



SPECIFICATIONS FOR WIRELINE OCCUPANCY OF VIRGINIA PASSENGER RAIL AUTHORITY PROPERTY

Table of Contents

1.0 GENERAL.....	3
1.1 Scope.....	3
1.2 Definitions.....	3
1.3 Application for Occupancy.....	3
1.4 Right of Entry.....	4
1.5 Site Inspection.....	4
1.6 Information Required for Submission.....	5
1.7 Notification to Proceed with Construction.....	6
2.0 CONSTRUCTION REQUIREMENTS.....	7
2.1 Aerial Wirelines.....	7
2.2 Underground Wirelines.....	8
2.3 Method of Installation for Underground Wirelines.....	9
2.4 Longitudinal Occupations.....	10
2.5 Inductive Interface.....	11
2.6 Modification of Existing Facilities.....	11
2.7 Abandoned Facilities.....	11
2.8 Conflict of Specifications.....	11
2.9 Marker Signs.....	12
2.10 Warning Type.....	12
2.11 Handholes and Manholes.....	12
2.12 Safety Requirements.....	12
2.13 Blasting.....	13
2.14 Support of Excavation Adjacent to Track.....	13
2.15 Reimbursement of VPRA Costs.....	14

1.0 GENERAL

1.1 Scope

1. This specification shall apply to the design and construction of wirelines carrying power or communication cables over, under, across and along VPRA property, and facilities. This specification shall also apply to tracks owned by others (sidings, industry tracks, etc.) over which VPRA operates its equipment.
2. VPRA owns its right-of-way for the primary purpose of facilitating railroad operations. All occupancies shall therefore be designed and constructed so that rail operations and facilities are not interfered with, interrupted or endangered. In addition, the proposed facility shall be located to minimize encumbrance to the right-of-way so that the operating railroad will have unrestricted use of VPRA right-of-way for current and future operations.

1.2 Definitions

1.	VPRA	-	Virginia Passenger Rail Authority
2.	Contract Administration	-	VPRA's Contract Administration Department
3.	Owner	-	Individual, corporation, or municipality receiving an occupancy permit from VPRA
4.	Applicant	-	Individual, corporation, or municipality applying to VPRA for an occupancy permit
5.	Professional Engineer	-	Engineer licensed in the state where the facilities are to be constructed
6.	Conduit	-	Pipe, 6 inches in diameter or less, used to transport a wireline
7.	Sidings or industry tracks	-	Tracks located off VPRA's right-of-way, serving an industry or yard

1.3 Application for Occupancy

1. Individuals, corporations, or municipalities desiring occupancy of VPRA property by wireline occupations must agree, upon approval of the engineering and construction details by VPRA, to execute an appropriate VPRA occupancy permit, pay any required fees and/or rentals outlined therein, and meet all VPRA insurance requirements.

2. Contact Josh Lineberger (Joshua.Lineberger@vpra.virginia.gov) for the application for a wireline occupancy permit.
3. All applications shall be accompanied by PDF files for all design and construction plans, specifications, and engineering computations for the proposed occupancy. On extensive projects, only those plans involving work on, or affecting, VPRA property and operations shall be submitted. Included shall be a plan showing the extent of the total project upon which that portion of the work affecting VPRA is clearly defined.

1.4 Right of Entry

1. No entry upon VPRA property for the purpose of conducting surveys or field inspections, obtaining soils information, or any other purposes associated with the design and construction for the proposed occupancy will be permitted without a proper right of entry permit approved by VPRA. The Applicant must pay the associated fees and execute the right of entry permit.
2. Issuance of a right of entry permit does not constitute authority to proceed with any construction. Construction cannot begin until a formal agreement is executed by VPRA and the Owner, and the Owner receives permission from the designated inspection agent for of VPRA to proceed with the work.
3. Once permission from the VPRA representative is received to proceed with the work, all personnel are responsible for understanding and following the applicable local, county, state and federal laws and regulations, and any special requirements which may be imposed by the Federal Railroad Administration (FRA) or other regulatory agencies, including FRA fall protection and Roadway Worker Protection, applicable OSHA requirements, and Department of Homeland Security requirements.

Roadway Worker Safety training is provided by RailPros. Training must be specific to the operating railroad.

[Norfolk Southern Roadway Worker training](#)
[CSX Roadway Worker training](#)

4. Contact Josh Lineberger (Joshua.Lineberger@vpra.virginia.gov) for the application for a right of entry permit.

1.5 Site Inspection

1. For longitudinal occupancy of VPRA property or as otherwise required by VPRA, a site inspection along the proposed wireline route may be required before final design plans are prepared. When a site inspection is required, the party applying for an occupancy permit (Applicant) and/or its engineer must meet with representatives of VPRA to view the entire length of the proposed occupancy.
2. Prior to the site inspection, the Applicant must submit the following information:

- a. A plan view of the proposed route showing all tracks, all VPRA property lines, and all other facilities located on the property. The distance from the proposed pipeline to the adjacent track and to the property lines must be shown.
 - b. Typical cross sections along the proposed route. (See Plate IX)
3. Site inspections for wire crossings are not required unless, in the opinion of VPRA, the size and location of the facility warrant an inspection.
4. See Section 2.4 for further details.

1.6 Information Required for Submission

1. Plans for proposed wireline occupancies shall be submitted as a PDF package to and approved by VPRA prior to VPRA issuance of an occupancy permit and start of construction.
2. Plans shall be drawn to scale, dimensioned with US Customary Units, and shall include the following (See Plates I to IX):
 - a. Plan view of proposed wireline in relation to all VPRA facilities and facilities immediately adjacent to VPRA right of way, including, but not limited to tracks, buildings, signals, pole lines, other utilities and all other facilities that may affect or influence the wireline design and construction.
 - b. The geographical coordinates (latitude and longitude) of the wire crossing including the distance, in feet, to the nearest highway railroad grade crossing and the DOT number posted at the highway grade crossing, if available.
 - c. The name of the state and county in which the proposed facilities are to be located.
 - d. Profile of ground on centerline of pole or tower line showing clearances between top of high rail and bottom of sag, as well as clearances from bottom wire, cable to top wire, or cable of VPRA's transmission, signal and communication lines, catenary, and third rail when present. If VPRA facilities listed above do not exist at the point of crossing, the plan should so state. Actual vertical clearance shall be shown. (See Section 2.1 and Plate XIV for the required overhead clearance.)
 - e. All VPRA property lines, indicated by dimensions, in feet, to the centerline of adjacent track, as well as the overall width of the VPRA property. If the wireline is in a public highway, the limits of the dedicated highway property, as well as the limits of any paving, sidewalks etc., shall be defined, by dimensions in feet, from the centerline of the dedicated property.
 - f. The angle of the crossing in relation to the centerline of the track(s).
3. The plan shall be specific as to:

- a. Base diameter, height, class, and bury depth of poles.
 - b. Number of, size, and material of all wires, as well as number of pairs/strands in communication cables.
 - c. Nominal voltage of line and phase of circuit.
 - d. Location, number of, size of, material or anchors and all guying for poles and arms.
 - e. Conduit length across property lines.
 - f. Areas of impact and/or vegetation removal.
4. Once the application has been approved by VPRA, no variance from the plans, specifications, method of installation, and construction, etc., as approved in the occupancy document, will be considered or permitted without the payment to VPRA of additional fees for the re-processing and approval of the application.
 5. Under special conditions, VPRA will give consideration to occupations on its bridge superstructures, substructures, pole line, and others.
 6. At VPRA's request, all plans and computations associated with the work under the agreement shall be prepared by, and bear the seal of, a Professional Engineer and Professional Land Surveyor.
 7. Project specifications for all work on and affecting the railroad property shall be included with the submission. All pertinent requirements of this document shall be met by such submission.

1.7 Notification to Proceed with Construction

1. After approval of the engineering plans, specifications, and execution of the occupancy permit, a VPRA construction representative will reach out to the Owner. VPRA's construction representative will conduct VPRA's inspection of the project and coordinate all other construction aspects of the project that relate to VPRA (flagging, track work, protection of signal cables, etc.).

2.0 CONSTRUCTION REQUIREMENTS

2.1 Aerial Wirelines

1. Overhead power and communication lines shall be constructed in accordance with the *National Electrical Safety Code* (current edition), Part 2, "Safety Rules for the Installation and Maintenance of Overhead Electric Supply and Communication Lines," and as outlined further in this section.
2. Poles shall be set as close to VPRA property lines as possible and in no instance closer than 18 feet from face of pole to centerline of nearest track. When necessary, however, each location will be analyzed to consider speed, traffic, etc.
3. Double cross-arms are required on poles adjacent to track. Any tower or steel pole foundation design must be accompanied by engineering computations and data as well as stamped by a registered professional engineer.
4. Any tower or steel pole to be installed on VPRA property must meet or exceed the industry standards regarding design and usage.
5. Vertical clearance from the top of rail to the bottom of sag of aerial wire crossing, measured at 60 degrees Fahrenheit, shall be as follows:

Table 1

Guy wires, messenger cables, and telecommunication cables	Electric supply lines and neutral wires (voltage is measured phase-to-ground)*		
27 feet	Less than 750-V 30-feet	750-V to 15-KV 31-feet	15-KV to 50-KV 33-feet

* For electric supply lines or neutral wires carrying greater than 50-KV, use a vertical clearance of 33 feet plus 1/2 inch per 1-KV above 50-KV.

6. Vertical clearance between proposed aerial wire crossings and aerial VPRA communication lines shall be as follows:

Table 2

Guy wires, messenger cables, and telecommunication cables	Electric supply lines and neutral wires (voltage is measured phase-to-ground)*		
2 feet	Less than 750-V 2 feet	750-V to 15-KV 4 feet	15-KV to 50-KV 6 feet

* For electric supply lines or neutral wires carrying greater than 50-KV, use a vertical clearance of 33 feet plus 1/2 inch per 1-KV above 50-KV.

7. Overhead power and communication lines shall be constructed in accordance with the Signal Clearance Diagrams attached as Plate XII and XIII.

2.2 Underground Wirelines

1. Underground installations carrying power or communication wires and cables shall be constructed and properly marked with signs, in accordance with *American Railway Engineering Maintenance-of-Way Association* (current edition), Chapter 1, Part 5, except as outlined further in this section.
2. Conduits shall be located, where practicable, to cross tracks at approximate right angles to the track, but not less than 45 degrees.
3. Conduits shall not be placed within a culvert, under railroad bridges, nor closer than 50 feet from any portion of any railroad bridge, building, or other important structure, except in special circumstances, and then by special design, and only as approved by VPRA Engineering.
4. Conduits shall not be located within 25 feet of the limits of a turnout (switch) when crossing the track. The limits of the turnout extend from the point of the switch to the last long timber.
5. Plastic conduit material includes thermoplastic and thermoset plastic conduits, such as PVC and HDPE.
6. Conduits shall maintain a minimum horizontal clearance of 15 feet or if within 15 feet, a minimum vertical clearance of 15 feet from any railroad signal apparatus.
7. Minimum Depth of Installation:

Table 3

Material	Bore & Jack	HDD-A	HDD-B
Steel	5.5 feet	10 feet	5.5 feet
Plastic	15 feet*		
Parallel Occupancy	4 feet		

*Within 25 feet of centerline of the closest track and a minimum depth of 10 feet anywhere else on VPRA property.

8. Conduits under railroad tracks and across VPRA's property shall extend the greater of the following distances, measured at right angle to centerline of track:
 - a. Across the entire width of the VPRA property.
 - b. 3 feet beyond ditch line.
 - c. 2 feet beyond toe of slope.
 - d. Beyond theoretical railroad embankment line. This line begins at a point, on existing grade, 14 feet horizontally from centerline track and extends downward on a 2 (H) to 1 (V) slope (see Plate VII). The 14 feet are measured from 19 inches below the base of the rail.

2.3 Method of Installation for Underground Wirelines

1. Bored, jacked, or tunneled installations shall have a bore hole essentially the same as the outside diameter of the conduit plus the thickness of the protective coating.
2. The use of water or other liquids to facilitate conduit emplacement and spoil removal is prohibited, except as outlined in Section 2.3.6.
3. If during installation an obstruction is encountered which prevents installation of the conduit in accordance with this specification, the conduit shall be abandoned in place and immediately filled with grout. A new installation procedure and revised plans must be submitted to, and approved by, VPRA before work can resume.
4. The project specifications must require the contractor to submit a complete construction procedure of the proposed operations to VPRA for approval. Included with the submission shall be the manufacture's catalog information describing the type of equipment to be used.
5. Bore and Jack (Steel Pipe).

This method consists of pushing the pipe into the earth with a boring auger rotating within the pipe to remove the spoil.

- a. The boring operation shall be progressed on a 24-hour basis without stoppage (except for adding lengths of pipe) until the leading edge of the pipe has reached the receiving pit.
- b. The front of the pipe shall be provided with mechanical arrangements or devices that will positively prevent the auger from leading the pipe so that no unsupported excavation is ahead of the pipe.
- c. The auger and cutting head arrangement shall be removable from within the pipe in the event an obstruction is encountered. If the obstruction cannot be removed without excavation in advance of the pipe, procedures as outlined in Section 2.7 must be implemented immediately.
- d. The over-cut by the cutting head shall not exceed the outside diameter of the pipe by more than ½ inch. If voids should develop or if the bored hole diameter is greater than the outside diameter of the pipe (plus coating) by more than approximately 1 inch, grouting or other methods approved by VPRA shall be employed to fill such voids.
- e. The face of the cutting head shall be arranged to provide a reasonable obstruction to the free flow of soft or poor material.
- f. Any method that employs simultaneous boring and jacking for conduits over 8 inches in diameter and that does not meet the requirements of this section will

not be permitted. For pipe 8 inches and less in diameter, auguring or boring without this arrangement may be considered for use only if approved by VPRA.

6. Directional Boring/Horizontal Directional Drilling Method "A"

This method consists of setting up specialized drilling equipment on existing grade (launching and receiving pits are not required) and boring a small diameter pilot hole on the desired vertical and horizontal alignment using a mechanical cutting head with a high-pressure fluid (bentonite slurry) to remove the cuttings. The drill string is advanced with bentonite slurry pumped through the drill string to the cutting head and then forced back along the outside of the drill string, carrying the cuttings back to the surface for removal. When the cutting head reaches the far side of the crossing, it is removed and a reamer (with a diameter greater than the cutting head) is attached to the lead end of the drill string. The conduit is attached to the reamer and the pilot hole is then back reamed while the conduit is pulled into place.

- a. For steel conduits, the depth of cover must be greater than 10 feet below the base of the rail, or the bore is in rock.
- b. For plastic conduits, the depth of cover must be greater than 15 feet below the base of the rail, or the bore is in rock.
- c. Factors considered will be track usage, pipe size, contents of pipeline, soil conditions, etc.

7. Directional Boring/Horizontal Directional Drilling Method "B"

This method consists of using hydraulic jacking equipment to push a solid steel rod under the railroad from a launching pit to a receiving pit. At the receiving pit, a cone shaped "expander" is attached to the end of the rod and the conduit (casing pipe) is attached to the expander. The rod, expander and conduit are then pulled back from the launching pit until the full length of the conduit is in place.

- a. This method may be used to place conduit (casing pipe), up to and including 6 inches in diameter, under the railroad.
- b. For steel conduits, the depth of cover must be greater than 5.5 feet below the base of the rail, or the bore is in rock.
- c. For plastic conduits, the depth of cover must be greater than 15 feet below the base of the rail, or the bore is in rock.

2.4 Longitudinal Occupations

1. Conduits laid longitudinally on VPRA property shall be located as far as practicable from any tracks or other important structures and as close to the railroad property line as possible. Longitudinal conduits must not be located in earth embankments or within ditches located on the property.

2. Wires and cables running longitudinally along VPRA's property shall be constructed as close to property lines as possible. The following information must be submitted in addition to the detail of the pole-top configuration as provided in Plate V of these specifications:
 - a. Nominal voltage and phase of circuit(s) or number of pairs.
 - b. Phase of electrical circuit(s).
 - c. Number of electrical circuits.
 - d. Size (AWG or CM) and material of wires or cables.
 - e. Length of spans clearly indicated on drawing.
 - f. Any intended future wires or cables.

2.5 Inductive Interface

1. An inductive interference coordination study is required for all proposed longitudinal occupations. This study may also be required for any crossing other than 90 degrees with the track(s).
2. All agreements covering crossings and longitudinal occupations will include provisions that the owner of the wireless facility (Owner) will provide appropriate remedies, at the Owner's expense, to correct any inductive interference with VPRA facilities.

2.6 Modification of Existing Facilities

1. Any replacement or modification of an existing carrier pipe and/or casing shall be considered a new installation, subject to the requirements of this specification.

2.7 Abandoned Facilities

1. The Owner of all conduit crossings and other occupancies to be abandoned shall notify VPRA in writing of the Owner's intent to abandon.
2. Abandoned conduits shall be completely filled with cement grout, compacted sand, or other methods as approved by VPRA.
3. Abandoned handholes and other structures shall be removed to a minimum distance of 2 feet below finished grade and completely filled with cement grout or compacted sand.

2.8 Conflict of Specifications

1. Where laws or orders of public authority prescribe a higher degree of protection than specified herein, the higher degree so prescribed shall be deemed a part of this specification.

2.9 Marker Signs

1. Conduits (except those in streets where it would not be practicable to do so) shall be prominently marked 15 feet from the centerline of nearest track and at property lines at points of entry/exit (on both sides of track for crossings) by durable, weatherproof signs located over the centerline of the pipe. Signs shall show the following:
 - a. Name and address of Owner.
 - b. Contents of conduit.
 - c. Conduit depth below grade at point of the sign.
 - d. Emergency telephone number in event of pipe rupture.
2. For conduits running longitudinally on VPRA property, signs shall be placed over the conduit (or offset and appropriately marked) at all changes in direction of the conduit. Such signs should also be located so that when standing at one sign, the next adjacent marker in either direction is visible. In no event shall they be placed more than 500 feet apart unless approved in writing by VPRA.
3. The Owner must maintain all signs on VPRA property for as long as the occupational agreement is in effect.

2.10 Warning Type

1. All conduits installed by open cut and handholes on VPRA property shall have warning tape placed 2 feet directly above the entire conduit.

2.11 Handholes and Manholes

1. Handholes and manholes shall not be located on VPRA property where possible. At locations where this is not practicable, including longitudinal occupancies, handholes and manholes on VPRA property shall have a minimum of 2 feet of cover and be designed to withstand passage of trucks. Handholes and manholes must be locatable from the surface with industry standard location methods.
2. The distance from centerline of adjacent track to centerline of proposed handhole and manholes shall be shown on the plans.

2.12 Safety Requirements

1. All operations shall be conducted so as not to interfere with, interrupt, or endanger the operation of trains or damage, destroy, or endanger the integrity of railroad facilities. All work on or near VPRA property shall be conducted in accordance with VPRA safety rules and regulations. The contractor shall be familiar with and comply with the VPRA safety rules and shall give written acknowledgement to VPRA that the contractor and its employees have received, read, and understood such safety rules. Operations will be subject to VPRA inspection at any and all times.

2. All cranes, lifts, or other equipment that will be operated in the vicinity of the railroad's electrification and power transmission facilities shall be electrically grounded in accordance with NESC requirements and electrification industry practice.
3. At all times when the work is being progressed, a field supervisor for the work with no less than twelve (12) months experience in the operation of the equipment being used shall be present. If boring equipment or similar machines are being used, the machine operator also shall have no less than twelve (12) months experience in the operation of the boring or similar equipment being used.
4. Whenever equipment or personnel are working closer than 25 feet from the centerline of an adjacent track, that track shall be considered as being obstructed. Insofar as possible, all operations shall be conducted no less than this distance. Operations closer than 25 feet from the centerline of a track shall be conducted only with the permission of, and as directed by, a duly qualified VPRA railroad employee present at the site of the work.
5. Crossing of tracks at grade by equipment and personnel is prohibited, except by prior arrangement with, and as directed by, VPRA.

2.13 Blasting

1. Blasting will not be permitted.

2.14 Support of Excavation Adjacent to Track

1. The location and dimensions of all pits or excavations shall be shown on the plans. The distance from centerline of adjacent track to face of pit or excavation shall be clearly labeled. Also, the elevation of the bottom of the pit or excavation must be shown on the profile.
2. The face of all pits shall be located a minimum of 25 feet from centerline of adjacent track and **measured at right angles to track**, unless otherwise approved by VPRA.
3. If the bottom of the pit excavation intersects the theoretical railroad embankment line, (see Plate VII) interlocking steel sheet piling, driven prior to excavation, must be used to protect the track stability. The uses of trench boxes or similar devices are not acceptable in this area.
 - a. Design plans and computations for the pits must be stamped by a Professional Engineer and must be submitted by the Owner at time of application or by the contractor prior to start of construction. If the pit design is to be submitted by the contractor, the project specifications must require the contractor to obtain VPRA approval prior to beginning any work on, or which may affect, VPRA property.
 - b. The sheeting shall be designed to support all lateral forces caused by the earth, railroad, and other surcharge loads.

- c. After construction and backfilling, all sheet piling within 10 feet of centerline track must be cut off 24 inches below final grade and left in place.
4. All excavated areas are to be illuminated (flashing warning lights not permitted), fenced, and otherwise protected as directed by VPRA.

2.15 Reimbursement of VPRA Costs

1. All VPRA costs associated with the wire installation (inspection, flagging, track work, protection of signal cables, etc.) shall be reimbursed to VPRA by the Owner.

PUBLICATION STANDARDS SOURCES

ANSI	American National Standards Institute, Inc. 1899 L Street, NW, 11th Floor Washington, DC 20036 Tel: 202.293.8020
AREMA	American Railway Engineering Maintenance-of-Way Association 4501 Forbes Boulevard, Suite 130 Lanham, MD 20706 Tel: 301.459.3200
ASTM	American Society for Testing and Materials 100 Barr Harbor Drive, PO Box C700 West Conshohocken, PA 19428 Tel: 610.832.9500
NSEC	National Electrical Safety Code 445 Hoes Lane Piscataway, NJ 08854-4141 USA Tel: 732.981.0060

NOTE: If other than ANSI, AREMA, ASTM or NESC specifications are referred to for design, materials, or workmanship on the plans and specifications for the work, then copies of the applicable sections of such other specifications referred to shall accompany the plans and specifications for the work.