



## **FLORIDA KEYS ELECTRIC COOPERATIVE ASSOCIATION, INC.**

**(305) 852-2431 • 800-858-8845 • WWW.FKEC.COM**

This packet includes all FKEC underground service requirements, instructions, procedures and drawings. If you are considering underground power service please review this document in its entirety (19 page PDF).

### **Underground Service Requirements and Instructions**

NOTE: Electric meter installation requirements still apply. Review FKEC **Electric Meter Installation** drawings.

Florida Keys Electric Cooperative requires the following documents to be submitted to the FKEC Engineering department prior to the installation of FKEC underground cable or trench inspection. The installation must meet all of the requirements as stated in FKEC Underground Procedures.

1. A final site plan with the proposed trench route indicated. This site plan shall indicate the location of the house and roadways.
2. A trench detail drawing. (This may be hand-drawn.) The sketch should indicate the depth, separation distances, and sizes of all conduits occupying the same trench.

You must contact the FKEC Engineering department for the location of the conduit riser. The Staking Tech will determine which pole will be used and the arrangement of the risers on the pole.

The trench and conduit **must** be inspected by a FKEC inspector prior to the placing of back-fill. To arrange an inspection call FKEC at (305) 852-2431. The inspection will be worked within two business days. The FKEC inspector must approve any changes made.

### **FKEC Conduit Requirements for Underground Service**

- All conduits below ground shall be schedule 40 or schedule 80, electrical grade PVC conduit placed on a six inch bed of 1/4 inch pea rock
- All conduits extending above ground (i.e. at the pole, at the building) must be Schedule 80, electrical grade PVC conduit.
- For underground services, the bends will be wide-sweep, 24-inch radius.
- The conduit must be a minimum of 24 inches deep to the top of pipe below the finished grade. Plastic warning tape shall be installed above the conduit, 9 inches below finished grade.
- A separation of five feet horizontally must be maintained between the electric conduits and ANY wet utilities. If crossing an electrical conduit with any wet utility, there must be a minimum of one foot of vertical separation. Perpendicular crossings of other utility trenches must be identified.
- Leave a polyester pull tape (1800# with sequential markings) in each conduit.



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## **FKEC UNDERGROUND PROCEDURES**

### **1. SCOPE**

- 1.1. This document represents the minimum requirements and specifications for the installation of an electrical underground distribution system to be transferred to Florida Keys Electric Cooperative (FKEC) ownership.

### **2. DEFINITIONS**

- 2.1. Cooperative: Florida Keys Electric Cooperative and its designated representatives.
- 2.2. Contractor: Member, Developer, or firm installing electrical underground substructures.
- 2.3. Authority Having Jurisdiction: Generally Monroe County, Village of Islamorada, City of Key Colony Beach, City of Layton or City of Marathon.
- 2.4. Point of Delivery: The point where Cooperative's conductors are connected to premise's conductors, typically at the meter panel or service enclosure.

### **3. GENERAL**

- 3.1. The latest edition of all applicable building and safety codes shall be followed in the installation of the underground distribution system. Included, but not limited to are the:
  - 3.1.1. Local Jurisdiction Building and Fire Codes or any other applicable codes for a specific project location
  - 3.1.2. National Electrical Safety Code (NESC)
  - 3.1.3. U. S. Occupational Safety and Health Act of 1970 (OSHA)
  - 3.1.4. The American Concrete Institute (ACI)
  - 3.1.5. The American Society for Testing and Materials (ASTM)
- 3.2. Prior to construction a meeting shall be held to discuss and coordinate construction and inspection.
- 3.3. The Cooperative will require a signed and recorded easement at no cost or a filed plat incorporating Cooperative easement requirements prior to the Cooperative installing any electrical facilities.
- 3.4. No electrical facilities shall be connected by the Cooperative until after the final inspection is made and approval by the Authority Having Jurisdiction has been received.

### **4. COOPERATIVE RESPONSIBILITY**


- 4.1. Upon receipt of overall project plans and electrical load information from the Contractor/Developer, an Electrical Plan showing the general route of the conduit line, splice box and transformer pad locations, points of delivery, construction specifications,



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trench detail and other pertinent information will be furnished by the Cooperative.

- 4.2. The Cooperative will review and approve the Trench Profile and electrical service riser diagrams prior to the Contractor/Developer installing any electrical trenches or facilities.  
*Refer to 'Sec. Service Trench Multiple Conduit' – Drawing 2*   
*Refer to 'Sec. Service Trench Single Conduit' – Drawing 3*
- 4.3. The Cooperative inspector is to check all trenches and conduit installations prior to the placing of backfill.
- 4.4. The Cooperative inspector is responsible for all field changes and coordinating changes with the FKEC Engineering Department.
- 4.5. The Cooperative inspector is to inspect all transformer pad installations prior to the pouring of concrete.
- 4.6. After approval of the installed conduit system and substructures by the Cooperative inspector, and after the Contractor/Developer has signed all appropriate contracts, agreements, easements and has paid any CIA (Contribution in Aid of Construction), the Cooperative shall install risers, transformers, splices, elbows, equipment, primary cable, and secondary and service cables up to the line side of the point of delivery.
- 4.7. Upon notification of final electrical inspection on the member owned facilities from the Authority Having Jurisdiction, the Cooperative is to make final electrical connections at the point of delivery.

### 5. CONTRACTOR/DEVELOPER RESPONSIBILITY

#### 5.1. Coordination

- 5.1.1. In order to initiate a project, the Contractor/Developer must apply for service and provide the Cooperative an overall project plan and electrical load information. A pre-engineering meeting may be required on larger projects.
- 5.1.2. Utilizing the Electrical Plan provided by Cooperative, the Contractor/Developer is to provide the Cooperative a Trench Profile and electrical service riser diagram prior to installation of any electrical trenches or facilities.  
*Refer to 'Sec. Service Trench Multiple Conduit' – Drawing 2*  
*Refer to 'Sec. Service Trench Single Conduit' – Drawing 3*

The Trench Profile must show the electrical trench route and location; substructure locations and details including elevations; and cross-sectional trench details for each section of trench. The cross-sectional trench details must show trench width and depth, fill materials, and the conduit size and relative location of each trench occupant. The drawing will be of sufficient scale (typically 1"=10') and detail to identify conflicts and be used for inspections and construction. Perpendicular crossings of other utility trenches must be identified.

- 5.1.3. The Contractor/Developer is responsible to coordinate work with AT&T and Comcast Cable.



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- 5.1.4. The Contractor/Developer is responsible to obtain permits for trenching on public easements.
  - 5.1.5. The Contractor/Developer will guarantee workmanship for one year.
  - 5.1.6. The Cooperative's representative must inspect the trench prior to backfilling. The Contractor/Developer shall contact FKEC at (305) 852-2431 to request a trench inspection. Requests received prior to 12 Noon will be conducted the next business day. Requests received after 12 Noon will be conducted within two business days.
  - 5.1.7. The Contractor/Developer is to provide personnel and vehicular access to the facility at all times.
  - 5.1.8. The Contractor/Developer is to be held responsible for full direction and supervision of all work to be performed by his employees, agents or contractors. The Contractor/Developer shall also be responsible for the area at all times prior to acceptance, particularly in the prevention of damage to the electrical distribution system by the activities of other trades and utilities.
  - 5.1.9. The Contractor/Developer is to replace at his expense any damaged equipment or correct any work not in compliance with the requirements in the project sketch, FKEC Specifications or as specified by the Cooperative.
  - 5.1.10. The Contractor/Developer is to furnish equipment and labor to lay out trench, set grade, dig trenches, place conduit in trench, backfill and compact, repair pavement, restore vegetation, set transformer pads and place electrical splice boxes.
- 5.2. TRENCH
- 5.2.1. The conduit trench shall run in as straight alignment as practicable. All conduit and bends shall be Schedule 40 PVC or Schedule 80 PVC and shall be electrical grade. All PVC conduit and bends shall be gray in color. Plastic warning tape shall be installed above the duct system and nine (9) inches below finished grade. The number and size of conduits will be determined by FKEC as shown in the trench details.  
*Refer to 'Sec. Service Trench Multiple Conduit' – Drawing 2*  
*Refer to 'Sec. Service Trench Single Conduit' – Drawing 3*
  - 5.2.2. Where bends are required, the minimum radius shall be 36 inches for primary ducts and 24 inches for secondary ducts to prevent damage to cable being installed in the ducts. Conduit sizes or duct sizes shall not be changed between manholes, pull boxes, or transformer foundations. An adapter or coupling must be placed on all exposed ends of duct so that there are no rough edges.
  - 5.2.3. Conduits shall be installed so as to be subject to the least disturbance practical. In areas of expected construction or where there is heavy truck or equipment traffic, additional protection shall be provided by either increasing the burial depth or encasing the ducts in red colored concrete, or both. Conduit shall be installed to meet or exceed National Electric Safety Code standards.



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- 5.2.4. Conduits shall be installed over a six (6) inch bed of clean, compacted 1/4 inch pearock. After the ducts are installed on a compacted bed of 1/4 inch pearock, and before placing the compacted backfill over the ducts, FKEC shall be notified so that the installation can be inspected.
- 5.2.5. Backfilling of conduit trenches under paved areas, around conduit bends at riser poles and under transformer pad areas is to be compacted to 95% of the density of surrounding undisturbed soil as per ASTM D 698. Stabilization must be uniform to bottom of trench. Alternative stabilization methods for backfilling around conduit bends under transformer pad consist of two (2) sacks of portland cement mixed with earth backfill, flowable fill or the pouring of concrete backfill with transformer pad. The method used will be governed by prevalent local soil conditions.
- 5.2.6. Ducts that are under any type of roadway must be backfilled and compacted to F.D.O.T. standards.
- 5.2.7. Telephone and cable TV circuits may share the same trench as electric power circuits provided 12" separation is maintained per FKEC specifications. See FKEC trench details.  
*Refer to 'Sec. Service Trench Multiple Conduit' – Drawing 2*  
*Refer to 'Sec. Service Trench Single Conduit' – Drawing 3*
- 5.2.8. Water and sewer lines are not permitted in trench with power circuits. Water and sewer lines crossing electric circuits shall be located a minimum of twelve (12) inches from electric ducts.
- 5.2.9. A lateral separation of five (5) feet from other utilities is required on private property.
- 5.2.10. No foreign conduit or pipes are permitted under the transformer pad area.
- 5.2.11. Contractor is to pull a mandrel through each conduit to check and clear blockage and leave a polyester pull tape (1800# with sequential markings). Conduit shall be labeled and capped at both ends after cleaning.
- 5.3. SPLICE BOXES AND TRANSFORMER/EQUIPMENT PADS
- 5.3.1. The Contractor/Developer is to complete rough site grading, establish final grade at splice box and padmount equipment locations and clear these locations of all obstructions. Any change in final grade that requires the lowering or rising of electrical conductors or associated equipment shall be at the expense of the Contractor.  
*Refer to 'Primary Splice Boxes' – Drawing 11*



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- 5.3.2. Pull boxes and transformer box pads shall be constructed according to FKEC specifications. Pre-cast boxes are recommended.  
*Refer to 'Pull Box UG-PB3' – Drawing 4*  
*Refer to 'Switchgear Padmount' – Drawing 5*  
*Refer to 'Transformer Pad – 1 Phase' – Drawing 6*  
*Refer to 'Transformer Pad – 3 Phase UG-TB3' – Drawing 7*  
*Refer to 'Transformer Pad – 3 Phase UG-TB3L' – Drawing 8*
- 5.3.3. A ground rod or grounding system shall be provided at each splice box and pad per FKEC specifications. Any metal parts in the splice box shall be securely bonded to the grounding system. A resistance of 25 ohms or less is required.
- 5.3.4. If necessary, the grounding system shall be extended by adding ground rods, using longer ground rods, or installing a ground grid to achieve a ground resistance of 25 ohms or less. The minimum grounding conductor shall be number 4 AWG soft drawn bare copper for equipment or system grounds and number 6 AWG soft drawn bare copper for meter grounds. Ground rods shall be 5/8-inch copperweld. Ground wire shall be securely bolted to the ground rod.
- 5.3.5. An (8) foot copperbonded ground rod is required inside all transformer foundations.
- 5.3.6. Pull boxes will be constructed with a concrete floor and have a sump pit for pumping water out of the manhole during installation or maintenance of cables. The floor shall slope to the sump pit for drainage.  
*Refer to 'Pull Box UG-PB3' – Drawing 4*
- 5.3.7. Structures shall be located in areas that are normally free of run-off or standing water. The elevation of pull boxes should be such that water will drain away from the pull box.
- 5.3.8. Stainless steel pulling eyes shall be installed in pull boxes for cable pulling per FKEC specifications.
- 5.3.9. Pull boxes shall have conductor racks per FKEC specifications.
- 5.3.10. The top of transformer pads or boxes are to be installed a minimum of three (3) inches above finished grade. Transformer locations shall be selected at points of higher elevation to minimize flooding and assure drainage away from the transformer.  
*Refer to '1 Phase Padmount Transformer Box' – Drawing 9*  
*Refer to '1 Phase Padmount Transformer Box' – Drawing 10*
- 5.3.11. Transformer pads/boxes are to have a clear area surrounding the pad installation for safety, operation and maintenance purposes. Transformers shall not be located over lot lines. There shall be suitable space adjacent to structures for positioning cable reels while installing cable.  
*Refer to 'Transformer Clearance Requirements' – Drawing 12*
- 5.3.12. Transformers shall be positioned so that the doors face the street unless



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otherwise directed by FKEC. Property owners shall not plant trees, flowers, or shrubs nor construct fences, buildings or other structures within an 8-foot area in front of or within a 3-foot area on the sides and rear of any transformer.

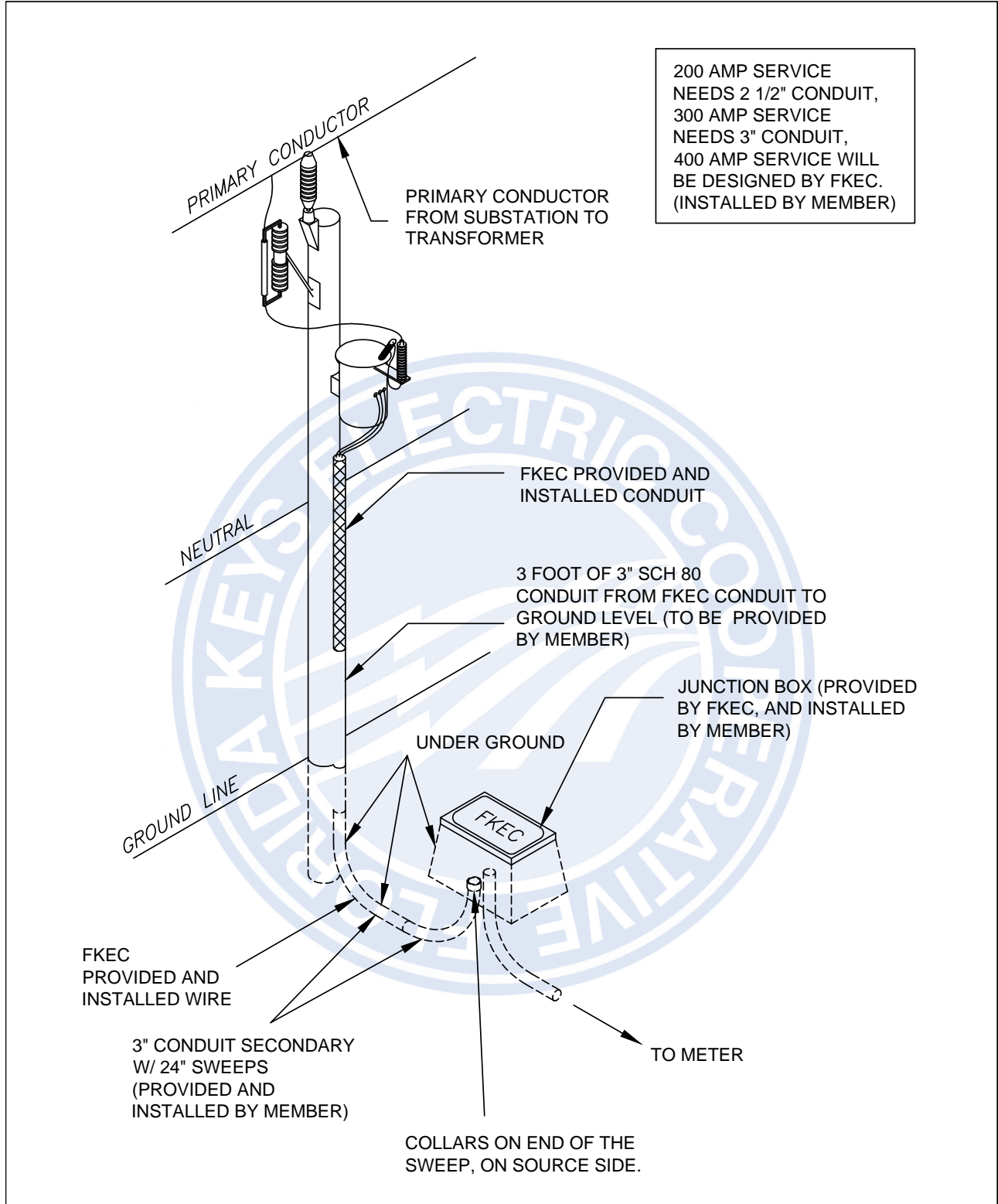
***Refer to 'Transformer Clearance Requirements' – Drawing 12***


### **5.4. POINTS OF DELIVERY**

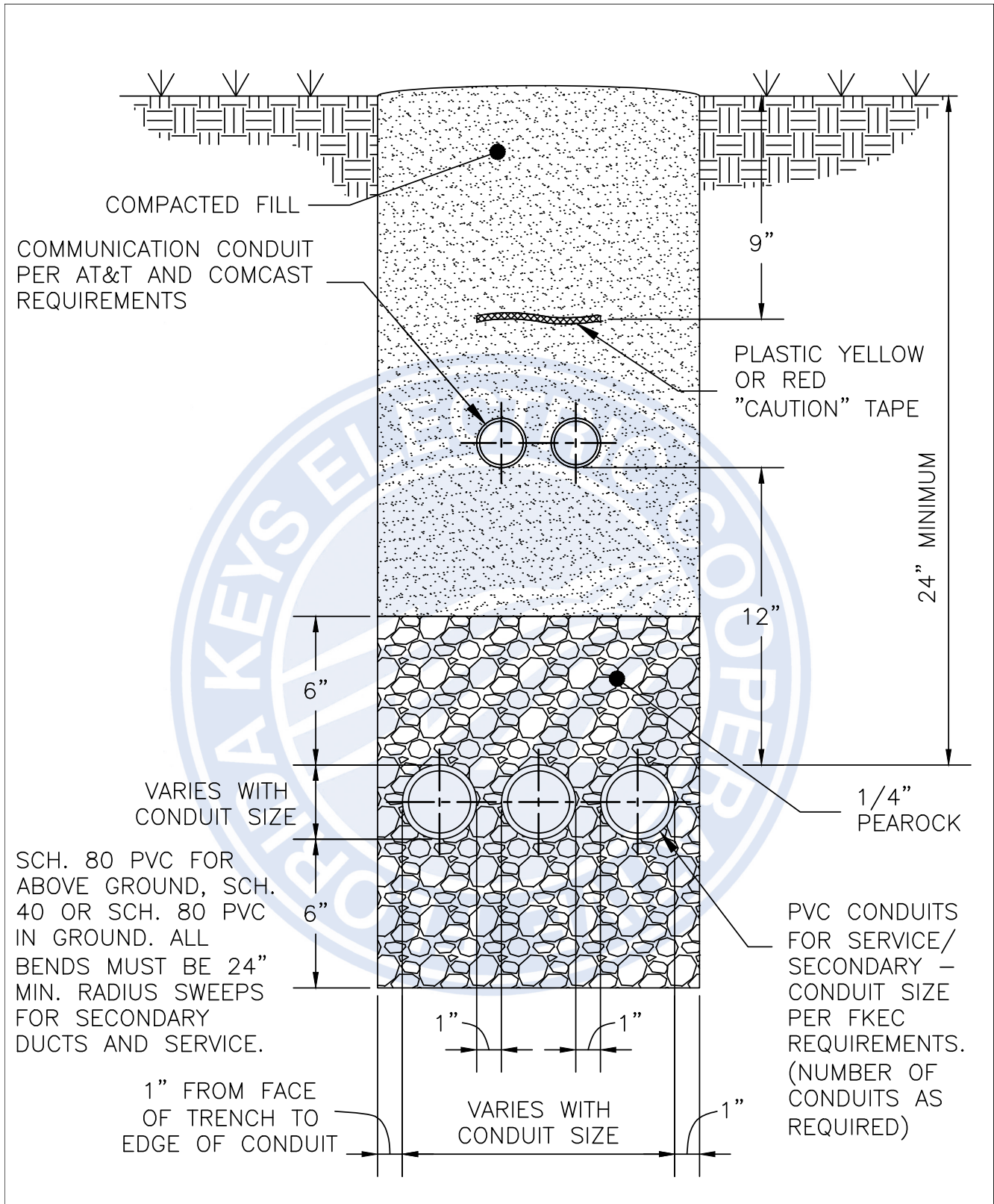
- 5.4.1. Refer to FKEC's Electric Service Entrance Requirements for details and specifications.
- 5.4.2. Standard service voltages are 120/240 volts single phase and 120/208 volts three phase. Self contained meters are readily available for these voltages for loads up to 300 amps.
- 5.4.3. Non-standard service voltages or loads in excess of 300 amps will require special metering considerations. In those cases, specific instructions and approval must be secured from FKEC.
- 5.4.4. Each meter installation shall include a driven copper bonded ground rod and a minimum No. 6 AWG soft drawn copper ground wire connecting the meter box to the ground rod. FKEC may refuse to set a meter unless the ground resistance measures 25 ohms or less.
- 5.4.5. The Contractor is to secure inspection and approval of premise's facilities by the Authority Having Jurisdiction prior to connection of electrical facilities.

### **6. ACCEPTANCE**

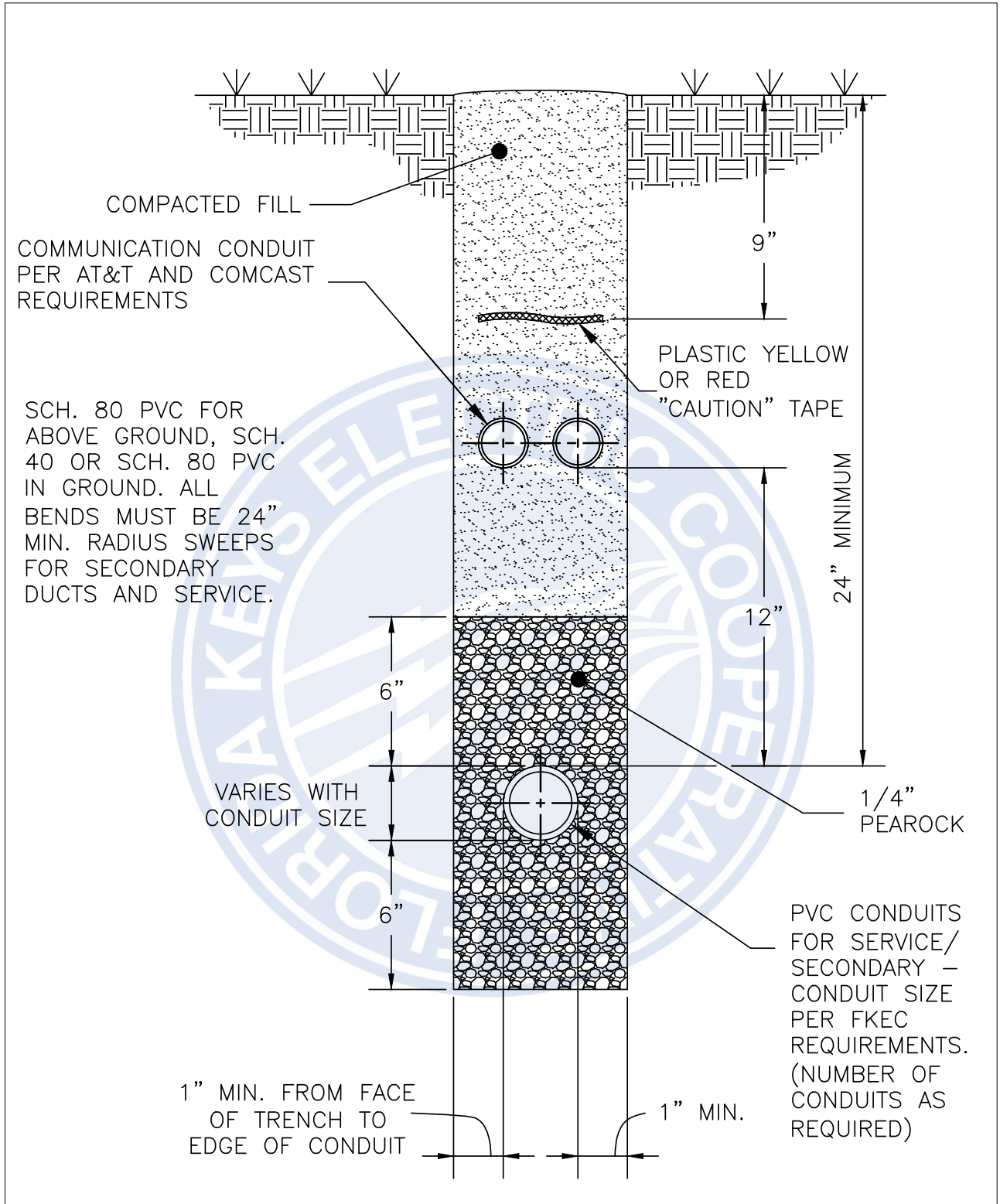
- 6.1. The Cooperative inspector shall meet with the Contractor to review the project prior to acceptance. Electrical facilities will be installed as approved by the Cooperative inspector only after acceptance of the project.




 <p>FLORIDA KEYS ELECTRIC COOPERATIVE ASSOCIATION, INC. TAVERNIER, FLORIDA</p>	<p><b>DRAWN</b> SAS</p>	<h2>UNDERGROUND SERVICE</h2>			
	<p><b>DESIGN</b></p>				
	<p><b>DATE</b> 02/22/10</p>	<p><b>DRAWING NO.</b> UNDERGROUND SERVICE.DWG</p>	<p><b>SHEET NO.</b> 1 OF 1</p>	<p><b>SCALE</b> N.T.S.</p>	<p><b>REVISION NO.</b> 0</p>



 <p>FLORIDA KEYS ELECTRIC COOPERATIVE ASSOCIATION, INC. TAVERNIER, FLORIDA</p>	DRAWN	SAS	<p><b>SECONDARY/SERVICE TRENCH PROFILE</b> <b>MULTIPLE FKEC CONDUIT</b></p>							
	DESIGN									
	DATE	02/22/10	DRAWING NO.	SECSERV TRENCH PROFILE MULTI FKECCOND.DWG	SHEET NO.	1 OF 1	SCALE	N.T.S.	REVISION NO.	0



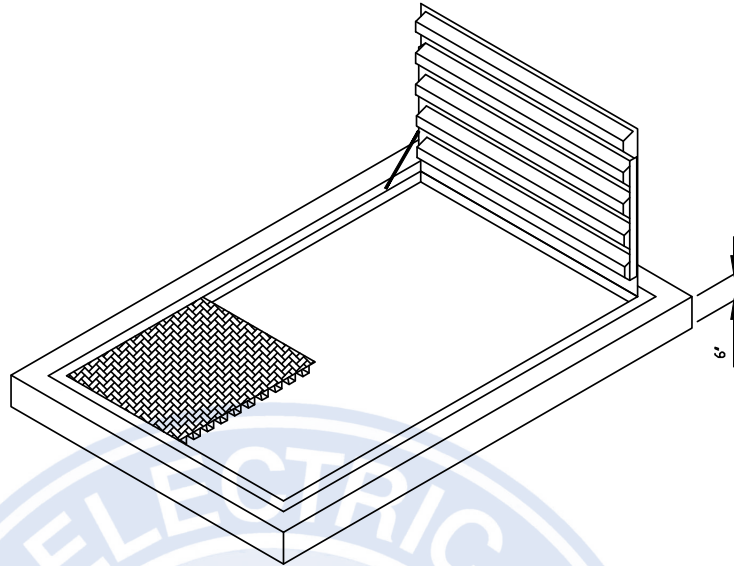
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	DESIGN					
	DATE	02/22/10	DRAWING NO.	SECSERV TRENCH PROFILE SINGLE FKECCOND.DWG	SHEET NO.	1 OF 1
			SCALE	N.T.S.	REVISION NO.	0

FKEC UNDERGROUND DRAWING 4 OF 12

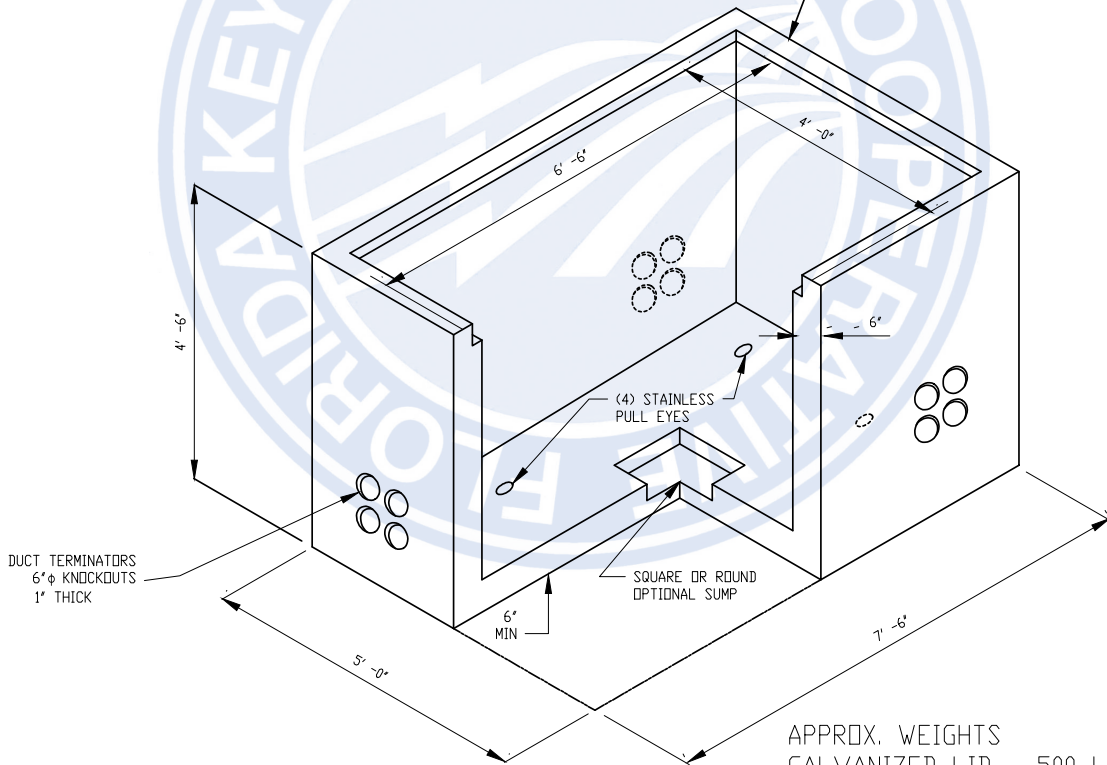
NO. 4878 ADJUSTABLE, H2O RATED, FRAME AND COVER ASSEMBLY

COVER INCLUDES:

- TORSION ASS'T OPENING
- SAFETY LATCH HOLD OPEN
- PENTHEAD BOLTDOWN
- SLIP RESISTANT COVERS (2EA.)
- HOT DIPPED GALVANIZED



4878 BASE  
NOTE: ALL EXPOSED STEEL TO BE HOT-DIPPED GALVANIZED OR STAINLESS STEEL.



APPROX. WEIGHTS  
GALVANIZED LID - 500 LBS.  
CONCRETE PULL BOX - 8000LBS.

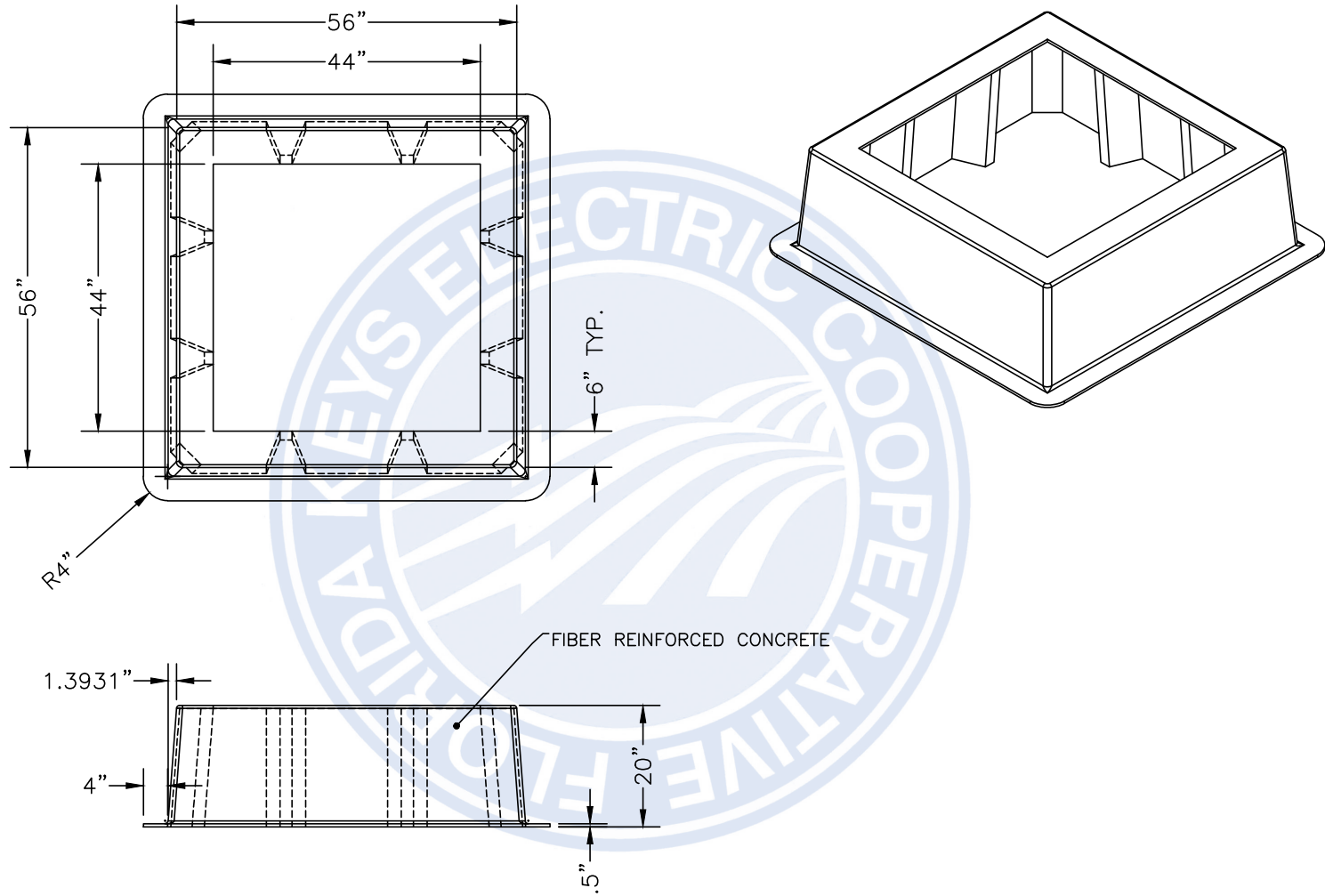


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DRAWN	SAS
DESIGN	
DATE	02/22/10

## 4' x 6'-6" x 1' TO 5' I.D. PULL BOX UG-PB3

DRAWING NO.	SHEET NO.	SCALE	REVISION NO.
UG-PB3.DWG	1 OF 1	N.T.S.	0



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**DRAWN** SAS  
**DESIGN**  
**DATE** 02/22/10

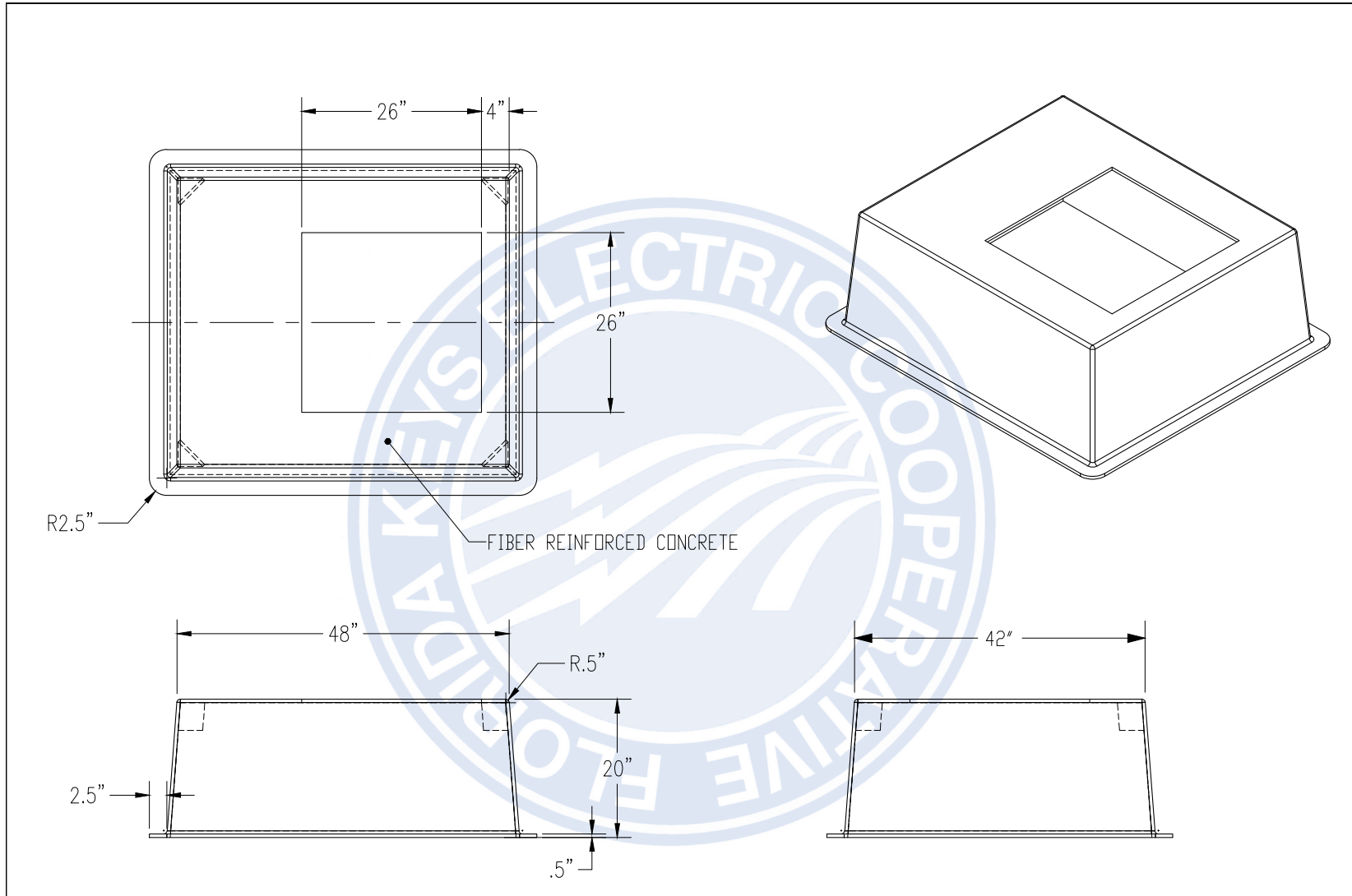
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**DRAWING NO.**  
UG-SWB1.DWG

**SHEET NO.**  
1 OF 1

**SCALE**  
N.T.S.

**REVISION NO.**  
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**DATE** 02/22/10

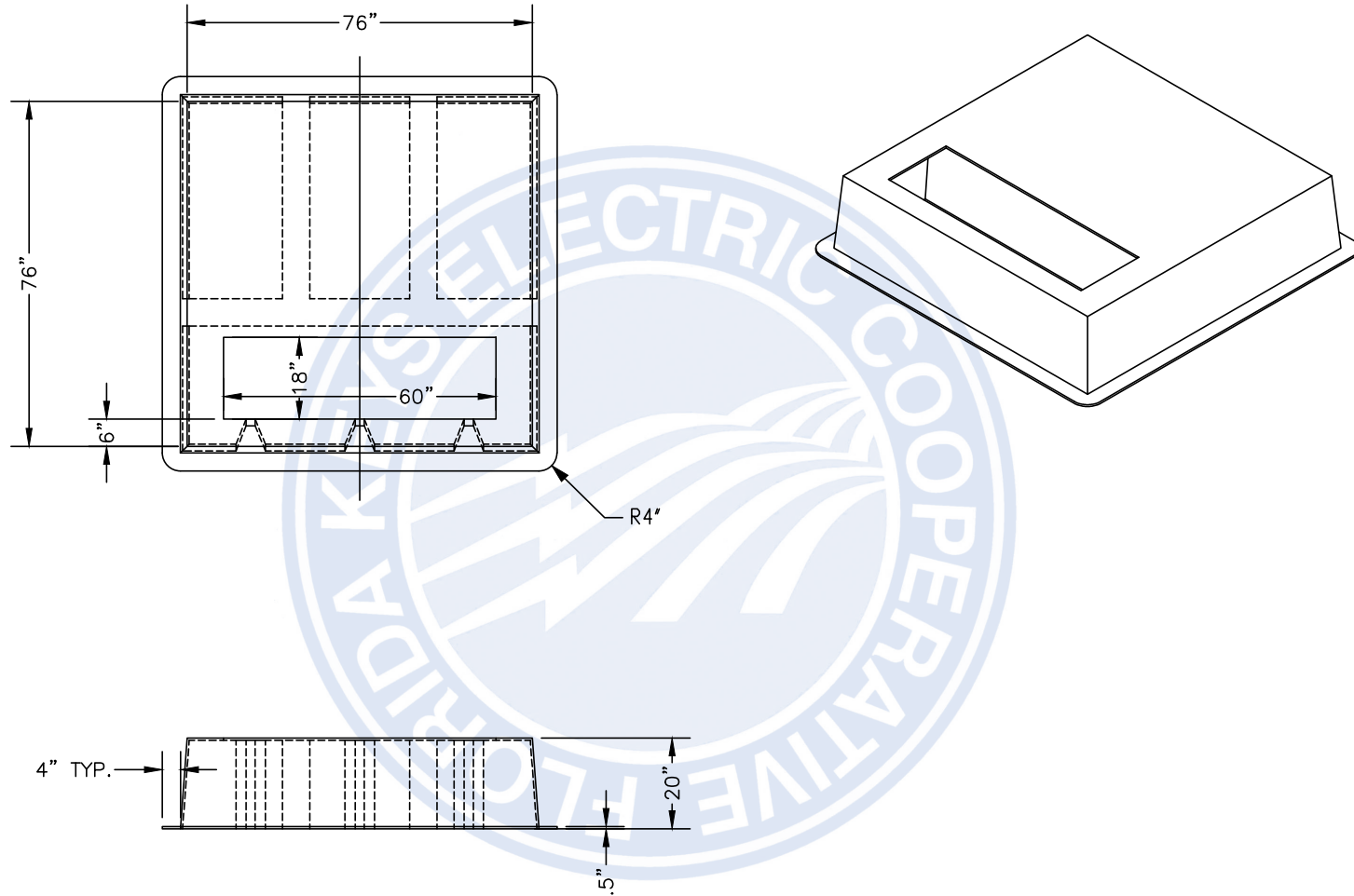
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**DRAWING NO.**  
UG-TB1.DWG

**SHEET NO.**  
1 OF 1

**SCALE**  
N.T.S.

**REVISION NO.**  
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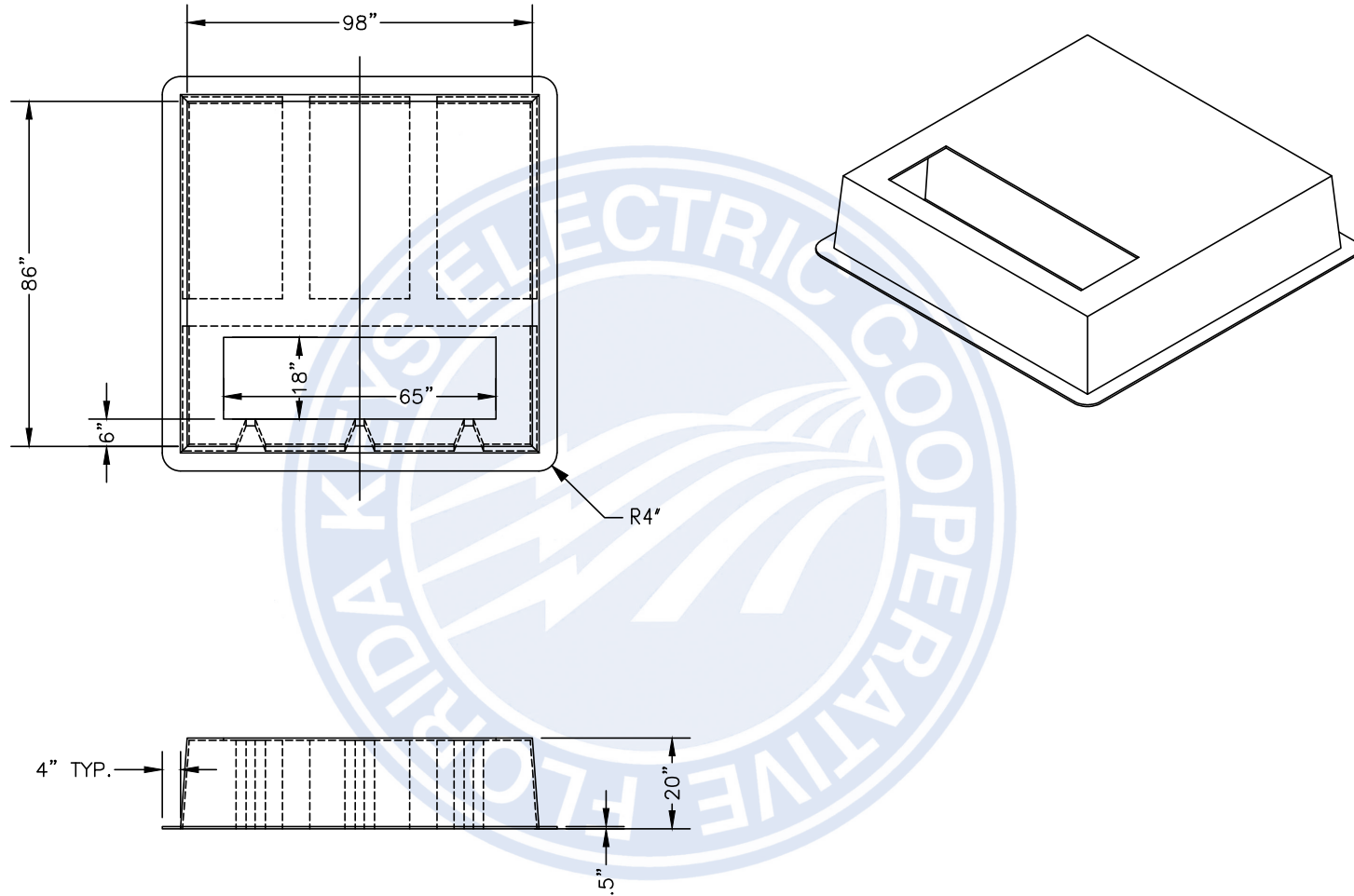


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<i>DRAWN</i>	SAS
<i>DESIGN</i>	
<i>DATE</i>	02/22/10

## TRANSFORMER PAD - 3 PHASE UG-TB3

<i>DRAWING NO.</i>	<i>SHEET NO.</i>	<i>SCALE</i>	<i>REVISION NO.</i>
UG-TB3.DWG	1 OF 1	N.T.S.	0



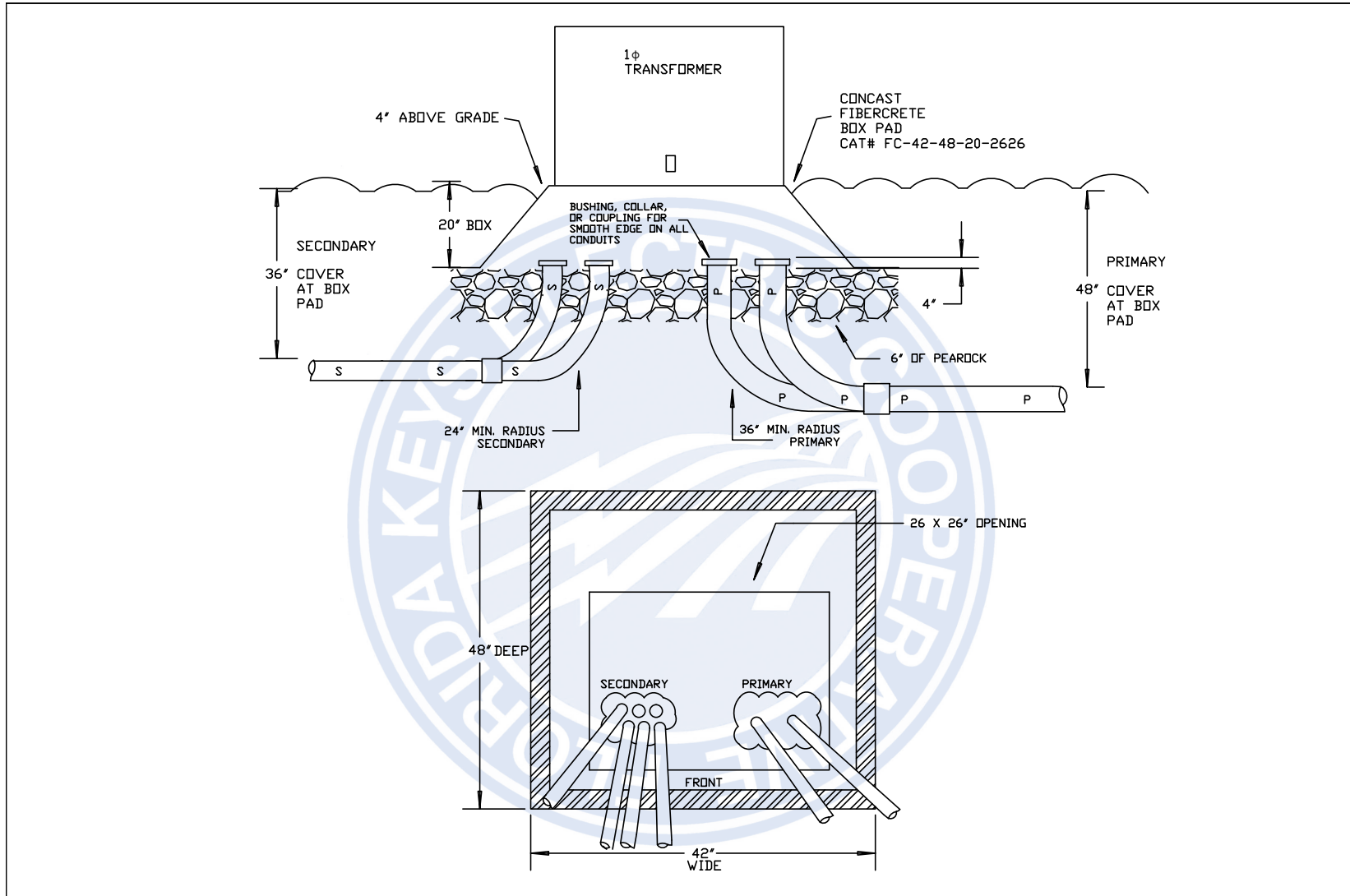
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<i>DRAWN</i>	SAS
<i>DESIGN</i>	
<i>DATE</i>	02/22/10

## TRANSFORMER PAD - 3 PHASE UG-TB3L

<i>DRAWING NO.</i> UG-TB3L.DWG	<i>SHEET NO.</i> 1 OF 1	<i>SCALE</i> N.T.S.	<i>REVISION NO.</i> 0
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FKEC UNDERGROUND DRAWING 9 OF 12



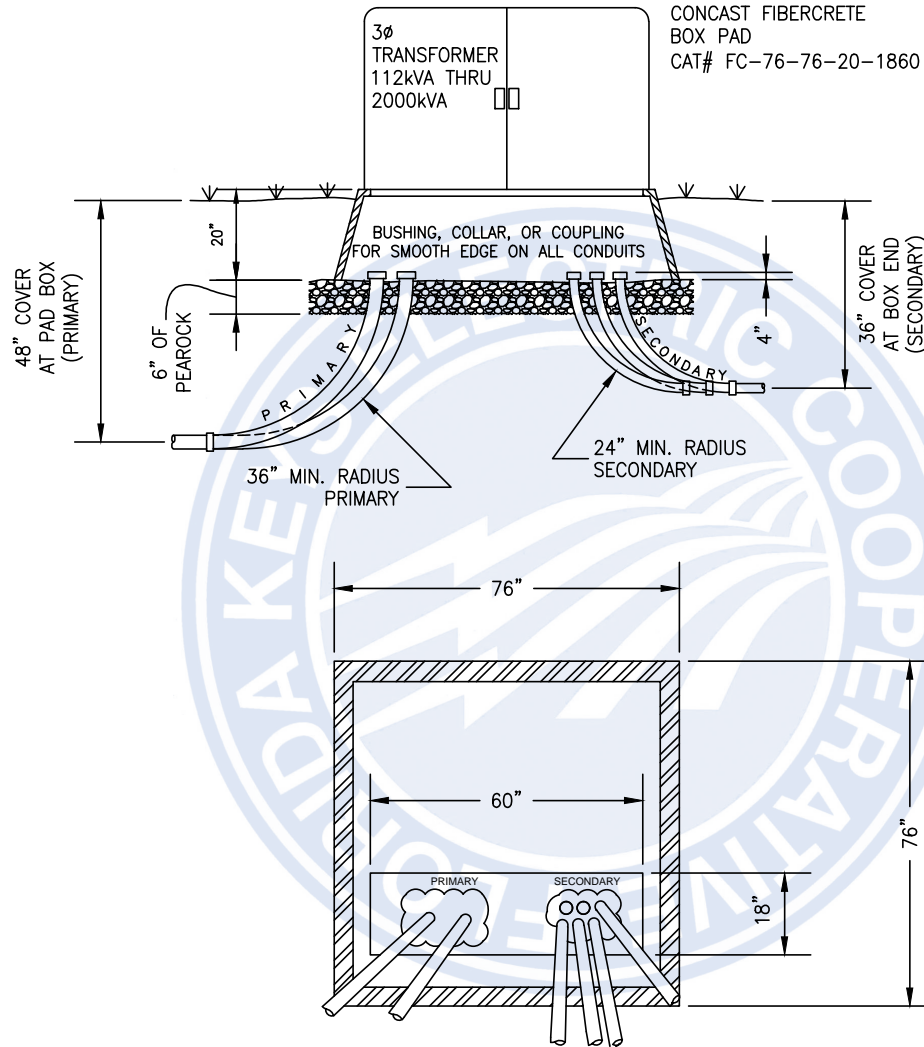
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<b>DRAWN</b>	SAS
<b>DESIGN</b>	
<b>DATE</b>	02/22/10

## FKEC 1 PHASE PADMOUNT TRANSFORMER BOX PAD

<b>DRAWING NO.</b>	1 PH XFMR PADMOUNT.DWG	<b>SHEET NO.</b>	1 OF 1	<b>SCALE</b>	N.T.S.	<b>REVISION NO.</b>	0
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FKEC UNDERGROUND DRAWING 10 OF 12

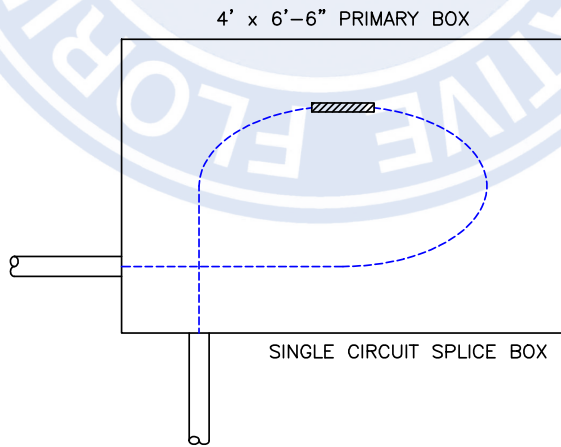
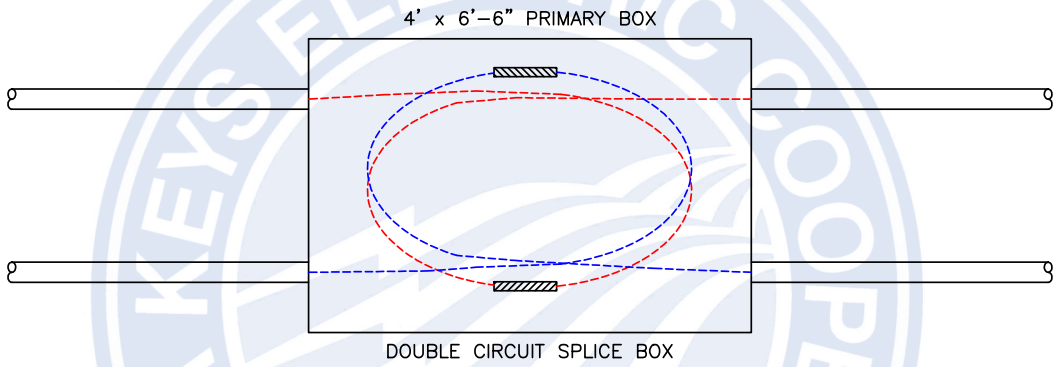
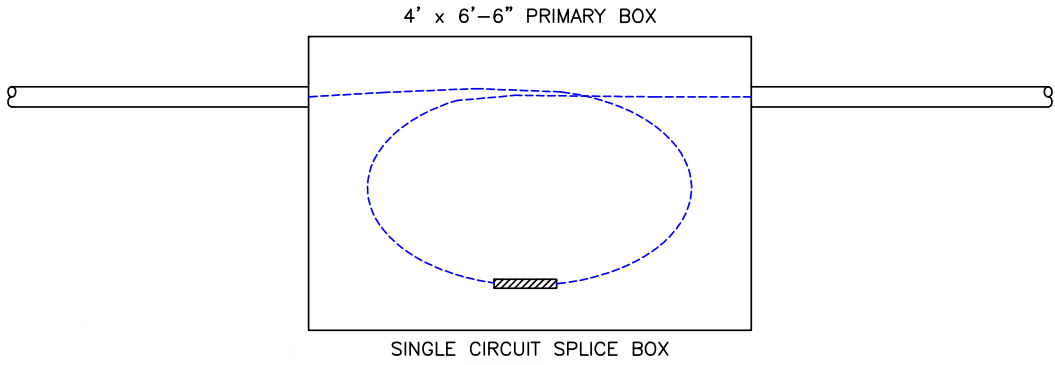


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DRAWN	SAS
DESIGN	
DATE	02/22/10

## FKEC 3 PHASE PADMOUNT TRANSFORMER BOX PAD

DRAWING NO.	SHEET NO.	SCALE	REVISION NO.
3 PH XFMR PADMOUNT.DWG	1 OF 1	N.T.S.	0



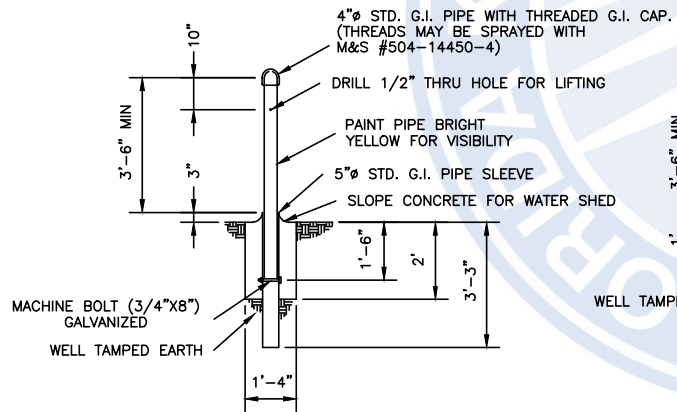
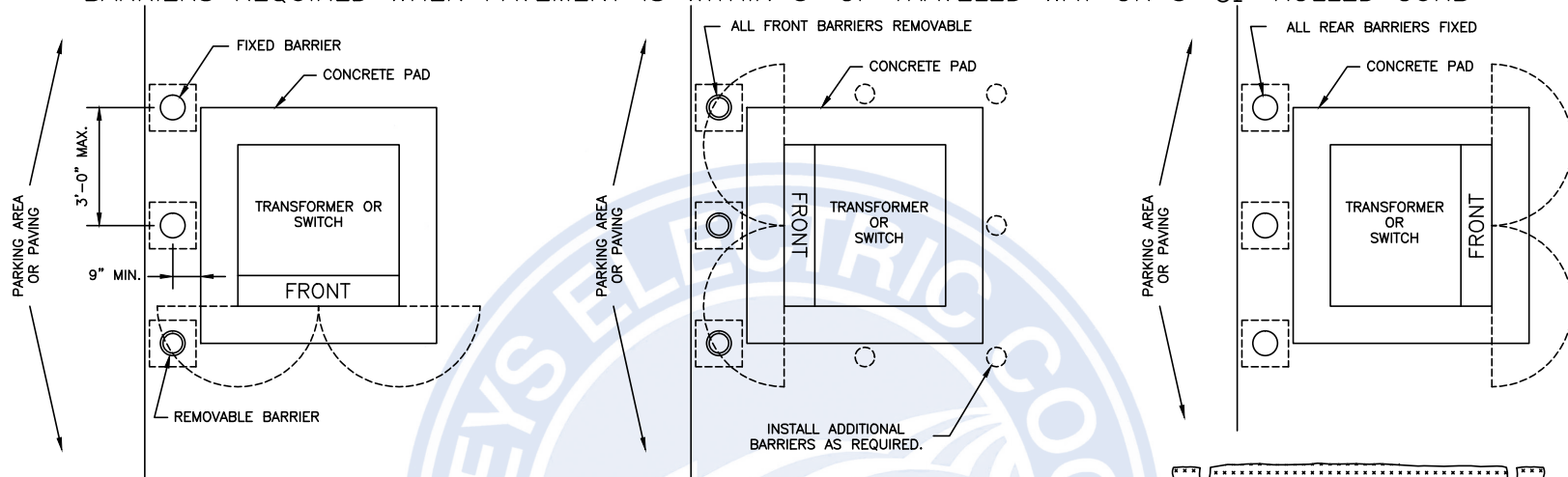
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<i>DRAWN</i>	SAS
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<i>DATE</i>	02/22/10

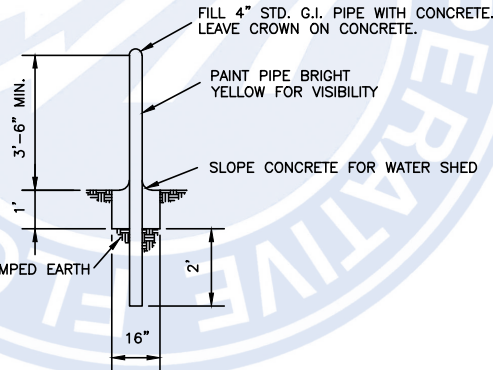
## PRIMARY SPLICE BOXES

<i>DRAWING NO.</i>	<i>SHEET NO.</i>	<i>SCALE</i>	<i>REVISION NO.</i>
PRIMARY BOX PLAN VIEWS.DWG	1 OF 1	N.T.S.	0

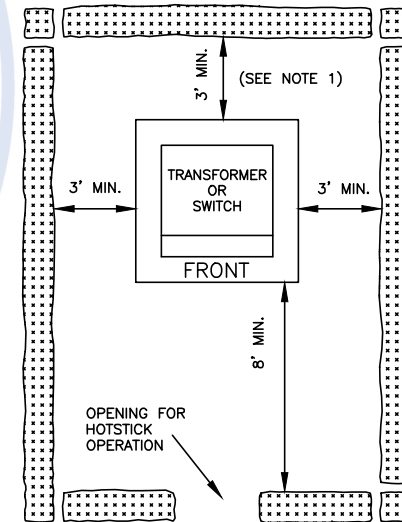
PROTECTIVE BARRIER AND PLANTING CLEARANCES FOR PADMOUNTED TRANSFORMERS AND SWITCHES  
 - BARRIERS REQUIRED WHEN PAVEMENT IS WITHIN 5' OF TRAVELED WAY OR 3' OF ROLLED CURB



REMOVABLE BARRIER



FIXED BARRIER



NOTE 1:  
 PADMOUNT SWITCHES  
 REQUIRE 8' MINIMUM  
 CLEARANCE IN THE  
 FRONT AND REAR.

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	DESIGN					
	DATE	02/22/10	DRAWING NO.	XFMR CLEAR REQ.DWG	SHEET NO.	1 OF 1
			SCALE	N.T.S.	REVISION NO.	0