

## 1.0 **GENERAL**

## 2.0 **DOCUMENTS**

- 2.1 This section of the Specification forms part of the Contract Documents and is to be read, interpreted, and coordinated with all other parts.

## 3.0 **SUMMARY**

### 3.1 **SECTIONS**

- 1.0 GENERAL
- 2.0 DOCUMENTS
- 3.0 SUMMARY
- 4.0 WIRELESS ACCESS POINT LOCATION SPECIFICATIONS
- 5.0 PHYSICAL SECURITY
- 6.0 INDOOR LOCATIONS
- 7.0 OUTDOOR LOCATIONS
- 8.0 APPENDICES

## 4.0 **WIRELESS ACCESS POINT LOCATION SPECIFICATIONS**

- 4.1 These specifications are tailored for the wireless equipment that the University of British Columbia is deploying as of the date of last revision of this document.
- 4.2 The following criteria must be met regardless of mounting type and location:
- 4.2.1 Two (2) category 6A cable runs shall be provided to each AP location.
  - 4.2.2 The length of each category 6A cable run to each AP location shall not exceed 90 meters.
  - 4.2.3 All APs shall be mounted in the horizontal plane.
  - 4.2.4 Mounting APs in the vertical plane (e.g., on walls, pillars, etc.) shall be avoided. If site conditions necessitate vertical electrical boxes, a right-angle wall mounting bracket (see Reference Section 8.1) shall be used.
  - 4.2.5 The preferred location for AP outlets is on ceilings unless the ceiling height exceeds 4572mm. In the event that ceiling heights exceeds the specified limit, consult with UBC IT Wireless group for alternative options.
  - 4.2.6 All wireless access points shall be installed such that the line of sight between the access point and its coverage area is not obstructed by other building components (architectural elements, HVAC ducting, plumbing, cable tray, lighting, ceiling fixtures, etc.) Contractors and Consultants shall take this requirement into consideration when scheduling the installation of conduit and access points in new buildings to ensure that AP installations do not become obstructed as other building components are installed. Regardless of reason, any AP that must be moved more than 1 meter from the designated spot on the drawings, must receive approval from UBC IT.
  - 4.2.7 For all outdoor access point installations, the required CEC and BCBC codes shall govern for locating, mounting, grounding, servicing cable and enclosures used.

- 4.2.8 All UBC drawings will clearly indicate AP locations with the standard data outlet symbol with the additional "AP" lettering.
- 4.2.9 The Contractor shall install category 6A cables "where they fall" on patch panels in Local or Main communications rooms as dictated by a maximum run distance of 90 meters. AP cables shall not be purposely grouped together as this may cause unbalanced power loading on switches.
- 4.3 Special Rooms and Areas
  - 4.3.1 Rooms such as Lecture Theaters, class rooms, and large capacity study areas must receive special consideration. These areas receive a high density of student population at times and can overwhelm a single AP regardless of signal coverage. Additional APs must be installed to handle the potential capacity of the room or area.
  - 4.3.2 A rough guideline for design is 1 AP installed per 70 seats or per 100 meters squared of common study area.

## 5.0 **PHYSICAL SECURITY**

- 5.1 When APs are located in common, public or secluded areas, all reasonable measures to hide or protect the AP from theft and vandalism without affecting the APs' signal propagation shall be considered. The use of an external enclosure should be considered a last resort.

## 6.0 **INDOOR LOCATIONS**

- 6.1 T-BAR CEILING MOUNT
  - 6.1.1 APs will be installed below the ceiling grid at a maximum height of 3658mm.
  - 6.1.2 A minimum of 3000mm of cable slack shall be coiled at the specified AP location.
  - 6.1.3 Coiled cable must be supported by a J-hook above the specified AP location.
  - 6.1.4 Where possible, access points shall be installed at the intersection of ceiling T-rails, such that the ceiling grid clip straddles the T-rail intersection. (see Reference Section 8.3)
  - 6.1.5 Patch cables shall be routed such that they are not visible from below the access point.
  - 6.1.6 All access points in T-bar ceilings will have some method to supply a secure and stable mounting point for UBC's current type of APs.
- 6.2 STRUCTURAL OR SOLID CEILING MOUNT
  - 6.2.1 APs will be installed below the ceiling structure at a maximum height of 4572mm.
  - 6.2.2 In the case of Structural ceilings where surface raceway systems are to be used the following criteria must be met:
    - 6.2.2.1 Cables shall be terminated in deep double-gang sized Wiremold or Panduit box, with appropriate mud ring.
    - 6.2.2.2 All installed surface boxes must use reinforced mounting points.
    - 6.2.2.3 For surface-mounted access point, cables shall be routed to location via surface mounted raceway and side entry double gang box. Double gang box cannot be located less than 2000mm AFF.
    - 6.2.2.4 Ceiling surface mounted electrical boxes shall not be installed less than 500mm from any adjoining walls.

- 6.2.3 In the case of structural ceilings where concealed 27mm conduit is used, a double gang deep masonry back box (MDB-2) or double gang deep back box and mud ring shall be installed.
- 6.2.4 Ceiling electrical boxes shall not be installed less than 500mm from any adjoining walls
- 6.3 WALL MOUNT
  - 6.3.1 APs will be installed below a maximum height of 4500mm and typically are installed at a height of 3048mm.
  - 6.3.2 Wall mounting is to be avoided if possible as it puts the AP in a horizontal plane which is problematic for signal propagation.
  - 6.3.3 Coordinate with UBCO IT for assistance in avoiding wall mounts.
  - 6.3.4 If wall mounting is unavoidable, right-angle AP mounting brackets (see Reference Section 8.1) will be supplied.
  - 6.3.5 Electrical boxes on walls or pillars shall not be installed less than 500mm from any adjoining wall or ceiling.
  - 6.3.6 All wall mounted locations will use a single gang back box.

## 7.0 **OUTDOOR LOCATIONS**

- 7.1 Selection of locations for outdoor wireless access points shall be based on the following sequence of preferences:
  - Street-level pole mount
  - Exterior building wall mount
  - Exterior building pole mount (soffit)
  - Roof mount
- 7.2 STREET LEVEL POLE MOUNT
  - 7.2.1 Cable terminations shall be routed and completed to the nearest building communications rooms with 27mm solid PVC conduit, enclosed in an outdoor NEMA Type 4 rated junction box or similar enclosure.
  - 7.2.2 Constant 110V AC power and SM optical fibre cable will be required if the distance between the building communications room and the pole-mounted access point exceeds 90 meters. AC power will not be required and Outdoor rated Category 6A Shielded copper cable can be used if the location is within the 90m distance limitation.
  - 7.2.3 If power is provided, the appropriate outdoor-rated GFCI receptacle shall be installed.
  - 7.2.4 APs shall be mounted to poles according to the design of the pole, within a 3000 to 7500mm range, with ideal mounting height at 5000mm.
- 7.3 EXTERIOR BUILDING WALL MOUNT
  - 7.3.1 Provided that the cable length limit of 90 meters is met, outdoor rated category 6A shielded cable to the mount point will be sufficient.
  - 7.3.2 Provision shall be made in the building design for the attachment of a 6 \* 6 \* 4 NEMA Type 4 rated junction box (see Reference Section 8.4) to which outdoor AP mounting brackets (such as the type described in Reference Section 8.5) can be affixed flush to the building.

- 7.3.2.1 If building material prevents flush mounting of junction box, proceed to install NEMA rated junction box directly to building exterior. AP shall be mounted flush to the junction box.
    - 7.3.2.2 Cable termination shall be completed within the exterior mounted junction box.
  - 7.3.3 APs shall be mounted at a height of between 3000 to 7500mm, with ideal mounting height at 5000mm.
  - 7.3.4 APs shall not be mounted on walls in areas where signals may be attenuated by external building elements (e.g., large canopies, balconies, design elements that impinge on the line-of-sight between the AP and the ground level.)
  - 7.3.5 In the event that the prior conditions cannot be met, consult with UBC IT Wireless group for alternative options.
- 7.4 EXTERIOR BUILDING POLE MOUNT (SOFFIT)
  - 7.4.1 In areas that an AP cannot be mounted to the building wall, install pole mount to underside of soffit.
    - 7.4.1.1 APs shall be mounted at a height of between 3000 to 7500mm, with ideal mounting height at 5000mm.
    - 7.4.1.2 Pole mount shall be 50.8mm – 76.2mm in diameter at a minimum length of 305mm from the underside of soffit.
    - 7.4.1.3 Cabling shall be terminated in a NEMA Type 4 rated junction box at the bottom end of the pole mount
  - 7.4.2 Pole mounts shall not be mounted on soffits in areas where the affixed AP's signals may be attenuated by external building elements (e.g., large canopies, balconies, design elements that impinge on the line-of-sight between the AP and the ground level.)
  - 7.4.3 In the event that the prior conditions cannot be met, consult with UBC IT Wireless group for alternative options.
- 7.5 ROOF MOUNT
  - 7.5.1 Roof mount locations shall be considered if the building height is no greater than 10500mm. Buildings with a roof exceeding the specified limit should use exterior wall mount locations for the external APs.
  - 7.5.2 For each of the indicated roof top AP locations provide one 27mm conduit stub up/ out terminated in an outdoor NEMA Type 4 rated junction box or similar enclosure in the vicinity of the indicated roof top AP location.
  - 7.5.3 The conduit stub up/ out shall be capable of preventing rodent ingress.
  - 7.5.4 Roof top masts are to be parapet mounted at the building edge to minimize the radio shadow at the base of the building.
  - 7.5.5 If parapet mount is not an option, NPRM shall be seismically braced to roof.
  - 7.5.6 In the event that the prior conditions cannot be met, consult with UBC IT Wireless group for alternative options.
  - 7.5.7 All roof top location masts and associated hardware are to be supplied and installed by Div 26.

## 8.0 REFERENCE

- 8.1 Right-angled indoor wall mounting bracket
  - 8.1.1 Drawing ITSTD - 50
  - 8.1.2 <https://oberoninc.com/products/1011-00-wh/>
- 8.2 Indoor wall mount location drawing
  - 8.2.1 Drawing ITSTD-51
  - 8.2.2 <https://oberoninc.com/products/1008-00-wh/>
- 8.3 Indoor T-Bar ceiling location drawing
  - 8.3.1 Drawing ITSTD - 53
  - 8.3.2 [http://www.cisco.com/c/en/us/td/docs/wireless/access\\_point/mounting/guide/apmount.html](http://www.cisco.com/c/en/us/td/docs/wireless/access_point/mounting/guide/apmount.html)
- 8.4 Outdoor AP NEMA rated junction box like:
  - 8.4.1 [http://www.cantexinc.com/Products/NM\\_Fittings\\_Accessories/Junction\\_Box/Cover.php](http://www.cantexinc.com/Products/NM_Fittings_Accessories/Junction_Box/Cover.php)
- 8.5 Outdoor AP mounting bracket
  - 8.5.1 Drawing ITSTD – 52
  - 8.5.2 [http://www.cisco.com/c/en/us/td/docs/wireless/access\\_point/1530/quick/guide/ap1532qsg.html](http://www.cisco.com/c/en/us/td/docs/wireless/access_point/1530/quick/guide/ap1532qsg.html)
- 8.6 Wireless MESH detailed installations drawings – ITSTD – 54, 55, 56, 57.

**END OF SECTION 27 21 33**