

PROJECT MANUAL

**New River Valley
Regional Open Access Network
(ROAN) Project - Contract IV*
for
Citizens Telephone Cooperative, Inc.**

** This Contract involves the following areas:*

*Pulaski and Giles Counties
Town of Pearisburg*

*T&L Project No.: 11164-03
August 2012*

NEW RIVER VALLEY REGIONAL OPEN ACCESS NETWORK

(ROAN) PROJECT - CONTRACT IV

FOR

CITIZENS TELEPHONE COOPERATIVE, INC.

WITH FINANCIAL ASSISTANCE FROM

**NATIONAL TELECOMMUNICATIONS AND INFORMATION
ADMINISTRATION (NTIA)**

**BROADBAND TECHNOLOGY OPPORTUNITIES PROGRAM (BTOP)
NTIA/BTOP GRANT #NT10BIX5570093**

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THOMPSON & LITTON

RADFORD, VA 24141

BID DOCUMENTS ISSUED 8/17/12

AUGUST 2012

COMMISSION NO. 11164-03

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INVITATION FOR BIDS

Citizens Telephone Cooperative, Inc.
220 Webbs Mill Road
Floyd, VA 24091

Subject: Installation of fiber optic infrastructure for Citizens Telephone Cooperative, Inc. located at 220 Webbs Mill Road, Floyd, VA 24091 in accordance with the enclosed general terms, conditions, and specifications. Should you have any questions concerning this Invitation for Bid, please contact Charles Huff at (540) 745-9546 or (540) 230-7906.

Separate sealed bids for the construction of the for the New River Valley Open Access Network (ROAN) Project - Contract IV will be received by Charles Huff, Engineering Construction Supervisor at the Citizens Telephone Cooperative, Inc., 220 Webbs Mill Road, Floyd, VA 24091 until 4:00 P.M., local prevailing time, on Thursday, September 11, 2012. Bids will not be opened publicly.

A **Mandatory** Pre-Bid Conference will be held on August 21, 2012 at 9:00 A.M. All interested parties are requested to meet representatives of the Owner and Engineer at Citizens Telephone Cooperative, Inc., 220 Webbs Mill Road, Floyd, VA 24091, at that time. Any questions must be submitted to Citizens Telephone Cooperative, Inc. via email to charleshuff@citizens.coop. All questions are due by 5:00 P.M. on August 28, 2012. Responses will be issued no later than August 30, 2012. Bids will not be accepted from Bidders who do not attend the Pre-bid Conference.

This IFB and any addenda are available online at: www.citizens.coop. The link is listed under the BTOP Project Updates - Contract IV section on the home page. To download the IFB, click the link and save the document to your hard drive.

All bidders shall use the enclosed Bid Form in submitting their bid prices. The Owner reserves the right to waive any informality in bids and to award in part or in whole or to reject any or all bids. All bids received after the appointed hour for submission, whether by mail or otherwise, will be returned unopened. Envelopes containing bids shall be sealed in a plainly marked package with the bid request number, project title, name and address of Bidder, and hour and due date of the bid. Only sealed and properly labeled bids will be accepted. Bids submitted by facsimile or electronic transmission will not be accepted.

Each Bidder must be licensed as a Class A contractor in the State of Virginia.

This is a federally assisted project. Bidders and contractors performing work under this advertisement are bound by the requirements of President's Executive Order 11246 as amended by Executive Order 11375; Title VI of the Civil Rights Act of 1964; Section 109 of Title I of the Housing and Community Development Act of 1974, as amended; Section 3 of the Housing and Urban Development Act of 1968; the Immigration Reform and Control Act of 1986; the Davis-Bacon Act; the Copeland "Anti Kickback" Act; the Contract Work Hours and Safety Standards Act; and Public Law 100 202.

This contract is expected to be funded in whole or in part using funds from the American Recovery and Reinvestment Act (ARRA). Section 1605 of the ARRA prohibits the use of these funds unless all iron, steel, and manufactured goods are produced in the United States. All iron and steel manufacturing processes must take place in the United States, except for metallurgical processes involving refinement of steel additives. There is no requirement for the origin of components and subcomponents of manufactured goods. Products listed at 48 CFR 25.104(a) have been determined to be unavailable in the United States and if required for the project may be purchased from foreign sources. No unauthorized use of foreign iron, steel, and/or manufactured goods will be allowed on this project.

MBE/WBE firms are encouraged to submit bids. Bidders must certify that they do not or will not maintain or provide for their employees any facilities that are segregated on the basis or race, color, creed, or national origin.

8/17/12
Date

J. Gregory (Greg) Sapp
J. Gregory (Greg) Sapp, General Manager
Citizens Telephone Cooperative, Inc.

SCOPE OF WORK

The construction of the New River Valley Regional Open Access Network (ROAN) Project - Contract IV, located in Pulaski and Giles Counties and in the Town of Pearisburg in the State of Virginia, all as more fully described in the Plans, Specifications, Construction Sheets, Maps, and Special Drawings, therefore hereinafter referred to will consist of the following approximate linear feet (L.F.) of telecommunication lines and associated facilities:

CONTRACT IV

The quantities shown below are for informational purposes only.

- Contract IV will connect to an existing fiber optic cable at the entrance to the NRV Airport located on Sheet 67A-5 and will consist of the buried and aerial construction along U.S Route 100 through Pulaski County and Giles County to the Town of Pearisburg. The project consists of approximately 18.5 miles of Buried Fiber Optic (240 and 144 BFO) and 5.5 miles of Aerial Fiber Optic (240 and 144 CO).

Note: All Splice Points (240 and 144 Ct) locations are based on 15,000 ft Reels for bidding purposes only. Actual splice locations shall be determined by Contractor based on field conditions and length of reels with prior approval from Owner/Engineer. The Owner has ordered five (5) 15,000 ft and three (3) 12,000 ft 240-Ct reels and two (2) 10,000 ft 144-Ct reels.

Additional Notes:

- All excavation shall be unclassified regardless of the material encountered.
- The Owner will furnish fiber to the Contractor. The Contractor must furnish all other materials, equipment and labor to complete the route.
- Fiber will be delivered to the Owner's storage yard in Floyd, Virginia. The Contractor shall be responsible for delivery to the project location.
- Fiber should be tested by the Contractor prior to removal from Owner's storage yard. Once fiber is removed, it shall be considered acceptable for use.
- All fiber not used shall remain property of the Owner. The Contractor shall be responsible for inventory management and shall provide monthly reports to the Owner showing what has been removed from the yard, what has been installed, and what remains.

- Bores shown on the plans are for paved road/driveway crossings and culvert crossings. Efforts were made to accurately identify and estimate each of these bores, however, there may be roads, driveways or culverts that were not located or that have changed. It is the Contractor's responsibility to bore all paved/concrete roads and driveways as well as culverts that have less than 48" of cover at crossing location.

INSTRUCTIONS TO BIDDERS

BIDDER'S REPRESENTATION & BIDDING DOCUMENTS

1. Prior to the submission of a bid, the Bidder shall make a careful examination of the site of the Project and shall become informed as to the location and nature of the proposed construction, the transportation facilities, the kind and character of the soil and terrain to be encountered, the kind of facilities required before and during the construction of the project, general local conditions, and all other matters that may affect the cost and the time of completion of the Project.
2. By submitting a bid in response to this Invitation for Bids, the Bidder certifies that it has read and understands the Bidding Documents, specifications, and drawings, if any, and has familiarized itself with all federal, state, and local laws, ordinances, rules, and regulations that in any manner may affect the cost, progress, or performance of the work. By submitting a bid, the Bidder is representing and warranting to the Owner that its bid materials, and the information contained therein, are true, complete, and accurate in all material aspects and do not fail to include any information or fact necessary to a materially accurate understanding of the Bidder's financial situation and ability to perform the Contract.
3. Complete sets of Bidding Documents shall be used in preparing bids; neither Owner nor Engineer assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.
4. To demonstrate qualifications to perform the Work, each Bidder must submit as a part of the Bid to the Owner on the form entitled "**Contractor's Qualification Statement**" detailed written evidence such as financial data, previous experience, present commitments, and other such data. Each Bid must contain evidence of Bidder's qualification to do business in the state where the Project is located or covenant to obtain such qualification prior to award of the contract. Contractor shall provide its identification number issued to it by the State Corporation Commission, evidencing its organization in the Commonwealth or authorizing it to do business in the Commonwealth. If the Bidder is not required to be authorized to transact business in the Commonwealth as a foreign business entity, or as otherwise required by law, the Bidder shall include in its bid a statement why the Bidder is not required to be so authorized.
5. The Owner shall have the right to take such steps as it deems necessary to determine the ability of the Bidder to perform his obligation under the contract, and the Bidder shall furnish the Owner all such information and data indicated on the form. The right is reserved to reject any Bid where an investigation of the available evidence or information does not satisfy the Owner that the Bidder is qualified to carry out properly the terms of the Contract.

6. The Bidder shall agree at the time of submitting its Bid that no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of its Bid for performance of the Work at the price(s) bid within the times required, and in accordance with the other terms and conditions of the Bidding Documents.
7. The Bidder shall promptly give Engineer written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder discovers in the Bidding Documents and confirm that the written resolution thereof by Engineer is acceptable to Bidder.
8. Addenda may also be issued to modify the Bidding Documents as deemed advisable by Owner or Engineer. Addenda will be posted to www.citizens.coop/.
9. Each Bidder shall acknowledge the receipt of each addendum on the Bid Form.

PRE-BID CONFERENCE

1. A **mandatory** Pre-Bid Conference will be held at 9:00 A.M. local time on August 21, 2012 at the Citizens Telephone Cooperative, Inc. located at 220 Webbs Mill Road, Floyd, VA 24091. Representatives of Owner and Engineer will be present to discuss the Project. Oral statements may not be relied upon and will not be binding or legally effective. Questions must be submitted in writing via email no later than 5 p.m. on August 28, 2012 to charleshuff@citizens.coop. Responses will be issued no later than August 30, 2012. Bids will not be accepted from Bidders who do not attend the Pre-bid Conference.

SITE & OTHER AREAS

1. All Work on this Project shall be performed in an efficient and continuous manner and shall not interfere with the normal flow of existing operations, traffic, and other site activities.
2. The Owner shall furnish all fiber for this project, and the following requirements shall apply:
 - A. All fiber not used in the construction of the project shall remain the property of the Owner and shall be returned to the Owner in good condition upon completion of the project.
 - B. Contractor is responsible for inventory management of the fiber and shall provide monthly reports to the Owner concerning this inventory.
 - C. Any handhole or closure (up to the amount specified in the construction of this project and furnished by the Contractor) not used in the construction of the project shall be furnished to the Owner in good condition upon completion of the project.
3. On request, Owner will provide Bidder access to the Site to conduct such examinations, investigations, explorations, tests, and studies as Bidder deems necessary for submission of a Bid. Bidder shall fill all holes and clean up and restore the Site to its former

condition upon completion of such explorations, investigations, tests, and studies. Bidder shall comply with all applicable Laws and Regulations relative to excavation and utility locations.

4. The storage of equipment and materials shall be coordinated with the Owner. Fiber cable will be stored at the Owner's yard; Contractor should test fiber before removing from the yard. Once fiber is removed, it shall be considered acceptable for use and the responsibility of the Contractor.
5. All excavation shall be unclassified regardless of material encountered. No additional payment shall be made to the Contractor for rock formations encountered while performing underground work including, but not limited to, boring, trenching, and digging.

BID SECURITY

1. A Bid must be accompanied by Bid security made payable to Owner in an amount of 5 percent of Bidder's maximum Bid price and in the form of a certified check or a Bid Bond issued by a Surety authorized to do business in Virginia.
2. The Bid security of the Successful Bidder will be retained until such Bidder has executed the Contract Documents, furnished the required contract security and met the other conditions of the Notice of Award, whereupon the Bid security will be returned. If the Successful Bidder fails to execute and deliver the Contract Documents and furnish the required contract security within 15 days after the Notice of Award, Owner may consider Bidder to be in default, annul the Notice of Award, and the Bid security of that Bidder will be forfeited. Such forfeiture shall be Owner's exclusive remedy if Bidder defaults. Forfeiture will not exceed the lesser of (i) the difference between the Bid for which the security was written and the next low Bid, or (ii) the face amount of the Bid security. The Bid security of other Bidders whom Owner believes to have a reasonable chance of receiving the award may be retained by Owner until the earlier of seven days after the Effective Date of the Agreement or 91 days after the Bid opening, whereupon Bid security furnished by such Bidders will be returned.
3. Bid security of other Bidders whom Owner believes do not have a reasonable chance of receiving the award will be returned within seven days after the Bid opening.

CONTRACT TIMES & LIQUIDATED DAMAGES

1. Liquidated damages in the amount of \$500.00 per day shall apply for each and every day that construction is delayed beyond the approved construction completion date after giving effect to extensions of time as provided for in the Contract.

SUBSTITUTE AND “OR EQUAL” ITEMS

1. Unless otherwise provided in the Invitation for Bids, the name of a certain brand, make or manufacturer does not restrict Bidders to the specific brand, make or manufacturer named; it conveys the general style, type, character, and quality of the article desired, and any article which the Owner in its sole discretion determines to be the equal of that specified, considering quality, workmanship, economy of operation, and suitability for the purpose intended, shall be accepted. Substitutions shall meet the Buy American provisions of the Contract.
2. It shall be understood that the burden of proof for an "equal" product shall be and remain the sole responsibility of the Bidder. The Owner's decision of approval or disapproval of a proposed alternate shall be final. Nothing herein is intended to exclude any responsible Bidder, its product or service or in any way restrain or restrict competition.

RETAINAGE

1. Provisions concerning Contractor's rights to deposit securities in lieu of retainage are set forth in the Agreement.

TAXES

1. Virginia State Sales and Use Taxes on materials and equipment to be incorporated in the Work shall be included in the Contract price.

SUBMISSION OF BIDS

1. The “**Bid Form**” is included in the Bidding Documents. All blanks on the Bid Form shall be completed in ink or typewriter and the Bid Form signed in ink. The Bid Form must be signed in order to be considered. A bid price shall be indicated for each Bid item listed therein, stated in numerals. The Total Bid Price must be stated in both words and numerals; in the case of a conflict, words will take precedence.
2. A Bid shall be submitted no later than the date and time prescribed and at the place indicated in the Invitation for Bids and shall be enclosed in a plainly marked package with the bid request number, project title (and, if applicable, the designated portion of the Project for which the Bid is submitted), name and address of Bidder, and hour and due date of the bid. Bidder shall enclose the Bid security and other required documents, including Bidder's Virginia License Number and Classification/Specialty Code Number. If a Bid is sent by mail or other delivery system, the sealed envelope containing the Bid shall be enclosed in a separate package plainly marked on the outside with the notation “**BID ENCLOSED.**” A mailed Bid shall be addressed to the Owner as designated on the Bid Form. All late bids shall be returned unopened to the sender. Bids sent by facsimile or other electronic transmission will not be accepted.
3. All prices must be F.O.B. delivered to the point as indicated in this bid. The Owner will grant no allowance for boxing, crating, or delivery unless specifically provided for in this bid.

4. The Bid shall contain an acknowledgement of receipt of all Addenda, the numbers of which shall be filled in on the Bid Form.
5. Before submitting a Bid, a nonresident Bidder must appoint the Director of the Virginia Department of Professional and Occupational Regulation as the Bidder's statutory agent for service of process.
6. In addition to the Bid Form, the following completed documents must be returned with each Bid submitted:
 - a. Bid Security in the form of a Bid Bond or Certified Check;
 - b. Contractor's Qualification Statement with Supporting Data;
 - c. Commonwealth of Virginia Worker's Compensation Certificate of Coverage;
 - d. Bidder Compliance Statement/Certification Regarding EEO;
 - e. Certification of Non-Segregated Facilities;
 - f. Certification Regarding Drug-Free Workplace;
 - g. Lobbying Certification; and
 - h. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion - Lower Tier Covered Transactions

MODIFICATION & WITHDRAWAL OF BIDS

1. Bid may be modified or withdrawn by an appropriate document duly executed in the same manner that a Bid must be executed and delivered to the place where Bids are to be submitted prior to the date and time for the opening of Bids.
2. If within two business days after Bids are opened, any Bidder files a duly signed, written notice with Owner and promptly thereafter demonstrates to the reasonable satisfaction of Owner that there was a material and substantial mistake in the preparation of the Bid, provided the Bid was submitted in good faith, and the mistake was a clerical mistake as opposed to a judgment mistake, and was actually due to an unintentional arithmetic error or an unintentional omission of a quantity of work, labor, or material made directly in the compilation of the Bid, that Bidder may withdraw his Bid and the Bid Security will be returned. Thereafter, the Bidder will be disqualified from further bidding on the Work to be provided under the Contract Documents.
3. No Bid may be withdrawn due to error when the result would be the awarding of the Contract on another Bid of the same Bidder or of another Bidder in which the ownership of the withdrawing Bidder is more than five percent.
4. If a Bid is withdrawn due to error, the lowest remaining Bid shall be deemed to be the low Bid.
5. No Bidder who is permitted to withdraw a Bid shall, for compensation, supply any material or labor to or perform any subcontract or other work agreement for the person or firm to whom the Contract is awarded or otherwise benefit, directly or indirectly, from the performance of the Project for which the withdrawn Bid was submitted.

OPENING OF BIDS

1. Bids will be accepted at the time and place indicated in the Invitation for Bids. Bids will not be opened publicly. An abstract of the amounts of the base Bids and major alternates, if any, will be made available to Bidders upon request after the opening of Bids. If, however, the Owner chooses not to accept any of the Bids and re-advertises the project, no abstract will be made, and Bids submitted will not be available for examination.

EVALUATION OF BIDS AND AWARD OF CONTRACT

1. The Owner reserves the right to waive any informality in bids and to award in part or in whole or to reject any and all bids.
2. In evaluating Bidders, Owner will consider the qualifications of Bidders and may consider the qualifications and experience of Subcontractors, Suppliers, and other individuals or entities proposed for those portions of the Work for which the identity of Subcontractors, Suppliers, and other individuals or entities must be submitted as provided in the Supplement General Conditions.
3. Owner may conduct such investigations as Owner deems necessary to establish the responsibility, qualifications, and financial ability of Bidders, proposed Subcontractors, Suppliers, individuals, or entities proposed for those portions of the Work in accordance with the Contract Documents.
4. If the Contract is to be awarded, Owner will award the Contract to the Bidder whose Bid is in the best interests of the Project.
5. Unless cancelled or rejected, the responsive Bid from the lowest responsible Bidder shall be accepted as submitted, except that if the Bid from the lowest responsible Bidder exceeds available funds, the Owner or designated official may negotiate with the apparent low Bidder to obtain a contract within available funds. In the event that the Total Base Bid from the lowest responsible Bidder exceeds available funds, the Owner may negotiate the Total Base Bid amount with the apparent low Bidder to obtain a contract price within available funds. Such negotiations with the apparent low Bidder may include discussions of reducing the quantity, quality, or other cost saving mechanisms which are part of the Total Base Bid.
6. Negotiation with Lowest Responsible Bidder: If award of a Contract to the lowest responsive and responsible Bidder is precluded because of limitations on available funds, the Owner reserves the right to negotiate the Total Base Bid amount with the lowest responsive Bidder to obtain a contract price within the available funds. This may involve changes in either the features or scope of the work included in the Base Bid. The Owner shall notify the lowest responsive and responsible Bidder that such a situation exists and the Owner and Bidder shall then conduct their negotiations in person, by mail, by telephone or by any means they find convenient. If an acceptable Contract cannot be negotiated, the Owner shall terminate negotiations and reject all bids.

BONDS & INSURANCE

1. In order to provide the Owner with security that the selected Bidder will fulfill the obligations under the Contract, the selected Bidder must, simultaneous with the delivery of the executed Contract, furnish the following bonds payable to the Owner:
 - a. A Performance Bond in the sum of the Contract amount conditioned upon the faithful performance of the Contract in strict conformity with the Contract Documents.
 - b. A Payment Bond in the sum of the Contract amount. Such Payment Bond shall be for the protection of claimants who have and fulfill contracts to supply labor or materials to the Contractor, or to any of Contractor's Subcontractors, in performing under the Contract, and shall be conditioned upon the prompt payment for all such material furnished or labor supplied or performed in the performance under the Contract. "Labor or materials" shall include public utility services and reasonable rental of equipment, but only for periods when the equipment rented is actually used at the site.
2. Each of the Bonds shall be executed by one or more surety companies authorized to do business in Virginia and shall be reasonably acceptable to the Owner. When the Contract amount exceeds \$100,000, such Surety company shall also be listed in the latest issue of the U.S. Treasury Circular 570 and the penal sum shall be within the maximum specified for such company in said Circular 570.
4. Failure to provide an acceptable Payment Bond or Performance Bond as provided herein shall be a violation of the Bid and, in addition to other rights and remedies of the Owner, the Owner may rescind the award of the Contract.
5. The successful Bidder shall maintain insurance to protect itself, the Owner, and the Owner's constituent organizations from claims for damages for personal injury, including death, and for damages to property, which may arise from operations under this contract. Such insurance shall conform to the requirements listed below. The successful Bidder shall provide a Certificate of Insurance confirming compliance and failure to so provide shall be a violation of this Invitation to Bid and the Contract.
6. The Contractor shall not commence work under this Contract until he has obtained all insurance required as hereinafter specified and until such insurance has been approved by the Owner, nor shall the Contractor allow any Subcontractor to commence work on his subcontract until all similar insurance required of the subcontractor has been so obtained and approved. Policies expiring on a fixed date before final acceptance of the project must be renewed and evidence of such renewal submitted to the Owner before such date.

Contractors Comprehensive General Liability

Bodily Injury	\$1,000,000 each occurrence
	\$2,000,000 aggregate
Property Damage	\$1,000,000 each occurrence

Comprehensive Automobile Liability Insurance

Bodily Injury	\$1,000,000 each person
	\$1,000,000 each accident
Property Damage	\$1,000,000 each occurrence

Excess or Umbrella Insurance

\$5,000,000 each occurrence

Workmen's Compensation Insurance

\$100,000 each accident

7. The Contractor agrees to continue Completed Operations coverage for one year after the work is accepted by the Owner. Comprehensive General Liability shall include coverage on: Premises, Operations, Independent Contractors (Protective Liability), Products and Completed Operations, and Contractual Liability as may be assumed and insurable under this contract. There shall be no exclusions for special hazards under Property Damage for collapse caused by grading or excavation, collapse caused by grading or excavation, underground property, explosion or blasting.
8. If the liability insurance purchased by the Contractor has been issued on a "claims made" basis, the Contractor must comply with the following additional conditions. The limits of liability and the extensions to be included as described previously in these provisions, remain the same. The Contractor must either:
 - a. Agree to provide certificates of insurance evidencing the above coverage for a period of two (2) years after final payment for the Agreement for General Liability policies. This certificate shall evidence a "retroactive date" no later than the beginning of the Contractor's work under this Agreement, or
 - b. Purchase the extended reporting period endorsement for the policy or policies in force during the term of this Agreement and evidence the purchase of this extended reporting period endorsement by means of a certificate of insurance or a copy of the endorsement itself.
9. Certificates of such aforementioned insurance shall be provided to the Owner. All certificates and policies of insurance obtained by the contractor shall list the Owner as an additional insured.

SPECIAL LEGAL REQUIREMENTS

1. This is a federally assisted project. Bidders will be required to comply with all applicable statutes, regulations, etc., including those pertaining to the licensing of contractors and the Anti-Kickback Acts, as amended (40 USC 276c; 41 USC 51 et seq.) and regulations issued pursuant thereto. Bidders and Contractors performing work under this Project are bound by the requirements of the President's Executive Order Nos. 11246, 11375, 11625, and 12138, Davis-Bacon Provisions, Civil Rights Act of 1964, and the Certification of Non-Segregated Facilities. The Bidder's attention is called to the "MBE/WBE Requirements of 40 CFR 33.240," the goals and timetables for minority and female participation, and to the fact that not less than minimum wages set forth in the Contract Documents must be paid.
2. Bidders must certify that they do not or will not maintain or provide for their employees any facilities that are segregated on the basis of race, color, creed, or national origins.
3. This contract is expected to be funded in whole or in part using funds from the American Recovery and Reinvestment Act (ARRA). Section 1605 of the ARRA prohibits the use of these funds unless all iron, steel, and manufactured goods are produced in the United States. All iron and steel manufacturing processes must take place in the United States, except for metallurgical processes involving refinement of steel additives. There is no requirement for the origin of components and subcomponents of manufactured goods. Products listed at 48 CFR 25.104(a) have been determined to be unavailable in the United States and if required for the project may be purchased from foreign sources. No unauthorized use of foreign iron, steel, and/or manufactured goods will be allowed on this project.
4. No Contractor or Subcontractor shall perform any work on the project unless he has obtained, and continues to maintain for the duration of such work, such worker's compensation coverage as may be required, and no Contractor will be awarded the Contract unless prior to the award of Contract he furnishes evidence of such coverage.
5. All Subcontractors must be registered either as a Class A or Class B contractor with the Virginia Board for Contractors.

BID FORM

This Bid is submitted to:

Date Submitted: _____

Citizens Telephone Cooperative, Inc.
220 Webbs Mill Road
Floyd, VA 24091

Bidder hereby proposes to perform all work described in the scope of work for the **New River Valley Open Access Network (ROAN) Project - Contract IV** project in accordance with general terms, conditions and specifications. Bidder has reviewed and understands the Bid Documents and all addenda posted on the website, and Bidder agrees to the terms of the Invitation to Bid and, if selected, the resulting Contract. Bidder has visited the Site and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work. Bidder agrees that the Work will be substantially complete and will be completed and ready for final payment within the number of calendar days indicated in the Agreement and accepts the provisions of the Agreement as to liquidated damages.

Submit one (1) original bid, five (5) printed copies and one (1) electronic version (.pdf) on disk.

BASIC BIDDER INFORMATION

(1) Name of Bidder: _____
Length of Time in Business (under same name): _____

(2) Address: _____

Length of time at current location: _____

(3) Contact Person: Name: _____
Title: _____
Phone Number: _____
Email Address: _____
Fax Number: _____

(4) An individual contractor is required to furnish their social security number and a proprietorship, partnership and corporation is required to furnish their employer identification numbers to the Owner. Please indicate this information on this Bid Form as follows:

Social Security (Individual Contractor): _____
Federal Employer ID No. (Non-Individual): _____
Virginia Contractors License Number: _____ Expires: _____

(5) Current number of full time employees _____
Project will be completed with own resources ____ Yes ____ No

- (6) Have you or your firm had any OSHA violations in the past three (3) years ____ Yes ____ No
I/We as well as any subcontractors will abide by all OSHA State, Owner, and Contractor Safety Rules and Regulations ____ Yes ____ No
- (7) I/We will provide weekly written electronic construction progress ____ Yes ____ No
I/We will provide a qualified individual to meet with Owner's representatives on an as-needed basis ____ Yes ____ No
- (8) I/We have refused to sign a Contract at the original bid ____ Yes ____ No
I/We have been declared in default of a contract ____ Yes ____ No
I/We have been named as a party in a lawsuit ____ Yes ____ No
- (9) I/We have been terminated from a Contract for cause ____ Yes ____ No
Within the last three years, Bidder made payment of actual and/or liquidated damages for failure to complete a project by the contracted date ____ Yes ____ No
- (10) I/We are ready to enter into the Contract Documents included with this Bid according to the terms and conditions included ____ Yes ____ No
- (11) I/We propose to construct the project in strict accordance with the RUS Specifications and Drawings inserts included in the Project Manual for this project and acknowledge that RUS Forms 515a, 515b, 515c, and 515d, dated September 2001, are hereby incorporated into the Contract by reference ____ Yes ____ No
- (12) In submitting this Bid, Bidder represents that:

Bidder has examined and carefully studied the Bidding Documents, other related data identified in the Bidding Documents, and the following Addenda, receipt of which is hereby acknowledged:

Addendum No. _____ Dated, _____
Addendum No. _____ Dated, _____
Addendum No. _____ Dated, _____
Addendum No. _____ Dated, _____

BASIS OF BID

Bidder will complete the Work in accordance with the Contract Documents for the following price(s):

BID SCHEDULE – CONTRACT IV

THE UNDERSIGNED HEREBY PROPOSES AND AGREES TO FURNISH ALL THE NECESSARY LABOR, MATERIALS, EQUIPMENT, TOOLS, AND SERVICES FOR THE CONSTRUCTION REQUIRED FOR THIS PROJECT IN ACCORDANCE WITH THE PLANS, SPECIFICATIONS, AND OTHER CONTRACT DOCUMENTS PREPARED BY THOMPSON & LITTON, INC. FOR CITIZENS TELEPHONE COOPERATIVE, INC., AT THE PRICES INDICATED BY THE BIDDER BELOW. THESE PRICES, AS STATED, SHALL COVER ALL EXPENSES TO COMPLETE THE WORK AND MAKE IT FULLY OPERATIONAL IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. TOTAL CONTRACT AMOUNTS SHALL BE STATED IN BOTH WRITTEN AND NUMERIC AMOUNTS. IN CASE OF A DISCREPANCY, WORDS SHALL GOVERN. THE UNDERSIGNED AGREES THAT THE PRICES BELOW ARE THE BALANCED FIGURES USED IN PREPARING THE BID AND FURTHER AGREES, IF AWARDED THE CONTRACT, TO FURNISH AN ITEMIZED BREAKDOWN OF COSTS FOR ANY BID ITEM. ALL LINE ITEMS MUST BE COMPLETED, AND PRICES MUST BE TOTALED ON LAST PAGE OF BID SCHEDULE.

ITEM NO.	DESCRIPTION
1	Install 94,310 L.F. of BFO 240R, complete, in place. Fiber will be furnished by the Owner.
2	Install 1,780 L.F. of BFO 144R, complete, in place. Fiber will be furnished by the Owner.
3	Install 11,670 L.F. of CO 240R/6M Strand and appurtenances, complete, in place. Includes riser guards, guys, guy guards, anchors rods, bolts, clamps, nuts, washers and any other hardware. Fiber will be furnished by the Owner.
4	Install 16,860 L.F. of CO 144R/6M, complete, in place. Includes riser guards, guys, guy guards, anchors rods, bolts, clamps, nuts, washers and any other hardware. Fiber will be furnished by the Owner.
5	Install 150 L.F. of UO 240R, complete, in place. Fiber will be furnished by the Owner.
6	Install 1,600 L.F. of UOSEB FO12, complete, in place. Fiber will be furnished by the Owner.
7	Install 1,600 L.F. of SEB FO12, complete, in place. Fiber will be furnished by the Owner.
8	Furnish and install twenty-three (23) BD 7 Pedestals including groundrods (BM2), gravel, stencils, complete, in place. The BD 7 Pedestals shall be placed for 100' storage loops.
9	Furnish and install three (3) BD MPH Pedestals including groundrods (BM2), gravel, stencils, complete, in place. The BD MPH Pedestals shall be placed at straight splices (with 100' storage loop).
10	Furnish and install forty-one (41) Handholes with Lids (24"x36"x30") T* including groundrods (BM2), gravel, stencils, complete, in place.

ITEM NO.	DESCRIPTION
11	Furnish and install two (2) 35'-5 poles, complete, in place.
12	Furnish and install seven (7) 30'-5 poles, complete, in place.
13	Furnish and install seven (7) closures (HBFO 240) including splice trays, multi-drop adaptor, complete, in place.
14	Furnish and install one (1) closure (HACO 240) including splice trays, multi-drop adaptor, complete, in place.
15	Furnish and install forty (47) Warning Posts/Markers – consists of the necessary labor and materials to install a Warning Post/Marker, with a customized warning sticker identifying CITIZENS as the company, and the locate number and the emergency number.

* Citizens Logo on lids.

NOTE: All Splice Points (240 and 144 Ct) locations are based on 15,000 ft Reels for bidding purposes only. Actual splice locations shall be determined by Contractor based on field conditions and length of reels with prior approval from Owner/Engineer. The Owner has ordered five (5) 15,000 ft and three (3) 12,000 ft 240-Ct reels and two (2) 10,000 ft 144-Ct reels.

NOTE: Bidder acknowledges that estimated quantities are for informational purposes only. No payments will be made based on unit quantities.

TOTAL BID - CONTRACT IV \$ _____

(_____ DOLLARS)

UNIT PRICES

These prices are to be used **in the event that additional services are required**. Any additional services must be approved by the Owner.

ITEM NO.	DESCRIPTION	UNIT	UNIT PRICE
1	BFO 240R Installation (Plowing), complete, in place.	L.F.	\$
2	BFO 144R Installation (Plowing), complete, in place.	L.F.	
3	CO 240R Installation, complete, in place.	L.F.	
4	CO 144R Installation, complete, in place.	L.F.	
5	UO 240R Installation, complete, in place.	L.F.	
6	SEB FO12 Installation, complete, in place.	L.F.	
7	SEA FO12 Installation, complete, in place.	L.F.	
8	BM61 DIR* (2") (Boring), complete, in place.	L.F.	
9	BM61 *(Boring), complete, in place.	L.F.	
10	BM Rock Adder Bore (Boring Rock), complete, in place.	L.F.	
11	BM71 Rock (Sawing or Chipping), complete, in place.	L.F.	
12	BM DUCT, complete, in place.	L.F.	
13	(BD 7) Pedestal Installation, including ground rod (BM2), complete, in place.	EA.	
14	(BD MPH) Pedestal Installation, including ground rod (BM2), complete, in place.	EA.	
15	(BD 8000) Pedestal Installation, including ground rod (BM2), complete, in place.	EA.	
16	BHF (24"x36"x30") T Handhole Installation, including ground rod (BM2), complete, in place.	EA.	

* The Joint Permit Application for stream crossings requires a Bentonite Spill Prevention Plan when using directional bore on permitted streams (BM61, BM61 DIR). See Insert VI for more information.

ITEM NO.	DESCRIPTION	UNIT	UNIT PRICE
17	BM53 – Marking Post Installation, complete, in place.	EA.	\$
18	BM80 – Riser Guard, 1 inch inside diameter (ID) x 8 feet, Installation, complete, in place.	EA.	
19	30'-5 Pole, complete, in place.	EA.	
20	35'-5 Pole, complete, in place.	EA.	
21	PE 1-2 – 6M Down Guy, complete, in place.	EA.	
22	PE 1-3 – 10M Down Guy, complete, in place.	EA.	
23	PE 1-4 – 16M Down Guy, complete, in place.	EA.	
24	PE 2-2 – 6M Overhead Guy, complete, in place.	EA.	
25	PF 1-3 – 6M Expanding Anchor, complete, in place.	EA.	
26	PF 1-5 – 10M Expanding Anchor, complete, in place.	EA.	
27	PF 1-7 – 16M Expanding Anchor, complete, in place.	EA.	
28	PM 2 – Pole Ground Assembly, complete, in place.	EA.	
29	PM 2A – Ground wire assembly for bonding aerial cable strand, complete, in place.	EA.	
30	PM 11 – Guy Guard, complete, in place.	EA.	
31	PM 12 – Sidewalk Guy Arm, complete, in place.	EA.	
32	PM 52 – Pole Marking, Per Pole, Route and Pole Number, complete, in place.	EA.	

ITEM NO.	DESCRIPTION	UNIT	UNIT PRICE
33	PM SS – Figure-8 a 100’ length of fiber optic cable utilizing two (2) snow-shoes, complete, in place.	EA.	\$
34	BMWL – complete, in place.	EA.	
35	HAFO 240 – complete, in place.	EA.	
36	HBFO 240 – complete, in place.	EA.	
37	HO1 – complete, in place.	EA.	
38	HO1(T) – complete, in place.	EA.	
39	HO12R – complete, in place.	EA.	
40	R3-5M – right-of-way clearing and trimming unit (Aerial Plant)	L.F.	

ATTACHMENTS TO THIS BID

The following documents are submitted with and made a condition of this Bid:

- A. Required Bid security in the form of Bid Bond or Certified Check;
- B. Bidder's Qualification Statement with Supporting Data;
- C. Evidence of authority to do business in the state of Virginia or a written covenant to obtain such license within the time for acceptance of Bids;
- D. Commonwealth of Virginia Worker's Compensation Certificate of Coverage; and
- E. Required Federal Forms:
 - 1. Bidder Compliance Statement/Certification Regarding EEO;
 - 2. Certification of Non-Segregated Facilities;
 - 3. Certification Regarding Drug-Free Workplace;
 - 4. Lobbying Certification; and
 - 5. Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion - Lower Tier Covered Transactions.

BID SUBMITTED BY:

If Bidder is:

An Individual

Name (typed or printed): _____

By: _____
(Individual's signature)

Doing business as: _____

A Partnership

Partnership Name: _____

By: _____
(Signature of general partner -- attach evidence of authority to sign)

Name (typed or printed): _____

A Corporation

Corporation Name: _____ (SEAL)

State of Incorporation: _____

Type (General Business, Professional, Service, Limited Liability): _____

By: _____
(Signature -- attach evidence of authority to sign)

Name (typed or printed): _____

Title: _____
(CORPORATE SEAL)

Attest _____

Date of Qualification to do business in Virginia is ____/____/____.

BID BOND

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned, _____

as Principal, and _____

as Surety, are hereby held and firmly bound unto _____

as OWNER in the penal sum of _____

for the payment of which, well and truly to be made, we hereby jointly and severally bind ourselves,
successors, and assigns.

Signed, this _____ day of _____, 20____.

The Condition of the above obligation is such that whereas the Principal has submitted to

a certain BID, attached hereto and hereby made a part hereof to enter into a contract in writing, for
the _____

NOW, THEREFORE,

- (a) If said BID shall be rejected, or
- (b) If said BID shall be accepted and the Principal shall execute and deliver a contract in
the Form of Contract attached hereto (properly completed in accordance with said

BID) and shall furnish a BOND for his faithful performance of said contract, and for the payment of all persons performing labor or furnishing materials in connection therewith, and shall in all other respects perform the agreement created by the acceptance of said BID, then this obligation shall be void, otherwise the same shall remain in force and effect; it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

The Surety, for value received, hereby stipulates and agrees that the obligations of said Surety and its BOND shall be in no way impaired or affected by any extension of the time within which the OWNER may accept such BID; and said Surety does hereby waive notice of any such extension. IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set forth above.

_____(L.S.)
Principal

Surety

BY: _____

IMPORTANT - Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the state where the project is located.

CONTRACTOR'S QUALIFICATION STATEMENT

All questions must be answered in full. Additional sheets for clarification of answers or additional information may be attached. This statement must be notarized.

1. Name, address, phone number of company -
2. Owner, principal officer, date, and place organized -
3. General character of work performed -
4. Any work awarded failed to be completed or contracts defaulted on, where and why -
5. List of three most important recent contracts of similar scope and nature. State the owner, work, approximate cost, place, date started, and date completed.
 1. _____ \$ _____
_____ From _____ To _____
 2. _____ \$ _____
_____ From _____ To _____
 3. _____ \$ _____
_____ From _____ To _____
6. List the contracts upon which you are currently working. Include owner, location, approximate cost, and estimated date of completion.
7. List your major equipment available for use on this project.
8. _____
List of three material suppliers and amount of credit available.

_____	_____
_____	_____
_____	_____

9. Bank references and credit available.

_____	_____
_____	_____

10. Insurance coverage and amount

Liability-Property

Liability-Personal Injury

Vehicle and Equipment

Other - Identify

11. Bonding reference - List surety and highest coverage.

12. Subcontractors utilized - List name, address, specialty, and years experience.

1. _____

2. _____

3. _____

13. Provide a general description of the experience of the company and its key personnel.
14. Is Contractor in bankruptcy or has Contractor ever filed bankruptcy? If so, state when and where said bankruptcy or bankruptcies were or are filed.
15. Is the Contractor involved in any pending litigation? If so, state the style of the case and the court in which it is pending and briefly summarize the nature of the claim including the relief sought.

The undersigned hereby authorizes and requests any person, firm, or Corporation to furnish any information requested by _____ in verification of the recitals comprising this statement of contractor's qualifications:

Contractor: _____

By: _____

Title: _____

Date: _____

STATE OF (_____), COUNTY OF (_____)

_____ being duly sworn deposes and says that he is

_____ of _____ and that the answers to the foregoing questions and all statements therein contained are true and correct.

SUBSCRIBED AND SWORN TO BEFORE ME THIS ____ DAY OF _____, 20____,

by _____, _____ (title),

of _____ (company name, if applicable).

NOTARY PUBLIC _____

MY COMMISSION EXPIRES _____, 20____

REGISTRATION NO. _____

COMMONWEALTH OF VIRGINIA WORKERS' COMPENSATION

Certificate of Coverage

Evidence of coverage must be provided prior to commencement of Work.

This form must be completed and returned to the organization contracting the Work.

The undersigned organization stipulates that it:

- A. has workers' compensation insurance and is in compliance with the Workers' Compensation statutes of the Commonwealth of Virginia. ____ Yes ____ No
Insurance Company _____
Policy expiration date _____
- B. is self insured for workers' compensation. ____ Yes

Title of Construction Contract: _____

Contract Number: _____

Signed by: _____

Title: _____

Firm Name: _____

Address: _____

GENERAL CONDITIONS

A. DEFINITIONS

1. Wherever used in the CONTRACT DOCUMENTS, the following terms shall have the meanings indicated which shall be applicable to both the singular and plural thereof:
2. ADDENDA -- Written or graphic instruments issued prior to the execution of the Agreement which modify or interpret the CONTRACT DOCUMENTS, DRAWINGS and SPECIFICATIONS, by additions, deletions, clarifications or corrections.
3. BID -- The offer or Bid of the BIDDER submitted on the prescribed form setting forth the prices for the WORK to be performed.
4. BIDDER -- Any person, firm or corporation submitting a BID for the WORK.
5. BONDS -- Bid, Performance, and Payment Bonds and other instruments of security, furnished by the CONTRACTOR and his surety in accordance with the CONTRACT DOCUMENTS.
6. CHANGE ORDER -- A written order to the CONTRACTOR authorizing an addition, deletion or revision in the WORK within the general scope of the CONTRACT DOCUMENTS, or authorizing an adjustment in the CONTRACT PRICE or CONTRACT TIME.
7. CONTRACT DOCUMENTS -- The contract, including Invitation for Bids, Information for Bidders, BID, Bid Bond, Agreement, Payment Bond, Performance Bond, NOTICE OF AWARD, NOTICE TO PROCEED, CHANGE ORDER, DRAWINGS, SPECIFICATIONS, and ADDENDA.
8. CONTRACT PRICE -- The total monies payable to the CONTRACTOR under the terms and conditions of the CONTRACT DOCUMENTS.
9. CONTRACT TIME -- The number of calendar days stated in the CONTRACT DOCUMENTS for the completion of the WORK.
10. CONTRACTOR -- The person, firm or corporation with whom Owner has executed the Agreement.
11. DRAWINGS -- The part of the CONTRACT DOCUMENTS which show the characteristics and scope of the WORK to be performed and which have been prepared or approved by the ENGINEER.
12. ENGINEER -- The person, firm or corporation named as such in the CONTRACT DOCUMENTS.
13. FIELD ORDER -- A written order effecting a change in the WORK not involving an adjustment in the CONTRACT PRICE or an extension of the CONTRACT TIME, issued by the Owner to the CONTRACTOR during construction.
14. NOTICE OF AWARD -- The written notice of the acceptance of the BID from Owner to the successful BIDDER.
15. NOTICE TO PROCEED -- Written communication issued by Owner to the CONTRACTOR authorizing him to proceed with the WORK and establishing the date of commencement of the WORK.
16. OWNER -- The entity for whom the WORK is to be performed.
17. PROJECT -- The undertaking to be performed as provided in the CONTRACT DOCUMENTS.

18. SHOP DRAWINGS -- All drawings, diagrams, illustrations, brochures, schedules and other data which are prepared by the CONTRACTOR, a SUBCONTRACTOR, manufacturer, SUPPLIER or distributor, which illustrate how specific portions of the WORK shall be fabricated or installed.

19. SPECIFICATIONS -- A part of the CONTRACT DOCUMENTS consisting of written descriptions of a technical nature of materials, equipment, construction systems, standards and workmanship.

20. SUBCONTRACTOR -- An individual, firm or corporation having a direct contract with the CONTRACTOR or with any other SUBCONTRACTOR for the performance of a part of the work at the site.

21. SUBSTANTIAL COMPLETION -- That date as certified by the ENGINEER when the construction of the PROJECT or a specified part thereof is sufficiently completed, in accordance with the CONTRACT DOCUMENTS, so that the PROJECT or specified part can be utilized for the purposes for which it is intended.

22. SUPPLEMENTAL GENERAL CONDITIONS -- Modifications to General Conditions required by a Federal agency for participation in the PROJECT and approved by the agency in writing prior to inclusion in the CONTRACT DOCUMENTS, or such requirements that may be imposed by applicable state laws.

23. SUPPLIER -- Any person or organization who supplies materials or equipment for the WORK, including that fabricated to a special design, but who does not perform labor at the site.

24. WORK -- All labor necessary to produce the construction required by the CONTRACT DOCUMENTS, and all materials and equipment incorporated or to be incorporated in the PROJECT.

25. WRITTEN NOTICE--Any notice to any party of the Agreement relative to any part of this Agreement in writing and considered delivered and the service thereof completed, when posted by certified or registered mail to the said party at his last given address, or delivered in person to said party or his authorized representative on the WORK.

B. ADDITIONAL INSTRUCTIONS AND DETAIL DRAWINGS

1. The CONTRACTOR may be furnished additional instructions and detail drawings, by the ENGINEER, as necessary to carry out the WORK required by the CONTRACT DOCUMENTS.

2. The additional drawings and instruction thus supplied will become a part of the CONTRACT DOCUMENTS. The CONTRACTOR shall carry out the WORK in accordance with the additional detail drawings and instructions.

C. SCHEDULES, REPORTS AND RECORDS

1. The CONTRACTOR shall submit to Owner such schedule of quantities and costs, progress schedules, payrolls, reports, estimates, records and other data where applicable as are required by the CONTRACT DOCUMENTS for the WORK to be performed.

2. Prior to the first partial payment estimate the CONTRACTOR shall submit construction progress schedules showing the order in which he proposes to carry on the WORK, including dates at which he will start the various parts of the WORK, estimated date of completion of each part and, as applicable:
3. The dates at which special detail drawings will be required, respective dates for submission of SHOP DRAWINGS, the beginning of manufacture, the testing and the installation of materials, supplies and equipment.
4. The CONTRACTOR shall also submit a schedule of payments that he anticipates he will earn during the course of the WORK.
5. Contractor shall submit weekly reports to the Engineer stating what has been completed for the previous week. The report shall be in Excel format and sent to the Engineer (via email) by 12:00 p.m. each Monday. The report shall include sequence numbers for pedestals (in/out), handholes (in/out), conduit (in/out) and base of poles.

D. DRAWINGS AND SPECIFICATIONS

1. The intent of the DRAWINGS and SPECIFICATIONS is that the CONTRACTOR shall furnish all labor, tools, equipment, and transportation necessary for the proper execution of the WORK in accordance with the CONTRACT DOCUMENTS and all incidental work necessary to complete the PROJECT in an acceptable manner, ready for use, occupancy or operation by Owner.
2. In case of conflict between the DRAWINGS and SPECIFICATIONS, the SPECIFICATIONS shall govern. Figure dimensions on DRAWINGS shall govern over scale dimensions, and detailed DRAWINGS shall govern over general DRAWINGS.
3. Any discrepancies found between the DRAWINGS and SPECIFICATIONS and site conditions or any inconsistencies or ambiguities in the DRAWINGS or SPECIFICATIONS shall be immediately reported to Owner, in writing, who shall promptly correct such inconsistencies or ambiguities in writing. WORK done by the CONTRACTOR after his discovery of such discrepancies, inconsistencies or ambiguities, and before correction at the direction of Owner shall be done at the CONTRACTOR'S risk.

E. SHOP DRAWINGS

1. The CONTRACTOR shall provide SHOP DRAWINGS as may be necessary for the prosecution of the WORK as required by the CONTRACT DOCUMENTS. The ENGINEER shall promptly review all SHOP DRAWINGS. The ENGINEER'S approval of any SHOP DRAWING shall not release the CONTRACTOR from responsibility for deviations from the CONTRACT DOCUMENTS. The approval of any SHOP

DRAWING which substantially deviates from the requirement of the CONTRACT DOCUMENTS shall be evidenced by a CHANGE ORDER.

2. When submitted for the ENGINEER'S review, SHOP DRAWINGS shall bear the CONTRACTOR'S certification that he has reviewed, checked and approved the SHOP DRAWINGS and that they are in conformance with the requirements of the CONTRACT DOCUMENTS.

3. Portions of the WORK requiring a SHOP DRAWING or sample submission shall not begin until the SHOP DRAWING or submission has been approved by the ENGINEER. A copy of each approved SHOP DRAWING and each approved sample shall be kept in good order by the CONTRACTOR at the site and shall be available to the ENGINEER.

F. MATERIALS, SERVICES AND FACILITIES

1. It is understood that, except as otherwise specifically stated in the CONTRACT DOCUMENTS, the CONTRACTOR shall provide and pay for all labor, tools, equipment, water, light, power, transportation, supervision, temporary construction of any nature, and all other services and facilities of any nature whatsoever necessary to execute, complete, and deliver the WORK within the specified time.

2. Materials and equipment shall be so stored by CONTRACTOR as to ensure the preservation of their quality and fitness for the WORK. Stored materials and equipment to be incorporated in the WORK shall be located so as to facilitate prompt inspection.

3. Manufactured articles, materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned as directed by the manufacturer.

4. Supplies and equipment shall be in accordance with samples submitted by the CONTRACTOR and approved by the ENGINEER.

5. Supplies or equipment to be incorporated into the WORK shall not be purchased by the CONTRACTOR or the SUBCONTRACTOR subject to a chattel mortgage or under a conditional sale contract or other agreement by which an interest is retained by the seller.

G. INSPECTION AND TESTING

1. All materials and equipment used in the construction of the PROJECT shall be subject to adequate inspection and testing in accordance with generally accepted standards, as required and defined in the CONTRACT DOCUMENTS.

2. OWNER shall provide all inspection and testing services not required by the CONTRACT DOCUMENTS.

3. The CONTRACTOR shall provide at his expense the inspection services required by the CONTRACT DOCUMENTS.

4. If the CONTRACT DOCUMENTS, laws, ordinances, rules, regulations or orders of any public authority, including local political subdivisions having jurisdiction require any WORK to specifically be inspected, tested, or approved by someone other than the CONTRACTOR, the CONTRACTOR will give the ENGINEER, timely notice of readiness. The CONTRACTOR will then furnish the ENGINEER the required certificates of inspection, testing or approval.

5. Inspections, tests or approvals by the ENGINEER or others shall not relieve the CONTRACTOR from his obligations to perform the WORK in accordance with the requirements of the CONTRACT DOCUMENTS.

6. OWNER and its representatives will at all times have access to the WORK. In addition, authorized representatives and agents of any participating Federal or state agency shall be permitted to inspect all work, materials, payrolls, records of personnel, invoices of materials, and other relevant data and records. The CONTRACTOR will provide proper facilities for such access and observation of the WORK and also for any inspection, or testing thereof.

7. If any WORK is covered contrary to the written instructions of OWNER or its representative it must, if requested by OWNER, be uncovered for observation and replaced at the CONTRACTOR'S expense.

8. If the ENGINEER considers it necessary or advisable that covered WORK be inspected or tested by others, the CONTRACTOR, at the ENGINEER'S request, will uncover, expose or otherwise make available for observation, inspection or testing as the ENGINEER may require, that portion of the WORK in question, furnishing all necessary labor, materials, tools, and equipment. If it is found that such WORK is defective, the CONTRACTOR will bear all the expenses of such uncovering, exposure, observation, inspection and testing and of satisfactory reconstruction. If, however, such WORK is not found to be defective, the CONTRACTOR will be allowed an increase in the CONTRACT PRICE directly attributable to such uncovering, exposure, observation, inspection, testing and reconstruction and an appropriate CHANGE ORDER shall be issued.

H. SUBSTITUTIONS

1. Whenever a material, article or piece of equipment is identified on the DRAWINGS or SPECIFICATIONS by reference to brand name or catalogue number, it shall be understood that this is referenced for the purpose of defining the performance or other salient requirements and that other products of equal capacities, quality and function shall be considered. The CONTRACTOR may recommend the substitution of a material, article, or piece of equipment of equal substance and function for those referred to in the CONTRACT DOCUMENTS by reference to brand name or catalogue number, and if, in the opinion of the ENGINEER, such material, article, or piece of equipment is of equal substance and function to that specified, the ENGINEER may approve its substitution

and use by the CONTRACTOR. The CONTRACTOR warrants that if substitutes are approved, no major changes in the function or general design of the PROJECT will result. Incidental changes or extra component parts required to accommodate the substitute will be made by the CONTRACTOR without a change in the CONTRACT PRICE or CONTRACT TIME.

I. PATENTS

1. The CONTRACTOR shall pay all applicable royalties and license fees. He shall defend all suits or claims for infringement of any patent rights and save OWNER harmless from loss on account thereof, except that OWNER shall be responsible for any such loss when a particular process, design, or the product of a particular manufacturer or manufacturers is specified, however if the CONTRACTOR has reason to believe that the design, process or product specified is an infringement of a patent, he shall be responsible for such loss unless he promptly gives such information to OWNER.

J. SURVEYS, PERMITS, REGULATIONS

1. Permits and licenses of a temporary nature necessary for the prosecution of the WORK shall be secured and paid for by the CONTRACTOR unless otherwise stated in the SUPPLEMENTAL GENERAL CONDITIONS. Permits, licenses and easements for permanent structures or permanent changes in existing facilities shall be secured and paid for by OWNER, unless otherwise specified. The CONTRACTOR shall give all notices and comply with all laws, ordinances, rules and regulations bearing on the conduct of the WORK as drawn and specified. If the CONTRACTOR observes that the CONTRACT DOCUMENTS are at variance therewith, he shall promptly notify the ENGINEER in writing.

K. PROTECTION OF WORK, PROPERTY AND PERSONS

1. The CONTRACTOR will be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the WORK. He will take all necessary precautions for the safety of, and will provide the necessary protection to prevent damage, injury or loss to all employees on the WORK and other persons who may be affected thereby, all the WORK and all materials or equipment to be incorporated therein, whether in storage on or off the site, and other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement.

2. The CONTRACTOR will comply with all applicable laws, ordinances, rules, regulations and orders of any public body having jurisdiction. He will erect and maintain, as required by the conditions and progress of the WORK, all necessary safeguards for safety and protection. He will notify OWNER of adjacent utilities when prosecution of the WORK may affect them. The CONTRACTOR will remedy all damage, injury or loss to any property caused, directly or indirectly, in whole or in part, by the CONTRACTOR, any SUBCONTRACTOR or anyone directly or indirectly employed by any of them or

anyone for whose acts any of them be liable, except damage or loss attributable to the fault of the CONTRACT DOCUMENTS or to the acts or omissions of OWNER or the ENGINEER or anyone employed by either of them or anyone for whose acts either of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of the CONTRACTOR.

3. In emergencies affecting the safety of persons or the WORK or property at the site or adjacent thereto, the CONTRACTOR, without special instruction or authorization from the ENGINEER or OWNER, shall act to prevent threatened damage, injury or loss. He will give the ENGINEER prompt WRITTEN NOTICE of any significant changes in the WORK or deviations from the CONTRACT DOCUMENTS caused thereby, and a CHANGE ORDER shall thereupon be issued covering the changes and deviations involved.

L. SUPERVISION BY CONTRACTOR

1. The CONTRACTOR will supervise and direct the WORK. He will be solely responsible for the means, methods, techniques, sequences and procedures of construction. The CONTRACTOR will employ and maintain on the WORK a qualified supervisor or superintendent who shall have been designated in writing by the CONTRACTOR as the CONTRACTOR'S representative at the site. The supervisor shall have full authority to act on behalf of the CONTRACTOR and all communications given to the supervisor shall be as binding as if given to the CONTRACTOR. The supervisor shall be present on the site at all times as required to perform adequate supervision and coordination of the WORK.

M. CHANGES IN THE WORK

1. OWNER may at any time, as the need arises, order changes within the scope of the WORK without invalidating the Agreement. If such changes increase or decrease the amount due under the CONTRACT DOCUMENTS, an equitable adjustment shall be authorized by written CHANGE ORDER and based on the unit prices in the submitted BID.

2. The ENGINEER, also, may at any time, by issuing a FIELD ORDER, make changes in the details of the WORK. The CONTRACTOR shall proceed with the performance of any changes in the WORK so ordered by the ENGINEER unless the CONTRACTOR believes that such FIELD ORDER entitles him to a change in CONTRACT PRICE, in which event he shall give the ENGINEER WRITTEN NOTICE thereof within seven (7) days after the receipt of the ordered change. Thereafter the CONTRACTOR shall document the basis for the change in CONTRACT PRICE within thirty (30) days. The CONTRACTOR shall not execute such changes pending the receipt of an executed CHANGE ORDER from OWNER.

3. Requests for CHANGE ORDERS shall not stop construction.

4. Minor changes (such as adding a bore for a culvert or driveway not identified, etc.) shall not constitute a change in WORK.

N. CHANGES IN CONTRACT PRICE

1. The CONTRACT PRICE may be changed only by a CHANGE ORDER. The value of any WORK covered by a CHANGE ORDER or of any claim for increase or decrease in the CONTRACT PRICE shall be determined by one or more of the following methods in the order of precedence listed below:

- (a) Unit prices previously approved.
- (b) An agreed lump sum.

O. TIME FOR COMPLETION AND LIQUIDATED DAMAGES

1. The date of beginning, interim goals, and the time for completion of the WORK are essential conditions of the CONTRACT DOCUMENTS and the WORK embraced shall be commenced on a date specified in the NOTICE TO PROCEED.

2. The number of days within which, or the dates by which, the WORK is to be substantially completed and ready for final payment are set forth in the Agreement.

3. The CONTRACTOR will proceed with the WORK at such rate of progress to insure full completion within the CONTRACT TIME and Internal goals. It is expressly understood and agreed, by and between the CONTRACTOR and OWNER, that the CONTRACT TIME for the completion of the WORK and internal goals times for progress of the Work described herein are reasonable times, taking into consideration the average climatic and economic conditions and other factors prevailing in the locality of the WORK.

4. Provisions for liquidated damages, if any, are set forth in the Agreement.

5. The CONTRACTOR shall not be charged with liquidated damages or any excess cost when the delay in completion of the WORK is due to the following, and the CONTRACTOR has promptly given WRITTEN NOTICE of such delay to OWNER or ENGINEER.

- a. To any preference, priority or allocation order duly issued by OWNER.
- b. To unforeseeable causes beyond the control and without the fault or negligence of the CONTRACTOR, including but not restricted to, acts of God, or of the public enemy, acts of OWNER, acts of another CONTRACTOR in the performance of a contract with OWNER, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, and abnormal and unforeseeable weather.

P. CORRECTION OF WORK

1. The CONTRACTOR shall promptly remove from the premises all WORK rejected by the ENGINEER for failure to comply with the CONTRACT DOCUMENTS, whether incorporated in the construction or not, and the CONTRACTOR shall promptly replace and re-execute the WORK in accordance with the CONTRACT DOCUMENTS and without expense to OWNER and shall bear the expense of making good all WORK of other CONTRACTORS destroyed or damaged by such removal or replacement.
2. All removal and replacement WORK shall be done at the CONTRACTOR'S expense. If the CONTRACTOR does not take action to remove such rejected WORK within ten (10) days after receipt of WRITTEN NOTICE, OWNER may remove such WORK and store the materials at the expense of the CONTRACTOR.

Q. SUBSURFACE CONDITIONS

1. All excavation shall be unclassified regardless of material encountered. No additional payment shall be made to the CONTRACTOR for rock formations encountered while performing underground work including, but not limited to, boring, trenching, and digging.

R. SUSPENSION OF WORK, TERMINATION AND DELAY

1. OWNER may suspend the WORK or any portion thereof for a period of not more than ninety days or such further time as agreed upon by the CONTRACTOR by WRITTEN NOTICE to the CONTRACTOR and the ENGINEER which notice shall fix the date on which WORK shall be resumed. The CONTRACTOR will resume that WORK on the date so fixed. The CONTRACTOR will be allowed an increase in the CONTRACT PRICE or an extension of the CONTRACT TIME, or both, directly attributable to any suspension.
2. If the CONTRACTOR is adjudged as bankrupt or insolvent, or if he makes a general assignment for the benefit of his creditors, or if a trustee or receiver is appointed for the CONTRACTOR or for any of his property, or if he files a petition to take advantage of any debtor's act, or to reorganize under the bankruptcy or applicable laws, or if he repeatedly fails to supply sufficient skilled workmen or suitable materials or equipment, or if he repeatedly fails to make prompt payments to SUBCONTRACTORS or for labor, materials or equipment or if he disregards laws, ordinances, rules, regulations or orders of any public body having jurisdiction of the WORK or if he disregards the authority of the ENGINEER, or if he otherwise violates any provision of the CONTRACT DOCUMENTS, then OWNER may, without prejudice to any other right or remedy and after giving the CONTRACTOR and his surety a minimum of ten (10) days from delivery of a WRITTEN NOTICE, terminate the services of the CONTRACTOR and take possession of the PROJECT and of all materials, equipment, tools, construction equipment and machinery, thereon owned by the CONTRACTOR, and finish the WORK by whatever method he may deem expedient. In such case the CONTRACTOR shall not

be entitled to receive any further payment until the WORK is finished. If the unpaid balance of the CONTRACT PRICE exceeds the direct and indirect costs of completing the PROJECT, including compensation for additional professional services, such excess SHALL BE PAID TO THE CONTRACTOR. If such costs exceed such unpaid balance, the CONTRACTOR will pay the difference to OWNER. Such costs incurred by OWNER will be determined by the ENGINEER and incorporated in a CHANGE ORDER.

3. Where the CONTRACTOR'S services have been so terminated by OWNER, said termination shall not affect any right of OWNER against the CONTRACTOR then existing or which may thereafter accrue. Any retention or payment of monies by OWNER due the CONTRACTOR will not release the CONTRACTOR from compliance with the CONTRACT DOCUMENTS.

4. After ten (10) days from delivery of a WRITTEN NOTICE to the CONTRACTOR and the ENGINEER, OWNER may, without cause and without prejudice to any other right or remedy, elect to abandon the PROJECT and terminate the Contract. In such case, the CONTRACTOR shall be paid for all WORK executed and any expense sustained plus reasonable profit.

5. If, through no act or fault of the CONTRACTOR, the WORK is suspended for a period of more than ninety (90) days by OWNER or under an order of court or other public authority, or the ENGINEER fails to act on any request for payment within thirty (30) days after it is submitted or OWNER fails to pay the CONTRACTOR substantially the sum approved by the ENGINEER within forty five (45) days of its approval and presentation, then the CONTRACTOR may, after ten (10) days from delivery of a WRITTEN NOTICE to OWNER and the ENGINEER, terminate the CONTRACT and recover from OWNER payment for all WORK executed and all expenses sustained. In addition and in lieu of terminating the CONTRACT, if the ENGINEER has failed to act on a request for payment or if OWNER has failed to make any payment as aforesaid, the CONTRACTOR may upon ten (10) days written notice to OWNER and the ENGINEER stop the WORK until he has been paid all amounts then due, in which event and upon resumption of the WORK, CHANGE ORDERS shall be issued for adjusting the CONTRACT PRICE or extending the CONTRACT TIME or both to compensate for the costs and delays attributable to the stoppage of the WORK.

6. If the performance of all or any portion of the WORK is suspended, delayed, or interrupted as a result of a failure of OWNER or ENGINEER to act within the time specified in the CONTRACT DOCUMENTS, or if no time is specified, within a reasonable time, an adjustment in the CONTRACT PRICE or an extension of the CONTRACT TIME, or both, shall be made by CHANGE ORDER to compensate the CONTRACTOR for the costs and delays necessarily caused by the failure of OWNER or ENGINEER.

S. PAYMENTS TO CONTRACTOR

1. At least ten (10) days before each progress payment falls due (but not more often than once a month), the CONTRACTOR will submit to OWNER a partial payment estimate

filled out and signed by the CONTRACTOR covering the WORK performed during the period covered by the partial payment estimate and supported by such data as the ENGINEER may reasonably require. If payment is requested on the basis of equipment not incorporated in the WORK but delivered and suitably stored at or near the site, the partial payment estimate shall also be accompanied by such supporting data, satisfactory to OWNER, as will establish the OWNER title to the material and equipment and protect his interest therein, including applicable insurance. The ENGINEER will, within forty five (45) days after receipt of each partial payment estimate, either indicate in writing his approval of payment and present the partial payment estimate to OWNER, or return the partial payment estimate to the CONTRACTOR indicating in writing his reasons for refusing to approve payment. In the latter case, the CONTRACTOR may make the necessary corrections and resubmit the partial payment estimate. OWNER will, within ten (10) days of presentation to him of an approved partial payment estimate, pay the CONTRACTOR a progress payment on the basis of the approved partial payment estimate. On completion and acceptance of a part of the WORK on which the price is stated separately in the CONTRACT DOCUMENTS, payment may be made in full, including retained percentages, less authorized deductions.

2. The request for payment may also include an allowance for the cost of such major equipment which are suitably, stored either at or near the site.

3. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

4. Prior to SUBSTANTIAL COMPLETION, OWNER, with the approval of the ENGINEER and with the concurrence of the CONTRACTOR, may use any completed or substantially completed portions of the WORK. Such use shall not constitute an acceptance of such portions of the WORK.

5. OWNER shall have the right to enter the premises for the purpose of doing work not covered by the CONTRACT DOCUMENTS. This provision shall not be construed as relieving the CONTRACTOR of the sole responsibility for the care and protection of the WORK, or the restoration of any damaged WORK except such as may be caused by agents or employees of OWNER.

6. Upon completion and acceptance of the WORK, the ENGINEER shall issue a certificate attached to the final payment request that the WORK has been accepted by him under the conditions of the CONTRACT DOCUMENTS. The entire balance found to be due the CONTRACTOR, including the retained percentages, but except such sums as may be lawfully retained by OWNER, shall be paid to the CONTRACTOR within sixty (60) days of completion and acceptance of the WORK.

7. The CONTRACTOR will indemnify and save OWNER or the OWNER agents harmless from all claims growing out of the lawful demands of SUBCONTRACTORS, Lessors, laborers, workmen, mechanics, warehouse personnel, and furnishers of machinery and parts thereof, equipment, tools, and all supplies, incurred in the

furtherance of the performance of the WORK. The CONTRACTOR shall furnish satisfactory evidence that all obligations of the nature designated above have been paid, discharged, or waived by executed acceptable lien waiver form. If the CONTRACTOR fails to pay the above, OWNER may, after having notified the CONTRACTOR, either pay unpaid bills or withhold from the CONTRACTOR'S unpaid compensation a sum of money deemed reasonably sufficient to pay any and all such lawful claims until satisfactory evidence is furnished that all liabilities have been fully discharged whereupon payment to the CONTRACTOR shall be resumed, in accordance, with the terms of the CONTRACT DOCUMENTS, but in no event shall the provisions of this sentence be construed to impose any obligations upon OWNER to either the CONTRACTOR, his Surety, or any third party. In paying any unpaid bills of the CONTRACTOR, any payment so made by OWNER shall be considered as a payment made under the CONTRACT DOCUMENTS by OWNER to the CONTRACTOR and OWNER shall not be liable to the CONTRACTOR for any such payments made in good faith.

8. If OWNER fails to make payment forty-five (45) days after Owner's receipt of the payment request, in addition to other remedies available to the CONTRACTOR, there shall be added to each such payment interest at 1% per month, commencing on the first day after said payment is due and continuing until the payment is received by the CONTRACTOR.

T. ACCEPTANCE OF FINAL PAYMENT AS RELEASE

1. The acceptance by the CONTRACTOR of final payment shall be and shall operate as a release to OWNER of all claims and all liability to the CONTRACTOR other than claims in stated amounts as may be specifically excepted by the CONTRACTOR for all things done or furnished in connection with this WORK and for every act and neglect of OWNER and others relating to or arising out of this WORK. Any payment, however, final or otherwise, shall not release the CONTRACTOR or his sureties from any obligations under the CONTRACT DOCUMENTS or the PERFORMANCE BOND and PAYMENT BONDS.

U. INSURANCE

1. The CONTRACTOR shall purchase and maintain such insurance as will protect him from claims set forth below which may arise out of or result from the CONTRACTOR'S execution of the WORK, whether such execution be by himself or by any SUBCONTRACTOR or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

- a. Claims under workmen's compensation disability benefit and other similar employee benefit acts;
- b. Claims for damages because of bodily injury, occupational sickness or disease, or death of his employees;

c. Claims for damages because of bodily injury, sickness or disease, or death of any person other than his employees;

d. Claims for damages insured by usual personal injury liability coverage which are sustained (1) by any person as a result of an offense directly or indirectly related to the employment of such person by the CONTRACTOR, or (2) by any other person; and

e. Claims for damages because of injury to or destruction of tangible property, including loss of use resulting therefrom.

f. CONTRACTOR shall add OWNER to each of said insurance policies as an additional Named Insured.

2. Certificates of Insurance acceptable to OWNER shall be filed with OWNER prior to commencement of the WORK. These Certificates shall contain a provision that coverage afforded under the policies will not be canceled unless at least thirty (30) days prior WRITTEN NOTICE has been given to OWNER.

3. The CONTRACTOR shall procure and maintain, at his own expense, during the CONTRACT TIME, liability insurance as hereinafter specified;

a. CONTRACTOR'S General Public Liability and Property Damage Insurance including vehicle coverage issued to the CONTRACTOR and protecting him from all claims for personal injury, including death, and all claims for destruction of or damage to property, arising out of or in connection with any operations under the CONTRACT DOCUMENTS, whether such operations be by himself or by any SUBCONTRACTOR under him, or anyone directly or indirectly employed by the CONTRACTOR or by a SUBCONTRACTOR under him. Insurance shall be written with a limit of liability of not less than \$1,000,000 for all damages arising out of bodily injury, including death, at any time resulting there from, sustained by any one person in any one accident; and a limit of liability of not less than \$2,000,000 aggregate for any such damages sustained by two or more persons in any one accident. Insurance shall be written with a limit of liability of not less than \$1,000,000 for all property damage sustained by any one person in any one accident; and a limit of liability of not less than \$1,000,000 aggregate for any such damage sustained by two or more persons in any one accident.

b. The CONTRACTOR shall acquire and maintain, if applicable, Fire and Extended Coverage insurance upon the PROJECT to the full insurable value thereof for the benefit of OWNER, the CONTRACTOR, and SUBCONTRACTORS as their interest may appear. This provision shall in no way release the CONTRACTOR or CONTRACTOR'S surety from obligations under the CONTRACT DOCUMENTS to fully complete the PROJECT.

4. The CONTRACTOR shall procure and maintain at his own expense, during the CONTRACT TIME, in accordance with the provisions of the laws Virginia, Workmen's Compensation Insurance, including occupational disease provisions, for all of his employees at the site of the PROJECT and in case any work is sublet, the CONTRACTOR shall require such SUBCONTRACTOR similarly to provide Workmen's Compensation Insurance, including occupational disease provisions for all of the latter's employees unless such employees are covered by the protection afforded by the CONTRACTOR. In case any class of employees engaged in hazardous work under this contract at the site of the PROJECT is not protected under Workmen's Compensation statute, the CONTRACTOR shall provide, and shall cause each SUBCONTRACTOR to provide, adequate and suitable insurance for the protection of his employees not otherwise protected. CONTRACTOR and SUBCONTRACTOR Workers Compensation policies shall add OWNER as an additional named insured and cover OWNER for any compensation liability for "Statutory Employees."

5. The CONTRACTOR shall secure, if applicable, "All Risk" type Builder's Risk Insurance for WORK to be performed. Unless specifically authorized by OWNER, the amount of such insurance shall not be less than the CONTRACT PRICE totaled in the BID. The policy shall cover not less than the losses due to fire, explosion, hail, lightning, vandalism, malicious mischief, wind, collapse, riot, aircraft, and smoke during the CONTRACT TIME, and until the WORK is accepted by OWNER. The policy shall name as the insured the CONTRACTOR, the ENGINEER, and OWNER.

V. CONTRACT SECURITY

1. The CONTRACTOR shall within ten (10) days after the receipt of the NOTICE OF AWARD furnish OWNER with a Performance Bond and Payment Bond conditioned upon the performance by the CONTRACTOR of all undertakings, covenants, terms, conditions and agreements of the CONTRACT DOCUMENTS, and upon the prompt payment by the CONTRACTOR to all persons supplying labor, leased property and equipment in the prosecution of the WORK provided by the CONTRACT DOCUMENTS. Such BONDS shall be executed by the CONTRACTOR and a corporate bonding company licensed to transact such business in the state in which the WORK is to be performed and named on the current list of "Surety Companies Acceptable on Federal Bonds" as published in the Treasury Department Circular Number 570. The expense of these BONDS shall be borne by the CONTRACTOR. If at any time a surety on any such BOND is declared a bankrupt or loses its right to do business in the state in which the WORK is to be performed or is removed from the list of Surety Companies accepted on Federal BONDS, CONTRACTOR shall within ten (10) days after notice from OWNER to do so, substitute an acceptable BOND (or BONDS) in such form and sum and signed by such other surety or sureties as may be satisfactory to OWNER. The premiums on such BOND shall be paid by the CONTRACTOR. No further payments shall be deemed due nor shall be made until the new surety or sureties shall have furnished an acceptable BOND to OWNER.

W. ASSIGNMENTS

1. Neither the CONTRACTOR nor OWNER shall sell, transfer, assign or otherwise dispose of the Contract or any portion thereof or of his right, title or interest therein, or his obligations thereunder, without written consent of the other party.

X. INDEMNIFICATION

1. The CONTRACTOR will indemnify and hold harmless OWNER and the ENGINEER and their agents and employees from and against all claims, damages, losses and expenses including attorney's fees arising out of or resulting from the performance of the WORK, provided that any such claims, damage, loss or expense is attributable to bodily injury, sickness, disease or death. or to injury to or destruction of tangible property including the loss of use resulting therefrom; and is caused in whole or in part by any negligent or willful act or omission of the CONTRACTOR, and SUBCONTRACTOR, anyone directly or indirectly employed by any of them or anyone for whose acts any of them may be liable.
2. In any and all claims against OWNER or the ENGINEER, or any of their agents or employees, by any employee of the CONTRACTOR, any SUBCONTRACTOR, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, the indemnification obligation shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the CONTRACTOR or any SUBCONTRACTOR under workmen's compensation acts, disability benefit acts or other employee benefits acts.
3. The obligation of the CONTRACTOR under this paragraph shall not extend to the liability of the ENGINEER, his agents or employees arising out of the preparation or approval of maps, DRAWINGS, opinions, reports, surveys, designs or SPECIFICATIONS.

Y. SEPARATE CONTRACTS

1. OWNER reserves the right to let other contracts in connection with this PROJECT. The CONTRACTOR shall afford other CONTRACTORS reasonable opportunity for the introduction and storage of their materials and the execution of their WORK, and shall properly connect and coordinate his WORK with theirs. If the proper execution or results of any part of the CONTRACTOR'S WORK depends upon the WORK of any other CONTRACTOR, the CONTRACTOR shall inspect and promptly report to the ENGINEER any defects in such WORK that renders it unsuitable for such proper execution and results.
2. OWNER may perform additional WORK related to the PROJECT by its own employees, or it may let other contracts containing provisions similar to these. The CONTRACTOR will afford the other CONTRACTORS who are parties to such Contracts (or OWNER, if he is performing the additional WORK himself), reasonable

opportunity for the introduction and storage of materials and equipment and the execution of WORK, and shall properly connect and coordinate his WORK with theirs.

3. If the performance of additional WORK by other CONTRACTORS or OWNER is not noted in the CONTRACT DOCUMENTS prior to the execution of the CONTRACT, written notice thereof shall be given to the CONTRACTOR prior to starting any such additional WORK. If the CONTRACTOR believes that the performance of such additional WORK by OWNER or others involves him in additional expense or entitles him to an extension of the CONTRACT TIME, he may make a claim therefore.

Z. SUBCONTRACTING

1. The CONTRACTOR may utilize the services of specialty SUBCONTRACTORS on those parts of the WORK which, under normal contracting practices, are performed by specialty SUBCONTRACTORS.

2. The CONTRACTOR shall not award WORK to SUBCONTRACTOR(s), in excess of forty (40%) percent of the CONTRACT PRICE, without prior written approval of OWNER.

3. The CONTRACTOR shall be fully responsible to OWNER for the acts and omissions of his SUBCONTRACTORS, and of persons either directly or indirectly employed by them, as he is for the acts and omissions of persons directly employed by him.

4. The CONTRACTOR shall cause appropriate provisions to be inserted in all subcontracts relative to the WORK to bind SUBCONTRACTORS to the CONTRACTOR by the terms of the CONTRACT DOCUMENTS insofar as applicable to the WORK of SUBCONTRACTORS and to give the CONTRACTOR the same power as regards terminating any subcontract that OWNER may exercise over the CONTRACTOR under any provision of the CONTRACT DOCUMENTS.

5. Nothing contained in this CONTRACT shall create any contractual relation between any SUBCONTRACTOR and OWNER.

AA. ENGINEER'S AUTHORITY

1. The ENGINEER shall act as the OWNER representative during the construction period. He shall decide questions which may arise as to quality and acceptability of materials furnished and WORK performed. He shall interpret the intent of the CONTRACT DOCUMENTS in a fair and unbiased manner. The ENGINEER will make visits to the site and determine if the WORK is proceeding in accordance with the CONTRACT DOCUMENTS.

2. The CONTRACTOR will be held strictly to the intent of the CONTRACT DOCUMENTS in regard to the quality of materials, workmanship and execution of the

WORK. Inspections may be made at the factory or fabrication plant of the source of material supply.

3. The ENGINEER will not be responsible for the construction means, controls, techniques, sequences, procedures, or construction safety.
4. The ENGINEER shall promptly make decisions relative to interpretation of the CONTRACT DOCUMENTS.

BB. LAND AND RIGHTS-OF-WAY

1. Prior to issuance of NOTICE TO PROCEED, OWNER shall attempt to obtain all easements necessary for carrying out and for the completion of the WORK to be performed pursuant to the CONTRACT DOCUMENTS. The lack of easements shall not prohibit the CONTRACTOR from working in areas where easements are not required or where they have been obtained.
2. OWNER shall provide to the CONTRACTOR information which delineates and describes the lands owned and rights-of-way acquired.
3. The CONTRACTOR shall provide at his own expense and without liability to OWNER any additional land and access thereto that the CONTRACTOR may desire for temporary construction facilities, or for storage of materials and equipment.

CC. GUARANTY

1. The CONTRACTOR shall guarantee all WORK performed for a period of one (1) year from the date of SUBSTANTIAL COMPLETION. The CONTRACTOR warrants and guarantees for a period of one (1) year from the date of SUBSTANTIAL COMPLETION of the system that the completed system is free from all defects due to faulty materials or workmanship and the CONTRACTOR shall promptly make such corrections as may be necessary by reason of such defects including the repairs of any damage to other parts of the system resulting from such defects. OWNER will give notice of observed defects with reasonable promptness. In the event that the CONTRACTOR should fail to make such repairs, adjustments, or other WORK that may be made necessary by such defects, OWNER may do so and charge the CONTRACTOR the cost thereby incurred. The Performance BOND shall remain in full force and effect through the guarantee period.
2. The CONTRACTOR shall maintain all relevant project records for three years after OWNER has made final payment to the CONTRACTOR.

DD. SETTLEMENT OF CLAIMS OR DISPUTES

1. **MEDIATION.** In the event of any dispute, claim, question, or disagreement arising from or relating to this Agreement or the breach thereof, the Parties hereto shall use their

best efforts to settle the dispute, claim, question, or disagreement. To this effect, they shall consult and negotiate with each other in good faith and, recognizing their mutual interests, attempt to reach a just and equitable solution satisfactory to both Parties. If they do not reach such solution within a period of 60 days, then, upon mutual agreement of the Parties, the matter may be submitted for non-binding mediation. The selected mediator shall have experience in and/or knowledge of telecommunication operations including the construction, maintenance, and operation of the fiber optic systems for the provision of internet, telephone, cable and data services. If the dispute(s), claim(s), question(s), or difference(s) is not resolved through mediation and settlement, either Party shall be entitled to pursue its lawful rights in the Circuit Court of Floyd County.

EE. TAXES

1. The CONTRACTOR will pay all sales, consumer, use and other similar taxes required by the law of the place where the WORK is performed.

FF. CODES

1. The Contractor shall comply with all state and local codes and ordinances and the latest editions of the following:

- Virginia Uniform Building Code
- National Electric Code
- National Electric Safety Code
- Virginia Department of Transportation policies and standards
- Virginia Erosion and Sediment Control Law

GG. PRODUCTS

1. MATERIALS STORAGE

- a. Contractor shall provide suitable and sufficient enclosed and covered spaces, with raised flooring, to protect materials and equipment subject to damage by weather or construction. Materials stored on site which have not been properly protected will not be acceptable for use in construction and their replacement will be paid for by CONTRACTOR.

2. TOILETS

- a. The Contractor shall provide adequate and sanitary temporary outside toilet facilities for use of persons working at site. Contractor shall comply with applicable legal and health requirements. Temporary sanitary facilities shall be removed upon completion of the work and the premises shall be left clean.

3. ELECTRICITY

- a. Contractor shall make arrangements for, and provide temporary equipment, poles, wiring, switches, and outlets necessary to provide an adequate supply of electricity for lighting and power for construction purposes. Cost of temporary service shall be borne by the CONTRACTOR.
- b. The CONTRACTOR shall make arrangements for meter installation, service connections, and wiring to meet the requirements of the completed project.

4. WATER

- a. Make arrangements for, and provide temporary equipment and piping necessary to provide an adequate supply of water for construction purposes. Cost shall be borne by the CONTRACTOR.

5. PUMPING AND DRAINING:

- a. Provide pumping equipment to keep construction and storage areas free from standing water that could cause damage or that would interfere with the work.

6. ACCESS

- a. The Project Site shall at all times be accessible for delivery of construction materials and equipment. Maintenance of access points and access roads, loading and unloading areas and directional signage shall be the responsibility of the CONTRACTOR.
- b. Provide signage and barricades to clearly direct pedestrian and construction traffic.
- c. Any damage to existing paved surfaces, curbing, landscaping, etc. shall be restored or repaired by the CONTRACTOR.
- d. Stabilize parking areas and access roads with a base of crushed stone as soon as practicable after finish grading.

HH. FIRST AID FACILITIES AND ACCIDENTS

1. FIRST AID FACILITIES

- a. The CONTRACTOR shall provide at the site, such reasonable equipment and facilities as are necessary to supply first aid to any of his personnel who may be injured in connection with the work.

II. BARRICADES, WARNING SIGNS AND LIGHTS

1. GENERAL

CONTRACTOR shall provide, erect and maintain as necessary, strong and suitable barricades, fencing, danger signs and warning lights and as may be required for the safety of all those employed in the work, visiting the construction site, and for the general public.

2. ACCOMMODATION OF TRAFFIC

a. Any construction within VDOT rights-of-way shall be protected with signage and traffic safety devices in accordance with the “Virginia Work Area Protection Manual Standards and Guidelines”, most recent edition.

b. Bidders may obtain information concerning the requirements of highway and road work hours allowed per Route Number by contacting:

For Pulaski and Giles Counties: Virginia Department of Transportation - John Jones, (540) 381-7198

c. During the progress of the work; streets, driveways, sidewalks, and crossings shall be kept open for the passage of traffic and pedestrians and shall not be unnecessarily obstructed unless authorized by the authority having jurisdiction over same. The CONTRACTOR shall take such measures at his own expense, as may be necessary to keep the street open for traffic, and shall give advance notice to the Fire and Police Departments of his proposed street operations.

d. Warning signs shall be provided along all highways while work is in progress; and where traffic direction is required flagmen shall be designated by the CONTRACTOR to direct traffic past the equipment, machinery, or construction operations. Barricades and lights shall be provided as required to protect traffic. Where trenches have been cut in road shoulders on which traffic may pass at times, red flags and warning signs shall be placed at frequent intervals and maintained until the shoulder is safe for travel. The traveling public shall be warned of the construction with signing that is in accordance with VDOT policy.

e. The CONTRACTOR shall notify the VDOT, five working days in advance of work in highway right-of-way, and shall fully cooperate with these authorities.

f. The CONTRACTOR shall construct and maintain, without extra compensation, such adequate and proper bridges over excavations as may be necessary or directed for the purpose of accommodating pedestrians or vehicles.

g. All temporary means constructed by the CONTRACTOR for maintaining traffic shall be removed upon completion of the work unless otherwise specified

by the ENGINEER and any damage done to public or private property shall be made good by the CONTRACTOR.

h. All dirt spilled from the CONTRACTOR'S trucks on existing pavements over which it is hauled or which has otherwise been deposited thereon shall be removed by the CONTRACTOR whenever in the opinion of the ENGINEER, the accumulation is sufficient to cause the formation of mud, dust, interference with traffic or create a traffic hazard.

JJ. PUBLIC CONVENIENCE AND PROTECTION

1. During progress of the work, the convenience and protection of the public must be provided for, and interferences held to a minimum.

2. The CONTRACTOR shall, at all times, conduct the work in such a manner as to ensure the least practicable obstruction to public travel. The convenience of the general public and of the residents along or adjacent to the area of the work shall be provided for in a satisfactory manner, consistent with the operation and local conditions. Road and streets must be kept open at all times or suitable detours provided. Access to fire hydrants and other fire extinguishing equipment shall be provided and maintained at all times.

3. When necessary, for the protection of the public, the CONTRACTOR shall provide watchmen and/or lights to burn between twilight and sunrise, and shall erect and maintain barriers and all other necessary protection around the work at his own expense. He shall also take other precautions as may be necessary to protect life, and property. OWNER reserves the right to remedy any neglect on the part of the CONTRACTOR as regards to the protection of the work after twenty-four (24) hours notice in writing; and, in cases of emergency, OWNER shall have the right to remedy any neglect without previous notice, and in either case deduct the cost of such remedy from money due the CONTRACTOR.

KK. PERIODIC CLEAN UP; BASIC SITE RESTORATION

1. During construction, the CONTRACTOR shall regularly remove from the site of the work all accumulated debris and surplus materials of any kind which result from his operations. Unused equipment and tools shall be stored at the CONTRACTOR'S yard or base of operations for the project.

2. When the work involves installation of sewers, drains, water mains, manholes, underground structures, or other disturbance of existing features in or across streets, rights-of-way, easements, or private property, the CONTRACTOR shall (as the work progresses) promptly backfill, compact, grade, and otherwise restore the disturbed area to the basic condition which will permit resumption of pedestrian or vehicular traffic and any other critical activity or functions consistent with the original use of the land. All work within 500 feet of the forward progress shall be complete with the exception of testing. The CONTRACTOR'S forward progress is subject to being suspended if in the

opinion of the ENGINEER the above requirement is not met. The requirements for temporary paving of streets, walks, and driveways are specified elsewhere. Unsightly mounds of earth, large stones, boulders, and debris shall be removed so that the site presents a neat appearance.

3. The CONTRACTOR shall perform the clean-up work on a regular basis and as frequently as ordered by the ENGINEER. Basic site restoration in a particular area shall be accomplished immediately following the installation or completion of the required facilities in that area. Furthermore such work shall be accomplished, when ordered by the ENGINEER, if partially completed facilities must remain incomplete for some time period due to unforeseen circumstances.

4. Upon failure of the CONTRACTOR to perform periodic clean-up and basic restoration of the site to the ENGINEER'S satisfaction, OWNER may, upon five (5) days prior written notice to the CONTRACTOR, without prejudice to any other rights or remedies of OWNER, cause such work for which the CONTRACTOR is responsible to be accomplished to the extent deemed necessary by the ENGINEER, and all costs resulting therefrom shall be charged to the CONTRACTOR and deducted from the amounts of money that may be due him. The CONTRACTOR shall receive no consideration for time extension or compensation for production time lost while not in compliance with the requirements for clean-up.

SUPPLEMENTAL GENERAL CONDITIONS

A. CONTRACTOR VERIFICATIONS

The CONTRACTOR shall verify the accuracy of all grades, elevations, dimensions, locations, and field measurements. In all cases of the interconnection of its Work with existing or other Work, CONTRACTOR shall verify at the site all dimensions relating to such existing or other Work. Any errors due to the CONTRACTOR'S failure to verify all such grades, elevations, locations, dimensions, or field measurements shall be promptly rectified by the CONTRACTOR without any additional costs to the OWNER or extensions of Contract Times.

B. INSPECTION OF WORK, MATERIALS, ETC.

1. The authorized representatives and agents of the National Telecommunications and Information Administration (NTIA) shall be permitted to inspect all work, materials, payrolls, records of personnel, invoices of materials and other relevant data and records.

C. INSPECTION AND TESTING OF MATERIALS

All materials and equipment used in the construction of the project shall be subject to adequate inspection and testing in accordance with accepted standards. The laboratory or inspection agency shall be selected by OWNER. Materials of construction, particularly those upon which the strength and durability of the structure may depend, shall be subject to inspection and testing to establish conformance with specifications and suitability for intended users. The CONTRACTOR will be responsible for replacement of all broken fibers, regardless of the size of the strand, which may result from testing and inspection.

D. CLAIMS FOR EXTRA COSTS

No claims for extra work or cost shall be allowed unless the same was done in pursuance of a written order from the ENGINEER and approved by OWNER.

E. COORDINATION BETWEEN CONTRACTORS

1. Where work by one CONTRACTOR connects to work by another CONTRACTOR, both CONTRACTORS shall consult each other; and an arrangement shall be made to provide a feasible method of interconnection. Arrangements shall be made as to the procedure by the first CONTRACTOR to bring his work to the point of connection. In cases of disagreement, the ENGINEER shall be consulted as to the intent of the Contract Documents. The ENGINEER'S decision shall be final and binding.
2. The same procedure shall apply where work of two contractors is adjacent and could interfere with the work of other contractors.

3. It is the intent of these CONTRACT DOCUMENTS that contractors working simultaneously on the premises cooperate with each other, without argument, and cooperate in the prosecution of the work.

F. CLAIMS BETWEEN CONTRACTORS

1. Should CONTRACTOR cause damage to the work or property of any other contractor at the Site, or should any claim arising out of CONTRACTOR'S performance of the Work at the Site be made by any other contractor against CONTRACTOR, OWNER, ENGINEER, or the construction coordinator, then CONTRACTOR (without involving OWNER, ENGINEER, or construction coordinator) shall either (1) remedy the damage, (2) agree to compensate the other contractor for remedy of the damage, or (3) remedy the damage and attempt to settle with such other contractor by agreement, or otherwise resolve the dispute by arbitration or at law.

G. PROTECTION OF REAL ESTATE CROSSED BY RIGHT-OF-WAY

1. General. The CONTRACTOR shall limit the movement of his crews and equipment to the right-of-way, including access routes. The CONTRACTOR shall further limit movement on the right-of-way so as to minimize damage to grazing land, crops, orchards, or property and shall avoid marring the lands, except to the extent required to accomplish the Work. The CONTRACTOR shall be responsible for all damages off the right-of-way and shall settle all such damage claims directly with the property owner.

2. Restoration of Land to Original Conditions. As soon as weather and ground conditions permit, CONTRACTOR shall return the land upon which it has worked pursuant to this contract as nearly as possible to its original condition. CONTRACTOR shall promptly notify the property OWNER of any damage which is his responsibility. The CONTRACTOR, within 60 days after his knowledge of or notice from a land OWNER of damages off the right-of-way, caused by his operations under this contract, shall notify OWNER in writing as to his disposition of each such claim or his assumption of responsibility for damage. In order to adequately protect OWNER against claims, demands, or liabilities arising out of the CONTRACTOR'S construction operations under this contract, OWNER may withhold such sums as it deems appropriate from progress payments due the CONTRACTOR until the matter is settled. OWNER may also withhold final payment, or any part thereof, until the CONTRACTOR presents satisfactory evidence that all claims which are the responsibility of the CONTRACTOR have been settled.

3. Utilities: All damages to utilities shall be the responsibility of the Contractor. Contractor shall comply with the Underground Utility Damage Prevention Act, Code of Virginia, Title 56, Chapter 10.3.

H. COMPLIANCE WITH FEDERAL LAWS

1. This is a federally assisted project. Bidders will be required to comply with all applicable statutes, regulations, etc., including those pertaining to the licensing of contractors and the Anti-Kickback Acts, as amended (40 USC 276c; 41 USC 51 et seq.) and regulations issued pursuant thereto. BIDDERS and CONTRACTORS performing work under this PROJECT are bound by the requirements of the President's Executive Order Nos. 11246, 11375, 11625, and 12138, Davis-Bacon Provisions, Civil Rights Act of 1964, and the Certification of Non-Segregated Facilities. The Bidder's attention is called to the "MBE/WBE Requirements of 40 CFR 33.240," the goals and timetables for minority and female participation, and to the fact that not less than minimum wages set forth in the Contract Documents must be paid.

2. The form entitled "**Bidder Compliance Statement/Certification Regarding Equal Employment Opportunity**" must be submitted by the general CONTRACTOR along with his bid and becomes a part of the construction Contract. Each SUBCONTRACTOR whose contract with the general CONTRACTOR is in excess of \$10,000 must also execute such form with the general CONTRACTOR and present a copy to the OWNER for his records. Payment may be withheld if these forms are not on file.

3. Certified payrolls shall be submitted to the OWNER in compliance with the Davis-Bacon Act. Reporting form is included herein. Computer printout may be used provided the information required on the Standard Form WH-347 is included. Form WH-348 must be attached to the payroll form, whether the standard form or computer sheet.

4. Bidders must certify that they do not or will not maintain or provide for their employees any facilities that are segregated on the basis of race, color, creed, or national origins.

5. This CONTRACT is expected to be funded in whole or in part using funds from the American Recovery and Reinvestment Act (ARRA). Section 1605 of the ARRA prohibits the use of these funds unless all iron, steel, and manufactured goods are produced in the United States. All iron and steel manufacturing processes must take place in the United States, except for metallurgical processes involving refinement of steel additives. There is no requirement for the origin of components and subcomponents of manufactured goods. Products listed at 48 CFR 25.104(a) have been determined to be unavailable in the United States and if required for the project may be purchased from foreign sources. No unauthorized use of foreign iron, steel, and/or manufactured goods will be allowed on this project.

I. REQUIRED PROVISIONS DEEMED INSERTED

Each and every provision of law and clause required by law to be inserted in this CONTRACT shall be deemed to be inserted herein and the contract shall be read and enforced as though it were included herein, and if through mistake or otherwise any such provision is not inserted, or is not correctly inserted, then upon the application of either

party the contract shall forthwith be physically amended to make such insertion of correction.

J. SUBCONTRACTS

The CONTRACTOR shall insert in any subcontracts these same "Supplemental General Conditions."

K. PROGRESS PAYMENTS

The CONTRACTOR shall submit as part of his monthly application for payment a sworn **Affidavit of Payments of Claims** provided herein at the end of these Supplementary General Conditions attesting that he has paid all SUBCONTRACTORS and SUPPLIERS of labor and materials all sums due to date relative to this particular project.

L. OTHER PROHIBITED INTERESTS

No official of OWNER who is authorized in such capacity and on behalf of OWNER to negotiate, make, accept or approve, or to take part in negotiating, making, accepting, or approving any architectural, engineering, inspection, construction or material supply contract or any subcontract in connection with the construction of the project, shall become directly or indirectly interested personally in this contract or in any part hereof. No officer, employee, architect, attorney, ENGINEER, or inspector of or for OWNER who is authorized in such capacity and on behalf of OWNER to exercise any legislative, executive, supervisory or other similar functions in connection with the construction of the project, shall become directly or indirectly interested personally in this contract or in any part thereof, any material supply contract, subcontract, insurance contract, or any other contract pertaining to the PROJECT.

M. PATENTS

The CONTRACTOR shall hold and save OWNER and its officers, agents, servants and employees harmless from liability of any nature or kind, including cost and expenses for, or on account of, any patented or unpatented invention, process, article or appliance manufactured or used in the performance of the contract, including its use by OWNER, unless otherwise specifically stipulated in the CONTRACT DOCUMENTS.

License or Royalty Fee: License and/or royalty fees for the use of a process which is authorized by OWNER of the project must be reasonable, and paid to the holder of the patent, or his/her authorized licensee, directly by OWNER and not by or through the CONTRACTOR. If the CONTRACTOR uses any design, device or materials covered by letters, patent or copyright, he/she shall provide for such use by suitable agreement with OWNER of such patented or copyrighted design, device or material. It is mutually agreed and understood that, without exception, the contract prices shall include all royalties or costs arising from the use of such design, device or materials, in any way involved in the work. The CONTRACTOR and/or his/her Sureties shall indemnify and hold harmless

OWNER of the project from any and all claims for infringement by reason of the use of such patented or copyrighted design, device or materials or any trademark or copyright in connection with work agreed to be performed under this contract, and shall indemnify OWNER for any cost, expense or damage which it may be obliged to pay by reason of such infringement at any time during the prosecution of the work or after completion of the work.

N. CUMULATIVE REMEDIES

In the event that federal funding is terminated or otherwise unavailable for the purpose of compensating the CONTRACTOR, the CONTRACT is null and void, releasing him from further obligations contained therein.

FEDERAL CONTRACT PROVISIONS, INCLUDING
AMERICAN RECOVERY AND REINVESTMENT ACT FUNDED PROJECTS

The following requirements apply to this Project:

A. EQUAL EMPLOYMENT OPPORTUNITY

Executive Order 11246 (Contracts/subcontracts above \$10,000)

During the performance of this contract, the Contractor and all subcontractors agree to the following.

- (1) The Contractor will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The Contractor will take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, or national origin. Such action shall include, but not be limited to the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided setting forth the provisions of this nondiscrimination clause.
- (2) The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive considerations for employment without regard to race, color, religion, sex, or national origin.
- (3) The Contractor will send to each labor union or representative of workers with which he has a collective bargaining agreement or an other contract or understanding, a notice to be provided advising the said labor union or workers' representatives of the Contractor's commitments under this section, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.
- (4) The Contractor will comply with all provisions of Executive Order 11246 of September 24, 1965, and of the rules, regulations, and relevant orders of the Secretary of Labor.
- (5) The Contractor will furnish all information and reports required by Executive Order 11246 of September 24, 1965, and by rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to his books, records, and accounts by the administering agency and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.
- (6) In the event of the Contractors' noncompliance with the nondiscrimination clauses of this contract or with any of the said rules, regulations, or orders, this contract may be canceled, terminated, or suspended in whole or in part and the Contractor may be declared ineligible for further Government contracts or federally assisted construction contracts in accordance with procedures authorized in Executive Order 11246 of September 24, 1965, and such other sanctions may be imposed and remedies invoked as provided in Executive Order 11246 of September 24, 1965, or by rule, regulation or order of the Secretary of Labor, or as otherwise provided by law.
- (7) The Contractor will include the portion of the sentence immediately preceding paragraph (1) and the provisions of paragraphs (1) through (7) in every subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to section 204

of Executive Order 11246 of September 24, 1965, so that such provisions will be binding upon each subcontractor or vendor. The Contractor will take such action with respect to any subcontract or purchase order as the administering agency may direct as a means of enforcing such provisions, including sanctions for noncompliance. Provided, however, that in the event a Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction by the administering agency the Contractor may request the United States to enter into such litigation to protect the interests of the United States.

B. NOTICE TO PRIME CONTRACTOR OF REQUIREMENT FOR CERTIFICATION OF NONSEGREGATED FACILITIES

Bidders and offerors are cautioned as follows: By signing this bid or offer, the bidder or offeror will be deemed to have signed and agreed to the provisions of the "Certification of Nonsegregated Facilities" in this solicitation. The certification provides that the bidder or offeror does not maintain or provide for his employees facilities which are segregated on a basis of race, creed, color, or national origin, whether such facilities are segregated by directive or on a de facto basis. The certification also provides that he will not maintain such segregated facilities.

C. COPELAND "ANTI-KICKBACK" ACT

All contracts and subgrants in excess of \$2000 for construction or repair awarded by recipients and subrecipients shall include a provision for compliance with the Copeland "Anti-Kickback" Act (18 U.S.C. 874), as supplemented by Department of Labor regulations (29 CFR part 3, "Contractors and Subcontractors on Public Building or Public Work Financed in Whole or in Part by Loans or Grants from the United States"). The Act provides that each Contractor or subrecipient shall be prohibited from inducing, by any means, any person employed in the construction, completion, or repair of public work, to give up any part of the compensation to which he is otherwise entitled. The recipient shall report all suspected or reported violations to the DoC operating unit.

D. CONSTRUCTION CONTRACTORS AFFIRMATIVE ACTION REQUIREMENTS

Whenever the Contractor, or any subcontractor at any tier, subcontracts a portion of the work involving any construction trade, it shall physically include in each subcontract in excess of \$10,000 the provisions of these specifications and the Notice which contains the affirmative action goals for minority and women participation and which is set forth in the solicitations from which this contract resulted.

The goals for minority and female participation, expressed in percentage terms for the Contractor's aggregate workforce in each trade on all construction work in the covered area, are as follows:

Goals for Minority Participation	Goals for Female Participation
Floyd, Giles, Montgomery, Pulaski, and Wythe Counties - 12.0%	6.9% in all areas

E. CIVIL RIGHTS ACT OF 1964

The Contractor and any subcontractors shall not, on the grounds of race, color, or national origin, or sex, exclude from participation in, deny the benefits of, or subject to discrimination, any person under any program or activity receiving federal financial assistance.

F. REHABILITATION ACT OF 1973; PL 93-112, AND AGE DISCRIMINATION ACT OF 1975

The Contractor and any subcontractors shall not on the grounds of race, color, national origin, or sex, exclude from participation in, deny the benefits of, or subject to discrimination any person under any program or activity funded in whole or in part with Federal funds. Any prohibition against discrimination on the basis of age under the Age Discrimination Act of 1975, or with respect to an otherwise qualified handicapped individual as provided in Section 504 of the Rehabilitation Act of 1973 shall also apply to any such program or activity.

G. REQUIREMENTS FOR THE “BUY AMERICAN” PROVISIONS OF THE AMERICAN RECOVERY AND REINVESTMENT ACT (ARRA)

Section 1605 of the ARRA prohibits the use of these funds unless all iron, steel, and manufactured goods are produced in the United States. All iron and steel manufacturing processes must take place in the United States, except for metallurgical processes involving refinement of steel additives. There is no requirement for the origin of components and subcomponents of manufactured goods. Products listed as 48 CFR 25.104(a) have been determined to be unavailable in the United States and if required for the project, may be purchased from foreign sources. No unauthorized use of foreign iron, steel, and/or manufactured goods will be allowed on this project.

Notice of Limited Waiver of Section 1605 (Buy American Requirement) of the American Recovery and Reinvestment Act of 2009 (ARRA): In accordance with Section 1605 of the Recovery Act, the Secretary of Commerce has granted a limited waiver of the Recovery Act's Buy American requirements with respect to certain broadband equipment that will be used in projects funded under the BTOP. A description of this equipment is included in the notice of waiver published in the Federal Register at 74 FR31410 (July 1, 2009).

H. WHISTLEBLOWER PROTECTION ACT

The Whistleblower Protection requirements of the American Recovery and Reinvestment Act (Recovery Act), Section 553 of Division A, Title XV, Public Law 111-5 which provides protection for employees of non-federal employers including employees of state and local governments, Contractors, subcontractors, recipients, and any other non-federal employers receiving Recovery Act fund recipients, making specified disclosures relating to possible fraud, waste, or abuse of Recovery Act funds. The act requires any non-federal employer receiving Recovery Act funds to post a notice of the rights and remedies provided under the Act. The Recipient shall post notice of employees rights and remedies for whistleblower protections provided under section 1553 of the American Recovery and Reinvestment Act of 2009 (Pub. L. 111-5) and shall include this notice requirement in all contracts with subrecipients, Contractors, and subcontractors.

I. SECTION 11-51.1, to CHAPTER 417 RELATING TO THE PROCUREMENT PRACTICES OF ALL PUBLIC BODIES

For every contract over \$10,000 the Contractor must maintain a drug-free workplace. During the performance of this contract, the Contractor agrees to (i) provide a drug-free workplace for the Contractor's employees; (ii) post in conspicuous places, available to employees and applicants for employment, a statement notifying employees that the unlawful manufacture, sale, distribution, dispensation, possession, or use of a controlled substance or marijuana is prohibited in the Contractor's workplace and specifying the actions that will be taken against employees for violations of such prohibition; (iii) state in all solicitations or advertisements for employees placed by or on behalf of the Contractor that the Contractor maintains a drug-free workplace; and (iv) include the provisions of the foregoing clauses in every subcontract or purchase order of over \$10,000, so that the provisions will be binding upon each subcontractor or vendor.

For the purposes of this section, "drug-free workplace" means a site for the performance of work done in connection with a specific contract awarded to a Contractor in accordance with this chapter, the employees of whom are prohibited from engaging in the unlawful manufacture, sale, distribution, dispensation, possession or use of any controlled substance or marijuana during the performance of the contract.

J. CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

Where applicable, all contracts awarded by recipients exceeding \$100,000 for construction contracts and for other contracts that involve the employment of mechanics or laborers shall include a provision for compliance with Sections 102 and 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 327–333), as supplemented by Department of Labor regulations (29 CFR Part 5). Under Section 102 of the Act, each Contractor shall be required to compute the wages of every mechanic and laborer on the basis of a standard work week of 40 hours. Work in excess of the standard work week is permissible provided that the worker is compensated at a rate of not less than 1 1/2 times the basic rate of pay for all hours worked in excess of 40 hours in the work week. Section 107 of the Act is applicable to construction work and provides that no laborer or mechanic shall be required to work in surroundings or under working conditions which are unsanitary, hazardous or dangerous. These requirements do not apply to the purchases of supplies or materials or articles ordinarily available on the open market, or contracts for transportation or transmission of intelligence.

K. RIGHTS TO INVENTIONS MADE UNDER A CONTRACT OR AGREEMENT

Contracts or agreements for the performance of experimental, developmental, or research work shall provide for the rights of the Federal Government and the recipient in any resulting invention in accordance with 37 CFR part 401, "Rights to Inventions Made by Nonprofit Organizations and Small Business Firms Under Government Grants, Contracts and Cooperative Agreements," and any implementing regulations issued by the awarding agency.

L. CLEAN AIR ACT (42 U.S.C. 7401 ET SEQ.) AND THE FEDERAL WATER POLLUTION CONTROL ACT (33 U.S.C. 1251 ET SEQ.), AS AMENDED

Contracts and subgrants of amounts in excess of \$100,000 shall contain a provision that requires the recipient to agree to comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act (42 U.S.C. 7401 *et seq.*) and the Federal Water Pollution Control Act as amended (33 U.S.C. 1251 *et seq.*). Violations shall be reported to the DoC operating unit and the Regional Office of the Environmental Protection Agency (EPA).

M. BYRD ANTI-LOBBYING AMENDMENT

Contractors who apply or bid for an award exceeding \$100,000 shall file the required certification. Each tier certifies to the tier above that it will not and has not used Federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a member of Congress, officer or employee of Congress, or an employee of a member of Congress in connection with obtaining any Federal contract, grant or any other award covered by 31 U.S.C. 1352. Each tier shall also disclose any lobbying with non-Federal funds that takes place in connection with obtaining any Federal award. Such disclosures are forwarded from tier to tier up to the recipient.

N. DEBARMENT AND SUSPENSION

No contract shall be made to parties listed on the General Services Administration's List of Parties Excluded from Federal Procurement or Nonprocurement Programs in accordance with E.O.s 12549 and 12689, "Debarment and Suspension" as implemented by DoC regulations at 15 CFR part 26. This list contains the names of parties debarred, suspended, or otherwise excluded by agencies, and Contractors declared ineligible under statutory or regulatory authority other than E.O. 12549. Contractors with awards that exceed the simplified acquisition threshold shall provide the required certification regarding its exclusion status and that of its principal employees.

O. COMPLIANCE WITH DAVIS-BACON ACT PAYROLL REVIEW

The Contractor and its subcontractors shall comply with provisions of the Davis-Bacon Act and Related Acts. Federal minimum wage laws are applicable to all construction contracts in excess of \$2,000. The Davis-Bacon Act stipulates that all laborers and mechanics employed by the Contractor or subcontractors on federally assisted projects shall be paid wages at rates not less than those prevailing on similar construction in the area as determined by the Secretary of Labor. The Contractor and its subcontractors shall comply with provisions of the Contract Work Hours and Safety Standards Act generally applicable to any contracts in excess of \$100,000.

Wage rates specified in the applicable wage determination for this construction trade and geographic area are included in the contract specifications immediately following these contract inserts. The wage determination must be posted at the site of the work in a prominent and accessible place. The Contractor or subcontractor shall insert in any subcontract the clauses included in 29 CFR 5.5 (a) (1) through (12) (Contract Provisions and Related Matters) including the applicable wage rates and a clause requiring the subcontractor include these clauses in any lower tier subcontract. The prime contractor will be responsible for compliance by any subcontractor or lower tier subcontractor with all contract clauses in 29 CFR 5.5 (see Department of Labor website or a Federal regulations website).

By entering into this contract the Contractor certifies that neither it (nor he or she) nor any person or firm which has an interest in the Contractor's firm is disbarred or suspended from bidding or working on a federally funded project. No part of this contract will be subcontracted to any person or firm who has been debarred or suspended from bidding or working on a federally funded project.

Any class of laborers or mechanics employed under the contract, which is not listed in the wage determination, shall be classified in conformance with the wage decision. Additional classifications shall be requested from the Department of Labor as specified in 29 CFR 5.5 or as amended (see Department of Labor Website for forms and instructions). Upon issuance of an additional classification the new wage rate including fringe benefits where appropriate shall be paid to all workers performing the work in the additional classification from the first day on

which work is performed in the classification. The Department of Labor shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

- (1) The work to be performed by the classification requested is not performed by a classification in the wage determination; and,
- (2) The classification is utilized in the area by the construction industry; and,
- (3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

1) Payroll(s)

All mechanics and laborers employed upon the site of the work will be paid unconditionally and not less than once a week without subsequent deduction or rebate on any account the full amounts of wages and bona fide fringe benefits or cash equivalents thereof except as provided for by Department of Labor regulations issued in accordance with provisions of the Copeland Act. The payment shall be computed at wage rates not less than those contained in the "wage determination" included in these specifications regardless of any contractual relationship alleged to exist between the Contractor or its subcontractors and such laborers and mechanics.

Each Contractor and subcontractor shall furnish each week, in which any contract work is performed, to the loan recipient (Owner) a payroll of wages paid to each of its employees engaged on work during the preceding weekly payroll period. The payroll submitted shall set out accurately and completely all of the information required to be maintained in the Records section below. Each payroll* submitted shall be accompanied by a Statement of Compliance* signed by the Contractor or subcontractor or his/her agent who pays and supervises the payment of persons employed under the contract and shall certify the following:

- 1) that the payroll for the payroll period contains the information noted above and that such information is true and complete,
- 2) that such laborer or mechanic employed on the contract during the payroll period has been paid the full weekly wage earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in federal regulation(s), and,
- 3) that each laborer or mechanic has been paid not less than the applicable wage rate and fringe benefits or cash equivalent for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

Laborers and mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the actual time worked therein, provided, that the employee's payroll records accurately set forth the time spent in each classification in which work is performed.

Whenever the minimum rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the Contractor shall either pay the benefit as stated in the wage determination classification or pay another bona fide fringe benefit or an hourly cash equivalent thereof. If the Contractor does not make payment to a trustee or other third person, the Contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, provided, that the Secretary of Labor has found, upon the written request of the Contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary

may require the Contractor to set aside in a separate account assets for the meeting of obligations under the plan or program. Contributions made or cost reasonably anticipated for bona fide fringe benefits under the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions above as well as regular contributions made or costs incurred for more than a weekly period (but not less than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period.

2) Records

Payrolls and basic records shall be maintained by the Contractor and each subcontractor for a period covering three years from the date of completion of the contract for all laborers, mechanics, apprentices, trainees, watchmen, helpers, and guards working at the site of the work. Payrolls will include the name; his or her correct classification; hourly rates paid as wages paid including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalent thereof the types described in Section 1(b) (2) (B) of the Davis-Bacon Act; daily and weekly number of hours worked; deductions made; and actual wages paid.

Whenever the Secretary of Labor has found under 29 CFR 5.5 (a) (1) (iv) that wages of any laborer or mechanic include the amount of costs reasonably anticipated in providing benefits under a plan or program described in Section 1 (b) (2) (B) of the Davis-Bacon Act, the Contractor shall maintain records which show the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, **that the plan or program has been communicated in writing to the laborers or mechanics affected**, and records show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

3) Penalties and Withholding

Falsification of a payroll certification may subject the Contractor or subcontractor to civil or criminal prosecution under section 1001 of Title 18 and Section 231 of Title 31 of the United States code. If the Contractor or subcontractor fails to submit the required records or to make them available, the Federal agency or delegated agent may after written notice to the Contractor, sponsor, applicant, or Owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guaranteed of funds.

The Contractor or subcontractor shall make the payroll records required available for inspection, copying, or transcription by authorized representatives of the Owner or the Department of Labor and shall permit such representatives to interview employees during working hours on the job. Failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CR 5.12.

A breach of the these contract clauses or the clauses continued in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a Contractor and a subcontractor as provided in 29 CFR 5.12.

The governing body, shall upon its own actions or upon written request of an authorized representative of the Department of Labor withhold from the Contractor under this contract or any other federal contract with the same prime Contractor, or any other contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime Contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics including apprentices, trainees, and helpers employed by the Contractor and subcontractor, the full amount of wages required by the contract. In the event of failure to pay any laborer or a mechanic including

any apprentice, trainee, or helper, employed or working on the site of the work all or part of the wages required by the contract, the State or the Department of Labor may, after written notice to the Contractor, sponsor, applicant, or Owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guaranteed of funds.



FACT SHEET
Broadband Technology Opportunities Program
Flow-down of Award Terms to Contractors and Vendors

I. Overview

Recipients are responsible for ensuring that they incorporate or “flow down” certain terms and conditions of their BTOP awards to contracts that the recipient (or one of its subrecipients) negotiates with a contractor or vendors. These terms and conditions may also flow down to subcontractors. In general, the clauses incorporated in procurement contracts should contain the terms that a contractor must flow down to its subcontractors or vendors.

- NOTE: As shown in the chart below, this Fact Sheet addresses contracts with contractors and vendors. BTOP recipients must require subrecipients to comply with practically all terms and conditions of the award, including but not limited to the “flow down” requirements discussed here. For further information, see the BTOP Subrecipient Monitoring Fact Sheet, posted at <http://www2.ntia.doc.gov/ManagementResources>. NTIA also plans to release another Fact Sheet addressing requirements specific to customers leasing BTOP facilities under Indefeasible Right-of-Use (IRU) arrangements.

II. Provisions Required in Most Contracts with Contractors and Vendors

As shown in the charts below, there are many contract provisions that a recipient or subrecipient must include in its contracts with contractors or vendors of goods or services purchased with award funds. The list of required provisions depends upon whether the recipient or subrecipient is an entity subject to 15 C.F.R. Part 14 or Part 24 of the Department of Commerce (DOC) Uniform Administrative Requirements. Part 14 applies to non-profit and commercial organizations, hospitals, and institutions of higher education, while Part 24 applies to State, local government, and tribal entities.

These charts also include other sources of BTOP terms and conditions that may flow down to contractors or vendors, such as the American Recovery and Reinvestment Act of 2009 (“ARRA”), the DOC Financial Assistance Standard Terms and Conditions (“DOC Standard Terms and Conditions”), and the DOC American Recovery and Reinvestment Act Award Terms (“DOC ARRA Award Terms”). These documents may also refer to other statutes or regulations, which may provide specific language for a recipient to include an agreement with a contractor or vendor.





A. Non-Profit, Commercial Organizations, Hospitals, and Institutions of Higher Education

Recipients or subrecipients that are nonprofit or commercial organizations, institutions of higher education, or hospitals must include the following provisions in their contracts with contractors or vendors:

Contract Provision	Contracts to Which Requirement Applies	Source(s) of Requirement and/or Contract Language
All Contracts		
Equal Employment Opportunity	All contracts (see 41 C.F.R. § 60-1.5 for exemptions)	<ul style="list-style-type: none">■ 15 C.F.R. Part 14, Appendix A■ 41 C.F.R. § 60-1.4(b)■ 41 C.F.R. § 60-4.3
Rights to Inventions	Contracts awarded to nonprofits and small business organizations for the performance of experimental, developmental, or research work	<ul style="list-style-type: none">■ 15 C.F.R. Part 14, Appendix A■ 37 C.F.R. § 401.14■ DOC Standard Terms and Conditions § M.04
Debarment and Suspension	All contracts except procurement contracts for goods and services under \$25,000 that do not require the consent of a DOC official; contracts in excess of \$100,000 must provide certification	<ul style="list-style-type: none">■ DOC Standard Terms and Conditions § J.04(b)■ 15 C.F.R. Part 14, Appendix A■ 2 C.F.R. Part 1326 Subpart C■ 2 C.F.R. § 180.330
Buy American	All contracts for construction, alteration, maintenance, or repair of a public building or public work	<ul style="list-style-type: none">■ ARRA § 1605■ DOC ARRA Award Terms § A.2
Access to Records	All contracts under ARRA	<ul style="list-style-type: none">■ ARRA § 1515■ DOC ARRA Award Terms § B.5■ 15 C.F.R. § 14.48(d)
Contracts in Excess of \$2,000		
Copeland "Anti-Kickback" Act	All construction or repair contracts in excess of \$2,000	<ul style="list-style-type: none">■ 15 C.F.R. Part 14, Appendix A■ 29 C.F.R. §§ 3.11, 5.5(a)





Contract Provision	Contracts to Which Requirement Applies	Source(s) of Requirement and/or Contract Language
Davis-Bacon Act	All construction contracts and subcontracts for laborers and mechanics in excess of \$2,000	<ul style="list-style-type: none"> ■ ARRA § 1606 ■ DOC ARRA Award Terms § A.3 ■ 15 C.F.R. Part 14, Appendix A ■ 29 C.F.R. § 5.5(a)
Contracts in Excess of \$100,000		
Bid Guarantees From Bidders Equivalent to 5% of the Bid Price	All construction and facility improvement contracts in excess of \$100,000, unless DOC approves the recipient's own policy and requirements	■ 15 C.F.R. § 14.48(c)
Performance Bonds and Payment Bonds for 100% of Contract Price		■ 15 C.F.R. § 14.48(c)
Clean Air Act, Federal Water Pollution Control Act	Contracts and subgrants in excess of \$100,000	<ul style="list-style-type: none"> ■ 15 C.F.R. Part 14, Appendix A ■ DOC Standard Terms and Conditions § L
Lobbying Restrictions		<ul style="list-style-type: none"> ■ DOC Standard Terms and Conditions § J.04(c) ■ 15 C.F.R. Part 14, Appendix A ■ 15 C.F.R. § 28.110 and Part 28, Appendices A-B
Violation/Breach of Contract		■ 15 C.F.R. § 14.48(a)
Termination		■ 15 C.F.R. § 14.48(b)
Contract Work Hours and Safety Standards Act (Overtime and Construction Safety)	Construction contracts and other contracts that employ mechanics or laborers in excess of \$100,000	<ul style="list-style-type: none"> ■ 15 C.F.R. Part 14, Appendix A ■ 29 C.F.R. § 5.5(b)-(c)





B. State, Local, and Tribal Governments

Recipients or subrecipients that are State, local, or tribal governments must include the following provisions in their contracts with contractors or vendors:

Contract Provision	Contracts to Which Requirement Applies	Source(s) of Requirement and/or Contract Language
All Contracts		
Rights to Inventions, Copyrights, and Data	All contracts	<ul style="list-style-type: none"> 15 C.F.R. § 24.36(i)(8)-(9) DOC Standard Terms and Conditions § M.04
Debarment and Suspension		<ul style="list-style-type: none"> DOC Standard Terms and Conditions § J.04(b) 2 C.F.R. Part 1326 Subpart C 2 C.F.R. § 180.330 15 C.F.R. § 24.35
Access to Records		<ul style="list-style-type: none"> ARRA § 1515 DOC ARRA Award Terms § B.5 15 C.F.R. § 24.36(i)(10)
Awarding Agency Reporting Requirements		<ul style="list-style-type: none"> 15 C.F.R. § 24.36(i)(7)
Records Retention Requirement		<ul style="list-style-type: none"> 15 C.F.R. § 24.36(i)(11)
Energy Policy and Conservation Act		<ul style="list-style-type: none"> 15 C.F.R. § 24.36(i)(13)
Copeland "Anti-Kickback" Act	All contracts and subgrants for construction or repair	<ul style="list-style-type: none"> 15 C.F.R. § 24.36(i)(4) 29 C.F.R. §§ 3.11, 5.5(a)





Contract Provision	Contracts to Which Requirement Applies	Source(s) of Requirement and/or Contract Language
Buy American	All contracts for construction, alteration, maintenance, or repair of a public building or public work	<ul style="list-style-type: none"> ■ ARRA § 1605 ■ DOC ARRA Award Terms § A.2
Contracts in Excess of \$2,000		
Contract Work Hours and Safety Standards Act (Overtime and Construction Safety)	Construction contracts in excess of \$2,000; contracts in excess of \$2,500 for other contracts that involve mechanics or laborers	<ul style="list-style-type: none"> ■ 15 C.F.R. § 24.36(i)(6) ■ 29 C.F.R. § 5.5(b)-(c)
Davis-Bacon Act	All construction contracts and subcontracts for laborers and mechanics in excess of \$2,000	<ul style="list-style-type: none"> ■ ARRA § 1606 ■ DOC ARRA Award Terms § A.3 ■ 15 C.F.R. § 24.36(i)(5) ■ 29 C.F.R. § 5.5(a)
Contracts in Excess of \$10,000		
Equal Employment Opportunity	Contracts in excess of \$10,000	<ul style="list-style-type: none"> ■ 15 C.F.R. § 24.36(i)(3) ■ 41 C.F.R. § 60-1.4(b) ■ 41 C.F.R. § 60-4.3
Termination	Construction contracts in excess of \$10,000	<ul style="list-style-type: none"> ■ 15 C.F.R. § 24.36(i)(2)
Contracts in Excess of \$100,000		
Clean Air Act, Clean Water Act	Contracts, subcontracts, and subgrants in excess of \$100,000	<ul style="list-style-type: none"> ■ 15 C.F.R. § 24.36(i)(12) ■ See also DOC Standard Terms and Conditions § L





Contract Provision	Contracts to Which Requirement Applies	Source(s) of Requirement and/or Contract Language
Lobbying Restrictions	Contracts, subcontracts, and subgrants in excess of \$100,000	<ul style="list-style-type: none"> ■ DOC Standard Terms and Conditions § J.04(c) ■ 15 C.F.R. § 28.110 and Appendices A-B to Part 28
Violation/Breach of Contract		<ul style="list-style-type: none"> ■ 15 C.F.R. § 24.36(i)(1)
Performance Bonds and Payment Bonds for 100% of Contract Price	All construction or facility improvement contracts exceeding \$100,000, unless DOC approves the recipient's own policy and requirements	<ul style="list-style-type: none"> ■ 15 C.F.R. § 24.36(h)
Bid Guarantees From Bidders Equivalent to 5% of the Bid Price		<ul style="list-style-type: none"> ■ 15 C.F.R. § 24.36(h)

III. Federal Interest Provisions in Agreements with Contractors and Vendors for Less Than Fee Simple Interest

In projects that involve construction, when using BTOP or matching funds to purchase an interest that is less than fee simple, a recipient or subrecipient must take one or both of the following actions:

- Include in the contract an acknowledgement of the Federal Interest in the property and provide a right of assignment if the property is not used in accordance with the terms and conditions of the BTOP award; and/or
- Record notice of the Federal Interest (e.g., a UCC-1 statement or a covenant in the land records, as appropriate).

In the case of land and fixtures, "less than fee simple" interests include, but are not limited to, capital leases, easements, and rights-of-way. In the case of personal property, such interests include, but are not limited to, long-term IRU agreements and other capital leases.

The Federal Interest is detailed in the BTOP Federal Interest Documentation Requirements Fact Sheet, posted at <http://www2.ntia.doc.gov/ManagementResources>. See also 15 C.F.R. §§ 14.30-37 and 24.31-34 (as applicable).

IV. Non-Discrimination and Interconnection Obligations in Agreements with Contractors Engaged to Deploy or Operate Facilities

Each BTOP Infrastructure award includes certain non-discrimination and interconnection requirements, which are described in the Notices of Funds Availability (NOFAs). See Notice of Funds Availability and Solicitation of Applications, 74 Fed. Reg. 33104 at 33110-11, 33132-34 (July 9, 2009) ("First NOFA"); Notice of Funds Availability and Solicitation of Applications, 75 Fed. Reg. 3792 at 3800-01 (Jan. 22, 2010) ("Second NOFA").

When a recipient engages another entity to deploy or operate a substantial proportion of the BTOP-funded network facilities, the recipient may need to require the other entity to comply with BTOPs nondiscrimination and





interconnection requirements to ensure that it provides the type of open and nondiscriminatory network that was the purpose of the award.

For more information on the nondiscrimination and interconnection obligations, please refer to the Nondiscrimination and Interconnection Obligations Fact Sheet, available at <http://www2.ntia.doc.gov/ManagementResources>.

V. Additional Resources

For additional information pertaining to the flow-down of contract provisions, please refer to the following resources:

- Department of Commerce Financial Assistance Standard Terms and Conditions, available at:
<http://oam.ocs.doc.gov/docs/GRANTS/DOC%20STCsMAR08Rev.pdf>
- U.S. Department of Commerce American Recovery and Reinvestment Act Award Terms, available at:
http://www2.ntia.doc.gov/files/award_docs/ARRA-DOC-Award-Terms-Final-5-20-09PDF.doc.pdf
- BTOP Subrecipient Monitoring Fact Sheet, available at:
http://www2.ntia.doc.gov/files/subrecipient_monitoring_fact_sheet_032111_final.pdf
- BTOP Federal Interest Documentation Requirements Fact Sheet, available at:
http://www2.ntia.doc.gov/files/fact_sheet_federal_interest_082510_v2_1.pdf
- BTOP Nondiscrimination and Interconnection Obligations Fact Sheet, available at:
http://www2.ntia.doc.gov/files/Interconnection_Nondiscrimination_11_10_10_FINAL.pdf
- Code of Federal Regulations, available at
<http://www.gpo.gov/fdsys/browse/collectionCfr.action?collectionCode=CFR>



FEDERAL FORMS AND INSERTS

**BIDDER COMPLIANCE STATEMENT/CERTIFICATION
REGARDING EQUAL EMPLOYMENT OPPORTUNITY**

Applicability: Bid exceeding ten thousand dollars for construction contract/subcontract of unlimited amount and non-construction contract/subcontract of less than one million dollars.

This statement relates to a proposed (contract between _____ and Public Body) or
(subcontract between _____ and _____) to be
(subcontractor) (contractor)

funded under a federally assisted project. Pursuant to Executive Order 11246 and its implementing regulations at 41 CFR 60-1.7 (b) (1), as the undersigned bidder. I certify that:

- 1) Bidder has participated in a previous contract or subcontract subject to the Equal Opportunity Clause.
_____ Yes _____ No
- 2) Bidder has developed and has on file at each establishment affirmative action programs pursuant to 41 CFR 60-2 (applies only to non-construction contractor).
_____ Yes _____ No
- 3) Bidder has filed with the Joint Reporting Committee, the Director (Office of Federal Contract Compliance Programs, U.S. Department of Labor), and agency, or the Equal Employment Opportunity Commission, all reports due under the applicable filing requirements.
_____ Yes _____ No

I understand that if I have failed to file any compliance reports which have been required of me, or have failed to develop and have on file at each establishment affirmative action programs pursuant to 41 CFR 60-2, when required, I am not eligible to have my bid or proposal considered, or to enter into the proposed contract.

I further understand that if awarded the proposed contract, and the contract for the FIRST time brings me under the filing requirements or the written affirmative action programs that I will, as applicable: (a) within 30 days file with the Public Body Standard Form 100 (EEO-1); and (b) within 120 days from the commencement of the contract develop and submit to the Director of OFCCP for approval a Written Affirmative Action Plan.

NAME AND ADDRESS OF BIDDER (Include ZIP Code):

NAME AND TITLE OF SIGNER (Please Type):

SIGNATURE:

DATE:

CERTIFICATION OF NONSEGREGATED FACILITIES

(Applicable to contracts, subcontracts, and agreements with Applicants who are themselves performing federally assisted construction contracts, exceeding \$10,000 which are not exempt from the provisions of the Equal Opportunity clause.)

By the submission of this bid, the bidder, offeror, applicant or subcontractor certifies that he does not maintain or provide for his employees any segregated facilities at any of his establishments, and that he does not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. He certifies further that he will not maintain or provide for his employees any segregated facilities at any of his establishments, and that he will not permit his employees to perform their services at any location, under his control, where segregated facilities are maintained. The bidder, offeror, applicant, or subcontractor agrees that a breach of this certification is a violation of the Equal Opportunity clause in this contract. As used in this certificate, the term "segregated facilities" means any waiting rooms, work areas, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation and entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive or are in fact segregated on the basis of race, creed, color, or national origin, because of habit, local custom, or otherwise. He further agrees that (except where he has obtained identical certifications from proposed subcontractors for specific time periods) he will obtain identical certifications from proposed subcontractors prior to the award of subcontracts exceeding \$10,000 which are not exempt from the provisions of the Equal Opportunity clause; that he will retain such certifications in his files, and that he will forward the following notice to such proposed subcontractors (except where the proposed subcontractors have submitted identical certifications for specific time periods).

(Signature)

(Date)

(Name and Title of Signer – Please Type)

NOTICE TO PROSPECTIVE SUBCONTRACTORS OF REQUIREMENTS FOR CERTIFICATIONS OF NON-SEGREGATED FACILITIES

A certification of Nonsegregated Facilities, as required by the May 9, 1967, order (32F.R. 7439, May 19, 1967) on Elimination of Segregated Facilities, by the Secretary of Labor, must be submitted prior to the award of a subcontract exceeding \$10,000 which is not exempt from the provisions of the Equal Opportunity clause. The certification may be submitted either for each subcontract or for all subcontracts during a period (i.e. quarterly, semiannually, or annually).

NOTE: The penalty for making false statements in offers is prescribed in 18 U.S.C. 1001.

DATE _____

(Signature of Bidder or Prospective Contractor)

Address (including Zip Code)

CERTIFICATION REGARDING DRUG-FREE WORKPLACE REQUIREMENTS

The grantee certifies that it will provide a drug-free workplace by:

- (a) Publishing a statement notifying employees that the unlawful manufacture, distribution, dispensing, possession or use of a controlled substance is prohibited in the grantee's workplace and specifying the actions that will be taken against employees for violation of such prohibition;
- (b) Establishing a drug-free awareness program to inform employees about—
 - (1) The dangers of drug abuse in the workplace;
 - (2) The grantee's policy of maintaining a drug-free workplace;
 - (3) Any available drug counseling, rehabilitation and employee assistance programs, and
 - (4) The penalties that may be imposed upon employees for drug abuse violations occurring in the workplace.
- (c) Making it a requirement that each employee to be engaged in the performance of the grant be given a copy of the statement required by paragraph (a);
- (d) Notifying the employee in the statement required by paragraph (a) that, as a condition of employment under the grant, the employee will—
 - (1) Abide by the terms of the statement; and
 - (2) Notify the employer of any criminal drug statute conviction for a violation occurring in the workplace no later than five days after each conviction;
- (e) Notifying the agency within ten days after receiving notice under subparagraph (d)(2) from an employee or otherwise receiving actual notice of such conviction;
- (f) Taking one of the following actions, within 30 days of receiving notice under subparagraph (d)(2), with respect to any employee who is so convicted—
 - (1) Taking appropriate personnel action against such an employee, up to and including termination; or
 - (2) Requiring such employee to participate satisfactorily in a drug abuse assistance or rehabilitation program approved for such purposes by a Federal, State, or local health, law enforcement, or other appropriate agency;
- (g) Making a good faith effort to continue to maintain a drug-free workplace through implementation of paragraphs (a), (b), (c), (d), (e) and (f).

Typed Name and Title of Certification Official

Signature

Date

LOBBYING CERTIFICATION

Certification for Contracts, Grants, Loans, and Cooperative Agreements

The undersigned certifies, to the best of his or her knowledge and belief, that:

(1) No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

(3) The undersigned shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subcontracts, subgrants, and contracts under grants, loans, and cooperative agreements) and that all subrecipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by section 1352, title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

Organization Name

Name and Title of Authorized Official

Signature

Date

CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION – LOWER TIER COVERED TRANSACTIONS

INSTRUCTIONS FOR CERTIFICATION

1. By signing and submitting this proposal, the prospective lower tier participant is providing the certification set out below.
2. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.
3. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous when submitted or had become erroneous by reason of changed circumstances.
4. The terms *covered transaction*, *debarred*, *suspended*, *ineligible*, *lower tier covered transaction*, *participant*, *person*, *primary covered transaction*, *principal*, *proposal*, and *voluntarily excluded*, as used in this clause, have the meaning set out in the Definitions and Coverage sections of the rules implementing Executive Order 12549. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations.
5. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transactions with a person who is proposed for debarment under 48 CFR part 9, subpart 9.4, debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.
6. The prospective lower tier participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion - Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.
7. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that it is not proposed for debarment under 48 CFR part 9, subpart 9.4, debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the List of Parties Excluded from Federal Procurement and Nonprocurement Programs.
8. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

9. Except for transactions authorized under paragraph 5 of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is proposed for debarment under 48 CFR part 9, subpart 9.4, suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

CERTIFICATION

- (1) The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.
- (2) Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

Organization Name

PR/Award or Project Name

Name and Title

Signature

Date

EMPLOYEE RIGHTS UNDER THE DAVIS-BACON ACT

FOR LABORERS AND MECHANICS EMPLOYED ON FEDERAL OR FEDERALLY ASSISTED CONSTRUCTION PROJECTS

THE UNITED STATES DEPARTMENT OF LABOR WAGE AND HOUR DIVISION

PREVAILING WAGES

You must be paid not less than the wage rate listed in the Davis-Bacon Wage Decision posted with this Notice for the work you perform.

OVERTIME

You must be paid not less than one and one-half times your basic rate of pay for all hours worked over 40 in a work week. There are few exceptions.

ENFORCEMENT

Contract payments can be withheld to ensure workers receive wages and overtime pay due, and liquidated damages may apply if overtime pay requirements are not met. Davis-Bacon contract clauses allow contract termination and debarment of contractors from future federal contracts for up to three years. A contractor who falsifies certified payroll records or induces wage kickbacks may be subject to civil or criminal prosecution, fines and/or imprisonment.

APPRENTICES

Apprentice rates apply only to apprentices properly registered under approved Federal or State apprenticeship programs.

PROPER PAY

If you do not receive proper pay, or require further information on the applicable wages, contact the Contracting Officer listed below:

or contact the U.S. Department of Labor's Wage and Hour Division.



For additional information:

1-866-4-USWAGE

(1-866-487-9243) TTY: 1-877-889-5627



WWW.WAGEHOUR.DOL.GOV

WAGE RATE DECISION

General Decision Number: VA120050 01/06/2012 VA50

Superseded General Decision Number: VA20100142

State: Virginia

Construction Types: Heavy (Heavy and Sewer and Water Line)

Counties: Botetourt, Craig, Giles, Montgomery, Pulaski and
Radford* Counties in Virginia.

*INDEPENDENT CITY

HEAVY CONSTRUCTION PROJECTS (Including Sewer and Water Lines)

Modification Number	Publication Date
0	01/06/2012

SUVA2010-040 09/02/2010

	Rates	Fringes
CARPENTER, Includes Form Work....	\$ 13.75	1.46
CEMENT MASON/CONCRETE FINISHER...	\$ 19.00	3.83
ELECTRICIAN.....	\$ 22.08	6.30
IRONWORKER, REINFORCING.....	\$ 22.45	11.85
IRONWORKER, STRUCTURAL.....	\$ 20.55	8.25
LABORERS.....	\$ 9.76	0.80
Flagger.....	\$ 7.39	0.20
Landscape.....	\$ 10.00	
Pipelayer.....	\$ 10.76	2.25
POWER EQUIPMENT OPERATOR:		
Backhoe.....	\$ 11.90	2.14
Bobcat/Skid Loader.....	\$ 11.40	
Bulldozer.....	\$ 20.63	7.28
Crane, All Types.....	\$ 15.85	1.46
Excavator.....	\$ 12.50	0.54
Loader.....	\$ 11.71	2.11
Mechanic.....	\$ 26.78	6.32
Trackhoe.....	\$ 12.75	1.24
Tugboat.....	\$ 19.00	
TRUCK DRIVER: All Dump Trucks....	\$ 9.96	0.97

WELDERS - Receive rate prescribed for craft performing
operation to which welding is incidental.

=====
Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of "identifiers" that indicate whether the particular rate is union or non-union.

Union Identifiers

An identifier enclosed in dotted lines beginning with characters other than "SU" denotes that the union classification and rate have found to be prevailing for that classification. Example: PLUM0198-005 07/01/2011. The first four letters, PLUM, indicate the international union and the four-digit number, 0198, that follows indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. The date, 07/01/2011, following these characters is the effective date of the most current negotiated rate/collective bargaining agreement which would be July 1, 2011 in the above example.

Union prevailing wage rates will be updated to reflect any changes in the collective bargaining agreements governing the rate.

Non-Union Identifiers

Classifications listed under an "SU" identifier were derived from survey data by computing average rates and are not union rates; however, the data used in computing these rates may include both union and non-union data. Example: SULA2004-007 5/13/2010. SU indicates the rates are not union rates, LA indicates the State of Louisiana; 2004 is the year of the survey; and 007 is an internal number used in producing the wage determination. A 1993 or later date, 5/13/2010, indicates the classifications and rates under that identifier were issued as a General Wage Determination on that date.

Survey wage rates will remain in effect and will not change until a new survey is conducted.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- * an existing published wage determination
- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

PAYROLL
(For Contractor's Optional Use; See Instructions at www.dol.gov/whd/forms/wh347instr.htm)



Rev. Dec. 2008

NAME OF CONTRACTOR <input type="checkbox"/> OR SUBCONTRACTOR <input type="checkbox"/>		ADDRESS	OMB No.: 1235-0008 Expires: 01/31/2015
DAY/POI NO.	FOR WEEK ENDING	PROJECT AND LOCATION	
		PROJECT OR CONTRACT NO.	

[illegible]

While completion of Form WH-347 is optional, it is mandatory for covered contractors performing work on Federally financed or assisted construction contracts to respond to the information collection contained in 29 C.F.R. §§ 3.3, 5.5(a), The Copeland Act (40 U.S.C. § 3145) contractors and subcontractors performing work on Federally financed or assisted construction contracts to "furnish weekly a statement with respect to the wages paid each employee during the preceding week." U.S. Department of Labor (DOL) regulations at 29 C.F.R. § 5.5(a)(3)(ii) require contractors to submit weekly a copy of all payrolls to the Federal agency contracting for or financing the construction project, accompanied by a signed "Statement of Compliance" indicating that the payrolls are correct and complete and that each laborer or mechanic has been paid not less than the proper Davis-Bacon prevailing wage rate for the work performed. DOL and federal contracting agencies receiving this information review the information to determine that employees have received legally required wages and fringe benefits.

Public Burden Statement

We estimate that it will take an average of 55 minutes to complete this collection, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. If you have any comments regarding these estimates or any other aspect of this collection, including suggestions for reducing this burden, send them to the Administrator, Wage and Hour Division, U.S. Department of Labor, Room S3502, 200 Constitution Avenue, N.W.

(over)

Date _____

I, _____ (Name of Signatory Party) _____ (Title)
do hereby state:

(1) That I pay or supervise the payment of the persons employed by

_____ (Contractor or Subcontractor) _____ on the _____
_____ (Building or Work) _____; that during the payroll period commencing on the _____
_____ day of _____, _____, and ending the _____ day of _____,

all persons employed on said project have been paid the full weekly wages earned, that no rebates have been or will be made either directly or indirectly to or on behalf of said

_____ (Contractor or Subcontractor) _____ from the full

weekly wages earned by any person and that no deductions have been made either directly or indirectly from the full wages earned by any person, other than permissible deductions as defined in Regulations, Part 3 (29 C.F.R. Subtitle A), issued by the Secretary of Labor under the Copeland Act, as amended (48 Stat. 948, 63 Stat. 108, 72 Stat. 967; 40 U.S.C. § 3145), and described below:

(2) That any payrolls otherwise under this contract required to be submitted for the above period are correct and complete; that the wage rates for laborers or mechanics contained therein are not less than the applicable wage rates contained in any wage determination incorporated into the contract; that the classifications set forth therein for each laborer or mechanic conform with the work he performed.

(3) That any apprentices employed in the above period are duly registered in a bona fide apprenticeship program registered with a State apprenticeship agency recognized by the Bureau of Apprenticeship and Training, United States Department of Labor, or if no such recognized agency exists in a State, are registered with the Bureau of Apprenticeship and Training, United States Department of Labor.

(4) That:
(a) WHERE FRINGE BENEFITS ARE PAID TO APPROVED PLANS, FUNDS, OR PROGRAMS

☐ — in addition to the basic hourly wage rates paid to each laborer or mechanic listed in the above referenced payroll, payments of fringe benefits as listed in the contract have been or will be made to appropriate programs for the benefit of such employees, except as noted in section 4(c) below.

(b) WHERE FRINGE BENEFITS ARE PAID IN CASH

☐ — Each laborer or mechanic listed in the above referenced payroll has been paid, as indicated on the payroll, an amount not less than the sum of the applicable basic hourly wage rate plus the amount of the required fringe benefits as listed in the contract, except as noted in section 4(c) below.

(c) EXCEPTIONS

EXCEPTION (CRAFT)	EXPLANATION

REMARKS:

NAME AND TITLE	SIGNATURE
THE WILLFUL FALSIFICATION OF ANY OFFICIAL INVESTIGATIVE STATEMENTS MAY SUBJECT THE CONTRACTOR OR SUBCONTRACTOR TO CIVIL OR CRIMINAL PROSECUTION. SEE SECTION 1001 OF TITLE 18 AND SECTION 231 OF TITLE 31 OF THE UNITED STATES CODE.	

Wage and Hour Division (WHD)

Instructions For Completing Payroll Form, WH-347

▪ WH-347 (PDF)

OMB Control No. 1215-0149, Expires 12/31/2011.

Persons are not required to respond to the collection of information unless it displays a currently valid OMB control number.

General: Form WH-347 has been made available for the convenience of contractors and subcontractors required by their Federal or Federally-aided construction-type contracts and subcontracts to submit weekly payrolls. Properly filled out, this form will satisfy the requirements of Regulations, Parts 3 and 5 (29 C.F.R., Subtitle A), as to payrolls submitted in connection with contracts subject to the Davis-Bacon and related Acts.

While completion of Form WH-347 is optional, it is mandatory for covered contractors and subcontractors performing work on Federally financed or assisted construction contracts to respond to the information collection contained in 29 C.F.R. §§ 3.3, 5.5(a). The Copeland Act (40 U.S.C. § 3145) requires contractors and subcontractors performing work on Federally financed or assisted construction contracts to "furnish weekly a statement with respect to the wages paid each employee during the preceding week." U.S. Department of Labor (DOL) Regulations at 29 C.F.R. § 5.5(a)(3)(ii) require contractors to submit weekly a copy of all payrolls to the Federal agency contracting for or financing the construction project, accompanied by a signed "Statement of Compliance" indicating that the payrolls are correct and complete and that each laborer or mechanic has been paid not less than the proper Davis-Bacon prevailing wage rate for the work performed. DOL and federal contracting agencies receiving this information review the information to determine that employees have received legally required wages and fringe benefits.

Under the Davis-Bacon and related Acts, the contractor is required to pay not less than prevailing wage, including fringe benefits, as predetermined by the Department of Labor. The contractor's obligation to pay fringe benefits may be met either by payment of the fringe benefits to bona fide benefit plans, funds or programs or by making payments to the covered workers (laborers and mechanics) as cash in lieu of fringe benefits.

This payroll provides for the contractor to show on the face of the payroll all monies to each worker, whether as basic rates or as cash in lieu of fringe benefits, and provides for the contractor's representation in the statement of compliance on the payroll (as shown on page 2) that he/she is paying for fringe benefits required by the contract and not paid as cash in lieu of fringe benefits. Detailed instructions concerning the preparation of the payroll follow:

Contractor or Subcontractor: Fill in your firm's name and check appropriate box.

Address: Fill in your firm's address.

Payroll No.: Beginning with the number "1", list the payroll number for the submission.

For Week Ending: List the workweek ending date.

Project and Location: Self-explanatory.

Project or Contract No.: Self-explanatory.

Column 1 - Name and Individual Identifying Number of Worker: Enter each worker's full name and an individual identifying number (e.g., last four digits of worker's social security number) on each weekly payroll submitted.

Column 2 - No. of Withholding Exemptions: This column is merely inserted for the employer's convenience and is not a requirement of Regulations, Part 3 and 5.

Column 3 - Work Classifications: List classification descriptive of work actually performed by each laborer or mechanic. Consult classification and minimum wage schedule set forth in contract specifications. If additional classifications are deemed necessary, see Contracting Officer or Agency representative. An individual may be shown as having worked in more than one classification provided an accurate breakdown of hours worked in each classification is maintained and shown on the submitted payroll by use of separate entries.

Column 4 - Hours worked: List the day and date and straight time and overtime hours worked in the applicable boxes. On all contracts subject to the Contract Work Hours Standard Act, enter hours worked in excess of 40 hours a week as "overtime".

Column 5 - Total: Self-explanatory

Column 6 - Rate of Pay (Including Fringe Benefits): In the "straight time" box for each worker, list the actual hourly rate paid for straight time worked, plus cash paid in lieu of fringe benefits paid. When recording the straight time hourly rate, any cash paid in lieu of fringe benefits may be shown separately from the basic rate. For example, "\$12.25/.40" would reflect a \$12.25 base hourly rate plus \$0.40 for fringe benefits. This is of assistance in correctly computing overtime. See "Fringe Benefits" below. When overtime is worked, show the overtime hourly rate paid plus any cash in lieu of fringe benefits paid in the "overtime" box for each worker; otherwise, you may skip this box. See "Fringe Benefits" below. Payment of not less than time and one-half the basic or regular rate paid is required for overtime under the Contract Work Hours Standard Act of 1962 if the prime contract exceeds \$100,000. In addition to paying no less than the predetermined rate for the classification which an individual works, the contractor must pay amounts predetermined as fringe benefits in the wage decision made part of the contract to approved fringe benefit plans, funds or programs or shall pay as cash in lieu of fringe benefits. See "FRINGE BENEFITS" below.

Column 7 - Gross Amount Earned: Enter gross amount earned on this project. If part of a worker's weekly wage was earned on projects other than the project described on this payroll, enter in column 7 first the amount earned on the Federal or Federally assisted project and then the gross amount earned during the week on all projects, thus "\$163.00/\$420.00" would reflect the earnings of a worker who earned \$163.00 on a Federally assisted construction project during a week in which \$420.00 was earned on all work.

Column 8 - Deductions: Five columns are provided for showing deductions made. If more than five deduction are involved, use the first four columns and show the balance deductions under "Other" column; show actual total under "Total Deductions" column; and in the attachment to the payroll describe the deduction(s) contained in the "Other" column. All deductions must be in accordance with the provisions of the Copeland Act Regulations, 29 C.F.R., Part 3. If an individual worked on other jobs in addition to this project, show actual deductions from his/her weekly gross wage, and indicate that deductions are based on his gross wages.

Column 9 - Net Wages Paid for Week: Self-explanatory.

Totals - Space has been left at the bottom of the columns so that totals may be shown if the contractor so desires.

Statement Required by Regulations, Parts 3 and 5: While the "statement of compliance" need not be notarized, the statement (on page 2 of the payroll form) is subject to the penalties provided by 18 U.S.C. § 1001, namely, a fine, possible imprisonment of not more than 5 years, or both. Accordingly, the

Items 1 and 2: Space has been provided between items (1) and (2) of the statement for describing any deductions made. If all deductions made are adequately described in the "Deductions" column above, state "See Deductions column in this payroll." See "FRINGE BENEFITS" below for instructions concerning filling out paragraph 4 of the statement.

Item 4 FRINGE BENEFITS - Contractors who pay all required fringe benefits: If paying all fringe benefits to approved plans, funds, or programs in amounts not less than were determined in the applicable wage decision of the Secretary of Labor, show the basic cash hourly rate and overtime rate paid to each worker on the face of the payroll and check paragraph 4(a) of the statement on page 2 of the WH-347 payroll form to indicate the payment. Note any exceptions in section 4(c).

Contractors who pay no fringe benefits: If not paying all fringe benefits to approved plans, funds, or programs in amounts of at least those that were determined in the applicable wage decision of the Secretary of Labor, pay any remaining fringe benefit amount to each laborer and mechanic and insert in the "straight time" of the "Rate of Pay" column of the payroll an amount not less than the predetermined rate for each classification plus the amount of fringe benefits determined for each classification in the application wage decision. Inasmuch as it is not necessary to pay time and a half on cash paid in lieu of fringe benefits, the overtime rate shall be not less than the sum of the basic predetermined rate, plus the half time premium on basic or regular rate, plus the required cash in lieu of fringe benefits at the straight time rate. In addition, check paragraph 4(b) of the statement on page 2 the payroll form to indicate the payment of fringe benefits in cash directly to the workers. Note any exceptions in section 4(c).

Use of Section 4(c), Exceptions

Any contractor who is making payment to approved plans, funds, or programs in amounts less than the wage determination requires is obliged to pay the deficiency directly to the covered worker as cash in lieu of fringe benefits. Enter any exceptions to section 4(a) or 4(b) in section 4(c). Enter in the Exception column the craft, and enter in the Explanation column the hourly amount paid each worker as cash in lieu of fringe benefits and the hourly amount paid to plans, funds, or programs as fringe benefits. The contractor must pay an amount not less than the predetermined rate plus cash in lieu of fringe benefits as shown in section 4(c) to each such individual for all hours worked (unless otherwise provided by applicable wage determination) on the Federal or Federally assisted project. Enter the rate paid and amount of cash paid in lieu of fringe benefits per hour in column 6 on the payroll. See paragraph on "Contractors who pay no fringe benefits" for computation of overtime rate.



Fact Sheet: Signage Requirements and Recipient Guidance

Overview

The purpose of this document is to provide guidance for satisfying the signage requirements placed on Broadband Technology Opportunities Program (BTOP) award recipients with construction projects. **In particular, recipients should focus on the bolded sections below that contain updated guidance.**

Signage Requirements

BTOP award recipients that have projects requiring "construction" are subject to a Special Award Condition that states: "The recipient is responsible for constructing, erecting, and maintaining in good condition throughout the construction period a sign(s) satisfactory to the NTIA that identifies the project and indicates that the project is Federally funded. The NTIA also may require that the recipient maintain a permanent plaque or sign at the project site with the same or similar information."

Producing and displaying signage – and specifically displaying the Recovery Act logo on signage – is one of several ways to provide openness and transparency to the public about how Federal funds are being spent. However, in order to be "satisfactory to the NTIA," it is important that the costs associated with signage are reasonable and limited. This means that signs should not be produced or displayed if doing so results in unreasonable cost or expense. (See Frequently Asked Questions below).

For purposes of this signage requirement, "construction" projects are those in which the major purpose of the award is construction, as defined in Chapter 17 of the Updated Department of Commerce Interim Grants Manual. Alteration of facilities incidental to a non-construction purpose is not considered construction. In general, projects classified as Infrastructure or Comprehensive Community Infrastructure (CCI) are subject to this signage requirement through the special award condition cited above. Some Public Computer Center (PCC) projects may be subject to this requirement through a special award condition to the extent they involve construction. Projects classified as Sustainable Broadband Adoption are not subject to this signage requirement.

To the extent that an award recipient must display signage, adherence to the following signage specifications is required by NTIA. At construction sites, recipients may satisfy the signage requirements by using the Primary or BroadbandUSA Emblems shown here and following all guidelines for size, clear space, and color. Complete guidelines are provided in the Information and Tools sections of this document.



Primary Emblem



BROADBANDUSA
CONNECTING AMERICA'S COMMUNITIES

BroadbandUSA Emblem





Summary: Recovery Act Logo Requirements

Recipients must meet the following minimum requirements when developing Recovery Act display signage for BTOP construction sites:

- Recipients must use the Primary Emblem or the BroadbandUSA Emblem in construction signage.
- The emblem must be at least six inches or larger in diameter.
- Recipients must not change proportions of the emblem.
- If using a color emblem, use the colors specified in the Information and Tools section.
- Always leave clear space surrounding the logo equal to half of the logo's radius.

Information and Tools

Recipients can use either of the two approved Recovery Act "marks" shown on the previous page. The BroadbandUSA Emblem incorporates the basic Recovery Act logo and is acceptable to meet signage requirements. Remember the following when using the emblems:



- Provide this fact sheet to your graphic designer or signage vendor. The details and tools provided here should provide everything needed to use the emblems correctly.
- Altering, distorting, or recreating the "marks" in any way is not permitted. Layout and design of signs and communication materials will vary, so care must be taken when applying the emblem.

Logo Artwork

- Emblem artwork is available on the BroadbandUSA.gov website. Copy www2.ntia.doc.gov/ManagementResources#signage into a browser to access camera-ready, high-resolution emblem artwork suitable for use in materials.
- The Primary Emblem and BroadbandUSA Emblem are available in TIF, JPEG and EPS formats.
- Do not alter, distort, or recreate the emblems in any way.

Color Specifications

- Use the exact colors listed below when reproducing the emblem in full color. CMYK values are used for print publications and RGB and HEX# values are used for on-screen applications.
- Do not change the colors of either emblem or use screens or tints of any color in any part of the logo.
- Recipients can also reproduce either emblem in black-and-white or in a one-color version. Use the "Navy" color indicated below when reproducing emblems in one color.

COLOR		CMYK	RGB	HEX#
	Navy	00 / 00 / 00 / 00	0 / 51 / 102	003366
	Red	30 / 100 / 100 / 50	102 / 0 / 0	660000







BROADBANDUSA

CONNECTING AMERICA'S COMMUNITIES

Made Possible by the Broadband Technology Opportunities Program

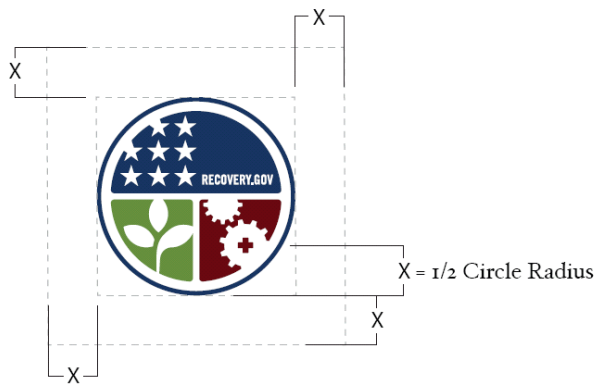
Funded by the American Recovery and Reinvestment Act of 2009

COLOR		CMYK	RGB	HEX#
	Green	65 / 25 / 100 / 7	103 / 144 / 62	67903E
	Light Blue	67 / 37 / 6 / 00	89 / 141 / 192	598DC0

Clear Space

Primary Emblem

- Always leave blank space surrounding the logo equal to half of the logo's radius.
- In the illustration below, the clear space is shown as the value "X," where "X" is equal to half of the radius. The minimum clear space must always be at least "X" on all sides of the emblem.



BroadbandUSA Emblem

- Please provide an amount of space surrounding the emblem equal to or larger than the height of the 'BroadbandUSA' emblem lettering, as shown below:





Frequently Asked Questions

Does NTIA have requirements regarding signage size?

NTIA does not specify sign size but does require that the Recovery or BroadbandUSA Emblem must be at least six inches in diameter.

Does NTIA have requirements regarding placement of the Recovery logo on signage OR the overall design of signage?

Recipients may adapt placement of the logos and may design signs to be suitable to the specific project on which they are displayed, but may not alter the design and colors of the logos themselves.

Can I use additional text on my signage?

Signs should be designed to maximize visibility of the logos and minimize any accompanying text. In addition, minimal text may be included on the sign, for example, "This project funded by" preceding the Recovery Act logo.

Am I required to use the Department of Commerce seal on signage?

No, the Commerce seal is not required. A grantee should not use the Department of Commerce's seal or NTIA's logo without written express permission from NTIA to do so.

Does NTIA require placement of signs at all construction sites?

Yes, provided that the costs associated with signage are reasonable and limited. Signs should not be produced or displayed if doing so results in unreasonable cost or expense. NTIA has determined that where construction is taking place in a remote area with few, if any, passersby, then the costs of producing a sign outweigh the benefits of displaying signage. For example, signs need not be posted at wireless towers unless they are within or adjacent to areas frequently accessed by passersby. Signs at construction projects should be placed where they are visible to passersby and to customers approaching the site. The recipient may also wish to consider placing signage on work vehicles when construction involves installation or deployment of buried or aerial fiber optic facilities, and where the construction may take place over long transmission rights of way.

Can I pay for signage costs with grant funds?

The cost of producing signage and displaying Recovery logos is an eligible project administration cost in BTOP grants. At the same time, costs associated with signage should be reasonable and limited. Signs should not be produced or displayed if doing so results in unreasonable cost or expense.

Do I need to document compliance with the signage requirements?

Yes. Recipients should maintain documentation of their compliance with the signage requirements set forth in their special award conditions, so that this documentation is available for audit purposes. This documentation should include a list of all construction sites, a description of where the signs are displayed, and cost information.



**CONSTRUCTION AGREEMENT
BETWEEN OWNER AND CONTRACTOR
(STIPULATED PRICE)**

THIS AGREEMENT is by and between Citizens Telephone Cooperative, Inc. (“Owner”) and
_____ (“Contractor”)

Owner and Contractor hereby agree as follows:

ARTICLE 1 – WORK

- 1.01 Contractor shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows:

Contract IV will connect to an existing fiber optic cable at the entrance to the NRV Airport located on Sheet 67A-5 and will consist of the buried and aerial construction along U.S Route 100 through Pulaski County and Giles County to the Town of Pearisburg. The project consists of approximately 18.5 miles of Buried Fiber Optic (240 and 144 BFO) and 5.5 miles of Aerial Fiber Optic (240 and 144 CO).

Note: All Splice Points (240 and 144 Ct) locations are based on 15,000 ft Reels for bidding purposes only. Actual splice locations shall be determined by Contractor based on field conditions and length of reels with prior approval from Owner/Engineer. The Owner has ordered five (5) 15,000 ft and three (3) 12,000 ft 240-Ct reels and two (2) 10,000 ft 144-Ct reels.

ARTICLE 2 – THE PROJECT

- 2.01 The Project for which the Work under the Contract Documents may be the whole or only a part is generally described as follows:

NEW RIVER VALLEY REGIONAL OPEN ACCESS NETWORK (ROAN) PROJECT -
CONTRACT IV FOR CITIZENS TELEPHONE COOPERATIVE, INC.

ARTICLE 3 – ENGINEER

The Project has been designed by Thompson & Litton, Inc. (Engineer), which is to act as Owner’s representative, assume all duties and responsibilities, and have the rights and authority assigned to Engineer in the Contract Documents in connection with the completion of the Work in accordance with the Contract Documents.

ARTICLE 4 – CONTRACT TIMES

4.01 *Time of the Essence*

- A. All time limits for Milestones, if any, Substantial Completion, and completion and readiness for final payment as stated in the Contract Documents are of the essence of the Contract.

4.02 *Dates for Substantial Completion and Final Payment*

- A. The Work will be substantially completed within 45 days after the date when the Contract Times commence to run and completed and ready for final payment within 60 days after the date when the Contract Times commence to run.

4.04 *Liquidated Damages*

- A. Contractor and Owner recognize that time is of the essence as stated in Paragraph 4.01 above. The parties also recognize the delays, expense, and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, Owner and Contractor agree that as liquidated damages for delay (but not as a penalty), Contractor shall pay Owner five hundred dollars (\$500.00) for each day that expires after the time specified in Paragraph 4.02 above for Substantial Completion until the Work is substantially complete. After Substantial Completion, if Contractor shall neglect, refuse, or fail to complete the remaining Work within the Contract Time or any proper extension thereof granted by Owner, Contractor shall pay Owner five hundred dollars (\$500.00) for each day that expires after the time specified in Paragraph 4.02 above for completion and readiness for final payment until the Work is completed and ready for final payment.

ARTICLE 5 – CONTRACT PRICE

- 5.01 Owner shall pay Contractor for completion of the Work in accordance with the Contract Documents an amount in current funds equal to the sum of the amounts determined pursuant to Paragraphs 5.01.A, below:

- A. For all Work, at the prices stated in Contractor's Bid, attached hereto as an exhibit.

ARTICLE 6 – PAYMENT PROCEDURES

6.01 *Submittal and Processing of Payments*

- A. Contractor shall submit monthly progress payment requests as defined in Paragraphs S.1-8. of the General Conditions.

6.02 *Progress Payments; Retainage*

- A. Owner shall make progress payments on account of the Contract Price on the basis of Contractor's payment requests on or about the 10th day of each month during performance of

the Work, as provided in Paragraph 6.02.A.1 below. Payment shall be made within forty-five (45) days of Owner's receipt of an approved payment request.

1. Prior to Substantial Completion, progress payments will be made in an amount equal to the percentage indicated below but, in each case, less the aggregate of payments previously made and less such amounts as Engineer may determine or Owner may withhold, including but not limited to liquidated damages.
 - a. 10 percent of Work completed (with the balance being retainage). If the Work has been 50 percent completed as determined by Engineer, and if the character and progress of the Work have been satisfactory to Owner and Engineer, then as long as the character and progress of the Work remain satisfactory to Owner and Engineer, there will be no additional retainage; and
 - b. 5 percent of cost of materials and equipment not incorporated in the Work (with the balance being retainage).
- B. Upon Substantial Completion, Owner shall pay an amount sufficient to increase total payments to Contractor to 95 percent of the Work completed, less 5 percent of Engineer's estimate of the value of Work to be completed or corrected as shown on the tentative list of items to be completed or corrected attached to the certificate of Substantial Completion.

6.03 *Final Payment*

- A. Upon final completion and acceptance of the Work in accordance with the General Conditions, Owner shall pay the remainder of the Contract Price as recommended by Engineer and as outlined in the General Conditions.

ARTICLE 7 – INTEREST

- 7.01 All moneys not paid when due as provided in the General Conditions shall bear interest at the rate of prime.

ARTICLE 8 – CONTRACT DOCUMENTS

8.01 *Contents*

- A. The Contract Documents consist of this Agreement, Conditions of the Contract (General and Supplemental General), Drawings, Specifications, Addenda issued prior to execution of this Agreement, Payment and Performance Bonds, and Modifications issued after execution of this Agreement.
 1. This Agreement (pages 1 to __, inclusive).
 2. Performance bond (pages ____ to ____, inclusive).
 3. Payment bond (pages ____ to ____, inclusive).

4. Other bonds (pages ____ to ____, inclusive).
 - a. ____ (pages ____ to ____, inclusive).
 - b. ____ (pages ____ to ____, inclusive).
5. General Conditions (pages ____ to ____, inclusive).
6. Supplemental General Conditions (pages ____ to ____, inclusive).
7. Specifications as listed in the Table of Contents of the Project Manual.
8. Drawings consisting of ____ sheets with each sheet bearing the following general title: ____ [or] the Drawings listed on attached sheet index.
9. Addenda (numbers ____ to ____, inclusive).
10. Exhibits to this Agreement (enumerated as follows):
 - a. Contractor's Bid (pages ____ to ____, inclusive).
 - b. Documentation submitted by Contractor prior to Notice of Award (pages ____ to ____, inclusive).
11. The following which may be delivered or issued on or after the Effective Date of the Agreement and are not attached hereto:
 - a. Notice to Proceed (pages ____ to ____, inclusive).
 - b. Change Orders.

ARTICLE 9 – MISCELLANEOUS

9.01 Terms

- A. Terms used in this Agreement will have the meanings stated in the General Conditions and the Supplemental General Conditions.

9.02 Severability

- A. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon Owner and Contractor, who agree that the Contract Documents shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

IN WITNESS WHEREOF, Owner and Contractor have signed this Agreement. Counterparts have been delivered to Owner and Contractor. All portions of the Contract Documents have been signed or have been identified by Owner and Contractor or on their behalf.

This Agreement will be effective on _____ (which is the Effective Date of the Agreement).

OWNER:

Citizens Telephone Cooperative, Inc.

By: _____

Title: _____

Attest: _____

Title: _____

Address for giving notices:

(If Owner is a corporation, attach evidence of authority to sign. If Owner is a public body, attach evidence of authority to sign and resolution or other documents authorizing execution of this Agreement.)

CONTRACTOR

By: _____

Title: _____

Attest: _____

Title: _____

Address for giving notices:

License No.: _____

PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS: That

(Name of Contractor)

(Address of Contractor)

a _____, hereinafter called Principal, and
(Corporation, Partnership, Individual)

(Name of Surety)

(Address of Surety)

hereinafter called Surety, are held and firmly bound unto _____

(Name of Owner)

(Address of Owner)

hereinafter called OWNER, in the penal sum of _____

Dollars, \$(_____) in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITIONS OF THIS OBLIGATION are such that whereas, the Principal entered into a certain contract with the OWNER, dated the ____ day of _____, 20__, a copy of which is hereto attached and made a part hereof for the construction of: _____

The Contractor shall furnish a payment bond in the sum of the Contract amount. Such bond shall be for the protection of claimants who have and fulfill contracts to supply labor or materials to the prime Contractor to whom the Contract was awarded, or to any subcontractors, in the prosecution of the Work provided for in such Contract, and shall be conditioned upon the prompt payment for all such material furnished or labor supplied or performed in the prosecution of the Work. "Labor or materials" shall include public utility services and reasonable rentals of equipment, but only for periods when the equipment rented is actually used at the site.

NOW, THEREFORE, if the Principal shall promptly make payment to all persons, firms, SUBCONTRACTORS, and corporations furnishing materials for or performing labor in the prosecution of the WORK provided for in such contract, and any authorized extension or modification thereof, including all amounts due for materials, lubricants, oil, gasoline, coal and coke, repairs on machinery, equipment and tools, consumed or used in connection with the construction of such WORK, and all insurance premiums on said WORK, and for all labor performed in such WORK, whether by SUBCONTRACTOR or otherwise, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said Surety for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to the WORK to be performed thereunder or the CONTRACT DOCUMENTS accompanying the same shall in any wise affect its obligation on this BOND, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the WORK or to the CONTRACT DOCUMENTS.

PROVIDED, FURTHER, that no final settlement between the OWNER and the CONTRACTOR shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

IN WITNESS WHEREOF, this instrument is executed in _____ counterparts, each
(number)
one of which shall be deemed an original, this the ____ day of _____, 20 ____.

ATTEST:

Principal

(Principal) Secretary

(SEAL)

By _____(s)

(Address)

Witness as to Principal

(Address)

Surety

By _____
(Attorney-In-Fact)

ATTEST:

Witness as to Surety

(Address)

(Address)

NOTE: Date of BOND must not be prior to date of Contract. If CONTRACTOR is Partnership, all partners should execute BOND.

IMPORTANT: Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the State where the PROJECT is located.

PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS: That

(Name of Contractor)

(Address of Contractor)

a _____, hereinafter called Principal, and
(Corporation, Partnership, Individual)

(Name of Surety)

(Address of Surety)

hereinafter called Surety, are held and firmly bound unto _____

(Name of Owner)

(Address of Owner)

hereinafter called OWNER, in the penal sum of _____

Dollars, \$(_____) in lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, successors, and assigns, jointly and severally, firmly by these presents.

THE CONDITIONS OF THIS OBLIGATION are such that whereas, the Principal entered into a certain contract with the OWNER, dated the _____ day of _____, 20____, a copy of which is hereto attached and made a part hereof for the construction of: _____

NOW, THEREFORE, if the Principal shall well, truly and faithfully perform its duties, all the undertakings, covenants, terms, conditions, and agreements of said contract during the original term thereof, and any extensions thereof which may be granted by the OWNER, with or without notice to the Surety and during the one year guaranty period, and if he shall satisfy all claims and demands incurred under such contract, and shall fully indemnify and save harmless the OWNER from all costs and damages which it may suffer by reason of failure to do so, and shall reimburse and repay the OWNER all outlay and expense which the OWNER may incur in making good any default, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED, FURTHER, that the said Surety for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract or to the WORK to be performed thereunder or the CONTRACT DOCUMENTS accompanying the same shall in any wise affect its obligation on this BOND, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the contract or to the WORK or to the CONTRACT DOCUMENTS.

PROVIDED, FURTHER, that no final settlement between the OWNER and the CONTRACTOR shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

IN WITNESS WHEREOF, this instrument is executed in _____ counterparts,
(number)
each one of which shall be deemed an original, this the ____ day of _____, 20 ____.

ATTEST:

Principal

(Principal) Secretary

(SEAL)

By _____(s)

(Address)

Witness as to Principal

(Address)

Surety
By _____
(Attorney-In-Fact)

ATTEST:

Witness as to Surety

(Address)

(Address)

NOTE: Date of BOND must not be prior to date of Contract. If CONTRACTOR is Partnership, all partners should execute BOND.

IMPORTANT: Surety companies executing BONDS must appear on the Treasury Department's most current list (Circular 570 as amended) and be authorized to transact business in the State where the PROJECT is located.

AFFIDAVIT OF PAYMENT OF CLAIMS

By: _____

(Contractor)

This day _____ personally appeared before me,
_____, a Notary Public in and for the City (County)
of _____, _____ and, being by me first duly
sworn, states that all subcontractors and suppliers of labor and materials have been paid all sums due them for
work performed or materials furnished in the performance of the Contract between,
_____, Owner, and _____,
Contractor, dated _____, 20____, for the construction of _____

_____ or arrangements have been made by the Contractor satisfactory to such subcontractors and suppliers with
respect to payments of such sums as may be due them by the Contractor.

Typed Contractor Name

By: _____

Signature

Typed Name & Title of Person Signing

Subscribed and sworn to before me this _____ day of _____, 20____. My commission
expires on the _____ day of _____, 20____.

Notary Public

WAIVER AND RELEASE OF LIEN

WHEREAS the undersigned, _____
NAME OF MANUFACTURER, MATERIAL SUPPLIER, OR SUBCONTRACTOR

has furnished to _____ the following:
NAME OF CONTRACTOR

_____ for
KIND OF MATERIAL AND SERVICES FURNISHED

use in the construction of a project belonging to _____
NAME OF OWNER

NOW, THEREFORE, the undersigned, _____
NAME OF MANUFACTURER, MATERIAL SUPPLIER, OR SUBCONTRACTOR

for and in consideration of \$ _____ and other good and valuable
consideration, the receipt whereof is hereby acknowledged, do(es) hereby waive and release any and all liens, or
right to or claim of lien, on the above described project and premises, under any law, common or statutory, on
account of labor or materials, or both, heretofore or hereafter furnished by the undersigned to or for the account of

said _____ for said project.
NAME OF CONTRACTOR

Given under my(our) hand(s) and seal(s) this _____ day of _____, 20_____.

Name of Manufacturer, Material Supplier, or Subcontractor

By _____
President, Vice President, Partner or Owner
If signed by other than one of foregoing, accompanied by
power of attorney signed by one of the foregoing in favor of
the signer. (Use applicable designation.)

Change Order

NO _____

Dated _____

OWNER'S Project No. _____ ENGINEER'S Project No. _____

Project _____

CONTRACTOR _____

CONTRACT FOR _____ CONTRACT DATE _____

TO: _____

CONTRACTOR

You are directed to make the changes noted below in the subject Contract:

OWNER

BY _____

DATED _____

NATURE OF THE CHANGES

ENCLOSURES:

These changes result in the following adjustments of Contract Price and Contract Time:

Contract Price Prior to This Change Order \$ _____

Net (Increase) (Decrease) Resulting from this Change Order \$ _____

Current Contract Price Including This Change Order \$ _____

Contract Time Prior to This Change Order _____
(Days or Date)

Net (Increase) (Decrease) Resulting from This Change Order _____
(Days)

Current Contract Time Including This Change Order _____
(Days or Date)

The Above Changes Are Approved: _____
ENGINEER
By _____
Date _____, 20__

The Above Changes Are Accepted: _____
CONTRACTOR
By _____
Date _____, 20__

CERTIFICATE OF SUBSTANTIAL COMPLETION

DATE OF ISSUANCE: _____

OWNER: _____

CONTRACTOR: _____

Contract: _____

Project: _____

OWNER's Contract No. _____

ENGINEER's Contract No. _____

☐ This Certification of Substantial Completion applies to *all Work* under the Contract Documents.

☐ This Certification of Substantial Completion *applies to the following specified parts* of the Contract Documents:

The Work to which this Certificate applies has been inspected by authorized representatives of the OWNER, CONTRACTOR and ENGINEER, and found to be substantially complete and is also the date of commencement of applicable warranties required by the Contract Documents, * (except as attached.)

The Work is hereby declared to be *substantially* complete with the Contract Documents on:

Date of Substantial Completion

☐ A "Punch-List" of items to be completed or corrected is attached hereto. This list may not be all-inclusive, and the failure to include an item in it does not alter the responsibility of the CONTRACTOR to complete all Work in accordance with the Contract Documents. The items in the tentative list shall be completed or corrected by the CONTRACTOR within _____ days of the above date of Substantial Completion.

☐ * A list of "excepted" Warranty items is attached hereto.

This Certification does not constitute an acceptance of Work NOT in accordance with the Contract Documents nor is it a release of Contractor's obligation to complete the Work in accordance with the Contract Documents.

Executed by ENGINEER

Date

Accepted by CONTRACTOR

Date

Accepted by OWNER

Date

NOTICE OF AWARD

To: _____

PROJECT Description: _____

The OWNER has considered the BID submitted by you dated _____ for the above described WORK.

You are hereby notified that your BID has been accepted for items in the amount of:
_____ Dollars (\$_____).

You are required to execute the Agreement and furnish the required CONTRACTOR'S Performance BOND, Payment BOND and certificates of insurance within ten (10) calendar days from the date of this Notice to you.

If you fail to execute said Agreement and to furnish said BONDS, within ten (10) days from the date of this Notice, said OWNER will be entitled to consider all your rights arising out of the OWNER'S acceptance of your BID as abandoned and as a forfeiture of your BID BOND. The OWNER will be entitled to such rights as may be granted by law. You are required to return an acknowledged copy of this NOTICE OF AWARD to the OWNER.

Dated this _____ day of _____, 20 _____.

Owner
By: _____
Authorized Signature

Title

ACCEPTANCE OF NOTICE

Receipt of the above NOTICE OF AWARD is hereby acknowledged

By _____,

this the _____ day of _____, 20 _____.

By _____

Title _____

NOTICE TO PROCEED

To: _____

PROJECT Description: _____

You are hereby notified to commence work on the referenced contract on or before _____, and shall fully complete all work of said contract within _____ consecutive calendar days thereafter. Your completion date is therefore _____.

The contract provides for an assessment of the sum of \$ _____ as liquidated damages for each consecutive calendar day after the above established contract completion date that the work remains incomplete.

Dated this _____ day of _____, 20 _____.

Owner
By: _____
Authorized Signature

Title

ACCEPTANCE OF NOTICE

Receipt of the above NOTICE TO PROCEED is hereby acknowledged

By _____,

this the _____ day of _____, 20 _____.

By _____

Title _____

FIELD ORDER NO. _____

DATE OF ISSUANCE: _____ EFFECTIVE DATE: _____

OWNER: _____

CONTRACTOR: _____

Contract: _____

Project: _____

OWNER's Contract No. _____

ENGINEER's Contract No. _____

You are hereby directed to promptly execute this Field Order for minor changes in the Work without changes in Contract Price or Contract Times. If you consider that a change in Contract Price or Contract Times is required, please notify the Engineer immediately and before proceeding with this Work.

Description:

Attachments:

Executed by ENGINEER

Date

Acknowledged by CONTRACTOR

Date

SPECIFICATIONS

INSERT I:

**UNIT DESCRIPTIONS AND REQUIREMENTS
TESTING PROCEDURES
MARKERS**

Unit Descriptions and Requirements

Telephone Outside Plant Project

Note: In order to construct buried cable routes as staked, it is recommended that a cable plow with and offset plowing capability be used.

BD - Buried

BD 7 The unit is to be an Emerson Network Power product UPC BD-7, or equivalent.

BD 8000 This labor and materials unit will consist of an Emerson Network Power UPC 8000 Pedestal, includes the stakes for mounting, and will be used to mount a separate fiber splice closure and any and all miscellaneous hardware, gravel and pedestal numbers. The fiber splice closures will be covered under HBFO and HAFO section of the contract.

BD MPH This labor and materials unit will consist of a Charles Industry Multi-Purpose Housing part number CMPH-752FN and includes the stakes for mounting and any and all miscellaneous hardware, gravel, and pedestal numbers.

Note: Only 3M Scotchlite, reflective, black on yellow pedestal numbers are to be provided, or equivalent.

BHF- Buried Handhole Assembly Unit

BHF (24 X 36) — Consists of necessary labor and materials to install a 24" x 36" x 30" vault assembly at a depth of 30". The vault shall include "Citizens" logo in the lid, be the open bottom style, and have a 20K load rating. The vendor of vault must be approved by Engineer or Owner prior to ordering.

BFO – Buried Fiber Optic Cable Assembly Units

BFO () The unit definition for all BFO units is hereby modified to require that all buried cable placement be done in the "stop and go" method; i.e., plowing/trenching will proceed to an appearance location; the equipment will be stopped until the appearance is set; whereupon the equipment will proceed to the next appearance location, etc.

- BFO Labor and material unit to install 1' of direct buried fiber cable to the specified depth. Includes warning tape, miscellaneous materials, and site restoration.
- Note: All cable shall be marked as specified in NESC: Rule 350G.
- Note: Fiber cable will be stored at Owner's yard; Contractor shall test fiber before removing from the yard. Once fiber is removed, it shall be considered acceptable for use and the responsibility of the Contractor.
- Note: The depth of buried cable in soil measured from the top of the cable to the surface of the ground is 30" minimum for parallel construction and 36" across ditches and under roads and driveways.
- Note: The off-reeling of fiber optic cable, pulling cable through road bores, through pipe crossings or conduits, under culverts, etc. and re-rolling of cable back onto reel to avoid cutting proposed facility is to be included in the placement cost of the fiber optic cable.
- Note: The fiber optic cable unit shall include labor and material to install one (1) foot of Terra ® Extra-Stretch™, as manufactured by Reef Industries, Inc., Houston, TX, or approved equal. Tape shall be orange, 6 mil, 2 inches wide, with standard Fiber Optic Line Buried Below imprint.
- Note: The Fiber Optic cable will not be cut at every handhole/fiber pedestal location. The Contractor shall cut the fiber optic cable only when directed by the Engineer.
- Note: All cable shall be bonded using only Premier Braded ground strap part number PT-BBR-EW-25, or equivalent. There should be an adequate amount of strap left in pedestal to allow easy removal and re-attachment to ground bar.

BM – Miscellaneous Assembly Units (Buried Plant & Service Entrance Installations)

- Note: BM 2 Housing ground rod assembly unit - A 5/8 inch x 8 foot copper coated ground rod. This unit shall also include the addition of an approved grounding connector (Utility Products ALP 387 or Equal) in the pedestal, if needed, and connection of the ground wire to the connector.
- Note: The Joint Permit Application for stream crossings requires a Bentonite Spill Prevention Plan when using directional bore on permitted streams. See Insert VI of this Project Manual.

- BM 53 This labor and material unit consists of the installation of a Contractor-provided, white, 6-foot warning stake (Carsonite CLM072011804 with graphic 7899CTLMG or equal), with a customized warning sticker identifying Citizens as the company, and the locate number and the emergency number to be provided before ordering. (800/648-7916 telephone number for ordering).
- BM 71 This labor and repair materials unit is modified hereby to stipulate that no BM 71 will be paid except for sawing, blasting or chipping in the absence of “spec” plow, i.e., a 20,000 pound cable plow or a 55,000 pound cable plow train. All BM 71 units must be approved by the engineering personnel.
- BM Duct This labor and materials unit consists of the placement of one (1) linear foot of 2-inch orange HDPE SDR 13.5 or thicker pipe in locations along the fiber cable route where rock has been encountered and the fiber cable needs additional protection. The BFO unit will be paid in the normal manner and this unit will be an additional cost when placed. This unit is payable only at the direction and approval of the engineering personnel.
- BM Rock
Adder Bore This labor and materials unit consists of one (1) linear foot of boring in solid rock and normally would not be paid unless three (3) attempts have been made to by-pass the rock by relocating drill rig. This unit will be in addition to the normal direct bore price BM 61. This is an option only to be used at the discretion of the engineering personnel on-site.
- BM WL This unit consists of all labor and materials required to locate, cut and repair one (1) buried water line up to 1-inch (inner diameter) in size, if necessary, to obtain the required depth of the cable being placed that will cross the water line. This unit will be paid only when subject water line is located prior to cutting.

CO – Aerial Fiber Optic Cable Assembly Units

- CO This unit includes strand, pole hardware, lashing wire, cable ID marker, and installation of 1' fiber optic cable strand - extra high strength (EHS) galvanized 6.6 m lashing - 0.045 stainless steel.

Note: Owner shall furnish fiber optic cable.

Note: CO – This unit shall include the labor and materials to install a “wrap-around” type cable tag at each pole attachment (Tech Products, Inc. – Wrap-Around Markers – see page near end of Insert I for description and

ordering information). The tags shall be white in color and of the required size for each location and is based on the cable diameter. The tag shall bear the description as follows:

Fiber Optic
Citizens Telephone Cooperative, Inc.
Floyd, Virginia

HBF and HAF – Buried Splice Closure Assembly Units and Aerial Splice Closure Units

- HBFO () Fiber Optic Splice Case- Fiber Optic splice cases that will be placed inside of a pedestal/handhole will be Preformed Coyote cases.
- HAFO () Fiber Optic Splice Case- Fiber Optic Splice cases that will be placed in and aerial splice application shall be Tyco FOSC 450().

PM – Miscellaneous Assembly Units (Underground & Aerial Plant)

- PM SS This unit shall consist of the necessary labor and materials to “figure-8” a 100-foot length of fiber optic cable utilizing two (2) “snow-shoes” in order to maintain appropriate bending radius required. Unit includes materials to strap the required length of cable to the strand. The “snow-shoes” shall be Catalog #FOS-3 as manufactured by OPTI-LOOP, or approved equal, and be equipped with clamps for attachment to strand. Fiber optic cable will be compensated for with units in Section CO.

SE – Service Entrance Assembly Units

- Note: The depth of buried service wire in soil measured from the top of the service wire to the surface of the ground is 24” minimum.

- SEBFO () Furnished by Owner.

- SEAFO () Furnished by Owner.

W – Rearrangement Units

WBFC/BFO The labor-only unit consists of all labor required to carefully expose and move an existing buried, telephone, or other cable to facilitate depth of placement for a fiber optic cable. This unit is payable per linear foot of existing cable exposed and moved at the Resident Engineer's discretion. This unit will not be payable unless a minimum of five (5) feet of existing cable requires exposing at any one site.

Pole Units (30'-5, 35'-5)

Note: Pole plan:

- insured warranted
- independent inspected
- quality assurance program

The poles shall be southern yellow pine timber, pentachlorophenol preservative and pressure treatment.

Note: All nine (9) poles shown on the construction documents will be staked by the Engineer. The Contractor shall notify the Engineer one week in advance to stake the poles. Note: All poles shall be staked on the same day. Any additional poles must be approved by Owner/Engineer and shall be staked to meet VDOT clear zone standards.

R3-5M – Right-Of-Way Clearing And Trimming Units – Aerial Plant

Note: Trees that are felled shall be cut to commercial wood length and left on the side of the right-of-way for the landowner. Commercial wood length means the length designated by the engineer, but in no case shall be required to be less than 8 feet.

Brush, branches, and refuse from the clearing operations shall, without delay, be disposed of by removing from the vicinity of the right-of-way.

1-1/2 Inch HDPE Aerial Figure-8

Note: Shall be HDPE 1-1/2-Inch I.D. Flexible Corrugated Aerial Figure-8 Conduit with 6.6M Strand, UV Stabilized, and Black polyethylene or Approved equal

SECTION NOTE: UNIT PRICES WILL APPLY ONLY FOR ADDITIONAL WORK APPROVED BY OWNER/ENGINEER.

1.0 **FIBER OPTIC SPLICING AND ACCEPTANCE TESTING**

- 1.1 **SPLICE AND CONNECTOR LOSSES.** The average bi-directional loss of all field and office splices on any one fiber between two offices shall not exceed 0.20 dB. Also, no individual splice shall have a bi-directional loss greater than 0.25 dB when using an OTDR. Office connector termination shall not exceed an average loss of 0.5 dB per connector half. Due to their proximity to each other, the office splice loss and the patch panel connector loss shall be tested all as one quantity using a 1-km delay line. The measured loss of the delay line connector, the patch panel connectors and the office splice shall not exceed a total of 1.7 dB.
- 1.2 **SPLICE LOCATIONS.** Splice locations are shown on staking sheets. If approved by the Engineer, one maintenance splice shall be allowed on each central office to central office run, at the Contractor's expense. Engineer will determine location of any fiber splices allowed. No fiber maintenance splice will be allowed within one thousand feet (1000') of another fiber splice or at the discretion of the engineer.
- 1.3 **FACTORY TEST RESULTS.** The Contractor must obtain from the cable vendor a copy of the factory test results for all of the fiber optic cable to be used for construction of the project and furnish them to the Owner before construction begins. As a minimum, this test data shall include attenuation per km and pulse dispersion for both 1310 and 1550 nm.

2.0 **FIBER OPTIC CABLE ACCEPTANCE TESTING**

- 2.1 The engineer shall be present during all testing.
- 2.2 **PRE-INSTALLATION AND PRE-SPLICE TESTING.** The Contractor, of his own accord, may choose to test the cable prior to installation at the point of delivery in order that no liability problems arise from installation of cable damaged before construction.
- 2.3 **REQUIRED TEST EQUIPMENT.** The Contractor shall supply the following test equipment required as a minimum for fiber optic cable acceptance testing:
 1. Optical Time Domain Reflectometer (OTDR) operational at 1300 nm and 1500 nm with:
 - strip chart plotter
 - patch cord to connect to patch panel
 2. Delay cable at least 1 km in length with:
 - patch cord to connect to patch panel
 - patch cord to connect to OTDR
 3. Optical source operational at 1300 nm and 1500 nm with:
 - patch cord to connect to patch panel

4. Optical power meter capable of measuring at least 1300 nm and 1500 nm with:

- patch cord to connect to patch panel
- patch cord to connect to optical source described in #3 above

The Contractor shall coordinate with the Engineer the final arrangements for acceptance testing.

- 2.4 **CALIBRATION OF TEST EQUIPMENT.** All test equipment shall have a certification of calibration stating that all operating specifications are met.

- 2.5 **POST INSTALLATION CABLE ACCEPTANCE TESTING.** After the cable has been installed, spliced, and terminated in each office of each link, the Contractor shall perform cable acceptance tests in the presence of the Engineer. The tests shall include:

1. End-to-End Cable Signature Testing
2. End-to-End Attenuation Testing
3. Shield Continuity Testing

The Contractor shall supply all equipment necessary for all acceptance testing.

All optical testing shall be conducted at wavelengths of both 1300 nm and 1500 nm and shall be conducted in both directions from each end of each link.

- 2.6 **END-TO-END CABLE SIGNATURE TESTING.** After all the cable has been installed, spliced, and terminated in each office, the Contractor shall perform end-to-end cable signature testing on each fiber using an OTDR. The cable signature tests are used to measure the loss of all field splices, office splices, and office connector terminations. The tests require an OTDR with a plotter, a 1-km delay line, and all necessary patch cords. Field splices, office splices and office connector terminations require the use of the delay line for testing.

The end-to-end testing shall be conducted using an OTDR operating at both 1300 nm and 1500 nm. Testing shall be done from both ends of each link on all fibers. When all splices and terminations have been determined acceptable, the Contractor shall provide strip chart recorder printouts as a final record of the fiber signature. A printout shall be required for each fiber from each end of the link at two different wavelengths. (Each fiber requires a total of 4 printouts).

- 2.7 **END-TO-END ATTENUATION TESTING.** After all cable has been installed, spliced, and terminated in each office, the Contractor shall perform end-to-end attenuation testing on each fiber. The attenuation tests are used to measure the overall end-to-end loss of each fiber on each link.
- The attenuation tests require the use of an optical source with a patchcord on one end and an optical power meter with a patch cord on the other end. The attenuation tests shall be conducted using a source operating at both 1300 nm and 1500 nm. Testing shall be done from both ends of each link on all fibers. The loss of each fiber (including all splices and connector terminations) shall be recorded on sheets acceptable to the Engineer.
- 2.8 **SHIELD CONTINUITY.** The shield continuity test shall verify the electrical conductivity of the cable shield between offices.
- 2.9 The Contractor will perform the fiber splicing and fiber acceptance tests and furnish written (a printout if produced electronically) results to the Owner. The printout requirement will be waived if the Contractor provides the results in electronic format with software capable of accessing the information.

WRAP-AROUND MARKERS SNAP-ON CABLES, CONDUIT AND PIPE

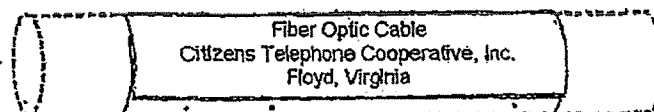
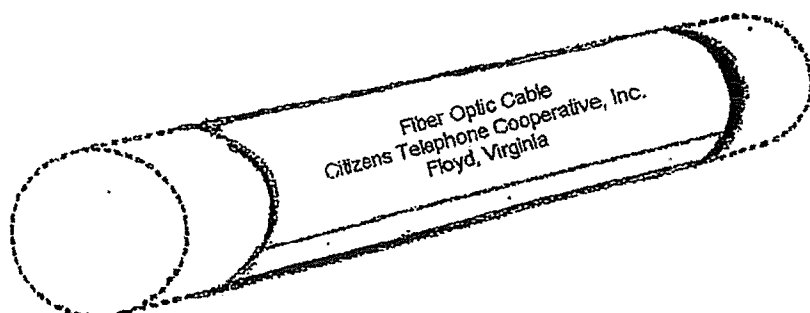
Rolled, flexible, vinyl markers snap on and curl securely around cables, ducts, tubing, or pipes to warn, show content, flow direction, etc. These easy to use markers do not need pre-assembly, cable ties, or adhesives and can be installed in a snap!

Standard sizes, colors, and many generic wordings available from stock.
Custom sizes and wordings available upon request.

MATERIAL: Outdoor grade, UV stabilized calendared vinyl and UV stabilized outdoor grade ink
COLORS: Orange, yellow, red, black, green, and white with black print.

Diameter to wrap around	Item Code	Length	Material Thickness
1/4 in. To 1 in.	SOM1x	4 in.	0.010 in.
1 in. To 2 in.	SOM2x	7 in.	0.020 in.
2 in. To 3 in.	SOM3x	8 in.	0.020 in.
3 in. To 4 in.	SOM4x	10 in.	0.020 in.

x = "O" for Orange, "Y" for Yellow, "R" for Red, "K" for Black, "G" for Green or "W" for White



Contact: Ms. Joanne McDougall

TECH
PRODUCTS, INC.

800-221-1311
718-442-4900
718-442-2121 - Fax
e-mail: team@techproducts.com
www.techproducts.com

INSERT II:

**RUS FORM 515A - SPECS AND DRAWINGS FOR
CONSTRUCTION OF DIRECT BURIED PLANT**



United States
Department of
Agriculture

Rural
Utilities
Service

RUS Bulletin 1753F-150
RUS Form 515a

Date: September 30, 2010

Specifications and Drawings for Construction of Direct Buried Plant

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UNITED STATES DEPARTMENT OF AGRICULTURE
Rural Utilities Service

BULLETIN 1753F-150

SUBJECT: Specifications and Drawings for Construction of Direct Buried Plant, RUS Form 515a

TO: All Telecommunications Borrowers and RUS Telecommunications Staff

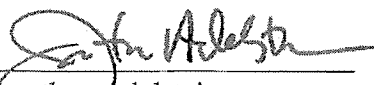
EFFECTIVE DATE: September 29, 2010

OFFICE OF PRIMARY INTEREST: Technical Standards Branch, Advance Services Division.

AVAILABILITY: RUS Bulletin 1753F-150, Specifications and Drawings for Construction of Direct Buried Plant, RUS Form 515a, issued September 17, 2001, has been revised. The revised bulletin can be accessed via the Internet at <http://www.usda.gov/rus/telecom/publications/bulletins.htm>.

PURPOSE: This specification provides Contractors, Engineers, and RUS Borrowers with industry-created assembly unit descriptions, materials, construction and installation, and drawings for direct buried plant associated with RUS Form 515, Telecommunications System Construction Contract.

ACKNOWLEDGMENT: This revised bulletin was developed through a cooperative effort of the *Rural Utilities Service* (RUS) and the *515 Task Force* of the *Association of Communication Engineers* (ACE) which also includes members representing the *Power and Communication Contractors Association* (PCCA) and the Rural Standards Initiatives (RSI).


Jonathan Adelstein
Administrator
Rural Utilities Service

SEP 29 2010
Date

RUS Bulletin 1753F-150
Specifications and Drawings for Construction of
Direct Buried Plant, RUS Form 515a

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CONSTRUCTION:

Buried Cable Plant

Fiber Optic Cable Plant

SPECIFICATIONS AND STANDARDS:

Outside Plant

LIST OF CHANGES

- 1 Modification of Section BA as follows:
 - (a) Redefined unit to indicate installation of all units must be in compliance with RUS BULLETIN 1728F-700, REA Specification for Wood Poles, Stubs and Anchor Logs.
- 2 Modification of Section BDO as follows:
 - (a) Redefined unit to indicate installation of all splicing or fiber termination hardware and accessories are included as necessary;
 - (b) Redefined unit to add housing sizes comparable to copper plant housings sizes: BDO3, BDO4, BDO5, BDO6, BDO7, BDO6000, BDO8000, BDO10000; and
 - (c) Added suffixes "C" for plastic cone mounted with crushed stone or gravel bed, "G" for pea gravel, "H" for handhole mounted with crushed stone or gravel bed, and "S" for poured in place sealant.
- 3 Modification of Section BDS, as follows:
 - (a) Redefined unit to include cross-connect modules, blocks, or bulkheads for FTTP; and
 - (b) Added suffixes "H" for handhole mounted with crushed stone or gravel bed and "S" for poured in place sealant.
- 4 Modification of the Section BFO, as follows:
 - (a) Redefined suffix "I" for buried cable, to be installed inside a duct placed by the contractor;
 - (b) Modified suffix " V() () " to "V(x)" with the first value in the V suffix parentheses must indicate the number of ducts by the second value specifying the inside diameter of the ducts in inches or millimeters; and
 - (c) Provided suffixes "H" for special conditions or instructions concerning the installation as determined by the Engineer, "IE" for buried cable to be installed inside an existing duct placed by others, "L" for adding a locate conductor to a dielectric cable, "R" for indicating cable of ribbon construction, and "W" for a 3" wide, orange warning tape, installed 18" above the cable.
- 5 Modification of the BM60 unit, as follows:
 - (a) To reflect installing buried plastic pipe as the standard installation practice for an entire project versus crossings only; and
 - (b) Provide suffixes "S" for steel pipe, "R" for specialized rock boring bit, and "RR" for larger specialized boring equipment.
- 6 Modification of the BM61 unit, as follows:
 - (a) To reflect providing a hole as the standard installation practice for service entrance cables versus crossings only.

- 7 Addition of miscellaneous assembly unit BM51, Fiber Optic Pre-connectorized Multiport Terminal Assembly Unit.
- 8 Modification of the Section HBF, as follows:
 - (a) Modified "HBFO()" to "HBFO(-)" with the cable strand count and when necessary, pre-hyphenated by the number of identical cables to be housed in the closure. Ribbon type cables are identified by an attached "R" to the cable strand count within the parenthesis; and
 - (b) Provided suffix "S()" for number of splices in the closure specified within the parenthesis.
- 9 Modification of the Section HO, as follows:
 - (a) Modified the section description for complete a ribbon fiber optic splice using mass splicing, to connect fiber-terminated ports using patch cords, and to terminate one optical splitter pigtail; and
 - (b) Provided suffix "HO4" for connecting a splitter pigtail, "HO5()" for a fiber optic connection by patch cord, and "HO#R" for splicing a ribbon matrix cable assembly.
- 10 In Part II, section 1, clarified for purposes of this specification references to outside buried cables include fiber optic or copper type cables unless otherwise specified.
- 11 In Part II, section 4, added compliance to the RUS "Buy American" provision for items for which categories do not appear in RUS IP 344-2, "List of Materials Acceptable for Use on Telecommunications Systems of RUS Borrowers."
- 12 In Part III, section 4, added when placing cable or wire by horizontal directional drilling (HDD) or boring, the cable or wire bore route must be pre-planned and mapped for the most efficient path.
- 13 In Part III, section 4, added a underground pipe assembly unit (BM60()) may use the "R" suffix for specialized rock boring or "RR" for heavy rock when specified for proper and acceptable use by the engineer prior to the bidding process. All underground or buried pipes must be properly capped with or without any cable or wire installed.
- 14 In Part III, section 4, added the minimum depth at subscriber premises, 12" (305 mm).
- 15 In Part III, sections 1-7, added miscellaneous language for the inclusion of FTTH.

For editorial or other minor technical changes, refer to the body of the document.

Part I - DESCRIPTION OF ASSEMBLY UNITS AND PROPOSAL AND CONTRACT SECTIONS

The Contractor's Proposal form is divided into sections and the sections approved for construction must be listed in the Construction Agreement by the Owner. The sections are as follows:

Section	BA	-	Buried Plant Housing Stub Pole Units
Section	BD	-	Buried Plant Housing Assembly Units
Section	BDO	-	Buried Plant Fiber Optic Housing Assembly Units
Section	BDS	-	Serving Area Interface Cabinet (SAIC) Assembly Units
Section	BFC	-	Buried Filled Copper Cable Assembly Units
Section	BFO	-	Buried Filled Fiber Optic Cable Assembly Units
Section	BH	-	Buried Handhole Assembly Units
Section	BM	-	Miscellaneous Assembly Units
Section	HBF	-	Buried Filled Splice Closure Assembly Units
Section	HC	-	Copper Splicing Assembly Units
Section	HO	-	Fiber Optic Splicing Assembly Units
Section	W	-	Rearrangement Units
Section	XX	-	Nonreusable Materials Removal Units
Section	XZ	-	Reusable Materials Removal Units

Each assembly unit includes only the materials listed on the corresponding Installation and Construction Guide Drawings or description of unit where no drawing exists. The various installation and construction units, which are included in this Proposal and upon which quotations are required, are defined by the following descriptions:

Section BA – BURIED PLANT HOUSING STUB POLE UNITS

Consists of all labor and material for a stub pole in place. Stub poles must be of the length and type designated by the Engineer as follows:

BA2	6.5 Feet [1.98 meters (m)], Round Wood Stub Pole
BA3	8.0 Feet (2.44 m), Round Wood Stub Pole
BA4	10.0 Feet (3.05 m), Round Wood Stub Pole
BA5	13.5 Feet (4.12 m), Round Wood Stub Pole
BA21	6.5 Feet (1.98 m), Sawn Wood Stub Pole
BA22	8.0 Feet (2.44 m), Sawn Wood Stub Pole
BA23	10.0 Feet (3.05 m), Sawn Wood Stub Pole

The stub pole plan, kind of preservative, and method of treatment are designated in the Proposal in compliance with Bulletin 1728F-700, *REA Specification for Wood Poles, Stubs and Anchor Logs*.

Section BD – BURIED PLANT HOUSING ASSEMBLY UNITS

Consists of a buried plant housing stake mounted in place. These units include all labor and material to install pea gravel, housing numbers, route letters, load point numbers, directional and other markings of buried filled copper cable, except as specifically provided for in other units. Includes all labor and material to install bonding connectors, harnesses, and grounding connector for terminating external ground wire, in accordance with RUS Splicing Standard Bulletin 1753F-401 (PC-2).

The assembly units are defined as follows:

BD3	Buried Plant Housing, Type H Stake-Mounted
BD4	Buried Plant Housing, Type H Stake-Mounted
BD5	Buried Plant Housing, Type H Stake-Mounted
BD7	Buried Plant Housing, Type H Stake-Mounted
BD14	Buried Plant Housing, Type M Stake-Mounted
BD15	Buried Plant Housing, Type M Stake-Mounted
BD16	Buried Plant Housing, Type M Stake-Mounted
BD6000	Buried Plant Housing, Large Count Stake-Mounted
BD8000	Buried Plant Housing, Large Count Stake-Mounted
BD10000	Buried Plant Housing, Large Count Stake-Mounted

Note: The splicing capacity must be in accordance with RUS Splicing Standard Bulletin 1753F-401(PC-2).

Options designated by the following suffixes apply:

<u>Suffix</u>	<u>Description</u>
A	Pole mounted (see guide drawing 905 when increased height is required). Pole compensated under BA units.
F	Concrete pad mounted. Pad compensated under BHF units.
H	Good-housekeeping panel.
P	Plastic pad mounted. Pad compensated under BHF units.
R	Crushed stone or gravel bed.

Examples:

BD3	BD3 housing stake mounted.
BD4AH	BD4 housing pole mounted and good-housekeeping panel.
BD14R	BD14 housing with crushed stone or gravel bed.
BD8000F	BD8000 housing, concrete pad mounted.

Section BDO – BURIED PLANT FIBER OPTIC HOUSING ASSEMBLY UNITS

Consists of a buried plant fiber optic housing stake mounted in place. These units include all the labor and material to install housing base material, housing numbers, route letters, and directional and other markings of buried fiber optic cable, except as specifically provided for in other units. Includes all labor and material to install all splicing, or splice case, or fiber termination hardware and accessories as necessary, bonding connectors, harnesses, and grounding connector for terminating external ground wire, in accordance with RUS Splicing Standard Bulletin 1753F-401 (PC-2).

The assembly units are defined as follows:

BDO3	Buried Plant Housing, Stake-Mounted
BDO4	Buried Plant Housing, Stake-Mounted
BDO5	Buried Plant Housing, Stake-Mounted
BDO6	Buried Plant Housing, Stake-Mounted
BDO7	Buried Plant Housing, Stake-Mounted
BDO6000	Large Buried Plant Housing, Stake-Mounted
BDO8000	Large Buried Plant Housing, Stake-Mounted
BDO10000	Large Buried Plant Housing, Stake-Mounted

Note: Type of hardware and accessories must be dependent upon the type of fiber optic connection(s), splicing, and/or splice case utilized.

Options designated by the following suffixes apply:

<u>Suffix</u>	<u>Description</u>
A	Pole mounted (see guide drawing 905 when increased height is required). Pole compensated under BA units.
C	Plastic cone mounted with crushed stone or gravel bed. Cone compensated under BHF units.
F	Concrete pad mounted. Pad compensated under BHF units.
G	Pea Gravel.
H	Handhole mounted with crushed stone or gravel bed. Handhole compensated under BHF units.
P	Plastic pad mounted. Pad compensated under BHF units.
R	Crushed stone or gravel bed.
S	Poured in place sealant.

The following illustrations indicate the method of designating the material required:

BDO3	A BDO3 housing stake mounted.
BDO4SH	A BDO4 housing with a poured in place sealant and handhole mounted with crushed stone or gravel bed.
BDO6SC	A BDO6 housing with a poured in place sealant and plastic cone mounted with crushed stone or gravel bed.
BDO8000F	A BD8000 housing, concrete pad mounted.

Section BDS – SERVING AREA INTERFACE CABINET (SAIC) ASSEMBLY UNITS

Consists of an SAIC stake mounted in place. Includes all labor and materials to complete the installation. Included in this unit must be the cabinet; cross-connect modules, blocks, or bulkheads; cabinet mounting accessories; internal mounting hardware such as frames, mounting brackets, all splicing hardware and accessories; grounding connector for terminating external ground wire, bonding connectors and harnesses in accordance with RUS Splicing Standard Bulletin 1753F-401(PC-2); cabinet base material; interface number and direction markings and placement of conduit(s) and such other labor and materials necessary to complete the

installation, except as specifically provided for in other units. Detailed plans and specifications further defining these units and establishing specific requirements including size of the housing for each SAIC location are attached hereto and are identified by the name and location of each SAIC.

The assembly units are defined as follows:

BDSM()() - SAIC equipped with modules.

BDSB()() - SAIC equipped with blocks.

BDSO()() - SAIC equipped with optical modules or bulk heads.

The number of feeder pairs or fibers to be terminated must be indicated in the first parentheses; the number of distribution pairs or fibers to be terminated must be indicated in the second parentheses; and the number of electronic pairs or pass through fibers to be terminated must be indicated in the third parentheses. Options designated by the following suffixes apply:

<u>Suffix</u>	<u>Description</u>
A	Pole mount.
F	Concrete slab mount. Pad compensated under BHF units.
H	Handhole mounted with crushed stone or gravel bed. Handhole compensated under the BHF units.
P	Plastic pad mount. Pad compensated under BHF units.
R	Crushed stone or gravel bed.
S	Poured in place sealant.

The following illustrations indicate the method of designating the material required.

BDSM(25)(25)(0)A

SAIC equipped with modules, 25 feeder pairs terminated, 25 distribution pairs, pole mounted.

BDSB(50)(25)(25)F

SAIC equipped with blocks, 50 feeder pairs terminated, 25 distribution pairs terminated, and 25 electronic pairs terminated, concrete pad mounted.

BDSO(72)(576)(54)SH

SAIC equipped with optical modules or bulkheads, 72 feeder fibers terminated, 576 distribution fibers terminated, 54 pass through fibers, with a poured in place sealant and handhole mounted with crushed stone or gravel bed.

Section BFC – BURIED FILLED COPPER CABLE ASSEMBLY UNITS

Consists of one (1) foot (0.305 m) of buried filled copper cable in place. This unit includes all material and labor for installing, ripping (where necessary as determined by the Engineer), and backfilling, except as specifically provided for in other units. Where the cable is plowed, ripping may be necessary to provide a ripped path to allow placement at the required depth, and may require more than one ripped pass.

Options designated by the following suffixes apply:

<u>Suffix</u>	<u>Description</u>
D	Two or more cables placed simultaneously in the same plow slot or trench. Specify all cables within parentheses () with every succeeding cable on the following next line. Each line will break out the length, labor, and material.
H	Screened cable designated for T1 carrier systems.
H1C	Screened cable designated for T1C carrier systems.
I	Buried cable, to be installed inside a duct placed by the contractor. The placement of the duct will be compensated under other units (BFC_V(x) and/or BM60()).
IE	Buried cable to be installed inside an existing duct placed by others.
P	Pre-designated buried filled cable which will, in the judgment of the Engineer, be much more difficult to install than normal for this project because of the presence of underground facilities or severe right-of-way restrictions. This suffix will be specified on the Construction Sheets in advance of bidding, and will not be specified later unless changes in the presence of underground utilities, right-of-way easement, or route changes occur that would, in the judgment of the Engineer, greatly increase the difficulty of cable placement. Also, this suffix will be specified during construction when undocumented buried facilities are encountered that, in the judgment of the Engineer, greatly increases the difficulty of cable placement.

- T Buried filled cable which will be placed at the specified depth by trenching only. This unit will be specified by the Engineer on the Construction Sheets in advance of bidding.
- V(x) One or more vacant ducts specified by the engineer in the Explanatory Notes to be placed simultaneously in the same plow slot or trench. Specify all cables and duct within parentheses () with every succeeding cable or duct on the following next line. Each line will break out the length, labor, and material. The first value in the V suffix parentheses must indicate the number of ducts by the second value specifying the inside diameter of the ducts in inches or millimeters. If cable is to be pulled into this duct as part of the construction then, cable placement must be compensated under the BFC work units suffixed "I".
- W Buried filled cable placed must have a 3" wide, orange warning tape, installed 18" above the cable. The tape must be imprinted with the words "CAUTION" and "COPPER CABLE BURIED BELOW" every 16 to 36".

This unit also includes:

- (1) Clearing of right-of-way. (The Engineer will be responsible for specifying any special conditions or instructions concerning the right-of-way clearing on the Construction Sheets.)

Note 1: Trees that are felled must be cut to commercial wood length and placed on the side of the right-of-way for the landowner. Commercial wood length means the length designated by the Engineer, but in no case must be required to be less than 2 feet (0.61 m).

Note 2: Brush, branches, and refuse from the clearing operations must, without delay, be disposed of by such of the following methods as the Engineer will direct:

<u>Code</u>	<u>Disposition</u>
A	Chipped and Blown.
B	Removed from the vicinity of the right-of-way.
C	Piled on one side of the right-of-way in such manner as to not obstruct roads, ditches, etc.
D	Other as specified by Engineer.

- (2) All labor and material required for the installation of cable guards installed with the approval of the Engineer for the convenience of the Contractor.
- (3) All labor and material required in the repair and/or replacement of streets, sidewalks, roads, drives, fences, lawns, shrubbery, water mains, pipes, pipelines and contents, underground power and telecommunications facilities, buried sewerage and drainage facilities, and any other property damaged during the installation of the buried cable, except loss or damage to crops, gardens, ornamental flowers or trees in the construction corridor necessarily incident to the construction of the Project and not caused by the negligence of the Contractor.
- (4) The cable installed in place for aerial inserts in buried plant when specified by the Engineer. It includes the miscellaneous accessories such as drive rings, thimbleye nuts, etc., in accordance with the Construction Sheets, not included in other units, needed to secure the buried cable in place. (This unit does not include poles, anchors, guys, riser guards or suspension strand units which will be separately specified by the Engineer.)
- (5) The spiraling of buried cable at an aerial insert where indicated by the Engineer on the Construction Sheets.
- (6) All labor and material including housings, splice closures, stub poles, trenching, backfilling, tamping, cable, straight splicing, and other material and labor required for the purpose of joining cable of the same size and gauge in continuous lengths (reel ends). The housings or closures and all other associated materials and equipment must be of the same type as required at other cable splicing points specified in the construction of the Project unless otherwise approved by the Engineer.
- (7) The labor and material for buried cable installed in Miscellaneous Assembly Units, such as, pipe crossings, rock excavating, asphalt or concrete. The labor and material required by these miscellaneous assembly units are specified separately.

The length of buried cable for compensation purposes is determined by taking the sum of distances between splice or terminal points specified by the Engineer, paralleling the cable. It includes the cable installed in trenches, pipes and non-pipe underground crossings, in sections of aerial construction of buried cable and in vertical runs on poles and in stake-mounted or pole-mounted housings. It excludes lateral and vertical runs of cable required solely for the purpose of joining cable in continuous lengths (reel ends) of the same size and gauge. The length of buried cable installed must be determined from the sequential number length markers on the outer jacket of the buried cable except where the markings are illegible, found to be in error or an excessive amount of slack has been provided such as in housings, filled splice closures and aerial inserts. Compensation for multiple cables placed in the same plow slot or trench is determined on the basis of the lengths of the individual cables involved.

Each buried filled copper cable assembly unit is listed in accordance with the number of pairs and gauge of conductors. Each unit is prefixed by the letters BFC. The following illustrations indicate the method of designating the material required:

(BFC50-24 & BFC25-22)D

Unit	No. of Units	Unit Price			Extended Price Labor and Materials
		Labor	Materials	Labor and Materials	
(BFC50-24 & BFC25-22)D					

Two cables placed simultaneously in the same plow slot or trench; one a 50 pair, 24 gauge and the other a 25 pair, 22 gauge cable. Quantity, labor and material unit prices are to be specified for each cable separately (BFO24 & V(2x1)D).

(BFC50-24 & V(2x1"))D

Unit	No. of Units	Unit Price			Extended Price Labor and Materials
		Labor	Materials	Labor and Materials	
(BFC50-24 & V(2x1"))D					

A 50 pair, 24 gauge with 2 vacant ducts having 1 inch (25.4 mm) inside diameters placed simultaneously in the same plow slot or trench. Quantity, labor and material unit prices are to be specified for each part separately.

Note: To have the contractor place the 50 pair 24 gauge copper cable in one of the vacant ducts as part of the construction is specified using the BM60 () unit with the standard dimension ratio (SDR) or schedule (SCH) specified in the parenthesis as necessary i.e. BM60(2x1" SDR11). The cable placement must be compensated under the BFC work units suffixed "I". The cable pulled into the duct would be specified as BFC50-24I.

BFC25-24I A 25 pair, 24 gauge buried filled copper cable to be installed in a duct placed by the contractor.

BFC50-24IE A 25 pair, 24 gauge buried filled copper cable to be installed in an existing duct placed by others.

BFC100-22H A 100 pair, 22 gauge buried filled copper cable with a screen designated for T1 carrier systems.

BFC300-24P It indicates a 300 pair, 24 gauge buried filled copper cable which in the judgment of the Engineer will be much more difficult to install than normal because of the presence of underground facilities or severe right-of-way restrictions.

Section BFO – BURIED FIBER OPTIC CABLE ASSEMBLY UNITS

Each unit consists of one (1) foot (0.305 m) of buried fiber optic cable in place. This unit includes all material and labor for installing, ripping (where necessary as determined by the Engineer), and backfilling, except as specifically provided for in other units. Where the cable is plowed, ripping may be necessary to provide a ripped path to allow placement at the required depth, and may require more than one ripped pass.

Options designated by the following suffixes apply:

<u>Suffix</u>	<u>Description</u>
D	Two or more cables placed simultaneously in the same plow slot or trench. Specify all cables within parentheses () with every succeeding cable on the following next line. Each line will break out the length, labor, and material.
H	Designated for cables with special conditions or instructions concerning the installation methods or handling as specified by the Engineer in the Explanatory Notes. This unit will be specified by the Engineer on the Construction Sheets in advance of bidding.
I	Buried cable, to be installed inside a duct placed by the contractor. The placement of the duct will be compensated under other units (BFO_V(x) and/or BM60()).
IE	Buried cable to be installed inside an existing duct placed by others.
L	Designated for adding a locate conductor to a dielectric cable specifically for locating the cable.
P	Pre-designated buried cable which will, in the judgment of the Engineer, be much more difficult to install than normal for this project because of the presence of underground facilities or severe right-of-way restrictions. This suffix will be specified on the Construction Sheets in advance of

bidding, and will not be specified later unless changes in the presence of underground utilities, right-of-way easement or route changes occur that would, in the judgment of the Engineer, greatly increase the difficulty of cable placement. Also, this suffix will be specified during construction when unknown and undocumented buried facilities are encountered that, in the judgment of the Engineer, greatly increase the difficulty of cable placement.

- R Indicates cable of ribbon construction.
- T Buried cable which will be placed at the specified depth by trenching only.
- V(x) One or more vacant ducts specified by the Engineer in the Explanatory Notes to be placed simultaneously in the same plow slot or trench. Specify all cables and duct within parentheses () with every succeeding cable or duct on the following next line. The first value in the V suffix parentheses must indicate the number of ducts by the second value specifying the inside diameter of the ducts in inches or millimeters. If cable is to be pulled into this duct as part of the construction then, cable placement must be compensated under the BFO work units suffixed "I".
- W Buried fiber optic cable placed must have a 3" wide, orange warning tape, installed 18" above the cable. The tape must be imprinted with the words "CAUTION" and "FIBER OPTIC CABLE BURIED BELOW" every 16 to 36".

This unit also includes:

- (1) Clearing of right-of-way. (The Engineer will be responsible for specifying any special conditions or instructions concerning the right-of-way clearing on the Construction Sheets).

Note 1: Trees that are felled must be cut to commercial wood length and left on the side of the right-of-way for the landowner. Commercial wood length means the length designated by the Engineer, but in no case must be required to be less than 2 feet (0.61 m).

Note 2: Brush, branches, and refuse from the clearing operations must, without delay, be disposed of by such of the following methods as the Engineer will direct:

<u>Code</u>	<u>Disposition</u>
A	Chipped and Blown.
B	Removed from the vicinity of the right-of-way.
C	Piled on one side of the right-of-way in such manner as to not obstruct roads, ditches, etc.
D	Other as specified by Engineer.

- (2) All labor and material required for the installation of cable guards installed with the approval of the Engineer for the convenience of the Contractor.
- (3) All labor and material required in the repair and/or replacement of streets, sidewalks, roads, drives, fences, lawns, shrubbery, watermain, pipes, pipelines and contents, underground power and telecommunications facilities, buried sewerage and drainage facilities, and any other property damaged during the installation of the buried cable, except loss or damage to crops, gardens, ornamental flowers or trees in the construction corridor necessarily incident to the construction of the Project and not caused by the negligence of the Contractor.
- (4) The cable installed in place for aerial inserts in buried plant when specified by the Engineer. It includes the miscellaneous accessories such as drive rings, thimbleye nuts, etc., in accordance with the Construction Sheets, not included in other units, needed to secure the buried cable in place. (This unit does not include poles, anchors, guys, riser guards or suspension strand units which will be separately specified by the Engineer.)
- (5) The spiraling of buried cable at an aerial insert where indicated by the Engineer on the Construction Sheets.
- (6) The labor and material for buried cable installed in Miscellaneous Assembly Units, such as, pipe crossings, rock excavating, asphalt or concrete. The labor and material required by these miscellaneous assembly units are specified separately.

The Buried Fiber Optic Cable Assembly Unit does not include labor and material for splicing the individual fibers. All splice points, including reel end splices, must be specified by the Engineer on the Construction Sheets. All labor and material required for splicing the fibers and for

enclosing the splice, such as, fiber organizers, splice closures, housings and stub poles, and miscellaneous hardware items must be included in other assembly units.

The length of buried cable for compensation purposes is determined by taking the sum of all distances between splice or terminal points specified by the Engineer. It includes the cable installed in trenches, pipes and non-pipe underground crossings, in sections of aerial construction of buried cable and in vertical runs on poles and in stake-mounted or pole-mounted housings. The length of buried cable installed must be determined from the sequential number length markers on the outer jacket of the buried cable except where the markings are illegible or found to be in error. Compensation for multiple cables placed in the same plow slot or trench is determined on the basis of the lengths of the individual cables involved.

Each buried fiber optic cable assembly unit is listed per the number of optical fibers. Each unit is prefixed by the letters BFO. The following illustrations indicate the method of designating the material required:

BFO288R A buried fiber optic cable with 288 fibers of ribbon construction.

(BFO144R & BFO36 & BFC100-24)D

Unit	No. of Units	Unit Price			Extended Price Labor and Materials
		Labor	Materials	Labor and Materials	
(BFO144R					
& BFO36					
& BFC100- 24)D					

A 144 Ribbon and 36 loose tube fiber, buried fiber optic cables and a 100 pairs, 24 AWG buried filled copper cable, placed in the same plow slot or trench. Quantity, labor and material unit prices are to be specified for each cable separately (BFO24 & V(2x1")D).

(BFO24 & V(2x1"))D

Unit	No. of Units	Unit Price			Extended Price Labor and Materials
		Labor	Materials	Labor and Materials	
(BFO24					
& V(2x1"))D					

A buried fiber optic cable containing 24 fibers with 2 vacant ducts having 1 inch (25.4 mm) inside diameters placed simultaneously in the same plow slot or trench. Quantity, labor and material unit prices are to be specified for each part separately.

Note: To have the contractor place the 24 fiber in one of the vacant ducts as part of the construction is specified using the BM60 () unit with the standard dimension ratio (SDR) or schedule (SCH) specified in the parenthesis as necessary i.e. BM60(2x1" SDR11). The cable placement must be compensated under the BFO work units suffixed "I". The cable pulled into the duct would be specified as BFO24I.

BF0361 A buried fiber optic cable containing 36 fibers installed in a duct placed by the contractor.

BFO36IE A buried fiber optic cable containing 36 fibers installed in an existing duct placed by others.

Section BH – BURIED HANDHOLE ASSEMBLY UNITS

Consists of labor and material for one (1) buried handhole installed in place, including the base, top cover and mounting hardware, and pea gravel. The handhole size, amount of pea gravel and the installation must be as specified by the Engineer. The handhole assembly unit must be used only in areas of non-vehicular traffic. When required for use in areas of vehicular traffic, the handhole must be rated to withstand vehicular traffic. Where specified, vehicular traffic rated handholes must be suffixed with the letter "T". Note: When unit is used for handholes and pads designed to support a specific pedestal type must be specified by the Engineer in the List of Changes and Deletions pages of the contract.

The assembly units are defined as follows:

BHC() Buried Handhole for copper systems.

BHF() Buried Handhole for fiber optic systems.

The dimensions of length, width, and depth of the handhole must be indicated in the parentheses in inches (millimeters).

Examples:

- | | |
|----------------|--|
| BHC(13x24X24) | Buried handhole for copper systems with dimensions of 13 x 24 x 24" (330 x 610 x 610 mm) (approximate). |
| BHF(17x30x30)T | Buried handhole for fiber optic systems with dimensions of 17 x 30 x 30" (432 x 762 x 762 mm)(approximate) which is rated for vehicular traffic. |

Section BM – MISCELLANEOUS ASSEMBLY UNITS

Consists of all labor and material to construct and install the units defined individually below required for the installation and construction of the buried cable portions of the Project:

- | | |
|-----------|---|
| BM2()() | <u>Housing Ground Assembly Unit</u> - Consists of the necessary labor and material for the installation of a ground rod (installed in undisturbed soil), ground rod clamp and the required length of a bare #6 AWG copper ground wire connected to an auxiliary grounding connector (included in the housing assembly unit) within the housing (see unit drawing BM2). Indicate the desired diameter and length of ground rod. For a sectionalized ground rod and coupling device use the suffix "S". |
|-----------|---|

- Examples:
- | | |
|---------------|---|
| BM2(1/2)(5) | A 1/2 inch X 5 foot (13 mm X 1.5 m) ground rod. |
| BM2(5/8)(8) | A 5/8 inch x 8 foot (16 mm X 2.4 m) ground rod. |
| BM2(5/8)(20)S | Two 5/8 inch x 10 foot (16 mm X 3.1 m) sectionalized ground rods and a coupling device. Where sectionalized ground rods are required the total length should appear on the Construction Sheets. |

- | | |
|------|--|
| BM2A | <u>Housing Auxiliary Ground Assembly Unit</u> – Consists of the necessary labor and material for the installation of a ground rod clamp (if required) and the required length of a bare #6 AWG copper ground wire connected to a pole ground wire using a ground wire connector (see unit drawing BM2A). |
|------|--|

- | | |
|------|--|
| BM2B | <u>Housing Ground Assembly Unit</u> – Consists of the necessary labor and materials for the installation of a bonding connector bracket within an existing housing. The bonding connector bracket should be the bracket that is recommended by the housing manufacturer. |
|------|--|

- BM2C Existing Facility Bonding Assembly Unit – Consists of the necessary labor and material for bonding new or existing cable in an existing facility, such as a buried plant housing or splice closure. This unit includes a bonding connector, a bonding harness, tie-wraps, replacement of gravel and/or sealer, and rearrangement of an existing cable. Compensation must be paid on a per bond basis.
- BM2D New Facility Re-Bonding Assembly Unit – Consists of the necessary labor and material for re-bonding an existing cable in a new facility such as a buried plant housing or splice closure. This unit includes a bonding connector, a bonding harness, and tie wraps. Compensation must be paid on a per bond basis.
- BM6M Suspension Strand Assembly Unit – Consists of one (1) foot (0.305 m) of 6M [6,000 pounds (lbs)—2722 kilograms (kg)] suspension strand, supporting hardware, lashing wire, cable straps, and all other accessories required for aerial insert construction in buried plant, but excludes the buried cable. This unit will be used for short sections of aerial construction in buried plant. When such aerial inserts are required, the Engineer will specify the pole, riser guard, guy and anchor assembly units required, plus the appropriate quantity of this unit. The Contractor will be compensated for these units at their respective bid prices plus the appropriate cable units including the vertical length on the end poles.
- BM10M Suspension Strand Assembly Unit – This unit is the same as the BM6M unit except that the size of the strand is 10M (10,000 lbs--4536 kg).
- BM16M Suspension Strand Assembly Unit – This unit is the same as the BM6M unit except that the size of the strand is 16M (16,000 lbs--7257 kg).
- BM21 Cable Entrance – Consists of the necessary labor and material to terminate copper and/or fiber optic outside plant cables as shown on the detailed drawings as specified by the Engineer.
- BM22 Grounding System – Consists of the necessary labor and material to construct a grounding system as shown on the detailed drawings as specified by the Engineer. This unit must include all ground electrodes, trenching, backfilling, bonding the auxiliary ground electrodes to each other and to the primary ground electrodes, and bonding to the master ground bar (MGB).
- BM50() Buried Service Wire or Cable Installation to Pole-Mounted Wire Terminal Assembly Unit – Consists of the necessary labor and material to install a buried wire or cable from a buried plant housing to a pole mounted wire

terminal. This unit includes the installation of pole mounted buried wire or cable, a pole mounted wire terminal, and the necessary wire work at the wire terminal (see assembly unit drawing BM50). Pair count of the terminal size must be indicated in the parentheses. Installation of the buried plant housing and splicing of the pole mounted buried wire or cable inside the buried plant housing must be compensated under separate units.

- BM51(x)

Fiber Optic Pre-connectorized Multiport Terminal Assembly Unit – Consists of the necessary labor and material to install a fiber optic pre-connectorized multiport terminal from a distribution enclosure to a handhole or buried plant housing. This unit includes the installation of the stubbed fiber cables, multiport terminal, and the necessary cable work and hardware to secure and install the unit. In the parentheses, the number of ports must be indicated first by the length of the cable stubs in feet. Installation of the buried plant enclosures and any splicing of the stubbed fiber optic cables must be compensated under separate units.
- BM52

Re-numbering Assembly Unit – This unit consists of the necessary labor and material to remove existing numbers and clean where necessary, and re-number an existing housing.
- BM53

Warning Sign Assembly Unit – Consists of one (1) staked mounted warning sign, in place as shown on the Construction Sheets. This unit includes all labor and material to install the stake mounted sign (see detail drawing specified by the Engineer).
- BM54

Route Sign Assembly Unit – Consists of one (1) stake mounted route sign, in place, as shown on the Construction Sheets. This unit includes all labor and material to install the stake mounted sign (see detail drawing specified by the Engineer).
- BM55

Splice Location Sign Assembly Unit – Consists of one (1) stake mounted splice location sign, in place, as shown on the Construction Sheets. This unit includes all labor and material to install the stake mounted sign (see detail drawing specified by the Engineer).
- BM55A

Buried Splice Location Assembly Unit – Consists of one (1) buried splice location assembly unit installed in or above the buried splice case. The installation of the buried splice location unit must be in accordance with the manufacturer's instructions. If the owner has standardized on a specific system, the Engineer must so indicate (see detail drawing specified by the Engineer).

BM60() Underground Pipe Assembly Unit – Consists of one (1) lineal foot (0.305 m) of Plastic pipe, with the inside diameter in inches (meters) specified in parentheses, installed in place. The standard dimension ratio (SDR) or schedule (SCH) must be specified in the parenthesis as necessary. This unit includes the pushing of pipe and any excavation, backfilling and tamping necessary for the installation of the pipe. The pipe must be installed at the depth specified by the Engineer. The installed pipe must be free of any sharp projections to avoid damage to the outer jacket of the buried cable or wire during its installation in the pipe. This unit includes all material and labor required in the repair and/or replacement of streets, roads, sidewalks, drives, fences, lawns, shrubbery, water mains, pipes, pipelines and contents, underground power and telecommunications facilities and any other property damaged by the excavating, except loss or damage to crops, gardens, trees or ornamental flowers in the construction corridor necessarily incident to the construction of the Project and not caused by the negligence of the Contractor. The contractor will be compensated for labor and material for the buried cable or wire under separate units. Options designated by the following suffixes apply:

<u>Suffix</u>	<u>Description</u>
D	Directional boring required.
S	Steel pipe required. The wall thickness must be specified in the BM60 unit's parenthesis as necessary.
R	Indicates when a specialized rock boring bit or reamer is required. The unit consists of the labor and equipment required to bore through rock that cannot be accomplished with typical equipment used for a similar bore where rock is not encountered. This unit will only be used when pre-approved by the engineer and will be paid on a per foot basis only for that portion of the bore that is through rock.
RR	Indicates heavy rock that will require significantly larger equipment than required for the rest of the project and/or specialized drill heads that pump mud through the head to remove the rock debris. The unit consists of the labor and equipment required for the bore. This unit will only be used when pre-approved by the engineer and the payment method

has been pre-negotiated prior to bringing the equipment on site.

- BM61() Underground Non-Pipe Assembly Unit – Consists of the labor in providing a hole in soil one (1) foot (0.305 m) in length and of a diameter in inches (meters) specified in parentheses. The depth of the hole below the surface of the ground must be specified by the Engineer in the plans and specifications. This unit includes any excavation, backfilling and tamping necessary for the installation. This unit may be used where the permanent installation of a steel or plastic pipe under the BM60 unit is not required. This unit includes all material and labor required in the repair and/or replacement of streets, roads, sidewalks, drives, fences, lawns, shrubbery, water mains, pipes, pipelines and contents, underground power and telecommunications facilities and any other property damaged by the excavating, except loss or damage to crops, gardens, trees or ornamental flowers in the construction corridor necessarily incident to the construction of the Project and not caused by the negligence of the Contractor. The contractor will be compensated for labor and material for the buried cable or wire under separate units. Where directional boring is required, the unit must be suffixed by the letter "D".
- BM65() Guard Assembly Unit – Consists of the necessary labor and material for installing one (1) lineal foot (0.305 m) of split galvanized steel guard. The sections of guard may be straight and or curved. This unit may be used as attachments to bridges, abutments, walls, etc., and any below ground location. All hangers, bolts, and other attachment hardware along with excavation, backfilling, tamping, and restoration are included as part of this unit. The diameter of the guard must be indicated in the parentheses. The contractor will be compensated for labor and material for the buried cable or wire under separate units. (See detailed drawings as specified by the Engineer). Where a split plastic guard is required, the unit must be suffixed by the letter "P".
- BM66() Bridge Attachment Assembly Unit – Consists of the necessary labor and material for installing one (1) lineal foot (0.305 m) of galvanized steel pipe, of the inside diameter in inches (meters) specified, attached to a bridge. Details of the method of installation will be in accordance with the Plans and Specifications as determined by the Engineer. The contractor will be compensated for labor and material for the buried cable or wire under separate units. (See detailed drawings as specified by the Engineer). Where a plastic pipe is required, the unit must be suffixed by the letter "P".

- BM71 Rock Excavating Unit – Consists of one (1) lineal foot (0.305 m) of trenching, blasting, sawing, etc., measured parallel to the surface of the ground, in rock, including excavation, backfilling and tamping to place cable or wire to the depth specified in the Specifications. This unit includes all material and labor required in the repair and/or replacement of streets, roads, sidewalks, drives, fences, lawns, shrubbery, water mains, pipes, pipelines and contents, underground power and telecommunications facilities and any other property damaged by the excavating, except loss or damage to crops, gardens, trees or ornamental flowers in the construction corridor necessarily incident to the construction of the Project and not caused by the negligence of the Contractor. This unit will be specified by the Engineer only when field conditions at the site show the existence of rock to a depth required by the specification, which cannot be trenched, plowed or ripped. If extra depth is required, the unit must be suffixed by "E()", where the required depth in rock must be shown inside the parentheses. The contractor will be compensated for labor and material for the buried cable or wire under separate units.
- BM72 Asphalt Assembly Unit – Consists of labor and material necessary to remove and restore one (1) lineal foot (0.305 m) of asphalt pavement (where the removal does not necessitate the breaking up of concrete) measured along the route of the cable or wire. Any trenching which may be necessary for the installation of buried cable or wire is included in this unit. All work must be performed as required in accordance with federal, state and/or local construction standards in effect at the time of bid date. (Pursuant to these federal, state and/or local standards, restoration may include the use of any base and sub-base materials such as concrete, crushed stone, etc.). The contractor will be compensated for labor and material for the buried cable or wire under the separate units.
- BM73 Concrete Assembly Unit – Consists of the labor and material necessary to remove and restore one (1) lineal foot (0.305 m) of concrete pavement (or any combination of concrete pavement and other surfacing material) where the removal necessitates the breaking up of concrete pavement, measured along the route of cable or wire. Any trenching which may be necessary for the installation of buried cable or wire is included in this unit. All work must be performed as required in accordance with federal, state and/or local construction standards in effect at the time of bid date. (Pursuant to these federal, state and/or local standards, restoration may include the use of any base and sub-base materials such as concrete, crushed stone, etc.) The contractor will be compensated for labor and material for the buried cable or wire separate units.
- BM80 Riser Guard, 1 inch inside diameter (ID) x 8 feet (25.4 mm x 2.44 m). (See assembly unit drawing BM80.)

- BM81 Riser Guard, 2 inch ID x 8 feet (50.8 mm x 2.44 m).
(See assembly unit drawing BM81.)
- BM82 Riser Guard, 3 inch ID x 8 feet (76.2 mm x 2.44 m, see assembly unit drawing BM82.)
- BM91 Pedestal Restricted Access Insert Assembly Unit – Consists of a restricted access insert installed within a housing and the labor and material for setting up in preparation for installing the insert, such as, opening the jacket and bonding of the cable shields. Cable splicing must be compensated under the appropriate splicing units.

Section HBF – BURIED SPLICE CLOSURE ASSEMBLY UNITS

This unit consists of a buried splice closure installed in place. It includes the labor and material for setting up in preparation for installing the closure, such as, excavating a splicing pit, installing closure in a housing or handhole if necessary, opening the sheath or jacket of the cable, bonding of the cable shields, and closing the closure in accordance with the manufacturer's instructions. Cable splicing must be compensated under the appropriate splicing units.

The assembly units are defined as follows:

- HBF() Buried Copper Closure - A filled splice closure with pair count and gauge for each cable to be spliced.
- HBFOx Buried Fiber Optic Closure - A fiber optic closure, splice organizer, and miscellaneous materials adequate for the individual location. Unless otherwise specified by the Engineer, the following suffixes designate the case size in the series of cases specified by the Engineer. Projects that require more than one series of case shall have an additional suffix as specified in the List of Changes, Additions, and Deletion Pages to designate the series of case. The letter "x" designates the case size as small (S), medium (M), or large (L), as specified below by the following suffices:

<u>Suffix</u>	<u>Description</u>
S	Small splice case with up to two main ports and two secondary ports that can accept two smaller main cables, two armored drop cables, or up to four flat drop cables. The largest fiber count cable this case will accept is 96 Fiber.

- | | |
|---|---|
| M | Medium splice case with up to four main ports and up to four secondary ports that can accept four smaller main cables, four armored drop cables, or up to six flat drop cables. The largest fiber count cable this case will accept is 288 Fiber. |
| L | Large splice case with greater than four main ports and up to four secondary ports that can accept four smaller main cables, four armored drop cables, or up to eight flat drop cables. The case should be capable of accepting the largest fiber specified in the project. If the case is to be placed on an existing cable that is larger than the largest cable specified in the contract, the Engineer shall adequately specify the maximum cable size that will be placed in the case. |

The Engineer shall provide additional information in the List of Changes, Additions, and Deletion Pages to adequately define the miscellaneous materials (splice trays, cable addition kits, etc.) required by the Bidder to complete this project. This information can be provided as a:

- (1) List of cases showing the splice location, case size (S, M, L), cables entering the case, and splices taking place in each case,; and/or
- (2) Schematic showing each splice location; and/or
- (3) List of construction prints that show each splice location.

Examples:

HBF(100-24)S(100)

Buried closure enclosing two cables ends same pair count and gauge and 100 splices.

HBF(200-24)(100-24)A

Buried closure enclosing two cable ends with different pair counts provided with a treated plank above.

HBFOS

Buried fiber optic closure enclosing up to two main ports and up to two secondary ports. The largest fiber count cable this case will accept is 96 Fiber.

- | | |
|-------|--|
| HBFOM | Buried fiber optic closure enclosing up to four main ports and up to four secondary ports. The largest fiber count cable this case will accept is 288 Fiber. |
| HBFOL | Buried fiber optic closure enclosing up to four main ports and up to four secondary ports. The case should be capable of accepting the largest fiber specified in the project. If the case is to be placed on an existing cable that is larger than the largest cable specified in the contract, the Engineer shall adequately specify the maximum cable size that will be placed in the case. |

Section HC – COPPER SPLICING ASSEMBLY UNITS

- | | |
|-----|--|
| HC1 | Consists of the labor and material necessary in the wire work and splicing of one (1) cable pair in any cable, including any non-working pair in an existing cable in accordance with RUS Splicing Standard Bulletin 1753F-401 (PC-2) using individual mechanical splicing connectors. The splice may be straight, bridged, or pieced out and bridged. Pairs that are to be tested, capped, or tested and capped, when specified by the Engineer are considered to be part of this unit. Only those pairs on which splicing, testing, and/or capping operations are performed are counted and each pair is counted only once at each location. On aerial inserts, each end of the fuse link is considered as a splice. |
| HC2 | Consists of the labor and material necessary for terminating one (1) distribution, feeder, and/or electronic pair on a cross-connect block or a cross-connect module, including any non-working pair in an existing cable in accordance with RUS Splicing Standard Bulletin 1753F-401(PC-2). Pairs that are to be tested, when specified by the Engineer are considered to be part of this unit. Only those pairs on which terminating and/or testing operations are performed are counted and each pair is counted only once at each location. |
| HC3 | Consists of the labor and material necessary in the wire work and splicing of one (1) cable pair in any cable, including any non-working pair in an existing cable in accordance with RUS Splicing Standard Bulletin 1753F-401 (PC-2) using splicing modules. The splice may be straight, bridged or pieced out and bridged. Pairs that are to be tested, capped, or tested and capped, when specified by the Engineer are considered to be part of this unit. Only those pairs on which splicing, testing, and/or capping operations are performed are counted and each pair is counted only once at each location. On aerial inserts, each end of the fuse link is considered as a splice. |

HC4 Consists of the labor and material for placing and terminating both ends of one (1) pair of cross-connect jumper wires on cross-connecting blocks and/or modules.

Section HO – FIBER OPTIC SPLICING ASSEMBLY UNITS

Consists of all labor and material and/or testing necessary to complete a single fiber optic splice, complete a ribbon fiber optic splice using mass splicing, to connect fiber-terminated ports using patch cords, or to terminate one optical splitter pigtail in accordance with RUS Splicing Standard Bulletin 1753F-401(PC-2). The labor must include initial measurement, minimizing the attenuation, splicing and stowing the spliced fiber or patch cord/pigtail in a fiber organizer. The labor and material for the fiber organizer is part of the appropriate splice closure unit or fiber patch equipment. Options designated by the following suffixes apply:

<u>Suffix</u>	<u>Description</u>
HO1	Fusion Splice
HO2	Mechanical Splice
HO3	Connector Splice
HO4	Connect Splitter Pigtail (Consists of cleaning and terminating one (1) optical splitter pigtail. The optical splitter must be provided by the Owner or under a separate unit.)
HO5()	Fiber Optic Connection (Consists of cleaning and terminating an optical patch cord as specified in the List of Changes, Additions, and Deletions section of the contract by the Engineer. The parenthesis must be used to differentiate between different types of patch cords in the same contract.)
HO#R	Consists of all labor and material necessary to splice and test one (1) glass fiber of a ribbon matrix cable assembly to one (1) glass fiber in a ribbon matrix cable assembly. This unit is only used when a consecutive group of 12 fibers in the ribbon assembly are being spliced to 12 consecutive fibers of another ribbon assembly. Splices of partial ribbon assemblies or of a ribbon assembly to a buffer tube assembly are compensated with the appropriate HO# suffixes 1 – 5().

Section W – REARRANGEMENT UNITS

Specific rearrangement units must be designated and described by the Engineer on the "List of Special Arrangement Units" table of RUS Form 515. Existing plant assembly units to be rearranged are designated by a prefix "W".

Section XX – NONREUSABLE MATERIALS REMOVAL UNITS

These units cover the furnishing of all labor for the removal of construction assembly units from existing lines, and transportation of the removed materials for proper disposal. The Contractor will be permitted to use the most economical method of removing these units. The removal units are designated by the prefix "XX" followed by the assembly unit designation of the unit to be removed.

Section XZ – REUSABLE MATERIALS REMOVAL UNITS

These units cover the furnishing of all labor for the removal of construction assembly units from existing lines and all labor and transportation of the removed materials to a location designated by the Owner. The Contractor will be charged by the Owner for the materials removed under this section at the unit material values shown in column 2 of the "Value and Disposition of Units to be Removed" table of RUS Form 515. The number of units to be charged to the Contractor and the extended value of these units are shown in columns 3 and 4. Such charges will be placed against the Contractor as assembly units are removed and the unit material values will be deducted from the total value of assembly units constructed on this project for determination of the work accomplished for purposes of the monthly progress payments to the Contractor. Of the assembly units listed in the "Value and Disposition of Units to be Removed" table to be removed from existing lines certain units are to be reused in the construction of the project. The quantity of such units to be reused is listed in the "Value and Disposition of Units to be Removed" table, column 5. These units when installed in the project will be inventoried as new assembly units and compensated for at the unit bid prices. The quantity of assembly units listed in column 6 of the "Value and Disposition of Units to be Removed" table is the maximum quantity of removed assembly units that are to be returned to the Owner for credit which will be allowed at the unit material prices in column 2. Column 7 indicates the extended value of the units to be returned to the Owner. The Contractor will be allowed credit for assembly units listed in column 6 which, in the opinion of the Engineer, have not been damaged by the Contractor in removal and handling. Such credits will be allowed the Contractor as the assembly units are returned to a location designated by the Owner and must be added to the total value of installed assembly units for determination of work accomplished for the purposes of the monthly progress payments to the Contractor. The removal units are specified by the prefix "XZ" followed by the assembly unit designation of the existing assembly unit to be removed.

Part II – SPECIFICATION FOR MATERIALS

- 1 **SCOPE** . This part of the specification is concerned with the various materials required for the construction of the outside buried cable and wire plant of the rural telecommunications system as shown on the Plans, Specifications, and Construction Sheets. For purposes of this specification references to outside buried cables refer to both fiber optic and copper type cables or wires unless otherwise specified.
- 2 **GENERAL**. All materials used in the construction of the rural telecommunications system except those listed in Paragraph 4 below must be listed in RUS Informational Publication (IP) 344-2, "List of Materials Acceptable for Use on Telecommunications Systems of RUS Borrowers," unless specific written approval has been granted by the Administrator.
- 3 **STUB POLES**. The stub pole plan, method of treatment, kind of preservative and general procedure applying to all stub poles must be in accordance with the latest RUS specifications in effect at the time the bids are received.
- 4 **MISCELLANEOUS**. Items for which categories do not appear in RUS IP 344-2, "List of Materials Acceptable for Use on Telecommunications Systems of RUS Borrowers," must be of a quality suitable for the application for which they are intended and in compliance with the RUS "Buy American" requirement.

Part III - SPECIFICATION FOR CONSTRUCTION AND INSTALLATION

- 1 **GENERAL**
 - a All construction and installation work must be done in a thorough and workmanlike manner in accordance with the Plans, Specifications and Construction Sheets and must be subject to acceptance by the Owner and the Administrator.
 - b All material to be used in construction of the Project must be stored so as to be protected from deteriorating effects of the elements.
 - c All buried cables or wires, and accessory materials used in the construction of the Project must be handled with care. Each reel of buried cable or wire must be inspected for damage. All damage must be repaired to the satisfaction of the Engineer and in accordance with the methods or other instructions described in the appropriate paragraphs of Part III. If reel wrap is present, the reel wrap must remain intact on the reel until the cable or wire is ready to be placed.
 - d Deviations from the Plans, Specifications and Construction Sheets must not be permitted except upon written permission of the Engineer.

- e The latest revision of the National Electrical Safety Code (NESC) and the National Electrical Code (NEC) must be followed in every case except where local regulations are more stringent, in which case local regulations must govern.
- f The Contractor must maintain conductor polarity (tip and ring) and optical fiber strand identification at the main distributing frame, buried plant housings, splice closures and in the service entrance, all in accordance with the Plans, Specifications, and Construction Sheets (see guide drawing 815-1 for conductor polarity).

2 BURIED PLANT HOUSING STUB POLES

- a The setting depth of stub poles where specified and used as mounting posts in connection with buried plant housings, must be a minimum of 3.0 feet (0.91 m) in soil and as specified by the Engineer in solid rock. If a greater depth in soil is necessary, the Engineer will indicate the required depth in the Proposal.
- b The bottom of the hole must be thoroughly tamped.

3 CABLE SPLICING. Splicing for fiber optic cable, copper cable and wire must be in accordance with RUS Splicing Standard Bulletin 1753F-401(PC-2).

4 BURIED CABLE OR WIRE

a General

- (1) The construction equipment must be subject to the approval of the Owner and the public authorities having jurisdiction over highway and road rights-of-way.
- (2) The design of the plowshare must be such that the buried cable or wire passing through the plow must not bind and must not be bent in a radius less than 10 times the outside diameter of the copper cable or wire. Buried fiber optic cable passing through the plow must not bind and must not be bent in a radius less than 20 times the outside diameter of the cable. The plowshare must have a removable gate for the purpose of inspection, and a hinged fairlead, which must be equipped with smooth, free wheeling rollers or low friction surfaces to prevent damage to the cable or wire.
- (3) The Engineer should periodically inspect the cable or wire as well as the installation equipment and procedures during installation to guard against

damage to the cable or wire when it is being placed in the ground, and to see that proper depth is maintained at all times.

- (4) The Contractor must promptly repair any damage to fences, lawns, shrubbery, drives and any other property damaged during construction.
- (5) A rock excavating unit (BM71) must be applied where a plow train cannot maintain specified depth under the buried cable or wire unit (including ripping). To assist in determining the ability of any plowing equipment to place the cable at a specified depth, the table below must be used only to compare the capability of this equipment with standard minimum drawbar pull ratings unless different characteristics are specified by the Engineer (greater drawbar pull may only be specified at greater depths than shown in the table).

Minimum Drawbar Pull vs. Cable or Wire Depth at 1.2 MPH (1.93 km/hr)

Depth		Minimum Drawbar Pull	
Inches	Meters	Pounds	Newtons
24	0.61	55,000	2.45×10^5
30	0.76	75,000	3.34×10^5
36	0.91	95,000	4.23×10^5

- (6) The equipment and construction methods used by the Contractor must be such as to cause minimum displacement of the soil. The slot made in the soil by the cable plow must be immediately closed.
- (7) Damage to banks, ditches, driveways and roads caused by the equipment must be immediately repaired to the satisfaction of the Engineer and public authorities having jurisdiction over highway and road rights-of-way where involved.
- (8) Where cables or wires are buried near the edge of pavements, the Contractor must take particular care to avoid damaging the pavement. If such damage does occur repairs must be made immediately to meet the requirements of state or local authorities having jurisdiction over the pavement involved.

- (9) The stub pole or stake portion of stake mounted housings must be installed in accordance with the Construction Sheets in a manner not to damage the cable or wire placed in the trench.
- (10) To avoid possible damage to buried cable or wire from exposure to traffic, livestock and other hazards, trenching of laterals, trenching around culverts, construction of aerial inserts and similar operations must be completed as soon as practicable behind the plowing operation.
- (11) Trenches must be promptly backfilled with earth and tamped at 6" (15.24 cm) lifts so that the earth is restored to original grade to assure no hazard to vehicular, animal or pedestrian traffic. No trenches must be left open overnight.
- (12) When placing cable or wire in a trench in rock, the cable or wire must be cushioned by a fill of sand or selected soil at least 2 inch (5.08 cm) thick on the floor of the trench. The backfill for at least 4 inch (10.16 cm) above the cable or wire must be free from stones, rock or other hard or sharp materials, which might damage the cable. Alternate methods are permissible subject to approval of the Engineer.
- (13) When placing cable or wire by horizontal directional drilling (HDD) or boring, the cable or wire bore route must be pre-planned and mapped for the most efficient path. As built bore route maps must serve as records for future reference and locating purposes however, alternate methods are permissible subject to approval of the Engineer and RUS.
- (14) For proper and acceptable use, the underground pipe assembly unit (BM60()) may use the "R" suffix for specialized rock boring or "RR" for heavy rock when specified by the engineer in the Explanatory Notes prior to the bidding process. All underground or buried pipes must be properly capped with or without any cable or wire installed.

(b) Handling of Cable

- (1) Cables or wires must be carefully inspected by the Contractor during the placement operation to be certain that the cables or wires are free from defects.
- (2) Bends of small radii and twists that might damage cable or wire must be avoided. During the placement operation, copper cable or wire must not be bent in a radius less than 10 times the outside diameter of the copper cable or wire. Fiber optic cable must not be bent in a radius less than 20 times the outside diameter of the cable.

- (3) Care is to be exercised during the plowing operation, to feed the cable or wire into the ground through the plow loosely and at no tension. Equipment and construction methods must be such as to assure compliance with this requirement. The Contractor must furnish competent supervision at all times at the site of plowing operations to assure compliance with this requirement.
- (4) If, during the plowing operation, the plow should strike a buried object or rock that stops the equipment which necessitates removal of the plow from the ground, the plow must be removed from the ground carefully, and if practicable without backing the plow, to avoid damage to the cable or wire. Should it be necessary to back the plow to remove it from the ground, the cable or wire must be uncovered a sufficient distance back for inspection by the Engineer to determine whether the cable or wire has been damaged.
- (5) Every instance of damaged cable or wire observed at any time whether prior to installation, occurring during construction, or discovered by test or observation subsequent to installation in plant, must be immediately called to the attention of the Engineer. The method of repair or correction of such damage must be in accordance with the written instructions of the Engineer. The Contractor must promptly repair such damage or make such corrections in accordance with such written instructions of the Engineer. Minor damage to the outer jacket of the cable or wire observed prior to or occurring during construction must be repaired in accordance with RUS Splicing Standard Bulletin 1753F-401(PC-2).
- (6) Major damage to cable or wire observed prior to or during construction must be corrected by enclosing the damaged section of cable or wire in (1) a buried plant housing located as specified by the Engineer or (2) a buried splice closure if approved by the Engineer, which are buried to the same depth as that required for the cable or wire. If the shield has been broken or the conductor insulation damaged, the cable or wire must be restored to the equivalent of new condition. This may require cutting out the damaged section of cable or wire if required by the Engineer.
- (7) Major damage to cable or wire discovered after placement either through test or observation must be repaired as approved by the Engineer. This may require cutting out the damaged section and replacing it with a short section of new cable or wire with splices made in (1) buried plant housing or (2) buried splice closures, if approved by the Engineer, which are buried to the same depth as that required for the cable or wire. It may also require the replacement of an entire section between housings already installed.

c Depth of Buried Plant

- (1) Unless otherwise specified by the Engineer in the Proposal, or on the Construction Sheets, the depth of buried cable or wire placed, measured from the top of the cable or wire to the surface of ground or rock must be as listed in the following table:

Minimum depth in soil	24 inch (610 mm)
Minimum depth at ditch crossings (See guide Drawing 975)	36 inch (914 mm)
Minimum depth in rock	6 inch (152 mm)
Minimum depth at subscriber premises	12 inch (305 mm)

- (2) In the case of a layer of soil over rock, either the minimum depth in rock, measured to the surface of the rock, or the minimum depth in soil, measured to the surface of the soil, may be used at the Contractor's option.
- (3) When rock excavating is specified, width and depth requirements of the trench must be as shown below:

<u>Trench Width</u>	<u>Trench Depth</u>
6 inch (152 mm) or less	6 inch (152 mm)
7 inch (178 mm)	9 inch (229 mm)
8 inch (203 mm)	12 inch (305 mm)
9 inch (229 mm)	15 inch (381 mm)
10 inch (254 mm) or greater	18 inch (457 mm)

Either the minimum depth in rock must be achieved or some other method may be employed by the Contractor to provide adequate protection to the cable or wire as agreed to by the Engineer.

- (4) When placing cable or wire by horizontal directional drilling (HDD) or boring, the Contractor must continually control the horizontal and vertical movements of the bore to a specified route and depth as planned on the bore route map.

d Splicing and Terminations

- (1) Buried service cables or wires must be spliced directly to the appropriate pair or optical strand of the buried cable, or spliced to the appropriate pair number or optical strand on a terminal block or optical terminator as specified by the Engineer.
- (2) For the purpose of joining buried cable or wire at reel ends, the buried cable or wire must be made continuous by splicing the conductors or optical strands directly together either in a housing or a buried splice closure. The method and location must be specified by the Engineer.
- (3) Splicing and termination of cable or wire must be in accordance with the cable schematic drawings issued by the Engineer.
- (4) All copper splices and terminations of cable or wire in buried splice closures must be electrically tested to ensure freedom from opens, shorts, crosses and grounds and all defects cleared prior to closing the splice closure. Shield continuity also must be checked prior to closing the splice closure.
- (5) Splicing of copper cable, wire, or fiber optic cable must be in accordance with RUS Splicing Standard Bulletin 1753F-401(PC-2).

5 BURIED HANDHOLES

- a Buried handholes must be installed per instructions given herein unless otherwise specified by the Engineer unless state or local requirements are more stringent in which case the latter requirements will govern.
- b The Engineer must determine the location of the handhole and must specify type, position and depth of installation.
- c A hole must be dug large enough to accommodate the handhole.
- d The handhole must be positioned and a suitable backfill must be tamped around the handhole.
- e Pea gravel should be placed inside of the handhole to minimize condensation problems.
- f The Engineer must ensure that the dimensions of the handhole must be large enough to accommodate the splice case installation and when required, cable slack.

6 MISCELLANEOUS - BURIED PLANT

- a The separate steel stakes of stake mounted housings must be driven a minimum of 12" (30.48 cm) in undisturbed earth in a vertical position and faced in accordance with the Construction Sheets. Care must be exercised in the installation of stakes or housings. Housing covers must be securely closed at all times except when work is being performed within the housing.
- b The shields of all buried copper cable or wire and the armor of all buried fiber optic cable must be connected together at all splices and termination points, as specified in RUS Splicing Standard Bulletin 1753F-401(PC-2) to ensure a continuous metallic connection throughout the buried plant. Buried cable or wire shields and fiber optic cable armor must also be connected to the ground connectors in buried plant housings and to other ground installations as shown on the Construction Sheets and in RUS Splicing Standard Bulletin 1753F-401(PC-2).
- c Stake mounted warning, route, and splice location signs must be installed in accordance with the manufacturer's instructions and in locations as specified by the Engineer. As an alternate to the splice location sign, the Engineer may specify the use of a buried splice location device (BM 55A).
- d Buried cable and wire, including buried services, terminated or spliced in a housing must be directionally marked as specified on the Construction Sheets or as specified by the Engineer. The directional markers must be installed at the time the cable or wire is placed in the housing and before the lateral trench to the housing is backfilled.
- e Where aerial inserts in buried plant are specified by the Engineer, the construction must be accomplished if possible without cutting the cable or wire. Where due to physical conditions, in the opinion of the Contractor, the cutting and splicing of cable or wire are necessary, prior approval to cut the cable or wire must be obtained from the Engineer. The splicing of cable or wire must be in accordance with RUS Splicing Standard Bulletin 1753F-401(PC-2).
- f Junctions between buried cable and aerial circuits must be made in accordance with the applicable Construction Sheets.
- g All products utilized to control rodents and/or insects should be specifically formulated for the telecommunications industry and applied in accordance with the instructions or directions detailed on the manufacturer's product label.
- h Buried cable and wire must be placed in the same trench to the buried plant housing, unless otherwise specified by the Engineer.

7 SPECIAL REQUIREMENTS FOR INSTALLATION OF SERVING AREA INTERFACE CABINETS (SAIC)

- a Specific installation instructions for the pad or slab base preparation and construction, placement of conduit(s), and the assembly and installation cabinet must be provided by the manufacturer and/or the Engineer.
- b A drainage hole must be drilled at the low point of the radius of bend of the conduit placed between two cabinets.
- c All vacant or unused conduits must be sealed as specified by the Engineer.
- d Specific installation instructions for mounting the cabinet assembly will be provided by the manufacturer and/or the Engineer.
- e The separate steel stakes of stake mounted housings must be driven a minimum of 12" (30.48 cm) in undisturbed earth in a vertical position and faced in accordance with the Construction Sheets. Care must be exercised in the installation of the stakes and housings. Housing covers must be securely closed at all times except when work is being performed within the housing.
- f All special installation tools for splicing and placing cross-connect jumpers must be used as indicated by the manufacturer.
- g Where conventional hard-wire splicing is employed at SAIC locations, the splicing and lay-up of conductor pairs must be in accordance with RUS Splicing Standard Bulletin 1753F-401 (PC-2) and/or special instructions issued by the Engineer.
- h Where conventional fiber splicing is employed at SAIC locations, the splicing and required cable slack must be in accordance with RUS Splicing Standard Bulletin 1753F-401 (PC-2) and/or special instructions issued by the Engineer.
- i Pair or optical strand counts must be shown on all splice, feeder and cross-connect modules or blocks identifying feeder, distribution, electronic, and pass through terminations.
- j Pair or optical strand count tags must be used on bundle counts where hard-wire or any fiber optic splicing is employed. On bundle tags, feeder, feeder/distribution, distribution and electronic/pass through cable identification, pair or optical strand counts must be shown per cable schematics in accordance with RUS Splicing Standard Bulletin 1753F-401 (PC-2).

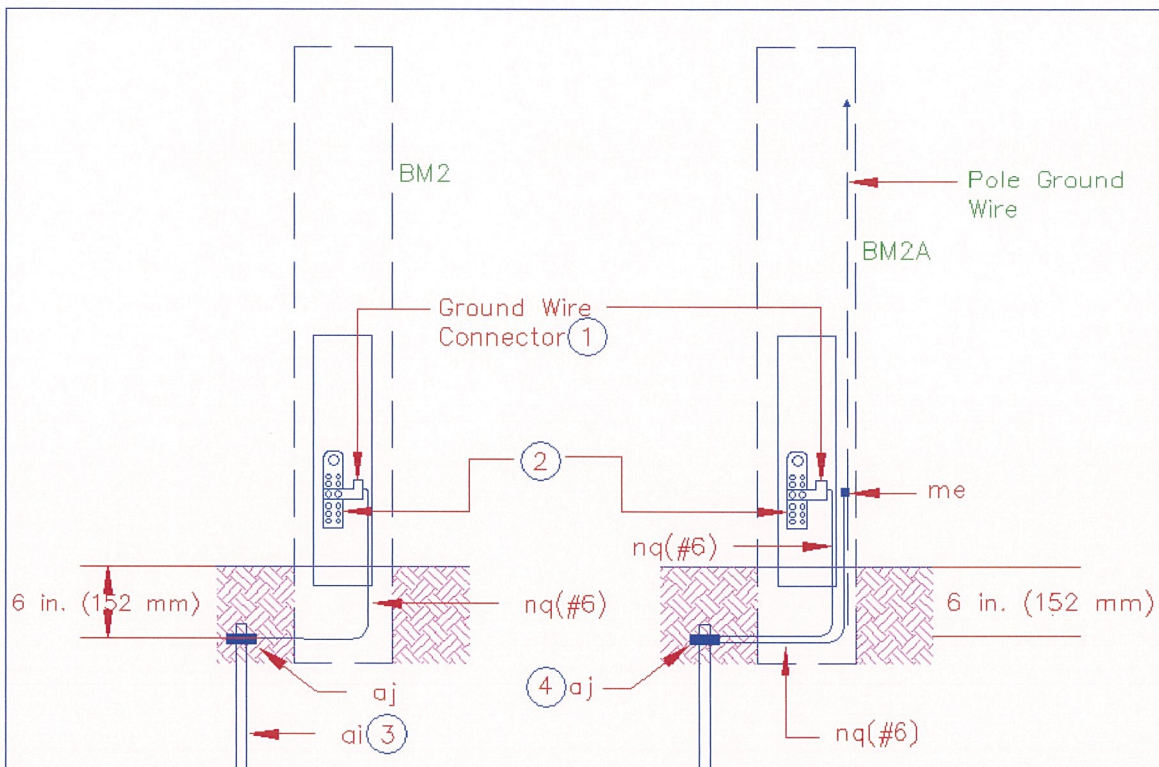
LIST OF CONSTRUCTION DRAWINGS AND PLANS**Assembly Unit Drawings**

BM2,-2A	Ground Wire Assembly, Buried Plant
BM50	Buried Service Wire or Cable Installation to Pole-Mounted Wire Terminal
BM80, BM81, BM82	Riser Guards

Construction Guide Drawings

815-1	Buried Plant Conductor Polarity Diagram
905	Installation of Type "M" or Type "H" Pole-Mounted Housings at Increased Height
907	Splice Closures – Direct Burial
910	Pea Gravel and Sealer Installation Procedures for Buried Plant Housings
951	Aerial Insert in Buried Plant Construction
952	Protection of Buried Cable from Power Contact to Aerial Inserts
965	Placement of Numbers and Letters on Housings
971-1	Wiring Arrangement at Junction of New Aerial Cable with Buried Cable or Wire
971-2	Junction of Aerial Cable with Buried Cable or Wire
975	Buried Plant Under Ditches
976	Housing Installation Details

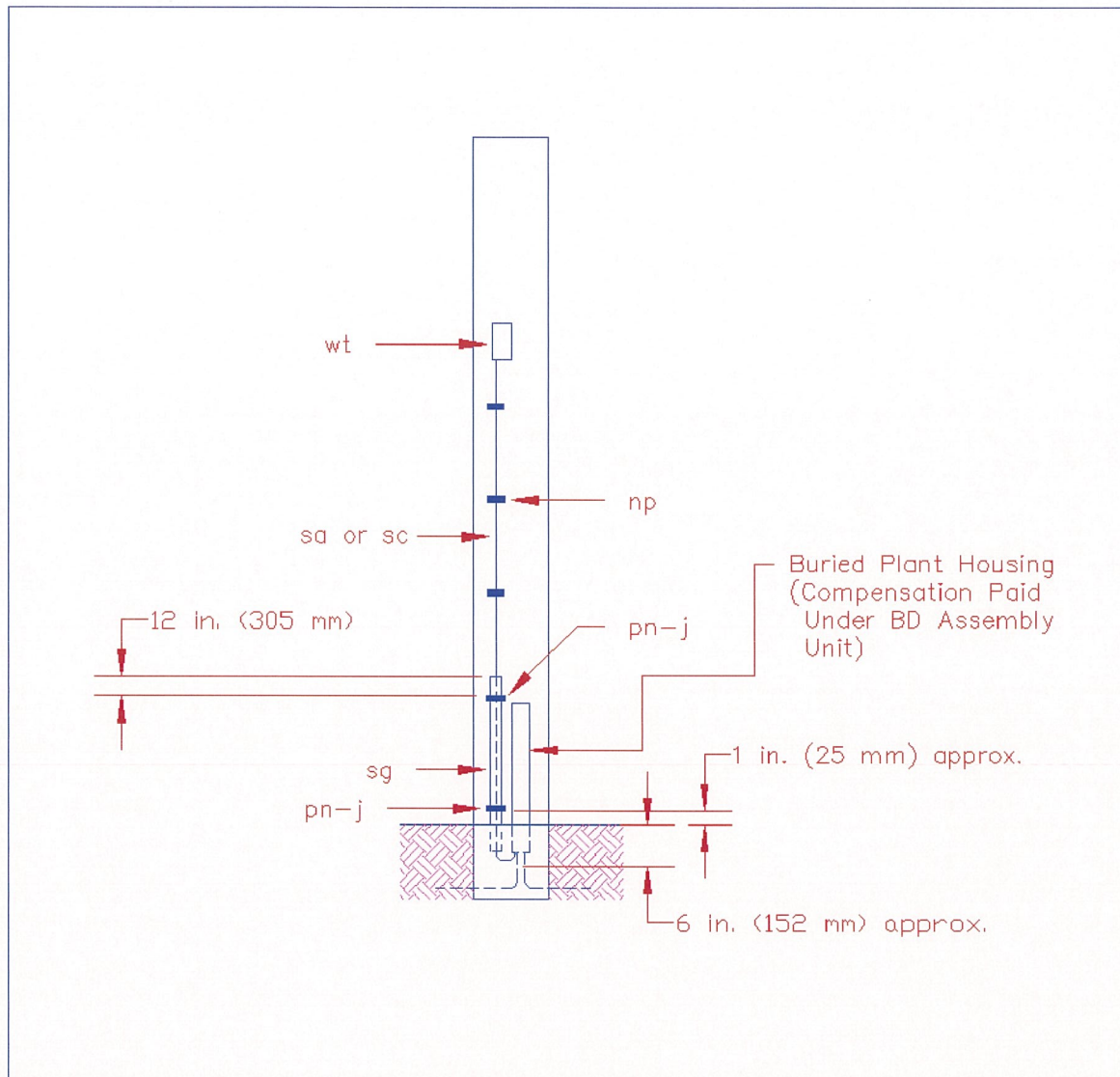
NOTE: On the Assembly Unit and Construction Guide Drawings an asterisk (*) in the ITEM column indicates items that are no longer listed in RUS IP 344-2, "List of Materials Acceptable for Use on Telecommunications Systems of RUS Borrowers."



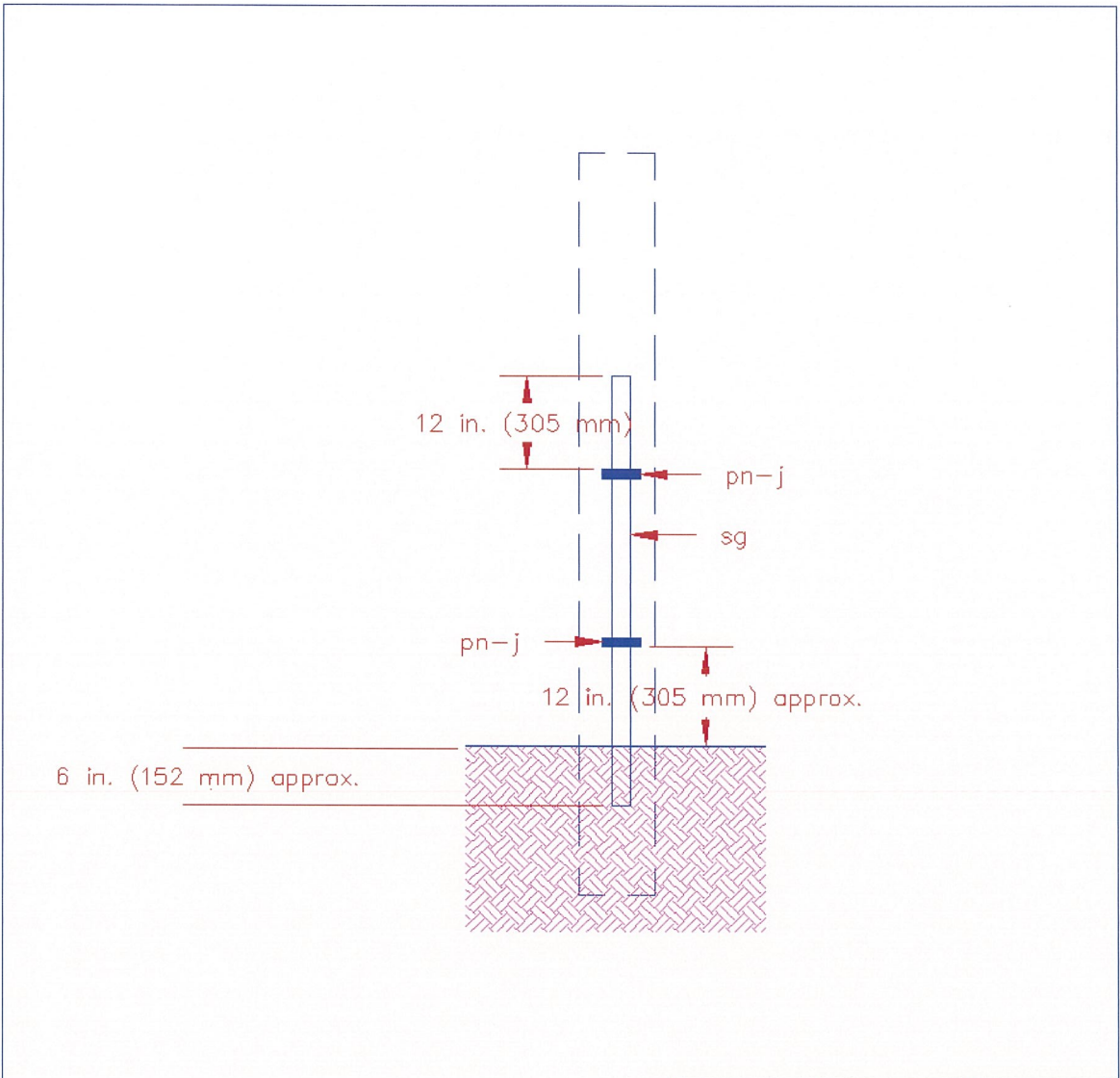
Notes:

1. The ground wire connector is supplied with the buried plant housing, buried plant fiber optic housing, and serving area interface cabinet under the BD, BDO, and BDS Assembly Units, respectively.
2. The bonding bracket is supplied with the buried plant housing, buried plant fiber optic housing, and serving area interface cabinet under the BD, BDO, and BDS Assembly Units, respectively.
3. The ground rod shall be installed in undisturbed soil.
4. One clamp may be used if it is listed by Underwriter's Laboratories (UL) or other acceptable organizations for connecting two wires, otherwise two UL or other acceptable organization listed clamps must be used.

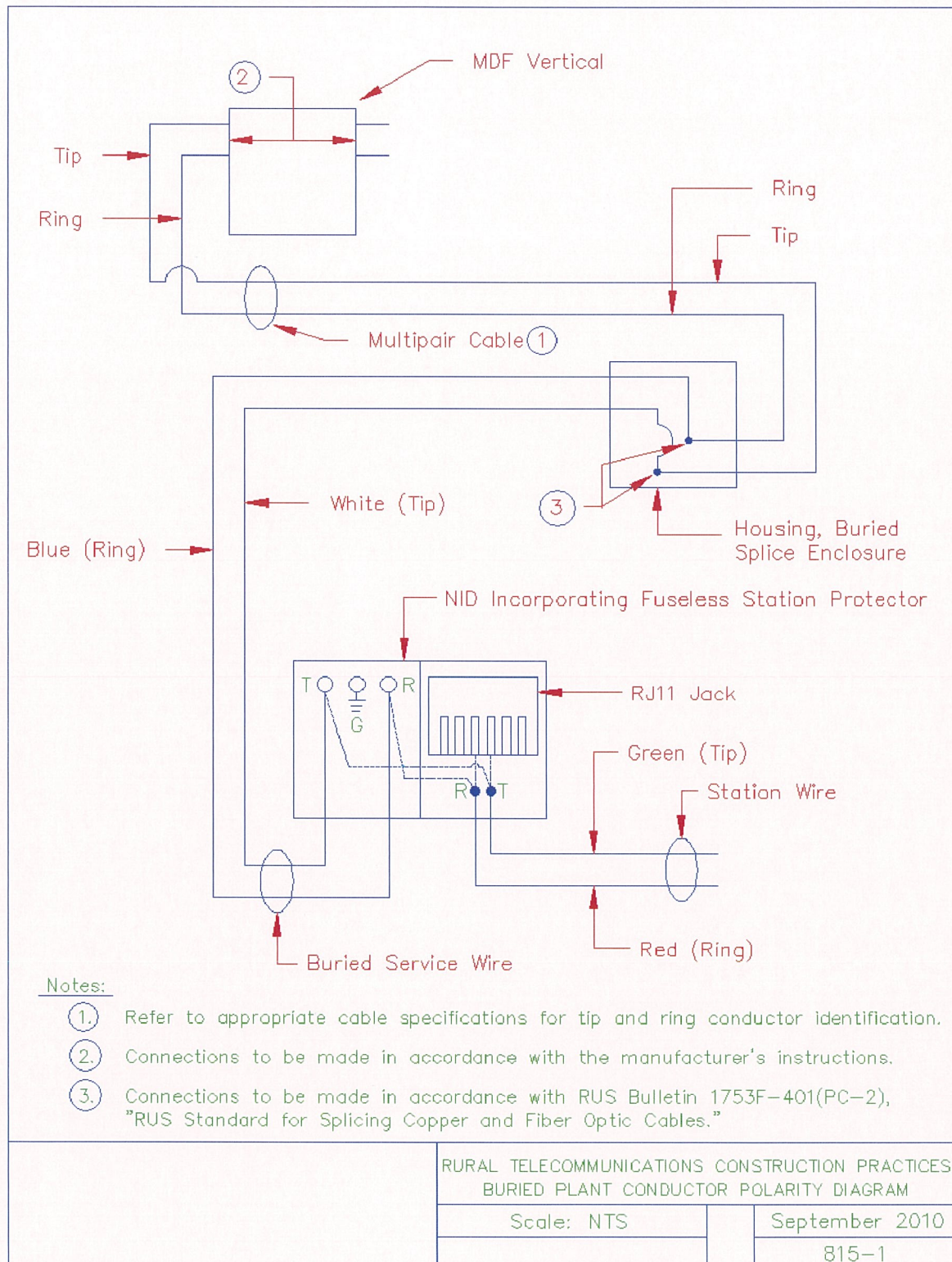
		BM2	BM2A
ITEMS	MATERIALS	NO. REQ'D	NO. REQ'D
*nq	Wire, ground, bare, #6 AWG copper	As required	As required
ai	Rod, ground (size & length as req'd)	1	—
me	Connector, ground wire	—	1
aj	Clamp, ground rod	1	If required
		RURAL TELECOMMUNICATIONS CONSTRUCTION PRACTICES GROUND WIRE ASSEMBLY, BURIED PLANT	
		Scale: NTS	September 2010 BM2 — BM2A

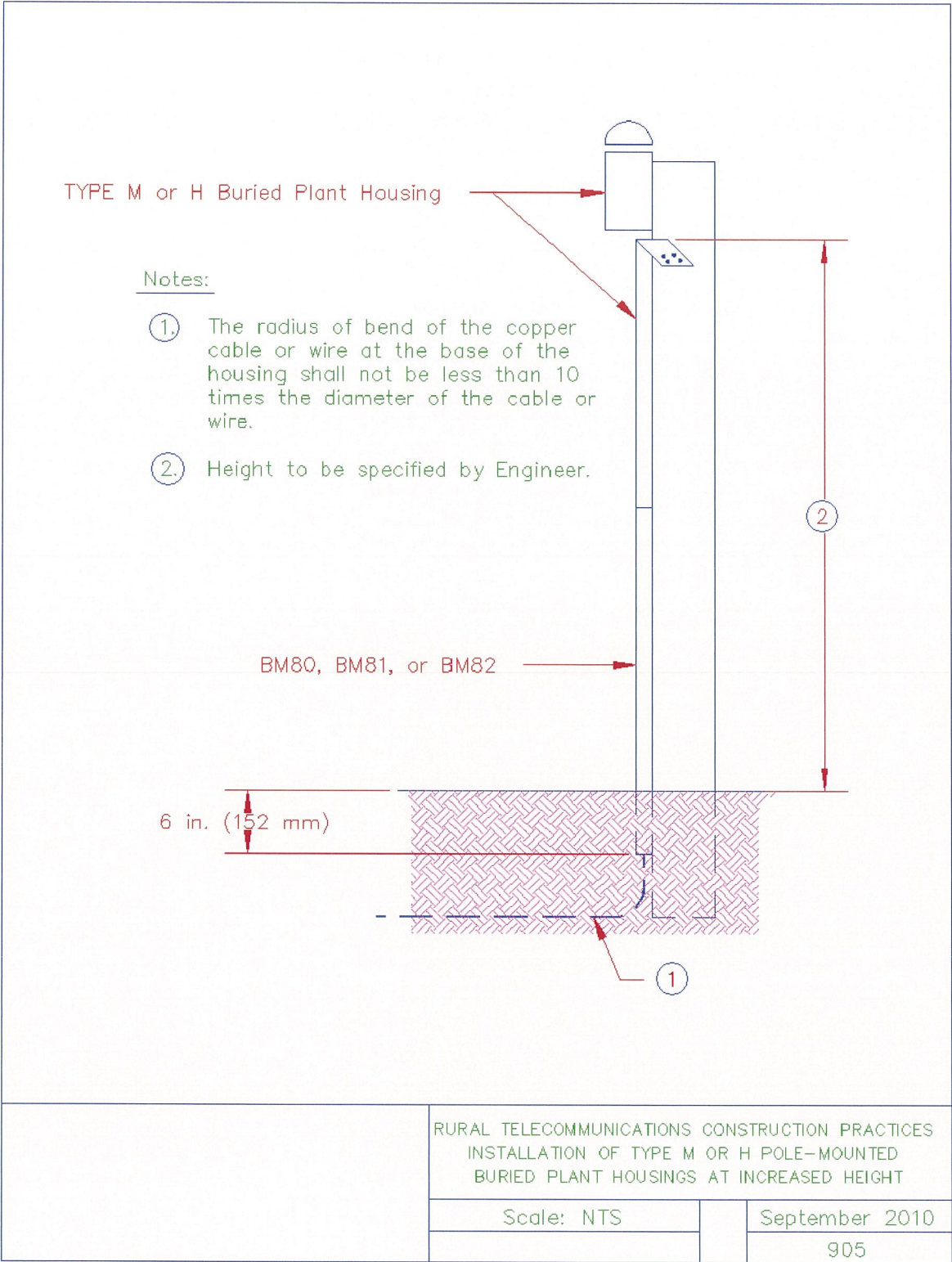


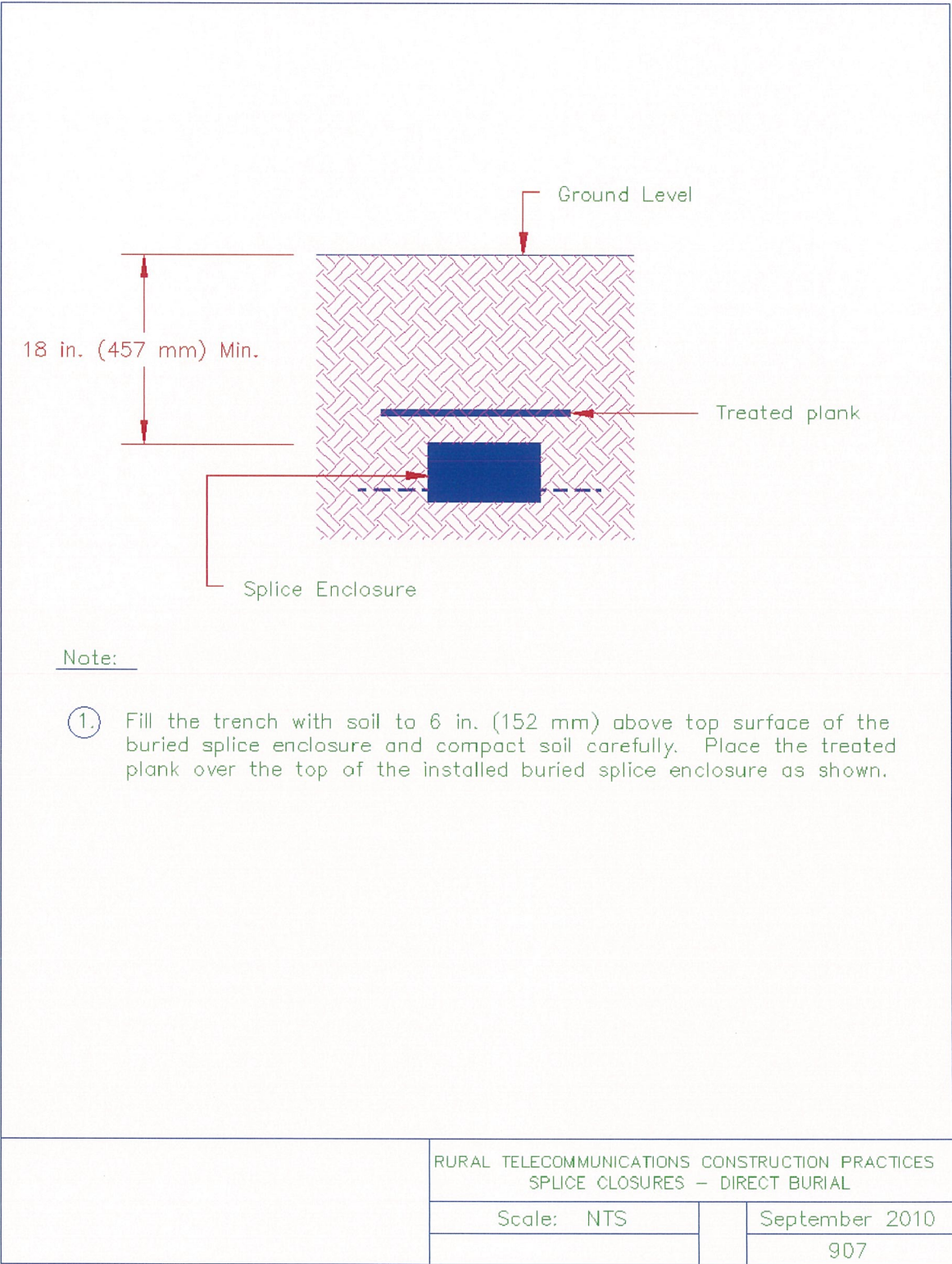
ITEMS	MATERIALS	NO. REQ'D
wt	Terminal, wire, filled, unprotected, pole-mounted (specify pair size)	1
*pn	Strap, riser guard	2
*np	Clamp, one-hole, offset	as req'd
sa or sc	Wire or cable, buried	as req'd
sg	Guard, riser, 1 in. ID by 8 ft (25 mm ID by 2.4 m)	as req'd
j	Screws, lag (size as required)	4
RURAL TELECOMMUNICATIONS CONSTRUCTION PRACTICES BURIED SERVICE WIRE OR CABLE INSTALLATION TO POLE-MOUNTED WIRE TERMINAL		
		Scale: NTS
		September 2010
		BM50

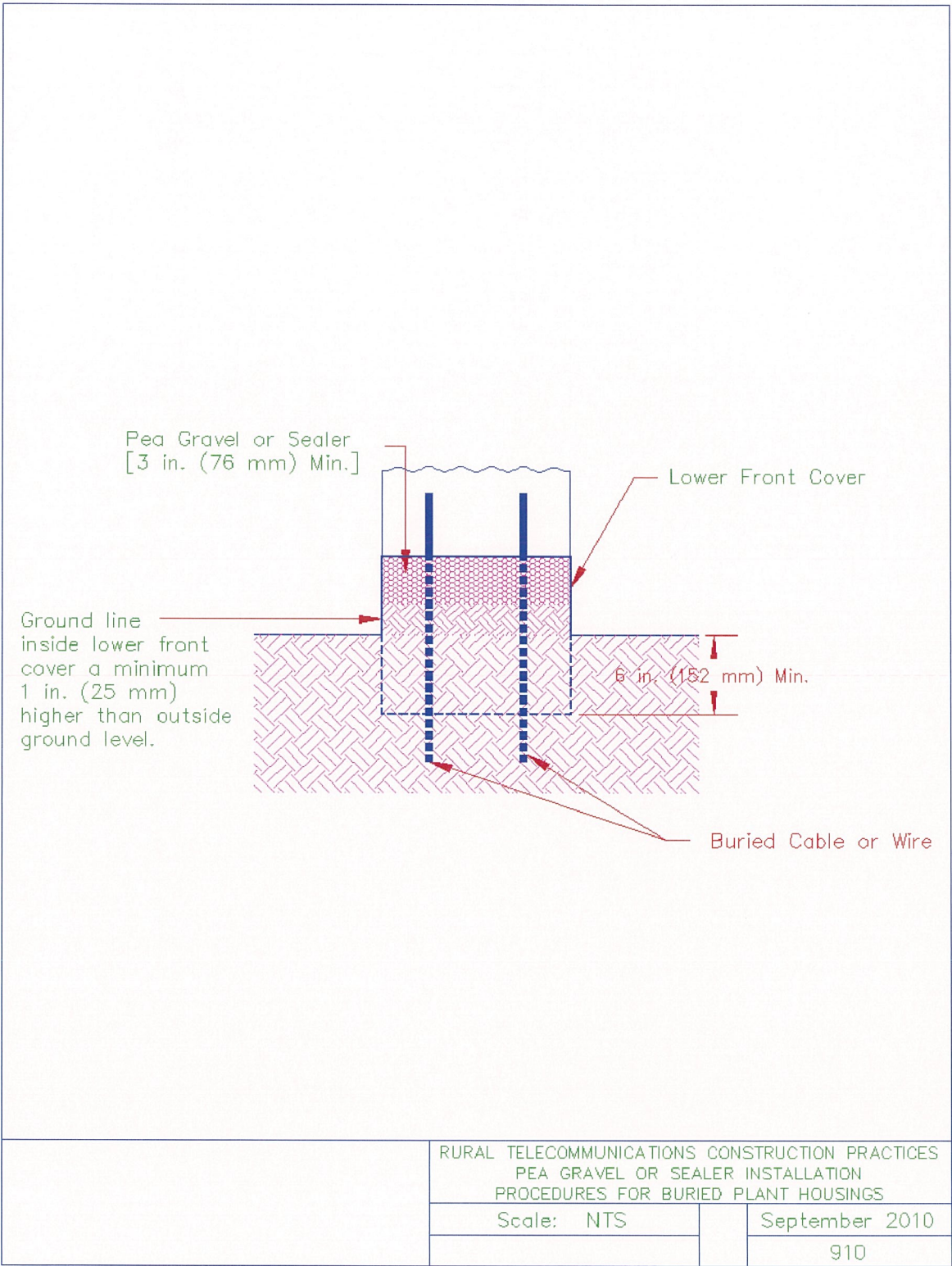


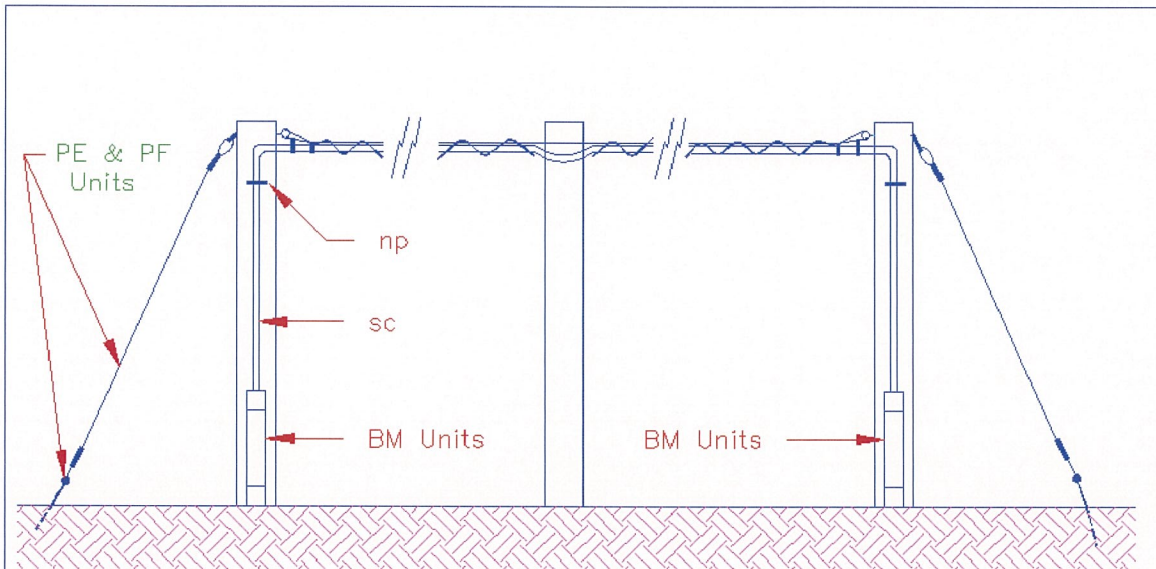
		BM80	BM81	BM82
ITEMS	MATERIALS	NO. REQ'D	NO. REQ'D	NO. REQ'D
sg	Guard, riser 1 in. ID * 8 ft (25 mm ID * 2.4 m)	1	—	—
sg	Guard, riser 2 in. ID * 8 ft (51 mm ID * 2.4 m)	—	1	—
sg	Guard, riser 3 in. ID * 8 ft (76 mm ID * 2.4 m)	—	—	1
*pn	Strap, riser guard	2	2	2
j	Screw, lag (size as required)	4	4	4
		RURAL TELECOMMUNICATIONS CONSTRUCTION PRACTICES		
		RISER GUARDS		
		Scale: NTS		September 2010
				BM80, 81, 82







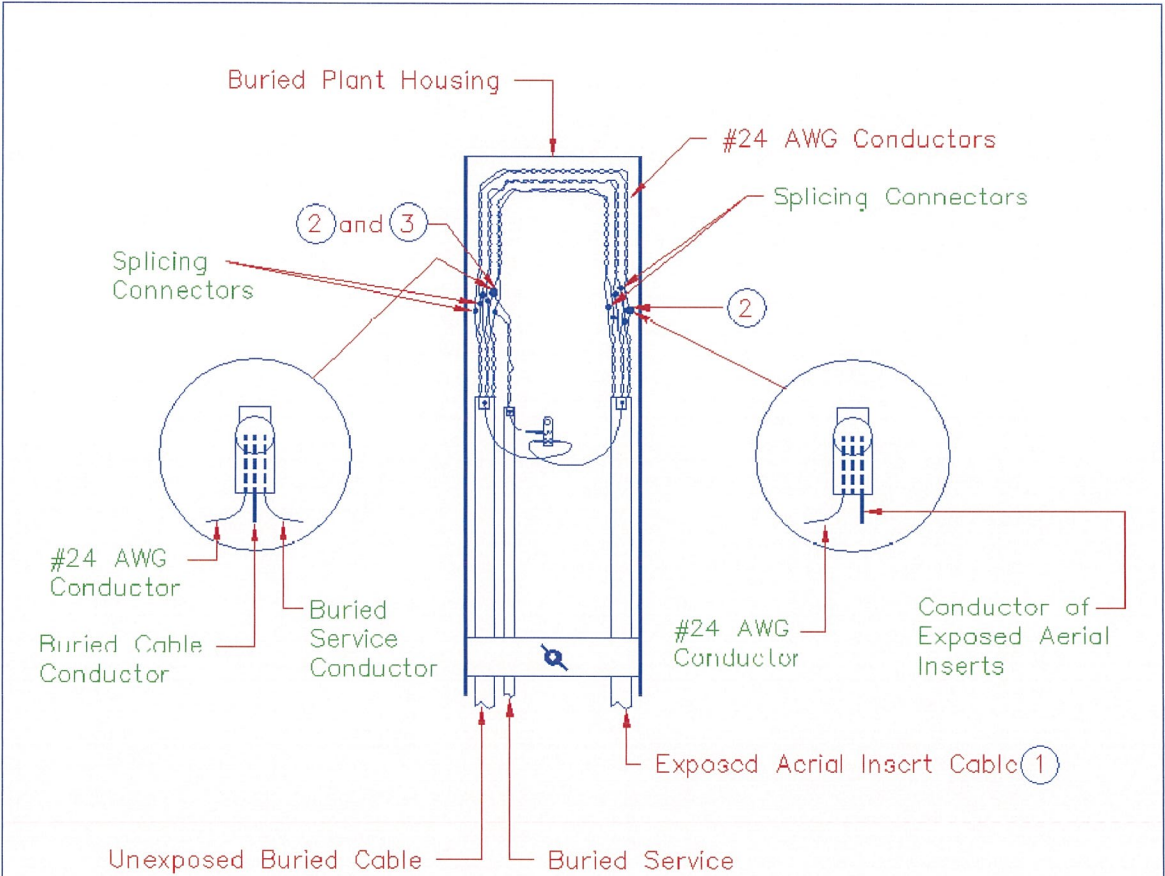




Notes:

- ①. The aerial construction used in this case shall be in accordance with the aerial construction practices described in RUS Form 515c entitled, "Specifications and Drawings for Construction of Aerial Plant."
- ②. The cable clamps shall be installed at approximately 18 in. (457 mm) intervals.
- ③. If it is necessary to cut the cable in making an aerial installation, the use of a ready-access enclosure or splice enclosure is acceptable.
- ④. Aerial inserts exposed to power contacts requiring special splicing will be identified by the Engineer and shall be isolated as shown on Guide Drawing 952.
- ⑤. Ground support strand where exposed to power contacts as specified by the Engineer on the Construction Sheets.

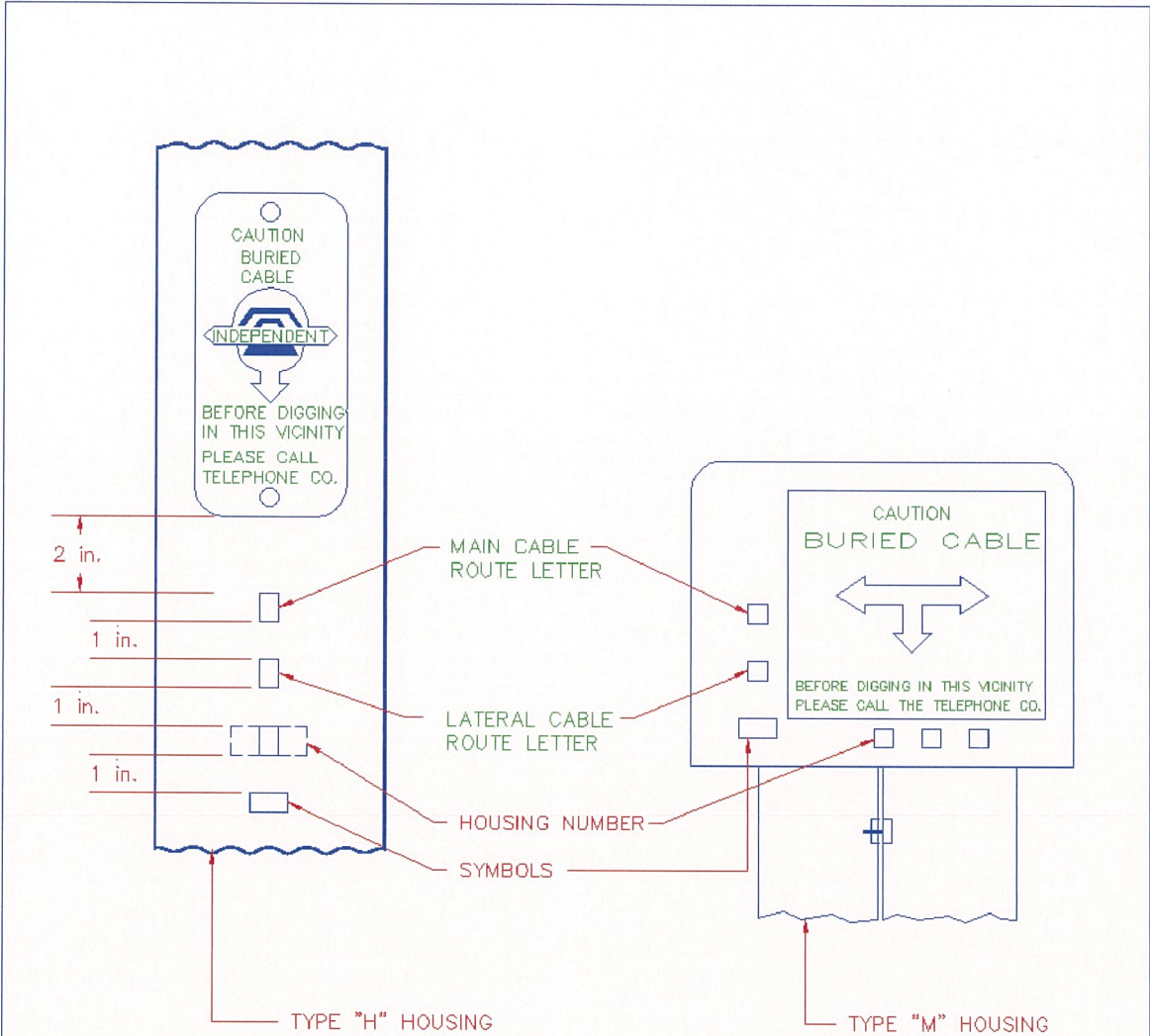
ITEMS	MATERIALS	NO. REQ'D
*np	Clamp, one-hole, offset	as req'd
pl	Enclosure, splice	if req'd
sc	Cable, buried	
er	Enclosure, ready-access	if req'd
RURAL TELECOMMUNICATIONS CONSTRUCTION PRACTICES AERIAL INSERT IN BURIED PLANT CONSTRUCTION		
Scale: NTS		September 2010
		951



Notes:

- 1. Guide Drawing 952 is applicable if the exposed aerial cable insert is #22 AWG or larger.
- 2. Splice a color coded #24 AWG Conductor [8 in. (203 mm) min. length] in series with each cable conductor appearing in the aerial insert.
- 3. Splice the buried service, if any, to the unexposed buried cable at the same point that the #24 AWG conductor is spliced.

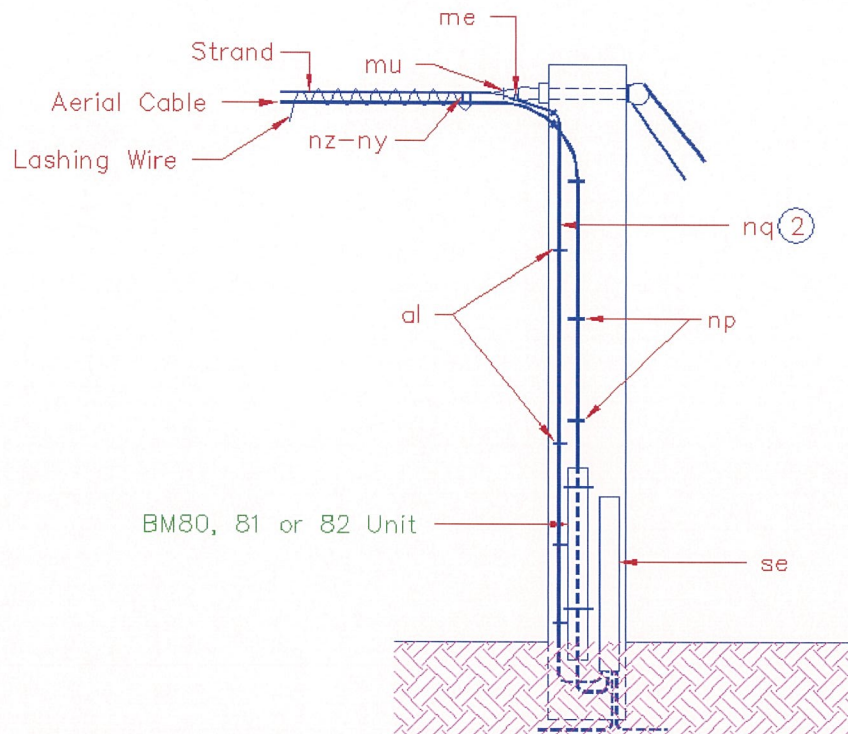
RURAL TELECOMMUNICATIONS CONSTRUCTION PRACTICES PROTECTION OF BURIED CABLE FROM POWER CONTACT TO AERIAL INSERTS		
Scale: NTS		September 2010
		952



Notes:

- 1. Field installed warning signs or numbering systems should not penetrate or harm the housing surface.
- 2. For converting English units to metric units use 1 in. = 25.4 mm.

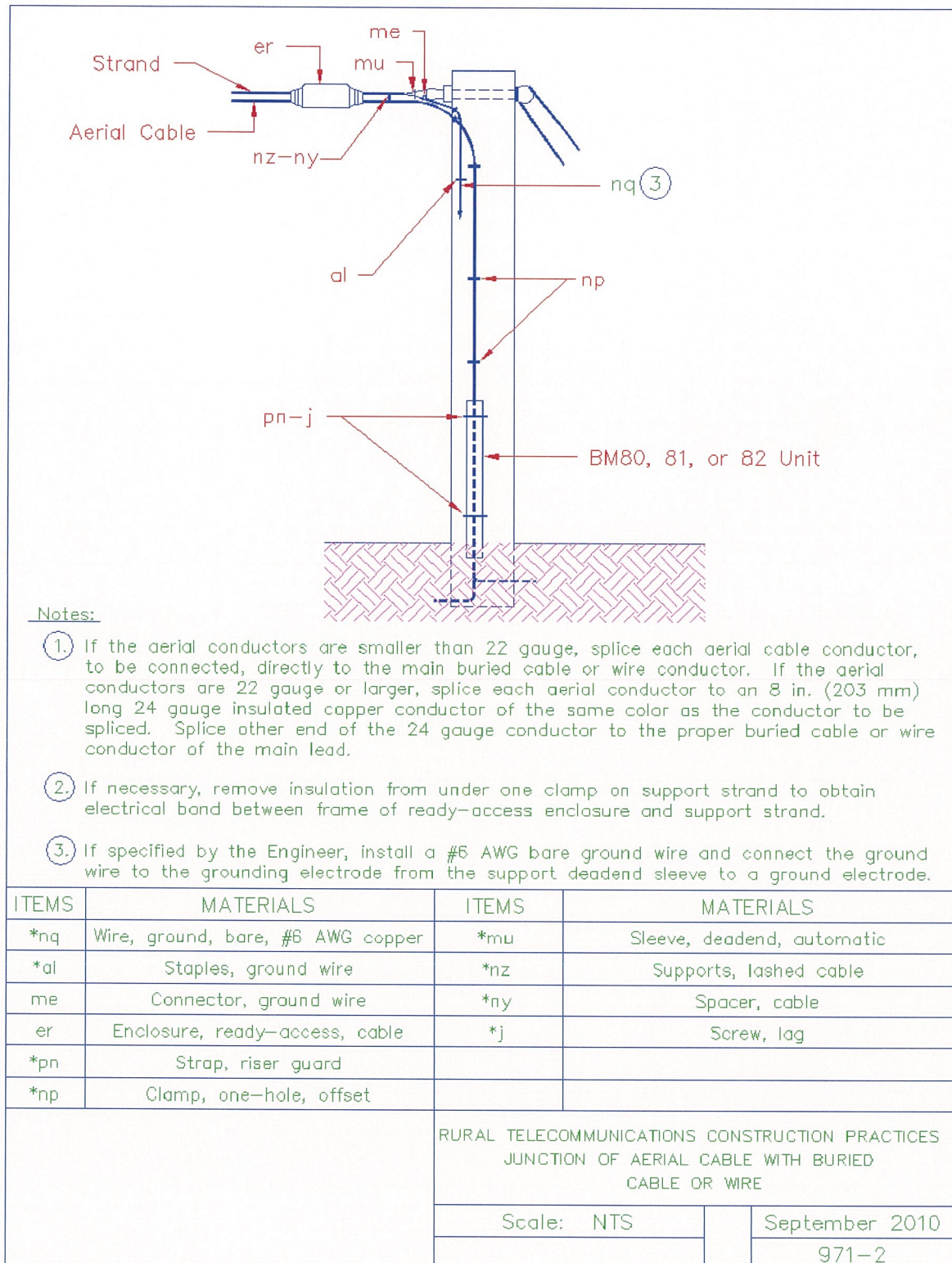
RURAL TELECOMMUNICATIONS CONSTRUCTION PRACTICES PLACEMENT OF NUMBERS AND LETTERS ON HOUSINGS		
Scale: NTS		September 2010
		965

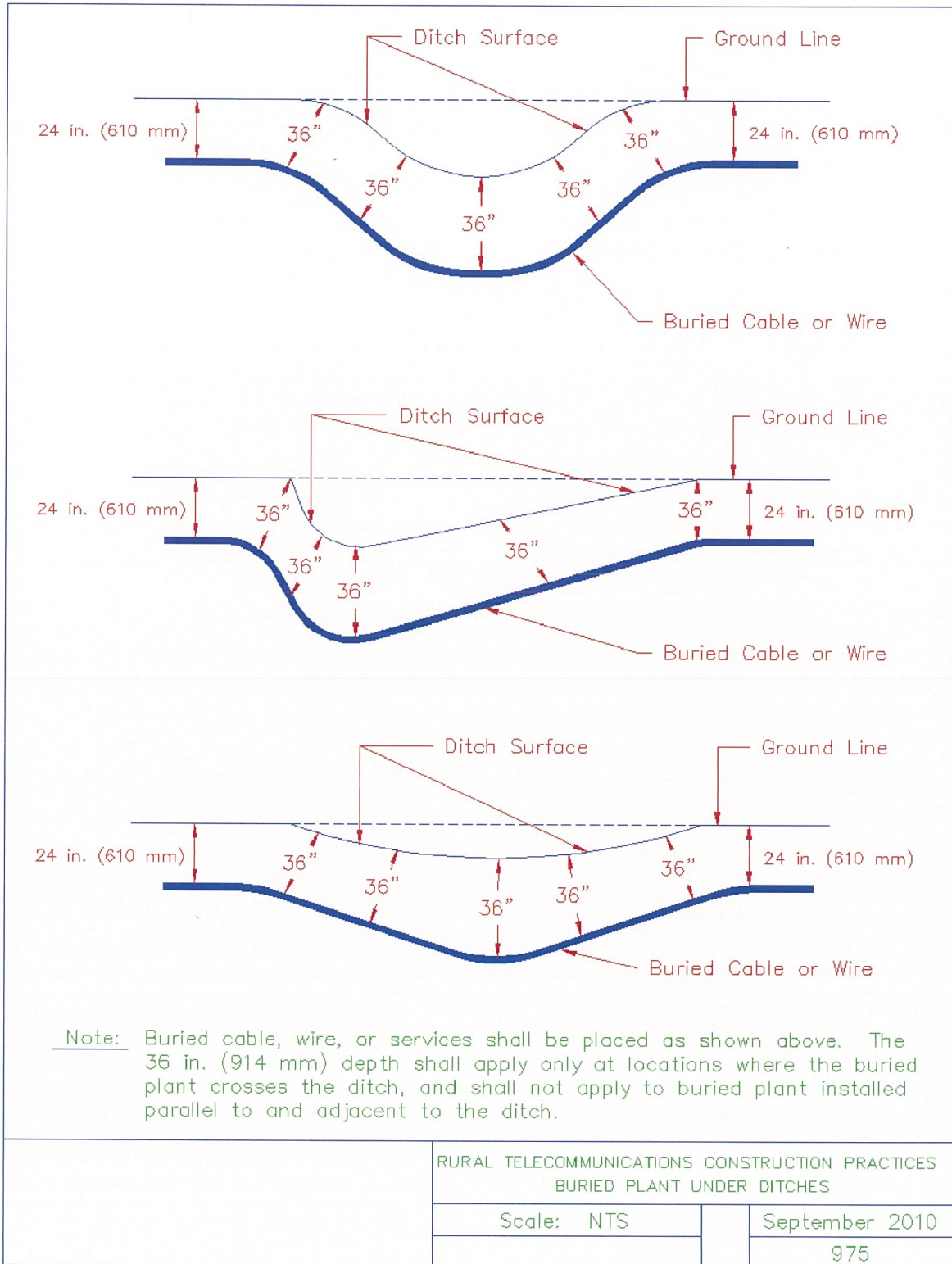


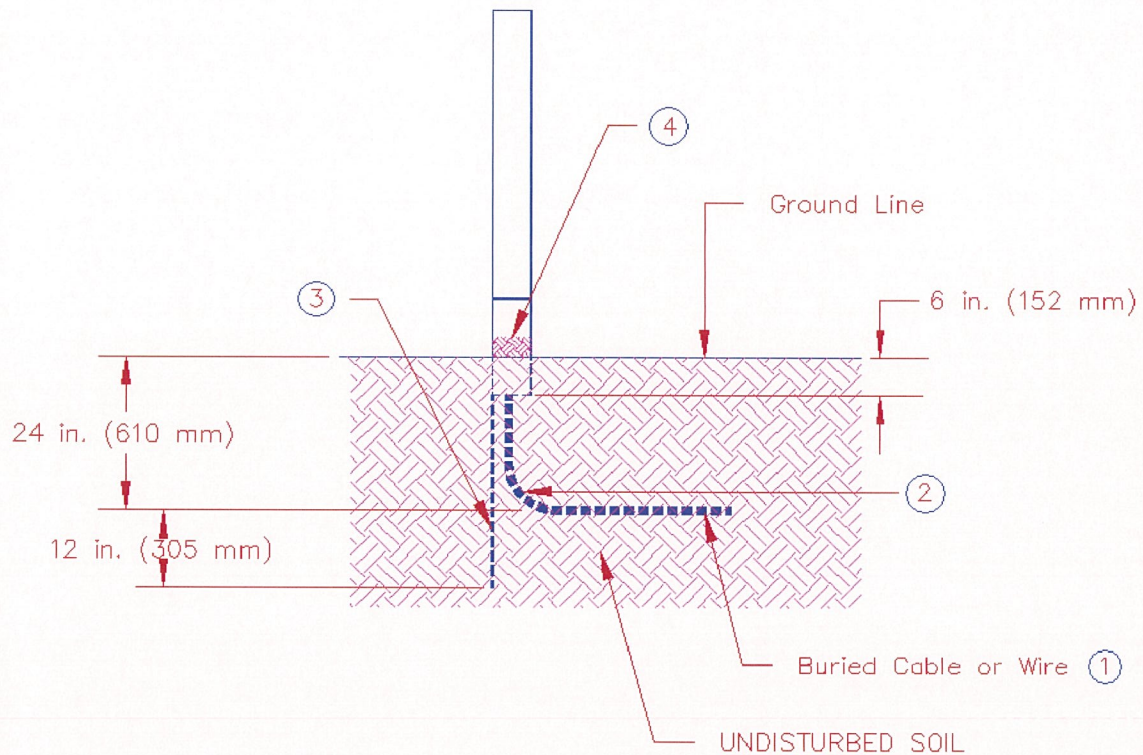
Notes:

- ① If the aerial conductors are smaller than 22 gauge, splice each aerial cable conductor, to be connected, directly to the main buried cable or wire conductor. If the aerial conductors are 22 gauge or larger, splice each aerial conductor to an 8 in. (203 mm) long 24 gauge insulated copper conductor of the same color as the conductor to be spliced. Splice other end of the 24 gauge conductor to the buried cable or wire conductor of the main lead.
- ② Connect the support strand of the cable to the grounding connector in the housing, by means of a #6 AWG ground wire and ground as specified by the Engineer.
- ③ Bond shield of aerial cable to bonding bracket in the housing.

ITEMS	MATERIALS	ITEMS	MATERIALS
*nq	Wire, ground, bare, #6 AWG copper	*mu	Sleeve, deadend, automatic
*al	Staples, ground, wire	*nz	Supports, lashed cable
me	Connector, ground wire	*ny	Spacer, cable
se	Housing, buried plant		
*np	Clamp, one-hole, offset		
RURAL TELECOMMUNICATIONS CONSTRUCTION PRACTICES WIRING ARRANGEMENT AT JUNCTION OF NEW AERIAL CABLE WITH BURIED CABLE OR WIRE			
		Scale: NTS	September 2010
			971-1







Notes:

- ①. Cable shall be placed on undisturbed soil at the bottom of the trench.
- ②. For copper cable and/or wire, the radius of bend of the cable and/or wire at the base of the housing shall not be less than 10 times the diameter of the cable and/or wire. For fiber optic cable, the radius of bend of the cable at the base of the housing shall not be less than 20 times the diameter of the cable.
- ③. The stake of the housing shall be driven into undisturbed soil to a depth of approximately 12 in. (305 mm).
- ④. The ground level inside the ground line cover plate shall not be less than 1 in. (25 mm) above the outside ground level.

RURAL TELECOMMUNICATIONS CONSTRUCTION PRACTICES
 HOUSING INSTALLATION DETAILS

Scale: NTS

September 2010

976

INSERT III:

**RUS FORM 515B - SPECS AND DRAWINGS FOR
CONSTRUCTION OF UNDERGROUND PLANT**



United States
Department of
Agriculture

Rural
Utilities
Service

RUS Bulletin 1753F-151
RUS Form 515b

September 2001

Specifications and Drawings for Construction of Underground Plant

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UNITED STATES DEPARTMENT OF AGRICULTURE
Rural Utilities Service

BULLETIN 1753F-151

SUBJECT: Specifications and Drawings for Construction of
Underground Plant, RUS Form 515b

TO: All Telecommunications Borrowers
RUS Telecommunications Staff

EFFECTIVE DATE: September 17, 2001

OFFICE OF PRIMARY INTEREST: Outside Plant Branch,
Telecommunications Standards Division.

AVAILABILITY: This bulletin supersedes RUS Bulletin 345-151, Specifications and Drawings for Conduit and Manhole Construction, RUS Form 515c, issued May 25, 1989; and RUS Bulletin 345-152, Specifications and Drawings for Underground Cable Installation, RUS Form 515d, issued May 25, 1989.

This bulletin can be accessed via the Internet at
<http://www.usda.gov/rus/telecom/publications/bulletins.htm>

PURPOSE: This specification provides Contractors, Engineers, and RUS Borrowers with assembly unit descriptions, materials, construction and installation, and drawings for underground plant associated with RUS Form 515, Telecommunications System Construction Contract.

Roberta D. Purcell

Roberta D. Purcell
Assistant Administrator
Telecommunications Program

8/21/01

Date

RUS Bulletin 1753F-151
Specifications and Drawings for Construction of
Underground Plant, RUS Form 515b

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ASSEMBLY UNITS:

Conduit and Manhole

CABLE:

Assembly Units

CONSTRUCTION:

Fiber Optic Cable Plant

Manholes

Underground Cable (Physical Plant)

Underground Conduit

SPECIFICATIONS AND STANDARDS:

Outside Plant

LIST OF CHANGES

1. Combination of RUS Form 515c and RUS Form 515d.
2. Modification of Section HC to provide compensation on a single pair basis.
3. Modification of Section HO to provide compensation for testing a fiber.
4. Modification of Section PM as follows:
 - (a) Redefined PM21 to a more generalized description;
 - (b) Added PM22 unit.
5. Elimination of Section U.
6. Modification of Section UD by elimination of suffix "P" and the adding of suffix "V" to allow placement of innerducts in new or existing conduit systems.
7. Modification of the UF and UO units to provide compensation on a per foot basis.
8. Elimination of Section UG.
9. Modification of Section UH to allow for installation in areas of vehicular traffic.
10. Modification of Section UM to indicate precast manholes as the default type.
11. In part III, section 2, added requirement that poured in place manholes are now to be constructed as specified by the Engineer. Other references to poured in place manholes were eliminated.
12. In part III, section 4, added requirement that when blowing of underground cable is specified, the installation shall be in accordance with the manufacturer of the blowing installation equipment.

For editorial or other minor technical changes, refer to the body of the document.

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Part I - DESCRIPTION OF ASSEMBLY UNITS AND PROPOSAL AND
CONTRACT SECTIONS

The Contractor's Proposal form is divided into sections and the sections approved for construction shall be listed in the Construction Agreement by the Owner. The sections are as follows:

- Section HC - Copper Splicing Assembly Units
- Section HO - Fiber Optic Splicing Assembly Units
- Section HU - Underground Splice Closure Assembly Units
- Section PM - Miscellaneous Assembly Units
- Section UD - Underground Conduit Assembly Units
- Section UF - Underground Filled Copper Cable Assembly Units
- Section UH - Underground Handhole Assembly Units
- Section UM - Precast Manhole Assembly Units
- Section UO - Underground Filled Fiber Optic Cable Assembly Units

Each assembly unit includes only the materials listed on the corresponding Installation and Construction Guide Drawings or description of unit where no drawing exists. The various installation and construction units, which are included in this Proposal and upon which quotations are required, are defined by the following descriptions:

Section HC - COPPER SPLICING ASSEMBLY UNITS

- HC1 Consists of the labor and material necessary in the wire work and splicing of one (1) cable pair in any cable, including any non-working pair in an existing cable in accordance with RUS Splicing Standard Bulletin 1753F-401 (PC-2) using individual mechanical splicing connectors. The splice may be straight, bridged, or pieced out and bridged. Pairs that are to be tested, capped, or tested and capped, when specified by the Engineer are considered to be part of this unit. Only those pairs on which splicing, testing, and/or capping operations are performed are counted and each pair is counted only once at each location. On aerial inserts, each end of the fuse link is considered as a splice.
- HC3 Consists of the labor and material necessary in the wire work and splicing of one (1) cable pair in any cable, including any non-working pair in an existing cable in accordance with RUS Splicing Standard Bulletin 1753F-401 (PC-2) using splicing modules. The splice may be straight, bridged or pieced out and bridged. Pairs that are to be tested, capped, or tested and capped, when specified by the Engineer are considered to be part of

this unit. Only those pairs on which splicing, testing, and/or capping operations are performed are counted and each pair is counted only once at each location. On aerial inserts, each end of the fuse link is considered as a splice.

Section HO - FIBER OPTIC SPLICING ASSEMBLY UNITS

Consists of all labor and material necessary to splice and/or test one (1) glass fiber in any cable in accordance with RUS Splicing Standard Bulletin 1753F-401(PC-2). The labor shall include initial measurement, minimizing the attenuation, splicing and stowing the spliced fiber in a fiber organizer. The labor and material for the fiber organizer is part of the appropriate splice closure unit.

<u>Suffix</u>	<u>Description</u>
H01	Fusion Splice
H02	Mechanical Splice
H03	Connector Splice

Section HU - UNDERGROUND SPLICE CLOSURE ASSEMBLY UNITS

Consists of an underground splice closure and the closure manufacturer's provided encapsulating material if required, installed in place and the labor and material for setting up in preparation for installing the closure, such as, opening the sheath or jacket of the cable, bonding of the cable shields, filling the closure if required, closing the closure, and, when applicable, pressure testing, all in accordance with the manufacturer's instructions. It also includes all necessary hardware items to support the closure and the cable adjacent to the closure on the cable racks in the manhole. Cable splicing shall be compensated under the appropriate splicing units.

The assembly units are defined as follows:

HUF()	<u>Underground Filled Closure</u> - A filled splice closure with pair count and gauge for each cable to be spliced.
HU0()	<u>Underground Filled Fiber Optic Closure</u> - A fiber optic closure and organizer with the number of fibers to be housed in the organizer.

HUP() Underground Pressurized Closure - A pressurized splice closure with pair count and gauge for each cable to be spliced.

The following illustrations indicate the method of designating the material required.

HUF(100-24)	Underground filled closure enclosing two cable ends same pair count and gauge.
HUP(200-24) (100-24)	Underground pressurized closure enclosing two cable ends with different pair counts.
HUF(600-24) (200-24) (200-24) (200-22)	Underground filled closure enclosing four cable ends with pair counts and gauges as shown.
HUO(24)	Underground filled fiber optic splice closure and organizer capable of accommodating a minimum of 24 fibers.

Section PM - MISCELLANEOUS ASSEMBLY UNITS

Consists of all labor and materials to construct and install the units defined individually below required for the installation and construction of the underground cable portions of the Project.

PM21 Cable Entrance - Consists of the necessary labor and material to terminate copper and/or fiber optic outside plant cables as shown on the detailed drawings as specified by the Engineer.

PM22 Grounding System - Consists of the necessary labor and material to construct a grounding system as shown on the detailed drawings as specified by the Engineer. This unit shall include all ground electrodes, trenching, backfilling, bonding the auxiliary ground electrodes to each other and to the primary ground electrodes, and bonding to the master ground bar (MGB).

Section UD - UNDERGROUND CONDUIT ASSEMBLY UNITS

Consists of one (1) foot [0.305 meters (m)] of single or multiduct conduit in place. This unit includes all material and labor for the placement of the conduit to the depth indicated in the specifications.

The assembly unit is defined as follows:

UD () Underground Conduit

The number of conduits placed horizontally, and vertically, and the inside diameter (distance between opposite walls for square conduit), shall be indicated in the parentheses.

Options designated by the following suffixes apply:

<u>Suffix</u>	<u>Description</u>
E	This unit consists of necessary labor and materials to encase the conduit in concrete. (Encasement shall consist of a 2 inch (in.) [51 millimeters (mm)] minimum cover over the conduit(s), a minimum of 1-1/2 in. (38 mm) at the sides and a minimum of 2 in. (51 mm) for the base.)
S	This unit consists of the necessary labor and materials to encase the conduit in sand or fine earth. (Encasement shall consist of a 4 in. (102 mm) cover over the conduit(s), a minimum of 1-1/2 in. (38 mm) at the sides and a minimum of 3 in. (76 mm) for the base.)
B	This unit consists of the necessary labor and materials to provide a concrete base for the conduit assembly unit as determined by the Engineer. (Concrete base will be 3 in. (76 mm) in thickness for the width of the trench.)
C	This unit consists of the necessary labor and materials to provide a concrete cover for the conduit assembly unit as determined by the Engineer. (The concrete cover shall have a minimum thickness of 3 in. (76 mm) and shall be at least as wide as the conduit.)
A	This unit consists of the necessary labor and materials to remove and restore paved surfaces. All work shall be performed as required in accordance with federal, state and/or local construction standards in effect at the time of bid date.

- V This unit consists of the necessary labor and materials to place one or more vacant innerduct(s) in a conduit. The parentheses for the UD unit shall indicate the number of innerducts followed by the inside diameter of the innerduct to be placed in new or existing conduit, including rodding and cleaning of the conduit if necessary.

A. This unit also includes:

(1) All labor and material required for conduit jointing, such as, conduit bends, couplings, adapters, fittings, plugs or seals, and spacers.

(2) All material and labor required in the repair of streets, roads, sidewalks, drives, fences, lawns, shrubbery, trees, watermains, pipes, pipelines and contents, underground power and telecommunications facilities, and any other incidental property damaged during the installation of underground conduit.

(3) All labor and material for trenching, shoring, backfilling, tamping, and disposal of water and excess or unusable material.

(4) All labor required for rodding and cleaning of conduit as specified by the Engineer. When rodding and cleaning are not specified by the Engineer, these actions shall be in accordance with Part III, Section 2.10.

B. The length of conduit for compensation purposes is determined by taking the sum of distances paralleling the conduit between manholes or between manholes and termination points as specified by the Engineer.

The following illustrations indicate the method of designating the material required.

UD(4x4-2)E	Indicates concrete encased conduit having four ducts horizontally by four ducts vertically, (16 ducts total), with each duct having an inside diameter of 2 in. (51 mm).
UD(4x3-3-1/2)B	Indicates a concrete base for a conduit having 4 ducts horizontally by 3 ducts vertically, (12 ducts total), with each duct having an inside diameter of 3-1/2 in. (89 mm).

UD(3-1.25)V Indicates 3 innerducts of 1.25 in. (31 mm) inside diameter to be placed in a new or existing conduit.

Section UF - UNDERGROUND FILLED COPPER CABLE ASSEMBLY UNITS

Consists of 1 foot (0.305 m) of underground filled copper cable installed in underground conduits and manholes. This unit also consists of setting up the cable within the manhole, providing and placing cable supports and cable rack hooks, pulling-in wires, duct seals or plugs, cable tags, manhole cable racks and rodding and cleaning of ducts all as required in accordance with the detailed plans and specifications. This unit includes bonding together of all closures, but does not include cable closure assemblies or cable splicing in manholes. The splicing and closures will be specified separately. The length of cable for compensation purposes is determined by measuring the distances paralleling the cable plus the vertical lengths of cable installed on supporting structures. This unit shall include the cleaning out and/or pumping out of manholes when specified by the Engineer in advance of bidding.

Options designated by the following suffixes apply:

<u>Suffix</u>	<u>Description</u>
H	Screened cable designated for T1 carrier systems.
H1C	Screened cable designated for T1C carrier systems.

Each underground filled copper cable assembly unit is listed in accordance with the number of pairs and gauge of conductors. Each unit is prefixed by the letters UF. The following illustration indicates the method of designating the material required.

UF600-24H1C A 600 pair, 24 gauge underground filled copper cable with a screen designated for T1C carrier systems.

Section UH - UNDERGROUND HANDHOLE ASSEMBLY UNITS

Consists of labor and material for one (1) underground handhole installed in place, including the base, top cover and mounting hardware, and pea gravel. The handhole size, amount of pea gravel and the installation shall be as specified by the Engineer. The handhole assembly unit shall be used only in areas of non-vehicular traffic. When required for use in areas of vehicular traffic, the handhole shall be rated to withstand vehicular traffic. Where specified, vehicular traffic rated handholes shall be suffixed with the letter "T".

The assembly units are defined as follows:

UHC() Underground Handhole for copper systems.
UHF() Underground Handhole for fiber optic systems.

The dimensions of length, width, and depth of the handhole shall be indicated in the parentheses in inches (millimeters).

Examples:

UHC(13x24X24) Underground handhole for copper systems with dimensions of 13 x 24 x 24 in. (330 x 610 x 610 mm) (approximate).

UHF(17x30x30)T Underground handhole for fiber optic systems with dimensions of 17 x 30 x 30 in. (432 x 762 x 762 mm) (approximate) which is rated for vehicular traffic.

Section UM - PRECAST MANHOLE ASSEMBLY UNITS

Consists of all labor and material necessary to install a precast concrete manhole in place. The unit shall include pit excavation, masonry materials, collar, manhole frame and cover, pulling-in irons, and other materials necessary to make an appropriate installation in accordance with the Construction Sheets. In addition, precast manhole assembly units also include all material and labor required in the repair and/or replacement of streets, roads, drives, fences, lawns, shrubbery, watermains, pipes, pipelines and contents, underground power and telecommunications facilities, buried sewerage and drainage facilities and any other property damaged during the construction of the manhole assembly unit. Backfilling shall include backfill compaction, removal of excess materials and site clearing. Each manhole is listed as a separate unit installed in place.

All manhole unit designations shall begin with the letters UM followed by a letter to indicate the type of the manhole and conduit arrangements shown in the unit drawings. The letters "A", "L", "T", "J", "X", or "Y" indicate rectangular manholes, and the letter "V" indicates a V-shaped manhole.

Immediately following the letter indicating the manhole type shall be a fourth letter, which shall indicate the type of frame, and cover with which the manhole is to be equipped. The letter "R" indicates a light duty frame and cover. The letter "B" indicates a heavy duty frame and cover. Following the letter indicating frame and cover type, and enclosed in parentheses shall be the nominal diameter of the frame opening in inches (millimeters).

Examples:

- UM-AR(24) Rectangular manhole equipped with a 24 in.
 (610 mm) light duty frame and cover.
- UM-VB(30) V shaped manhole equipped with a 30 in.
 (762 mm) heavy duty frame and cover.

UO - UNDERGROUND FILLED FIBER OPTIC CABLE ASSEMBLY UNITS

Consists of one (1) foot (0.305 m) of underground filled fiber optic cable installed in underground conduit and manholes. This unit also consists of setting up the cable within the manhole, providing and placing cable supports and cable rack hooks, pulling-in wires, duct seals or plugs, cable tags, manhole cable racks, and rodding and cleaning of ducts, all as required in accordance with the detailed plans and specifications. This unit does not include cable closure assembly or cable splicing. They will be specified separately. The length of cable for compensation purposes is determined by measuring the distances paralleling the cable plus the vertical lengths of cable installed on supporting structures. This unit shall include cleaning out and/or pumping out of manholes when specified by the Engineer in advance of bidding.

Each underground filled fiber optic cable assembly unit is listed in accordance with the number of optical fibers. Each unit is prefixed by the letters UO. The following illustration indicates the method of designating the material required.

- UO24 An underground filled fiber optic cable
 with 24 fibers.

Part II - SPECIFICATION FOR MATERIALS**1. SCOPE**

This part of the specification is concerned with the various materials required for the construction of underground plant of a rural telecommunications system as shown on the Plans, Specifications, and Construction Sheets.

2. GENERAL

All materials used in the construction of the rural telecommunications system except those listed in Paragraph 3 below shall be listed in RUS Informational Publication (IP) 344-2, "List of Materials Acceptable for Use on Telecommunications Systems of RUS Borrowers," unless specific written approval has been granted by the Administrator.

3. MISCELLANEOUS

Items which do not appear in RUS IP 344-2, "List of Materials Acceptable for Use on Telecommunications Systems of RUS Borrowers," shall be of a quality suitable for the application for which they are intended.

Part III - SPECIFICATIONS FOR CONSTRUCTION AND INSTALLATION**1. GENERAL**

1.1 All construction and installation work shall be done in a thorough and workmanlike manner in accordance with the Plans, Specifications and Construction Sheets and shall be subject to acceptance by the Owner and the Administrator.

1.2 All material to be used in construction of the Project shall be stored so as to be protected from deteriorating effects of the elements.

1.3 All underground cables and accessory materials used in the construction of the Project shall be handled with care. Each reel of underground cable shall be inspected for damage. Prior to installation, all damage shall be repaired to the satisfaction of the Engineer. If reel wrap is present, the reel wrap shall remain intact on the reel until the cable is ready to be placed.

1.4 Deviations from the Plans, Specifications and Construction Sheets shall not be permitted except upon written permission of the Engineer.

1.5 The latest revision of the National Electrical Safety Code (NESC) and the National Electrical Code (NEC) shall be followed in every case except where local regulations are more stringent, in which case local regulations shall govern.

2. UNDERGROUND CONDUIT AND MANHOLES

2.1 The underground conduit and manhole system shall be constructed in accordance with the instructions given herein unless otherwise specified by the Engineer or unless state or local requirements are more stringent in which case the latter requirements will govern.

2.2 The Engineer shall determine the location of all conduit and manholes and shall specify size, type, position, and depth at which they are to be constructed. The size, type and location of all main conduit and subsidiary ducts, location of foreign structures where known; and applicable right-of-way restrictions shall be shown on the Construction Sheets. The size, type, and location of all conduit entrances and size and location of the manhole frame opening shall be shown on the Construction Sheets.

2.3 All parties associated with excavations for the conduit and manhole system shall follow well-established safety rules and regulations to safeguard the public and workmen.

2.3.1 Testing shall be conducted in excavations and manholes to determine if there is an oxygen deficiency or a presence of harmful gas, in accordance with federal, state, and/or local requirements.

2.3.2 Gas and oil mains shall be given special attention and precautions shall be taken to guard against the fire hazards they present. Excavations in public streets shall always be checked for gas leakage, even though gas mains or sewers are not directly encountered. No flame of any sort shall be permitted around excavations when the odor of gas is detected. Workmen shall not be allowed to smoke; and precautions shall be taken to prevent pedestrians from throwing lighted cigars, cigarettes, or burning matches into such excavations. The owning company shall be notified when excavation involving such structures is undertaken so that a representative may be present if desired.

2.3.3 The Contractor shall provide adequate shoring, warning signs, lights, no parking signs, barricades, and removal of excess water and excavated material. Flagmen and guards shall be provided where required to maintain safe conditions for the workmen and the public.

2.3.4 Blasting shall only be permitted with approval from state or local authorities and with the warning to and protection of workmen and the public.

2.3.5 Excavations shall be closed and/or barricaded for public protection prior to leaving the job site at night with warning lights and/or guards.

2.3.6 Accessibility to fire hydrants, fire alarm boxes, and private driveways shall be maintained using temporary bridges over trenches as required.

2.4 The Contractor shall notify utilities, local authorities, regulatory bodies, and others when construction is to commence. When conflicts are encountered involving the relocation of manholes or conduits, the Engineer shall be notified.

2.5 Where deviations from the Construction Sheets are necessary or desirable, such construction shall proceed only with prior approval by the Engineer.

2.6 The depth of the trench shall be sufficient to obtain a cover of at least 24 in. (610 mm) over the conduit formation including top protection where employed unless otherwise approved by the Engineer.

2.7 The trench route and manhole locations shall be clearly marked by the Engineer before excavation is started.

2.8 In preparing the trench bed for the conduit installation, the trench bed shall be leveled to form an even base. In some cases it may be necessary to provide sand or fine earth to establish an even base. If, upon excavation, the trench bed appears to be incapable of firmly supporting the conduit, the Engineer shall determine whether a concrete base is required.

2.9 Backfilling next to the conduit shall be free from stones or other material which might damage the conduit or conduit joints. Large boulders shall not be included in any part of the backfill. In tamping the backfill at the sides of the conduit, extreme care shall be used to avoid damage to the joints or shifts in the conduit structure. Backfilling and tamping alongside the conduit shall be done in layers only an inch or two in thickness until the level of the top of the conduit is reached. Backfilling around conduit joined with mortar bandages shall proceed as soon as the joints are completed. Troweled joints shall be allowed to set at least 24 hours before backfilling.

2.10 Upon completion of conduit sections, a test mandrel 1/4 in. (6.4 mm) smaller in diameter than the inside diameter of the conduit shall be pulled through all single duct conduit and through two diagonally opposite ducts in multiduct conduit formations to ensure proper alignment. In addition, all conduits shall be cleaned of loose materials such as concrete, mud, dirt, stones, etc. Pull wire (type as specified by the Engineer) shall be placed in conduit if so indicated by the Engineer on the Construction Sheets. The ends of the conduit shall be sealed to prevent the entrance of foreign matter and to protect against water or gas from entering manholes of buildings. All conduit entering central offices or other buildings shall be kept plugged at all times. If the work extends over several days, the conduits shall be plugged at night temporarily and permanently upon completion of the work.

2.11 Where sod and/or top soil has been removed, finish off the surface of the trench with top soil and/or sod as removed. This work shall be done to the satisfaction of the property owner and authorities.

2.12 All surplus material and debris shall be promptly cleared from the job site.

2.13 All cement used in underground construction shall be Portland cement and shall conform to the latest specification for Portland cement of the American Society for Testing and Materials.

2.14 Cement shall be kept dry at all times prior to use in order to prevent deterioration. No cement shall be used which contains lumps, which will not pulverize readily in the hand. The presence of such lumps indicates that the cement has absorbed moisture and has deteriorated.

2.15 To ensure that concrete used in manhole construction will be watertight, water shall be prevented from flowing through or over the freshly placed concrete and washing away the cement paste. Admixtures shall not be used for the purpose of producing watertight concrete.

2.16 Each precast manhole shall be provided with hardware and equipment as specified below and shown in the Construction Sheets.

2.16.1 Type A, L, T, J, and V manholes shall be provided with either 37-hole or 18-hole cable racks as shown in the Construction Sheets. When 18-hole racks are used, they shall be attached to cable rack supports with three cable rack supports required for each set of two 18-hole racks. Type X and Y manholes shall be

provided with 8-hole racks as shown in the Construction Sheets. The cable racks shall be attached to the supports by means of 1/2 in. x 1-3/4 in. (12.7 mm x 44.4 mm) galvanized machine bolts and nuts. The cable rack supports shall be secured to the manhole walls by means of 1/2 in. x 2-1/2 in. (12.7 mm x 63.5 mm) galvanized machine bolts screwed into metal inserts which shall be cast in the walls when the manhole is constructed.

2.16.2 Rectangular manholes, except Type X and Y, shall be provided with four cable racks or sets of cable racks as shown in the Construction Sheets. Type Y manholes shall be provided with two racks and Type X manholes shall be provided with one rack as shown on the Construction Sheets.

2.16.3 Type V manholes shall be provided with six cable racks or sets of cable racks as shown on the Construction Sheets.

2.16.4 One pulling-in iron shall be cast in the wall opposite each conduit with which it is associated and shall be installed in accordance with the Construction Sheets.

2.17 The frame shall be supported on a collar as shown in the Construction Sheets. The collar shall be of sufficient height to bring the cover flush with the grade of the street or surrounding earth.

2.18 The sump or drain shall be located directly under the manhole cover.

2.19 Pulling-in irons shall be placed so as to extend into the manhole far enough to permit a clear opening of approximately 3 in. (76.2 mm) in the eye.

2.20 When poured-in-place manholes are specified, the construction and installation of the poured-in-place manhole shall be as specified by the Engineer.

3. UNDERGROUND HANDHOLES

3.1 The underground handholes shall be installed in accordance with the instructions given herein unless otherwise specified by the Engineer unless state or local requirements are more stringent in which case the latter requirements will govern.

3.2 The Engineer shall determine the location of the handhole and shall specify type, position and depth of installation.

3.3 A hole shall be dug large enough to accommodate the handhole.

3.4 The handhole shall be positioned and a suitable backfill shall be tamped around the handhole.

3.5 Pea gravel should be placed inside of the handhole to minimize condensation problems.

3.6 The Engineer shall ensure that the dimensions of the handhole shall be large enough to accommodate the splice case installation and when required, cable slack.

4. UNDERGROUND CABLE PLACEMENT

4.1 Prior to entry, testing shall be conducted in excavations and manholes to determine if there is an oxygen deficiency or a presence of harmful gas, in accordance with federal, state, and/or local requirements.

4.2 When working in manholes, care shall be taken to prevent damage to the cables in setting up the pulling apparatus or in placing tools or hardware. Cables shall not be stepped upon when entering or leaving the manhole.

4.3 Cable reels, which are delivered to the work location and are not set up immediately for placing operations shall be securely blocked or secured to a substantial support to prevent rolling.

4.4 The Contractor and Engineer shall jointly verify distances between splice points prior to ordering cable in specific cut lengths.

4.5 The duct assignment for each individual cable for any conduit section shall be specified on the Construction Sheets. Cables shall not be placed in ducts other than those specified on the Construction Sheets without prior approval of the Engineer.

4.6 It shall be the Contractor's responsibility to determine whether ducts assigned for occupancy shall be rodded and cleaned.

4.7 All ducts containing earth, sand or gravel shall be cleaned. Ducts, which cannot be cleaned, shall be reported to the Engineer.

4.8 Reels shall be rolled in the direction indicated by the arrows painted on the reel flanges.

4.9 Cable reels shall be set up on the same side of the manhole as the conduit section in which the cable is to be placed. The reel shall be leveled and brought into proper alignment with the conduit section so that the cable pays off from the top of the reel in a long smooth bend into the duct without twisting. Under

no circumstances shall the cable be payed off from the bottom of a reel.

4.10 The Contractor shall check the equipment set up prior to beginning the cable pulling to avoid an interruption once pulling has started.

4.11 A cable feeder guide of suitable dimensions shall be used between the cable reel and the face of the duct to protect the cable and guide it into the duct as it is payed off the reel. Copper cable shall not be bent to a radius of less than 10 times the diameter of the cable. Fiber optic cable shall not be bent to a radius of less than 20 times the diameter of the cable.

4.12 The mechanical stress placed upon a cable during installation shall not be such that the cable is twisted or stretched. During installation, the Contractor shall not exceed the maximum pulling tension of the cable as specified by the cable manufacturer.

4.13 As the cable is payed off the reel, it shall be carefully inspected for jacket defects. If defects are noticed, the pulling operations shall be stopped immediately and the Engineer will determine what corrective action shall be taken.

4.14 As the cables are payed off the reel into the cable feeder guide, they shall be sufficiently lubricated with a type of lubricant recommended by the cable manufacturer. Where the cable is pulled through a manhole it shall also be sufficiently lubricated at the intermediate manhole.

4.15 Cable placement shall be stopped immediately if the cable on a reel binds or does not pay off freely. The cause of the binding must be cleared to the satisfaction of the Engineer before the pulling operation is continued.

4.16 When blowing of underground cable is specified, the installation shall be in accordance with the manufacturer of the blowing installation equipment.

4.17 Sufficient cable shall be provided in each manhole to properly rack and splice the cables as shown on the Construction Sheets.

4.18 All cable ends, shall be protected at all times with acceptable end caps except during actual splicing. During the splicing operations, protection shall be available for immediate installation in case water.

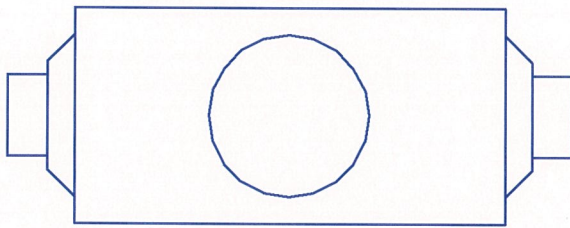
LIST OF CONSTRUCTION DRAWINGS AND PLANS

Construction Guide Drawings

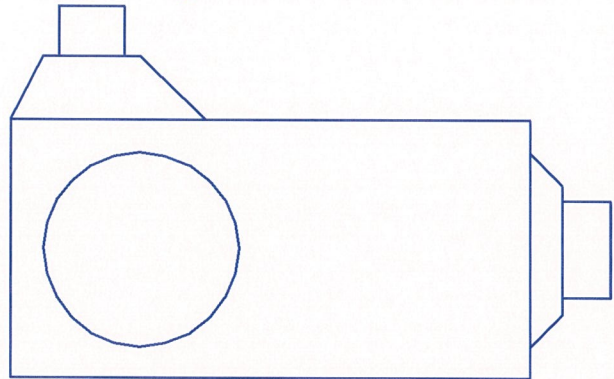
UM-A, L, T, J	Types A, L, T and J Precast Manholes
UM-V	Type V Precast Manhole
UM-X, Y	Types X and Y Precast Service Manholes

Typical Arrangements of Main Conduit
Entrances in Rectangular Precast Manholes

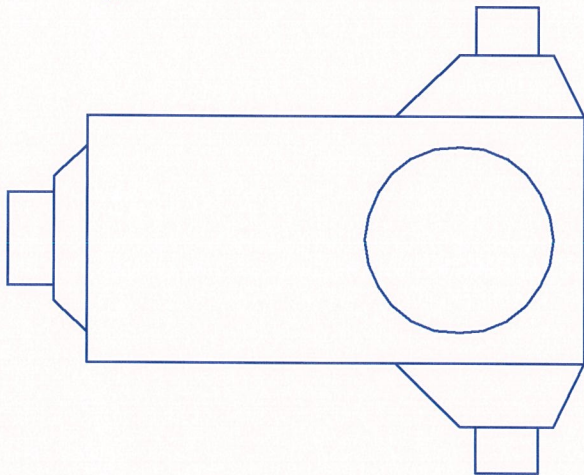
Type "A" Precast Manhole



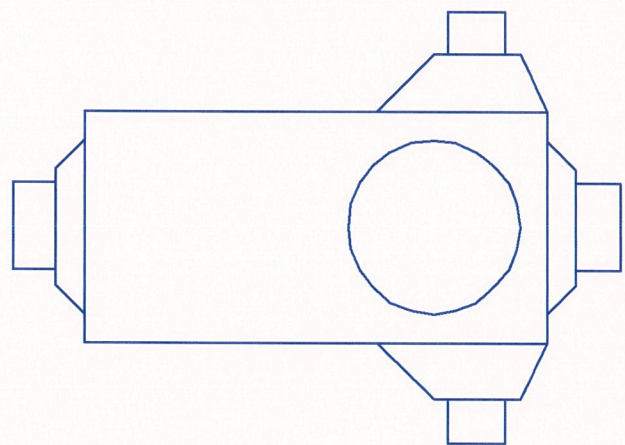
Type "L" Precast Manhole



Type "T" Precast Manhole



Type "J" Precast Manhole



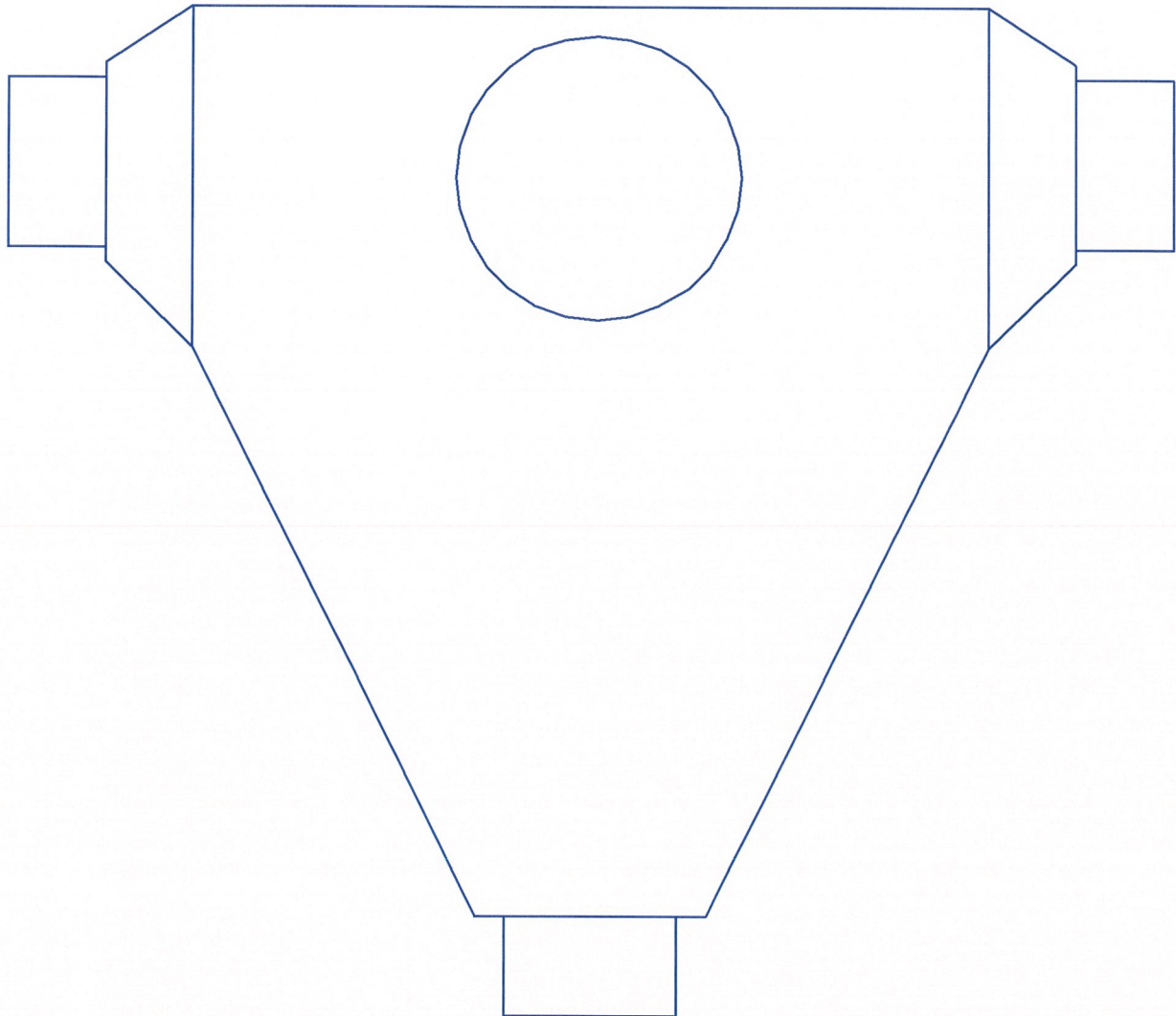
RURAL TELECOMMUNICATIONS CONSTRUCTION PRACTICES
TYPES A, L, T AND J PRECAST MANHOLES

Scale: NTS

March 2001

UM-A,-L,-T,-J

Typical Arrangement of Main Conduit Entrances in Type "V" Precast Manholes

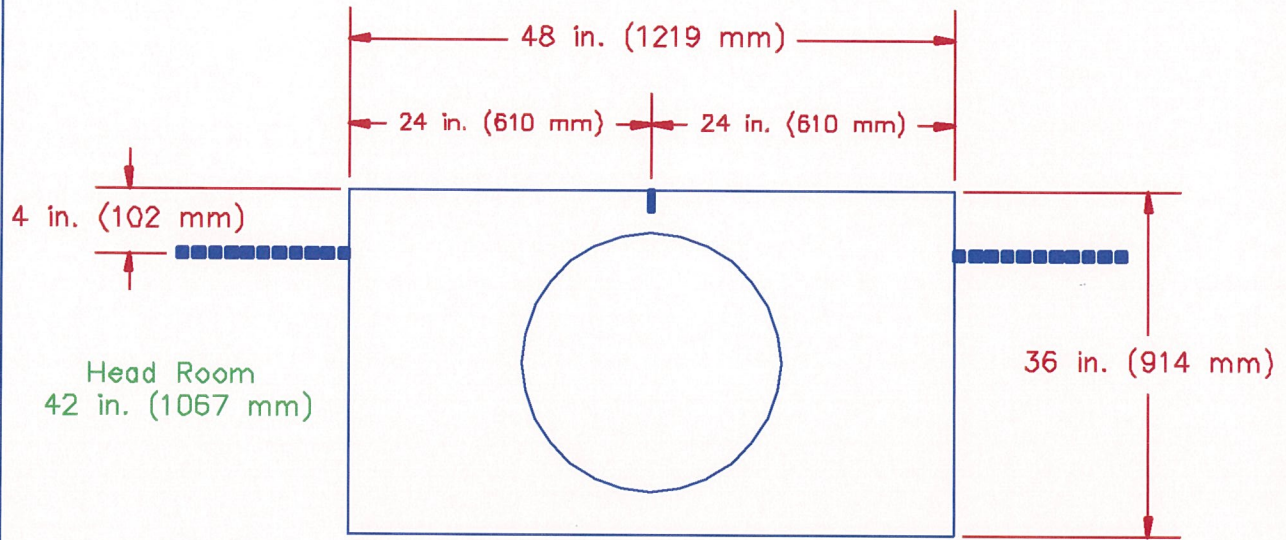


RURAL TELECOMMUNICATIONS CONSTRUCTION PRACTICES
TYPE V PRECAST MANHOLE

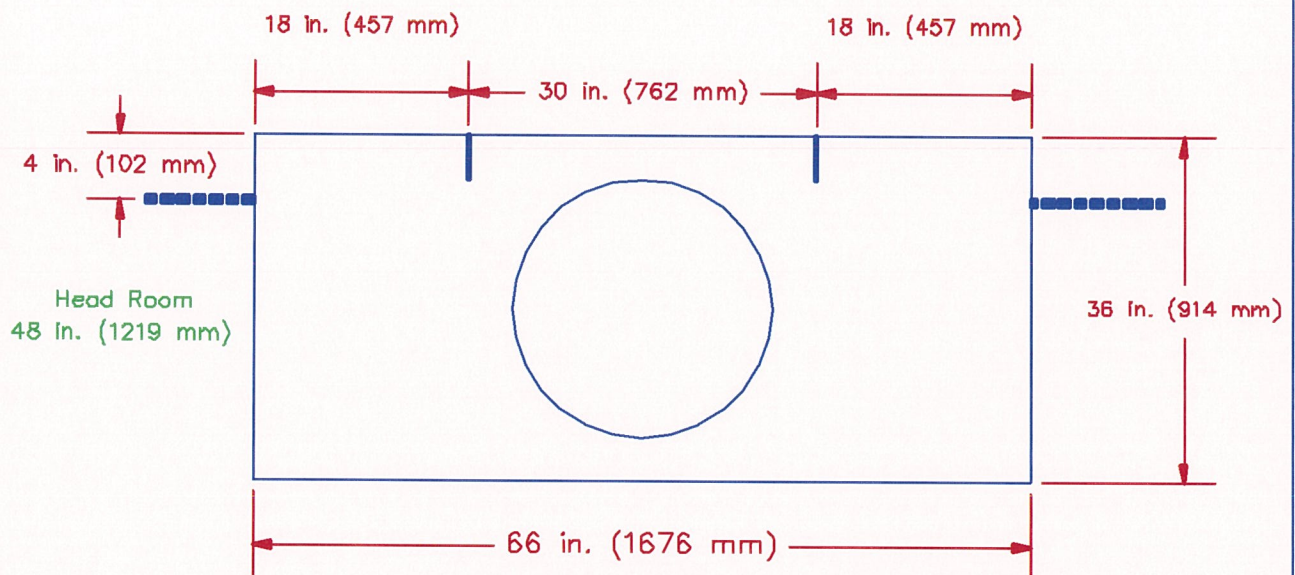
Scale: NTS

March 2001

UM-V



Type X Precast Service Manhole



Type Y Precast Service Manhole

Note: All dimensions shown are recommended minimum inside dimensions.

RURAL TELECOMMUNICATIONS CONSTRUCTION PRACTICES
TYPES X AND Y PRECAST SERVICE MANHOLES

Scale: NTS

March 2001

UM-X,-Y

INSERT IV:

**RUS FORM 515C - SPECS AND DRAWINGS FOR
CONSTRUCTION OF AERIAL PLANT**



United States
Department of
Agriculture

Rural
Utilities
Service

RUS Bulletin 1753F-152
RUS Form 515c

September 2001

Specifications and Drawings for Construction of Aerial Plant

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UNITED STATES DEPARTMENT OF AGRICULTURE
Rural Utilities Service

BULLETIN 1753F-152

SUBJECT: Specifications and Drawings for Construction of
Aerial Plant, RUS Form 515c

TO: All Telecommunications Borrowers
RUS Telecommunications Staff

EFFECTIVE DATE: September 17, 2001

OFFICE OF PRIMARY INTEREST: Outside Plant Branch,
Telecommunications Standards Division.

AVAILABILITY: This bulletin supersedes RUS Bulletin 345-153,
Specifications and Drawings for Construction of Pole Lines,
Aerial Cables and Wires, RUS Form 515f, issued May 25, 1989.
This bulletin can be accessed via the Internet at
<http://www.usda.gov/rus/telecom/publications/bulletins.htm>

PURPOSE: This specification provides Contractors, Engineers, and
RUS Borrowers with assembly unit descriptions, materials,
construction and installation, and drawings for aerial plant
associated with RUS Form 515, Telecommunications System
Construction Contract.

Roberta D. Purcell

Roberta D. Purcell
Assistant Administrator
Telecommunications Program

8/21/01

Date

RUS Bulletin 1753F-152
Specifications and Drawings for Construction of
Aerial Plant, RUS Form 515c

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ASSEMBLY UNITS:

 Cable Plant, Aerial

CABLE:

 Aerial Cable Plant Construction
 Assembly Units

CONSTRUCTION:

 Aerial Cable Plant
 Fiber Optic Cable Plant

POLES LINES:

 Design of

POLES:

 Numbering

RIGHT-OF-WAY:

 Clearing and Trimming Assembly Units

SPECIFICATIONS AND STANDARDS:

 Outside Plant

WIRE:

 Seven Wire Aluminum Clad Steel Strand
 Steel, 7 Wire Galvanized Strand

LIST OF CHANGES

1. Modification of Pole Units from Section 1 to Section A.
2. Elimination of Section C and Section CF.
3. Addition of Section CFO, Self Supporting Filled Fiber Optic Cable Assembly Units.
4. Modification of CO and CW units as follows:
 - (a) Provide for compensation on a per foot basis;
 - (b) Redefined compensation to include the sum of the cable distances between supporting structures as indicated by the sequential foot markings;
 - (c) Specified utility grade galvanized steel strand as the default type.
5. Elimination of suffixes "N" and "R" under Section HA. For ready access splice closures specified under the "R" suffix, a new unit designated HR was created.
6. Addition of Section HR, Ready Access Splice Closure Assembly Unit.
7. Modification of Section HC as follows:
 - (a) Redefined unit to provide compensation on a single pair basis;
 - (b) Created HC5 unit in order to provide compensation for terminating cable pairs on a terminal block within a ready access closure.
8. Modification of Section HO to provide compensation for testing a fiber.
9. Elimination of section PC and section PDS.
10. Modification of Section PE to indicate utility grade galvanized steel as the default type.
11. Elimination of Section PG. The terminal blocks are now included under Section PM.
12. Modification of PM21 and PM22 to provide for a more generalized description.
13. Addition of PM25, Filled Terminal Block Assembly Unit.
14. Modification of Section R to provide compensation on a per foot basis.

15. In part III, section 2, elimination of information on pole facing.
16. In part III, the Figure 8 cable was changed to describe Self Supporting Fiber Optic Cable.
17. In part III, eliminated references to load coils, pressurized cable, and air-core cable.

For editorial or other minor technical changes, refer to the body of the document.

Part I - DESCRIPTION OF ASSEMBLY AND PROPOSAL AND
CONTRACT SECTIONS

The Contractor's Proposal form is divided into sections and the sections approved for construction shall be listed in the Construction Agreement by the Owner. The sections are as follows:

Section A	-	Pole Units
Section CFO	-	Self Supporting Filled Fiber Optic Cable Assembly Units
Section CO	-	Aerial Filled Fiber Optic Cable Assembly Units
Section CW	-	Aerial Filled Copper Cable Assembly Units
Section HA	-	Aerial Splice Closure Assembly Units
Section HC	-	Copper Splicing Assembly Units
Section HO	-	Fiber Optic Splicing Assembly Units
Section HR	-	Ready Access Closure Assembly Units
Section PE	-	Guy Assembly Units
Section PF	-	Anchor Assembly Units
Section PM	-	Miscellaneous Assembly Units
Section R	-	Right-of-Way Clearing and Trimming Units
Section W	-	Rearrangement Units
Section XX	-	Nonreusable Materials Removal Units
Section XZ	-	Reusable Materials Removal Units

Each assembly unit includes only the materials listed on the corresponding Installation and Construction Guide Drawings or description of unit where no drawing exists. The various installation and construction units, which are included in this Proposal and upon which quotations are required, are defined by the following descriptions:

Section A - POLE UNITS

Consists of one (1) pole in place. It does not include the pole top assembly units or other parts attached to the pole. Poles shall be of the height and class as designated by the Engineer. The pole plan, species of timber, kind of preservative and method of treatment are designated in the Proposal.

Example:

A35-7 A 35 foot [10.7 meters (m)] class 7 pole.

Section CFO - SELF SUPPORTING FILLED FIBER OPTIC CABLE
ASSEMBLY UNITS

Consists of one (1) foot (0.305 m) of self supporting filled fiber optic cable in place including all supporting hardware, cable guards, insulating tapes, and bonding of the armor (when present) and supporting member in accordance with the Construction Sheets.

- A. The length of the self supporting cable measured for compensation purposes includes the sum of the cable distances between supporting structures as indicated by the sequential foot markings.
- B. This unit does not include labor and material for fiber splicing, splice closures, housings, or organizers. The labor and material for these items are provided for in other units.
- C. This unit includes the spiraling of the self supporting cable in accordance with the method shown in the Construction Sheets.

Each self supporting filled fiber optic cable unit is listed in accordance with the number of optical fibers. Each unit is prefixed by the letters CFO. The following illustration indicates the method of designating the material required.

CFO16	A self supporting filled fiber optic cable with 16 fibers.
-------	--

Section CO - AERIAL FILLED FIBER OPTIC CABLE ASSEMBLY UNITS

Consists of one (1) foot (0.305 m) of aerial filled fiber optic cable in place including supporting messenger of galvanized steel strand, lashing wire, attachments to strand, bonding of the armor (when present) and strand in accordance with the Construction Sheets.

Options designated by the following suffixes apply:

<u>Suffix</u>	<u>Description</u>
A	Aluminum-clad steel strand.
C	Class C galvanized steel utility grade strand for corrosion areas.

- D Two or more cables are to be initially lashed to the same suspension strand.
- E Cables are lashed to existing strand and cable(s).
- A. The length of aerial cable measured for compensation purposes includes the sum of the cable distances between supporting structures as indicated by the sequential foot markings.
- B. This unit does not include labor and material for fiber splicing, splice closures, housings or organizers. The labor and material for these items are provided for in other units.
- C. Class A galvanized steel utility grade strand shall be provided unless another type is specified by the appropriate suffix.

Each aerial filled fiber optic cable assembly unit is listed in accordance with the number of optical fibers. Each unit is prefixed by the letters CO. The following illustrations indicate the method of designating the material required.

- CO16(6M) An aerial filled fiber optic cable with 16 fibers, supported by 6000 pound (lbs) [26,688 Newtons (N)] Class A galvanized steel utility grade strand.
- CO8E An aerial filled fiber optic cable with 8 fibers, lashed to existing strand and cables(s).

Section CW - AERIAL FILLED COPPER CABLE ASSEMBLY UNITS

Consists of one (1) foot (0.305 m) of aerial filled copper cable in place including supporting messenger of galvanized steel strand, lashing wire, attachments to strand, bonding of the shield and strand in accordance with the Construction Sheets.

Options designated by the following suffixes apply:

<u>Suffix</u>	<u>Description</u>
A	Aluminum-clad steel strand.
C	Class C galvanized steel utility grade strand is required for corrosion areas.
D	Two or more cables are to be initially lashed to the same suspension strand.
E	Cables are to be lashed to existing strand and cable(s).

- H Screened cable designated for T1 carrier systems.
- H1C Screened cable designated for T1C carrier systems.
- A. This unit includes labor and material for installation of the splice closure, and other labor and materials for straight splicing cables of the same size and gauge required only for the purpose of joining such cables in one continuous length (reel ends).
- B. When specified in the Proposal, this unit includes the spiraling of cable around the suspension strand at the locations shown on the Construction Sheets.
- C. The length of aerial cable measured for compensation purposes includes the sum of the cable distances between supporting structures as indicated by the sequential foot markings.
- D. Where aerial cables are supported by separate through-bolts on the same pole, messenger bonds required as shown on the Construction Sheets are included as a part of this unit.
- E. Class A galvanized steel utility grade strand shall be provided unless another type is specified by the appropriate suffix.

Each aerial filled copper cable assembly unit is listed in accordance with the number of pairs and gauge of conductors. Each unit is prefixed by the letters CW. The following illustrations indicate the method of designating the material required.

- | | |
|--------------|--|
| CW50-24(6M) | A 50-pair, 24-gauge aerial filled copper cable supported by 6000 lbs (26,688 N) Class A galvanized steel utility grade strand. |
| CW50-24(6M)C | A 50-pair, 24-gauge aerial filled copper cable supported by 6000 lbs (26,688 N) Class C galvanized steel utility grade strand. |

Section HA - AERIAL SPLICE CLOSURE ASSEMBLY UNITS

Consists of an aerial splice closure and the closure manufacturer's provided encapsulating material if required, installed in place and the labor and material for setting up in preparation for installing the closure, such as, opening the sheath or jacket of the cable, bonding of cable shields, filling the closure if required, closing the closure, and, when applicable, pressure testing, all in accordance with the manufacturer's instructions. It also includes all necessary hardware items to support the cable adjacent to the closure and to

terminate the lashing wire. Cable splicing shall be compensated under the appropriate splicing units.

The assembly units are defined as follows:

HAC()	<u>Aerial Free-Breathing, Nonfilled Closure</u> - A free-breathing, nonfilled splice closure with pair count and gauge for each cable to be spliced.
HAF()	<u>Aerial Filled Closure</u> - A filled splice closure with pair count and gauge for each cable to be spliced.
HAP()	<u>Aerial Pressurized Closure</u> - A pressurized splice closure with pair count and gauge for each cable to be spliced.

For Fiber Optic applications use the following suffix:

<u>Suffix</u>	<u>Description</u>
O	Splice closure and organizer for fiber optic cables. The closure manufacturer shall specify the appropriate organizer.

The following illustrations indicate the method of designating the material required.

HAC(100-24)	Aerial free-breathing, nonfilled splice closure enclosing two cable ends with same pair count and gauge.
HAF(100-24)(50-24)	Aerial filled splice closure enclosing two cable ends with different pair counts.
HACO(24)	Aerial free-breathing, nonfilled fiber optic splice closure and organizer capable of accommodating a minimum of 24 fibers.
HAP(100-24)	Aerial pressurized splice closure enclosing two cable ends with same pair count and gauge.
HAPO(12)	Aerial pressurized fiber optic splice closure and organizer capable of accommodating a minimum of 12 fibers.

Section HC - COPPER SPLICING ASSEMBLY UNITS

- HC1 Consists of the labor and material necessary in the wire work and splicing of one (1) cable pair in any cable, including any non-working pair in an existing cable in accordance with RUS Splicing Standard Bulletin 1753F-401 (PC-2) using individual mechanical splicing connectors. The splice may be straight, bridged, or pieced out and bridged. Pairs that are to be tested, capped, or tested and capped, when specified by the Engineer are considered to be part of this unit. Only those pairs on which splicing, testing, and/or capping operations are performed are counted and each pair is counted only once at each location. On aerial inserts, each end of the fuse link is considered as a splice.
- HC3 Consists of the labor and material necessary in the wire work and splicing of one (1) cable pair in any cable, including any non-working pair in an existing cable in accordance with RUS Splicing Standard Bulletin 1753F-401 (PC-2) using splicing modules. The splice may be straight, bridged or pieced out and bridged. Pairs that are to be tested, capped, or tested and capped, when specified by the Engineer are considered to be part of this unit. Only those pairs on which splicing, testing, and/or capping operations are performed are counted and each pair is counted only once at each location. On aerial inserts, each end of the fuse link is considered as a splice.
- HC5 Consists of the labor and material necessary for terminating one (1) pair on a terminal block within a ready access closure, including a non-working pair in existing cables in accordance with RUS Splicing Standard Bulletin 1753F-401 (PC-2). Pairs that are to be tested, when specified by the Engineer, are considered to be part of this unit.

Section HO - FIBER OPTIC SPLICING ASSEMBLY UNITS

Consists of all labor and material necessary to splice and/or test one (1) glass fiber in any cable in accordance with RUS Splicing Standard Bulletin 1753F-401(PC-2). The labor shall include initial measurement, minimizing the attenuation, splicing and stowing the spliced fiber in a fiber organizer. The labor and material for the fiber organizer is part of the appropriate splice closure unit.

<u>Suffix</u>	<u>Description</u>
HO1	Fusion Splice
HO2	Mechanical Splice
HO3	Connector Splice

Section HR - READY ACCESS SPLICE CLOSURE ASSEMBLY UNITS

Consists of a ready access closure containing unprotected filled terminal blocks installed in place and includes the labor and material for setting up in preparation for installing the ready access closure, such as, opening the sheath or jacket of the cable, bonding of cable shields, and closing the closure in accordance with the manufacturer's instructions. It also includes all necessary hardware items to support the cable adjacent to the closure and to terminate the lashing wire. Cable splicing shall be compensated under the appropriate splicing units. When protected filled terminal blocks are to be specified, the unit shall be suffixed by the letter "P".

Ready access closures not containing filled terminal blocks shall be suffixed with the letter "U". Under this option, installation of filled terminal blocks shall be compensated under other units.

The assembly units are defined as follows:

HR1()() A straight splice ready access closure.

HR2()() A branch splice ready access closure.

The first set of parentheses shall indicate the main cable diameter (dia.), in inches (in.) [millimeters (mm)], as shown in the illustration. The second set of parentheses shall indicate the number of terminals within the ready access closure. When the unit is suffixed with the letter "U" the second set of parentheses is not applicable.

The following illustrations indicate the method of designating the material required.

HR1(2.0)(12) Ready access closure, accommodating a straight splice with a maximum cable diameter of 2.0 in. (50.8 mm), and equipped with filled terminal blocks with a total of 12 terminations.

- HR2(1.0)(6) Ready access closure, accommodating a branch splice with a maximum cable diameter of 1.0 in. (25.4 mm), and equipped with filled terminal blocks with a total of 6 terminations.
- HR1(2.0)U Ready access closure, accommodating a straight splice with a maximum cable diameter of 2.0 in. (50.8 mm), without any terminal blocks installed.

Section PE - GUY ASSEMBLY UNITS

Consists of strand and hardware; and insulators or ground connection where required. For guying purposes, when a cable messenger strand is extended one or more spans to a deadend structure, the strand in each such span shall be considered as an overhead guy for the appropriate size of strand used.

The assembly units are defined as follows:

- | | |
|--------|---|
| PE1-2 | Down Guy for 6M strand |
| PE1-3 | Down Guy for 10M strand |
| PE1-4 | Down Guy for 16M strand |
| PE1-2G | Down Guy, Ground Connection Type for 6M strand |
| PE1-3G | Down Guy, Ground Connection Type for 10M strand |
| PE1-4G | Down Guy, Ground Connection Type for 16M strand |
| PE2-2 | Overhead Guy for 6M strand |
| PE2-3 | Overhead Guy for 10M strand |
| PE2-4 | Overhead Guy for 16M strand |
| PE2-2G | Overhead Guy, Ground Connection Type for 6M strand |
| PE2-3G | Overhead Guy, Ground Connection Type for 10M strand |
| PE2-4G | Overhead Guy, Ground Connection Type for 16M strand |

Note: When the above Guy Assembly Units are to be installed on existing poles, the assembly unit designation is prefixed by the letter "N".

Unless otherwise indicated by an additional suffix, the strand furnished on the Project will be seven-wire, Class A galvanized steel utility grade. The following suffix may be used:

- | <u>Suffix</u> | <u>Type of Strand</u> |
|---------------|--|
| A | Aluminum - Clad steel |
| C | Class C galvanized steel utility grade |

Section PF - ANCHOR ASSEMBLY UNITS

Consists of the anchor with rod, complete and in place, ready for attaching the guy strand.

The assembly units are defined as follows:

PF1-3	Expanding Anchor	-	6,000 lbs	(26,688 N)
PF1-5	Expanding Anchor	-	10,000 lbs	(44,480 N)
PF1-7	Expanding Anchor	-	16,000 lbs	(71,168 N)
PF2-3	Plate Anchor	-	6,000 lbs	(26,688 N)
PF2-5	Plate Anchor	-	10,000 lbs	(44,480 N)
PF2-7	Plate Anchor	-	16,000 lbs	(71,168 N)
PF3-3	Screw Anchor	-	6,000 lbs	(26,688 N)
PF3-5	Screw Anchor	-	10,000 lbs	(44,480 N)
PF3-7	Screw Anchor	-	16,000 lbs	(71,168 N)
PF5-3	Rock Anchor	-	3/4 in. dia. (19 mm)	rod
PF5-4	Rock Anchor	-	1 in. dia. (25.4 mm)	rod
PF6-3	Swamp Anchor	-	10 in. dia. (254 mm)	
PF6-4	Swamp Anchor	-	12 in. dia. (305 mm)	
PF6-5	Swamp Anchor	-	15 in. dia. (381 mm)	

Note: When twineye rods are required for the above anchor assembly units, the unit designation is suffixed by the letter "A".

Section PM - MISCELLANEOUS ASSEMBLY UNITS

Consists of all labor and materials to construct and install the units defined individually below required for the installation and construction of the aerial portions of the Project:

PM1	Pole Lightning Protection Assembly
PM2	Pole Ground Assembly
PM2-1	Auxiliary Ground Rod Assembly
PM2A	Ground wire assembly for bonding aerial cable strand or support wire to electric system neutral or pole ground assembly.
PM4	Cable Extension Arm (Short)
PM4A	Cable Extension Arm (Long)
PM5	Pole Stepping Assembly
PM6	One Wood Pole Key

PM7	Two Wood Pole Keys
PM8	One Wood Key and One Metal Expanding Key
PM9	Two Wood Keys and One Metal Expanding Key
PM11	Guy Guard
PM12()	Consists of all labor and material to install a sidewalk guy arm. The guy, guy guard and anchor assembly units will be specified separately. The length in feet (meters) of a single piece of 2 in.(50.8 mm) galvanized steel pipe shall be indicated in the parentheses.
PM14	Push Brace Accessories
PM21	<u>Cable Entrance</u> - Consists of the necessary labor and material to terminate copper and/or fiber optic outside plant cables as shown on the detailed drawings as specified by the Engineer.
PM22	<u>Grounding System</u> - Consists of the necessary labor and material to construct a grounding system as shown on the detailed drawings as specified by the Engineer. This unit shall include all ground electrodes, trenching, backfilling, bonding the auxiliary ground electrodes to each other and to the primary ground electrodes, and bonding to the master ground bar (MGB).
PM25()	<u>Filled Terminal Block Assembly Unit</u> - Consists of an unprotected filled terminal block, mounted in place in a ready access closure (separately specified) and connected to the conductors of the cable as specified by the Engineer. Splicing of the cable conductors shall be in accordance with RUS Splicing Standard Bulletin 1753F-401 (PC-2). The pair count of the terminal block shall be indicated in the parentheses. When protected filled terminal blocks are to be specified, the unit shall be suffixed by the letter "P".
PM52	Pole Marking, Per Pole, Route and Pole Number.

Section R - RIGHT-OF-WAY CLEARING AND TRIMMING UNITS
Aerial Plant

A. Clearing Units are defined as follows:

- R1-5 Is one (1) foot (0.305 m) in length and 5 feet (1.52 m) in width (to be measured on one side of the pole line) of actual clearing of right-of-way. The unit applies to clearing right-of-way along new or existing telecommunications pole lines and along existing power pole lines. This includes clearing of underbrush, tree removal, and such tree trimming as may be required to leave an unobstructed right-of-way from the ground up on one side of the line of poles carrying wire or cable. The length of actual clearing shall be measured in a straight line parallel to the line between poles and across the maximum dimension of foliage cleared (not trunk) projected to the ground line. All trees and underbrush across the width of the right-of-way shall be considered to be grouped together as a single length in measuring the total length of clearing. Lengths along the right-of-way in which no trees are to be removed or trimmed or underbrush cleared shall be omitted from the total measurement. This unit includes the removal, or topping (cutting out the top of the tree so that if the remaining portions of the tree fall, they will not endanger the line) at the option of the Contractor, of danger trees outside of the right-of-way when so designated by the Engineer. (Danger trees are defined as dead or leaning trees, which, in falling, would affect the operation of the line.) The Contractor shall not remove or trim shade, fruit, or ornamental trees unless so directed by the Engineer.
- R1-10 Identical to R1-5 except that width is 10 feet (3.05 m).
- R2-5 Identical with R1-5, except that width 10 feet (3.05 m); to be measured 5 feet (1.52m) on each side of the pole line.
- R2-10 Identical with R1-5, except that width 20 feet (6.1 m), to be measured 10 feet (3.05m) on each side of the pole line.

Note: The letter "M" added as a suffix to the above "R" units designates units for reclearing existing right-of-way. With the

exception of the substitution of the word "reclearing" for "clearing", the remaining description of the "R" assembly units applies for the units suffixed with the letter "M".

B. The Trimming Unit is defined as follows:

R3-5 Is one (1) foot (0.305 m) in length and consists of the trimming of foliage and branches from trees growing on or adjacent to the right-of-way so as to provide a clearance of not less than 5 feet (1.52 m) in all directions from telecommunications cable. This unit is measured parallel to the pole line across the maximum width of foliage trimmed. All trees, underbrush or shrubbery across the width trimmed shall be considered to be grouped together as a single length in measuring the total length of trimming. Lengths along the right-of-way in which no trimming is performed shall be omitted from the total measurement. Any trimming included in R1 or R2 right-of-way clearing units, shall not be considered a part of the measurement of the unit. The Contractor shall not trim any shade, fruit or ornamental trees unless so directed by the Engineer. When so designated by the Engineer, a tree may be trimmed of its branches with the trunk left extending into the zone to be trimmed.

Section W - REARRANGEMENT UNITS

Specific rearrangement units shall be designated and described by the Engineer on the "List of Special Arrangement Units" table of RUS Form 515. Existing plant assembly units to be rearranged are designated by a prefix "W".

Section XX - NONREUSABLE MATERIALS REMOVAL UNITS

These units cover the furnishing of all labor for the removal of construction assembly units from existing lines, and transportation of the removed materials for proper disposal. The Contractor will be permitted to use the most economical method of removing these units. The removal units are designated by the prefix "XX" followed by the assembly unit designation of the unit to be removed.

Section XZ - REUSABLE MATERIALS REMOVAL UNITS

These units cover the furnishing of all labor for the removal of construction assembly units from existing lines and all labor and transportation of the removed materials to a location designated by the Owner. The Contractor will be charged by the Owner for

the materials removed under this section at the unit material values shown in column 2 of the "Value and Disposition of Units to be Removed" table of RUS Form 515. The number of units to be charged to the Contractor and the extended value of these units are shown in columns 3 and 4. Such charges will be placed against the Contractor as assembly units are removed and the unit material values will be deducted from the total value of assembly units constructed on this project for determination of the work accomplished for purposes of the monthly progress payments to the Contractor. Of the assembly units listed in the "Value and Disposition of Units to be Removed" table to be removed from existing lines certain units are to be reused in the construction of the project. The quantity of such units to be reused is listed in the "Value and Disposition of Units to be Removed" table, column 5. These units where installed in the project will be inventoried as new assembly units and compensated for at the unit bid prices. The quantity of assembly units listed in column 6 of the "Value and Disposition of Units to be Removed" table is the maximum quantity of removed assembly units that are to be returned to the Owner for credit which will be allowed at the unit material prices in column 2. Column 7 indicates the extended value of the units to be returned to the Owner. The Contractor will be allowed credit for assembly units listed in column 6 which, in the opinion of the Engineer, have not been damaged by the Contractor in removal and handling. Such credits will be allowed the Contractor as the assembly units are returned to a location designated by the Owner and shall be added to the total value of installed assembly units for determination of work accomplished for the purposes of the monthly progress payments to the Contractor. The removal units are specified by the prefix "XZ" followed by the assembly unit designation of the existing assembly unit to be removed.

Part II - SPECIFICATIONS FOR MATERIALS**1. SCOPE**

This part of the specification is concerned with the various materials required for the construction of the outside aerial cable plant of the rural telecommunications system as shown on the Plans, Specifications, and Construction Sheets.

2. GENERAL

All materials used in the construction of the rural telecommunications system except those listed in Paragraph 4 below shall be listed in RUS Informational Publication (IP) 344-2, "List of Materials Acceptable for Use on Telecommunications Systems of RUS Borrowers," unless specific written approval has been granted by the Administrator.

3. POLES

3.1 The pole plan, method of treatment, kind of preservative and general procedure applying to all poles shall be in accordance with the latest RUS specifications for these items in effect at the time the bids are received. All poles shall be framed in accordance with the framing guide attached to the specifications.

3.2 Poles shall be of the length and American National Standards Institute, Inc. (ANSI) class specified in the Proposal.

4. MISCELLANEOUS

Items which do not appear in RUS IP 344-2, "List of Materials Acceptable for Use on Telecommunications Systems of RUS Borrowers," shall be of a quality suitable for the application for which they are intended.

Part III - SPECIFICATIONS FOR CONSTRUCTION AND INSTALLATION**1. GENERAL**

1.1 All construction and installation work shall be done in a thorough and workmanlike manner in accordance with the Plans, Specifications and Construction Sheets and shall be subject to acceptance by the Owner and the Administrator.

1.2 All material to be used in construction of the Project shall be stored so as to be protected from deteriorating effects of the elements.

1.3 All guy strand, suspension strand, aerial cables, and accessory materials used in the construction of the Project shall be handled with care. Each reel of aerial cable shall be inspected for damage. All damage shall be repaired to the satisfaction of the Engineer and in accordance with the methods or other instructions described in the appropriate paragraphs of Part III. If reel wrap is present, the reel wrap shall remain intact on the reel until the cable is ready to be placed.

1.4 Deviations from the Plans, Specifications and Construction Sheets shall not be permitted except upon written permission of the Engineer.

1.5 The latest revision of the National Electrical Safety Code (NESC) and the National Electrical Code (NEC) shall be followed in every case except where local regulations are more stringent, in which case local regulations shall govern.

1.6 The Contractor shall maintain conductor polarity (tip and ring) identification at the main distributing frame, cable terminals, wire terminals, terminal blocks, and in the service entrance, all in accordance with the Specifications and Construction Sheets (see guide drawing 815).

2. POLE LINES

2.1 Poles shall be handled carefully. Damaged poles shall not be used.

2.2 The pole hole shall be of sufficient diameter to permit the pole to settle freely to the bottom of the hole without trimming the butt and still have sufficient space between the pole and the sides of the hole to permit proper tamping of the backfill at every point around the pole, and throughout the entire depth of the hole.

2.3 The setting depth, in feet (or meters), for poles of various lengths shall be as follows:

<u>Length of Pole</u>	<u>Setting in Soil</u>	<u>Setting in Solid Rock</u>
20 (6.10)	4.0 (1.22)	3.0 (0.91)
25 (7.62)	5.0 (1.52)	3.5 (1.07)
30 (9.14)	5.5 (1.68)	3.5 (1.07)
35 (10.67)	6.0 (1.83)	4.0 (1.22)
40 (12.19)	6.0 (1.83)	4.0 (1.22)
45 (13.72)	6.5 (1.98)	4.5 (1.37)
50 (15.24)	7.0 (2.13)	4.5 (1.37)
55 (16.76)	7.5 (2.29)	5.0 (1.52)
60 (18.29)	8.0 (2.44)	5.0 (1.52)

2.4 The "Setting in Soil" depth as shown in paragraph 2.3, shall apply where poles are to be set in soil only; where there is a layer of soil more than 2 feet (0.61 m) in depth over solid rock; or where the pole in solid rock is not substantially vertical or the diameter of the hole at the surface of the rock exceeds approximately twice the diameter of the pole at the same level.

2.5 The "Setting in Solid Rock" depth as shown in paragraph 2.3, shall apply where solid rock is encountered at the ground line and where the hole is substantially vertical, approximately uniform in diameter, and large enough to permit the use of tamping bars the full depth of the hole.

2.6 Where there is a layer of soil 2 feet (0.61 m) or less in depth over solid rock, the depth of the hole shall be the depth of the soil in addition to the depth specified in paragraph 2.3 under "Setting in Solid Rock," provided, however, that such depth shall not exceed the depth specified under "Setting in Soil."

2.7 On sloping ground the depth of the hole shall be measured from the low side of the hole. Where a pole is to be set on the side of a steep grade where soil erosion appears to be a consideration, the hole should be one (1) foot (0.305 m) deeper than specified in paragraph 2.3 under "Setting in Soil."

2.8 When an earth boring machine is employed for holes for guyed poles, the bottom of the hole shall be thoroughly tamped to compact any loose earth that may be present.

2.9 All holes shall be backfilled with soil or small rock and all pole holes in rock shall be inspected and approved by the Engineer before being backfilled.

2.10 Backfill shall be thoroughly tamped the full depth of the pole hole. Earth must be banked around the pole to a minimum height of 6 in. [15.24 centimeters (cm)] above ground level.

2.11 Holes in soil for poles at unguyed corners where the pole will not be keyed shall be one (1) foot (0.305 m) deeper than the "Setting in Soil" depth as shown in paragraph 2.3. For holes in solid rock the "Setting in Solid Rock" depth will apply.

2.12 The Contractor shall be responsible for setting poles in alignment according to the staking sheets. If the Contractor should find stakes out of alignment, the Engineer shall, upon request of the Contractor, realign the stakes according to the construction sheets.

2.13 Poles shall be set plumb except at corners where they shall be set and raked against the load so that the pole top will be in line after the load is applied. The rake in pole shall not exceed 6 in. (15.24 cm) for each 10 feet (3.05 m) of pole length after the conductors are installed at the required tension. Deadend shall be set so as to be plumb and in line after the load it applied.

2.14 Pole lightning protection shall be a #6 AWG bare copper wire installed in accordance with assembly unit drawing PM1.

3. MOUNTING HARDWARE AND GUYS

3.1 All bolts employed for the mounting of hardware items on poles shall be long enough to fully engage the nut (including locknut, where applicable) but shall not extend more than 2 in. (50.8 mm) beyond the nut after the nut is tightened. The ends of bolts shall not be cut.

3.2 The Engineer shall determine all guy locations and shall specify the type of guy. Guys shall be installed before conductors or cable suspension strands are placed.

4. ANCHORS

4.1 Anchor assembly units shall be installed at locations designated on the construction sheets.

4.2 All anchors and rods shall be in line with the load and shall be so installed that the eye of the rod is above grade. Not more than 6 in. (152 mm) of rod shall remain out of the ground after the load is applied.

4.3 When an expansion type anchor is used, the anchor shall be fully expanded and shall be expanded into undisturbed earth before backfilling the anchor hole.

4.4 Backfill shall be thoroughly tamped the full depth of all anchor holes.

4.5 Rock anchors shall be placed in accordance with the detailed instructions of the Engineer. Where a rock is encountered below the surface of the ground, instructions from the Engineer shall be obtained before placing an anchor at that location.

5. SELF SUPPORTING FIBER OPTIC CABLE

5.1 Where physical obstructions make it necessary to pull cable along the line from a stationary reel, cable stringing blocks shall be used to support the cable during all placing and tensioning operations. Ladders, cable cars and other equipment shall not be placed on or against the cable.

5.2 Splicing of the optical fibers shall be performed in accordance with RUS Splicing Standard Bulletin 1753F-401 (PC-2). Splicing of the support member shall be performed in accordance with the method specified by the Engineer.

5.3 During installation, maximum pulling tension and minimum bending radius of the self supporting fiber optic cable shall not exceed the cable manufacturer's recommendations.

5.4 Initial stringing tension, maximum permissible span length, and sagging shall be in accordance with the cable manufacturer's recommendations.

5.5 Self supporting fiber optic cable shall be spiraled in accordance with the method shown on Construction Guide Drawing 250-1. Spiraling of the cable shall be performed within 24 hours of the tensioning operation.

5.6 The insulation shall not be removed from the support member except at bonding and ground points; and at points where ends of the support member are terminated in splicing and deadend devices.

5.7 The support member of self supporting fiber optic cable shall be made electrically continuous throughout its entire length.

5.8 At junctions between self supporting fiber optic cable and aerial fiber cable, or buried fiber cable, the support messenger shall be bonded to the aerial cable strand or buried cable armor.

5.9 The support member of self supporting fiber optic cable shall be grounded at locations specified by the Engineer by connecting the support wire to a pole ground wire as shown on the Construction Sheets.

5.10 When specified by the Engineer, the insulation of the support member at deadend fittings, splices and bridged grounding connections shall be restored in accordance with the method shown in Construction Guide Drawing 360.

5.11 Damaged portions of the self supporting fiber optic cable shall be cut out and the support member spliced in accordance with the method specified by the Engineer.

6. SUSPENSION STRAND

6.1 The cable shall be installed within a reasonable time after the strand is installed and tensioned. If a delay in installing cable in excess of 24 hours is encountered, temporary dampers shall be installed on the strand.

6.2 When tensioning strand the cable suspension clamps shall be loose enough to allow free movement of the strand.

6.3 Suspension strand shall be placed in accordance with the Construction Sheets and shall be tensioned in accordance with instructions, which shall be furnished, to the Contractor by the Engineer.

6.4 The suspension strand shall be placed on the roadside of the pole line unless otherwise directed by the Engineer.

6.5 In tangent construction, the lip of the suspension strand clamp shall point toward the pole. At angles in the line, the suspension strand clamp lip shall point away from the load.

6.6 In level construction the suspension strand clamp shall be placed in such a manner that it shall hold the strand below the through-bolt. At points where there is an up-pull on the strand, the clamp shall be so placed that it shall support the strand above the through-bolt.

6.7 When a thimbleye bolt is used both to mount the suspension strand clamp and to make the guy attachment, the size of the suspension strand clamp shall be governed by the size of the thimbleye bolt required for the guy.

6.8 The air temperature at the time and place of tensioning the strand shall be determined by means specified by the Engineer.

6.9 The suspension strand shall be made electrically continuous throughout its entire length as indicated on the Construction Sheets.

6.10 Suspension strands shall be bonded to other bare cable suspension strands, and guys on the same pole and grounded by connection to ground leads at locations specified by the Engineer and in the manner specified by the Engineer. Where the strand is to be grounded to a multigrounded neutral on a pole which does not carry a vertical pole ground wire, a #6 AWG bare copper wire shall be left coiled and taped to permit it to be extended up the pole and connected to the multiground neutral by a representative of the power company.

7. FILLED AERIAL CABLE

7.1 The Contractor and Engineer shall jointly inspect all reels of cable for damage prior to installation.

7.2 Cable ends shall be kept sealed at all times, i.e., during transportation, in storage, and during cable placement to prevent moisture entry into the cable core. Acceptable cable end caps shall be used for this purpose.

7.3 Cable shall be taken from the reel only as it is placed. Bends of small radii and twists shall be avoided in handling cable.

7.4 If the jacket is deformed in handling the cable, the Engineer shall be notified. If directed by the Engineer, the deformed section of the jacket shall be removed; the insulation and conductors shall be examined and if damaged shall be repaired. The opening in the jacket shall then be closed by means of a suitable enclosure. Repairs so made shall be done in accordance with appropriate specifications.

8. FILLED AERIAL CABLE PLACEMENT

8.1 During placing operations, copper cables shall not be bent in a radius less than 10 times the outside diameter of the cable and fiber optic cables shall not be bent in a radius less than 20 times the outside diameter of the cable. Temporary supports where necessary, shall be placed sufficiently close together and proper tensioning of the cable shall be employed to prevent bending in excess of the above requirements.

8.2 In those instances where spiraling of cable is involved, the mounting of closures for purposes of splicing and distribution

shall be accomplished after the spiraling operation has been completed.

8.3 Cable guards shall be applied over the cable at points of potential abrasion such as at supports, and in locations where tree trimming is not permitted.

8.4 Cable shall be lashed with lashing wire to the suspension strand by means of a suitable lashing machine.

8.5 The pitch of the lashing wire may be from 10 to 15 in. (254 to 381 mm) but must be constant for any section of cable of the same size and gauge. For cables of 3/4 in. (19 mm) or larger in diameter, the lashing wire shall be placed with a tension of 35 to 40 lbs (156 to 178 N). Cables having a smaller diameter less than 3/4 in. (19 mm) shall be lashed with a lashing wire tension of 18 to 25 lbs (80 to 111 N).

8.6 During the placing operation, precautions shall be taken to prevent slippage of the cable sheath or jacket over the core.

8.7 The cable shall be snug against the suspension strand throughout the span. It shall be supported in a position directly below the strand insofar as possible, except where spiraling has been specified. Where more than one cable is placed on a strand, the cables shall be arranged as shown on the Construction Sheets so that the cables are snug against the suspension strand and against each other.

8.8 The lashing wire shall be terminated at each pole and the cable shall be supported and protected at the suspension clamp in accordance with the Construction Sheets.

8.9 At lashing wire terminating points, the tension placed in the lashing wire by the lashing machine shall be maintained. No slack in the lashing wire shall be permitted to run into the span.

8.10 When lashing wire is spliced in a span, the splice shall be made by means of a compression type splicing sleeve. The completed splice shall be placed on the strand in such a position that it shall not result in damage to the cable sheath or jacket.

8.11 Where suspension strand attachments such as suspension strand cross-over, suspension strand pull-offs, etc., are encountered in the span, a positive separation shall be provided between the suspension strand attachment and the cable, and the cable shall be supported and protected in accordance with the Construction Sheets.

8.12 At splices where the cable is not cut, no slack shall be left in the cable. So that no slack can run into the span, the lashing wire shall be securely clamped to the strand until the splice is completed, at which time the lashing wire shall be terminated in accordance with the Construction Sheets.

8.13 At cut splices in the cable, sufficient overlap shall be provided to permit splicing without piecing out the conductors.

8.14 Spiraling of lashed cable where specified shall be performed in accordance with the method shown on the Construction Guide Drawing 250. Spiraling of the cable shall be performed within 48 hours of the tensioning operation.

8.15 Where the new cable is to be lashed to existing strand and cable(s), the preceding requirements for placement of lashed cable shall also be adhered to, except as modified and/or supplemented as follows:

8.15.1 The cable shall be lashed to the existing strand and cable(s) so that it and the existing cable(s) shall be as snug against the existing strand as is practicable.

Note: If the existing cable is spiraled, the spiraling shall first be removed. The existing cable after unspiraling and the new cable shall then be lashed, without either being spiraled, to the existing strand in the same lashing operation.

8.15.2 The lashing wire shall be terminated on both sides of all splices and devices in/on the existing cable where interference with the lashing operation is encountered.

8.15.3 Cable spacers and cable straps, as required, shall be used at all points of lashing wire termination to maintain proper separation and support for the new cable.

8.15.4 Spacers shall be added to the existing suspension clamp mountings, where required, to maintain proper separation between the cable and the surface of the pole.

8.15.5 Ready-access closures to be installed on the new cable(s) shall be equipped with extension fittings so that they will be located below and separate from the existing cable.

8.16.6 The existing lashing wire, fittings and attachments shall be adjusted as necessary to maintain proper security of the new cable and the existing cable, and to maintain adequate separations and clearances.

9. CABLE SPLICING AND TERMINALS

9.1 Splicing for copper cable and fiber optic cable shall be in accordance with RUS Splicing Standard Bulletin 1753F-401 (PC-2).

9.2 Aerial cable terminals and ready-access closures equipped with filled terminal blocks shall be installed in accordance with the Construction Sheets and connected in accordance with the cable schematic drawings furnished by the Engineer. Splicing shall be performed in accordance with RUS Splicing Standard Bulletin 1753F-401 (PC-2).

10. CLEARING RIGHT-OF-WAY

10.1 In clearing the right-of-way, trees shall be removed or trimmed and underbrush cleared in accordance with the Construction Sheets. Trees fronting the side of the right-of-way shall be trimmed symmetrically unless otherwise directed by the Engineer.

10.2 Dead trees beyond the right-of-way, which would strike the line in falling, shall be removed.

10.3 Leaning trees beyond the right-of-way which would strike the line in falling and which would require topping if not removed, may be removed or topped at the option of the Contractor; however, the Contractor shall trim and not remove shade, fruit, or ornamental trees unless otherwise directed by the Engineer.

LIST OF CONSTRUCTION DRAWINGS AND PLANSAssembly Unit Drawings

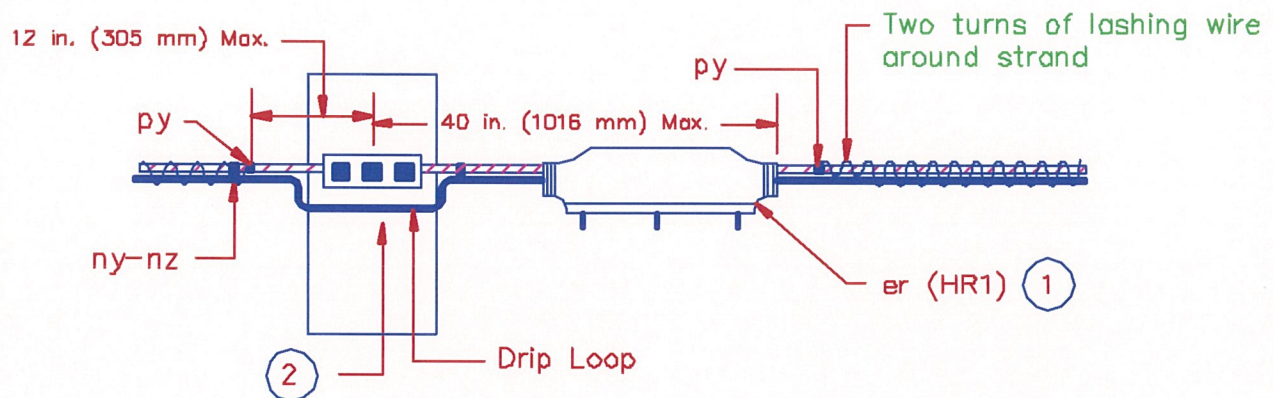
HR1	Ready-Access Enclosure, Lashed Cable Straight Splice
HR2	Ready-Access Enclosure, Lashed Cable Branch Splice
PE1-2, PE1-3, and PE1-4 PE1-2G, PE1-3G, and PE1-4G	Down Guy Down Guy, Ground Connections
PE2-2, PE2-3, and PE2-4 PE2-2G, PE2-3G, and PE2-4G	Overhead Guy Overhead Guy, Ground Connections
PF1-3, PF1-5, and PF1-7 PF3-3, PF3-5, and PF3-7 PF5-3 and PF5-4 PF6-3, PF6-4, and PF6-5	Expanding Anchor Assembly Screw Anchor Assembly Rock Anchor Assembly Swamp Anchor Assembly
PM1	Pole Lightning Protection Assembly
PM2 PM2-1 PM2A	Pole Ground Assembly Auxiliary Ground Rod Assembly Ground Wire Assembly
PM4 PM4A	Cable Extension Arm Assembly (Short) Cable Extension Arm Assembly (Long)
PM5	Pole Stepping Assembly
PM6 and PM7 PM8 and PM9	Pole Key Assemblies Pole Key Assemblies
PM12	Sidewalk Guy Arm Assembly
PM14	Push Brace Accessories
PM52	Pole Marking

Construction Guide Drawings

201	Suspension Strand Mounting
201-1	Self Supporting Filled Fiber Optic Cable Support
202	Suspension Strand Mounting (Pull Away from Pole)
202-1	Suspension Strand Mounting (Pull Against Pole)
202-3	Self Supporting Filled Fiber Optic Cable Support, Corner

203	Suspension Strand Mounting (Corners)
203-1	Self Supporting Filled Fiber Optic Cable Support, Corner
204	Suspension Strand Deadend
206	Branch Suspension Strand
207	Branch Suspension Strand
208	Suspension Strand Pull-Off
209-1	Suspension Strand Bonding
211	False Deadend
212	Strand Layouts
214	Arrangement Details of Cables at Pole Supports
241	Lashed Cable Support at Pole
242	Lashing Wire Terminations
243	Lashing Wire Terminations at Suspension Strand Crossovers
250	Method of Spiraling Aerial Cable
250-1	Method of Spiraling Self Supporting Filled Fiber Optic Cable (Figure 8 Design)
312-1	Aerial Plastic Cable, Details of Wire Connections to Terminal blocks
360	Method of Restoring Insulation on Support Member of Self Supporting Filled Fiber Optic Cable (Figure 8 Design)
812	Guy Hook, Details of Installation
815	Conductor Polarity (Tip and Ring) Diagram (Aerial Plant)

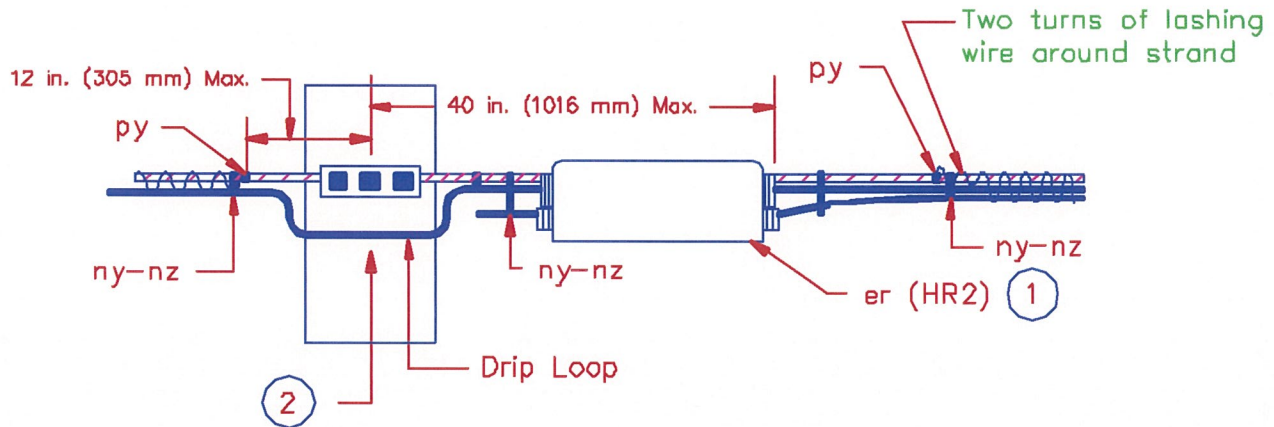
NOTE: On the Assembly Unit or Guide Drawings an asterisk (*) in the ITEM column indicates items that are no longer listed in RUS IP 344-2, "List of Materials Acceptable for Use on Telecommunications Systems of RUS Borrowers."



Notes:

1. Select enclosure size for the main cable diameter from 0.4 to 3.0 in. (10 to 76 mm) and install in accordance with the enclosure manufacturer's instructions.
2. Lashed cable supports with the proper size cable spacers shall be used to hold the cable parallel to the strand and clear of the hardware.

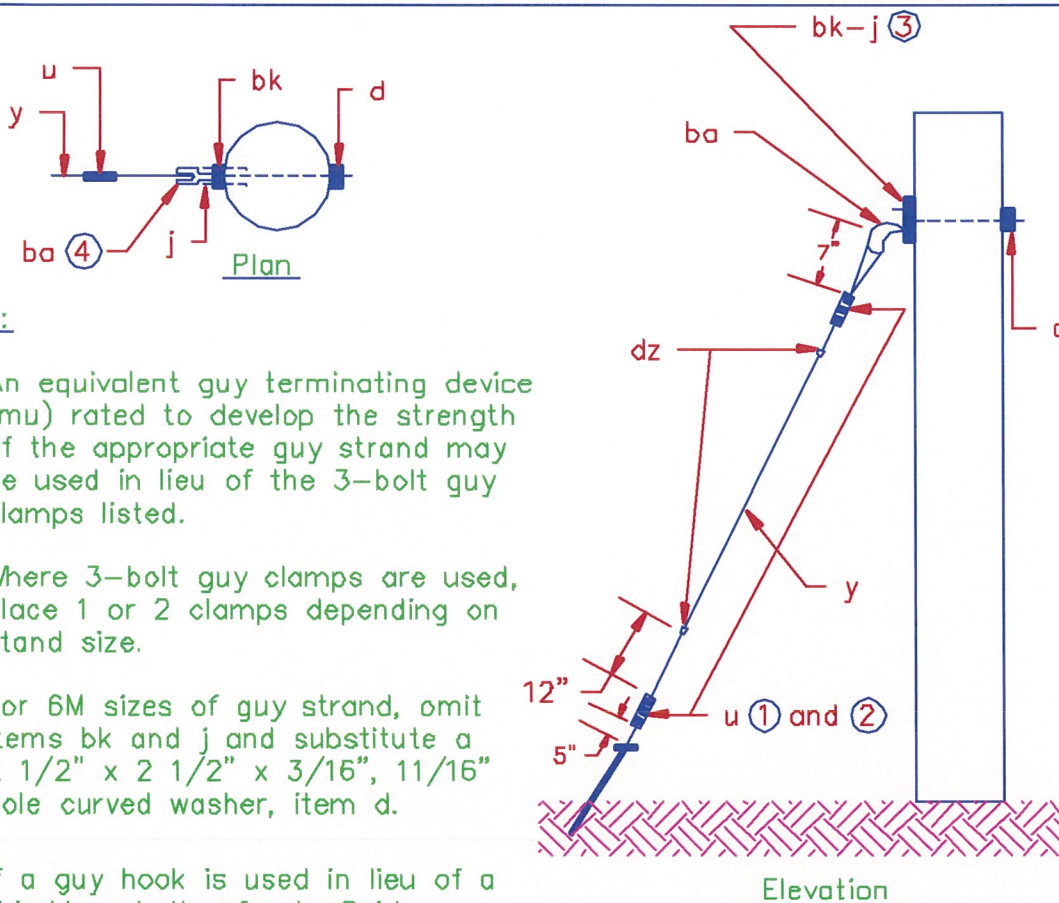
		HR1
ITEMS	MATERIALS	NO. REQUIRED
er	Enclosure, ready-access	1
*ny	Spacers, cable	As required
*nz	Supports, lashed cable	As required
*py	Clamps, lashing wire, terminating	As required
		RURAL TELECOMMUNICATIONS CONSTRUCTION PRACTICES READY-ACCESS ENCLDSURE LASHED CABLE - STRAIGHT SPLICE
		Scale: NTS
		March 2001
		HR1



Notes:

1. Select enclosure size for the main cable diameter from 0.4 to 3.0 in. (10 to 76 mm) and install in accordance with the enclosure manufacturer's instructions.
2. Lashed cable supports with the proper size cable spacers shall be used to hold the cable parallel to the strand and clear of the hardware.

		HR2
ITEMS	MATERIALS	NO. REQUIRED
er	Enclosure, ready-access	1
*ny	Spacers, cable	As required
*nz	Supports, lashed cable	As required
*py	Clamps, lashing wire, terminating	As required
		RURAL TELECOMMUNICATIONS CONSTRUCTION PRACTICES READY-ACCESS ENCLOSURE LASHED CABLE - BRANCH SPLICE
		Scale: NTS
		March 2001 HR2



Notes:

- ①. An equivalent guy terminating device (mu) rated to develop the strength of the appropriate guy strand may be used in lieu of the 3-bolt guy clamps listed.
- ②. Where 3-bolt guy clamps are used, place 1 or 2 clamps depending on stand size.
- ③. For 6M sizes of guy strand, omit items bk and j and substitute a 2 1/2" x 2 1/2" x 3/16", 11/16" hole curved washer, item d.
- ④. If a guy hook is used in lieu of a thimbleye bolt refer to Guide Drawing 812 for installation details.
- ⑤. For converting English units to metric units use 1 in. = 25.4 mm and 1 ft = 0.3048 m.

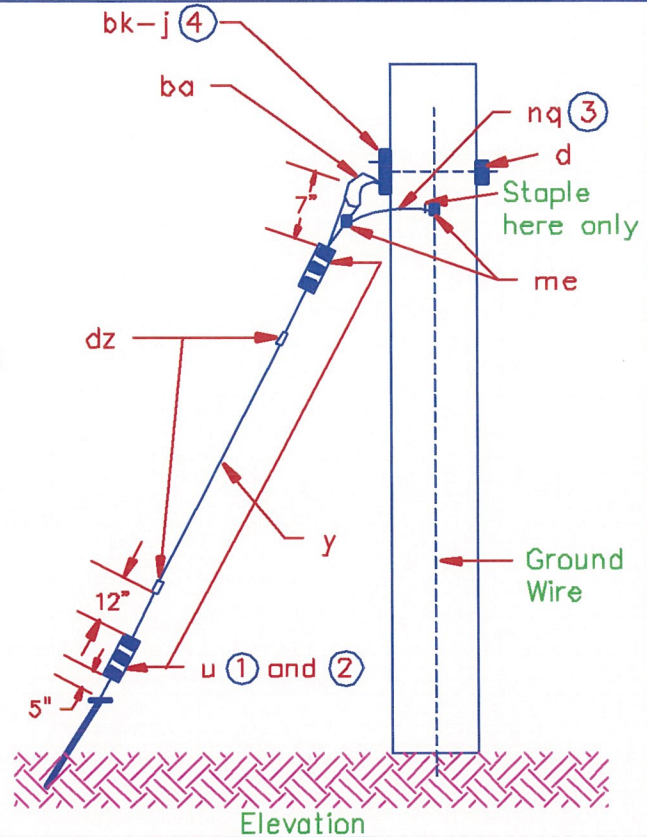
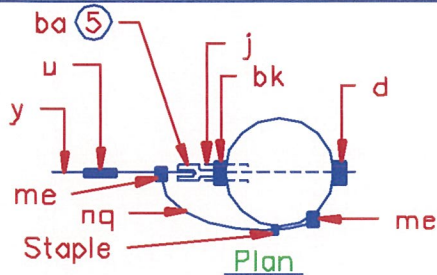
ITEMS	MATERIALS	PE1-2	PE1-3	PE1-4
		6M	10M	16M
d	Washers, curved, 3" x 3" x 1/4", 13/16" hole	—	—	1
d	Washers, curved, 2 1/2" x 2 1/2" x 3/16", 11/16" hole	2	1	—
j	Screws, lag, 1/2" x 4"	—	2	2
u	Clamps, guy, 3-bolt	2	2	4
y	Strand, guy	req'd lgth	req'd lgth	req'd lgth
ba	Bolts, angle, thimbleye, 3/4" x req'd length	—	—	1
ba	Bolts, angle, thimbleye, 5/8" x req'd length	1	1	—
bk	Plates, lift, curved, 7" x 2 1/2" x 5/16"	—	—	1
bk	Plates, lift, curved, 7" x 2 1/2" x 1/4"	—	1	—
*dz	Clips, guy	2	2	2

RURAL TELECOMMUNICATIONS CONSTRUCTION PRACTICES
DOWN GUY

Scale: NTS

March 2001

PE1-2, -3, -4



Notes:

- ①. An equivalent guy terminating device (mu) rated to develop the strength of the appropriate guy strand may be used in lieu of the 3-bolt guy clamps listed.
- ②. Where 3-bolt guy clamps are used, place 1 or 2 clamps depending on strand size.
- ③. On joint use poles where no vertical pole ground wire is present, leave enough length of #6 AWG copper ground wire (item nq) coiled and taped to enable it to be extended up the pole and connected to a multigrounded neutral by a representative of the power company.
- ④. For 6M sizes of guy strand, omit items bk and j and substitute a 2 1/2" x 2 1/2" x 3/16", 11/16" hole curved washer, item d.
- ⑤. If a guy hook is used in lieu of a thimbleye bolt refer to Guide Drawing 812 for installation details.
- ⑥. For converting English units to metric units use 1 in. = 25.4 mm and 1 ft = 0.3048 m.

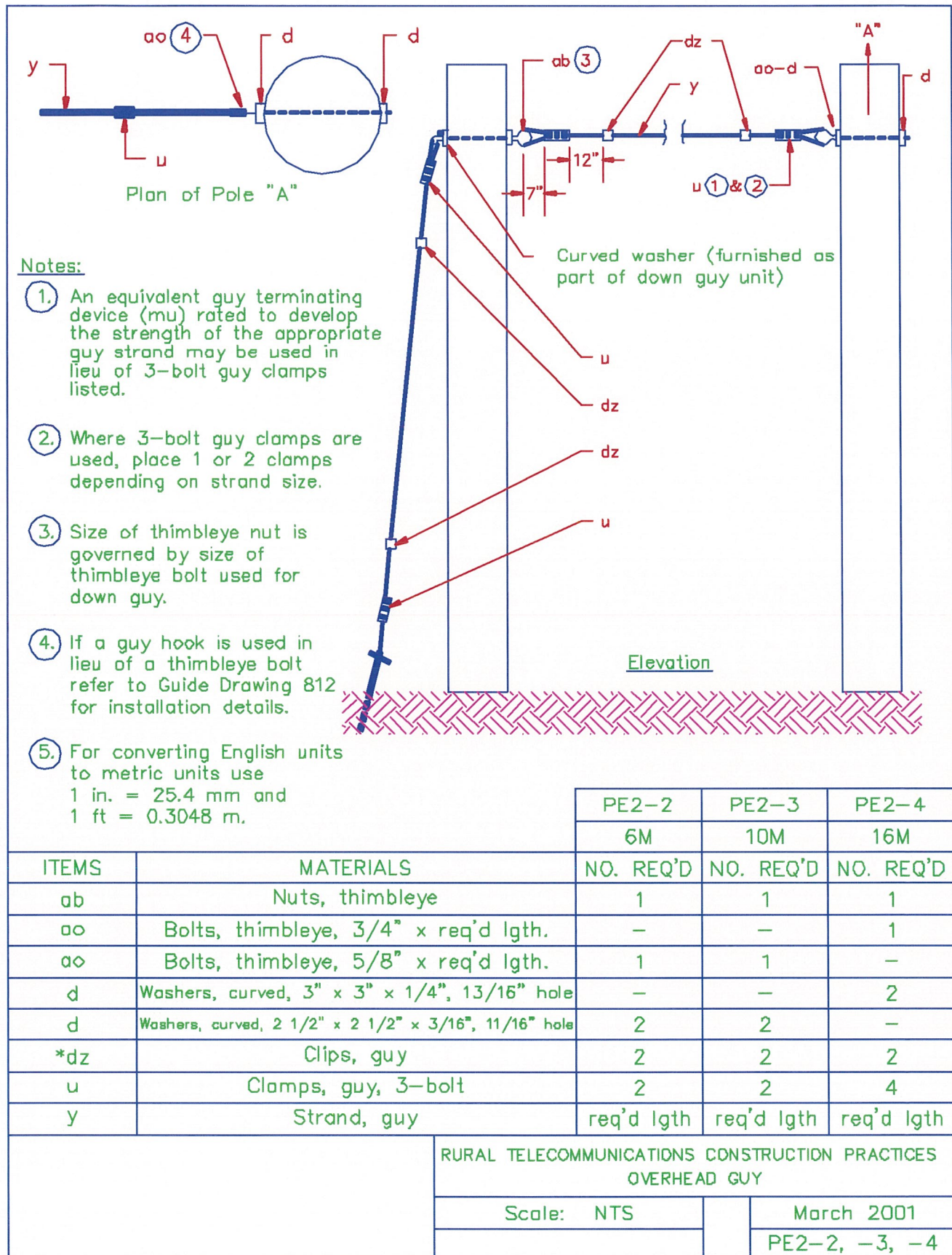
ITEMS	MATERIALS	PE1-2G	PE1-3G	PE1-4G
		6M	10M	16M
		NO. REQ'D	NO. REQ'D	NO. REQ'D
d	Washers, curved, 3" x 3" x 1/4", 13/16" hole	—	—	1
d	Washers, curved, 2 1/2" x 2 1/2" x 3/16", 11/16" hole	2	1	—
j	Screws, lag, 1/2" x 4"	—	2	2
u	Clamps, guy, 3-bolt	2	2	4
y	Strand, guy	req'd lgth	req'd lgth	req'd lgth
ba	Bolts, angle, thimbleye, 3/4" x req'd length	—	—	1
ba	Bolts, angle, thimbleye, 5/8" x req'd length	1	1	—
bk	Plates, lift, curved, 7" x 2 1/2" x 5/16"	—	—	1
bk	Plates, lift, curved, 7" x 2 1/2" x 1/4"	—	1	—
*dz	Clips, guy	2	2	2
me	Connector, grounding	2	2	2
*nq	Wire, ground, bare #6 AWG copper	req'd lgth	req'd lgth	req'd lgth

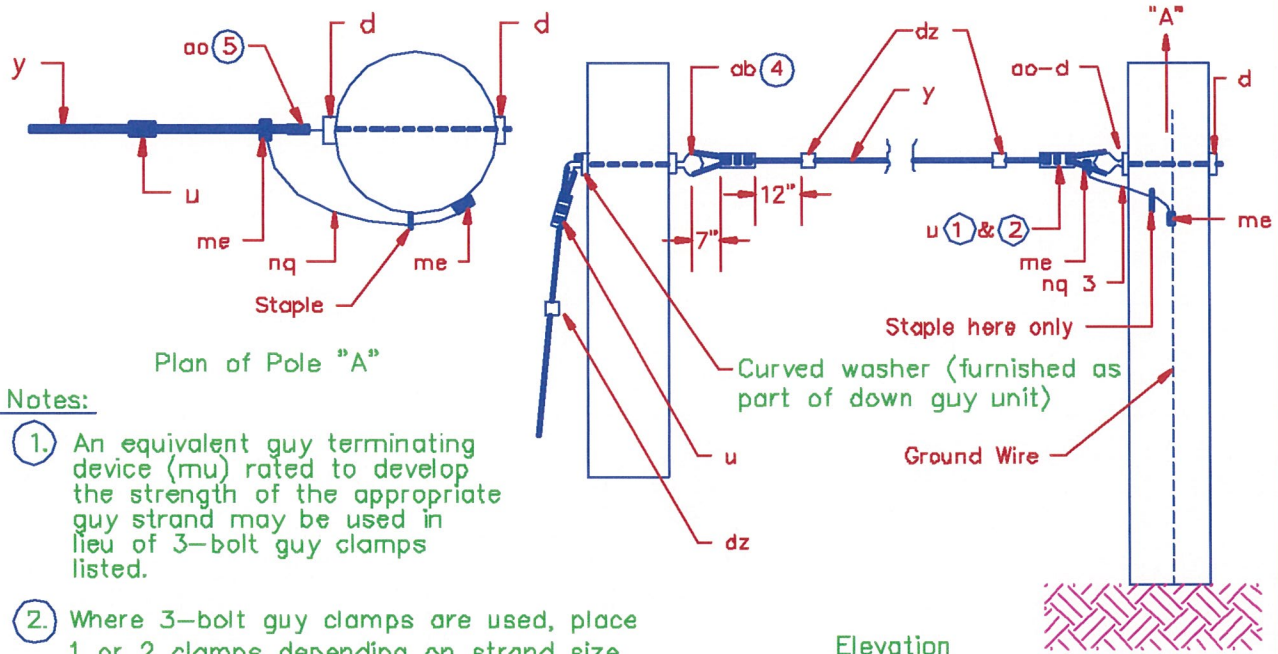
RURAL TELECOMMUNICATIONS CONSTRUCTION PRACTICES
DOWN GUY, GROUND CONNECTIONS

Scale: NTS

March 2001

PE1-2G, -3G, -4G





Notes:

1. An equivalent guy terminating device (mu) rated to develop the strength of the appropriate guy strand may be used in lieu of 3-bolt guy clamps listed.
2. Where 3-bolt guy clamps are used, place 1 or 2 clamps depending on strand size.
3. On joint use poles where no vertical pole ground wire is present, leave enough length of #6 AWG copper ground wire (Item nq) coiled and taped to enable it to be extended up the pole and connected to a multigrounded neutral by a representative of the power company.
4. Size of thimble nut is governed by size of thimble nut used for down guy.
5. If a guy hook is used in lieu of a thimble nut refer to Guide Drawing 812 for installation details.

6. For converting English units to metric units use 1 in. = 25.4 mm and 1 ft = 0.3048 m.

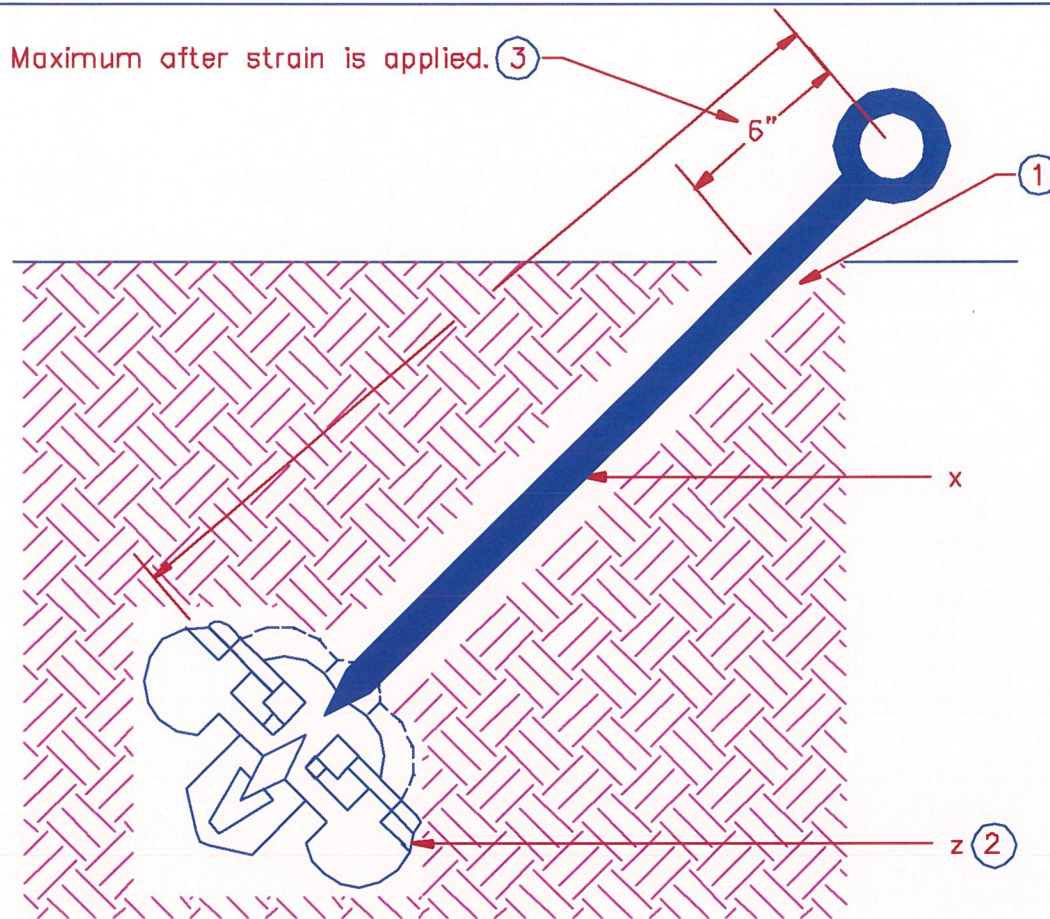
ITEMS	MATERIALS	PE2-2G	PE2-3G	PE2-4G
		6M	10M	16M
ab	Nuts, thimble	1	1	1
ao	Bolts, thimble, 3/4" x req'd lgth.	—	—	1
ao	Bolts, thimble, 5/8" x req'd lgth.	1	1	—
d	Washers, curved, 3" x 3" x 1/4", 13/16" hole	—	—	2
d	Washers, curved, 2 1/2" x 2 1/2" x 3/16", 11/16" hole	2	2	—
*dz	Clips, guy	2	2	2
u	Clamps, guy, 3-bolt	2	2	4
y	Strand, guy	req'd lgth	req'd lgth	req'd lgth
me	Connectors, grounding	2	2	2
*nq	Wires, ground, bare #6 AWG copper	req'd lgth	req'd lgth	req'd lgth

RURAL TELECOMMUNICATIONS CONSTRUCTION PRACTICES
OVERHEAD GUY, GROUND CONNECTIONS

Scale: NTS

March 2001

PE2-2G, -3G, -4G



Notes:

- ① Size of hole shall be governed by the diameter of the unexpanded anchor.
- ② Expand the blades into undisturbed earth.
- ③ Eye of anchor rod shall not be below surface of ground.

- ④ For converting English units to metric units use 1 in. = 25.4 mm, 1 ft = 0.3048 m, and 1 lbf = 4.448 N.

PF1-3	PF1-5	PF1-7
6,000 lbf Holding Power	10,000 lbf Holding Power	16,000 lbf Holding Power

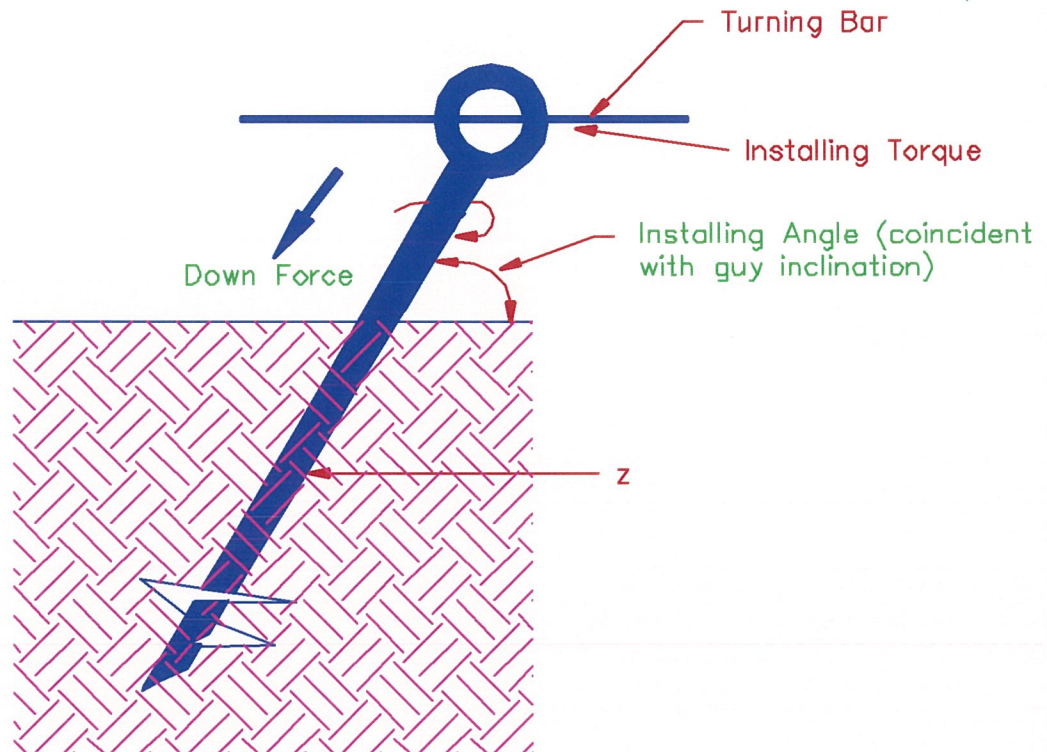
ITEMS	MATERIALS	NO. REQ'D	NO. REQ'D	NO. REQ'D
x	Rod, anchor, thimbleye type, 5/8" x 7'0"	1	—	—
x	Rod, anchor, thimbleye type, 3/4" x 8'0"	—	1	—
x	Rod, anchor, thimbleye type, 1" x 10'0"	—	—	1
z	Anchor, expanding	1	1	1

RURAL TELECOMMUNICATIONS CONSTRUCTION PRACTICES
EXPANDING ANCHOR ASSEMBLY

Scale: NTS

March 2001

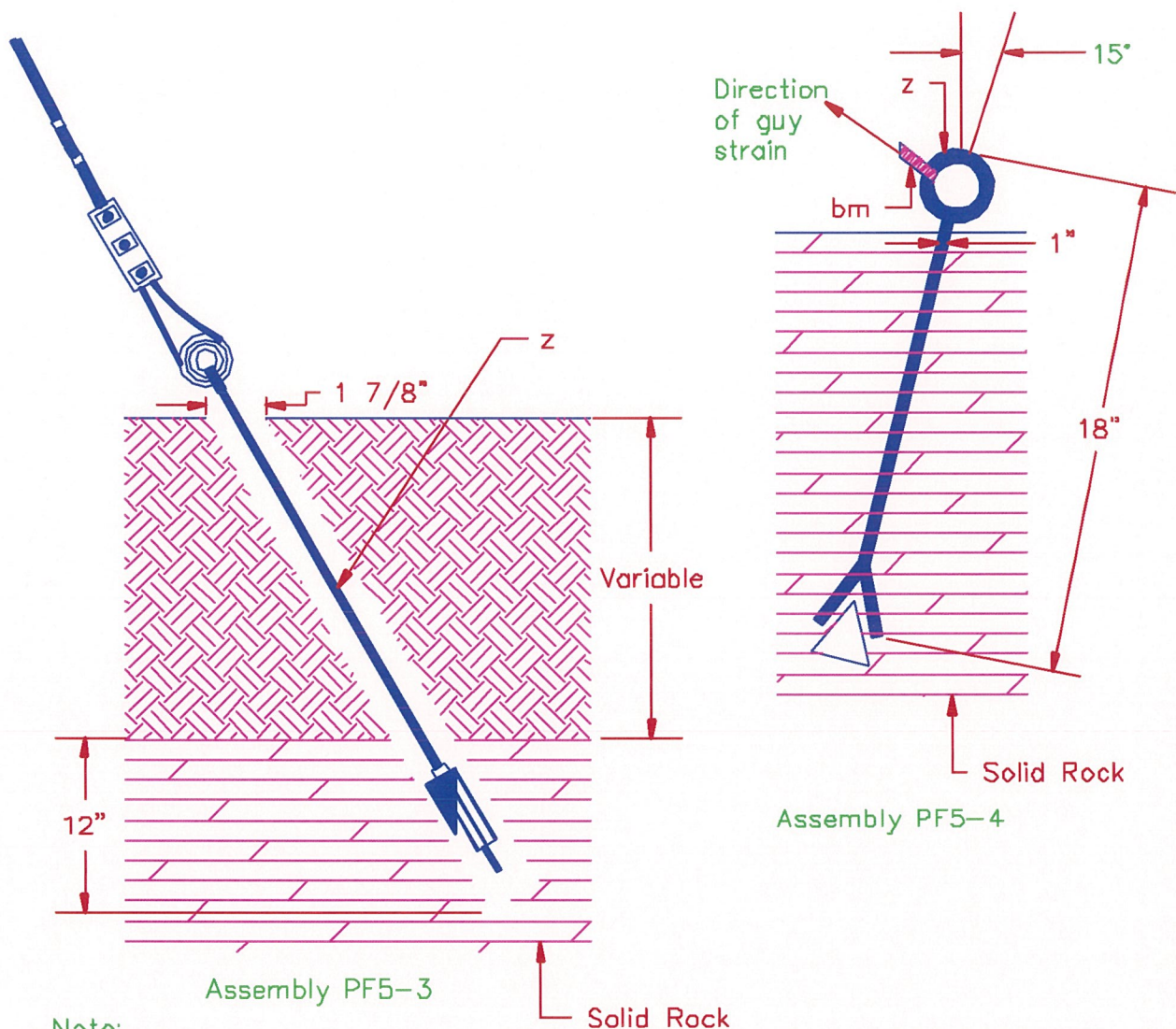
PF1-3, -5, -7



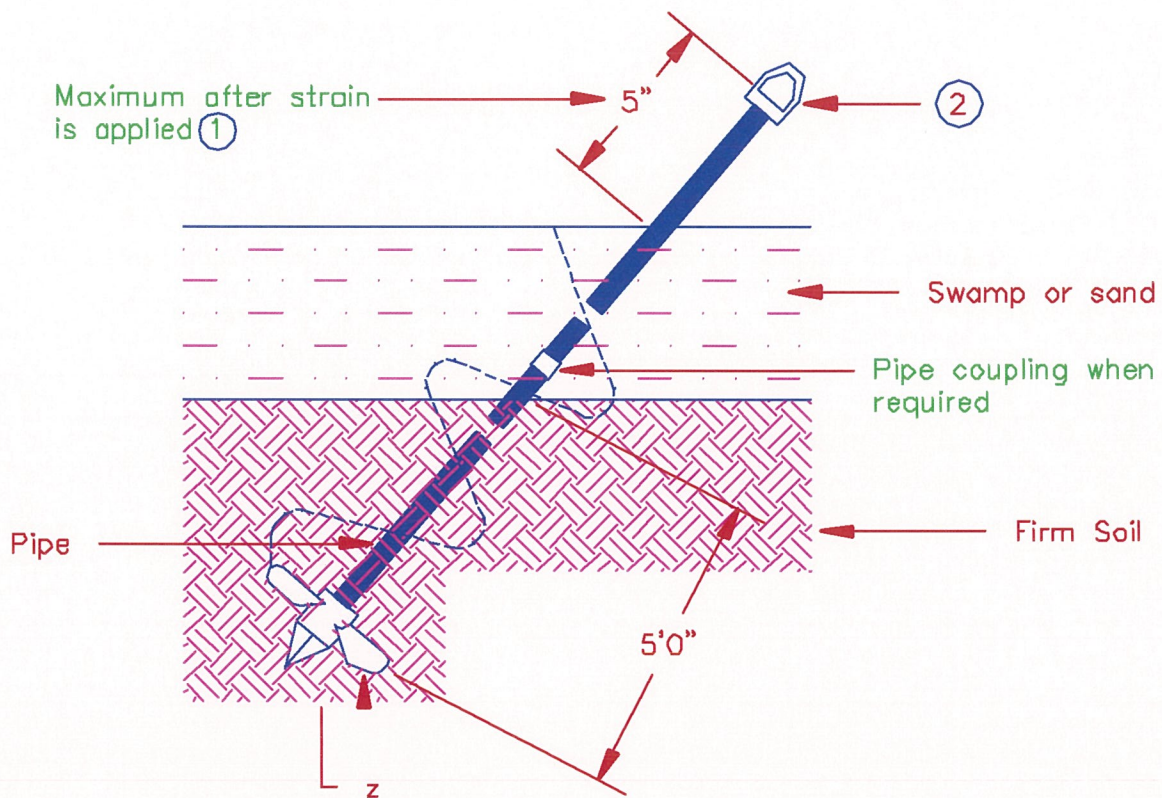
Note:

For converting English units to metric units use 1 in. = 25.4 mm
 and 1 lbf = 4.448 N.

		PF3-3	PF3-5	PF3-7
		6,000 lbf Holding Power	10,000 lbf Holding Power	16,000 lbf Holding Power
ITEMS	MATERIALS	NO. REQ'D	NO. REQ'D	NO. REQ'D
Z	Anchor, screw - 8" (203 mm) helix dia.	1	—	—
Z	Anchor, screw - 10" (254 mm) helix dia.	—	1	—
Z	Anchor, screw - 12" (305 mm) helix dia.	—	—	1
		RURAL TELECOMMUNICATIONS CONSTRUCTION PRACTICES SCREW ANCHOR ASSEMBLY		
		Scale: NTS		March 2001
				PF3-3, -5, -7



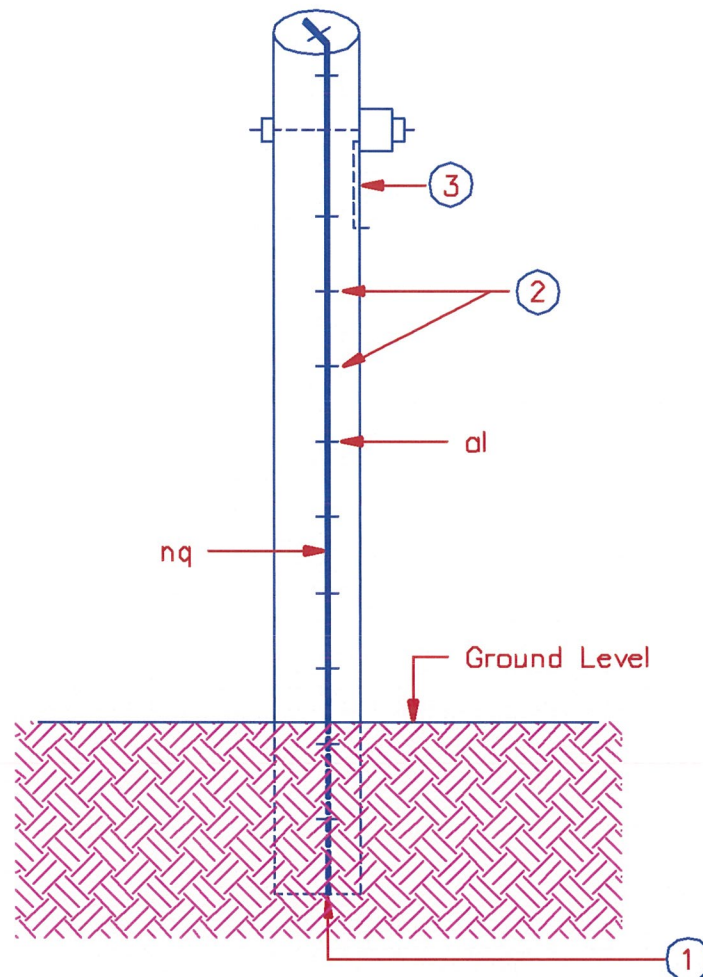
		PF5-3	PF5-4
		16,000 lbf Holding Power	12,000 lbf Holding Power
ITEMS	MATERIALS	NO. REQ'D	NO. REQ'D
z	Anchor, rock, expanding	1	—
z	Anchor, rock, split wedge type	—	1
*bm	Thimble, guy	—	1
		RURAL TELECOMMUNICATIONS CONSTRUCTION PRACTICES ROCK ANCHOR ASSEMBLY	
		Scale: NTS	March 2001
			PF5-3, -4



Notes:

- ① Eye of anchor rod shall not be below surface of ground.
- ② Anchor nut is furnished with anchor by manufacturer.
- ③ For converting English units to metric units use 1 in. = 25.4 mm,
1 ft = 0.3048 m, and
1 lbf = 4.448 N.

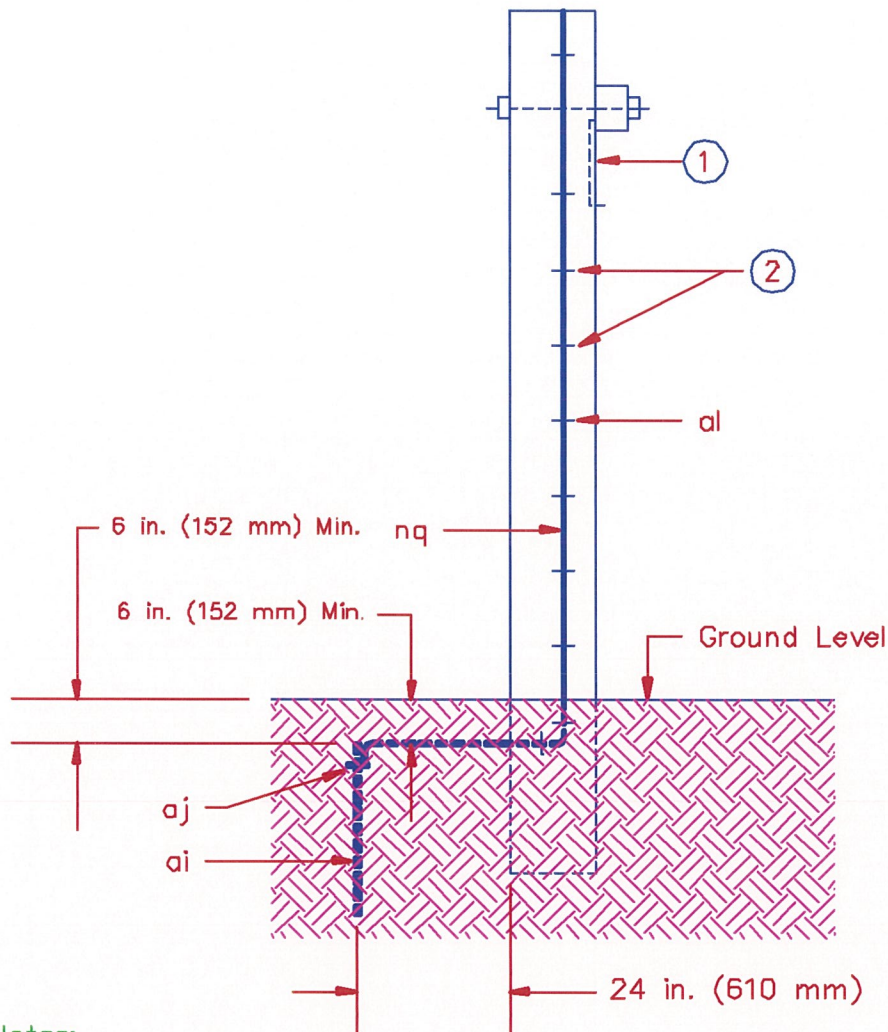
		PF6-3	PF6-4	PF6-5
		6,000 lbf Holding Power	8,000 lbf Holding Power	10,000 lbf Holding Power
ITEMS	MATERIALS	NO. REQUIRED	NO. REQUIRED	NO. REQUIRED
z	Anchor, swamp, 10"	1	—	—
z	Anchor, swamp, 12"	—	1	—
z	Anchor, swamp, 15"	—	—	1
—	Pipe, galvanized, 1 1/2", dia.	length as req'd	—	—
—	Pipe, galvanized, 2" dia.	—	length as req'd	length as req'd
		RURAL TELECOMMUNICATIONS CONSTRUCTION PRACTICES SWAMP ANCHOR ASSEMBLY		
		Scale: NTS		March 2001
				PF6-3, -4, -5



Notes:

- ①. Leave a sufficient length of wire at the bottom of the pole to form a "butt" ground.
- ②. Staples on ground wire should be about 18 in. (457 mm) apart.
- ③. Ground wire should clear all hardware by 2 in. (51 mm) minimum and be stapled to maintain this position.

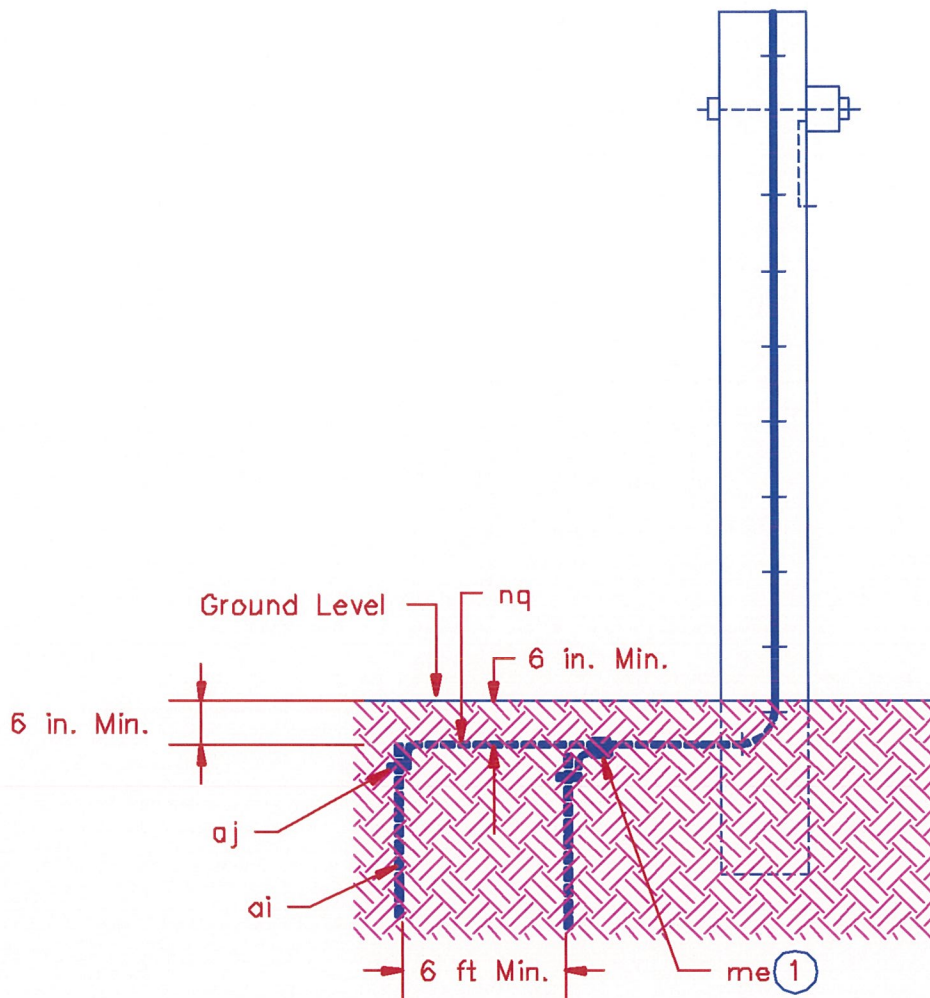
ITEMS	MATERIALS	NO. REQ'D
*nq	Wire, ground, bare, #6 AWG copper	as required
*al	Staples, ground wire	as required
RURAL TELECOMMUNICATIONS CONSTRUCTION PRACTICES POLE LIGHTNING PROTECTION ASSEMBLY		
Scale: NTS		March 2001
		PM1



Notes:

- ①. Ground wire should clear all hardware by 2 in. (51 mm) minimum and be stapled to maintain this position.
- ②. Staples on ground wire should be about 18 in. (457 mm) apart.

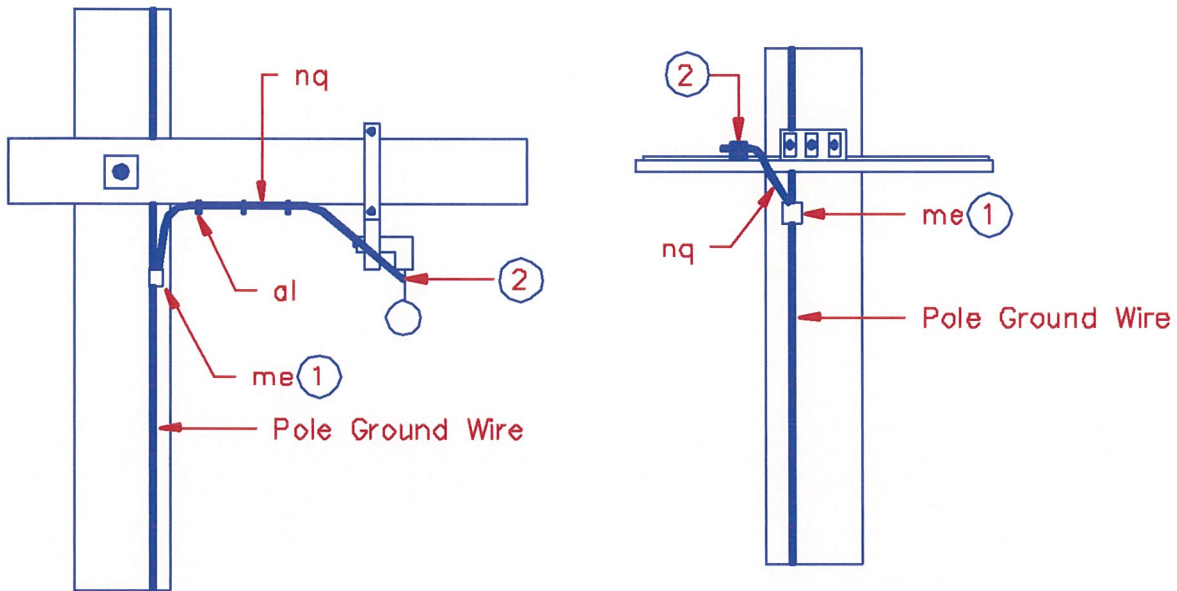
ITEMS	MATERIALS	NO. REQ'D
ai	Rod, ground, 1/2 in. x 5 ft (13 mm x 1.5 m)	1
aj	Clamp, ground rod	1
*nq	Wire, ground, bare, #6 AWG copper	as required
*al	Staples, ground wire	as required
RURAL TELECOMMUNICATIONS CONSTRUCTION PRACTICES POLE GROUND ASSEMBLY		
Scale: NTS		March 2001
		PM2



Notes:

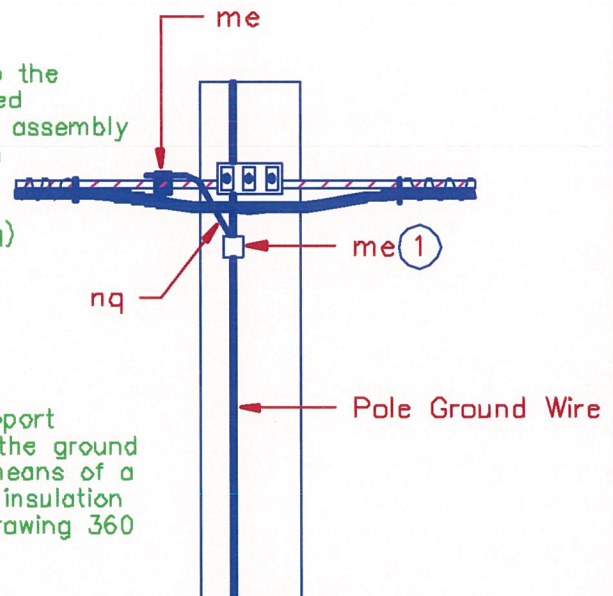
- ① Connector may be omitted if pole ground wire is extended to last ground rod.
- ② For converting English units to metric units use 1 in. = 25.4 mm and 1 ft = 0.3048 m.

ITEMS	MATERIALS	NO. REQ'D
ai	Rod, ground, 5/8 in. x 8 ft (16 mm x 2.4 m)	1
aj	Clamps, ground rod	1
*nq	Wire, ground, bare, #6 AWG copper	as required
me	Connector, grounding, compression type	1
RURAL TELECOMMUNICATIONS CONSTRUCTION PRACTICES AUXILIARY GROUND ROD ASSEMBLY		
Scale: NTS		March 2001
		PM2-1

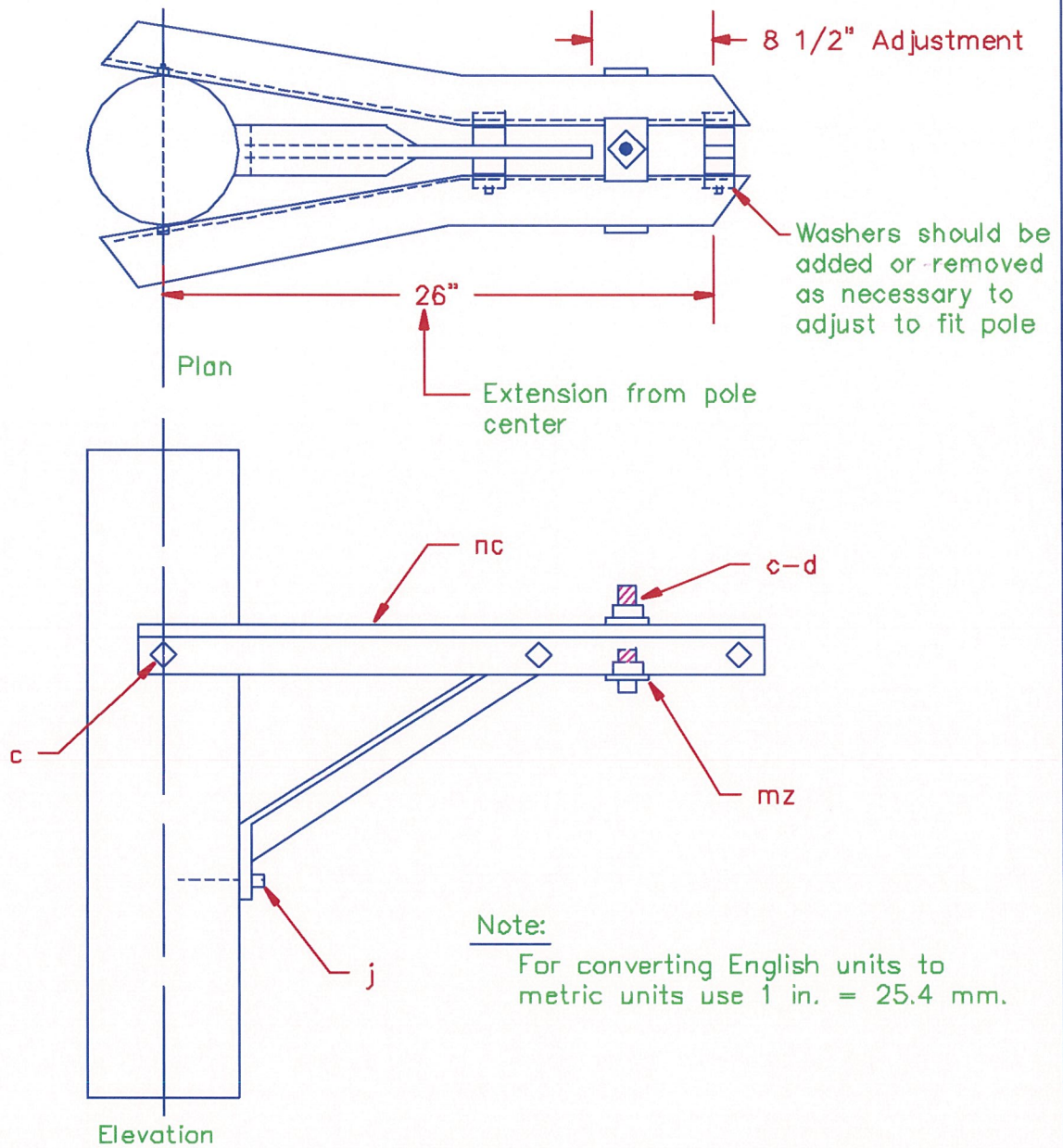


Notes:

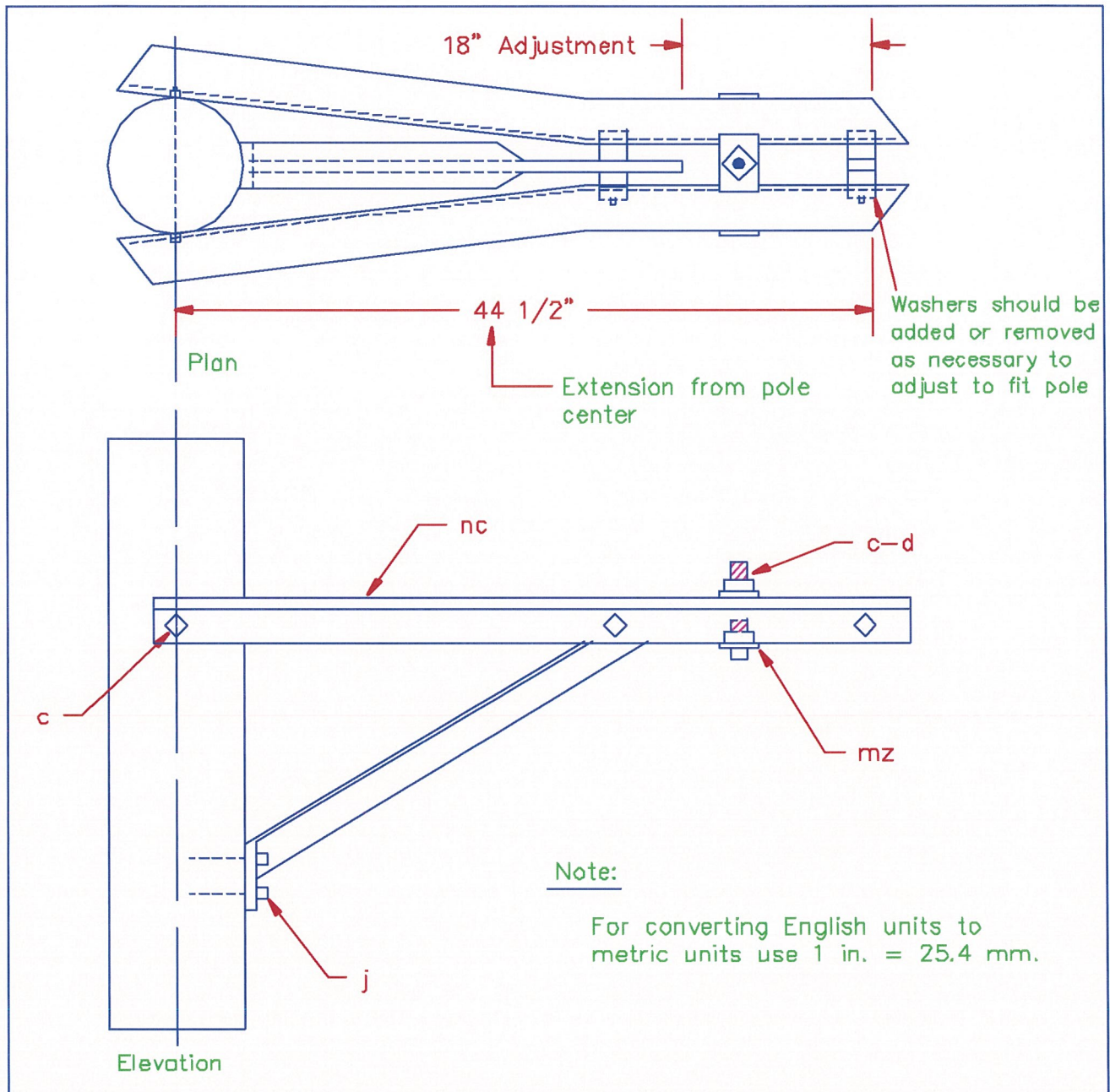
1. Ground wire (item nq) shall be connected to the vertical pole ground wire of the multigrounded power system neutral or to the pole ground assembly (PM2 unit). If a multigrounded power system neutral is present on the pole but there is no vertical pole ground wire, a sufficient length of bare #6 AWG copper wire (item nq) shall be left coiled and taped to permit it to be extended up the pole and connected to the multigrounded neutral by a representative of the power company.
2. Carefully remove the insulation from the support wire or the strand to permit connection of the ground wire to the support wire or the strand by means of a grounding connector (item me). Where the insulation is required to be restored, refer to Guide Drawing 360 for restoration details.



ITEMS	MATERIALS	NO. REQ'D
me	Connectors, grounding	2
*nq	Wire, ground, bare, #6 AWG copper	as required
*al	Staples, ground wire	as required
RURAL TELECOMMUNICATIONS CONSTRUCTION PRACTICES GROUND WIRE ASSEMBLY		
Scale: NTS		March 2001
		PM2A



ITEMS	MATERIALS	NO. REQ'D
*nc	Cable, extension arms, short	1
c	Bolts, machine, 5/8" x required length	2
mz	Clamps, cable, suspension	1
j	Screws, lag, 1/2" x 4"	1
d	Washers, flat, 2 1/4" x 2 1/4", 11/16" hole	1
RURAL TELECOMMUNICATIONS CONSTRUCTION PRACTICES CABLE EXTENSION ARM ASSEMBLY (SHORT)		
Scale: NTS		March 2001
		PM4

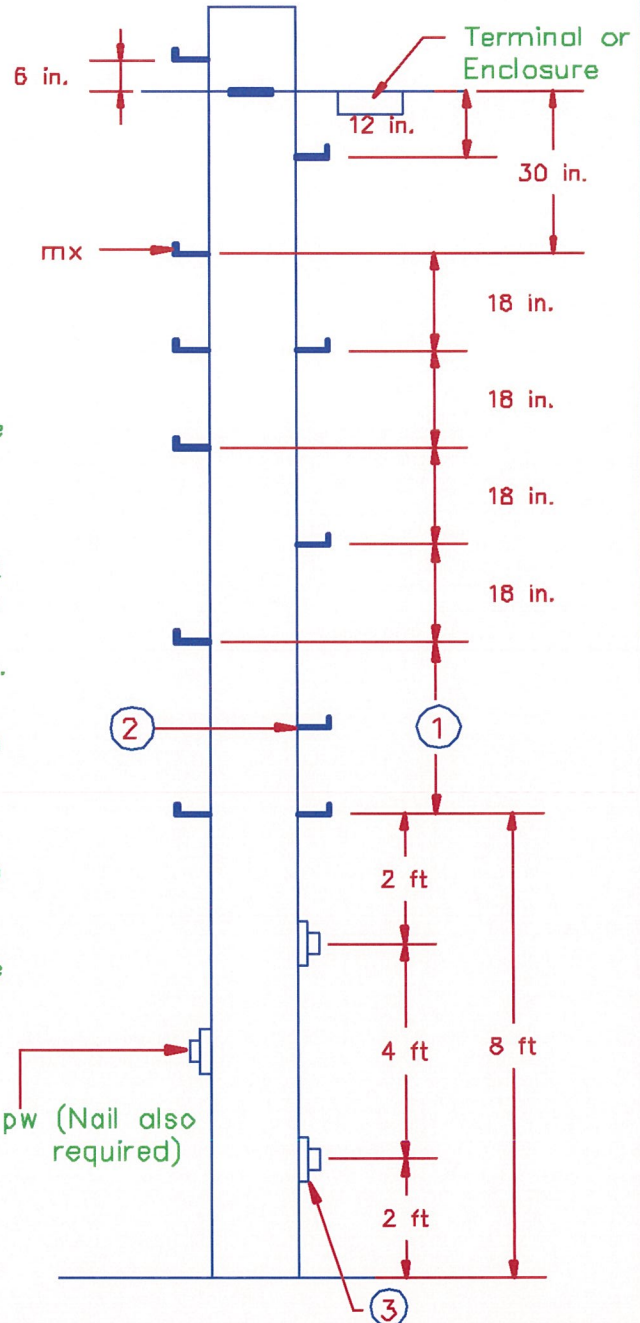


ITEMS	MATERIALS	NO. REQ'D
*nc	Cable, extension arms, long	1
c	Bolts, machine, 5/8" x required length	2
mz	Clamps, cable, suspension	1
j	Screws, lag, 1/2" x 4"	2
d	Washers, flat, 2 1/4" x 2 1/4", 11/16" hole	1
RURAL TELECOMMUNICATIONS CONSTRUCTION PRACTICES CABLE EXTENSION ARM ASSEMBLY (LONG)		
Scale: NTS		March 2001
		PM4A

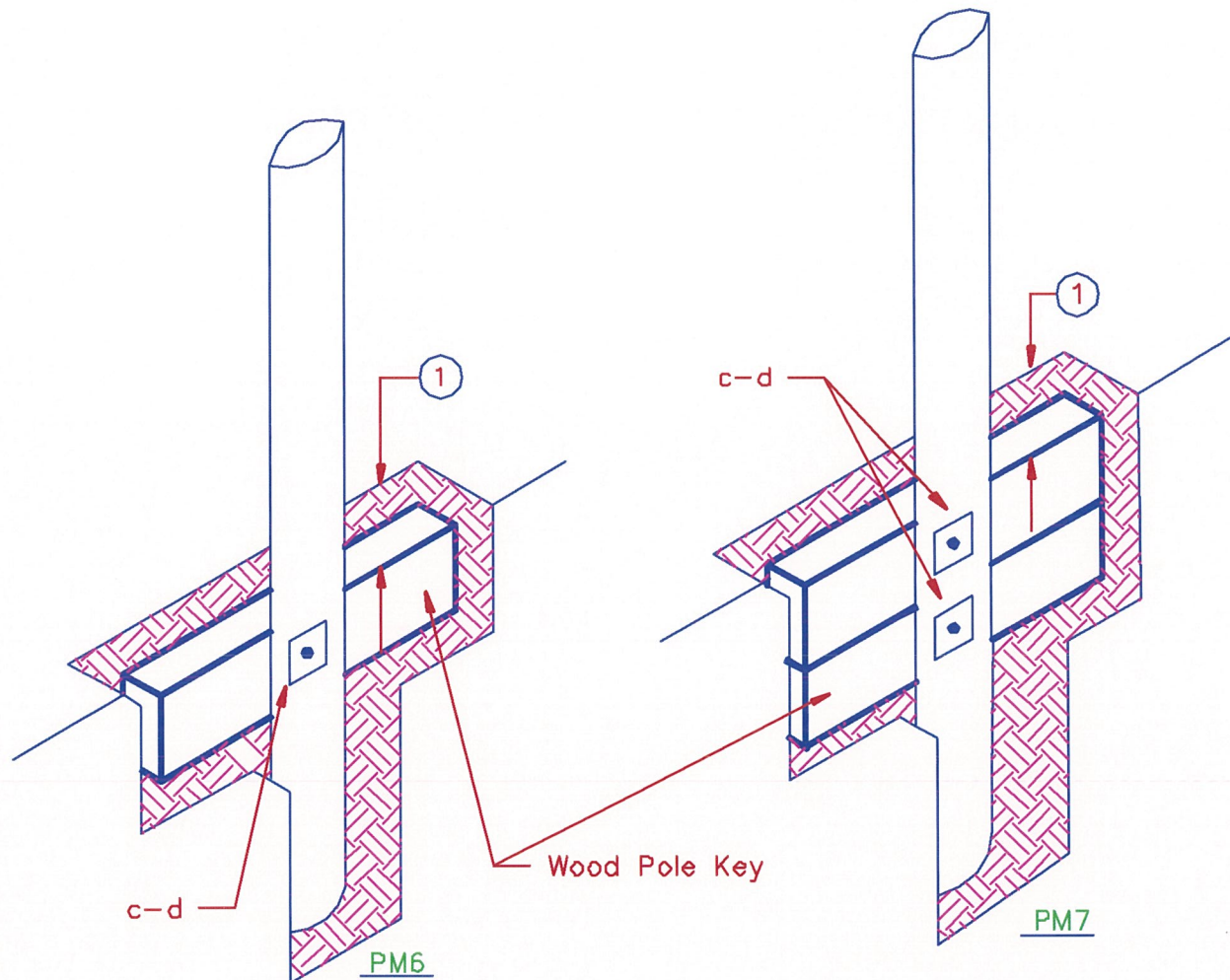
Pole Illustrated is 25 ft Pole Set 5 ft in soil
 with the Point of Attachment 13 in. from
 the Top of the Pole.

Notes:

- ①. Not more than 36 in. and not less than 18 in.
- ②. Place step 1/2 the distance between steps in Note 1.
- ③. The first pole plate below the 8 ft set of steps is to be placed on the same side of the pole as the first step above the 8 ft set.
- ④. When double steps occur at a point where the pole is less than 8 in. in diameter, place one of the steps about 1 in. below the opposite step.
- ⑤. Steps should be located in line with the lead unless otherwise specified by the Engineer.
- ⑥. 3/8 in. lead holes about 2 in. deep shall be bored in all species of poles to accommodate the lag screws used in mounting detachable step plates.
- ⑦. For converting English units to metric units use 1 in. = 25.4 mm and 1 ft = 0.3048 m.



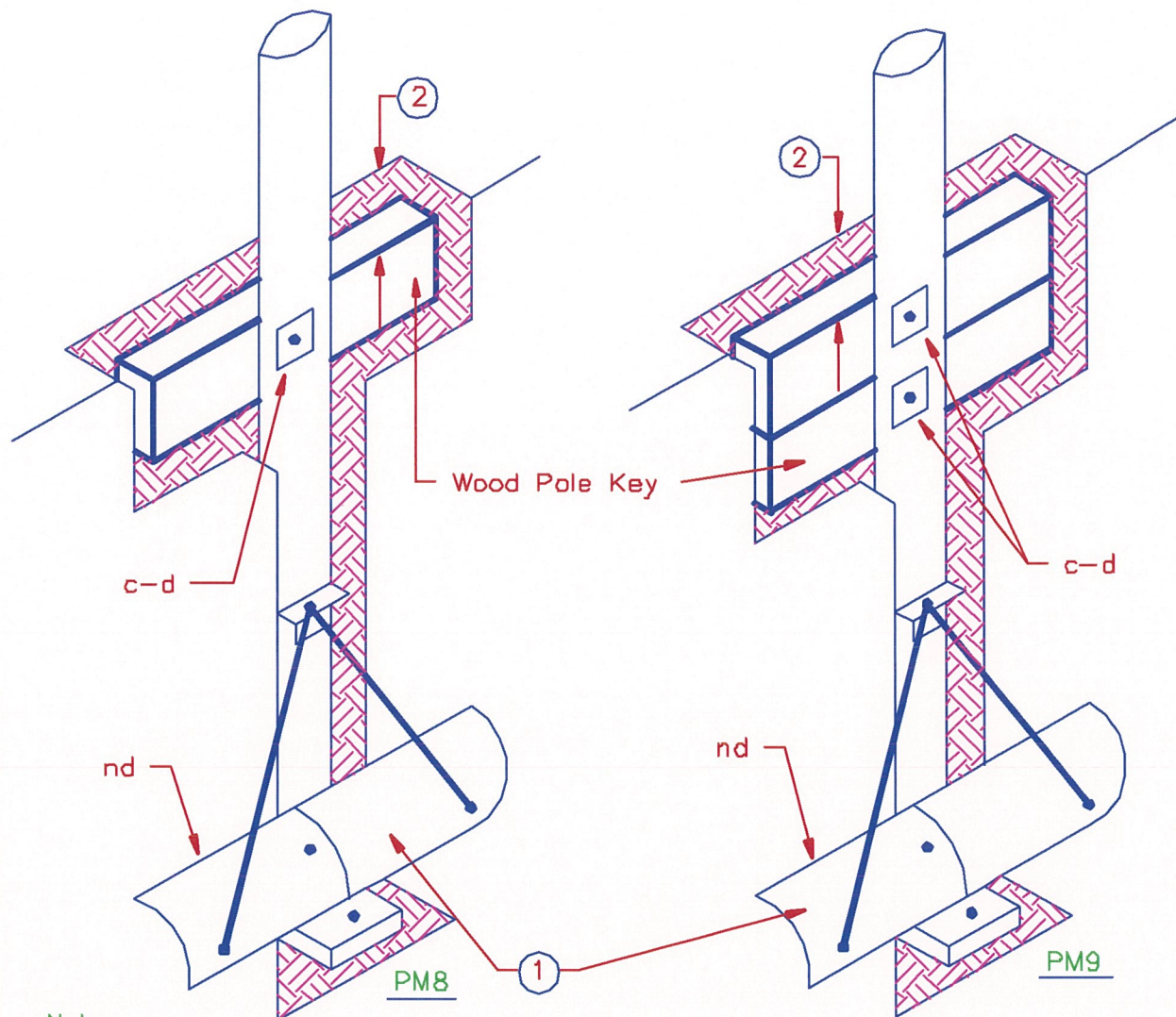
ITEMS	MATERIALS	NO. REQ'D
*mx	Steps, steel pole, 5/8 in. x 10 in.	as required
*pw	Steps, detachable pole (pole plate and lag screw only)	3
-	Nails, #20d galvanized	2
RURAL TELECOMMUNICATIONS CONSTRUCTION PRACTICES POLE STEPPING ASSEMBLY		
Scale: NTS		March 2001
		PM5



Notes:

1. Wood pole key should be placed 6 in. below the level of the ground.
2. For converting English units to metric units use 1 in. = 25.4 mm and 1 ft = 0.3048 m.

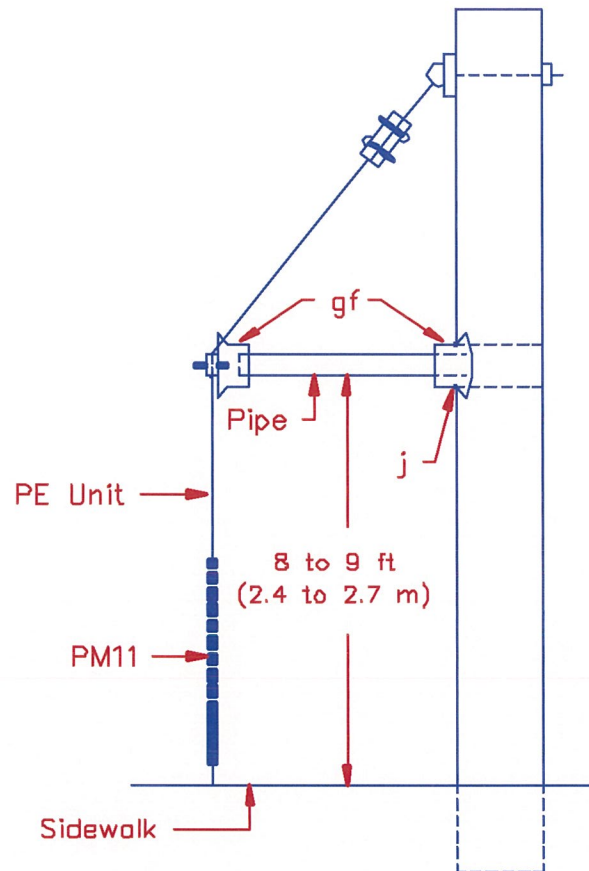
		PM6	PM7
ITEMS	MATERIALS	NO. REQ'D	NO. REQ'D
c	Bolts, machine, 5/8" x required length	1	2
d	Washers, 2 1/4" x 2 1/4" x 3/16", 11/16" hole	2	4
-	Key, pole, wood, treated, 3" x 12" x 3' 0"	1	2
		RURAL TELECOMMUNICATIONS CONSTRUCTION PRACTICES	
		POLE KEY ASSEMBLIES	
		Scale: NTS	March 2001
			PM6, PM7



Notes:

- ①. Metal pole key shown in expanded position.
- ②. Wood pole key should be placed 6 in. below the level of the ground.
- ③. For converting English units to metric units use
 1 in. = 25.4 mm and 1 ft = 0.3048 m.

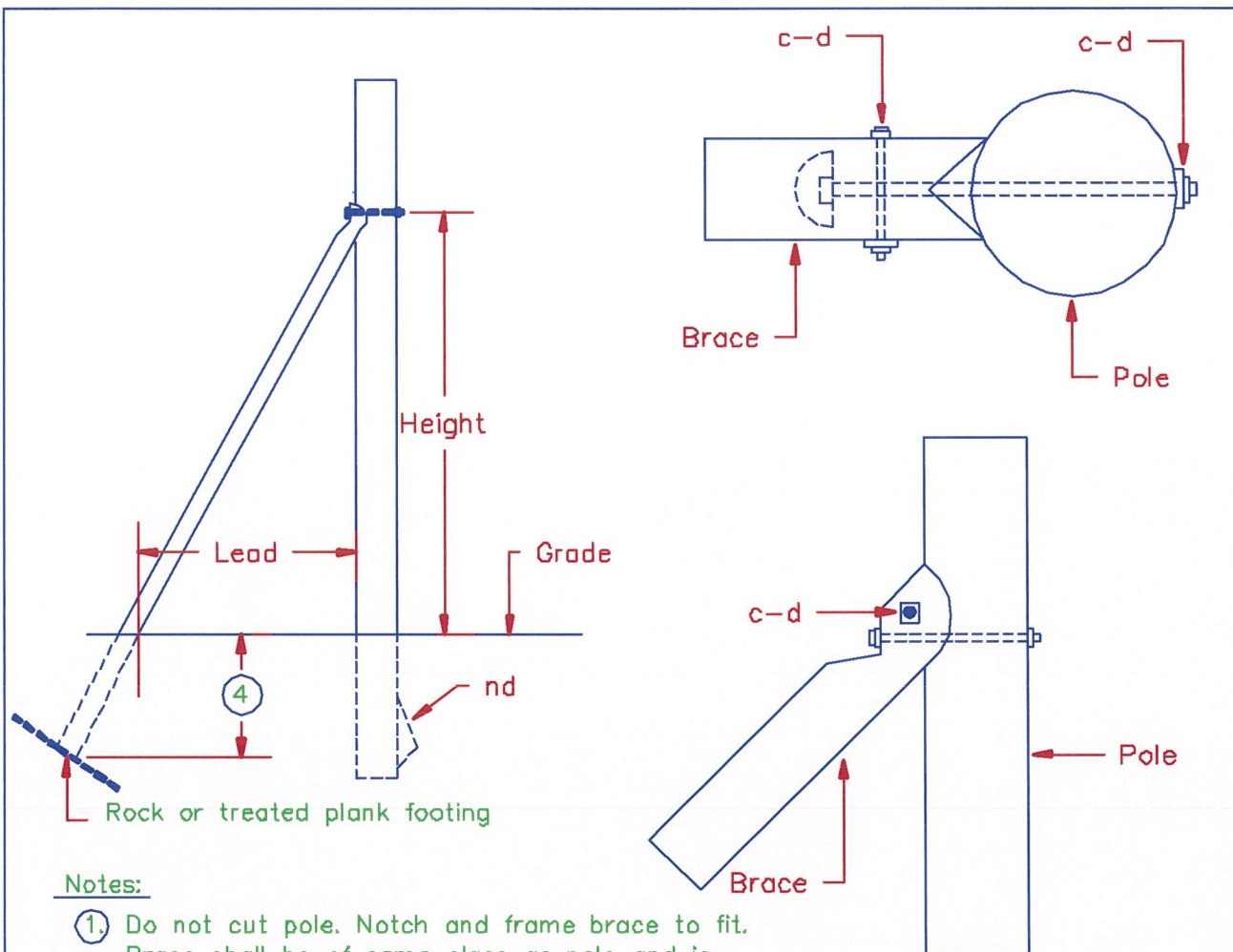
ITEMS	MATERIALS	PM8	PM9
		NO. REQ'D	NO. REQ'D
c	Bolts, machine, 5/8" x required length	1	2
d	Washers, 2 1/4" x 2 1/4" x 3/16", 11/16" hole	2	4
—	Key, pole, wood, treated, 3" x 12" x 3' 0"	1	2
*nd	Key, pole, metal	1	1
RURAL TELECOMMUNICATIONS CONSTRUCTION PRACTICES POLE KEY ASSEMBLIES			
		Scale: NTS	March 2001
			PM8, PM9



Note:

Where two guys are specified, the points of attachment of the two guy strands to the pole shall be separated by a minimum distance of 12 in. (305 mm) and the cable support clamp shall be placed on the thimbleye bolt for the lower guy.

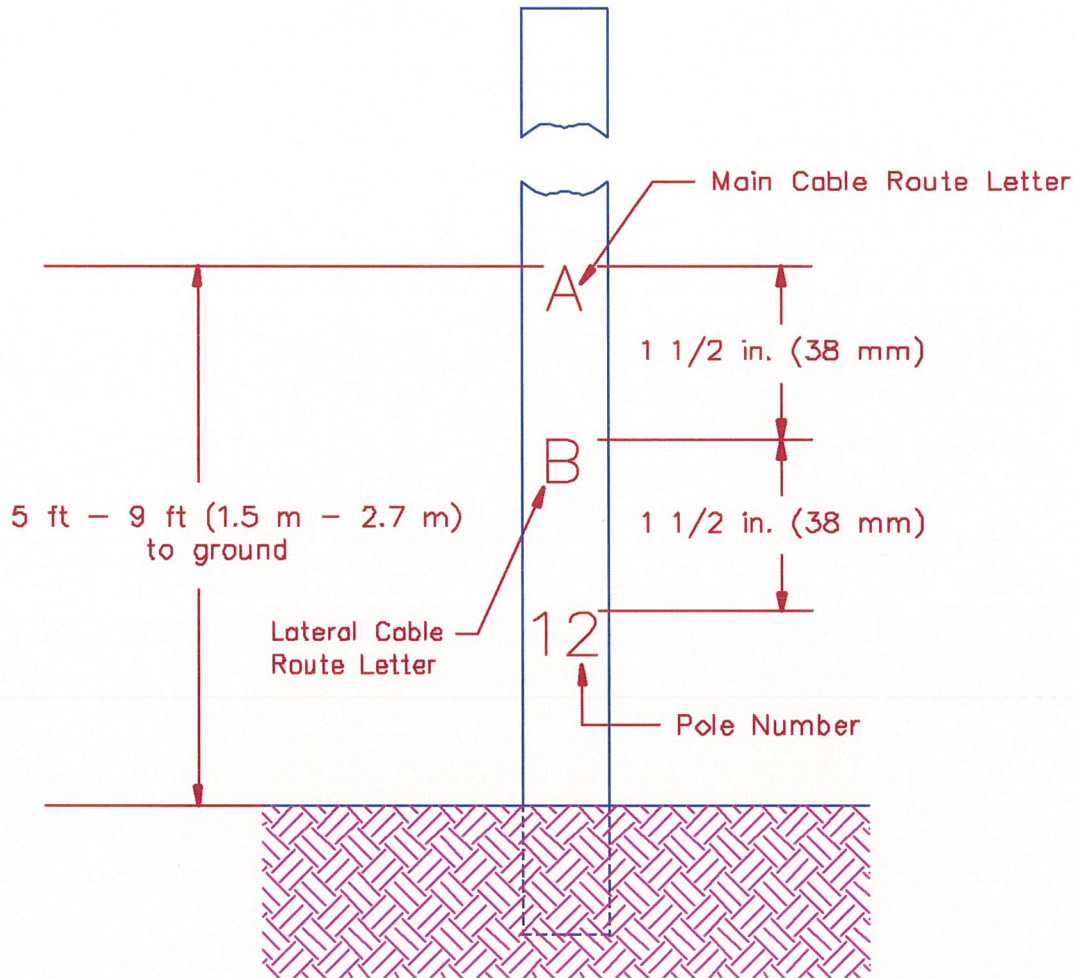
ITEMS	MATERIALS	NO. REQ'D
*gf	Fittings, sidewalk guy arm	2
j	Screws, lag, 1/2 in. x 3 in. (13 mm x 76 mm)	as required
—	Pipe, galvanized steel, 2 in. (51 mm) ID, unthreaded, length as specified	1
RURAL TELECOMMUNICATIONS CONSTRUCTION PRACTICES SIDEWALK GUY ARM ASSEMBLY		
Scale: NTS		March 2001
		PM12



Notes:

- ①. Do not cut pole. Notch and frame brace to fit. Brace shall be of same class as pole and is considered to be a pole unit.
- ②. Lead to height ratio not to be less than 1/3.
- ③. A prefabricated metal push brace bracket, item gb, installed in accordance with the manufacturer's recommendations may be used in lieu of the method shown.
- ④. Depth to be determined by Engineer.
- ⑤. For converting English units to metric units use 1 in. = 25.4 mm and 1 ft = 0.3048 m.

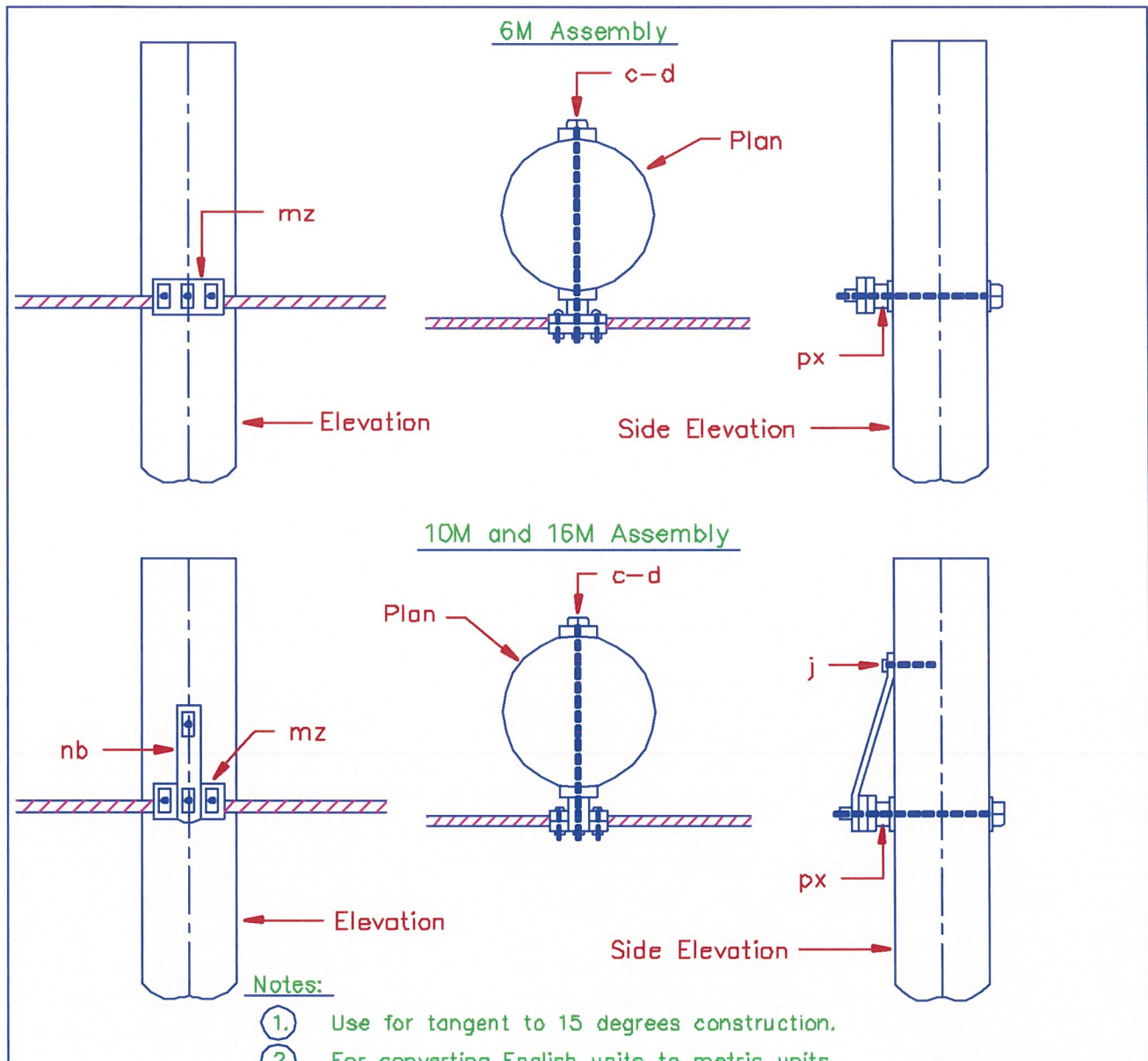
ITEMS	MATERIALS	NO. REQ'D
c	Bolts, machine, 5/8" x required length	2
d	Washers, 2 1/4" x 2 1/4" x 3/16", 11/16" hole	4
*nd	Key, metal, pole	1
—	Plank, treated, 3" x 12" x 3' 0"	1
*gb	Bracket, push brace	See note ③
RURAL TELECOMMUNICATIONS CONSTRUCTION PRACTICES PUSH BRACE ACCESSORIES		
Scale: NTS		March 2001
		PM14



Notes:

- ①. All numbers and letters shall be installed so that they will face the road.
- ②. Where other pole numbering schemes are used, the Engineer shall revise the above labeling.

ITEM	MATERIAL	NO. REQ'D
az	Numbers, pole, 1 1/2 in. (38 mm) high	as required
RURAL TELECOMMUNICATIONS CONSTRUCTION PRACTICES POLE MARKING		
Scale: NTS		March 2001
		PM52



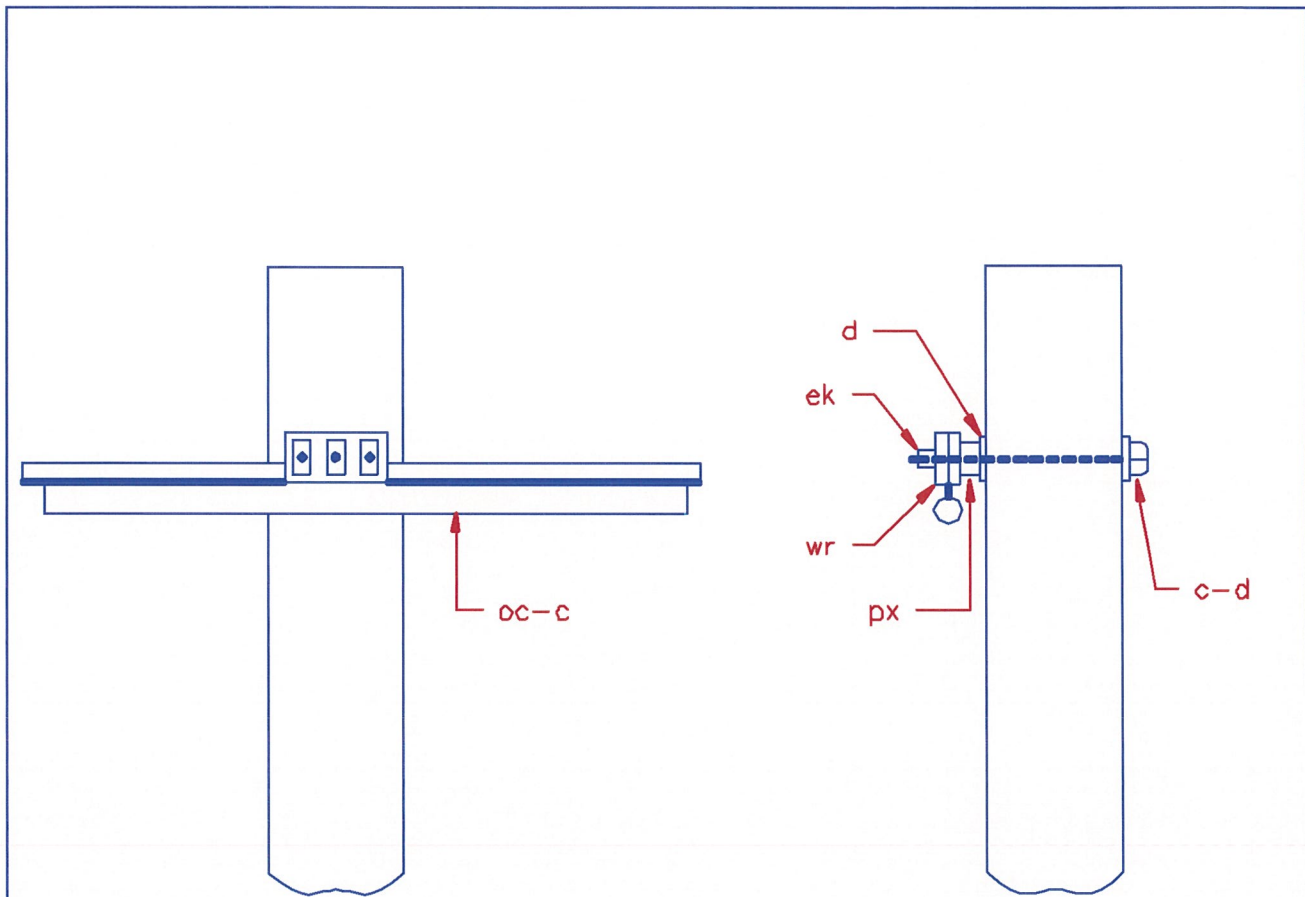
ITEMS	MATERIALS	6M	10M	16M
		NO. REQ'D	NO. REQ'D	NO. REQ'D
c	Bolts, machine, 5/8" x required length	1	1	1
d	Washers, curved, 2 1/2" x 2 1/2" x 3/16", 11/16" hole	2	2	2
j	Screws, lag, 1/2" x 4"	—	1	1
px	Nuts, regular square, 5/8"	1	1	1
mz	Clamps, cable, suspension	1	1	1
nb	Straps, suspension clamp, reinforcement	—	1	1

RURAL TELECOMMUNICATION CONSTRUCTION PRACTICES
SUSPENSION STRAND MOUNTING

Scale: NTS

March 2001

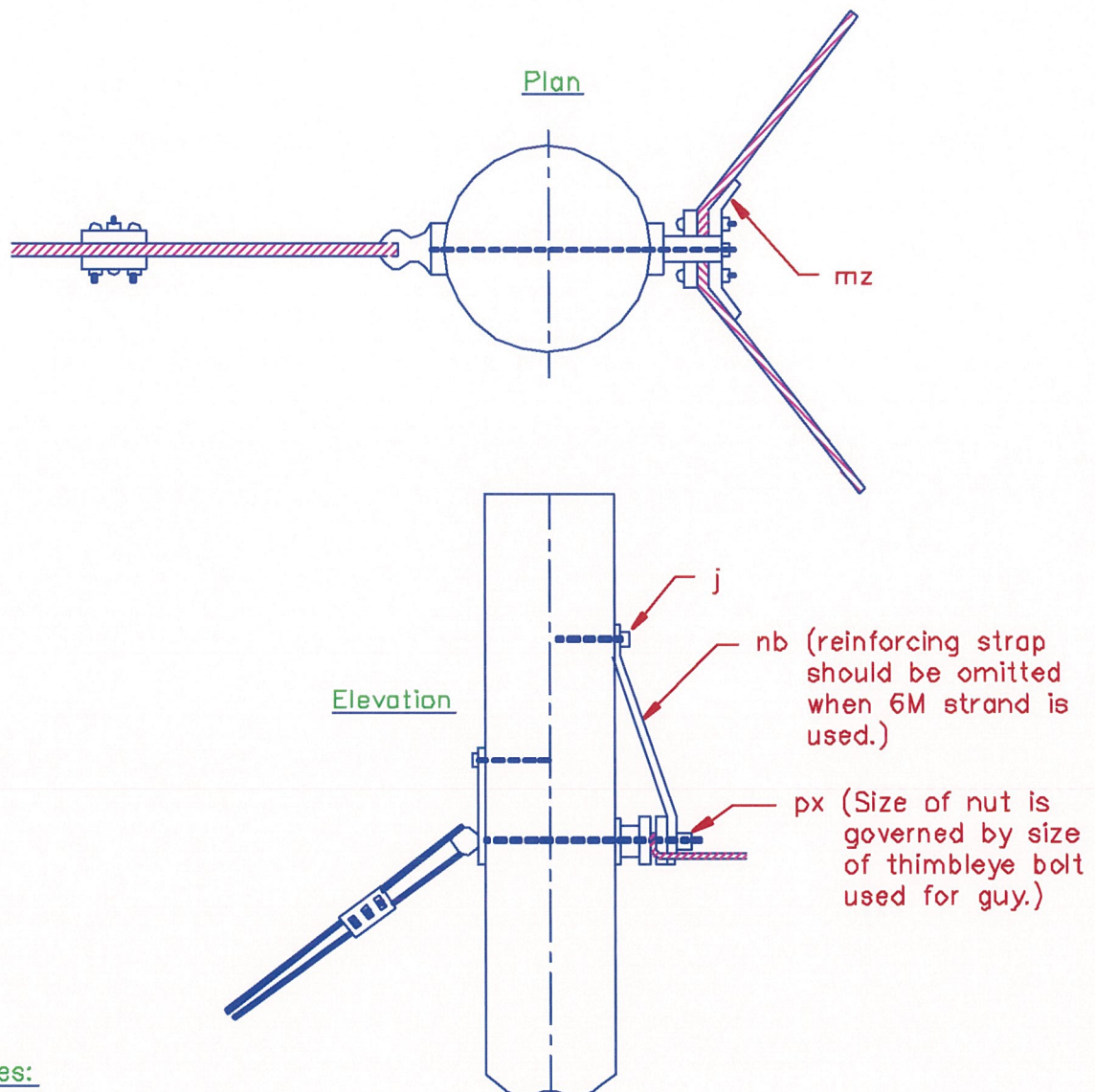
201



Notes:

- ① Use for corners from 0 to 20 degrees.
- ② Place cable in clamp without removing support wire insulation or slitting web.
- ③ For converting English units to metric units use 1 in. = 25.4 mm.

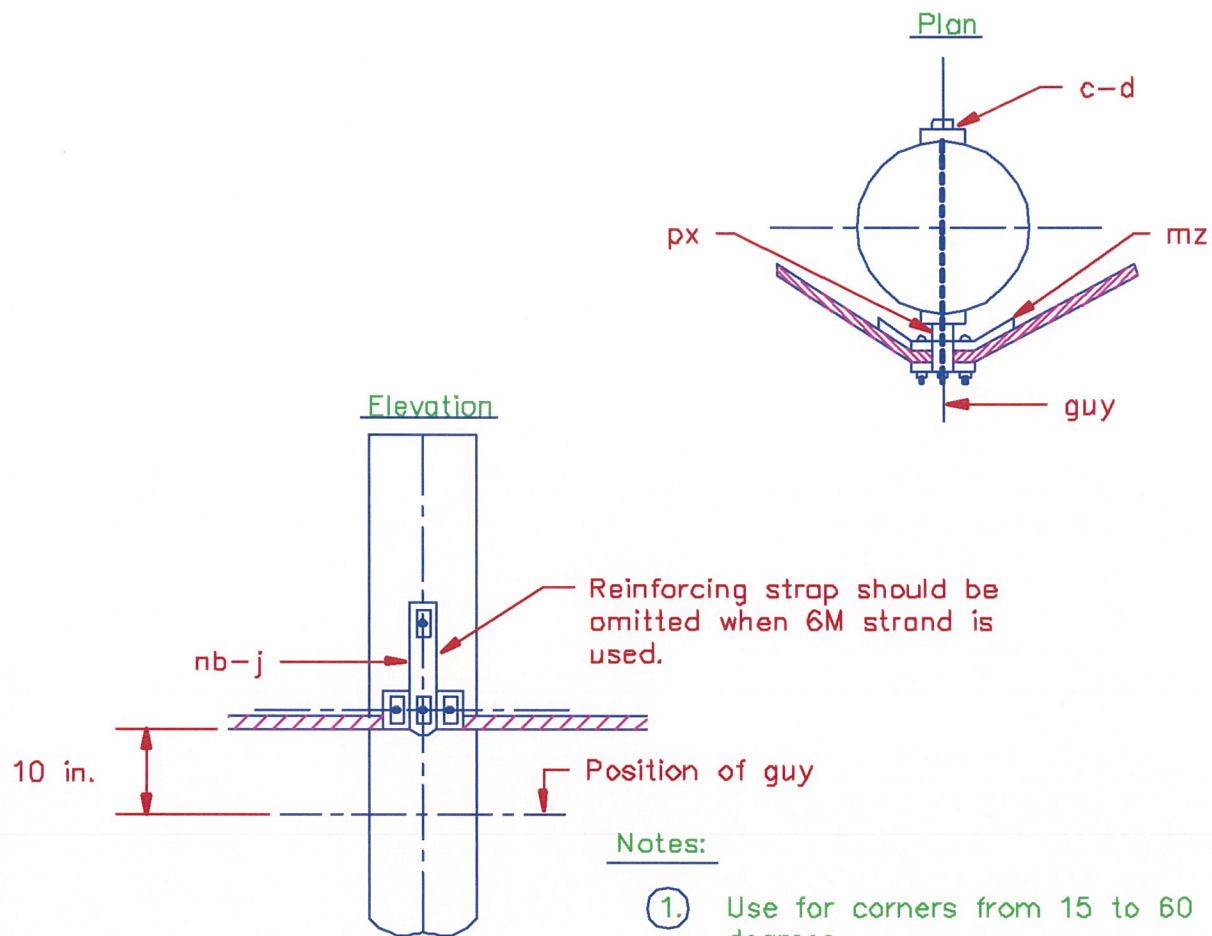
ITEMS	MATERIALS	NO. REQ'D
oc-c	Cable, filled, fiber optic, self-supporting (figure 8 design)	as required
*wr	Clamp, support, self-supporting, cable	1
c	Bolt, machine, 5/8" x required length	1
d	Washers, 2 1/4" x 2 1/4" x 3/16", 11/16" hole	2
px	Nut, square	1
ek	Locknut, 5/8"	1
RURAL TELECOMMUNICATIONS CONSTRUCTION PRACTICES SELF-SUPPORTING FILLED FIBER OPTIC CABLE SUPPORT		
		Scale: NTS
		March 2001
		201-1



Notes:

- ① Use for corners from 15 to 60 degrees.
- ② See guy assembly drawings for guying, materials.

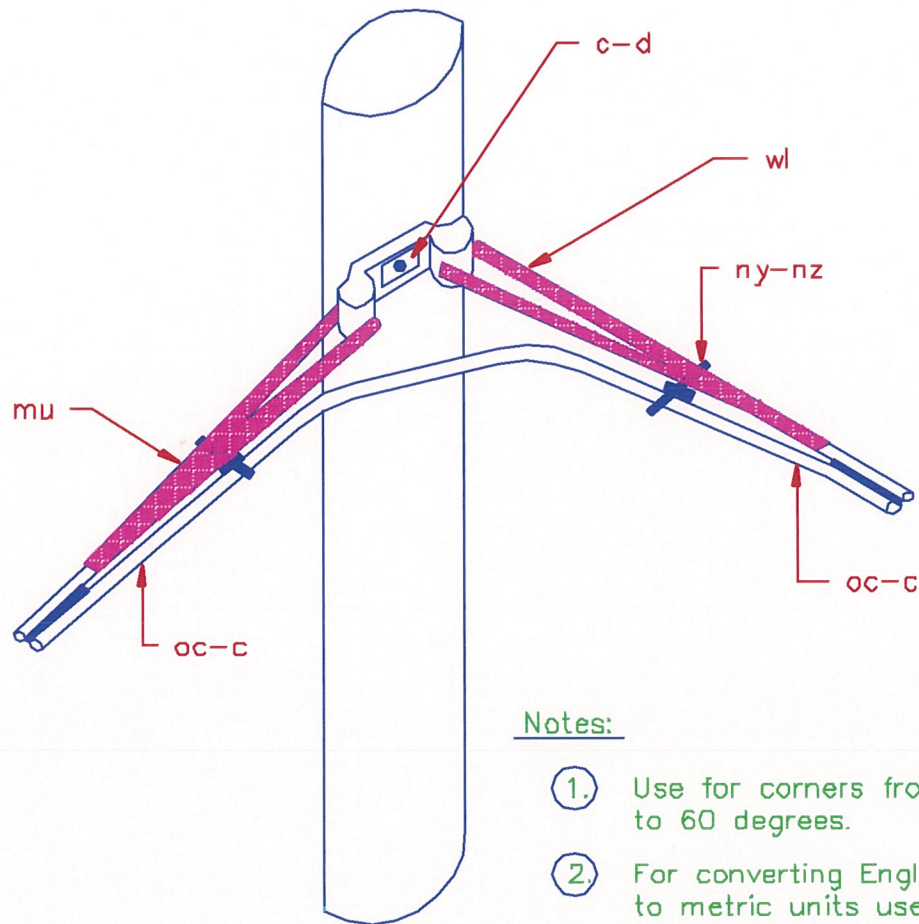
		6M	10M	16M
ITEMS	MATERIALS	NO. REQ'D	NO. REQ'D	NO. REQ'D
j	Screws, lag, 1/2 in x 4 in. (13 mm x 102 mm)	—	1	1
px	Nuts, regular square	1	1	1
mz	Clamps, corner suspension	1	1	1
nb	Straps, suspension clamp, reinforcement	—	1	1
		RURAL TELECOMMUNICATIONS CONSTRUCTION PRACTICES SUSPENSION STRAND MOUNTING (PULL AWAY FROM POLE)		
		Scale: NTS		March 2001
				202



Notes:

- ① Use for corners from 15 to 60 degrees.
- ② For converting English units to metric units use 1 in. = 25.4 mm.

ITEMS	MATERIALS	6M	10M	16M
		NO. REQ'D	NO. REQ'D	NO. REQ'D
c	Bolts, machine, 5/8" x required length	1	1	—
d	Washers, curved, 2 1/2" x 2 1/2" x 3/16", 11/16" hole	1	1	—
px	Nuts, regular square, 5/8"	1	1	—
j	Screws, lag, 1/2" x 4"	—	1	1
nb	Straps, suspension clamp, reinforcement	—	1	1
mz	Clamps, corner suspension	1	1	1
c	Bolts, machine, 3/4" x required length	—	—	1
d	Washers, curved, 3" x 3" x 1/4", 13/16" hole	—	—	2
px	Nuts, regular square, 3/4"	—	—	1
RURAL TELECOMMUNICATIONS CONSTRUCTION PRACTICES SUSPENSION STRAND MOUNTING (PULL AGAINST POLE)				
		Scale: NTS	March 2001	
			202-1	



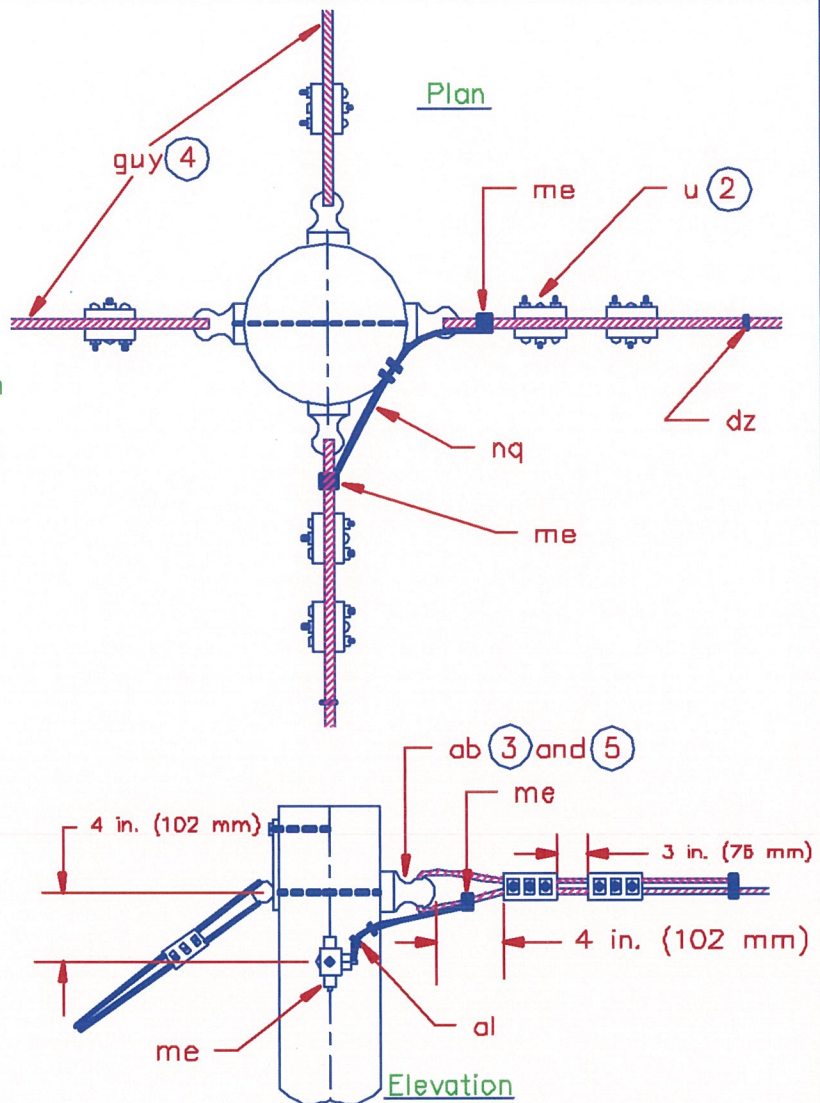
Notes:

- ① Use for corners from 20 to 60 degrees.
- ② For converting English units to metric units use
1 in. = 25.4 mm.

ITEMS	MATERIALS	NO. REQ'D
oc-c	Cable, filled, fiber optic, self-supporting (figure 8 design)	as required
*wl	Support, double deadend	1
*mu	Sleeves, splicing (deadending, preformed or automatic type)	2
*ny	Spacers, cable	2
*nz	Supports, lashed cable	2
d	Washers, 2 1/4" x 2 1/4" x 3/16", 11/16" hole	1
c	Bolts, machine, 5/8" x required length	1
RURAL TELECOMMUNICATIONS CONSTRUCTION PRACTICES SELF-SUPPORTING FILLED FIBER OPTIC CABLE SUPPORT, CORNER		
Scale: NTS		March 2001
		202-3

Notes:

1. Use for corners from 60 to 90 degrees.
2. An equivalent terminating device (mu) rated to provide the strength of the appropriate suspension strand may be used in lieu of 3-bolt guy clamps listed.
3. Square nut under eye nut may be omitted when length of bolt thread extending beyond pole is short enough to permit turning eye nut down to curved washer without interfering with the placing of strand.
4. Refer to guy assembly drawings PE1-2, -3, -4; PE1-2G, -3G, -4G; PE2-2, -3, -4; and PE2-2G, -3G, -4G for for guying materials.
5. Size of thimbleye nut is governed by size of thimbleye bolt used for guys.



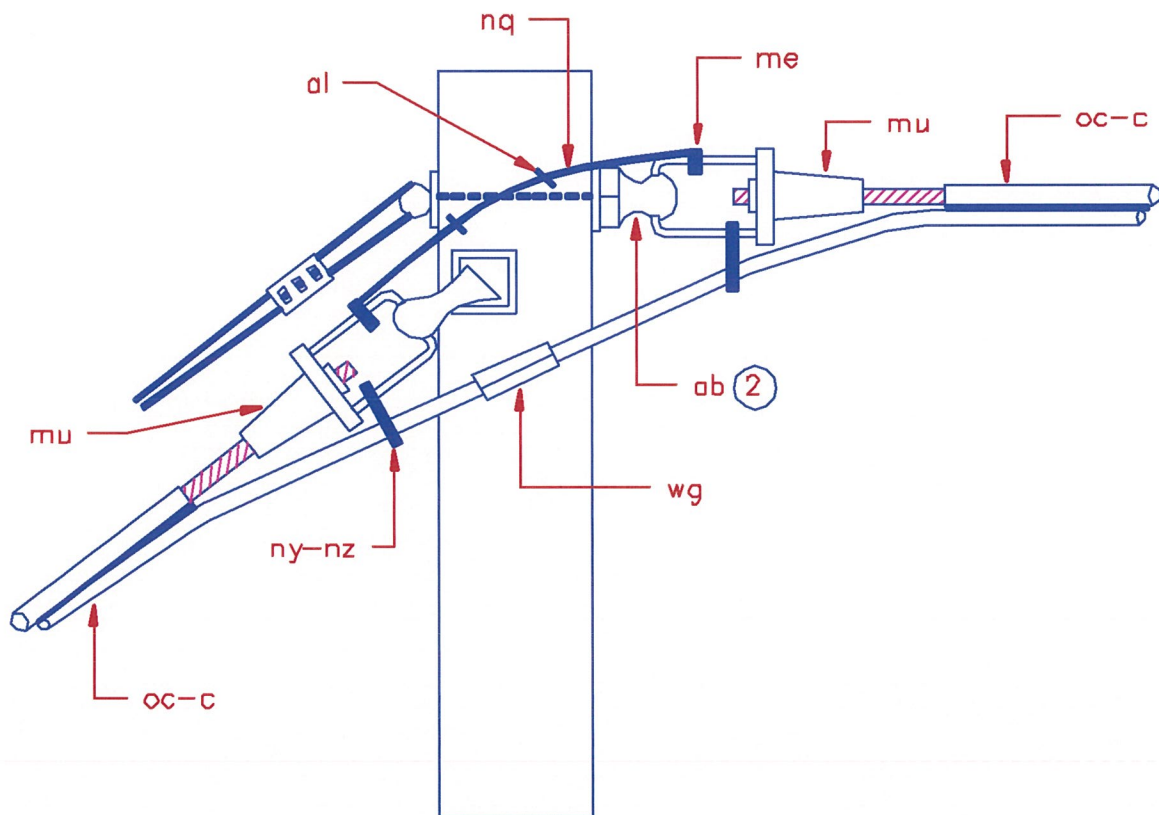
ITEMS	MATERIALS	6M	10M	16M
		NO. REQ'D	NO. REQ'D	NO. REQ'D
u	Clamps, guy, 3-bolt	1	1	2
ab	Nuts, thimbleye	1	1	1
*dz	Clips, guy	1	1	1
me	Connectors, grounding	2	2	2
*al	Staples, ground wire	as req'd	as req'd	as req'd
*nq	Wire, ground, bare, #6 AWG copper	as req'd	as req'd	as req'd

RURAL TELECOMMUNICATIONS CONSTRUCTION PRACTICES
SUSPENSION STRAND MOUNTING (CORNERS)

Scale: NTS

March 2001

203



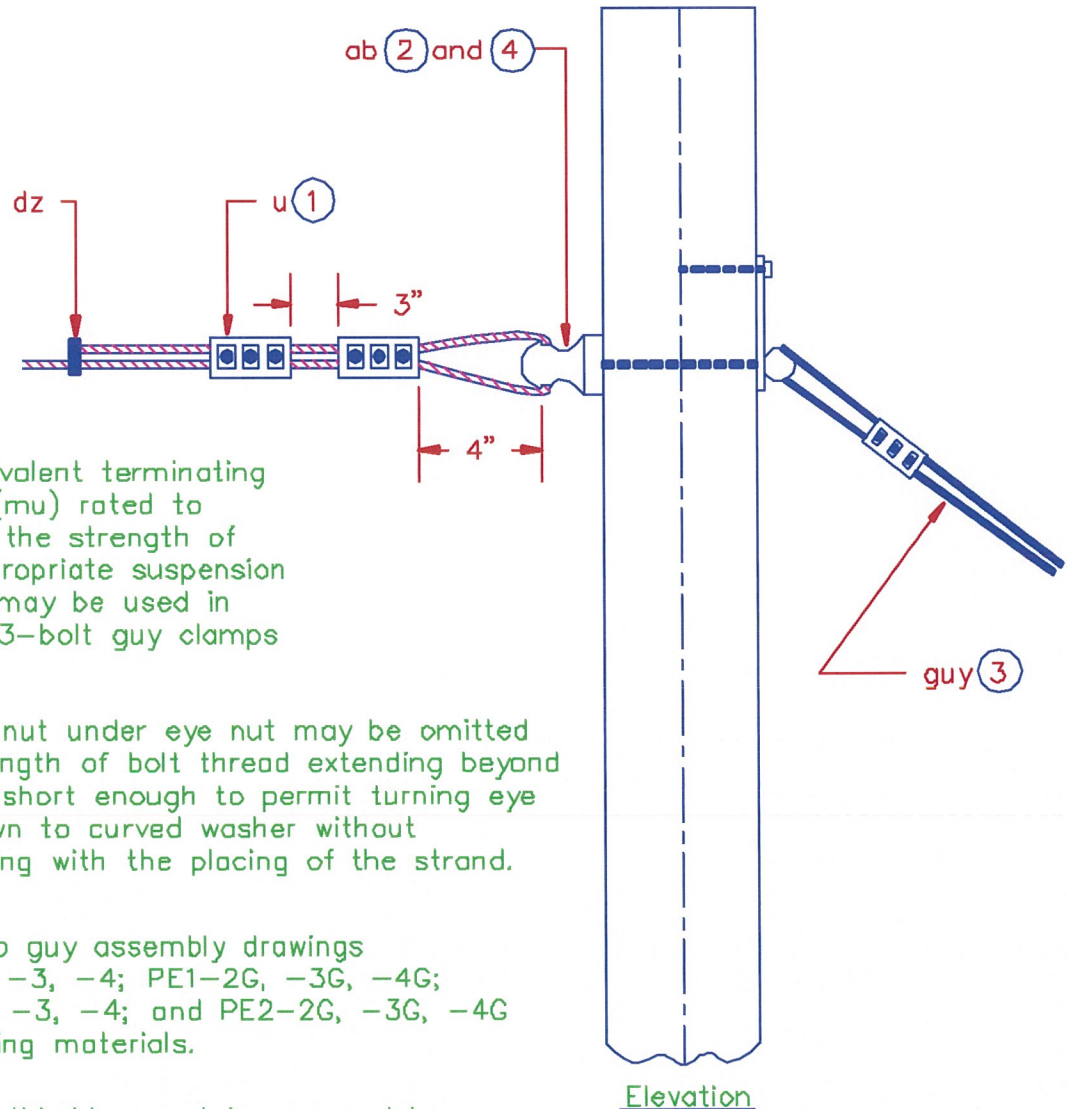
Notes:

- ①. Use for corners from 60 to 90 degrees.
- ②. Size of thimbleye nut is governed by size of thimbleye bolt used for guy.

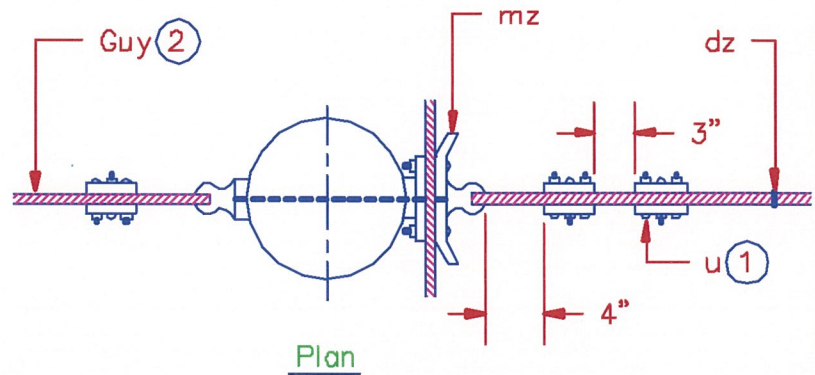
ITEMS	MATERIALS	NO. REQ'D
oc-c	Cable, filled, fiber optic, self-supporting (figure 8 design)	as required
*mu	Sleeves, splicing (deadending, preformed or automatic type)	2
*ny	Spacers, cable	2
*nz	Supports, lashed cable	2
wg	Guard, plastic, cable	1
*nq	Wire, ground, bare, #6 AWG copper	as required
me	Connectors, grounding	2
ab	Nuts, thimbleye	2
*al	Staples, ground wire	as required
RURAL TELECOMMUNICATIONS CONSTRUCTION PRACTICES SELF-SUPPORTING FILLED FIBER OPTIC CABLE SUPPORT, CORNER		
Scale: NTS		March 2001
		203-1

Notes:

- ①. An equivalent terminating device (mu) rated to provide the strength of the appropriate suspension strand may be used in lieu of 3-bolt guy clamps listed.
- ②. Square nut under eye nut may be omitted when length of bolt thread extending beyond pole is short enough to permit turning eye nut down to curved washer without interfering with the placing of the strand.
- ③. Refer to guy assembly drawings PE1-2, -3, -4; PE1-2G, -3G, -4G; PE2-2, -3, -4; and PE2-2G, -3G, -4G for guying materials.
- ④. Size of thimbleye nut is governed by the size of the thimbleye bolt used for the guys.
- ⑤. For converting English units to metric units use 1 in. = 25.4 mm.

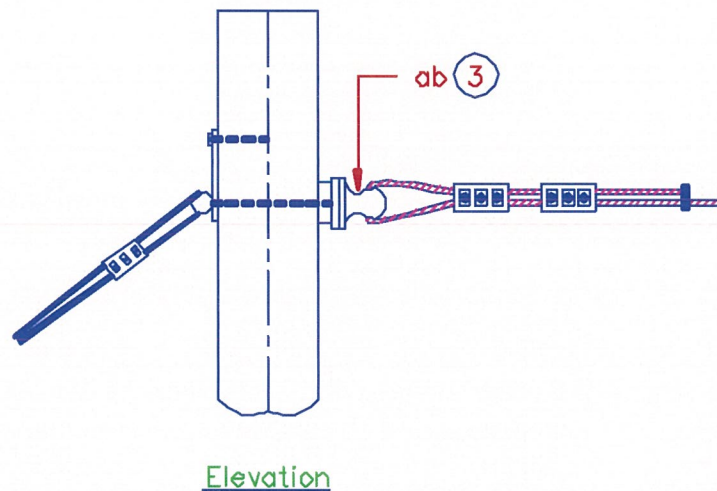


		6M	10M	16M
ITEMS	MATERIALS	NO. REQ'D	NO. REQ'D	NO. REQ'D
u	Clamps, guy, 3-bolt	1	1	2
ab	Nuts, thimbleye	1	1	1
*dz	Clips, guy	1	1	1
		RURAL TELECOMMUNICATIONS CONSTRUCTION PRACTICES SUSPENSION STRAND DEADEND		
		Scale: NTS	March 2001	
			204	

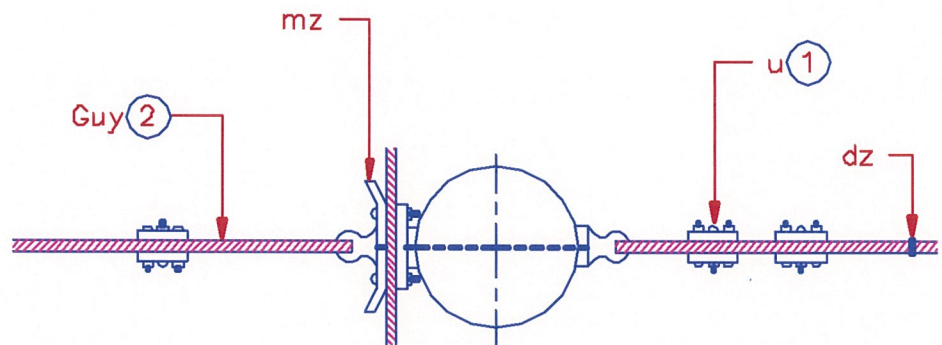


Notes:

- ①. An equivalent terminating device (mu) rated to provide the strength of the appropriate suspension strand may be used in lieu of 3-bolt guy clamps listed.
- ②. Refer to guy assembly drawings PE1-2, -3, -4; PE1-2G, -3G, -4G; PE2-2, -3, -4; and PE2-2G, -3G, -4G for guying materials.
- ③. Size of thimbleye nut is governed by the size of the thimbleye bolt used for the guys.
- ④. For converting English units to metric units use 1 in. = 25.4 mm.

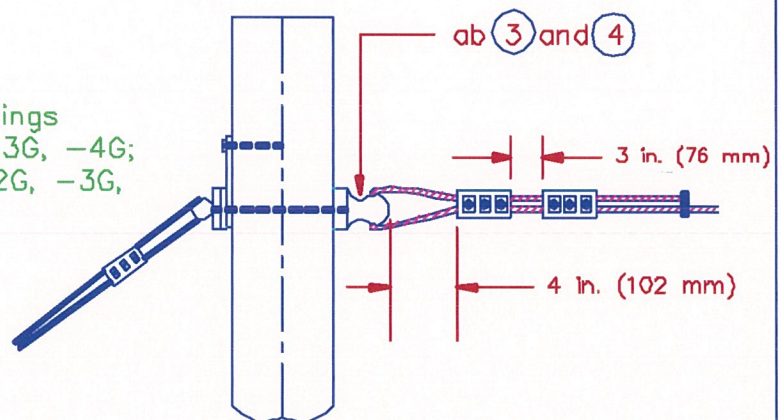


		6M	10M	16M
ITEMS	MATERIALS	NO. REQ'D	NO. REQ'D	NO. REQ'D
u	Clamps, guy, 3-bolt	1	1	2
ab	Nuts, thimbleye	1	1	1
*dz	Clips, guy	1	1	1
mz	Clamps, suspension, corner	1	1	1
		RURAL TELECOMMUNICATIONS CONSTRUCTION PRACTICES BRANCH SUSPENSION STRAND		
		Scale: NTS		March 2001
				206

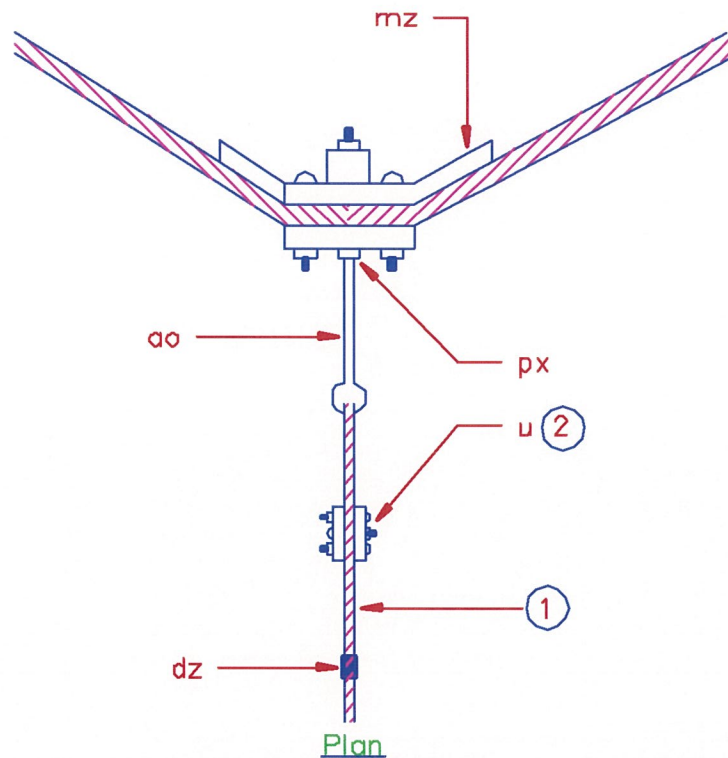


Notes:

- ①. An equivalent terminating device (mu) rated to provide the strength of the appropriate suspension strand may be used in lieu of 3-bolt guy clamps listed.
- ②. Refer to guy assembly drawings PE1-2, -3, -4; PE1-2G, -3G, -4G; PE2-2, -3, -4; and PE2-2G, -3G, -4G for guying materials.
- ③. Size of the thimbleye nut is governed by the size of the thimbleye bolt used for the guys.
- ④. Square nut under eye nut may be omitted when length of bolt thread extending beyond pole is short enough to permit turning eye nut down to curved washer without interfering with the placing of strand.



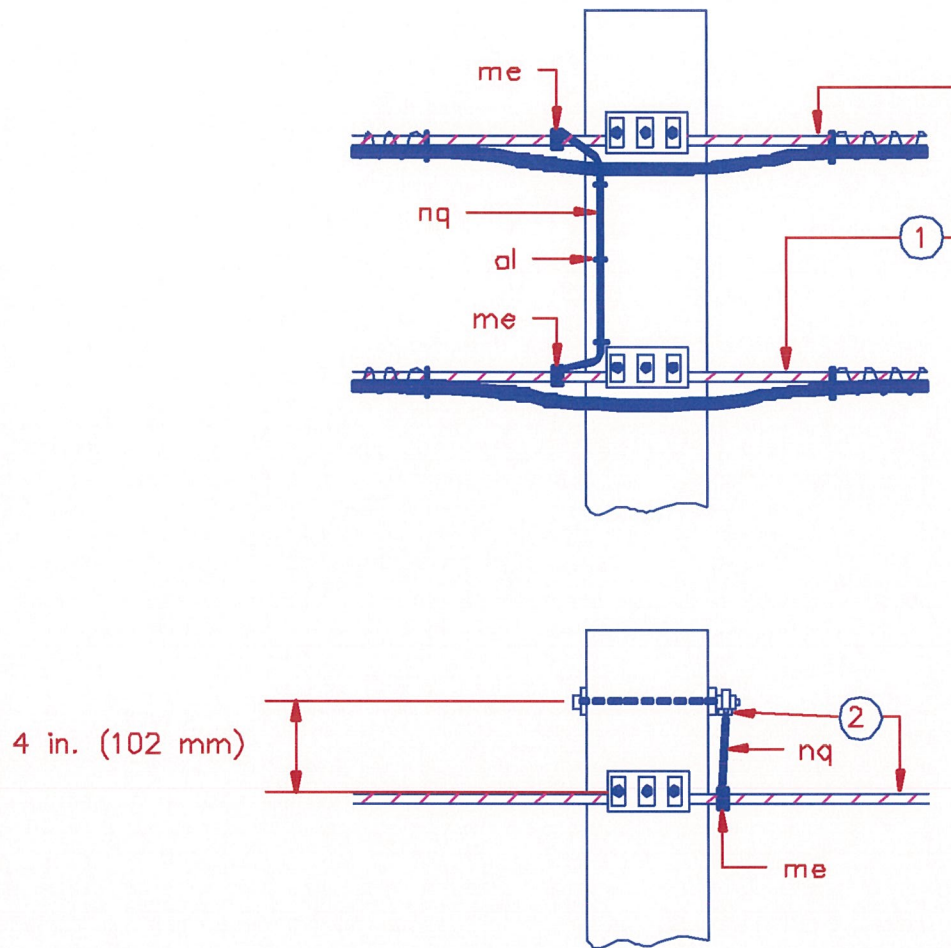
		6M	10M	16M
ITEMS	MATERIALS	NO. REQ'D	NO. REQ'D	NO. REQ'D
u	Clamps, guy, 3-bolt	1	1	2
ab	Nuts, thimbleye	1	1	1
*dz	Clips, guy	1	1	1
mz	Clamps, suspension, corner	1	1	1
		RURAL TELECOMMUNICATIONS CONSTRUCTION PRACTICES BRANCH SUSPENSION STRAND		
		Scale: NTS		March 2001
				207



Notes:

- ① Assembly unit designations refer to this strand.
- ② An equivalent terminating device (mu) rated to provide the strength of the appropriate suspension strand may be used in lieu of 3-bolt guy clamps listed.

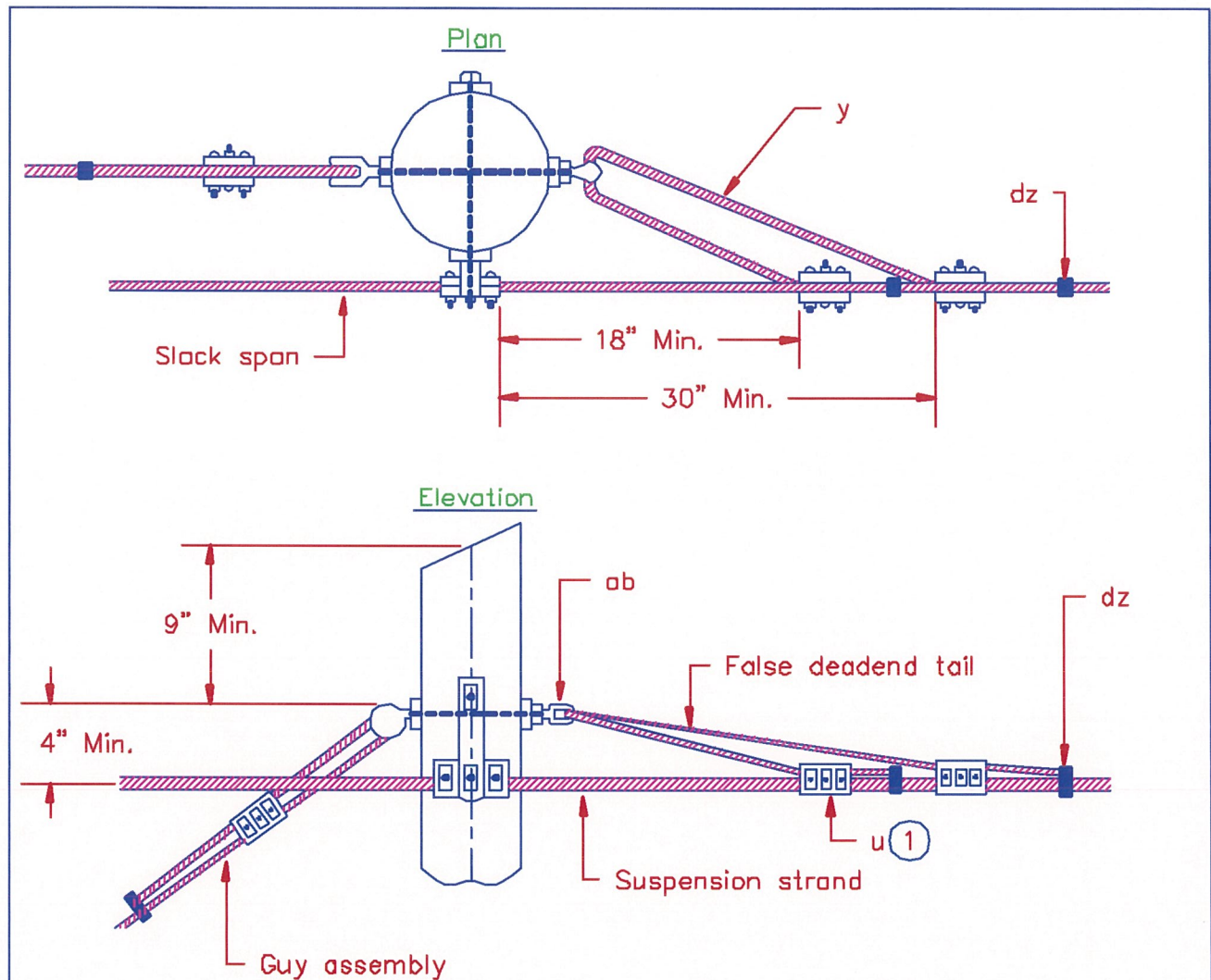
		6M	10M	16M
		NO. REQ'D	NO. REQ'D	NO. REQ'D
ITEMS	MATERIALS			
mz	Clamps, corner suspension	1	1	1
u	Clamps, guy, 3-bolt	1	1	2
*dz	Clips, guy	—	—	1
ao	Bolts, thimbleye, 3/4 in. (19 mm) diameter	—	—	1
ao	Bolts, thimbleye, 5/8 in. (16 mm) diameter	1	1	—
px	Nuts, regular square, 5/8 in. (16 mm)	1	1	—
px	Nuts, regular square, 3/4 in. (19 mm)	—	—	1
RURAL TELECOMMUNICATIONS CONSTRUCTION PRACTICES SUSPENSION STRAND PULL-OFF				
		Scale: NTS	March 2001	
			208	



Notes:

- ①. On pole lines carrying two strand-mounted cable leads and paralleling each other, the suspension strands shall be bonded at each end of the joint section and at approximately 1/4-mile (402 m) intervals as directed by the Engineer.
- ②. Where two cable leads cross each other at a pole, the two strands shall be bonded as shown.

ITEMS	MATERIALS	NO. REQ'D
me	Connectors, grounding	2
*nq	Wire, ground, bare, #6 AWG copper	as required
*al	Staples, ground wire	as required
RURAL TELECOMMUNICATIONS CONSTRUCTION PRACTICES SUSPENSION STRAND BONDING		
Scale: NTS		March 2001
		209-1



Notes:

- ①. An equivalent terminating device (mu) rated to provide the strength of the appropriate suspension strand may be used in lieu of 3-bolt guy clamps listed.
- ②. For converting English units to metric units use 1 in. = 25.4 mm.

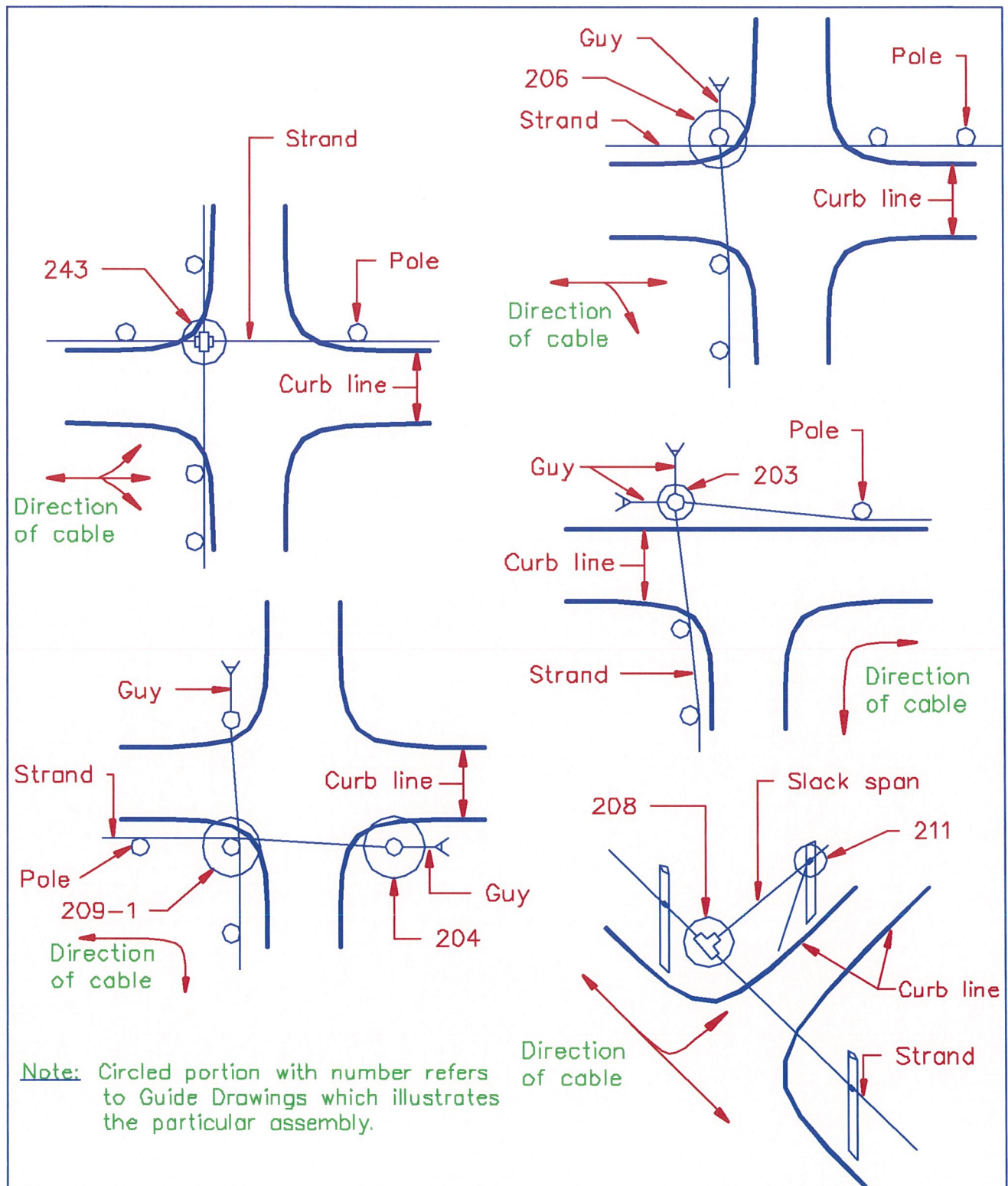
ITEMS	MATERIALS	6M	10M	16M
		NO. REQ'D	NO. REQ'D	NO. REQ'D
u	Clamps, guy, 3-bolt	2	2	2
y	Strand, as required	6M	10M	16M
ab	Nuts, thimbleye, for 5/8 in. (16 mm) bolt	1	1	—
ab	Nuts, thimbleye, for 3/4 in. (19 mm) bolt	—	—	1
*dz	Clips, guy	2	2	2

RURAL TELECOMMUNICATIONS CONSTRUCTION PRACTICES
FALSE DEADEND

Scale: NTS

March 2001

211

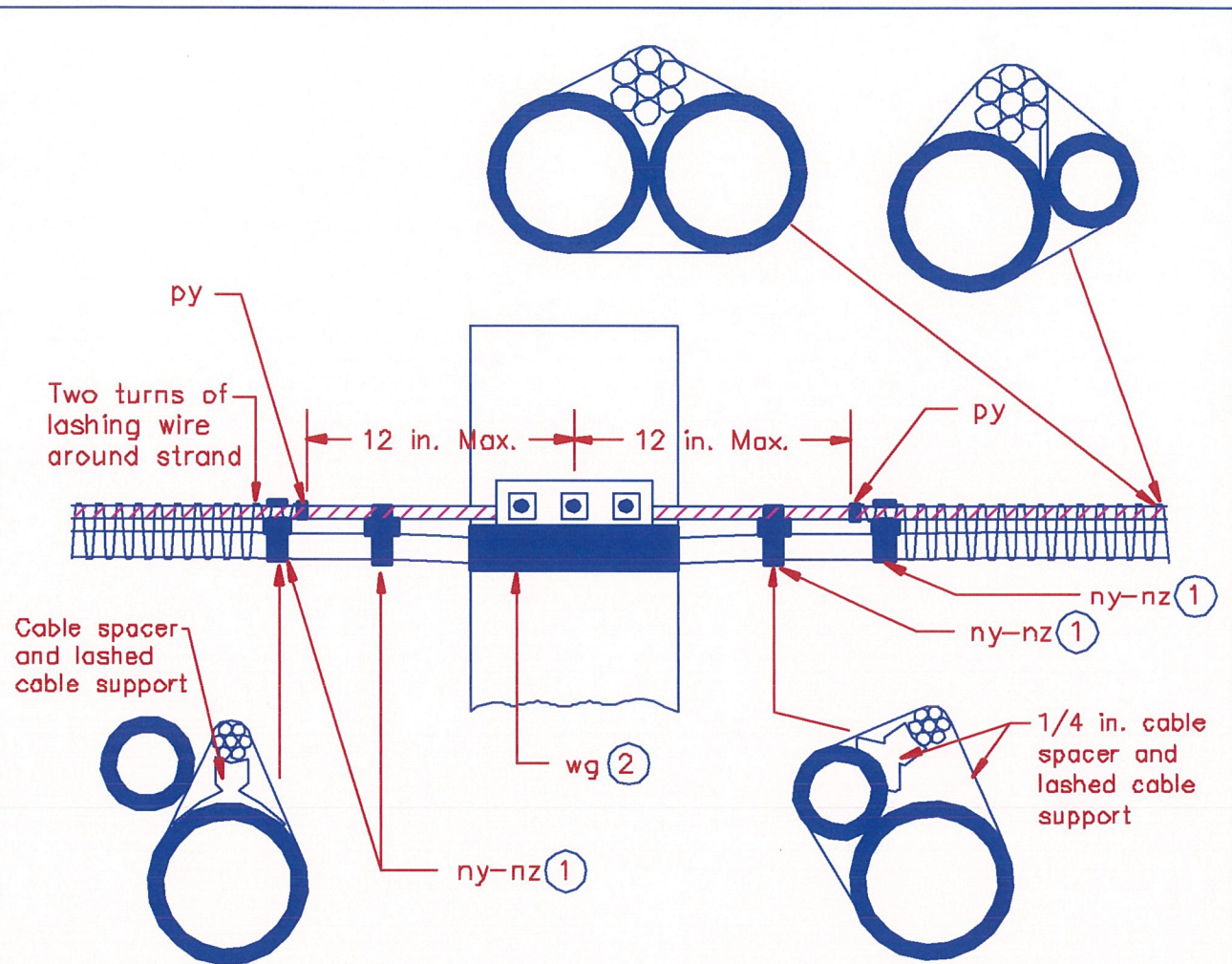


RURAL TELECOMMUNICATIONS CONSTRUCTION PRACTICES
STRAND LAYOUTS

Scale: NTS

March 2001

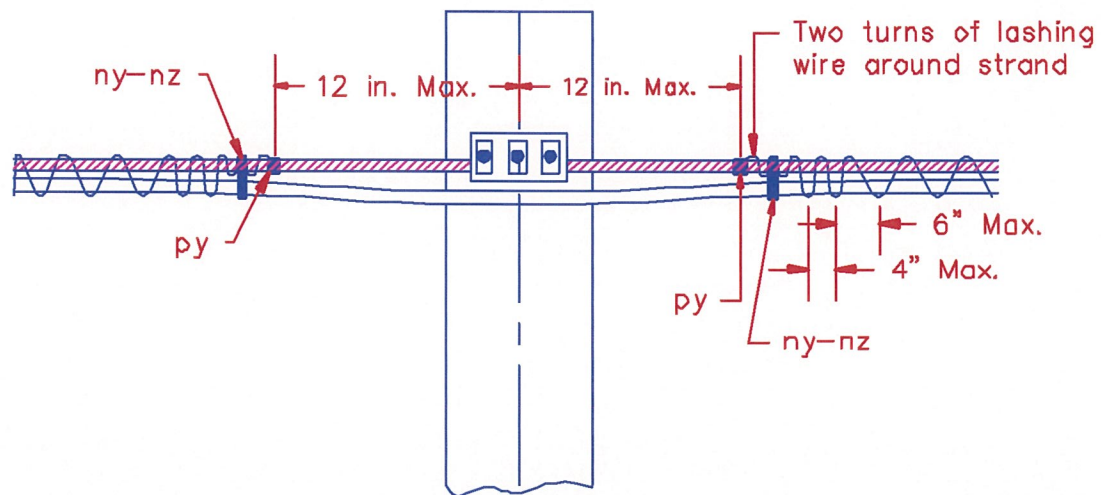
212



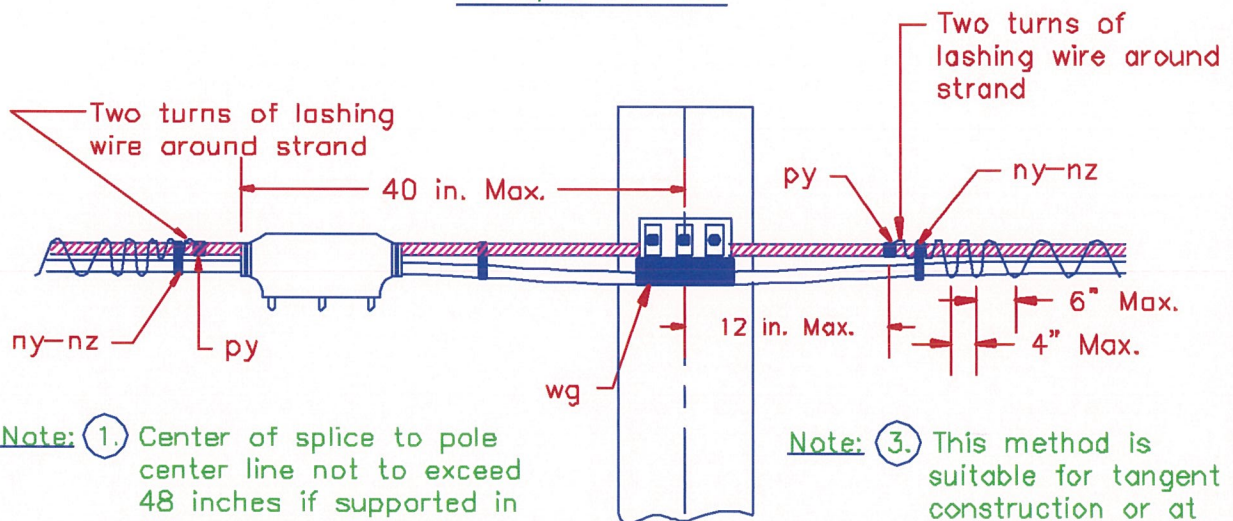
Notes:

- ① Install cable spacers and lashed cable supports as needed to hold cable in position.
- ② Place split cable guard around cable at point of contact with suspension clamp to prevent abrasion of cable. Secure split cable guard to cable by means of 3 full layers of vinyl tape.
- ③ For converting English units to metric units 1 in. = 25.4 mm.

ITEMS	MATERIALS		
*py	Clamps, terminating, lashing wire		
*ny	Spacers, cable, 1/4"		
*nz	Supports, lashed cable		
wg	Guards, cable, split		
		RURAL TELECOMMUNICATIONS CONSTRUCTION PRACTICES ARRANGEMENT DETAILS OF CABLES AT POLE SUPPORTS	
		Scale: NTS	March 2001



No Splice at Pole



Note: ①. Center of splice to pole center line not to exceed 48 inches if supported in this manner. Otherwise treat as a midspan splice.

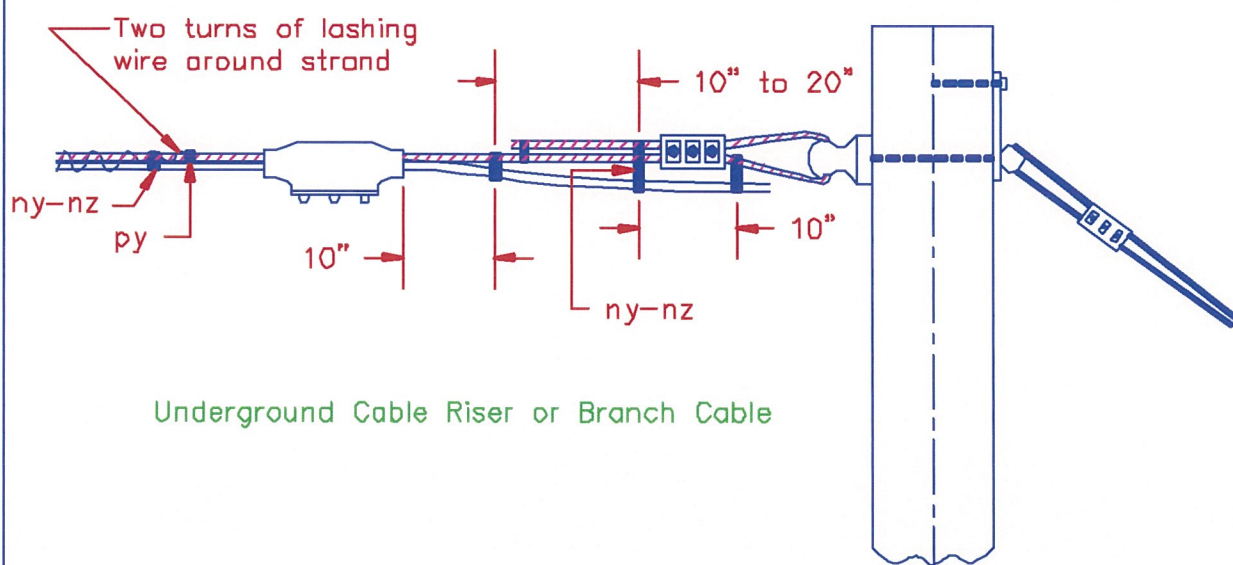
Note: ②. For converting English units to metric units use 1 in. = 25.4 mm.

Note: ③. This method is suitable for tangent construction or at corners where pull is away from pole.

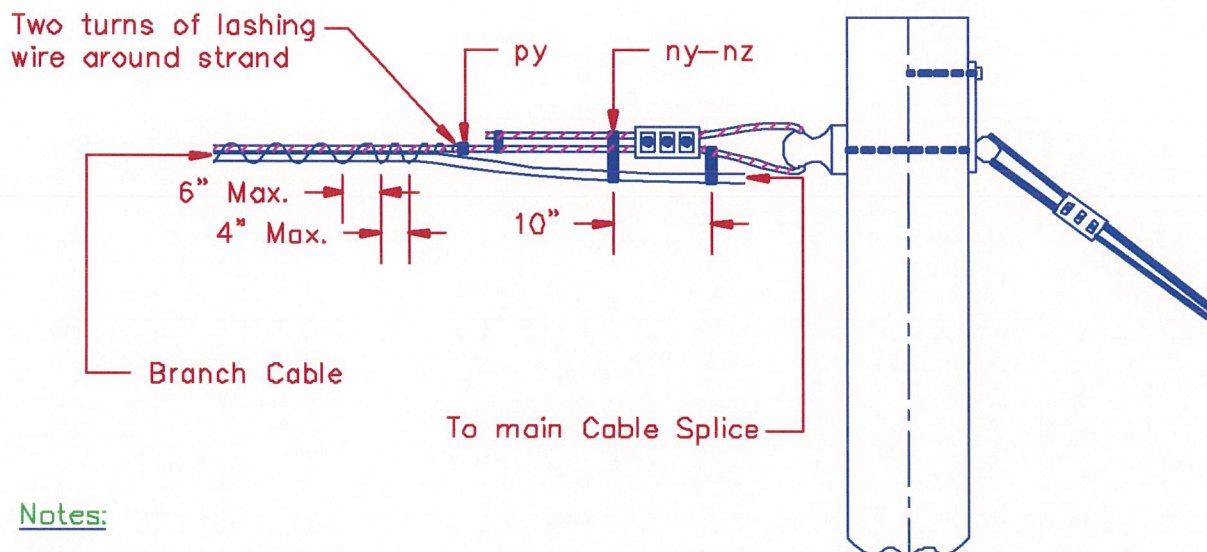
Splice at Pole

ITEMS	MATERIALS	NO. REQ'D
*ny	Spacers, cable	2
*nz	Supports, lashed cable	2
*py	Clamps, terminating, lashing wire	2
wg	Guard, cable, plastic	1

RURAL TELECOMMUNICATIONS CONSTRUCTION PRACTICES LASHED CABLE SUPPORT AT POLE		
Scale: NTS		March 2001
		241



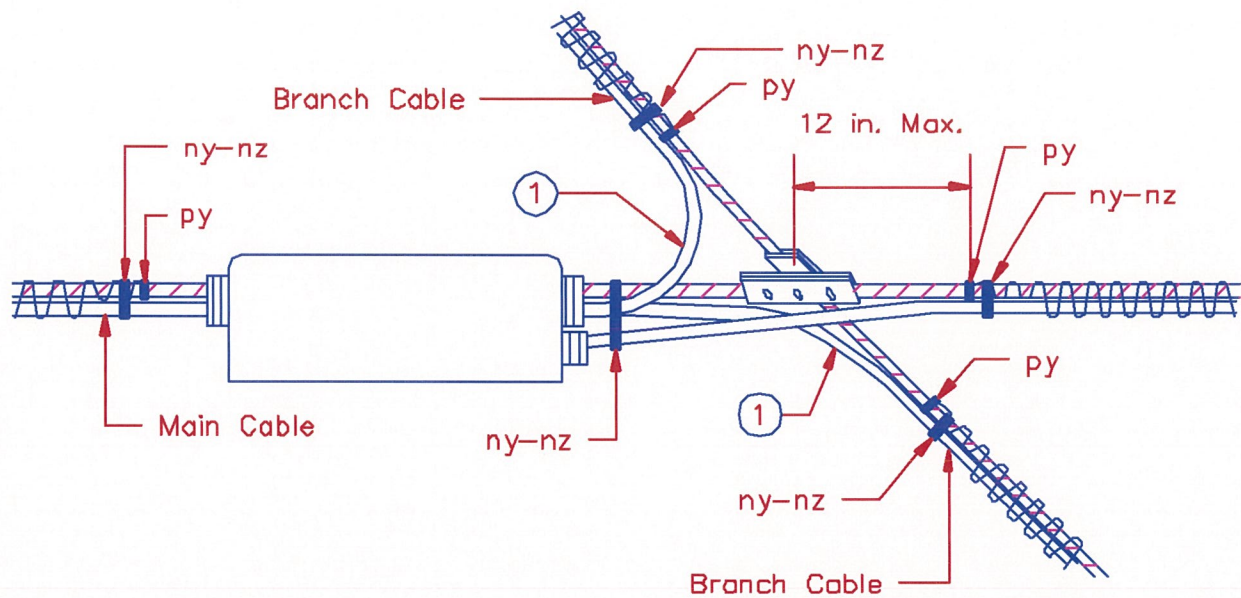
Underground Cable Riser or Branch Cable



Notes:

- ① For converting English units to metric units use 1 in. = 25.4 mm.
- ② This method of terminating lashing wire should be used at deadend junction of aerial cable and underground riser, and junction of branch and main cable.

ITEMS	MATERIALS	NO. REQ'D
*ny	Spacers, cable	as required
*nz	Supports, lashed cable	as required
*py	Clamps, terminating, lashing wire	1
RURAL TELECOMMUNICATIONS CONSTRUCTION PRACTICES LASHING WIRE TERMINATIONS		
Scale: NTS		March 2001
		242



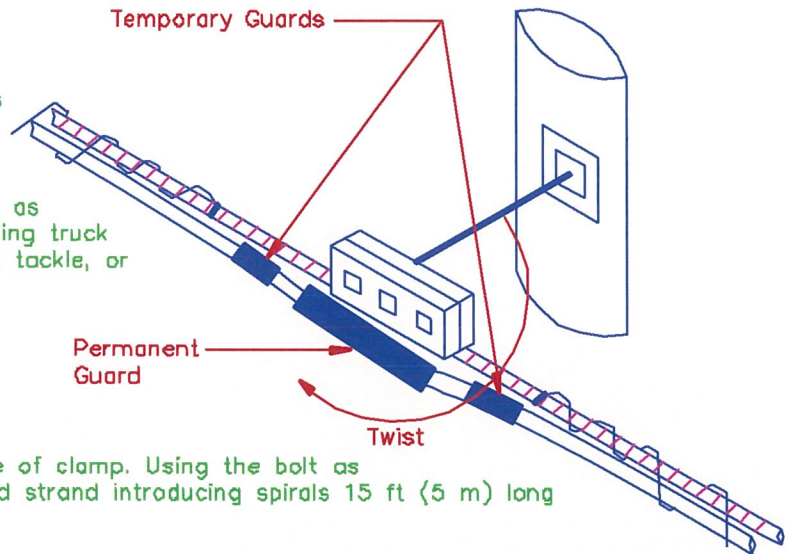
Notes:

- ①. The radius of bend shall not be less than 10 times the outside diameter for copper cables. The radius of bend shall not be less than 20 times the outside diameter for fiber optic cables.
- ②. For converting English units to metric units use 1 in. = 25.4 mm.

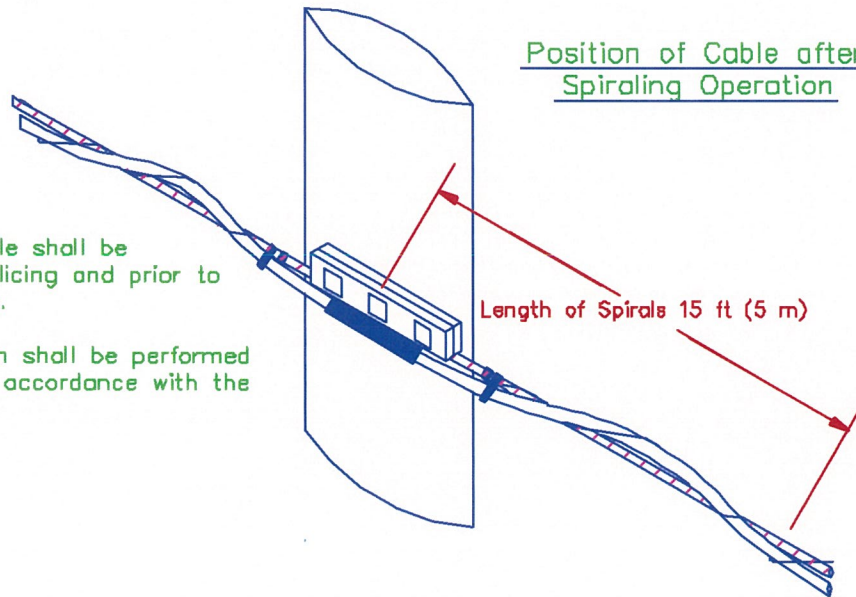
ITEMS	MATERIALS	NO. REQUIRED
*ny	Spacers, cable	5
*nz	Supports, lashed cable	5
*py	Clamps, terminating, lashing wire	4
RURAL TELECOMMUNICATIONS CONSTRUCTION PRACTICES LASHING WIRE TERMINATIONS AT SUSPENSION STRAND CROSSEOVERS		
Scale: NTS		March 2001
		243

Spiraling Operation Detail

- Step (1) Place split cable guards. (plastic)
- Step (2) Loosen lashing wire clamps as required to allow for movement of lashing wire.
- Step (3) Support and position cable as necessary for operation, using truck mounted derrick, block and tackle, or other means.
- Step (4) Remove suspension clamp from through bolt allowing cable and strand to swing free.
- Step (5) Place a bolt in center hole of clamp. Using the bolt as a lever, twist the cable and strand introducing spirals 15 ft (5 m) long in the adjacent spans.
- Step (6) In the spiraling operation, lashing wire will tighten in the span on one side of pole and loosen on the other. Lashing wire clamps shall be adjusted to allow for this movement. After spiraling, the lashing wire shall be adjusted, tapping on the strand as the lashing wire is pulled up or adjusted and clamps tightened to hold cable firmly in place.
- Step (7) Reattach cable and remove temporary cable guards.
- Step (8) A split cable guard shall also be installed on the cable at each tangent pole adjacent to the pole on which spiraling has been performed.



Position of Cable after Spiraling Operation



Notes:

- ① Spiraling of aerial cable shall be performed prior to splicing and prior to mounting of terminals.
- ② The spiraling operation shall be performed on alternate poles in accordance with the steps shown above.

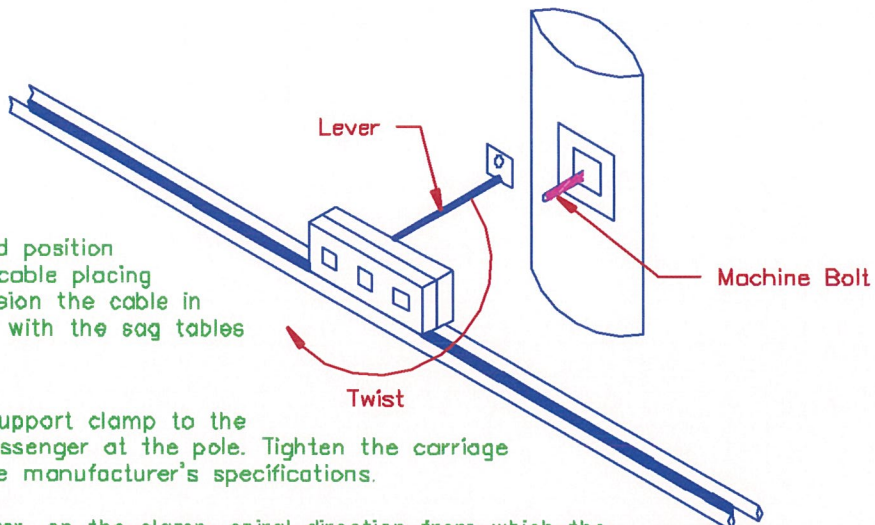
RURAL TELECOMMUNICATIONS CONSTRUCTION PRACTICES
METHOD OF SPIRALING AERIAL CABLE

Scale: NTS

March 2001

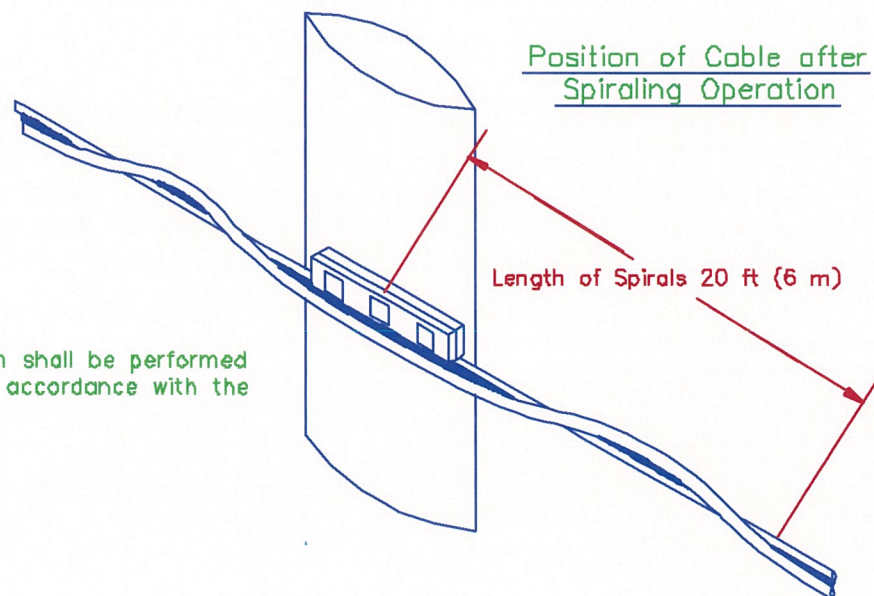
250

Spiraling Operation Detail

- 
- Step (1) Support and position cable with cable placing blocks. Tension the cable in accordance with the sag tables specified.
- Step (2) Fasten a support clamp to the support messenger at the pole. Tighten the carriage bolts to the manufacturer's specifications.
- Step (3) Using a lever, on the clamp, spiral direction from which the previous adjacent spiraling operation was performed. If the adjacent spans are unequal, use the shorter span for determining the number of spirals.
- Step (4) Place the clamp on the machine bolt and tighten nuts to the manufacturer's specifications.

Note:

- ① The spiraling operation shall be performed on alternate poles in accordance with the steps shown above.

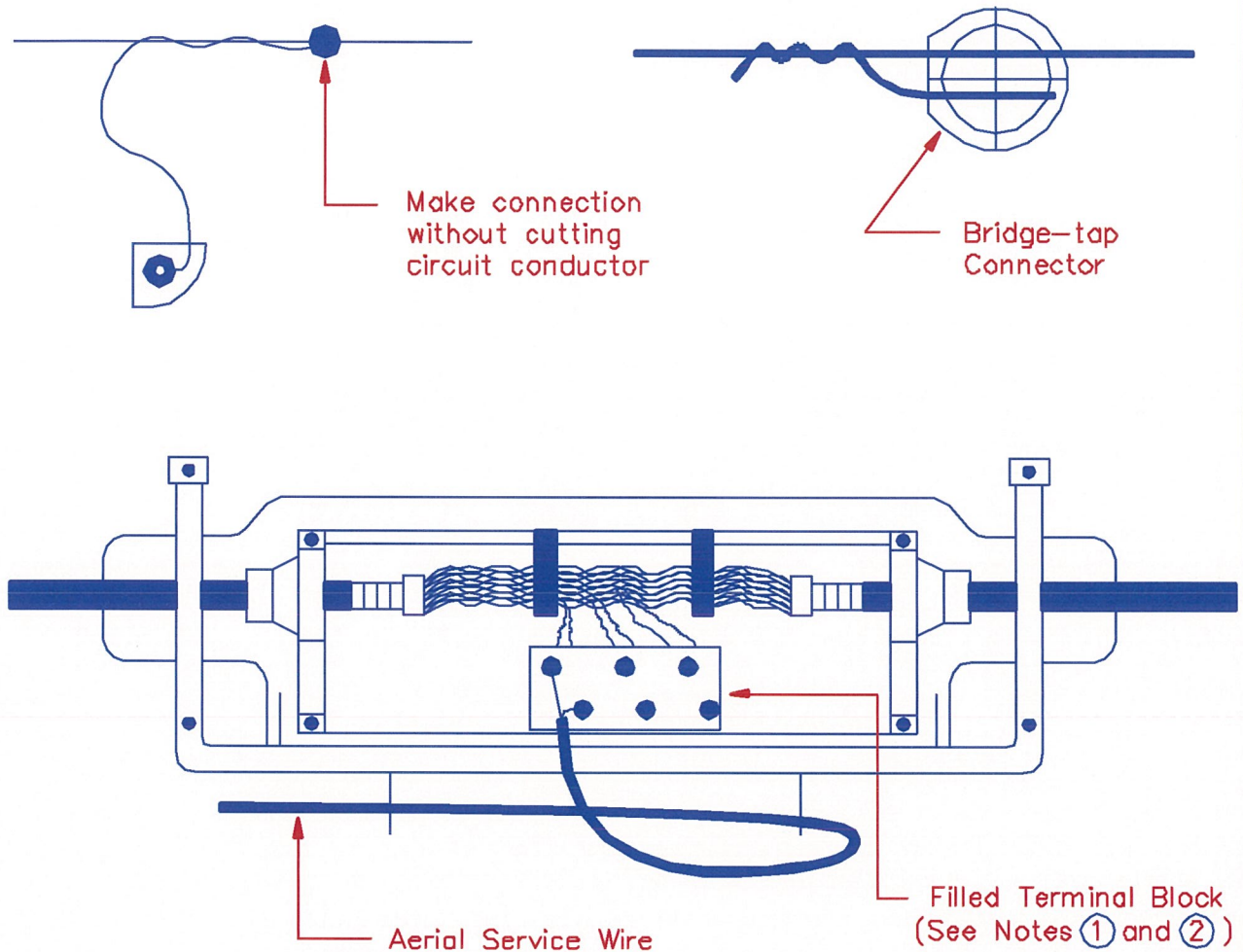


RURAL TELECOMMUNICATIONS CONSTRUCTION PRACTICES
METHOD OF SPIRALING SELF-SUPPORTING FILLED FIBER
OPTIC CABLE (FIGURE 8 DESIGN)

Scale: NTS

March 2001

250-1



Notes:

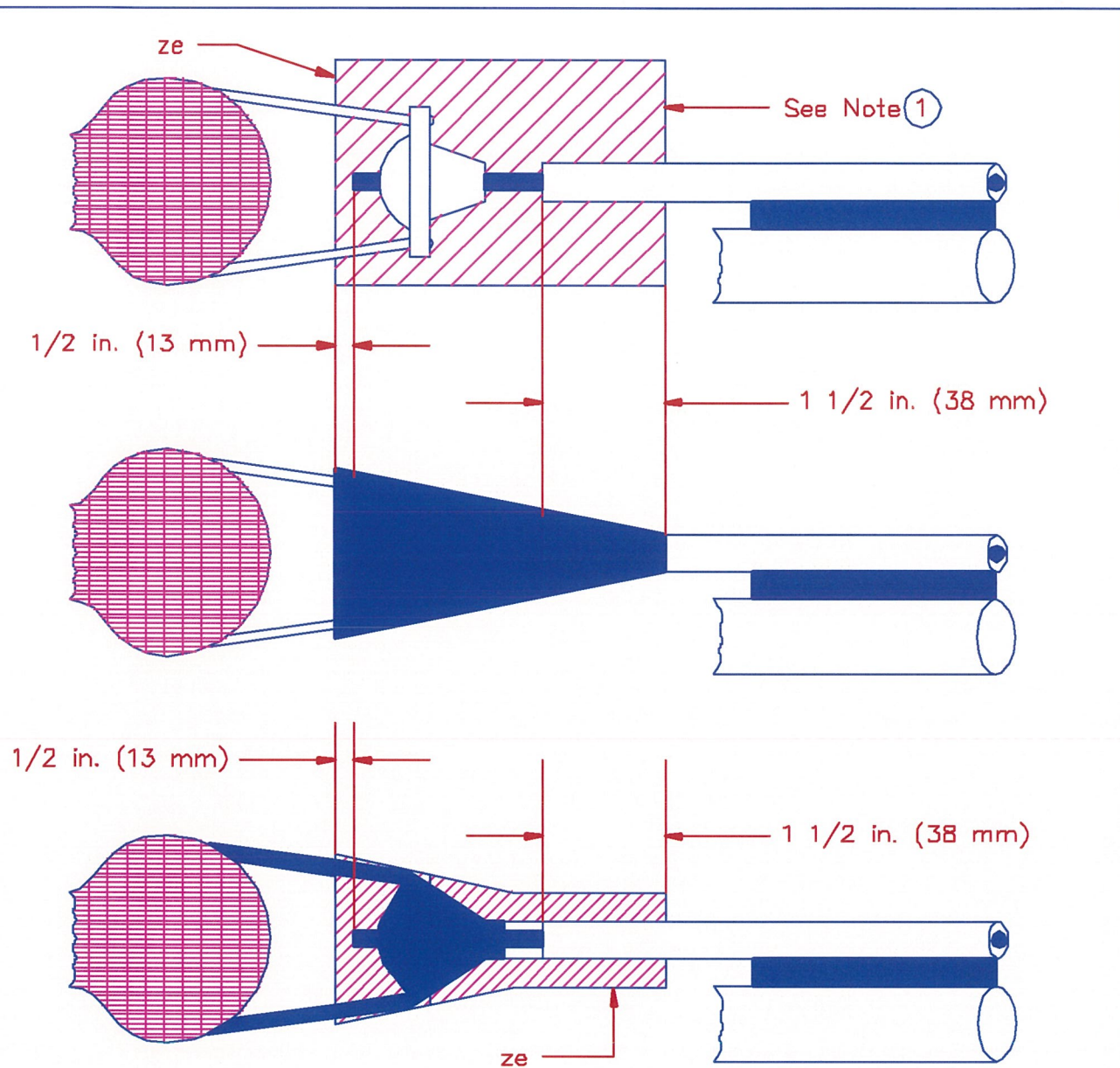
- ①. Where aerial service wire connections are made along aerial plastic cable, unprotected filled terminal blocks equipped with lead-out wires shall be used.
- ②. Conductors of the aerial service wire shall be connected directly to the binding posts of the filled terminal block.

RURAL TELECOMMUNICATIONS CONSTRUCTION PRACTICES
AERIAL PLASTIC CABLE DETAILS OF WIRE
CONNECTIONS TO FILLED TERMINAL BLOCKS

Scale: NTS

March 2001

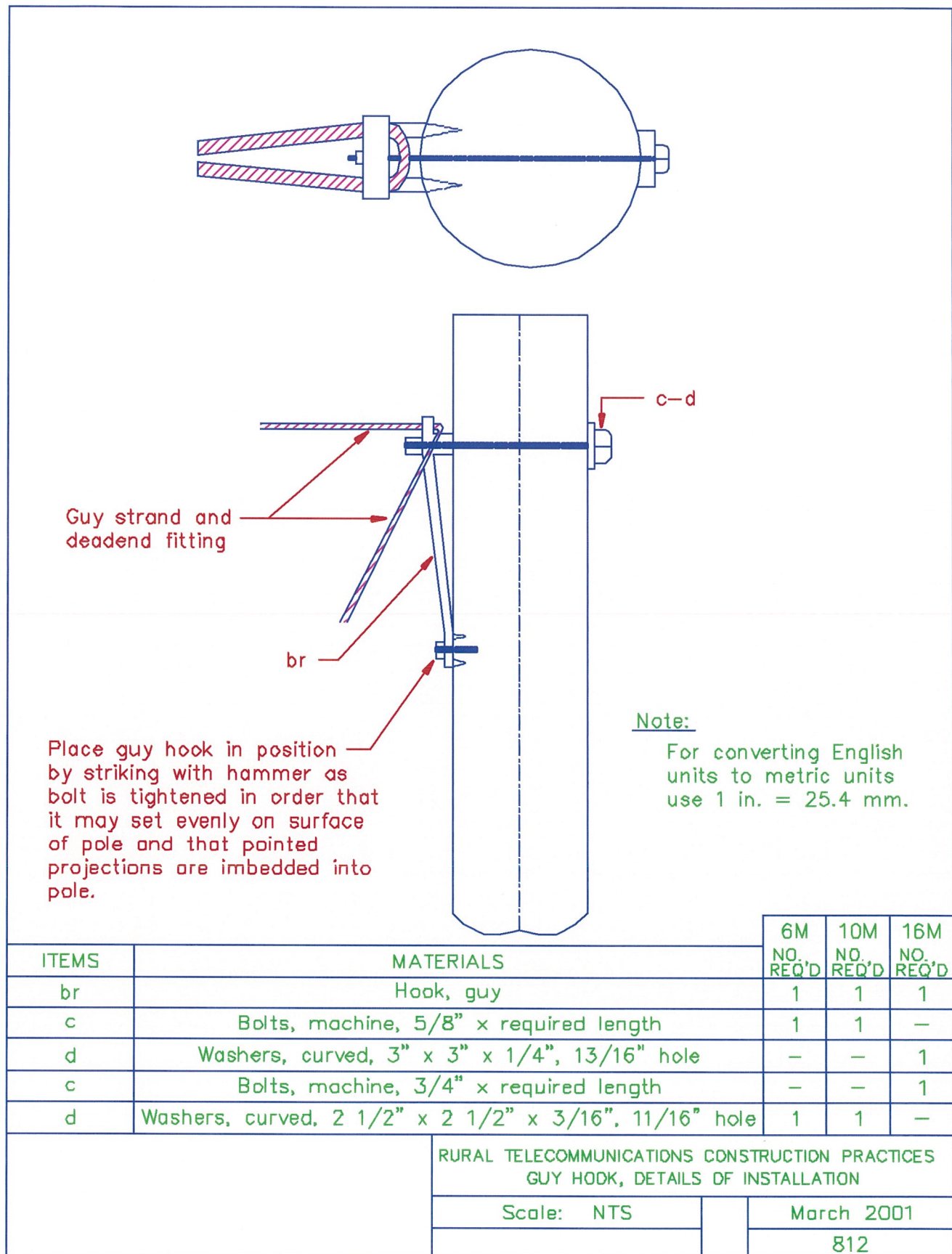
312-1



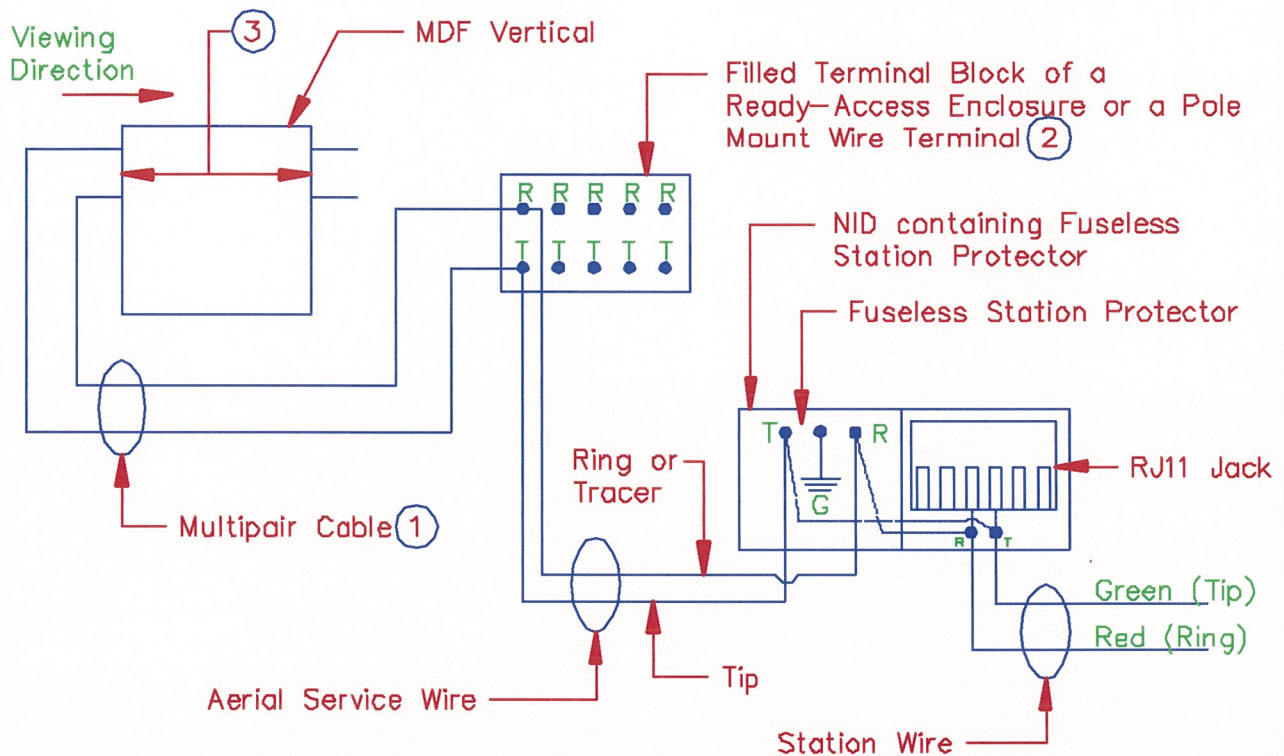
Note:

- ①. Mold sealing compound with fingers to provide a tight seal and a neat appearance. Restoration of the insulation on support wire in places other than at deadends shall be accomplished in a similar manner.

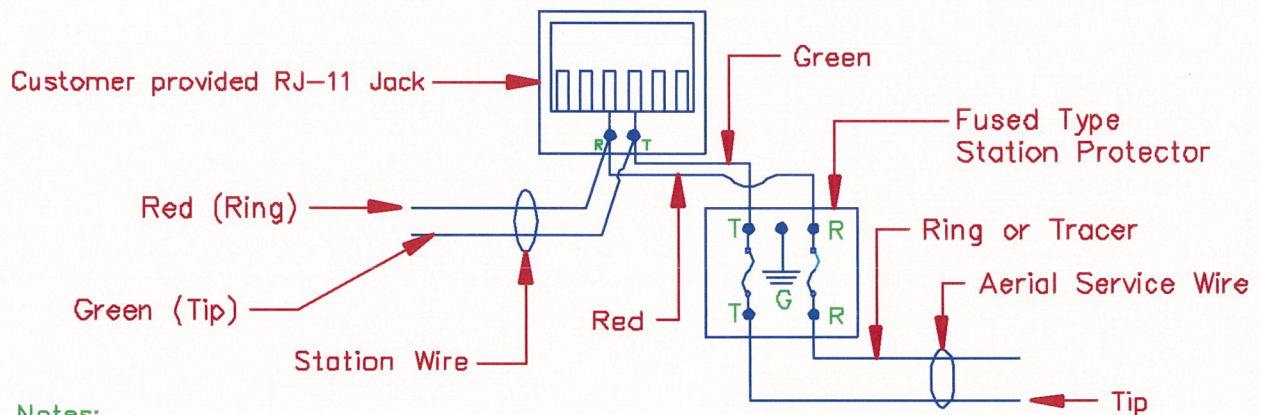
ITEM	MATERIAL	NO. REQUIRED
*ze	Compound, sealing	As required
RURAL TELECOMMUNICATIONS CONSTRUCTION PRACTICES METHOD OF RESTORING INSULATION ON SUPPORT MEMBER OF SELF-SUPPORTING FILLED FIBER OPTIC CABLE (FIGURE 8 DESIGN)		
Scale: NTS		March 2001
		360



Conductor Polarity Diagram For NID Incorporating Fuseless Station Protector



Conductor Polarity Diagram For Fused Station Protector



Notes:

- ① Refer to appropriate cable specifications for tip and ring conductor identification.
- ② When facing the cable terminal the positive (tip) is on the left and the negative (ring) is on the right side of the pair.
- ③ Connections to be made in accordance with the manufacturer's instructions.

RURAL TELECOMMUNICATIONS CONSTRUCTION PRACTICES
CONDUCTOR POLARITY (TIP AND RING) DIAGRAM
(AERIAL PLANT)

Scale: NTS

March 2001

815

INSERT V:

**RUS FORM 515D - SPECS AND DRAWINGS FOR
SERVICE INSTALLATION AT CUSTOMER ACCESS LOCATIONS**



United States
Department of
Agriculture

Rural
Utilities
Service

RUS Bulletin 1753F-153
RUS Form 515d

September 2001

Specifications and Drawings for Service Installation at Customer Access Locations

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UNITED STATES DEPARTMENT OF AGRICULTURE
Rural Utilities Service

BULLETIN 1753F-153

SUBJECT: Specifications and Drawings for Service Installations
at Customer Access Locations, RUS Form 515d

TO: All Telecommunications Borrowers
RUS Telecommunications Staff

EFFECTIVE DATE: September 17, 2001

OFFICE OF PRIMARY INTEREST: Outside Plant Branch,
Telecommunications Standards Division.

AVAILABILITY: This bulletin supersedes RUS Bulletin 345-154,
Specifications and Drawings for Service Entrance and Station
Protector Installation, RUS Form 515g, issued May 25, 1989.
This bulletin can be accessed via the Internet at
<http://www.usda.gov/rus/telecom/publications/bulletins.htm>

PURPOSE: This specification provides Contractors, Engineers, and
RUS Borrowers with assembly unit descriptions, materials,
construction and installation, and drawings for service
installations at customer access locations associated with RUS
Form 515, Telecommunications System Construction Contract.

Roberta D. Purcell

Roberta D. Purcell
Assistant Administrator
Telecommunications Program

8/21/01

Date

RUS Bulletin 1753F-153
Specifications and Drawings for Service Installations at
Customer Access Locations, RUS Form 515d

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Outside Plant

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Buried Service

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LIST OF CHANGES

1. Addition of BM50 unit, Buried Service Wire or Cable Installation to Pole-Mounted Wire Terminal Assembly Unit.
2. Provision of suffix "D" to BM60 and BM61 units to indicate directional boring.
3. Provision of suffix "P" to the BM60 unit to indicate plastic pipe.
4. Modification of the BM61 unit allowing the Engineer to specify the maximum bore diameter in parentheses.
5. Provision of suffix "E" to the BM71 unit to indicate extra depth in rock.
5. Modification of Section NI to become Section NID, Network Interface Device Assembly Units. Redefined unit to include protectors as part of the unit, as well as mounting arrangements for mobile home installation.
6. Elimination of Section P. Protectors are now included as part of Section NID.
7. Modification of Section SE as follows:
 - (a) Compensation will be on a per foot basis;
 - (b) Elimination of the SEK unit. This unit is now covered under two separate units: the SEA unit and the BM50 unit.
8. In part III, section 3, changed minimum depth of buried service entrances from 24 inches to 12 inches in soil.
9. In part III, section 4, modified section to cover NID's in place of station protection.
10. Modification of the NID2 and NID3 assembly unit drawings to indicate the Power Company's method of providing the electrical system ground connection.

For editorial or other minor technical changes, refer to the body of the document.

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**Part I - DESCRIPTION OF ASSEMBLY UNITS AND PROPOSAL AND
CONTRACT SECTIONS**

The Contractor's Proposal form is divided into sections and the sections approved for construction shall be listed in the Construction Agreement by the Owner. The sections are as follows:

Section BM - Miscellaneous Assembly Units
Section NID - Network Interface Device Assembly Units
Section SE - Service Entrance Assembly Units
Section W - Rearrangement Units
Section XX - Nonreusable Materials Removal Units
Section XZ - Reusable Materials Removal Units

Each assembly unit includes only the materials listed on the corresponding Installation and Construction Guide Drawings or description of unit where no drawing exists. The various installation and construction units which are included in the Proposal and upon which quotations are required are defined by the following descriptions:

Section BM - MISCELLANEOUS ASSEMBLY UNITS

Consists of all labor and material to construct and install the units defined individually below required for the installation and construction of the service entrance portions of the Project:

BM50() Buried Service Wire or Cable Installation to Pole-Mounted Wire Terminal Assembly Unit - Consists of the necessary labor and material to install a buried wire or cable from a buried plant housing to a pole mounted wire terminal. This unit includes the installation of pole mounted buried wire or cable, a pole mounted wire terminal, and the necessary wire work at the wire terminal (see assembly unit drawing BM50). Pair count of the terminal size shall be indicated in the parentheses. Installation of the buried plant housing and splicing of the pole mounted buried wire or cable inside the buried plant housing shall be compensated under separate units.

BM60() Underground Pipe Crossing Assembly Unit - Consists of one (1) lineal foot [0.305 meters (m)] of steel pipe, with the inside diameter in inches (meters) specified in parentheses, installed in place. This unit includes the pushing of pipe and any excavation, backfilling and tamping necessary for the installation of the pipe. The pipe shall be installed at the depth specified by the Engineer. The installed pipe shall be free of any sharp

projections to avoid damage to the outer jacket of the buried cable or wire during its installation in the pipe. The contractor will be compensated for labor and material for the buried cable or wire under separate units. Options designated by the following suffixes apply:

<u>Suffix</u>	<u>Description</u>
D	Directional boring required.
P	Plastic pipe required.

BM61() Underground Non-Pipe Crossing Assembly Unit - Consists of the labor in providing a hole in soil one (1) foot (0.305 m) in length and of a diameter in inches (meters) specified in parentheses. The depth of the hole below the surface of the ground shall be specified by the Engineer. This unit includes any excavation, backfilling and tamping necessary for the installation. This unit may be used where the permanent installation of a steel or plastic pipe under the BM60 unit is not required. The contractor will be compensated for labor and material for the buried cable or wire under separate units. Where directional boring is required, the unit shall be suffixed by the letter "D".

BM71 Rock Excavating Unit - Consists of one (1) lineal foot (0.305 m) of trenching, blasting, sawing, etc., measured parallel to the surface of the ground, in rock, including excavation, backfilling and tamping to place cable or wire to the depth specified in the Specifications. This unit includes all material and labor required in the repair and/or replacement of streets, roads, sidewalks, drives, fences, lawns, shrubbery, watermains, pipes, pipelines and contents, underground power and telecommunications facilities and any other property damaged by the excavating, except loss or damage to crops, gardens, trees or ornamental flowers in the construction corridor necessarily incident to the construction of the Project and not caused by the negligence of the Contractor. This unit will be specified by the Engineer only when field conditions at the site show the existence of rock to a depth required by the specification, which cannot be trenched, plowed or ripped. If extra depth is required, the unit shall be suffixed by "E()", where the required depth in rock shall be shown inside the parentheses.

The contractor will be compensated for labor and material for the buried cable or wire under separate units.

BM83 Buried Service Guard - Consists of a guard, including fasteners, mounted in place over the buried wire or cable and/or ground wire, as shown on the Construction Sheets (see unit drawing BM83).

Section NID - NETWORK INTERFACE DEVICE ASSEMBLY UNITS

Consists of a network interface device (NID) installed in place, with necessary hardware and jumpers connected, and where required, furnishing and installing a ground and/or bond in accordance with the Construction Sheets. The assembly units are equipped with modular jacks and fuseless protectors.

The assembly unit is defined as follows:

NID () Network Interface Device

The number specified in the parentheses shall indicate the number of modular jacks and the number of fuseless protectors

The mounting arrangement suffixes for the NID unit are as follows:

<u>Suffix</u>	<u>Description</u>
1	Electric System Ground with Bond to Metallic Water Pipe System (see unit drawing NID1)
2	Electric System Ground Rod (see unit drawing NID2)
3	Electric System Grounding Conductor (see unit drawing NID3)
4	Telco Ground Rod with Sub-surface Bond to Electric Ground (see unit drawing NID4)
5	Telco Ground Rod with Above-surface Bond to Electric Ground (see unit drawing NID5)
6	Telco Ground Rod with Bond to Water Pipe - no Electric Service at Site (see unit drawing NID6)
7	Mobile Home Installation - within 35 ft of Electric Service Equipment (see unit drawing NID7)

- 8 Mobile Home Installation - over 35 ft from
Electric Service Equipment
(see unit drawing NID7)
- G Indicates Gas-Tube station protectors are to be
Furnished
- I Indicates inside mounting (see detailed drawings
as specified by the Engineer)

Examples:

- NID(2)3 NID containing 2 modular jacks and 2 fuseless
station protectors with electric system
grounding conductor
- NID(6)G1 NID containing 6 modular jacks and 6 fuseless
station protectors having gas tube arrestors
with electric system ground with bond to
metallic water pipe system.

Section SE - SERVICE ENTRANCE ASSEMBLY UNITS

Consists of one (1) foot (0.305 m) of service entrance wire or cable in place from the network interface device (NID) to either filled terminal blocks in a ready-access closure or buried plant housing; or buried cable pair. This unit includes all clamps, rings, hooks and other hardware required for attachment to poles, buried plant housings and buildings. This unit does not include the labor and material for connecting the wire or cable to the NID unless specified by the Engineer and suffixed by the letter "P". This unit does not include cable splicing. For compensation purposes, the length of service entrance wire or cable includes the sum of the distance between supporting structures and when required the vertical runs on buildings and poles. The service entrance units are further defined as follows:

- SEA Aerial Service Entrance from Aerial Cable Assembly Unit
- This unit includes the labor and material for an aerial service entrance extending from aerial plant. It includes the labor and material for the installation of aerial service wire connected to the filled terminal blocks of the ready access closure or pole mounted wire terminal in accordance with the Construction Sheets. Tree trimming necessary for installing the aerial service wire is also included and shall be performed in accordance with the instructions of the Engineer.

SEB Buried Service Entrance Assembly Unit - This unit includes the labor and material for placement of buried service wire or cable to the depth set forth in the specifications and the backfilling and tamping of the trench and for the repair and/or replacement of all fences, shrubbery, drives, lawns, watermains, pipes, sidewalks, pipelines and contents, underground power and telecommunications facilities, pavements, roadways, buried sewerage and drainage facilities, and any other property damaged during the installation of Service Entrances.

Suffix Description

P When the units above are suffixed with the letter "P" the labor and material for connecting the conductors, and the shield for buried service wire or cable, to the station protector of the NID are included. This work shall be done in accordance with the Construction Sheets.

Each service entrance assembly unit is listed in accordance with the number of pairs and gauge of conductors. Each unit is prefixed by the letters SE. The following illustrations indicate the method of designating the material required.

SEA1-18 Indicates an aerial service entrance assembly unit from an aerial cable utilizing a one-pair, parallel conductor, 18 gauge aerial service wire.

SEB2-22 Indicates a buried service entrance assembly unit utilizing a two-pair, 22 gauge filled buried wire.

SEBP2-22 Indicates a buried service entrance assembly unit utilizing a two-pair, 22 gauge filled buried wire connected to the station protector of the NID.

Section W - REARRANGEMENT UNITS

Specific rearrangement units shall be designated and described by the Engineer on the "List of Special Arrangement Units" table of RUS Form 515. Existing plant assembly units to be rearranged are designated by a prefix "W".

Section XX - NONREUSABLE MATERIALS REMOVAL UNITS

These units cover the furnishing of all labor for the removal of construction assembly units from existing lines, and transportation of the removed materials for proper disposal. The Contractor will be permitted to use the most economical method of

removing these units. The removal units are designated by the prefix "XX" followed by the assembly unit designation of the unit to be removed.

Section XZ - REUSABLE MATERIALS REMOVAL UNITS

These units cover the furnishing of all labor for the removal of construction assembly units from existing lines and all labor and transportation of the removed materials to a location designated by the Owner. The Contractor will be charged by the Owner for the materials removed under this section at the unit material values shown in column 2 of the "Value and Disposition of Units to be Removed" table of RUS Form 515. The number of units to be charged to the Contractor and the extended value of these units are shown in columns 3 and 4. Such charges will be placed against the Contractor as assembly units are removed and the unit material values will be deducted from the total value of assembly units constructed on this project for determination of the work accomplished for purposes of the monthly progress payments to the Contractor. Of the assembly units listed in the "Value and Disposition of Units to be Removed" table to be removed from existing lines certain units are to be reused in the construction of the project. The quantity of such units to be reused is listed in the "Value and Disposition of Units to be Removed" table, column 5. These units where installed in the project will be inventoried as new assembly units and compensated for at the unit bid prices. The quantity of assembly units listed in column 6 of the "Value and Disposition of Units to be Removed" table is the maximum quantity of removed assembly units that are to be returned to the Owner for credit which will be allowed at the unit material prices in column 2. Column 7 indicates the extended value of the units to be returned to the Owner. The Contractor will be allowed credit for assembly units listed in column 6 which, in the opinion of the Engineer, have not been damaged by the Contractor in removal and handling. Such credits will be allowed the Contractor as the assembly units are returned to a location designated by the Owner and shall be added to the total value of installed assembly units for determination of work accomplished for the purposes of the monthly progress payments to the Contractor. The removal units are specified by the prefix "XZ" followed by the assembly unit designation of the existing assembly unit to be removed.

Part II - SPECIFICATIONS FOR MATERIALS**1. SCOPE**

This part of the specifications is concerned with the various materials required for the construction of customer access service installations of the rural telecommunications system as shown on the Plans, Specifications, and Construction Sheets.

2. GENERAL

All materials used in the construction of the rural telecommunications system except those listed in Paragraph 3 below shall be listed in RUS Informational Publication (IP) 344-2, "List of Materials Acceptable for Use on Telecommunications Systems of RUS Borrowers," unless specific written approval has been granted by the Administrator.

3. MISCELLANEOUS

Items for which categories do not appear in RUS IP 344-2, "List of Materials Acceptable for Use on Telecommunications Systems of RUS Borrowers," shall be of a quality suitable for the application for which they are intended.

Part III - SPECIFICATIONS FOR CONSTRUCTION AND INSTALLATION**1. GENERAL**

1.1 All construction and installation work shall be done in a thorough and workmanlike manner in accordance with the Plans, Specifications and Construction Sheets and shall be subject to acceptance by the Owner and the Administrator.

1.2 All material to be used in construction of the Project shall be stored so as to be protected from deteriorating effects of the elements.

1.3 All service wires and cables, and accessory materials used in the construction of the Project shall be handled with care. Each reel of service wire or cable shall be inspected for damage. Prior to installation, all damage shall be repaired to the satisfaction of the Engineer. If reel wrap is present, the reel wrap shall remain intact on the reel until the wire or cable is ready to be placed.

1.4 Deviations from the Plans, Specifications and Construction Sheets shall not be permitted except upon written permission of the Engineer.

1.5 The latest revision of the National Electrical Safety Code (NESC) and the National Electrical Code (NEC) shall be followed in every case except where local regulations are more stringent, in which case local regulations shall govern.

1.6 The Contractor shall maintain conductor polarity (tip and ring) identification at the main distributing frame, cable terminals, wire terminals, terminal blocks, and for Service Entrances at the network interface device (NID), all in accordance with the Specifications and Construction Sheets.

2. AERIAL SERVICE ENTRANCES

2.1 Aerial service wires shall be installed in accordance with RUS Service Installation Standard Bulletin 1753F-801(PC-5A), and the Construction Sheets.

2.2 All clearances shall comply with the applicable requirements of the NESC, and NEC, or local laws, or ordinances, whichever are most stringent.

3. BURIED SERVICE ENTRANCES

3.1 Buried service entrances shall be installed at the depth listed below unless otherwise specified by the Engineer.

minimum depth in soil	-	12 inches (in.) [305 millimeters (mm)]
minimum depth in ditches	-	36 in. (914 mm) (see guide drawing 975)
minimum depth in rock	-	3 in. (76 mm)

3.2 Buried services shall contact the building as near as practicable to the NID or proposed NID location.

3.3 Buried services shall be located to avoid damage from lawn mowers, animals, etc., and, where deemed necessary by the Engineer, shall be guarded.

3.4 The method of installation is shown on the Construction Sheets.

3.5 Buried services shall be installed against a foundation wall or pillar to provide adequate support and mechanical protection.

3.6 The buried service conductors shall be terminated in the NID, when specified by the Engineer, as shown on the Construction Sheets.

4. NID

4.1 NID's shall be installed and grounded in accordance with RUS Service Installation Standard Bulletin 1753F-801(PC-5A), and the Construction Sheets. They shall also be installed in such a manner as to coordinate with acceptable, available grounding electrodes, such as to meet the existing applicable requirements of the NEC or local laws or ordinances whichever are more stringent.

4.2 The NID shall be located as directed by the Engineer. The choice of location shall be chosen to facilitate common grounding with existing (code) acceptable grounding electrodes by obtaining the best compromise between the length of horizontal service wire or cable run and length of protector grounding conductor wire run.

4.3 Where a grounding conductor or a bonding conductor is to be buried, the trench shall be dug as close to the side of the building as practicable. Trenches shall be properly backfilled.

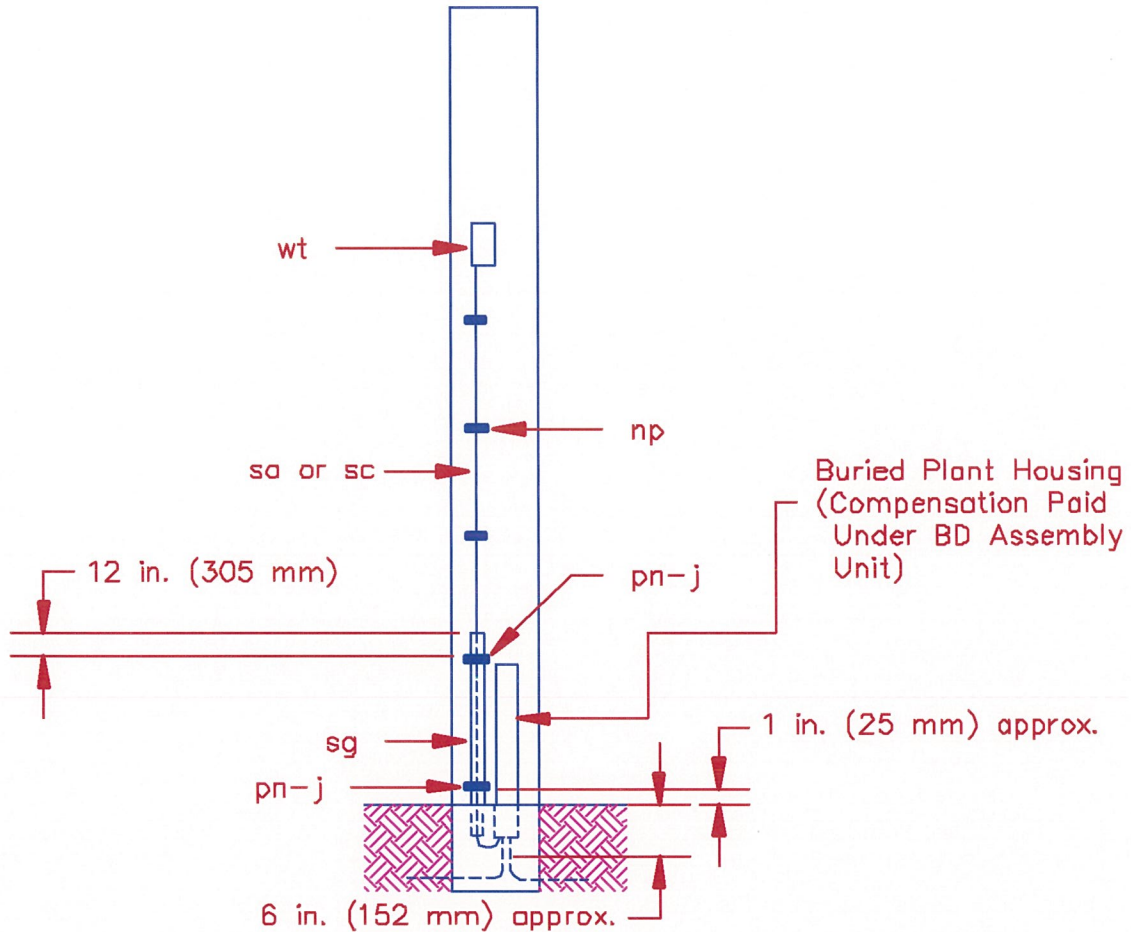
LIST OF CONSTRUCTION DRAWINGS AND PLANSAssembly Unit Drawings

BM50	Buried Service Wire or Cable Installation to Pole-Mounted Wire Terminal
BM83	Buried Service Guard
NID1	Electric System Ground with Bond to Metallic Water Pipe System
NID2	Electric System Ground Rod
NID3	Electric System Grounding Conductor
NID4	Telco Ground Rod with Sub-surface Bond to Electric Ground
NID5	Telco Ground Rod with Above-surface Bond to Electric Ground
NID6	Telco Ground Rod with Bond to Water Pipe - No Electric Service at Site
NID7	Mobile Home Installation - within 35 ft of Electric Service Equipment
NID8	Mobile Home Installation - over 35 ft from Electric Service Equipment

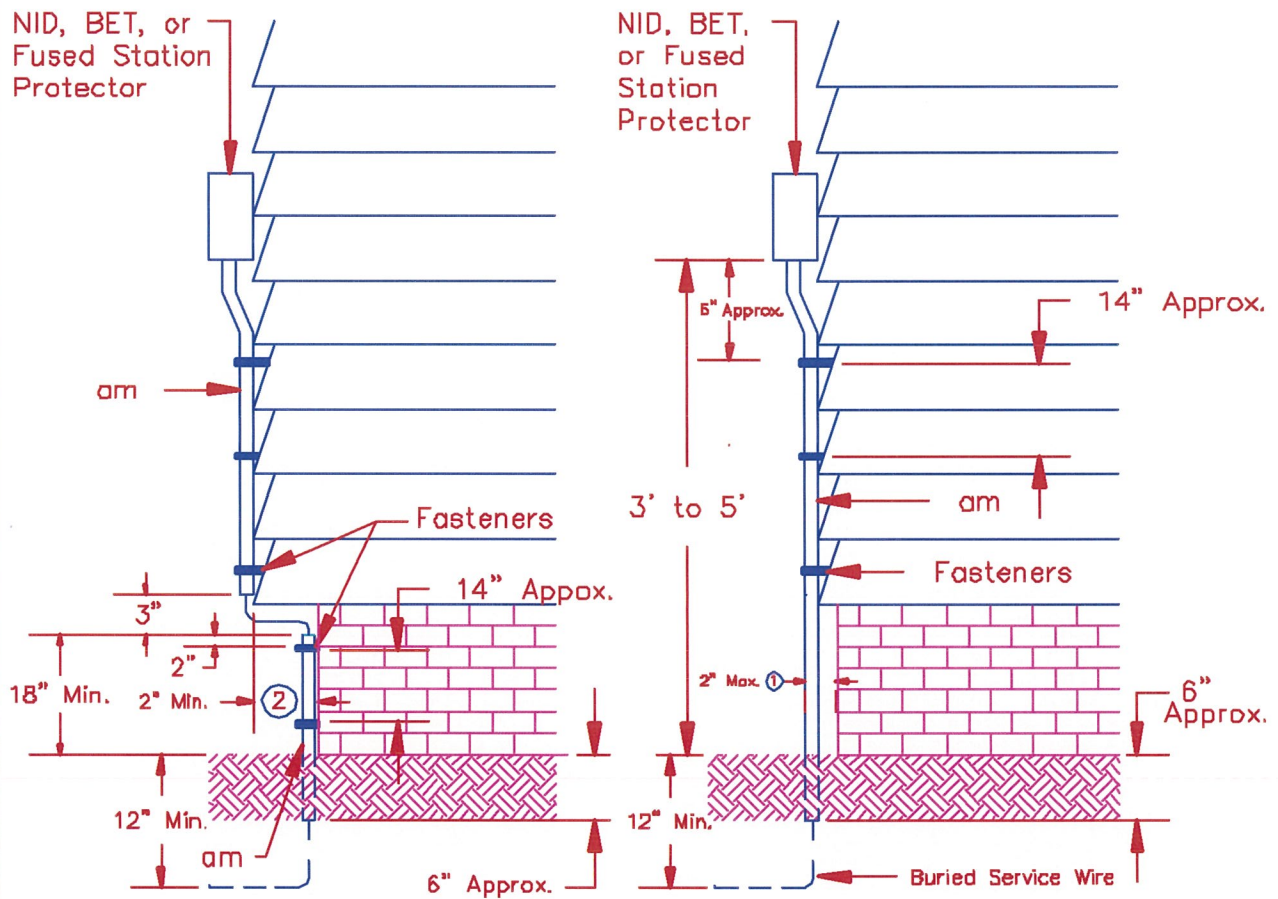
Construction Guide Drawings

962-1	Buried Service Wire - Termination of Shield and Conductors on Station Protector Binding Posts of NID
963-2	Bonding Buried Service Wire at Station Protector of NID - (Service Wire Shield Bonding Connector)

NOTE: On the Assembly Unit and Construction Guide Drawings an asterisk (*) in the ITEM column indicates items that are no longer listed in RUS IP 344-2, "List of Materials Acceptable for Use on Telecommunications Systems of RUS Borrowers."



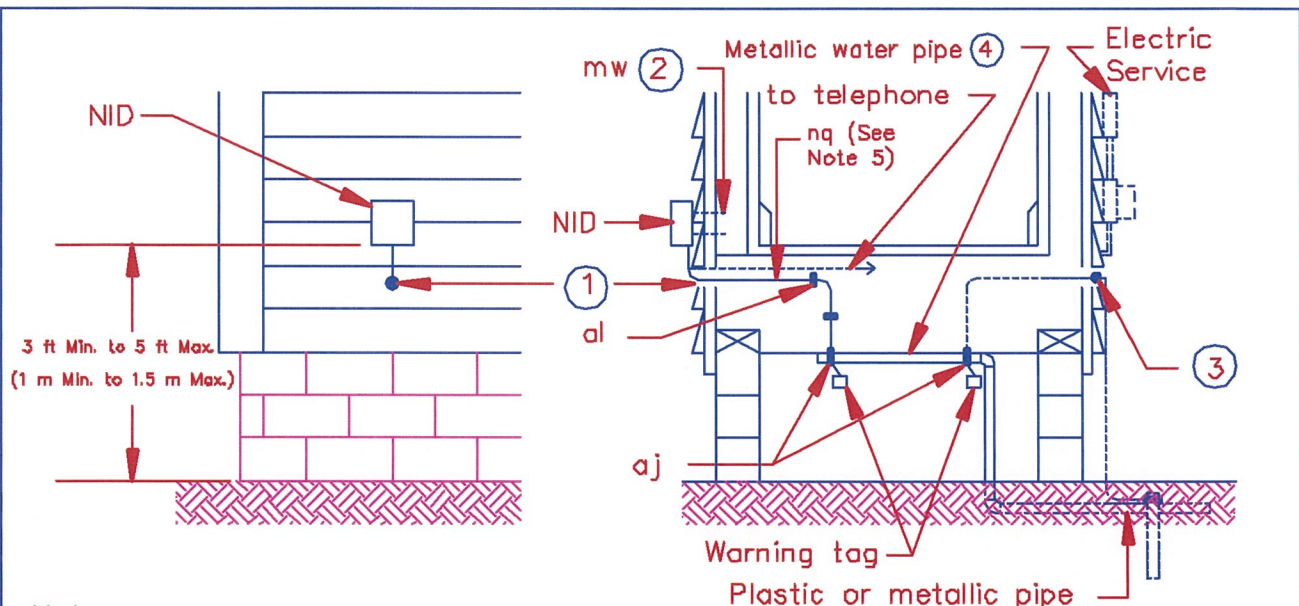
ITEM	MATERIALS	REQUIRED
wt	Terminal, wire, filled, unprotected, pole-mounted (specify pair size)	1
*pn	Strap, rise guard	2
*np	Clamp, cable (1-one hole, offset)	as req'd
sa or sc	Wire or cable, filled, buried	as req'd
sg	Guard, riser, 1"ID*8'	as req'd
j	Screws, lag (size as required)	4
RURAL TELECOMMUNICATIONS CONSTRUCTION PRACTICES BURIED SERVICE WIRE OR CABLE INSTALLATION TO POLE-MOUNTED WIRE TERMINAL		
Scale: NTS		March 2001
		BM50



Notes:

- ①. Where an obstruction of less than 2 in. is encountered, the buried service guard (item am) shall be extended from the NID, BET, or fused protector to 6 in. below the ground.
- ②. Where an obstruction of greater than 2 in. is encountered, the buried service guard (item am) shall be divided as shown (from the NID, BET, or fused protector to the obstruction, and from 3 in. below the obstruction to 6 in. below the ground). In lieu of divided service guards (item am), a continuous flexible conduit may be used from the NID, BET, or fused protector to 6 in. below the ground.
- ③. For converting English units to metric units use 1 in. = 25.4 mm and 1 ft = 0.3048 m.

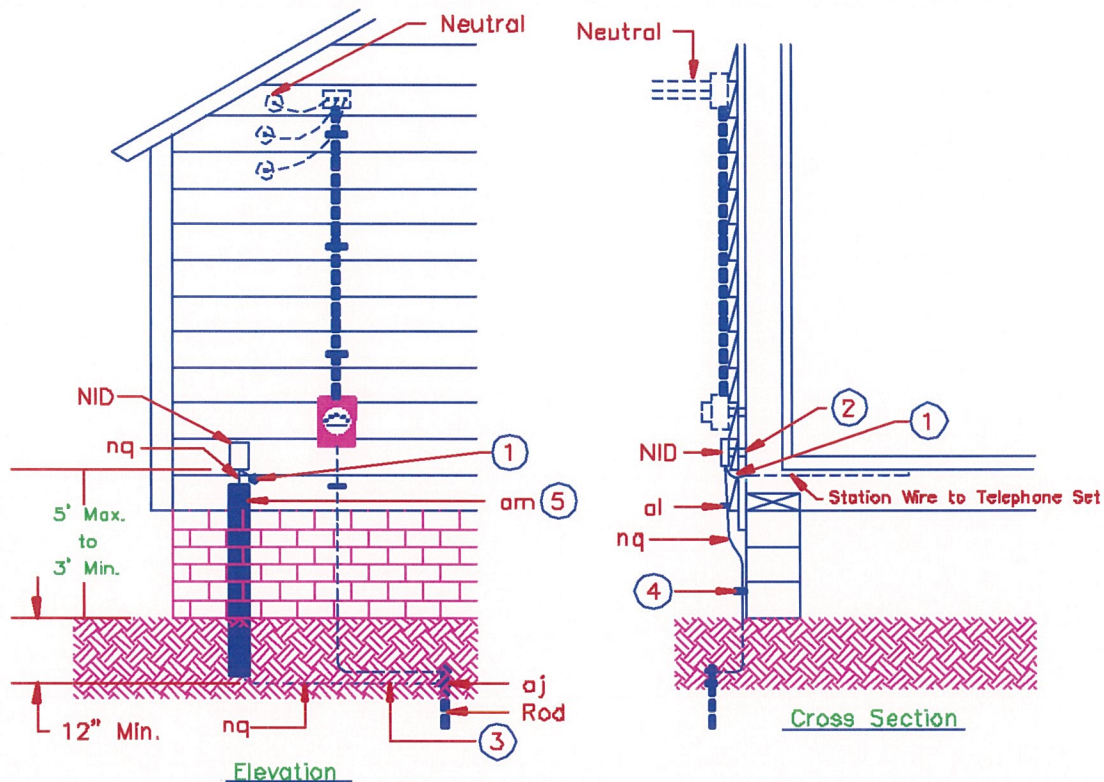
ITEM	MATERIAL	NO. REQ'D
am	Guard, buried service (including fasteners)	1
		RURAL TELECOMMUNICATIONS CONSTRUCTION PRACTICES BURIED SERVICE GUARD
		Scale: NTS
		March 2001 BM83



Notes:

- ①. Holes shall be sloped slightly upward and wires shall be taped to a tight fit.
- ②. When mounting NID on masonry surface, screw expansion anchors or equivalent manual or machine-driven fastening devices shall be used.
- ③. Bonding wire from the metallic water pipe to electric service ground shall be installed by telecommunications customer's qualified electrician in a manner that is in accordance with the National Electrical Code or more stringent local code, as applicable, prior to installation of NID.
- ④. Metallic water pipe shall be electrically continuous from point of NID grounding conductor attachment to a point where the metallic water pipe is bonded to the electric system.
- ⑤. The ground wire conductor size used shall be chosen for the installation based on the number of telecommunications circuits installed at the customer location. See RUS 1753F-801(PC-5A) for correct conductor size.

ITEMS	MATERIALS	NO. REQ'D
NID	NID, outside station (specify no. of modular jacks/fuseless protectors)	1
aj	Clamps, ground rod and pipe	1
*al	Staples or nails, ground wire	as req'd
*nq	Wire, ground, insulated (See Note 5 for conductor size)	as req'd
*mw	Screws, stainless steel, wood	as req'd
—	Tag, warning	1
RURAL TELECOMMUNICATIONS CONSTRUCTION PRACTICES OUTSIDE NETWORK INTERFACE DEVICE (NID) — ELECTRIC SYSTEM GROUND WITH BOND TO METALLIC WATER PIPE		
Scale: NTS		March 2001
		NID1

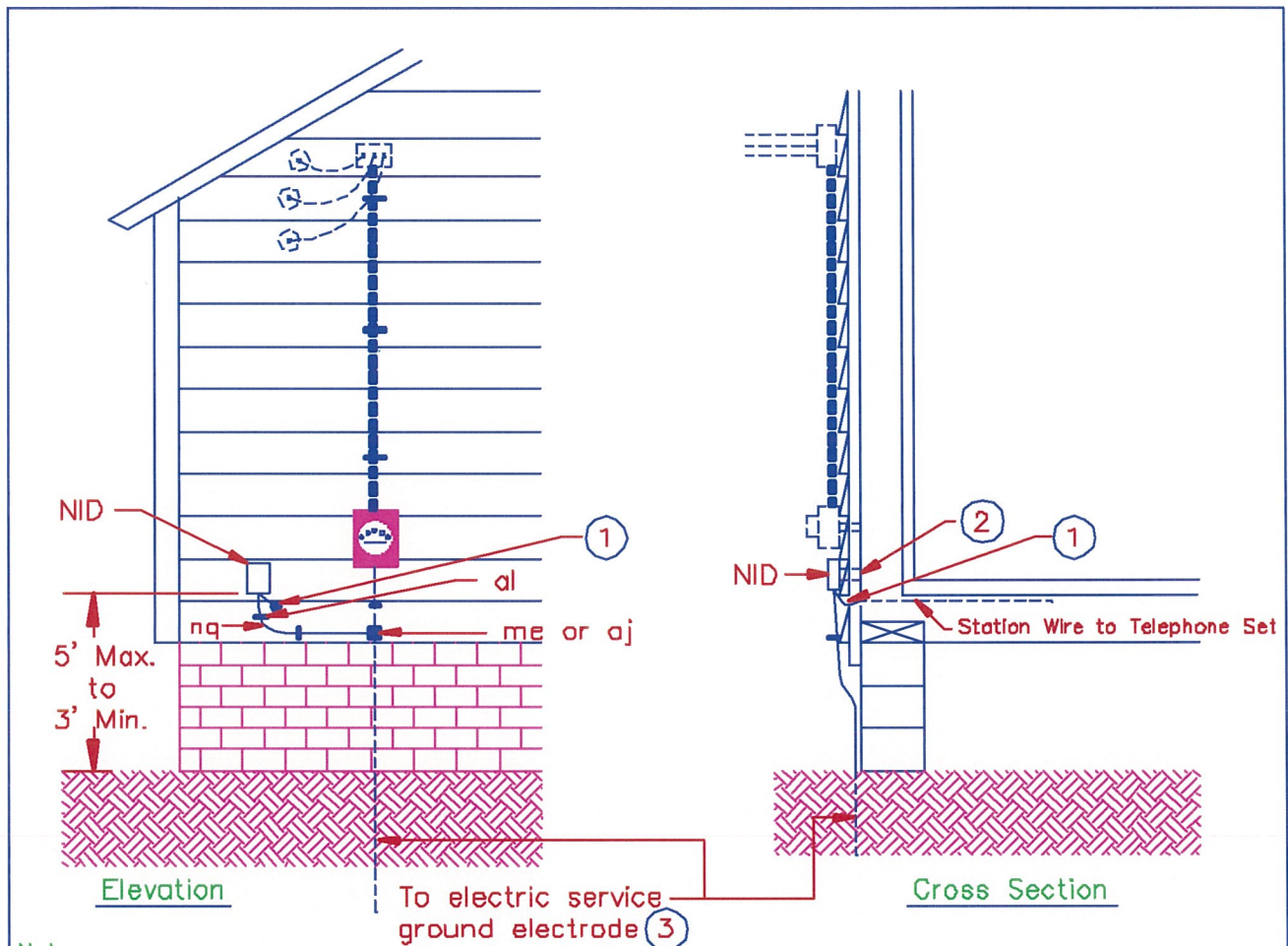


Notes:

- ①. Holes shall be sloped slightly upward and wires shall be taped to a tight fit.
- ②. When mounting NID on masonry surface, screw expansion anchors or equivalent manual or machine-driven fastening devices shall be used.
- ③. Ground wire shall be connected to the electric service ground rod by means of pipe-type ground clamp. Be sure the electric system ground is in compliance with existing applicable codes. Electric system grounding conductor attachment shall not be disturbed.
- ④. Ground wire shall be fastened to the building 4 in. above the grade.
- ⑤. Grounding conductor shall be guarded (item am) from physical damage where necessary. Plastic guards are recommended. If metallic guards are used both ends of the guard shall be bonded to the NID grounding conductor.
- ⑥. The ground wire conductor size used shall be chosen for the installation based on the number of telco circuits to be installed at the customer location. See RUS Bulletin 1753F-B01(PC-5A) for correct conductor size.
- ⑦. For converting English units to metric units use 1 in. = 25.4 mm and 1 ft = 0.3048 m.

ITEMS	MATERIALS	NO. REQ'D
NID	NID, outside station (specify no. of modular jacks/fuseless protectors)	1
aj	Clamps, ground rod and pipe	1
*al	Staples or nails, ground wire	as req'd
*nq	Wire, ground, insulated (See Note 6 for conductor size)	as req'd
*mw	Screws, stainless steel, wood	as req'd
am	Guard, buried service (including fastners)	as req'd

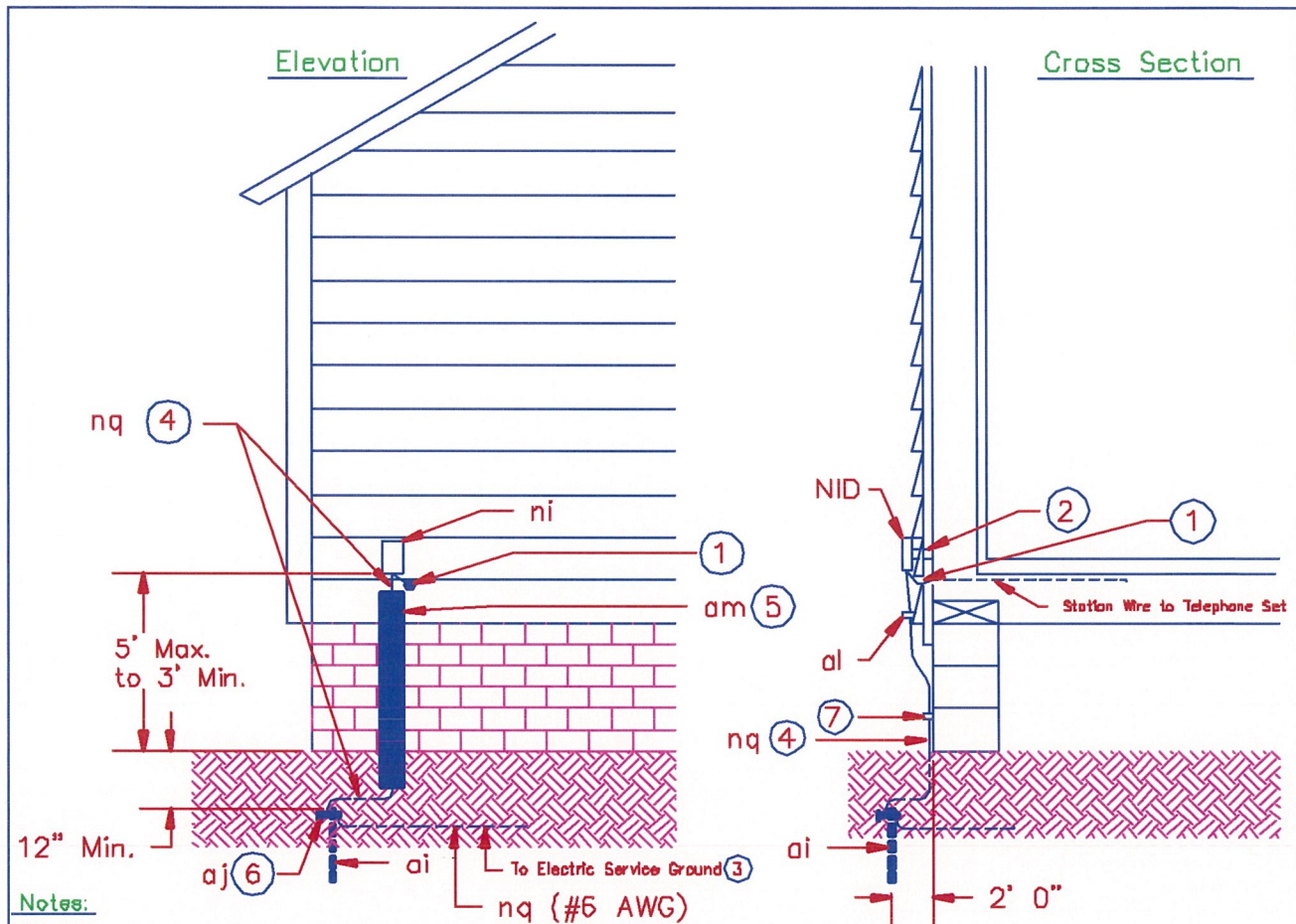
RURAL TELECOMMUNICATIONS CONSTRUCTION PRACTICES OUTSIDE NETWORK INTERFACE DEVICE (NID) ELECTRIC SYSTEM GROUND ROD		
Scale: NTS		March 2001
		NID2



Notes:

- ① Holes shall be sloped slightly upward and wires shall be taped to a tight fit.
- ② When mounting NID on masonry surface, screw expansion anchors or equivalent manual or machine-driven fastening devices shall be used.
- ③ Ground wire shall be connected to the electric service grounding conductor or to the metallic conduit (enclosure) covering the electric service grounding conductor by means of a grounding connector or pipe-type clamp, Item "me" or "aj", as appropriate. Be sure electric system grounding is in compliance with existing applicable codes. Electric ground attachments shall not be disturbed..
- ④ The ground wire conductor size used shall be chosen for the installation based on the number of telecommunications circuits to be installed at the customer location. See RUS Bulletin 1753F-801(PC-5A) for correct conductor size.

ITEMS	MATERIALS	NO. REQ'D
NID	NID, outside station (specify no. of modular jacks/fuseless protectors)	1
aj	Clamp, ground rod and pipe	1
*al	Staples or nails, ground wire	as req'd
*mw	Screws, stainless steel, wood	as req'd
*nq	Wire, ground, insulated. (See Note 4 for conductor size)	as req'd
me	Connector, grounding compression type	as req'd
<p>For converting English units to metric units use 1 in. = 25.4 mm and 1 ft = 0.3048 m.</p>		
<p>RURAL TELECOMMUNICATIONS CONSTRUCTION PRACTICES OUTSIDE NETWORK INTERFACE DEVICE (NID) ELECTRIC SYSTEM GROUNDING CONDUCTOR</p>		
Scale: NTS		March 2001
		NID3



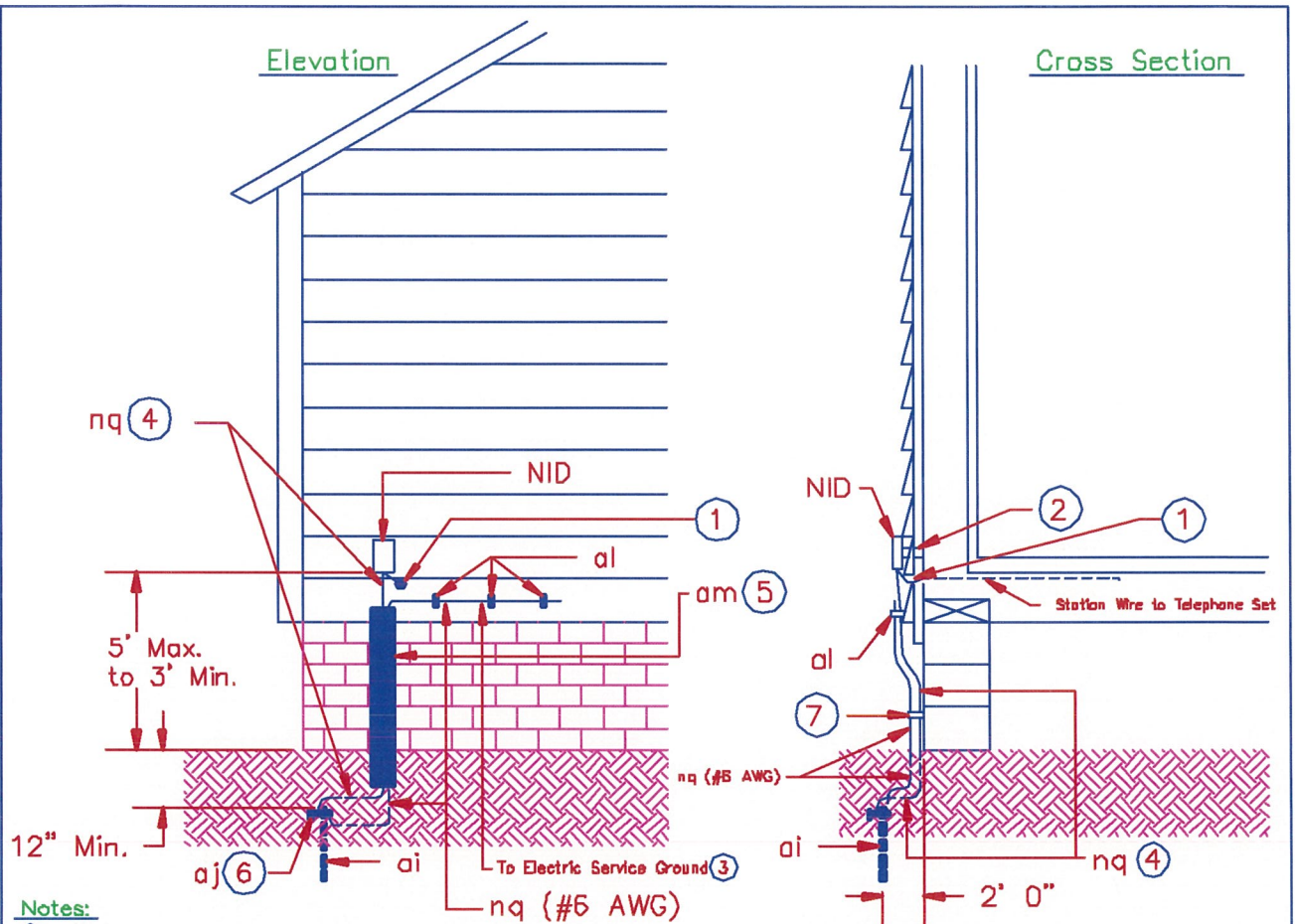
Notes:

1. Holes shall be sloped slightly upward and wires shall be taped to a tight fit.
2. When mounting NID on masonry surface, screw expansion anchors or equivalent manual or machine-driven fastening devices shall be used.
3. Bonding wire shall be connected to the electric service grounding conductor or to the metallic conduit (enclosure) covering the electric service grounding conductor or the electric service grounding electrode by means of a grounding connector or pipe-type clamp, Item "me" or "aj", as appropriate. Be sure electric system ground is in compliance with existing applicable codes. Electric ground attachments shall not be disturbed.
4. The ground wire conductor size used shall be chosen for the installation based on the number of telco circuits to be installed at the customer location. See RUS Bulletin 1753F-601(PC-5A) for correct conductor size.
5. Grounding conductor shall be guarded (with Item "am") from physical damage, where necessary. Plastic guards are recommended. If metallic guards are used both ends of the guard shall be bonded to the NID grounding conductor.
6. One clamp may be used if it is listed by Underwriter's Laboratories (UL) or other acceptable organizations for connecting two wires, otherwise two UL or other acceptable organization listed clamps must be used.
7. Ground wire shall be fastened to building 4 in. above grade.

ITEMS	NO. REQ'D	MATERIALS	ITEMS	NO. REQ'D	MATERIALS
			*mw	as req'd	Screws, stainless steel, wood
NID	1	NID, outside station (specify no. of modular jacks/fuseless protectors)	*nq	as req'd	Wire, ground, insulated, (See Note 4 for conductor size)
ai	1	Rod, ground, 1/2" x 5' 0" min.	me	as req'd	Connector, grounding
*al	as req'd	Staples or nails, ground wire	am	as req'd	Guard, buried service (including fasteners)
*nq	as req'd	Wire, ground, bare, #6 AWG copper	aj	1	Clamps, ground rod and pipe

For converting English units to metric units use
1 in. = 25.4 mm and 1 ft = 0.3048 m.

RURAL TELECOMMUNICATIONS CONSTRUCTION PRACTICES
OUTSIDE NETWORK INTERFACE DEVICE (NID) - TELCO GROUND
ROD WITH SUB-SURFACE BOND TO ELECTRIC GROUND
Scale: NTS
March 2001
NID4



Notes:

1. Holes shall be sloped slightly upward and wires shall be taped to a tight fit.
2. When mounting NID on masonry surface, screw expansion anchors or equivalent manual or machine-driven fastening devices shall be used.
3. Bonding wire shall be connected to the electric service grounding conductor or to the metallic conduit (enclosure) covering the electric service grounding conductor or the electric service grounding electrode by means of a grounding connector or pipe-type clamp, Item "me" or "aj", as appropriate. Be sure electric system ground is in compliance with existing applicable codes. Do not disturb electric ground attachments.
4. The ground wire conductor size used shall be chosen for the installation based on the number of telco circuits to be installed at the customer location. See RUS Bulletin 1753F-801(PC-5A) for correct conductor size.
5. Grounding conductor shall be guarded (with Item "am") from physical damage, where necessary. Plastic guards are recommended. If metallic guards are used both ends of the guard shall be bonded to the NID grounding conductor.
6. One clamp may be used if it is listed by Underwriter's Laboratories (UL) or other acceptable organizations for connecting two wires, otherwise two UL or other acceptable organization listed clamps must be used.
7. Ground wire shall be fastened to building 4 in. above grade.

7. Ground wire shall be fastened to building 4 in. above grade.			ITEMS	NO. REQ'D	MATERIALS
ITEMS	NO. REQ'D	MATERIALS	*mw	as req'd	Screws, stainless steel, wood
NID	1	NID, outside station (specify no. of modular jacks/fuseless protectors)	*nq	as req'd	Wire, ground, insulated, (See Note 4 for conductor size)
ai	1	Rod, ground, 1/2" x 5' 0" min.	me	as req'd	Connector, grounding
*al	as req'd	Staples or nails, ground wire	am	as req'd	Guard, buried service (including fasteners)
*nq	as req'd	Wire, ground, insulated, #6 AWG copper	aj	1	Clamp, ground rod and pipe

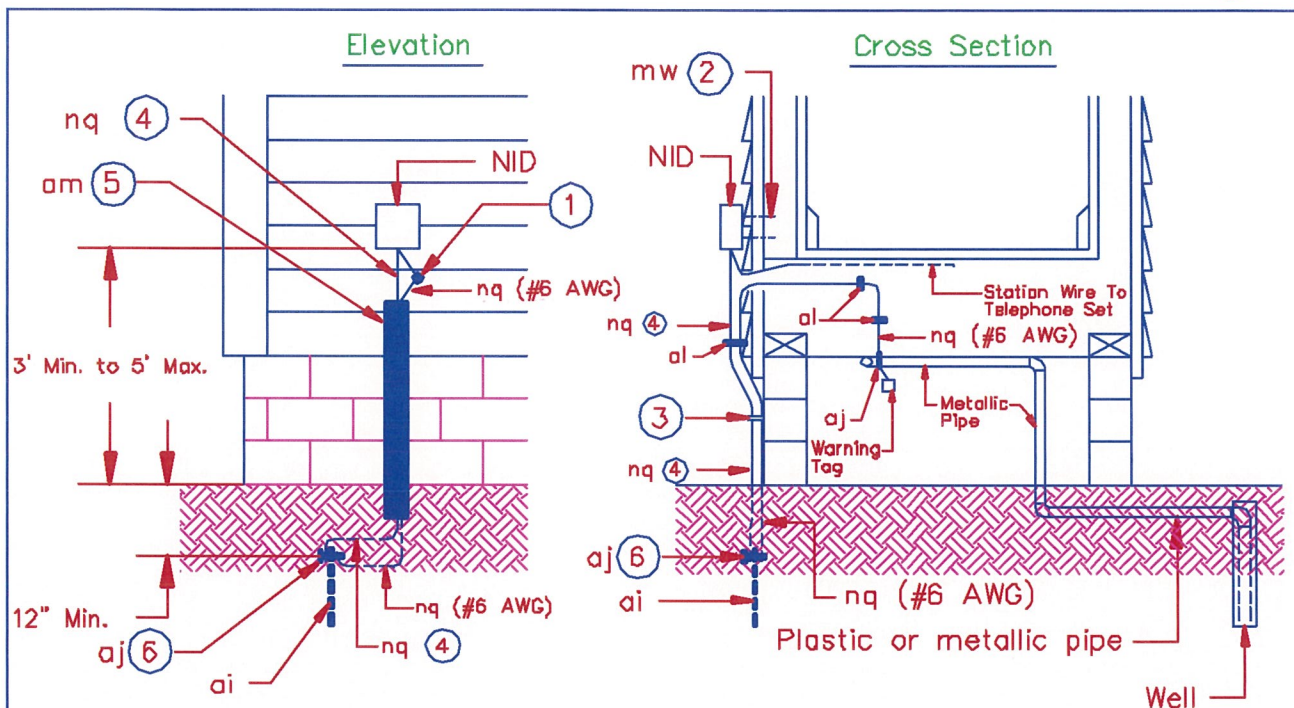
For converting English units to metric units use
 $1 \text{ in.} = 25.4 \text{ mm}$ and $1 \text{ ft} = 0.3048 \text{ m}$.

RURAL TELECOMMUNICATIONS CONSTRUCTION PRACTICES
OUTSIDE NETWORK INTERFACE DEVICE (NID) – TELCO GROUND
ROD WITH ABOVE-SURFACE BOND TO ELECTRIC GROUND

Scale: NTS

March 2001

NID5



Notes:

1. Holes shall be sloped slightly upward and wires shall be taped to a tight fit.
2. When NID on masonry surface, screw expansion anchors or equivalent manual or machine-driven fastening devices shall be used.
3. Ground wire shall be fastened to building 4 in. above grade.
4. The ground wire conductor size used shall be chosen for the installation based on the number of telco circuits to be installed at the customer location. See RUS Bulletin 1753F-801(PC-5A) for correct conductor size.
5. Grounding and bonding conductors shall be guarded (with Item "am") from physical damage, where necessary. Plastic guards are recommended. If metallic guards are used both ends of the guard shall be bonded to the NID grounding conductor.
6. One clamp may be used if it is listed by Underwriter's Laboratories (UL) or other acceptable organizations for connecting two wires, otherwise two UL or other acceptable organization listed clamps must be used.

ITEMS	NO. REQ'D	MATERIALS	ITEMS	NO. REQ'D	MATERIALS
NID	1	NID, outside station (specify no. of modular jacks/fuseless protectors)	*mw	as req'd	Screws, stainless steel, wood
al	1	Rod, ground, 1/2" x 5' 0" min.	-	1	Warning tag
aj	2	Clamps, ground rod and pipe	*nq	as req'd	Wire, ground, insulated, (See Note 4 for conductor size)
*al	as req'd	Staples or nails, ground wire	*nq	as req'd	Wire, ground, insulated, #6 AWG copper
			am	as req'd	Guard, buried service (including fasteners)

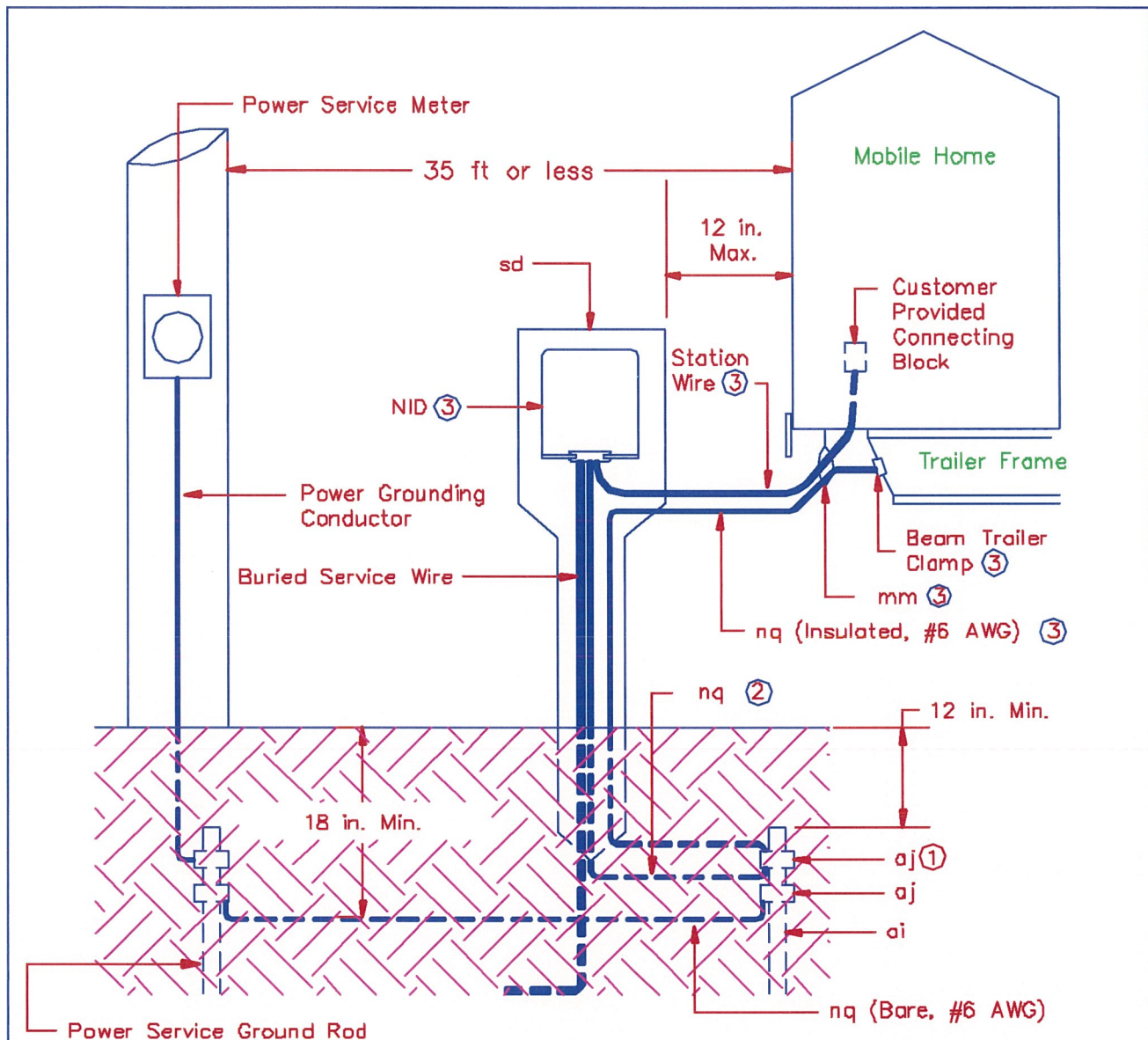
For converting English units to metric units use
1 in. = 25.4 mm and 1 ft = 0.3048 m.

RURAL TELECOMMUNICATIONS CONSTRUCTION PRACTICES
OUTSIDE NETWORK INTERFACE DEVICE (NID) - TELCO
GROUND ROD WITH BOND TO WATER PIPE -
NO ELECTRIC SERVICE AT SITE

Scale: NTS

March 2001

NID6



Notes:

- ① One clamp may be used if it is listed by Underwriter's Laboratories (UL) or other acceptable organizations for connecting two wires, otherwise two UL or other acceptable organization listed clamps must be used.
- ② The ground wire conductor size used shall be chosen for the installation based on the number of telco circuits to be installed at the customer location. See RUS Bulletin 1753F-801(PC-5A) for correct conductor size.
- ③ See RUS Bulletin 1753F-801(PC-5A) for terminations.

③ See RUS Bulletin 1753F-801(PC-5A) for terminations.			ITEMS	NO. REQ'D	MATERIALS
ITEMS	NO. REQ'D	MATERIALS	*nq	as req'd	Wire, ground, insulated, #6 AWG copper
NID	1	NID, outside station (specify no. of modular jacks/fuseless protectors)	*nq	as req'd	Wire, ground, insulated (See Note 2 for conductor size)
al	1	Rod, ground, 1/2" x 5' 0" min.	*nq	as req'd	Wire, ground, bare #6 AWG copper
aj	2	Clamps, ground rod and pipe	sd	1	Post, mobile home
*mm	1	Drive ring	—	1	Clamp, trailer beam

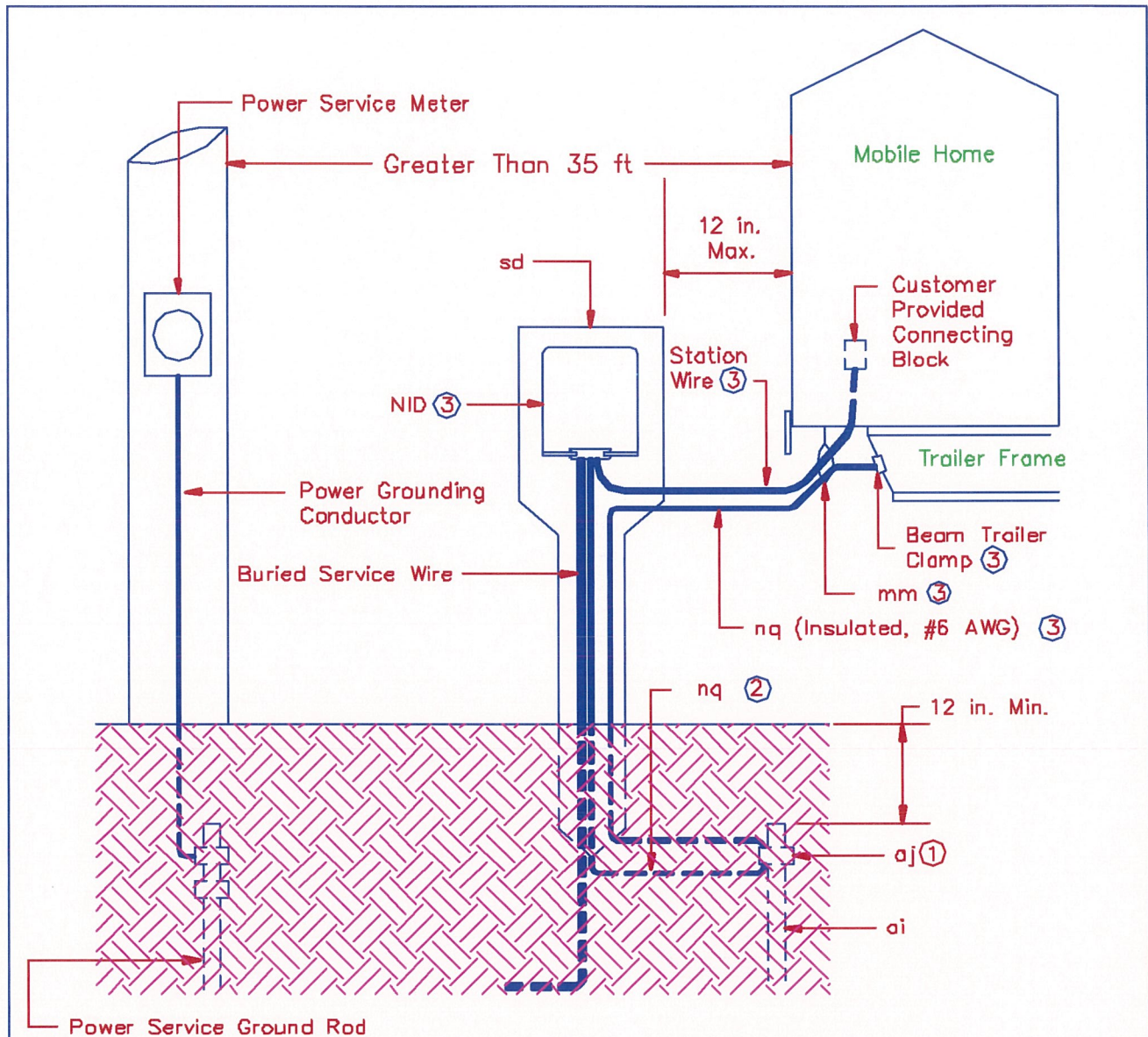
For converting English units to metric units use
1 in. = 25.4 mm and 1 ft = 0.3048 m.

RURAL TELECOMMUNICATIONS CONSTRUCTION PRACTICES NETWORK INTERFACE DEVICE (NID) MOBILE HOME INSTALLATION WITHIN 35 FEET OF ELECTRIC SERVICE EQUIPMENT

Scale: NTS

March 2001

NID7

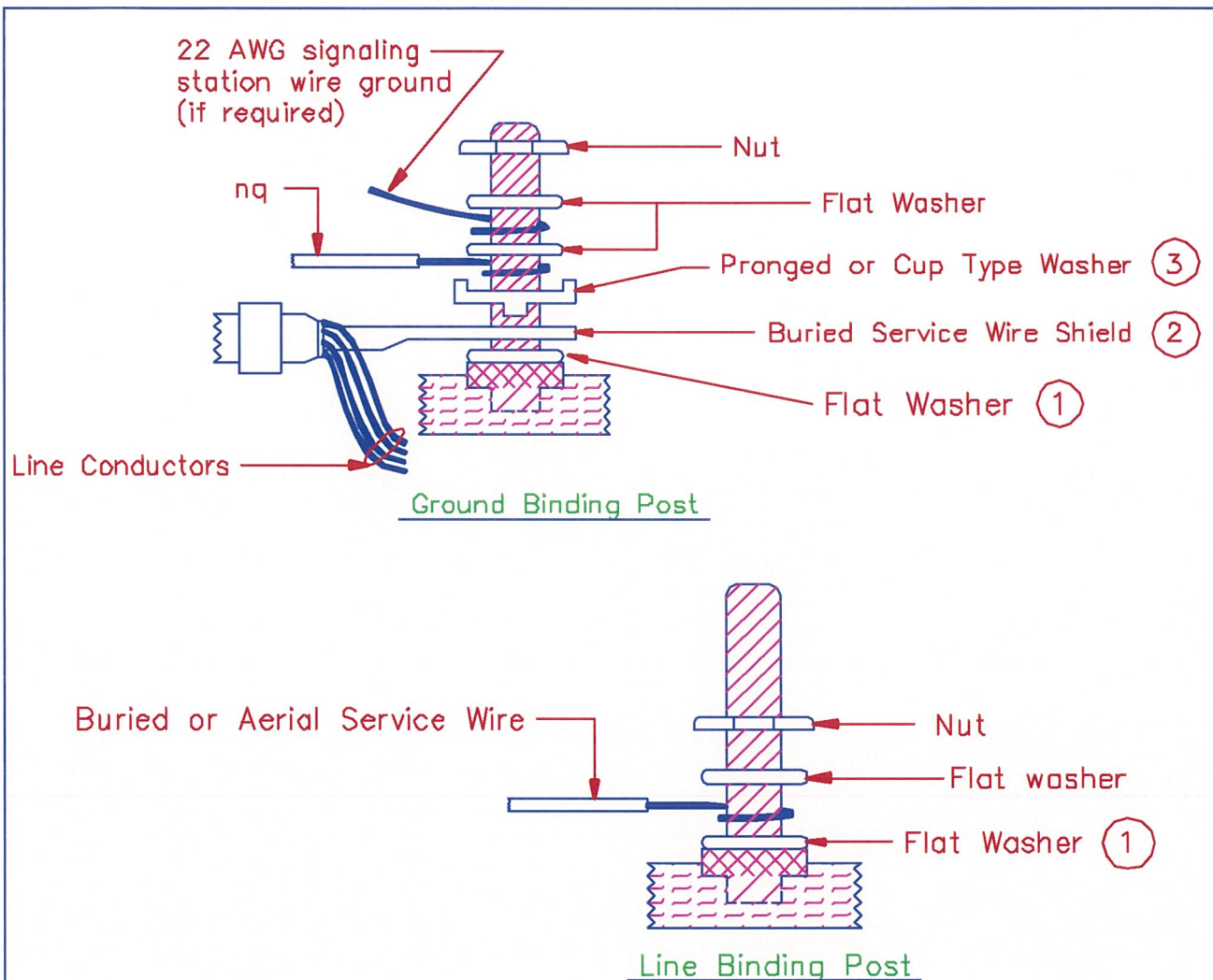


Notes:

- ① One clamp may be used if it is listed by Underwriter's Laboratories (UL) or other acceptable organizations for connecting two wires, otherwise two UL or other acceptable organization listed clamps must be used.
- ② The ground wire conductor size used shall be chosen for the installation based on the number of telco circuits to be installed at the customer location. See RUS Bulletin 1753F-801(PC-5A) for correct conductor size.
- ③ See RUS Bulletin 1753F-801(PC-5A) for terminations.

ITEMS	NO. REQ'D	MATERIALS	ITEMS	NO. REQ'D	MATERIALS
NID	1	NID, outside station (specify no. of modular jacks/fuseless protectors)	*nq	as req'd	Wire, ground, insulated (See Note 2 for conductor size)
ai	1	Rod, ground, 1/2" x 5' 0" min.	*nq	as req'd	Wire, ground, insulated, #6 AWG copper
aj	1	Clamps, ground rod and pipe	sd	1	Post, mobile home
*mm	1	Drive ring	-	1	Clamp, trailer beam

For converting English units to metric units use 1 in. = 25.4 mm and 1 ft = 0.3048 m.		RURAL TELECOMMUNICATIONS CONSTRUCTION PRACTICES NETWORK INTERFACE DEVICE (NID) MOBILE HOME INSTALLATION OVER 35 FEET FROM ELECTRIC SERVICE EQUIPMENT	
		Scale:	NTS
			March 2001
			NID8



Notes:

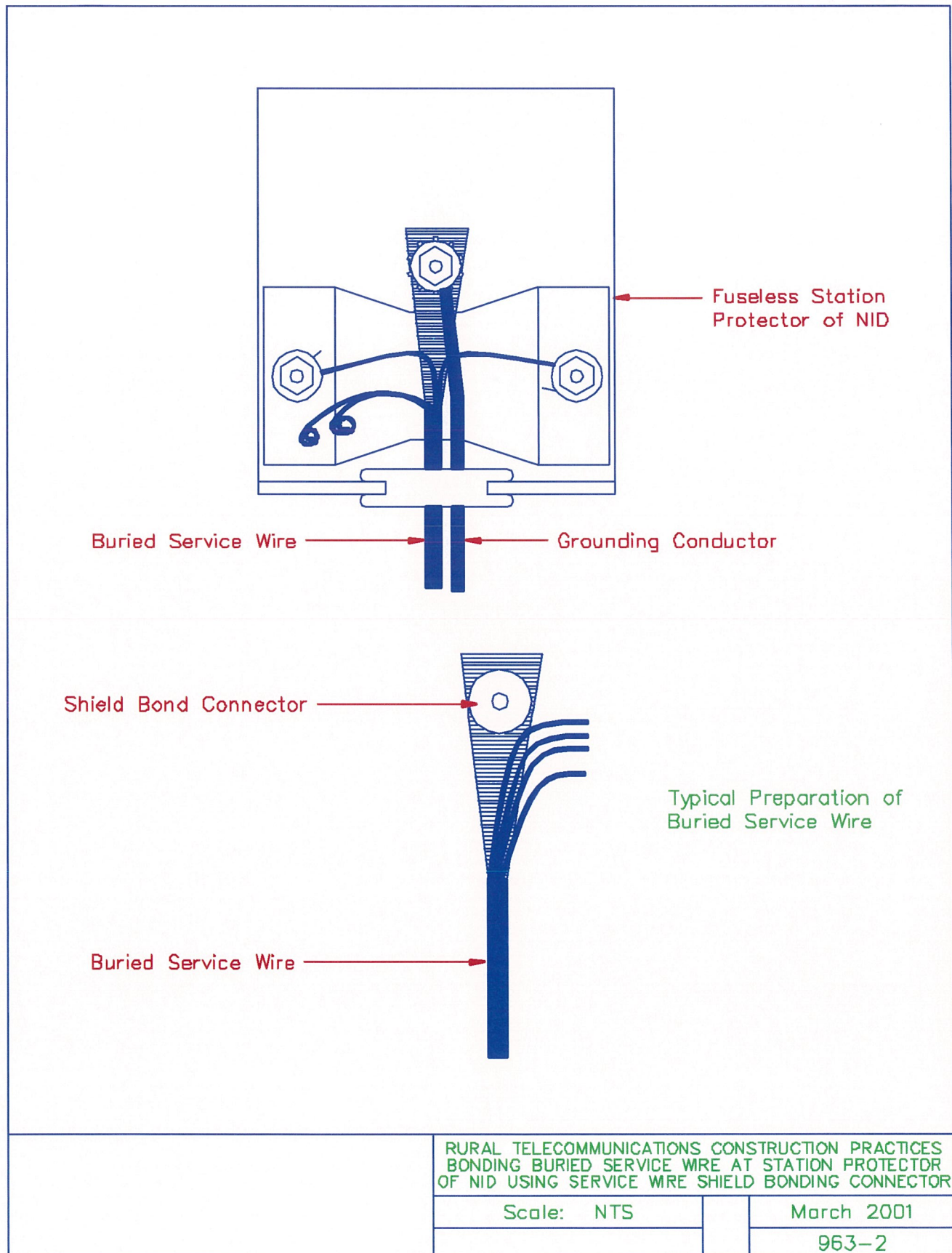
- (1) If the shoulder is inadequate to support the shield or the conductor an additional flat washer shall be added. The first flat washer shall be placed on the shoulder. The first conductor (or terminal) shall be placed on the first flat washer.
- (2) Buried service wire shield shall be terminated on the station protector grounding lug of the NID using either Figure 12 of RUS Bulletin 1753F-801(PC-5A), shield bonding connector manufacturer's instructions, or Guide Drawing 963-2.
- (3) Station protector binding posts of NID may be equipped with a cup type washer instead of a pronged washer.

RURAL TELECOMMUNICATIONS CONSTRUCTION PRACTICES
BURIED SERVICE WIRE TERMINATIONS OF SHIELD AND
CONDUCTORS ON STATION PROTECTOR BINDING POSTS OF NID

Scale: NTS

March 2001

962-1



INSERT VI:

BENTONITE SPILL PREVENTION PLAN

*NOTE: The Joint Permit Application for stream crossings requires a Bentonite Spill Prevention Plan when using directional bore on permitted streams.

Bentonite Spill Prevention Plan

In the HDD industry, the ability to respond and handle frac-outs must be a part of the construction procedures. This plan is intended to make sure the project is completely prepared for their responsibility in regards to eliminating or reducing the possibility of bentonite frac-outs to surface or water.

Bentonite:

Bentonite is a clay product mined in Wyoming and has all the natural characteristics as detailed in the MSDS sheet. The Department of Environmental Protection has determined that these bentonite drilling fluids are derived from natural-occurring sodium montmorillonite clays. The bentonite is non-toxic and commonly used in farming practices.

Bentonite drilling fluids (drill mud) is used exclusively in the HDD industry as a drilling lubricant and viscosifier, suspending the cuttings and carrying the cuttings back up the annulus of the pilot hole to a containment pit. These fluids and cuttings are then pumped from the bore pit to the solids control unit, cleaned and re-used; thus, creating a complete recycled use of drilling mud.

At a work site all drilling personnel have their responsibilities should an exposure or loss of circulation of bentonite occur. Drilling personnel monitor mud returns for loss volumes and report immediately to the driller, mud operator and the drilling superintendent. Mud pressures, mud viscosity, sand content and weight are continuously monitored during all phases of the drilling. By monitoring the mud, the HDD contractor can determine the correct properties needed for drilling different type formations, i.e. maximum cleaning, loss circulation and frac-out controls. Loss circulation or frac-outs can be reduced and contained or eliminated by strict monitoring and implementing proper controls and procedures.

Frac-Outs:

A Frac-Out or inadvertent return of drilling lubricant is a potential concern with any HDD. The primary areas of concern for inadvertent returns occur near the entry and exit points and where the drill depths are less than 20 feet. The likelihood of inadvertent returns decreases, as the depth of the drill increases but a release is still a possibility. Early detection is the key to minimizing the impact.

The "Frac-Out Plan" is generally prepared by the Engineering firm charged with the overall project design in conjunction with the drilling contractor, to ensure that preventive and responsive measures can be implemented by the contractor. To minimize the potential for a frac-out, the contingency plan should include:

Contingency Plan or Frac-Out:

Contingency Plan or Frac-Out:

- Minimize the potential for a frac-out associated with the horizontal directional drill.
- Provide for the timely detection of frac-outs.
- Protect areas that are considered environmentally sensitive (bays, streams, wetlands, other biological resources, and cultural resources).
- Ensure an organized, timely and "minimum-impact" response in the event a frac-out and or release of drilling mud occur.
- Ensure that all appropriate notifications are made to all the necessary regulatory agencies and ensure documentation has been completed.

Design protocols to be implemented for the protection of sensitive cultural and biological resources.

- 1) Prior to construction, sensitive cultural and or biological resources should be protected as well as areas where run off could occur with a barrier, i.e., hay bales and silt fencing.
- 2) On-site briefings will be conducted for the workers to identify and locate sensitive resources at the site.
- 3) Ensure that all field personnel understand their responsibility for timely reporting of frac-outs.
- 4) Maintain necessary response equipment and material at a readily accessible location.

Standard procedures for containment of frac-outs of bentonite drilling fluids during drilling operations:

- Cease drilling operations immediately
- Notify Site Inspector
- Locate and contain any frac-outs accessible
- Place pump or vacuum equipment
- Document frac-out
- Review options
- Implement procedures
- Commence drilling

Along with standard frac-out procedures, other methods can be implemented to avoid or reduce frac-outs. The design of the crossing should be reviewed for sufficient depths in various soil and rock conditions.

It is important to maintain sufficient depths in the drill path to reduce or eliminate the possibility of mud exposure. In a sand and silts formation 30 to 35 feet of cover is normally a sufficient, safe depth and in a consolidated rock formation 20 to 25 feet should be sufficient as well. However in a porous rock formation bentonite can migrate to the surface through fractures or poor rock conditions.

The placement of casing from surface through the alluvial soils down to rock can greatly reduce the possibility of frac-outs. In addition some loss circulation materials (LCM) and special drilling techniques can provide the contractor some assistance in reducing frac-outs and or loss circulation down hole. There are many LCM's used in the HDD industry, such as mica, poly swell, magna fiber and cedar fiber to name a few. These LCM's are mixed with the bentonite and circulated or spotted down hole to the suspected area of exposure where the material can begin to heal the formation.

Should a drilling operation experience partial loss of mud or a visible frac-out is encountered, the HDD operation will immediately cease pumping of drilling fluids and commence placing containment barriers around the frac-out. Pumps or vacuum trucks (dependent on the situation) will be positioned at the frac-out for transfer of mud back to the recycling system or to a pre-approved disposal site.

During this operation the client's site inspector or engineer will be immediately notified. The drilling superintendent will then provide all necessary documentation as to time, location, pump and bit pressures and estimated volumes of the frac-out to the proper authorities. If a land exposure is located, pumps and or vacuum trucks will be positioned at the frac-out for containment and transfer of mud back to the recycling system or to a pre-approved disposal site.

Should a frac-out occur under water, the necessary equipment to contain and vacuum the mud will be placed into operation. Equipment that may be required for frac-outs into water include filter bags, silt screens and water lifts. For some offshore frac-outs a small boat or barge with a water lift can raise the bentonite mud from the river bottom and pump the fluids into a holding tank back on shore. With minimum frac-outs, filter bags or used to contain and filter the mud for easy transfer or disposal.

Any frac-out is considered a priority and there will be protective measures in place to contain or quickly recover any bentonite drilling fluids that may frac-out to surface. In addition the project will make every effort during the drilling operations to prevent the possibility of frac-outs. However, when drilling in subsurface conditions with limited geotechnical data, a drilling contractor cannot guarantee that frac-outs will not occur.

CONTAINMENT AND DISPOSAL OF FUELS AND WASTE MATERIALS

The following potentially hazardous materials may be used on site. The primary oil-based or toxic products to be used on-site consist of:

- Diesel fuel
- Gasoline
- Lube oil
- Bearing grease

- Pipe lubricant
- Hydraulic oil
- Used oil
- Used filters, rags, etc.

Diesel Fuel:

Required to fuel drill rig motor and heaters, will be transported by approved bulk trucks. To ensure spillage does not occur, all engines are connected to one fuel supply with approved hoses or steel lines. Limited amounts of fuel will be stored on site.

Gasoline:

Required for remote water pump engines and other support pumps or portable generators. This will be supplied and transported in 55-gallon drums. The transfer of gas from the barrels to the engines will be carried out with barrel pumps that fit solidly into the barrel opening.

Lube Oil:

Required for all engines to maintain oil levels and oil changes. Oil will be supplied in tin cans in case lots or pails. This reduces the chance of sizeable spills and makes handling easier. Used oil will be caught in containers designed to fit below the drain opening. The used oil will then be placed in a 45 or 55 gallon drum, which can be sealed. The contained used oil will be removed from the site at the end of the project and disposed of in an approved manner.

Bearing Grease:

This will be required in very limited amounts. The packaging of the product will be in container tubes, which are placed directly into the grease guns.

Hydraulic Oil:

Required on a limited basis for the drill rig's hydraulic system for drill pipe rotation, pull and push capacity and the breakout or make-up of drill pipe. Again, limited quantities will be required and will be transported in sealed 5-gallon steel containers or 55-gallon drums. Filling will only be required in the remote event that a leak develops.

The drilling operation will insure there are protective measures in place to contain or quickly recover any oil that may leak from the units by ensuring that all hydraulic hoses and fittings are in good shape and designed for cold weather applications. All hydraulic pump-bearing seals will be checked for leaks and repaired as necessary.

Absorbent oil spill padding will be on site and will be placed under areas of the drill rig where the possibility of an oil leak might occur. This will absorb any oil that may escape before the leak is discovered and repairs can be made.

Used Oil:

The handling and containment of used oil is always a potential problem at any temporary work site. In this case the short duration of the project will reduce the volume of used oil. However, even in this case, used oil will accumulate throughout the project and must be collected and temporarily stored.

Containers will be used to hold all the used oil collected. These containers will have openings that can be sealed shut when full. This will allow them to be transported without any possibility of leaking en route. Used oil will be taken to a proper treatment plant where it can be disposed of in an approved manner.

Garbage:

Any construction or drilling site will accumulate a reasonable amount of garbage that needs to be disposed. This can be handled in several ways, including dumpsters on site that will be supplied by and removed by an authorized collection company within the local area.

Used filters and oily rags of a toxic nature will be placed in steel containers that can be sealed against leakage once they are filled. These containers will be identified by clearly marking on the barrel the nature of the contents inside. Once filled they will be taken to an approved licensed disposal site.

EROSION CONTROL CONTAINMENT AND DISPOSAL

During drilling operations, it may become necessary to implement erosion control procedures and containment or disposal of rainwater, drilling fluids and alluvial soils. All these materials should be tested for possible contaminants prior to replacement or disposal. The responsibility and limits for handling of any erosion control, containment or disposal of these materials must be agreed on prior to construction.

Erosion Control:

On the operations site, earthen berms are constructed for containment and flow direction of any fluids back to the containment pit, which is located directly in front of the drilling rig. The containment pit is approximately 10 foot wide, 10 foot long and 4 foot deep and is enclosed with an orange safety fence. This fluid can be pumped back to the mud system for recycling down hole.

If excessive amounts of rainwater are encountered, hay bales, straw and silt fencing can be placed on or around the erosion site to provide some stabilization of the ground. Should heavy runoffs occur, a deflection or containment berm or shallow pit can be constructed and any fluids pumped back to holding tanks or the mud system.

Disposal of Materials:

Prior to commencement of drilling operations, a method for transportation and disposal of drilling fluids and cuttings will be established. In addition, vacuum trucks and holding tanks are identified, which can be put on notice for containment and disposal assistance.

DRILLING FLUID AND SOLIDS DISPOSAL PROCEDURES

Prior to commencement of drilling operations, the drilling superintendent will establish an approved landfill or off-site facility for disposal of all excess drilling fluids and cuttings. The selected name and location will be provided to our client for approval. Solids Disposal during the pilot hole and reaming operations, bentonite drill fluids will carry the solids from the formation back to the entry pit. The fluids and cuttings will be contained for separation. The solid materials (maximum of 50% water by volume) will be placed in a lined container and prepared for hauling to an approved site.

Bentonite Disposal:

The bentonite drilling fluids are continually contained. After the project is completed, the drilling fluids will be vacuumed up and hauled to the aforementioned approved site for disposal.

The information provided herein details HDD industry standards for almost all directional drilling projects. However, various site and sub-surface conditions could require some slight changes in the methodology.