WL4557 Walla Walla Mill Creek
RF Justification
July 2023

SERVICE OBJECTIVES & TARGETED SERVICE AREA

AT&T is proposing to build a new wireless communication facility "WCF" and/or "Facility" WL4557 Walla Walla Mill Creek , at 928 Sturm Avenue, Walla Walla, WA 99362 in Walla Walla County.

Service Objectives—Generally

AT&T strives for a network design that provides high radio frequency ("RF") signal strength and signal-to-interference-plus-noise ratio ("SINR") resulting in quality service inside buildings and vehicles. To support this network design there are two main drivers that prompt the need for a new cell site—coverage and capacity.

"Coverage" is the need to expand wireless service into an area that either has no service or bad service. "Capacity" is the need for more wireless resources. Cell sites have a limited amount of resources to handle voice calls, data connections, and data volume. When these capacity limits are reached, user experience quickly degrades. Capacity issues for LTE networks are identified by using SINR metrics to measure the network's signal quality when there is a high traffic load condition. High traffic areas in the network experience poor SINR due to the increased amount of signal noise/interference generated by the interfering strength of the simultaneous transmissions.

Service Objectives—Proposed New Facility

The proposed new Facility is a service coverage and capacity site. Currently, portions in and around Walla Walla East have minimal to no 4G voice service and in other portions, AT&T's existing coverage in the area is at or near its capacity and is insufficient for the volume of traffic (*i.e.* though this area already has AT&T coverage, additional capacity is needed to service the volume of users).

The Objective of this proposed new facility to improve coverage to Walla Walla East residential area . This new WCF will also improve coverage to Berney Elementary school, Pioneer Middle School, Pioneer Park and various major and minor roads. This service objective and Targeted Service Area was determined by AT&T's RF engineers through a combined analysis of market demand, customer complaints, service requests, and RF engineering design (including SINR metrics).

The proposed new Facility meets AT&T's service objectives to provide sufficient continuous and uninterrupted outdoor, in-vehicle, and in-building wireless service within the Targeted Service Area, resulting in fewer dropped calls, improved call quality, and improved access to additional wireless services the public now demands (this includes emergency 911 calls).

In addition to AT&T LTE commercial facilities, this proposed WCF will include facilities to support FirstNet. As a FirstNet site, this proposed WCF is part of a more significant initiative by AT&T to upgrade existing wireless sites and to build new sites to support FirstNet and deploy the new frequency band for first responders ("Band 14"). Placing antenna at the minimum height necessary to reliably make and receive telephone calls and provide data service in the presence of varying signals is crucial for the efficient and effective operation of this site as a FirstNet Network site.

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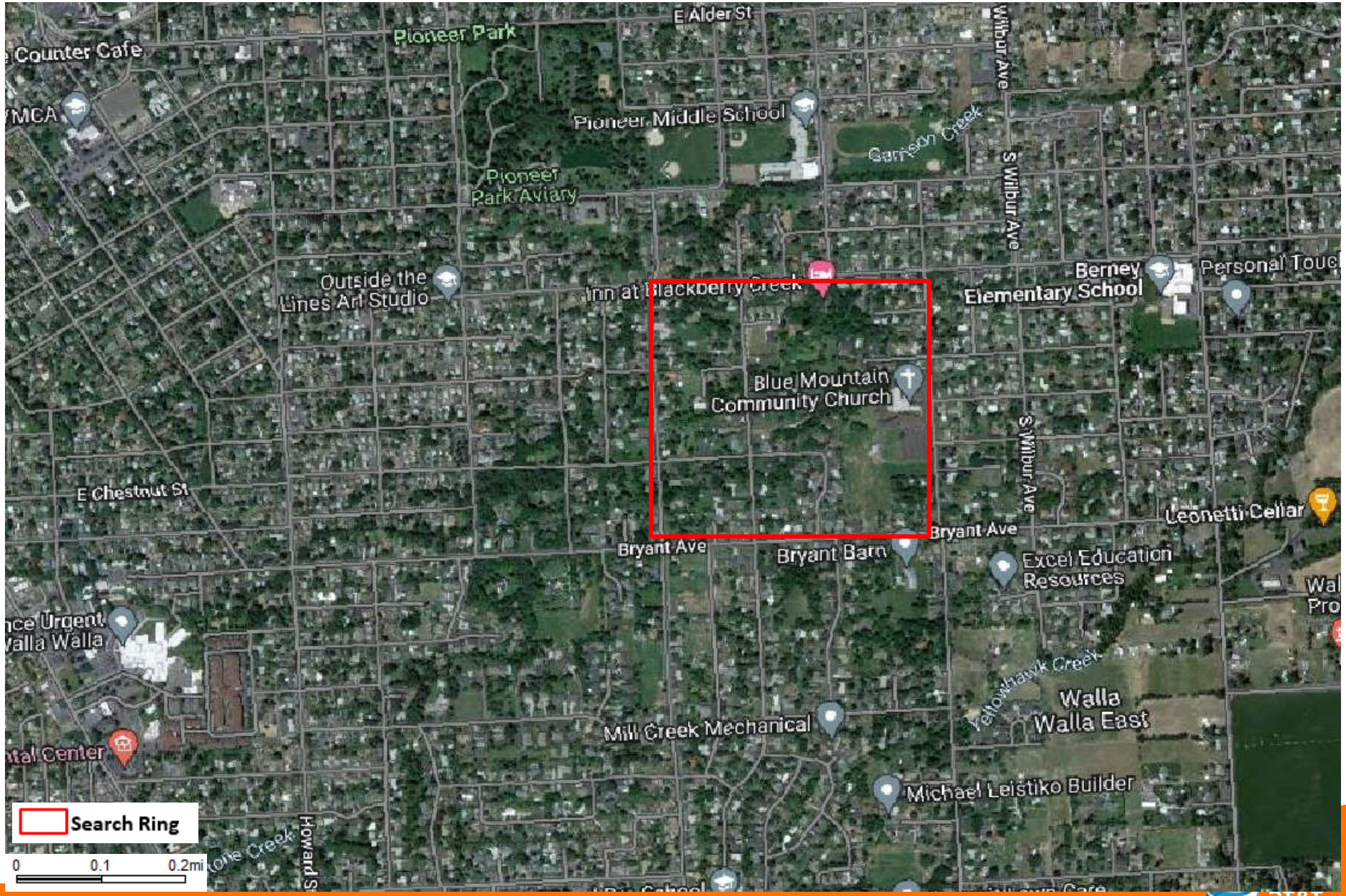
SEARCH RING

AT&T's RF engineers performed an RF engineering study—considering multiple objectives—to determine the approximate site location and antenna height required to best fulfill the noted service objectives within the Targeted Service Area. From this study, AT&T's RF engineers identified a "search ring" area where a new wireless facility may be located to provide effective service in the Targeted Service Area.

As this is a service coverage site intended to improve coverage in a specific area, the proposed new Facility must be located within the identified search ring to be able to establish a dominant signal within the Targeted Service Area—i.e. the proposed new Facility will provide service to users' handsets and prevent them from communicating with AT&T's existing facility, thereby relieving some of the burden on the existing facility by offloading users' data requirements to the proposed new Facility.

Figure A—Targeted Search Ring, below, indicates the search ring AT&T's RF engineers established for this proposed site. A discussion of the methodology AT&T's RF engineers used to identify the search ring is included at the end of this RF Justification document.

Figure A—Targeted Search Ring



PROPOSED NEW AT&T FACILITY

Antennas and Equipment

To meet AT&T's service objectives within the Targeted Service Area, AT&T is proposing to install up to twelve (12) eight-foot (8ft) panel antennas, twelve (12) remote radio head (RRH) units, one (1) microwave antenna, together with additional associated equipment with a 59ft antenna tip height.

Required Height

As the proposed new Facility is intended to provide new coverage and enhance existing capacity, height and location play an important role. The proposed antenna tip height was determined by considering various factors such as the height of surrounding wireless sites, ground elevation, obstructions to the signal, and the surrounding terrain. Accordingly, the proposed 59ft antenna tip height is the minimum necessary to best meet AT&T's service objectives within the Targeted Service Area. A lower antenna tip height at this location would not provide as effective coverage improvement within the Targeted Service Area as compared to the 59ft antenna tip heights. The proposed antenna tip height is also the height where an AT&T wireless device can be reliably used to make and receive telephone calls and use data service in the presence of varying signals.

Projected New Coverage

Based upon the above proposed equipment and antenna tip height, AT&T's RF engineers project that the proposed Facility will provide the following new AT&T coverage.

Figure B —Target Area reflects the region where AT&T intends to improve existing cellular services by intensify coverage. This is to focus on high population residential neighborhood and neighborhood business areas, schools and event locations.

Figure C —Existing AT&T Coverage shows existing AT&T wireless services in the general area of the proposed new site, which demonstrates the current gap in coverage in the targeted service area. The red star indicates the location of the proposed new WCF. The pink diamond indicates the location of existing AT&T WCF sites; coverage from AT&T's existing WCF sites is shaded in green. As can be seen, there is a coverage gap in all areas not shaded in green. Currently, the target coverage area has minimal to no 4G voice service and does not have adequate 4G LTE service.

Figure D —Projected New AT&T Coverage identifies the projected coverage from the proposed new WCF with the requested antenna tip height of 59ft. The proposed antenna tip height is the minimum necessary to help fill the coverage gap relative to nearby complementary wireless facilities and to support the FirstNet Network. This is also the height where an AT&T wireless device can be reliably used to make and receive telephone calls and use data service in the presence of varying signals.

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Figure B—Target Area

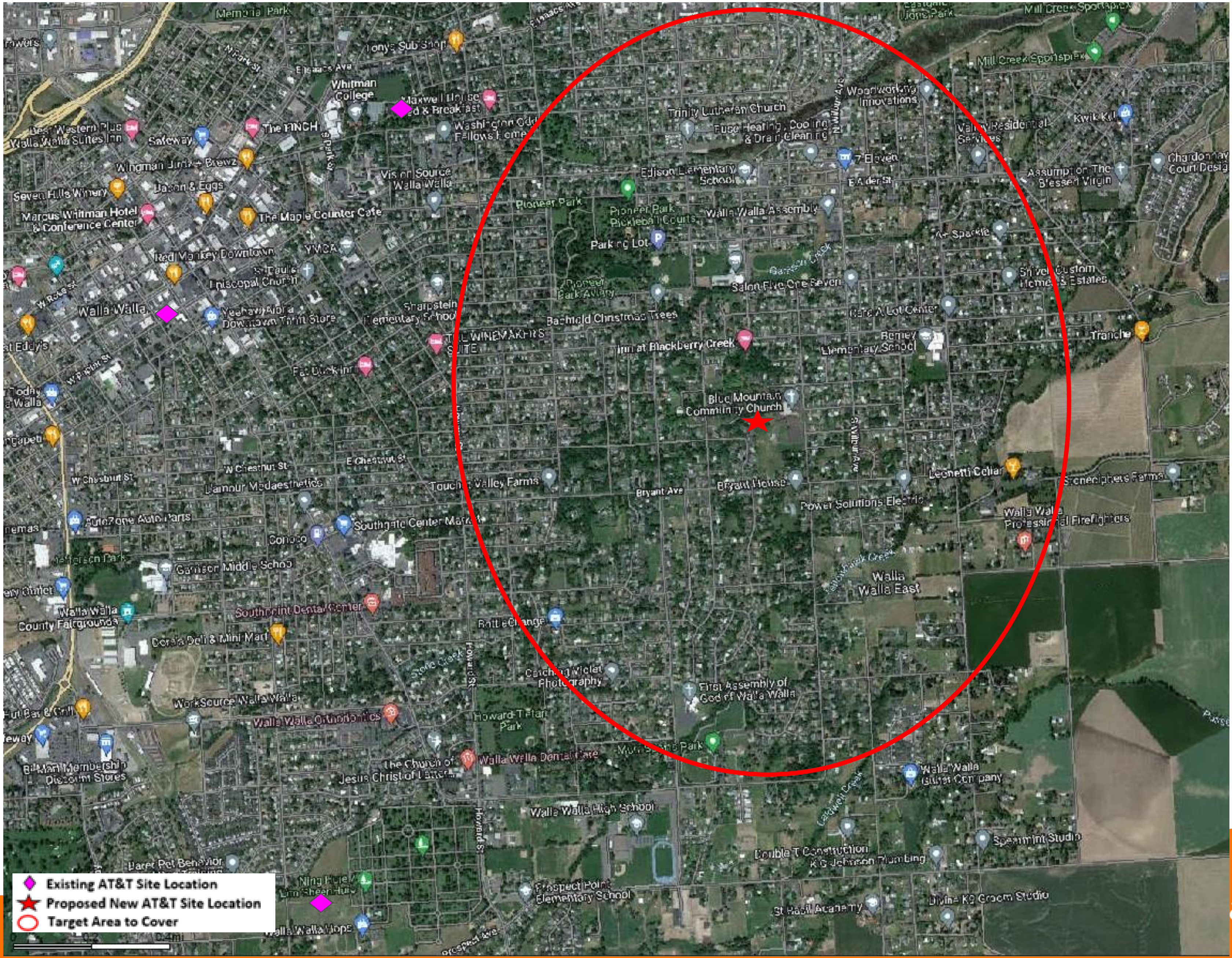


Figure C—Existing AT&T Coverage

Targeted Service Area BEFORE Addition of Proposed New Wireless Facility

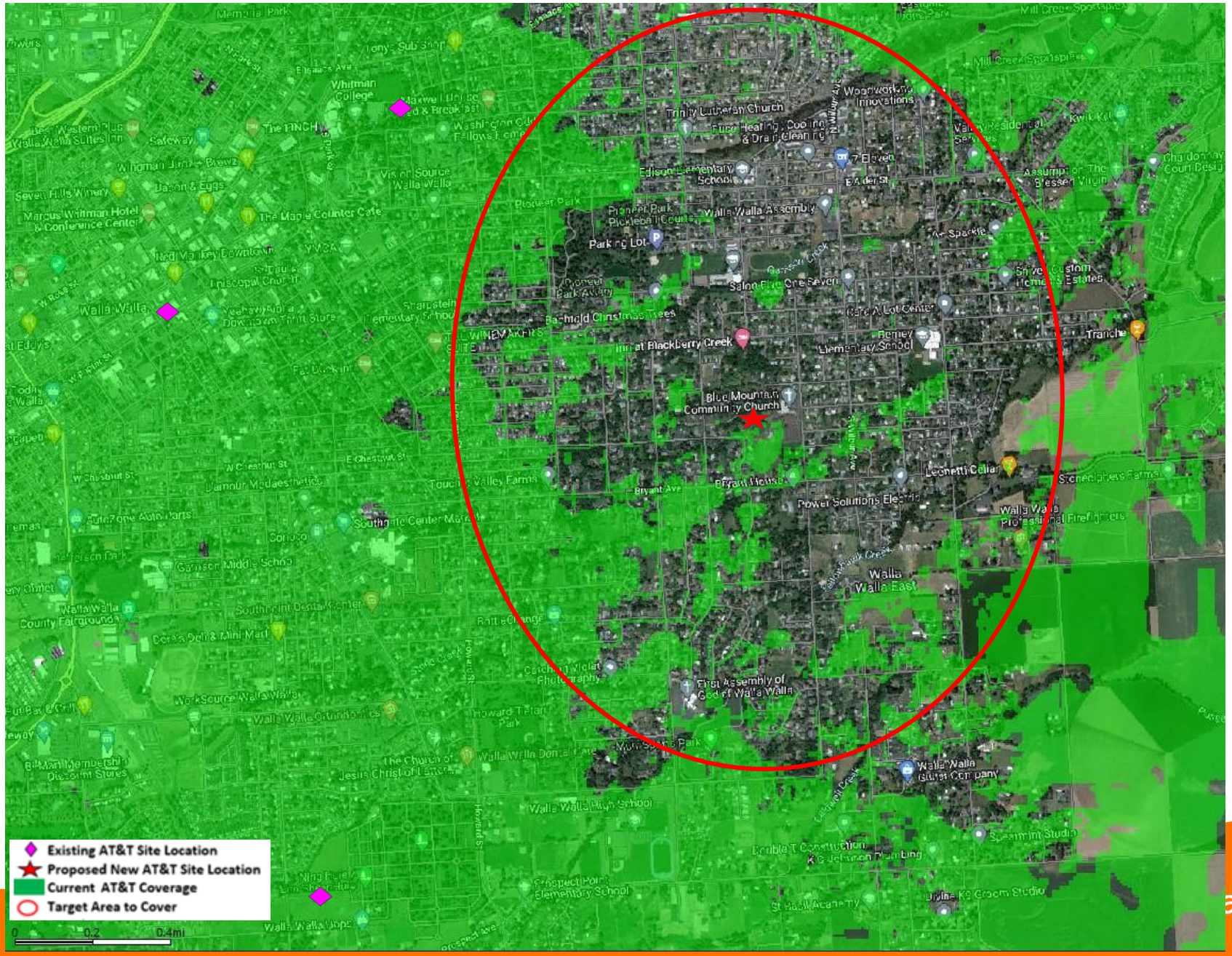
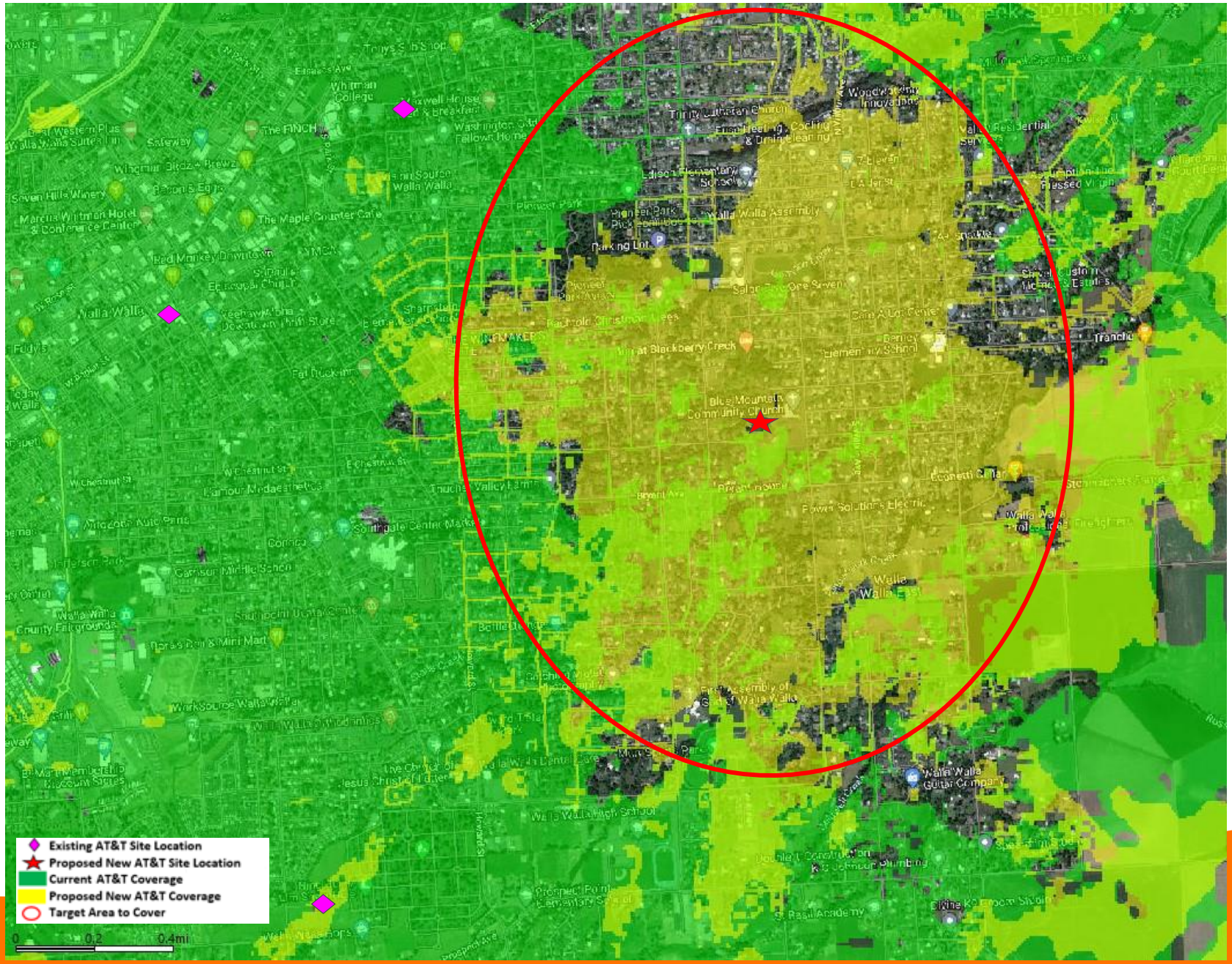


Figure D—Projected New AT&T Coverage

Coverage AFTER Proposed AT&T Facility On-Air—59ft Antenna Tip Height



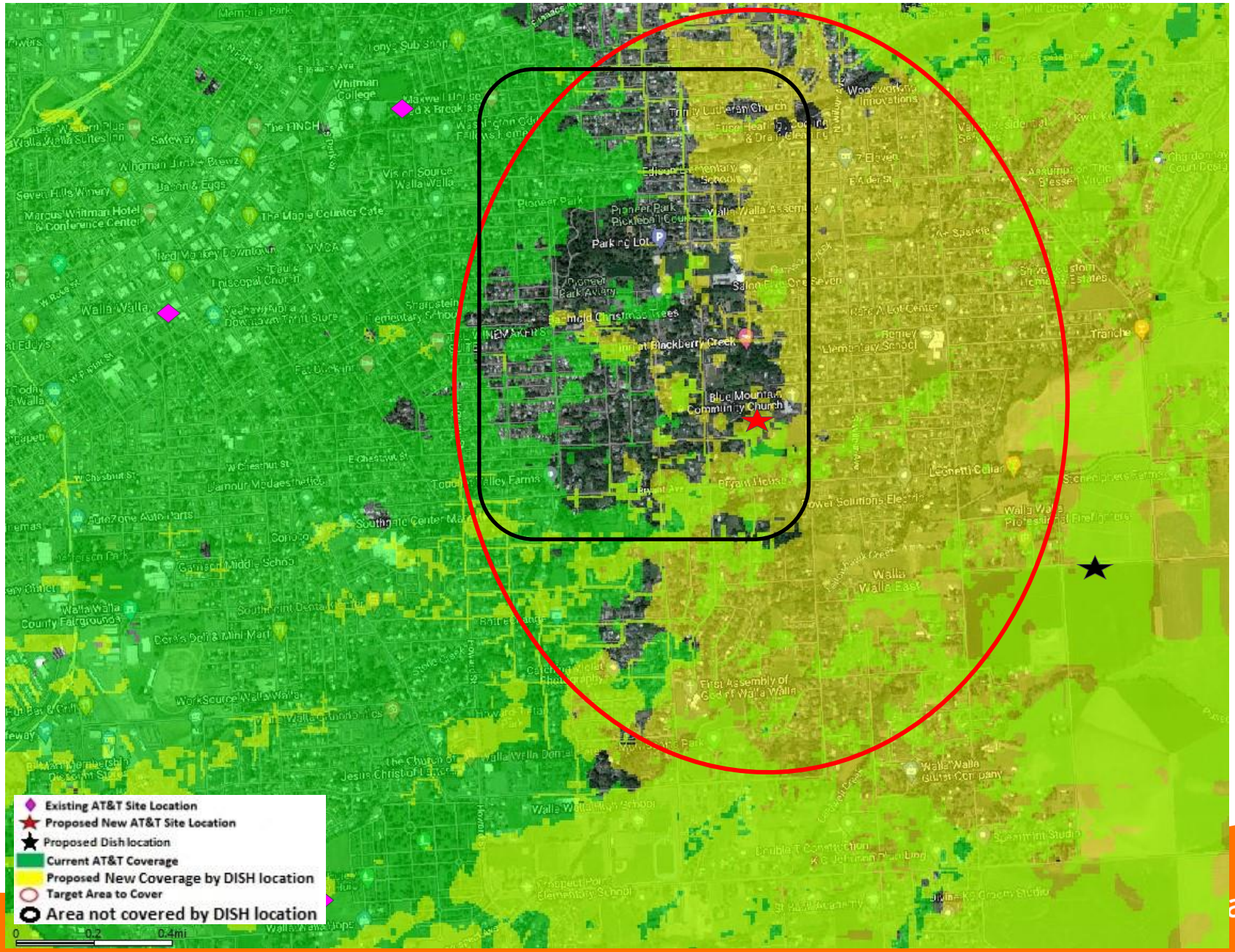
Alternative Site Analysis

100-ft tower proposed by DISH with tip height of 85’ available for collocation Location: 46 03’ 10.87”N 118 17’ 31.46”W

Figure E—Projected Coverage with tower proposed by DISH

Figure E— Coverage of Alternative Site Analysis

Coverage AFTER alternative site On-Air—85ft Antenna Tip Height



Search Ring Methodology

AT&T's RF engineers used coverage propagation software systems to predict the coverage provided by the proposed new WCF. The software and AT&T's RF engineers considered the general factors outlined below, as well as more project-specific factors such as the type of antenna, antenna tilt, etc.

Coverage. The antenna site must be located in an area where the radio frequency broadcasts will provide adequate coverage within the targeted service area. The RF engineer must take into consideration the coverage objectives for the site as well as the terrain in and around the area to be covered. Because radio frequency broadcasts travel in a straight line and diminish as they travel further away from the antennas, it is generally best to place an antenna site near the center of the desired coverage area. However, in certain cases, the search ring may be located away from the center of the desired coverage area due to the existing coverage, the surrounding terrain, or other features which might affect the radio frequency broadcasts, *e.g.* buildings or sources of electrical interference.

Clutter. AT&T's WCFs must "clear the clutter"—the WCF site must be installed above or close to RF obstructions (the "clutter") to enable the RF to extend beyond and clear the clutter. AT&T's radio frequencies do not penetrate mountains, hills, rocks, or metal, and are diminished by trees, brick and wood walls, and other structures. Accordingly, AT&T's antennas must be installed above or close to the "clutter" to provide high quality communications services in the desired coverage areas. Additionally, if the local code requires us to accommodate additional carriers on the support structure, the structure must be even taller to also allow the other carriers' antennas to clear the clutter.

Call Handoff. The WCF site must be in an area where the radio broadcasts from the site will allow seamless "call handoff" with adjacent WCF sites. Call handoff is a feature of a wireless communications system that allows an ongoing telephone conversation to continue uninterrupted as the user travels from the coverage area of one antenna site into the coverage area of an adjacent antenna site. This requires coverage overlap for a sufficient distance and/or period of time to support the mechanism of the call handoff.

Quality of Service. Users of wireless communications services want to use their services where they live, work, commute and play, including when they are indoors. AT&T's coverage objectives include the ability to provide indoor coverage in areas where there are residences, businesses and indoor recreational facilities.

Search Ring Methodology—Con't

Radio Frequencies used by System. The designs of wireless communications systems vary greatly based upon the radio frequencies that are used by the carrier. If the carrier uses radio frequencies in the 850 MHz to 950 MHz range, the radio signals will travel further and will penetrate buildings better than the radio frequencies in the 1900 MHz band. As a result, wireless communications systems that use lower radio frequencies will need fewer sites than wireless communications systems that use higher radio frequencies.

Land Use Classifications. A&T's ability to construct a WCF site on any particular property is affected by state and local regulations, including zoning and comprehensive plan classifications, goals, and policies. AT&T's search rings take these laws and regulations into consideration.