

TOWN OF BARNSTEAD  
FIRE PROTECTION CISTERN  
SPECIFICATIONS

!!!! NOTE !!!!

The Town of Barnstead and Barnstead Fire Rescue are the ultimate customers/owners of any cistern constructed for subdivisions. As a result, the Town and the Fire Rescue have a clear interest in assuring that work is satisfactory. To that end, inspections will be performed by both the Town Building Inspector and a representative of the Board of Fire Wards as they deem necessary.

- 1) Cisterns are to be located as required by the Town of Barnstead Subdivision Regulations.
- 2) The Town of Barnstead Fire Wards expect the design of a cistern to be reasonable, practical, trouble-free and last a lifetime. All design and construction information must be shown on plans.
- 3) The cistern is to be 30,000 gallons, minimum, available through the suction piping system.
- 4) The suction piping system is to be capable of delivering 1000 gallons per minute for three-quarters of the cistern capacity.
- 5) The design of the cistern is to be submitted to the Fire Wards for approval prior to construction. All plans must be signed by an acceptable registered professional engineer.
- 6) Each cistern must be sited to the particular location by the same registered engineer as in Item #5 above and approved by the Fire Wards.
- 7) The entire cistern is to be rated for highway loading, unless specifically exempted by the Fire Wards.
- 8) All drawings herein are for estimating purposes only and are not to be used as design. Alternative designs and materials are welcome and may be submitted for review.

- 9) Cast in place concrete is to achieve a twenty-eight day strength of 3000 psi. It must be placed with a minimum of a 4 inch slump and vibrated in a workmanlike manner.
- 10) The concrete is to be mixed, placed, and cured without the use of calcium chloride. Winter placement and curing must follow the accepted ACI codes.
- 11) All suction and fill piping is to be ASTM Schedule 40 steel. Any deviation from this must be specifically approved by the Fire Wards.
- 12) The 8 x 5 inch eccentric reducer is available from suppliers such as Boston Pipe and Fittings, Cambridge, MA., or local suppliers.
- 13) The final suction connection is to be 4-1/2 inch National Hose male thread. It must be capped. Both the adapter and the cap must be of non-corrosive materials.
- 14) The filler pipe siamese is to have 4 inch Storz fitting with a locking cap model 3080 manufactured by Knox.
- 15) The entire cistern is to be completed and inspected before any backfilling is done.
- 16) All backfill material is to be screened gravel with no stones larger than 1-1/2 inches and shall be lightly compacted by mechanical means.
- 17) Bedding for the cistern shall be a minimum 12 inches of 3/4 to 1-1/2 inch crushed, washed stone, compacted. No fill shall be used under the stone.
- 18) Filler pipe siamese is to be 36 inches above final backfill grade.
- 19) Suction pipe connection is to be 20 to 24 inches above the level of the finished surface where vehicle wheels will be located when cistern is in use. No benchmark grades are permitted to be shown on plans. The only notation permitted indicating height of suction pipe connection is in relation to the level of the finished roadway surface.
- 20) Suction pipe is to be supported either to top of tank or to a level below frost.

- 21) Cistern must be designed so that it will not float when empty. This must be stated on the plans.
- 22) Perimeter of tank at floor/wall joint to be sealed with continuous 8 inch PVC waterstop. All butt ends are to be sealed.
- 23) After backfilling, tank is to be protected by fencing or large stones.
- 24) Backfill over the tank shall be:
  - a) 4 feet of fill; or
  - b) The top and highest 2 feet of sides of cistern insulated with vermin-resistant foam insulation, and 2 feet of fill.
  - c) All backfill shall extend 10 feet beyond the edge of the cistern, then maximum 3:1 slope, loamed and seeded.
- 25) Bottom of suction pipe to pumper connection must not exceed 14 feet vertical distance.
- 26) Pitch of shoulder and vehicle pad from edge of pavement to pumper suction connection must be 3% downgrade.
- 27) Shoulder and vehicle pad must be of sufficient length to permit convenient access to suction connection when pumper is set at 45 degrees to the road.
- 28) All construction, backfill, and grading material to be in accordance with proper construction practices and acceptable to the Fire Wards.
- 29) All horizontal suction piping must slope slightly uphill towards pumper connection.
- 30) Installer is responsible for completely filling cistern until accepted by Fire Wards.
- 31) NO EXCEPTIONS PERMITTED: All form ties shall be of a type that permit breaking-off at least one inch below the surface of the concrete. In addition sealing washers shall be placed halfway along the length. All form ties are to be broken at least 1 inch below the surface and sealed with a non-shrinking grout.
- 32) The outside of the cistern walls must be waterproofed with an acceptable material.

33) The Fire Wards shall perform such tests on the cistern both during and after construction as they deem necessary. These tests shall include a flow test and a leakage test, the latter requiring at least two weeks.

34) Some method of positive leak prevention must be provided.

35) The filler Storz fitting may be mounted on a separate 4-inch steel pipe. (See Detail B.) The filler Storz fitting may then be located 24 inches above final grade level. The plans must state which method is to be used.

36) Each cistern must be furnished with an automatic fill system deemed acceptable by the Fire Wards.

37) Two (2) sets of stamped and signed final plans must be submitted. More may be required as needed by the Town or its engineer.

38) The acceptable padlock is a Caterpillar brand. Keying is to be determined.

39) A building permit is required by the Town.

NOTE: These specifications and accompanying drawings are subject to change. Be sure to check for revisions.

# OVERALL

DETAIL A

DETAIL B

DETAIL C

DETAIL D

30,000 GALLON CAPACITY

SEE SPECIFICATIONS AND OTHER  
DRAWINGS FOR DETAILS.

NOT TO SCALE --- COMPONENTS SHOWN  
FOR ILLUSTRATION ONLY.

DETAIL E

MIN. 12 INCHES 3/4-1 1/2 INCH WASHED STONE  
(COMPACTED) AS BASE UNDER CISTERN.

6/88 REV 8/04

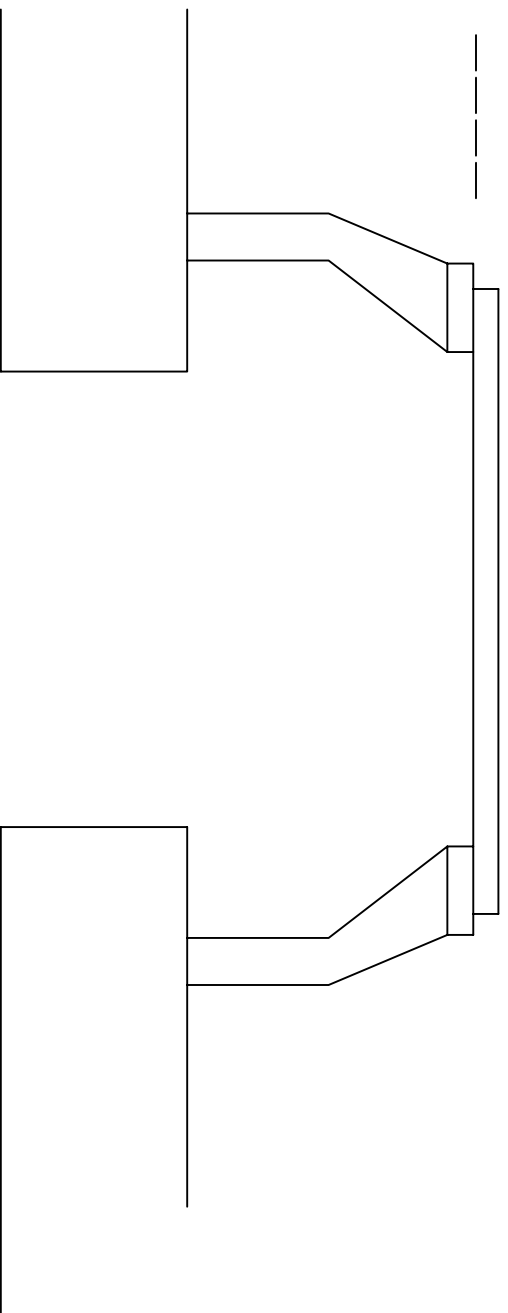
# DETAIL C

# MANHOLE

NEENAH R-1744 32-INCH MANHOLE  
OR R-1792-HL  
WITH TYPE D LOCKING DEVICE

PADLOCK TO BE ACCEPTABLE  
TO FIRE DEPARTMENT

FINAL  
GRADE LEVEL



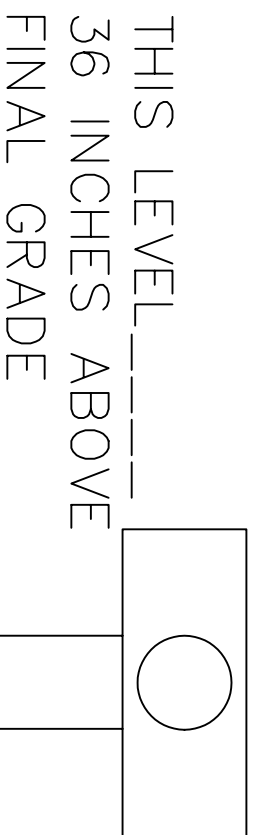
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# DETAIL B

FILL PIPE

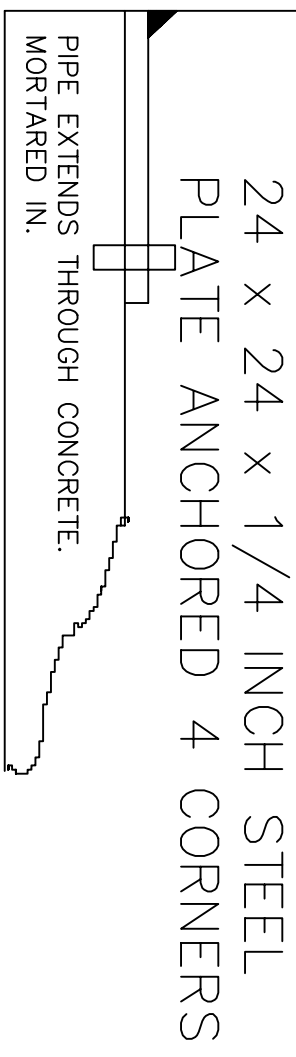
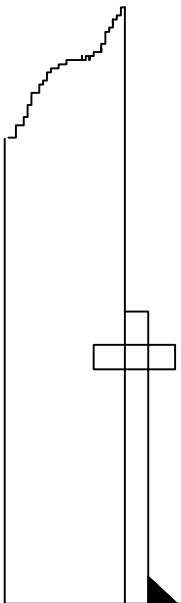
ALTERNATE TO A



4 INCH STORZ FITTING  
WITH MODEL 3080 LOCKING CAP  
MANUFACTURED BY KNOX

4 INCH SCHED 40 STEEL PIPE

PIPE WELDED TO PLATE



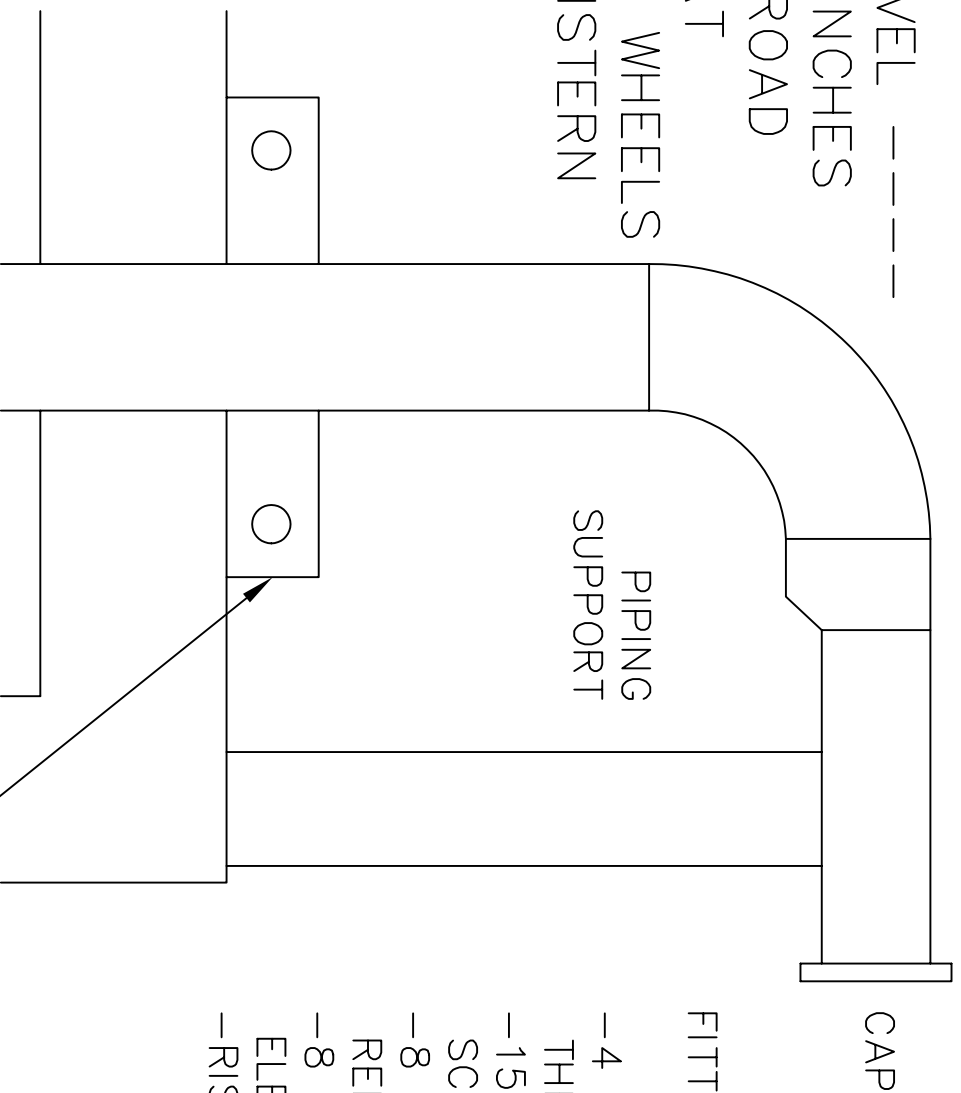
NOT TO SCALE 6/88 REV 8/04

# UPPER SUCTION PIPE

## DETAIL D

ALL PIPE SCHED 40 STEEL

THIS LEVEL -----  
20-24 INCHES  
ABOVE ROAD  
LEVEL AT  
VEHICLE WHEELS  
WHEN CISTERN  
IN USE



CAP

FITTING LIST FROM CAP

- 4 1/2 INCH NAT'L HOSE  
THREAD ADAPTER WITH CAP
- 15 INCH MIN. 5-INCH  
SCHED 40 NIPPLE
- 8 X 5 INCH ECCENTRIC  
REDUCER
- 8 INCH WELDED 90-DEGREE  
ELBOW
- RISER CLAMP WELDED TO PIPE

PIPING  
SUPPORT

NOT TO SCALE

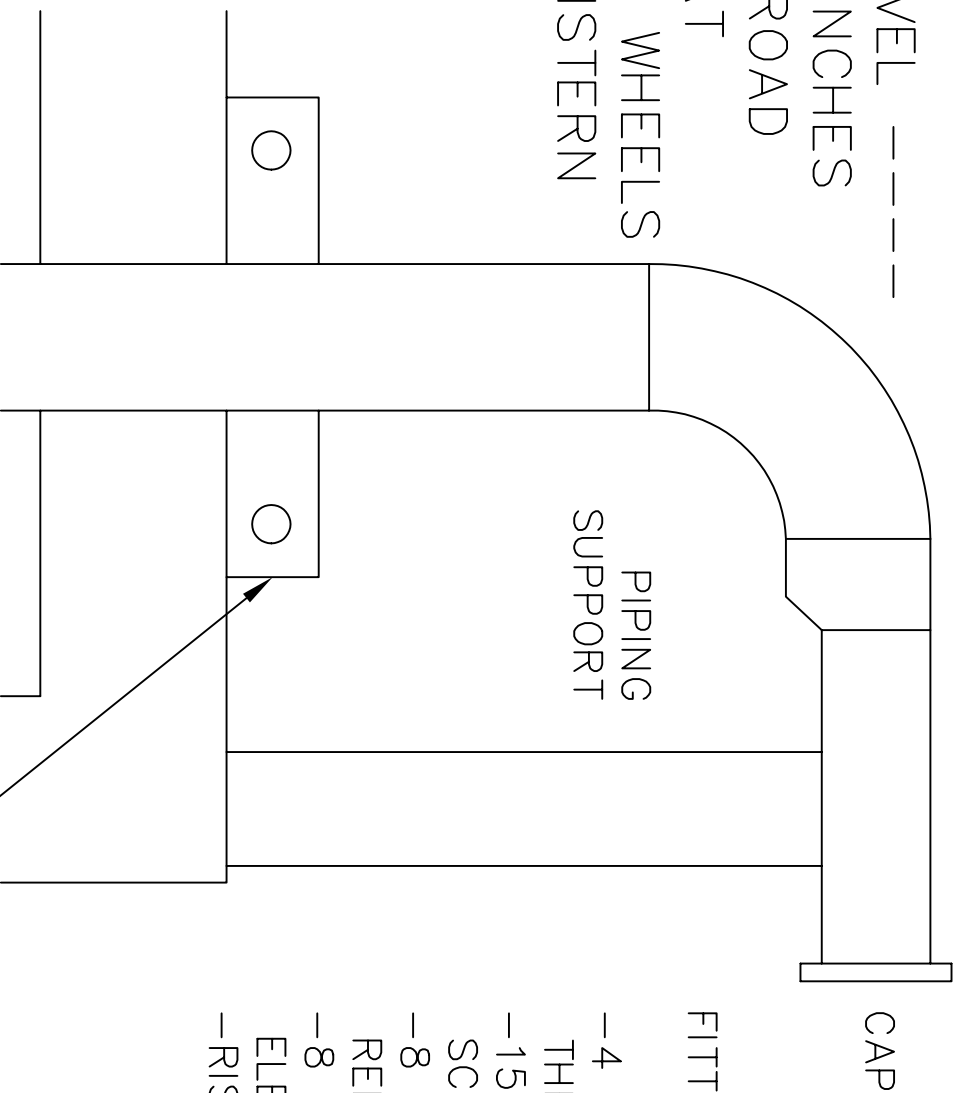
8 INCH RISER CLAMP  
WELDED TO PIPE

# UPPER SUCTION PIPE

## DETAIL D

ALL PIPE SCHED 40 STEEL

THIS LEVEL -----  
20-24 INCHES  
ABOVE ROAD  
LEVEL AT  
VEHICLE WHEELS  
WHEN CISTERN  
IN USE



CAP

FITTING LIST FROM CAP

- 4 1/2 INCH NAT'L HOSE  
THREAD ADAPTER WITH CAP
- 15 INCH MIN. 5-INCH  
SCHED 40 NIPPLE
- 8 X 5 INCH ECCENTRIC  
REDUCER
- 8 INCH WELDED 90-DEGREE  
ELBOW
- RISER CLAMP WELDED TO PIPE

NOT TO SCALE

8 INCH RISER CLAMP  
WELDED TO PIPE

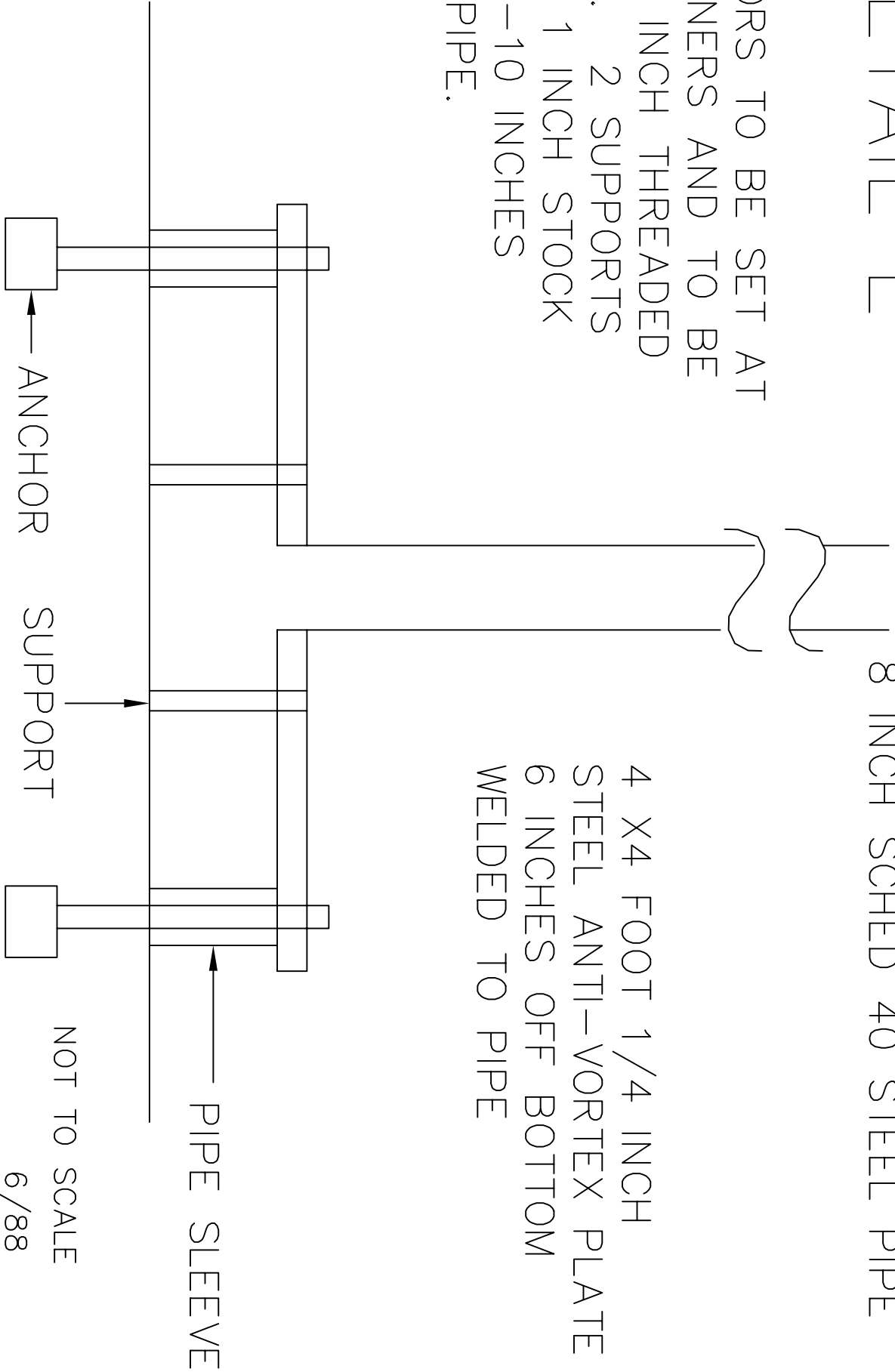
# LOWER SUCTION PIPE

## DETAIL E

ANCHORS TO BE SET AT 4 CORNERS AND TO BE MIN. 1 INCH THREADED STOCK. 2 SUPPORTS TO BE 1 INCH STOCK AND 6-10 INCHES FROM PIPE.

8 INCH SCHED 40 STEEL PIPE

4 X4 FOOT 1/4 INCH STEEL ANTI-VORTEX PLATE 6 INCHES OFF BOTTOM WELDED TO PIPE



PIPE SLEEVE

ANCHOR

SUPPORT

NOT TO SCALE

6/88