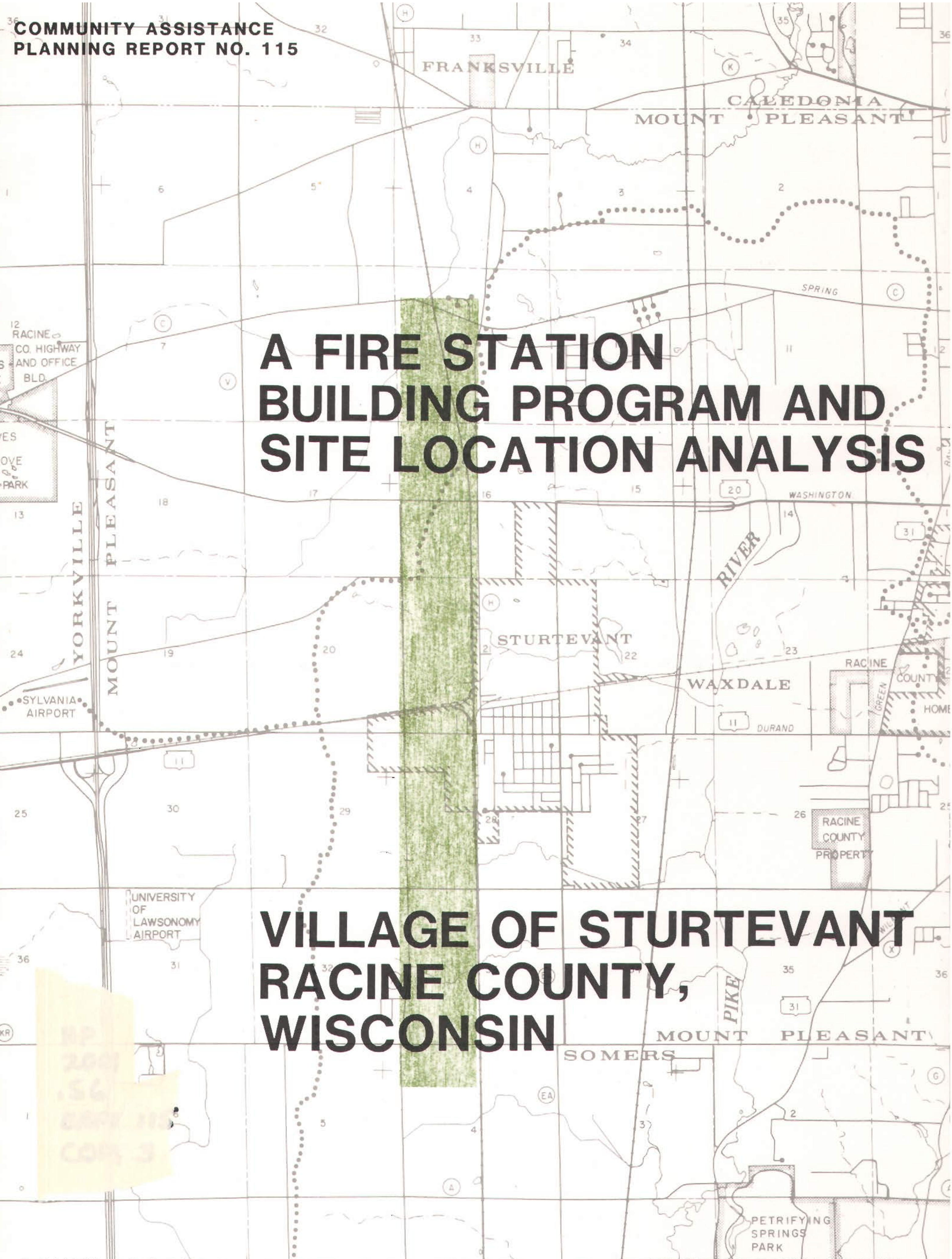
COMMUNITY ASSISTANCE
PLANNING REPORT NO. 115

A FIRE STATION BUILDING PROGRAM AND SITE LOCATION ANALYSIS

VILLAGE OF STURTEVANT RACINE COUNTY, WISCONSIN



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Special acknowledgement is due Mr. Patrick J. Meehan, AIA, Principal Planner, for his contribution to the preparation of this report.

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A FIRE STATION BUILDING PROGRAM AND SITE LOCATION ANALYSIS

Village of Sturtevant
Racine County, Wisconsin

Prepared by the

Southeastern Wisconsin Regional Planning Commission
P. O. Box 769
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September 1984

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Outside Region $10.00

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SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION

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September 28, 1984

Mr. Abe J. Kirkorian, President; and
Members of the Village Board of Trustees
and Members of the Village Plan Commission
Village of Sturtevant
2555 Wisconsin Avenue
Sturtevant, Wisconsin 53177

Ladies and Gentlemen:

By letter dated July 19, 1984, the Village of Sturtevant requested the Southeastern Wisconsin Regional Planning Commission to undertake a study of fire station needs in the Village. The study was initiated in July and completed in September 1984. The findings and recommendations of the study are presented in this report.

In addition to setting forth a fire station building program extending to the year 2000 and identifying a recommended site for a new fire station, this report presents pertinent information on the existing and probable future village fire department service area; historic fire occurrence and fire hazard occupancies in the Village; the existing fire station; existing and probable future fire-fighting and rescue equipment needs; and fire station location and site design criteria. The report identifies and evaluates seven alternative fire station sites, and provides a fire station building construction cost estimate and a proposed site plan for the recommended fire station site. In addition, land costs associated with each of the seven alternative sites examined are presented.

The Regional Planning Commission is appreciative of the assistance offered by the Village Plan Commission, the Sturtevant Volunteer Fire Department, and the Village Clerk in the preparation of this report.

The Commission staff stands ready to assist village officials in presenting the information and recommendations contained in this report to the public for its review and evaluation, and in the adoption and implementation of the recommendation made herein.

Sincerely,

Kurt W. Bauer
Executive Director

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Chapter I

INTRODUCTION

On July 19, 1984, the Village of Sturtevant requested that the staff of the Southeastern Wisconsin Regional Planning Commission undertake a study of fire stations in the Village. The study was to include the following work elements: 1) an inventory of current fire protection services; 2) a review of fire protection needs in the Village, including a review of fires in the Village over the recent past; 3) the identification of existing and probable future needs for fire stations; 4) the development of locational and site design criteria for the fire stations; 5) the conduct of alternative fire station location and site evaluations; and 6) the development of a fire station site and building program. The Commission staff has completed the requested study, and this report presents the findings and recommendations of that study.

THE VILLAGE OF STURTEVANT FIRE DEPARTMENT SERVICE AREA

The Village of Sturtevant Fire Department service area is shown on Map 1 and consists of all of the area within the corporate limits of the Village. According to the Fire Chief as of July 1984, the Village had mutual aid agreements with surrounding communities.

HISTORIC FIRE OCCURRENCE IN THE VILLAGE FIRE DEPARTMENT SERVICE AREA

Map 1 shows the location of fires in the Village of Sturtevant during the 10-year period from July 1, 1974 to June 30, 1984. The map indicates that the fires in the Village have been dispersed throughout the Village, with a slightly higher concentration in the eastern part of the Village near and around Durand Avenue (STH 11). This area may be defined as a medium hazard area composed of mostly retail sales and service establishments, and high-density multiple-family housing. Table 1 shows the total number of fire and rescue equipment calls in the Village by year from 1974 to 1984. The average number of fire calls per year has been about 58 and the average number of rescue calls per year has been about 176. The total fire calls for this 10-year period was 577, and the total number of rescue calls, 1,760.

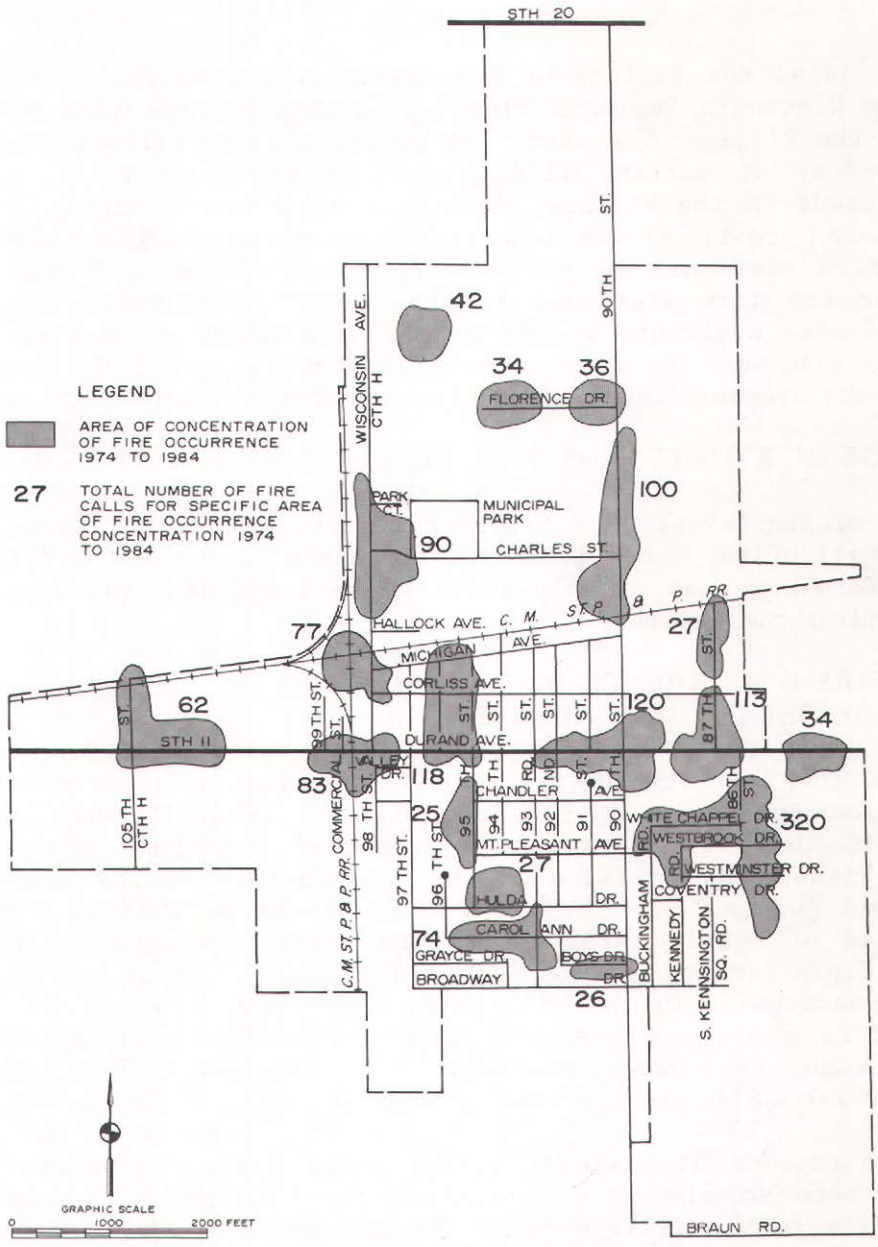
Since concentrations of historic fires in the Village over the last 10-year period have been so dispersed throughout the Village, the proper siting of a fire station in the Village cannot be determined by these data alone. Other data such as the location of high and medium hazard occupancies, the forecast year 2000 urban service area of the Village, and applicable fire station locational standards must be examined.

HIGH, MEDIUM, AND LOW HAZARD OCCUPANCY AREAS IN THE VILLAGE OF STURTEVANT

The National Fire Protection Association (NFPA) has developed a classification system for analyzing occupancies related to fire hazard. The NFPA classification system provides for three hazard classes for urban areas, termed high,

Map 1

THE VILLAGE OF STURTEVANT FIRE DEPARTMENT SERVICE AREA AND CONCENTRATIONS OF FIRE OCCURRENCE : 1974 to 1984



Source: Village of Sturtevant Volunteer Fire Department and SEWRPC.

Table 1

FIRE OCCURRENCE CALLS AND RESCUE SQUAD CALLS IN THE VILLAGE OF STURTEVANT JULY 1, 1974 to JUNE 30, 1984

Year	Number of Fire Calls	Number of Rescue Calls	Total Calls[c]
1974[a]	25	84	109
1975	49	163	212
1976	81	189	270
1977	68	157	225
1978	53	176	229
1979	86	186	272
1980	55	193	248
1981	52	181	233
1982	39	157	196
1983	39	187	226
1984[b]	30	87	117
Total	577	1,760	2,337

[a]July 1, 1974 to end of year only.

[b]January 1, 1984 to June 30, 1984 only.

[c]These figures include mutual aid calls to Racine, Mt. Pleasant, and Union Grove.

Source: Greg Havel, Assistant Fire Chief, Sturtevant Volunteer Fire Department.

medium, and low. High hazard occupancies include uses such as schools, hospitals, nursing homes, explosive plants, refineries, high rise buildings, and other high hazard or large fire potential occupancies. Medium hazard occupancies include apartments, offices, and mercantile and industrial occupancies not normally requiring extensive rescue or fire-fighting forces. Low hazard occupancies include one-, two-, or three-family dwellings and scattered small business and industrial occupancies.

Map 2 illustrates the location of high, medium, and low hazard areas in the Village. As shown on Map 2, the high hazard areas are located in the far northern, the central, and the far eastern areas of the Village. Medium hazard areas are located primarily along Durand Avenue (STH 11) and consist of concentrations of commercial, industrial, and multiple-family residential uses. The low hazard areas occupy the balance of the Village developed as one-, two-, or three-family dwellings.

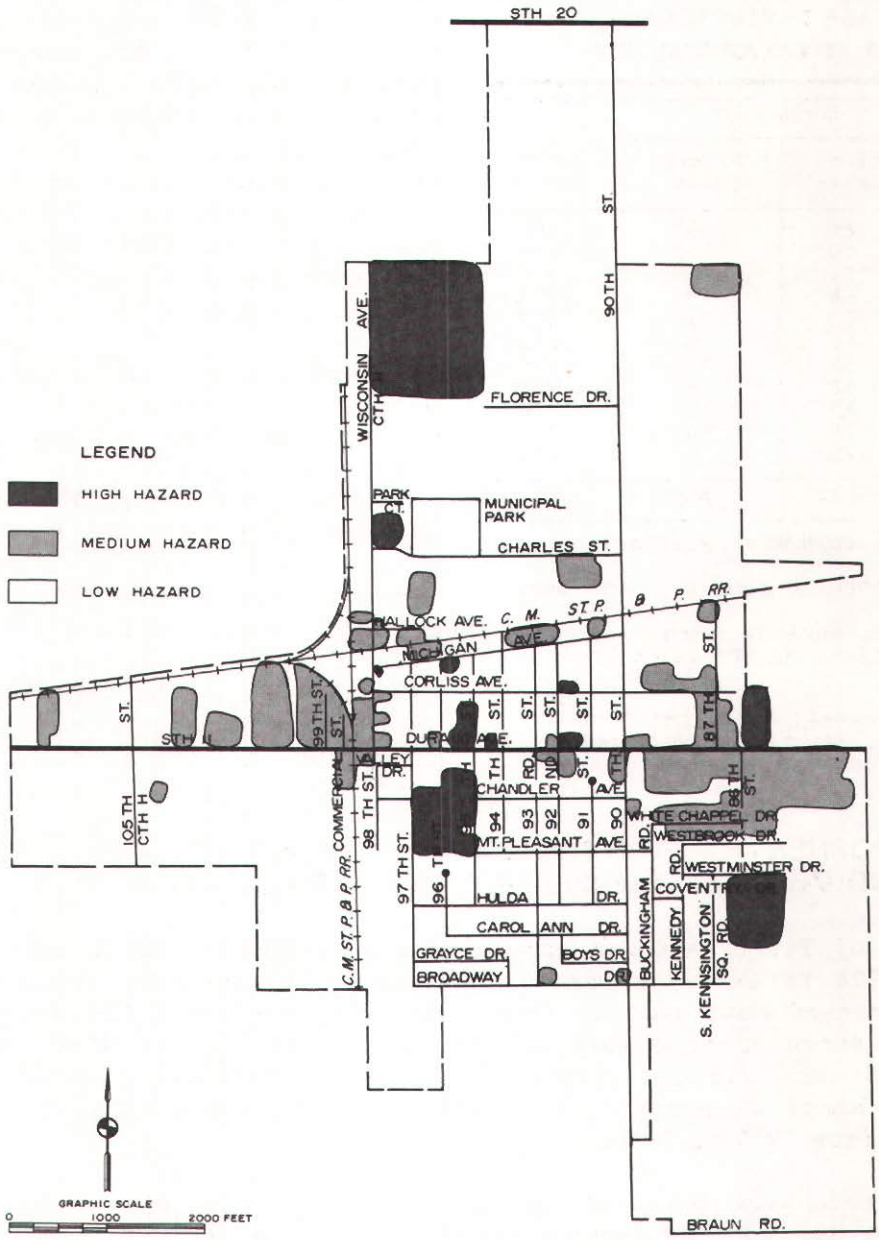
RESIDENT POPULATION AND POPULATION CHANGE FOR THE VILLAGE AND VILLAGE FIRE DEPARTMENT SERVICE AREA

The Village of Sturtevant has experienced a steady growth in resident population from 1920 to 1980, as shown in Table 2. The resident population of the Village increased most rapidly from 1960 to 1970--from 1,488 persons to 3,376 persons, an increase of almost 127 percent. From 1970 to 1980, the resident population of the Village increased from 3,376 persons to 4,130 persons, an increase of about 22 percent, and similar to the more moderate growth rate experienced from 1950 to 1960.

Population forecasts prepared by the Regional Planning Commission for the Village under the adopted regional land use plan assume a continuation of this more moderate population growth rate into the near future. The resident population of the Sturtevant urban service area may accordingly be expected to increase from 4,130 persons in 1980 to about 5,300 in 1990, an increase of about 1,200 persons, or about 29 percent; and from about 5,300 persons in 1990 to about 6,560 persons by the year 2000, an increase of about another 1,200 persons, or about 23 percent. Table 3 shows the size the of historic and forecast Village of Sturtevant urban service area from 1900 to 2000. The table shows that from 1970 to 1980, the Village increased in area from 1.5 square miles to 2.1 square miles, an increase of 0.6 square mile, or about 40 percent. The table shows this trend to continue to the year 2000, with an increase of

Map 2

THE LOCATION OF HIGH, MEDIUM, AND LOW HAZARD OCCUPANCY IN THE VILLAGE OF STURTEVANT: 1980



Source: SEWRPC.

Table 2

HISTORIC AND FORECAST POPULATION FOR THE VILLAGE OF STURTEVANT AND STURTEVANT URBAN SERVICE AREA, RACINE COUNTY, WISCONSIN

Year	Population	Incremental Change	Percent of Population Change From Previous Period
1900	--[a]	--	--
1910	525	--	--
1920	564	39	7.4
1930	746	182	32.2
1940	803	57	7.6
1950	1,176	373	46.5
1960	1,488	312	26.5
1970	3,376	1,888	126.9
1980	4,130	754	22.3
1990	5,345[b]	1,215	29.4
2000	6,560[b]	1,215	22.7

[a]In 1907, the unincorporated Village of Corliss (which in 1923 changed its name to Sturtevant) was incorporated from a part of the Town of Mt. Pleasant.

[b]Forecast based upon adopted regional land use plan urban service area for Sturtevant.

Source: U. S. Bureau of the Census and SEWRPC.

Table 3

HISTORIC AND FORECAST VILLAGE OF STURTEVANT URBAN SERVICE AREA: 1900 to 2000

Year	Area (square miles)	Incremental Area Change (square miles)	Percent of Area Change From Previous Period
1900	--[a]	--	--
1920	1.3	1.3	100.0
1940	1.3	--	--
1950	1.3	--	--
1960	1.5	0.2	15.4
1970	1.5	--	--
1980	2.1	0.6	40.0
1990	2.6	0.5	23.8
2000	3.2	0.6	23.1

[a]In 1907, the unincorporated Village of Corliss (which in 1923 changed its name to Sturtevant) was incorporated from a part of the Town of Mt. Pleasant.

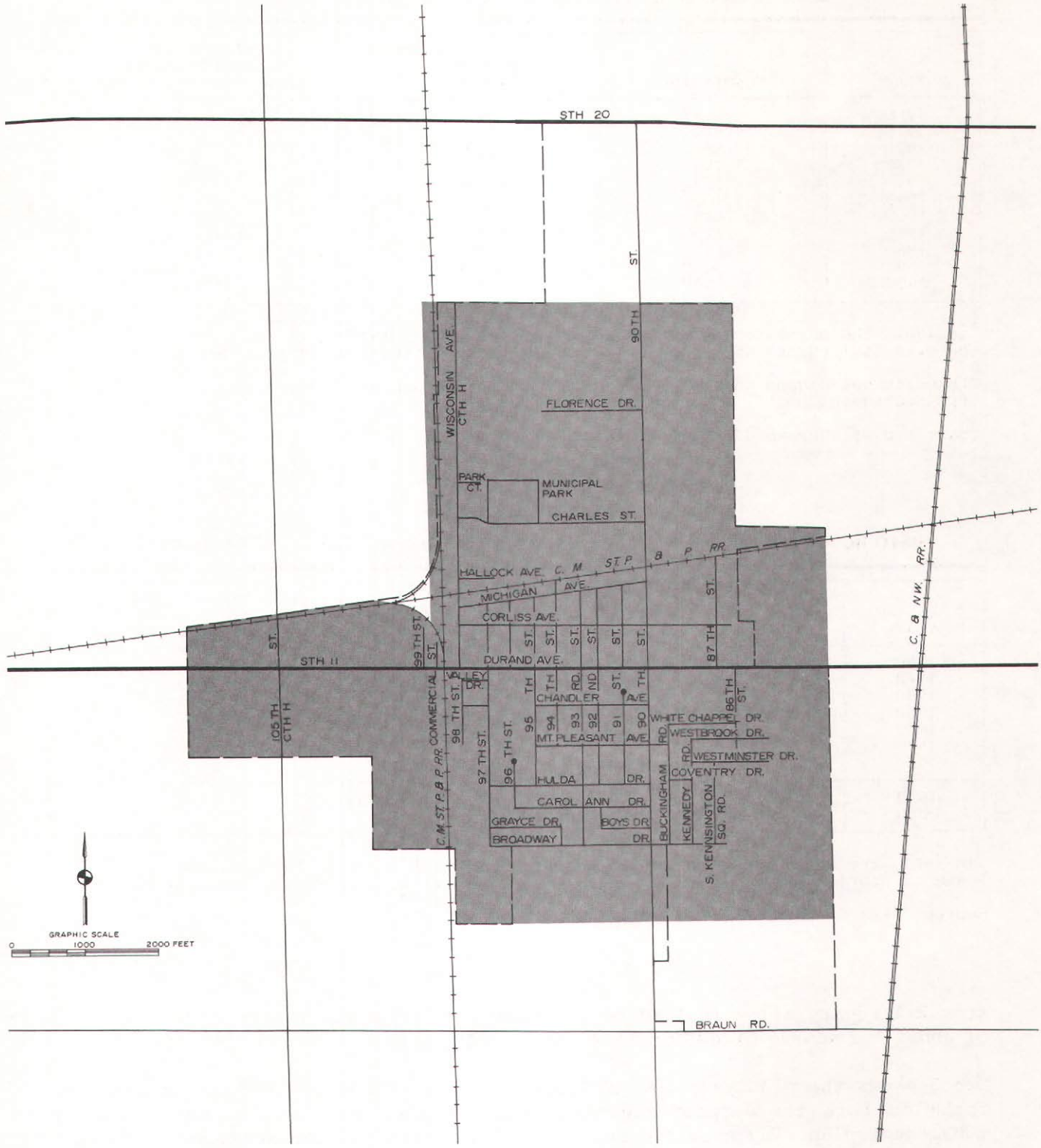
Source: SEWRPC.

from 2.1 square miles in 1980 to 3.2 square miles in the year 2000--an increase of about 1.2 square miles, or about 52 percent, over the 20-year period.

Map 3 shows the plan year 2000 Village of Sturtevant urban service area as set forth in both the adopted regional land use plan and areawide water quality management plan. The expected population increases and the attendant expansion of the Sturtevant urban area would increase the need for good fire-fighting equipment and facilities to house the equipment. The probable future growth of the Village dictates that the future requirements, as well as present requirements, for fire protection facilities be analyzed.

Map 3

FORECAST YEAR 2000 VILLAGE OF STURTEVANT URBAN SERVICE AREA



Source: SEWRPC.

EXISTING PLANS AND VILLAGE FIRE PROTECTION

In 1970-1972 the Regional Planning Commission prepared SEWRPC Planning Report No. 14, A Comprehensive Plan for the Racine Urban Planning District, with the assistance of Harland Bartholomew and Associates, Planning Consultants. The plan addressed existing as well as anticipated urban development in the Racine Urban Planning District, of which the Village of Sturtevant is a part. The District includes all of that area of Racine County lying east of IH 94, and consists of 101 square miles of land encompassing seven general-purpose local units of government, including the City of Racine; the Villages of Elmwood Park, North Bay, Sturtevant, and Wind Point; and the Towns of Caledonia and Mt. Pleasant. In addition to addressing the pattern of urban development in the District, the plan addressed public facility requirements for the District, including existing and anticipated fire protection.

The District plan concluded that a one-and-one-half-mile travel time for fire protection should be adequate in urbanized areas and that, for the Village of Sturtevant and its immediate urban area, a single fire station, as already existing in the Village, should be adequate to meet fire protection needs to the year 1990. The plan did not address the potential need for the expansion of the existing village fire station to accommodate the additional equipment which would be required to service the anticipated population and urban service area. There are no other known documented plans regarding the provision of fire protection services for the Village.

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Chapter II

EXISTING VILLAGE FIRE STATION FACILITIES, EQUIPMENT, AND EQUIPMENT NEEDS

THE EXISTING VILLAGE FIRE STATION AND ITS SITE

The existing Village of Sturtevant fire station is an approximately 4,770-square-foot, one-story concrete block building situated on a site approximately 15,000 square feet, or 0.34 acre, in area. The station is located on the southeast corner of the intersection of Michigan Avenue and 96th Street. The building is in need of repair to both the roof and exterior walls, and is too small to properly accommodate existing fire-fighting equipment. In addition, the site of the existing fire station is not large enough to accommodate present firefighter parking needs and future building expansion needs. The allocation of space within the existing fire station building is set forth in Table 4.

Table 4

EXISTING VILLAGE OF STURTEVANT FIRE STATION SPATIAL ALLOCATIONS

Use	Floor Area (square feet)	Percent of Total
Apparatus Room.....	3,620	75.9
Meeting Room.....	770	16.2
Kitchen Unit.....	140	2.9
Office.....	140	2.9
Restroom (1 only)...	100	2.1
Total	4,770	100.0

Source: SEWRPC.

EXISTING 1984 AND FORECAST YEAR 2000 FIRE-FIGHTING AND RESCUE VEHICLE NEEDS

In 1984, the Sturtevant Volunteer Fire Department owned and operated four fire-fighting vehicles and two rescue squads. The four fire trucks consisted of a 1976 Ford Pirsch, 1,000-gallon-per-minute (gpm) pumper truck; a 1968 Ford 1,000-gpm pumper truck; a 1948 IHC 500-gpm pumper truck (reserve status); and a 1941 Pirsch 65-foot aerial ladder truck. The two rescue squads consisted of a 1968 IHC van and a 1977 Dodge van. The 1984 village fire-fighting equipment is listed in Table 5, along with the number of fire-fighting personnel per vehicle and the total number of fire-fighting personnel by vehicle type.

Table 5 also shows the year 2000 fire-fighting and rescue squad vehicle needs based, in part, upon consideration of the forecast year 2000 resident population of approximately 6,560 persons in the Sturtevant urban service area; the plan year 2000 urban service area of 3.2 square miles; the recommended standards of the National Fire Protection Association (see Table 8 of Chapter IV); and a recent 1984 fire department needs analysis prepared by the Sturtevant Volunteer Fire Department and the Village Plan Commission. As shown in Table 4, by the year 2000 the Sturtevant Volunteer Fire Department may be expected to require 10 vehicles, including four pumper trucks, two reserve pumper trucks, one aerial ladder truck, and three rescue squads. A total of 54 fire-fighting personnel would be required to man these 10 vehicles.

Table 5

EXISTING 1984 AND FORECAST YEAR 2000 VILLAGE OF STURTEVANT FIRE-FIGHTING AND RESCUE VEHICLES

Type of Vehicle	Existing 1984 Vehicles			Forecast Year 2000 Vehicles			1984 to 2000 Vehicle Increment
	Quantity	Number of Personnel per Vehicle	Total Number of Personnel per Vehicle Type	Quantity	Number of Personnel per Vehicle	Total Number of Personnel per Vehicle Type	
Pumper Truck.....	2	5	10	4	5	20	2
Reserve Pumper Truck...	1	5	5	2	5	10	1
Aerial Ladder Truck....	1	6	6	1	6	6	0
Rescue Squad.....	2	6	12	3	6	18	1
Total	6	--	33	10	--	54	4

Source: SEWRPC.

Chapter III

ARCHITECTURAL PROGRAMMING OF THE VILLAGE FIRE STATION

INTRODUCTION

Architectural programming is a process leading to the statement of a specific architectural design problem and the determination of the spatial requirements to be met in the solution to the problem. Architectural programming for the needs and spatial requirements of a new Village of Sturtevant fire station constitutes, in effect, problem definition; while the ultimate architectural design of the building is the solution to the defined problem. Since it is necessary to know the spatial needs and requirements of the Village of Sturtevant Fire Department in order to select a site which will meet these needs, a building program was formulated. The program is based, in part, upon data obtained by the Commission staff from both the Village Plan Commission and Sturtevant Volunteer Fire Department.

FIRE STATION FUNCTIONAL SPACES

Apparatus Room

The apparatus room is the heart of a fire station; it houses the fire-fighting vehicles, rescue vehicles, and related equipment. Through its size, layout, and location, the apparatus room should allow vehicles to respond quickly to fire calls. Ideally, each vehicle should have direct access to a street. The apparatus room should house pumper equipment and aerial fire trucks, rescue squads, a hose dryer and/or hose rack, boot and fire equipment storage racks, the rescue equipment storage area, and a vehicle repair bay and shop. Desirably, the apparatus room should be able to be expanded as new equipment is acquired. Ample space is needed around each vehicle to permit cleaning and repair work and changing of fire hoses, and to provide room for fire-fighters to put on fire clothing during a fire response and to move freely during a fire response.

Watch Desk-Communications Area

The watch desk-communications area is the nerve center of the fire station. All communications are maintained here. The telephone, signaling devices, alarm equipment, and various other types of communications devices should be conveniently located and arranged in a compact, orderly manner. Ready access to this area should be available for incoming fire-fighters from an adjacent onsite parking area.

Fireman Meeting Room-Classroom Area and Kitchen Unit

A meeting and classroom area should be provided with a minimum capacity of 60 seated persons. This area is intended to be used both as a fire-fighter training classroom and as a general meeting room for village-sponsored activities. Since this space is intended to function as a general meeting room,

a kitchen unit should be provided. The room should also provide for direct access from the outdoors, as well as from the apparatus room in order to limit conflicts with meeting room uses and fire-fighting activities. A coat rack or closet and table/chair storage area should be provided. This area could also function as an operations center for the Village Fire Department during an emergency.

Fire Chief's Office

From the Fire Chief's office, the Fire Chief can efficiently administer the Village Fire Department. Suitable office furniture such as desks, chairs, file cabinets, shelves, and coat and supply closets should be provided.

Fire Inspector's-Investigator's Office

The Fire Inspector's-Investigator's office should serve as the administration center for fire inspections and investigations. Suitable office furniture such as desks, chairs, file cabinets, shelves, and coat and supply closets should be provided.

Lavatories/Restrooms

Lavatories and restrooms for both men and women should be provided in accordance with the Wisconsin Building Code.

Janitor Closet

Space for a janitor's closet, including equipment storage and mop sink, with access to the outdoors should be provided.

Mechanical Equipment Room

A mechanical equipment room may be necessary for heating, ventilating, air conditioning, and water heating, depending upon the type of systems selected for the fire station. Fire department needs may dictate special backup electrical systems in case of power failure.

THE VILLAGE FIRE STATION BUILDING PROGRAM

One of the most important functions of an architectural building program is to provide a consolidated listing of all the building facility requirements believed necessary to serve the forecast need to specified design years, in this case, the years 1984 and 2000. The definition of building space needs in the architectural program forms the basis for determining land and site requirements, as well as for preparing detailed cost and budget estimates for the construction of the facilities.

An architectural building program and site location analysis for a municipal fire station should provide the following information:

1. A statement of the objectives of the architectural program and building facility as discussed in Chapter I. In addition, forecasts of user populations and service areas concerned should be presented.

Table 6

THE BUILDING PROGRAM

Functional Area	Phase I (square feet)	Phase II (square feet)	Total (square feet)
Apparatus Room			
Vehicular Space:			
Pumper Trucks (4) (each truck should have a minimum storage bay area of 16 feet x 35 feet = 560 square feet).....	1,120	1,120	2,240
Reserve Pumper Trucks (2) (each truck should have a minimum storage bay area of 16 feet x 35 feet = 560 square feet).....	560	560	1,120
Aerial Ladder Truck (1) (minimum storage bay area should be 20 feet x 50 feet = 1,000 square feet).....	1,000	0	1,000
Rescue Squads (3) (minimum storage bay area should be 20 feet x 34 feet = 680 square feet).....	1,360	680	2,040
Support Equipment Space:			
Truck Service Bay (1) (minimum bay area of 16 feet x 35 feet = 560 square feet).....	560	0	560
Boot and Fire Equipment Storage Rack.....	100	0	100
Hose-Drying Rack Tower.....	100	0	100
Repair Shop Area.....	100	0	100
Rescue Squad Storage Rack.....	60	0	60
Subtotal	4,960	2,360	7,320
Watch Desk-Communications Area	35	0	35
Subtotal	35	0	35
Fireman Meeting Room/Classroom Area and Kitchen Unit			
The combined general meeting room and fireman classroom area should provide for a maximum of 60 persons providing 20 square feet per person; the room should have access from outdoors.....	1,200	0	1,200
Coat Rack-Closet.....	40	0	40
Table-Chair Storage.....	30	0	30
Kitchen Unit.....	50	0	50
Subtotal	1,320	0	1,320
Fire Chief's Office			
Office.....	90	0	90
Coat Closet.....	10	0	10
Supply Closet.....	15	0	15
Subtotal	115	0	115
Fire Inspector's-Investigator's Office			
Office.....	90	0	90
Coat Closet.....	10	0	10
Supply Closet.....	15	0	15
Subtotal	115	0	115

Table 6 (continued)

Functional Area	Phase I (square feet)	Phase II (square feet)	Total (square feet)
Lavatories-Restrooms			
Women			
Two Water Closets and Two Lavatories	125	0	125
Men			
Two Lavatories and Two Showers	250	0	250
Drinking Fountain	10	0	10
Subtotal	385	0	385
Janitor's Closet			
The janitor's closet should have room for storage, a mop sink, and equipment, and should provide access to outdoors	50	0	50
Subtotal	50	0	50
Mechanical Equipment Room			
The mechanical equipment room should serve the meeting/ classroom, offices, and lavatories, and could include a backup electrical system; the apparatus room will probably be served by ceiling hung units	90	0	90
Subtotal	90	0	90
Total Building Space Needs	7,070	2,360	9,430

Site Minimum Requirements	Phase I (square feet)	Phase II (square feet)	Total (square feet)
Building Area	7,070	2,360	9,430
Off-Street Automobile Parking (for Phase I 40 autos; for Phase II an additional 20 autos for a total of 60 autos. Each auto to have 375 square feet, including circulation space)	15,000	7,500	22,500
Outside Maintenance/Apron Area (two required--one for ingress area and one for egress area of fire station)	4,800	3,200	8,000
Landscaping and Setback Area (15 percent of building area and off-street automobile parking	3,310	1,480	4,790
Total Minimum Site Space Needs	30,180	14,540	44,720

Source: SEWRPC.

2. An examination of the building facilities and equipment currently serving the user population and of forecast building and equipment needs as discussed in Chapter II.

3. Forecasts of building facility spatial needs, including not only the needs of the building itself but also attendant land and parking requirements and construction phasing requirements for both short-term 1984 and the year 2000 as discussed in this chapter.

4. Locational and site design criteria for the fire station, as presented in Chapter IV.

5. An alternative site evaluation and site selection as presented in Chapter V.

6. The budget or cost estimate analysis as discussed in Chapter VI.

7. The conceptual organization of the building facilities, including the relative location and functional relationship of spaces and their relationship to the site, as discussed in Chapter VII.

The building program outlined herein consists of two phases of construction. Phase I construction, as defined in Table 6, would accommodate the 1984 spatial needs of a new fire station. Phase II construction, also as defined in Table 6, would accommodate the additional space needs of the design year 2000 at the same site. The fire station building should consist of eight functional areas, which, as described earlier, consist of an apparatus room; watch desk-communications area; fireman meeting room-classroom area and attendant kitchen unit; Fire Chief's office; Fire Inspector's/Investigator's office; lavatories/restrooms; janitor's room; and mechanical equipment room. Each of these general functional areas is further defined by its component subspaces and forecast square foot needs assigned for both Phase I and Phase II building construction.

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Chapter IV

FIRE STATION LOCATIONAL AND SITE DESIGN CRITERIA

INTRODUCTION

The proper location of public fire station sites requires agreement on locational and site design criteria. In this respect, locational and site design criteria may be defined as a body of information which can be applied to help determine the proper siting of fire stations. The locational and site design criteria must be very specific in order to be of assistance in the site location process.

FIRE STATION LOCATIONAL CRITERIA

Distribution of Fire Stations

The location of fire stations should permit quick response into high-risk areas without depleting other areas of the community of protection should a second fire occur. Stations should be located near extensive industrial or business districts, near districts where there is a high hazard to human life, and near areas which have experienced high rates of past fire occurrence. The spacing of stations should vary in relation to population densities, building intensities, types of building construction, the pattern of trafficways, and the relative degree of fire hazard. Based on these locational requirements, fire stations and equipment should be distributed to meet the travel distance standards set forth in Table 7, or generally within a one-and-one-half-mile radius of all existing and forecast fire hazard occupancy areas.

Equipment Distribution and Fire Equipment Response Capability

Fire equipment response capability should conform to the requirements set forth in Table 8.

Volunteer Fire-Fighters

Fire stations should not be located on the basis of where volunteer firefighters live or work in order to facilitate quick response, since the location of volunteer staff may change over time.

Man-Made and Natural Barriers

Fire stations should be located to avoid natural or man-made barriers between the stations and their service areas that may require time-consuming detours to reach the primary fire station service area.

When locating a fire station at or near a hill, the site selected should be at the crest of the hill rather than at the bottom, with the fire station exit being downhill in order for fire trucks to gain speed easily. However, good sight distances while egressing the site should be maintained.

Table 7

FIRE COMPANY DISTRIBUTION STANDARDS

District and Required Fire Flow	Optimum Service Radius in Miles	
	From Engine, Hose, or Engine-Ladder Company	From Ladder Company
High-Value District (commercial, industrial, and institutional)		
Where required flow is 9,000 gpm or more.....	3/4	1
Where required flow is 5,000 to 8,999 gpm.....	1	1 1/4
Where required flow is less than 4,500 gpm.....	1 1/2	2
Residential District		
Where required flow is more than 2,000 gpm, or where there are buildings in the district three or more stories in height, including tenement houses, apartments, or hotels.....	1 1/2	2
Same as above, but where the life hazard is above normal.....	1	1 1/4
For buildings having an average separation of less than 100 feet (and a fire flow requirement of 2,000 gpm or less).....	2	3
For buildings having an average separation of 100 feet or more (and a fire flow requirement of 2,000 gpm or less).....	4	4

NOTE: The above distances should be considered as direct street travel distances. Also, the above distances should be reduced if a severe hazard to life exists; if streets are narrow or in poor condition; if traffic, one-way streets, topography, or other unusual conditions hinder response; or if other circumstances peculiar to the district or municipality indicate that such a reduction is needed.

Source: SEWRPC.

Heavily Traveled and One-Way Streets

The positioning of fire stations along heavily traveled arterial streets and highways, or along a one-way street, is undesirable because of difficulties entailed in fire vehicle access and traffic control during a response, and the limitations placed upon response routes. A desirable location is on a street which runs parallel to or across a major thoroughfare such as a collector street which is close to and leads into the arterial facilities.

Travel Time

Fire stations should be located so that the first arriving fire-fighting vehicle may be at the scene of the emergency anywhere in the service area within no more than five minutes of the sounding of the alarm.

Arterial Intersections

Fire stations should not be located so close to arterial street intersections that traffic backups may prevent fire equipment from leaving the station. Fire stations should, however, be located near enough to arterial street intersections to permit a fire response in more than two directions, depending upon the orientation of the fire station on the site.

Table 8

EVALUATION OF FIRE DEPARTMENT RESPONSE CAPABILITY

HIGH HAZARD OCCUPANCIES: Schools, hospitals, nursing homes, explosive plants, refineries, high-rise buildings, and other high life hazard or large fire potential occupancies At least four pumpers, two ladder trucks, two officers, and specialized apparatus as may be needed to cope with the combustibles involved; no fewer than 24 fire-fighters and two officers
MEDIUM HAZARD OCCUPANCIES: Apartments, offices, mercantile and industrial occupancies not normally requiring extensive rescue or fire-fighting forces At least three pumpers, one ladder truck, one officer, and specialized apparatus as may be needed or available; no fewer than 16 fire-fighters and one officer
LOW HAZARD OCCUPANCIES: One-, two-, or three-family dwellings and scattered small business and industrial occupancies At least two pumpers, one ladder truck, one officer, and specialized apparatus as may be needed or available; no fewer than 12 fire-fighters and one officer
RURAL OPERATIONS: Scattered dwellings, small businesses and farm buildings At least one pumper with a large water tank (500 or more gallons), one mobile water supply apparatus (1,000 gallons or larger), and specialized apparatus as may be necessary to perform effective initial fire-fighting operations; at least six fire-fighters and one officer
ADDITIONAL ALARMS: At least the equivalent of those required for Rural Operations for second alarms; equipment as may be needed according to the type of emergency and capabilities of the fire department. This may involve the immediate use of mutual aid companies until local forces can be supplemented with additional off-duty personnel.

Source: Gordon P. McLommem and Keith Tower (eds.), Fire Protection Handbook: Fourteenth Edition (Boston: National Fire Protection Association, 1976, pp. 9-76.

FIRE STATION SITE DESIGN CRITERIA

Area of Site

Fire station sites should be large enough to accommodate the fire station building program needs under present as well as design year requirements.

Setback

A minimum building setback of 30 feet from street right-of-way lines should be provided to ensure good visibility by vehicle drivers while departing from the fire station.

Side Yards

Minimum side yards of 25 feet should be provided.

Outside Maintenance-Apron Area

The minimum depth of the outside paved maintenance area or "apron" at the ingress and egress ends of the fire station apparatus room should be 50 feet, and the minimum width should be such as to extend the apron across the cumulative length of the egress doors for vehicles.

Outside Fireman Training Area

An outside training area of at least 5,000 square feet should be provided. The outside maintenance area or "apron" and parking area can serve this purpose if no special area for this function is provided at the fire station site.

Lot Frontage Width Onto Streets

A minimum lot frontage of 100 feet should be provided for a single fire company, and an additional 30 feet of frontage should be provided for each additional fire company.

Fire Station Orientation on the Site for Vehicular Ingress

The fire station should be placed on the site so that vehicles can be driven through a separate fire station entrance for station ingress rather than backed in through the exit doors of the station.

Landscaping

The fire station site should be large enough to allow for attractive and functional landscaping. Landscaping should be provided to minimize annoyance of station operations to neighboring uses.

The fire vehicle access street or streets should have a minimum pavement width of 36 feet in order to allow adequate space for fire vehicle turning movements.

Off-Street Parking Lot

Off-street parking should be provided near the front of the fire station to facilitate fast access by volunteer fire-fighters. Parking should be provided at the rate of one parking space for each fire-fighter necessary to man each piece of equipment housed at the station. A minimum of 375 square feet of parking area should be provided per automobile, including circulation space for the vehicle.

On-Street Parking

On-street parking should be restricted within 150 feet of the fire station exit since parked vehicles on streets near fire stations can hamper fire vehicle egress from the station. On-street parking of fire-fighters' privately owned vehicles should be prohibited.

Drives for Fire Trucks and Automobiles

Fire truck service drives on the fire station site should have a minimum width of 16 feet for one-way traffic and 32 feet for two-way traffic. Automobile drives on the site should have a minimum width of 12 feet for one-way traffic and 24 feet for two-way traffic..

Onsite Fire Station Buffering From Neighboring Land Uses

The fire station should be effectively buffered from adjacent, incompatible land uses such as residential and commercial uses by means such as distance, landscaping, or fencing.

Chapter V

ALTERNATIVE FIRE STATION SITES AND A NONECONOMIC FIRE STATION SITE SELECTION EVALUATION

ALTERNATIVE FIRE STATION SITES

Chapter I described both the existing and forecast year 2000 village urban service areas. The 1980 urban service area was shown to be about 2.1 square miles in area and about 2.5 miles across between its farthest points. The forecast year 2000 urban service area was shown to be about 3.2 square miles in area and about 3.0 miles across between its farthest points. Using the fire station distribution standard contained in Chapter IV which states that fire stations should be distributed generally within a one-and-one-half-mile radius of all existing and forecast fire hazard occupancy areas, it was determined that the Village could be adequately served by one relatively centrally located fire station within the forecast year 2000 urban service area.

That portion of the Chicago, Milwaukee, St. Paul & Pacific Railroad (Milwaukee Road) right-of-way which extends in an east-west direction through the Village is used to provide limited local railway freight service to industrial users located east of the Village in the Town of Mt. Pleasant, that service operated on the average of less than once a week. Accordingly, this segment of the railway poses no significant restrictions to the free passage of fire trucks or rescue vehicles. That portion of the Milwaukee Road right-of-way which extends in a north-south direction through the Village and located along the western edge of the Village is more heavily utilized for both intercity railway freight and passenger service, and may restrict the free passage of fire trucks or rescue vehicles if a long, slowly moving train blocks Durand Avenue (STH 11). However, there are no high fire hazard areas located west of these tracks. In addition, no significant urban growth is proposed to occur west of these tracks and, as a consequence, a single fire station properly located on a site east of these tracks should adequately serve the year 2000 Sturtevant urban service area.

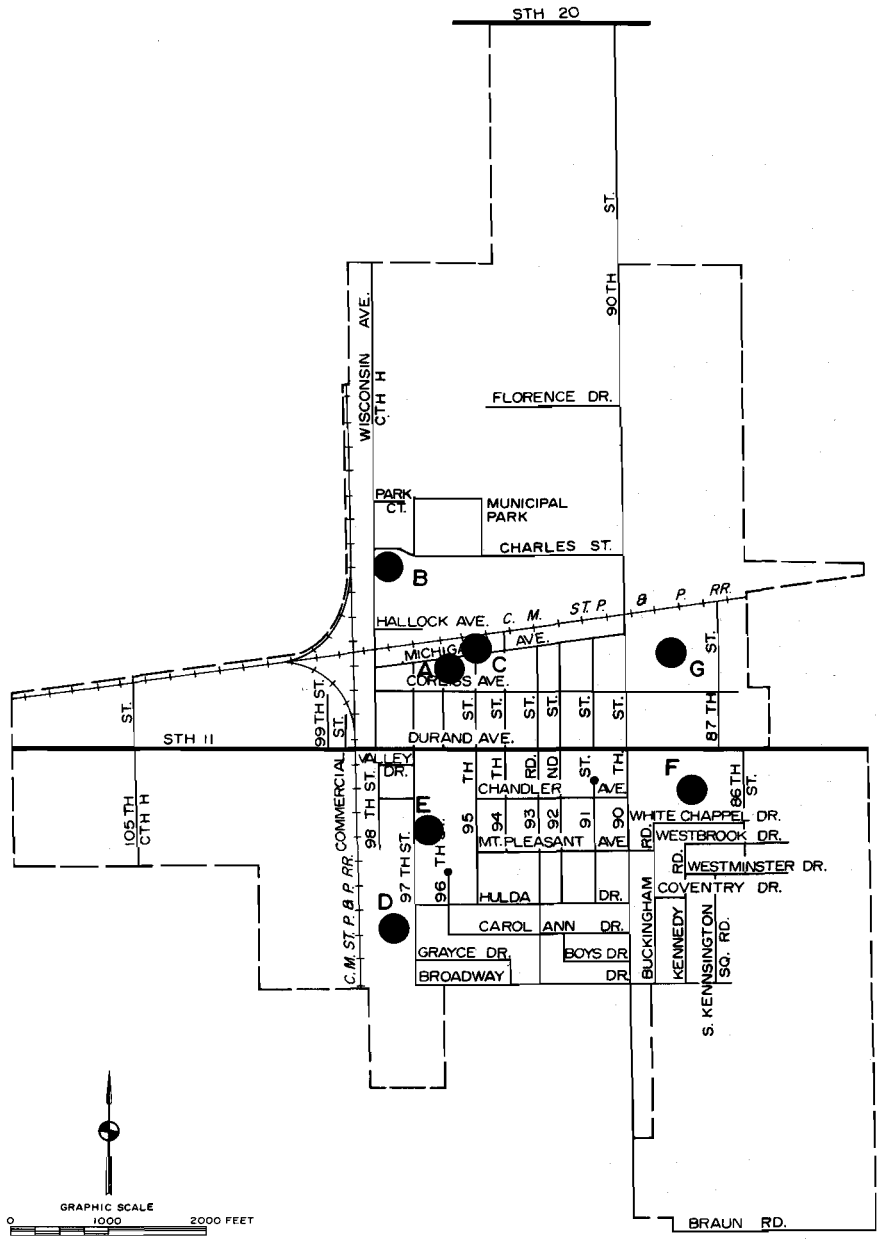
Seven alternative sites located in the Village of Sturtevant were considered as the site of a new fire station. Map 4 shows the location of the seven sites. Each of the seven sites considered is described below in terms of site size, existing zoning, existing structures and vegetation, neighboring land uses, vehicular ingress and egress, topography and drainage, soil characteristics, site microclimate and orientation, visual exposure and identity, and the availability of utilities such as sanitary sewer and water. A locational and site boundary sketch is presented for each site, and the advantages and disadvantages of each site are discussed.

Alternative Site A

Site Size: Site A is the existing village fire station site and is illustrated in Figure 1. Site A is approximately 15,000 square feet, or 0.34 acre, in size, and is located on the north side of the Village on the southeast corner of the intersection of Michigan Avenue and 96th Street. Based on the architectural programming requirements set forth in Chapter III, a total site

Map 4

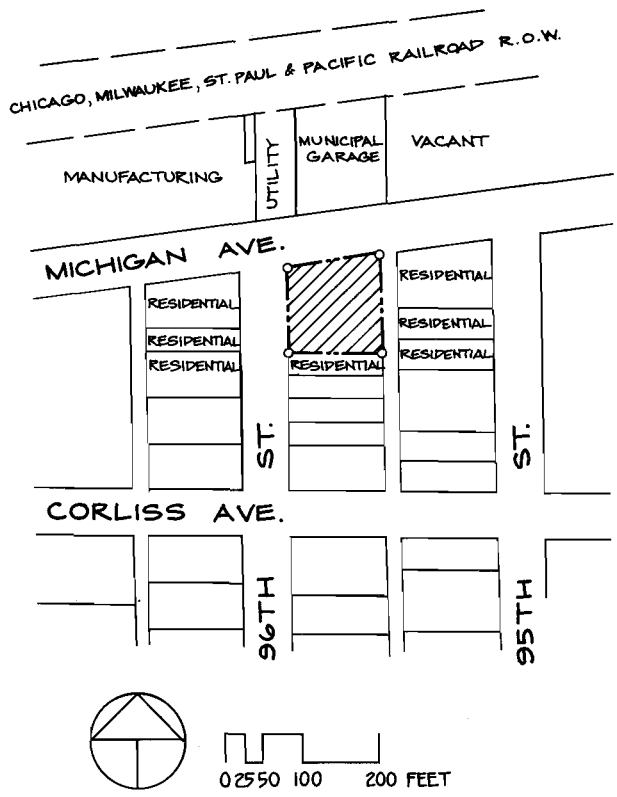
LOCATION OF ALTERNATIVE FIRE STATION SITES IN THE VILLAGE OF STURTEVANT



Source: SEWRPC.

Figure 1

ALTERNATIVE SITE A
(THE EXISTING FIRE STATION SITE)



Source: SEWRPC.

size of about 44,720 square feet is needed in order to meet the year 2000 fire station needs. The existing fire station site is too small to meet these requirements unless adjoining property is acquired by the Village to expand the site area.

Existing Zoning: The site is located in the One- and Two-Family Residence District provided by the village zoning ordinance. Municipal buildings, such as fire stations, are a permitted use in this district.

Existing Structures and Vegetation: There is no significant vegetation presently located on the site.

Neighboring Land Uses:

North - Village Water Department and Municipal Garage
South - Residential (single family)
East - Residential (single family)
West - Residential (single family)

Vehicular Ingress and Egress: Access for fire-fighting vehicles is provided by both Michigan Avenue and 96th Street, which afford easy access to the community.

Topography and Drainage: The site is relatively level, with drainage to the northeast. There are no significant topographic limitations for use of the site for fire station purposes.

Soil Characteristics: The soils of the site are of the Markham silt loam type and pose only moderate limitations for the development of a new fire station.

Site Microclimate and Orientation: Prevailing cold winter winds from the west are hampered somewhat by existing structures and street trees located west of the site. Prevailing summer winds from the southwest are greatly hampered by existing structures and street trees located southwest of the site. Depending upon the height of the new fire station, solar access potential may be hampered from the south because of existing neighboring structures and trees.

Visual Exposure and Identity: The site has good visual exposure and community identity.

Utilities: Sanitary sewer service is provided by an eight-inch-diameter sewer located in 96th Street and a 12-inch-diameter sewer located in Michigan Avenue. Water service is provided by six-inch-diameter mains located in both Michigan Avenue and 96th Street. A 15-inch-diameter storm sewer is located in Michigan Avenue.

Major Disadvantages of the Site:

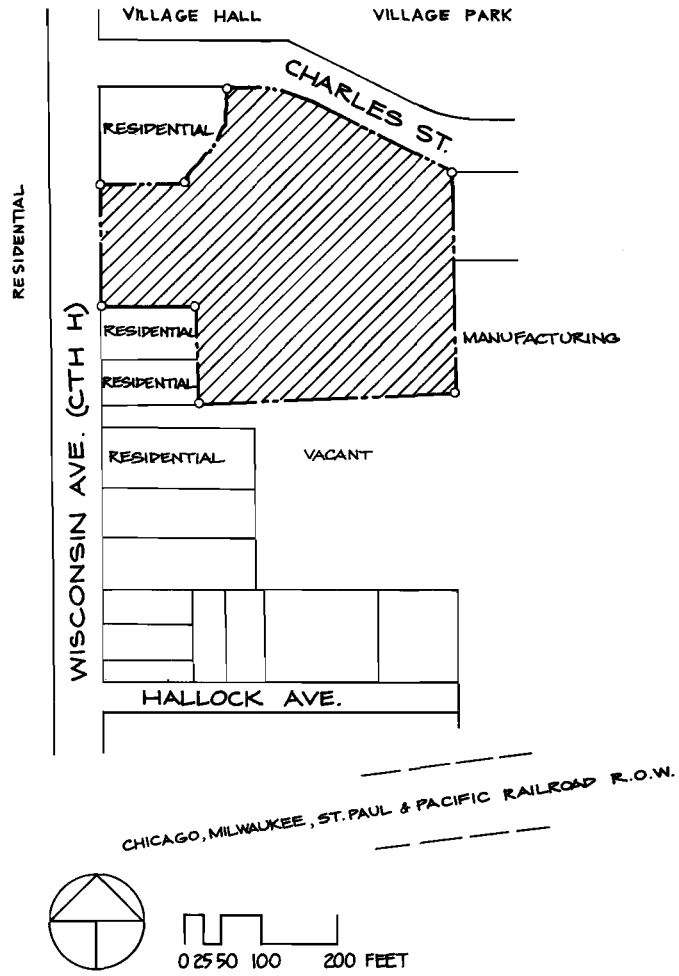
1. Too small to accommodate forecast year 2000 space needs without the acquisition of neighboring parcels of land and the subsequent demolition of buildings situated on those parcels.
2. The demolition of the existing fire station to make way for the new would require the interim housing of the fire-fighting equipment at another facility, which currently does not exist.

Major Advantages of the Site:

1. Provides easy access to the community.

Figure 2

ALTERNATIVE SITE B



Source: SEWRPC.

Alternative Site B

Site Size: Site B is illustrated in Figure 2. Site B is approximately 155,335 square feet, or 3.56 acres, in size and is located on the north side of the Village on the southeast corner of the intersection of Wisconsin Avenue (CTH H) and Charles Street south of the Village Hall. The site is more than adequate in size to accommodate forecast year 2000 fire station site space requirements as discussed in Chapter III. The site shape is irregular, but does allow flexibility in the siting of the fire station and ancillary facilities on the site.

Existing Zoning: The site is currently zoned in three districts of the village zoning ordinance: the One- and Two-Family Residence District, the Business District A, and the Industrial District. Fire stations are permitted in all of these districts.

Existing Structures and Vegetation: Presently the site is vacant with no significant vegetation. There is, however, a significant mound of soil located on the eastern portion of the site.

Neighboring Land Uses:

North - Village Hall and open village parklands
South - Residential (single family) and vacant lands
East - Manufacturing and vacant lands
West - Residential (single family)

Vehicular Ingress and Egress: Vehicular access is provided to the site by both Wisconsin Avenue (CTH H) and Charles Street, thus allowing for excellent access to all parts of the community. Wisconsin Avenue is an arterial street which in 1981 carried an average weekday traffic volume for a 24-hour period of 3,470 vehicles. Charles Street functions as an east-west collector street linking Wisconsin Avenue and 90th Street. Access to the site from its Wisconsin Avenue border would have to be assisted onsite by a bridge or similar means to cross the intermittent stream which traverses that part of the site.

Topography and Drainage: The site is gently sloping to the northwest, with drainage to an intermittent stream traversing the western portion of the site. Associated with the intermittent stream is a narrow 100-year recurrence interval floodplain, but it is the understanding of the Commission staff that the stream is proposed to be enclosed by the Village, thus eliminating this portion of the floodplain. A large man-made mound of earth is located on the eastern side of the site. There are no significant topographic limitations for use of the site for fire station purposes.

Soil Characteristics: The soils of the site are both the Markham silt loam type and the Astalan loam type, the latter being located along the intermittent stream through the site. The Markham silt loam soils pose only moderate limitations for the development of a fire station, while the Astalan loam soils pose severe limitations for the development of a fire station, with high shrink-swell potential, high compressibility, low shear strength, and a high water table. If a fire station were to be developed at the site, the Astalan loam soils would have to be avoided in the building placement.

Site Microclimate and Orientation: Depending upon the placement on the site of the new fire station, prevailing cold winter winds from the west could be hampered somewhat in the northernmost areas of the site because of the location of existing deciduous trees along the intermittent stream. Since these trees are planted parallel to the summer breezes from the southwest, they should not hamper summer winds from cooling the site. Also, depending upon the orientation and height of the fire station, solar access may be hampered because of the general sloping of the site to the northwest away from the sun and its fall from an elevation of about 722 feet in the southeast corner of the site to about 708 feet along the intermittent stream located in the northwest portion of the site.

Visual Exposure and Identity: The site has excellent visual exposure and community identity potential since it adjoins the existing Village Hall/village park complex and is located along an arterial highway from which the site can be readily seen.

Utilities: Existing utilities serving the site include an eight-inch-diameter sanitary sewer and a six-inch-diameter water main located in Wisconsin Avenue (CTH H). An unnamed intermittent stream traverses the western portion of the site and serves as the storm water outfall for the site. An eight-inch-diameter sanitary sewer is proposed to be constructed in Charles Street approximately 300 feet east of the east property line of the site. An eight-inch-diameter water main is also proposed to be constructed along the entire length of Charles Street abutting the northern boundary of the site. The unnamed intermittent stream located through the western end of the site is proposed to be

enclosed in a 48-inch-diameter storm sewer, and a 21-inch-diameter storm sewer is proposed to be installed along Charles Street to a point about 300 feet east of the east property line of the site.

Major Disadvantages of the Site:

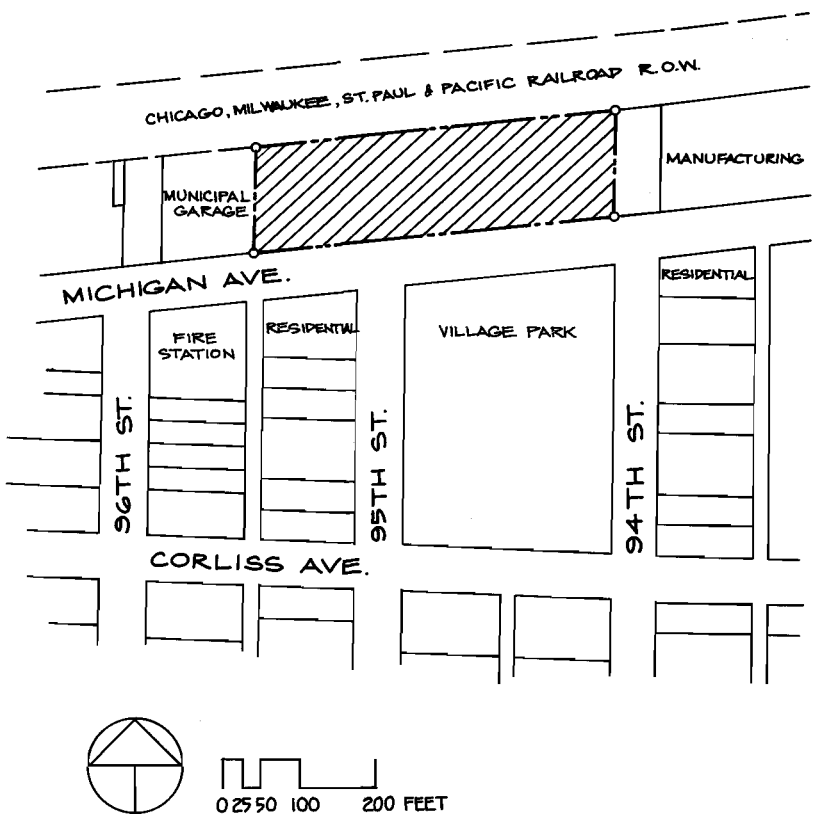
1. None which are apparent. The large man-made mound of earth located at the site can be either removed from the site or relocated on the site. The small areas of poor soils located along the intermittent stream which crosses the parcel can be avoided by good site planning.

Major Advantages of the Site:

1. The site location and orientation along both a low-volume arterial street and a collector street afford excellent access to all parts of the community during an alarm.
2. The site is of sufficient size to easily accommodate the minimum space requirements of the fire station both to and beyond the year 2000.
3. Potential conflicts in land use with neighboring single-family residential development can readily be minimized by both proper spacing and landscaping.
4. Use of this site for a fire station would reinforce the already established image of this area of the Village as the government center of the Village. The site offers a higher level of visibility to the public than the six other sites considered.

Figure 3

ALTERNATIVE SITE C



Source: SEWRPC.

Alternative Site C

Site Size: Site C is illustrated in Figure 3. Site C is approximately 65,800 square feet, or 1.5 acres, in size and is located on the north side of the Village along the north side of Michigan Avenue between 94th Street and 96th Street. The site is adequate in size to accommodate forecast year 2000 fire station site spatial needs as set forth in Chapter III. The site shape is rectangular but elongated so that building and ancillary facility placement on the site is severely limited.

Existing Zoning: The site is currently located in the Industrial District of the village zoning ordinance. A municipal building such as a fire station is a permitted use in this district.

Existing Structures and Vegetation: The site is vacant, with no significant vegetation.

Neighboring Land Uses:

North - Chicago, Milwaukee, St. Paul & Pacific Railroad right-of-way
South - Village park and residential (single family)
East - Manufacturing
West - Village water department and municipal garage

Vehicular Ingress and Egress: Vehicular access to the site is provided by Michigan Avenue and 95th Street, both of which afford easy access to the community.

Topography and Drainage: The site is relatively flat and gently sloping to the southeast for drainage. No significant topographic limitations for use of the site for fire station purposes are apparent.

Soil Characteristics: The soils of the site are of the Markham silt loam type and pose only moderate limitations for the development of a new fire station on the site.

Site Microclimate and Orientation: Depending upon the ultimate placement of the new fire station on the site, prevailing cold winter winds from the west may be hampered somewhat by the existing structures located west of the site. In addition, prevailing cooling summer winds would be hampered by the location of existing street trees near the southern boundary of the site, as would solar access depending upon the shadows cast by these trees.

Visual Exposure and Identity: The site has fair visual exposure and community identity potential.

Utilities: A 12-inch-diameter sanitary sewer, six-inch-diameter water main, and 15- to 21-inch-diameter storm sewer are all located in Michigan Avenue.

Major Disadvantages of the Site:

1. Although the site size is large enough to accommodate the new fire station, the narrow and elongated configuration of the site would tend to dictate a minimal solution to the building design problem, and all area requirements of the building program may not be met. Expansion of the building for needs beyond the year 2000 would not be possible unless neighboring lands were purchased.

Major Advantages of the Site:

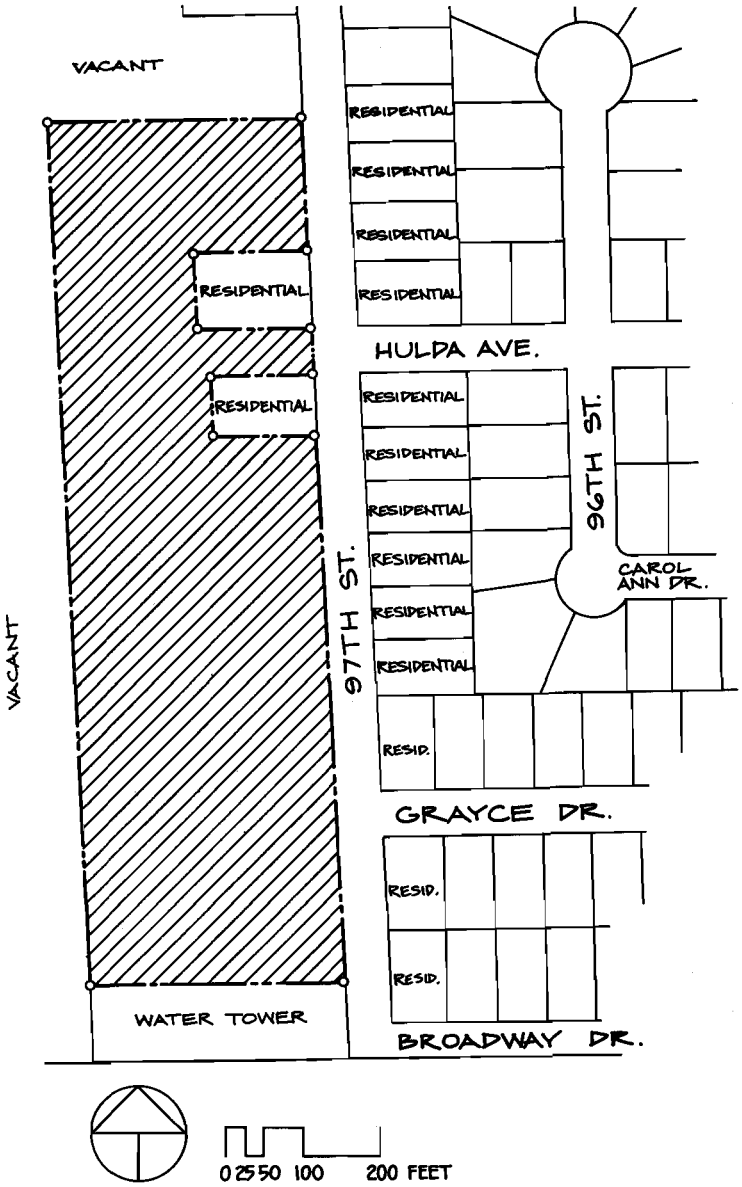
1. Provides easy access to the community
2. Very little conflict with neighboring and surrounding land uses

Alternative Site D

Site Size: Site D is illustrated in Figure 4. Site D is approximately 357,622 square feet, or 8.2 acres, in size and is located on the southwest side of the Village along the west side of 97th Street between Broadway Drive and Hulda Avenue. The site is more than adequate in size to accommodate forecast year 2000 and beyond fire station site spatial needs as outlined in

Figure 4

ALTERNATIVE SITE D



Source: SEWRPC.

Chapter III. The site is roughly rectangular in shape with the exception of the eastern boundary. The site provides adequate freedom for the siting of the fire station and ancillary facilities.

Existing Zoning: The site is currently located in the One- and Two-Family Residence District of the village zoning ordinance. Municipal buildings, such as a fire station, are a permitted use in this district.

Existing Structures and Vegetation: The site is vacant, with no significant vegetation.

Neighboring Land Uses:

North - Vacant lands and residential (single family)
South - Village water tower
East - Residential (single family)
West - Vacant lands

Vehicular Ingress and Egress: Vehicular access is provided to the site only on the east by 97th Street, Hulda Avenue, and Broadway Drive. Both 97th Street and Broadway Drive function as collector streets, thus affording easy access to the entire community.

Topography and Drainage: The site gently slopes to the northwest, with storm-water runoff flowing to the intermittent stream located through the north end of the site. The intermittent stream tends to bisect the northern and southern portions of the site. There are no apparent significant topographic limitations for use of the site for fire station purposes.

Soil Characteristics: The soils of the site primarily consist of the Ashkum silty clay loam--northern two-thirds of the site--and the Elliott silt loam--south one-third of the site. The Ashkum silty clay loam poses severe limitations for the development of a fire station, and has a low bearing capacity, high shrink-swell potential, and high water table. The Elliott silt loam

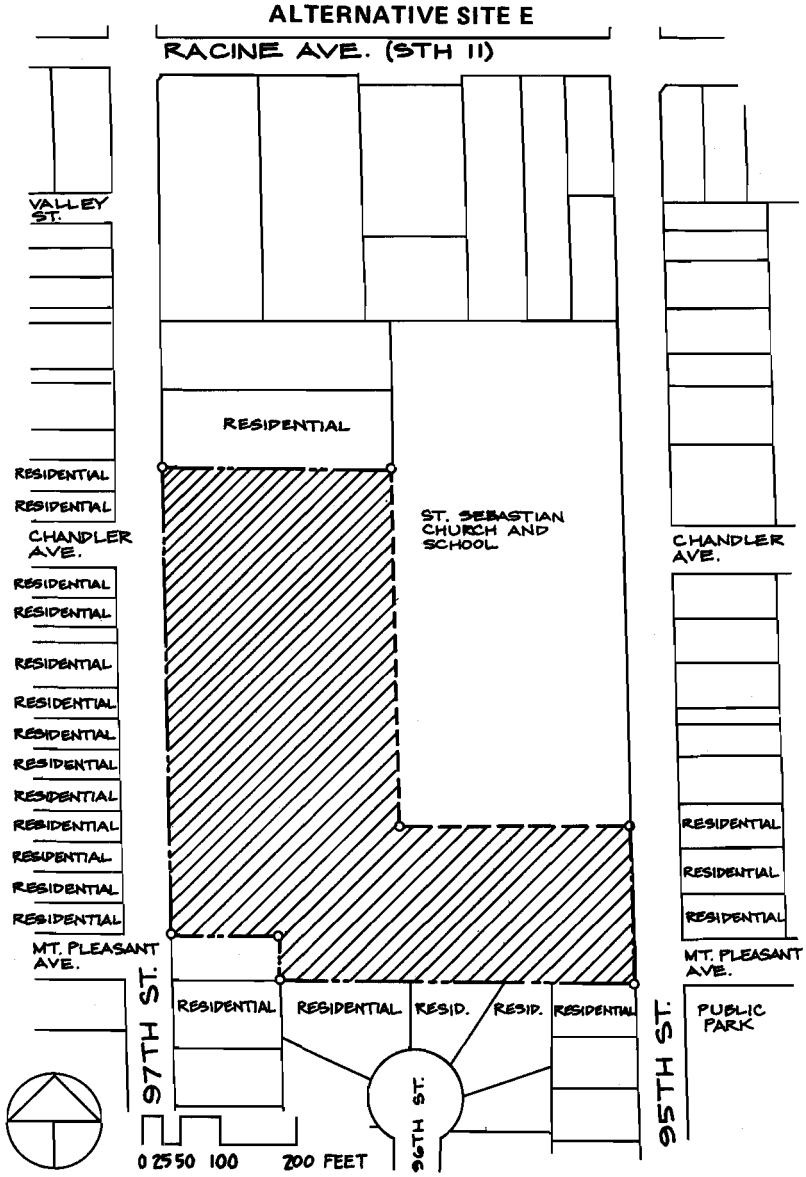
also poses severe limitations for fire station development, and has a high water table, low bearing capacity, and high shrink-swell potential, and causes frost heave.

Site Microclimate and Orientation: Prevailing cold winter winds from the west would not be hampered by any existing conditions of the site, and cooling summer winds from the southwest would not be hampered since the site is open and not shielded. Solar access is available from the south and west, with no existing major limiting factors.

Visual Exposure and Identity: The site has poor visual exposure and community identity potential.

Utilities: An eight-inch-diameter sanitary sewer is located in 97th Street about 150 feet north of Grace Drive. There is a six- to eight-inch-diammeter water main located in 97th Street. Also, there is a 42-inch-diameter storm sewer extending in an east-west direction through the site at Hulda Avenue.

Figure 5
ALTERNATIVE SITE E



Source: SEWRPC.

Major Disadvantages of the Site:

1. The soil limitations are very severe for the development of a fire station on the site. Special engineering of the building footings, foundations, and/or slabs would likely be required.
2. The site is located in a remote area of the Village, with new development forecast to take place in other areas of the Village.
3. Since the site is distant from the growth areas of the Village, visibility and image potential is severely limited.

Major Advantages of the Site:

1. The site is more than adequate in size to accommodate year 2000 and beyond land space needs.

2. The site poses little conflict with surrounding land uses.

Alternative Site E

Site Size: Site E is illustrated in Figure 5. Site E is approximately 251,300 square feet, or 5.76 acres, in size and is located on the vacant portion of the site of St. Sebastian's Church situated on the east side of 97th Street between Mt. Pleasant Avenue and Chandler Avenue. The site is more than adequate in size to accommodate forecast year 2000 and beyond fire station site spatial needs as outlined in Chapter III. The site is somewhat L-shaped, with adequate freedom for the siting of the fire station and ancillary facilities.

Existing Zoning: The site is currently located in the One- and Two-Family Residence District of the village zoning ordinance. Municipal buildings, such as a fire station, are a permitted use in this district.

Existing Structures and Vegetation: The portion of the total site under consideration for fire station location is vacant, with no significant vegetation.

Neighboring Land Uses:
North - Residential
South - Residential
East - Institutional (St. Sebastian's Church and School)
West - Residential

Vehicular Ingress and Egress: Vehicular access to the site is provided on the east by 95th Street and on the west by 97th Street; 97th Street functions as a collector street and affords easy access to other portions of the community.

Topography and Drainage: The site is level to very gently sloping to the west. No significant topographic limitations are apparent for use of the site for fire station purposes.

Soil Characteristics: The site is covered by both Markham silt loam soils (southern two-thirds of site) and Ashkum silty clay loam soils (northern one-third of site). The Markham silt loam poses only moderate limitations for the development of a new fire station on the site. The Ashkum silty clay loam, however, poses severe limitations for the development of a fire station since this type of soil has a low bearing capacity, a high shrink-swell potential, and a high water table.

Site Microclimate and Orientation: Prevailing cold winter winds from the west would not be hampered by any existing conditions of the site, and cooling summer winds from the southwest would not be hampered since the site is open and not shielded. Solar access is available from the south and west, with no existing major limiting factors.

Visual Exposure and Identity: The site has fair visual exposure and community identity potential.

Utilities: An eight-inch-diameter sanitary sewer and six-inch-diameter water main are located in both 95th Street and 97th Street. A 12-inch-diameter storm sewer extends through the north end of the site and a 15- to 18-inch-diameter storm sewer is located in 95th Street.

Major Disadvantages of the Site:

1. Locating a fire station next to a school site may pose child pedestrian safety problems, and could be disruptive to classroom activities at the school.

Major Advantages of the Site:

1. More than adequate in size to accommodate year 2000 and beyond land space needs.
2. Direct access available to two streets, one of which is a collector street providing easy access to the community.

Alternative Site F

Site Size: Site F is illustrated in Figure 6. Site F is approximately 213,825 square feet, or 4.9 acres, in size and is located on the east side of the Village south of STH 11 and north of White Chapel Drive between 90th Street on the west and 86th Street on the east. The site is more than adequate in size to accommodate forecast year 2000 and beyond fire station site spatial needs as outlined in Chapter III. However, the site is elongated, irregular, and narrow in shape, thus severely limiting fire station and ancillary facility placement at the site.

Existing Zoning: The site is currently located in Business District A of the village zoning ordinance. Fire stations are a permitted use in this district.

Existing Structures and Vegetation: The site is vacant, with no significant vegetation.

Neighboring Land Uses:

North - Commercial
South - Residential (multiple family)
East - Residential (multiple family)
West - Residential (single family and multiple family)

Vehicular Ingress and Egress: Vehicular access is provided to the site on the east by 86th Street and on the west by 90th Street; 90th Street serves as a collector street and affords easy access to all parts of the community.

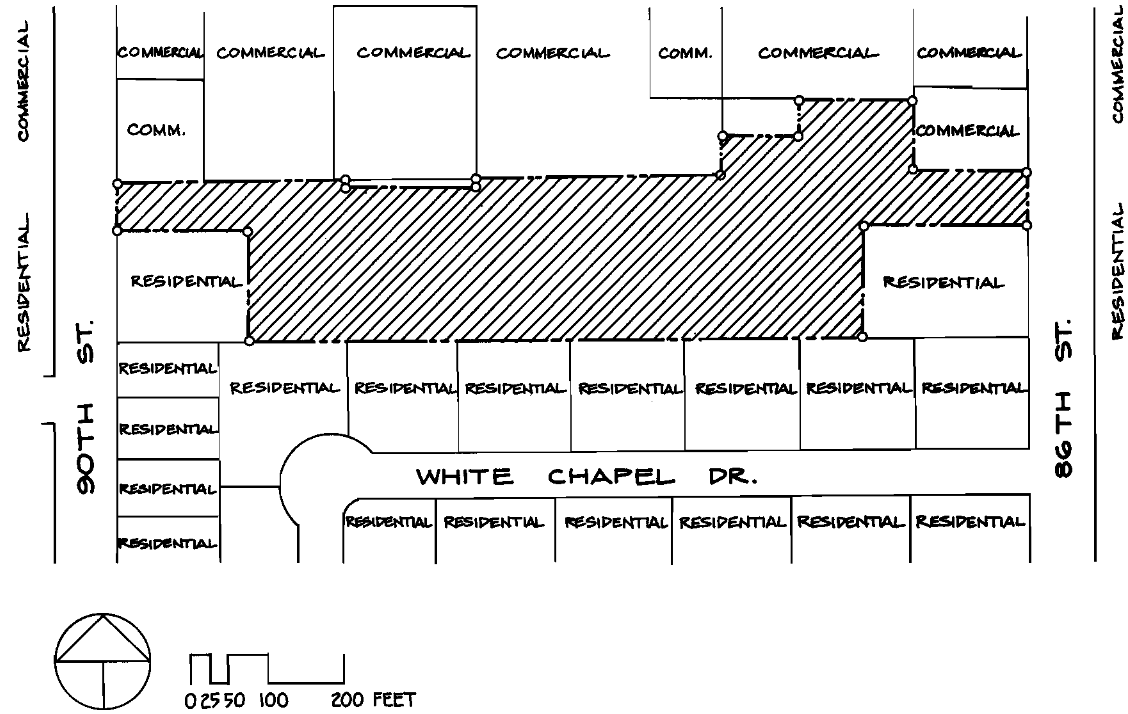
Topography and Drainage: The site is generally level, with a gentle slope to the east. No significant topographic limitations are apparent for use of the site for fire station purposes.

Soil Characteristics: The soils of the site are of the Markham silt loam type and pose only moderate limitations for the development of a new fire station on the site.

Site Microclimate and Orientation: Prevailing cold winter winds from the west would not be hampered by any existing conditions at the site. Cooling summer winds from the southwest would, however, be shielded from the site by the existing residential structures situated along the site's southern border. Depending upon the building height and placement of the new fire station on the site, solar access may be slightly hampered from the south by these residential structures.

Figure 6

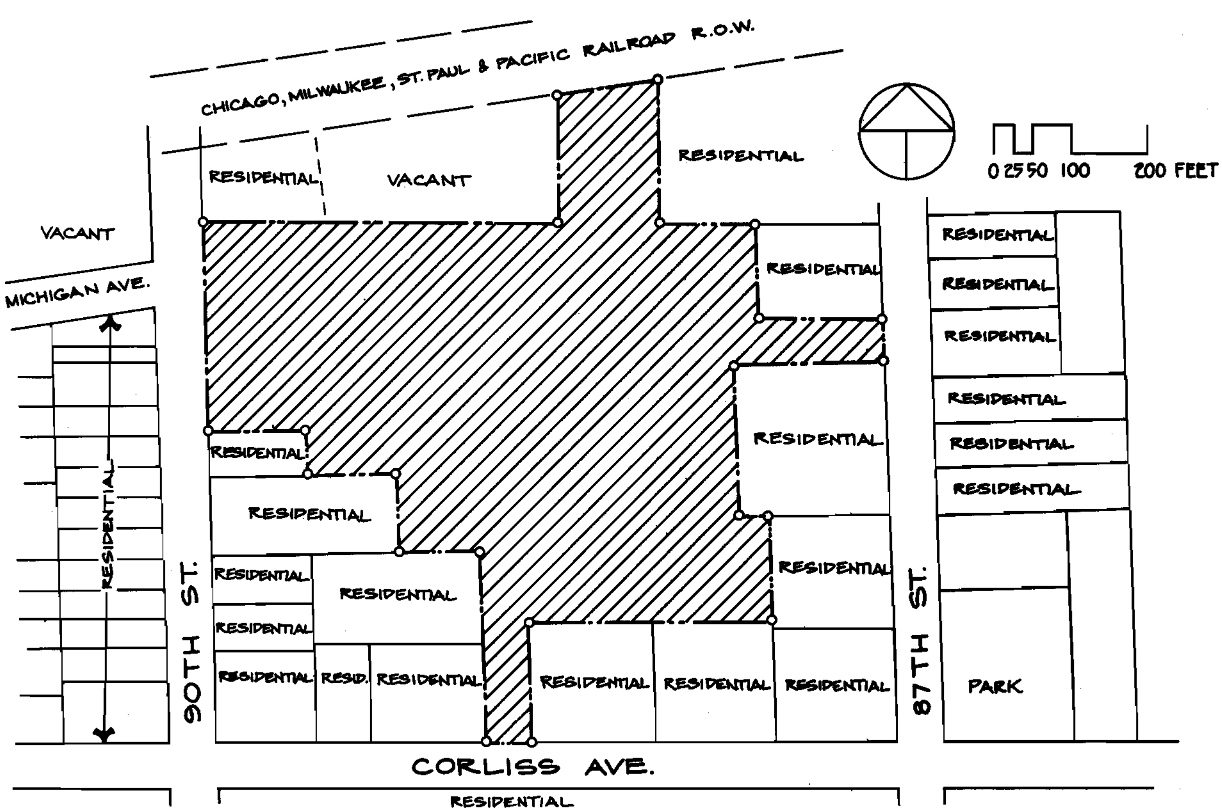
ALTERNATIVE SITE F



Source: SEWRPC.

Figure 7

ALTERNATIVE SITE G



Source: SEWRPC.

Visual Exposure and Identity: The site has poor visual exposure and community identity potential.

Utilities: Sanitary sewer service to the site is provided by an eight-inch-diameter sewer located in 86th Street, a 10-inch-diameter sewer located in 90th Street, and a 10-inch-diameter sewer extending through the east end of the site in a north-south direction. Water service is available from a six-inch-diameter main located in 90th Street and a 10-inch-diameter main located in 86th Street. A 15-inch-diameter storm sewer is located in 90th Street.

Major Disadvantages of the Site:

1. Although the site size is more than large enough to accommodate forecast fire station space requirements, the narrow and elongated configuration of the site may dictate a less than optimal solution to the building design and general site layout.
2. The fire station activities may be disruptive to residents of the abutting multiple-family housing.
3. Since the site is located between existing commercial and multiple-family residential development, visual exposure and community identity may not be practicable.

Major Advantages of the Site:

1. Excellent access to neighboring medium hazard occupancies.
2. Has ready access to a major collector street (90th Street).

Alternative Site G

Site Size: Site G is illustrated in Figure 7. Site G is approximately 350,085 square feet, or 8.0 acres, in size and is located on the northeast side of the Village abutting Corliss Avenue on the south, the Chicago, Milwaukee, St. Paul & Pacific Railroad right-of-way on the north, 90th Street on the west, and 87th Street on the east. The site is more than adequate in size to accommodate forecast year 2000 and beyond fire station site spatial needs as outlined in Chapter III. The site is irregular in shape, but is large enough to allow for adequate flexibility in the siting of the fire station and associated amenities at the site.

Existing Zoning: The site is currently located in the One- and Two-Family Residence District of the village zoning ordinance. Municipal buildings, such as a fire station, are a permitted use in this district.

Existing Structures and Vegetation: The site is vacant, with no significant vegetation.

Neighboring Land Uses:

North - Chicago, Milwaukee, St. Paul & Pacific Railroad right-of-way
South - Residential (single family and multiple family)
East - Residential (single family and multiple family)
West - Residential (single family and multiple family) and vacant lands

Vehicular Ingress and Egress: Vehicular access is provided to the site by 87th Street on the east, Corliss Avenue on the south, and 90th Street on the west. Corliss Avenue and 90th Street are both collector streets affording easy access to arterial streets leading to all parts of the community.

Topography and Drainage: The site is generally level, with a very gentle slope to the northeast. No significant topographic limitations for use of the site for fire station purposes are apparent.

Soil Characteristics: The site is generally covered by soils of the Markham silt loam type, which pose only moderate limitations for the development of a new fire station on the site. Only a small area of the site located in its northwest corner contains soils of the Ashkum silty clay loam type, which pose severe limitations for the development of a fire station and have a low bearing capacity, high shrink-swell potential, and high water table.

Site Microclimate and Orientation: Prevailing cold winter winds from the west and summer winds from the southwest would not be hampered by existing conditions unless the building was located east of and near existing abutting residential structures. Also, solar access is available from the south and west with no major limiting factors.

Visual Exposure and Identity: There would be good visual exposure and community identity potential since the fire station would abut a major thoroughfare.

Utilities: Sanitary sewer service to the site is provided by 18-inch-diameter sewers located in both 87th Street and Corliss Avenue and an eight-inch-diameter sewer located in 90th Street. Water service to the site is provided

Table 9

COMPARATIVE NONECONOMIC FIRE STATION SITE EVALUATION CRITERIA

Evaluation Criteria	Rank Order	Normalized Value
Vehicular Ingress and Egress	4.0	1.22
Site Location Desirability	3.7	1.13
Sufficient Site Size to Accommodate Facility	3.7	1.13
Compatibility with Neighboring Land Uses and Buildings	2.7	0.83
Facility Expansion Capabilities of Site	2.7	0.83
Site Configuration (shape) Conducive to Use	2.7	0.83
Topography Compatibility with Use	2.7	0.83
Adequate Provision of Utilities (sanitary sewer and water)	2.5	0.76
Site Microclimate/Orientation Properties (wind and solar exposure)	2.3	0.70
Drainage	2.0	0.61
Soil Characteristics and Compatibility	2.0	0.61
Visual Exposure/Identity	1.7	0.52
Total	32.7	10.00

Source: SEWRPC.

Table 10

COMPARATIVE NONECONOMIC FIRE STATION SITE EVALUATION FOR ALTERNATIVE FIRE STATION SITES IN THE VILLAGE OF STURTEVANT

Fire Station Site Evaluation Criteria	Normalizing Factor	Site A		Site B		Site C		Site D		Site E		Site F		Site G	
		Score	Normalized Score	Score	Normalized Score	Score	Normalized Score	Score	Normalized Score	Score	Normalized Score	Score	Normalized Score	Score	Normalized Score
Vehicular Ingress and Egress...	1.22	4	4.88	4	4.88	4	4.88	4	4.88	4	4.88	3	3.66	4	4.88
Site Location Desirability.....	1.13	2.5	2.83	4	4.52	2.5	2.83	2	2.26	2.25	2.54	4	4.52	3	3.39
Sufficient Size to Accommodate Facility (to year 2000).....	1.13	0	0	4	4.52	4	4.52	4	4.52	4	4.52	4	4.52	4	4.52
Compatibility with Neighboring Land Uses and Buildings.....	0.83	2	1.66	3.5	2.91	4	3.32	3.5	2.91	3	2.49	3.5	2.91	3	2.49
Facility Expansion Capabilities of Site (beyond year 2000).....	0.83	0	0	4	3.32	1	0.83	4	3.32	4	3.32	4	3.32	4	3.32
Site Configuration (shape conducive to use).....	0.83	4	3.32	4	3.32	2	1.66	4	3.32	4	3.32	2	1.66	4	3.32
Topography Compatibility with Use.....	0.83	4	3.32	4	3.32	4	3.32	4	3.32	4	3.32	4	3.32	4	3.32
Adequate Provision of Utilities (sanitary sewer and water).....	0.76	4	3.04	4	3.04	4	3.04	4	3.04	4	3.04	4	3.04	4	3.04
Site Microclimate/ Orientation (wind and solar exposure).....	0.70	2	1.40	2.5	1.75	2	1.40	3	2.10	3	2.10	2.5	1.75	3	2.10
Drainage.....	0.61	3	1.83	3	1.83	3	1.83	3	1.83	3	1.83	3	1.83	3	1.83
Soil Characteristics and Compatibility.....	0.61	3	1.83	3	1.83	3	1.83	1	0.61	3	1.83	3	1.83	3	1.83
Visual Exposure and Identity.....	0.52	2	1.04	4	2.08	2	1.04	2	1.04	2	1.04	1	0.52	3	1.56
Total	10.00	30.5	25.15	44.0	37.32	35.5	30.50	38.5	33.15	40.25	34.23	38.0	32.88	42.0	35.60

NOTE: The following scale was used for each score assigned: 4=excellent, 3=good, 2=fair, 1=poor, 0=unsatisfactory.

Source: SEWRPC.

by six-inch-diameter mains located in 87th Street, Corliss Avenue, and 90th Street. Storm sewers serving the site include a 30- to 36-inch-diameter sewer located in 87th Street, a 27-inch-diameter sewer located in Corliss Avenue, and a 21-inch-diameter sewer located in 90th Street.

Major Disadvantages of the Site:

1. No major disadvantages are apparent.

Major Advantages of the Site:

1. Good access is provided the site by two collector streets in addition to a local street.
2. The site is more than large enough to accommodate forecast year 2000 and beyond fire station needs.
3. The site has good visual exposure and community identity potential.

A COMPARATIVE NONECONOMIC FIRE STATION SITE EVALUATION

Among the many variables which must be considered in the proper siting of a fire station, the most important noneconomic criteria are vehicular ingress and egress, site location desirability, site size, the compatibility of the use of the site with neighboring land uses and buildings, the fire station facility expansion characteristics and capabilities of the site, the site configuration and its conduciveness to fire station use, utilities, the site microclimate including its orientation to wind and sun, site drainage, site soils, and the visual exposure and community identity of the facility. Each of the site alternatives should be evaluated based on these urban design variables.

The site selection process may be aided by comparing the various noneconomic site criteria of the alternative sites and their relative importance to one another and to the proper siting of a fire station facility. The noneconomic criteria were discussed earlier and are listed in Table 9. Each of the noneconomic criteria is listed in rank order on a scale of from zero to 4.0 in importance, with 4.0 representing the highest level of importance and 1.0 the lowest. A relative value is assigned to each of the evaluation criteria listed and the values are normalized so that their total equals 10.0. Each site alternative, in turn, is evaluated based on the noneconomic site evaluation criteria shown in Table 9 and scored. The scoring is based upon the degree to which the site meets each site evaluation criterion in relation to the other site alternatives being considered. A score of 4.0 is excellent; 3.0 is good; 2.0 is fair; 1.0 is poor; and 0 is unsatisfactory.

Table 11

RANK ORDER LISTING OF THE ALTERNATIVE FIRE STATION SITES BASED UPON THE NONECONOMIC SITE EVALUATION

Rank Order	Normalized Score	Alternative Site
1	37.32	B
2	35.60	G
3	34.23	E
4	33.15	D
5	32.88	F
6	30.50	C
7	25.15	A

Source: SEWRPC.

The score for each of the site evaluation criteria is then multiplied by its normalization factor (see Table 9) in order to attain the normalized score for each criterion. The normalized scores for all of the site evaluation criteria for each site are then summed and an overall score for each alternative site is attained. This process for each of the alternative fire station sites considered is shown in Table 10. The site with the highest score is considered the best suitable site for a fire station facility.

THE RECOMMENDED FIRE STATION SITE

A rank order listing of all seven alternative fire station sites considered, based upon the noneconomic evaluation, is shown in Table 11. The site which scored the highest is Site B, located south of the Village Hall near the southeast corner of the intersection of Wisconsin Avenue (CTH H) and Charles Street. The site which scored the second highest is Site G, located on the northeast side of the Village abutting Corliss Avenue on the south, the Chicago, Milwaukee, St. Paul & Pacific Railroad right-of-way on the north, 90th Street on the west, and 87th Street on the east. The site which scored the third highest was Site E, located on the vacant portion of the site of St. Sebastian's Church on the east side of 97th Street between Mt. Pleasant Avenue and Chandler Avenue. Based upon the evaluation, the site recommended for the new village fire station by the Commission staff is Site B.

ASSESSED REAL PROPERTY VALUES OF THE ALTERNATIVE FIRE STATION SITES CONSIDERED

Table 12 presents the assessed values of the seven alternative fire station sites considered. Since the assessed values may not necessarily correspond to the current market value of the sites, it is recommended that the Village have an appraisal made of the site it ultimately selects for a village fire station if that site is not already owned by the Village. Costs per net acre of these seven sites--based upon the assessed value--varied from about $4,540 to $20,240. The recommended Site B does not have an assessed value since it is already owned by the Village.

Table 12

ASSESSED REAL PROPERTY VALUES OF THE ALTERNATIVE FIRE STATION SITES IN THE VILLAGE OF STURTEVANT

Alternative Site	Assessed Valuation (100%) of Real Property as of August 20, 1984		
	Land	Improvements	Total
A	0	0	0[a]
B	0	0	0[a]
C	$30,360	0	$30,360[b]
D	$42,254	$22,222	$64,476[c]
E	0	0	0[d]
F	$58,685	0	$58,685[e]
G	$87,950	0	$87,950[f]

[a]Land owned by the Village of Sturtevant and therefore not taxed.

[b]Averages to about $20,240 per net acre without improvements.

[c]Averages to about $4,540 per net acre excluding improvements.

[d]Not taxed as a church.

[e]Averages to about $5,240 per net acre without improvements.

[f]Averages to about $9,057 per net acre without improvements.

Source: SEWRPC.

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Chapter VI

FIRE STATION CONSTRUCTION COST ESTIMATE ANALYSIS

RECENT COSTS OF FIRE STATIONS

Appendix A provides cost data for 26 fire stations constructed in the Midwest and southeastern Wisconsin from September 1978 to March 1983. The cost data shown in Appendix A are based upon recent information obtained from the F. W. Dodge, McGraw-Hill Information Systems Company reports entitled Costs and Trends. Based upon these unit costs, the square-foot costs for a fire station ranged from $20.94 to $79.45 from 1978 to 1983.

CURRENT FIRE STATION BUILDING COST DATA FOR THE GREATER MILWAUKEE AREA

Table 13 provides current--January 1, 1984--square-foot cost data for the construction of fire stations in the greater Milwaukee area. The costs shown in Table 13 were derived, in part, from the publication Means Building Construction Cost Data 1984 published by the Robert Snow Means Company, Inc., with the Means Data Bank of Construction Costs adjusted to January 1, 1984, for the greater Milwaukee area. The first column of the table indicates that 25 percent of the projects have lower costs than the unit square-foot cost shown, and 75 percent have higher; the median column shows that 50 percent of the projects have lower costs, and 50 percent have higher; and the third column of the table shows that 75 percent of the projects have lower costs, and 25 percent have higher. For the purposes of this study, a median construction cost of $61.21 per square foot of fire station floor area was used, exclusive of any site preparation costs or architectural fees.

Table 13

SQUARE-FOOT CONSTRUCTION COST DATA FOR THE CONSTRUCTION OF FIRE STATIONS IN THE GREATER MILWAUKEE AREA FOR JANUARY 1, 1984

Cost per Square Foot[a]		
1/4	Median	3/4
$45.26	$61.21	$74.46

[a] The costs were derived from the Means Data Bank of Construction Costs adjusted to January 1, 1984, and from the size of the building proposed for the Village and associated costs for the greater Milwaukee area. The 1/4 column shows that 25 percent of the projects have lower costs, and 75 percent have higher; the 3/4 column shows that 75 percent of the projects have lower and 25 percent have higher; and the median column shows that 50 percent of the projects have lower costs, and 50 percent have higher.

Source: Means Building Construction Cost Data: 1984 (Kingston, Mass.: Robert Snow Means Company, Inc., 1983); and SEWRPC.

PHASE I AND PHASE II FIRE STATION CONSTRUCTION COST ESTIMATE ANALYSIS

Table 14 provides a cost estimate analysis for the construction of a new fire station in the Village of Sturtevant expressed in 1984 dollars for Phase I construction to meet 1984 fire station needs and for Phase II construction to

Table 14

COST ESTIMATE ANALYSIS FOR THE CONSTRUCTION OF A NEW VILLAGE OF STURTEVANT FIRE STATION

Cost Factors	Estimated Costs of Facilities		
	Phase I	Phase II	Total
A. Building Costs[a]	$432,755	$144,455	$577,210
B. Fixed Equipment (5 percent of A)	$ 21,640	$ 7,220	$ 28,860
C. Site Development (varies depending upon site selected, but a figure of 7 percent of A can be used)	$ 30,290	$ 10,115	$ 40,405
D. Total Construction Cost (A + B + C)	$484,685	$161,790	$646,475
E. Site Acquisition/Demolition (varies depending upon site selected)	$ --	$ --	$ --
F. Professional Fees (architects, engineers, etc.--8 percent of D)	$ 38,775	$ 12,945	$ 51,720
G. Contingencies (10 percent of D)	$ 48,469	$ 16,179	$ 64,648
H. Movable Equipment (2 percent of D)	$ 9,696	$ 3,236	$ 12,932
I. Administrative Costs to the Village (1 percent of D)	$ 4,850	$ 1,620	$ 6,470
J. Total Building Budget Recommended (excluding site acquisition/ demolition costs)	$586,475	$195,770	$782,245

[a]Using median costs as of January 1, 1984, as presented in Table 13 ($61.21 per square foot), and building space needs as defined in this report.

Source: SEWRPC.

meet year 2000 fire station needs. The cost estimate was prepared using unit costs which include the costs of labor, materials, and equipment. The cost estimate analysis does not include allowances for insurance, project peculiarities, overhead, profit, or land acquisition/demolition costs.

It is important for the Village to establish a realistic budget for the project if it is to be undertaken. Should the cost estimate result in a total budget amount which is larger than the extent of funds that can reasonably be expected to be made available, or that the Village is willing to pay, then the quality of construction or the scope of the project must be reduced. Cost factors which were addressed in preparing the building construction cost estimate include building costs, fixed equipment costs, total construction costs, site acquisition and/or demolition costs, professional fees, contingencies, movable equipment costs, administration costs to the Village, and the total budget required by the Village to complete the project. Each of these factors is discussed below.

Building Costs

Building costs include all costs of construction within five feet of the building line, items required by codes, and items normally found in buildings regardless of building type.

Fixed Equipment

Fixed equipment costs include the costs of all equipment items which may be installed before completion of the building and which are a part of the construction contract. Movable equipment would include special equipment such as chairs, tables, and desks.

Site Development

Site development costs include the costs of all work required on that portion of the building site which lies within the site boundary and up to five feet from the edge of the building, including grading, fencing, the construction of driveways and parking areas, utilities, landscape development, the placement of walks, site lighting, and sign placement, and the costs required to overcome any unusual foundation conditions.

Total Construction

The total construction cost represents the expected total budget for construction, including building costs, fixed equipment costs, and site development costs. This figure should approximate the base bid of the building contract documents.

Site Acquisition and Demolition

The site acquisition and demolition cost represents the amount to be budgeted for acquisition and demolition of any existing structures on the site.

Professional Fees

Professional fees include the costs of legal, architectural, engineering, and land surveying services.

Contingencies

The contingency represents a percentage of the total construction reserve to meet unforeseen contingencies.

Movable Equipment

Movable equipment includes special equipment, chairs, tables, desks, dishes, kitchenette appliances, and other furniture as needed.

Administrative Cost to the Village

Administrative costs include costs for which the Village is responsible during the planning and building process, including insurance costs and the cost of village staff personnel time.

Total Budget

The total budget represents the amount required to completely construct a ready-to-occupy fire station. This figure does not include any financing costs, or any site acquisition and/or demolition costs.

The building budget was determined to approximate $586,475 for Phase I and $195,770 for Phase II construction, expressed in 1984 constant dollars. These costs are based upon the spatial requirements for the fire station defined in the building program outlined in Chapter III, the building costs per square foot for recently constructed fire stations within the Midwest and Region and the cost forecasts based upon these costs, and the cost estimate analysis presented in Table 14.

Because of the constantly changing market costs of labor and materials, and because of competitive bidding, the statements of probable construction cost for the facilities cannot be guaranteed. In addition, the building design and construction material selected will be significant in determining the final construction costs. It should be understood that the costs outlined herein are based upon the median per square foot costs reported in the current--January 1, 1984--construction market and represent, at best, estimates which may change once the building has been designed and construction material selected.

Chapter VII

FIRE STATION SITE PLAN DESIGN FOR THE RECOMMENDED SITE

INTRODUCTION

This chapter presents a detailed site plan for the fire station site recommended in Chapter V. The detailed site plan is based, in part, upon consideration of existing site characteristics, the fire station site planning design criteria presented in Chapter VI, and certain functional considerations of both the fire station building and its site. In addition to the detailed site plan, this chapter presents an analysis of the planning considerations which assisted in developing the site plan.

FUNCTIONAL CONSIDERATIONS

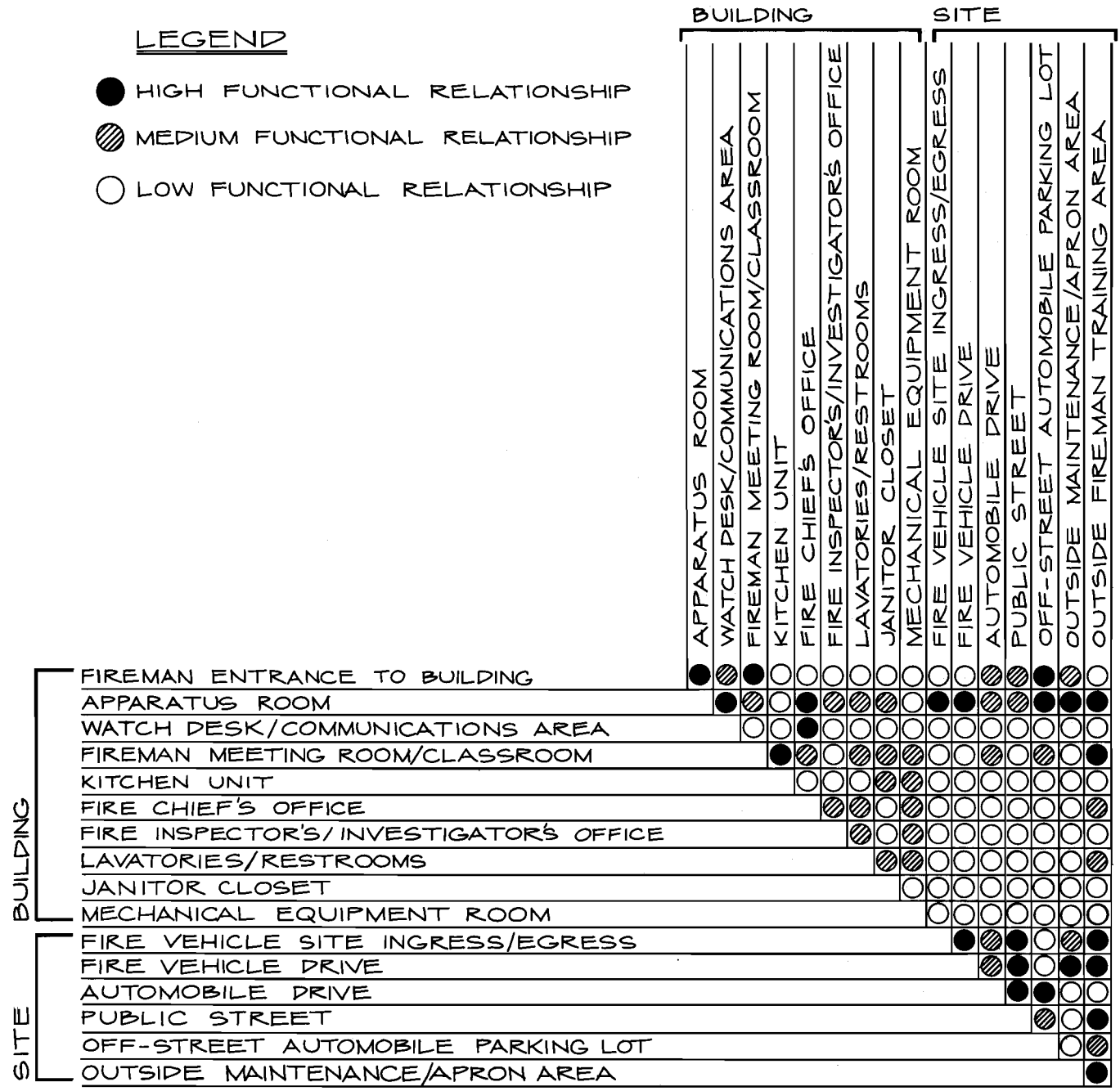
A fire station must provide space for many functions, including, as discussed in Chapter III, fireman access to the station, apparatus room, watch desk and communications area, fireman meeting and classroom, kitchen unit, fire chief's office, fire inspector's-investigator's office, lavatories and restrooms, janitor closet, and mechanical equipment room. In addition, the fire station site must provide space for many functions, including fire vehicle site ingress and egress, a fire vehicle service drive, an automobile service drive for volunteer firemen, linkage to a public street, off-street automobile parking for volunteer firemen, an outside maintenance area or "apron," and, optionally, an outside fireman training area. All of these functional spaces must be properly related to one another in order to create an efficient and purposeful design solution to the fire station problem. Figure 8 illustrates a fire station spatial interaction matrix which shows the functional relationships between the fire station building spaces and related site spaces. The spatial relationships are defined as high, medium, or low. The matrix should assist in laying out the various functional areas of both the building and site.

PREDEVELOPMENT CONDITIONS ANALYSES FOR THE RECOMMENDED FIRE STATION SITE

In Chapter V, the existing conditions of the recommended fire station site (Site B) were described and pertinent information was presented on site size, existing zoning, existing structures and vegetation, neighboring land uses, vehicular ingress and egress, topography and drainage, soil characteristics, site microclimate, the visual exposure and identity characteristics of the site, existing and proposed utilities, and the major advantages and disadvantages of the site. Figure 9 illustrates the analysis of some of these site conditions and how they affect the development of a site plan for the site. Also taken into consideration in this analysis are some of the site design criteria discussed in Chapter IV of this report. Figure 9 indicates the development constraints imposed by the unnamed creek which traverses the recommended site, the soils, building setback lines, and existing contiguous residential land uses.

Figure 8

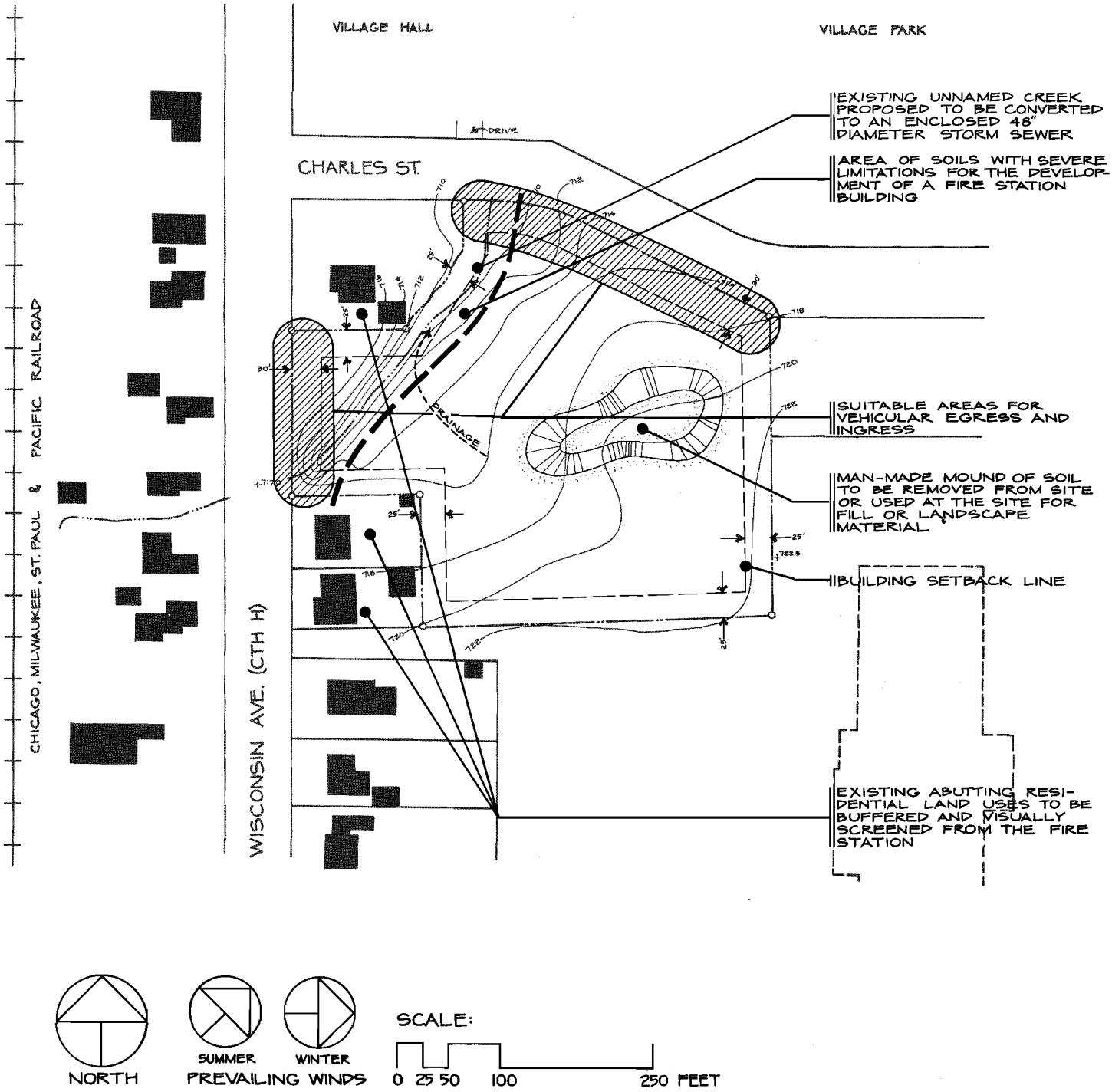
MATRIX OF FUNCTIONAL RELATIONSHIPS BETWEEN THE FIRE STATION SITE AND BUILDING SPACE USES



Source: SEWRPC.

Figure 9

ANALYSIS OF THE RECOMMENDED FIRE STATION SITE PREDEVELOPMENT CONDITIONS



Source: SEWRPC.

SITE DEVELOPMENT PLAN FOR THE RECOMMENDED FIRE STATION SITE

A detailed fire station site plan for the recommended site was prepared which is responsive to both the program for the fire station as outlined in Chapter III and the site design criteria outlined in Chapter IV. The plan is shown in Figure 10.

The site plan shows a fire station building with 9,430 square feet of floor area; 60 ancillary fireman automobile parking spaces; and two fire vehicle apron areas--one for fire vehicle ingress and the other for egress. Fireman automobile parking and circulation is functionally separated from the fire vehicle circulation in order to minimize vehicular conflicts during a fire call response. Fire vehicle ingress and egress is provided from and to Wisconsin Avenue (CTH K) and Charles Street to foster quick response in two different directions. The fire station building is oriented on the site to be visually prominent, to visually screen the off-street fireman parking lot, and to channel prevailing summer winds through the apparatus room of the building when the apparatus room doors are open to vehicle emissions from the station.

Landscaping at the site consists of dense coniferous shrub planting screens on the northwest and southwest in order to buffer and visually screen adjoining residential uses. In addition, landscape buffer screens should be installed along the southern edge of the site in order to screen fire station activities from neighboring properties as they are developed. Other landscaping features include a row of specimen or ornamental deciduous trees along the Wisconsin Avenue entrance to the site, shade trees at the pedestrian entrances to the fire station, and earth berms. All landscaping is located at least 30 feet from the site's building setback lines in order to not hinder the clear view of fire vehicle operators when exiting the site.

The site provides for expansion of the fire station to accommodate the additional two fire vehicle bays which may be required by the Village beyond the year 2000. In addition, the site provides for a fireman training or practice area in the southeastern portions of the site, an optional feature not required by the building program.

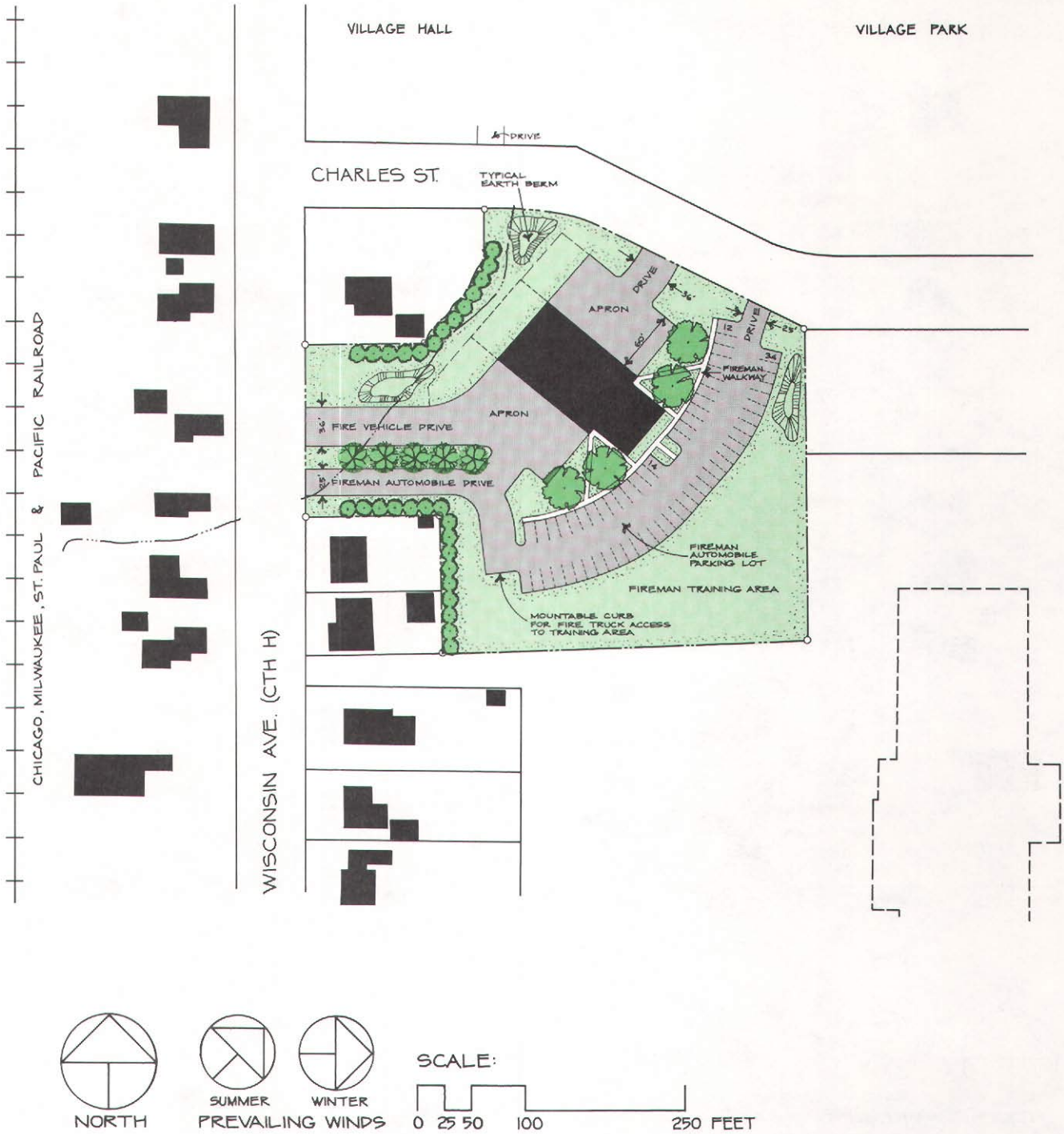
A analysis of the site development plan for the fire station is illustrated in Figure 11.

VILLAGE PLAN COMMISSION RECOMMENDATION

On September 27, 1984, at a meeting of the Village Plan Commission, the Regional Plan Commission staff presented the findings of this report. At the conclusion of that meeting, the Village Plan Commission approved SEWRPC Community Assistance Planning Report No. 115, A Fire Station Building Program and Site Location Analysis for the Village of Sturtevant, Racine County, Wisconsin and recommended to the Village Board that the new village fire station be constructed at the recommended site.

Figure 10

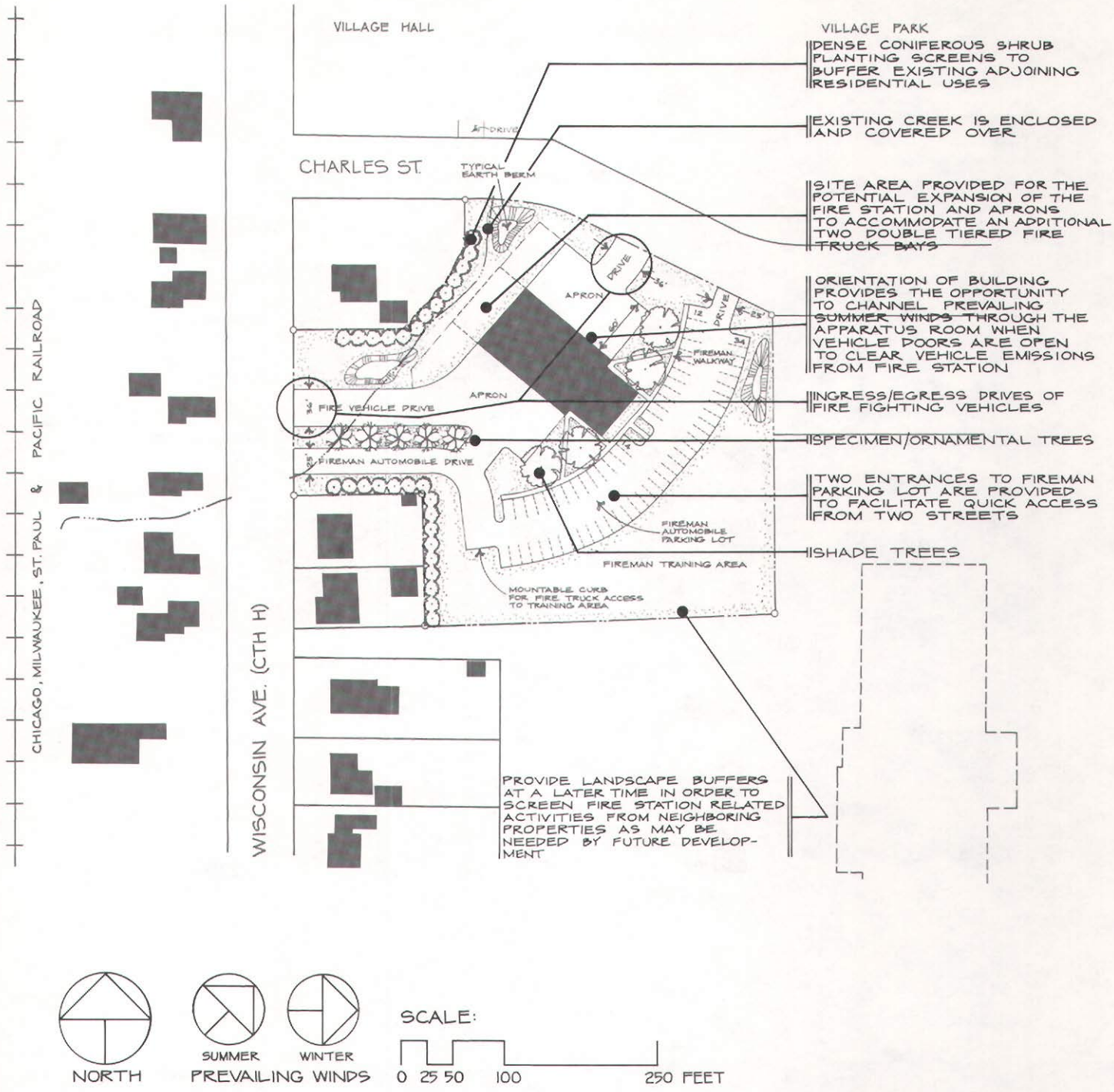
SITE PLAN FOR THE RECOMMENDED FIRE STATION SITE



Source: SEWRPC.

Figure 11

GRAPHIC ANALYSIS OF THE SITE PLAN FOR THE RECOMMENDED FIRE STATION SITE



Source: SEWRPC.

Chapter VIII

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

INTRODUCTION

On July 19, 1984, the Village of Sturtevant requested that the staff of the Southeastern Wisconsin Regional Planning Commission undertake a study of fire station needs in the Village. The purpose of the study was the development of a fire station building program for the Village. The study was to include an inventory of current fire protection services; a review of fire protection needs in the Village, including a review of the location of fires in the Village over the recent past; the determination of existing and probable future needs for fire stations; the development of locational and site design criteria for fire stations; the conduct of alternative fire station location and site evaluations; and the development of a fire station building program. This report presents the findings and recommendation of that study.

The study was necessitated by the need for the Village Fire Department to serve an expanded area, as well as an increase in population, by the year 2000. The Village of Sturtevant Volunteer Fire Department served 2.1 square miles within the existing corporate limits of the Village in 1980, and is expected to serve about 3.2 square miles by the year 2000. Furthermore, the population of the Sturtevant urban service area may be expected to increase from 4,130 persons in 1980 to about 6,560 persons in the year 2000. This expanded population is expected to be accommodated by an expansion of the village urban service area to the northeast. Good fire-fighting equipment and supporting facilities will be needed in the Village to accommodate these increases. Presently, the Village of Sturtevant Fire Department serves only the village proper.

The locations of fires in the Village over the last 10 years were analyzed, and high and medium fire hazard occupancy areas were identified. High hazard areas were defined as those containing such facilities as schools and churches requiring quick response and special training and equipment. Medium hazard areas were defined as those containing apartments, offices, and other facilities.

EXISTING VILLAGE FIRE STATION FACILITIES, EQUIPMENT, AND EQUIPMENT NEEDS

The existing Village of Sturtevant fire station is a 4,770-square-foot, one-story concrete block building situated on a 15,000-square-foot site located on the southeast corner of the intersection of Michigan Avenue and 96th Street. The building is in need of repair to both the roof and exterior walls, and is too small to adequately accommodate existing village fire-fighting equipment. In addition, the site of the existing fire station is inadequate to accommodate present fire-fighter parking needs or future needs for building expansion.

In 1984, the Sturtevant Volunteer Fire Department owned and operated four fire trucks and two rescue squads. It is anticipated that by the year 2000 the Fire Department will need 10 fire-fighting vehicles including four pumper trucks, two reserve pumper trucks, one aerial ladder truck, and three rescue squads. A total of 54 fire-fighting personnel would be required to man these vehicles.

ARCHITECTURAL PROGRAMMING OF THE VILLAGE FIRE STATION

A process called architectural programming was used in determining the needs and spatial requirements of a new fire station. Architectural programming is a process leading to the statement of the specific architectural design problem and the spatial requirements to be met in the solution to the problem. Programming for the needs and spatial requirements of a new fire station is problem definition and the ultimate architectural design of the building is the solution to the problem. Since it is necessary to know the spatial needs and requirements of the fire station in order to select a suitable site, a building program was formulated. The building program for the fire station provides a consolidated listing of all the building facility requirements believed necessary to serve the village existing 1984 and year 2000 population.

The building program consists of two phases of construction. Phase I construction accommodates the 1984 spatial needs of a new fire station and Phase II construction accommodates the additional space needs for the year 2000. The fire station building will consist of eight functional areas, including the apparatus room, watch desk/communications area, fireman meeting room/classroom area and kitchen unit, Fire Chief's office, Fire Inspector's/Investigator's office, lavatories/restrooms, janitor's room, and mechanical equipment room. Each of these general functional areas is further defined in the program by its component subspaces and forecast square-foot needs assigned for both Phase I and Phase II building construction. It was determined that, for 1984, a fire station of 7,070 square feet is required on a site of 30,180 square feet. In the year 2000 an additional 2,360 square feet will be required for the fire station and an additional 14,540 square feet will be required for its site. Therefore, in the year 2000, the Village of Sturtevant will need a new fire station on a site of 44,720 square feet.

DEVELOPMENT OF FIRE STATION LOCATIONAL AND SITE DESIGN CRITERIA

The location of a new fire station for the Village was determined based on locational and site design criteria developed under the study. Locational and site design criteria can be defined as a body of information which can be applied to help determine the proper siting of the proposed fire station. Fire station locational criteria consider the distribution of fire stations, equipment distribution and fire equipment response capability, fire risk areas, volunteer fire-fighters, man-made and natural barriers, heavily traveled and one-way streets, outlying areas, travel time, and road intersections. Fire station site design criteria consider site area, setbacks, side yards, outside maintenance/apron area, outside fireman training area, lot frontage width onto streets, fire station orientation on the site for vehicular ingress, landscaping, off-street automobile parking, on-street parking, fire truck and automobile drives, and onsite fire station buffering from neighboring land uses.

THE ALTERNATIVE FIRE STATION SITES CONSIDERED

Based on the fire station distribution standard which states that fire stations should generally be distributed within a one-and-one-half-mile radius of all existing and forecast fire hazard occupancy areas, it was determined that the Village could be served by one somewhat centrally located fire station within the forecast year 2000 urban service area. Seven alternative fire station sites were studied as the site for the new fire station. Several characteristics of the seven sites were considered, including existing zoning, existing structures and vegetation, neighboring land uses, vehicular ingress and egress, topography and drainage, soil characteristics, site microclimate and orientation, visual exposure and identity, and the availability of utilities such as sanitary sewer and water. In addition, for each of the seven sites a detailed locational site sketch was prepared and the advantages and disadvantages of each site determined. The following seven sites were considered:

Site A - The existing fire station site, a 15,000-square-foot, or 0.34-acre, parcel of land located on the southeast corner of the intersection of Michigan Avenue and 96th Street.

Site B - A 155,335-square-foot, or 3.56-acre, site located on the southeast corner of the intersection of Wisconsin Avenue (CTH H) and Charles Street south of the Village Hall.

Site C - A 65,800-square-foot, or 1.5-acre, site located along the north side of Michigan Avenue between 94th Street and 96th Street.

Site D - A 357,622-square-foot, or 8.2-acre, parcel of land located along the west side of 97th Street between Broadway Drive and Hulda Avenue.

Site E - A 251,300-square-foot, or 5.76-acre, parcel of land located on the vacant portion of the site of St. Sebastian's Church situated on the east side of 97th Street between Mt. Pleasant Avenue and Chandler Avenue.

Site F - A 213,825-square-foot, or 4.9-acre, site located south of STH 11, and north of White Chapel Drive between 90th Street on the west and 86th Street on the east.

Site G - A 350,085-square-foot, or 8.0-acre, site abutting Corliss Avenue on the south, the Chicago, Milwaukee, St. Paul & Pacific Railroad right-of-way on the north, 90th Street on the west, and 87th Street on the east.

A COMPARATIVE NONECONOMIC FIRE STATION SITE EVALUATION AND THE RECOMMENDED SITE

The most important noneconomic criteria which must be considered for the proper siting of a fire station are vehicular ingress and egress, site location desirability, site size, the compatibility of the use of the site with neighboring land uses and buildings, the fire station facility expansion characteristics and capabilities of the site, the site configuration (shape) and its conduciveness to fire station use, utilities, the site microclimate including its

orientation to wind and sun, site drainage, site soils, and the visual exposure and potential community identity of the facility. Following the evaluation of the seven sites, Site B, a 3.6-acre site on the north side of the Village, was recommended as the site for the new fire station. This site is currently owned by the Village.

FIRE STATION BUILDING CONSTRUCTION COST ESTIMATE ANALYSIS

Based upon data contained in the publication Means Building Construction Costs Data 1984 published by Robert Snow Means Company, Inc., and the Means Data Bank of Construction Costs adjusted to January 1, 1984, for the greater Milwaukee area, the cost per square foot of a fire station such as that proposed for the Village would be about $61.21, not including site preparation costs or architect fees. Using the per-square-foot cost of $61.21 and the data contained in the architectural building program developed for the fire station, the Phase I, Phase II, and total construction costs (in 1984 dollars) of the fire station were determined as follows:

Phase I - $586,475
Phase II - $195,770
Total - $782,245

These costs do not include the cost of land acquisition. Because of the constantly changing market costs of labor and materials, and because of competitive bidding, the statements of probable construction cost for the facilities cannot be guaranteed. In addition, the building design and construction material selected will be significant in determining the final construction costs.

FIRE STATION SITE PLAN DESIGN

A detailed site plan design for recommended Site B was developed based on an analysis of the various spatially related functions of a fire station and its site. In addition, the predevelopment conditions of the site were analyzed. Figure 11 illustrates the fire station site plan, and shows a 9,430-square-foot fire station with 60 ancillary fireman automobile parking spaces, and two fire vehicle maintenance/apron areas.

VILLAGE PLAN COMMISSION RECOMMENDATION

On September 27, 1984, at a meeting of the Village Plan Commission, the Regional Planning Commission staff presented the findings of this report. At the conclusion of that meeting, the Village Plan Commission approved SEWRPC Community Assistance Planning Report No. 115, A Fire Station Building Program and Site Location Analysis, Village of Sturtevant, Racine County, Wisconsin, and recommended to the Village Board that the new village fire station be constructed at the recommended site.

APPENDICES

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Appendix A

RECENT COSTS OF FIRE STATIONS IN THE MIDWEST AND SOUTHEASTERN WISCONSIN REGION: SEPTEMBER 1978 TO MAY 1983

Location	Date Bid Received	Building Size (square feet)	Construction and Mechanical Systems	Building Cost per Square Foot
Schleswig, Iowa	September 1978	3,968	Concrete masonry bearing walls, bar joists, built-up roof, exposed concrete floor. Slab on grade. Oil-fired heating system.	$26.10
Fowlersville, Michigan	October 1978	5,850	Concrete masonry bearing walls with decorative exterior block, steel joists, metal deck, built-up roof, interior painted drywall, no interior floor or ceiling finishes. Gas-fired warm air heating system, no air-conditioning.	$28.24
Addison, Illinois	April 1979	4,760	Brick and concrete block, built-up roof. Gas forced air heating and electrical forced air cooling.	$70.75
Sandusky, Michigan	April 1979	5,600	Wood trusses on masonry block bearing walls, asphalt shingle roof. Gas-fired forced air heat.	$26.00
Apple Valley, Minnesota	May 1979	4,379	Load bearing concrete block walls, built-up roof. Forced air heating system.	$36.65
Jamestown, North Dakota	May 1979	2,320	Load bearing concrete masonry walls, built-up roof, exposed joists in apparatus room.	$48.85
Mercer, Wisconsin	June 1979	5,600	Structural steel, masonry walls, exposed acoustical tile ceiling, built-up roof. Forced air oil heat.	$32.12
Romulus, Michigan	August 1979	2,460	Brick and block walls, steel joists, built-up roofing on metal deck. Gas-fired unit heaters.	$79.45
Sioux City, Iowa	August 1979	6,194	Steel roof structure on brick and block bearing walls, built-up and aluminum roofing.	$48.50
Moline, Illinois	August 1979	4,500	Brick veneer on wood frame or masonry walls, shingle roofing. Gas-fired forced air heating, electric forced air cooling.	$60.07
Gaylord, Michigan	February 1980	7,300	Concrete block walls with brick veneer, wood trusses and steel beams, asphalt shingle roof. Gas-fired warm air heating.	$25.34
Deer River, Minnesota	February 1980	6,000	Concrete block piers and walls, steel beams, steel bar joists, steel deck with built-up roofing. Infrared gas heating.	$35.97
Waukesha, Wisconsin	March 1980	5,100	Concrete masonry bearing walls, basement, precast concrete plank, wood rafters, metal roof decking.	$52.00
Spring Grove, Illinois	February 1981	7,722	Masonry bearing walls with brick veneer, built-up roofing. Gas-fired forced air heating, electric cooling.	$43.38
Wausau, Wisconsin	April 1981	9,620	Brick and block walls, precast concrete roof structure, asphalt shingle roof. Forced air heating.	$44.76
Indianapolis, Indiana	May 1981	5,959	Split face block bearing walls, asphalt shingle roof. Gas-fired forced air heating, electric cooling.	$31.43
Livingston County, Michigan	July 1981	3,100	Masonry bearing walls, pitched roof trusses, shingle roof. Gas-fired forced air heating.	$45.81

Appendix A (continued)

Location	Date Bid Received	Building Size (square feet)	Construction and Mechanical Systems	Building Cost per Square Foot
Flandreau, South Dakota	August 1981	4,320	Wood frame walls, wood truss roof structure, asphalt shingle roof. Electric and ceiling hung gas unit heaters.	$20.94
Tawas City, Michigan	October 1981	3,444	Split face block bearing walls, prefinished metal roofing. Gas forced air and gas unit heaters.	$46.45
Des Moines, Iowa	November 1981	15,140	Prestressed concrete columns, beams, and roof decking; block with brick veneer bearing walls; vinyl and glazed tile wall coverings; concrete, ceramic tile, VAT, and carpet floor coverings; built-up roofing. Gas/oil boiler heating, electric condenser cooling.	$77.10
Emmet County, Michigan	June 1982	5,350	Masonry bearing walls, fiberglass shingle roof. Infrared hot water boiler.	$36.37
Dickinson, North Dakota	July 1982	5,818	Steel frame with steel joists, brick with block and steel stud walls, vinyl and ceramic wall coverings, built-up roofing. Gas-fired forced air heating, sprinklers throughout.	$56.16
Phelps, Wisconsin	August 1982	4,800	Steel columns and beams, wood truss roof, concrete and wood frame with plywood siding, asphalt shingle roof. LP gas ceiling-suspended heaters.	$27.71
Town of Sherry, Wisconsin	August 1982	4,000	Stud walls, poured concrete exterior walls, wood roof trusses, asphalt shingle roof. Forced air heating.	$16.19
Lisle, Illinois	August 1982	6,846	Masonry bearing walls, wood siding, carpet and linoleum flooring, suspended ceilings, asphalt shingle roof. Gas forced air heating; split system air-cooled, condensing-type cooling.	$70.05
Morris, Illinois	March 1983	3,560	Masonry columns, concrete block and face brick walls, precast concrete plank roof structure, built-up roofing. Electric baseboard heating.	$44.16

Source: F. W. Dodge, McGraw-Hill Information Systems Company, Costs and Trends of Current Building Projects: Region A Edition/Midyear 1979 Through Year End 1983 (New York: F. W. Dodge Division, McGraw-Hill Information Systems Company, 1979, 1980, 1981, 1982, and 1983). These editions were the most current as of August 1984.