

# SECTION 16

## **UNDERGROUND SYSTEMS**

## **UNDERGROUND DISTRIBUTION & TRANSFORMER VAULT SPECIFICATIONS**

This section deals with the trenching and duct requirements of underground primary cable, including specifications for vaults for the installation of padmount transformers. The customer will normally be responsible for the installation of duct banks and the construction of transformer vaults: CUC Planning Personnel shall inspect these installations before concrete is poured and backfill is placed.

### **TRENCHES**

The depth and width for trenches shall be in accordance with the specifications on drawing "Underground Trench & Duct Details". Trenches shall be as straight as practical and the bottom free of any stones or sharp ridges. A warning tape shall be installed in the trench - 8" above the concrete and 10" from road/ground surface as per Drawing 16-2.

Concrete encased ducts are required in all primary installation. All main line duct banks must be reinforced with steel rebar.

The requirements for primary cable dips are specified on drawing "Underground Primary Installation Page 16-3"

### **TRANSFORMER VAULTS**

Transformer vaults as per the specifications on drawings "Single Phase Padmount Transformer Vault" and "Three Phase Transformer Vault" Pages 16-5 thru 16-9 are required for all loop and radial fed transformers.

### **CABLE LENGTHS**

The maximum length of cable per run is dependent on the cable size, the conduit size and the number of bends in the duct. The Planning Department must approve all cable installation designs.

## CLEARANCE REQUIREMENTS PADMOUNT TRANSFORMERS

### **Combustible Materials and Containers AND Windows, Doors and Stairwells of Buildings**

#### GENERAL:

This document establishes the minimum clearance and proximity distances required by Caribbean Utilities Company, Ltd. to ensure the safe operation of high voltage electrical lines and equipment near combustible materials and/or containers of combustible materials and/or windows, doors and stairwells of buildings.

#### DESCRIPTION OF COMBUSTIBLE MATERIALS AND CONTAINERS OF COMBUSTIBLE MATERIALS:

Any material that has a flash point of 70°C or less is a Combustible Material for this Standard and is considered capable of causing a fire or explosion if ignited or heated to the flash point temperature. Any container of Combustible Materials is considered to have the same or greater potential for causing a fire or explosion whether, or not, it is full, partially full, or empty.

#### DESCRIPTION OF PROXIMITY TO WINDOWS, DOORS AND STAIRWELLS:

Any public access route to building or any window that is within the blast radius of CUC energized high voltage equipment.

#### MINIMUM CLEARANCE AND PROXIMITY DISTANCES:

The minimum clearance and proximity distance for CUC high voltage equipment shall be:

Either,

- 1) Twenty feet (20') from nearest point of CUC's energized high voltage equipment to the Combustible Materials or a container of Combustible Materials or window, door or stairwell of building. Examples of Combustible Materials include but are not limited to the following:

#### EXAMPLES:

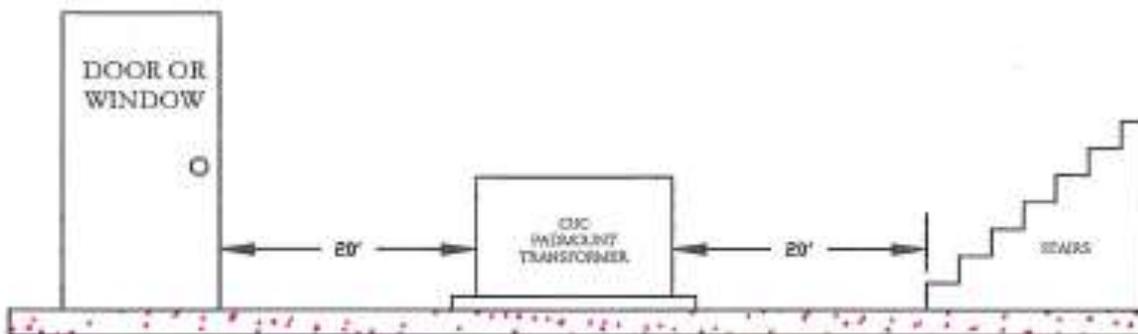
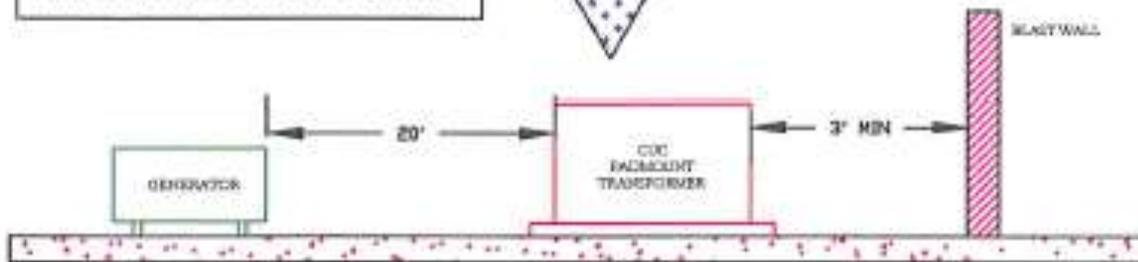
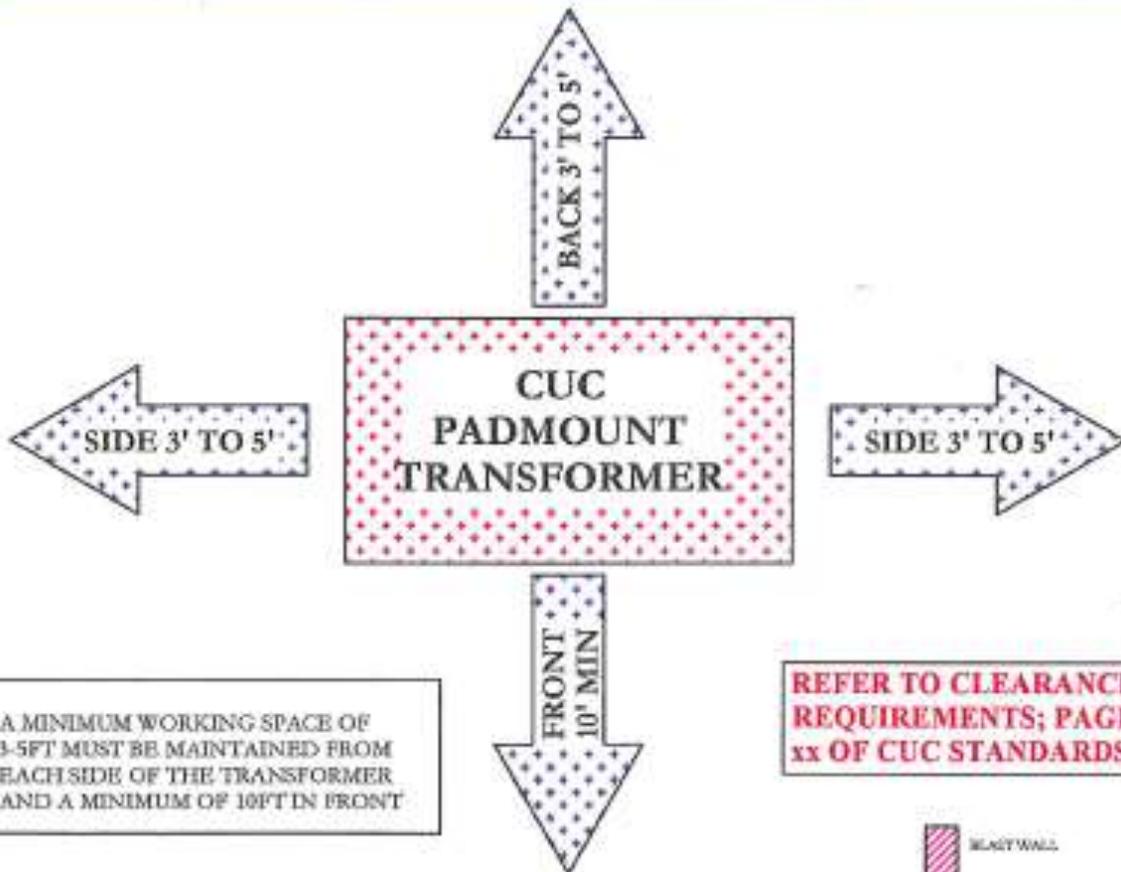
- Building materials with a flash point of 60°C or greater
- Liquefied Petroleum tanks
- Service Station Fuel Pumps
- Fuel Storage Tanks
- Carbon based fueled equipment storage

Or,

- 2) Three feet (3') from a fire/blast wall that protects CUC's high voltage equipment from a fire or explosion of Combustible Materials. The fire/blast wall shall have minimum construction requirements as follows:
  - The height shall be either, a) at least one foot (1') taller than the Combustible Materials or Combustible Materials Container, or b), at least one foot (1') taller than the CUC high voltage equipment, whichever is the highest.
  - The width shall be at least one and one-half times wider than either, a) the width of the Combustible Materials or Combustible Materials Container, or b), the width of the CUC high voltage equipment, whichever is the greater width.
  - The thickness shall be at least six inches (6") thick solid concrete with steel reinforcement (including the foundation) and able to withstand fire and explosion of the Combustible Materials or Combustible Materials Container.
  - The fire/blast wall design and installation shall be approved by CUC before service is allowed to customers affected by this Standard.

### **Working Space**

A minimum working space of 3-5ft must be maintained from each side of the transformer and a minimum of 10 ft from the front. Clear space for safe access to and egress from the working space must be maintained.



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**PROJECT**

CUC  
STANDARDS

**DRAWING**

PADMOUNT TRANSFORMER  
CLEARANCES

DATE: AUG, 2014

SCALE: NTS

DRAWN BY: DCM

CHECKED BY: CP

APPROVED BY: CUC SC

PROJECT #

DRAWING #

SHEET #

REV. #

REV. DATE

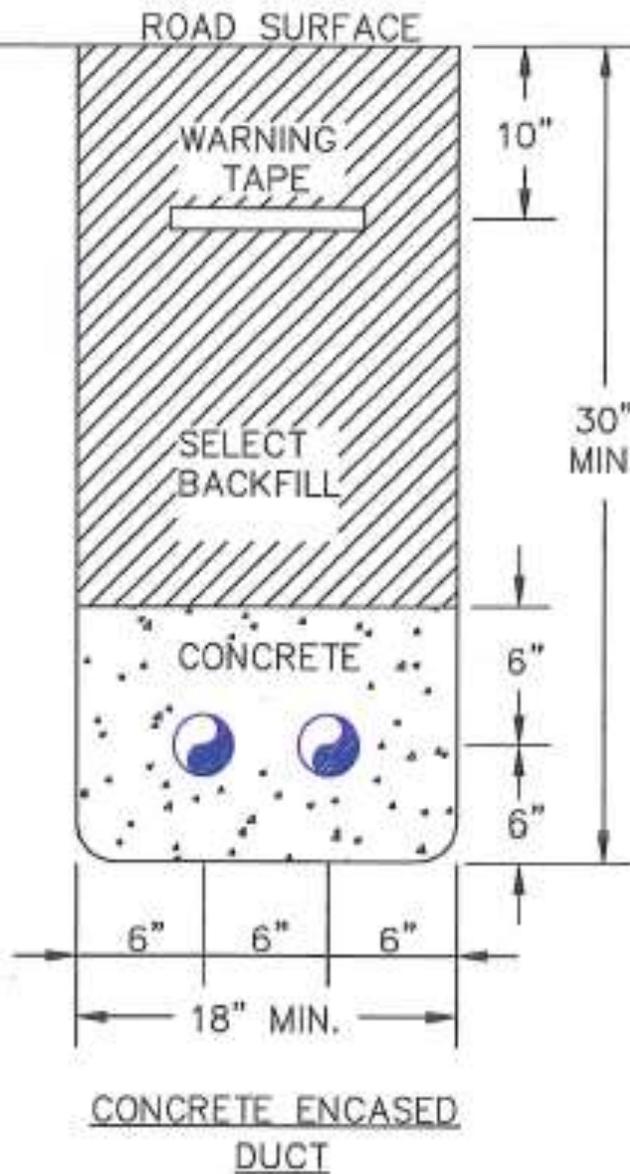
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01 of 01

A

Oct, 2014

**APPROVED**



**NOTES:**

1. THE REQUIRED DUCT SIZE IS 3 INCHES FOR SINGLE PHASE AND 4 INCH FOR THREE HV CIRCUITS.
2. THE DUCT SHALL BE PVC OR APPROVED EQUIVALENT AND ALL JOINTS SHALL BE SEALED WITH SOLVENT WELD.
3. SPARE DUCT(S) SHALL BE INSTALLED FOR ALL HV CABLE INSTALLATION.
4. CONCRETE ENCASED DUCTS SHALL BE SUPPORTED BY PLASTIC SPACERS AT 48 INCH INTERVALS.
5. CONCRETE SHALL HAVE A 28 DAY STRENGTH OF 3000 LBS.
6. A FISH WIRE OR  $\frac{3}{8}$ " ROPE SHALL BE INSTALLED IN EACH HV DUCT AND THE ENDS SECURELY CAPPED.
7. A WARNING TAPE INDICATING PRESENCE OF UNDERGROUND CABLE SHALL BE INSTALLED IN ALL TRENCHES.
8. ALL TRENCHES FOR HV CABLES INSTALLATION SHALL BE INSPECTED BY CUC PERSONNEL PRIOR TO BACK FILLING OR THE PLACEMENT OF CONCRETE
9. LOW VOLTAGE (SERVICE) DUCT SIZE WILL BE DETERMINED BY THE OWNER; TRENCH DETAILS SHALL BE AS REQUIRED.



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**PROJECT**

CUC  
 STANDARDS

**DRAWING**

STANDARD TRENCH & DUCT  
 DETAIL

DATE: JUNE 2014

SCALE: NIS

DRAWN BY: DCM

CHECKED BY: CP

APPROVED BY: CUC BC

PROJECT #

DRAWING # DT-01

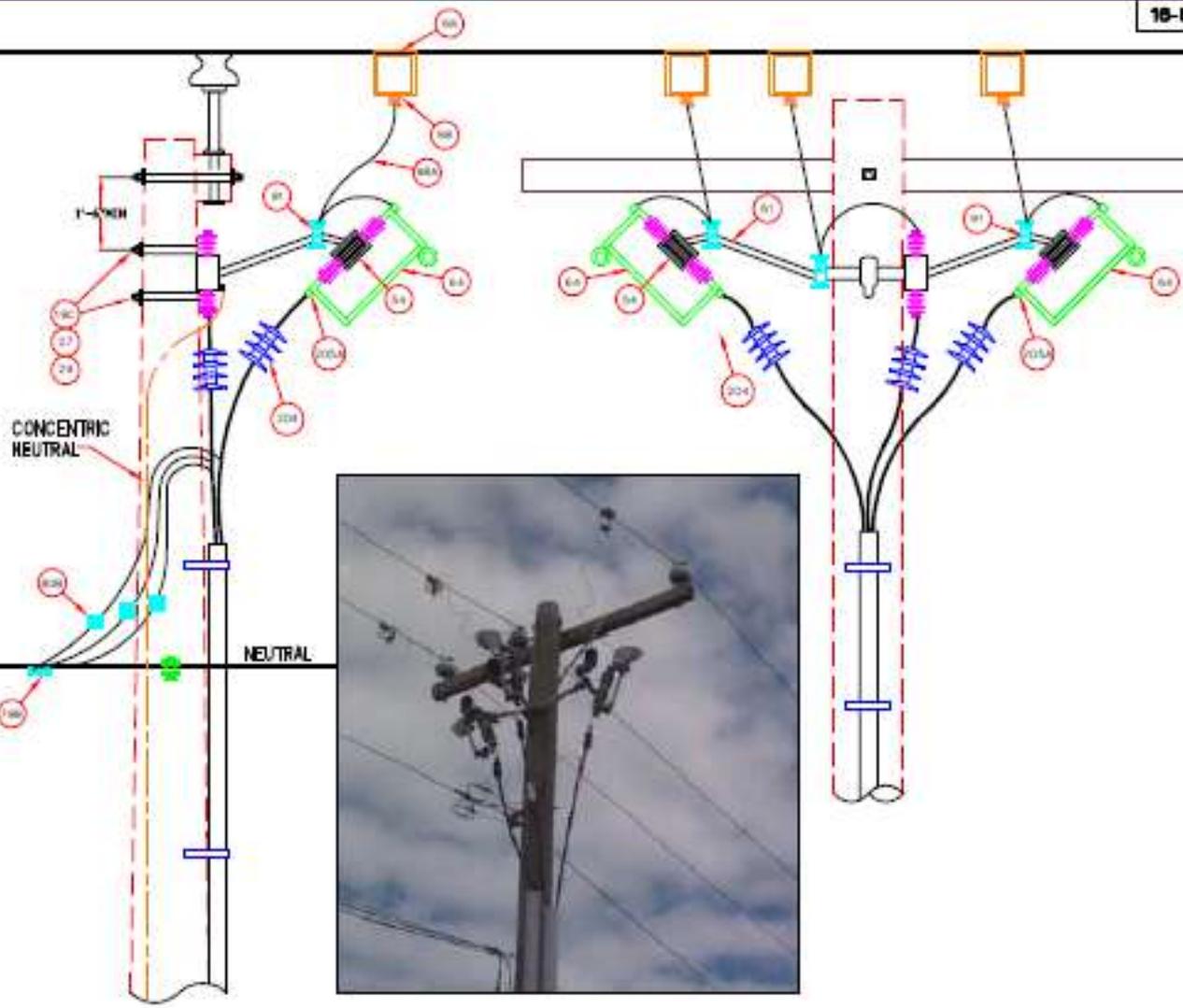
SHEET # 01 of 01

REV. # A

REV. DATE Oct. 2014

**APPROVED**





**NOTES:**

1. THE CONCENTRIC NEUTRAL (EACH PHASE) SHALL BE CONNECTED SEPARATELY TO THE NEUTRAL.
2. ARRESTERS AND CUTOUTS ARE REQUIRED ON ALL CABLE DIPS.
3. IT IS ALSO RECOMMENDED THAT NO OTHER EQUIPMENT BE INSTALLED ON THIS STRUCTURE.
4. PROVISIONS SHOULD BE MADE FOR THE CONDUIT TO ALWAYS TERMINATE ABOVE THE NEUTRAL.
5. A 40' POLE OR HIGHER IS REQUIRED FOR A SINGLE PHASE U/G PRIMARY SERVICE.
6. SEE LIST SECTION FOR TERMINATOR INSTALLATION DETAILS.

ITEM NO.	QTY	MATERIAL	STOCK NO.
16C	2	BOLT - WASH, 5/8 X 12	098-00015
27	2	WASHER - SQUARE, 2"	973-00005
28	2	WASHER - LOCK, DS, 5/8"	973-00011
61	1	BRACKET-CUTOOT, 3 PHASE	108-00004
91	3	ARRESTER	037-00001
86	3	CLAMP-BAL 2/0 (477)	183-00001
68	3	CLAMP-HOT LINE, CU	183-00006
54	3	CUTOOT DISTRB - 200A	264-00002
64	3	FUSE LINK - TYP5 SF	
98A	AR	WRE-SDBIC #4	963-00010
206A	3	TERMINAL-PIN, CU	
78B	3	CRMPY-CU, 2-6	253-00006
82D	1	SLEEVE-SERVICE, 2-2	785-00006
80B	1	CRMPY-CABLELOK, 2/0-2	253-00008
204	1	TERMINATOR #2 COLD SHRINK	880-00002

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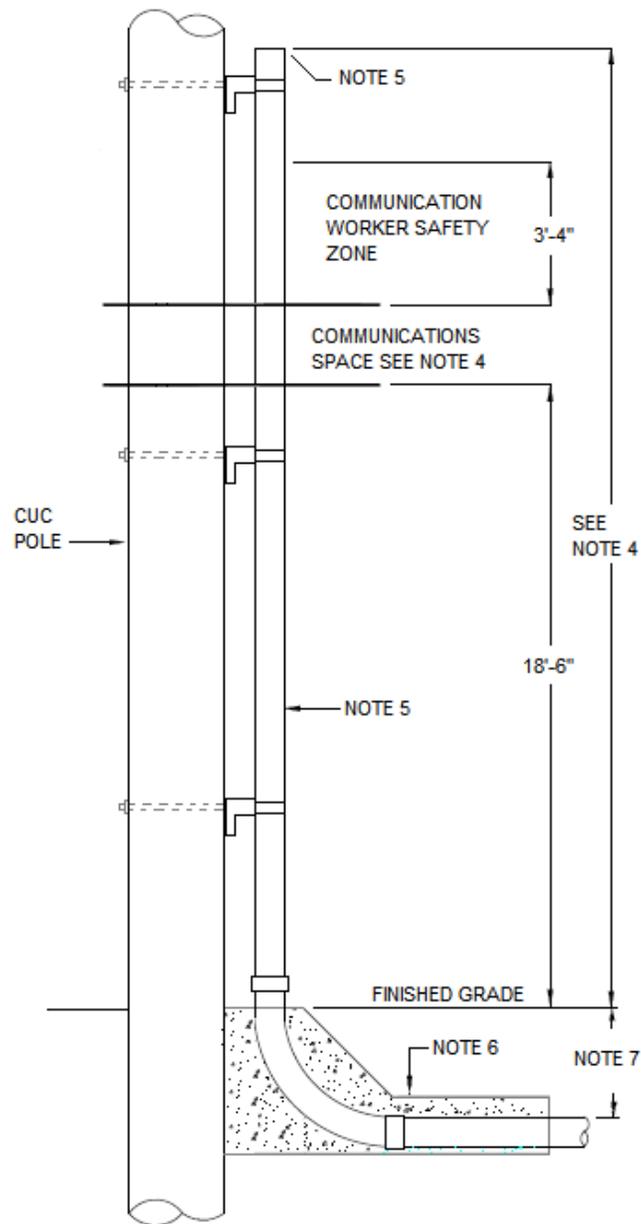
**CARIBBEAN UTILITIES COMPANY, LTD.**  
 111 North Bay Street  
 P.O. Box 8111, Grand Cayman, Cayman Islands, KY1-8800  
 Telephone: (345) 943-3300  
 Facsimile: (345) 943-3301  
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PROJECT  
**CUC STANDARDS**

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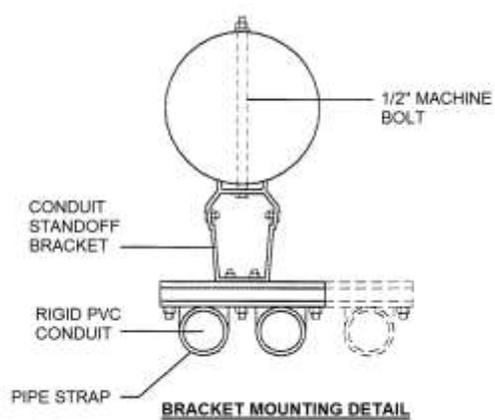
DRAWING  
**THREE PHASE CABLE DIP (3CD)**

DATE:	JAN 2011	PROJECT #	
SCALE:	HTS	DRAWN BY	3CD
DRAWN BY:	DM	CHECKED BY	91 OF 91
CHECKED BY:	CJ	REV #	A
APPROVED BY:		REV	A
			JAN 2011
			REASON DESCRIPTION



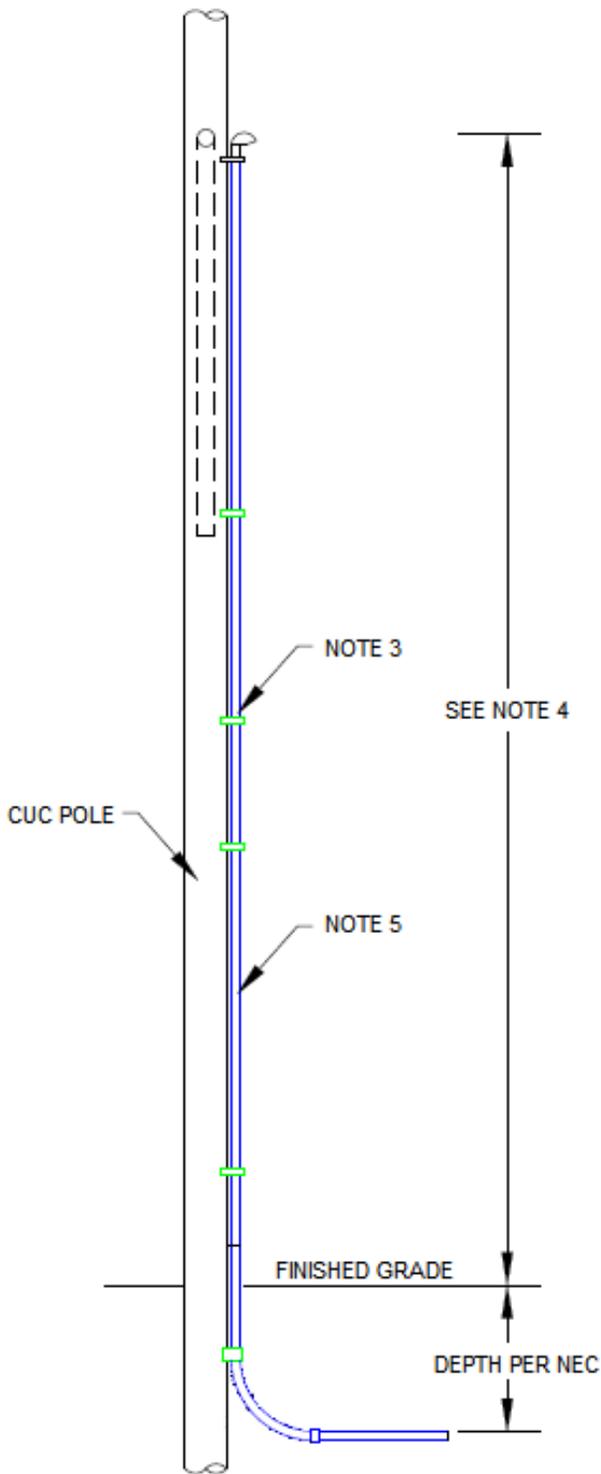
**NOTES:**

1. The customer must obtain prior permission for the installation of U/G primary on CUC poles.
2. The location of the U/G primary, i.e. side of the pole must be obtained from CUC's Planning Dept.
3. Conduit standoff brackets (Aluma-Form 9-CSO-12 or equivalent) are required.
4. A conduit height above finished ground of 28' minimum is required on all mainline communication joint use poles. With CUC prior approval, a reduced height may be permitted where joint use is not required. In no case is an unqualified person permitted to work within 10 feet of CUC primary or secondary conductors.
5. Schedule 80 PVC conduit will be required for the long sweep elbow encased in concrete and the sections up the pole. Where the top end of the conduit on the pole is not a bell end, an end bell fitting shall be installed.
6. All trench and duct details shall be in accordance with CUC requirements. A 3" diameter conduit is required for single phase and a 4" diameter conduit is required for three phase circuits. A spare conduit is required for all installations and must be capped a minimum of 6" above the concrete base.
7. A 30" minimum depth of burial is required for 12.5 kV installations. Subject to CUC prior approval and where suitable mechanical protection is used to protect the cable or duct, a lesser depth may be used.
8. Ducts shall contain a 3/8" rope and the ends shall be capped. Spare ducts do not require a rope.
9. All hardware must be hot dipped galvanized.



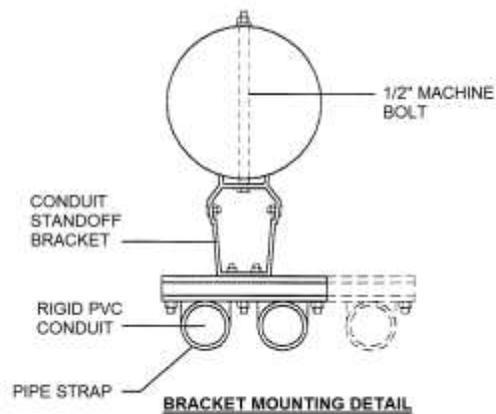
DATE: April 24, 2019
DRAWN: C. Rose
REV.:
DATE:

<b>DISTRIBUTION STANDARDS</b>	
<b>UNDERGROUND PRIMARY INSTALLATION DETAILS</b>	
APPROVED BY: C. Rose	<b>STANDARD NO. 16-8</b>
DATE: May 3, 2019	



**NOTES:**

1. The customer must obtain prior permission for the installation of U/G service on CUC poles.
2. The location of the U/G service, i.e. side of the pole must be obtained from CUC's Planning Dept.
3. Conduit may be attached to the pole with 2-hole PVC coated steel straps and screws or stainless steel straps and lag screws. If more than two conduits are required, a conduit standoff bracket (Aluma-Form 9-CSO-12 or equivalent) is required. See Bracket Mounting Detail.
4. A weather head height above finished grade of 26'-10" minimum is required on all poles. In no case is an unqualified person permitted to work within 10 feet of CUC primary or secondary conductors.
5. Conduit on the pole including the elbow at the base of the pole, must be Schedule 80 PVC.
6. Sufficient conductor must be provided for type of connection as follows:
  - a. 3 feet for supply drop
  - b. 6 feet for open wire secondary
7. Three phase and multi-conductor services must be marked or color coded in accordance with the requirements on page 18-3 of Service & Metering Requirements.



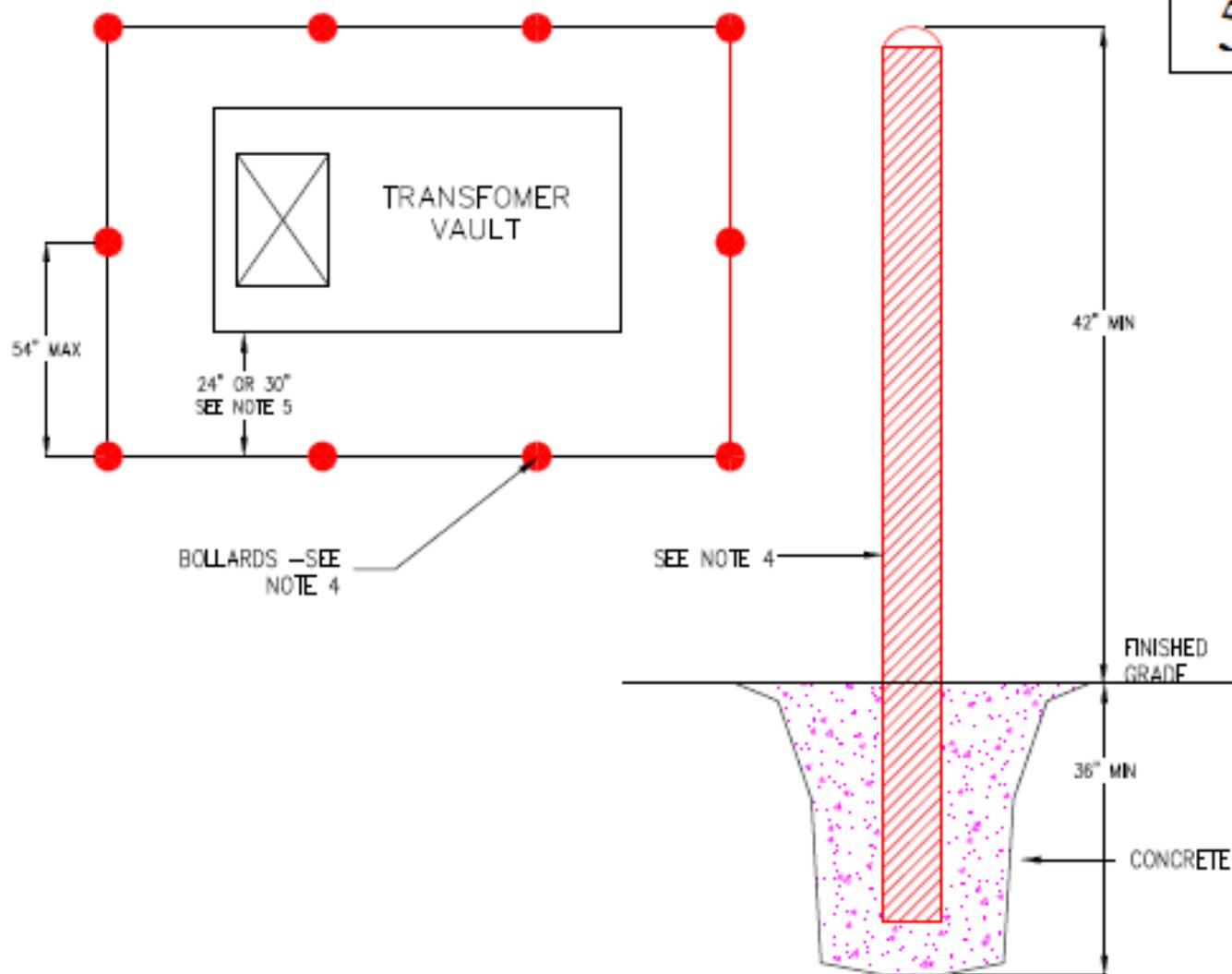
DATE: April 24, 2019  
 DRAWN: C. Rose  
 REV.:  
 DATE:

**DISTRIBUTION STANDARDS**

**UNDERGROUND SECONDARY SERVICE  
 INSTALLATION DETAILS**

APPROVED BY: C. Rose  
 DATE: May 3, 2019

**STANDARD NO.  
 16-9**



BOLLARDS -SEE NOTE 4

SEE NOTE 4

FINISHED GRADE

36" MN

CONCRETE

NOTES:

1. WHEN TRANSFORMER VAULT IS LOCATED WHERE DAMAGE BY VEHICULAR TRAFFIC IS POSSIBLE - TRANSFORMER PROTECTION IS NECESSARY.

2. THE USE OF BOLLARDS, LOCATED AS SHOWN, IS RECOMMENDED; THESE BOLLARDS NEED ONLY BE USED ON THE SIDE(S) WHERE VEHICULAR TRAFFIC MAY BE A HAZARD.

3. A CONCRETE OR CONCRETE BLOCK WALL MAY ALSO BE ACCEPTABLE, HOWEVER APPROVAL OF THE CUC PLANNING DEPARTMENT IS REQUIRED.

4. THESE BOLLARDS SHALL BE FABRICATED USING RIGID STEEL PIPE (4 INCHES MINIMUM SIZE, PREFERABLY GALVANIZED), FILLED WITH CONCRETE OR MORTAR. THEY SHALL EXTEND A MINIMUM OF 42 INCHES ABOVE FINISHED GRADE AND BE EMBEDDED TO A MINIMUM OF 36 INCHES.

5. THE MAXIMUM SPACING BETWEEN BOLLARDS IS 54 INCHES AND THE MINIMUM CLEARANCE FROM THE PAD/VAULT IS 30 INCHES AT THE FRONT (CABLE CLOT SIDE) AND 24 INCHES ON ALL OTHER SIDES.



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PROJECT

CUC  
STANDARDS

DRAWING

STANDARD PADMOUNT  
TRANSFORMER VAULT  
PROTECTION

DATE: JUNE 2014

SCALE: NTS

DRAWN BY: DCM

CHECKED BY: CP

APPROVED BY: CUC SC

PROJECT #

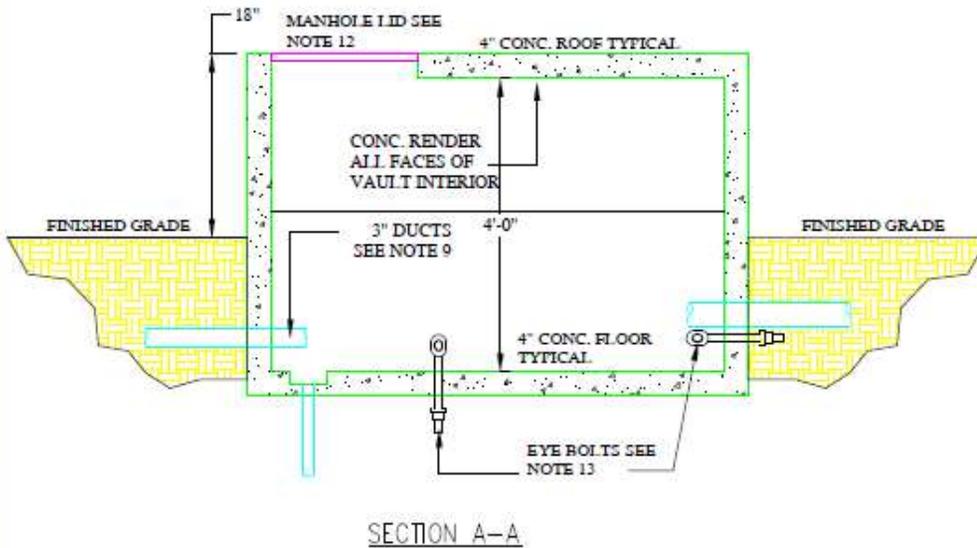
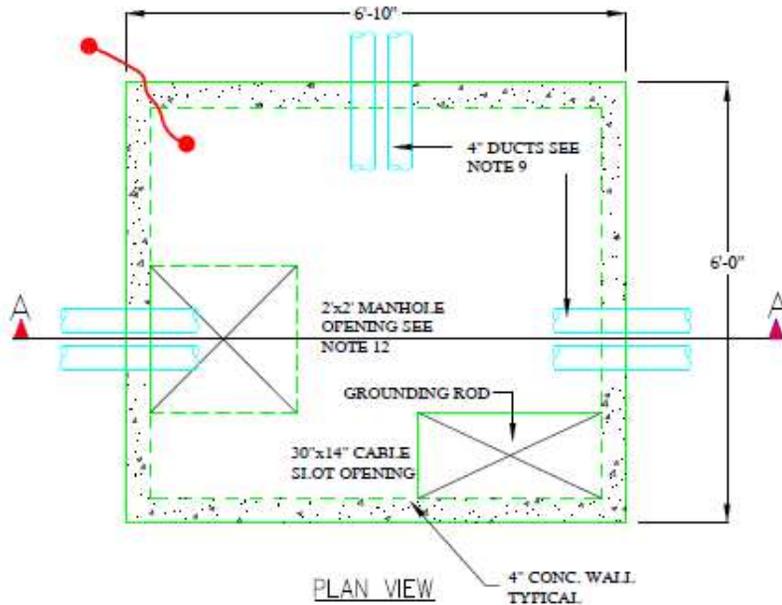
DRAWING # TX-04

SHEET # 01 of 01

REV. # A

REV. DATE Sept. 2014

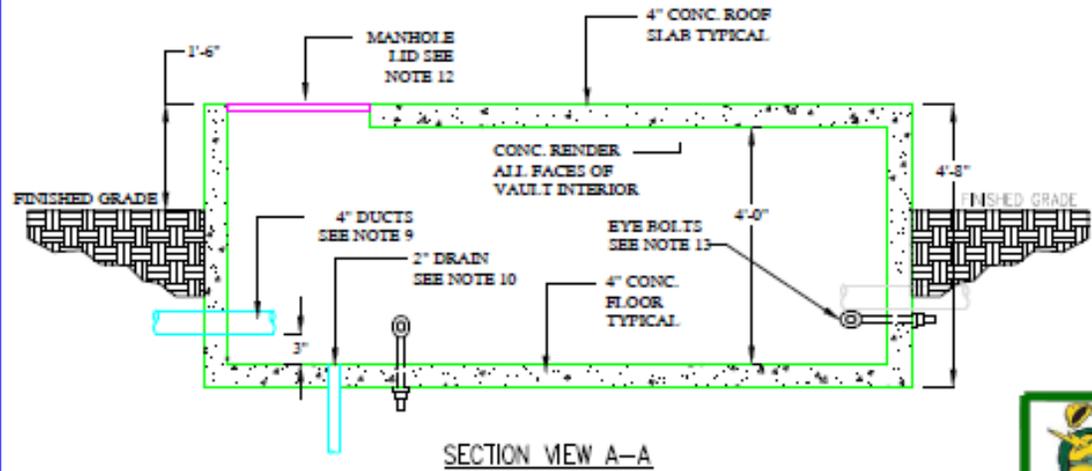
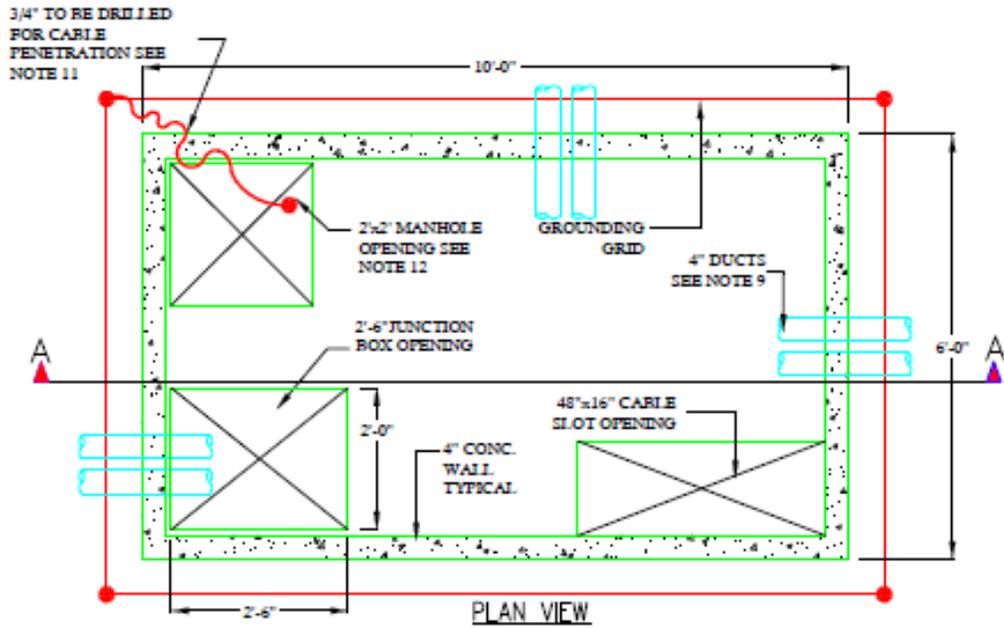
APPROVED



**NOTES:**

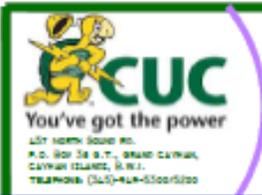
1. THIS VAULT WILL ACCOMMODATE TRANSFORMERS UP TO 250 KVA.
2. THE VAULT SHALL BE POSITIONED TO SUITABLE DEPTH TO MATCH THE TRENCH DUCT, BUT MUST BE NO LESS THAT 18" ABOVE GRADE.
3. THE FLOOR SLAB SHALL HAVE A MINIMUM OF 4 INCHES OF CONCRETE REINFORCED WITH 1/2" REBAR AT 12 INCH CENTRES.
4. THE TOP SLAB SHALL HAVE A MINIMUM THICKNESS OF 4" OF CONCRETE REINFORCED WITH 1/2" REBAR AT 8 INCH CENTRES.
5. THE WALLS MAY BE CONSTRUCTED USING CONCRETE (REINFORCED) OR CONCRETE BLOCK WITH REINFORCING AND CONCRETE FILL. THE REINFORCING BAR IN THE WALLS SHALL BE TIED TO THE REINFORCING IN THE TOP AND FLOOR SLAB.
6. ALL CONCRETE SHALL HAVE A 28 DAY STRENGTH OF 3000 PSI.
7. THE TOP SLAB SHALL BE LEVEL AND HAVE A SMOOTH SURFACE TO ALLOW WATER TO RUN OFF.
8. PRIMARY (HV) DUCTS SHALL BE MIN. 3" WITH ONE SPARE DUCT FOR EACH FEED. DUCT SHALL BE INSTALLED 3 INCHES ABOVE THE FLOOR AND FLUSH WITH THE INSIDE OF THE VAULT WALL. THE REIL. END OF THE CONDUIT SHALL BE USED IN THE VAULT WALL.
9. THE HV DUCTS WILL NORMALLY BE PLACED IN THE END(S) OF VAULT TO ACCOMODATE CABLE INSTALLATION. PLACEMENT OF THE HV DUCT IN THE SIDES IS ONLY ACCEPTABLE FOR THE OUT FEED ON LOOP FEED SYSTEMS.
10. A 2 INCH DRAIN HOLE IS REQUIRED IN THE FLOOR SLAB AND SHALL BE LOCATED DIRECTLY UNDER THE CENTRE OF THE MANHOLE OPENING.
11. ONE OR MORE GROUND ROD(S), SHALL BE INSTALLED DIRECTLY BELOW THE CABLE SLOT BEFORE THE FLOOR SLAB IS POURED. A MINIMUM OF 6 INCHES OF EACH ROD MUST EXTEND ABOVE THE FLOOR.
12. THE MANHOLE SHALL BE LOCATED AT AN END WALL AS SHOWN; MANHOLE OPENINGS NEED NOT BE CENTERED.
13. FOR CABLE PULLING PURPOSE SHALL BE EMBEDDED IN THE WALL DIRECTLY OPPOSITE EACH SET OF THE DUCTS AND IN THE FLOOR SLAB BELOW THE MANHOLE.
14. A MINIMUM CLEAR WORKING SPACE OF 3'-5" MUST BE MAINTAINED AND A MIN. OF 10" FROM THE FRONT.
15. MANHOLE/VAULTS TO BE RACKED IN ACCORDANCE WITH PAGE 7

<p><b>CUC</b> You've got the power</p> <p>457 North Sable Rd. P.O. Box 38 O.T., Okaloosa, FL 32560 CARRIE BLONK, E.W.I. TELEPHONE: (352)-949-5300/5302</p>	<p><b>PROJECT</b> CUC STANDARDS</p>	<p>DATE: JUNE 2014</p>	<p>PROJECT # TXV-05</p>
	<p><b>DRAWING</b> SINGLE PHASE TRANSFORMER VAULT</p>	<p>SCALE: NTS</p>	<p>DRAWN BY: DCM</p>
		<p>CHECKED BY: CP</p>	<p>REV. #</p>
		<p>APPROVED BY: CUC SC</p>	<p>REV. DATE</p>
		<p><b>APPROVED</b></p>	

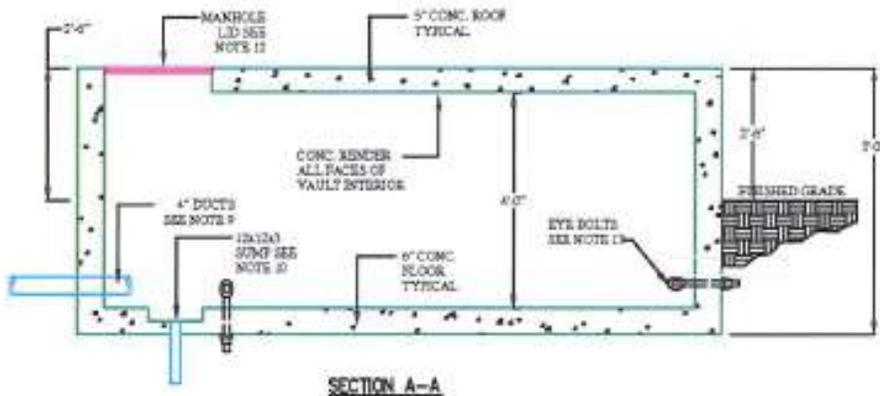
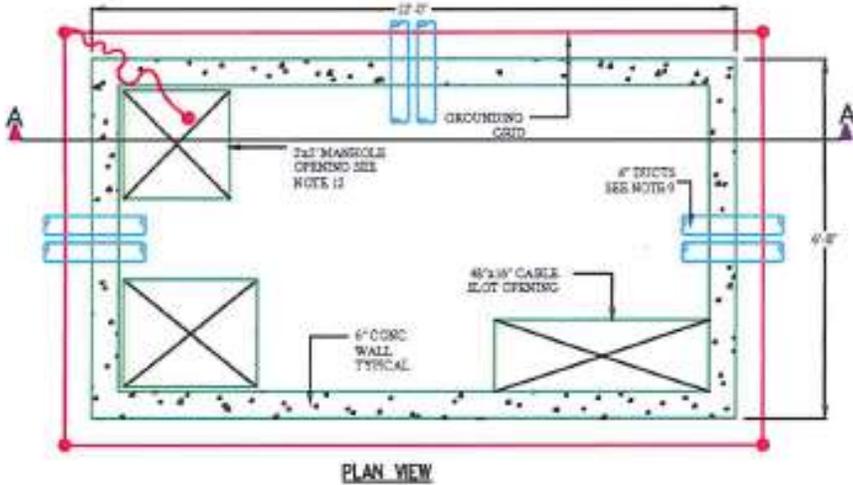


NOTES:

1. THIS VAULT WILL ACCOMMODATE TRANSFORMER UP TO 500KVA NOT TO EXCEED 6 SERVICE CABLES.
2. VAULT SHALL EXTEND APPROXIMATELY 18" INCHES ABOVE FINISHED GRADE; APPROXIMATELY 6 INCHES OF CRUSHED STONE SHALL BE PLACED UNDER THE FLOOR SLAB.
3. THE FLOOR SLAB SHALL HAVE A MINIMUM OF 4 INCHES OF CONCRETE REINFORCED WITH 1 LAYER OF #4 @ 8" CENTRES.
4. THE TOP SLAB SHALL HAVE A MINIMUM THICKNESS OF 4" OF CONCRETE REINFORCED WITH 1 LAYER OF #4 @ 8" CENTRES.
5. THE WALLS MAY BE CONSTRUCTED USING CONCRETE REINFORCED OR CONCRETE BLOCK WITH REINFORCING AND CONCRETE FILL. THE REINFORCING IN THE WALLS SHALL BE #4 @ 8" o/c TIED TO THE REINFORCING IN THE TOP AND FLOOR SLABS.
6. ALL CONCRETE SHALL HAVE A 28 DAY STRENGTH OF 3000 PSI.
7. THE TOP SLAB SHALL BE LEVEL AND HAVE A SMOOTH SURFACE TO ALLOW WATER TO RUN OFF.
8. PRIMARY (HV) DUCTS SHALL BE MIN. 4" WITH ONE SPARE DUCT FOR EACH FEED DUCT SHALL BE INSTALLED 3" ABOVE THE BOTTOM OF DUCT FLOOR AND FLUSH WITH THE INSIDE OF THE VAULT WALL; THE BELL END OF THE CONDUIT SHALL BE USED IN THE VAULT WALL.
9. THE HV DUCTS SHALL NORMALLY BE PLACED IN THE END(S) OF VAULT TO ACCOMMODATE CABLE INSTALLATION PARTICULARLY FOR LONG RUNS. HV DUCTS IN THE SIDES IS ONLY ACCEPTABLE FOR THE DUCT FEED ON LOOP FEED SYSTEM.
10. A 2 INCH DRAIN HOLE REQUIRED IN THE FLOOR SLAB FOR DRAINAGE AND SHALL BE LOCATED DIRECTLY UNDER THE CENTRE OF THE MANHOLE OPENING.
11. FIVE GROUND RODS SHALL BE INSTALLED AS SHOWN. SHALL BE CONNECTED TO 2/0 BARE COPPER CABLE BURIED 1' DEEP, CONNECTIONS TO THE GROUND RODS AND GROUND GRID WILL BE EXOTHERMIC WELD 10' OF CABLE TO EXTEND INTO BOTTOM OF VAULT. ONE GROUND ROD SHALL BE INSTALLED DIRECTLY BELOW THE MANHOLE BEFORE THE THE FLOOR SLAB IS POURED. A MINIMUM OF 6" OF GROUND ROD MUST EXTEND ABOVE FLOOR. A 3/4" HOLE TO BE DRILLED FOR CABLE ACCESS
12. THE JUNCTION MANHOLE SHALL BE LOCATED AT AN END WALL AS SHOWN. THE MANHOLE SHALL MEASURE 2' SQUARE WITH A LOCKING LID AND THE JUNCTION BOX HOLE 2'x2'-6" WITH MINIMUM DISTANCE OF 12" BETWEEN.
13. 10" EYEBOLTS 5/8" GALVANIZED CABLE PULLING PURPOSE SHALL BE EMBEDDED IN THE WALL DIRECTLY OPPOSITE EACH SET OF THE DUCTS AND IN THE FLOOR SLAB BELOW THE MANHOLE OPENING.
14. IF LESS THAN 6 SERVICE CABLES, THE OPENING FOR THE JUNCTION BOX MUST BE COVERED WITH 1/4" ALUMINUM PLATE.
15. IF MORE THAN 6 SERVICE CABLES, A JUNCTION BOX WILL BE REQUIRED.
16. ALL CABLES SHALL BE INSTALLED ON RACKS BY CUC
17. A MINIMUM CLEAR WORKING SPACE OF 3'-5" MUST BE MAINTAINED AND A MIN. OF 10' FROM, THE FRONT.



PROJECT CUC STANDARDS	DATE:	MARCH 2011	PROJECT #	-
	SCALE:	NTS	DRAWING #	16-6 500KVA
DRAWING THREE PHASE TRANSFORMER UP TO 500KVA	DRAWN BY:	DCM	SHEET #	01 of 01
	CHECKED BY:	CP	REV. #	-
	APPROVED BY:	CUC SC	REV. DATE	-
				<b>APPROVED</b>



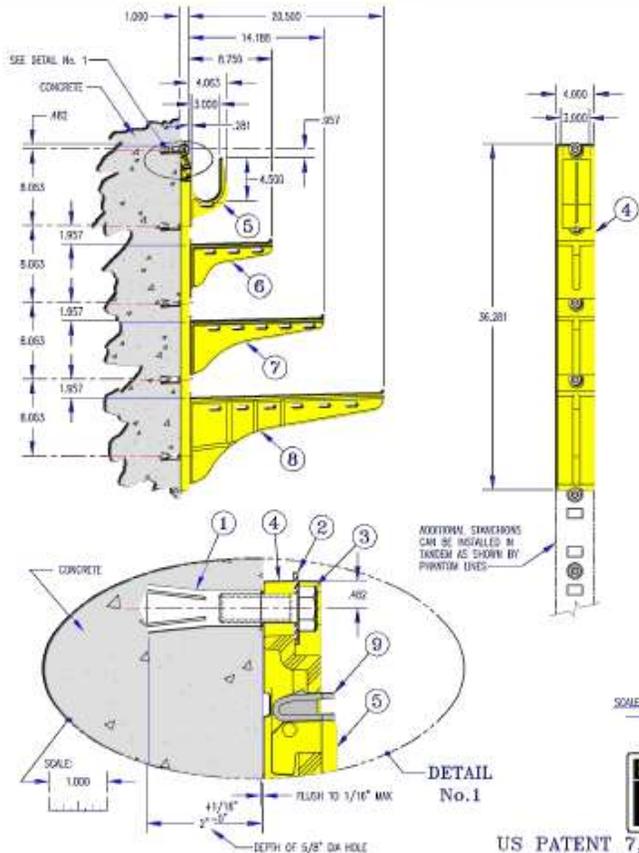
**NOTES:**

1. THIS VAULT WILL ACCOMMODATE TRANSFORMERS UP TO 1500KVA NOT EXCEEDING 6 SERVICE CABLES.
2. VAULT SHALL EXTEND APPROXIMATELY 18" INCHES ABOVE FINISHED GRADE; APPROXIMATELY 6 INCHES OF CRUSHED STONE SHALL BE PLACED UNDER THE FLOOR SLAB.
3. THE FLOOR SLAB SHALL HAVE A MINIMUM OF 6 INCHES OF CONCRETE REINFORCED WITH 1 LAYER OF #4 @8" CENTRES.
4. THE TOP SLAB SHALL HAVE A MINIMUM THICKNESS OF 6" OF CONCRETE REINFORCED WITH 1 LAYER OF #4 @8" CENTRES.
5. THE WALLS MAY BE CONSTRUCTED USING CONCRETE REINFORCED OR CONCRETE BLOCK WITH REINFORCING AND CONCRETE FILL. THE REINFORCING IN THE WALLS SHALL BE #4 @3'-6" TIED TO THE REINFORCING IN THE TOP AND FLOOR SLABS.
6. ALL CONCRETE SHALL HAVE A 28 DAY STRENGTH OF 3000 PSI.
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8. PRIMARY (HV) DUCTS SHALL BE MIN. 4" WITH ONE SPARE DUCT FOR EACH FEED DUCT SHALL BE INSTALLED 3" ABOVE THE FLOOR AND FLUSH WITH THE INSIDE OF THE VAULT WALL; THE BELL END OF THE CONDUIT SHALL BE USED IN THE VAULT WALL.
9. THE HV DUCTS SHALL NORMALLY BE PLACED IN THE END(S) OF VAULT TO ACCOMMODATE CABLE INSTALLATION PARTICULARLY FOR LONG RUNS. HV DUCTS IN THE SIDES IS ONLY ACCEPTABLE FOR THE DUCT FEED ON LOOP FEED SYSTEM.

10. A 2 INCH DRAIN HOLE WITH SUMP IS REQUIRED IN THE FLOOR SLAB FOR DRAINAGE AND SHALL BE LOCATED DIRECTLY UNDER THE CENTRE OF THE MANHOLE OPENING.
11. FIVE GROUND RODS SHALL BE INSTALLED AS SHOWN. SHALL BE CONNECTED TO 20 BARE COPPER CABLE BURIED 1' DEEP. CONNECTIONS TO THE GROUND RODS AND GROUND GRID WILL BE EXOTHERMIC WELD 10' OF CABLE TO EXTEND INTO BOTTOM OF VAULT. ONE GROUND ROD SHALL BE INSTALLED DIRECTLY BELOW THE MANHOLE SLOT BEFORE THE FLOOR SLAB IS POURED. A MINIMUM OF 6" OF GROUND ROD MUST EXTEND ABOVE FLOOR.
12. THE MANHOLE SHALL BE LOCATED AT AN END WALL AS SHOWN; MANHOLE OPENINGS NEED NOT BE CENTERED. THE MANHOLE SHALL MEASURE 7' SQUARE WITH A LOCKING LID.
13. 10" EYE BOLTS 1/8" GALVANIZED FOR CABLE PULLING PURPOSE SHALL BE EMBEDDED IN THE WALL DIRECTLY OPPOSITE EACH SET OF THE DUCTS AND IN THE FLOOR SLAB BELOW THE MANHOLE OPENING.
14. IF LESS THAN 6 SERVICE CABLES, THE OPENING FOR THE JUNCTION BOX MUST BE COVERED WITH 1/4" ALUMINUM PLATE.
15. IF MORE THAN 6 SERVICE CABLES A JUNCTION BOX WILL BE REQUIRED.
16. ALL CABLES SHALL BE INSTALLED ON RACKS BY CUC
17. A MINIMUM CLEAR WORKING SPACE OF 3'-5" MUST BE MAINTAINED AND A MIN. OF 10' FROM THE FRONT.

 <p>137 NORTH SAGE DR. P.O. BOX 28 A.T., SHERIDAN, CALIFORNIA CORNER SQUARE, S.E. 1. TELEPHONE (916) 414-1500/5284</p>	<p><b>PROJECT</b> CUC STANDARDS</p>	<p>DATE: MARCH 2011</p>	<p>PROJECT #</p>
	<p><b>DRAWING</b> THREE PHASE TRANSFORMER UP TO 1500KVA 15.00KVA</p>	<p>SCALE: NTS</p>	<p>DRAWN BY: BCM</p>
		<p>CHECKED BY: CP</p>	
		<p>APPROVED BY: CUC/SC</p>	<p>APPROVED</p>

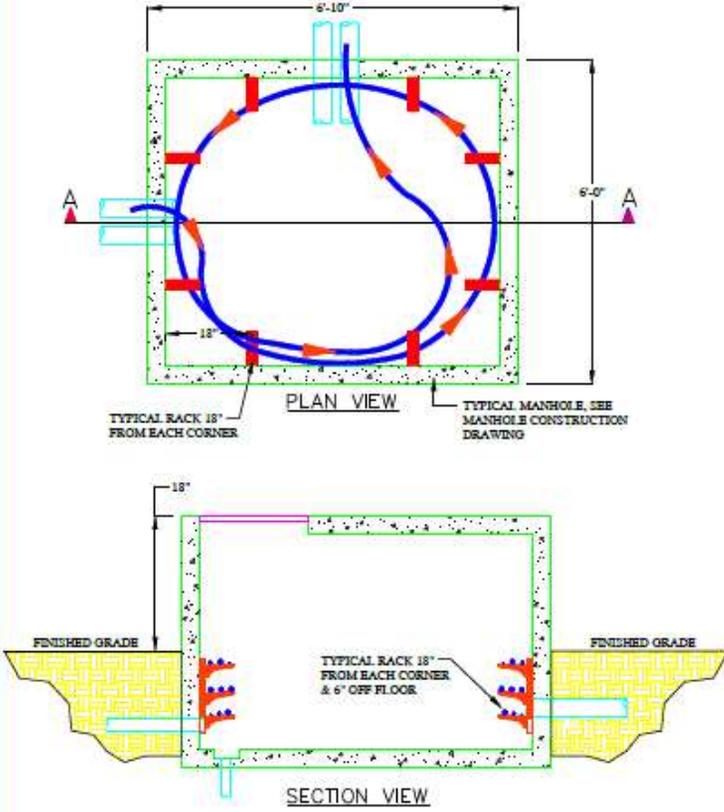




BILL OF MATERIAL			
ITEM NUMBER	CATALOG NUMBER	DESCRIPTION	QUANTITY REQUIRED
①	FSRM-12	1/2"-13 DROP-IN ANCHOR Material: 303 STAINLESS STEEL	8
②	FFWS16-18-40	FLAT WASHER ID=363, OD=1.550, THK=.076 Material: 316 STAINLESS STEEL	8
③	HC216-16-044	1/2"-13 X 1-3/4" LS. HEX HEAD CAP SCREW Material: 316 STAINLESS STEEL	8
④	CS36-B	CS36-B STANCHION Material: 303 SS Hex Reinforced Nylon	1
⑤	3P05	3P05 SADDLE Material: 303 SS Hex Reinforced Nylon	1
⑥	RA08	RA08 ARM (8" LONG) Material: 303 SS Hex Reinforced Nylon	1
⑦	RA14	RA14 ARM (14" LONG) Material: 303 SS Hex Reinforced Nylon	1
⑧	RA20	RA20 ARM (20" LONG) Material: 303 SS Hex Reinforced Nylon	1
⑨	HOL	HOL LOCK (OPTIONAL) Material: Polycarbonate	PER ARM
NOT SHOWN			AS REQ'D
SETTING TOOL (Used to install Galvaloy No. FSRM-12 Drop-in Anchor)			AS REQ'D

- STANCHION INSTALLATION GUIDELINES**  
 For the highest cable load capacity:
- BE SURE THE SURFACE OF THE CONCRETE WALL IS SMOOTH, FLAT AND PLUMB.
  - INSTALL ONE FASTENER IN EVERY FLAGGED STANCHION HOLE.
  - INSTALL EACH DROP-IN ANCHOR AS SHOWN ON THIS DRAWING AND AS DESCRIBED BELOW:
    - DRILL A 5/8" DIAMETER HOLE 2" DEEP.
    - BLOW OUT HOLE.
    - DRIVE ANCHOR FLUSH TO 1/16" BELOW SURFACE OF CONCRETE.
    - EXPAND ANCHOR WITH FRI-112 SETTING TOOL. ANCHOR IS PROPERLY SET WHEN SHOULDER OF SETTING TOOL IS FLUSH WITH THE TOP OF ANCHOR.
  - INSTALL THE FLAT WASHER AND TIGHTEN THE CAP SCREW JUST ENOUGH TO ATTAIN A SNUG FIT. RIGID HIGH SCREW TORQUE WHICH INDICES COMPRESSIVE STRESS.
  - AFTER ASSEMBLING THE ARM TO THE STANCHION, TAP THE ARM SCREW WITH A LIGHT Mallet BLOW. THE LIGHT Mallet BLOW WILL FULLY SEAT AND LOCK ARM IN PLACE.
  - INSTALL (OPTIONAL) HOL LOCK BY PLACING THE LOCK ON THE ARM WITH THE LOCKING TABS UP. PUSH THE LOCK INTO THE RECTANGULAR HOLE IN THE STANCHION. WHEN THE STOP FLANGES ON THE LOCK HIT THE STANCHION, THE LOCK WILL CLICK INTO PLACE. SEE DETAIL No.1 AT LEFT.
- NOTES:**
- THE ANCHOR ALIGNMENT SHOWN ON THIS INSTALLATION DRAWING ALLOWS FOR COMPLETE VARIABILITY OF ARM SIZE & LOCATION OF ARM ON STANCHION.
  - SEE US "ANCHORING HARDWARE" CATALOG SHEET (FORM 100202AC) FOR ANCHOR LOAD CAPACITY, GENERAL ANCHOR NOTES AND HEX HEAD CAP SCREW NOTES.
  - SEE US "TECHNICAL DATA" CATALOG SHEET (FORM 1113314E) FOR LOAD CARRYING CAPACITY.
  - SEE US "SULC SPECIFICATIONS" (FORM 1231514A) FOR GENERAL SPECIFICATIONS ON THE HEAVY DUTY NON-METALLIC CABLE RACK.

**HEAVY DUTY NON-METALLIC CABLE RACK**  
 Installation Details For 1 Ea. CS36-B Stanchion With 1 Ea. 30BS Saddle,  
 1 Ea. RA08, 1 Ea. RA14 & 1 Ea. RA20 Arm Using Drop-in Anchors  
 See At Left Don McCoy Don McCoy  
 12-3-03 11/11/11  
 Ist Designed For TYPICAL INSTALLATION OF CABLE RACKS  
 UNDERGROUND DEVICES, INC. 90-3161  
 NORTHBRIDGE, ILLINOIS 60052 - PHONE: (847) 285-9000 PAGE 1 OF 1



ITEM NO.	QUANTITY	MATERIAL	STOCK NO.
123	8	STANCHION, 36" (BRACKET)	836-00002
26B	40	SCREW, HEX HEAD	744-00004
38D	40	ANCHOR, DROP IN 1/2"-13	029-00010

**CARIBBEAN UTILITIES COMPANY, LTD.**  
107 West Street  
 P.O. Box 10177 - Grand Cayman, Cayman Islands, KY-11102  
 Telephone: (345) 943-6000/6001  
 Fax: (345) 943-6002/6003  
 Email: [caribbean@caribbean-cu.com](mailto:caribbean@caribbean-cu.com)

PROJECT: CUC STANDARDS

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DRAWING: RAKING ORIENTATION - UNDERGROUND MANHOLE/VAULT

DATE: OCT 2014

SCALE: NTS

DRAWN BY: DCM

CHECKED BY: SF

APPROVED BY: SC

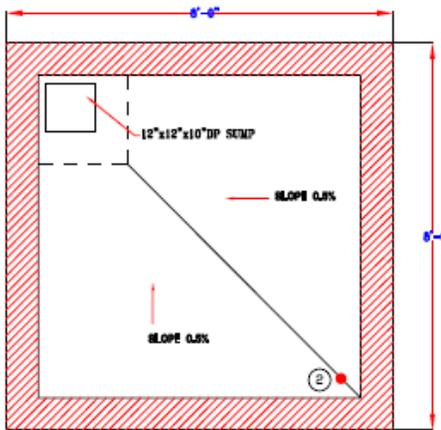
PROJECT # \_\_\_\_\_

DRAWERS # 19

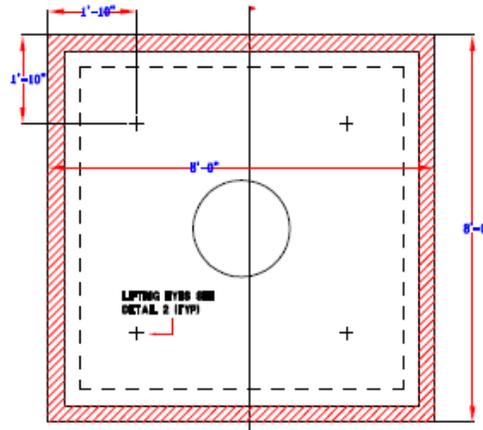
REV. #

CONSTRUCTION

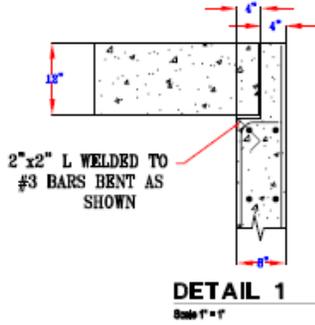
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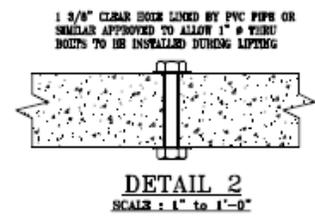
**BASE SLAB PLAN VIEW**  
Scale 1/2" = 1'-0"



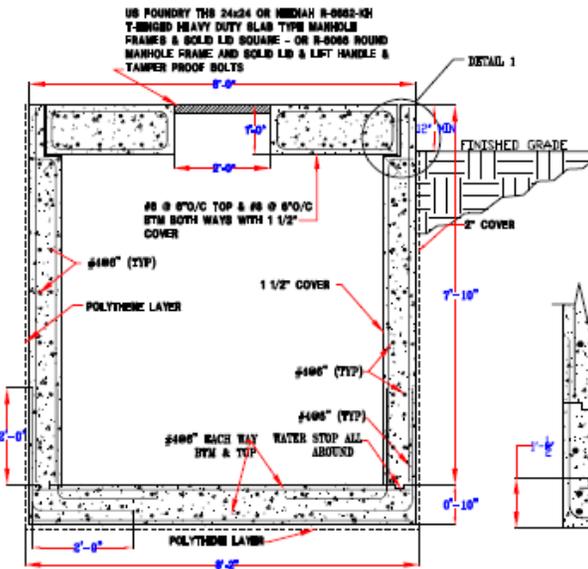
**ROOF SLAB PLAN VIEW**  
Scale 1/2" = 1'-0"



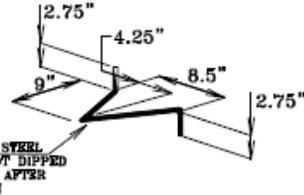
**DETAIL 1**  
Scale 1" = 1'-0"



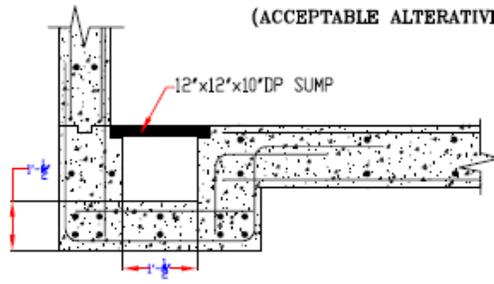
**DETAIL 2**  
SCALE: 1" to 1'-0"



**SECTION A REBARS**  
HTS



**ISOMETRIC OF PULLING IRON**  
**NOT TO SCALE**  
(ACCEPTABLE ALTERNATIVE TO EYE BOLT)

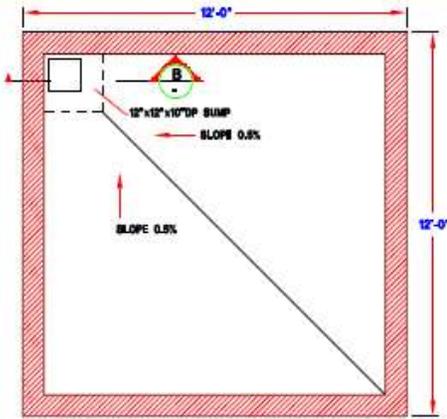


**SUMP SECTION**

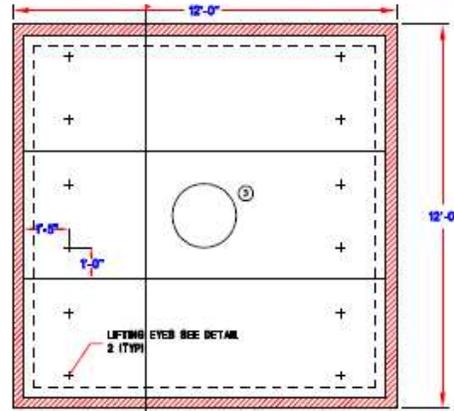
**NOTES:**

1. TO BE USED WHEN THERE ARE UP TO SIX CABLES (2 RUNS) OF 500 kcmil. THERE IS NO LIMIT TO THE NUMBER OF #2 CU OR FIBER CABLES.
2. ONE GROUND ROD SHALL BE INSTALLED AS SHOWN IN ANY CORNER EXCEPT IN THE SUMP HOLE AND MUST BE INSTALLED BEFORE THE FLOOR SLAB IS POURED. A MINIMUM OF 6' OF ROD MUST EXTEND ABOVE THE FLOOR.
3. THE TOP SLAB WILL BE ONE SOLID PIECE WITH THE MANHOLE IN THE CENTER.
4. ALL CONCRETE SHALL HAVE 28 DAY STRENGTH OF 3,000 psi

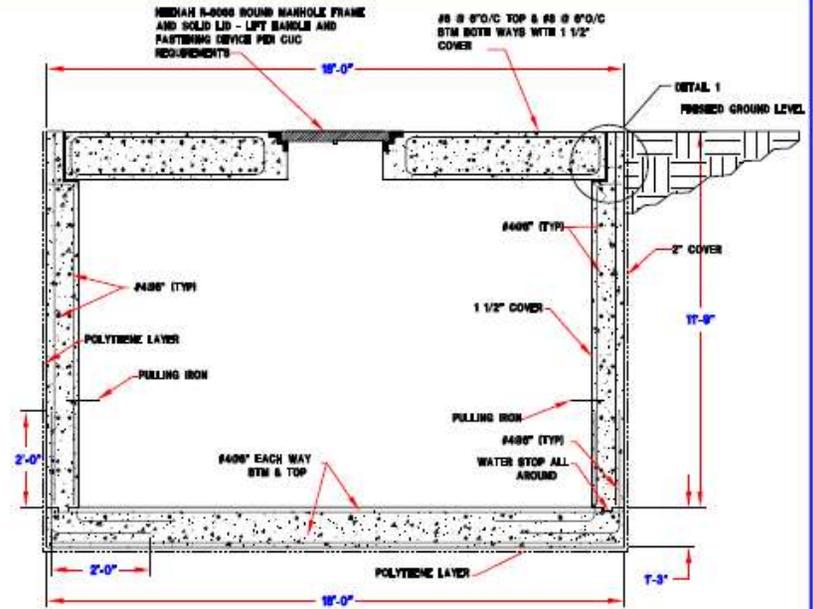
 <b>CARIBBEAN UTILITIES COMPANY, LTD.</b> <small>107 North Street St. P.O. Box 88 017, Grand Cayman, Cayman Islands, KY2 Telephone: (344) 949-2888/2289 Fax: (344) 949-2288/2289 Email: <a href="mailto:caribbean@caribbean.com">caribbean@caribbean.com</a> Website: <a href="http://www.caribbean.com">www.caribbean.com</a></small>	PROJECT <b>CUC STANDARDS</b>	DATE: <b>MARCH 2011</b>	PROJECT # _____
	DRAWING <b>STANDARD 8"x8" MANHOLE</b>	SCALE: <b>HTS</b>	DRAWN BY: <b>DM</b>
		CHECKED BY: <b>CUC BC</b>	REV. # 
		APPROVED BY: _____	<b>CONSTRUCTOR</b>



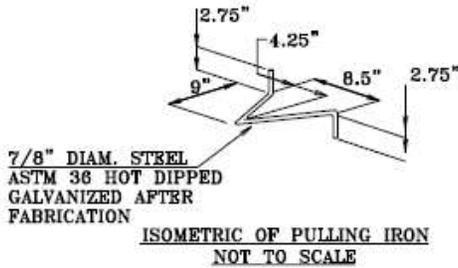
**BASE SLAB PLAN VIEW**  
Scale 1/2" = 1'-0"



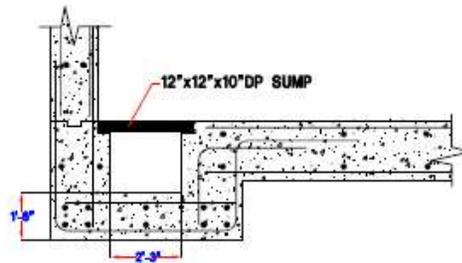
**ROOF SLAB PLAN VIEW**  
Scale 1/2" = 1'-0"



**SECTION A REBARS**  
Scale 1/2" = 1'-0"

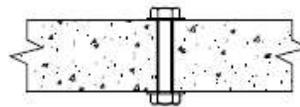


**ISOMETRIC OF PULLING IRON**  
NOT TO SCALE

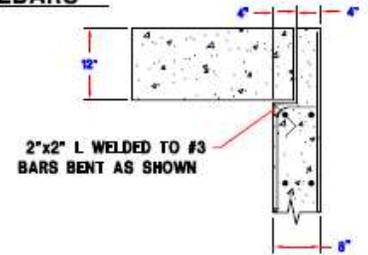


**SECTION B SUMP**  
Scale 1/2" = 1'-0"

1 3/8" CLEAR HOLE LINED BY PVC PIPE OR SIMILAR APPROVED TO ALLOW T ? THRU BOLTS TO BE INSTALLED DURING LIFTING



**DETAIL 2**  
SCALE : 1" = 1'-0"



**DETAIL 1**  
Scale 1" = 1'-0"

**NOTES:**

1. TO BE USED FOR TRANSMISSION OR IF THERE ARE MORE THAN 6 CABLES (2 RINGS) OF SPOKCHIL THERE IS NO LIMIT TO THE NUMBER OF #3 OR FIBER CABLES.
2. ONE GROUND ROD SHALL BE INSTALLED AS SHOWN IN ANY CORNER EXCEPT IN THE SUMP HOLE AND MUST BE INSTALLED BEFORE THE FLOOR SLAB IS POURED. A MINIMUM OF 6" OR GROUND ROD MUST EXTENDED ABOVE THE FLOOR.
3. THERE WILL BE THREE EQUAL TOP SLABS WITH THE ACCESS HATCH PLACED IN THE CENTER OF THE SLAB.
4. THE LOCATION OF THE DUCTBANK WINDOWS AND PULLING IRONS TO BE VERIFIED AT TIME OF CONSTRUCTION.
5. ALL CONCRETE SHALL HAVE A 28 DAY STRENGTH OF 3000 PSI

 <p><b>CARIBBEAN UTILITIES COMPANY, LTD.</b> 17, 18th Floor, 21, Queen's Quay East, Nassau, Bahamas, BHS Telephone: (1-242) 392-2200 Facsimile: (1-242) 392-2202 E-mail: <a href="mailto:caribbean@caribbean.com">caribbean@caribbean.com</a> Web: <a href="http://www.caribbean.com">www.caribbean.com</a></p>	PROJECT	DATE: <b>MARCH 2011</b>	PROJECT # _____
	CUC STANDARDS	SCALE: <b>M75</b>	DRAWING # _____
	DRAWING	DRAWN BY: <b>DM</b>	REV. # <b>△</b>
	12"x12" MANHOLE	CHECKED BY: <b>CUC BC</b>	
	APPROVED BY: _____		<b>CONSTRUCTION</b>

