

Case File Number: PLN15042

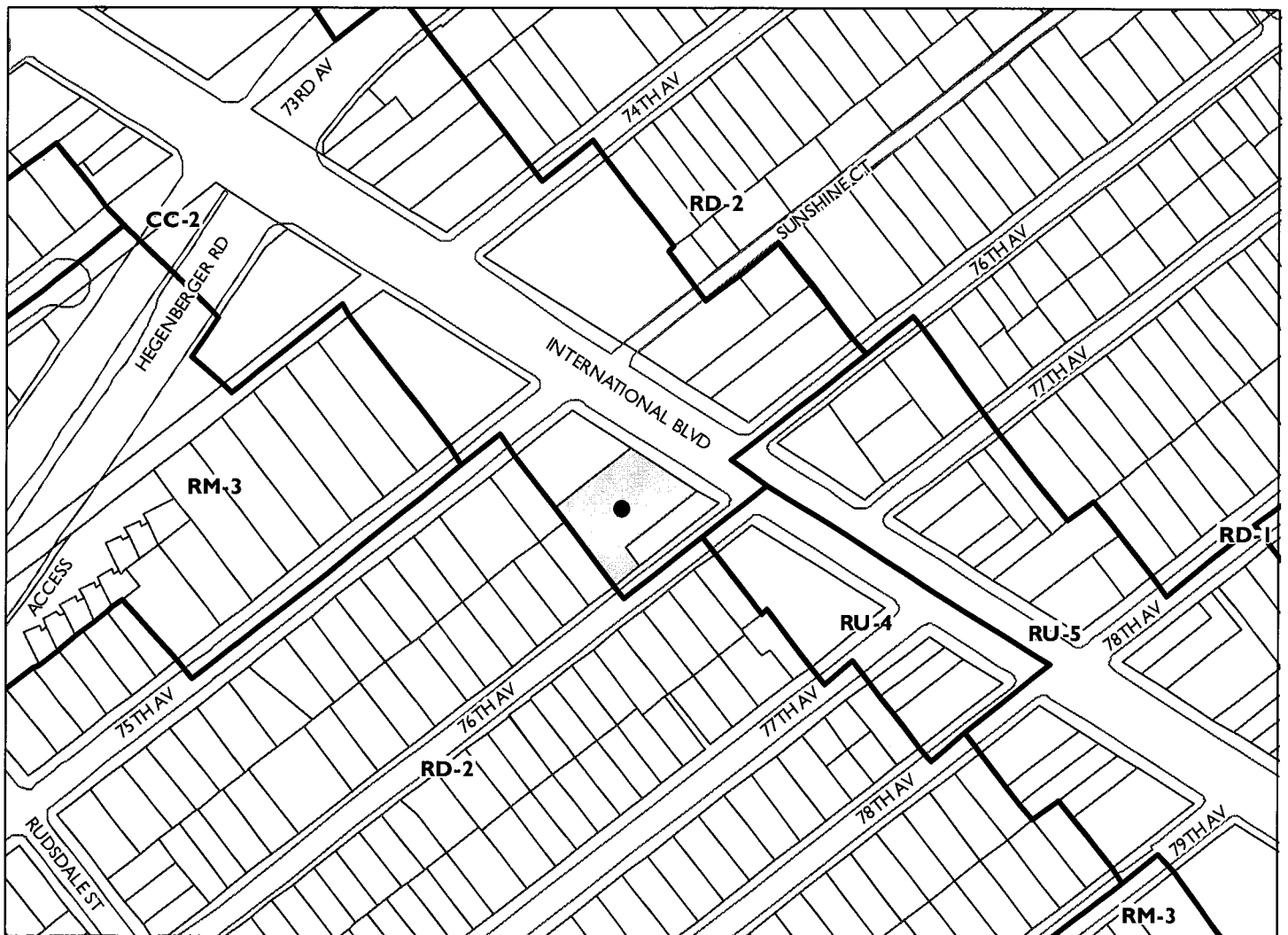
May 20, 2015

Location:	7515 International Blvd. (See map on reverse)
Assessors Parcel Numbers:	(041-4191-003-01)
Proposal:	To install eight (8) new concealed telecommunication antennas, twelve (12) remote radio units (RRU's) and associated equipment on the roof of an existing building.
Applicant:	Complete Wireless Consulting for Verizon Wireless
Contact Person:	Brandon Leonard
Phone Number:	(916)747-0624
Owner:	East Oakland Community Project
Case File Number:	PLN15042
Planning Permits Required:	Regular Design Review to install eight (8) concealed telecommunication antennas, 12 remote radio units and associated equipment on the roof of an existing building. Major Conditional Use Permit for a Mini telecommunication facility within 100 feet of a residential zone.
General Plan:	Community Commercial
Zoning:	CC-2 Community Commercial Zone
Environmental Determination:	Exempt, Section 15301 of the State CEQA Guidelines; minor alterations to an existing facility Exempt, Section 15303 of the State CEQA Guidelines; new construction of small structures. Section 15183 of the State CEQA Guidelines; projects consistent with a community plan, general Plan or zoning.
Historic Status:	No Historic Record
Service Delivery District:	4
City Council District:	7
Date Filed:	2/24/15
Finality of Decision:	Appealable to City Council within 10 days
For Further Information:	Contact case planner Michael Bradley at (510) 238-36935 or mbradley@oaklandnet.com

SUMMARY

The following staff report addresses the proposal for a new unmanned wireless telecommunication facility located on the roof of an existing transitional housing building. Given the number of antennas (8 total) and the type of structure, this would be considered a "Mini" Telecommunications Facility. The site is located within a retail transit oriented corridor of International Boulevard in East Oakland near the corner of 76th Avenue and International Boulevard. The site is in the CC-2 Community Commercial Zone and the General Plan designation for the site is Community Commercial. The project was reviewed by the Bureau of Planning staff, and found to comply with the design review findings with regard to compatibility and stealth of the antennas on the roof of the exiting building.

CITY OF OAKLAND PLANNING COMMISSION



0 125 250 500 750 1,000 Feet



Case File: PLN15042

Applicant: Complete Wireless Consulting for Verizon Wireless

Address: 7515 International Boulevard

Zone: CC-2

TELECOMMUNICATIONS BACKGROUND

Limitations on Local Government Zoning Authority under the Telecommunications Act of 1996 Section 704 of the Telecommunications Act of 1996 (TCA) provides federal standards for the siting of "Personal Wireless Services Facilities." "Personal Wireless Services" include all commercial mobile services (including personal communications services (PCS), cellular radio mobile services, and paging); unlicensed wireless services; and common carrier wireless exchange access services. Under Section 704, local zoning authority over personal wireless services is preserved such that the FCC is prevented from preempting local land use decisions; however, local government zoning decisions are still restricted by several provisions of federal law.

Under Section 253 of the TCA, no state or local regulation or other legal requirement can prohibit or have the effect of prohibiting the ability of any entity to provide any interstate or intrastate telecommunications service.

Further, Section 704 of the TCA imposes limitations on what local and state governments can do. Section 704 prohibits any state and local government action which unreasonably discriminates among personal wireless providers. Local governments must ensure that its wireless ordinance does not contain requirements in the form of regulatory terms or fees which may have the "effect" of prohibiting the placement, construction, or modification of personal wireless services.

Section 704 also preempts any local zoning regulation purporting to regulate the placement, construction and modification of personal wireless service facilities on the basis, either directly or indirectly, on the environmental effects of radio frequency emissions (RF) of such facilities, which otherwise comply with FCC standards in this regard. See, 47 U.S.C. 332(c)(7)(B)(iv) (1996). This means that local authorities may not regulate the siting or construction of personal wireless facilities based on RF standards that are more stringent than those promulgated by the FCC.

Section 704 mandates that local governments act upon personal wireless service facility siting applications to place, construct, or modify a facility within a reasonable time. 47

U.S.C.332(c)(7)(B)(ii). See FCC Shot Clock ruling setting forth "reasonable time" standards for applications deemed complete.

Section 704 also mandates that the FCC provide technical support to local governments in order to encourage them to make property, rights-of-way, and easements under their jurisdiction available for the placement of new spectrum-based telecommunications services. This proceeding is currently at the comment stage.

For more information on the FCC's jurisdiction in this area, contact Steve Markendorff, Chief of the Broadband Branch, Commercial Wireless Division, Wireless Telecommunications Bureau, at (202) 418-0640 or e-mail "smarkend@fcc.gov".

PROJECT DESCRIPTION

The applicant (Verizon) is proposing eight (8) new wireless telecommunication panel antennas screened behind architectural features at the roof of an existing building with paint and texture to match the existing building. The antenna enclosures will provide articulation on the upper portion of the architecturally eclectic building. The proposal for the equipment cabinets is to locate the equipment towards the center of the building on the roof. All proposed antennas and associated equipment will not be accessible to the public. **(See Attachment A).**

PROPERTY DESCRIPTION

The subject property is a four story transitional housing facility with five family rooming units and a dormitory with 98 beds for men and women located near the corner of 76th Avenue and International Boulevard. The property was first developed in 2008 (based on Alameda County Assessors Data). The building has a modern eclectic architectural design with highly articulated massing elements and various materials.

GENERAL PLAN ANALYSIS

The subject property is located within the Community Commercial General Plan designation. The Community Commercial land use classification is intended to identify, create, maintain and enhance areas suitable for a wide variety of commercial and institutional operations along the City's major corridors and in shopping districts or centers. The proposed unmanned wireless telecommunication facility will not adversely affect and/or detract from the commercial or residential characteristics of the neighborhood. The antennas will be mounted on the existing building and visual impacts will be mitigated since the antennas will be screened and painted and textured to match the existing building. General Plan Policy N9.9 states that the City encourages rehabilitation efforts which respect the architectural integrity of a building's original style. The proposed project will have very minimal effect on the existing building and the architectural additions to the building will match the existing materials and character that is present.

ZONING ANALYSIS

The subject property is located within the CC-2 Community Commercial Zone. The CC-2 zone is intended to create, maintain, and enhance areas with a wide range of commercial businesses with direct frontage and access along the City's corridors and commercial areas. The proposal is for additional unmanned wireless telecommunication equipment to be mounted to the wall of an existing building and requires a major conditional use permit since the project is within one hundred feet of the boundary of a residential zone. Staff finds that the proposed application meets applicable CC-2 zoning and the City of Oakland Telecommunication regulations.

ENVIRONMENTAL DETERMINATION

The California Environmental Quality Act (CEQA) Guidelines lists the projects that qualify as categorical exemptions from environmental review. The proposed project is categorically exempt from the environmental review requirements pursuant to Section 15301, alterations to existing facilities, Section 15303, new construction of small structures and 15183, projects consistent with a community plan, general plan or zoning.

KEY ISSUES AND IMPACTS

1. Conditional Use Permit

Section 17.128.025 of the City of Oakland Planning Code requires a conditional use permit to install a Mini Telecommunication facility within one hundred (100) feet of the boundary of any residential zone. Furthermore, Section 17.134.020 defines a major and minor conditional use permits. Subsection (A)(3)(h) lists a major conditional use permit: "Any telecommunication

facility in or within one hundred (100) feet of the boundary of any residential zone.” The required findings for a major conditional use permit are listed and included in staff’s evaluation as part of this report.

2. Project Site

Section 17.128.110 of the City of Oakland Telecommunication Regulations indicate that new wireless facilities shall generally be located on designated properties or facilities in the following order of preference:

- A. Co-located on an existing structure or facility with existing wireless antennas.
- B. City owned properties or other public or quasi-public facilities.
- C. Existing commercial or industrial structures in non-residential zones.
- D. Existing commercial or industrial structures in residential zones.
- E. Other non-residential uses in residential zones.
- F. Residential uses in non-residential zones.
- G. Residential uses in residential zones.

*Facilities locating on an A, B or C ranked preference do not require a site alternatives analysis.

Since the proposed project involves the installation of new antennas and associated equipment cabinets on an existing quasi-public facility within a non-residential zone , the proposed project meets (B) for location preferences.

3. Project Design

Section 17.128.120 of the City of Oakland Telecommunications Regulations indicates that new wireless facilities shall generally be designed in the following order of preference:

- A. Building or structure mounted antennas completely concealed from view.
- B. Building or structure mounted antennas set back from roof edge, not visible from public right-of way.
- C. Building or structure mounted antennas below roof line (facade mount, pole mount) visible from public right-of-way, painted to match existing structure.
- D. Building or structure mounted antennas above roof line visible from public right of-way.
- E. Monopoles.
- F. Towers.

* Facilities designed to meet an A or B ranked preference do not require a site design alternatives analysis. Facilities designed to meet a C through F ranked preference, inclusive, must submit a site design alternatives analysis as part of the required application materials. A site design alternatives analysis shall, at a minimum, consist of:

- a. Written evidence indicating why each higher preference design alternative can not be used. Such evidence shall be in sufficient detail that independent verification could be obtained if required by the City of Oakland Zoning Manager. Evidence should indicate if the reason an alternative was rejected was technical (e.g. incorrect height, interference from existing RF sources, inability to cover required area) or for other concerns (e.g. inability to provide utilities, construction or structural impediments).

City of Oakland Planning staff has reviewed and determined that the site selected is conforming to all other telecommunication regulation requirements. The project has met design criteria (A and B) since the antennas will be screened behind architectural features at the roof of an existing building with paint and texture to match the existing building. The antenna enclosures will provide articulation on the upper portion of the architecturally eclectic building. Furthermore, to mitigate visual impacts the antennas will be mounted approximately 45' above the public right of way. The associated equipment cabinets will have no visual impact since the equipment will be placed towards the center of the roof of the existing building. Further, the project was found to comply with the design review findings with regard to compatibility and stealth of the antennas on the roof of the exiting building.

4. Project Radio Frequency Emissions Standards

Section 17.128.130 of the City of Oakland Telecommunication Regulations require that the applicant submit the following verifications including requests for modifications to existing facilities:

- a. With the initial application, a RF emissions report, prepared by a licensed professional engineer or other expert, indicating that the proposed site will operate within the current acceptable thresholds as established by the Federal government or any such agency who may be subsequently authorized to establish such standards.
- b. Prior to commencement of construction, a RF emissions report indicating the baseline RF emissions condition at the proposed site.
- c. Prior to final building permit sign off, an RF emissions report indicating that the site is actually operating within the acceptable thresholds as established by the Federal government or any such agency who may be subsequently authorized to establish such standards.

The applicant states that the proposed project meets the radio frequency (RF) emissions standards as required by the regulatory agency. Submitted with the initial application was a RF emissions report, prepared by Hammett & Edison, Inc. (**attachment B**). The report states that the proposed project will comply with the prevailing standards for limiting public exposure to radio frequency energy and, therefore, will not cause a significant impact on the environment. Additionally, staff recommends that prior to the final building permit sign off, the applicant submits certified RF emissions report stating that the facility is operating within acceptable thresholds established by the regulatory federal agency.

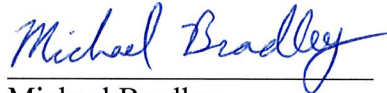
CONCLUSION

City of Oakland planning staff believes that the proposed project and subject property can be developed to meet the established zoning and telecommunication regulations that were created and adopted to set certain criteria minimums and maximums for similar types of developments. Staff believes that the findings for approval can be made to support the Conditional Use Permit and Design Review.

RECOMMENDATIONS:

1. Affirm staff's environmental determination
2. Approve Conditional Use Permit and Design Review application PLN15042 subject to the attached findings and conditions of approval

Prepared by:



Michael Bradley
Planner I

Approved by:



Scott Miller
Zoning Manager

Approved for forwarding to the
City Planning Commission



Darin Ranelletti, Deputy Director
Bureau of Planning

ATTACHMENTS:

- A. Project Plans & Photo simulation
- B. Hammett & Edison, Inc. RF Emissions Report

FINDINGS FOR APPROVAL**FINDINGS FOR APPROVAL:**

This proposal meets all the required findings under Section 17.134.050, of the General Use Permit criteria; all the required findings under Section 17.136.050.(A), of the Residential Design Review criteria; all the required findings under Section 17.128.060(B), of the telecommunication facilities (Mini) Design Review criteria; and all the required findings under Section 17.128.060.(C), of the telecommunication facilities (Mini) Conditional Use Permit criteria; and as set forth below and which are required to approve your application. Required findings are shown in **bold** type; reasons your proposal satisfies them are shown in normal type.

SECTION 17.134.050 – MAJOR CONDITIONAL USE PERMIT FINDINGS:

A. That the location, size, design, and operating characteristics of the proposed development will be compatible with, and will not adversely affect, the livability or appropriate development of abutting properties and the surrounding neighborhood, with consideration to be given to harmony in scale, bulk, coverage, and density; to the availability of civic facilities and utilities; to harmful effect, if any upon desirable neighborhood character; to the generation of traffic and the capacity of surrounding streets; and to any other relevant impact of the development.

The location, size, design and operational characteristics of the proposal will not adversely affect the livability or appropriate development of abutting properties and the surrounding neighborhood. Consideration was given to the harmony in scale, bulk, and coverage; to the availability of civic facilities and utilities; to harmful effect, if any, upon desirable neighborhood character; to the generation of traffic and the capacity of surrounding streets; and to any other relevant impact of the development. The proposed telecommunications antennas will be installed on the roof top of an existing building and will not adversely affect the operating characteristic or livability of the existing area. The facility will be unmanned and will not create additional vehicular traffic in the area.

B. That the location, design, and site planning of the proposed development will provide a convenient and functional living, working, shopping, or civic environment, and will be as attractive as the nature of the use and its location and setting warrant.

The location, design and site planning of the proposed development will provide a convenient and functional working and shopping environment, and will attempt to preserve the attractive nature of the use and its location and setting warrant. The proposal will preserve a convenient and functional working and living environment; therefore it would not affect the general quality and character of the neighborhood.

C. That the proposed development will enhance the successful operation of the surrounding area in its basic community functions, or will provide an essential service to the community or region.

The proposed development will enhance the successful operation of the surrounding area in its basic community function and will provide an essential service to the community or region. This

will be achieved by improving the functional use of the site by providing a regional telecommunication facility for the community and will be available to police, fire, public safety organizations and the general public.

D. That the proposal conforms to all applicable design review criteria set forth in the DESIGN REVIEW PROCEDURE of Chapter 17.136 of the Oakland Planning Code.

The proposal conforms with all significant aspects of the design review criteria set forth in Chapter 17.136 of the Oakland Planning Code, as outlined below.

E. That the proposal conforms in all significant respects with the Oakland General Plan and with any other applicable plan or development control map which has been adopted by the City Council.

The proposal conforms in all significant aspects with the Oakland General Plan and with any other applicable plan or zoning maps adopted by the City of Oakland. The proposed mini-telecommunication facility in the Community Commercial General Plan designation will enhance and improve communication service for a mixture of civic, residential, commercial and institutional uses in the area.

17.136.050(A) –RESIDENTIAL DESIGN REVIEW CRITERIA:

1. That the proposed design will create a building or set of buildings that are well related to the surrounding area in their setting, scale, bulk, height, materials, and textures:

The proposal for a mini telecommunications facility which includes the installation of eight (8) new concealed telecommunication antennas, twelve (12) remote radio units (RRU's) and associated equipment on the roof of an existing building. The proposed antennas will be screened behind architectural features at the roof of an existing building with paint and texture to match the existing building. The antenna enclosures will provide articulation on the upper portion of the eclectic architecturally designed building and therefore is consistent and well related to the surrounding area in scale, bulk, height, materials, and textures.

2. That the proposed design will protect, preserve, or enhance desirable neighborhood characteristics:

The design will be appropriate and compatible with current zoning and general plan land use designations. The proposal protects and preserves the surrounding neighborhood context by installing screened wireless telecommunication antennas to a commercial, industrial and residential area. The antennas will be away from public view and will not have any visual impact on the neighborhood.

3. That the proposed design will be sensitive to the topography and landscape:

The proposal is for a rooftop installation on a flat lot, thus no landscaping will be disturbed.

4. That, if situated on a hill:

The proposal is for a rooftop installation on a flat lot.

5. That the proposed design conforms in all significant respects with the Oakland General Plan and with any applicable design review guidelines or criteria, district plan, or development control map which have been adopted by the Planning Commission or City Council.

The proposal conforms with the City of Oakland Comprehensive General Plan meeting specific General Plan policies and the Supplemental Report and Recommendations on Revisions to the Citywide Telecommunications Regulations. The proposal will conform to performance standards for noise set forth in Section 17.120.050 for decibels levels in commercial and residential areas for both day and nighttime use. The Project conforms to all mini-facility definitions set forth in Section 17.128.060 and meets all design review criteria to minimize all impacts throughout the neighborhood

17.128.060(B) DESIGN REVIEW CRITERIA FOR MINI FACILITIES

1. Antennas should be painted and/or textured to match the existing structure:

The proposed antennas will be screened behind architectural features at the roof of an existing building with paint and texture to match the existing building. The antenna enclosures will provide articulation on the upper portion of the eclectic architecturally designed building approximately 45' above ground.

2. Antennas mounted on architecturally significant structures or significant architectural details of the building should be covered by appropriate casings which are manufactured to match existing architectural features found on the building:

All new materials, texture and color will match the existing exterior building materials.

3. Where feasible, antennas can be placed directly above, below or incorporated with vertical design elements of a building to help in camouflaging:

The proposed antennas will be incorporated into the vertical design elements of the building to create a vertical articulation at the roof with color and texture to match existing building materials and design.

4. Equipment cabinets shall be concealed from view or placed underground:

The equipment cabinets will be located in an area where there is no public access. The equipment cabinets will be located towards the center of the roof.

5. That all reasonable means of reducing public access to the antennas and equipment has been made, including, but not limited to, placement in or on buildings or structures, fencing, anti-climbing measures and anti-tampering devices.

The proposed antennas will be screened behind architectural features at the roof of an existing building with paint and texture to match the existing building. The antenna enclosures will provide articulation on the upper portion of the eclectic architecturally designed building approximately 45' above ground. The equipment cabinets will be located towards the center of the roof where there is no public access.

6. For antennas attached to the roof, maintain a 1:1 ratio for equipment setback; screen the antennas to match existing air conditioning units, stairs, or elevator towers; avoid placing roof mounted antennas in direct line with significant view corridors.

The proposed antennas will be screened behind architectural features at the roof of an existing building with paint and texture to match the existing building. The antenna enclosures will provide articulation on the upper portion of the eclectic architecturally designed building approximately 45' above ground

Section 17.128.060(C) CONDITIONAL USE PERMIT (CUP) FINDINGS FOR MINI FACILITIES

1. The project must meet the special design review criteria listed in subsection B of this section (17.128.060B):

The proposed project meets the special design review criteria listed in section 17.128.060B.

2. The proposed project must not disrupt the overall community character:

Due to the proposed project screening the telecommunication antennas and equipment, it will not disrupt the overall community character of the site.

CONDITIONS OF APPROVAL

PLN15042

STANDARD CONDITIONS:

1. Approved Use

Ongoing

a) The project shall be constructed and operated in accordance with the authorized use as described in the application materials, **PLN15042**, and the plans dated **January 19, 2015** and submitted on **February 24, 2015** and as amended by the following conditions. Any additional uses or facilities other than those approved with this permit, as described in the project description and the approved plans, will require a separate application and approval. Any deviation from the approved drawings, Conditions of Approval or use shall required prior written approval from the Director of City Planning or designee.

b) This action by the City Planning Commission ("this Approval") includes the approvals set forth below. This Approval includes: **The installation of a mini telecommunications facility located on an existing building at 7515 International Blvd. (APN: 041-4191-003-01), under Oakland Municipal Code 17.128, 17.136 and 17.134.**

2. Effective Date, Expiration, Extensions and Extinguishment

Ongoing

Unless a different termination date is prescribed, this Approval shall expire **two calendar years** from the approval date, unless within such period all necessary permits for construction or alteration have been issued, or the authorized activities have commenced in the case of a permit not involving construction or alteration. Upon written request and payment of appropriate fees submitted no later than the expiration date of this permit, the Director of City Planning or designee may grant a one-year extension of this date, with additional extensions subject to approval by the approving body. Expiration of any necessary building permit for this project may invalidate this Approval if the said extension period has also expired.

3. Scope of This Approval; Major and Minor Changes

Ongoing

The project is approved pursuant to the Oakland Planning Code only. Minor changes to approved plans may be approved administratively by the Director of City Planning or designee. Major changes to the approved plans shall be reviewed by the Director of City Planning or designee to determine whether such changes require submittal and approval of a revision to the approved project by the approving body or a new, completely independent permit.

4. Conformance with other Requirements

Prior to issuance of a demolition, grading, P-job, or other construction related permit

- a) The project applicant shall comply with all other applicable federal, state, regional and/or local laws/codes, requirements, regulations, and guidelines, including but not limited to those imposed by the City's Building Services Division, the City's Fire Marshal, and the City's Public Works Agency. Compliance with other applicable requirements may require changes to the approved use and/or plans. These changes shall be processed in accordance with the procedures contained in Condition of Approval 3.

- b) The applicant shall submit approved building plans for project-specific needs related to fire protection to the Fire Services Division for review and approval, including, but not limited to automatic extinguishing systems, water supply improvements and hydrants, fire department access, and vegetation management for preventing fires and soil erosion.

5. Conformance to Approved Plans; Modification of Conditions or Revocation

Ongoing

- a) Site shall be kept in a blight/nuisance-free condition. Any existing blight or nuisance shall be abated within 60-90 days of approval, unless an earlier date is specified elsewhere.
- b) The City of Oakland reserves the right at any time during construction to require certification by a licensed professional that the as-built project conforms to all applicable zoning requirements, including but not limited to approved maximum heights and minimum setbacks. Failure to construct the project in accordance with approved plans may result in remedial reconstruction, permit revocation, permit modification, stop work, permit suspension or other corrective action.
- c) Violation of any term, conditions or project description relating to the Approvals is unlawful, prohibited, and a violation of the Oakland Municipal Code. The City of Oakland reserves the right to initiate civil and/or criminal enforcement and/or abatement proceedings, or after notice and public hearing, to revoke the Approvals or alter these conditions if it is found that there is violation of any of the conditions or the provisions of the Planning Code or Municipal Code, or the project operates as or causes a public nuisance. This provision is not intended to, nor does it, limit in any manner whatsoever the ability of the City to take appropriate enforcement actions.

6. Signed Copy of the Conditions

With submittal of a demolition, grading, and building permit

A copy of the approval letter and conditions shall be signed by the property owner, notarized, and submitted with each set of permit plans to the appropriate City agency for this project.

7. Indemnification

Ongoing

- a) To the maximum extent permitted by law, the applicant shall defend (with counsel acceptable to the City), indemnify, and hold harmless the City of Oakland, the Oakland City Council, the City of Oakland Redevelopment Agency, the Oakland City Planning Commission and its respective agents, officers, and employees (hereafter collectively called City) from any liability, damages, claim, judgment, loss (direct or indirect) action, causes of action, or proceeding (including legal costs, attorneys' fees, expert witness or consultant fees, City Attorney or staff time, expenses or costs) (collectively called "Action") against the City to attack, set aside, void or annul, (1) an approval by the City relating to a development-related application or subdivision or (2) implementation of an approved development-related project. The City may elect, in its sole discretion, to participate in the defense of said Action and the applicant shall reimburse the City for its reasonable legal costs and attorneys' fees.
- b) Within ten (10) calendar days of the filing of any Action as specified in subsection A above, the applicant shall execute a Letter of Agreement with the City, acceptable to the Office of the City Attorney, which memorializes the above obligations. These obligations and the Letter of

Agreement shall survive termination, extinguishment or invalidation of the approval. Failure to timely execute the Letter of Agreement does not relieve the applicant of any of the obligations contained in this condition or other requirements or Conditions of Approval that may be imposed by the City.

8. Compliance with Conditions of Approval

Ongoing

The project applicant shall be responsible for compliance with the recommendations in any submitted and approved technical report and all the Conditions of Approval set forth below at its sole cost and expense, and subject to review and approval of the City of Oakland.

9. Severability

Ongoing

Approval of the project would not have been granted but for the applicability and validity of each and every one of the specified conditions, and if any one or more of such conditions is found to be invalid by a court of competent jurisdiction this Approval would not have been granted without requiring other valid conditions consistent with achieving the same purpose and intent of such Approval.

10. Job Site Plans

Ongoing throughout demolition, grading, and/or construction

At least one (1) copy of the stamped approved plans, along with the Approval Letter and Conditions of Approval, shall be available for review at the job site at all times.

11. Special Inspector/Inspections, Independent Technical Review, Project Coordination and Management

Prior to issuance of a demolition, grading, and/or construction permit

The project applicant may be required to pay for on-call special inspector(s)/inspections as needed during the times of extensive or specialized plancheck review, or construction. The project applicant may also be required to cover the full costs of independent technical and other types of peer review, monitoring and inspection, including without limitation, third party plan check fees, including inspections of violations of Conditions of Approval. The project applicant shall establish a deposit with the Building Services Division, as directed by the Building Official, Director of City Planning or designee.

12. Days/Hours of Construction Operation

Ongoing throughout demolition, grading, and/or construction

The project applicant shall require construction contractors to limit standard construction activities as follows:

- a) Construction activities are limited to between 7:00 AM and 7:00 PM Monday through Friday, except that pile driving and/or other extreme noise generating activities greater than 90 dBA shall be limited to between 8:00 a.m. and 4:00 p.m. Monday through Friday.
- b) Any construction activity proposed to occur outside of the standard hours of 7:00 am to 7:00 pm Monday through Friday for special activities (such as concrete pouring which may require more continuous amounts of time) shall be evaluated on a case by case basis, with criteria including the proximity of residential uses and a consideration of resident's preferences for whether the activity is acceptable if the overall duration of construction is

shortened and such construction activities shall only be allowed with the prior written authorization of the Building Services Division.

- c) Construction activity shall not occur on Saturdays, with the following possible exceptions:
 - i. Prior to the building being enclosed, requests for Saturday construction for special activities (such as concrete pouring which may require more continuous amounts of time), shall be evaluated on a case by case basis, with criteria including the proximity of residential uses and a consideration of resident's preferences for whether the activity is acceptable if the overall duration of construction is shortened. Such construction activities shall only be allowed on Saturdays with the prior written authorization of the Building Services Division.
 - ii. After the building is enclosed, requests for Saturday construction activities shall only be allowed on Saturdays with the prior written authorization of the Building Services Division, and only then within the interior of the building with the doors and windows closed.
- d) No extreme noise generating activities (greater than 90 dBA) shall be allowed on Saturdays, with no exceptions.
- e) No construction activity shall take place on Sundays or Federal holidays.
- f) Construction activities include but are not limited to: truck idling, moving equipment (including trucks, elevators, etc) or materials, deliveries, and construction meetings held on-site in a non-enclosed area.

13. Operational Noise-General

Ongoing

Noise levels from the activity, property, or any mechanical equipment on site shall comply with the performance standards of Section 17.120 of the Oakland Planning Code and Section 8.18 of the Oakland Municipal Code. If noise levels exceed these standards, the activity causing the noise shall be abated until appropriate noise reduction measures have been installed and compliance verified by the Planning and Zoning Division and Building Services.

PROJECT SPECIFIC CONDITONS:

14. Radio Frequency Emissions

Prior to the final building permit sign off

The applicant shall submit a certified RF emissions report stating the facility is operating within the acceptable standards established by the regulatory Federal Communications Commission.

15. Architectural Detailing and Painting



Prior to the final building permit sign off


The applicant shall paint and texture all proposed antennas, antennas screening enclosures, dishes and other related equipment attached to the building to match the existing building materials and texture.

16. Height and Massing of Antennae Screening

Ongoing

The height and massing of the antennae screening enclosures are appropriate given the overall height, massing, and articulation of the existing building. Any proposed future increase in height, massing or articulation would compromise the appropriate scale and proportionality with the existing building mass.

Z D DRAWING SIGN - OFF	
DATE:	TIME:
	
SITE ACQUISITION:	DATE:
PLANNING:	
CONSTRUCTION:	
MANAGEMENT:	
CONSTRUCTION:	DATE:
REAL ESTATE:	
RF ENGINEER:	
EQUIPMENT ENGINEER:	
W/ ENG./TRANSPORT:	
OTHER (IF APPLICABLE):	DATE:



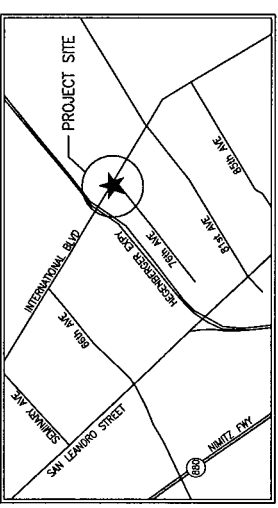
verizon

WIRELESS

2785 Mitchell Drive, Walnut Creek, CA 94598

HEGENBERGER INTERNATIONAL

7515 INTERNATIONAL BOULEVARD
OAKLAND, CA 94621
APN: 041-4191-003-01
LOCATION #: 272310



LOCATION PLAN

PROJECT DIRECTORY	
OWNER: VERIZON WIRELESS 2785 MITCHELL DRIVE WALNUT CREEK, CA 94598	LANDLORD: HENRY U. JACKSON EAST OAKLAND COMMUNITY PROJECT 7515 INTERNATIONAL BLVD OAKLAND, CA 94621 510-432-3211
ARCHITECT: MST ARCHITECTS 1520 RIVER PARK DRIVE SACRAMENTO, CA 95815 mstarchitects.com	CONSTRUCTION MANAGER: COMPLETE WIRELESS CONSULTING, INC. 2008 V STREET SACRAMENTO, CA 95818 mccoy@completemw.com

PROJECT SUMMARY	
ASSESSOR'S PARCEL NUMBER: 041-4191-003-01	
JURISDICTION: CITY OF OAKLAND	
ACQUISITION: S-2 (UNMANNED TELECOMMUNICATIONS FACILITY) U (TOWER)	
TYPE OF CONSTRUCTION: V-B	
ZONING: CC2	

CODE COMPLIANCE	
ALL WORK AND MATERIALS SHALL BE PERFORMED AND INSTALLED IN ACCORDANCE WITH THE CURRENT EDITIONS OF THE FOLLOWING CODES AS ADOPTED BY THE LOCAL GOVERNING AUTHORITIES. NOTHING IN THESE PLANS IS TO BE CONSTRUED TO PERMIT WORK NOT CONFORMING TO THESE CODES.	
1. 2013 CALIFORNIA ADMINISTRATIVE CODE (CAC) (INCL. TITLE 24 & 25)	
2. 2013 CALIFORNIA BUILDING CODE (CBC)	
3. 2013 CALIFORNIA ELECTRICAL CODE (CEC)	
4. 2013 CALIFORNIA FIRE CODE (FC)	
5. 2013 CALIFORNIA PLUMBING CODE (CPC)	
6. 2013 CALIFORNIA ENERGY CODE (CEC)	
7. 2013 CALIFORNIA FIRE CODE (FC)	
8. 2013 CALIFORNIA GREEN BUILDING STANDARDS CODE (CALGreen CODE)	
9. 2013 CALIFORNIA PLUMBING CODE (CPC)	
10. LOCAL COUNTY OR CITY ORDINANCES	
ACCESSIBILITY REQUIREMENTS: THIS FACILITY IS UNMANNED AND NOT FOR HUMAN OCCUPANCY. THEREFORE, IT SHALL BE CONSTRUED IN ACCORDANCE WITH THE 2010 CBC 11B-203.5, AND 11B-202.4 EXCEPTION 7.	

PROJECT DESCRIPTION	
FENCED, VERIZON WIRELESS UNMANNED TELECOMMUNICATIONS FACILITY, INCLUDING:	
- A 10'-9"20'-10" ROOFTOP EQUIPMENT LEASE AREA	
- A 3'-0"12'-5"10'-0"3'-0" ANTENNA LEASE AREA	
- (2) 3'-0"10'-0" ANTENNA LEASE AREAS	
- POWER & TELCO UTILITIES BROUGHT TO FACILITY.	
- A STANDBY GENERATOR	
- (12) ANTENNAS W/ASSOCIATED TOWER MOUNTED EQUIPMENT MOUNTED ON AN EXISTING ROOFTOP.	

PROJECT MILESTONES	
12/02/2014	90% ZONING DOCUMENTS
01/09/2015	95% ZONING DOCUMENTS
01/19/2015	100% ZONING DOCUMENTS
XX/XX/XXXX	90% CONSTRUCTION DOCUMENTS
XX/XX/XXXX	100% CONSTRUCTION DOCUMENTS

DIRECTIONS	
FROM VERIZON OFFICE @ 2785 MITCHELL DRIVE, WALNUT CREEK, CA 94598:	
1. HEAD SOUTHEAST ON OAK GROVE RD.	
2. TURN RIGHT ON SUNLIGHT AVE AND BECOMES HILLSIDE AVE	
3. TURN RIGHT ONTO THE RAMP TO CA-24 W	
4. CONTINUE ONTO CA-24 W TO EASY ON CA-24 W	
5. TAKE THE EXIT TOWARD HAYWARD/CALIFORNIA 13 S	
6. MERGE ONTO CA-13 S	
7. MERGE ONTO I-580 E	
8. TAKE THE EXIT TOWARD SUNSET DR	
9. TURN RIGHT ONTO EDWARDS AVE	
10. CONTINUE ONTO SUNSET DR	
11. SUNSET DR TURNS SLIGHTLY LEFT AND BECOMES 73RD AVE	
12. TURN LEFT ONTO INTERNATIONAL BLVD	

INDEX OF DRAWINGS	
TITLE SHEET, LOCATION PLAN, PROJECT DATA	
OVERALL SITE PLAN	
EQUIPMENT LAYOUT PLAN	
ANTENNA LAYOUT PLAN	
ANTENNA LAYOUT PLAN SECTOR A&B	
ANTENNA LAYOUT PLAN SECTOR C&D	
PROJECT ELEVATIONS	
PROJECT ELEVATIONS	

PROJECT MILESTONES	
12/02/2014	90% ZONING DOCUMENTS
01/09/2015	95% ZONING DOCUMENTS
01/19/2015	100% ZONING DOCUMENTS
XX/XX/XXXX	90% CONSTRUCTION DOCUMENTS
XX/XX/XXXX	100% CONSTRUCTION DOCUMENTS

PROJECT DIRECTORY	
OWNER: VERIZON WIRELESS 2785 MITCHELL DRIVE WALNUT CREEK, CA 94598	LANDLORD: HENRY U. JACKSON EAST OAKLAND COMMUNITY PROJECT 7515 INTERNATIONAL BLVD OAKLAND, CA 94621 510-432-3211
ARCHITECT: MST ARCHITECTS 1520 RIVER PARK DRIVE SACRAMENTO, CA 95815 mstarchitects.com	CONSTRUCTION MANAGER: COMPLETE WIRELESS CONSULTING, INC. 2008 V STREET SACRAMENTO, CA 95818 mccoy@completemw.com


PROJECT SUMMARY	
ASSESSOR'S PARCEL NUMBER: 041-4191-003-01	
JURISDICTION: CITY OF OAKLAND	
ACQUISITION: S-2 (UNMANNED TELECOMMUNICATIONS FACILITY) U (TOWER)	
TYPE OF CONSTRUCTION: V-B	
ZONING: CC2	

CODE COMPLIANCE	
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PROJECT MILESTONES	
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01/09/2015	95% ZONING DOCUMENTS
01/19/2015	100% ZONING DOCUMENTS
XX/XX/XXXX	90% CONSTRUCTION DOCUMENTS
XX/XX/XXXX	100% CONSTRUCTION DOCUMENTS





MST ARCHITECTS
1120 BAY PARK DRIVE, LOS ANGELES, CA 90015
TEL: 213-698-1100
WWW.MSTARCHITECTS.COM

THIS PROJECT HAS BEEN REVIEWED BY THE CITY OF LOS ANGELES AND THE COUNTY OF LOS ANGELES. THE REVIEW IS LIMITED TO THE TECHNICAL ASPECTS OF THE PROJECT AND DOES NOT CONSTITUTE A GUARANTEE OF THE ACCURACY OR COMPLETENESS OF THE INFORMATION PROVIDED. THE REVIEWER'S OPINION IS BASED ON THE INFORMATION PROVIDED AND DOES NOT CONSTITUTE A GUARANTEE OF THE ACCURACY OR COMPLETENESS OF THE INFORMATION PROVIDED.



Verizon Wireless
7515 INTERNATIONAL BOULEVARD
OAKLAND, CA 94621

OVERALL SITE PLAN

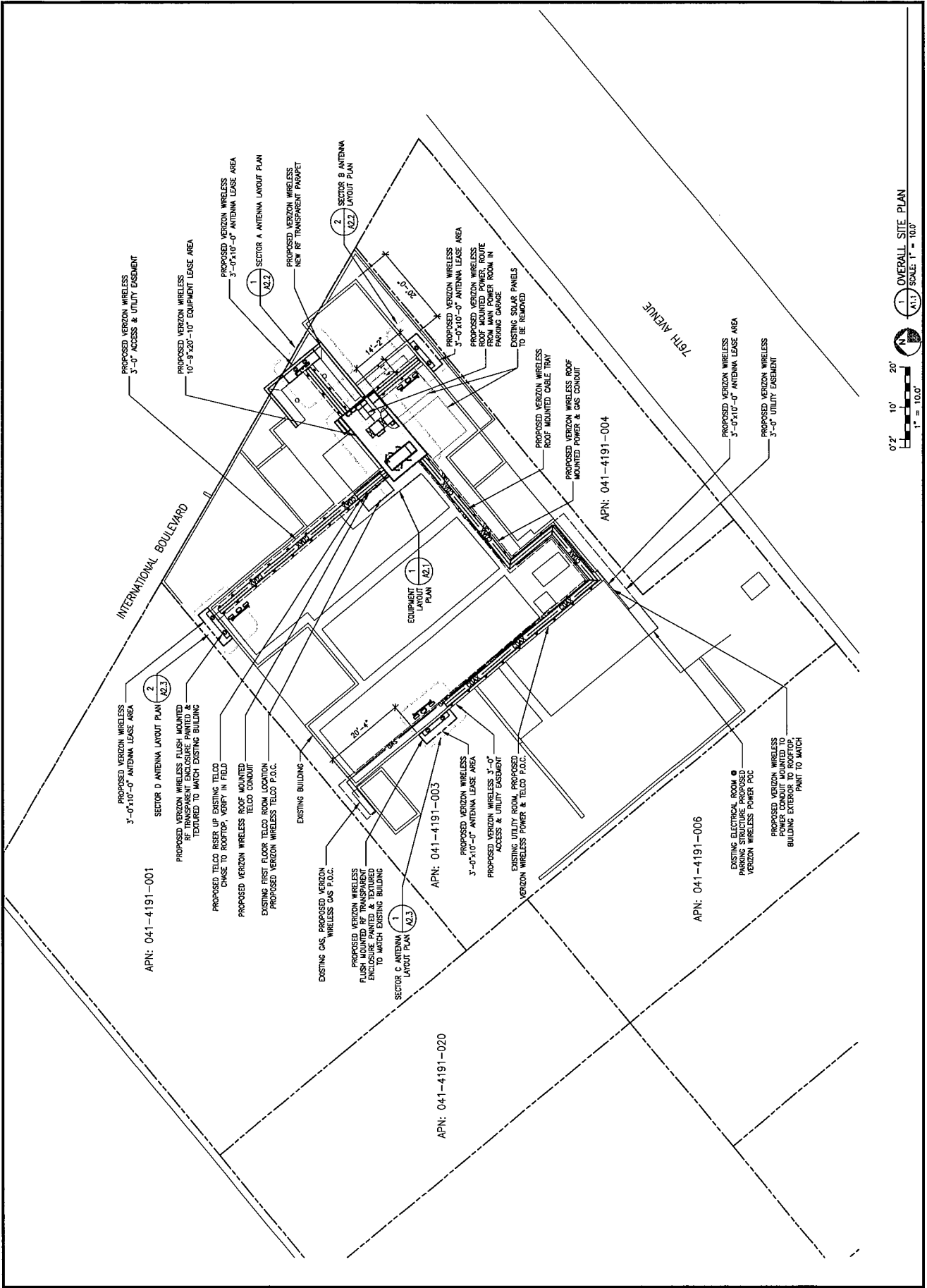
A1.1

Job No. 162.106

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Checked By: [Name]
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Date: 12/22/14

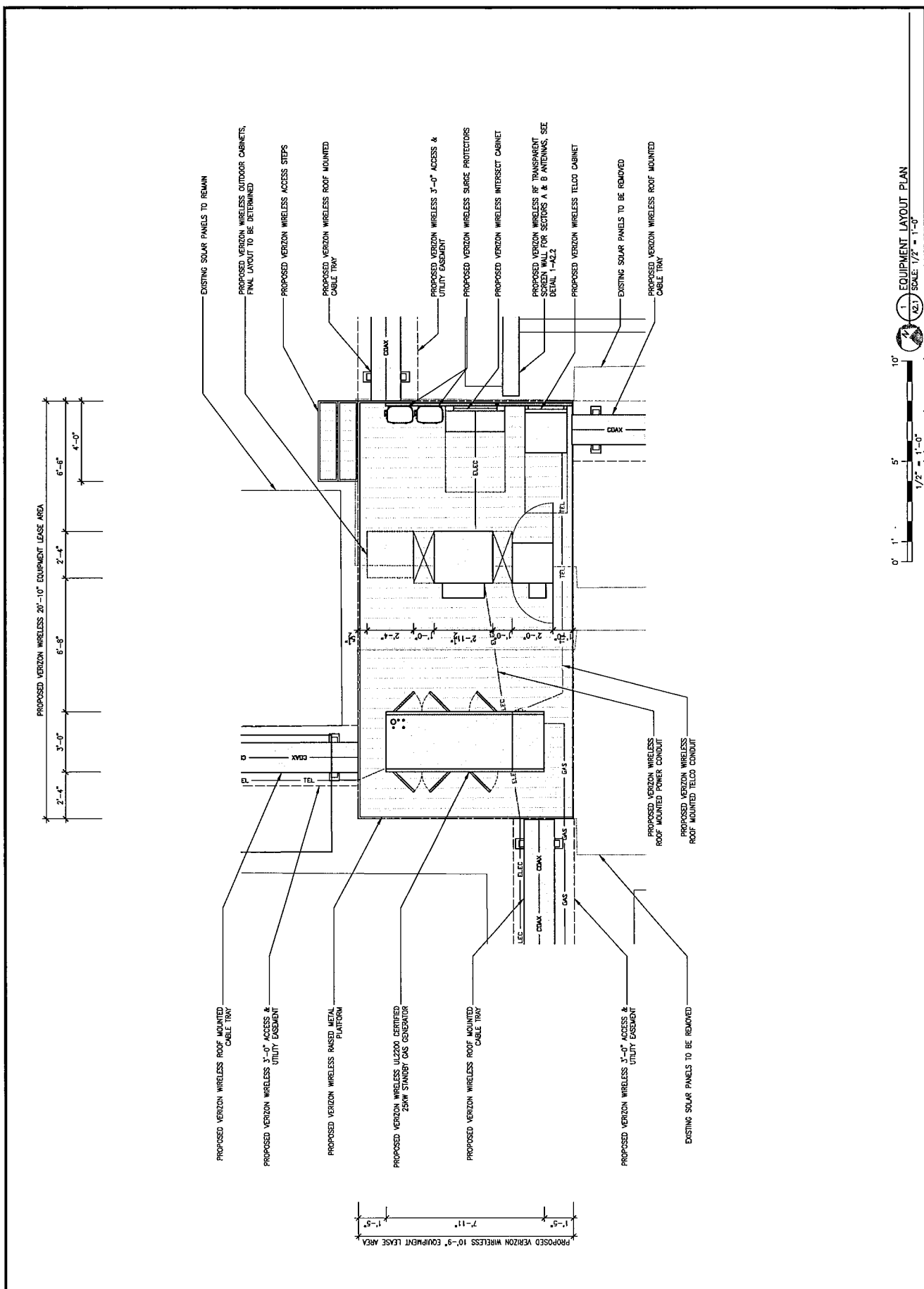
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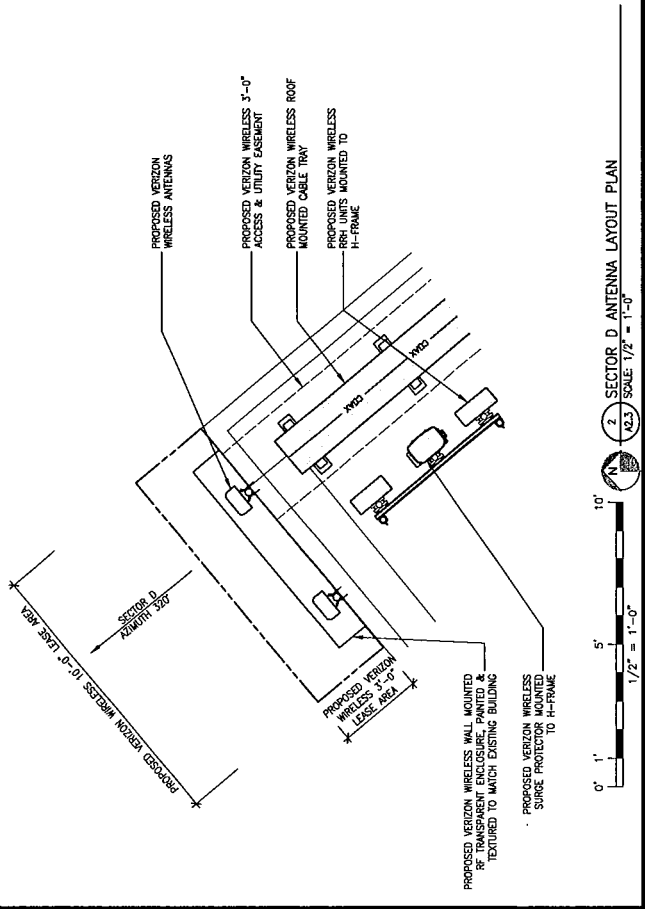


0' 10' 20' 1" = 10.0'

OVERALL SITE PLAN

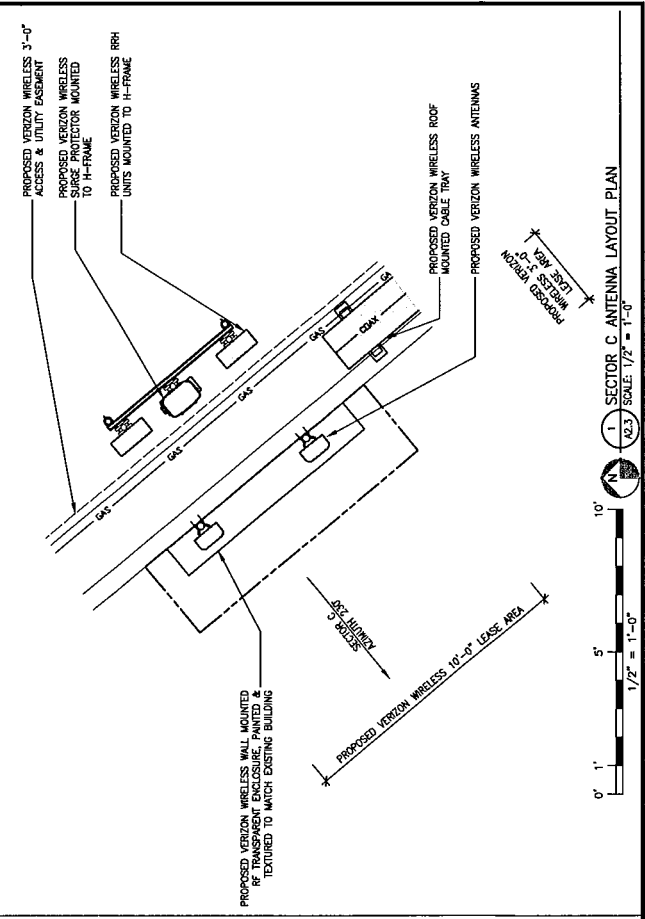


EQUIPMENT SCHEDULE						
EQUIPMENT	DESCRIPTION	QUANTITY				TOTAL
		SECTOR A	SECTOR B	SECTOR C	SECTOR D	
ANTENNA	HEX45BCW000X	2	2	2	2	8
RRH	BRIS12	3	3	3	3	12
TWA OR DIPLEXER	N/A	0	0	0	0	0
SURGE PROTECTOR/HYBRID	PANCAF DC3315 / HYBRID TRUNK CABLE		4/4			4/4
COAXIAL CABLE	1/2" 5/8" DIAMETER COAX	0	0	0	0	0
NET CABLE	N/A		0			0



0' 1' 5' 10' SCALE: 1/2" = 1'-0"

2 SECTOR D ANTENNA LAYOUT PLAN A2.3



0' 1' 5' 10' SCALE: 1/2" = 1'-0"

1 SECTOR C ANTENNA LAYOUT PLAN A2.3

MST ARCHITECTS
1110 RIVER PARK DRIVE, SUITE 200, OAKLAND, CA 94612
TEL: 510.763.1000
WWW.MSTARCHITECTS.COM

COMPLETE
Architectural Consulting, Inc.

Verizon Wireless
7515 INTERNATIONAL BOULEVARD
OAKLAND, CA 94621

ANTENNA LAYOUT PLAN SECTOR C&D
SHEET TITLE

FILE: 102-1000000000
DRAWN BY: [Name]
CHECKED BY: [Name]
SCALE: AS SHOWN
DATE: 12/02/14
JOB NO: 102-1000000000

A2.3

Revisions:	
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Job No. 162-1388

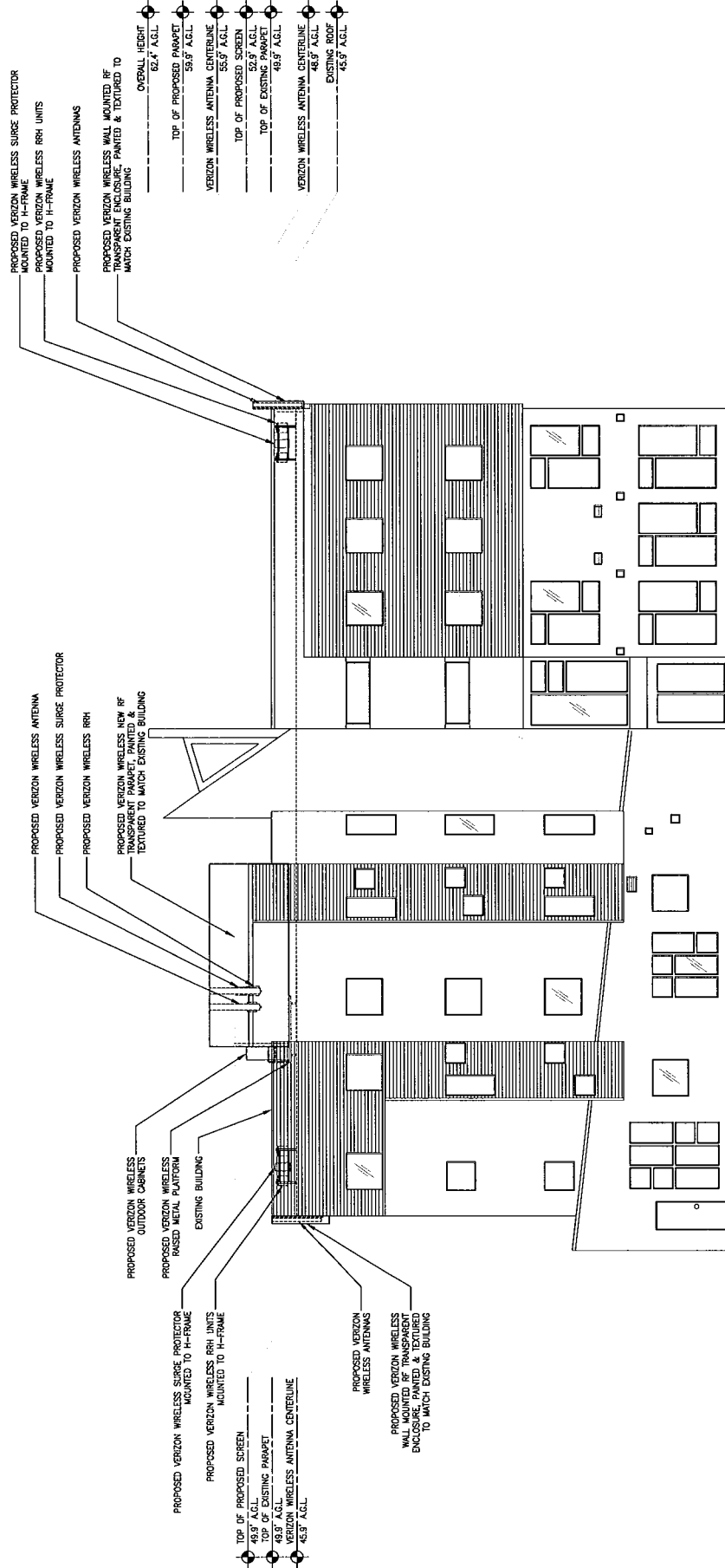
PROJECT ELEVATIONS

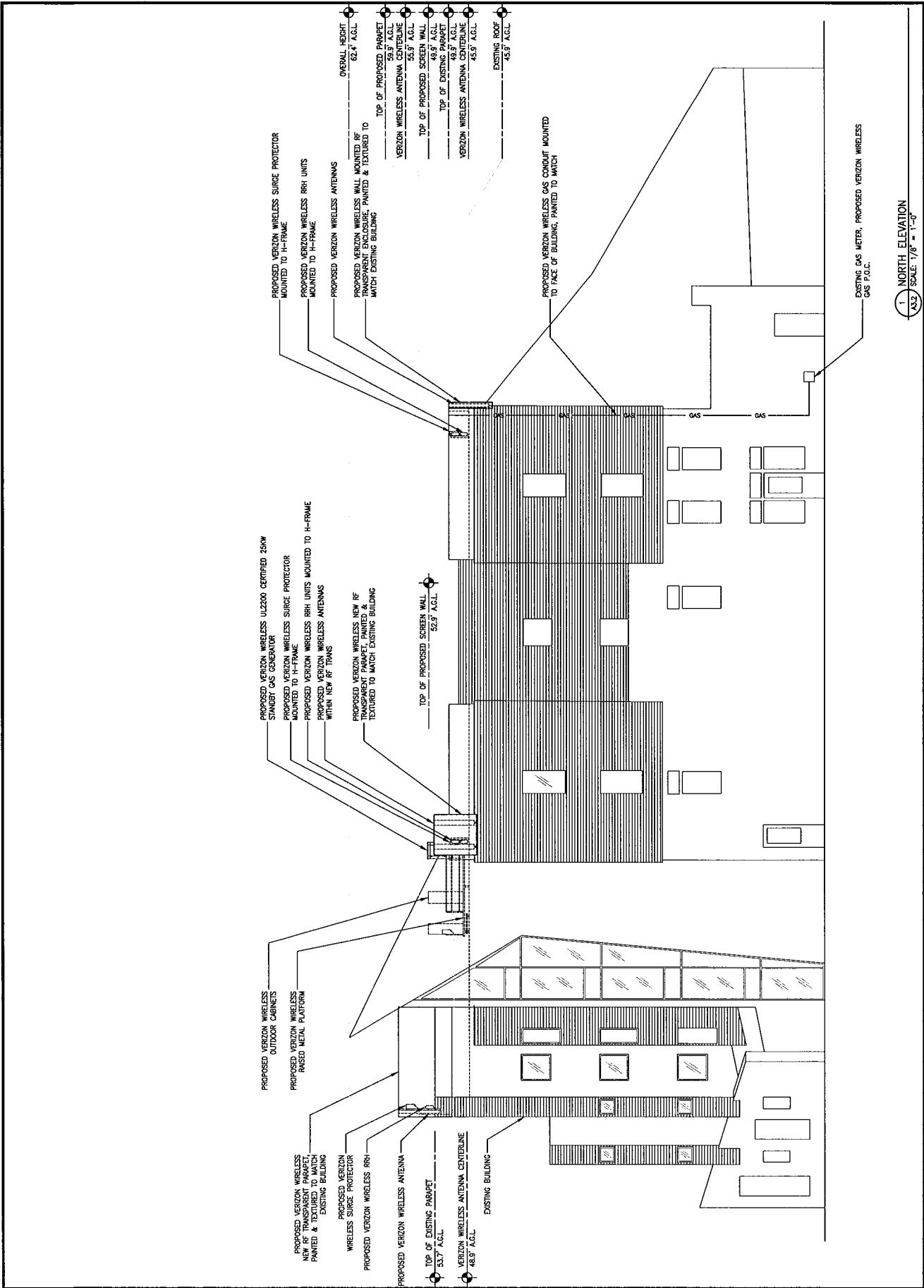
SHEET TWO

verizon WIRELESS
HEGEBERGER INTERNATIONAL
7515 INTERNATIONAL BOULEVARD
OAKLAND, CA 94621



MST ARCHITECTS





Aerial photograph showing the viewpoints for the photosimulations and neighborhood views.

Hegenberger & Intl.

7211 International Boulevard
Oakland, CA 94621

verizonwireless

ATTACHMENT A





Photosimulation of the view looking west from International at 77th.

Hegenberger & Intl.

7211 International Boulevard
Oakland, CA 94621

verizonwireless





Existing

Photosimulation of the view looking southeast from International Blvd.

Hegenberger & Intl.

7211 International Boulevard
Oakland, CA 94621

verizonwireless



Proposed



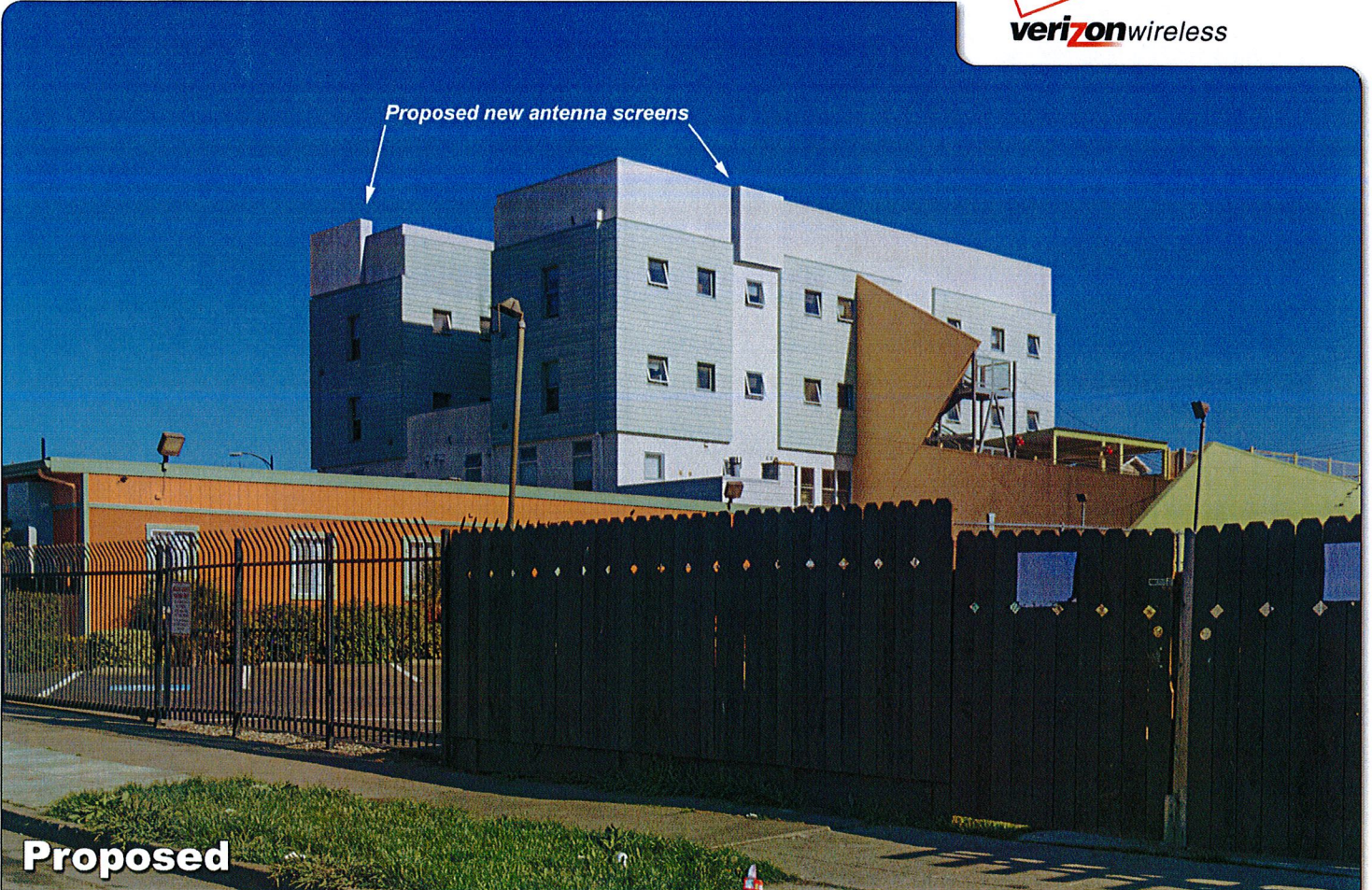
Existing

Photosimulation of the view looking east from 75th Avenue.

Hegenberger & Intl.

7211 International Boulevard
Oakland, CA 94621

verizonwireless



Proposed

**Verizon Wireless • Proposed Base Station (No. 272310 “Hegenberger International”)
7515 International Boulevard • Oakland, California**

Statement of Hammett & Edison, Inc., Consulting Engineers

The firm of Hammett & Edison, Inc., Consulting Engineers, has been retained on behalf of Verizon Wireless, a personal wireless telecommunications carrier, to evaluate the base station (No. 272310 “Hegenberger International”) proposed to be located at 7515 International Boulevard in Oakland, California, for compliance with appropriate guidelines limiting human exposure to radio frequency (“RF”) electromagnetic fields.

Executive Summary

Verizon proposes to install directional panel antennas on the four-story East Oakland Community Project building, located at 7515 International Boulevard in Oakland. The proposed operation will, together with the existing base stations nearby, comply with the FCC guidelines limiting public exposure to RF energy.

Prevailing Exposure Standards

The U.S. Congress requires that the Federal Communications Commission (“FCC”) evaluate its actions for possible significant impact on the environment. A summary of the FCC’s exposure limits is shown in Figure 1. These limits apply for continuous exposures and are intended to provide a prudent margin of safety for all persons, regardless of age, gender, size, or health. The most restrictive FCC limit for exposures of unlimited duration to radio frequency energy for several personal wireless services are as follows:

Wireless Service	Frequency Band	Occupational Limit	Public Limit
Microwave (Point-to-Point)	5,000–80,000 MHz	5.00 mW/cm ²	1.00 mW/cm ²
BRS (Broadband Radio)	2,600	5.00	1.00
WCS (Wireless Communication)	2,300	5.00	1.00
AWS (Advanced Wireless)	2,100	5.00	1.00
PCS (Personal Communication)	1,950	5.00	1.00
Cellular	870	2.90	0.58
SMR (Specialized Mobile Radio)	855	2.85	0.57
700 MHz	700	2.40	0.48
[most restrictive frequency range]	30–300	1.00	0.20

General Facility Requirements

Base stations typically consist of two distinct parts: the electronic transceivers (also called “radios” or “channels”) that are connected to the traditional wired telephone lines, and the passive antennas that send the wireless signals created by the radios out to be received by individual subscriber units. The transceivers are often located at ground level and are connected to the antennas by coaxial cables. A small antenna for reception of GPS signals is also required, mounted with a clear view of the sky.

**Verizon Wireless • Proposed Base Station (No. 272310 “Hegenberger International”)
7515 International Boulevard • Oakland, California**

Because of the short wavelength of the frequencies assigned by the FCC for wireless services, the antennas require line-of-sight paths for their signals to propagate well and so are installed at some height above ground. The antennas are designed to concentrate their energy toward the horizon, with very little energy wasted toward the sky or the ground. This means that it is generally not possible for exposure conditions to approach the maximum permissible exposure limits without being physically very near the antennas.

Computer Modeling Method

The FCC provides direction for determining compliance in its Office of Engineering and Technology Bulletin No. 65, “Evaluating Compliance with FCC-Specified Guidelines for Human Exposure to Radio Frequency Radiation,” dated August 1997. Figure 2 describes the calculation methodologies, reflecting the facts that a directional antenna’s radiation pattern is not fully formed at locations very close by (the “near-field” effect) and that at greater distances the power level from an energy source decreases with the square of the distance from it (the “inverse square law”). The conservative nature of this method for evaluating exposure conditions has been verified by numerous field tests.

Site and Facility Description

Based upon information provided by Verizon, including zoning drawings by MST Architects, Inc., dated January 19, 2015, it is proposed to install eight Amphenol Model HEX458CW0000X directional panel antennas in pairs with no downtilt on the four-story East Oakland Community Project building, located at 7515 International Boulevard in Oakland. Three pairs are to be installed inside new view screen enclosures on the faces of the building, at effective heights of at least 46 feet above ground, and would be oriented toward 140°T, 230°T, and 320°T. The remaining pair would be installed behind new view screens above the northeast end of the roof, mounted at an effective height of about 56 feet above ground, 10 feet above the roof, and oriented toward 50°T. The maximum effective radiated power in any direction would be 15,250 watts, representing simultaneous operation at 4,340 watts for AWS, 4,070 watts for PCS, 4,000 watts for cellular, and 2,840 watts for 700 MHz service.

Reportedly located above the roof of the 4-story residential building about 150 feet to the southeast are similar antennas for use by Sprint and T-Mobile. For the limited purpose of this study, the transmitting facilities of those carriers are assumed to be as follows:

Operator	Service	Maximum ERP	Antenna Model	Downtilt	Height
Sprint	BRS	1,500 watts	KMW ET-X-WM-18-65-8P	2°	46 ft
	PCS	7,000	KMW ET-X-TS-70-15-62-18	2	46
	SMR	500	KMW ET-X-TS-70-15-62-18	2	46
T-Mobile	AWS	4,400	Ericsson AIR21	2	46
	PCS	2,200	Ericsson AIR21	2	46

**Verizon Wireless • Proposed Base Station (No. 272310 “Hegenberger International”)
7515 International Boulevard • Oakland, California**

Study Results

For a person anywhere at ground, the maximum RF exposure level due to the proposed Verizon operation by itself is calculated to be 0.039 mW/cm², which is 4.5% of the applicable public exposure limit. The maximum calculated cumulative level at ground, for the simultaneous operation of all three carriers, is 5.4% of the public exposure limit. The maximum calculated cumulative level at the top-floor elevation of any nearby building* is 13% of the public exposure limit. It should be noted that these results include several “worst-case” assumptions and therefore are expected to overstate actual power density levels.

Recommended Mitigation Measures

Due to their mounting locations, the Verizon antennas would not be accessible to the general public, and so no mitigation measures are necessary to comply with the FCC public exposure guidelines. To prevent occupational exposures in excess of the FCC guidelines, it is recommended that appropriate RF safety training be provided to all authorized personnel who have access to the antennas, including employees and contractors of Verizon and of the building owner. No access within 25 feet directly in front of the Verizon antennas themselves, such as might occur during maintenance work on the building, should be allowed while the base station is in operation, unless other measures can be demonstrated to ensure that occupational protection requirements are met. Posting explanatory signs† on the screens in front of the antennas and at the antennas, such that the signs would be readily visible from any angle of approach to persons who might need to work within that distance, would be sufficient to meet FCC-adopted guidelines.

Conclusion

Based on the information and analysis above, it is the undersigned’s professional opinion that operation of the base station proposed by Verizon Wireless at 7515 International Boulevard in Oakland, California, will comply with the prevailing standards for limiting public exposure to radio frequency energy and, therefore, will not for this reason cause a significant impact on the environment. The highest calculated level in publicly accessible areas is much less than the prevailing standards allow for exposures of unlimited duration. This finding is consistent with measurements of actual exposure conditions taken at other operating base stations. Training authorized personnel and posting explanatory signs is recommended to establish compliance with occupational exposure limits.

* Including the residences located at least 150 feet away, based on photographs from Google Maps.

† Signs should comply with OET-65 color, symbol, and content recommendations. Contact information should be provided (e.g., a telephone number) to arrange for access to restricted areas. The selection of language(s) is not an engineering matter, and guidance from the landlord, local zoning or health authority, or appropriate professionals may be required.

**Verizon Wireless • Proposed Base Station (No. 272310 "Hegenberger International")
7515 International Boulevard • Oakland, California**

Authorship

The undersigned author of this statement is a qualified Professional Engineer, holding California Registration No. E-20309, which expires on March 31, 2015. This work has been carried out under her direction, and all statements are true and correct of her own knowledge except, where noted, when data has been supplied by others, which data she believes to be correct.

February 24, 2015



Andrea L. Bright

Andrea L. Bright, P.E.
707/996-5200



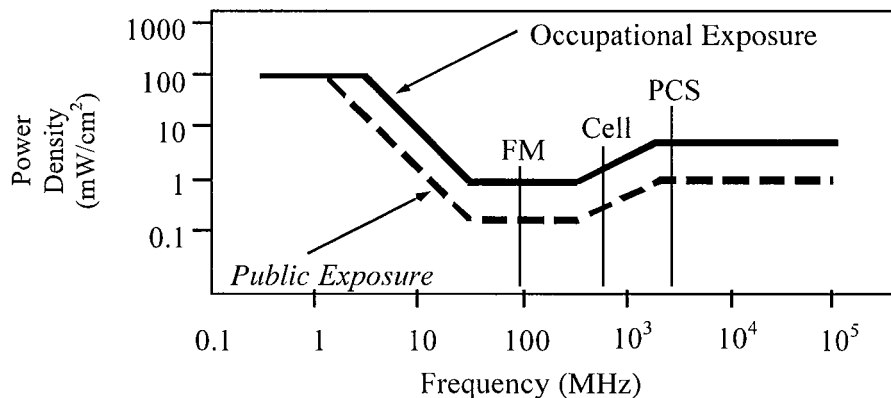
HAMMETT & EDISON, INC.
CONSULTING ENGINEERS
SAN FRANCISCO

FCC Radio Frequency Protection Guide

The U.S. Congress required (1996 Telecom Act) the Federal Communications Commission ("FCC") to adopt a nationwide human exposure standard to ensure that its licensees do not, cumulatively, have a significant impact on the environment. The FCC adopted the limits from Report No. 86, "Biological Effects and Exposure Criteria for Radiofrequency Electromagnetic Fields," published in 1986 by the Congressionally chartered National Council on Radiation Protection and Measurements ("NCRP"). Separate limits apply for occupational and public exposure conditions, with the latter limits generally five times more restrictive. The more recent standard, developed by the Institute of Electrical and Electronics Engineers and approved as American National Standard ANSI/IEEE C95.1-2006, "Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz," includes similar limits. These limits apply for continuous exposures from all sources and are intended to provide a prudent margin of safety for all persons, regardless of age, gender, size, or health.

As shown in the table and chart below, separate limits apply for occupational and public exposure conditions, with the latter limits (in *italics* and/or dashed) up to five times more restrictive:

<u>Frequency</u>	<u>Electromagnetic Fields (f is frequency of emission in MHz)</u>					
Applicable Range (MHz)	Electric Field Strength (V/m)		Magnetic Field Strength (A/m)		Equivalent Far-Field Power Density (mW/cm ²)	
0.3 – 1.34	614	<i>614</i>	1.63	<i>1.63</i>	100	<i>100</i>
1.34 – 3.0	614	<i>823.8/f</i>	1.63	<i>2.19/f</i>	100	<i>180/f²</i>
3.0 – 30	1842/f	<i>823.8/f</i>	4.89/f	<i>2.19/f</i>	900/f ²	<i>180/f²</i>
30 – 300	61.4	<i>27.5</i>	0.163	<i>0.0729</i>	1.0	<i>0.2</i>
300 – 1,500	3.54√f	<i>1.59√f</i>	√f/106	<i>√f/238</i>	f/300	<i>f/1500</i>
1,500 – 100,000	137	<i>61.4</i>	0.364	<i>0.163</i>	5.0	<i>1.0</i>



Higher levels are allowed for short periods of time, such that total exposure levels averaged over six or thirty minutes, for occupational or public settings, respectively, do not exceed the limits, and higher levels also are allowed for exposures to small areas, such that the spatially averaged levels do not exceed the limits. However, neither of these allowances is incorporated in the conservative calculation formulas in the FCC Office of Engineering and Technology Bulletin No. 65 (August 1997) for projecting field levels. Hammett & Edison has built those formulas into a proprietary program that calculates, at each location on an arbitrary rectangular grid, the total expected power density from any number of individual radio sources. The program allows for the description of buildings and uneven terrain, if required to obtain more accurate projections.

RFR.CALC™ Calculation Methodology

Assessment by Calculation of Compliance with FCC Exposure Guidelines

The U.S. Congress required (1996 Telecom Act) the Federal Communications Commission (“FCC”) to adopt a nationwide human exposure standard to ensure that its licensees do not, cumulatively, have a significant impact on the environment. The maximum permissible exposure limits adopted by the FCC (see Figure 1) apply for continuous exposures from all sources and are intended to provide a prudent margin of safety for all persons, regardless of age, gender, size, or health. Higher levels are allowed for short periods of time, such that total exposure levels averaged over six or thirty minutes, for occupational or public settings, respectively, do not exceed the limits.

Near Field.

Prediction methods have been developed for the near field zone of panel (directional) and whip (omnidirectional) antennas, typical at wireless telecommunications base stations, as well as dish (aperture) antennas, typically used for microwave links. The antenna patterns are not fully formed in the near field at these antennas, and the FCC Office of Engineering and Technology Bulletin No. 65 (August 1997) gives suitable formulas for calculating power density within such zones.

For a panel or whip antenna, power density $S = \frac{180}{\theta_{BW}} \times \frac{0.1 \times P_{net}}{\pi \times D \times h}$, in mW/cm²,

and for an aperture antenna, maximum power density $S_{max} = \frac{0.1 \times 16 \times \eta \times P_{net}}{\pi \times h^2}$, in mW/cm²,

where θ_{BW} = half-power beamwidth of the antenna, in degrees, and

P_{net} = net power input to the antenna, in watts,

D = distance from antenna, in meters,

h = aperture height of the antenna, in meters, and

η = aperture efficiency (unitless, typically 0.5-0.8).

The factor of 0.1 in the numerators converts to the desired units of power density.

Far Field.

OET-65 gives this formula for calculating power density in the far field of an individual RF source:

power density $S = \frac{2.56 \times 1.64 \times 100 \times RFF^2 \times ERP}{4 \times \pi \times D^2}$, in mW/cm²,

where ERP = total ERP (all polarizations), in kilowatts,

RFF = relative field factor at the direction to the actual point of calculation, and

D = distance from the center of radiation to the point of calculation, in meters.

The factor of 2.56 accounts for the increase in power density due to ground reflection, assuming a reflection coefficient of 1.6 (1.6 x 1.6 = 2.56). The factor of 1.64 is the gain of a half-wave dipole relative to an isotropic radiator. The factor of 100 in the numerator converts to the desired units of power density. This formula has been built into a proprietary program that calculates, at each location on an arbitrary rectangular grid, the total expected power density from any number of individual radiation sources. The program also allows for the description of uneven terrain in the vicinity, to obtain more accurate projections.