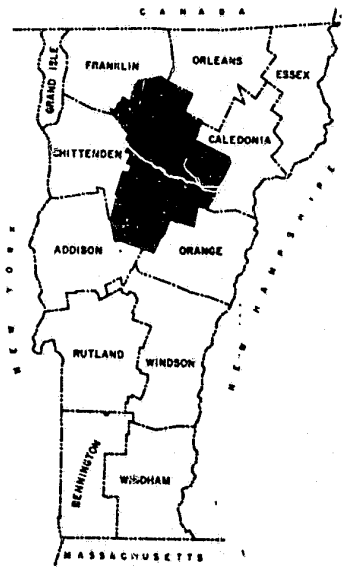
COOPERATIVE DISPATCHING OF EMERGENCY SERVICES

A Feasibility Study for Washington and Lamoille Counties in Central Vermont



Prepared for:

The State of Vermont Governors' Commission
on The Administration of Justice
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August 1976

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REPORT ON A FEASIBILITY STUDY

OF AN

INTEGRATED COMMUNICATIONS AND DISPATCHING SYSTEM

FOR

POLICE, FIRE AND EMERGENCY MEDICAL SERVICES (EMS)

IN CENTRAL VERMONT

A study authorized by the

Vermont Governor's Commission

on the

Administration of Justice

* * *

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DATE: August 16, 1976

PROJECT SYNOPSIS
FOR
A FEASIBILITY STUDY ON A
CENTRAL VERMONT COOPERATIVE DISPATCH CENTER

Following is an abbreviated summary of findings, conclusions and recommendations contained in this report.

1. The project is referred to as "CVCDC" - Central Vermont Cooperative Dispatch Center.

2. There is already a trend toward some sort of combined communication network in Lamoille and Washington County, but piecemeal efforts can defeat the effectiveness.

3. Citizen volunteer efforts in the Fire and Emergency Medical Services greatly need communication dispatching services to obtain effective usage from investments in radio equipments.

4. A telephone system using 7-digit numbers and designed to take advantage of extended free-calling zones would be less costly than 911, but would not provide a single number for emergency calls nor offer useful features available in 911 service. It could be an interim solution, however, to simplify the many listed numbers for emergency service.

5. The most economical telephone system for incoming calls would be with terminations in Montpelier and Hyde Park, with a Microwave circuit bringing Lamoille County calls to Montpelier.

6. A center staffed properly for Washington County traffic would handle Lamoille County traffic. Two centers would increase costs by about 50%. The center should be in Montpelier.

7. Better on-site radio system coordination among the services could be achieved with a new coordination channel in the 154 MHz region of local government frequencies.

8. Improved UHF radio coverage is recommended by:
   a. Putting a new Transmitter on "K" Troop Channel at Mt. Mansfield.
   b. Using Mobile Relay operation on a rural and a city channel.
   c. Using High Gain Uni-directional Antenna at Millstone Hill and an off-center pattern antenna at Mansfield.
   d. Consideration to a transmitter site at Roxbury Gap.
   e. Using receiver voting equipment to permit multi-path signal selection of mobiles in terrain of varrying elevation.

9. Improved ability for Police coordination from portables can be achieved with a highband portable radio and dual front end receiver for monitoring UHF, in place of all UHF portables, in some cases.

10. Middlesex is not a suitable location for the final operational site of a Dispatch Center because of the premium cost of telephone circuits, and its unfavorable location for Microwave and standby base radio stations.

11. A new site for State Police and D. P.S. Headquarters communications is recommended which could provide space to be rented by the CVCDC.

12. An operation budget for dispatching telephones and administation is estimated at about $225,000 per year.

13. With financial support from D. P. S. and Department of Health, a pro-rata funding plan is shown that would cost about $1.61 per person per year in the two counties. The net cost per town is less than that for which they could provide comparable services.

14. Management of the Center could be by a hired Director, selected by an 8-man Governing Board, responsible for CVCDC operation and policy.

A. Robert Patzlaff, P.E.

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COOPERATIVE DISPATCHING OF EMERGENCY SERVICES

PART I - INTRODUCTION

Recent Observations:

In a recent 13-day period traveling some 850 miles, talking to about 60 working level and management people involved in providing Police, Fire and Ambulance emergency assistance services to the citizens of Washington and Lamoille Counties, Vermont, a message came through loud and clear from the smaller towns. That message was: "What can you do to help us get better communications?" While the Department of Public Safety has done an excellent job in establishing a State-wide Police communication network including a Microwave central point-to-point system that serves not only State Police, Department of Highways, Civilian Defense and other State communication requirements, the day-to-day communication dispatch operations of the municipalities whereby single point call reception for Fire, Police or Ambulance is provided, has not yet been squarely faced.

In the conversion to the 450MHz State-wide police radio system, the frequency plan gave most towns of any size a radio channel for their local dispatch operations. However, one or two men town Police departments eventually seek relief from answering the police telephone at one of their residences throughout the night and usually approach the town councilmen for funds to provide a telephone line that may be answered at the Police District K barracks at Middlesex. One town police chief reported that this minor cost for providing night time dispatch service was often met with reluctance until he asked the council if they would like the telephones to ring in their homes all night. The approval was granted!

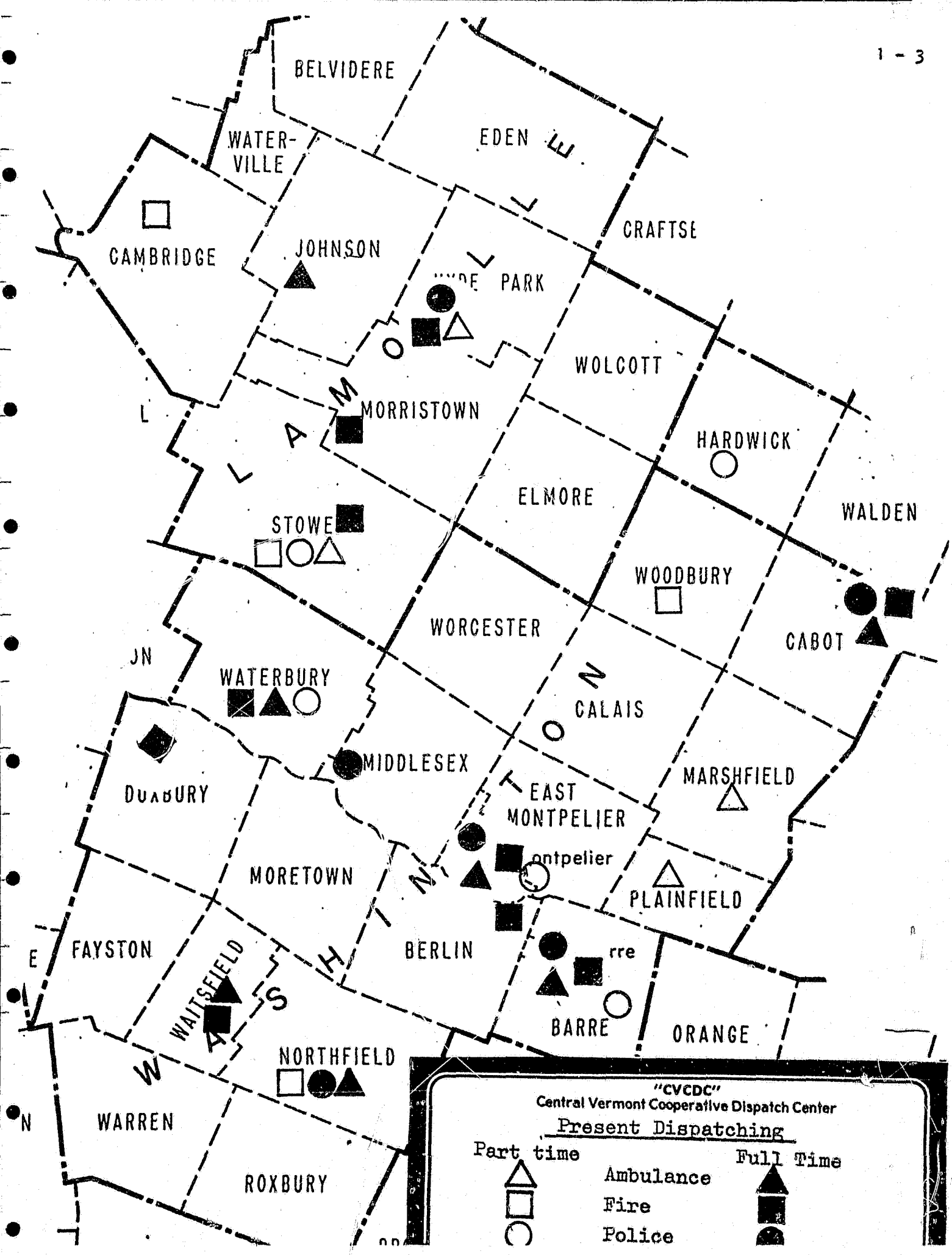
However, the mere inconvenience of a telephone ringing at night is not the major reason for considering better dispatching methods or law enforcement

activities. Many citizens depend on their local resident area "outpost trooper" or "part-time deputy sheriff" when they need assistance. Calling these people directly finds a willing spirit, ready to help at any hour. However, the help is often initiated without the awareness of some central radio dispatch center to provide needed assistance should the officer get into a situation beyond which he can handle individually. In many cases, outpost troopers and volunteer sheriff's men work together but have no way to communicate with one another. When a sheriff's vehicle requests a license check or national crime information and the computer produces a "hit" (recognition of a stolen vehicle or a dangerous suspect), this goes out to officers unknown to other State Police or City officers listening on separate radio channels.

While sheriff's departments operate independently, raise their own funds, and largely assume personally all expenses for their equipments, they nevertheless are providing police protection service to many rural areas. One way or the other these requests for police assistance must be met and it would seem wise to provide all law enforcement units with an effective communication center whereby proper assignment of available manpower, monitoring of further activities and protective support among the various independently managed groups could be provided in a cooperative effort.

Trend Noted:

The fact that most smaller departments after trying to dispatch their own units have already asked part-time dispatch assistance from either Middlesex or the Lamoille County Sheriff, indicates a trend towards this central dispatch concept in the police services. However, being pursued as independent efforts and not generally coordinated, this trend has not been without its problems. Dispatching on frequencies intended only for car-to-car communication in the over-all State-wide plan has generated confusion and unnecessary interference.


BELVIDERE
WATER-
VILLE
EDEN
CRAFTSE
CAMBRIDGE
JOHNSON
PARK
WOLCOTT
MORRISTOWN
HARDWICK
ELMORE
WALDEN
STOWE
WOODBURY
WORCESTER
CABOT
WATERBURY
CALAIS
MIDDLESEX
MARSHFIELD
EAST
MONTPELIER
ontpelier
MORETOWN
PLAINFIELD
FAYSTON
BERLIN
rre
BARRE
ORANGE
NORTHFIELD
WARREN
ROXBURY
"CVCDC"
Central Vermont Cooperative Dispatch Center
Present Dispatching
Part time
Full Time
Ambulance
Fire
Police

The inability to transmit from Mt. Mansfield on the frequency assigned to State Police Troop K results in several areas in the vicinity of Stowe where communications on the Troop K frequency cannot be received. Other system design problems needing attention prohibit the full utilization of portable communications over extended ranges. An effort toward centralized dispatching from Lamoille County is not complete in encompassing all services, and has run into legal snags with respect to means for funding this operation. The net result is an over-all fragmented conglomeration of individual approaches to solving individual problems and has left an atmosphere of distrust and confusion among the various agencies which it is hoped can be pulled together.

Fire Departments Need Help:

In the personal interviews conducted, those appealing loudest for assistance were the individual volunteer fire groups throughout the two-county region. While the Department of Public Safety is charged with fire marshall responsibility (See Chapter 113, Paragraph 1872 of State Code), the State Radio Communication System provided for in Paragraph 1875 of the State Code makes no provision for meeting the needs of the fire services. In an effort to improve the resources available for fire fighting, rural fire departments have joined together in a mutual aid organization. This provides participating towns access to nearby fire equipments to support them in a large emergency. Here again, however, individual attempts are being made to coordinate crew alerting and dispatch communication. In some cases commercial communication companies are contracted to dispatch or alert volunteer fire men.

These fragmented answers to the question provide no trained public safety personnel at the dispatch center to effectively direct movements of equipment, or to coordinate a large scale fire through knowledgable procedures. Lack of enforced communication operation procedures in the fire service results in installation of transmitters on the mutual aid frequency in personal vehicles. Thus many unnecessary transmissions clutter the air waves as firemen converge on the fire scene. Some towns have resorted to the use of their Local Government channel in their fire vehicles to achieve some degree of coordination among their police and other town vehicles. However, these local town frequencies are different in each town and some fire departments have no direct communication with town units operating on the mutual aid frequency.

D. O. H. Ambulance Services Equipments Need Dispatch Services:

The State Department of Health has done an excellent job in organizing individual ambulance service districts. However, again the cry from the individual operators is a need for communication from some central location when enroute to the hospital. Often there is no provision for informing either a fire or ambulance crew of a false call once they are enroute. Acting independently, the Department of Health receives funding grants from the Department of Transportation. This money is being used to solve in their independent way the need for dispatch from each individual ambulance service. It is hoped that the establishment of an over-all communication network will entail a second look at these scattered dispatch centers and result in a more effective over-all coordinated plan and less radio equipments in the hands of organizations not under the direct control of a municipality or other government agency responsible for the equipments.

In the ambulances and fire vehicles a more standardized channel usage could contribute to clearer instructions and more effective dispatcher coordination in a large emergency. Today Channel 1 may mean communication to one point for one ambulance or fire vehicle operator and communication to another point to another operator. Standardization along these lines greatly simplifies training procedures.

Volunteer Effort Needs Support:

Thus, while the untiring volunteer efforts of many citizens is somehow providing the needed emergency services, they are not being provided without unnecessary expenditures and waste in manpower efforts and facilities. Therefore, it is the intent of this report to review the present situation and to examine how a coordinated dispatch operation can be achieved. In approaching this subject it is important that all understand what is meant by a dispatch center. Simply stated, it is a center of operations which can coordinate the activities but not disturb the integrity of independent line officer control by the various participants.

State-wide Coordination Needed:

For over-all uniformity in communication operation there is a need for State-wide standards and coordination. The State D. P. S. is most logically the oversee organization to provide guidelines and technical support for the facilities of each dispatch center that may evolve. Without this coordination divergent policies and procedures could result in compounded fragmentation of communication. For effective interaction among the towns and services, there is a need for over-all radio frequency coordination, operational guideline

and training programs, equipment standardization and equipment service support. These activities can be supplied by strengthening and financially supporting existing organizations within the State. Without this, divergent paths will result in redundant equipment purchases, ineffective frequency usage, and no over-all outlook as to how each individual municipality co-ordinates with other municipalities. Each individual municipal dispatch center that may result from this beginning, must fit in with an over-all State-wide pattern, just as the State of Vermont must provide means for communication with adjoining states.

The new and much-needed factor being considered by this study is a provision for the day-to day control and coordination of all the municipal safety communication services in a cooperative venture by the towns participating therein. What it is hoped can result is an organization which makes the town realize that each of them has a voice in the fiscal control, policies, personnel selection and day-to-day operational procedures unique to their dispatch center.

Objectives:

The following portions of this report summarize existing facilities and compares alternate approaches to the design, and discuss financing and operation of a cooperative dispatch facility for Lamoille and Washington County. Hopefully, this program study will be that catalectic action needed to pull together the resources now devoted to a series of divergent individual efforts into a cohesive program that will: (1) Be more effective and economically practical to the towns; (2) Provide a more uniform and simplified toll-free telephone number plan for the citizenry to summon help in time of need.

With respect to the second point, it should be recognized that a Central Vermont citizen today must sort through a complex maze of telephone numbers when needing

emergency numbers

Emergency Number Page from New England Bell Telephone Company Directory for the Barre - Montpelier Area.

fire	
police	
state police	
ambulance	
doctor	office
	home
FBI	dial "directory assistance" [Federal Bureau of Investigation]
u.s. secret service	617-223-2728

or dial "OPERATOR" in any emergency and say for example "I want to report a fire at—" or "I want a policeman at—." If you cannot stay at the telephone, give the "OPERATOR" your city or town as well as your street and number or the exact location where help is needed.

localities	fire	police
Barre	476-6622	476-4011
Barre Town	476-3217	479-2677
Berlin	223-5622	828-2115
Cambridge	644-5500	644-5477 or 1 + 828-2115
Chelsea	685-4545	1 + 828-2115 or 685-7777
East Barre	476-3217	479-2677
East Calais	223-5546	828-2115
East Montpelier	223-5546	229-0555 or 828-2115
Eden	635-2324	635-7036 or 1 + 828-2115
Fayston	496-2400	496-2262 or 1 + 828-2115
Goddard College, Plainfield	454-8333	454-7771 or 828-2115
Hyde Park	888-3113	888-2276 or 1 + 828-2115
Jeffersonville	644-5500	644-5477 or 1 + 828-2115
Johnson	635-7766	635-7036 or 1 + 828-2115
Marshfield	426-3209	454-7771 or 1 + 828-2115
Middlesex	223-5525	828-2115
Montpelier	223-2841	223-3445
Moretown	496-3731	496-2262 or 1 + 828-2115
Morrisville	888-4949	888-4211 or 888-2276
Northfield	485-9101	485-9181
North Hyde Park	635-2324	635-7036 or 1 + 828-2115
Plainfield	454-7711	454-7771 or 828-2115
Roxbury	485-8696 (7:30 a.m.-5:30 p.m.)	485-7977
	485-7928 or 485-7906 (5:30 p.m.-7:30 a.m.)	
Stowe	253-7779	253-7732
Waitsfield	496-2400	496-2262 or 1 + 828-2115
Warren	496-3661	496-2862 or 1 + 828-2115
Washington	883-2345	1 + 828-2115
Waterbury	244-8611	244-7339
Waterbury Ctr.	244-7311	828-2115
Williamstown	433-5500	1 + 828-2115
Wolcott	888-5666	888-4211 or 888-2276
Woodbury	472-6571	dial "0"
Worcester	223-5888	828-2115

assistance. There are some 55 different police and fire telephone numbers listed on the emergency page for the area under consideration. There are 6 more different numbers listed under "ambulances" in the "classified" section of the directory. While many longtime residents of the area are well familiar with their local police department, visitors and newcomers may not be so familiar. In time of distress it is important to be able to summon help quickly. Seconds saved can prevent property loss or save lives. Today many telephone numbers listed in the emergency page are further qualified with hours during which they may be called; others require a long distance call. While the State has taken a very positive step by providing the "dial zero" facility, this primarily serves the Police activities, and places the first reception of an emergency call input into the hands of a telephone company operator and not a trained emergency service dispatcher. Thus, a very immediate and direct benefit to the citizenry and visitors to the State of Vermont would be a simplified telephone numbering plan which was easily remembered, and an associated communication center that would place within arm's reach of the dispatcher any facet of the emergency services needed for response to a particular caller. It is felt that a more simplified and lower cost emergency calling plan be achieved.

Acknowledgement:

This consultant wishes to extend his sincere gratitude for all the time and cooperative effort provided by all the people interviewed during this study. There was always a sense of gracious welcome and concern for the problem, and this was much appreciated. The attitude of willingness to find a better solution to this complex question expressed by all should provide the further means to resolve any misunderstandings among towns as this program progresses to a final conclusion and implementation on how this need can best be solved.

Police Emergency Telephone Service

From any telephone just dial "0" for operator and say "Police Emergency". Do not hang up. You will be connected to an appropriate police agency where an official will take down your information and dispatch help if needed.

Callers are asked to stay on the line until the police agency is furnished with all the information they require.

Remember these rules if you need emergency police assistance 24 hours a day, toll free:

1. Dial "0" for operator
2. When the operator answers say "Police Emergency"
3. Tell them who you are and where you are.
4. Tell them what the problem is and why you are calling.
5. Stay on the line until the telephone operator and the police have the necessary information.

Police help is as near as your telephone operator.

"CVCDC"
Central Vermont Cooperative Dispatch Center
TELEPHONE STICKERS BEING USED

This is an example of how each emergency service is solving their communication problem independently. A coordinated effort would be less confusing to the public, and less costly.

TRAVEL TALKER Consulting Engineering Services

(Wording from telephone sticker supplied by EMS:)

Montpelier AMBULANCE Service
223-6633
Police_____
Fire_____
GIVE NAME, PROBLEM
LOCATION & PHONE NUMBER
EMS 76-1

STATE POLICE—Continued
Waitsfield Outpost ---------------496-2262
Warren Outpost ---------------496-2862
State's Attorneys & Sheriffs Depts
Executive Dir 52 State Mplr---------828-2891
SUPREME COURT
Administrative Servs ---------------828-3278
Administrator ---------------828-3281
Clerk of Supreme Court---------------828-3281
Fiscal Officer ---------------828-3276
Law Clerks ---------------828-3282
TAX DEPT
SEE ADMINISTRATION AGENCY
Transportation Agency
Aeronautics Dept---------------828-2442
TREASURER ---------------828-2301
...& Social Security Div---------828-2305
...unicipal Bond Bank---------828-2301
...cil on the Arts Inc---------828-3291
...TATE HOSPITAL—SEE HUMAN
...ERVS AGENCY MENTAL HEALTH DEPT
...irs City Hall Mplr---------828-3379
...OURCES
...RONMENTAL CONSERVATION AGENCY
...ents Not Listed Above---------828-1110
...STATE OF VERMONT LISTINGS
..."V" LISTINGS CONTINUED
Vermont Sugarhouse Sweets Inc
29 Currier Barre---476-3604
Vermont Superintendents Assn 62 State Mplr---223-3580
Vermont Techniques Inc Northfield Vt---------485-7905
VERMONT TELVSN CORP sales dept
30 Washington Barre---476-4197
Nights Sun Holidays---------Barre 476-3113
Vermont Tennis Court Constructors
10 Park St Johnsbury---748-4378
Waterbury Vt ---------------244-7861
Fayston Vt ---------------496-221...
Vermont Tomorrow Inc envrnmtl org ...223-60...
5 State Mplr...229-...
Vermont Transit Lines 543 N Main Barr---47...
112 State Mplr---------
2 N Main Wby---------
VERMONT TRAVEL AGENCY
Portland
Vermont Truck & Bus Assoc Inc St...
Vermont Truck Suppliers Inc S B...
Vermont Typographics N Calais
VERMONT UNEMPLOYMENT
SEE VERMONT STATE
VERMONT VIDEO M...
Vermont Weatherb...
Vermont Whole...
Vermont Wir...
Vermont-V...
Vermonter...
VERNA'S...

Note the listing of outpost troopers in the alphebetical section of the telephone directory.

...-2121
...ATE GUARD
...SEE SECRETARY OF STATE
PERSONNEL DEPT
SEE ADMINISTRATION AGENCY
PUBLIC SAFETY DEPT
Administration Terrace Mplr---------828-2146
Personnel---------------828-2147
Property---------------828-2119
Accounting---------------828-2176
Registry-Snowmobiles & Motorboats &
Explosives 120 State Mplr---828-2178
Civil Defense 132 State Mplr---------828-2163
Community Shelter Planning
132 State Mplr---229-9160
Commissioner---------------828-2144
Communications Ofc---------------828-2141
Crime Laboratory & Identification---828-2171
Polygraph---------------828-2174
Criminal Div-Deputy Fire Marshal---------828-2167
Dir-State Police---------------828-2101
Information-General ---------------828-2136
Safety Education Terrace Mplr---------828-2187
Special Servs Div-Snowmobiles & Motorboat
Enforcement
1710 Hedgemen Colchester---828-2105
Staff Servs Div Terrace Mplr---------828-2186
Vermont Crime Information Ctr
Middlesex US Rte #2---828-2155
Vermont Law Enforcement Training Council
Pittsford Vt---483-6228
PUBLIC SERV BD
General Information ---------------828-2811
Clerk---------------828-2319
Complaints---------------828-2332
Racing Comm 136 State Mplr---------828-2374
SECRETARY OF HUMAN SERVS AGENCY
SEE HUMAN SERVS AGENCY
SECRETARY OF STATE---------------828-2363
Corporation Dept---------------828-2386
Licensing & Registration Unit---------828-2381
Cosmetology Bd ---------------828-2381
Nursing Bd---------------828-2384
Plumbers Bd---------------828-3391
Registration For Professional
Engineers Bd---828-2855
Norwich University Northfield---------485-9341
If no answer---------------485-5011
Other Professional Bds---------------828-2381
Vital Statistics---------------828-2367
SOCIAL & REHABILITATION SERVS DEPT
SEE HUMAN SERVS AGENCY
SOCIAL WELFARE DEPT
SEE HUMAN SERVS AGENCY
STATE HOSPITAL
SEE HUMAN SERVS AGENCY
MENTAL HEALTH DEPT
State Housing Authority 155 Elm Mplr---------828-3295
STATE POLICE
Chelsea Outpost ---------------685-7777
E Montpelier Outpost---------------229-0555
Hyde Park Outpost Hyde Park Vt---------888-2276
Jeffersonville Outpost ---------------644-5477
Johnson Outpost ---------------635-7036
"K" Troop Hdqtrs Middlesex US Rte #2---828-2115
Marshfield Outpost Plainfield---------454-7771
Plainfield Outpost ---------------454-7771

Ambulance Services are listed in the classified section of the telephone directory at present.

Ambulance Service

BOARDWAY & CILLEY FUNERAL HOME
DAVID P. CILLEY - DIRECTOR
24 Hour Ambulance Service
Also Call Residence Tunbridge, Vt. 889-3300
Chelsea Vt 685-4600

Hardwick Ambulance & Oxygen Serv
SpringHardwick 472-5261

LAMOILLE AMBULANCE SERVICE
24 HOUR SERVICE EMERGENCY PHONE-635-7511
LOCAL & LONG DISTANCE TRANSFERS
(AIR SERVICE CAN BE ARRANGED)
OXYGEN & TRAINED E.M.T's. ON ALL VEHICLES
MASTER CHARGE & BANKAMERICARD ACCEPTED
CERTIFIED FOR MEDICARE
Main Jhns ....635-7511 / 635-7724

Mad River Valley Ambulance Service Inc
WaitsfieldVt 496-3600
Morristown Ambulance Service
Morristown Vt 888-5656
Perkins V L Co Inc 46SMainWby 244-7223
SILVER CREST AMBULANCE SERV
SBurlingtonVt 862-4206
WATERBURY AMBULANCE SERVICE INC
17ElmWby 244-5511

"CVCDC"
Central Vermont Cooperative Dispatch Center

A citizen must choose from among many numbers for help today.

PEOPLE INTERVIEWED (7/8 thru 7/20/76)
- Partial Listing -

Major Davis	Vermont State Police
Ernest Flanders	Montpelier Fire, Asst. Chief
O. J. Ortiz	Montpelier Fire, Chief
C. Bowman	Governor's Justice Commission
Earl Osgood	Fire Chief, Berlin State C. D. Director
Sgt. Wade	District K State Police
Irving MacAndrew	Vermont Public Safety Comm. Officer
Al Tuscany	Town Manager, Waterbury
Jos. Sprano	Police Chief, Waterbury
Fran Wilder	Trustee, Ambulance Service, Fire Chief, Waterbury
Shirley Egan	Ambulance Service, Waterbury
Mike Mayo	Sheriff, Washington County
Caroll Willet	Dept. Sheriff, Roxbury
Ed Solomon	Fire Chief, Barre Town
Bob Edwards	Police Chief, Barre Town
Paul McGinley	Town Manager, Barre Town
Rolan Dubay	City Manager, Montpelier
William Kozezar	Police Chief, Montpelier
Kenneth Libby	Vermont League of Cities and Towns
Del Hill	Police Dispatcher, Stowe
Jay Hawthorne	City Manager - Barre
Elwin Martin	Director Public Works, Barre
Dale Nudgent	Fire Dispatcher, Barre City
Shawn Bryan	Town Clerk, Northfield
Chief Sanders	Police Chief, Northfield
Ed Webster	Police Department, Stowe
Fireman	Woodbury, Vermont
Ron Pitkin	Mutual Aid Fire
John Gladding	Association of Police Chiefs
Deputy Sheriff	Lamoille County
Stan Titus	New England Bell
Fireman	Worcester
Robert Norton	Morrisville Fire
B. Welch	Morrisville Power Co. Dispatchers
Dr. Caffin	Cabot, Doctor, Dep. Sheriff
Mrs. Caffin	Secretary, Cabot Ambulance
Officer Graham	Northfield Police
Sam Frank	Northfield Ambulance
Chas. Larkin	Public Service Board
Emerson Baker	Vermont Tax Maping
Anthony Ciaraldi	Lamoille County Development Commission

PART 2 -

SUMMARY OF PROJECT SCOPE AND PRESENT INVENTORIES

CVCDC Defined:

This report considers how to best provide a communication dispatch center for central Vermont. It shall be referred to throughout the report as "CVCDC" - Central Vermont Cooperative-Dispatch Center. The name was selected to reflect the cooperative nature of the center with respect to financial support and a joint effort to serve the needs of Police, Fire and Ambulance services. These basic parameters form the operating philosophies for this center.

1. The center will receive emergency calls for providing routine day-to-day emergency assistance from established Police, Fire and Ambulance districts.
2. The center will not be concerned with the routine State-wide communication functions, such as highway maintenance, civilian defense and certain State Police State-wide communication efforts. It will also not be concerned with radio communications from within the State of Vermont to adjacent states.
3. The CVCDC may be considered one of a series of similar centers to be eventually implemented across the State whose primary function is to meet the daily municipal demands for emergency assistance, but would be fully supported by technical knowledge and maintenance service from the State.
4. All Police departments within a district whether they be County, State, or town municipality, would have radio messages directing them to a complainant relayed by the Cooperative Dispatch Center. To facilitate the public reaching these centers, a simplified telephone plan which will either reduce to a single number for the region or a single number for each telephone exchange area will be established.

5. The centers would be financed on a shared basis to be explained later between the Department of Public Safety, the Department of Health and the participating towns benefiting from this cooperative venture.

Heretofore, the question of central dispatch has been looked at from a State-wide basis and has given an overwhelming complex picture. This project by confining itself to a specified region, will consider the unique problems to be solved in the Lamoille and Washington County area by working with a smaller and more manageable entity, and solutions can be more quickly found and progress toward implementing the plan can be more quickly achieved.

RADIO EQUIPMENT INVENTORY:

The radio units that would be dispatched by the proposed CVCDC would include those installed in Police vehicles, Fire vehicles and Ambulances. A tabulation approximately representative of the number of units now in service follows:

(1) CENTRAL VERMONT - EQUIPMENT SUMMARY IN MUNICIPAL AND STATE PUBLIC SAFETY ACTIVITIES

	Base Stations	Mobile	Portables	Alert Receivers or Scanners
Low Band	1	29	3	
High Band	22	78	15	145
UHF Band	18	44	24	
(2) TOTAL	41	151	43	145

(1) Does not include Radio Equipments used by town street, water or other local work. Includes only police, fire and ambulance units.

(2) In some cases exact quantities of units was not determined for certain. The summary does provide an approximate order of magnitude for estimated maintenance costs.

CENTRAL VERMONT - LOW BAND RADIO

Municipality	Base	Mobiles	Portables
Wash. Co. Sheriff	1	16 (Old) 13 (New) 29	3 (Old)

HIGH BAND RADIO FIRE AND AMBULANCE EQUIPMENT SUMMARY

	Base	Mobiles	Portables	Alert Receivers or Scanners
Barre City	1	7	2	-
Barre Town	2	8	-	20
Berlin	2	1	2	20
Cabot	3	3	-	-
Cambridge	1	3	-	-
E. Montpelier	1	3	2	20
Goddard College	1	2	-	-
Johnson	1	2	-	26
Marshfield	1	3	-	-
Middlesex	1	4	-	15
Montpelier	1	7	3	19
Morristown	1	6	-	-
Northfield	1	4	-	-
Plainfield	1	3	-	-
Stowe	1	6	6	
Waterbury	1	8	-	25
Waterbury Center	1	2	-	-
Woodbury	1	6	-	-
	22	78	15	145

UHF POLICE RADIO SYSTEM

Municipality	Base Stations	Mobile Radio Units	Portable Radio Units
Barre	1	2	5
Hardwick	1	1	1
Johnson	-	1	1
Montpelier	1	2	2
Morristown	1	1	1
Northfield	2	1	1
Stowe	2	2	2
Waterbury	1	1	1
Websterville	1	1	1
TOTAL (TOWNS)	10	12	15
Sheriff (Washington)	0	3	0
Sheriff (Lamoille)	2	2	0
State Police	6	27	10
TOTAL-POLICE UHF	18	44	25

RADIO FREQUENCY LICENSE INVENTORY:

The following table summarizes the radio frequencies by emergency service classification now licensed within the two-county area. While this report deals primarily with Police, Fire and Ambulance services, the local Government frequencies used by the Village trucks are significant for there are times when coordination among these trucks and the emergency vehicles may be required. A mutual frequency that will be within the range to permit two-frequency operation from these service vehicles to emergency vehicles and also to permit coordination between Police and Ambulance will be an objective pursued by this study. This will permit easier coordination at the scene of a major disaster or facilitate communication with these crews on highway problems. This tabulation shows that State and Town Police activities are conducted on the UHF (450MHz) Band. Sheriff departments continue operation on 45.50 (Low Band) and the towns of Northfield and Barre hold licenses on 155.010 which may have an application in the new system as discussed in the frequency plan.

INVENTORY OF RADIO FREQUENCIES LICENSED FOR MUNICIPAL PUBLIC SAFETY SERVICES IN CENTRAL VERMONT
(LAMOILLE AND WASHINGTON COUNTIES) (SIMPLEX OPERATION UNLESS NOTED FOR "T" OR "R")

TOWN, AGENCY OR USE	CALL SIGN	EXP. DATE	RADIO SERVICE AND MOBILE FREQUENCIES POLICE	FIRE	LOCAL GOV'T.	SPEC. EMER.	HWY.	OTHER	REMARKS
All State & Town Police			460.500						Channel 2-Car-to-Car
All State & Town Police			460.025R						Tone Selected Repeaters
All State & Town Police			465.025T						
State Police Cars			460.275						Channel 4-Interzone
District K - State Cars			460.425						Dist.4 Simplex Dispatch
State-wide Data									Not yet used.
WASHINGTON CO. TOWNS:									
Barre City	KCE 607	12/77		154.190					
	KCB 756	12/77	155.01						
	KSU 635	3/76	460.250						
	KDT 305	12/77			158.760				
	WLH 51	3/76	465.025						
Barre, Town	KQR 539	?		154.190					)Check License
	KRE 258	?			154.055				)for Renewal
	KUE 515	6/77	460.200						
Berlin	KRL 286	6/78		154.190					
	KVH 276	6/78		"					
	KVH 275	6/78		"					
	KR5427	6/78		"					
Cabot	KWI610	3/79			45.56				
	KN8518	?		154.190					
Cambridge Fire	KLE829	11/77		154.190					
East Montpelier	KXZ765	3/80			154.085				
Goodard College	KUJ794	9/77		154.190					
Hyde Park Town	KUL736	9/77			154.115				
Johnson	?	?		High Band					
Lamoille County Sheriff	KWI570	3/79	460.450R						
	KS6142	3/79	465.450T						
	KWI571	3/79	460.450						
Marshfield, Town	KXR856	1/80			45.480				
Marshfield, Fire	KZE678	?		154.190					
Middlesex	KW0463	5/79		154.190					
	KYL640	6/80			45.140				
Montpelier	KCC586	1/78		154.190					
	KY5173	8/80	460.050R						
	WBD966	8/80	465.050T						
	KGB278	10/78			158.820				
Morristown	K09356	8/77	460.250						
	KWV631	6/79					158.985		
	KJU998	6/78			158.745				
Northfield, Town	KSU582	12/78	460.175						
	KCF401	7/79	155.01						
	KE0246	12/77			155.040				
Plainfield	KK3583	10/79		154.190					
Stowe	KJH202	?			154.040				
	KSU583	3/76	460.250						
	KLY993	?		154.190					
Washington Co.Sheriff	KDV843	9/77	45.500						
Waterbury KXL427/KUL767		11/79		154.190					
	KUL767	9/77			154.980				
	KSU584	3/76	460.175						
Waterbury Center	KQR439	?							
Woodbury	KW0465	5/79		154.190					
---- HOSPITALS ----									
Central Vt.Med.Cent. (Barre)	KXB718	7/75	?			155.295			
Copley Hospital (Morrisville)	KJ2883	2/73	?			155.160			
	KVT822	8/79				155.340			
	KXB498	8/79				155.400			

CHANNEL SUMMARY:						
TOTAL LOW BAND	1	0	2	0	0	TOTAL 3
TOTAL HIGH BAND	1	1	9	4 (2)	1	TOTAL 16
(1)TOTAL UHF BAND	9	0	0	0 (2)	0	TOTAL 9
TOTAL - ALL	11	1	11	4	1	38

NOTES:
(1) A freq. pair spaced 5Mhz counted as 1 channel.

PRESENT COSTS FOR RADIO COMMUNICATIONS:

Almost every town and municipality incurs some communication cost at the present time to support their individual system. Typical of the town's cost are these taken from the town of Northfield's annual report for 1975, showing their budget expenses for communications:

	POLICE COMMUNICATIONS	FIRE COMMUNICATIONS	AMBULANCE COMMUNICATIONS
Telephone	$900.00	$990.00	$700.00
Radios	250.00	650.00	-
Repair and Maintenance	500.00	50.00	100.00

The most significant item is the aggregate amount for Telephone for the three emergency services which totals $2,590.00, budgeted for 1976. The Police telephone includes a telephone line to Northfield to permit operation of the Northfield base station after normal hours when the station is manned. The Fire and Ambulance figures represent the cost for the multi-phone answering facilities used in these networks by volunteers. With a program to gradually provide crew alerting by means of alert-monitor radio receivers, and by elimination of the control circuit for Northfield Police radio station, this total phone bill could ultimately be reduced to provide only local service lines to each of these activities at a cost of approximately $600.00 per year, or a net difference of some $1,900.00 per year. Monitor receivers cost approximately $200.00 each which could gradually be added to the department and dispatched from a central center, thereby ultimately eliminating the need for the multi-phone networks for Police and Ambulance alerting.

Expense items now attributed to radio dispatching for the following department's individual efforts add up to a substantial sum.

SUMMARY OF DISPATCHER COSTS

Town	Amount (Estimates)
Barre	$ 8,000.00
Montpelier Police Dept.	20,000.00
State Police (District K)	70,000.00
Stowe	8,000.00
Lamoille County	30,000.00
TOTAL	$136,000.00

Further, as a means to providing 24-hour phone answering service for their Fire departments, some towns have gone to a commercial answering service. For this, the town of Stowe now pays $14,000.00 annually. The towns of East Montpelier, Berlin and Middlesex spend approximately $1,000.00 for this in a joint venture, using a commercial dispatch service in Montpelier. Telephone lines for the part-time Police call answering at Middlesex for Barre town, Northbrook, Stowe and Waterbury Police total some $3,200.00 per year. Total expenditures for red phone systems for Fire and Ambulance approximate some $10,000.00 annually.

Just these few more obvious expense items total to $164,000.00 in taxpayers monies expended for call reception and radio dispatch services; not fully meeting the entire two-county needs.

CVCDC SUB SYSTEMS:

Several factors must be considered in the over-all planning for an effective dispatch center serving a large area to insure effective and economic operation. Among these considerations are the following:

1. The Telephone Sub-System: What is the best method for bringing in trunk lines and the most economical method for providing toll-free calling to all users within the operational area? Are one or two centers the least costly? What alternatives are there to waiting 18 months for a 911 System?

2. Location of the CVCDC: What are the alternatives? What are the limitations? What factors govern the location?
3. Staffing, Equipments and Operation of the CVCDC: What is the expected traffic input?
4. The Radio System Frequency Plan: What plan for standardization of channel positions and utilization of frequencies will permit intercommunication, but retain effective dispatching frequencies for each coordination service? What steps can be taken in this cooperative operation to conserve radio frequency spectrum?
5. Radio System Design Consideration: How can coverage be improved? Where shall base equipments be located?
6. The Cost Sharing Plan.
7. The Cooperative Organization Structure and Management.

Following sections of the report are devoted to each of these topics.

BASIS FOR POPULATION ESTIMATES:

Much of the statistical information, and funding allocation, will be based on the population of the area. Estimates of population were obtained from the Department of Health, the State Planning Office and the 1970 Census. The town-by-town summary from each of these sources was tabulated. The State Planning Office projections for population growth were used to estimate the 1976 and 1986 populations which are used later as a basis for planning the necessary manpower and telephone line requirements.

- POPULATION FIGURES -

SOURCES: 1970 CENSUS
STATE PLANNING OFFICE (SPO)
STATE DEPT. OF HEALTH (DOH)

1976 AND 1986 LEVELS BASED ON ANNUAL GROWTH ESTIMATES IN SPO REPORT OF NOVEMBER 22, 1973

by

RALPH R. MONTICELLO

	1970 (Census)	1972 (SPO)	1973 (DOH)	1976 Estimate $(1.016)^3 \times$ (73 pop.) or $(1.048) \times$ (73 pop.)	1986 Estimate $(1.016)^{10} \times$(76 pop.) or $(1.172) \times$ (76 pop.)
WASHINGTON COUNTY	47,659	50,000	48,800	51,142	59,938
Barre Town	6,509	7,000	6,797	7,123	8,348
Barre City	10,209	10,400	10,202	10,691	12,530
Berlin	2,050	2,000	2,124	2,226	2,609
Cabot	663		712	746	874
Calais	749		863	904	1,059
Duxbury	621		640	671	786
East Montpelier	1,597	1,700	1,866	1,956	2,292
Montpelier City	8,609	8,800	8,415	8,819	10,336
Fayston	292		348	365	428
Marshfield	1,033		1,079	1,131	1,326
Middlesex	857		901	944	1,106
Moretown	904		949	995	1,116
Northfield	4,870	5,000	4,862	5,095	5,971
Northfield Cent.	2,139				
Plainfield	1,399		1,477	1,548	1,814
Roxbury	354		359	376	441
Waitsfield	837		936	981	1,150
Warren	588		681	714	837
Waterbury	4,614	4,500	4,549	4,767	5,587
Woodbury	399		451	473	554
Worcester	505		589	617	723

- POPULATION FIGURES -

SOURCES: 1970 CENSUS
STATE PLANNING OFFICE (SPO)
STATE DEPT. OF HEALTH (DOH)

1976 AND 1986 LEVELS BASED ON ANNUAL GROWTH
ESTIMATES IN SPO REPORT
OF NOVEMBER 22, 1973

by

RALPH R. MONTICELLO

	1970 (Census)	1972 (SPO)	1973 (DOH)	1976 Estimate 3 (1.018) X (73 pop.) or (1.055) X (73 pop.)	1986 Estimate 10 (1.018) X (76 p or (1.195) X (76 po
LAMOILLE COUNTY	13,309	14,500	15,000	15,825	18,910
Belvidere	189		203	214	256
Cambridge	1,528	1,645	1,671	1,763	2,107
Jeffersonville	382				
Cambridge	235				
Eden	513		535	564	674
Elmore	292		309	326	390
Hyde Park	1,347	1,477	1,479	1,560	1,864
Hyde Park	418				
Johnson	1,927	2,481	2,683	2,831	3,383
Johnson	1,296				
Morristown	4,052	4,317	4,373	4,614	5,514
Morrisville	2,116				
Stowe City					
Stowe Town	2,388	2,547	2,577	2,719	3,249
Waterville	397		403	425	508
Wolcott	676		767	809	967

TOTAL - BOTH COUNTIES (76 EST.)

WASHINGTON	51,142
LAMOILLE	15,825
	66,967

PART 3 -

THE TELEPHONE SUB SYSTEM

TRAFFIC SUMMARY:

Basic to a determination for the number of incoming lines and the trunking requirements is a forecast of the number of emergency calls to be received at the dispatch center. Exact information on past history is somewhat sketchy throughout the two-county region. Where figures do exist it is difficult to tie them down to a specific number of population. For example, the Middlesex District K Police office dispatches part-time for four towns. While a number of calls received by them can be determined from their radio logs, it is difficult to ascertain the exact population being served by the center at a given time.

Previous studies by this consultant have found that complaint calls -- or calls requiring the dispatch of a Police vehicle range from approximately .02 calls per 100 population per day in rural areas to about .15 per 100 population per day in more densely populated areas. Some studies made by others have used a factor of .005 to .007 calls per 100 population per day. However, in a spot check based on the estimated number of calls at several of the departments interviewed, these ratios were calculated:

Montpelier Police	- .38	calls	per	100	per	day
K Troop	- .23	"	"	"	"	"
Stowe	- .20	"	"	"	"	"
Washington Sheriff	- .04	"	"	"	"	"
Roxbury	- .003	"	"	"	"	"
Barre	- .09	"	"	"	"	"
Northfield	- .08	"	"	"	"	"
Cabot	- .21	"	"	"	"	"

The above tabulation shows a rather broad spread of estimates though it does somewhat approach the figures stated above. It must be remembered that many of these were done strictly by recollection of the person being interviewed and backed up by no exact statistical data. It is recognized that the Washington - Lamoille County region is one subject to great variation in popu- lation due to the transient vacationers and skiers coming into the area.

Also, the City of Montpelier's population expands greatly during the normal working day. With these considerations in mind, a traffic study was made by choosing estimate of emergency Police call inputs ranging from .02 to .2 calls per 100 per day, using a subjective estimate based upon the expected variation in population and other factors which might influence the calls due to increase population density.

The Fire and Ambulance calls indicate a somewhat more closely correlated figure. Fire calls in rural areas are approximately .006 calls per 100 population per day and Ambulance calls seem to run .03 calls per 100 population per day. These figures were quite consistent throughout the two counties.

Thus, the method for determining the calling traffic followed the following procedure:

1. A careful outline of the telephone exchanges serving the two-county region was determined.
2. The population included within each telephone exchange area was determined by using the town population figures referred to earlier in the report and estimating the percentage of that town falling within a given telephone exchange.
3. An estimated factor for Police, Fire and Ambulance calls per 100 population was assigned the territory covered by each telephone exchange. Where the population density was highest, higher factors were used for Police and Fire.
4. The total emergency calls per exchange area were summed up and an estimated ratio due to seasonal increase was applied giving the total number of emergency calls expected per day in the peak season based upon population.

5. It was assumed that 17% of the daily calls will occur in a peak hour and incoming lines requirement must be capable of meeting peak demand at that time.
6. To convert the number of calls to a traffic unit or loading percent an average calling time of 1/2 minute per call was used.
7. Estimates were made for the year 1976 and 1986 based upon the projected population growths by the State Planning Office.
8. The number of required emergency trunks that would produce a grade of service busy 1 time in 1,000 call attempts were determined by using tabulated data from the Erlang B equation; a copy of which is published in "Reference Data for Radio Engineers", 6th Edition, by Howard W. Sams and Company, Indianapolis, Indiana, Page 36-11.

From this procedure it was determined that for emergency incoming calls the number of trunks per exchange range from 1 to 3, in a system using dedicated lines brought from each exchange to the dispatch center. However, a minimum of 2 trunks per exchange is used in the design to guard against the occurrence of two simultaneous emergency calls, and to give increased reliability through redundancy of facilities.

INFORMATION CALLS:

The aforesaid computation calculates the incoming trunk lines for emergency calls that would find a busy condition less than 1 per 1,000 calls, or, in other words, the circuit would be blocked less than 1/10 of 1% of the time. However, it is recognized that calls other than emergency are directed to the Police station and studies have shown that these calls range as high as 8 times the number of emergency calls. Exactly where best to receive such calls as request

for weather, and other calls for highway conditions, will be discussed in later paragraphs. At this time, it is recognized that the routine calls for service are expected to exceed the emergency calls by a factor from 4 to 8 times the emergency call level. However, while the emergency trunk input was designed for a grade of service of 99.9 % in availability, a lower grade of service can be assigned to the information calls. The grade of service used was for a busy line 1 out of 20 times, or 95% line availability. Using this service grade the number of non-emergency or information lines per exchange were calculated to be from 1 to 3, in other words, equal to or less than the number of emergency lines.

ESTIMATE OF INCOMING TELEPHONE CALLS AND TRUNK OR LINE REQUIREMENTS

(1) EXCHANGE CENTER / Lamoille Co. / Washington Co.		(2) ESTIMATED POPULATION SERVED 1976	(2) 1986 (1)	(3) NUMBER EMERG. CALLS/DAY ESTIMATING FACTOR CALLS/100 POPULATION/DAY POLICE .03 to.2	FIRE .006to.02	AMB. .03	TOTAL	(4) ESTIMATED RATIO SEASONAL INCREASE OF CALLS	(5) CALLS/DAY (1) PEAK SEASON (2)X(3)X(4) ÷ 100 1976	1986
Barre	(W)	19,139	22,430	.18	.02	.03	.23	1.25	55	65
Montpelier	(W)	14,476	16,965	.20	.02	.03	.25	2.5	90	106
Morrisville	(L)	6,949	8,304	.06	.010	.03	.10	1.50	10	12.5
Waitsfield	(W)	2,315	2,713	.03	.006	.03	.066	1.10	1.7	1.97
Northfield	(W)	5,523	6,473	.04	.008	.03	.078	1.10	4.7	5.6
Waterbury	(W)	5,607	6,571	.07	.010	.03	.110	1.25	7.7	9.
Stowe	(L)	3,316	3,962	.12	.015	.03	.165	3.0	16.4	19.2
Hardwick	(L) (3)	2,929	3,500	.05	.006	.03	.086	1.20	3.02	3.6
Johnson	(L)	3,389	4,050	.04	.006	.03	.076	1.10	2.8	3.4
Jeffersonville	(L)	2,517	3,008	.03	.006	.03	.066	1.10	1.8	2.2
Plainfield	(W)	1,742	2,041	.03	.006	.03	.066	1.10	1.3	1.48
Cabot	(W)	847	993	.03	.006	.03	.066	1.10	.6	.7
E. Calais	(W)	551	646	.03	.006	.03	.066	1.10	.4	.5
Marshfield	(W)	1,172	1,373	.03	.006	.03	.066	1.10	.85	1.0
TOTALS: (2)		70,472	83,029	-	-	-	-	-	196.27	232.15
LAMOILLE		19,100	22,824						34.02	40.9
WASHINGTON		51,372	60,205						162.25	191.25

(6) TRAFFIC UNITS IN BUSY HOUR (17 PERCENT DAILY CALLS, 1/2 MIN. EACH) 1976	1986	(7) TRUNKS FOR BUSY LESS THAN 1 PER 1,000 (EMERG. LINES) 1976	1986	(8) ESTIMATED RATIO INFO. CALLS TO EMERGENCY	(9) TRAFFIC UNITS FOR INFORMATION CALLS 1976	1978	(10) INFO. LINES FOR BUSY LESS THAN 1 PER 20 1976	1986
.078	.092	3	3	6	.467	.552	3	3
.128	.149	3	3	7	.896	1.043	3	4
.014	.017	2	2	6	.085	.102	2	2
.002	.003	2	2	4	.008	.006	1	1
.007	.008	2	2	4	.028	.032	1	1
.011	.013	2	2	7	.077	.091	2	2
.023	.027	2	2	8	.184	.216	2	2
.004	.005	2	2	4	.016	.020	1	1
.004	.005	2	2	4	.016	.020	1	1
.003	.003	2	2	4	.012	.012	1	1
.002	.002	2	2	4	.008	.008	1	1
.0008	.001	1(2)	1(2)	4	.003	.004	1	1
.0006	.0007	1(2)	1(2)	4	.002	.003	1	1
.001	.0015	2	2	4	.004	.006	1	1
.2784	.3272	28(30)	28(30)	-	1.806	2.115	21	22
.048	.057	10	10		.313	.37	7	7
.2304	.2702	18 (20)	18 (20)		1.493	1.745	14	15

(1) Population growth in 10 years based on 1.195 times in Lamoille County and 1.172 times in Washington County.

(2) Totals include some from adjacent Counties.

(3) The majority of the Hardwick Exchange is in Caledonia. However, if this area is part of dispatch system it is probably more closely allied to Lamoille than Washington County activities and is included in Lamoille traffic loading for analysis purposes.

(4) While traffic level indicates only one trunk needed from Cabot and Calais, a minimum of 2 is recommended for 9 1.

"CVCDC"
Central Vermont Cooperative Dispatch Center

The Telephone Sub-System

Table summarizing the traffic estimate, and required trunking for emergency and information lines.

TRAVEL TALKER Consulting Engineering Services

EXCERPTS FROM
TRUNK LOADING CAPACITY - FULL AVAILABILITY
(PER ERLANG B EQUATION) (1)

TRUNKS	TRAFFIC UNITS FOR GRADE OF SERVICE 1 DENIAL PER 1,000 (2)	TRAFFIC UNITS FOR GRADE OF SERVICE 1 DENIAL PER 20
1	.001	.05
2	.05	.38
3	.19	.90
4	.44	1.52
5	.76	2.22
6	1.15	2.96

(1) Howard Sams, Indianapolis, Indiana, Reference Data for Radio Engineers, Sixth Edition, Page 36-11.

(2) A Traffic Unit is an aggregate of 1 call hour in traffic expected in the busy hour.

TELEPHONE COMPANIES
OPERATING IN VERMONT

* 1. CONTINENTAL TELEPHONE COMPANY OF VERMONT, INC.
Donald Barnes, Manager
Springfield, Vermont 05156
885-9911

Richmond Office - 434-9911

New England Area Office
P. O. Box 351
Concord, N. H. 03301

2. FRANKLIN TELEPHONE COMPANY
Hugh Gates, President & Treasurer
Franklin, Vermont 05457

3. LUDLOW TELEPHONE COMPANY
Lowell F. Hammond, President
111 Main Street
Ludlow, Vermont 05149

* 4. NEW ENGLAND TELEPHONE & TELEGRAPH COMPANY
James W. Wooster, III, General Manager
One Burlington Square
Burlington, Vermont 05401

5. TELEPHONE DATA SYSTEM (TDS)
* NORTHFIELD TELEPHONE COMPANY
Robert J. Collins, President
Lock Box #30
Depot Square
Northfield, Vermont 05663

PERKINSVILLE TELEPHONE COMPANY
David Taylor, Manager
Box 57 - North Street
Perkinsville, Vermont 05151

6. SHOREHAM TELEPHONE COMPANY, INC.
D. S. Arnold, Sr., President — Margie B. Arnold, Treas.
Shoreham, Vermont 05770

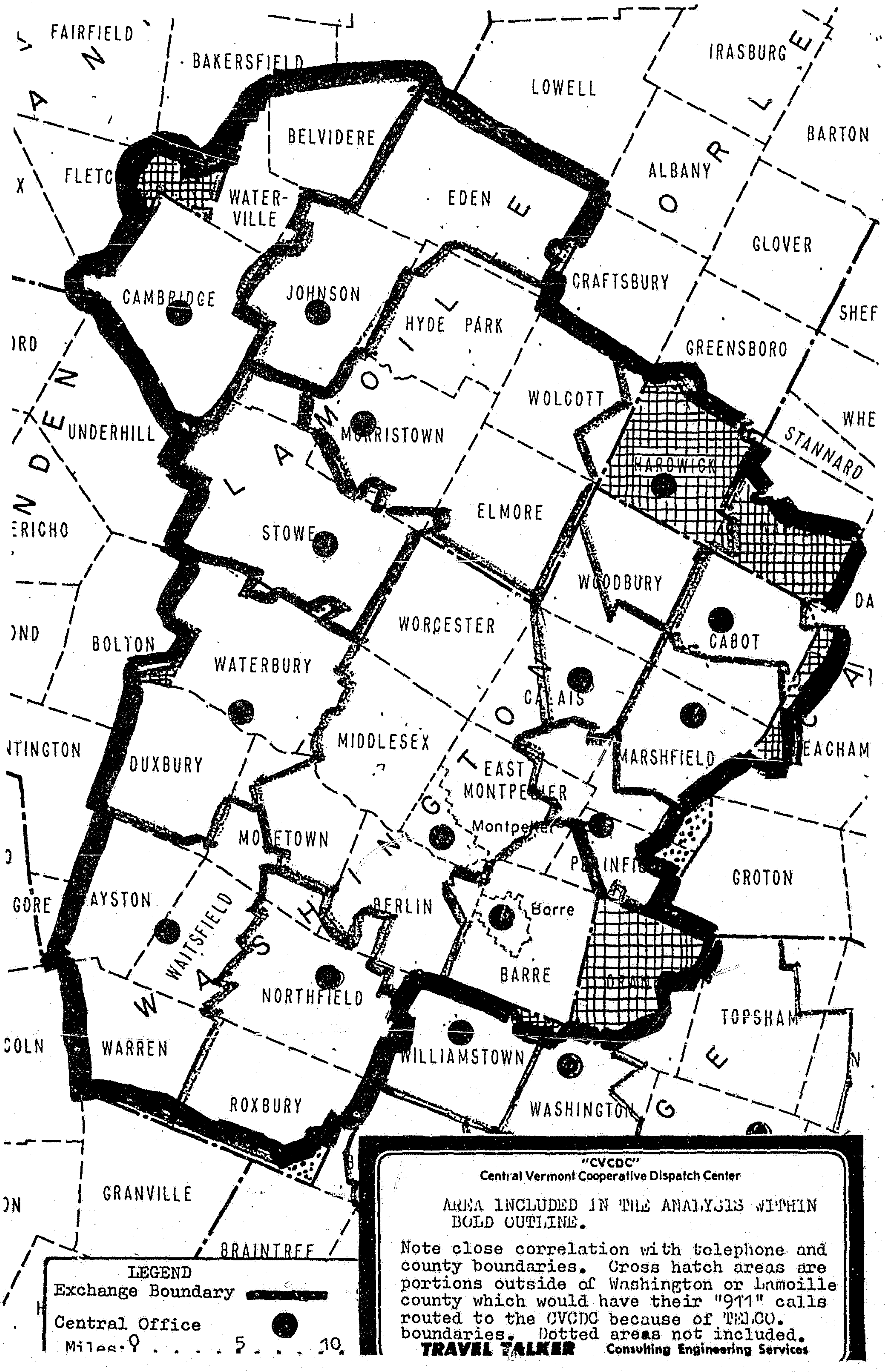
7. TOPSHAM TELEPHONE COMPANY, INC.
Margaret K. Sahlman, Treasurer — Frank Sahlman, President
Box 26
West Topsham, Vermont
439-5725

* 8. WAITSFIELD-FAYSTON TELEPHONE COMPANY
Dana L. Haskin, President — Eleanor G. Haskin, Treas.
Waitsfield, Vermont 05673
496-3391

* Have exchanges in Lamoille or Washington County.

SUMMARY OF MAIN STATIONS AND POPULATION IN TELEPHONE EXCHANGES
SERVING WASHINGTON AND LAMOILLE COUNTIES IN VERMONT
(LISTED IN DESCENDING ORDER OF NUMBER OF MAIN STATIONS)

I.D. No.	EXCHANGE: OPERATING CO: COUNTY SERVED:	NUMBER OF MAIN STATIONS	TOWNS SERVED AND EST. % AREA		1976 POPULATION EST. FOR EXCHANGE	
1.	Barre N.E. Bell Co. (Washington County)	6,801 25%	Barre Berlin (10%) Orange (60%) E. Mont. (20%) Plainfield (25%)		17,814 223 324 391 387	19,139 27%
2.	Montpelier (B) N.E. Bell Co. (Washington County)	5,932 22%	E. Mont. (80%) Berlin (80%) Moretown (50%) Middlesex (98%) Worcester Montpelier City Calais (30%)		1,565 1,780 500 925 617 8,819 270	14,476 21%
3.	Morrisville N.E. Bell Co. (Lamoille County)	2,457 9%	Morristown (95%) Hyde Park (98%) Eden (3%) Wolcott (80%) Elmore (98%)		4,400 1,560 17 650 322	6,949 10%
4.	Waitsfield Waitsfield - Fayston Tel. Co. (Washington County)	2,300 8%	Waitsfield Fayston Duxbury (1%) Warren Moretown (25%)		981 365 7 714 248	2,315 3%
5.	Northfield Telephone Data Systems Northfield, Ill. (Washington County)	1,800 7%	Northfield (95%) Roxbury (95%) Moretown (10%) Berlin (10%)		4,840 360 100 223	5,523 8%
6.	Waterbury N. E. Bell Co. (Washington County)	1,708 6%	Waterbury (98%) Duxbury (99%) Moretown (15%) Middlesex (2%) Stowe (1%)		4,771 664 150 19 3	5,607 8%
7.	Stowe N.E. Bell Co. (Lamoille County)	1,644 6%	Stowe (99%) Morristown (13%)		2,716 600	3,316 5%
8.	Hardwick N.E. Bell Co. (Serves towns in Caledonia, Washington, Lamoille and Orleans Counties)	1,015 4%	Hardwick (99%) Woodbury (60%) Walden (1%) Wolcott (20%) Greensboro (1%)		2,500 (C) 284 (W) 4 (C) 135 (L) 6 (O)	2,929 4%
9.	Johnson N.E. Bell Co. (Lamoille County)	918 3%	Johnson (99%) Eden (99%) Hyde Park (2%)		2,800 558 31	3,389 5%
10.	Jeffersonville N.E. Bell Co. (Lamoille Co. and some in Franklin Co.)	868 3%	Cambridge Waterville Belvidere Fletcher (25)	(F)	1,763 425 214 115	2,517 4%
11.	Plainfield N. E. Bell Co. (Washington County)	587 2%	Plainfield (70%) E. Montpelier (10%) Calais (20%) Marshfield (25%)		1,084 195 180 283	1,742 2%
12.	Cabot Continental Tel. Co. (Washington & Caledonia County)	418 2%	Cabot (70%) Walden (65%) Percham (5%)	(C)	522 300 25	847
13.	E. Calais N.E. Bell Co. (Washington County)	315 1%	Calais (40%) Woodbury (40%)		361 190	551 .8%
14.	Marshfield Continental Tel. Co. (Washington County)	289 1%	Marshfield (75%) Cabot (30%) Percham (5%)		850 300 (C) 22	1,172 1.7%
TOTAL		27,052 (100%)			70,472	
WASHINGTON CO.		20,150 (74.5%)			50,795 (72.1%)	
LAMOILLE CO.		6,902 (25.5%)			16,381 (23.3%)	
ADJOINING COUNTIES (C - Caledonia) (F - Franklyn) (O - Orleans)					3,296 (4.6%)	



"CVCDC"
Central Vermont Cooperative Dispatch Center

AREA INCLUDED IN THE ANALYSIS WITHIN BOLD OUTLINE.

Note close correlation with telephone and county boundaries. Cross hatch areas are portions outside of Washington or Lamoille county which would have their "911" calls routed to the CVCDC because of TELCO. boundaries. Dotted areas not included.

TRAVEL TALKER Consulting Engineering Services

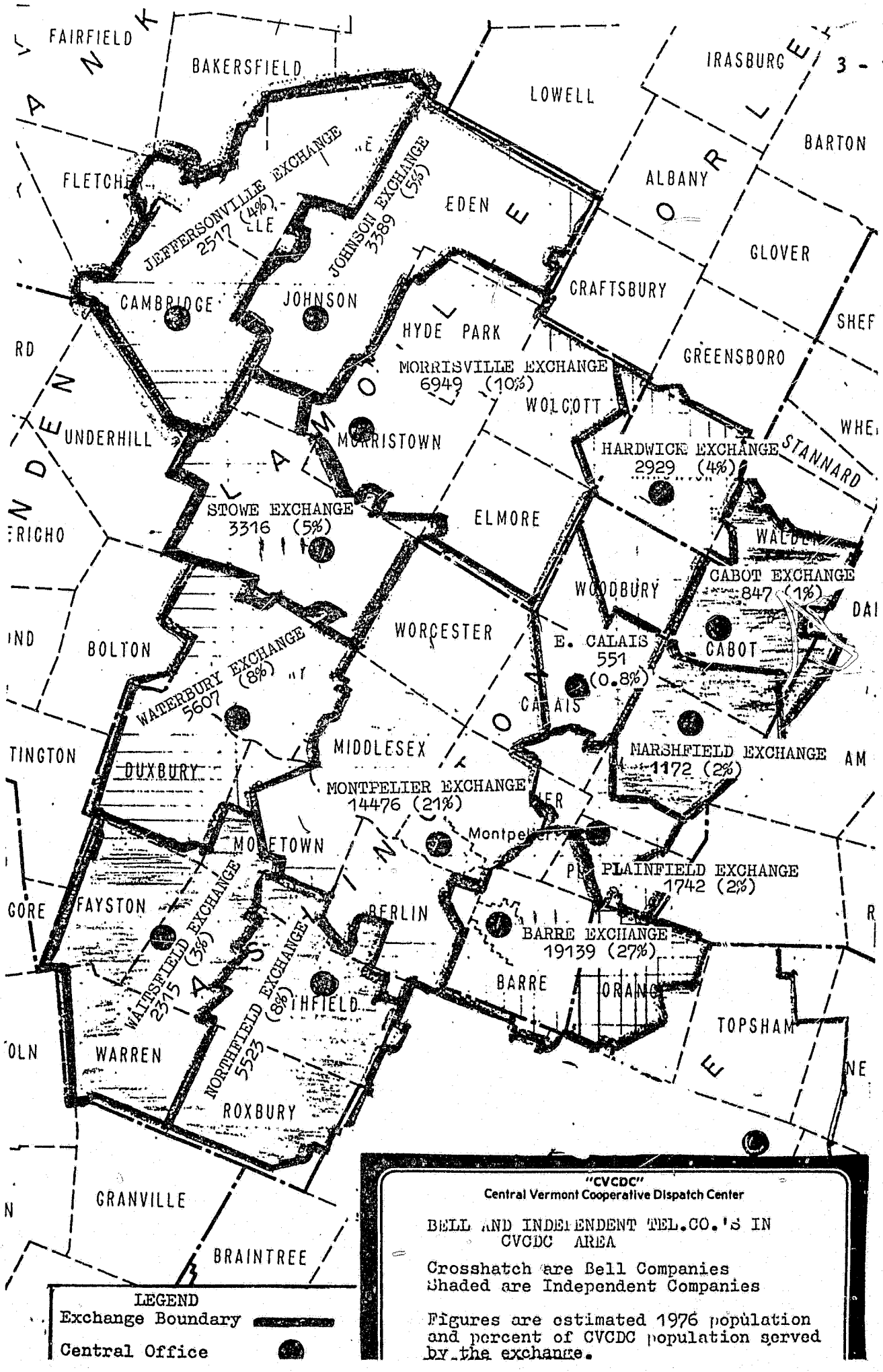
LEGEND
Exchange Boundary
Central Office
Miles: 0 . . . . 5 10

OPTIONAL INCOMING CALL PLANS THAT WERE CONSIDERED:

The nationwide telephone number 911 offers many advantages to a dispatch center. Exchanges so equipped can provide the Police agency the ability to hold the line and trace a call, or to call back a party. It can also provide the feature for automatic disconnect to prevent a caller from tying up emergency lines. The Bell System is committed to convert its exchanges to provide 911 service whenever a firm order for such a requirement is presented. The company policy is that there must be an official spokesman with the authority to place such an order before they will initiate the expensive engineering required to convert their exchanges.

The majority of the Washington and Lamoille County area is served by Bell System exchanges. Maps enclosed show the exchanges operated by Bell and independents, the population, and percentage of the total area population included within an exchange boundary. It can be seen that the Lamoille-Washington County area has a distinct advantage in that its County borders coincide very closely with the extremeties of the Telephone Company exchanges serving the area. For the purposes of the study, it will be noted that the Hardwick exchange is included. This was because the Hardwick exchange includes a portion of Woodbury. Also, Hardwick Police activities are usually more associated with towns of Lamoille and Washington counties.

The Cabot exchange includes a portion of Walden town which is outside of Washington County and Barre a portion of Orange. There are also a few other areas where the extremities of the telephone boundaries either go slightly beyond the county or exclude very small portions. In most cases where this occurs, however, the area is in a relatively sparsely settled region or in mountainous regions where there are few telephones. Thus, the outer perimeter of the telephone boundaries used for this study are in excellent correlation with the two


FAIRFIELD
BAKERSFIELD
LOWELL
IRASBURG
BARTON
ALBANY
FLETCHER
JEFFERSONVILLE EXCHANGE
2517 (4%)
JOHNSON EXCHANGE
3389 (5%)
EDEN
GLOVER
CRAFTSBURY
CAMBRIDGE
JOHNSON
HYDE PARK
GREENSBORO
MORRISVILLE EXCHANGE
6949 (10%)
WOLCOTT
UNDERHILL
MORRISTOWN
HARDWICK EXCHANGE
2929 (4%)
STANNARD
STOWE EXCHANGE
3316 (5%)
ELMORE
WOODBURY
CABOT EXCHANGE
847 (1%)
BOLTON
WORCESTER
E. CALAIS
551
(0.8%)
CABOT
WATERBURY EXCHANGE
5607 (8%)
CALAIS
MIDDLESEX
MARSHFIELD EXCHANGE
1172 (2%)
DUXBURY
MONTPELIER EXCHANGE
14476 (21%)
Montpelier
MORETOWN
PLAINFIELD EXCHANGE
1742 (2%)
FAYSTON
WAITSFIELD EXCHANGE
2315 (3%)
BERLIN
BARRE EXCHANGE
19139 (27%)
NORTHFIELD EXCHANGE
5523 (8%)
BARRE
ORANGE
TOPSHAM
WARREN
ROXBURY
GRANVILLE
BRAINTREE
LEGEND
Exchange Boundary
Central Office
"CVCDC"
Central Vermont Cooperative Dispatch Center
BELL AND INDEPENDENT TEL.CO.'S IN CVCDC AREA
Crosshatch are Bell Companies
Shaded are Independent Companies
Figures are estimated 1976 population and percent of CVCDC population served by the exchange.

county boundaries. Exact correlation is not absolutely necessary when considering use of 911, because calls coming in from an adjacent county can be referred to the proper center serving that area. The important thing is that well trained dispatchers be aware of what agency serves each town from which it will receive calls.

A method for precluding calls from areas covered by an exchange where it is not desired to have their calls sent to this exchange, is by careful listing in the telephone directory. For example, as noted, the greater portion of the town of Orange is included in the Barre exchange. This portion could easily be served by "CVCDC". However, if this is not decided, the telephone listings for the town of Orange must show a different emergency number to be used for the township. However, - and this is important - if 911 is used, and the Barre exchange calls are terminated at the CVCDC, all 911 calls from the portion of Orange township within the Barre exchange, would be directed to the Washington-Lamoille County dispatch center. Where "7-digit" numbers are used calls can be terminated at various locations with greater freedom.

Bell companies are committed to provide 911 service whenever a bonafide order is received. Generally, phone companies receive many requests for considering 911, but justifiably do not initiate conversion of their exchange equipment until a firm order has been received. This requires the establishment of an appointed government representative with the authority to authorize installation of a 911 plan. However, before this can be done, the agency must have a method for receiving the calls and disseminating the dispatch information -- in other words, a coordinated dispatch plan must have been worked out and agreed to by the agencies involved.

The independent telephone companies are not generally committed to 911 and express concern over the conversion cost. This should not deter the County or the State from requesting that they provide the service if it is determined that it provides faster response to citizen requests for help. In some hardship cases funding support through Federal Government or State assistance could be explored later. It should be noted though that after receipt of a firm order, a time period of approximately 18 months to two years is required for the Bell System to convert to handle 911 calls in most cases. Independent telephone company conversion times could be longer. Specific quotations would have to be requested.

A design goal stated for the CVCDC is that all incoming calls from citizens be toll-free; and that the number of telephone numbers for obtaining emergency service be reduced to one or at least be drastically reduced. 911 is considered to be the ultimate goal, but an interim plan which offers convenience and lower cost to the taxpayers may be put into effect sooner while the phone companies connect to 911.

Following pages include worksheets comparing two telephone plans:

1. An interim plan utilizing the free-calling areas available in the two counties and trunking calls into the dispatch center.
2. The utilization of 911 for the entire CVCDC area.

Each of these plans were further considered in a cost comparison between bringing calls into one central location in the Montpelier area, or using two reception centers -- one at Hyde Park and one at Montpelier.

"FREE-CALLING AREA" -
Interim telephone plan.

The interim telephone plan considered could be put into immediate service. It would use seven-digit numbers, with, if possible, the same last four digits in each free-calling service area. As a preparatory step toward 911 introduction

the last four digits could be "0911". Typical numbers for the area would be 223-0911, 635-0911, etc. Using this approach, a total of seven numbers could replace the 60 now listed for emergency calls. This plan could be put into effect without telephone company changes. Where necessary, some independent exchanges could continue with the seven digit number should they find it absolutely financially impractical to convert to 911. Full "911" coverage is recommended as the ultimate goal however, but by using the "free-calling" area plan, the CVCDC could begin at once, while the telephone company completed 911 equipment modifications. The free-calling plan would have advantages over the Dial 0 plan in operation since calls could come direct to the emergency dispatch center without the intermediary of a telephone company operator, also, the number would be for any emergency - police, fire or ambulance.

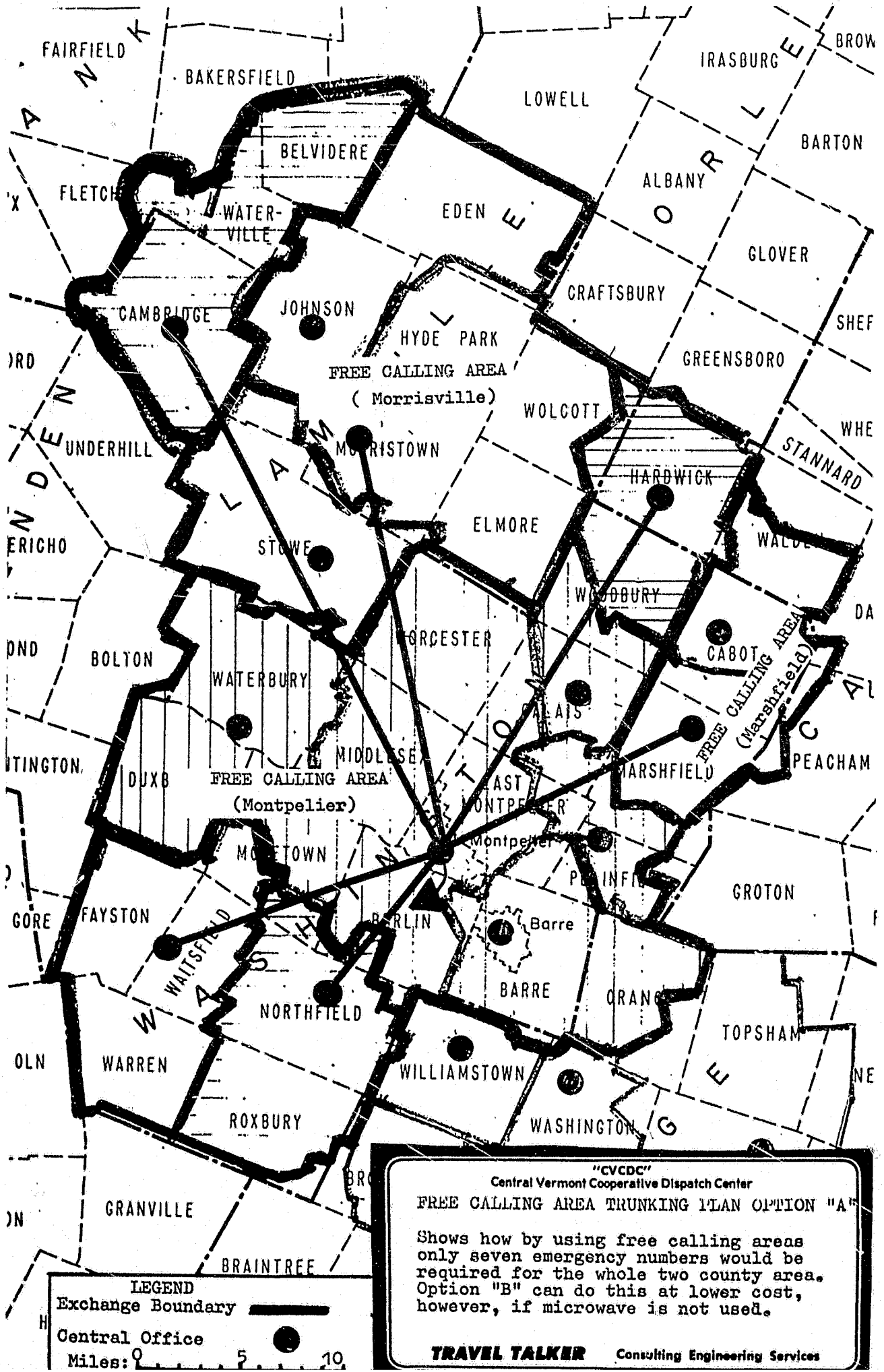
In the Northern portion of the area, there are two choices for routing the free-calling area calls to a "CVCDC" in Montpelier. Choice A would combine the exchanges of Johnson, Stowe and Morrisville with the free-calling exchange trunks coming from the Morrisville exchange. A second option would be to combine Morrisville, Johnson and Cambridge, using Johnson as the free-calling exchange common to all three, and having trunks from Johnson and also from Stowe to the CVCDC center. The following drawings and tables illustrate the free-calling areas and the trunking plans. The free-calling plan was also considered with separate reception centers at Montpelier and Hyde Park, as illustrated in the maps and tables.

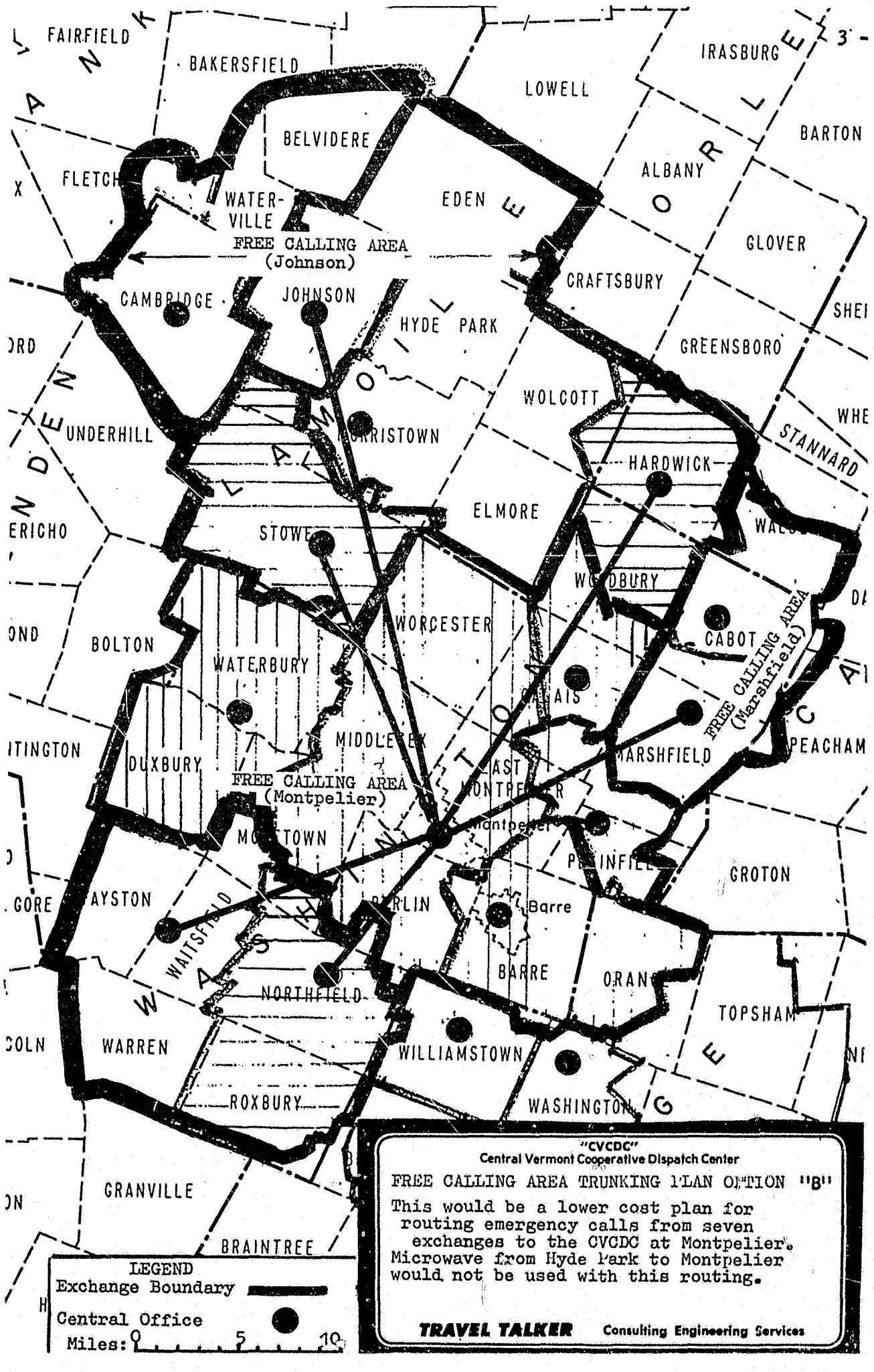
from these telephones	your local calling area includes	dial as shown below
Barre (476, 479)	Barre	only last 5 numerals
	East Calais, Montpelier, Plainfield, Washington, Williamstown	the 7 numerals
Chelsea (685)	Chelsea	only last 5 numerals
	*Tunbridge	the 7 numerals
East Calais (456)	East Calais	only last 5 numerals
	Barre, Hardwick, Montpelier, Plainfield	the 7 numerals
Jeffersonville (644)	Jeffersonville	only last 5 numerals
	Johnson	the 7 numerals
Johnson (635)	Johnson	only last 5 numerals
	Jeffersonville, Morrisville	the 7 numerals
★Marshfield (426)	Marshfield	only last 5 numerals
	*Cabot, Plainfield	the 7 numerals
Montpelier (223, 229, 828)	Montpelier	only last 5 numerals
	Barre, East Calais, Plainfield, Waterbury	the 7 numerals
Morrisville (888)	Morrisville	only last 5 numerals
	Johnson, Stowe	the 7 numerals
Plainfield (454)	Plainfield	only last 5 numerals
	Barre, East Calais, Marshfield, Montpelier	the 7 numerals
Stowe (253)	Stowe	only last 5 numerals
	Morrisville	the 7 numerals
Washington (883)	Washington	only last 5 numerals
	Barre	the 7 numerals
Waterbury (244)	Waterbury	only last 5 numerals
	Montpelier	the 7 numerals
Williamstown (433)	Williamstown	only last 5 numerals
	Barre	the 7 numerals

★Indicates Continental Telephon
*Call your Business Office if you

"CVCDC"
Central Vermont Cooperative Dispatch Center

Page from telephone book showing calling areas.


FAIRFIELD
BAKERSFIELD
LOWELL
IRASBURG
BARTON
BELVIDERE
ALBANY
FLETCH
WATER-
VILLE
EDEN
GLOVER
CAMBRIDGE
JOHNSON
CRAFTSBURY
HYDE PARK
FREE CALLING AREA
(Morrisville)
GREENSBORO
WOLCOTT
UNDERHILL
MORRISTOWN
HARDWICK
STANNARD
ELMORE
STOWE
WOODBURY
BOLTON
WATERBURY
CABOT
FREE CALLING AREA
(Marshfield)
MARSHFIELD
PEACHAM
DUXB
FREE CALLING AREA
(Montpelier)
Montpelier
GROTON
FAYSTON
BERLIN
Barre
WAITSFIELD
BARRE
NORTHFIELD
TOPSHAM
WARREN
WILLIAMSTOWN
ROXBURY
WASHINGTON
GRANVILLE
BRAINTREE
LEGEND
Exchange Boundary
Central Office
Miles: 0 5 10
"CVCDC"
Central Vermont Cooperative Dispatch Center
FREE CALLING AREA TRUNKING PLAN OPTION "A"
Shows how by using free calling areas only seven emergency numbers would be required for the whole two county area. Option "B" can do this at lower cost, however, if microwave is not used.
TRAVEL TALKER Consulting Engineering Services


FAIRFIELD
BAKERSFIELD
LOWELL
IRASBURG
BELVIDERE
BARTON
ALBANY
FLETCH
WATER-
VILLE
EDEN
FREE CALLING AREA
(Johnson)
GLOVER
CRAFTSBURY
CAMBRIDGE
JOHNSON
HYDE PARK
GREENSBORO
WOLCOTT
UNDERHILL
HARDWICK
STANNARD
ELMORE
STOWE
WORCESTER
BOLTON
WATERBURY
CABOT
FREE CALLING AREA
(Marshfield)
DUXBURY
MIDDLESEX
FREE CALLING AREA
(Montpelier)
MARSHFIELD
Montpelier
GROTON
GORE
AYSTON
Barre
BARRE
NORTHFIELD
TOPSHAM
WARREN
WILLIAMSTOWN
ROXBURY
WASHINGTON
GRANVILLE
BRAINTREE
LEGEND
Exchange Boundary
Central Office
Miles: 0 5 10
"CVCDC"
Central Vermont Cooperative Dispatch Center
FREE CALLING AREA TRUNKING PLAN OPTION "B"
This would be a lower cost plan for routing emergency calls from seven exchanges to the CVCDC at Montpelier. Microwave from Hyde Park to Montpelier would not be used with this routing.
TRAVEL TALKER Consulting Engineering Services

COMPARISON OF FREE CALLING OPTIONS IN NORTHERN EXCHANGES WITH TERMINATION AT MONTPELIER

OPTION A.

TRUNK FROM:	FOR FREE CALLING	TO MONTPELIER MILES PER TRUNK	T. U. (1976)		TRUNKS	TRUNK MILES
Morrisville	Johnson Morrisville Stowe	20	.004) .014) .023)	.041	2	40
Cambridge	Cambridge	28	.003		2	56
TOTAL						96

Monthly Trunk Mileage - 96 X 4 = $384.00

VS.

OPTION B.

Johnson	Johnson Morrisville Jeffersonville	26	.004) .014) .003)	.021	2	52
Stowe	Stowe	15	.023		2	30
TOTAL						82

Monthly Trunk Mileage - 82 X 4 = $328.00

NET $ SAVED/MONTH: $384.00 - 328.00 = $56.00
56 X 12 = $672.00/Year for(Emergency Lines Only)

PLUS MORE EVEN CIRCUIT LOADING:

FREE AREA CALLING PLAN
DETERMINATION OF TRUNKS FOR SINGLE TERMINATION
USING LOWEST COST ROUTING PLAN

EXCHANGE CENTER AND RECOMMENDED TEL. NUMBER IF AVAILABLE	(1) EXCHANGES NOW SERVED WITH FREE CALLING (2) POPULATION (76) ESTIMATE (3) MAIN STATIONS INCLUDED	-1976- COMBINED TRAFFIC UNITS - PEAK HOUR (EMER.CALLS)	LINES AND/OR TRUNKS FROM CENTER TO MONTPELIER FOR BUSY LESS THAN 1 PER 1,000 TIMES	MILES TO MONTPELIER	TRUNK MILES TO MONTPELIER
Johnson (#9) (635-0911) Wash. Co.	(1) Jeffersonville (10) Johnson (9) Morrisville (3) (2) 12,855 (3) 4,243	.021	2	26	52
Stowe (#7) (253-0911)	(1) Stowe (2) 3,316 (3) 1,644	.023	2	15	30
Montpelier (#2) (223-0911)	(1) Montpelier (2) Waterbury (6) E.Calais (13) Plainfield (11) Barre (1) (2) 41,515 (3) 15,343	.220	4	0	0
Marshfield (#14)	(1) Marshfield (14) Cabot (12) (2) 2,019 (3) 707	.002	2	14	28
Waitsfield (#4) (496-0911)	(1) Waitsfield (2) 2,315 (3) 2,300	.002	2	14	28
Northfield (#5) (485-0911)	(1) Northfield (2) 5,523 (3) 1,800	.007	2	9	18
Hardwick (#8) (472-0911)	(1) Hardwick (2) 2,929 (3) 7,015	.004	2	17	34
TOTALS	(1)-All 14 Exchanges in area				
(Population)	(2) 70,472 (100%)	.279	16	-	190
(Main Stations)	(3) 27,052 (100%)				

DETERMINATION OF EMERGENCY LINE REQUIREMENTS IN FREE CALLING AREA TRUNKING PLAN WITH TERMINATION AT HYDE PARK, FOR LAMOILLE COUNTY

EXCHANGE CENTER AND RECOMMENDED NO.	(1) EXCHANGE SERVED	COMBINED TRAFFIC UNITS (EMER.CALLS)	LINES OR TRUNKS (1976)	MILES TO MORRISVILLE	TRUNK MILES
Morrisville (888-0911)	Morrisville (3) Johnson (7) Stowe (9)	.041	2	0	0
Jeffersonville	Jeffersonville	.003	2	11	22
Hardwick	Hardwick	.004	2	15	30
TOTALS	-	.048	6	-	52

FREE CALLING AREA PLAN
MONTHLY COST COMPARISON
EMERGENCY LINE ONLY

(A) With Single Termination of all calls at Montpelier, within Basic rate area:

Local Line Costs:		
16 @ $15.00	$ 240.00	
Trunk Mileage:		
190 Miles @ $4.00/Mile	760.00	
Total Monthly Line Cost	$1,000.00	

(B) With Separate Termination at Montpelier and Hyde Park:

1. For Washington County:

Local Line Costs:		
10 @ $15.00	$ 150.00	
Trunk Mileage:		
74 Miles @ $4.00/Mile	296.00	
Sub-Total - WASHINGTON CO.		$446.00

2. For Lamoille County:

Local Line Costs		
2 @ $19.00 (Morrisville)	$ 38.00	
4 @ $22.50	90.00	
Trunk Mileage:		
52 Miles @ $4.00/Mile	208.00	
Sub-Total - LAMOILLE CO.		336.00

3. COST - BOTH COUNTIES: $782.00

"911" Telephone System Trunking and Line Costs - (Emergency Lines Only)

The trunk routing and costs for 911 circuits into one center or two separate centers is illustrated in the following series of maps and tables.

The tabulation shows trunking costs to be lower if brought to two centers.

911 SYSTEM COST CALCULATION AND COMPARISON - (EMERGENCY LINES)

CASE 1. ALL TRUNKS TO MONTPELIER.

401 Trunk Miles @ $4.00/Mile		$ 1,604.00
Base Rate and Channel Connection		
3 Montpelier @ $12.10	$ 36.30	
27 Other Exchanges @ $15.60	421.20	
Line Charges		457.50
Total Line and Toll		$2,061.50

CASE 2. SEPARATE CENTERS FOR LAMOILLE AND WASHINGTON.

Washington County		
183 Trunk Miles @ $4.00/Mile		$ 732.00
Basic Rate and Channel Conn.		
3-Montpelier @ $12.10	$ 36.30	
17 Other @ $15.60	254.20	
Line Charges		301.50
Sub-Total - Washington Co.		$1,033.50
Lamoille County		
76 Trunk Miles @ $4.00/Mile		$ 304.00
2-Hyde Park Lines @ $19.00		
(Beyond basic rate)	$ 38.00	
8 Other Lines @ $22.50	180.00	
Line Charges		218.00
Sub-Total - Lamoille Co.		$ 522.00

SUMMARY:

Montpelier Center: $2,062/Mo.

Separate Centers:

Washington	$1,034
Lamoille	522
	1,557

+ Added Termination Equip. @ $100/Mo.

Net Difference

Single Center (Montpelier	$2,062
Two Centers-Hyde Park and Montpelier	1,657
	$ 405 - Net in favor of 2

About $405 Cheaper/month with 2 terminations

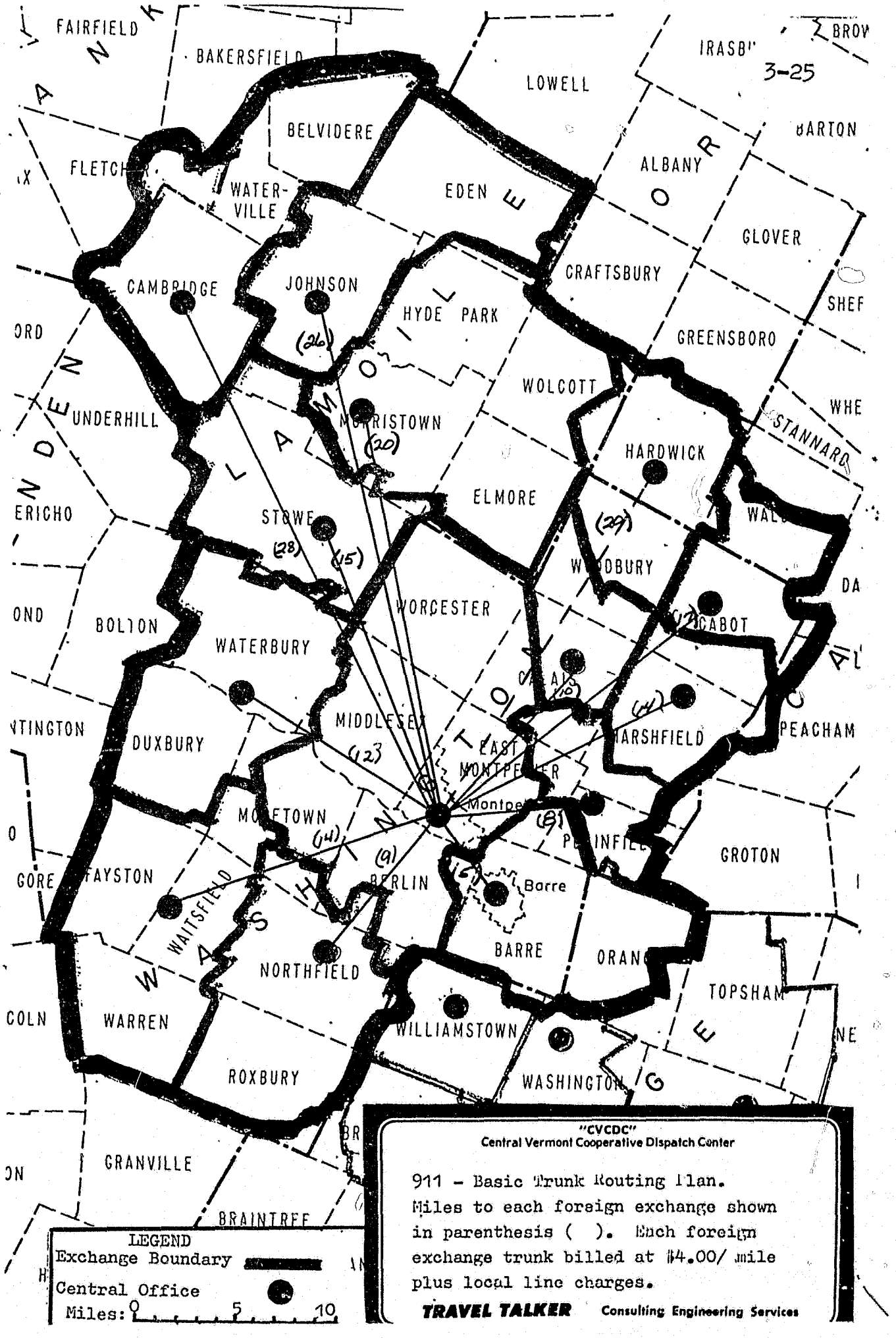
$405 x 12 = $4,860/Year

Present worth @ 8%

$4,860 x 6.710 = $32,610

CALCULATION OF 911 - BASIC PLAN TRUNK MILEAGE USING MONTPELIER AND HYDE PARK

	EXCHANGE	EMERGENCY TRUNKS (LINES)	MILES TO MONTPELIER	MONTPELIER TRUNK MILES	MILES TO MORRISVILLE	MORRISVILLE TRUNK LINES
	Barre	3	5	15	-	-
	Montpelier	3	0	0	-	-
(L)	Morrisville	2	20	(L)40	0	0
	Waitsfield	2	14	28	-	-
	Northfield	2	9	18	-	-
	Waterbury	2	12	24	-	-
(L)	Stowe	2	15	(L)30	6	12
(L)	Hardwick	2	20	(L)40	15	30
(L)	Johnson	2	26	(L)52	6	12
(L)	Jeffersonville	2	28	(L)56	11	22
	Plainfield	2	8	16	-	-
	Cabot	2	17	34	-	-
	E. Calais	2	10	20	-	-
	Marshfield	2	14	28	-	-
	TOTALS	30	-	401	-	-
	For Washington County	20	-	183	-	-
	For Lamoille Co.	10	-	218	-	-
	IF SEPARATE CENTERS:					
	To Washington County	20	-	183	-	-
	For Lamoille Co.	10	-	-	-	76


3-25
FAIRFIELD
BAKERSFIELD
LOWELL
BELVIDERE
ALBANY
FLETCHER
WATER-
VILLE
EDEN
GLOVER
CAMBRIDGE
JOHNSON
CRAFTSBURY
HYDE PARK
GREENSBORO
(26)
WOLCOTT
UNDERHILL
MORRISTOWN
(20)
HARDWICK
ELMORE
STOWE
(28)
(15)
(29)
WORCESTER
BOLTON
WATERBURY
CABOT
(17)
(10)
(44)
DUXBURY
MIDDLESEX
(12)
MARSHFIELD
EAST
MONTPELIER
Montpelier
(8)
MORETOWN
(14)
(9)
PLAINFIELD
GROTON
FAYSTON
BERLIN
Barre
(16)
WAITSFIELD
BARRE
NORTHFIELD
TOPSHAM
WARREN
WILLIAMSTOWN
ROXBURY
WASHINGTON
GRANVILLE
BRAINTREE
LEGEND
Exchange Boundary
Central Office
Miles: 0 5 10
"CVCDC"
Central Vermont Cooperative Dispatch Center
911 - Basic Trunk Routing Plan.
Miles to each foreign exchange shown in parenthesis ( ). Each foreign exchange trunk billed at $4.00/ mile plus local line charges.
TRAVEL TALKER Consulting Engineering Services

The following table compares the emergency line trunking costs for "free-calling" vs. 911. It should be pointed out that the comparison cost among the various options included only the line routing charges and do not include all termination equipment charges since these would be required regardless of which plan is adopted. The cost for line termination equipment is included only as the additional amounts that would be necessary with two centers. In other cases, the comparative figures that follow show only the relative difference between the different trunk routing plans.

EMERGENCY LINES
SUMMARY - TELEPHONE LINE ROUTING OPTIONS
(Relative Cost Comparisons)

	FREE ZONE CALLING PLAN	911 PLAN	NET DIFFERENCE
Single Center at Montpelier	$1,000.00	$2,062.00	$1,062.00
Two Centers:			
Washington Co.	446.00	1,034.00	
Lamoille Co.	336.00	522.00	
Lamoille Extra Ter.	75.00	100.00	
	$ 857.00	$1,656.00	799.00
NET DIFFERENCE	$ 143.00	$ 406.00	
NET SAVINGS ANNUAL COST - WITH 2 TERMINATION POINTS	$1,716.00	$4,872.00	

Information Lines:

A similar analysis for information lines was made comparing the free-calling area scheme to the option of using dedicated watts ("800") type lines at a fixed monthly amount. Incoming "800" lines were estimated at $135.00 per month which includes ten hours of calling time per line. Thus, if 5 lines are used the total aggregate free time is 50 hours. This 50 hours could be on one line or a combination totaling 50 hours among all the lines. In other words, there is 10 free hours allotted for each line ("number") leased. The traffic loading summaries indicate that the anticipated calls would be within the 10-hour time period. Furthermore, it is found that the combining of the traffic loading into the plan using the "800" line scheme requires fewer lines than for trunk routing from each individual exchange. The detail calculations comparing the information line plan options are in tables that follow.

With a single center, the "800" line plan is the lower cost, while with two centers, the Free Zone plan is lower cost.

TRUNK LINES FOR "INFORMATION"
CALLING - USING FREE CALLING ZONE
OPTION B (SEE MAP)
(TERMINATION ALL LINES - MONTPELIER)

EXCHANGE CENTER	COMBINED TRAFFIC UNITS (INFO. CALLS)	TRUNKS (FOR BUSY LESS THAN 1 IN 20)	MILES TO MONTPELIER	TRUNK MILES TO MONTPELIER
Johnson (L)	.113	2	26	52
Stowe (L)	.184	2	15	30
Montpelier (W)	1.217	4	0	0
Marsfield (W)	.007	1	14	14
Waitsfield (W)	.008	1	14	14
Northfield (W)	.028	1	9	9
Hardwick (L)	.016	1	17	17
TOTAL (ALL)	1.573	12	-	136
WASHINGTON CO.	1.260	7	-	37
LAMOILLE CO.	.313	5	-	99

Cost for Local - Toll-free Plan:

12 Lines	@ $15.00/Mo	$180.00/Mo.
136 Trunk-Miles	@ $ 4.00/Mile	544.00/Mo.
ALL TO MONTPELIER		$724.00/Mo.

WASHINGTON CO. ONLY: (TO MONTPELIER)

7 Lines @ $15.00/Mo.	$105.00/Mo.
37 Trunk-Miles @ $ 4.00/Mile	148.00/Mo.
	$253.00/Mo.

LAMOILLE COUNTY - TRUNK LINES FOR
"INFORMATION" WITH TERMINATION AT
HYDE PARK USING FREE CALL ZONES

EXCHANGE CENTER	COMBINED TRAFFIC UNITS (INFO. CALL)	TRUNKS (FOR BUSY LESS THAN 1 OUT OF 20	MILES TO MORRISVILLE	TRUNK MILES
Morrisville	.285	2	0	0
Jeffersonville	.012	1	11	11
Hardwick	.016	1	15	15
TOTAL	.313	4	-	26

LAMOILLE COUNTY ONLY (INFO. LINES)

2 Lines @ $19.00 ea.	= $ 38.00
2 Lines @ $22.50 ea.	= 45.00
26 Trunk Miles @ $4.00/Mile	= 104.00
	$187.00

If "800" incoming Watts used, requires:

5 For all calls to Montpelier	@ $135.00 =	$675.00
or		
4 For Washington Co. to Montpelier	@ $135.00 =	$540.00
2 For Lamoille Co. to Hyde Park	@ $135.00 =	$270.00

INFO LINE SUMMARY AND COST COMPARISON

	MONTHLY COST "Free Zone" Plans	"800" Watts Plan
Single Center	$724.00	$675.00
Two Centers		
Washington County	$253.00	$540.00
Lamoille County	187.00	270.00
	$440.00	$810.00

TELEPHONE PLANS - SUMMARIZED:

A summary of the results comparing the cost of various telephone plans for emergency and information lines is tabulated below.

SUMMARY
COMPARISON OF TELEPHONE PLANS ($/MONTH)

	EMERG. LINES		INFO. LINES		LEAST COST All	
Disp. Centers	Free Zone	911	Free Zone	"800" Watts	Systems	LEAST COST WITH 911
- 1 Center Montpelier	$1,000	$2,062	$ 724	$ 675	$1,675	$2,737
- 2 Centers Montpelier & Hyde Park	$ 857	$1,656	$ 440	$ 810	$1,297	$2,096
NET DIFFERENCE						
Favoring 1 Center	-	-	-	$ 135	-	-
Favoring 2 Centers	$143	$ 406	$ 284	-	$ 378	$ 641
ANNUAL SAVINGS	$1,716	$4,872	$3,408	$1,620	$4,536	$7,692

COST SUMMARY CONCLUSIONS:

Line costs are least costly with two terminations.

Net Annual Line Cost Savings Without 911 - using 2 - Centers:

$378 x 12 = $4,536

Net Annual Line Cost Savings With 911 using 2 - Centers

$641 x 12 = $7,692

MICROWAVE LINK TO HYDE PARK:

It is possible to use a Microwave link from Hyde Park to Mt. Mansfield and take advantage of the lower trunk costs from dual termination. Such a scheme would offer the option of having a standby emergency answering position in Hyde Park for Lamoille County lines. A microwave link so arranged could save approximately $375 per month in trunking costs over the least costly plan without the microwave into a single dispatch center at Montpelier. When the system goes to 911 the monthly savings would be approximately $640.00. However, some of the net savings in lease line charges would be offset by the annual maintenance cost for microwave; nevertheless, the long term financial advantage to the municipalities is substantial.

A series of annual payments for leasing facilities has a present day value approximately equal to the annual expense divided by the current interest rate; or for every $100 saved in annual lease expense the present value with 8% interest is approximately $1,250 which could be devoted to a capital expenditure, and result in the same cost. Significant capital equipment purchasing financial leverage is realized by municipalities eligible for a possible 90-10 matching fund arrangement. A $1,250 investment can purchase $12,500 in capital equipment. The exact amount of the present worth of a series of payments over a 10-year period at 8% is shown in the following tabulations and amounts to the factor of 6.710 times the annual expenditure.

COST SAVINGS ANALYSIS

MICROWAVE STUB TO HYDE PARK FROM MANSFIELD

vs.

COST OF LEASED LINES TO MONTPELIER

Present Worth Factor

Calculation of present worth of a series of annual payments. Present worth = (Payment Amt.) (P. W. Factor)

$$\text{Present worth factor} = \frac{(1 + i)^n - 1}{i\,(1 + i)^n}$$

i = interest rate = 8%; n = years = 10

$$\text{Present worth factor} = \frac{2.159 - 1}{.08(2.159)} \doteq 6.710$$

PRESENT WORTH OF ANNUAL SAVINGS

Annual Savings - "Free Call Area" Plan
(Telephone Trunks Only):

	$4,536
Less	600 (Annual Microwave Maintenance)
NET	$3,936

PRESENT WORTH = 6.710 x $3,936 = $26,410

Value of Capital Equipment that could be purchased at 90/10 matching:

$$26{,}410 \div .10 = \$264{,}100$$

Annual Savings - "911 Plan"
(Telephone Trunks Only):

	$7,692
Less	600 (Annual Microwave Maintenance)
NET	$7,092

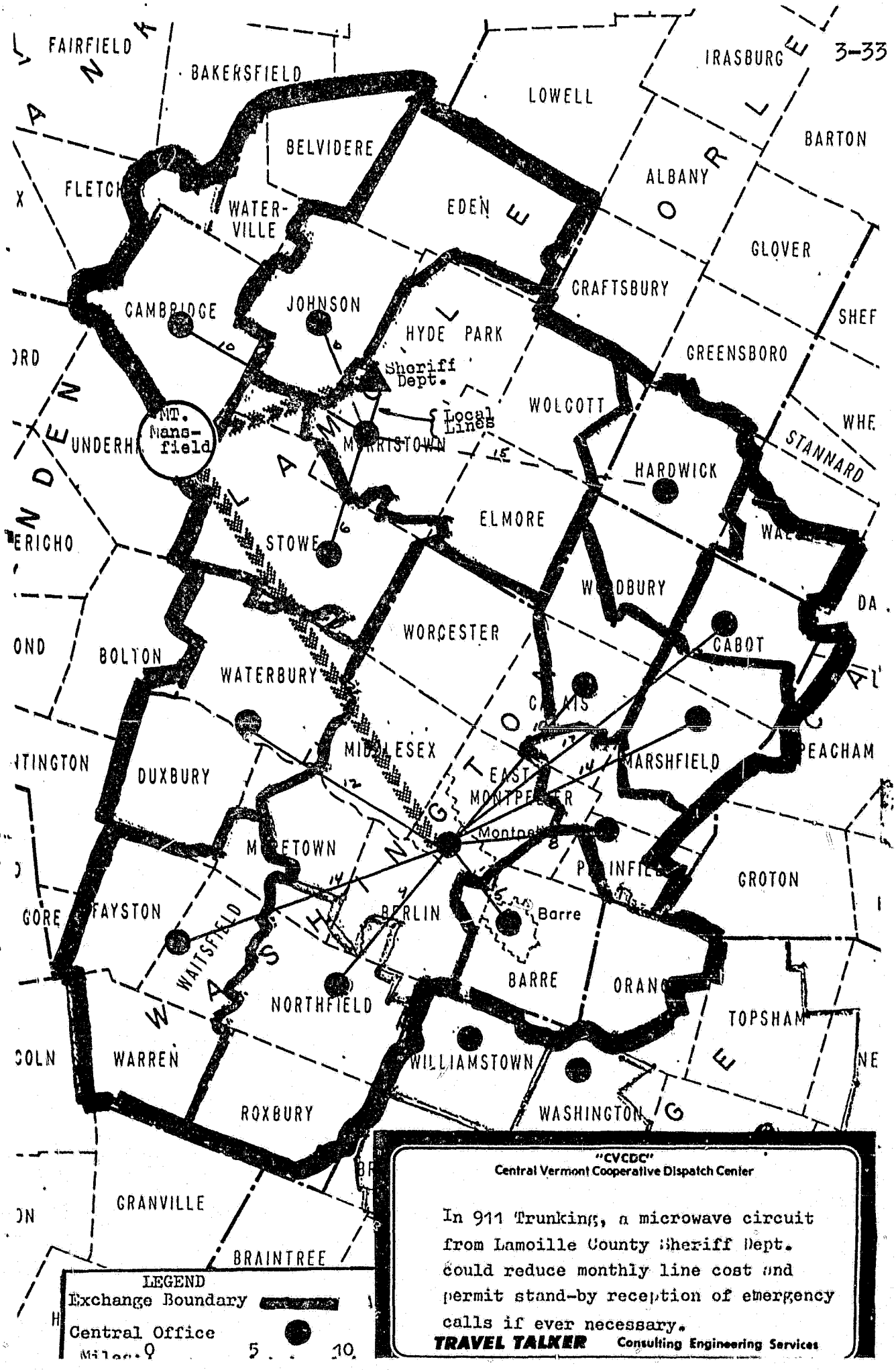
PRESENT WORTH = 6.710 x $7,092 = $47,587

Capital Equipment Value = $475,000 !

ESTIMATED COST OF MICROWAVE:

2 R.F. Terminals	@	$10K	= $20K
2 12 Ch. MPX	@	6K	= $12K
2 Ant. & Line	@	3K	= $ 6K
Install & Test			= $ 3K
			$41K

Thus, the spending of $4,100 for Microwave now, by the "CVCDC" organization, (assuming 90% matching funds), can provide substantial savings over a long period.



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Central Vermont Cooperative Dispatch Center

In 911 Trunking, a microwave circuit from Lamoille County Sheriff Dept. could reduce monthly line cost and permit stand-by reception of emergency calls if ever necessary.

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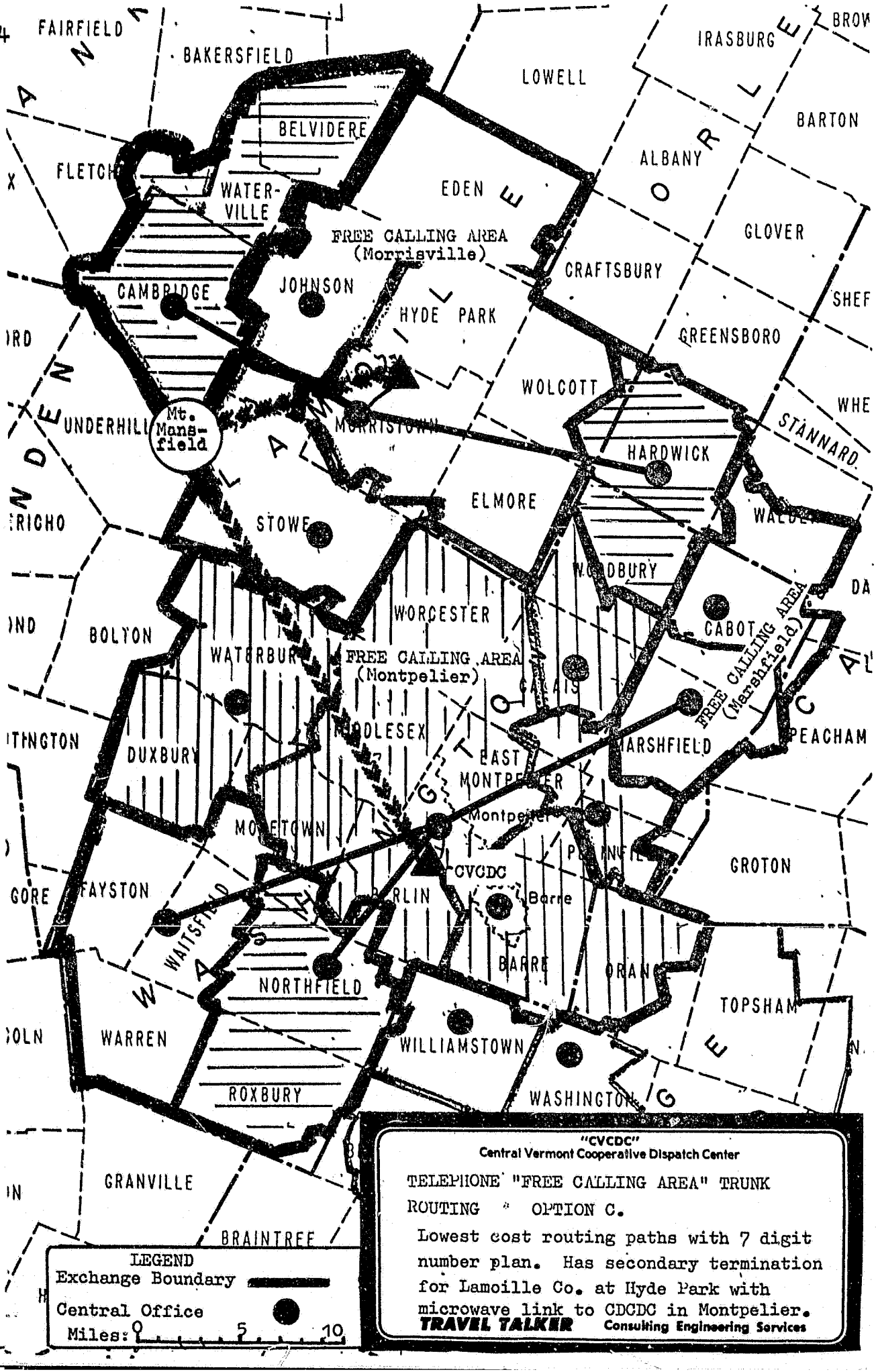

FAIRFIELD
BAKERSFIELD
LOWELL
IRASBURG
BARTON
ALBANY
BELVIDERE
FLETCHER
WATER-
VILLE
EDEN
FREE CALLING AREA
(Morrisville)
GLOVER
CRAFTSBURY
CAMBRIDGE
JOHNSON
HYDE PARK
GREENSBORO
WOLCOTT
Mt.
Mans-
field
UNDERHILL
MORRISTOWN
HARDWICK
STANNARD
ELMORE
STOWE
WORCESTER
BOLTON
WATERBURY
FREE CALLING AREA
(Montpelier)
CABOT
FREE CALLING AREA
(Marshfield)
DUXBURY
MIDDLESEX
MARSHFIELD
EAST
MONTPELIER
Montpelier
MORETOWN
CVCDC
Barre
GROTON
FAYSTON
BERLIN
WAITSFIELD
BARRE
NORTHFIELD
TOPSHAM
WARREN
WILLIAMSTOWN
ROXBURY
WASHINGTON
GRANVILLE
BRAINTREE
LEGEND
Exchange Boundary
Central Office
Miles: 0 5 10
"CVCDC"
Central Vermont Cooperative Dispatch Center
TELEPHONE "FREE CALLING AREA" TRUNK ROUTING - OPTION C.
Lowest cost routing paths with 7 digit number plan. Has secondary termination for Lamoille Co. at Hyde Park with microwave link to CDCDC in Montpelier.
TRAVEL TALKER Consulting Engineering Services

In the case of municipalities, where every dollar saved in annual expenditures is a dollar saved for the taxpayers, these savings have virtually an infinite return. In other words, referring back to an earlier statement - "the savings realized annually has a present worth equal to the savings divided by the interest rate" - that where there is no interest (equal to a condition where the money is not invested, nor the capital accumulated) the savings are infinite! This is reasonable from the point of view that any monies not spent annually, results in a lower cost per capita to the participants.

However, the option of using a microwave link to route the telephone calls from the Northern part of the CVCDC area back to the Central Dispatch Center at Montpelier should only be considered in the following cases:

1. It is intended to continuously maintain an office in the Hyde Park Sheriff's Department for an indefinite period of time which provide jail and lockup facilities for the County.
2. The telephone company will concur on such inter-connection.
3. The Center at Hyde Park will <u>not</u> be staffed 24 hours a day <u>for the purpose of controlling the communications equipment</u>. The telephone terminations will be made there only for use in emergency should there be a break-down in the regular link back to Montpelier, or other unusual emergency use.

PART 4 -

DISPATCHING MANPOWER AND OPERATION

DISPATCHER MANPOWER REQUIREMENTS:

The major cost of operating a dispatch center will be the required manpower to receive calls and to dispatch the radio system.

These design goals are recommended for the dispatch center:

1. Some personnel will be assigned with the primary duty of receiving incoming calls, and handling teletype and data messages. Radio operators will devote their full attention to operation of the radio equipment so that they maintain complete awareness on the status of vehicles under their control. They will answer incoming emergency calls only when necessary and incoming routine lines only on an occasional basis. The radio operator's primary purpose will be the safety of the vehicles under his jurisdiction.
2. The dispatch center will be devoted solely to communication activities. In this regard, it will not be associated with any window traffic or other duties which could detract it from its primary purpose of affording the safe and effective dispatching of emergency services when requested.
3. All dispatchers shall be trained thoroughly in the proper procedure for handling incoming calls of all types - i.e., Police, Fire, Ambulance.
4. For safety and security, and for meeting high volumes of traffic during emergencies no center should ever be staffed with less than two people.

An analysis of the traffic loading on the dispatchers was made in a similar fashion to that for arriving at the number of trunk lines. Comparisons were made using the option of a single center for both counties and two centers -- one in Washington and one in Lamoille County. Results are tabulated in the summary below:

TABULATION OF DISPATCHER LOADING

METHODOLOGY: Assuming a distribution of calls among the three shifts from busiest to least busy at 50%, 30% and 20%, respectively, a "waiting dispatcher" was considered as a "waiting trunk line". Using the grade of service that the dispatchers be available 95% of the time to answer a telephone call, the estimated manpower for a single center - or two centers, is as follows:

FOR HANDLING ALL CALLS:

	FOR ONE CENTER FOR WASHINGTON AND LAMOILLE		FOR WASHINGTON CO. ONLY		FOR LAMOILLE CO. ONLY	
SHIFT	T.U.	People	T.U.	People	T.U.	People
Busiest (50% Daily Calls)	2.08	5	1.74	5	.34	2
Next Busiest (30% Daily Calls)	1.21	4	1.01	4	.20	2
Least Busy (20% " "	.83	3	.69	3	.14	2
TOTAL PEOPLE PER DAY		12		12		6

A similar analysis using loading expected for Emergency Calls only, shows the following:

	ONE CENTER FOR BOTH CO.'S		WASHINGTON CO. ONLY		LAMOILLE CO. ONLY	
SHIFT	T.U.	People	T.U.	People	T.U.	People
Busiest	.278	2	.234	2	.044	1
Next Busiest	.161	2	.135	2	.025	1
Least Busy	.111	2	.093	2	.017	1
TOTAL PEOPLE PER DAY		6		6		3

From this, certain conclusions become apparent:

1. A Center adequately staffed for Washington County calls can handle Lamoille County traffic.
2. Two Centers would require approximately 50% more in operator expenses.
3. Lamoille is today getting by with one dispatcher with ease, as it could by continuing to handle only emergency traffic and if one accepts the premise that a single person doing both radio and telephone answering can give sufficient attention to the whereabouts of the field offers while detracted with phone conversations and walk-in counter traffic.
4. An adequate staffing ranges between 2 and 5 people per shift.
5. Earlier savings noted in lower telephone trunking monthly costs are easily offset by higher manpower costs in operating two Centers for Washington and Lamoille.
6. Two Radio Operator positions should be provided for meeting the anticipated radio traffic associated with emergency calls.

Recommend Call Answering Routine:

For a Center whereby the radio dispatchers can devote virtually their entire attention to the activities of outside patrol units, it is recommended that phones be answered primarily by complaint takers, the CVCDC activity being divided among 4 people essentially as follows:

2 Radio Operators

2 Complaint and Data Operators

Both radio consoles would be identical, so access to all systems was available at both positions, but normal work load would have one operator responsible for Police unit dispatching, the other Fire and Ambulance. The operator assigned

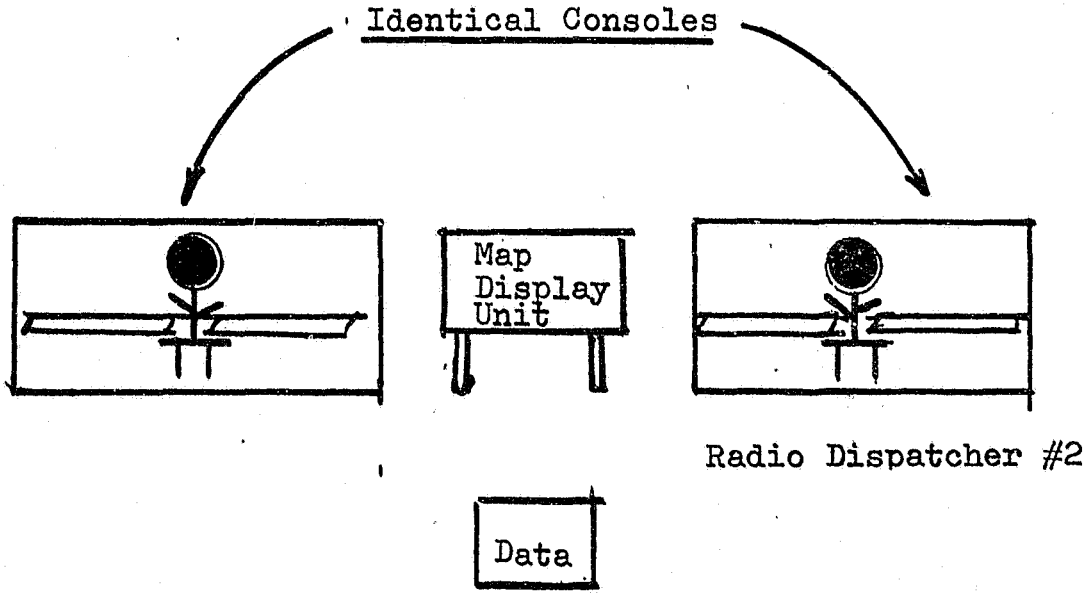
to Fire dispatching would be responsible for activating the tone signalling equipment to alert fire companies, using tone alert monitor receivers. The complaint takers would be the "first line" for reception of incoming calls, but emergency lines would also be answerable at the radio positions, in the event both complaint takers were occupied.

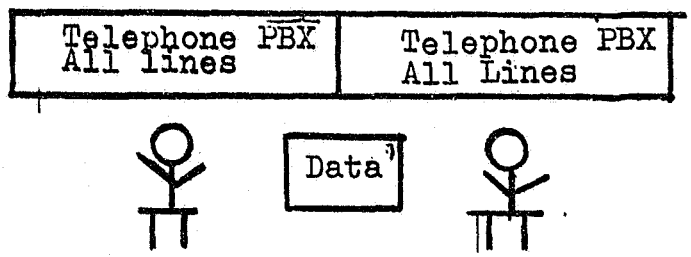
It is recommended that two data keyboards be available so that either the radio or complaint takers could have access to the State computer for license checks from their operating positions.

The two operating positions would provide flexibility in shifting the traffic among the dispatchers as required to meet specific demand situations. For example, a major police activity in one area could be coordinated by one dispatcher, while the other dispatcher temporarily handled all other routine police, fire and ambulance radio traffic, or a major activity in Barre or Montpelier could be handled by one, while the other handled rural activity.

It is recommended that telephone listings continue to show a listing for local road information which would route to the CVCDC and another for State-wide Road information which would be terminated at the State D. P. S. Hq. State D. P. S. is in the best position to have access to such information on a Statewide basis. This would relieve some of the routine calls from the CVCDC. Also, some routine daytime calls pertaining only to a particular Police department will, no doubt, be called in directly to those departments during working hours.

Thus, while the tables above show a single center staffing of 5-4-3, for the three shifts respectively, it is anticipated an operator staffing of 4-4-3, respectively, for 3 shifts is worth trying initially, because of the calls that will probably be phoned in directly to the local departments and D. P. S. Headquarters communication. The minimum staffing of 3 is expected to be easily capable of handling all emergency traffic. All personnel would give priority to answering calls on emergency lines.





Telephone Complaint and
Data Operations

"CVCDC"
Central Vermont Cooperative Dispatch Center

DISPATCH CENTER MANPOWER ASSIGNMENTS

Shifts would be manned by 3 or 4 men
(See Text)

- OPERATION -

All dispatchers and complaint takers would be trained as required for police, fire and ambulance traffic. Training must include specific instructions on essential information to obtain from the complainant. Tape recording of incoming calls is recommended for logging with additional instant playback capability of recordings for the last call at each operating position.

Calls would be handled as follows:

POLICE: The complaint would be received, recorded on a card and given to the radio operator. Future equipment modifications could investigate use of the keyboard entry of complaints on to the Cathode Ray tubes. The dispatcher would record time of dispatch on the card and time complaint is cleared. It should be noted that individual departments would still have the availability of occasional radio contact to their units from the existing base radios. But all dispatching should be done from the CVCDC. In the event a local request is received and relayed locally to a car, the car should immediately advise the CVCDC. Greater safety to all officers is the objective achievable by having an efficient Communication Center, constantly aware of all units whereabouts and status.

FIRE: Until such time as all Fire Companies are equipped with Alert Monitor Receivers, some crew alerting will be by call forwarding to the Red Phone System from the CVCDC. The telephone company can aid greatly in providing the latest available equipments for this. Some nearby companies (Montpelier and Barre) could probably be quickest alerted with direct line connections. These two towns may also prefer to retain listing of their 7-digit fire number, though this is discouraged. The potential of future features incorporated in a 911 telephone network for automatic number identification and location of calling party, can best be implemented with all emergency calls funneling through a single center. Initially most outlying departments would be alerted through transfering to outgoing watts lines and activating a single button dealer, such as the

"touch-a-matic" available from Western Electric. A single instrument including the line transfer capabilities and the single button dealing is reported available from Western Electric and Bell, suitable for Rotary or Touch Tone Dialing. The eventual goal is to equip all rural volunteer departments with Alert Monitor receivers so that crew alerting can be independent of fixed telephones which require 24 hour personal attendance.

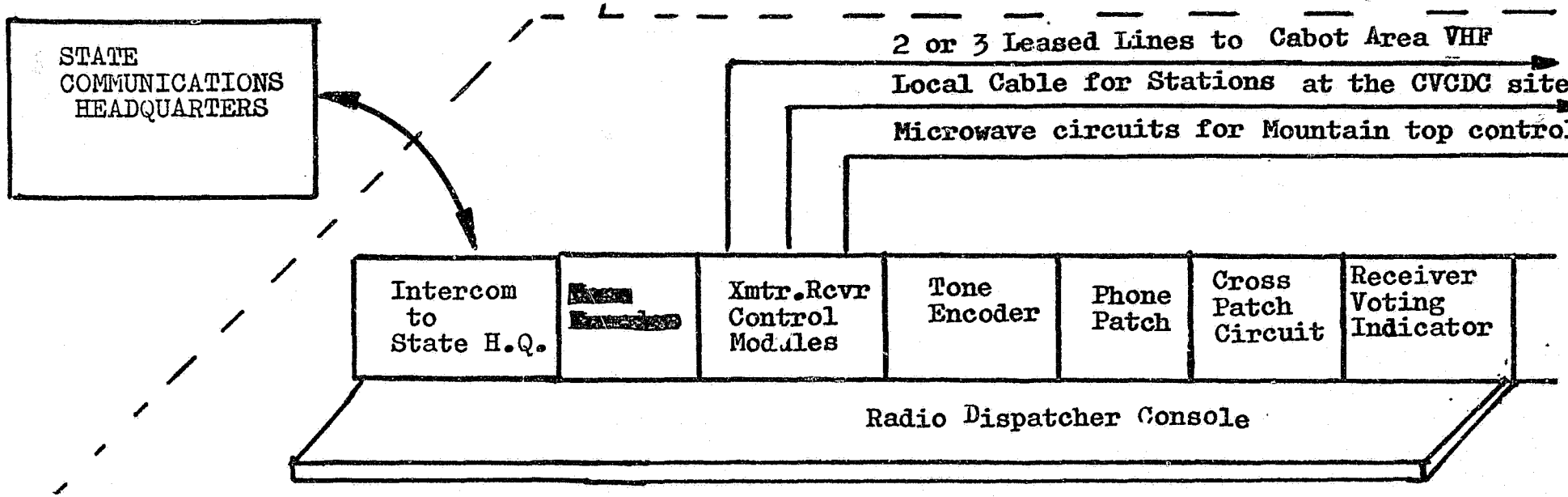
Once a fire crew is rolling, central coordination for calling additional departments is coordinated at the CVCDC. The local fire company could still use their local base for direct communication to trucks, if necessary.

Operational procedures can be developed by the Mutual Aid group. It is strongly recommended that the practice of installing radio transmitters on the fire frequency in volunteer member personnel cars be discontinued. Any needed communication among them enroute should be via CB radio. However, their alert monitor receiver would still permit reception on the fire channel, while enroute.

AMBULANCE CREW ALERTING:

Initially, ambulance crews would be alerted by call forwarding as described for fire, using the automatic dealer and outgoing watts lines. However, gradual conversion to radio alerting on a local government channel from the CVCDC is the objective recommended. While the Ambulance crews are in process of establishing individual radio dispatch capability at each crew headquarters, this expense could be avoided through activation of the CVCDC. Through the "Free Call" telephone plan, any volunteer crew headquarters could quickly reach any dispatched vehicle via the CVCDC. Furthermore, through the use of a phone patch, the CVCDC would have far greater flexibility in getting an ambulance driver in direct contact with a Doctor or anyone else. The State Department of Health communication plans include a special emergency frequency for dispatch from a central location, which location could in this case be the CVCDC.

COOPERATIVE DISPATCHING OF EMERGENCY SERVICES



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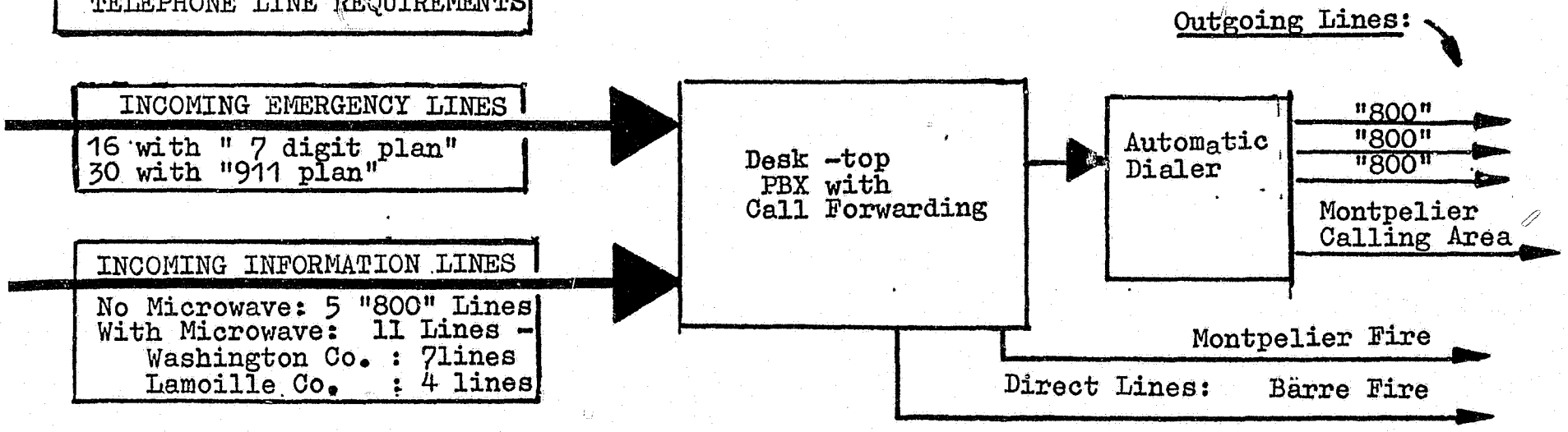
CONTROL CAPABILITY AND

TELEPHONE LINE REQUIREMENTS



All dispatchers and complaint receivers at the CVCDC should be trained in proper procedure as required by the Department of Health for receiving calls for ambulance service.

In summary, later paragraphs show a frequency plan whereby Ambulance crews would:

A. Be alerted by CVCDC.

B. Have access to the CVCDC for dispatch messages, or phone patch to or from ambulance while enroute.

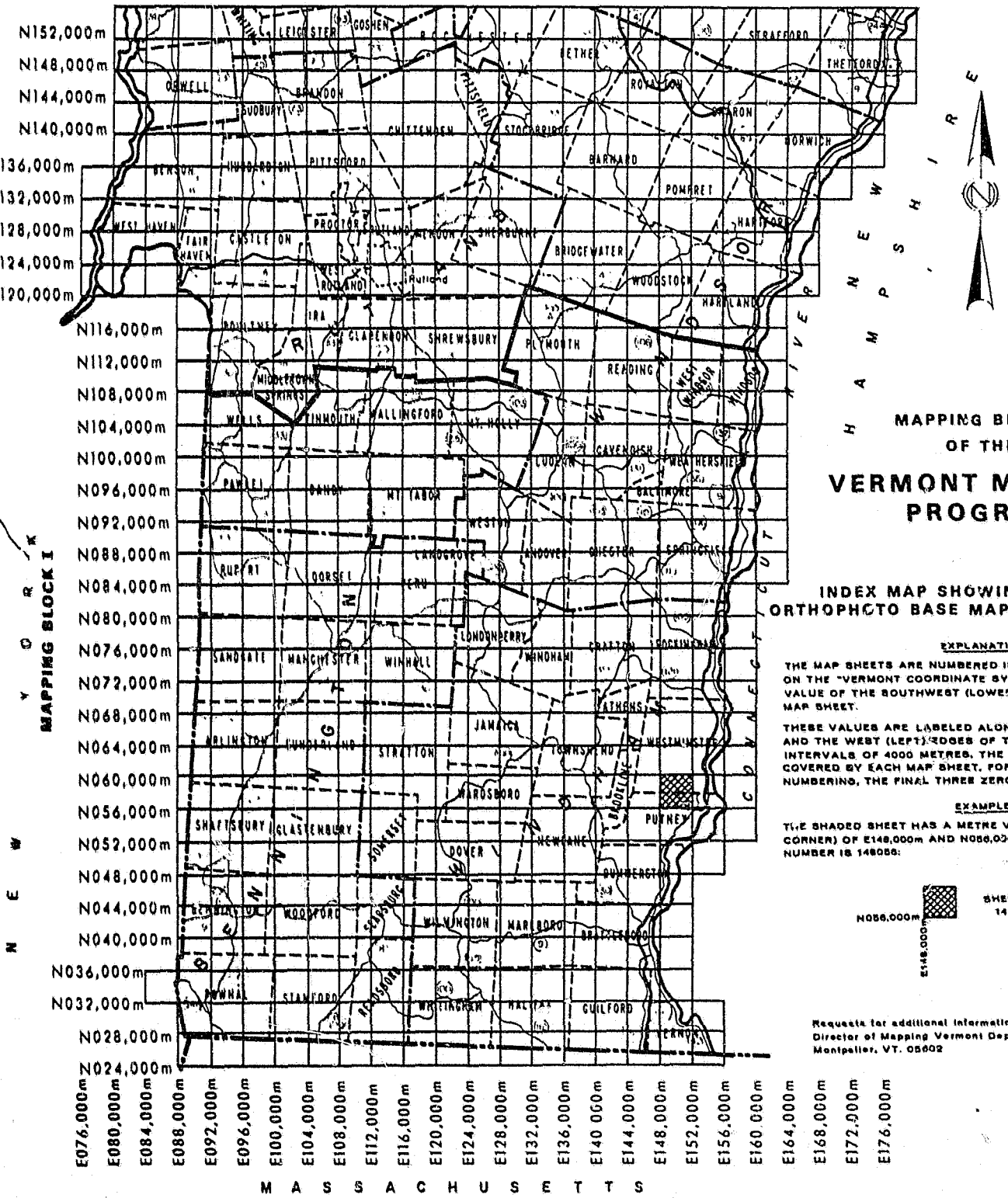
C. Have access to Burlington Headquarters via 155.280.

D. Have direct Hospital contact when within range on 155.340, using discreet continuous squelch tones for each hospital.

E. Have access to a scene of disaster coordination channel.

DISPATCHING ROOM MAP SYSTEM:

The Vermont State Department of Taxes is working on an Orthophoto maping system. A copy of the INDEX map is included in the report for reference. The system divides the State into 4,000 meter square sections with an easy reference scheme noted on the INDEX map. The Orthophoto concept actually is a photographic process which shows photographically natural features, and would seem to be an ideal system for use in the dispatch system for directing vehicles to an unfamiliar location.



"CVCDC"
Central Vermont Cooperative Dispatch Center

These maps currently being prepared by the Vermont Department of Taxes show buildings and terrain features photographically. The ones for the CVCDC area could be easily indexed in a projection system to assist dispatchers in giving directions to mobile unit operators.

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PART 5 -
CVCDC LOCATION

ALTERNATIVES AND CRITERION:

These alternatives present themselves as immediate possibilities for the location of the municipal dispatch center:

A. The Middlesex District "K" State Police Building.

B. Hyde Park Sheriff's Department.

C. Redstone - (State Police Headquarters in Montpelier).

D. An available space in an existing building.

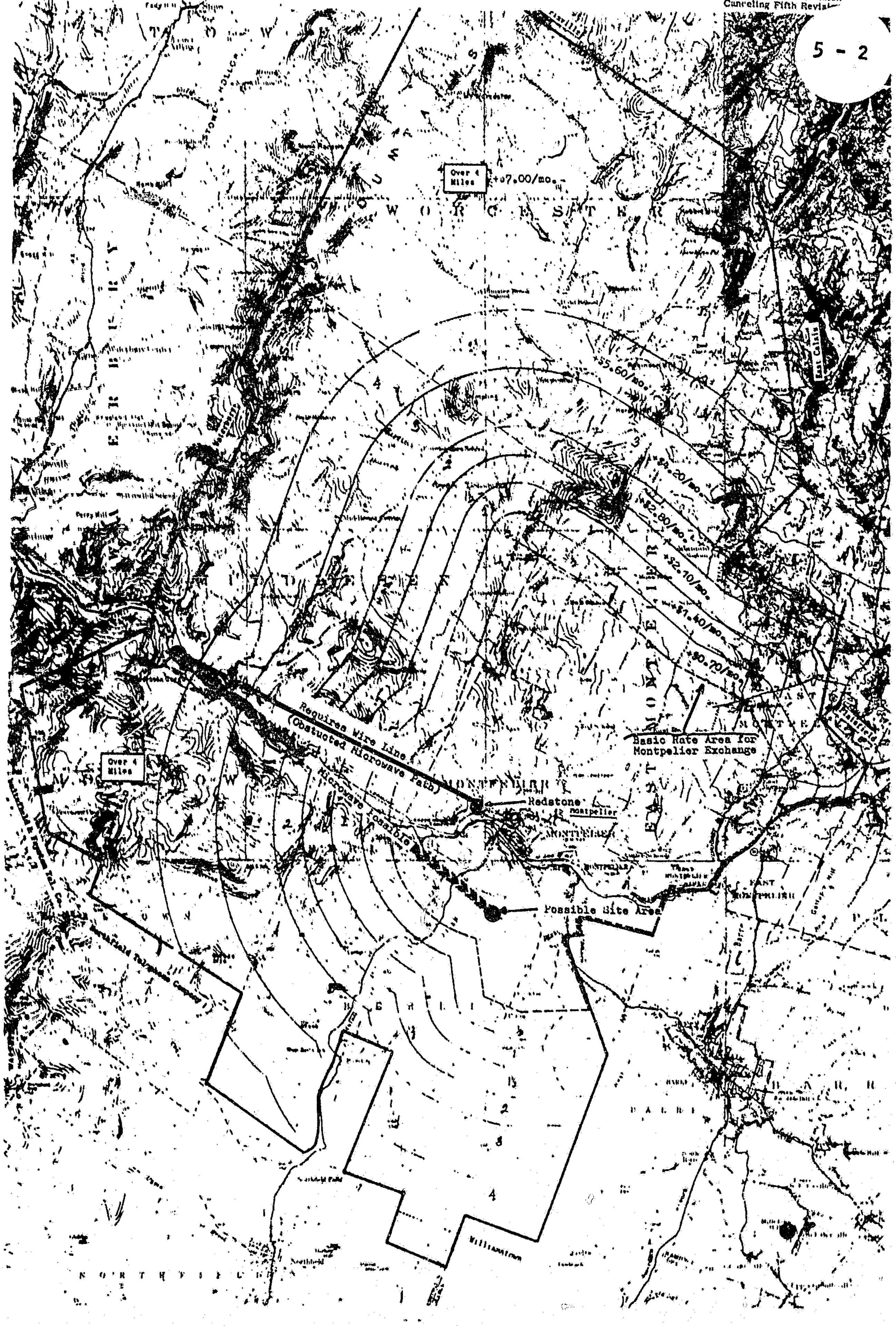
E. A new building site.

Because the Middlesex building is at the far end of the service area for the Montpelier exchange, every telephone line carries a $7.00 per month premium over the same line terminated some place within the telephone basic rate zone. The Montpelier exchange map shows the basic rate area. Further, while a State or CVCDC owned Microwave link from Montpelier could be used to extend these circuits, the radio path profile between Redstone and Middlesex is such that a tower height of some 800 feet would be required to clear intervening terrain reaching above 1100 feet MSL. Thus, further expenditures at developing Middlesex as a communication center is not wise as long as the State Police headquarters are at Redstone.

The following criterion for selection of a CVCDC site should be carefully considered:

1. The location should be within the basic rate zone of the telephone exchange to minimize monthly leased line charges.
2. It should be at a favorable ground elevation to permit good UHF radio transmission to the immediate area and thus be not solely dependent on remotely controlled stations.

5 - 2


Over 4 Miles
+$7.00/mo.
W O R C E S T E R
+$5.60/mo.
+$4.20/mo.
+$2.80/mo.
+$2.10/mo.
+$1.40/mo.
+$0.70/mo.
Basic Rate Area for Montpelier Exchange
Requires Wire Line (Obstucted Microwave Path)
Microwave Possible
Over 4 Miles
Redstone
Montpelier
Possible Site Area
East Calais
Northfield Telephone Company

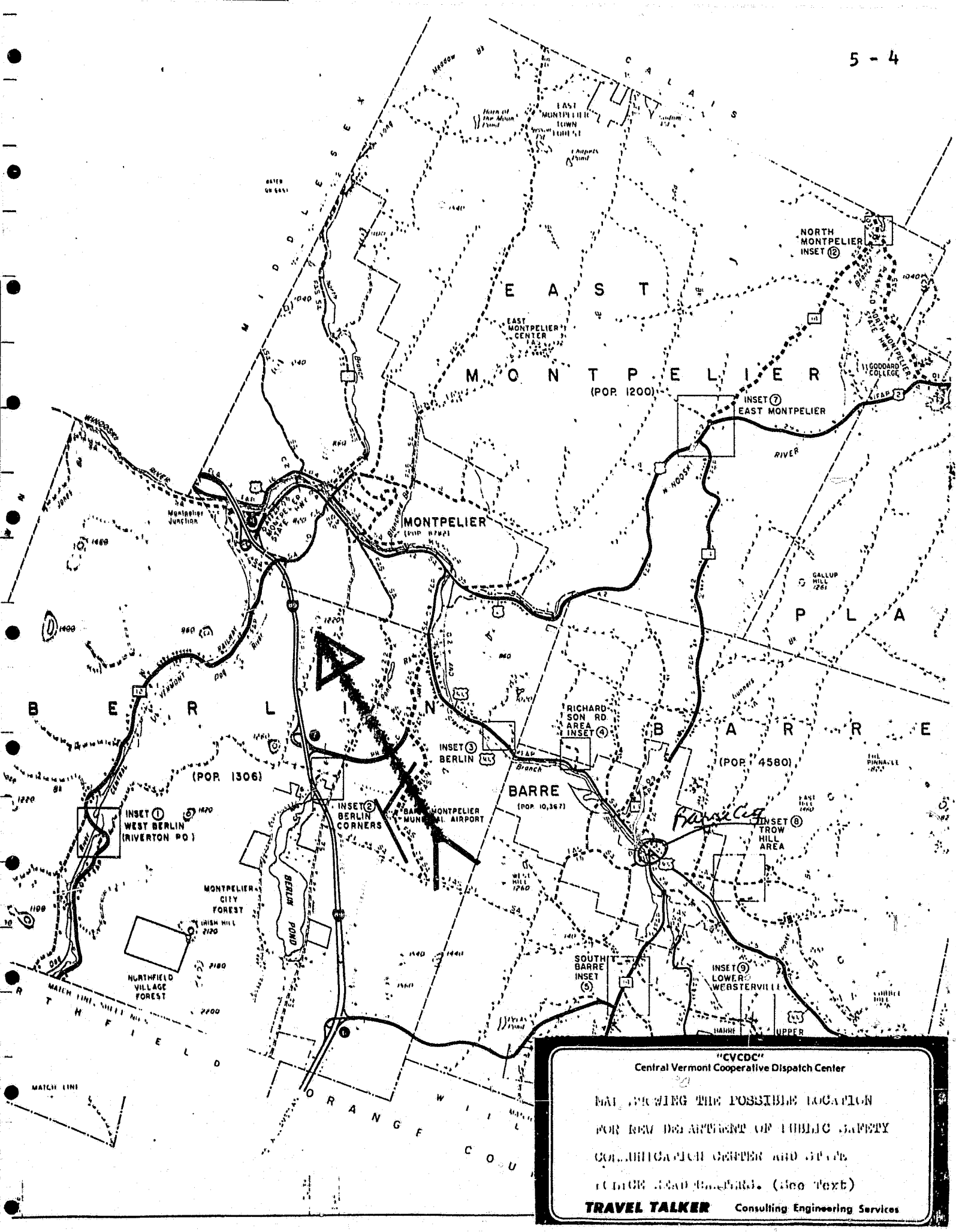
3. If condition #1 is met, it should have the possibility for a Microwave path to the headquarters termination of the State Microwave system, for access to Mt. Mansfield and Millstone Hill transmitters.
4. It could be located at the same location as the State communication center, thereby keeping interconnection circuits at an absolute minimum cost.

ANALYSIS OF ALTERNATIVES:

Based on the aged condition of the present Redstone State Police Headquarters, it seems only a question of time before action is taken to either replace it, or relocate it. To replace it on the present site would require temporary facilities for the Microwave link, basic to the entire network. Thus, investigation of a new site for Redstone might be a practical approach at this time rather than find a new CVCDC site meeting point #2 above. A new facility could be built, with duplicate communication circuits installed and cut over when construction is complete. A location that could be investigated as appearing favorable on the topographic maps is just south of the City limits in the town of Berline, midway between routes 12 and 302. This site was not inspected at the time of the field visit since this analysis as to how best to proceed had not yet been made. The site referred to is at approximately:

44° 13' 19" N
72° 34' 48" W

Elevation is 1200 feet. If this site, or something nearby is available, it would provide a clear Microwave path up the Winooski River to the Middlesex District "K" building, it would be favorably located for radio coverage into Montpelier and Barre, and be an excellent site for a Central Fire dispatch transmitter to serve a good portion of Washington County. A more thorough radio path and coverage



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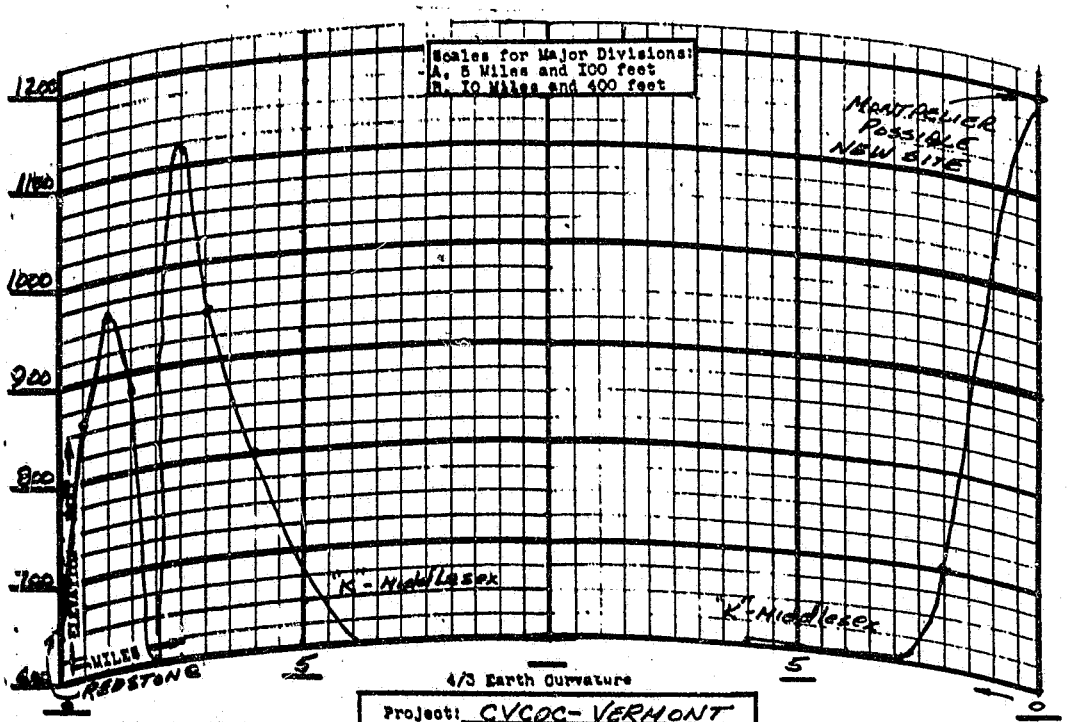
MAP SHOWING THE POSSIBLE LOCATION FOR NEW DEPARTMENT OF PUBLIC SAFETY COMMUNICATION CENTER AND STATE POLICE HEADQUARTERS. (See Text)

TRAVEL TALKER Consulting Engineering Services



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RADIO PATH PROFILES

(For Feasibility Analysis Only)

(1) Middlesex to Redstone
(2) Middlesex to possible new site for State Police Headquarters.

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survey would be necessary at the time an available site is confirmed. The suggested site area is indicated on the enclosed map.

The low ground elevation and unfavorable Telephone lise costs really rules out Middlesex as the final location for the CVCDC.

If it is used for the CVCDC, all emergency and business telephone lines and the radio control would need to be brought in over a Microwave circuit or leased lines. If Microwave alone is used, the network would be dependent on proper operation of the Microwave path. LOSS of the Microwave could lose everything. To continue the telephone circuits over leased facilities but with radio only controlled via Microwave would be a possibility, but, the low elevation at Middlesex offers little opportunity for extended radio coverage from standby radio equipments at that site. Further, the 25 to 50 telephone lines needed (depending on which telephone plan is used) would add $175 to $350 a month telephone charge, because of the $7.00 per circuit local line charge.

Using the earlier analysis for "present-worth" shows the $350 figure (the cost when 911 is used) to have a present worth of:

$$\$350 \times 12 \times 6.710 = \$28,182$$

This amount put toward providing a "CVCDC" in a new D. P. S. Headquarters building would be a better answer.

After a new Communication Center site is established, the Middlesex building could continue as Barracks headquarters for "K" Troop, and a low density Microwave circuit for administrative telephone and teletype could be installed to the new site.

Since Lamoille County emergency traffic is estimated at only 17% of the two-county region, its proximity to the major portion of activity does not make it a good choice for the CVCDC location. Further, a new more secure and spacious facility would be required. Also, Montpelier, being between Mt. Mansfield and

Millstone Hill, has access in two directions to either site, even if one Microwave circuit were disrupted, However, the existing site at Hyde Park, considered as a standby dispatch for Lamoille, in case of Microwave circuit loss, and as a northern transmitter site for the fire net, still utilizes the tower and facility. The County jail requires manning at the location anyhow which provides protection for equipment, and someone available for emergency dispatch. The Microwave circuit could also handle any administration traffic from Lamoille County to the Montpelier area. The option of using space in an existing building within the Montpelier Telephone Exchange basic rate area, is always open if the Committee knows of a suitable location.

RECOMMENDATION ON LOCATION:

1. It is recommended that the site referred to be investigated for a new State Police H.Q. and that a space be provided therein for the CVCDC.
2. Temporary operation using the equipment now at Middlesex was considered but abandoned because:
   A. The age of the console makes it difficult to expand the number of control circuits.
   B. Several more wire lines would be needed for fire control.
   C. Space is at a premium, and the Center would not be properly set up.
   D. The attitude of the personnel would be difficult to overcome, even if adequate staffing was provided, because of past history.
   E. A one position console is not sufficient for the CVCDC, and to add another would only require it to be moved later. Temporary individual control units could be purchased but have no use in the ultimate Center.

F. A mixture of headquarters communication with the CVCDC would not give a clear evaluation of its effectiveness.

G. Management control would appear to be by State Police.

H. To buy new Control Consoles and move them would involve double installation and testing costs.

CVCDC EQUIPMENT REQUIREMENTS

Equipment at the CVCDC would essentially be as follows:

I. Two Control Consoles with following capability:

1. Control 2 police channel in CVCDC district, with selection of specific transmitter sites.
2. Receiver voting indication (each police channel).
3. Transmit and receive capability on established D. P. S. Channel 2 and Channel 3 (point to point).
4. Transmit and receive control capability for:

   Fire (154.190)
   L. G. Coordination channel
   Ambulance Dispatch Channel
   State Highway (Dispatch point from Highway Dept.)
   Civilian Defense (Dispatch point from C. D.)

5. Phone Patch from any radio channel.
6. Crosspatch among channels.
7. Intercommunication to State Headquarters Dispatch Center.
8. Individual Channel Volume Control.
9. Tone or D. C. Control.
10. C.B. Reception Capability.
11. Dual Tone encoder (900 Code capacity). A standardized dual tone signalling method must be specified for use by all tone alerting applications.)

II. Telephone answering and call forwarding equipment (4 positions).

III. Selective projectors for instant display of maps, and other data to assist dispatchers.

IV. Recorders for logging Telephone and Phone conversations.

V. Instant playback recorders at each Center.

VI. Teleprinter and Termination devices for accessing NCIC and State Data Bank.

PART 6 -
RADIO FREQUENCY PLAN

POLICE:

In considering what radio channels the various town, state and city police units are to be dispatched on, two approaches are possible:

One would be to remotely control each existing 450 MHz base station at Barre, Montpelier, the Lamoille Sheriff Department, Northfield and Stowe. This would require a separate control module at the console plus leased wire lines to each station. Dispatching of individual cars on their town frequency tends to fragment the information awareness of all field units, however. One or two common dispatch channels would provide better coordination.

Thus, a second approach that uses two duplex 450MHz dispatch channels, with mobile relay operation set up at the option of the radio dispatcher is recommended. One channel would primarily serve the Montpelier and Barre Municipal area, and the second the outlying rural areas. Since there may be occasional needs for local traffic between a town car and his headquarters office during the day, the existing base equipments could be retained for that purpose. All cars would have access to both dispatch channels.

The ability to have repeater operation on dispatch channels will permit more effective use of portable radio units in the system.

The following standardized channel plan for each car in the region is suggested, with comments noted, as they apply to each channel.

Channel 1: The Rural Area Dispatch Channel: Since the majority of the mobiles (State Police and several towns) already have the K Troop frequency in this channel position, it is recommended that it be the Rural Dispatch Channel but modified for Duplex operation so the mobile frequency on

all CVCDC Police units in Channel 1 is: Transmit 465.425, Receive 460.425.

Channel 2: The present Statewide car-to-car Channel - T & R 460.500.

Channel 3: This is the present Statewide repeat Channel, and no change is recommended since Statewide bulletins from State headquarters are sent on this channel. The practice of equipping any future town cars with tone encoders can be discontinued if adequate radio coverage is provided on the dispatch channels by system improvements involving base station locations.

Channel 4: For - State Cars - This would remain the Statewide frequency for operation to other districts - T & R 460.275. For Town, City, Sheriff cars in the CVCDC system, this can be their local administrative frequency. However, for conservation of frequency usage, it is recommended all towns use the same frequency. The Channel 460.250, already used by Barre, and Stowe is recommended. Sheriff's cars may choose to continue on 460.450 as a common channel to any Sheriff department when crossing the state. But, common use of 460.250 by all CVCDC towns also makes available a second Simplex channel for separate localized activity.

Channel 5: Montpelier/Barre area dispatch channels - Mobile T465.050, R460.050. This channel is already used by Montpelier. System design changes incorporating receiver voting is recommended to insure good coverage over the two-city area from mobiles or portables.

UHF radios all have the scan capability and operational procedures should require scanning at all times of Channel 3 plus the assigned dispatch channel (1 - or - 5).

CONTINUED

1 OF 2

All local town base stations should have the exact channel arrangement as the mobiles. This would provide - if necessary, extended contact via the repeat capability on Channel 1 or 5. It also provides backup capability for town base to mobile units on Channel 2, 3, or 4. However, with the CVCDC concept accepted, it should be agreed that any car assigned to respond to a call by a local station shall immediately make the CVCDC aware of his assignment and destination. The Channel 4 capability should strictly be considered for convenience and emergency backup use.

FIRE:

The frequency 154.190 is extensively used and there is much investment in equipment already operating on the frequency. Thus, this continued use of 154.190 for fire dispatching is recommended. However, for greater coordination among all service units, a second channel in the local government service is recommended for use in all fire, ambulance and town truck vehicles.

Fire crew alerting on 154.190 is also well established and to change to another channel for this would inject confusion and cost. Furthermore, volunteer firemen can use their monitors on 154.190 to hear CVCDC dispatches of further information as they go to a fire. At the scene of a fire units could have the option of operating on the 154.190 or the new coordination channel mentioned. Channel scan or searching between the two in mobile units is recommended on new purchases.

All fire companies not now equipped to operate on 154.190 should add the capability as their number 1 frequency.

NEW L. G. - COORDINATION CHANNEL:

Four towns now operate their town street and maintenance vehicles on frequencies in the 154-155 MHz portion of the band. Thus, selection of a common coordination channel in that range could permit 2-frequency operation in Fire, Ambulance or Local Town vehicles, with the second frequency a coordination channel

common to all three services. Use of this channel would permit City trucks, snow plows, etc. to coordinate emergency communications required. Some towns use Local Government City frequencies beyond the 2-frequency tuneable range in a radio - unless widespread equipment is used. These towns could either use a second radio for coordinating, or change to a new frequency within the tuneable range. The towns affected are Montpelier (158.82), Barre City (158.76) and Morristown (158.745). Morristown uses 158.475 for Fire and is recommended to change to the 154.19 channel to put all CVCDC units on the same frequency. Two-fraquency operation in standard equipments usually must be within 1 MHz, and in some equipments can go to 1.5 MHz.

Lowest frequency in 154 range now used:

Stowe 154.040

Fire is 154.190

Highest in 155 range in use is 155.340 - Ambulance to Hospitals.

Thus, for 1 MHz maximum spread, the coordination channel should be between 154.340 and 155.040. Avoiding those channels in this range already used in the area leaves 154.995 or 155.025 as possible choices.

F. C. C. listings as of February, 1976 shows the following nearby users:

154.995 - Milton, Vt.

155.025 - Willeston, Vt.

If there is objection by the users to CVCDC applying for either of these frequencies perhaps a 7.5 KHz off-set channel, as authorized in F. C. C. rule 89.259H could be used.

AMBULANCE CHANNELS:

Ambulance units are recommended to standardize on the following Channel Plan:

Channel 1: 154.340 (70 Hospitals using a discreet CCTCS for each hospital)

Channel 2: 155.280 to Burlington via Microwave.

Channel 3: Ambulance to Dispatch Center - (A special emergency channel to be agreed on).

Channel 4: The coordination channel referred to above.

CREW ALERTING:

Ambulance crew alerting could be done on the new coordination channel referred to above.

SCHOOL BUSES:

During the field visit some concern was expressed for the safety of school buses during winter weather. It is difficult to justify the cost of higher priced VHF radio for this application. The use of CB radio - with tone decoder added to reduce driver distraction is recommended.

The bus would install a tone decoder to the CB radio which would eliminate annoying and distracting radio traffic to the driver. Operational procedure should be established to prohibit use of the CB unit by the mobile operator unless called, or there is an emergency or an important message to relay from the bus. The school, and volunteer citizens with CB units along the route could be equipped with tone encoders for calling the bus when required. These same points could monitor the designated CB channel during times the bus was enroute for messages from the bus. The citizens and schools would have access to the telephone for reaching the CVCDC for any additional assistance needed.

CB RADIO APPLICATION:

Since a growing segment of the citizenry equip their automobiles with CB radios, the practice of placing CB units in Police and Rescue vehicles for direct communication with an accident scene, or snow bound stranded vehicle is recommended. A program encouraging responsible citizen cooperation as a public

relations project could be initiated. Such a policy may also help achieve greater respect for use of the CB airways. Highway signs showing channels monitored by Police or rescue vehicles would be part of the program.

The CB radio offers an effective direct link to the scene of assistance while emergency units are enroute. Volunteer firemen enroute to a fire can also use CB for coordination.

POLICE PORTABLE RADIO CONSIDERATION:

With most police communication on UHF (450 MHz), the question of how to best include police in an effort using the new 154 MHz coordination channel must be considered.

The simplest method would be to crosspatch at the dispatch center one of the 450 MHz dispatch channels to the 154 MHz coordination channel. The disadvantage here is the entire dispatch area will hear all traffic, which may really pertain only to the local situation requiring coordination.

A second method would be to provide repeat capability in a few selected police vehicles which could be brought to the scene. These vehicles would be set up to repeat the Channel 2 police (460.500) on the 154 coordination channel and vice versa.

A third approach would be to purchase some highband police portables with Dual Front End receiver to permit reception on UHF. This approach could also contribute to permitting police communication on 155.475 MHz, the national police emergency channel and provide a 150 MHz Police portable talk-back channel. The channel arrangement in the portables would be as follows:

Channel 1. T_1 154.XXX, R_1 154.XXX (The coordinating channel)

Channel 2. T_2 155.475, R_2 155.475 (National Emerg. Freq.)

Channel 3. T_3 155.010, R_3 460.050 (Priority)

1 2

The portables would be set with 2-channel searching with 460.050 having priority, regardless of which channel position was selected. Thus, the police unit would always be reached by the CVCDC, while coordinating on Channel 1, at the scene of a special event. The frequency 155.01 presently licensed to Barre and Northfield could be used as a highband portable talk-back channel.

The substitution of such a portable unit for police would cost no more per unit than a multi-channel UHF.

Base repeat from R 155.010 to T 460.050 could be set up by the dispatcher, to permit communication to any police vehicle from a portable.

The following diagrams illustrate the Frequency plan.

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THE RADIO FREQUENCY PLAN

ALL POLICE - U.H.F.

Chan.	Xmtr	Rcvr.
1	465.425	460.425
2	460.500	460.500
3	465.025	460.025
4	As Noted:	460.275
5	465.050	460.050

State Police "K" — 460.250

Town Police — 460.450

Sheriff (Both CTY) — 460.250

Barre & Montpelier City Police

CVCDC Repeat Control (See Text)

R 460.425

T 465.425

R 155.01

150MHz Port. with Dual R.F. in Rcvr. (See Text)

155.XXX

Nationwide Emerg. 155.475

FIRE, AMBULANCE AND CITY VEHICLES
154 to 155 MHz

Fire Veh.
1. 154.190
2. 155.XXX

Ambulance
1. 154.340
2. 155.280
3. (S.E. Disp.)
4. 155.XXX

Town Street Water Etc.
1. Existing freq. if 154 to 155
2. 155.XXX

(See Text)

Local Citizens and Tourists — C B Radio

Tone Encoder
C B RADIO

SCHOOLS

Tone Decoder
C B RADIO

BUSES

Tone Encoder
C B RADIO

CITIZEN VOLUNTEERS
"Bus Watchers"

Further investigation is suggested. Tests from Mt. Mansfield on any existing UHF channel should first be conducted to verify the degree of coverage from Mansfield. Additional sites may not be needed. Based on available data, a 100 Watt base at Mansfield with 10 DB Antenna is calculated to result in 1 to 2 M Volt signal about 50% of the time in the Waitsfield area. Directional Antennas are recommended at Mansfield and Millstone Hill on the Channel 1 frequency to place the maximum usable radiated emergency within the "CVCDC" area as much as possible. The system has been designed around existing sites primarily.

Drawings in this section illustrate the station plan, with receiver voting incorporated to improve talk-back reception. Sites and antennas for the two Police channels (1 and 5) are:

UHF POLICE CHANNEL 1 BASE (T 460.425, R 460.425)

SITE	ANTENNA	REMARKS
Mt. Mansfield	10 DB - Omni - with Offset Pattern to East.	Requires a new base at Mansfield and precaution against desensitizing other channels.
Millstone Hill	10' Dish with De-icer - directed NNE for improved signal in Cabot, Woodbury Towns.	Millstone is an existing site with Microwave control. Because it is at the end of the coverage area, a uni-directional high gain antenna for Channel 1 is recommended.
Montpelier	10 DB - Omni - Antenna	(The Montpelier station is back-up in case of failure of Microwave control to mountain sites, but it also can be part of voting system.
Roxbury Gap	10 DB - Omni - With offset pattern to North	Addition of this site depends on result of survey from Mansfield, and site suitability and availability. Would require point-to-point control. (Perhaps 960 MHz or 2KMC)

FOR UHF POLICE CHANNEL 5 (T 460.050, R 465.050)

SITE	ANTENNA	REMARKS
Millstone Hill	6' Dish - Directed toward Barre - Montpelier	Use Voting Comparator and select transmitter in area of strongest signal
Montpelier	Offset Omni - 50B directed E.N.E.	Use Voting Comparator and select transmitter in area of strongest signal

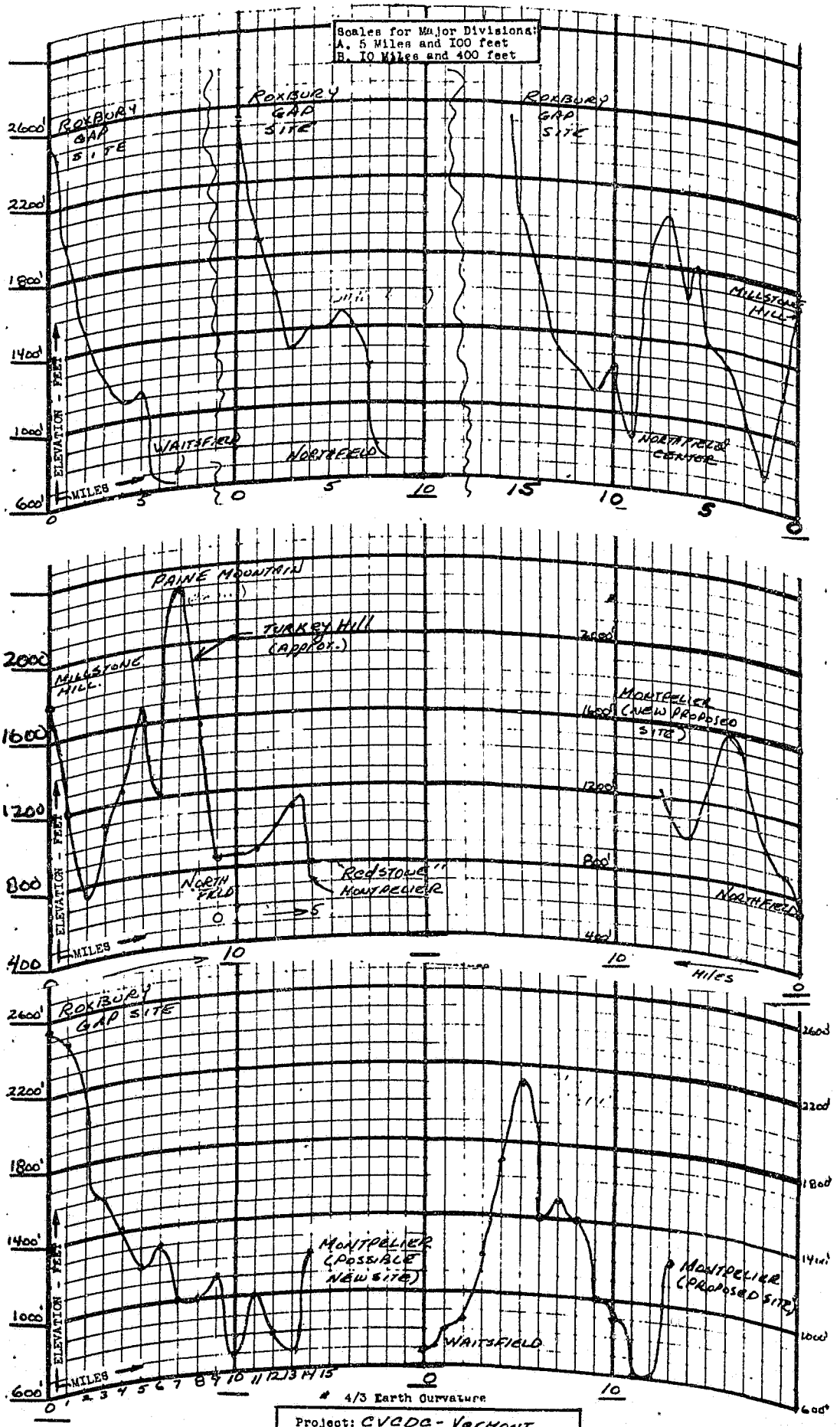
In addition, if the use of high band portables as discussed earlier is acceptable, tone coded squelch receivers on 155.01 MHz would be at each site. This would also go into a voting comparator for portable talk-back reception.

The dispatch console would have the option for setting any UHF transmitter for repeat of its UHF receive frequency, 155.01 or both.

To avoid mutual interference from other users on 154.190, it is recommended that base stations on that frequency and the proposed coordination channel not be on Mansfield or Millstone, but that protection of the surrounding mountain be used to advantage on these channels. V.H.F.(150 Mhz) stations at Montpelier, Hyde Park area and a site in the eastern section near Hardwick or Cabot for the Fire and coordination channel are recommended. Two-wire line circuits to each are required (one for each channel). This will permit crosspatching of the channels and individual control. Receivers on 155.01 could be at these same sites for portable talk-back.

Duplication of the UHF Channel 1 station at the Montpelier control center is not needed for obtaining coverage, but does provide these useful advantages:

1. Local transmission can be made and not cause unnecessary interference over the wide areas as caused by Mt. Mansfield.
2. It provides a backup transmitter at the control site, always accessible.
3. It provides another receiver voting path.



NOTE: FOR FEASIBILITY STUDY ONLY. NOT FOR FINAL DESIGN.

Project: CVCOG - VERMONT

Path Bearing (A to B): _____ Degrees

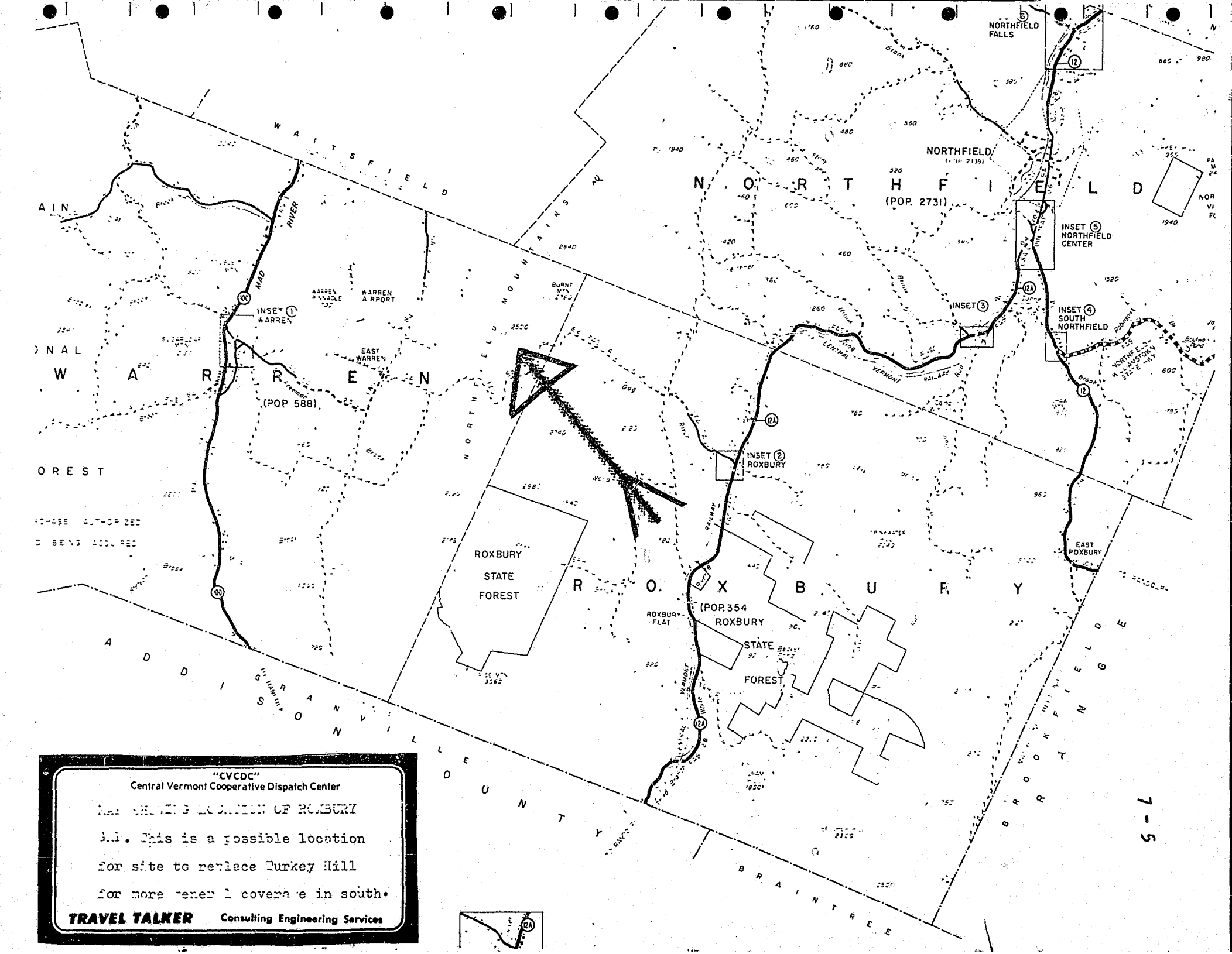
Drawn By: RAP Date: 8/6/76

Page ___ of ___

Site B: _____

LAT. N: ___ D ___ M ___ S

LONG. W: ___ D ___ M ___ S



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[illegible] LOCATION OF ROXBURY

[illegible]. This is a possible location for site to replace Turkey Hill for more general coverage in south.

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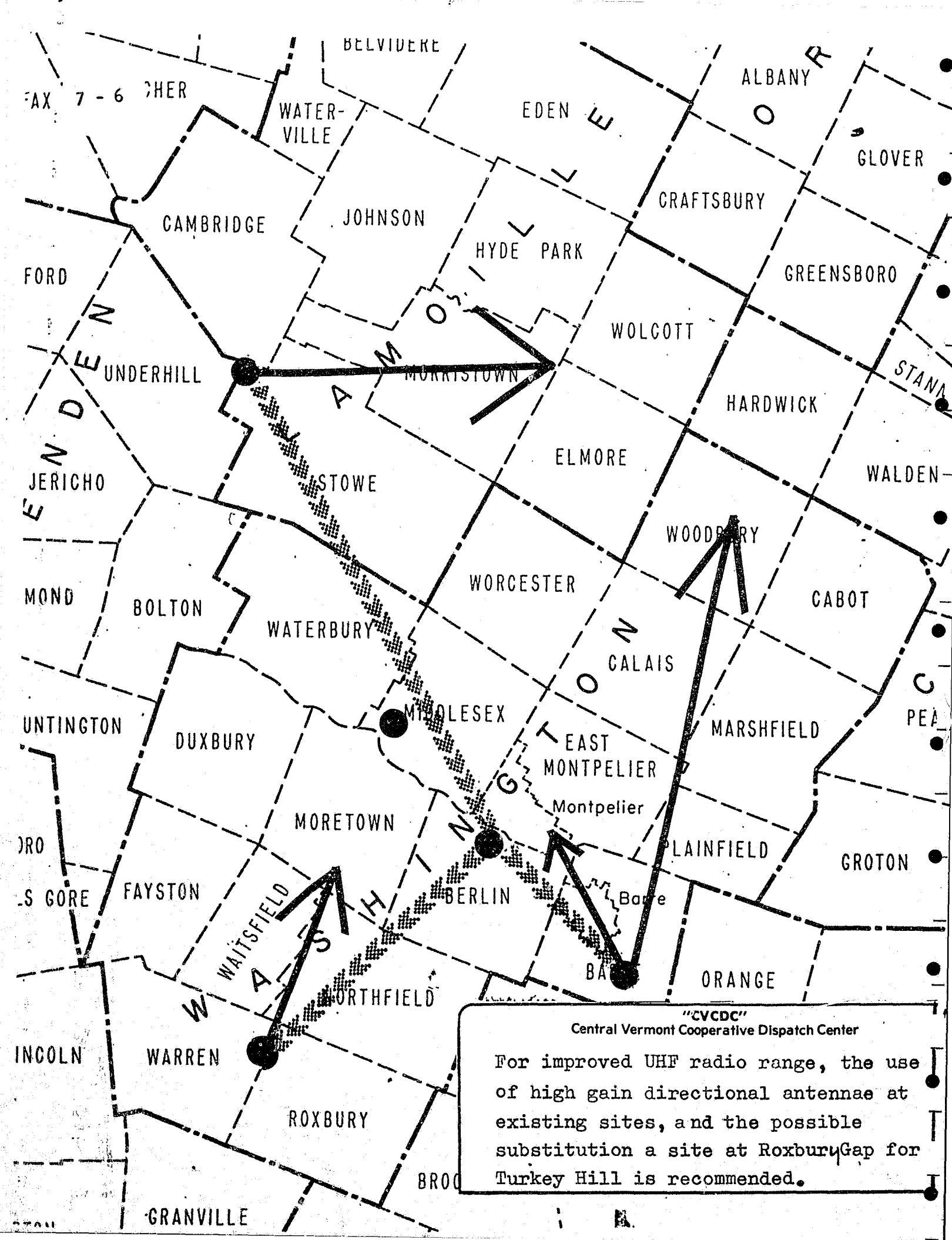
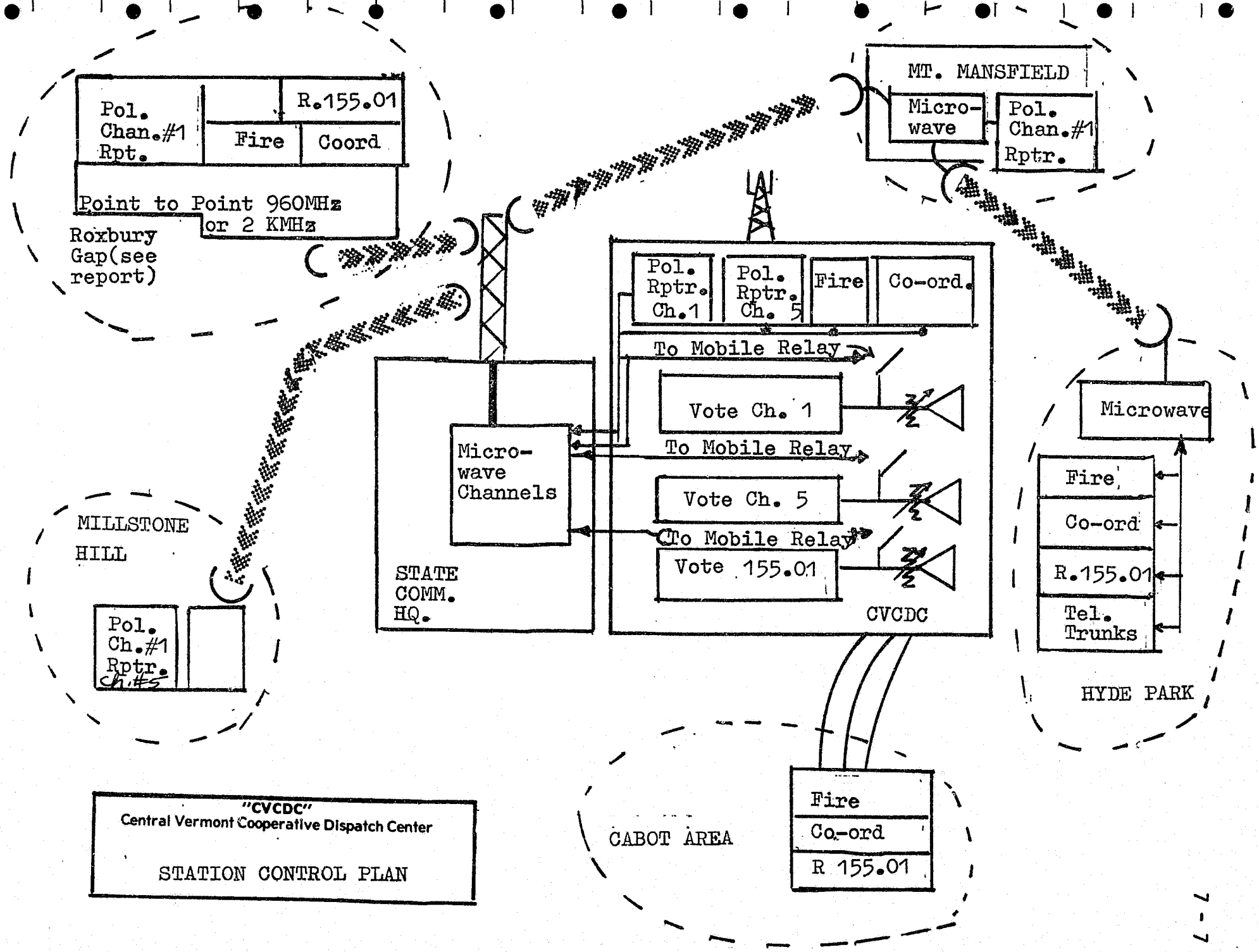
5-7


BELVIDERE
ALBANY
EAX 7 - 6 CHER
WATER-
VILLE
EDEN
GLOVER
CAMBRIDGE
JOHNSON
CRAFTSBURY
HYDE PARK
FORD
GREENSBORO
WOLCOTT
UNDERHILL
MORRISTOWN
HARDWICK
ELMORE
JERICHO
STOWE
WORCESTER
BOLTON
WATERBURY
CALAIS
MIDDLESEX
DUXBURY
MARSHFIELD
EAST
MONTPELIER
Montpelier
MORETOWN
PLAINFIELD
GROTON
FAYSTON
BERLIN
Barre
WAITSFIELD
ORANGE
WARREN
ROXBURY
GRANVILLE
LAMOILLE
WASHINGTON
ENDEN
"CVCDC"
Central Vermont Cooperative Dispatch Center
For improved UHF radio range, the use of high gain directional antennae at existing sites, and the possible substitution a site at RoxburyGap for Turkey Hill is recommended.



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STATION CONTROL PLAN

PART 8 -

A SUGGESTED PRO-RATA COST PLAN

The following approach to CVCDC Operation Cost sharing is one believed to make a reasonable distribution among the participants, and is based both on percentage of use by the three emergency services, and also the population being served. It divides the costs among the Department of Public Safety, Department of Public Health, participating Towns in the two Counties, and the two Sheriff's Departments. It shows how all can obtain 24-hour 7-day dispatch service for the three emergency services at an amount less than equivalent 24-hour service could be provided individually by each town.

The reader is asked to review the pro-rata method for fairness in the approach. Exact dollar amounts may vary some in the final analysis.

ESTIMATED COST OF OPERATIONS:

1. Telephone Answerers or Dispatchers with shifts manned 4, 4, 3, respectively:

   11 people per day
   8 hours per person
   $4.35 per hour (D.P.S. est. $4.17/hour)
   7 days per week
   52 weeks per year:

   11 x 8 x $4.35 x 7 x 52 = $139,339.

2. CVCDC - Administrator and Manager:

Proj. Mgr.	$18,000
Secretarial	9,000
Supplies	3,000
	30,000
Rent/Main./Elec.	12,000
	$42,000

3. Telephone:

	(COST MONTHLY) 911	Free-Calling Plan
Incoming Leased Lines:	$2,737	$1,675
Telephone Apparatus	600	300
V.H.F. Radio Control Lines		
2 to Hyde Park @ $94.00	188	188
Outgoing Lines:		
4 Watts @ $135.00	810	810
1 Local @ $16.00	16	16
2 Direct @ $16.00	32	32
MONTHLY TOTAL	$ 4,383	$ 3,020
ANNUAL AMOUNT	$52,596	$36,252
SAVINGS WITH MICROWAVE:		
Per Month	$ 641	$ 378
Per Year	$ 7,692	$ 4,536
TELEPHONE TOTAL $ ANNUALLY IF MICROWAVE USED TO HYDE PARK	$44,904	$31,716

SUMMARY: (Rounded Amounts)

Dispatchers	$139,500
Administration, Rent	42,000
* Telephone (911)	45,000
Total - Annual Operation	$226,500

* The Telephone was included at the most costly plan.

PRO-RATA COST FORMULA SUGGESTION:

(1) Divide by Usage among 3 Services; based on requests for service: (After first year, actual figures can be used. For this analysis, average estimated calls per 100 population developed in telephone section were used.)

First Year Estimate:

Average of calls/100 population/day (estimate):

Police	.067	63%
Fire	.009	9%
Ambulance	.030	28%
TOTAL	.106	100%

(2) Divide Police in proportion to UHF Mobile Radio plus P rtable Equipments: (UHF-): i.e.,

UHF UNITS	MOBILE	PORTABLE	TOTAL	
State	27	10	37	(54%)
Town Police	12	15	27	(39%)
Lamoille Sheriff	2	0	2	(3%)
Washington Sheriff	3	0	3	(4%)
TOTAL			69	(100%)

Pro-Rate the 63% for Police:

State	63% x .54 = 34%	.34 x 226,500 =	$ 77,010
Towns	63% x .39 = 25%	.25 x 226,500 =	56,625
Lamoille) Sheriff)	63% x .03 = 1.89%	.019 x 226,500 =	4,303
Washington) Sheriff)	63% x .04 = 2.52%	.025 x 226,500 =	5,662
TOTAL POLICE			$143,600

(3) Department of Public Health share to support 50% of Ambulance Use to provide dispatching for its radio equipment.

226,500 x .28 (Amb.) x .50 (DOH) = $31,710

(4) Towns pay the rest on pro-rata basis by population.

(5) SUMMARY: - ANNUAL PRO-RATA

	D.P.S.	Towns	Lamoille Sheriff	Washington Sheriff	D. O. H.
Police (63%) $143,600	$77,010	$56,625	$ 4,303	$ 5,662	-
Ambulance (28%) $ 63,420	-	31,710	-	-	$ 31,710
Fire (9%) $ 19,480	-	19,480	-	-	-
TOTAL - $226,500 (100%)	$77,010	$107,815	$ 4,303	$ 5,662	$ 31,710

(6) TOWNS SHARE:

Straight pro-rata on population (1976)

$107,815 ÷ 66,967 = $1.61 a person

Typical $ Examples: Barre City: $1.61 x 10,691 = $17,212 Per Year

Montpelier: $1.61 x 8,819 = $14,198 " "

Stowe: $1.61 x 2,719 = $ 4,378 " "

Northfield: $1.61 x 5,090 = $ 8,194 " "

(7) FUNDING COMMENTS:

1. Center could take in revenue by charging monthly fee for Monetary Burglar Alarms. A standard alarm system should be used - all users must conform to standard type agreed upon. Commercial rates run about $10 to $15 per month.

2. Above amounts include no pro-rata of capital equipment to set up Center.

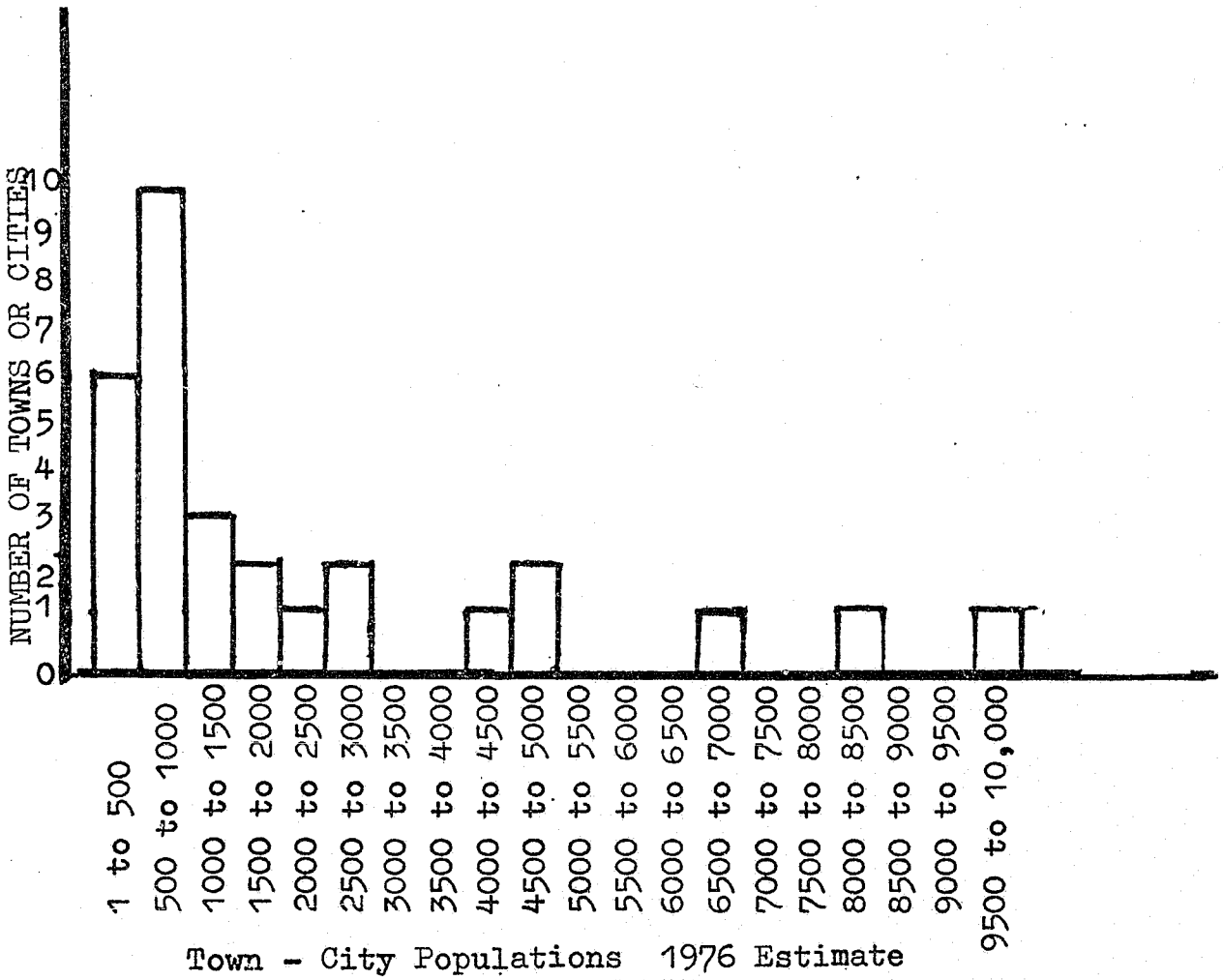
3. Annual Cost of 1 Dispatcher for:

24 Hours, 7 Days/Week is:
24 x $4.35 x 7 x 52 = $38,001

24 Hours, 5 Days/Week is:
24 x $4.35 x 5 x 52 = $27,144

8 Hours, 5 Days/Week is:

$27,144 ÷ 3 = $9,048



Town - City Populations 1976 Estimate

"CVCDC"
Central Vermont Cooperative Dispatch Center

Distribution of population among the municipal entities in Washington and Lamoille Counties. If pro-rata cost is kept below $2.00, the average size town cost would be $2,000 a year.

TRAVEL TALKER Consulting Engineering Services

PART 9 -

MANAGEMENT AND SUPPORT ORGANIZATION

The engineering, servicing and experience in Communications technology within the Vermont Department of Public Safety Communication Division must be depended upon to support the individually managed communication Dispatch Centers, of which the "CVCDC" can be a prototype for similar centers throughout the State.

It is suggested that the day-to-day responsibility for operation of the Dispatch Center be by a Communication Center Managing Director, appointed by a governing board discussed in later paragraphs.

D. P. S. COMMUNICATIONS DIVISION SUPPORT

The support functions which the State must organize to insure the cost saving benefits resulting in uniform standards in operation and equipments are:

Standards and Training

Systems Engineering and Equipment Specifications

Service and Maintenance

It is recommended the State Communications Division organize with three branches under control of a Supervisor in each of these activities.

Standards and Training:

A training program for proper dispatch techniques should be established which all dispatchers in Municipal or State systems should attend. The training should include a description of the complete communication system so that dispatchers can use the equipment under their control to its fullest capability. The training department shall arrange to include representatives from Police, Fire and Emergency Medical Services who can train on dispatching or telephone procedures unique to each of their respective activities. A job description

for dispatchers, outlining require aptitude and previous experience shall be prepared and used as the basis for hiring dispatchers in all communication centers.

To insure uniformity in telephone appratus, this section shall work closely with a State telephone representative and establish a list of acceptable telephone answering devices that may be recommended for installation in the dispatch centers. Every effort should be made to establish similar apparatus and uniform operating procedures among all dispatching centers.

This department shall also include instructional material for operation of all data and teletype devices, and approve all message formats used in these systems.

The information in Chapter 23 "Communications", and Chapter 24 "Information Systems" in the POLICE volume issued by the National Advisory Commission on Criminal Justice Standards and Goals should be referred to when setting performance goals. Also, helpful is "The Public Safety Communications Standard Operating Procedures Manual", available from the Executive Secretary, Associated Public Safety Communications Officers, Inc.; P. O. Box 669, New Smyrna Beach, Florida 32069.

System Engineering and Equipment Specifications:

Systems Engineering: A State-wide system engineering review and liaison service can insure compatibility among individual networks, and provide technical support needed in resolving equipment or system performance problems with equipment vendors.

Tone Signalling: An agreed to [redacted] tone signalling method for selective call should be established by tone frequency range, tone duration, spaced between tones, and stability. With a growing use of alert monitor receivers and pagers being used, a STANDARDIZED [redacted] tone coded format is essential. This department shall also

maintain a log of tone codes used in each dispatch center by R. F. Channel, and be a clearing center when new tone devices are added.

R. F. Frequencies: All R. F. Frequency plans utilized in a communication center should be reviewed and recorded for compatibility among other State networks. Records of equipments at mountain top sites should be retained so that interference potential can be evaluated when new equipment is proposed.

Equipment Specifications: A testing center that can verify compliance of vendor equipments against required specifications should be established. Also, new equipments available should be tested against environmental and installation or engineering problems unique to State systems and an approved list of suitable equipments should be maintained.

Service and Maintenance

At typical commercial service contract rates, equipments in the CVCDC area would cost about $25,000 per year to maintain. However, the State has an established organization with test equipment and shops for service which can be expanded to provide service to the cities and towns.

Many cities complain of high cost and time delays in getting their equipment repaired by commercial vendors. It is suggested that the opportunity be offered to each town and city for the State to service its equipment, and that the State service organization determine what additional manpower and equipments may be needed to service those not now covered. Towns can reimburse the State at an agreed to cost sharing plan, after the costs are determined. The Total Service Cost estimated by the State could be pro-rated by number of equipments in service and included in the total pro-rata cost shown in the previous section for Operation costs.

A possible formula for pro-rating service cost is as follows:

Contract Service Costs are about -
$11.00/Month per Base
6.00/Month per Mobile
4.00/Month per Portable
2.00/Month for Receivers

1. Use these factors to find a weighted average "unit service cost". That is, a base is worth 11 Units, a mobile 6 Units of cost, etc.

2. Find the "unit" service cost as follows:

Total Base in CVCDC	x 11	=	B
Total Mobile in CVCDC	x 6	=	M
Total Portable in CVCDC	x 4	=	P
Total Alert Receivers	x 2	=	R
Sum of Above			S

$$U = \text{Unit Cost} = \frac{\text{State Annual Service \$ for CVCDC}}{S}$$

A Towns Service Units would be:

11 x Town Qty.	Base	=	BT
6 x " "	Mobiles	=	MT
4 x " "	Portables	=	PT
2 x " "	Receivers	=	RT
	SUM	=	St

Towns Cost would be
$U \times S_t$ = $ Annual Service

EXAMPLE: Assume D. P. S. budget $20,000 to Service CVCDC Area.

CVCDC has:

41 Base, 151 Mobiles, 43 Portables, 145 Receivers

Unit Service Cost is:

$$\$20{,}000 \div \left((11\times41)+(6\times151)+(4\times43)+(2\times145) \right)$$

or $11 per "UNIT"

Montpelier has

VHF	1 Base	7 Mobiles	3 Portables	19 Receivers
UHF	1 "	2 "	2 "	- "
Total	2	9	5	19
Weight factor	x11	x6	x4	x2
Service Units	22	54	20	38

Total Service Units = 134

Annual Pro-rata cost = 134 x 11 = $1,470

(The cost figures are for example. The service budget must be determined. Total units will change, and a unit $ value would be adjusted annually.)

CVCDC Organization

It is suggested a 10-man governing board be established and hire a Managing Director for the CVCDC.

CVCDC Defined: The Central Vermont Cooperative Dispatch Center shall be an organization to provide telephone answering and unit radio or signalling dispatch for all Police, Fire and Emergency Medical Services in Washington and Lamoille Counties in Vermont.

Members of Governing Board:

1 - Representative from the Mutual Aid Fire.

1 - Representative selected by a meeting of the Police Chiefs from participating towns.

2 - Representatives selected by the participating towns and County government of Lamoille County. (Could be selected by Lamoille County Development Board.)

2 - Representatives selected by the participating towns and County government of Washington County. (Could be selected by Central Vermont Regional Development Board.)

1 - Representative from the Department of Public Safety Communications.

1 - Representative from the Emergency Medical Services.

Term: Members shall serve for a one-year term, but may be re-appointed for up to 3 consecutive terms.

Governing Board Duties: The governing board shall set policy for the CVCDC and approve all system equipment and procedures. They shall jointly approve all expenditures and prepare a working budget for each year.

Officers: The Governing Board shall elect annually a Chairman, Vice Chairman and Secretary-Treasurer.

Meetings: The Governing Board shall convene monthly.

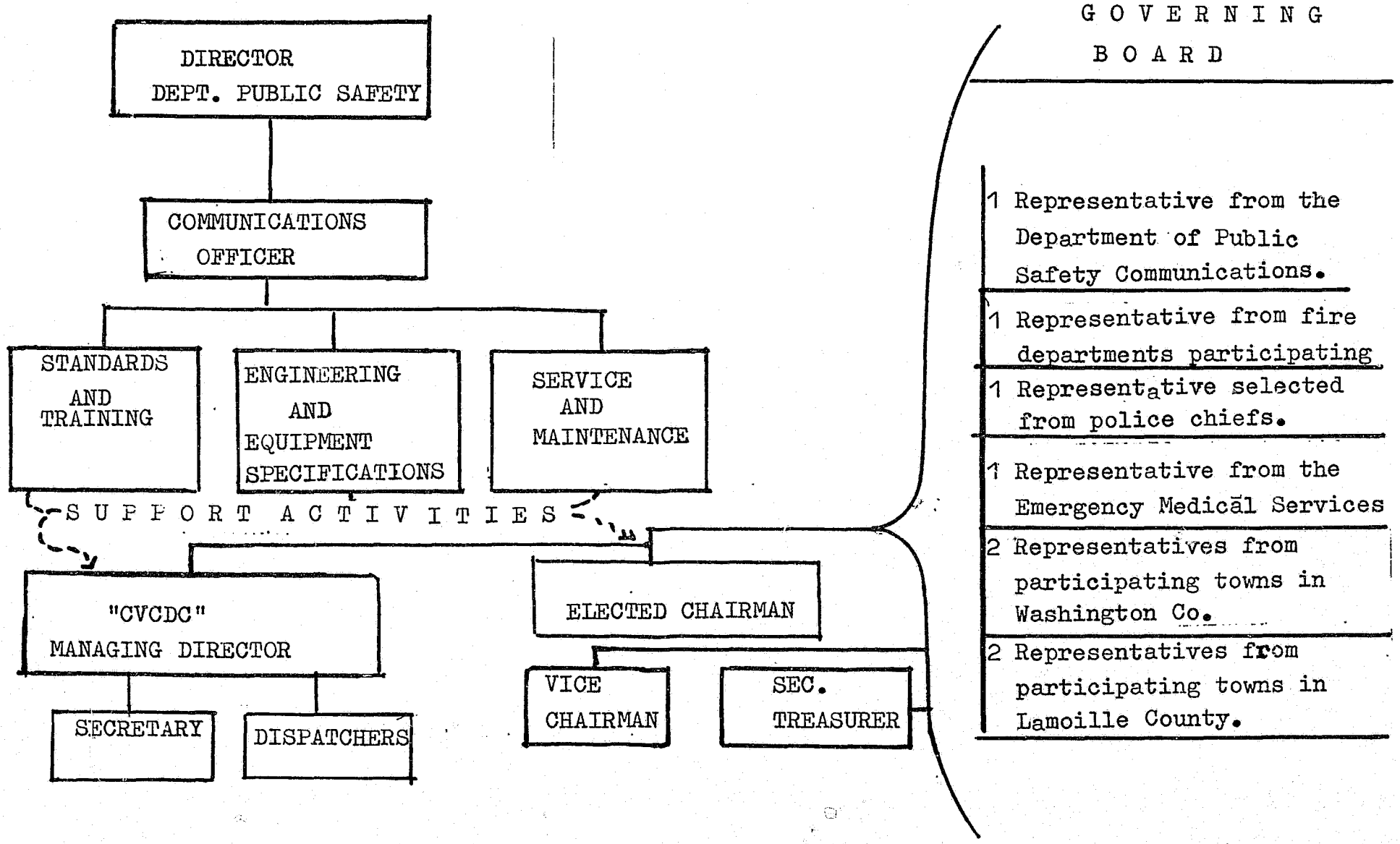
CVCDC Managing Director:

The Governing Board shall hire a Managing Director who shall supervise all dispatch operations and hire and train dispatchers. He shall handle the day-to-day management of the center and arrange for all service needed. He shall enforce all policy guidelines accepted and noted upon by the Governing Board.

CVCDC Participants:

All municipalities within the CVCDC designated area shall be invited to be part of the Cooperative Center. A majority vote of the Governing Board shall be required to accept new participants in the CVCDC. A signed agreement from all participants shall be part of the CVCDC records. All costs shall be pro-rated according to the following formula:

(See suggested formula in the Cost Section of Report)


DIRECTOR
DEPT. PUBLIC SAFETY
COMMUNICATIONS
OFFICER
STANDARDS
AND
TRAINING
ENGINEERING
AND
EQUIPMENT
SPECIFICATIONS
SERVICE
AND
MAINTENANCE
S U P P O R T A C T I V I T I E S
"CVCDC"
MANAGING DIRECTOR
SECRETARY
DISPATCHERS
ELECTED CHAIRMAN
VICE
CHAIRMAN
SEC.
TREASURER
G O V E R N I N G
B O A R D
1 Representative from the Department of Public Safety Communications.
1 Representative from fire departments participating
1 Representative selected from police chiefs.
1 Representative from the Emergency Medical Services
2 Representatives from participating towns in Washington Co.
2 Representatives from participating towns in Lamoille County.

END