

ANNE ARUNDEL COUNTY  
MARYLAND

DEPARTMENT OF PUBLIC WORKS

**CHAPTER V**

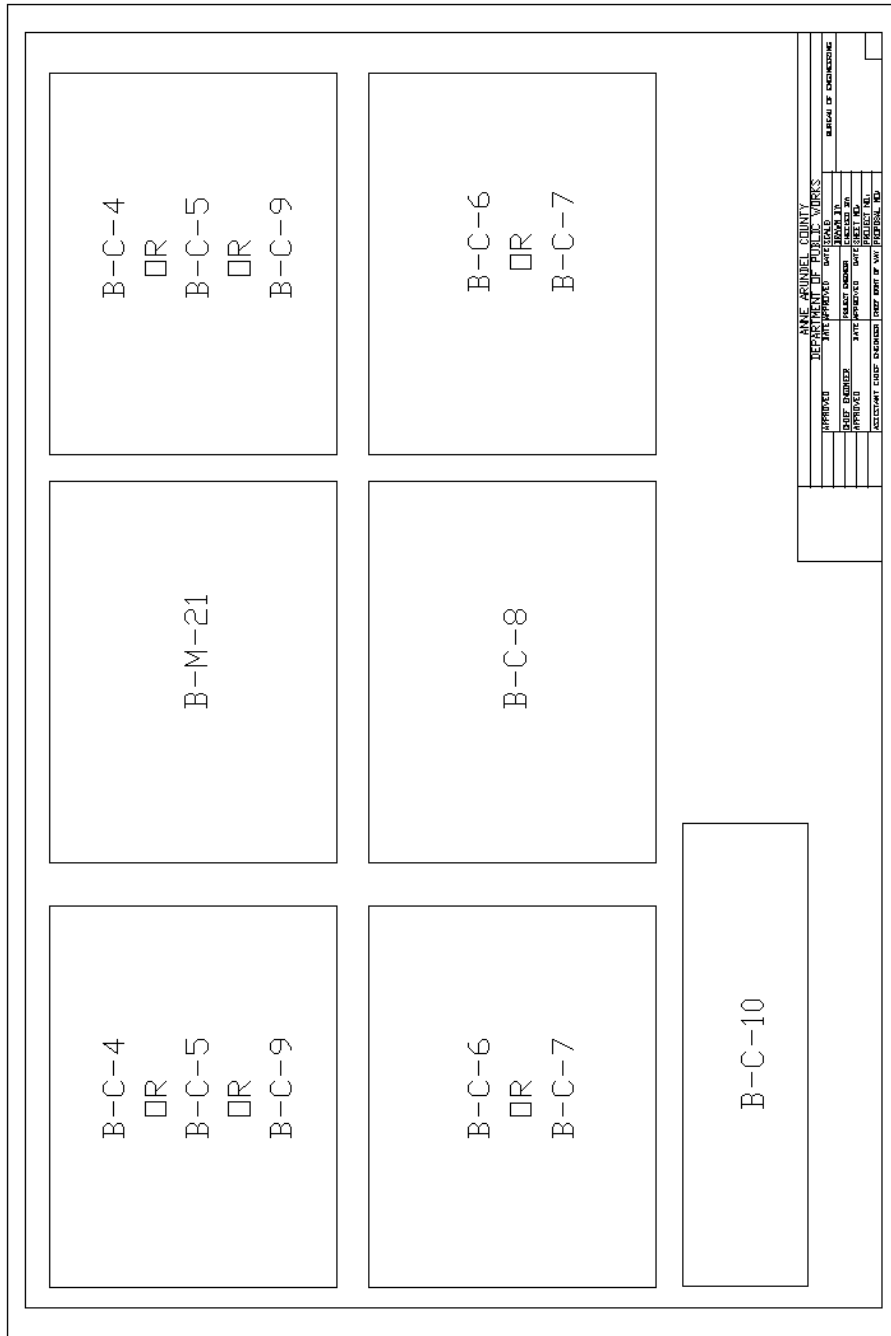
**REFERENCE DRAWINGS**  
**for**  
**LIQUID AND GAS**  
**STORAGE TANKS**

**January 2001**

**REFERENCE DRAWINGS FOR  
LIQUID AND GAS STORAGE TANKS**

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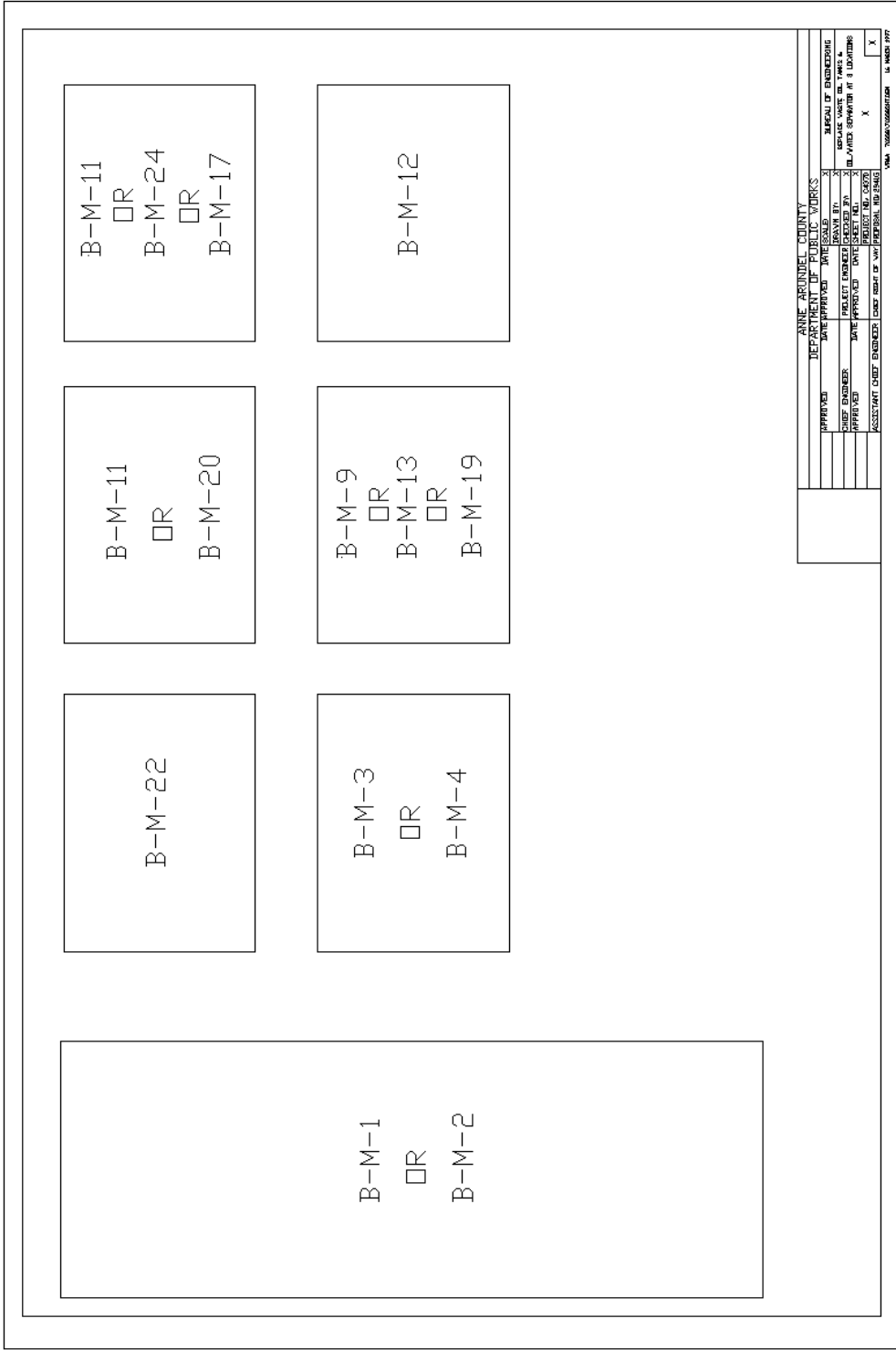


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 \_\_\_\_\_  
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 \_\_\_\_\_  
 DESIGN ENGINEER  
 DATE: \_\_\_\_\_

**LIQUID AND GAS STORAGE TANK  
 REFERENCE DRAWING  
 CIVIL LAYOUT SHEET**

**B-C-L1**

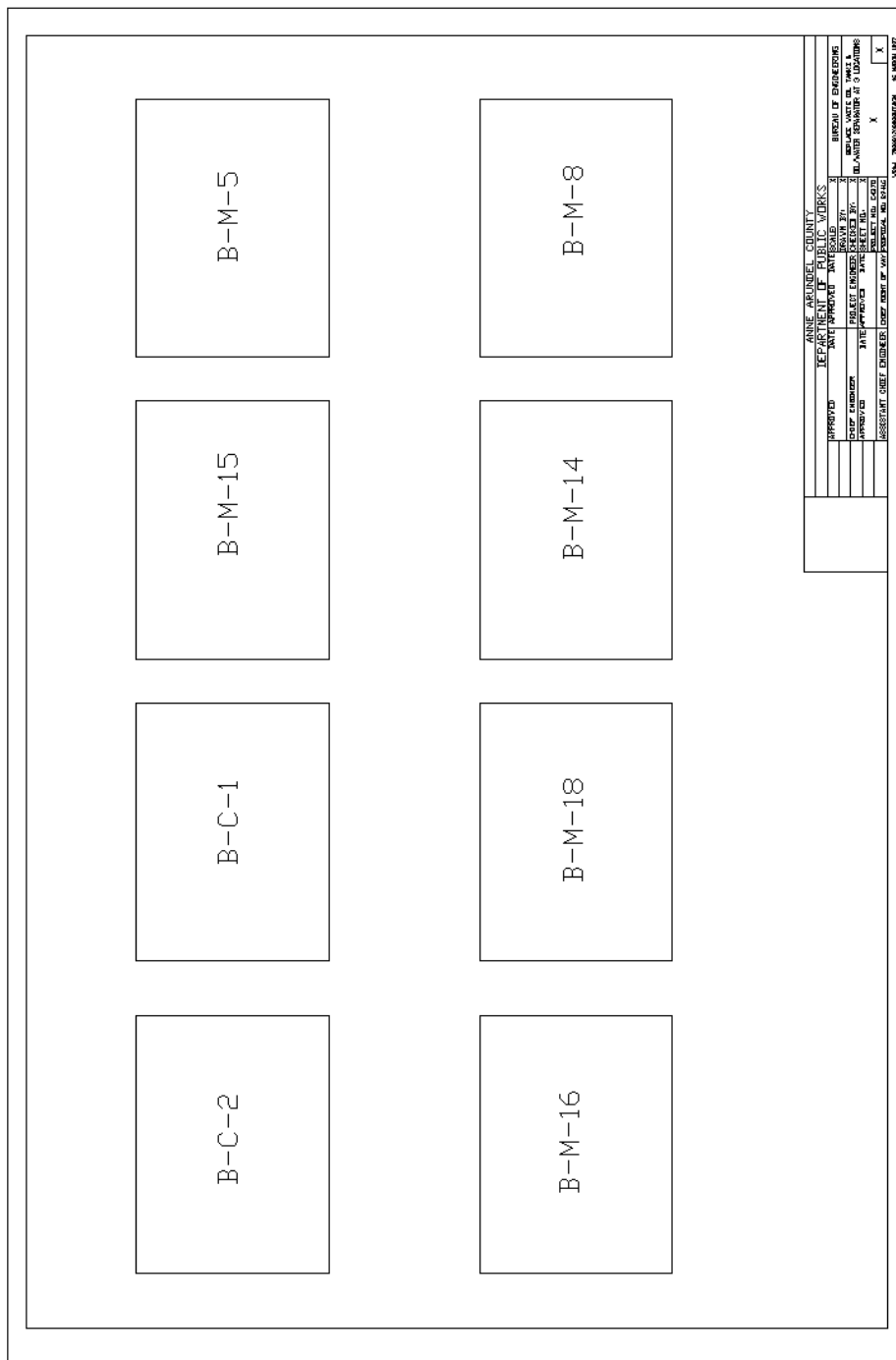


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**LIQUID AND GAS STORAGE TANK  
 REFERENCE DRAWING  
 MECHANICAL LAYOUT SHEET**

**B-M-L2**



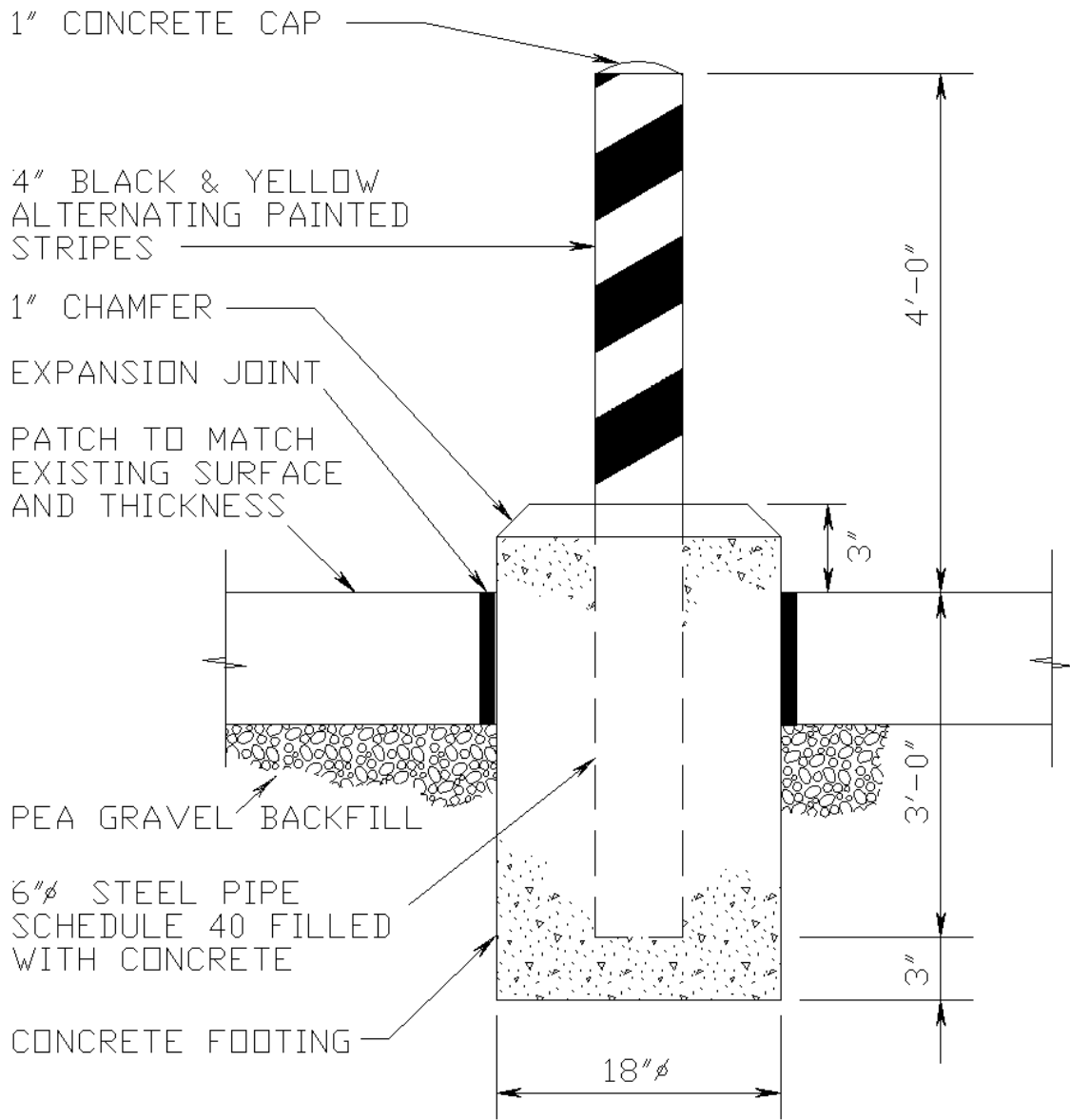
ANNE ARUNDEL COUNTY		
DEPARTMENT OF PUBLIC WORKS		
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_____ DESIGN ENGINEER	_____ CHECKED BY	_____ PROJECT NO.
DATE	PROJECT NO.	PROJECT NO.
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DESIGN ENGINEER  
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**LIQUID AND GAS STORAGE TANK  
REFERENCE DRAWING  
MECHANICAL LAYOUT SHEET**

**B-M-L3**



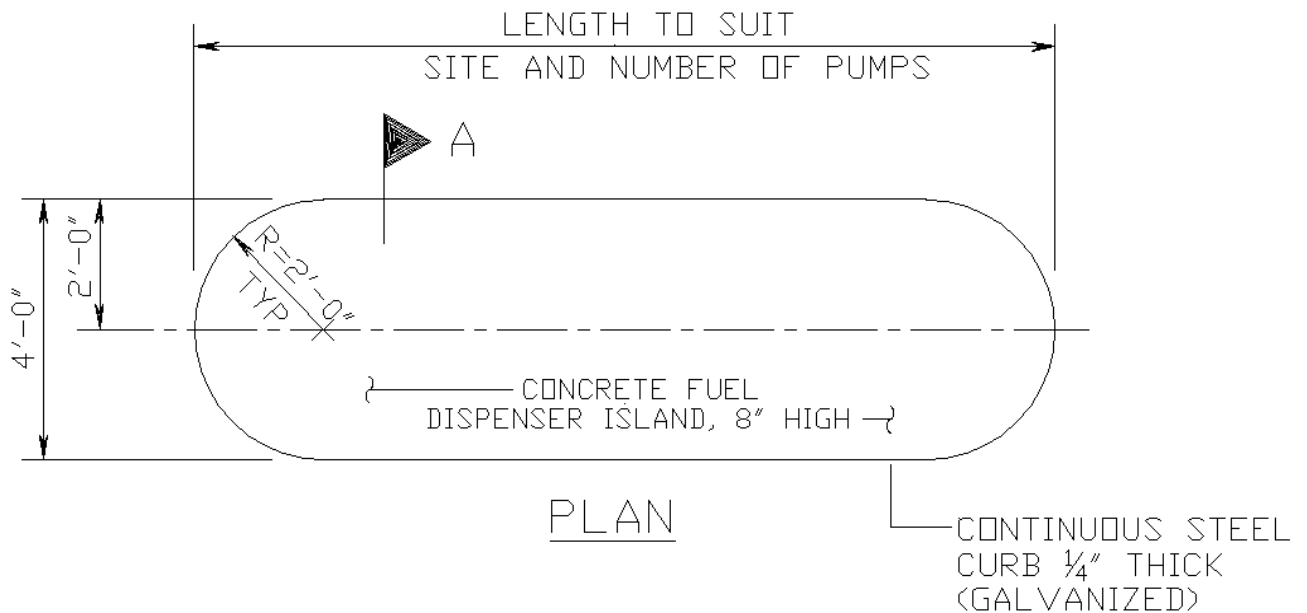
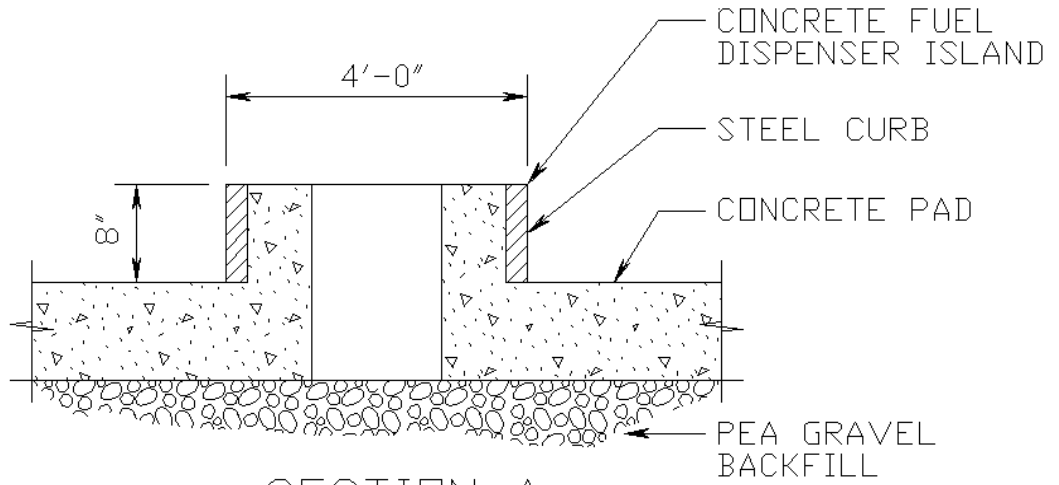
**PIPE BOLLARD DETAIL**  
**NOT TO SCALE**

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 \_\_\_\_\_  
 DESIGN ENGINEER  
 DATE:

**LIQUID AND GAS STORAGE TANK  
 REFERENCE DRAWING**  
**PIPE BOLLARD DETAIL**

**B-C-1**



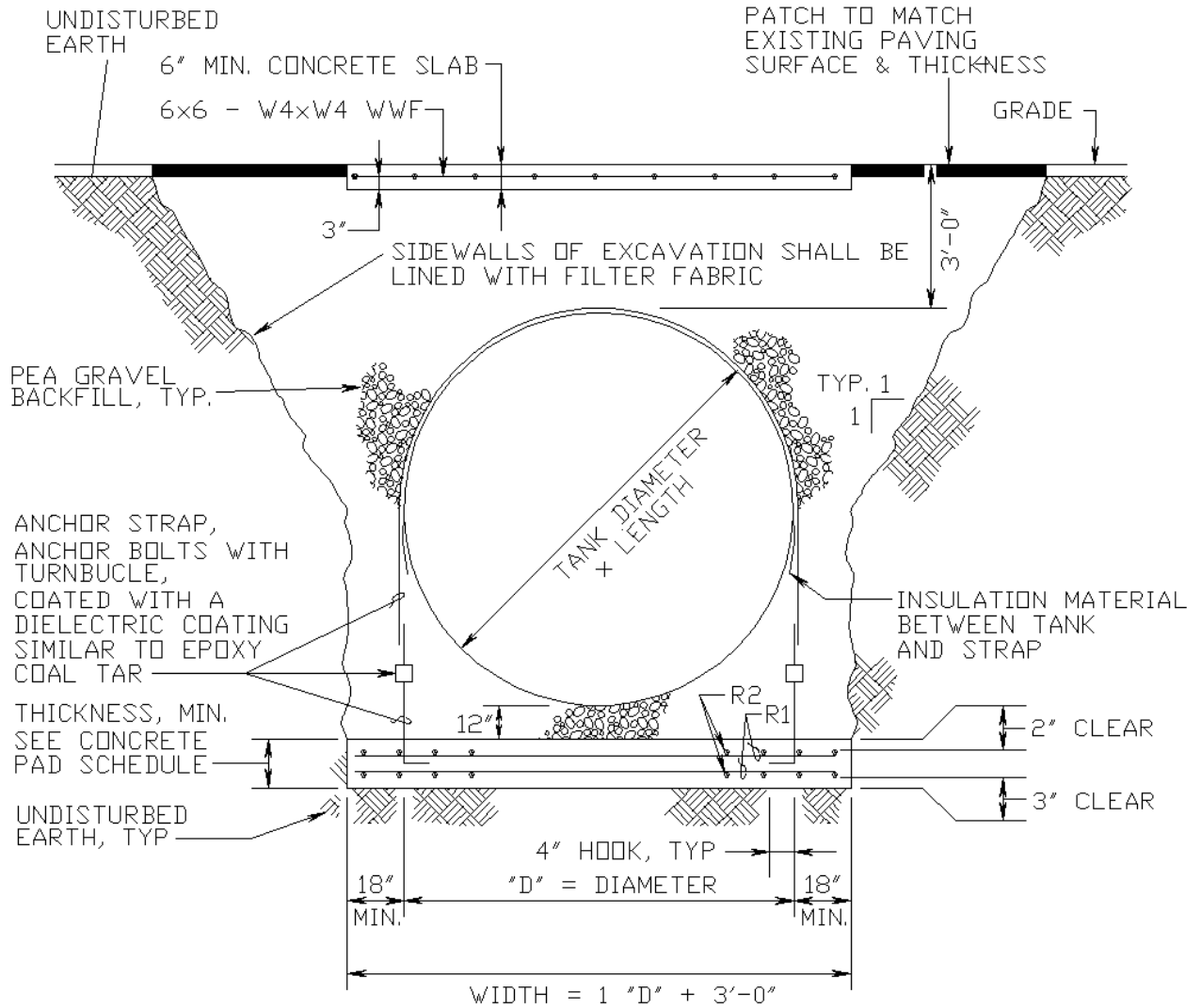
**FUEL DISPENSER ISLAND**  
**DETAIL**  
**NOT TO SCALE**

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 DATE:

**LIQUID AND GAS STORAGE TANK  
 REFERENCE DRAWING**  
**FUEL DISPENSER ISLAND  
 DETAIL**

**B-C-2**

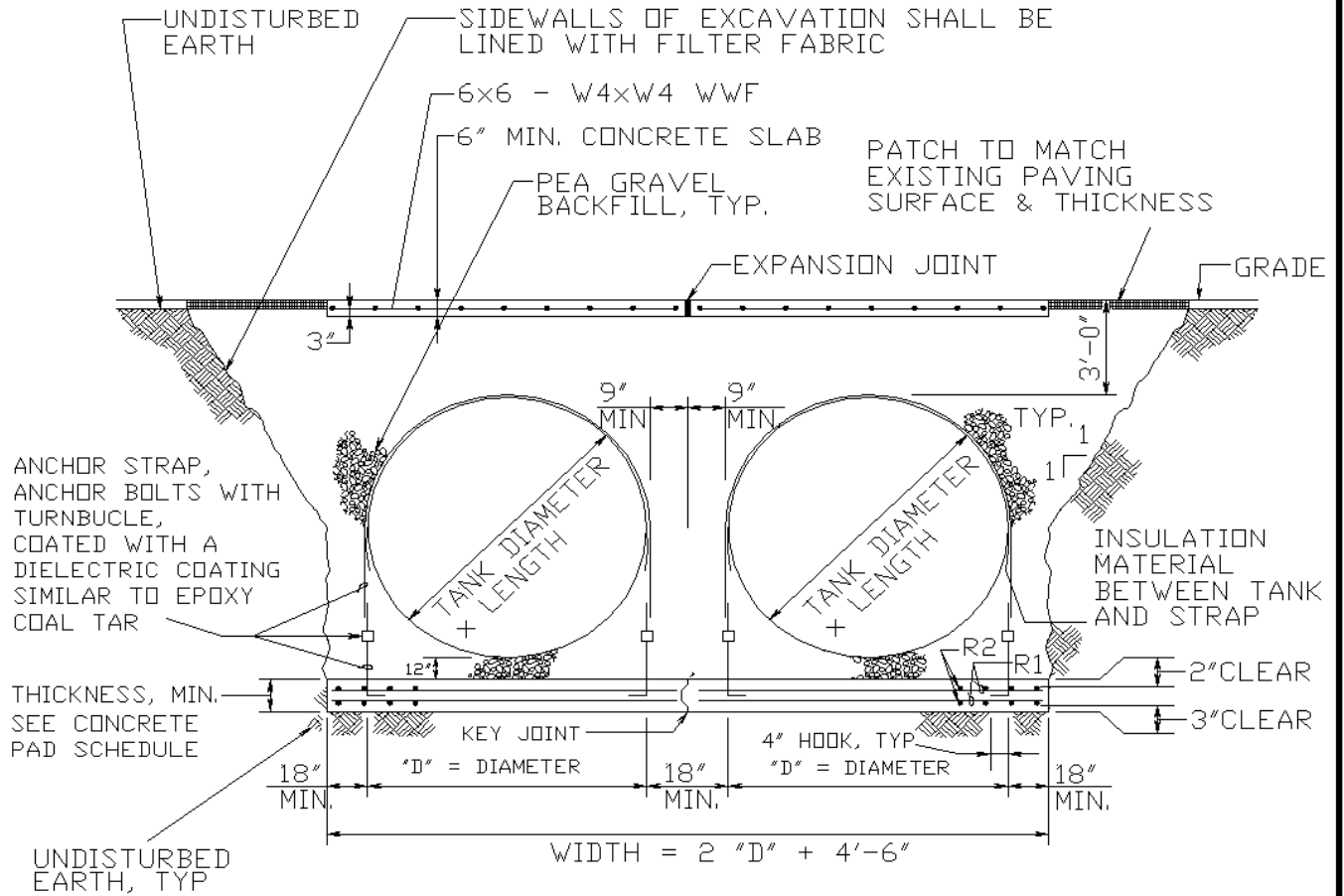


**NOTE:**  
 SEE FUEL TANK CONCRETE BALLAST PAD SCHEDULE FOR CONCRETE PAD AND TANK ANCHOR SIZES

**SINGLE TANK INSTALLATION WITH CONCRETE PAD**  
**NOT TO SCALE**

ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS	APPROVED _____ CHIEF ENGINEER _____ DESIGN ENGINEER DATE: _____	LIQUID AND GAS STORAGE TANK REFERENCE DRAWING <b>TANK INSTALLATION WITH                  CONCRETE PAD</b>	<b>B-C-4</b>
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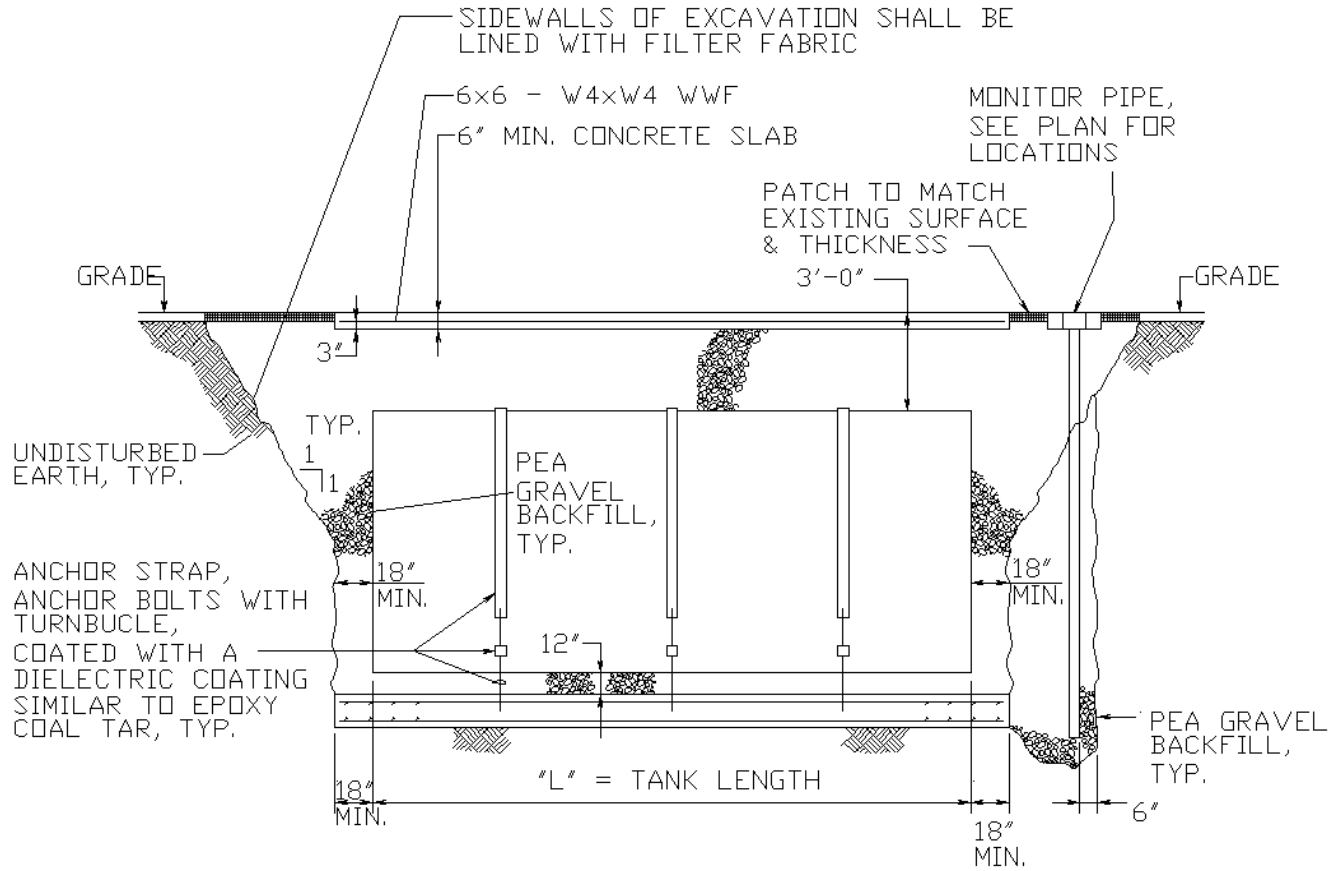
**TWIN TANK INSTALLATION WITH CONCRETE PAD**  
**NOT TO SCALE**

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 \_\_\_\_\_  
 CHIEF ENGINEER  
 \_\_\_\_\_  
 DESIGN ENGINEER  
 DATE:

**LIQUID AND GAS STORAGE TANK  
 REFERENCE DRAWING**  
**TWIN TANK INSTALLATION  
 WITH CONCRETE PAD**

**B-C-5**

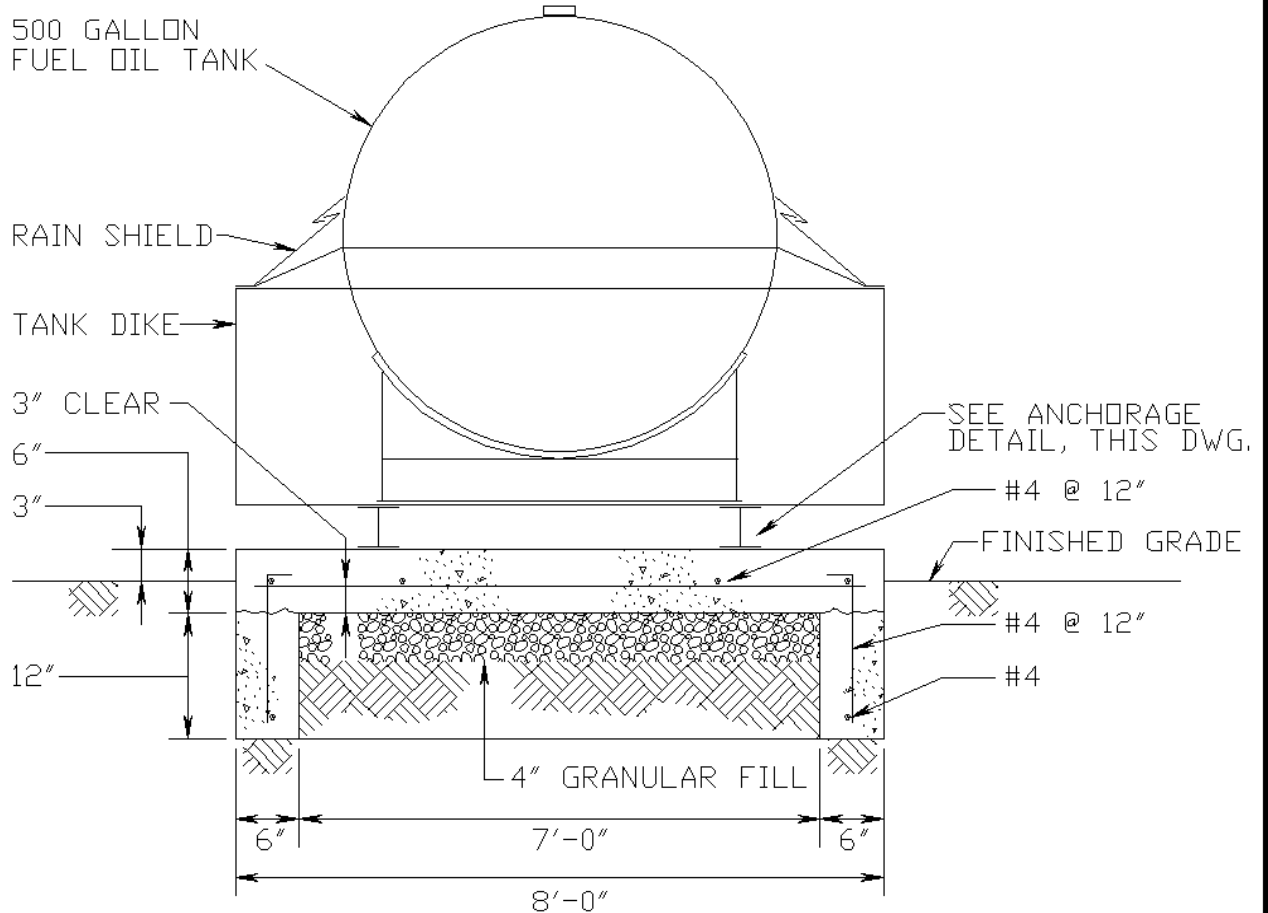


**NOTE:**

SEE FUEL TANK CONCRETE BALLAST PAD SCHEDULE FOR CONCRETE PAD AND TANK ANCHOR SIZES

**TANK INSTALLATION WITH CONCRETE PAD - SIDE VIEW**  
**NOT TO SCALE**

ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS	APPROVED _____ CHIEF ENGINEER _____ DESIGN ENGINEER DATE: _____	LIQUID AND GAS STORAGE TANK REFERENCE DRAWING TANK INSTALLATION WITH CONCRETE PAD	B-C-6
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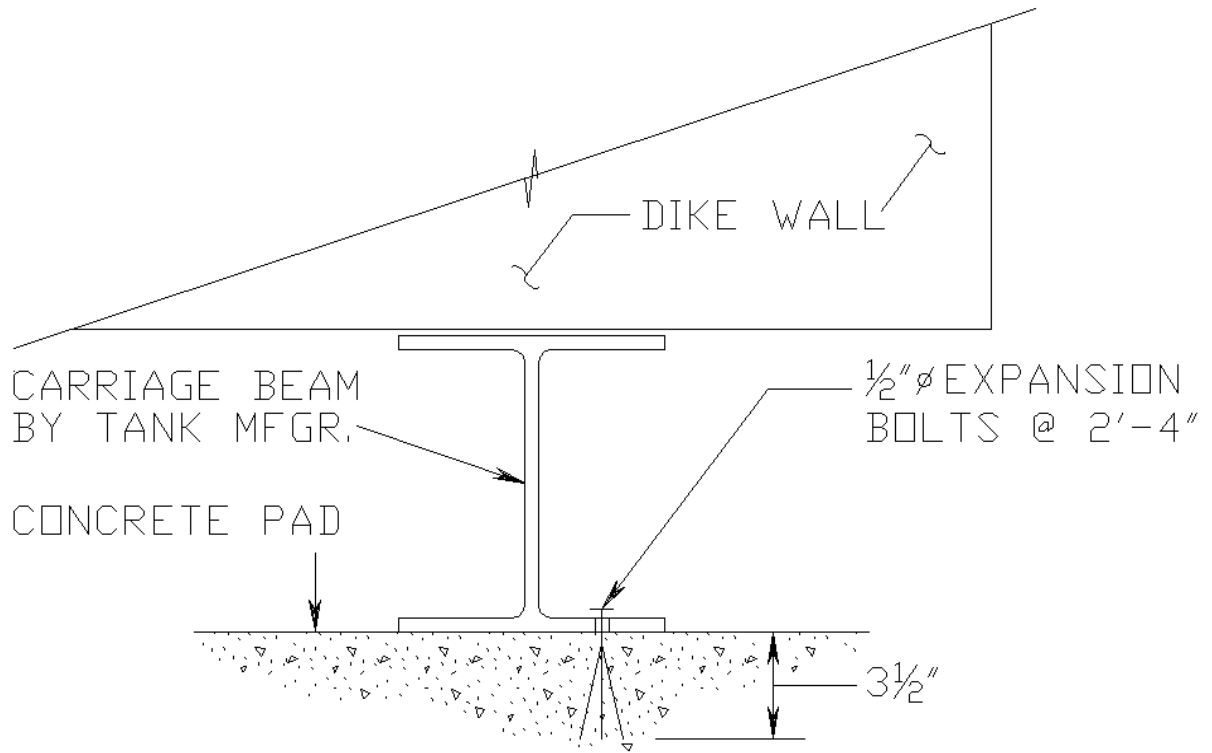
**AST DETAIL 1  
 ABOVE GROUND DIKE TANK  
 INSTALLATION ON CONCRETE PAD  
 NOT TO SCALE**

ANNE ARUNDEL  
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 \_\_\_\_\_  
 CHIEF ENGINEER  
 \_\_\_\_\_  
 DESIGN ENGINEER  
 DATE:

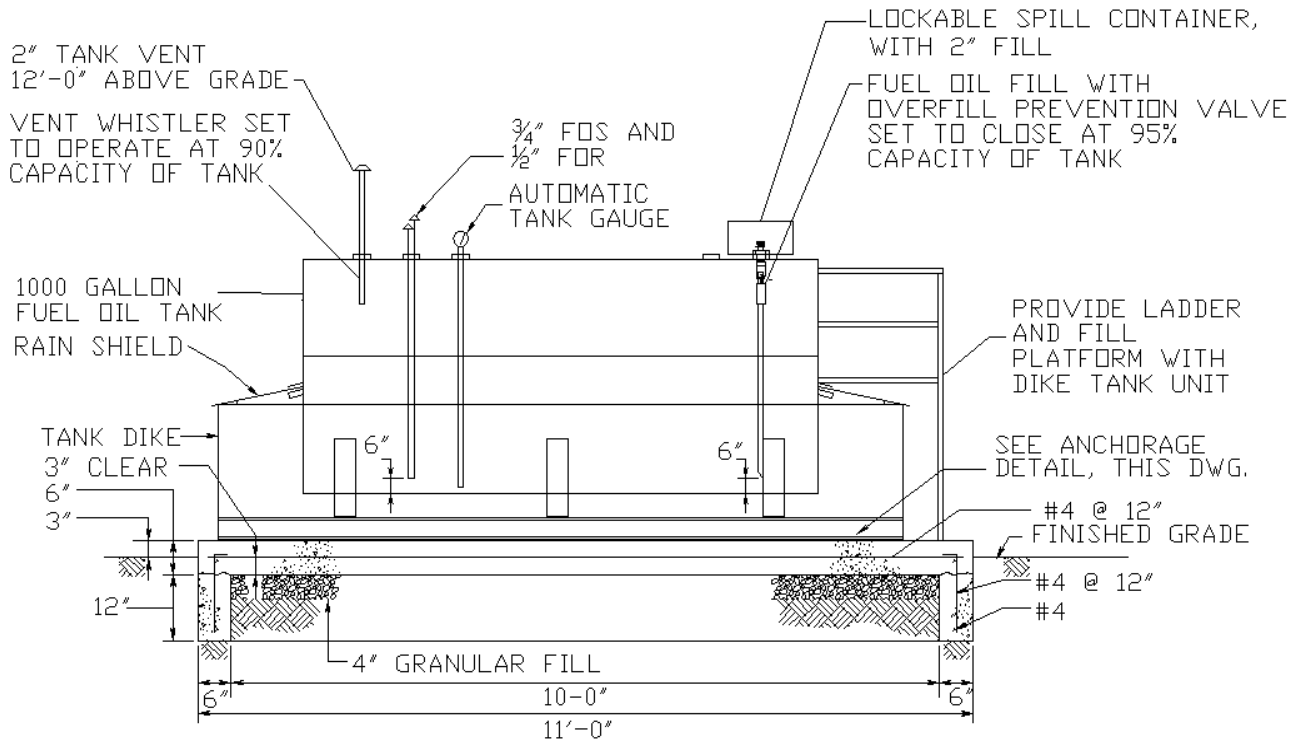
**LIQUID AND GAS STORAGE TANK  
 REFERENCE DRAWING  
 AST DETAIL 1 ABOVE GROUND  
 DIKE TANK INSTALLATION  
 ON CONCRETE PAD**

**B-C-7**



**ANCHORAGE DETAIL**  
**NOT TO SCALE**

ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS	APPROVED _____ CHIEF ENGINEER _____ DESIGN ENGINEER DATE:	LIQUID AND GAS STORAGE TANK REFERENCE DRAWING ANCHORAGE DETAIL	B-C-8
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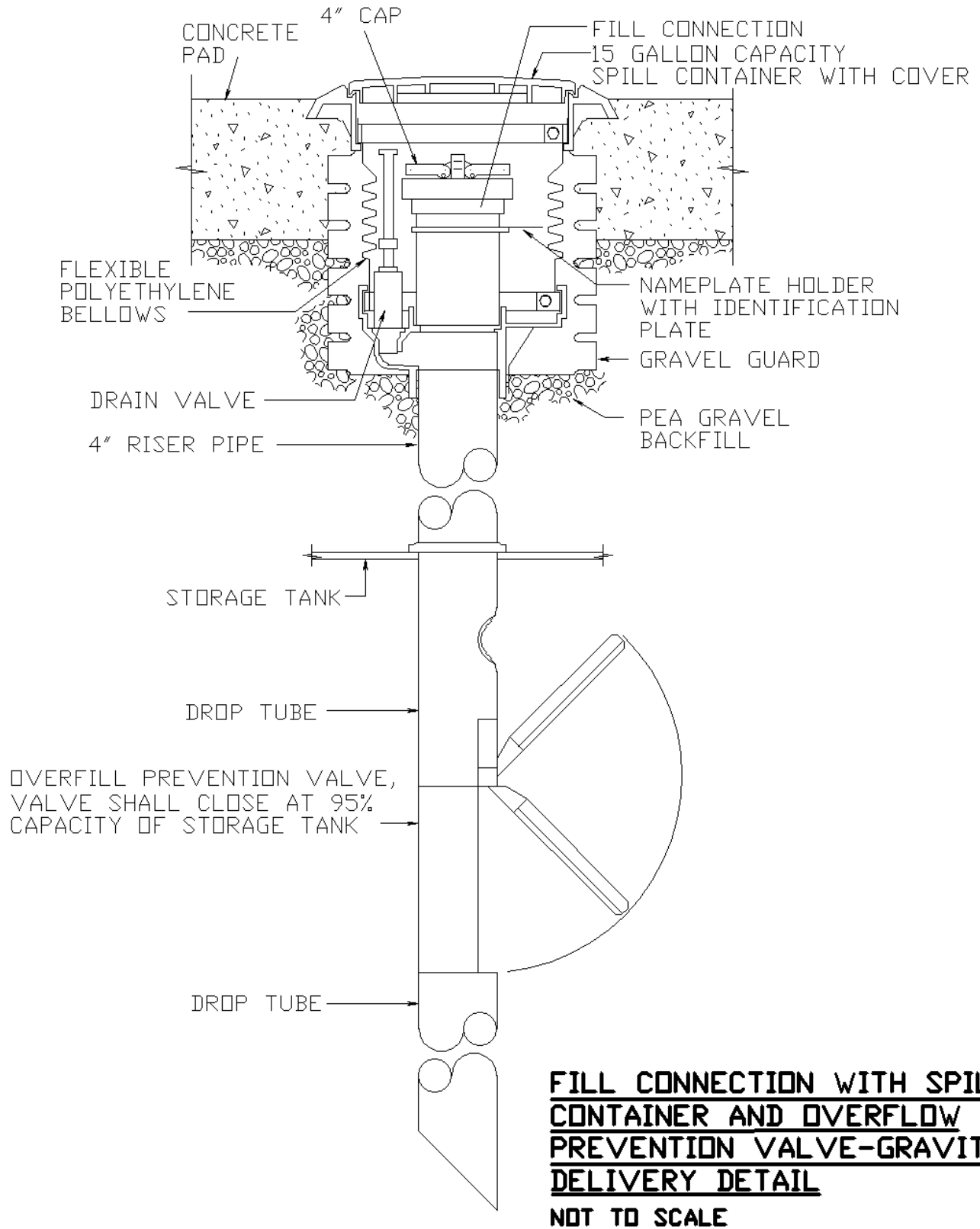
**AST DETAIL 2  
SIDE VIEW - ABOVE GROUND DIKE TANK  
INSTALLATION ON CONCRETE PAD**

**NOT TO SCALE**

ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS	APPROVED _____ CHIEF ENGINEER  _____ DESIGN ENGINEER DATE:	LIQUID AND GAS STORAGE TANK REFERENCE DRAWING AST DETAIL 2 SIDE VIEW ABOVE GROUND DIKE TANK INSTALLATION ON CONC. PAD	B-C-9
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<b>FUEL TANK CONCRETE BALLAST PAD SCHEDULE</b>									
TANK LOCATION	TANK SIZE (GALLONS)	NOMINAL DIA × LENGTH	CONCRETE PAD				STRAP ANCHOR		
			WIDTH	LENGTH	THICKNESS	REINFORCEMENT	BOLT SIZE	# OF STRAPS	⊥ SPACING

ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS	APPROVED _____ CHIEF ENGINEER	<b>LIQUID AND GAS STORAGE TANK                  REFERENCE DRAWING                  FUEL TANK CONCRETE BALLAST                  PAD SCHEDULE</b>	<b>B-C-10</b>
	_____ DESIGN ENGINEER DATE:		

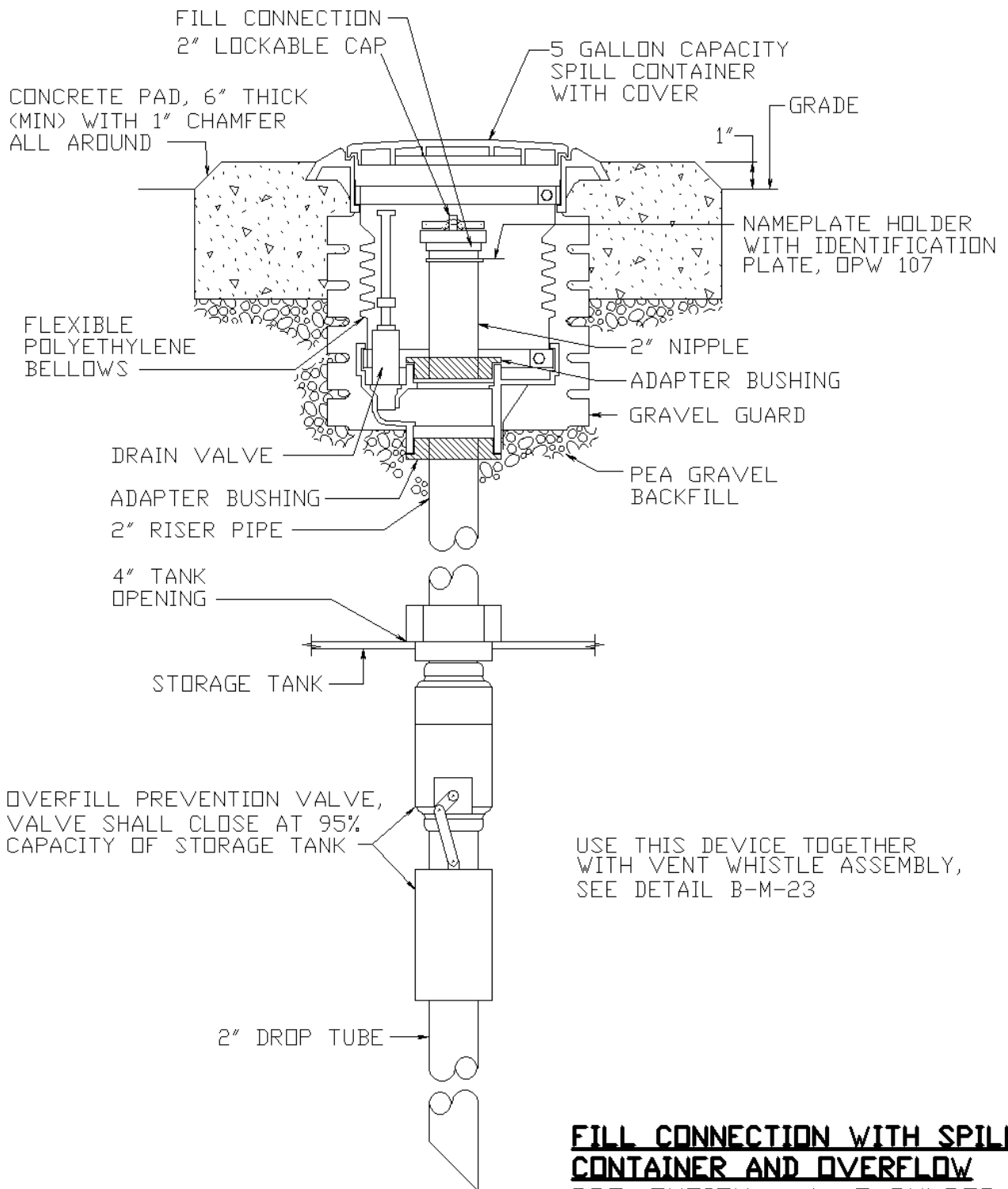


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DESIGN ENGINEER  
DATE:

**LIQUID AND GAS STORAGE TANK  
REFERENCE DRAWING  
FILL CONNECTION  
GRAVITY DELIVERY**

**B-M-1**

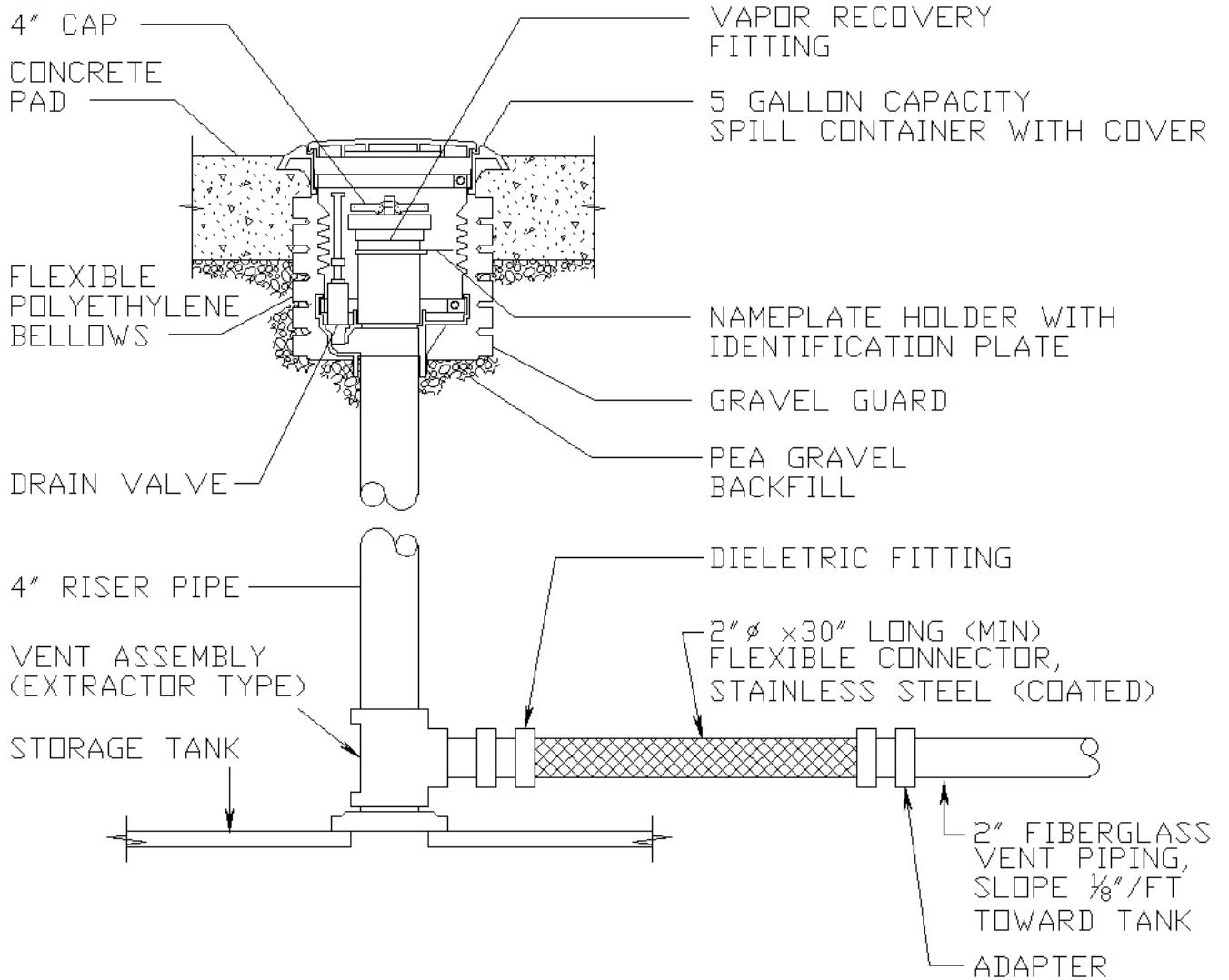


USE THIS DEVICE TOGETHER  
WITH VENT WHISTLE ASSEMBLY,  
SEE DETAIL B-M-23

**FILL CONNECTION WITH SPILL  
CONTAINER AND OVERFLOW  
PREVENTION VALVE-PUMPED  
DELIVERY DETAIL**  
NOT TO SCALE

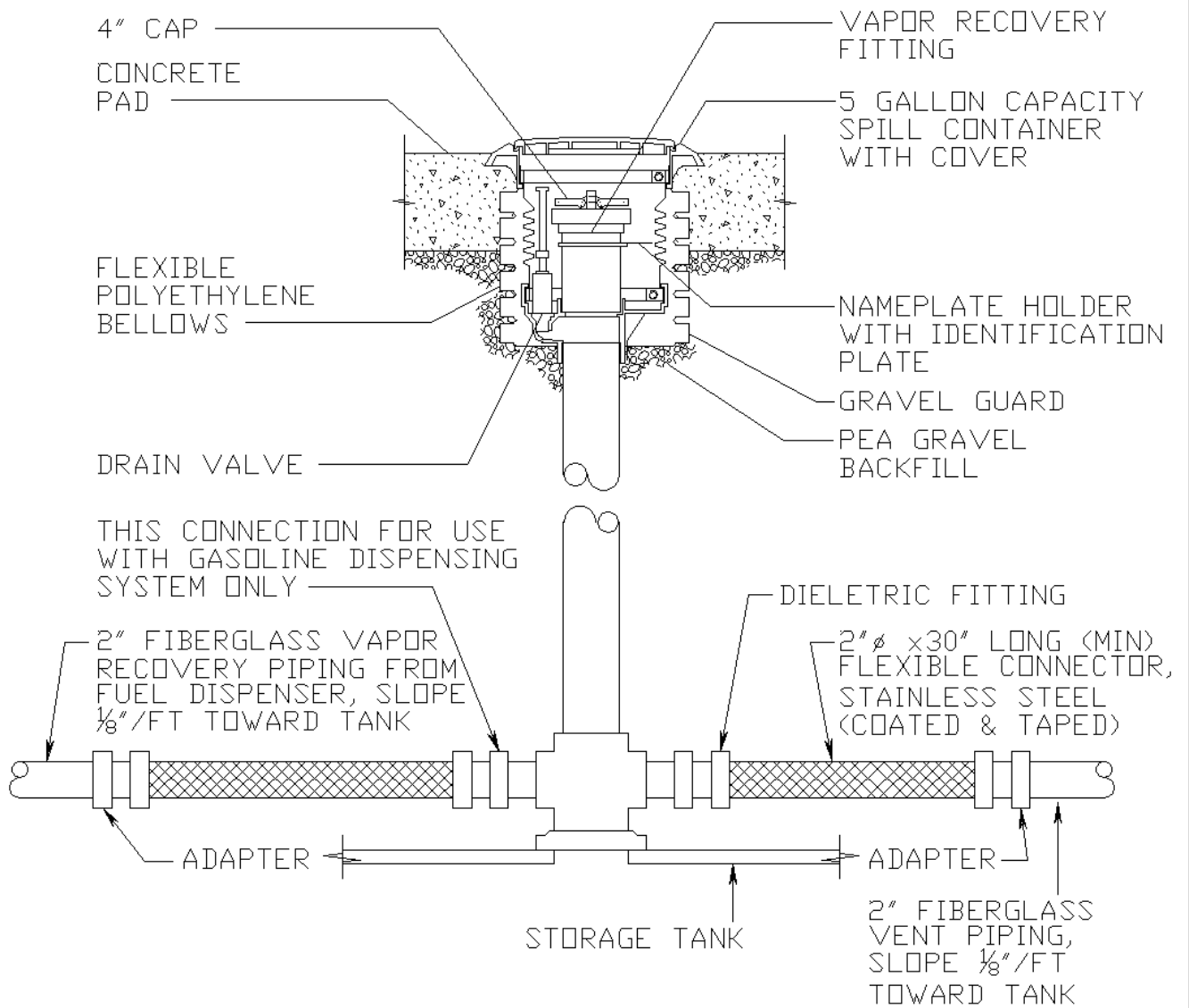
ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS	APPROVED _____ CHIEF ENGINEER _____ DESIGN ENGINEER DATE:	LIQUID AND GAS STORAGE TANK REFERENCE DRAWING FILL CONNECTION PUMPED DELIVERY	B-M-2
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**VAPOR RECOVERY CONNECTION**  
**DETAIL**  
**NOT TO SCALE**

ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS	APPROVED _____ CHIEF ENGINEER _____ DESIGN ENGINEER DATE: _____	LIQUID AND GAS STORAGE TANK REFERENCE DRAWING <b>VAPOR RECOVERY CONNECTION                  DETAIL</b>	<b>B-M-3</b>
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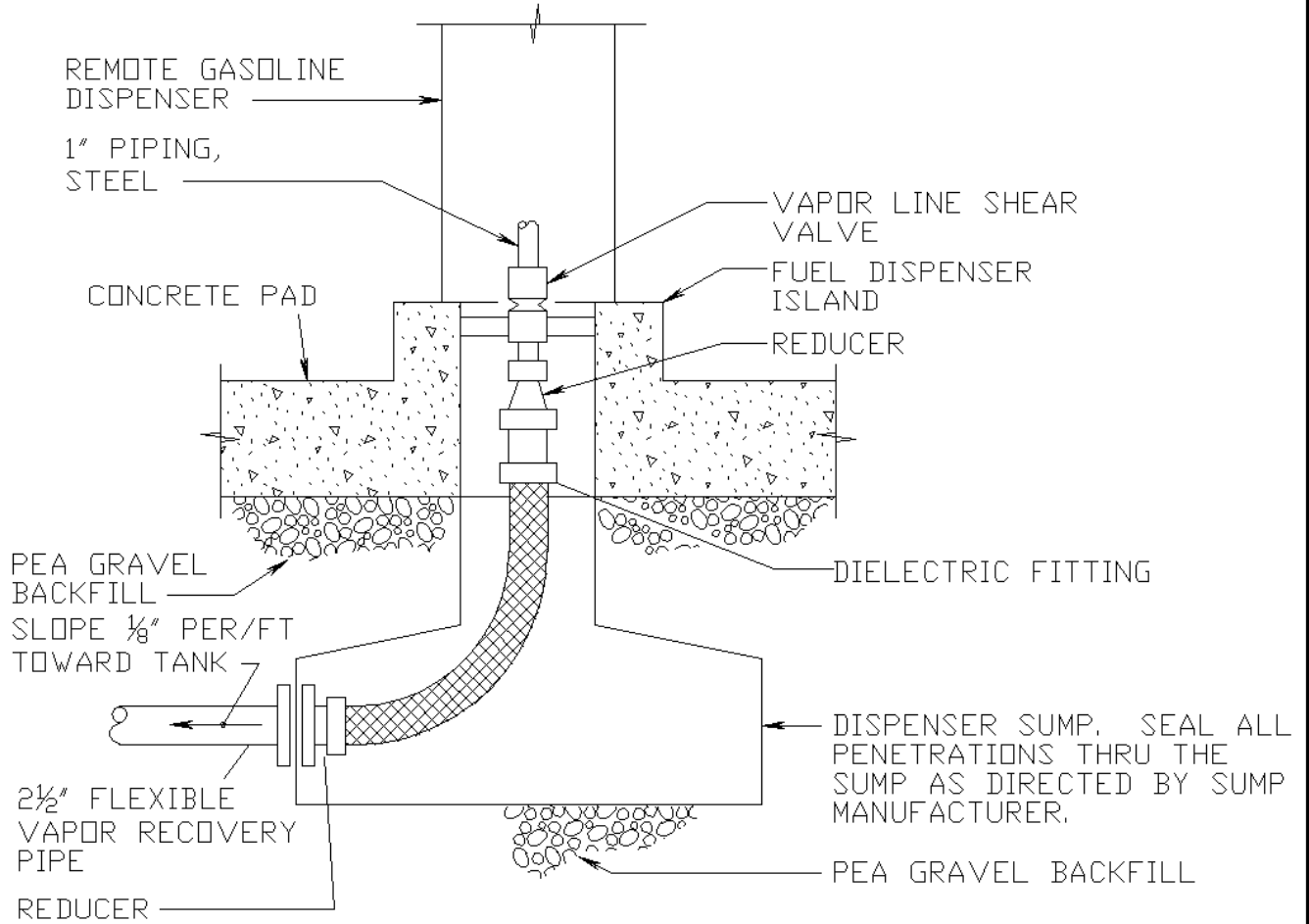
**VAPOR RECOVERY CONNECTION**  
**DETAIL**  
**NOT TO SCALE**

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 CHIEF ENGINEER  
 \_\_\_\_\_  
 DESIGN ENGINEER  
 DATE:

**LIQUID AND GAS STORAGE TANK  
 REFERENCE DRAWING**  
**VAPOR RECOVERY CONNECTION  
 DETAIL**

**B-M-4**



# VAPOR RECOVERY PIPING PHASE 2

## DETAIL

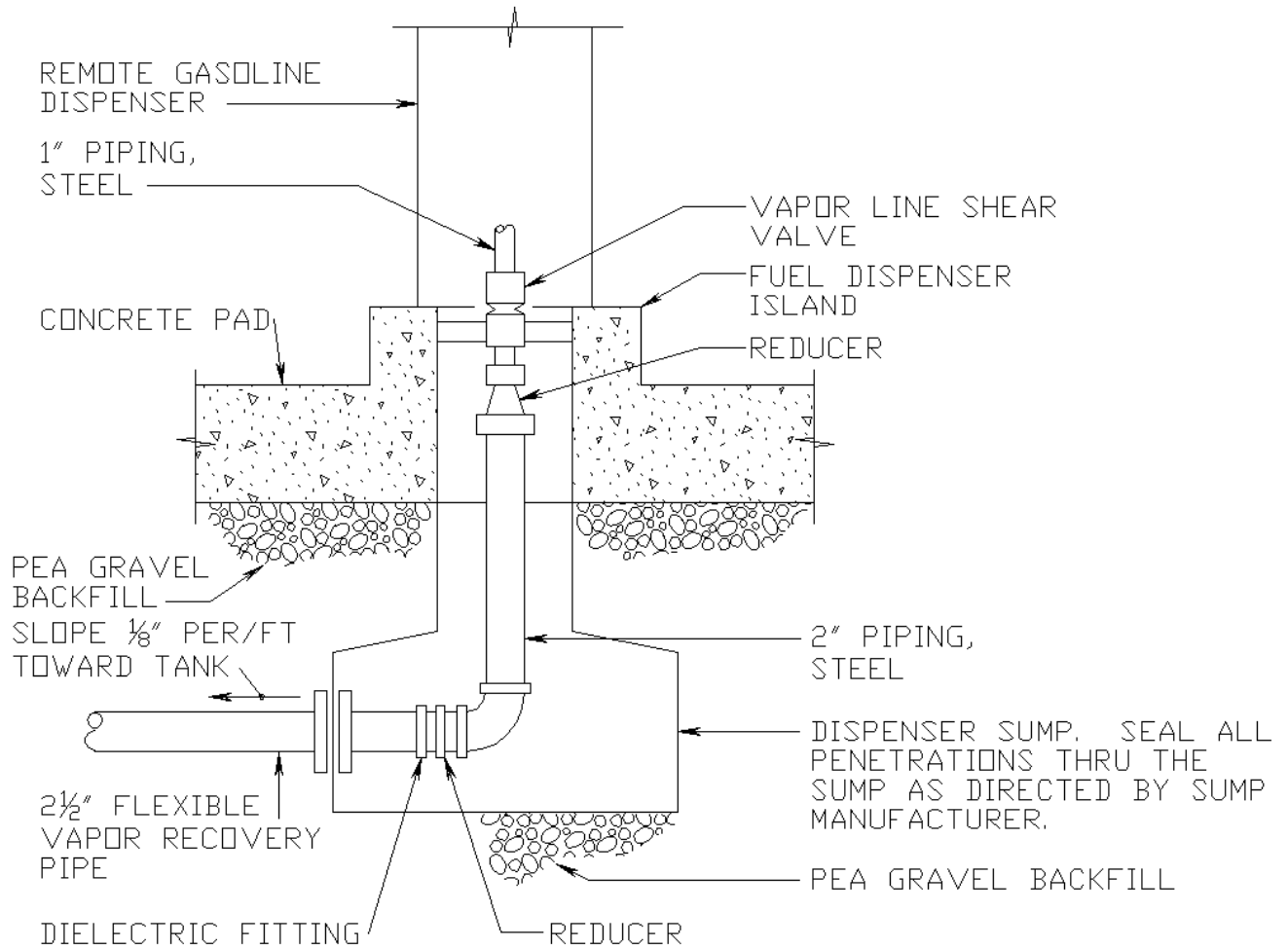
**NOT TO SCALE**

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\_\_\_\_\_  
CHIEF ENGINEER  
\_\_\_\_\_  
DESIGN ENGINEER  
DATE:

**LIQUID AND GAS STORAGE TANK  
REFERENCE DRAWING  
VAPOR RECOVERY PIPING  
PHASE 2 DETAIL**

**B-M-5**



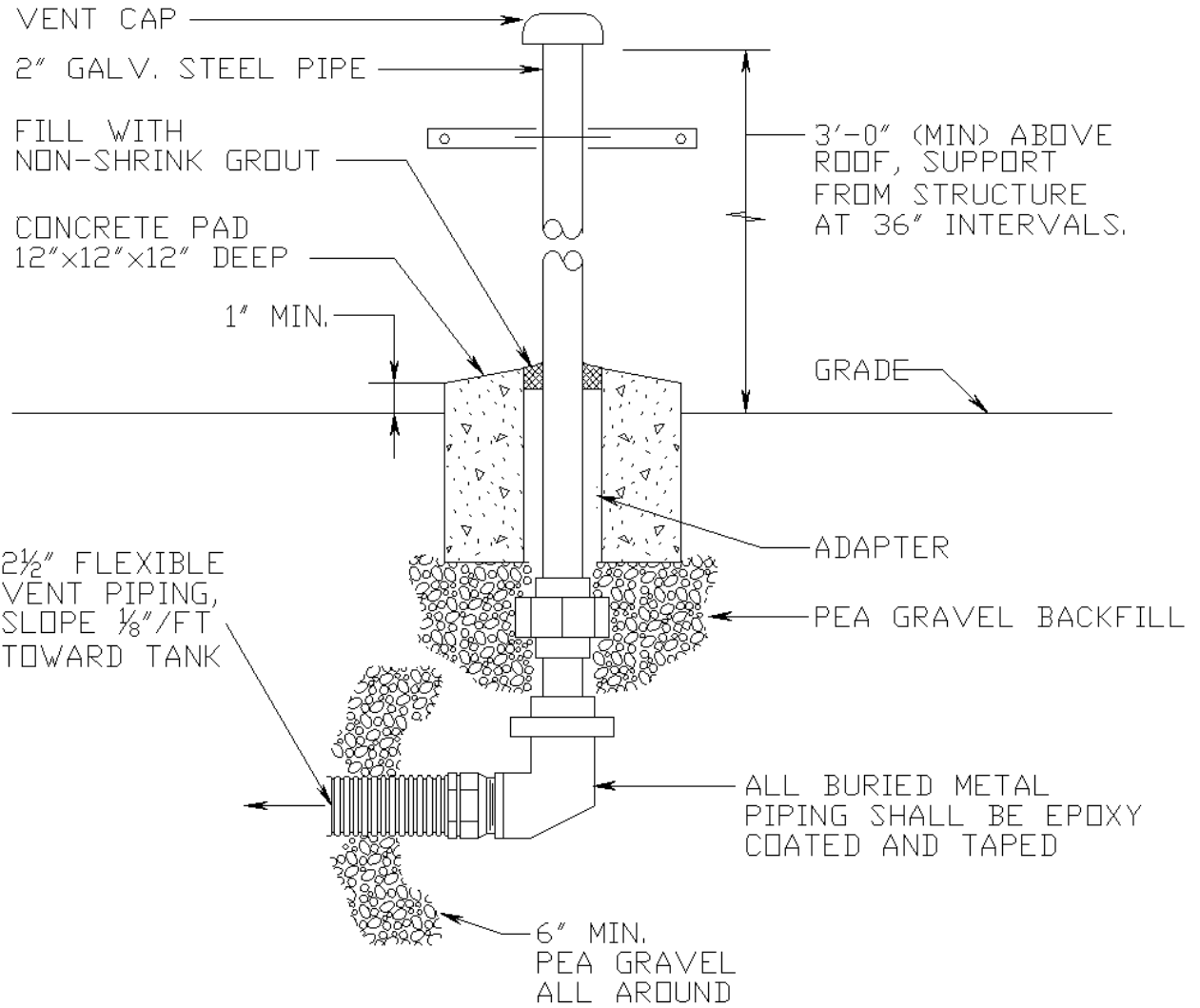
**VAPOR RECOVERY PIPING PHASE 2**  
**DETAIL**  
**NOT TO SCALE**

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APPROVED  
 \_\_\_\_\_  
 CHIEF ENGINEER  
 \_\_\_\_\_  
 DESIGN ENGINEER  
 DATE:

**LIQUID AND GAS STORAGE TANK  
 REFERENCE DRAWING**  
**VAPOR RECOVERY PIPING  
 PHASE 2 DETAIL**

**B-M-5A**



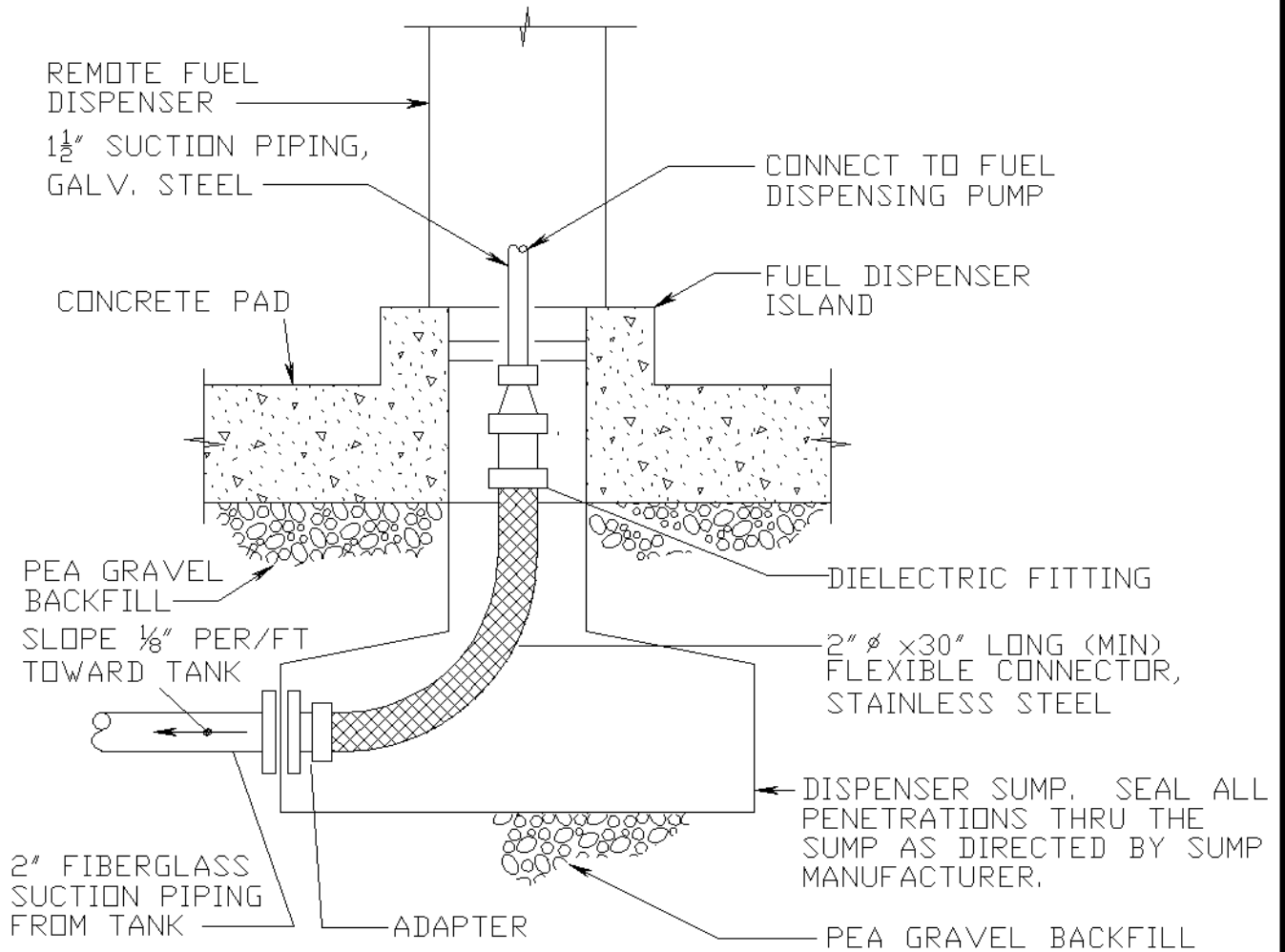
**VENT PIPING DETAIL**  
**NOT TO SCALE**

ANNE ARUNDEL  
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 \_\_\_\_\_  
 CHIEF ENGINEER  
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 DESIGN ENGINEER  
 DATE:

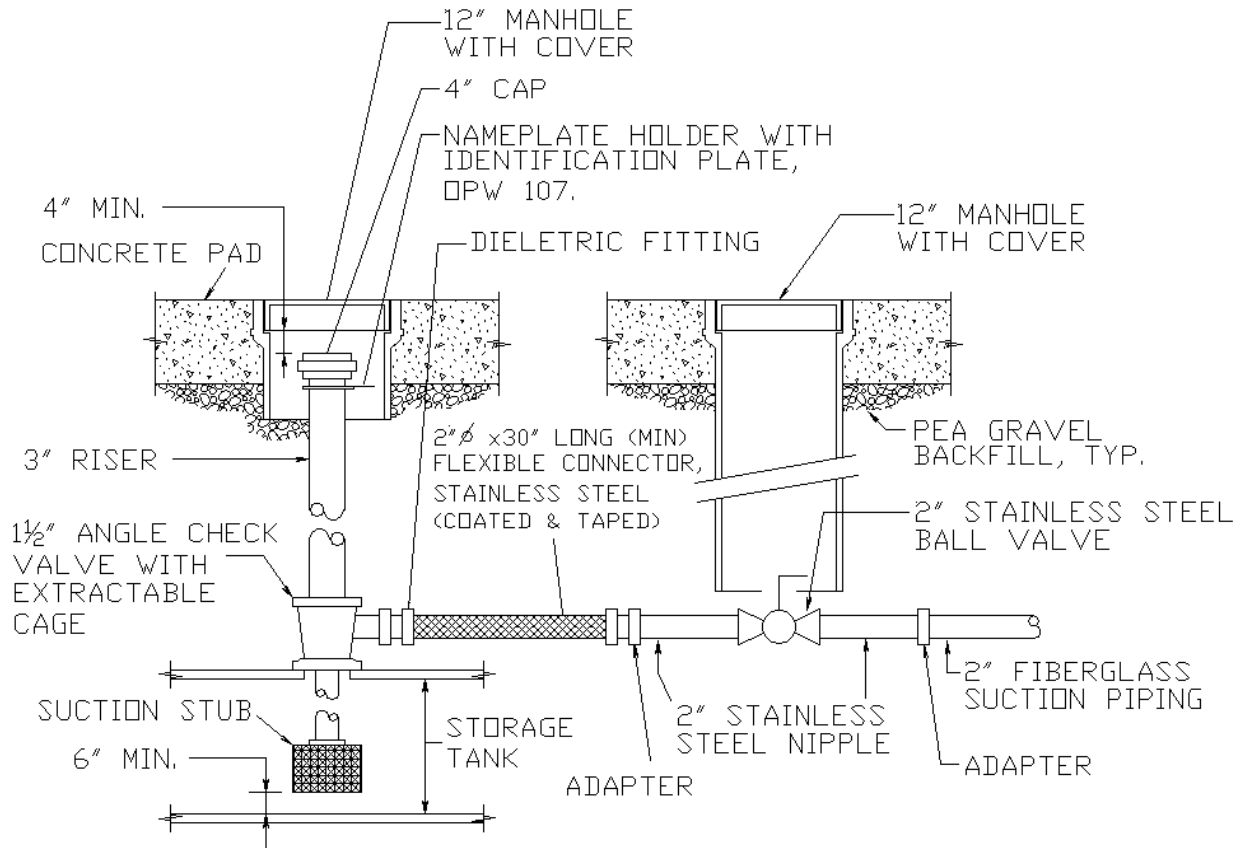
**LIQUID AND GAS STORAGE TANK  
 REFERENCE DRAWING  
 VENT PIPING DETAIL**

**B-M-7**



**SUCTION PIPING DETAIL**  
**NOT TO SCALE**

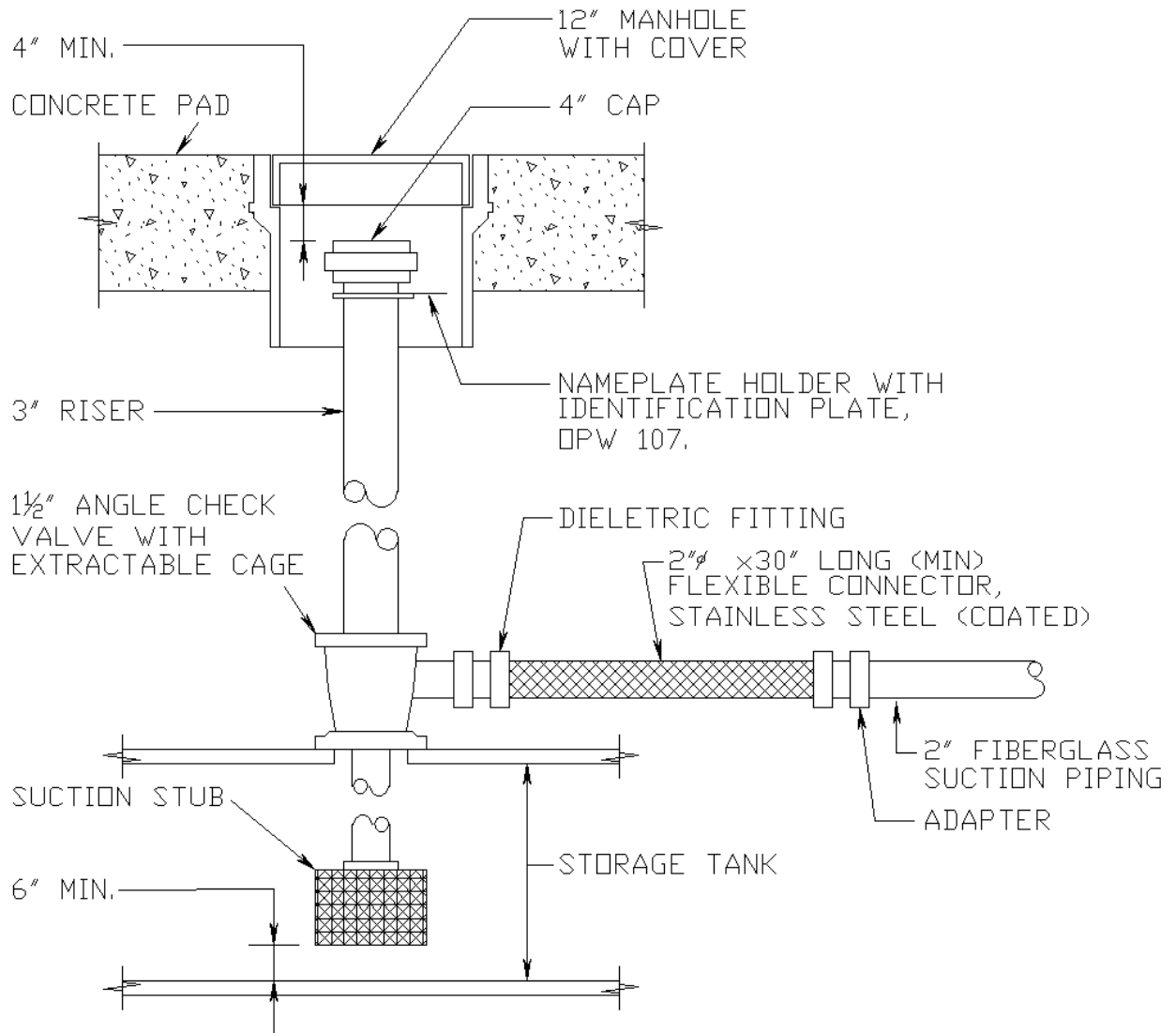
ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS	APPROVED <hr/> CHIEF ENGINEER <hr/> DESIGN ENGINEER DATE:	LIQUID AND GAS STORAGE TANK REFERENCE DRAWING <b>SUCTION PIPING DETAIL</b>	<b>B-M-8</b>
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**SUCTION PIPING CONNECTION AT TANK**  
**DETAIL (GASOLINE ONLY)**

**NOT TO SCALE**

ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS	APPROVED <hr/> CHIEF ENGINEER <hr/> DESIGN ENGINEER DATE:	LIQUID AND GAS STORAGE TANK REFERENCE DRAWING <b>SUCTION PIPING CONNECTION                  AT TANK DETAIL</b>	<b>B-M-9</b>
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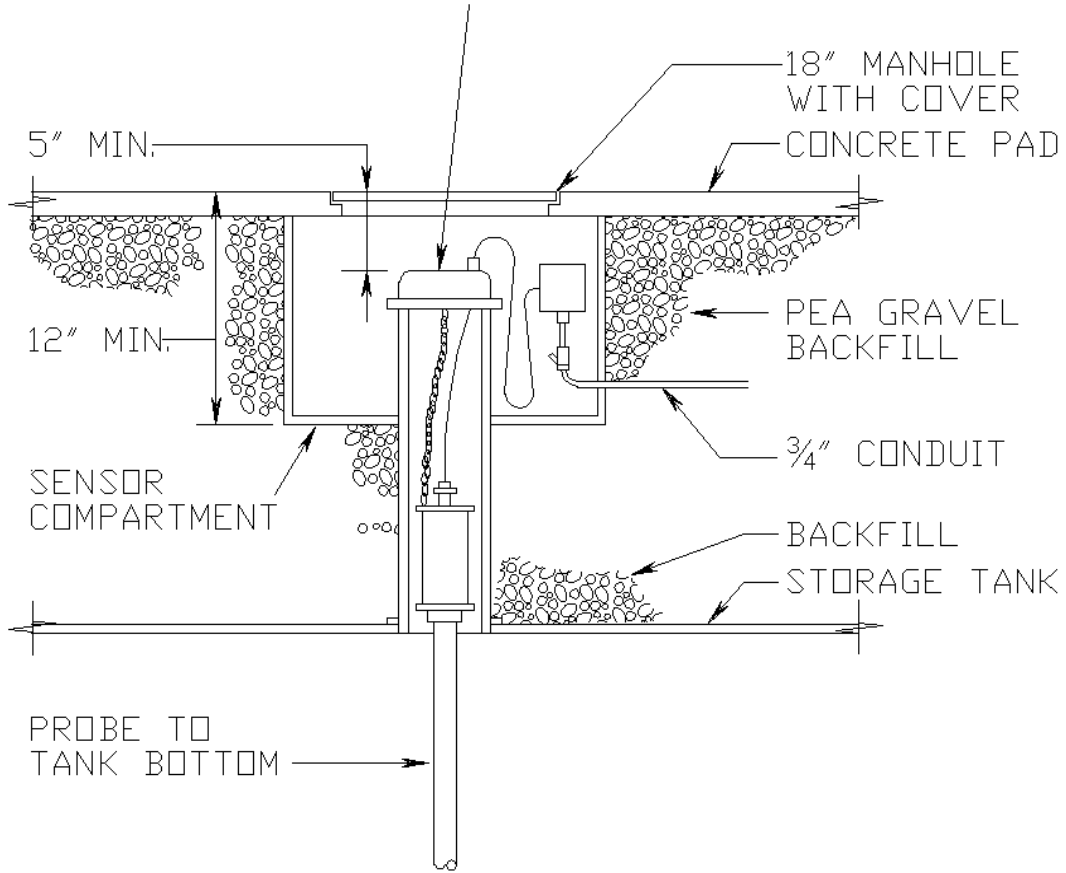
# SUCTION PIPING CONNECTION AT TANK DETAIL

**NOT TO SCALE**

ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS	APPROVED _____ CHIEF ENGINEER _____ DESIGN ENGINEER DATE: _____	LIQUID AND GAS STORAGE TANK REFERENCE DRAWING SUCTION PIPING CONNECTION AT TANK DETAIL	B-M-11
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TANK LEVEL SENSOR, VEEDER-ROOT MODEL NUMBER TO BE PROVIDED BY THE COUNTY, MANHOLE, RISER PIPE, SENSOR COMPARTMENT, AND CONDUIT SHALL BE INSTALLED IN ACCORDANCE WITH CONTRACT DOCUMENTS.



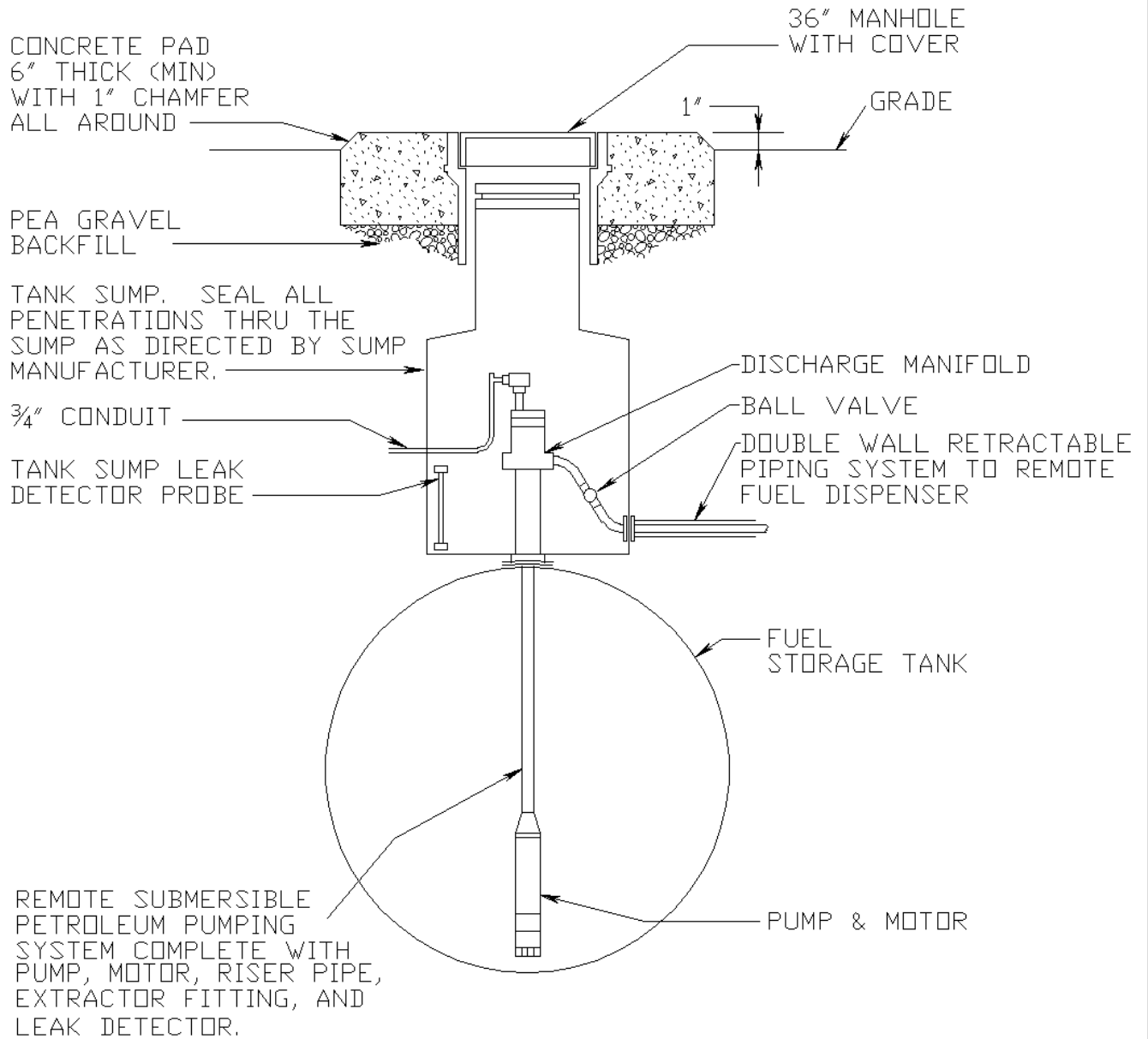
**ELECTRONIC LEAK DETECTOR WELL**  
**DETAIL**  
**NOT TO SCALE**

ANNE ARUNDEL  
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 DATE:

**LIQUID AND GAS STORAGE TANK  
 REFERENCE DRAWING  
 ELECTRONIC LEAK DETECTOR  
 WELL DETAIL**

**B-M-12**



## REMOTE SUBMERSIBLE PUMP DETAIL

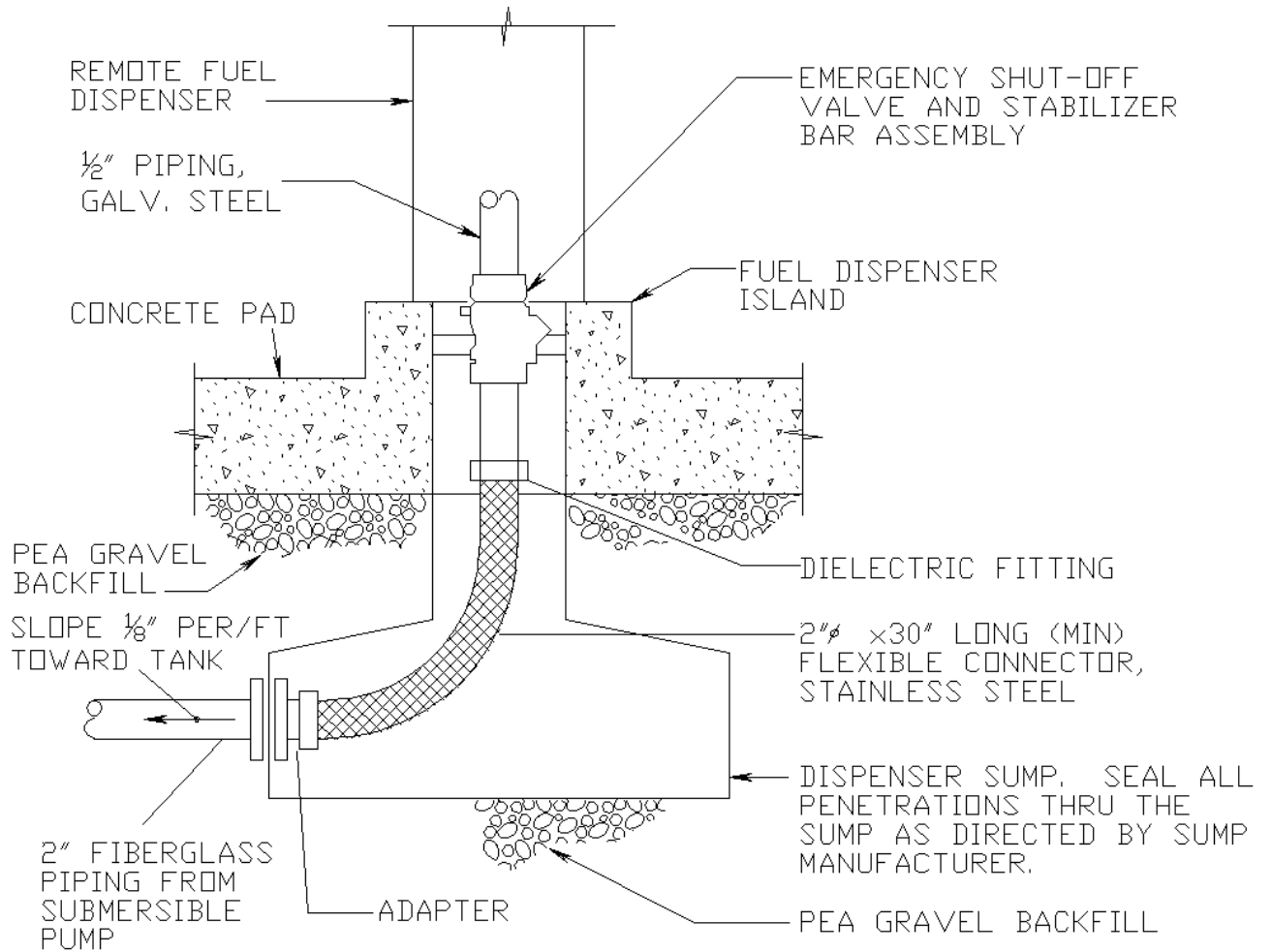
**NOT TO SCALE**

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DESIGN ENGINEER  
DATE:

**LIQUID AND GAS STORAGE TANK  
REFERENCE DRAWING  
REMOTE SUBMERSIBLE PUMP  
DETAIL**

**B-M-13**



# EMERGENCY SHUT-OFF VALVE DETAIL

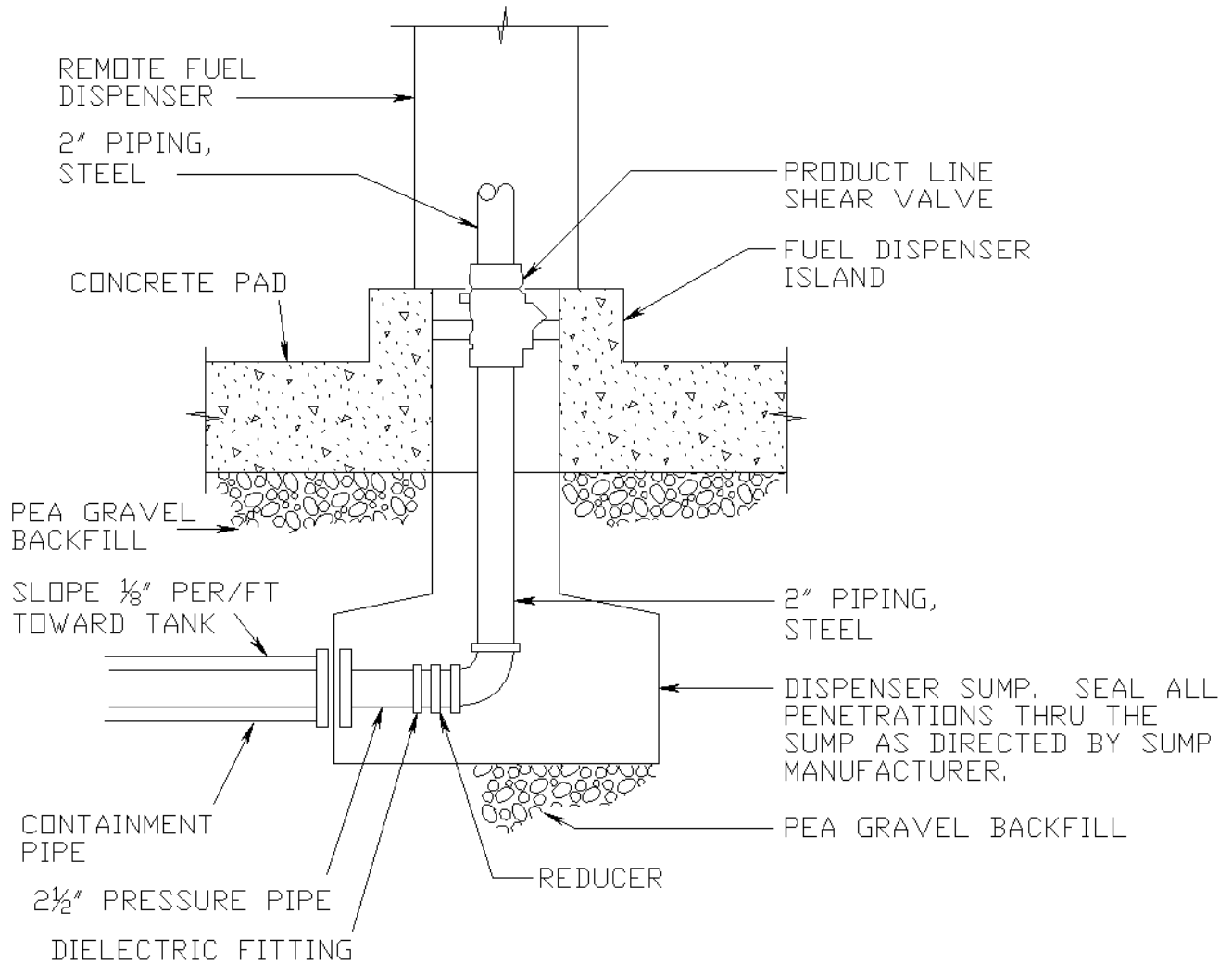
**NOT TO SCALE**

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**LIQUID AND GAS STORAGE TANK  
REFERENCE DRAWING  
EMERGENCY SHUT-OFF VALVE  
DETAIL**

**B-M-14**



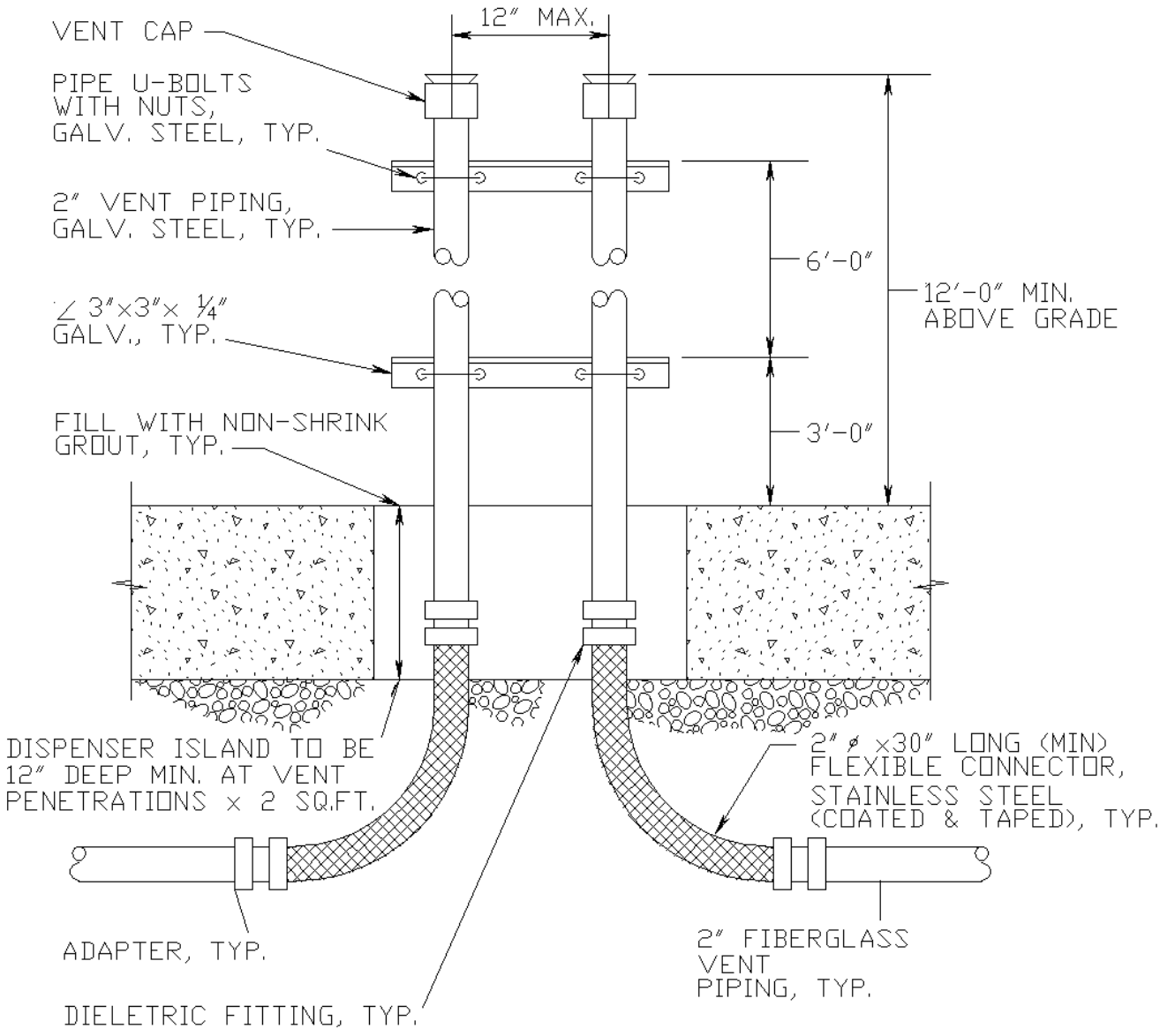
**EMERGENCY SHUT-OFF VALVE**  
**DETAIL**  
**NOT TO SCALE**

ANNE ARUNDEL  
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**LIQUID AND GAS STORAGE TANK  
 REFERENCE DRAWING  
 EMERGENCY SHUT-OFF VALVE  
 DETAIL**

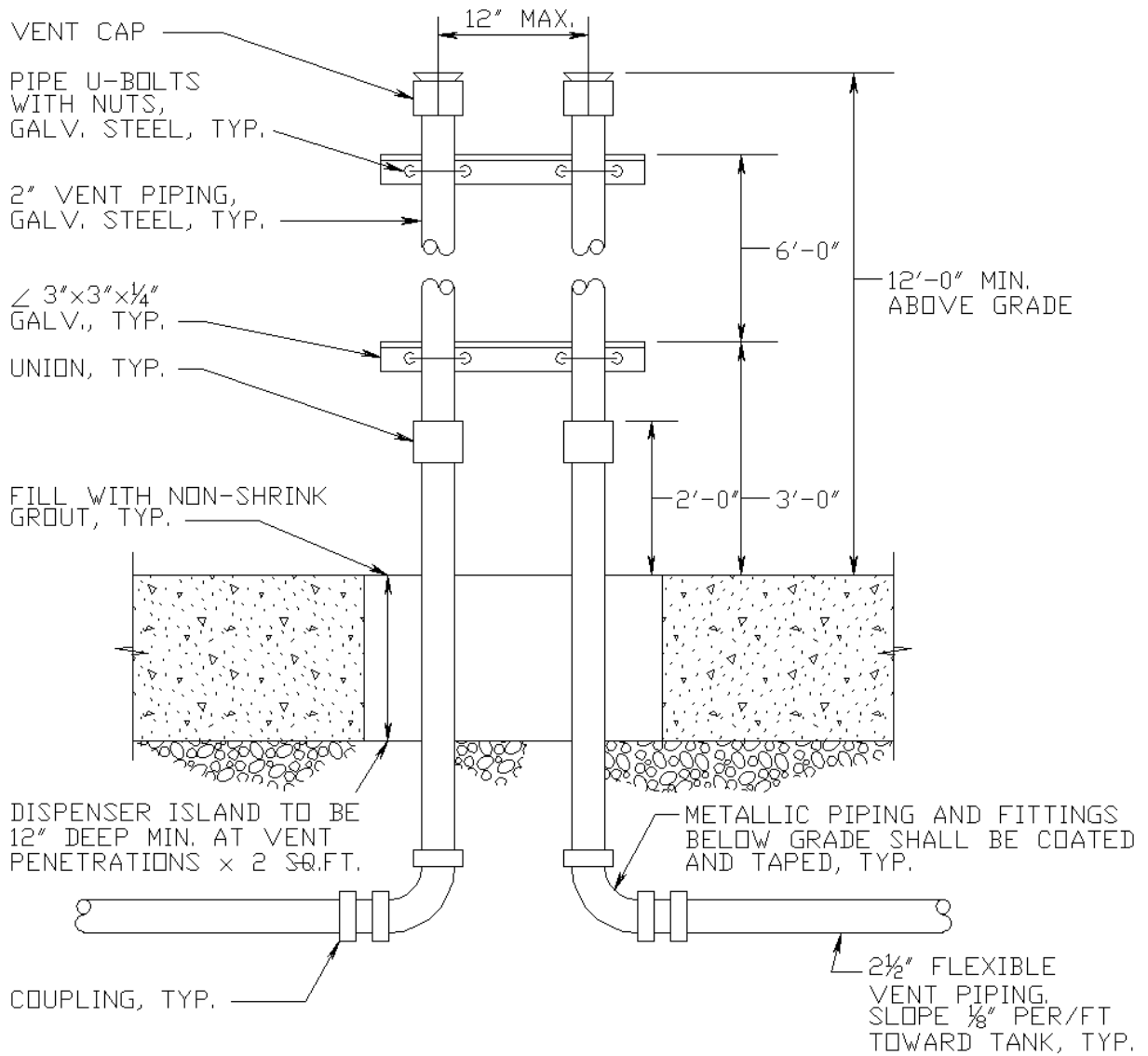
**B-M-14A**



# ISLAND DUAL VENT PENETRATION DETAIL

**NOT TO SCALE**

ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS	APPROVED <hr/> CHIEF ENGINEER <hr/> DESIGN ENGINEER DATE:	<b>LIQUID AND GAS STORAGE TANK                  REFERENCE DRAWING                  ISLAND DUAL VENT                  PENETRATION</b>	<b>B-M-15</b>
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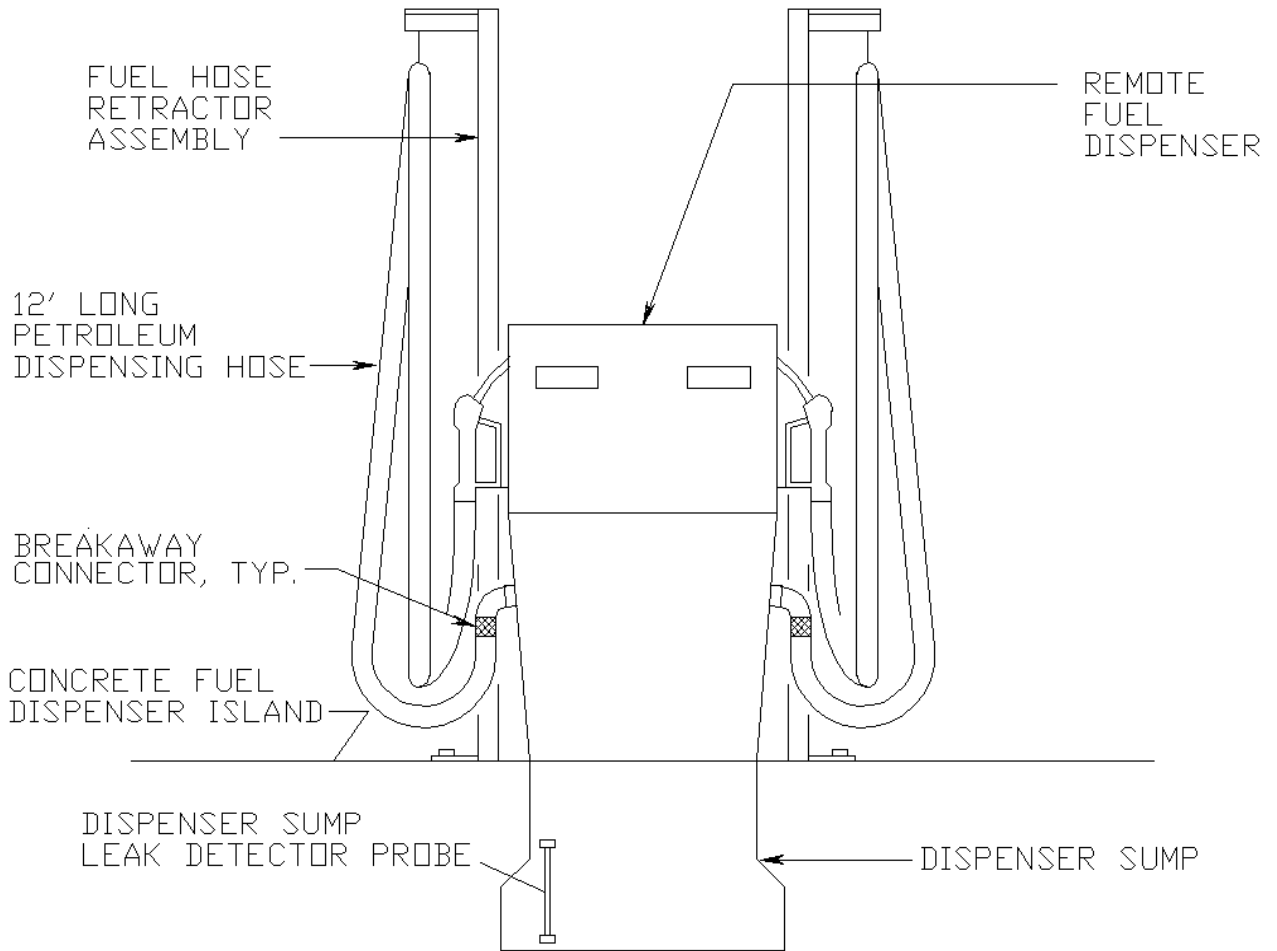
**ISLAND DUAL VENT PENETRATION  
DETAIL  
NOT TO SCALE**

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DESIGN ENGINEER  
DATE:

**LIQUID AND GAS STORAGE TANK  
REFERENCE DRAWING  
ISLAND DUAL VENT  
PENETRATION**

**B-M-15A**



NOTES:

DIESEL FUEL DISPENSER SHOWN. GASOLINE DISPENSER SHALL HAVE ALL NECESSARY EQUIPMENT FOR STAGE II VAPOR RECOVERY OPERATION.

**REMOTE FUEL DISPENSER WITH HOSE RETRACTOR ASSEMBLY**  
**DETAIL**

**NOT TO SCALE**

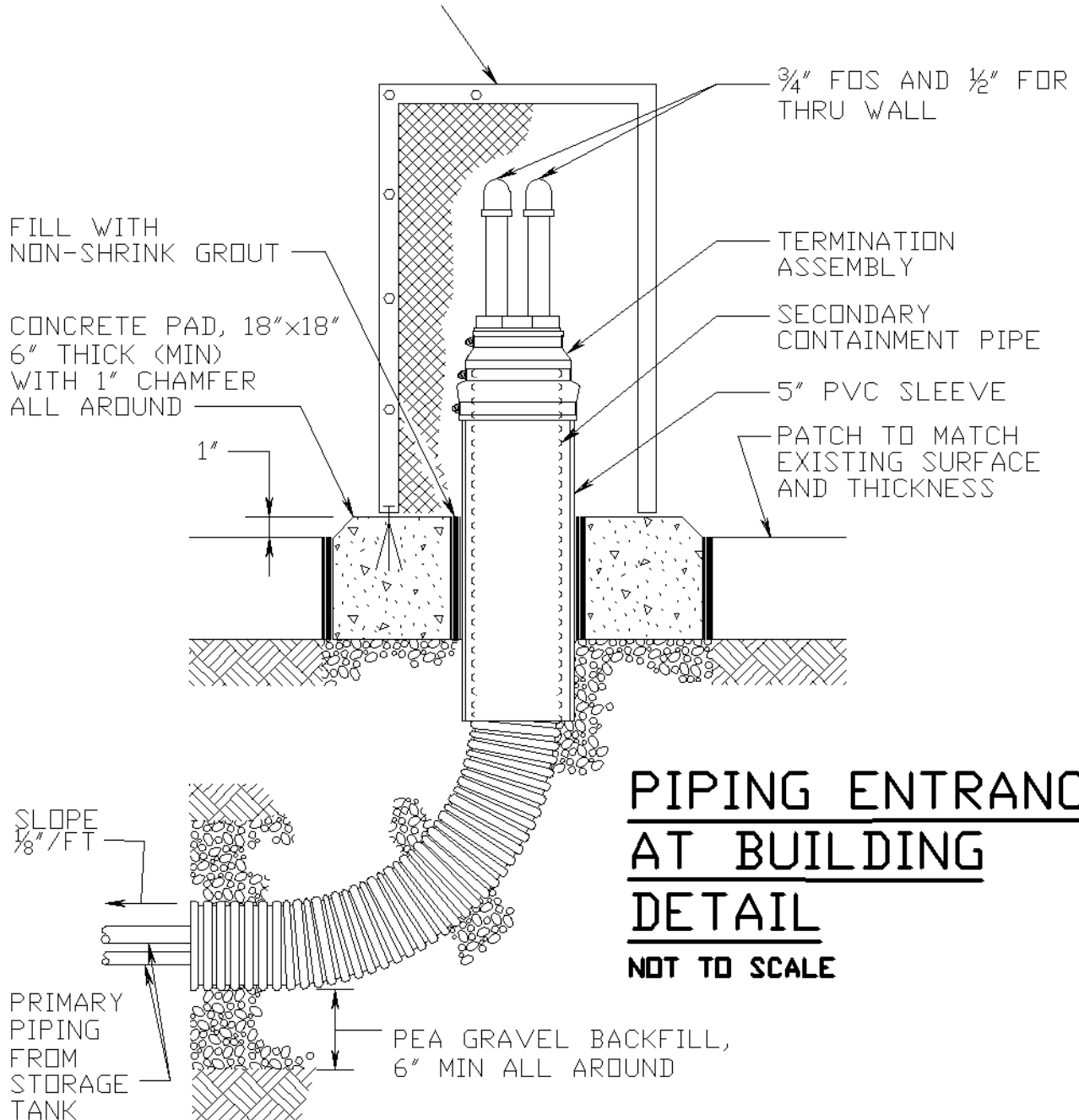
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DESIGN ENGINEER  
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**LIQUID AND GAS STORAGE TANK  
REFERENCE DRAWING**  
**REMOTE FUEL DISPENSER  
ASSEMBLY DETAIL**

**B-M-16**

PROVIDE EXPANDED METAL ENCLOSURE AROUND PIPING ASSEMBLY. ANCHOR SECURELY TO BUILDING AND CONCRETE PAD WITH  $\frac{1}{4}$ " $\times$  $2\frac{1}{2}$ " EXPANSION BOLTS.



**PIPING ENTRANCE  
AT BUILDING  
DETAIL  
NOT TO SCALE**

<p>ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS</p>	<p>APPROVED _____ CHIEF ENGINEER _____ DESIGN ENGINEER DATE:</p>	<p><b>LIQUID AND GAS STORAGE TANK REFERENCE DRAWING PIPING ENTRANCE AT BUILDING DETAIL</b></p>	<p><b>B-M-17</b></p>
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$\frac{3}{4}$ " BALL VALVE WITH  
COMPRESSED AIR QUICK  
CONNECT FITTING

$\frac{3}{4}$ " NON-FREEZE POST  
HYDRANT, J.R. SMITH  
FIG. No. 5910 WITH  
VACUUM BREAKER

2'-0"

FILL WITH NON-SHRINK  
GROUT, TYP.

CONCRETE PAD

FUEL DISPENSER  
ISLAND

PEA GRAVEL  
BACKFILL

3'-0"

$\frac{3}{4}$ " WATER

$\frac{3}{4}$ " COMPRESSED AIR

NOTE:

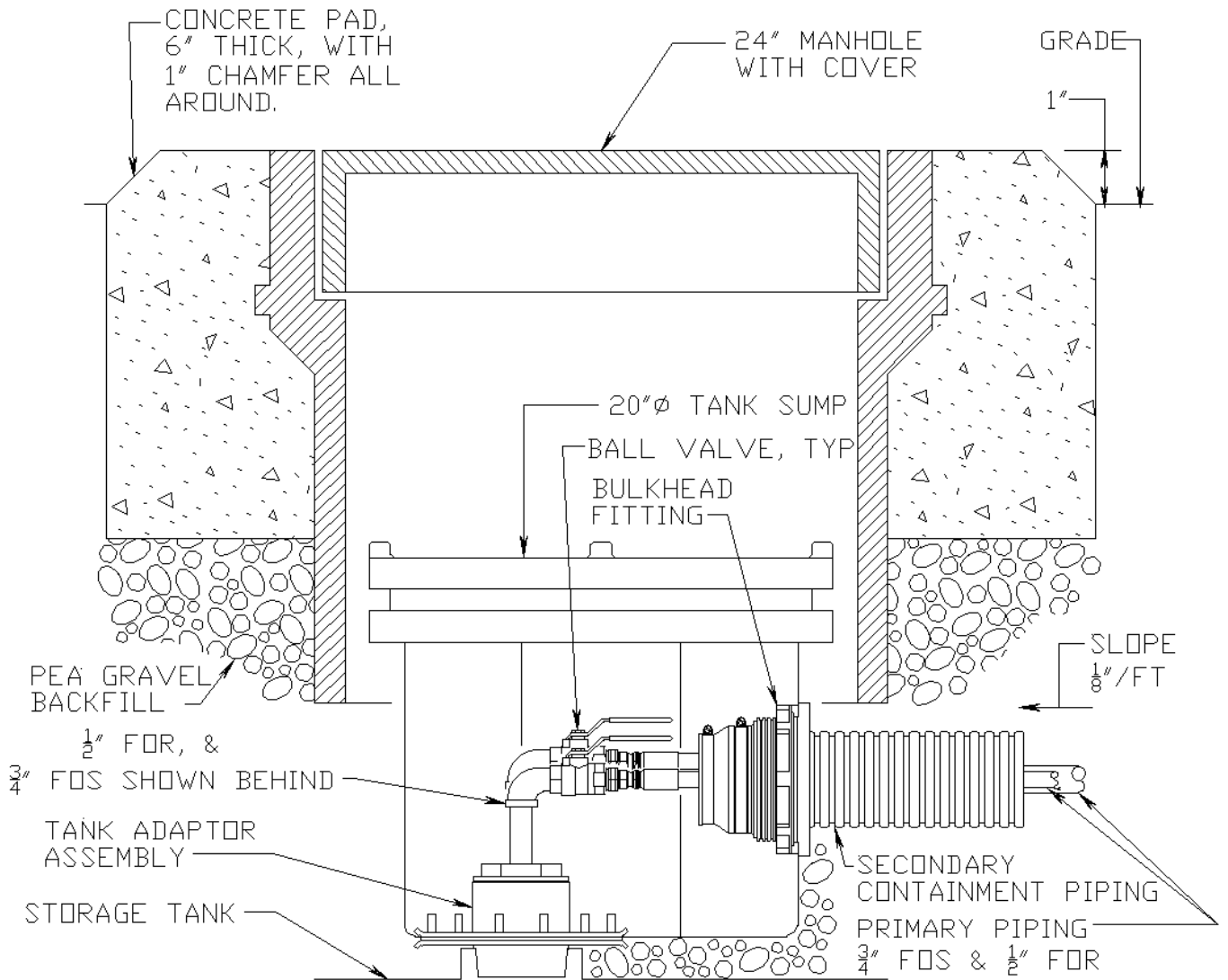
$\frac{3}{4}$ " COPPER PIPE, TYPE M  
WITH FITTINGS.

## AIR & WATER AT FUEL DISPENSER ISLAND

### DETAIL

NOT TO SCALE

ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS	APPROVED _____ CHIEF ENGINEER _____ DESIGN ENGINEER DATE:	LIQUID AND GAS STORAGE TANK REFERENCE DRAWING AIR & WATER AT FUEL DISPENSER ISLAND	B-M-18
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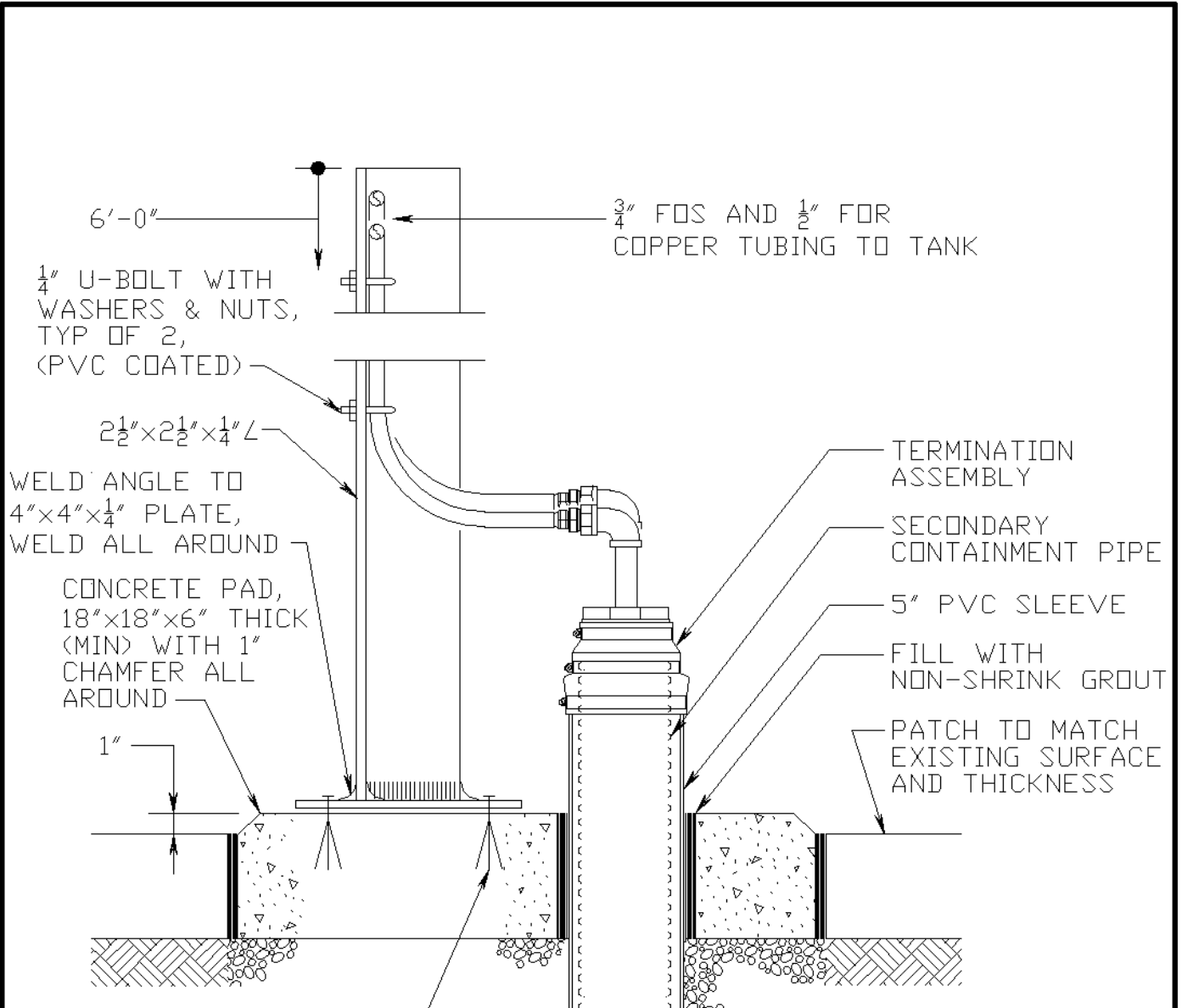


## FOS & FOR PIPING AT U/G TANK

### DETAIL

**NOT TO SCALE**

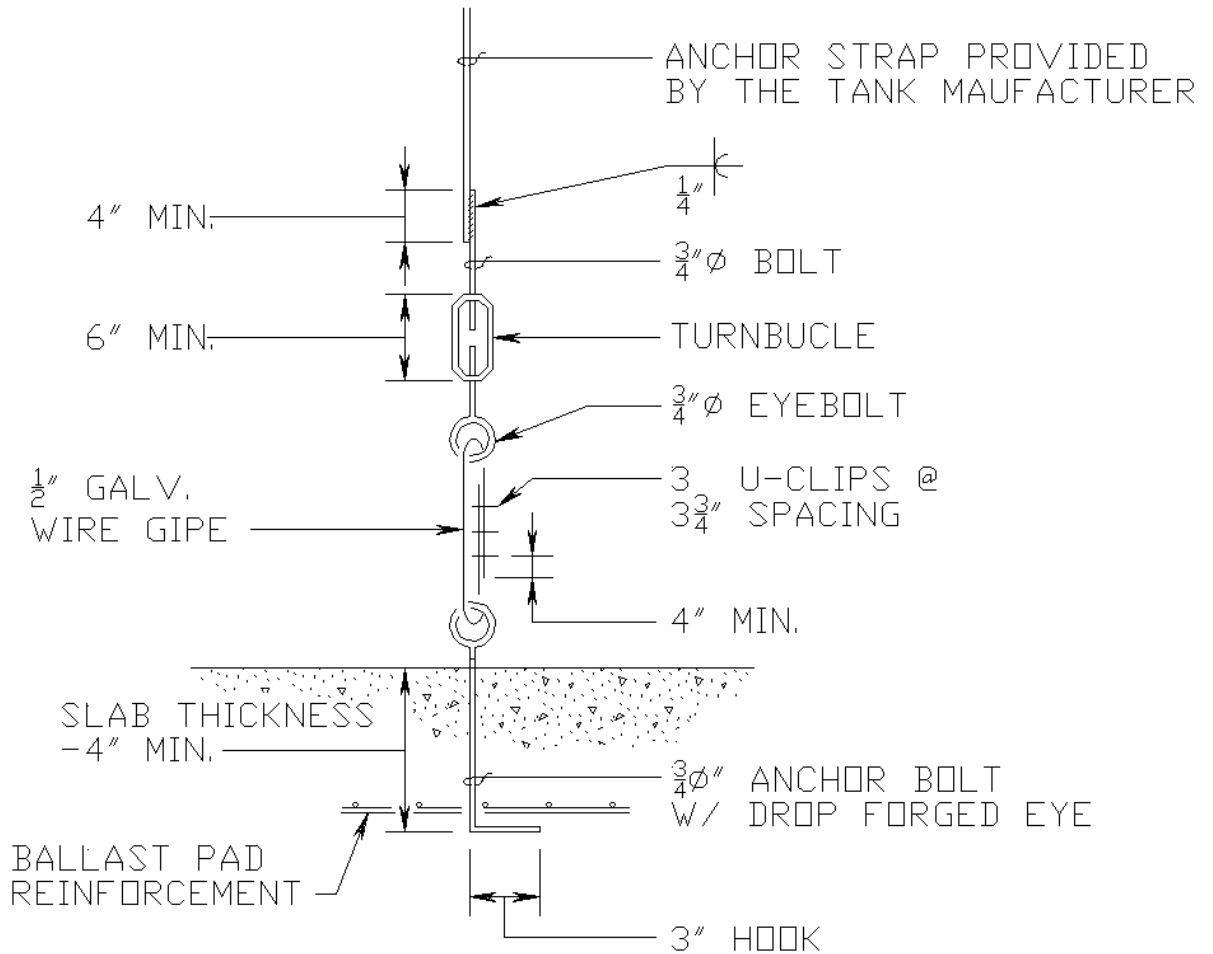
ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS	APPROVED _____ CHIEF ENGINEER _____ DESIGN ENGINEER DATE: _____	<b>LIQUID AND GAS STORAGE TANK          REFERENCE DRAWING</b> <b>FOS &amp; FOR PIPING AT U/G          TANK</b>	<b>B-M-19</b>
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ANCHOR TO CONCRETE PAD WITH 4 - 1/4" Ø x 3" EXPANSION BOLTS

**PIPING TO UNDERGROUND**  
**DETAIL**  
**NOT TO SCALE**

ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS	APPROVED _____ CHIEF ENGINEER _____ DESIGN ENGINEER DATE: _____	LIQUID AND GAS STORAGE TANK REFERENCE DRAWING <b>PIPING TO UNDERGROUND                  DETAIL</b>	<b>B-M-20</b>
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**TYPICAL STRAP ANCHOR DETAIL**

**NOT TO SCALE**

ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS	APPROVED _____ CHIEF ENGINEER _____ DESIGN ENGINEER DATE: _____	LIQUID AND GAS STORAGE TANK REFERENCE DRAWING <b>TYPICAL STRAP ANCHOR                  DETAIL</b>	<b>B-M-21</b>
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12" ROUND MONITOR  
MANHOLE ASSEMBLY

CONCRETE PAD, 2'-4"x2'-4"x6" THICK,  
PAD SHALL BE FLUSH WITH AND AT THE  
SAME HEIGHT AS ADJACENT CONCRETE PAD.

CONCRETE PAD

4" LOCKABLE CAP 4" MIN

PEA GRAVEL  
BACKFILL

BENTONITE SEAL BETWEEN  
MANHOLE SKIRT AND  
MONITOR PIPE

4" MONITOR PIPE,  
SCHEDULE 40 PVC-SLOTTED,  
WRAPPED IN FILTER FABRIC.

TERMINATE MONITOR PIPE  
2'-0" (MIN) BELOW BOTTOM  
OF TANK

## MONITORING PIPE DETAIL

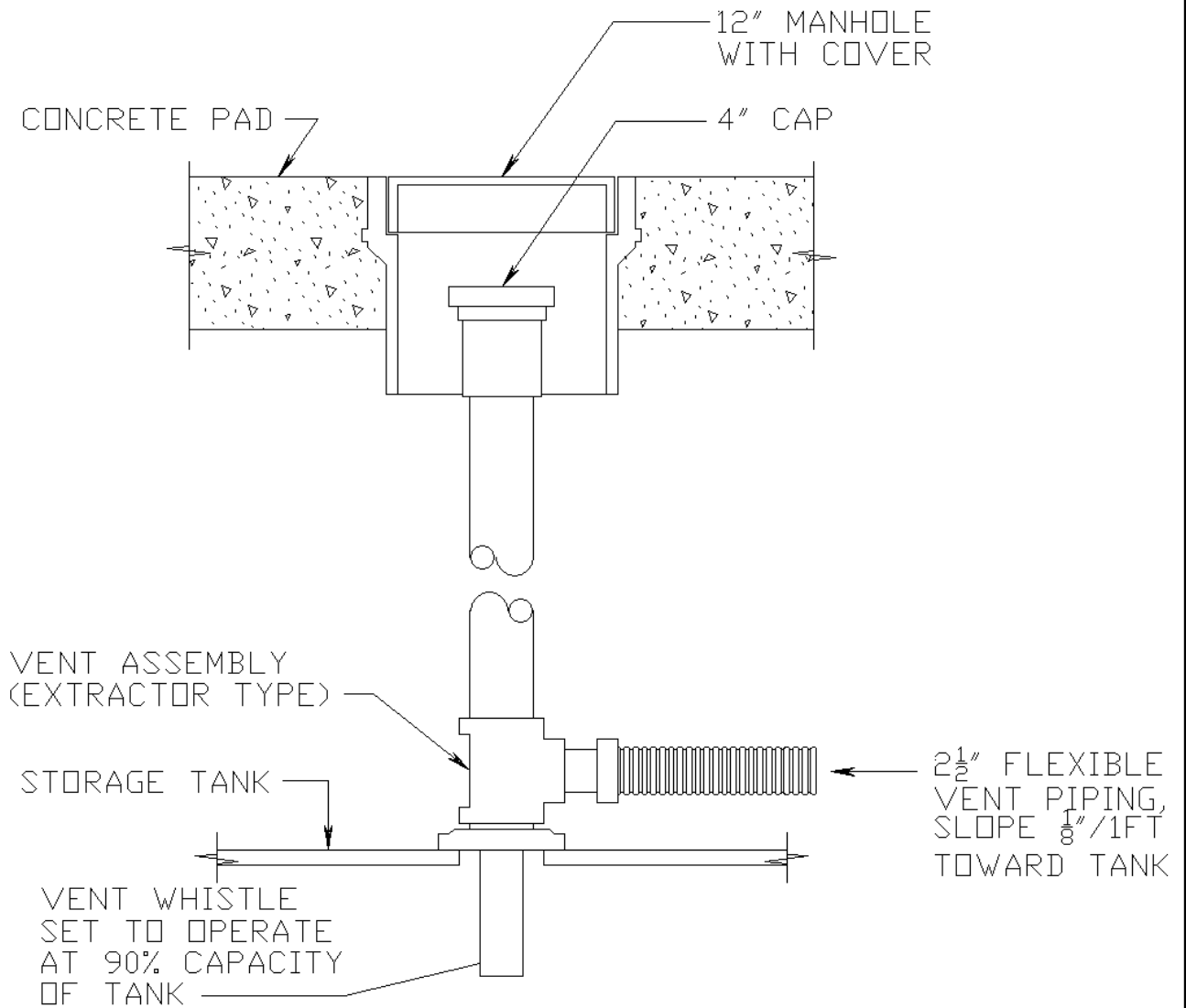
**NOT TO SCALE**

ANNE ARUNDEL  
COUNTY  
DEPARTMENT OF  
PUBLIC WORKS

APPROVED  
\_\_\_\_\_  
CHIEF ENGINEER  
\_\_\_\_\_  
DESIGN ENGINEER  
DATE:

**LIQUID AND GAS STORAGE TANK  
REFERENCE DRAWING  
MONITORING PIPE**

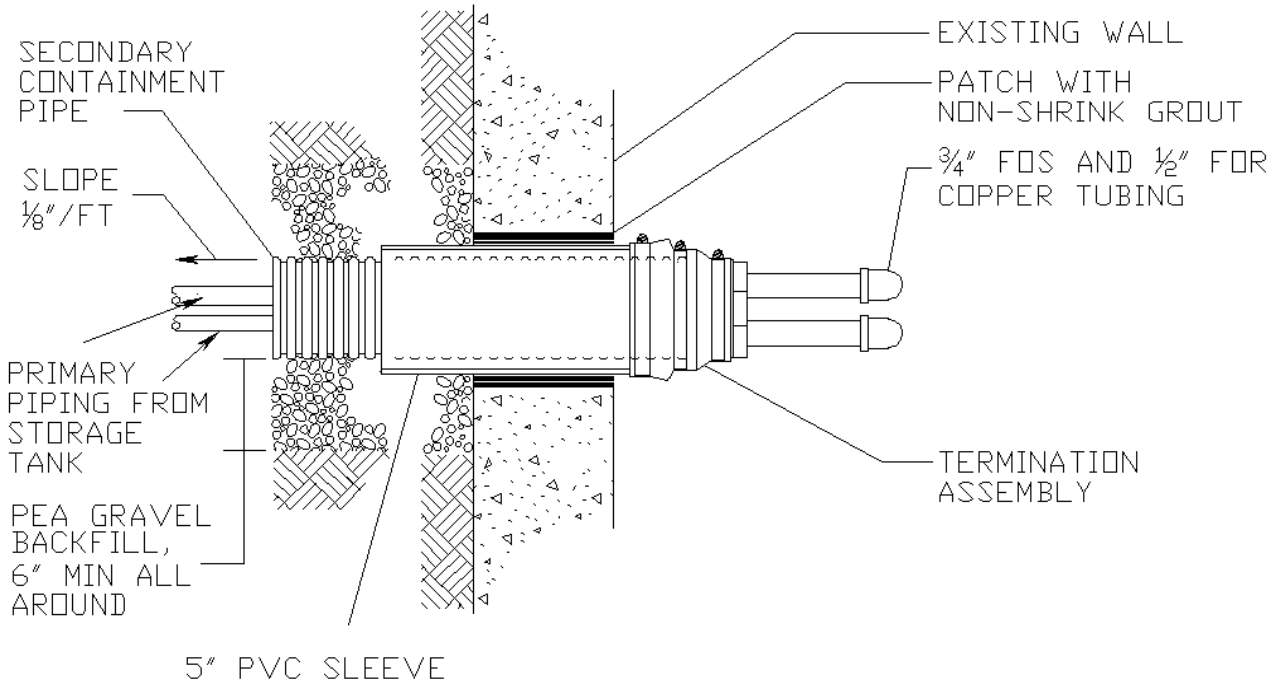
**B-M-22**



**VENT CONNECTION WITH WHISTLE**  
**DETAIL**

**NOT TO SCALE**

ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS	APPROVED _____ CHIEF ENGINEER _____ DESIGN ENGINEER DATE: _____	LIQUID AND GAS STORAGE TANK REFERENCE DRAWING <b>VENT CONNECT WITH WHISTLE</b>	<b>B-M-23</b>
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**PIPING TERMINATION ASSEMBLY**  
**DETAIL**  
**NOT TO SCALE**

ANNE ARUNDEL COUNTY DEPARTMENT OF PUBLIC WORKS	APPROVED _____ CHIEF ENGINEER _____ DESIGN ENGINEER DATE:	LIQUID AND GAS STORAGE TANK REFERENCE DRAWING PIPING TERMINATION ASSEMBLY DETAIL	B-M-24
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