

ATTENTION: These documents are provided for informational purposes. They provide standard configurations, general requirements, and guidelines for trenching and standard customer interconnections for APS customers. These documents do not address every possible situation. It is the responsibility of the customer to ensure that the documents provided here are the most current version. APS reserves the rights to require modifications based on site specific or system conditions.



ARIZONA PUBLIC SERVICE COMPANY
T&D CONSTRUCTION STANDARDS

BY	LDR.	MGR.	DATE	REV.
LMO	B. BOOKER	R. CANDRA	12/2015	9

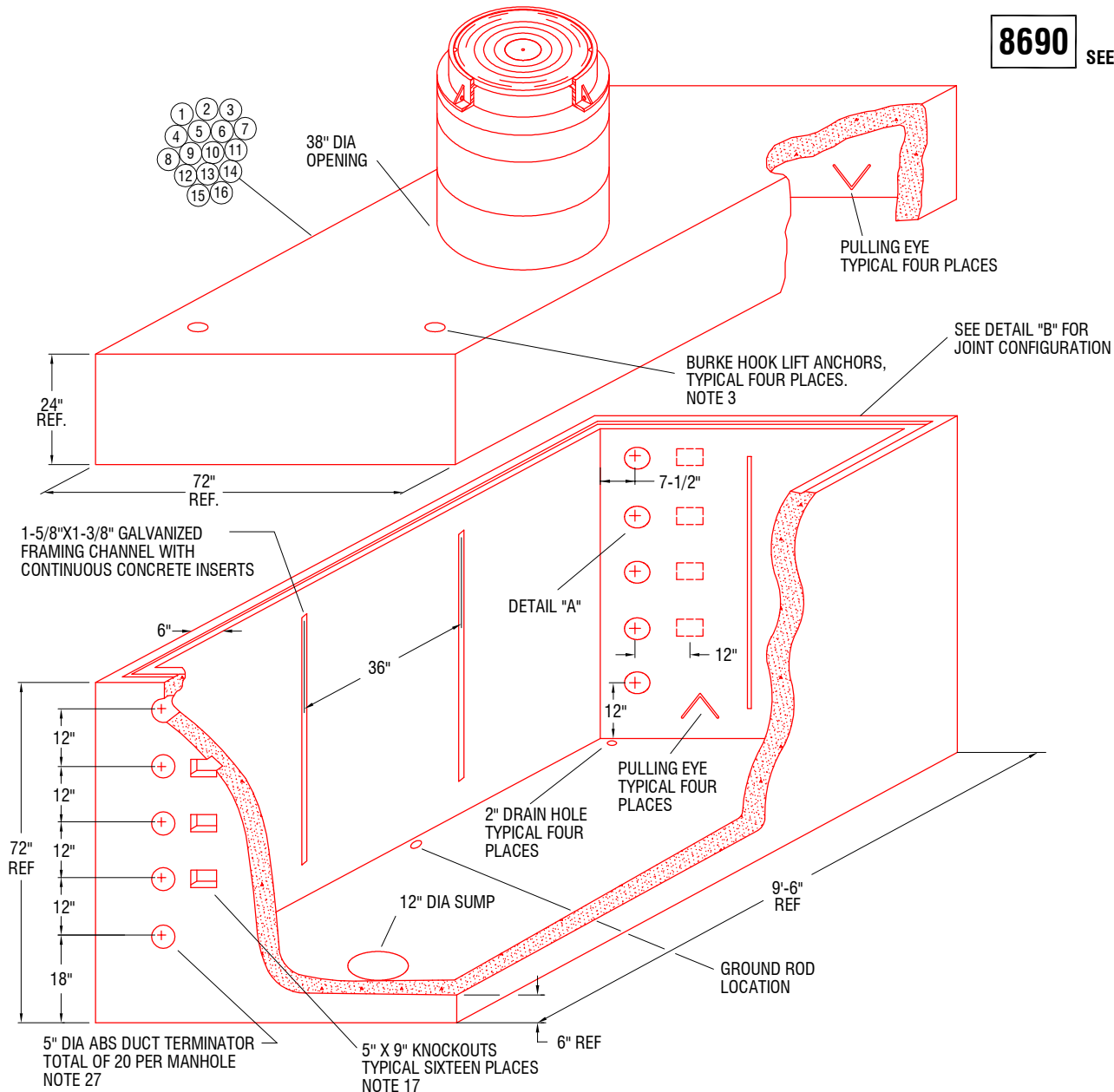
**SUBSTRUCTURES
MANHOLE
STANDARD TRAFFIC-BEARING
RECTANGULAR OF REINFORCED PRE-CAST CONCRETE**

COVER

8690

8690

SEE NOTE 14



4. DRIVE GROUND ROD IN THE LOCATION SHOWN BEFORE INSTALLING THE TOP PORTION OF THE MANHOLE OR SEE 2400 STANDARDS FOR ALTERNATE GROUNDING METHODS. THE PARTY RESPONSIBLE FOR THE INSTALLATION OF THE CONDUIT SYSTEM SHALL BE RESPONSIBLE FOR THE INSTALLATION OF THE STEPS, LADDER AND GROUND ROD OR AN APPROVED ALTERNATE. DO NOT DRIVE THE GROUND ROD IN THE SUMP HOLE.
5. CLEAN JOINT SURFACES WITH A BRUSH AND ENSURE JOINTS ARE DRY. FIRMLY PRESS JOINT FILLER ONTO SURFACE END-TO-END AROUND THE ENTIRE JOINT. ALLOW 1-INCH OVERLAPS WHEN ABUTTING.
6. PREFORMED BUTYL JOINT SEALER SUFFICIENT FOR SETTING THE MANHOLE SHALL BE SUPPLIED BY THE MANUFACTURER. THE APS PREFORMED BUTYL SEALER IS APN 32902568.
7. THE CABLE RACKING SHOWN IN DETAIL "C" UTILIZES 12-INCH RACKS AND IS REQUIRED TO ENSURE THAT THE REQUIRED 36-INCH MINIMUM CLEAR HORIZONTAL WORKING SPACE IS AVAILABLE.

NOTES:

1. APPROXIMATE WEIGHT OF MANHOLE COMPONENTS:

TOP SECTION	BOTTOM SECTION
7,000 LBS	16,000 LBS
2. THE ALLOWABLE WORKING LOAD FOR EACH PULLING ANCHOR IS 16,800 LBS.
3. THE ALLOWABLE WORKING LOAD FOR EACH LIFTING ANCHOR IS 5,000 LBS.



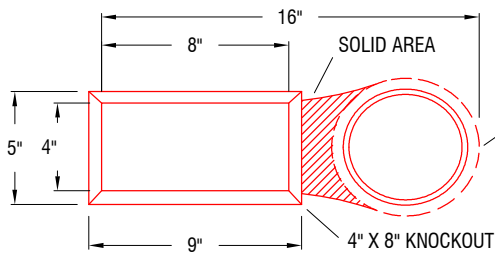
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SUBSTRUCTURES
MANHOLE
STANDARD TRAFFIC-BEARING
RECTANGULAR OF REINFORCED PRE-CAST CONCRETE

SH 1 OF 2

8690

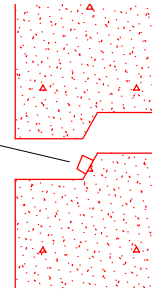


KNOCKOUT DETAIL "A"

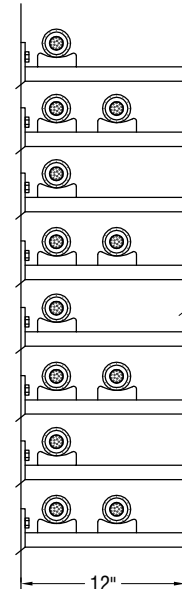
APPLICATION:

KNOCKOUTS ARE PROVIDED ON THE ENDS OF THE MANHOLE AND ARE DESIGNED TO FACILITATE THE INSTALLATION OF INDIVIDUAL PHASES IN SEPARATE CONDUITS. BREAK OUT THE SOLID AREA ALONG WITH THE 4-INCH BY 8-INCH KNOCKOUT AND REMOVE THE DUCT TERMINATOR. POSITION THE NEW CONDUITS WITH EQUIDISTANT SPACING. TERMINATE THE CONDUITS PER 8601, 18.0.

NOTES
5 AND 6



JOINT DETAIL "B"



CABLE RACKING DETAIL "C"

8. TERMINATE CONDUIT PER 8601, SECTION 18.0.

9. CONDUIT FOR PRIMARY OR FEEDERS INSTALLED SHALLOWER THAN A 36-INCH DEPTH SHALL BE PARTIALLY ENCASED WITH A MINIMUM 4-INCH CONCRETE CAP ON TOP AND 2 INCHES ON THE SIDES. PARTIAL CONCRETE ENCASEMENT SHALL INCLUDE TOP AND SIDES OF CONDUIT, BUT NOT THE BOTTOM (SEE 8601, 23.0).

10. THE EXACT MANHOLE DESIGN AND DIMENSIONS VARY SLIGHTLY BY MANUFACTURER. THE DIMENSIONS SHOWN ON THIS DRAWING ARE APPROXIMATE ONLY (VARIANCE IS ± 1 -INCH).

11. THE EXACT LOCATION AND ORIENTATION OF THE MANHOLE SHALL BE SPECIFIED ON THE CONSTRUCTION DRAWINGS.

12. ENGINEERING SHALL VERIFY THE STRENGTH OF THE MANHOLE WILL NOT BE ADVERSELY AFFECTED, PRIOR TO APPROVING ANY FIELD MODIFICATIONS SUCH AS CUTS TO FORM SLOTS OR HOLES.

13. THE MANHOLE PURCHASE PRICE INCLUDES NORMAL DELIVERY AND SET WITHIN 50 MILES OF MANUFACTURER'S FACILITY.

14. MANHOLE LADDER GROUNDING, 36" DEEP NECK WITH STEPS AND CAST IRON MANHOLE COVER ARE INCLUDED WITH THIS STANDARD. MANHOLE NECK DEEPER THAN 36" MUST BE SPECIFIED SEPARATELY, SEE 8695. CABLE RACKING SHALL BE SPECIFIED SEPARATELY (SEE REFERENCES).

15. A MAXIMUM OF FOUR, THREE-PHASE 750 KCMIL FEEDERS MAY BE INSTALLED ON THE LONG WALL OF THE MANHOLE WHEN UTILIZING THREE CABLES WITHIN 5-INCH CONDUIT. RACK CABLES ON ONLY ONE WALL.

16. OFFSET MANHOLES FROM JOINTLY-USED TRENCHES TO AVOID BLOCKING THE TRENCH WHEREVER PRACTICAL. SEE 1287.

17. KNOCKOUTS ARE PROVIDED ON THE ENDS OF THE MANHOLE AND ARE DESIGNED TO FACILITATE THE INSTALLATION OF INDIVIDUAL PHASES IN SEPARATE CONDUITS. EACH KNOCKOUT CAN ACCOMMODATE TWO 3-INCH, THREE 2-INCH OR ONE 4-INCH CONDUITS. WHEN INSTALLING A SMALLER CONDUIT IN THE 5-INCH HOLE, REMOVE THE DUCT TERMINATOR. TERMINATE THE CONDUITS PER 8601, 18.0.

18. MAXIMUM ALLOWABLE COVER OVER MANHOLE IS 11 FEET.

19. SEE 8695 FOR MANHOLE NECK WITH CAST-IRON FRAME AND COVER DETAILS.

20. SEE 8698 FOR MANHOLE INTERNAL GROUNDING DETAILS.

21. SEE 8801 FOR 12-INCH CABLE RACKING DETAILS, AND DETAIL "C" ABOVE.

22. SEE 8865 FOR MANHOLE LADDER DETAILS.

23. SEE 8601 FOR PROPER EXCAVATION, BEDDING, BACKFILL AND COMPACTION REQUIREMENTS.

24. SEE 8601 AND 8640 FOR EXCAVATION SAFEGUARDS.

25. SEE UNDERGROUND METHODS FOR MANHOLE FEEDER NUMBERING DETAILS.

26. SEE 8606 AND 8610 FOR THE MINIMUM REQUIRED BACKFILL COVER.

27. SEE 8601 FOR THE PRIMER AND CEMENT REQUIREMENTS WHEN JOINING PVC CONDUIT TO THE ABS TYPE DUCT TERMINATORS.

28. SEE 2400 STANDARDS FOR ALTERNATE GROUNDING METHODS.

CODE	8690	MATERIAL LIST	
ITEM	QTY	DESCRIPTION	APN
1	2	GRADE RING 12" *	32902562
2	1	GRADE RING 6" *	32902564
3	1	CONCRETE, FAST-SETTING	32900850
4	60	CABLE, #4/0 7STRD CU BARE	31104020
5	10	CONN CU GRD CLAMP 2/0-4/0	71703835
6	5	CONN CU "C" 3/0-4/0 3/0-4/0	33101346
7	1	CONNECTOR 350 MCM ALL PUR	33002962
8	3	GRADE RING SEALER *	32902568
9	1	MANHOLE RECTANGULAR H-20	32904720
10	3	STEP, HOT DIP GALV *	00052071
11	10	NUT, SPRING 1/2"-13 REG	33105004
12	1	ROD COPPERCLAD GRD 5/8"X8	33004805
13	1	LADDER 8-FOOT GALV HOOK *	00052070

* THIS MATERIAL AUTOMATICALLY COMES WITH MANHOLE FROM MANUFACTURER.