THIS DRAWING OUTLINES THE MINIMUM REQUIREMENTS FOR CONDUIT AND CABLE INSTALLED BY CUSTOMERS, CONTRACTORS, OR DEVELOPERS FOR THE SERVICE LATERAL TO ANY NEW OR UPGRADED ELECTRIC SERVICE PANEL. LARGER THAN SPECIFIED CABLE AND CONDUIT MAY BE REQUIRED FOR A GIVEN PANEL SIZE TO MEET ALLOWABLE VOLTAGE DROP AND FLICKER LEVELS.

CONDUITS AND CABLE REQUIREMENTS FOR RESIDENTIAL SERVICE

Maximum Service Equipment "Panel" Rating (Amps) (80% Rated Services)	Conduit Size and Quantity	Aluminum Cables Required (per phase) – Full Size Neutral Required (AWG or kcmil)	Copper Cables Required (per phase) – Full Size Neutral Required (AWG or kcmil)
125	1 – 2"	1 – 1/0	1 – # 2
200	1 – 3"	1 – 4/0	1 – 2/0
400	1 – 4"	1 – 350	1 – 4/0
600 ▲	2 – 4"	2 – 350	2 – 4/0

▲ Only allowed with Engineering Managers Approval.

CONDUIT AND CABLE REQUIREMENTS FOR COMMERCIAL/INDUSTRIAL SERVICES – SINGLE PHASE

Maximum Service Equipment "Panel" Rating (Amps) (100% Rated Services)	Minimum Conduit Size and Quantity	Aluminum Cables Required (per phase) – Full Size Neutral Required (AWG or kcmil)	Copper Cables Required (per phase) – Full Size Neutral Required (AWG or kcmil)
125	1 – 2"	1 – 4/0	1 – 1/0
200	1 – 3"	1 – 4/0	1 – 4/0
400	1 – 4"	1 – 750	1 – 500
600	2 – 4"	2 – 500	2 – 350

CONDUIT AND CABLE REQUIREMENTS FOR COMMERCIAL/INDUSTRIAL SERVICES – THREE PHASE

Maximum Service Equipment "Panel" Rating (Amps) (100% Rated Services)	Conduit Size and Quantity	Aluminum Cables Required (per phase) – Full Size Neutral Required (AWG or kcmil)	Copper Cables Required (per phase) – Full Size Neutral Required (AWG or kcmil)
400	1 – 4"	1 – 750	1-500
600	2 – 4"	2 – 500	2 – 350
800	2 – 4"	2 – 750	2 – 500
1000	3 – 4"	3 – 750	3 – 500
1200	4 – 4"	4 – 750	3 – 750 or 4 – 500
1600	4 – 4"	4 – 750	4 – 500
1800 *	4 – 4"	None Approved	4 – 500 X-Flex
2000 *	6 – 4"	None Approved	6 – 500 X-Flex
2500 *	6 – 4"	None Approved	6 – 500 X-Flex
3000 *	7 – 4"	None Approved	7 – 500 X-Flex
4000 * (Max Demand 2500 kVA)	7 – 4"	None Approved	7 – 500 X-Flex

* Bus Way/Transition Cabinet – See CPAU drawing SR–XF–E–1020 for details – may be used in place of conduit and X–Flex cables. Installations must comply with the most recent version of the National Electric Code (NEC).

REV	DATE	DESCRIPTION	APPR
5	7/16	Revised conduit for 200A panel, 3"	TT
4	5/15	Added note - 600A req Mgr Appvl	TT
3	5/13	Added cable for 1ph 600A Panels	TT
2	1/12	Revised footnote	TT
1	9/09	Revised 400A, 1ph Svc Cable	TT

APPROVED ____/____/200

ENGR. MANAGER

Original Signed and Approved by Engineering Manager

ENGINEERING STANDARD

UNDERGROUND SERVICE CONDUIT AND CABLE REQUIREMENTS

ENGR	TT	
DRAWN	MD	
CHECKED	PV	

CITY OF PALO ALTO
CALIFORNIA

SCALE	STANDARD NO.	SHEET NO.
NTS	DT–SE–U–1032	1 OF 2

NOTES:

- THE INSTALLATION OF A 4000 A PANEL MUST BE APPROVED BY CITY OF PALO ALTO UTILITIES (CPAU) ELECTRIC ENGINEERING DEPARTMENT. IT IS LIMITED TO A MAXIMUM PEAK DEMAND OF 2500 KVA.
- STANDARD ALLOWABLE SERVICE CABLE SIZES – #2, 1/0, 2/0, 4/0, 350, 500, AND 750 (AWG OR KCMIL) ALUMINUM OR COPPER PER THE TABLES.
- SERVICE LATERAL MAY NOT EXCEED 100 FEET UNLESS APPROVED BY UTILITIES ELECTRIC ENGINEERING.
- "X–FLEX" IS COBRA WIRE & CABLE, INC., EXTRA FLEXIBLE CABLE, 600V, 105 °C, X–FLEX (PART # A1530MB–DBS) OR CPAU APPROVED EQUIVALENT, PER CPAU DRAWING SR–XF–E–1020.
- "X–FLEX" CABLES ARE A CPAU NON–STANDARD CABLE . WHEN USED, THE DESIGNATED SERVICE POINT SHALL BE THE SECONDARY TERMINALS OF THE TRANSFORMER. THE CUSTOMER IS RESPONSIBLE FOR MAINTENANCE, OR REPLACEMENT IF NECESSARY, OF THESE CABLES.
- "X–FLEX" CABLES REQUIRE A CRIMP TYPE LUG SUITABLE FOR FINE STRAND CABLE. SEE CPAU DWG SR–XF–E–1020 FOR DETAILS. CUSTOMER IS RESPONSIBLE FOR TERMINATING AND CONNECTING CABLES AT SWITCHGEAR OR TRANSITION CABINET. CPAU WILL TERMINATE AND CONNECT CABLES AT TRANSFORMER.
- ALLOWABLE CONDUIT SIZES – 2, 3, 4, and 5 INCH. ½ INCH SIZES ARE NOT PERMITTED.
- CONDUIT AND CABLE SIZES INDICATED ARE THE MINIMUM ALLOWABLE SIZES PER PANEL RATING.
- EXISTING 1½" OR 2" CONDUIT MAY BE ALLOWED FOR PANEL UPGRADES IN THE SAME LOCATION IF THEY MEET AMPACITY AND CONDUIT FILL REQUIREMENTS, AND IS APPROVED BY CPAU ENGINEERING.
- THE FOLLOWING CABLE INSULATION TYPES ARE ALLOWED: XLP, THWN–2, USE–2, OR OTHERWISE RATED FOR UNDERGROUND SERVICE ENTRANCE USE AND APPROVED BY CPAU ELECTRIC ENGINEERING DEPARTMENT.
- CONDUIT SHALL BE SCHEDULE 40, PER UL STD 651 & NEMA TC 2, OR DB–120 PVC CONDUIT, PER NEMA TC 6 & TC 8 AND ASTM F–512, FOR BELOW GROUND INSTALLATIONS; GALVANIZED RIGID STEEL CONDUIT SHALL BE USED FOR ABOVE GROUND INSTALLATIONS.
- NO MORE THAN FOUR SERVICE CONDUITS WILL BE INSTALLED TO ANY ONE TRANSFORMER, UNLESS APPROVED BY ELECTRIC ENGINEERING FOR USE WITH "X–FLEX" CABLES AND TRANSFORMERS WITH SECONDARY BUSHING SUPPORTS.
- CONDUIT BENDS MUST NOT EXCEED 90° WITH NO MORE THAN 3 – 90° BENDS (270° TOTAL) BETWEEN PULL BOXES.
- ALLOWABLE BEND RADIUS:

CONDUIT SIZE	MINIMUM BEND RADIUS
2 inch	24 inches
3 inch	36 inches
4 inch	36 inches
5 inch	60 inches
All risers	36 inches

APPROVED ____/____/200

ENGR. MANAGER

Original Signed and Approved by Engineering Manager

ENGINEERING STANDARD

UNDERGROUND SERVICE CONDUIT AND CABLE REQUIREMENTS

REV	DATE	DESCRIPTION	APPR
6	9/16	Added note for existing 2" except	TT

ENGR.	TT	
DRAWN	MD	
CHECKED	PV	

CITY OF PALO ALTO
CALIFORNIA

SCALE	STANDARD NO.	SHEET NO.
NTS	DT–SE–U–1032	2 OF 2