

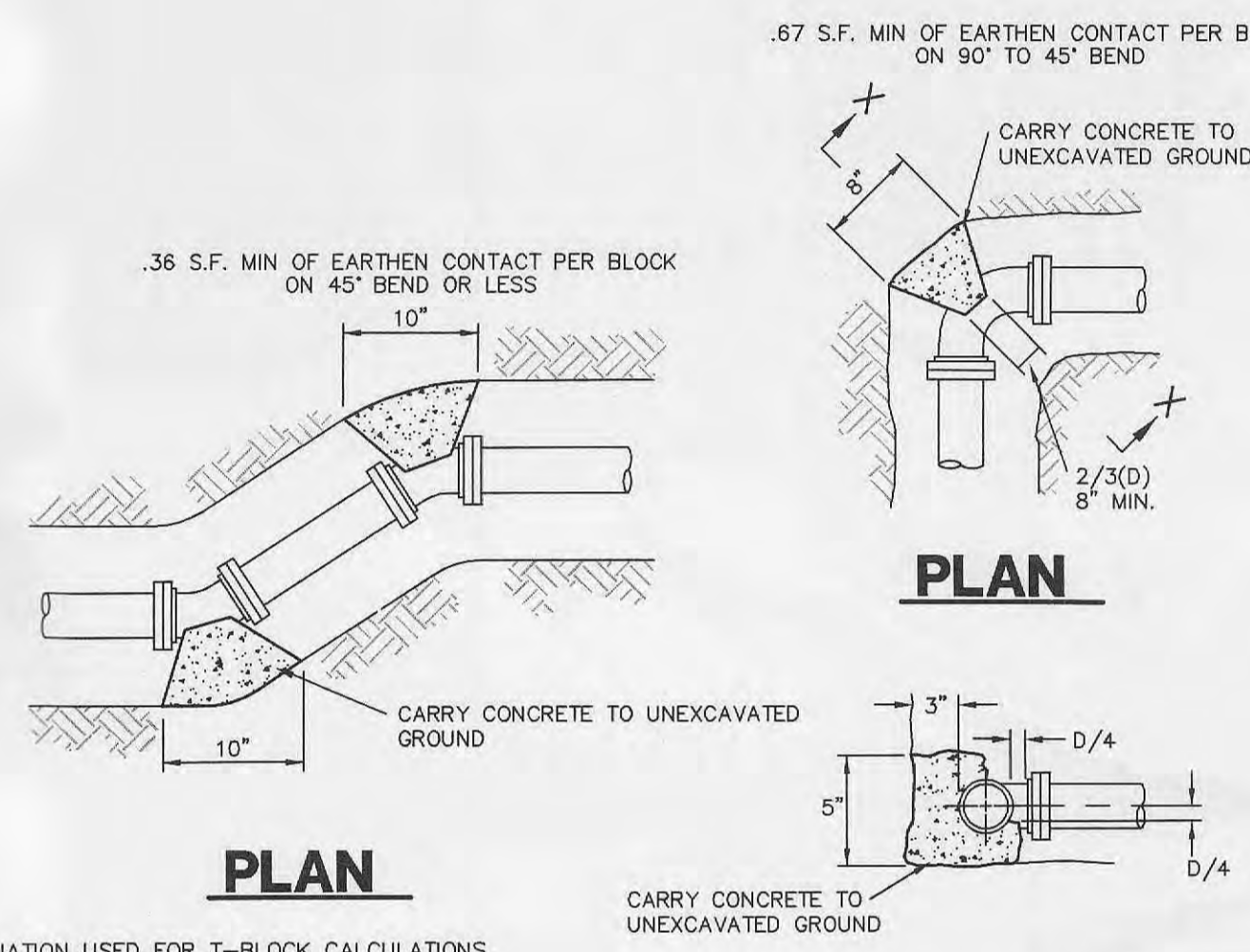
WATER LINE NOTES

1. ALL MATERIALS AND METHODS OF CONSTRUCTION FOR WATER MAINS TO MEET REQUIREMENTS OF THE CITY OF O'FALLON OR MISSOURI-AMERICAN WATER COMPANY DEPENDING UPON WHO IS SELECTED TO SERVE THE DEVELOPMENT.
2. WATER MAINS SHALL BE POLYVINYL CHLORIDE (PVC) CLASS 200, SDR 21 PIPE CONFORMING TO A.S.T.M. SPECIFICATIONS D2241. THE PIPE SHALL BE PRESSURE RATED FOR A HYDROSTATIC WORKING PRESSURE OF 200 PSI AT 73.4 DEGREES F AND SHALL MEET ALL APPLICABLE REQUIREMENTS AS SET FORTH UNDER COMMERCIAL STANDARD (CS) 256-63.
3. DUCTILE IRON PIPE MATERIALS AND CONSTRUCTION SHALL BE IN ACCORDANCE WITH ALL THE REQUIREMENTS OF U.S.A. STANDARD A2151 (A.W.W.A. C-151-65). THE PIPE SHALL BE FURNISHED WITH MECHANICAL, PUSH ON, OR FLANGE JOINTS AS REQUIRED. THE INTERIOR SURFACE OF PIPE SHALL BE COATED WITH A CEMENT-MORTAR LINING IN ACCORDANCE WITH U.S.A. STANDARD A 21.4 (A.W.W.A. C. 104). AFTER DRYING, THE CEMENT LINING SHALL BE SEAL COATED WITH SIMILAR A.W.W.A. APPROVED BITUMINOUS VARNISH. ALL FITTINGS AND BENDS SHALL BE CONSTRUCTED OF CAST OR DUCTILE IRON.
4. WATER MAIN TRACER TAPE TO BE INSTALLED WITH ALL WATER MAIN AND SHALL CONSIST OF THREE INCH WIDE TAPE MADE OF BONDED LAYER PLASTIC WITH A METALLIC FOIL CORE. TAPE SHALL BE "TERRA TAPE D" AS MANUFACTURED BY THE GRIFFOLYN COMPANY OF HOUSTON, TEXAS, OR APPROVED EQUAL.
5. WATER MAIN LOCATOR SHALL BE INSTALLED WITH ALL WATER MAIN, FITTINGS, AND VALVE INSTALLATION AND SHALL CONSIST OF A STANDARD ELECTRIC SERVICE WIRE, A SINGLE NO. 12 U.L. APPROVED COPPER WIRE OF THE SOLID OR STRAND TYPE WITH INSULATION FOR 600 VOLTS.
6. ALL VALVES FOR EXTERIOR USE SHALL BE BURIED GATE VALVES WITH A VALVE BOX AND TWO INCH SQUARE NUT ATTACHMENT FOR MANUAL OPERATION WITH STANDARD VALVE WRENCH. GATE VALVE SHALL BE IRON BODIED WITH BRASS OR BRONZE MOUNTED DOUBLE DISC GATE. GATE VALVES SHALL BE OF THE NON-RISING STEM TYPE, OPENED BY TURNING COUNTER-CLOCKWISE. THE VALVE STEM SHALL HAVE DOUBLE "O" RING SEALS AND TERMINATE AT TOP WITH TWO INCH SQUARE NUT. GATE VALVE CONSTRUCTION AND MATERIALS SHALL CONFORM TO THE LATEST GOVERNING SPECIFICATIONS OF THE A.S.T.M. AND A.W.W.A. ALL GATE VALVES FOR USE SHALL BE "MUELLER" OR APPROVED EQUAL.
7. VALVE BOXES FOR USE SHALL BE THE SCREW-TYPE, EXTENSION SLEEVE KIND, OR P.V.C. PIPE. ALL BOXES SHALL BE FITTED WITH A RECESSED COVER HAVING THE WORD "WATER" CAST IN THE TOP.
8. FIRE HYDRANTS SHALL BE MUELLER "CENTURION" OR THE AMERICAN DARLING MODEL NO. "B-84-B". HYDRANTS SHALL BE TRAFFIC MODEL TYPE WITH A WORKING PRESSURE OF 150 PSI IN FULL COMPLIANCE WITH A.W.W.A. STANDARD SPECIFICATIONS C-502 OF THE LATEST REVISION. HYDRANTS TO BE THREE-WAY WITH TWO HOSE CONNECTIONS AND ONE PUMPER CONNECTION AND SHALL HAVE 5 1/4" VALVE OPENINGS. HYDRANTS TO BE YELLOW IN COLOR.
9. CONCRETE FOR THRUST BLOCKING AT BENDS, TEES, VALVES, HYDRANTS, ETC., SHALL BE 3,500 PSI COMPRESSIVE STRENGTH AT 28 DAYS.
10. BEFORE WATER MAINS SHALL BE ACCEPTED AND PUT INTO SERVICE THEY SHALL BE TESTED FOR TWO HOURS ON EACH SEGMENT BETWEEN END POINTS AT A TEST PRESSURE OF AT LEAST 50% IN EXCESS OF NORMAL MAXIMUM OPERATING PRESSURE, NOT TO EXCEED 200 PSI. WATER MAINS SHALL BE STERILIZED AND FLUSHED IN ACCORDANCE WITH THE CITY OF O'FALLON OR MISSOURI-AMERICAN WATER COMPANY DEPENDING UPON WHO IS SELECTED TO SERVE THE DEVELOPMENT.
11. ALL WATER LINES AND SERVICE LINES SHALL HAVE A MINIMUM OF 42" OF COVERAGE.
12. VERTICAL CLEARANCE BETWEEN SEWERS AND WATER MAINS SHALL BE A MINIMUM OF 2'-0".
13. EACH FIRE HYDRANT SHALL HAVE A 6 INCH BARREL AND SHALL BE OF THE BREAKAWAY DESIGN, FROST FREE WITH CHAIN, LEFT HAND OPEN DESIGN AND HAVE NATIONAL STANDARD THREADS.
14. IN SETTING HYDRANTS, DUE REGARD SHALL BE GIVEN TO FINAL GRADELINE. THE CENTER OF A HOSE NOZZLE OUTLET SHALL NOT BE LESS THAN EIGHTEEN (18) INCHES ABOVE GRADE AND THE OULETS MUST FACE THE STREET OR ACCESS DRIVE.
15. THERE SHALL BE NO OBSTRUCTION, I.E., PLANTINGS, BUSHES, TREES, SIGNS, LIGHT STANDARDS, MAILBOXES, ETC. WITHIN SIX (6) FEET ON ANY FIRE HYDRANT, AND/OR FIRE DEPARTMENT CONNECTION TO AN AUTOMATIC SPRINKLER SYSTEM.
16. PUBLIC HYDRANTS SHALL HAVE THE BONNETS COLOR CODED IN ACCORDANCE WITH ORDINANCE NO 13 OF THE COTTEVILLE FIRE PROTECTION DISTRICT.

A = CONTACT BEARING AREA OF BLOCK WITH EARTH IN SQUARE FEET

PIPE DIA. IN.	PLUG	45° WYE	TEE CONNECTION	UP TO 22.5'	UP TO 45'	UP TO 90'
	A (SQ. FT.)	A (SQ. FT.)	A (SQ. FT.)	A (SQ. FT.)	A (SQ. FT.)	A (SQ. FT.)
4" and smaller	0.5	1.4	2.6	1.8	2.2	2.0
6"	1.5	3.0	6.0	4.0	4.5	4.5
8"	2.5	5.0	9.5	6.5	8.0	8.0
10"	4.1	8.0	13.0	9.5	12.5	12.5
12"	5.5	11.5	19.0	13.5	18.0	18.0
16"	9.0	18.0	33.0	23.0	27.0	32.0
20"	14.0	28.0	51.0	36.0	42.0	50.5

NOTES:
 1. BEARING AREAS ARE BASED ON UNDISTURBED SOIL WITH A BEARING CAPACITY OF 1,000 POUNDS PER SQUARE FOOT. FOR A LESSER SOIL BEARING CAPACITY THESE AREAS SHALL BE INCREASED ACCORDINGLY.
 2. ALL CONCRETE THRUST BLOCKS SHALL BE 3000 p.s.i. CONCRETE.
 3. THRUST BLOCKS SHALL BE POURED AGAINST UNDISTURBED EARTH.
 4. NO JOINT SHALL BE COVERED WITH CONCRETE.
 5. JOINTS THAT LOCATED AGAINST THRUST BLOCKS ARE TO BE WRAPPED IN A CLOTH MATERIAL.
 6. APPROVED MECHANICAL JOINT RESTRAINTS ARE REQUIRED AT ALL VERTICAL BENDS AND MAY BE USED IN LIEU OF THRUST BLOCKS AT HORIZONTAL BENDS AT THE OPTION OF THE ENGINEER, AT NO ADDITIONAL COST TO THE OWNER.

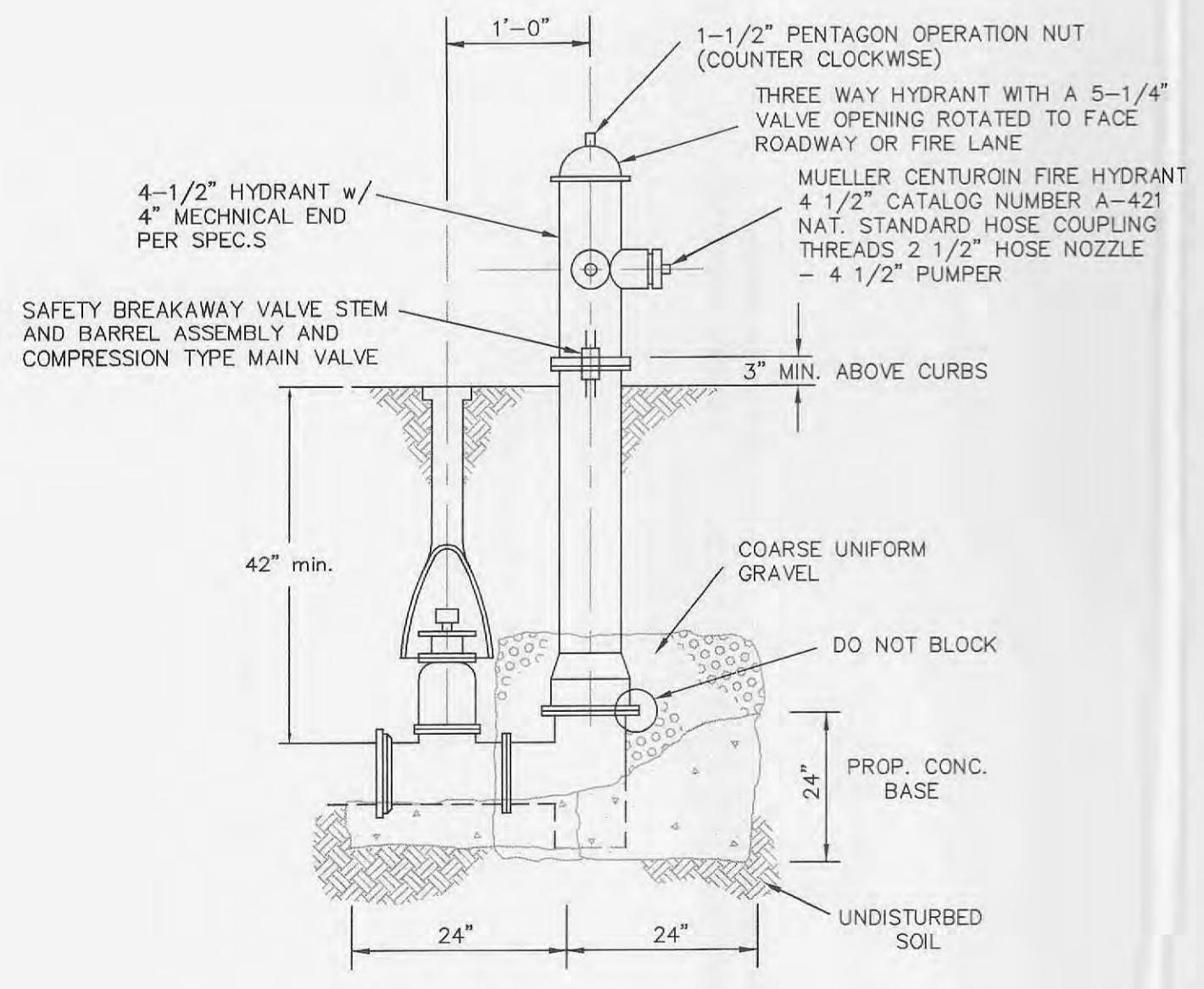


EQUATION USED FOR T-BLOCK CALCULATIONS
 $T = 2(PA \sin \theta / 2) \times f.o.s. \text{ of } 1.5$
 ASSUMED PRESSURE OF 150 PSI AND SOIL BEARING CAPACITY OF 1500 PSF

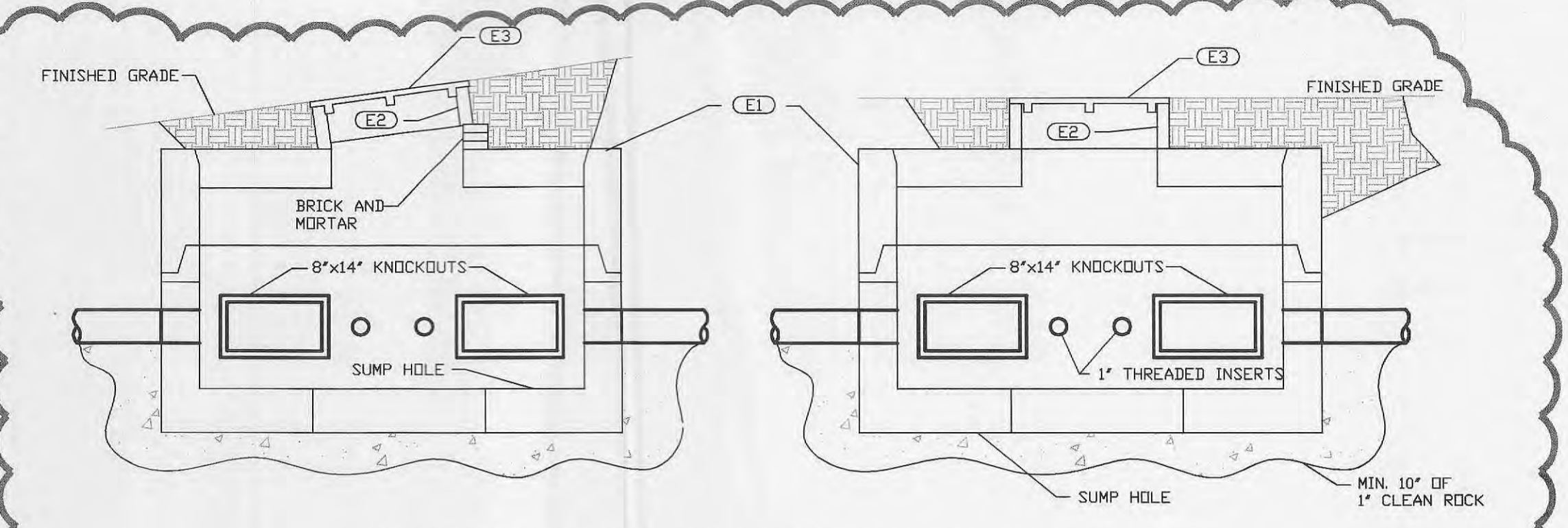
THRUST BLOCK DETAIL
 SCALE: 1"=1'

MISSOURI AMERICAN WATER LINE NOTES

1. THE SERVICE CONNECTION WILL REQUIRE THE PLUMBER TO PURCHASE A TAP AT LEAST TWO WEEKS PRIOR TO WHEN HE NEEDS IT. AS A GENERAL RULE, MISSOURI AMERICAN WATER CO. MAKES THE TAPS IN THE ORDER IN WHICH THEY ARE RECEIVED, AND CANNOT GUARANTEE TWO WEEKS DURING A BUSY TIME OF THE YEAR. ONCE THE TAP IS PURCHASED THE PLUMBER HAS TO SCHEDULE IT WITH THE DISTRICT SUPERVISOR. THE PLUMBER HAS TO HAVE ALL REQUIRED INFORMATION, PLUS MISSOURI AMERICAN WATER REQUIRES TWO SETS OF A SITE PLANS SHOWING THE PROPOSED LAYOUT AND VALVING. ALONG WITH THIS MISSOURI AMERICAN WATER CO. CAN INSURE THAT THEY ARE ABLE TO PROVIDE THE REQUIRED FLOW. THE ONLY FEE IS THE ACTUAL COST OF THE TAP ITSELF. THE TAPPING FEE IS DIFFERENT FOR EVERY COMBINATION OF PIPE SIZE AND TAP SIZE AND IS BASED ON PREVIOUS YEAR'S ACTUAL COSTS.
2. THE FOOTING OF THE BUILDING MUST BE IN BEFORE MISSOURI AMERICAN WATER CO. WILL MAKE A TAP. MISSOURI AMERICAN WATER DOES NOT MAKE TAPS FOR VACANT LOTS OR PREVIOUS TO SUBSTANTIAL BUILDING CONSTRUCTION.
3. A MINIMUM CLASS 52 DUCTILE IRON PIPE, CONFORMING TO APPLICABLE AWWA STANDARDS, IS REQUIRED ON ANY SERVICE LINE THAT IS 4" OR GREATER IN SIZE BEFORE A METER. COPPER PIPING IS REQUIRED FOR SMALLER SERVICES FROM THE MAIN THROUGH THE METER BOX. FOR SERVICES SMALLER THAN 4" IN SIZE, FLEXIBLE TYPE "K" COPPER IS REQUIRED THROUGH THE STOP BOX. AFTER THE STOP BOX, FLEXIBLE OR RIGID TYPE "K" OR "L" COPPER IS REQUIRED TO FOUR FEET BEYOND THE METER BOX. FOR LARGER SERVICES, DUCTILE IRON PIPE SHOULD RUN FROM THE MAIN TO A POINT AT LEAST SIX FEET BEYOND THE METER BOX. FROM THE BUILDING FOUNDATION, COPPER OR DUCTILE IRON PIPE MUST EXTEND A MINIMUM OF TEN FEET OUTSIDE THE BUILDING WALL. ONCE A FIRE LINE IS PAST A DETECTOR CHECK METER IT IS CONSIDERED TO BE METERED AND ANY MATERIALS CAN BE USED THAT COMPLY WITH THE LOCAL PLUMBING CODES (C-900 PVC IS THE MINIMUM). A "MASTER SERVICE" WOULD NOT METERED.
4. THE JOINTS ON COPPER SERVICE LINES (EXCLUDING JOINTS ON PRE-PURCHASED "METER SETTERS" SHALL BE EITHER FLARED, COMPRESSION, OR SILVER SOLDERED.
5. EXISTING SERVICES WILL HAVE TO BE DESTROYED AT THE MAIN UNLESS THEY ARE BEING REUSED. PERMISSION TO REUSE A SERVICE (EITHER PERMANENTLY OR TEMPORARILY) MUST COME FROM THE DISTRICT SUPERVISOR. EXCAVATIONS IN THE PUBLIC RIGHT-OF-WAY WILL REQUIRE AN EXCAVATION PERMIT.
6. MISSOURI AMERICAN WATER DOES NOT OWN, OPERATE, OR MAINTAIN SERVICE LINES. AS A GENERAL RULE, MISSOURI AMERICAN WATER DOES NOT RUN A WATER MAIN EXTENSION ON A PROJECT WHICH CAN BE SERVED BY A SERVICE LINE.
7. MISSOURI AMERICAN WATER CO. REQUIRES A DETECTOR CHECK VALVE ON ALL FIRE PROTECTION LINES FOR SPRINKLER SYSTEMS. THEY ALSO REQUIRE A DETECTOR CHECK VALVE ON FIRE HYDRANTS, WITH THE POSSIBLE EXCEPTION OF HYDRANTS THAT ARE IMMEDIATELY ADJACENT TO AND VISIBLE FROM PUBLIC STREETS. MISSOURI AMERICAN WATER ALSO REQUIRES VALVES ON BOTH FIRE AND DOMESTIC LINES AFTER THEY SPLIT FROM A COMBINED SERVICE. THIS A TYPICAL SPLIT SERVICE WOULD HAVE VALVES ON BOTH FIRE AND DOMESTIC LINES AFTER A TEE. OF COURSE THIS WOULD ALSO REQUIRE A VALVE ON A LINE GOING TO A FIRE HYDRANT THAT CAME OFF OF A "MASTER WATER SERVICE".



FIRE HYDRANT DETAIL
 (n.t.s.)



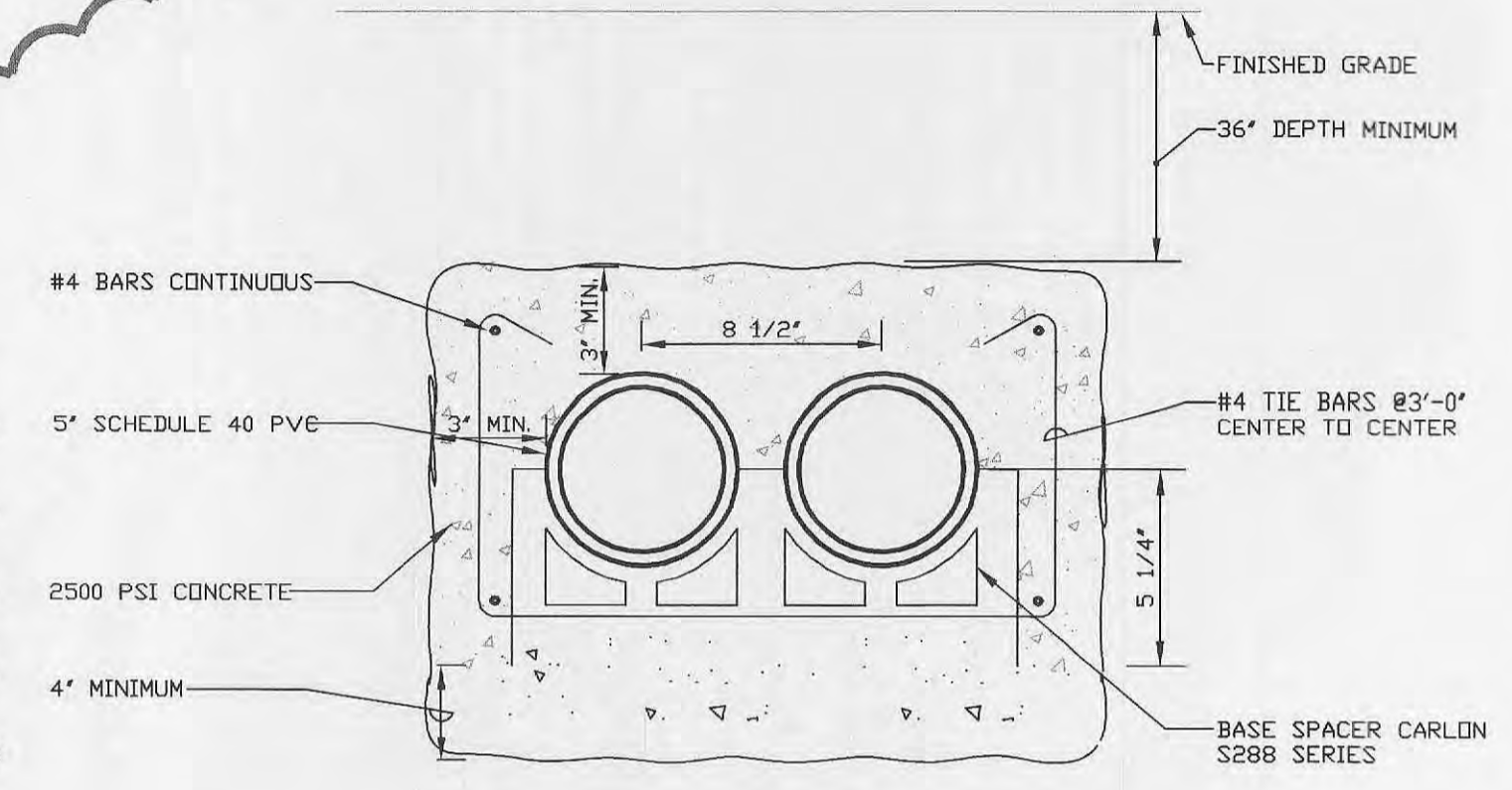
ELECTRICAL MANHOLE DETAIL

NO SCALE

NOTE: ELECTRICAL NOTES AND DETAILS PROVIDED BY KJVW ENGINEERING. SEE SHEET E01 FOR MORE INFORMATION.

- NOTES:
1. THIS VAULT SHALL BE SITUATED OUT OF THE WAY OF VEHICULAR TRAFFIC IN A LOCATION DETERMINED BY AMEREN.
 2. EXCAVATE A 6'x11' PIT INTO A DEPTH NECESSARY TO OBTAIN MINIMUM COVER FOR THE CONDUITS ON A 10' BASE OF 1" GRAVEL. OUTSIDE VAULT DIMENSIONS: L-8'10", W-5'6", H-4'8", RISER 6" TALL. NOTE: RISER MUST BE USED.
 3. FILL ANY OVER DIG WITH CRUSHED ROCK LEVELING THE ROCK AND TAMPERING TO FIRM WHEREVER THE EARTH HAS BEEN DISTURBED.
 4. TO LIFT VAULT, USE SWIVEL PLATES MOUNTED TO THE RICHMOND INSERTS WITH LAG BOLTS THAT "FIRMLY" FASTEN THE PLATE AGAINST THE WALL.
 5. PLACE CONDUITS INTO KNOCKOUTS 6" AS REQUIRED. GROUT OR MORTAR AROUND CONDUITS ENTERING THROUGH KNOCKOUTS.
 6. FILL AND TAMP- REPLACE AND STABILIZE THE EARTH AROUND THE VAULT AND RISER TAMPING TO COMPACTION.
 7. BRICK AND MORTAR BETWEEN THE CONCRETE RISER AND ACCESS HOLE IN VAULT TO ACCOMMODATE THE GRADE SLOPE. SEAL THE COVER FRAME TO THE RISER WITH MORTAR.
 8. GRADE ADJUSTMENTS SHALL BE MADE USING THE RISER AND NECESSARY BRICK AND MORTAR TO MEET EXISTING SLOPE. THE VAULT FLOOR SHALL ALWAYS BE INSTALLED LEVEL.
 9. CONTRACTOR SHALL PROVIDE MANHOLE FROM AMEREN UE.

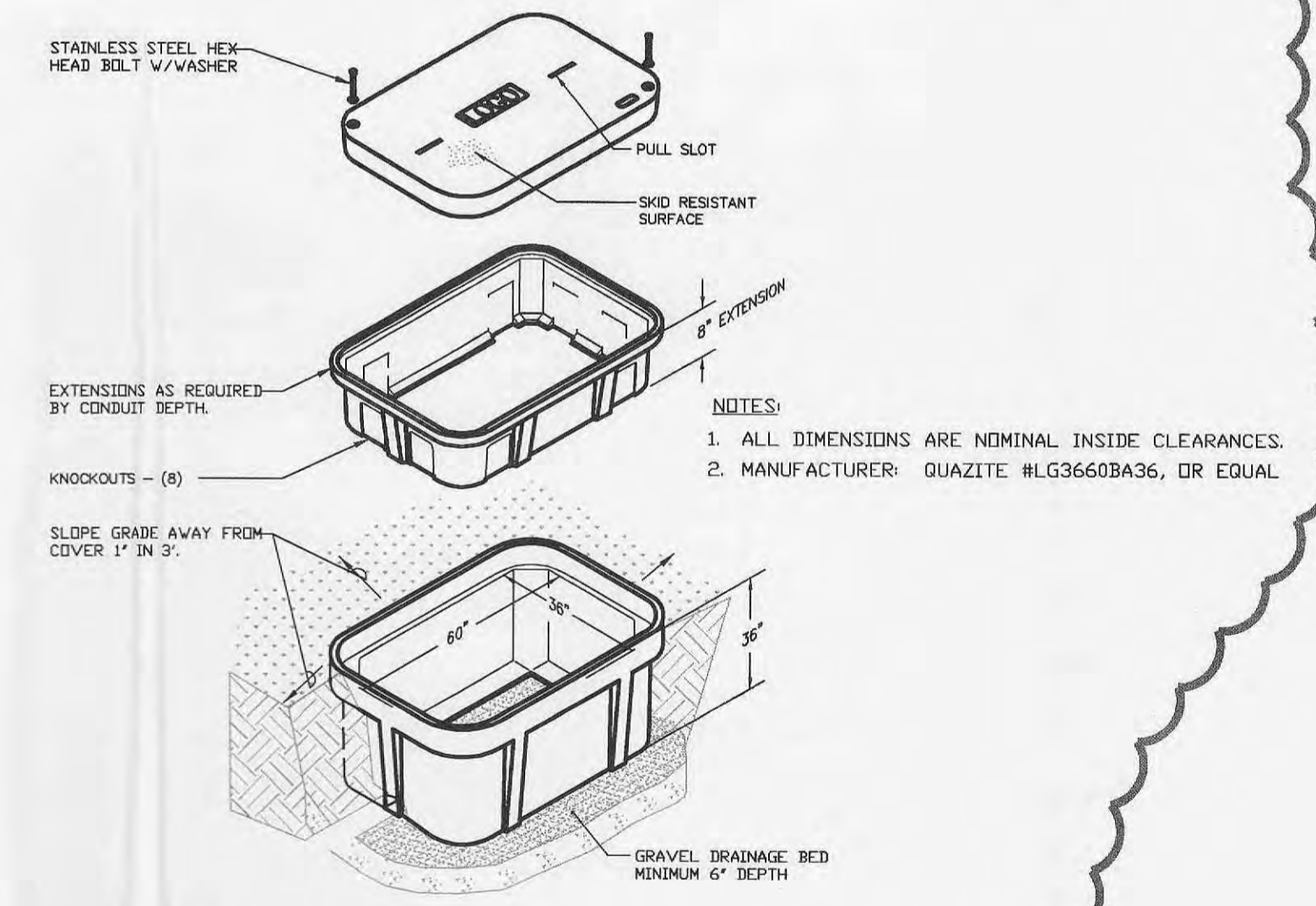
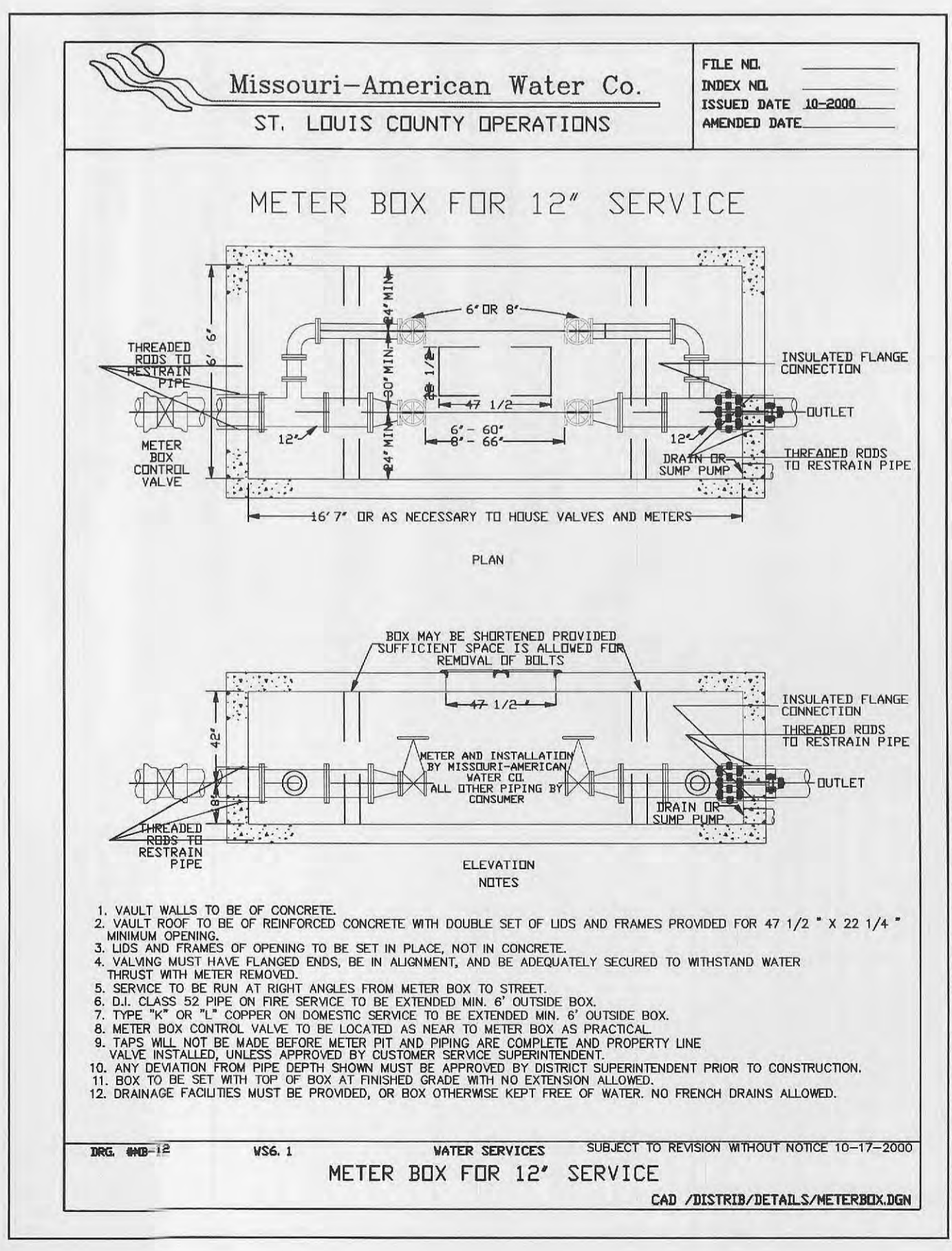
- KEYNOTES:
- (E1) MATERIAL NUMBER: 12 06 096 DESCRIPTION: VAULT- PRECAST 4'x8'
 - (E2) MATERIAL NUMBER: 12 06 098 DESCRIPTION: RISER- CONCRETE NECK 6' EXTENSION
 - (E3) MATERIAL NUMBER: 12 02 084 DESCRIPTION: COVER- VAULT CAST IRON 24"x42"



DUCT BANK DETAIL

NO SCALE

- NOTES:
1. INSTALL 200 lb TENSILE STRENGTH PULL ROPE IN ALL CONDUITS.
 2. TRENCHING AND BACKFILL ACCORDING TO SPECIFICATION SECTION 02225.



EXTERIOR HANDHOLE DETAIL

NO SCALE

- 5 - 03/02/05 REVISED PER CITY & COORDINATING COMMENTS
 4 - 02/02/05 REVISED PER CITY, DUKET, CREEK AND MOOD COMMENTS
 3 - 12/08/04 REVISED SANITARY SEWER ROUTE
 2 - 12/01/04 REVISED PER FIRE DISTRICT, SEWER DISTRICT AND CITY COMMENTS
 1 - 11/22/04 REVISED PER COORDINATION ISSUES

PROGRESS WEST HEALTHCARE CENTER - UTILITY PACKAGE

WATER AND ELECTRIC CONSTRUCTION DETAILS

P & Z FILE NUMBER 99104.09.03

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