to monitor developments at MFA and communicate community concerns, including potential noise impacts, to NASA.

By 2010, residents of Sunnyvale may hear twice as many aircraft as they did in 1995.

SAN JOSE INTERNATIONAL AIRPORT

In 1994, San Jose International Airport had 295,000 flight operations. Residents in northeast Sunnyvale are affected by San Jose Airport flight patterns. By 2010, they may hear twice as many aircraft as they did in 1995. However, noise levels will eventually stabilize and decrease as quieter aircraft become prevalent. Current and future noise levels are below state limits. The City of Sunnyvale is one of the legislative bodies that appoints the members of the Santa Clara County Airport Land Use Commission (ALUC). For a

⁵ Ibid.



discussion of the purpose of the ALUC see section on this Sub-Element titled "*Regulating Noise, County Authority*".

Two flight patterns affect northeast Sunnyvale. When winds are from the south, aircraft approach San Jose International Airport from the northwest (over Sunnyvale). When aircraft bank to the right during takeoffs, back blasts occur in Sunnyvale's direction. These turning movements cause a longer period of increased noise than do simple overflights.

Despite more flight activity in the future, noise levels throughout the San Jose International Airport's corridor are expected to stabilize in the long term, and go down in the longer term.

The State Aeronautic Act requires civilian airports to eventually achieve a CNEL of 65dB for residential areas. A noise contour map for San Jose International Airport shows that Sunnyvale's CNEL is less than 65dB. Northeast Sunnyvale is probably in the range of 55 to 60dB CNEL, but precise contours have not been published.

The frequency of flights is increasing. The number of passengers rose from 3.8 million in 1984 to 6.8 million in 1995. By 2010, 12.5 to 16.1 million passengers are expected to use San Jose International Airport. This activity will result from terminal expansion plans, the international status of the airport, and the growing importance of the local air travel market.

Despite more activity in the future, noise levels throughout the airport's corridor are expected to stabilize in the long term, and go down in the longer term. This reduction will mainly be due to the use of quieter aircraft. Such use rose from 38 percent in 1964 to 47 percent in 1985. In the year ending in August 1996, 92% of the scheduled flight operation at San Jose International Airport were Stage 3 aircraft. A federal mandate requires that Stage 2 aircraft (noisier aircraft than Stage 3) be phased out by the year 2000.

What do these trends mean to northeast Sunnyvale? Little can be done to change the air patterns and the increased frequency of flights. Residents can expect to hear more aircraft, but not more noise from a single event. They can also expect average noise levels to level off and decrease over time. According to State guidelines, their noise environment will remain acceptable.



HELICOPTERS

Heliport Standards

There are no heliports located in Sunnyvale. Santa Clara County has only six heliports. One is open to the public at San Jose International Airport. The others are restricted to private use by companies, hospital/medical uses, executives and other individuals.

There is no formally adopted heliport plan for Santa Clara County. The Airport Land Use Commission (ALUC) has developed noise standards for heliports affecting residential uses. The noise standards:

- prohibit residential structures within the 65 dB CNEL noise impact boundary of the heliport;
- require a 45 dB interior annual CNEL for residential structures with the windows closed;
- require acoustical analysis showing that any new residential structure within the 60 dB CNEL contour be designed to limit intruding noise to prescribed allowable levels; and
- limit the maximum noise level at the nearest residentially zoned area to not exceed 80 dBA by reason of the heliport.

Design and location criteria for any new private use heliports would require permits from the ALUC and affected cities.



Helicopters at Moffett Federal Airfield

There were approximately 6,000 helicopter flight operations at Moffett Federal Airfield in 1995 which accounted for 1/4 of the total flight operations (24,000) at MFA in 1995. The helicopters are used for training purposes and generally have several "touch and go" operations in one training session. Each take-off and landing is considered a flight operation. There are two touch and go patterns that the helicopters use: an east and a west pattern. The east pattern crosses over Sunnyvale, the west pattern crosses over Mountain View. The eastern pattern in Sunnyvale crosses mainly over industrial land uses but also crosses over some residential land uses.

Helicopters at Construction Sites

Helicopters are sometimes used in construction projects to lift heavy equipment. In most cases, the work occurs away from residential areas. Occasional conflicts arise when the work occurs near homes. The City does not regulate activities of helicopters used at construction sites. The Federal Aviation Administration (FAA) evaluates airspace considerations associated with the temporary landings (heliports) of the helicopters used at construction sites. The Caltrans Division of Aeronautics exempts temporary heliports at construction sites from obtaining a heliport permit as long as the event is less than one year in length and permission of the property owner has been obtained.



Overflights of aircraft are rarely a problem.

OVERFLIGHTS

Sunnyvale lies under the path of many aircraft flying at high altitudes. These overflights are rarely a problem.

CURRENT TRAIN NOISE

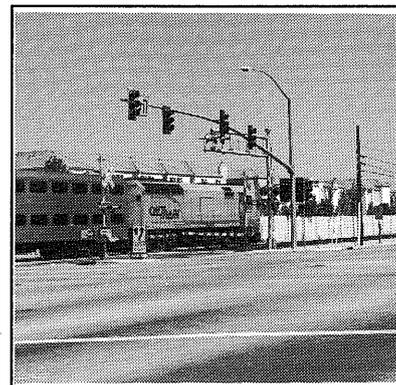
Central Sunnyvale is affected by noise from the CALTRAIN corridor. Since 1992, SamTrans has managed commuter train operation under the direction of the Peninsula Joint Powers Board (JPB). JPB member agencies include the



Santa Clara County Transportation Authority, the San Mateo Transit District, and the City and County of San Francisco. Commuter trains carry about 17,500 people per day. In 1996, there are 59 (29 northbound and 30 southbound) commuter trains daily between San Francisco and San Jose. Eight commuter trains run through Sunnyvale between the hours of 8:00 p.m. and 6:00 a.m.

There are also freight train operations at night. Unscheduled freight operations can happen any time. In addition to noise from train passbys, train horns blow at the Mary Avenue and Sunnyvale Avenue at-grade rail crossings and two local stations.

Currently, the areas affected by train noise have an Ldn of 71-73 dBA at 50 feet from the tracks (see Noise Condition Map). Maximum noise events can reach 90 dBA (engines) and 105 dBA (horns). Current noise levels are acceptable for all but approximately 80 older homes near the tracks which experience "conditionally acceptable" noise levels. Some of these homes are exposed to excessive outdoor noise (above 70dB Ldn) and probably excessive interior noise as well (above 45dB Ldn). Title 24 (State Noise Insulation Requirements), discussed in the "Regulating Noise, State Authority" section of this Sub-Element, can protect new multi-family residential uses from excessive train noise. Current noise levels are generally acceptable for non-residential uses.



Central Sunnyvale is affected by noise from the CALTRAIN corridor.

FUTURE TRAIN NOISE

Commuter train operations are likely to continue and expand. In 1992, when the JPB assumed operation of the line, the number of trains was increased and long range plans have been made to further increase service. JPB is also considering moving the downtown San Francisco station to a more central location. If this happens, the number of commuter trains could double. Ldn contours would increase by a noticeable 3dB. The JPB is also considering electrification of the route; this could reduce the existing Ldn by as much as 8 dB. Because of uncertainty in

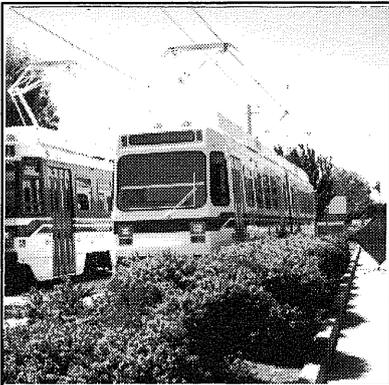


these plans, these conditions are not noted on the Noise Condition Map.

Freight train operations are not likely to expand. There are few major rail shippers left on the railroad line. Commuter passenger service is now the primary reason for the existence of the railroad line. Heavy industry on the Peninsula and in San Francisco is in decline.

Sunnyvale has no jurisdiction over the number or noise level of trains. If the frequency of trains increases in the future, conditions could worsen for abutting homes. The City can monitor changes in the number and noise levels of trains, and seek mitigation for any change that would worsen local conditions. Using the discretionary land use permit process and the California Environmental Quality Act (CEQA), the City can require mitigation or avoid new residential developments adversely affected by train noise. This position must be balanced against the benefits of train use by commuters. The City could also educate owners of older homes on ways to reduce noise levels from trains. The City could support noise legislation for trains. Normal construction techniques will achieve acceptable working environments for commercial, office and industrial buildings.

LIGHT RAIL NOISE



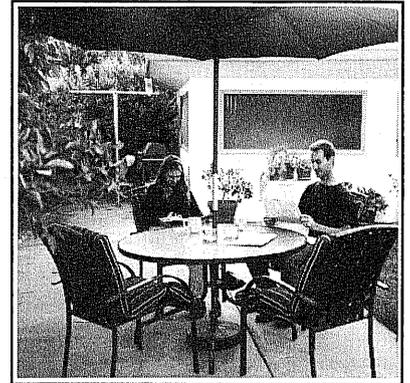
The light rail transit line project will incorporate mitigation techniques to ensure that there are no excessive noise impacts for residents.

In 1996 construction began on a light rail transit line through northern Sunnyvale. There will be six stations in Sunnyvale. This line will traverse Tasman Drive, Java Drive, Mathilda Avenue and Moffett Park Drive. The area is predominantly industrial, with the exception of Tasman Drive, where there are several large mobile home parks. The frontage on Fair Oaks Avenue is Futures Sites 7 and 8 (residential). Noise and vibration studies done as part of an Environmental Impact Report/Statement for the project indicated that barriers should be provided to guard against wheel squeal at two locations near the mobile home parks. The project will provide these barriers, as well as replacing dilapidated wooden fences with concrete community walls. These mitigation techniques will result in no excessive noise impacts for residents in these areas.



NOISE ENVIRONMENTS FOR OUTDOOR RECREATIONAL AREAS OF RESIDENTIAL USES

How much noise is acceptable for outdoor recreation areas of residential uses? The State Noise Guidelines indicate that residential land uses with 60-75dB outside Ldn are "conditionally acceptable". The City has enforced this limit in plans and projects and attempts to achieve a 60 dB Ldn for backyards and common recreation areas. The City has approved projects with conditions of approval that require achieving an Ldn of 60dB for common recreation areas, back yards, patios, and large and medium balconies but not for small balconies. Common recreation areas, patios and backyards have a high use rate and deserve a fairly quiet setting. A quiet environment does not seem to be as important for small balconies. Small balconies have a low use rate and sometimes face a major roadway. Because small balconies are frequently above ground level, options for reducing the noise (beyond site plan considerations) are limited to enclosing the balconies with a glass shield. Enjoyment of these areas is reduced by the high glass shields, therefore the City has not required achieving an Ldn of 60 dBA for small balconies.



Common recreation areas, patios and backyards have a high use rate and deserve a fairly quiet setting.

Achieving an outdoor Ldn of 60 dBA if the noise source is a railroad, is generally less important. This is because train noise is usually made up of relatively few loud events. Although the outdoor Ldn may be high, the noise level between events is typically acceptable for speech. An Ldn limit of 60dB would be unnecessary. An Ldn limit of 70 dBA is more appropriate for areas affected by train noise.

If the noise source is aircraft, an outdoor Ldn limit of 60dB would be impractical. Aircraft noise comes from overhead, not from ground level. This source makes it difficult to shield aircraft noise from people who are outdoors. Preventing residential uses within areas of high Ldn from aircraft is a way of avoiding noise exposure of homes from aircraft.



Community Noise

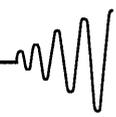
The noise provisions in the Sunnyvale Municipal Code regulate operational noises and some single-event noises.

For the purposes of this Noise Sub-Element, community noise is everything other than transportation noise. There are two types of community noise: land use operational and single-event noise. The noise provisions in the Sunnyvale Municipal Code (effective February, 1995) regulate operational noises and some single-event noises. (See the section titled "Regulating Noise, Sunnyvale Authority" in this Sub-Element for a detailed discussion of content of noise regulations in the Sunnyvale Municipal Code.) The noise regulations were revised to address complaints and concerns regarding the hours of operation and noise levels produced by certain activities and powered equipment which affected some residents.

The rationale behind the content of the noise regulations is to:

- address the majority of complaints received about noise;
- provide adequate and appropriate protection to the residential community while providing sufficient opportunities for businesses to operate; and
- keep the ordinance simple and easy to understand and enforce.

Because the Municipal Code noise provisions address the majority of noise complaints, noise complaints from people in special circumstances (e.g. unusual schedules or sensitivities to certain noises) are not accommodated. For example, a night shift worker trying to sleep during the day would be expected to tolerate children playing nearby. City staff and community members acknowledge that the Municipal Code is not a panacea for all noise issues. In some instances, complaints about noise are difficult to resolve despite the intent and guidelines of the noise regulations.



NOISE COMPLAINTS

In October of 1995, the effectiveness of the revised provisions was evaluated (RTC No. 95-402 "Noise Ordinance Review"). A portion of the review consisted of tabulating noise complaints by noise source during the period February 1, to August 31, 1995. The majority of noise complaints (42%) received were about noisy neighbors, music and parties. The second largest number (22%) of noise complaints were related to noise produced by powered equipment (leaf blowers, lawn mowers and edgers). Table 3, summarizes the number and types of noise complaints received by the City during the review period.

Table 3 - Types of Noise Complaints Received 2/1/95 - 8/31/95

Type of Complaint	Number	Percentage
Noisy Neighbors, Music, Speech, Impulsive Sound	138	42
Powered Equipment	74	22
Other (barking dogs, children, airplane, car horns, etc.)	42	12
Security Alarms	30	9
Construction Noise	25	7
Land Use Operational Noise	22	6
Deliveries	10	2
Total	341	100

The noise complaints that cannot be resolved through application of code regulations are primarily due to conditions existing prior to adoption of the revisions (February, 1995), conditions that are not appropriate to regulate (children at child care centers) or conditions that are beyond the City's sphere of influence (transportation noise). The result of the October 1995 review was that the noise regulations, in concert with other sections of the Sunnyvale Municipal Code, addresses most community noise issues. Effectiveness of the Sunnyvale Municipal Code noise

regulations should be periodically monitored. The number and type of noise complaints can be monitored on an annual basis (as part of the Community Condition Indicators - see Table 5).

ENFORCEMENT

Noise complaints are received and handled by the Public Safety Department and the Community Development Department's Neighborhood Preservation and Building Safety Divisions. The type of noise and when it occurs determines which department initially responds. Table 4, of this Sub-Element, shows the procedures and responding department for noise complaints received by the City.

Table 4 - Noise Complaint Response Procedure

Noise Complaints (Time and Type)	Responding Department or Division
All Types of Noises (nighttime hours)	Public SAFETY - certain types of noise complaints (see below) are subsequently referred to the Neighborhood Preservation or Building Safety Divisions for resolution.
Powered equipment, operational noise and deliveries (nighttime hours)	Reported to the Department of Public Safety but are subsequently resolved through Neighborhood Preservation Division
Powered equipment, operational noise and deliveries (daytime hours)	Neighborhood Preservation Division
Barking dogs (all hours)	Public Safety
Family disturbance and domestic violence (all hours)	Public Safety
Other nuisance noise (all hours)	Public Safety
Construction noise (nighttime hours)	Reported to the Department of Public Safety but are subsequently resolved through Building Safety Division
Construction noise (daytime hours)	Building Safety Division
Extreme and recurring noise	Cases are cited as a violation of the Code by the Department of Public Safety and may be referred to the Office of the City Attorney



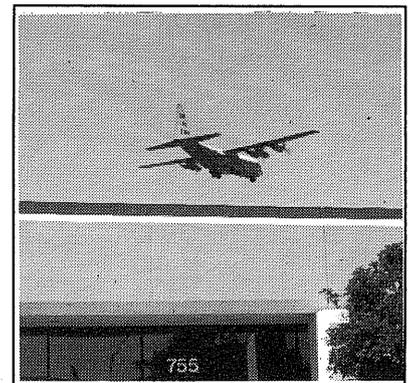
Each noise complaint represents a specific set of circumstances, but in all cases staff tries to find a solution to resolve the problem. Only about 5% of the noise complaints are addressed using Title 19 (zoning) noise regulations.

In the case of noise complaints resulting from operational noise, it may be necessary to take one or several instantaneous decibel (dBA) readings to determine if the noise generated is in compliance with the operational noise regulations in the Sunnyvale Municipal Code. The readings taken to measure the noise level should be taken at the property line of the property generating the noise and in a location and time that fairly represents the noise.

Most complaints are resolved through mediation at the time of the incident and by giving citizens information regarding noise issues and noise regulations. In accordance with Council's direction, all staff involved in code compliance emphasize problem solving techniques rather than a punitive approach. To date this approach seems to meet the needs of the City and the community. In the majority of cases compliance is achieved.

NOISE COMPLAINTS - MOFFETT FEDERAL AIRFIELD (MFA)

Complaints that NASA receives about aircraft operations at MFA are intermittent but average about 5 per month (once a week). Most of the "complaints" are inquiries about what type of aircraft is flying or why aircraft are flying at nighttime.



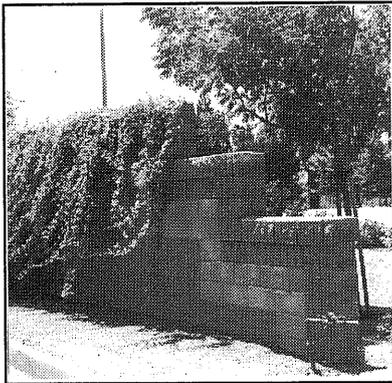
Most of the "complaints" that NASA receives about aircraft are inquiries about what type of aircraft is flying.



Noise Reduction Techniques

Up to this point, this Sub-Element has focused on ways to reduce the source of noise. This section explains how to block the path of noise and insulate people from noise.

SOUND WALLS



Typical sound walls will reduce noise levels about 6 to 8 dBA.

Because all major freeways and Lawrence Expressway are already protected by sound walls, installing walls is no longer an option for the City for noise protection from traffic noise in these areas. However, to comply with Title 24, the City may require additional sound walls to be constructed around new residential developments that are adjacent to major roadways.

Typical sound walls (6 to 8 feet high) will reduce noise levels about 6 to 8 dBA. Sound walls should be close to either the noise source or the noise receiver. Effective walls are solid and impervious to air flow. Sound walls must be continuous, so that noise cannot travel through openings or around the ends. In addition, the material the sound wall is made of (wood, masonry, etc.) affects the amount of sound that travels through the sound wall. The material the sound wall is made of must be dense enough to provide the mass needed to block the sound.

Sound walls are most effective at reducing noise on properties nearest to the sound wall. The effectiveness of the sound wall at reducing noise decreases as the distance from the sound wall increases.

The use of very high sound walls has limited benefits. This conclusion was reached in the Southern Pacific Corridor Specific Plan. The Plan concluded that the location of residential units, site plan arrangements and building insulation are more effective ways to protect people from noise.

Sound walls can be unattractive, isolate neighborhoods and give the community a "walled-in" appearance. This effect



can be minimized by landscaping and earth berms, and by requiring walls that are more decorative than the standard choices.

Proposed sound walls or other barriers should be reviewed for design, location, and material before installing the sound wall. Sound readings should be taken before and after installing the sound wall (or other noise reduction barrier) in order to determine the efficacy of the noise reduction barrier. The measurement techniques should be similar to procedures used by Caltrans to measure efficiency of sound walls.

SETBACKS

Building setbacks can reduce noise if the distance is substantial. Sound levels decrease 3 to 5dB for each doubling of the distance from the center of the road. For example, a building located 50 feet from the center of the road may have an Ldn of 64 dBA at the building facade closest to the roadway. But if the building were setback to 100 feet from the center of the roadway (an additional 50 feet), the Ldn would be reduced to about 60 dBA.

SITE PLANNING

Site planning is a good way to block noise. The concept is to buffer sensitive areas (such as bedrooms) with less sensitive areas (such as a parking structure).

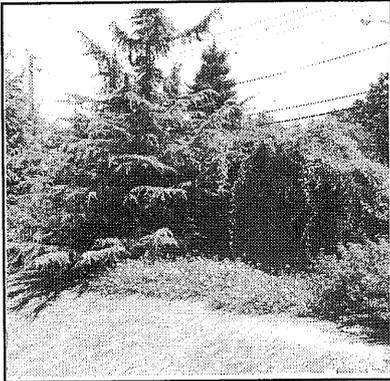
Floor plans can be arranged to orient sensitive bedroom and living room areas away from the noise source. Garages, kitchens and bathrooms can be noise buffers.

Conventional home building practices will reduce interior noise levels by about 15dB, even with windows partially open. If these practices are not enough to achieve acceptable noise levels, other measures such as air conditioners which allow windows to remain closed, double or triple pane windows, airtight doors and windows, and vents oriented away from the noise, may be needed. These,



and other measures are required by Title 24 when the indoor Ldn exceeds 45dB. See section in this Sub-Element titled "*Regulating Noise, State Authority*", for a discussion of Title 24, Noise Insulation Requirements.

LANDSCAPING



Planting of landscaping can have an aesthetic and psychological value by removing the noise source from view.

Landscaping provides little reduction in noise levels. 100 feet of dense foliage (so that no visual path extends through the foliage) achieves approximately 3-5 dBA noise reduction. Planting of landscaping can have an aesthetic and psychological value by removing the noise source from view, but actual noise levels will be reduced only slightly by the plantings.



The Strategic Plan

Because the noise environment of the City is a vital component to the quality of life in Sunnyvale, it is important to develop a strategic plan for responding to the existing and changing noise environment in Sunnyvale. Transportation noise causes most of the ambient noise in Sunnyvale. The City has little control over transportation-related noise sources. The City can mitigate new residential development in areas where homes would be exposed to "conditionally acceptable" transportation noise. The City can avoid new residential development in areas where homes would be exposed to "unacceptable" transportation noise. However, the City must balance the need for housing and improving transportation systems with maintaining and creating an acceptable noise environment in the community. Using the policies and action statements contained in this Sub-Element provides the City with thresholds of significance to determine when to avoid and mitigate noise.

Some single-event noises can be more irritating than ambient noise. The City's current approach of mediating complaints about most single-event noise has been effective. The regulations for single-event noise (powered equipment and deliveries) have limited some single-event noise to daytime hours. While this may not address all individual complaints about single-event noise, it does provide protection to the residential community while providing opportunities for businesses to operate in the community. It is in the City's interest to keep the noise ordinance simple and easy to understand and enforce.

Community condition indicators, which show transportation and community noise-related data (see Table 5) will be monitored annually to insure goals are being met.

The City must balance the need for housing and improving transportation systems with maintaining and creating an acceptable noise environment in the community.



Community Condition Indicators

Traffic Noise

- average daily traffic (ADT) counts on selected roads

Railroad Noise

- number of commuter trains per day

Aircraft Noise

- Moffett Federal Airfield flight operations per year
- San Jose International Airport flight operations per year

Community Noise

- complaints per year from land use operation and single-event noise



Updating the Noise Sub-Element

Periodic updating can provide current data on community conditions and indicate if goals are being met.

ANNUAL UPDATE

- Update community condition indicators in Table 5.
- Assess any changes in state and federal noise standards and/or guidelines.

FIVE YEAR UPDATE

Five-year reviews are recommended by State law to include:

- Assess changes in transportation conditions (roadways, aircraft, trains, light rail and rapid transit facilities).
- Update the Noise Condition Map and its accompanying technical report.
- Assess the effectiveness of regulations for operational noise and single-event noise.
- Research the latest information on noise measurement and noise reduction techniques.
- Assess all goals, policies and action statements.

Table 5 - Community Condition Indicators

Noise Source	Year 1986	Year 1996
U.S Highway 101	130,000 ADT *	175,000 ADT
State Highway 237	40,000 ADT	53,000 ADT
Lawrence Expressway (between Highways 101 and 237)	40,000 ADT	40,000 ADT
Evelyn Avenue (between Mathilda and Sunnyvale Avenues)	12,916 ADT	13,615 ADT
Fremont Avenue (between Mary and Hollenbeck Avenues)	22,730 ADT	20,706 ADT
Homestead Road (between Hollenbeck Avenue and S'vale-Saratoga Road)	30,970 ADT	22,605 ADT
Hollenbeck Avenue (between Homestead Road and Fremont Avenue)	15,230 ADT	15,037 ADT
Mary Avenue (between Central Expressway and Maude Avenue)	12,000 ADT	14,718 ADT
Remington Drive (between El Camino Real and Sunnyvale-Saratoga Rd.)	16,160 ADT	14,778 ADT
Wolfe Road (between Homestead Road and Fremont Avenue)	30,550 ADT	29,912 ADT
Commuter Trains (trains per day)	52	59
Moffett Federal Airfield (flight operations per year)	80,000	24,000
San Jose International Airport (flight operations per year)	General Aviation: 103307 Commercial: 247,892	157,685 130,621
Land Use Operational Noise Complaints	Not Available	22 ¹ (7 months)
Single-event Noise Complaints (includes powered equipment, deliveries, music, voices, alarms, barking dogs, airplane, fireworks, horns etc.)	Not Available	294 ¹ (7 months)

* Average Daily Trips

1 Report to Council, No. 95-402, "Noise Ordinance Review", completed in October of 1995. Part of the report involved tabulating the number and types of noise complaints received by the City during the 7 month period from February 1 to August 31, 1995.

GOALS, POLICIES AND ACTION STATEMENTS

Introduction

This section of the Noise Sub-Element contains a set of integrated goals, policies and action statements. The goals and policies reflect the current and future direction of the City regarding noise. They will guide decision makers confronted with specific issues and proposals. The action statements outline specific ways to implement the City's goals and policies.

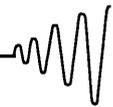
Goals, policies and action statements of this Sub-Element are based on certain assumptions. They are:

- Noise is a significant part of Sunnyvale's environment.
- Sunnyvale residents need and desire a living environment reasonably protected from noise.
- The City has capabilities as a single entity to improve some noise conditions, protect others from getting worse, and protect acceptable conditions.
- The City can encourage other public agencies to address noise issues as part of their plans and projects.

The goals and policies regarding noise will guide decision makers confronted with specific issues and proposals.



- Protection from excessive noise must be balanced with other community and regional goals.
- Continued exposure to excessive noise is inevitable in parts of the City, as is the worsening of some noise levels.



Goals, Policies and Action Statements of the Noise Sub-Element

Noise Sub-Element goals are organized under three headings:

- Goal 3.6A - Land Use Compatibility
- Goal 3.6B - Transportation Noise
- Goal 3.6C - Community Noise

GOAL 3.6A
MAINTAIN OR ACHIEVE A COMPATIBLE NOISE ENVIRONMENT FOR ALL LAND USES IN THE COMMUNITY (LAND USE COMPATIBILITY).

Policy 3.6A.1

Prevent significant noise impacts from new development by applying state noise guidelines and Sunnyvale Municipal Code noise regulations in the evaluation of land use issues and proposals.

Action Statements

3.6A.1a Apply the Sunnyvale Municipal Code noise regulations in the evaluation of land uses and proposals. Acoustical analysis may be required to determine if mitigation measures shall be required for the new development. If required, mitigation measures shall be incorporated into the new development that bring the proposed development into conformance with the noise regulations in the Sunnyvale Municipal Code.

3.6A.1b Consult the Noise Condition Map (Appendix A) to determine noise levels throughout the City.

3.6A.1c Comply with the "Noise and Land Use Compatibility Guidelines" (Table 2) for the compatibility of land uses with their noise environments, except where the City determines that there are prevailing circumstances of a unique or special nature.



3.6A.1d Use Table 3.6A.1d to determine if proposed development results in a "significant noise impact" on existing development.

Table 3.6A.1d - Significant Noise Impacts from New Development on Existing Land Uses

Ldn Of Existing Development ¹	Significant Noise Impact Increase In Ldn Of Existing Development From New Development
"Normally Acceptable" ²	more than 5 dBA, but noise level still in the "Normally Acceptable" category
"Normally Acceptable"	more than 3 dBA and the noise level exceeds the "Normally Acceptable" category
exceeds "Normally Acceptable"	more than 3 dBA

- 1 *The Ldn shall be measured at any point along the property line shared by the proposed development and existing land uses.*
- 2 *"Normally Acceptable" as defined by the State of California "Noise and Land Use Compatibility Guidelines", summarized in this Sub-Element.*

3.6A.1e Use the CEQA and the discretionary permit processes to protect existing land uses from significant noise impacts due to new development. Acoustical analysis required as part of the CEQA or discretionary permit process, master plans, and/or design review shall determine if significant noise impacts occur from proposed development on existing land uses. If significant noise impacts occur, then mitigation measures shall be required to minimize the impact of the new development on existing land uses.

3.6A.1f Supplement the "Noise and Land Use Compatibility Guidelines" (Table 2) for residential uses by attempting to achieve an outdoor Ldn of no greater than 60 dBA for common recreation areas, backyards, patios, and medium and large-size balconies. These guidelines should not apply where the noise source is a railroad or airport. If the noise source is a railroad, then an Ldn of no greater than 70 dBA should be achieved in common



recreation areas, backyards, patios, and medium and large balconies. If the noise source is from aircraft, then preventing new residential uses within areas of high Ldn from aircraft noise is recommended.

Policy 3.6A.2

Enforce and supplement state laws regarding interior noise levels of residential units.

Action Statements

3.6A.2a Enforce Title 24 Noise Insulation Requirements for all new hotels, motels, apartments, condominiums group care homes, and all other dwellings, except single-family detached homes.

3.6A.2b Apply Title 24 Noise Insulation Requirements to all new single-family detached homes.

3.6A.2c Attempt to achieve a maximum instantaneous noise level of 50dBA in bedrooms and 55dBA in other areas of residential units exposed to train or aircraft noise, where the exterior Ldn exceeds 55dB .

Policy 3.6A.3

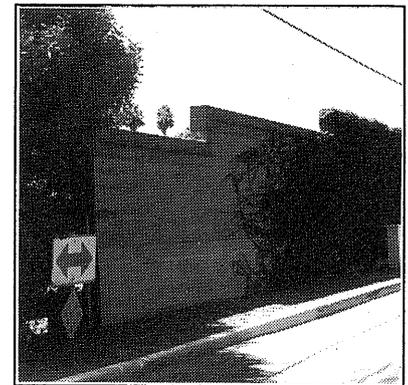
Consider techniques which block the path of noise and insulate people from noise.

Action Statements

3.6A.3a Use a combination of barriers, setbacks, site planning and building design techniques to reduce noise impacts, keeping in mind their benefits and shortcomings.

3.6A.3b Consider compiling and distributing information to residents of noise-impacted areas about what they can do to protect themselves from noise.

3.6A.3c Proposed sound walls or other noise reduction barriers should be reviewed for design, location, and material before installing the barrier. Sound readings should be taken before and after installing the noise



Consider techniques which block the path of noise and insulate people from noise.

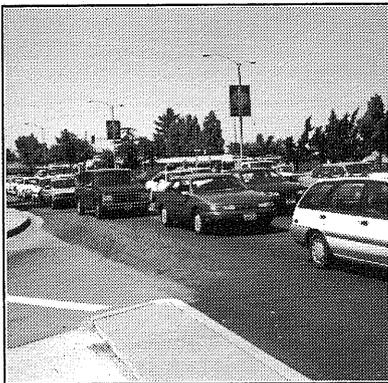


reduction barrier in order to determine the efficacy of the noise reduction barrier. Measurement techniques shall be similar to procedures used by Caltrans to measure efficiency of sound walls.

GOAL 3.6B
PRESERVE AND ENHANCE THE QUALITY OF NEIGHBORHOODS BY MAINTAINING OR REDUCING THE LEVELS OF NOISE GENERATED BY TRANSPORTATION FACILITIES (TRANSPORTATION NOISE).

Policy 3.6B.1

Refrain from increasing or reduce the noise impacts of major roadways.



Refrain from increasing or reduce the noise impacts of major roadways.

Action Statements

3.6B.1a Identify and mitigate roadway noise impacts as part of local land use plans and proposals.

3.6B.1b Regulate the location, design and capacity of local roadway improvement projects to mitigate their noise impacts.

3.6B.1c Use local traffic management techniques to reduce or protect noise levels. (For example, the City can place truck routes away from neighborhoods. Commuters can be diverted from residential streets. Note that some techniques may address one problem but cause others. For instance, stop signs can improve safety but they can also raise noise levels. In such cases, the City must balance its goals to the extent possible.)

3.6B.1d Advocate that neighboring cities should identify and mitigate roadway noise impacts that affect Sunnyvale as part of their land use plans.

3.6B.1e Advocate that public agencies should identify and mitigate noise impacts as part of their transportation system improvement projects.



3.6B.1f Support state legislation to reduce vehicle noise levels.

3.6B.1g Continue to enforce state muffler and exhaust laws.

Policy 3.6B.2

Support efforts to reduce or mitigate airport noise.

Action Statements

3.6B.2a Support the retention of the Airport Land Use Commission.

3.6B.2b Support the right of private citizens to sue airports for noise impacts.

3.6B.2c Encourage airport operation policies and procedures which reduce the level and frequency of noise as well as other policies and federal funding to alleviate the effects of aircraft noise.

Policy 3.6B.3

Support activities that will minimize the noise impacts of Moffett Federal Airfield.

Action Statements

3.6B.3a Monitor the annual number of flight operations and evaluate any increases in activity.

3.6B.3b Encourage NASA to seek ways to minimize flights over the community and manage practice landings.

3.6B.3c Encourage NASA to continue to direct flight operations over the Bay during evening and nighttime hours.

3.6B.3d Encourage NASA to continue flight, landing and maintenance procedures which lower noise levels.



3.6B.3e Encourage NASA to establish a complaint record and response program.

3.6B.3f Support the continuation of NASA's public information program.

3.6B.3g Oppose any effort and/or expenditure of public funds to promote Moffett Federal Airfield for non-federal purposes.

3.6B.3h Support efforts to limit non-essential air traffic at Moffett Federal Airfield.

3.6B.3i Support federal legislation that require military and federal aircraft to meet Stage 3 noise requirements similar to commercial aircraft.

Policy 3.6B.4

Support activities that will minimize and/or reduce the noise impacts of San Jose International Airport.

Action Statements

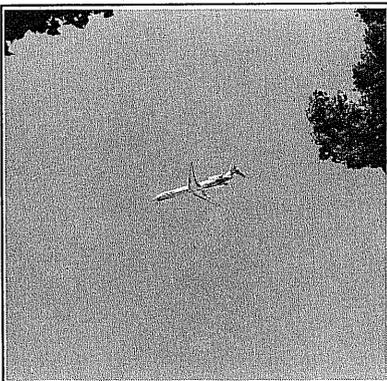
3.6B.4a Monitor the annual number of passengers and evaluate trends in activity at San Jose International Airport.

3.6B.4b Monitor plans for expansion of San Jose International Airport terminals and evaluate the resulting increases in activity.

3.6B.4c Consider encouraging the City of San Jose to install a local noise monitoring station in the Lakewood area.

3.6B.4d Encourage the City of San Jose to promote the use of Stage 3 aircraft.

3.6B.4e Encourage the City of San Jose to maintain strict control over flight patterns which influence noise in Sunnyvale.



Support activities that will minimize and/or reduce the noise impacts of San Jose International Airport.



3.6B.4f Encourage the City of San Jose to educate pilots and seek their cooperation in using cockpit techniques that reduce noise levels.

3.6B.4g Support federal legislation to lower the noise levels of civilian aircraft.

3.6B.4h Support state legislation to lower the noise levels of civilian airports.

Policy 3.6B.5

Encourage activities that limit the noise impacts of helicopters.

Action Statements

3.6B.5a Encourage NASA to direct helicopter flight operations and flight patterns so that they occur over industrial, not residential, areas.

3.6B.5b Allow the use of airborne helicopters at construction sites on a limited basis as permitted by the FAA and the Caltrans Division of Aeronautics.

Policy 3.6B.6

Mitigate and avoid the noise impacts from trains.

Action Statements

3.6B.6a Monitor plans and projects which would increase the number of commuter trains, and evaluate their noise impacts and seek mitigation for any change that worsens local conditions.

3.6B.6b Monitor plans and projects which would increase the number of freight trains, and evaluate their noise impacts and seek mitigation for any change that worsens local conditions.

3.6B.6c Avoid construction of new residential uses where the outdoor Ldn is greater than 70 dBA as a result from train noise.

3.6B.6d Educate owners of older homes on ways to reduce noise levels from trains.

3.6B.6e Support legislation to reduce the noise level of trains.

3.6B.6f Seek the cooperation of train engineers to avoid unnecessary and prolonged use of air horns except for safety purposes.

Policy 3.6B.7

Monitor and mitigate the noise impacts of light rail facilities.

Action Statements

3.6B.7a Monitor regional plans for light rail facilities in Sunnyvale to ensure that noise impacts are identified and mitigated.

GOAL 3.6C

MAINTAIN OR ACHIEVE ACCEPTABLE LIMITS FOR THE LEVELS OF NOISE GENERATED BY LAND USE OPERATIONS AND SINGLE-EVENTS (COMMUNITY NOISE).

Policy 3.6C.1

Regulate land use operation noise.

Action Statements

3.6C.1a Monitor the effectiveness of operational noise regulations every five years by referring to related community condition indicators.

3.6C.1b Apply conditions to discretionary land use permits which limit hours of operation, hours of delivery and other factors which affect noise.

3.6C.1c Continue interdepartmental procedures to respond to complaints about operational noise.



3.6C.1d Instantaneous noise measurements taken for the purpose of enforcing the noise regulations in the Sunnyvale Municipal Code shall be taken at the property line of the property generating the noise and in a location and time(s) that fairly represents the noise.

Policy 3.6C.2

Regulate select single-event noises and periodically monitor the effectiveness of the regulations.

Action Statements

3.6C.2a Monitor the effectiveness of limits on deliveries hours and hours of operation of powered equipment on properties adjacent to residentially zoned properties every five years by referring to related community condition indicators.

3.6C.2b Continue efforts by the Department of Public Safety and Neighborhood Preservation to mediate complaints about single-event noise that is not regulated by the Sunnyvale Municipal Code.

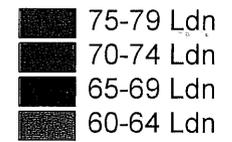


Regulate select single-event noises and periodically monitor the effectiveness of the regulations.



City of Sunnyvale 2010 NOISE CONDITIONS

Noise Exposure - 50' from
Edge of Road/Railroad

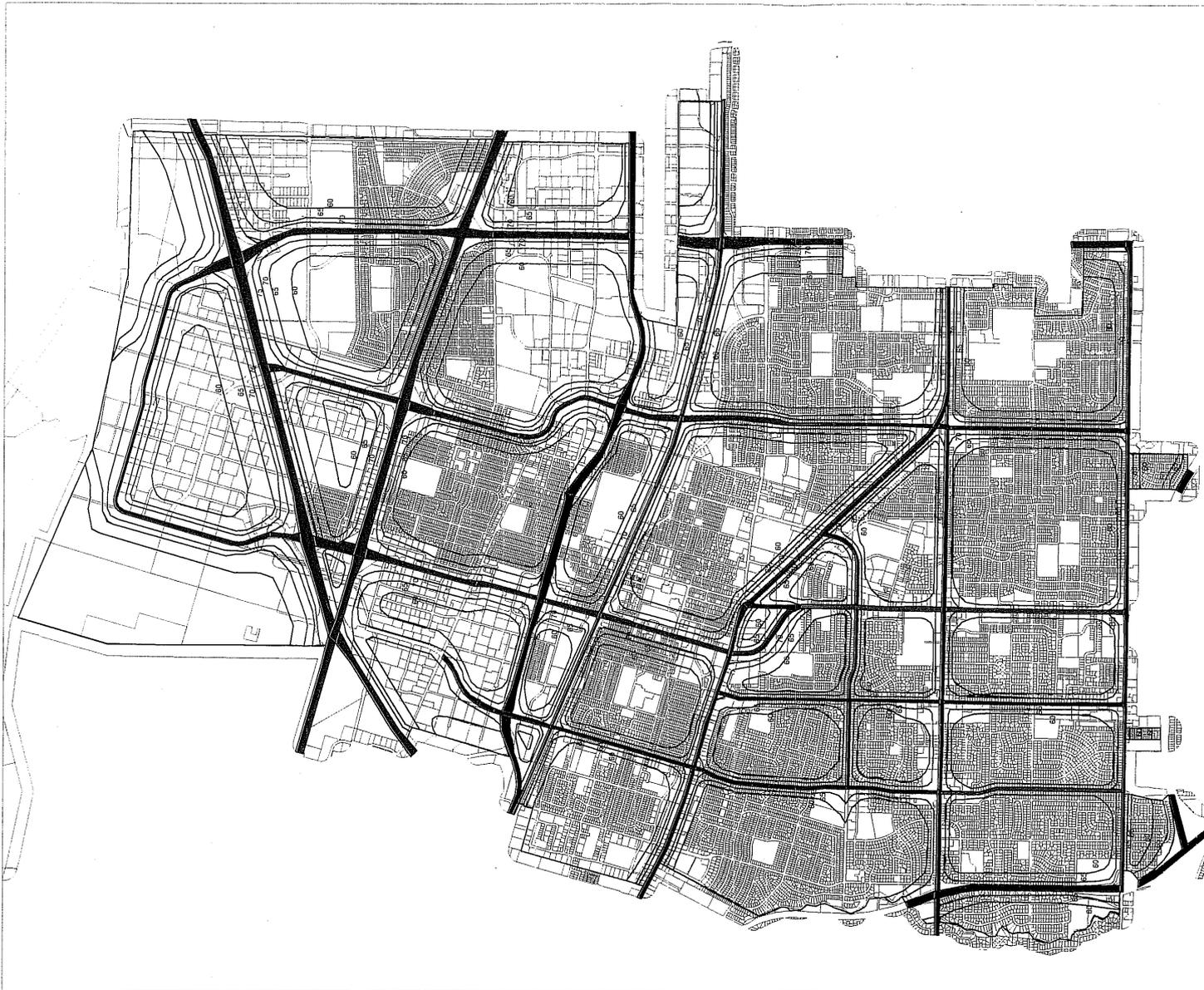


0 2000 4000 6000 Feet

City of Sunnyvale
Department of Community Development
February 20, 1997

City of Sunnyvale
Noise Sub-Element

Appendix A



**MOFFETT FIELD
COMPREHENSIVE USE PLAN
ENVIRONMENTAL ASSESSMENT**

FIGURE 16

**Mitigated
Year 2010 Forecast
Noise Exposure
Conditions (CNEL)**

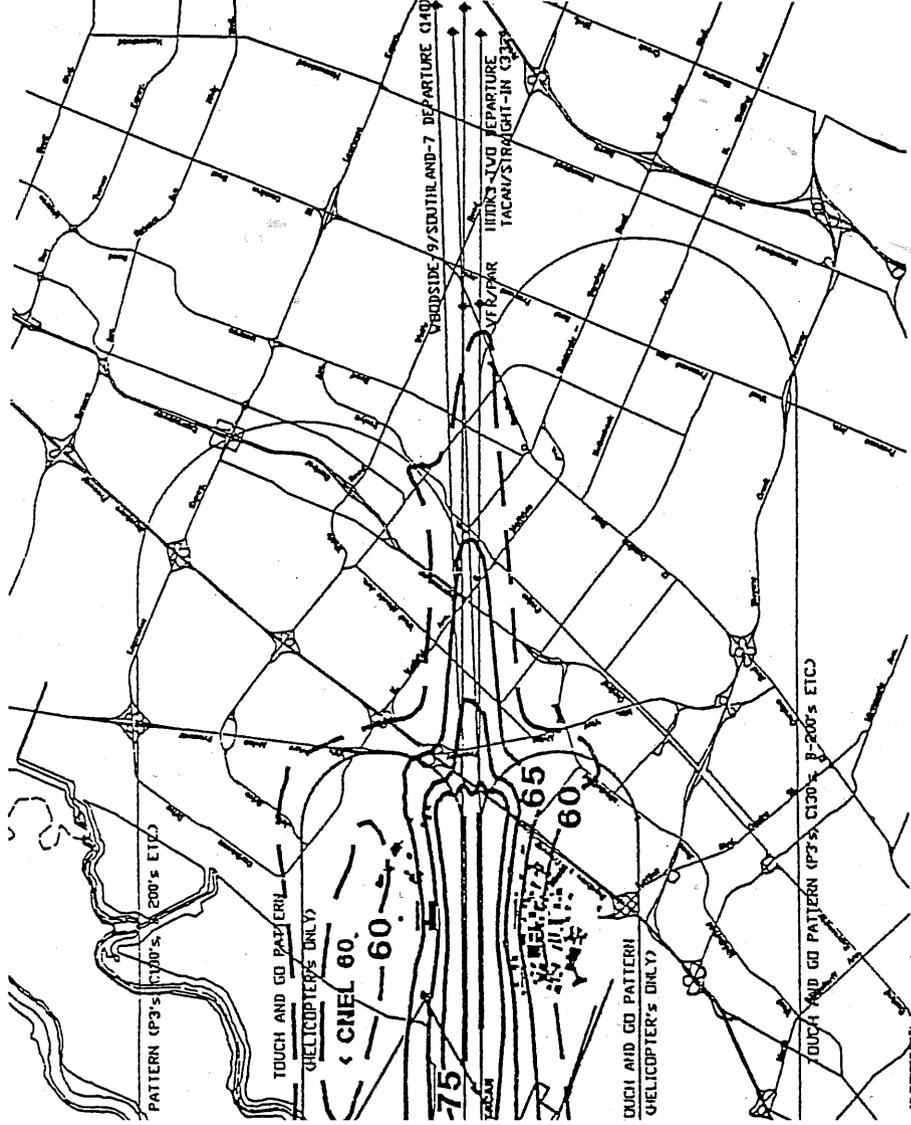
LEGEND

- Major IFR/VR Flight Tracks
- CNEL Noise Contours (65-75 dB)
- - - CNEL Noise Contour (60 dB)

Source: P & D Aviation



NASA



**City of Sunnyvale
Noise Sub-Element**

Appendix B