CONDUIT CONSTRUCTION SPECIFICATIONS

1. A preconstruction meeting with the utilities affected and with the Developer/Customer and/or his Contractor shall be held prior to the start of any trench or conduit work involving Navopache Electric Cooperative, Inc. (NEC) distribution system facilities. The Developer/Customer or his Contractor shall coordinate with NEC to schedule the preconstruction meeting date with as much advance notice as possible.

2. The Developer/Customer and/or his Contractor must comply with ARS 40-360.21, 22, 24, 26 and 28 (Underground Dig In Law) and will be responsible for requesting locations of all existing underground facilities before excavating, by calling Arizona Blue Stake at 1-800-STAKE IT.

3. The Developer/Customer and/or his Contractor will be responsible for securing all necessary permits required by local municipalities, county or other governing entities having jurisdiction.

4. NEC is not responsible for locating property lines or trenches. Stakes will be provided by NEC at the location of above-ground facilities such as transformer locations, secondary pedestals, sectionalizing boxes, etc., but the Developer/Customer and/or his Contractor is responsible for determining property lines and placing the trench within the established right-of-way or easement and within the specifications established by these trenching requirements or construction plans provided by NEC. The property pins should not be disturbed and, if so, are the responsibility of the Developer/Customer and/or his Contractor.

5. Any area which will be subject to a grade change such as, but not limited to streets, easement strips, alleys, parking areas, landscape areas, building site areas, etc. (including the side slopes and drainage or "bar" ditches) which are to contain NEC’s electric facilities, must be within six inches (6") of finished grade prior to excavation of trench.

The grade conditions must be completed and certified in writing by the project engineer or an engineer licensed to make such certification and received by NEC’s Engineering Department at Lakeside, Arizona.

The total project, as indicated on the work order, must be certified prior to starting cable installation unless phasing of the project has been agreed to by NEC. NEC will not schedule cable installation until grade certification is received.

6. Trenches must be of minimum depth and width as shown on the trench cross section detail. Trench depth is measured from grade provided at time of installation on low side of trench. No allowance will be made for proposed or future grades. If, subsequent to construction, the grade is changed in such a way as to require relocation or change of the underground facilities, or results in damage to such facilities, the cost of such relocation, change, and/or resulting repairs shall be borne by the Developer/Customer and/or his Contractor responsible for the grade change.

Effective: March 1, 2008
7. When the electric lines are located parallel to water, sewer, or gas lines in the same utility easement, a separation of at least four feet (4') horizontally is desired between the other underground facilities trench. The water, sewer, or gas lines shall not be installed in the same trench as primary electric lines.

8. Crossing of other underground facilities (water lines, drainage structures, sewer lines, fuel lines, communication lines or structures etc.) must maintain, at the minimum, a twelve inch (12") vertical clearance from the electrical lines. The vertical separation may be above or below the facility being crossed if the required depth as specified on the trench cross section detail is maintained on the electrical line. In general, NEC’s preference is to cross below any other facility.

9. The Developer/Customer and /or his Contractor is to be responsible for all earth work required for the build up, leveling, compacting, etc. of any necessary equipment pads.

10. The Developer/Customer and /or his Contractor will be responsible for "dressing up" around above-ground equipment. This consists of a level soil apron extending out three feet (3') completely around the transformers and eighteen inches (18") completely around all other equipment. Underground electric cables will not be energized until the trench is completely backfilled and "dressing up" around equipment is completed. An inspection of the project will be made prior to acceptance of the system.

11. It will be the Developer/Customer and /or his Contractor’s responsibility to provide for clean up and "dressing up" around equipment, if subsequent to acceptance, it is required due to other construction activity in the project such as finishing roads, installing water or sewer lines, etc.

12. Compacted backfill shall be free of soil material, rocks, etc. greater than four inches (4") in maximum dimension.

13. Wheel roll compaction is the minimum required on all trenching. This includes all notches from main trench to above ground equipment.

14. All conduit requirements for the electric distribution system designed to service the Developer's project shall be furnished by the Developer in accordance with NEC's electric distribution plan. Approved duct types for all primary, secondary, and service lines is polyvinyl chloride (PVC) designed for direct burial installation and in compliance with one of the following standards: Electrical Grade PVC conduit marked Schedule 40 PVC, 90°C or Schedule 80, 90°C when required.

15. Typical URD 1-phase primary is one (1) 3" diameter conduit at 36" minimum cover from top of conduit to finished grade. Typical trench depth is 43" from finished grade. Within the City of Show Low, contact NEC Engineering Department for project specific requirements.

16. Typical URD 3-phase primary is three (3) 3" diameter conduits at 36" minimum cover from top of conduits to finished grade. Typical trench depth is 43" from finished grade or greater as specified. Within the City of Show Low, contact NEC Engineering Department for project specific requirements.
17. Typical URD secondary service conduits in the same trench as primary cable conduits shall be at 36” minimum cover from top of conduit to finished grade. Install (1) 2-½” or 3” (when required) diameter Schedule 40 PVC conduit stub-out per lot at 36” minimum cover from top of conduit to finished grade at single-phase transformer locations. Secondary service conduit runs from single-phase transformers to the meter panel can be sloped up to a 30” minimum cover. All conduit for service stub-outs, plus future extensions of service conduit to the meter panel are to be supplied and installed by the Developer/Customer and/or his Contractor. **Within the City of Show Low, contact NEC Engineering Department for project specific requirements.**

18. If the project has been designed with secondary pedestals, install (1) 3” diameter Schedule 40 PVC conduit per secondary cable run at 30” minimum cover from top of conduit to finished grade. The Developer/Customer and/or his Contractor will also be required to install the NEC furnished secondary pedestals for this type of installation. **Within the City of Show Low, contact NEC Engineering Department for project specific requirements.**

19. All conduit is to be installed per the manufacturer's recommendations and shall be properly joined together with couplings and aligned such that no sharp edges protrude on the inside. Primer and glue will be required at all conduit joints. Moisture, dirt, or other foreign material shall be kept from entering the conduit system during installation. The conduit system shall be dry and clear of obstructions when completed.

20. All conduit shall be placed on a smooth and level trench bottom with 3” bedding to provide even support of the conduit. Intersecting conduits shall have a 3” separation between them to ensure that all voids in the conduit group are adequately filled with shading and to prevent pressure points from conduit-to-conduit contact. Crushed conduits compressed out-of-round will be rejected.

21. The sum angle of all vertical and horizontal sweeps in any given span between outlets should not exceed 360°. All horizontal sweeps in any primary run with an accumulative radius of sweep bends exceeding 360°, shall be encased in a 3” thickness of concrete. Encasement of sweeps should extend a minimum of 12” beyond joints.

22. The permissible sweep radius for all 3” primary conduit spans is 36” minimum. All sweeps for 2-½” and 3” secondary service conduit shall be 24” minimum radius in the runs and 36” minimum radius at the transformer locations. Sweep deflections of 45° and 90° are permitted for any conduit run. Vertical sweep deflections shall be 90° at all riser/dip poles and three-phase transformer locations. Vertical sweep deflections shall be 45° at single-phase transformer locations.

23. It is the responsibility of the Developer/Customer and/or his Contractor to install all concrete transformer pads and other special equipment pads specified in the electric distribution plan. All installations shall be to NEC specifications and in compliance with road rights-of-way and public utility easements. All costs for relocation of conduit and NEC equipment due to improper conduit placement or poor conduit installation shall be borne by the Developer/Customer and/or his Contractor. NEC supplied transformer ground sleeves and ground rods shall be installed by the Developer/Customer and/or his Contractor. **NEC supplied materials must be picked up by the Developer/Customer and/or his Contractor at NEC’s warehouse between the hours of 8:30 am and 11:30 am only.**

24. NEC shall periodically inspect the conduit system installation to include the entire trench route, all shading, all conduit installation, all transformer and equipment ground sleeves, all
transformer and equipment pads, all conduit stub-outs, all concrete encasement when required, and all secondary pedestals when these apply. Installation and inspection of the distribution conduit system in phases is permissible; however, NEC will not install its facilities until the entire distribution conduit system is completed and approved.

**A minimum of 48 hours notice is required for inspection requests.** Inspection requests can be made at the following NEC offices:

<table>
<thead>
<tr>
<th>Office</th>
<th>Phone Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lakeside Office</td>
<td>928-368-1289</td>
</tr>
<tr>
<td>Springerville Office</td>
<td>928-333-4631</td>
</tr>
<tr>
<td>St. Johns Office</td>
<td>928-337-4414</td>
</tr>
<tr>
<td>Overgaard Office</td>
<td>928-535-4307</td>
</tr>
<tr>
<td>Reserve Office</td>
<td>505-533-6328</td>
</tr>
</tbody>
</table>

ANY ELECTRICAL TRENCH AND CONDUIT WORK BACKFILLED WITHOUT NEC INSPECTION OR INSTALLED IN A SUBSTANDARD MANNER WILL BE REJECTED.

25. All conduit lines shall be thoroughly cleaned of foreign debris and an approved mandrel no more than ½” smaller in diameter than the inside diameter of the conduit shall be drawn through. All conduit shall be tagged at outlets with appropriate identifying notations. Only flat pull tape shall be used to draw or retrieve the mandrel to ensure conduit integrity. After the mandrel pull test passes, all primary and secondary conduit runs shall be left with a minimum 1250 lb. test pull tape installed. All service stub-outs shall be left with a minimum 1250 lb. test pull tape in place with a minimum of 20' at the stub.

26. NEC approved shading and bedding material for a conduit system can be up to 1” minus from existing trench spoil or imported material. Screened cinders and rock which are 1” minus are excluded with the exception of cinder sand and rock crusher tailings mixed with sand.

### CONDUIT SCHEDULE

#### Single-phase Residential Services

<table>
<thead>
<tr>
<th>Service Entrance Rating/Size</th>
<th>Size of Conduit</th>
<th>Number of Conduits Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>100-200A</td>
<td>2 ½”</td>
<td>1</td>
</tr>
<tr>
<td>400A</td>
<td>3”</td>
<td>1</td>
</tr>
<tr>
<td>600A</td>
<td>4”</td>
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### Single-phase Commercial Services

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<thead>
<tr>
<th>Service Entrance Rating/Size</th>
<th>Size of Conduit</th>
<th>Number of Conduits Required</th>
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<tr>
<td>100-200A</td>
<td>2 ½”</td>
<td>1</td>
</tr>
<tr>
<td>400A</td>
<td>4”</td>
<td>1</td>
</tr>
<tr>
<td>600A</td>
<td>4”</td>
<td>2</td>
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</tbody>
</table>

### Three-phase Residential and Commercial Services

<table>
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<th>Service Entrance Rating/Size</th>
<th>Size of Conduit</th>
<th>Number of Conduits Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>100-200A</td>
<td>3”</td>
<td>1</td>
</tr>
<tr>
<td>400A</td>
<td>4”</td>
<td>1</td>
</tr>
<tr>
<td>600A</td>
<td>4”</td>
<td>2</td>
</tr>
<tr>
<td>800A</td>
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<tr>
<td>1000A</td>
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</tr>
<tr>
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</tr>
<tr>
<td>1600A</td>
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</tr>
<tr>
<td>2000A</td>
<td>4”</td>
<td>5</td>
</tr>
<tr>
<td>2500A</td>
<td>4”</td>
<td>6</td>
</tr>
<tr>
<td>3000A</td>
<td>4”</td>
<td>7</td>
</tr>
</tbody>
</table>
TRENCHES FOR CONDUIT INSTALLATIONS

NOTES:
1. SECONDARY SERVICES MAY BE 30" MINIMUM COVER. REFER TO CONDUIT CONSTRUCTION SPECIFICATIONS.
2. WITHIN THE CITY OF SHOW LOW, CONTACT NEC ENGINEERING FOR PROJECT SPECIFIC REQUIREMENTS.
3. CONTACT TELEPHONE AND CATV FOR THEIR SPECIFIC REQUIREMENTS.
GROUND SLEEVE INSTALLATION

1. Excavate the hole approximately 4" - 6" deeper than the ground sleeve burial depth. This should be approximately 32" - 34" in depth. The top of the ground sleeve shall be 4" above the final grade.

2. Compact the soil with a backhoe or a hydraulic tamper.

3. Add approximately 4" - 6" of 1" minus (or smaller) gravel to the bottom of the hole.

4. Compact by machine and level the gravel.

5. Place the ground sleeve on the leveled gravel bed.

6. Level the ground sleeve.


8. Do not back-fill with chunks of frozen material or large rocks next to the ground sleeve.

9. Pack the back-fill material by foot tamping.

10. Within the City of Show Low, contact NEC Engineering for project specific requirements.
INSTALLATION NOTES

1. Primary conduits shall be 3" PVC Schedule 40. Check with NEC Engineering Department for number required. The conduits to extend a maximum of 3" above grade within the conduit opening.

2. Secondary conduits shall be PVC Schedule 40. Check with NEC Engineering Department for size and number required. The conduits to extend a maximum of 3" above grade within the conduit opening.

3. 2500 p.s.i. concrete minimum. Pad to be made in one continuous pour.

4. 3" minimum concrete cover over #4 rebar placed 10" O.C. each way.

5. All concrete forms and conduits must be in place and approved prior to pouring the pad.

6. The following unobstructed minimum clear areas are required around the transformer pad:
   Sides - 2 ft; Rear - 3 ft; Front - 10 ft.

7. Transformer locations to comply with all codes, ordinances and regulations within the States of Arizona and New Mexico or as specified by NEC.

8. 5/8" X 8' Ground rod to extend a maximum of 6" above grade within the conduit opening.

3-PHASE PADMOUNT TRANSFORMER
CONCRETE PAD INSTALLATION
THREE-SCHEDULE 40
90° X 36° MIN. RADIUS

FINAL GRADE

STUB UP CONDUIT 3" MIN. TO 6" MAX. ABOVE FINAL GRADE WITH CAPPED ENDS

36" MIN. COVER TO THE TOP OF ALL PRIMARY CONDUITS. INCREASE DEPTH AS REQUIRED FOR JOINT USE CONDITIONS.

NEC PRIMARY POLE

THREE-PHASE PRIMARY
3" CONDUIT RISER POLE DETAIL

DATE
09/25/07

DRAWING NO.
U1

Effective: March 1, 2008
DUCT PLUG DETAIL

Conduit plugs must be furnished on all duct outlets in transformer and sectionalizing cab basements. (Duct tape will not be permitted.)

Developer to label & tag all primary, secondary, and service conduits which enter/exit the basement. Secure tag to duct plug with plastic wire tie.

Mule tape is to be furnished in all service stub-outs only. Use a 1250 lb min. test line secured to service duct plugs.

Unless specified by NEC, mule tape will not be a requirement in primary or secondary ducts.

SERVICE STUB DETAIL

Future extension of 2-1/2" service conduit to meter panel at home or mobile home pedestal is to be furnished installed by the customer. Routing of service line to the home must be along the shortest direct route from the source indicated by the electric plan of NEC.

Developer/customer to furnish mule tape in all service stub-outs only. Leave a 20 foot length in service stub-out ducts.

Install conduit cap over mule tape. Leave cap unglued (duct tape will not be accepted.)

Effective: March 1, 2008
NOTES TO SLOPE PROTECTION REQUIREMENTS:

1. NEC MUST BE ABLE TO MAINTAIN & SERVICE ALL ELECTRIC EQUIPMENT FROM THE STREET OR BY OTHER LEGAL ACCESS.

2. NEC PERSONNEL MUST HAVE A LEVEL SURFACE TO WORK ALL EQUIPMENT ONCE ENERGIZED AND MUST HAVE AT LEAST 10 FEET OF CLEAR WORK SPACE ON THE FRONT SIDE OF ALL TRANSFORMERS AND DRY-TYPE JUNCTION CABINETS. A 10 FOOT CLEAR WORK ZONE MUST BE MAINTAINED AT THE FRONT SIDE AND REAR SIDE OF ALL DOUBLE-SIDED "FUSED" SECTIONALIZER CABINETS.

3. DEVELOPER/CUSTOMER SHALL BE RESPONSIBLE FOR ALL COST RELATED TO REPAIR OF ELECTRIC EQUIPMENT THAT HAS SETTLED EXCESSIVELY OR HAS BECOME BURIED DUE TO LACK OF SLOPE PROTECTION AND/OR AS A RESULT OF SOIL EROSION.

4. A 24" MAXIMUM RISE IN ELEVATION IS PERMISSIBLE ON FRONT SIDE OF ALL TRANSFORMERS, WITH PROPER SLOPE PROTECTION.

5. DEVELOPER/CUSTOMER SHALL BE RESPONSIBLE FOR ALL COSTS TO REPLACE EQUIPMENT THAT HAS RUSTED OR BECOME DAMAGED DUE TO PROLONGED CONTACT WITH UNPROTECTED SOIL OR DUE TO IMPROPER SOIL COMPACTION.

6. DEVELOPER/CUSTOMER SHALL ENSURE THAT ALL STREET AND LOT DRAINAGE WATER IS CHANNELED AWAY FROM OR AROUND NEC'S EQUIPMENT.

7. SERVICE STUB-OUTS SHALL BE EXTENDED BEYOND RIP-RAP SLOPES OR RETAINING WALLS, SO THAT FUTURE SERVICE EXTENSIONS DO NOT DAMAGE THE SLOPE PROTECTION.