



CITY OF SUNNYVALE REPORT ADMINISTRATIVE HEARING

October 14, 2009

File Number: 2009-0508

Permit Type: Use Permit

Location: 1209 W Remington Drive (near Remington Court) (APN: 198-43-024)

Applicant/Owner: BCI Sites For Clearwire / Pacific Gas And Electric Company

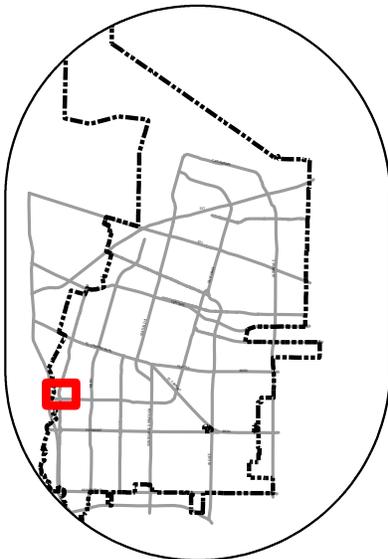
Staff Contact: Shaunn Mendrin, Senior Planner (408) 730-7429

Project Description: Use Permit and Variance to allow a second carrier adding three panel antennas and three microwave dishes on an extension of the existing lattice tower and associated radio cabinet on the ground. No backup generators are proposed as part of this project.

Reason for Permit: A Use Permit is required for any telecommunications facility that proposes collocation of not more than two facilities or users on an existing lattice tower and a Variance is required to allow the extension of the existing lattice tower to accommodate the new wireless facility.

Issues: Aesthetics

Recommendation: Approve with Conditions



500

Feet

PROJECT DESCRIPTION

Existing Conditions: Lattice Tower Zoning District: R-0 Equipment Enclosure Area: Ground Level	Right Side Setback: 300' Left Side Setback: 220' Rear Setback: 1,200'
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Previous Planning Projects related to subject Application.

UP 1999-0433 - The Planning Commission approved the first wireless telecommunication facility at the subject site on April 26, 2009. The approval allowed 16 antennas on the existing lattice tower.

MPP 1999-0434 – A Miscellaneous Plan Permit application was approved by staff on March 22, 2009 to allow temporary antennas.

MPP 2006-0168 - A Miscellaneous Plan Permit application was approved in 2006 to allow the existing 16 antennas to be consolidated into 6 antennas.

Deviations from Standard Zoning Requirements.

The proposed project requires a Variance to exceed the maximum height requirements for the area, which is 30'. The existing PG&E lattice tower is 126' tall and the project includes a 6' extension to the top of the tower to accommodate the proposed antennas. These types of extensions are commonly referred to as "Top Hats" and allow for a greater coverage area due to height and line of site.

Adjacent to Residential or Non-Commercial/Industrial Uses.

The subject property is surrounded by single-family residential (R-0 and R-1) to the north and east, and two-family dwelling (R-2) to the south and Highway 85 to the west.

Facility Purpose: The proposed project is to allow the co-location of three panel antennas, three microwave dishes on an existing 126' PG&E lattice tower. Microwave dishes are necessary to the wireless services that Clearwire provides, as they link all Clearwire sites together by providing point-to-point connections. Associated ground equipment will be added near the existing Metro PCS equipment under the existing lattice tower. The project does not include a generator.

Design: The proposed antennas and microwave dishes will be located on the proposed 6' extension. Cabling for the antennas will be via a raceway, in a similar manner as the existing. The required equipment cabinet, GPS, and RF (radio frequency) heads will be located adjacent to the existing Metro PCS cabinet under the lattice tower. The proposed equipment will be enclosed with a 6' solid wood fence.

Radio Frequency (RF) Emissions Exposure: The Federal Communication Commission (FCC) is the final authority on safety of telecommunications facilities. If the FCC has determined the facility to be in compliance with federal standards, the City is not permitted to make additional judgments on health and safety issues. The application can be reviewed by the City for compliance with design and location criteria only. The attached RF Emissions report (Attachment E) provides information about the proposed RF emissions of the facility. These results indicate the RF emissions are considered safe for inhabited areas.

Public Contact: 11 notices were sent to surrounding property owners and residents adjacent to subject site in addition to standard noticing practice. No letters were received.

Environmental Determination: A Categorical Exemption Class 3 (construction of small structures) relieves this project from CEQA provisions.

FINDINGS - VARIANCE

In order to approve the Variance the following findings must be made:

1. Because of exceptional or extraordinary circumstances or conditions applicable to the property, or use, including size, shape topography, location or surroundings, the strict application of the ordinance is found to deprive the property owner of privileges enjoyed by other properties in the vicinity and within the same zoning district, **and**

The height limitations for the subject property are for single-family districts. The proposed project will use an existing PG&E lattice tower, which exceeds the current height requirements by 96'. The Variance is requested to allow a minor 6' extension of the existing tower, which will be located 126' above the adjacent grade. The appearance of the extension will be minimal due to the height and location of the tower. The strict application of the zoning code would deprive the property owner from being able to provide additional public utility services such as wireless telecommunications.

2. The granting of the Variance will not be materially detrimental to the public welfare or injurious to the property, improvements, or uses within the immediate vicinity and within the same zoning district, **and**

The requested Variance will not be materially detrimental to the public welfare in that the location of the existing facility will minimize visual impacts and provide improved cellular service for the area.

3. Upon granting of the Variance, the intent and purpose of the ordinance will still be served and the recipient of the Variance will not be granted special privileges not enjoyed by other surrounding property owners within the same zoning district.

The project applicant will not be granted special privileges in that the proposed tower extension will use of the existing facility, which currently exceeds the allowable height in the area. In addition, the extension will not interfere with the existing public utility services and it serves the co-location intent of the Section 19.54 Wireless Telecommunication Facilities.

FINDINGS - USE PERMIT

In order to approve the Use Permit, the following findings must be made:

1. The proposed use attains the objectives and purposes of the General Plan of the City of Sunnyvale.

There are three policies and action statements that relate to the proposed application.

- **Telecommunications Policy** Action Statement A.1.e- Support retention of local zoning authority for cellular towers, satellite dish antennas, and other telecommunications equipment, facilities and structures.
- **Land Use and Transportation Sub-Element N1.3.** Promote an attractive and functional commercial environment.
- **Land Use and Transportation Sub-Element N1.5** Establish and monitor standards for community appearance and property maintenance.

The proposed project is consistent with the objectives of the General Plan in that the proposed project provides collocation on an existing structure to accommodate the proposed antennas and equipment and the associated equipment will be located behind and existing fence, minimizing visual clutter under the lattice tower. Standard conditions of approval will ensure that the standards for community appearance are maintained.

Staff was able to make the findings as the design meets the guidelines described above.

2. The proposed use ensures that the general appearance of proposed structures, or the uses to be made of the property to which the application refers, will not impair the orderly development of, or the existing uses being made of, adjacent properties.

The project is expected to have no impacts on surrounding properties.

ALTERNATIVES:

1. Approve the Use Permit and Variance with recommended Conditions in Attachment B.
2. Approve the Use Permit and Variance with modifications.
3. Deny the Use Permit and Variance.

RECOMMENDATION

Alternative 1 as staff was able to make the required findings.

Reviewed by:
Steve Lynch
Senior Planner

Prepared by: Shaunn Mendrin, Project Planner

Attachments:

- A. Standard Requirements and Recommended Conditions of Approval
- B. Site and Architectural Plans
- C. Photosimulations
- D. Letter from the Applicant including Use Permit and Variance Justifications
- E. RF Emissions Report

Standard Requirements

The following is a list of standard requirements. This list is intended to assist the applicant and public in understanding basic related requirements, and is not intended as an exhaustive list. These requirements cannot be waived or modified.

- A. **Testing Within 15 Days:** The applicant shall test any wireless telecommunications site installed in the City of Sunnyvale within 15 days of operating the tower. The test shall confirm that any Emergency 911 wireless call made through the wireless telecommunications site shall provide Enhanced 911 capability (including phase 2 information when available from the caller's device) and direct the call to the City of Sunnyvale Department of Public Safety dispatcher, ensuring phase 2 information is transferred. If the call is to be directed elsewhere pursuant to State and Federal law the applicant shall ensure that the Enhanced 911 information transfers to that dispatch center. This capability shall be routinely tested to ensure compliance as long as the approved wireless telecommunications site is in service.
- B. **Permit Expiration:** The Use Permit and Variance for the use shall expire if the use is discontinued for a period of one year or more.
- C. **Permit Lapse if not Exercised (Ordinance 2895-09):** The Use Permit and Variance shall be valid for three (3) years from the date of approval by the final review authority (as adopted by City Council on April 21, 2009, RTC 09-094). Extensions of time may be considered, for a maximum of two one year extensions, if applied for and approved prior to the expiration of the permit approval. If the approval is not exercised within this time frame, the permit is null and void.
- D. **Building Permits:** Obtain Building Permits.
- E. **Certification:** Before January 31 of each even numbered year following the issuance of any authorizing establishment of a wireless telecommunication facility, an authorized representative for each wireless carrier providing service in the City of Sunnyvale shall provide written certification to the City executed under penalty of perjury that (i) each facility is being operated in accordance with the approved local and federal permits and includes test results that confirm the facility meets city noise requirements and federal RF emissions standards; (ii) each facility complies with the then-current general and design standards and is in compliance with the approved plans; (iii) whether the facility is currently being used by the owner or operator; and (iv) the basic contact and site information supplied by the owner or operator is current.
- F. **Renewal:** Every owner or operator of a wireless telecommunication facility shall renew the facility permit at least every ten (10) years from

the date of initial approval. If a permit or other entitlement for use is not renewed, it shall automatically become null and void without notice or hearing ten (10) years after it is issued, or upon cessation of use for more than a year and a day, whichever comes first. Unless a new use permit or entitlement of use is issued, within one hundred twenty (120) days after a permit becomes null and void all improvements, including foundations and appurtenant ground wires, shall be removed from the property and the site restored to its original pre-installation condition within one hundred eighty (180) days of nonrenewal or abandonment.

- G. **Comply with Applicable Regulations:** The facility must comply with any and all applicable regulations and standards promulgated or imposed by any state or federal agency, including but not limited to the Federal Communications Commission and Federal Aviation Agency.
- H. **RF Emissions:** Certification must be provided that the proposed facility will at all times comply with all applicable health requirements and standards pertaining to RF emissions.
- I. **Business License:** The owner or operator of the facility shall obtain and maintain current at all times a business license as issued by the city.
- J. **Maintain Current Information:** The owner or operator shall maintain, at all times, a sign mounted on the outside fence showing the operator name, site number and emergency contact telephone number. The owner or operator of the facility shall also submit and maintain current at all times basic contact and site information on a form to be supplied by the city. The applicant shall notify city of any changes to the information submitted within thirty (30) days of any change, including change of the name or legal status of the owner or operator. This information shall include, but is not limited to the following:
 - i. Identity, including name, address and telephone number, and legal status of the owner of the facility including official identification numbers and FCC certification, and if different from the owner, the identity and legal status of the person or entity responsible for operating the facility.
 - ii. Name, address and telephone number of a local contact person for emergencies.
 - iii. Type of service provided.
- K. **Good Repair:** All facilities and related equipment, including lighting, fences, shields, cabinets, and poles, shall be maintained in good repair, free from trash, debris, litter and graffiti and other forms of vandalism, and any damage from any cause shall be repaired as soon as reasonably possible so as to minimize occurrences of dangerous conditions or visual blight. Graffiti shall be removed from any facility or equipment as soon as

practicable, and in no instance more than forty-eight (48) hours from the time of notification by the city.

- L. **Minimize Noise:** The facility shall be operated in such a manner so as to minimize any possible disruption caused by noise. Backup generators shall only be operated during periods of power outages, and shall not be tested on weekends or holidays, or between the hours of 10:00 p.m. and 7:00 a.m. on weekday nights. At no time shall equipment noise from any source exceed an exterior noise level of 60 dB at the property line.
- M. **Responsibility to Maintain:** The owner or operator of the facility shall routinely and regularly inspect each site to ensure compliance with the standards set forth in the Telecommunications Ordinance.
- N. **Hold Harmless:** The wireless telecommunication facility provider shall defend, indemnify, and hold harmless the city or any of its boards, commissions, agents, officers, and employees from any claim, action or proceeding against the city, its boards, commission, agents, officers, or employees to attack, set aside, void, or annul, the approval of the project when such claim or action is brought within the time period provided for in applicable state and/or local statutes. The city shall promptly notify the provider(s) of any such claim, action or proceeding. The city shall have the option of coordinating in the defense. Nothing contained in this stipulation shall prohibit the city from participating in a defense of any claim, action, or proceeding if the city bears its own attorney's fees and costs, and the city defends the action in good faith.
- O. **Liability:** Facility lessors shall be strictly liable for any and all sudden and accidental pollution and gradual pollution resulting from their use within the city. This liability shall include cleanup, intentional injury or damage to persons or property. Additionally, lessors shall be responsible for any sanctions, fines, or other monetary costs imposed as a result of the release of pollutants from their operations. Pollutants include any solid, liquid, gaseous or thermal irritant or contaminant, including smoke, vapor, soot, fumes, acids, alkalis, chemicals, and waste. Waste includes materials to be recycled, reconditioned or reclaimed.
- P. **No Interference with City Communication Systems:** The facility operator shall be strictly liable for interference caused by the facility with city communication systems. The operator shall be responsible for all labor and equipment costs for determining the source of the interference, all costs associated with eliminating the interference, (including but not limited to filtering, installing cavities, installing directional antennas, powering down systems, and engineering analysis), and all costs arising from third party claims against the city attributable to the interference.
- Q. **No Threat to Public Health:** The facility shall not be sited or operated in such a manner that is poses, either by itself or in combination with other

such facilities, a potential threat to public health. To that end, the subject facility and the combination of on-site facilities shall not produce at any time power densities in any inhabited area that exceed the FCC's Maximum Permissible Exposure (MPE) limits for electric and magnetic field strength and power density for transmitters or any more restrictive standard subsequently adopted or promulgated by the federal government.

Recommended Conditions of Approval

In addition to complying with all applicable City, County, State and Federal Statutes, Codes, Ordinances, Resolutions and Regulations, Permittee expressly accepts and agrees to comply with the following conditions of approval of this Permit:

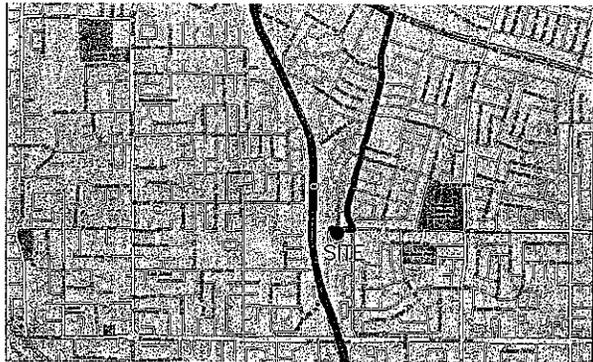
1. **Project Conformance:** Project shall be in conformance with the plans approved at the public hearing(s). Minor changes may be approved by the Director of Community Development, major changes may be approved at a public hearing.
2. **Execute Permit Document:** Execute a Use Permit and Variance document prior to issuance of the building permit.
3. **Conditions of Approval on Plans:** The Conditions of Approval shall be reproduced on a page of the plans submitted for a Building permit for this project.
4. **Design:** The tower extension and new antennas shall be painted to match the existing facility.
5. **Tree Removal:** No trees shall be removed as part of this application.

clearwire®

PG&E REMINGTON CREEK CA-SJC0063B

SAP NO.: 40752605 TOWER NO.: 4/24 & 6/36
TOWER LINE NAME: LAWRENCE-MONTA VISTA
1209 STEVENS FREEWAY SUNNYVALE, CA 94087

VICINITY MAP - N.T.S.



DRIVING DIRECTIONS

FROM: CLEARWIRE REGIONAL OFFICE
12857 ALCOSTA BLVD, STE 300
SAN RAMON, CA 94583

TO: 1209 STEVENS FREEWAY
SUNNYVALE, CA 94087

DISTANCE: 53.1 MILES

1. START AT 2999 OAK RD, WALNUT CREEK GOING TOWARD TREAT BLVD TURN RIGHT ON TREAT BLVD
2. TURN RIGHT ON N MAIN ST
3. TURN RIGHT TO TAKE RAMP ONTO I-880 S TOWARD OAKLAND/SAN JOSE
4. TAKE EXIT #12/MISSION BLVD ONTO MISSION BLVD(CA-262 W) TOWARD MISSION BLVD WEST/WARM SPRINGS DISTRICT (I-880)/UC EXTENSION
5. TAKE LEFT RAMP ONTO I-880 S TOWARD SAN JOSE
6. TAKE THE MTN VIEW EXIT ONTO CA-237 W TURN LEFT ON E EL CAMINO REAL(CA-82 S)
7. TURN RIGHT ON S BERNARDO AVE
8. TURN RIGHT ON W REMINGTON DR
9. ARRIVE AT 1285 W REMINGTON DR, SUNNYVALE, ON THE LEFT

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. CALIFORNIA ADMINISTRATIVE CODE (INCL TITLE 24 & 25) | 6. ANSI/ISA-222-F LIFE SAFETY CODE NFPA-101 |
| 2. 2007 CALIFORNIA BUILDING CODE | 7. 2007 CALIFORNIA PLUMBING CODE |
| 3. CITY/COUNTY ORDINANCES | 8. 2007 CALIFORNIA ELECTRICAL CODE |
| 4. BUILDING OFFICIALS AND CODE ADMINISTRATORS (BOCA) | 9. LOCAL BUILDING CODE |
| 5. MECHANICAL 2007 CALIFORNIA CODE | |

BUILDING/ SITE DATA LEGEND

LATITUDE: 37° 21' 34.44" N (NAD83)
LONGITUDE: 122° 03' 42.17" W (NAD83)
ELEVATION: 159' AMSL (NGVD 29)
A.P.N.: 198-43-024
ZONING: R0, RESIDENTIAL LOW DENSITY
OCCUPANCY: U, UNMANNED
TYPE OF CONSTRUCTION: VN
LEASE AREA: 63.0 SQ. FT.
HANDICAP REQUIREMENTS: FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION, HANDICAPPED ACCESS NOT REQUIRED.
TITLE 24 REQUIREMENTS: FACILITY IS UNMANNED AND NOT FOR HUMAN HABITATION, TITLE 24 IS EXEMPT.

PROJECT DESCRIPTION

INSTALLATION OF A WIRELESS COMMUNICATIONS FACILITY, INCLUDING THE INSTALLATION OF (1) EQUIPMENT CABINET, (3) MICROWAVE DISHES, (3) PANEL ANTENNAS, AND (1) GPS

SIGNATURE BLOCK

ZONING MANAGER	DATE
SITE ACQ. MANAGER	DATE
RF MANAGER	DATE
CONSTRUCTION MANAGER	DATE
MICROWAVE MANAGER	DATE

PROJECT SUMMARY

PROPERTY OWNER: PACIFIC GAS & ELECTRIC CO 245 MARKET ST. SAN FRANCISCO, CA 94105 CONTACT: SHARI HOLLAND PHONE: (415) 973-3353	ARCHITECT: DELTA GROUPS ENGINEERING, INC. 5635 WEST LAS POSITAS, SUITE 403 PLEASANTON, CA 94566 NAME: FRANCIS ONG CONTACT: HAROLD TRIAS PHONE: (925) 468-0115
APPLICANT: CLEARWIRE 2999 OAK ROAD, SUITE 10 WALNUT CREEK, CA 94597 CONTACT: TOM DERKAS PHONE: (925) 202-3333	STRUCTURAL ENGINEER: DELTA GROUPS ENGINEERING, INC. 5635 WEST LAS POSITAS, SUITE 403 PLEASANTON, CA 94566 CONTACT: ALBERT TENG PHONE: (949) 622-0333
LEASING MANAGER: GOODMAN NETWORKS 2999 OAK ROAD, SUITE 10 WALNUT CREEK, CA 94597 PLEASANTON, CA 94566 CONTACT: TIM TASSINARI PHONE: (214) 571-7100	CONSTRUCTION MANAGER: GOODMAN NETWORKS 2999 OAK ROAD, SUITE 10 WALNUT CREEK, CA 94597 CONTACT: MITCHELL SMITH PHONE: (925) 595-9353
ZONING MANAGER: GOODMAN NETWORKS 2999 OAK ROAD, SUITE 10 WALNUT CREEK, CA 94597 CONTACT: GORDON BELL PHONE: (530) 647-1932	PG&E PROJECT MANAGER: PACIFIC GAS & ELECTRIC CO. STREET ADDRESS CITY, STATE, ZIP CONTACT: SEAN KENNEDY PHONE: (925) 786-3375

SHEET INDEX

T1	TITLE SHEET
C1	SITE SURVEY
A1	OVERALL SITE PLAN
A2	EQUIPMENT AREA PLAN, ANTENNA LAYOUT & ANTENNA LAYOUT
A3	NORTH & EAST ELEVATIONS
A4	SOUTH & WEST ELEVATIONS
A5	ENLARGED NORTH, EAST, SOUTH & WEST ELEVATIONS

clearwire®

4400 CARILLON POINT
KIRKLAND, WA 98033

PROJECT INFORMATION:

**PG&E REMINGTON CREEK
CA-SJC0063B**
1209 STEVENS FREEWAY
SUNNYVALE, CA
SANTA CLARA COUNTY

CURRENT ISSUE DATE:

09/15/09

ISSUED FOR:

ZD (100%)

REV.: DATE: DESCRIPTION: BY:

△	09/15/09	ZD (100%)	CL
△	08/18/09	ZD (100%)	CC
△	08/12/09	ZD (100%)	JK
△	07/20/09	ZD (100%)	CL
△	07/2/09	ZD (95%)	CL
△	06/30/09	ZD (95%)	JT
△	06/13/09	ZD (90%)	IT

PLANS PREPARED BY:



5635 WEST LAS POSITAS, SUITE 403
PLEASANTON, CA 94566
TEL: (925) 468-0115 FAX: (925) 468-0335

CONSULTANT:

SEAL OF APPROVAL:

SHEET TITLE:

TITLE SHEET

SHEET NUMBER: REVISION:

Page 1 of 7
ATTACHMENT B
59CCL061

KEY NOTES:

- ① PROPOSED LOCATION OF 6'-0"x7'-0" CLEARWIRE LEASE AREA (63 SQ. FT. TOTAL)
- ② EXISTING LANDSCAPE (TYP.)
- ③ EXISTING PG&E LATTICE TOWER
- ④ EXISTING WOOD FENCE
- ⑤ EXISTING CONCRETE/ASPHALT AREA
- ⑥ EXISTING PG&E J.P.A. WITH TRANSFORMER (POWER P.O.C.)
- ⑦ PROPOSED CLEARWIRE UNDERGROUND POWER ROUTING WITHIN 6'-0" WIDE EASEMENT - TO LOCATION OF POWER P.O.C.
- ⑧ PROPOSED 10'-0" WIDE EASEMENT

NOTES:
TOWER SITS ON SBE/ 135-43-29

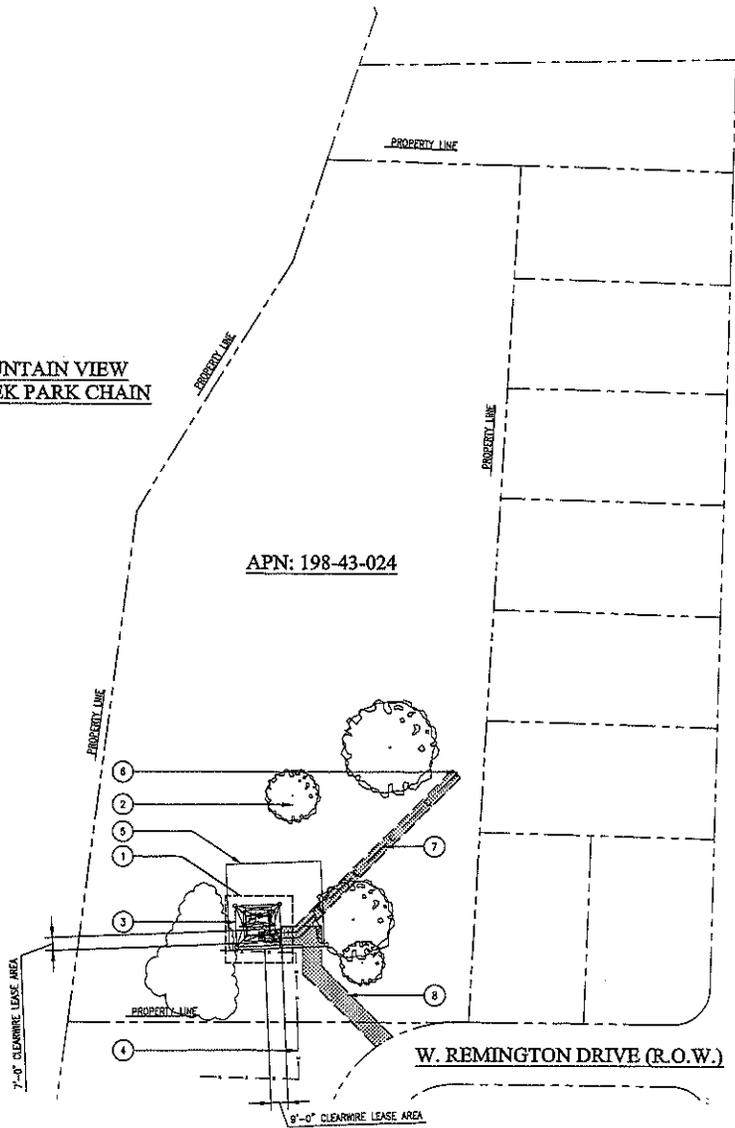
CITY OF MOUNTAIN VIEW
(STEVENS CREEK PARK CHAIN)

APN: 198-43-024

ROBIN WAY

W. REMINGTON DRIVE (R.O.W.)

NOTES:
1. DO NOT SCALE DRAWINGS. ALL DIMENSIONS OF AND BETWEEN EXISTING BUILDINGS/STRUCTURES, OR RELATIVE DISTANCES AS SHOWN BETWEEN EXISTING BUILDINGS/STRUCTURES, PROPERTY LINES, EASEMENTS, AND THE TRUE NORTH ARE TO BE CONFIRMED BY A SURVEYOR.
2. POWER ROUTING DESIGN IS PRELIMINARY AND MUST BE VERIFIED WITH LOCAL UTILITY COMPANIES.



OVERALL SITE PLAN

SCALE:
1 inch = 30 ft



clearw're
4400 CARILLON POINT
KIRKLAND, WA 98033

PROJECT INFORMATION:
**FG&E REMINGTON CREEK
CA-SJC0063B**
1209 STEVENS FREEWAY
SUNNYVALE, CA
SANTA CLARA COUNTY

CURRENT ISSUE DATE:
09/15/09

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ZD (100%)

REV. #	DATE	DESCRIPTION	BY
△	09/15/09	ZD (100%)	CL
△	08/18/09	ZD (100%)	CC
△	08/12/09	ZD (100%)	JK
△	07/20/09	ZD (100%)	CL
△	07/2/09	ZD (95%)	CL
△	06/30/08	ZD (95%)	JZ
△	06/13/09	ZD (90%)	TT

PLANS PREPARED BY:
**DELTA GROUPS
ENGINEERING, INC.**
CONSULTING ENGINEERS
8436 WEST LAS POSITAS, SUITE 403
PULVERVILLE, CA 95075
TEL (925) 458-0115 FAX (925) 458-0355

CONSULTANT:

SEAL OF APPROVAL:

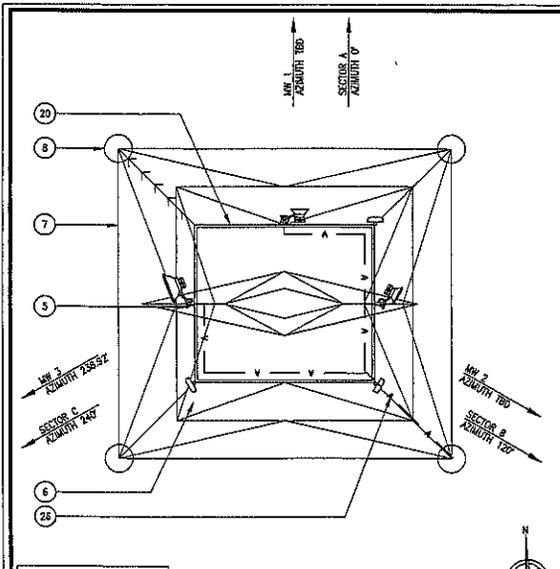
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ATTACHMENT 7
OVERALL SITE PLAN
Page

SHEET NUMBER: 7

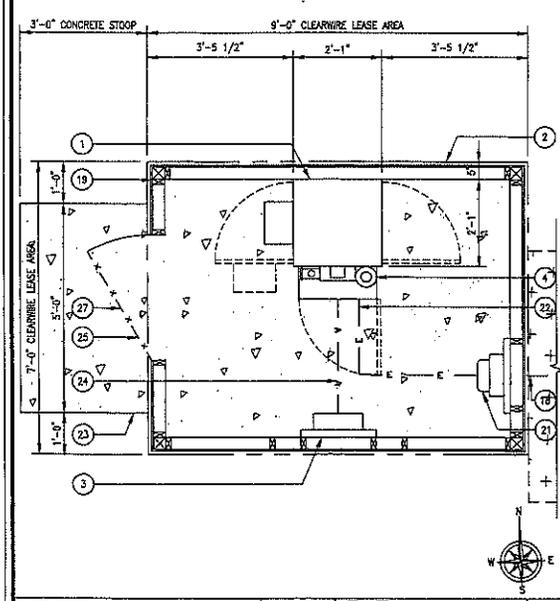
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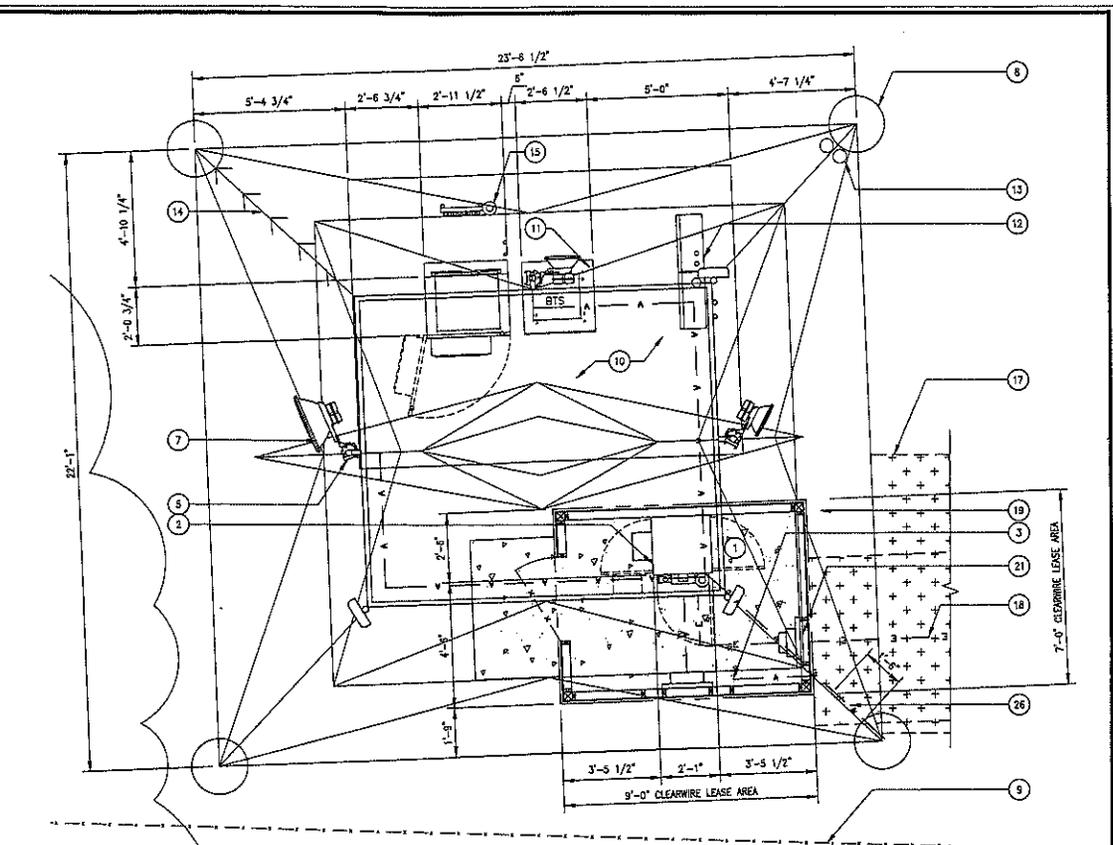


NOTES:
EXISTING METRO PCS ANTENNA NOT SHOWN FOR CLARITY

ANTENNA LAYOUT SCALE: 1/4" inch = 1 ft



EQUIPMENT LAYOUT SCALE: 3/4" inch = 1 ft



- KEY NOTES:**
- 1 PROPOSED CLEARWIRE EQUIPMENT CABINET
 - 2 PROPOSED 9'-0"x7'-0" CLEARWIRE LEASE AREA (83 SQ. FT. TOTAL)
 - 3 PROPOSED CLEARWIRE RF HEAD (TYP. OF 3) - STACKED
 - 4 PROPOSED CLEARWIRE GPS - MOUNTED TO EQUIPMENT CABINET
 - 5 PROPOSED CLEARWIRE 4'-0" HIGH PANEL ANTENNA (1 PER SECTOR, TYP., 3 SECTORS TOTAL)
 - 6 PROPOSED CLEARWIRE MICROWAVE DISHES (1 PER SECTOR, TYP., 3 SECTORS TOTAL)
 - 7 EXISTING POLE LATTICE TOWER
 - 8 EXISTING CONCRETE FOOTING
 - 9 EXISTING WOOD FENCE
 - 10 EXISTING ROYAL STREET CONCRETE SLAB
 - 11 EXISTING ROYAL STREET EQUIPMENT CABINET
 - 12 EXISTING ROYAL STREET H-FRAME UTILITY CABINET
 - 13 EXISTING ROYAL STREET COAX CABLE ROUTING
 - 14 EXISTING CLIMBING LEG
 - 15 EXISTING ROYAL STREET GPS
 - 16 PROPOSED CONCRETE SLAB
 - 17 PROPOSED 10'-0" WIDE EASEMENT
 - 18 PROPOSED CLEARWIRE UNDERGROUND POWER ROUTING WITHIN 5'-0" WIDE EASEMENT - TO LOCATION OF POWER P.O.C.
 - 19 PROPOSED 5'-0" HIGH WOODEN FENCE
 - 20 PROPOSED 6'-0" HIGH TOP HAT ON TOP OF EXISTING POLE LATTICE TOWER
 - 21 PROPOSED 100A METER WITH MAIN DISCONNECT
 - 22 PROPOSED POWER CABLE CONDUIT - TO LOCATION OF PROPOSED 100A METER
 - 23 PROPOSED 3'-0" X 5'-0" CONCRETE STOOP
 - 24 PROPOSED ANTENNA COAX/FIBER ROUTING
 - 25 PROPOSED 3'-0" WIDE WOOD ACCESS GATE
 - 26 NEW COAX CABLE ROUTING: (6) SIX 1/2" COAX CABLES - MOUNTED TO LEG OF EXISTING POLE LATTICE TOWER
 - 27 PROPOSED CLEARWIRE EMERGENCY SIGNAGE - MOUNTED TO PROPOSED GATE

EQUIPMENT AREA PLAN SCALE: 1/2" inch = 1 ft

NOTES:
1. DO NOT SCALE DRAWINGS. ALL DIMENSIONS OF AND BETWEEN EXISTING BUILDINGS/STRUCTURES, OR RELATIVE DISTANCES AS SHOWN BETWEEN EXISTING BUILDINGS/STRUCTURES, PROPERTY LINES, EASEMENTS AND THE TRUE NORTH ARE TO BE CONFIRMED BY A SURVEYOR.
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clearw're
4400 CARILLON POINT
KIRKLAND, WA 98033

PROJECT INFORMATION:
PG&E REMINGTON CREEK
CA-SJC0063B
1200 STEVENS FREEWAY
SUNNYVALE, CA
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CURRENT ISSUE DATE:
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ISSUED FOR:
ZD (100%)

REV.	DATE	DESCRIPTION	BY
△	09/15/09	ZD (100%)	CL
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△	08/12/09	ZD (100%)	JK
△	07/20/09	ZD (100%)	CL
△	07/2/09	ZD (95%)	CL
△	06/30/09	ZD (95%)	JZ
△	06/13/09	ZD (90%)	IT

PLANS PREPARED BY:
DELTA GROUPS ENGINEERING, INC.
CONSULTING ENGINEERS
8855 WEST LAS POSAS, SUITE 403
PULGARIN, CA 94368
TEL: (925) 468-0115 FAX: (925) 468-0355

CONSULTANT:

SEAL OF APPROVAL:

SHEET TITLE:
EQUIPMENT AREA PLAN, ANTENNA LAYOUT, & EQUIPMENT LAYOUT

SHEET NUMBER: **Page 2** OF **4** REVISION: **CL061**

clearw're

4400 CARILLON POINT
KIRKLAND, WA 98033

PROJECT INFORMATION:

**PG&E REMINGTON CREEK
CA-SJC0063B**
1209 STEVENS FREEWAY
SUNNYVALE, CA
SANTA CLARA COUNTY

CURRENT ISSUE DATE:

09/15/09

ISSUED FOR:

ZD (100%)

REV.: DATE: DESCRIPTION: BY:

REV.	DATE	DESCRIPTION	BY
△	09/15/09	ZD (100%)	CL
△	08/18/09	ZD (100%)	CC
△	08/12/09	ZD (100%)	JK
△	07/20/08	ZD (100%)	CL
△	07/2/09	ZD (95%)	CL
△	06/30/09	ZD (95%)	JZ
△	06/13/09	ZD (90%)	TT

PLANS PREPARED BY:

**DELTA GROUPS
ENGINEERING, INC.**
CONSULTING ENGINEERS
2635 WEST LAS POSITAS, SUITE 403
PLEASANTON, CA 94588
TEL: (925) 484-0115 FAX: (925) 489-0355

CONSULTANT:

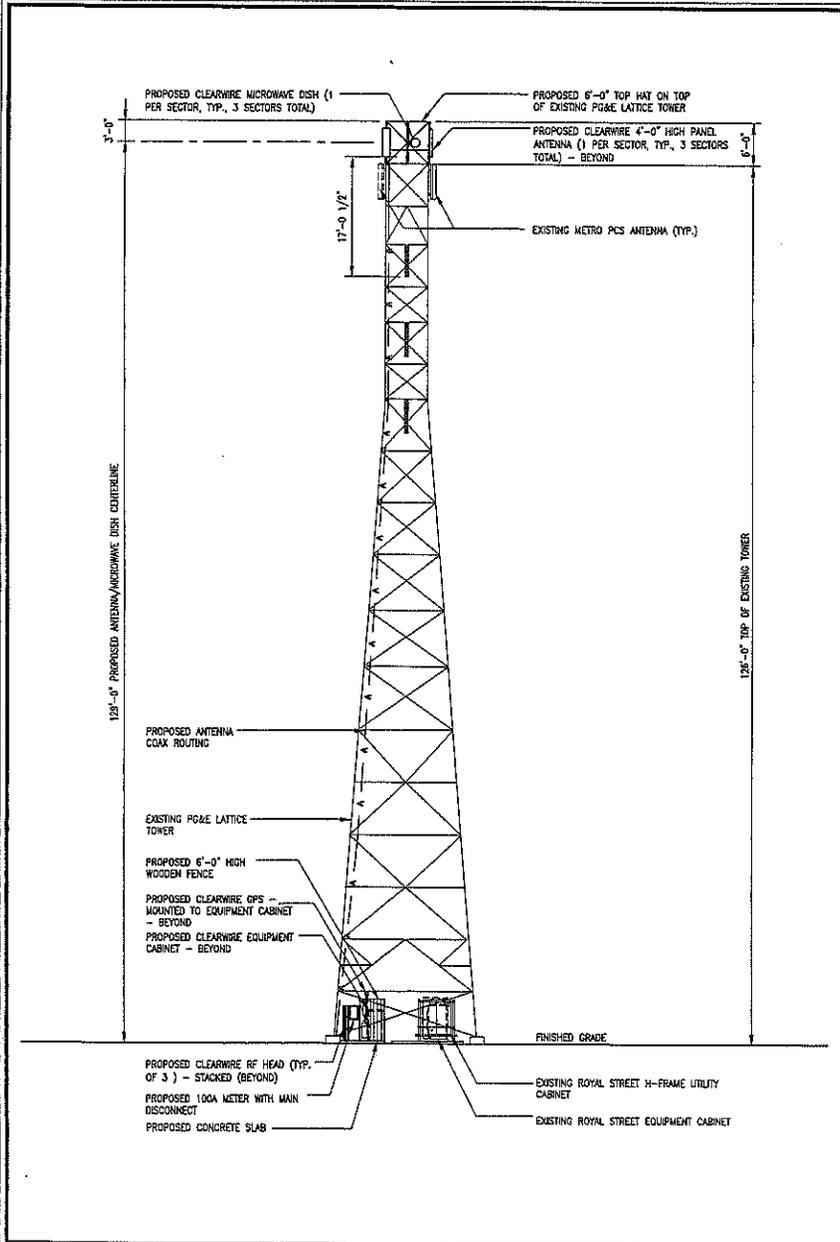
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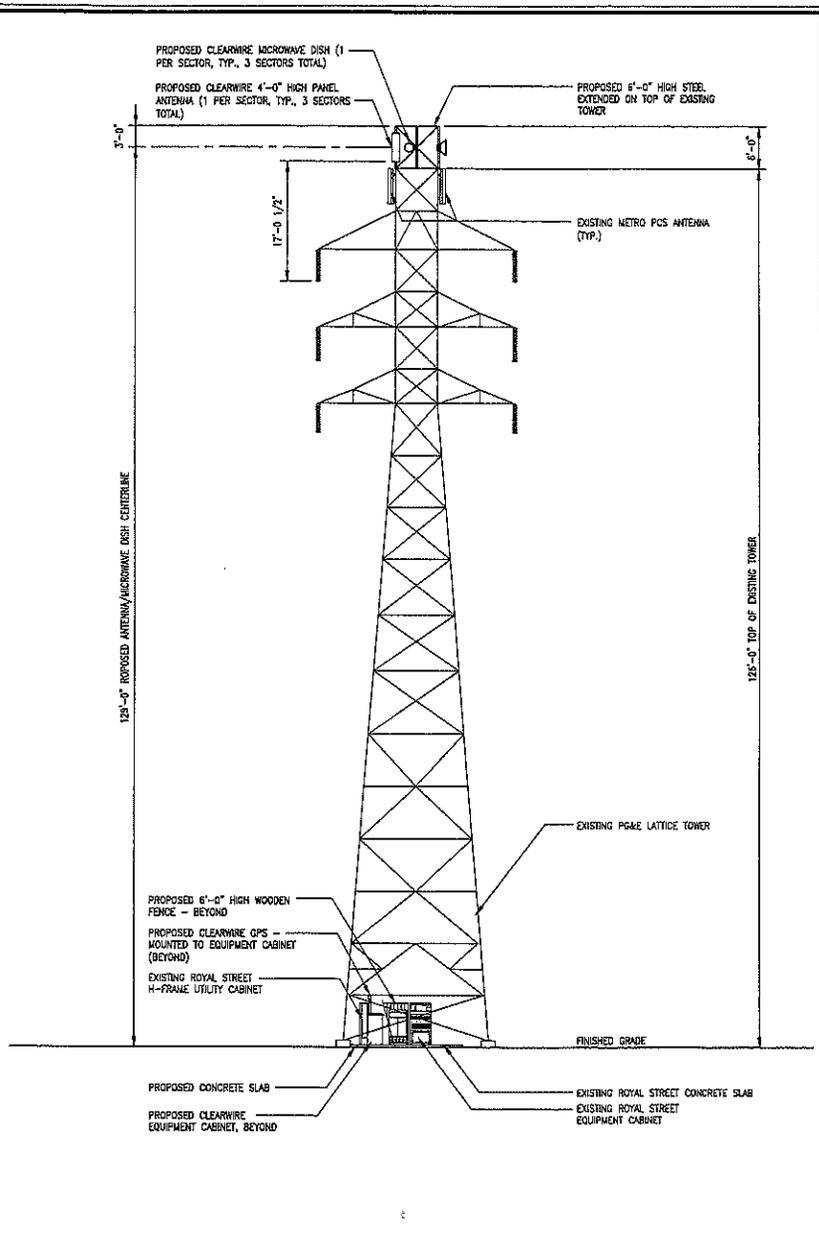
NORTH & EAST
ELEVATIONS
Page 4 of 7

SHEET NUMBER: REVISION:

A337
7
09CL061



EAST ELEVATION SCALE: 1/8" = 1'-0" 2



NORTH ELEVATION SCALE: 1/8" = 1'-0" 1

clearw're

4400 CARILLON POINT
KIRKLAND, WA 98033

PROJECT INFORMATION:

PG&E REMINGTON CREEK
CA-SJC0063B
1209 STEVENS FREEWAY
SUNNYVALE, CA
SANTA CLARA COUNTY

CURRENT ISSUE DATE:

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△	08/18/09	ZD (100%)	CC
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△	06/30/09	ZD (95%)	JZ
△	06/13/09	ZD (90%)	TT

PLANS PREPARED BY:

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CONSULTANT:

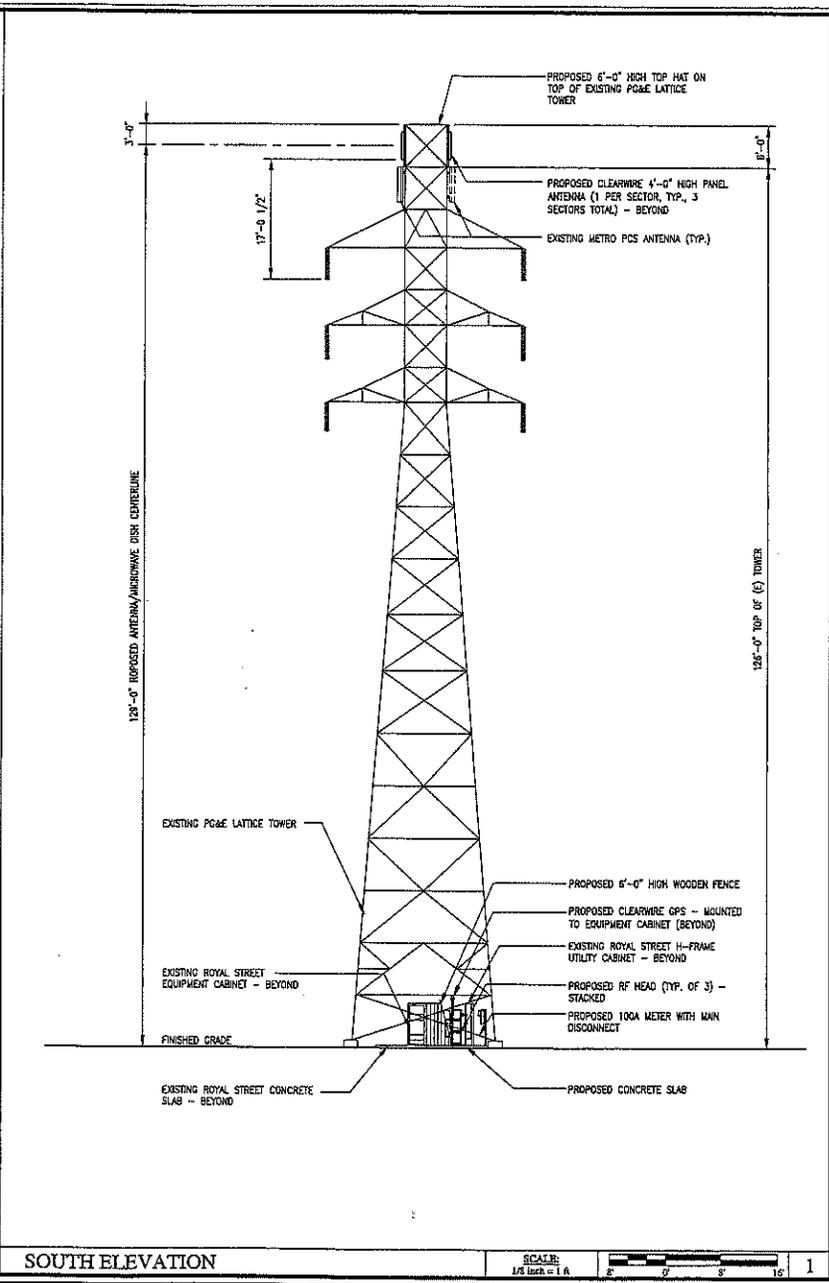
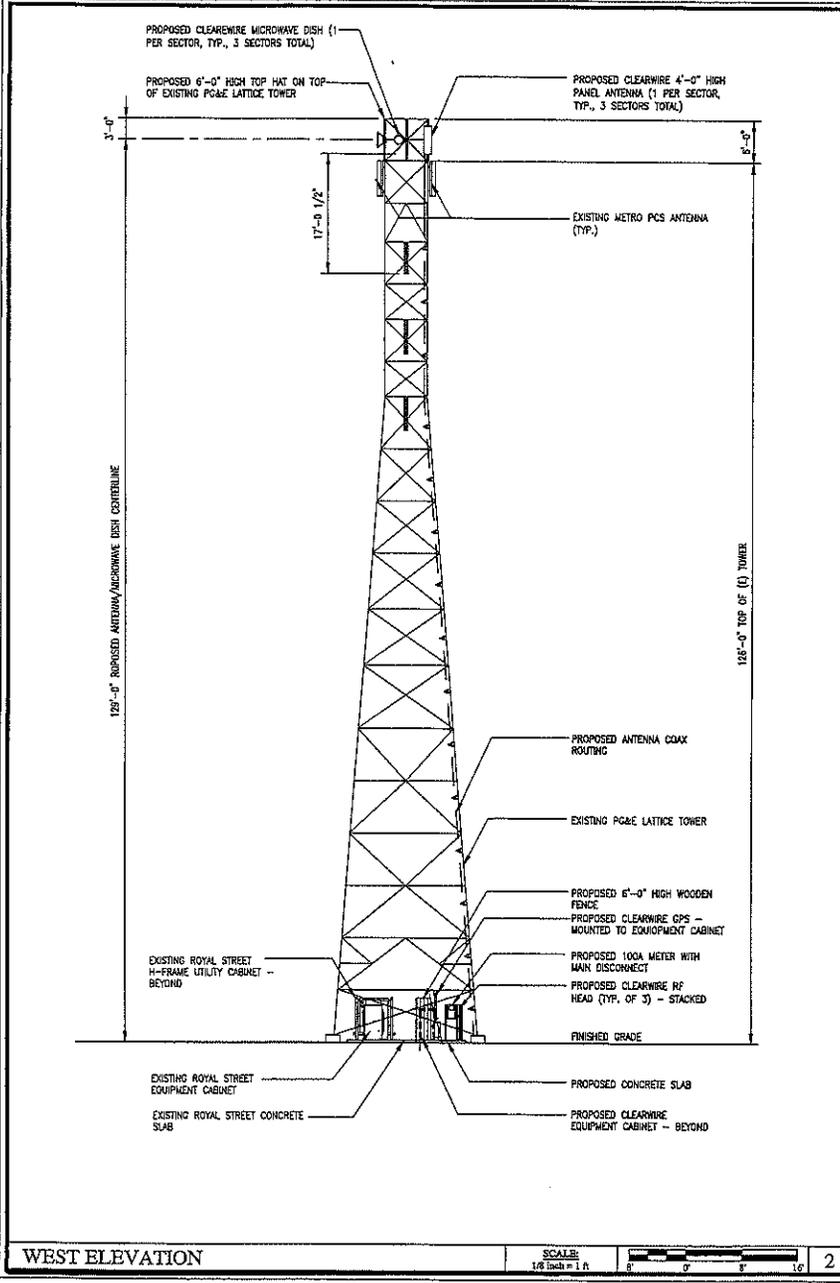
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SHEET TITLE:

SOUTH & WEST
ELEVATIONS

SHEET NUMBER DIVISION:

A4 ATTACHMENT **7**
Page 5 of 4
909CL041

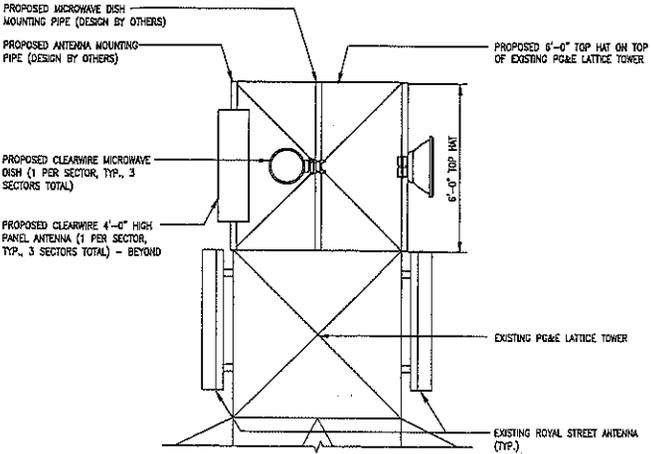
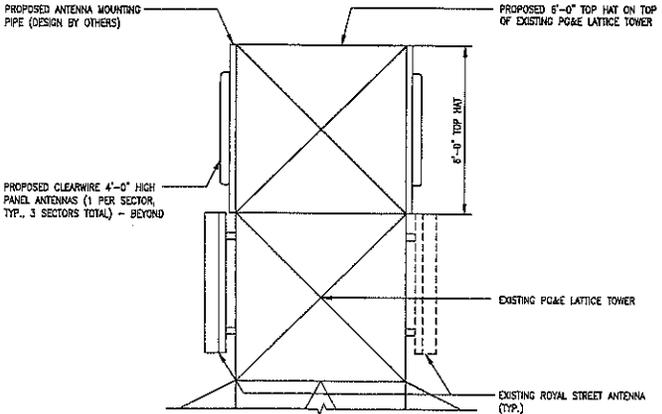


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Page 5 of 4

ATTACHMENT 7

909CL041

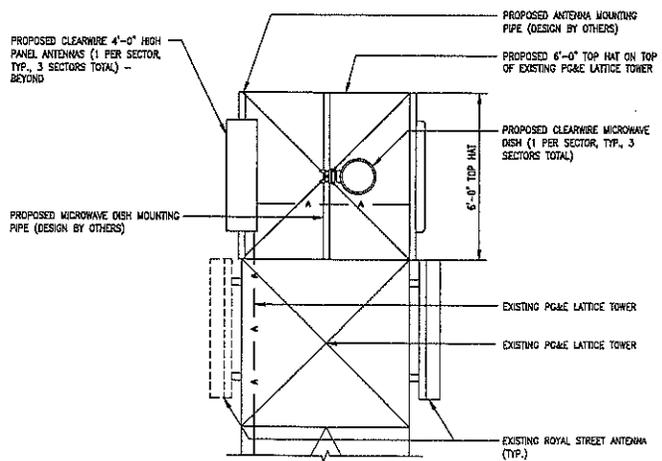
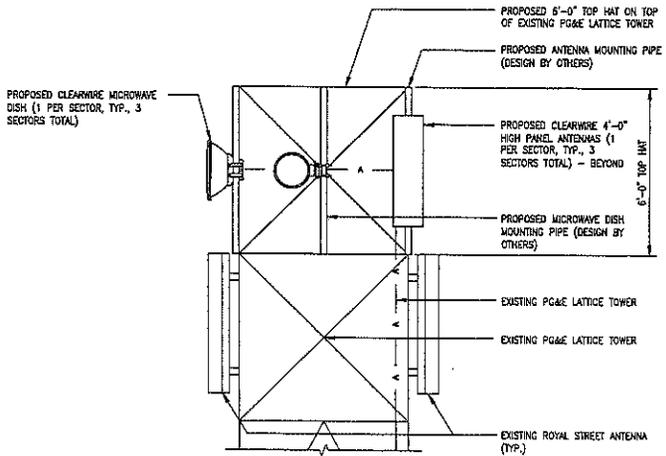


SOUTH ELEVATION

SCALE: 1/2 inch = 1 ft

NORTH ELEVATION

SCALE: 1/2 inch = 1 ft



WEST ELEVATION

SCALE: 1/2 inch = 1 ft

EAST ELEVATION

SCALE: 1/2 inch = 1 ft

clearw're

4400 CARILLON POINT
KIRKLAND, WA 98033

PROJECT INFORMATION:

**PG&E REMINGTON CREEK
CA-SJC0063B**
1209 STEVENS FREZWAY
SUNNYVALE, CA
SANTA CLARA COUNTY

CURRENT ISSUE DATE:

09/15/09

ISSUED FOR:

ZD (100%)

REV.: DATE: DESCRIPTION: BY:

REV.	DATE	DESCRIPTION	BY
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△	08/18/09	ZD (100%)	CC
△	08/12/09	ZD (100%)	JK
△	07/20/09	ZD (100%)	CL
△	07/2/09	ZD (95%)	CL
△	06/30/09	ZD (95%)	JZ
△	05/13/09	ZD (90%)	TT

PLANS PREPARED BY:

**DELTA GROUPS
ENGINEERING, INC.**
CONSULTING ENGINEERS

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FRESNO, CALIF. 94388
TEL: (559) 448-0115 FAX: (559) 444-0358

CONSULTANT:

SEAL OF APPROVAL:

SHEET TITLE:

SOUTH & WEST
ELEVATIONS

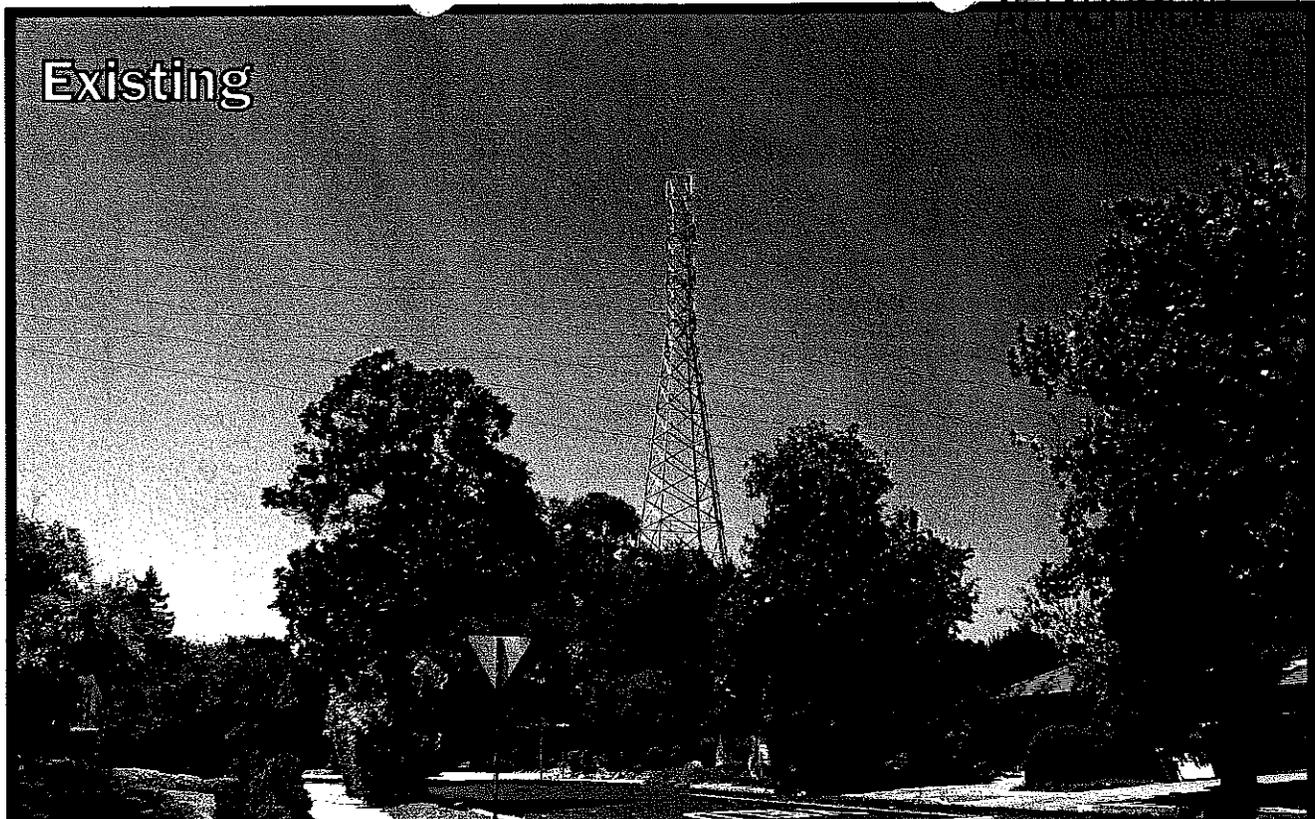
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ATTACHMENT
A3061

4 of 5

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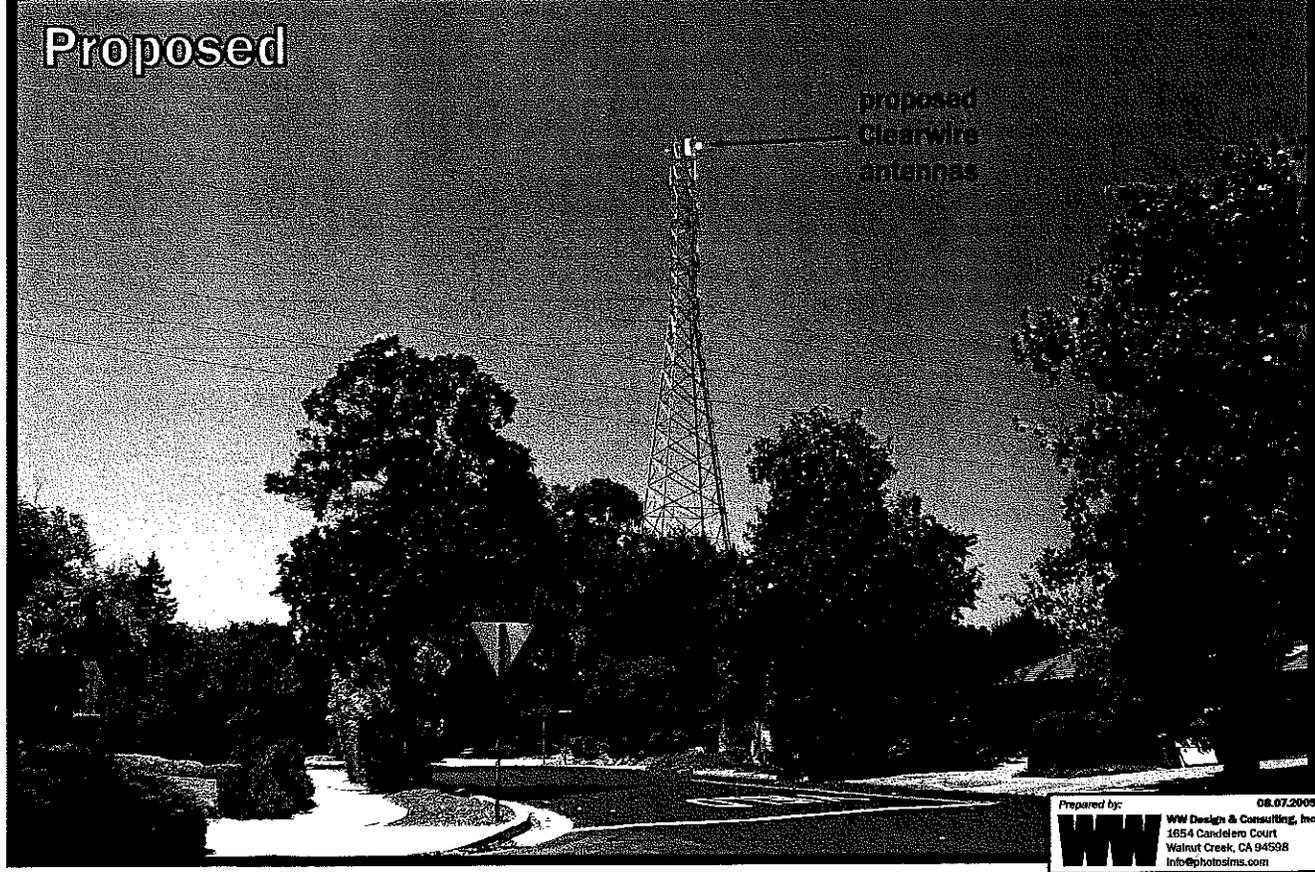
Existing



Photosimulation of the proposed telecommunication facility as seen looking west along Remington Drive

<p>clear wireless broadband</p>	<p>CA-SJC0063</p>	<p>PG&E Remington Creek</p>	<p>1209 Stevens Freeway Sunnyvale, CA 94087</p>
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Proposed



Prepared by: **WW** 08.07.2009
 WW Design & Consulting, Inc.
 1654 Candefero Court
 Walnut Creek, CA 94598
 info@photosims.com

Existing



Photosimulation of the proposed telecommunication facility as seen looking southwest from Robin & Oxford

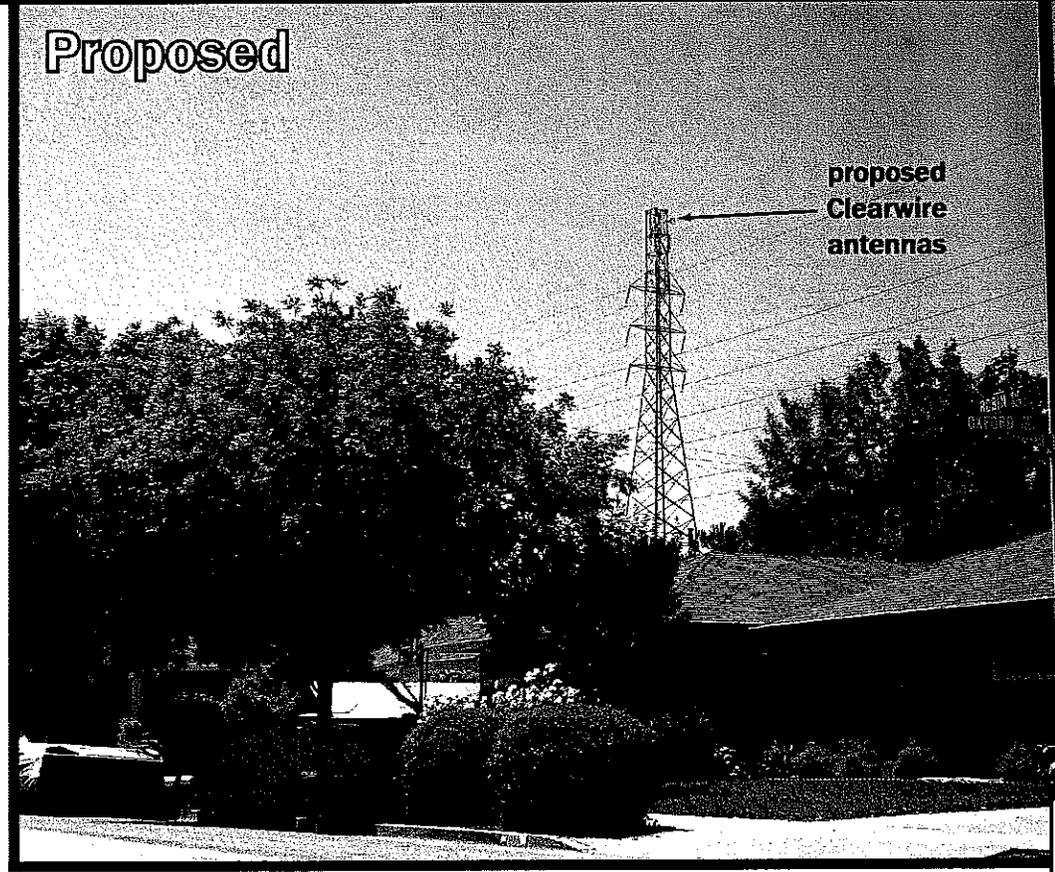
clear
wireless broadband

CA-SJC0063

**PG&E Remington
Creek**

1209 Stevens Freeway
Sunnyvale, CA 94087

Proposed



proposed
Clearwire
antennas

Prepared by: **WW** 08.07.2009
WW Design & Consulting, Inc.
1854 Camelliere Court
Walnut Creek, CA 94598
info@photosims.com



September 16, 2009

City of Sunnyvale
Planning Division
456 W. Olive Avenue
Sunnyvale, CA 94088

RE: **ClearWire Site CA-SJC0063:** Application for a Minor Use Permit for a Wireless Communications Facility at 1209 W. Remington Drive, Sunnyvale, CA, APN 198-43-024 (Resubmittal)

This letter is hereby submitted in conjunction with an application for a minor use permit for an unmanned wireless communications facility located on and under an existing PG&E lattice tower at a property located at 1209 W. Remington Drive in the City of Sunnyvale. The proposed facility is part of a wireless communications network for ClearWire Technologies.

I. Applicant Information

Lessee/Applicant

ClearWire Technologies
2999 Oak Road, Ste. 110
Walnut Creek, CA 94597
Attn: Tom Derkas
Phone: (925) 202-3333

Agent for Applicant

bci Communications, Inc (Attn: Gordon Bell)
4020 Sierra Springs Drive
Pollock Pines, CA 95726
Phone: (530) 647-1932
Fax: (805) 456-3958
Email: gbell61639@aol.com

Property Owner

Pacific Gas & Electric
245 Market Street, 10th Floor
San Francisco, CA 94105
Attn: Sean Kennedy
Phone: (925) 786-5375

II. Project Description

Project Location

The proposed project is located at 1209 W. Remington Drive in the City of Sunnyvale. The proposed communications facility will be located on and under an existing PG&E lattice tower. The project site is located on Assessor's Parcel 198-43-024. Geographic coordinates

(NAD 83) for the proposed facility are Latitude: 37°21' 34.94"; Longitude: -122° 03' 42.17", at an elevation of approximately 163' AMSL (above mean sea level). The aerial photo below shows project location and surrounding land uses.

Fig. 1. Aerial Photo Showing Project Location and Surrounding Land Uses



Project Components

The proposed project would consist installation of antennas and radio equipment on and under an existing PG&E lattice tower as shown on the attached plans. The proposed project components would consist of the following elements to be contained within a 63.0 (9' x 7') square foot lease area:

- Radio equipment cabinet (approx. 2' x 2') to be installed on a concrete slab under the PG&E lattice tower within the proposed Clearwire lease area which would be fenced with a 6'-high wooden fence.
- Three (3) panel antennas (4'-long) and three (3) microwave dishes (Max. diameter 26.1", Min. diameter 15.3") to be installed on a 6'-tall top hat extension on to the existing 126'-tall lattice tower, bringing the overall tower height to 132' above ground level.
- One (1) GPS antenna to be mounted on the radio cabinet within the lease area
- Associated fiber/coax cable to be run from the radio cabinets on slab to the antennas on the top hat along the tower legs. Power would be pulled from existing electrical service adjacent to the site as shown on the plans.

- A generator is not proposed as part of this project.

Access is provided by existing access easements from Remington Court.

Collocation

The existing tower already supports one existing communications facility (Metro PCS) and may be capable of handling additional antennas should other wireless communications companies be interested in collocation on the tower.

Network Technology

Clearwire offers a robust suite of advanced voice, high-speed Internet services to consumers and businesses. The company is building the first Mobile WiMax 4G network in the San Francisco Bay area bringing together an unprecedented combination of speed and mobility. Clearwire is licensed by the FCC to operate the Mobile WiMax Network in the 2.5-2.7GHz frequency range in San Francisco market. Clearwire will be using microwave backhaul for the Mobile WiMax network.

The Clearwire network is designed upon utilization of microwave backhaul throughout the network of hundreds of sites in the Bay area. This is a 100 percent backhaul solution, with no hardline connections within the system. What this means is that the majority of the sites transport a signal to at least three other sites with "hubs" located at the center of some of the rings to transport an initial signal. Because sites are inextricably linked by these microwave connections, it is imperative that the MW dishes obtain maximum height over the surrounding clutter and topography to ensure a point-to-point connection with other sites in the system.

In terms of Clearwire's relationship to other carriers and their networks, it should be known that Clearwire is a subsidiary of Sprint/Nextel (Sprint owns 51%), but the systems are not integrated. Clearwire's network is an entirely new network. Eventually, Clearwire's subscribers may have roaming agreements with Sprint/Nextel where Clearwire is not present, but the systems are not integrated to support each other. Because of the ownership relationship, Clearwire's footprint is very similar to Sprint's in the Bay area because we know that it is possible to utilize Sprint/Nextel's shelters, mounting brackets, coax cable trays, etc. with the appropriate collocation agreement with Sprint/Nextel. We also know we're more likely to have willing landlords were Sprint/Nextel is already located.

Public Services

Public services such as fire and law enforcement are not required given that the facilities are designed to be vandalism resistant (fenced and located on the tower) and are uninhabitable. The project does not require school or transit facilities, as it is an unmanned wireless communications facility.

Operations

The site is an unmanned facility that will not generate any noise, dust, or odors. It is expected that a service technician may visit the site for routine maintenance once every month to two months if needed. Ample parking is available in the adjacent to the site for this transient visit.

III. Land Use

Zoning

The project parcel is zoned R0, Residential Low Density. The project site is bounded on the south and east by similar residential land uses. Land north and east of the project site is vacant or used as a transportation corridor (Stevens Creek Freeway).

Environmental Setting

The project is located on a relatively level, vacant, residentially zoned parcel that is currently used as a utility corridor for PG&E high voltage transmission lines. The site is bisected by a seasonal creek which trends north/south. The proposed project would not impact existing riparian vegetation lining the creek and is proposed solely in disturbed areas. Outside the creek corridor vegetation consists primarily of annual grasslands. While the site is fenced, it appears that the site is utilized for passive recreational uses. The project would not impede any of these uses. There is an existing wireless communications facility located on and under the tower. Proposed antennas will be visible from surrounding public viewsheds but will not change the visual character of the site as the proposed tower will remain with just an overall height increase of 5%.

IV. Conclusion

In conclusion, the proposed project is a compatible use with the surrounding land uses as proven by the fact that an existing facility is located on and under the lattice tower. The proposed project will provide valuable communications services to area residents and businesses. Should you have any questions regarding this application, please feel free to call me at (530) 647-1932.

Sincerely,

bciSites, Inc.

Gordon J. Bell
Gordon J. Bell
Zoning Specialist
Encl.



USE PERMIT/SPECIAL DEVELOPMENT PERMIT JUSTIFICATIONS

ATTACHMENT D
Page 5 of 5

One of the two following findings must be made in order to approve a Use Permit or Special Development Permit application.

The Sunnyvale Municipal code states that at least one of the following two justifications must be met before granting the Use Permit or Special Development Permit. Please provide us information on how your project meets at least one of the following criteria.

1. The proposed use attains the objectives and purposes of the General Plan of the City of Sunnyvale as the project ...

OR

2. The proposed use ensures that the general appearance of proposed structures, or the uses to be made of the property to which the application refers, will not impair either the orderly development of, or the existing uses being made of, adjacent properties as ...

The proposed project is to be located on and under an existing PG&E lattice tower. The tower appearance will not change with the exception of an addition of a top hat extension designed to increase the overall height of the tower by 6 feet. The telecommunications use is passive and will have no impact on surrounding properties.

If you need assistance in answering either of these justifications, contact the Planning Division staff at the One-Stop Permit Center.

One-Stop Permit Center - City Hall - 456 W. Olive Avenue - (408) 730-7444
Planners and Building Division staff are available 8:00 a.m. to noon and 1:00 to 5:00 p.m.
www.SunnyvalePlanning.com / www.SunnyvaleBuilding.com

Rev. 7/07 (white)



VARIANCE JUSTIFICATIONS

All three of the following findings must be made in order to approve a Variance application.

The Sunnyvale Municipal code states that all three of the following justifications must be met before granting the Variance. Please provide us information on how your project meets all of the following criteria.

1. Because of exceptional or extraordinary circumstances or conditions applicable to the property, or use, including size, shape, topography, location or surroundings, the strict application of the ordinance is found to deprive the property owner of privileges enjoyed by other properties in the vicinity and within the same zoning district.

Strict application of the zoning ordinance would require all PG&E towers on this property to be limited to a height of 30 feet. The existing towers on this property already greatly exceed that height, and thus by strictly applying the ordinance to these towers, the City would preclude PG&E from utilizing these towers in a manner in which they see fit, which is to provide public utility type services such as power, gas, and telephone services. It should be noted that PG&E is not regulated by the City, and can extend their towers without permits from the City. Clearwire is proposing to go on a PG&E-installed tower extension, not one undertaken by Clearwire. It is PG&E's policy, as discussed in their top-hat extension letter submitted with this application to plan for future collocation of wireless carriers consistent with the City's zoning ordinance.

AND

2. The granting of the Variance will not be materially detrimental to the public welfare or injurious to the property, improvements, or uses within the immediate vicinity and within the same zoning district.

Granting of the variance, which would consist of the 6-foot overall extension of the 126-foot tall tower, would not significantly change the overall appearance of the tower, which is for transmission lines and existing telecom facilities which already exceed the height limit. Since the use is not changing, it will have no impact on surrounding properties or the public welfare of the neighbors. An RF report has been prepared which demonstrates that Radiofrequency Radiation levels are well below FCC guidelines.

AND

3. Upon granting of the Variance, the intent and purpose of the ordinance will still be served and the recipient of the Variance will not be granted special privileges not enjoyed by other surrounding property owners within the same zoning district.

The intent and purpose of the ordinance will still be served upon granting of the variance, as the project is a collocation project which the ordinance is designed to promote. The recipient will not be granted special privileges as this PG&E tower already supports one telecom facility above the height limit of the R0 zone district.

If you need assistance in answering any of these justifications, contact the Planning Division staff at the One-Stop Permit Center.

Statement of Hammett & Edison, Inc., Consulting Engineers

The firm of Hammett & Edison, Inc., Consulting Engineers, has been retained on behalf of Clearwire, LLC, a personal wireless service provider, to evaluate the base station (Site No. CA-SJC0063) proposed to be located at 1209 West Remington Drive in Sunnyvale, California, for compliance with appropriate guidelines limiting human exposure to radio frequency ("RF") electromagnetic fields.

Prevailing Exposure Standards

The U.S. Congress requires that the Federal Communications Commission ("FCC") evaluate its actions for possible significant impact on the environment. In Docket 93-62, effective October 15, 1997, the FCC adopted the human exposure limits for field strength and power density recommended in 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 exposure limits. 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:

Personal Wireless Service	Approx. Frequency	Occupational Limit	Public Limit
Broadband Radio ("BRS")	2,600 MHz	5.00 mW/cm ²	1.00 mW/cm ²
Advanced Wireless ("AWS")	2,100	5.00	1.00
Personal Communication ("PCS")	1,950	5.00	1.00
Cellular Telephone	870	2.90	0.58
Specialized Mobile Radio ("SMR")	855	2.85	0.57
Long Term Evolution ("LTE")	700	2.33	0.47
[most restrictive frequency range]	30-300	1.00	0.20

Power line frequencies (60 Hz) are well below the applicable range of these standards, and there is considered to be no compounding effect from simultaneous exposure to power line and radio frequency fields.



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 about 1 inch thick. 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. Along with the low power of such facilities, 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 attached 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 Clearwire, including zoning drawings by Delta Groups Engineering, Inc., dated June 13, 2009, it is proposed to mount three Argus Model LLPX310R directional panel BRS antennas on a 6-foot extension above an existing 106-foot PG&E transmission tower located near 1209 West Remington Drive in Sunnyvale. The antennas would be mounted with 2° downtilt at an effective height of about 109 feet above ground and would be oriented at about 120° spacing, to provide service in all directions. The maximum effective radiated power in any direction would be 970 watts. Also proposed to be installed beside the panel antennas are three microwave “dish” antennas, for interconnection of this site with others in the Clearwire network.

Presently located on the same tower are similar antennas for use by MetroPCS, another wireless telecommunications carrier. For the limited purposes of this study, it assumed that Metro has installed Kathrein Model 742-213 directional panel PCS antennas at an effective height of about 104 feet above ground and operates at a maximum effective radiated power of 1,890 watts.



Study Results

For a person anywhere at ground, the maximum ambient RF exposure level due to the proposed Clearwire operation by itself is calculated to be 0.00017 mW/cm², which is 0.017% of the applicable public exposure limit. The maximum calculated cumulative level at ground, for the simultaneous operation of both carriers, is 0.037% of the public exposure limit; the maximum calculated cumulative level at the second-floor elevation of any nearby building* is 0.045% 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. The microwave antennas would be in point-to-point service and are so directional that they make no significant contribution to RF exposure conditions at ground.

Recommended Mitigation Measures

Due to their mounting locations, the Clearwire antennas would not be accessible to the general public, and so no mitigation measures are necessary to comply with the FCC public exposure guidelines. It is presumed that PG&E already takes adequate precautions to ensure that there is no unauthorized access to its tower. To prevent exposures in excess of the occupational limit by authorized PG&E workers, it is expected that they will adhere to appropriate safety protocols adopted by that company.

Conclusion

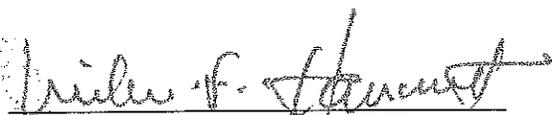
Based on the information and analysis above, it is the undersigned's professional opinion that the base station proposed by Clearwire, LLC at 1209 West Remington Drive in Sunnyvale, California, will comply with the prevailing standards for limiting public exposure to radio frequency energy and, therefore, 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.

* Located at least 110 feet away, based on aerial photographs from Google Maps.



Authorship

The undersigned author of this statement is a qualified Professional Engineer, holding California Registration Nos. E-13026 and M-20676, which expire on June 30, 2011. This work has been carried out under his direction, and all statements are true and correct of his own knowledge except, where noted, when data has been supplied by others, which data he believes to be correct.



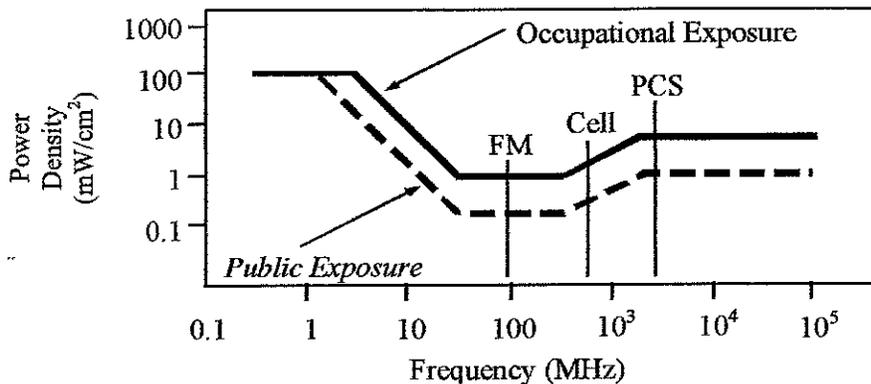
William F. Hammett, P.E.

July 27, 2009

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:

Frequency Applicable Range (MHz)	Electromagnetic Fields (f is frequency of emission in 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.



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 ($1.6 \times 1.6 = 2.56$). 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.

