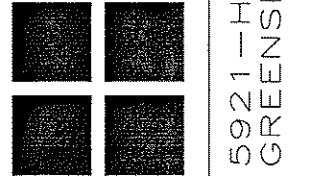


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BRADLEY & BALL ARCHITECTS

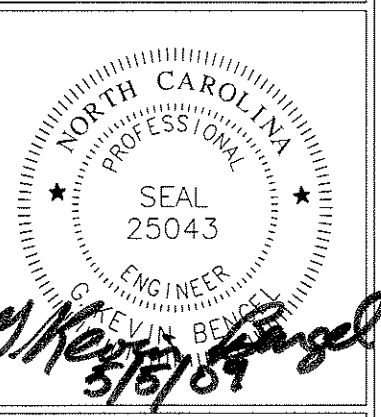


5921-H WEST FRIENDLY AVE
GREENSBORO, N.C. 27410

BLUE RIDGE PROJECT NUMBER 071-04A-NC
LEGACY AT CAROLINA FOREST
"A" BUILDING-1/2/3 BEDROOM APT.
JACKSONVILLE TOWNSHIP JACKSONVILLE, NC

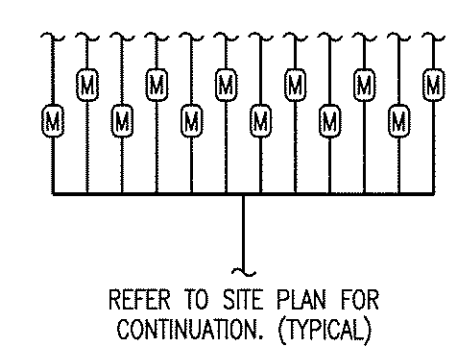
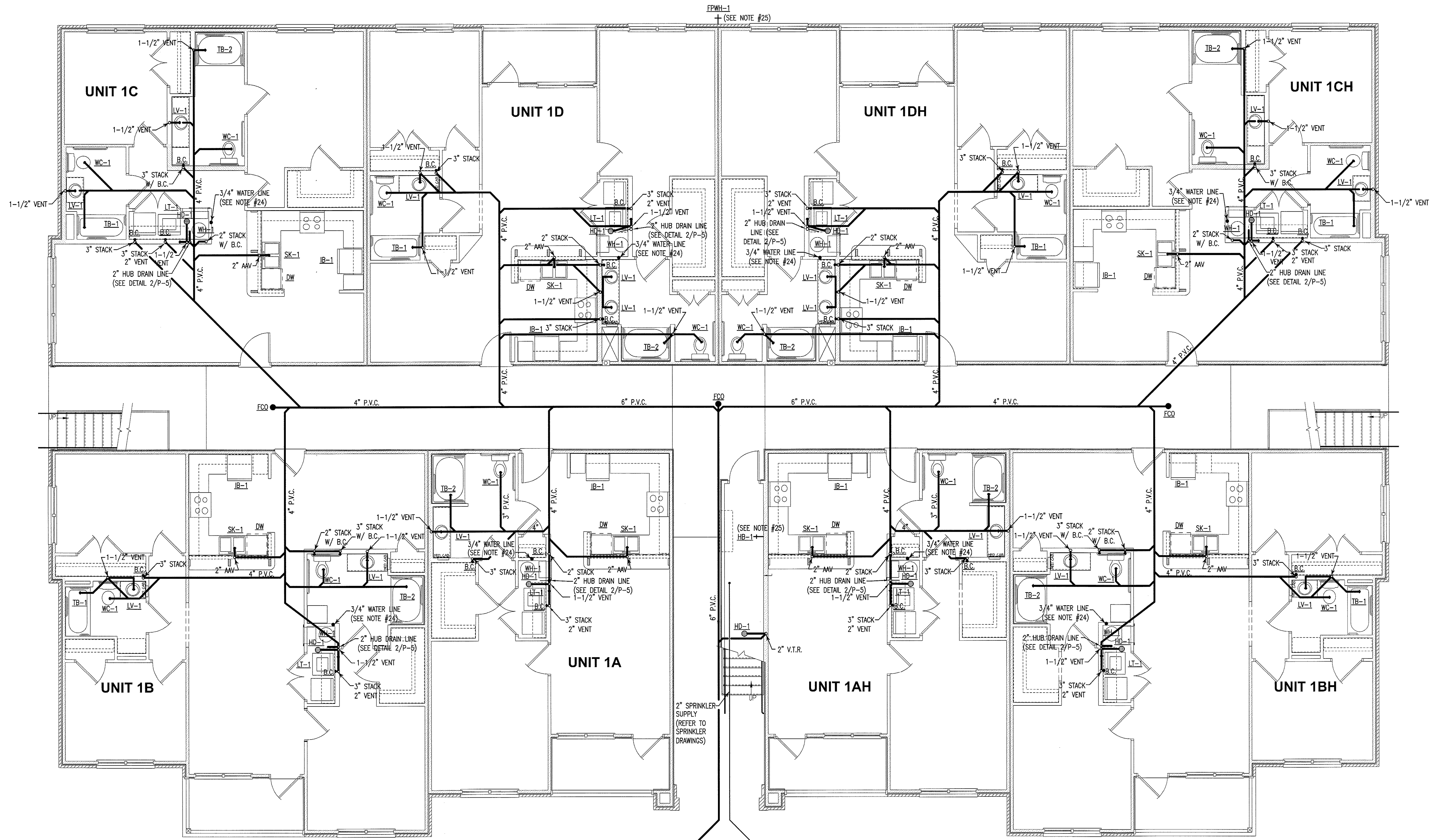
JACKSONVILLE TOWNSHIP JACKSONVILLE, NC

DRAWING NAME
1ST FLOOR PLUMBING PLAN



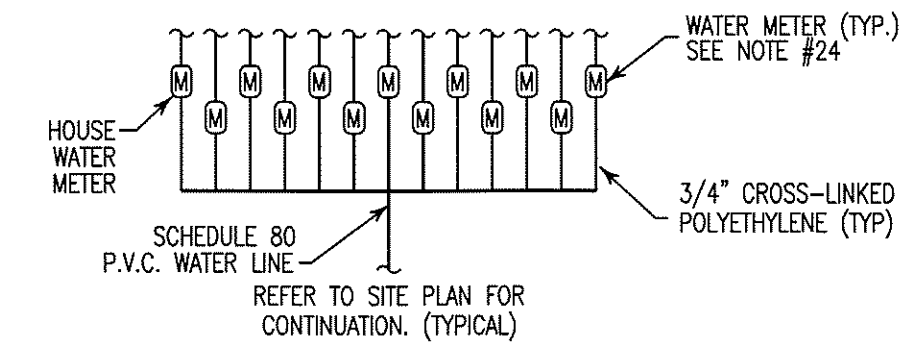
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SCALE: AS NOTED
JOB NO: 9006
SHEET

P-1



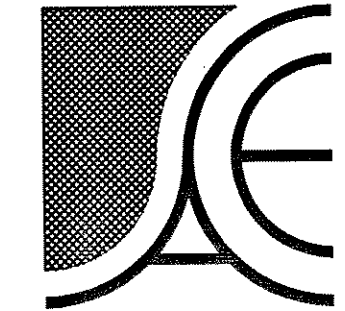
EXTEND AND CONNECT 6" P.V.C. SEWER LINE SLOPED AT 1/8" PER 1'-0" TO SEWER

WATER LINE TO ENTER SIDE OF BUILDING CLOSEST TO EXISTING WATER MAIN. REFER TO SITE PLAN.



PIPING LEGEND	
SYMBOL	DESCRIPTION
C	COLD WATER
—	SEWER PIPING

1ST FLOOR PLUMBING PLAN
SCALE: 3/16" = 1'-0"



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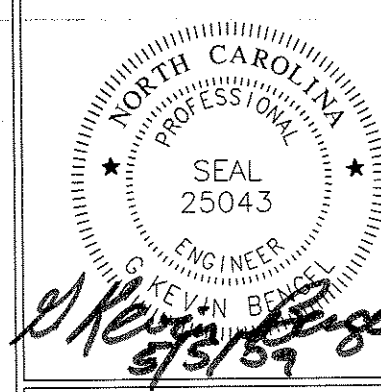
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BRADLEY & BAIL ARCHITECTS

5921-H WEST FRIENDLY AVE
GREENSBORO, N.C. 27410

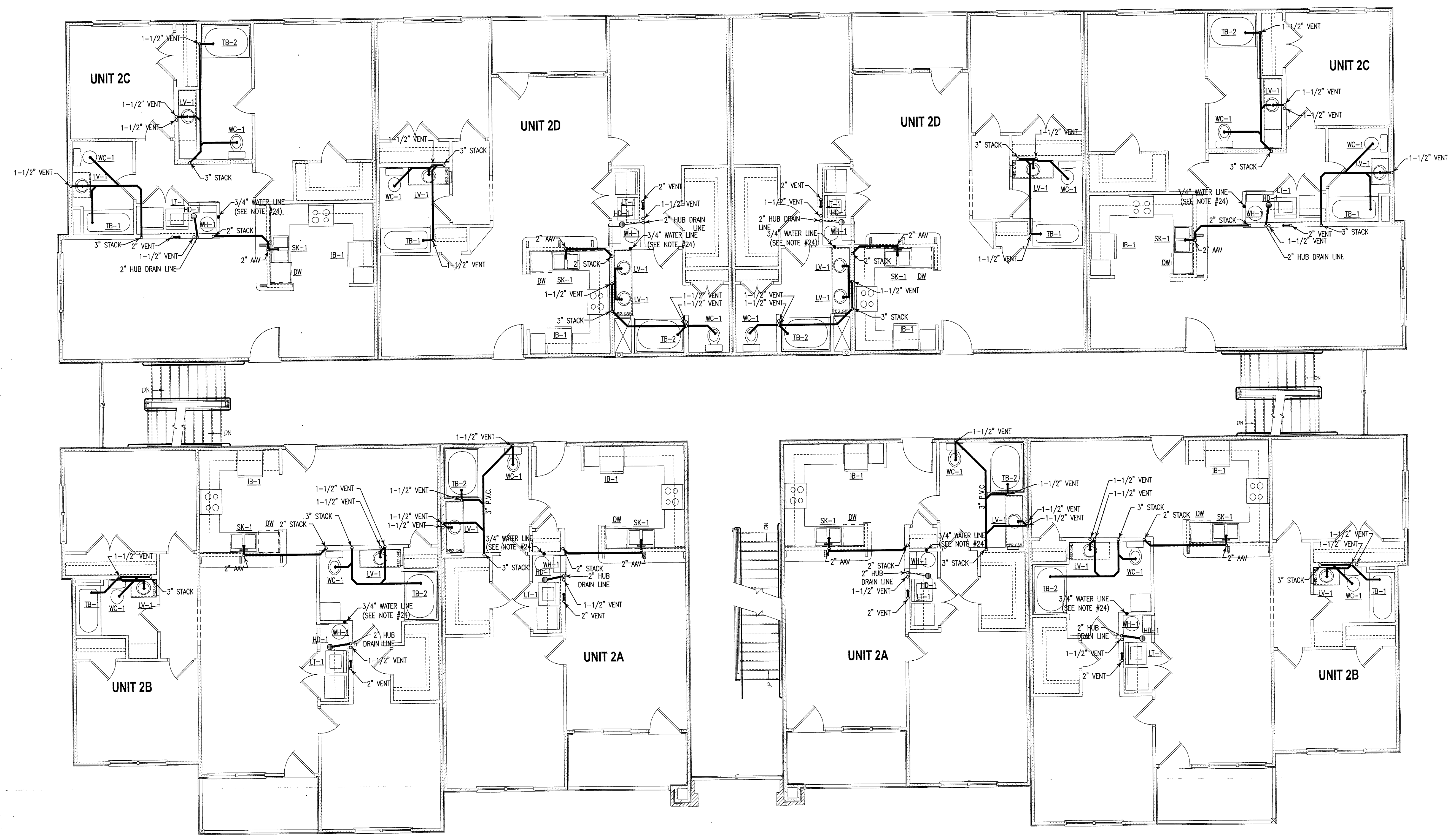
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LEGACY AT CAROLINA FOREST
"A" BUILDING-1/2/3 BEDROOM APT.
JACKSONVILLE TOWNSHIP JACKSONVILLE, NC

DRAWING NAME
2ND FLOOR PLUMBING PLAN



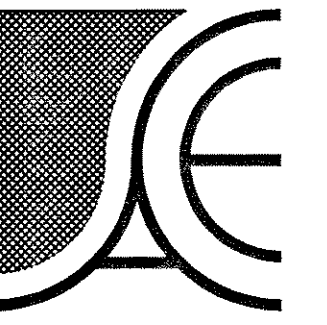
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JOB NO.: 9006
SHEET

P-2



1
P-2
2ND FLOOR PLUMBING PLAN
SCALE: 3/16" = 1'-0"

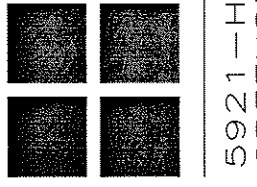
PIPING LEGEND	
SYMBOL	DESCRIPTION
	SEWER PIPING



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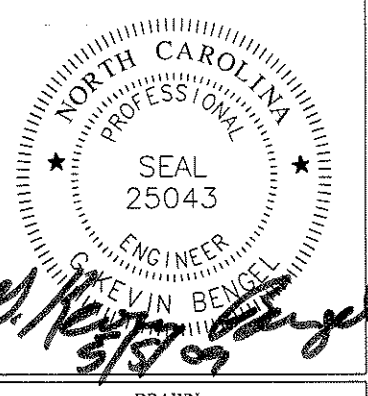
BRADLEY & BALL ARCHITECTS



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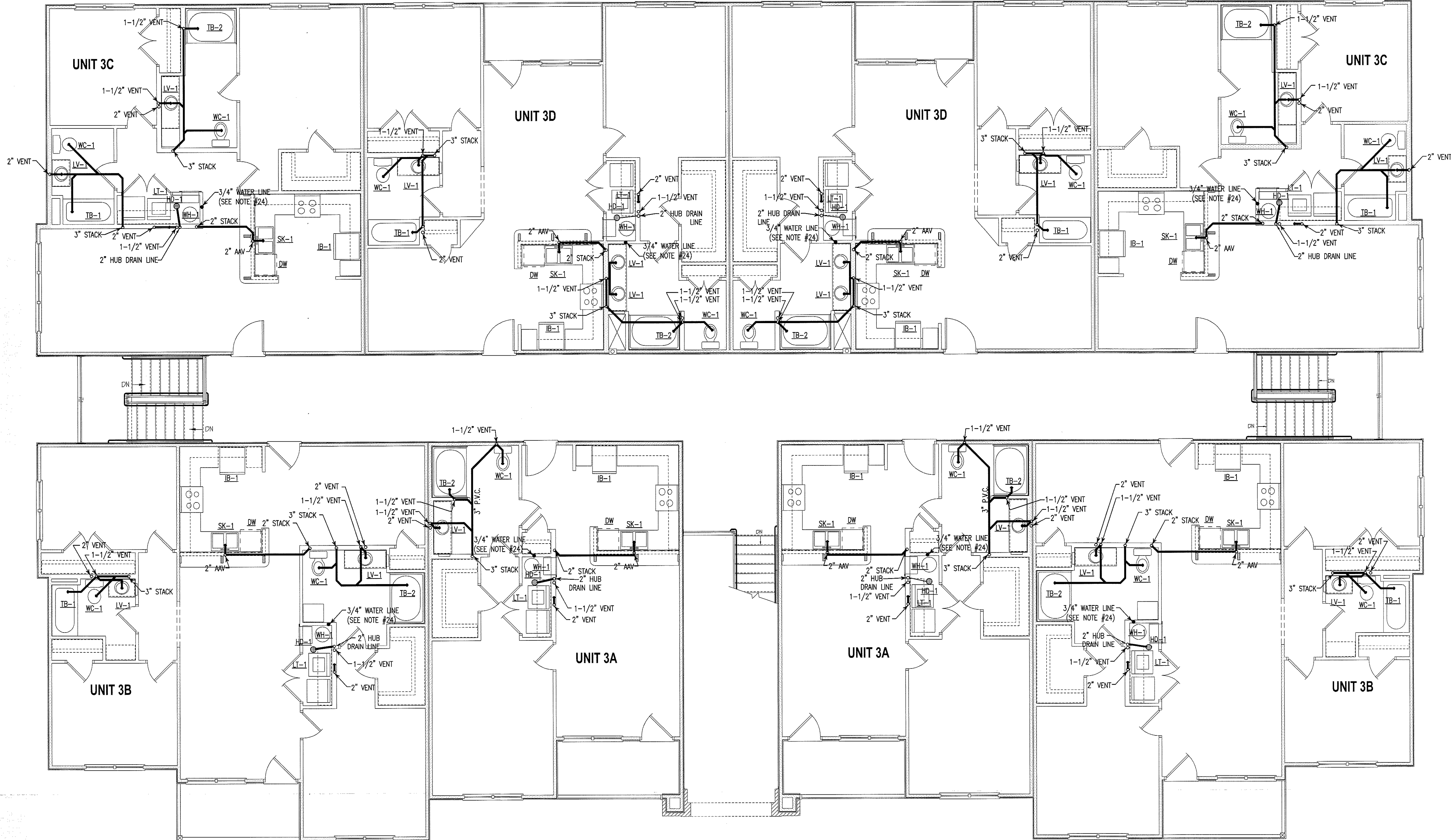
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LEGACY AT CAROLINA FOREST
"A" BUILDING-1/2/3 BEDROOM APT.
JACKSONVILLE TOWNSHIP JACKSONVILLE, NC

DRAWING NAME
3RD FLOOR PLUMBING PLAN



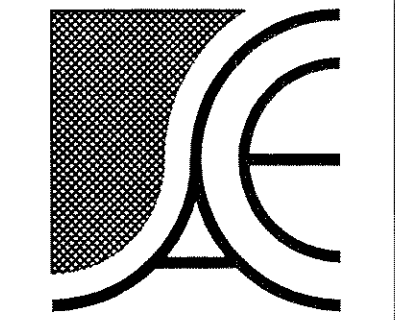
DRAWN
CCM
DATE
5/5/09
SCALE
AS NOTED
JOB NO.
9006
SHEET

P-3



3RD FLOOR
PLUMBING PLAN
SCALE: 3/16" = 1'-0"

PIPING LEGEND	
SYMBOL	DESCRIPTION
	SEWER PIPING



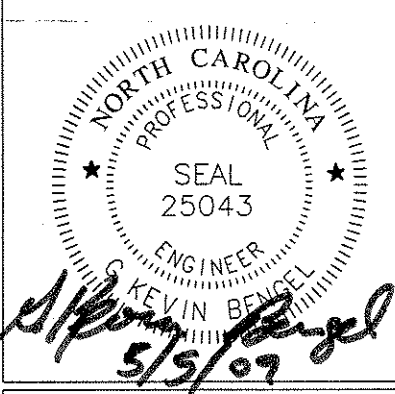
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BRADLEY & BALL ARCHITECTS
5921-H WEST FRIENDLY AVE
GREENSBORO, N.C. 27410

BLUE RIDGE PROJECT NUMBER 071-044-NC
LEGACY AT CAROLINA FOREST
"A" BUILDING-1/2/3 BEDROOM APT.
JACKSONVILLE TOWNSHIP
JACKSONVILLE, NC

DRAWING NAME
PLUMBING NOTES AND DETAILS



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CHECKED
MMR
DATE
5/5/09
SCALE
AS NOTED
JOB NO.
9006
SHEET

P-4

PLUMBING FIXTURE SCHEDULE								
ITEM NO.	FIXTURE DESCRIPTION	MANUFACTURER	MODEL NO.	CONNECTION SIZES			REMARKS	
				C.W.	H.W.	WASTE		
WC-1	WATER CLOSET - TANK TYPE	ELJER	091-0285	1/2"	---	4"	2"	1.6 GAL/FLUSH, H.C. HEIGHT OLSONITE #94 PLASTIC SEAT
LV-1	COUNTER MOUNT LAVATORY	B&K	122-331	1/2"	1/2"	1-1/2"	1-1/2"	CULTURED MARBLE TOP BY OTHERS
TB-1	TUB AND SHOWER COMBO	B&K	122-241	1/2"	1/2"	1-1/2"	1-1/2"	CAROLINA CLASSIC TUB BY OTHERS
TB-2	GARDEN TUB AND SHOWER COMBO	B&K	122-241	1/2"	1/2"	1-1/2"	1-1/2"	CAROLINA CLASSIC TUB BY OTHERS
SK-1	DOUBLE COMP. KITCHEN SINK	FHP	DS604	1/2"	1/2"	1-1/2"	1-1/2"	B&K 122-418 SINGLE LEVER FAUCET, TRUEBRO PIPING COVERS
HD-1	HUB DRAIN	CHARLOTTE PLASTICS	4" x 2"	---	---	3"	---	2nd & 3rd FLOORS TO DISCHARGE INTO 1st FLOOR HUB DRAIN
LT-1	LAUNDRY TRAY	IPS	82069	1/2"	1/2"	1-1/2"	1-1/2"	2 CHROME 1/4 TURN ADAPTER BALL VALVES, 1/2" PEX
IB-1	ICE MAKER BOX	IPS	82093	1/2"	1/2"	1-1/2"	1-1/2"	CHROME 1/4 TURN ADAPTER BALL VALVES, 1/2" PEX
B.C.	BASE CLEAN OUT	ZURN	Z-1441	---	---	---	---	SIZE DETERMINED UPON WASTE PIPE
FCO	FLOOR CLEAN OUT	OATEY	74129	---	---	---	---	SIZE DETERMINED UPON WASTE PIPE
AAV	AIR ADMITTANCE VALVE	STUDOR	REDI-VENT	---	---	---	1-1/2"	---
SM	WATER SUB-METER	NORGAS MULTIMAG	---	---	---	---	---	WIRED TO TELEMETRY DEVICE IN ATTIC
HR-1	CHROME HOSE BIBB	WOODFORD	24C	1/2"	---	---	---	MOUNT 18" A.F.F.
FPWH-1	FROST PROOF WALL HYDRANT	WOODFORD	65	1/2"	---	---	---	MOUNT 24" ABOVE GRADE LEVEL

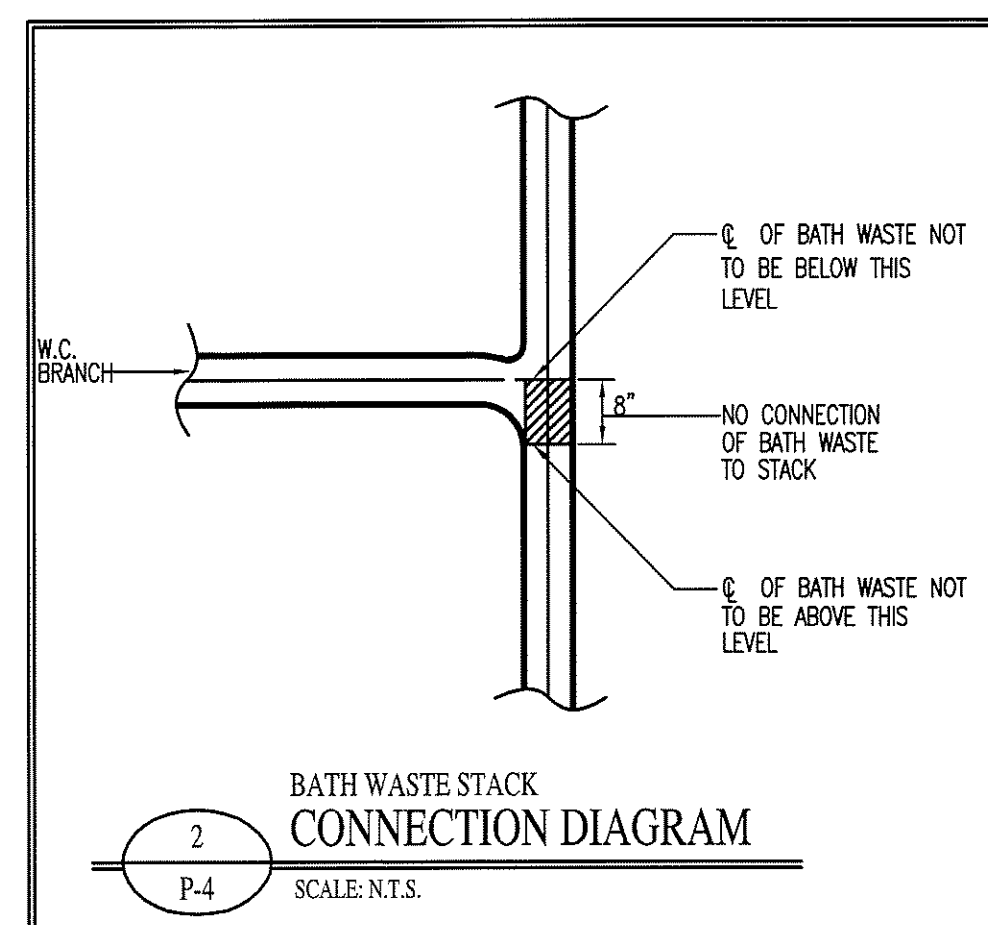
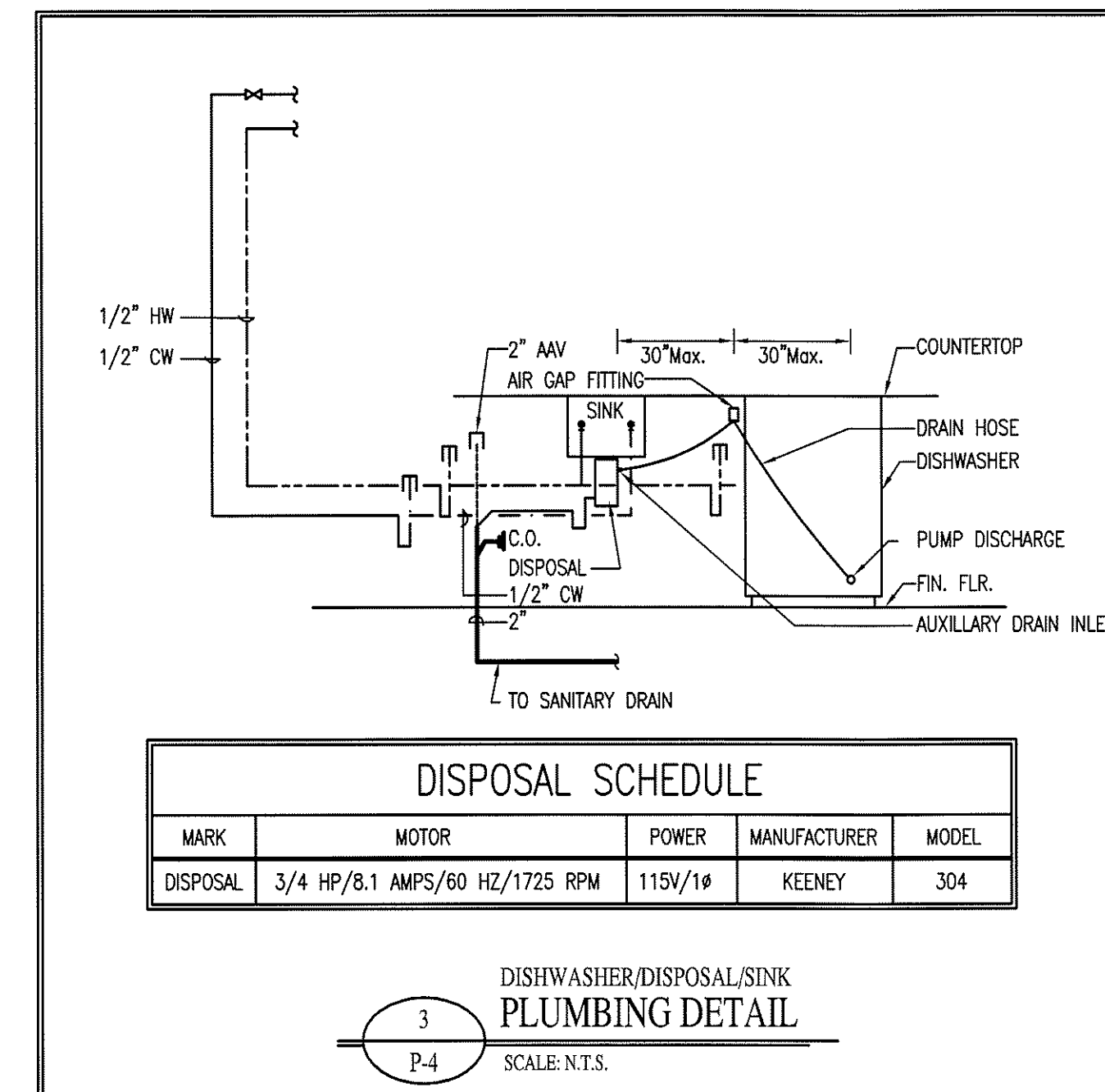
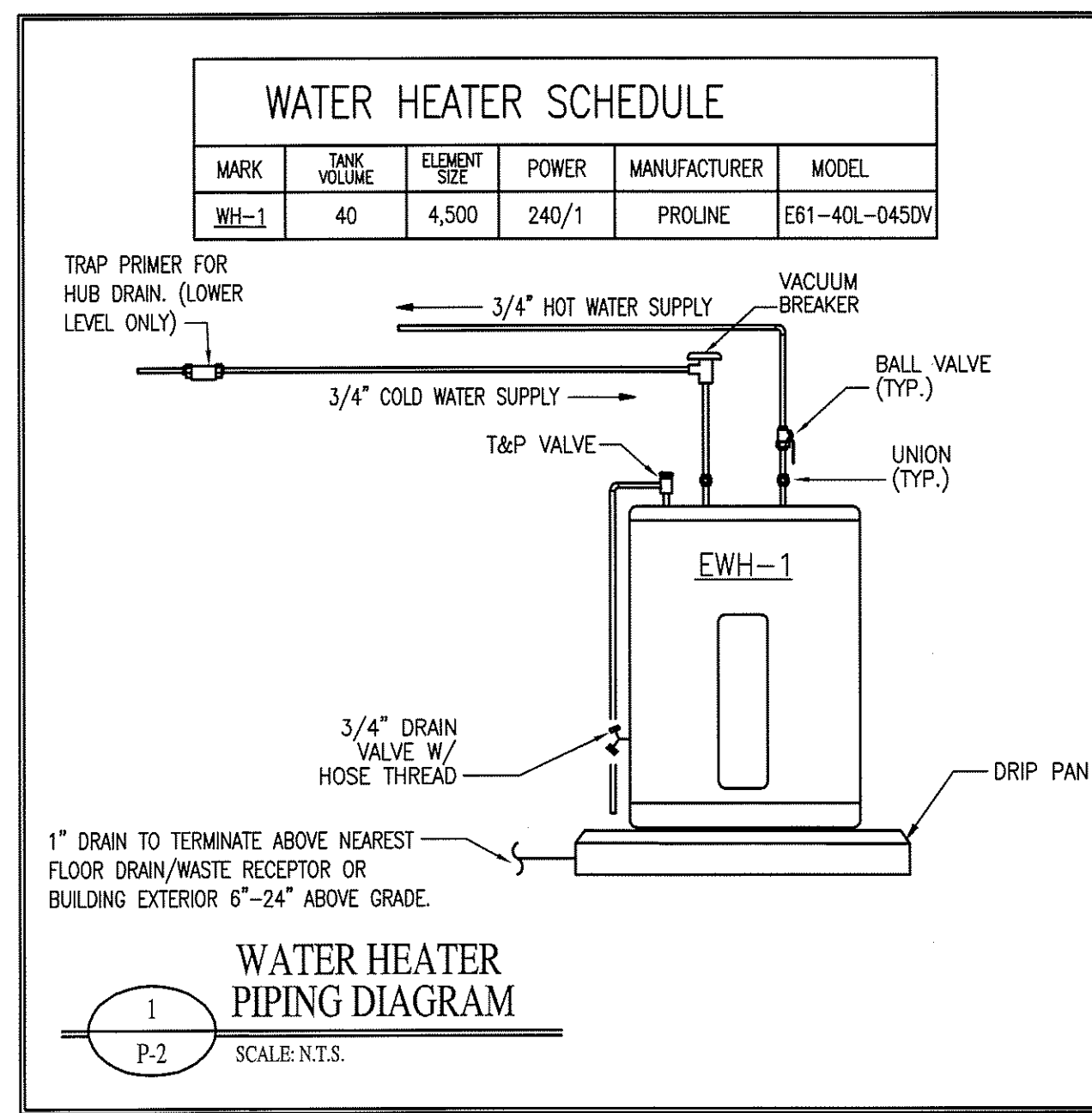
FIXTURE MODEL NUMBERS LISTED ARE FOR DESCRIPTION ONLY.

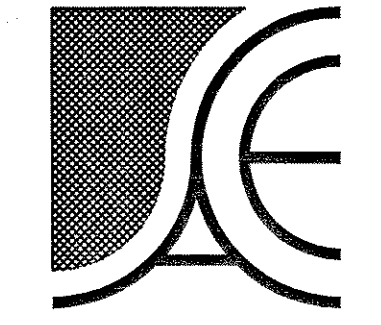
WASTE AND WATER CALCULATIONS									
FIXTURE TYPE	QUANTITY	WASTE FIXTURE UNITS		HOT WATER FIXTURE UNITS		COLD WATER FIXTURE UNITS		TOTAL WATER FIXTURE UNITS	
		PER UNIT	TOTAL	PER UNIT	TOTAL	PER UNIT	TOTAL	PER UNIT	TOTAL
BATHROOM GROUP	42	5	210	1.5	63	2.7	113.4	3.6	151.2
WASHING MACHINE	24	2	48	1	24	1	24	1.4	33.6
DISHWASHER	24	2	48	1.4	33.6	0	---	1.4	33.6
KITCHEN SINKS	24	2	48	1	24	1	24	1.4	33.6
HUB DRAIN	25	2	50	0	---	0	---	0	---
TOTAL			404		144.6		161.4		252

- 6" WASTE LINE SLOPED AT 1/8" PER 1'-0" IS ADEQUATE FOR 700 FIXTURE UNITS
- 2" WATER LINE IS ADEQUATE FOR 120 GPM.

GPM=75

- PLUMBING NOTES:**
- PLUMBING TO BE INSTALLED IN ACCORDANCE WITH ALL STATE AND LOCAL CODES.
 - PLUMBING CONTRACTOR TO COORDINATE ALL WORK WITH OTHER TRADES.
 - ALL WASTE AND VENT PIPING TO BE SCHEDULE 40 P.V.C.
 - WATER LINES TO BE COPPER (TYPE K) ON MAIN FEED WITH CROSS-LINKED POLYETHYLENE THROUGHOUT THE BUILDING.
 - ALL PVC UNDER SLAB SHALL BE A MINIMUM OF 2" NPS.
 - COPPER PIPING TO BE INSULATED WHERE IT PASSES THROUGH CONCRETE.
 - INSULATE HOT & COLD WATER LINES IN ACCORDANCE WITH BUILDING CODE. INSULATE COLD WATER LINES WHERE SWEATING WOULD RESULT IN STRUCTURAL DAMAGE TO BUILDING DUE TO ROTTING OF WOOD OR STAINING OF CEILING TILES.
 - TRAP PRIMERS SHALL BE INSTALLED ON HUB DRAINS WITH TRAPS.
 - LAVATORIES AND KITCHEN SINK ARE TO BE EQUIPPED WITH CLEAN-OUT TEES BELOW. CLEAN-OUT TO BE ACCESSIBLE FROM CLOSET WHERE PRACTICAL, UNDER CABINETS OTHERWISE.
 - ALL FIXTURES TO BE EQUIPPED WITH SHUT-OFF VALVES ON SUPPLY LINES.
 - THE CONTRACTOR SHALL COORDINATE THE LOCATION OF ALL PIPING AND EQUIPMENT WITH ALL OTHER TRADES PRIOR TO BEGINNING INSTALLATION TO AVOID CONFLICTS AND INTERFERENCE WITH OTHER TRADES.
 - FINAL UTILITY CONNECTIONS (GAS, ELECTRIC, WATER ETC.) TO EQUIPMENT SHALL BE MADE BY THE CONTRACTOR INSTALLING THE EQUIPMENT REQUIRING THE UTILITIES.
 - PLANS AND ISOMETRICS ARE DIAGRAMMATIC. THERE IS NO INTENT TO INDICATE ALL AND FITTINGS REQUIRED. GENERALLY, PIPING SHALL BE INSTALLED PARALLEL OR PERPENDICULAR TO AND PLUMB WITH WALL CONSTRUCTION.
 - SOIL AND WASTE PIPING SHALL BE LAID ON MINIMUM 1/4" PER FT. SLOPE FOR PIPE SIZES LESS THAN 4", AND MINIMUM 1/8" PER FT. FOR PIPE 4" AND LARGER.
 - UNLESS OTHERWISE NOTED, PLUMBING CONTRACT SHALL TERMINATE AT A POINT FIVE (5) FEET OUTSIDE THE BUILDING. FOR WORK BY OTHER CONTRACTORS OUTSIDE THE 5 FOOT TERMINATION, REFER TO SITE UTILITY DRAWINGS.
 - VALVES AND DEVICES INSIDE CHASES OR WALLS OR ABOVE NON-ACCESSIBLE CEILINGS SHALL BE PROVIDED WITH APPROPRIATELY SIZED ACCESS PANEL COMPATIBLE WITH SURROUNDING FINISHES. SUCH ACCESS PANELS SHALL BE FURNISHED BY THE PLUMBING CONTRACTOR FOR INSTALLATION BY THE GENERAL CONTRACTOR.
 - PLUMBING VENT PIPING PENETRATING ROOF SHALL BE INSTALLED BY THE PLUMBING CONTRACTOR. CUTTING OF HOLES AND FLASHING OF PENETRATIONS SHALL BE BY THE GENERAL CONTRACTOR.
 - REFER TO ARCHITECTURAL DRAWINGS FOR DIMENSIONED LOCATIONS OF WALLS AND PARTITIONS AND FOR PARTITION THICKNESS AND CONSTRUCTION MATERIALS.
 - THE INTERNAL DIAMETER OF A HORIZONTAL DISCHARGE PIPE (FIXTURE DRAIN) SHALL BE THE SAME AS THE TRAP TO WHICH IT IS ATTACHED.
 - SUFFICIENT ACCESS SHALL BE PROVIDED TO ENABLE ALL PIPE WORK TO BE TESTED AND TO PROVIDE REASONABLE ACCESS FOR CLEANING AND OTHER NECESSARY MAINTENANCE. ALL ACCESS POINTS FOR CLEANING PURPOSES SHALL BE CAREFULLY SITED TO ALLOW THE ENTRY OF CLEARING APPARATUS OR THE INSERTION OF TESTING APPARATUS AND, WHERE THESE ARE IN DUCTS, CONSIDERATION SHALL BE GIVEN TO THE OTHER SERVICES ACCOMMODATED IN THE DUCT.
 - CLEAN OUTS SHALL BE PROVIDED AT THE BASE OF EACH STACK.
 - WATER HAMMER ARRESTORS SHALL BE INSTALLED ON COLD WATER LINES SERVING ICE MAKERS, DISHWASHERS, AND CLOTHES WASHING MACHINES. THE WATER HAMMER ARRESTOR SHALL BE ACCESSIBLE FOR MAINTENANCE AND REPLACEMENT.
 - FLUSH HANDLE TO BE ON THE WIDE SIDE OF HANDICAP WATER CLOSET STALL. PLUMBING CONTRACTOR TO COORDINATE PRIOR TO ORDERING.
 - WATER METER TO BE EQUIPPED WITH VACUUM BREAKERS, WHICH ACT AS BACKFLOW PREVENTER ASSEMBLY (BFFA). INSTALL EXPANSION TANK OR THERMAL EXPANSION VALVE UPSTREAM OF WATER HEATER.
 - HOSE BIBB AND WALL HYDRANT TO BE FED FROM MAIN WATER SUPPLY AND NOT INDIVIDUAL UNITS'.

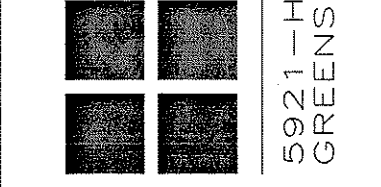




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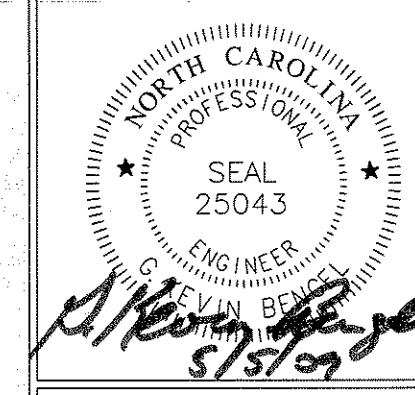


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BLUE RIDGE PROJECT NUMBER 071-04A-NC
JACKSONVILLE TOWNSHIP
JACKSONVILLE, NC

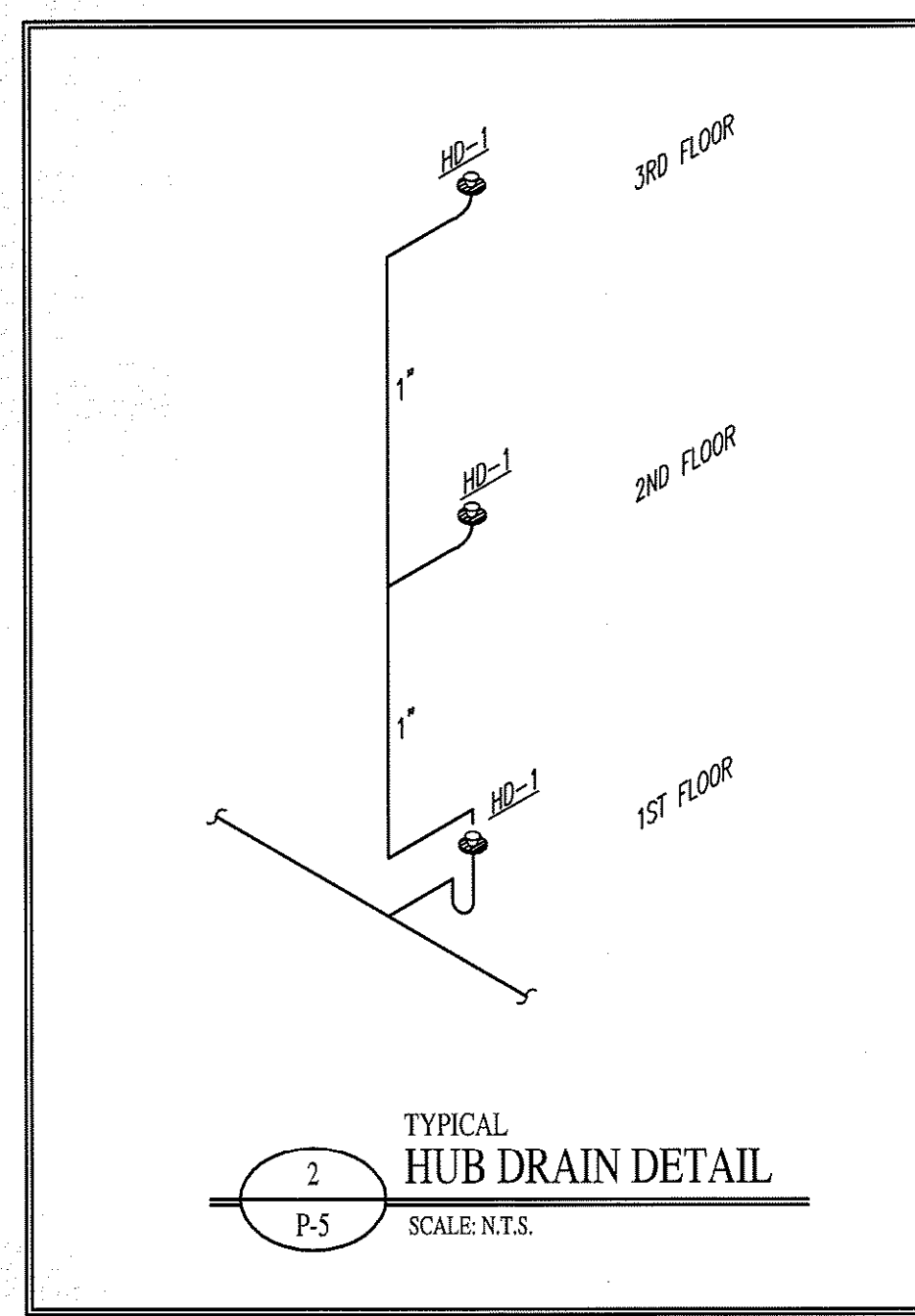
LEGACY AT CAROLINA FOREST
"A" BUILDING-1/2/3 BEDROOM APT.

DRAWING NAME
PARTIAL PLUMBING RISER DIAGRAM



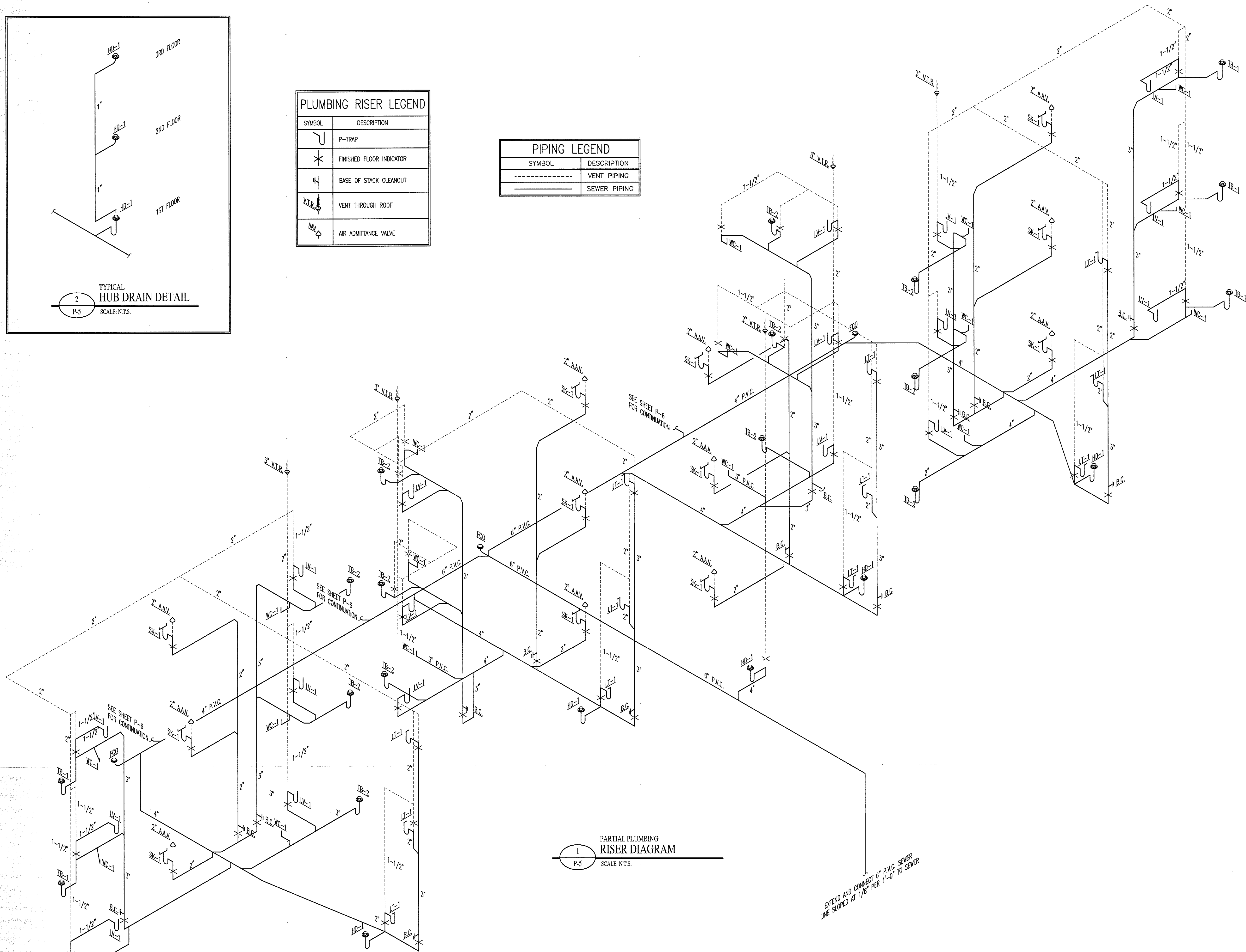
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SHEET:

P-5



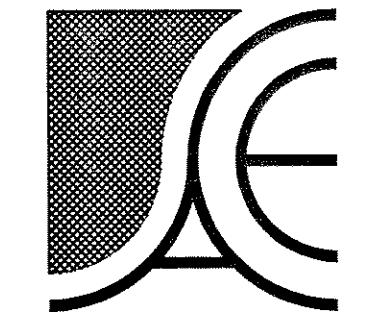
PLUMBING RISER LEGEND	
SYMBOL	DESCRIPTION
	P-TRAP
	FINISHED FLOOR INDICATOR
	BASE OF STACK CLEANOUT
	VENT THROUGH ROOF
	AIR ADMITTANCE VALVE

PIPING LEGEND	
SYMBOL	DESCRIPTION
	VENT PIPING
	SEWER PIPING



PARTIAL PLUMBING RISER DIAGRAM
SCALE: N.T.S.

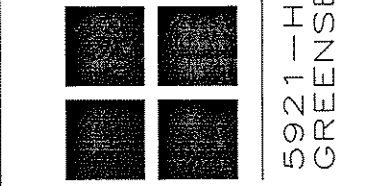
EXTEND AND CONNECT 6\"/>



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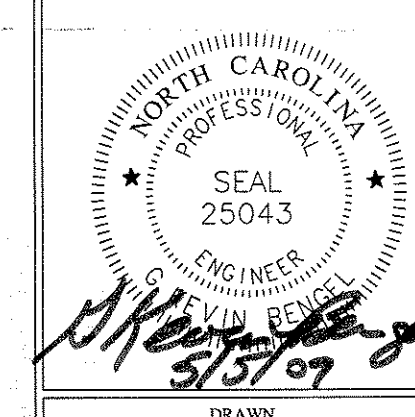


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BLUE RIDGE PROJECT NUMBER 071-04A-NC
LEGACY AT CAROLINA FOREST
"A" BUILDING-1/2/3 BEDROOM APT.

JACKSONVILLE TOWNSHIP
JACKSONVILLE, NC

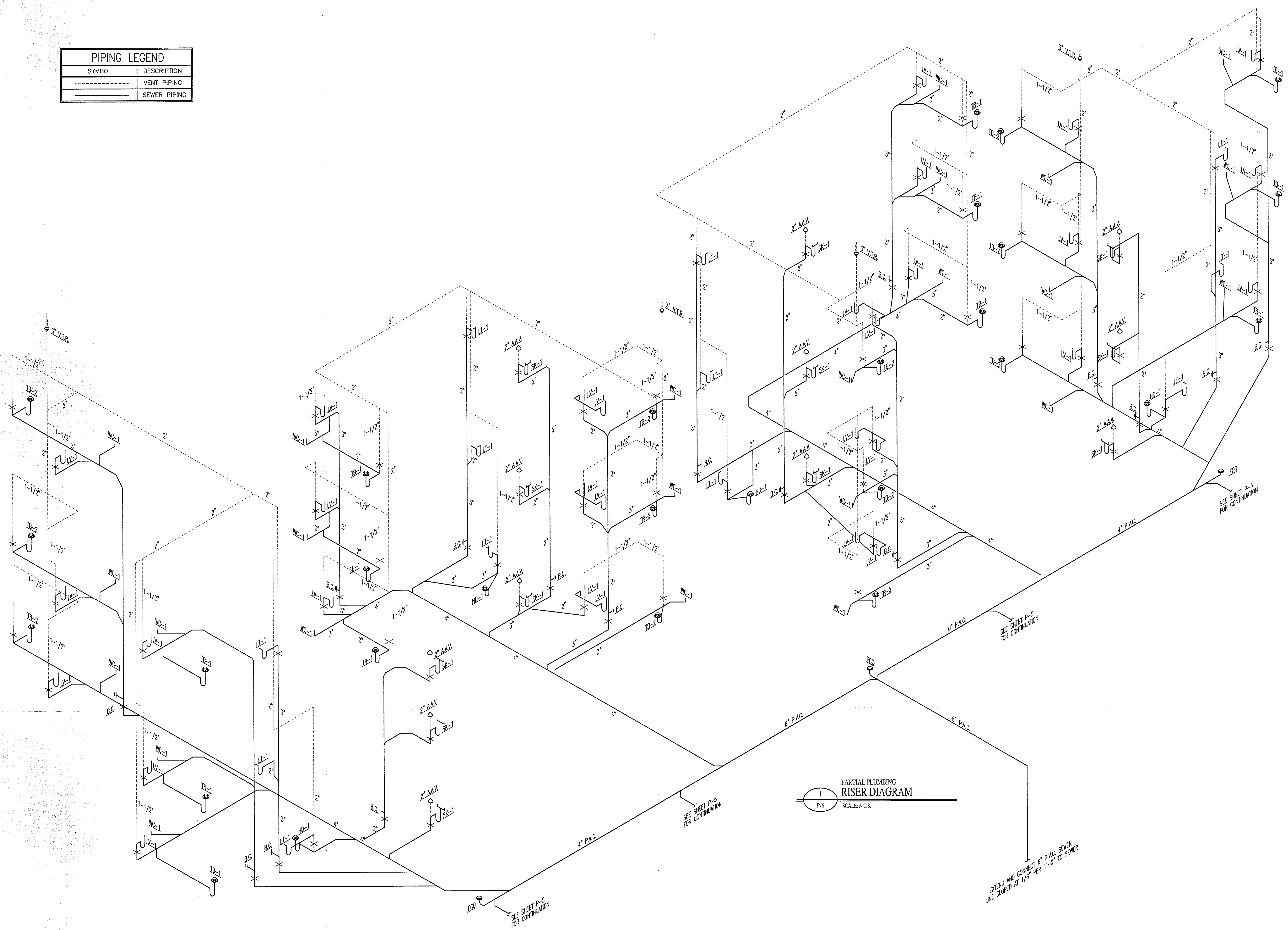
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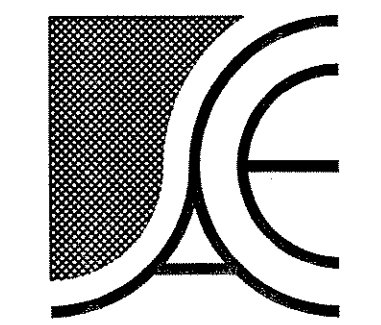


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DATE
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SCALE
AS NOTED
JOB NO.
9006
SHEET

P-6

PIPING LEGEND	
SYMBOL	DESCRIPTION
---	VENT PIPING
—	SEWER PIPING

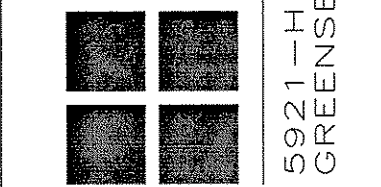




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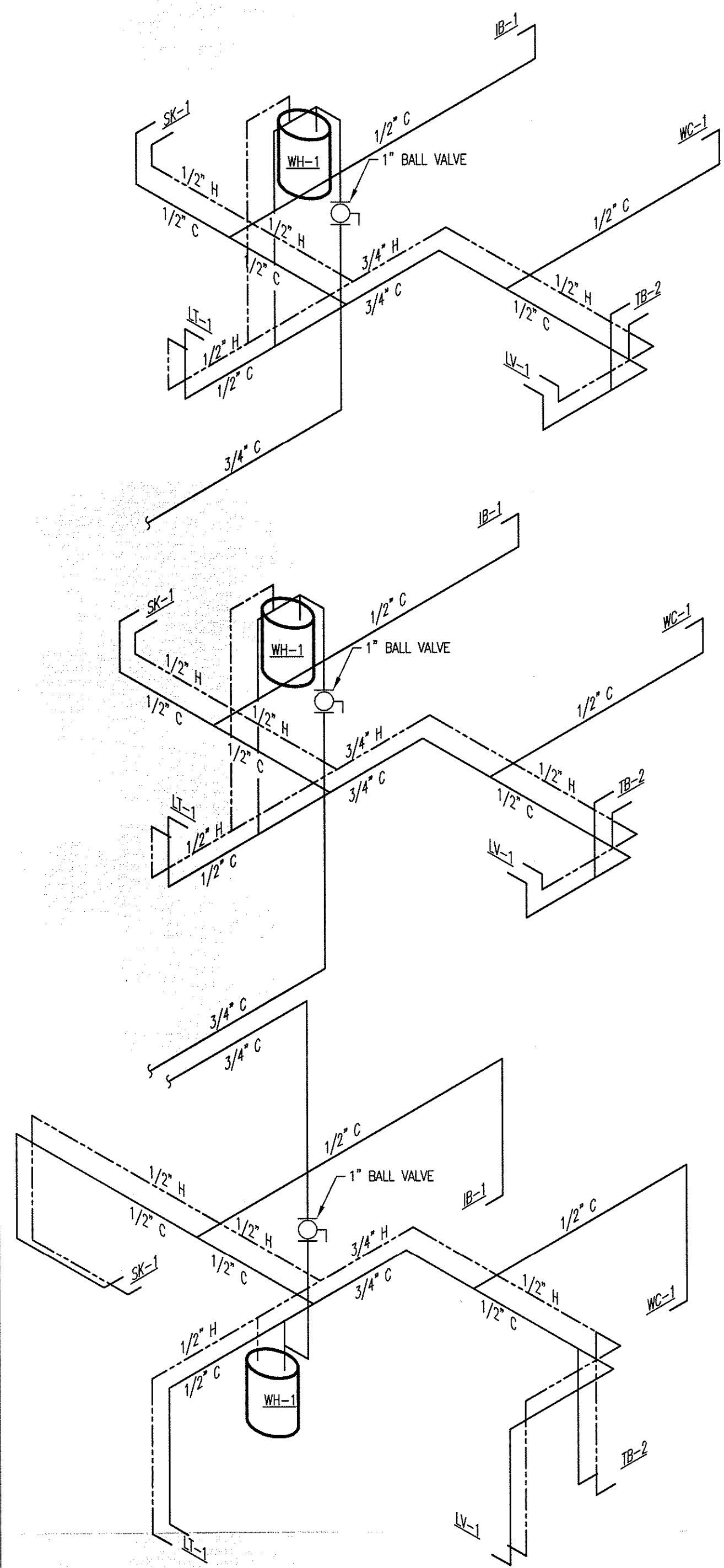
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**LEGACY AT CAROLINA FOREST
"A" BUILDING-1/2/3 BEDROOM APT.**

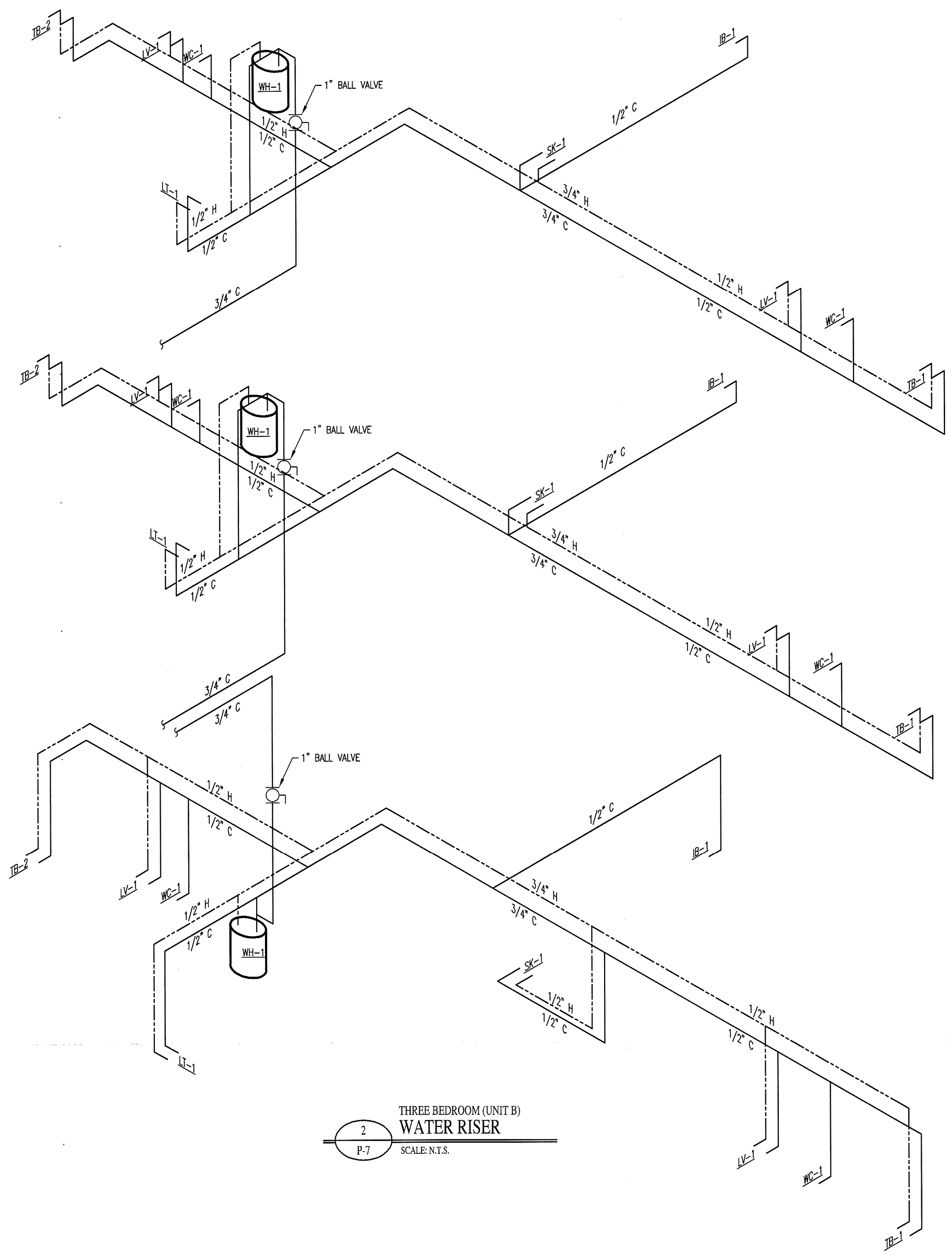
JACKSONVILLE, NC

JACKSONVILLE TOWNSHIP

- NOTES:**
1. ALL WATER LINES ARE CROSS-LINKED POLYETHYLENE, UNLESS NOTED OTHERWISE.
 2. 1st AND 2nd FLOOR WATER LINES SHALL BE ROUTED IN 2nd FLOORS, FLOOR TRUSSES.
 3. 3rd FLOOR WATER LINES SHALL BE ROUTED IN 3rd FLOORS, FLOOR TRUSSES.



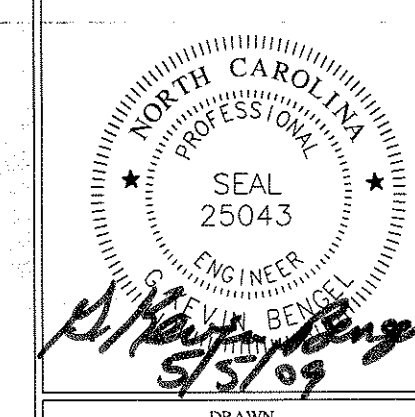
**1 ONE BEDROOM (UNIT A)
WATER RISER**
SCALE: N.T.S.



**2 THREE BEDROOM (UNIT B)
WATER RISER**
SCALE: N.T.S.

PIPING LEGEND	
H - - - - -	HOT WATER
C - - - - -	COLD WATER

DRAWING NAME
**WATER RISER
DIAGRAM**



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CCM

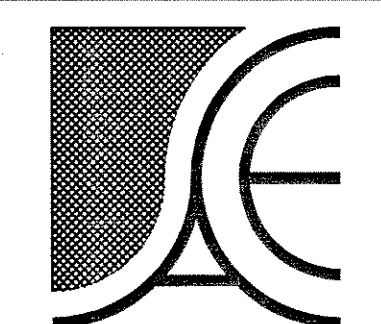
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5/5/09

SCALE
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JOB NO.
9006

SHEET

P-7

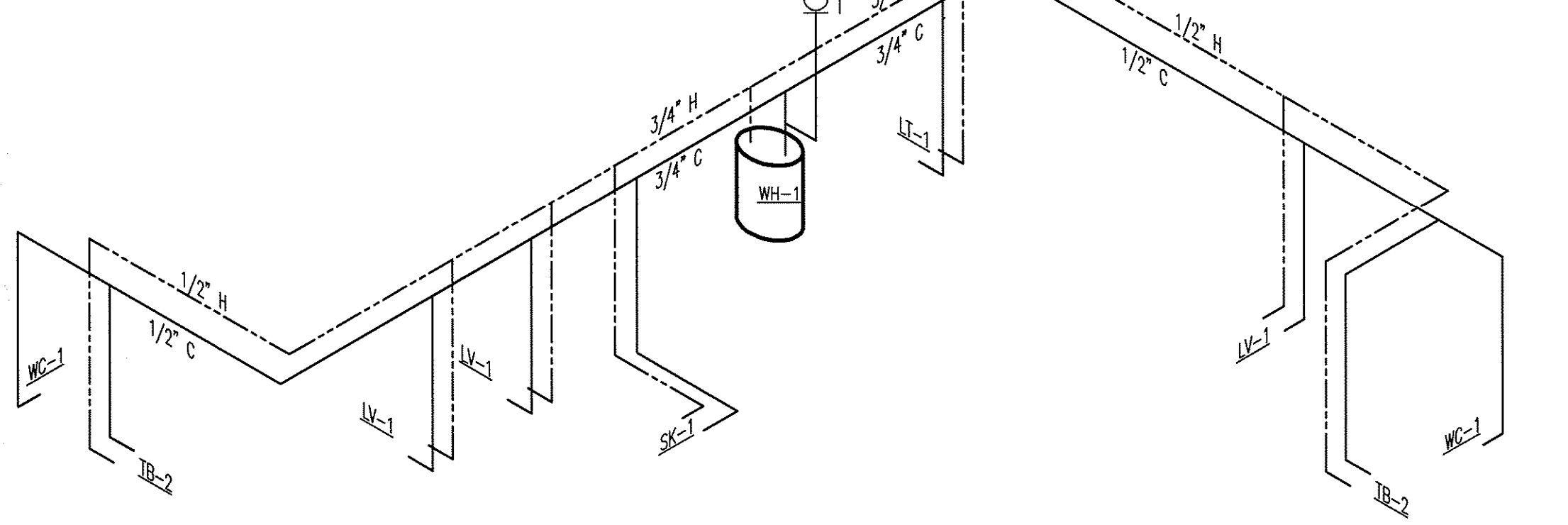
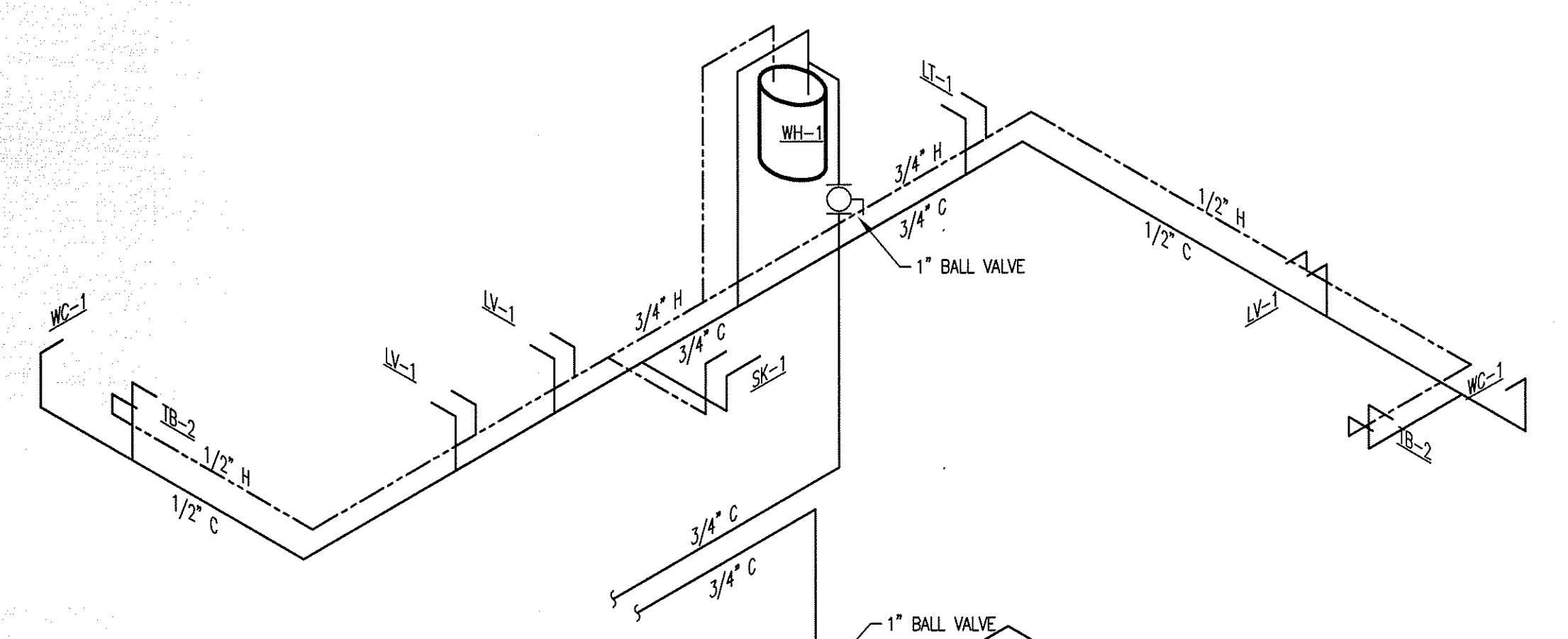
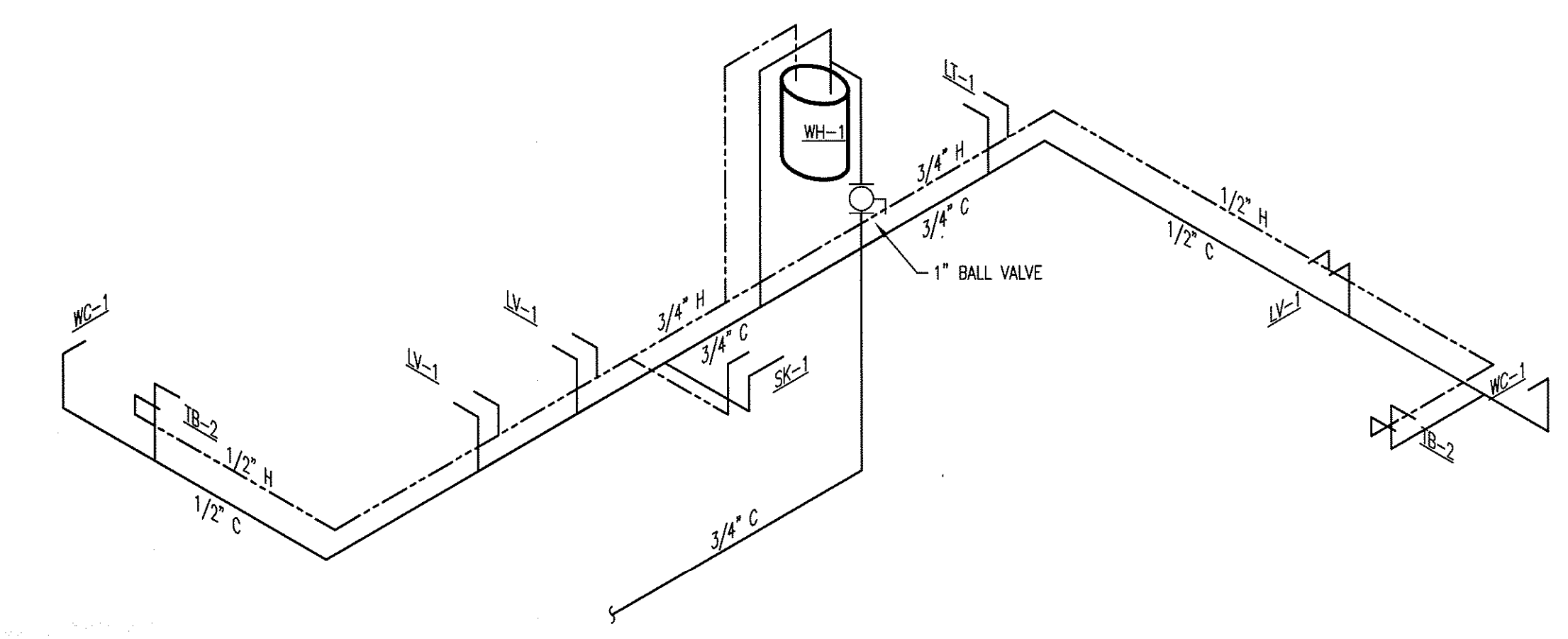


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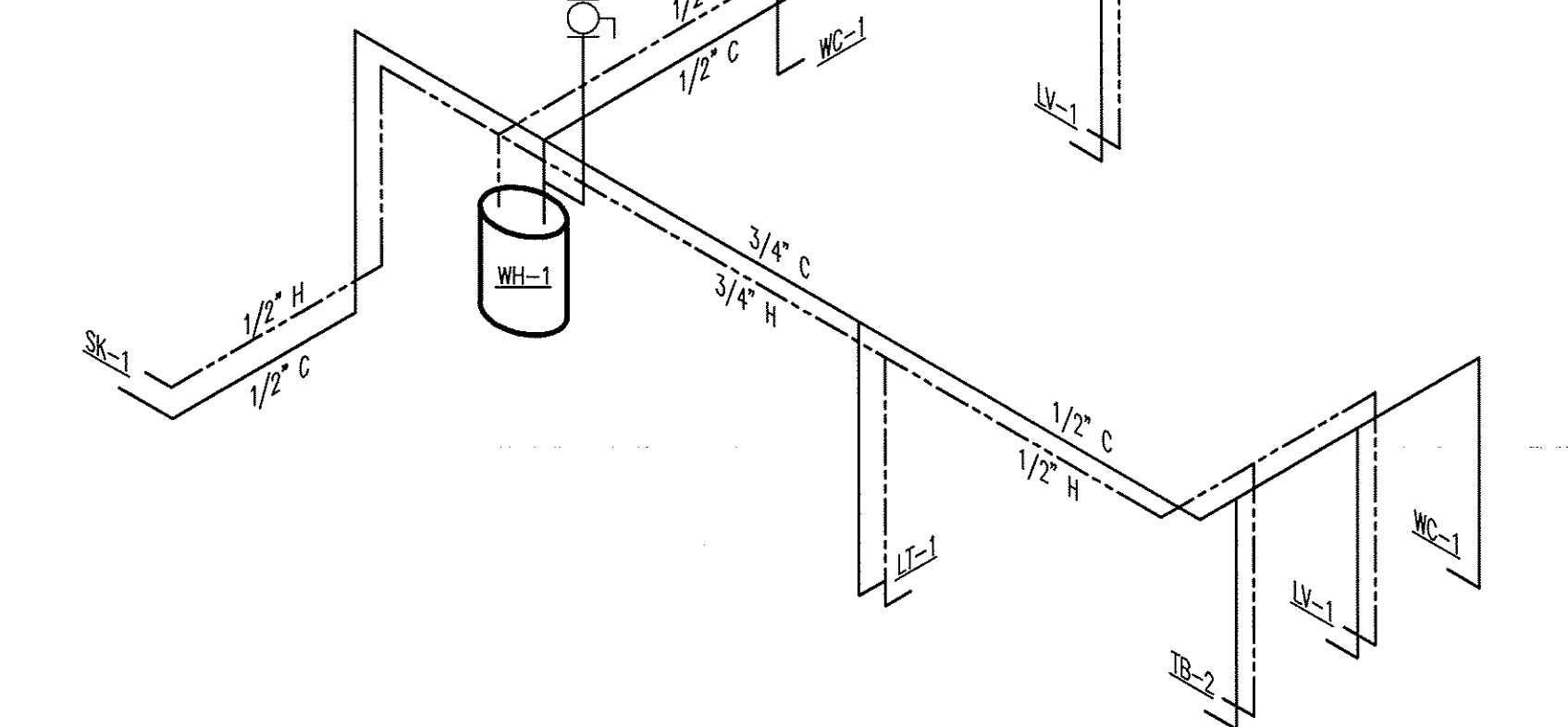
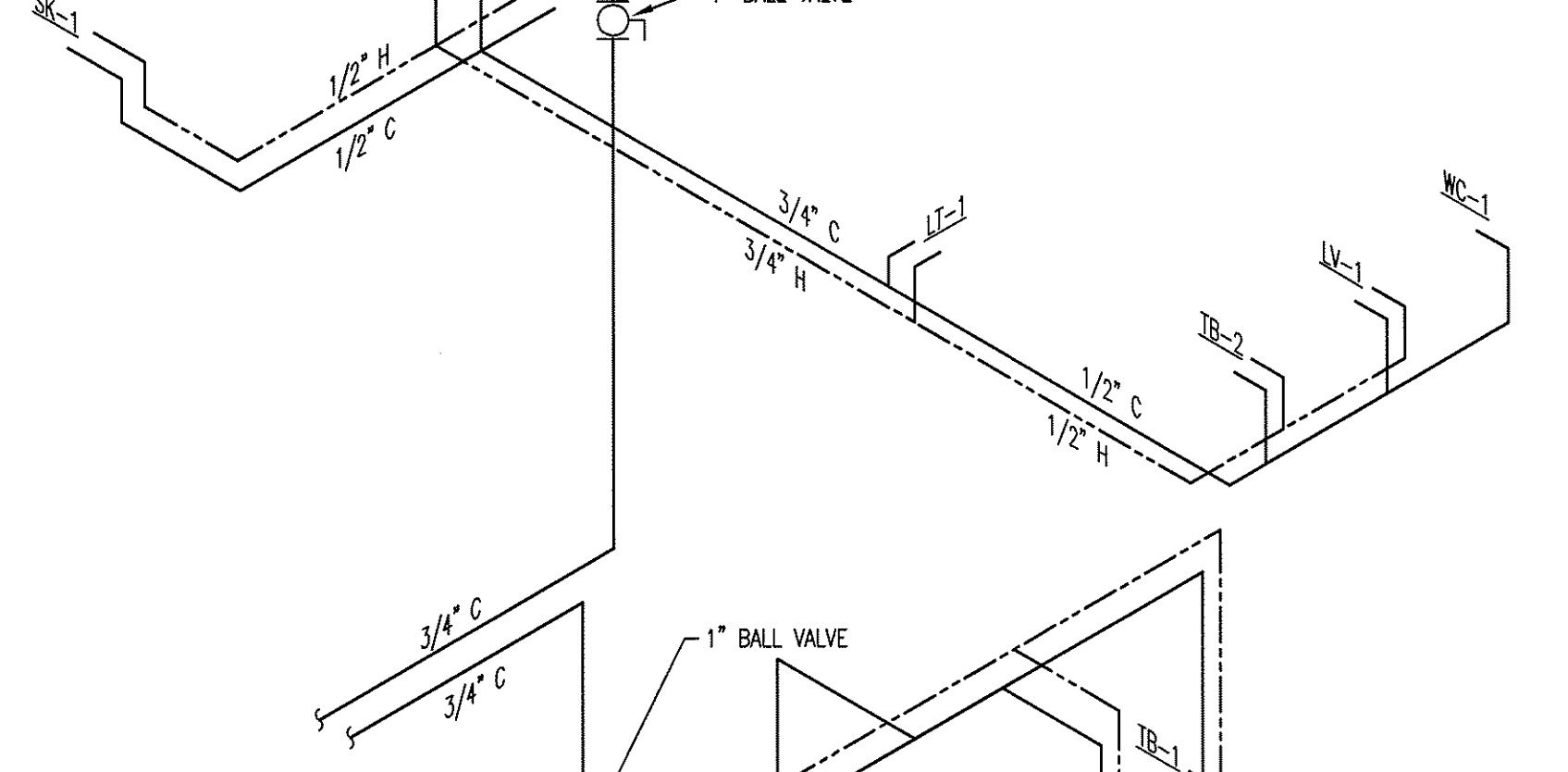
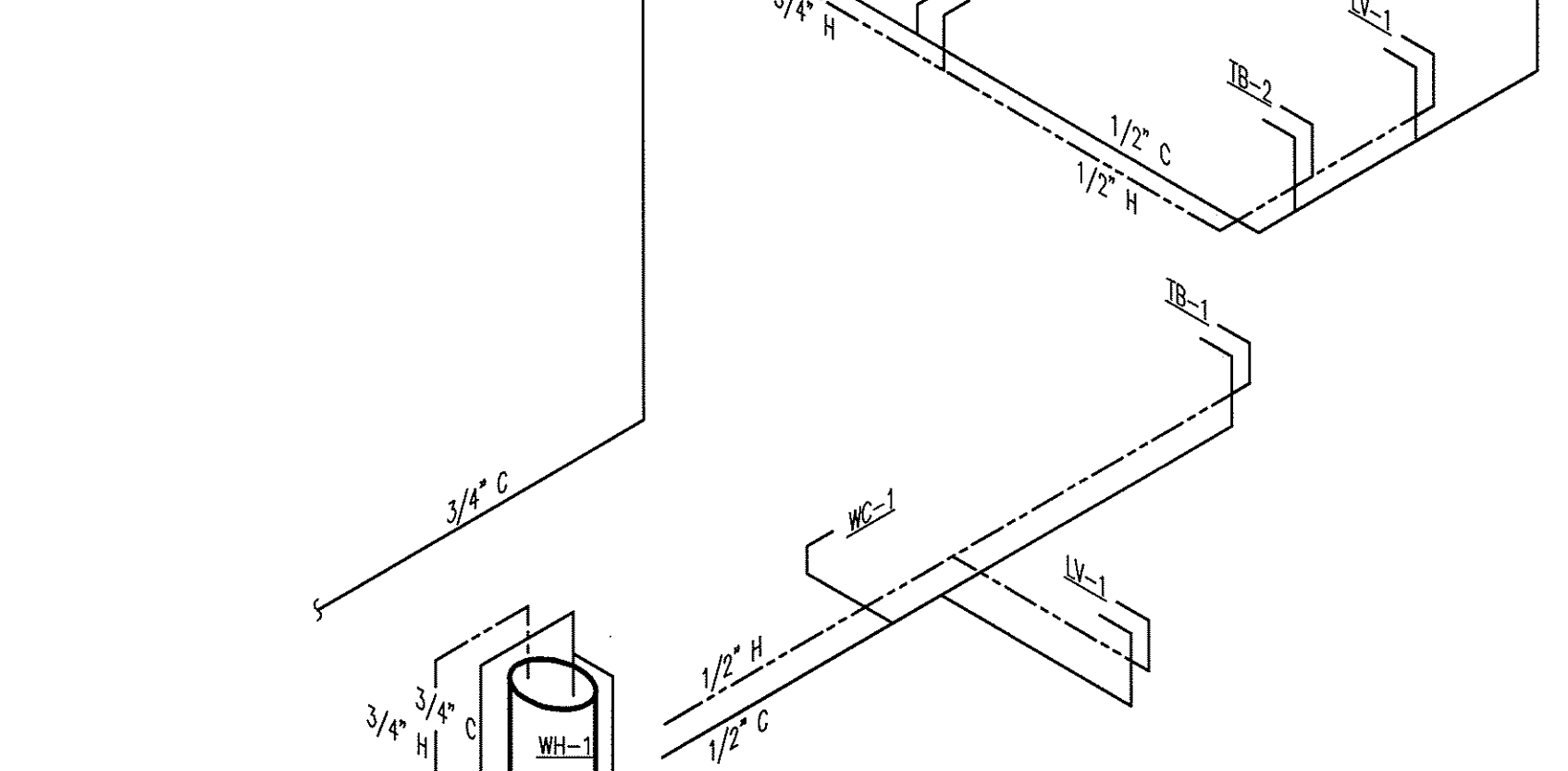
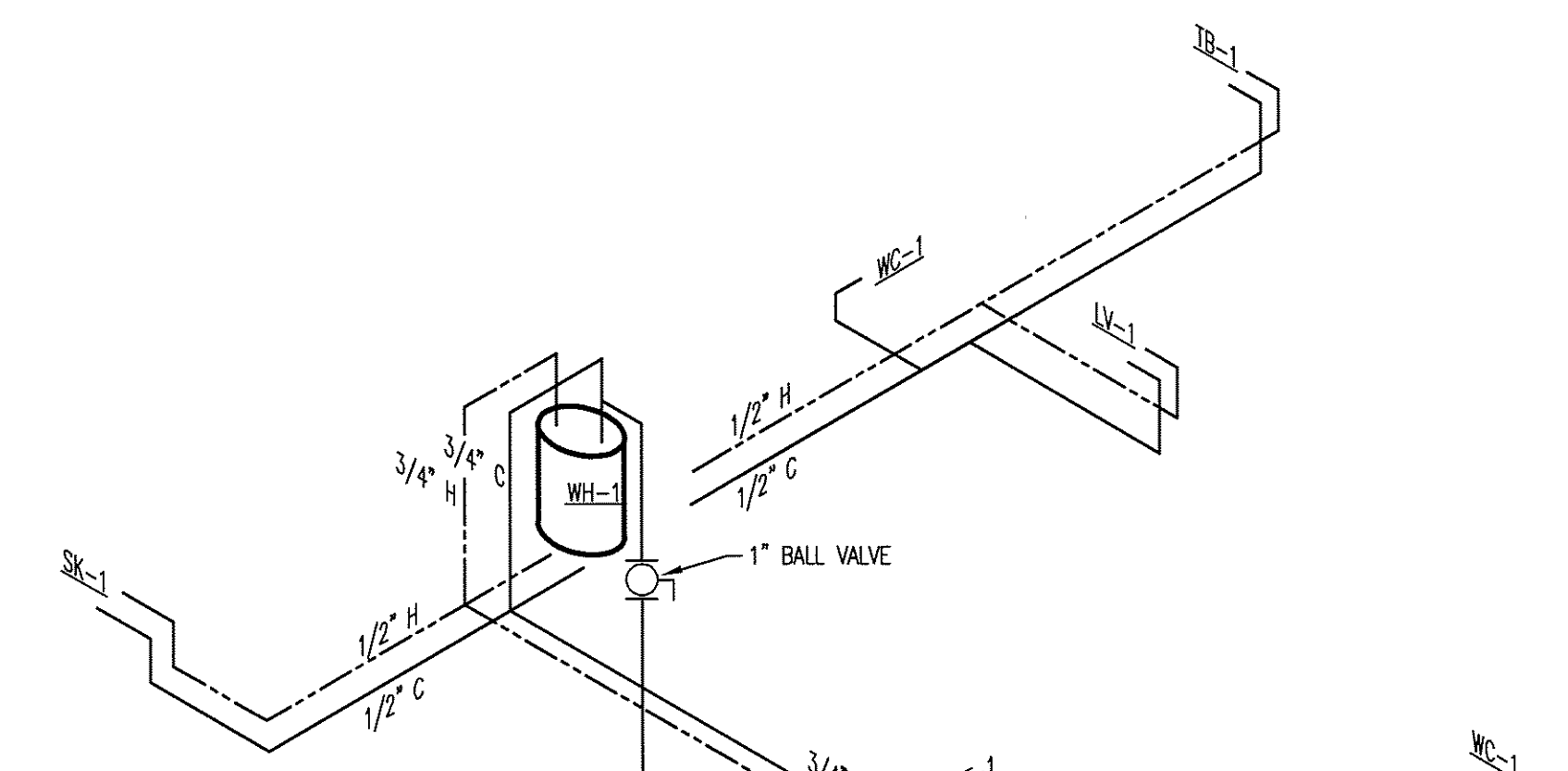
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BRADLEY & BALL ARCHITECTS
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- NOTES:**
1. ALL WATER LINES ARE CROSS-LINKED POLYETHYLENE, UNLESS NOTE OTHERWISE.
 2. 1st AND 2nd FLOOR WATER LINES SHALL BE ROUTED IN 2nd FLOORS, FLOOR TRUSSES.
 3. 3rd FLOOR WATER LINES SHALL BE ROUTED IN 3rd FLOORS, FLOOR TRUSSES.



1
TWO BEDROOM (UNIT D)
WATER RISER
P-8 SCALE: N.T.S.

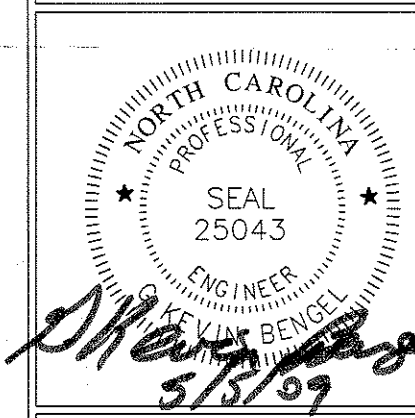


2
TWO BEDROOM (UNIT C)
WATER RISER
P-8 SCALE: N.T.S.

PIPING LEGEND	
H	HOT WATER
C	COLD WATER

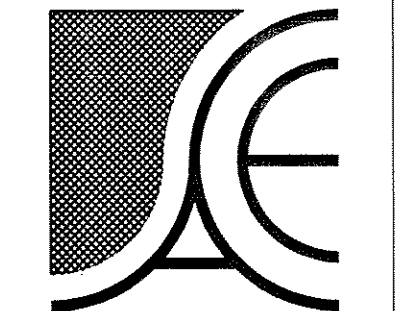
BLUE RIDGE PROJECT NUMBER 071-04A-NC
LEGACY AT CAROLINA FOREST
"A" BUILDING-1/2/3 BEDROOM APT.
JACKSONVILLE TOWNSHIP JACKSONVILLE, NC

DRAWING NAME
WATER RISER
DIAGRAM



DRAWN
CCM
CHECKED
MKK
DATE
5/8/09
SCALE
AS NOTED
JOB NO.
9006
SHEET

P-8



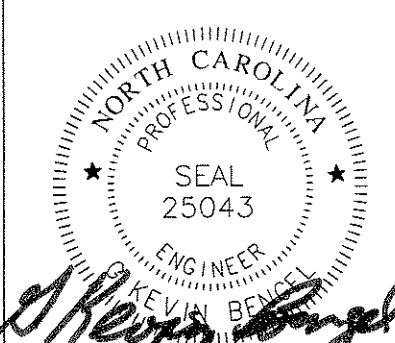
Alamance Consulting Engineers

961-F Burlington Ave.
Gibsonville, N.C. 27249
Phone: (336) 449-4558
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BRADLEY & BALL ARCHITECTS
5921-H WEST FRIENDLY AVE
GREENSBORO, N.C. 27410

BLUE RIDGE PROJECT NUMBER 071-044-NC
LEGACY AT CAROLINA FOREST
"A" BUILDING-1/2/3 BEDROOM APT.
JACKSONVILLE TOWNSHIP
JACKSONVILLE, NC

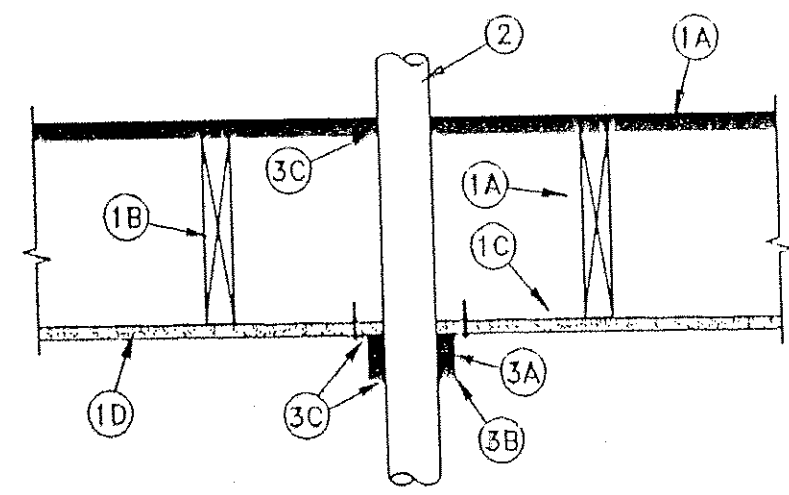
DRAWING NAME
PENETRATION DETAILS



DATE: 5/5/09
SCALE: AS NOTED
JOB NO.: 9006
SHEET

P-9

SYSTEM NO. FC2024
F Rating - 1 and 2 Hr (See Item 1)
T Rating - 0, 1-1/2 and 2 Hr (See Item 3)



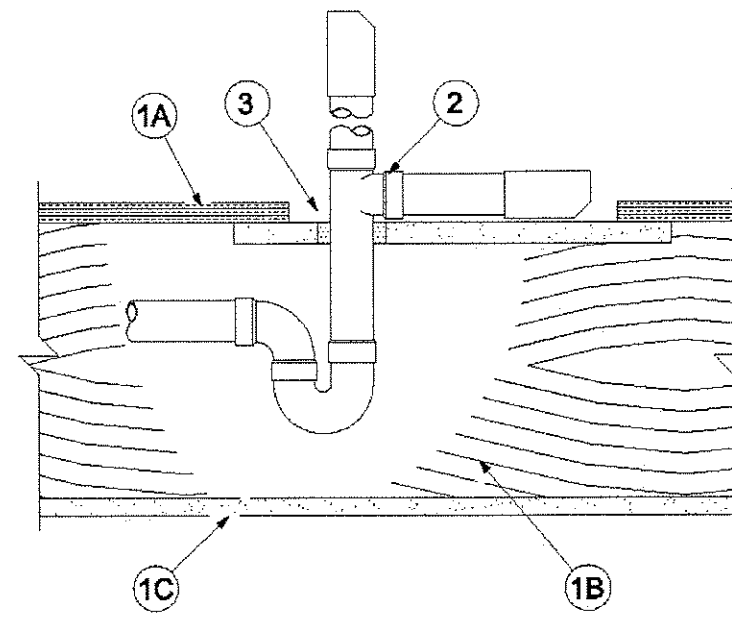
- Floor-Ceiling Assembly**—The 1 hr fire-rated solid or trussed lumber joist floor-ceiling assembly shall be constructed of the materials and in the manner specified in the individual L500 Series Floor-Ceiling Designs in the UL Fire Resistance Directory. The 2 hr fire-rated wood joist floor-ceiling assembly shall be constructed of the materials and in the manner specified in Design Nos. 1505, 1511 or 1516 in the UL Fire Resistance Directory. The F Rating of the firestop system is equal to the rating of the floor-ceiling assembly as summarized below:
 - Flooring System**—Lumber or plywood subfloor with finish floor of lumber, plywood or floor topping mixture* as specified in the individual Floor-Ceiling Design.
 - Wood Joists**—For 1 hr fire-rated floor-ceiling assemblies, nominal 10 in. deep (or deeper) lumber, steel or combination lumber and steel joists, trusses or Structural Wood Members* with bridging as required and with ends firestopped. For 2 hr fire-rated floor-ceiling assemblies, nominal 7 by 10 in. lumber joists spaced 16 in. OC with nominal 1 by 3 in. lumber bridging and with ends firestopped.
 - Furring Channels**—(Not Shown) — Resilient galv. steel furring installed perpendicular to wood joists between first and second layers of wallboard (Item 1B) in 2 hr fire-rated assembly. Furring channels spaced max 24 in. OC.
 - Wallboard, Gypsum**—Nom 4 ft wide by 5/8 in. thick as specified in the individual Floor-Ceiling Design. First layer of wallboard nailed to wood joists. Second layer of wallboard (2 hr fire-rated assembly) screw-attached to furring channels.
- Through Penetrants**—One nonmetallic pipe, conduit or tubing to be installed approx midway between wood joists. Diam of opening hole-sawed through flooring system and through two layers gypsum wallboard ceiling to be 0 to 1/4 in. larger than the outside diam of through-penetrant. Pipe or conduit to be rigidly supported on both sides of the floor-ceiling assembly. The following types and sizes of nonmetallic pipes or conduits may be used:
 - Polyvinyl Chloride (PVC) Pipe**—Nom 4 in. diam (or smaller) Schedule 40 solid-core PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
 - Cellular-Core Polyvinyl Chloride (ccPVC) Pipe**—Nom 4 in. diam (or smaller) Schedule 40 cellular core PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
 - Chlorinated Polyvinyl Chloride (CPVC) Pipe**—Nom 4 in. diam (or smaller) SDR17 CPVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
 - Acrylonitrile Butadiene Styrene (ABS) Pipe**—Nom 4 in. diam (or smaller) Schedule 40 solid-core ABS pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
 - Cellular-Core Acrylonitrile Butadiene Styrene (ccABS) Pipe**—Nom 4 in. diam (or smaller) Schedule 40 cellular core ABS pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
- Firestop System**—The details of the firestop system shall be as follows:
 - Fill, Void or Cavity Materials**—Wasp Strip—Nom 1/4 in. thick intumescent elastomeric material faced on one side with aluminum foil, supplied in 1 and 2 in. wide strips. Strips tightly wrapped around nonmetallic pipe (full side exposed) with the edges butted against the bottom surface of the gypsum wallboard ceiling. The min wasp strip width, the number of layers of wasp strip required, the type of pipe and the nom diam, as well as the F and T Rating of the system are shown in the following table:

Pipe Type	Nom Pipe Diam In.	F Rating	T Rating	Wasp Strip Width In.	Min Wasp Strip Layers
PVC, CPVC, ABS, ccPVC or ccABS (a)	1/2 to 1-1/2	1	1	1	1
PVC, CPVC, ABS, ccPVC or ccABS (a)	2 to 2-1/2	1	1	1	2
PVC, CPVC, ABS, ccPVC or ccABS (a)	3	1	1	1	3
PVC, CPVC, ABS, ccPVC or ccABS (a)	1/2 to 2	1	1	2	1
PVC, CPVC, ABS or ccPVC	2 1/2 to 4	1	1	2	2
ccABS (a)	2 1/2 to 3	1	1/2	2	2
ccABS (a)	3 1/2 to 4	1	1/2	2	1
PVC, CPVC, ABS, or ccPVC	1/2 to 1-1/2	2	1-1/2	2	1
ccABS (a)	1/2 to 1-1/2	2	2	2	2
ABS, PVC, ccPVC or CPVC	1 1/2 to 2	2	1-1/2	2	2
ABS, PVC, ccPVC or CPVC	2 1/2 to 3	2	1-1/2	2	2
ABS, ccPVC or CPVC	3 1/2 to 4	2	1-1/2	2	3
PVC, ccPVC or CPVC	3 1/2 to 4	2	2	2	3

- (a)—Requires use of aluminum tape detailed in Item 3D
Minnesota Mining & Mfg. Co.—Type 15-195
- Steel Collar**—Nom 2 in. deep collar with 1 1/4 in. wide by 2 in. long anchor tabs and 3/4 in. long tabs to retain wasp strip layers. Collar of percut 0.016 in. thick (30 gauge) galv steel steel are available from wasp strip manufacturer. As an alternate, collar may be field fabricated from min 0.016 in. thick (30 gauge) galv steel steel in accordance with instruction sheet applied by wasp strip manufacturer. Steel collar, with anchor tabs bent outward 90 degrees, wrapped tightly around wasp strip by with min 1 in. overlap at the seam. With steel anchor tabs pressed tightly against underside of gypsum wallboard ceiling, compress collar around wasp strip layers using a min 1/2 in. wide by 0.028 in. thick stainless steel band clamp at the collar midheight. As an alternate to the band clamp, collar may be secured by a max No. 10 by 1/2 in. long steel metal screws installed in the vertical axis at the center of the 1 in. overlap along the perimeter joint of the collar. A min of three screws is required. Secure collar to gypsum wallboard ceiling using 1/16 in. diam steel large bolts (5/8 in. qtp) in conjunction with 1 1/4 in. diam steel leader washers. Min of three fasteners, symmetrically located, required for nom 1/2 in. to nom 3 in. diam pipes. Min of four symmetrically located fasteners required for nom 3 1/2 in. and 4 in. diam pipes. As a final step, bend wasp strip retained tabs 90 degrees toward pipe to lock wasp strip layers in position.
 - Fill, Void or Cavity Materials**—Caulk—Generous application of caulk to be applied around the perimeter of the steel collar at its interface with the gypsum wallboard ceiling and around the perimeter of the pipe at its interface with the wasp strip layers. Caulk also applied around perimeter of pipe to fill annular space to max extent possible. Flush with top surface of floor.
 - Top Plate (not shown)**—Nom 4 in. wide, 3 mil thick aluminum tape wrapped around pipe prior to the installation of the wasp strip (Item 3B). Min of one wrap, flush with ceiling and extending downward. Tape is required only for nom 3-1/2 in. to 4 in. diam ABS pipes and for all ABS pipes.
 - Minnesota Mining & Mfg. Co.—Type 15-195 WD**
 - Firestop Device**—(Not Shown)—As an alternate to Item A and B when nom 1-1/2, 2, 3, or 4 in. diam nonmetallic pipes are used, a firestop device consisting of a steel-steel split collar lined with intumescent material and provided with steel clips for attachment may be used in accordance with the table below. Firestop device to be installed on underside of ceiling in accordance with the accompanying installation instructions.
- | Pipe Type | Nom Pipe Diam In. | F Rating | T Rating | Firestop Device |
|------------------------------------|-------------------|----------|----------|--------------------|
| PVC, CPVC, ABS, ccPVC or ccABS (a) | 1-1/2 | 1 | 1 | FFD 1.5 or FFD 150 |
| PVC, CPVC, ABS, ccPVC or ccABS (a) | 2 | 1 | 1 | FFD 2 or FFD 200 |
| PVC, CPVC, ABS, ccPVC or ccABS (a) | 3 | 1 | 1 | FFD 3 or FFD 300 |
| PVC, CPVC, ABS, ccPVC or ccABS (a) | 4 | 1 | 1 | FFD 4 or FFD 400 |
| PVC, CPVC, ABS, ccPVC or ccABS (a) | 4 | 1 | 1/2 | FFD 200 |
| ccABS (a) | 4 | 1 | 1/2 | FFD 300 |
| ccABS (a) | 3 | 1 | 1/2 | FFD 400 |
| PVC, CPVC, ABS or ccPVC | 1-1/2 | 2 | 1-1/2 | FFD 1.5 or FFD 150 |
| ccABS (a) | 1-1/2 | 2 | 1-1/2 | FFD 150 |
| ABS, PVC, ccPVC or CPVC | 2 | 2 | 1-1/2 | FFD 200 |
| ABS, PVC, ccPVC or CPVC | 3 | 2 | 1-1/2 | FFD 300 |
| PVC, ccPVC or CPVC | 4 | 2 | 1-1/2 | FFD 400 |
| ABS | 3 1/2 to 4 | 2 | 1-1/2 | FFD 400 |
- (a)—Requires use of aluminum tape detailed in Item 3D
*Bearing the UL Classification Marking



1 PENETRATION DETAIL
SCALE: N.T.S.
(PVC UP THROUGH NON-RATED WALL)



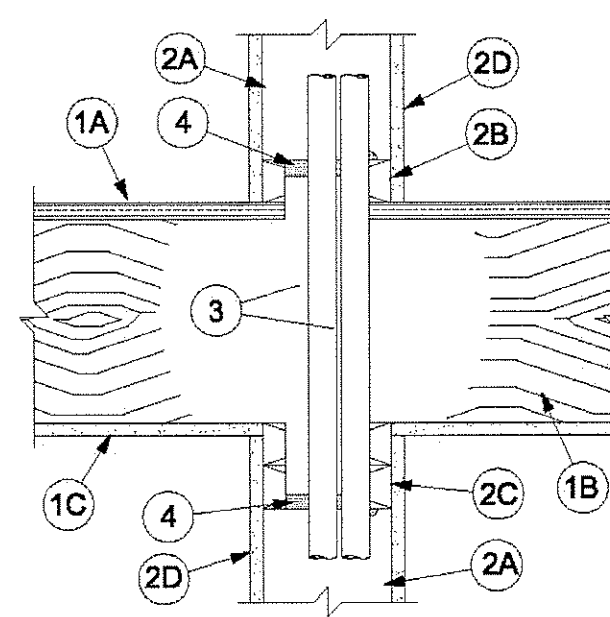
System No. F-C-2320
F Rating - 1 Hr
T Rating - 1 Hr

- Floor-Ceiling Assembly**—The 1 hr fire-rated solid or trussed lumber joist floor-ceiling assembly shall be constructed of the materials and in the manner specified in the individual L500 Series Floor-Ceiling Designs in the UL Fire Resistance Directory. The general construction features of the floor-ceiling assembly are summarized below:
 - Flooring System**—Lumber or plywood subfloor with finish floor of lumber, plywood or Floor Topping Mixture* as specified in the individual Floor-Ceiling Design. Rectangular cutout in flooring to accommodate the bathtub drain piping (Item 2) to be max 8 by 12 in. (203 by 305 mm). Cutout to be patched on underside of subfloor using one layer of min 3/4 in. (19 mm) thick plywood or min 5/8 in. (16 mm) thick gypsum wallboard (Item 1C) sized to lap min 2 in. (51 mm) beyond each edge of rectangular cutout. Diam of opening hole-sawed through patch to accommodate drain piping (Item 2) to be 1 in. (25 mm) larger than outside diam of drain piping and positioned such that drain piping is centered in opening. Patch split into two pieces at opening hole-sawed for bathtub drain piping. Two pieces positioned around drain piping, with cut edges tightly butted, and screw-attached to underside of subfloor with 1-1/4 in. (32 mm) long Type S steel screws spaced max 6 in. (152 mm) OC.
 - Wood Joists**—Nom 10 in. (254 mm) deep (or deeper) lumber, steel or combination lumber and steel joists, trusses or Structural Wood Members* with bridging as required and with ends firestopped.
 - Gypsum Board**—Nom 4 ft (1.22 m) wide by 5/8 in. (16 mm) thick, attached as described in the individual Floor-Ceiling Design.
- Drain Piping**—Nom 1-1/2 in. (38 mm) diam (or smaller) Schedule 40 cellular or solid core polyvinyl chloride (PVC) or acrylonitrile butadiene styrene (ABS) pipe and drain fittings cemented together and provided with PVC or ABS bathtub waste/overflow fittings. The annular space shall be a min 3/8 in. (10 mm) to max 5/8 in. (16 mm).
- Fill, Void or Cavity Material**—Sealant—Min 5/8 in. (16 mm) depth of fill material applied within annular space, flush with both surfaces of plywood or gypsum wallboard patch.
SPECIFIED TECHNOLOGIES INC—Type WF300 Caulk

*Bearing the UL Classification Marking



2 PENETRATION DETAIL
SCALE: N.T.S.



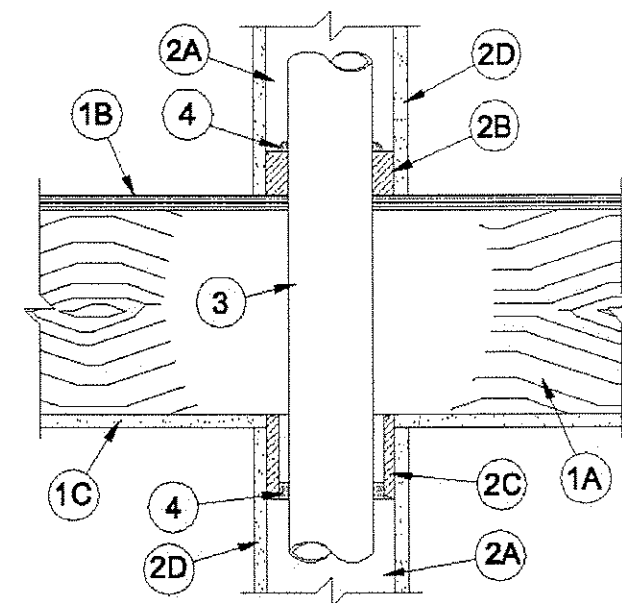
System No. F-C-2319
F Rating - 1 Hr
T Rating - 1 Hr

- Floor-Ceiling Assembly**—The 1 hr fire-rated wood joist floor-ceiling assembly shall be constructed of the materials and in the manner specified in the individual L500 Designs in the UL Fire Resistance Directory, as summarized below:
 - Flooring System**—Lumber or plywood subfloor with finish floor of lumber, plywood or Floor Topping Mixture* as specified in the individual Floor-Ceiling Design. Diam of floor opening to be min 1/2 in. (13 mm) to max 1 in. (25 mm) larger than outside diameter of individual or grouped penetrants. Max diam of opening is 3 in. (76 mm).
 - Wood Joists**—Nom 10 in. (254 mm) deep (or deeper) lumber, steel or combination lumber and steel joists, trusses or Structural Wood Members* with bridging as required and with ends firestopped.
 - Gypsum Board**—Thickness, type, number of layers and fasteners as required in the individual Floor-Ceiling Design.
- Chase Wall**—The through penetrant (Item 3) shall be routed through a 1 hr fire-rated single, double or staggered wood stud/gypsum board chase wall. Depth of chase wall stud cavity to be min 1/2 in. (13 mm) greater than diameter of opening cut in sole and top plates to accommodate the through penetrant (Item 2). The chase wall shall be constructed of the materials and in the manner specified in the individual U300 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
 - Studs**—Nom 2 by 4 in. (51 by 102 mm), 2 by 6 in. (51 by 152 mm) or double nom 2 by 4 in. (51 by 102 mm) lumber studs.
 - Sole Plate**—Nom 2 by 4 in. (51 by 102 mm), 2 by 6 in. (51 by 152 mm) or parallel 2 by 4 in. (51 by 102 mm) lumber plates, tightly butted. Diam of opening in sole plate to be min 1/2 in. (13 mm) to max 1 in. (25 mm) larger than outside diameter of individual or grouped penetrants. Max diam of opening is 3 in. (76 mm).
 - Top Plate**—The double top plate shall consist of two nom 2 by 4 in. (51 by 102 mm), two nom 2 by 6 in. (51 by 152 mm) or two sets of parallel 2 by 4 in. (51 by 102 mm) lumber plates, tightly butted. Diam of opening in top plate to be min 1/2 in. (13 mm) to max 1 in. (25 mm) larger than outside diameter of individual or grouped penetrants. Max diam of opening is 3 in. (76 mm).
 - Gypsum Board**—Thickness, type, number of layers and fasteners shall be as specified in the individual Wall and Partition Design.
- Through Penetrants**—One or more nonmetallic pipes, conduits or tubing to be installed either concentrically or eccentrically within the opening. Min space between pipes, conduits or tubes to be 0 in. Annular space between the pipes, conduits or tubing and the periphery of the opening shall be min 0 in. (0 mm, point contact) to max 1 in. (25 mm). Penetrants to be rigidly supported on both sides of floor-ceiling assembly. The following types and sizes of nonmetallic pipes, conduits or tubing may be used:
 - Cross Linked Polyethylene (PEX) Tubing**—Nom 1 in. (25 mm) diam (or smaller) SDR9 PEX tubing for use in closed (process or supply) piping systems.
 - Electrical Nonmetallic Tubing (ENT)**—Nom 2 in. (51 mm) diam (or smaller) PVC tubing installed in accordance with Article 331 of the National Electrical Code (NFPA 70).
- Fill, Void or Cavity Material**—Sealant—Min 3/4 in. (19 mm) thickness of fill material applied within the annulus, flush with the top surface of the floor or chase wall sole plate. Min 5/8 in. (16 mm) thickness of fill material applied within the annulus, flush with bottom surface of chase wall top plate. Min 3/8 in. (10 mm) diam bead of fill material applied at point contact location on the top surface of floor or sole plate and at the penetrant/chase wall top plate interface.
SPECIFIED TECHNOLOGIES INC—Type WF300 Caulk

*Bearing the UL Classification Marking



3 PENETRATION DETAIL
SCALE: N.T.S.
(PVC UP THROUGH 1-HR RATED WALL)



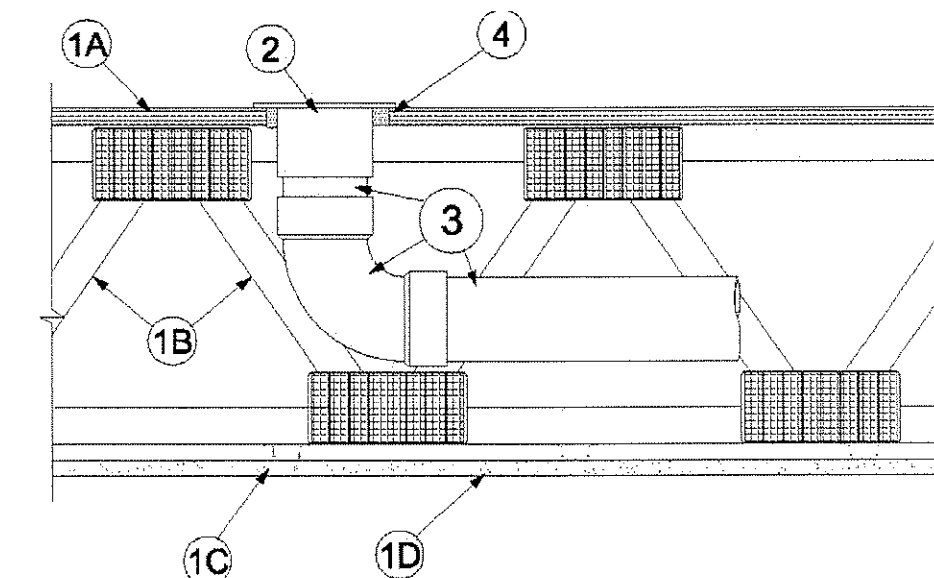
System No. F-C-2027
F Rating - 1 Hr
T Rating - 1 Hr

- Floor Assembly**—The 1 hr fire-rated wood truss or combination wood and steel truss Floor-Ceiling assembly shall be constructed of the materials and in the manner described in the individual L500 Series Design in the UL Fire Resistance Directory, as summarized below:
 - Joists**—Nom 10 in. (254 mm) deep (or deeper) lumber, steel or combination lumber and steel joists, trusses or Structural Wood Members* with bridging as required and with ends firestopped.
 - Flooring System**—Lumber or plywood subfloor with finish floor of lumber, plywood or Floor Topping Mixture* as specified in the individual Floor-Ceiling Design. Diam of opening in flooring shall be max 1 in. (25 mm) larger than the outside diam of nonmetallic pipe or conduit (Item 2).
 - Gypsum Board**—Thickness, type, number of layers and fasteners shall be as specified in the individual Floor-Ceiling Design.
- Chase Wall**—The through penetrants (Item 2) shall be routed through a 1 hr fire-rated single, double or staggered wood stud/gypsum wallboard chase wall constructed of the materials and in the manner specified in the individual U300 Series Wall and Partition Designs in the UL Fire Resistance Directory and shall include the following construction features:
 - Studs**—Nom 2 by 6 in. (51 by 152 mm) or double nom 2 by 4 in. (51 by 102 mm) lumber studs.
 - Sole Plate**—Nom 2 by 6 in. (51 by 152 mm) or parallel 2 by 4 in. (51 by 102 mm) lumber plates, tightly butted together. Diam of opening in sole plate shall be max 1 in. (25 mm) larger than outside diam of nonmetallic pipe or conduit.
 - Top Plate**—The double top plate shall consist of two nom 2 by 6 in. (51 by 152 mm) or two sets of parallel 2 by 4 in. (51 by 102 mm) lumber plates, tightly butted together. Diam of opening in top plate shall be max 1 in. (25 mm) larger than outside diam of nonmetallic pipe or conduit.
 - Gypsum Board**—Thickness, type, number of layers and fasteners shall be as specified in individual Wall and Partition Design.
- Through Penetrants**—One nonmetallic pipe or conduit to be installed concentrically or eccentrically within the firestop system. Annular space between pipe or conduit and edge of opening to be 0 in. (point contact) to max 1/2 in. (0 to 13 mm). Pipe may be installed in continuous point contact. Pipe to be rigidly supported on both sides of floor-ceiling assembly. The following types and sizes of nonmetallic pipes may be used:
 - Polyvinyl Chloride (PVC) Pipe**—Nom 4 in. (102 mm) diam (or smaller) Schedule 40 solid or cellular core PVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
 - Chlorinated Polyvinyl Chloride (CPVC) Pipe**—Nom 4 in. (102 mm) diam (or smaller) SDR17 CPVC pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
 - Acrylonitrile Butadiene Styrene (ABS) Pipe**—Nom 4 in. (102 mm) diam (or smaller) Schedule 40 solid or cellular core ABS pipe for use in closed (process or supply) or vented (drain, waste or vent) piping systems.
- Fill, Void or Cavity Material**—Sealant—Min 1/2 in. (13 mm) thickness of fill material applied around through penetrant within the annulus on top surface of chase wall sole plate. Min 1/2 in. (13 mm) thickness of fill material applied within the annulus of the top plate flush with the bottom surface of the lower top plate. Min 1/2 in. (13 mm) bead of fill material applied at the penetrant/plate interfaces at point contact locations on both sides of assembly. When penetrant is installed at continuous contact or with min 0 in. to max 1/4 in. (0 to 6 mm) annular spaces, a continuous 1/2 in. (13 mm) bead of sealant shall be applied at the penetrant/plate interfaces on both sides of assembly.
SPECIFIED TECHNOLOGIES INC—Type WF300 Caulk

*Bearing the UL Classification Marking



4 PENETRATION DETAIL
SCALE: N.T.S.



System No. F-C-2322
F Rating - 1 Hr
T Rating - 1 Hr

- Floor-Ceiling Assembly**—The 1 hr fire-rated solid or trussed lumber joist floor-ceiling assembly shall be constructed of the materials and in the manner specified in individual L500 Series Floor-Ceiling Designs in the UL Fire Resistance Directory, as summarized below:
 - Flooring System**—Lumber or plywood subfloor with finish floor of lumber, plywood or Floor Topping Mixture* as specified in the individual Floor-Ceiling Design. Max diam of opening is 5 in. (127 mm).
 - Wood Joists**—Nom 2 by 10 in. (51 by 254 mm) lumber joists spaced 16 in. (406 mm) OC with nom 1 by 3 in. (25 by 76 mm) lumber bridging and with ends firestopped. As an alternate to lumber joists, nom 10 in. (254 mm) deep (or deeper) lumber, steel or combination lumber and steel joists trusses or Structural Wood Members* with bridging as required with ends firestopped.
 - Furring Channels**—(Not Shown)—Resilient galv. steel furring installed perpendicular to wood joists (Item 1B) between gypsum board (Item 1D) and wood joists as required in the individual Floor-Ceiling Design.
 - Gypsum Board**—Nom 4 ft (1.22 m) wide by 5/8 in. (16 mm) thick as specified in the individual Floor-Ceiling Design. Gypsum board secured to wood joists as specified in the individual Floor-Ceiling Design.
- Closet Flange**—Polyvinyl chloride (PVC) or acrylonitrile butadiene styrene (ABS) closet flange installed in hole-sawed opening in flooring system with flange secured to top of flooring with steel screws. Diam of circular opening through flooring (Item 1A) to be max 1/2 in. (13 mm) larger than outside diam of closet flange.
- Drain Piping**—Nom 4 in. (102 mm) diam (or smaller) Schedule 40 PVC or ABS drain piping and fittings. Short length of pipe with 90 degree elbow fitting cemented into bottom socket of closet flange. Drain piping to soil stack cemented into elbow.
- Fill, Void or Cavity Material**—Sealant—Fill material forced into annulus between closet stub and periphery opening in flooring to max extent possible, flush with bottom surface of floor. Additional fill material to be installed such that a min 3/8 in. (10 mm) crown is formed around the closet stub on bottom surface of floor.
SPECIFIED TECHNOLOGIES INC—Type WF300 Caulk
- Water Closet**—(Not Shown)—Floor mounted vitreous china water closet.

*Bearing the UL Classification Marking



5 PENETRATION DETAIL
SCALE: N.T.S.