GOVERNMENT OF THE DISTRICT OF COLUMBIA
OFFICE OF PLANNING

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D.C. OFFICE OF PLANNING
2003 FEB -4 PM 12:48

MEMORANDUM

TO: Board of Zoning Adjustment

FROM: JLS for Andrew Altman, Director

DATE February 19, 2003

SUBJECT: BZA Application **16991**
1700 Rhode Island Avenue, N.E. – Public Safety Communications Project (OCTO)

APPLICATION
The Office of the Chief Technology Officer (OCTO) is requesting a **special exception** for a proposed replacement of an existing telecommunications facility at 1700 Rhode Island Avenue, N.E.

SUMMARY RECOMMENDATION
Office of Planning **recommends approval** of the special exception request for the 150-foot monopole at 1700 Rhode Island Avenue, N.E. to support the District's upgrade of its emergency communications network.

SITE AND AREA DESCRIPTION
The subject property is located in Square 4134 in the northeast quadrant of the District. Hamlin Street bound the Square to the north, Rhode Island Avenue to the south, 18th Street to the east and 17th Street on the west. The property is improved with a 2-story brick structure, a parking lot and a 100-foot tall monopole used by the D.C Metropolitan Police and Fire 911 Headquarters. The area is a mix of commercial and residential uses with commercial properties in the C-2-A zoned district along Rhode Island Avenue, and the residential R-1-B zoned areas to the north and south of Rhode Island Avenue.

PROJECT DESCRIPTION
OCTO is responsible for the upgrade of the emergency management communication system for the District and proposes to replace the aging system with a new state of the art radio network system. The Metropolitan Police Department, and the D.C Fire and Emergency Management Agency use the radio network for local and regional emergency communications.

BZA
Case No. 16991
Exhibit No. 26

Board of Zoning Adjustment
District of Columbia
CASE NO. 16991
EXHIBIT NO. 26

As part of its wider strategy, OCTO proposes to replace the existing monopole located at 1700 Rhode Island Avenue, N.E. with a new 150-foot pole, to be located at the northeast corner of the lot. Sixteen new antennas including three microwave dishes, three panel antennas and ten whips will be located at various heights on the monopole. The emergency communications system needs to be elevated to provide the required coverage, and positioned such that it clears terrain and other structures.

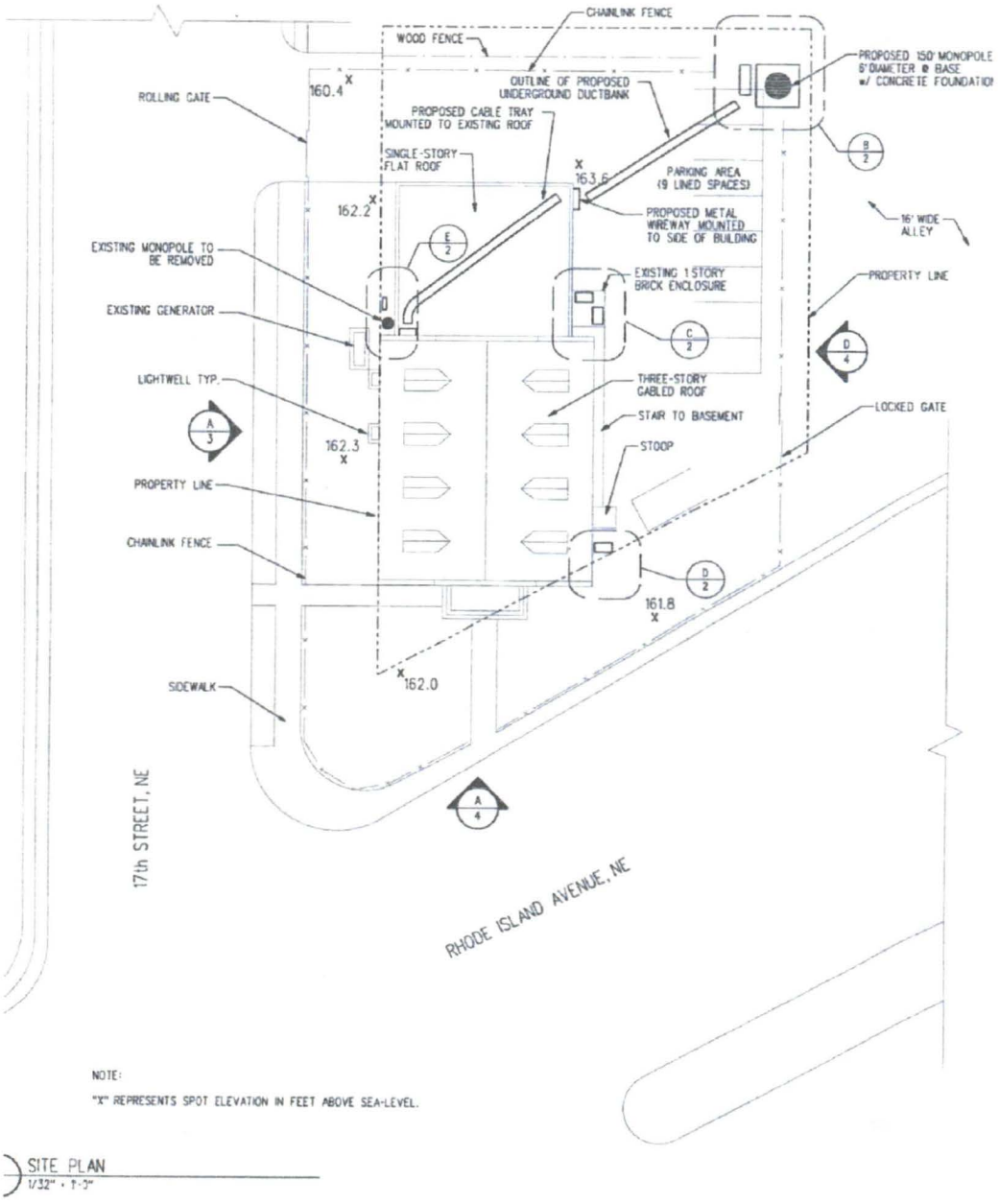


Figure 1 – Site Plan - 1700 Rhode Island Avenue

ZONING REQUIREMENTS and ANALYSIS

The site is zoned C-2-A. Installation of telecommunication systems involving towers and monopoles in this district require special exception approval by the Board of Zoning Adjustment. Specifically, the Board is authorized to grant special exceptions, where they will be in harmony with the general purpose and intent of the Zoning Regulations and Maps and will not tend to adversely affect the use of neighboring property, in accordance with the provisions set forth in §212 as follows:

Section 212

212.2 *The proposed use, location, and related conditions shall be consistent with the purposes set forth in § 2520.*

The proposed use, location and related condition are consistent with the purposes of §2520. The new monopole will be higher than the existing by 50 feet to accommodate more antennas than the previous monopole. The existing pole is located on the western side of the property and is not screened from public view. The new location is an improvement since it is proposed at the far eastern corner of the property, which is tree-lined, and does not detract from the streetscape along Rhode Island Avenue and 17th Street. The eastern property line abuts an alley, and the new location is less of a compromise to the health, welfare or safety of the neighborhood population.

212.3 *If review by the Historic Preservation Review Board or Commission of Fine Arts is required, concept review and approval shall have occurred before review by the Board of Zoning Adjustment.*

No review by the Historic Preservation Board or the Commission of Fine Arts is required.

212.4 *The Board may impose conditions relating to operation, location, screening, or other requirements as it deems necessary to protect adjacent and nearby property, consistent with the general purpose and intent of this section.*

The submitted plan shows that the site is already secured and there is no additional room for landscaping.

212.5 *The Board may require the removal of any nonconforming antenna as a condition to the approval of an antenna.*

The applicant has stated that any abandoned telecommunication equipment, including the older monopole and related antennas will be removed upon installation of the new structure.

212.6 *The location and other characteristics of the antenna shall be reasonably necessary for the intended use of the antenna.*

The existing tower is a necessary accessory in support of the communications operation of the 911 headquarters of the Metropolitan Police and Fire Department at the subject site. The location of the tower is necessary to support the required coverage area,[1] and the efficiency of the antennas. The applicant submits there are no existing alternative structures or properties in the vicinity, which would allow OCTO to meet the objectives of the communications network. In addition, the existing monopole structure could not accommodate an increase in the number of antennas necessary for the upgraded system.

212.7 *The present character and future development of the neighborhood shall not be adversely affected.*

OP does not believe that the present and future character of the neighborhood will be affected. Improved facilities increase the capacity for communication among emergency personnel, thereby reducing the response times in crises. In this instance, the older monopole has been in operation for some time and OP has no record of complaints due to its operation and function in the community. Upon installation of the new facility, the only traffic to the site will be for maintenance, which by the applicant's experience has amounted to 1 to 2 visits per month or for emergency repairs. There will be no offensive odors emitted by equipment or antennas or other harmful emissions or noise from the equipment. The new tower and its proposed location represents an improvement for the immediate neighborhood, in terms of reduced visibility and enhanced communications for the immediate neighborhood and the District.

OCTO is responsible for improvement of the District's emergency communications system used exclusively by District and federal public safety and emergency preparedness personnel. Emergency communications have not been effective with the current system, including coordination with personnel in various District agencies and with Maryland and Virginia. The replacement monopole with its increased height will support more antennas with increased capacity for communication. The relocation of the monopole will also be an improvement on the visual impact of the current system, since it will be removed from its close proximity to public space on the west of the property to a

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[1] **Coverage & Antennas**
Each site in the system provides coverage to that local area which allows communication with all of the other sites through a prime site. The antennas and equipment located at each site provide a radio communication link between the system and its members as well as between each site and the central communications office. The transmit antennas send the transmissions in a focused direction. The whip antennas receive the transmissions from mobile or portable radios. Other sites have microwave dishes, which provide a site-to-site link, or backbone, for the system.

secure compound and away from the public's visibility along Rhode Island Avenue and 17th Street.

The establishment of an improved telecommunications facility is beneficial to the public good and the special exception may be granted without substantially impairing the intent, purpose and integrity of the zone plan. Increase in the overall height of the tower will require mayorial approval, if the Board approves the application.

OP believes that installation of the new system complies with current and proposed Zoning Regulations, which encourage co-location on structures to diminish the adverse visual impact of antennas and their support structures.

COMMUNITY COMMENTS

ANC 5A has requested that the applicant present their proposal at another community meeting to be held on March 6th, 2003. The ANC will record their recommendation at a subsequent meeting.

CONCLUSION

The Office of Planning **recommends approval** of the installation of the replacement lattice tower to accommodate the District's upgrade of its emergency telecommunications network. The intent of the antenna regulation is to ensure that antennas have as little visibility as possible from public space. Whenever possible, co-location of antennas on an existing tower is encouraged as a way to limit the visual intrusion of antennas. OP supports the removal of the existing monopole and placement of the proposed to the rear of the property, since it is a visual improvement for the immediate neighborhood and the District's skyline.

Attachments:

1. Aerial Photo
2. RF Engineering Study


Brentwood Road NE
Hamlin St NE
18th St NE
17th St NE
Vacant Lot
Site
Alley
R-1-B
Existing Monopole
Rhode Island Ave NE
C-2-A
Girard St NE
R-1-B
Feature Key
Zoning Boundaries
Square Index
Board of Zoning Adjustment
Application No. # 16990
OCTO - 1700 Rhode Island Avenue
DC Office of Planning
February 21, 2003
Scale 1:1125
Attachment 1

ENGINEERING STATEMENT
RADIO-FREQUENCY EXPOSURE ANALYSIS
OCTO PROJECT
1700 RHODE ISLAND AVENUE, WASHINGTON, DC

An analysis has been made of the radio-frequency (RF) exposure in the vicinity of the proposed installation of radio communications facilities to be used by the Metropolitan Police Department and Fire Department/Emergency Medical at 1700 Rhode Island Avenue. This engineering statement describes the results of the analysis and the methodology employed.

The Public Safety Service radio installations, operating on dedicated frequencies, as proposed in the OCTO Project, are environmentally benign. They are compliant with the RF exposure standards adopted by the Federal Communications Commission (AFCC@) and do not constitute a health hazard. They are not a potential source of interference to television or radio broadcast station reception or to electrical or electronic devices. They are neither a noise source nor a generator of traffic, nor do they emit noxious fumes.

In brief, the analysis shows that the RF exposure from the proposed transmissions anywhere in the vicinity of the site will not exceed approximately 0.5 percent of the maximum permissible exposure ("MPE") established by the FCC for uncontrolled (general population) environments.

For the Police, four RFS Cablewave Model BMR 12-O-B1 antennas are to be located on the tower at a level of 138 feet (42 meters) above ground. One of the four antennas will transmit energy from four transmitters and the other three antennas will each transmit energy from three transmitters. The effective radiated power (the product of antenna gain and antenna power input) per transmitter will be 246 watts. Police transmissions will be in the band of frequencies from 852.6125 to 860.9875 millions of cycles per second (megahertz, or MHz).

For the Fire/Emergency Medical services, four RFS Model 455-7 antennas are to be located on the tower at a level of 160 feet (48.8 meters) above ground. Each of the four antennas will transmit energy from four transmitters. The effective radiated power per transmitter will be 575.4 watts. The frequency band to be employed is to be from 460.025 to 460.4750 MHz.

Antennas at the top of the tower are for receiving only and do not contribute to RF exposure. Each antenna concentrates the power toward the horizon. By so concentrating power, each antenna substantially reduces power delivered to nearby areas.

Calculations were made for distances starting from the base of the tower and extending for a distance of 2,000 feet. A tabulation of exposure versus distance at six feet above ground for the system follows:

Distance[1] (feet)	Pwr. Density ($\mu W/cm^2$)[2]	% of FCC MPE[3]	Times Below MPE
0	2.018	0.447	224
50	1.825	0.404	247
100	1.417	0.314	319
200	0.748	0.166	603
300	0.452	0.104	966
400	0.367	0.086	1,168
500	0.304	0.073	1,363
600	0.322	0.079	1,262
700	0.254	0.064	1,572
800	0.263	0.067	1,495
900	0.296	0.073	1,375
1000	0.308	0.073	1,369
1500	0.276	0.072	1,381
2000	0.247	0.065	1,542

[1] Horizontal distance from tower.

[2] Microwatts (millionths of a watt) per square centimeter.

[4] Maximum permissible exposure.

The power density does not drop off uniformly as the distance increases because the antenna concentrates the energy toward the horizon. At close distances, the amount of signal suppression may counteract the distance factor. At greater distances, the direct ray toward the location of interest more closely approaches the maximum of the antenna pattern. At some distances, the increased transmitted signal strength is a greater factor than the increased
distance factor. Beyond 2000 feet, the exposure level declines inversely as the square of the distance because the transmitted signal is at a maximum. That is, if the distance doubles, the power density drops by a factor of four.

Exposure levels were calculated by methods prescribed by the FCC in a technical bulletin produced by the Office of Engineering and Technology. The rules specify different levels of exposure for two environments: (1) Occupational/Controlled and (2) General Population/Uncontrolled. The second category permits the exposure at most frequencies, including those used for the public safety services, to be only one-fifth of the levels permissible for the first category. At 850 MHz, the maximum exposure level permitted is 568 $\mu W/cm^2$ averaged over a period of 30 minutes for the General Population/Uncontrolled environment. At 460 MHz, the maximum exposure level permitted is 307 $\mu W/cm^2$ averaged over a period of 30 minutes for the General Population/Uncontrolled environment.

In making the foregoing calculations, the assumption was made that all transmitters are operating simultaneously (an unlikely occurrence) and a reflecting surface is causing the exposure to be increased because the reflected signal is arriving in phase with the direct ray. The reflected signal could just as well arrive out of phase and act to reduce the exposure. Furthermore, the assumption was made that no intervening terrain obstructions, foliage or manmade structures reduced received signal strength.

The standard adopted by the FCC follows the maximum exposure limits set by the National Council on Radiation Protection and Measurements (NCRP), with some features taken from Standard C95.1/1992 of the American National Standards Institute/Institute of Electrical and Electronics Engineers. The NCRP is an independent expert group chartered by Congress.

The permissible exposures set, even for the Occupational/Controlled environment, are not at the threshold where biological harm may result. They are based on the scientific, peer-reviewed literature, including a data base of in excess of 10,000 papers, reporting experimental results. Studies show that the most sensitive indicator of a biological effect is behavioral. When animals are trained to do a particular task, their performance of that task is modified when exposure is equal to a level approximately ten times greater than the maximum exposures permitted for the Occupational/Controlled environment and fifty times greater than the exposures permitted for the General Population/Uncontrolled environment.

Behavior modification is not necessarily harmful and disappears when the field is reduced, but the assumption is made that prolonged exposure in excess of the level causing behavioral modification might be harmful.

Continuous exposure at the level cited above is well within the maximum exposure level permitted by the standards. Those standards are premised on avoidance of RF exposure that may have an adverse biological effect.

Jules Cohen, P.E.

February 21, 2003