

Click here to enter UW PROJECT NAME.
UW Project Number Click here to enter NUMBER.
Click here to enter CONSULTANT NAME.
Click here to choose or enter DATE OF SPECIFICATIONS.

This Wi-Fi Section shall be included in the Contract Specifications, unless directed by the University Project Manager.

Contact the UW Project Manager to determine if the design for Wi-Fi outlet locations (WAPs) will be part of the A/E contract or provided through UWIT. If the design is provided by UWIT the A/E will receive the lay out for the WAPs from the Owner and the A/E will show Pathway for WAPs on the Drawings.

Where cable is part of the Contractor scope of work coordinate with section 27 17 52 to provide cabling for the WAPs

The consultant shall modify portions of this specification as necessary to accurately reflect conditions of the Project. When a section is not used, keep the heading and indicate "Not Used."

(Example: 2.4 AP OUTDOOR ENCLOSURES:- Not Used)

PART 1 – GENERAL

1.1 SCOPE

- A. The Contractor shall provide a wireless local area network (WLAN) conforming to the 802.11a, g, n and ac both in the 2.4 and 5 GHZ bands throughout the designated coverage area (s) Wi-Fi technologies as specified herein and indicated in the Drawings.

For all new projects and major renovations Wi-Fi coverage shall be included for surrounding outside areas. If this does not qualify as a new or major renovation project delete "B" below

- B. **The designated coverage areas shall include both indoor and outdoor coverage.**

1.2 RELATED SECTIONS

Delete 1.2C when the Owner provides the cabling for Wi-Fi.

- A. Division 26, "Electrical"
B. 27 17 51 "Communications Infrastructure"
C. **27 17 52 "Copper and Fiber Optic Communications",**

1.3 QUALITY ASSURANCE

A. Contractor Qualifications:

1. The Contractor performing the work of this section shall have demonstrated ability installing Aruba networks with the equipment specified and shall have been in the wireless network installation business for a minimum of five (5) years.
2. The Contractor performing the work of this section shall have successfully completed five (5) similar wireless communications projects equal in magnitude (in terms of size and construction cost) and for projects consisting of less and 35 access points, projects shall have been successfully integrated into a network consisting of no fewer than 400 access points, within the previous three (3) years, with the similar equipment specified herein,
3. Contractor performing the work of this section shall ensure and warrant that all installations meet the manufacture's specifications and all applicable requirements, standards and regulations from the UW, local, state or federal agencies.

4. The Contractor performing the work of this section shall employ individuals who are fully familiar with and qualified to install Aruba equipment and have the capability to complete the installation and provisioning process as described herein.
 5. Only full-time permanent employees of the Contractor performing the work of this section shall install the work of this Section.
 6. The Installation Firm shall provide all needed software and shall have staff proficient in the use of layered AutoCAD Design for incorporation into AutoCAD
- B. Project Meetings:

Validate with UW Project Manager and UW-IT if a pre-installation meeting/walk-through is required for the Project. If not ... delete the content of this portion.

1. Pre-installation meeting: Early in the construction time line if required, the Contractor shall schedule a pre-installation meeting to include the Owner's Representative, UWIT Wi-Fi Engineer and the Wi-Fi Designer (ACMP), where communications infrastructure installation issues shall be discussed. This meeting may coordinated with or be part of the Pre-installation walk-through.
2. Pre-installation walk-through: Prior to commencing installation, the Contractor shall coordinate a pre-installation walk-through with the Owner's UW-IT Wireless Engineer and all trades related to installation of the wireless communications systems.
 - a. The walk-through shall address installation of penetrations, sleeves, conduit, cable tray, grounding and bonding, and electrical power and other building support infrastructure requirements.
 - b. The Lead or Forman for the Contractor performing the work of this section who will be on site for the execution of the project shall be at this walk-through.
 - c. At Owner's sole discretion, this walk-through may occur as part of the pre-construction meeting.
3. Construction meetings: During the scheduled time period of the Wi-Fi installation the Wi-Fi installation contractor shall have a representative at the weekly (or as often as they occur) construction meetings.

1.4 SPECIAL COORDINATION

- A. The Contractor shall coordinate with the A/E and Owner throughout the project to provide information in the installer portion of the Owner's Wi-Fi Information Form (Google Spreadsheet).
1. Contact the Owner's Representative to receive access to this form.

1.5 SUBMITTALS

- A. The Contractor shall submit evidence to Owner of Contractor Qualifications meeting the requirements of section 1.3 upon award of the contract for the work of this section or when any change in personnel, for whom these certifications are required, takes place.
- B. Prepare and submit CAD as-built drawings. The as-built should be based upon the UW-IT file provided to the designer. Include:
 - 1. Floor plans indicating location of the wireless equipment.
 - a. Note any changes from the design documents and show as-built location of all equipment.
 - b. Each AP shall have a unique name in the format CCC.RRRR.APyy where:
 - (1) CC is the Owner's building code, in all capital letters (e.g., SAV for Savery Hall and UMSS for the SS Wing of UWMC). This code is found on the Owner's Wi-Fi Information Form.
 - (2) RRRR is the room number, indicated on the Contract Drawings, wherein the AP is located.
 - (3) yy is a two digit incrementing integer for each AP within a room, beginning with 01. (Sample AP names include: HMC.12EH-04.1.AP01; HUB.203.AP01; HUB.203.AP02; HSJ.J100S.AP01; WCH3.100B.AP01)
- C. For Substantial Completion, submit O&M Manual information required by Section 01 77 00.

1.6 SUBSTITUTIONS

- A. Product substitutions will only be considered with complete product descriptions including technical data and performance records and approval by UW-IT.

PART 2- PRODUCTS

Other Aruba models supporting 802.11ac may be permitted with approval by UWIT. The AP selection should be approved by UW-IT Wireless Engineering prior to specifying. Modify the products below to reflect the actual products approved for this project.

2.1 WIRELESS ACCESS POINTS (APs)

Wireless Access Points will be Owner furnished, Contractor installed (OFCI) and are included here for reference and coordination purposes.

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A. Indoor wireless APs

1. Aruba AP-214, or
 2. Aruba AP-215 or
 3. Aruba AP-224 or
 4. Aruba AP-225
5. No Substitutions unless approved by UW-IT

B. Outdoor wireless APs

1. Aruba AP-274, or
 2. Aruba AP-275 or
 3. Aruba AP-277 or
 4. Aruba AP-214 or
 5. Aruba AP-224 or
 6. Aruba AP-215 or
 7. Aruba AP-225
8. No Substitutions for Aruba products unless approved by UW-IT

2.2 AP ANTENNA

Wireless Access Points Antenna will be Owner furnished and are included here for reference and coordination purposes.

AP-244 and 274 require external antennas. AP-225, 275, & 277 do not require antennas.

A. Provide an antenna that demonstrates Aruba AP-compatibility.

B. No Substitutions for Aruba products unless approved by UW-IT

2.3 AP INDOOR MOUNT KITS (BRACKETS) AND ENCLOSURES

Aruba Wireless Access Mount Kits will be Owner furnished and are included here for reference and coordination purposes.

A. Suspended ceilings

1. Aruba AP-220-MNT-C2
2. No Substitutions for Aruba products unless approved by UW-IT

B. Wall or hard ceilings

1. Aruba AP-220-MNT-W2
2. No Substitutions for Aruba products unless approved by UW-IT

The following are optional mounting devices. Select or substitute those that apply to the project. Modify for types of AP to be deployed. Coordinate with architectural intent.

C. Partially recessed horizontal mounting kits (hard lid and acoustic tile)

1. Aruba ap-220-mn-t, for use with AP 215 & AP-225 (Owner Furnished)
2. Oberon 1042-AP215 (Contractor Furnished)
3. Oberon 1042-AP225 (Contractor Furnished)
4. Or approved equal (Contractor Furnished)

D. Horizontal Bracket Mounts for Aruba APs (Contractor Furnished)

1. Oberon Model 1009-00
2. Or approved equal

E. Polycarbonate enclosure for interior APs in wet areas. (Contractor Furnished)

1. Oberon 1020-00
2. Or approved equal

F. Polycarbonate enclosure for interior APs in under seat areas. (Contractor Furnished)

1. Oberon 1020-00
2. Or approved equal

2.4 AP OUTDOOR ENCLOSURES

Delete the content and Label 2.4 "Not Used" if not required by the project. Modify as needed see A/E instructions section 3.3 ENCLOSURES.

Enclosures shall be furnished under this construction contract.

- A. Install outdoor access points in a NEMA 4X/IP66 enclosure on the exterior of building. Box dimensions shall be sufficient to permit easy access for service and subsequent removal.

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1. Oberon 1020-00
2. Or approved equal

2.5 AIR MONITORS (AMs)

A dedicated Aruba Air Monitor overlay shall be provided in UW Medicine, Housing and Food Services, and other facilities as directed by UW-IT. Consult with UW Project Manager. Label 2.5 "Not Used" if not required by the project.

Wireless Air Monitors will be Owner furnished and are included here for reference and coordination purposes.

- A. Aruba AP-224, or
- B. Aruba AP-225
- C. Aruba AP-214, or
- D. Aruba AP-215
- E. No Substitutions for Aruba products unless approved by UW-IT

PART 3- EXECUTION

3.1 GENERAL REQUIREMENTS

- A. The installed AP equipment must provide coverage for 802.11a, g, n and Wi-Fi technologies (with a maximum Standard Noise Reduction of 25dB and a minimum receive signal strength (Power Threshold) of -65 dBm) throughout the designated coverage area(s).
 1. All areas designated for coverage shall provide sufficient cell overlap such that users can roam through the area(s) of coverage without loss of connectivity.
 2. Each Client should see a minimum of 2APs at the same time while receiving a minimal signal strength of -70 dBm..
 3. Capacity coverage:

Indicate the number of estimated users in 3.1A.2.a

- a. The estimated occupancy for this project will be users in total per coverage area. Users per specific areas should be represented as well when capacity considerations are being met.
- b. Within coverage areas, APs shall be installed to accommodate a maximum of 20 users per AP.
- c. If the user density exceeds 16 sq. ft. per user, a special layout may be required beyond the 20 users per AP criteria. The following information is provided to assist the Contractor in this circumstance:

- 1) 5 GHz DFS channels shall be used.

Designer shall verify if that the building and occupant systems support DFS channels. If not change the above to read:

- 1) 5 GHz non-DFS channels shall be used.

- 2) 20 MHz channel width will be used in the 2.4 GHz band.
- 3) 20 MHz channel width shall be used in the 5 GHz band.

With the Owner and UWIT Wi-Fi engineer's approval the above may be replaced with:

- 3) 40 MHz channel width shall be used in the 5 GHz band

- 3) Co-Channel interference shall be minimized with a goal of no more than one AP seen on any channel with signal strength of -80 dBm or higher. IF more than 2 APs are seen on a single channel the Owner and UWIT Wi-Fi engineers shall be contacted for direction.
- 4) If the design provided appears to vary from any of these requirements report the discrepancy to the Owner.
- 5) Access points shall meet the above with power levels set to a maximum of 9 dBm on 2.4 GHz band and 18 dBm on 5GHz band.

B. Air Monitors (AMs):

Delete the following 3.1B when there are no air monitors and Label 7.1.B "Not Used"

2. Install one (1) AM for every five (5) to seven (7) APs on a floor, such that monitoring coverage is provided for the entire area in both bands.
3. AMs shall be placed as indicated on Drawings but never directly adjacent to APs.

3.2 INSTALLATION

- A. Unless otherwise indicated, APs shall be mounted between 8 and 10 feet above finished floor.
 1. Wall mounted APs shall be installed with a minimum 6 inches of clearance between the top of AP and the ceiling.
 2. APs installed on suspended ceilings shall attach to the main runner (rather than cross tees).

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3. All alternative placements shall be approved by the Owner prior to installation.

3.3 EQUIPMENT LABELING

- A. To each AP/AM affix label(s) which include at a minimum the following information (see the Wi-Fi Information Form):
 1. The AP/AM name, matching the configured name of the device.
 2. The University of Washington asset inventory tag number designated by the Owner for each AP/AM.

END OF SECTION