Staff Report to the Zoning Administrator

Application Number: 131060

Applicant: Sharon James, Crown Castle Inc. (for Verizon)
Owner: County of Santa Cruz (Dept. of Public Works)
APN: N/A (in County Right-of-Way)

Agenda Date: April 18, 2014
Agenda Item #: 5
Time: After 9:00 a.m.

Project Description: Proposal to install a microcell wireless communication facility (location ID #AP33) on a new 49-foot tall wooden utility pole, including three 52" tall panel antennas mounted on top of the new pole, and related pole-mounted equipment, as part of a 4 microcell site distributed antenna system (DAS) providing Verizon cellular coverage in the Seacliff neighborhood of Aptos. Two of the 4 other DAS microcell sites have already been approved, and the remaining 1 site is still in "incomplete" application status.

Location: Project is located in County right-of-way adjacent on the east side of Poplar St. east of its intersection with Oakdale Dr., between Poplar St. and the SCCRTC railroad right-of-way, directly across Poplar St. from the dividing property line between APNs 038-115-01 (215 Poplar St.) and 038-115-11 (213 Poplar St.).

Supervisorial District: 2nd District (District Supervisor: Zach Friend)

Permits Required: Requires a Commercial Development Permit and a Coastal Development Permit.

Technical Reviews: N/A

Staff Recommendation:

- Certification that the proposal is exempt from further Environmental Review under the California Environmental Quality Act.
- Approval of Application **131060**, based on the attached findings and conditions.

Exhibits

A.	Categorical Exemption (CEQA determination)	E.	Assessor's, Location, Zoning and General Plan Maps
B.	Findings	F.	Photo-Simulations
C.	Conditions	G.	RF Report
D.	Project plans		

Parcel Information

Parcel Size:	N/A – project located in County right-of-way
Existing Land Use - Parcel:	On-street parking
Existing Land Use - Surrounding:	Railroad right-of-way and single family residential
Project Access:	Take State Park Dr. exit off Hwy. 1 south, turn right at end of ramp, and right again at first right onto Searidge Dr. then continue to the end of that street and turn left onto Mar Vista Dr. Then drive one block to a hard right onto Poplar St. Drive two blocks north on Poplar to project site across from 213 Poplar St.
Planning Area:	Aptos
Land Use Designation:	PF (Public Facility)
Zone District:	P-F (Public Facility)
Coastal Zone:	X Inside __ Outside
Appealable to Calif. Coastal Comm.	__ Yes X No

Environmental Information

Geologic Hazards:	Not mapped/no physical evidence on site
Soils:	N/A
Fire Hazard:	Not a mapped constraint
Slopes:	N/A
Env. Sen. Habitat:	Not mapped/no physical evidence on site
Grading:	No grading proposed
Tree Removal:	No trees proposed to be removed
Scenic:	Not a mapped resource
Drainage:	Existing drainage adequate
Archeology:	Not mapped/no physical evidence on site

Services Information

Urban/Rural Services Line:	X Inside __ Outside
Water Supply:	N/A
Sewage Disposal:	N/A
Fire District:	Aptos/La Selva FPD
Drainage District:	Zone 6

History

There have not been other development applications proposed for this particular site in the past.

Project Setting

The subject utility pole is located next to the shoulder portion of Poplar St., in a County right-of-way area that is zoned P-F (Public Facility). The parcels across Poplar Street to the west are zoned R-1-4 (Single Family Residential - 4,000 sq. ft. per unit/parcel) and parcels on to the north

on Poplar St. are zoned R-1-6 (Single Family Residential - 6,000 sq. ft. per unit/parcel) and contain one and two-story single family residences. The Santa Cruz Co. Regional Transportation Commission (SCCRTC) railroad right-of-way lies to the east of the subject pole (running parallel to Poplar St.).

Zoning & General Plan Consistency

The subject County right-of-way area is located in the P-F (Public Facilities) zone district, a designation which allows Wireless Communications Facilities (WCFs) such as the proposed Distributed Antenna System (DAS) node microcell installation. The proposed DAS node/microcell WCF is a principal permitted use within the zone district and the zoning is consistent with the site's (P) Public Facilities General Plan designation.

Local Coastal Program Consistency

The proposed DAS node/microcell is in conformance with the County's certified Local Coastal Program, in that the structure is sited and designed to be visually compatible, in scale with, and integrated with the character of the surrounding neighborhood. Developed parcels in the area contain commercial office buildings and multi-family dwellings. Architectural styles vary widely in the area, and the design submitted is not incompatible with the existing range of styles. The project site is not located between the shoreline and the first public road and is not identified as a priority acquisition site in the County's Local Coastal Program. Consequently, the proposed project will not interfere with public access to the beach, ocean, or other nearby body of water.

Design Review

The proposed DAS node/microcell complies with the requirements of the County Design Review Ordinance, in that the proposed project will be visually inconspicuous and will have minimal visual impact on surrounding land uses and the natural landscape.

Radio Frequency Emissions

A radio frequency (RF) radiation emissions calculation report has been prepared for this project by a qualified consulting engineer. The proposed facility is calculated to result in a maximum ambient RF level of no more than 0.66% of the applicable FCC public exposure limit at ground level, and 2.4% of that limit at the second floor level of the nearest 2-story structure.

Environmental Review

Staff has determined that the proposed project is Categorically Exempt from the requirements of the California Environmental Quality Act (CEQA) because it qualifies as "New Construction or Conversion of a Small Structure" (Class 3, Section 15303). The CEQA Categorical Exemption form is attached as Exhibit A.

Conclusion

As proposed and conditioned, the project is consistent with all applicable codes and policies of

the Zoning Ordinance and General Plan/LCP. Please see Exhibit "B" ("Findings") for a complete listing of findings and evidence related to the above discussion.

Staff Recommendation

- Certification that the proposal is exempt from further Environmental Review under the California Environmental Quality Act.
- **APPROVAL** of Application Number **131060**, based on the attached findings and conditions.

Supplementary reports and information referred to in this report are on file and available for viewing at the Santa Cruz County Planning Department, and are hereby made a part of the administrative record for the proposed project.

The County Code and General Plan, as well as hearing agendas and additional information are available online at: www.co.santa-cruz.ca.us

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Santa Cruz County Planning Department
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Santa Cruz CA 95060
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CALIFORNIA ENVIRONMENTAL QUALITY ACT
NOTICE OF EXEMPTION

The Santa Cruz County Planning Department has reviewed the project described below and has determined that it is exempt from the provisions of CEQA as specified in Sections 15061 - 15332 of CEQA for the reason(s) which have been specified in this document.

Application Number: 131060
Assessor Parcel Number: N/A (in County Right-of-Way)
Project Location: Across from APNs 038-115-01 and 038-115-11 on Poplar St. in Seacliff area of Aptos, CA

Project Description: Proposal to install a microcell wireless communication facility ("AP33") on a new 49-ft. tall utility pole, including antennas and related equipment, as part of a 4 microcell site distributed antenna system (DAS) in the Seacliff neighborhood of Aptos.

Person or Agency Proposing Project: Sharon James, Crown Castle LLC

Contact Phone Number: (408) 468-5553

A. _____ The proposed activity is not a project under CEQA Guidelines Section 15378.
B. _____ The proposed activity is not subject to CEQA as specified under CEQA Guidelines Section 15060 (c).
C. _____ **Ministerial Project** involving only the use of fixed standards or objective measurements without personal judgment.
D. _____ **Statutory Exemption** other than a Ministerial Project (CEQA Guidelines Section 15260 to 15285).

Specify type:

E. __X__ **Categorical Exemption**

Specify type: 3 - New Construction or Conversion of Small Structure (Section 15303)

F. Reasons why the project is exempt:

Construction of a microcell wireless communication facility on an existing utility pole is not anticipated to generate any environmental impacts.

In addition, none of the conditions described in Section 15300.2 apply to this project.

_____ Date:_____
Frank Barron, Project Planner

EXHIBIT A

Coastal Development Permit Findings

1. That the project is a use allowed in one of the basic zone districts, other than the Special Use (SU) district, listed in section 13.10.170(d) as consistent with the General Plan and Local Coastal Program LUP designation.

This finding can be made, in that the County right-of-way (ROW) site is zoned P-F (Public Facilities), a designation which allows DAS node/microcell uses. The proposed DAS node/microcell is a principal permitted use within the zone district, and the zoning is consistent with the site's P (Public Facility) General Plan designation.

2. That the project does not conflict with any existing easement or development restrictions such as public access, utility, or open space easements.

This finding can be made, in that no such easements or restrictions are known to encumber the project site.

3. That the project is consistent with the design criteria and special use standards and conditions of this chapter pursuant to section 13.20.130 et seq.

This finding can be made, in that the development is consistent with the surrounding neighborhood in terms of visual impact; the site is surrounded by lots developed to an urban density; the colors will be natural in appearance and complementary to the site; and the development site is not on a prominent ridge, beach, or bluff top.

4. That the project conforms with the public access, recreation, and visitor-serving policies, standards and maps of the General Plan and Local Coastal Program land use plan, specifically Chapter 2: figure 2.5 and Chapter 7, and, as to any development between and nearest public road and the sea or the shoreline of any body of water located within the coastal zone, such development is in conformity with the public access and public recreation policies of Chapter 3 of the Coastal Act commencing with section 30200.

This finding can be made, in that the project site is not located between the shoreline and the first public road. Consequently, the DAS node/microcell will not interfere with public access to the beach, ocean, or any nearby body of water. Further, the project site is not identified as a priority acquisition site in the County Local Coastal Program.

5. That the proposed development is in conformity with the certified local coastal program.

This finding can be made, in that the structure is sited and designed to be visually compatible, in scale, and integrated with the character of the surrounding neighborhood. Additionally, DAS node/microcell uses are allowed uses in the P-F (Public Facility) zone district, as well as the General Plan and Local Coastal Program land use designation. Developed parcels in the area contain single and multi-family dwellings. Architectural styles vary widely in the area, and the design submitted is not inconsistent with the existing range of styles.

Development Permit Findings

1. That the proposed location of the project and the conditions under which it would be operated or maintained will not be detrimental to the health, safety, or welfare of persons residing or working in the neighborhood or the general public, and will not result in inefficient or wasteful use of energy, and will not be materially injurious to properties or improvements in the vicinity.

This finding can be made, in that the project is located in an area designated for Wireless Communication Facility, including DAS node/microcell, uses and is not encumbered by physical constraints to development. Construction will comply with prevailing building technology, the California Building Code, and the County Building ordinance to insure the optimum in safety and the conservation of energy and resources. The proposed DAS node/microcell will not deprive adjacent properties or the neighborhood of light, air, or open space, in that the structure meets all current setbacks that ensure access to these amenities.

2. That the proposed location of the project and the conditions under which it would be operated or maintained will be consistent with all pertinent County ordinances and the purpose of the zone district in which the site is located.

This finding can be made, in that the proposed location of the DAS node/microcell and the conditions under which it would be operated or maintained will be consistent with all pertinent County ordinances and the purpose of the P-F (Public Facility) zone district as the proposed DAS node/microcell will meet all applicable current site standards for the zone district; and that the project is consistent with County Code Section 13.10.510(D)(2) regarding exceptions to the height limits for structures which, as per County Policy Interpretation WCF-01, allows structure mounted WCFs such as the proposed project to be up to 25-feet taller than the height limit for habitable structures, or 53-feet tall, in the PF zone district, without the need for a variance; and that the project is consistent with all of the visual impact criteria and protections contained in the County's Wireless Communications Facility Ordinance (County Code Sections 13.10.660-668 inclusive).

3. That the proposed use is consistent with all elements of the County General Plan and with any specific plan which has been adopted for the area.

This finding can be made, in that the proposed DAS node/microcell use is consistent with the use and density requirements specified for the Public Facility (P) land use designation in the County General Plan.

The proposed DAS node/microcell will not adversely impact the light, solar opportunities, air, and/or open space available to other structures or properties, and meets all current site and development standards for the zone district, in that the DAS node/microcell will not adversely shade adjacent properties, and will meet current setbacks for the zone district.

The proposed DAS node/microcell will be properly proportioned to the utility pole and will fit in with the character of the neighborhood. The proposed DAS node/microcell will comply with the site standards for the P-F zone district (including height) and will result in a structure consistent

with a design that could be approved on any similar utility pole in the vicinity.

4. That the proposed use will not overload utilities and will not generate more than the acceptable level of traffic on the streets in the vicinity.

This finding can be made, in that the proposed DAS node/microcell is to be constructed on a new utility pole, and will not overload the pole structurally, nor will it overload the electric capacity of PG&E's network. Nor will it overload the land line telephone network, as the proposed DAS will be connected to a newly installed high capacity fiber optic overhead cable network. There will be no additional traffic generated by the proposed project.

5. That the proposed project will complement and harmonize with the existing and proposed land uses in the vicinity and will be compatible with the physical design aspects, land use intensities, and dwelling unit densities of the neighborhood.

This finding can be made, in that the proposed structure is located in a mixed neighborhood containing a variety of architectural styles, and the proposed DAS node/microcell is not inconsistent with the land use intensity and density of the neighborhood.

6. The proposed development project is consistent with the Design Standards and Guidelines (sections 13.11.070 through 13.11.076), and any other applicable requirements of this chapter.

This finding can be made, in that the proposed DAS node/microcell will be of an appropriate scale and type of design that will not diminish the aesthetic qualities of the surrounding properties and will not reduce or visually impact available open space in the surrounding area.

Wireless Communication Facility Use Permit Findings

1. The development of the proposed wireless communications facility (WCF) as conditioned will not significantly affect any designated visual resources, environmentally sensitive habitat resources (as defined in the Santa Cruz County General Plan/LCP Sections 5.1, 5.10, and 8.6.6.), and/or other significant County resources, including agricultural, open space, and community character resources; or there are no other environmentally equivalent and/or superior and technically feasible alternatives to the proposed wireless communications facility as conditioned (including alternative locations and/or designs) with less visual and/or other resource impacts and the proposed facility has been modified by condition and/or project design to minimize and mitigate its visual and other resource impacts.

This finding can be made, in that the proposed WCF is of the microcell type which, due to its small size and location on a utility pole, is the least visually obtrusive type of WCF. Moreover, its installation and use in a road right-of-way will not impact any sensitive habitat resources or other significant County resources, including agricultural, open space, and community character resources. Finally, there are no other environmentally equivalent and/or superior and technically feasible alternatives to the proposed microcell designs that have less visual and/or other resource impacts.

2. The site is adequate for the development of the proposed wireless communications facility and, for sites located in one of the prohibited and/or restricted areas set forth in Sections 13.10.661(b) and 13.10.661 (c), that the applicant has demonstrated that there are not environmentally equivalent or superior and technically feasible: (1) alternative sites outside the prohibited and restricted areas; and/or (2) alternative designs for the proposed facility as conditioned.

This finding can be made, in that the proposed DAS node/microcell is to consist of antennas mounted upon a new utility pole in the County right-of-way, an area where numerous utility poles are already located. Microcell WCF installations located on utility poles, such as these, are encouraged in the WCF Ordinance as the preferred WCF design, due to their relatively inconspicuous nature.

3. The subject property upon which the wireless communications facility is to be built is in compliance with all rules and regulations pertaining to zoning uses, subdivisions and any other applicable provisions of this title (County Code 13.10.660) and that all zoning violation abatement costs, if any, have been paid.

This finding can be made, in that the existing infrastructure uses of the subject right-of-way are in compliance with the requirements of the zone districts and General Plan designations, in which they are located, and that there are no outstanding or unpaid zoning violation abatement costs.

4. The proposed wireless communication facility as conditioned will not create a hazard for aircraft in flight.

This finding can be made, in that the proposed microcell WCF will be located on an approximately 49-foot tall new utility pole, the top of which is at a height too low to interfere with the observed height of aircraft from nearby airports.

5. The proposed wireless communication facility as conditioned is in compliance with all FCC and California PUC standards and requirements.

This finding can be made, in that the maximum ambient RF levels at ground level due to the proposed WCF operations are calculated to be no more than 0.66% of the most restrictive applicable (i.e., FCC) limit, and only 2.4% of that limit at the nearest second story level.

6. For wireless communication facilities in the coastal zone, the proposed wireless communication facility as conditioned is consistent with the all applicable requirements of the Local Coastal Program.

This finding can be made, in that the proposed microcell wireless communication facility is designed and located in a manner that will minimize potential impacts to scenic and biotic resources, and that the construction of the proposed facility will not impede access to the beach or other recreational resources.

Conditions of Approval

Exhibit D: Project Plans, 4 sheets, prepared by HP Communications, Inc., dated 10/7/13

I. This permit authorizes the construction of a microcell wireless communication facility (location ID #AP33) on a new 49-foot utility pole, including three 52" tall antennas mounted on top of the pole, and related pole-mounted equipment, as part of a 4 microcell site distributed antenna system (DAS) in the Seacliff neighborhood of Aptos. This approval does not confer legal status on any existing structure(s) or existing use(s) on the subject site that are not specifically authorized by this permit. Prior to exercising any rights granted by this permit including, without limitation, any construction or site disturbance, the applicant/owner shall:

A. Sign, date, and return to the Planning Department one copy of the approval to indicate acceptance and agreement with the conditions thereof.

B. Obtain a Building Permit from the Santa Cruz County Building Official.

Any outstanding balance due to the Planning Department must be paid prior to making a Building Permit application. Applications for Building Permits will not be accepted or processed while there is an outstanding balance due.

C. Obtain an Encroachment Permit from the Department of Public Works for all work performed in the County road right-of-way.

D. Submit proof that these conditions have been recorded in the official records of the County of Santa Cruz (Office of the County Recorder) within 30 days from the effective date of this permit.

II. Prior to issuance of a Building Permit the applicant/owner shall:

A. Submit final architectural plans for review and approval by the Planning Department. The final plans shall be in substantial compliance with the plans marked Exhibit "D" on file with the Planning Department. Any changes from the approved Exhibit "D" for this development permit on the plans submitted for the Building Permit must be clearly called out and labeled by standard architectural methods to indicate such changes. Any changes that are not properly called out and labeled will not be authorized by any Building Permit that is issued for the proposed development. The final plans shall include the following additional information:

1. One elevation shall indicate materials and colors as they were approved by this Discretionary Application. If specific materials and colors have not been approved with this Discretionary Application, in addition to showing the materials and colors on the elevation, the applicant shall supply a color and material board in 8 1/2" x 11" format for Planning Department review

EXHIBIT C

and approval.

2. Details showing compliance with any fire department requirements, as applicable.

B. Submit four copies of the approved Discretionary Permit with the Conditions of Approval attached. The Conditions of Approval shall be recorded prior to submittal, if applicable.

C. Meet all requirements and pay any applicable plan check fee of the Aptos/La Selva Beach Fire Protection District.

III. All construction shall be performed according to the approved plans for the Building Permit. Prior to final building inspection, the applicant/owner must meet the following conditions:

A. All site improvements shown on the final approved Building Permit plans shall be installed.

B. All inspections required by the building permit shall be completed to the satisfaction of the County Building Official.

C. Pursuant to Sections 16.40.040 and 16.42.080 of the County Code, if at any time during site preparation, excavation, or other ground disturbance associated with this development, any artifact or other evidence of an historic archaeological resource or a Native American cultural site is discovered, the responsible persons shall immediately cease and desist from all further site excavation and notify the Sheriff-Coroner if the discovery contains human remains, or the Planning Director if the discovery contains no human remains. The procedures established in Sections 16.40.040 and 16.42.080, shall be observed.

IV. Operational Conditions

A. In the event that future County inspections of the subject property disclose noncompliance with any Conditions of this approval or any violation of the County Code, the owner shall pay to the County the full cost of such County inspections, including any follow-up inspections and/or necessary enforcement actions, up to and including permit revocation.

B. The wireless communication facility may not be connected to a power source or operated until a final inspection and clearance from the Santa Cruz County Planning Department has been received.

C. The use of temporary generators to power the wireless communication facility is not allowed.

D. The exterior finish and materials of the wireless communication facility must be

maintained on an annual basis to continue to blend with the existing trees and utilities infrastructure. Additional paint and/or replacement materials shall be installed as necessary to blend the wireless communication facility with the existing trees and utilities infrastructure to maintain visual appearance as approved.

E. The operator of the wireless communication facility must submit within 90 days of commencement of normal operations (or within 90 days of any major modification of power output of the facility) a written report to the Santa Cruz County Planning Department documenting the measurements and findings with respect to compliance with the established Federal Communications Commission (FCC) Non-Ionizing Electromagnetic Radiation (NEIR) exposure standard. The wireless communication facility must remain in continued compliance with the NEIR standard established by the FCC at all times. Failure to submit required reports or to remain in continued compliance with the NEIR standard established by the FCC will be a violation of the terms of this permit.

F. If, in the future, the pole based utilities are relocated underground at this location, the operator of the wireless communication facility must abandon the facility and be responsible for the removal of all permanent structures and the restoration of the site as needed to re-establish the area consistent with the character of the surrounding natural landscape.

G. If, as a result of future scientific studies and alterations of industry-wide standards resulting from those studies, substantial evidence is presented to Santa Cruz County that radio frequency transmissions may pose a hazard to human health and/or safety, the Santa Cruz County Planning Department shall set a public hearing and in its sole discretion, may revoke or modify the conditions of this permit.

H. If future technological advances would allow for reduced visual impacts resulting from the proposed telecommunication facility, the operator of the wireless communication facility must make those modifications which would allow for reduced visual impact of the proposed facility as part of the normal replacement schedule. If, in the future, the facility is no longer needed, the operator of the wireless communication facility must abandon the facility and be responsible for the removal of all permanent structures and the restoration of the site as needed to re-establish the area consistent with the character of the surrounding natural landscape.

I. Any modification in the type of equipment shall be reviewed and acted on by the Planning Department staff. The County may deny the modification or amend the approved conditions at that time, or the Planning Director may refer it for public hearing before the Zoning Administrator.

J. Transfer of Ownership: In the event that the original permittee sells its interest in the permitted wireless communications facility, the succeeding carrier shall

assume all responsibilities concerning the project and shall be held responsible to the County for maintaining consistency with all project conditions of approval, including proof of liability insurance. Within 30-days of a transfer of ownership, the succeeding carrier shall provide a new contact name to the Planning Department.

K. In the event that future County inspections of the subject property disclose noncompliance with any Conditions of this approval or any violation of the County Code, the owner shall pay to the County the full cost of such County inspections, including any follow-up inspections and/or necessary enforcement actions, up to and including permit revocation.

V. As a condition of this development approval, the holder of this development approval ("Development Approval Holder"), is required to defend, indemnify, and hold harmless the COUNTY, its officers, employees, and agents, from and against any claim (including attorneys' fees), against the COUNTY, it officers, employees, and agents to attack, set aside, void, or annul this development approval of the COUNTY or any subsequent amendment of this development approval which is requested by the Development Approval Holder.

A. COUNTY shall promptly notify the Development Approval Holder of any claim, action, or proceeding against which the COUNTY seeks to be defended, indemnified, or held harmless. COUNTY shall cooperate fully in such defense. If COUNTY fails to notify the Development Approval Holder within sixty (60) days of any such claim, action, or proceeding, or fails to cooperate fully in the defense thereof, the Development Approval Holder shall not thereafter be responsible to defend, indemnify, or hold harmless the COUNTY if such failure to notify or cooperate was significantly prejudicial to the Development Approval Holder.

B. Nothing contained herein shall prohibit the COUNTY from participating in the defense of any claim, action, or proceeding if both of the following occur:

1. COUNTY bears its own attorney's fees and costs; and

2. COUNTY defends the action in good faith.

C. Settlement. The Development Approval Holder shall not be required to pay or perform any settlement unless such Development Approval Holder has approved the settlement. When representing the County, the Development Approval Holder shall not enter into any stipulation or settlement modifying or affecting the interpretation or validity of any of the terms or conditions of the development approval without the prior written consent of the County.

D. Successors Bound. "Development Approval Holder" shall include the applicant and the successor'(s) in interest, transferee(s), and assign(s) of the applicant.

Director at the request of the applicant or staff in accordance with Chapter 18.10 of the County Code.

Please note: This permit expires three years from the effective date listed below unless a building permit (or permits) is obtained for the primary structure described in the development permit (does not include demolition, temporary power pole or other site preparation permits, or accessory structures unless these are the primary subject of the development permit). Failure to exercise the building permit and to complete all of the construction under the building permit, resulting in the expiration of the building permit, will void the development permit, unless there are special circumstances as determined by the Planning Director.

Approval Date: _____

Effective Date: _____

Expiration Date: _____

Wanda Williams	Frank Barron, AICP
Deputy Zoning Administrator	Project Planner

Appeals: Any property owner, or other person aggrieved, or any other person whose interests are adversely affected by any act or determination of the Zoning Administrator, may appeal the act or determination to the Planning Commission in accordance with chapter 18.10 of the Santa Cruz County Code.

NOTE

A COPY OF ALL REQUIRED PERMITS MUST BE PRESENT DURING ANY WORK ON THIS LOCATION AND PERFORMING WORK AT THIS LOCATION INDICATES THAT THE CONTRACTOR HAS READ AND COMPLIED WITH THE REQUIREMENTS STATED IN THE PERMITS

SIGNATURE

CROWN CASTLE

SEACLIFF
NODE AP33_A2
213 POPLAR STREET APTOS, CA 95003

Call Before you Dig!

811

Know what's **below.**
Call before you dig.
Call 811 Before you Dig!

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 THE AREAS GOVERNING CODES.

1. STATE ADMINISTRATIVE CODE
2. STATE BUILDING CODE
3. ANSI/NFPA LIFE SAFETY CODE NFPA-101-'00
4. STATE MECHANICAL CODE

CODE COMPLIANCE

PROPERTY INFORMATION

CUSTOMER	CROWN CASTLE
PROJECT	SEACLIFF
NODE	AP33_A2
LATITUDE	36.978780
LONGITUDE	-121.919252
STREET ADDRESS	213 POPLAR STREET
CITY, STATE	APTOS, CA 95003
POLE / TYPE	NEW WOOD POLE **PROPOSED (N) 88' CL3 POLE**
RAD CENTER / ANTENNA HEIGHT	46'-10" TO RAD CENTER
ANTENNA TYPE	(3) DIRECTIONAL
AZIMUTH FOR ANTENNA	110°, 257°, 345°
POWER TO PROJECT	EXISTING SECONDARY
POLE ACCESS	STREET SIDE
POLE LOCATION & DESCRIPTION	APPROX. 160' SW C/O OAKDALE DR AND POPLAR ST

PROJECT SUMMARY

VICINITY MAP

SHEET	DESCRIPTION	REV.
1	TITLE SHEET	0
2	SITE PLAN	0
3	UTILITY POLE EQUIPMENT PROFILES	0
4	UTILITY POLE EQUIPMENT TYPICALS	0
5	SITE SURVEY	0

SHEET INDEX

THE PROJECT CONSISTS OF THE INSTALLATION AND OPERATION OF WIRELESS EQUIPMENT AND ANTENNAS FOR CROWN CASTLE ON EXISTING WOOD UTILITY POLES

PROJECT DESCRIPTION

INSTALL NEW WIRELESS EQUIPMENT AND ANTENNAS AND ALL ASSOCIATED BRACKETS IN ACCORDANCE TO CONSTRUCTION SPECIFICATIONS. REARRANGE ANY EXISTING FACILITIES IN ACCORDANCE TO GOVERNING CONSTRUCTION GUIDELINES

PROJECT SCOPE

DO NOT SCALE DRAWINGS

CONTRACTOR SHALL VERIFY ALL PLANS AND EXISTING DIMENSIONS AND CONDITIONS ON THE JOB SITE AND SHALL IMMEDIATELY NOTIFY THE ARCHITECT IN WRITING OF ANY DISCREPANCIES BEFORE PROCEEDING WITH THE WORK OR BE RESPONSIBLE FOR SAME

GENERAL CONTRACTOR NOTES

CROWN CASTLE
2000 TASMAN DRIVE
MILPITAS, CA 95035-7439
PHONE: (408) 954-1580

PROJECT INFORMATION:

SEACLIFF
NODE AP33_A2
213 POPLAR STREET
APTOS, CA 95003

CURRENT ISSUE DATE:

10/07/13

PERMIT SUBMISSION

REV.	DATE:	DESCRIPTION:	BY:

PLANS PREPARED BY:

HP COMMUNICATIONS INC.
13341 Temescal Can. Rd.
Corona, CA. 92883
PHONE: (951) 471-1919

PLANS APPROVED BY:

CROWN CASTLE

REV:

COMMENTS:

SHEET TITLE:

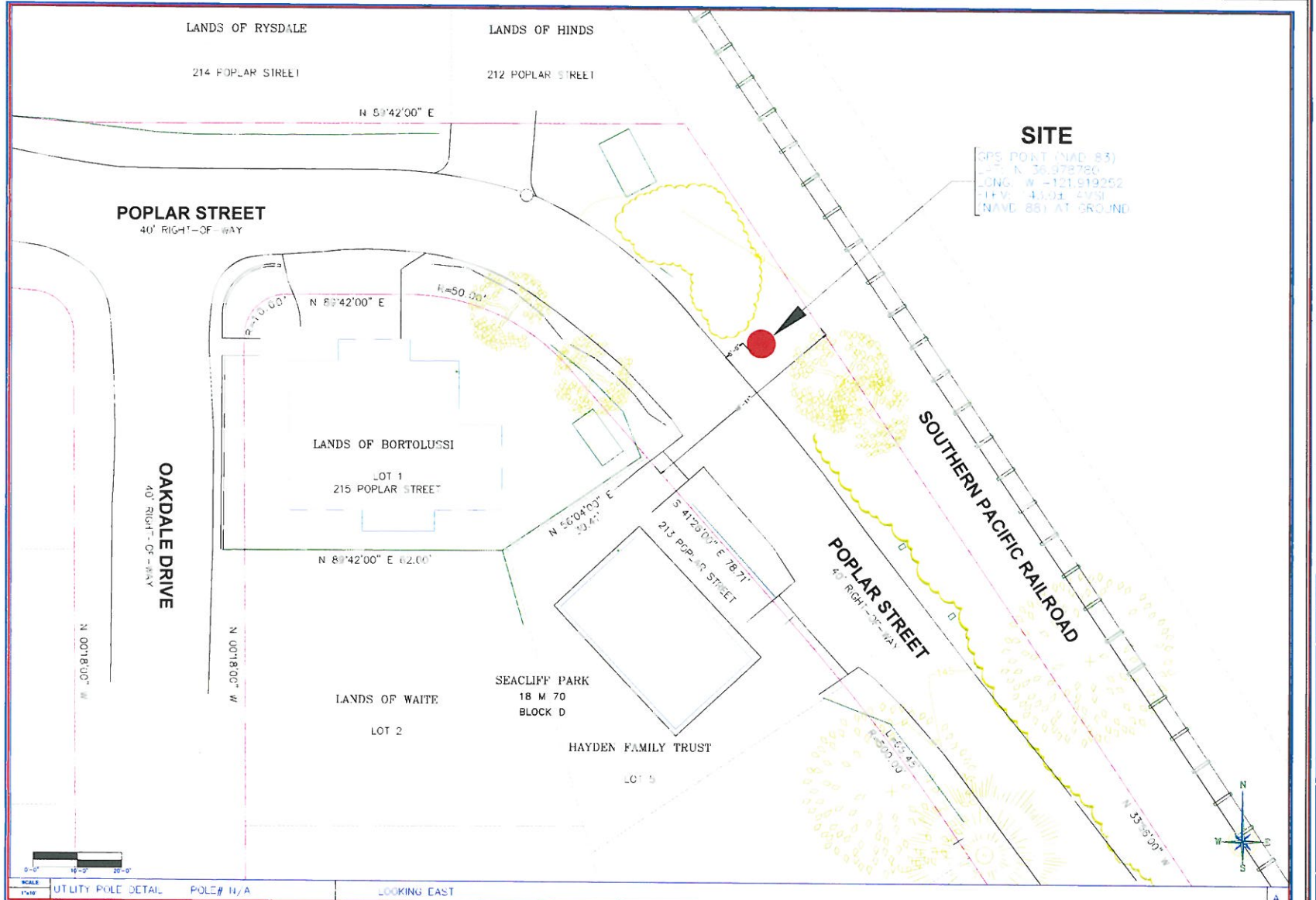
CROWN CASTLE
POLE PROFILE NODE AP33_A2

1 | 0

1 OF 5

16

EXHIBIT D



SITE PLAN

CROWN CASTLE

890 TATMAN DRIVE
MILPITAS, CA 95035-7439
PHONE: (408) 914-1580

PROJECT INFORMATION:

SEACLIFF
NODE AP33_A2
213 POPLAR STREET
APTOS, CA 95003

CURRENT ISSUE DATE:

10/07/13

PERMIT SUBMISSION:

REV.	DATE	DESCRIPTION	BY

PLANS PREPARED BY:

HP COMMUNICATIONS INC.

13341 Temescal Cyn. Rd.
Corona, CA 92883
PHONE: (951) 471-1919

PLANS APPROVED BY:

CROWN CASTLE

REP:

COMMENTS:

SHEET TITLE:

CROWN CASTLE
POLE PROFILE NODE AP33_A2

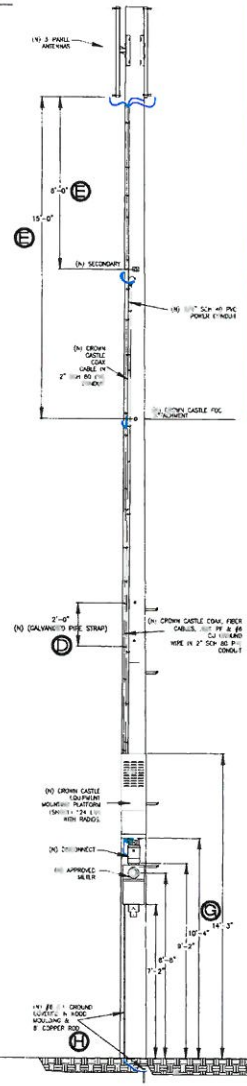
2 **0**

2 OF 5

17

EXHIBIT D

AZIMUTH	DOWNTILT
110°	N/A
257°	N/A
345°	N/A



MAKE READY
STEP POLE ACCORDING TO GO-95 STANDARDS.
NEW CONSTRUCTION
CONSTRUCTION: CROWN CASTLE TO PROPOSED NEW POLE @ 49'-0"
NOTES:
(N) TOP OF POLE 49'-0" ANTENNA RAD CENTER: 46'-10" (N) SECONDARY H.O.A 39'-0" (N) CROWN CASTLE FOC H.O.A 29'-10"
ANTENNA OUTPUT DOES NOT EXCEED GENERAL POPULATION EXPOSURE LIMITS
RF EMISSION PLACARDS / SIGNAGE MEETING THE FCC REQUIREMENTS SHALL BE IN A LOCATION VISIBLE FROM CLIMBING SPACE AND BE AFFIXED TO THE POLE NO LOWER THAN 9'-0" ABOVE GROUND LINE & NO HIGHER THAN 3'-0" BELOW THE ANTENNA.
PLACARDS / SIGNAGE ARE UV-RESISTANT AND SHALL BE ATTACHED TO THE POLE WITH GALVANIZED NAILS OR GALVANIZED SCREWS.

PROPOSED (N) 55' CL3 POLE

Ⓐ – 72" MIN. CLEARANCE BETWEEN SECONDARY POWER AND CLOSEST LEVEL OF ANTENNA ASSEMBLY.

Ⓑ – POLE TOP EXTENSION. UPPER AND LOWER BRACKET STEPS ARE TO BE INSTALLED WITH THE POLE TOP EXTENSION BRACKET ASSEMBLY. STEPS ARE NOT TO BE INSTALLED ON WOOD EXTENSION BAYONET.

Ⓒ – 72" MIN CLEARANCE REQ'D.

Ⓓ – 24" SPACING MAX. (GALVANIZED PIPE STRAP)

Ⓔ – 72" MIN. TO SECONDARY LEVEL.

Ⓕ – 12" MIN. SPACING FOR EQUIP TO CURB.

Ⓖ – 15' MIN. (MAY BE REDUCED TO 9' WHEN NOT EXPOSED TO TRAFFIC).

Ⓗ – GROUND INSTALLED BY COMM COMPANY (INCLUDES 8' COPPER ROD).

Ⓘ – 24" MIN. FROM CENTER OF POLE

Ⓙ – 24" MIN. CLEARANCE REQ'D.

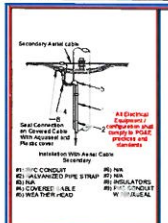
Ⓚ – 7' MIN. / 8' MAX. REQ'D.

Ⓛ – 4" MIN. CLEARANCE BETWEEN EQUIPMENT AND POLE.

Ⓜ – PROTECTIVE COVERING MUST EXTEND A MINIMUM OF 3'-0" BEYOND ENERGIZED 0-750 VOLTS.

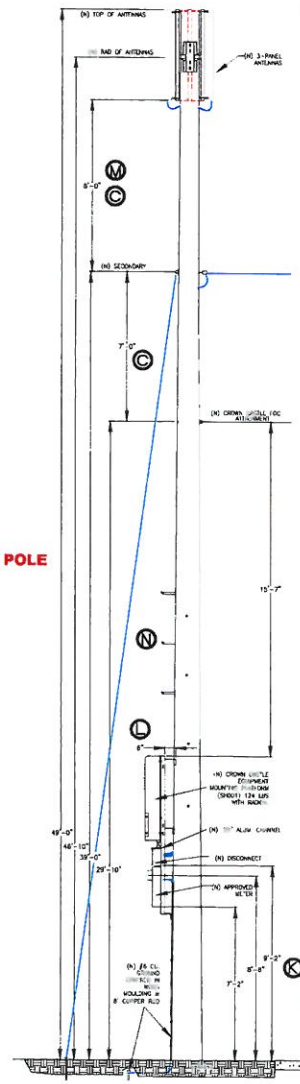
Ⓝ – POLE STEPS TO BE INSTALLED FROM 8'-6" ABOVE GRADE TO NEXTG ATTACHMENT.

SCALE	UTILITY POLE DETAIL	POLE# N/A	LOOKING SOUTH	A



PROPOSED (N) 55' CL3 POLE

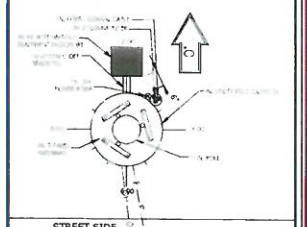
AZIMUTH	DOWNTILT
110°	N/A
257°	N/A
345°	N/A



SCALE	UTILITY POLE DETAIL	POLE# N/A	LOOKING EAST	B

SCALE	SITE POLE PICTURE	C

POLE WILL BE STEPPED IN ACCORDANCE TO GO95 STANDARDS IN RESPECT TO CLIMBING SPACE.
1-2" CROWN CASTLE RISER @ 1.00
REMOTE EQUIPMENT @ 12.00
1-3/4" POWER RISER @ 1.00



POLE# N/A

SCALE	RISER POLE DETAIL	D

Call Before you Dig!
811
Know what's below.
Call before you dig.
Call 811 Before you Dig!

CROWN CASTLE
890 TASMAN DRIVE
MILPITAS, CA. 95035-7439
PHONE: (408) 954-1100

PROJECT INFORMATION:

SEACLIFF
NODE AP33_A2
213 POPLAR STREET
APTOS, CA 95003

CURRENT ISSUE DATE:
10/07/13

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PLANS PREPARED BY:

HP COMMUNICATIONS INC.
13341 Temescal Cyn. Rd.
Corona, CA. 92883
PHONE: (951) 471-1919

PLANS APPROVED BY:
CROWN CASTLE
PEP

COMMENTS:

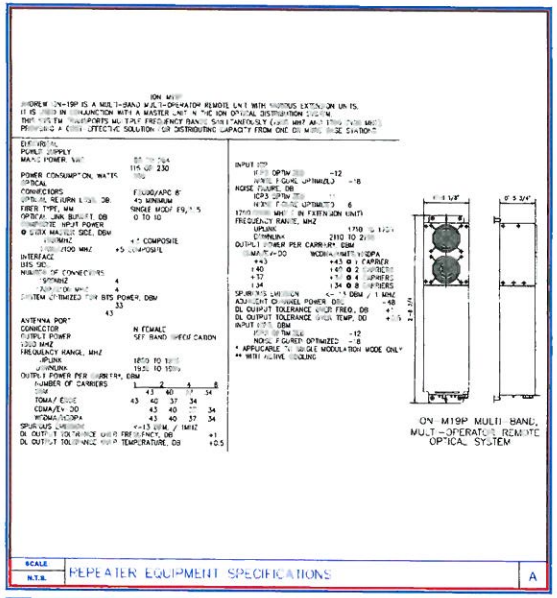
SHEET TITLE:
CROWN CASTLE
POLE PROFILE NODE AP33_A2

3 **0**
3 OF 5

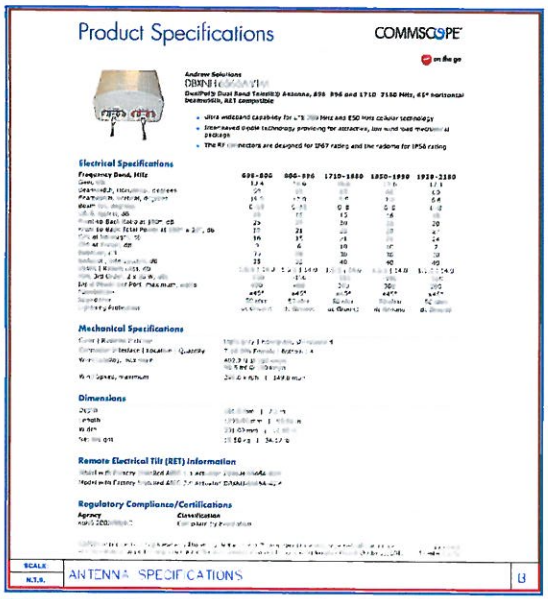
UTILITY POLE EQUIPMENT PROFILES

18

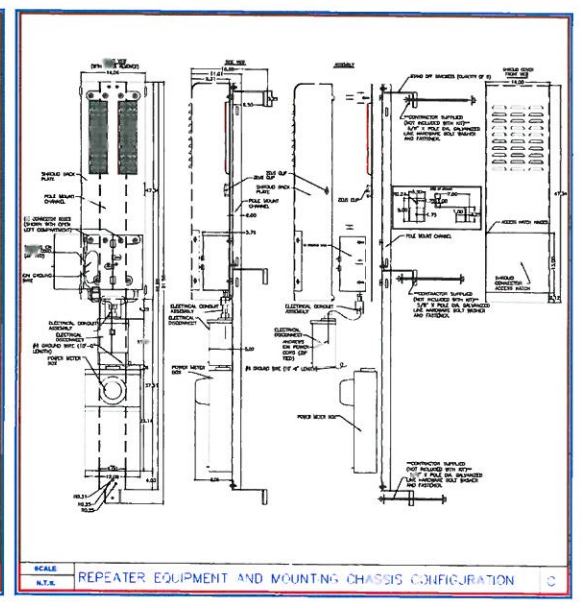
EXHIBIT D



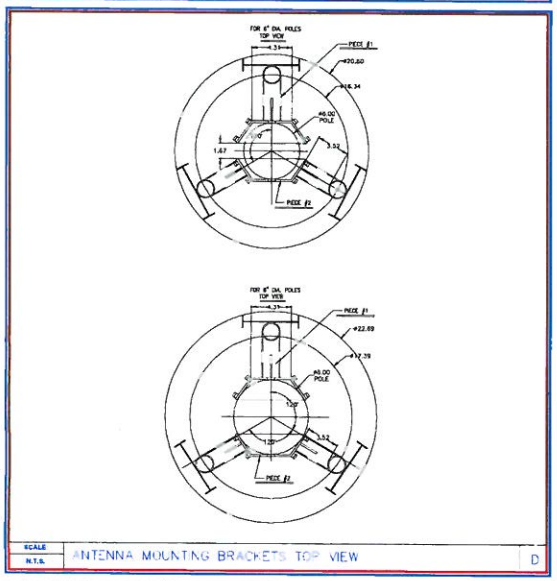
SCALE N.T.S. REPEATER EQUIPMENT SPECIFICATIONS A



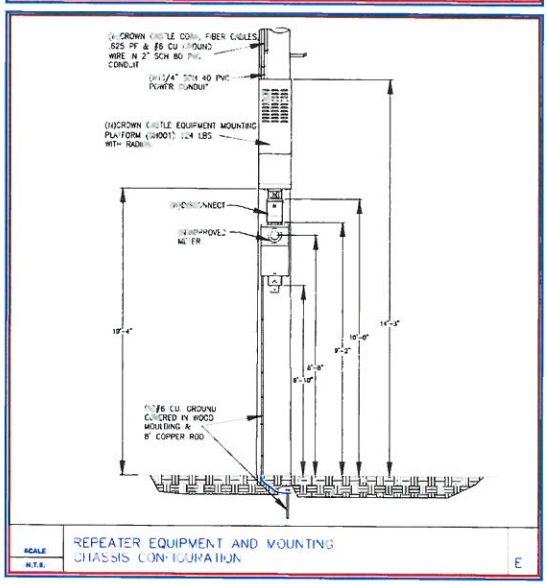
SCALE N.T.S. ANTENNA SPECIFICATIONS B



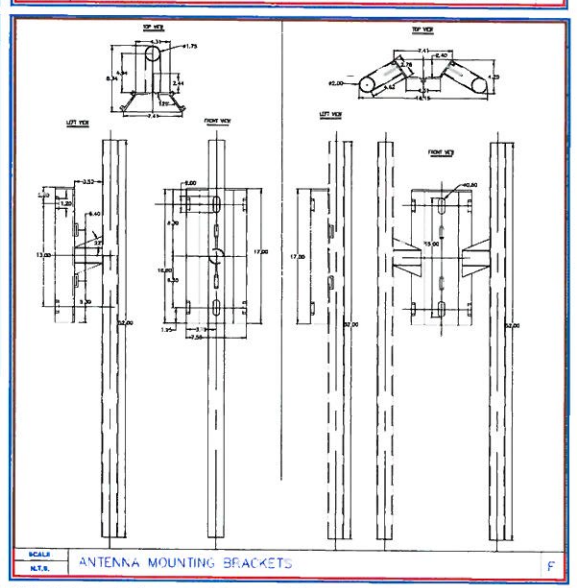
SCALE N.T.S. REPEATER EQUIPMENT AND MOUNTING CHASSIS CONFIGURATION C



SCALE N.T.S. ANTENNA MOUNTING BRACKETS TOP VIEW D



SCALE N.T.S. REPEATER EQUIPMENT AND MOUNTING CHASSIS CONFIGURATION E



SCALE N.T.S. ANTENNA MOUNTING BRACKETS F

UTILITY POLE EQUIPMENT TYPICALS

CROWN CASTLE
890 TAYMAN DRIVE
MILPITAS, CA 95035-7439
PHONE: (408) 954-1983

PROJECT INFORMATION:

SEACLIFF
NODE AP33_A2
213 POPLAR STREET
APTOS, CA 95003

CURRENT ISSUE DATE:
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REV	DATE	DESCRIPTION	BY

PLANS PREPARED BY:

HP COMMUNICATIONS INC.
13341 Temescal Can Rd
Corona, CA 92883
PHONE: (951) 471-1919

PLANS APPROVED BY:

CROWN CASTLE
REP:

COMMENTS:

SHEET TITLE:

CROWN CASTLE
POLE PROFILE NODE AP33_A2

4 **0**
4 OF 5

19

EXHIBIT D

EXHIBIT E

Seacliff Node Locations

EXHIBIT E

FOR TAX PURPOSES ONLY

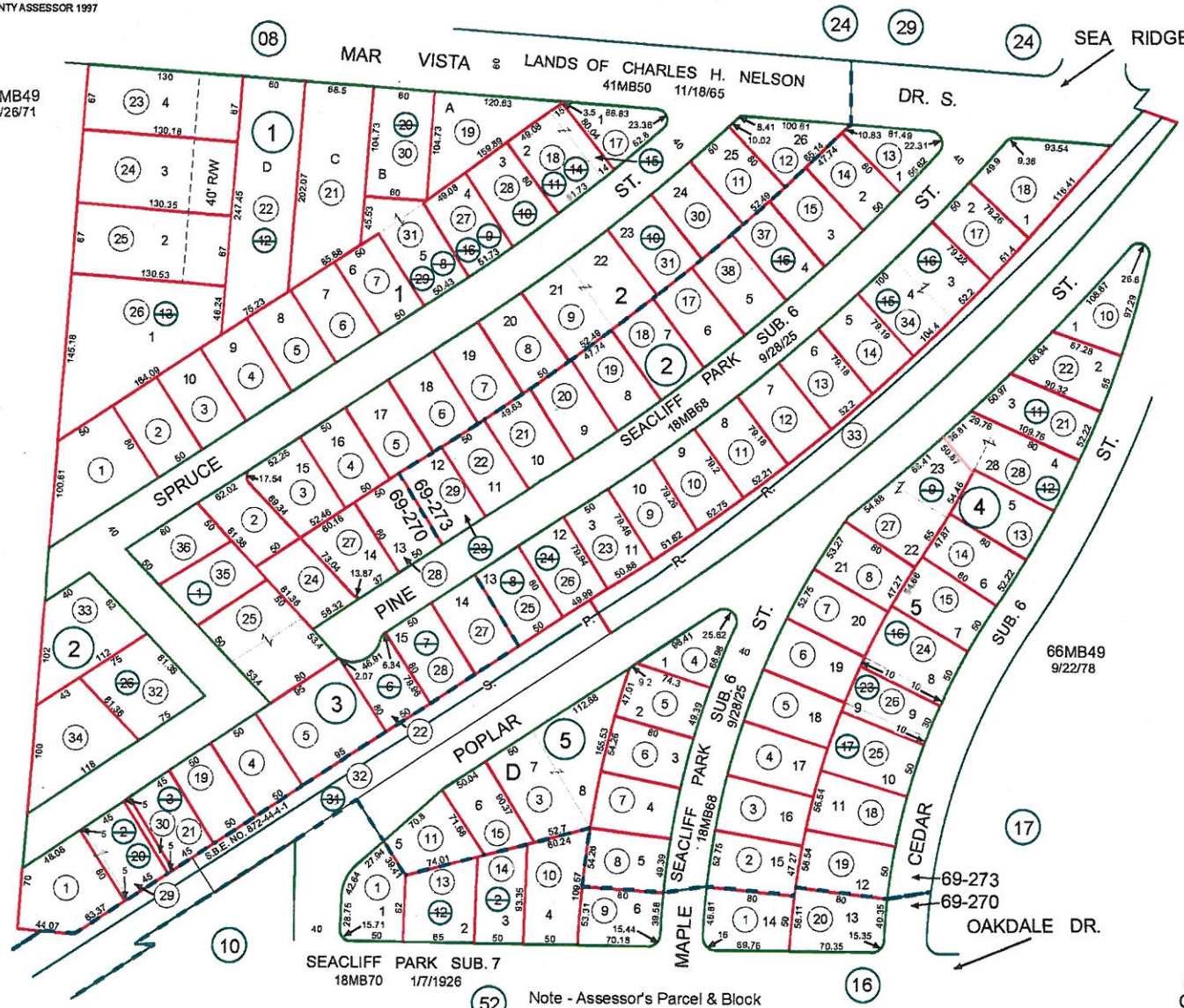
THE ASSESSOR MAKES NO GUARANTEE AS TO MAP ACCURACY NOR ASSUMES ANY LIABILITY FOR OTHER USES. NOT TO BE REPRODUCED. ALL RIGHTS RESERVED.

APTOS RANCHO

POR. N. 1/2 SEC. 13, T.11S., R.1W., M.D.B. & M.

Tax Area Code
69-270 69-273

38-11



Note - Assessor's Parcel & Block Numbers Shown in Circles.

Assessor's Map No. 38-11
County of Santa Cruz, Calif.
Nov., 1997

Electronically Redawn 11/25/97 wrlp
Rev. 11/25/97 (Por. to pg. 52) wrlp
Rev. 5/1/98 KSA (CA)
Rev. 3/11/99 GG (add Pine St)
Rev. 5/12/99 CB (Tax Consolidation)
Rev. 12/28/99 GG (99-0069723 LBA, 4-27, 28)
Rev. 4/27/01 mvm (changed page refs.)
Rev 2/23/06 md (spatial adjustment)

21

EXHIBIT M

plot28

Location Map

LEGEND

- Subject Cell Site
- Assessors Parcels
- Streets

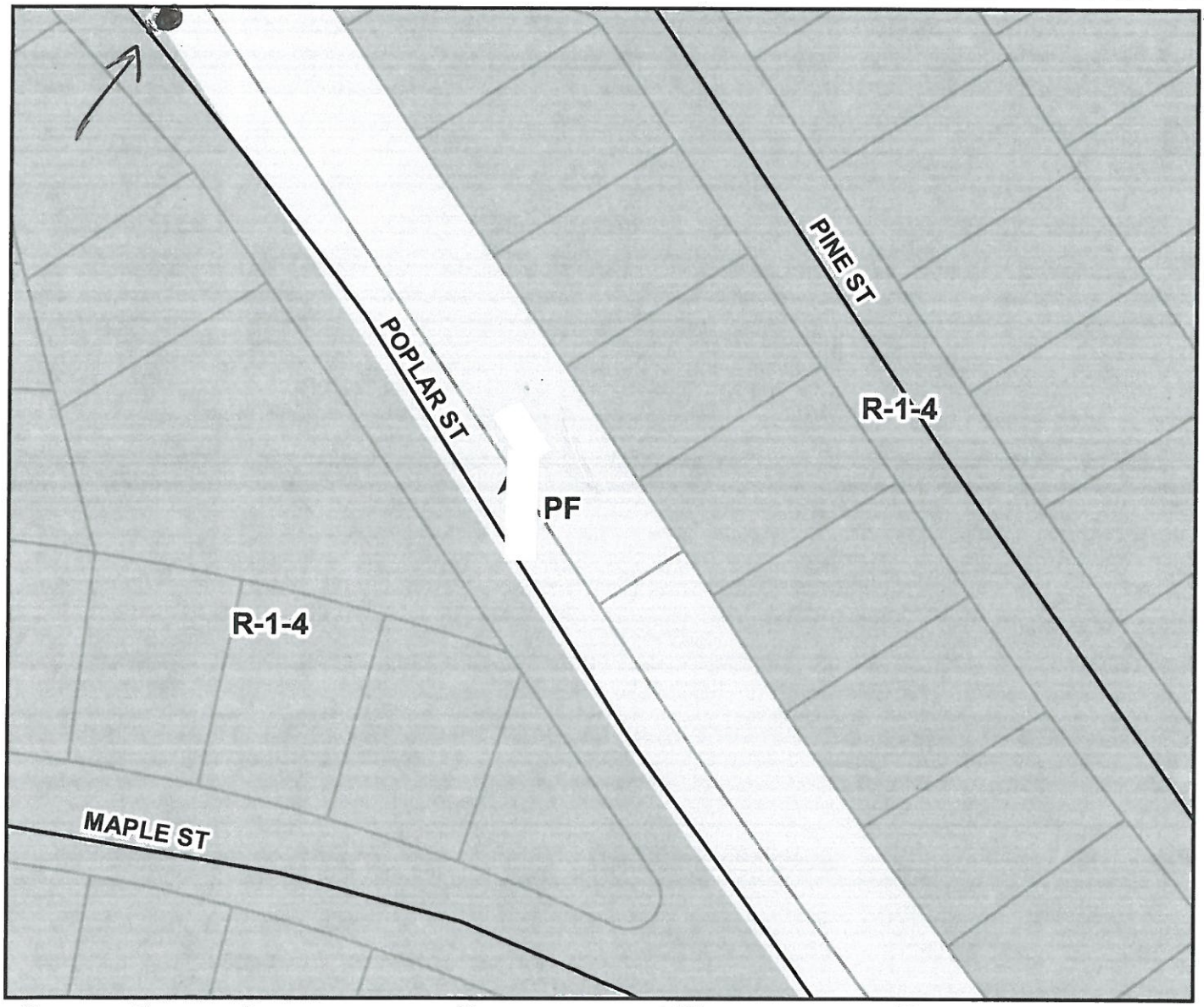
N
W E
S

Map Created by
County of Santa Cruz
Planning Department
March 2013

EXHIBIT E

pln028

Zoning Map



80 40 0 80 160 240 320 Feet

LEGEND

- Subject Cell Site
- Assessors Parcels
- Streets
- PUBLIC FACILITY
- RESIDENTIAL-SINGLE FAMILY

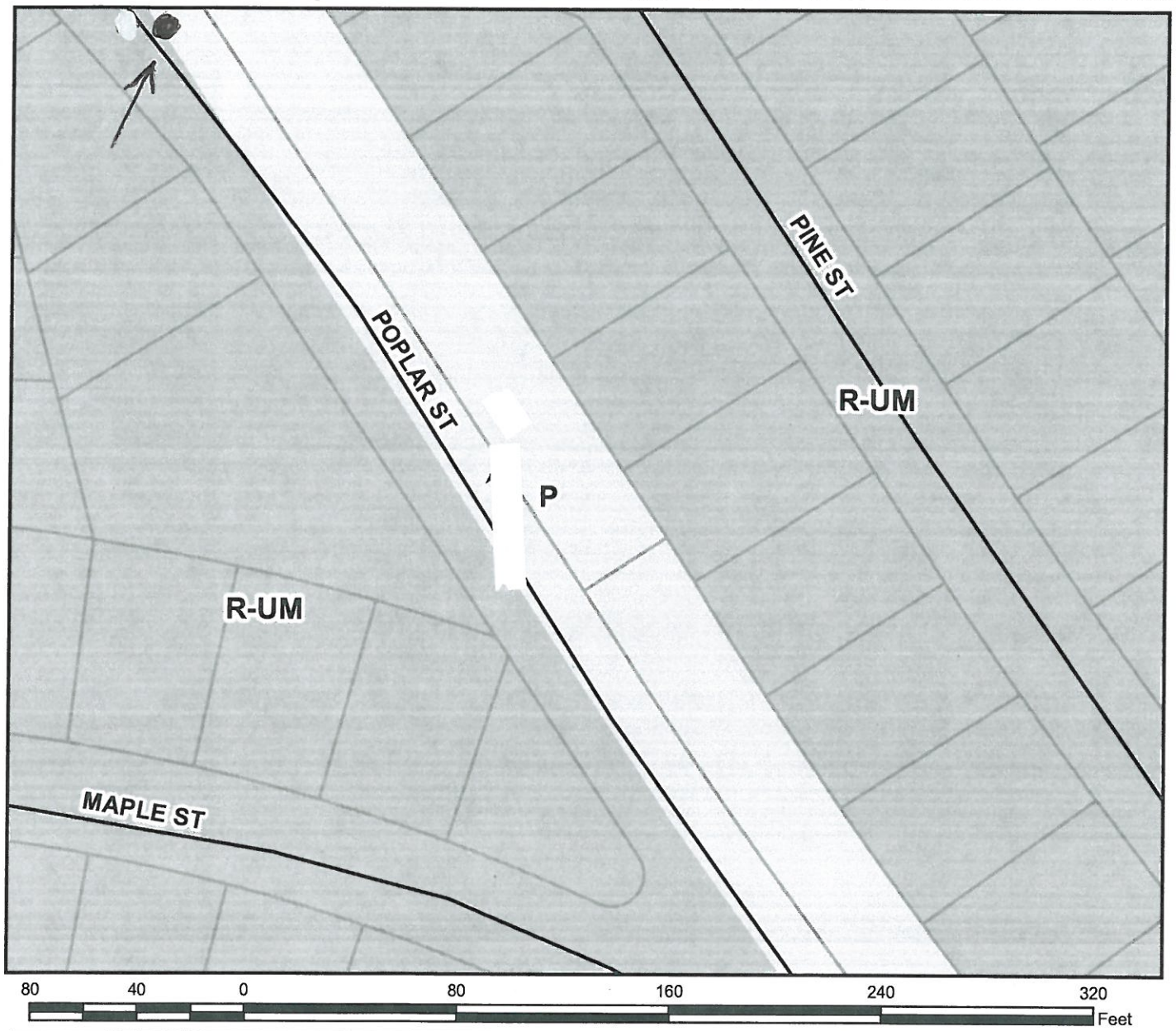
N W E S

Map Created by
County of Santa Cruz
Planning Department
March 2013

EXHIBIT E

pln028

General Plan Designation Map



80 40 0 80 160 240 320 Feet

LEGEND

- Subject Cell Site
- Assessors Parcels
- Streets
- Public Facilites
- Residential - Urban Medium Density

N
W E
S

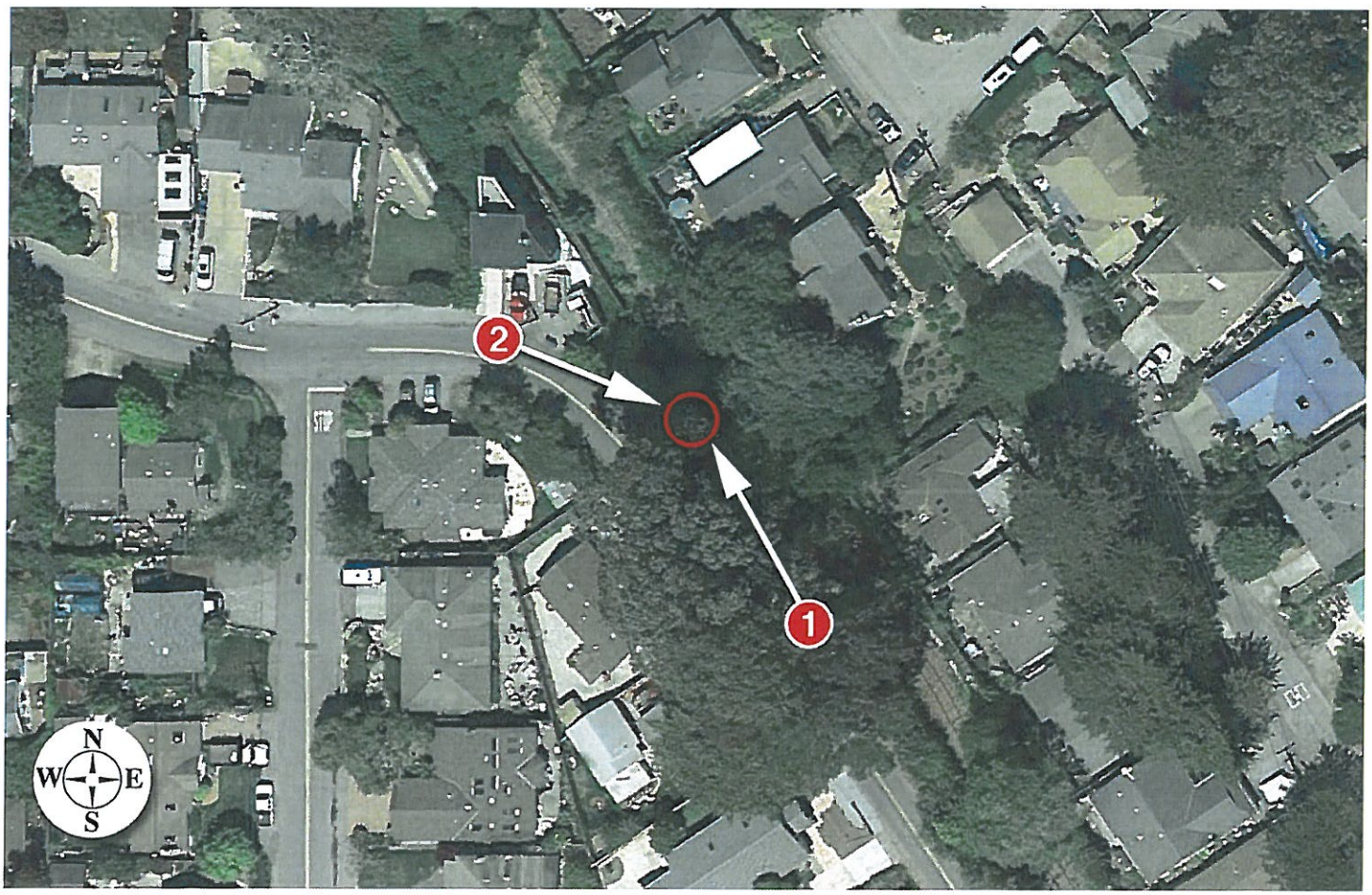
Map Created by
County of Santa Cruz
Planning Department
March 2013

EXHIBIT E

pln028


1


2


2
1
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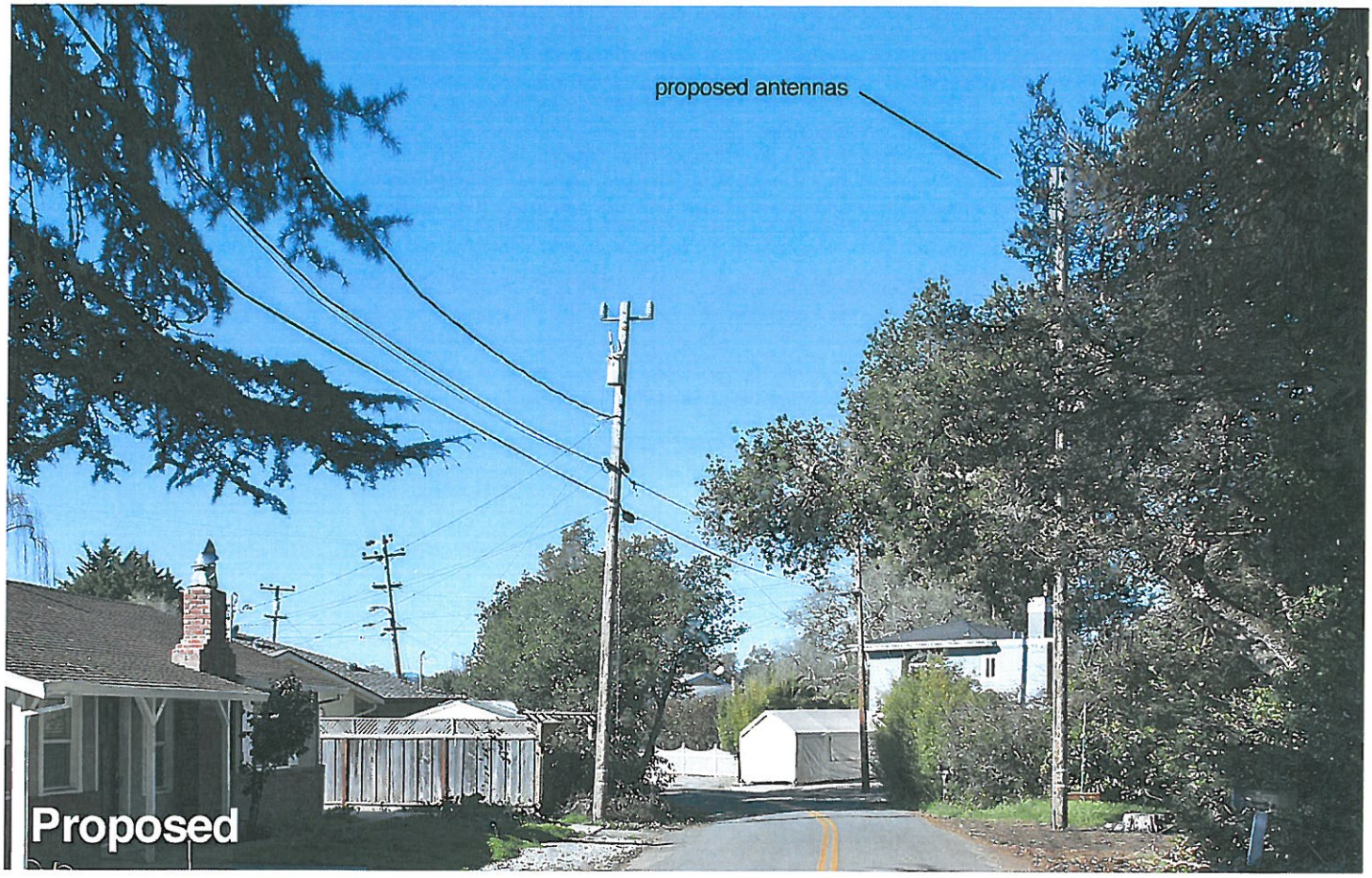


CROWN CASTLE

Seacliff **Site # AP33 A2**

209 Poplar Street
Aptos, CA 95003

Looking North from Poplar Street

11/12/13

EXHIBIT F

View #1

Applied Imagination 510 914-0500

CROWN CASTLE

Seacliff **Site # AP33 A2**

209 Poplar Street
Aptos, CA 95003

11/12/13

Looking Southeast from Poplar Street

View #2

Applied Imagination 510 914-0500

EXHIBIT F

Statement of Hammett & Edison, Inc., Consulting Engineers

The firm of Hammett & Edison, Inc., Consulting Engineers, has been retained on behalf of Crown Castle, a personal wireless facilities provider, to evaluate the distributed antenna system proposed to be developed in Seacliff, California, for compliance with appropriate guidelines limiting human exposure to radio frequency ("RF") electromagnetic fields.

Executive Summary

Crown Castle proposes to install a Distributed Antenna System (DAS) in Seacliff, consisting of antennas on twelve utility poles. The proposed operations will 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
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

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.

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 Crown Castle, it is proposed to install three Andrew Model DBXNH-6565A-VTM directional panel antennas on each of twelve existing utility poles within the City of Seacliff, at the addresses indicated below. The antennas would be placed at effective heights ranging between about 27½ and 34½ feet above ground. The maximum effective radiated power proposed at these sites is 515 watts, representing simultaneous operation by Verizon Wireless at 322 watts for PCS, 53 watts for cellular, and 140 watts for 700 MHz service. There are reported no other wireless telecommunications base stations near any of these sites, nor are there other carriers presently proposing to use these sites.

Study Results

For a person anywhere at ground near any of these sites, the maximum ambient RF exposure level due to the proposed operations is calculated to be 0.0060 mW/cm^2, which is 0.66% of the applicable public exposure limit, as tabulated below. The maximum calculated level at the second-floor elevation of any nearby residence is 2.4% of the public exposure limit. The table below lists all twelve sites and the calculated exposure levels at ground and at the second-floor elevation near each site. It should be noted that these results include several "worst-case" assumptions and therefore are expected to overstate actual power density levels from the proposed operation.

These calculated levels do not add significantly to existing levels in terms of compliance with the prevailing standards. That is, these levels will not cause cumulative levels – including existing power density levels in the surrounding areas – to exceed the public or occupational exposure limits.

EXHIBIT G

Node #	Site Address	Antenna Height	Maximum Calculated Exposure Level at Ground	Maximum Calculated Exposure Level on Second Floor beyond	Distance
AP-32	Mar Vista Drive near Sailfish Drive	30½ ft	0.0046 mW/cm^2 0.51% public	0.0047 mW/cm^2 0.91% public	54 ft
AP-33	Cedar Street near Oakdale	34½	0.0034 mW/cm^2 0.37% public	0.0081 mW/cm^2 0.89% public	12
AP-34	Hillcrest Drive near Beachgate Way	28	0.0058 mW/cm^2 0.63% public	0.020 mW/cm^2 2.2% public	10
AP-36	El Camino Del Mar near Santa Cruz Avenue	30½	0.0046 mW/cm^2 0.51% public	0.013 mW/cm^2 1.5% public	17
AP-37	Lake Court near Earl Court	27½	0.0060 mW/cm^2 0.66% public	0.021 mW/cm^2 2.4% public	16
AP-38	Martin Drive near Elva Drive	29½	0.0050 mW/cm^2 0.55% public	0.0055 mW/cm^2 1.1% public	45
AP-39	Baldwin Drive near Cliff Drive	30½	0.0046 mW/cm^2 0.51% public	0.0047 mW/cm^2 0.91% public	25
AP-40	Belle Monte Avenue near Belle Monte Court	32½	0.0039 mW/cm^2 0.43% public	0.010 mW/cm^2 1.1% public	16
AP-41	Loyola Avenue near Doris Avenue	32½	0.0039 mW/cm^2 0.43% public	0.0036 mW/cm^2 0.70% public	27
AP-42	St. Andrews Drive near Clubhouse Drive	29½	0.0050 mW/cm^2 0.55% public	0.0055 mW/cm^2 1.1% public	41
AP-43	Toledo Drive near Bayview Drive	32½	0.0039 mW/cm^2 0.43% public	0.0072 mW/cm^2 0.83% public	25
AP-44	Sumner Avenue near Clubhouse Drive	32½	0.0039 mW/cm^2 0.43% public	0.0024 mW/cm^2 0.47% public	145

Recommended Mitigation Measures

Due to their mounting locations, the proposed 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, no access within two feet directly in front of the antennas, such as might occur during maintenance work on the poles, 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 warning signs* at the antennas and/or on the poles below the antennas, such that the signs would be readily visible from any angle of

* Warning 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. Signage may also need to comply with the requirements of PUC GO95.

EXHIBIT G

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 Distributed Antenna System as proposed by Crown Castle in Seacliff, 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.

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, 2013. 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.
707/996-5200

May 24, 2012

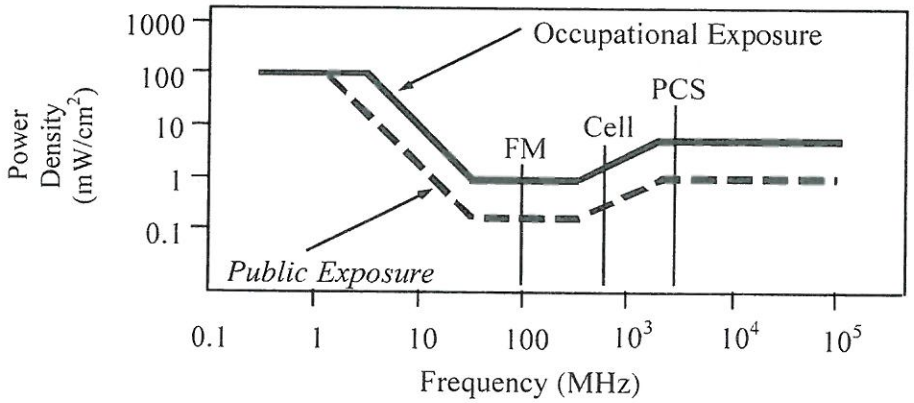
EXHIBIT G

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:

Frequency	Electromagnetic Fields (f is frequency of emission in MHz)					
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	*614*	1.63	*1.63*	100	*100*
1.34 – 3.0	614	*823.8/f*	1.63	*2.19/f*	100	*180/f^2*
3.0 – 30	1842/ f	*823.8/f*	4.89/ f	*2.19/f*	900/ f^2	*180/f^2*
30 – 300	61.4	*27.5*	0.163	*0.0729*	1.0	*0.2*
300 – 1,500	$3.54\sqrt{f}$	*$1.59\sqrt{f}$*	$\sqrt{f}/106$	*$\sqrt{f}/238$*	f/300	*f/1500*
1,500 – 100,000	137	*61.4*	0.364	*0.163*	5.0	*1.0*



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/cm^2,

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/cm^2,

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:

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

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.