Specifications for Electrical Underground Distribution Systems from Padmounted Transformation, Secondary Service Accounts

Specification DDS-4 UG
Revision 11, March 2010
TABLE OF CONTENTS

SECTION 1 - SCOPE .......................................................... Page 1
SECTION 2- REFERENCES .................................................. Page1
SECTION 3- DEFINITIONS .................................................... Page 1
SECTION 4- GENERAL ........................................................ Page 1
SECTION 5- COMPANY RESPONSIBILITY ................................ Page 2
SECTION 6- CONTRACTOR RESPONSIBILITY ............................. Page 3
SECTION 7- ACCEPTANCE ..................................................... Page 6

ATTACHMENTS:

DDS-4 UG Detail Sheets 1- 57
1. SCOPE

This document represents the minimum requirements and specifications for the installation of the electrical underground distribution systems fed from padmounted transformation, serving Secondary Service Accounts, to be transferred to Oncor Electric Delivery Company ownership.

2. REFERENCES

This specification shall be used in conjunction with the latest edition of the following publications.

2.1 The Electric Service Guidelines, Oncor Electric Delivery Company.

3. DEFINITIONS

3.1 Company: Oncor Electric Delivery Company and its designated representatives.

3.2 Contractor: Individual or firm installing electric underground service to Secondary Service Accounts.

3.3 Authority Having Jurisdiction: Generally an incorporated City or Town, but may be an agency of the County, State or Federal Government.

3.4 Point of Delivery: The point where Company’s conductors are connected to premise's conductors, typically at the padmounted transformer secondary terminals or the padmounted connection enclosure.

4. GENERAL

4.1 The latest edition of all applicable building and safety codes shall be followed in the installation of the electrical underground distribution system. Included, but not limited to, are the:
4. GENERAL (continued)

4.1.1 Local City Building and Fire Codes or any other applicable Codes for a particular project location

4.1.2 National Electrical Safety Code (NESC)

4.1.3 U.S. Occupational Safety and Health Act of 1970 (OSHA)

4.1.4 The American Concrete Institute (ACI)

4.1.5 The American Society for Testing and Materials (ASTM)

4.2 Upon receipt of all necessary information from the Contractor, a project sketch showing the route of the conduit line and other pertinent information will be furnished by the Company.

4.3 Prior to construction a meeting shall be held to discuss and coordinate construction and inspection.

4.4 The Company will require a signed easement at no cost or a filed plat incorporating Company easement requirements prior to the Company installing any electrical facilities.

4.5 Joint use ditch will be determined by the Company on an individual basis.

4.6 No electrical facilities shall be connected by the Company until after the final inspection is made and approval by the Authority Having Jurisdiction, as required by code, has been received.

5. COMPANY RESPONSIBILITY- The following shall be performed by, and the responsibility of, the Company:

5.1 The Company inspector is to inspect all conduit installations prior to the placing of backfill.

5.2 The Company inspector is responsible for all field changes and coordinates changes with the local Engineering office.

5.3 The Company inspector is to inspect all equipment pad installations prior to the laying of concrete.
5. COMPANY RESPONSIBILITY (continued)

5.4 After approval of the installed conduit system by the Company inspector, and after the Contractor has signed all appropriate contracts, agreements, easements and has paid any required CIAC (contribution in aid of construction), the Company shall install service lateral cables up to the line side of the point of delivery.

5.5 Upon notification of final electrical inspection from the Authority Having Jurisdiction, the Company is to make final electrical connections at the point of delivery.

6. CONTRACTOR RESPONSIBILITY - The following shall be performed by, and the responsibility of, the Contractor:

6.1 The Contractor is to provide the Company a Site Plan, a Dimension Control Plan, an Elevation Plan, a Grading Plan and loading information.

6.2 The Contractor is to coordinate with the Company inspector for inspection of work prior to backfilling.

6.3 The Contractor is to provide personnel and vehicular access to the facility at all times.

6.4 The Contractor is to be held responsible for the full direction and supervision of all work being performed by his employees, agents or contractors. The Contractor 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.

6.5 All testing of concrete and backfill which is deemed necessary by the Company is to be performed by an independent testing laboratory at the Contractor's expense.

6.6 The Contractor is to replace at his expense any damaged equipment or work not in compliance with the requirements in these specifications, the project sketch, the DDS-4 UG Detail Sheets or as specified by the Company.

6.7 The Contractor is to furnish equipment and labor to lay out ditch, set grade, dig ditches, place conduit in ditch, set equipment pads and place electrical connection boxes. The line 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.

6.8 The Contractor may be required to furnish a spare conduit in the same ditch with service conduit(s) and cap both ends at bends.
6. CONTRACTOR RESPONSIBILITY (continued)

6.9 The Contractor is to complete rough site grading, establish final grade at padmounted equipment locations and clear these locations of all obstructions. Any change in final grade which requires the lowering or raising of electrical conductors or associated equipment is at the expense of the Contractor.

6.10 Minimum vertical crossing clearance of electrical conduits from other utilities' conduits is twelve (12) inches.

6.11 A lateral separation of five (5) feet from electrical conduits to other utilities' conduits is required on private property.

6.12 No foreign pipes are permitted under the equipment pad area except gas, telephone and cable T.V. that are installed at the same time as the electrical facilities. Gas is allowed only if sleeved in polyethylene or Schedule 40 PVC. Telephone and cable T.V. are allowed only if installed in conduit.

6.13 Backfilling of conduit trenches under paved areas, around conduit bends 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 ditch. Alternative stabilization methods for backfilling around under transformer pad consist of two (2) sacks of cement mixed with earth backfill or the pouring of concrete backfill with transformer pad. An alternative method for backfilling around conduit bends consists of concrete backfill with bend. The method and location where used will be at the discretion of the Company.

6.14 Equipment pads are to be installed a minimum of three (3) inches above finished grade. No equipment pad shall be installed in a pit below the finished grade of the surrounding area.

6.15 Equipment pads are to have a clear area surrounding the pad installation for safety, operation and maintenance purposes. Refer to DDS-4 UG Detail Sheets 51, 52, 53 and 54 for layout and dimensions.

6.16 Piers and/or beams are required on all equipment pads unless waived by the Company inspector. If required, stabilization method(s) will be determined by the Company inspector. The depth shall extend to rock or a change in soil conditions sufficient to bear the load of pad and transformer to prevent settlement due to undercutting for conduit bend installation or washing due to drainage.

6.17 The Contractor has the option of installing manufactured transformer pads or poured in place pads. However, where terrain will not permit the installation of a manufactured equipment pad as determined by the Company, the Contractor is to install a poured in place equipment pad. For details, refer to the DDS-4 UG Detail Sheets.
6. CONTRACTOR RESPONSIBILITY (continued)

6.18 Concrete forms are to be tight and aligned so when forms are removed the finished surface shall require little, if any, corrective measures. Concrete work is to have an acceptable finish free of honeycombs, sharp or irregular surfaces.

6.19 Contractor is to pull a mandrel through each conduit to check and clear blockage and leave an approved pull tape in each conduit. Pull tape shall be furnished by the party providing conduit and shall be installed by Contractor. Mandrel shall be furnished by Contractor. Conduit shall be plugged at both ends. Reference DDS-4 UG Detail Sheet 7 for approved pull tapes.

6.20 Approved self-contained meter sockets or approved meter packs are to be provided and installed by the Contractor. Transocket meter bases and service enclosures (when required) are to be provided by the Company and installed by the Contractor. Reference the Electric Service Guidelines for approved self-contained meter sockets. Contact Company for approval of meter packs prior to letting bids and installing equipment.

6.21 For single occupant, C. T. metered Secondary Service accounts fed from padmounted transformation, the Contractor is to provide, install and maintain the underground raceway(s) and conductors to the secondary terminals of the transformer. The Contractor shall provide compression type connectors and the Company shall install these connectors on the Contractor’s conductors and connect to the secondary terminals of the transformer. The meter will be located at or on the transformer secondary terminal enclosure. Reference the Electric Service Guidelines for approved compression type connectors.

6.22 In cases where the number of service conductors to a padmounted transformer is in excess of the physical connection capabilities of the secondary terminals, a padmounted connection enclosure separate from the transformer shall be used. The Contractor is to (1) provide, install and maintain the underground raceways and conductors to the load side of the connection enclosure, and (2) provide and install the underground raceways between the connection enclosure and the transformer pad. The service lateral conductors between the transformer secondary terminals and the source side of the connection enclosure shall be supplied, installed, connected and maintained by the Company. The Contractor shall provide compression type connectors and the Company shall install these connectors on the Contractor’s conductors and connect to the load side of the connection enclosure. Reference the Electric Service Guidelines for approved compression type connectors.
6. CONTRACTOR RESPONSIBILITY (continued)

6.23 If socket type metering fed from padmounted transformation is utilized, the Contractor is to mount the meter socket on the building(s) with the location approved by the Company and provide, install and maintain the underground raceway(s) and conductors to the transformer secondary terminals. The Contractor shall provide compression type connectors and the Company shall install these connectors on the Contractor’s conductors and connect to the secondary terminals of the transformer. Reference the Electric Service Guidelines for approved compression type connectors.

6.24 For multiple occupancy Secondary Service accounts fed from padmounted transformation, the Contractor is to provide, install and maintain (1) the conductors and associated raceways from the service enclosure to the padmounted transformer and (2) the conductors and associated raceways from the service enclosure to the line side of the meters. The Contractor shall provide compression type connectors and the Company shall connect the Contractor’s conductors to the secondary terminals of the transformer. Reference the Electric Service Guidelines for approved compression type connectors.

6.25 For multiple occupancy Secondary Service accounts utilizing meter packs fed from padmounted transformation, the Contractor is to provide, install and maintain the conductors and associated raceways from the meter pack enclosure to the padmounted transformer. The Contractor shall provide compression type connectors and the Company shall connect the Contractor’s conductors to the secondary terminals of the transformer. Reference the Electric Service Guidelines for approved compression type connectors.

6.26 The Contractor is to secure inspection and approval of premise's facilities by the Authority Having Jurisdiction prior to the connection of electrical facilities.

6.27 Meter sockets to multi-metered locations shall be clearly and permanently marked by Contractor on the exterior and interior of the meter socket to indicate each location served. Engraved or stamped metal, weather resistant placards shall be used on the exterior of the meter socket and be permanently affixed. Permanent marker or other acceptable method shall be used to mark the location on the inside of the meter socket (at a location other than the cover) where it can be easily read.

7. ACCEPTANCE

7.1 The Company inspector shall meet with the Contractor and review the project prior to acceptance. Electrical facilities will be installed as approved by the Company inspector only after acceptance of the project.
NOTES

1. Contact company representative for (1) routing of conduit line, (2) size of conduit, and (3) installations requiring more than one riser on pole.

2. Limit raceway to three 90° bends. If more than three 90° bends are required, contact company representative.

3. Distance between 90° bends shall be five feet minimum.

4. Reference detail sheet 12 for bend radius for all horizontal and vertical conduit bends.

TERMINATION OF PRIMARY CONDUIT AT RISER POLE

DDS-4 UG DETAIL SHEET 1 OF 57
TRENCH REQUIREMENTS

1 PRIMARY CONDUIT

2 PRIMARY CONDUITS

1 PRIMARY CONDUIT AND
1 SECONDARY CONDUIT
VERTICALLY ARRANGED

1 PRIMARY CONDUIT AND
1 SECONDARY CONDUIT
HORIZONTALLY ARRANGED

NOTES:
1. CONSULT COMPANY REPRESENTATIVE FOR CONDUIT SIZE.
2. SEE DETAIL SHEETS 7 AND 8 FOR NOTES AND INSTRUCTIONS.
3. SEPARATION DIMENSIONS APPLY TO COMPANY CONDUITS OR CABLES ONLY. MAINTAIN 12" SEPARATION BETWEEN COMPANY CONDUITS OR CABLES AND FOREIGN CONDUITS OR CABLES.
NOTES:

1. 12" MIN. WITH MORE THAN ONE ELECTRICAL SUPPLY CONDUIT.
   4" MIN. WITH ONE ELECTRICAL SUPPLY CONDUIT (IN SOLID ROCK PIPE DIAMETER DETERMINES MIN. WIDTH).
2. AMPLITUDES ARE REDUCED FOR MULTIPLE CIRCUITS IN A TRENCH.
3. SEE DETAIL SHEETS 7 AND 8 FOR NOTES AND INSTRUCTIONS.
4. THE GAS LINE IN A JOINT TRENCH SHALL BE POLYETHYLENE.
5. WHEN A GAS LINE Crosses UNDER AN ENCLOSURE SUCH AS A PEDESTAL, PADMOUNT TRANSFORMER OR
   STUCCO/FULL BOX, IT WILL BE SLEEVED IN A SECTION OF POLYETHYLENE OR SCHEDULE 40 PVC.
   THE SLEEVE WILL EXTEND A MINIMUM OF THREE FEET BEYOND THE EDGE OF THE ENCLOSURE ON EACH SIDE.
   MAINTAIN A 12" SEPARATION BETWEEN GAS LINE AND ELECTRICAL SUPPLY CONDUITS.
6. BACKFILL MATERIAL AND COMPACTION SHALL MEET OR EXCEED EACH UTILITY'S SPECIFICATIONS.

TRENCH REQUIREMENTS
JOINT USE ELECTRIC, GAS
AND COMMUNICATION

Oncor

DDS-4 UG DETAIL SHEET 3 OF 57
NOTES:
1. MINIMUM 24" DEPTH TO TOP OF BOTH GAS PIPE AND COMMUNICATION FACILITIES. TELCO SHALL NOT BE PLACED ABOVE THE GAS PIPE.
2. MINIMUM 12" VERTICAL SEPARATION BETWEEN SURFACE OF GAS, COMMUNICATION FACILITIES AND ELECTRICAL CONDUITS.
3. MINIMUM 12" HORIZONTAL SEPARATION BETWEEN SURFACE OF COMMUNICATION FACILITIES AND GAS PIPE.
4. MINIMUM 30" DEPTH PLUS PIPE outside Diameter TO TOP OF ELECTRICAL CONDUITS.
5. TRENCH MUST BE WIDE ENOUGH TO ENSURE 12" SEPARATION AT ALL POINTS BETWEEN THE GAS MAIN AND COMMUNICATION FACILITIES.
6. THE GAS PIPE SHALL ONLY BE PLACED AGAINST UNDISTURBED SOIL THAT IS FREE OF STONES AND WHERE THERE ARE NO HARD PARTICLES LARGER THAN ONE-HALF INCH.
7. BACKFILL MATERIAL AND COMPACTION SHALL MEET OR EXCEED EACH UTILITY'S SPECIFICATIONS.
NOTES:

1. 12" MIN. WITH MORE THAN ONE ELECTRICAL SUPPLY CONDUIT.
2. 4" MIN. WITH ONE ELECTRICAL SUPPLY CONDUIT (IN SOLID ROCK PIPE DIAMETER DETERMINES MIN. WIDTH).
3. AMPACITIES ARE REDUCED FOR MULTIPLE CIRCUITS IN A TRENCH.
4. SEE DETAIL SHEETS 7 AND 8 FOR NOTES AND INSTRUCTIONS.
5. THE GAS LINE IN A JOINT TRENCH SHALL BE POLYETHYLENE.
6. WHEN A GAS LINE CROSSES UNDER AN ENCLOSURE SUCH AS A PEDESTAL, PADMOUNT TRANSFORMER OR SPICE-PULL BOX, IT WILL BE SLEEVED IN A SECTION OF POLYETHYLENE OR SCHEDULE 40 PVC. THE SLEEVE WILL EXTEND A MINIMUM OF THREE FEET BEYOND THE EDGE OF THE ENCLOSURE ON EACH SIDE. MAINTAIN A 12" SEPARATION BETWEEN GAS LINE AND ELECTRICAL SUPPLY CONDUIT(S).
7. BACKFILL MATERIAL AND COMPACTION SHALL MEET OR EXCEED EACH UTILITY'S SPECIFICATIONS.
NOTES:
1. 12" MIN WITH MORE THAN ONE ELECTRICAL SUPPLY CONDUIT.
   4" MIN WITH ONE ELECTRICAL SUPPLY CONDUIT (IN SOLID ROCK PIPE DIAMETER DETERMINES MIN. WIDTH).
2. AMPACITIES ARE REDUCED FOR MULTIPLE CIRCUITS IN A TRENCH.
3. SEE DETAIL SHEETS 7 AND 8 FOR NOTES AND INSTRUCTIONS.
4. BACKFILL MATERIAL AND COMPACTION SHALL MEET OR EXCEED EACH UTILITY'S SPECIFICATIONS.
1. TRENCH ALIGNMENT SHALL BE AS STRAIGHT AS CONDITIONS PERMIT. ANY DEVIATIONS FROM PLANNED ALIGNMENT SHALL HAVE PRIOR APPROVAL BY THE PROJECT ENGINEER/INSPECTOR. ALL TRENCH CUTS SHALL BE IN ACCORDANCE WITH EXISTING SAFETY REGULATIONS IN EFFECT.

2. TRENCH BOTTOM SHOULD BE UNDISTURBED, TAMPED, OR RELATIVELY SMOOTH EARTH. WHERE EXCAVATION IS IN ROCK, THE CONDUIT SHOULD BE LAID ON A LAYER OF CLEAN BACKFILL

3. ALL BACKFILL SHOULD BE FREE OF DEBRIS OR OTHER MATERIAL THAT MAY DAMAGE THE CONDUIT SYSTEM OR CAUSE SETTLING. THE MATERIAL SHOULD FILL THE VOIDS AROUND THE CONDUIT TO PREVENT HOT SPOTS & SETTLING.

4. BACKFILL SHOULD BE ADEQUATELY COMPACTED. BACKFILL NOT UNDER PAVEMENT SHOULD BE COMPACTED TO THE DENSITY OF THE SURROUNDING UNDISTURBED SOIL. BACKFILL UNDER PAVEMENT SHOULD BE COMPACTED TO NOT LESS THAN 85% OF THE DENSITY OF UNDISTURBED SOIL AS DETERMINED BY ASTM D-698.

5. SEE SHEET B FOR INSTRUCTIONS FOR JOINING PVC CONDUIT.

6. EACH CONDUIT RUN SHALL BE CHECKED BY PULLING A MANDREL THROUGH THE ENTIRE LENGTH AT THE COMPLETION OF THE CIVIL INSTALLATION.

7. A PULL TAPE SHALL BE LEFT IN EACH CONDUIT. CONDUIT SHALL BE PLUGGED AT BOTH ENDS.

<table>
<thead>
<tr>
<th>CONDUIT SIZE</th>
<th>MANUFACTURER</th>
<th>CATALOG NO.</th>
<th>TSN</th>
</tr>
</thead>
<tbody>
<tr>
<td>1&quot;, 2&quot;, 3&quot; &amp; 4&quot;</td>
<td>ARNCO</td>
<td>BL-WP256</td>
<td>321088</td>
</tr>
<tr>
<td></td>
<td>NEPTCO, INC.</td>
<td>WP2500P</td>
<td></td>
</tr>
<tr>
<td>6&quot;</td>
<td>ARNCO</td>
<td>BL-WP60</td>
<td>387816</td>
</tr>
<tr>
<td></td>
<td>NEPTCO, INC.</td>
<td>RP6000N</td>
<td></td>
</tr>
</tbody>
</table>

8. CONTACT COMPANY REPRESENTATIVE FOR TRENCH DIMENSIONS FOR MORE THAN 2 CONDUITS IN SAME DITCH.
THE CHEMICALS USED IN SOLVENT WELDING OF CONDUIT ARE INTENDED TO PENETRATE THE SURFACE OF BOTH PIPE AND FITTING, WHICH AFTER CURING RESULT IN A COMPLETE FUSION AT THE JOINT. THE OVER-USE OR UNDER-USE OF CHEMICALS RESULTS IN LEAKY JOINTS OR WEAKENED PIPE.

A. CLEAN CONDUIT BY WIPING OFF ALL DUST, DIRT AND MOISTURE FROM SURFACES TO BE CEMENTED EITHER BY MECHANICAL OR CHEMICAL CLEANING.

1. MECHANICAL CLEANING – FINE ABRASIVE PAPER OR CLOTH (180 GRIT OR FINE) OR CLEAN OIL-FREE STEEL WOOL.

2. CHEMICAL CLEANING – CLEANER RECOMMENDED BY MANUFACTURER OR EQUIVALENT (METHYL ETHYL KETONE – MEK).

B. WITH A NON-SYNTHETIC BRISTLE BRUSH APPLY AN EVEN COATING OF CEMENT TO THE OUTSIDE OF THE PIPE AND INSIDE THE SOCKET. MAKE SURE THAT THE AMOUNT OF CEMENT APPLIED TO THE CONDUIT IS EQUAL TO THE DEPTH OF THE SOCKET. BEFORE ASSEMBLY, IF SOME EVAPORATION OF SOLVENT FROM THE SURFACES TO BE JOINED IS NOTED, REAPPLY CEMENT, THEN ASSEMBLE.

IF CEMENT BEING USED HAS AN APPRECIABLE CHANGE IN VISCOSITY OR SHOWS SIGNS OF JELLING, IT SHALL BE DISCARDED. IN NO CASE SHALL THINNER BE USED IN AN ATTEMPT TO RESTORE JELLED PVC CEMENT. THINNER MAY ONLY BE USED TO CHANGE THE VISCOSITY OF A MEDIUM BODIED CEMENT TO THAT OF A REGULAR BODIED CEMENT FOR APPLICATION ON PVC PIPE SMALLER THAN 2 1/2 INCH DIAMETER. A MEDIUM BODIED CEMENT SHALL BE USED ON 2 1/2 TO 6 INCH PVC PIPE.

IN COLD WEATHER USE A PRIMER TO SOFTEN THE JOINING SURFACES BEFORE APPLYING CEMENT, ALLOW LONGER CURE TIME. (SEE ITEM E).

C. JOIN PIPE WITHIN 20 SECONDS OF APPLYING CEMENT. TURN THE PIPE 1/4 TURN TO ENSURE EVEN DISTRIBUTION OF CEMENT ON SURFACES TO BE BONDED. MAKE SURE THAT PIPE IS INSERTED TO THE FULL DEPTH OF THE SOCKET.

D. CLEAN OFF ANY BEAD OR EXCESS CEMENT THAT APPEARS AT THE OUTER SHOULDER OF THE FITTING. EXCESS CEMENT ALLOWED TO REMAIN IN CONTACT WITH THE MATERIAL IS APT TO CAUSE WEAKENING OF THE MATERIAL, AND SUBSEQUENT FAILURE.

E. NEARLY ASSEMBLED JOINTS SHOULD BE HANDLED CAREFULLY UNTIL THE CEMENT HAS CURED TO THE RECOMMENDED SET PERIOD. SET PERIODS ARE RELATED TO THE AMBIENT TEMPERATURE AS FOLLOWS:

30 MIN. MINIMUM AT 60°F TO 100°F
1 HR. MINIMUM AT 40°F TO 60°F
2 HR. MINIMUM AT 20°F TO 40°F
4 HR. MINIMUM AT 0°F TO 20°F
<table>
<thead>
<tr>
<th>CONDUIT NOMINAL SIZE (IN.)</th>
<th>MINIMUM BEND RADIUS (IN.)</th>
<th>TYPE OF BEND MATERIAL FOR PULLS:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>18</td>
<td>PVC</td>
</tr>
<tr>
<td>2</td>
<td>24</td>
<td>PVC</td>
</tr>
<tr>
<td>3</td>
<td>24</td>
<td>PVC</td>
</tr>
<tr>
<td>4</td>
<td>24</td>
<td>PVC</td>
</tr>
<tr>
<td>6</td>
<td>36</td>
<td>PVC</td>
</tr>
</tbody>
</table>

NOTES:
1. SCH. 80 PVC CONDUIT SHALL BE USED FOR ALL ABOVE GROUND INSTALLATIONS (POLE AND METER RISERS). SCH. 40 MAY BE USED FOR ALL BELOW GROUND INSTALLATIONS.
TABLE 1

<table>
<thead>
<tr>
<th>BEND</th>
<th>CONCRETE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 INCH BEND</td>
<td>1.2 CUBIC FT.</td>
</tr>
<tr>
<td>2 INCH BEND</td>
<td>1.6 CUBIC FT.</td>
</tr>
<tr>
<td>3 INCH BEND</td>
<td>1.8 CUBIC FT.</td>
</tr>
<tr>
<td>4 INCH BEND</td>
<td>2.2 CUBIC FT.</td>
</tr>
<tr>
<td>5 INCH BEND</td>
<td>3.8 CUBIC FT.</td>
</tr>
</tbody>
</table>

NOTES:
1. CONTACT COMPANY INSPECTOR TO DETERMINE REQUIREMENT FOR BEND ENCASEMENT.
2. DO NOT BOND CONCRETE TO POLE WHEN ENCASING A POLE RISER BEND.
NOTES:

1. Vertical crossing clearance from other utilities shall be 12 inches. A 60 inch lateral separation of paralleling foreign utilities (excluding gas and communication) shall be required. An exception would be to allow gas, telephone and/or CATV in the same ditch as company conduit system providing the need requirements for conduit separation are met or exceeded and the communications circuits are installed in conduit.

2. It is understood that only 12 inch separation is required on public rights-of-way. Personnel involved in excavation on public rights-of-way are fully aware of the hazards involved. However, excavation on private property can be done by individuals who are not likely to be fully aware of the hazards. Therefore, the 60 inch lateral separation is required to help prevent injury to personnel doing excavation on private property.
NOTES:
1. SEE DETAIL SHEET 13 AND 14 FOR LOCATIONS OF CONDUITS AND GROUND ROD AND OTHER APPLICABLE NOTES.
2. PIERS ARE REQUIRED ON ALL PADS UNLESS WAIVED BY THE COMPANY INSPECTOR. REFERENCE DETAIL SHEET 17 FOR PIER INSTALLATION.
3. ALL STEEL TO BE A MINIMUM OF 1 1/2" FROM SURFACE OF CONCRETE.
4. ALL CHAMFERS TO BE 1 1/2" X 45 DEGREES. Rounding of Edges with Rounding Trowel is acceptable in lieu of Chamfering.
5. CONSULT COMPANY REPRESENTATIVE FOR APPROVED PREFABRICATED PADS.
6. SEE DETAIL SHEET 21 FOR GENERAL NOTES.
7. GROUT WINDOW AS PER DETAIL SHEET 15.

POURED IN PLACE PAD
FOR SINGLE PHASE TRANSFORMERS

DDS-4 UG DETAIL SHEET 12 OF 57

03 - 10
NOTES:

1. Consult company representative for (1) number, size and location of conduits in pad window and (2) whether design is Type I or Type II conduit arrangement.

2. No more than 8-2 inch, 8-3 inch or 4-4 inch conduits including spares shall be placed in the secondary side of pad window.

3. Reference detail sheet 9 for bend radius for all horizontal and vertical conduit bends.

4. Consult company representative on where to obtain 8/0 X 1.5 Copper clad ground rod. Ground rod to be obtained and installed by contractor. Installation depth shall be 7-6 inches.

5. Grout window as per detail sheet 16.

6. This dimension is 8 inches for precast concrete pad and 4 inches for polymer concrete pads.

7. Reference detail sheet 18 for foreign utility equipment ground.

8. Piers are required on all pads unless waived by company inspector. Reference detail sheet 17 for pier detail.

9. The 3" flex conduit shall have a minimum of 8" of cover as it exits on the right hand side of the transformer pad.

TRANSFORMER PAD—PRECAST SINGLE PHASE DEADFRONT TYPE I

DDS-4 UG DETAIL SHEET 13 OF 57
SECTION "A - A"

NOTES:

1. CONSULT COMPANY REPRESENTATIVE FOR NUMBER, SIZE AND LOCATION OF CONDUITS IN PAD WINDOW AND WHETHER TYPE I OR TYPE II CONDUIT ARRANGEMENT.
2. NO MORE THAN 6-2 INCH, 6-3 INCH OR 4-4 INCH CONDUITS INCLUDING SPARES SHALL BE PLACED IN THE SECONDARY SIDE OF PAD WINDOW.
3. REFERENCE DETAIL SHEET 6 FOR BEND RADIUS FOR ALL HORIZONTAL AND VERTICAL CONDUIT BENDS.
4. CONSULT COMPANY REPRESENTATIVE ON WHERE TO OBTAIN 6' X 6' COPPER CLAD GROUND ROD. GROUND ROD TO BE OBTAINED AND INSTALLED BY CONTRACTOR. INSTALLATION DEPTH SHALL BE 7'-6".
5. GROUT WINDOW AS PER DETAIL SHEET 16.
6. THIS DIMENSION IS 6 INCHES FOR PRECAST CONCRETE PAD AND 4 INCHES FOR POLYMER CONCRETE PADS.
7. GROUT DETAIL SHEET 16 FOR FOREIGN UTILITY EQUIMENT GROUND.
8. PIERS ARE REQUIRED ON ALL PADS UNLESS WAIVED BY COMPANY INSPECTOR. REFERENCE DETAIL SHEET 17 FOR PIER DETAIL.
9. THE CONDUITS MUST BE INSTALLED TO ENSURE THAT THE TOTAL MAXIMUM BENDING RADIUS FOR THE PRIMARY CABLE DOES NOT EXCEED 6 INCHES (ANGLE PRIMARY CONDUIT WHENEVER POSSIBLE).
10. THE 6" FLEX CONDUIT SHALL HAVE A MINIMUM OF 8" OF COVER AS IT EXITS ON THE RIGHT HAND SIDE OF THE TRANSFORMER PAD.
NOTES:
1. THE GROUT SHALL BE PORTLAND BINDER SPREAD AND SANDED. DO NOT USE CONCRETE.
2. FILL IN PAD WINDOW WITH 4 INCHES OF EARTH BACKFILL AND 2" OF GROUT.
3. GROUND RODS SHALL EXTEND A MAXIMUM OF 3 INCHES ABOVE GROUTING TO ASSURE ADEQUATE DRIVEN DEPTH AND ALLOW FOR ADEQUATE CONNECTING SPACE.
4. GROUND RODS SHALL EXTEND A MINIMUM OF 7'- 6" INTO EARTH.
5. GRAVEL FILL IS NOT ACCEPTABLE.
NOTES:

1. ON NEW INSTALLATIONS, INSTALL NO. 8 S.G. BARE COPPER AS SHOWN FOR FOREIGN UTILITY COMPANY BONDING.
2. THE NATIONAL ELECTRICAL SAFETY CODE RULE 384C RECOMMENDS BONDING OF ALL ABOVE GROUND METALLIC POWER AND COMMUNICATIONS APPARATUS (PEDESTALS, TERMINALS, APPARATUS CASES, TRANSFORMER CASES, ETC.) THAT ARE SEPARATED BY A DISTANCE OF 6 FEET OR LESS.
NOTES:

1. PIERs SHALL BE INSTALLED UNDER PAD WHEN DIRT HAS BEEN DISTURBED UNDER THE LOAD BEARING AREA OF PAD. TAMP BACKFILL (95% COMPACTION) TO TOP OF PIER SUPPORTS (USE DITCH SPOIL WHEN POSSIBLE).

2. CUT SUPPORT PIERs FROM SECTION OF 4 IN PVC CONDUIT.

3. PLACE PIERs AS SHOWN. FILL WITH CONCRETE.

4. TOP OF PIERs SHOULD BE LEVEL AND 3 IN. BELOW FINAL GROUND LEVEL TO A DEPTH OF:
   (1) MINIMUM OF 36 IN. IN UNDISTURBED EARTH (SOIL).
   (2) BOTTOM OF DITCH.
   (3) BEGINNING OF SQUID BASE.

5. AFTER PLACING PAD, FILL voids UNDER AND AROUND PAD WITH SELECT DITCH SPOIL.

6. ALL BACKFILL UNDER AND AROUND PAD SHALL BE WELL TAMPERED.
NOTES:

1. 30" X 48" X 36" SPICE/PULL BOX DESIGNED FOR PARKEWAY INSTALLATION WITH HDD LOADING (LIGHT TRAFFIC). CONTACT COMPANY REPRESENTATIVE ON WHERE TO ACQUIRE SUBSURFACE SPICE/PULL BOX.

2. THIS BOX IS INTENDED FOR USE AS AN INTERMEDIATE SPICE BOX AS NEEDED DUE TO LONG PULLING DISTANCES AND RESTRICTED TO SINGLE #4/0 CABLE.

3. TAMAP ALL DISTURBED SOIL UNDERNEATH PAD TO 95% COMPACTION AS PER ASTM D 854 AND INSTALL A 5 INCH WELL TAMPED LAYER OF MEDIUM GRAVEL Fill.

4. CONTACT COMPANY REPRESENTATIVE ON WHERE TO ACQUIRE 6" X 6" COPPER CLAD GROUND ROD. GROUND ROD TO BE OBTAINED AND INSTALLED BY CONTRACTOR. INSTALLATION DEPTH SHALL BE 7'-6".
NOTES:

1. SPICE/PULL BOX DESIGNED FOR PARKWAY INSTALLATION WITH H-10 LOADING (LIGHT VEHICULAR TRAFFIC). CONTACT COMPANY REPRESENTATIVE ON WHERE TO ACQUIRE SPICE/PULL BOX.

2. THIS BOX IS INTENDED FOR USE AS AN INTERMEDIATE SPICE BOX AS NEEDED DUE TO LONG PULLING DISTANCES AND RESTRICTED TO ONE 3 PHASE CIRCUIT.

3. TAMPER ALL DISTURBED SOIL UNDERNEATH PAD TO 95% COMPACTION AS PER ASTM D 697 AND INSTALL A 6 INCH WELL TAMPERED LAYER OF MEDIUM GRAVEL FILL.

4. CONTACT COMPANY REPRESENTATIVE ON WHERE TO ACQUIRE 6/32" X 6' COPPER CLAD GROUND ROD. GROUND ROD TO BE OBTAINED AND INSTALLED BY CONTRACTOR. INSTALLATION DEPTH SHALL BE 7" - 8".

THREE PHASE PRIMARY SUBSURFACE SPICE / PULL BOX INSTALLATION

DDS-4 UG DETAIL SHEET 19 OF 67
NOTES:
1. PADS SHALL BE CONSTRUCTED AS PER THE CONCRETE AND REBAR DETAIL SHEETS REFERENCED IN THE TABLE BELOW.
2. DF MEANS DEADFRONT AND LF MEANS LIVEFRONT.
3. CABLE SPREADER WELLS ARE REQUIRED ON LOOP FEED TRANSFORMER PADS. REFERENCE DETAIL SHEETS 28 THRU 27 FOR DIMENSIONS.
4. PIERS ARE REQUIRED ON ALL PADS UNLESS WAIVED BY THE COMPANY INSPECTOR. REFERENCE DETAIL SHEET 20 FOR PIER DETAILS.

<table>
<thead>
<tr>
<th>KVA</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
<th>REFERENCE DETAIL SHEET</th>
</tr>
</thead>
<tbody>
<tr>
<td>75 - 150</td>
<td>6&quot;</td>
<td>89&quot;</td>
<td>89&quot;</td>
<td>12&quot;</td>
<td>14&quot;</td>
<td>48&quot;</td>
<td>28&quot;</td>
<td>20&quot;</td>
<td>21&quot;</td>
<td>14&quot;</td>
<td>24</td>
</tr>
<tr>
<td>225 - 500</td>
<td>6&quot;</td>
<td>94&quot;</td>
<td>94&quot;</td>
<td>12&quot;</td>
<td>16&quot;</td>
<td>52&quot;</td>
<td>28&quot;</td>
<td>24&quot;</td>
<td>26&quot;</td>
<td>17&quot;</td>
<td>25</td>
</tr>
<tr>
<td>750 - 1500</td>
<td>6&quot;</td>
<td>94&quot;</td>
<td>111&quot;</td>
<td>12&quot;</td>
<td>20&quot;</td>
<td>52&quot;</td>
<td>28&quot;</td>
<td>24&quot;</td>
<td>27&quot;</td>
<td>17&quot;</td>
<td>26</td>
</tr>
<tr>
<td>1800 - 2500</td>
<td>6&quot;</td>
<td>111&quot;</td>
<td>123&quot;</td>
<td>12&quot;</td>
<td>20&quot;</td>
<td>62&quot;</td>
<td>28&quot;</td>
<td>24&quot;</td>
<td>24&quot;</td>
<td>17&quot;</td>
<td>27</td>
</tr>
<tr>
<td>75 - 150 LF LOOP FEED</td>
<td>6&quot;</td>
<td>83&quot;</td>
<td>83&quot;</td>
<td>12&quot;</td>
<td>14&quot;</td>
<td>55&quot;</td>
<td>38&quot;</td>
<td>18&quot;</td>
<td>14&quot;</td>
<td>13&quot;</td>
<td>28 &amp; 29</td>
</tr>
<tr>
<td>75 - 150 DF LOOP FEED</td>
<td>6&quot;</td>
<td>83&quot;</td>
<td>83&quot;</td>
<td>12&quot;</td>
<td>14&quot;</td>
<td>62&quot;</td>
<td>37&quot;</td>
<td>25&quot;</td>
<td>11&quot;</td>
<td>10&quot;</td>
<td>30 &amp; 31</td>
</tr>
<tr>
<td>225 - 500 LF LOOP FEED</td>
<td>6&quot;</td>
<td>94&quot;</td>
<td>86&quot;</td>
<td>12&quot;</td>
<td>14&quot;</td>
<td>60&quot;</td>
<td>40&quot;</td>
<td>20&quot;</td>
<td>25&quot;</td>
<td>16&quot;</td>
<td>32 &amp; 33</td>
</tr>
<tr>
<td>225 - 500 DF LOOP FEED</td>
<td>6&quot;</td>
<td>94&quot;</td>
<td>86&quot;</td>
<td>12&quot;</td>
<td>14&quot;</td>
<td>62&quot;</td>
<td>37&quot;</td>
<td>25&quot;</td>
<td>17&quot;</td>
<td>17&quot;</td>
<td>34 &amp; 35</td>
</tr>
<tr>
<td>750 DF LOOP FEED</td>
<td>6&quot;</td>
<td>94&quot;</td>
<td>96&quot;</td>
<td>12&quot;</td>
<td>14&quot;</td>
<td>62&quot;</td>
<td>37&quot;</td>
<td>25&quot;</td>
<td>17&quot;</td>
<td>17&quot;</td>
<td>36 &amp; 27</td>
</tr>
</tbody>
</table>

TRANSFORMER PADS - CONCRETE THREE PHASE PAD DIMENSIONS

DD5-4 UG DETAIL SHEET 20 OF 57

03 - 10
1. CONTACT COMPANY REPRESENTATIVE FOR PAD SIZE AND NUMBER AND LOCATION OF PRIMARY AND SECONDARY CONDUITS.

2. REFERENCE DETAIL SHEET 9 FOR BEND RADIUS FOR ALL HORIZONTAL AND VERTICAL CONDUIT BENDS.

3. GROUND RODS TO BE OBTAINED AND INSTALLED BY CONTRACTOR. INSTALLATION DEPTH SHALL BE 7'-8". REFERENCE DETAIL SHEETS FOR SIZE.

4. REFERENCE DETAIL SHEET 16 FOR LOCATION OF FOREIGN UTILITY EQUIPMENT GROUND.

5. REFER TO DETAIL SHEETS 51, 52, 63 & 64 FOR MINIMUM CLEARANCES FROM SURROUNDING OBJECTS.

6. PIERS ARE REQUIRED ON ALL SINGLE PHASE TRANSFORMER PADS UNLESS WAIVED BY THE COMPANY INSPECTOR. REFERENCE DETAIL SHEET 17 FOR PIER DETAIL FOR SINGLE PHASE PADS.

7. BEAMS SHALL BE INSTALLED ON ALL THREE PHASE TRANSFORMER PADS SET IN UNSTABLE SOILS AND IN AREAS WHERE DRAINAGE COULD CAUSE SOIL UNDER THE PAD TO WASH OUT. THE DEPTH OF BEAMS SHALL BE AS SHOWN OR TO ROCK. IF ROCK IS ENCOUNTERED WITHIN THREE INCHES OF SURFACE, BEAMS ARE NOT REQUIRED.

8. PIERS ARE REQUIRED ON ALL THREE PHASE TRANSFORMER PADS AND ON ALL SWITCHGEAR PADS UNLESS WAIVED BY THE COMPANY INSPECTOR. REFERENCE DETAIL SHEETS 22 AND 23 FOR PIERS FOR THREE PHASE TRANSFORMER AND SWITCHGEAR PADS.

9. REINFORCING STEEL SHALL CONFORM TO ASTM A 615 AND SHALL BE DEFORMED, INTERMEDIATE GRADE (GRADE 60). ALL REINFORCING STEEL SHALL BE CLEANED OF ALL COATINGS THAT ADVERSELY AFFECT BONDING CAPACITY. ALL REINFORCING STEEL SHALL BE ACCURATELY POSITIONED AND RIGIDLY HELD IN PLACE DURING POURING.

10. ALL REINFORCING STEEL SHALL HAVE A 3 INCH CLEARANCE FROM THE BOTTOM. THERE SHALL BE A 3 INCH CLEARANCE FROM SIDES TO STEEL RUNNING PARALLEL THEREOF. THERE SHALL BE A 2 INCH CLEARANCE FROM END OF STEEL TO SIDES AND WINDOW.

11. OUTER SURFACE EDGES OF PADS TO BE CHAMFERED 1 1/2" x 45 DEGREES. ROUNDED OF EDGES WITH A ROUNDLING TROWEL IS ACCEPTABLE IN LIEU OF CHAMFERING.

12. TAMPER ALL DISTURBED SOIL UNDERNEATH PAD TO 95% COMPACTION AS PER ASTM D 698.

13. CONCRETE SHALL CONFORM TO ASTM C 150 FOR TYPE I OR TYPE III HIGH EARLY. CONCRETE SHALL BE PROPORTIONED TO PRODUCE A COMPRESSIVE STRENGTH OF 3000 PSI AT 28 DAYS. CONCRETE SLUMP SHALL BE 3-4 INCHES.

14. AGGREGATES SHALL CONFORM TO ASTM C 33 AND SHALL BE CLEAN AND FREE FROM DELETERIOUS AMOUNTS OF ACIDS, ALKALIS, ORGANIC MATTER OR OTHER FOREIGN SUBSTANCES. THE MAXIMUM AGGREGATE SIZE SHALL NOT EXCEED 3/4 INCH.

15. MIXING WATER SHALL BE CLEAN AND FREE FROM OILS, ACIDS, ALKALIS, SALTS, ORGANIC MATERIALS OR OTHER SUBSTANCES THAT MAY BE DELETERIOUS TO CONCRETE OR STEEL.

16. NO ADMIXTURES WILL BE PERMITTED WITHOUT THE APPROVAL FROM THE COMPANY.

17. CONCRETE MAY BE MIXED ON THE JOB OR READY MIX CONCRETE MAY BE USED.

18. FOR CONCRETE MIXED ON THE JOB, A MIXER WITH A MINIMUM TWO (2) SACK CAPACITY SHALL BE USED. CEMENT AND AGGREGATES SHALL BE PROPORTIONED ON CALIBRATED SCALES. WATER FOR MIXING SHALL BE ACCURATELY MEASURED. ALL CONCRETE SHALL BE PLACED WITHIN ONE HOUR AFTER MIXING.

NOTES:
1. PIER DEPTH SHALL BE 5 FEET BELOW BOTTOM OF PAD UNLESS ROCK OR OTHER HARD SURFACES ARE ENCOUNTERED.
   IF ROCK OR OTHER HARD SURFACES ARE ENCOUNTERED PRIOR TO A 5 FOOT DEPTH, PIER DEPTH SHALL EXTEND
   8 INCHES INTO THE HARD SURFACE.
2. PIER REINFORCING TO EXTEND 3 INCHES INTO PAD.
3. FOURPIERS POSITIONED AS SHOWN ARE RECOMMENDED FOR ALL PAD SIZES EXCEPT THE 14" X 152" PAD, SIX PIERS
   POSITIONED AS SHOWN ARE RECOMMENDED FOR THIS PAD SIZE.
4. SEE DETAIL SHEET 21 FOR ADDITIONAL NOTES.

REINFORCING SCHEDULE

<table>
<thead>
<tr>
<th>NUMBER</th>
<th>SIZE</th>
<th>LENGTH</th>
<th>SHAPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>#5</td>
<td>6'</td>
<td>STRAIGHT</td>
</tr>
<tr>
<td>8</td>
<td>#3</td>
<td>2&quot; - 1&quot;</td>
<td>HOOP</td>
</tr>
</tbody>
</table>

0.145 CU YARDS CONCRETE/PIER
TOTAL WEIGHT OF (1) PIER: 605 LBS.

PIER DETAILS
FOR THREE PHASE
TRANSFORMER PADS

ONCOR

DDS-4 UG DETAIL SHEET 22 OF 57
NOTES:

1. PIER DEPTH SHALL BE 6 FEET BELOW BOTTOM OF PAD UNLESS ROCK OR OTHER HARD SURFACES ARE ENCOUNTERED. IF ROCK OR OTHER HARD SURFACES ARE ENCOUNTERED PRIOR TO A 5 FOOT DEPTH, PIER DEPTH SHALL EXTEND 6 INCHES INTO THE HARD SURFACE.

2. PIER REINFORCING TO EXTEND 3 INCHES INTO PAD.

3. SEE DETAIL SHEETS 39, 40, 41, 42 AND 43 FOR CONCRETE SWITCHGEAR PAD DETAILS.

4. SEE DETAIL SHEETS 47 AND 48 FOR CONCRETE CONNECTION ENCLOSURE PAD DETAILS.

5. SEE DETAIL SHEET 21 NOTES.
NOTE 3

REINFORCEMENT SPACING: 11" CENTERS

REINFORCING SCHEDULE
PAD WITH BEAMS (NOTES 2 & 3)

<table>
<thead>
<tr>
<th>NUMBER OF #8 BARS</th>
<th>LENGTH</th>
<th>WEIGHT (LBS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>70&quot;</td>
<td>32.2</td>
</tr>
<tr>
<td>6</td>
<td>81&quot;</td>
<td>8.0</td>
</tr>
<tr>
<td>2</td>
<td>17&quot;</td>
<td>1.1</td>
</tr>
<tr>
<td>2</td>
<td>10&quot;</td>
<td>0.6</td>
</tr>
<tr>
<td>5</td>
<td>9&quot;</td>
<td>1.2</td>
</tr>
</tbody>
</table>

14 CU YARDS CONCRETE
TOTAL WEIGHT OF PAD 6,850 LBS

REINFORCING SCHEDULE
PAD WITHOUT BEAMS

<table>
<thead>
<tr>
<th>NUMBER OF #8 BARS</th>
<th>LENGTH</th>
<th>WEIGHT (LBS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>70&quot;</td>
<td>22.2</td>
</tr>
<tr>
<td>6</td>
<td>81&quot;</td>
<td>8.0</td>
</tr>
<tr>
<td>2</td>
<td>17&quot;</td>
<td>1.1</td>
</tr>
<tr>
<td>2</td>
<td>10&quot;</td>
<td>0.6</td>
</tr>
<tr>
<td>5</td>
<td>9&quot;</td>
<td>1.2</td>
</tr>
</tbody>
</table>

0.8 CU YARDS CONCRETE
TOTAL WEIGHT OF PAD 3,100 LBS

NOTES:
1. SEE DETAIL SHEET 21 FOR GENERAL NOTES.
2. CONTRACTOR TO OBTAIN AND INSTALL (2) 5/8" X 9' COPPER GROUND RODS AS SHOWN.
3. PIERS ARE REQUIRED ON ALL THREE PHASE TRANSFORMER PADS UNLESS WAIVED BY
   THE COMPANY INSPECTOR. REFERENCE DETAIL SHEET 22 FOR PIER DETAILS.
4. BEGIN SECONDARY CONDUITS AT RIGHT EDGE OF PAD WINDOW. ADD CONDUITS AS REQUIRED. RIGHT
   TO LEFT, DO NOT CROSS DIVIDING LINE BETWEEN PRIMARY AND SECONDARY COMPARTMENTS.
5. GROUT WINDOW AS PER DETAIL SHEET 15.

ONCOR

TRANSFORMER PAD
THREE PHASE
75 - 150 KVA RADIAL

DDS-4 UG DETAIL SHEET 24 OF 57

03 - 10
NOTES:
1. SEE DETAIL SHEET 21 FOR GENERAL NOTES.
2. CONTRACTOR TO OBTAIN AND INSTALL (2) 6/8" X 6" GROUND RODS AS SHOWN. INSTALLATION DEPTH SHALL BE 7 - 8".
3. PIERS ARE REQUIRED ON ALL THREE PHASE TRANSFORMER PADS UNLESS WAIVED BY THE COMPANY INSPECTOR. REFERENCE DETAIL SHEET 22 FOR PIER DETAILS.
4. BEGIN SECONDARY CONDUITS AT RIGHT EDGE OF PAD WINDOW. ADD CONDUITS AS REQUIRED RIGHT TO LEFT. DO NOT CROSS DIVIDING LINE BETWEEN PRIMARY AND SECONDARY COMPARTMENTS.
5. GROUT WINDOW AS PER DETAIL SHEET 16.

REINFORCEMENT SPACING: 11" CENTERS

REINFORCING SCHEDULE
PAD WITH BEAMS (NOTES 2 & 3)

<table>
<thead>
<tr>
<th>NUMBER OF #3 BARS</th>
<th>LENGTH</th>
<th>WEIGHT (LBS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>90&quot;</td>
<td>42.3</td>
</tr>
<tr>
<td>5</td>
<td>62&quot;</td>
<td>6.7</td>
</tr>
<tr>
<td>2</td>
<td>21&quot;</td>
<td>1.8</td>
</tr>
<tr>
<td>2</td>
<td>13&quot;</td>
<td>0.6</td>
</tr>
<tr>
<td>6</td>
<td>8&quot;</td>
<td>1.2</td>
</tr>
</tbody>
</table>

1.8 CU YARDS CONCRETE
TOTAL WEIGHT OF PAD 7,260 LBS

REINFORCING SCHEDULE
PAD WITHOUT BEAMS

<table>
<thead>
<tr>
<th>NUMBER OF #3 BARS</th>
<th>LENGTH</th>
<th>WEIGHT (LBS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>90&quot;</td>
<td>31.0</td>
</tr>
<tr>
<td>6</td>
<td>62&quot;</td>
<td>6.7</td>
</tr>
<tr>
<td>2</td>
<td>21&quot;</td>
<td>1.8</td>
</tr>
<tr>
<td>2</td>
<td>13&quot;</td>
<td>0.6</td>
</tr>
<tr>
<td>6</td>
<td>8&quot;</td>
<td>1.2</td>
</tr>
</tbody>
</table>

1.8 CU YARDS CONCRETE
TOTAL WEIGHT OF PAD 4,170 LBS

TRANSFORMER PAD
THREE PHASE
225 - 500 KVA RADIAL

DDS-4 UG DETAIL SHEET 25 OF 57
NOTES:
1. SEE DETAIL SHEET 21 FOR GENERAL NOTES.
2. CONTRACTOR TO OBTAIN AND INSTALL (2) 5/8" X 8' GROUND RODS AS SHOWN.
   INSTALLATION DEPTH SHALL BE 7'-6".
3. PIERS ARE REQUIRED ON ALL THREE PHASE TRANSFORMER PADS UNLESS WAIVED
   BY THE COMPANY INSPECTOR. REFERENCE DETAIL SHEET 22 FOR PIER DETAILS.
4. BEGIN SECONDARY CONDUITS AT RIGHT EDGE OF PAD WINDOW. ADD CONDUITS AS REQUIRED
   RIGHT TO LEFT. DO NOT CROSS DIVIDING LINE BETWEEN PRIMARY AND SECONDARY
   COMPARTMENTS.
5. GROUT WINDOW AS PER DETAIL SHEET 15.

REINFORCEMENT SPACING: 3" CENTERS

REINFORCING SCHEDULE
PAD WITH BEAMS (NOTES 2 & 3)

<table>
<thead>
<tr>
<th>NUMBER OF #4 BARS</th>
<th>LENGTH (FT)</th>
<th>WEIGHT (LBS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>92&quot;</td>
<td>34.0</td>
</tr>
<tr>
<td>7</td>
<td>110&quot;</td>
<td>24.1</td>
</tr>
<tr>
<td>6</td>
<td>71&quot;</td>
<td>14.7</td>
</tr>
<tr>
<td>3</td>
<td>29&quot;</td>
<td>2.2</td>
</tr>
<tr>
<td>3</td>
<td>29&quot;</td>
<td>1.2</td>
</tr>
<tr>
<td>5</td>
<td>9&quot;</td>
<td>1.5</td>
</tr>
</tbody>
</table>

2.1 CU YARDS CONCRETE
TOTAL WEIGHT OF PAD 8,545 LBS

REINFORCING SCHEDULE
PAD WITHOUT BEAMS

<table>
<thead>
<tr>
<th>NUMBER OF #4 BARS</th>
<th>LENGTH (FT)</th>
<th>WEIGHT (LBS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>92&quot;</td>
<td>36.8</td>
</tr>
<tr>
<td>5</td>
<td>110&quot;</td>
<td>12.2</td>
</tr>
<tr>
<td>8</td>
<td>71&quot;</td>
<td>14.7</td>
</tr>
<tr>
<td>3</td>
<td>29&quot;</td>
<td>2.2</td>
</tr>
<tr>
<td>3</td>
<td>29&quot;</td>
<td>1.2</td>
</tr>
<tr>
<td>6</td>
<td>9&quot;</td>
<td>1.5</td>
</tr>
</tbody>
</table>

1.3 CU YARDS CONCRETE
TOTAL WEIGHT OF PAD 8,190 LBS

TRANSFORMER PAD
THREE PHASE
750 - 1000 KVA RADIAL

DDS-4 UG DETAIL SHEET 26 OF 57
TRANSFORMER PAD
THREE PHASE
1500 - 2500 KVA RADIAL

ONCOR

DDS-4 UG DETAIL SHEET 27 OF 57

03 - 10
REINFORCEMENT SPACING: 11" CENTERS

REINFORCING SCHEDULE
PAD WITHOUT BEAMS

<table>
<thead>
<tr>
<th>NUMBER OF #2 BARS</th>
<th>LENGTH</th>
<th>WEIGHT (LBS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>75&quot;</td>
<td>168.0</td>
</tr>
<tr>
<td>6</td>
<td>9&quot;</td>
<td>1.90</td>
</tr>
<tr>
<td>3</td>
<td>9&quot;</td>
<td>0.54</td>
</tr>
<tr>
<td>2</td>
<td>10&quot;</td>
<td>0.83</td>
</tr>
<tr>
<td>6</td>
<td>60&quot;</td>
<td>9.56</td>
</tr>
</tbody>
</table>

1.50 CU YARDS CONCRETE
TOTAL WEIGHT OF PAD 4,611 LBS

NOTES:
1. SEE DETAIL SHEET 31 FOR GENERAL NOTES.
2. CONTRACTOR TO OBTAIN AND INSTALL (2) 5/8" X 12" GROUND ANCHORS AS SHOWN.
   INSTALLATION DEPTH SHALL BE 7'-6".
3. PIERs ARE REQUIRED ON ALL THREE PHASE TRANSFORMER PADS UNLESS WAIVED BY
   THE COMPANY INSPECTOR. REFER TO DETAIL SHEET 22 FOR PIER DETAILS.
4. BEGIN SECONDARY CONDUITS AT RIGHT EDGE OF PAD WINDOW. ADD CONDUITS AS REQUIRED RIGHT
   TO LEFT. DO NOT CROSS DIVIDING LINE BETWEEN PRIMARY AND SECONDARY COMPARTMENTS.
5. GROUT WINDOW AS PER DETAIL SHEET 18.
TRANSFORMER PAD WITH BEAMS
THREE PHASE 75 - 150 KVA
LIVE FRONT LOOP FEED

1. See detail sheet 21 for general notes.
2. Contractor to obtain and install 21 5/8" x 10' ground rods as shown.
   Installation depth shall be 7' - 6".
3. Piers are required on all three phase transformer pads unless waived by
   the Company Inspector. Reference detail sheet 22 for pier details.
4. Begin secondary conduits at right edge of pad window, add conduits as required right
   to left; do not cross dividing line between primary and secondary compartments.
5. Grout window as per detail sheet 16.

REINFORCEMENT SPACING: 18" CENTERS

REINFORCING SCHEDULE
PAD WITH BEAMS (NOTES 4 & 5)

<table>
<thead>
<tr>
<th>NUMBER</th>
<th>LENGTH</th>
<th>WEIGHT (LBS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>70&quot;</td>
<td>20.7</td>
</tr>
<tr>
<td>6</td>
<td>4&quot;</td>
<td>1.93</td>
</tr>
<tr>
<td>2</td>
<td>9&quot;</td>
<td>0.60</td>
</tr>
<tr>
<td>2</td>
<td>10&quot;</td>
<td>0.62</td>
</tr>
<tr>
<td>8</td>
<td>63&quot;</td>
<td>9.98</td>
</tr>
</tbody>
</table>

1.70 C.U YARDS CONCRETE
TOTAL WEIGHT OF PAD 6,910 LBS
NOTES:
1. SEE DETAIL SHEET 21 FOR GENERAL NOTES.
2. CONTRACTOR TO OBTAIN AND INSTALL (2) 5/8" X 10' GROUND RODS AS SHOWN.
   INSTALLATION DEPTH SHALL BE 7" - 9".
3. PIERS ARE REQUIRED ON ALL THREE PHASE TRANSFORMER PADS UNLESS WAIVED BY
   THE COMPANY INSPECTOR. REFERENCE DETAIL SHEET 22 FOR PIER DETAILS.
4. BEGIN SECONDARY CONDUITS AT RIGHT EDGE OF PAD WINDOW. ADD CONDUITS AS REQUIRED RIGHT
   TO LEFT. DO NOT CROSS DIVIDING LINE BETWEEN PRIMARY AND SECONDARY COMPARTMENTS.
5. GROUT WINDOW AS PER DETAIL SHEET 16.

TRANSFORMER PAD
THREE PHASE 75 - 150 KVA
DEADFRONT LOOP FEED
DDS-4 UG DETAIL SHEET 30 OF 57
NOTES:

1. SEE DETAIL SHEET 21 FOR GENERAL NOTES.
2. CONTRACTOR TO OBTAIN AND INSTALL (2) 5/8" X 10' GROUND RODS AS SHOWN. INSTALLATION DEPTH SHALL BE 7'-6".
3. PIERs ARE REQUIRED ON ALL THREE PHASE TRANSFORMER PADS UNLESS WAIVED BY THE COMPANY INSPECTOR. REFERENCE DETAIL SHEET 23 FOR PIER DETAILS.
4. BEGIN SECONDARY CONDUITS AT RIGHT EDGE OF PAD WINDOW. ADD CONDUITS AS REQUIRED RIGHT TO LEFT. DO NOT CROSS DIVIDING LINE BETWEEN PRIMARY AND SECONDARY COMPARTMENTS.
5. GROUT WINDOW AS PER DETAIL SHEET 16.

TRANSFORMER PAD WITH BEAMS
THREE PHASE 75 - 150 KVA
DEADFROnT LOOP FEED
DDS-4 URG DETAIL SHEET 31 OF 57
REINFORCEMENT SPACING: 10" CENTERS

<table>
<thead>
<tr>
<th>NUMBER OF #3 BARS</th>
<th>LENGTH</th>
<th>WEIGHT (LBS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>82&quot;</td>
<td>10.3</td>
</tr>
<tr>
<td>6</td>
<td>68&quot;</td>
<td>10.5</td>
</tr>
<tr>
<td>8</td>
<td>8&quot;</td>
<td>1.00</td>
</tr>
<tr>
<td>2</td>
<td>12&quot;</td>
<td>0.75</td>
</tr>
<tr>
<td>2</td>
<td>92&quot;</td>
<td>20.2</td>
</tr>
</tbody>
</table>

134 CU YARDS CONCRETE
TOTAL WEIGHT OF PAD 5,282 LBS

SECTION "A - A"

SECTION "B - B"

NOTES:
1. SEE DETAIL SHEET 21 FOR GENERAL NOTES.
2. CONTRACTOR TO OBTAIN AND INSTALL (6) 4/0 x 10' GROUND RODS AS SHOWN.
   INSTALLATION DEPTH SHALL BE 7 - 8".
3. Piers are required on all three phase transformer pads unless waived by
   the company inspector. Reference detail sheet 22 for see details.
4. BEGIN SECONDARY CONDUITS AT RIGHT EDGE OF PAD WINDOW. ADD CONDUITS AS REQUIRED RIGHT
   TO LEFT. DO NOT CROSS DIVIDING LINE BETWEEN PRIMARY AND SECONDARY COMPARTMENTS.
5. GROUT WINDOW AS PER DETAIL SHEET 16.
REINFORCEMENT SPACING: 10" CENTERS

REINFORCING SCHEDULE
PAD WITH BEAMS (NOTES 4 & 5)

<table>
<thead>
<tr>
<th>NUMBER OF #3 BARS</th>
<th>LENGTH</th>
<th>WEIGHT (LBS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>92&quot;</td>
<td>15.4</td>
</tr>
<tr>
<td>6</td>
<td>86&quot;</td>
<td>10.6</td>
</tr>
<tr>
<td>6</td>
<td>69&quot;</td>
<td>1.50</td>
</tr>
<tr>
<td>2</td>
<td>16&quot;</td>
<td>1.00</td>
</tr>
<tr>
<td>2</td>
<td>12&quot;</td>
<td>0.75</td>
</tr>
<tr>
<td>2</td>
<td>82&quot;</td>
<td>28.9</td>
</tr>
</tbody>
</table>

2.00 CU YARDS CONCRETE
TOTAL WEIGHT OF PAD 7,840 LBS

NOTES:
1. SEE DETAIL SHEET 21 FOR GENERAL NOTES.
2. CONTRACTOR TO OBTAIN AND INSTALL (2) 5/8" X 10' GROUND RODS AS SHOWN. INSTALLATION DEPTH SHALL BE 7'-6''.
3. PIERS ARE REQUIRED ON ALL THREE PHASE TRANSFORMER PADS UNLESS WAIVED BY THE COMPANY INSPECTOR. REFERENCE DETAIL SHEET 23 FOR PIER DETAILS.
4. BEGIN SECONDARY CONDUITS AT RIGHT EDGE OF PAD WINDOW. ADD CONDUITS AS REQUIRED RIGHT TO LEFT, DO NOT CROSS DIVIDING LINE BETWEEN PRIMARY AND SECONDARY COMPARTMENTS.
5. GROUT WINDOW AS PER DETAIL SHEET 16.

TRANSFORMER PAD WITH BEAMS
THREE PHASE 225 - 500 KVA
LIVE FRONT LOOP FEED

DDS-4 UG DETAIL SHEET 33 OF 57
REINFORCEMENT SPACING: 10" CENTERS

REINFORCING SCHEDULE PAD WITHOUT BEAMS

<table>
<thead>
<tr>
<th>NUMBER OF #11 BARS</th>
<th>LENGTH</th>
<th>WEIGHT (LBS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>62&quot;</td>
<td>15.3</td>
</tr>
<tr>
<td>5</td>
<td>56&quot;</td>
<td>10.5</td>
</tr>
<tr>
<td>6</td>
<td>8&quot;</td>
<td>1.5</td>
</tr>
<tr>
<td>4</td>
<td>12&quot;</td>
<td>1.6</td>
</tr>
<tr>
<td>7</td>
<td>82&quot;</td>
<td>20.2</td>
</tr>
</tbody>
</table>

1.34 CU YARDS CONCRETE
TOTAL WEIGHT OF PAD 6,270 LBS

SECTION "A - A"

SECTION "B - B"

NOTES:
1. SEE DETAIL SHEET 21 FOR GENERAL NOTES.
2. CONTRACTOR TO DETAIN AND INSTALL (2) 6/8" X 30' GROUND RODS AS SHOWN. INSTALLATION DEPTH SHALL BE 7'-6".
3. PIERS ARE REQUIRED ON ALL THREE PHASE TRANSFORMER PADS UNLESS WAIVED BY THE COMPANY INSPECTOR. REFERENCE DETAIL SHEET 22 FOR PIER DETAILS.
4. BEGIN SECONDARY CONDUCTS AT RIGHT EDGE OF PAD WINDOW. ADD CONDUCTS AS REQUIRED RIGHT TO LEFT. DO NOT CROSS DIVIDING LINE BETWEEN PRIMARY AND SECONDARY COMPARTMENTS.
5. GROUT WINDOW AS PER DETAIL SHEET 16.

TRANSFORMER PAD
THREE PHASE 225 - 500 KVA
DEADFRONT LOOP FEED

DDS-4 UG DETAIL SHEET 24 OF 57
REINFORCEMENT SPACING: 10" CENTERS

REINFORCING SCHEDULE
PAD WITH BEAMS (NOTES 4 & 5)

<table>
<thead>
<tr>
<th>NUMBER OF #3 BARS</th>
<th>LENGTH</th>
<th>WEIGHT (LBS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>52&quot;</td>
<td>13.6</td>
</tr>
<tr>
<td>6</td>
<td>46&quot;</td>
<td>10.5</td>
</tr>
<tr>
<td>9</td>
<td>9&quot;</td>
<td>1.2</td>
</tr>
<tr>
<td>4</td>
<td>72&quot;</td>
<td>1.6</td>
</tr>
<tr>
<td>9</td>
<td>92&quot;</td>
<td>25.0</td>
</tr>
</tbody>
</table>

1.97 CU YARDS CONCRETE
TOTAL WEIGHT OF PAD 7,710 LBS

SECTION "A - A"

SECTION "B - B"

NOTES:
1. SEE DETAIL SHEET 21 FOR GENERAL NOTES.
2. CONTRACTOR TO OBTAIN AND INSTALL (2) 6/0 X 10' GROUND ROCKS AS SHOWN.
INSTALLATION DEPTH SHALL BE 7'-6".
3. PIERS ARE REQUIRED ON ALL THREE PHASE TRANSFORMER PADS UNLESS WAIVED BY
THE COMPANY INSPECTOR. REFERENCE DETAIL SHEET 22 FOR PIER DETAILS.
4. BEGIN SECONDARY CONDUITS AT RIGHT EDGE OF PAD WINDOW. ADD CONDUITS AS REQUIRED RIGHT
TO LEFT. DO NOT CROSS DIVIDING LINE BETWEEN PRIMARY AND SECONDARY COMPARTMENTS.
5. GROUT WINDOW AS PER DETAIL SHEET 15.
NOTES:
1. SEE DETAIL SHEET 21 FOR GENERAL NOTES.
2. CONTRACTOR TO OBTAIN AND INSTALL (2) 60" X 10" GROUND RODS AS SHOWN.
   INSTALLATION DEPTH SHALL BE 7'- 6".
3. PIERs ARE REQUIRED ON ALL THREE PHASE TRANSFORMER PADS UNLESS WAIVED BY
   THE COMPANY INSPECTOR. REFERENCE DETAIL SHEET 22 FOR PER DETAIL.
4. BEGIN SECONDARY CONDUITS AT RIGHT EDGE OF PAD WINDOW. ADD CONDUITS AS REQUIRED RIGHT
   TO LEFT. DO NOT CROSS DIVIDING LINE BETWEEN PRIMARY AND SECONDARY COMPARTMENTS.
5. GROUT WINDOW AS PER DETAIL SHEET 18.

TRANSFORMER PAD
THREE PHASE 750 KVA
DEADFRONT LOOP FEED

DDS-4 UG DETAIL SHEET 38 OF 57
REINFORCEMENT SPACING: 10" CENTERS

REINFORCING SCHEDULE
PAD WITH BEAMS (NOTES 4 & 5)

<table>
<thead>
<tr>
<th>NUMBER OF #8 BARS</th>
<th>LENGTH</th>
<th>WEIGHT (LBS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>02&quot;</td>
<td>48.5</td>
</tr>
<tr>
<td>8</td>
<td>08&quot;</td>
<td>15.5</td>
</tr>
<tr>
<td>8</td>
<td>08&quot;</td>
<td>12.4</td>
</tr>
<tr>
<td>4</td>
<td>13&quot;</td>
<td>1.4</td>
</tr>
</tbody>
</table>

2.14 CU YARDS CONCRETE
TOTAL WEIGHT OF PAD 8,390 LBS

NOTES:
1. SEE DETAIL SHEET 31 FOR GENERAL NOTES.
2. CONTRACTOR TO OBTAIN AND INSTALL (2) 5-9/16" X 10' GROUND RODS AS SHOWN.
   INSTALLATION DEPTH: SHALL BE 7'- 6".
3. PIERs ARE REQUIRED ON ALL THREE PHASE TRANSFORMER PADS UNLESS WAIVED BY
   THE COMPANY INSPECTOR. REFERENCE DETAIL SHEET 22 FOR PER DETAIL.
4. BEGIN SECONDARY CONDUITS AT RIGHT EDGE OF PAD WINDOW. ADD CONDUITS AS REQUIRED RIGHT
   TO LEFT. DO NOT CROSS DIVIDING LINE BETWEEN PRIMARY AND SECONDARY COMPARTMENTS.
5. GROUT WINDOW AS PER DETAIL SHEET 18.

TRANSFORMER PAD WITH BEAMS
THREE PHASE 750 KVA
DEADFROnt LOOP FEED

ONCOR

DDS-4 UG DETAIL SHEET 37 OF 57

03 – 10
### MAXIMUM NUMBER OF SECONDARY CONDUITS AND CABLES FOR PADMOUNTED TRANSFORMERS

#### DDS-4 UG DETAIL SHEET 38 OF 57

*Oncor Electric Delivery Company. All rights reserved.*
CONCRETE PAD
POURED IN PLACE
25 KV LIVE FRONT SWITCHGEAR

ONCOR

DDS-4 UG DETAIL SHEET 39 OF 57

03 - 10
CONCRETE PAD
POURED IN PLACE
15 KV LIVE FRONT SWITCHGEAR
DDS-4 UG DETAIL SHEET 40 OF 57

15KV

A  B  C  D  E  F  G  H
PMH - 9  11"  0.5"  19"  19"  8.5"  6"  11"  32"
PMH - 10  13"  13"  14.5"  14.5"  13"  7"  13"  30"
PMH - 11  11"  0.5"  19"  14.5"  13"  5"  11"  32"

NOTES:
1. PIERS ARE REQUIRED ON ALL SWITCHGEAR PADS UNLESS WAIVED BY THE COMPANY INSPECTOR. REFERENCE DETAIL SHEET 23 FOR PIER DETAIL.
2. USE WIRE MESH FOR CONCRETE REINFORCEMENT AROUND DEEPWELL BOX.
3. ENDS OF RE-BAR SHALL REMAIN A MINIMUM OF 2" INSIDE OF CONCRETE AND SHALL BE INTERMEDIATE GRADE 60 AND CONFORM TO ASTM A615.
4. CONTACT COMPANY REPRESENTATIVE ON WHERE TO ACQUIRE 5/8" X 10 COPPER CLAD GROUND RODS. GROUND RODS TO BE OBTAINED AND INSTALLED BY CONTRACTOR. INSTALLATION DEPTH SHALL BE 7'-6".
5. FOR CLEARANCES ON ALL SIDES OF THE SWITCHGEAR REFERENCE DETAIL SHEETS 31, 32, 33 AND 54.
6. FOR PADS PLUNGED INTO DUCT BANKS, INSTALL 2" COMMUNICATION CONDUIT FROM MANHOLE TO FRONT RIGHT CORNER OF LOAD SIDE CONDUIT OPENING OF PAD.
7. GROUT AS PER DETAIL SHEET 16.
CONCRETE PAD POURED IN PLACE
25 KV LIVE FRONT AUTOMATED
SUPERVISORY CONTROL SWITCHGEAR
DDS-4 UG DETAIL SHEET 41 OF 57

NOTES:
1. PIERs ARE REQUIRED ON ALL SWITCHGEAR PADS UNLESS WAIVED BY THE COMPANY INSPECTOR. REFERENCE DETAIL SHEET 29 FOR PER DETAIL.
2. USE WIRE MESH FOR CONCRETE REINFORCEMENT AROUND DEEPWELL BOX.
3. ENDS OF RE-BAR SHALL REMAIN A MINIMUM OF 2" INSIDE OF CONCRETE AND SHALL BE INTERMEDIATE GRADE 60 AND CONFORM TO ASTM A616.
4. CONTACT COMPANY REPRESENTATIVE ON WHERE TO ACQUIRE 5/8" X 10' COPPER CLAD GROUND RODS. GROUND RODS TO BE OBTAINED AND INSTALLED BY CONTRACTOR. INSTALLATION DEPTH SHALL BE 7'-8'.
5. FOR CLEARANCES ON ALL SIDES OF THE SWITCHGEAR SEE DETAIL SHEETS 61, 62, 63 AND 64.
6. FOR PADS PLUMB INTO DUCT BANKS INSTALL 3" COMMUNICATION CONDUIT FROM MANHOLE TO FRONT RIGHT CORNER OF LOAD SIDE CONDUIT OPENING OF PAD.
7. GROUT AS PER DETAIL SHEET 18.
NOTES:
1. TO PREVENT SETTLING AND IMPROVE PAD STABILIZATION ADD A MINIMUM OF 1/2 INCH MEDIUM SIZE GRAVEL BOTTOM & SIDES.
2. CONDUIT SHALL NOT EXTEND MORE THAN 2 INCHES ABOVE CONDUIT WINDOW OPENINGS.
3. TO ALLOW FOR ADEQUATE DRAINAGE DO NOT SEAL CONDUIT WINDOW OPENINGS WITH GROUT. MORTAR WITH AGGREGATE ONLY.
4. LIFTING POINTS (4) RATED AT 2000 LBS EACH. TOTAL PAD WEIGHT IS 6,000 LBS.
5. FOR PADS PLANTED TO CONCRETE ENGAGED DUCT, INSTALL 8 INCH COMMUNICATION CONDUIT FROM MANHOLE TO A LOAD SIDE OPENING.
6. ALLELE OF CONDUIT PLACEMENTS (VERTICAL OR HORIZONTAL) WHEN SPARE CONDUITS ARE REQUIRED.

### DESCRIPTION & APPROVED VENDORS

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>ONCOR TSN</th>
<th>VENDOR PART#</th>
</tr>
</thead>
<tbody>
<tr>
<td>PAD. PRECAST 20&quot; DEEPWELL SWITCHGEAR 25KV MANHOLE TYPE 1/2&quot; X 36&quot;</td>
<td>335429</td>
<td></td>
</tr>
<tr>
<td>OLD CASTLE PRECAST</td>
<td></td>
<td></td>
</tr>
<tr>
<td>THE TURNER COMPANY</td>
<td>1004702</td>
<td></td>
</tr>
<tr>
<td>ROD. EID. DJ CLAD 57-1/4&quot; X KV, UL LABEL &amp; DIMEN STAMPED ON TOP</td>
<td>306221</td>
<td></td>
</tr>
<tr>
<td>ERITECH</td>
<td>816000</td>
<td></td>
</tr>
</tbody>
</table>

**ONCOR**

**PRECAST DEEPWELL PAD**

**DEAD FRONT / LIVE FRONT**

**25 KV SWITCHGEAR**

DDS-4 UG DETAIL SHEET 42 OF 67

05 - 15
NOTES:

1. FOR STABILIZATION AND DRAINAGE INSTALL SMALL TO MEDIUM GRAVEL UNDER PAD DEEP WELL.
2. FOR CLEARANCES ON ALL SIDES OF THE SWITCHGEAR SEE DETAIL SHEETS 61, 62, 63 AND 64.
3. PIERs ARE REQUIRED ON ALL PADS UNLESS WAIVED BY THE COMPANY INSPECTOR. REFERENCE DETAIL SHEET 23 FOR PIER DETAIL.
4. LIFT PAD WITH PROVIDED LIFTING POINTS ONLY. SEE LIFTING RINGS INSIDE WALL OF DEEP WELL.
5. CONDUIT NOT TO EXTEND MORE THAN 3" ABOVE BOTTOM OF DEEP WELL.
6. MINIMUM TRENCH DEPTH AT PAD TO TOP OF CONDUIT FOR THE FOLLOWING CONDUITS:
   6" CONDUIT — 87"
   4" CONDUIT — 47"
   2" CONDUIT — 40"
7. REFER TO DETAIL SHEET 44 FOR CONDUIT LOCATIONS.
8. ADDITIONAL AREA FOR CONTROL CABINET WHEN MOUNTING REMOTE SUPERVISORY CONTROLLED SWITCHGEAR.
9. CONTACT COMPANY REPRESENTATIVE ON WHERE TO ACQUIRE 6/0 X 16 COPPER CLAD GROUND RODS.
10. GROUND RODS TO BE OBTAINED AND INSTALLED BY CONTRACTOR. INSTALLATION DEPTH SHALL BE 7'-6".
11. CONTACT COMPANY REPRESENTATIVE ON WHERE TO ACQUIRE PRECAST CONCRETE PAD.

PRECAST DEEPWELL PAD
FOR 25 KV DEADFRONT SWITCHGEAR

DDS-4 UG DETAIL SHEET 43 OF 57
NOTE:
1. CONDUIT SHALL BE CENTERED ON CENTER BUSHING OF EACH SWITCHED WAY. IF SPARE CONDUIT IS REQUIRED, BOTH SHALL BE CENTERED AS SHOWN ON CENTER BUSHING OF SWITCHED WAY.
2. FOR PADS PLUMBLED INTO DUCT BANKS, INSTALL 3" COMMUNICATION CONDUIT FROM MANHOLE TO FRONT LEFT CORNER OF THE CONDUIT OPENING OF PAD.

CONDUIT LOCATIONS
DEAD FRONT PADMOUNT
25 KV VISTA SWITCHGEAR

DDS-4 UG DETAIL SHEET 44 OF 57
NOTE:
1. ALL DIMENSIONS SHOWN ARE MINIMUM INSIDE MEASUREMENTS. CONTACT DISTRIBUTION STANDARDS FOR ACTUAL MFG. DIMENSIONS.
2. LADDER, PLATFORMS, SUPPORT ANGLES AND COVER ARE PRE-INSTALLED.
3. STEEL DIAMOND PLATE TENSION ASSISTED COVERS.
4. VERTICAL LOADS TO COVER SHALL NOT EXCEED 10,000 LBS LIVE WHEEL WEIGHT.
5. VAULTS SHALL NOT BE INSTALLED IN LOCATIONS DESIGNATED ACCESSIBLE BY VEHICULAR TRAFFIC.
6. ADJUSTABLE SWITCHGEAR PLATFORM FOR 4-8 WAY SWITCHGEAR.
7. FOR CLEARANCES ON ALL SIDES OF THE SWITCHGEAR SEE DETAIL SHEETS 51, 62, 63 & 64.
8. CONTACT COMPANY REPRESENTATIVE ON WHERE TO ACQUIRE 3/4" X 10' COPPER CLAD GROUND ROD.
   GROUND ROD TO BE OBTAINED AND INSTALLED BY CONTRACTOR, INSTALLATION DEPTH SHALL BE 7'-8'.
9. CONTACT COMPANY REPRESENTATIVE ON WHERE TO ACQUIRE PRECAST VAULT.
1. See Sheet 48 for enclosure details.
2. Conduit configuration will depend on quantity and size of conduits.
3. Piers shall be installed on all pads. Reference Sheet 23 for pier details.
4. Contractor to obtain and install (1) 1/2" x 8' copper ground rod as shown. Installation depth shall be 7'-6".
5. Reference Sheet 21 for additional notes.
NOTE:
1. SEE SHEET 40 FOR ENCLOSURE DETAILS.
2. CONDUIT CONFIGURATION WILL DEPEND ON QUANTITY AND SIZE OF CONDUITS.
3. PIERS SHALL BE INSTALLED ON ALL PADS. REFERENCE SHEET 23 FOR PIER DETAIL.
4. CONTRACTOR TO OBTAIN AND INSTALL (1) 5/8" X 8' COPPER GROUND ROD AS SHOWN. INSTALLATION DEPTH SHALL BE 7'-8".
5. REFERENCE SHEET 21 FOR ADDITIONAL NOTES.

PAD DETAILS FOR
36" X 36"
SECONDARY ENCLOSURE

ONCOR
DDS-4 UG DETAIL SHEET 48 OF 57
NOTES:
1. WHEN INSTALLING NEAR A TRANSFORMER, MAKE SURE THERE IS AT LEAST 5 FT. OF CLEARANCE FROM THE FRONT AND REAR OF ENCLOSURE AND TRANSFORMER AND 3 FT. OF CLEARANCE ON EACH SIDE.
2. SEE SHEETS 47 AND 48 FOR PAD DETAILS.
TYPICAL LAYOUT FOR TRAFFIC AND PARKING

NOTES:
1. INSTALL GUARD POST WHERE PROTECTION FROM DAMAGE DUE TO VEHICULAR TRAFFIC IS NEEDED.
2. DISTANCE BETWEEN POSTS SHOULD NOT EXCEED 4 FEET. ADD ADDITIONAL POSTS WHERE NECESSARY TO MEET THE CONDITION. VERIFY LOCATION OF POST IN FRONT OF TRANSFORMER TO ALLOW FOR DOOR OPENING.
3. INCREASE HEIGHT TO 48" AND DEPTH TO 36" IN TRUCK LOADING AREAS, AND INCREASE SIZE TO 6" GALVANIZED PIPE.
4. THIS DISTANCE TO BE LARGE ENOUGH TO ALLOW FULL OPENING OF ALL EQUIPMENT DOORS. CONTACT COMPANY REPRESENTATIVE TO VERIFY DIMENSIONS.

GUARD POST INSTALLATION

DDS-4 UG DETAIL SHEET 50 OF 57

03 – 10
1. CLEARANCE FROM BUILDING WALLS SHALL COMPLY WITH THE CLEARANCE TABLE. ALL DIMENSIONS SHOWN ARE MINIMUM DIMENSIONS.
2. WHERE THERE ARE BUILDING EAVES OR OVERHANGS WITHIN 20'-0" ABOVE GROUND, CLEARANCE SHALL BE MEASURED HORIZONTALLY BEGINNING FROM THE EDGE OF THE EAVE OR OVERHANG.
3. FIRE RESISTIVE BUILDING WALLS INCLUDE BRICK AND MASONRY STRUCTURES THAT HAVE A 2-HOUR FIRE RATING.
4. CLEARANCE TO BUILDING DOORS, WINDOWS, VENTS AND FIRE ESCAPES TO BE MEASURED RADIALY.
5. LIQUID FLOW OF AREA SURROUNDING TRANSFORMER SHOULD BE AWAY FROM BUILDING WHERE GROUND IS FLAT OR SLOPES TOWARD BUILDING. A DIKE SUFFICIENT TO CONTAIN ALL TRANSFORMER OIL FOR TRANSFORMERS 600 KVA AND LARGER SHALL BE PROVIDED.
6. CLEARANCES ARE MEASURED FROM PAD EDGE TO BUILDING WALL, OPENING, OVERHANG OR FIRE ESCAPE UNLESS A CONTAINMENT DIKE IS UTILIZED. IF A CONTAINMENT DIKE IS UTILIZED, CLEARANCE IS MEASURED FROM DIKE.
7. CLEARANCES FOR WINDOWS AND VENTS ABOVE TRANSFORMER ARE MEASURED RADIALY FROM CLOSEST POINT ON TRANSFORMER.
8. PADMOUNTED TRANSFORMERS SHALL BE POSITIONED SUCH THAT HOTTICK USE IS NOT REQUIRED ON THE SIDE FACING THE BUILDING. IF HOTTICK USE IS REQUIRED ON THE BUILDING SIDE, CLEARANCES SHOWN IN DETAIL SHEET 52 SHALL BE MAINTAINED.
9. THERE SHOULD NOT BE ANY GROUND OBLSTRUCTIONS, SUCH AS SHRUBS, COOLING TOWERS, GAS METERS, FENCING, ETC. WITHIN 10'-0" OF PAD OR OVERHANG ABOVE PAD FACILITIES. REFERENCE DETAIL SHEET 52 FOR SCREENING CLEARANCES AROUND PADMOUNTED EQUIPMENT.
10. THERE SHOULD NOT BE ANY PIPING OR CONDUIT UNDER THE PAD (EXCEPTION: MUTUALLY AGREED UPON COMMUNICATION CONDUITS) OTHER THAN ENTERING THE TRANSFORMER.
11. TRANSFORMERS SHALL NOT OBLIQUE FIRE LANE.
12. IT IS THE OWNER'S RESPONSIBILITY TO COMPLY WITH ANY INSURANCE REGULATIONS AFFECTING THE PREMISES.

CLEARANCES OF PADMOUNTED TRANSFORMERS FROM BUILDINGS

ONCOR

DDS-4 UG DETAIL SHEET 51 OF 57

03 - 10
NOTES:

1. CLEARANCES TO BUILDING WALLS SHALL BE THE GREATER OF:
   CLEARANCES LISTED IN DETAIL SHEET 31 FOR OIL FILLED EQUIPMENT,
   10 FEET IF "HOT STICK" USE IS REQUIRED ON THIS SIDE OF EQUIPMENT, OR
   6 FEET IF "HOT STICK" USE IS NOT REQUIRED ON THIS SIDE OF EQUIPMENT.

2. A MINIMUM OF 5 FEET CLEARANCE IS ALLOWED IF "HOT STICK" USE IS NOT REQUIRED

3. GATE SHALL OPEN OUTWARD AND THE WIDTH SHALL BE NO LESS THAN 10 FEET.

4. WHERE GROUND IS FLAT OR SLOPES TOWARD BUILDING, A DIKE SUFFICIENT TO CONTAIN ALL OIL
   FOR TRANSFORMERS 500 KVA AND LARGER SHALL BE PROVIDED. REFERENCE DETAIL SHEET 81.

5. WHEN TRANSFORMERS ARE INSTALLED, SCREENING WALLS SHALL PROVIDE ADEQUATE VENTILATION.
ABOVEGROUND CLEARANCES FROM GAS METER INSTALLATIONS

ONCOR

DDS-4 UG DETAIL SHEET 53 OF 57
1. PADMOUNTED EQUIPMENT, PEDESTALS AND OTHER ABOVE GROUND ENCLOSURES SHOULD BE LOCATED NOT LESS THAN 4 FEET FROM FIRE HYDRANTS. WHERE CONDITIONS DO NOT PERMIT A CLEARANCE OF 4 FEET, A CLEARANCE OF NOT LESS THAN 3 FEET IS ALLOWED.

2. ALL ABOVE GROUND METALLIC POWER AND COMMUNICATION EQUIPMENT (PEDESTALS, TRANSFORMER CASES, APPARATUS CASES, ETC.) THAT ARE SEPARATED BY A DISTANCE OF 6 FEET OR LESS SHALL BE BONDED. REFERENCE DETAIL SHEET 16 FOR METHOD FOR PROVIDING FOREIGN UTILITY COMPANY EQUIPMENT GROUND.
NOTES:
1. SEE SHEET 06 FOR ENCLOSURE DETAILS.
2. CONDUIT CONFIGURATION WILL DEPEND ON QUANTITY AND SIZE OF CONDUITS.
3. PIERS SHOULD BE INSTALLED ON ALL PADS TO A DEPTH OF 8 FEET UNLESS ROCK OR OTHER HARD SURFACES ARE ENCOUNTERED. IF ROCK OR OTHER HARD SURFACES ARE ENCOUNTERED PRIOR TO A 6 FOOT DEPTH, PIERS SHOULD EXTEND 6 INCHES INTO HARD SURFACE. REFERENCE SHEET 17 FOR PIER DETAIL.
4. RECOMMENDED LOCATION FOR 6/8" X 6 COPPER GROUND ROD AS SHOWN.
5. SERVICE ENCLOSURES, WHEN REQUIRED, ARE TO BE PROVIDED BY COMPANY AND INSTALLED BY CONTRACTOR.
6. THE CONTRACTOR IS TO PROVIDE, INSTALL AND MAINTAIN (1) THE PAD, ASSOCIATED RACEWAYS AND CABLE FROM THE SERVICE ENCLOSURE TO THE PADMOUNTED TRANSFORMER AND (2) THE CABLE AND ASSOCIATED RACEWAYS FROM THE SERVICE ENCLOSURE TO THE METERS.
NOTES:
1. SEE SHEET B6 FOR PAD DETAILS.
2. CONDUIT CONFIGURATION WILL DEPEND ON QUANTITY AND SIZE OF CONDUITS.
3. RECOMMENDED LOCATION FOR 5/8" X 8" COPPER GROUND ROD AS SHOWN
4. SERVICE ENCLOSURES, WHEN REQUIRED, ARE TO BE PROVIDED BY COMPANY AND INSTALLED BY CONTRACTOR.
5. THE CONTRACTOR IS TO PROVIDE, INSTALL AND MAINTAIN (1) THE PAD, ASSOCIATED RACEWAYS AND CABLE FROM THE SERVICE ENCLOSURE TO THE PADMOUNTED TRANSFORMER AND (2) THE CABLE AND ASSOCIATED RACEWAYS FROM THE SERVICE ENCLOSURE TO THE METERS.

PAD MOUNTED SERVICE ENCLOSURE
44" X 52" X 24"

DDS-4 UG DETAIL SHEET 58 OF 57
TYPICAL SINGLE METER INSTALLATION

NOTES:
1. SERVICE ENTRANCE ENCLOSURE (FOR MULTIPLE METER INSTALLATIONS) PROVIDED BY COMPANY AND INSTALLED BY CONTRACTOR FOR SERVICE ENTRANCES THROUGH 2000 AMPS. CONTACT COMPANY REPRESENTATIVE FOR INFORMATION.
2. METER SOCKETS INSTALLED BY CONTRACTOR.
3. REFER TO ONCOR'S "ELECTRIC SERVICE GUIDELINES" FOR METER AND SERVICE ENCLOSURE INFORMATION.
4. CONDUCTORS, RACEWAY AND GUTTER PROVIDED AND INSTALLED BY CONTRACTOR.
5. SERVICE ENTRANCE CONDUCTORS TO BE CONTINUOUS FROM METER SOCKET INTO SERVICE ENCLOSURE.
6. METER DISCONNECT SWITCH AS ALLOWED BY LOCAL INSPECTION AUTHORITY. VERIFY ACCEPTANCE PRIOR TO INSTALLATION.
7. CONTACT COMPANY FOR APPROVAL OF METER PACKS PRIOR TO LETTING BIDS AND INSTALLING EQUIPMENT.
8. EACH SOCKET MUST BE CLEARLY AND PERMANENTLY MARKED ON THE INTERIOR AND EXTERIOR OF THE METER SOCKET TO INDICATE EACH APARTMENT OR LOCATION SERVED.

TYPICAL MULTIPLE METER INSTALLATION WITH SERVICE ENCLOSURE

TYPICAL METER PACK INSTALLATION

TYPICAL METER INSTALLATIONS