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RTI Project OU-230-2

January 1968

Operations Research and Economics Division

OCD Work Unit 4113E

DETROIT CIVIL DEFENSE OPERATING SYSTEM SYNTHESIS

VOLUME I
PRELIMINARY SYSTEM DESCRIPTION

by

Robert N. Hendry

Prepared For

Office of Civil Defense
United States Department of the Army
Contract No. OCD-PS-64-56

Wash. DC 20310

RESEARCH TRIANGLE PARK, NORTH CAROLINA 27709

PRELIMINARY REPORT
OU-230-2

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Volume I

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DETACHABLE SUMMARY

The Detroit Civil Defense System is described in this volume; the technical approach to this description is presented in a second volume. The description is presented in a specification format to show concisely the relationship between components and missions. The total system and each subset of components is described by (1) mission and performance requirements, (2) components, and (3) operations. Subsequently, systems analysis of the combined effects is expected to yield realistic performance and cost characteristics.

A local civil defense system is conceptualized as a four-component organization, consisting of resources derived from the community, and working together as subsystems to solve local problems resulting from a nuclear attack. Central control (headquarters) directs and coordinates the other three. The shelter (central countermeasure) subsystem is concerned with warning, guiding to shelter, shielding, and sustaining occupants during and following the attack, as well as radiological monitoring to determine whether it is unsafe to stay or safe to leave shelter. The extra-shelter subsystem is a mobile force put together to fight fires, clear debris, rescue, assist in remedial movement, and to otherwise overcome environmental hazards affecting the safety of the sheltered population. Finally, the support subsystem assists the other three by providing communication, transportation, supplies, and personnel; this subsystem responds to requests from the other subsystems rather than initiating action in defense of the population. This concept of assigning responsibilities is comparable to the efficient military organizations which have proven most successful in emergency situations.

The Detroit CD system is represented by an operating area schematic and a time-phased set of control functions together with a resource matrix. The schematic describes a composite of services united in a controlled countermeasures operation to solve a problem in a specific area. The resource organization assignment matrix relates the service function to the component organization. Deployment of resources to a specific operating area is shown in a schematic block diagram which represents the basic civil defense operating subsystem. The total system should be visualized as many of these basic subsystems operating simultaneously under the control of an emergency operating center.

A diagrammatic description was adopted instead of a narrative, picture, etc., as the best means for showing the functional and physical aspects of the system. Functional flow block diagrams (FFBD) show the central control, deployment, and countermeasures operation. The schematic block diagram (SBD) shows the physical displacement of the organization for subsequent analysis. The key countermeasures operation diagram was

evolved from the problem definition of each operating area and from the available countermeasures needed to solve it. A set of similar diagrams representing most, if not all, countermeasure operations likely to be encountered in the Detroit area will be developed during continuing work.

Supporting research studies are recommended to establish a standardized land-use classification and casualty and property-damage functions as a basis for system-oriented problem definitions. Studies in system synthesis should continue in greater detail and should be supported by objective selection and systems analysis studies to insure that an appropriate interface exists between problem definition and system evaluation. Continuing system studies can be expected to expand this beginning into a comprehensive description which can be useful in system evaluation within the Five-City Studies and, subsequently, within the Damage-Limiting Studies. Ultimately, systems analyses can be expected to help minimize city damage from nuclear attack.

FOREWORD

The description and approach covering the synthesis of one or more total near-future civil defense systems was performed under the Office of Civil Defense Contract No. OCD-PS-64-56, Modification No. 15 dated 1 May 1967. Initially, work was assigned to Work Unit 4113E. This number has been changed to 4126A for the continuing effort.

Volume I offers a preliminary description of a total civil defense system at the local level. Detroit's CD system was selected as a specific case for study. It is intended that subsequent research will improve this initial description and provide a basis for describing competing system concepts. If system alternatives can be described in a manner comparable to the Detroit study, quantitative systems analysis can be expected to yield performance criteria that will make selection of the most effective alternative possible.

Volume II describes the technical approach to the system synthesis and indicates that it will be suited to the Five-City Study. Subsequent work will continue to develop this approach as a means for unifying research effort to achieve civil defense objectives.

The author expresses his indebtedness to Mr. Charles Kepple of the Research Directorate of the Office of Civil Defense for assistance in providing materials, arranging briefings and conferences, and in reviewing and making recommendations as the study progressed. The author also expresses his appreciation to Mr Philip McMullan, Group Leader, and to others in the Research Triangle Institute who provided guidance and support during this system study.

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Section 1.0

SUMMARY

DETROIT CIVIL DEFENSE OPERATING SYSTEM SYNTHESIS

Volume I - Preliminary System Description

1.0 SUMMARY

The Detroit Civil Defense System is described in this volume; the technical approach to this description is presented in a second volume. The description is presented in a specification format to show concisely the relationship between components and missions. The total system and each subset of components is described by (1) mission and performance requirements, (2) components, and (3) operations. Subsequently, systems analysis of the combined effects is expected to yield realistic performance and cost characteristics.

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Supporting research studies are recommended to establish a standardized land-use classification and casualty and property-damage functions as a basis for system-oriented problem definitions. Studies in system synthesis should continue in greater detail and should be supported by objective selection and systems analysis studies to insure that an appropriate interface exists between problem definition and system evaluation. Continuing system studies can be expected to expand this beginning into a comprehensive description which can be useful in system evaluation within the Five-City Studies and, subsequently, within the Damage-Limiting Studies. Ultimately, systems analyses can be expected to help minimize city damage from nuclear attack.

Section 2.0

GENERAL INFORMATION

2.0 GENERAL INFORMATION

2.1 Purpose and Applicability

The synthesis is intended to establish a basic approach to describing a local civil defense system. The description was derived from a study of the Detroit CD system [1] within the context of Civil Defense Research Analysis [2] and Systems Analysis in Civil Defense, Parts I and II [3] by John F. Devaney.

A specification format was adopted to reveal the system structure.

2.2 Explanation of Terms

2.2.1 Mission--a task to be undertaken or an objective to be accomplished (i.e., civil defense). The option distinguishes between continuous and discrete assignments. Mission assignments may or may not have a value function attached.

2.2.2 System--a group of related components operating together to achieve a mission.

2.2.3 Synthesis--the process by which the basic components and their functions or operations are assembled into a system.

2.2.4 Description--the product of a synthesis intended to convey a mental image of a system meeting specified requirements, consisting of a defined set of components, and accomplishing its objective by a definite set of operations.

2.2.5 Performance requirements--the limits beyond which performance of the mission is unacceptable and thus the criteria as to whether the mission has or has not been achieved by a system with specific performance capabilities and cost characteristics. (The synthesis task is given as much freedom as possible in providing candidates for analysis.)

2.2.6 Component--a part of the system otherwise identified as a subsystem, service, unit, team, individual, or other subordinate level in a hierarchy of elements.

2.2.7 Function (Integrator)[4]--an action performed by the system or one of its components. Three types of functions are recognized; namely, countermeasure, control, and support. Countermeasures (CM) produce direct effects; controls insure that the effects are the intended ones; and support actions produce intermediate results that help the other two perform their missions. An operation is a set of functions of any type.

1/ P. C. McGillivray, Detroit Civil Defense Plan, City of Detroit Office of Civil Defense, February 1966.

2/ Devaney, Civil Defense Research Analysis, Research Report No. 11, Research Directorate, OCD, Dec. 15, 1966.

3/ Devaney, Systems Analysis in Civil Defense, Parts I and II, Systems Evaluation Division, Research Directorate, OCD, August 1965.

4/ Ibid, p. 47.

2.2.8 Operating area--a bounded geographic locality in which CD operations take place. The basic unit of area is the census tract or standard location area (SLA); these units may be aggregated into zones, sectors, or both. Zones may take on any shape; however, sectors are aggregates in the form of radial slices of an annular ring about ground zero.

2.3 Approach

The total CD system and each component is described by missions, requirements, components, and operations; these descriptors indicate the objective, functions, physical characteristics, and qualitative performance.

Estimated cost and effectiveness of the total system cannot be adequately developed without a systems analysis; total cost must reflect the building system as well as the operating system. Moreover, component cost is not valid until the equipment level has been described; at this level, every significant hardware and personnel attribute has been identified, and decisions have been made regarding the effectiveness to determine whether it is cost-effective over some alternative expenditure.

For a more extensive report of this approach refer to Volume II, Technical Approach.

Section 3.0

TOTAL DETROIT CIVIL DEFENSE SYSTEM

3.0 TOTAL DETROIT CIVIL DEFENSE SYSTEM

3.1 Mission and Performance Requirements

3.1.1 Mission--The Detroit CD system will provide preparation against and relief from the effects of a nuclear attack. It will broadcast public information, warn the community, control damage (as practicable), restore vital facilities, and provide relief from weapons effects to maximize the number of survivors, minimize property damage, and enable the earliest restoration of normal conditions.

3.1.2 Performance Requirements--Performance of the total near-future CD system is constrained to near-neighbors to present policy. Measures of performance will be based on estimates of the change in casualties, mortalities, and property damage as a consequence of the system's employment of available resources.

In pursuance of its civil defense objectives, the Detroit system will:

(1) Enable timely mobilization in response to a defined threat.

(2) Employ resources prior to a threatened attack in order to shelter, harden, disperse, or otherwise minimize the number of people and the amount of property damaged.

(3) Provide timely warning and movement to shelter.

(4) Shelter the population during the attack.

(5) Employ resources following an attack to render relief services for survivors, to reduce property damage from fires, to decrease hazards resulting from weapons effects, to prevent further deterioration of the community, and to support recovery operations.

(6) Make maximum use of resources within its control.

3.2 System Components

A plan will be followed to use effectively all publicly-owned resources and to augment these with volunteer citizens and agencies having (or capable of having within mobilization time constraints) skills and resources that are adaptable to CD operations.

The four major components are: central control, shelter, extra-shelter, and support. These subsystems reflect the Detroit civil defense organization as currently planned,[5/] except that the shelter function is emphasized in contradistinction to the extra-shelter function. This separation reflects the OCD recognition of the central and peripheral countermeasures concept. This breakdown is believed necessary to recognize the fundamentally different roles in the CD operations.

5/ McGillivray, op. cit.

The next level of components includes eleven services:

Headquarters Service
Medical Service
Engineering Service
Fire Service
Police Service
Rescue Service
Welfare Service
Warden Service
Communication and Warning Service
Transportation Service
Supply and Personnel Service

Each service is described in this volume.

Resources will be organized into a system as described in Figure 1, Detroit Civil Defense Organization, to perform the postattack activity (rather than preattack administrative, vulnerability reduction, and training operations). The team represents the basic component of the organization; in general, all resources, people, equipment, supplies, and facilities are allocated to teams or aggregates of teams.

3.3 Schematic Operating Plan

Integration of functions and components is achieved by an operating area schematic.[6] At the EOC (or its alternate) planning will be in terms of shelter and CM operations which relate service functions to problems defined in specific operating areas.

Figure 2, Detroit Civil Defense System Diagram, is a schematic showing the relationship between headquarters control functions, support functions, and the CM functions. Commands to perform specific operations designed by central or intermediate control to overcome field problems flow downward through the deployment control functions to the operating team's service function. Concurrently, information flows upward describing the area problems and service needs. This cyclic flow occurs throughout the emergency period.

Figure 3, Time-Phased Central Control Operations, presents the time phases appropriate to the local CD system. They are superimposed on the headquarters (central control) to reflect the changes in the control problem throughout the emergency period.

As a result of prior data, the community will be subdivided into small operating areas called standard location areas (SLA's).[7] Problems will be defined at the SLA level to enable adequate system evaluation.

Shelter and extra-shelter operations will be defined as a set of concurrent and/or sequential functions adopted by central or deployment control to overcome SLA problems. Figure 2 shows a specific set of actions taken by the shelter and extra-shelter subsystems. Each SLA can be analyzed to

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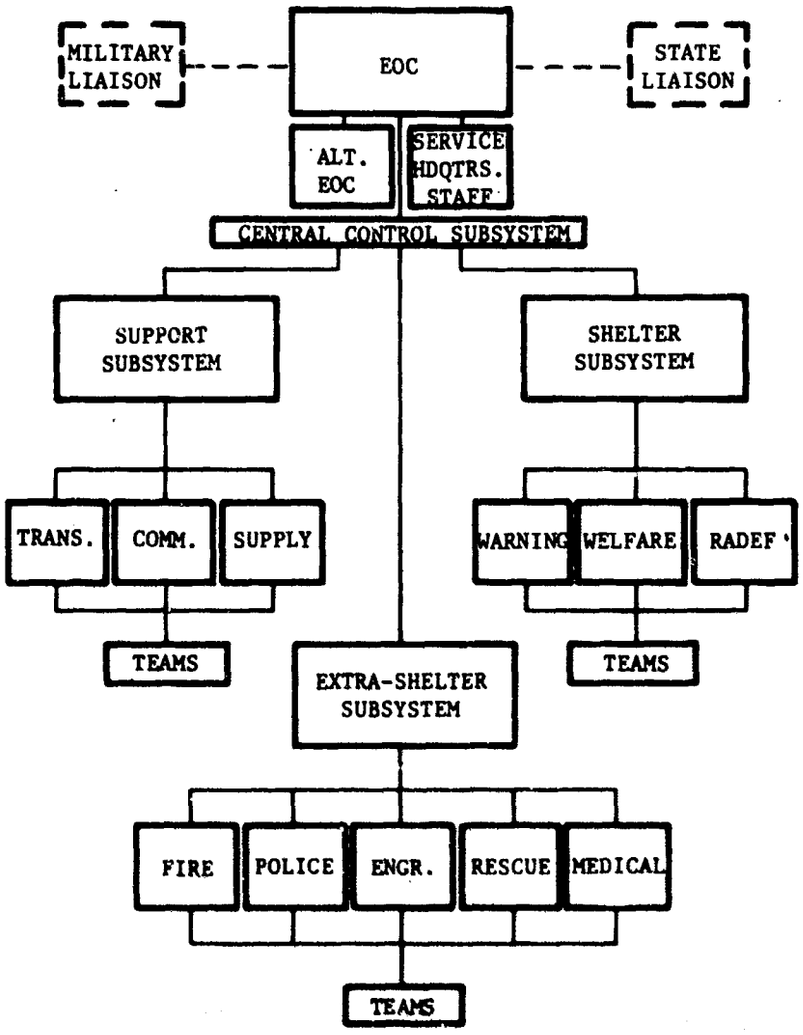
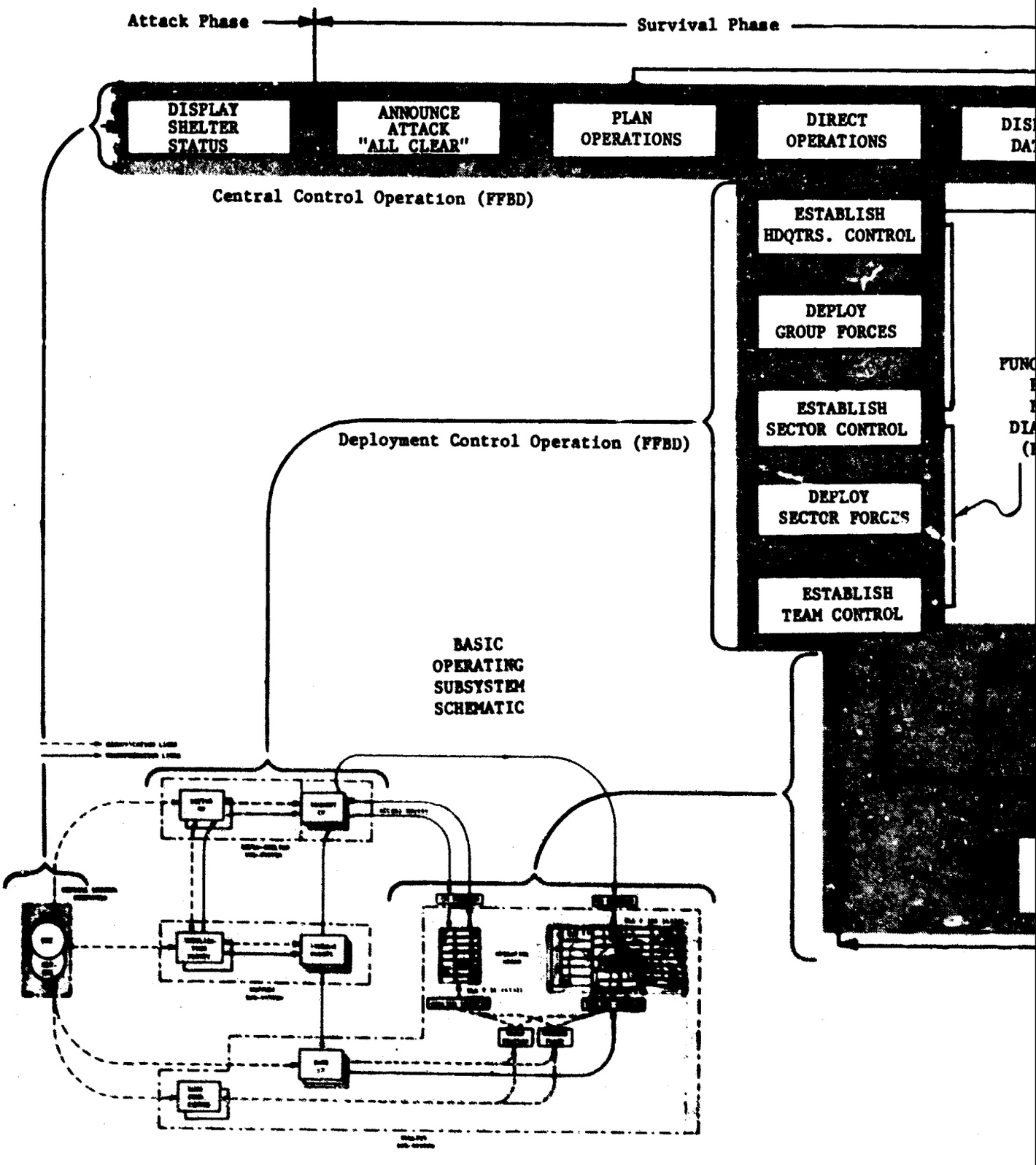
[6] See Vol. II for a detailed explanation.

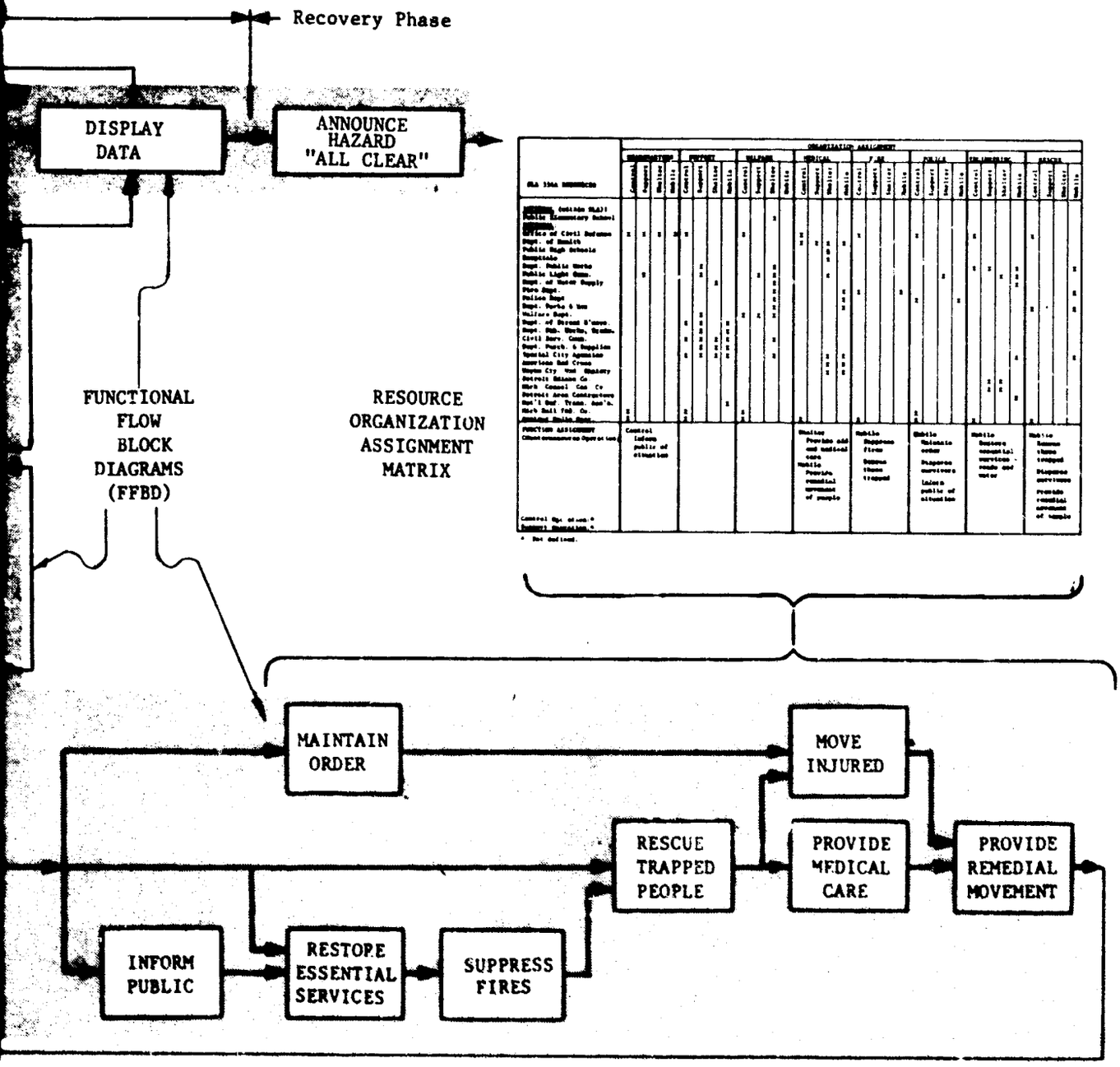
[7] William L. White, Roger S. Cannell, and William S. Royce, National Location Code, Palo Alto, California: Stanford Research Institute, January 1956.



Source: Adapted from Detroit Civil Defense Plans.

Fig. 1. Detroit Civil Defense Organization.


Attack Phase
Survival Phase
DISPLAY SHELTER STATUS
ANNOUNCE ATTACK "ALL CLEAR"
PLAN OPERATIONS
DIRECT OPERATIONS
Central Control Operation (FFBD)
ESTABLISH HDQTRS. CONTROL
DEPLOY GROUP FORCES
ESTABLISH SECTOR CONTROL
Deployment Control Operation (FFBD)
DEPLOY SECTOR FORCES
ESTABLISH TEAM CONTROL
BASIC OPERATING SUBSYSTEM SCHEMATIC



Countermeasures Control Operation (FFBD)

Fig. 2 Detroit Civil Defense System Diagram

2

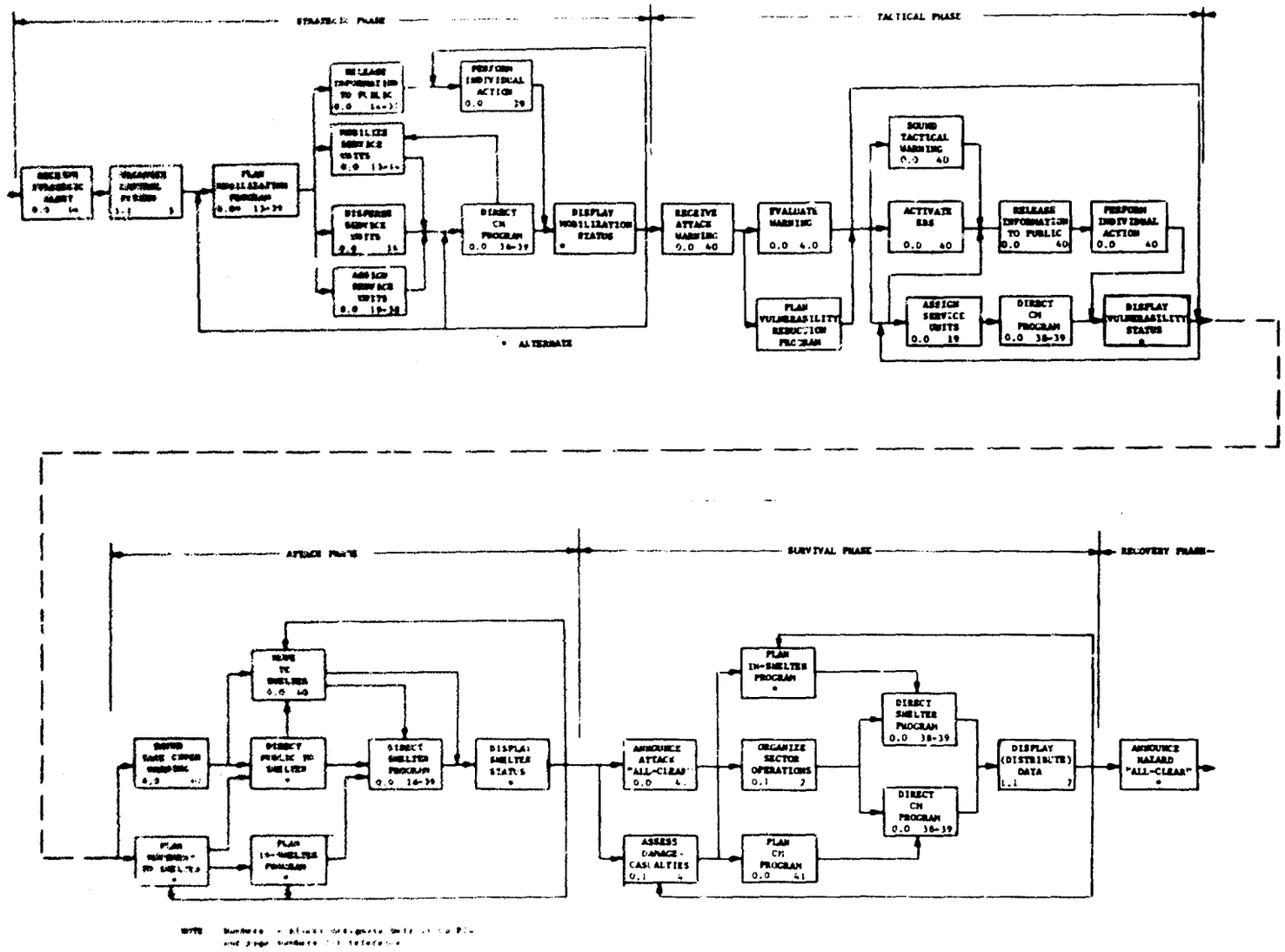


Fig. 3. Time-Phased Central Control Operations.

determine the set of functions needed to counter the hazards threatened or caused by a nuclear weapons attack.

Table I shows the synthesis of CM operations for defined problems in specific SLA's. Expansion of this synthesis to include every SLA and all functions and situations that change with time will reveal a larger set of frequently occurring operations. Analysis of these operational patterns, together with quantification of performance parameters, will subsequently yield the total effectiveness of the system.

The area 20 to 30 miles from the central business district of Detroit (excluding the Canadian side) is designated as the Dispersed Mobilization Zone. If time and circumstances permit, civil defense forces will be dispersed to mobilization points in this zone before the attack (see Figure 4); from these points, forces will converge on the perimeter of a damaged area and form sectors. A sector, or portion of the perimeter, is about one mile long; approximately 12 sectors will be formed around the damaged area. A field headquarters will be established to coordinate and control deployment of CD operations in the sector.

3.4 Performance Capabilities

Civil defense performance is judged by its ability to meet performance requirements. System parameters, which enable the evaluator to judge the degree of success or failure, define the performance characteristics according to the capabilities of its components.

Qualitative measures of performance for the system can be defined:

(1) Response time from one state to another.

(2) Readiness, or the proportion of components that are operational.

(3) Time to shelter Detroit's population (either total time, sheltering rate, or probability of reaching shelter).

(4) Vulnerability of equipment, supplies, and facilities, or the fraction of the system that survives the initial effects (attack phase) to perform CD operations (based on component probability of survival).

(5) Probability that the sheltered population will survive.

(6) Vulnerability of the individual or the community, or the proportion that survives the survival phase (based on the summation of the number of survivors added or resources protected by each CD operation).

(7) Vulnerability of equipment, supplies, and facilities or the fraction of resources that survive the aftereffects (survival phase) to enter the recovery phase (based on vulnerability, weapon yield, and operational figures of merit).

The numerical values (or range of values) for the qualitative measures cannot be estimated without a total systems analysis including the calculation of the effects on the casualty and property functions used in

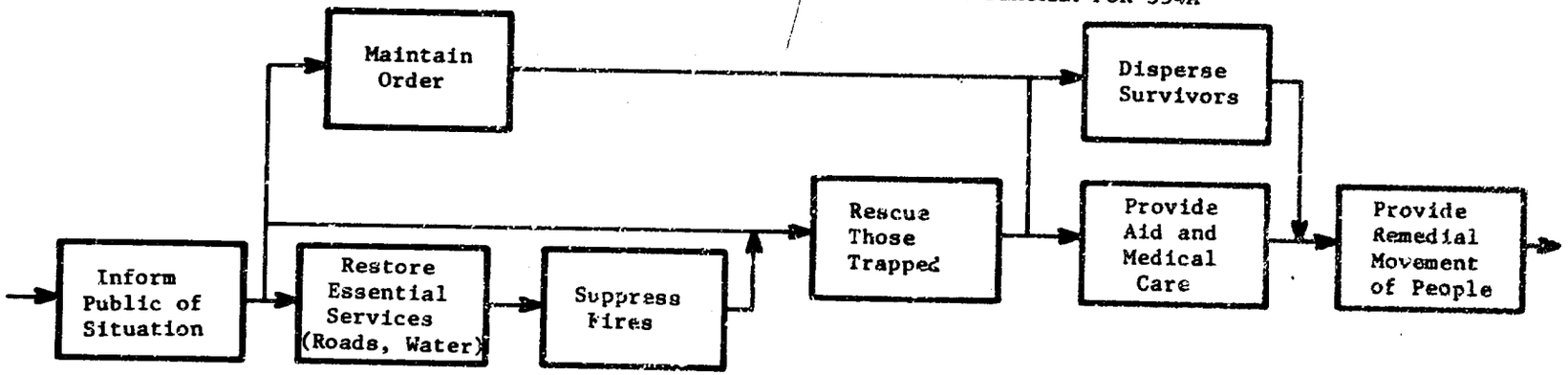
Table I

COUNTERMEASURES OPERATION SYNTHESIS

SLA No.	Problem* Definition	1 Provide Shelter	2 Provide Warning	3 Provide Remedial Movement of People	4 Rescue Those Trapped	5 Provide Protective Clothing	6 Maintain Health	7 Suppress Fires	8 Maintain Order	9 Shut-down for Attack	10 Disperse Survivors	11 Harden Shelters and Resources	12 Provide Aid and Medical Care	13 Provide Food and Water	14 Provide Housing	15 Inform Public of Situation	16 Restore Essential Facilities	17 Decontaminate Essential Areas	18 Provide Welfare Services
354A	5-B			X	X			X	X		X		X			X	X		
351B	6-C	X		X	X			X	X		X		X			X			
206	9-C	X		X	X				X		X		X			X			
456	5-A			X	X			X	X		X		X			X	X		
507	9-A	X		X	X				X		X		X			X			

* See Vol. II for Explanation

COUNTERMEASURE OPERATION FLOW DIAGRAM FOR 354A



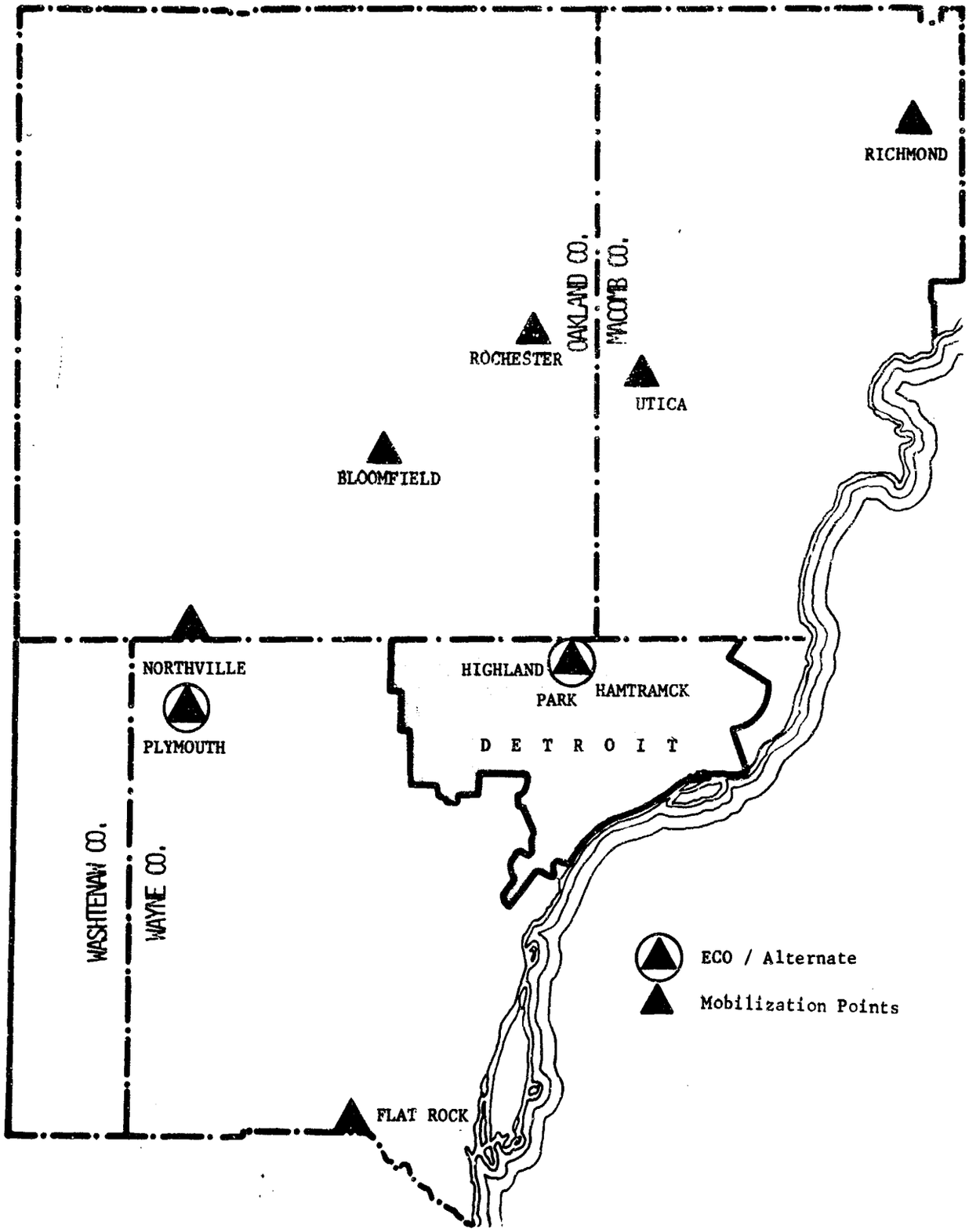


Fig. 4. Control and Mobilization Points.

the city damage calculations. When these values are available, they can be added as specific target parameters and should be incorporated as constraining limits in the performance requirements section.

3.5 Cost Estimates

The present study describes an existing "operating" system; nearly all costs except current operating expense have been expended and are considered nonrecoverable. Determination of total cost of a local CD system will require ground rules to enable the development of an appropriate value scheme since no real local cost constraints exist. Furthermore, assessment of voluntary help and dual-purpose systems complicate the determination of total cost. It is beyond the scope of this study to estimate cost.

Section 4.0

CENTRAL CONTROL SUBSYSTEM

4.0 CENTRAL CONTROL SUBSYSTEM

4.1 Headquarters Service

4.1.1 Mission and Performance Requirements

4.1.1.1 General--The Headquarters Service will establish and operate the command and control system to make most efficient use of resources, to maximize survivors, and to minimize property damage and the time for return to normalcy. Functions include organizing, planning, informing, deciding, commanding, maintaining morale, and dispersing.

Performance requirements can be expressed in terms of reduction in fatalities and casualties, reduction in property damage and loss, reduction in time to reestablish essential services.

4.1.1.2 Organizing (K.1)[8/]--The organizing mission includes the mobilization, integration, expansion or modification of the system necessary to make maximum use of personnel and resources after the attack.

Performance requirements can be expressed in terms of time to react to a specified attack environment and time to reestablish essential services with a specified personnel and resource level.

4.1.1.3 Planning (K.2)--The planning mission includes the evaluation of plans for the current and anticipated situation, alternate courses of action, comparison of performance with expected standards, and initiation of changes as necessary to meet anticipated situations.

Performance requirements could be expressed as time required to promulgate a change of plans due to changes in the anticipated attack environment or casualties estimates.

4.1.1.4 Informing (K.3)--The informing mission consists of collecting, processing, evaluating, and disseminating data necessary for the operation of the CD system. It includes internal, lateral, and higher organization communications.

Performance requirements can be stated as percent of the population reached, scope and extent of information disseminated, and desired time for the warnings and information to reach the population. Refinements in the requirements could include the degree to which the information and warnings are understood and a comparison of population reactions.

4.1.1.5 Deciding (K.4)--The deciding mission is the selection of the most appropriate course of action to maximize survivors, minimize property damage, and expedite a return to normalcy.

Performance requirements can be expressed as reduction of property damage, fatalities, casualties, and time to reestablish essential services when presented with different situations and concommitant courses of action.

8/ The parenthetical numbers provide cross reference to Devaney's Systems Analysis in Civil Defense, Part II, ch. 2 and ch. 3.

4.1.1.6 Commanding (K.5)--The commanding mission is the exercising of authority over the operation of the CD system. It includes a review of operations and a determination of whether the desired operations are being maintained with minimum adverse effects.

Performance requirements can be stated as a comparison of results between alternative command promulgating procedures.

4.1.1.7 Maintaining Morale (F.15)--The mission of maintaining morale is keeping the public informed about the situation, measures taken to improve the situation, and the condition of relatives.

Performance is classified as "high", "good", etc., according to the number of shelter incidents, confidence of the people, their willingness to accept and endure the hardships of shelter life, and similar indicators.

4.1.1.8 Dispersing (F.3.2)[9/]--The dispersing mission includes the movement of civil defense and other resources away from areas of high target value.

Performance requirements could be expressed as a reduction of resource losses for a given attack situation.

4.1.2 Components (C.1.3, C.2)

4.1.2.1 Teams and Responsibilities:

Command Team	Direct the entire CD system consistent with the mission and the local and national requirements.
Operations Team	Coordinate shelter, extra-shelter, and support service operations subject to the direction of the command team (see Headquarters Team or chiefs of other individual services)
Communication Team	Establish, operate, and maintain a central communication system.
Administrative Team	Provide administrative aid for entire Headquarters Service.
Public Information Team	Prepare the text of all CD information for release.
Broadcast Team	Detail the radio program for broadcast.
Publishing Team	Detail the CD material for typesetting and printing.
Liaison Group	Coordinate Detroit CD operations with other CD agencies whether local, independent support, or military.

9/ Op. cit., p. 54. This function is related but not explicitly the same as defined under F.3.2 of Devaney's Systems Analysis in Civil Defense, Part II.

4.1.2.2 Personnel Source and Number:

All City Departments	74
Other	8

The staff of the Detroit civil defense headquarters will consist of the director and employees of the OCD assigned to main and alternate control centers, the representatives of all the civil defense services, and the principal cooperating agencies and liaison officers from the military forces. There may also be personnel that the mayor may desire to have conduct administrative, fiscal, and legal matters during the emergency.

4.1.2.3 Communications--Communication equipment at the EOC will include telephones; 2-meter and 10-meter RACES radio systems; the State Conservation Radio System; local government radio systems; and access to the facilities of Emergency Broadcasting System (EBS).

4.1.2.4 Transportation--Transportation vehicles include city-owned vehicles assigned to OCD and other agency personnel, and private vehicles.

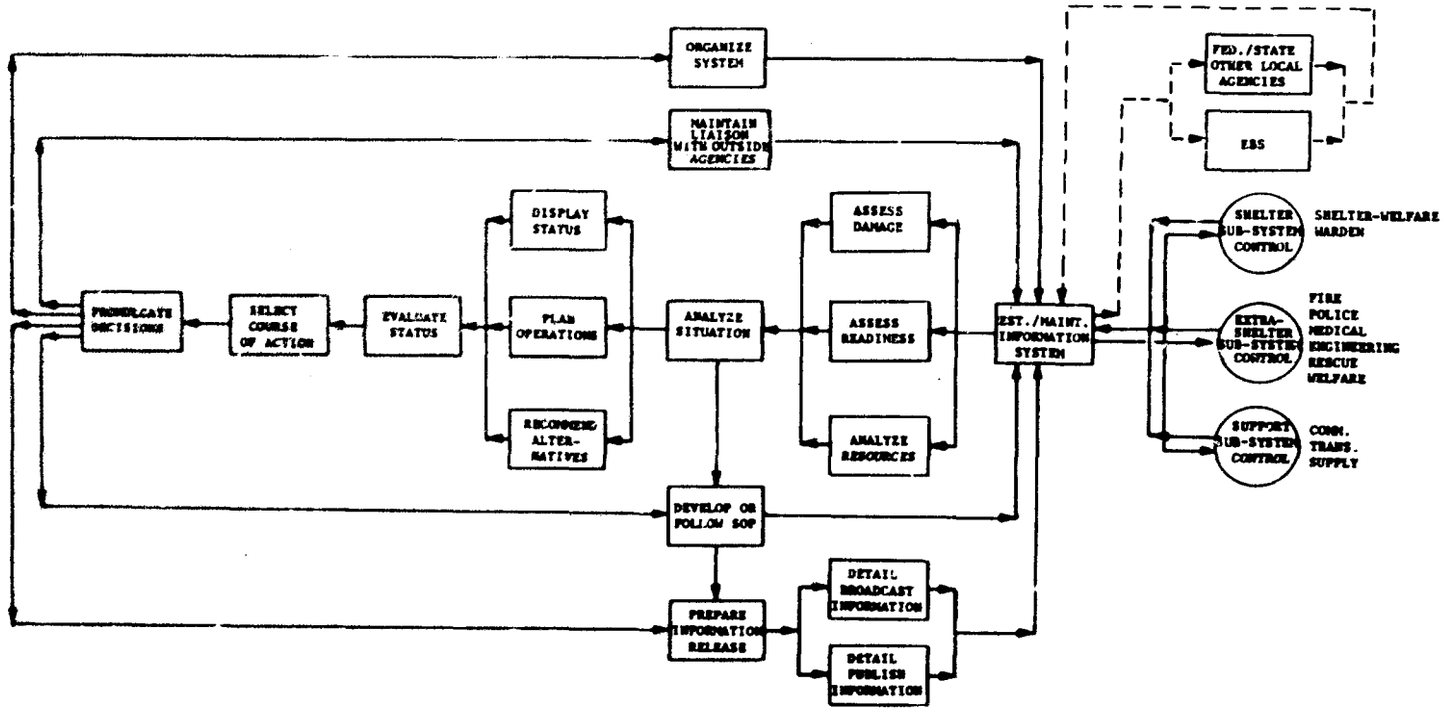
4.1.2.5 Equipment and Supplies--Control, shelter, and support resources now installed and stocked at the control centers (other than the communication and transportation items identified above) shall be supplemented as needed.

4.1.2.6 Facilities (see Figure 4):

Main Control Center
900 Merrill Plaisance
Palmer Park
Detroit 3, Michigan

Alternate Control Center
Detroit House of Correction
Five-Mile Road, west of Beck Road
Plymouth, Michigan

4.1.3 Operations (see Figure 5)



Personnel, together with equipment, will activate the emergency operations center (EOC) and the alternate center during the preattack (strategic or tactical) phase. Communications will be established with assigned group control units, with other EOC, and with the state and higher headquarters. Remaining under cover during the attack phase, deployment control teams will emerge from shelter to direct survival operations by the civil defense system during the postattack phase.

Control of operations will be exercised through the management organizations of the Shelter Subsystem, Extra-Shelter Subsystem and the Support Subsystem. A parallel chain of command will be maintained and utilized through the group or sector control units on down to the actual working level, the operating teams.

Within the Headquarters (EOC, primarily, but with alternate keeping track of the situation and decisions, unless one is destroyed during attack phase), the Operations Team accepts the inflow of information and analyzes it for action. This team is composed of at least one high level individual representing each of the services which, in turn, perform all of the integrator functions. This composite team assesses the information received for damage, readiness, and remaining available resources.

A situation is analyzed; SOP's followed, if feasible; or specific plans are developed for command approval. Information is released to the public and presentations are made to the command team concerning situation status and suggested operations (with alternatives). The command team evaluates the situation, selects a course of action, and issues orders to the civil defense system through the operations team.

Support for the command and operation teams is provided by a number of specialized teams, such as: administration, information, broadcast, and liaison.

Fig. 5. Central Control Operations.

Section 5.0

SHELTER SUBSYSTEM

5.0 SHELTER SUBSYSTEM

5.1 Welfare Service - Sheltering (F.1)

5.1.1 Mission and Performance Requirements--The mission of the Welfare Service will be to organize and operate the shelter subsystem to protect the population from immediate and delayed weapons effects and to minimize the hardships and problems of shelter life.

Performance requirements can be expressed as a reduction in fatalities and casualties from prompt and residual weapons effect. Specifications can be stated in terms of PV, PF, square feet per shelter occupant, and comfort facilities.

5.1.2 Components- The NFSS shelter tabulation provides a description of shelter components; this information is summarized by SLA in Figure 6.

5.1.3 Operations (see Figure 7).

5.2 Warden Service - Moving to Shelter (F.3.4)[10/]

5.2.1 Mission and Performance Requirements--The mission of the Warden Service is the movement of people to shelters and from hazardous to less hazardous areas. This service is not currently functional in the Detroit system.

Performance requirements can be expressed as specified times for movement as well as percentage of available shelter used.

5.2.2 Components--The components of this service are individuals as mobilized and trained by civil defense personnel during the preattack phase.

5.2.3 Operations (see Figure 7)--Organization and operational plans will be developed later.

5.3 Medical Service - RADEF (K.3.1.1.3.2)

5.3.1 Mission and Performance Requirements--The mission of the Medical Service is to determine, evaluate, forecast, and disseminate information on radiological, biological, or chemical hazards resulting from an attack on Detroit or the surrounding area.

Performance characteristics can include specified time to complete a survey, time to reduce monitoring or survey data, and specified accuracy of contamination plots.

5.3.2 Components (C.1.3)

5.3.2.1 Teams and Responsibilities:

Headquarters Team	Provide information on radiological conditions to headquarters personnel (see Headquarters Operations Team).

10/ This function is not uniquely defined in Devaney's Systems Analysis in Civil Defense; for this reason a fourth function is added here and F.3.2 is reserved for tactical movement (dispersal in Detroit CD plans).

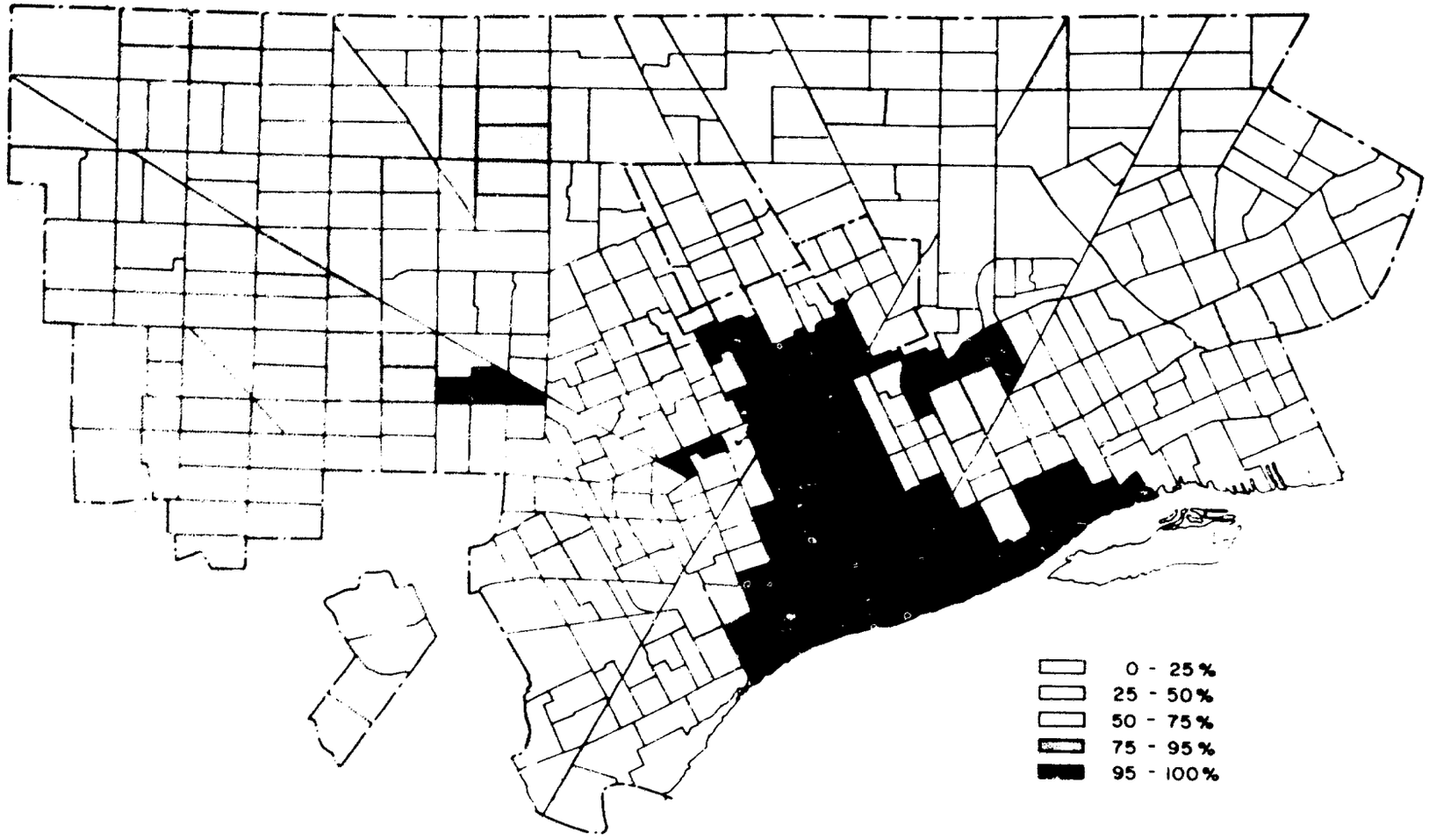
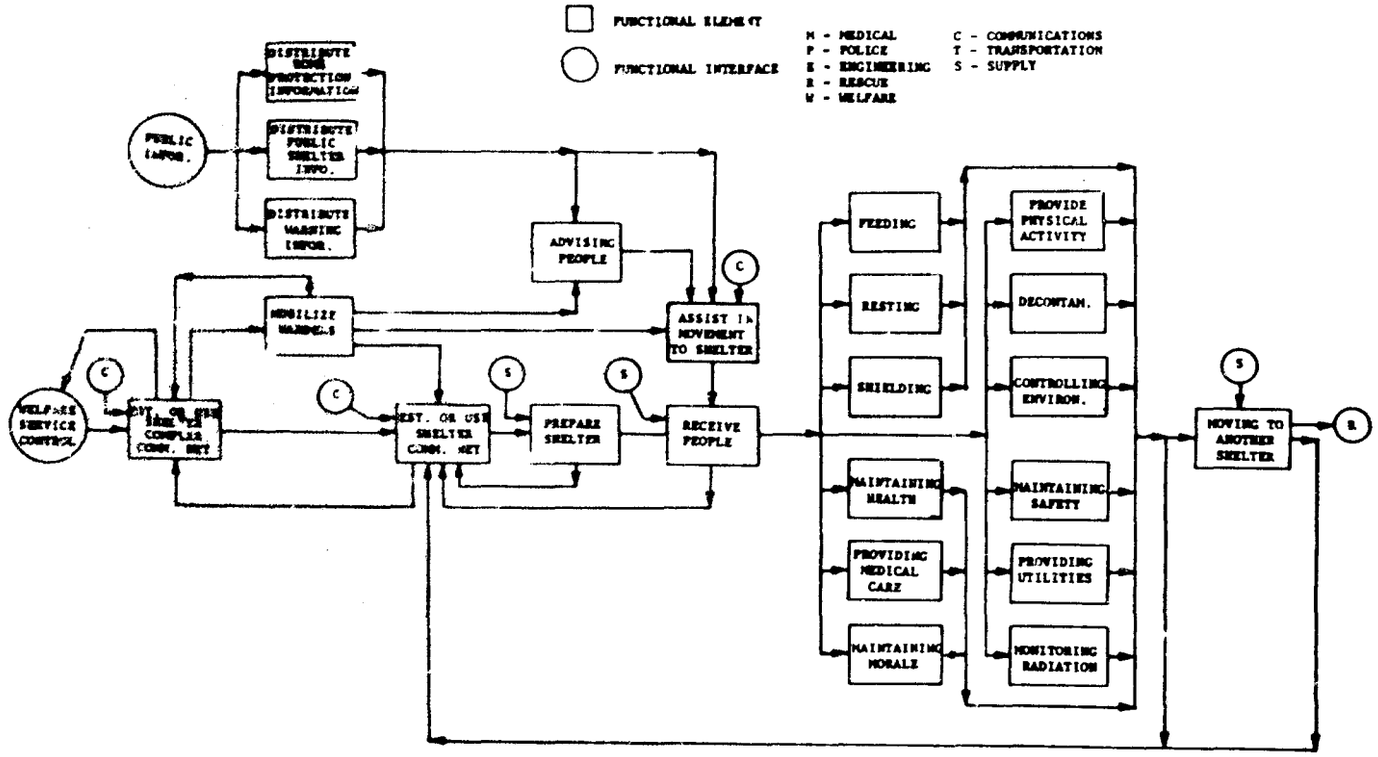


Fig. 6. Population Percent Protected by NFSS Shelters.



Shelter control operations are of primary concern during the preattack (tactical phase) of any emergency situation. The shelter complex communication network is activated between shelter groups and headquarters. The wardens are mobilized to aid in advising the population as to the situation and to assist in the movement of the population to shelters. While this effort is in progress, the public information system will be involved in providing the population with all the information necessary for individual and group guidance and preparation. The public will be warned about the situation by means of the air raid warning system, the wardens, and the distribution of home protection and public shelters information. The population is assigned to public shelter on the basis of distance (within 15 minutes walking distance). All those not assigned to shelters will be requested to remain at home in whatever shelter can be devised.

As the attack phase becomes more imminent, the shelter system is fully activated as it receives assigned people. Within the shelter complex and individual shelters, a number of functions are performed that parallel those encountered in the overall civil defense system. The shelter subsystem is a complete, functioning entity that provides protection for the population, both during the attack and afterwards, as dictated by fallout, during the survival phase. It functions during this period in co-existence with the Extra-shelter and Support subsystem to provide additional support to survivors from the damage areas. The shelter groups can act as way-stations for survivors moving out of disaster areas by providing interim shelter from radiation hazards, or as lodging pending establishment of reception centers by Welfare Service.

Fig. 7. Shelter Operations.

Reporting Team	Supervise RADEF stations; collect and relay RADEF reports to headquarters.
Monitoring Team	Monitor radiological conditions at fixed sites or on RADEF reconnaissance trips as directed.

5.3.2.2 Personnel Source and Number:

Medical	12
Building and Safety Engineering	404*
Fire	154

* Including 180 volunteers

5.3.2.3 Communications--Fire department communications will be used by fixed RADEF stations with priority second to fire units; RACES mobiles will be assigned by the Communication Service; other emergency facilities will include public telephone and available messenger service.

5.3.2.4 Transportation--Vehicles will be assigned and equipped with a mobile radiological monitoring station. Other light vehicles will be assigned for emergency use by Transportation Service.

5.3.2.5 Equipment and Supplies--All existing equipment pertaining to radiological monitoring (including 165 CD V-777 kits), Federal supplies, and equipment as available will be assigned to RADEF units

5.3.2.6 Facilities--Fire stations, schools, and shelters have been designated as fixed monitoring stations (Figure 8 shows fixed stations at schools which are operated by the Engineering Service in support of RADEF operations).

5.3.3 Operations (see Figure 9)

5.4 Communication and Warning Service (F.2)

5.4.1 Mission and Performance Requirements--The mission of the Communication and Warning Service is to inform the populace of a potential hazard, to direct protective action according to the instructions and information issued by the Headquarters Service (4.1.1), and to sound warnings to mark the transition from one emergency time phase to another--that is, strategical to tactical, tactical to attack, attack to survival.

Performance requirements can be stated as the percent of the population that follow the instructions and the percent of protective facilities that are used after the warning and before the attack.

5.4.2 Components

5.4.2.1 Teams and Responsibilities:

Dispatcher: Police Telephone Bureau	Receive initial air raid warning; disseminate by the Bell and Lights and the siren system.

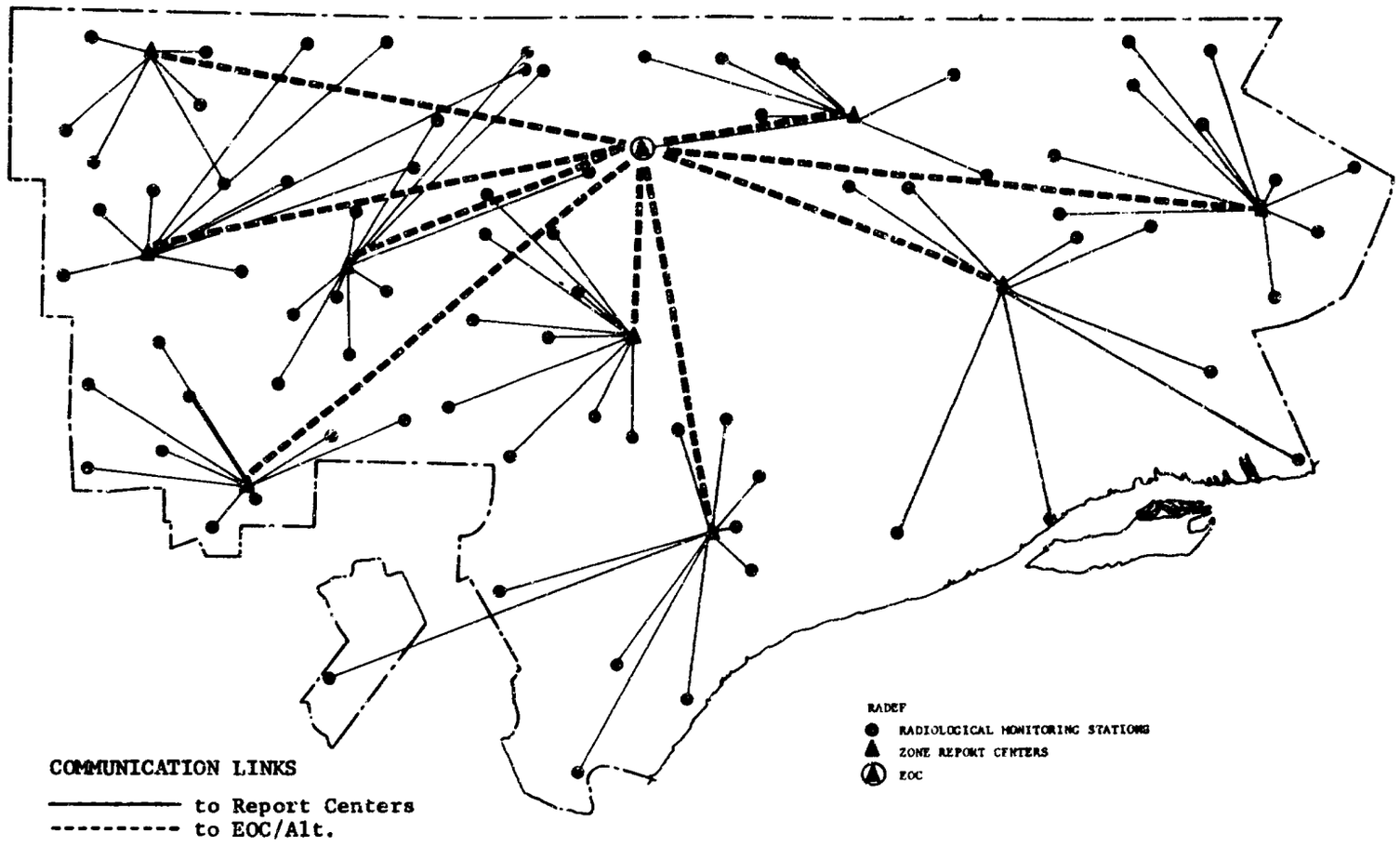
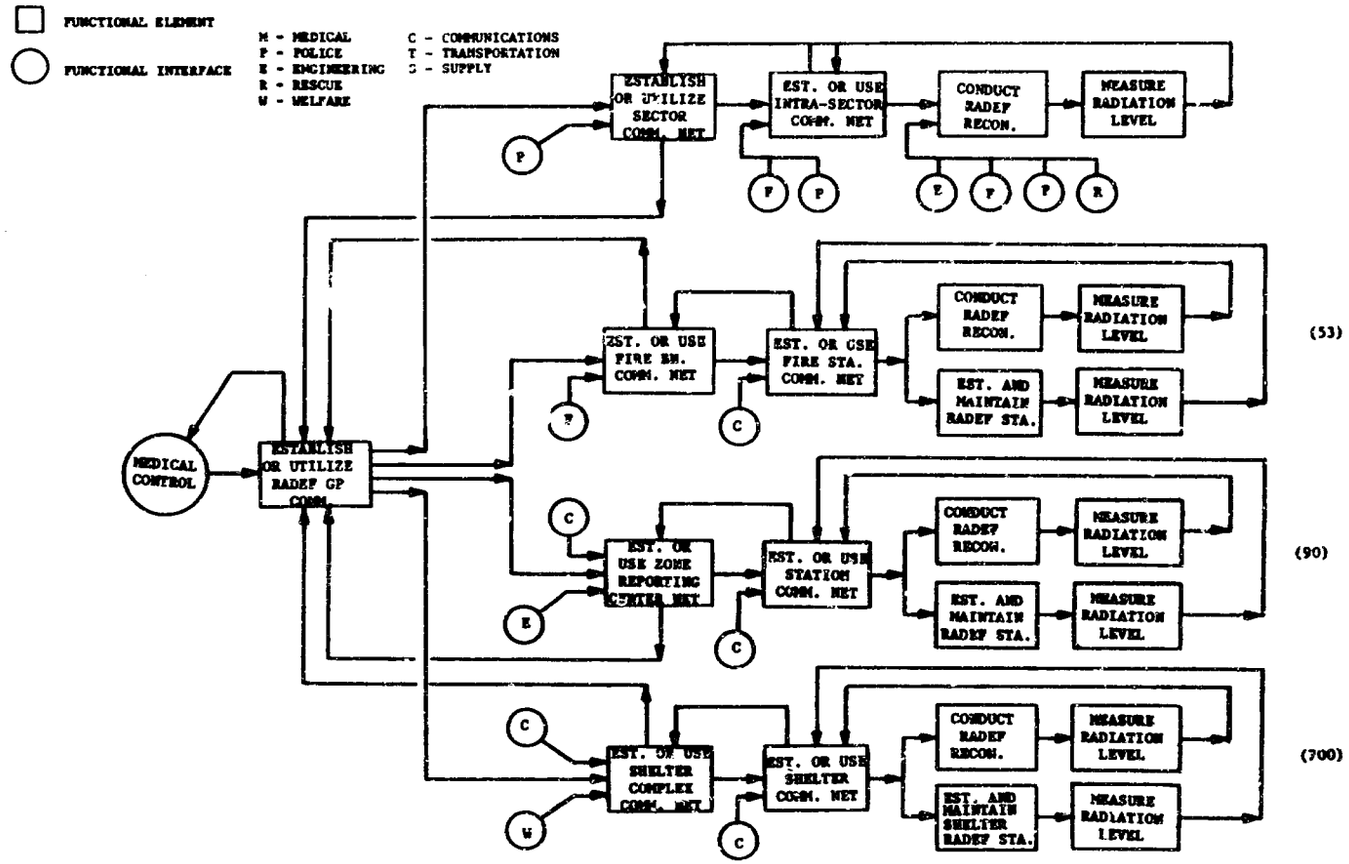


Fig. 8. RADEF (Engineering) Station Distribution.



During the preattack phase, the RADEF personnel move with equipment to preassigned mobilization points; there to remain in shelters until after the attack. In the tactical phase, RADEF Service uses established group communication networks to maintain contact with Headquarters and Sub-ordinate Monitoring Stations. As teams deploy during the survival phase, various communication nets are activated: sector, fire battalion, and shelter complex. These nets, in addition to normal control function, such as that of the shelter complex, will be used to collect and then disseminate radiological fallout information. All communications will be vertical to higher control units unless otherwise directed.

Radiological fallout surveys will be conducted by both ground and aerial teams that move toward the damage area ahead of all services (as well as with firefighting teams). In addition, general area surveillance is maintained to detect fallout in areas that would result from detonations outside the immediate target area. A close watch would be kept on radiation levels, from fixed monitoring points located in fire stations and schools and mobile teams operating in conjunction with other Civil Defense Services.

Fig. 9. RADEF Operations.

Emergency Broadcast Unit	Warn and advise public when Alert or Take Cover signal sounds.
Dispatcher: Fire Service Headqusrters	Activate siren system manually if not operating simultaneously with receipt of Take Cover signal by Bell and Lights system.

5.4 2.2 Personnel Source--Telephone dispatchers of the Police and Fire Services are assigned this function as an additional duty.

5.4 2.3 Communications--The fire department Bell and Lights system, The Outdoor Warning System (siren), and the EBS are allocated to this service.

5.4.2.4 Transportation--Police and Fire Services communications and maintenance vehicles are assigned on a priority basis.

5.4.2.5 Equipment and Supplies--Police and Fire Services communications and ancillary equipment are allocated as needed.

Section 6.0

EXTRA-SHELTER SUBSYSTEM

6.0 EXTRA-SHELTER SUBSYSTEM

6.1 Medical Service

6.1.1 Mission and Performance Requirements

6.1.1.1 General--The Medical Service will direct and coordinate all activity related to collection and care of casualties and will coordinate public health and mortuary services. The objective is to prevent deaths and to reduce loss of man-days of productive effort.

Performance requirements may be expressed as reduction of the loss of man-days, the incidence of illnesses due to shelter environment, the time to determine extent and intensity of radiation, and the number of burials.

6.1.1.2 Medical Care (F. 12)--The mission of medical care is to prevent deaths and to reduce loss of man-days whether caused by illness, injury, or other complications.

Performance characteristics can be expressed as the number of ill or injured transported to a treatment center, the number of inpatients and outpatients treated, the number of hospital beds available, and average length of incapacitation.

6.1.1.3 Maintaining Health (F. 6)--The health mission is to reduce spread of disease and to prevent deaths of the ill or those caring for them.

Performance requirements can be stated as the amount of water purified, sewage disposed of, refuse and garbage collected, the number and type of inoculations administered, and the specified levels of vector control.

6.1.1.4 Burial of Dead--The burial mission is to eliminate or reduce health hazards and psychological effects on survivors.

Performance requirements can be expressed as number of burials and burial rate.

6.1.2 Components (C.1.3, C.2)

6.1.2.1 Teams and Responsibilities:

Service Chief	Direct medical operations for entire CD system (see Headquarters Operations Team).
Group Controllers	Direct medical operations of teams in assigned zone.
Sector Controllers	Direct medical teams within assigned sector.
Reconnaissance Team	Conduct aerial and ground reconnaissance to locate existing or potential hospital facilities.

First Aid Team	Provide emergency first-aid for seriously and lightly injured survivors; arrange for remedial removal of seriously injured to existing or emergency hospital centers.
Collecting Team	Move litter patients from first-aid centers to emergency hospital centers and remove nonambulatory survivors from damaged areas to first-aid centers; aid in locating casualties.
Ambulance Team	Move nonambulatory, seriously injured to existing or emergency hospital centers.
Emergency Treatment Team	Locate existing facilities and establish emergency treatment centers; provide emergency treatment for nonambulatory and ambulatory seriously injured.
Hospital Team	Activate existing hospital facilities and care for seriously injured.
Outpatient Treatment Team	Establish outpatient care for lightly injured ambulatory survivors.
Public Health Team	Provide sanitation, hygiene, inoculation, quarantine, and vector control services.
Burial Detail Team	Assist Engineering Service (Burial Detail Team) in collection and burial of dead.

6.1.2.2 Personnel Source and Number:

Health Department	3,600
Fire Department	3
Wayne County Medical Society	?

6.1.2.3 Communications--Telephone communication facilities that are normally available, mobile 10-meter RACES radio systems, mobile local government radio systems, and other emergency facilities developed by Communication Services are assigned to the Medical Service.

6.1.2.4 Transportation--City vehicles normally assigned to the department of health, private vehicles as authorized, and light commercial vehicles that are assigned by Transportation Service for temporary use represent the capability of the service.

6.1.2.5 Equipment and Supplies--All available equipment and supplies in the city commonly used by the Medical Service with first priority over other services and Federal and State equipment, especially the Civil Defense Emergency Hospitals (CDEH), are allocated to the Medical Service.

6.1.2.6 Facilities--All medical facilities and institutions in the city (see Figure 10 and Table II) and public high schools are assigned for emergency care.

Total Number of Hospitals	53	10,001 beds
Over 100 beds	28	8,648 beds
Under 100 beds	25	1,353 beds

6.1.3 Operations--Medical care operations are described in Figure 11. Public health operations are not illustrated; they are reinstated during survival phase but are most important during the recovery phase.

6.2 Engineering Service

6.2.1 Mission and Performance Requirements

6.2.1.1 General--The Engineering Service will reestablish essential facilities, utilities, and communication routes by restoration of facilities, decontamination, hardening, emergency shutdown, collection and burial of the dead, and removal of debris.

Performance requirements can be expressed as the number of facilities, utilities, and communication routes reestablished, facilities restored, areas decontaminated, installations shutdown, the degree of reduction in loss of property and domestic animals, and the number of dead collected and the time required to transport to collection points.

6.2.1.2 Restoring Facilities (F.16.2, 16.3)--The restoring mission is to return facilities required for civil defense functions to usable condition, consistent with nature of the emergency.

Performance requirements can be expressed as the number and types of structures or facilities (such as headquarters, hospitals, utilities, transportation systems, housing, and communication centers) restored or replaced within a specified time.

6.2.1.3 Decontamination (F.17)--The decontamination mission is the removal of chemical, biological, or radiological contamination from areas or structures.

Performance requirements include the size of the area to be decontaminated, degree of contamination, and the time required for decontamination.

6.2.1.4 Hardening (F.11)--The mission of hardening is the protection of property and domestic animals against weapons effects by reducing vulnerability.

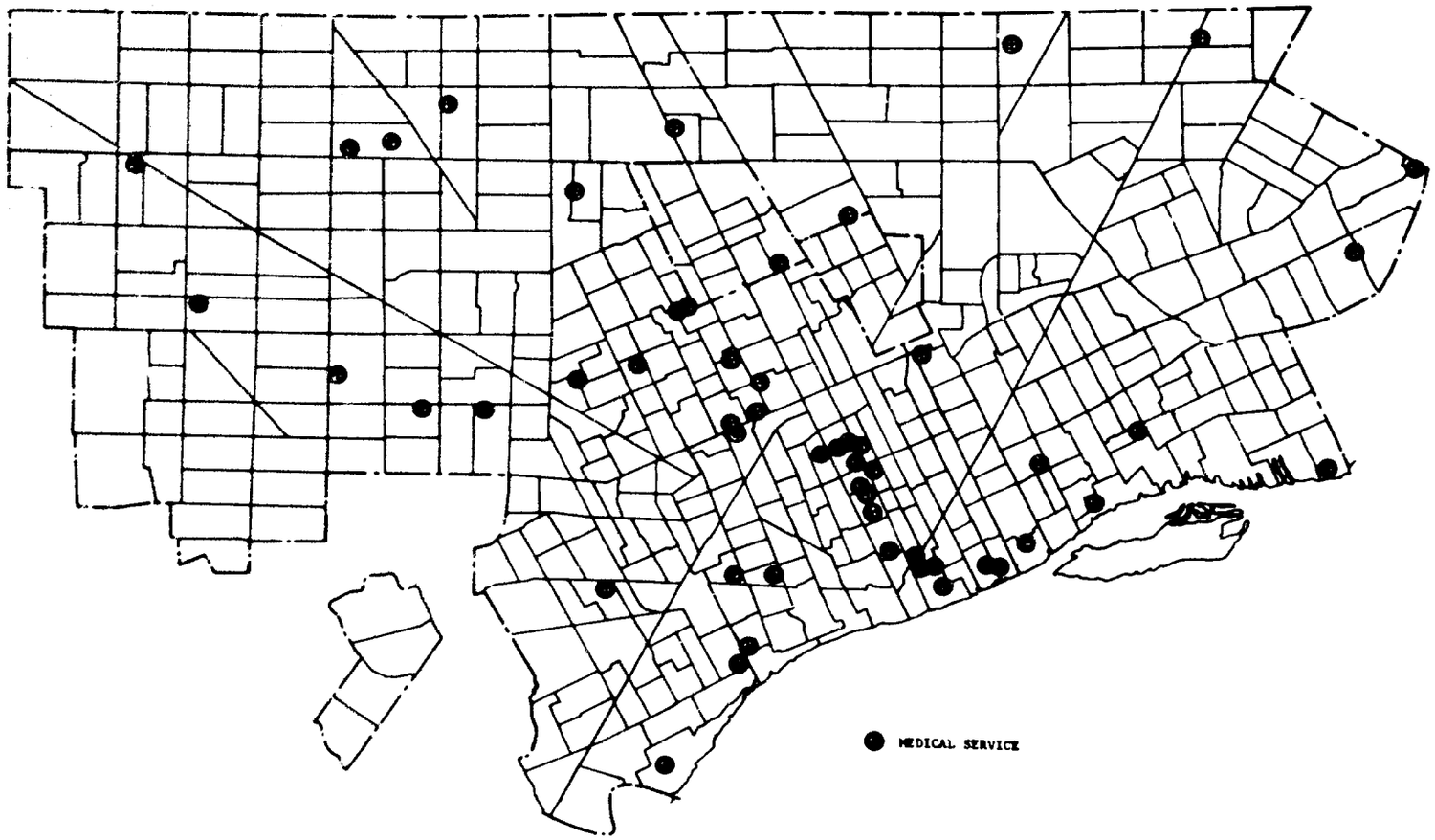


Fig. 10. Major Medical Facilities Distribution.

TABLE II

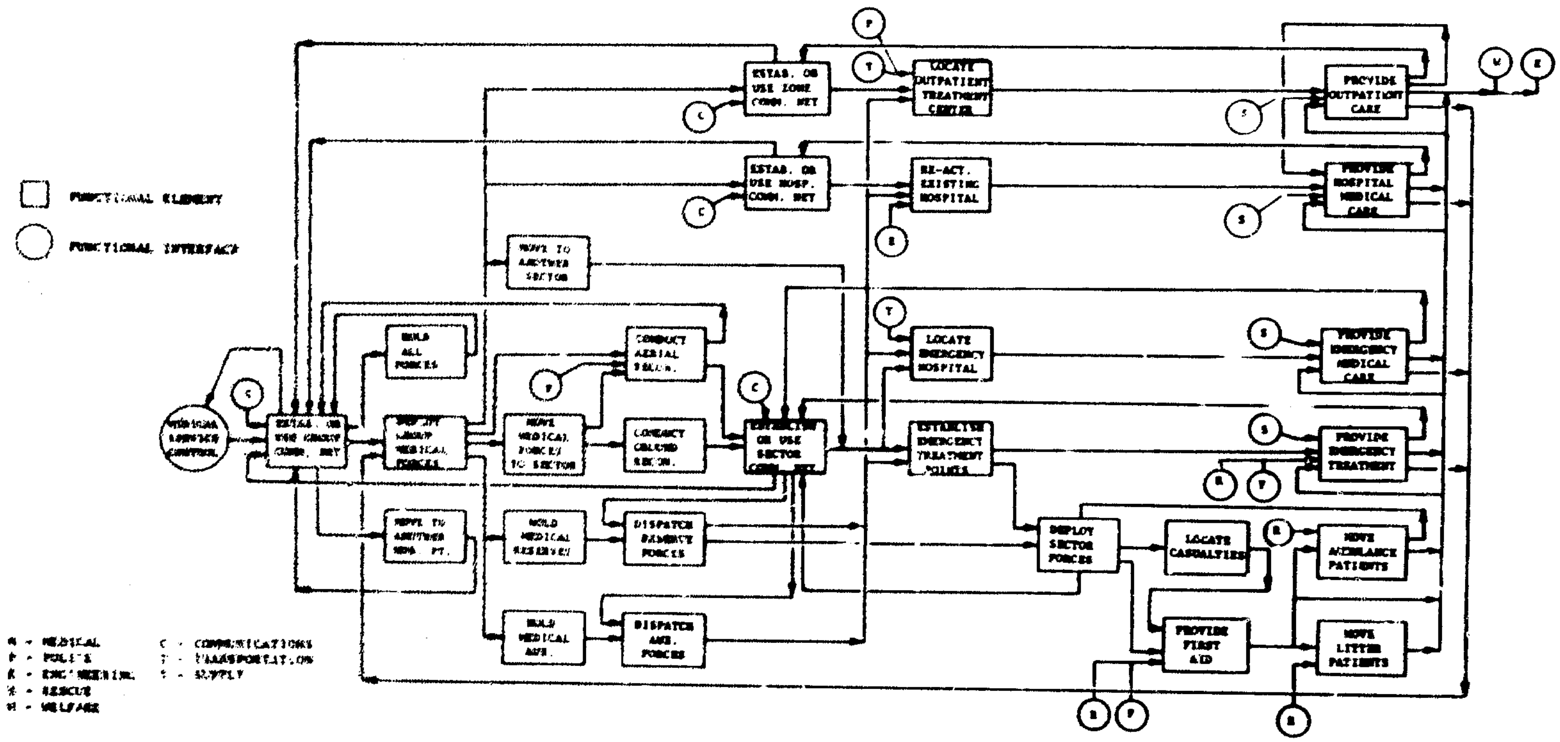
DETROIT MEDICAL FACILITIES

Existing Hospitals		
Name	Address	No. of Beds
Henry Ford Hospital	2799 W. Grand Blvd.	1029
Herman Kiefer Hospital	Hamilton and Taylor	1018
Receiving Hospital	1326 St. Antoine	700
Harper Hospital	3825 Brush	690
Mt. Carmel Mercy Hospital	6071 W. Outer Dr.	559
Grace (Northwest)	18700 Meyers	444
Grace Hospital	4160 John R	425
Sinai Hospital	6767 W. Outer Dr.	387
Woman's Hospital	432 E. Hancock	357
Detroit Memorial Hospital	1420 St. Antoine	335
St. John Hospital	22101 Mack	292
Children's Hospital	5224 St. Antoine	215
Columbia Medical Hospital	250 E. Columbia	187
Crittenton Hospital	1554 Tuxedo	193
U. S. Public Health Service	Windmill Pointe	183
Zeiger Osteopathic Hospital	4244 Livernois	165
Martin Place Hospital West	19535 Schoolcraft	173
Metropolitan Hospital	1800 Tuxedo	156
Holy Cross Hospital	4777 E. Outer Dr.	151
Art Centre Hospital	5435 Woodward	150
Lafayette Clinic	951 E. Lafayette	145
Jennings Memorial Hospital	7815 E. Jefferson	134
Saratoga Hospital	15000 Gratiot	127
Brent General Hospital	16260 Dexter	120
Alexander Blain Hospital	2201 E. Jefferson	110
Burton Mercy Hospital	271 Elliot	106
St. Clair Hospital	7850 E. Jefferson	101
North Detroit General Hospital	3105 Carpenter	97
Boulevard General Hospital	1852 W. Grand Blvd.	93
Plymouth General	15361 Plymouth	83
Elliott General	13015 W. Chicago	80
East Side General Hospital	2199 Cadillac	80
Maybury Grand Medical Hospital	2750 Maybury Grand	77
Lincoln Hospital	1053 25th St.	76
Doctors Hospital	2730 E. Jefferson	74
Lakeside General Hospital	995 E. Jefferson	72
Delray General Hospital	7125 W. Jefferson	66
Northwest General Hospital	8741 W. Chicago	57
E. K. Thomas Memorial Hospital	556 Garfield	52
Kirwood General Hospital	301 E. Kirby	50
Towne Hospital	525 E. Grand Blvd.	50

TABLE II (Continued)

Existing Hospitals		
Name	**Address**	**No. of Beds**
Park Community Hospital	801 Virginia Park	46
Mercy General Hospital	2929 W. Boston	44
Mt. Lebanon Hospital	2610 14th St.	34
Lister General Hospital	10040 Yellowstone	33
Palmer Osteopathic Hospital East	4535 Cadieux	31
Palmer Osteopathic Hospital	18160 Woodward	30
Straith Hospital	2605 W. Grand Blvd.	29
St. Joseph Mercy Hospital	2200 E. Grand Blvd.	28
Barlo General Hospital	292 E. Ferry	28
McGregor Center	8344 E. Jefferson	25
Civic Hospital	610 E. Grand Blvd.	18
Trumbull General Hospital	3966 Trumbull	
Evangelical Deaconers	3245 E. Jefferson	
Redford General	Grand River Blvd.	

Existing 200-Bed CDEH Stored in Southeast Michigan			
County	**City**	**Location**	**Model No.**
Livingston	Brighton	Brighton City Fire Dept. Bldg.	55/355-7/57
	Howell	County Court Bldg.	55/420-6/57
	Pinckney	Putman Township Hall	55/354-6/57
Monroe	Carleton	Airport School	56/30-8/58
	Dundee	Monroe County Road Commission	55/[illegible]79-6/58
	Ida	Ida Farmers Cooperative	56/31-8/58
	Monroe	Monroe Port Commission Bldg.	55/380-6/58
Oakland	Lake Orion	Lake Orion Jr. High School Annex	56/32-8/58
	Milford	Adm. Bldg. Proving Grounds	55/255-5/58
	Oxford	Masonic Temple	57/659-6/61
St. Clair	Marine City	Marine City Filtration Plant	55/257-5/58
	Marysville	Marysville High School	55/257-12/57
	Yale	Yale City Hall	55/[illegible]78-10/57
Washtenaw	Dexter	Dexter City Fire Dept.	57/656-6/61
	Ypsilanti	Ypsilanti State Hospital	57/658-6/61
Wayne	Detroit	Redford Twp. OCD Storage Bldg.	56/197-10/59



Medical service personnel and equipment would be dispersed during the preattack (tactical) phase to preassigned mobilization points. Medical group communication networks would be established and activated vertically to headquarters and laterally to other medical group control units. During the attack phase, operations should be in abeyance. During the survival phase, medical forces would be deployed into sectors with deployments based upon the results of both ground and aerial reconnaissance, local and from headquarters. It is also possible that one or more group control unit(s) would have to move to another mobilization point should the one assigned be untenable.

The deployment of group medical forces would include movement of forces into the sector and the holding of medical reserves or auxiliary pending clarification of the situation. At the same time medical forces could be shifted between sectors depending upon the requirement.

Sector forces establish emergency and first aid medical facilities. The re-establishment and use of hospital communication nets would be instigated as usable hospitals are reactivated. Also during this initial phase of operations, zones would be established within a sector as [illegible] for the treatment of out patients.

As the medical forces are deployed into the sectors, sector communication networks [illegible]. Communications would be vertical to group and headquarters control units and lateral to other medical sector control units. The establishment of sector control units would allow [illegible] hospitals to be established together with emergency treatment points. These would be operated in the zone in conjunction with existing hospitals that had been reactivated and out-patient treatment centers that had been established in zones or sectors. Sector forces would then be deployed into the sector to provide support to the segment teams from the rescue, fire, police and other subsystems that are operating in the sectors within the damage lines.

Deployed medical forces would be engaged in the operations of locating casualties and providing first aid to survivors. In addition, first aid would include the movement of litter patients and the provision of the removal of non-ambulatory patients by ambulance.

The emergency hospitals and the emergency treatment points would provide for the emergency care and emergency treatment of seriously and moderately injured ambulatory and non-ambulatory persons. Hospital facilities that have been reactivated would provide essential complete hospital medical care, at least to the extent of available equipment and personnel.

Hospitals that survive the initial attack and are outside the damage line are reactivated and used to provide extensive hospital and medical care for the non-ambulatory, seriously injured survivors at the same time out-patient treatment centers are established to care for ambulatory and slightly injured survivors. In all cases, the local emergency hospitals and treatment points will tend to funnel medical casualties back through either the hospital or the out-patient care centers. From there, as feasible, the survivors are sent on to welfare centers for care and rehabilitation.

Fig. 11. Medical Care Operations.

Performance requirements can be expressed as reduction of loss of property and domestic animals, and as the degree of hardening--that is, amount of increase in PF or PV, number of square feet of space to be hardened, or amounts of critical materiel to be shielded.

6.2.1.5 Emergency Shutdown (F.9)--The shutdown mission is to protect property and life by eliminating losses due to secondary effects.

Performance requirements could be reduction of property damage and number of industrial installations shutdown.

6.2.1.6 Collection and Burial of Dead--The burial mission is to reduce health hazards by promptly collecting and transporting the dead to burial points, burying them, and registering the graves.

Performance requirements can be stated as the number of dead to be collected, distance to collection points, and man-hours to collect and bury the dead.

6.2.1.7 Debris Removal (F.16.1)--The debris clearance mission is to reestablish access to structures or use of transportation routes by removal of obstructions.

Performance requirements can be expressed as tons (or volume) of debris removed, miles of transportation routes cleared, and time to accomplish the task.

6.2.2 Components

6.2.2.1 Teams and Responsibilities:

Headquarters Team	Direct engineering operations for entire system (see Headquarters Operations Team).
Group Controllers	Direct engineering operations of teams in assigned mobilization zone.
Sector Controllers	Direct engineering operations of teams in assigned sector.
Decontamination Team	Decontaminate essential areas in support of other service operations.
Debris Removal Team	Clear routes into and out of the damaged area to provide ready access to medical care centers, welfare reception centers, and other areas of safety; remove debris to facilitate firefighting and rescue of trapped survivors.
Repair Team	Repair essential buildings behind damage lines in support of Welfare and Medical Services; restore essential facilities such as water and power.

Demolition Team	Demolish damaged buildings or structures to decrease hazards to adjacent facilities or traffic routes.
Burial Detail Team	Collect and bury dead.
Reconnaissance Team	Conduct aerial and ground reconnaissance to determine access routes for movement of survivors and the condition of emergency equipment, facilities, and utilities.

6.2.2.2 Personnel Sources and Numbers

City Plan Commission	55
Housing Commission	395
Municipal Parking Authorities	1
Public Lighting Commission	650
Public Works Department	4,900
Streets and Traffic	245
Water Supply	1,140

6.2.2.3 Communications--Local government radio system, Detroit Edison radio system, Michigan Consolidated Gas Company radio system, radio systems of private contractors, public telephones, and messengers are assigned as available.

6.2.2.4 Transportation--All vehicles ordinarily available to the Engineering Service and other vehicles by request to the Transportation Service represent the capability of the service.

6.2.2.5 Equipment and Supplies--Equipment and supplies of the combined city departments and items available to cooperating private agencies are allocated to the Engineering Service.

6.2.2.6 Facilities--Facilities are assigned from the cooperating departments and agencies (see Figure 12) and all private organizations engaged in engineering or construction activity.

6.2.3 Operations (see Figure 13).

6.3 Fire Service (F. 7)

6.3.1 Mission and Performance Requirements--The Fire Service will control fires, limit destruction of property, and rescue persons threatened by fire.

Performance requirements can be expressed as the reduction of property destruction, time to control a fire of a designated size, and reduction of deaths, illness, or injury caused by fire.

6.3.2 Components

6.3.2.1 Teams and Responsibilities:

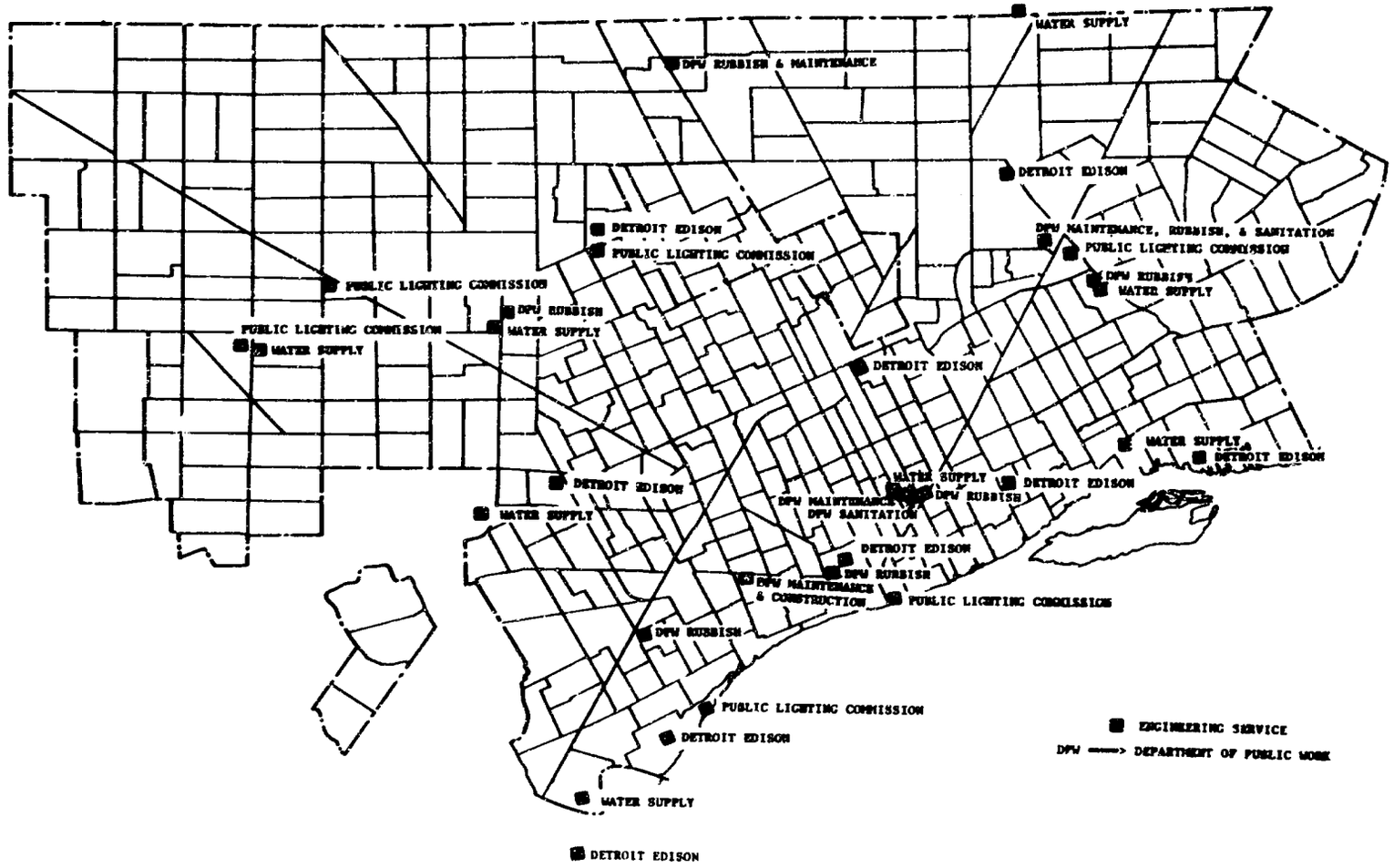
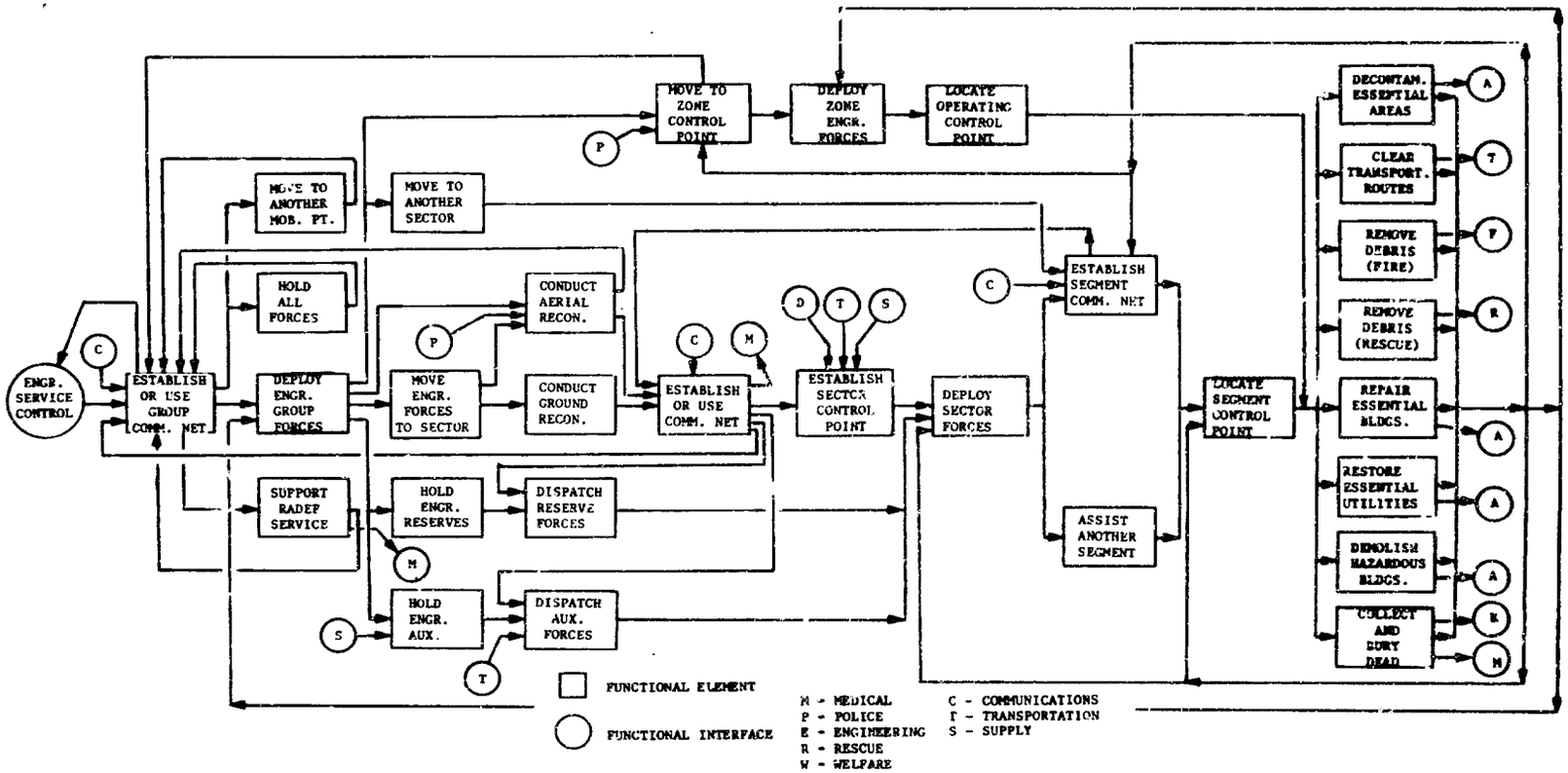


Fig. 12. Engineering Facilities Distribution.



During the preattack phase, the Engineering Services are dispersed to preassigned mobilization points. The group communication networks are established and activated between headquarters and the various group control units. During attack, operations are held in abeyance and personnel and equipment are kept sheltered. Following attack, group forces are deployed or held in reserve depending upon the existing situation. The group control unit may move to another mobilization point should the assigned point become untenable.

Based upon own and headquarters reconnaissance information, engineering group forces are deployed into assigned sectors. At the same time, engineers provide support to the RADEF Service. Engineer reserves and auxiliary forces are held and dispatched as necessary to support sector or segment operations with forces deployed into sectors. Ground reconnaissance backed up by aerial reconnaissance is conducted to establish a plan of action for the clearance of debris from major roads and for the restoration of facilities as required for the remedial removal of survivors, fighting of fires, and the conduct of radiological monitoring.

At the same time that sector group forces are being deployed, zone control units may be set up, either within a sector or intersector, in areas behind the damage line to support Medical, Welfare, Shelter Services, etc.

Sector control points are established and sector control units activate communication networks. Communications are established vertically with group and headquarters and laterally with other sector control units. Once this has been done, sector forces are deployed toward the damage line to establish segment control points for the deployment of forces within a segment or to assist other segments.

Once segment communication networks have been activated, the segment control unit deploys its teams in support of Rescue, Fire, and Medical Services. Engineer team operations include, but are not necessarily limited to the following: removal of debris in support of the fire and rescue services; clearing of transportation routes for the removal of survivors and for the passage of required equipment; conducting of essential decontamination but not general decontamination; restoration of essential utilities and facilities such as power and water; repair of essential buildings and the demolition of hazardous buildings; and finally, when the situation has begun to stabilize, the collection and burial of the dead.

Fig. 13. Engineering Operations.

Service Chief	Direct firefighting operations for entire CD system (see Headquarters Operations Team).
Group Controllers	Direct firefighting operations of teams in assigned zone.
Sector Controllers	Direct firefighting operations of teams in assigned sector.
Reconnaissance Team	Conduct aerial and ground reconnaissance to assess fire situations--that is, to locate fire lanes and points for fighting major fires and controlling minor scattered fires.
Engine Companies	Fight minor fires to facilitate removal/rescue of survivors; fight major fires to control spread.
Rescue Team	Rescue people trapped by fires in structures.
RADEF Team	Monitor radiation levels to warn firefighting personnel; report radiation levels to RADEF stations.
Ladder Companies	Support the Engine Companies in fighting minor and major fires and the Rescue Teams in removing trapped survivors from tall buildings.

6.3.2.2 Personnel Sources and Numbers:

Fire Department	1,920
Auxiliary Fire Service	?
Industrial Fire Brigades	?

6.3.2.3 Communications--Fire department radio and telephone systems, public telephones, and messengers are assigned as available.

6.3.2.4 Transportation--All departmental vehicles are assigned and additional trucks are provided on request by the Transportation Service.

6.3.2.5 Equipment and Supplies--Departmental, civil defense, and industrial fire equipment and supplies are allocated as available. Additional supplies are provided on request by the Supply Service as needed.

6.3.2.6 Facilities--All departmental installations and other facilities are assigned as available (see Figure 14).

6.3.3 Operations (see Figure 15).

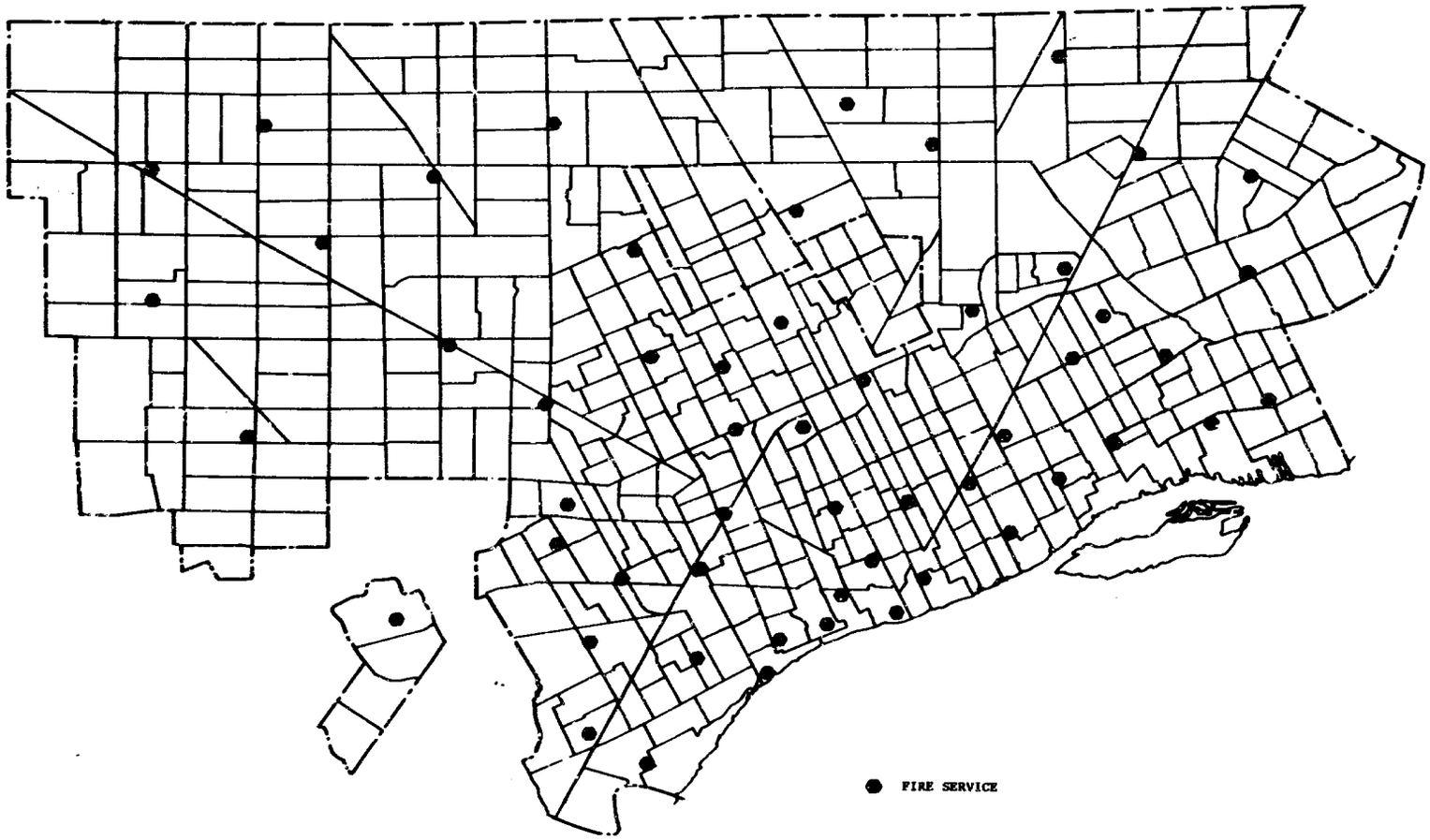
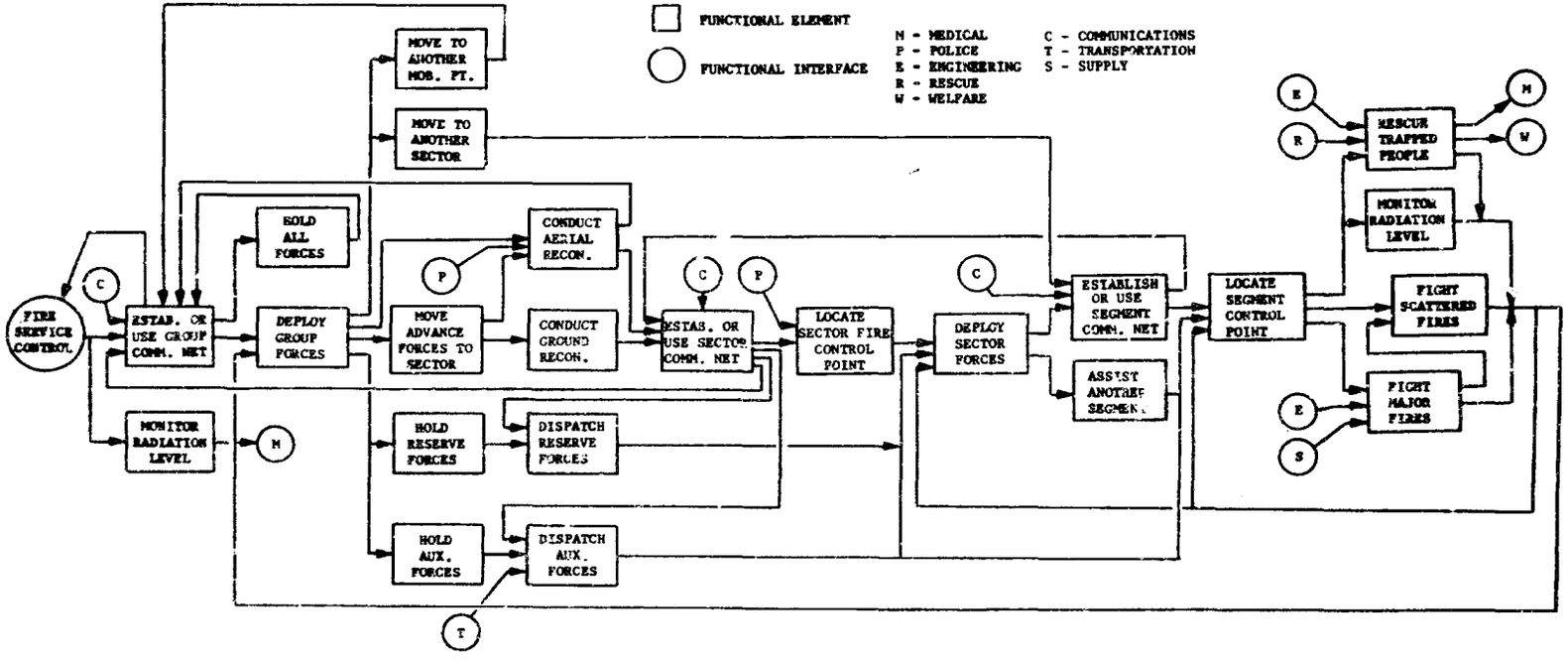


Fig. 14. Firefighting Facilities Distribution.



Fire Service personnel and equipment are dispersed to predesignated mobilization points during the preattack (tactical) phase. Communications networks are established between group control units and Headquarters. No action is taken during the attack phase, but immediately following the group control unit, based upon information received from Headquarters or its own reconnaissance, deploys group forces. An immediate operation will be the monitoring of the radiation level in the vicinity of the control points and in toward the damage line. Should the mobilization point become untenable, the group control unit will move to another mobilization point or to another sector as directed by higher headquarters.

Group forces will be deployed into the assigned sector with advance forces moving toward the damage line. The reserve and auxiliary forces will be held for dispatch or allocation as required. The allocation of group forces is dependent upon aerial and ground reconnaissance conducted by both the forces within a sector and by Headquarters.

Deployed group forces establish sector communication networks and locate sector control points. The location of sector control points depends upon the state and extent of damage and the spread of fires within a sector. Once the sector control units have been established, the sector forces will be deployed to segments along the fire lines.

Segment control units establish segment communication networks that are both vertical to group sector and headquarters, and lateral to other segments control units. Forces are deployed within segments as teams to perform specific functions with respect to fighting fires, monitoring radiation, and rescuing trapped persons. The primary functions of these teams is to try to control major fires and to knock down minor, scattered fires to facilitate the rescue and removal of survivors. Secondary functions are the rescue of trapped people and the monitoring of radiation levels.

Fig. 15. Fire Service Operations.

6.4 Police Service

6.4.1 Mission and Performance Requirements

6.4.1.1 General--The Police Service will establish sector headquarters on the perimeter of the disaster area to maintain law and order, to regulate traffic, and to control sector operations. The objective is to minimize interference with recovery operations.

Performance requirements could be set as the size of the area to be policed, number of refugees to be handled, volume and nature of traffic to be controlled, number and nature of incidents to be handled, amount and type of real property to be safeguarded.

6.4.1.2 Maintaining Law and Order (F.8.1)--The mission is to prevent crime, to arrest criminals, and to administer justice.

Performance requirements include size of area to be policed, number and nature of criminal incidents, amount and type of real property to be safeguarded.

6.4.1.3 Regulating Traffic (F.8.2)--The mission is to enforce public discipline, to restrict access, to control vehicular movement, and to control crowd movement.

Performance requirements can be expressed by volume and nature of traffic and the number and nature of mob incidents.

6.4.1.4 Control Sector Operations--The mission is to establish a sector headquarters and coordinate sector operations on the perimeter of disaster area.

Performance requirements can be set in terms of area to be controlled and time to establish control headquarters.

6.4.2 Components

6.4.2.1 Teams and Responsibilities:

Service Chief	Direct police operations for entire CD system (see Headquarters Operations Team).
Group Controllers	Direct and coordinate police operations and operations of all other services within assigned zones in the absence of direction from EOC.
Sector Controllers	Direct and coordinate police operations and operations of all other services within assigned sector in the absence of direction from higher authority.
Aerial Reconnaissance Team	Conduct aerial reconnaissance to evaluate and coordinate operations of all the services.

Ground Reconnaissance Team	Conduct ground reconnaissance to evaluate and coordinate operations of all services.
Law Enforcement Team	Enforce law and order to control assault, looting, and anarchy.
Traffic Control Team	Regulate movement of survivors from damaged areas to reception centers and emergency vehicles to and from damaged areas, and coordinate operations of all services at the segment level in the vicinity of damaged areas or firelines.

6.4.2.2 Personnel Source and Number

Police Department	4,890
House of Corrections	100

6.4.2.3 Communications--Detroit police department radio equipment (159.20/156.21/159.09 MC) are assigned as available.

6.4.2.4 Transportation--Departmental vehicles and authorized private vehicles are allocated as available.

6.4.2.5 Equipment and Supplies--Departmental equipment and supplies, all firearms and ammunition in the Detroit area, and civil defense trailers and equipment for sector headquarters are allocated as available.

6.4.2.6 Facilities--Departmental facilities and special facilities are assigned for protection of personnel and property (see Figure 16).

6.4.3 Operations (see Figure 17).

6.5 Rescue Service

6.5.1 Mission and Performance Requirements

6.5.1.1 General (F.4)--The Rescue Service will extricate people from damaged structures, inform shelter officials when it is safe to leave shelters, and provide transportation for remedial movements.

Performance requirements can be expressed as the distance, time, and number of people to be moved, and number of shelters to be notified.

6.5.1.2 Releasing Trapped People (F.4.1)--The mission is to extricate people from damaged buildings and blocked shelters.

Performance requirements can be expressed as number of people rescued and type of environment in which rescue is effected.

6.5.1.3 Transporting People in Remedial Movement (F.4.3)--The mission is to provide transportation required for remedial movement.

Performance requirements can be expressed as a reduction in numbers killed or man-days lost.

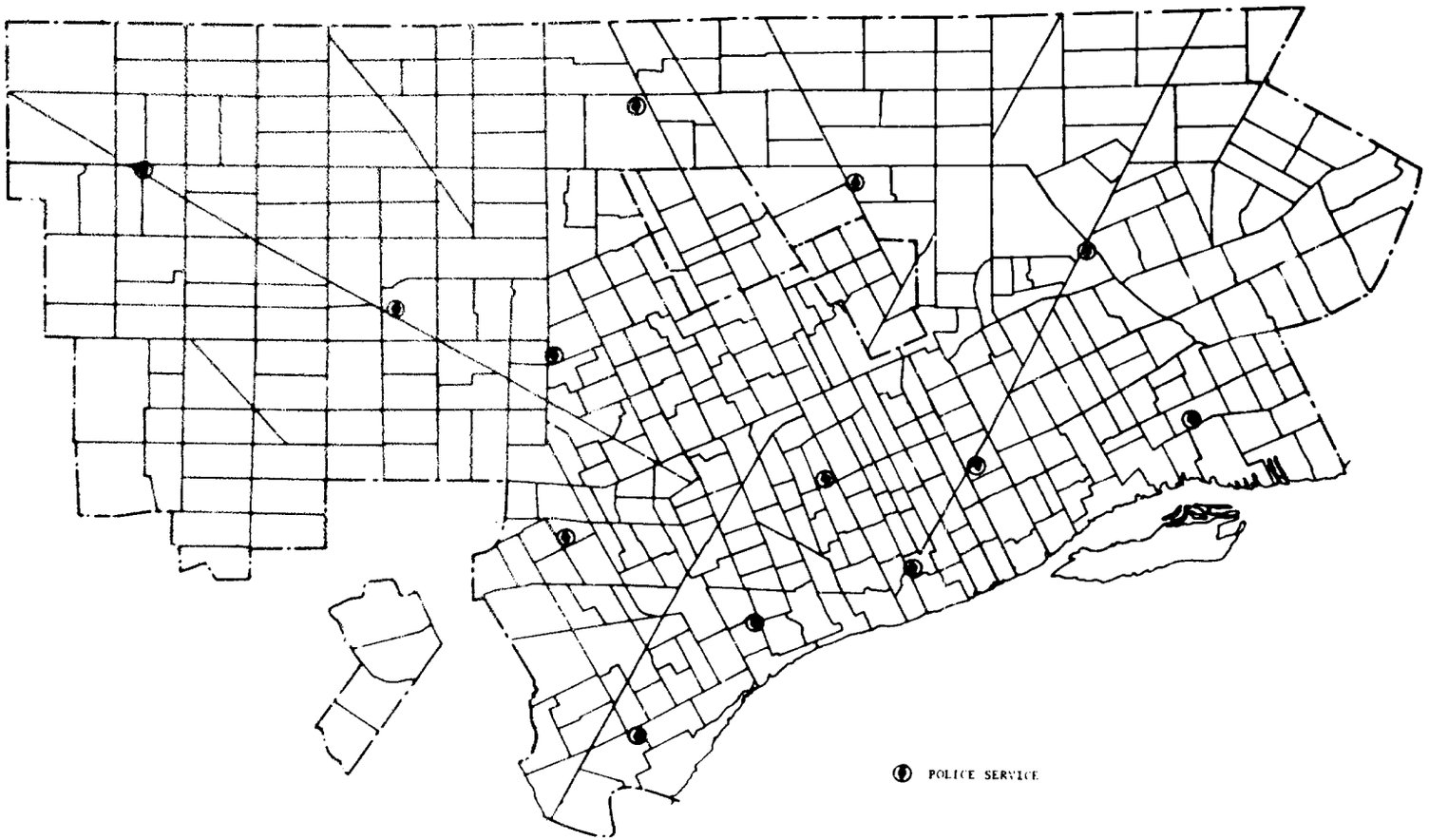
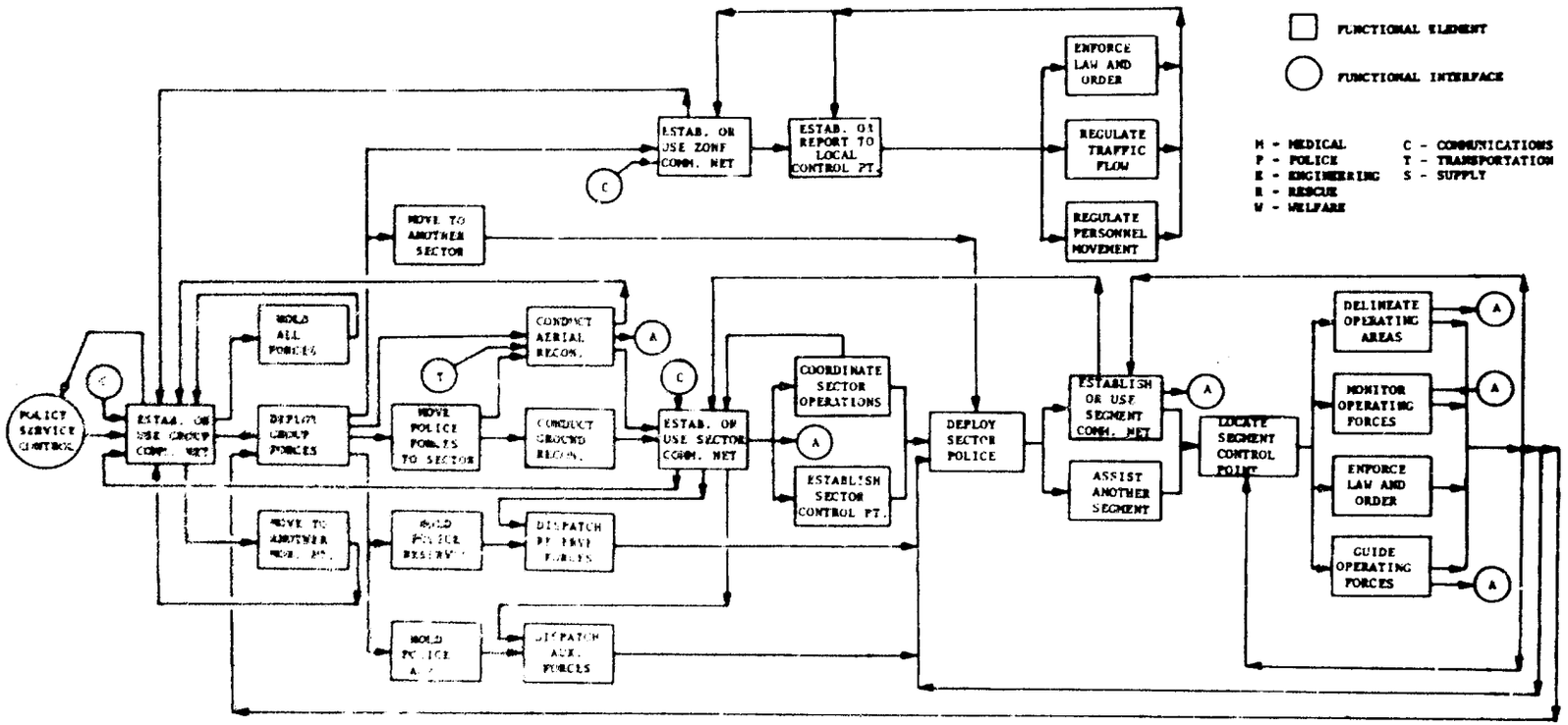


Fig. 16. Police Facilities Distribution.



During the predattack phase, the Police Service will be dispersed with personnel and equipment to preassigned mobilization points. Group communication networks will be established with communications vertically to headquarters and laterally to other group control units. During the attack phase all personnel will take shelter. During the postattack phase (survival phase) the situation will be evaluated based upon the results of both aerial and ground reconnaissance with information coming in from both police and other service operating teams. Group forces will be deployed within assigned sectors of zones. Police reserves and some auxiliary forces will either be held in reserve or dispatched as necessary toward the damage areas. At the group and sector control team level the police will act as the coordinating authority for the operation of all forces.

Police control teams will establish and operate communications networks. The communications will be vertical to the group and headquarters control teams and lateral to other police and fire units. At the same time sector control points are established, some control units may be located and forces established behind the damage areas to facilitate rescue and surveillance and maintenance of law and order. Police control teams would coordinate and direct the overall operations of the other services assigned to zones. The functions to be performed within the zone by the various operating teams would be the enforcement of law and order, the regulation of traffic flow through and into the zone, and the regulation of survivor movement (whether this movement is into or through the zone, or to the reception centers within the zone).

The sector control teams coordinate all sector operations and direct as necessary operations of the other services within that sector. Sector police forces are deployed throughout the sector to establish segment control points and segment communication networks. These areas include the damage lines. Segment control networks are vertical to both sector, group, and headquarters control units and lateral to other segment control teams. The police control teams provides guidance for the various operating forces teams from the other services within the forward segment areas. Within any segment, the police lieutenant (or other designated official from the police department) is responsible for the coordination of all operations within that segment. He coordinates and directs the operations of the other services by delineating operating areas. He monitors overall operations. He controls police operations for the enforcement of law and order.

Fig. 17. Police Service Operations.

6.5.1.4 Informing Sheltered They Can Leave (F.4.2)--Mission is to serve as alternate means of informing shelter officials.

Performance requirements could be expressed in reduction of man-days lost.

6.5.2 Components

6.5.2.1 Teams and Responsibilities:

Service Chief	Direct rescue operations for entire CD system (see Headquarters Operation Team).
Group Controllers	Direct rescue operations of teams in assigned zones.
Sector Controllers	Direct rescue operations of teams in assigned sectors.
Reconnaissance Team	Conduct aerial and ground reconnaissance of damaged areas to inform Sector and Group Controllers of local situations and to direct Rescue Teams to rescue sites.
Rescue Team	Locate and release trapped survivors; direct survivors to safer areas or aid the Collection Teams in removing nonambulatory, seriously injured to first aid centers or medical treatment centers; provide emergency first aid to injured survivors.
RADEF Monitoring Team	Monitor radiation levels to warn rescue personnel; report radiation levels to RADEF stations.
Remedial Movement Team	Use vehicles and drivers obtained from Transportation Service to remove survivors from damaged areas.

6.5.2.2 Personnel Source and Number:

Park and Recreation Department	1,615
Zoological Parks Commission	20

6.5.2.3 Communications--Park and Recreation Department radio network (159.33 MC) are assigned and augmented by civil defense communication equipment, telephones, and messengers as available.

6.5.2.4 Transportation--Park and Recreation Department vehicles are allocated to the Rescue Service and supplemented on priority request to the Transportation Service.

6.5.2.5 Equipment and Supplies--Park and Recreation Department rescue equipment and supplies and rescue equipment from industrial plants are allocated to the Rescue Service as available. Additional supplies are provided on request by the Supply Service.

6.5.2.6 Facilities--All Recreation Department facilities will be used (see Figure 18).

6.5.3 Operations (see Figure 19).

6.6 Welfare Service

6.6.1 Mission and Performance Requirements.

6.6.1.1 General--The Welfare Service will establish emergency centers to feed, house, and clothe survivors, to reunite families, and to provide permanent housing as soon as possible.

Performance requirements can be stated as the amount of food for a certain level of energy, number of people fed, number of temporary and permanent spaces, number requiring financial assistance, and type of assistance required.

6.6.1.2 Feeding (F.13)--The mission is to feed people who cannot provide food for themselves.

Performance requirements can be defined as the number of people to be fed in private homes and in centralized feeding places.

6.6.1.3 Housing (F.14)--The mission is to provide emergency lodging initially and permanent housing as time permits.

Performance requirements can be expressed as a reduction in the numbers of people without housing, the numbers of people to be provided community lodging and billeting; housing can be expressed as a reduction in man-days of lodging, number of people temporarily displaced, the number of unhabitable housing units.

6.6.1.4 Other (F.18)--Other missions are to expedite reestablishment of normal living patterns by providing financial aid and minimum essential personal and family property and by reuniting families.

Performance requirements can include the number of people requiring financial aid, the number of families to be reunited, and quantities of clothing and other personal and family effects distributed.

6.6.2 Components

6.6.2.1 Teams and Responsibilities:

Service Chief	Direct welfare operations for entire CD system (see Headquarters Operations Team).
Group Controllers	Direct welfare operations of teams in assigned zone; coordinate operations with Shelter Management Teams.

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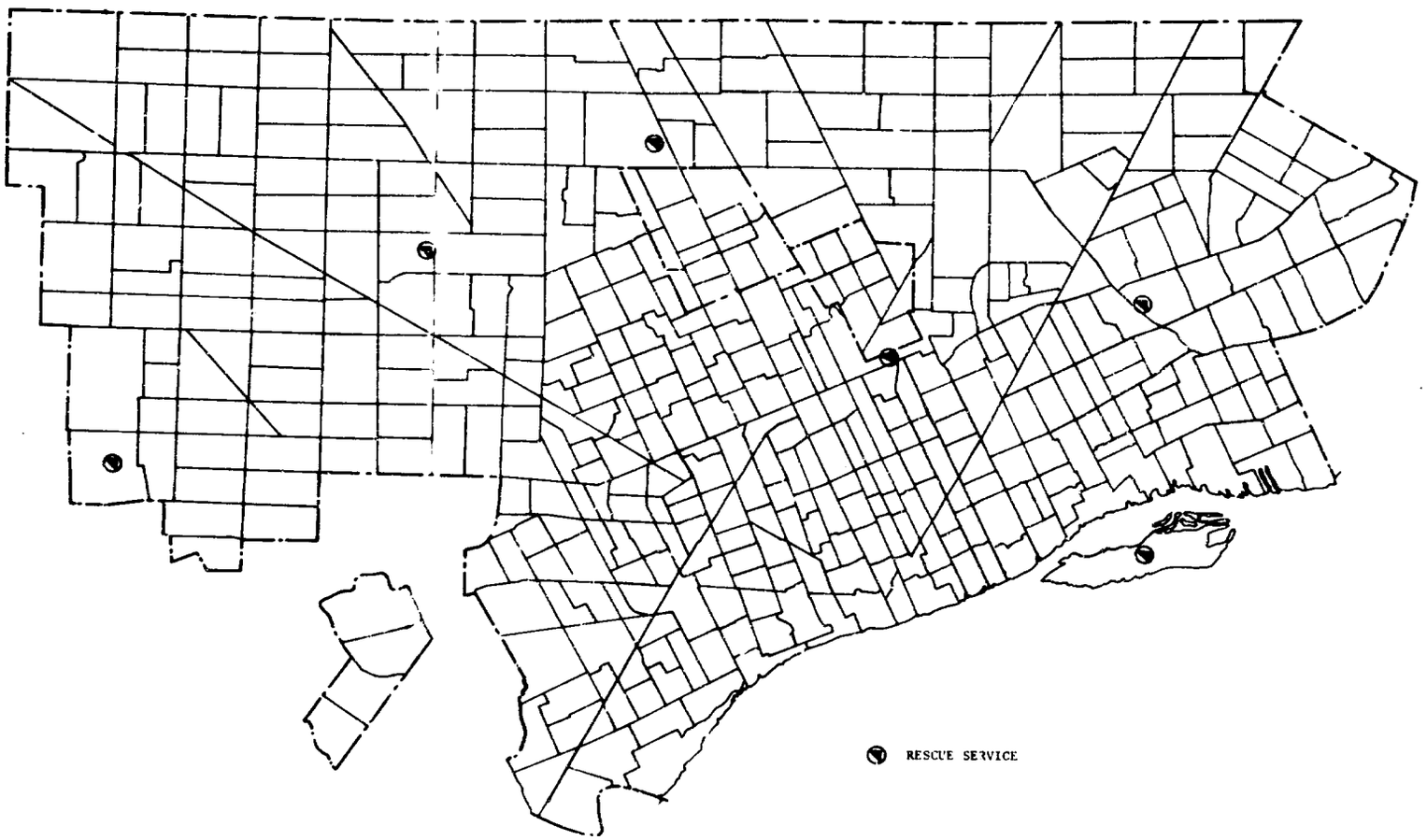
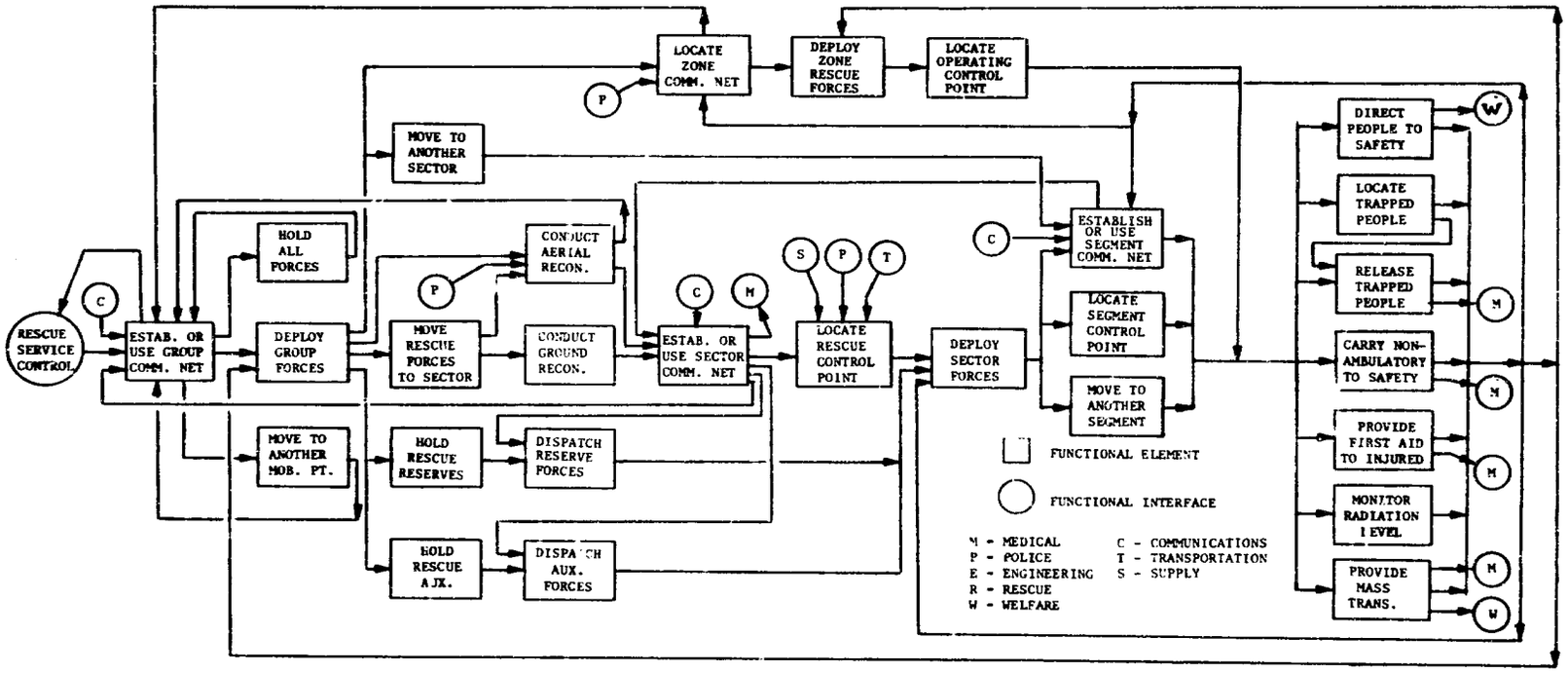


Fig. 18. Rescue Facilities Distribution.



During the pre-attack phase, Rescue Service personnel and equipment are dispersed to mobilization points. At this time, the group communication nets are activated between Headquarters and groups. During the attack phase, personnel take shelter with operations in abeyance. Following attack, and as directed by Headquarters, group control units begin operations in assigned sectors. Control is exercised from initial points; however, group control units can move to another mobilization point should the assigned point become untenable.

In the postattack phase, assigned forces are either held in reserve, moved to another sector or zone, or deployed within assigned sector. Rescue forces and reserves/auxiliaries are deployed in accordance with information received from group reconnaissance, other services, and headquarters.

Sector communication nets are activated, rescue control points are established, and forces deployed to segments on the periphery of damage. Communications are vertical to group and Headquarters, and lateral to other sector control points.

At the same time sector control points are established, and behind the line of damage within a sector (or even intersector), zones may be established for areal rescue operations, redistribution of survivors, or providing assistance to shelter subsystem or welfare service.

Following deployment and establishment of sector control units, sector communication nets are established for control of segment control units and operating teams. This information system works vertically to sector, group, and Headquarters control units, as well as laterally between teams. Forces are deployed within segments as teams to perform specific functions with respect to survivors and the environment. Team operations include, but are not necessarily limited to, rescue of trapped persons, rendering first aid, dispersal of survivors (directing), monitoring of radiation levels, and coordinating locally the use of transportation provided. This latter coordination includes assigned vehicles plus the mass transportation provided for remedial removal of survivors. The operating teams are the basic organizations for conduct of rescue operations.

Fig. 19. Rescue Service Operations.

Reconnaissance Team	Conduct aerial and ground reconnaissance to locate centers for reception of survivors; determine routes for removal of survivors from one area to another; locate existing facilities to use for reception centers and mass lodging.
Mass Care Center Team	Establish facilities for the mass reception and care of survivors.
Registration Team	Establish registration points for survivors within reception centers; communicate the information to a registration center.
Mobile Kitchen Team	Operate mobile kitchens to feed survivors; requisition and maintain food supplies at reception centers.
Clothing Team	Maintain and distribute supplies of clothing to survivors.
Billeting Team	Locate group lodging within reception areas; locate billets within surviving residential areas; assign survivors to billets or lodging in zones.
Information Teams	Establish points of inquiry; disseminate information to survivors.
Public Assistance Teams	Administer aid programs for survivors at local level.

6.6.2.2 Personnel Source and Number:

Arts Commission	110
Board of Assessors	160
General Auditor	40
Aviation Commission	5
Buildings and Safety Engineering	90
Commission on Children and Youth	10
City Clerk	15
City Planning Commission	22
City Treasury	153
City Center Commission	104
Commission on Community Relations	20
Election Commission	42
Fire Department	10
Historical Commission	53
House of Correction	110
Industrial and Commercial Development	4
Commission on Skid Row	6
Municipal Parking Authority	9

Parks and Recreation (Dept. of)	180
Public Lighting Commission	25
Public Works (Dept. of)	100
Rapid Transit Commission	1
Recorders Court (Traffic Division)	270
Street Railways (Dept. of)	80
Streets and Traffic (Dept. of)	5
Total Action Against Poverty Committee	800
Water Supply (Dept. of)	95

6.6.2.3 Communications--Telephone and messenger services and RACES radio units are assigned as available.

6.6.2.4 Transportation--All vehicles assigned to the Welfare Service will remain under the control of the service. Additional vehicles will be furnished on priority request by the Transportation Service.

6.6.2.5 Equipment and Supplies--Equipment and supplies from industries for the preparation and handling of food and special equipment and supplies from OCD for shelters are assigned to the Welfare Service shelters. All food, clothing, and bedding supplies for the Welfare Service are allocated by priority from the Supply Service.

6.6.2.6 Facilities--Elementary school buildings and all other public and semipublic buildings not otherwise assigned (see Figure 20) will be assigned to the Welfare Service.

6.6.3 Operations (see Figure 21).

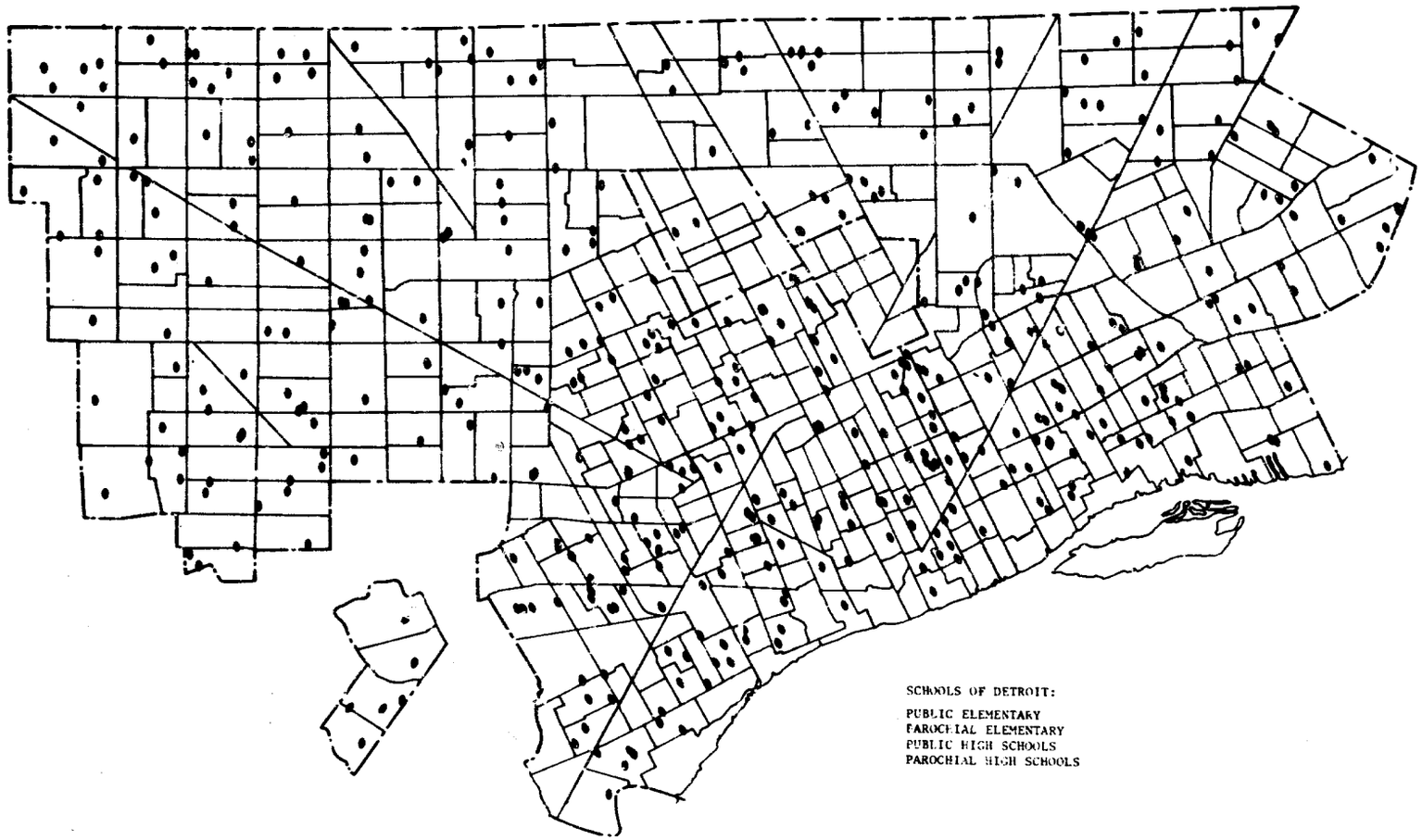
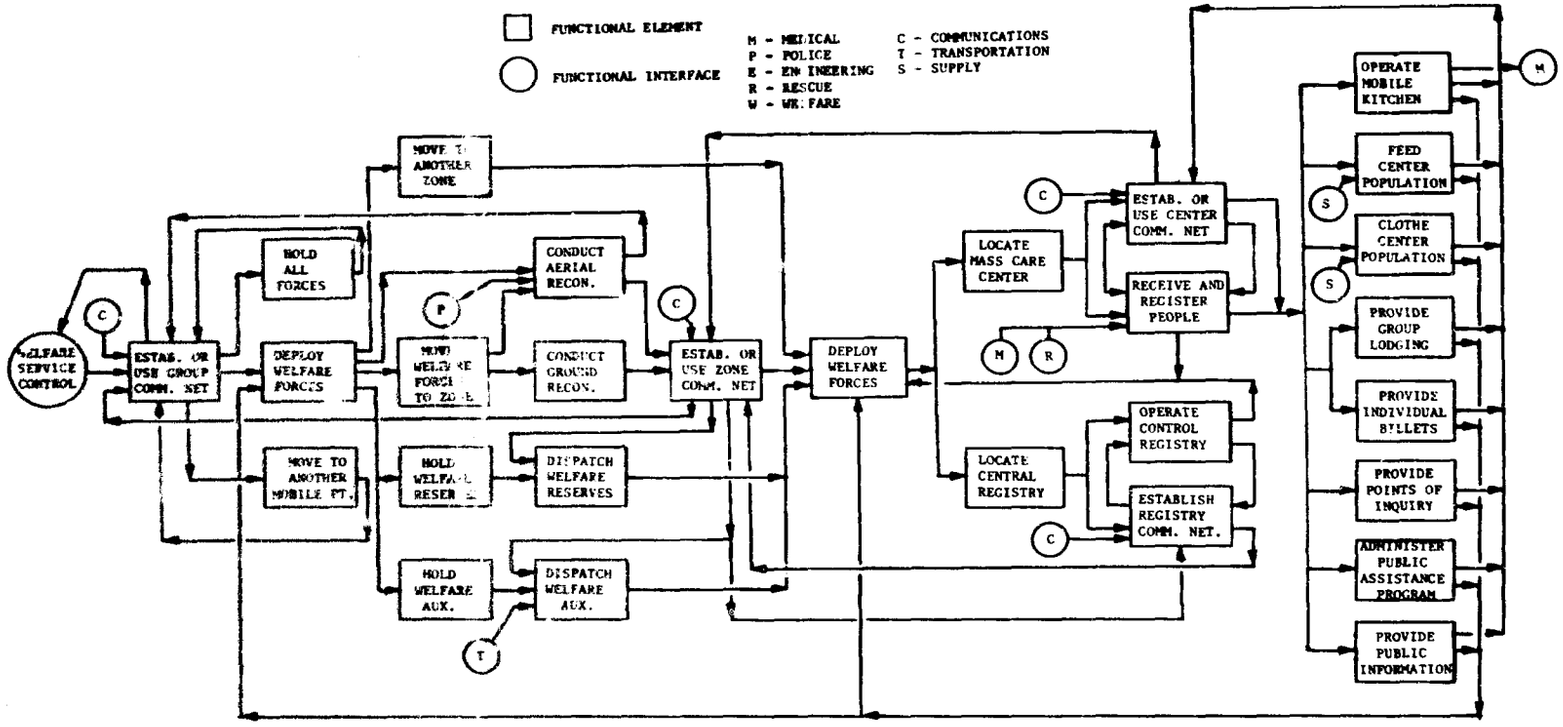


Fig. 20. Welfare Facilities (Schools) Distribution.



During the preattack phase, the Welfare Service is organized and dispersed with personnel and equipment to preassigned mobilization points. Group communication networks are activated and communications are established vertically to headquarters and laterally to other group welfare control units. During the attack phase, personnel take shelter. Immediately following the attack, the Welfare service group control units evaluate the situation and begin to deploy their forces.

The welfare forces are deployed in accordance with information received from both aerial and ground reconnaissance conducted by groups and headquarters. The welfare group control unit may have to move to another zone or mobilization point should the assigned point become untenable. Reserves and auxiliary forces are held in reserve and are dispatched as required to support the primary welfare forces which are sent into the zone.

Welfare operates on a zone basis behind the damage lines and provides support to the other forces, such as: Medical, Rescue, Firefighting; and takes charge of the removal to and reception of survivors in reception centers for housing and feeding and care. Zones are established behind the damage lines and cut across one or more of the sector areas. As the group welfare forces are deployed, zone communication networks are established with vertical communications to both group and headquarters control units and lateral communications to other welfare forces in adjacent zones. The welfare forces cooperate closely with the shelter subsystem management groups to care for the survivors that are in the shelters within the zone as well as to take care of mobile and non-mobile or ambulatory survivors that return to the zone from the area of damage. These survivors would be directed to the welfare by the Police, Firefighting, and Rescue Service, at the least, and would generally be moved by the Transportation Service as part of a mass movement. This does not preclude the receipt of a number of survivors that would move on foot from the damage area. To take care of survivors, the welfare forces within a zone would locate mass care centers. In addition, they would establish a central registry for identification of survivors and the eventual attempt to reunite families who have become separated during the emergency.

Fig. 21. Welfare Service Operations.

Section 7.0

SUPPORT SUBSYSTEM

7.0 SUPPORT SUBSYSTEM

7.1 Transportation Service

7.1.1 Mission and Performance Requirements--The mission is to establish and operate transportation equipment and facilities.

Performance requirements can be expressed as the number of man-miles or ton-miles for which transport must be provided.

7.1.2 Components

7.1.2.1 Teams and Responsibilities:

Service Chief	Direct transportation operations for entire CD system (see Headquarters Operations Team).
Group Controllers	Direct transportation operations of teams in assigned zones.
Sector Controllers	Direct operations of teams in assigned sectors.
Reconnaissance Team	Perform aerial and ground reconnaissance to establish routes for mass movement of survivors.
Motor Pool Team	Operate motor pools in zone and dispatch assigned vehicles as requested.
Station Refueling Teams	Operate assigned zone or sector fueling stations.
Mobile Refueling Team	Operate refueling tank trucks.
Maintenance Team	Operate maintenance depots.
Railroad Team	Operate railroad equipment as directed by Group and Headquarters Control Teams.
Aircraft Team	Operate aircraft as directed by Group or Headquarters Control Teams.
Transport Team	Support other services with vehicles; operate mass transportation for removal of survivors from damaged areas to welfare and medical reception centers.

7.1.2.2 Personnel Source and Number:

Aviation Commission	30
Public Works	265
Street Railways	2,510

7.1.2.3 Communications--Telephones, messengers, and two-way radios are assigned as available in cooperating agencies.

7.1.2.4 Transportation--All transportation equipment and facilities not specifically assigned to other services will be assigned to the Transportation Service.

7.1.2.5 Equipment and Supplies--Equipment from the Department of Street and Railways; motor coach lines operating in Detroit; Department of Public Works (Motor Transportation Division); commercial vehicles operating in Detroit; railroad equipment operating in the Detroit area as assigned by Railroad Committee; air transport facilities in Detroit at time of alert (except planes of over 12,500 pounds); and all maintenance and fueling equipment and supplies for motor, rail, and air transport will be assigned to the Transportation Service.

7.1.2.6 Facilities--All public and private facilities for warehousing, shipping, and vehicle maintenance will be assigned to the Transportation Service. (see Figure 22 for public facilities and Figures 23 and 24 for highway and rail distribution).

7.1.3 Operations (see Figure 25)

7.2 Communication and Warning Service

7.2.1 Mission and Performance Requirements--Operate emergency communications and warning systems.

Performance requirements can be expressed in terms of a desired reaction and the percentage of the population so reacting.

7.2.2 Components

7.2.2.1 Teams and Responsibilities:

Service Chief	Direct for entire CD system Communication Service (see Headquarters Operations Teams).
Radio Team	Operate and service assigned radio equipment.
Mobile Radio Team	Operate and service field radio equipment as assigned.
Radio Maintenance Team	Repair radio equipment.
EBS Teams	Operate and maintain EBS.
Telephone Operator Team	Operate switchboard; receive and transmit messages.
Telephone Repair Team	Install and repair lines and field telephone equipment
TWX Operator Team	Operate teletype equipment.

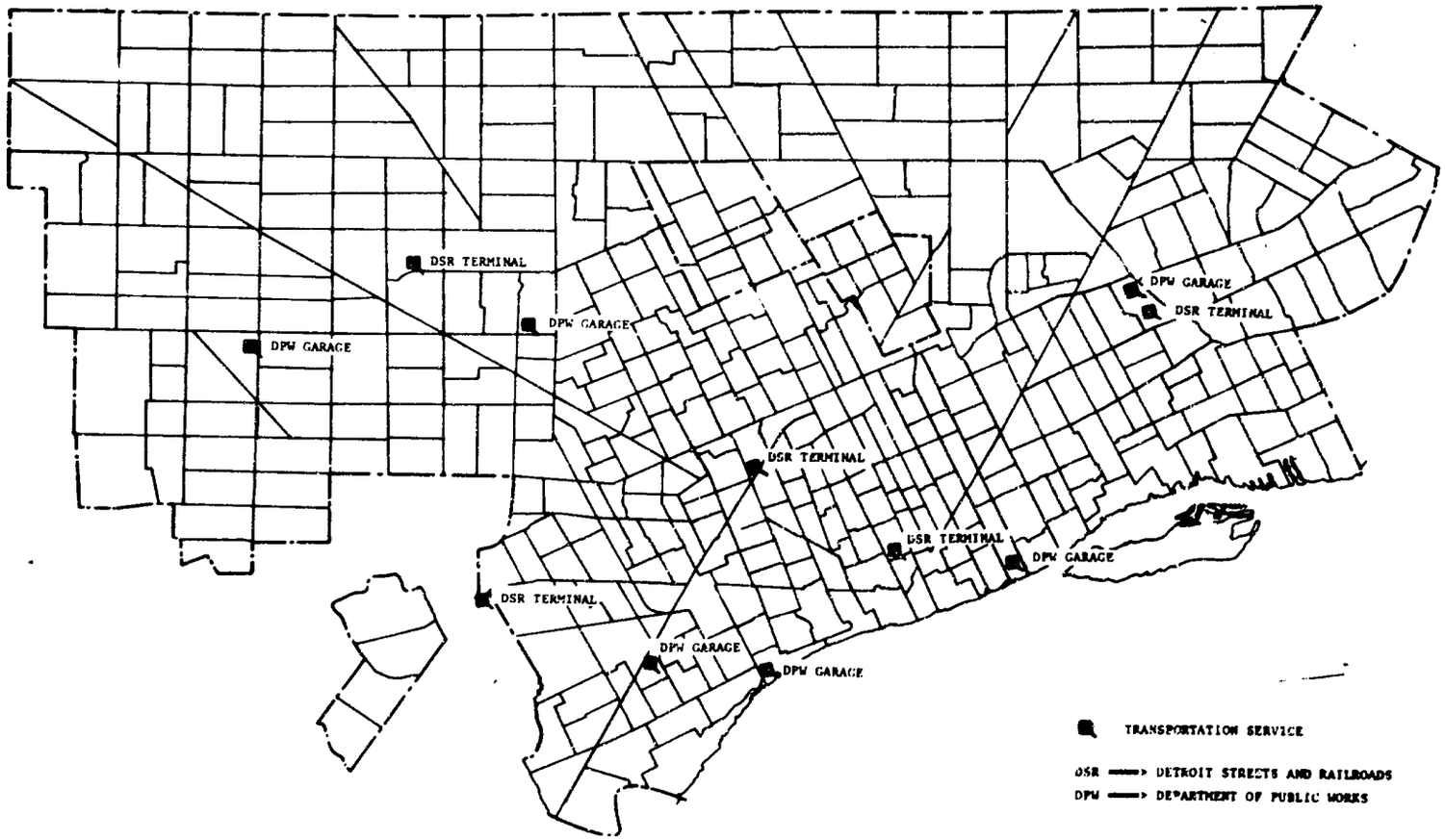


Fig. 22. Transportation Facilities Distribution.

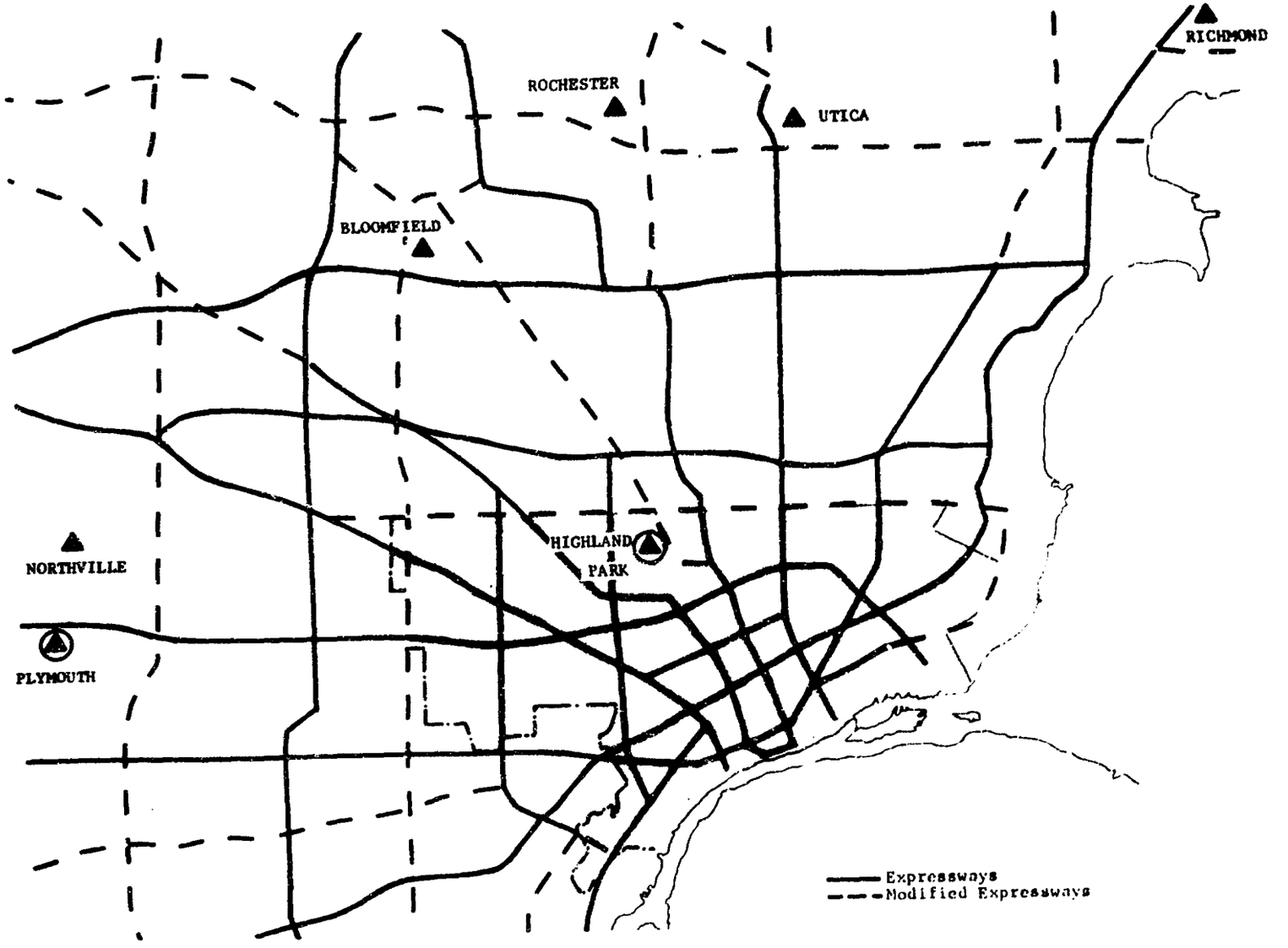


Fig. 23. Major Highway Distribution.

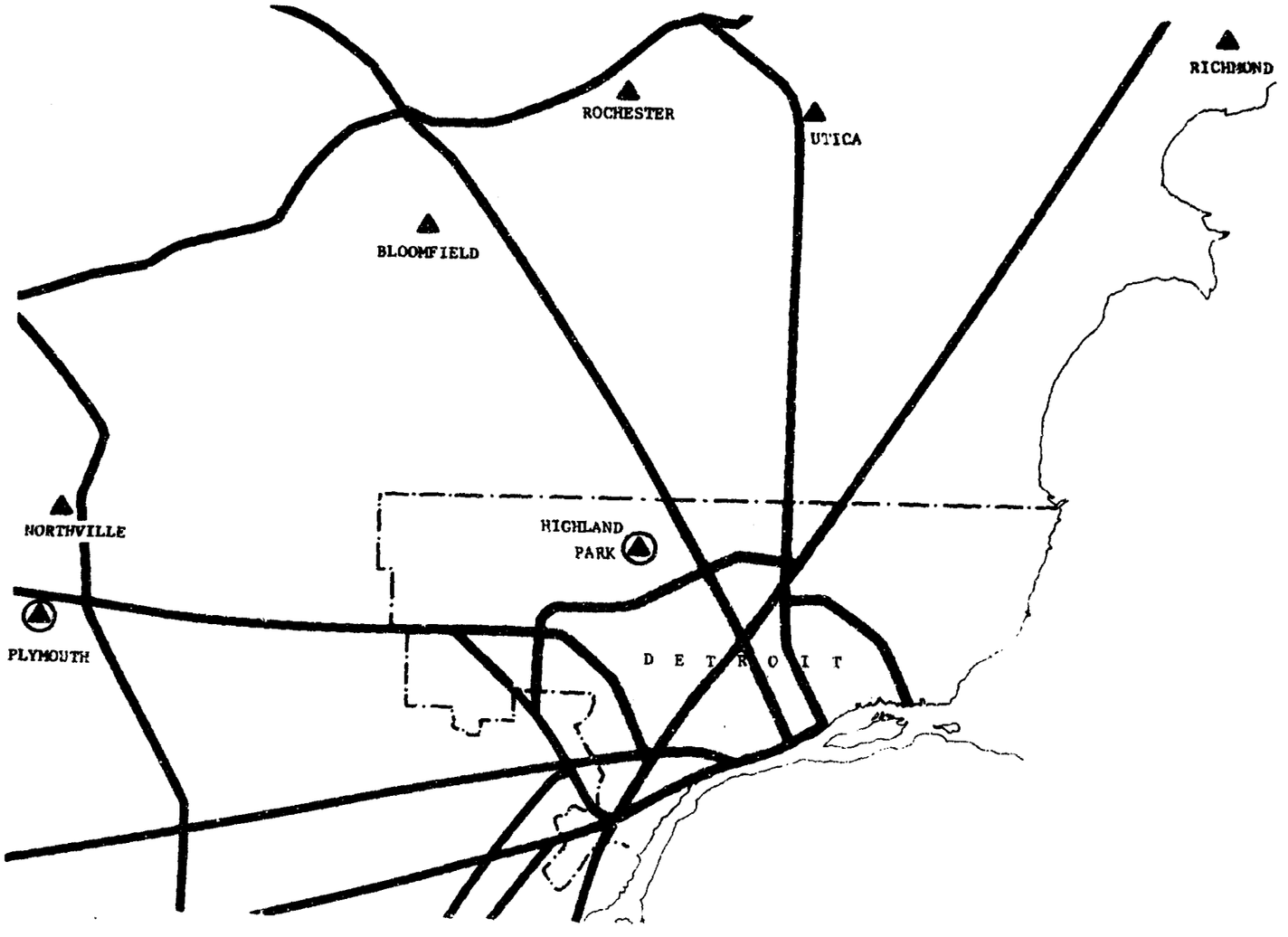
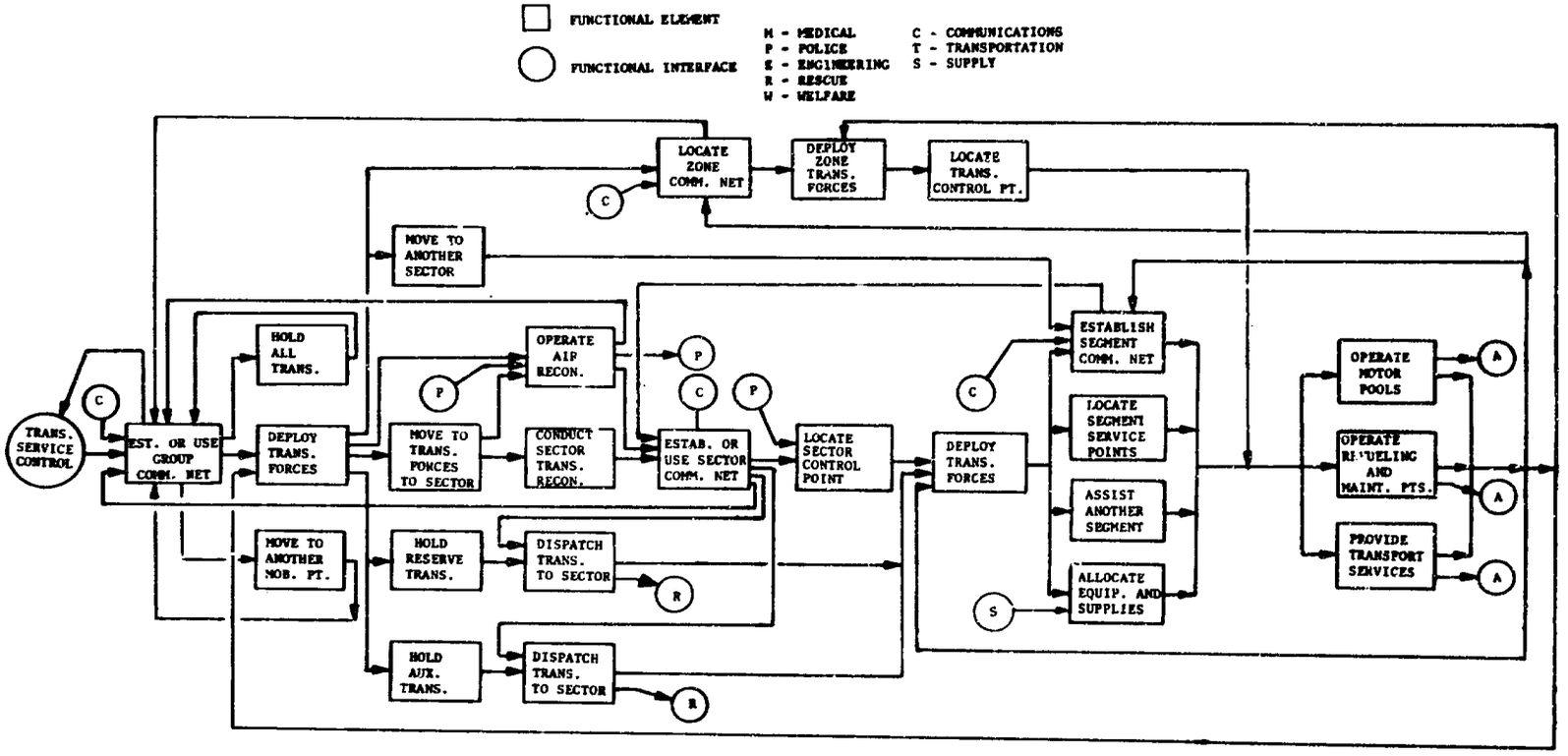


Fig. 24. Major Rail Distribution.



Transportation Service equipment and personnel are dispersed to mobilization points that have been preassigned. During this preattack phase, group communication networks are activated vertically between headquarters and group control units and laterally between the various group control units. Following attack, decisions are made as to the deployment or holding of the transportation forces. It is also possible that transportation group control units would have to move to another mobilization point should the one assigned become untenable.

Based upon information obtained from group and headquarters reconnaissance, both ground and air, group forces are deployed into assigned sectors. The reserve and auxiliary transportation forces are held in reserve pending determination of need. Some of the forces may be moved to another sector depending upon the situation. The same time that this occurs, a zone(s) may be established for the support of survivors, removal of survivors from an area, support of Welfare or Medical Services within a zone or within several zones.

Based upon reconnaissance, sector control points are located and sector communication networks are established and activated--vertical to both group and headquarters and lateral to other sector control units. Upon establishment of the sector control points, sector forces are deployed to assigned segments, segment control points are established and segment communication networks are activated both laterally and vertically.

Transportation forces within a segment operate in support of the other services within that segment or adjacent segments. Requests for transportation can be received from Rescue Service, Medical Service, Fire Service, or Police. Transportation Services are supporting forces and not an operation in their own right. Within a segment, motor pools are operated, refueling and maintenance points are established, and transportation services are provided as required.

Fig. 25. Transportation Service Operations.

7.2.2.2 Personnel Sources and Numbers:

Public Lighting Commission	85
Dept. Report and Information Committee	20
Michigan Bell Telephone Company	?
Inter-city Amateur Radio Association	?

7.2.2.3 Communications--Each civil defense service will have telephone and Time Wire Exchange (TWX) facilities at the main and alternate control centers. The Detroit police, fire, and PLC telephone systems are connected to the main control center and will be available to the departments controlling them. There is no plan, however, to extend these services to the alternate control center. Amateur radio systems will be available under the RACES program and will be assigned to support agencies that do not normally have radio systems.

7.2.2.4 Transportation--Special communications vehicles, trailers, and properly identified RACES mobile units will be assigned to the Communication Service.

7.2.2.5 Equipment and Supplies--Maintenance and repair equipment supplies for public and city-owned telephone systems; 75-meter, 2-meter, and 10-meter amateur-radio equipment; State Conservation radio, and all city-owned radio systems; radio facilities under the EBS will be controlled by the Communication Service (see Table III). Public air raid siren system installed at the fire stations will be assigned to the Communication Service for inspection and maintenance.

7.2.2.6 Facilities--Existing telephone exchanges and short-wave base stations, control center installations, and mobile communication centers are assigned to the Communication Service for maintenance (see Figures 26 and 27).

7.2.3 Operations (see Figure 28).

7.3 Supply and Personnel Service

7.3.1 Mission and Performance Requirements--Procure personnel, services, supplies, and equipment required during the emergency.

Performance requirements can be expressed in number, types, and time required to procure, stock, and issue supplies and equipment or to enlist, mobilize, and assign personnel.

7.3.2 Components

7.3.2.1 Teams and Responsibilities:

Service Chief	Direct supply operations for the entire CD system. (See Headquarters).
Group Controllers	Direct operations of supply and personnel teams in assigned zone.

TABLE III

CIVIL DEFENSE RADIO SYSTEMS

Service	Radio System
C. D. Headquarters	2-meter RACES
	6-meter voice-RACES
	7-meter RTTY-RACES
	10-meter RACES
	Mich. Dept. Conservation
	Local Government
Public Information	Emergency broadcast (AM)
Medical	
Health Dept.	10-meter RACES
RADEF Service	10-meter RACES
Fire Dept.	Fire Dept.
Bldgs. & Safety	Local government
Engineering	
Dept. Public Works	Local government
Public Lighting Commission	Public Lighting
Dept. Water Supply	Water Dept.
Detroit Edison	Detroit Edison
Mich. Consolidated Gas	Mich. Consolidated Gas
Fire	Fire Dept.
	Zone Headquarters (portable units)
	Hand-carried equipment (field use only)
Police	East Side City
	West Side City
	Central City
	Metropolitan Area City
	Radiotelegraph
	Hand-carried equipment (field use only)
	Police communications trailer
	Sector trailers 2-meter RACES
Rescue	
Parks and Recreation Dept.	Forestry Division
Welfare	
Welfare Department	10-meter RACES
Transportation	
DPW-Motor Transportation	Local government
Nat'l. Defense Trans. Assn.	
Trucking firms	As available
Railroads	As available
Water transportation	As available
Dept. Street Railways	DSR
Detroit Aviation Commission	
Privately owned aircraft	As available
Communication	Taxicab (to be assigned)

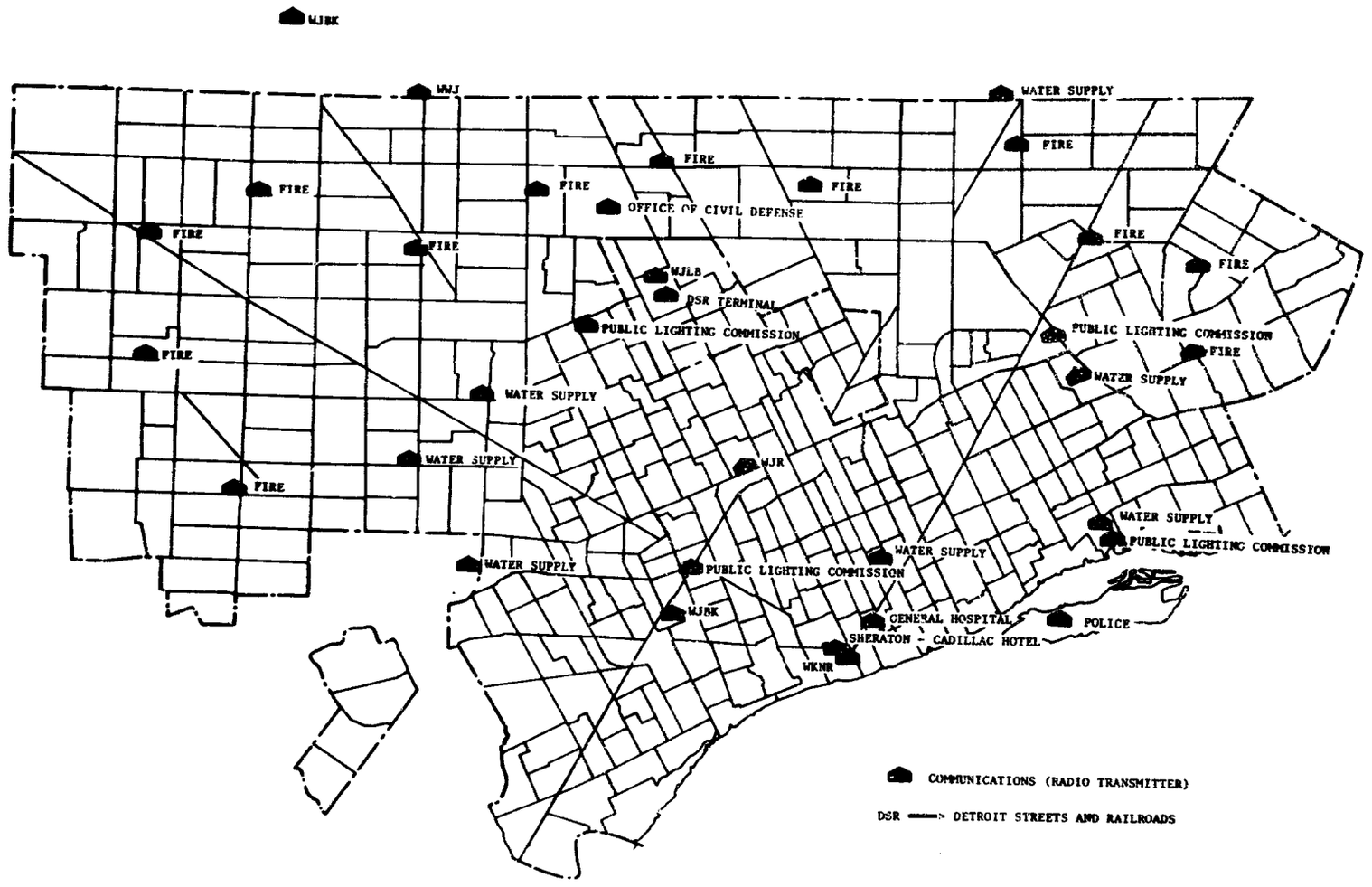


Fig. 26. Radio Facilities Distribution.

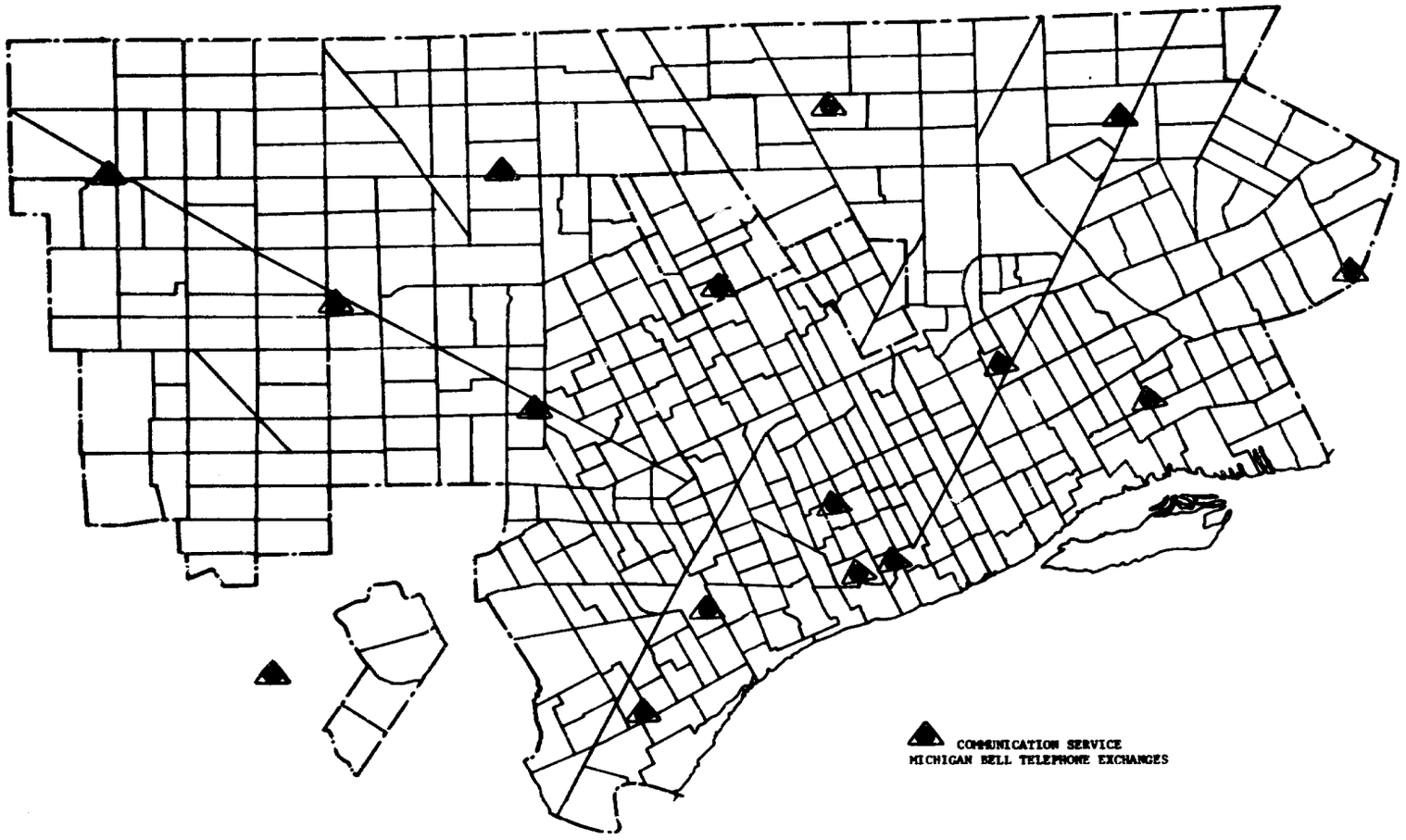
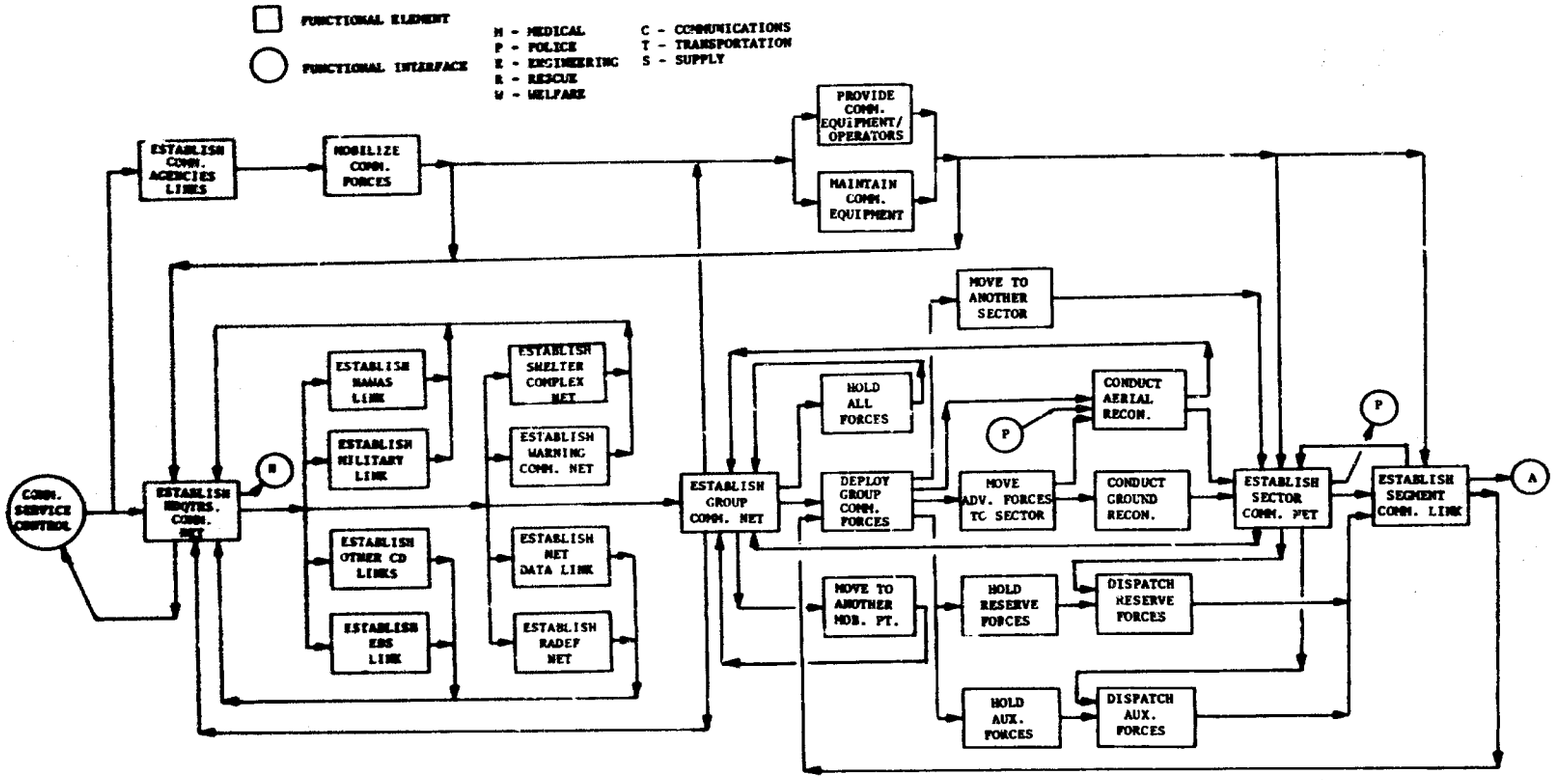


Fig. 27. Telephone Exchange Distribution.



The Communication Service allocates personnel and equipment to mobilization points during the preattack (tactical) phase. At both headquarters and group control unit location, communication networks are established and activated. Links are established by radio and hardwire, both internally within the City of Detroit Civil Defense system and externally to higher-level headquarters. Primary and alternate routes are developed and either put in use or kept on standby during the tactical planning stage and postattack (survival) phase of the emergency. The communications forces are mobilized and assigned to the control units and operating forces as required and available.

A number of distinct communication links are established, such as: HAMAS, military (liaison), emergency broadcast system (EBS), shelter complex, warning, data link, and RADEF.

Following the attack, the group control unit communication networks are activated. In response to ground and aerial reconnaissance, group forces are deployed--and this includes the communication teams. They are dispatched with control and operating units into assigned sectors to locate and setup sector communication nets, vertically to group and central headquarters and laterally to other sector control units. Forces are held in reserve, are shifted between sectors, and are committed to forward segment areas as required by the overall situation. As segment control units are established, the segment communication nets are established and circuits activated.

Adequate and operable communications are vital for proper control and transfer of information, without which system effectiveness approaches zero.

Fig. 28. Communication Service Operations.

Sector Controllers	Direct operations of supply teams assigned in sector.
Reconnaissance Team	Conduct aerial and ground reconnaissance to locate supplies and equipment and to locate facilities for storage of equipment and supplies.
Procurement Team	Make arrangements for purchase or confiscation of equipment and supplies required by CD forces.
Facilities Team	Establish welfare reception centers and medical facilities near shelters to store equipment and supplies; distribute equipment, supplies, and food as directed.
Civil Service Team	Locate personnel from among survivors to aid all services to accomplish their missions.
Stock Control Team	Issue equipment and supplies.

7.3.2.2 Personnel Sources and Numbers:

City Controller	234
Civil Service Commission	104
Purchases and Supplies	113

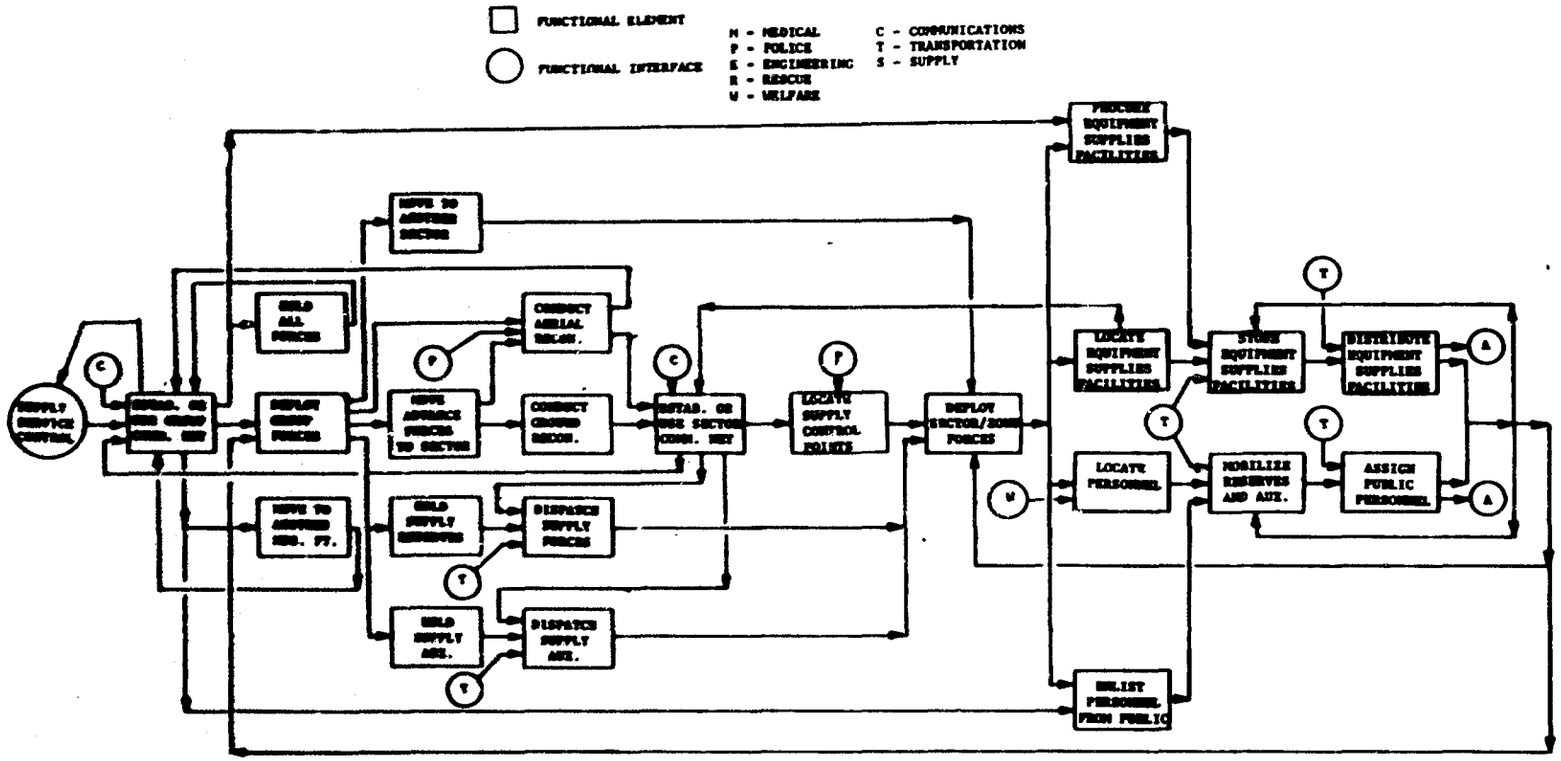
7.3.2.3 Communications--Telephone and messenger services are assigned as available.

7.3.2.4 Transportation--City-owned passenger vehicles and other vehicles as requested and allocated from Transportation Service.

7.3.2.5 Equipment and Supplies--All equipment and supplies designated as civil defense controlled items not specifically allocated to another service will be controlled by the Supply Service. No general assignments.

7.3.2.6 Facilities--Space will be provided at main and alternate control centers for Headquarters Team. Space will be made available as needed at mobilization points and field headquarters locations for other teams. Buildings required for control of equipment and supplies will be allocated to the Supply Service.

7.3.3 Operations (see Figure 29)



Supply Service teams within a sector or zone establish facilities for the storage of equipment and supplies and then proceed to procure equipment and supplies that are available in the area or that would be moved in from outlying areas. It is anticipated that the bulk of supplies would come from various mobilization points and other outlying districts. The established facilities would be manned by various of supply service personnel augmented by personnel (able-bodied survivors) enlisted from the public. The facilities would support the Shelter Subsystem and the Welfare Service in taking care of and in sheltering and feeding the survivors.

Supply Service operates entirely in support of all the other services to provide a source of consumables, other than petroleum products, that would be needed for the support of the surviving population. The operation includes the procurement, storage and distribution of medical supplies, food, clothing, and any equipment that was not previously distributed to the other operating services.

During the preattack phase, the Supply Service moves personnel and equipment to preassigned mobilization points. Group communication networks are established, with vertical communications to headquarters and lateral communications to other group control units. During the attack phase, everybody stays in shelters. During the survival phase, group forces are deployed into assigned sectors. In the event that assigned mobilization points become untenable, group control units will move to other mobilization points.

Auxiliary and reserve forces are held in reserve to be dispatched as necessary. As the group forces move into the sectors, aerial and ground reconnaissance are carried out to establish routes and to locate points for the establishment of sector and segment control units. Sector control units locate facilities and establish communication networks, vertically to headquarters and groups and laterally to other sector control units. When this has been accomplished, sector or zone forces are deployed into assigned sectors or zones.

Fig. 29. Supply ard Personnel Service Operations.

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A local civil defense system is conceptualized as a four-component organization, consisting of resources derived from the community, and working together as subsystems to solve local problems resulting from a nuclear attack. Central control (headquarters) directs and coordinates the other three. The shelter (central countermeasure) subsystem is concerned with warning, guiding to shelter, shielding, and sustaining occupants during and following the attack, as well as radiological monitoring to determine whether it is unsafe to stay or safe to leave shelter. The extra-shelter subsystem is a mobile force put together to fight fires, clear debris, rescue, assist in remedial movement, and to otherwise overcome environmental hazards affecting the safety of the sheltered population. Finally, the support subsystem assists the other three by providing communication, transportation, supplies, and personnel, this subsystem responds to requests from the other subsystems rather than initiating action in defense of the population. This concept of assigning responsibilities is comparable to the efficient military organizations which have proven most successful in emergency situations.

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DOCUMENT CONTROL DATA - R&D

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1. ORIGINATING ACTIVITY (Corporate author) Research Triangle Institute Post Office Box 12194 Research Triangle Park, North Carolina 27709	2a. REPORT SECURITY CLASSIFICATION Unclassified 2b. GROUP

3. REPORT TITLE

Detroit Civil Defense Operating System Synthesis - Volume I

4. DESCRIPTIVE NOTES (Type of report and inclusive dates)

Preliminary Report

5. AUTHOR(S) (Last name, first name, initial)

Hendry, Robert N.

6. REPORT DATE	7a. TOTAL NO. OF PAGES	7b. NO. OF REFS
January 1968	76	5

8a. CONTRACT OR GRANT NO.	9a. ORIGINATOR'S REPORT NUMBER(S)
OCD-PS-64-56 b. PROJECT NO. Work Unit 4113E c. Systems Evaluation Division d. OCD Research Directorate	R-OU-230-2 9b. OTHER REPORT NO(S) (Any other numbers that may be assigned this report)

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13. ABSTRACT The Detroit Civil Defense System is described in this volume; the technical approach to this description is presented in a second volume. The description is presented in a specification format to show concisely the relationship between components and missions. The total system and each subset of components is described by (1) mission and performance requirements, (2) components, and (3) operations. Subsequently, systems analysis of the combined effects is expected to yield realistic performance and cost characteristics.

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DD FORM 1 JAN 64 1473

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