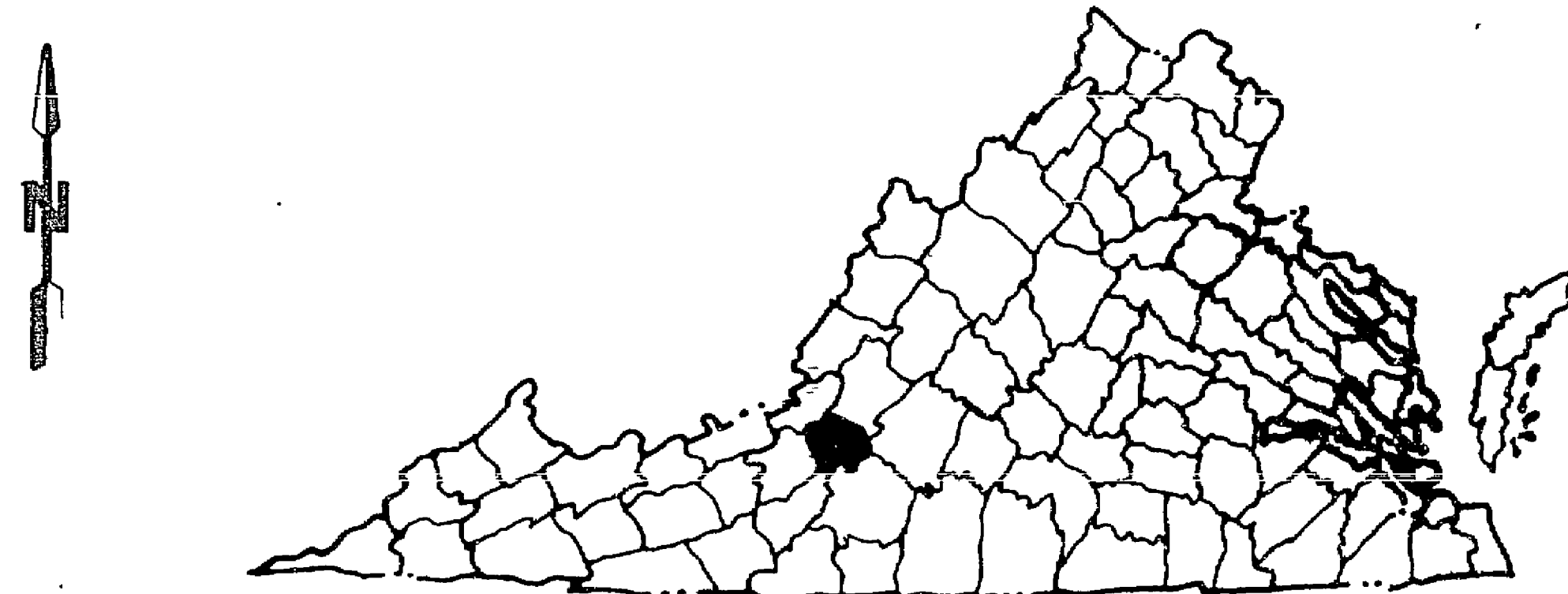


ROANOKE REGIONAL LANDFILL FINAL CAPPING CLOSURE

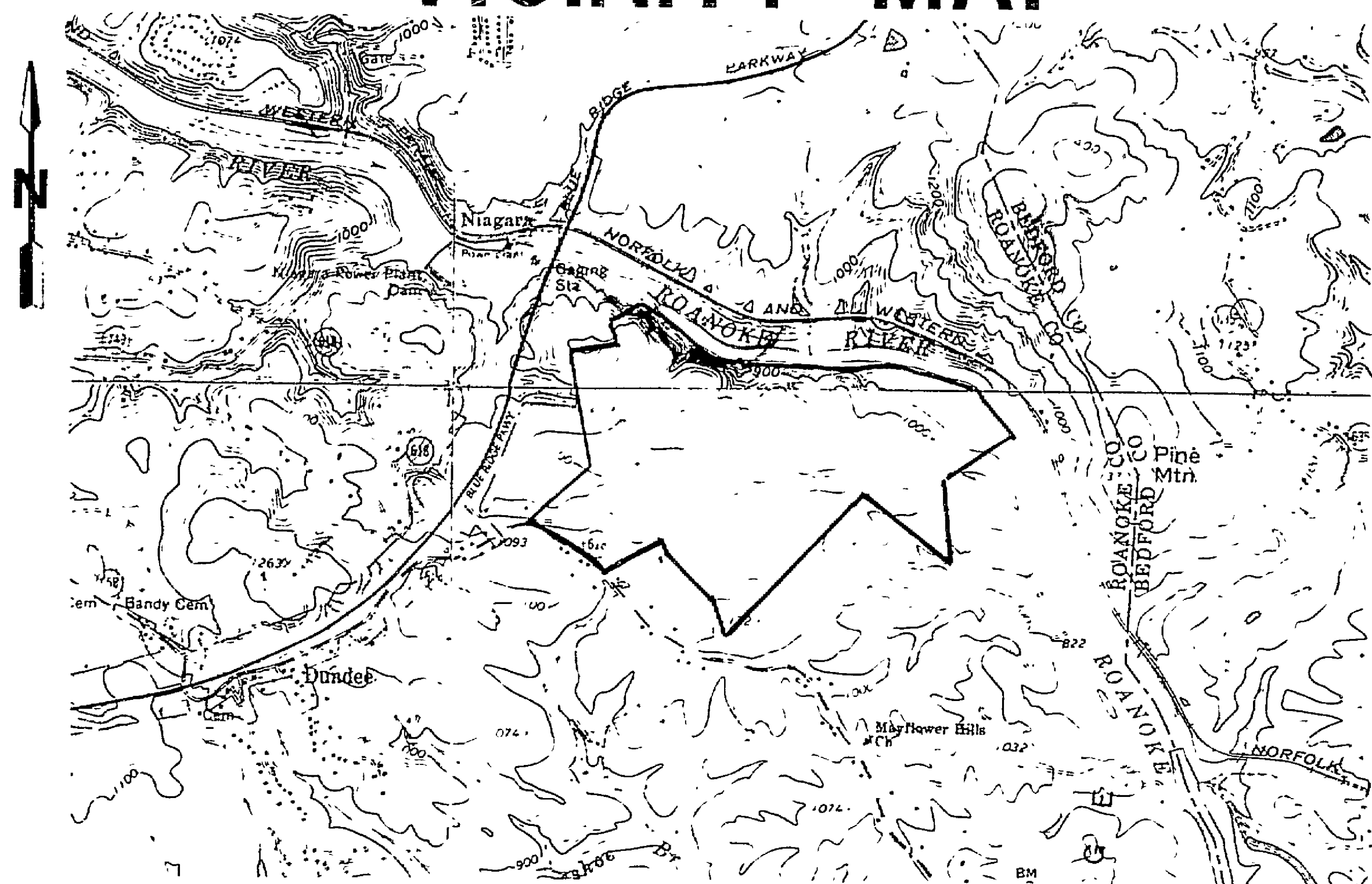
PERMIT No.: 165

APPROVED
LAND DISTURBANCE PERMIT
EROSION-SEDIMENT CONTROL
ROANOKE COUNTY
SRB 31 May 94
DATE

LOCATION MAP



VICINITY MAP



Scale: 1" = 2000'

Map taken from the Stewartville and Hardy
U.S.G.S. Quadrangles, each photorevised 1984.

SHEET INDEX

Sheet No.	Title
1	Title Sheet
2	Existing Site Conditions and Monitoring Locations
3	Landfill Cap Grading Plan, Areas B and C
4	Erosion Control for Areas B and C
5	Landfill Cap Grading Plan, Areas F and G
6	Erosion Control for Areas F and G
7	Landfill Cap Grading Plan, Portion of Area C
8	Borrow Area Grading Plan, Area 1
9	Borrow Area Grading Plan, Area 2 and 5
10	Borrow Area Grading Plan, Area 4
11	Borrow Area Grading Plan, Area 3
12	Soil Stockpile Grading Plan
13-16	Details

NOTES

1. Aerial survey flown and mapped by J.H. Bell, P.C. Date of photography in 10/1/93.
2. Erosion and sediment control measures will be implemented in accordance with the Virginia Erosion and Sediment Control Handbook, latest edition.
3. Landfill cap was designed in accordance Virginia DEQ Regulations for sanitary landfills, current regulations.
4. Following the first notice to proceed, the contractor shall place and install temporary erosion and sediment controls. (i.e. construction entrance, sediment traps, silt fence, etc.). No additional work may commence until the controls are installed.
5. During project implementation temporary seeding shall be placed as specified in the construction specifications.
6. Contractor shall coordinate construction with existing traffic patterns.
7. Contractor shall be responsible for repairing any damage to existing facilities (fences, utilities, structures, etc.) to a condition equal to or better than that found.
8. Boundary taken from plat showing property conveyed to Roanoke County and the City of Roanoke. Plat prepared by David Dick and Associates, dated June 26, 1973, job number 9793. Locations of improvements, aerial topo, and design features are tied to original boundary survey. The accuracy of the survey has not been confirmed by Draper Aden Associates.
9. Pre- and Post-1988 fill areas were established in the field by landfill staff during walkovers on November 3 and 15, 1993.
10. Rutrough Road and all adjoining property shall be kept free of sediment at all times.
11. Project shall be bid in consideration of both on-site soils and off-site soils. Off-site soils would come from Rockydale Quarry or other approved site. Rockydale will excavate and load the soil at no cost to Contractor or Owner.



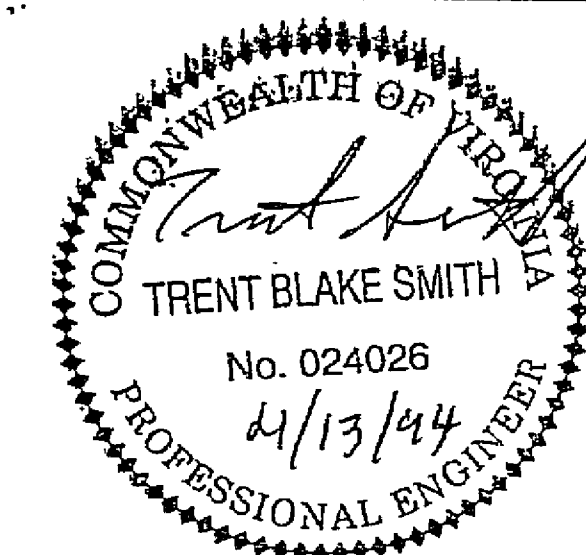
Draper Aden Associates
CONSULTING ENGINEERS

4136 Innslake Dr. 2206 South Main Street 2214 Metro Center Blvd.
Richmond, Virginia 23060 Blacksburg, Virginia 24060 Suite 106
(804)-270-7675 (703)-552-0444 Nashville, Tennessee
(615)-259-3996

ROANOKE VALLEY
RESOURCE AUTHORITY

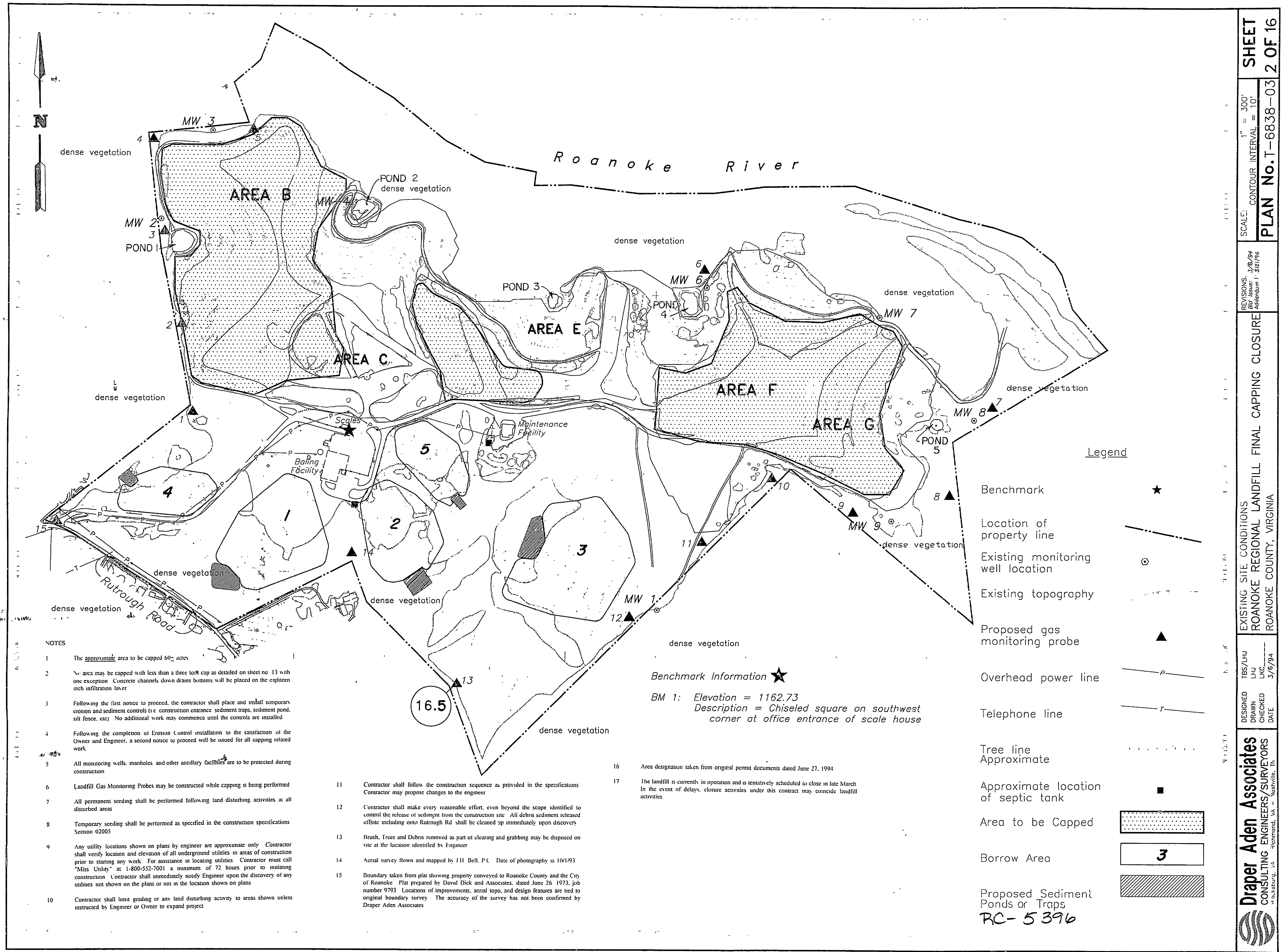
MR. JOHN HUBBARD
CHIEF EXECUTIVE OFFICER
1020 HOLLINS ROAD
ROANOKE, VIRGINIA 24012
(703)857-5050

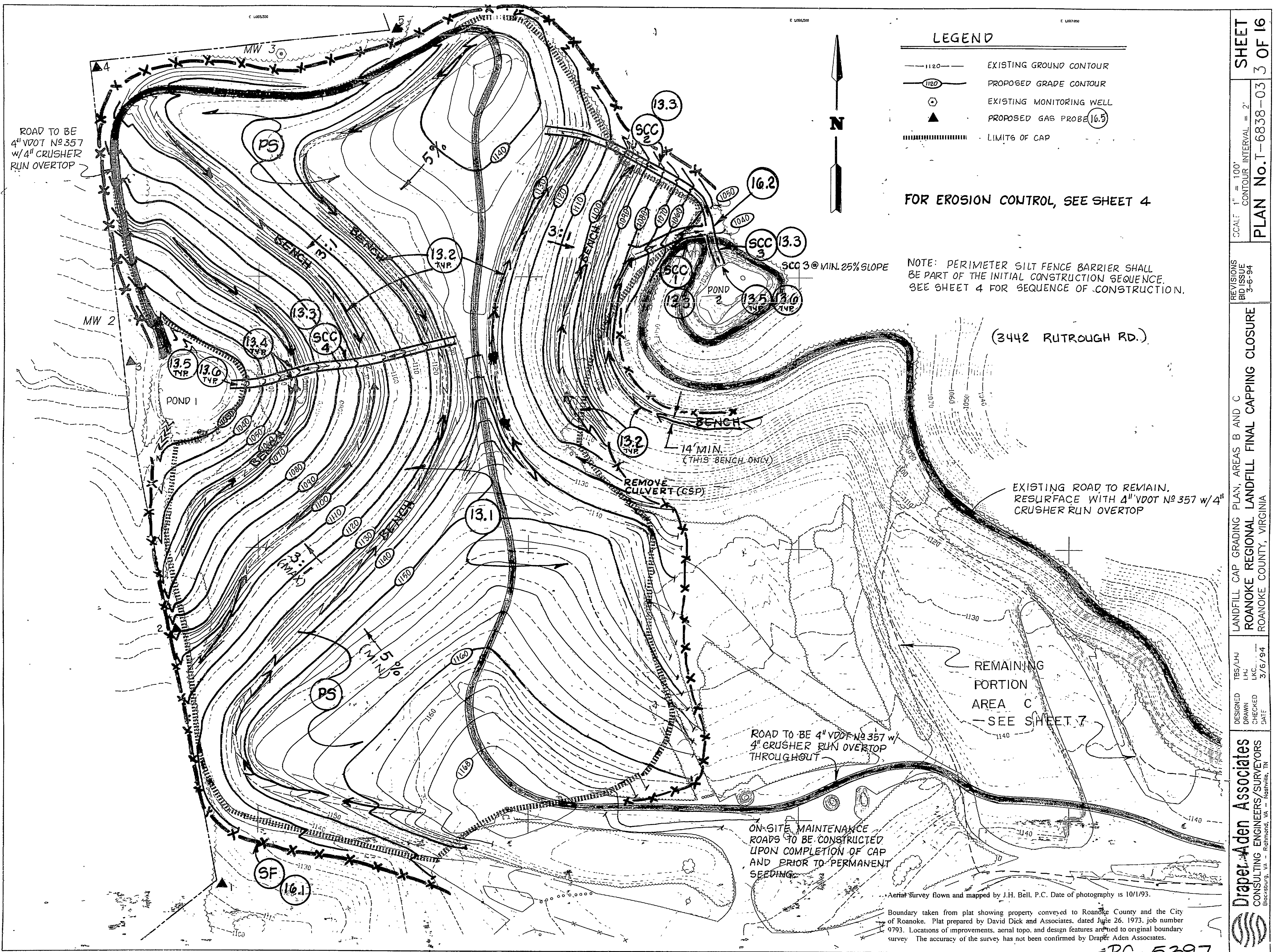
These documents, including drawings, specifications, reports, and studies were prepared by Draper Aden Associates, Consulting Engineers, pursuant to an agreement by and between Draper Aden Associates and the Roanoke Valley Resource Authority. Any reuse or modification of these documents without written verification or approval by Draper Aden Associates for the specific purpose intended will be at the sole risk of the individual or entity utilizing said documents, drawings, specifications, reports, and studies from any and all claims, damages, losses and expenses, including attorney's fees arising out of the unauthorized use of these documents, drawings, specifications, reports, and studies prepared as a result of a professional contract.



JOB No.: 6838-03
BID ISSUE: 3/06/94

RC-5395





LEGEND

- 1120 — EXISTING GROUND CONTOUR
- - - 1120 - - - PROPOSED GRADE CONTOUR
- ⊙ EXISTING MONITORING WELL
- ▲ PROPOSED GAS PROBE
- LIMITS OF CAP

FOR EROSION CONTROL, SEE SHEET 4

NOTE: PERIMETER SILT FENCE BARRIER SHALL BE PART OF THE INITIAL CONSTRUCTION SEQUENCE. SEE SHEET 4 FOR SEQUENCE OF CONSTRUCTION.

(3442 RUTROUGH RD.)

EXISTING ROAD TO REMAIN. RESURFACE WITH 4" VDOT No 357 w/4" CRUSHER RUN OVERTOP

REMAINING PORTION AREA C — SEE SHEET 7

ROAD TO BE 4" VDOT No 357 w/4" CRUSHER RUN OVERTOP THROUGHOUT

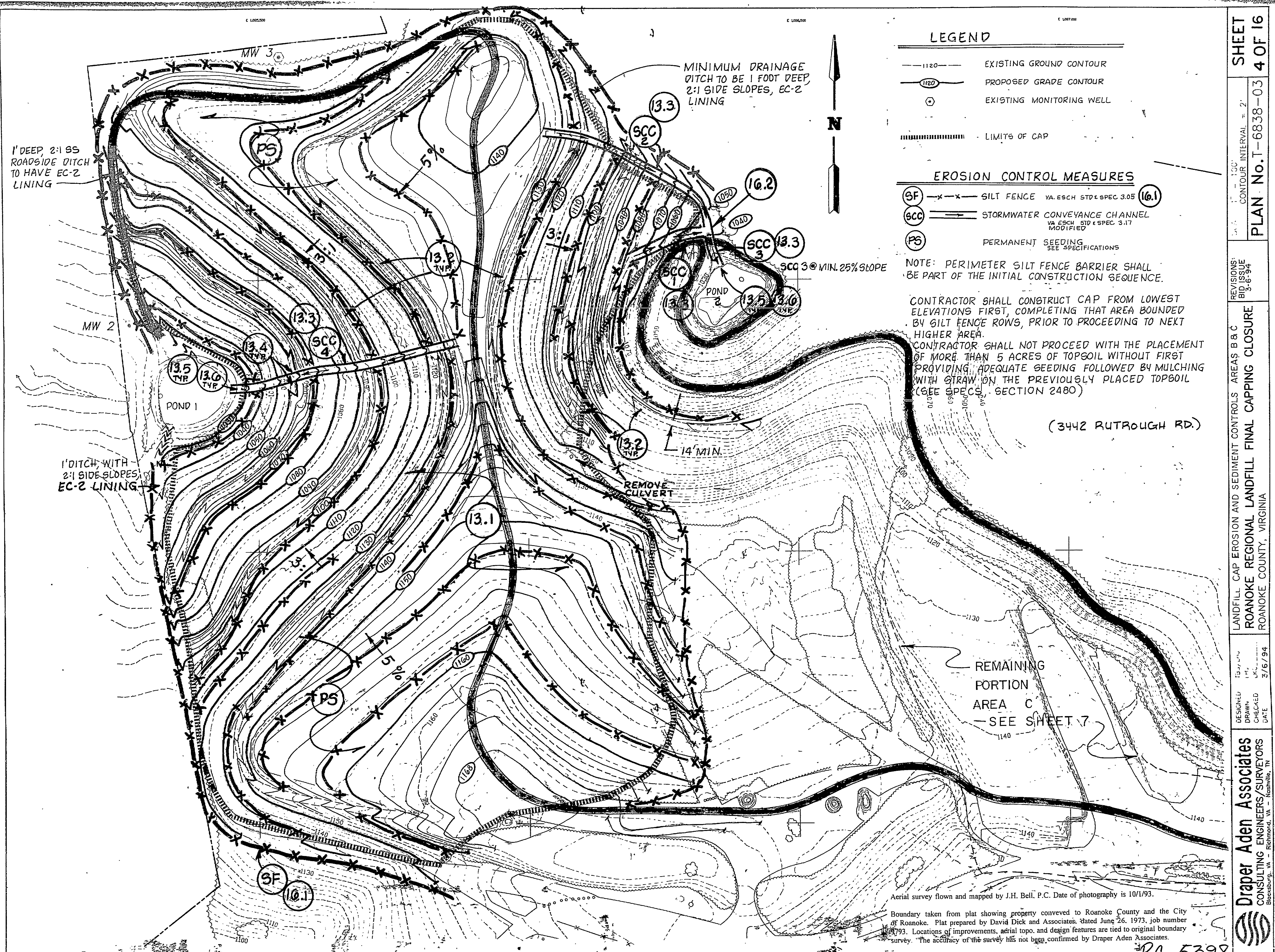
ON-SITE MAINTENANCE ROADS TO BE CONSTRUCTED UPON COMPLETION OF CAP AND PRIOR TO PERMANENT SEEDING

Aerial Survey flown and mapped by J.H. Bell, P.C. Date of photography is 10/1/93.

Boundary taken from plat showing property conveyed to Roanoke County and the City of Roanoke. Plat prepared by David Dick and Associates, dated June 26, 1973, job number 9793. Locations of improvements, aerial topo, and design features are tied to original boundary survey. The accuracy of the survey has not been confirmed by Draper Aden Associates.

Draper Aden Associates CONSULTING ENGINEERS/SURVEYORS Blossburg, VA - Richmond, VA - Nashville, TN	DESIGNED TBS/LHJ	LANDFILL CAP GRADING PLAN, AREAS B AND C	SHEET 3 OF 16
	DRAWN LHJ	ROANOKE REGIONAL LANDFILL FINAL CAPPING CLOSURE	
	CHECKED LHJ	REVISIONS 3-6-94	
	DATE 3/6/94	PLAN No. T-6838-03	

RC 5397



LEGEND

- 1120 — EXISTING GROUND CONTOUR
- 1120 — PROPOSED GRADE CONTOUR
- EXISTING MONITORING WELL
- LIMITS OF CAP

EROSION CONTROL MEASURES

- (SF) — SILT FENCE VA. ESCH STD & SPEC 3.05
- (SCC) — STORMWATER CONVEYANCE CHANNEL VA. ESCH STD & SPEC 3.17 MODIFIED
- (PS) — PERMANENT SEEDING SEE SPECIFICATIONS

NOTE: PERIMETER SILT FENCE BARRIER SHALL BE PART OF THE INITIAL CONSTRUCTION SEQUENCE.

CONTRACTOR SHALL CONSTRUCT CAP FROM LOWEST ELEVATIONS FIRST, COMPLETING THAT AREA BOUNDED BY SILT FENCE ROWS, PRIOR TO PROCEEDING TO NEXT HIGHER AREA.
CONTRACTOR SHALL NOT PROCEED WITH THE PLACEMENT OF MORE THAN 5 ACRES OF TOPSOIL WITHOUT FIRST PROVIDING ADEQUATE SEEDING FOLLOWED BY MULCHING WITH STRAW ON THE PREVIOUSLY PLACED TOPSOIL (SEE SPECS. SECTION 2480)

(3442 RUTROUGH RD.)

REMAINING
PORTION
AREA C
— SEE SHEET 7

Aerial survey flown and mapped by J.H. Bell, P.C. Date of photography is 10/1/93.

Boundary taken from plat showing property conveyed to Roanoke County and the City of Roanoke. Plat prepared by David Dick and Associates, dated June 26, 1973, job number 12793. Locations of improvements, aerial topo, and design features are tied to original boundary survey. The accuracy of the survey has not been confirmed by Draper Aden Associates.

SHEET
4 OF 16
PLAN No. T-6838-03
CONTOUR INTERVAL = 2'

REVISIONS:
BID ISSUE
3-6-94

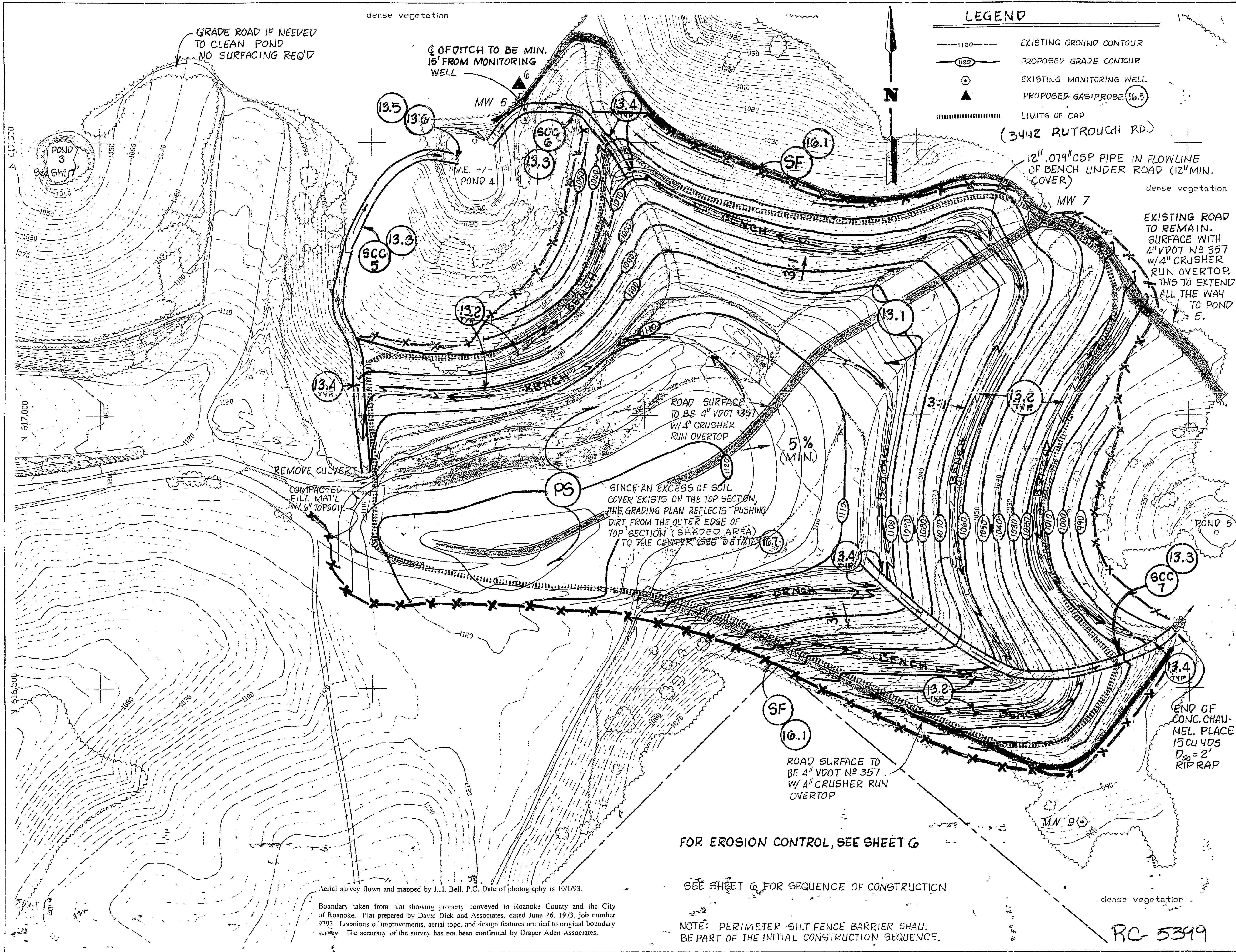
LANDFILL CAP EROSION AND SEDIMENT CONTROLS AREAS B & C
ROANOKE REGIONAL LANDFILL FINAL CAPPING CLOSURE
ROANOKE COUNTY, VIRGINIA

DESIGNED
DRAWN
CHECKED
DATE
3/6/94

Draper Aden Associates
CONSULTING ENGINEERS/SURVEYORS
Blacksburg, VA - Richmond, VA - Nashville, TN



RC 5398



LEGEND

- EXISTING GROUND CONTOUR
- PROPOSED GRADE CONTOUR
- EXISTING MONITORING WELL
- PROPOSED GAS PROBE
- LIMITS OF CAP

SHEET

5 OF 16

PLAN No. T-6838-03

CONTOUR INTERVAL = 2'

BID ISSUE 3-6-94

ADDENDUM 1-3/2/94

LANDFILL CAP GRADING PLAN, AREAS F AND G

ROANOKE REGIONAL LANDFILL FINAL CAPPING CLOSURE

ROANOKE COUNTY, VIRGINIA

DESIGNED

TBS/LHJ

DRAWN

LHJ

CHECKED

LHC

DATE

3/6/94

Draper Aden Associates

CONSULTING ENGINEERS/SURVEYORS

Blacksburg, VA - Richmond, VA - Nashville, TN

FOR EROSION CONTROL, SEE SHEET G

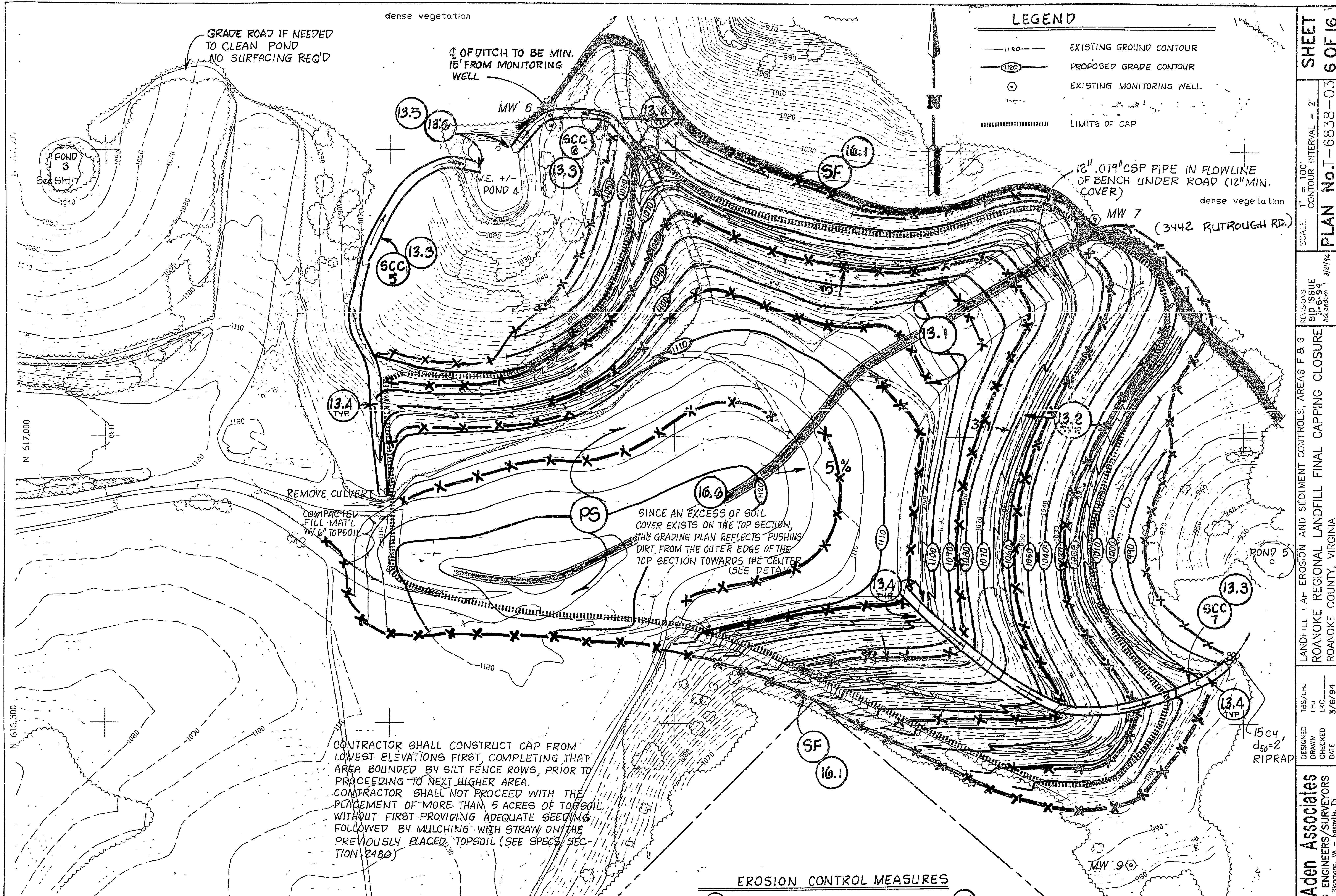
SEE SHEET G FOR SEQUENCE OF CONSTRUCTION

NOTE: PERIMETER SILT FENCE BARRIER SHALL BE PART OF THE INITIAL CONSTRUCTION SEQUENCE.

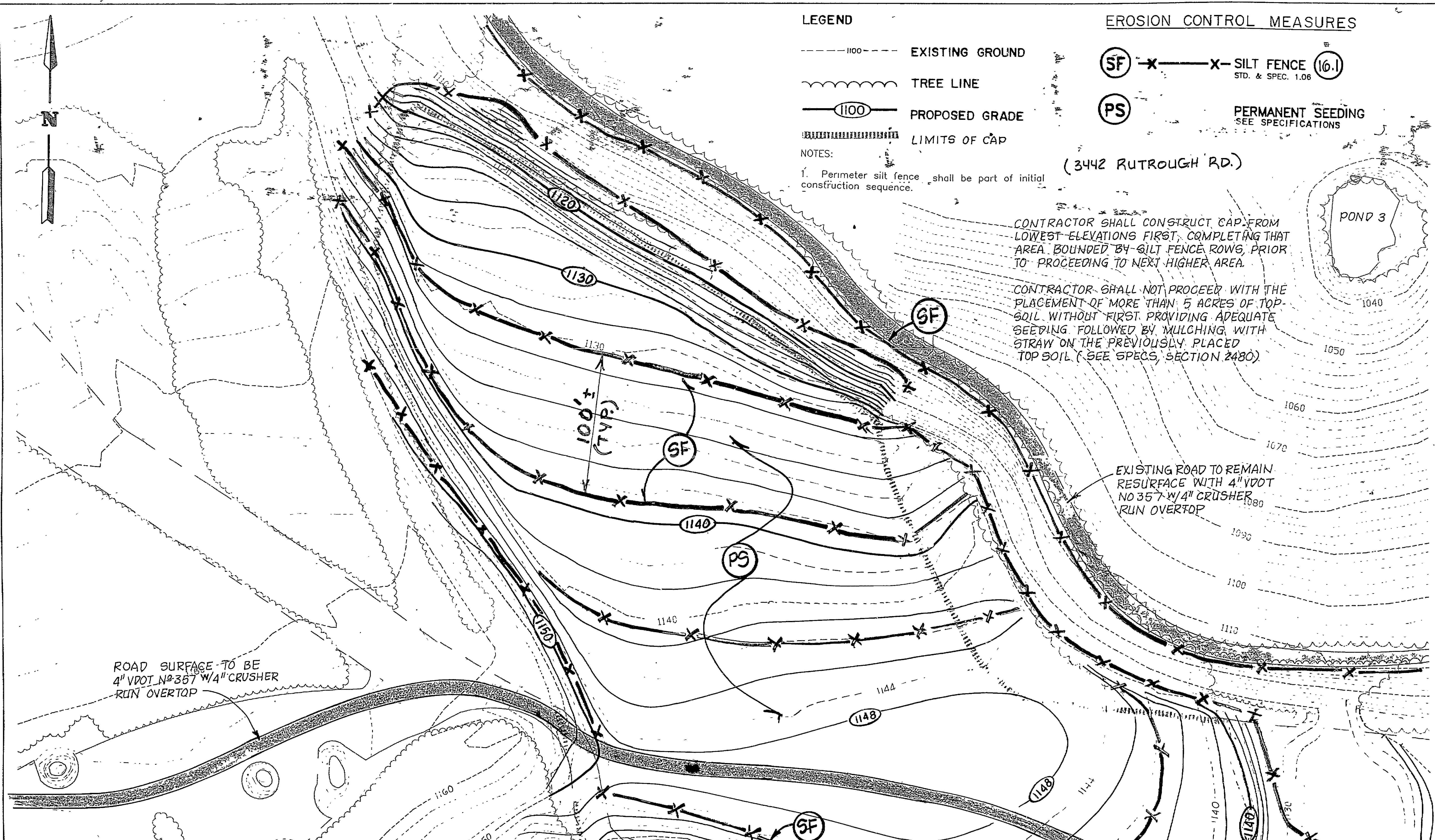
RC-5399

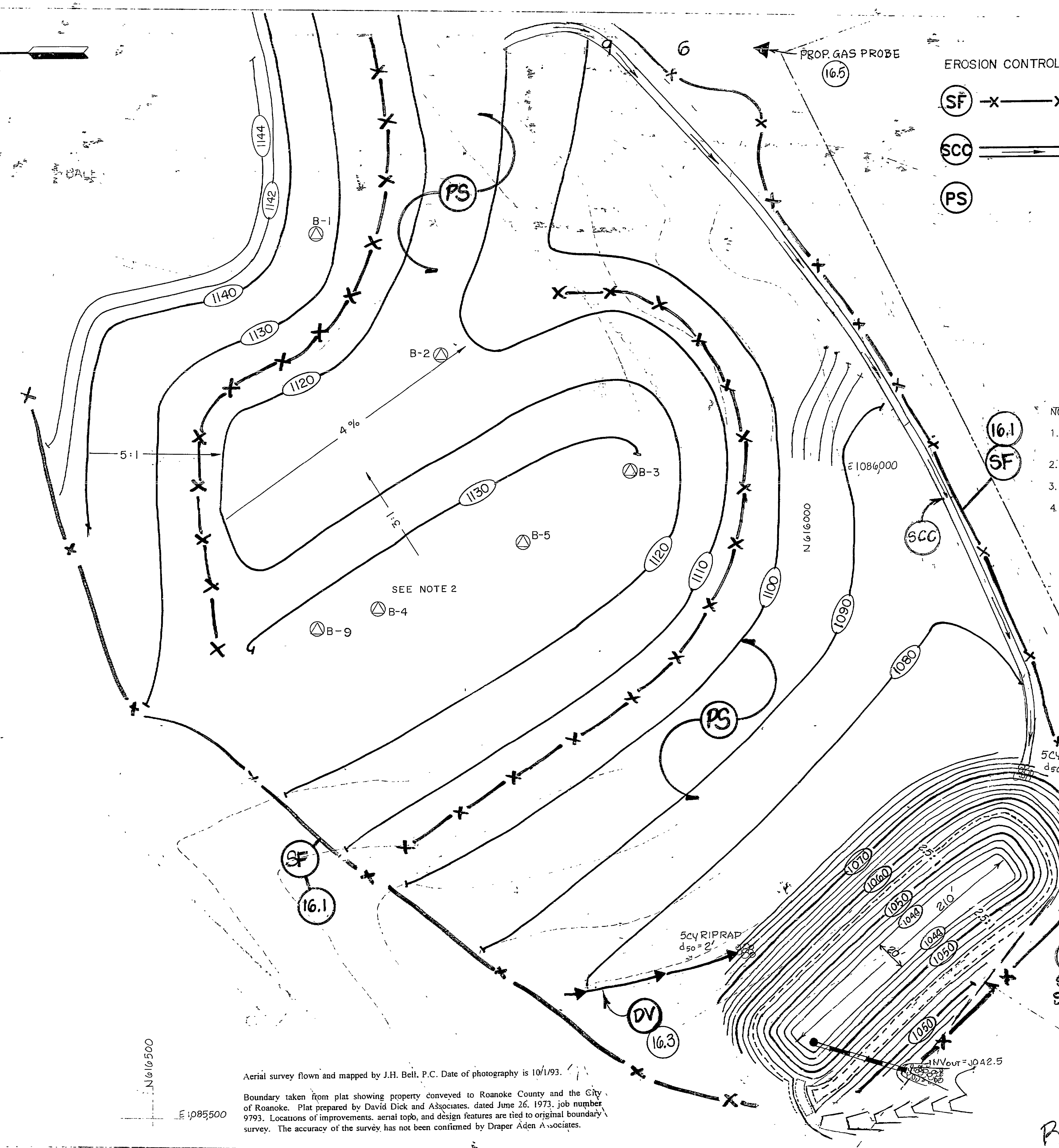
Aerial survey flown and mapped by J.H. Bell, P.C. Date of photography is 10/1/93.

Boundary taken from plat showing property conveyed to Roanoke County and the City of Roanoke. Plat prepared by David Dick and Associates, dated June 26, 1973, job number 9793. Locations of improvements, aerial topo, and design features are tied to original boundary survey. The accuracy of the survey has not been confirmed by Draper Aden Associates.



Aden Associates ENGINEERS/SURVEYORS Richmond, VA - Nashville, TN	DESIGNED DRAWN CHECKED DATE	TBS/LHU LHC 3/6/94	LANDFILL AP EROSION AND SEDIMENT CONTROLS, AREAS F & G ROANOKE REGIONAL LANDFILL FINAL CAPPING CLOSURE ROANOKE COUNTY, VIRGINIA	REVISIONS BID ISSUE Addendum 1 3/2/94	SCALE: 1" = 100' CONTOUR INTERVAL = 2'	SHEET 6 OF 16 PLAN No. 1-6838-03
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EROSION CONTROL FEATURES

- (SF) —X—X— SILT FENCE
STD. & SPEC. 3.05
- (DV) —> DIVERSION
STD. & SPEC. 3.12
- (SCC) ——— STORMWATER CONVEYANCE CHANNEL
STD. & SPEC. 3.17
- (PS) PERMANENT SEEDING
SEE SPECIFICATIONS

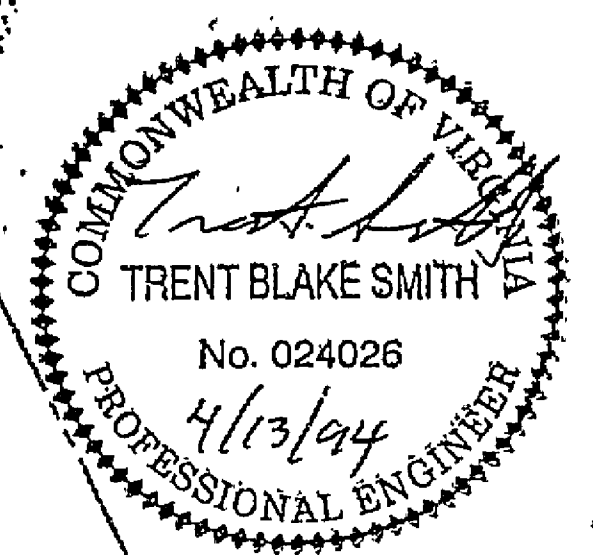
LEGEND

- (△) SOIL BORING
- 1100 ----- EXISTING GROUND
- PROPERTY LINE
- ~~~~~ TREE LINE
- (1100) PROPOSED GRADE

NOTES:

1. Perimeter silt fence, temporary runoff conveyance ditch and sediment pond shall be part of initial construction sequence.
2. Contractor shall attempt to excavate this area, producing a gentle slope (5:1) to sediment pond.
3. No total area of excavation may exceed 3.0 acres without providing temporary or permanent seeding.
4. For soil boring information see Exhibit A of Section 2200 of Construction Specifications.

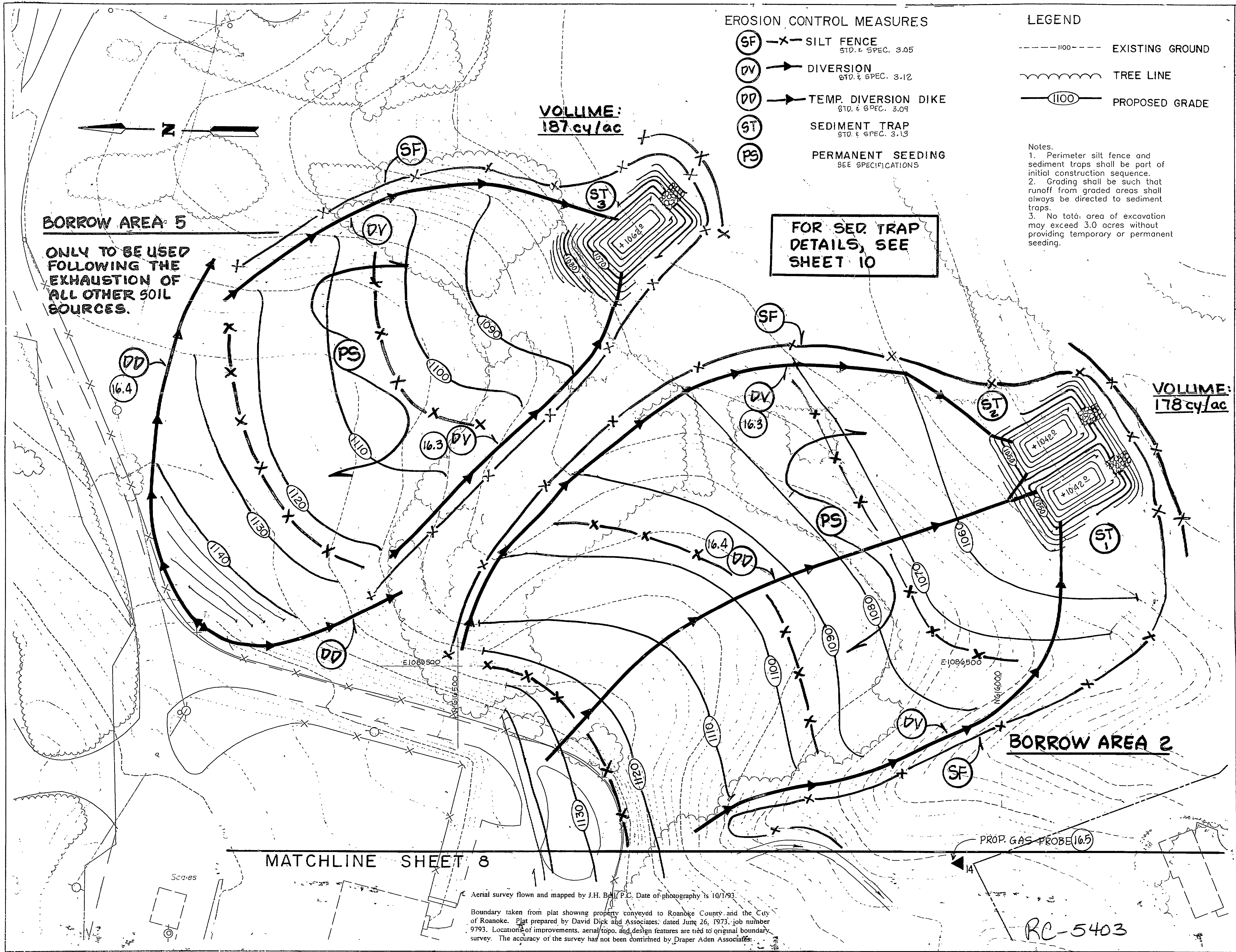
Temporary Runoff Conveyance Channel
Side Slope: 2:1
Bottom Width: 2.0'
Depth: 2.0 ft
Lining: EC-2 OR BETTER



Aerial survey flown and mapped by J.H. Bell, P.C. Date of photography is 10/1/93.

Boundary taken from plat showing property conveyed to Roanoke County and the City of Roanoke. Plat prepared by David Dick and Associates, dated June 26, 1973. Job number 9793. Locations of improvements, aerial topo, and design features are tied to original boundary survey. The accuracy of the survey has not been confirmed by Draper Aden Associates.

BC-5402



EROSION CONTROL MEASURES

- (SF) —X— SILT FENCE
STD. & SPEC. 3.05
- (DV) —> DIVERSION
STD. & SPEC. 3.12
- (DD) —> TEMP. DIVERSION DIKE
STD. & SPEC. 3.09
- (ST) SEDIMENT TRAP
STD. & SPEC. 3.13
- (PS) PERMANENT SEEDING
SEE SPECIFICATIONS

LEGEND

- 1100 --- EXISTING GROUND
- ~~~~~ TREE LINE
- 1100 — PROPOSED GRADE

Notes:
1. Perimeter silt fence and sediment traps shall be part of initial construction sequence.
2. Grading shall be such that runoff from graded areas shall always be directed to sediment traps.
3. No total area of excavation may exceed 3.0 acres without providing temporary or permanent seeding.

FOR SED TRAP
DETAILS, SEE
SHEET 10

BORROW AREA 5

ONLY TO BE USED
FOLLOWING THE
EXHAUSTION OF
ALL OTHER SOIL
SOURCES.

VOLUME:
187 cy/ac

VOLUME:
178 cy/ac

BORROW AREA 2

MATCHLINE SHEET 8

Aerial survey flown and mapped by J.H. Bell, P.C. Date of photography is 10/1/93.
Boundary taken from plat showing property conveyed to Roanoke County and the City of Roanoke. Plat prepared by David Dick and Associates, dated June 26, 1973, job number 9793. Locations of improvements, aerial topo, and design features are tied to original boundary survey. The accuracy of the survey has not been confirmed by Draper Aden Associates.

PROP. GAS PROBE (16.5)

RC-5403

SHEET 9 OF 16

PLAN No. 6838-03

CONTOUR INTERVAL = 2'

REV'S JMS

BID ISSUE

3-6-94

TBS/LHJ

DATE

3/6/94

DESIGNED

DRAWN

CHECKED

DATE

BORROW AREA GRADING PLAN - AREAS 2 AND 5

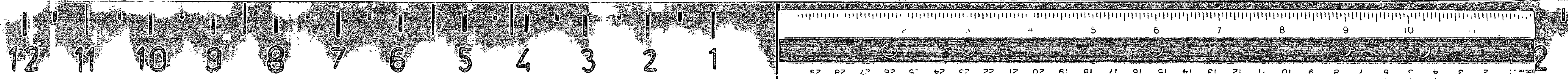
ROANOKE REGIONAL LANDFILL FINAL CAPPING CLOSURE

ROANOKE COUNTY, VIRGINIA

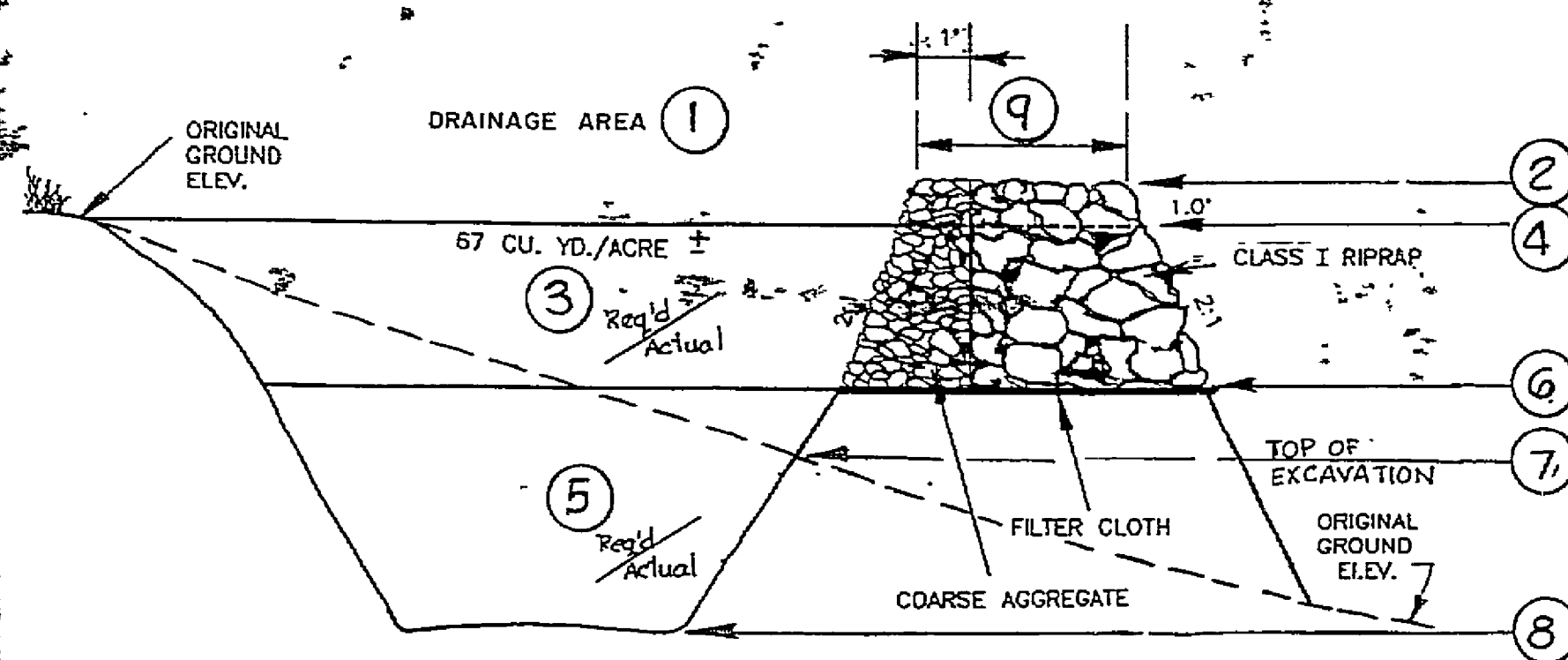
Draper Aden Associates

CONSULTING ENGINEERS/SURVEYORS

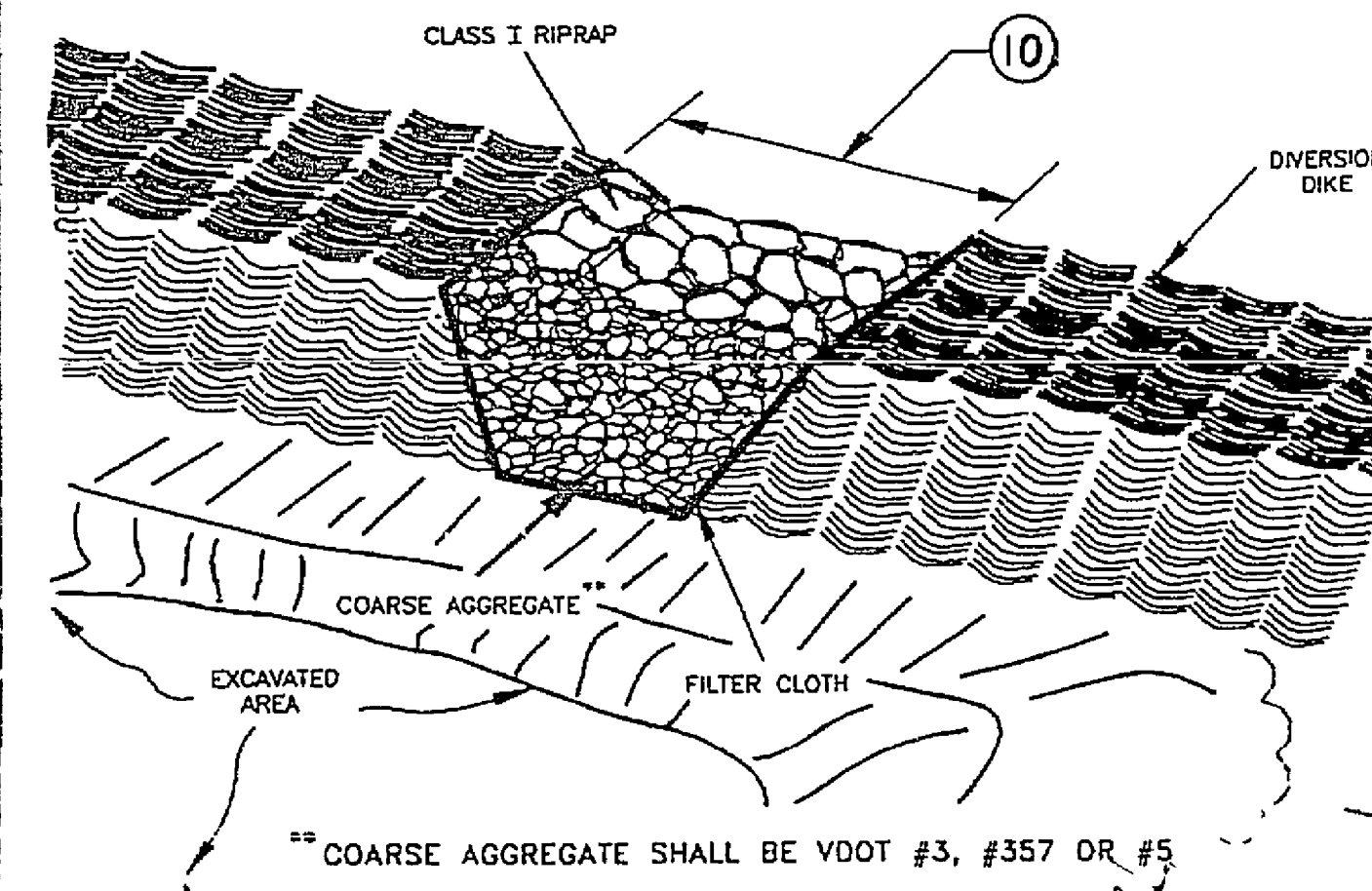
Bldg. 200, VA - Richmond, VA - Nashville, TN



TEMPORARY SEDIMENT TRAP



CROSS SECTION OF OUTLET



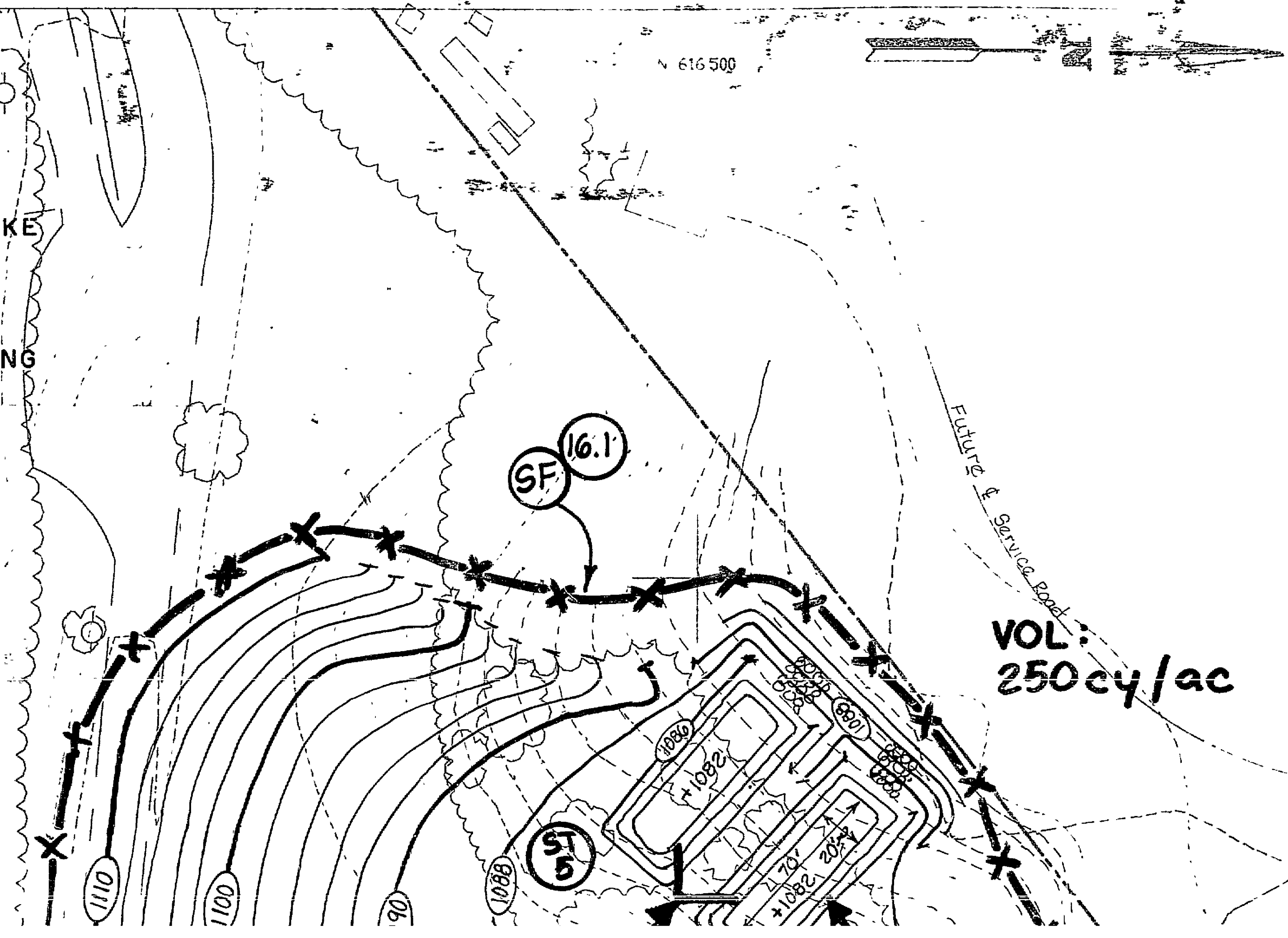
EROSION CONTROL MEASURES

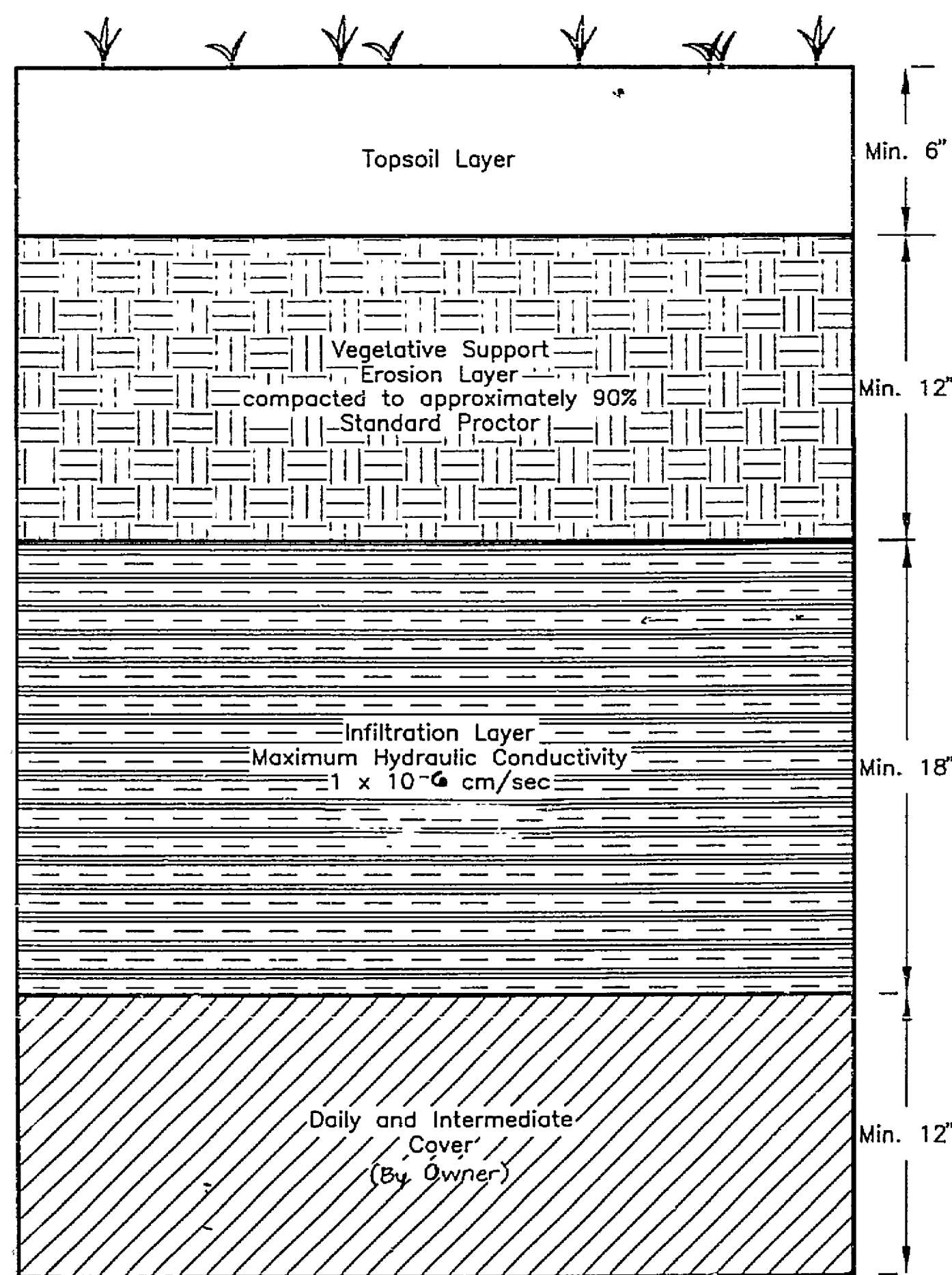
- (SF) SILT FENCE
STD. & SPEC. 3.05
- (DV) DIVERSION
STD. & SPEC. 3.12
- (VD) TEMP. DIVERSION DIKE
STD. & SPEC. 3.09
- (ST) SEDIMENT TRAP
STD. & SPEC. 3.13
- (PS) PERMANENT SEEDING
SEE SPECIFICATIONS

LEGEND

- EXISTING GROUND
- TREE LINE
- PROPOSED GRADE

- Notes:
1. Perimeter silt fence and sediment traps shall be part of initial construction sequence.
 2. Grading shall be such that runoff from graded areas shall always be directed to sediment traps.
 3. No total area of excavation

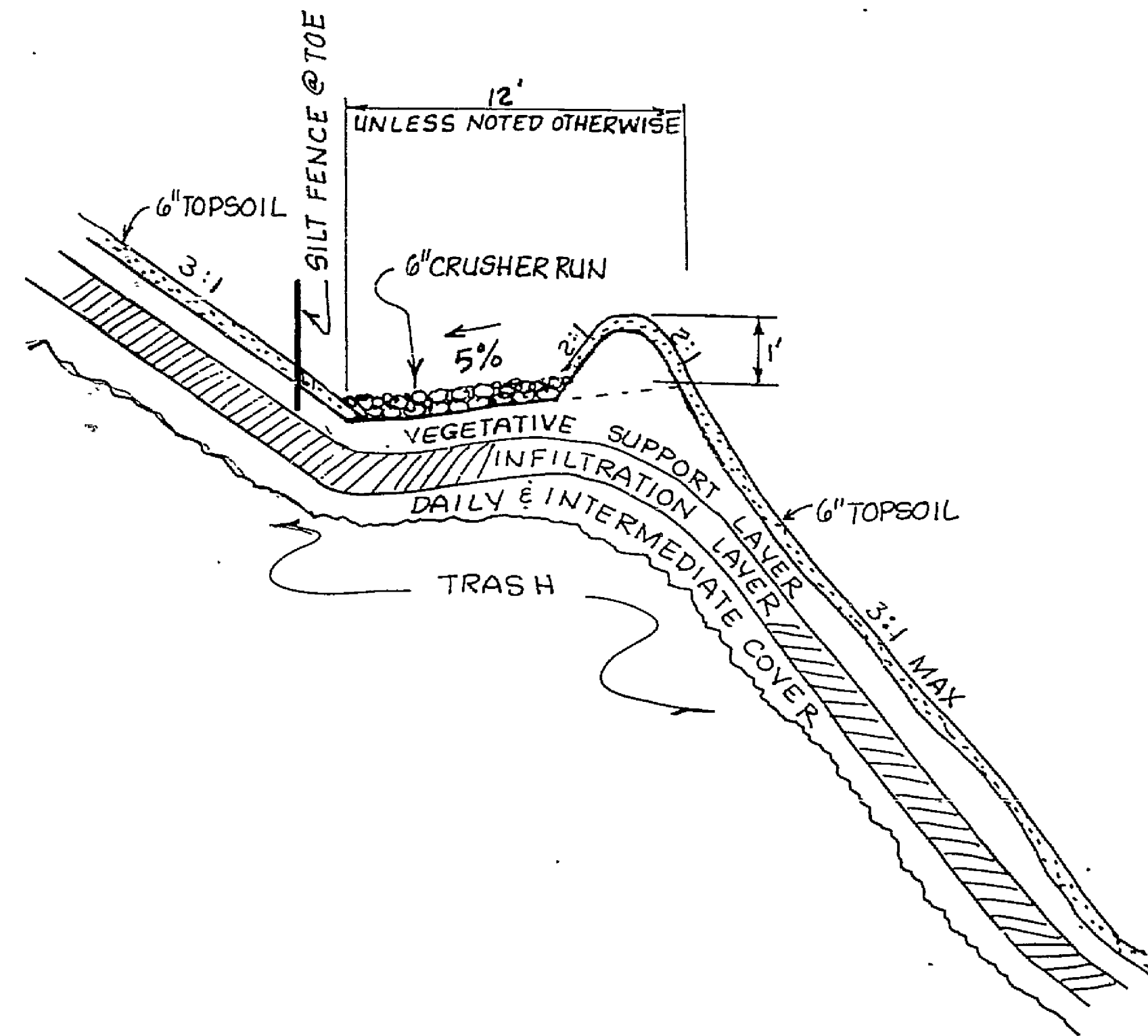




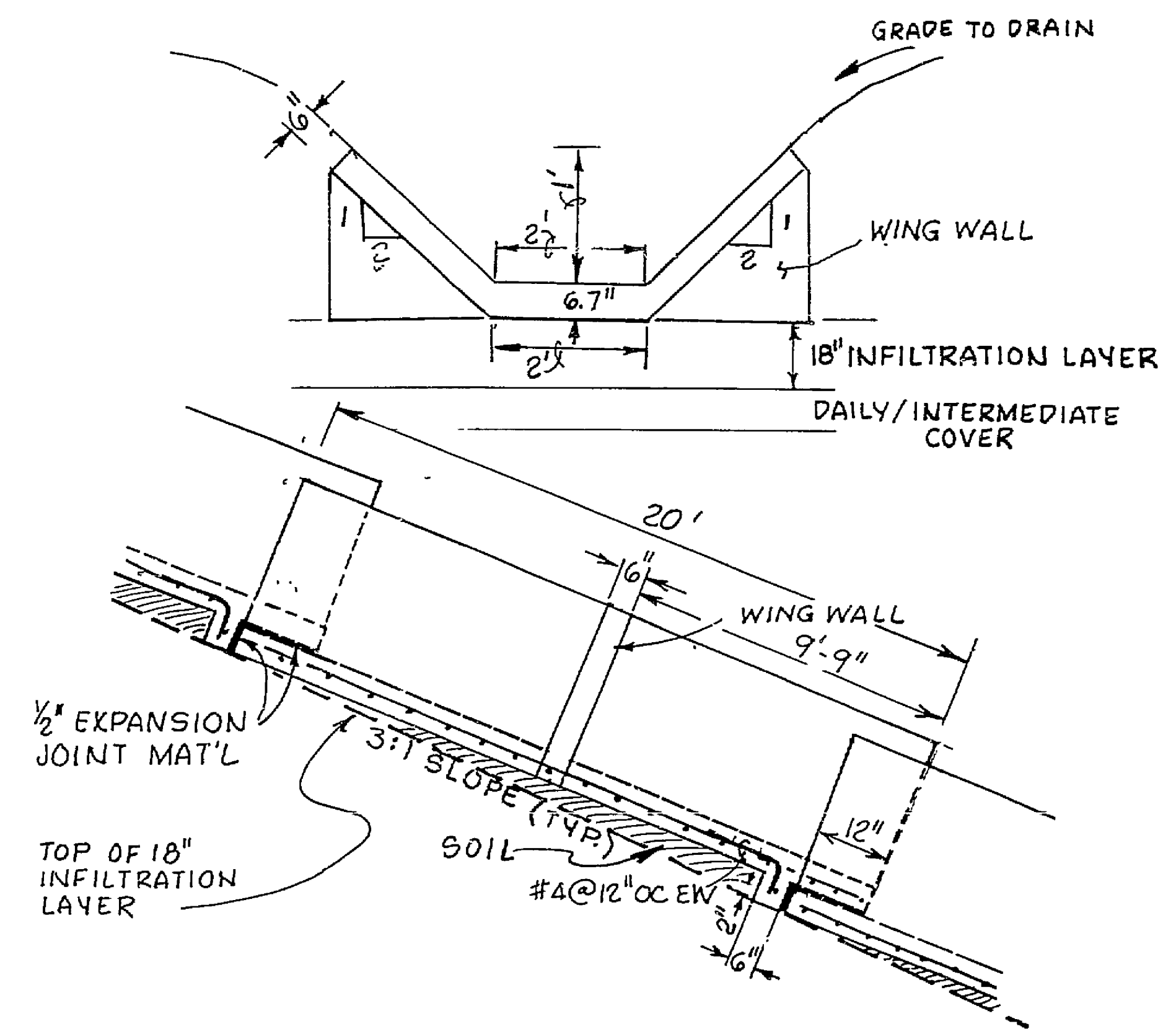
NOTE:

1. The cap base shall be proof rolled as described in the construction specifications.
2. The infiltration layer shall be protected, during construction, from erosion and excessive drying.

CAP DETAIL

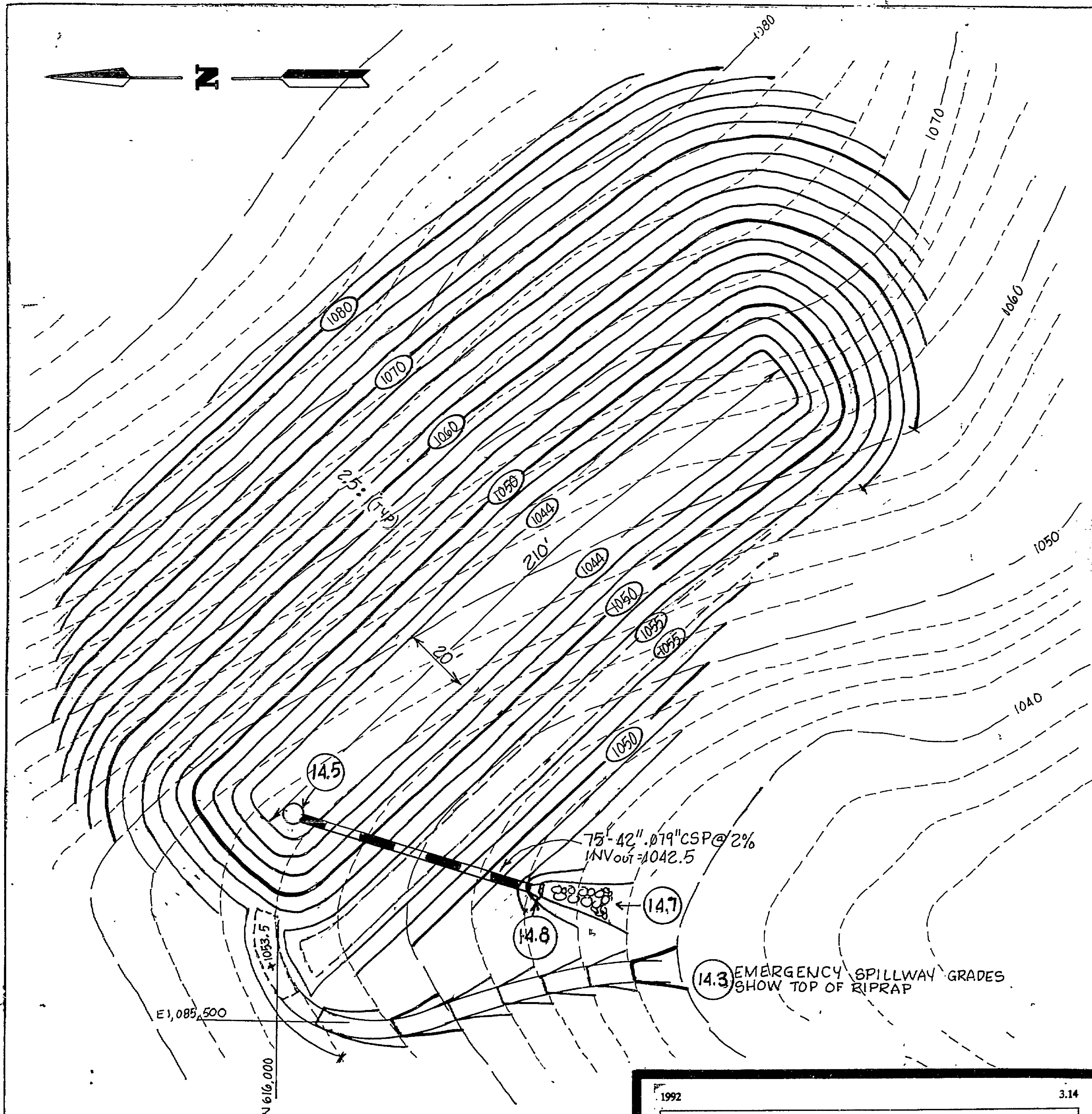


BENCH DETAIL

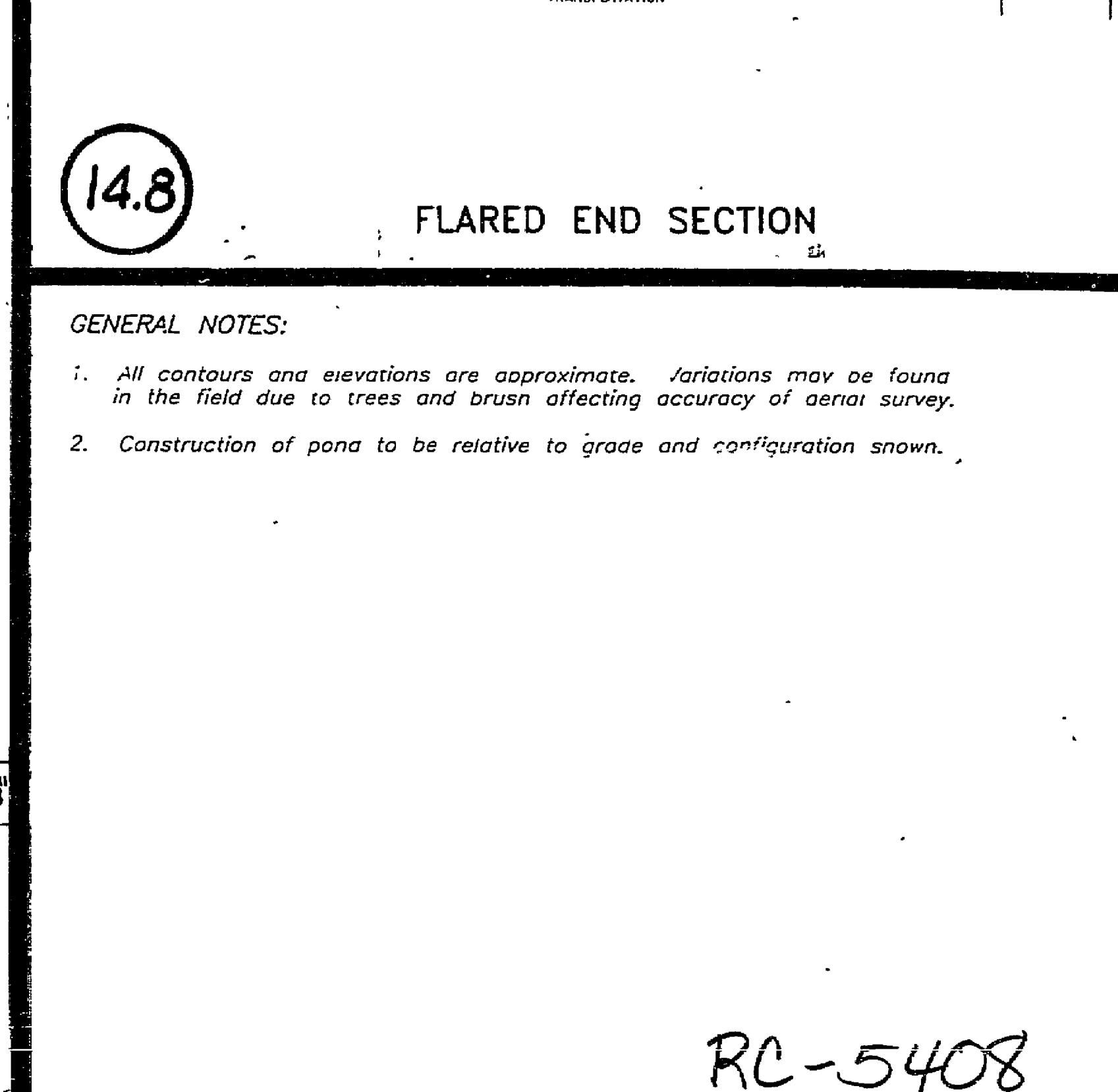
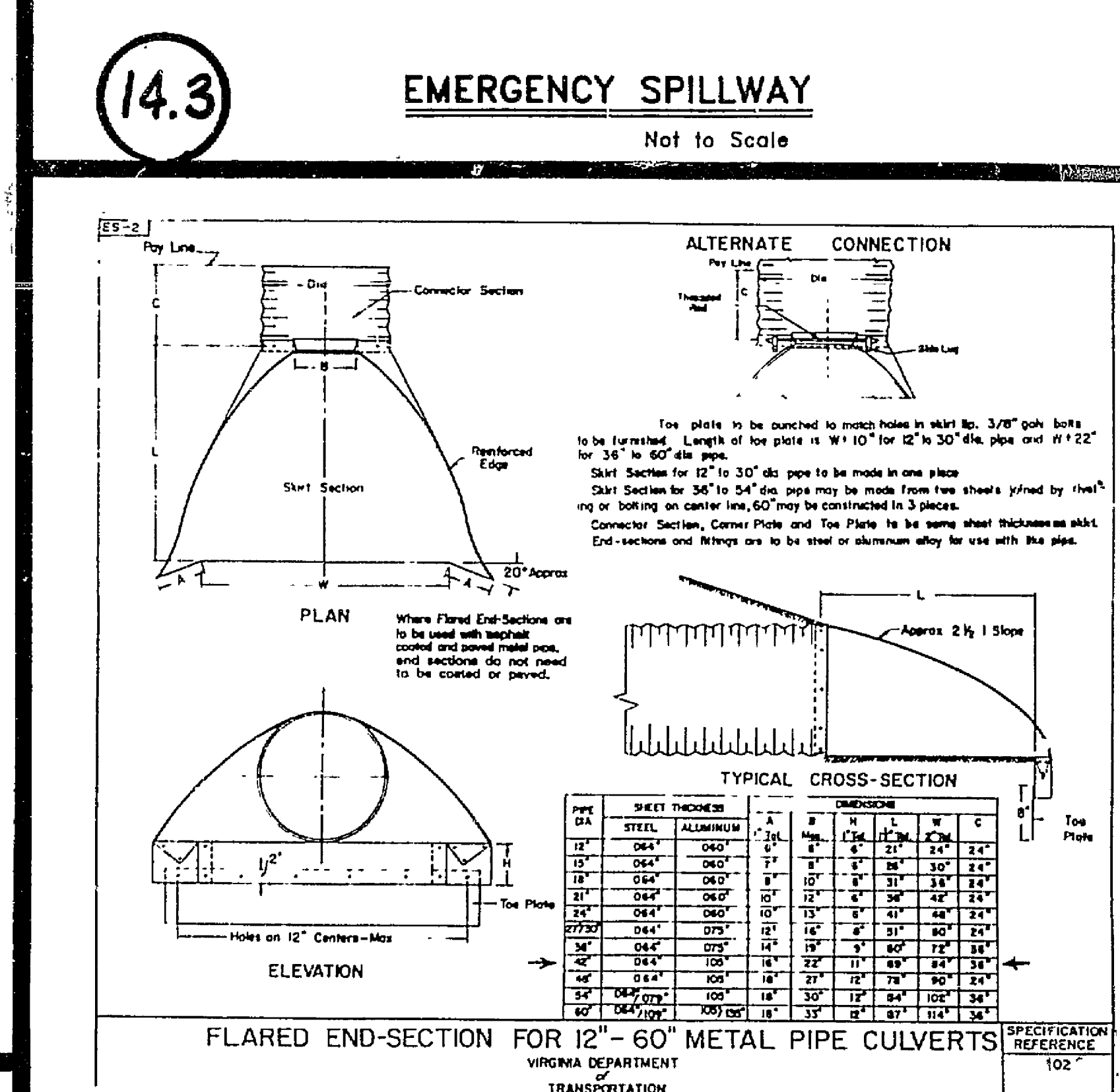
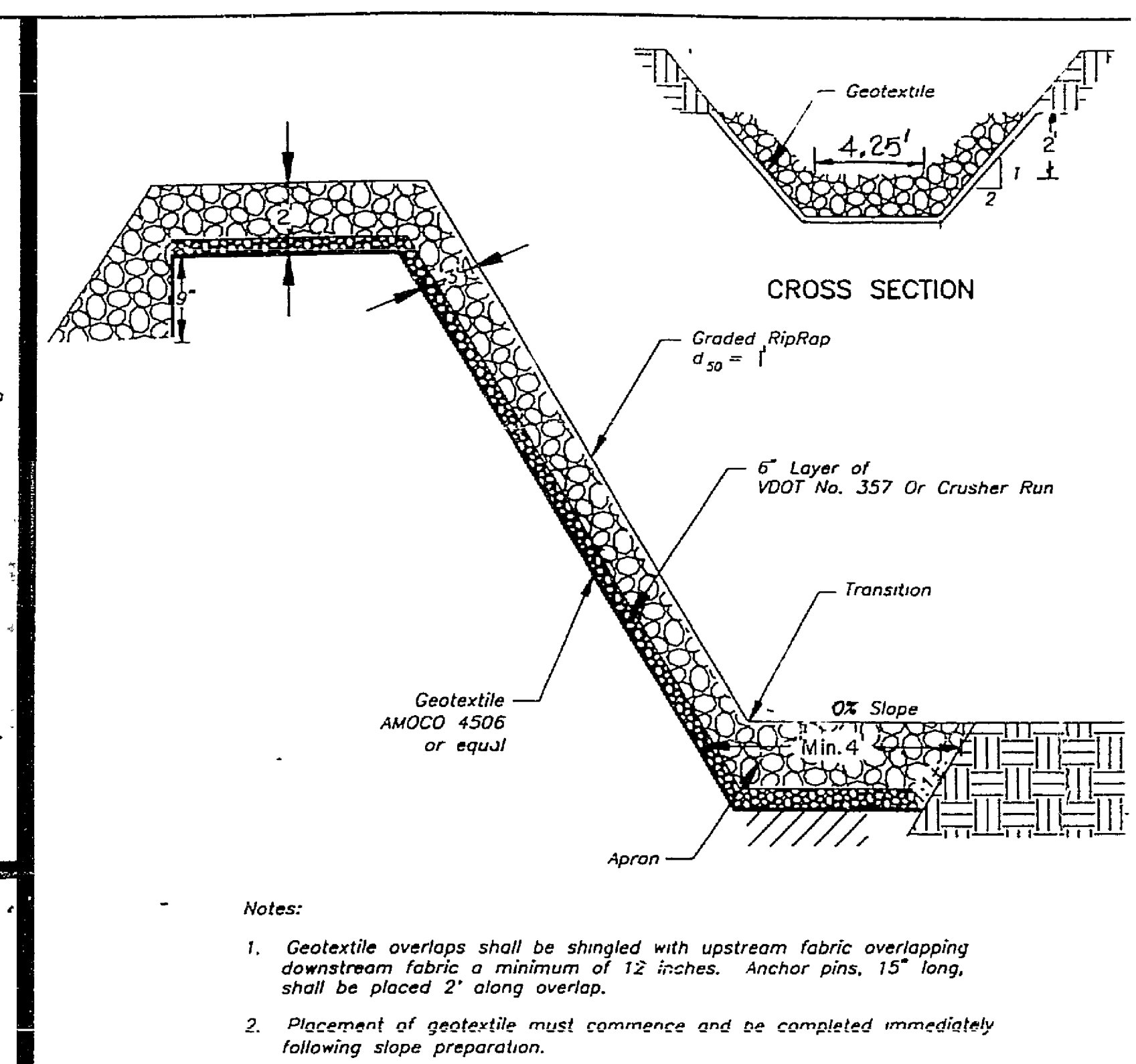
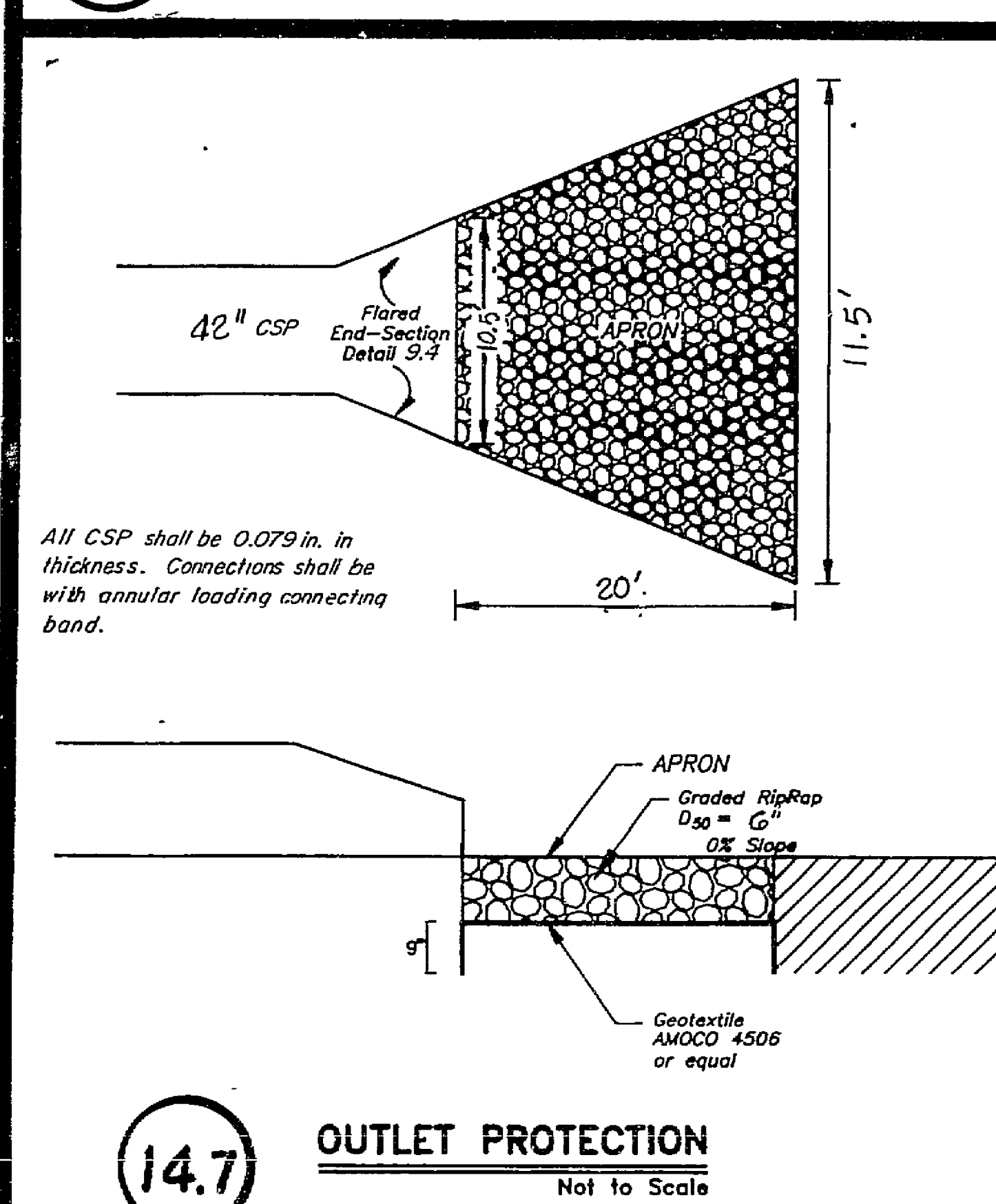
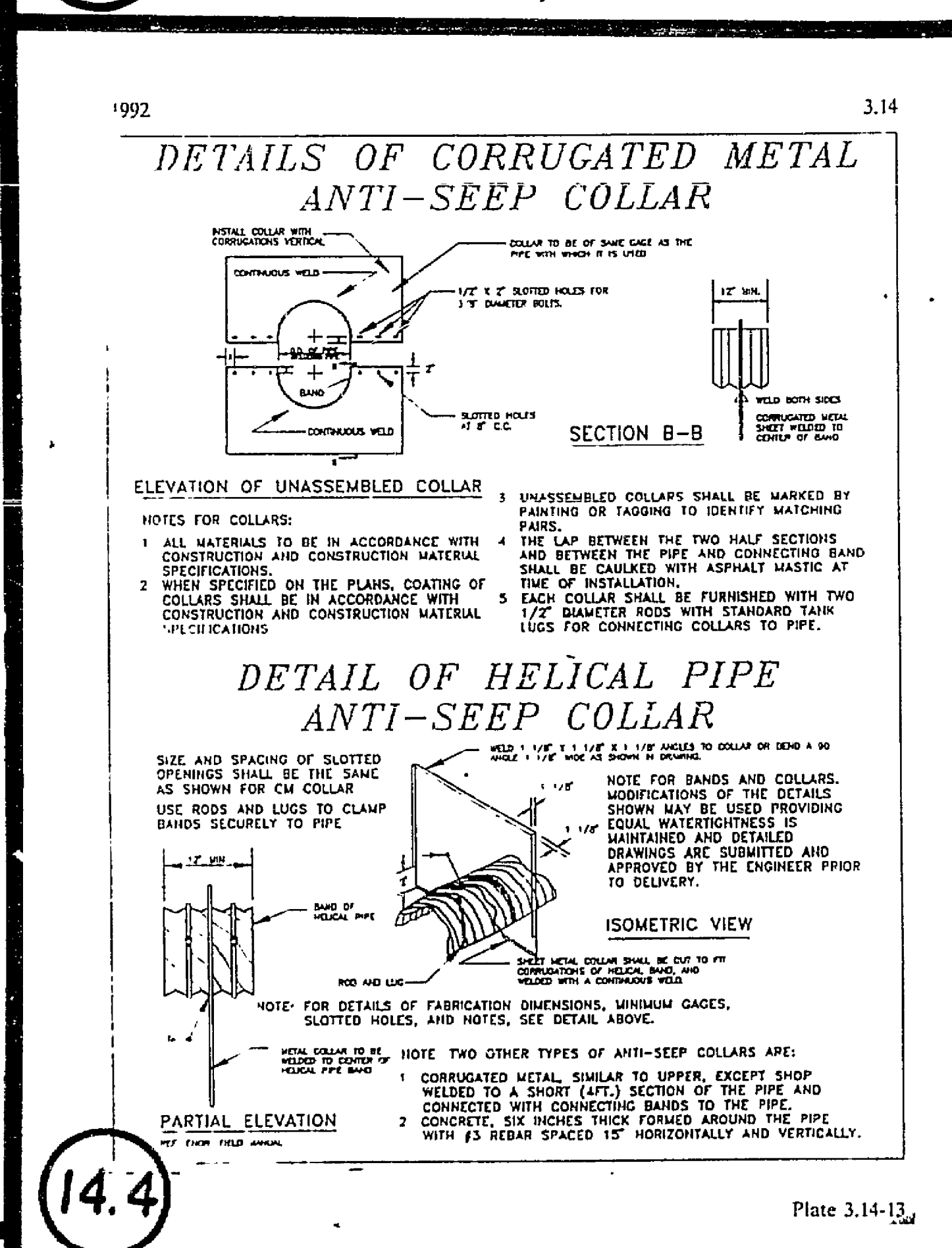
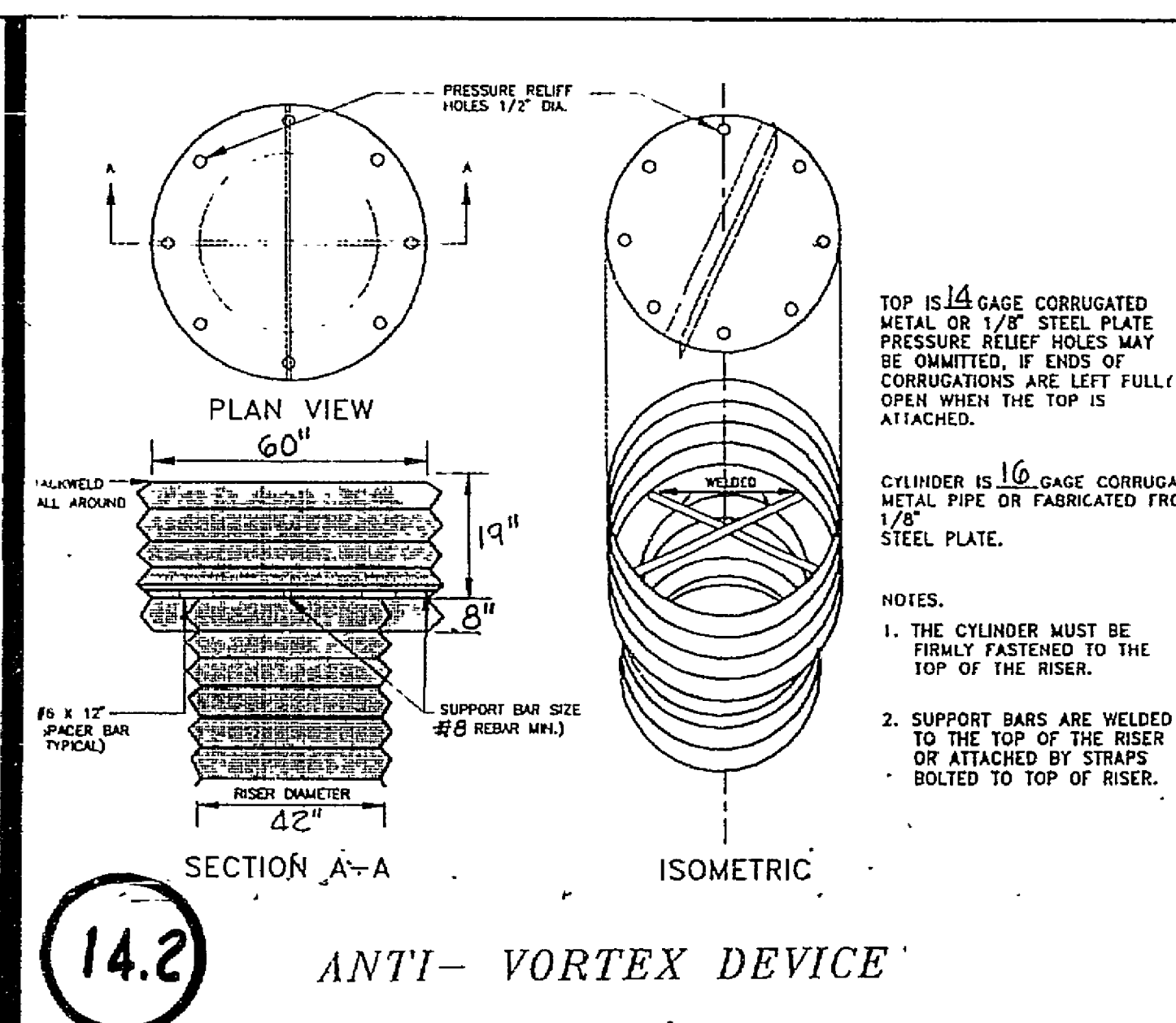
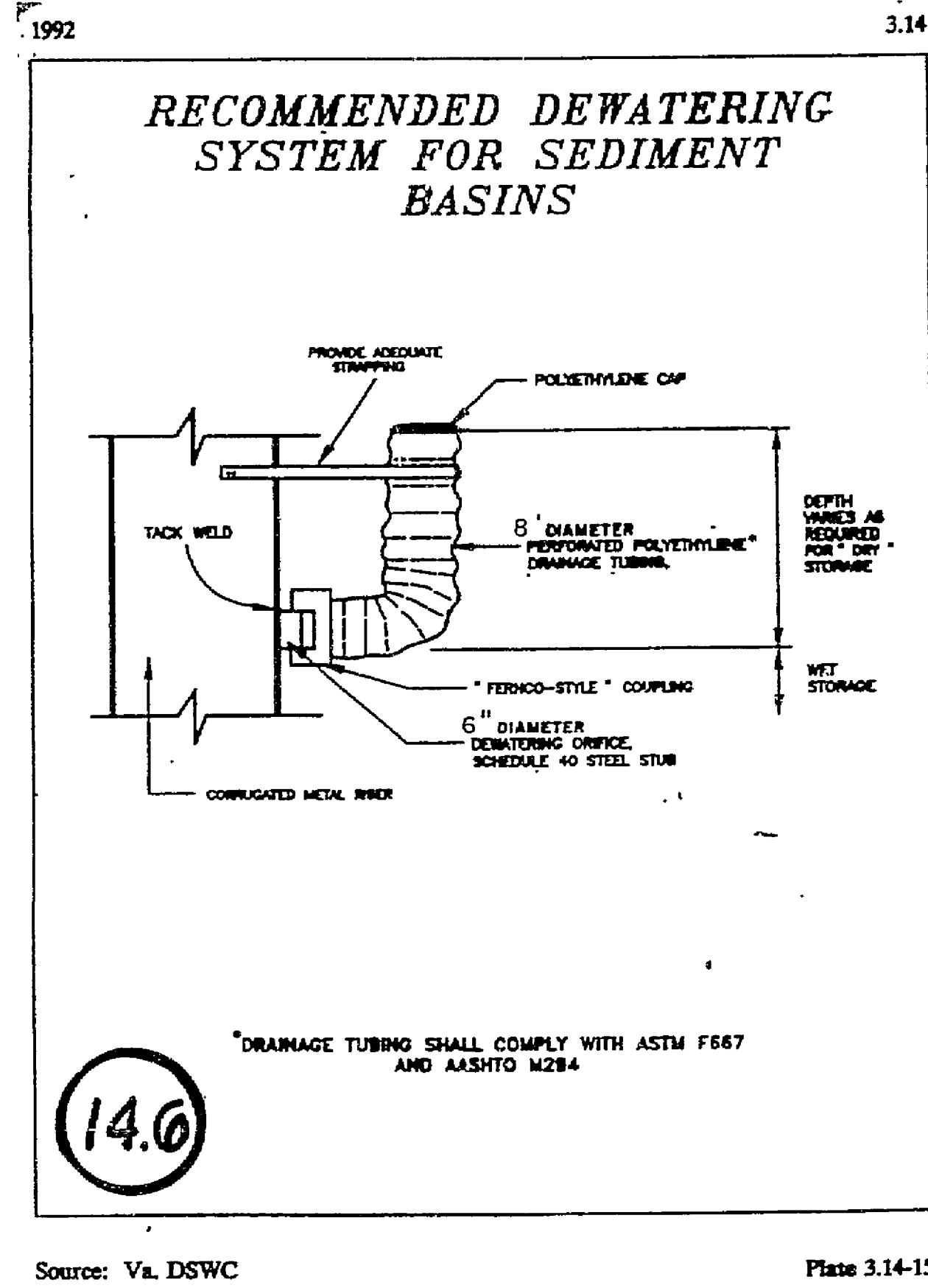
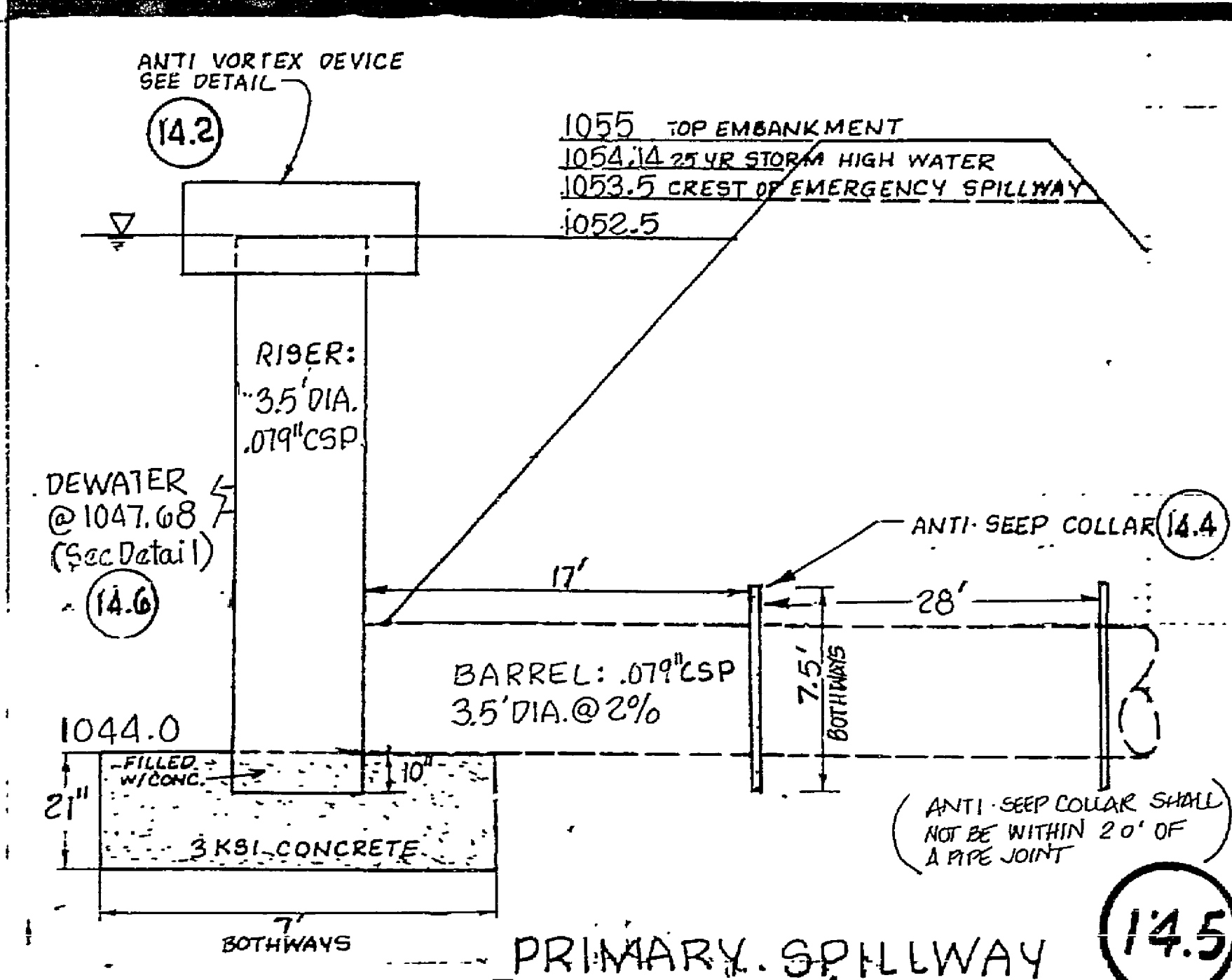


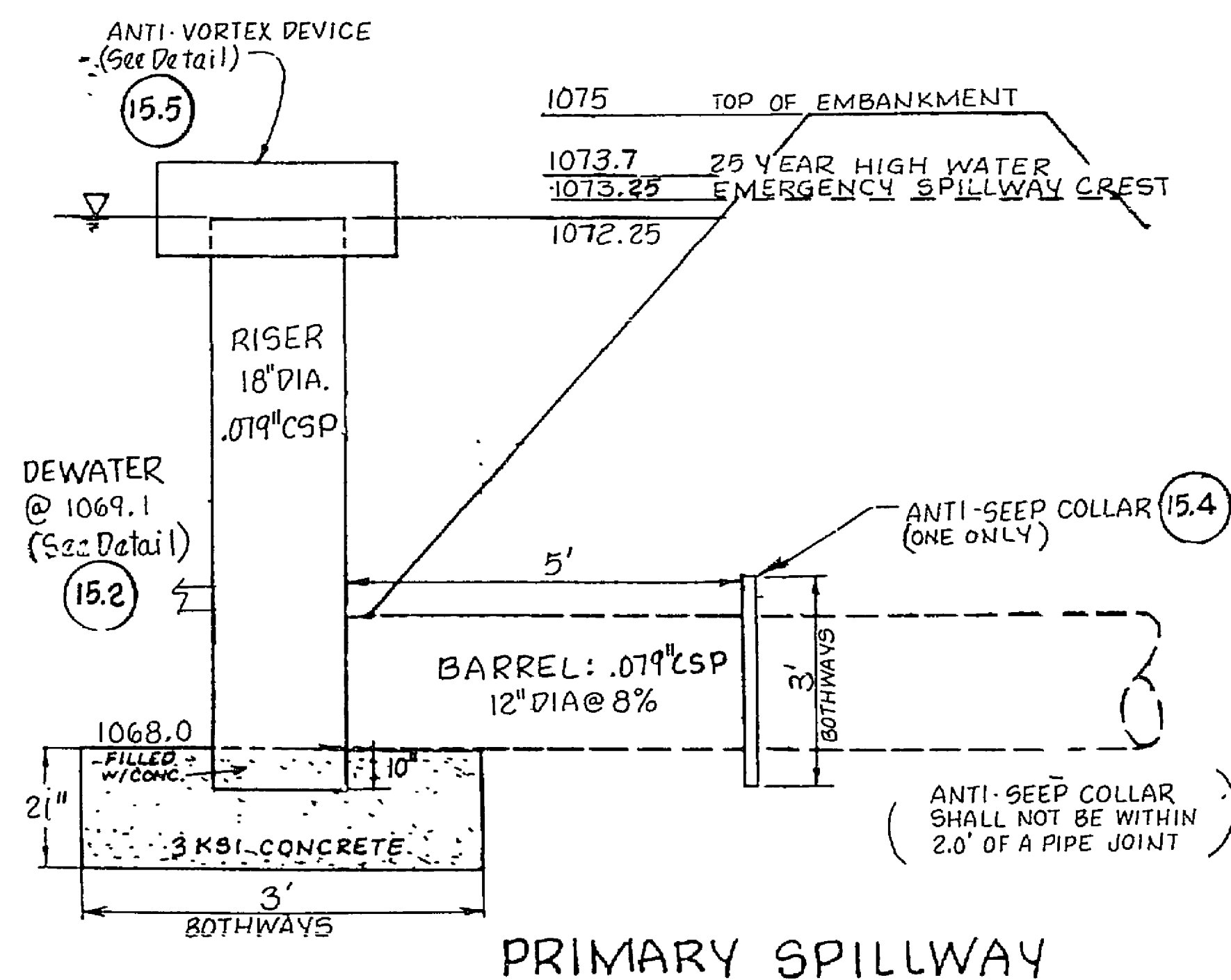
- CONC. SHALL BE MIN. STRENGTH 4000 PSI
- AIR ENTRAINED PER VDOT SPECS WITH No.4 REINF. STEEL (60KSI) @ 12" SPACING BOTH WAYS.
- MIN. COVER OF STEEL SHALL BE 2 3/4"

SCC (CONC. DOWNDRAIN) DETAIL

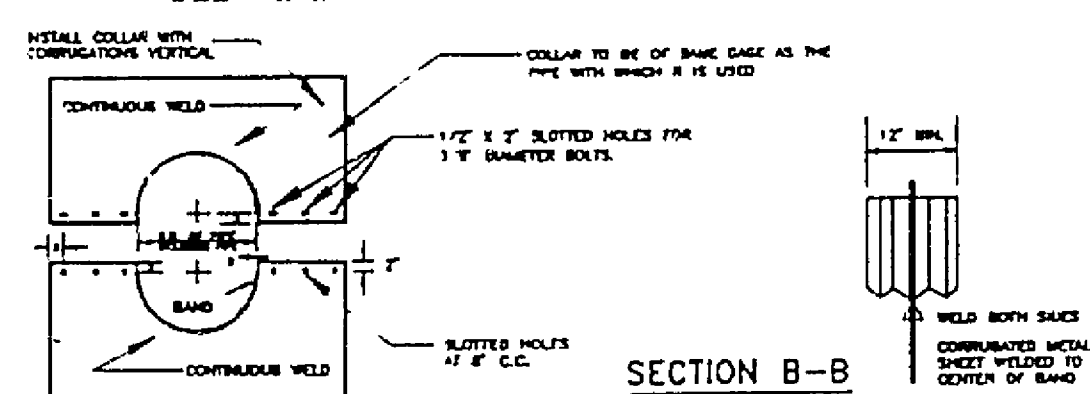


14.1 SEDIMENT BASIN SCALE: 1" = 30'

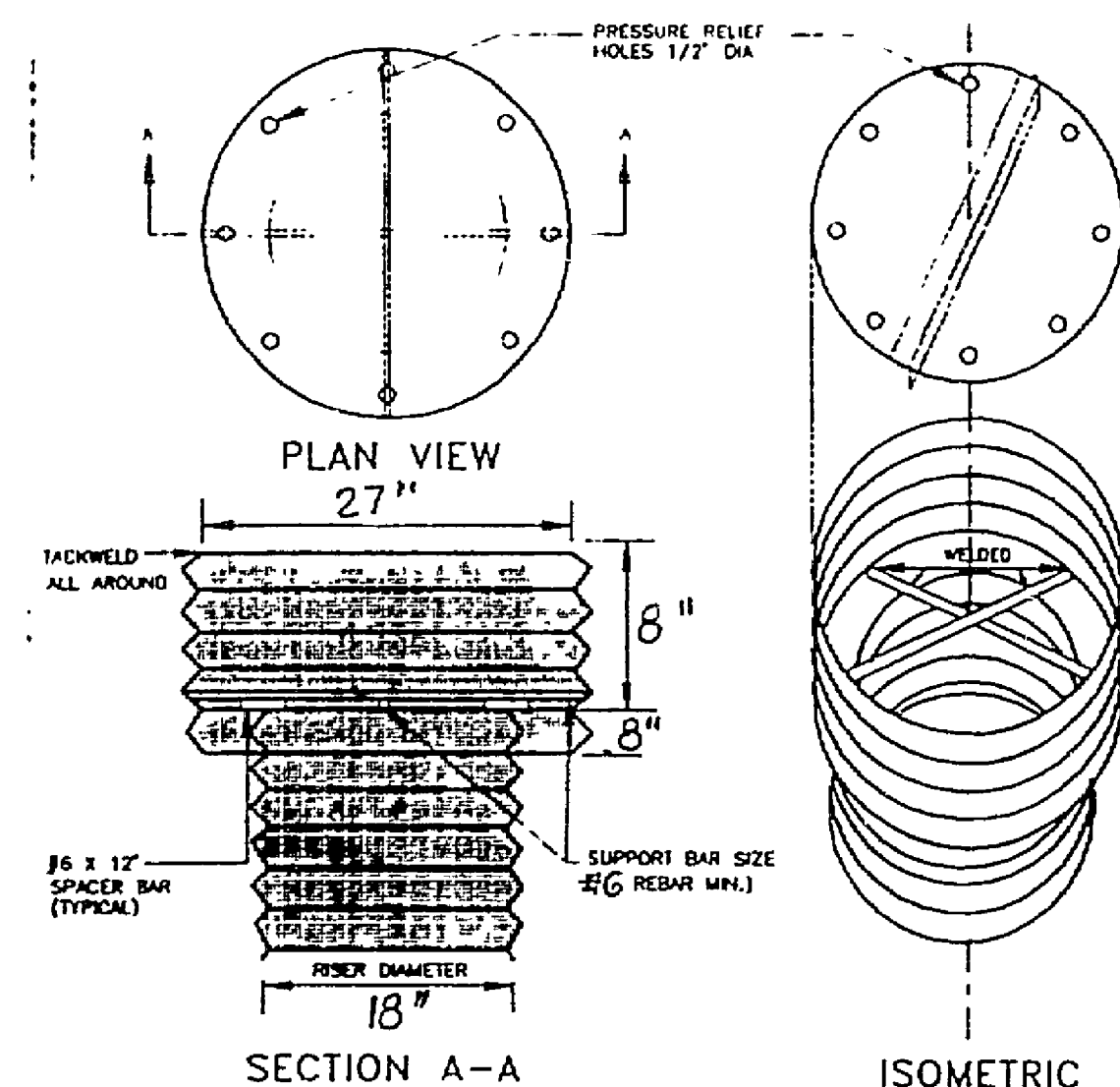




DETAILS OF CORRUGATED METAL ANTI-SEEP COLLAR

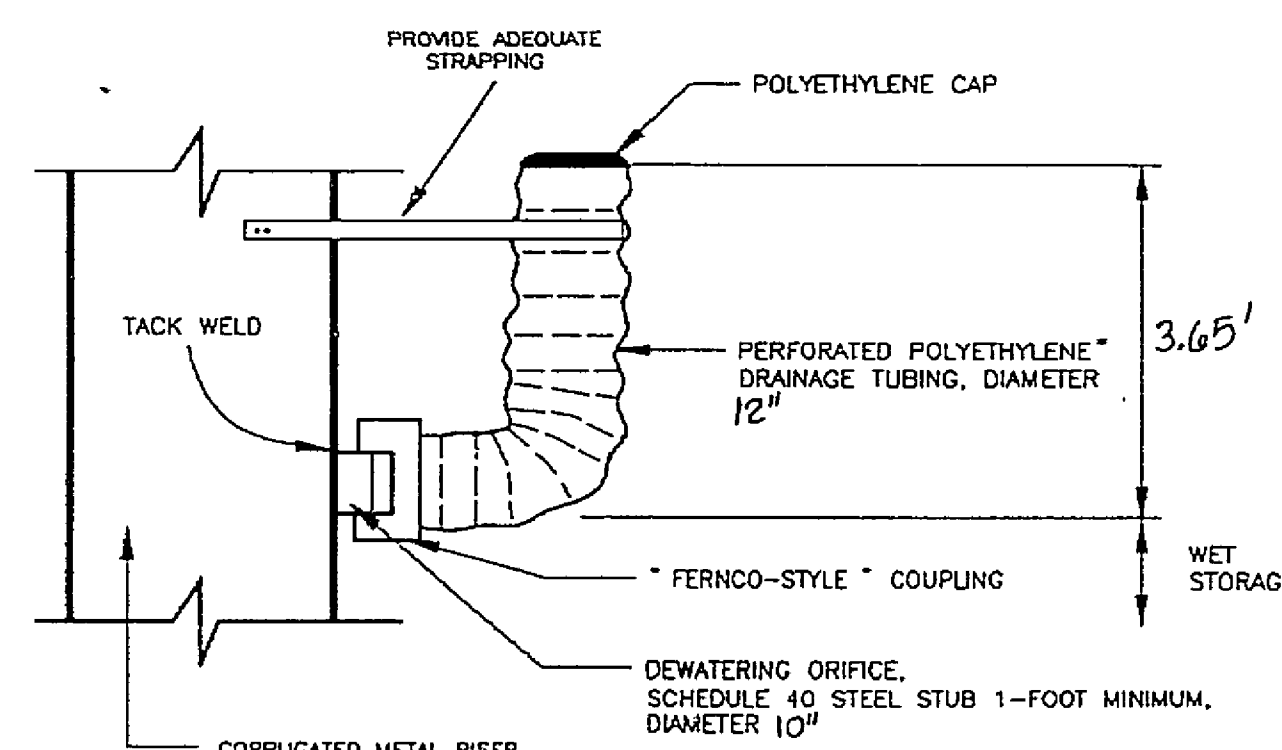


- ELEVATION OF UNASSEMBLED COLLAR**
- NOTES FOR COLLARS:**
1. ALL MATERIALS TO BE IN ACCORDANCE WITH CONSTRUCTION AND CONSTRUCTION MATERIAL SPECIFICATIONS.
 2. WHEN SPECIFIED ON THE PLANS, COATING OF COLLARS SHALL BE IN ACCORDANCE WITH CONSTRUCTION AND CONSTRUCTION MATERIAL SPECIFICATIONS.
 3. UNASSEMBLED COLLARS SHALL BE MARKED BY PAINTING OR TAGGING TO IDENTIFY MATCHING PAIRS.
 4. THE LAP BETWEEN THE TWO HALF SECTIONS AND BETWEEN THE PIPE AND CONNECTING BAND SHALL BE CAULKED WITH ASPHALT MASTIC AT TIME OF INSTALLATION.
 5. EACH COLLAR SHALL BE FURNISHED WITH TWO 1/2\"/>



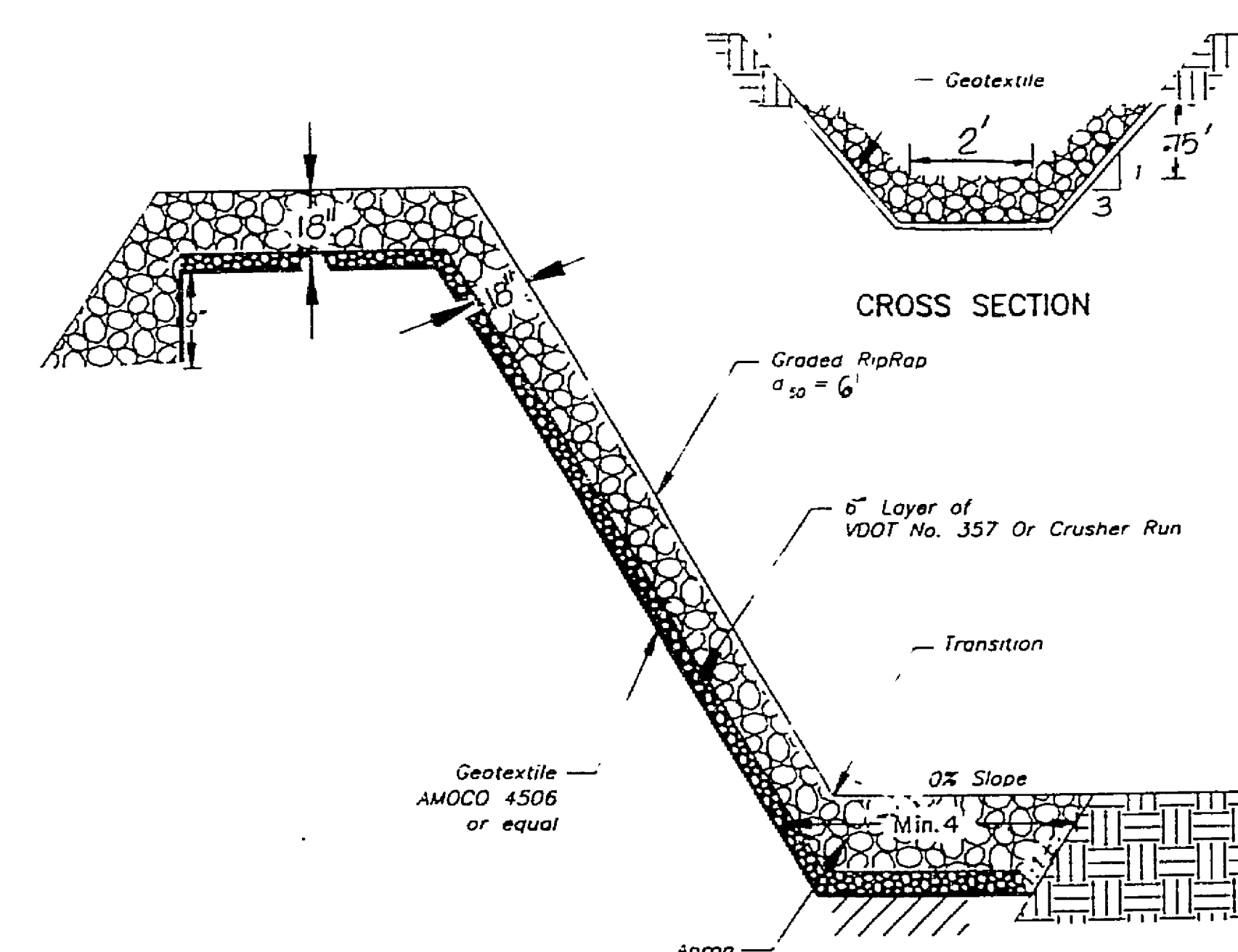
ANTI-VORTEX DEVICE

RECOMMENDED DEWATERING SYSTEM FOR SEDIMENT BASINS



NOTE: WITH CONCRETE RISER, USE PVC SCHEDULE 40 STUB FOR DEWATERING ORIFICE

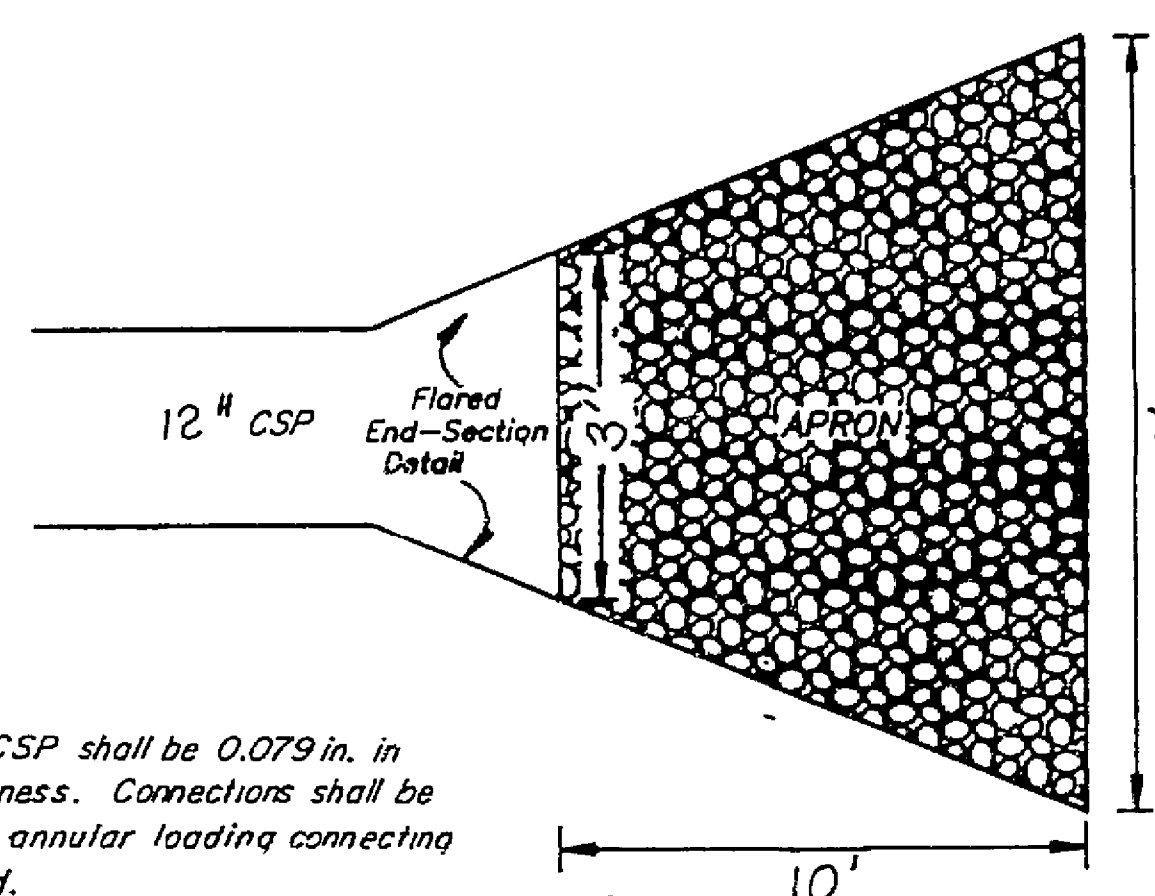
*DRAINAGE TUBING SHALL COMPLY WITH ASTM F567 AND AASHTO M294



- Notes:**
1. Geotextile overlaps shall be shingled with upstream fabric overlapping downstream fabric a minimum of 12 inches. Anchor pins, 15\"/>
 - 2. Placement of geotextile must commence and be completed immediately following slope preparation

EMERGENCY SPILLWAY

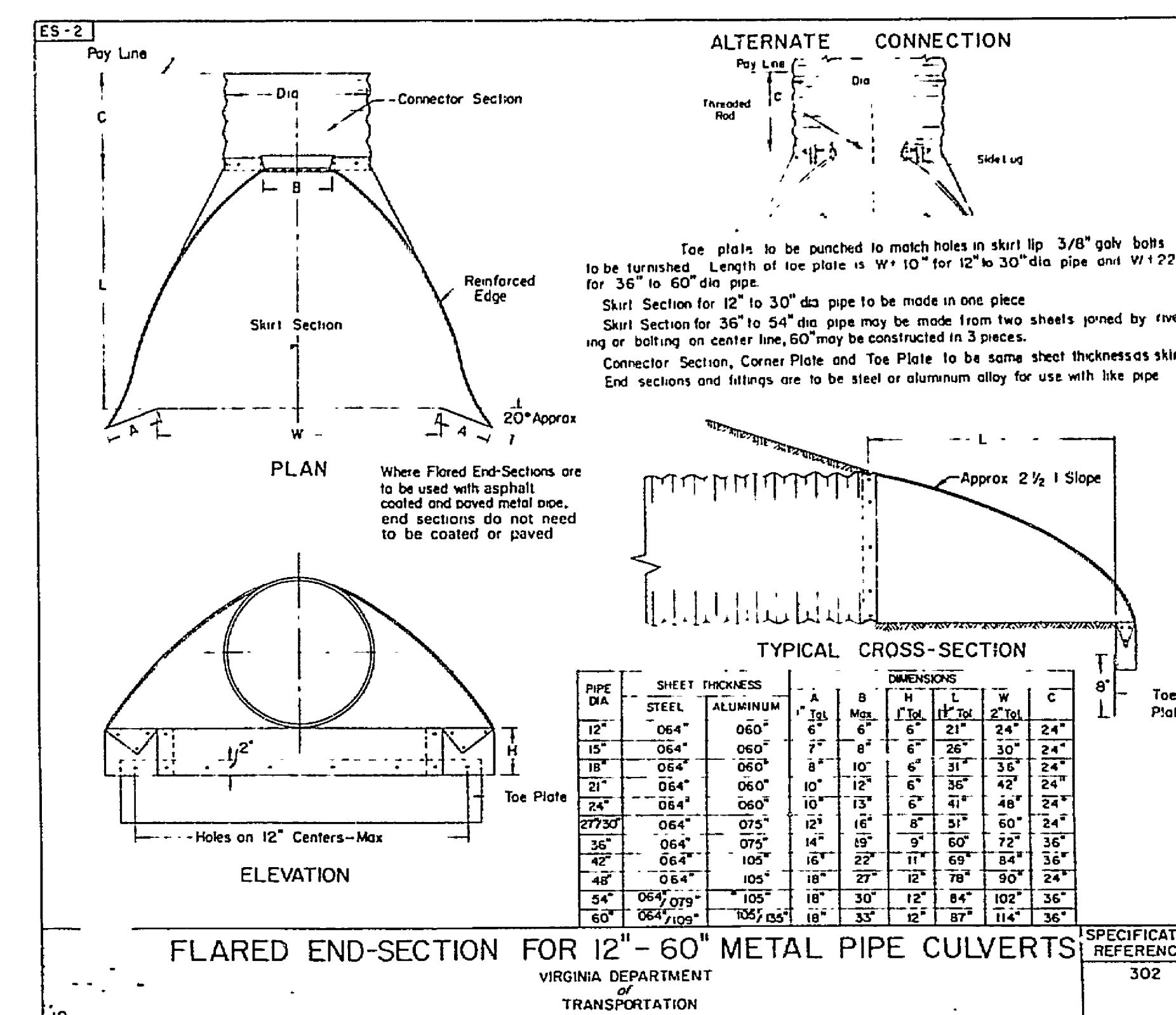
Not to Scale



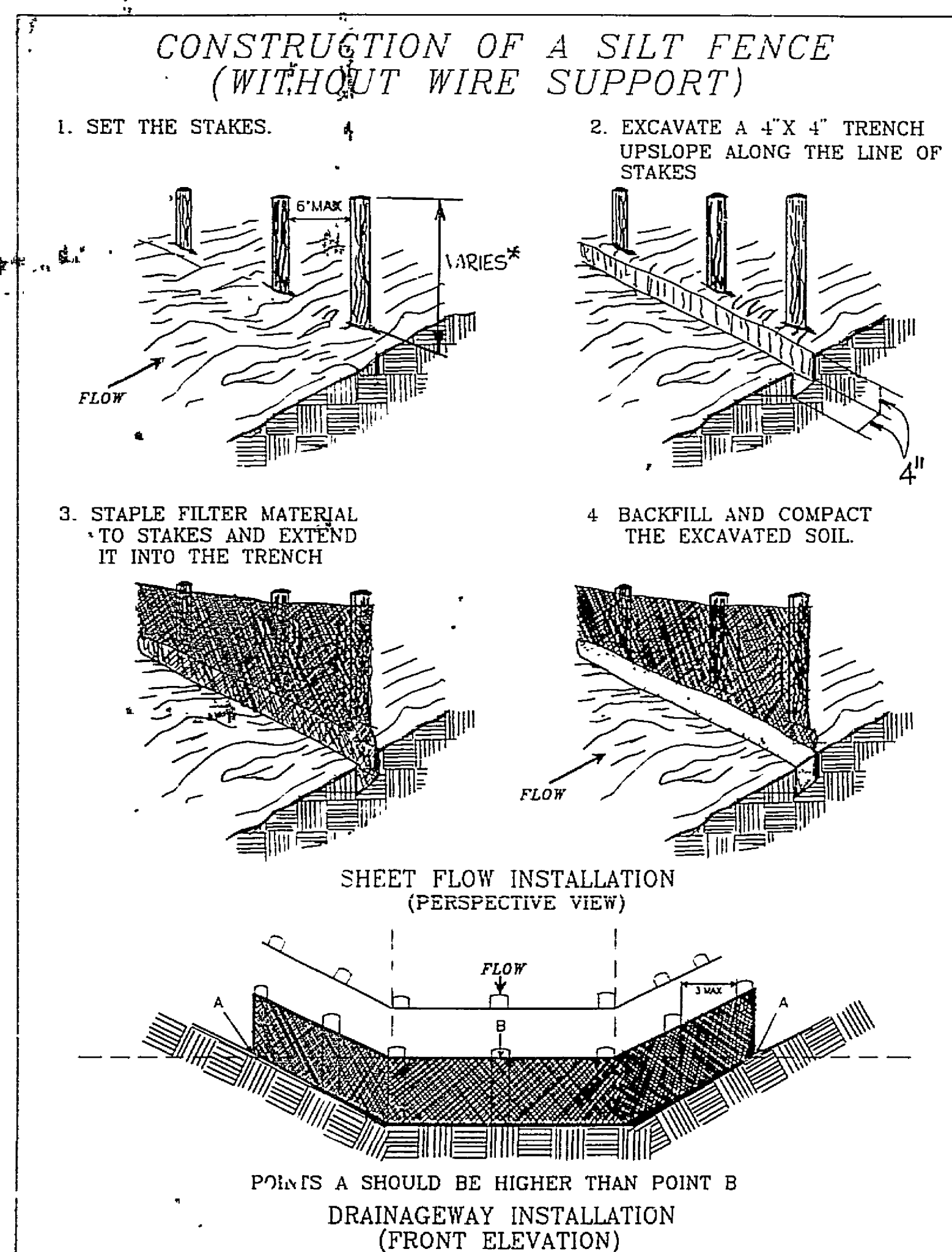
All CSP shall be 0.079 in. in thickness. Connections shall be with annular loading connecting band.

OUTLET PROTECTION

Not to Scale

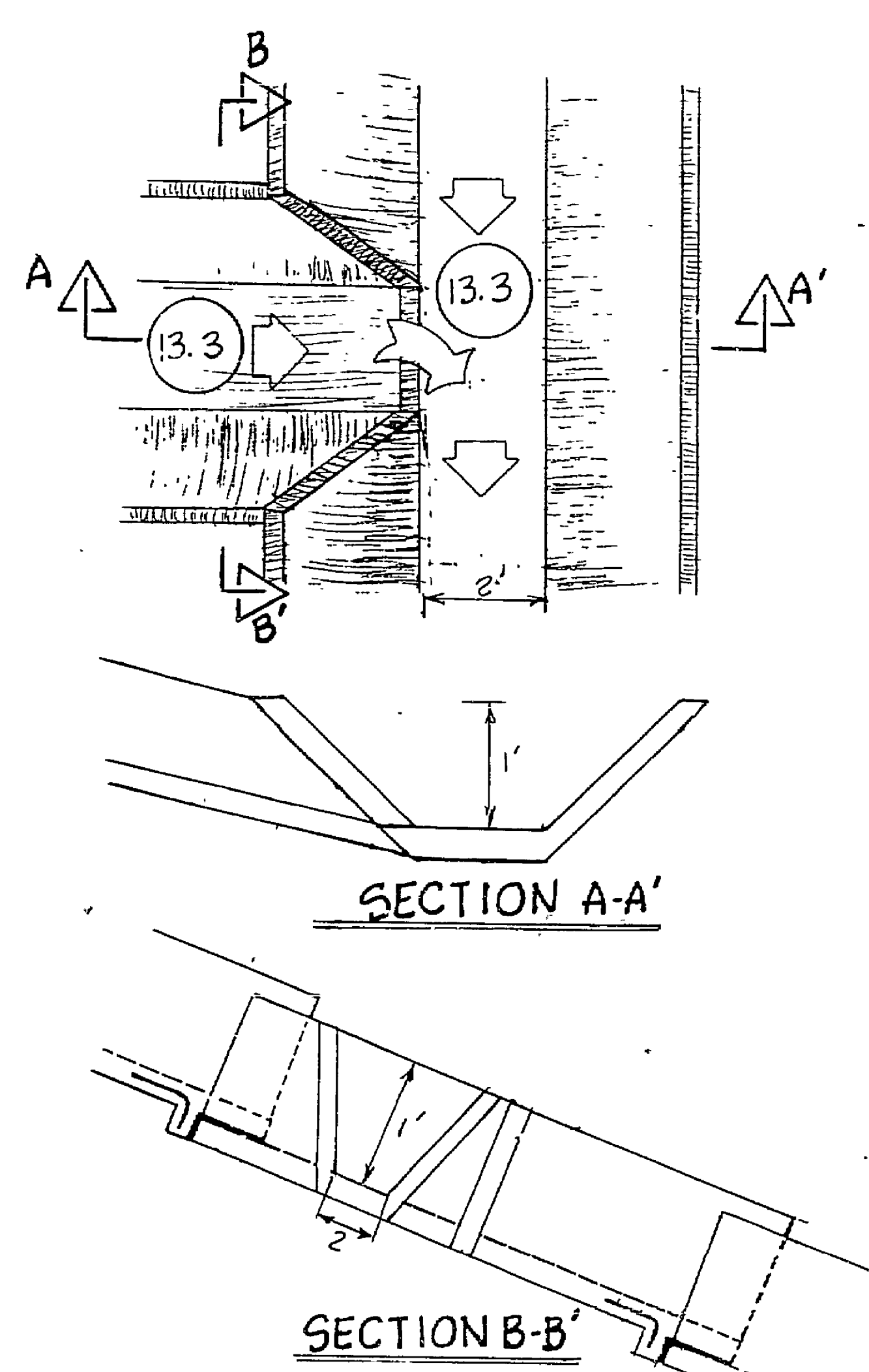


RC-5409



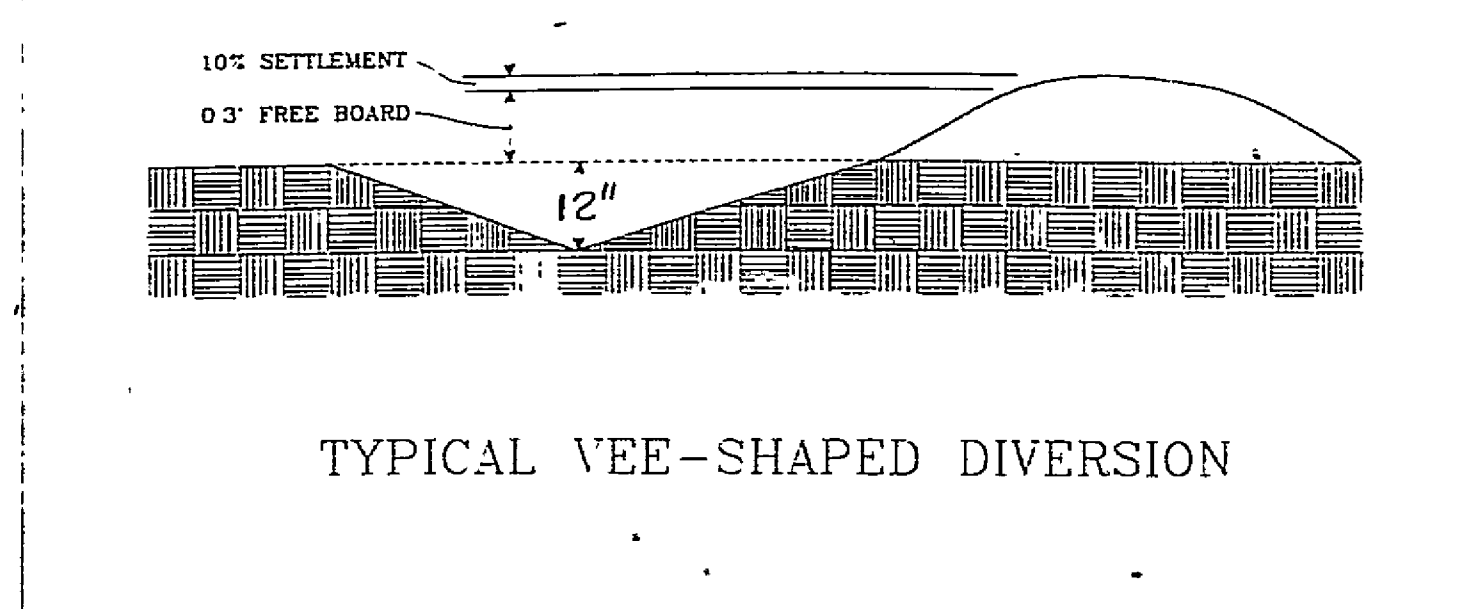
16.1

SILT FENCE

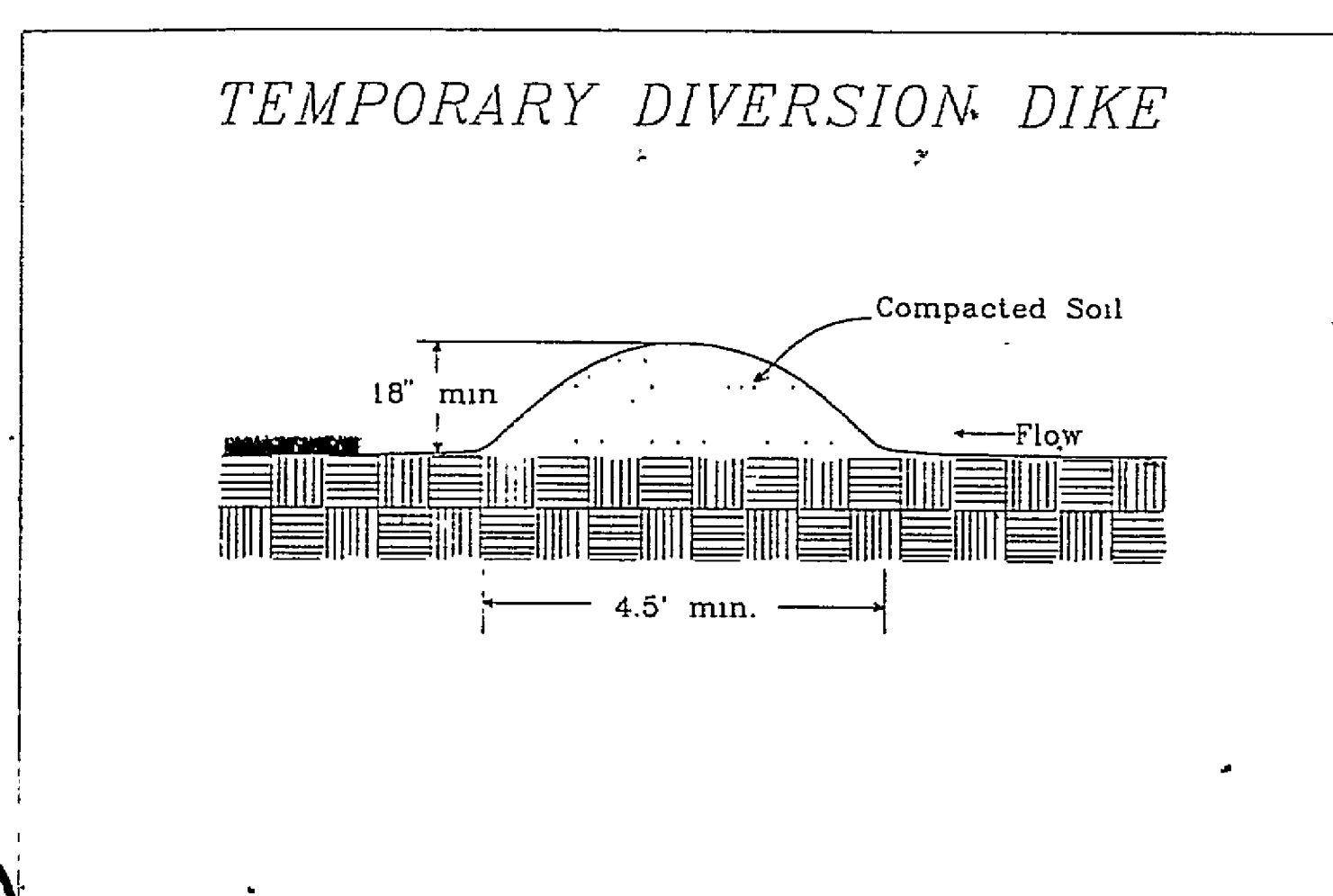


16.2

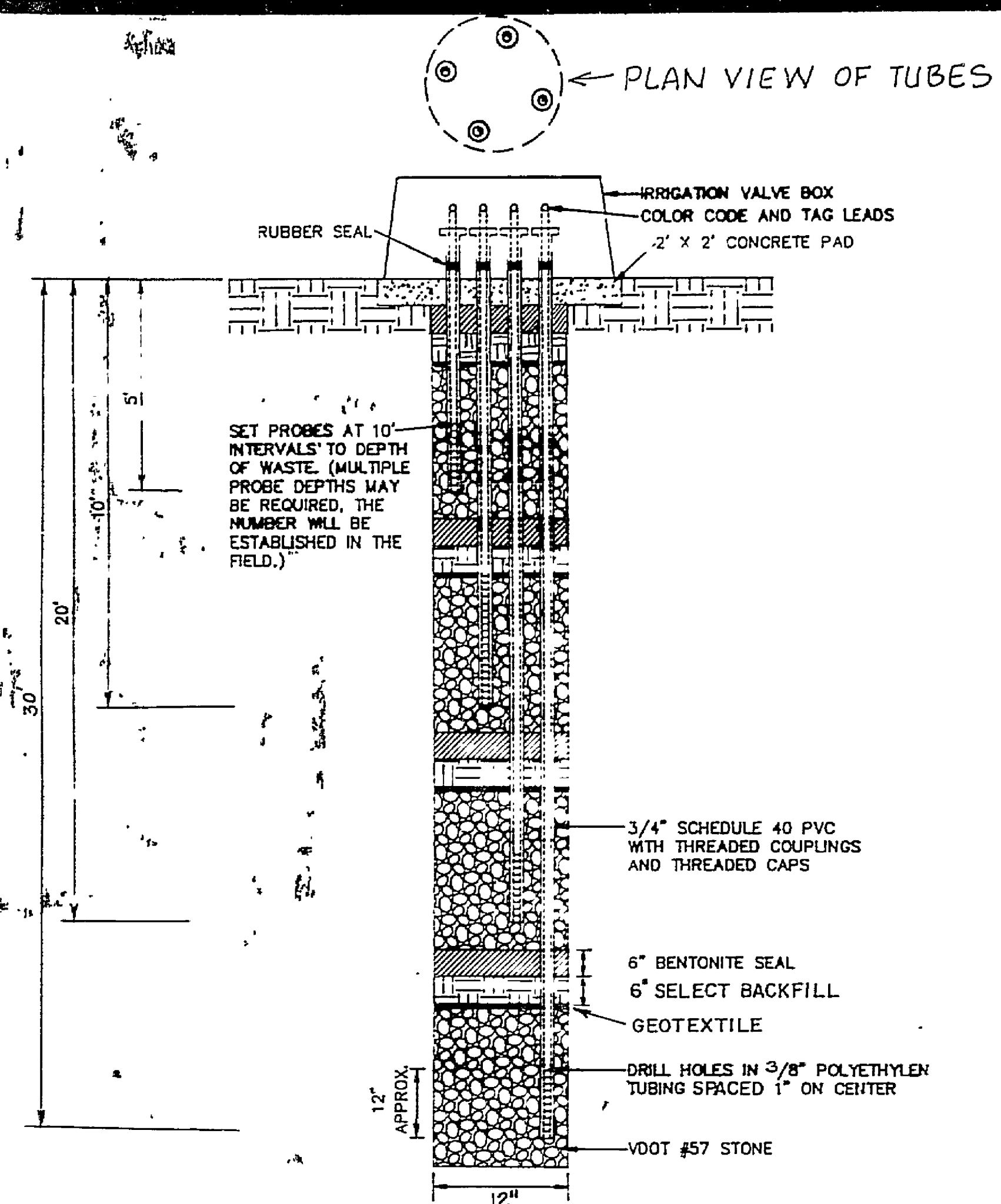
SCC INTERSECTION DETAIL



16.3



16.4



16.5

GAS PROBE DETAIL

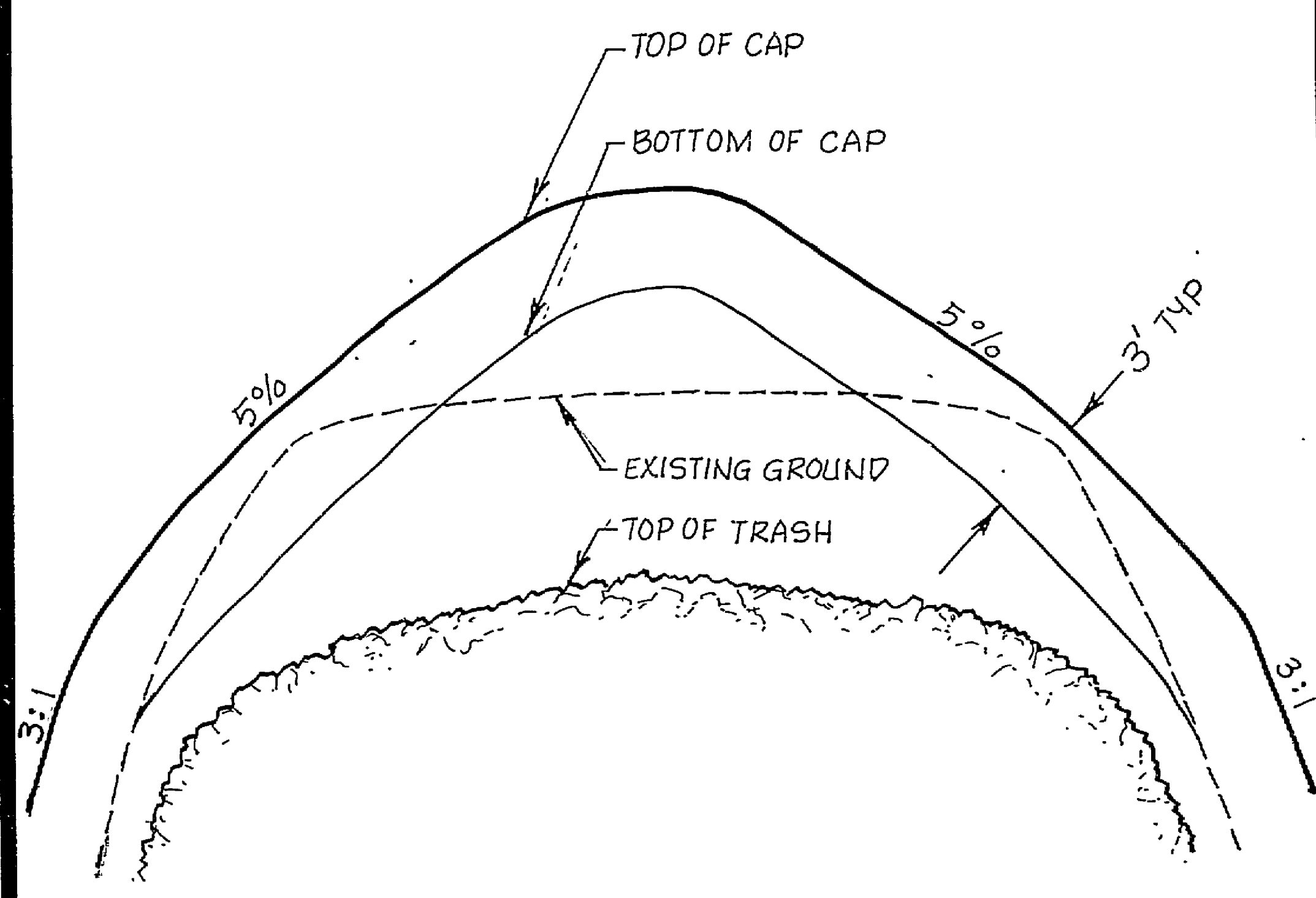
LANDFILL GAS MONITORING PROBE CONSTRUCTION SCHEDULE

SHEET NO.	PROBE NO.	TOTAL DEPTH FT.
2	1	30
	2	30
	3	10
	4	30
	5	30
	6	10
	7	10
	8	10
	9	30
	10	30
	11	30
	12	10
	13	10
	14	10
	15	10

DEPTHS ARE ESTIMATES. MAY VARY WITH FIELD CONDITIONS

16.6

GAS PROBE DEPTHS



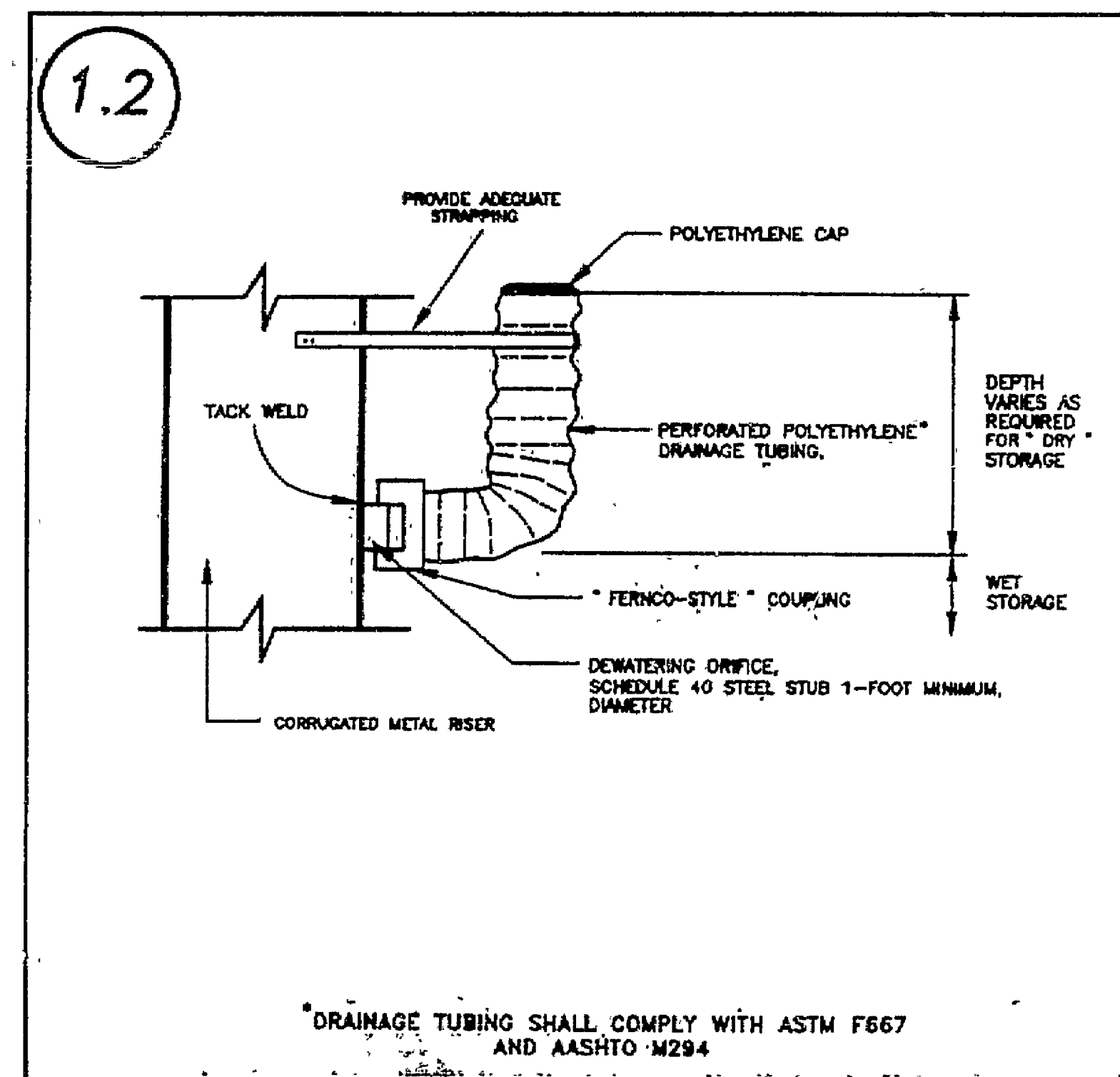
16.7

CAP SECTION FOR SHEET 5

RC-5410

NOTES

1. LANDFILL PONDS ARE NUMBERED TO COINCIDE WITH NUMBERS SHOWN ON SHEET 2 OF 16
2. PONDS SHALL BE CLEANED, MAINTAINED, AND IMPROVED ACCORDING TO THESE DRAWINGS AND THE SPECIFICATIONS. MATERIAL REMOVED FROM POND WILL BE DISPOSED AT A LOCATION NOT TO BE CAPPED AS DIRECTED BY ENGINEER.
3. CONTRACTOR SHALL FIRST INSTALL A SILT FENCE BARRIER DOWNSTREAM OF THE DISCHARGE PIPE, THEN PERFORM MODIFICATIONS TO THE DISCHARGE PIPE, FOLLOWED BY POND CLEANING AND EXCAVATION. PRIOR TO CLEANING POND, POND WATER MAY BE DISCHARGED THROUGH STANDPIPE.
4. EACH POND WILL REQUIRE THE 36" CSP DISCHARGE PIPE TO BE CUT WITH ADDITIONAL PIPE WELDED INTO PLACE ALONG THE SLOPE TO PROVIDE THE DISCHARGE AT GROUND LEVEL. SEE DETAIL 1.1.
5. CLEANOUT PONDS (REMOVE ALL ACCUMULATED SEDIMENT) AND EXCAVATE TO "PROPOSED BOTTOM ELEVATION" WHILE MAINTAINING UNIFORM SIDE SLOPES TO THIS BOTTOM ELEVATION.
6. CONTRACTOR SHALL RAISE ALL EMBANKMENTS AS NECESSARY TO ENSURE THAT THE TOP OF BANK IS 3' MINIMUM ABOVE THE STANDPIPE CREST.
7. CONTRACTOR SHALL TEMPORARILY REPAIR ALL STANDPIPE LEAKS.

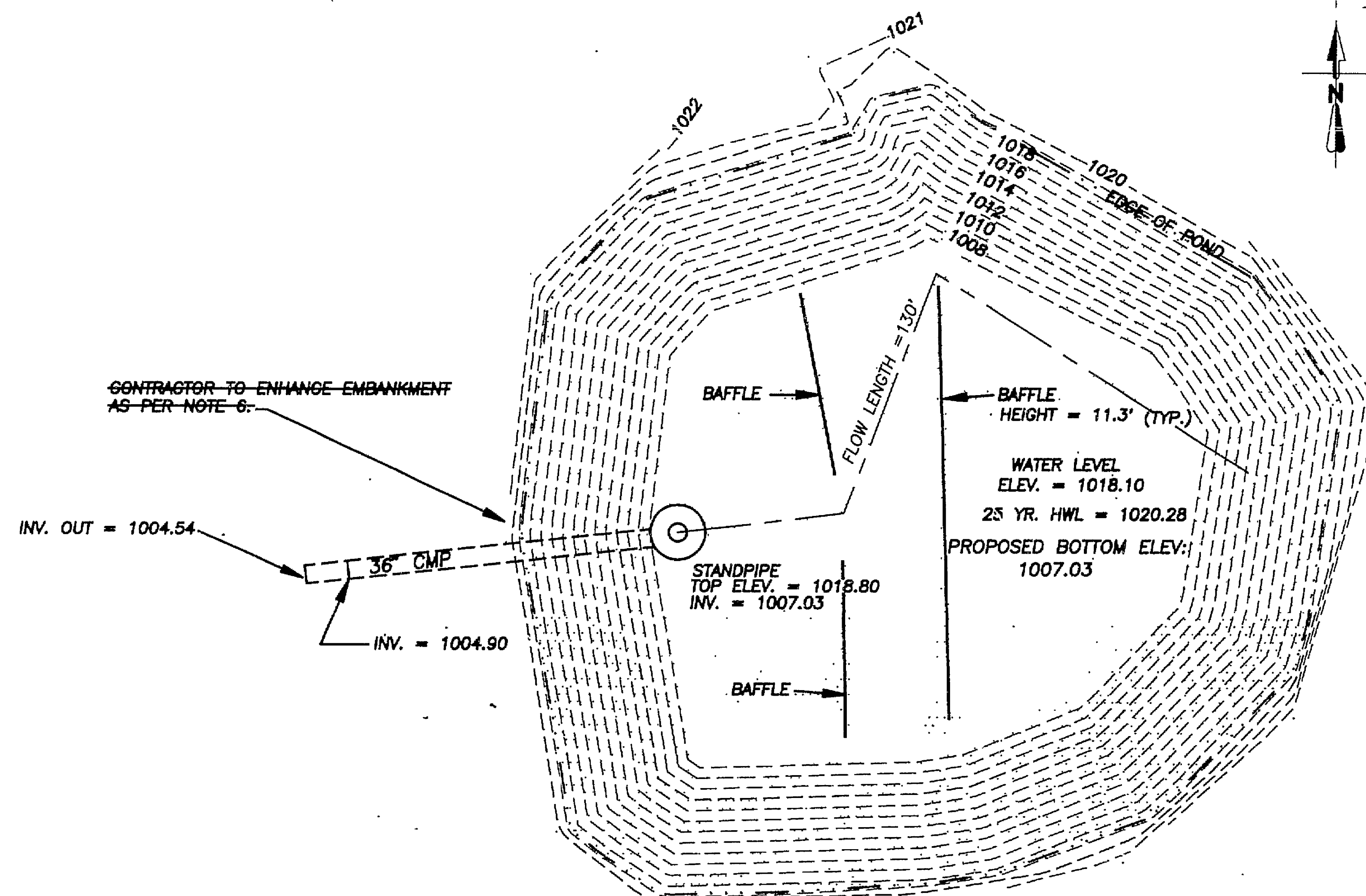
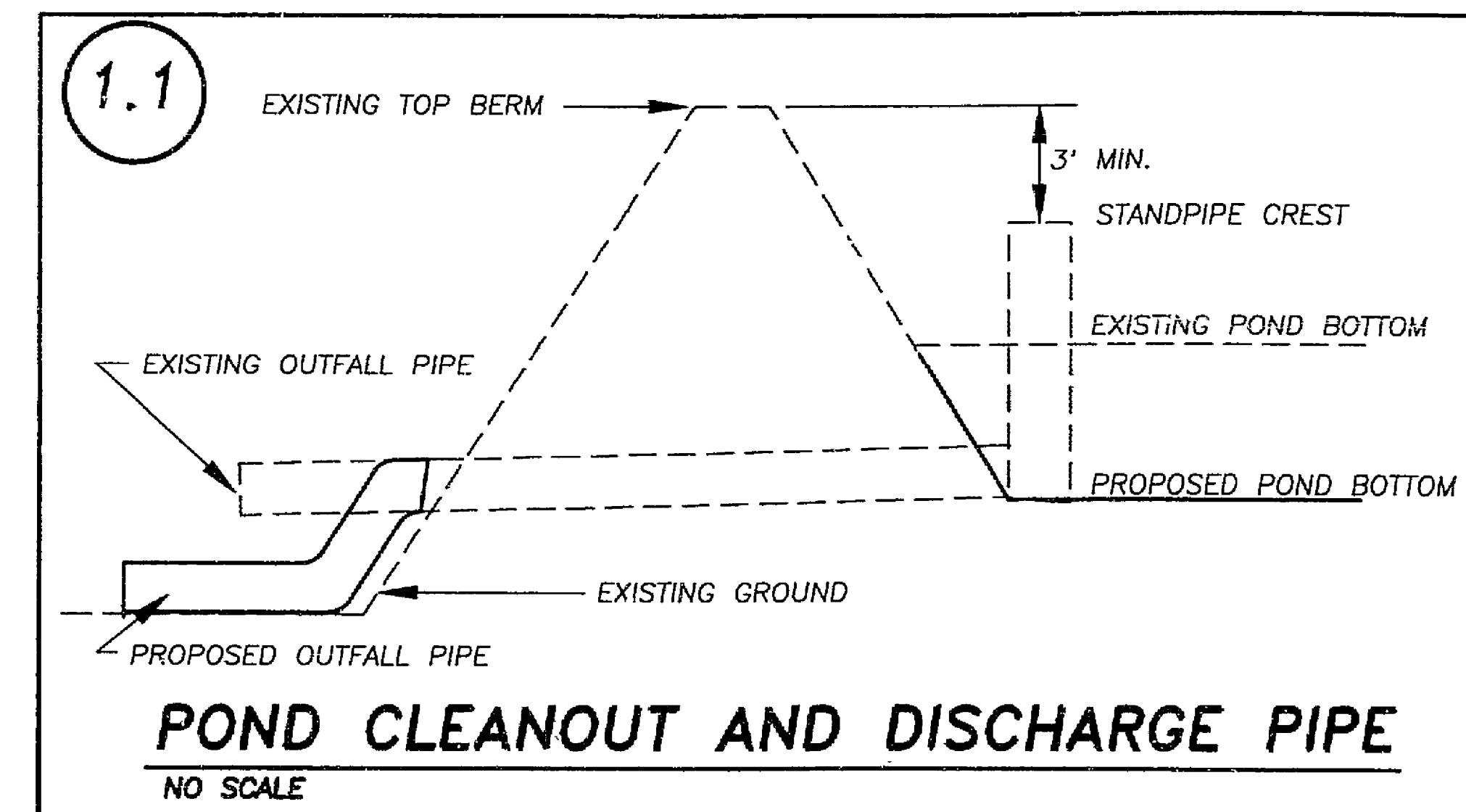


LANDFILL POND NO.	SEDIMENT CLEANOUT ELEVATION	DEWATERING DEVICE ELEVATION
	DISTANCE IS MEASURED FROM STANDPIPE CREST	
1	9.8	7.0
2	7.4	5.5
3	7.7	5.8
4	12.1	10.3
5	10.6	6.0

APPROXIMATELY 7 CY OF $d_{50} = 1.5$ FT. RIP RAP SHALL BE INSTALLED AT EACH PIPE OUTFALL.

DEWATERING DEVICE IS 6" DIAMETER FOR ALL PONDS.

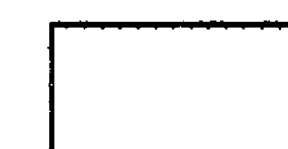
DEWATERING AND CLEANOUT SCHEDULE



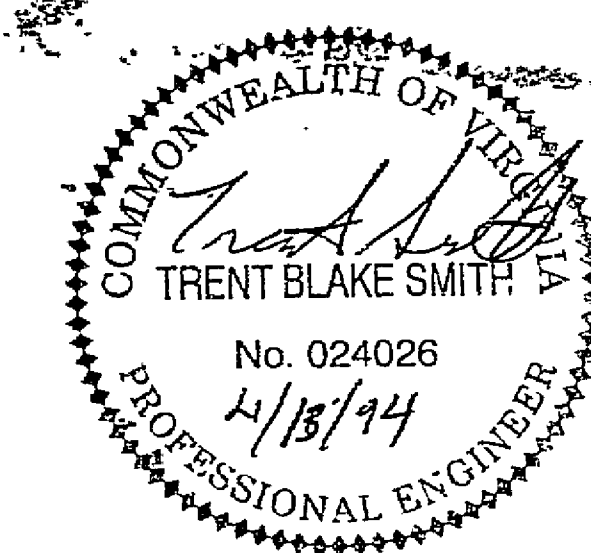
FOR BAFFLE DETAIL, SEE SHEET 2

SEDIMENT POND NO. 1

SCALE: 1"=20'



WATER LEVEL AT CREST OF STANDPIPE



RC-5411

APPROVED
LAND DISTURBING PERMIT
EROSION-SILTATION CONTROL
ROANOKE COUNTY

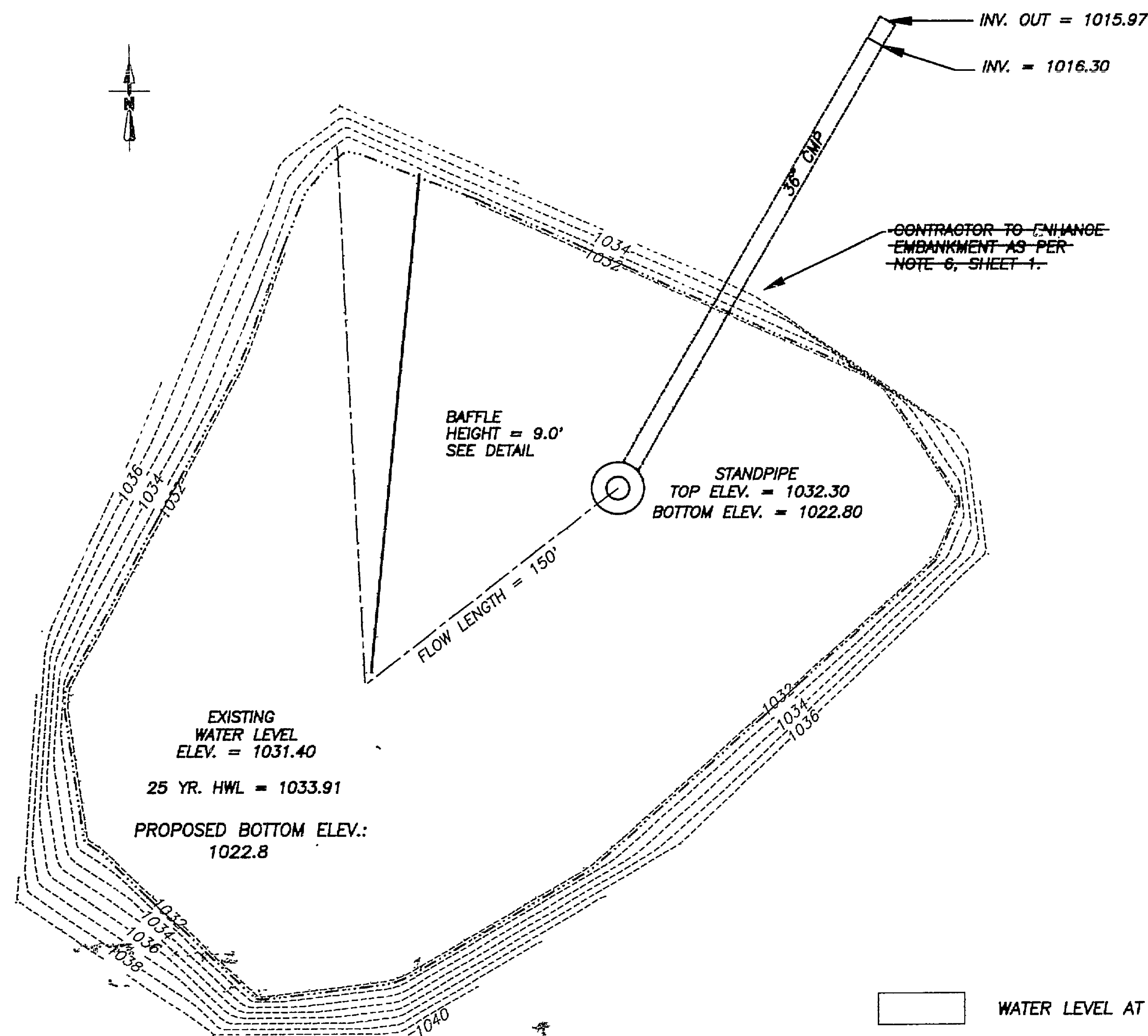
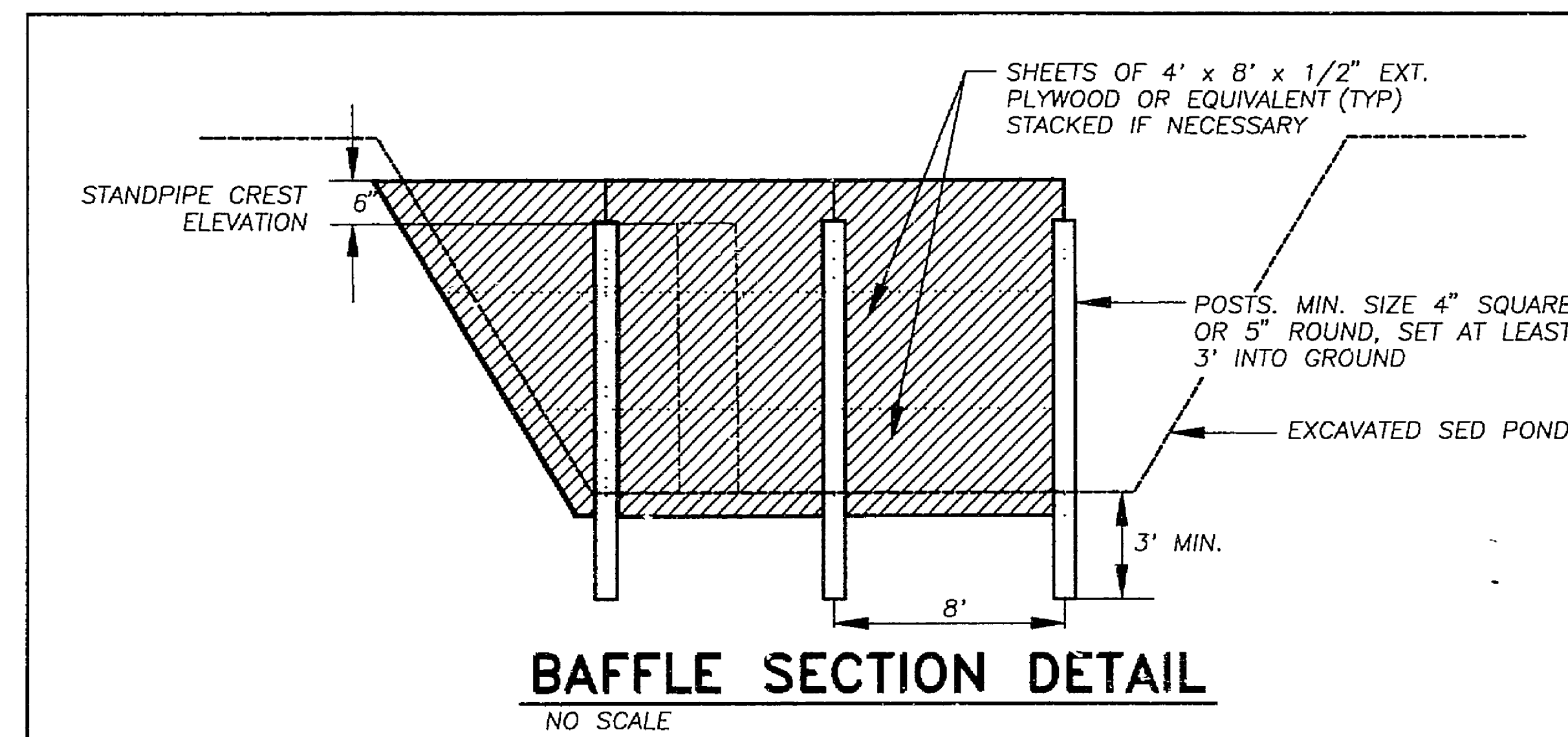
DATE

REVISIONS:
4/08/94

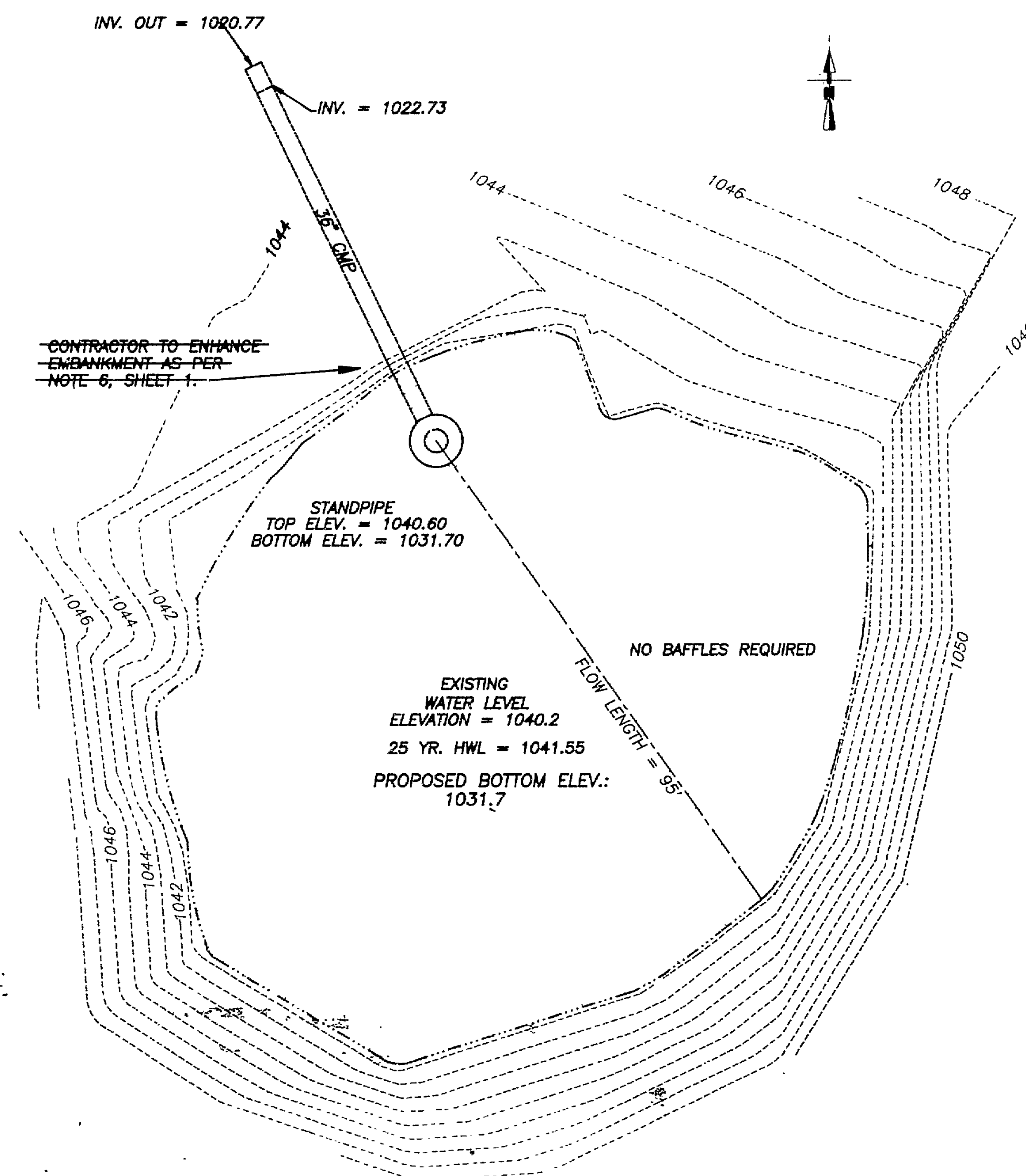
LANDFILL POND IMPROVEMENTS
ROANOKE REGIONAL LANDFILL FINAL CAPPING CLOSURE
ROANOKE COUNTY, VIRGINIA

DESIGNED
DRAWN
CHECKED
DATE
TBS/LHJ
LHJ
LKS
4/03/94

Draper Aden Associates
CONSULTING ENGINEERS/SURVEYORS
Bristol, VA - Richmond, VA - Nashville, TN

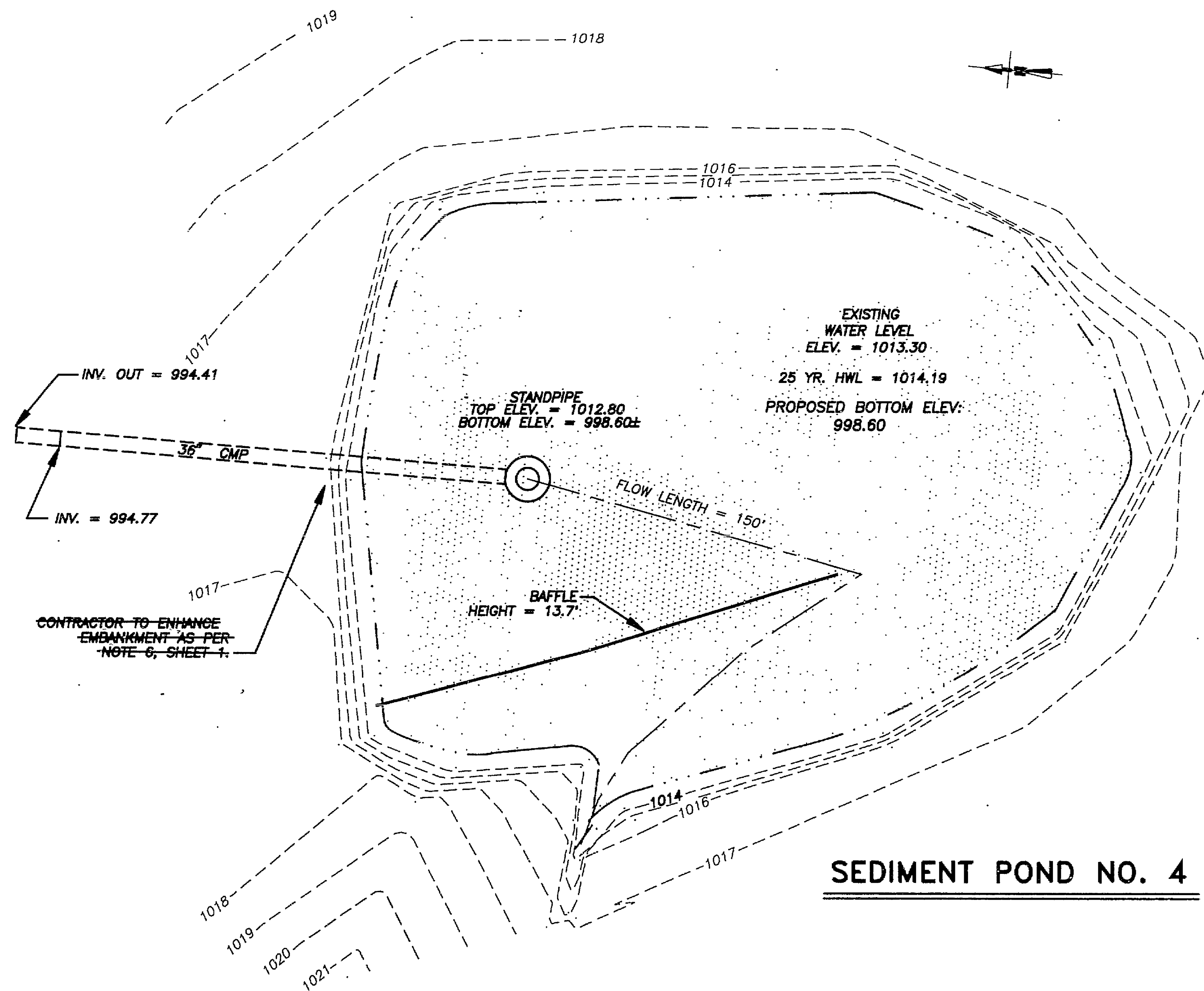


SEDIMENT POND NO. 2



SEDIMENT POND NO. 3

RC-5412



SHEET
6 OF 3

SCALE: 1" = 20'

PLAN No.T-6838-03A

REVISIONS:
4/08/94

ADDENDUM 1: LANDFILL POND IMPROVEMENTS
ROANOKE REGIONAL LANDFILL FINAL CAPPING CLOSURE
ROANOKE COUNTY, VIRGINIA

DESIGNED TBS/LHJ
DRAWN LHJ
CHECKED LKC
DATE 4/03/94

Draper Aden Associates
CONSULTING ENGINEERS/SURVEYORS
Blackburn, VA - Richmond, VA - Nashville, TN

