

**2003-2004 SANTA CLARA COUNTY CIVIL GRAND JURY**

**INQUIRY INTO THE TRANSFER OF CELLULAR 911 CALLS  
TO LOCAL PUBLIC SAFETY CALL CENTERS**

**Summary**

The 2003-2004 Santa Clara Civil Grand Jury (Grand Jury) inquired into the ongoing process of transferring responsibility for receiving cellular 911 calls from the California Highway Patrol Centers (CHP) in Vallejo and Monterey, California, to Santa Clara County Public Safety Emergency Call Centers.

The public is cautioned that until this change is completed, cellular 911 calls may not be directly answered by a local public safety call center that dispatches police, fire, and medical help, but rather that their calls may be routed to the CHP in Vallejo or Monterey, who, with minimal delay, will forward their calls to the appropriate public safety call center. When there is a choice, emergency 911 calls should be made from landline telephones rather than cell phones. It is strongly recommended that the public take note of and use the seven-digit direct dial emergency numbers for each of the county's public safety call centers, thus by-passing the present cellular 911 system until the switchover is completed. Depending on the cell phone, wireless service provider, and location within the county, emergency services may not be dispatched immediately. The Grand Jury recommends that the public safety and public affairs organizations continue to alert Santa Clara County citizens about these issues.

**Background**

**California 911 System**

In 1972, with the passage of Assembly Bill 515, the State of California Telecommunications Division 911 Program Office was charged with implementing landline 911 throughout California. Thirteen years later, on December 16, 1985, statewide implementation of basic landline 911 was completed, and a program to upgrade the public safety call centers (call centers) to *enhanced 911* had already begun. Call centers are the locations that dispatch emergency police, medical, and fire assistance. In addition to routing landline 911 calls to the proper public safety call center, *enhanced 911* provides automatic location identification (ALI) and automatic number identification (ANI) from its data base of all phone numbers and associated addresses. That is to say, the call taker receives the caller's telephone number and the address from where the call is initiated.

Upon receiving and screening this information, the call center can dispatch assistance to a specific location. ANI and ALI are particularly important when responding to hang-up calls or calls that are made by someone under duress.

With increased use of cell phones in the 1980's, and because the majority of cell phones were used in cars, state authorities directed the wireless service providers to route wireless 911 calls to the California Highway Patrol (CHP) regional communications centers. The CHP was, and is today, the agency charged with public safety on the highways throughout all of California. California is served by 24 CHP regional communications centers. Until very recently, the CHP received all cell phone 911 calls, sent a response to freeway emergencies, and routed other calls to the appropriate call centers. For Santa Clara County, this means most cellular 911 calls are routed to the CHP center in Vallejo, while some calls initiated in the south county are routed to the CHP Monterey center. The California system for routing cellular 911 calls and the appropriate information is evolving much like the landline 911 system evolved over three decades ago. First just the call is routed, then more descriptive information follows as the technology improves.

As the number of cell phones in service increased over the past 20 years, wireless service providers (wireless providers) emerged. Santa Clara County is currently serviced by six major wireless companies: Verizon, AT&T, Sprint, Cingular, Nextel, and MetroPCS. Each wireless provider has its own network of antennae with slight differences in the technology used for handling cellular calls.

Because cellular phones are portable, there is uncertainty as to where to direct responders. The call taker in the 911 center must ask the caller for a location. That location could change if the emergency is occurring in a moving vehicle, and there are times when the caller may not know the location. When the caller hangs up or is under duress, assistance cannot be sent to a physical location. In the case of a call made from a cell phone that has a restricted number, the call taker cannot reconnect immediately if the call has been terminated for any reason. Because the cell phone number is not in the system, the exact location of the caller may not be known.

In response to concerns about locating 911 cell phone callers, FCC Order 94-102 imposed a mandate on wireless providers that required them to enhance their networks to route location and callback number information with the cell phone call to the call center. Due to the effort and costs associated with this mandate, the wireless providers requested and have been granted a number of waivers to the original timeline. As a result, full implementation for all providers is not required until the end of 2005. Slight differences exist in the technology used by these wireless providers; this means that call centers must accommodate varying formats for the location and identification information. See Attachment A for an image of the call taker's computer display.

A special situation exists for cellular phones operated outside the wireless providers' system, i.e. non-subscribed phones and old phones donated to various charities where the caller does not subscribe to a wireless service. Such phones can connect to the cellular 911 system, but the phone cannot receive a call nor make a call out, other than to 911. The wireless provider must forward these calls to the CHP and other call centers, which process them in a normal manner.

The public should know that the ability for the call center to call back, if the original call is dropped, may not be available with these phones.

## **Evolution of Cell Phone 911 Technology**

### ***Phase 0***

There are three levels involved in the implementation of cellular 911. The most basic of these, *Phase 0*, is currently in place. The cellular caller reaches the CHP and no ALI/ANI information accompanies the call. However, for calls made with unrestricted numbers, the caller's phone number is forwarded, along with the call.

### ***Phase I***

Phase I requires that the wireless provider supply the CHP and other call centers with the callback number of the cellular caller. In California, the location of the wireless transmission tower, the sector of the wireless signal antenna tower that receives the call, and a contact number for the wireless provider will also be supplied.

In the event of a dropped call from a restricted phone number, the call center could contact the wireless provider to identify the wireless subscriber and the home or business address of the subscriber. Assistance will not reach the caller if the subscriber is not at either address. The current procedures for contacting the wireless provider vary and often involve considerable delay, with additional concerns about the privacy of account information.

### ***Phase II***

Phase II requires that the wireless provider furnish the geographic coordinates of the caller in addition to the Phase I information. In California, these will be transmitted as latitude and longitude data which will allow the caller to be placed geographically within 50-100 meters of accuracy. Most new phones sold in California after December 2003 must have limited Global Positioning System (GPS) capability using satellite electronics to position the caller's latitude and longitude or an equivalent capability. Not all of the wireless providers have their entire networks completely compatible with GPS or have a proven equivalent system.

The accuracy of location is dependent on the service provider's equipment and the geographic position of the caller. In less densely populated areas, with fewer antennae, the accuracy of location is less. In heavily populated areas, it is more accurate, but between or in tall buildings the locating technology may not work at all.

With both GPS and other locating methods, computation time is required to resolve the location and to assess an accuracy factor. This could take from 5 to 15 seconds, and the data may arrive after the call has been received by the call center. This is problematic for dispatching assistance if the call has been dropped.

As statewide cellular 911 call volume to the CHP increased from 5.5 million calls in 2001 to 7.5 million calls in 2002, concerns about busy signals at the CHP emergency call center and fear of response time delays increased. The State of California General Services Division Office of

Emergency Communications and the state legislature acknowledged this in passing AB 1263, which became effective in January 2001.

This bill offered local call centers the option of handling cellular 911 calls directly, and authorized funding to those agencies opting to take these calls if they met certain criteria.

### **Santa Clara County's Response**

Santa Clara County was interested in taking this option. Early on, the Public Safety Communication Managers Association of Santa Clara County (PSCMA) began feasibility studies for the county and coordination activities with the CHP and the California Emergency 911 Program Office in Sacramento. The PSCMA is made up of representatives of the county's various police, safety, and fire agencies. The Palo Alto Police Department's Communications Department acted as a liaison for PSCMA with the State of California 911 office. The Palo Alto Police Department's communications manager continues to coordinate cellular 911 switchover activities and provides technology assistance to the various call centers in the Bay Area. As of December 2003, eleven out of the twelve call centers in Santa Clara County have confirmed with the CHP and the State of California Emergency Communications Department their intent to start the switchover process. All of these call centers have qualified for state funding. The twelfth call center began the process of qualifying for the switchover program in March 2004. This is a voluntary switchover program. The CHP will continue to answer cellular 911 calls directly for its jurisdiction, i.e. California highways, other contracted areas, and for those public safety agencies that do not opt to switchover.

The decision by the municipalities to enter into the cellular 911 call-answering network was reached with public safety in mind. It was made partially out of civic pride, but mainly out of a desire to better service their residents and those individuals passing through their jurisdictions with prompt emergency assistance based, in part on their familiarity with the local territory. The local call centers are taking emergency 911 calls already and as such, have experienced, qualified personnel and procedures for dispatching assistance in emergencies.

## **Discussion**

The Grand Jury performed an extensive review of the literature concerning cellular 911 calls published by the Federal Department of Transportation, the Federal Communications Commission, the State of California 911 Emergency Communications Office, and the Santa Clara County Communications Managers Association. It interviewed supervisory personnel at the CHP Golden Gate Call Center in Vallejo, the Santa Clara County Emergency Communications Center, City and County of San Francisco Emergency Communications Department, Los Gatos Police Department's call center and Los Altos Police Department's call center. Telephone surveys were conducted with the San Jose Police Department, Gilroy Police Department, and the CHP Monterey call center.

In the process of interviewing the various call centers within the county and the CHP, and after reviewing the literature published by the State of California Department of General Services

Telecommunications Division, the Grand Jury learned of limitations in the present system of handling cellular 911 calls by CHP. It also foresees inherent limitations to the system after the county's call centers complete the switchover and commence answering calls directly.

The switchover process is complicated and will take at least two years to complete. (See Table 1).

Each of the county's call centers has to acquire equipment and software to handle cellular call routing, establish jurisdictions with the CHP, and commence call-taking operations with six different wireless providers. Because of the differences in technologies employed by each wireless provider, slight adjustments to the call center software and call taker's displays have to be developed. (See Attachment A). Call centers that preceded Santa Clara County in this switchover process, like San Francisco, strongly recommend that each wireless service provider be brought on-line one at a time. During this switchover, the CHP will continue to be the primary call taker of cellular 911 calls.

**Table 1**

**Santa Clara County Public Safety Answering Centers  
Implementation Schedule**

| <b>Public Safety Agency</b> | <b>Date to start receiving Phase II wireless calls w/o ANI/ALI</b> | <b>Date all wireless providers are sending Phase II data</b> | <b>Planned date for full implementation of Phase II Technology</b> |
|-----------------------------|--|--|--|
| Campbell                    | 11/12/03   | 12/31/04   | 1st Quarter 05   |
| Gilroy                      | 07/01/04   | 12/31/04   | 1st Quarter 05   |
| Milpitas                    | 11/12/03   | 12/31/04   | 1st Quarter 05   |
| Los Altos                   | 4th Quarter 04   | TBA  | TBA  |
| Los Gatos/Monte Sereno      | 2nd Quarter 05   | TBA  | TBA  |
| Morgan Hill                 | 02/20/04   | 12/31/04   | 1st Quarter 05   |
| Mountain View               | 11/11/03   | 12/31/04   | 1st Quarter 05   |
| Palo Alto                   | 11/12/03   | 12/31/04   | 1st Quarter 05   |
| San Jose                    | 4th Quarter 04   | TBA  | TBA  |
| Santa Clara                 | 07/01/04   | 12/31/04   | 1st Quarter 05   |
| Santa Clara County          | 4th Quarter 04   | TBA  | TBA  |
| Sunnyvale                   | 12/16/03   | 12/31/04   | 1st Quarter 05   |

**Legend:** TBA= To be announced

Theoretically, once each wireless provider qualifies its data with one call center, then all call centers will be able to receive complete data. The actual date when each call center will first use data is unknown at this time.

### **Current Operations**

With the limited technology available, the CHP has been effectively handling cellular 911 calls for over 20 years. When the call center operators receive 911 calls routed from the wireless providers, the dispatch operator assesses the situation and forwards the call to the appropriate local public safety agency or dispatches safety, medical, or fire assistance as required. The CHP call takers screen all calls for valid personal emergencies as well as for duplicate reports of the same incident. As noted earlier, the cell phone caller's location is not immediately known to the dispatch operator, so time must be spent establishing the caller's location, which in some cases is unknown to the caller, especially when the cellular caller is in a moving vehicle. When the call is interrupted for any reason, reestablishing communication is not immediate for those callers with phone numbers outside the area or with calls made from phones that have a restricted number feature.

In December 2003, the CHP's Golden Gate Center in Vallejo began an upgrade of its cellular call handling equipment to accept Phase II (ANI/ALI) data from the six wireless providers servicing the Bay Area. The upgrade has not been completed, so currently, only the cell phone number is known at the time the call is received.

During this transitional period, the CHP remains the primary call taker and Santa Clara County callers can expect delays between the time the cell call is initiated and when help is dispatched. By federal statute, emergency calls may only be transferred once. Therefore, the CHP must validate the jurisdiction and the location, call the appropriate agency, and then obtain concurrence that the agency will take the call before the call can be forwarded. The local call center will then take the incident report and proceed with the appropriate action. Precious time can be lost in this system. Although the Grand Jury could not verify the call centers' actual response times, up to 20 minute delays have been reported. This delay is caused by several factors: technical system delays, and the amount of call traffic at the answering centers for both the CHP and the local call centers.

The CHP reports a high incidence of dropped calls, mistakenly dialed calls, and misuse of the cellular 911 system. This is due in part to a feature built into older cell phones when they were programmed to dial 911 if several keys were depressed at one time or when number 9 speed dial was programmed to dial 911. Also, 911 calls are inadvertently made when someone or something sits on a cell phone and depresses several keys. Because cell phones are ubiquitous, misuse of the 911 system for requests for government services of a non-emergency nature continue to add to call volume. Duplicate calls for the same incident also add to the call counts. It is estimated by the State of California 911 Emergency Communications Office that up to 40% of all 911 calls fall into these categories.

## **A Partial Solution**

Communications officials are urging cell phone users in need of emergency assistance to dial a seven-digit number to reach their local call center during the switchover. Dialing this number provides more direct access than dialing 911 on a cell phone. Emergency response time will probably be quicker. To help promote this, the Santa Clara County Communications Department, an active member of the PSCMA publishes a brochure titled “Telephone Tips During an Emergency” (Attachment B). This contains helpful hints on how to report an emergency and a list of local phone numbers for contacting each of the local public safety emergency call centers.

## **Fiscal Impact**

The fiscal impact of the switchover on the local municipalities’ budget is projected to be negligible since the bulk of equipment and software required is funded through the state’s emergency 911 fund, which gets its dollars from telephone surcharges and fees. The public pays these fees with each monthly bill for landline and cellular telephone service. Upgrading the facilities of each call center is dependent on the age and condition of their individual facilities, but is projected to be minimal, since call centers were routinely upgraded in the past as telephone and radio technology became available.

## **Staffing Issues**

It is difficult to assess how many additional call-taking personnel will be needed within the local call centers to handle the new volume of calls. The San Jose Police Department reports that they received 49,000 cellular 911 calls transferred from the CHP and handled 202,000 landline 911 calls last year. San Francisco and Palo Alto report about the same ratio: 20% of their 911 calls were transfer calls from the cellular 911 system. The CHP advised that cellular call duration is up to three times as long as landline 911 calls. However, a short undocumented study from San Francisco’s call center and three months of experience in Palo Alto demonstrate that cell phone calls are around twice as long in duration. While the duration of the call greatly depends on the nature of the incident being reported, cellular callers tend to describe similar situations in more detail, or are prompted by the call centers to describe their location in detail. In many cases, the callers do not know their location or the exact nature of the emergency incident in progress. Multiple calls for the same incident, mis-dials, and a variety of misuses of the system for non-emergency requests add to the increased volume. The CHP screened all calls and only transferred valid emergency calls, one per incident, before the switchover. The CHP advises the new call centers to expect two to three times the number of calls previously transferred and to expect each call to take longer. The Palo Alto call center confirms this projection after three months of experience with the direct cellular 911 calls. Applying the CHP’s rule of thumb, the Santa Clara County call centers should expect 20% to 40% more calls after the switchover is completed.

## **Conclusion**

The switchover of cellular 911 call answering services from the CHP to Santa Clara call centers is a vital and relatively low-risk program from a fiscal point of view. It should level the call

volume between the CHP and the local call centers, deploy the latest technology, and make the overall cellular 911 system more responsive. Callers will be connected to the closest call center, will not have to repeat information, and will be assisted by a local dispatcher familiar with the local territory. All of the county's public safety agencies have experience in handling 911 landline telephone calls. The various call centers have shown the ability to cooperate in jurisdictional and mutual aid matters. There is no reason to believe the county's public safety agencies will not cooperate in this switchover program.

The Grand Jury hopes that cellular 911 call handling and response to emergencies will be improved after the switchover is completed. Problems inherent with current cell phone use remain in the way of making the cellular 911 system as reliable as the landline 911 system.

## **Findings and Recommendations**

### **Finding I**

Cellular 911 calls made within Santa Clara County through 2005 may be handled by either the CHP or a local public safety agency. Until the switchover is completed, the cellular 911 caller will not know which agency will receive his call. The local call centers are more familiar with the territory; when they take the call directly, bypassing the transferring/hand-off delays, they will usually respond quicker. Each local call center has a direct, 7-digit, phone number that connects the cell phone caller directly to the answering center, bypassing the wireless providers' emergency call director system.

### **Recommendation I**

The information in the Santa Clara County Communication Center's brochure, "Telephone Tips During an Emergency," with local phone numbers for each of the county's call centers, should be given as wide a distribution as possible. See Attachment B.

### **Finding II**

Misuse of the 911 emergency number for non-emergencies continues at a significant rate. In the case of the cellular emergency system, the incidence is equally high. This additional call volume impacts the busy signal wait time for real emergencies and answering center staffing.

## **Recommendation II**

County Public Affairs Offices, Public Safety Outreach Programs, and media outlets within the county should continue their public education efforts and awareness programs concerning the proper use of the 911 emergency communications system.

## **Finding III**

Cellular 911 calls are subject to the current shortcomings of mobile technology. Cell phone signals are subject to dropping, bending, skipping, and fading. Cell phones, currently, are not as reliable as landline phones and do not work well inside or around tall buildings or in mountainous areas.

## **Recommendation III**

The public should continue to be instructed to use landline phones for 911 emergency calls whenever there is a safe choice.

## **Finding IV**

The use of a cell phone with a *number restricted* feature for a 911 call could impede a call center's ability to contact the caller if the emergency call is interrupted.

## **Recommendation:**

None.

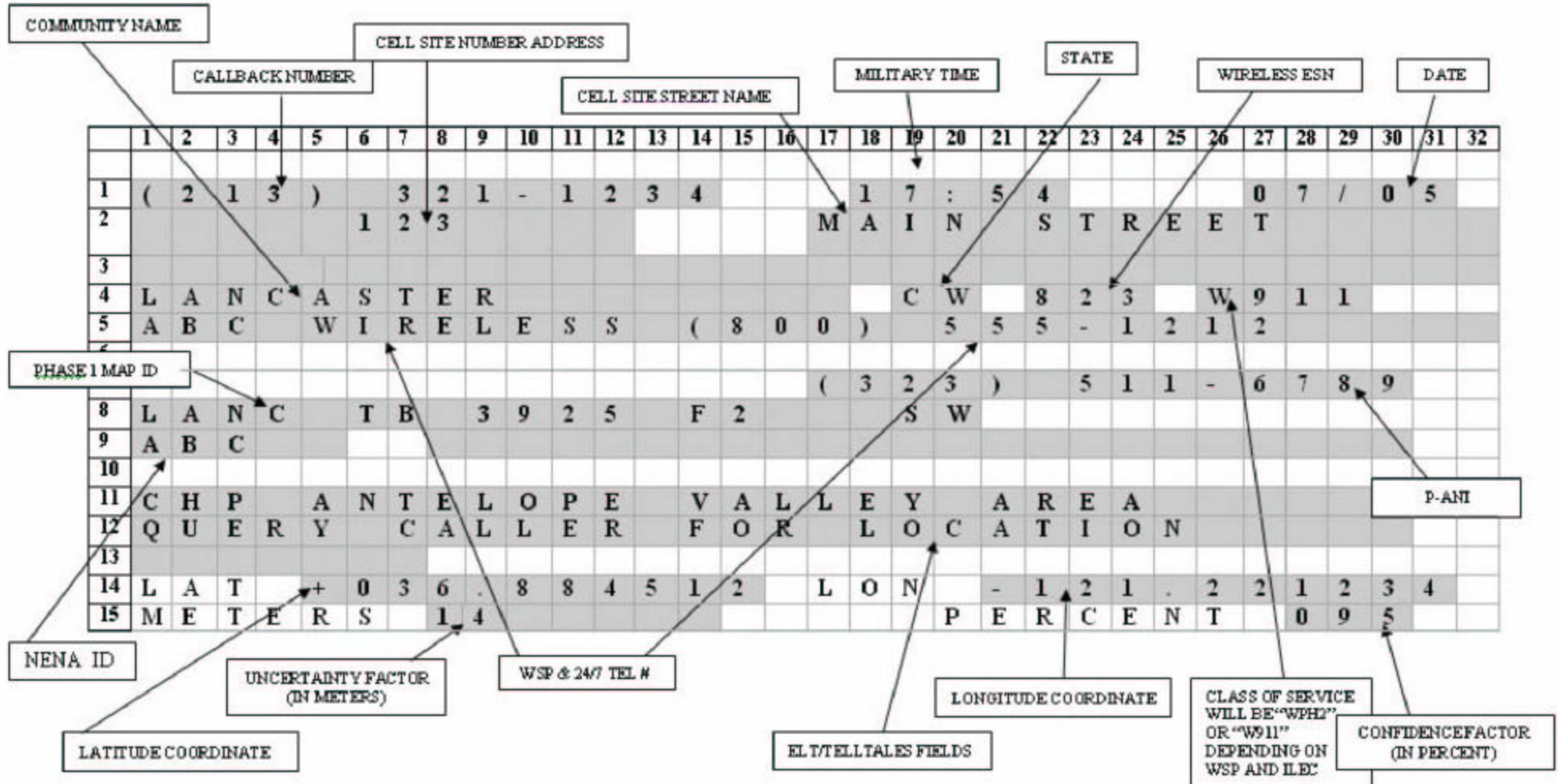
**PASSED** and **ADOPTED** by the Santa Clara County Civil Grand Jury on this 29<sup>th</sup> day of April 2004.

---

Richard H. Woodward  
Foreperson

# ATTACHMENT A

## State of California - Wireless E9-1-1 Typical Phase II Wireless ALI Display (from Format 03)



# ATTACHMENT B

Regular telephone users dial 9-1-1 to report all emergencies

Cellular phone users dial these seven digit numbers to report an emergency when in the following cities in Santa Clara County:

|                 |  |
|-----------------|--|
| Campbell        | 408 378-8161                             |
| Cupertino       | 408 299-3233                             |
| Gilroy          | 408 846-0354                             |
| Los Altos       | 650-947-2779                             |
| Los Altos Hills | 408 299-3233                             |
| Los Gatos       | 408 354-8600                             |
| Milpitas        | 408 263-1212 Police<br>408 998-7212 Fire |
| Monte Sereno    | 408 354-8600                             |
| Morgan Hill     | 408 779-2101                             |
| Mt. View        | 650 903-6395                             |
| Palo Alto       | 650 321-4433                             |
| San Jose        | 408 277-8911                             |
| San Martin      | 408 299-3233                             |
| Santa Clara     | 408 296-2236 Police<br>408 296-1515 Fire |
| Saratoga        | 408 299-3233                             |
| Sunnyvale       | 408 736-6244                             |
| Unincorporated  | 408 299-3233                             |

## HOW TO REPORT AN EMERGENCY

- Speak slowly and clearly
- State your name, location of the emergency and telephone number
- Describe the emergency
  - What happened?
  - Where did it happen?
  - Who is involved?
  - Stay on the phone.



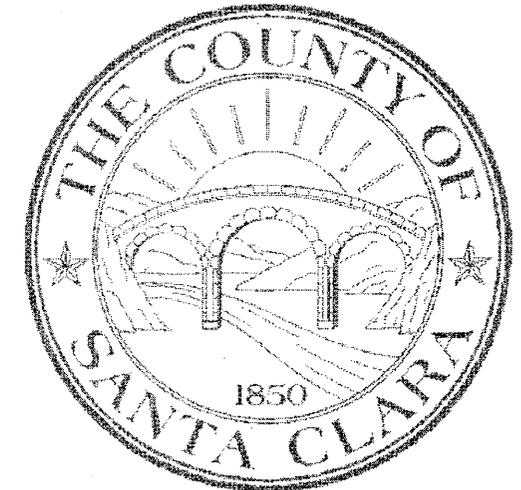
**\*PREPARE FOR EMERGENCIES**

**\*BE AWARE OF YOUR SURROUNDINGS**

**\*TAKE ACTION TO PROTECT YOURSELF AND OTHERS**

# Telephone Tips

## DURING AN EMERGENCY



**Prepare**

**Be Aware**

**Take Action**

Santa Clara County  
9-1-1 Communications

408 977-3200



# Helpful Hints Helpful Hints

## DURING AN EARTHQUAKE AND OTHER MAJOR EMERGENCIES...

Telephone lines are designed to handle 10% phone use at any given time. Once phone use exceeds 10%, the system is overwhelmed and local call service can be suspended.

That means 9-1-1 calls won't be available! Long distance calls will be easier to make so arrange an out of area contact where loved ones can check in and receive messages.

*If power is out, cordless telephones will not work. Keep a backup phone available to plug directly into the phone jack.*

To help reduce the strain on the phone system:

- Stay off the phone unless you have a life threatening emergency. For general information about the earthquake, turn on a battery operated radio.

Put telephone receivers shaken off the hook back in their cradle immediately.

- If you do have an emergency and can't get a dial tone, don't click the receiver. When you pick up the phone, your call request goes into a que. Each time you click the receiver, you go back to the end of the line. If a dial tone is not received within 60 seconds, the system may be overwhelmed. *Be sure to know life saving techniques.*

**Pay phone service** is restored before residential service. Calling 9-1-1 from a pay phone is a free call.

**Many cellular phone** calls must travel through regular phone lines to connect. So the same rules apply – use only for life threatening emergencies. *Calling 9-1-1 from a cellular phone will connect you to the California Highway Patrol in Vallejo and can cause delays in emergency response.* Know your local seven digit emergency number to call directly to your 9-1-1 center.

**The seven digit emergency phone numbers for Santa Clara County are:**

**(408) 299-3233 Sheriff's Office**  
**(408) 299-3144 Fire Department**  
**(408) 299-3325 Medical Emergencies**

## PREPARE FOR ALL EMERGENCIES

- Make copies of important personal/business documents and store them in a safe place.
  - Identify an **out of state** contact person so family and friends can communicate with you during an emergency.
  - Develop an emergency plan.
    - Plan for a meeting place if you cannot go home.
    - Discuss what children should do if at school. Coordinate with neighbors for pick-up if children who attend the same school and list them on school emergency form.
    - Assemble emergency supplies for 3-7 days, including prescription medicines, eyeglasses, First Aid Kit, battery operated radio & flashlight, food & water.
    - Learn how to locate and shut-off (if necessary) electricity, water and gas.
  - **Organize your neighborhood!**
    - Discuss Emergency Preparedness
    - Contact the Office of Emergency Services for assistance!
- Enroll in Community Emergency Response Team (CERT) training**

## References

### Documents

“911 calls: More trouble ahead” Report, Consumer Reports, February 2004.

Data Mobile Phone Handset Sales Forecast, Gartner Group, January 2003.

Federal Communications Commission, 911 Mandate Abstract, January 2001.

“New Technology Can Pinpoint User’s Location,” San Francisco Chronicle, October 23, 2003.

Public Safety Communications Manager’s Association of Santa Clara County Memo to Palo Alto Police Command Staff, December 10, 2003.

Public Safety Communications Manager’s Association of Santa Clara County Memo to Tech Services Coordinator Palo Alto Police Command Staff, October 15, 2002.

Santa Clara County Communications publication “Telephone Tips,” July, 2002.

#### State of California 9-1-1 Emergency Communications Office Publications

- AB 1263 Wireless 9-1-1 Memo, December 2000.
- Emergency 7-digit Telephone Lines, June 2001.
- Introduction 911 Manual, November 2002.
- Power Point Slides GIS Definition, Cal Emergency 9-1-1 Office, January 2003.
- Power Point Slides Wireless E 9-1-1, Cal. Emergency 9-1-1 Office, January 2003.
- Program Office Policies and Procedures, April 2000.
- Public Safety Next Generation E 9-1-1 Network Project Summary California DGS.
- State 9-1-1 Program Funding, December 2001.
- Telecommunications Division California 911 Emergency Communications Office, April 2000.
- W E 9-1-1 FAQs, November 2002.
- Wireless E 9-1-1 Project status (4<sup>th</sup> Quarter 2002).
- Wireless General FAQs, April 2003.
- Wireless Specifics FAQs, April 2003.
- Wireless Technical FAQs, April 2003.

State of California Assembly Bill 1263, 2000.

“Telecom Changes Imperil 911,” San Jose Mercury News, January 2, 2004.

U.S. Department of Transportation, DOT Wireless E 9-1-1 Steering Council Priority Action Plan, May 2003.

## **Tours**

CHP Golden Gate Communications, October 27, 2003.

City and County on San Francisco Emergency Center, December 8, 2003.

Los Gatos/Monte Sereno Police Department Call Center, February 26, 2004.

San Jose Police Department, October 6, 2003.

Santa Clara County Communications Center, October 6, 2003.