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**NEEDS ASSESSMENT STUDY
GREENFIELD FIRE DEPARTMENT
GREENFIELD, MA**

January 24, 1994

GREENFIELD FIRE STATION NEEDS ASSESSMENT STUDY

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Background

Greenfield's existing fire station was built in 1936 to standards for fire equipment and apparatus which have changed significantly in the past fifty years. Modern equipment is now wider and heavier which has stretched the stations ability to accommodate the needs for the Fire Department. In physical terms the apparatus squeezes through doors which are barely wider than the apparatus and overhead clearances above apparatus are woefully inadequate and substandard. The net result being delayed response time in emergencies and increased potential for damage to facilities and apparatus. Within the building itself the space constraints continue with low headroom and minimal space side to side prohibiting work on the apparatus. Current standards for facilities favor doors on both ends of apparatus rooms for immediate access to each piece of apparatus. This is not the case nor is it feasible with the current facility.

Following meetings with Chief Mackenzie and DPW Engineering Superintendent Larry Petrin, conversations with the Planning Office and review of data provided the town by Metcalf and Eddy in their Water Pollution Control Plant Facilities Plan Final Report, the following needs assessment study was developed. Planning a new facility to meet current and future needs of the town entails consideration of several factors. These include evaluation of current trends, projections for future growth, analysis of growth and development historically and definition of physical needs for the department.

Brief History

Historical population data indicates the population of Greenfield in 1940 (shortly after completion of the existing station) was 15, 000. Industry was centrally located with GTD and Millers Falls Tool facilities within walking distance of the central business district. Over the next twenty years the post war baby boom increased the population by 15%. Since 1960 the town population stabilized with modest fluctuations between 18,000 and 19,000. In the 70's, local control of industry was lost with the purchase by larger corporations of both GTD and Millers Falls Tool resulting in the relocation of operations outside of the town. While population stabilized and industry exited, housing starts continued as family size decreased. Commercial development extended along major arteries and the town was bisected by the construction of Interstate 91 and Route 2 By-Pass.

Over these years Greenfield's Fire Protection needs were addressed by the Main Street Station and the Brookside volunteer fire company located in the north end of Country Club Road. The Brookside facility was closed in March of 1990. Since that time the Main Street Station has served as the sole facility.

A Look Ahead

Greenfield's Planning Department has indicated that the town is considering initiatives which will encourage growth in three areas: industrial development in the Industrial Park at Adams Road, adaptive re-use of vacated mill buildings along the Green River south of Main Street, and commercial revitalization of the downtown area. In addition subdivisions for new housing units are approved for the north end of town off of Log Plain Road East and near the Greenfield Community College. Open space in the meadows (Colrain and Plain Roads) could succumb to development pressure as farming operations become less viable.

Population increases projected by the Franklin County Planning Office through the next decade are expected to be less than 1 percent. Projecting the established trend since the sixties into the next half century would suggest that Greenfield's population is unlikely to experience any rapid growth and will likely remain between 18,000 and 20,000 residents.

Factors affecting Fire Protection

There are several factors which affect the level of fire protection provided by a community. For many years insurance underwriters, governmental agencies and fire service organizations have sought to develop standards for evaluating fire service. NFPA (National Fire Protection Association) appointed a Select Committee to evaluate criteria for service levels of fire departments in 1990. The current rating system used by many communities including Greenfield is a grading system administered by the Insurance Service Organization (ISO). The rating system becomes a basis for establishing primarily commercial insurance rates within a community and may affect residential rates as well. The National Board of Fire Underwriters (Now the American Insurance Association) have issued engineering bulletins for establishing fire department standards, however, the last bulletin was issued in January of 1963. The role of the Select Committee established by NFPA was to provide discussion between the numerous agencies and attempt to develop some consistency in development of standards. The rating system developed by ISO has become the basis for developing a Fire Rating Suppression Schedule. The criteria weights three areas in establishing a rating. These include water supply, fire department and fire alarm systems. Greenfield was last rated in December of 1992 and received a rating of 5 on a scale of 1 to 10 with 1 being the ideal and 10 being none. The only criteria related to facilities in the grading system has to do with distribution of fire companies. The remaining criteria for fire departments relate to equipment, man power and training.

Geographic Site Criteria

In an optimum situation, ISO suggests, a fire company should be located within 2-1/2 miles of any structure in town. In Greenfield, this would not be easily accomplished without multiple facilities. Therefore, some risk assessment needs to be evaluated in establishing site criteria. The town is divided by railways, limited access highways and a river which create limited opportunities for access by fire apparatus to certain parts of the town. East Greenfield is isolated from the rest of town with Mountain Road

connecting to the east end of Maple Street and Montague City Road extending to the southern end of Deerfield Street. Deerfield Street and neighborhoods to the southwest can only be accessed via the Bank Row, River Street and Washington Street underpasses of the B&M railroad. Western parts of town are accessed by the Route 2 Rotary, Colrain Street and Leyden Road overpasses of Route 91. Northern parts of town are accessed by Country Club Road, Bernardston Road and Adams Road. Prudent planning would suggest coverage should be provided for areas of anticipated commercial and industrial development. This would favor a site located in the vicinity of Federal and Pierce Streets. (See Map 1)

Broader coverage could be provided with a main station and sub-station. Two stations have significant financial implications. It requires some duplication of facilities and equipment. If two stations are considered, a site on River Street would provide coverage for the entire town north as far as the Route 2 By-Pass with a sub-station located in the northern part of town in the vicinity of Severance Street. In essence, re-establishing the Brookside station. (See Map 2) While two stations may appear on the surface to provide a superior level of fire protection, the fact of the matter is that two stations will only marginally provide a better service rating. Fire company distribution accounts for only 4% of a communities overall rating. Increasing fire fighting personnel, for example, would have a greater impact on the service rating than distribution of facilities.

Since multiple stations would not significantly improve the level of fire protection and would require greater financial commitment for facility operating expenses than a single facility, the following program for a new central facility was developed with provisions for expanding staffing levels to include an additional watch. Using general planning and programming requirements for fire stations of similar size, the program outline was generated to determine gross area requirements for the proposed new central station for the Town of Greenfield.

Criteria for the new Greenfield Fire Station

The proposed new facilities for the Greenfield Fire Station will include an apparatus room of 5 bays with drive through access to house equipment, administrative support spaces and dormitories for on-duty firefighters. The program requirements include a projected gross area of 18,330 square feet. The building footprint will be equal to the gross area if a one story scheme is developed to meet program requirements. If the administration/dormitory areas are developed as a two story building element, then the building footprint for the new building could be reduced up to 5,000 square feet. In developing the criteria for site selection several variables have been considered. These include implications of building size, circulation requirements for the vehicles, orientation to the street and zoning requirements.

Emergency Medical Service

The fire department does not currently include emergency medical services within the department. These needs were not included in the program requirements for the new

station. If upon future analysis these services would become part of the fire departments responsibilities then additional facilities would be required either as an addition to the central station or as a separate facility.

Greenfield Fire Department
Greenfield, MA

Program Outline

Current Equipment

Current equipment to be housed in the apparatus room include:

Equipment:	YR/Make	Length	Width	Ladder Ext.
• Engine #1:	1976 Maxim	336"l	106"w	60"
• Engine#2:	1988 Pierce	372"l	112"w	60"
• Engine#3:	1993 Pierce	351"l	96"w	20"
• Engine #5:	1982 Pierce	324"l	102"w	60"
• Ladder#1:	1972 Maxim	572"l	103"w	N/A
• Rescue#8:	1971 Ford	312"l	98"w	N/A
• Fire Alarm:	1985 Chev.	235"l	110"w	N/A
• Brush Truck:	1988 Chev.	236"l	78"w	N/A
• Haz-Mat:	1979 Chev.	224"l	102"w	N/A

FACILITIES

I. Apparatus

Apparatus Room **7200 s.f.**

5 Bays 20 foot wide by 72 feet deep are required to house apparatus. It is preferred to provide front and rear apron areas for access to bays from either direction. Directly adjacent or included as part of the apparatus room should be:

Fire Gear Lockers	150 s.f.
Hose/Equipment Repair	150 s.f.
Hose Racks/Gear Cleaning	100 s.f.
Air Charge Equipment	120.s.f.
Hose Tower	100 s.f.

Sub-total Apparatus **7820 s.f.**

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II. Administration

Entry & Foyer		200 s.f.
Dispatch/Watch Room		150 s.f.
Fire Alarm Equipment		175 s.f.
Offices		
On Duty Officer		150 s.f.
Fire Prevention Office		150 s.f.
Admin/Secretary		150 s.f.
Chief's Office		175 s.f.
Drill/Conference Room		250 s.f.
Public Toilets		225 s.f.
Meeting/Training Day Room		1200 s.f.
Kitchen Alcove		200 s.f.
Vending Alcove		50 s.f.
<hr/>		
Sub total Administration		3075 s.f.

III Dormitories

Personal Lockers		120 s.f.
Dormitories for 3 to 4 men	3 @ 400 s.f.	1200 s.f.
Private Sleeping Rooms	3 @ 150 s.f.	450 s.f.
Toilets/Showers		300 s.f.
Laundry		50 s.f.
Exercise/Fitness Room		300 s.f.
<hr/>		

Sub-total Dormitories	2420 s.f.
<u>IV. Mechanical/Storage</u>	
Janitor's Closet	50 s.f.
Storage	400 s.f.
Mechanical Room	800 s.f.
Emergency Generator	100 s.f.
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Sub-total Mechanical/Storage	1350 s.f.
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TOTAL NET SQUARE FOOTAGE	14,665 s.f.
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Net to Gross Ratio (x 1.25)	
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TOTAL PROJECTED SQUARE FOOTAGE	18,330 s.f.

Building Size

For the purposes of developing site criteria, one and two story schemes were considered. The apparatus room represents a block of space 110 feet by 75 feet with access required in the longer dimension from both sides. The admin/dorm wing has been shown as a one story block 75 feet by 135 feet or a two story block 85 feet by 60 feet. Obviously, other configurations are possible and final configuration will be dependent on the actual design developed once a site has been selected.

Vehicular Circulation

Circulation outside the apparatus room should include a 50' apron on each side to allow a truck to be completely out of each bay before beginning a turn. Inside turning radius for a truck is thirty five feet. Shorter vehicles, such as the brush truck and Haz-Mat truck will comfortably turn in twenty feet. In addition, enough area should be allotted for

parking to accommodate a fully occupied watch and all on-duty personnel. Parking for twenty cars on-site should meet this requirement. Municipal uses, such as meetings, workshops or voting should also be considered. The meeting/day room could accommodate 80 to 100 people. Parking criteria of the zoning by-law suggests one space be provided for every 3 seats in assembly uses. Potentially 30 additional spaces could be warranted for public use of the meeting room. The possibility of off site parking should be evaluated during site selection and site size increased if off site facilities are limited or would adversely impact traffic flow and/or neighboring uses. Diagrammatic layouts do not account for on-site accommodation of additional parking.

Orientation to the Street

The apparatus room could front the street with access around the building to the rear or be rotated 90 degrees with access to both sides of the apparatus room. The diagrammatic site plans show both conditions with lot sizes required for each scenario. A third scenario is a corner lot. The option selected will be dependent on available sites and operational preferences. In any case, if multiple curb cuts are used to access the site, only one should be used when fire apparatus are responding to a call.

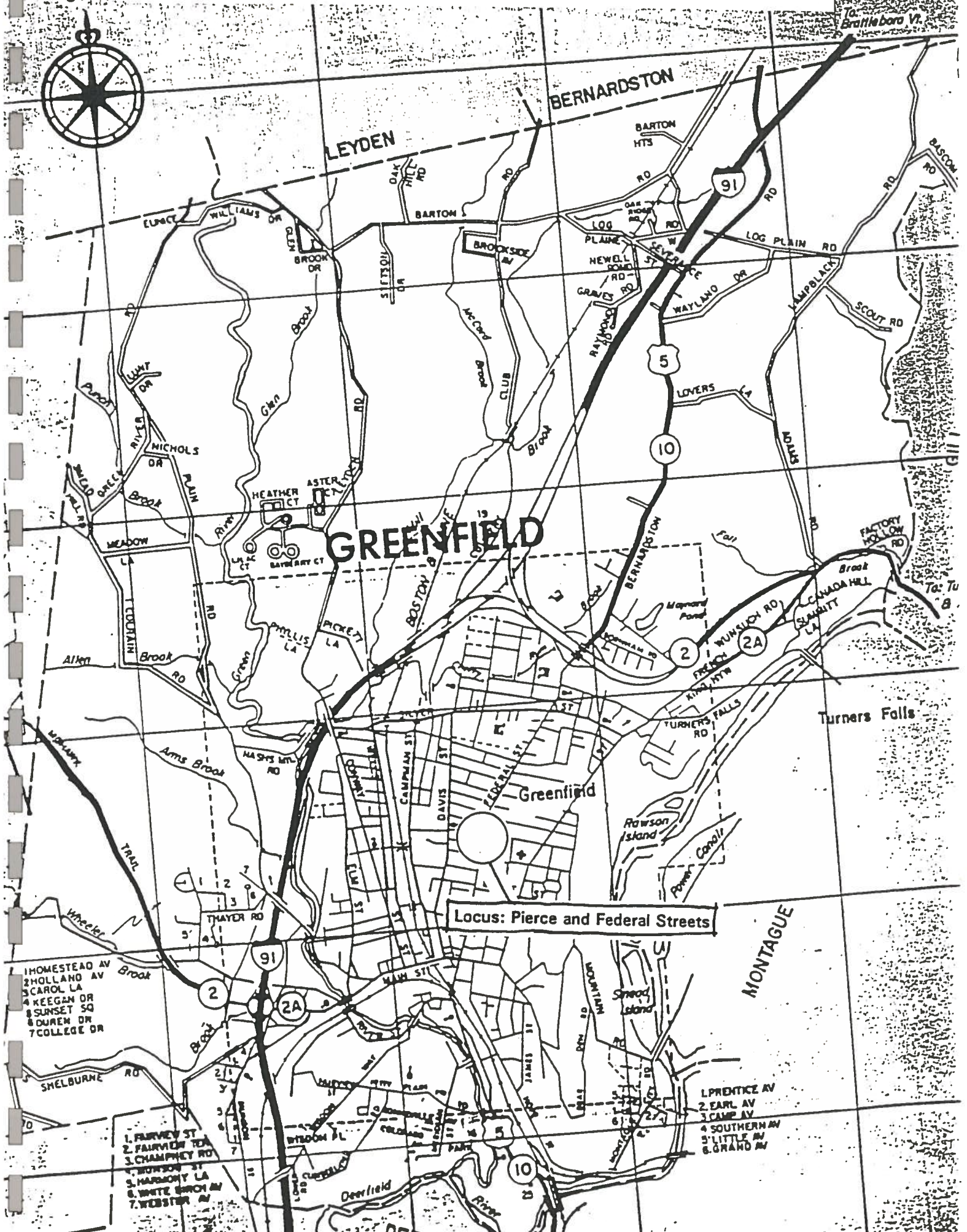
Zoning Requirements

Municipal uses are allowed in all districts. Essentially the new station could be located anywhere in the town. There are considerations in selecting a site that make certain districts more or less desirable. The water protection (WP) overlay district should be avoided as a potential site location. Both WP Districts are located well outside the town and would likely be rejected because of their location. The GI and PI districts may likely be rejected because of availability. All other districts are good candidates. Since RA, RB, & RC districts require 50 percent open space and SR and O districts require 25 percent open space, minimum lot sizes will vary according to district. In general, minimum lot sizes acceptable for consideration are 2.25 acres in R districts, 2.0 acres in SR and O districts and 1.75 acres in commercial districts. Front, side and rear yard requirements will not impact site size from district to district since apron requirements exceed minimum yard requirements. Required screening from adjacent residential uses will require a 10 foot buffer strip at all parking and paving areas along lot lines in R districts or sites abutting residential property. Zoning requirements also govern parking requirements. The number of required spaces as discussed above is based upon an interpretation of the bylaw and should be confirmed with the building inspector. The actual number could be reduced by special permit. For selection criteria, on-site parking was based upon employee count and the assumption that the occasional use by the public would warrant the granting of a special permit to exclude assembly uses when determining the on-site parking requirement. The maximum width of driveway entrances is defined as 24 feet. This may be modified due to special circumstances as provided for in the bylaw. Since these requirements may be modified and represent special circumstances, it has been assumed that relief would be granted.

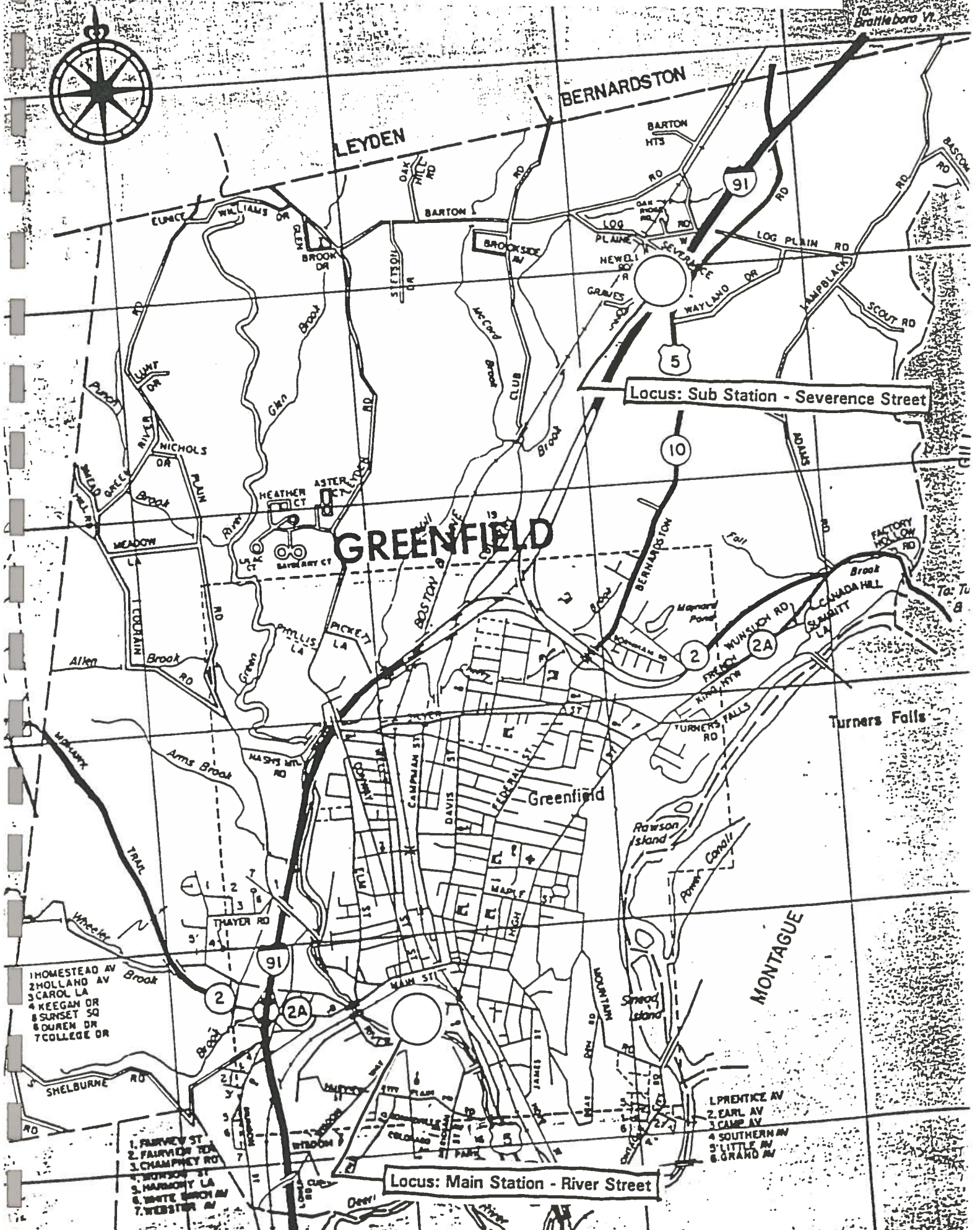
Summary

The site diagrams demonstrate size requirements based upon the criteria listed above. Each scenario represents minimum requirements to meet the planning criteria. Other than size, the major site selection criteria will be location. A central facility will need access to major cross streets to dispatch equipment quickly to any location in town. Several potential sites, if possible should be identified and evaluated for dimensional suitability, impact the facility will have on the neighborhood and additional requirements such as site lines for oncoming traffic and/or the potential need for traffic signals. Traffic analysis should be performed on the final site to establish the impact dispatching vehicles will have on traffic at neighboring intersections and entrances to the site to assure safe and quick responses.

1. CENTRAL STATION PREFERRED SITE LOCATION



2. MAIN STATION / SUB STATION SITE LOCATIONS



Locus: Sub Station - Severence Street

Locus: Main Station - River Street

- 1 HOMESTEAD AV
- 2 HOLLAND AV
- 3 CAROL LA
- 4 KEEGAN DR
- 5 SUNSET SQ
- 6 DUREN DR
- 7 COLLEGE DR

- 1 FAIRVIEW ST
- 2 FAIRVIEW TER
- 3 CHAMPNEY RD
- 4 WILSON ST
- 5 MARBURY LA
- 6 WHITE BROOK AV
- 7 WEBSTER AV

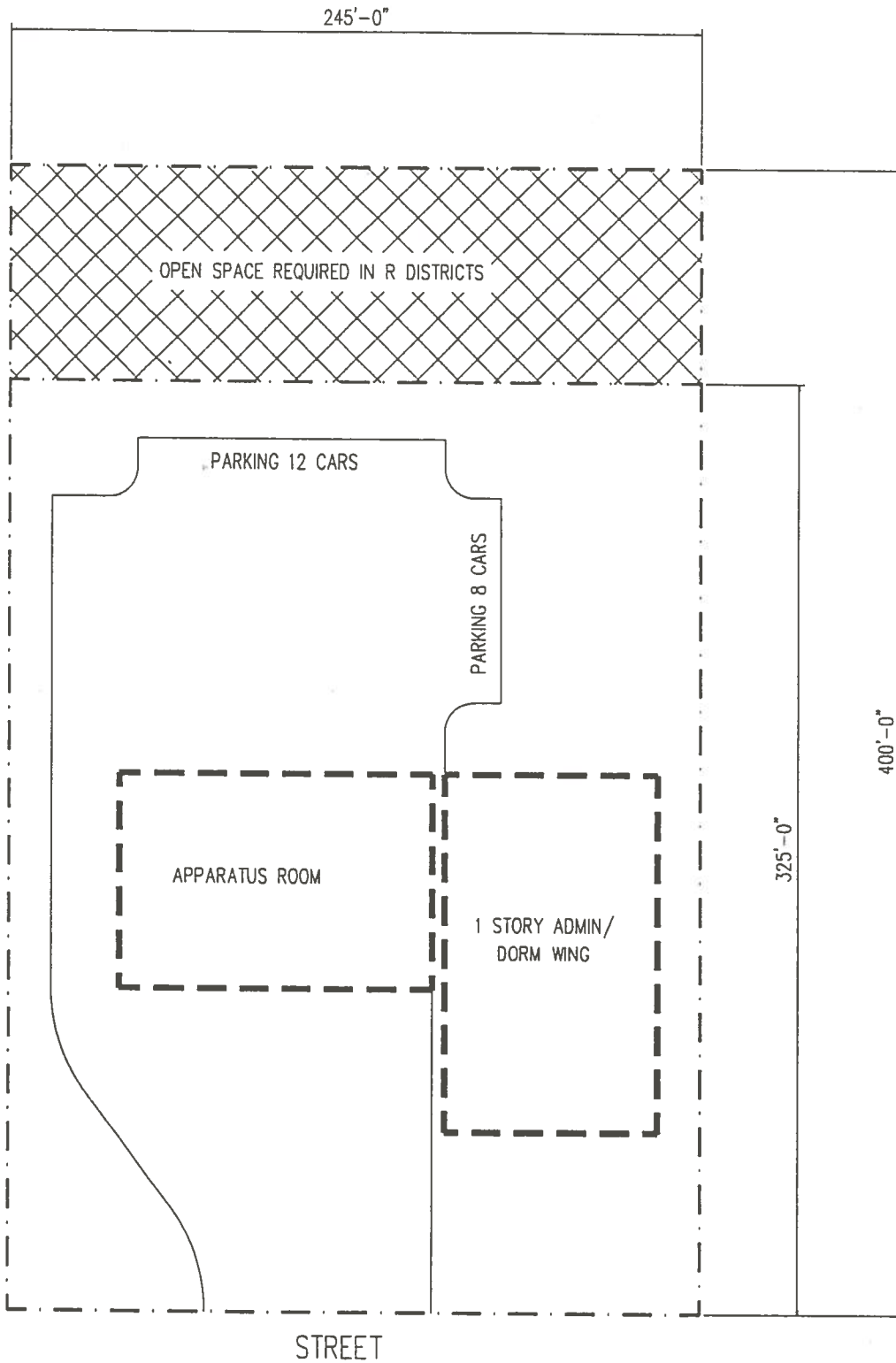
- 1 PRENTICE AV
- 2 EARL AV
- 3 CAMP AV
- 4 SOUTHERN AV
- 5 LITTLE AV
- 6 GRAND AV

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Greenfield Fire Station

Site Selection Criteria



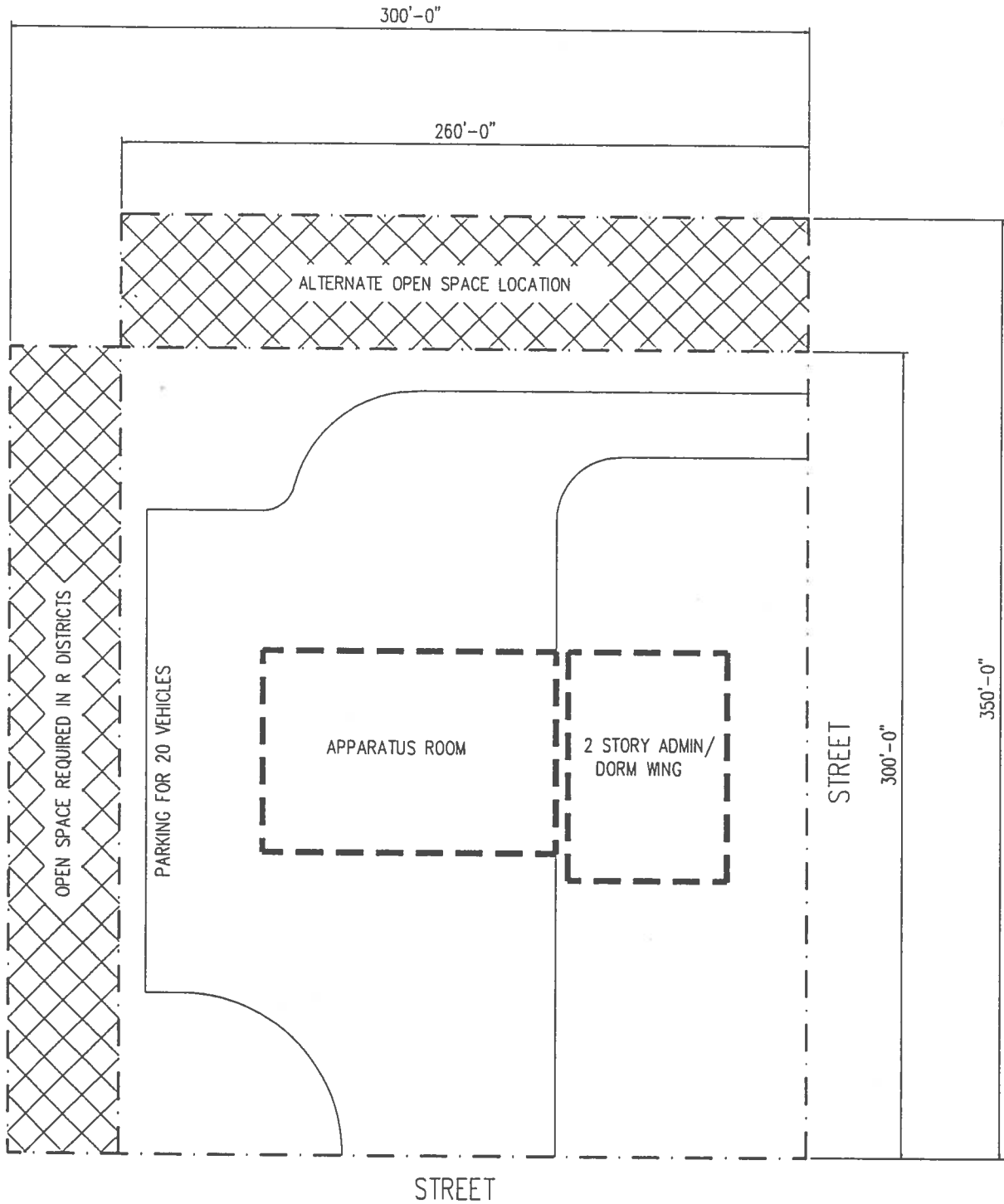
APPARATUS ROOM FRONTING STREET - 1 STORY SCHEME

MINIMUM LOT SIZE - 245' x 325' (245' x 400' in R Districts)

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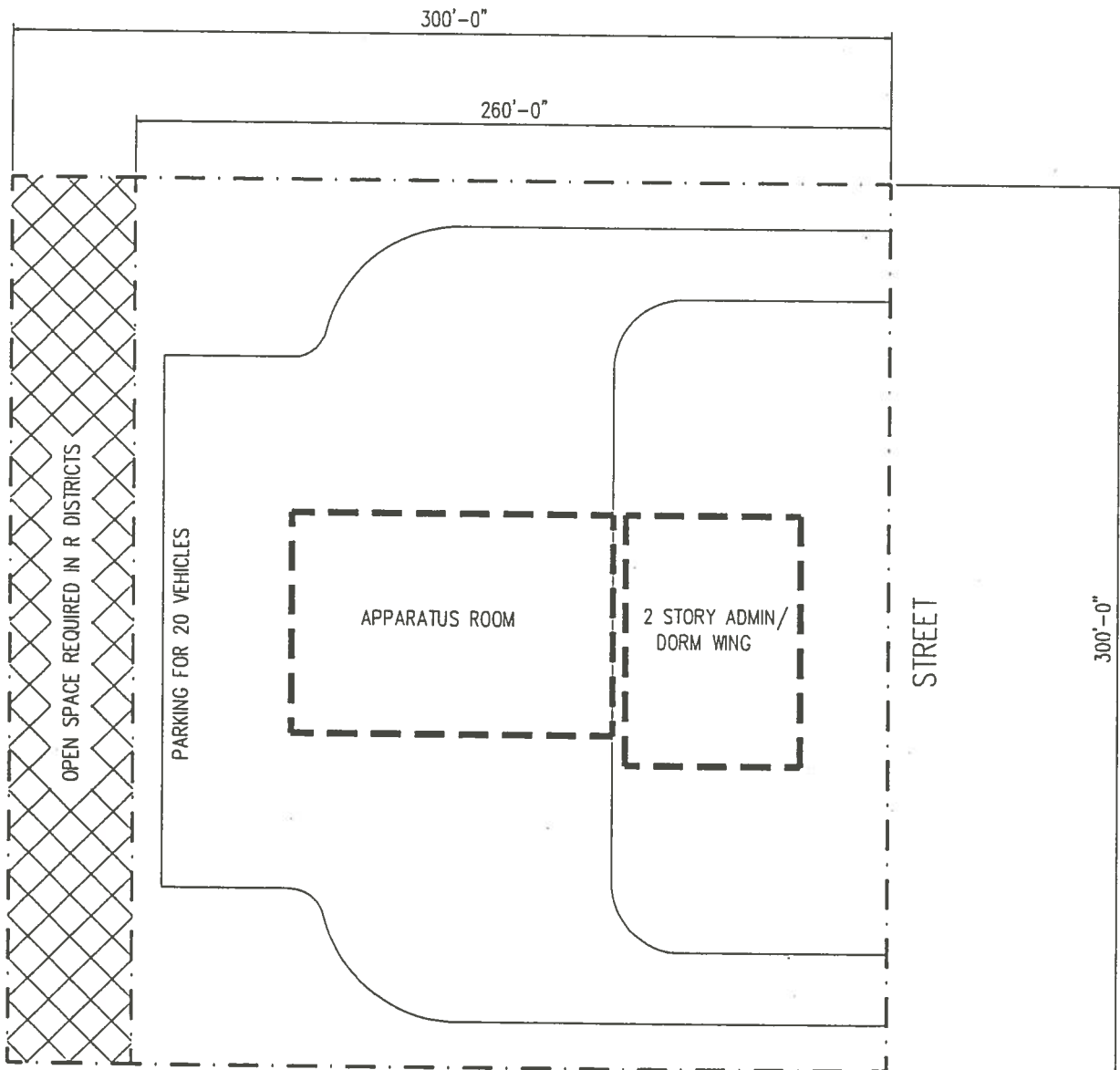
Greenfield Fire Station

Site Selection Criteria



CORNER LOT - 2 STORY SCHEME

MINIMUM LOT SIZE - 260' x 300' (260' x 350' or 300' x 300' in R Districts)



APPARATUS ROOM PERPENDICULAR TO STREET - 2 STORY SCHEME

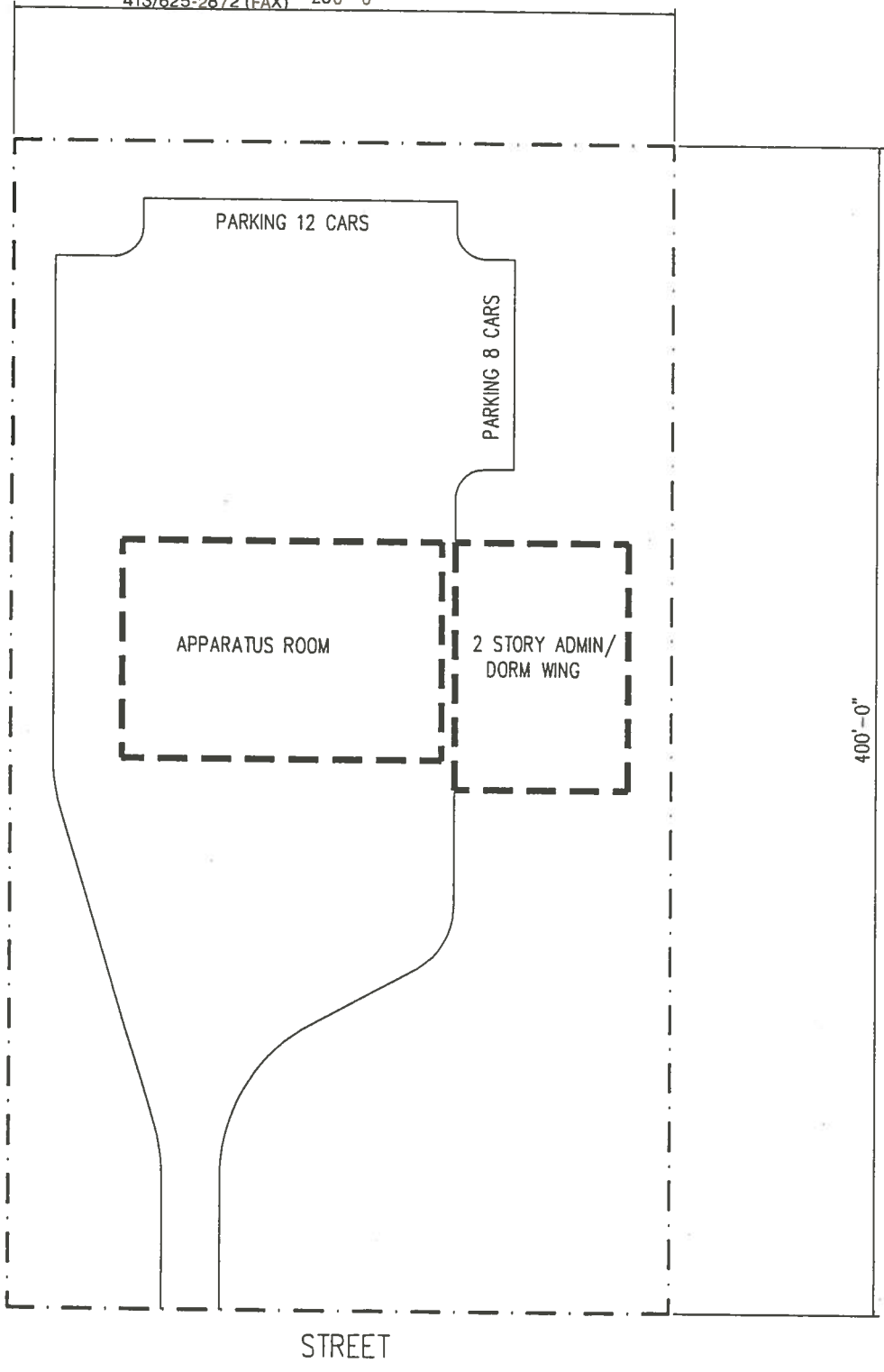
MINIMUM LOT SIZE - 260' x 300' (300' x 300' in R Districts)

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Greenfield Fire Station

Site Selection Criteria



NARROW CURB CUT FRONTING STREET - 2 STORY SCHEME

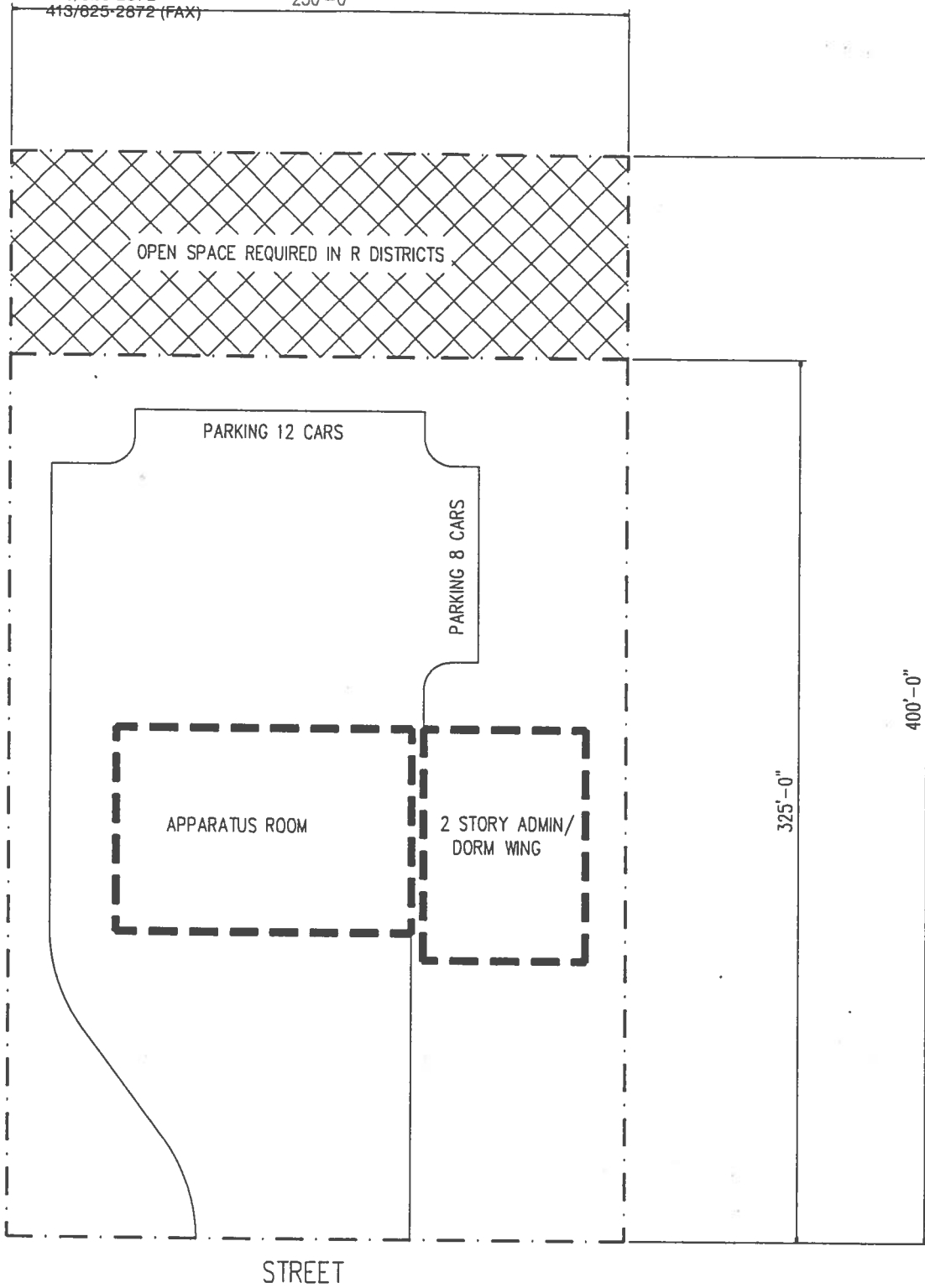
MINIMUM LOT SIZE - 230' x 400'

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Greenfield Fire Station

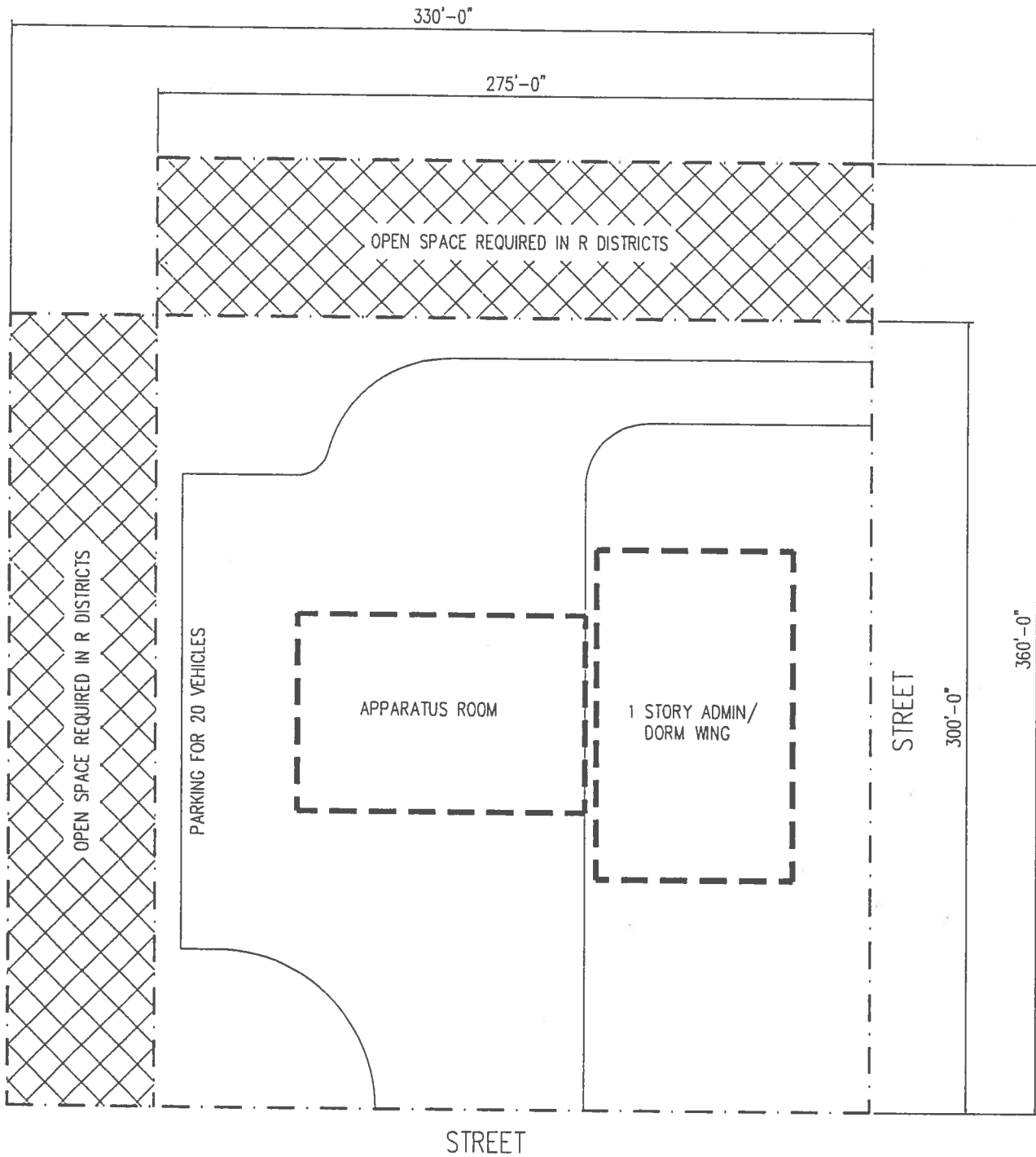
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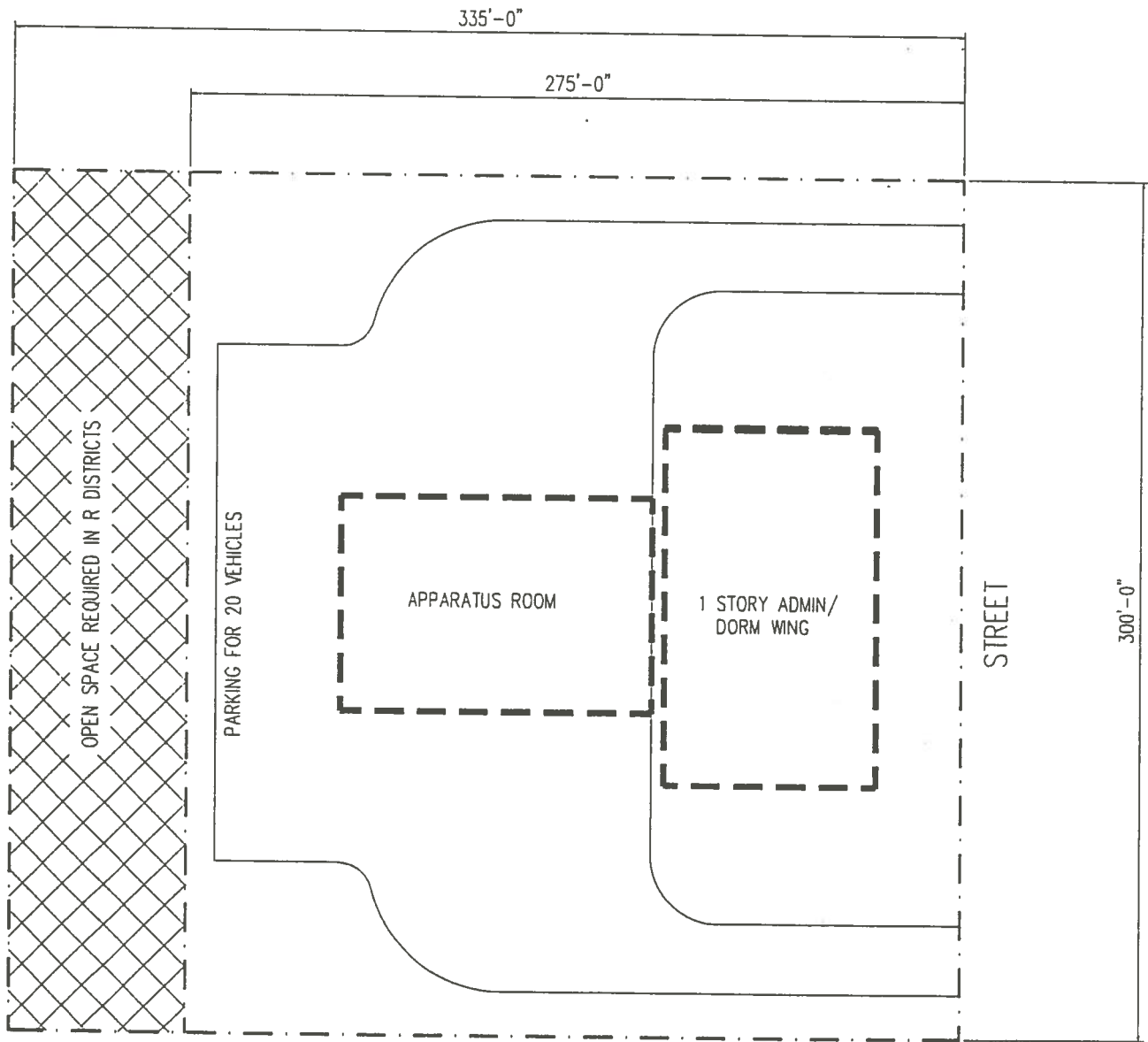
APPARATUS ROOM FRONTING STREET - 2 STORY SCHEME

MINIMUM LOT SIZE - 230' x 325' (230' x 400' in R Districts)



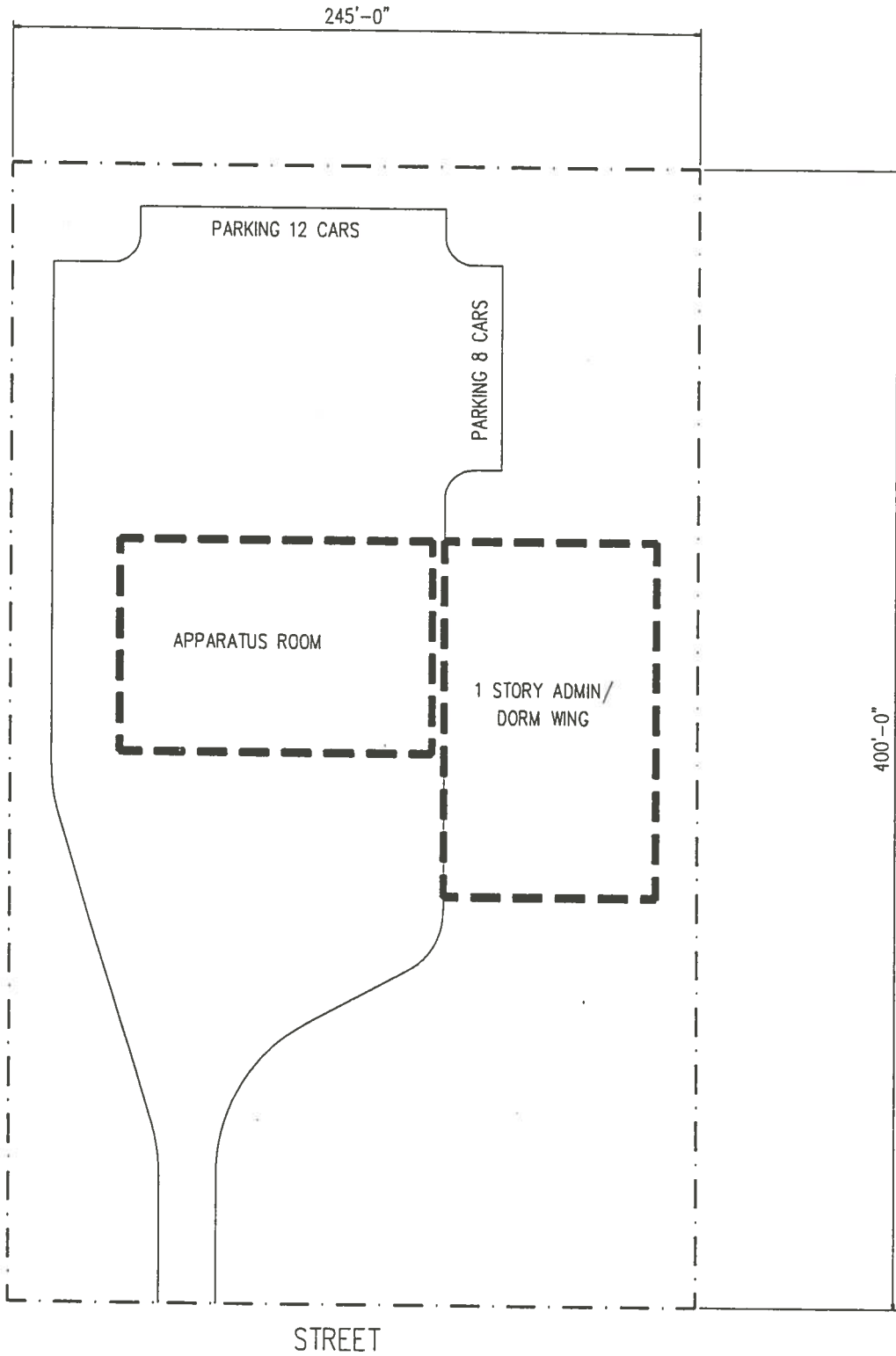
CORNER LOT - 1 STORY SCHEME

MINIMUM LOT SIZE - 300' x 275' (300' x 330' or 360' x 275' in R Districts)



APPARATUS ROOM PERPENDICULAR TO STREET - 1 STORY SCHEME

MINIMUM LOT SIZE - 300' x 275' (300' x 335' in R Districts)



NARROW CURB CUT FRONTING STREET - 1 STORY SCHEME

MINIMUM LOT SIZE - 245' x 400'

Bibliography & Acknowledgements:

1. Chief James J. Mackenzie, Greenfield Fire Department.
2. Laurence F. Petrin, Engineering Superintendent, Greenfield Department of Public Works.
3. Terry Anderson, Greenfield Planning Office
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9. 'No surprises' fire station design, Mithchell S. Conner, Fire Chief, Feb. 1992.
10. From the Ground Up: Constructing or Reconstructing a Modern Firehouse, Part 2, Paul J. De Silva, Fire Engineering, January 1990.
11. Fire Station Planning, Design & Construction, Robert H. Ely, International Association of Fire Chiefs, c 1989.