



**ATTACHMENT GUIDELINES
for
Wired Attachments
Wireless Attachments
Equipment Attachments
Conduit Usage**



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**KUB Attachment Guidelines for
Wired Attachments, Wireless Attachments, Equipment Attachments and
Conduit Usage**

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1.0 INTRODUCTION

1.1 Overview

The information contained in this document is intended to communicate the requirements and procedures for individuals and companies requesting attachment to KUB Infrastructure. In most cases, these entities will need to establish an Infrastructure Use Agreement with Knoxville Utilities Board (KUB) before proceeding to request attachment. Adherence to these guidelines, procedures and requirements will improve timeliness of application and approval processes.

This document outlines situations under which KUB considers the attachment of facilities to any portion of its infrastructure. It also outlines the requirements and procedures for granting such permission as well as the physical installation and maintenance of attachments to KUB Facilities.

It is the responsibility of all that apply for attachment to KUB Facilities or use of the KUB Network/Conduit System to follow all Applicable Standards.

Any notification concerning attachments shall be sent to:

Knoxville Utilities Board
Infrastructure Use Team
Electric Systems Engineering
Mail Stop 43
4505 Middlebrook Pike
Knoxville, TN 37921
attachments@kub.org
www.kub.org

1.2 Definitions

Anchor: shall mean an anchor, including “guy wire”, with shielding, where appropriate, which is utilized to stabilize a KUB pole.

Applicable Standards: means all applicable engineering and safety standards governing the installation, maintenance and operation of facilities and the performance of all work in or around KUB Infrastructure and includes the most current versions of National Electrical Safety Code (NESC), the National Electrical Code (NEC), the regulations of the Occupational Safety and Health Administration (OSHA), as well as the engineering and safety standards established by KUB, each of which is incorporated by reference in the Infrastructure Use Agreement, and/or other reasonable KUB provided safety and engineering requirements or other federal, state, or local governmental entity with jurisdiction over KUB Infrastructure.

Application: means the form and process by which Operator submits a request to make attachment to any portion of KUB’s Infrastructure.

Assigned Space: means space on or within KUB Infrastructure that can be used, as defined by the Applicable Standards, for the attachment or placement of wires, cables, and associated equipment for the provision of Communications Service or electric service. The Communication Workers Safety Zone is not considered Assigned Space.

Attachment: means any piece of equipment, device used to place or affix the equipment, or cable/messenger of the Operator, regardless of its purpose or type, which contacts KUB Infrastructure. This does not include a Riser, support, or safety attachments attached to a single Pole where Operator has an existing Attachment on such Pole. A new or existing Service Drop that is attached to the same pole as an Operator’s existing attachment is considered a component of the existing attachment for purposes of this definition. Each wired Pole Attachment provides one foot of vertical space on a Pole and provides for one point of contact. Each Conduit Attachment provides one linear foot of conduit space and provides for one point of contact.

Capacity: means the ability of a Pole to accommodate an Attachment based on Applicable Standards, including space and loading considerations as determined by KUB.

Climbing Space: means that portion of a Pole’s surface and surrounding space that is free from encumbrances to enable KUB employees and contractors to safely climb, access, and work on KUB Infrastructure.

Communication Worker Safety Zone: means that space between the Supply Space and the Communication Space. Spacing requirements are as specified by KUB.

Communications Space: means a lower zone on a Pole, located immediately below the Communication Workers Safety Zone, for the placement of communication and non-power carrying cables. The Communications Space is used primarily for the placement of cable television, broadband, fiber, and telephone wires used to deliver Communications Services.

Communications Facilities: means wired and/or wireless facilities including, but not limited to, fiber optic, copper, and/or coaxial cables, wireless antennas, receivers, or transceivers utilized to provide Communications Service including all associated equipment.

Communications Service: means the offering of the transmission, between or among points specified by the Operator, of information of the Operator's choosing, without change in the form or content of the information as sent and received.

Conduit Attachment: shall mean an attachment to, or a location in, a KUB underground system of a single communications cable, wire, or other authorized facility owned by Operator and occupying one liner foot of a single conduit, duct, innerduct, or other enclosed structure in KUB's underground network.

Facility Attachment: shall mean an Attachment or ground placement of equipment, cables, wires, or associated Communication Facilities to Infrastructure other than Poles or conduit.

Ground Space: means the ground space containing ground mounted equipment that is a certain distance from each Pole being used to mount wireless communication facilities.

Infrastructure: shall mean KUB distribution Poles, transmission Poles with or without distribution underbuild, ducts, conduits, vaults, anchors, fiber optic cable capacity and active communications capacity, facilities, and all other utility infrastructure and associated materials and equipment on or connected to these structures which are owned, managed, or regulated by KUB.

Innerduct: shall mean a flexible conduit installed by KUB inside a larger conduit for the placement of communications facilities.

Joint-Use Agreement: means an agreement whereby each party in agreement owns poles and has agreed the other party has the right to attach to and occupy space upon the poles owned by the other party.

Joint User: means a User who may attach to facilities owned by KUB and in kind grants KUB equivalent rights of attachment to facilities owned by the Joint User.

License: means a nonexclusive, revocable authorization, either written or in electronic format, issued by KUB for Operator to make or maintain Attachments to specific KUB Infrastructure pursuant to the requirements of the Agreement and as described in the Application submitted for the License.

Make Ready; or Make Ready Work: means the changes to be made to KUB's Infrastructure, its own Attachments, the Attachments of other Users, or the equipment associated with such Attachments, which KUB reasonably determines to be required to accommodate Operator's proposed Attachment(s). Such Make Ready Work is to be approved by KUB and performed by Operator's employees, KUB's employees, a certified contractor approved by KUB by employed by Operator, or a third party. The definition includes all administrative work, engineering work,

inspection, design, planning, construction, permitting, tree trimming (other than tree trimming performed for normal maintenance purposes), pole replacement and construction, or Conduit System clearing, or other work reasonably necessary for the installation of Operator's Attachments to poles or within conduit or duct systems. This includes, without limitation, work related to transfers, rearrangements and replacement of existing Poles or other Infrastructure, the addition of new Infrastructure, and the rearrangement of third party pole attachments.

Network: means all underground conduit owned by KUB.

NJUNS: shall mean the National Joint Utility Notification System, an organization that facilitates efficient utility communications through an electronic online system built to communicate and track information regarding joint utility ventures.

Occupancy: means the use or specific reservation of Assigned Space for Attachments on a KUB Pole.

Operator: The active entity that wishes to make attachment to KUB Infrastructure.

Overlash: means to place an additional wire or cable onto an existing Attachment owned by Operator.

Pedestals/Vaults/Enclosures: means above- or below-ground housings that are used to enclose a cable/wire splice, power supplies, amplifiers, passive devices, and/or provide a service connection point and that shall not be attached to KUB Poles.

Pole: means a utility pole owned by KUB used for the transmission/distribution of electricity and/or Communications Service that is capable of supporting Attachments for Communications Facilities.

Post-Installation Inspection: means the inspection required by KUB to determine and verify the Attachments have been made in accordance with Applicable Standards and the License.

Rearrangement of Attachment; or Rearrange: shall mean the moving of attachments from one position to another on the same Pole or in the same Conduit.

Reserved Capacity: means capacity or space on a Pole that KUB has identified and reserved for its own Utility requirements pursuant to a reasonable projected need or business plan.

Riser Attachment: means metallic or plastic encasement materials placed vertically on KUB Infrastructure to guide and protect communications wires and cables when transitioning from underground to overhead or overhead to underground. Riser Attachments shall not be counted as an additional Pole Attachment for rental fee purposes on Poles where Operator has an existing licensed Pole Attachment.

Service Drop: shall mean (i) a Cable used to connect directly to an Operator's customer's location from one Pole and attached to no more than one additional Pole where the additional

Pole does not support voltage greater than 600V; or (ii) a Cable used to connect an Operator's customer's location through the use of multiple Licensed Poles where service drop Make Ready has been performed. Service drops shall not be counted as an additional Pole Attachment for attachment fee purposes as long as such service drop is within the attachment space of a Licensed Attachment subject to the attachment fee.

Site: means an individual pole upon which Operator has attached wireless communication facilities and the ground space portion of each enclosed or nearby property upon which Operator has constructed facilities.

Supply Space: means the upper portion of a Pole located above the Communication Workers Safety Zone and used to support electric supply cables and other electrical equipment such as transformers or switches used for electric service. Only KUB-authorized electrical workers can work in or above the Supply Space. The lowest point of the Supply Space may be the bottom of a bracket; the bottom of a transformer, sectionalizer, recloser, capacitor, etc.; a conductor; or even the top of a conduit riser for electrical supply conductors. Streetlight conductors and hardware may be excluded from this list per NESC 238C.

Support Space: means space on KUB Poles that is not used for the placement of wires or cables, but which jointly benefits all users of the Poles by supporting the underlying structure and/or providing safety clearance between attaching entities and electric Infrastructure.

Tag: means the placement of distinct markers on Attachments coded by means specified by KUB and applicable federal, state or local regulations, which will readily identify its owner and the nature of the Attachments and be legible from the ground.

Transfer of Attachments; or Transfer: shall mean the removing of Attachments from one Pole and placing these onto another Pole or moving of Attachments from one location in KUB's Network to another location in KUB's Network.

Unauthorized Attachment: shall mean the placement of any Attachment on KUB Infrastructure without proper authorization as required by this Agreement. An Unauthorized Attachment shall not include any Attachment that Operator is permitted to affix to KUB Infrastructure pursuant to the terms and conditions hereof, even if the installation of such Attachment does not meet Applicable Standards or differs from the design described in the applicable Application; the foregoing notwithstanding, the deliberate installation of an Attachment or Overlash in knowing violation of Applicable Standards constitutes an Unauthorized Attachment. Any attachment which has not been licensed through the application process.

User: means any public or private entity, other than KUB or Operator, which, pursuant to an Infrastructure Use Agreement with KUB, places an Attachment on or within KUB Infrastructure.

Wireless Attachment: means the antennas and support equipment including but not limited to batteries, conduits, and boxes for power supply and other purposes, support mounts and structures, radio access nodes, accessory equipment (including associated hardware), cables and wires connecting antennas to accessory equipment on the same structure, electronic equipment

shelters and all property within such shelters, pedestals supporting equipment cabinets or panels, and other necessary communications equipment used to provide Telecommunications Service, as defined in Section 3 of the Telecommunications Act of 1996.

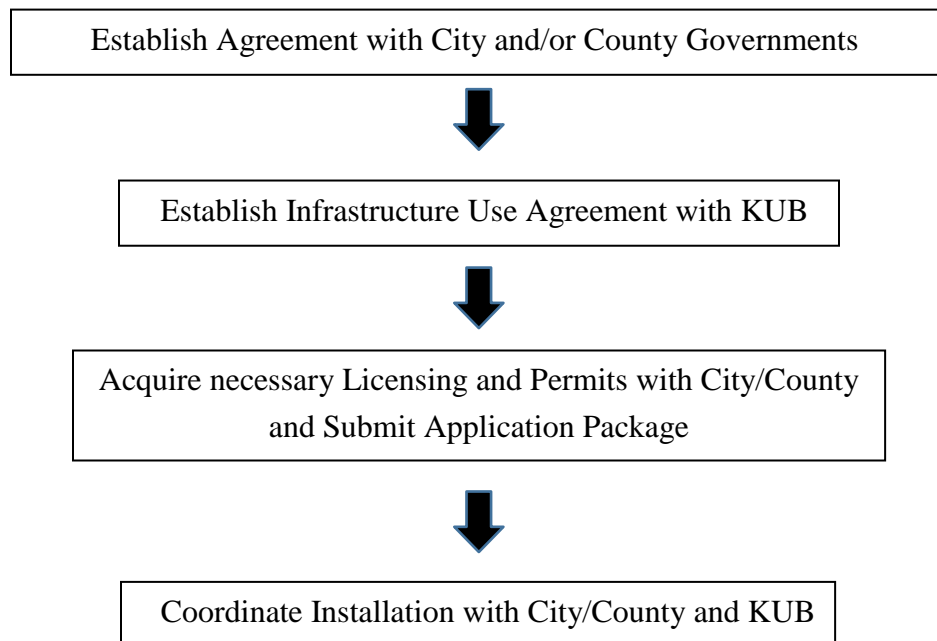
Work: shall mean, and be understood to include, but not necessarily be limited to, all make ready, supervision, installation, repair, maintenance, transportation, operation, labor, materials, equipment, administration, design, engineering, and overhead required of a party, or agreed to be done by a party, under this Agreement.

2.0 BASIC PROCEDURES

In fulfillment of the mission of the Knoxville Utilities Board to act as good stewards of our communities' resources and to work to safeguard those resources and enhance their value for the people of the communities we serve and generations to come, KUB has established these Attachment Guidelines to govern the process for access and attachment to KUB Infrastructure.

These KUB Attachment Guidelines are applicable to all companies and individuals who wish to make an attachment of any type to KUB Facilities. Such attachments may consist of wired or wireless communication facilities, risers, banners, lights, signs, cameras, school flashers, span wires, etc. and includes the use of KUB conduit or its Network. The Guidelines provide for a non-discriminatory, uniform, consistent, and streamlined approach for access to and use of KUB Infrastructure. The information contained in this document is intended to communicate the requirements for attachment requests from companies and individuals who have a valid Infrastructure Use Agreement with KUB. It is the responsibility of all groups, companies, or individuals that apply for attachment to KUB Infrastructure to follow all Applicable Standards.

The process for making attachments to KUB Facilities are generally the same regardless of the type of attachment being proposed.



Establish Agreement with City of Knoxville and/or surrounding counties. To begin the process, the Operator must establish an agreement with the City of Knoxville, Knox County, and/or surrounding municipal or governmental agencies, as applicable, to obtain permission to construct, maintain, operate, and use those facilities within the City and/or County limits and rights-of-way. For sign and banners, a permit rather than an agreement may need to be applied for with the municipal/county authority. For some types of applications such as small pieces of equipment an agreement with the local governmental authority is not required. For the purposes of requesting a streetlight attachment, the governmental authority itself will be the entity making the request. Once an agreement is in place, the Operator may initiate entering into an Infrastructure Use Agreement with KUB.

Enter into Infrastructure Use Agreement with KUB. The Operator must enter into an Infrastructure Use Agreement (IUA) with KUB to obtain permission to use KUB Infrastructure. This is done through KUB's Procurement Department. This Agreement sets forth the terms and conditions of making attachments and provides some procedural information. Certain technical information on attachments can be found within this document. At this same time, an online account will be established that will allow for monitoring of applications and their payments. To create this account, the Operator will need to provide the KUB representative assisting with the IUA the following information: Business name, EIN, primary phone number, physical address and email address. After execution, the Operator will be contacted by KUB to register the account to allow for online payments via www.kub.org when submitting applications for attachments.

Acquire Necessary Licensing and Permits with City/County and Submit Application Package. Once the IUA is in place, the Operator can submit an application package to KUB for each type of attachment requested and pay the associated application fee. KUB recommends the Operator contact the appropriate authorities early in the process to obtain any necessary permit(s) for other governing authorities. KUB will review completed applications within forty-five (45) days of submittal. KUB will contact the Operator with the results of the application review. If the application is not approved, the Operator must revise and re-submit the application. If the application is approved, the Operator may proceed with Make Ready Work under certain conditions. During the Application Review certain additional permits, such as traffic control or easements from private owners, may be required and must be obtained. Prior to submitting any applications, the Operator shall obtain an NJUNS member code. Users with less than fifty (50) attachments are not required to have an NJUNS member code.

Coordinate Installation with City/County and KUB. The Operator shall work with KUB and governmental agencies, through their permitting and licensing processes to coordinate communication Make Ready Work with existing Users, perform any required power Make Ready Work using KUB approved contractors, install their facilities, and complete the licensing process. In the case of Network attachments, KUB will perform all Make Ready Work within the Network system. Once Make Ready Work is complete and approved by KUB, KUB will issue a License to attach. The Operator can then proceed to install their facilities. For each type of attachment requested, this coordination and attachment process is outlined.

2.1 Process Overview: Wired Attachments

Wired attachments refer to communication wires/cables and associated equipment attached to KUB Infrastructure. The process for making wired attachments is summarized below and illustrated in Figure 2.1.

Submit Application Package. The Operator shall submit an application package for each attachment request. The application package is limited to a maximum of fifty (50) wired attachments and must include the application form, route map, and proposed Make Ready engineering worksheets. All proposed attachments must be in the same general area and not spread out over the KUB system. KUB will review complete applications within forty-five (45) days of submittal and will contact the Operator with the results of the application review. If not approved, the Operator must revise and re-submit the application. If the application is approved by KUB, the Operator may proceed with coordination with other affected Users. In providing its approval, KUB may present revised engineering for the Operator to consider.

Coordinate Make Ready Engineering Review with Existing Users. The Operator is responsible for coordinating the review of proposed Make Ready engineering on existing attachments with affected Users. If such review results in changes to the Make Ready engineering design, the Operator must resubmit the revised design for KUB review. If there are no changes to the approved Make Ready design, the Operator shall provide proof of acceptance by other Users and may only proceed with the approved Make Ready Work once KUB has issued a Notice to Proceed.

Perform Make Ready Work. The Operator shall perform all power Make Ready Work associated with the proposed attachment(s) and shall arrange for the execution of communication Make Ready Work. See Section 3.2 for more details on performing Make Ready Work. The Operator shall notify KUB once all Make Ready Work is complete. KUB will inspect Make Ready Work within fourteen (14) days of completion and contact the Operator with the results of the Make Ready review. If the Make Ready Work is not approved, the Operator must make the necessary corrections within thirty (30) days. KUB will issue a License to attach upon approval of Make Ready Work. Until approval is obtained and a License issued, Operator cannot install fiber on KUB facilities.

Install Attachments. KUB will reserve one foot of vertical space and one point of contact on each piece of infrastructure required for one-hundred twenty (120) days after the License is issued. The Operator shall notify KUB once the attachment(s) have been installed. KUB may perform a post-installation inspection at their discretion within thirty (30) days of installation. Any unauthorized changes from the approved design will brought to the Operator's attention, and they will have thirty (30) days to make necessary corrections.

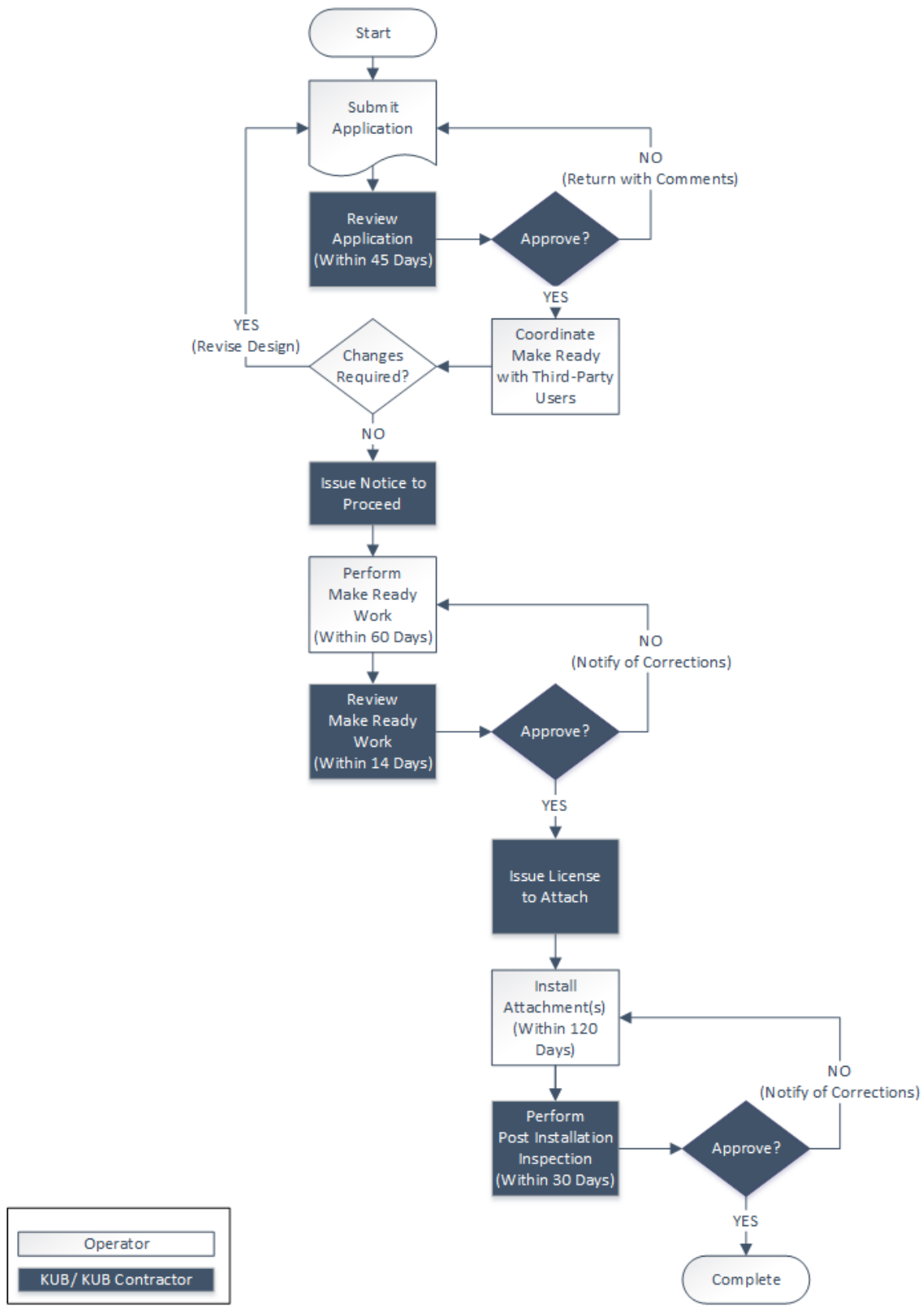


Figure 2.1 Wired Attachment Process

2.2 Process Overview: Wireless Attachments

Wireless attachments refer to any installation on KUB Facilities that sends and/or receives radio frequency signals, including but not limited to directional, omnidirectional and parabolic antennas, structures to support sending and receiving and/or transmitting devices, cabinets, accessory equipment and other ancillary equipment involved with small cell installations, distributed antenna systems, remote radio units, or strand-mounted small cells. The process for making wireless attachments is summarized below and illustrated in Figure 2.2.

Submit Application Package. The Operator shall submit an application package for each wireless attachment request, a limit of one site installation per application. The application package must include an Application form, location map, proposed Make Ready worksheet, pole loading analysis, RF study, and manufacturer specifications/design information for the proposed wireless antenna equipment and mounting hardware. KUB will review the complete application within forty-five (45) days of submittal. KUB will contact the Operator with the results of the application review. If the application is not approved, the Operator must revise and re-submit the application. If the application is approved, the Operator may proceed to coordinate Make Ready engineering review with other affected Users. In providing its approval, KUB may present revised engineering for the Operator to consider.

Coordinate Make Ready with Existing Users. The Operator is responsible for coordinating the review of approved Make Ready Work on existing attachments with affected Users. If such review results in changes to the Make Ready design, the Operator must submit the revised design for KUB review. If there are no changes to the approved Make Ready design, the Operator shall provide proof of acceptance by other Users and may only proceed with the approved Make Ready once KUB has issued a Notice to Proceed.

Perform Make Ready. The Operator shall perform all power Make Ready Work associated with the proposed attachment(s) and shall arrange for the execution of communication Make Ready Work. See Section 3.2 for more details on performing Make Ready Work. The Operator shall notify KUB once all Make Ready work is complete. KUB will inspect Make Ready work within fourteen (14) days of completion and contact the Operator with the results of the Make Ready Review. If the Make Ready Work is not approved, the Operator must make the necessary corrections within thirty (30) days. KUB will issue a License to attach upon approval of Make Ready Work. Until approval is obtained and a License issued, Operator cannot install any portion of the wireless installation on KUB facilities.

Install Attachment. KUB will reserve the approved length of vertical space for the wireless attachment for sixty (60) days after the license is issued. If the Operator does not complete installation within the specified time frame, KUB may reclaim the assigned space. The Operator shall notify KUB once the attachment has been installed. KUB may perform a post-installation inspection at their discretion within thirty (30) days of installation. Any unauthorized changes from the approved design will be brought to the Operator's attention, and they will have thirty (30) days to make necessary corrections.

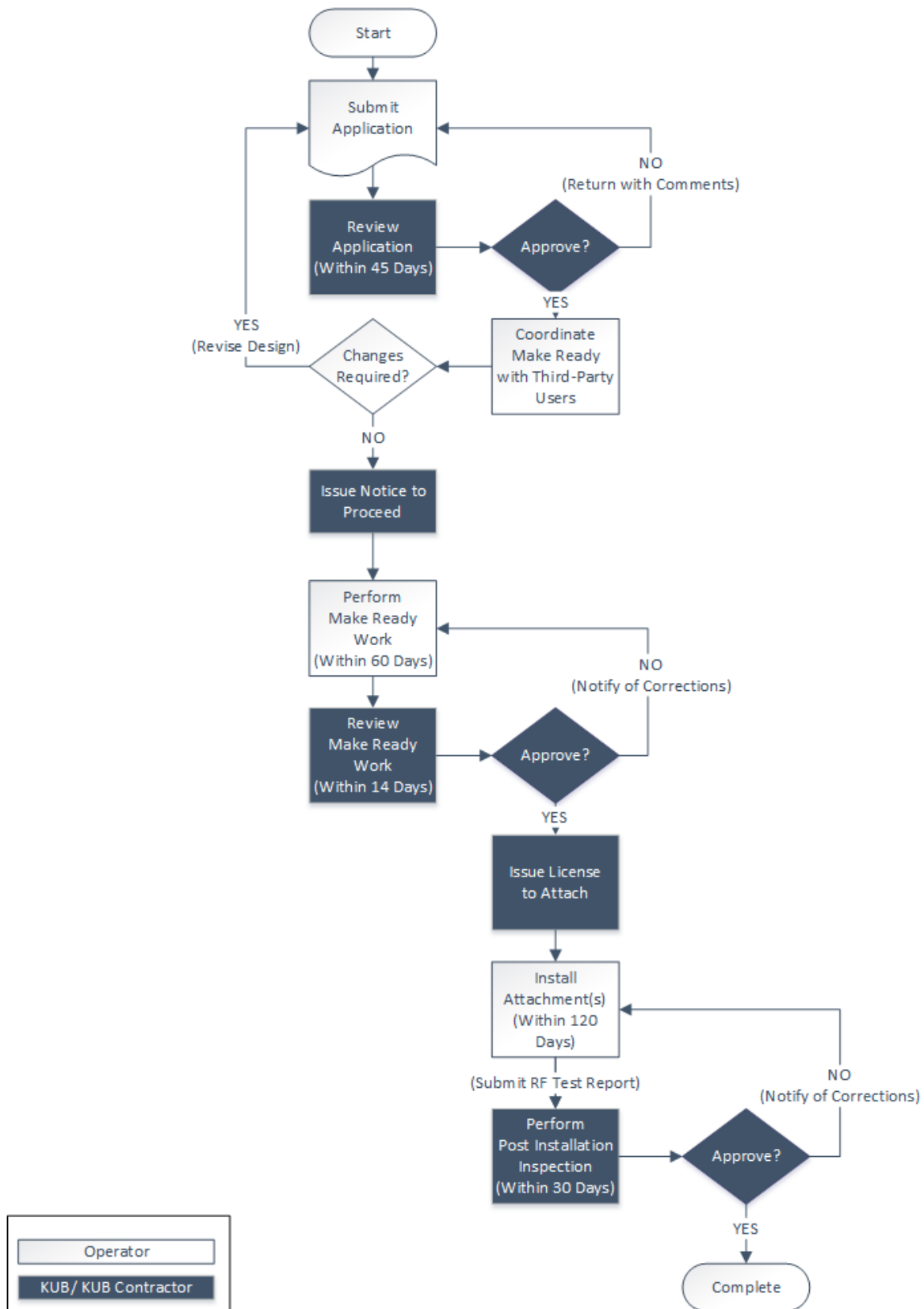


Figure 2.2 Wireless Attachment Process

2.3 Process Overview: Conduit Usage

Conduit usage refers to a single communications cable or other object/equipment occupying one (1) linear foot of a single conduit, duct, innerduct, or other enclosed structure in KUB's underground conduit system. The process for making conduit attachments is summarized below and illustrated in Figure 2.3.

Submit Application Package/Request Route Feasibility Study. The Operator shall submit an application package for the desired paths within the downtown network system, or other underground power conduit. The application package must include an Application Form, proposed route map and indicated destination points. KUB will then perform a Route Feasibility Study, indicating available conduit paths that would pass by the destinations requested, and provide a cost estimate for the Make Ready Work within forty-five (45) days. Applications can be for one continuous routing or divided between different routes but limited to a total of 10 city blocks or approximately 4000 linear feet. It should be understood the available path may differ from the proposed route first submitted by Operator. KUB will indicate available routing that best matches Operator's desires. Operator is free to construct their own conduit route after consultation and permission with the City of Knoxville.

Provide Payment for Make Ready. If the Operator approves the route and Make Ready estimate provided by KUB, they shall provide payment within fourteen (14) days. KUB will perform the necessary Make Ready Work within thirty (30) days of receipt of payment and will notify the Operator when Make Ready Work is complete. The License to attach will be issued at that time.

Complete Fiber Pull. KUB will reserve the necessary linear feet of one (1) one-inch (1") innerduct along the approved route for fourteen (14) days after the License is issued. If the Operator does not schedule installation within the specified time frame, KUB may reclaim the assigned space

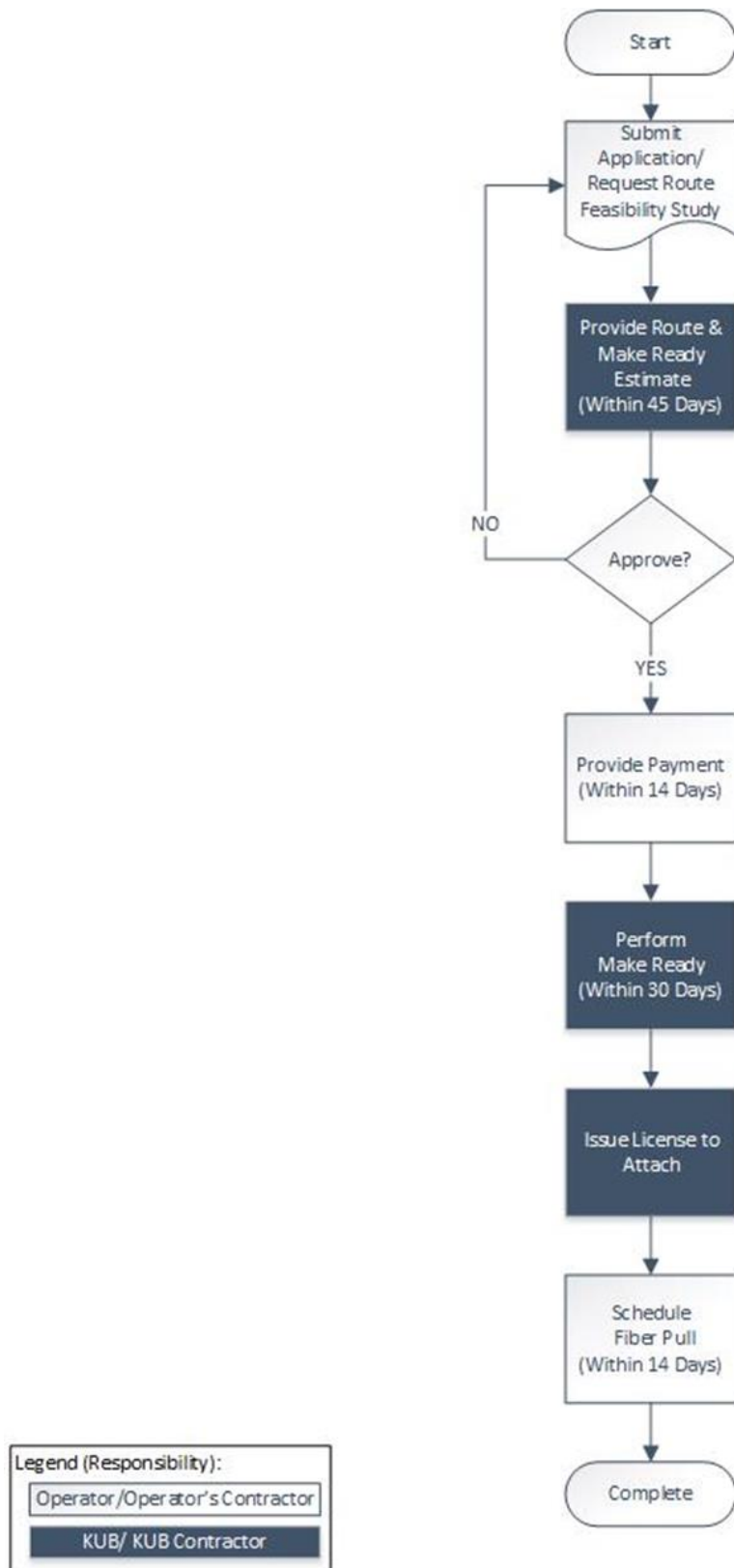


Figure 2.3 Conduit Attachment Process

2.4 Process Overview: Equipment Attachments

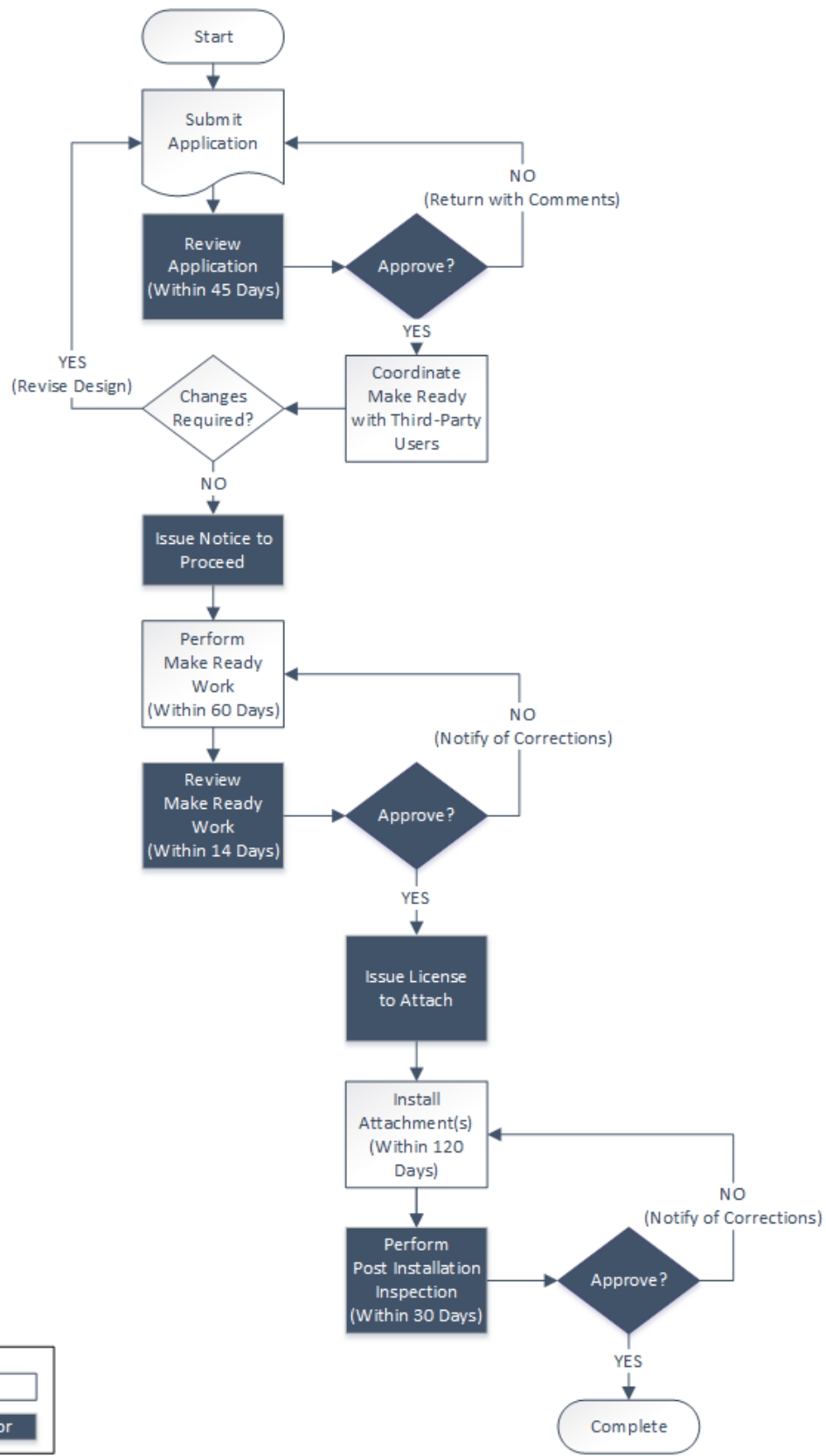
Equipment attachments are handled similarly to wireless attachments. This type of attachment refers to each individual power supply, amplifier, pedestal, banner, sign, streetlight, decoration, appliance or other single device or piece of equipment affixed to or contained in or around any unit of KUB Infrastructure. The process for making equipment attachments is summarized below and illustrated in Figure 2.4.

Submit Application Package. The Operator shall submit a completed application package for each equipment request. The application package must include a completed application form, location map, proposed Make Ready worksheet, pole loading analysis, and manufacturer specifications/design information for the proposed equipment and/or mounting hardware. The application is limited to twenty (20) attachments. KUB will review completed applications within forty-five (45) days of submittal. KUB will contact the Operator with the results of the application review. If not approved, the Operator must revise and re-submit the application. If the application is approved by KUB, the Operator may proceed with coordination with other affected Users. In providing its approval, KUB may present revised engineering for the Operator to consider.

Coordinate Make Ready with Existing Users. The Operator is responsible for coordinating the review of proposed Make Ready engineering on existing attachments with affected Users. If such review results in changes to the Make Ready engineering design, the Operator must resubmit the revised design for KUB review. If there are no changes to the approved Make Ready design, the Operator shall provide proof of acceptance by other Users and may only proceed with the approved Make Ready Work once KUB has issued a Notice to Proceed.

Perform Make Ready. The Operator shall perform all power Make Ready Work associated with the proposed attachment(s) and shall arrange for the execution of communication Make Ready Work. See Section 3.2 for more details on performing Make Ready Work. The Operator shall notify KUB once all Make Ready work is complete. KUB will inspect Make Ready work within fourteen (14) days of completion and contact the Operator with the results of the Make Ready Review. If the Make Ready Work is not approved, the Operator must make the necessary corrections within thirty (30) days. KUB will issue a License to attach upon approval of Make Ready Work. Until approval is obtained and a License issued, Operator cannot install any portion of the wireless installation on KUB facilities.

Install Attachment. KUB will reserve the approved location for the equipment attachment for sixty (60) days after the license is issued. If the Operator does not complete installation within the specified time frame, KUB may reclaim the assigned space. The Operator shall notify KUB once the attachment(s) have been installed. KUB may perform a post-installation inspection at their discretion within thirty (30) days of installation. Any unauthorized changes from the approved design will be brought to the Operator's attention, and they will have thirty (30) days to make necessary corrections.



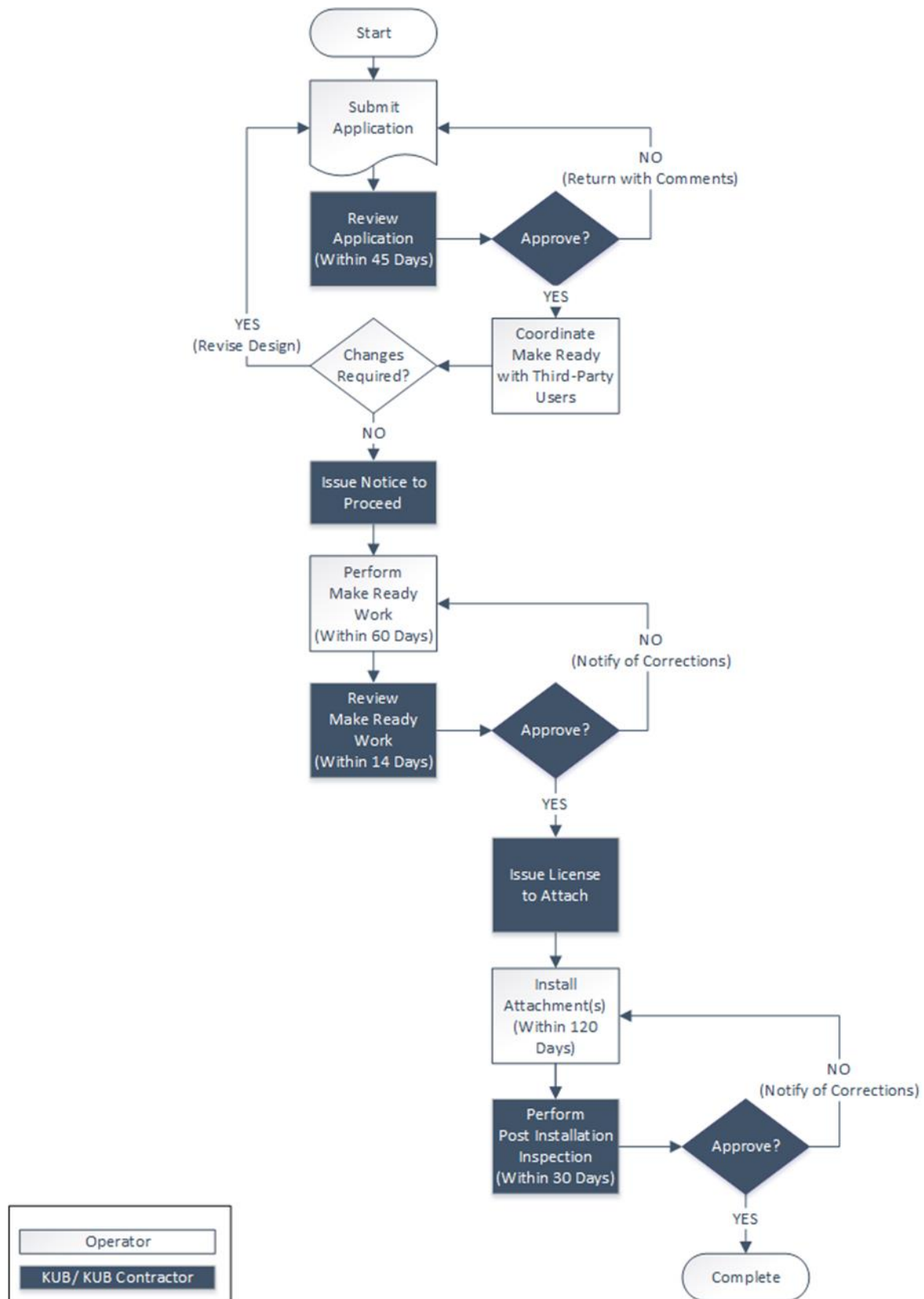


Figure 2.4 Equipment Attachment Process

3.0 ATTACHMENT PROCESS

3.1 Application

The Infrastructure Use Application is found at www.kub.org and must be filled out and submitted electronically along with any supporting documents. If desired, a copy of the application can be mailed to KUB along with any supporting documentation. Upon submittal and payment of the application fee, KUB will date and begin the forty-five (45) day review cycle. KUB may require additional review if multiple applications from the Operator are submitted within the same thirty (30) day period. Sequencing of application review will be discussed with the Operator prior to beginning review of any applications.

It is strongly advised that Operator review the entire contents of the Attachment Guidelines along with the information provided on the website before filling out the Application.

3.1.1 Application Instructions. This section allows the Operator to select the type of installation to view the fees and requirements prior to actually completing the Application Form. If all of the required files are not yet available, the Operator is advised to gather all required documentation before submitting the Application.

APPLICATION INSTRUCTIONS

Before submitting this application, please read [KUB's Attachment Guidelines](#). General information about the [KUB Infrastructure Attachment and Conduit Use Program](#) is also available. It is important that you use the **Fees & Requirements** panel below to:

1. Calculate the application fees that will be billed to you upon receipt of this application
2. See a list of required files that must accompany this application

The screenshot shows a web interface with a blue header bar containing 'Fees & Requirements' and a dropdown menu set to 'Conduit Use'. Below the header, the 'Conduit Use' section is active. It includes a sub-header 'Conduit Use' followed by a note: 'Application Fees will be billed upon receipt of this application:'. Below this, a bulleted list states '\$740 per 4,000 linear ft/10 city blocks (or any portion thereof)'. A second note states 'The following Required Files must be attached to this application:'. Below this, a numbered list includes '1. Proposed Route Map, including needed destination points'. To the right of this text is a dark blue box with the heading 'DESCRIPTION' and the text: 'Conduit Usage includes single communication cable or other object/equipment occupying one linear foot of single conduit, duct, innerduct, or other enclosed structure in KUB's underground conduit system.'

Figure 3.1 Application Instructions

3.1.2 Installation Information. Following the Application Instructions is the start of the Application form itself, beginning with Installation Information. Only one type of attachment can be applied for per form: Conduit, Equipment, Wired or Wireless. Information requested will change based on the attachment type. Each attachment type will ask for a General Project Location and the Project City. For projects that extend along a linear path, select a location that would apply for the project as a whole. Take time to include full route information or details about the application in the Additional Information area on the form.

Installation Information

ATTACHMENT TYPE *

☒ Conduit ☐ Equipment ☐ Wired ☐ Wireless

See Fees & Requirements panel above for a description of each Attachment Type

QUANTITY (FEET) *

GENERAL PROJECT LOCATION *

PROJECT CITY *

ADDITIONAL INFORMATION *

Figure 3.2 Installation Information

Attachment Type. Each application is limited to one type of the following attachments:

- Conduit Attachment
- Equipment Attachment (Amplifier, Banner Arm, Camera, Decoration, Pedestal, Power Supply, School Flasher, Sign, Street Light, Traffic Antenna, Traffic Control Flashing Light, Traffic Signal, Wired Repeater, or Other Single Piece of Equipment not part of a Wireless System)
- Wired Attachment
- Wireless Attachment

If your installation does not fit one of these categories, please contact KUB for further instructions.

The number of attachments allowed per application is limited to:

- Fifty (50) per Wired Attachment application.
- One (1) wireless attachment per Wireless Attachment application.
- Ten (10) blocks/pulls or 4,000 feet of cable per Conduit Attachment application.
- Single piece of equipment or appliance for each Equipment Attachment, or twenty (20) streetlights, traffic signal, banners, signs, or decorations for each Equipment Attachment.

3.1.3 File Attachments. Next is the tab to attach the required files/documentation. Please add all files requested or the application will be delayed in being processed. There is no limit to the quantity or size of files. If file attachments cannot be attached, please send hard copies along with a hard copy of the application to KUB. Some of the information required include:

Route Map. The route map should clearly show city name, street names, and reference point locations that correspond with the locations of the requested attachments. For wired, wireless or equipment attachments, the route map must clearly identify each structure to which the Operator is proposing to attach. This should easily match with facility identifies shown on the Make

Ready Worksheet. For conduit attachments, the route map must identify the entry and exit points, as well as the locations of all penetrations into/out of the KUB Conduit System along that route. This information will be used by KUB for its Feasibility Study.

Make Ready Worksheet. For wired and wireless attachments, the Operator must submit a Make Ready Worksheet on the template provided by KUB on our website and must be attached with the Application Form. All fields in the Make Ready Worksheet must be filled out, as described below:

- **Pole ID #.** Sequential number, starting with 1, that corresponds to the route map.
- **Pole Address.** The nearest street address to the pole.
- **Tag #.** KUB pole numbers, any other identifying information marked on the pole, or none.
- **Pole Type, Height, & Class.** The pole type may be wood, ductile iron, steel, or composite, and must be a minimum Class 3. The pole height must be noted in feet.
- **Company.** The owner of the Pole/Facility which contains KUB Facilities (KUB, AT&T, TDS, Frontier).
- **Attachment Item.** Attachment items may include Secondary, Neutral, Transformer, Riser, Cable, Cable drop, Streetlight, or Guy.
- **Attachment Height.** Existing attachment height in feet and inches (e.g. 20' 2")
- **Action Required.** The requested direction and the distance (e.g. Raise 12" or Lower 20") of existing attachment(s) to make room for proposed attachment.
- **Proposed Attachment Height.** Proposed attachment height in feet and inches.
- **Pole Condition.** The structural condition of the pole (holes, rot damage, cracking, etc.).
- **Tree Trimming Required.** If tree trimming is required, describe the need. Operator shall provide for their own tree trimming, vine removal, etc.
- **Comments.** Document any Make Ready Work needed (e.g. replace pole, tree trimming, re-sag duplex, span guy, or verify clearance) or existing violation(s) of the Applicable Standards that must be corrected prior to installing the proposed attachment.

Pole Load Analysis. The Operator must submit a Pole Load Analysis for wireless attachments, wired attachments involving overlashing that creates a 2" or greater overall cable diameter, or as directed by KUB. The Pole Load Analysis must be signed and sealed by a professional engineer, registered in Tennessee, certifying the Operator's attachments fully complies with all Applicable Standards. The certification shall include confirmation the design is in accordance with NESC pole strength requirements. Loading criteria shall consider NESC Rule 250B, Medium Loading District, Grade 'N' construction. Operator is not required to include loading contributed by existing cables on the structure. Operator's loading will be analyzed by KUB along with other existing pole loading to determine if the structure can support the proposed attachment. Operator will be notified if a structure changeout is required, which will be done at Operator's expense. KUB presently uses PLS-CADD to perform all pole loading calculations.

Private Property Permissions. The Operator is solely responsible for obtaining consent, where necessary, from private property owners. At a minimum, the Operator shall obtain written permission from all private property owners when work related to the application results in anchors, poles, attachments, or other facilities to be located on or crossing private property.

KUB does not provide property rights from property owners, municipalities, or other rights-of-way owners and will not obtain or negotiate property rights on behalf of the Operator.

Permits. The Operator is responsible for obtaining all permits required for attachment installations involving City, County, and/or State road rights-of-way or property owned by others such as TVA or railroad companies.

Specifications. Manufacturer specifications (including typical attachment drawings) and design information for proposed wireless antenna equipment and mounting hardware.

Maximum Permissible Exposure Report and/or Intermodulation Test Report.

Documentation that all RF emissions comply with Applicable Standards governing RF exposure levels.

Technical Data. Technical data on fiber optic cable as guide for KUB handling inside KUB facilities (minimum bending radius, maximum pulling tension, etc.)

Pictures. For certain installation, such as a wireless or traffic signal, pictures or photo renderings of the potential final installation can assist KUB in their review.

3.1.4 Project Information. The Project Information section allows the Operator to select the Company Name who will be responsible for the attachment, along with a name for the Project. For single location installations such as a Wireless Attachment, this name may simply be an address. If the Operator's name is not available from the drop-down list, click on Write In Company to manual insert Operator's name.

3.1.5 Contact Information. In this section, KUB requires contact information on someone who has direct knowledge of the project, and who would provide additional information about the application, project site, Make Ready efforts, and actual installation.

Contact Information

FIRST NAME *

LAST NAME *

PHONE *

E-MAIL ADDRESS *

Figure 3.3 Contact Information

First Name/Last Name. Name of a person familiar with the indicated project and can answer questions from KUB on installation matters.

Phone. The phone number where KUB may reach the Operator during regular business hours

E-Mail Address. A valid, monitored account where all communication and billing, including engineering and make ready, can be received.

3.1.6 Mailing Information. This section requires the Operator to enter a physical address where all communication and billing, including engineering and Make Ready issues, can be received.

Once all information is entered and files attached, the form may be submitted.

3.1.7 Payment. As part of executing an IUA with KUB, the Operator will have an online account created to allow for management of fees. After submitting the Application, Operator can go online to www.kub.org and click on Pay My Bill. After logging in, Operator will be able to access their account and submit payment online in the amount required per the Application submitted. Once payment has been received and tied to the Application, KUB will begin its review process.

3.1.8 Application Review. KUB will review the completed application package within forty-five (45) days upon receipt. The review time may be longer if multiple applications are submitted within a thirty (30) day period from the same Operator. If there are any issues with the proposed Make Ready Engineering, KUB will contact the Operator to discuss. If there are no issues, KUB will complete the review and notify the Operator the proposed power and/or communication Make Ready Work necessary to accommodate the attachments are approved, along with any recommended modifications to the Operator's description and proposed adjustments to any individual piece of KUB Facilities.

For attachments within the underground conduit system, KUB will provide an estimate of the total cost for labor, materials, equipment, and permitting required to accommodate Operator's request. Operator will have fourteen (14) days to review this estimate and either accept or reject it. If accepted, KUB will process with Make Ready Work as outlined in Section 2.3.

Following KUB review of the application, the Operator must contact existing Users, if applicable, to gain their approval of proposed relocation of communication facilities. If modifications to the approved Make Ready worksheet are made because of interactions with existing Users, the Operator must re-submit the revised application to KUB for review and approval. If there are no changes to the Make Ready design, the Operator shall provide KUB will proof of acceptance of the proposed Make Ready Engineering by each affected party. Once all affected Users have provided approval, KUB will issue a Notice to Proceed with the Make Ready Work. This does NOT allow the Operator to begin making attachments to KUB facilities.

3.1.9 Obtain Permits. Where attaching installations involve property owned by other such as Army Corp of Engineers, TVA or railroad companies, KUB recommends the Operator contact the appropriate authorities early in their planning process. The Operator will be required to submit copies of the following permits (if required) before a License can be finalized:

- TDOT permits: <http://www.tdot.state.tn.us/environement/permits/waterquality.htm>

- US Army Corps of Engineer permits:
<http://www.lrn.usace.army.mil/Missions/Regulatory/ObtainPermit.aspx>
- Railroad Crossing Permits (CSX):
http://www.csx.com/fuseaction=about.property_corridor
- TVA Crossing Permits: <http://www.tva.com/river/26apermits/howto.htm>

In addition, the Operator shall obtain written permission from all private property owners when work related to the Application results in anchors, poles, attachments or other facilities to be located on or crossing their private property.

3.2 Make Ready Work

Make Ready Work may include, but is not limited to, all administrative work, engineering work, inspection, design, planning, construction, permitting, tree trimming (other than tree trimming performed for normal maintenance purposes), or other work reasonably necessary to prepare for the installation of Operator's attachments to KUB Infrastructure, including without limitation, work related to transfers, rearrangements and replacement of existing poles or other infrastructure, and the addition of new Infrastructure, and the rearrangement of existing User attachments. More information on Make Ready Work is found in Section 4 of these Guidelines.

KUB poles have a Power Supply Space, Communication Worker Safety Zone, Communication Space, and Support Space as illustrated in Figure 3.4. The requirements vary depending on the Make Ready Work to be performed in each separate space, as described in the following sections.

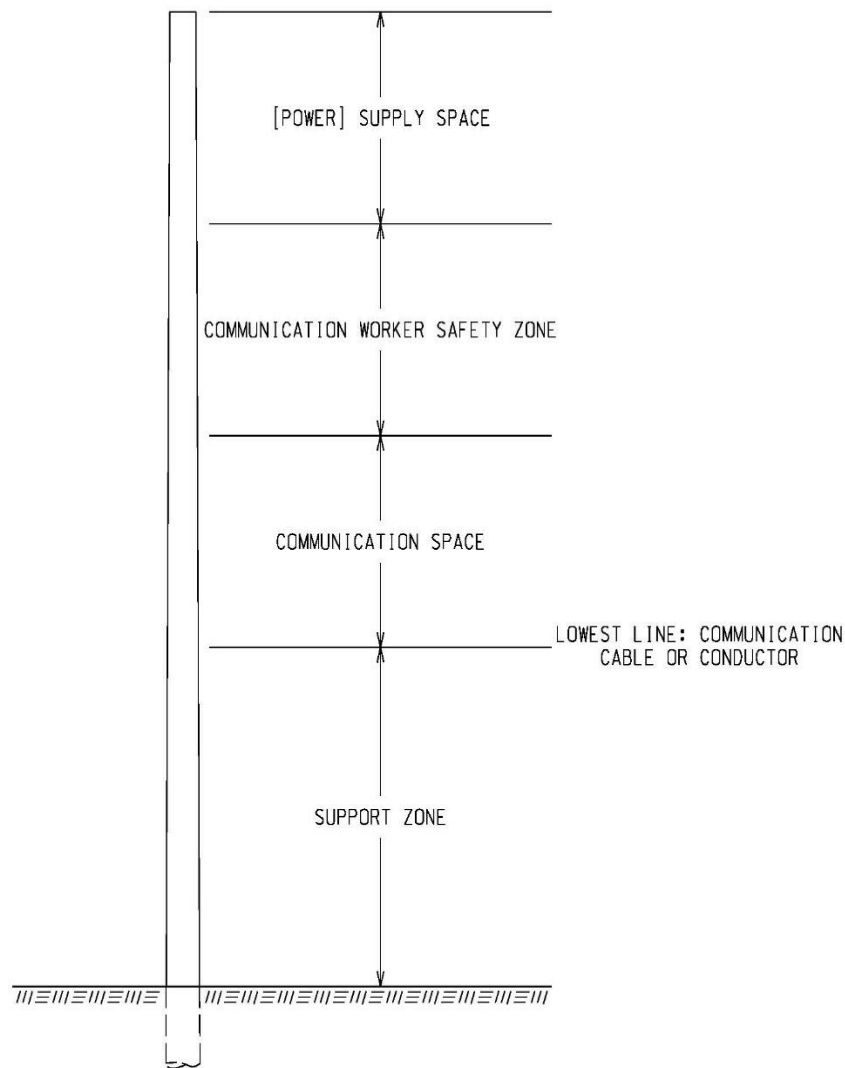


Figure 3.4 Work Zones on KUB Poles

Power Make Ready Work. Power Make Ready Work refers to all work performed within or above the power supply space and includes KUB-owned pole replacement. Power Make Ready for poles must be performed by KUB-authorized contractors and will not be performed by KUB crews. The KUB-authorized contractors are specially trained electrical linemen with the skillset to work with and around electrical wires in the electric supply Space. A list of approved KUB-authorized contractors is available from KUB Procurement.

If a taller or stronger pole is required to accommodate Operator's proposed attachments per the Applicable Standards, the Operator will contract and pay for the efforts of a KUB-authorized contractor to perform the work which will include all replacement of associated materials and equipment, including but not limited to crossarms, cut-outs, insulators, jumpers, nuts, bolts, washers, etc. KUB will provide, at Operator's cost, all poles and power supply material needed for a pole replacement. If an existing pole is marked as defective KUB will replace the pole with one that can accommodate all existing and proposed attachments without cost to the Operator.

Communication Make Ready Work. Communication Make Ready Work refers to all work performed within the Communication Space and Support Space, including installation of equipment, guys, and anchors, and rearrangement of existing attachments.

The rearrangement of communication attachments must be performed by the existing Users at the Operator's expense. The Operator is responsible for coordinating communication Make Ready Work with the appropriate Users. KUB will not re-arrange or re-locate any attachments or other facilities owned or operated by third parties on its facilities to accommodate placement of any new attachment.

Conduit Make Ready Work. Conduit Make Ready Work refers to all work required within the KUB underground conduit system to allow for installation of Operator's facilities. Only KUB personnel are permitted to access KUB facilities (manholes, vaults, and concrete-encased duct banks). KUB will use good faith efforts to complete conduit Make Ready within thirty (30) days of receipt of Operator's approval of the Make Ready estimate. If there are extenuating circumstances that make the necessary Make Ready more complicated or time-consuming, including, but not limited to, seasonal weather conditions, KUB shall identify those factors in the Make Ready description and cost estimate and the parties shall agree upon a reasonable timeframe for completion. KUB shall issue a License to attach once Make Ready Work has been completed.

Quality of Make Ready Work. All work performed on KUB-owned facilities shall be completed per the Applicable Standards. This includes proper material, installation techniques, spacing between all attachment points, and general methods. If Make Ready Work is not approved by KUB, Operator shall be notified and shall have thirty (30) days to take corrective actions.

Completion of Make Ready Work. For wired, wireless, and equipment attachments, the Operator shall notify KUB when all Make Ready efforts are complete. Upon successful inspection of the Make Ready work, KUB will grant the Operator a revocable, nonexclusive License, thus authorizing the Operator to install the approved attachment(s).

3.3 Attachment Installation

Once a License is issued and only when the License is issued, Operator may install its facilities in accordance with the approved Application and Applicable Standards. All the Operator's installation work, by either the Operator's employees or contractors, shall be performed at the Operator's sole cost, in a good and workmanlike manner, and shall not adversely affect the structural integrity of KUB Infrastructure or other Users' facilities or equipment. The Operator shall assure that any person installing, maintaining, or removing its facilities is fully qualified and familiar with all Applicable Standards, including standards for working in the Supply Space. For conduit attachments, KUB shall perform all installation work within the conduit system with assistance from the Operator, and Operator shall pay all costs associated with this installation.

The Operator shall secure all required permits and licenses required from City/County authorities while performing work in the field on KUB Infrastructure.

At all times during their construction activities on KUB Infrastructure, Operator should adhere to the following:

- When installing or maintaining its facilities, the Operator's construction crews, whether employees or contractors, must present the License if requested in the field.
- Communication cables must be properly guyed and anchored before tensioning. This means the Operator must install separate guying and anchoring devices to secure their cables.
- On existing steel or concrete poles, use banding or existing holes. No new holes shall be drilled.
- New wired attachments should typically overbuild existing wired attachments, while satisfying all Applicable Standards.
- All equipment associated with a wireless attachment installation shall be banded, not bolted, to the pole.

Upon installation of all attachment(s) authorized by the License, the Operator must notify KUB at attachments@kub.org.

3.4 Post-Installation Inspection

Within thirty (30) days of notice to KUB that Operator has completed installation of an attachment (including overlash, riser attachments, and/or service drops), KUB may perform a Post-Installation Inspection for each attachment made to KUB Infrastructure. If KUB elects to not perform any Post-Installation Inspection, such non-inspection shall not be grounds for any liability being imposed upon KUB or a waiver of any liability of the Operator.

KUB will notify Operator if the Post-Installation Inspection reveals the Operator's facilities have been installed in violation of Applicable Standards or the approved design. The Operator shall have thirty (30) days from the date of receipt of such notice to correct such violations. KUB may perform subsequent Post-Installation Inspections once the correction has been made to ensure Operator's attachments have been brought into compliance. The Operator shall pay the actual and documented costs for the initial and any subsequent post-installation inspections.

KUB will provide notice of the continuing violation if the Operator's attachments remain out of compliance with Applicable Standards or approved design after any subsequent inspection. The Operator will have thirty (30) days from receipt of such notice to correct the violation. If the violation is not brought into compliance within thirty (30) days, it will be considered an Unauthorized Attachment.

3.5 Unauthorized Attachments

If any of the Operator's facilities are found occupying any portion of the KUB Infrastructure for which no License has been issued or remains in violation of Applicable Standards after thirty (30) days of receipt of notice from KUB of the violation, the attachment shall be deemed an Unauthorized Attachment. This shall include any attachment KUB may have reason to believe was deliberately installed in knowing violation of Applicable Standards.

The Operator shall pay back rent for all Unauthorized Attachments for a period of five (5) years, or since the date of the last inventory of Operator's Facilities conducted by KUB (whichever is shortest), at the rental rate in effect during such periods. In addition to back rent, where post-construction notification was required but not provided, where Operator deliberately installed in knowing violation of Applicable Standards, or refused to correct violations as directed by KUB, the Operator shall be subject to penalties as specified within the Infrastructure Use Agreement for each Unauthorized Attachment.

If the Operator fails to submit an application for such Unauthorized Attachments as directed within the Infrastructure Use Agreement or fails to resolve the violation to the satisfaction of KUB, the Operator's facilities shall be subject to removal per the terms of the Infrastructure Use Agreement.

4.0 CONSTRUCTION GUIDELINES

KUB poles and other facilities are part of an overall electrical power supply system. The power lines attached to poles should always be presumed energized. All persons, including the Operator's employees and contractors, must exercise caution and take all reasonable precautions to avoid personal injury or property damage when working on or near electric utility poles and/or near the Supply Space. KUB employees and approved contractors are trained to perform their jobs safely by adhering to OSHA safety requirements and all Applicable Standards. Refer to the most recent edition of the NESC; including but not limited to, Part 4 Work Rules for the Operation of Electric Supply and Communication Lines and Equipment; Section 41 – Supply and Communication Systems – Rules for Employers; Subsection 411E – Identification and Location.



Figure 4.1 Typical KUB Pole with Multiple Users Attached

4.1 General Requirements

Authorized Contractors. Operator shall only use authorized, qualified contractors approved by KUB to conduct Make Ready Work (or any other work) in or around the Power Supply Space on a pole. Other Users may specify their own authorized contractors to perform Make Ready Work in the Communication Space.

Climbing Space. A clear climbing space must always be maintained on the face of the pole. All attachments must be placed to allow and maintain a clear and proper climbing space on the face of the utility pole. Operator's cable/wire attachments shall be placed on the same side of the pole as those of other attaching entities and should not be mounted as to "box-in" the pole. In general, all other attachments and risers should be placed on pole quarter faces and oriented to not interfere with power supply equipment such as switch operating handles.

Communication Cables. All communications cables/wires not owned by KUB shall be attached within the Communications Space as defined by the NESC. Communications cables must be designed for installation as low to the ground as practical but should match sag of existing cables within the Communications Space. Communication cables shall be sagged to meet proper vertical separation mid-span, shall not be attached to the opposite side of the pole from other communication cables, and shall not cross over adjoining cables.

Horizontal Extension Arms. Operator shall not use horizontal extension arms.

Mid-Span Connections. No mid-span connections of any type are allowed. Service drops should be made at the pole.

Notifications. For notices about work on KUB Facilities, the Operator shall notify KUB via e-mail at attachments@kub.org and include the Operator's Company, License/Application Number, Action, and Date in the subject line (e.g. AT&T, License #18-ATT0004, Service Drop Installation on 2/21/17). Notifications may include, but are not limited to, the following:

- Changes to KUB-approved Make Ready design based on feedback from other Users
- Completion of Communication Make Ready Work
- At least twenty-four (24) hours prior to installing service drops, overlashing, and communication riser attachments
- Within thirty (30) days of installing wired and/or wireless attachments
- Identification of violations
- Completion of corrective actions

Pedestals, Vaults, and Enclosures. If required, every effort should be made to install pedestals, vaults, and/or enclosures at a minimum of four (4) feet from poles or other utility facilities. The installation of ground-mounted pedestals, vaults, and other enclosures within road rights-of-way shall be coordinated with the controlling entity.

Pole Replacements. At the Operator's request, an existing pole may be replaced with a taller or stronger pole to accommodate an attachment. The Operator shall pay the actual and documented cost of the pole replacement including but not limited to all labor and material for the pole and

associated materials and equipment, whether incurred by KUB forces or contract forces employed by the Operator. KUB, at its own cost, will replace a pole that is determined to be defective or overloaded (without consideration of Operator's proposed attachment), provided the Communications Space on the existing pole could have been arranged with sufficient spacing to accommodate the Operator's proposed attachments. Poles that have been marked with an Osmose tag (single/double white, metal tag) shall be replaced at KUB's cost. Primary riser poles and gang-operated switch poles shall always be replaced with a non-wood pole.

Protection. While work is performed around any part of the KUB system, whether overhead or underground and while equipment or personnel will be located in the streets, alleys, highways, or other public rights-of-way granted to KUB or other municipal or county authorities, the protection of persons and property shall be provided by the Operator. The Operator shall be solely responsible for providing adequate barricades, warning lights, traffic cones, danger signs, and other similar devices to protect all traffic, persons, and property around the work area from danger. The Operator further agrees to comply with all safety laws, regulations, ordinances, and statutes pertaining to the Work to be performed and the tools and equipment used to accomplish such work, and to bear the sole responsibility for compliance therewith by its employees, agents, and/or contractors.

Vertical Extension Arms. In all cases, the Operator shall endeavor to make direct attachment to the pole and shall not use vertical extension arms or extensions of any type to hold the cable out and away from the structure. If direct attachment cannot be achieved, Operator shall consult with KUB Infrastructure Use Team for possible remedies.

4.2 Tagging Requirements

Each Operator shall install identification tags on all its attachments, overlying, and/or wireless equipment at the time of installation. Communication cables must be identified by tagging every cable at every pole and every conduit entry and exit point. Cable shall be tagged at the time of installation, and Operators should make tagging an ongoing effort and work toward completing tagging of all existing cables not currently tagged.

Tags. All tags shall:

- Be secured to remain permanently affixed to the attaching company's cable or equipment.
- Be resistant to fading from the effects of weather, chemicals, etc.
- Clearly indicate the name of the Operator along with a contact number on a colored tag. Characters shall be no less than one (1) inch and no greater than two (2) inch in height.
- Avoid the use of sharp edges and corners to prevent injury to personnel and damage to cables.
- Markers should be affixed close to the point of attachment.
- Multiple attachments on same pole shall be marked separately.
- Be located as close to the physical attachment as possible and be easily identified from the ground.

Identification Code. Each Operator shall have a unique colored tag assigned to their cable. The Operator will work with KUB to determine the color scheme to clearly differentiate their facilities from other Users.

Tagging for Conduit Attachments. The Operator's cable(s) shall be permanently identified by tags at each manhole or other access opening in the Network or conduit system. Tags shall be of a type and wording reasonably satisfactory to KUB and consistent with the guidelines given above. All cost of this identification shall be the responsibility of the Operator.

4.3 Clearance Requirements

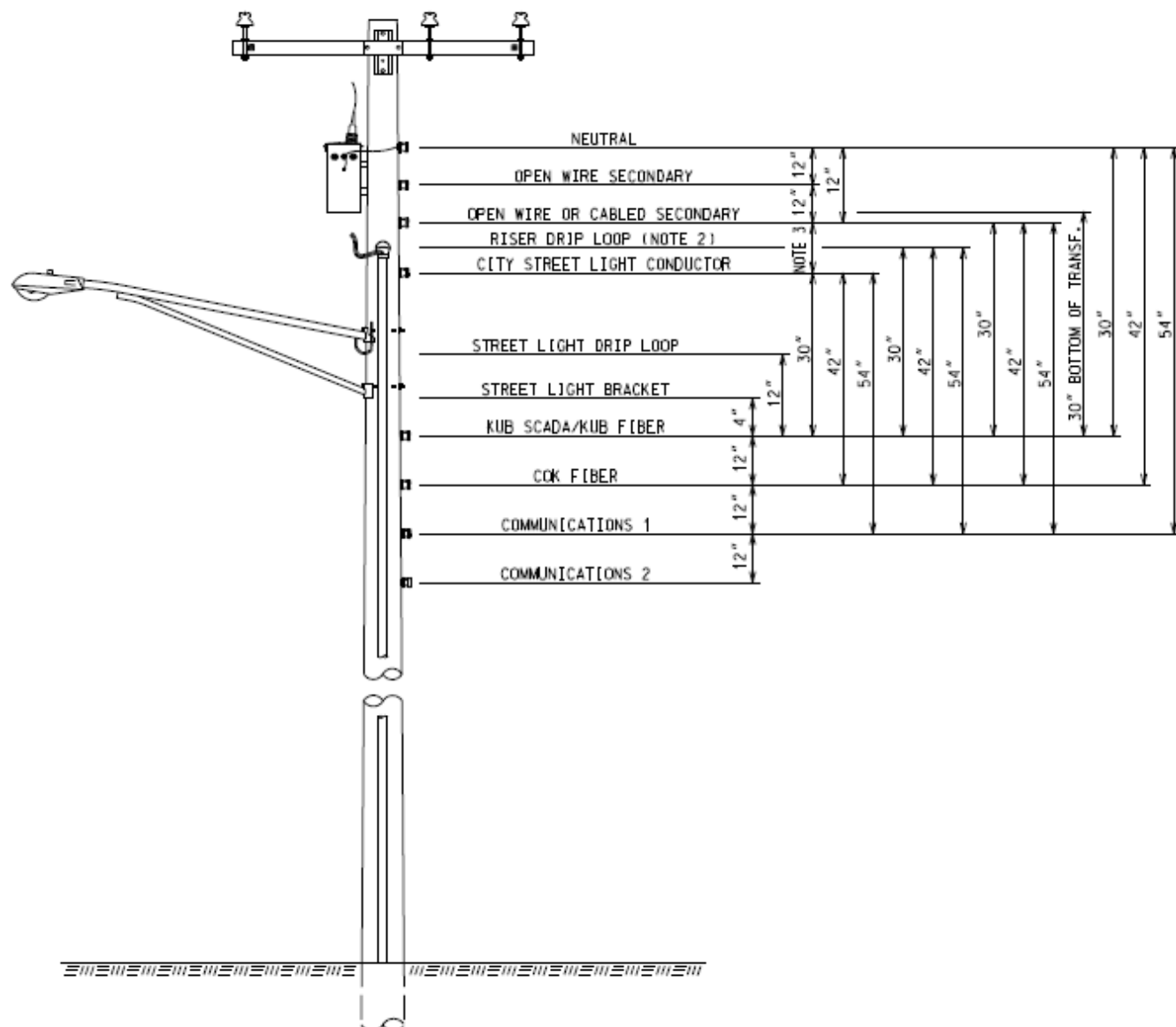
Attachment Clearances. On poles, attachments should be installed as low as possible. Operator's attachments on KUB poles, including metal attachment clamps and bolts, metal cross-arm supports, bolts, bands and straps, and other equipment, must be attached to maintain the minimum separations specified in the NESC and KUB Clearance Standards.

Cable Clearances. All requirements for vertical clearances of wires, conductors, and cable are based on NESC Rule 232. It is the responsibility of the Operator to ensure that all installations meet or exceed the requirements listed in the NESC or KUB Standards. In some situations, KUB requirements may exceed the NESC requirements as shown in Figure 4.2. Of note, the Communication Worker Safety Zone shall be 54" on poles located within the city limits of Knoxville. The same zone shall be 42" for all other areas. Note that all clearance requirements are based on worst-case sag conditions, which are significantly affected by weather.

Placement on Pole. Communication cables must be installed on the same side of poles (typically the road side) as other attachments. In the absence of any existing installations, cables shall be installed on the same side of the pole as the power neutral conductor assembly. Cables placed opposite existing attachments will trap the pole and shall be considered Unauthorized Attachments.

Sag and Mid-Span Clearances. Operator will leave proper sag in its lines and cables and shall observe the established sag of power line conductors and other cables so that minimum clearances are (1) achieved at poles located on both ends of the span; and (2) retained throughout the span. At mid-span, a minimum of twelve (12) inches of separation must be maintained between all communication cables that meet NESC Rule 230E1 (includes common phone, CATV, and fiber optic cables lashed to an effectively grounded messenger strand, or self-supporting cables).

Streetlighting. For streetlights installed, owned and maintained by KUB, KUB shall determine the required clearances if Make Ready Work is required on the streetlight. For streetlights installed, owned and maintained by others, the streetlight and any User-owned power supply conductor for that streetlight must maintain a minimum of sixteen (16) inches separation to KUB facilities in the power supply space. Note that conductors feeding streetlights, even if owned by another entity, are still considered power conductors and shall be considered part of the power supply space.



NOTES:

1. THE LATEST EDITION OF THE NATIONAL ELECTRICAL SAFETY CODE (NEC) CLEARANCES ARE TO BE CONSIDERED AS THE MINIMUM.
2. FOR TRAFFIC SIGNAL SYSTEMS CLEARANCES, CONSULT THE NEC AND LOCAL AUTHORITIES.
3. CITY STREET LIGHT CONDUCTOR (INCLUDING DRIP LOOP) IS TO BE 16" BELOW SECONDARY CONDUCTOR, THE TOP OF SECONDARY SUPPLY RISERS, OR OTHER KUB FACILITIES ALSO IN THE SUPPLY SPACE (WHICHEVER IS LOWER).
4. INCLUDES THE TOP OF PRIMARY AND SECONDARY RISERS, AND DRIP LOOP (WHICHEVER IS LOWER).

Figure 4.2 KUB Standard Minimum Clearances at Pole

4.4 Overlash Requirements

Overlash Attachment. Operators seeking to overlash to their own wires or cables are required to submit a complete pole-loading analysis and perform necessary Make Ready Work. Under no circumstances may an Operator overlash to KUB or another User's cables. The Owner of the supporting cable is responsible for all conditions the overlash creates.

Overlash Application. If the proposed overlash attachment is less than two (2) inches in diameter, there is no application required, but if requested the Operator must provide KUB the loading analysis to show the additional cable load will not adversely affect KUB Facilities. If the overlash attachment is greater than two (2) inches in diameter, the Operator must submit an application and follow the process for a wired attachment including submitting loading analysis for all overlash facilities. There is no fee for this excessive overlash, but overlash does require the payment of any Make Ready Work that may be necessary to accommodate and inspect the overlash facilities.

4.5 Service Drop Requirements

Service Drop. The Operator shall have the right to attach service drop cables extending from an existing supply line to the new customer's premises for the sole purpose of providing new service to a new customer. Service drops between poles containing other communication cables must be lashed, bound, or bundled, although no messenger strand is needed, in order to maintain proper clearances. Cables must be tagged at the service drop.

Service Drop Application. If the service drop originates at a licensed attachment and extends to one additional service pole, the Operator must notify KUB at least twenty-four (24) hours prior to making the attachment but there is no application required. If the service drop is attached to two or more poles past its origin, the Operator must submit an application and follow the process for a wired attachment.

Service Drop Clearances. The parallel minimum separation between power service conductors and communications service drops from the pole to the home/building shall be no less than twelve (12) inches.

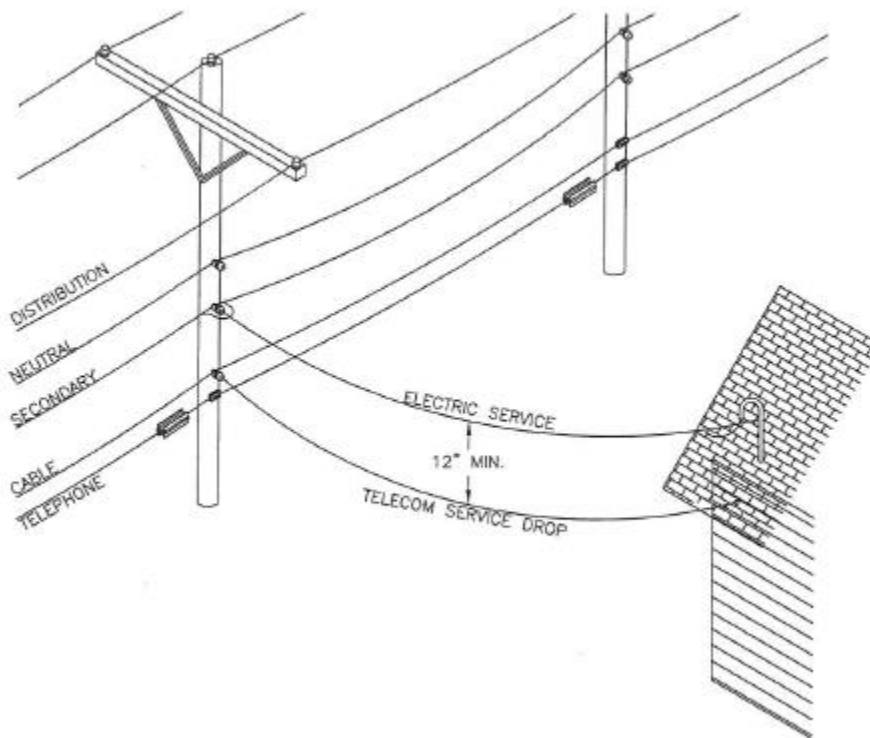


Figure 4.3 Service Drop

4.6 Riser Requirements

This section addresses both power risers and communication risers. Power risers contain power supply cables that bring the electric supply feed to the meter. Communication risers are conduits that contain only communication cables.

Communication Riser. A communication riser may only be installed on a pole where the Operator has a licensed attachment. The Operator must notify KUB at least twenty-four (24) hours prior to installing the riser but there is no application required. If the communication riser is attached where no licensed attachment already exists for that Operator, the Operator must submit an application and follow the process for a wired attachment prior to installing the riser.

Conduit Dimensions. Conduit for power or communication risers shall not exceed two (2) inches in diameter without approval. All conduits shall be mounted on the face of the pole. The maximum number of conduits allowed on the pole shall be four 2" conduits.

Conduit Clearance. A two (2) inch clearance in any direction from cable, bolts, clamps, metal supports, and other equipment shall be maintained.

Above-Ground Risers for Communications. All above-ground wires, communication cables, and connections shall be installed in conduit, U-guard, or otherwise protected, painted gray, and placed on the same side of the pole.

Underground Risers. Underground risers placed underneath paved surfaces such as roadways or driveways or within tree wells must be enclosed in SCH 80 PVC or in rigid metal conduit. All other underground Must be SCH 80 PVC or encased in concrete. Operators can work with KUB on special situations.

Power Supply Riser. The supply conduit cannot go through the equipment cabinet and must run directly from the electric supply to the meter base, which shall be provided by the Operator. Meter shall be mounted five-foot six inches (5'-6") from ground level and shall not face the street, alley, or property side of the facility. The power riser shall extend past the Communication Workers Safety Zone and into the Power Supply Space, such that the power supply drip loop is located at least fifty-four (54) inches above the Communication Space.

Stand-Off Bracket. In order to provide safe climbing space on pole, power supply risers cannot be attached directly to poles. All conduits shall be installed on Alumaform standoffs with Alumaform 2-way T-slot extrusion. A minimum of four (4) are required for each riser or group of risers. There shall be a maximum of four (4) risers of all types allowed on any one riser pole. New risers added may be installed on existing or new standoff brackets.

4.7 Grounding and Bonding Requirements

Bonding. All parts of the attachment on the pole shall be bonded together and grounded. If bond wire is unsupported more than twelve (12) inches long, properly fasten to wood or concrete pole or bond to metal pole using appropriate connectors. All grounding and bonding shall be per NEC Article 250.

Grounding. Operator shall bond to KUB ground wherever one is in existence on the pole or other facility. If the ground is under a metal U-guard, contact KUB to make ground connection. If no pole ground exists, install a ground wire or bond to the existing grounding metal facility. In no case shall ground wire be connected to guys or anchors.

Ground Wire. A copper ground wire, number six (#6) minimum size, shall be installed from the base or feedline of the connection point to a ground rod at the base of the pole. The ground wire shall be located on the same face of the pole and run adjacent to the communication riser.

Ground Rod. A ground rod, eight (8) feet minimum in length, shall be driven into undisturbed soil at the base of the pole. The ground wire shall be permanently connected to the ground rod. The top of the ground rod shall be at least six (6) inches below grade and twelve (12) inches from the face of the pole. A second ground rod shall be installed in a similar manner a minimum of six (6) feet from the first rod.

4.8 Guy and Anchor Requirements

The Operator shall be responsible for procuring and installing all guy wires and anchors necessary to properly support the additional stress placed on KUB facilities by Operator's attachments. The Operator is responsible for the costs of any damage to KUB facilities resulting from improper guying, anchoring, and /or loading.

Guys and Anchors. Guy wires and anchors must be set on each pole where there is a turn or angle and on all dead-end poles to support any unbalanced loads caused by Operator's attachments. Operator shall make guy attachments to KUB facilities at or just below its licensed attachment. No attachment shall be installed on a KUB pole until all required guys and anchors are installed, nor shall any attachment be modified or relocated in such a way that will materially increase the stress or loading on poles until all required guys and anchors are installed. Operator is responsible for the costs of any damage to KUB Facilities or any others resulting from improper guying, anchoring, and/or loading.

Grounded Guys. Operator's down guys shall not be bonded to the ground or neutral wires of KUB poles and shall not provide a current path to ground from the ground or neutral wires. KUB will determine if guys should be grounded or insulated.

Insulated Guys. Operator's guys that pass within twelve (12) inches of supply conductors, and also pass within twelve (12) inches of communication cables, shall be protected with a suitable insulating covering where the guy wire passes by other conductors, unless the guy is effectively grounded or insulated with a strain insulator at a point below the lowest supply conductor and above the highest communication cable.

Anchors. Operator's anchors should be placed a minimum of five feet (5') from KUB power anchors and three feet (3') from anchors of other Users. No anchor shall be installed closer than four (4) feet from the pole. Use of the KUB anchoring system shall only be permitted under unusual circumstances and must be preapproved in writing by KUB. Operator may not attach guy wires to User-owned anchors without specific prior written consent.

4.9 Equipment Requirements

For purposes of construction, this section applies to both wireless and equipment attachments that may be installed on KUB facilities. See Section 4.10 for more information on Wireless Equipment installation.

Backup Power Supply. Generators and other emergency electric supplies are prohibited unless specifically approved by KUB. If approved, any generator or back-up power supply shall not be interconnected with the KUB electric system.

Banner Arms. Requests to attach banner arms within the city limits of the City of Knoxville must go through the Office of Neighborhoods (OON). Officials with the OON will make application through our web portal for review by KUB. All banner arms shall be of the breakaway type and shall not be permitted in the Supply Space.

Color. Cabinets must be painted/wrapped/otherwise colored gray.

Decorations. Christmas lights and other temporary decorations mounted on KUB Facilities shall follow the guidelines under Section 4.11.

Disconnect. For all wireless equipment installations, a customer-owned disconnect switch shall be installed between the meter and the wireless equipment. The customer disconnect cannot be locked.

Equipment Restrictions. Equipment attachments shall not restrict the operation or maintenance of the power system and its facilities. No boxes or other equipment shall be installed on any poles upon which capacitor banks, sectionalizing equipment, voltage regulators, or where existing cabinets and/or wireless equipment including but not limited to power equipment controls, traffic controls, antennas and communications/CATV equipment are already installed.

Marking. All equipment cabinets, boxes, and enclosures shall be clearly marked with the Operator's name, twenty-four (24) hour contact number, and alpha/numeric designation such that Operator can determine the equipment location, type, and function.

Meter. Placement of the electric meter shall be mounted five feet, six inches (5' – 6") from ground and shall not face the street or property side of the pole. Meter base shall be provided by the Operator and shall be a single position, ring-style, single phase, four (4) terminal 100/125 amp overhead/underground meter base.

Pole-Mounted Cabinets. Cabinets shall be used to house equipment. The maximum envelope of the cabinet can be no larger than forty-eight (48) inches high by eighteen (18) inches wide by ten (10) inches deep. The mounting must meet one of these three conditions:

- Cabinets six (6) inches high by twelve (12) inches wide by four (4) inches deep or smaller may be banded directly to the pole.

- Cabinets up to forty-eight (48) inches high by eighteen (18) inches wide by ten (10) inches deep may be banded directly to the pole if the pole is located within fifteen (15) feet of a bucket truck-accessible paved road.
- Cabinets up to forty-eight (48) inches high by eighteen (18) inches wide by ten (10) inches not located within 15' of a bucket track accessible paved road must be mounted on a standoff bracket banded to the pole that does not interfere with KUB fall arrest equipment. The bracket and cabinet must still fall inside that ten (10) inch depth measurement.

RF Emissions. Antennas, wi-fi devices, or other equipment mounted on KUB facilities that have a maximum permissible exposure that exceeds the FCC limits for General Population/Uncontrolled Exposure given in the FCC's rules shall have a disconnect located within the Support Space to allow for disconnecting any backup power supply. In addition, all installations that present RF exposure shall submit a complete report detailing the actual measured RF output of the installation. All RF producing equipment shall be labeled with a RF warning and shall clearly denote a 24-hour emergency number for notification, readable from the ground.

Supply Conduit. Supply conduit cannot go through equipment cabinet and must run directly to the meter base.

4.10 Wireless Equipment Requirements

Wireless equipment, including radio transceivers, antennas, coaxial or fiber optic cable, power supplies, and associated equipment, may be configured as a DAS or small cell network. DAS and small-cell networks may be installed within the communications space on a pole or in the Support Space, but not above the Communication Space in general. The wireless equipment regulations below apply to all wireless equipment, regardless of configuration or location on the pole. Only one DAS or small cell installation per pole is allowed.

Bucket Truck Accessible. All antenna installations must be made on poles that are located within fifteen (15) feet of a bucket truck accessible paved road.

Community Concerns. The Operator is responsible for responding to all community concerns or complaints related to the antenna, including aesthetic appearance, health concerns due to radio frequency emissions, interference, etc.

Disconnect. All antenna power sources must have a disconnect installed, to allow for the antenna power source and any back-up power sources to be disconnected, especially if the facility has a maximum exposure value that exceed the FCC maximum permissible limits for General Population/Uncontrolled Exposure. This disconnect must remain unlocked and be mounted above reach of the general public.

Electric Meter. Each wireless communication facility must be individually metered.

Ground-Mounted Equipment. New ground-mounted equipment is not permitted, unless equipment cannot be feasibly installed on a pole. The equipment shroud or cabinet must contain all the equipment associated with the facility other than the antenna. If ground-mounted equipment is to be used, all cables and conduits associated with the equipment must be concealed from view and buried between the pole and the ground-mounted cabinet. The equipment design should incorporate ambient noise suppression measures to ensure compliance with all applicable noise regulations.

Interference. Wireless equipment shall be operated in such a manner which will not cause wireless interference to any existing or future KUB facility, KUB wireless system or operations, governmental public safety facilities or operations, or the facilities or operations of third-party Users.

Marking. All antennas and associated equipment shall be labeled with the Operator's name and contact information, including emergency contact number.

Meter. Operator is responsible for installation of conduit and wire from meter socket to point of service (hand-hole).

Pole-Mounted Equipment Enclosures. All pole mounted equipment (except for the antenna(s), electric meter, and disconnect switch) must be concealed within an equipment enclosure. The equipment cage shall not exceed twenty-one (21) cubic feet and may not extend more than ten

(10) inches from the face of the pole. Any stand-off mount for the equipment cage may not exceed four (4) inches and must include metal flaps to conceal the space between the cage and the pole. The equipment cage must be non-reflective and painted/wrapped/otherwise colored gray. Pole mounted equipment must be installed as flush to the pole as possible, using stainless steel banding straps. Through-bolting or use of lag bolts is prohibited.

Pole-Top Antennas. Wireless antennas or equipment are not permitted to be mounted within or above the Supply Space on any pole.

RF Exposure Levels. The Operator must provide KUB with documentation that confirms all RF emissions comply with Applicable Standards governing RF exposure levels.

RF Warning Signs. Operator must install RF warning sign(s) on the pole at the level where the safe approach distance ends for FCC General Population/Uncontrolled Environments. The sign must include the owner's name, contact number, and the permissible approach distance of the antenna. Warning Sign: *Warning – Antenna Radiation. Minimum Approach Distance is X FT.*

Risers and Conduits. Antenna riser cables and grounds must be installed in a minimum of Schedule 40 conduit not larger than two (2) inches.

Spools and Coils. Excess cable for wireless communication facilities shall not be spooled, coiled, or otherwise stored on the pole except within an approved enclosure such as a cage or cabinet.

Antenna(s) mounted in Communication Space. Antenna(s) installed within the Communication Space or Support Space on KUB poles must have concealed cable connections, antenna mount, and other hardware. The maximum dimensions of each antenna mounted in the Communication or Support Space are thirty (30) inches high and twelve (12) inches wide.

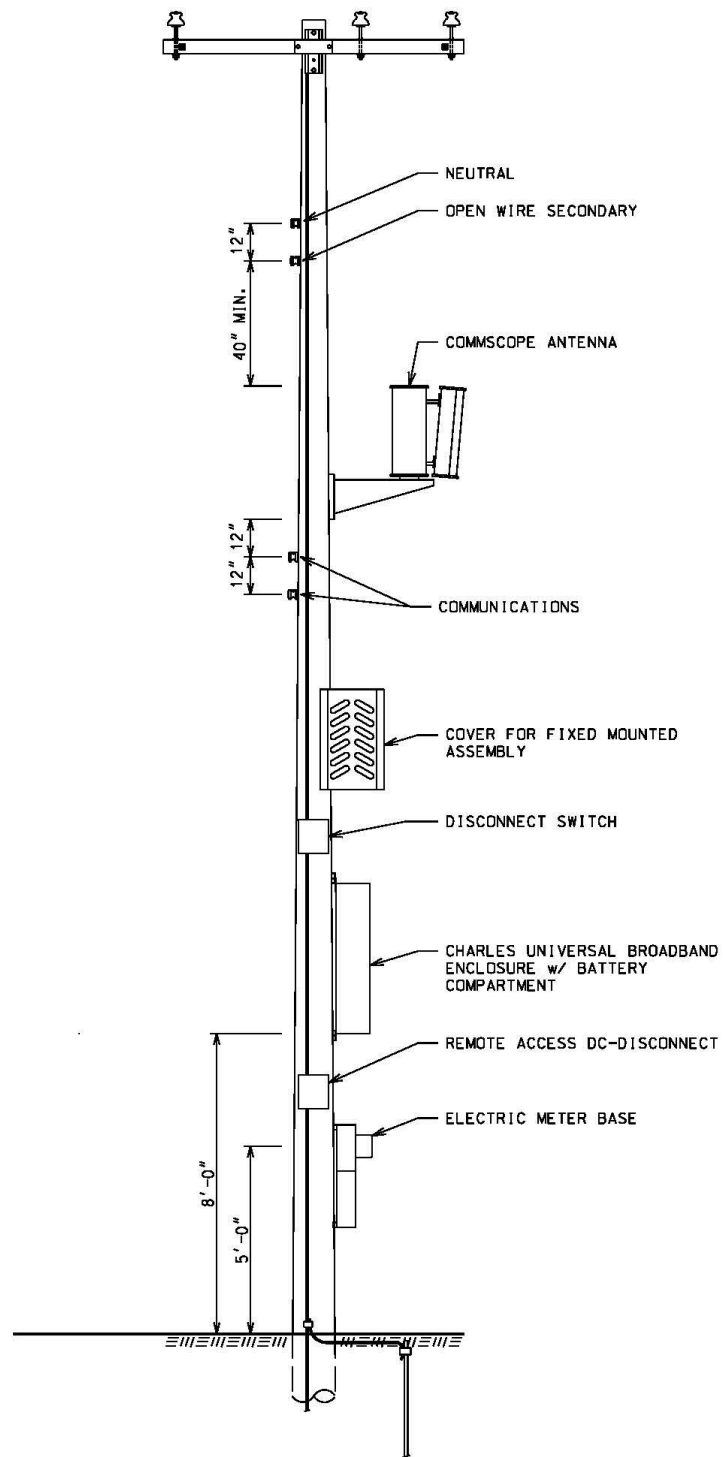


Figure 4.6 Antenna Installed in Communication/Support Space

4.11 Temporary Decorative Attachments

All decorative temporary attachments to KUB Infrastructure require KUB prior written approval. Licenses for decorative temporary attachments, such as seasonal lighting and other temporary attachments (flags, banners, etc.) will be issued to municipalities and county agencies only, without an attachment fee, provided the requirements listed below have been met. Attachments for commercial purposes, signs posted by individuals and pole-to-pole banners or decorations are prohibited. Any attachments that have not been licensed or are deemed to be unsafe may be disconnected or removed.

Process. The following outlines the steps to be taken to apply for temporary seasonal or decorative attachments.

- 1) At least 60 days prior to making the desired attachment, contact KUB's Infrastructure Use Team to request an "Application for Temporary Decorative Attachments to Utility Poles"
- 2) Return the completed application to KUB's Infrastructure Use Team.
- 3) An on-site meeting will be held with KUB and Operator or Operator's representative for review of plans for the proposed attachments.
- 4) Submit certificates of insurance to KUB. The Operator and Operator's contractor must both provide certificates of insurance with minimum liability limits of \$2,000,000 and must designate Knoxville Utilities Board as additional insured.
- 5) Upon approval of proposal and receipt of certificates of insurance from the Operator and Operator's contractor, KUB will issue a License for temporary attachment, which will contain terms, conditions, provisions and content. The application only applies to the attachments as described wherein and for the term specified.
- 6) All proposed fixtures and/or attachments must not interfere with KUB's or any User's existing or future facilities and/or access to the poles and must comply with all Applicable Standards.

Please note that all utility poles in our service territory are owned by KUB, AT&T, TDS, Frontier or City of Knoxville. This process is only for installations on KUB-owned poles. For installations on other poles, approval for the installation must be obtained from the owner of those poles. Please contact the appropriate telephone company or the City of Knoxville regarding its policies or requirements for pole attachments.

There is no charge for the License Agreement. However, if an electrical connection is needed, Applicant must apply for service through KUB's New Service and the appropriate fees and inspections completed. Operator will be responsible for all energy usage.

General Requirements for Installation. All attachment shall be constructed and composed of a non-flammable material and be supported by a bracket made of stainless steel, galvanized steel, aluminum or an aluminum alloy and should be easily removable from the pole. All drawing submissions must be stamped by a Professional Engineer along with a certificate of approval stating the attachment complies with all Applicable Standards. Attachment to poles shall be by means of stainless-steel banding or galvanized steel clamp. Wood poles will have ¼" Neoprene rubber under steel banding. No drilling will be allowed in any poles.

Construction Standards

- 1) Attachment cannot overhang a highway, road, alleyway or other means of vehicular access. Attachments must meet a minimum clearance of 9'-0" above the sidewalk's finished grade.
- 2) Attachments must be below all primary/secondary conductors and communication cables.
- 3) Attachments are not allowed on poles having traffic lights or pedestrian crossover attachments.
- 4) Attachments must maintain 100'-0" minimum horizontal clearance to crosswalks and traffic signals.
- 5) Attachments are not allowed on poles with primary/secondary risers or switches
- 6) Attachments are not allowed on poles which are in poor, questionable condition or are congested.
- 7) Only one organization within any given period is allowed to use the same pole.
- 8) Metal parts of the installation that are not intended to be energized and that are accessible to unauthorized persons shall be effectively grounded.
- 9) With KUB approval, a maximum of three (3) attachments may be allowed to be placed on a pole.
- 10) The design, installation, maintenance and removal of temporary decorative attachments rest with the Operator. The Operator shall ensure compliance with all Applicable Standards, with written assurance/indemnity made available to JUB upon request.
- 11) In the interest of public safety or to satisfy required work practices, KUB at its sole discretion may prohibit attachment for reasons other than those listed above.

Size Allowances

- Banner (complete attachment including the brackets and banding)
 - Dimensions (maximum): 3'-0" wide and 6'-0" long
 - Surface Area (maximum): 18 ft²
 - Weight (maximum): 20 pounds.
- Seasonal Decorations (complete attachment including the brackets and banding)
 - Dimensions (maximum): 4'-0" wide and 6'-0" long.
 - Weight (maximum): 40 pounds.

4.12 Conduit Requirements

Cable. Fiber optic cable must be applicable for installation in one (1) inch conduit and not be shielded or armored. The Operator shall provide the following:

- Fiber optic cable on reel trailer.
- Cable tags for proper identification.
- Necessary labor to operate cable reel and to receive cable outside of KUB facilities.
- Traffic Control, necessary permits and coordination of all necessary approvals with the City of Knoxville

In addition, a representative from the Operator shall be present during all KUB installation of network cable, splice capsules and accessories. The Operator's representative shall be knowledgeable and experienced in underground cable, innerduct, splice capsules and accessory installation and shall be authorized by the Operator to answer questions and make decisions on the Operator's behalf regarding problems and questions that occur during KUB installation of underground cable, splice capsules and accessories.

No equipment or facilities other than cables are permitted within KUB underground structures. Slack loop and coils are not allowed within KUB underground structures.

Conduit Paths. Paths for telecommunications use are comprised of four one (1) inch HDPE Innerduct installed inside KUB-owned four (4) inch conduit. If an available four (4) inch KUB-owned conduit has yet to have innerduct installed, the KUB will install four 1" HDPE innerduct with the customer paying for the installation of the inner duct to be used (i.e., if one innerduct is used, customer must pay 25% of installation cost; if two innerducts are required, customer must pay 50% of installation cost). The total cost includes labor, permitting, equipment, and material.

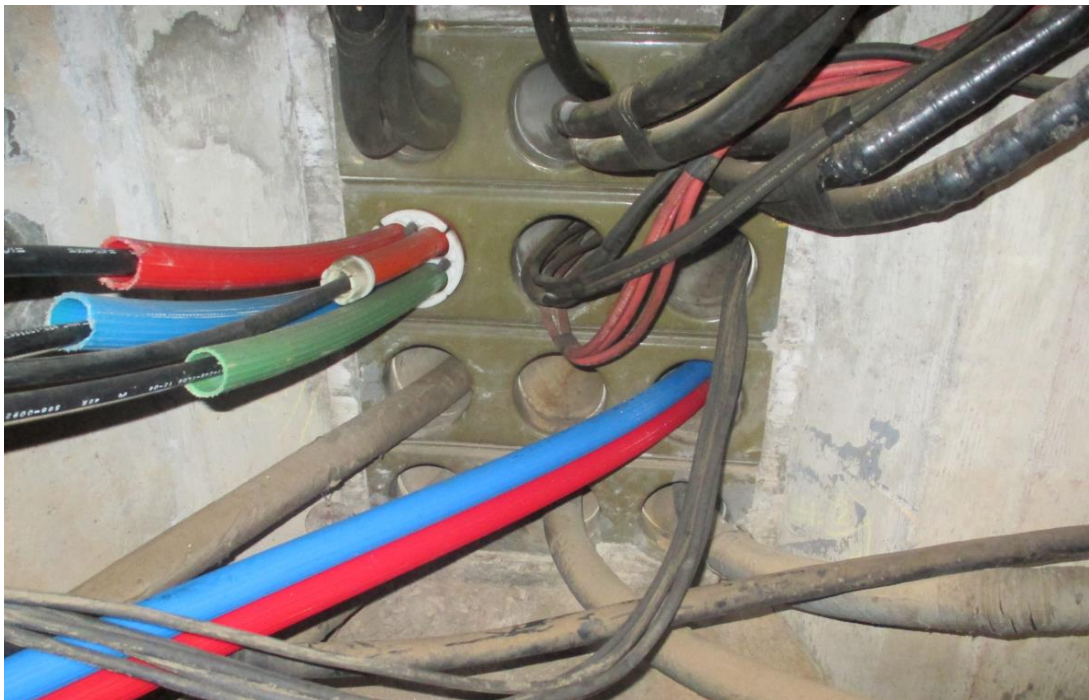


Figure 4.7 KUB Network with Innerduct and Cable

Network Access. Only KUB personnel are permitted access to KUB-owned facilities (manholes, vaults, and concrete-encased duct banks). Innerduct installation must be performed by KUB personnel. Cable installation must be performed by KUB personnel. KUB manholes or transformer vaults shall not be opened or tampered with by an employee, agent or contractor of Operator. No employee, agent or contractor of the Operator shall enter or work in any of KUB's manholes or transformer vaults without an authorized representative of KUB present. KUB's authorized representative shall have the authority to terminate Operator's work operations around KUB's manholes or transformer vaults if any hazardous condition arises or any unsafe practice is being followed by Operator's agents, employees or contractors.

Emergency Circumstances. KUB's work shall take precedence over all operations of the Operator. In the event the Operator experiences an emergency with its attachments located in KUB's Network, KUB will respond to the emergency as arranged between the Operator and a KUB representative. An emergency call associated with the Operator or KUB customers out of service will be treated on a 'priority' basis. KUB's response time will be based on the situation existing at the time of the emergency. All KUB labor and material associated with the Operator's emergency that do not arise from faults in the Network or the acts of omissions of any other User of the Network will be billed to the Operator.

APPROVALS

Approved by: _____

Les Beaver, Infrastructure Use Team Lead

Approved by: _____

Bob Colwick, Manager Electric Systems Engineering