A REVIEW AND EVALUATION OF POLICE COMMUNICATIONS

A Technical Assistance Report prepared for

The Police Department of Charlottesville, Virginia

Task # 7907301

Performed by

THE ASSOCIATED PUBLIC SAFETY COMMUNICATIONS OFFICERS, INC.
New Smyrna Beach, Florida 32069

under a grant from:
THE LAW ENFORCEMENT ASSISTANCE ADMINISTRATION

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The City of Charlottesville should continue to provide leadership for a consolidation of all communications command and control capabilities for the public safety services in Albemarle County.

The consolidation would improve the coordination and delivery of law enforcement, fire, emergency medical and emergency preparedness services of the three primary entities, the City of Charlottesville, the County of Albemarle and the University of Virginia. Consolidation of communications would further the expressed goals of these agencies.

The resulting communications system should be consolidated in control and radio frequency components so as to minimize vulnerability and any potential for system failure. The City and County must recognize that the existing console equipment is obsolete due to age and design, and should be replaced.

The existing frequencies are not satisfactory for a consolidated system, and an application for new frequency assignments should begin immediately with the goal of obtaining assignments in the 460 MHz band compatible with those of the University of Virginia system.

Planning for adequate physical facilities and staffing for the consolidated center should begin as soon as practical.

The City of Charlottesville, the County of Albemarle, and the University of Virginia are considering the consolidation of their individual law enforcement communications systems into one serving system. Their intent is to improve overall efficiency and obtain a more responsive coordination of their mutual needs.

The agencies, through the City of Charlottesville, requested Technical Assistance from the Associated Public-Safety Communications Officers, Inc. (APCO) to advise them concerning the development of a consolidation plan and implementation of the plan.

PROBLEM

1. The agencies need advice concerning the steps necessary to accomplish the consolidation of communications.
2. The agencies need a listing of specific key items requiring resolution before consolidation can be accomplished.

ELEMENTS OF THE PROBLEM

1. Incompatibility of the three agencies/ communications systems frequencies;
2. space and facility considerations;
3. condition and capabilities of the existing communications consoles and radio equipment;
4. agency communication system design.

FINDINGS

The City of Charlottesville utilizes two General Electric consoles that are approaching the maximum life expectancy of seven (7) years and both are in need of replacement. The consoles are located in an area of the Police Records Bureau on the main floor of Police Headquarters. This location poses a serious security threat by being clearly in the view of the general public. Also, due to the location, interruptions by records personnel, the general public, and others is a constant distraction for the working telecommunicators. The city's vehicular repeater system is for the most part inoperative. When more than one unit arrives at a scene, all others must be told, by radio, to disable their repeaters. When this is not done, communications will hear only a carrier as two or more repeaters will be engaged simultaneously. We are told that this condition cannot be remedied.

The University of Virginia uses the latest state of the art console equipment and is operating on the 460 UHF band. The University Police are very receptive to the idea of a consolidation of the communications services and the records keeping systems.

The Fire service and Medical services use separate dispatch facilities. Attachment I, a listing of emergency telephone numbers, clearly identifies the citizens' problem of getting help in Charlottesville and Albemarle County. Citizens in CENTEL's (telephone company) service area have 15 numbers listed for Public Safety Emergency assistance.

City administrators believe that the proposed consolidated operation could best be supervised by the Chief of Police. This is due to the fact that he is responsible for the majority of Police and records keeping activity.

The key consideration expressed by the possible user agencies is that whoever supervises the operations should be sympathetic and understanding to the needs of all agencies in the system.

FREQUENCY USE:

CHARLOTTESVILLE POLICE
39.44 - dispatch channel
155.580- vehicular repeater
39.54 - statewide mutual aid

UNIVERSITY OF VIRGINIA POLICE
460.025 - dispatch
460.075
39.54 - statewide mutual aid

ALBEMARLE COUNTY SHERIFF
39.86 - dispatch
39.54 - statewide mutual aid

FIRE SERVICES
46.46

CITY-PUBLIC WORKS
155.715
155.115

TWO COUNTY RESCUE SQUADS
Charlottesville Rescue Squad
Western Albemarle Rescue Squad

One vendor has proposed a lease purchase police system. However, this appears to be very costly during the five (5) year lease period.

CENTEL (telephone company that serves city and county) states that 911 cannot be provided at this time. All participating agencies, except fire, desire a 911 public access.

AREA POPULATION

City population is 42,000 with an additional 40,000 in the service area just outside the city, and an additional 16,000 students at the University of Virginia.

Police consoles monitor all fire and rescue radios but do not dispatch for either service. The major use of this monitoring ability is to alert city officers of any pertinent fire or rescue activity.

THe University of Virginia Hospital is a major burn center and a major hospital in the northern and western parts of the State. Due to this activity, a large number of rescue vehicles enter the city 24 hours a day.

TELEPHONE SERVICES PRESENTLY OFFER:

One number for Charlottesville Police Emergency - 3 lines

One number for Albemarle County Sheriff

One number for fire services, city and county

One number for rescue and ambulance services

The city has very efficient volunteer rescue and part volunteer fire operations.

RECOMMENDATIONS

The City and County governing bodies should immediately form a task force to be responsible for planning a local 911 system (alternative to this 911 solution to be addressed in a separate paragraph). This task force should include, but not be limited to:

1. public safety and other agency services representatives;
2. representatives of volunteer agencies;
3. elected officials;
4. representatives of the local telephone company (CENTEL-Charlottesville and Albermarle County).

TASK FORCE PRIMARY ISSUES

1. Area to be served by 911
   a) Identification of resources and jurisdictional boundaries of emergency service agencies within area of service
   b) Comparison of area to be served with telephone company central office boundaries to determine the extent of mismatch or overlap areas of service
   c) Determine population and agencies affected by overlap or boundary mismatch
2. Determine location of key dispatching facilities
3. Determine location of public safety answering point(s) (PSAP(s))
4. Communications service consolidation of Charlottesville, Albemarke County, and the University should be resolved by this time
5. Employment of a consultant or engineering firm to assist the development of the program and system design
6. Development of standardized procedures as necessary
7. Each of these key issues must be considered in light of
   a) each agency's current emergency reporting and dispatching system;

b) each community's needs;

d) contractual or mutual support arrangements among agencies.

911 ALTERNATIVE

If CENTEL cannot provide the 911 system as desired, the Task Force should recommend on an interim basis the adoption of single, seven digit emergency response numbers for each agency operating an answering point. Where practical, this number should include 911 as the last three digits. Many communities in North Carolina are adopting this interim numbering scheme.

RADIO SYSTEM ALTERNATIVES

The City and County should purchase the necessary radio "patch" equipment that will allow the direct connection of low and high VHF and UHF on the existing console equipment. This would be at an estimated cost of $1,000.00 and would allow compatible communications from the University's system on 460 MHz to City's low and high channels and vice versa. This procedure has worked extremely well in Durham as we "patch" a 450 frequency sytem to a high band system in the fire service. This would, of course, eliminate the need for two radios per vehicle.

The City, through the Virginia APCO frequency coordinator, should attempt to obtain 460 channels that would be compatible with the University system. The high band channel should be retained and expanded with one repeater station that will cover the 11 square miles and surrounding service area of the Charlottesville Police Department.

The University's console should be used as the primary dispatch tool, with the city equipment as back up.

CONSOLIDATION

The City, County, and University should consolidate their law enforcement communications services into one serving system operating under the direction and responsibility of one of the participants or as a separate service agency governed by the participants and operated as an individual agency.

The existing centralized jail facility participatory agreements and management structure could serve as a model for developing a similar communications service agency.

emergency numbers

Write in the telephone numbers you will need in case of emergency.

ambulance & rescue		
fire		
police		
state police	Charlottesville, Crozet, Fork Union, Palmyra, Schuyler, Scottsville, Stanardsville	Emergencies Only 1-800 552-0962 No Charge to Calling Party
doctor	office	
	home	
[illegible]	Charlottesville	293-9663
U.S. Secret Service	Richmond, Va.	782-2274

or dial "OPERATOR" in any emergency and say for example

"I want to report a fire at—"

or "I want a policeman at—."

If you cannot stay at the telephone, tell the "OPERATOR" the exact location where help is needed.

University of Virginia Emergency Room 924-2231
Crisis Intervention Center 924-5564
If no answer call 924-0211
Poison Control Center 924-5543

localities	fire	rescue squad	police	sheriff
Charlottesville	295-1125	295-1191	295-4151	296-2112
Earlysville	295-1125	295-1191	————	296-2112
East Rivanna	295-1125	295-1191	————	296-2112
North Garden	295-1125	295-1191		
Crozet	823-4000	823-5102	————	296-2112
Fork Union (842)	911	911	————	911
Palmyra (589)	911	911	————	or
Kents Store (589)	911	911	————	589-8211
(Subscribers with prefix other than 589 or 842, dial 1 + 589-8211)				
Schuyler	286-3611	295-1191		
Scottsville	295-1125	286-2111	296-2112	————
Greene County	911	911	————	911
Stanardsville (985)	911	911	————	or
Ruckersville (985)	911	911	————	985-2222
(Subscribers with prefix other than 985, dial 1 + 985-2222)				

(Note: If you are calling long distance, dial "1" + the above number)

Warning!

FRAUDULENT USE OF CREDIT CARDS AND BILLING NUMBERS—Virginia law prohibits the fraudulent use of a telephone number or other means to obtain or attempt to obtain telephone service fraudulently. The maximum penalty, upon conviction, is 10 years imprisonment.

ANNOYANCE CALLS—Virginia law provides that it is unlawful to use or permit another to use the telephone to intentionally annoy another by telephoning without intent to converse. The maximum penalty, upon conviction, is a fine of $500.

OBSCENE AND MALICIOUS CALLS—Virginia law provides that it is unlawful to make obscene calls or to maliciously make false statements, by telephone, of the health of another. The maximum penalty, upon conviction, is imprisonment for one year or a fine of $1,000 or both.

MISUSE OF PARTY LINE SERVICE—It is unlawful to refuse the use of a party line to another person for the purpose of permitting such person to report a fire or summon police, medical aid or ambulance service in an emergency situation where property or human life is in danger. It is also unlawful for anyone to falsely claim an emergency to gain access to a party line. The maximum penalty, upon conviction, is a fine of $100.

Charlottesville, Va.—IFC

ATTACHMENT 1

3.0 911 SYSTEM OPERATING DESCRIPTION AND REQUIREMENTS

The design of a 911 system configuration includes the specification of the area to be served, operational methods, operational and technical standards, system sizing requirements, telephone system requirements, 911 answering center location and personnel requirements. These subjects are discussed in this section.

3.1 DEFINITION OF AREA TO BE SERVED

It is important from a systems standpoint to define the area to be served by a 911 system. This definition is especially important in light of the occurrence of radically different central office boundaries as they coincide with jurisdictional boundaries (See Section 2).

Because of the problems encountered with overlaps, telephone company communication consultants must have specific guidelines to design a system for a designated population area. These design parameters are supplied by the Division of Communications engineers after thorough deliberation concerning the problem.

Since the largest jurisdictional system unit is the county, and intracounty jurisdictional overlaps can be solved by interlocal agreements, the following approach is utilized. The following rule was instituted as a criteria for system design: When central office boundaries overlap into adjacent counties, calls will be directed to the answering center serving the majority of citizens affected. The "majority of citizens affected" rule frees the system designer to optimize the design within a specified 911 serving area. (See Appendix 3.0 for call volume considerations in overlapping areas between 911 centers.) The following information definitizes the remaining 911 system operating description and system requirements.

3.2 DESCRIPTION OF OPERATIONAL METHODS

The objectives of a 911 emergency service communications system are to make it as easy as possible for a citizen to contact the proper emergency service agency and to minimize the response time required for a citizen to receive emergency service. The 911 system does this by simplifying the role of the citizen (that is, by reducing the number of decisions he must make) and increasing the responsibility of the public safety communications system.

The primary function of the 911 emergency answering center is to facilitate the flow of information between the citizen and the responding agency. The 911 center answers emergency calls and selects the proper agency. This is performed by an answering operator who determines which public safety agency should respond to the citizen's problem. Determination of the proper agency by the 911 answering personnel essentially entails obtaining as rapidly as possible the location and the nature of the problem.

The manner in which the information is routed to the agency varies with the jurisdictional, operational, and organizational requirements of the area being served. The four basic operational methods are direct dispatch, call transfer, call relay, and call referral. Most 911 systems comprise a combination of several of these methods to accommodate variations in the levels of cooperation,

centralization, and consolidation between and within the participating agencies in the system, as well as boundary mismatch problems with adjacent 911 systems.

Figure 3.2-1 illustrates the information flow for each of the operational methods.

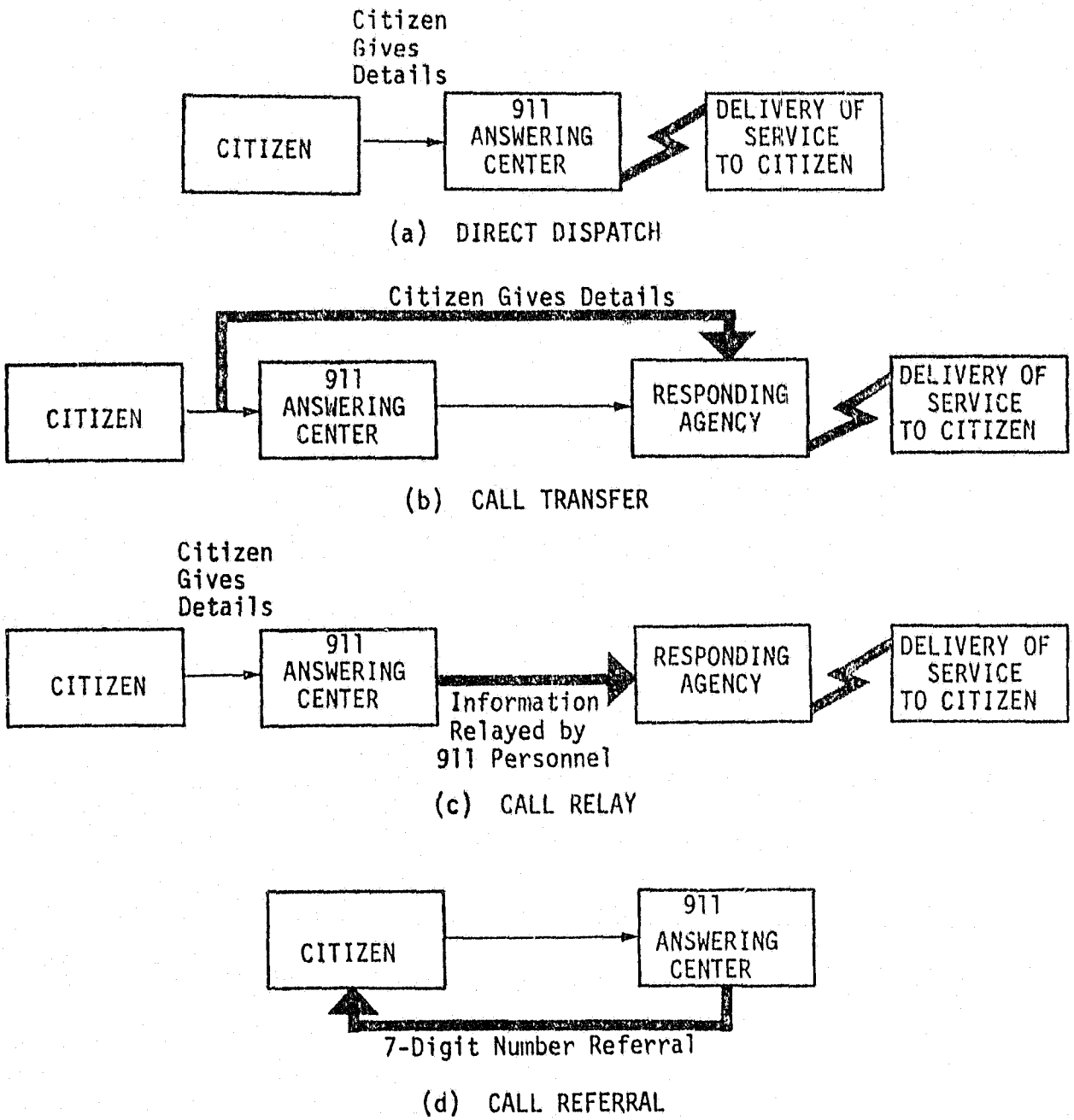


Figure 3.2-1 911 OPERATIONAL METHODS

3.2.1 Direct Dispatch

All emergency calls that come into a 911 answering center which has the authority and responsibility to dispatch emergency vehicles for the required public safety agency are handled in a direct dispatch method. The person answering the call also performs as a complaint writer, and upon determining that the required public safety agency can be dispatched from the answering center, obtains and conveys the necessary information to the dispatcher by either a complaint card or by means of a computer-aided digital data transmission system using an electronic keyboard and readout. For small 911 emergency systems, the person answering the call may also perform the dispatching function. Calls handled by the direct dispatch method minimize the response time for a citizen to contact either the complaint writer or the dispatcher of the proper public safety agency. In summary, the public safety agency which has the "911" center located in its facilities generally uses the direct dispatch method.

3.2.2 Call Transfer

All emergency calls that come into a 911 answering center for a public safety agency remotely located from the answering center are handled in a call transfer method. After the answering operator has determined the proper agency, the caller is then transferred and placed in contact with the agency's complaint writer or dispatcher. The answering operator remains on the line until the agency answers and the correctness of the transfer is ascertained. The transfer is routed to the public safety agency over a dedicated transfer line connecting the answering center's telephone answering equipment directly with the agency's telephone equipment.

A variation of the call transfer method is the seven-digit call transfer method. This method transfers the caller to the proper public safety agency over his seven-digit emergency number, as opposed to a transfer over a direct line. This method is only used where the expected call volume may not be large enough to warrant the cost of a dedicated transfer line, but the agency feels that it is still necessary to speak directly to the citizen. A typical application would be the Florida Division of Forestry and an existing foreign exchange line.

The response time of the call transfer method is lengthened compared with the direct dispatch method because the caller must talk to an additional person before he is in contact with either the complaint writer or the dispatcher of the proper agency.

3.2.3 Call Relay

The call relay, like the call transfer, is used to convey information to a remotely located agency; however, the information rather than the caller is transferred to the proper agency.

The information can be relayed by voice using the agency's existing seven-digit emergency number, or hot line or point-to-point radio system if such capabilities already exist. The information can also be relayed by digital data transmission using an electronic keyboard or cathode ray tube (CRT) display. However, proper operation of the call relay method requires that

explicit call answering policies be established with the participating agencies to ensure that the essential information is obtained from the caller.

This method is well suited for use with agencies that are not expected to have a large enough call volume to warrant the cost of a dedicated transfer line, and where the agency feels that it is not necessary to speak directly to the citizen.

The call relay method can also be used if the caller if too emotionally distressed to be transferred. In this case, the 911 answering operator would obtain as many details as possible about the emergency and relay the information to the appropriate agency.

The overall response time of a voice relayed call is longer than any other call handling method. However, the response time of a digital data transmission relayed call is shorter than a transferred call.

3.2.4 Call Referral

Non-emergency and administrative calls that enter a 911 center may be handled by the call referral method. The 911 answering center operator gives the citizen the seven digit number or refers the citizen to the telephone directory.

In any operational public safety call receiving center, i.e., 911 answering center, cooperative dispatch center, public safety agency department, etc., only a certain portion of all calls demand immediate response. The remainder are administrative or of a non-emergency nature and can be quickly referred. Based upon the ratio of emergency to non-emergency calls experienced by Florida law enforcement agencies, it is estimated that only 50% of all calls received by the answering center are handled to completion on the 911 system. The remaining calls are referred to the correct number or to the telephone directory to keep the 911 emergency system (operator and lines) free to handle true emergency calls.

It is recognized that in the smaller operational public safety call receiving centers, such as in the Sheriff's Department in the less populated counties, the treatment of administrative and non-emergency calls is given somewhat more personalized attention. It is further recognized that the additional responsibility of 911 operations do not change existing procedures and therefore, the call referral handling method has little application in these situations.

3.2.5 Examples of Operational Methods

As a first example, let us consider how these operational methods are used in a case where a countywide 911 answering center is collocated with a sheriff's radio dispatch facility and where all 911 calls received that are not for the sheriff's office are handled by the call transfer method. This type of operation is called a call transfer/direct dispatch system.

Incoming emergency calls that are for the sheriff's office are handled by the direct dispatch method. If an incoming call is not for the sheriff's office but is for any fire protection agency, emergency medical agency, or other law enforcement agency within the service boundary of this 911 system, the 911

operator obtains enough information from the caller to determine the type of emergency service required and the agency that should supply the service, and connects the caller by private line directly to the correct dispatch center. The caller then gives the complete details of the emergency to the dispatch center that has the responsibility of providing the required assistance. The dispatch center decides how to deploy its resources.

If the caller is too emotionally distressed to be transferred, the 911 operator obtains as many details as possible about the emergency and relays this information in to the appropriate radio dispatch center. This procedure uses the call relay method as a backup mode of operation. This same method is used if the caller hangs up before he is transffered. In these two instances, an individual operator position recorder is of great benefit.

The agencies being served by each 911 center must determine among themselves what types of calls they consider as emergency calls. If a call that is not considered an emergency enters the 911 center, the caller is given the correct seven-digit number to call to make his report or complaint. This procedure uses the call referral method.

As a second example, let us assume that instead of the call transfer method the call relay method is used in conjunction with the direct dispatch method. Let us further assume that voice relay is used (rather than digital data relay). The only difference between this example and the previous example is, then, in how emergency calls not destined for the sheriff's office are handled.

When a 911 call enters that is not for the sheriff's office, the 911 operator obtains the required information (predetermined by the participating public safety agencies) from the caller and, by contact with the correct dispatch agency by radio or over their seven-digit emergency number, tells the dispatcher the details of the emergency. The local dispatching agency then decides how to respond to the caller's emergency.

Call referral is used as described in the first example.

As a third example, let us assume the same situation as that in the second example except that the call relay method uses digital data transmission (rather than voice relay).

In this method of operation, as the 911 operator obtains the required details from the caller, she types the necessary information on an electronic keyboard attached to a CRT. At the same time, a computer determines (on the basis of programming and data files) which dispatch center should receive the information (this will be the dispatch center responsible for responding to this particular request for service). The computer determines which is the proper agency before the caller has completed his call and displays on the CRT the code for that agency. When the operator has finished talking with the caller, she enters the agency code on the keyboard, pushes the "send" button, and the computer automatically routes and transmits the call information over a private line to the correct dispatch center. This method requires that the dispatch centers also have one or more CRT's (the number required depends on their busy-hour call volume) to receive the digital information. We recommend that in this type of operation, the radio dispatcher be the receiver of the emergency call information rather than some other individual, as is now done

in many dispatch centers. Since the 911 center relays all the available required information, routing it through a third individual accomplishes nothing but an increase in response time.

This type of operational system also has call transfer capability for special types of emergency calls or for use in the event of failure of digital or electronic equipment, and uses call referral as necessary.

In any one of the three examples presented above, if, because of telephone boundary/jurisdictional overlap, a call enters the 911 center that should have gone to an adjoining area's 911 center, it can be handled in one of two basic ways. The caller's information can be relayed by private two-way tie lines to the 911 center that handles the dispatch center responsible for providing the requested service, or contact can be made by radio or seven-digit emergency private lines directly with the correct dispatch center. The latter case, because of increased telephone line cost, is used only if very few agencies are involved in the overlap. The decision of whether the correct dispatch center should be contacted directly is, of course, made jointly by the agencies involved.

In all these examples we have assumed that a large number of the calls are being handled by the direct dispatch method of operation because of the 911 center/s being collocated with (in these examples) a sheriff's office dispatch center. If the 911 center is not collocated with any public safety dispatch center, then all 911 calls are handled by either the call transfer method or the call relay method, backed up by call referral.

3.3 TECHNICAL AND OPERATIONAL STANDARDS

To ensure a uniform and high level of service to citizens and visitors throughout Florida, all 911 systems within the state must meet the mandatory minimum standards discussed in this section. Waivers to certain of these standards may be granted when sufficient evidence is presented to the Division of Communications showing that such waivers are in the public's interest.

3.3.1 Technical Standards

The following technical standards must be complied with in the design of all 911 systems:

(1) All public safety agencies, i.e., law enforcement, fire protection, emergency medical, and rescue agencies within the boundaries of the 911 system must be considered in the 911 system.

(2) The 911 answering center shall be located at the public safety agency receiving the greatest number of calls.

(3) When a telephone company central office serves citizens in two counties, calls shall be routed to the answering center serving the majority of citizens affected.

(4) A sufficient number of incoming 911 lines shall be provided between the telephone company's central offices

and the 911 answering center to supply a P.01 grade of service or better (one busy in 100 attempts during the average busy hour).

(5) If direct trunking (as opposed to tandem trunking) is used, there shall be a minimum of two 911 lines between the 911 center and each of the central offices.

(6) There shall be minimum of two incoming lines from the serving central office of each tandem network.

(7) If tandem trunking is used the grade of service provided over the interoffice trunks shall be at least the same level as exists for the Direct Distance Dialing network.

(8) Enough answering positions and operators shall be provided such that during the average busiest hour of the day a minimum of 90% of the calls shall be answered within 10 seconds (two or three rings).

(9) Each answering position shall have access to all incoming 911 lines outgoing private dedicated lines, tie-lines, and dial-out lines.

(10) Each answering position shall be equipped with an instant playback type of recorder to record each incoming 911 call.

(11) The 911 operator shall receive both an audible and a visual indication of the incoming 911 call.

(12) Public safety radio dispatch centers not collocated with the 911 answering center shall be connected to the 911 center by private lines wherever conditions warrant.

(13) Private lines shall be provided between the 911 center and each connected agency in sufficient quantity to be compatible with traffic volume and the number of operators at the connected agency.

(14) The 911 center shall be connected by private lines to each adjacent 911 center wherever central office boundaries overlap county lines. Alternately for minor overlaps, intercity radio may be used.

(15) The telephone company operators shall have dedicated lines or other means of connecting the operator or citizen with the 911 center.

(16) The 911 center shall have standby emergency electrical power capability for use in the event of commercial power failure.

(17) The 911 center shall have a logging magnetic tape recorder equipped to record the data and time of receipt of each call.

(18) The 911 center shall have sufficient building security to minimize the possibility of intentional disruption of operations.

(19) All exposed 911 circuit facilities into the 911 center shall be protected and marked to prevent accidental contact or tampering.

(20) Maintenance personnel shall not interrupt or alter circuits and equipment at a central office or in the 911 center of the 911 system until permission is obtained from the 911 center supervisor.

(21) When an automatic call distributor (ACD) is used to terminate 911 calls, the recorded announcement option shall be used.

3.3.2 Operational Standards

The following operational standards must be complied with in all 911 systems:

(1) 911 calls shall be answered at the complaint writer or dispatcher position, or additional positions as required, of the public safety agency where the 911 answering center is located.

(2) The 911 operator shall be dedicated to answering 911 calls and perform as a complaint writer. Other simultaneous functions such as radio dispatcher, clerk, or jailer can be performed if Technical Standard 8 can be met.

(3) The 911 answering center shall operate 24 hours a day, seven days a week.

(4) The caller must never be permitted to talk with more than two people, the 911 operator answering the caller, and the complaint writer or dispatcher at the required safety agency.

(5) The only published emergency number shall be "911".

(6) Service measurements on the 911 lines shall be made periodically to determine if the required grade of service is being maintained.

3.4 911 SYSTEM DESIGN

3.4.1 General Design Approach

The method employed in the design of a 911 system can be described by a 911 system model augmented by associated supporting studies and the required

inputs. The resultant outputs then determine the 911 system costs. Figure 3.4-1 shows the associated supporting studies, the inputs, and the resultant outputs of the design model. The inputs fall into four categories; traffic estimates, operational methods, performance requirements, and communications network information. The outputs are the sizing requirements for each cost component of the system and fall into three categories; telephone system equipment, additional safety agency personnel requirements, and other equipment requirements.

The inputs are obtained from telephone company personnel, and the 911 planning committee representing each local government that will plan the 911 system. Where inputs are not obtainable, data from related studies and analysis are used. The telephone equipment outputs are obtained by both the telephone company and the Division of Communications working in close association. The telephone equipment costs are determined by the telephone company and forwarded to the local government as a telephone system proposal. The remaining costs are determined by the Division of Communications.

3.4.2 Overall 911 System Design Model

The 911 system design model consists of a set of functional relationships between the design criteria and the sizing requirements, as indicated in Figure 3.4-1. The number of operator positions for a 911 center are a function of answering operator grade of service, busy hour call volume, and average call length. The number of incoming 911 trunks required is also a function of 911 busy hour call volume, and call length, plus the specified telephone grade of service. Requirements for outgoing lines (transfer lines, dial-out lines, tie-lines) are computed like those for incoming trunks, substituting the appropriate safety agency dispatch center busy hour call volume for total 911 busy hour call volume and taking into account the number of complaint takers available at the safety agency. The type of telephone terminal equipment required for the center is a function of the number of operator positions, number of incoming trunks, and number of outgoing lines. And finally, the number of telephone recorder connectors is a function of the number of incoming trunks or answering positions.

The total number of personnel required by the safety agency where the 911 center is located to staff the 911 operator and supervisor positions is a function of the number of answering positions and the expected call volume loading over the three 8-hour shifts. The number of additional personnel required by the safety agency is a function of the additional 911 call volume load placed upon the agency.

3.4.3 Performance Standards & Requirements

There are a number of performance standards and requirements that determine the system size. They are discussed in this subsection.

3.4.3.1 Operator Grade of Service

The maximum number of answering positions and operators to answer and handle 911 calls is computed on the basis of the busy hour call volume and a particular grade of service. The grade of service is the probability of a caller having to wait more than a certain length of time because the operator is busy

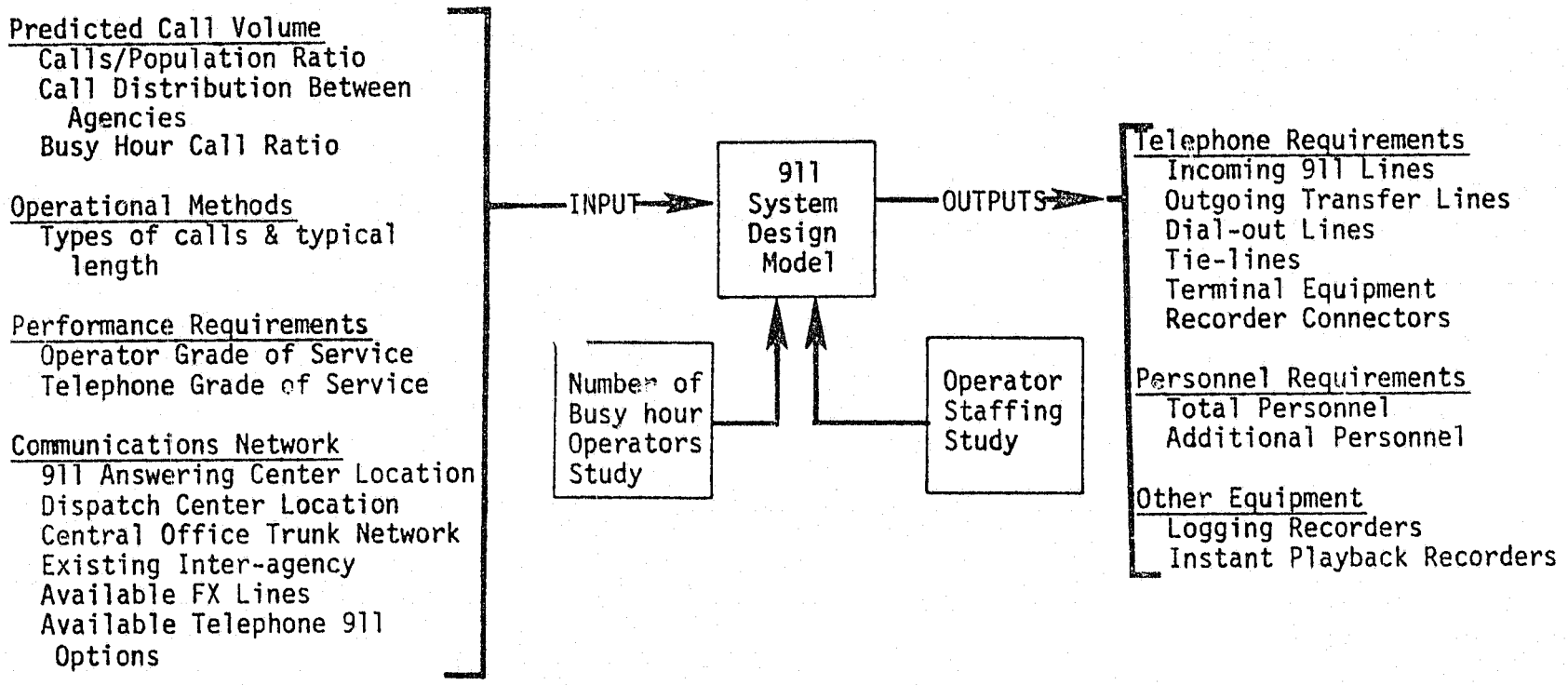


Figure 3.4-1 INPUTS & OUTPUTS FOR A 911 SYSTEM DESIGN MODEL

answering and handling another call. It is expressed as a decimal and is associated with a ringdown time. In the design of the 911 systems presented in this plan, the grade of service probability that a caller will have to wait more than a 10 seconds ringdown time is 0.1 (10%). Another way of specifying this grade of service in that 90 percent of all the callers will have their call answered during a ringdown time of 10 seconds or less.

3.4.3.2 Telephone Grade of Service

The number of required telephone lines (incoming 911 lines, transfer lines, dial-out lines, and tie-lines) is computed on the basis of a particular grade of service. Grade of service, expressed in a technical sense, is the probability of a call being blocked by busy trunks. It is expressed as a decimal fraction and usually means the busy-hour probability. In designs of the 911 systems presented in this plan, we have used a busy-hour grade-of-service probability of a call being blocked of 0.01 (sometimes written P01). This means that no more than one call out of 100 during the busy hour should receive a busy signal. In its application to a citizen seeking help, this grade (or level) of service means that it is highly unlikely that he will receive a busy signal when he dials 911.

3.4.3.3 Ringdown Time

The length of time that a phone rings before it is answered is called ringdown time. This factor affects both the number of telephone lines and the number of operators required, particularly the latter. We have based our telephone line and operator calculations on a ringdown time of 10 seconds. Given the normal telephone company standard that each ring is two seconds long followed by a four-second pause, a 10-second ringdown time is equivalent to two rings..

3.4.3.4 Call Volume

The quantity of calls expected to be handled by the 911 answering center during a 24-hour period is called call volume data. Call volume data is related to the population within the area served by the 911 answering center. An area with a larger population generally has a larger incidence of crime and therefore has a larger volume of calls per capita. Similarly, an area with high tourism also has a larger volume of calls per capita. Division of Communication Engineers have takne crime and tourism into consideration in determining call volume and the resultant effect in additional operator staffing.

The derivation of the call volume to population ratios used is discussed in Appendix 3.0. These ratios together with the estimated 911 calls some typical county 911 systems will handle per day are presented in Figure 3.4-2.

3.4.3.5 Call Length

Call length varies with many factors, such as the type of emergency service, the service policies and techniques of the agency being contact, and the individual characteristics of the calling party. Based on discussions with public safety agency personnel, telephone company personnel, and experimentation, an average call length for each of the operational call handling methods discussed in subsection 3.2 was established. These call lengths are detailed

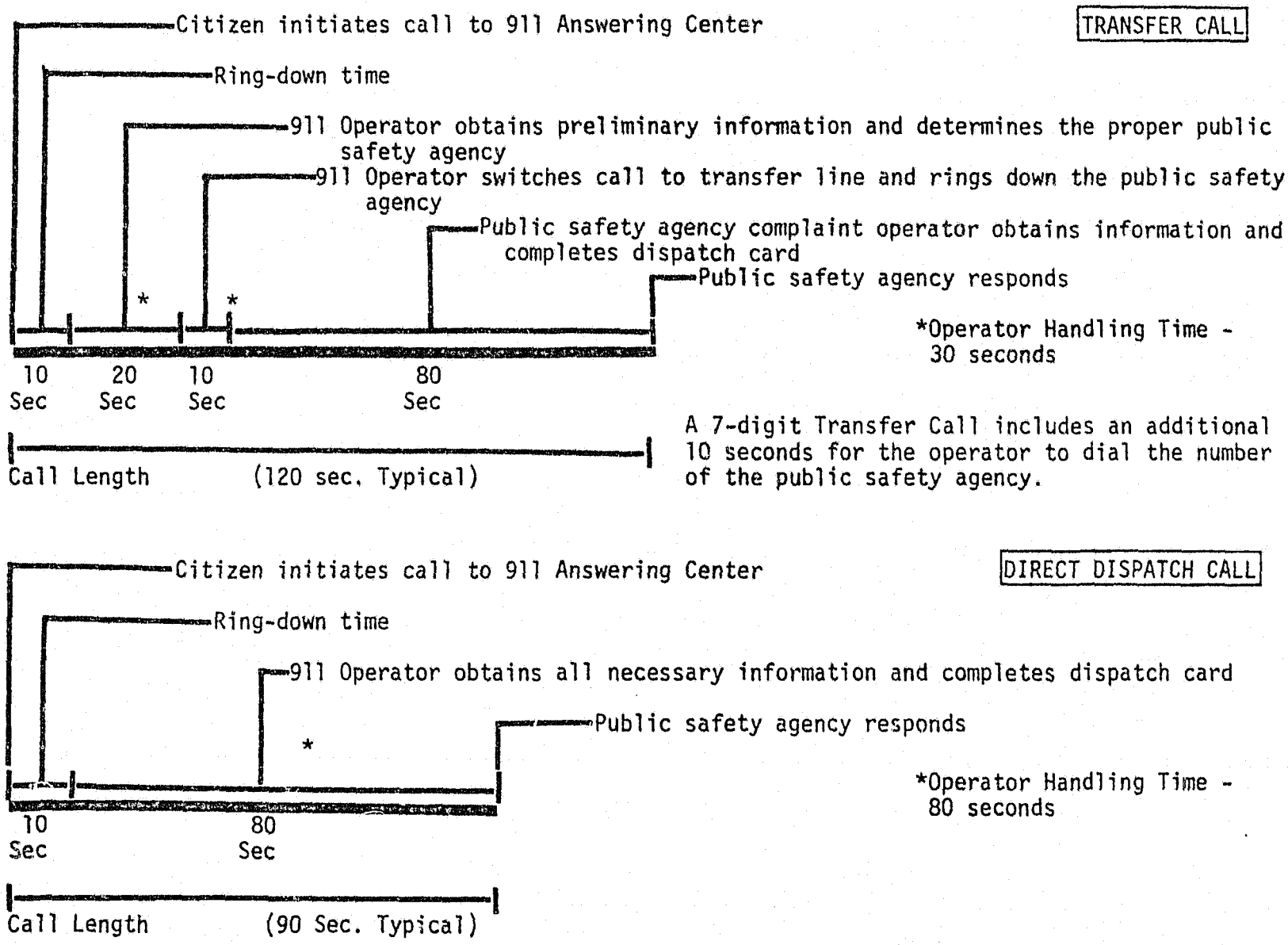
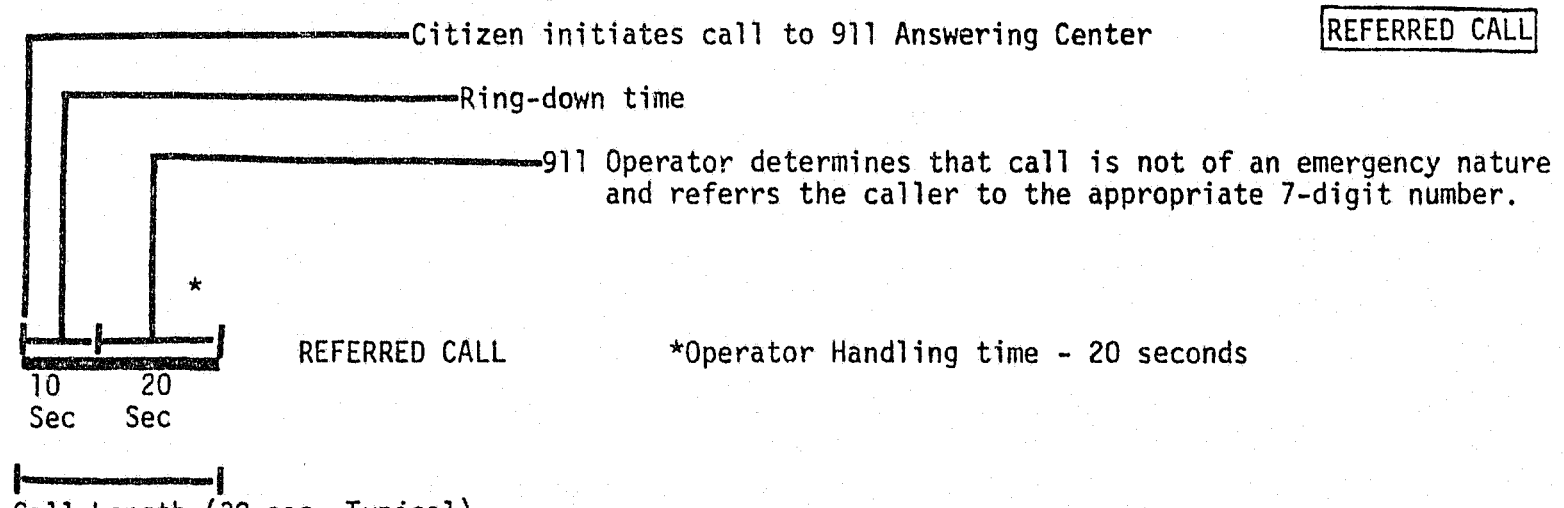


Figure 3.4-3 CALL LENGTH



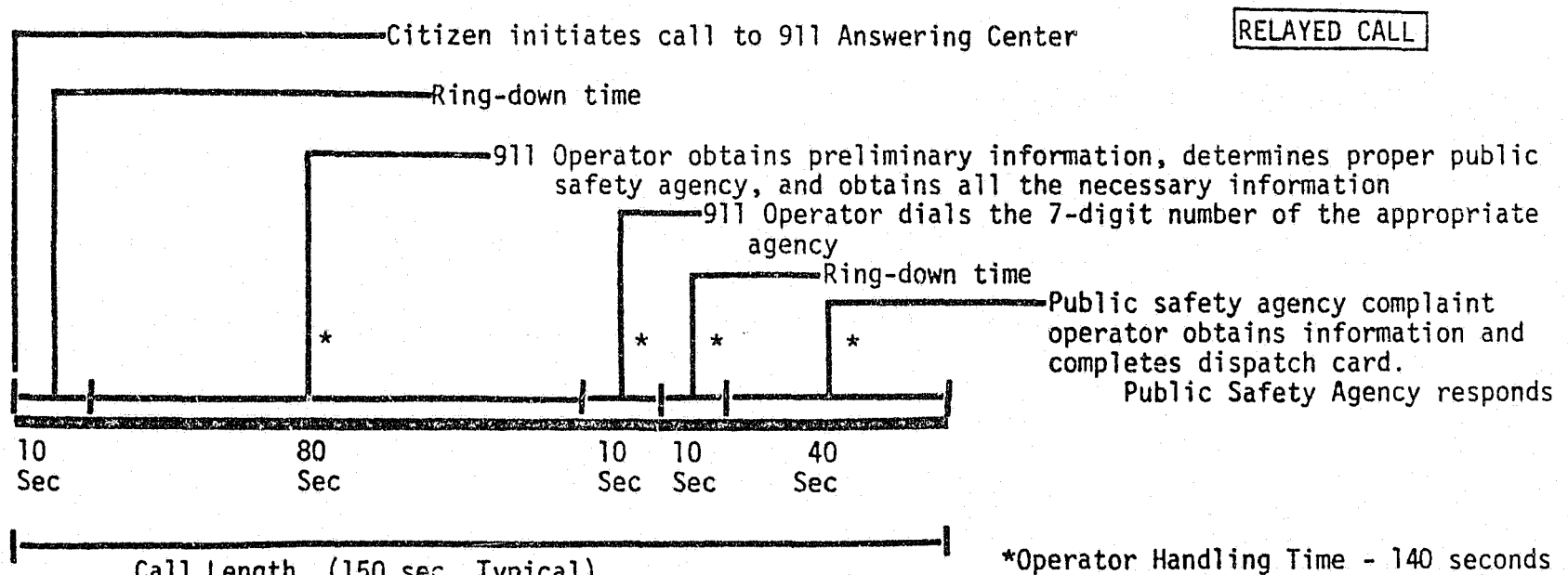


Figure 3.4-3 Cont.

in Figure 3.4-3. The related time for the 911 operator to handle the call and the time the incoming 911 trunk is utilized is further established from the call lengths for the various call handling methods. A summary of these related processing times is shown in Table 3.4-1.

Call Method	Call Length	Incoming 911 Line Holding Time	Operator Handling Time
Direct Dispatch	90 sec.	90	80*
Call Transfer	120	120	30
7-Digit Call Transfer	130	130	40
Call Relay	150	90	140
Call Referral	30	30	20

* 90 seconds if the operator also performs the dispatching function.

Table 3.4-1 SUMMARY OF CALL PROCESSING TIME

3.4.4 Telephone System Requirements and Costs

3.4.4.1 Telephone System Requirements

A 911 system has the following seven primary telephone components:

(1) Incoming 911 trunks (or lines) from the telephone central office to the 911 center.

(2) Outgoing private lines from the 911 center to dispatch agencies and to other 911 centers.

(3) Terminal answering equipment.

(4) Dial-out lines to access the 7-digit telephone number of the dispatch agencies.

(5) Tie-lines (two-way) between 911 centers.

(6) Telephone recorder connectors.

(7) Optional service features and equipment.

The incoming 911 trunks can be provided using either tandem or direct trunking. In tandem trunking all 911 calls are routed by the telephone company in whatever manner it chooses to the telephone central office (CO) providing service to the 911 center, and the 911 center then leases the required number of

incoming trunks or lines between this serving CO and the 911 center to handle the estimated busy-hour call volume. In direct trunking the 911 center leases a sufficient number of incoming direct trunks or lines between each CO in the 911 service area and the 911 center. Direct trunking thus requires more lines than tandem trunking. Some systems may use both methods of trunking.

Direct trunking is more expensive than tandem trunking because of the greater number of telephone lines required, but direct trunking is a prerequisite for certain optional features that are discussed later. The available trunking networks are discussed with the 911 planning personnel for each county to assist their system decision.

Outgoing private lines are necessary to transfer callers reporting an emergency to the appropriate dispatch center or to another 911 center. The number of lines required depends primarily on the estimated volume of calls that the dispatch center will receive in its busy hour.

Tie-lines may also be necessary in some cases to connect adjacent 911 centers with each other where there is a two-way flow of information. The purpose of these lines is to provide the capability of transferring callers or relaying information when the caller is involved in a telephone boundary/jurisdictional overlap. These lines could also be used as coordination channels in the event of a common emergency affecting two adjacent 911 system areas. The exact number of these interconnecting lines depends primarily upon the expected call volume.

A variety of terminal equipment is available from Florida's telephone companies for use in 911 centers. Both key telephone equipment and switchboards (PBX's or PABX's) are suitable and a function of the system requirements.

Dial-out lines are necessary to relay the callers information to the appropriate agency (call relay method) or to transfer the caller to the appropriate agency over the agency's 7-digit telephone line (dial-out call transfer method). Dial-out lines are not required as part of the 911 system if the agency where the 911 center is located has such lines available.

Foreign exchange (FX) lines to agencies in another exchange area where Extended Area Service is not available has been considered in lieu of dedicated transfer lines where low call volume does not justify the cost of the transfer lines. Likewise, the use of FX lines for the agency where the 911 center is located has been considered to reduce the cost of dial-out transfer toll calls.

3.4.4.2 Telephone System Costs

The cost of the 911 system for each county is based upon a proposal received from the local telephone company, and the decisions of the 911 planning personnel associated with the system if available.

3.4.5 Detailed System Design

3.4.5.1 Busy Hour Operator Positions/Total Staff

Figure 3.4-4 shows the flow diagram for determining the total number of required busy hour operator positions and the total staff for operating a 911

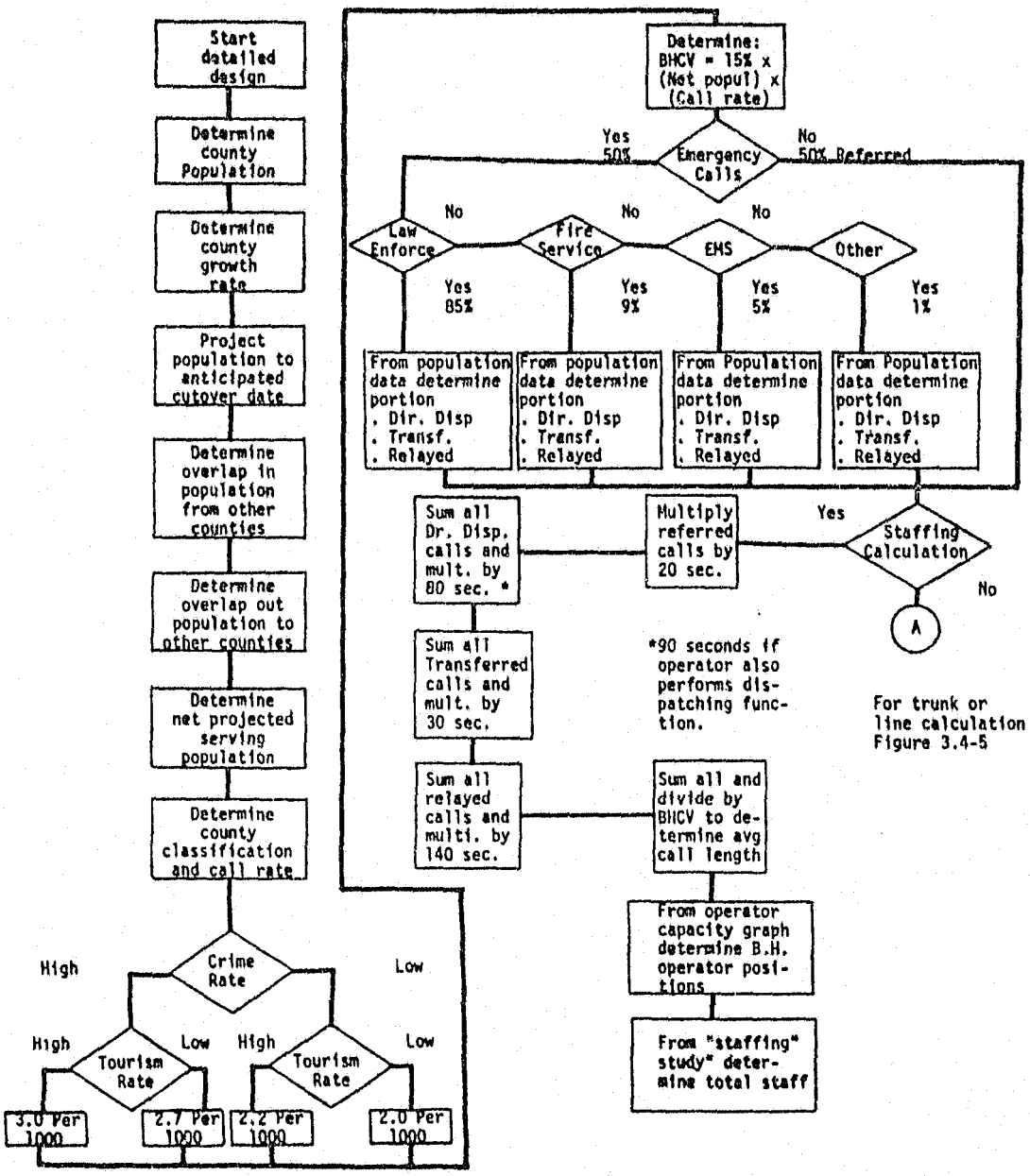


Figure 3.4-4 911 SYSTEM DESIGN FLOW DIAGRAM-BUSY HOUR POSITIONS-TOTAL STAFF

center around the clock, seven days per week. The flow diagram is discussed in the following paragraphs:

Basic parameters required for analyzing 911 requirements are the county's estimated population and recent rate of growth. Both of these figures are available from the document "Florida Estimates of Population" published by the Florida Department of Administration. The population must be projected to the anticipated date of 911 system cutover.

Adding to the projected county population will be additional population from adjacent counties resulting from telephone central office overlaps outside the county. Deducting from the serving population of the center, will be those citizens trunked to 911 centers in adjoining counties due to overlaps into the county. The net population considering the above, will be the serving population of the center. However, it should be remembered that a portion of the calls generated by those citizens trunked to an adjacent county, will be transferred or relayed back to the co-located public safety agencies of the 911 center and must be handled by the 911 line operators, and equipment. The quantity involved is usually negligible in impacting system design and has not been included in the flow chart.

The 67 counties in Florida have been classified into one of four types each having a corresponding total daily call volume (TDCV) rate per 1000 population as discussed in Appendix 3.0. The applicable call rate for the county in question must be determined. Busy Hour Call Volume (BHCV) for the center is determined from the following:

$$BHCV = 15\% \times TDCV$$

The TDCV and BHCV figures calculated above should be compared with actual county data whenever available. Marked discrepancies from the call rates indicated should be reviewed carefully to pinpoint why a particular county is deviating from state and national experience for comparable areas.

An important function of a 911 operator is to politely encourage the public to use the 911 lines only for truly emergency calls. However, in spite of all educational efforts a large fraction of the calls will be non-emergency and will be referred to a seven digit administrative number by the 911 operator. As high as 71% of all calls have been found to be non-emergency in existing 911 systems. The Division of Communications uses a conservative figure of 50% for such referred calls. In certain sparsely populated rural counties, referred calls are not considered because such counties tend to handle all calls in the same manner emergency or non-emergency.

The remaining 50% of all busy hour calls, the true emergency calls, are broken down percantagewise by agency type as shown in the flow diagram. A discussion of call distribution by type is discussed in Appendix 3.0. The total volume for each classification is determined from these percentage factors.

The number of busy hour calls direct dispatched at the 911 center is computed as a function of population within the jurisdiction of each public safety agency co-located with the 911 center. Likewise, the number of calls that must be transferred and relayed is determined.

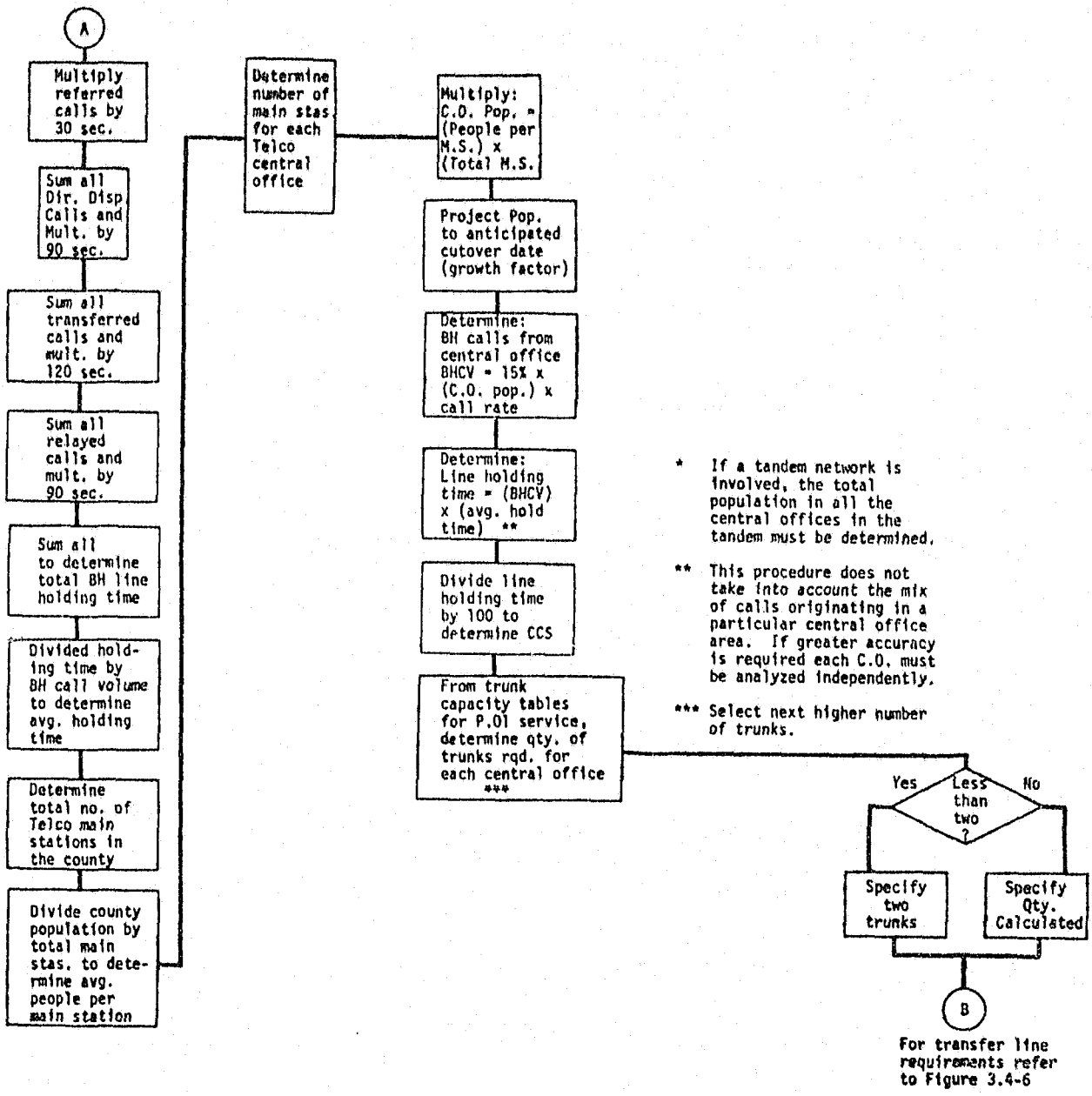


Figure 3.4-5 911 SYSTEM DESIGN FLOW DIAGRAM-INCOMING LINES OR TRUNKS

For a staffing calculation, each type of call is multiplied by the average operator handling time to determine the total. Referred calls average 20 seconds, direct dispatch calls average 80 seconds, transferred calls average 30 seconds and relayed calls average 140 seconds. The grand total of all types is summed to determine the total operator handling time. Incoming trunk or line holding time calculations also follow this basic procedure to this point with the flow chart of Figure 3.4-5 showing the line holding time procedure.

The total operator handling time determined above is divided by the busy hour call volume to determine the average call handling time. As discussed in Appendix 5.0, operator capacity tables or graphs are consulted to determine the number of busy hour operator positions required for the given number of calls of the above determined average holding time in order to assure that 90% of all calls are answered within ten seconds.

Tables are provided in the "Operator Staffing Study" Appendix 4.0 which give the total staff to man the center around the clock, seven days a week for the given number of busy hour operator positions.

3.4.5.2 Incoming Lines or Trunks

Figure 3.4-5 shows the flow diagram for determining the required number of lines or trunks connected to each direct trunked central office or connected to the serving central office of a tandem network. The flow diagram is discussed in the following paragraphs.

From the staffing procedure of 3.4.5.1 the numberof calls by type, i.e., referred, direct dispatched, transferred or relayed, is determined. The total for each type of call is multiplied by the average line holding time. Referred calls average 30 seconds, direct dispatched calls and relayed calls average 90 seconds, and transferred calls average 120 seconds. The grand total of all types is summed to determine the total line holding time. This figure is divided by the busy hour call volume to determine the average line holding time per call for the entire serving area of the 911 center. This figure is used in the following paragraphs to determine trunk or line requirements from each individual central office. For greater accuracy, the correspondence of particular public safety agency jurisdictions with particular central office boundaries could be evaluated to determine the mix of calls and the resultant total busy hour line holding time for each central office. The variation in crime rate for particular central office areas could also be taken into consideration. However, the average holding time per call per this procedure gives sufficient accuracy for planning for initial cutover for a 911 center. Fine tuning in terms of additions or deletions of lines can be accomplished as experience dictates after the center is in operation.

The population within the serving area of each central office, projected to the cutover date, must be determined. Consistent reliable data of this type has not been found to be readily available from the telephone industry. Consequently, main station data by central office has been used to estimate population. The total county population derived from the Department of Administration document is divided by the total number of main stations in the county as supplied by the telephone company to determine the average number of citizens per main station in the given county. The number of main stations in a particular central office is multiplied by this average figure to

determine an estimate of the population served by the central office and the resulting figure is projected to the anticipated 911 system cutover date.

Busy hour call volume from the particular central office is determined by multiplying the applicable call rate for the county times the estimated central office population and taking 15% of the result. The resulting call volume figure is multiplied by the average line holding time per call to determine the total busy hour holding time. This figure is divided by 100 to convert to CCS. From trunk capacity tables, the required number of lines is determined to assure P.01 service, i.e., one busy signal out of 100 busy hour calls. Of course, during the remainder of the day, the quality of service will be even better.

The required number of lines or trunks is determined per the forgoing for each central office. For any central office in which less than two trunks are indicated, a minimum of two trunks shall be specified.

3.4.5.3 Transfer Lines

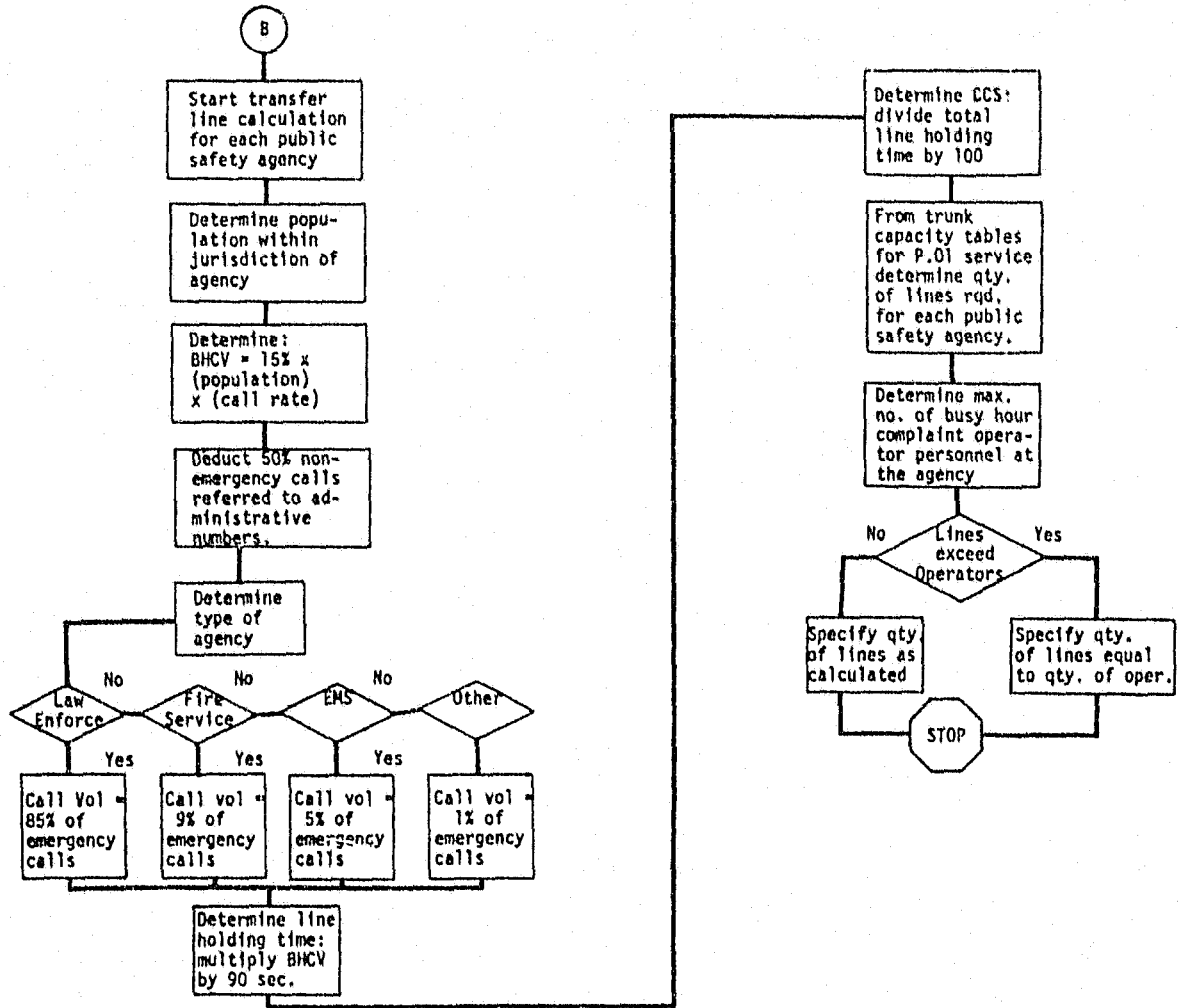
Figure 3.4-6 shows the flow diagram for determining the required number of transfer lines for each public safety agency to which calls are to be transferred. The flow diagram is discussed in the following paragraphs.

The population within the jurisdiction of each public safety agency is projected to the cutover date. As discussed previously, busy hour call volume for the jurisdiction is calculated by multiplying 15% times the population times the applicable call rate. Deducted from the results will be 50% of all calls which are referred by the 911 operator to an administrative 7-digit number. The remaining true emergency calls are multiplied by the applicable percentage figure for the particular type of emergency service to determine the agency's call volume. The call volume figure is multiplied by the average line holding time of 90 seconds to determine total line holding time.

The total line holding time determined above is divided by 100 to convert to CCS. By referring to the trunk capacity tables for P.01 service, the required number of transfer lines is determined.

If a particular public safety agency has a very low call volume coupled with significant telephone costs for the line, then other means of communicating with the agency should be considered. This is particularly true if substantial distances are involved. A dial out transfer arrangement may be employed, preferably using speed dialing, to transfer the caller directly to the agency using the existing telephone company switching network. The incurrence of several long distance calls per month in this manner may be much less costly than charges for a direct line. Alternately, it may be desirable to employ a call relay technique using radio or telephone communication.

Finally, in determining the number of transfer lines for a particular public safety agency, there is no point in providing more lines than the maximum number of complaint operators at the safety agency, i.e., the person at the agency cannot talk on more than one line at a time. If an additional call should arrive at the center destined for a given agency after all the agency's lines are occupied, the 911 operator can, (1) assist the calling party by



* For public safety agencies having very low call call volumes coupled with high Telco line costs, dial-out transfer should be considered.

Figure 3.4-6 911 SYSTEM DESIGN FLOW DIAGRAM-TRANSFER LINES

recording initial information; (2) take an alternate course of action such as transferring the call to another similar agency operating under a mutual aid agreement; (3) break in on an existing call if necessary; or (4) can calm or instruct the caller pending freeing up of the remote agency's transfer lines and then immediately transfer the call.

3.5 PERSONNEL REQUIREMENTS

This requirement is defined as the required manpower loading to staff a 911 answering center 24 hours a day, 7 days a week, 52 weeks a year. Where necessary, the loading also includes supervisory personnel. The required manpower loading is a function of the required number of operator (busy hour) answering positions, and the expected distribution of the call volume over the daily work shifts (shift loading). The personnel requirements methodology and results for up to 10 answering positions are contained in a study performed by the Division of Communications entitled "Operator Staffing Study". (See Appendix 4.0). In summary, the staff loading can be obtained by multiplying the total three shift loading for one day by a factor of 1.61.

The number of personnel that the Division of Communications uses for operator staffing was at times at variance with the number local entities felt they should have. With the possibility of the State funding recurring costs of 911 a consideration, a method had to be adopted that would specify the number of operator personnel the State would fund. The philosophy used is that in the event of State subvention, only the additional operator load caused by the 911 system is considered for funding and not pre-existing positions in an agency prior to their becoming a 911 center. It would not be proper for the State to fund the cost of personnel already being funded locally.

To adhere to an equitable result, two procedures were instituted regarding additional personnel; one for large counties requiring about three or more 911 answering positions, and one for the smaller counties.

3.5.1 Large County Personnel Determination

The following procedure is used to determine the 911 personnel requirements for large counties:

(1) Determine the busy hour call volume of the 911 answering center based on serving population and the applicable call rate. This is designated call volume "A".

(2) Determine the busy hour call volume of the affected public safety agency where the center is located based on the type of agency, population served and the applicable call rate. This is designated call volume "B".

(3) Determine the additional call volume by calculating A - B = C.

(4) Determine the average operator handling time for

the additional call volume "C" above and designate this "D".

(5) Plot the busy hour positions for "C" calls at "D" seconds on the operator capacity curves. (See Appendix 5.0). Select the number of operators from the next higher curve.

3.5.2 Small County Personnel Determination

In the smaller counties, the public safety agency accepting the 911 answering duties will usually be the Sheriff's Department. As is usually the case, the person who answers the 911 calls is the existing radio dispatcher, who also performs other duties such as prisoner booking, clerk, and jailer. During the "non-business hours", the jailer may be the person to perform the 911 and dispatching duties. For this type of operation, the required additional personnel is determined by obtaining the difference between the required manpower loading to staff the 911 center, and the existing staff, plus any additional personnel to ensure that the operator grade of service performance will be met; such as separating the jailer or clerk duties from the 911 call handling--radio dispatching duty.

3.5.3 Resolution of Personnel Determination Differences

The results given by these procedures compensate the center for the additional work burden caused by 911. If for some reason the additional personnel requirement is contested by local officials, Division of Communications engineers are more than willing to reexamine the data and try to arrive at a satisfactory solution.

3.6 TYPES OF TELEPHONE TERMINAL ANSWERING EQUIPMENT

Briefly described in this subsection are the different types of telephone answering equipment that under the appropriate conditions of telephone requirements (number of incoming 911 lines, outgoing transfer lines, dial-out lines, tie-lines, and number of answering positions) are best suited for 911 answering centers. The different types can be grouped into two general categories: Key Systems, and Private Branch Exchange System (PBX) and Private Automatic Branch Exchange System (PABX) with or without Automatic Call Distributor (ACD). The equipment is discussed in increasing order of complexity and cost.

3.6.1 Key Systems

3.6.1.1 Dialess Key Telephone Set

This is a telephone set without dial-out capability. A set is connected to each incoming 911 line. This method is suitable when the call transfer method is not required and no more than four incoming lines are required.

3.6.1.2 Multi-Button Telephone Sets

This is the familar multi-button business telephone set and is the most suitable method when the call transfer method is not required. In some instances the safety agency's existing multi-button set can be used if there are a sufficient number of unused buttons equal to the number of required

incoming 911 lines. In other instances it may be possible to change over some of the agency's existing lines to the required number of incoming 911 lines and use the agency's existing set. However, it is recommended that separate 911 sets be added to keep the 911 key system separate from the agency's existing key system. The agency's existing set can be used for the call relay method.

3.6.1.3 Multi-Button, Multi-Appearance Telephone Sets

This method is used where there are a limited number of nearby safety agencies requiring their calls to be handled by the call transfer method. This requires the installation of an identical multi-button set at the 911 center and each of the participating safety agencies. With ring-only at the 911 center, the appropriate agency can be alerted to answer his phone by intercom signaling.

3.6.1.4 Multi-Button Telepatcher Sets

This method is used where there are safety agencies requiring their calls to be handled by the call transfer method. This method has a limitation in the total number of incoming 911 lines and outgoing lines (transfer and dial-out lines) and the number of simultaneous transfer calls that can be in progress. This method can use either a special multi-button set with built-in patching capability, or a separate patcher unit and standard multi-button set. This method has a limitation on the number of answering positions.

3.6.1.5 Multi-Line Key System

This method utilizes key system assemblies to provide call answering/call transfer capabilities to handle a set combination of incoming 911 lines and outgoing lines (transfer, dial-out, tie-lines) with no limitations of the number of simultaneous transfers that can be in progress. The total line capacity of the 911 system can be obtained in a 24, 48, 75, and 99 line grouping. A system is available where the number of incoming 911 lines cannot exceed 20 and the total number of outgoing lines cannot exceed 8. Three multi-line systems used in this plan are the Allen Tel GB 9900 Dispatch System, Bell Telephone 8A Key System, and the Plant Equipment Incorporated PEIX-II Key Telephone Dispatch System.

3.6.2 Private Branch Exchange (PBX)

3.6.2.1 Cord Switchboard

This is the familar switchboard utilizing cord pairs to patch or transfer the caller to the line connected to the appropriate agency. There is no limitation on the number of simultaneous transfer that can be in progress. It is still capable of providing fast and reliable semi-automatic operation. However, it is not too well suited where a large number of dial-out call transfers will occur, and it does take up more operator space than desk top PBX consoles. As many switchboards as there are answering positions can be utilized.

3.6.2.2 Cordless Switchboard

This equipment is used where a small number of outgoing lines (transfer,

dial-out, tie-line) are used to handle a small call volume by the call transfer method. The appropriate agency is rung and the caller transferred in a semi-automatic manner by operating more than one button switch, however with some equipment this is done automatically with a single operation. This equipment may have limitations in the number of incoming lines, number of simultaneous transfers that can be in progress, and the number of answering positions. The equipment used in this plan are, Automatic Electric 20B, Automatic Electric 80A, North Electric ARD-561, and Stromberg Carlson E-120.

3.6.2.3 Automatic Switchboard (PABX)

This equipment is used where a large number of outgoing lines (transfer, dial-out, tie-line) are required to handle a large call volume by the call transfer method. The appropriate agency is rung and the caller transferred automatically by depressing a button associated with that safety agency. There is no limitation on the number of simultaneous transfers that can be in progress. As many PBX desk top consoles as there are answering positions can be utilized. The equipment used in the plan is the CEAC Emergency Call Answering System offered by the General Telephone Company. The CEAC equipment also includes the ACD function described in the next subsection.

3.6.3 Automatic Call Distributor (ACD)

This equipment is used where there is a requirement to handle a large call volume by a large number of answering positions. The purpose of the equipment is to distribute incoming calls to operators that are not busy thereby assuring that only one operator will answer the call and that the calls will not go unanswered. The equipment will intercept calls not answered within a programmed period with an announcement to reassure callers.

3.7 OTHER EQUIPMENT

The technical standards for all 911 systems required that all incoming 911 calls be tape recorded on a logging magnetic tape recorder equipped to record the data and time of receipt of each call. This standard implies that outgoing (transferred) calls can also be recorded. Many dispatch centers presently record incoming emergency calls. These audio recordings provide a record that can be used in the event of any litigation or any dispute between the 911 center and one of the radio dispatch centers that it serves on how and when a call was handled.

The technical standards also require that each 911 operator position be equipped with an instant playback magnetic recorder to record each incoming calls. This standard implies that each supervisory position also be equipped with a recorder if the position is capable of answering and handling 911 calls. This type of recorder automatically records both sides of every emergency call and provides the operator with an immediately accessible record of the call (without interrupting the master logging recorder) if the information must be repeated or reconfirmed but the citizen is no longer available to provide it.

There are two approaches to recording incoming 911 calls on a logging recorder; (1) record the entire conversation, that is, also record the transferred portion of the callers conversation with the appropriate safety agency answering/dispatcher, or (2) record only the callers conversation with the 911 operator.

The former approach is suitable if (1) all calls other than those handled as direct dispatch calls are relayed, (2) the safety agencies where the caller is transferred has their own logging recorder, (3) the recorded acceptance of the transferred call by the appropriate safety agency is satisfactory to the 911 center in the event of any litigation. The former approach is the least costly approach because a logging recorder channel is required for each 911 answering position instead of each incoming 911 lines. These approaches were discussed with the 911 planning representatives of each local government and their acceptance of the most suitable approach has resulted in logging recorder channel requirement of not greater than ten.

In those cases where the 911 center is located with a safety agency that already has a recorder, or is or will be ordering a recorder of sufficient capacity, it has been so noted in the county plan and excluded in the system implementation cost summary.

3.8 OPTIONAL 911 SYSTEM FEATURES

There are a number of telephone service options that improve the performance of the 911 systems. Definitions of these optional features are presented in Table 3.8-1.

Because of the many possible combinations of terminating equipment, types of trunking, types and capabilities of telephone company central office equipment, and the like, most (all for some companies) of the optional features cannot be priced until a specific detailed request is made to the telephone company for a special assembly. The resultant costs and implementation time vary by telephone company and with the particular 911 system that employs the option.

With the exception of automatic number identification (ANI) and automatic location identification (ALI) options, the resultant implementation costs requested for each option should be forwarded to the Division of Communications for consideration of payment by the State as part of the implication cost of the basic 911 system.

This Division feels that ANI and ALI are desirable features in and of themselves but do not believe that either is critical to the feasibility or implementation of 911 in Florida. ANI and ALI is not any less or more desirable if the present 7-digit system is retained; their benefit is primarily operational to public safety agencies and does not affect the institutional form of 911.

A discussion of selective call routing is given in Section 4.0.

This Division agrees with the public safety community that coin-free dialing of 911 would be a valuable adjunct to 911 in Florida. It has the potential of allowing a large decrease in response time for emergency calls made from public pay stations. This is not, however, a feature that can be ordered from the telephone companies by local governments. The decision of whether to implement this feature can be made only by the Florida Public Service Commission (PSC). The Florida PSC thru Docket No. 74189-Rule (RA), Order No. 7132 has recently determined that the capability of coin-free dialing of 911 be provided by all Florida telephone companies within five years from now.

At the present time, the following telephone companies have indicated that they will provide some of the 911 system options at no additional charge. Therefore, these options have been included in each county 911 system plan where applicable. They are as follows:

(1) Southern Bell Telephone and Telegraph Company - Called Party Hold, Forced Disconnect, and Idle Trunk Tone Application.

(2) Florida Telephone Company - Called Party Hold and Forced Disconnect.

(3) General Telephone Company - Recorded Announcement (which is a feature of their 911 switch).

The visual originating central office identification option will be provided at no additional charge by all of the telephone companies where direct trunking is employed.

TABLE 3.8-1

911 TELEPHONE SERVICE OPTIONS

Option	Description
Called-party hold	Enables the 911 center to hold a connection through the local central office by remaining in an off-hook position. The connection is held regardless of the status of the originating party's switchhook. This feature would permit manual trace of the call. Available only when direct trunks (not tandem routing) are employed.
Ringback or callback	Enables the 911 operator to hold and ring the calling party after the connection has been broken by the calling party. This feature is usually limited to calls from 1- and 2-party lines. It also requires direct trunking and called-party hold as necessary prerequisites.
Idle trunk tone application	Enables the 911 operator to determine whether the calling party hung up before his call was answered. Independent of trunking network.
Switch-hook status	Enables the 911 operator to determine whether the caller is on the line but unable to speak, or has hung up. Requires direct trunking via metalic facilities.

Table 3.8-1 Cont.

Forced disconnect	Enables automatic release of 911 trunk on disconnect by the 911 center, independent of the calling party's switchhook. It is designed to enable the 911 center to avoid tieup or intentional jamming of the incoming 911 lines. The speed of disconnect depends on the type of central office switching equipment. Independent of trunking network.
Visual originating central office identification	The 911 operator's console has a separate lamp for each incoming 911 line. This allows identification of the telephone central office where the call originates. Not available when an automatic call distributor (ACD) or tandem trunking is used.
Audible originating exchange identification	The name of the central office from which the call originates automatically precedes each 911 call as a recorded announcement. This option can be employed where an ACD is used. Independent of trunking network.
Recorded announcement capability	Enables the 911 center to have any incoming calls that encounter a busy signal answered by a recorded message identifying the center or saying whatever is desired. The content of the recording would be controlled and changed as necessary by the 911 center. This option can be employed when an ACD is used.
Automatic number identification (ANI)	Central office equipment automatically determines the telephone number of the calling party and transmits it to the 911 center. Not available when tandem trunking is used.
Automatic location identification (ALI)	The address location from which a call is placed is identified electronically. Not available when tandem trunking is used.
Selective call routing	911 calls would automatically be routed to the proper jurisdiction, regardless of telephone company central office boundaries.
Coin-free dialing or no-coin dial tone	Permits coin station dialing and connection to the 911 center without the deposit of a coin.

Section X Interagency Agreements

The use of formalized, written mutual aid agreements is strongly recommended. Although the following background information and suggested formats are for law enforcement mutual aid, similar agreements should be considered for fire and emergency medical services agencies. In fact, in North Carolina a number of such agreements exist for fire and medical services. Some of these are unwritten, and should be formalized for reasons outlined below.

The primary purpose in adopting the Public Safety Answering Point concept of a 911 system is to improve citizens access to emergency services.

An important aspect of this improvement is an understanding that the first agency dispatched to attend to an emergency renders required assistance even though it may turn out that the scene is in another agency's jurisdiction. In other words, assistance must not be withheld because of an erroneous dispatch, whatever the reason. (This problem generally arises when there is overlap by telephone exchanges of political boundaries)

Written mutual aid agreements should prevent confusion as to authority, jurisdiction, command, control, and in particular liability.

The National Sheriff's Association ("Mutual Aid Planning", U.S. Department of Justice, September 1973) states that:

> "By utilizing Mutual Aid, a higher degree of coordination of police functions can be achieved, confusion incident to an emergency situation is reduced, law enforcement efforts have been better supervised, response time has been lowered, and a great amount of personnel and equipment can be brought to bear on the situation. In addition, the increased costs of such operations are spread over a number of jurisdictions, thus lessening the financial burden that might fall on one jurisdiction."

One study that was conducted by the Asspciation revealed three major problems that might possibly have an impact on the implementation of mutual aid agreements. These are apathy, jurisdictional rivalries, and lack of understanding concerning mutual aid. Perhaps the biggest mutual aid obstacle today is that of liability for actions of officers exercising their powers outside of their jurisdictions. Courts have, for the most part, been unwilling to extend to the police officer immunity benefits afforded other municipal officials. The effect on the officer's aggressive performance of his duties appears of little concern to the courts. Some recent court decisions as well as state statutes have seemed to partially remedy the condition of little to no immunity for the police. Many municipal governments have adopted programs indemnifying their police officers against suits.

The problem of liability for police within their jurisdiction is magnified when the officer takes action extra-territorially in response to a call for mutual aid. It is therefore necessary to have a written provision in the mutual aid agreement granting immunity from liability.

Written mutual aid agreements are usually between a limited group of contiguous municipalities and contain the following provisions:

> Designation of an appropriate official empowered to request assistance and procedures to be followed in responding to a request for assistance.

CONVERSATION LENGTH IS 40 SECONDS AND THAT A 1% PROBABILITY OF A 10 SECOND WAIT IS THE MAXIMUM TOLERABLE DELAY. THE FOLLOWING TABLE RELATING THE CALLING LOAD TO THE NUMBER OF OPERATORS REQUIRED HAS BEEN PREPARED.

LOAD CALLS PER HOUR	NUMBER OF OPERATORS REQUIRED
0 - 1	1
1 - 17	2
17 - 48	3
48 - 91	4
91 - 140	5
140 - 210	6
210 - 320	7

END