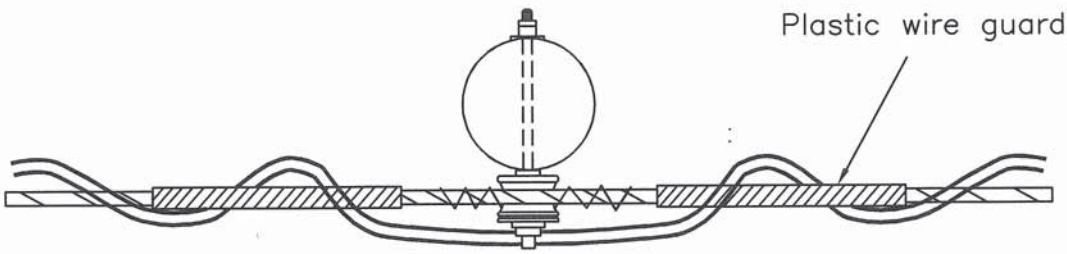
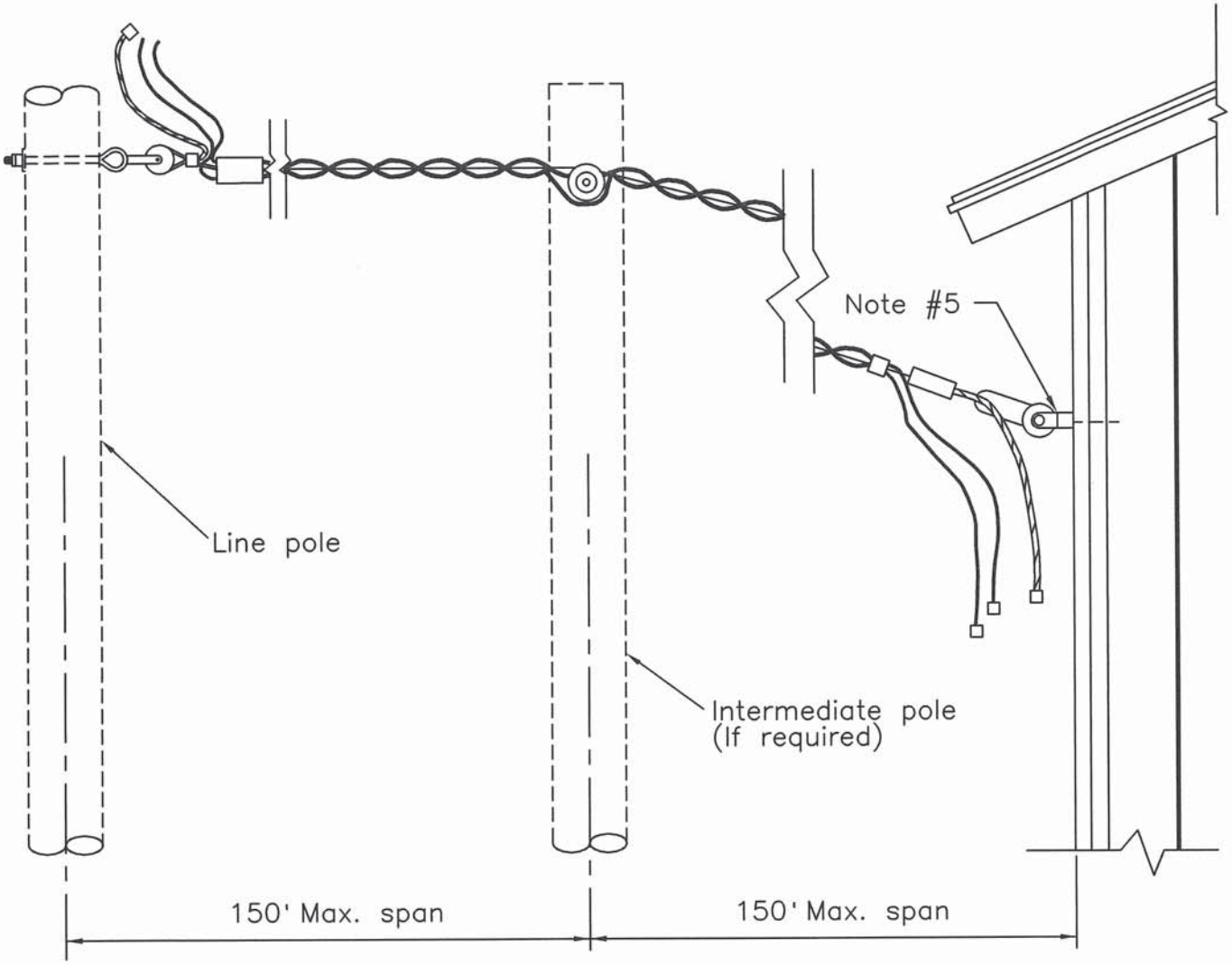




NOTES:

1. Services as short as possible are preferred.
2. See NESC Table 232–1 for minimum ground clearances.
3. Refer to secondary and service assemblies for construction details.
4. Service connectors to be insulated compression type.
5. Confirm house attachment point is properly supported.

No.	Description	Engr	Appd	Date

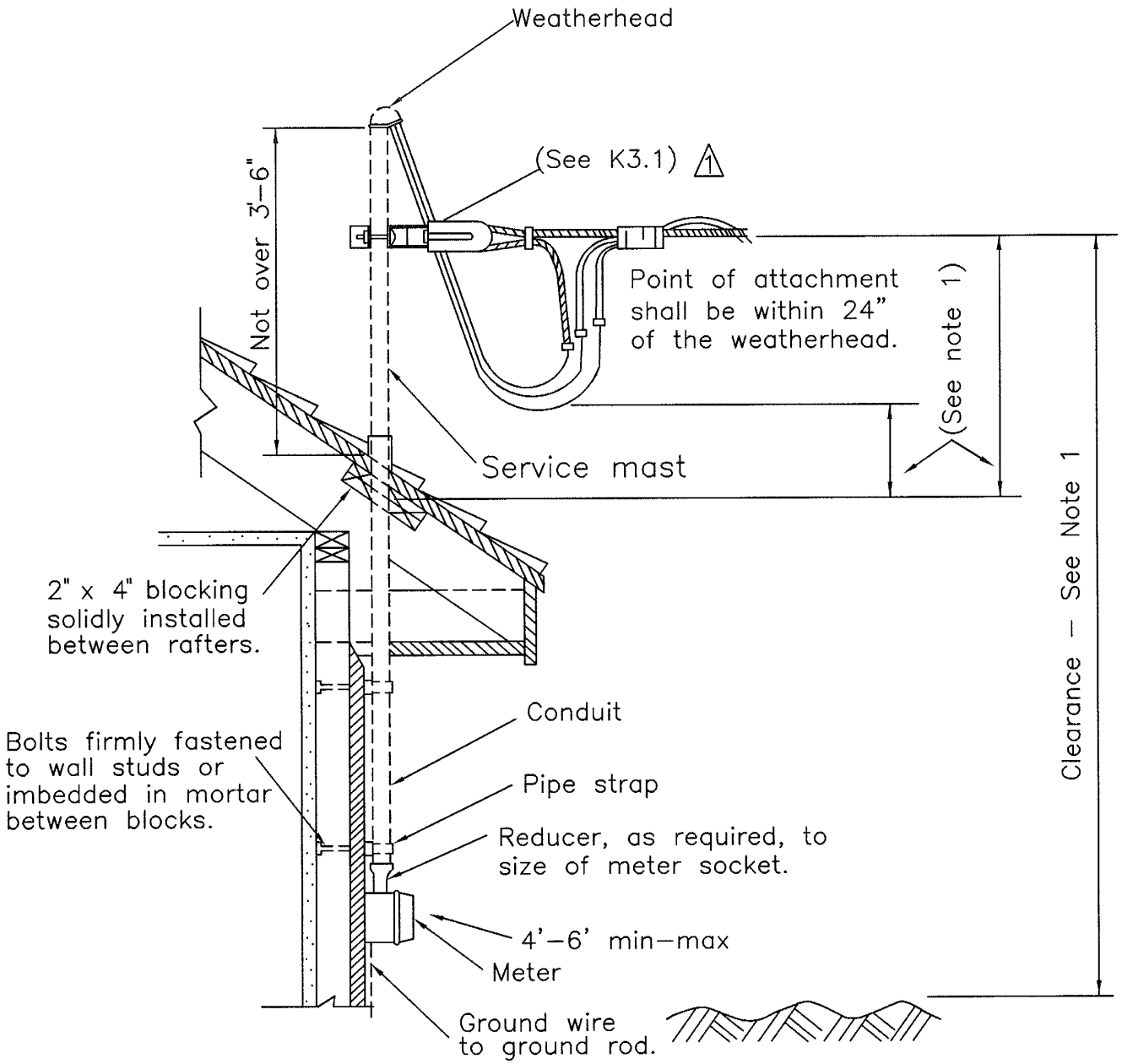
CABLE SERVICE ASSEMBLY GUIDE

Wright-Hennepin Cooperative Electric Association
A Touchstone Energy® Cooperative

12.47/7.2 KV
June 1, 2013

Engr Tech:	Engr:	Approved:	Date:
SLA	C.M.C		4-12-13

K4.1G
(M24)



NOTES:

1. All clearances to be in conformance to the most stringent requirements of the NESC, NEC or other codes of governmental or regulating authorities as applicable.
2. ⚠1 If length of conduit exceeds 10 feet, coupling is permitted but shall not be installed above the roof line.
3. On new mast install, electric service only. CATV or Phone not allowed.

MAST TYPE SERVICE ASSEMBLY GUIDE

No.	Description	Engr	Appd	Date
1	Change to K3.1, Notes	CK	JH	5/22/15

Wright-Hennepin Cooperative Electric Association
A Touchstone Energy® Cooperative

Engr Tech:	Engr:	Approved:	Date:

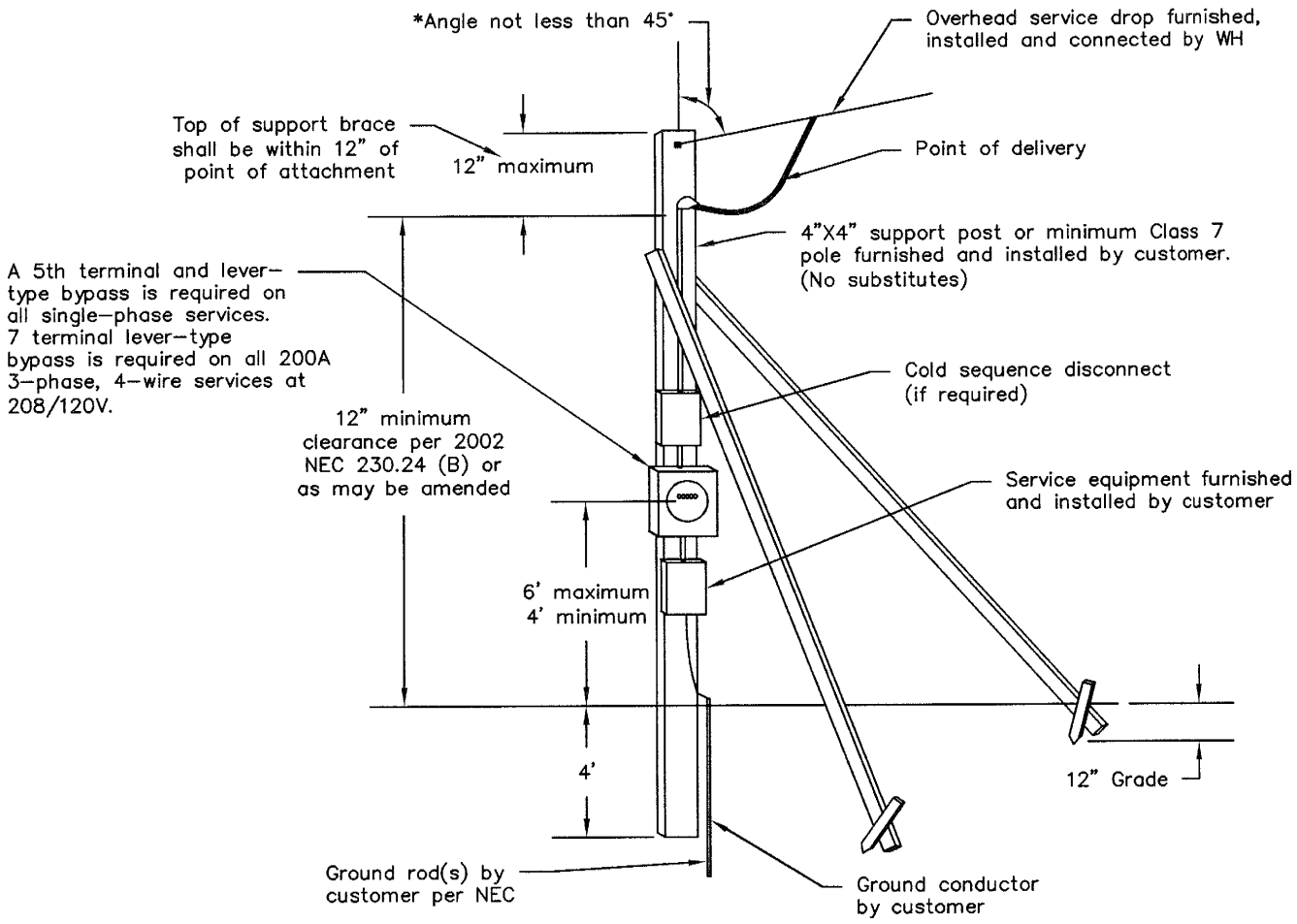
12.47/7.2 KV
June 1, 2013

K4.2G
(M24-10)

Temporary Overhead Service

The installation shall be outside utility easement and no closer than 10 feet or more than 75 feet from WH's secondary supply point.

Temporary service installations subject to cold sequence requirements.



Service address shall be prominently displayed on temporary service installation

Vertical Clearance from Ground:

- 12' minimum clearance from ground (except as below).
- 18' over public streets, alleys, roads, parking areas subject to truck traffic, driveways on other then residential property, and other land such as cultivated, grazing, forest and orchard.

- Temporary installation shall not be attached to a WH pole
- Support may require additional braces to be protected from vehicular and other construction hazards.
- Make sure area is clear of underground obstructions before installing support or ground rod.
- A CT connection is required on all 3-phase connection greater than 208V or 200A and all single-phase connect cabinets greater than 320A.

*Service drop shall not be at an angle of less than 45° from vertical and not closer than 10' horizontal.

No.	Description	Engr	Appd	Date

Wright-Hennepin Cooperative Electric Association
A Touchstone Energy® Cooperative

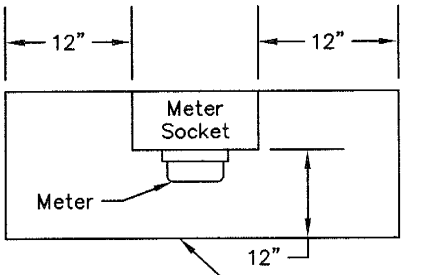
TEMPORARY SERVICE INSTALLATION FROM AN OVERHEAD SECONDARY SUPPLY

12.47/7.2 KV
MAY 2015

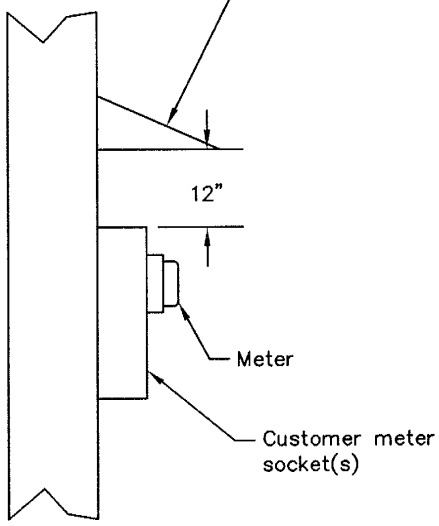
Engr Tech:	Engr:	Approved:	Date:
EMR	CMC		5/28/15

K4.3G

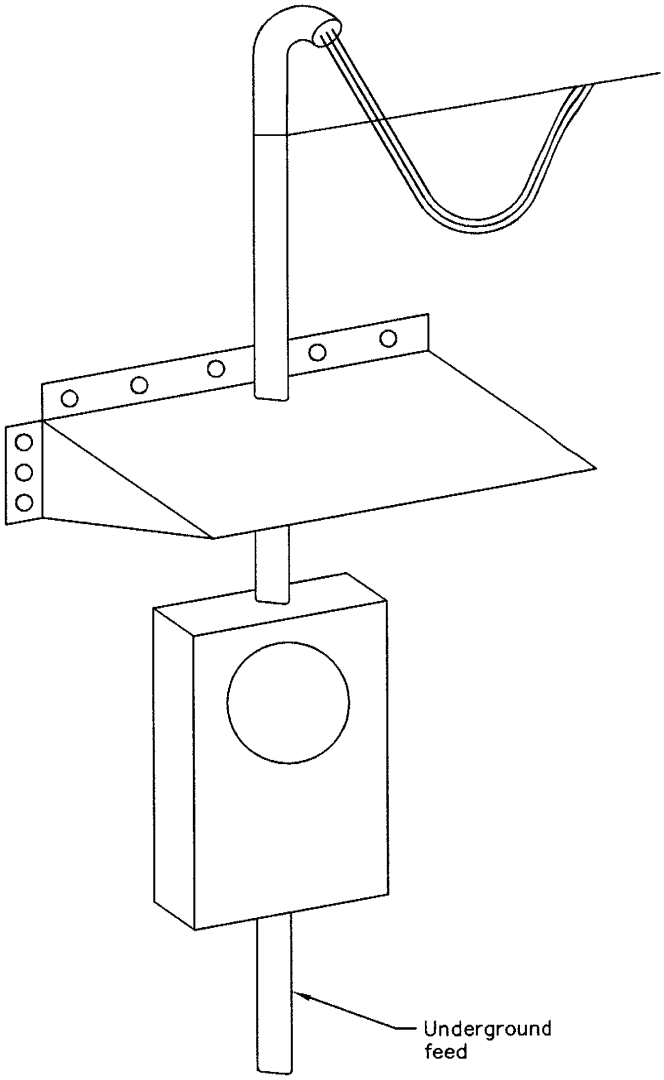
METER ICE AND SNOW SHIELD



Top View



Wall Section



Front View

- Shield must be capable of protecting meter.
- Shield shall be primed and painted with rust resistant paint.
- Meter socket must have minimum 12" clearance from shield in all directions.
- Check with Cooperative to determine if ice and snow shield is required.

No.	Description	Engr	Appd	Date

Wright-Hennepin Cooperative Electric Association
A Touchstone Energy® Cooperative

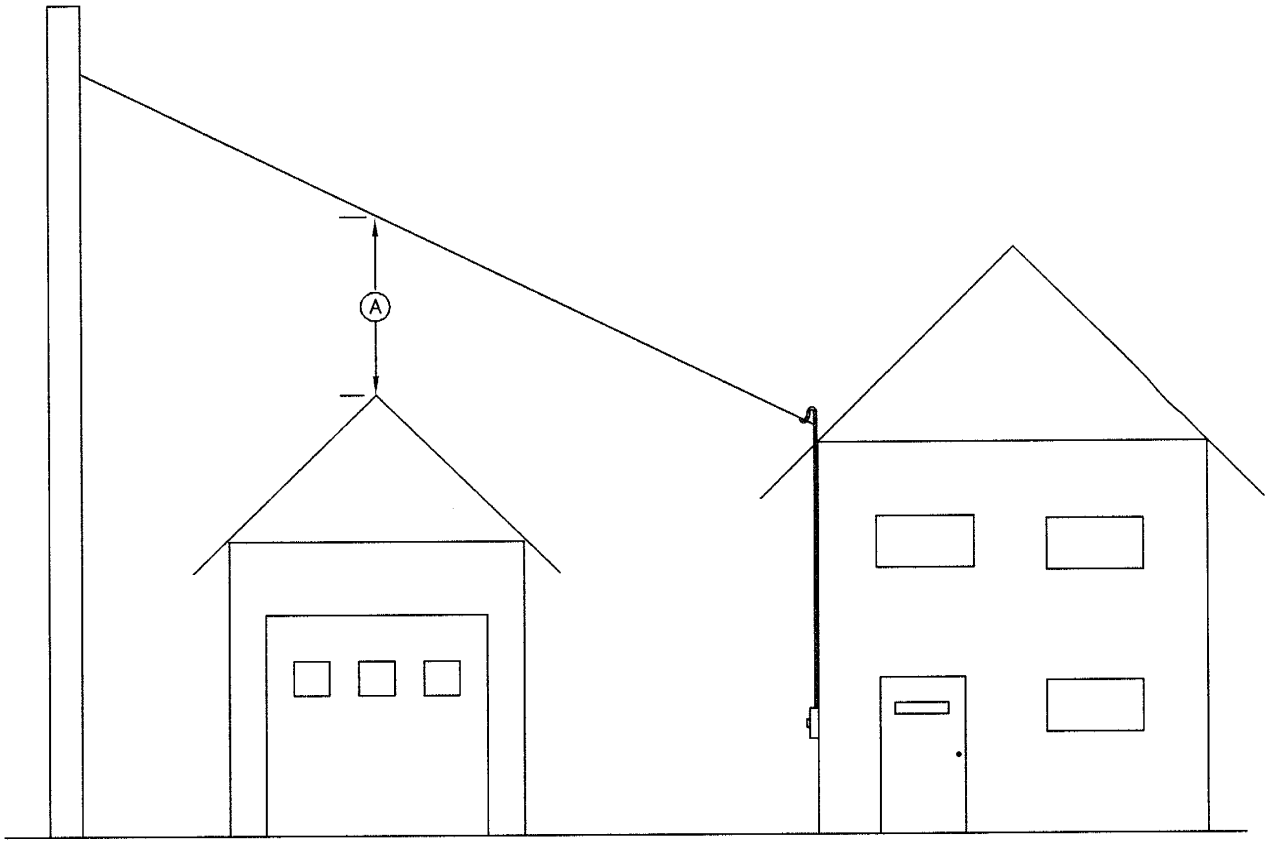
METER ICE AND SNOW SHIELD

12.47/7.2 KV
MAY 2015

Engr-Tech: EKQ | Engr | Approved: | Date: 5/28/15

K4.4G

SERVICE DROP CLEARANCE REQUIREMENTS OVER OTHER STRUCTURES AT MAXIMUM SAG OF WIRE DESIGN



Ⓐ –11 feet required above roof of other structures readily accessible to pedestrians.
–3.5 feet required above roof of other structures not readily accessible to pedestrians.

No.	Description	Engr	Appd	Date

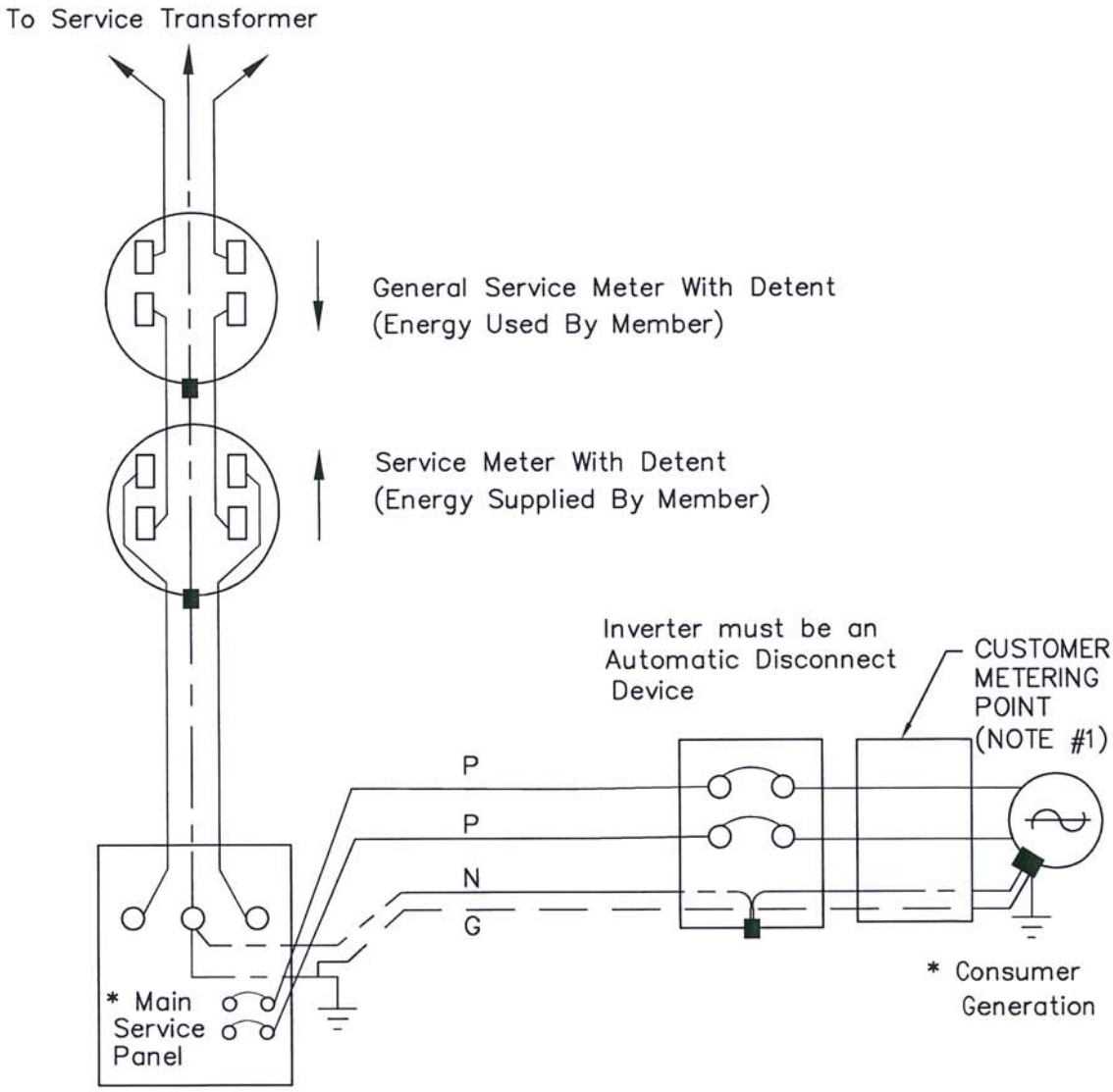
Wright-Hennepin Cooperative Electric Association
A Touchstone Energy® Cooperative

SERVICE DROP CLEARANCE REQUIREMENTS

12.47/7.2 KV
MAY 2015

Engr. Tech: Engr: Approved: Date: 5/22/15

K4.5G



* Consumer owned equipment, subject to Cooperative's Rules and Regulations, NEC, NESC and Minnesota State Board of Electricity approval.

All meters owned by Cooperative.

NOTES:

1. "Optional" customer metering point. Customer pay W–H to install the meter and socket (can be installed by owner).

No.	Description	Engr	Appd	Date

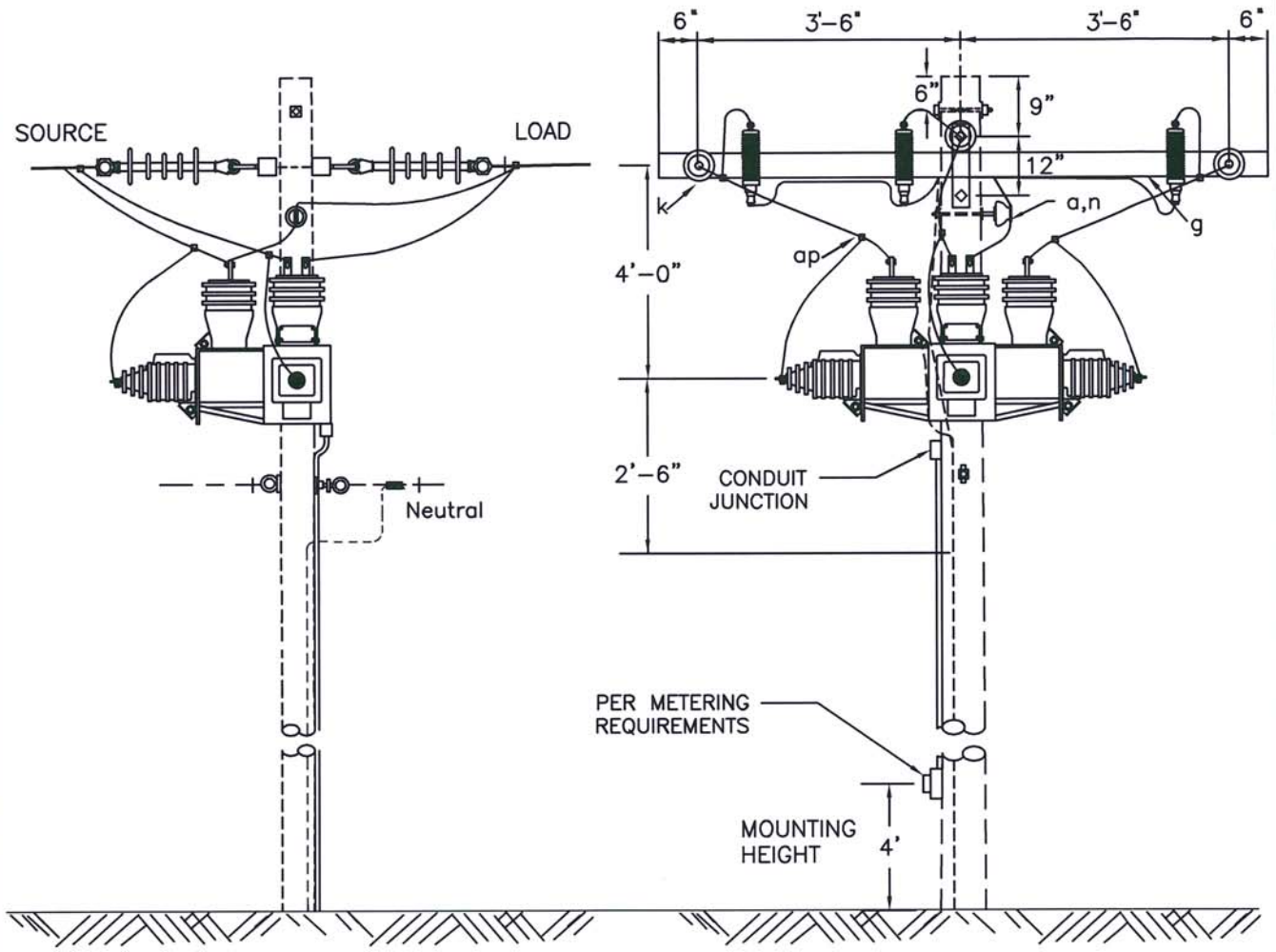
NET METERING GUIDE

Wright-Hennepin Cooperative Electric Association

12.47/7.2 KV
JUNE 1, 2013

Engr Tech:	Engr:	Approved:	Date:
EJA	AwC		10/28/13

Q2.3G



STOCK NO	ITEM	MATERIAL	QTY
34223000	a	Insulator, regular, pin	1
6380500	c	Bolt, machine, 5/8" x req'd length	2
71030000	d	Washer, square, 3"	15
18182131	g	Crossarm Fiberglass Tangent, 8'	2
34280040	k	Insulator, epoxy	6
11720000	l	Clamp, conduc, dead end, all	8
6330500	n	Bolt, double arm, 5/8" x req'd length	4
6361500	o	Bolt, eye, oval, 5/8" or 3/4"	2
42901063	aa	Nut, oval eye, 5/8" or 3/4"	6
1521002	ae	Arrester, surge (10kV)	3
17410000	ap	Connector, hot line clamp	3
	ek	Locknuts	14
		Jumper pin	1

NOTES:

1. For neutral ground assembly, see drawing H1.1.

No.	Description	Engr	Appd	Date

PRIMARY METERING INSTALLATION (THREE–PHASE)

Wright-Hennepin Cooperative Electric Association
A Touchstone Energy® Cooperative

12.47/7.2 KV
JUNE 1, 2013

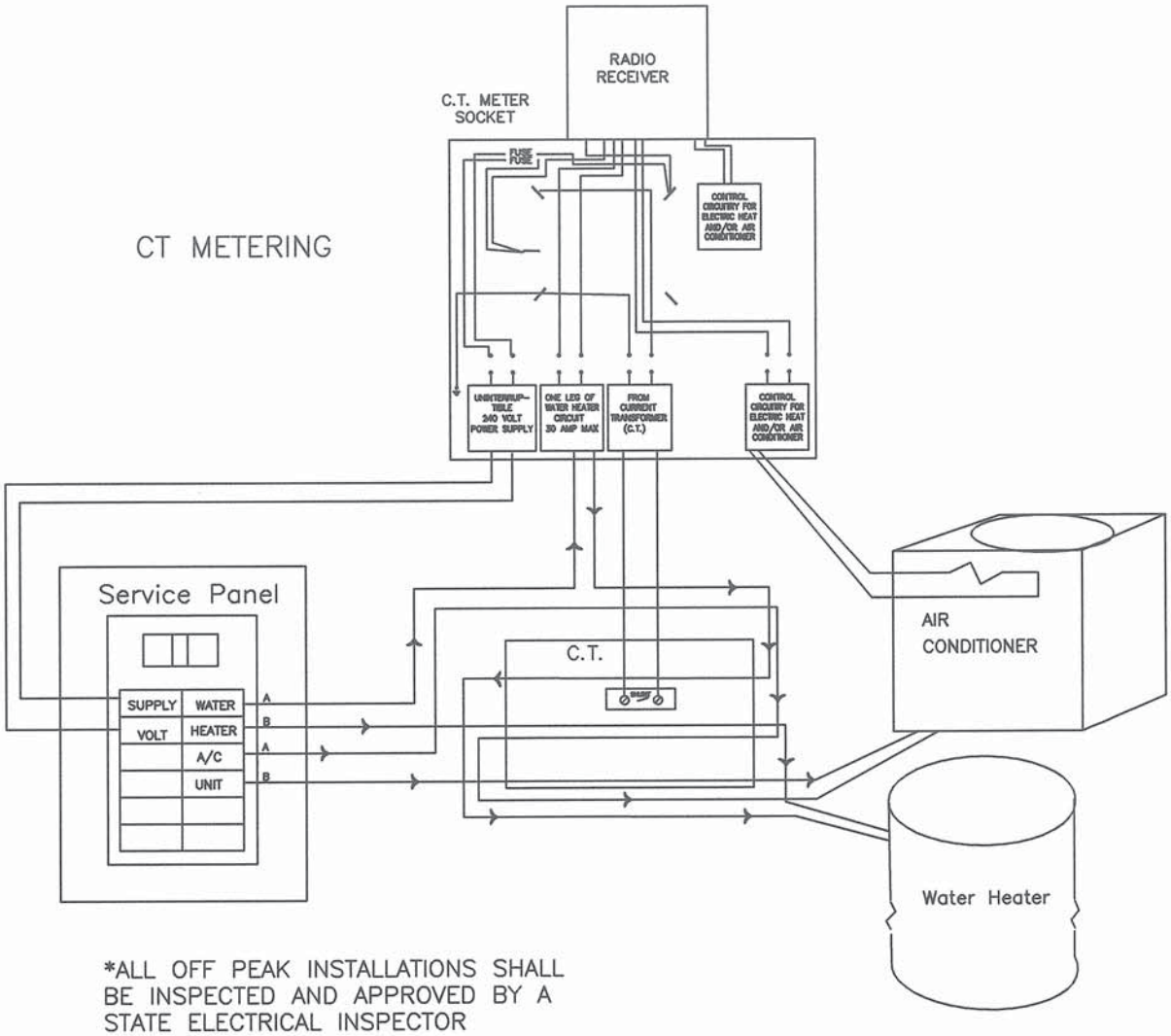
Engr Tech: ERO Engr: Approved: Date: 10/28/13

Q4.2

FORM 3S

OFF PEAK ONLY

CT METERING



*ALL OFF PEAK INSTALLATIONS SHALL BE INSPECTED AND APPROVED BY A STATE ELECTRICAL INSPECTOR

	CT SIZE	METER Rr	BILLING MULTIPLIER
MECHANICAL	200 : 5	8 1/3	1
	CT SIZE	**METER MULT.**	**BILLING MULTIPLIER**
ELECTRONIC	200 : 5	20	1

ASSEMBLY	SERVICE SIZE
UM8.6.2–240	400 – 800 AMP

STOCK NO	ITEM	MATERIAL	QTY
3700138		3S AMR, Class 20	1
69112121		CT 200:5, RF4, Bar Type	2

No.	Description	Engr	Appd	Date

SINGLE PHASE 120/240 VOLT SERVICE
1 CT – 3 WIRE

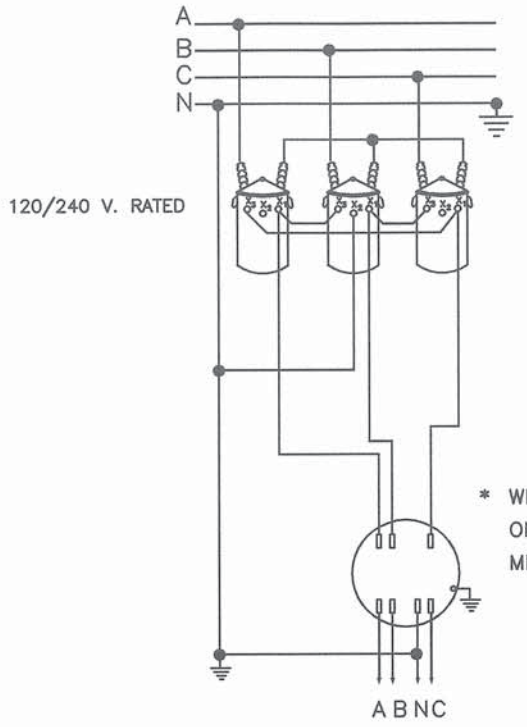
Wright-Hennepin Cooperative Electric Association
A Touchstone Energy® Cooperative

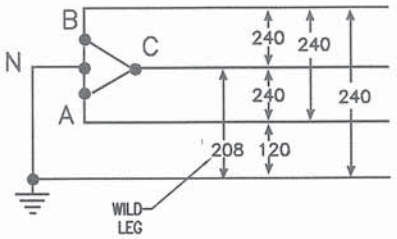
MAY 2015

Engr Tech: Engr: Approved: Date: 5/22/15

3S–1
(UM8.6.2–240)

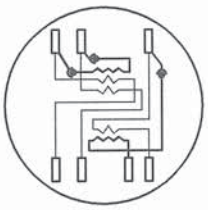
FORM 16S





* WILD LEG ALWAYS ON RIGHT SIDE OF METER SOCKET.

7 TERM. SOCKET



200 A SERVICE ONLY

ASSEMBLY	SERVICE SIZE
UM8.7–208Y	200 AMP OR LESS

STOCK NO	ITEM	MATERIAL	QTY
3700143		16S AMR, Class 200, 3–Ph Meter	1

THREE PHASE 120/240 VOLT SERVICE
4 WIRE DELTA

No.	Description	Engr	Appd	Date

Wright-Hennepin Cooperative Electric Association
A Touchstone Energy® Cooperative

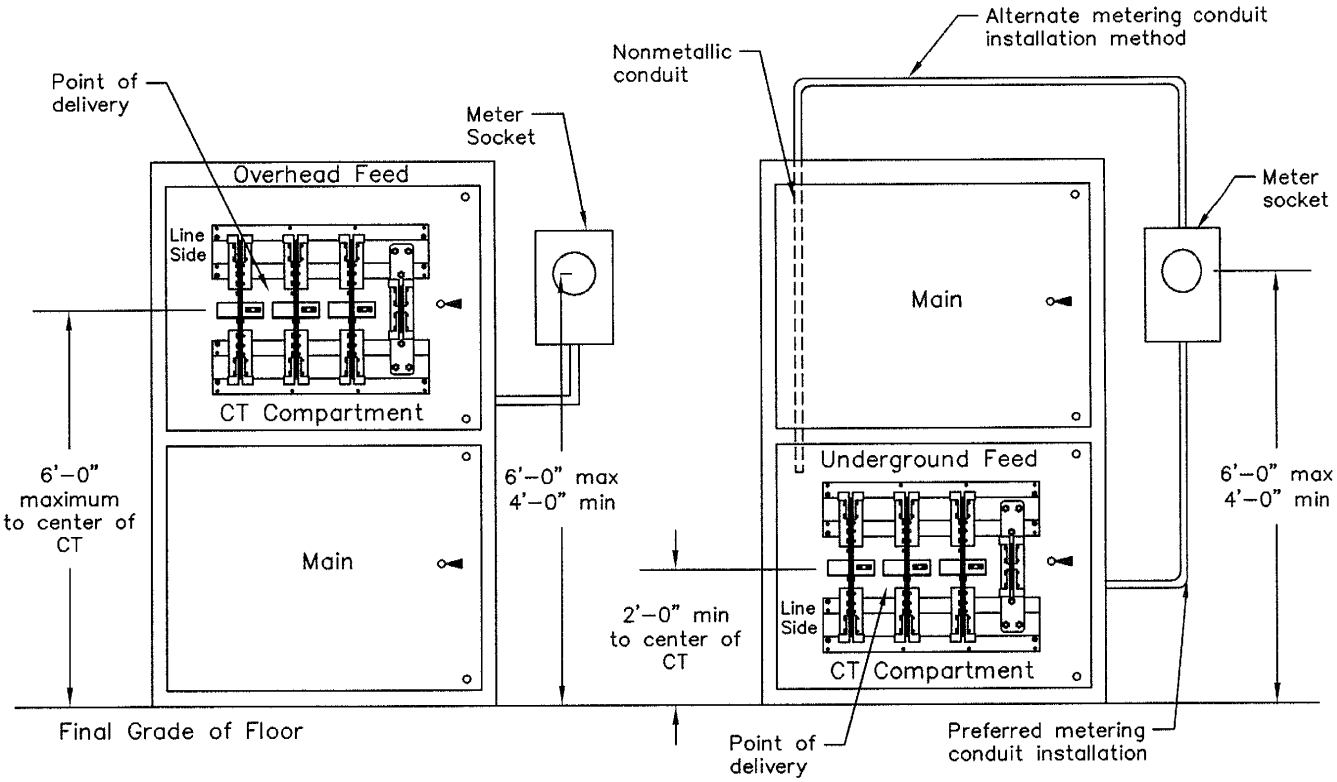
MAY 2015

Engr. Tech: Engr: Approved: Date: 5/28/15

16S–3
(UM8.7–208Y)

Point of delivery on overhead service is at the point where the customers service conductors meet WH's service drop.

Point of delivery on underground service is at the line side terminals of the CT's on residential service and at WH's facilities on commercial service.



SEE FIGURE M2 FOR CURRENT TRANSFORMER MOUNTING REQUIREMENTS

–All cabinets shall be UL approved.
–Center conduits under/over terminations.
–CT compartment shall be locked separately.
–Nonmetallic conduit shall extend into CT compartment.
–Enclosure doors shall have provisions for a WH padlock with a 5/16" diameter shackle and shall be hinged on the right or left side only.

*At 480VAC delivery point shall be worked on in a de–energized state per Arc–Flash Rules.

No.	Description	Engr	Appd	Date

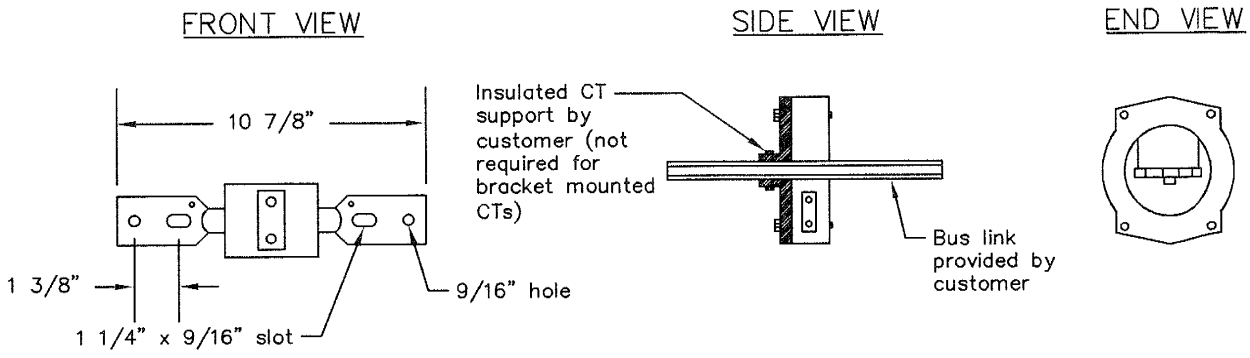
TYPICAL ARRANGEMENTS FOR SWITCHGEAR INSTALLATION

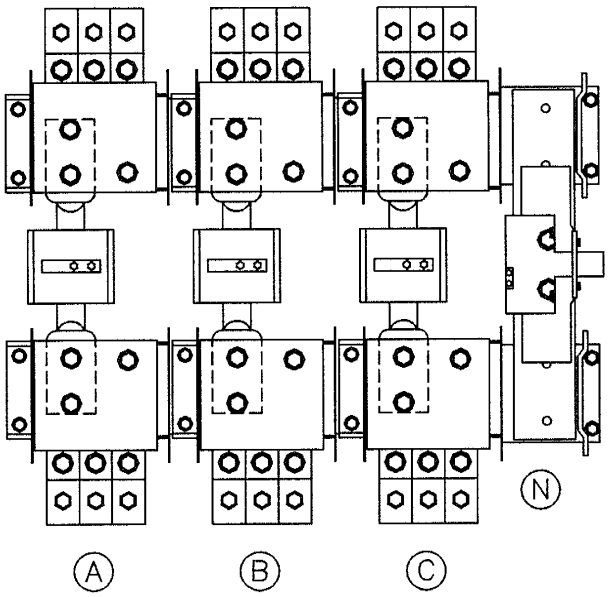
Wright-Hennepin Cooperative Electric Association
A Touchstone Energy® Cooperative

12.47/7.2 KV
MAY 2015

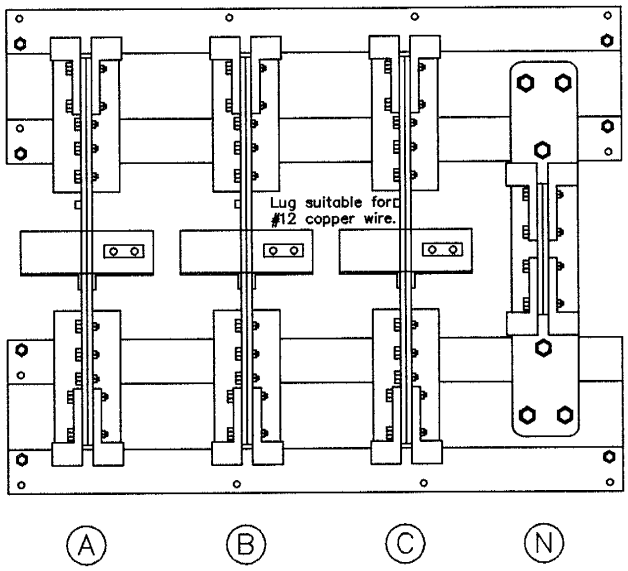
Engr Tech: Engr: Approved: Date: 5/28/15

FIGURE M1





For services 800 amps and below



For services 1000–4000 amps

–White dot on CT is polarity mark and faces line–side.
–Enclosure door shall have provisions for a standard WH padlock with a 5/16" diameter shackle and shall be hinged on the right or left side only.
–Phasing shall be A,B,C front to back, top to bottom or left to right when viewing from front.

No.	Description	Engr	Appd	Date

CURRENT TRANSFORMER MOUNTING REQUIREMENTS FOR CABINETS AND SWITCHGEAR

Wright-Hennepin Cooperative Electric Association
A Touchstone Energy® Cooperative

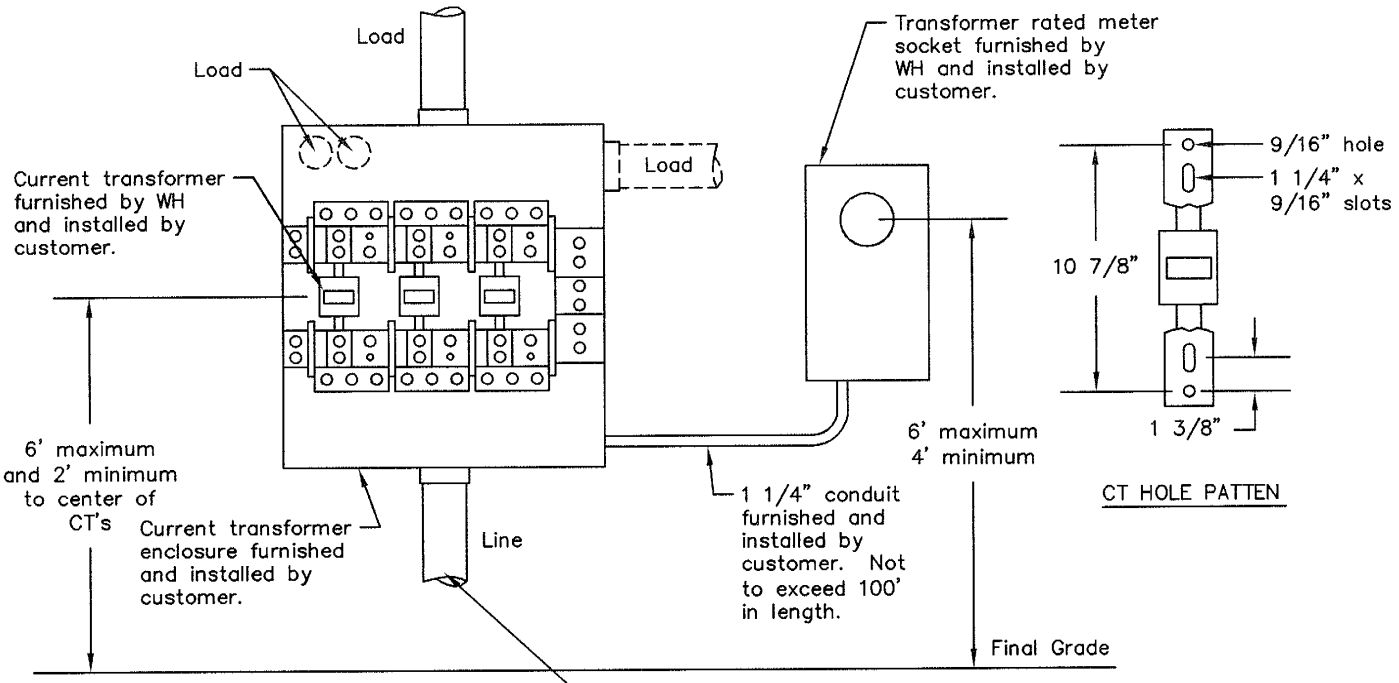
12.47/7.2 KV
MAY 2015

Engr Tech:	Engr:	Approved:	Date:
			5/22/15

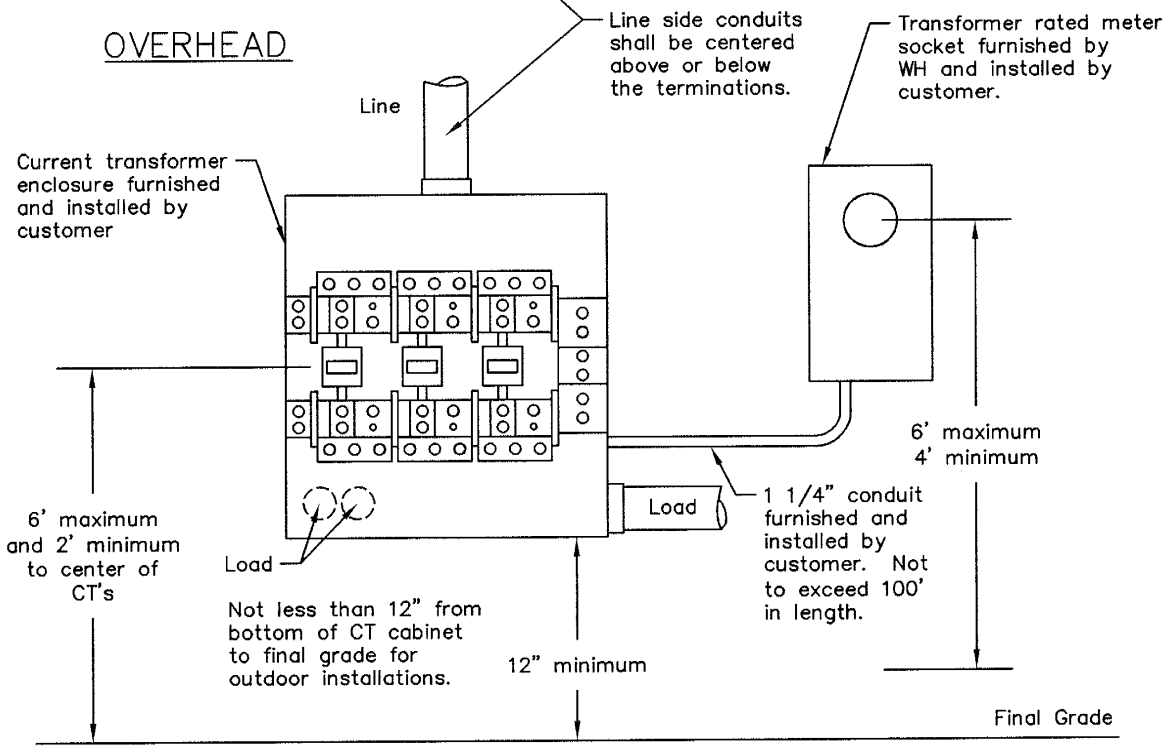
FIGURE M2

Services from 320–800 amps

UNDERGROUND



OVERHEAD



- White dot on CT is polarity mark and must face line–side.
- Service conductors are not allowed to cross in front of CTs.
- See Section 4 for instrument transformer type, installation details and requirements.

No.	Description	Engr	Appd	Date

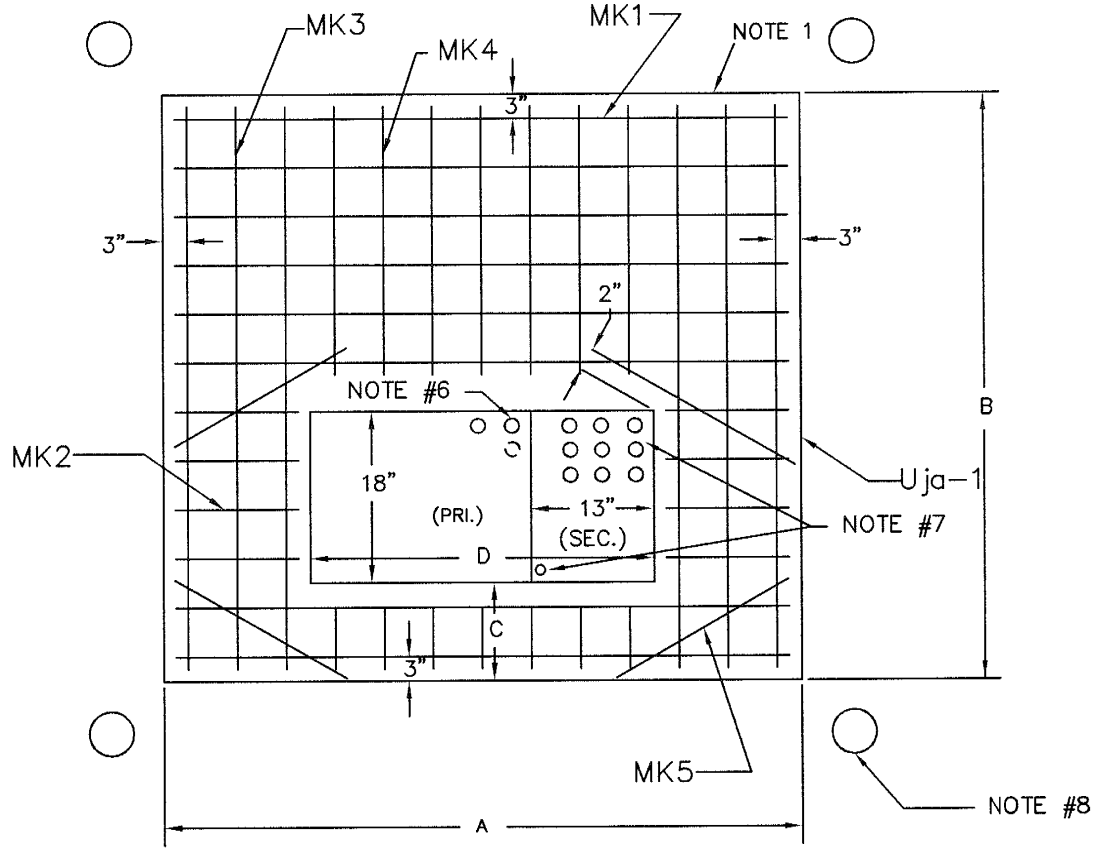
WALL–MOUNTED CURRENT TRANSFORMER ENCLOSURES

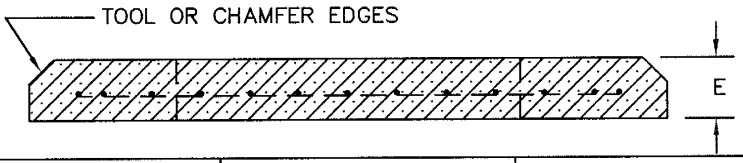
Wright-Hennepin Cooperative Electric Association
A Touchstone Energy® Cooperative

12.47/7.2 KV
MAY 2015

Engr. Tech: ERL | Engr: | Approved: | Date: 5/22/15

FIGURE M3





PAD	3-PHASE TRANSF. kVA	DIMENSIONS IN INCHES					REINFORCING BARS				
		A	B	C	D	E	MK1	MK2	MK3	MK4	MK5
#1	75, 112 1/2, 150, 225, 300, 500	76	62	10	54 (1)	6	7 #4 70"	4 #4 10"	6 #4 57"	6 #4 28"	4 #4 26"
#2	750, 1000 1500, 2500	104	100	10	54	8	12 #4 98"	6 #4 19"	6 #4 94"	7 #4 66"	4 #4 29"

NOTES:

1. CONCRETE TESTING, 3000 POUNDS MIN. PER SQUARE INCH; 4% TO 6% ENTRAINED AIR, 3/4" MAXIMUM SIZE AGGREGATE.
2. REINFORCING STEEL, ATSM-A615 GRADE 60, PLACE APPROX. 6" O.C. EACH WAY AND SECURELY TIED TOGETHER.
3. MINIMUM CONCRETE COVER OVER REINFORCING STEEL 2 INCHES UNLESS NOTED.
4. WOOD FLOAT FINISH, LEAVING NO DEPRESSIONS.
5. LOCATE CONDUITS FOR SECONDARY CABLES AS CLOSE TO RIGHT EDGE OF OPENING AS POSSIBLE.
6. EXTEND (2) – 5" CONDUITS ON THE PRIMARY SIDE 1' BEYOND TRANSFORMER PAD, PARKING LOT, ROADWAY & CURBS TO GREEN AREA AS DIRECTED BY W.H.E.
7. 3/4" CONDUIT REQUIRED FOR CONNECTION CABINET GROUND. (4) – 6" CONDUIT FOR SECONDARY TO TRANSITION CABINET OR BUILDING. EXTEND CONDUIT 1' BEYOND TRANSFORMER PAD.
8. CONCRETE OR PIPE BARRIERS MAY BE REQUIRED FOR PROTECTION FROM TRAFFIC. BARRIERS WILL BE PROVIDED BY CUSTOMER AND INSTALLED BY CONTRACTER AS DIRECTED BY W.H.E.
9. CUSTOMER IS RESPONSIBLE FOR FORMAL ENGINEER APPROVAL (THIS IS A GUIDELINE ONLY.)

No.	Description	Engr	Appd	Date
1	Change #1 D to 54	[illegible]	[illegible]	5/22/15

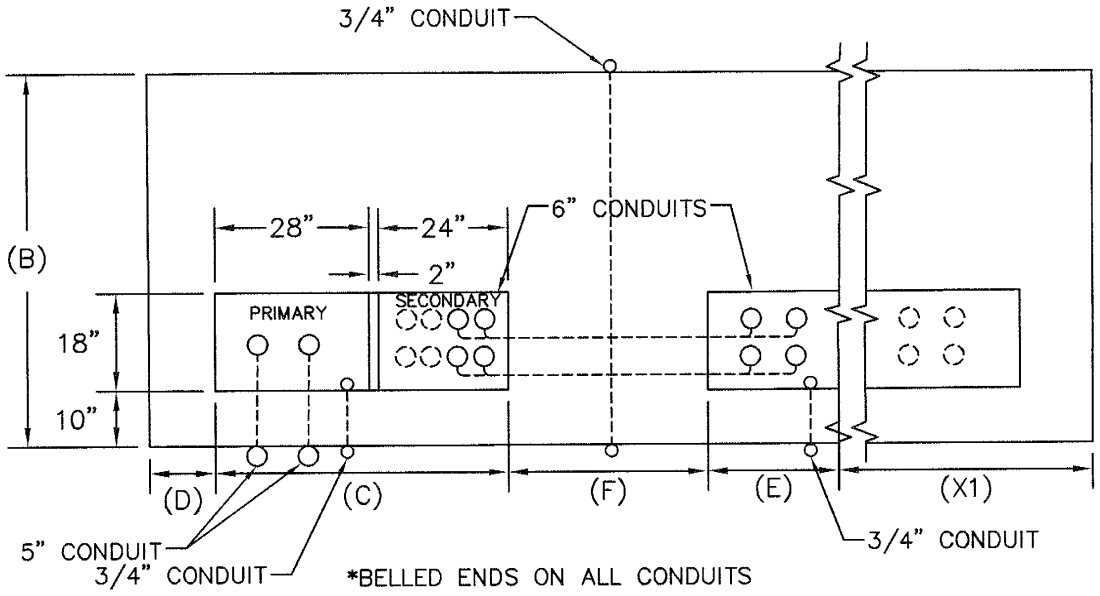
THREE PHASE TRANSFORMER CONCRETE PAD GUIDELINE

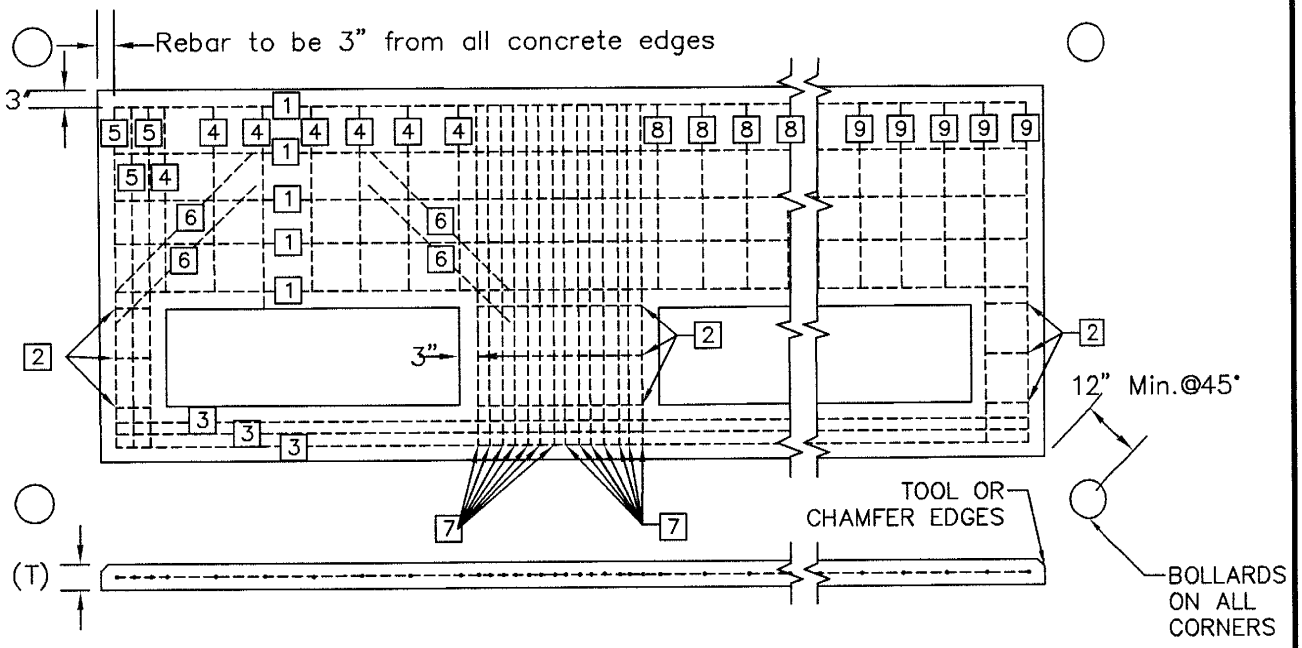
Wright-Hennepin Cooperative Electric Association
A Touchstone Energy® Cooperative

12.47/7.2 KV
OCTOBER 1, 2013

Engr. Tech:	Engr:	Approved:	Date:
[illegible]	[illegible]	[illegible]	10/28/13

UM1-6C





SIZE	B	C	D	E	F	T	X1
75-500 kVA	68"	54"	12"	18" Min	36"	6"	Bal of SCC width
750-2500 kVA	100"	54"	20"	18" Min	36"	8"	Bal of SCC width

REINFORCED STEEL SCHEDULE								
1	2	3	4	5	6	7	8	9
5-#4	3-#4	3-#4	7-#4	3-#4	2-#4 X 3'0"	14-#4	4-#4	#4
9-#4	3-#4	3-#4	8-#4	6-#4	2-#4 x 3'-0"	14-#4	5-#4	#4

*SEE UM1–G1 & G2 FOR NOTES AND GROUNDING
**CUSTOMER IS RESPONSIBLE FOR FORMAL ENGINEERING APPROVAL ON ALL CONCRETE WORK. (THIS IS A GUIDELINE ONLY.)

(GUIDELINE ONLY)

THREE PHASE PAD–MOUNTED TRANSFORMER SECONDARY CONNECTION CABINET CONCRETE PAD – IN–LINE ORIENTATION

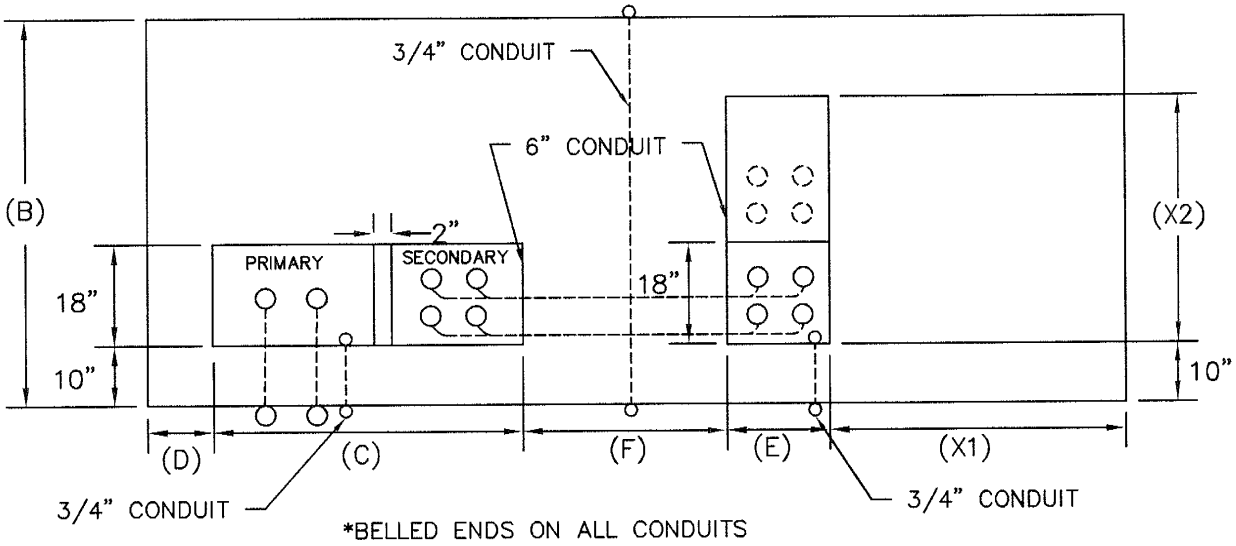
No.	Description	Engr	Appd	Date
2	Changed Dimensions			5/28/15
1	Changed Dimensions			7/14/14

Wright-Hennepin Cooperative Electric Association
A Touchstone Energy® Cooperative

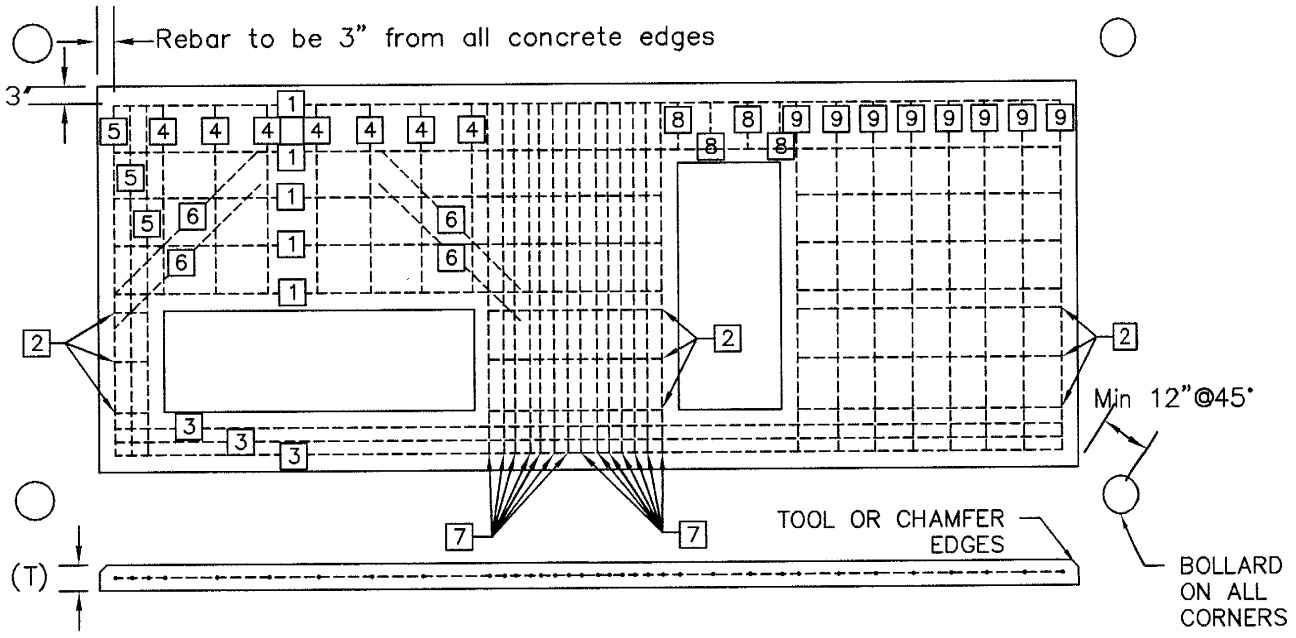
12.47/7.2 KV
OCTOBER 1, 2013

Engr Tech. | Engr | Approved: | Date:

UM1–8C



*BELLED ENDS ON ALL CONDUITS



SIZE	PAD DIMENSIONS (DIM)								REINFORCED STEEL SCHEDULE								
	B	C	D	E	F	T	X1	X2	1	2	3	4	5	6	7	8	9
75-500 kVA	68"	54"	12"	18" Min	36"	6"	Bal of SCC depth	Bal of SCC width	5-#4	3-#4	3-#4	7-#4	3-#4	2-#4 X 3'0"	14-#4	4-#4	#4
750-2500 kVA	100"	54"	20"	18" Min	36"	8"	Bal of SCC depth	Bal of SCC width	9-#4	3-#4	3-#4	8-#4	6-#4	2-#4 x 3'-0"	14-#4	5-#4	#4

*SEE UM1–G1 & G2 FOR NOTES AND GROUNDING
**CUSTOMER IS RESPONSIBLE FOR FORMAL ENGINEERING APPROVAL ON ALL CONCRETE WORK. (THIS IS A GUIDELINE ONLY.)

(GUIDELINE ONLY)

THREE PHASE PAD–MOUNTED TRANSFORMER SECONDARY CONNECTION CABINET CONCRETE PAD – 90° ORIENTATION

No.	Description	Engr	Appd	Date
2	Changed Dimensions			5/26/15
1	Changed Dimensions	--	--	7/14/14

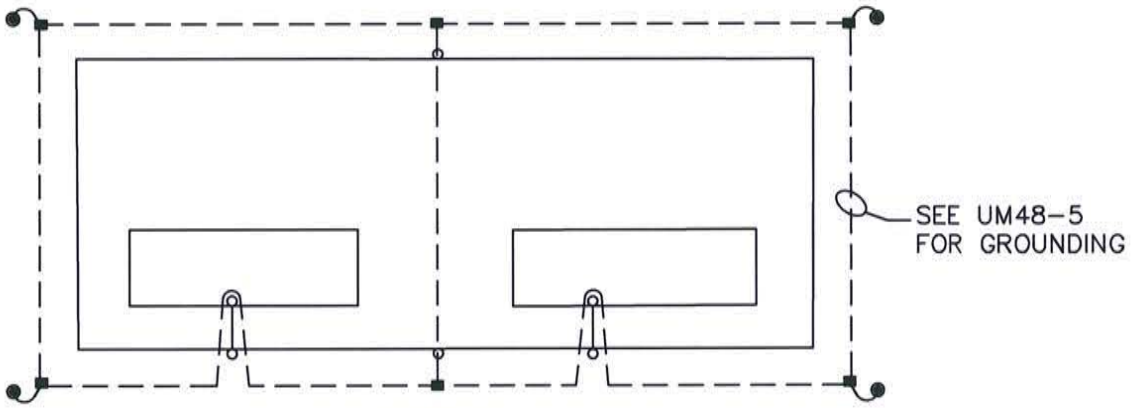
Wright-Hennepin Cooperative Electric Association
A Touchstone Energy® Cooperative

12.47/7.2 KV
OCTOBER 1, 2013

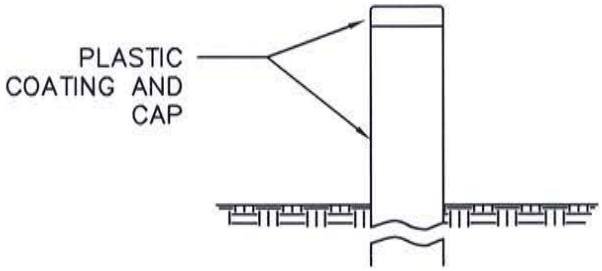
UM1–9C

NOTES:

1. CONCRETE TESTING, 3000 POUNDS MIN. PER SQUARE INCH: 4% TO 8% ENTRAINED AIR, 3/4" MAXIMUM SIZE AGGREGATE.
2. REINFORCING STEEL, ATSM–A615 GRADE 60, PLACE APPROXIMATELY 6" O.C. EACH WAY AND SECURELY TIED TOGETHER.
3. MINIMUM CONCRETE COVER OVER REINFORCING STEEL 2 INCHES UNLESS NOTED.
4. WOOD FLOAT FINISH, LEAVING NOT DEPRESSIONS.
5. LOCATE CONDUITS FOR SECONDARY CABLES AS CLOSE TO RIGHT EDGE OF OPENING AS POSSIBLE.
6. EXTEND (2) – 5" CONDUITS ON THE PRIMARY SIDE 1" BEYOND TRANSFORMER PAD, PARKING LOT, ROADWAY AND CURBS.
7. 3/4" CONDUIT REQUIRED FOR CONNECTION CABINET GROUND. (4) – 6" CONDUIT FOR SECONDARY TO TRANSITION.
8. CONCRETE OR PIPE BARRIERS MAY BE REQUIRED FOR PROTECTION FROM TRAFFIC. BARRIERS WILL BE PROVIDED BY CUSTOMER AND INSTALLED BY CONTRACTOR AS DIRECTED BY W.H.E.
9. SOIL COMPACTION UNDER PAD (FOR BOTH POUR–IN–PLACE AND SEPARATE STANDARD PADS) TO BE AT 95% STANDARD PROCTOR. (CONTACT LOCAL AUTHORITY FOR TIGHTER REQUIREMENTS.)
10. MAXIMUM 2 ELBOWS (CONDUITS), FOR PRIMARY FEED AND SOURCE CIRCUITS, WILL BE 5" SCHEDULE 40 PVC, 90°, 36" RADIUS.
11. PRIMARY PVC ELBOW STUB–OUTS MUST BE A MINIMUM OF 12" OUT FROM THE PAD EDGE WHETHER FROM A FRONT OR SIDE TRENCH APPROACH FEEDING THE TRANSFORMER.
12. THE SCC WINDOW ENTRANCE SHALL BE MINIMUM OF 18" DEEP.
13. ALL CABLING AND CONDUIT SHALL BE FURNISHED AND INSTALLED PER THE NATIONAL ELECTRIC CODE (NEC).



GROUNDING



BOLLARD DETAIL

No.	Description	Engr	Appd	Date

THREE PHASE TRANSFORMER GUIDE

Wright-Hennepin Cooperative Electric Association
A "Touchstone Energy" Cooperative

12.47/7.2 KV
OCTOBER 1, 2013

Engr Tech: Eha | Engr: Curt C | Approved: | Date: 10/28/13

UM1–G1

SERVICE LATERAL SIZES

PADMOUNTED TRANSFORMERS		
KVA	Copper	Aluminum
208 Grd Y/120 Volt		
300	3 - 500	2 - 750
500	4 - 500	4 - 750
750	6 - 500	6 - 750
* 1000	8 - 500	8 - 750
240/120 Volt Δ (1)		
300	2 - 500	2 - 750
500	4 - 500	3 - 750
750	6 - 500	6 - 750
* 1000	7 -500	7 - 750
480 Grd Y/277 Volt		
300	1 - 500	1 - 750
500	2 - 500	2 - 750
750	3 - 500	3 - 750
1000	4 - 500	4 - 750
1500	6 - 500	6 - 750
* 2000	7 - 500	7 - 750
*2500	9-500	9-750
240/120 Volt 1 ∅		
167	2 - 500	2 - 500

⚠1

⚠1 * Need extension and support on secondary bushings of transformer and all transition cabinet. (For all connections over six (6) holes.)
**All secondary wiring shall be reated at 90° C, rating per 2014 NEC Code, Table 310.15.
NOTE: 80% derate applied to cables in conduit.

TRANSFORMER CONNECTION INFORMATION

CUSTOMER WIRING COLORS

The NEC specifies that the grounded (neutral) conductor be white or natural gray. The phase wires are not required by the NEC to be a specified color with the exception of the phase conductor with the higher voltage to ground in a 4–wire delta–connected secondary (wild leg) which shall be orange. Color coding guidelines shown below are consistent with common industry practice and should be used.

Color Coding (reading L to R as you stand facing the equipment)

Secondary Voltage	N	X1	X2	X3
480 V WYE	White	Brown	Orange	Yellow
208 V WYE	White	Black	Red	Blue
240 V DELTA		Black	Black	Orange (wild leg)

NOTES:
1. Ground conductors must be green.
2. Phase rotation – ABC clockwise rotation (ABC DOES NOT have to be indicated).
3. DO NOT USE red/white/blue to identify phase wires.
4. Any color code used on customer wires shall be verified before making a connection.

CUSTOMER METER CONNECTIONS – (Refer to Meter Standards)
Wild leg is attached to the lug farthest to the right.

CUSTOMER–OWNED SERVICE CONNECTION CABINET
Preferred bus phase connection sequence: top–phase A, upper middle–phase B, lower middle–phase C, bottom–neutral. ⚠1

No.	Description	Engr	Appd	Date
1	Upd. chart, add & upd. notes			5/22/15

THREE PHASE TRANSFORMER WIRING GUIDE

Wright-Hennepin Cooperative Electric Association
A Touchstone Energy® Cooperative

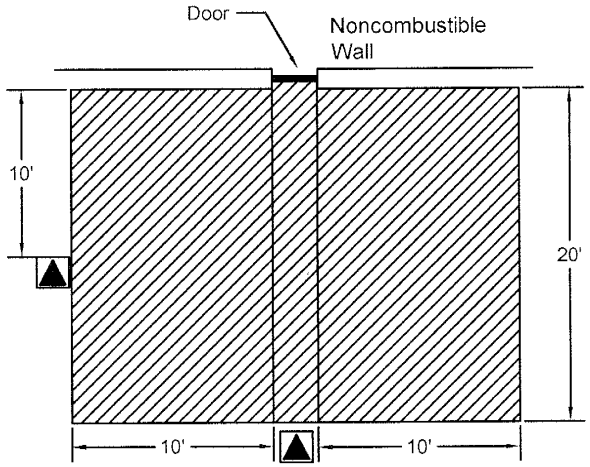
12.47/7.2 KV
MAY 2015

Engr Tech: CVC | Engr | Approved: | Date: 10/22/15

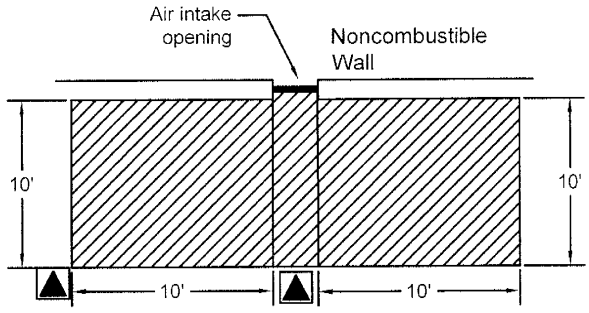
UM1–G2

1. NONCOMBUSTIBLE WALLS (included in this class would be wood framed brick veneered buildings, metal clad steel framed buildings, asbestos-cement-board walled metal framed buildings and masonary buildings with a one hour fire rating).
Oil insulated, pad-mounted transformers may be located a minimum distance of 10' from walls if all the following clearances are maintained from doors, windows, and other building openings. A sump shall be installed for transformers if the immediate terrain is not pitched away from the building. Contact Electric Standards for sump specifications. If a combustible first floor overhang exists, a 10' distance from the edge of the transformer to the edge of the overhang (combination of vertical and horizontal distance) shall be required in addition to the other clearances shown.

A. DOORS
Oil insulated,pad-mounted transformers shall not be located within a zone extending 20' outward and 10' to either side of a building door.



B. AIR INTAKE OPENINGS
Oil insulated,pad-mounted transformers shall not be located within a zone extending 10' outward and 10' to either side of an air intake opening located within 10' of the ground. If the air intake opening is located more than 10' above ground, the distance from the transformer to the opening shall be a minimum of 25'.



No.	Description	Engr	Appd	Date

PAD–MOUNT TRANSFORMER CLEARANCE GUIDE

Wright-Hennepin Cooperative Electric Association
A Touchstone Energy® Cooperative

12.47/7.2 KV
MAY 2015

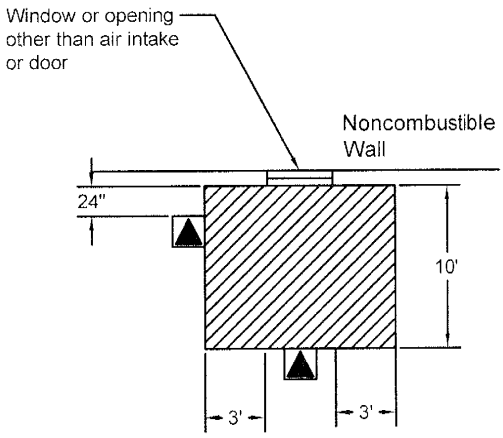
Engr. Tech: EAO Engr: Approved: Date: 5/28/15

UM1–G3A

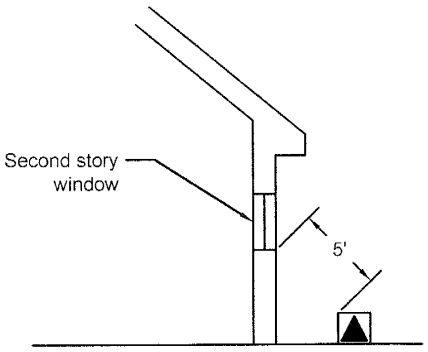
CLEARANCE REQUIREMENTS FOR PAD-MOUNTED TRANSFORMERS

C. WINDOWS OR OPENINGS OTHER THAN AIR INTAKE OR DOOR

1. FIRST STORY
Oil insulated, pad-mounted transformers shall not be located within a zone extending 10' outward and 3' to either side of a building window or opening other than an air intake or door.



2. SECOND STORY
Oil insulated, pad-mounted transformers shall not be located less than 5' from any part of a second story window or opening other than an air intake. Oil fill equipment shall not be placed below an operating window. No exceptions will be made.



No.	Description	Engr	Appd	Date

Wright-Hennepin Cooperative Electric Association
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PAD–MOUNT TRANSFORMER CLEARANCE GUIDE

12.47/7.2 KV
MAY 2015

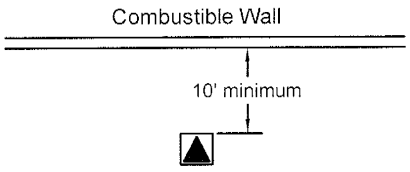
Engr-Tech: Engr: Approved: Date: 5/28/15

UM1–G3B

CLEARANCE REQUIREMENTS FOR PAD-MOUNTED TRANSFORMERS

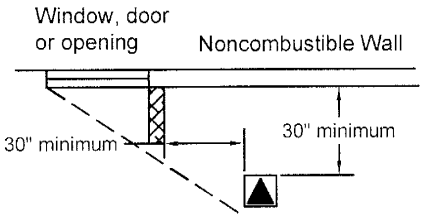
II. COMBUSTIBLE WALLS

(Included in this class are wood buildings and metal clad buildings with wood frame construction.) Oil insulated, pad-mounted transformers shall be located a minimum of 10' from the building wall in addition to the clearance from building doors, windows and other openings set forth for noncombustible walls. A sump shall be installed for transformers if the immediate terrain is not pitched away from the building. Contact Engineer for sump specifications. If a combustible first floor overhang exits, a 10' distance from the edge of the transformer to the edge of the overhang (combination of vertical and horizontal distance) shall be required in addition to the other clearances as shown.



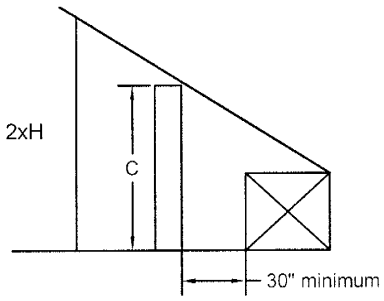
III. BARRIERS

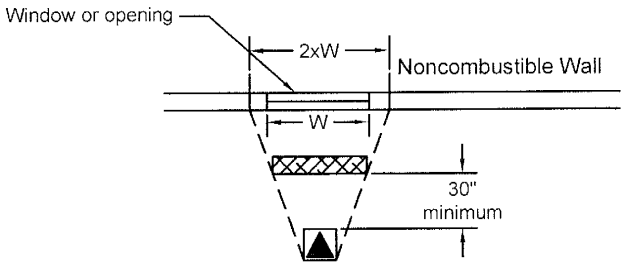
(Included in this class are reinforced concrete, brick or concrete block barrier walls with a 3 hour fire rating.) If the clearance specified above cannot be attained, a fire resistant barrier shall be constructed in lieu of the separation. The barrier (when required) is provided by the customer.



A. NONCOMBUSTIBLE WALLS

The barrier shall extend to a projection line from the corner of the pad-mounted to the furthest corner of the window, door or opening in question.





No.	Description	Engr	Appd	Date

PAD–MOUNT TRANSFORMER
CLEARANCE GUIDE

Wright-Hennepin
Cooperative Electric Association
A Touchstone Energy® Cooperative

12.47/7.2 KV
MAY 2015

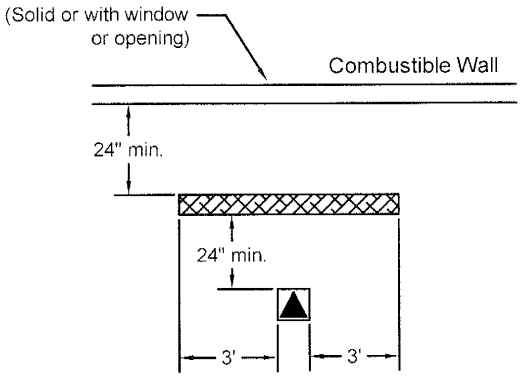
Engr. Tech: [illegible] Engr: [illegible] Approved: [illegible] Date: 5/28/15

UM1–G3C

CLEARANCE REQUIREMENTS FOR PAD-MOUNTED TRANSFORMERS

B. COMBUSTIBLE WALLS

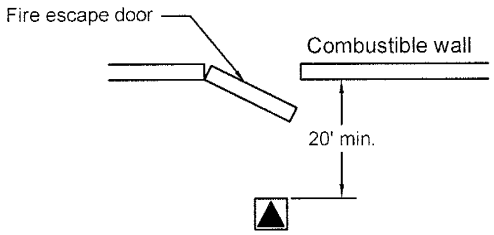
The barrier shall extend 3' beyond the oil insulated, pad-mounted transformer. The height of the barrier shall be 3' above the top of the pad-mount transformer. If a combustible first floor overhang exists, the 24" specified shall be measured from the edge of the overhang rather than from the building wall.



IV. FIRE ESCAPES

Oil insulated, pad-mounted transformers shall be located such that a minimum clearance of 20' is maintained from fire escape at all times.

Exception: Oil insulated, pad-mounted transformers may be located closer to a fire escape then the 20' minimum when a fire resistant barrier is constructed around the transformer (side walls and roof). The barrier shall extend a minimum of 1' beyond the transformer. The transformer and barrier shall not in any way obstruct the fire escape exit. 10' clearance is required in front of pad-mount transformer doors. Adequate transformer accessibility and ventilation shall be provided. It transformer is installed underneath a fire escape, maintain 10' vertical clearance.



V. DECORATIVE COMBUSTIBLE ENCLOSURE

Decorative combustible enclosures (fence) installed by the customer around oil insulated, pad-mounted transformers adjacent to a combustible building wall shall not extend more than 24" beyond the transformer towards the combustible wall. 10' clearance required in front of pad-mounted transformer doors. Adequate transformer accessibility and ventilation shall be provided.

VI. NONCOMBUSTIBLE AND COMBUSTIBLE WALLS - FIRE RESISTANT BARRIERS

The examples of combustible and noncombustible walls and fire resistant barriers obtained from March & McLennan Inc., Protection Consultants, and apply to building exposure to a fire located outside of the building.

No.	Description	Engr	Appd	Date

PAD–MOUNT TRANSFORMER CLEARANCE GUIDE

Wright-Hennepin Cooperative Electric Association
A Touchstone Energy® Cooperative

12.47/7.2 KV
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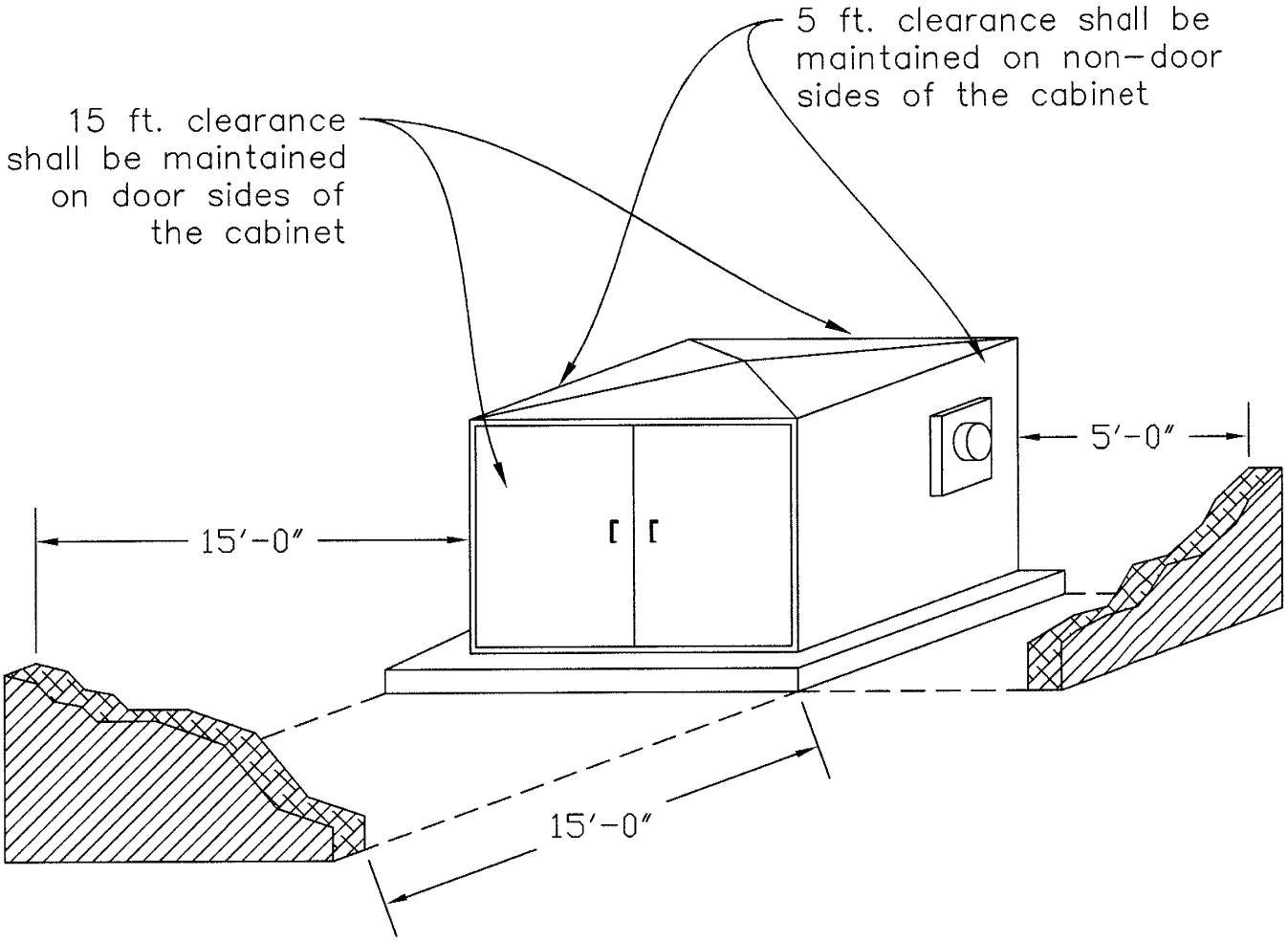
Engr. Tech: | Engr: | Approved: | Date: 5/20/15

UM1–G3D



PRIMARY METER CABINET CLEARANCE REQUIREMENTS

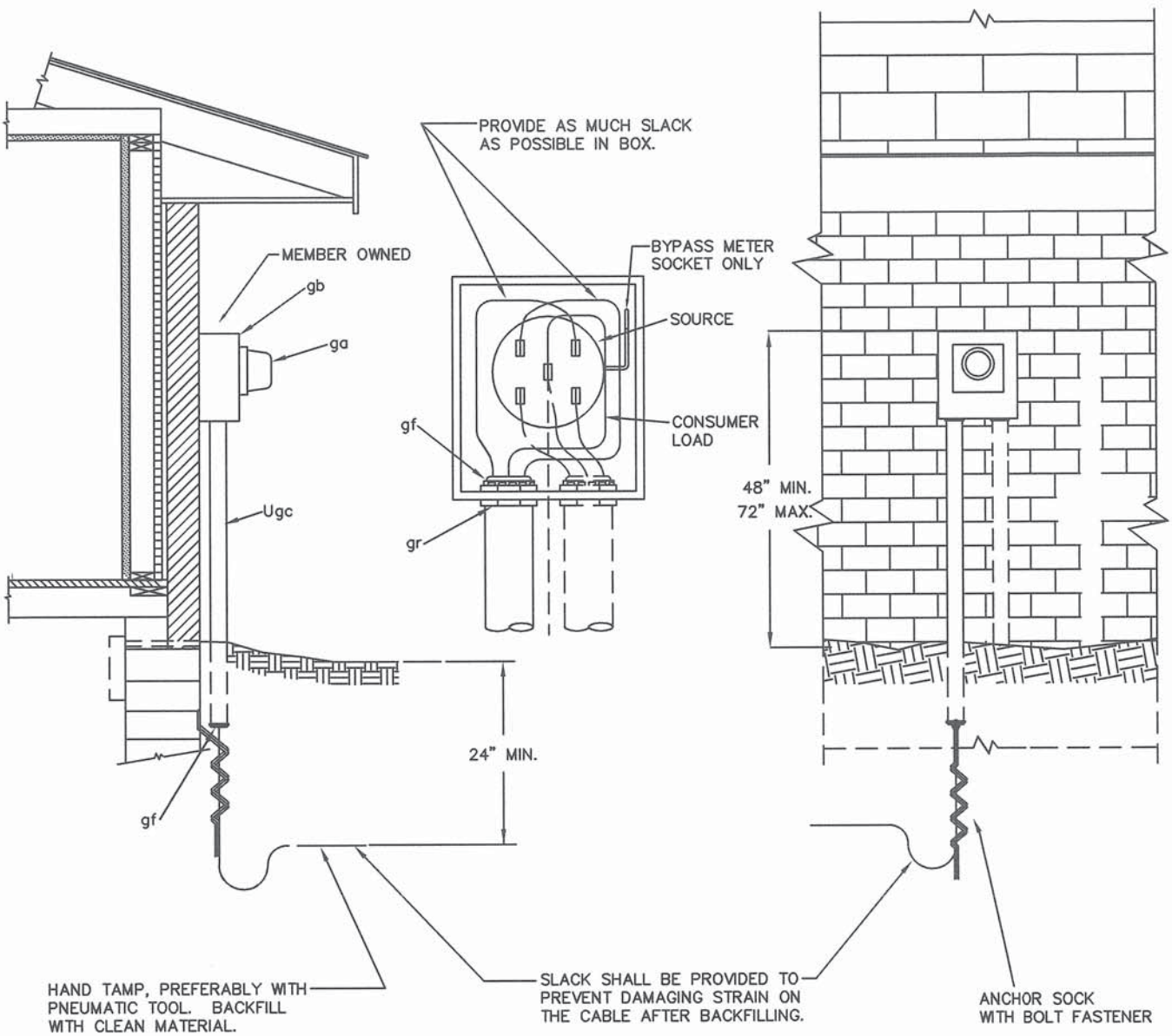
No.	Description	Engr	Appd	Date

Wright-Hennepin Cooperative Electric Association
A Touchstone Energy® Cooperative

12.47/7.2 KV
MAY 2015

Engr-Tech: Engr: Approved: Date: 5/27/15

UM1-G4



STOCK NO	ITEM	MATERIAL	QTY
	ga	Meter, as required	1
	gb	Meter socket	1
	gf	Insulated bushing, size as req'd	2
	gr	Conduit locknuts, size as req'd	2
	Ugc	Conduit, diameter and length as req'd	1

METER INSTALLATION UNDERGROUND SOURCE GUIDE

No.	Description	Engr	Appd	Date
1	Added By-Pass Meter			7/14/14

Wright-Hennepin Cooperative Electric Association
A Touchstone Energy® Cooperative

12.47/7.2 KV
OCTOBER 1, 2013

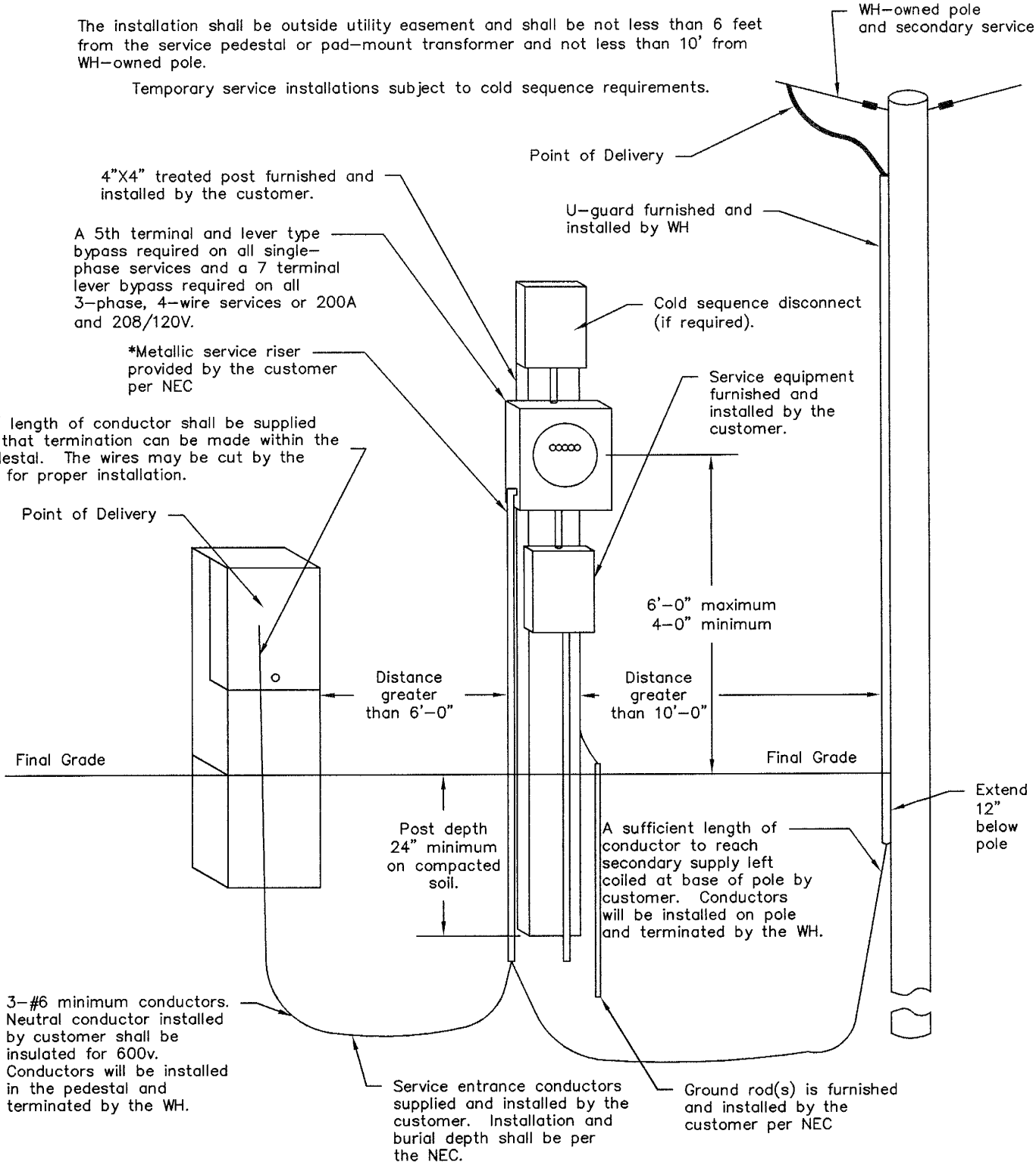
Engr. Tech: EHO | Engr: | Approved: | Date: 10/22/13

UM8
(UK8)

TEMPORARY UNDERGROUND SERVICE GUIDE

The installation shall be outside utility easement and shall be not less than 6 feet from the service pedestal or pad-mount transformer and not less than 10' from WH-owned pole.

Temporary service installations subject to cold sequence requirements.



*A CT connection cabinet is required on all 3-phase connection greater than 208V or 200A and all single-phased connection cabinets greater than 320A.
*Member shall be aware that an electrical inspection may occur at anytime and all wiring shall be completed to all applicable codes.
*Service address shall be prominently displayed on the temporary service installation.

No.	Description	Engr	Appd	Date

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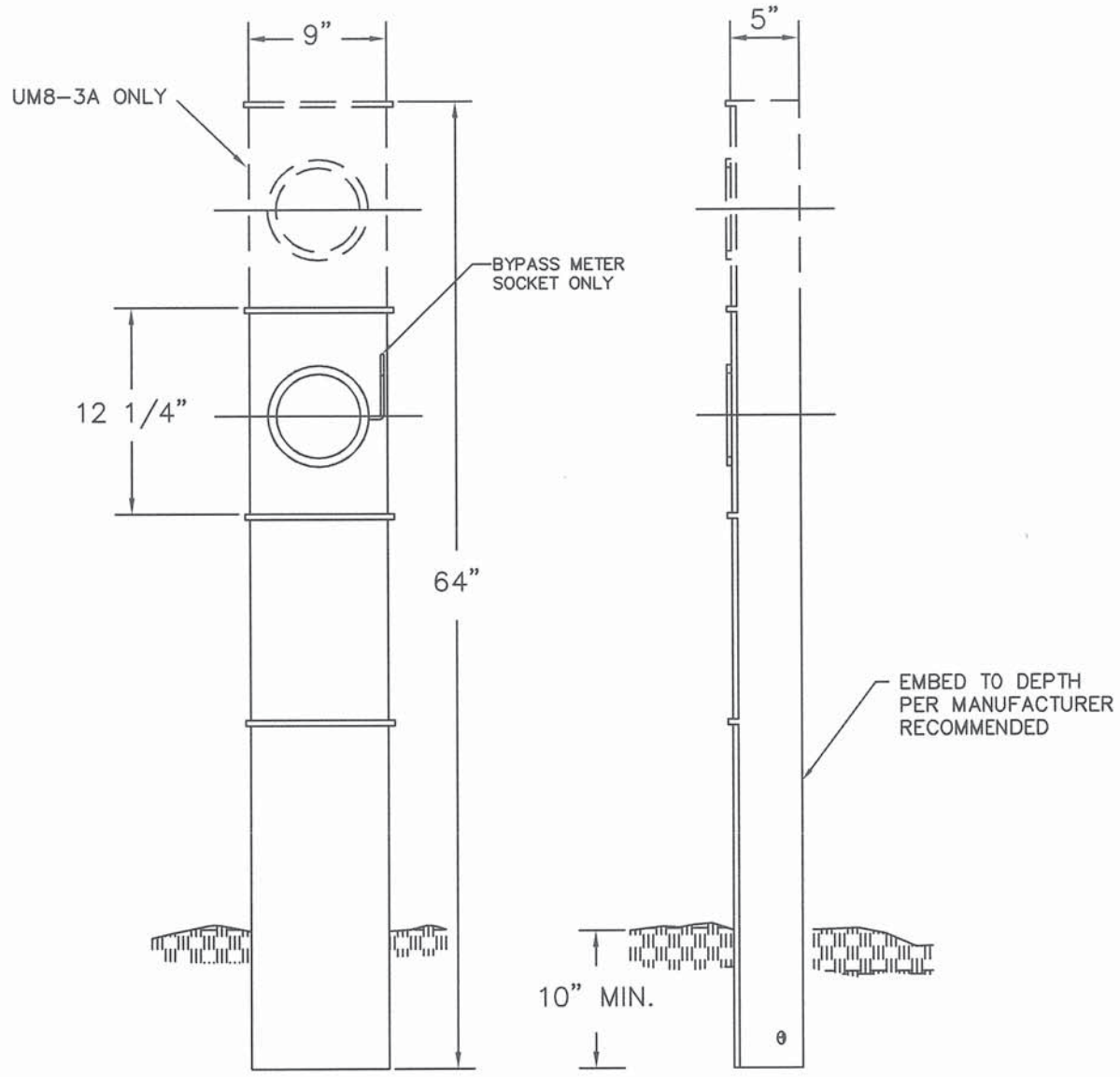
A Touchstone Energy® Cooperative

TEMPORARY SERVICE INSTALLATION GUIDE FROM AN UNDERGROUND SECONDARY SUPPLY

12.47/7.2 KV
MAY 2015

Engr Tech: ERC | Engr: J.A.C | Approved: | Date: 5/26/15

UM8-G1



"MEMBER OWNED"

STOCK NO	ITEM	MATERIAL	QTY
39900001		Meter, pedestal, 200 A Main,	1
		200 Amp per position (UM8–3)	
		Meter, pedestal, 400 A. Main,	1
		200 Amp per position (UM8–3A)	

TROUGH TYPE METER PEDESTAL GUIDE

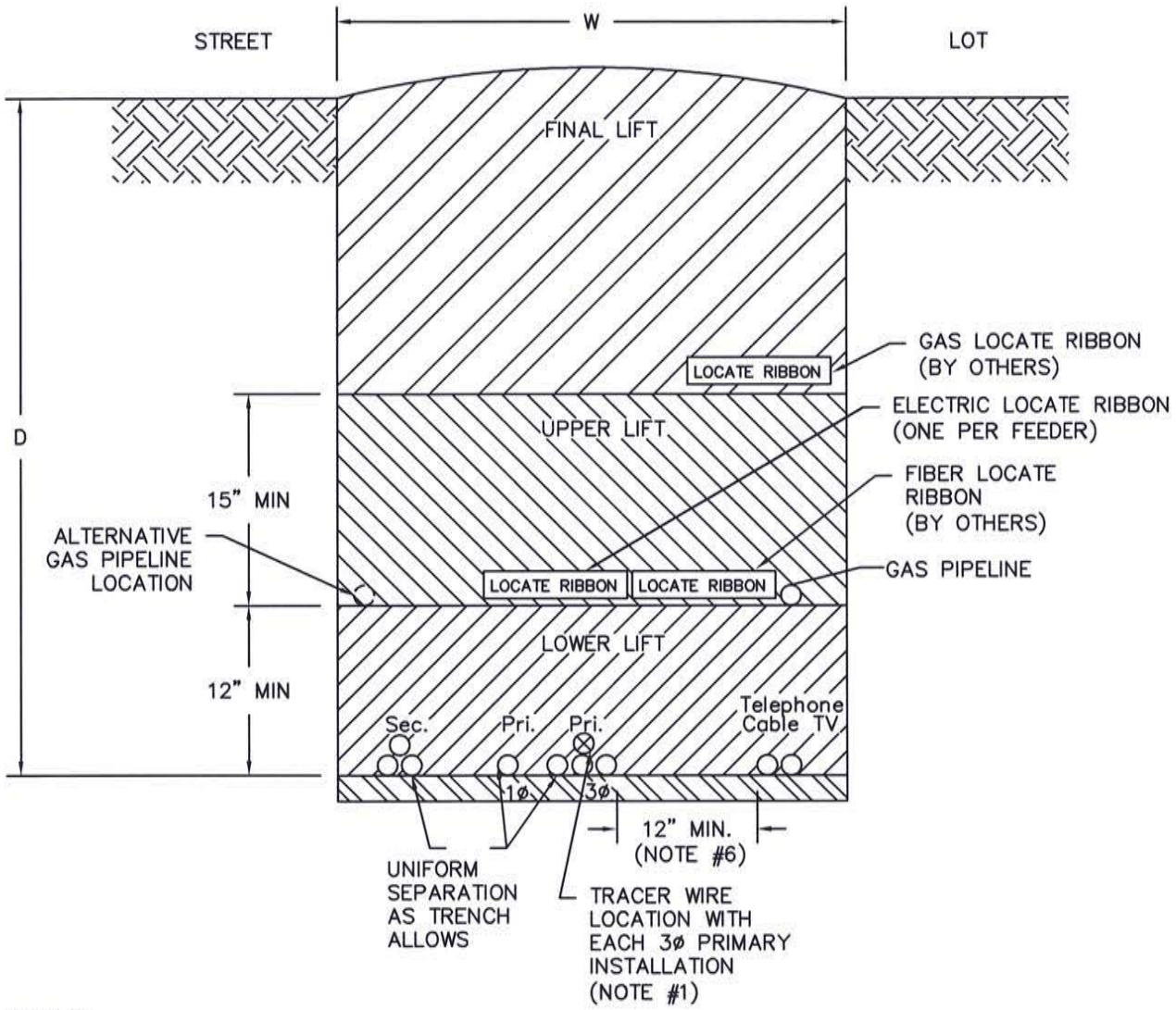
No.	Description	Engr	Appd	Date
1	Added By–Pass Meter			7/14/14

Wright-Hennepin Cooperative Electric Association
A Touchstone Energy® Cooperative

12.47/7.2 KV
OCTOBER 1, 2013

Engr. Tech: | Engr: | Approved: | Date: 10/22/13

UM8–3
UM8–3A



LEGEND

- FINAL LIFT, COMPACTED BACKFILL
- UPPER LIFT, COMPACTED BACKFILL
- LOWER LIFT, COMPACTED BACKFILL
- UNDISTURBED EARTH
- ⊗ TRACER WIRE #12 STEEL REINFORCED COPPER COATED
- BEDDING SAND/CLEAN FILL

PRI. = PRIMARY SUPPLY CABLES
SEC. = SECONDARY OR STREETLIGHT WIRES

D = NORMAL TRENCH 42" – 48" DEPTH
W = 24" – 36" NORMAL

NOTES:

1. TRACER WIRES SHALL BE PROVIDED FOR ALL 3ø FEEDERS, AND 3ø EXPRESS SERVICE. (ON A PER FEEDER/PER SERVICE BASIS.)
2. DEPTHS SPECIFIED ARE TO FINISHED GRADE.
3. SAND BEDDING WILL BE SPECIFIED AS NEEDED BY WH FOREMAN.
4. BACKFILLING IS PART OF ALL TRENCHING UNITS INCLUDING JOINT–USE TRENCHES. ALL JOINT TRENCH BACKFILL SHALL BE PROPERLY COMPACTED. (PER LOCAL GOVERNING AUTHORITY REQUIREMENTS.)
5. ALL SPLICE POINTS FOR PRIMARY CONDUCTORS SHALL BE MARKED PER WH'S REQUIREMENTS. (WITH WH LOCATE DISK.)
6. FOR EASE OF CONSTRUCTION AND MAINTENANCE, PRIMARY CABLE SHOULD BE 12–24" FROM COMMUNICATION CABLES. HOWEVER NESC PERMITS "SUPPLY AND COMMUNICATION CABLES TO BE BURIED TOGETHER AT THE SAME DEPTH WITH NO DELIBERATE SEPARATION BETWEEN FACILITIES, PROVIDED ALL PARTIES ARE IN AGREEMENT."
7. ONLY SINGLE PHASE SUPPLY CABLES MAY BE BURIED AT THE SAME DEPTH WITH COMMUNICATION CABLES WITH NO DELIBERATE SEPARATION. THREE PHASE CABLES MUST BE SEPARATED FROM COMMUNICATION CABLES BY A MINIMUM OF 1 FOOT (REFERENCE LATEST NESC REQUIREMENTS).
8. IN PARALLEL TRENCH CONSTRUCTION, STEEL GAS PIPE MUST BE A MINIMUM OF 24" FROM ANY ELECTRIC OR COMMUNICATION LINES.

TRENCHES FOR DIRECT BURIAL CABLE

No.	Description	Engr	Appd	Date

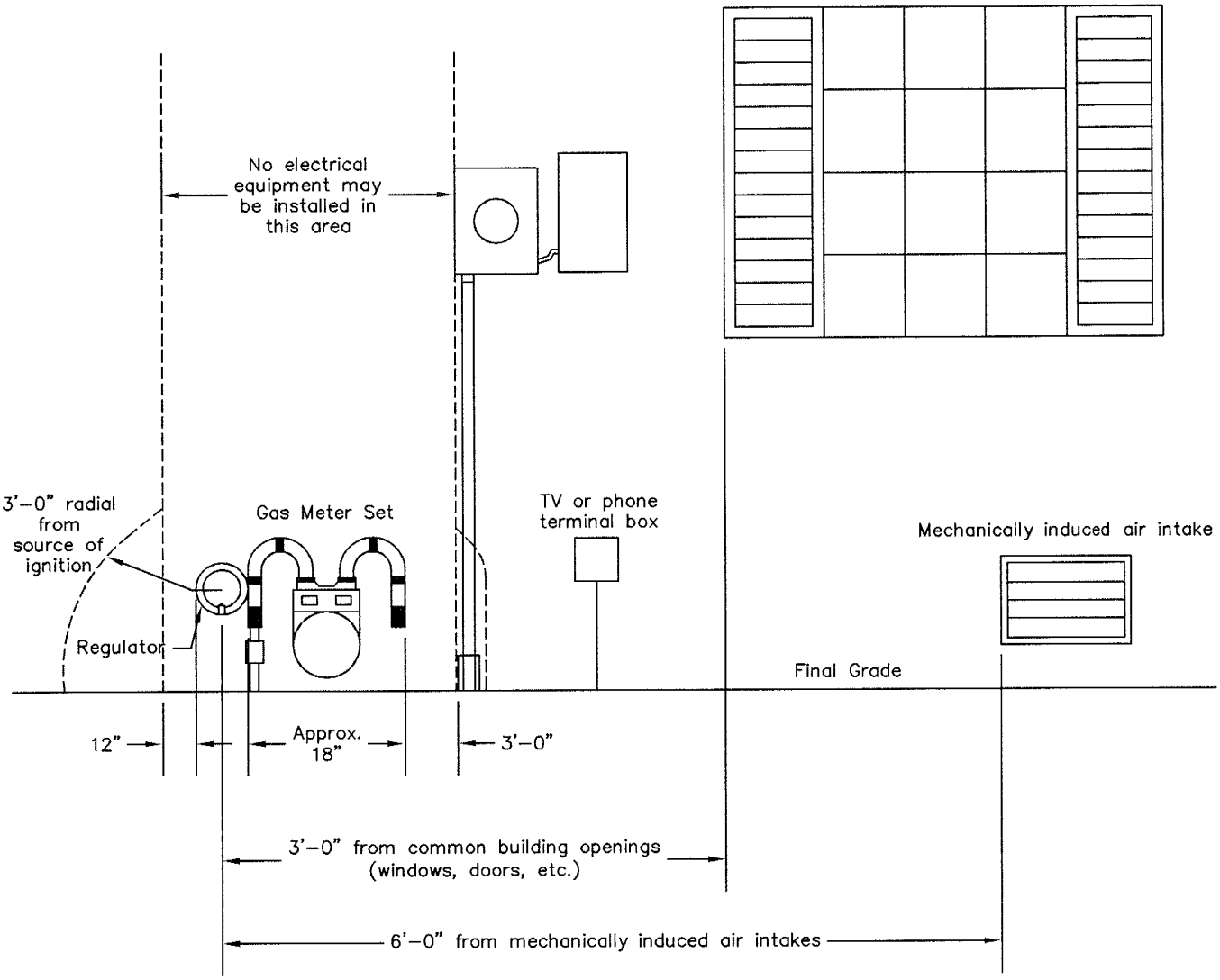
Wright-Hennepin Cooperative Electric Association
A Touchstone Energy® Cooperative

12.47/7.2 KV
OCTOBER 1, 2013

Engr. Tech: Date: 10/28/13

UR2–NT

WALL ELEVATION



Note: 3'–0" minimum working clearances from non–electrical obstructions is preferred around gas meter set.

–Clearances required in specific cases may be obtained from WH.
–Meters are to be located on the front one third of the house.

CLEARANCE REQUIREMENTS FROM GAS METER

No.	Description	Engr	Appd	Date

Wright-Hennepin Cooperative Electric Association
A Touchstone Energy® Cooperative

12.47/7.2 KV
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UM1–G5