



**SPECIFICATIONS FOR THE INSTALLATION OF
CONDUIT SYSTEMS IN RESIDENTIAL SUBDIVISIONS**

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SPECIFICATIONS FOR THE INSTALLATION OF CONDUIT SYSTEMS IN RESIDENTIAL SUBDIVISIONS

This document is dedicated to defining the specifications for installation of direct buried conduit systems in residential subdivisions on the Ameren Missouri system as defined in the Schedule No. 5 tariff filed with the Missouri Public Service Commission.

1 Definitions

- 1.1 Contractor - The owner(s) and or developer(s) or their agents of the tract of land to be served by the underground electric system, and/or the party or parties installing a portion of the system.
- 1.2 Company - Ameren Missouri.
- 1.3 Company Representative - Person designated by the Company to coordinate all facets of the project between the Company and the Contractor.
- 1.4 Work - Labor and material installation as required for the project.
- 1.5 Drawings - Approved conduit and electrical drawings provided by the Company indicating location and installation details for a specific residential subdivision. Any exceptions to this Specification shall be noted on the Drawings.
- 1.6 Specification - This specification and any additional Drawings or Standards supplied for a specific residential subdivision.
- 1.7 Standards - Company approved construction standards specifying material and installation details.

2 Scope of Work

The Contractor Shall:

- 2.1 Perform all work necessary to construct the conduit system in accordance with Drawings and Specifications furnished by the Company.
- 2.2 Furnish excavation and backfill for trenches for conduit system.
- 2.3 Install complete integrated conduit system as required.
- 2.4 Supply field surveying to locate easements, right of way, and property lines necessary for installation of conduit system as indicated on Drawings.
- 2.5 Obtain necessary permits for installation of conduit system and pay applicable fees.

- 2.6 Assume responsibility for all material from time of receipt to time of acceptance of installation by Company.

The Company Shall:

- 2.7 Furnish Drawings indicating the installation of the conduit system.
- 2.8 Furnish all materials required for conduit system consisting of conduit, manholes, pulling boxes, transformer pads, switchgear pads, pedestals, and other required subsurface structures.
- 2.9 Install Ameren Missouri primary, secondary, streetlight cable, transformers, streetlights, and switchgear.

3 Extent of Work

- 3.1 The detailed information for the work required shall be shown on the approved Drawings. During the progress of work, such additional detail Drawings as the Company may consider necessary for clarification will be furnished to the Contractor, and these additional Drawings shall be made a part of the Specification.
- 3.2 Where interpretation of Specification or clarification of intent of any Drawing is required, the determination of the Company Representative shall prevail.
- 3.3 The location of manholes, the conduit route, location, arrangement and number of conduits will be shown on the Drawings.
- 3.4 Field determination of location and elevation of all foreign lines and obstructions to provide adequate space for duct and manhole construction, as well as establishment of trench grade to insure the installation in accordance with Drawings and Specifications, is the responsibility of the Contractor and subject to the approval of the Company Representative.

4 Inspection and Performance of Work

- 4.1 Contractor shall notify the Company Representative with at least one full working day advance notice before commencing any item of construction or installation of material to enable proper inspection of materials and workmanship. Materials and/or workmanship failing to meet the requirements of this specification, or installed without prior notice to Company Representative, will

be subject to rejection. Any work rejected shall be immediately corrected at the Contractor's expense. Conduit installations made by Contractor shall be subject to inspections by Company on a daily basis prior to backfilling, embedding in concrete, or otherwise covering or concealing.

5 Trenching

General Requirements

- 5.1 The route of the ducts shall be maintained as specified on the Drawings. Straight routes shall be maintained unless specified otherwise on the Drawings.
- 5.2 Turns and bends to avoid surface or hidden obstructions shall be made within the limits specified either on the Drawing or by approval of the Company Representative
- 5.3 Deviations outside the boundaries of the easement or right-of-way are not allowed. Problems concerning the use of the easement or right-of-way shall be referred to the Company Representative for solution.
- 5.4 Clearances stated in the National Electric Safety Code shall be observed. The use of a joint trench with other utilities is acceptable and encouraged, provided the joint trench utilities agree to the placements within the trench.
- 5.5 As a general rule, approximate final grade within 6 inches should be established before trenching is started.
- 5.6 The bottom of the trench shall be relatively smooth, and consist of well compacted earth at an elevation necessary to establish the standard burial depths.
- 5.7 The minimum width of the trench shall be a measured two inches larger than the duct size used. If more than one duct size is used at the same elevation, the minimum width shall be two inches larger than the horizontal distance occupied by the ducts.
- 5.8 Burial Depths
Standard burial depths are 36" of cover from final grade for primary cables and 24" - 36" of cover from final grade for secondary and streetlight cables. Any exceptions to the specified burial depths must be approved by the Company Representative.

- 5.9 If rock or untrenchable conditions are encountered consult with the Company Representative for alternatives.
- 5.10 Where ducts are to be installed by boring, the soil and surface conditions must be such that the solid materials encountered do not subject the duct to undue stresses. Burial depths as stated previously shall be maintained.

6 Duct Installation

6.1 Bedding

The duct shall be bedded on firm, well compacted, undisturbed dirt or on well tamped dirt or other backfill supplied for leveling or grading of the trench. Materials as described in Section 7 are acceptable.

6.2 Configurations

- 6.2.1 Configurations vary with various subdivision designs. The Drawing will specify the configuration of multiple duct installations.
- 6.2.2 Sweep bends may be made with 5 degree couplings with a minimum radius of 36" subject to Company Representative approval.
- 6.2.3 Sweep bends must be staked to prevent opening of the couplings during installation. No other operations producing visible stress on the couplings will be allowed. Visible stress exists when there is more than two degrees of offset on the coupling or where significant in-line offset is observed. Care must be taken to prevent deformation of the duct at the stakes.
- 6.2.4 Bends must be stabilized by concrete encasement as specified on the Drawings according to Company Standards.

6.3 Joining

- 6.3.1 The ducts shall be joined with company provided couplings and cement to assure a leak free continuous duct of the same internal diameter as the original duct. No internal protrusions or

obstructions are allowed.

6.3.2 The Contractor shall make sure that no foreign material enters the ducts to be joined. The end of the duct shall be plugged with approved end plugs whenever installation work on the duct is stopped.

6.3.3 Joining and repair of ducts shall be done according to Company Standards.

6.4 Protection

6.4.1 Unsupported overhangs will not be permitted. Ducts entering manholes or penetrating other structures shall be placed on well compacted earth or other backfill to prevent shear forces at the point of entry.

6.4.2 Shallower than normal depths shall be protected if approved by Company Representative (see Section 5).

6.4.3 Special design for railroad, pipeline and other crossings may be required. These conditions will be covered on the Drawings. Any permits and fees required for special crossings will be the responsibility of the Contractor.

6.4.4 Problems associated with unstable soil conditions shall be referred to the Company Representatives to obtain proper installation procedures.

6.5 Structures - Placement

The requirements associated with the installations of vaults, pull boxes, manholes, hand holes, transformer pads, pedestals, and other structures used for this system will be detailed on Drawings or Standards covering the installation of these items.

Customer shall install Ameren provided bell end couplings for cut conduit entering equipment.

6.6 Conduit Sizes

Conduit will be provided by Company as follows: 1.5" Schedule 40 for streetlight cable, 3" Schedule 40 for primary and secondary cable.

6.7 Identification of conduit sections

If noted on Drawing or required by Company Representative, conduit runs will be identified as specified by Company Representative.

7 Backfilling

7.1 General

- 7.1.1 Local codes or ordinances will govern when these exceed the backfill requirements stated herein. Any permits or fees for street crossings will be the responsibility of the Contractor.
- 7.1.2 Except as noted on Drawings and Specifications, native spoil free of rock and debris may be used as backfill material unless disqualified by the Company Representative. The spoil should pass through a two inch screen.
- 7.1.3 Except as noted on Drawings and Specifications, limestone screenings - ¼" minus may be used as an alternate to soil when backfilling. Alternate backfill material for street crossings may be used as allowed by local codes or ordinances.
- 7.1.4 Voids where water can collect shall be avoided. Any conditions which produce crushing pressures on the duct are unacceptable. Trenches must be kept clear of foreign materials such as grease, hydrocarbons, wood, rotting vegetation, or other debris.
- 7.1.5 Where shale or rock are encountered, limestone screening must be placed above and below the ducts in a thickness adequate to protect the conduit, but not less than two inches.

7.2 Compaction

- 7.2.1 In new subdivisions, the backfill shall be compacted to provide a firm fill able to support a man's weight as the trench is walked upon.
- 7.2.2 In established areas, compaction shall be obtained with hand or mechanical tampers to provide densities in excess of 90 percent of the density of the undisturbed soil.
- 7.2.3 The soil shall be placed back in the excavation in multiple passes of approximately 18 inch depth and compressed as necessary until final grade is reestablished. No rock shall be placed in the bottom six inches of the backfill.
- 7.2.4 Hydrotamping is not acceptable.
- 7.2.5 During backfilling the ducts shall be restrained, if necessary, to prevent movement.
- 7.2.6 Areas supporting vehicular traffic and other areas may require special backfilling as prescribed by the Company Representative or local codes and ordinances.
- 7.2.7 Settlement of the backfill material above the ducts is an indicator of improper compaction. When required, the Contractor must re-establish final grade by placing additional backfill or by other methods as appropriate.
- 7.2.8 Settlement of transformers, pedestals, and other structures is an indication of improper compaction. Charges associated with correcting these conditions are the responsibility of the Contractor. Backfilling with limestone screenings - 1/4" minus under transformers, pedestals, and other structures is recommended to prevent settling except as noted otherwise on Drawings and Specifications.

7.3 Resurfacing

- 7.3.1 Pavements, sod, or other surfaces shall be replaced with materials corresponding to those removed unless permission is granted by Company Representative to substitute other materials. Thickness, strength, and final appearance shall match the original materials as closely as possible.
- 7.3.2 Asphalt, concrete, or paving blocks shall be set in accordance with construction techniques proper to the placement of these materials.

8 Acceptance

- 8.1.1 A company supplied pulling tape shall be installed in all completed duct sections. The pulling tape shall be blown into the conduit, or other acceptable method, after duct sections are complete and the conduit cement is dry. A minimum of 10 feet of pulling string shall be left at each duct end. During installation of the pulling tape, the reel of tape should be placed on a payout stand to allow the tape to payout flat into the duct. The pulling tape must be installed in continuous pieces, no knots are permitted.
- 8.1.2 Contractor shall notify Company Representative in writing when complete conduit sections have been installed and are ready for Company to pull cable. A “Notification of Completed Conduit Sections” form is attached for this purpose. A conduit section is defined as all conduits between, and associated with, adjacent transformers. If Company attempts to pull cable in completed conduit sections within 10 working days of notification of completion and cannot successfully pull cable, Contractor shall be responsible for any repairs necessary to allow Company to complete pulls. After 10 working days, Contractor shall only be responsible for repairs required due to poor workmanship on his part or the part of his subcontractors.

8.2 Records

- 8.2.1 The Company Representative will maintain an as built set of Drawings showing changes, additions or deletions to the project. Field changes not covered by the original Drawings shall be clearly noted on the as built Drawings. Any field changes require advance approval of the Company Representative.
- 8.2.2 When the depth of cover exceeds the design value by 50 percent or more, the actual depth shall be provided by the Contractor and noted on the as built Drawings.
- 8.2.3 When the depth of cover is less than the design value, the actual depth shall provided by the Contractor and noted on the as built Drawings.
- 8.2.4 When the route or location of equipment varies from the Drawing, the Contractor shall supply dimensions from fixed above grade structures to be noted on the as built Drawings.

8.3 Certification

- 8.3.1 The Contractor shall certify at the completion of the project that all work has been performed according to the Drawings and Specifications. He shall guarantee the continuity and size of all conduit. He shall certify that all depth requirements have been met and that conduit system has been installed within easements and right of way as shown on Drawings.
- 8.3.2 Shortfalls in the specified construction practices in any area covered herein shall be reason for withdrawal of acceptance by the Company.

Notification of Completed Conduit Sections

In Residential Subdivisions

Subdivision: _____ Ameren Missouri W.R. #: _____
Contractor Name: _____ Ameren Missouri District: _____
Phone No.: _____ Address: _____
Fax No.: _____
Ameren Missouri Rep.: _____

Contractor Signature: _____
Date: _____

The following sections of conduit are complete and ready for cable installation by Ameren Missouri. (Indicate Pad No., Switchgear #, or pole location.)

FROM:

TO:

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

NOTE:

A conduit section is defined as all conduits (primary, secondary, and streetlight) between, and associated with, adjacent transformers.

If Ameren Missouri attempts to pull cable in completed conduit sections within 10 working days of notification of completion and cannot successfully pull cable, Contractor shall be responsible for any repairs necessary to allow Ameren Missouri to complete pulls. After 10 working days, Contractor shall only be responsible for repairs required due to poor workmanship on his part or the part of his subcontractors.

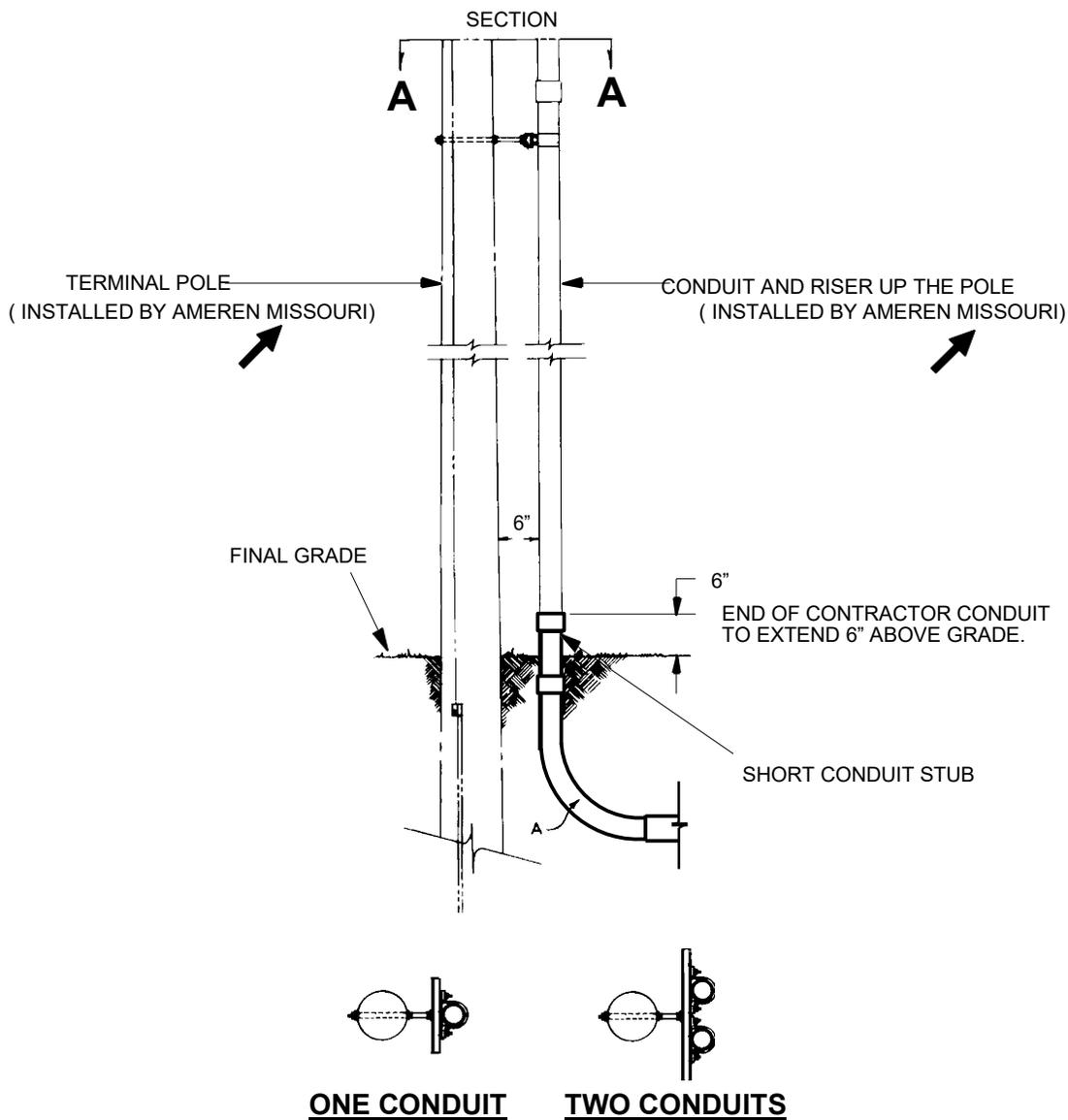
Attachment

**SPECIFICATIONS FOR THE INSTALLATION OF
CONDUIT SYSTEMS IN RESIDENTIAL SUBDIVISIONS**

APPENDIX

STANDARD SPECIFICATION DRAWINGS

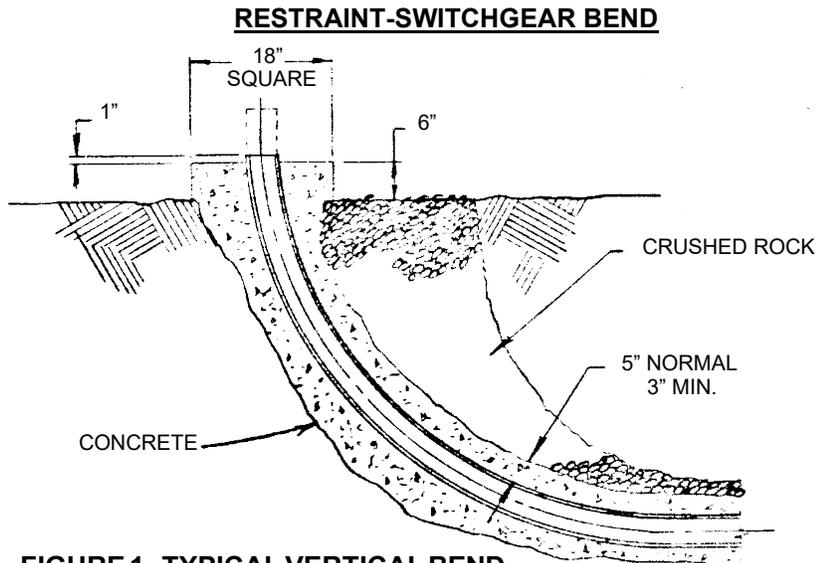
<u>NO.</u>	<u>DESCRIPTION</u>
1	Risers on Standoffs
2	Restraint - Underground Bends
3	Conduit - Direct Buried Drainage Pit
4	Splice Box - 2' x 4' x 2' Deep
5	Vault - Precast 3' x 5' x 42" Deep
6	Vault - Precast 4' x 8' x 4' Deep
7	Pad - Single Phase Padmounted Transformers
8	Enclosure Pad - 2, 3, & 4 - Way Cable Junction
9	Secondary Power Pedestal
10	Service Conduit Connection to Pedestal or Transformer
11	Padmounted Primary Switchgear - Fiberglass Box Pad
12	Joint Trenching
14	Fiberglass Box Vault - Single Phase Padmounted Transformers



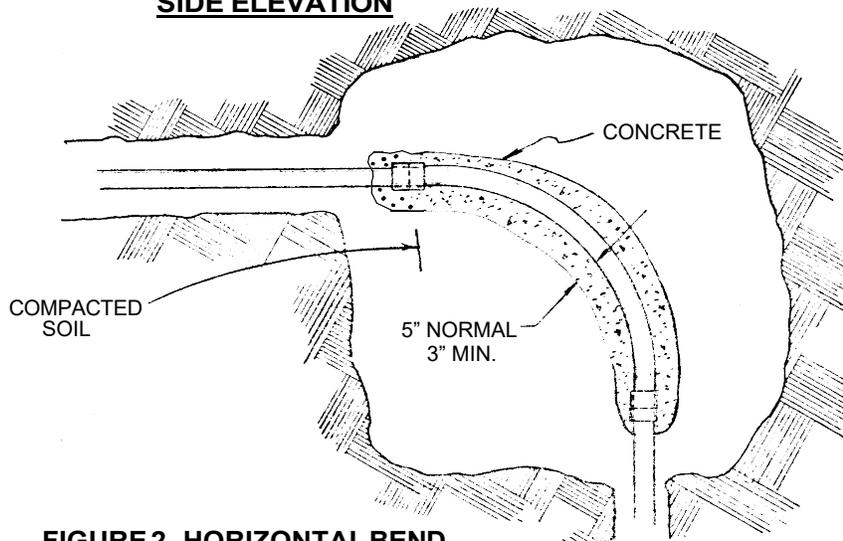
SECTION A A

NOTE: AMEREN MISSOURI REP. WILL DESIGNATE THE QUADRANT OF THE POLE WHERE THE CONDUIT IS TO BE INSTALLED.
 MATERIAL INSTALLED BY CONTRACTOR FOR ONE RISER
 (DERIVED FROM CONSTRUCTION STANDARD 14 00 26 **)

	Stk. No.	Description	Qty.
A	12 51 331	Bend - 1-1/2" x 24" Rad (Streetlight)	1
	12 51 173	Bend - 3" x 36" Rad (Primary and Secondary)	1
	12 51 206	Bend - 5", 36" Rad (3 Phase Primary)	1



**FIGURE 1 - TYPICAL VERTICAL BEND
 SIDE ELEVATION**



**FIGURE 2 - HORIZONTAL BEND
 PLAN VIEW**

MATERIAL INSTALLED BY CONTRACTOR
 (DERIVED FROM CONSTRUCTION STANDARD 31 47 01 **)

Material / Stk. No.		Quantity					
		Horizontal			Vertical		
12 51 331	Bend 1-1/2" x 24" Rad.	1			1		
12 51 173	Bend 3" x 36" Rad.		1			1	
12 51 206	Bend 5" x 36" Rad.			1			1
	Concrete Cu. Ft.	4	5	7	6	7	9
	Crushed Rock Cu. Yd.				1/2	1/2	1/2
	Backhoe trn 36" x Ft.	4	4	4	4	4	4

STRUCTURES - CONDUIT
Conduit - Direct Buried Drainage Pit
 (When Required For Water Problems)

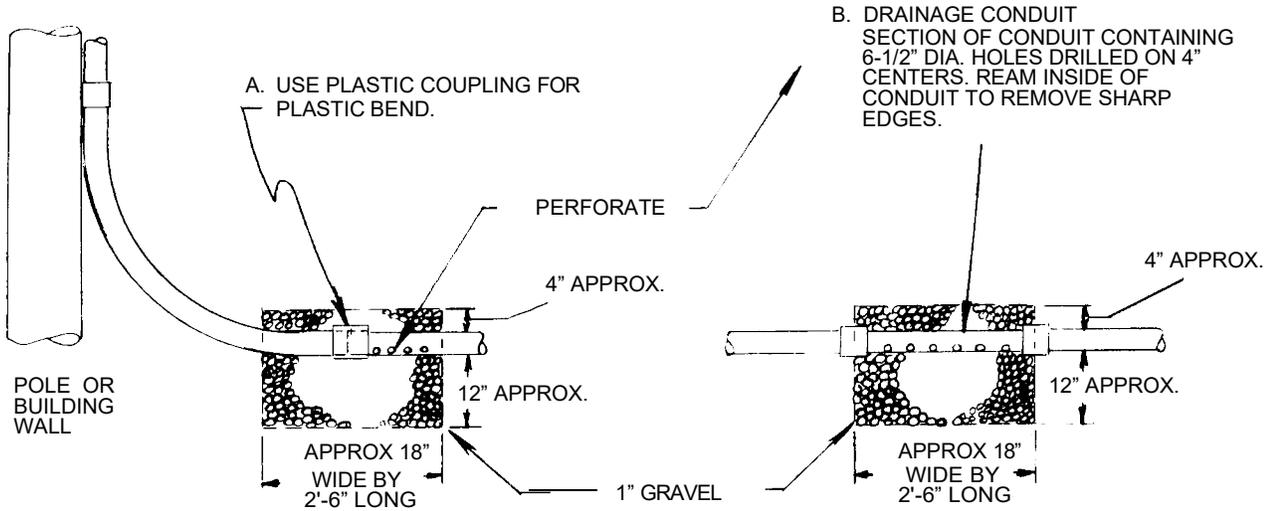


FIG. 1
FOR BURIED ELECTRICAL PLASTIC CONDUIT

FIG. 2
FOR BURIED PLASTIC CONDUIT AT LOWEST POINT IN RUN

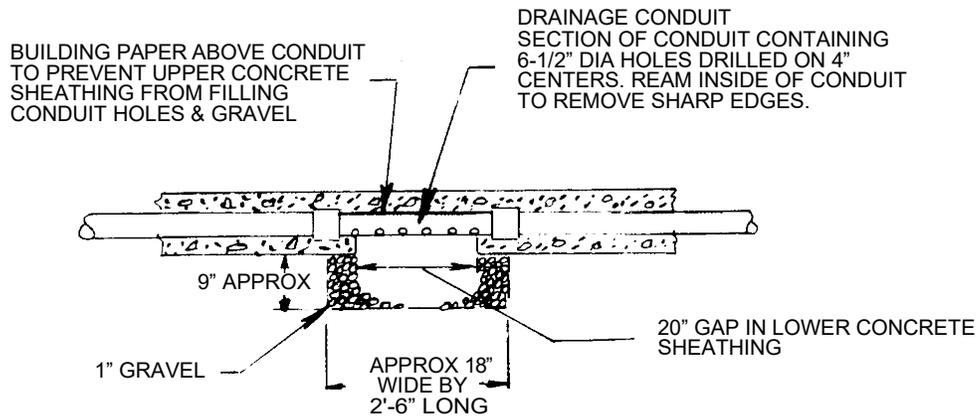


FIG. 3
FOR CONCRETE ENCASED PLASTIC CONDUIT AT LOWEST POINT IN RUN

MATERIAL INSTALLED BY CONTRACTOR

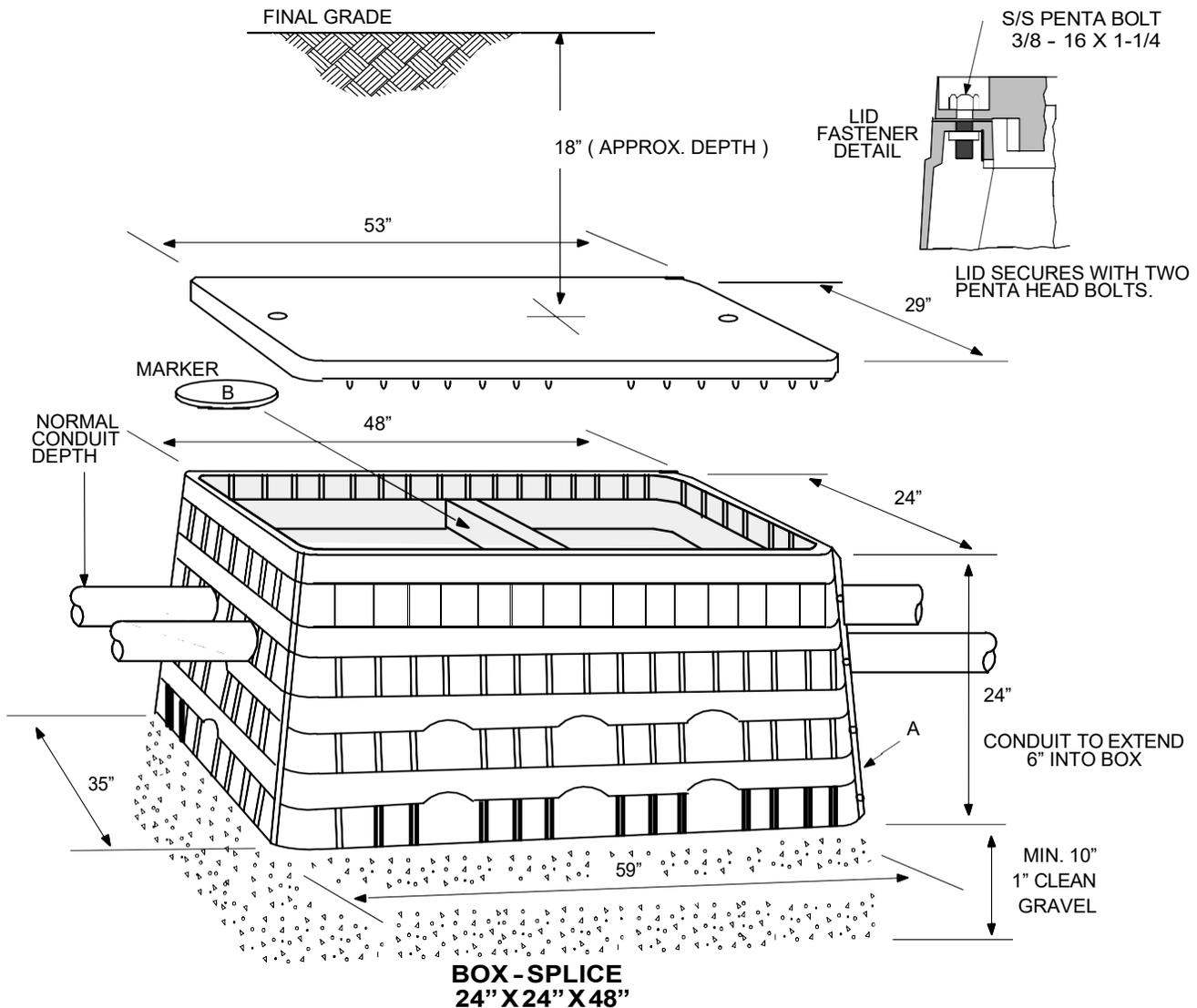
(DERIVED FROM CONSTRUCTION STANDARD 31 47 02 **)

Material / Stk. No.	Description	Conduit Size		
		Quantity		
		1-1/2"	3"	5"
	Conduit Perforated 30" long	1 Ea	1 Ea	1 Ea
	Backhoe 42" in ft.	3'	3'	3'
	Rock Crushed	As Req'd	As Req'd	As Req'd

STRUCTURES

Splice - Box

2' X 4' X 2' Deep



INSTRUCTIONS :

1. Excavate and install box so that conduits remain at standard depths on 10 inch base of 1 inch gravel. Box lid located approximately 18" below grade.
2. Install conduits thru knockouts, or bore holes in the box. Seal conduits at box interface.
3. After installing box, place lid on box, partially backfill around lid and tamp soil.
4. Place electronic marker at the center inside of the box. **IMPORTANT:** Marker must be laid flat.
5. Splice Box weight is 120 lbs.
6. Duct tape over bolt holes on lid before covering box.

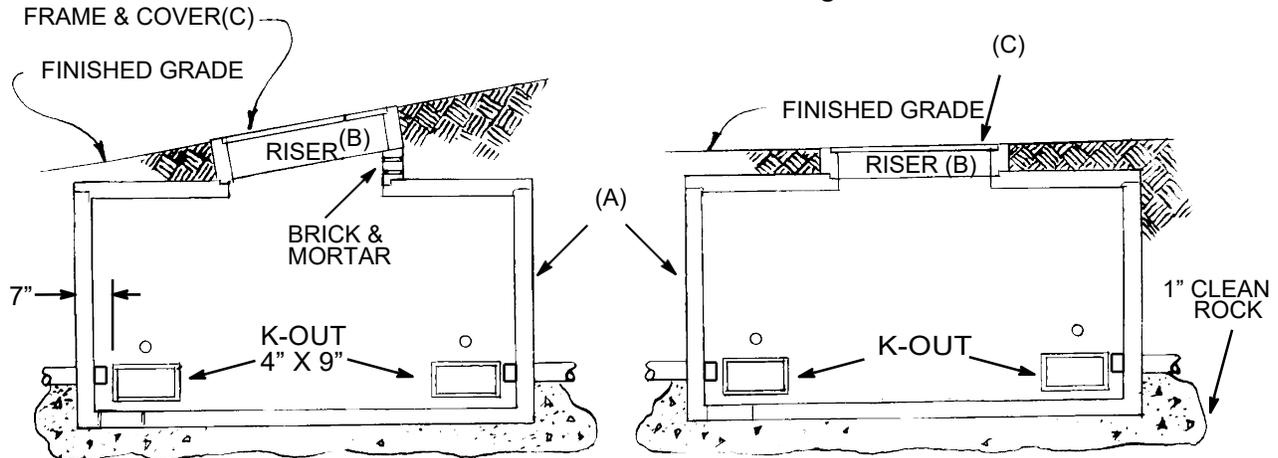
MATERIAL INSTALLED BY CONTRACTOR
(DERIVED FROM CONSTRUCTION STANDARD 31 21 02 00)

	Material / Stk. No.	Description	Qty.
A	12 06 105	Box, Cable, 2' x 4' x 2' Deep	1
B	49 05 519	Marker, Electronic	1
		Rock Crushed	As Req'd

UNDERGROUND STRUCTURES

Vault - Precast 3' x 5' - 42" deep 2-4" PVC Couplings Each End

This vault does not have a traffic rating.



Grade adjustments shall be made using the riser and necessary brick and mortar to meet the existing slope. The vault floor shall always be installed level.

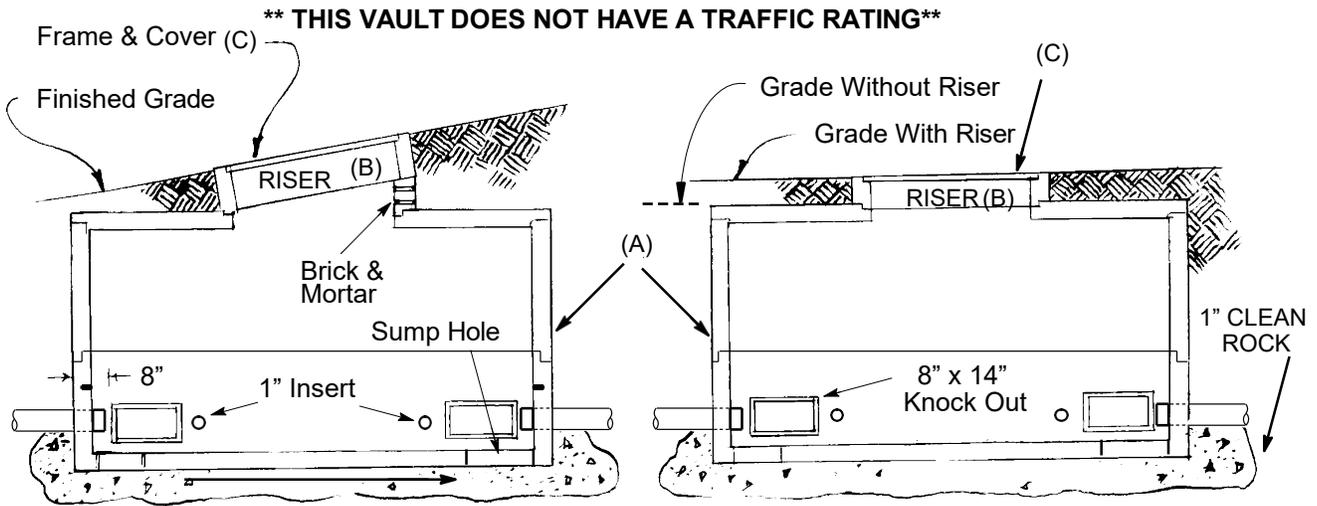
1. Locate this vault out of the way of vehicular traffic.
2. Excavate a 4' x 6' pit to a depth necessary to obtain minimum cover for the conduits. Outside dimensions are L-5'8"; W3'8"; H-4'2"; Riser 6" tall. NOTE: RISER MUST BE USED.
3. Fill any overdig with crushed rock leveling the rock and tamping to firm wherever the earth has been disturbed.
4. To lift vault, use swivel plates mounted to the Richmond inserts with lag bolts that "Firmly" fasten the plate against the wall.
5. Place conduits into ducts or Knockouts 6 inches as required. Grout or mortar around ducts entering thru Knockouts.
6. FILL & TAMP - Replace and stabilize the earth around the vault and riser tamping to compaction.
7. Brick and mortar between riser and keyway in manhole to accommodate the grade slope. Seal the cover frame to the riser.
8. Sod or resurface grade as necessary.

MATERIAL INSTALLED BY CONTRACTOR

(DERIVED FROM CONSTRUCTION STANDARD 32 24 01 **)

	Materials / Stk. No.	Description	Quantity			Weights
			UNIT	LEVEL	SLOPED	
A	12 06 097	Vault - Precast 3' x 5'	Ea	1	1	Vault 4200 lbs.
B	12 06 192	Riser - Neck 6" Extension	Ea	1	1	Riser 665 lbs.
C	12 02 100	Cover - Vault Galv. Stl. 42" x 66"	Ea	1	1	Cover 500 lbs.
		Rock - Crushed (1" Clean)	Cy	1	1	
		Brick	Ea	--	--	
		Mortar	Bag	0	1	

UNDERGROUND STRUCTURES
 Vault - Precast 4' x 8' - 4 Ft. deep
 3-5" PVC Couplings Each End

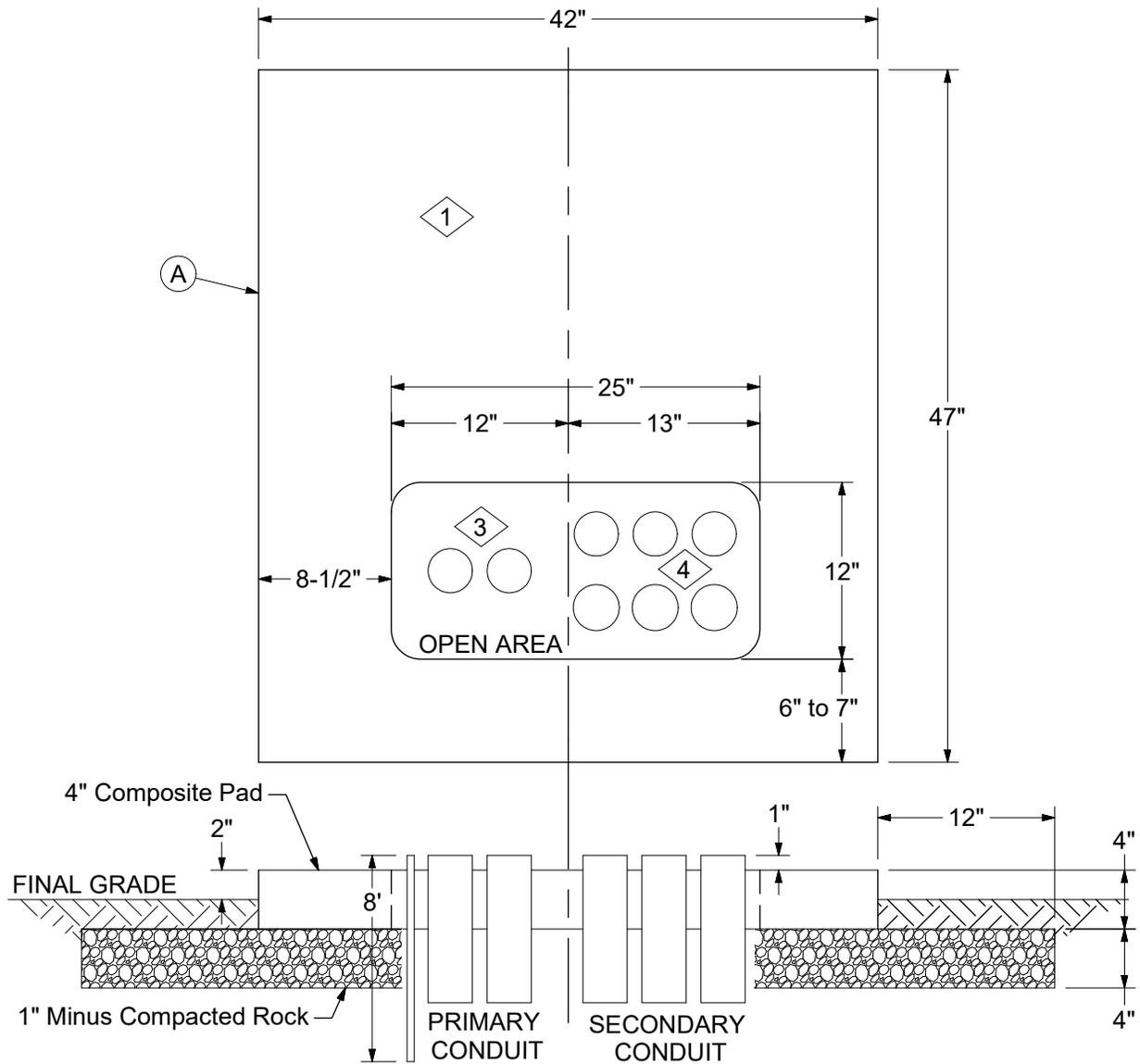


Grade adjustments shall be made using the riser and necessary brick and mortar to meet the existing slope. The vault floor shall always be installed level.

1. Locate this vault out of the way of vehicular traffic.
2. Excavate a 6' x 11' pit to a depth necessary to obtain minimum cover for the conduits on a 10" base of 1" gravel. Outside vault dimensions: L-8'10"; W-5'6"; H-4'-8"; Riser 6" tall. NOTE: RISER MUST BE USED.
3. Fill any overdig with crushed rock leveling the rock and tamping to firm wherever the earth has been disturbed.
4. To lift vault, use swivel plates mounted to the Richmond inserts with lag bolts that "Firmly" fasten the plate against the wall.
5. Place conduits into ducts or Knockouts 6 inches as required. Grout or mortar around ducts entering thru Knockouts.
6. FILL & TAMP - Replace and stabilize the earth around the vault and riser tamping to compaction.
7. Brick and mortar between riser and keyway in manhole to accommodate the grade slope. Seal the cover frame to the riser.
8. Sod or resurface grade as necessary.

MATERIAL INSTALLED BY CONTRACTOR
 (DERIVED FROM CONSTRUCTION STANDARD 32 24 02

	Material / Stk. No.	Description	Quantity			Weights
			UNIT	LEVEL	SLOPED	
A	12 06 096	Vault - Precast 4' x 8'	Ea	1	1	Top 4600 lbs.
B	12 06 192	Riser - Neck 6" Extension	Ea	1	1	Riser 665 lbs.
C	12 02 100	Cover - Vault Galv. Stl. 42" x 66"	Ea	1	1	Cover 500 lbs.
		Rock - Crushed (1" clean)	Cy	2	2	
		Brick	Ea	--	--	
		Mortar	Bag	0	1	

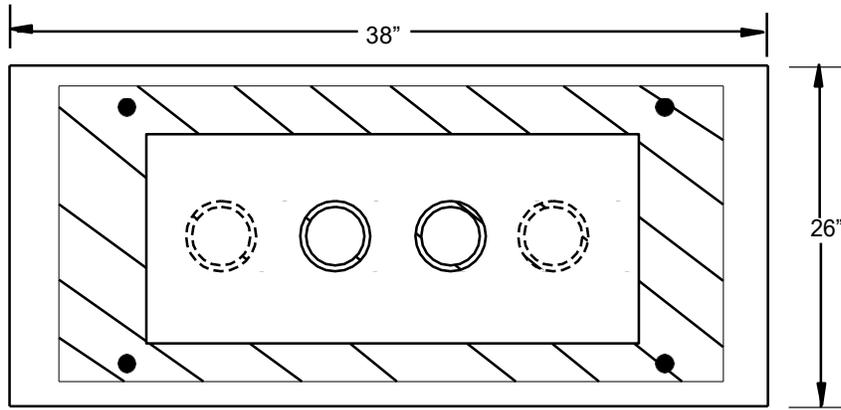


34 21 05 02 - Heavy Pad
25 kVA thru 250 kVA Single Phase Loop Feed

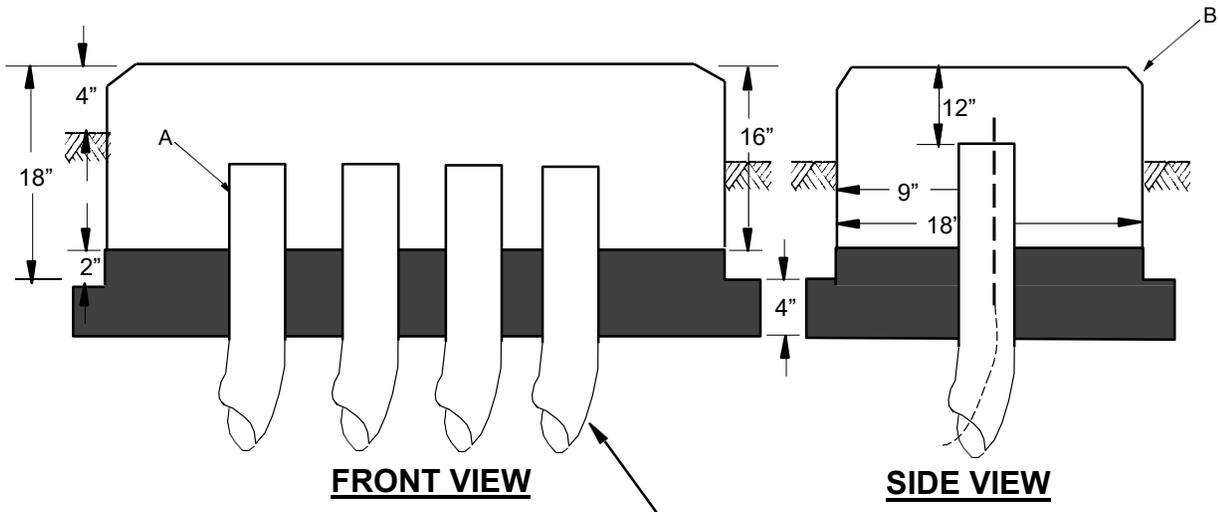
CONSTRUCTION NOTE(s):

- 1. Approximate weight of single-phase pads: Heavy - 300 lbs.
- 2. In Missouri residential developments, the contractor will install the pad and conduits.
- 3. Two conduits shall be installed on the primary side - minimum size 2".
- 4. Secondary conduit shall be symmetrically located within 12" x 13" area. The maximum number of conduits is 6 - 3" for the secondary. The number of secondary cables shall not exceed 8 per phase.

STRUCTURES - ENCLOSURE PAD
 2-Way, 3-Way, 4-Way Cable Junction
 Loadbreak, Single Phase Primary



DOOR SIDE OF ENCLOSURE
TOP VIEW



FRONT VIEW

SIDE VIEW

NOTE:
 CONDUIT ENDS EXTENDING INTO PAD
 MUST BE PLUMB AND PROPERLY
 POSITIONED PRIOR TO BACKFILLING.
 BUNDLE CONDUIT ENDS WITH DUCT
 TAPE TO PREVENT MOVEMENT.

MATERIAL INSTALLED BY CONTRACTOR

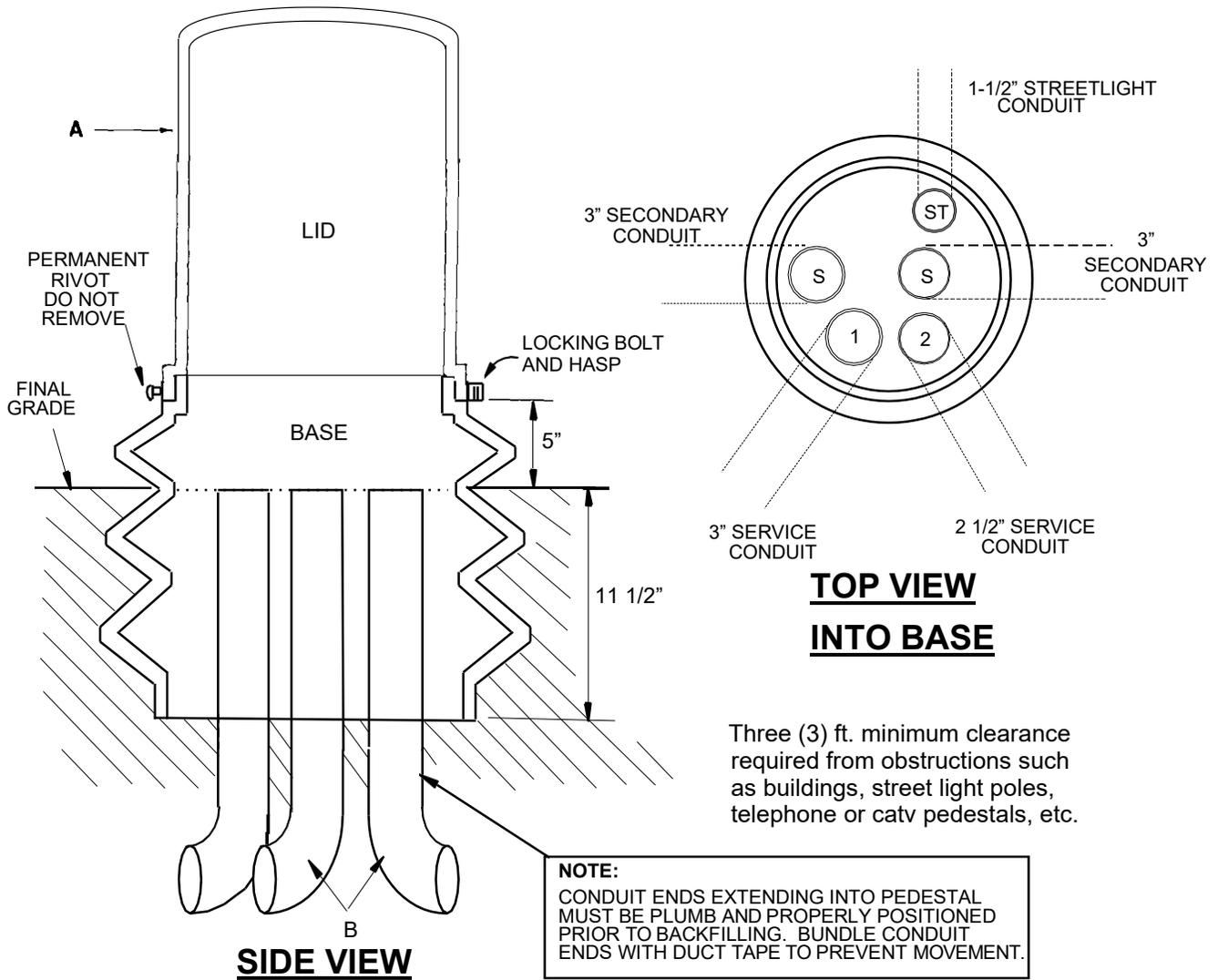
(DERIVED FROM CONSTRUCTION STANDARD 51 11 06 **)

	Material / Stk.No.	Description	Quantity		
			2 Way	3 Way	4 Way
A	12 51 173	Bend - Plastic, 3", 36" Rad.	2	3	4
B	12 06 134	Pad - Ground Sleeve	1	1	1

1. Approximate weight of sleeve is less than 100 lbs.
2. Proper compaction of backfill is important to prevent settling. Backfilling with limestone screenings is recommended.

UNDERGROUND EQUIPMENT
Secondary Power Pedestal
Above Grade - Polyethylene

SPEC 9
 Sheet 1 of 2



NOTES:

1. See Spec 10 for installations of service conduit.
2. All conduits shall be cut off level at final grade.
3. Conduit ends shall be sealed with duct tape and tape marked with permanent marker as follows: S= secondary, ST = Streetlight, and service conduits marked with lot number.
4. Temporary hole to face away from street.
5. Lid is secured with a 3/8" Penta head bolt. To open: loosen pentabolt, turn hasp out of slot, and twist lid.
6. Proper compaction of backfill is important to prevent settling. Backfilling with limestone screenings is recommended.

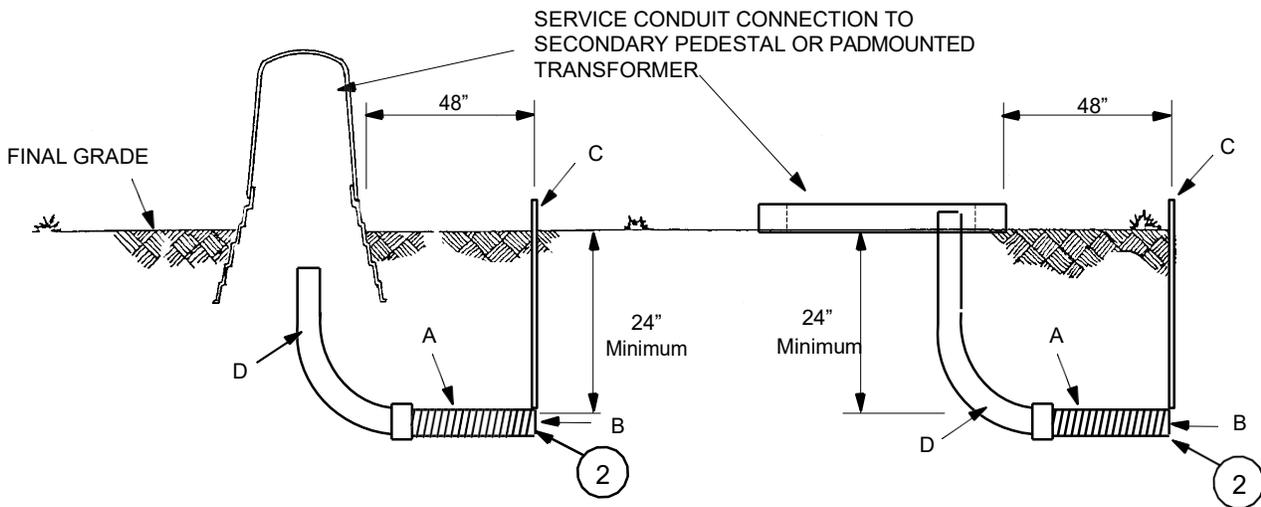
UNDERGROUND EQUIPMENT
Secondary Power Pedestal
Above Grade - Polyethylene

SPEC 9
Sheet 2 of 2

MATERIAL INSTALLED BY CONTRACTOR

(DERIVED FROM CONSTRUCTION STANDARD 52 11 01 **)

	Stk. No.	Description	Qty.
A	12 05 049	Pedestal - Above Ground, Polyethylene	1
B	12 51 331	Bend-Plastic, 1-1/2", 24" Rad. (Streetlight)	As Req'd
	12 51 173	Bend-Plastic, 3", 36" Rad. (Secondary & 400 A Service)	As Req'd
	12 51 264	Bend-Plastic, 2 1/2", 24" Rad. (200 A Service)	As Req'd



NOTES:

1. Flexible conduit shall point in the direction of the service. The conduit will extend 48" beyond the edge of the pedestal and/or transformer pad. **
2. The flex conduit end of the contractor installed conduit shall be sealed and marked with buried conduit marker (C). Marker should be attached to flex conduit end.
3. Seal conduits in pedestal and transformer pad with duct tape and mark on tape with permanent marker as follows: S= Secondary, ST= Streetlight, and service conduits marked with lot number.

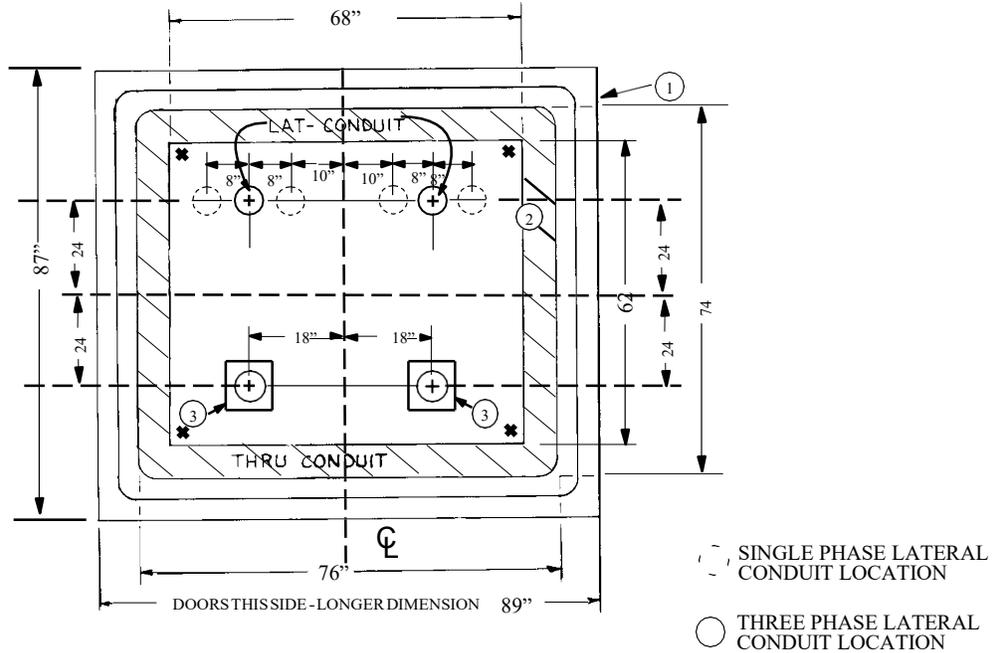
** Flex conduit will be gray in color and have dimensions that allow the use of standard Sch 40 fittings and accessories.

MATERIAL INSTALLED BY CONTRACTOR

(DERIVED FROM CONSTRUCTION STANDARD 34 21 03 00 AND 59 81 40 **)

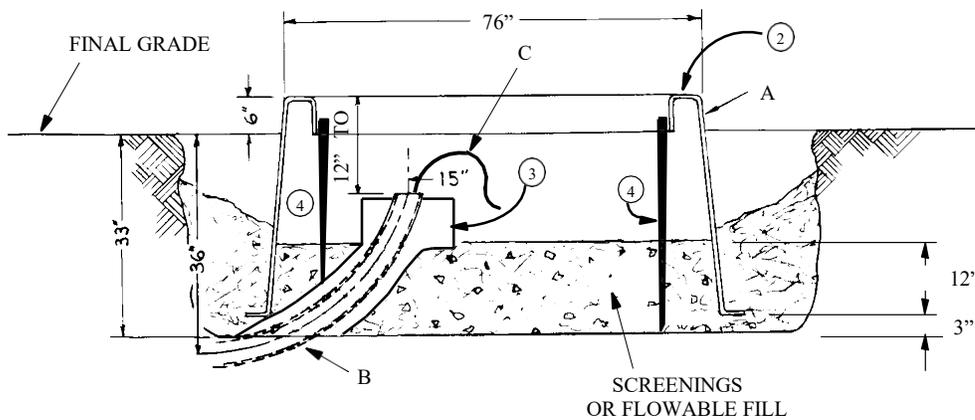
	Material Stock No.	Description	Service Size	
			0-200 Amp	201 thru 400 Amp
A	12 51 267	Conduit - Plastic, Flexible, 2-1/2", Corrugated	4'	
	12 51 239	Conduit - Plastic, Flexible, 3", Corrugated		4'
B	12 51 007	Plug - Conduit, 2 1/2"	1	
	12 51 002	Plug - Conduit, 3"		1
C	49 55 520	Marker - Buried Conduit, Red Plastic	1	1
D	12 51 264	Bend - Plastic, 2 1/2", 24" Rad	1	
	12 51 173	Bend - Plastic, 3", 36" Rad.		1
			Quantity	

COMPOSITE SWITCHGEAR PAD



TOP VIEW

- 1 BASE OF PAD
- 2 LOAD BEARING SURFACE OF PAD
- 3 RESTRAIN THRU CONDUIT BENDS PER SPEC 2 AS REQUIRED BY AMEREN FOR PULLING LONG CABLE LENGTHS.
- 4 PLACE GROUND RODS AT CORNERS (X). AS AN ALTERNATIVE, FOUR 1 INCH PVC SLEEVES OF 18 INCHES MIN. LENGTH MAY BE INSTALLED



SIDE VIEW

UNDERGROUND EQUIPMENT-SWITCHING
Padmounted Primary Switchgear
Composite Box Pad

MATERIAL INSTALLED BY CONTRACTOR
 (DERIVED FROM CONSTRUCTION STANDARD 53 11 04 **)

	Material / Stk No.	Description	Quantity
A	12 06 165	Pad - Switchgear, Composite (Provided by Ameren)	1
B	12 51 173	Bend - Plastic, 3" x 36" Rad, Sch. 40	As Req'd
	12 51 176	Bend - Plastic, 4" x 36" Rad, Sch. 40	As Req'd
	12 51 206	Bend - Plastic, 5" x 36" Rad, Sch. 40	As Req'd
C	83 36 252	Pulling Tape - 3/4" Wide, 2500 lbs. Strength (ft.)	As Req'd
D	23 63 027	Rod - Ground 5/8" x 8', Copper	4

INSTRUCTIONS FOR EXCAVATION AND PLACEMENT OF SWITCHGEAR BOX PAD.

Placing The Bends

Situate the bends as required by Ameren on the job drawings. Note that a 36 inch radius bend on the lateral side at a 36 inch depth will almost touch the side of the pad when it is placed at depth. An increase of final burial depth or angling of the conduit may be necessary to clear the pad flange.

Excavation And Final Depth

An initial depth of 33 inches shall be excavated removing or tamping all loose soil. The length and width of the hold should be 99" by 97". This allows 5" of side clearance. The longer dimension is the door side of the gear.

One inch clean gravel shall be placed and tamped to a final level depth of 30 inches. The area bearing the pad shall be leveled with a carpenter's level. The final depth of 30 inches will leave the required 6 inches of pad exposed at final grade.

Place The Pad

Place the pad with the longer side where the doors will be, as indicated on the job drawings provided by Ameren.

Backfilling

Stabilize the pad before backfilling the outside of the pad to prevent shifting.

Stabilizing

To further stabilize the pad and conduit bends, place 12 inches of screenings inside the pad and tamp in place.

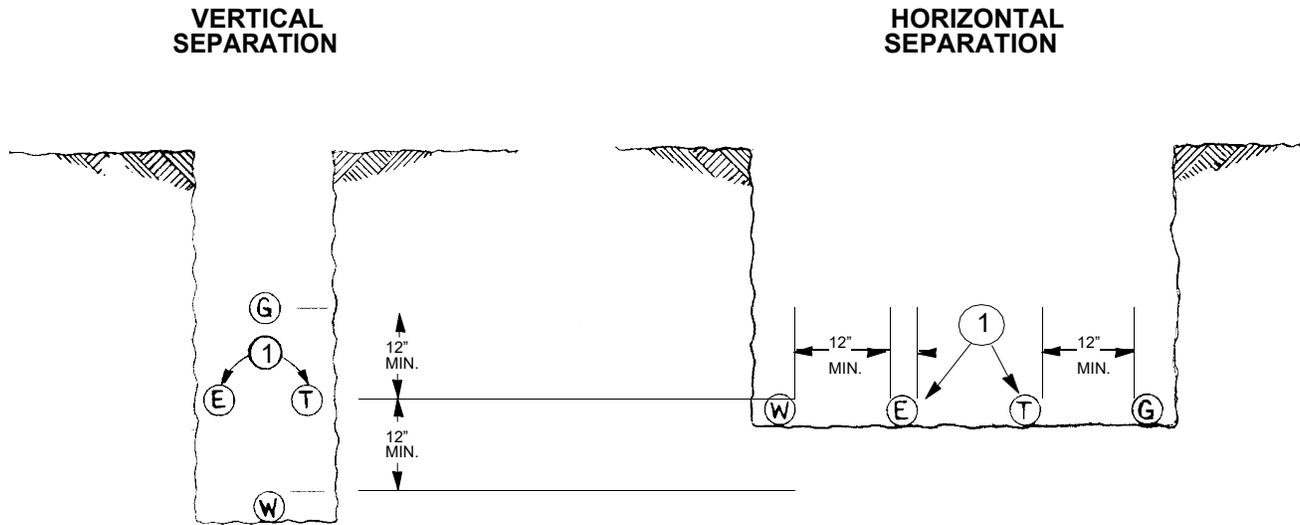
Bend - Final Preparation

The conduit bend should be cut off below the switchgear pad mounting flange. The rule is as follows: 5 inch diameter bend shall be cut a minimum of 16 inches below the flange. A 3 inch conduit cut a minimum of 12 inches below.

Ground Rods

Place the 4 ground rods in the corners of the pad opening. Drive the ground rods into the soil to a depth of 5 feet. Place the ground rods before adding screenings or flowable fill inside of the pad.

UNDERGROUND LINES INSTRUCTION
Joint Trenching
Minimum Cable Clearance Requirements (NESC)



LEGEND	
E	- ELECTRIC
G	- GAS
T	- TELEPHONE
W	- WATER

NOTES:

1. Horizontal separation is 12 inches. This dimension may be reduced to 6 inches minimum in Missouri providing all parties are in agreement to this reduction.

(DERIVED FROM CONSTRUCTION STANDARD 59 40 00 44)

