

Geauga Metropolitan Housing Authority

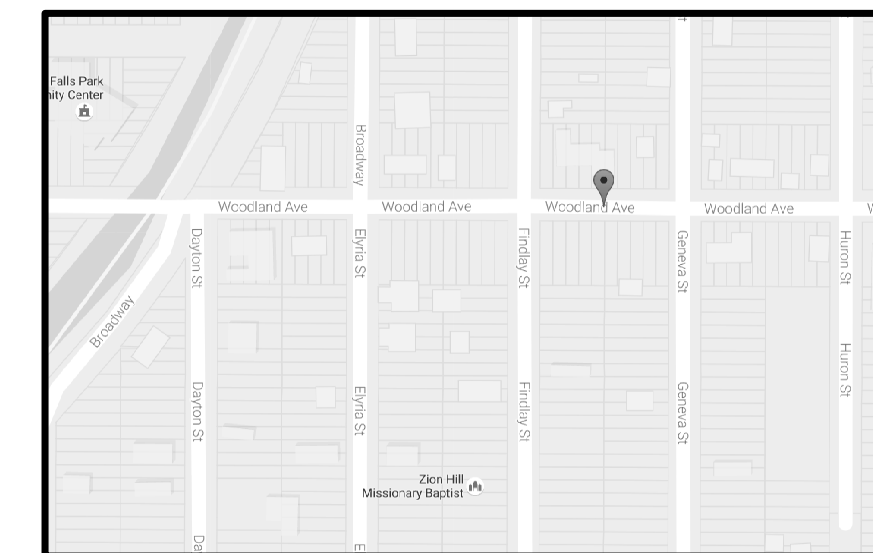
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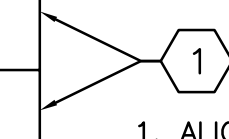
Strickland Arms Waterline Replacement Strickland Arms Development Chagrin Falls, OH 44023

Submitted To:

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Executive Director
Neva Rodgers



SHEET KEYNOTE INSTRUCTIONS	DRAWING INDEX
<p>SHEET KEYNOTES ARE NOTED WITHIN THE GRAPHIC AREA OF THE DRAWING. THESE ARE REPRESENTED BY A NUMBER SURROUNDED BY A HEXAGON, WITH OR WITH OUT A LEADER. A LEGEND ON RIGHT SIDE OF THE PAGE LISTS THE NOTES IN NUMERICAL ORDER</p> <p>EXAMPLES:  1. ALIGN NEW CONSTRUCTION WITH THE FACE OF EXISTING CONSTRUCTION</p>	<p>GENERAL</p> <p>G-001 COVER SHEET</p> <p>PLUMBING</p> <p>P-101 PLUMBING DEMOLITION & NEW WORK TYPE 1 UNITS P-102 PLUMBING DEMOLITION & NEW WORK TYPE 2 UNITS P-201 PLUMBING SPECIFICATIONS P-202 PLUMBING SPECIFICATIONS</p>
	<p>SCOPE OF WORK</p> <p>THE REPLACEMENT OF EXISTING COPPER DOMESTIC WATERLINES WHICH SERVE THE KITCHEN AND UPSTAIRS BATHROOM WITH NEW PEX WATERLINES.</p> <p>THE REMOVAL AND REPLACEMENT OF EXISTING DOMESTIC WATER HEATERS WITHIN EACH UNIT.</p>

GENERAL SHEET NOTES

- GOVERNING CODE -- OHIO MECHANICAL CODE 2011.
- THESE DOCUMENTS WERE PREPARED ON THE BASIS OF EXAMINATION OF VISIBLE PORTIONS OF THE EXISTING STRUCTURE. THE ARCHITECTS/ ENGINEERS ASSUME NO RESPONSIBILITY FOR ANY SITUATIONS, DIMENSIONS, OR OTHER CONDITIONS OF THE EXISTING STRUCTURE WHICH MAY ARISE DURING DEMOLITION OR CONSTRUCTION.
- SHOULD ANY OF THE DETAILED INSTRUCTIONS SHOWN ON THE DRAWINGS CONFLICT WITH THESE NOTES, STRUCTURAL NOTES, THE SPECIFICATIONS, OR WITH EACH OTHER, THE STRICTEST PROVISION SHALL GOVERN.
- THE GENERAL CONTRACTOR SHALL COMPLY WITH ALL BUILDING CODE REQUIREMENTS THE LOCAL GOVERNING AUTHORITY, AND SHALL OBTAIN AND PAY FOR ALL REQUIRED PERMITS, FEES, AND INSPECTIONS, WITH THE EXCEPTION OF FEES REQUIRED FOR THE PLUMBING, HVAC, AND ELECTRICAL PORTIONS OF THE WORK, WHICH ARE THE RESPONSIBILITY OF THE RESPECTIVE SUBCONTRACTORS.
- IT IS SOLELY THE CONTRACTOR'S RESPONSIBILITY TO FOLLOW THE APPLICABLE SAFETY CODES AND REGULATIONS DURING ALL PHASES OF CONSTRUCTION.
- PERFORM DEMOLITION AS INDICATED ON PLANS AND DETAILS AND AS REQUIRED FOR THE COMPLETION OF THE PROJECT AS INDICATED. SCHEDULE AND PERFORM DEMOLITION PROCEDURES TAKING NECESSARY PRECAUTIONS TO PREVENT WATER DAMAGE TO THE EXISTING STRUCTURE.
- DO NOT CUT OR PATCH ANY WORK THAT WILL IMPAIR THE STRUCTURAL LOAD CARRYING CAPACITY OR REDUCE THE LOAD/DEFLECTION RATIO.
- PROVIDE ADEQUATE TEMPORARY SUPPORT AND SHORING FOR WORK BEING CUT AND PATCHED TO PREVENT FAILURE. PROVIDE ADEQUATE PROTECTION OF OTHER WORK DURING CUTTING AND PATCHING TO PREVENT DAMAGE. CUT WORK BY METHOD LEAST LIKELY TO DAMAGE RETAINED AND ADJOINING WORK.
- CUTTING INTO NEW WORK OF OTHER TRADES OR INTO THE EXISTING STRUCTURE SHALL BE PERFORMED BY THE TRADE REQUIRING THE CUTTING. ALL CUTTING SHALL BE DONE IN A NEAT MANNER USING SAWS WHERE POSSIBLE. ANY DAMAGE TO THE WORK OF THE OTHER TRADES OR TO THE EXISTING STRUCTURE IN EXCESS OF THE CUTTING REQUIRED, WHICH, IN THE OPINION OF THE ARCHITECT, IS DUE TO NEGLIGENCE, SHALL BE REPAIRED AT THE EXPENSE OF THE TRADE WHO DID THE CUTTING. ALL PATCHING AND PAINTING AS A RESULT OF THE CUTTING AND NOT TO THE NEGLIGENT ACTION SHALL BE DONE BY THE CONTRACTOR AT HIS EXPENSE.
- IN ANY ROOM IN WHICH PLUMBING, HEATING, OR ELECTRICAL ALTERATIONS ARE MADE, THE CONTRACTOR REQUIRING CUTTING INTO EXISTING WORK SHALL MAKE PROPER REPAIRS TO OTHER BUILDING ITEMS AFFECTED (I.E., FLOORS, WALLS, CEILINGS, BASE, CHAIR RAIL, TRIM ETC.).
- FILL ANY MASONRY VOIDS WITH MORTAR OR CONCRETE WHERE ANCHORS OCCUR.
- SIZE AND LOCATION OF ALL FLOOR OPENINGS ARE TO BE VERIFIED WITH THE TRADE AFFECTED BEFORE PROCEEDING WITH THE WORK.
- COORDINATE LOCATIONS AND/OR ELEVATIONS OF FLOOR DRAINS, REGISTERS, ACCESS PANELS, GRILLS, LOUVERS, CONVECTORS, CABINET UNIT HEATERS, PANELS, ETC., WITH MECHANICAL AND ELECTRICAL CONTRACTORS.
- IN GENERAL, NEW MATERIALS AND MATERIALS FOR REPAIR CONDITIONS SHALL MATCH SIMILAR ITEMS IN QUALITY, DETAIL, PROFILE, AND FINISH AS THOSE ALREADY BUILT INTO THE WORK.
- PATCH ALL WALLS, FLOORS, AND CEILINGS AND PROPERLY PREPARE ALL SURFACES FOR NEW FINISHES. PATCH WITH SEAMS WHICH ARE DURABLE AND AS INVISIBLE AS POSSIBLE. COMPLY WITH SPECIFIED TOLERANCES FOR THE TYPE OF WORK BEING DONE. RESTORE EXPOSED FINISHES OF PATCHED AREAS AND, WHERE NECESSARY, EXTEND NEW FINISH RESTORATION ONTO ADJOINING RETAINED WORK IN A MANNER WHICH WILL ELIMINATE EVIDENCE OF PATCHING.
- THE CONTRACTOR SHALL HIRE AN OHIO LICENSED SURVEYOR TO RESET ANY PROPERTY PINS DISTURBED DURING CONSTRUCTION.



REV.	DATE	DESCRIPTION
01	12/17	100% CONSTRUCTION DOCUMENTS
08	09/17	100% BID DOCUMENTS

**GMHA - WATERLINE
STRICKLAND ARMS DEVELOPMENT
BAINBRIDGE, OH 44023**

COVER SHEET

ISSUED FOR:	
PERMIT	-
BID	08/09/17
CONSTRUCTION	-
RECORD	-

PROJECT MANAGER	DESIGNER
SW	KAB

JOB NO.
2016359.05

G-001

GENERAL SHEET NOTES

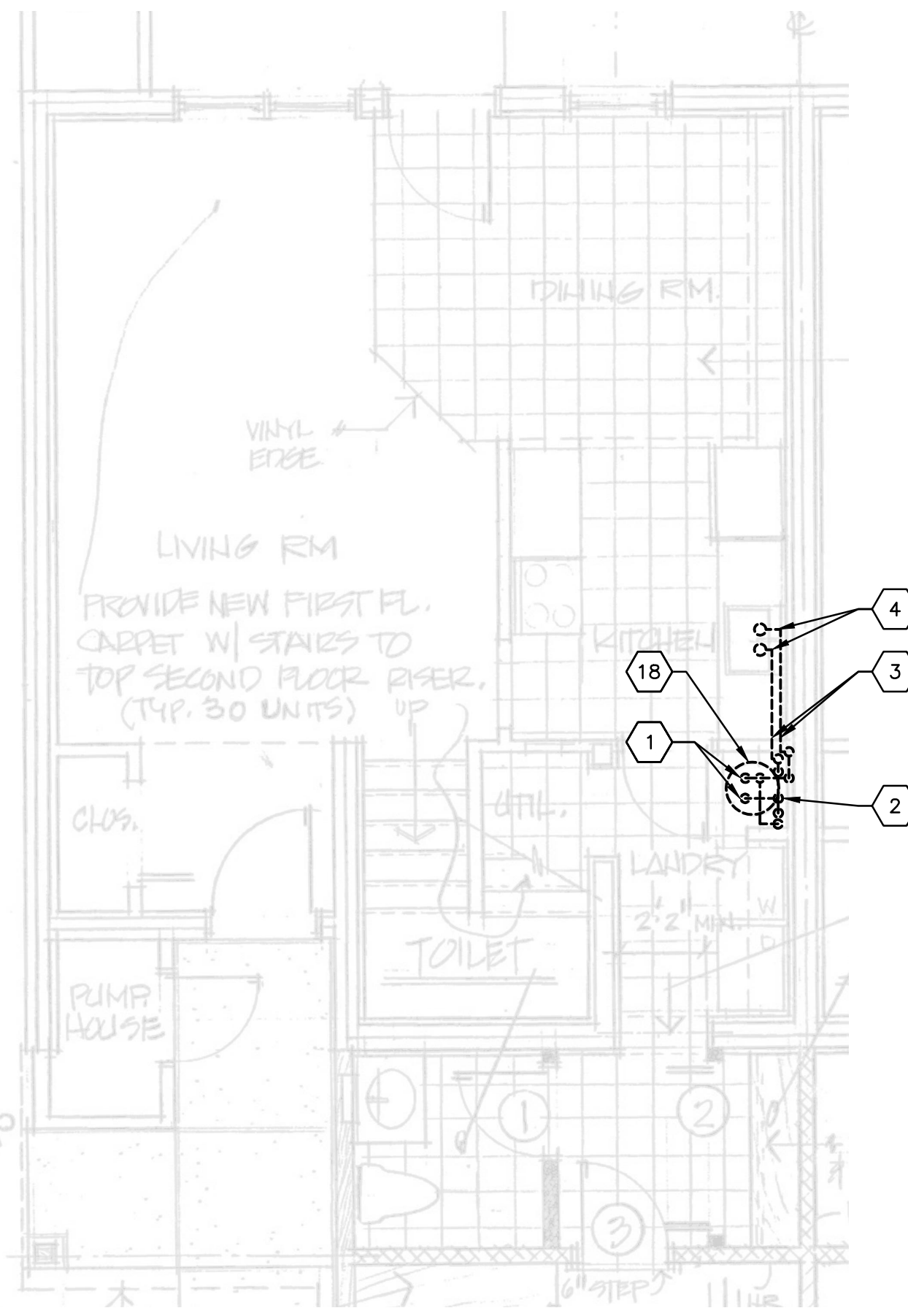
1. THE GENERAL NOTES LISTED HERE APPLY TO ALL DEMOLITION DRAWINGS IN ADDITION TO ANY ADDITIONAL DEMOLITION DRAWING NOTES ON THE INDIVIDUAL DEMOLITION DRAWINGS.
2. SEE CODED NOTES ON INDIVIDUAL DRAWING SHEETS FOR SPECIFIC INSTRUCTIONAL NOTES.
3. FIELD VERIFY EXISTING CONDITIONS PRIOR TO THE START OF CONSTRUCTION.
4. DARK, DASHED LINES INDICATE PIPING AND EQUIPMENT TO BE REMOVED.
5. THIS CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS PRIOR TO START OF CONSTRUCTION.
6. THE PLUMBING CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE EXACT LOCATION AND ELEVATION OF ALL EXISTING UNDERGROUND UTILITIES PRIOR TO COMMENCING WORK. THE PLUMBING CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGES WHICH OCCURS BY HIS FAILURE TO LOCATE OR PRESERVE THE UNDERGROUND CONDITIONS.
7. IF DURING CONSTRUCTION OPERATIONS, THE PLUMBING CONTRACTOR ENCOUNTERS UTILITIES OTHER THAN THOSE LOCATIONS SHOWN IN THE PLANS, HE SHALL IMMEDIATELY NOTIFY THE ENGINEER AND TAKE THE NECESSARY STEPS TO PROTECT THE FACILITY AND ASSURE THE CONTINUANCE OF SERVICE.
8. WHERE PLUMBING PIPING HAS BEEN REMOVED AND/OR CAPPED, THE PLUMBING CONTRACTOR IS TO PATCH FLOOR/WALL TO MATCH EXISTING CONDITIONS.
9. RECONNECT ANY EXISTING DOMESTIC WATER PIPING TO NEW PEX PIPING AS REQUIRED.

NOTE:

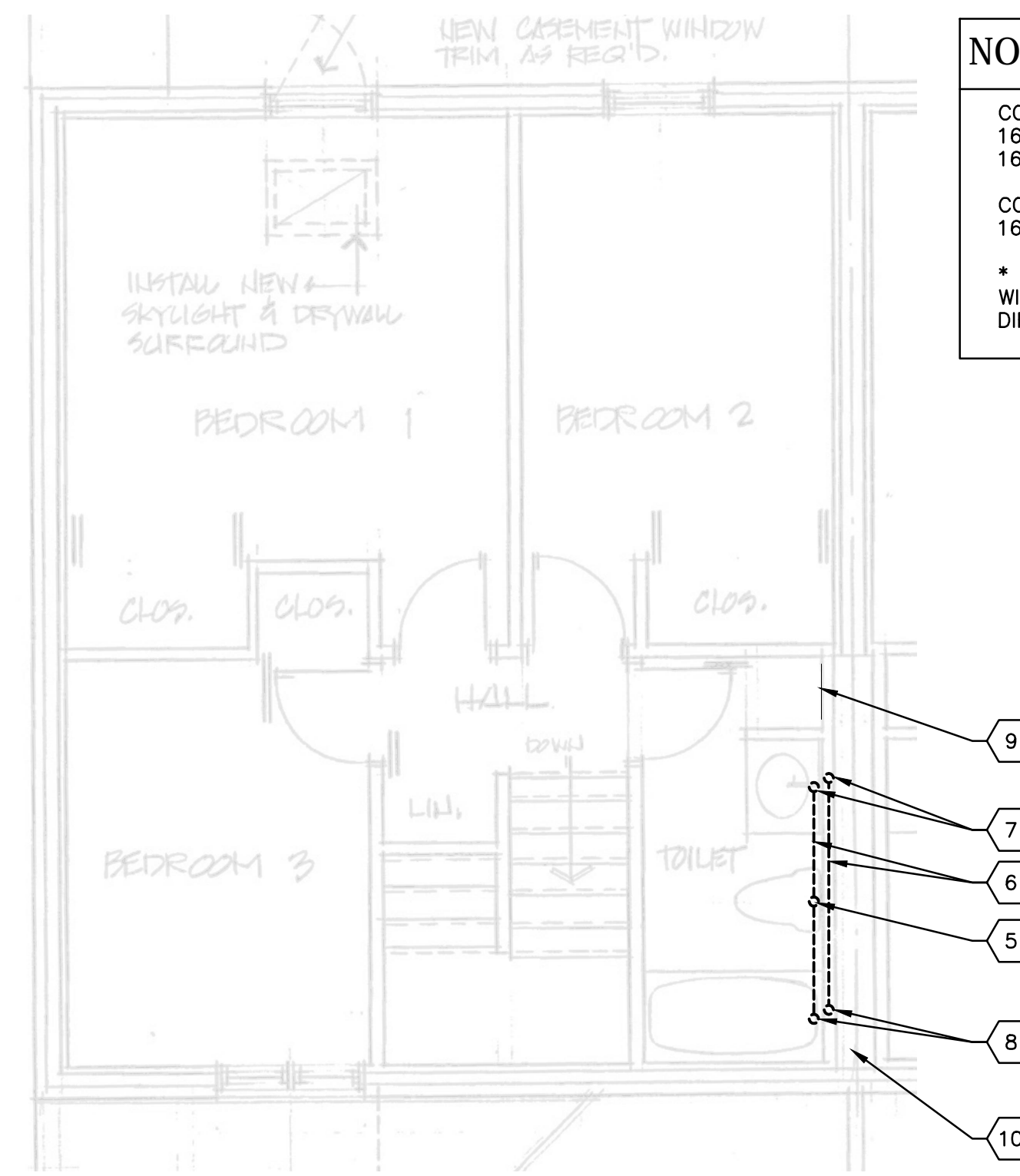
CONTRACTOR TO USE THIS SHEET FOR BUILDINGS 16774, 16778, 16743, 16747, 7172, 16721, 16685, 16689.

CONTRACTOR TO MIRROR PLANS FOR BUILDINGS 16776, 16745, 7174, 16723, 16687, 16691.

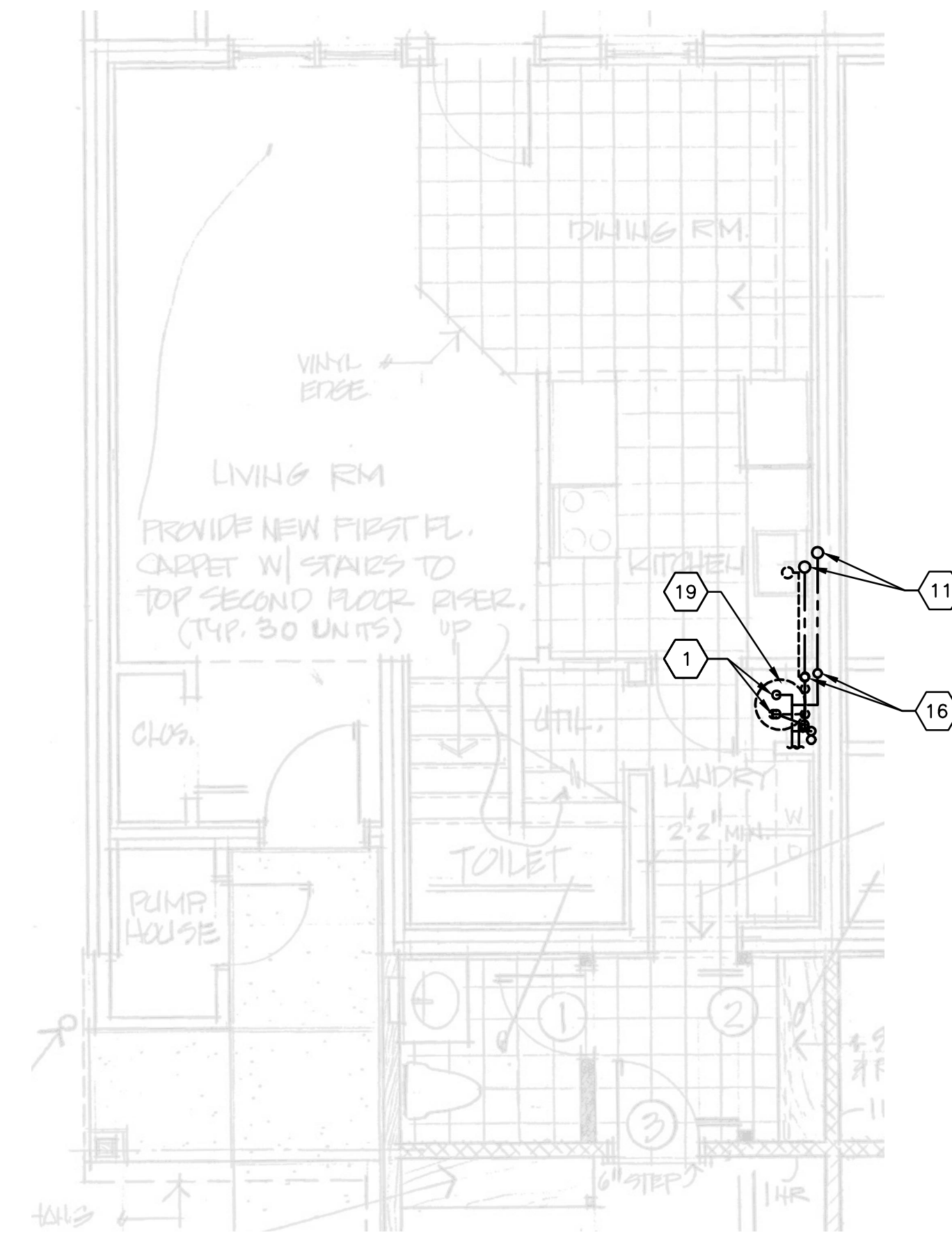
* ALL PLANS ARE APPROXIMATE AND CONTRACTOR WILL NEED TO WALK AND UNDERSTAND DIFFERENCES BETWEEN DIFFERENT FLOOR PLANS.



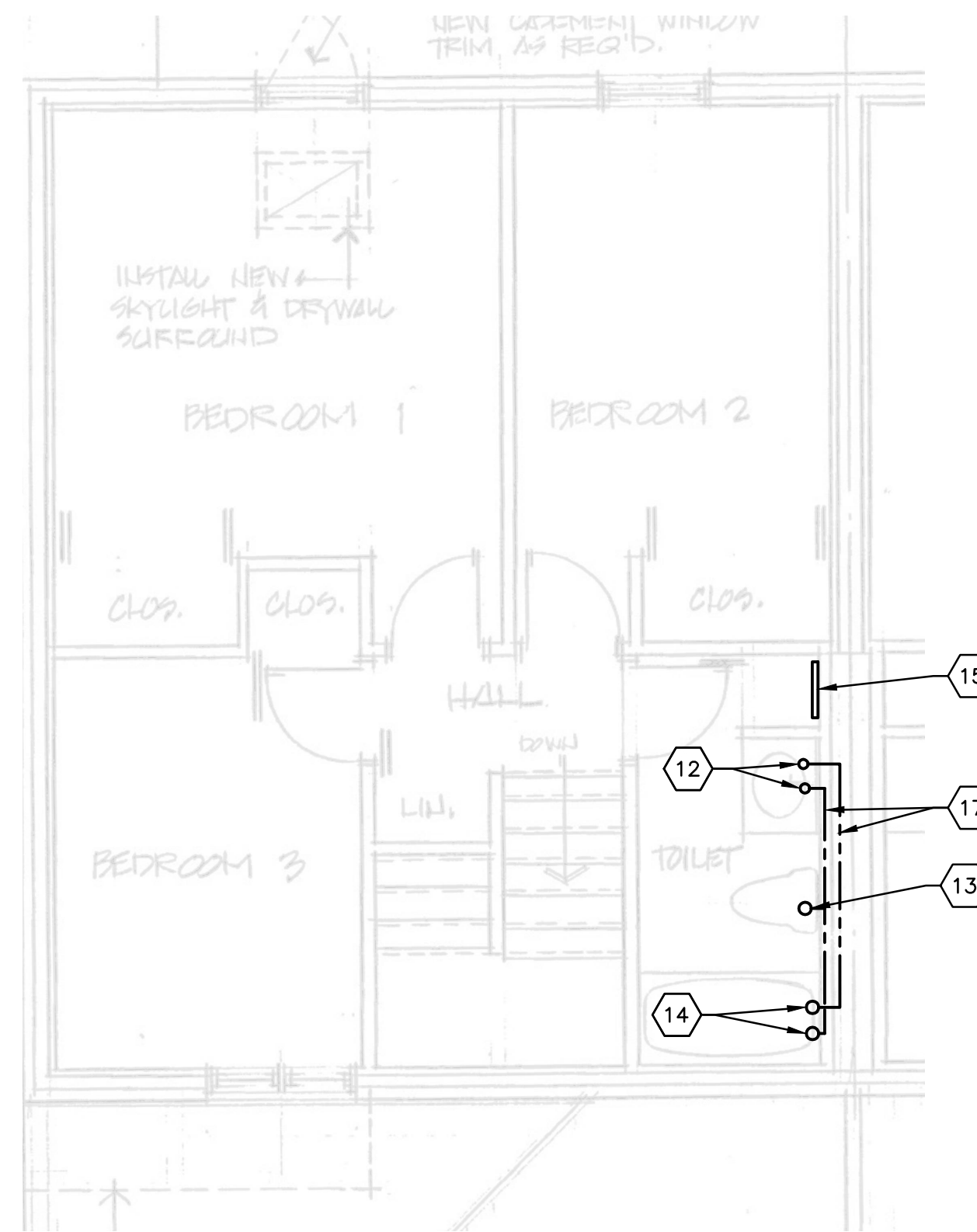
C1 DEMO FIRST FLOOR PLAN
 1/4"=1'-0"



C3 DEMO SECOND FLOOR PLAN
 1/4"=1'-0"



A1 NEW FIRST FLOOR PLAN
 1/4"=1'-0"



A3 NEW SECOND FLOOR PLAN
 1/4"=1'-0"

SHEET KEYNOTES

1. CONTRACTOR TO DISCONNECT EXISTING HOT AND COLD WATER LINES FROM WATER HEATER AND REPLACE WITH NEW 3/4" HOT AND COLD PEX WATER LINES.
2. CONTRACTOR TO VERIFY CONDITION OF EXISTING WATER ENTRY THROUGH GROUND. IF DAMAGED, REPLACE CONCRETE AND BRING NEW WATER STUB UP THROUGH GROUND.
3. REMOVE EXISTING HOT AND COLD WATER LINES TO EXISTING KITCHEN. PATCH AND REPAIR HOLE IN WALL.
4. REMOVE EXISTING HOT AND COLD WATER LINES SERVING EXISTING KITCHEN SINK INCLUDING SHUT OFF VALVES.
5. REMOVE EXISTING COLD WATER LINE SERVING EXISTING WATER CLOSET INCLUDING SHUT OFF VALVE.
6. ABANDON EXISTING HOT AND COLD WATER LINES LOCATED IN WALL.
7. REMOVE EXISTING HOT AND COLD WATER LINES SERVING EXISTING LAVATORY INCLUDING SHUT OFF VALVES.
8. REMOVE EXISTING HOT AND COLD WATER LINES SERVING EXISTING SHOWER INCLUDING SHUT OFF VALVES.
9. CUT 18"x36" OPENING IN DRYWALL IN BACK OF LINEN CLOSET.
10. IF EXISTING CHASE IS NOT PRESENT, CONTRACTOR TO CUT BATHROOM DRYWALL 12" A.F.F. TO RUN WATER LINES IN EXISTING STUD WALL. GENERAL CONTRACTOR TO REPAIR EXISTING WALL WITH NEW WATER RESISTANT GYPSUM BOARD AND PAINT TO MATCH EXISTING.
11. EXTEND 1/2" COLD AND HOT WATER THROUGH EXISTING KITCHEN CABINET SPACE APPROX. 12" A.F.F. AND CONNECT TO EXISTING KITCHEN SINK. INSTALL NEW SHUT OFF VALVES IN CABINET BELOW SINK.
12. 3/4" HOT AND COLD WATER LINES FROM FLOOR BELOW IN LAVATORY VANITY CABINET. TEE WATER LINES WITHIN CABINET AND EXTEND 1/2" HOT AND COLD WATER UP TO EXISTING LAVATORY AND EXTEND 3/4" HOT AND COLD WATER THROUGH BACK OF CABINET TO STUD WALL APPROX. 12" A.F.F.
13. EXTEND 1/2" COLD WATER TO EXISTING WATER CLOSET. INSTALL NEW SHUT OFF VALVE.
14. EXTEND 1/2" COLD WATER AND HOT WATER TO EXISTING SHOWER. INSTALL NEW SHUT OFF VALVES.
15. CUT 18"x36" ACCESS PANEL INTO SECOND FLOOR BATHROOM CLOSET. INSTALL PLYWOOD ACCESS PANEL AND TRIM WITH 1"x2" WOOD AND PAINT TO MATCH EXISTING.
16. EXTEND 3/4" HOT AND COLD WATER LINES UP THROUGH EXISTING CEILING PENETRATION TO SECOND FLOOR LAVATORY VANITY CABINET.
17. HOT AND COLD WATER LINES TO BE RUN THROUGH CHASE APPROXIMATELY 12" A.F.F. CUT DRY WALL AS REQUIRED TO ALLOW FOR PIPE INSTALLATION. PATCH WALL TO MATCH EXISTING.
18. DISCONNECT AND REMOVE EXISTING ELECTRIC HOT WATER HEATER ALONG WITH ALL ASSOCIATED PIPING, VALVING AND EXPANSION TANK.
19. INSTALL NEW ELECTRIC HOT WATER HEATER. SEE DETAIL.

REV.	DATE	DESCRIPTION
01.12.17		100% CONTRACT DOCUMENTS
08.09.17		100% BID DOCUMENTS

**GMHA - WATERLINE
 STRICKLAND ARMS DEVELOPMENT
 BAINBRIDGE, OH 44023**

**PLUMBING DEMOLITION
 AND NEW WORK
 TYPE 1 UNITS**

ISSUED FOR:	
PERMIT	-
BID	08/09/17
CONSTRUCTION	-
RECORD	-

PROJECT MANAGER	DESIGNER
SW	SC

JOB NO.
2016359.05

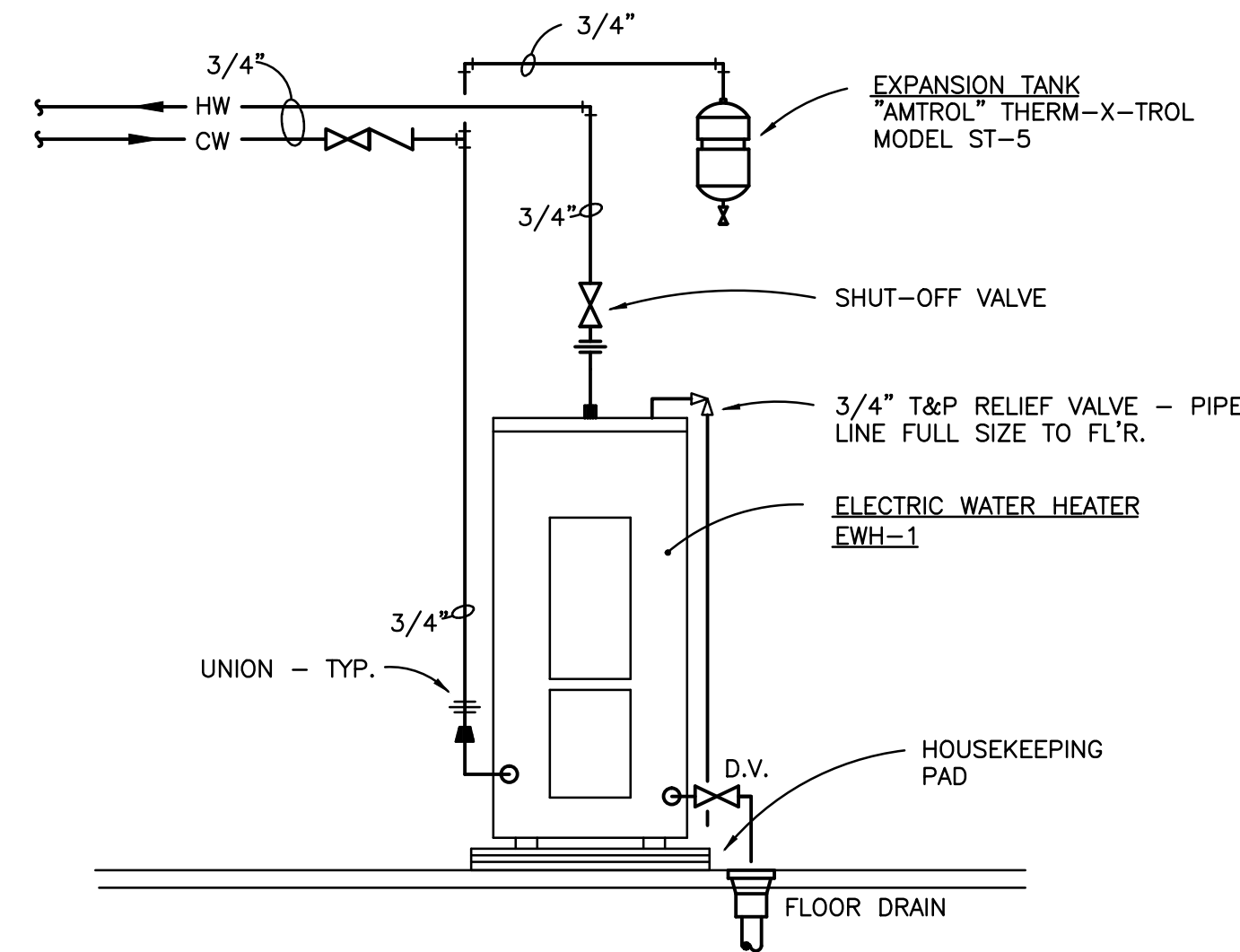
P-101

DOMESTIC HOT WATER HEATER SCHEDULE

MARK	MANUFACTURER MODEL NO.	HEATING ELEMENT (KW)	CAPACITY (GALLONS)	RECOVERY (GPH)	MAX. WORKING PRESSURE (PSI)	ELECTRICAL	WEIGHT (LBS)	REMARKS
WH 1	BRADFORD WHITE RE340S6	4.5	40	21	150	240V/1PH	114	1,2,3,4,5,6

NOTES:

- | | |
|---|---|
| <ol style="list-style-type: none"> 1. ENERGY STAR COMPLIANT 2. HUD APPROVED 3. 6 YEAR WARRANTY | <ol style="list-style-type: none"> 4. ASME T&P RELIEF VALVE 5. DRAIN PAN 6. NEW EXPANSION TANK, AMTROL MODEL: THERM-X-TROL ST-5C |
|---|---|



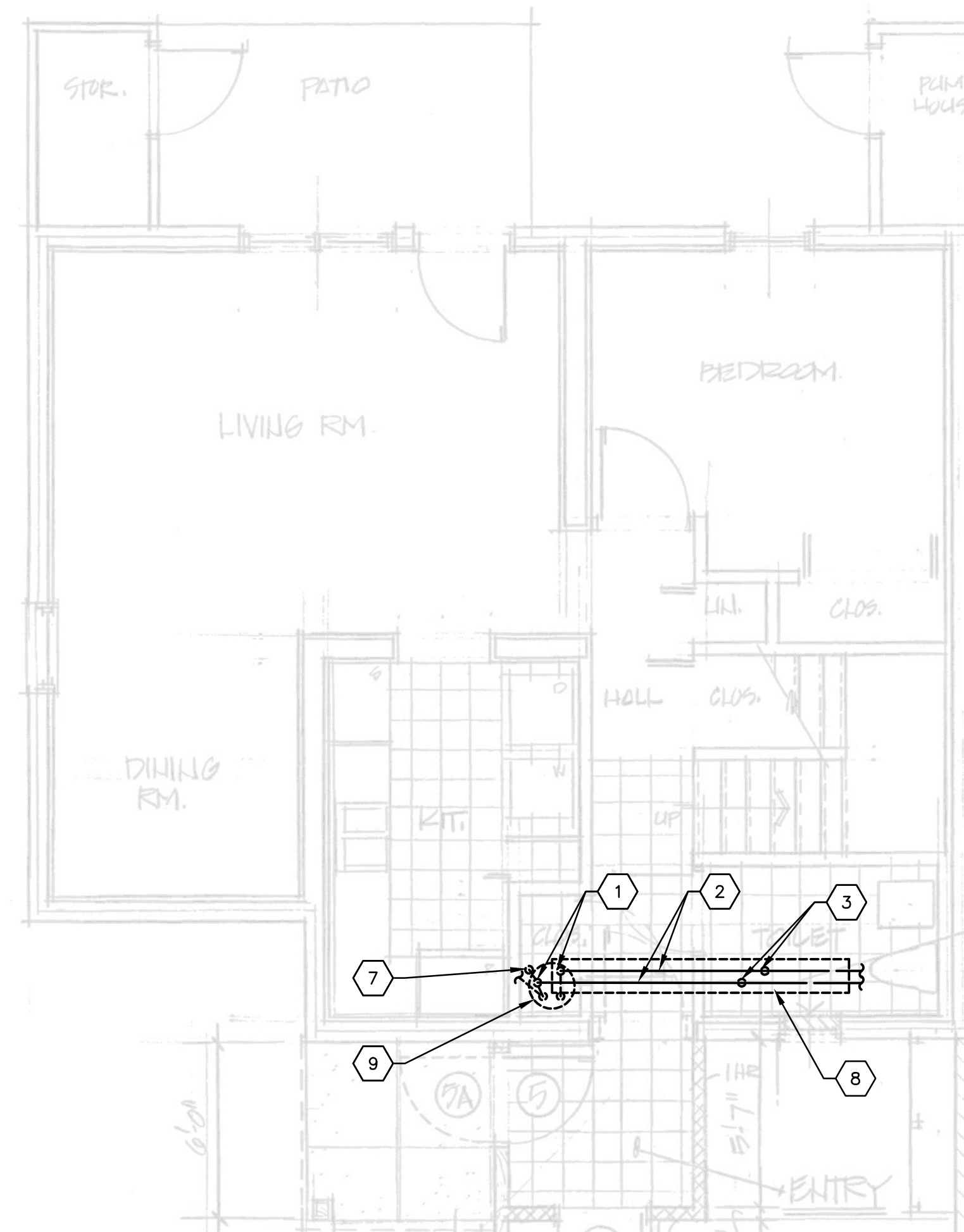
C3 HOT WATER HEAT DETAIL
N.T.S.

NOTE:

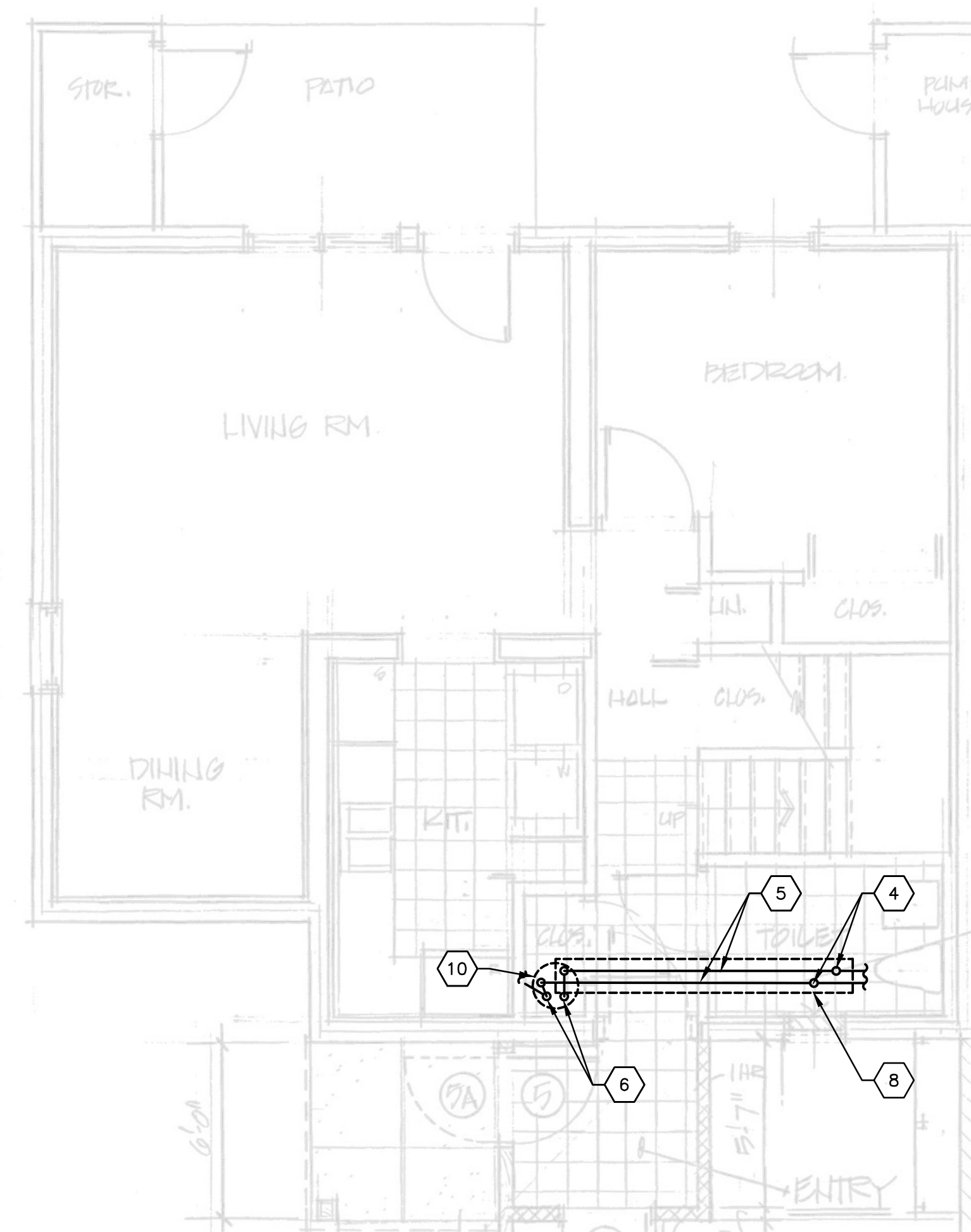
CONTRACTOR TO USE THIS SHEET FOR BUILDING 16731.

CONTRACTOR TO MIRROR PLANS FOR BUILDING 16733.

* ALL PLANS ARE APPROXIMATE AND CONTRACTOR WILL NEED TO WALK AND UNDERSTAND DIFFERENCES BETWEEN DIFFERENT FLOOR PLANS.



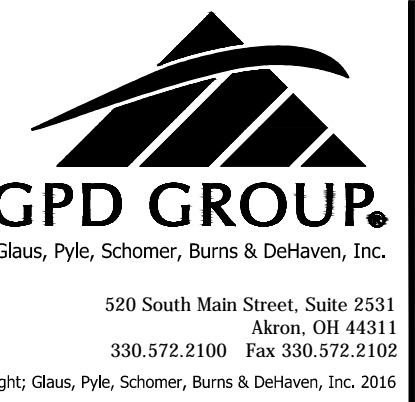
A1 DEMO FIRST FLOOR PLAN
1/8"=1'-0"



A3 NEW FIRST FLOOR PLAN
1/8"=1'-0"

GENERAL SHEET NOTES

1. THE GENERAL NOTES LISTED HERE APPLY TO ALL DEMOLITION DRAWINGS IN ADDITION TO ANY ADDITIONAL DEMOLITION DRAWING NOTES ON THE INDIVIDUAL DEMOLITION DRAWINGS.
2. SEE CODED NOTES ON INDIVIDUAL DRAWING SHEETS FOR SPECIFIC INSTRUCTIONAL NOTES.
3. FIELD VERIFY EXISTING CONDITIONS PRIOR TO THE START OF CONSTRUCTION.
4. DARK, DASHED LINES INDICATE PIPING AND EQUIPMENT TO BE REMOVED.
5. THIS CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS PRIOR TO START OF CONSTRUCTION.
6. THE PLUMBING CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE EXACT LOCATION AND ELEVATION OF ALL EXISTING UNDERGROUND UTILITIES PRIOR TO COMMENCING WORK. THE PLUMBING CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGES WHICH OCCURS BY HIS FAILURE TO LOCATE OR PRESERVE THE UNDERGROUND CONDITIONS.
7. IF DURING CONSTRUCTION OPERATIONS, THE PLUMBING CONTRACTOR ENCOUNTERS UTILITIES OTHER THAN THOSE LOCATIONS SHOWN IN THE PLANS, HE SHALL IMMEDIATELY NOTIFY THE ENGINEER AND TAKE THE NECESSARY STEPS TO PROTECT THE FACILITY AND ASSURE THE CONTINUANCE OF SERVICE.
8. WHERE PLUMBING PIPING HAS BEEN REMOVED AND/OR CAPPED, THE PLUMBING CONTRACTOR IS TO PATCH FLOOR/WALL TO MATCH EXISTING CONDITIONS.
9. RECONNECT ANY EXISTING DOMESTIC WATER PIPING TO NEW PEX PIPING AS REQUIRED.



REV.	DATE	DESCRIPTION
	01.12.17	100% CONTRACT DOCUMENTS
	08.09.17	100% BID DOCUMENTS

SHEET KEYNOTES

1. CONTRACTOR TO REMOVE EXISTING COPPER HOT AND COLD WATER LINES. REPLACE WITH LIKE SIZE PEX PIPING.
2. CUT AND REMOVE EXISTING CEILING TO REMOVE 3/4" HOT AND COLD WATER PIPING IN FIRST FLOOR CEILING SPACE.
3. EXTEND 3/4" HOT AND COLD WATER LINES UP THROUGH CEILING TO SECOND FLOOR LAVATORY VANITY CABINET.
4. NEW 3/4" PEX HOT AND COLD WATER UP THROUGH FLOOR TO BELOW EXISTING LAVATORY VANITY CABINET. TEE WATER LINES WITHIN CABINET AND EXTEND 1/2" HOT AND COLD WATER UP TO EXISTING LAVATORY AND EXTEND 1/2" HOT AND 3/4" COLD WATER THROUGH BACK OF CABINET TO STUD WALL APPROX. 12" A.F.F. TEE WATER LINES WITHIN WALL AND EXTEND 1/2" COLD WATER LINE TO EXISTING WATER CLOSET AND 1/2" HOT AND COLD WATER LINES TO EXISTING SHOWER. CUT DRYWALL 12" A.F.F. TO ALLOW PIPING TO BE RUN THROUGH WALL. PATCH AND PAINT WALL TO MATCH EXISTING.
5. INSTALL NEW 3/4" PEX HOT AND COLD WATER LINES IN FIRST FLOOR CEILING. PATCH CEILING AND PAINT TO MATCH EXISTING.
6. TIE NEW 3/4" PEX HOT AND COLD WATER LINES INTO NEW WATER HEATER AND INSTALL NEW ISOLATION VALVES.
7. CONTRACTOR TO VERIFY CONDITION OF EXISTING WATER ENTRY THROUGH GROUND. IF DAMAGED, REPLACE CONCRETE AND BRING NEW WATER STUD UP THROUGH GROUND.
8. CUT CEILING AS REQUIRED TO INSTALL NEW PEX PIPING. PATCH AND PAINT CEILING TO MATCH EXISTING.
9. DISCONNECT AND REMOVE EXISTING ELECTRIC HOT WATER HEATER ALONG WITH ALL ASSOCIATED PIPING, VALVING AND EXPANSION TANK.
10. INSTALL NEW ELECTRIC HOT WATER HEATER. SEE DETAIL.

**GMHA - WATERLINE
STRICKLAND ARMS DEVELOPMENT
BAINBRIDGE, OH 44023**

**PLUMBING DEMOLITION
AND NEW WORK
TYPE 2 UNITS**

ISSUED FOR:	
PERMIT	-
BID	08/09/17
CONSTRUCTION	-
RECORD	-

PROJECT MANAGER	DESIGNER
SW	SC

JOB NO.
2016359.05

P-102

SECTION 221116 - DOMESTIC WATER PIPING

1.1 RELATED DOCUMENTS

- A. DRAWINGS AND GENERAL PROVISIONS OF THE CONTRACT, INCLUDING GENERAL AND SUPPLEMENTARY CONDITIONS, APPLY TO THIS SECTION.

1.2 SUMMARY

- A. SECTION INCLUDES:
 1. COPPER TUBE AND FITTINGS.
 2. PEX TUBE AND FITTINGS.
 3. PIPING JOINING MATERIALS.
 4. ENCASEMENT FOR PIPING.
 5. TRANSITION FITTINGS.
 6. DIELECTRIC FITTINGS.

1.3 FIELD CONDITIONS

- A. INTERRUPTION OF EXISTING WATER SERVICE: DO NOT INTERRUPT WATER SERVICE TO FACILITIES OCCUPIED BY OWNER OR OTHERS UNLESS PERMITTED UNDER THE FOLLOWING CONDITIONS AND THEN ONLY AFTER ARRANGING TO PROVIDE TEMPORARY WATER SERVICE ACCORDING TO REQUIREMENTS INDICATED:
 1. NOTIFY OWNER NO FEWER THAN TWO DAYS IN ADVANCE OF PROPOSED INTERRUPTION OF WATER SERVICE.
 2. DO NOT INTERRUPT WATER SERVICE WITHOUT OWNER'S WRITTEN PERMISSION.

PART 2 - PRODUCT

2.1 PIPING MATERIALS

- A. COMPLY WITH REQUIREMENTS IN "PIPING SCHEDULE" ARTICLE FOR APPLICATIONS OF PIPE, TUBE, FITTING MATERIALS, AND JOINING METHODS FOR SPECIFIC SERVICES, SERVICE LOCATIONS, AND PIPE SIZES.
- B. POTABLE-WATER PIPING AND COMPONENTS SHALL COMPLY WITH NSF 14 AND NSF 61 ANNEX G. PLASTIC PIPING COMPONENTS SHALL BE MARKED WITH "NSF-PW."
- C. Comply with NSF Standard 372 for low lead.

2.2 COPPER TUBE AND FITTINGS

- A. HARD COPPER TUBE: ASTM B 88, TYPE L (ASTM B 88M, TYPE B) WATER TUBE, DRAWN TEMPER.
- B. CAST-COPPER, SOLDER-JOINT FITTINGS: ASME B16.18, PRESSURE FITTINGS.
- C. WROUGHT-COPPER, SOLDER-JOINT FITTINGS: ASME B16.22, WROUGHT-COPPER PRESSURE FITTINGS
- D. BRONZE FLANGES: ASME B16.24, CLASS 150, WITH SOLDER-JOINT ENDS.
- E. COPPER UNIONS:
 1. MSS SP-123.
 2. CAST-COPPER-ALLOY, HEXAGONAL-STOCK BODY.
 3. BALL-AND-SOCKET, METAL-TO-METAL SEATING SURFACES.
 4. SOLDER-JOINT OR THREADED ENDS.

2.3 PEX TUBE AND FITTINGS

- A. TUBE MATERIAL: PEX PLASTIC ACCORDING TO ASTM F 876 AND ASTM F 877.
- B. FITTINGS: ASTM F 1807, METAL INSERT AND COPPER CRIMP RINGS OR ASTM F 1960, COLD EXPANSION FITTINGS AND REINFORCING RINGS.

2.4 PIPING JOINING MATERIALS

- A. SOLDER FILLER METALS: ASTM B 32, LEAD-FREE ALLOYS.
- B. FLUX: ASTM B 813, WATER FLUSHABLE.
- C. BRAZING FILLER METALS: AWS A5.8M/A5.8, BCUP SERIES, COPPER-PHOSPHORUS ALLOYS FOR GENERAL-DUTY BRAZING UNLESS OTHERWISE INDICATED.
- D. PLASTIC, PIPE-FLANGE GASKETS, BOLTS, AND NUTS: TYPE AND MATERIAL RECOMMENDED BY PIPING SYSTEM MANUFACTURER UNLESS OTHERWISE INDICATED.

2.5 TRANSITION FITTINGS

- A. GENERAL REQUIREMENTS:
 1. SAME SIZE AS PIPES TO BE JOINED.
 2. PRESSURE RATING AT LEAST EQUAL TO PIPES TO BE JOINED.
 3. END CONNECTIONS COMPATIBLE WITH PIPES TO BE JOINED.

PART 3 - EXECUTION

3.1 PIPING INSTALLATION

- A. DRAWING PLANS, SCHEMATICS, AND DIAGRAMS INDICATE GENERAL LOCATION AND ARRANGEMENT OF DOMESTIC WATER PIPING. INDICATED LOCATIONS AND ARRANGEMENTS ARE USED TO SIZE PIPE AND CALCULATE FRICTION LOSS, EXPANSION, AND OTHER DESIGN CONSIDERATIONS. INSTALL PIPING AS INDICATED UNLESS DEVIATIONS TO LAYOUT ARE APPROVED ON COORDINATION DRAWINGS.
- B. INSTALL COPPER TUBING UNDER BUILDING SLAB ACCORDING TO CDA'S "COPPER TUBE HANDBOOK."
- C. INSTALL DOMESTIC WATER PIPING LEVEL WITHOUT PITCH AND PLUMB.
- D. INSTALL PIPING CONCEALED FROM VIEW AND PROTECTED FROM PHYSICAL CONTACT BY BUILDING OCCUPANTS UNLESS OTHERWISE INDICATED AND EXCEPT IN EQUIPMENT ROOMS AND SERVICE AREAS.
- E. INSTALL PIPING TO PERMIT VALVE SERVICING.

- F. INSTALL FITTINGS FOR CHANGES IN DIRECTION AND BRANCH CONNECTIONS.
- G. INSTALL PEX TUBING WITH LOOP AT EACH CHANGE OF DIRECTION OF MORE THAN 90 DEGREES.
- H. INSTALL ESCUTCHEONS FOR PIPING PENETRATIONS OF WALLS, CEILINGS, AND FLOORS.

3.2 JOINT CONSTRUCTION

- A. REMOVE SCALE, SLAG, DIRT, AND DEBRIS FROM INSIDE AND OUTSIDE OF PIPES, TUBES, AND FITTINGS BEFORE ASSEMBLY.
- B. BRAZED JOINTS FOR COPPER TUBING: COMPLY WITH CDA'S "COPPER TUBE HANDBOOK," "BRAZED JOINTS" CHAPTER.
- C. SOLDERED JOINTS FOR COPPER TUBING: APPLY ASTM B 813, WATER-FLUSHABLE FLUX TO END OF TUBE. JOIN COPPER TUBE AND FITTINGS ACCORDING TO ASTM B 828 OR CDA'S "COPPER TUBE HANDBOOK."
- D. FLANGED JOINTS: SELECT APPROPRIATE ASBESTOS-FREE, NONMETALLIC GASKET MATERIAL IN SIZE, TYPE, AND THICKNESS SUITABLE FOR DOMESTIC WATER SERVICE. JOIN FLANGES WITH GASKET AND BOLTS ACCORDING TO ASME B31.9.
- E. JOINT CONSTRUCTION FOR SOLVENT-CEMENTED PLASTIC PIPING: CLEAN AND DRY JOINING SURFACES. JOIN PIPE AND FITTINGS ACCORDING TO THE FOLLOWING:
 1. COMPLY WITH ASTM F 402 FOR SAFE-HANDLING PRACTICE OF CLEANERS, PRIMERS, AND SOLVENT CEMENTS. APPLY PRIMER.
 2. CPVC PIPING: JOIN ACCORDING TO ASTM D 2846/D 2846M APPENDIX.
 3. PVC PIPING: JOIN ACCORDING TO ASTM D 2855.
- F. JOINTS FOR PEX TUBING: JOIN ACCORDING TO ASTM F 1807 FOR METAL INSERT AND COPPER CRIMP RING FITTINGS AND ASTM F 1960 FOR COLD EXPANSION FITTINGS AND REINFORCING RINGS.

3.3 TRANSITION FITTING INSTALLATION

- A. INSTALL TRANSITION COUPLINGS AT JOINTS OF DISSIMILAR PIPING.

3.4 CONNECTIONS

- A. DRAWINGS INDICATE GENERAL ARRANGEMENT OF PIPING, FITTINGS, AND SPECIALTIES.
- B. CONNECT DOMESTIC WATER PIPING TO WATER-SERVICE PIPING WITH SHUTOFF VALVE; EXTEND AND CONNECT TO THE FOLLOWING:
 1. WATER HEATERS: COLD-WATER INLET AND HOT-WATER OUTLET PIPING IN SIZES INDICATED, BUT NOT SMALLER THAN SIZES OF WATER HEATER CONNECTIONS.
 2. PLUMBING FIXTURES: COLD- AND HOT-WATER-SUPPLY PIPING IN SIZES INDICATED, BUT NOT SMALLER THAN THAT REQUIRED BY PLUMBING CODE.

3.5 FIELD QUALITY CONTROL

- A. PERFORM THE FOLLOWING TESTS AND INSPECTIONS:
 1. PIPING INSPECTIONS:
 - a. DO NOT ENCLOSE, COVER, OR PUT PIPING INTO OPERATION UNTIL IT HAS BEEN INSPECTED AND APPROVED BY AUTHORITIES HAVING JURISDICTION.
 - b. DURING INSTALLATION, NOTIFY AUTHORITIES HAVING JURISDICTION AT LEAST ONE DAY BEFORE INSPECTION MUST BE MADE. PERFORM TESTS SPECIFIED BELOW IN PRESENCE OF AUTHORITIES HAVING JURISDICTION:
 - 1) ROUGHING-IN INSPECTION: ARRANGE FOR INSPECTION OF PIPING BEFORE CONCEALING OR CLOSING IN AFTER ROUGHING IN AND BEFORE SETTING FIXTURES.
 - 2) FINAL INSPECTION: ARRANGE FOR AUTHORITIES HAVING JURISDICTION TO OBSERVE TESTS SPECIFIED IN "PIPING TESTS" SUBPARAGRAPH BELOW AND TO ENSURE COMPLIANCE WITH REQUIREMENTS.
 - c. REINSPECTION: IF AUTHORITIES HAVING JURISDICTION FIND THAT PIPING WILL NOT PASS TESTS OR INSPECTIONS, MAKE REQUIRED CORRECTIONS AND ARRANGE FOR REINSPECTION.
 - d. REPORTS: PREPARE INSPECTION REPORTS AND HAVE THEM SIGNED BY AUTHORITIES HAVING JURISDICTION.
 2. PIPING TESTS:
 - a. FILL DOMESTIC WATER PIPING. CHECK COMPONENTS TO DETERMINE THAT THEY ARE NOT AIR BOUND AND THAT PIPING IS FULL OF WATER.
 - b. TEST FOR LEAKS AND DEFECTS IN NEW PIPING AND PARTS OF EXISTING PIPING THAT HAVE BEEN ALTERED, EXTENDED, OR REPAIRED. IF TESTING IS PERFORMED IN SEGMENTS, SUBMIT A SEPARATE REPORT FOR EACH TEST, COMPLETE WITH DIAGRAM OF PORTION OF PIPING TESTED.
 - c. LEAVE NEW, ALTERED, EXTENDED, OR REPLACED DOMESTIC WATER PIPING UNCOVERED AND UNCONCEALED UNTIL IT HAS BEEN TESTED AND APPROVED. EXPOSE WORK THAT WAS COVERED OR CONCEALED BEFORE IT WAS TESTED.
 - d. CAP AND SUBJECT PIPING TO STATIC WATER PRESSURE OF 50 PSIG (345 KPA) ABOVE OPERATING PRESSURE, WITHOUT EXCEEDING PRESSURE RATING OF PIPING SYSTEM MATERIALS. ISOLATE TEST SOURCE AND ALLOW IT TO STAND FOR FOUR HOURS. LEAKS AND LOSS IN TEST PRESSURE CONSTITUTE DEFECTS THAT MUST BE REPAIRED.
 - e. REPAIR LEAKS AND DEFECTS WITH NEW MATERIALS, AND RETEST PIPING OR PORTION THEREOF UNTIL SATISFACTORY RESULTS ARE OBTAINED.
 - f. PREPARE REPORTS FOR TESTS AND FOR CORRECTIVE ACTION REQUIRED.
- B. DOMESTIC WATER PIPING WILL BE CONSIDERED DEFECTIVE IF IT DOES NOT PASS TESTS AND INSPECTIONS.
- C. PREPARE TEST AND INSPECTION REPORTS.

3.6 ADJUSTING

- A. PERFORM THE FOLLOWING ADJUSTMENTS BEFORE OPERATION:
 1. OPEN SHUTOFF VALVES TO FULLY OPEN POSITION

3.7 CLEANING

- A. CLEAN AND DISINFECT POTABLE DOMESTIC WATER PIPING AS FOLLOWS:
 1. PURGE NEW PIPING AND PARTS OF EXISTING PIPING THAT HAVE BEEN ALTERED, EXTENDED, OR REPAIRED BEFORE USING.
 2. USE PURGING AND DISINFECTING PROCEDURES PRESCRIBED BY AUTHORITIES HAVING JURISDICTION; IF METHODS ARE NOT PRESCRIBED, USE PROCEDURES DESCRIBED IN EITHER AWWA C651 OR AWWA C652 OR FOLLOW PROCEDURES DESCRIBED BELOW:
 - a. FLUSH PIPING SYSTEM WITH CLEAN, POTABLE WATER UNTIL DIRTY WATER DOES NOT APPEAR AT OUTLETS.
 - b. FILL AND ISOLATE SYSTEM ACCORDING TO EITHER OF THE FOLLOWING:
 - 1) FILL SYSTEM OR PART THEREOF WITH WATER/CHLORINE SOLUTION WITH AT LEAST 50 PPM (50 MG/L) OF CHLORINE. ISOLATE WITH VALVES AND ALLOW TO STAND FOR 24 HOURS.
 - 2) FILL SYSTEM OR PART THEREOF WITH WATER/CHLORINE SOLUTION WITH AT LEAST 200 PPM (200 MG/L) OF CHLORINE. ISOLATE AND ALLOW TO STAND FOR THREE HOURS.
 - c. FLUSH SYSTEM WITH CLEAN, POTABLE WATER UNTIL NO CHLORINE IS IN WATER COMING FROM SYSTEM AFTER THE STANDING TIME.
 - d. REPEAT PROCEDURES IF BIOLOGICAL EXAMINATION SHOWS CONTAMINATION.
 - e. SUBMIT WATER SAMPLES IN STERILE BOTTLES TO AUTHORITIES HAVING JURISDICTION.

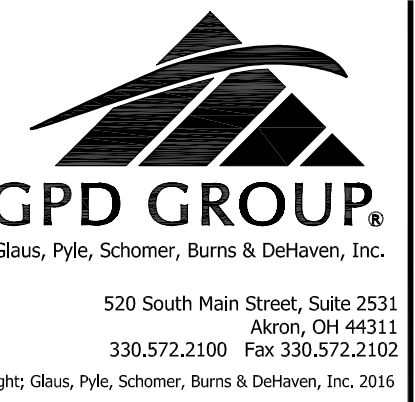
3.8 PIPING SCHEDULE

- A. TRANSITION AND SPECIAL FITTINGS WITH PRESSURE RATINGS AT LEAST EQUAL TO PIPING RATING MAY BE USED IN APPLICATIONS BELOW UNLESS OTHERWISE INDICATED.
- B. ABOVEGROUND DOMESTIC WATER PIPING, NPS 2 (DN 50) AND SMALLER SHALL BE THE FOLLOWING:
 1. PEX TUBE, NPS 1 (DN 25) AND SMALLER.
 - a. FITTINGS FOR PEX TUBE:
 - 1) ASTM F 1807, METAL INSERT AND COPPER CRIMP RINGS.
 - 2) ASTM F 1960, COLD EXPANSION FITTINGS AND REINFORCING RINGS.
 - 3) ASSE 1061, PUSH-FIT FITTINGS.

3.9 VALVE SCHEDULE

- A. DRAWINGS INDICATE VALVE TYPES TO BE USED. WHERE SPECIFIC VALVE TYPES ARE NOT INDICATED, THE FOLLOWING REQUIREMENTS APPLY:
 1. SHUTOFF DUTY: USE BALL OR GATE VALVES FOR PIPING NPS 2 (DN 50) AND SMALLER.

END OF SECTION 221116



REV.	DATE	DESCRIPTION
	01/12/17	100% CONTRACT DOCUMENTS
	08/09/17	100% BID DOCUMENTS

**GMHA - WATERLINE
STRICKLAND ARMS DEVELOPMENT
BAINBRIDGE, OH 44023**

**PLUMBING
SPECIFICATIONS**

ISSUED FOR:	
PERMIT	-
BID	08/09/17
CONSTRUCTION	-
RECORD	-
PROJECT MANAGER	DESIGNER
SW	SC

JOB NO.
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P-201

SECTION 223300 - ELECTRIC, DOMESTIC-WATER HEATERS

PART 1 - GENERAL

1.1 SUMMARY

- A. SECTION INCLUDES:
 1. RESIDENTIAL, ELECTRIC, STORAGE, DOMESTIC-WATER HEATERS.
 2. DOMESTIC-WATER HEATER ACCESSORIES.

1.2 ACTION SUBMITTALS

- A. PRODUCT DATA: FOR EACH TYPE AND SIZE OF DOMESTIC-WATER HEATER INDICATED. INCLUDE RATED CAPACITIES, OPERATING CHARACTERISTICS, ELECTRICAL CHARACTERISTICS, AND FURNISHED SPECIALTIES AND ACCESSORIES.

B. SHOP DRAWINGS:

- 1. WIRING DIAGRAMS: FOR POWER, SIGNAL, AND CONTROL WIRING.

1.3 INFORMATIONAL SUBMITTALS

- A. PRODUCT CERTIFICATES: FOR EACH TYPE OF RESIDENTIAL, ELECTRIC, DOMESTIC-WATER HEATER, FROM MANUFACTURER.
- B. DOMESTIC-WATER HEATER LABELING: CERTIFIED AND LABELED BY TESTING AGENCY ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION.
- C. SOURCE QUALITY-CONTROL REPORTS.
- D. FIELD QUALITY-CONTROL REPORTS.
- E. WARRANTY: SAMPLE OF SPECIAL WARRANTY.

1.4 CLOSEOUT SUBMITTALS

- A. OPERATION AND MAINTENANCE DATA: FOR ELECTRIC, DOMESTIC-WATER HEATERS TO INCLUDE OPERATION, AND MAINTENANCE MANUALS.

1.5 QUALITY ASSURANCE

- A. ELECTRICAL COMPONENTS, DEVICES, AND ACCESSORIES: LISTED AND LABELED AS DEFINED IN NFPA 70, BY A QUALIFIED TESTING AGENCY, AND MARKED FOR INTENDED LOCATION AND APPLICATION.
- B. ASHRAE/IESNA COMPLIANCE: APPLICABLE REQUIREMENTS IN ASHRAE/IESNA 90.1.
- C. ASME COMPLIANCE: WHERE ASME-CODE CONSTRUCTION IS INDICATED, FABRICATE AND LABEL COMMERCIAL, DOMESTIC-WATER HEATER STORAGE TANKS TO COMPLY WITH ASME BOILER AND PRESSURE VESSEL CODE: SECTION VIII, DIVISION 1.
- D. NSF COMPLIANCE: FABRICATE AND LABEL EQUIPMENT COMPONENTS THAT WILL BE IN CONTACT WITH POTABLE WATER TO COMPLY WITH NSF 61 ANNEX G, "DRINKING WATER SYSTEM COMPONENTS - HEALTH EFFECTS."

1.6 COORDINATION

- A. COORDINATE SIZES AND LOCATIONS OF CONCRETE BASES WITH ACTUAL EQUIPMENT PROVIDED.

1.7 WARRANTY

- A. SPECIAL WARRANTY: MANUFACTURER'S STANDARD FORM IN WHICH MANUFACTURER AGREES TO REPAIR OR REPLACE COMPONENTS OF ELECTRIC, DOMESTIC-WATER HEATERS THAT FAIL IN MATERIALS OR WORKMANSHIP WITHIN SPECIFIED WARRANTY PERIOD.
 1. FAILURES INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:
 - a. STRUCTURAL FAILURES INCLUDING STORAGE TANK AND SUPPORTS.
 - b. FAULTY OPERATION OF CONTROLS.
 - c. DETERIORATION OF METALS, METAL FINISHES, AND OTHER MATERIALS BEYOND NORMAL USE.
 2. WARRANTY PERIODS: FROM DATE OF SUBSTANTIAL COMPLETION.
 - a. RESIDENTIAL, ELECTRIC, STORAGE, DOMESTIC-WATER HEATERS:
 - 1) STORAGE TANK: 10 YEARS.
 - b. COMPRESSION TANKS: 1 YEAR.

PART 2 - PRODUCTS

2.1 RESIDENTIAL, ELECTRIC, DOMESTIC-WATER HEATERS

A. RESIDENTIAL, ELECTRIC, STORAGE, DOMESTIC-WATER HEATERS:

1. MANUFACTURERS
 - a. BRADFORD WHITE CORPORATION
 - b. AMERICAN WATER HEATERS
 - c. A.O. SMITH WATER PRODUCTS
 - d. LOCHINVAR CORPORATION
 - e. RHEEM MANUFACTURING COMPANY
2. STANDARD: UL 174.
3. STORAGE-TANK CONSTRUCTION: STEEL.
 - a. TAPPINGS: ASME B1.20.1 PIPE THREAD.
 - b. PRESSURE RATING: 150 PSIG (1035 KPA).
 - c. INTERIOR FINISH: COMPLY WITH NSF 61 ANNEX G BARRIER MATERIALS FOR POTABLE-WATER TANK LININGS, INCLUDING EXTENDING LINING MATERIAL INTO TAPPINGS.
4. FACTORY-INSTALLED STORAGE-TANK APPURTENANCES:
 - a. ANODE ROD: REPLACEABLE MAGNESIUM.
 - b. DIP TUBE: REQUIRED UNLESS COLD-WATER INLET IS NEAR BOTTOM OF TANK.
 - c. DRAIN VALVE: ASSE 1005.
 - d. INSULATION: COMPLY WITH ASHRAE 90.2.
 - e. JACKET: STEEL, CYLINDRICAL, WITH ENAMELED FINISH.
 - f. HEAT-TRAP FITTINGS: INLET TYPE IN COLD-WATER INLET AND OUTLET TYPE IN HOT-WATER OUTLET.
 - g. HEATING ELEMENTS: ONE; ELECTRIC, SCREW-IN IMMERSION TYPE.
 - h. TEMPERATURE CONTROL: ADJUSTABLE THERMOSTAT.

- i. SAFETY CONTROL: HIGH-TEMPERATURE-LIMIT CUTOFF DEVICE OR SYSTEM.
- j. RELIEF VALVE: ASME RATED AND STAMPED FOR COMBINATION TEMPERATURE-AND-PRESSURE RELIEF VALVES. INCLUDE RELIEVING CAPACITY AT LEAST AS GREAT AS HEAT INPUT, AND INCLUDE PRESSURE SETTING LESS THAN DOMESTIC-WATER HEATER WORKING-PRESSURE RATING. SELECT RELIEF VALVE WITH SENSING ELEMENT THAT EXTENDS INTO STORAGE TANK.

2.2 DOMESTIC-WATER HEATER ACCESSORIES

A. DOMESTIC-WATER COMPRESSION TANKS:

1. MANUFACTURERS
 - a. AMTROL INC.
 - b. A.O. SMITH WATER PRODUCTS
 - c. STATE INDUSTRIES
 - d. TACO, INC.
2. DESCRIPTION: STEEL PRESSURE-RATED TANK CONSTRUCTED WITH WELDED JOINTS AND FACTORY-INSTALLED BUTYL-RUBBER DIAPHRAGM. INCLUDE AIR PRECHARGE TO MINIMUM SYSTEM-OPERATING PRESSURE AT TANK.
3. CONSTRUCTION:
 - a. TAPPINGS: FACTORY-FABRICATED STEEL, WELDED TO TANK BEFORE TESTING AND LABELING. INCLUDE ASME B1.20.1 PIPE THREAD.
 - b. INTERIOR FINISH: COMPLY WITH NSF 61 ANNEX-G BARRIER MATERIALS FOR POTABLE-WATER TANK LININGS, INCLUDING EXTENDING FINISH INTO AND THROUGH TANK FITTINGS AND OUTLETS.
 - c. AIR-CHARGING VALVE: FACTORY INSTALLED.
- B. DRAIN PANS: CORROSION-RESISTANT METAL WITH RAISED EDGE. COMPLY WITH ANSI/CSA LC 3. INCLUDE DIMENSIONS NOT LESS THAN BASE OF DOMESTIC-WATER HEATER, AND INCLUDE DRAIN OUTLET NOT LESS THAN NPS 3/4 (DN 20) WITH ASME B1.20.1 PIPE THREADS OR WITH ASME B1.20.7 GARDEN-HOSE THREADS.
- C. PIPING-TYPE HEAT TRAPS: FIELD-FABRICATED PIPING ARRANGEMENT ACCORDING TO ASHRAE/IESNA 90.1 OR ASHRAE 90.2.
- D. HEAT-TRAP FITTINGS: ASHRAE 90.2.
- E. COMBINATION TEMPERATURE-AND-PRESSURE RELIEF VALVES: ASME RATED AND STAMPED. INCLUDE RELIEVING CAPACITY AT LEAST AS GREAT AS HEAT INPUT, AND INCLUDE PRESSURE SETTING LESS THAN DOMESTIC-WATER HEATER WORKING-PRESSURE RATING. SELECT RELIEF VALVES WITH SENSING ELEMENT THAT EXTENDS INTO STORAGE TANK.
- F. PRESSURE RELIEF VALVES: ASME RATED AND STAMPED. INCLUDE PRESSURE SETTING LESS THAN DOMESTIC-WATER HEATER WORKING-PRESSURE RATING.
- G. VACUUM RELIEF VALVES: ANSI Z21.22/CSA 4.4.

2.3 SOURCE QUALITY CONTROL

- A. FACTORY TESTS: TEST AND INSPECT DOMESTIC-WATER HEATERS SPECIFIED TO BE ASME-CODE CONSTRUCTION, ACCORDING TO ASME BOILER AND PRESSURE VESSEL CODE.
- B. HYDROSTATICALLY TEST DOMESTIC-WATER HEATERS TO MINIMUM OF ONE AND ONE-HALF TIMES PRESSURE RATING BEFORE SHIPMENT.
- C. ELECTRIC, DOMESTIC-WATER HEATERS WILL BE CONSIDERED DEFECTIVE IF THEY DO NOT PASS TESTS AND INSPECTIONS. COMPLY WITH REQUIREMENTS IN SECTION 014000 "QUALITY REQUIREMENTS" FOR RETESTING AND REINSPECTING REQUIREMENTS AND SECTION 017300 "EXECUTION" FOR REQUIREMENTS FOR CORRECTING THE WORK.
- D. PREPARE TEST AND INSPECTION REPORTS.

PART 3 - EXECUTION

3.1 DOMESTIC-WATER HEATER INSTALLATION

- A. RESIDENTIAL, ELECTRIC, DOMESTIC-WATER HEATER MOUNTING: INSTALL RESIDENTIAL, ELECTRIC, DOMESTIC-WATER HEATERS ON FLOOR.
 1. MAINTAIN MANUFACTURER'S RECOMMENDED CLEARANCES.
 2. ARRANGE UNITS SO CONTROLS AND DEVICES THAT REQUIRE SERVICING ARE ACCESSIBLE.
 3. PLACE AND SECURE ANCHORAGE DEVICES. USE SETTING DRAWINGS, TEMPLATES, DIAGRAMS, INSTRUCTIONS, AND DIRECTIONS FURNISHED WITH ITEMS TO BE EMBEDDED.
 4. INSTALL ANCHOR BOLTS TO ELEVATIONS REQUIRED FOR PROPER ATTACHMENT TO SUPPORTED EQUIPMENT.
 5. ANCHOR DOMESTIC-WATER HEATERS TO SUBSTRATE.
- B. INSTALL ELECTRIC, DOMESTIC-WATER HEATERS LEVEL AND PLUMB, ACCORDING TO LAYOUT DRAWINGS, ORIGINAL DESIGN, AND REFERENCED STANDARDS. MAINTAIN MANUFACTURER'S RECOMMENDED CLEARANCES. ARRANGE UNITS SO CONTROLS AND DEVICES NEEDING SERVICE ARE ACCESSIBLE.
- C. INSTALL COMBINATION TEMPERATURE-AND-PRESSURE RELIEF VALVES IN TOP PORTION OF STORAGE TANKS. USE RELIEF VALVES WITH SENSING ELEMENTS THAT EXTEND INTO TANKS. EXTEND COMMERCIAL-WATER-HEATER RELIEF-VALVE OUTLET, WITH DRAIN PIPING SAME AS DOMESTIC-WATER PIPING IN CONTINUOUS DOWNWARD PITCH, AND DISCHARGE BY POSITIVE AIR GAP ONTO CLOSEST FLOOR DRAIN.
- D. INSTALL COMBINATION TEMPERATURE-AND-PRESSURE RELIEF VALVES IN WATER PIPING FOR ELECTRIC, DOMESTIC-WATER HEATERS WITHOUT STORAGE. EXTEND COMMERCIAL-WATER-HEATER RELIEF-VALVE OUTLET, WITH DRAIN PIPING SAME AS DOMESTIC-WATER PIPING IN CONTINUOUS DOWNWARD PITCH, AND DISCHARGE BY POSITIVE AIR GAP ONTO CLOSEST FLOOR DRAIN.
- E. INSTALL WATER-HEATER DRAIN PIPING AS INDIRECT WASTE TO SPILL BY POSITIVE AIR GAP INTO OPEN DRAINS OR OVER FLOOR DRAINS. INSTALL HOSE-END DRAIN VALVES AT LOW POINTS IN WATER PIPING FOR ELECTRIC, DOMESTIC-WATER HEATERS THAT DO NOT HAVE TANK DRAINS.
- F. INSTALL PIPING-TYPE HEAT TRAPS ON INLET AND OUTLET PIPING OF ELECTRIC, DOMESTIC-WATER HEATER STORAGE TANKS WITHOUT INTEGRAL OR FITTING-TYPE HEAT TRAPS.
- G. FILL ELECTRIC, DOMESTIC-WATER HEATERS WITH WATER.
- H. CHARGE DOMESTIC-WATER COMPRESSION TANKS WITH AIR.

3.2 CONNECTIONS

- A. COMPLY WITH REQUIREMENTS FOR PIPING SPECIFIED IN SECTION 221116 "DOMESTIC WATER PIPING." DRAWINGS INDICATE GENERAL ARRANGEMENT OF PIPING, FITTINGS, AND SPECIALTIES.
- B. WHERE INSTALLING PIPING ADJACENT TO ELECTRIC, DOMESTIC-WATER HEATERS, ALLOW SPACE FOR SERVICE AND MAINTENANCE OF WATER HEATERS. ARRANGE PIPING FOR EASY REMOVAL OF DOMESTIC-WATER HEATERS.

3.3 FIELD QUALITY CONTROL

- A. PERFORM TESTS AND INSPECTIONS.
 1. MANUFACTURER'S FIELD SERVICE: ENGAGE A FACTORY-AUTHORIZED SERVICE REPRESENTATIVE TO

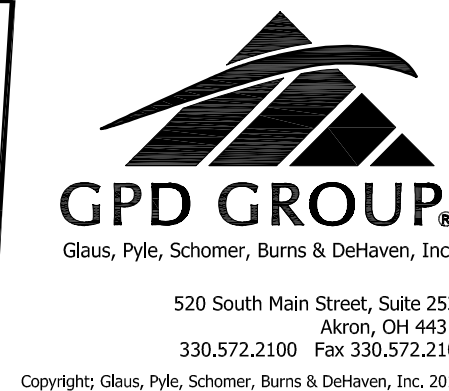
INSPECT COMPONENTS, ASSEMBLIES, AND EQUIPMENT INSTALLATIONS, INCLUDING CONNECTIONS, AND TO ASSIST IN TESTING.

2. LEAK TEST: AFTER INSTALLATION, CHARGE SYSTEM AND TEST FOR LEAKS. REPAIR LEAKS AND RETEST UNTIL NO LEAKS EXIST.
3. OPERATIONAL TEST: AFTER ELECTRICAL CIRCUITRY HAS BEEN ENERGIZED, START UNITS TO CONFIRM PROPER OPERATION.
4. TEST AND ADJUST CONTROLS AND SAFETIES. REPLACE DAMAGED AND MALFUNCTIONING CONTROLS AND EQUIPMENT.

B. ELECTRIC, DOMESTIC-WATER HEATERS WILL BE CONSIDERED DEFECTIVE IF THEY DO NOT PASS TESTS AND INSPECTIONS.

C. PREPARE TEST AND INSPECTION REPORTS.

END OF SECTION 223300



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