CERTIFICATE OF AUTHENTICITY

THIS IS TO CERTIFY THAT THE FOLLOWING ELECTRONIC RECORDS ARE TRUE AND ACCURATE REPRODUCTIONS OF THE ORIGINAL RECORDS OF JAMES CITY COUNTY GENERAL SERVICES DEPARTMENT- STORMWATER DIVISION; WERE SCANNED IN THE REGULAR COURSE OF BUSINESS PURSUANT TO GUIDELINES ESTABLISHED BY THE LIBRARY OF VIRGINIA AND ARCHIVES; AND HAVE BEEN VERIFIED IN THE CUSTODY OF THE INDIVIDUAL LISTED BELOW.

BMP NUMBER: **MC020**

DATE VERIFIED: **December 7, 2012**

QUALITY ASSURANCE TECHNICIAN: **Leah Hardenbergh**

Leah Hardenbergh

LOCATION: WILLIAMSBURG, VIRGINIA

Stormwater Division

MEMORANDUM

Date: April 4, 2012

To: Michael J. Gillis, Virginia Correctional Enterprises Document Management Services

From: Leah Hardenbergh

PO: 110426

Re: Files Approved for Scanning

General File ID or BMP ID: **MC020**

PIN: **4740100031**

Owner Name (if known): **LAKE POWELL**

Legal Property Description: **POWELL LAKE**

Site Address:

(For internal use only):

Box # 4

Agreements (in file as of scan date): **N** **Book or Doc #:**

MC-020

Contents for Stormwater Management Facilities As-built Files

Each file is to contain:

1. As-built plan
2. Completed construction certification
3. Construction Plan
4. Design Calculations
5. Watershed Map
6. Maintenance Agreement
7. Correspondence with owners
8. Inspection Records
9. Enforcement Actions

No.	DATE	REVISION / COMMENT / NOTE	WORD PROCESSOR BY

LAKE POWELL WATERSHED
APPROX. 2,591 - 2,610 ACRES

MARYWOOD SUBDIVISION

TOTAL LAND AREA = 115.27 ACRES
AREA OF LOTS = 43.01 ACRES
AREA OF RIGHT OF WAY = 7.58 ACRES
AREA OF COMMON AREA = 64.68 ACRES

Missing DA Hook at St Andrews Church Rec.

BROOKHAVEN
THE MEADOWS
CREEK
ROUTE 199
CANTERBURY HILLS
THE FOXES
INDIGO PARK
WILLIAMSBURG CROSSING
BRANDON WOODS
WHITE OAKS
GRAYLIN WOODS
JOHN TYLER MEMORIAL HWY
WINSTON TERRACE
WESTRAY DOWNS
VILLAGE SQUARE
DRUID HILLS
MARYWOOD
BIRCHWOOD
KINGSWOOD
JAMESTOWN ROAD
SETTLER'S MILL
LAKE POWELL FOREST
ROLLING WOODS

N

GRAPHIC SCALE
500' 0' 500' 1000'
SCALE: 1" = 500'

5248 Olde Towne Road, Suite 1
Williamsburg, Virginia 23188
(757) 253-0040
Fax (757) 220-8994

CONSULTING ENGINEERS
WILLIAMSBURG • RICHMOND

LAKE POWELL WATERSHED MAP
MARYWOOD SUBDIVISION
FOR CENTEX HOMES
JAMESTOWN DISTRICT JAMES CITY COUNTY VIRGINIA

Designed	Drawn
AES	AES
Scale	Date
1"=500'	7/11/06
Project No.	
9272	
Drawing No.	
-	

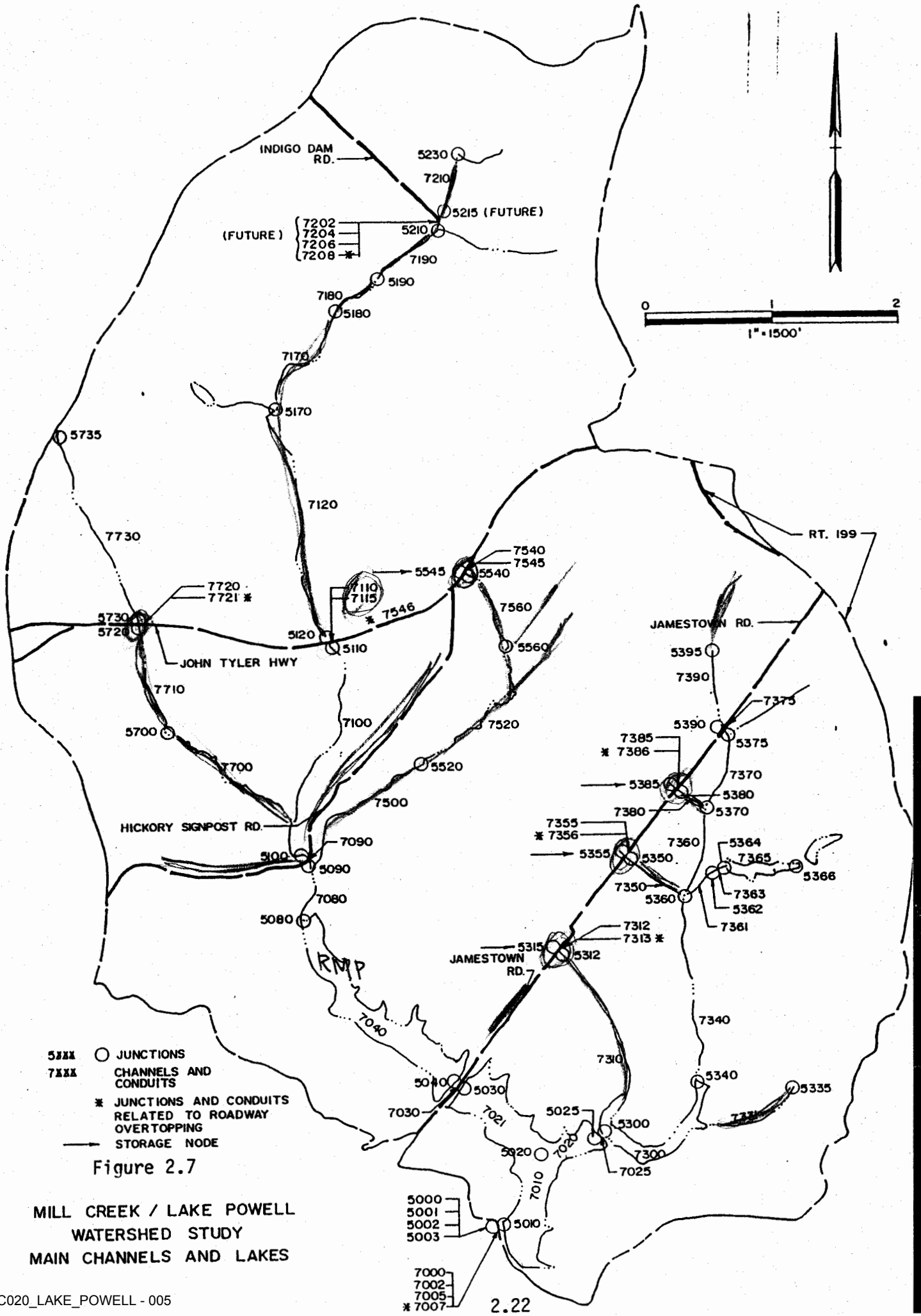
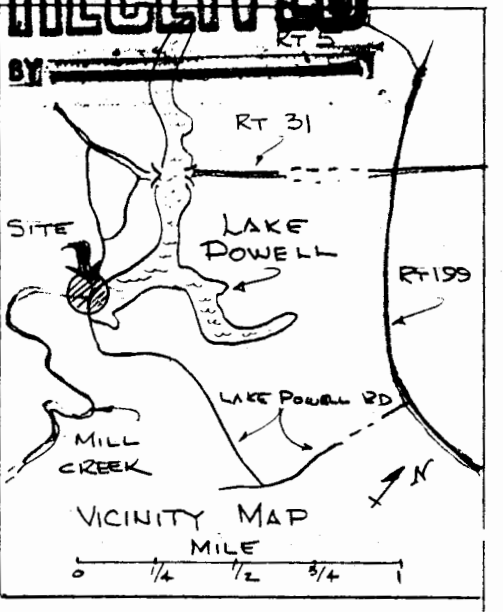


Figure 2.7

MILL CREEK / LAKE POWELL
WATERSHED STUDY
MAIN CHANNELS AND LAKES



PRIVATE RESIDENCE

PRIVATE RESIDENCE

PLAN VIEW
NOT TO SCALE

N

SEWERAGE LIFT STATION

SITE

EXISTING SPILLWAY

MILL CREEK

TIDAL WATER

A

A

LAKE POWELL

PROPOSED RIPRAP

LAKE POWELL ROAD

EARTHEN DAM

DATE - 6 NOV 1992

PURPOSE -
FILL ERODED DAM CORE
&
ESTABLISH WATER
SPILLWAY

EB

PLAN VIEW
ADJACENT PROP. OWNERS
① FLOYD CARMINES
② L.H. MATTHEWS
③

REPAIR LAKE POWELL
DAM & SPILLWAY
JAMES CITY CO.
VIRGINIA
APPLICATION BY:
FLORENCE ADSIT

REPAIR LAKE POWELL DAM & SPILLWAY
JAMES CITY CO.
VIRGINIA
APPLICATION BY:
FLORENCE ADSIT

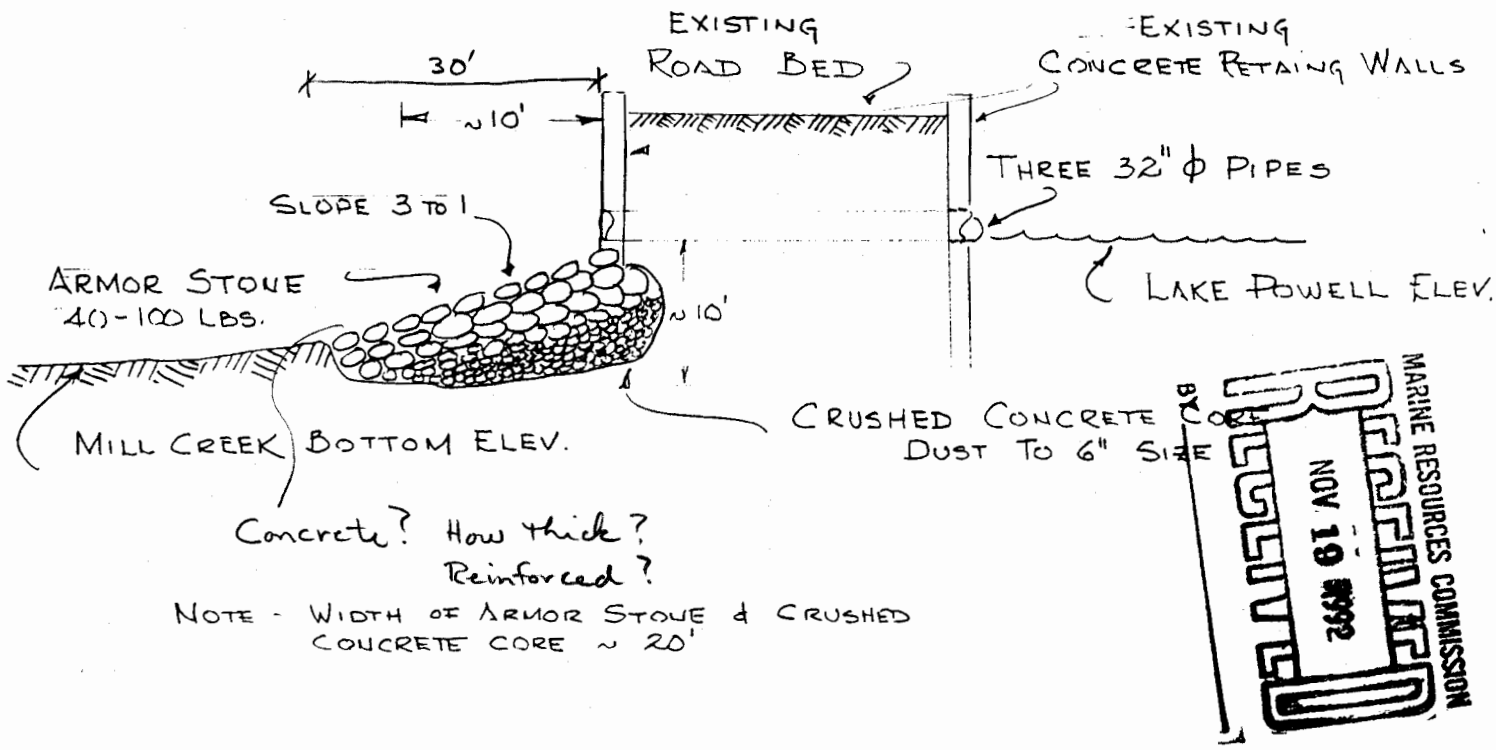
SECTION VIEW

PURPOSE - FILL ERODED DAM CORE & ESTABLISH WATER SPILLWAY

DATUM: MLW

ADJACENT PROP. OWNERS
@ FLOYD CARMINES
@ L.H. MATTHEWS

SECTION A-A
NOT TO SCALE



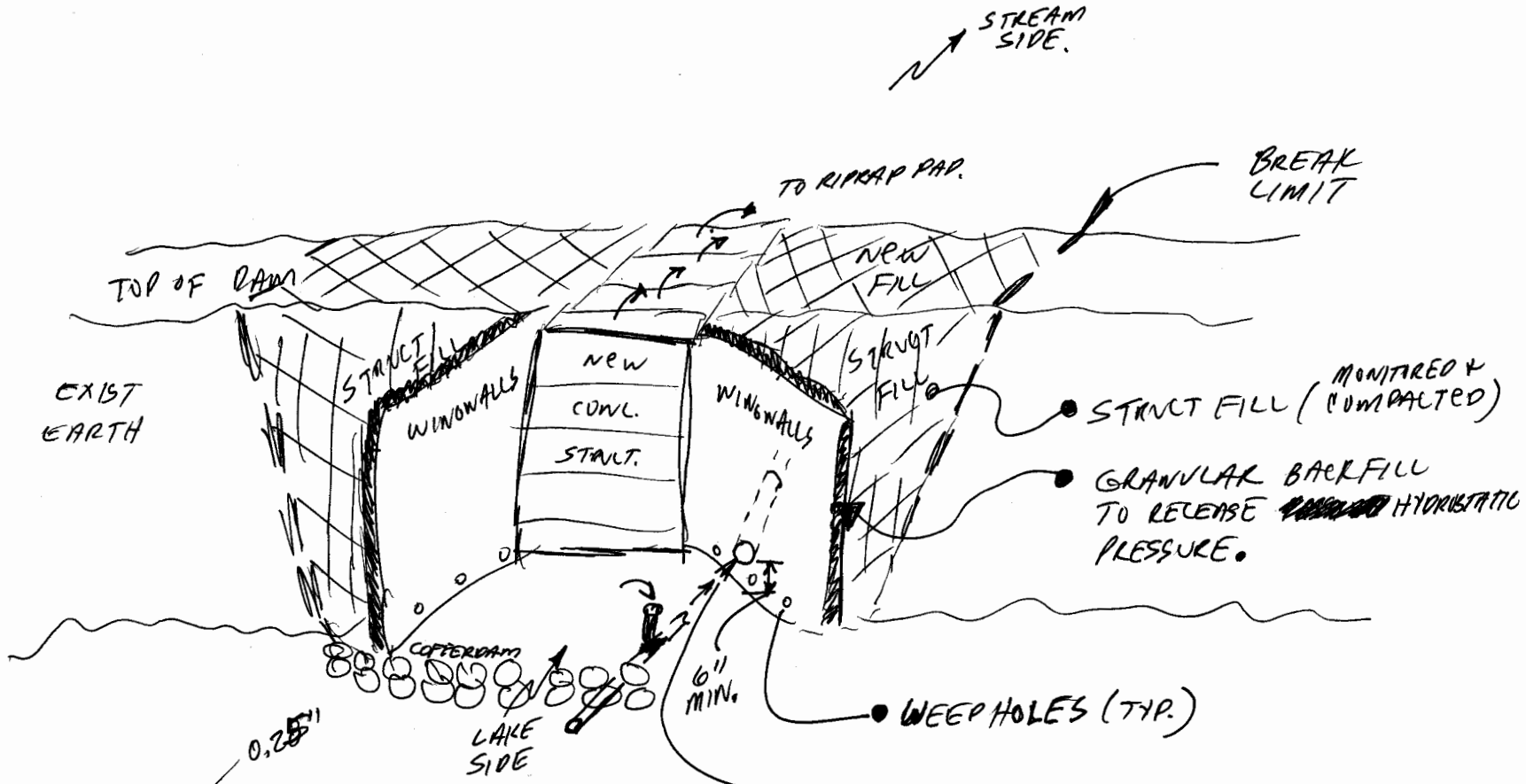
NOTE - WIDTH OF ARMOR STONE & CRUSHED CONCRETE CORE ~ 20'

DATE - 6 NOV 1992

COUNTY REVIEW

SHEET 1 OF 2

SKETCH



PIPE DESIGN REQUIREMENTS

8" CLASS 50 (WALL THICKNESS)

DEPTH OF COVER = 20' MAX.

CLASS 50. GOOD FOR ABOUT 20' DEPTH

TYPE 2, 3, 4 & 5 BEDDING

NO GOOD FOR CLASS 1 (FLAT BOTTOM TRENCH W/ LOOSE BACKFILL)

RUBBER RING COMPRESSION TYPE JOINT FOR UNDERGROUND SERVICE.

16' DESIGN MAX.

20' LAYING LENGTH

" O.D.

9.05"

350 psi RATED WORKING PRESSURE (INTERNAL) PLUS SURGE (100psi)

PUSH-ON JOINT MEETING ANSI/AWWA C111

FLANGED JOINT MEETING ANSI/AWWA C104

0.25"

8" DUCTILE IRON DRAIN/SAMPLING PIPE W/ MH & VALVE @ END.

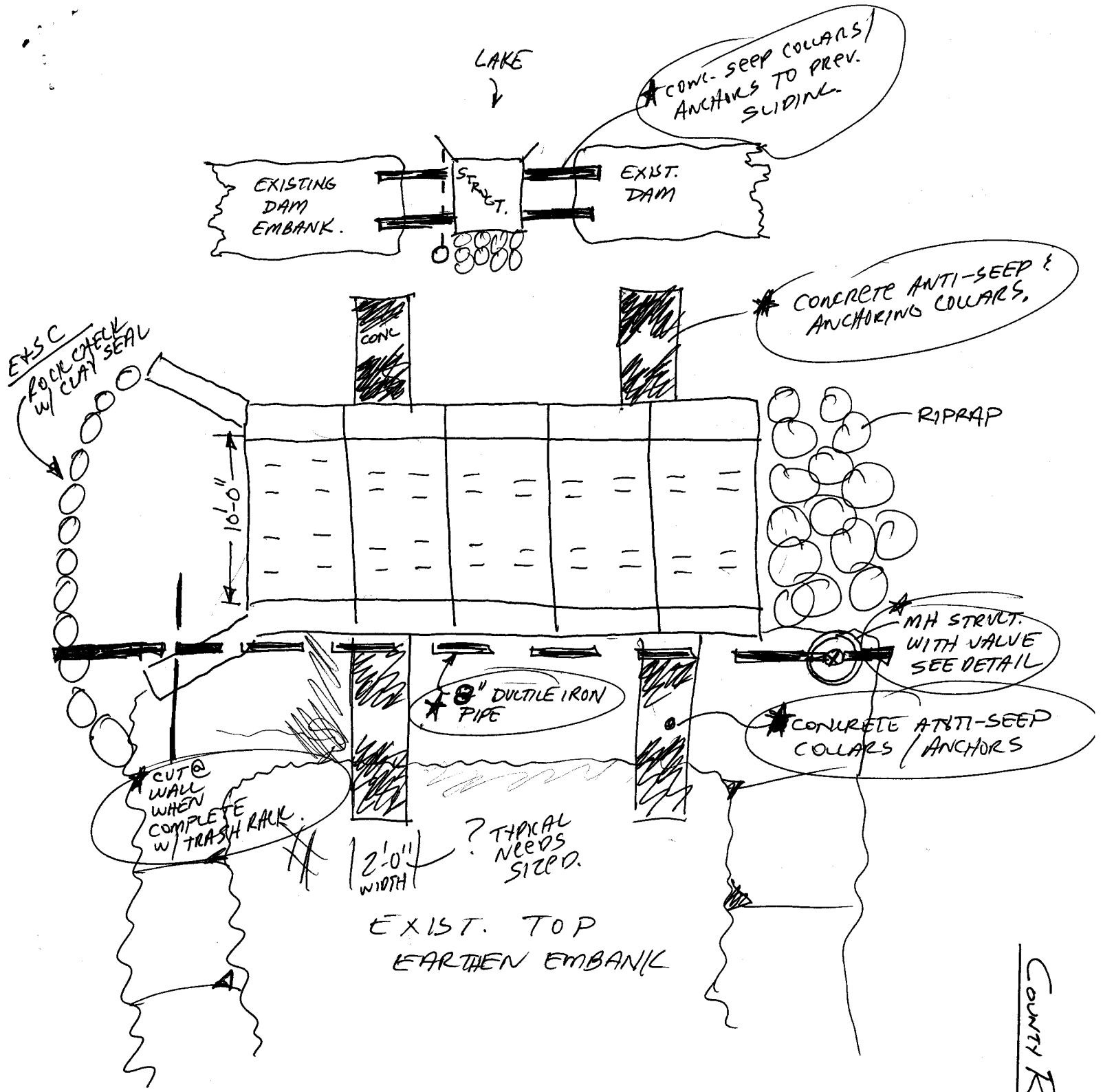
PIPE & VALVE SPECS.

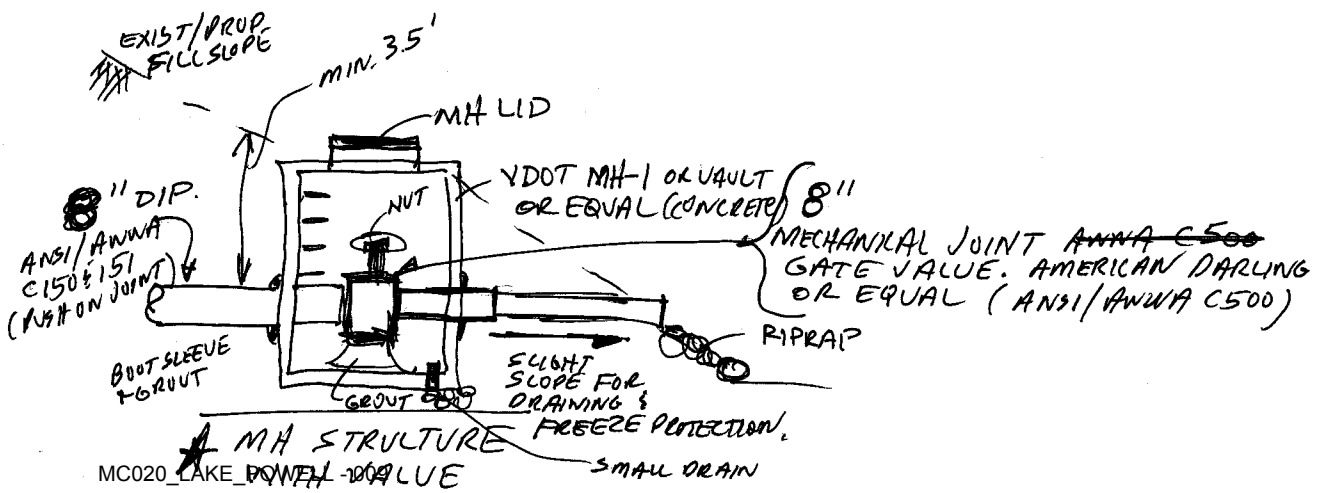
PIPE: CLASS 50 PUSH ON JOINT PIPE, ANSI/AWWA C150/C151; ANSI/AWWA C111; ANSI/AWWA C104.

VALVE: ANSI/AWWA C500 GATE VALVE 3" thru 48" NRS FOR WATER AND SEWAGE SYSTEMS CAN BE USED FOR THROTTLING PURPOSES.

200psi W.P.

MC020_LAKE_POWELL_008

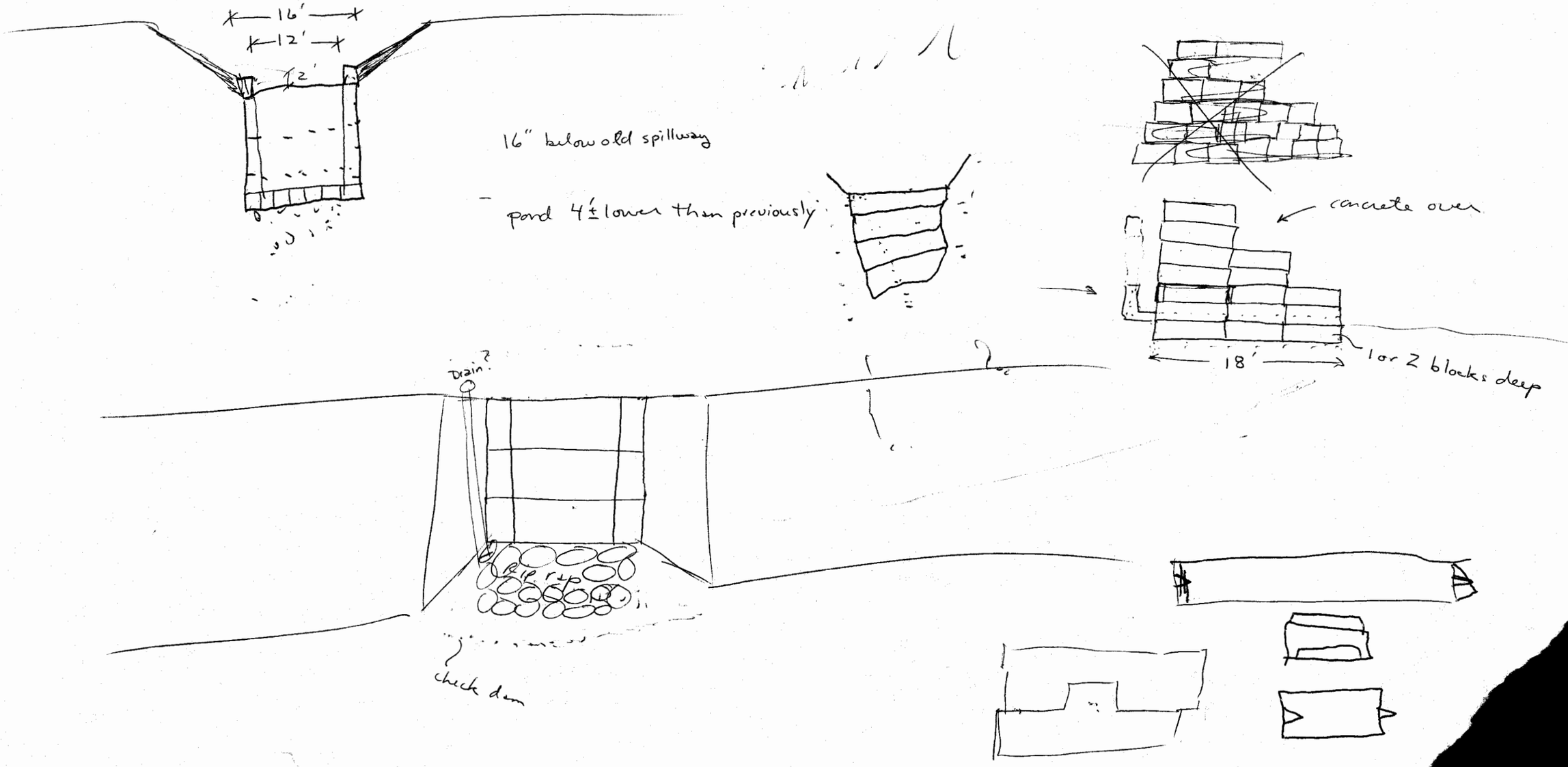


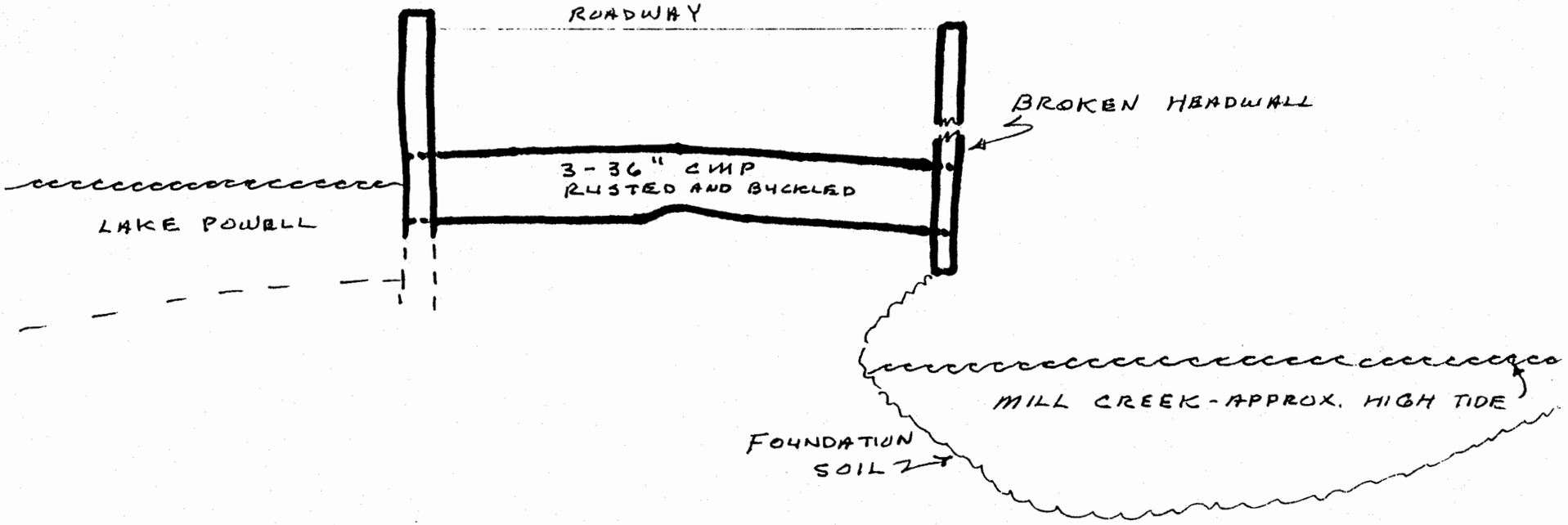


COUNTY REVIEW

SHEET 2 OF 2

H. R. Dellinger - 820-5122 beeper
- does design need to be certified by P.E.

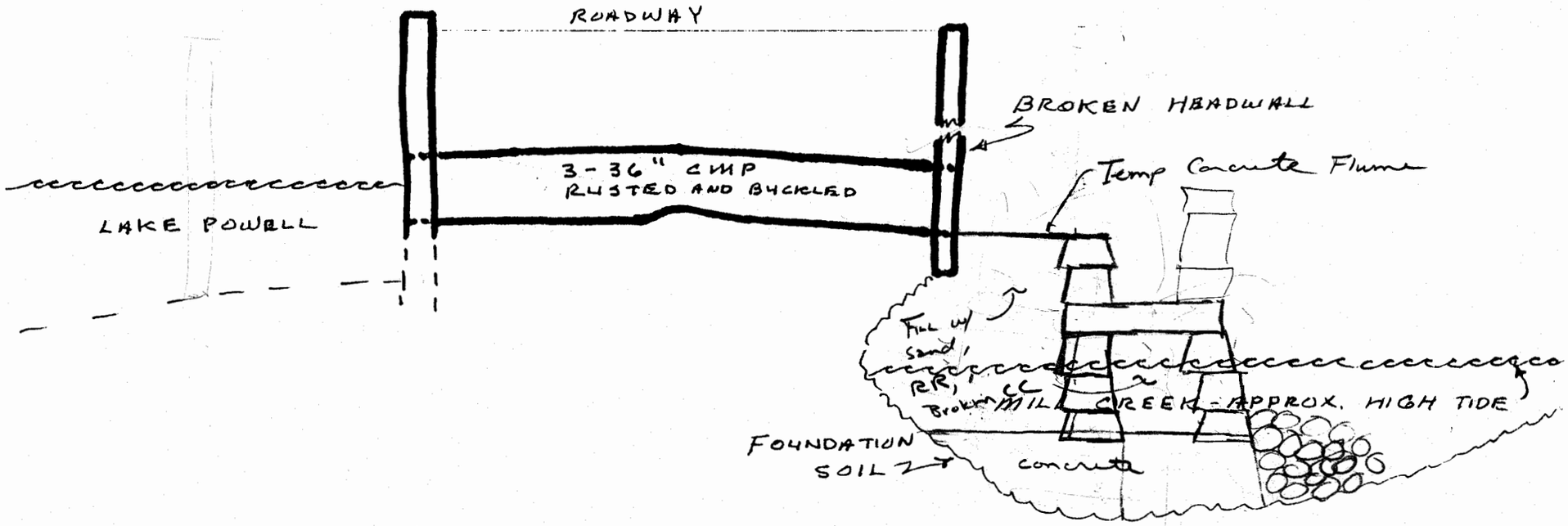




SKETCH - LAKE POWELL SPILLWAY

1"≈6'± 3-92 WNB

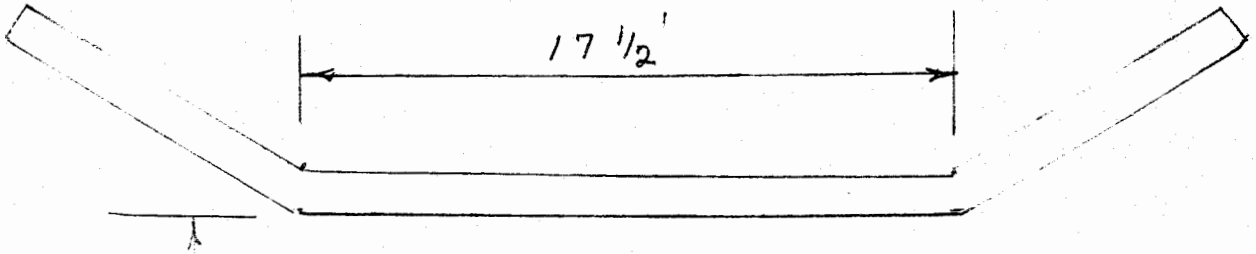
FIGURE 5



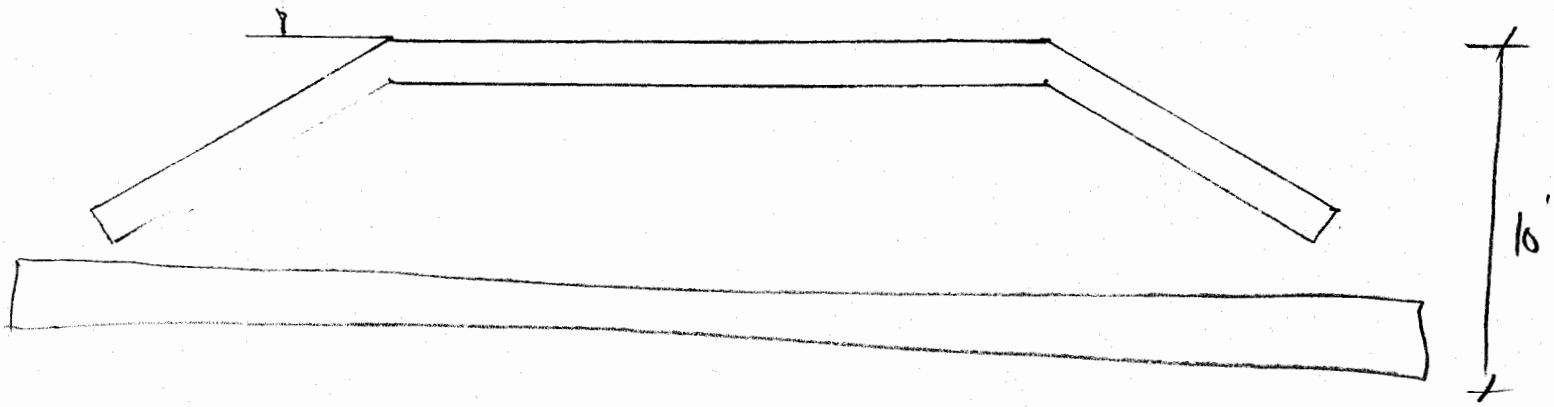
SKETCH - LAKE POWELL SPILLWAY

1" ≈ 6' ± 3-92 WNB

FIGURE 5



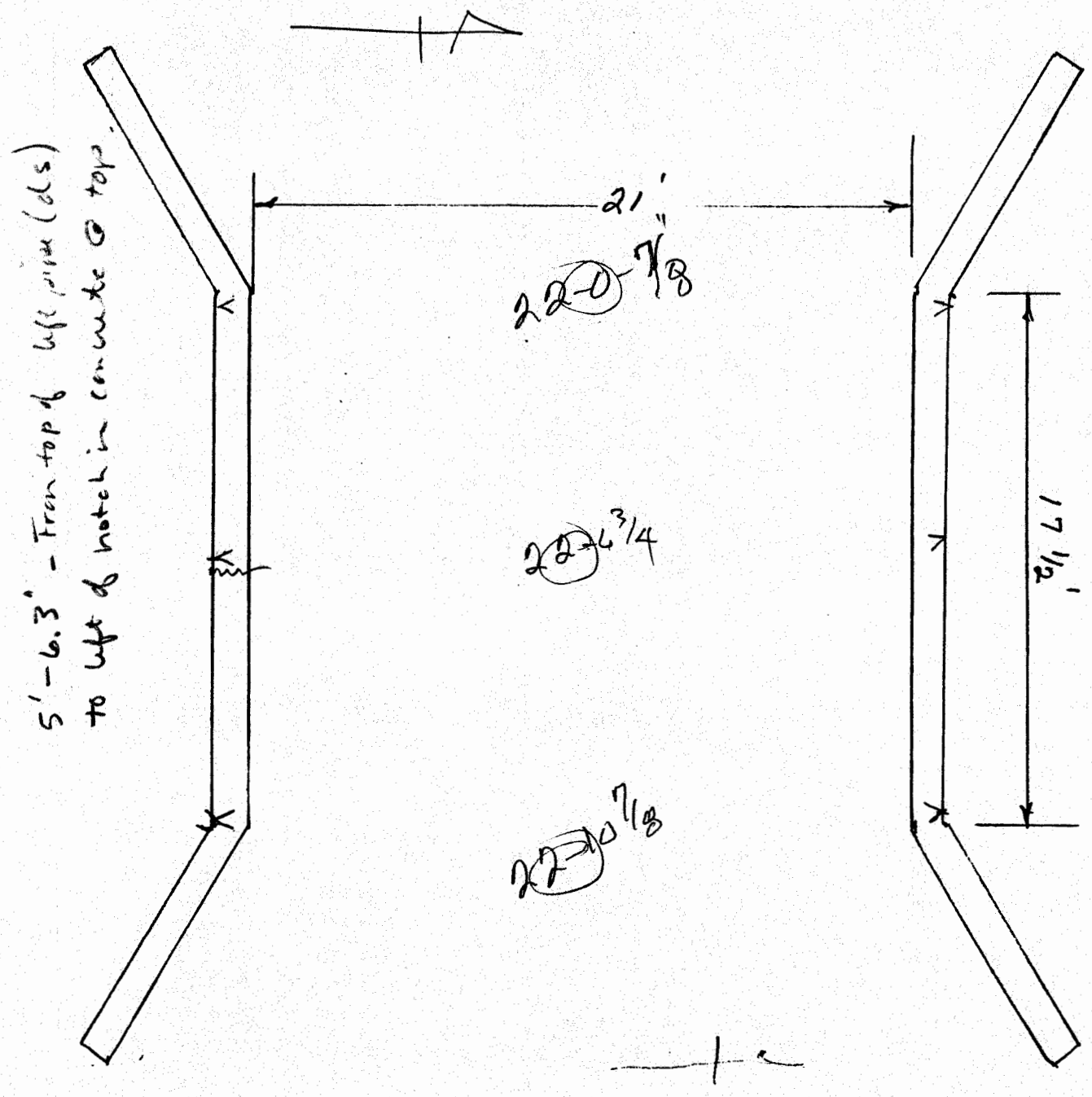
21'



1" = 5' ±

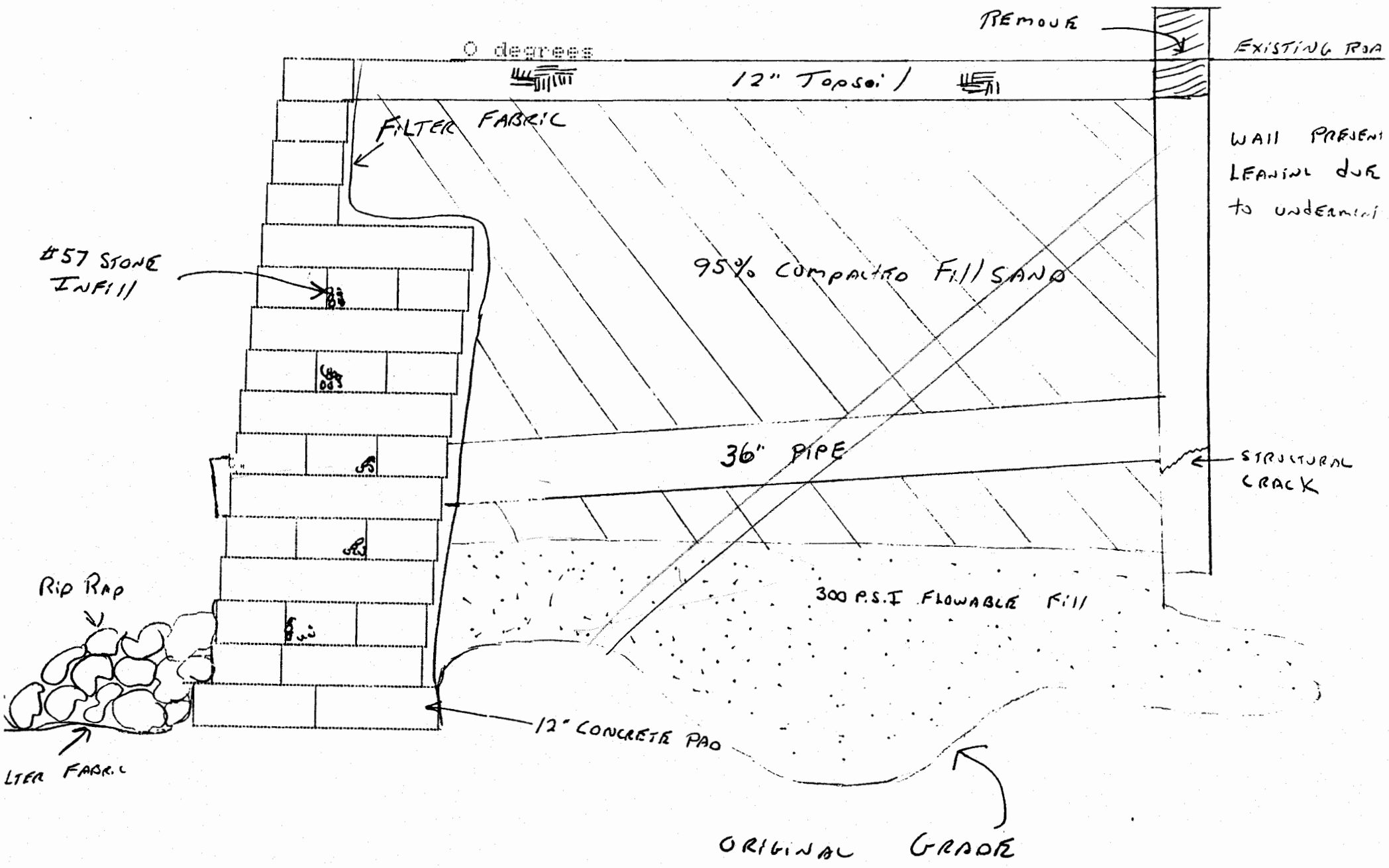
10/11/91

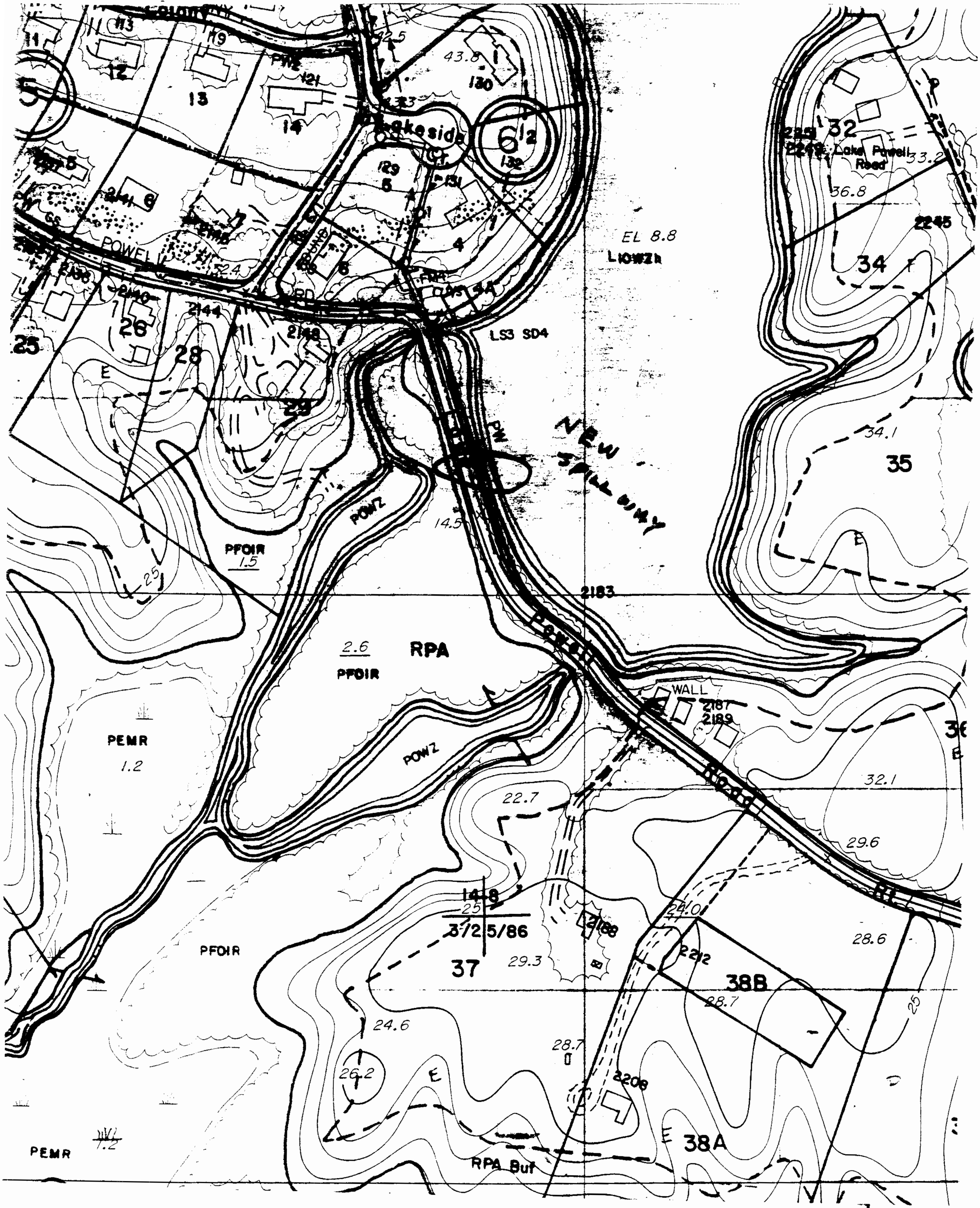
WM/DBC



3-20-92

LAKE POWELL PROPOSAL




Lakeside Ct.
EL 8.8
LS3 SD4
NEW SPILLWAY
POWELL RD
Powell Road
2249 Lake Powell Road
PFOIR
1.5
RPA
2.6
PFOIR
POWZ
PEMR
1.2
PFOIR
PEMR
14.5
22.7
14.8
25
3/25/86
37
29.3
24.6
26.2
28.7
38B
38A
RPA Buf
WALL
2187
2189
2183
2212
2208
2188
32.1
29.6
28.6
34.1
35
34
32
36.8
33.2
2245
43.8
130
132
129
131
113
119
121
133
2141
2146
2140
2144
2148
2136
26
28
29
25
12
13
14
5
6
4
4A

BY: SJ Thomas DATE: 02-18-00 SHEET 1 OF 6

CHKD: _____ DATE: _____ PROJECT NO.

APRVD: _____ DATE: _____ LAKE POWELL

DEVELOPMENT MANAGEMENT

101-E MOUNTS BAY ROAD, P.O. BOX 8784, WILLIAMSBURG, VIRGINIA 23187-8784
(757) 253-6671 Fax: (757) 253-6850 E-MAIL: devtman@james-city.va.us

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ENVIRONMENTAL DIVISION (757) 253-6670 environ@james-city.va.us
PLANNING (757) 253-6685 planning@james-city.va.us
COUNTY ENGINEER (757) 253-6678
INTEGRATED PEST MANAGEMENT (757) 253-2620

GIVEN:

48" CORRUGATED POLYETHYLENE PIPE AASHTO M252/M294 USE CPPA DESIGN PROCESS.

OD = 540"

A_s (SECTION AREA) = 0.4294 $IN^2/IN.$

c = 1.860 in.

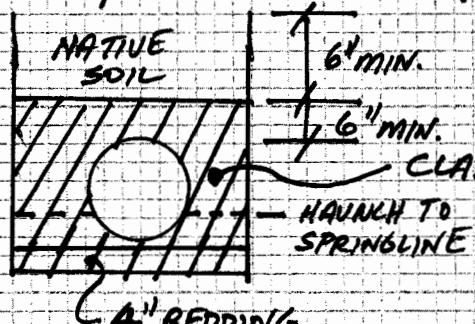
I = 0.6919 $in^4/in.$

PS = 17 psi @ 5% deflection

ASSUME NATIVE SOIL TYPE BACKFILL MEETING ASTM D2321 CLASS III, COARSE GRAINED SOILS WITH FINES MODERATE COMPACTION, E'(psi) = 1,000

[NOTE: SPECIFICATION SHOULD CALL FOR MODERATE COMPACTION 85% - 95% MINIMUM STANDARD PROCTOR.]

D_L = Shape Factor = 6.7 (for moderate-high > 85% SPD)



Bedding Constant (K) = 0.10

Live Load, 5 ft. cover AASHTO H-20 (HIGHWAY) = 1.74 psi

~~Cooper E-80 (RAILROAD) = 16.67 psi~~

Impact Load = Not Required since d > 3'

4' = H_2O 2.78 psi

3' = H_2O 4.17 psi

2' = H_2O 5.56 psi

FIND: CHECK 48" NOM. ID, CPP PIPE W/ 5', 4', 3' & 2' COVER

BY: _____ DATE: _____ SHEET 2 OF 6

CHKD: _____ DATE: _____ PROJECT NO.

APRVD: _____ DATE: _____

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SOIL LOAD (W_L)

5': $W_c = \frac{H\,\gamma_s\,OD}{144} = \frac{(5')(120\,pcf)(54\,in)}{144\,in^2/ft^2} = 225$ lb/linear inch of pipe

4': $= 4 = \frac{(4')(120\,pcf)(54\,in)}{144} = 180$ lb/lin inch

3': $= \frac{(3')(120\,pcf)(54\,in)}{144} = 135$ lb/lin inch

2' cover: $= \frac{(2')(120)(54\,in)}{144} = 90$ lb/lin. inch

W_L (LIVE LOAD)

H20 LIVE LOAD (psi) X OD VALUE

5ft cover: $1.74\,\frac{lb}{in^2} \times 54\,in = 93.96$ lb/in.

4': $2.78\,lb/in^2 \times 54\,in = 150.12$ lb/in.

3': $4.17\,\frac{lb}{in^2} \times 54\,in = 225.18$ lb/in.

2': $5.56\,lb/in^2 \times 54\,in = 300.24$ lb/in.

BY: _____ DATE: _____ SHEET 3 OF 6

CHKD: _____ DATE: _____ PROJECT NO.

APRVD: _____ DATE: _____

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DEFLECTION

LIMITED TO 7.5% OF BASE ID DIA = (0.075) × 48 = 3.60 IN.

$$\Delta Y(\text{IN.}) = \frac{K(D_L W_C + W_L)}{0.149\,PS + 0.061\,E'}$$

$D_L = 1.0$
W_C = ABOVE
W_L = ABOVE
PS = 17 pii
E' = 1,000 psi
$K = 0.1$

$$= \frac{0.1(1.0(W_C) + W_L)}{2.533 + 61}$$

$$= \frac{0.1(W_C + W_L)}{63.53}$$

FOR 5' COVER: $\frac{0.1(225 + 93.96)}{63.53} = 0.5021'' < 3.6''$ OK

FOR 4' COVER: $\frac{0.1(180 + 150.12)}{63.53} = 0.5196'' < 3.6''$ OK

FOR 3' COVER: $\frac{0.1(135 + 225.18)}{63.53} = 0.5669'' < 3.6''$ OK

FOR 2' COVER: $\frac{0.1(90 + 300.24)}{63.53} = 0.6143'' < 3.6''$ OK

∴ ALL OK FOR DEFLECTION

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BUCKLING

Determine Critical (Allowable) Buckling Pressure

$$P_{CR}(psi) = \frac{0.772}{SF}\left[\frac{E' PS}{1-\nu^2}\right]^{1/2}$$

$$= \frac{0.772}{2.0}\left[\frac{(1{,}000)(17)}{1-0.4}\right]^{0.5}$$

$$= 64.97 psi$$

$SF = 2.0$
$E' = 1{,}000$ psi
$PS = 17$ psi
$\nu = 0.4$ FOR CPP

ACTUAL BUCKLING PRESSURE

$$P_V(psi) = \frac{R_W H \gamma_S}{144} + \frac{\gamma_W H_W}{144} + \frac{W_L}{OD}$$

$R_W = 1 - 0.33\left(\frac{H_W}{H}\right)$
H_W = Height GW ABOVE Pipe = 0
$\therefore R_W = 1.0$
H = Height Cover (ft.)
γ_S = soil density pcf use 120 pcf
W_L = LIVE LOAD 16/LIN INCH
OD = outside DIA 54"

For 5' cover: $\frac{1.0(5')(120)}{144} + 0 + \frac{93.96}{54}$

$= 5.90 psi << 64.97 psi$, OK

For 4' cover = $\frac{1.0(4)(120)}{144} + 0 + \frac{150.12}{54}$

$= 6.11 psi << 64.97 psi$, OK

For 3' cover = $\frac{1.0(3)(120)}{144} + 0 + \frac{225.18}{54}$

$= 6.67 psi << 64.97$ OK

For 2' cover = $\frac{1.0(2)(120)}{144} + 0 + \frac{300.24}{54}$

$= 7.22 psi << 64.97 psi$ OK

$\therefore$ ALL OK FOR BUCKLING

DEVELOPMENT MANAGEMENT

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BENDING

FOR CPP BENDING STRESS < 3,000 psi
BENDING STRAIN < 5%

BENDING STRESS

$$\underset{(psi)}{\sigma_B} = \frac{2(D_f)(E)(\Delta y)(y_o)\,SF}{D_m^2}$$

$D_f = 6.7$

E = MODULUS OF ELASTICITY 110,000 psi

Δy = Defl. IN
5' - 0.5021"
4' - 0.5196"
3' - 0.5669"
2' - 0.6143"

WHERE y_o IS > OF $\frac{OD - D_m}{2} = \frac{54 - 51.72}{2} = 1.14$ IN.

OR $\frac{D_m - ID}{2} = \frac{51.72 - 48}{2} = 1.86$ IN.

$y_o = 1.86$ IN.

$SF = 1.5$

$D_m = ID + 2c$
$= 48 + 2(1.860)$
$= 51.72$ IN.

$D_m = 51.72$ IN

FOR 5': $\sigma_B = \frac{2(6.7)(110{,}000)(0.5021)(1.86)(1.5)}{(51.72)^2} = 771.92$ psi < 3,000 OK

FOR 4': $\sigma_B = \frac{2(6.7)(110{,}000)(0.5196)(1.86)(1.5)}{(51.72)^2} = 798.82$ psi < 3,000 psi OK

FOR 3': $\sigma_B = \frac{2(6.7)(110{,}000)(0.5669)(1.86)(1.5)}{(51.72)^2} = 871.55$ psi < 3,000 psi OK

FOR 2': $\sigma_B = \frac{2(6.7)(110{,}000)(0.6143)(1.86)(1.5)}{(51.72)^2} = 944.72$ psi < 3,000 psi OK

ALL OK FOR BENDING STRESS

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BENDING STRAIN (< 5% ALLOWABLE)

$$\varepsilon_B = \frac{2(D_F)(\Delta y)(y_0)}{D_m^2}\,SF$$

ε_B (IN./IN.)
$D_F = 6.7$
$\Delta y =$
5' – 0.5021"
4' – 0.5196"
3' – 0.5669"
2' – 0.6143"
$y_0 = 1.86$ IN.
$SF = 1.5$
$D_m = 51.72$"
$5\%_0 = 2.70$ IN ALLOW. OR 0.05 IN/IN. $\left(\frac{2.70}{54} = 0.05\right)$

For 5': $\frac{2(6.7)(0.5021\text{ IN.})(1.86\text{ IN.})}{(51.72\text{ IN})^2} = 0.0047$ IN./IN OK

4': $\frac{2(6.7)(0.5196)(1.86)}{(51.72)^2} = 0.0048\,\frac{IN}{IN}$ OK

3': $\frac{2(6.7)(0.5669)(1.86)}{(51.72)^2} = 0.0053\,\frac{IN}{IN}$ OK

2': $\frac{2(6.7)(0.6143)(1.86)}{(51.72)^2} = 0.0057\,\frac{IN}{IN}$ OK

ALL OK FOR BENDING STRAIN

important installation requirements.

- MIN COVER 2' permanent & during construction
  MAX COVER 28' (Read Load)
- AASHTO M294
- 48 INCH DIA, meeting requirements for AASHTO M294-97
  Type S, Smooth interior, Bell & Spigot Joint
- Gaskets meeting ASTM F477 (Rubber)

- ASTM D2321 CLASS III MIN 90% DENSITY GM, GC, SM, SC MATERIAL PER ASTM D 2487 (Coarse Grained Soils w/ Fines)

FORCES CAUSING SLIDING: Fs = 3,649
FORCES RESISTING SLIDING: Fr = 8,609
RATIO OF FORCES: Fr/Fs = 2.36
MIN. ALLOWABLE Fsafe = 1.50

STABILITY AGAINST OVERTURNING:

OVERTURNING MOMENT: Mo = 18,243
RESISTING MOMENT: Mr = 48,873
RATIO: Mr/Mo = 2.68
MIN. ALLOWABLE Msafe = 2.00

BEARING PRESSURE:

PRESSURE: SUM Wi / FTG AREA = 1,931
MIN. ALLOW BEARING PRESSURE = 3,000

LOCATION OF RESULTANT VERTICAL FORCE:

RESULTANT: SUM Wi + Pav + Psv + Ppv = 13,515
X = (Mr-Mo)/R = 3.62

(P)rint, (E)dit, (F)ile or (Esc) to quit.

LAKE POWELL DAM REPAIR PROJECT

JAMES CITY COUNTY, VIRGINIA

WINTER 1999 - 2000

LAKE POWELL DAM REPAIR PROJECT

JAMES CITY COUNTY, VIRGINIA

Prepared by: Randall K. Cooper, acting project coordinator
office: 229-5150 home: 220-1031 mobile: 876-3397
H.R. Dellinger -

THE INCIDENT

The unbelievable excess of the 17 inch rainfall from Hurricane Floyd completely overwhelmed all sub-division drainage facilities located around Lake Powell. The resulting torrent drained into the lake and raised the normal level by 4 to 6 feet, resulting in an overflowing of the lake's earthen dam.

The current spillway was not designed to accommodate such an excess!

Residents near the dam, who witnessed the flood, indicate that the dam was doing fine until trees began uprooting along it's surface due to the high winds. Once the loose earth was exposed, it didn't take long for the rushing water to cut an approximately 115' wide and 18' deep gorge in the dam. The lake completely drained and sent around 3,500 to 4,000 cubic yards of earth, clay, and shells further down Mill Creek. (See Illustration A.)

This is an environmental disaster that has not yet been realized, but was a simple "act of God".

Everyone in James City County should be concerned about the situation and cooperate to restore the lake to its previous condition as soon as possible. Lake Powell, which was originally called "Durfey's Pond", has been retaining water since the late 1700's. Certainly the area water tables have become dependent on the 81 acre retention. Also, pollutants from run-off will now flow directly into the tidal marsh until the breach is repaired and the "filtration" process is restored.

THE REPAIR

My role will primarily be as liaison between the County, contractor, and the individual owners of the lake; Florence Adsit, Lee and Annie Reed, and the Stanley Powell family. The owners have agreed as to the scope of the project and are funding the repair with private resources.

The contractor is H. R. Dellinger of Gloucester, Virginia. He has vast experience in this type of repair and has previously done a similar job with the Army Corps of Engineers. His idea is to

build a massive concrete structure, approximately 14 feet wide and 16' feet tall in the center of the breach, creating a new primary spillway. (See Illustration B.) He plans to stack large interlocking concrete blocks, (2'X2'X6' long), to build the half triangle shaped structure. The vertical wall will face the lake. He will also fill in with concrete as he goes and form and pour the face solid. The leading edges of the face will have concrete wings to prevent erosion in the event of an overflow. The rear of the structure will step down to the creek and water will cascade over rip rap whenever the lake reaches a level requiring relief.

As part of the plan, the rip rap in the existing spillway will be excavated to form and serve as a secondary relief point. This will approximately double the outflow capacity at the dam and hopefully prevent a similar occurrence in the future.

EROSION CONTROL

Before construction begins, Dellinger will construct rock check dams on both sides of the breach, seal with clay, and pump the area of disturbance dry. He will excavate to a sound base point on the shale and begin stacking the blocks. After the structure is built and the edges are filled in with clay and compacted, the surface will be stabilized and seeded, matted or mulched. Silt fence will be used as needed to secure areas on the dam used as ramps.

THE DAM SURFACE AND FOOTPATH

The pedestrian bridge across the existing spillway suffered considerable de-stabilization during the storm. The foundation at both ends was severely eroded and needs to be re-stabilized with rip rap. Also, because of the construction of the new spillway, the footpath will need a second bridge. Even further, <u>all</u> of the trees on the dam should be cut down and hauled away since they appear to be the main culprit. It is my understanding that the County is responsible for the maintenance of the footpath and bridge. Mr. Dellinger is willing to cooperate with county planners to achieve this end and restore the pedestrian access to this beautiful part of James City County.

SUMMARY AND LONG TERM

Currently the owners have agreed that the lake should remain private. However, certain future events could produce an agreement between the owners to sell the lake. Should that occur, possibly a lake owners association could be formed to purchase and maintain the lake. Perhaps even a partnership between the association and James City County, which would allow possible limited public access to the lake itself and not just the dam.

A long term surface maintenance plan should be devised by the County to protect the footpath. Additional fill material will be needed in future years as the tree stumps degrade. Rip Rap should be gradually added to the lake side slope to develop a berm sufficient to hold added water volume that is sure to come.

Lake Powell is everyone's responsibility!! Let's fix it!!

ILLUSTRATION A

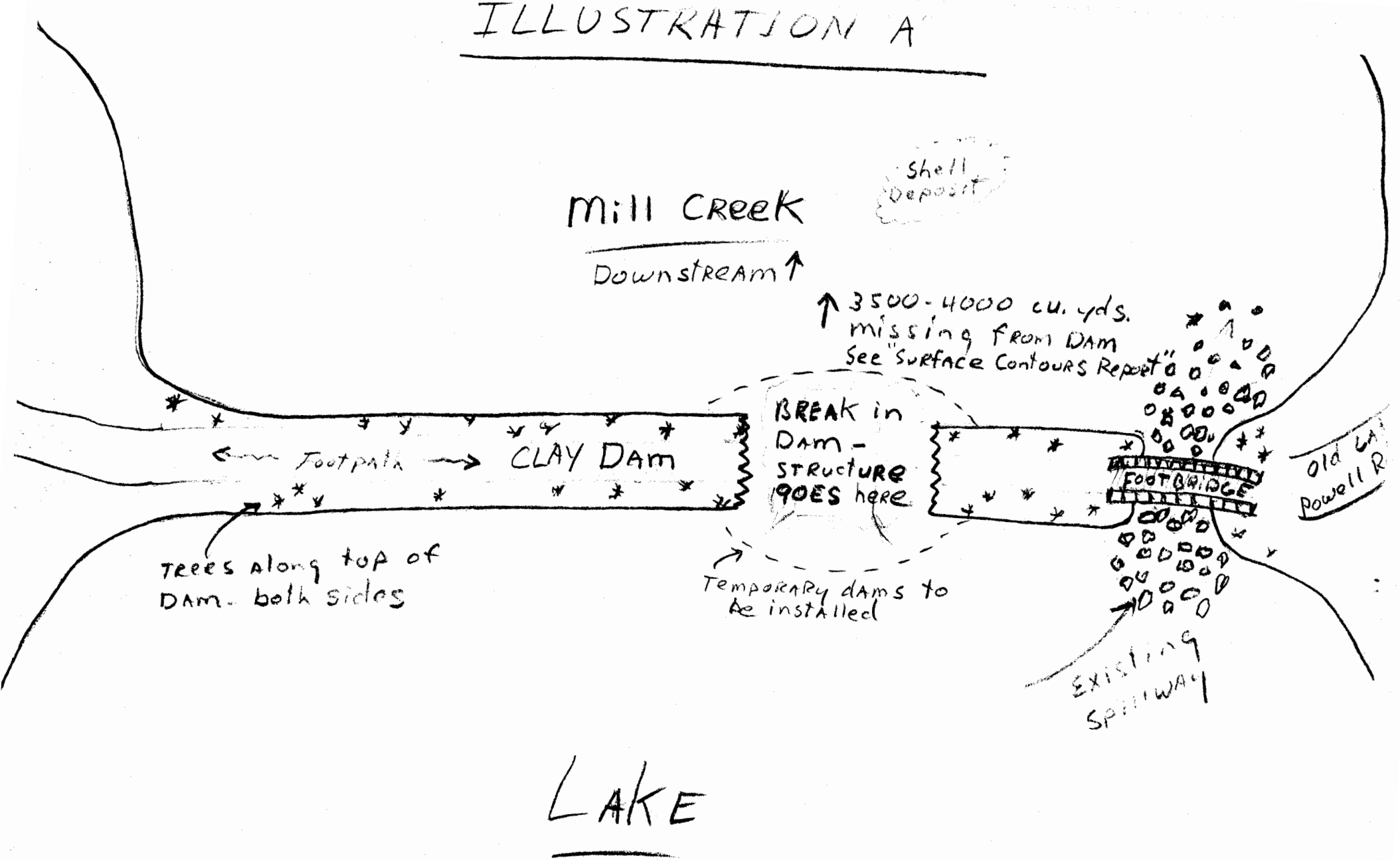
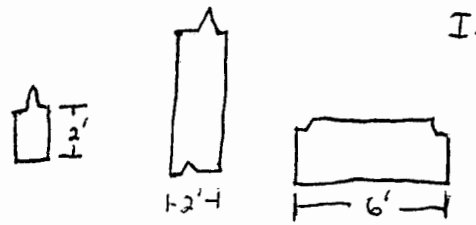
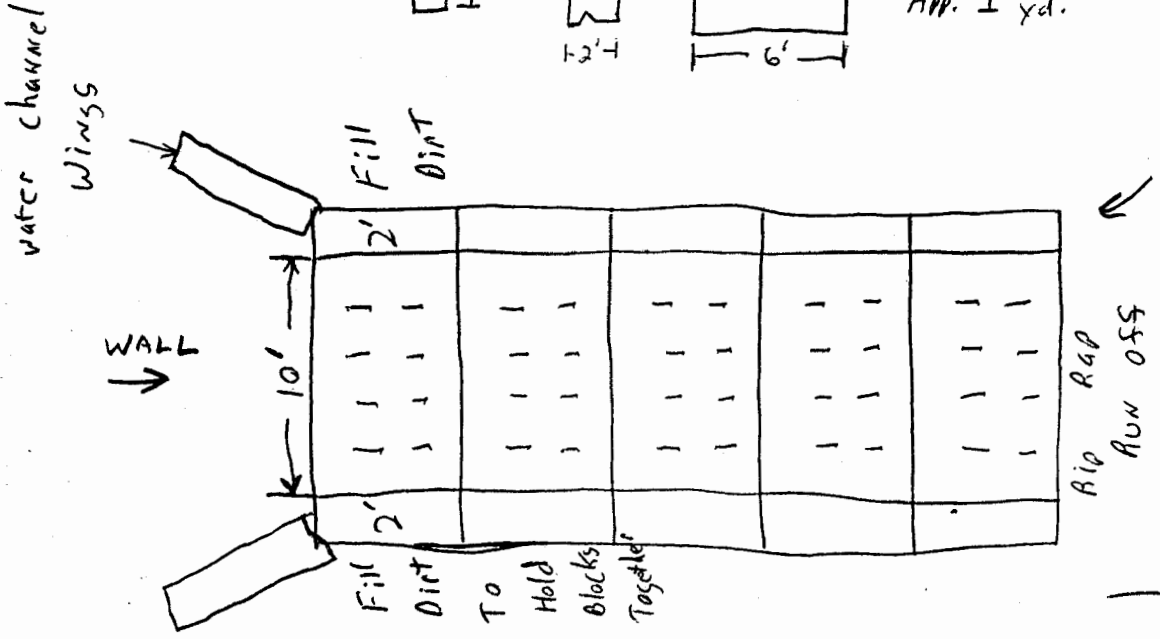
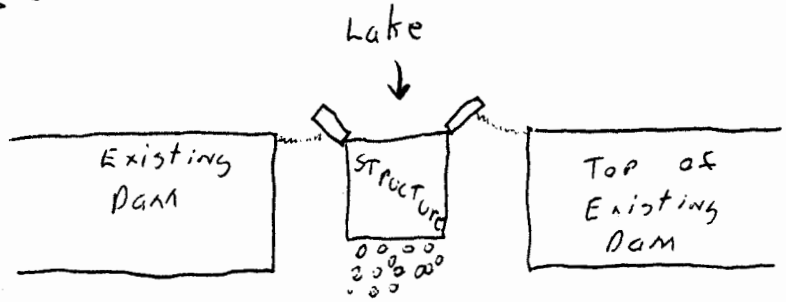


ILLUSTRATION B

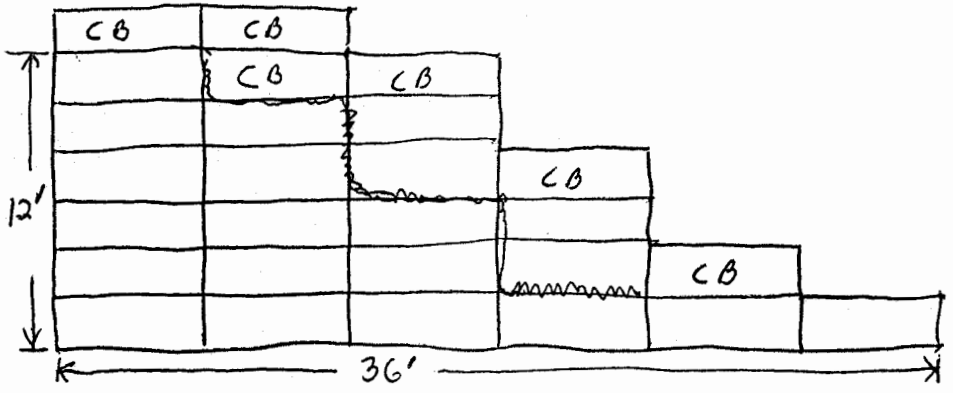


Interlock Blocks Cement App. 1 yd.





RUN OFF



CB- Channel Blocks
To keep water onto structure

Total Volumes Report
LAKEPOWL
LAKE POWELL DAM REPAIR

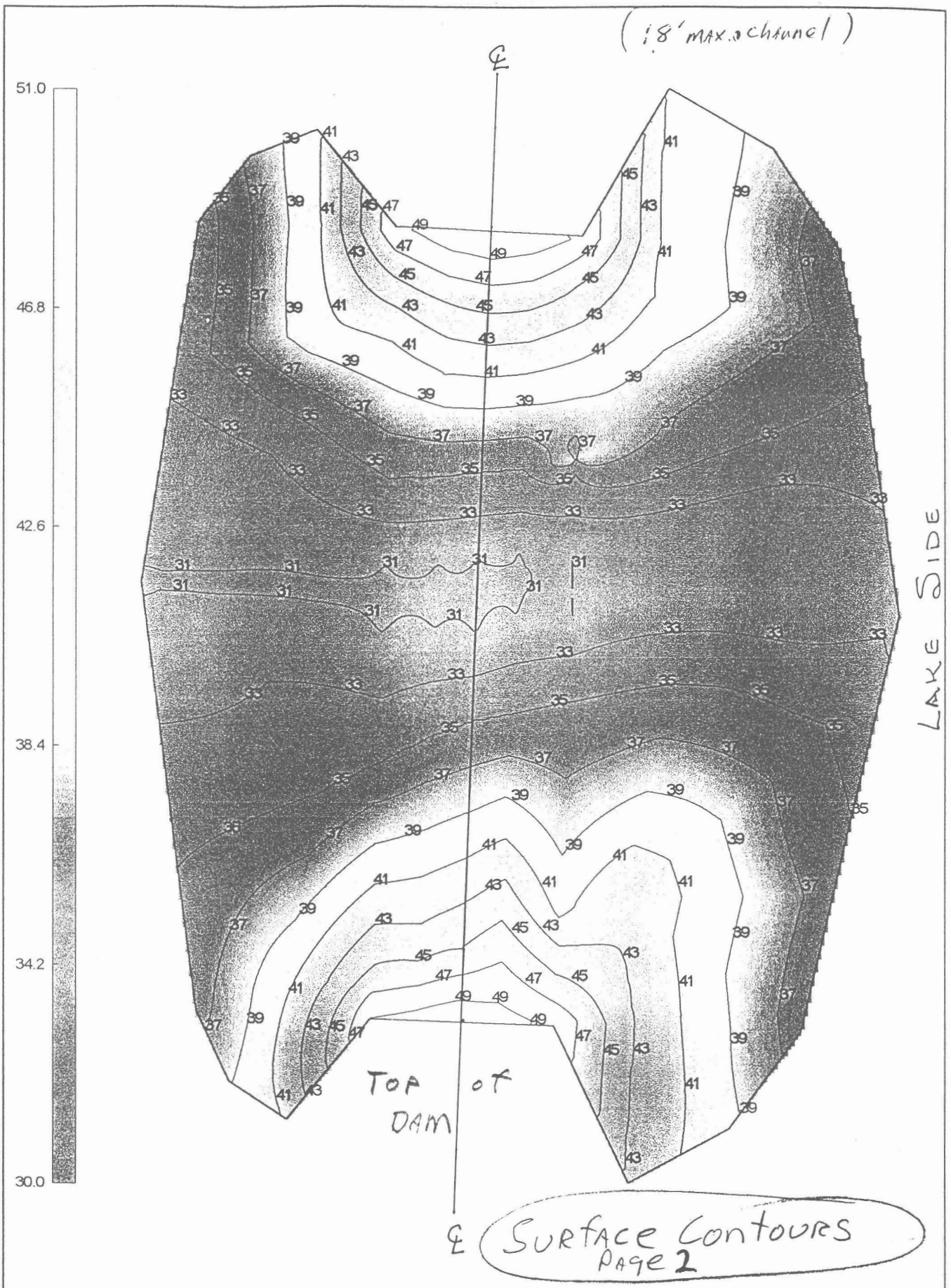
November 24, 1999

AOI	Tight Cut (cu yd)	Tight Fill (cu yd)	% Cut Swell (cu yd)	% Fill Shrink (cu yd)	Adjusted Cut (cu yd)	Adjusted Fill (cu yd)
1 : Existing vs. Proposed						
PERIM	0.17	3083.87	0.00	5.00	0.17	3238.06
Total Master AOI						
1 : PERIM	0.17	3083.87	0.00	5.00	0.17	3238.06
Project Totals:	**0.17**	**3083.87**	**0.00**	**5.00**	**0.17**	**3238.06**
Import:		**3083.70**				**3237.89**

+ 260 = 2' CUT in Bottom of CHANNEL
TOTAL = 3500 C.Y.

Surface Contours Report

Page 1


(18' MAX. change)
51.0
46.8
42.6
38.4
34.2
30.0
LAKE SIDE
TOP of DAM
℄
℄
Surface Contours
PAGE 2
0
20
40
HSB
Surface Contours Report
LAKEPOWL: LAKE POWELL DAM REPAIR
1
Existing
November 16, 1999 · 10:53 PM

FILE COPY

Scott Thomas

From: Scott Thomas
Sent: Friday, August 25, 2000 10:16 AM
To: Darryl Cook
Cc: Gerry Lewis
Subject: Interim Report Lake Powell

Attached is a report for the Lake Powell Dam Repair Project based on recent field observations. Both Gerry Lewis and myself have serious concerns about the project from both an erosion and sediment control (to Mill Creek) standpoint and relative to standard accepted practice for dam engineering/construction. Please review the attached report as soon as possible and forward to Wayland Bass and John Horne as you deem necessary.

LakePowell3.insp.wpd

If you need to make any additions or corrections to the report, it can be found in the shared file under *\CountyProj \LakePowell3.insp.wpd. If you have any questions, see me.

Scott J. Thomas, P.E.
James City County, Va.
Environmental Division

DEVELOPMENT MANAGEMENT

101-E MOUNTS BAY ROAD, P.O. BOX 8784, WILLIAMSBURG, VIRGINIA 23187-8784
(757) 253-6671 Fax: (757) 253-6850 E-MAIL: devtman@james-city.va.us

CODE COMPLIANCE
(757) 253-6626
codecomp@james-city.va.us

ENVIRONMENTAL DIVISION
(757) 253-6670
environ@james-city.va.us

PLANNING
(757) 253-6685
planning@james-city.va.us

COUNTY ENGINEER
(757) 253-6678

INTEGRATED PEST MANAGEMENT
(757) 259-4116

September 20, 2000

Florence P. Adsit
2187 Lake Powell Road
Williamsburg VA 23185

Re: Lake Powell Dam Repair

Dear Ms. Adsit:

Your Erosion Control Plan and Land Disturbing Permit for the above-referenced project expires on October 24, 2000. As construction is not yet complete and all disturbed areas are not stabilized, it will be necessary to extend the plan and permit. Because your existing plan is adequate, submission of an updated Erosion Control Plan is not required.

Please sign the enclosed permit where indicated and return the original package back to this office. This application for a renewed permit and plan must be received by October 17, 2000, otherwise, the Erosion Plan becomes void, and the Land Disturbing Permit will be revoked. If the plan becomes void, no further land disturbing activities will be allowed and the County will issue no further permits until the plan is re-approved.

Please call me if your have any questions.

Sincerely,

Joan Etchberger
Engineering Assistant

Enclosure

4/5

Joan -

Send copy of permit to

Randy Cooper

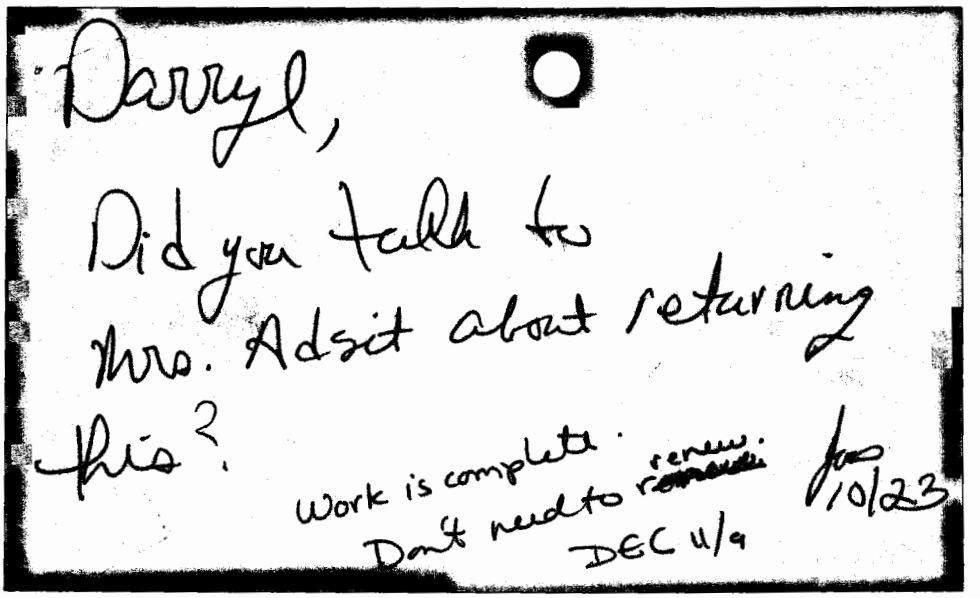
PO Box 413

Wmbg 23187

Darryl

ph- 229-5150

fax - 253-7568


Darryl,

Did you talk to Mrs. Adsit about returning this?

Work is complete. Don't need to renew DEC 11/9

10/23

FRIENDS OF LAKE POWELL, INC.
P. O. BOX 413
WILLIAMSBURG, VA 23187-0413

April 13, 2000

Mr. Darryl E. Cook P.E.
Environmental Director
James City County
P. O. Box 8784
Williamsburg, VA 23187-8784

RE: Lake Powell Dam Repair Project

Dear Darryl,

In responding to your letter of March 2nd, we first of all want to thank you and your associates for the special consideration given our endeavor. Your guidance and suggestions have been very helpful and saved us considerable time and money. We intend to follow your recommendations to the extent that our obvious financial constraints will allow.

Fortunately, we have reached our goal of raising $50,000. towards the project and are ready to move forward. Of course, this figure was a soft estimate by Mr. Dellinger based on his initial sketch and we will still have to plea for additional help from material suppliers, haulers, and anyone else willing to contribute. There are also no provisions for any extras, such as the drain, fees for a professional geotechnical survey or the additional concrete needed for the anti-seep collars and anchors. It is our current plan to "scavenge" these particulars as we go and continue our fundraising efforts throughout construction.

We are anxious to accept any "in-kind" support we can muster!

We have located a source for high quality fill material (Branscome) and plan to 'key-in' to the existing embankment simply by "grooving" and compacting to as near 100% as possible. We also intend to "footer" the anti-seep collars 1' – 2' below the level of the structure to prevent sliding, in lieu of doweling. The entire structure will be "bonded" together and sealed using rebar and concrete.

Please bear in mind that we are basically putting our faith in the ability and experience of Dellinger and realize that this is not an engineered repair. The group is willing to accept a certain amount of failure risk, given the shoestring budget, but all have confidence in his common sense approach. We believe his overall plan will result in a sturdy and long lasting fix.

We should all be prepared to discuss the construction sequence and determine how to coordinate efforts at our site meeting on April 24th. Dellinger has indicated that he wants to build the "structure" first and then contend with the old spillway. It seems sensible to adopt his idea of moving the existing bridge to span the new spillway and fill in the old using culverts as a secondary outflow point. This will eliminate the need for a second bridge.

We are depending on the County to provide the culverts, fill in the old spillway, relocate the bridge and remove the trees in conjunction with restoring the footpath. We would also appreciate any inspections and engineering guidance possible during construction.

Again, thank you for your help!

Sincerely,

Randall K. Cooper

Randall K. Cooper
President
Acting Project Coordinator

RKC:sfc

DEVELOPMENT MANAGEMENT

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(757) 253-6671 Fax: (757) 253-6850 E-MAIL: devtman@james-city.va.us

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codecomp@james-city.va.us	environ@james-city.va.us	planning@james-city.va.us	INTEGRATED PEST MANAGEMENT
			(757) 253-2620

March 2, 2000

Mr. Randall K. Cooper
Acting Project Coordinator
P.O. Box 413
Williamsburg, Va. 23187

Re: Lake Powell Dam Repair Project
Repair Considerations

Dear Mr. Cooper:

As you may be aware, the Environmental Division forwarded a copy of the Lake Powell dam repair plan to the Division of Dam Safety for a cursory review. Although the structure is not regulated under the dam safety program, the dam safety group is quite familiar with reviewing alteration or repair plans for all classes of impounding structures. The following is a combined list of comments pertaining to the project from both the James City County Environmental Division and Mr. Jon Phillippe, Department of Conservation and Recreation, Division of Dam Safety. Mr. Phillippe's comments are based on his response to the Environmental Division via a phone conversation on Monday February 28th.

James City County Environmental Division

A. Anti-Seep Collars/Anchors. It is recommended that at least two (2) sets of concrete seep-anchor collars be extended outward from each side of the mass concrete channel block structure to prevent piping from along contact areas, specifically the concrete block/engineered fill interface and the engineered fill/existing embankment interface. In addition to preventing seepage and piping, the concrete seep-anchor collars should extend into the existing earthen embankment to serve as anchors for sliding stability. The anchors will reduce susceptibility of the entire repair zone from sliding due to hydrostatic forces associated with the dam and due to non-homogenous characteristics between the engineered fill (cohesive type) material and the existing embankment (cohesionless type) material. The concrete seep-anchor collars should be constructed as monolithic extensions of the concrete block structures to the greatest extent possible using drilled dowels, concrete pours, etc.

B. 8 inch Drain. It is recommended that an 8 inch drain be incorporated into the repair plan. The drain would serve for future interim drawdown purposes, if required for general maintenance or inspection of the block structure, and as a potential water sampling point for the impoundment pool. The drain could consist of 8 inch ductile iron, push-on joint pipe, Class 50, meeting the requirements of ANSI/AWWA C150 and C151 and C104/C111. A gate valve meeting the requirements of ANSI/AWWA C500 (for water and sewage systems) could be placed on the downstream side of the 8 inch drain for shutoff control and throttling purposes. The valve should

be enclosed in a minimum 3.5 foot deep VDOT MH-1 type concrete manhole or an equivalent buried vault structure. The purpose of the manhole/vault structure would be to prevent valve vandalism, provide for accessibility if maintenance or normal replacement of the valve is necessary and to reduce the potential for valve corrosion and freezing. The inlet side of the drain could be located at (through) the proposed wingwall and should be provided with a simple small cage-type trash rack on the inlet end.

Temporary Use of the Drain. Once installed, the 8 inch drain could also be used during construction by extending the drain from the proposed wingwall location to and through the upstream clay-sealed rock check dam. The pipe could serve as a temporary constant drawdown orifice for the permanent pool which will start to backup once the upstream cofferdam is installed. In addition, a simple wye fitting could be temporarily attached to the end or any upper section of the 8 inch drain to direct pumped water from the excavation (work zone) area, if needed, instead of placing discharge hoses through the downstream work zone. Once work is completed and prior to removal of the upstream cofferdam, the extended portion of the pipe can be trimmed to the proposed wingwall. The drain could also be easily flushed clean of any sediment following its use as a temporary diversion for runoff or pumped water.

C. Embankment Fill. Provide information on how the proposed "fill dirt" material will be keyed into both sides of the existing dam embankment. The "fill dirt"indicated between the existing earthen embankment and the new concrete structure should consist of material suitable for dam construction and compacted in accordance with standard accepted engineering practice for dam embankments (95% of Standard Proctor recommended). It is highly recommended that a professional engineer, qualified in the design and construction of dam structures, be present to observe and certify the existing soil subgrade beneath the mass concrete structure prior to fill placement and that proper testing, monitoring, placement and compaction of surrounding fill material is achieved.

Division of Dam Safety (Mr. Jon Phillippe)

A. Sliding and overturning failure is a major concern and should be evaluated by professional geotechnical engineer. The whole dam with the repair section included should evaluated for stability as one unit.

B. The system should be doweled firmly into acceptable strata below the repair zone. Shale material is typically in layers and tends to peel off in chunks.

C. All joints between the concrete block structures should be grouted tightly.

D. Individual blocks in the interlocking concrete block system should be doweled together.

E. Use of PVC pipe for the drain is recommended. The drain should draw from the upper region of the pool rather than the bottom. Avoid sharp bends or use 45 degree or 22-1/2 degree bends, if necessary.

F. Drill holes into the blue marl shale layer. Suggests 2 inch diameter holes with 3/4 to 1 inch reinforcing bars from concrete extending 2 feet into solid ground material. These anchors are to prevent sliding and should be installed at 12' x 8' spacing. This will result in a dowel anchor in every other block lengthwise and every 4th block structure sideways.

G. Remove trees from the embankment, particularly the downstream face. Saturated roots mats combined with high wind can cause trees to overtop and accelerate soil erosion and embankment failure.

Again, all of the preceding comments are suggestive and pertain to the alteration/repair plan for the Lake Powell Dam Repair Project from an engineering perspective. Response to the comments are not required for the erosion and sediment control plan or Land Disturbance Permit review, approval or issuance; however, it is suggested that the owners, liaison and contractor involved with the project incorporate the suggestions into the work plan to obtain an improved, safer and longer-lasting structure.

Please review the comments and inform us as to your course of action. Thank you for your consideration.

Sincerely,

Darryl E Cook

Darryl E. Cook, P.E.
Environmental Director

DEC/sjt

cc: James City County Board of Supervisors
Sanford B. Wanner, County Administrator
Jon Phillippe, Division of Dam Safety

FYC BERNIE
DARRYL ✓
CHRIS

3/21/94; SANDY AND JOHN; LAKE POWELL. WMB

REPAIR PLANS;

ON THE NIGHT OF MARCH 18 H.R. DELLINGER, JR. MRS ADSITS CONTRACTOR RETURNED MY PHONE CALL AND VERBALLY LAYED OUT THE FOLLOWING PLAN FOR REPAIRING THE SPILLWAY.

1. FILLING MOST OF THE UPSTREAM CHANNEL WITH RIP-RAP.

2. SLOPING THE SIDES OF THE FAILED ROADWAY SECTION.

3. REMOVING THE 3 REMAINING PIPE SECTIONS FROM THE REMAINING END WALL AND ENLARGING THE OPENINGS THROUGH THE WALL.

4. COVERING THE SIDES OF THE FAILED ROADWAY SECTION WITH RIP-RAP.

IF THIS REPAIR PLAN IS CARRIED OUT PEDESTRIANS, BICYCLES AND MOTOR VEHICLES WILL NOT BE ABLE TO CROSS THE DAM.I VISITED THE SITE MON AM 3/21 A PIECE OF CONSTRUCTION EQUIPMENT HAD BEEN RETURNED TO THE SITE OVER THE WEEKEND AS HAD BEEN INDICATED BY MR DELLINGER ON FRIDAY NIGHT.

ENGINEERING STUDY QUESTIONS;

1. WHAT HAPPENS TO WATER LEVEL WHEN DAM FAILS SUDDENLY ?

2. DITTO IF DAM FAILS GRADUALLY ?

3 & 4. WHAT HAPPENS TO JAMESTOWN RD CAUSEWAY IN SCENARIOS 1 AND 2 ABOVE ??

WE VERBALLY REQUESTED PROPOSALS FROM 4 FIRMS. WE RECEIVED 3 PROPOSALS.

WE HAD SEVERAL CONVERSATIONS IN PERSON OR BY PHONE WITH TWO FIRMS. WE ADDED A FIFTH QUESTION REGARDING THE JAMESTOWN RD CAUSEWAY AS A DAM.

IF THE COUNTY WANTS TO PROCEED WITH THE STUDY WE RECOMMEND

A PURCHASE ORDER TO SMITH DEMER NORMAN FOR $11,100. JERRY NORMAN IS A NATIONALLY RECOGNIZED EXPERT IN THIS AREA. HE CONSTRUCTED A COMPUTER MODEL OF THE LP WATERSHED IN 1988. THE STUDY INCLUDES CONSULTING WITH A SOILS ENGINEER REGARDING THE CAUSEWAY AS A DAM.

THE ANSWERS TO OUR QUESTIONS WILL BE THE BEST JUDGEMENT OF A RECOGNIZED EXPERT WITHOUT DETAILED SITE DATA. WE SHOULD EXPECT DISCLAIMERS SUCH AS LIABILITY AND THE EXACT WAY IN WHICH THE DAM MAY ULTIMATELY FAIL. WE EXPECT MR NORMANS REPORT BY THE END OF APRIL. THE PRICE INCLUDES A LETTER REPORT BUT NOT A PRESENTATION.

VDOT WRITTEN OPINION REGARDING CAUSEWAY AS A DAM ?

QUINTIN ELLIOT IS OUT OF THE OFFICE FOR MOST OF THIS WEEK. I WILL CONTACT HIM ASAP.

DEPARTMENT OF THE ARMY
NORFOLK DISTRICT CORPS OF ENGINEERS
FORT NORFOLK 803 FRONT STREET
NORFOLK VIRGINIA 23510-1096

February 21, 2008

CENAO-REG

Western Virginia Regulatory Section
NAO-2008-0291 (Lake Powell / James River)

Mr. Lee Reed and Kristen Adsit
c/o Lake Powell Dam Restoration
5248 Olde Towne Road / Suite 1
James City County, Virginia 23061

Dear Mr. Reed and Ms. Adsit:

This is regarding your preconstruction notification (PCN) for verification under the Nationwide Permit 3 to repair and rehabilitate a section of the dam that impounds waters known as Lake Powell in James City County, Virginia.

We have determined the PCN is incomplete for the following reasons:

1. The PCN does not contain a complete description of the work. The plans submitted only show backfill upstream of the dam and repairs to one spillway. However, during a site inspection on February 12, 2008, we noted there are two spillways; the other one is on the far northwest end and is also in complete disrepair yet it is not shown or addressed in the plans;
2. We also noted during the site inspection a sinkhole approximately 1.5 feet in diameter in the pavement on the southeast end of the dam. It appears that additional geotechnical work is necessary to evaluate the structural integrity of the remaining earthen dam in order to determine the most effective repair;
3. We do not believe that the project description has accounted for all the wetland impacts. The wetland delineation map, dated December 5, 2007, shows wetlands at the location of the aforementioned spillway (wetland flags C14-2, C15, C21, C22, C24 and C27). Repairs to this spillway will likely impact these wetlands as well;
4. We noted the dam face is overgrown with large deciduous trees yet it is not addressed in the plan. It seems likely the trees will be removed for safety reasons and that a substantial amount of work is necessary to bring the dam into compliance with current dam safety standards. We believe this work will change the footprint of the dam and impact additional wetlands;
5. Because this creek is tidal, there is a strong probability that anadromous fish are using the system upstream of the dam now that it is no longer a migration barrier. Repairing the dam may negatively affect these populations and must be addressed in the PCN.

The information in the PCN must be supplemented to address these deficiencies before a determination is made that impacts from repairing the dam are no more than minimal. If it appears that dam repairs would result in more than minimal impacts, the work would require an individual permit.

Please provide this information within 30 days of the date of this letter. If we do not receive the information by that date, we will administratively withdrawal you permit application. If you have any questions, please call Ms. Floyd at 757-201-7367 or you may email her at scharlene.a.floyd@nao02.usace.army.mil

Sincerely,

Michael A. Schwinn
Chief, Western Virginia Regulatory Section

Copies Furnished:
Virginia Department of Environmental Quality
James City County Planning and Zoning
Williamsburg Planning and Zoning
Virginia Department Conservation Recreation
Virginia Department of Game and Inland Fish

ENVIRONMENTAL – STORMWATER
TRANSMITTAL

PROTECTING RESOURCES PRIDE IN DELICATE ENVIRONMENTS

James City County Jamestown 1607

COUNTY PLAN NO: N/A

BMP ID CODE: MC 020

WATERSHED: MILL CREEK

- ☐ **ENTIRE RECORD FILE**
- ☐ **ASBUILTS**
- ☐ **CONSTRUCTION CERTIFICATION**
- ☐ **COMPUTATIONS**
- ☑ **OTHER:** Please file this in the file for Lake Powell, Private Dam MC 020 RE: USACOE CORRESPONDENCE

NAME: Scott J. Thomas

SIGNATURE: Scott Thomas

DATE: 02/29/08

RECEIVED FEB 29 2008
Stormwater Quality

CONSULTING ENGINEERS

5248 Olde Towne Road, Suite 1, Williamsburg, Virginia 23188

March 9, 1994

Via fax, and U. S. mail

Mr. Wayland N. Bass, County Engineer
James City County
P.O. Box 8784
Williamsburg, Virginia 23187-8784

RE: Lake Powell
AES Project No. 7963

Dear Mr. Bass:

This letter with attachments will serve as our proposal to you regarding your request for an engineering study of Lake Powell. Specifically, the study will address four issues of immediate concern to James City County. Posed as questions, these issues are:

1. What events are likely to occur if the Lake Powell dam experiences a "gradual" failure?

2. What events are likely to occur if the Lake Powell dam experiences a "sudden" failure?

3. What will be the likely impact on the Jamestown Road causeway across Lake Powell as a result of a "gradual" failure of the Lake Powell dam?

4. What will be the likely impact on the Jamestown Road causeway across Lake Powell as a result of a "sudden" failure of the Lake Powell dam?

In order to answer these questions, AES proposes the following work tasks:

TASK DESCRIPTION

1. Meet and discuss problem with County staff. Obtain all available data on the problem including surveys, soils reports, highway plans, County maps, etc.

2. Survey and document the horizontal and vertical geometry of the dam, the dam's outlet structure, the causeway, the causeway culvert, the existing utilities in the dam and causeway, and other features that would effect hydraulic performance during standard rainfall events (10,25,50 and 100 year storms). This effort will document the lake's normal pool elevation and will include soundings in the vicinity of the dam and causeway at regular intervals.

Paul C. Small, P.E., P.L.S. • Richard A. Costello, P.E. • Andrew M. Snyder, P.E.
G. T. Wilson, Jr., C.L.S. • G. Archer Marston, III, P.E. • Steven O. Wigley, P.E. • G. Donald Gartrell III, P.E.
804-253-0040 FAX 804-220-8994

TASK DESCRIPTION

3. Setup a hydraulic model of Lake Powell using the surveyed physical geometry plus watershed characteristics derived from County topographic maps and other available data. Prepare maps of the watershed and the lake plus profiles, cross-sections, and detailed dimensions of all pertinent features.

4. Simulate the "normal" hydraulic performance of the dam and causeway by routing the 10,25,50 and 100 year design storm through the existing spillway, approach and exit channel.

5. Simulate a "gradual" dam failure under all four design storms by modifying the outflow characteristics of the existing spillway, approach and exit channel. A "gradual" failure can be defined as the hydraulic equivalent of a higher outflow over a shorter period of time as compared to the "normal" performance characteristics.

6. Simulate a "sudden" dam failure under all four design storms by further modifying the outflow characteristics to be the hydraulic equivalent of a major "breach" in the dam (i.e. loss of spillway, approach channel and exit channel, resulting in free flow conditions from lake elevation to receiving stream).

7. Prepare five copies of a draft report documenting the data and hydraulic modeling results. Evaluate the results and answer the "four questions" in a straight forward manner using common sense, logic, and layman terminology. Submit report, meet and discuss same with County staff, revise and edit accordingly. Provide 20 copies of final report and present report to the Board of Supervisors if instructed to do so.

Our fee for providing the above services will be a lump sum of $ 14,800.00. We will need four weeks from notice to proceed to complete the work and submit the draft report. We will need an additional two weeks after staff review and comment to revise, edit and print the final report. Finally, we agree to perform this work under the terms and provisions of our annual term engineering contract with the County.

We hope this proposal is timely and responsive to your request. Please call if you have any questions or require additional information.

Sincerely,

AES Consulting Engineers

Paul C. Small, P.E.

7963C09.PCS/jlc

SDN Water Resources

FAX TRANSMISSION COVER SHEET

FAX NO. - (804) 865 - 1533

TO: Weyland Bass

COMPANY: James City Co.

PHONE NO.: 1-253-6663

JOB NUMBER: Marketing

FROM: Jerry Normann

COMPANY: SDN

DATE: 3/15/94

RE: Proposal to Evaluate Lake Powell Dam Failure.

COMMENTS: Pls. let me know if this is acceptable.

PAGES INCLUDING THIS COVER SHEET: 4

IF THERE ARE ANY PROBLEMS WITH THIS TRANSMISSION, PLEASE CALL (804) 865 - 9610.

Central Park/Six Manhattan Square/Suite 102/Hampton, Virginia 23666
Telephone 804-865-9610/Norfolk 804-627-6900/Fax 804-865-1533

March 15, 1994

Mr. Wayland N. Bass, P.E.
County Engineer
James City County
Development Management
Post Office Box JC
Williamsburg, Virginia 23187

Re: Fee Proposal to Conduct Analysis of Potential Lake Powell Dam Failure

Dear Mr. Bass:

Based on your telephone call of March 14, 1994, we propose to perform analyses of the potential inpacts of the potential failure of the embankment at the outlet of Lake Powell. The analyses will include evaluations the potential impacts of:

1. A sudden outlet embankment failure or Lake Powell - this will include time to drain the lake, minimum elevation, and our judgement on secondary impacts such as fish kill, embankment sloughing, etc.

2. A gradual outlet embankment failure on Lake Powell - same analyses as for part 1, except that the lake drawdown and impacts will be based on our judgement of a gradual failure of the embankment.

3. A sudden outlet embankment failure on the Jamestown Road fill and crossing - includes scour around the existing culvert opening, and sloughing of roadway embankment.

Central Park/Six Manhattan Square
Suite 102/Hampton, Virginia 23666
Telephone 804-865-3610
Norfolk 804-627-6900
Fax 804-865-1533

4. A gradual outlet embankment failure or the Jamestown Road fill and crossing - same as #3, above with a gradual failure as described in #2.

We have available several dam failure evaluation programs, including the NWS Dam Failure Program, SCS TR-66, HEC-1, etc. Because the lake and its upstream watershed have been modeled using the James City County Storm Drainage models, including STORMLINK and SWMM/EXTRAN, we propose to use these models for the analysis. For the gradual failure, we will transpose the EXTRAN data to version 4 of the SWMM model so as to be able to model the estimated gradual failure mode. EXTRAN will provide information on time to drain the lake, and flows and velocities created by the embankment failure on upstream stations. We will use the drawdown times, coupled with velocities through the Jamestown Road opening, to evaluate the potential for scour failure of the structure. For this, we will use VDOT bridge or culvert scour evaluation methods, and any available information on the construction of the embankment and opening.

We propose to analyze the failures under dry conditions (normal inflows) and under a 2 year storm event.

Results will be summarized in a Technical Memorandum to James City County, with our appraisal of the situation.

In preparing our fee proposal, we have made the following assumptions:

1. The evaluations are preliminary in nature and are for guidance to the County. The County understands that there are infinite modes of embankment failure; we hope to bracket the actual event, but the actual failure will probably be different than our analysis.

2. Smith Demer Normann (SDN) assumes no liability for any consequences such as damages or loss of life from the actual failure.

3. SDN will provide the County with our best judgement of the consequences of failure on the lake and the Jamestown

Road crossing. However, without precise field information on all aspects of the outlet embankment conditions, the lake boundary, and the Jamestown Road Crossing, and much more detailed evaluations, we cannot define with precision the exact sequence of failure.

4. No soil borings, hydrographic surveys, or other field investigations, except for one site visit, will be performed as a part of this work.

5. Land use conditions in the watershed will be selected from one of the three conditions modeled in the Mill Creek/Lake Powell study: Existing, Comprehensive Plan, or Ultimate. (This can be decided by the County.)

We propose to perform the above described scope of work for a lump sum fee of eight thousand five hundred dollars ($8,500.00). This figure includes a 10 percent contingency and related expenses.

Alternatively, we will perform the work on a labor plus expenses basis, using our standard billing rates (current rates attached). Expenses will be billed at the cost plus ten percent (10%).

Please let me know if the proposed scope of work is what you desire, and whether this fee proposal is acceptable. I will be happy to discuss any aspect of the proposal with you. We hope to work with James City County on this project.

Very truly yours,

SDN WATER RESOURCES

Jerome M. Normann, P.E.
Director Water Resources

JMN/jm

Ray Basley
253-1911
13 December 1990

TO: Otis Denby

File Rte 7/6
York Co.

SUBJECT: Queens Lake Dam

As discussed, the following comments are forwarded for information.

1. The cost to repair and maintain the dam is Queens Lake property owners responsibility.

2. Currently, the spillway is subject to failure at any time, and the risk is getting higher as each day passes. Water is continuing to wash out the undermined areas and the spillway banks, thus continuing to weaken the dam.

3. If the spillway fails, there is a good possibility the bridge will go with it, and so will the water pipe line supplying the West side of the lake.

4. The Queens Lake Board of Directors should explore the feasibility/possibility of immediately installing the recommended 24 inch emergency drain at a new location away from the spillway. Recommend this new drain line be placed such that the lake could be drained down 2 feet if desired. Estimated cost - $10,000 and is going to be required ultimately no matter what is done. By installing this drain now, you have the safety factor that if the leakage starts to increase, you can dump dirt in front of the wear to seal off the leakage, and shift the lake level control to the 24 inch drain.

5. The steel beams of the bridge are supporting the spillway side walls from falling inward, thus cannot be removed until other support is provided.

6. As the result of the August 1989, 12 inch rain storm, the depth of the lake rose by over 3 feet and was actually going over the road at the Western end of the dam. Any thought of reducing the overflow capacity is false economy, and should not be supported.

7. The $100,000 total cost estimate is just that -- an estimate. Many considerations and cost factors need to be refined. The ultimate total cost is probably somewhere between $80,000 and $150,000, with more confidence in a higher figure than a lower figure.

8. The Board of Directors need the actual cash in hand before going out for a bid for final design contract/actual repair contract, or someone to put up the actual money in advance of collecting it from the property owners.

Attached - copy of Virginia Freedom of Information Act.

Scott Thomas

To: Wayland Bass
Cc: Darryl Cook
Subject: Lake Powell E.S.

As we discussed, I performed a structural evaluation for use of corrugated polyethylene pipes (CPP's) within Lake Powell's emergency spillway, if the bridge was removed. Here are the results. (Note: Although we talked about 60 inch diameters, I evaluated use of 48 inch diameter. 48 inch is more of a standard size (readily available) and is the largest size currently incorporated into AASHTO M294-97. We would want the pipes to meet this AASHTO specification.)

In accordance with structural design procedure by the Corrugated Polyethylene Pipe Association (CPPA), use of 48 inch diameter CPP will be acceptable for dead load, H20 (32,000 lb. axle load), deflection, buckling, bending stress and bending strain associated with covers ranging from 2 feet to 5 feet to the top of the pipes. I stopped the analyses at 5 ft. of cover. Greater depths could be evaluated but it appears that this 2 to 5 ft. zone is the most critical since both live and dead loads are influencing the pipes. As the depth increases, dead loads increase but live load influence diminishes tremendously. After 10 ft. of cover, live load is considered negligible. 48 inch pipe can handle up to about 28 feet of dead load cover.

Although structurally acceptable, certain conditions (specifications) would need to be adhered to during installation to meet this design. These conditions, which are standard to the industry, include:

1. Use of 48 inch diameter high density, corrugated polyethylene pipe meeting the requirements of AASHTO M294-97, Type S (smooth interior) with bell and spigot joints and rubber gaskets meeting the requirements of ASTM F477.

2. If soil is to be used as backfill it must consist of at least a Class III material meeting the requirements of ASTM D2321 compacted to a minimum 90 percent Standard Proctor density with 9 inch lifts. Class III backfill is coarse grained soil with fines (E' of 1,000 psi) consisting of GM, GC, SM and SC materials per ASTM D 2487. Compacted Class III backfill would be required below the pipe in a 4 inch bedding layer and extend to a depth of at least 6 inches over the pipe. Native soils, compacted to a lesser degree, can be used in the final backfill layer which starts at a point 6 inches over the top of pipe and extends to the final ground surface. Of course backfill better than Class III (ie. ASTM D2321 Class IA, IB or II) would also be acceptable. These classifications consist of compacted coarse grained soils (without fines, min. 85 percent compaction) to dumped (no compaction required) clean aggregate.

3. A minimum cover of 2 feet is required over the pipe during construction to prevent crushing due to heavy equipment.

4. Minimum 27 inch spacing between multiple culverts for backfill & compaction purposes.

CARL M. HENSHAW
DRAINAGE PRODUCTS, INC
P.O. BOX 429
POWHATAN, VA. 23139

3-13-92

To Pat Menichino Fax 253-6663
Phone 253-6675

From Gary Potter

The product I would recommend be used for the relining is Cement Lined 16ga Alumunged Type-2 CSP. Note the recommended dam classification usage and maximum Fill height of 35'.

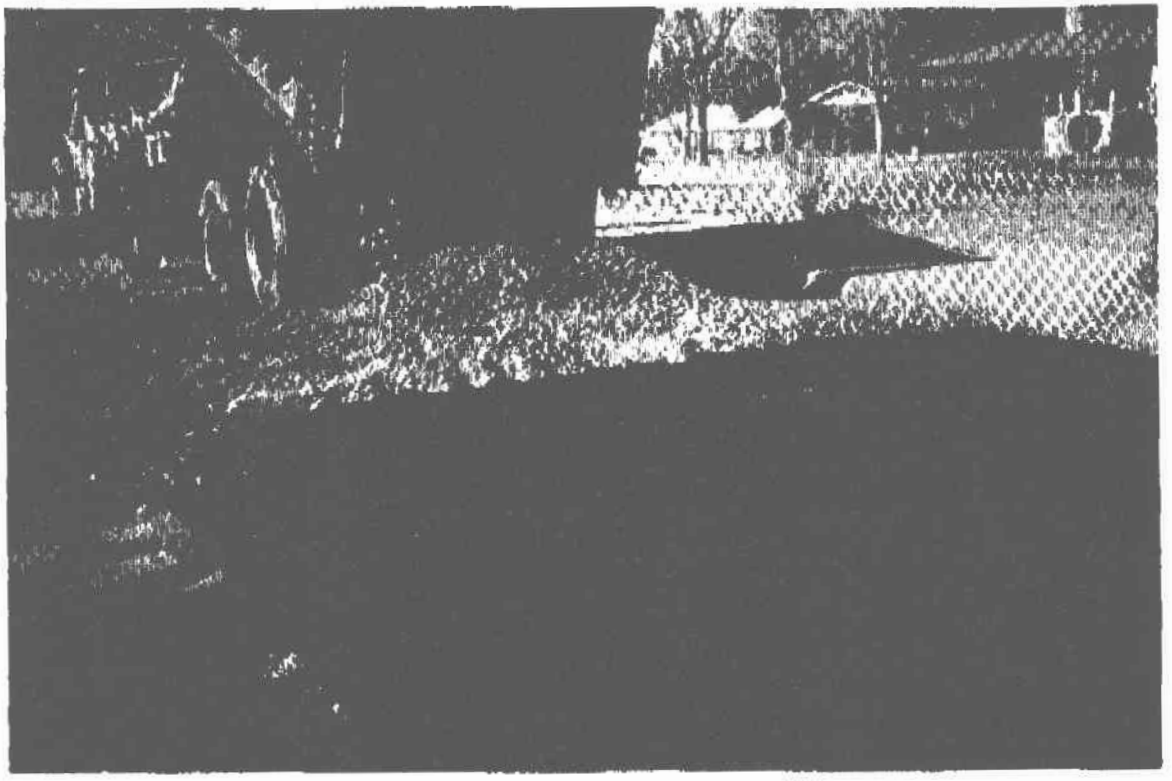
30" pipe would sell for 28.00 /LF
30" Bands w/ O Ring Gaskets 49.58
Grout holes w/ plugs 24.00 ea
FOB Williamsburg

The band is very tight and is used for regular dam installations. This band w bolts will cause the OD measurement to be ≈ 1½" greater than the 31" OD of the pipe barrel in this one area of the band.

an alternative would be to weld several "tabs" of 3"x4"x¼" steel around the circumference of one end of the 30" pipe forming a "bell" alignment. then one pipe is in place, use an internal band till the grouting procedure is complete and then remove this band.

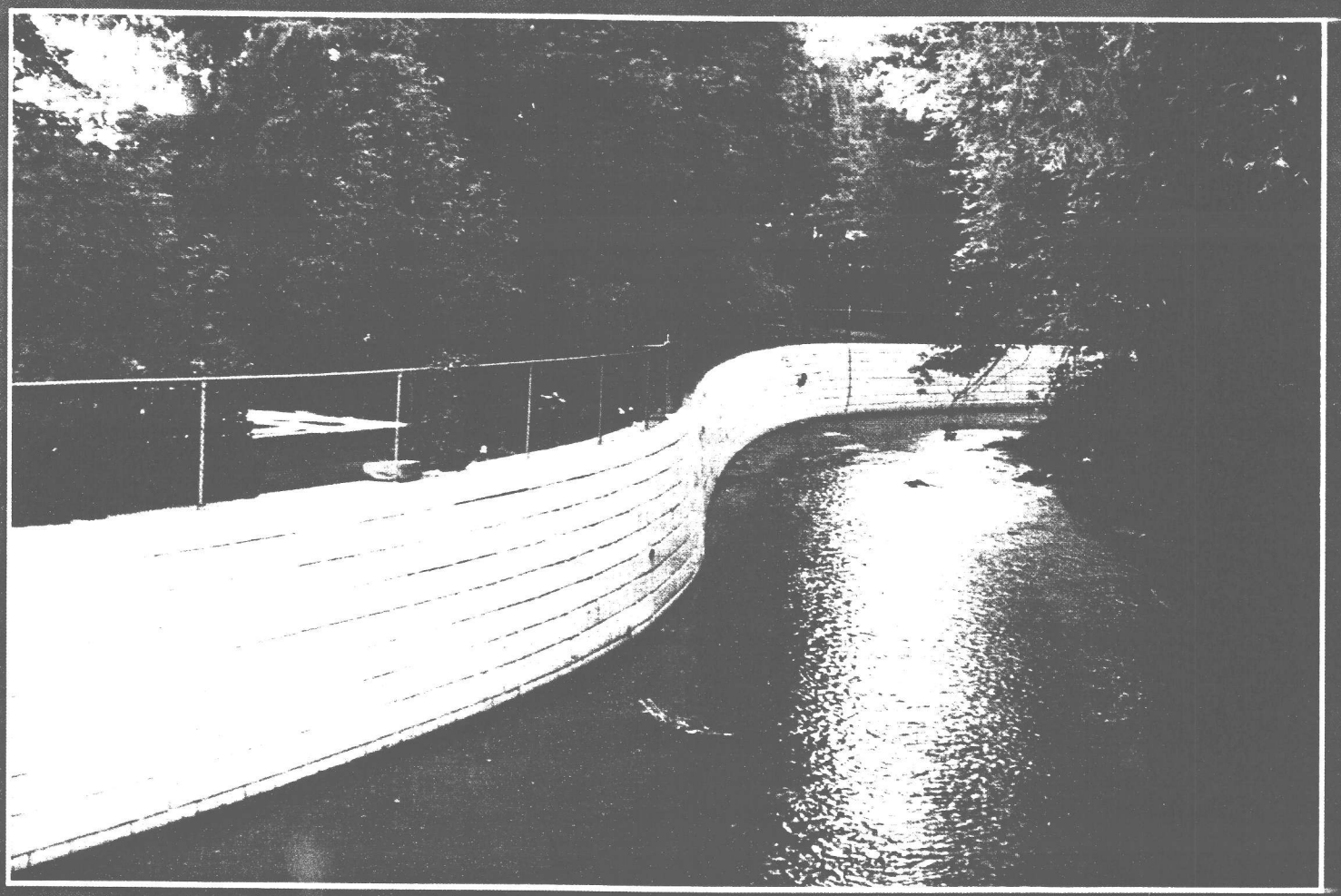
TerraCell™

Cellular Confinement System



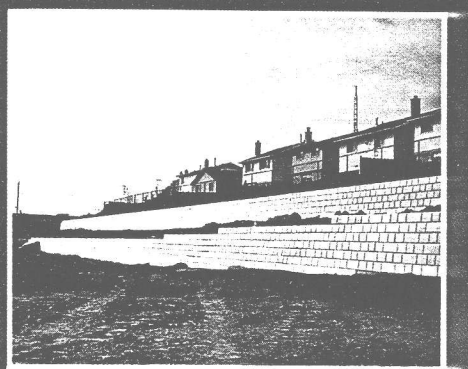
The use of TerraCell and on-site fill materials creates numerous opportunities for long lasting economical solutions to stabilization, erosion control, and retaining structure problems. Included among the many applications of TerraCell are:

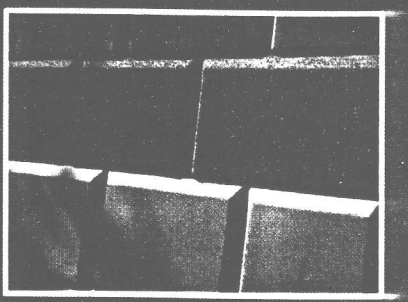
- **ROAD AND AREA STABILIZATION**
- **PIPELINE STABILIZATION**
- **BOAT LAUNCH STABILIZATION**
- **SLOPE EROSION CONTROL**
- **CHANNEL EROSION CONTROL**
- **PIPE OUTFLOW EROSION CONTROL**
- **EMBANKMENT RETAINING WALLS**
- **WATERWAY RETAINING WALLS**
- **DIKES AND COFFERDAMS**

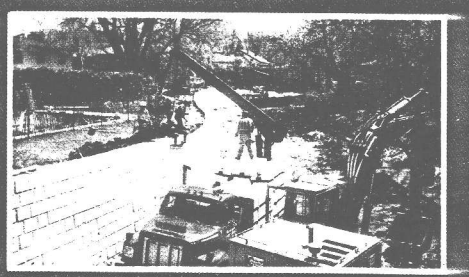


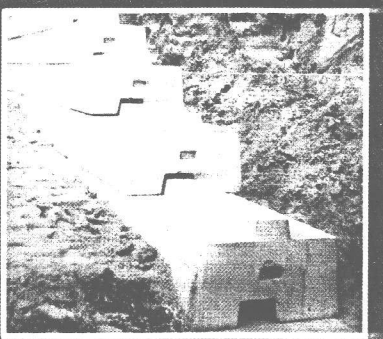
DURA-HOLD®

Interlocking Retaining Wall System for heavy duty protection

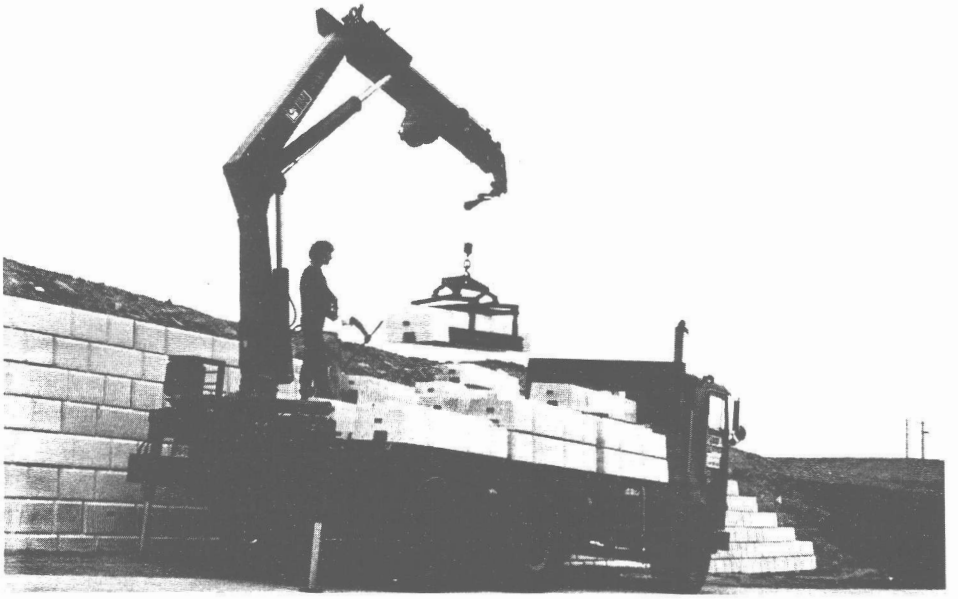






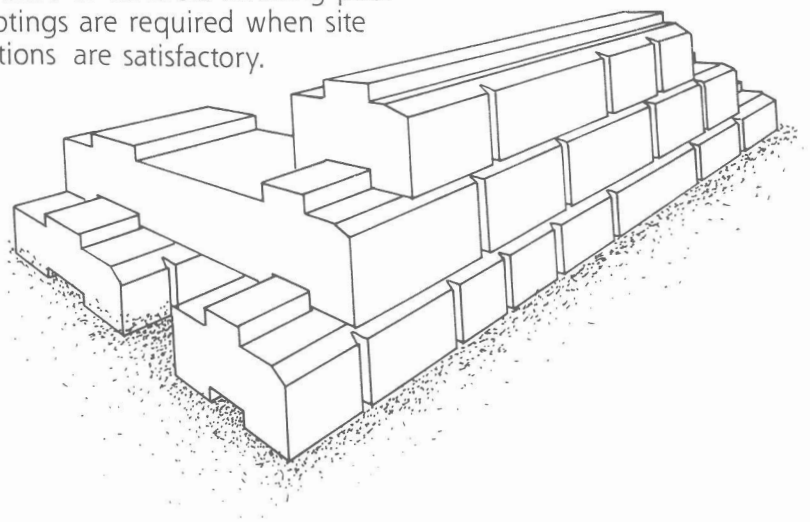


Build with DURA-HOLD® for massive retaining walls without footings

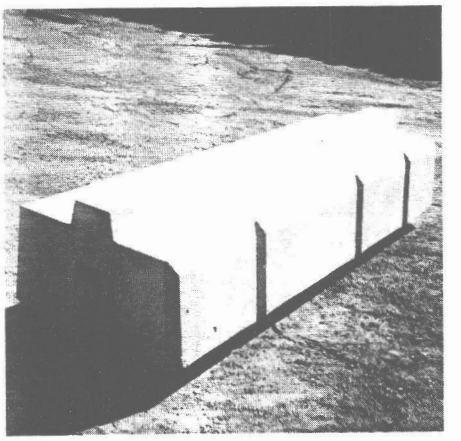


Units can be placed quickly with a scissor clamp on small crane or delivery vehicle.

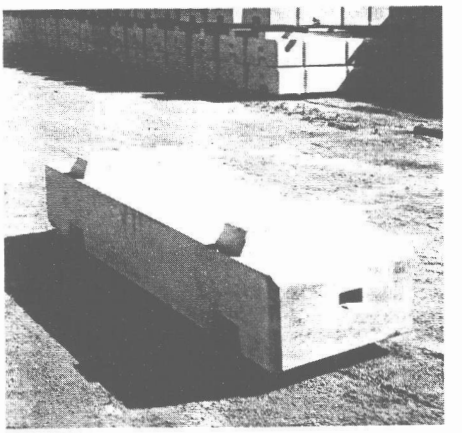
Low installed cost and long maintenance-free life for industrial and commercial landscaping, erosion control, protective facing and waterfront treatments. Dura-hold face units and tiebacks produce correct batter automatically to form a combination gravity and semi-crib wall up to 25 feet high. Only preparation is a levelled crushed stone base or concrete levelling pad: no footings are required when site conditions are satisfactory.



Standard units and tiebacks all interlock. Tiebacks are aligned vertically in alternate courses on 8 foot centers. Single standard unit is placed at rear between tiebacks for solid support. Under normal soil conditions, walls under 8 feet do not need tiebacks. Ask for engineering drawings.



Standard unit is the face panel and is segmented to create a random block pattern. Blocks can be sandblasted to a desired architectural exposed aggregate finish. Set-back interlock ensures proper inward lean throughout height of wall.
Size: 12" x 24" x 72". Weight 1740 pounds. Half pieces and corner blocks available. Coping is same as standard unit but has flat top.



Interlock device carries through on tieback and allows a deeper crib effect with two tiebacks in tandem. Tieback and standard unit remain stable, cannot slide across each other, yet remain flexible to let wall move with frost.

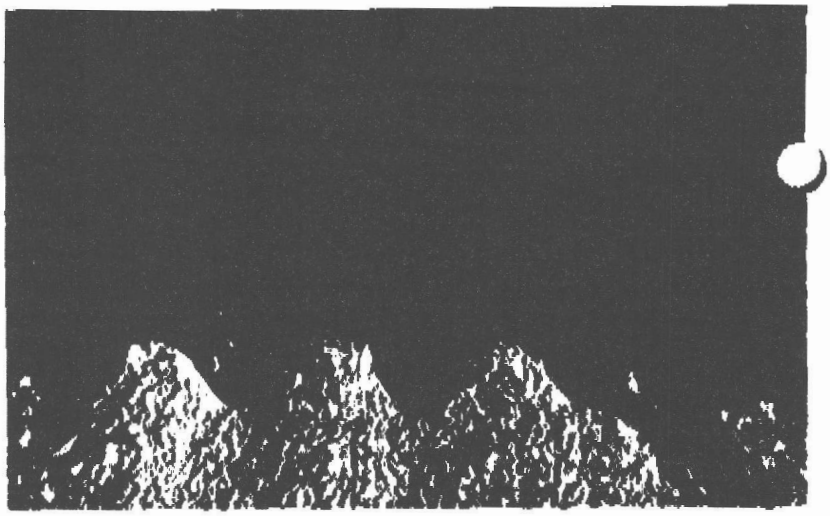
CUSTOM CONCRETE
P.O. BOX 3559
WILLIAMSBURG, VA 23187-3559
(804) 565-2264 • FAX (804) 565-1250
READY MIX • SAND • GRAVEL • PRECAST

DURA-HOLD®

Description:

TerraCell is a lightweight, flexible confinement system constructed of high density polyethylene strips which are uniquely bonded together to form a high strength system. TerraCell has a three dimensional honeycomb shaped cellular construction which, with the use of on-site or select fill materials can provide:

- semi-rigid slabs,
- lateral load distribution,
- reduced subgrade pressures, and
- reduced base thickness.



Specifications:

Expanded dimension
8 ft. x 20 ft. x 8 in. or 4 in.

Collapsed dimension
11 ft. x 8 in. x 8 in. or 4 in.

Panel thickness (nominal)
.050 +/- .004

Weight
111 or 56 lbs.

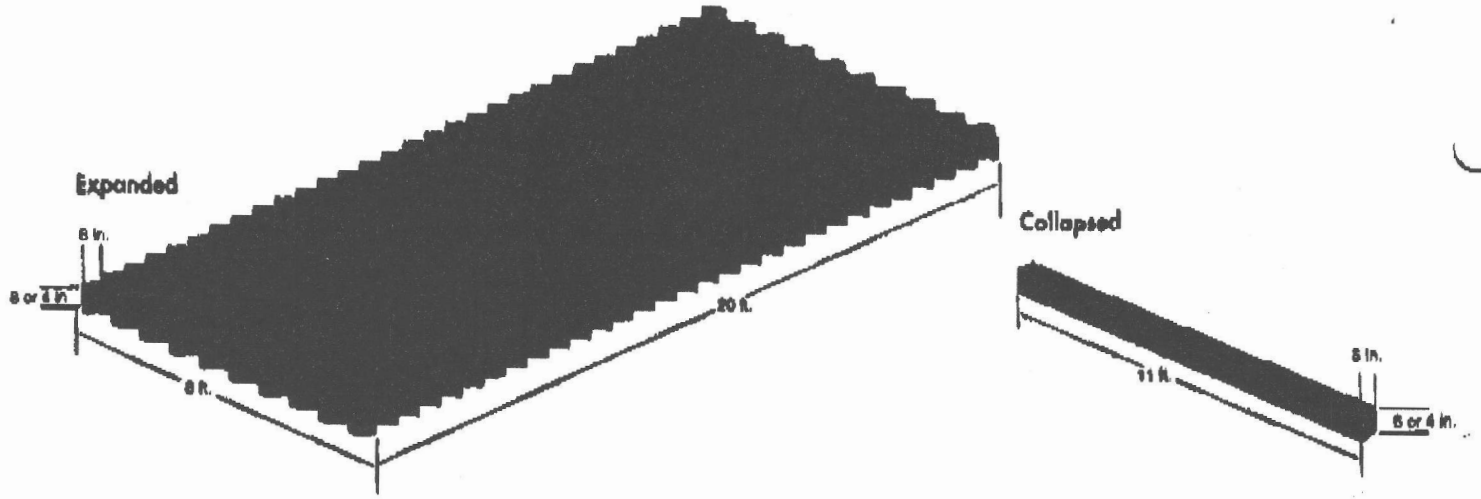
Seams tensile peel strength
525 lbs. or 262 lbs. min.

Installation temperature range
-18° F to +110° F

Polymer material
High density polyethylene

Color
Black

Carbon black content
2% to 2½%



Distribution

TerraCell™ is marketed by WEBTEC, Inc., through a network of local distributors. For further information on TerraTex products or local distribution contact:

MIRAFI INC
Civil
Engineering
Fabrics

ENGINEERED ENVIRONMENTAL SYSTEMS CO

11841 Kilkenny Rd.
Midlothian, VA 23113
(804) 794-5096

LOCAL DISTRIBUTOR

CLTC 2/92

May 11, 1988

Risi Stone - Typical Walls — Project No. 8814

TYPICAL RETAINING WALL PARAMETERS

Assumptions and Definition of Variables:

Wall:
- H - Exposed wall height
- Ha - Effective wall height retaining soil
- h - Wall embedment depth
- b - Width of wall base
- γ_w - Unit weight of wall components
- q - Surcharge loading
- i - Angle of backfill with the horizontal
- α - Angle of wall batter from vertical
- β - Angle between a line connecting the top and bottom corners of the wall, with the horizontal
- Wx - Weight of components of cross section of wall
- dx - Distance to centroid of components of cross section of wall

Soil:
- γ_s = 135 pcf - Unit weight of soil
- δ_a = 24^o - Angle of wall friction
- ϕ' = 36^o - Angle of internal friction
- f = 0.6 - Frictional coefficient at base

Loads:
- F_r - Forces resisting sliding along the base
- F_s - Forces causing sliding along the base
- M_r - Moments resisting overturning about the toe
- M_o - Moments causing overturning about the toe
- P_a - Active soil force
- P_p - Passive soil force
- P_s - Active soil force due to surcharge
- FS_s - Factor of safety against sliding
- FS_o - Factor of safety against overturning

NOTE: Soil variables are based on the assumption of a well compacted MTO Granular 'B' type backfill material both above and below the wall.

May 11, 1988

Risi Stone - Typical Walls — Project No. 8814

TYPICAL EQUATIONS FOR RETAINING WALL ANALYSIS USING THE COULOMB METHOD

1. Determine forces acting on wall

Active Pressure:

$$P_a = 1/2\ K_a\ \gamma s\ Ha^2$$

where

$$K_a = \left[\frac{\operatorname{cosec} \beta \sin(\beta - \phi')}{\sqrt{\sin(\beta + \delta)} + \sqrt{\frac{\sin(\delta + \phi')\sin(\phi' - i)}{\sin(\beta - i)}}} \right]^2$$

Passive Pressure:

$$P_p = 1/2\ K_p\ \gamma s\ h^2$$

where

$$K_p = \left[\frac{\operatorname{cosec} \beta \sin(\beta + \phi')}{\sqrt{\sin(\beta - \delta)} - \sqrt{\frac{\sin(\delta + \phi')\sin(\phi' + i)}{\sin(\beta - i)}}} \right]^2$$

Surcharge Pressure:

$$Ps = Ka\ q\ Ha$$

2. Determine stability against sliding along the base:

$$FS_s = \frac{\sum \text{Forces Resisting}}{\sum \text{Sliding Forces}} = \frac{\sum Fr}{\sum Fs} \geq 1.5 \text{ if passive resistance is ignored}$$

where $\sum Fr = (\sum \text{vertical forces}) \times f + P_p$

$= (Pa \sin(\delta + \beta - 90) + Ps \sin(\delta + \beta - 90) + \sum W_x) \times f + P_p$

$\sum Fs = (\sum \text{horizontal sliding forces})$

$= Pa \cos(\delta + \beta - 90) + Ps \sin(\delta + \beta - 90)$

3. Determine stability against overturning about the toe:

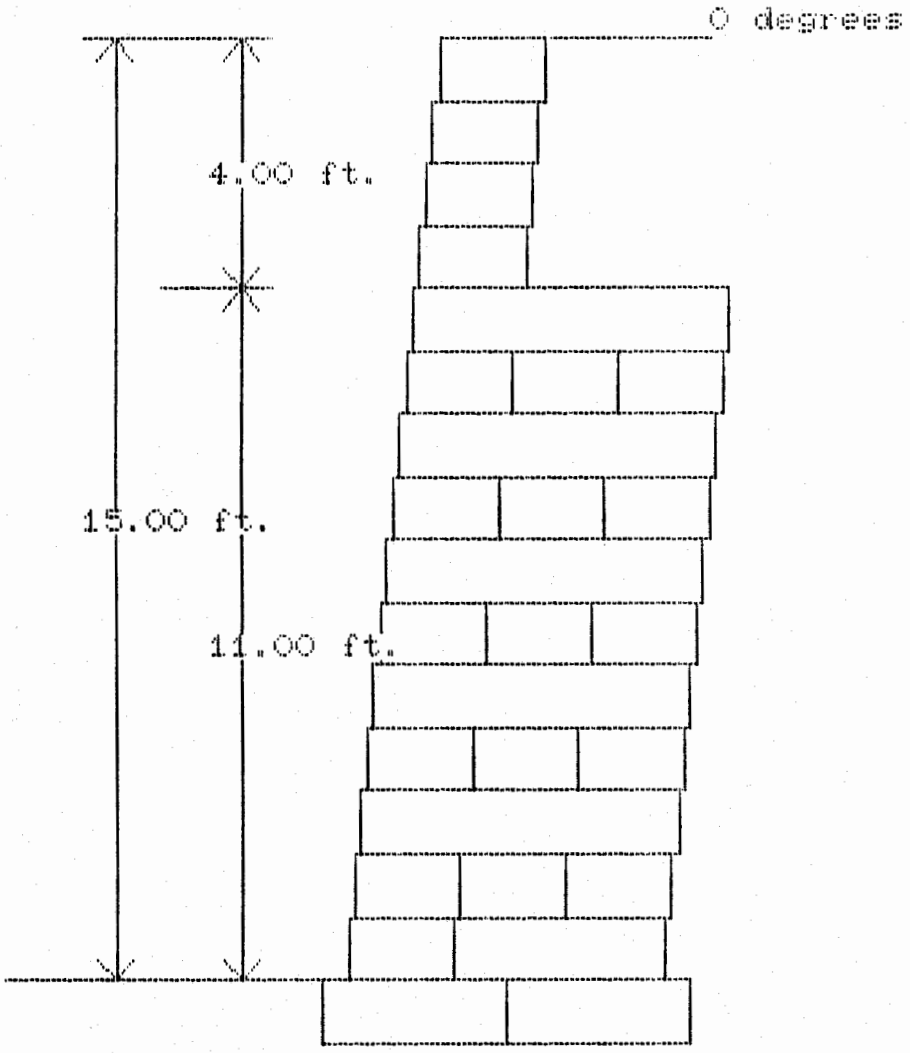
$$FS_o = \frac{\sum \text{Resisting Moments}}{\sum \text{Overturning Moments}} = \frac{\sum Mr}{\sum Mo} \geq 1.5$$

where $\sum Mr = \sum(W_x \times d_x) + Pa \sin(\delta + \beta - 90) \times da + Ps \sin(\delta + \beta - 90) \times d_s$

$\sum Mo = Pa \cos(\delta + \beta - 90) \times Ha/3 + Ps \cos(\delta + \beta - 90) \times Ha/2$

C R I B B E D W A L L :

DH SLB FULL
Project:



ENTER TO PRINT, ANY OTHER KEY TO RETURN TO MENU .

CARL M. HENSHAW
DRAINAGE PRODUCTS, INC
P.O. BOX 429
POWHATAN, VA. 23139

3-18-92

To Pat Menichino

From Gary Potter

The attached brochure discusses Terracell. This is the "web" ~~to~~ honeycomb product. For embankment you would use the 4" deep product
It sells for $1.95 lsf based on 5000 sf FOB jobsite.

RANDY COOPER
P.O. BOX 1413
WILLIAMSBURG, VA
23187

FAX
253-7568

JAMES CITY COUNTY
ENVIRONMENTAL DIVISION
P. O. BOX 8784
WILLIAMSBURG, VIRGINIA 23187-8784
(757) 253-6670

INSPECTION REPORT - EROSION AND SEDIMENT CONTROL

Date: 8/29/00
Project: LAKE POWELL DAM REPAIR

~~Permittee~~: CONTRACTOR
H. P. DILLINGER INC.
5640 Millwood Drive
Gloucester VA 23061

Phone/Fax: _____

An inspection of the above-referenced project was conducted on 8/24, the following represents an evaluation of that projects compliance with James City County's Environmental Regulations. Items identified below as "Needs Repair" are deficiencies that must be corrected.

IN COMPLIANCE	NEEDS REPAIR	
☐	☐	SEDIMENT BASIN _____
☐	☐	SEDIMENT TRAP _____
☐	☐	CONSTRUCTION ENTRANCE _____
☐	☑	SILT FENCE EXTEND SILT FENCE TO LOWEST POINT POSSIBLE ON DOWNSTREAM SIDE OF DAM
☐	☐	INLET PROTECTION _____
☐	☐	STABILIZATION _____
☐	☑	OTHER ITEMS RIPRAP AT END OF SPILLWAY AND ALSO AT END OF 12" DISCHARGE PIPE

Notice is hereby given that those deficiencies listed shall be corrected in accordance with James City County's Environmental Requirements on or before _____. The site will be reinspected at that time and you are invited to accompany the inspector on that date. Failure to comply with this report will result in Enforcement Actions .

GERALD LEWIS
JCC Environmental Division Inspector
757-253-6670

_____
Project Representative Notified

3/00

SJT-COMMENTS

LAKE POWELL DAM REPAIR PROJECT.

CONFIRM TO MINIMIZE SLOPE FILL SLIDING

STRUCTURAL FILL

1. "FILL DIRT" BETWEEN EXISTING EARTHEN EMBANKMENT AND CONCRETE STRUCTURE SHOULD BE SUITABLE DAM EMBANKMENT MATERIAL & COMPACTED (MIN. 95% STANDARD PROCTOR). SPECIFY MIN. COMPACTION REQUIREMENTS, PROFESSIONAL ENGINEER TO MONITOR & CERTIFY FILL.

SUBGRADE PREPARATION

2. DEFINE "SOUND BASE" THAT CONTRACTOR WILL EXCAVATE TO. RECOMMEND PROFESSIONAL ENGINEER TO MONITOR & INSPECT STRUCTURE & DAM FILL SUBGRADE DURING CONSTRUCTION.

ACCESS (REE), BORROW, FILL SITES

3. EXSC PLAN. CLAY SEAL ROCK CHECK DAMS ARE ACCEPTABLE; HOWEVER SPECIFY TYPE OF FILTERING STRUCTURE REQUIRED FOR WATER PUMPED FROM THE WORK ZONE

12" DRAIN & SAMPLING PIPE.

4. SUGGEST 8" DIA. DUCTILE IRON PIPE (PUSH-ON JOINT C150/C151, ANSI/AWWA) THRU U/S ROCK CHECK ~~TO ALLOW RUNOFF~~, WORK ZONE TO D/S TOE. WILL HELP TO ALLOW RUNOFF TO FLOW THRU ROCK AREA. PIPE 8" W/ VALVE AND MANIFOLD TO BE USED AS A DRAWDOWN DRAIN & SAMPLING POINT. (ANSI/AWWA C500 GATE VALVE) (SEE ATTACHED SKETCH)

SMALL TRASH RACK AT INLET (WINGWALL) SIDE.

COLLARS & ANCHORS

5. SUGGEST CONCRETE ANTI-SEEP COLLARS (2) @ 2'-0" TO PREVENT PIPING ALONG FILL/CONC INTERFACE AND TO PROVIDE SLIDING (ANCHOR) RESISTANCE FOR NEW STRUCTURE. EXTEND INTO EXIST. EARTHEN EMBANKMENT. (SEE ATTACHED SKETCH)

WINGWALLS

6. SUGGEST WEEP HOLES & GRANULAR BACKFILL AT WINGWALLS TO RELIEVE ~~RESIDUE~~ HYDROSTATIC PRESSURE & PREVENT MOVEMENT & CRACKING.

DARRYL / PAT

1 - 36" ϕ CULVERT - LAKE POWELL SPILLWAY

CHART 2 VDOT DRAINAGE MANUAL

$HW/D \approx .5$

$Q \approx 10$ CFS

SAY 5 CFS AVG AS LEVEL DECLINES

AVG FLOW THROUGH LAKE SAY $\approx$ 2.5 MGD

$\approx$ 1750 GPM

$\approx$ 29 GPS

$\approx$ 4 CFS

INITIALLY ONE 36" ϕ CULVERT WOULD CARRY AVG FLOW AND PRODUCE SOME DRAWDOWN; AS LAKE LEVEL LOWERS A POINT OF EQUILIBRIUM WOULD ~~OCCUR~~ OCCUR BEFORE LEVEL REACHED CULVERT INVERT.

STORM ~~FLOWS~~ FLOWS WOULD NEED TO BE STORED in FREEBOARD

2 YR STORM w/ 1" RUNOFF WOULD PRODUCE

$Z_{LOW}/60 \times 1" \approx 43"$ STORAGE NEED.

Pump Rental Cost

Delivery Out-of-Richmond

DPC 250 Diesel Pump - 10" intake, with 3500 GPM Capacity

ITEM	Week	Month
Pick-up & Delivery	$450.00	$450.00
Pump	885.00	2655.00
Suction Hose - 20'	150.00	450.00
Discharge Hose - 100'	396.00	1190.00
TOTALS	$1,881.00+	$4,745.00+

Lake Powell Dam

1. Pump Pipes Full of Concrete

36" ϕ - 7.07 ft^2

25' - x7.07 = 176.75 cf^3 x 3 = 530 cft^3 - 19.6 cyds

20 cyds x $70 = $1400

2. $Q_{100} \cong$ 240 cfs -

$Q = CLH^{3/2}$

Top of dam - 14.5

- water surface elev - 9.0

Δ = 5.5'

Q = 240 =

$450/CY - Per Barry Bryant

1.0 GUIDELINE TECHNICAL SPECIFICATIONS

The following provides general technical specifications for Risi Stone Ltd. wall systems. Refer to "Guideline Construction and Installation Procedures" for additional details regarding the construction and installation of the wall systems.

1.1 Description

This work is the furnishing and constructing of Risi Stone Ltd. retaining wall systems (DURA-HOLD and DURA-HOLD II) including excavation of on-site soils and placement and compaction of select and general backfill, in reasonably close conformity with the lines, grades, dimensions, locations, and sections shown on the approved contract drawings and in accordance with the contract documents, local, state or industry standard specifications for retaining walls, and the requirements set forth herein, to form retaining structures of satisfactory stability.

1.2 Materials

1.2.1 Precast Concrete Units: Precast concrete units comprised of dry-cast or wet-cast, Portland cement concrete achieving a minimum 28-day compressive strength (f'_c) of 5,000 pounds per square inch (psi). Use Portland cement conforming to the requirements of ASTM C150, with the cement type determined by project specific requirements. Maintain the water absorption of finished concrete units to not exceed five (5) percent.

Reinforce DURA-HOLD and DURA-HOLD II tieback units with a minimum of two (2), No. 5 size, Grade 60, deformed steel reinforcing bars. Space the bars equidistant from the cross-sectional center of gravity along a horizontal line through the center of gravity, while maintaining the required concrete cover.

Provide temperature and shrinkage reinforcement in all units where required by the applicable specifications. Distribute the reinforcement within the units to conform to generally accepted engineering practices and to practices deemed acceptable by the governing agencies. When required, distribute such reinforcement as a minimum of two reinforcing bars; one bar placed as near each longitudinal face as requirements for concrete cover permit, along a horizontal plane through the cross-sectional center of gravity. Optionally, place an equivalent area of flat sheet, welded wire fabric along the horizontal plane through the cross sectional center of gravity. Maintain the required concrete cover for all reinforcing steel.

Reinforce tieback, standard, coping and corner units for nonstandard applications, if/as required by an independent structural design of the units.

Use aggregate in the manufacture of precast units consisting of washed, natural mineral aggregate conforming to the requirements of AASHTO M43 or ASTM D448.

Use water in the manufacture of precast units reasonably clean and free of deleterious materials which could affect the finished product and having a hydrogen ion concentration (pH) between 6 and 8.

1.2.2 Cast-in-place concrete composed of Portland cement conforming to ASTM C150 for foundations and general site work. Select type of Portland cement dictated by field conditions. Use concrete having a minimum 28-day compressive strength (f'_c) of 3,000 psi and a slump of three to four inches. Limit the maximum aggregate size in concrete to 1-1/2 inches. Perform plain and reinforced concrete construction in accordance with the latest editions of ACI 318.1 and ACI 318, respectively.

1.2.3 Steel reinforcement consisting of Grade 60 deformed steel reinforcing bars (except as described in 1.2.1 for precast concrete units) of the size specified and smooth, welded wire fabric (WWF) of the grid and size specified, conforming to ASTM A615 and ASTM A185, respectively. Provide reinforcement in accordance with ACI 318, Section 3.5. Maintain position of reinforcement during unit manufacture using supports and spacers consisting of standard steel stays, chairs, hangers and spacers. Where concrete is cast against earth, maintain the position of reinforcement using items permitted for unit manufacture, or by using precast concrete mortar blocks. The use of stones, brick, wood, or pieces of broken concrete is prohibited. Securely wire supports and spacers to reinforcement and attach to formwork.

1.2.4 Expansion and construction joint material consisting of premolded, bituminous-bonded fiber type joint filler or durable, inert, rubber joint filler.

1.2.5 Drainage pipe consisting of high-density polyethylene (HDPE) corrugated, perforated pipe or Schedule 40, polyvinyl chloride (PVC) perforated pipe of the required diameter.

1.2.6 Geotextile filter fabric consisting of a durable, nonwoven, polyester filter fabric suitable for separation of particulate materials.

1.2.7 Select backfill consisting of AASHTO Size No. 57 hard, durable, angular gravel, crushed gravel, or crushed stone, or a combination thereof, conforming to the requirements of

AASHTO M43 or ASTM D448. Do not use slag as select backfill without permission of the Engineer. If slag is permitted for use, only blast furnace slag resulting from the production of pig iron is acceptable.

1.2.8 General backfill consisting of inorganic, uncontaminated compactible site soils or rock deemed suitable by the Engineer for use as general backfill.

1.3 Manufacture of Units

Furnish precast concrete units manufactured by Risi Stone Ltd. or a licensee of Rothbury Investments, Ltd. (licenser of Risi Stone Products). Manufacture the units in a concrete products plant with approved facilities. Before proceeding with production, provide a model precast unit from the Manufacturer for the Engineer's approval to establish a guide and standard for the type of finish to be furnished on the exposed face. Retain this model at the Manufacturer's plant to be used for comparison purposes during production. Formed surfaces, other than the exposed face, shall not require a special finish.

1.3.1 Unit Characteristics: Use standard rail and tieback units with closed faces and containing offset tongue-and-groove interlocking connections for self battering. Chamfer exposed faces of DURA-HOLD and DURA-HOLD II to create a "random" block appearance.

Cast the standard units to the following nominal length, width and height dimensions:

- DURA-HOLD: 72" x 24" x 12"
- DURA-HOLD II: 72" x 12" x 12"

Cast half-standard and one-half coping rail units to one-half the standard length dimension. Cast the standard coping unit to the same dimensions as the standard rail unit without the tongue. Cast corner units (90°) to a length of 60 inches for DURA-HOLD and DURA-HOLD II units.

1.3.2 Unit Casting: Cast concrete wall units in substantial, unyielding steel forms. Properly assemble, clean, and oil the forms before any concrete is placed therein. During the placing and setting of the concrete, hold the forms rigidly in place.

Secure reinforcement, where required, in the required position in the forms so that it will not be displaced during placement of the concrete.

Apply satisfactory vibration and/or pressure to the fresh concrete to insure filling of all space in the form, to

densify the concrete, and to completely and intimately contact the reinforcement. Do not over-vibrate or use excessive pressure which causes segregation of the concrete materials. Reject units with segregated areas.

1.3.3 Unit Handling and Storage: After molding, carefully transport and store freshly-cast units for initial curing within a temperature controlled enclosure. Provide initial curing in accordance with ACI 308 and the recommendations of ACI Committees 516 and 517, as applicable. After initial curing, store units for additional curing outside temperature controlled enclosure. Ship the units only after two-thirds of the required 28-day concrete compressive strength (f'_c) has been attained.

1.3.4 Unit Quality Control: Precast concrete units will be subject to rejection for any of the following reasons: (1) exposure of the reinforcing; (2) defects which indicate imperfect mixing, placing, or curing of concrete; (3) fractures and cracks, except for small spalls or broken edges; and (4) dimensions not conforming to the following tolerances:

- Length, height, and width of unit: ±3/16"
- Key (tongue and groove) dimensions: ±1/8"
- Deviation from square along base length diagonal: ± 1/8"

Maintain a level of quality control consistent with uniform production practices in the precast industry and project specifications, utilizing generally accepted procedures implemented by qualified quality control personnel. Verify the curing strength, 28-day compressive strength (ASTM C39) and absorption (AASHTO M199) of the concrete as a minimum, as part of the quality control program.

Core test cylinders from dry cast units, or cast cylinders for wet cast units, to determine the 28-day compressive strength (f'_c) and unit weight of concrete representative of each production run. Use coring equipment or cylinder molds of standard dimensions and type or as specified by the Engineer. Failure of any of the 28-day test cylinders to meet 90 percent of the specified minimum compressive strength or failure of the average to meet the specified minimum compressive strength, can, at the discretion of the Engineer, be cause for rejection of a production run. Provide adequate facilities and equipment for the Engineer's quality assurance personnel.

1.4 Construction Methods

1.4.1 Excavation: Perform excavation for the foundation to the grade shown on the contract drawings. Subgrade materials

for bearing of the foundation shall be firm and stable. Proof-roll the bottom of the foundation excavation for observation by the Engineer for adequacy just prior to constructing the foundation.

Maintain the geometry of temporary cut slopes behind the wall to stable, unyielding, erosion-resistant configurations, which provide adequate space for construction of the wall and appurtenances and maintain safe working conditions.

1.4.2 Foundation Construction: Construct foundations to the proper dimensions, grades, and alignments as shown on the contract drawings. Where required by design, construct leveling pad consisting of a minimum nine-inch thickness of compacted select backfill or six-inch thickness of concrete. Where reinforced concrete foundations are required, develop reinforcement through construction joints and provide shear keys to integrate discontinuous concrete pours.

Protect the foundations from the effects of frost through sufficient embedment, or other means.

1.4.3 Placement of Precast Units: Carefully handle and erect precast units so as to avoid damage to the units. Replace all members that are damaged to the extent where their aesthetics or structural integrity is compromised at the Contractor's own expense.

Assemble the units as shown on the Engineer-approved contract drawings and in accordance with the Manufacturer's recommendations. Perform shimming of units to maintain levelness using a freshly-applied, thin mortar pad (not exceeding 1/8" thickness) or bituminous paper. Maintain full bearing of the precast units, and stagger joints on alternating layers. Do not use blocks, wedges or other devices for permanent shimming of wall units.

Maintain the center-to-center spacing between tiebacks along a given rail level at 8'-0"± for DURA-HOLD units and 7'-0"± for DURA-HOLD II units.

Embed the base rails of single and double crib walls a minimum of one foot below finished grade in front of the wall.

Conform the arrangement of tieback units for the respective wall systems to that shown in Figures 1 and 2 for DURA-HOLD and Figures 3 and 4 for DURA-HOLD II, and as described herein, unless an independent design by a qualified, registered professional engineer determines that an alternate arrangement is adequate.

1.4.4 Backfilling and Compaction: Place select backfill in the cribs and to a minimum of two feet behind the wall in 12-inch maximum loose lifts. Compact each lift by a minimum of five (5) complete passes of a hand-operated, vibratory plate tamper, or other piece of hand compaction equipment that can be operated inside the cribs and within close proximity of the wall without damaging the precast units. Compact each lift of select backfill to a minimum relative density of 70 percent.

Place and compact general backfill in eight-inch maximum loose lifts. Compact general backfill which is granular (sand and/or gravel with less than 12 percent passing No. 200 sieve) to a minimum relative density of 70 percent. Compact general backfill which does not meet the above gradational criterion to a minimum of 92 percent of the maximum dry density obtained by the Modified Proctor Method (ASTM D1557, Method A), at a water content between three percent below and two percent above the optimum water content.

Provide chemically stable backfill, free of trash, rubble, roots, organics, frozen matter, debris or other unsuitable material.

Key general backfill into the slopes of undisturbed material at least every third lift.

Perform backfilling simultaneously with erection of the precast concrete wall units, unless, in the opinion of the Engineer, a different procedure is required.

1.4.5 Drainage: Separate all interfacing materials of distinctly different gradation with geotextile filter fabric.

Where significant seepage or relatively rapid accumulation of water is anticipated behind the wall, incorporate drainage pipe into the two-foot minimum width of select backfill behind the wall to improve drainage conditions. Direct the flow from drainage pipe to weep holes along the exterior face of the wall or directly to storm water conveyances.

GUIDELINE CONSTRUCTION AND INSTALLATION PROCEDURES

The following provides guideline construction and installation procedures for the DURA-HOLD and DURA-HOLD II wall systems manufactured by Risi Stone, Ltd. or a licensee of Rothbury Investments, Ltd. (licenser of Risi Stone Products). Refer to "Guideline Technical Specifications" for requirements regarding the manufacture and general installation of the wall system products.

1. Excavation

- Ensure that excavated slopes are cut to stable configurations and surface drainage from areas outside the excavation is conveyed away from excavated areas. Ensure that surface drainage collected within an excavation is conveyed from the area in conformance with the sedimentation control plan.
- Allow sufficient excavation below the leveling pad grade and behind the wall for placement of base material below the wall and granular backfill behind the wall.
- Allowing for tieback units, fully excavate or channel cut the area behind the wall face with allowable room behind the wall for placement of granular backfill.

2. Base

- Place the base or first course for toe, heel and central rails on a leveling pad at least twelve (12) inches below finished grade and check for level in all directions.
- Provide a minimum thickness of nine (9) inches of compacted select granular backfill or six (6) inches of concrete for a leveling pad where footing is not required.
- Select the type and size of footing based on foundation support requirements.

3. Stacking

- Stack all units with the chamfered side toward the exposed wall face.
- Lift units using a scissors clamp mounted on a backhoe, crane or other suitable lifting device.
- Sweep the tongue-and-groove free of product burrs and debris prior to installing a unit at the next higher level.
- Slide each unit into place with bars or other devices to properly "seat" the unit; do not just lay the unit in place.
- Cut units for corners or wall ends as required using a masonry power saw.

4. Tiebacks

- Stack tiebacks as generally described in Stacking.
- "Seat" the unit at the front and rear of the wall.
- Provide rear support for the tieback using standard units.

5. Backfill

- Place free-draining, nonexpansive aggregate within and to the required depths behind the wall. Place and compact aggregate in lifts as wall courses are installed. As required, place geotextile between select backfill and general backfill materials.
- Ensure the grade and connectivity of drainage conduits in the backfill and through the wall face using level surveys and water flow tests.
- Do not use on-site soils for select backfill within or immediately behind the wall system unless the material meets the requirements for free-draining, nonexpansive aggregate.
- Take care when operating backfilling and/or compaction equipment near the wall to avoid dislodging installed units and inducing additional stresses.

6. Coping Units

- Stack coping units as described in Stacking.
- As required, core coping units for installation of fence or guiderail posts. (The effect of mounting fence or other structures on the wall must be assessed by a qualified, registered professional engineer.)
- Cut coping units as required using a masonry power saw.

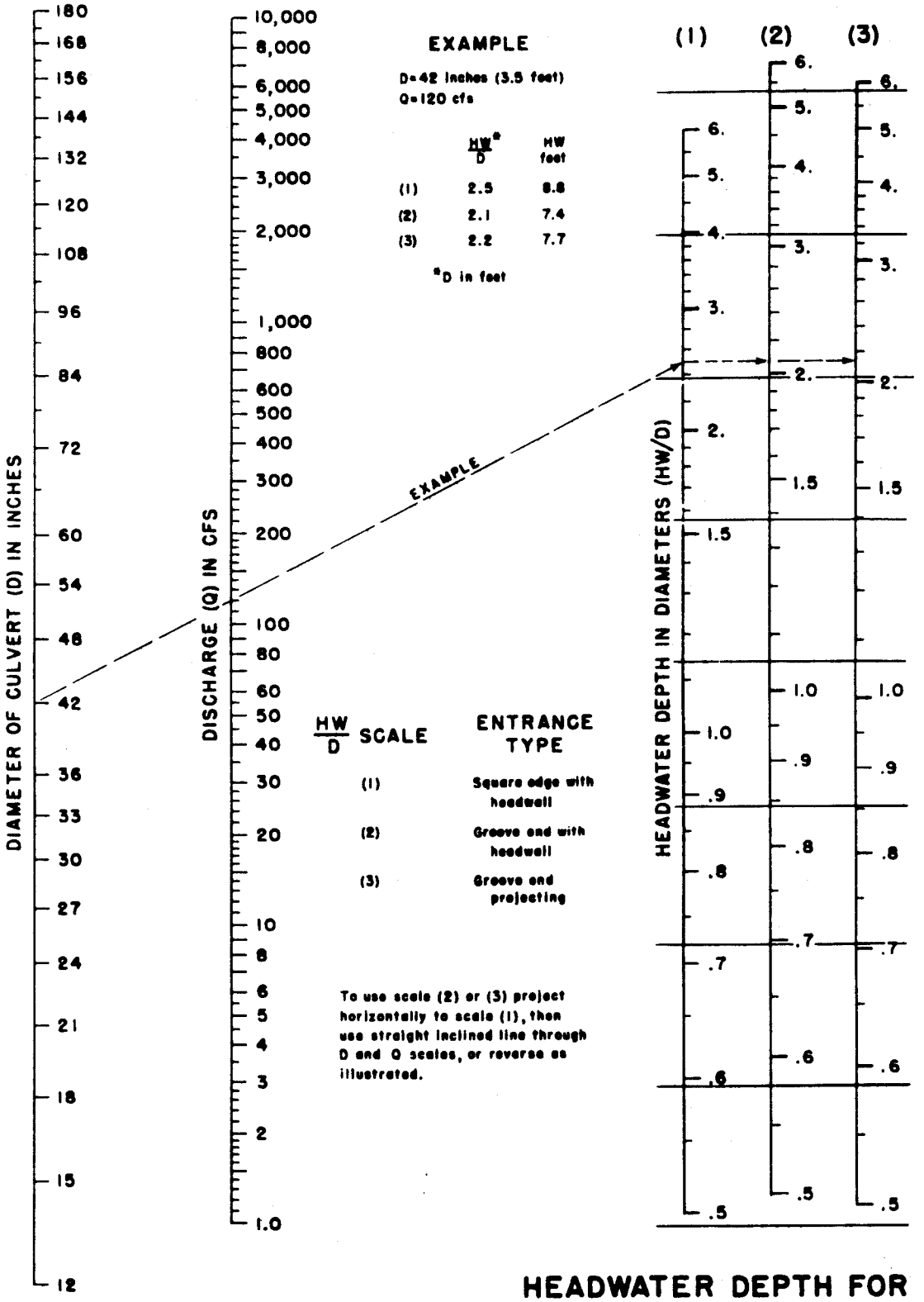
7. Corners

- Stack corner units as described in Stacking.

8. Finished Grades

- Check finished grades above and at the base of the wall after wall erection and backfilling operations are complete.
- Ensure that all drainage measures above the wall such as ditches and swales are in place and properly graded after wall erection and backfilling operations are complete. Check the upper wall courses to assure that units have not been dislodged during backfilling. If units have become dislodged, carefully seat units back into place.

CHART 2

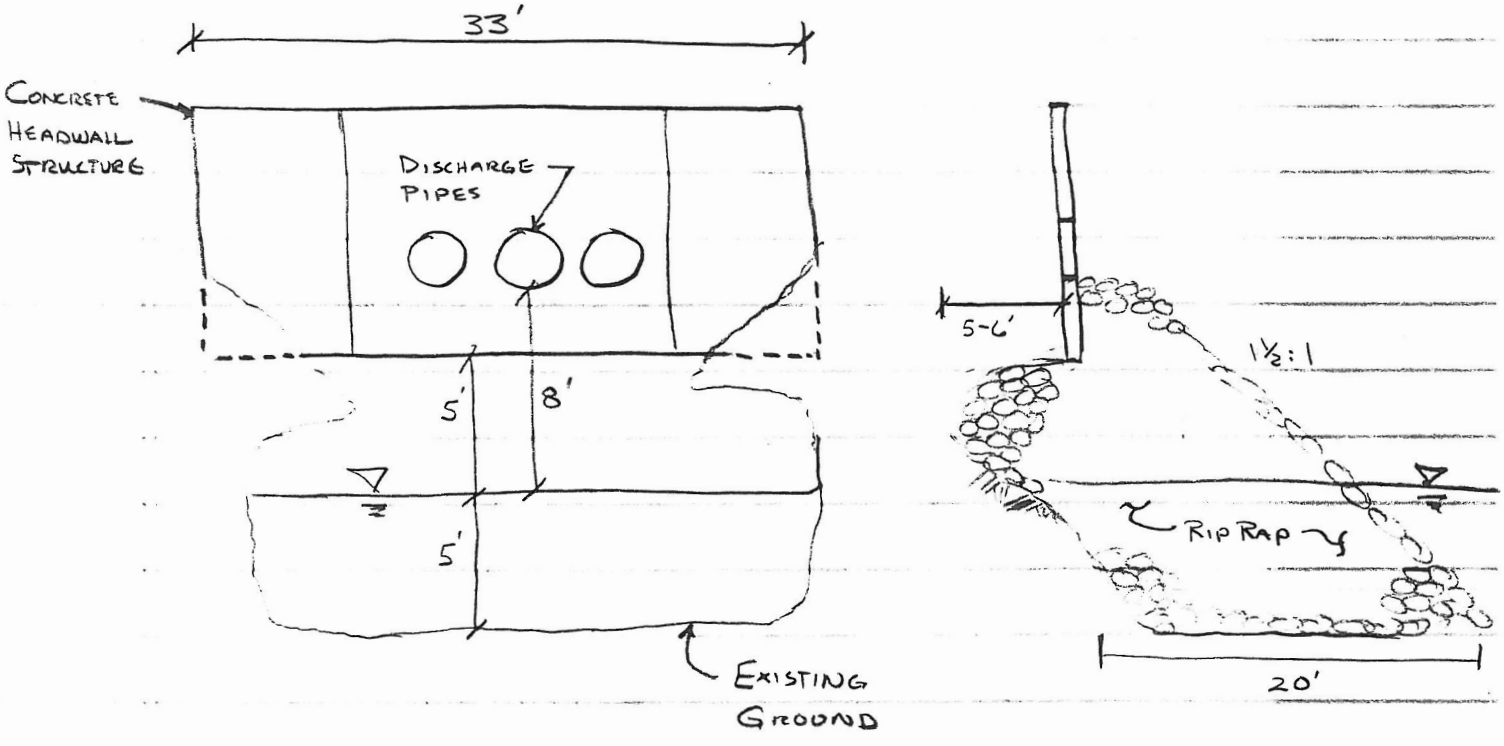


HEADWATER DEPTH FOR CONCRETE PIPE CULVERTS WITH INLET CONTROL

HEADWATER SCALES 2 & 3
REVISED MAY 1964

BUREAU OF PUBLIC ROADS JAN. 1963

LAKE POWELL OUTFALL PROTECTION



1. VOLUME STONE - 13' high × 33' wide × 20' long / 2 = 4290 cu ft

= 159 cu. yds

1 syd = 18" deep = 1 ton

(2 tons/yd)

$160 \text{ cyds} \times 4000 \text{ lb/cyd} \times \frac{1 \text{ ton}}{2000 \text{ lb}} = 320 \text{ tons}$

2. VELOCITY - $\frac{82 \text{ cfs}}{7.07 \text{ ft}^2} = 11.6 \text{ fps}$

from plate 1.36c of VE+SCH -

$d_{50} = 0.9'$ ∴ use VDOT Class I - $d_{50} = 1.1'$

Class AI - ½ size of Class I

3. COST -

22 loads × 43.5 = Delivery - $43.50/load - 14½ tons/load $957

506-8676
MASSIE
Erica Keene

Class I Rip Rap - 16.50/ton × 320 = $5280

Labor to place - Cost Stone + 10% = 5808

CONTINGENCIES - add 25% = 3011

$15,056

CAUTION: HEADWALL STRUCTURE COULD FAIL DURING REPAIRS

Best & Worst news of this year, 21A

Cheap Seats, 1B

VIRGINIA GAZETTE

Midweek Edition

www.vagazette.com

Wednesday, Dec. 28, 2005 — Covering Williamsburg, James City & York since 1736 — 50¢

Lake threatened by housing spurt

Patches aren't holding, neighbors fear breach

By Cary Bell

JAMES CITY — The county approval of Marywood three weeks ago has stirred a sense of urgency among members of the Friends of Lake Powell.

The group raised $55,000 five years ago to rebuild the Lake Powell dam after Hurricane Floyd washed it out, and paid another $5,000 to patch sinkholes around the dam's base last year.

Randy Cooper, president of Custom Builder Supply and one of the organizers of Friends of Lake Powell, has discovered that the patches aren't holding. He fears additional development upstream is likely to make the problem worse.

"The patch was only a temporary fix," Cooper said. "It was meant to stay like that until we reached a point that the county would get involved and fix it permanently."

That hasn't happened. The county won't pay to repair the dam because the structure is on private property, and neighbors don't want the dam sold to the county for fear it might allow cars to again cross the dam if Lake Powell Road is re-opened.

The matter is being dealt with "privately," development manager John Horne said in a e-mail responding to a reporter's questions.

"The county was caught between a rock and a hard place," Cooper said. "If they paid to fix the leak, it would just have been for the people around it. But we feel that the county should take some responsibility for the lake, which has been there for over 300 years.

"What would the drive down Jamestown Road be without Lake Powell?" Cooper asked rhetorically.

Cooper spoke to neighbors who lived nearby in the 1930s when the dam washed out before. They told him that it took two months for the lake to re-fill. After the 2000 re-build, it took about two weeks.

Cooper and the Friends of Lake Powell were surprised with how quickly the water level went up.

"We thought we'd have more time before the water rose," Cooper said. "The amount of stormwater that runs into the lake is steadily

See Construction, page 4A

Cary Bell

Erosion has chipped away at the ground on one side of the dam (right).

MC020_LAKE_POWELL - 078

Construction began in 1999

Continued from page 1A

increasing because of new developments. It's gotten worse since Lake Powell Pointe came in."

Construction on houses in Lake Powell Pointe began in 1999. "Now it can rain an inch and the lake fills back up. The cause is all of the development. Everything for miles around dumps into that lake."

Newer neighborhoods are built with retention ponds, but that's not enough, Cooper said.

"When development occurs there is increased runoff," County environmental engineer Darryl Cook explained. Developments are required to form retention ponds to catch the runoff, but it's an imperfect system.

"The numbers for the retention ponds are calculated on a yearly average," Cooper said. "When we get a bigger rain than expected, the lake overflows."

Cooper dreads the idea of how quickly the lake will fill up once Marywood is built out.

"To some extent, the county is to blame," he said. "The reason the water gets so high is because of all of the development allowed around the lake."

Cook didn't say directly how recent developments affect the level of water in the lake.

"If a permanent spillway for the dam is going to be built, a qualified engineering firm will need to take into account the existing and future flows coming into the lake," Cook said.

Cary Bell

The current water level is only a few feet lower than the bridge on top of the dam.

Cooper pointed out that the county has helped the Friends of Lake Powell in some aspects. Cook helped them with the design of the patch. But what the Friends say they really need is financial backing from the county.

"It's too much of a grassroots effort," Cooper said. "It's all we could do to get the original $50,000 to fix it."

Jamestown supervisor John McGlennon said the county has an interest. "Certainly we want to be involved in any discussion about long-term solutions, but that will require the property owners approaching us for some kind of sense of what they would like to do,"

Florence Adsit was the lake's most vocal defender and advocate, shooing off intruders and fiercely holding the lake private until her death in 2001.

Cooper said the current owner is a descendant of Floyd Powell, the lake's namesake. He is elderly and generally relies on Cooper to speak on behalf of the Friends. "I've been in touch with the owner, and he's singing the same tune that I'm singing," Cooper said.

"After the first of the year, we are going to try a new approach and see if we can come up with a permanent solution," Cooper said. "Otherwise, if we have one big rainfall, the lake will be gone."

Want to help? *Send donations to Friends of Lake Powell Inc., P.O. Box 413, Williamsburg VA 23187.*

Lake Powell

"Regarding the Dec. 28 lead article: Fewer than a handful of people own property at Marywood who object to having the spillway fixed correctly with the road going around. James City would pay for this and keep the lake from going away when there's a storm. I believe it might have been the original roadway to Jamestown Island. But there is only one outlet, and that is Brookwood from Lake Powell to Route 199. There's the Williamsburg Winery and all the houses around and in between on that street. There is no outlet in case of an emergency except that small Brookwood off Lake Powell. It's something that needs to be addressed. The county sort of turns its back on this matter because it seems to be hand-tied. If that road cannot be opened, another one should be opened."

●

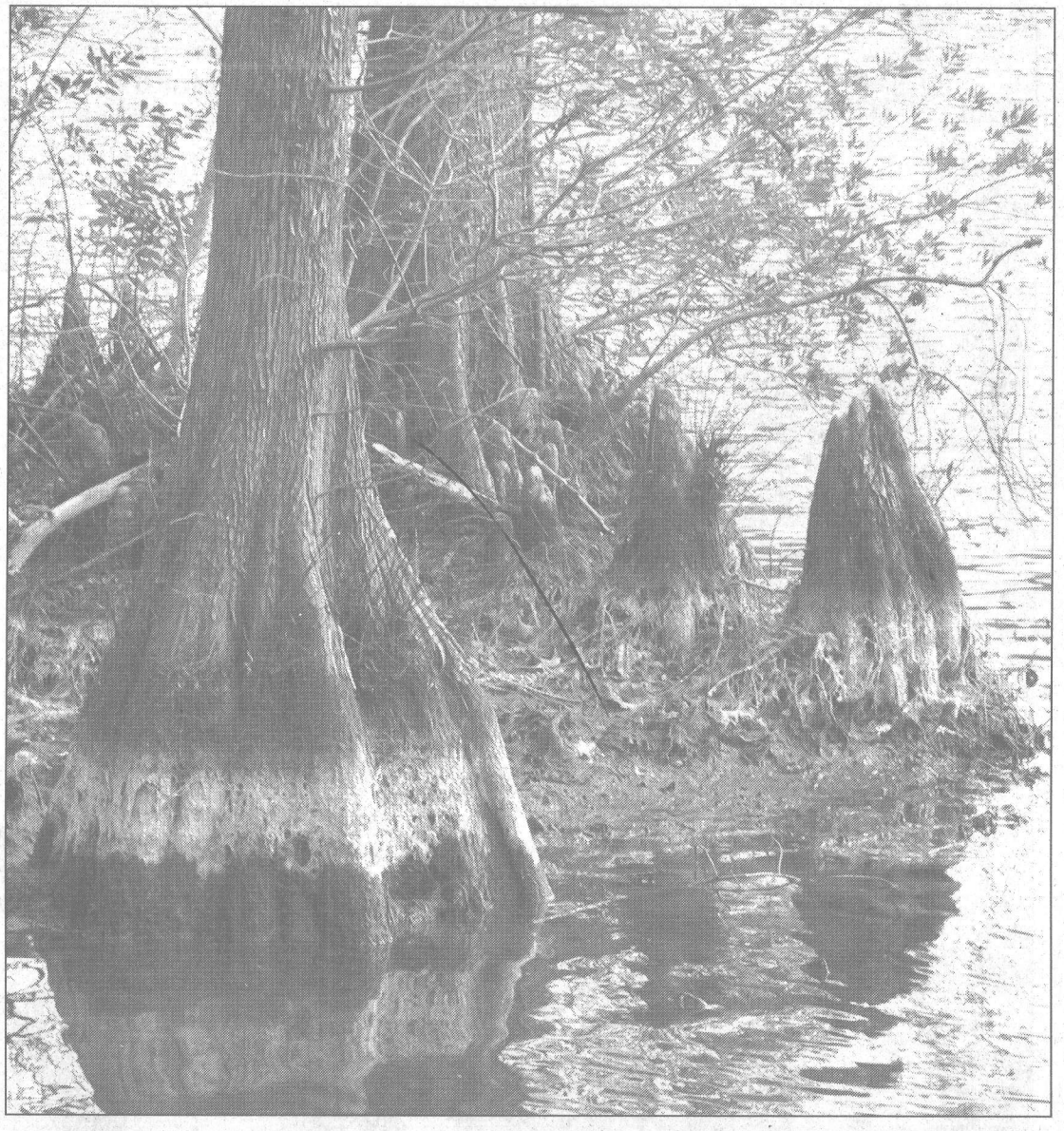
"Here we go again with the Friends of Lake Powell and the owners of Lake Powell wanting James City, at taxpayer expense, to take on the spillwell for Lake Powell. The owners do not want to relinquish ownership of the lake. The county probably bears some responsibility for improper drainage into the lake. However, the owners do not want people to fish on the lake. They want to retain ownership. They do not want cars to be able to go around the lake on Lake Powell Road any longer. You can't have it both ways. Why are the owners keeping that land and wanting someone else to take care of it? As a taxpayer, I do not want my money going toward maintaining that personal property. That being the case, everyone with a private street in James City should say, 'Okay, our street needs to be paved. Let's do it at taxpayers' expense.'"

●

"I am a lifelong resident of James City and someone who once lived on Lake Powell Road, when it was called Old Jamestown Road. At that time, we had the right to drive around the lake and there was a pier to fish from and boats to rent. That privilege was taken away by the residents when the lake flooded. The only people who benefit from the lake are the residents themselves. Why should we spend our tax money to repair a lake we are not allowed to ride around or use in any way? If that is the case, we have a lake at the end of our street that we do not use and is owned by the residents, but now we can have our tax money repair that too. If the residents want this as their community, they need to start a homeowner association and upkeep their lake. Anyone who lives around the lake will benefit from it when they sell their home, as the lake increases the value of the homes if for nothing more than the view. There are so many other things in this county to worry about. Let the people who want to own the lake repair it."

Choking game

"I am the mother of two well-adjusted girls aged 14 and 18. After watching the 'Dr. Phil' show on 'the choking game,' I asked my girls about it. They both told me they have seen the game done on friends at sleepovers. They said it is done mostly by middle school children. My daughters told me the person's neck or chest is held so he or she cannot breathe, then the person passes out. I thank God no one was killed. My girls assured me they have never done it and never will. I told them they should not let their friends do it either. I think parents need to talk to their kids about this."



Photos by Cary Bell

Former water lines can be seen on these stumps exposed as the lake's level dropped.

Water flows from a pipe at the base of the Lake Powell dam.

Lake Powell level is dropping. Why?

3 theories emerge, but here's what happened

By Cary Bell

JAMES CITY — Shades of "Chinatown": Why is the water level in Lake Powell dropping?

Alarmed neighbors began calling the Gazette this week, reporting that the water had dropped 2-3 feet recently.

Three explanations have emerged — drought, danger or conspiracy. Based on calls to homeowners who live nearby in The Colony, speculation ranges from intentionally lowering the water to reduce pressure on the fragile earthen dam, to a plot to create an eyesore that will induce the county to maintain the structure.

Among a half-dozen neighbors contacted, none wanted to be identified for fear of stirring controversy among other homeowners. Still, there are visible signs the water level is down, such as exposed tree stumps that are normally submerged.

"There's a very clear difference in water levels after it has rained," said one person in The Colony. "You can tell just look at the lake and tell it hasn't rained for a while."

Another neighbor said water is being released to protect the dam. "Lowering the water level keeps the dam from eroding," said a fellow who lives on Lake Powell Road. "The dam just isn't powerful enough to hold too much water."

Supervisor John McGlennon said Friday that he had heard both reasons for the drop. "Just that it has declined, largely as a result of a lack of rain and an effort to bring the water level down to keep the dam in place," he said.

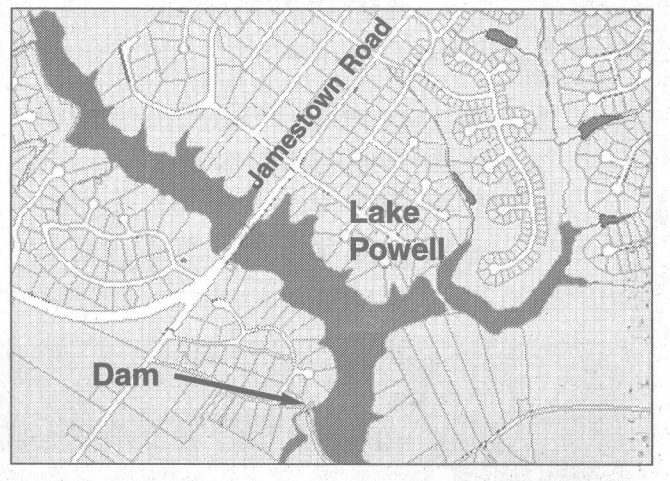
The dam blew out in 1999 during Hurricane Floyd, taking with it a stretch of Jamestown Road that crossed the lake. Neighbors raised $55,000 money to pay for rebuilding the dam, while VDOT spent months rebuilding the road.

Last year the Friends of Lake Powell paid $5,000 to patch sinkholes around the base of the dam. In December, Randy Cooper, one of the organizers of Friends of Lake Powell, said the patches were beginning to fail.

Some residents are concerned that the pressure of too much water on the dam combined with the weakening patches may cause it to break.

"The patch was only a temporary fix," Cooper said in December. "It was meant to stay like that until we reached a point that the county would get involved and fix it permanently."

Some neighbors are working to take pressure off the dam. One man said he and one of the lake owners, Lee Reed, take turns opening a valve to lower the water level.



But how much water should be drained?

"The lake is pretty shallow, and the wet areas around the edges of the lake are starting to dry out," complained one neighbor. "Tree roots are starting to show, and fish could be in danger."

Most neighbors want James City to fix the dam permanently. County officials say they would be willing, but only if the dam is deeded to the county. Neighbors fear doing so will lead to reopening Lake Powell Road to car traffic.

A Last Word caller chastised the owners of Lake Powell. "If the owners cannot be better stewards of what they have inherited by the grace of God, they should give the lake to the people of James City to take care of and enjoy."

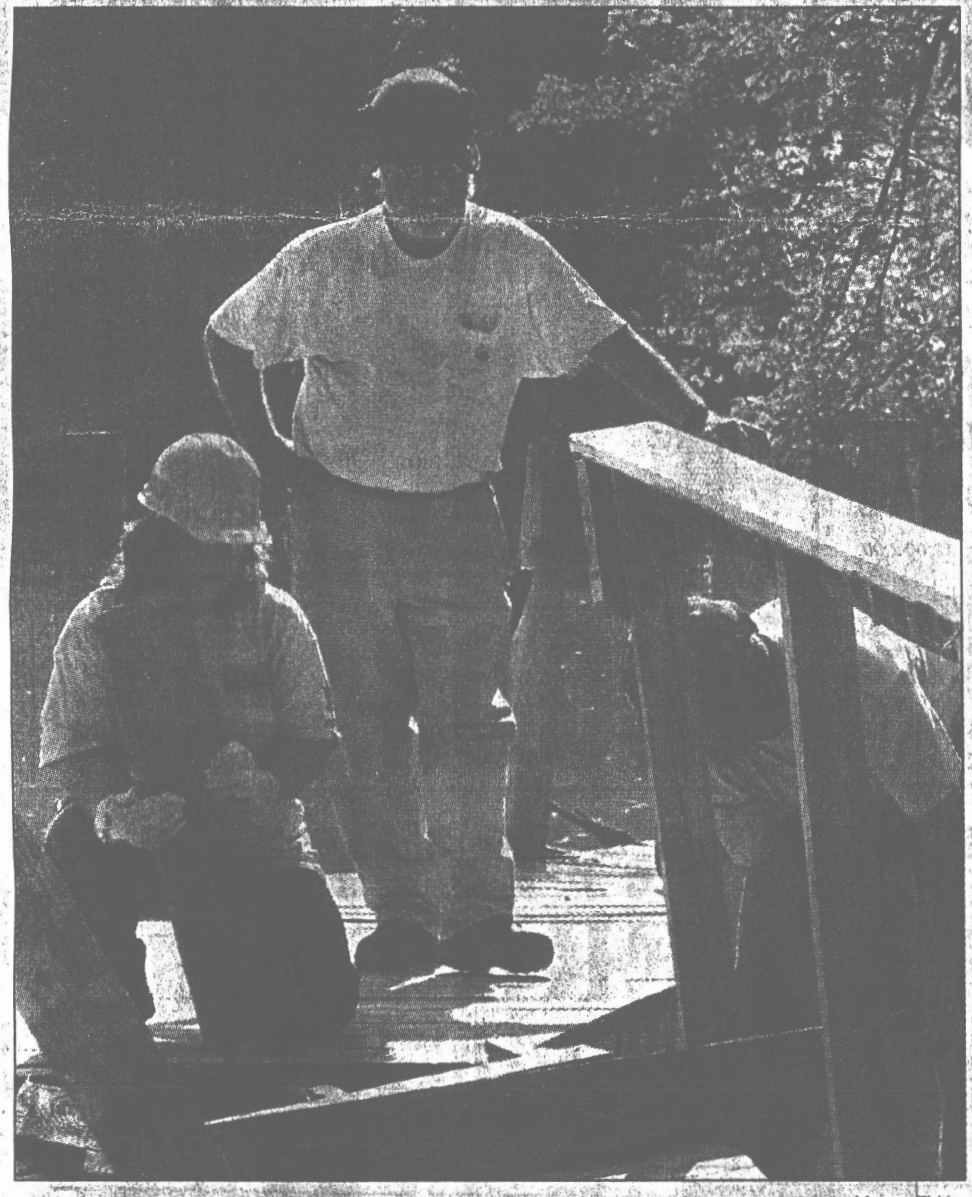
Another source had a more sinister reason for the drop in water. He said he heard the lake was being drained so the county would repair the dam, relieving the owner as well as the Friends of Lake Powell.

More — *Last Word, 22D.*

Who should pay for dam?

10/14/06

At $2 million for fix, homeowners would average $37,000



Megan Zirkle

County workers dismantle a wooden bridge across the Lake Powell dam. The steel was shifted when the dam breached and became a safety hazard.

MC020_LAKE_POWELL_082

By Megan Zirkle

JAMES CITY — Who should bear the cost of rebuilding Lake Powell dam emerged as a central issue after the aging, earthen berm breached and nearly broke apart from last week's nor'easter that dumped 10 inches of rain.

Replacement costs, originally estimated at $1.2 million by county planning staff early in the week, have since climbed to $2 million or more following a closer inspection of the damage.

Bill Browning, division director of Dam Safety & Flood Plain Management within the Virginia Department of Conservation & Recreation, said Friday that estimating a replacement cost is difficult.

"Each dam is unique, and there's no way of knowing right now," he said. Another state official who would not speak on the record estimated the cost even higher.

The county won't act to fix the dam unless it gets to take ownership of the 81-acre lake. Negotiations with the lake owners have begun. The water level has stabilized at 7 feet below normal.

That likely places the onus on the 54 households who own property contiguous to the lake. Supervisor John McGlennon has suggested a special taxing district to cover the cost.

That's where it gets controversial.

McGlennon said property owners would have to initiate the request for a taxing district. At least 28 of the affected property owners would have to back the idea, then petition the supervisors to implement the tax district.

As it happens, 30 people attended a meeting in June to discuss the dam.

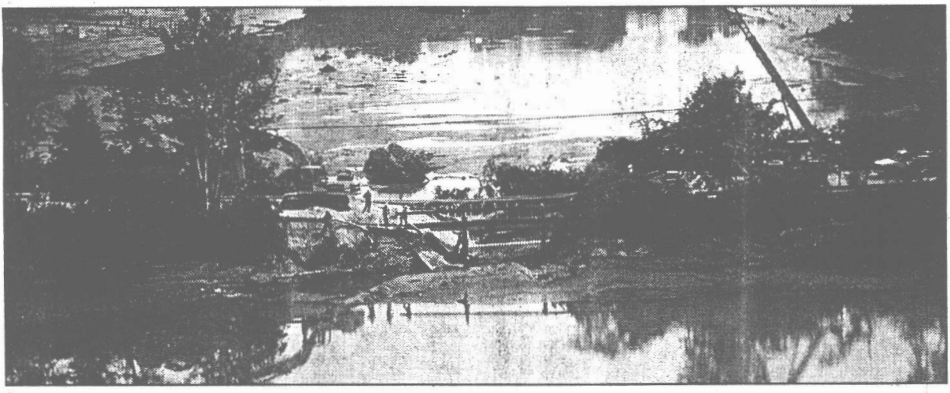
"There definitely is a split," said Bambi Walters, who owns two acres of lakefront property in Lake Powell Pointe. "Some feel the county is best to manage the lake, while others completely oppose a tax."

Realtor Bob Sheeran lives in The Colony, the neighborhood closest to the dam. He doesn't favor a taxing district. "I won't, however, run from my financial responsibility," he said.

Sheeran faulted years of traffic that crossed the dam when it was a public road decades ago. "The state minimized maintenance instead of maximizing the dam," he said of its closure.

County attorney Leo Rogers said Friday that because the abandoned crossing was built before 1932, roads were allowed to be built as ease-

See Dam, page 9A



An aerial view of Lake Powell in 1999 after the dam broke during Hurricane Floyd.

File photo

Without new dam, repeat of '99 feared

Continued from page 1A

ments on private land. "The government responsibility was to maintain the road, not the land under it," he said.

County workers spent Thursday morning dismantling a wooden walkway that crossed the dam. When it breached last weekend, the walkway shifted and began to sag in the middle.

If a replacement dam costs $2 million, the 54 property owners who hold land contiguous to the lake would face an average bill of $37,000 each. Since the taxing district is based on home assessments, the amount would vary based on the value of each home and be spread over several years.

Stephen Ponds, president of the Lake Powell Pointe Homeowner Association, said he wouldn't mind paying a higher tax than his neighbor to help rebuild the dam. "At the end of the day, you have to ask yourself whether or not the assessments are fair," Ponds said. "If they are, they are fair for the improvement tax district."

Walters also supports a taxing district, but with conditions. She wants a guarantee that the county would use the money solely to restore the dam and maintain the lake. "There are so many uncertainties when you get the government involved," she noted.

With the crowning event of Jamestown 2007 just eight months away, there's a sense of urgency. The county is investigating a temporary fix. The state has authorized steps to prevent further erosion of the dam, but costs would fall on the owners, McGlennon said.

The county's experience a decade ago with a taxing district to pay for Alternate Route 5 may give the supervisors pause. While enough property owners initially favored the Alt 5 tax, many who inherited the levy when they bought new homes felt discriminated against. The county quietly dropped the surtax.

On Thursday, McGlennon stressed that "an alternate solution should be explored." State funding and grants from environmental agencies have been researched, with no luck. "Private funding and state funding tend to be restricted to dams that pose a risk to life," he added, and that's not the case here.

By itself, Lake Powell does not have a high dollar value. County assessor Rich Sebastian confirmed that the assessed value is just $40,700. Though seemingly low, Sebastian noted that the lake is valued as any marshland would be.

Its greater value is as an aesthetic view and as a stormwater management pond for surrounding developments.

McGlennon said in an e-mail to nearby homeowners that if the county owned the dam, there probably would be "limited" use for boating and fishing because of lack of parking and no ramp.

Recreational use of the lake has limited potential anyway. Sheeran noted that its deepest point is about 7 feet, just off his property.

"The county has a huge responsibility for that dam," Sheeran added. "There was heavy use of it years ago when it was a state road, and that certainly contributed to its condition. It's so wrong that the family who owns the lake and the dam should be blamed for any lack of care for the dam."

More — *Editorial, 34A.*

Should lake revert to wetlands?

Pros & cons of removing dam

By Megan Zirkle

JAMES CITY — The breach of Lake Powell dam has environmentalists contemplating the benefit of letting it revert to wetlands. Let the lake drain out and grow green instead, some say.

The idea arose during a secret session last week as the Board of Supervisors puzzled over what to do about Lake Powell. The county is negotiating with the lake owners and may buy it to rebuild or repair the dam permanently.

At first, officials dodged the wetlands angle as inflammatory, since lakeside homeowners resent having to pay $37,000 each and other taxpayers are bitter over how the county has handled the lake for years.

Confronted directly, Darryl Cook, environmental director for the county, would only say, "A wetlands community would be a good thing." He quickly noted that restoring the dam would also have the positive effect of providing stormwater retention for the 2,600 surrounding acres that drain into the lake. It's also a valued waterfront view for more than 50 homeowners.

Supervisor Jim Icenhour confirmed that reversion to wetlands arose. "We did have that discussion," he said Tuesday. "The question was asked that if the dam wasn't repaired, what would be the alternative. The alternative would be a wetlands, which would stink for a year."

Reaction was mixed.

"There was divided opinion on what would environmentally be better for the lake," Icenhour added. He raised other factors, including that the lake is part of a "community character corridor" in the county. He cautioned that there's not enough time to make permanent repairs to the dam before Jamestown 2007.

"We need to find out the options," Icenhour added. "What kind of money is available from the state and federal governments? At this point the big driver is financial. It's a huge amount of money, and it's well beyond the capability of the homeowners."

Reverting to wetlands would take time and planning. Randy Chambers, an associate professor of biology at the College of William & Mary,

See Wetlands, page 6A

Return to wetlands is an option

Continued from page 1A

said that over several decades, the 81-acre lake would slowly re-establish itself as the forest wetlands it was a century ago.

But the lake offers a natural filtration system.

"The water quality is improved by the lake through retention before it flows downstream," Chambers said. Without the dam, "fertilizers, sediment and organic chemicals would head downstream into the James River."

The short-term impact of no dam would also alter the lake's ecosystem. Chambers explained that erosion would increase downstream, potentially suffocating juvenile organisms that are part of the food chain. Plant life would also diminish, as "cloudy water would block the sunlight for photosynthesis to produce energy."

Jamestown supervisor John McGlennon said that in environmental terms, having the lake return to its natural state "would not be a disaster." He explained that several natural streams flow under the lake and would serve as an alternative stormwater pond. Unlike the lake, however, water would not be detained and naturally filtered before flowing into Mill Creek and eventually the James River.

Having said that, McGlennon favors rebuilding the dam, as do his lakeside constituents.

"There is aesthetic value of the lake, and it also benefits other habitat and wildlife species," he said. He used the bald cypress growing on the banks as an example.

The big downside of no dam is obvious.

"Those properties would no longer be on the waterfront," Chambers said.

Dan Cristol, another biology professor at W&M, said that returning the lake to its wetlands state requires more than draining it.

"You'd have to plant extensively," he said. "If you don't, what you'd end up with is not what you'd want there. In the interim you'd have mud. And mosquitoes."

If the county were to consider allowing the lake to drain, the time to do it is now, Cristol noted. He pointed to a recent U.S. Supreme Court case upholding a locality in Connecticut that took land by eminent domain from a private landowner and turned it over to a developer.

"Since then, states have begun enacting legislation that requires the government to repay landowners for lost value," Cristol said, adding that no legislation is pending in Virginia. "You take away the lake and those land values on Lake Powell will plummet."

Cristol recently talked about the Kelo issue with former Supreme Court Associate Justice Sandra Day O'Connor, who is chancellor at the College of William & Mary. She was still on the Supreme Court at the time of the Kelo decision and wrote the minority opinion.

"She said what she feared is exactly what has happened," Cristol said.

Would the county have the right to let the lake drain if it had control over the tract?

Absolutely, according to Eric Cades, a professor at the College of William & Mary Law School.

"If it's not a navigable waterway, then a body of water can be controlled by a private owner," Cades said. "That owner would have as many rights to the lake as you have over dirt."

Neighbors say no to draining of lake

By Megan Zirkle

JAMES CITY — The idea of draining Lake Powell so an engineering firm can conduct a study is repugnant to adjacent homeowners. They've organized a community meeting with the Board of Supervisors.

Homeowner Bambi Walters of Lake Powell Pointe sent out a mass e-mail Friday that included the supervisors and Friends of Lake Powell. She called for a public forum to explore the options and to settle rumors of a deadline on a permanent fix of the dam.

"We truly feel a sense of urgency knowing that [the state] recently gave the lake/dam owners a short deadline and thoroughly explored imposing fines, fees and the possibility of placing liens on property," Walters wrote.

In an interview Friday, she said the lake owners were considering draining the water so engineers could assess the situation to meet a deadline.

Donald Topping, son-in-law of one of the lake owners, Lee Reed, denied a timeframe for fixing the dam in a brief phone interview. "There is no deadline," Topping insisted. He explained the lake owners were "working toward a plan" with the county and the dam safety section of the Virginia Department of Conservation & Recreation.

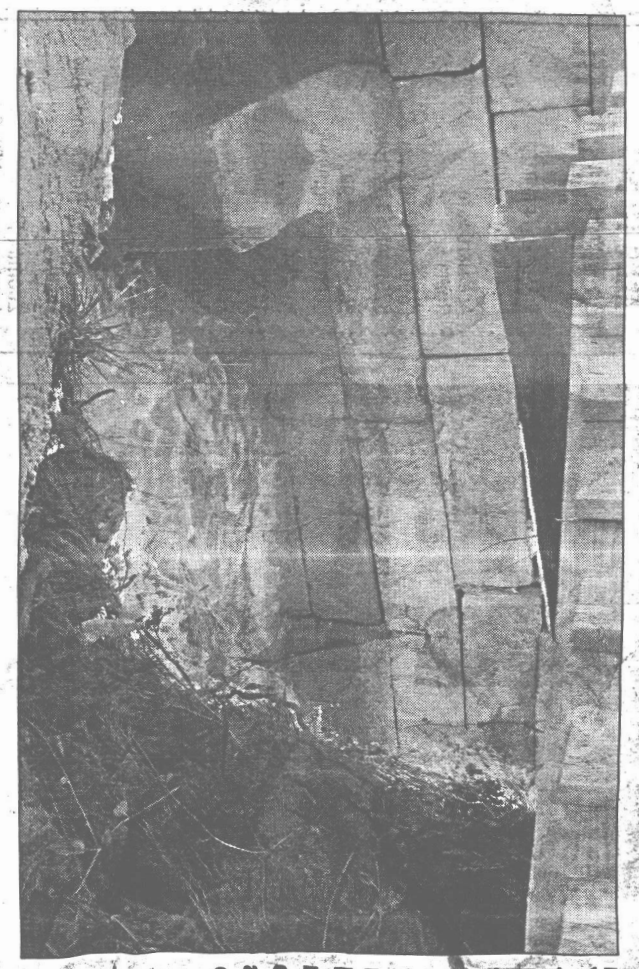
David Conniff, regional dam safety engineer with Conservation & Recreation, confirmed Topping's statement. "There is no timeline set by the DCR for repairing of the dam." He added that the DCR is "encouraging the owners of the dam to proceed with bringing the dam into compliance with state regulations, which would include a timetable or schedule of some sort." Conniff said he's seen the situation for himself.

Walters and other Friends of Lake Powell are lobbying to preserve the lake and not let it revert to a stream. If the lake were drained, she said property owners would view a "mud flat" instead of the 81 acres of water.

Walters said that if the dam stayed privately owned, the Friends of Lake Powell could raise money and fix it again, like they did after Hurricane Floyd in 1999. If so, the group would not have to get building or construction permits.

See Dam, page 7A

Private fix to dam would be temporary



Megan Zirkle
Water from Lake Powell flows through a hole in the dam right after heavy rains dropped about 10" of water.

Continued from page 1A

Conniff said he's seen the situ

"It would be a fix until Jamestown 2007 is over," she said.

In the e-mail, Walters also examined the possibility of adjacent homeowners buying the lake from the owners. Her thoughts are to form a nonprofit entity where several landowners could maintain the dam and lake level.

Meanwhile, the county has verbally stated its interest in purchasing the lake and dam. County staff has estimated $1.2 million to rebuild the structure up to state regulations, but some say it would cost up to $2 million.

Neighbors and other residents are afraid of the county taking ownership and reopening Lake Powell Road. According to Walters, if the county takes over, it might require the road for emergency access, evacuation or utility access.

Conniff said there's no state mandate. "The road being brought back into service has nothing to do with dam safety regulations," he said. "We might evaluate the potential hazard differently if it includes the road versus if it doesn't include a road, but there is no requirement one way or another from a state regulation point of view."

Jamestown supervisor John McGlennon has said that VDOT has no intention of rebuilding the road.

As for the strange men neighbors might have seen out by Lake Powell on Thursday, McGlennon said the Timmons Group, an engineering firm, was assessing the dam. "They were there to revise and estimate a cost to rebuild the dam," he said.

Want to go? *The community meeting on Lake Powell will be held at 7 p.m. Monday, Nov. 13, in Building F at the County Government Complex, off Mounts Bay Road.*

Send a local celeb to jail 1C

Rams win 6th straight 1B

THE VIRGINIA GAZETTE

Midweek Edition

www.vagazette.com

Wednesday, Nov. 1, 2006 Covering Williamsburg, James City & York since 1736 50c

Dam fix impossible by '07

Report says work will take 2 years and top $2.6 million

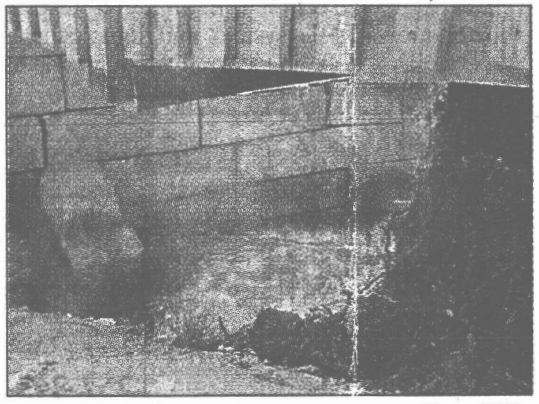
By Megan Zirkle

JAMES CITY — A new report reveals that fixing the Lake Powell dam can't be done before Anniversary Weekend next May, and the cost has grown to as much as $2.8 million.

The Timmons Group, a local engineering firm, submitted the report to the county last week. It marks the third time the dam has been evaluated this year, and it shows the earthen structure continues to deteriorate.

The report does not commit the county to doing the job at taxpayer expense, which would only happen if it took possession. That debate continues.

Timmons assessed the lake and dam last April after owners lowered the lake level in anticipation of spring rains. A second inspection was submitted May 3, just one week after the first inspection.



Megan Zirkle

The breached area of the dam causes an eroding slope to form a pool of water.

County planning director John Horne said the new analysis should not cause alarm. "It is what it is, and the numbers will change over time," he said.

Engineers estimated 12-15 months for the design phase, which includes a topographic survey, geotechnical analysis, design improvements, coordination with the state's Division of Dam Safety, and environmental permitting.

Construction of a new dam would take an additional 9-12 months, although some of the design and construction work could be done

See Inspection, page 7A

TWO OPTIONS

Option 1 — Construct a new earth impoundment along the upstream face of the dam. This would require draining the work area and importing suitable fill material to construct the new impoundment. Existing trees would have to be removed upstream, but this option eliminates the need to remove trees from the downstream face. Some type of cut-off wall or trench along with the new impoundment would be required to ensure that the new dam fill material is appropriately connected to sound material. Environmental permitting would be needed.

Option 2 — Use roller-compacted concrete either on the upstream or downstream face to stabilize the existing earth fill material. This involves the placement of dry, compacted concrete in small lifts that act like concrete stabilization. The option may be difficult for this application since the moisture content of the concrete needs to be controlled precisely to obtain the appropriate results. Citing these difficulties, this option was not priced. More information can be found on this technique at www.cement.org/water/dams_rcc.asp.

Source: The Timmons Group

Inspection found hole

Continued from page 1A

simultaneously. Fully two years would be needed to rebuild the dam to state code.

There has been talk among Lake Powell homeowners of an interim fix. Horne said neither county staff nor the Timmons Group has discussed short-term repairs.

The reinspection after the dam breached Oct. 7 states that "significant damage occurred around the principal spillway structure," and in the "previous breach area under the steel bridge, causing large sections of concrete to be displaced." Slopes along the edge of the channel were also found to be severely eroded from rushing stormwater.

The most startling discovery by engineers was a large hole on the east end of the dam. It will require further investigation to determine how much it will cost to repair.

Engineers warned that the remaining lake may drain "if the breach section continues to erode" as a result of water flow from future storms."

Other recommendations include the removal of mature trees and stumps, upgrading of a 100-year storm spillway and bringing the dam into compliance with state regulations for dam safety.

Preliminary opinions to fix the dam were given by the Timmons Group. Option 1 is to construct a new earth impoundment, which would require environmental permits. Option 2 suggests using "roller-compacted" concrete to stabilize the existing earth fill material either upstream or downstream. An option included in the May analysis suggested filling the existing material with riprap. That was ruled out after the new hole was discovered.

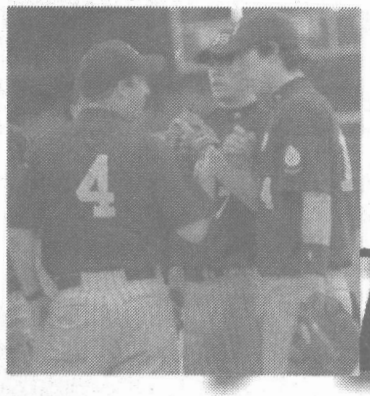
A memo sent out by county officials states the first analysis of the lake was done in early spring "in re[illegible] acquisition and operation of Lake Powell."

Jamestown supervisor John McGlennon said he requested a professional analysis of the lake in late March out of general concern. "I was receiving comments from people about possibilities that the dam might fail," McGlennon said. "I thought it was a good time to start getting information."

COSTS

Design	
Topographic survey	$30,000
Environmental permitting	50,000
Geotechnical analysis	30,000
Division of Dam Safety coordination	30,000
Design improvements	150,000
Construction administration	40,000
Materials testing	25,000
Total	**$355,000**
Construction	
Mobilization	$200,000
De-watering	200,000
Tree removal	75,000
Repair of hole in dam	50,000
Replace 100-foot section of dam	150,000
New principal spillway	100,000
Cut-off walls for 2 seepage areas	25,000
New concrete emergency spillway	200,000
Removal of existing concrete	50,000
Downstream bank stabilization	250,000
Address unsuitable fill (Option1)	500,000
RCC Stabilization (Option 2)	650,000
Stabilize with seed and matting	20,000
Erosion and sediment control	35,000
20% contingency	370,000-400,000
Total	**$2.2 million-2.4 million**
Grand total	**$2.6 million-2.8 million**

Source: The Timmons Group



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VIRGINIA GAZETTE©

Weekend Edition

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Saturday, July 31, 2004 Covering Williamsburg, James City & York since 1736 50¢

Heavy rains threatened Lake Powell dam

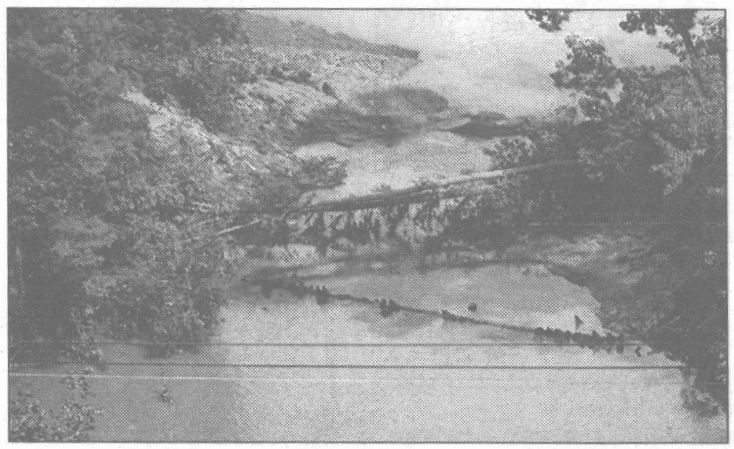
By Amy Johnson

JAMES CITY — When up to 17 inches of rain from Hurricane Floyd poured into Lake Powell four years ago, the result was a ruptured earthen dam. The force of rushing water through a single drain pipe was so powerful it sucked out a large section of Jamestown Road.

Last weekend, after three inches of rain fell in three days, a number of locals feared that history might repeat itself.

On Sunday, residents along Lake Powell Road noticed the level of water in the lake was rising. As the rain continued, the lake surged and the water pressure threatened to breach the dam.

"On Sunday it was unreal," said Randy Cooper, owner of Custom Builder Supply and one of the organizers of the Friends of Lake Powell, which raised $55,000 and rebuilt the dam in 2000. "Water was about to go over the dam and almost started going around the second spillway we built after Hurricane Floyd."



File photo

Some feared a repeat of 1999, when the Lake Powell dam broke during Hurricane Floyd.

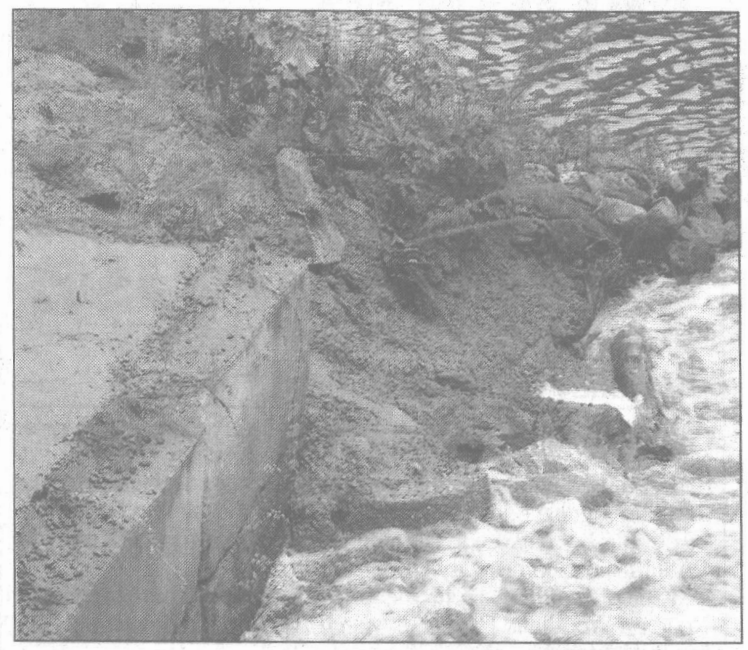
Nearby, the causeway that supports Jamestown Road is a major artery, both for locals and tourists. And though VDOT rebuilt the stretch with more and larger pipes to handle the flow of water from one side of the causeway to the other, no one knows for sure if it will withstand another dam break.

As a result of the pressure from the water, sinkholes formed around the spillway, which could threaten the dam's integrity.

County engineers went out to inspect the dam on Monday since the damage encroached upon the county-owned pedestrian walkway. But because the damage stemmed from the dam, development manager John Horne said that any repairs would have to be done privately.

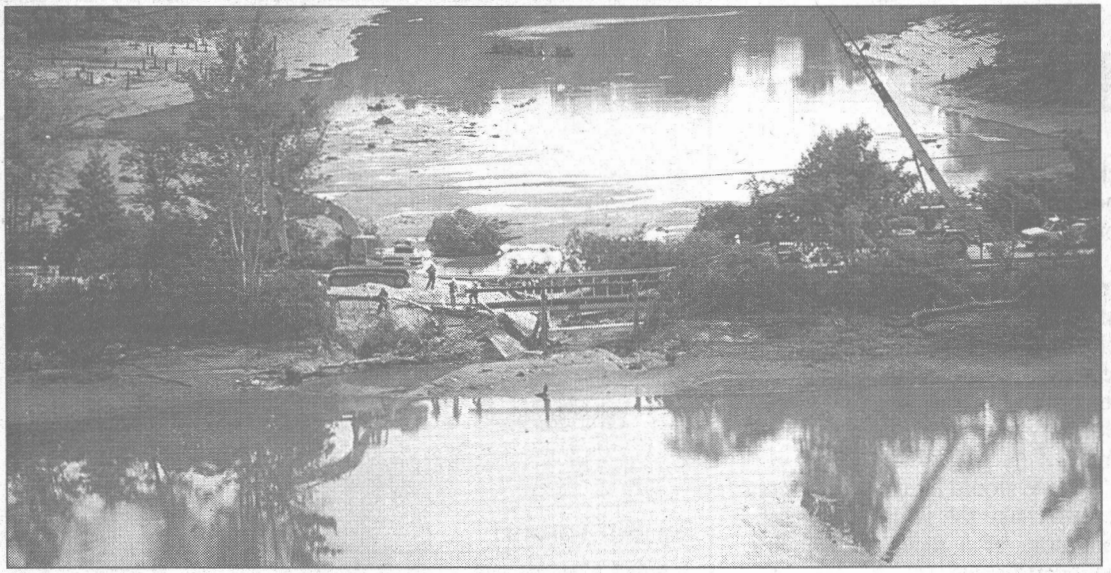
Jamestown District supervisor John McGlennon was contacted by several constituents

*See **Dam**, page 5A*



Amy Johnson

Concrete now fills sinkholes created by the water.



Within a day, Lake Powell was reduced from a scenic body of water to a muddy bog. Here, crews begin work on the causeway where Jamestown Road crosses the lake.

File photo

★Heavy rain threatened dam

Continued from page 1A

concerned about the dam.

"There has been a lot of rain and the dam appeared to be under some stress," McGlennon said.

The Friends of Lake Powell relies on private donations that go toward fixing the dam when needed. It swung into action quickly on Thursday.

As a precaution, the group temporarily closed the walkway. Cooper organized contractors who came out later that day to fill the sinkholes with concrete and to realign the face of the dam. The repairs cost $5,000.

"This should buy us some more time," he said.

As for the dam's future, the Friends resists the idea of turning it over to the county, which could then fund upkeep and repair.

"If the county took it over, it would become open to the general public," Cooper said. "We like it just the way it is, quiet and private."

Want to help? *To donate to the Friends of Lake Powell, make checks payable to The Friends of Lake Powell Inc. and mail to PO Box 413, Williamsburg 23185.*

Tara Hayden

Volunteers used about $5,000 worth of concrete to repair the dam on Thursday.

WF

Lake Powell residents raise repair money

By Deborah Straszheim
Daily Press

WILLIAMSBURG

Lake Powell will not remain a mud pit forever.

A group of local residents who live near the 81-acre lake raised more than $50,000 needed to repair the dam.

The dam broke apart when heavy rains from Hurricane Floyd last September caused privately owned Lake Powell to swell. As water rushed through, Jamestown Road and the dam at Lake Powell Road collapsed.

John McGlennon, a James City County supervisor who represents that area, said a contractor has begun bringing in materials to fix the dam.

"I think everybody was thrilled when the group was able to raise the money," said McGlennon, referring to The Friends of Lake Powell. He said repairs could be nearly finished in about a month.

Workers are going to build a new dam and spillway, and repair the old spillway to use for overflow. They are also going to install a valve at the bottom of the lake to release pressure when the water level is too high.

After the dam collapsed, the lake emptied and became a muddy swamp. It has since dried and greenery has begun growing from the lake bottom.

Daily Press

A group of local residents near Lake Powell have raised more than $50,000 to repair the dam.

Lake Powell filling too fast

VA GAZETTE 08/23/00

Water spills over temporary dam

By Brian M. Rafferty

JAMES CITY—It seems that Lake Powell is recovering a little too quickly.

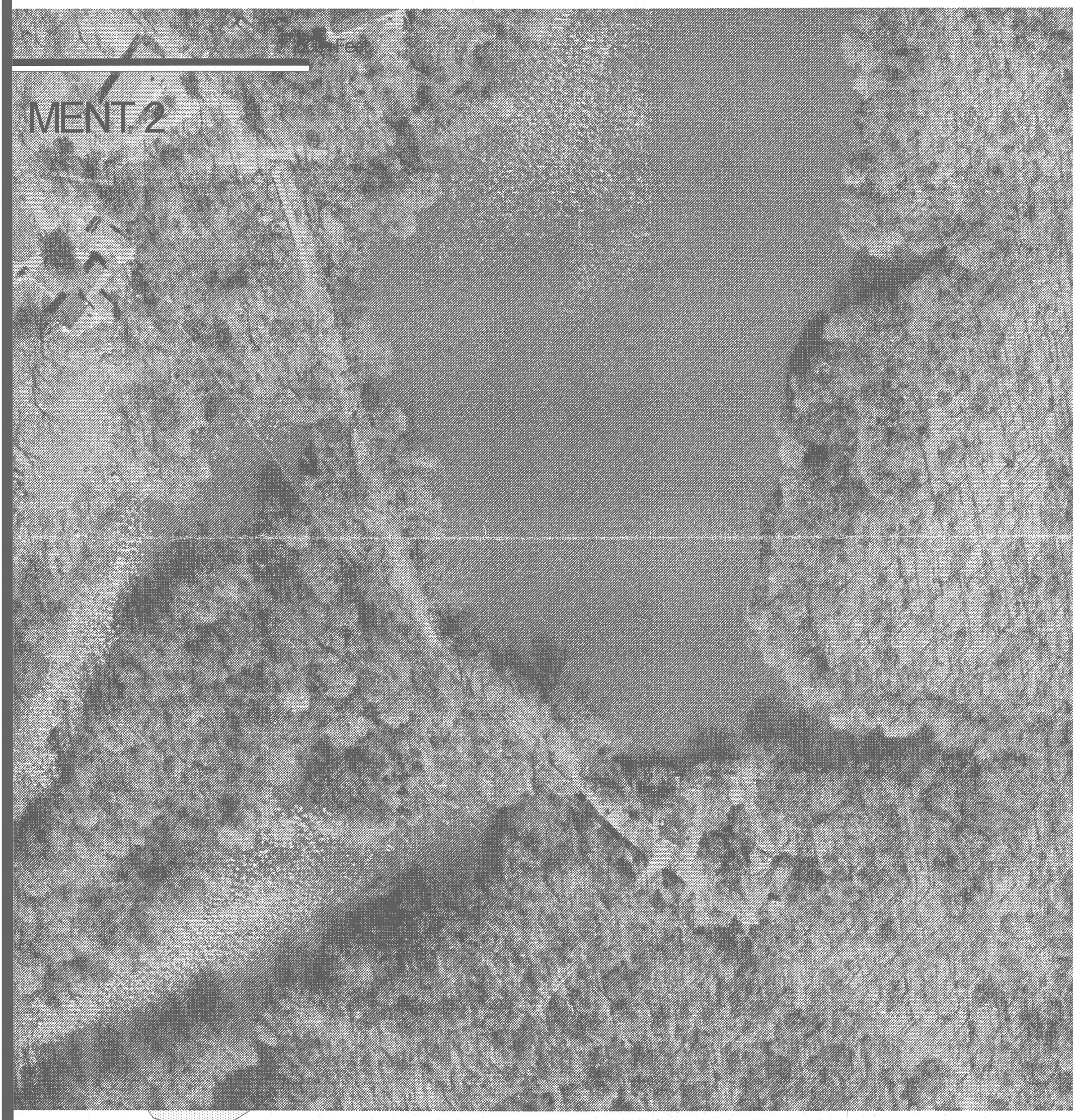
Last week, as progress continued on the reconstruction of the dam at Lake Powell, workers realized that heavy rains throughout the spring and summer have sped up the lake's refilling, causing a temporary setback.

According to Randy Cooper, president of the Friends of Lake Powell, progress on the construction of the dam has been hampered by the water level climbing too high. A set of cofferdams was set up to give workers space in which they could construct the permanent replacement to the dam destroyed by Hurricane Floyd last September.

Water has actually started coming over the top of the cofferdam and interfering with the progress of the permanent dam's construction. "We have had to open the dam up a bit to drop the level of the lake," Cooper said. "We just want to be sure that when people see the water level drop again, they don't think there is something wrong."

Last week the lake seemed restored to its full height, about 13 feet above sea level. This week the level will be dropped up to four feet.

The $50,000 project was expected to be complete this month, but delays may push the date back. Cooper said he didn't want anybody, especially those who have donated money to help save the lake, to worry that the dam project had failed.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ATTACHMENT 2

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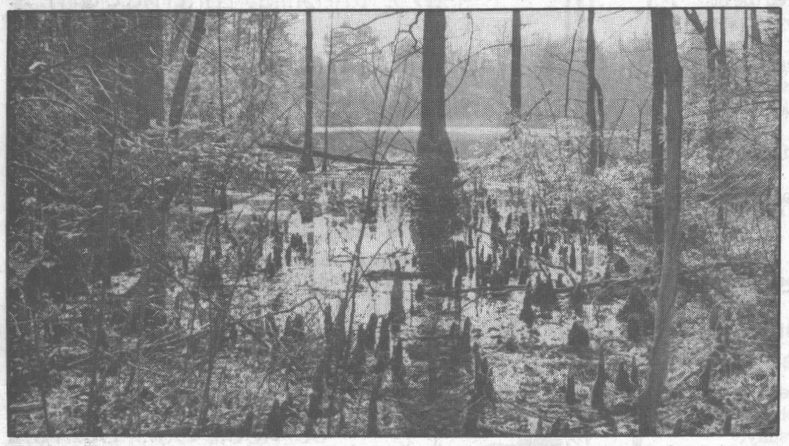


These cypress trees on Lake Powell soak up sun. Other plant life in the lake isn't so lucky, as silt from development often obscures sunlight and prevents reproduction.

Silt choking Lake Powell

Development runoff blamed; flaws seen in erosion control

By Nathaniel Axtell

JAMES CITY—Florence Adsit pounds her frail, bony fist down on the arm of her chair with the vigor of a woman half her 60-plus years.

"Isn't it pitiful what man does to nature?" she says, not really asking as much as telling. "It's enough to make you sick."

Though she looks and sounds like a grandmother who's just seen a particularly disturbing documentary on seal slaughters, Adsit is referring to nature closer to home. 20 feet closer, actually.

Five concrete steps down a hill from her front door sits Lake Powell, an 80-acre body of water formed when Mill Creek was dammed sometime before 1761. Adsit, whose family bought the lake in the 1920s, has kept a watchful eye over the lake for over 25 years. Recently, the widow hasn't liked what she's seen.

Like its Jamestown Road relative, Lake Matoaka, Lake Powell is in jeopardy. When it rains, muddy sediment from construction sites throughout the lake's watershed clouds its water. The silt fills in the lake, buries fish eggs and starves aquatic vegetation of its lifeblood, the sun.

Perhaps Adsit's greatest fear, however, is that the lake will drain completely. The Lake Powell Road dam, which was last repaired in 1938, is eroding. The state highway department, which insists the bridge and dam are Adsit's responsibility, says it'll cost $500,000 to fix it. The state doesn't have the funds.

"It's getting to the point that the dam might break, and I'll lose the whole lake," Adsit laments.

The bridge-dam is now twentieth on a list of secondary road improvements requested by the county. It got that high on

To page 3A

★Lake Powell in jeopardy

From page 1A

the list only after Adsit elicited the help of supervisors chairman Thomas Mahone.

"The highway department won't probably get to it in my lifetime, but at least the county is on record as saying, 'This is important to us' if the dam breaks and the state is forced to repair it," Mahone said.

That may be sooner than later, since the structure trembles tremendously every time construction truck crosses it. They regularly do, Adsit says, although signs ban through-trucks. "They ignore the signs," she said. "I stop them on the road, but they just keep on coming through here."

Though grateful for Mahone's legwork, Adsit is still amidst a private battle with the county that started in 1976. She sued the county then for damages incurred when sewage pipe was laid on Richneck and Jamestown roads, causing muddy runoff to enter the lake. The two parties settled out of court, but Adsit's vendetta with James City continues.

"I blame the supervisors," she said. "They've told me they don't have the staff to keep up with the development, yet they keep issuing permits. It's ruining my lake."

Decades ago, the state identified Powell as an important resource. The lake is unique because it is spring-fed and contains calcium deposits, which dissolve into the water and enrich plant and fish life.

"A 15-pound [largemouth] bass from here carried the state record for years," Adsit said. "They're still catching nice fish, but not like they used to."

Harley Boone, a Hampton resident who's fished Powell for 30 years, has seen firsthand the effects of adjacent development on the lake. "You used to could catch 100 [chain pickerel] a day five years ago, and now the lilypads are gone and the grass is down," Boone said. "You're lucky to catch five or six today."

Scientists familiar with the lake attribute the grass and lilypad loss to turbid water. The sun, which plants need to grow, can't penetrate the turbidity found in coves near the road and adjacent developments. Adsit charges Westray Downs, Graylin Woods and Joseph Terrell's Richneck East project with the most damage.

The developers claim they've met all of the county and state erosion control ordinances and sometimes have done more. "The county held our feet to fire," Terrell said. "Between the silt traps and the containment basin, no sediment is washing into that lake."

When told by the state that Terrell's project was in order, Adsit grew livid. "If that meets the state requirements, then they should be changed because I can't see my hand three inches below the surface after a rain."

Darryl Cook, a county code compliance inspector, said current erosion control techniques typically let through 30 percent of runoff from a development. Fine material, he said, is hard to catch. "But we've been very careful in dealing with projects in the Lake Powell watershed just because of Mrs. Adsit."

But some experts agree with Adsit that the current system is flawed. "We don't demand high enough standards," said Gerald Johnson, a geologist with William and Mary. "The state handbook has various measures that are typically just plopped into a plan. The measures could stand improvements during all phases: design, construction, and while the land stabilizes."

Mahone said meeting state guidelines, however effective, is the law for Virginia counties. "Admittedly, the soil and erosion thing is one of the weaker variables we deal with in rezonings, but her options aren't very good, and neither are ours."

★ Dam

From page 1A

wants to preserve the dam and may be willing to pay for it. I'll go down and stick my thumb in the dam."

In 1993, the county tried to develop a public-private relationship with the residents living near Lake Powell. "The trouble was that we had to have some public benefit to invest in it," said Judy Knudson, who represented the Jamestown District on the board of supervisors at the time. She debated the pros and cons of repairing the dam, which lay in her district. In retrospect, she said, "This is close to being a problem you can't solve."

Adsit ended up paying for dam repairs last year, too.

Bob Magoon now represents the Jamestown District. He plans to meet with the Lake Powell neighbors within the next two weeks to iron out a plan to fix the dam. "A couple of weeks ago I asked for the Lake Powell file just to familiarize myself with it," said Magoon. "I didn't know I was going to run into a crisis."

The highway department, which has only assumed responsibility for the surface of the dam, claimed no responsibility Friday. "We really don't have any involvement in it any more," Cannell said, even though the roadway doesn't revert to the county until mid-March.

The Commonwealth Transportation Board, acting on a recommendation from the supervisors, will take the road out of the secondary road system March 15, when it becomes a county-maintained bike and pedestrian path. Responsibility for the road surface will fall on local taxpayers, but the private owners will still be responsible for maintenance of the dam and its foundation.

Bell Atlantic dispatched an engineer Friday to check out telephone lines. While no major cable lines are near Lake Powell, if poles are washed out, some customers could lose phone service, according to Jim Griffith, Peninsula manager for Bell Atlantic.

Virginia Power has an overhead line that runs along Lake Powell Road and serves homes in that area. District manager Robert Ware said while no special efforts were made to check power lines Friday, they're keeping abreast of developments at the dam site.

A gas line also runs along nearby Neck-O-Land Road.

Laura Frink

Onlookers watch as the dam starts to claim a split-rail fence. By Thursday morning, the fence was completely engulfed.

Lake dam crumbling

Unsafe Powell crossway undergoing repair

By Natalie Kostelni

JAMES CITY—Lake Powell dam, that small, controversial stretch of road that once pitted county officials against the highway department, has taken matters into its own hands.

What began as a deteriorating spillway within 24 hours became a gaping sinkhole that Friday swallowed a portion of Lake Powell Road, a recently installed fence and tons of concrete and riprap.

The highway department conducted studies of the Jamestown Road crossway Friday and concluded that Jamestown Road would remain unaffected even if the dam breaks, according to Bill Cannell, highway department spokesman.

The Lake Powell crossway, on the other hand, was unsafe and continued to crumble Friday, though repairs were being made.

If the dam were to collapse, it would drain Lake Powell in an estimated 48-72 hours. According to county staff who've studied the possibility, water from the lake would rush along Mill Creek and drain into the nearby James River. It could flood fields in nearby Gate House Farms and Page Landing subdivisions, which are low-lying areas and frequently hold standing water following heavy rainfalls.

The dam's sudden deterioration, which began Thursday morning during nor'easter rains, has sparked another debate over who should pay for the dam maintenance.

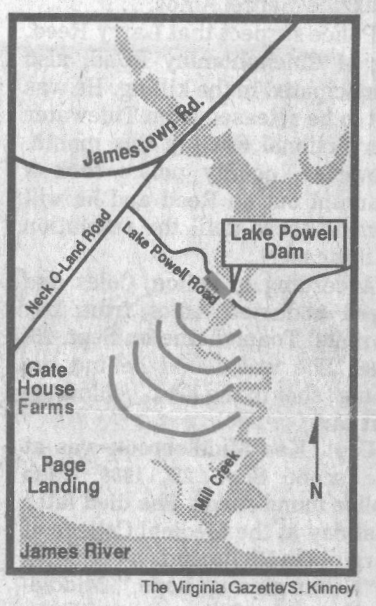
Florence Adsit, one of the four owners of the dam, paid a contractor to patch the dam Friday. While the patch job will keep the dam from collapsing now, it is a temporary answer to a continuing problem.

Board of supervisors chairman Perry DePue said Friday the dam crisis is far from over. "The long-term issues need to be discussed. The timing of this was a surprise, but the fact that this happened wasn't. Fixing [the dam] would be similar to someone's house burning down and the county spending tax money to fix it," DePue said.

Lee Reed, a part-owner of the dam and Mrs. Adsit's newphew, said he believes the rupture of 56-year-old pipes caused the dam to crumble. They were installed when the dam was repaired in 1938, after hard rains swelled the lake by 10 feet and washed away 100 feet of it.

In 1992, the four owners of the dam and county officials discussed making permanent repairs, but reached an impasse. The supervisors felt that unless the county had legal access to the crossway, they couldn't justify spending public funds to fix it.

"We need the supervisors help," Reed said. "They've taken a negative attitude about the whole thing. It benefits county residents because everyone enjoys it. The dam affects property values and has historical value." The dam is part of the original, 18th century road that linked Williamsburg to Jamestown.



The Virginia Gazette/S. Kinney

Reed and Helene Pitman, who lives in The Colony, think installation of the wooden fence the county put in just over a month ago compromised the dam. A jackhammer was used to break the asphalt for post holes. "I think that caused a large part of the breakage," Pitman said. "The community

See Dam page 4A

- LAKE POWELL SPILLWAY
- GREEN SPRINGS BMP MAP
- GREYSTONE
- WMBG GLADE
- ~~SCH~~ ROBERTS SCHOOL BMPS
- BEAVERS / SCHOOL [redacted] E MAIL
-

NOVEMBER 19, 1992
DATE

MEMORANDUM

TO: JAMES CITY COUNTY WETLANDS BOARD STAFF

FROM: VIRGINIA MARINE RESOURCES COMMISSION, HABITAT MANAGEMENT DIVISION

SUBJECT: VMRC # 92-1632-5 (FLORENCE P. ADSIT)

ATTACHED IS A COPY OF AN APPLICATION FOR PERMIT SUBMITTED TO THIS OFFICE. THERE IS A POSSIBILITY THAT THIS PROJECT MAY INVOLVE WETLANDS. THE ENVIRONMENTAL ENGINEER RESPONSIBLE FOR YOUR AREA HAS NOT YET SEEN THIS APPLICATION AND NO DETERMINATION HAS BEEN MADE REGARDING ITS COMPLETENESS. PLEASE ADVISE US OF YOUR DETERMINATION IN THIS MATTER AND WHEN A PUBLIC HEARING IS SCHEDULED IF, IN YOUR JUDGMENT, WETLANDS ARE INVOLVED. YOU MAY ALSO WANT TO FORWARD A COPY OF YOUR RESPONSE TO THE U.S. ARMY CORPS OF ENGINEERS, NORFOLK DISTRICT, TO ADVISE THEM OF YOUR FINDINGS CONCERNING THIS PROJECT.

BETH L. HOWELL
DIVISION OFFICE MANAGER

/BLH
ATTACHMENT

****

DATE

MEMORANDUM

TO: VIRGINIA MARINE RESOURCES COMMISSION, HABITAT MANAGEMENT DIVISION

FROM: _____ WETLANDS BOARD STAFF

REVIEW OF THE ABOVE-REFERENCED APPLICATION INDICATES THIS PROJECT:

[ ] DOES NOT INVOLVE WETLANDS. A LETTER WILL BE FORWARDED TO TO THE APPLICANT ADVISING THAT NO PERMIT WILL BE REQUIRED FROM THIS BOARD.

[ ] DOES INVOLVE WETLANDS AND A PERMIT WILL BE REQUIRED. A PUBLIC HEARING HAS BEEN TENTATIVELY SCHEDULED FOR _____ AT _____.

[ ] DOES INVOLVE WETLANDS BUT A PERMIT WILL NOT BE REQUIRED BECAUSE _____

_____

_____

[ ] SITE INSPECTION CONDUCTED ON _____.

[ ] NO SITE INSPECTION CONDUCTED.

WETLANDS BOARD STAFF CONTACT

BASIC APPLICATION FORM

JOINT PERMIT APPLICATION FOR ACTIVITIES IN WATERS OF THE COMMONWEALTH OF VIRGINIA

Before you complete this application please refer to the definitions on pages 5-8 and explanations on pages 9-11. PLEASE ANSWER ALL QUESTIONS ON THE BASIC APPLICATION FORM. IF A QUESTION DOES NOT APPLY TO YOUR PROJECT, WRITE NOT APPLICABLE (N/A) IN THAT BLOCK. PLEASE PRINT OR TYPE. **USE BLACK INK (BLUE INK OR PENCIL ARE NOT EASILY REPRODUCIBLE; THEREFORE, NEITHER WILL BE ACCEPTED)**. If additional space is needed, attach extra 8-1/2" X 11" sheets of paper.

1. Applicant's (Property owners) name and complete address:
   FLORENCE P. ADSIT
   2189 LAKE POWELL ROAD
   WILLIAMSBURG, VA 23185
   (SEE ATCH SHEET FOR ADDITIONAL PROPERTY OWNERS)

   Telephone number:
   Home (A/C 804) 229-2245
   Work (A/C) SAME

2. Authorized agent's name and complete address (if applicable):
   COL(RET) HERBERT E BELL
   9 BAYBERRY LANE
   WILLIAMSBURG, VA 23185

   Telephone number:
   Home (A/C 804) 229-0839
   Work (A/C) SAME

3. Have you obtained a contractor for the project? ☑ YES ☐ NO If your answer is "YES", complete the remainder of this question and submit the Applicant's and Contractor's Acknowledgement Form on page 21 with your application.

   Contractor's name and complete address:
   H.R. DELLINGER
   ROUTE 4, BOX 2565
   GLOUCESTER, VA 23061

   Telephone number:
   Home (A/C 804) 693-5683
   Work (A/C) SAME

FOR OFFICE USE ONLY
Date Stamp

Application No. 92-1632-5

MARINE RESOURCES COMMISSION
RECEIVED
NOV 19 1992
BY _____

NAO Form 1065, Rev 10 May 85/VMRC 30-300

BASIC APPLICATION FORM (Continued)

4. List the name, address, and telephone number of the newspaper having general circulation in the area of the project. Failure to complete this question may delay Local and State processing.

Name VIRGINIA GAZETTE
Address 216 IRONBOUND RD
WILLIAMSBURG, VA 23185
Telephone # 804-220-1736

5. Have you discussed the project with any representative(s) of Local, State, or Federal regulatory agencies? ☑ YES ☐ NO If your answer is "YES", complete the information below concerning the on-site pre-application meeting.

Name of Representative(s): JULIAN H LIPSCOMB JR
Name of Agency: VA MARINE RESOURCES COMMISSION
Date: 16 JUNE 1992 (SEE ITEM 5 - CONT SHEET

If your answer is "NO", and you wish an on-site inspection before submitting this application, contact one of the pertinent agencies as listed on pages b and c.

6. Provide a brief description of the project.
UNDERCUTTING OF THE EXISTING LAKE POWELL SPILLWAY AND SUPPORTING DAM CORE AND CONTINUED USE OF THE COUNTY ROAD (ON TOP OF DAM & SPILLWAY) BY HEAVY VEHICLES HAS CAUSED SIGNIFICANT DAMAGE TO THE LAKE POWELL SPILLWAY. IN ORDER TO REPAIR THE SPILLWAY & SUPPORTING DAM CORE IT HAS BECOME CRITICAL THAT THIS PROJECT BE STARTED SOONEST. LAKE SPILLWAY WATER WILL TEMPORARILY BE ROUTED (SEE BASIC APPLICATION FORM CONT SHEET ATTACHED - ITEM 6)

7. Name of the water body at the project location:
LAKE POWELL
JAMES CITY COUNTY a tributary to MILL CREEK, JAMES CITY COUNTY

8. The water body at the project site is: (check one on line A and check one on line B)

A. ☐ natural ☒ man-made ☐ uncertain

B. ☐ tidal ☒ non-tidal ☐ uncertain

9. Location of the project:
ROUTE 618
JAMES CITY COUNTY, VA.
County/City

LAKE POWELL SPILLWAY
ROUTE 618
JAMES CITY COUNTY, VA
Street, road or other descriptive location (lot #, tract, section, subdivision, etc.)

Name of and distance to local town, community, or other identifying landmark (For Rural Areas):
WILLIAMSBURG, VIRGINIA - 2 MILES EAST

10. Proposed use (check one):

☒ Private ☐ Commercial ☐ Industrial ☐ Government ☐ Other (explain below):

BASIC APPLICATION FORM (Continued)

11. Primary purpose of the project:

TO SAVE LAKE POWELL

Secondary purpose of the project:
PRESERVE A BEAUTIFUL 82 ACRE FRESH WATER LAKE AND ITS NATURAL HABITATE, WILDLIFE, FISH AND PUBLIC RECREATION POTENTIAL. - MINIMAL

12. Will any public benefit be derived from the project? ☒ YES ☐ NO ☐ UNCERTAIN
If your answer is "YES", explain below.
OUTSTANDING FRESH WATER FISHING, WILDLIFE OBSERVATION, BIRD WATCHING, PUBLIC SCHOOL EDUCATION CLASSES, STATE COLLEGE & UNIVERSITY EDUCATION PROGRAMS & PURE SCENIC BEAUTY.
↳ Do these activities occur?

13. Does the project involve destruction or alteration of wetlands? (See definition on page 8.) ☒ YES ☐ NO ☐ UNCERTAIN If your answer is "YES", what will be the approximate total of:

A. vegetated wetlands area(s) to be impacted? ZERO square feet

B. nonvegetated wetlands area(s) to be impacted? 200 square feet
(seems small - should be more like 600 ft²)

(See page 45 for How to Calculate Square Feet.) Also, if your answer is "UNCERTAIN" contact the Corps or VMRC for an on-site inspection before submitting this application.

14. Will there be any discharge (either direct or indirect) of waste material into State waters from the construction or operation of the project? ☐ YES ☒ NO

15. If the project will be a marina or other place where boats are moored or an addition to or maintenance of the same, have you obtained the State Health Department's approval for sanitary facilities? ☐ YES ☐ NO ☒ N/A If your answer is "NO", contact your Local Health Department. You are required by Section 62.1-3 of the Code of Virginia to obtain this approval or a variance before a VMRC permit can be issued.

16. Have you previously applied to, or obtained a permit from, any agency (Interstate, Federal, State, or Local) for any portion of the project described in this application? ☐ YES ☒ NO ☐ UNCERTAIN If your answer is "YES", provide the following information:

Issuing or Denying Agency	Type of Action	ID No.	Application Date	Action Date

BASIC APPLICATION FORM (Continued)

17. Has any work commenced or has any portion of the project for which you are seeking a permit been completed? ☐ YES ☒ NO If your answer is "YES", give details below. State when the work was completed and who performed the work. Please clearly differentiate on your application drawings that portion of the work which has been completed from that which is proposed.

18. Approximately how long will it take to complete the project after all required permits have been issued? ONE months OR LESS.

19. Approximate total cost of the project (including materials and labor):
$ 6850.00

20. List the name and complete address of each adjacent property owner (see definition on page 5) to the project.

FLOYD P. CARMINES
2188 LAKE POWELL RD
WILLIAMSBURG, VA 23185

L. H. MATTHEWS
2148 LAKE POWELL RD
WILLIAMSBURG, VA 23185

21. List the name and complete address of each waterfront property owner across the waterway from the project, if the water body is less than 500 feet wide. Also, if the project is within a cove, list the name and address of each property owner located on the cove.

FLOYD P. CARMINES
2188 LAKE POWELL RD
WILLIAMSBURG, VA 23185

L. H. MATTHEWS
2148 LAKE POWELL RD
WILLIAMSBURG, VA 23185

22. Have you discussed this project with all adjacent property owners and property owners across the waterway (if applicable) and had them sign an Adjacent Property Owner's Acknowledgement Form on page 19? ☒ YES ☐ NO If your answer is "NO", refer to page 11, explanation number 20.

23. List the name and address of each known claimant of Riparian Rights and/or Oyster Planting Grounds in the vicinity of the project:

NONE

BASIC APPLICATION FORM
(CONT)

ITEM 1. (CONT) - ADDITIONAL PROPERTY OWNERS

LEE A. REED
2245 LAKE POWELL ROAD
WILLIAMSBURG, VA 23185 — 804-229-4755 (H)

CAROLYN G. LASSITER
4153 GLADNEY DRIVE
ATLANTA, GA. 30340 — 404-938-4069 (H)

STANLEY H. POWELL
13 AFTON PARKWAY
PORTSMOUTH, VA 23702 — 804-393-0252 (H)

ITEM 5. (CONT.) - DISCUSS - REGULATORY AGENCY

JOHN B. PATTON
JAMES CITY COUNTY WETLANDS BOARD
16 JUNE 1992

ITEM 6. (CONT.) PROJECT DISCRIPTION
AROUND THE FILL AREA IN ORDER TO INSURE COMPACTION AND KEEP EROSION RUNOFF FROM FILL & RIP RAP TO A MINIMUM. A RIP RAP CORE DAM CORE WILL BE CREATED BY PLACING CRUSHED CONCRETE (DUST TO 4 INCH SIZE) AT DOWN STREAM SIDE OF DAM. THIRTY TO 100 POUND SIZE RIP RAP WILL BE PLACED ON TOP OF CRUSHED CONCRETE AND DOWN SPILLWAY SLOPE AT A 3:1 SLOPE. THE RIP RAP AND CRUSHED CONCRETE WILL BE LOCKED IN WITH NEW POURED CONCRETE TO MINIMIZE FILL MOVEMENT AND ENHANCE WATER RUN-OFF. THE ATTACHED PHOTOS ILLUSTRATE THE CRITICAL NATURE OF THE SPILLWAY AND DAM CORE UNDERCUTTING.

BASIC APPLICATION FORM (Continued)

24. Check the appendices below which apply to your project. (NOTE: The applicable appendices must be completed and submitted as part of your application).

	LIST OF APPENDICES	PAGE
☐	A. Piers, Marginal Wharves, Boathouses, or Marinas	23
☐	B. Dolphins or Moorings	25
☐	C. Boat Ramps	27
☐	D. Bulkheads	29
☒	E. Fill	31
☒	F. Riprap	33
☐	G. Dredging or Excavating	35
☐	H. Jetties, Groins, or Breakwaters	37
☐	I. Intake or Outfall Structures	39
☐	J. Channel Modifications or Impoundment Structures (Dams)	41
☐	K. Submarine Crossings, Overhead Crossings, or Tunnels	43

REMINDER: BE SURE TO COMPLETE THE APPENDICES YOU CHECKED ABOVE UPON COMPLETION OF THE BASIC APPLICATION FORM (PAGES 13-18). AFTER COMPLETION OF THE APPROPRIATE APPENDICES, TURN TO THE SAMPLE DRAWINGS INFORMATION ON PAGE 48 AND PREPARE YOUR APPLICATION DRAWINGS. MAIL ALL INFORMATION TO:

Virginia Marine Resources Commission
Habitat Management Division
P. O. Box 756
Newport News, Virginia 23607

BASIC APPLICATION FORM (Continued)

ALL APPLICANTS MUST SIGN THIS PAGE. If the Certification of Authorization below is completed and returned with this application all future application correspondence may be signed by the duly authorized agent. Also, please provide the name(s) and complete address(es) of the legal property owner(s) as shown on your recorded deed.

I hereby make application for all permits and a Certificate of Water Quality Compliance (401), as required, to authorize the activities I have described herein. Upon my signature, I agree to allow the duly authorized representatives of any Local Wetlands Board, Virginia Marine Resources Commission, State Water Control Board, State Health Department, Virginia Institute of Marine Science, Shoreline Erosion Advisory Service, Virginia Soil and Water Conservation Commission, U. S. Army Corps of Engineers, National Marine Fisheries Service, Environmental Protection Agency, U. S. Fish and Wildlife Service, and the Tennessee Valley Authority to enter upon the premises of the project site at reasonable times for the purpose of inspection.

I hereby certify that the information submitted in this application is true and accurate to the best of my knowledge.

NOV 6 19 92
DATE

Florence P. Adsit
APPLICANT'S SIGNATURE

FLORENCE P. ADSIT
APPLICANT'S NAME (PRINTED/TYPED)

CERTIFICATION OF AUTHORIZATION
(Only agents need to complete this form)

I hereby certify that I am designated and authorized by FLORENCE P. ADSIT [APPLICANT'S NAME] to act on [redacted]/her/[redacted] behalf as agent and take all actions necessary to the processing, issuance, acceptance, and implementation of this permit and any and all standard and special conditions attached hereto.

Herbert E. Bell
AGENT'S SIGNATURE

COL(RET) HERBERT E. BELL, PE
AGENT'S NAME (PRINTED/TYPED)

ADJACENT PROPERTY OWNER'S ACKNOWLEDGEMENT FORM

I, L. H. MATTHEWS, am a property owner whose land is
(ADJACENT PROPERTY OWNER'S NAME PRINTED)

adjacent to the land of FLORENCE P. ADSIT. I am aware of the proposed
(APPLICANT'S NAME)

project and have reviewed the applicant's drawings dated 11/6/92
(DATE)

to be submitted for all necessary Local, State, and Federal permits.

I ☒ HAVE NO COMMENT ☒ DO NOT OBJECT ☐ DO OBJECT to the project. SEE NOTE ON REVERSE SIDE OF PAGE IF YOU OBJECT TO THE PROPOSAL. The applicant has agreed to contact me again for additional comments if the proposal changes prior to construction of the project.

W L Matthews II — 11/6/92
ADJACENT PROPERTY OWNER'S SIGNATURE — DATE

NAO FM 1020, 10 May 85

ADJACENT PROPERTY OWNER'S ACKNOWLEDGEMENT FORM

I, FLOYD P. CARMINES, am a property owner whose land is
(ADJACENT PROPERTY OWNER'S NAME PRINTED)

adjacent to the land of FLORENCE P. ADSIT. I am aware of the proposed
(APPLICANT'S NAME)

project and have reviewed the applicant's drawings dated November 6, 1992
(DATE)

to be submitted for all necessary Local, State, and Federal permits.

I ☐ HAVE NO COMMENT ☒ DO NOT OBJECT ☐ DO OBJECT to the project. SEE NOTE ON REVERSE SIDE OF PAGE IF YOU OBJECT TO THE PROPOSAL. The applicant has agreed to contact me again for additional comments if the proposal changes prior to construction of the project.

Floyd Powell Carmines — November 6, 1992
ADJACENT PROPERTY OWNER'S SIGNATURE — DATE

NAO FM 1020, 10 May 85

APPLICANT'S AND CONTRACTOR'S ACKNOWLEDGEMENT FORM

I, FLORENCE P. ADSIT (APPLICANT'S NAME), have contracted H.R DELLINGER (CONTRACTOR'S/COMPANY'S NAME) to perform the work described in the application signed and dated Nov 6 1992 (DATE) We will read and abide by all conditions as set forth in all Local, State, and Federal permits as required for this project. We understand that failure to follow the conditions of the permits may constitute a violation of applicable Local, State, and Federal statutes and that we will both be liable for any civil and/or criminal penalties imposed by those statutes. See FEDERAL PENALTIES FOR VIOLATIONS AND RELATED STATE CODES on the reverse side of this page.

In addition, we agree to make available a copy of the Corps permit to any regulatory representative who is authorized to visit the project site to ensure permit compliance. If we fail to provide the specified permit upon request, we understand that the representative will have the option of stopping our operation until it has been determined that we have a properly executed and signed permit and are in full compliance with all of its terms and conditions.

Florence P. Adsit
APPLICANT'S SIGNATURE

Nov 6, 1992
DATE

H.R. Dellinger President
CONTRACTOR'S SIGNATURE AND TITLE (if applicable)

Nov. 10, 1992
DATE

H.R. DELLINGER
CONTRACTOR'S NAME (PRINTED/TYPED) OR NAME OF FIRM

ROUTE 4 BOX 2565
GLOUCESTER, VA. 23061
CONTRACTOR'S OR FIRM'S ADDRESS

(A/C804) 693-5683
CONTRACTOR'S OR FIRM'S PHONE NUMBER

NAO FM 1021, 10 May 1985

APPENDIX E
FILL

NOTE 1 – Please make sure answers to all of the questions in this appendix correspond to information on the application drawings.

NOTE 2 – See page 45 – How to Calculate Square Feet, Cubic Feet, and Cubic Yards.

1. How many feet will the fill be placed channelward of the:

   A. tidal waters: mean high water line? FIVE feet

   mean low water line? ZERO feet

   B. non-tidal waters: ordinary high water line? ZERO feet

2. How much fill will be located on:

   A. subaqueous land? 100 square feet

   B. non-vegetated wetlands? 200 square feet

   C. vegetated wetlands? ZERO square feet

3. The fill will be (check one) ☒ A. hauled in from upland sources

   ☐ B. obtained from dredged material

4. What method will be used to place the fill? HYDRAULIC BUCKET

5. How will the fill be retained? RIPRAP - ARMOUR STONE

6. State the type and composition percentage of the fill material (e.g. sand 80%, silt 5%, clay 15%, etc.). GRANULAR CONCRETE

7. Describe the type(s) of structure(s) to be erected on the filled area (if any).

   NONE

8. What type of ground cover will be provided for the filled area(s) to prevent soil erosion and help keep sediment from reaching State waters?

   NONE INVOLVED

APPENDIX F
RIPRAP

NOTE 1 - Please make sure answers to all of the questions in this appendix correspond to information on the application drawings.

NOTE 2 - See page 45 - How to Calculate Square Feet, Cubic Feet, and Cubic Yards.

NOTE 3 - To calculate average number of cubic yards of riprap per running foot of shoreline: Divide the average length of shoreline structure into the cubic yards.

1. Have you discussed the project with Virginia Institute of Marine Science (VIMS) and the Shoreline Erosion Advisory Service (SEAS)? ☐ YES ☒ NO If your answer is "YES", include a copy of your SEAS and/or VIMS advisory letter with your completed application.

2. Will the project be considered "MAINTENANCE" of an existing riprap structure? ☒ YES ☐ NO

3. What will be the overall length of the riprap structure? 20 feet

4. What will be the average number of cubic yards of riprap used per running foot of shoreline (See note 3)? 2 cubic yards

5. How many feet will the riprap structure be placed channelward of the:

   A. tidal waters: mean high water line? FIVE feet

      mean low water line? ZERO feet

   B. non-tidal waters: ordinary high water line? ZERO feet

6. How much of the riprap structure will be located on:

   A. subaqueous land? 100 square feet

   B. non-vegetated wetlands? 200 square feet

   C. vegetated wetlands? ZERO square feet

7. What type of material(s) will be used for construction of the riprap structure (e.g. quarry stone, broken concrete, cinder blocks, etc.)?

   QUARRY STONE

   BROKEN CONCRETE

8. Will the riprap structure be backfilled? ☒ YES ☐ NO If your answer is "YES", complete APPENDIX E.

APPENDIX F (Continued)
RIPRAP

9. Will filter cloth be used behind the riprap structure? ☐ YES ☒ NO

10. What will be the average weight of the:

    A. armor (larger size riprap) material? 100 pounds

    B. core (smaller size riprap) material? 40 pounds

    (See sample drawing on page 49 for illustration of armor and core material.)

11. What is the average slope of the existing bank?

    SLOPE = 2 feet (Run-Horizontal distance) : 10 feet (Rise-Vertical distance)

12. What will be the average slope of the riprap structure?

    SLOPE = 3 feet (Run-Horizontal distance) : 1 feet (Rise-Vertical distance)

HOW TO CALCULATE SLOPE

FORMULA

$$\text{SLOPE} = \frac{\text{RUN (Horizontal distance or Base width)}}{\text{RISE (Vertical distance or Height)}}$$

PROBLEM

Stabilize an eroding bank by filling an area 4 feet high and 8 feet wide with quarry stone riprap.

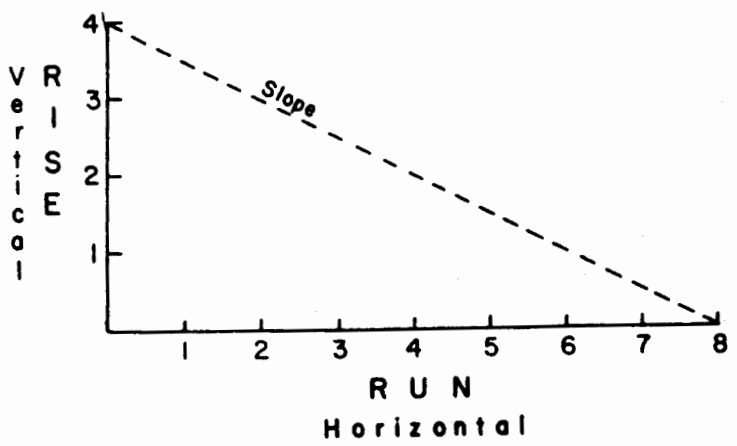
CALCULATION

$$\text{SLOPE} = \frac{\text{RUN}}{\text{RISE}}$$

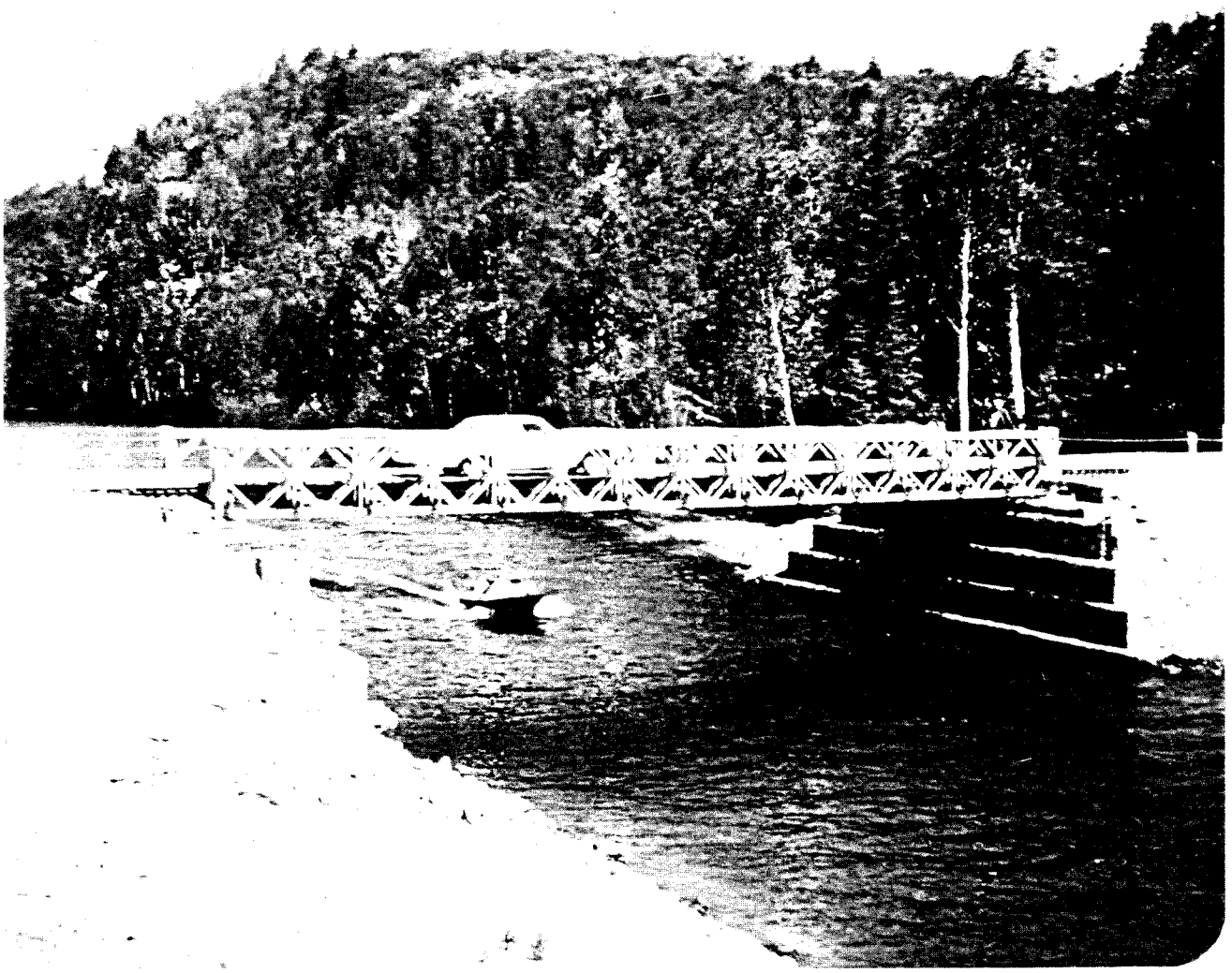
$$\text{SLOPE} = \frac{8}{4}$$

$$\text{SLOPE} = \frac{2}{1}$$

SLOPE = 2H : 1V



Figs. 50, 50A and 50B.
Architect's sketch, plan of piers and wingwalls, and photograph of finished job indicate the attractive results of erecting bridge abutments with gabions.

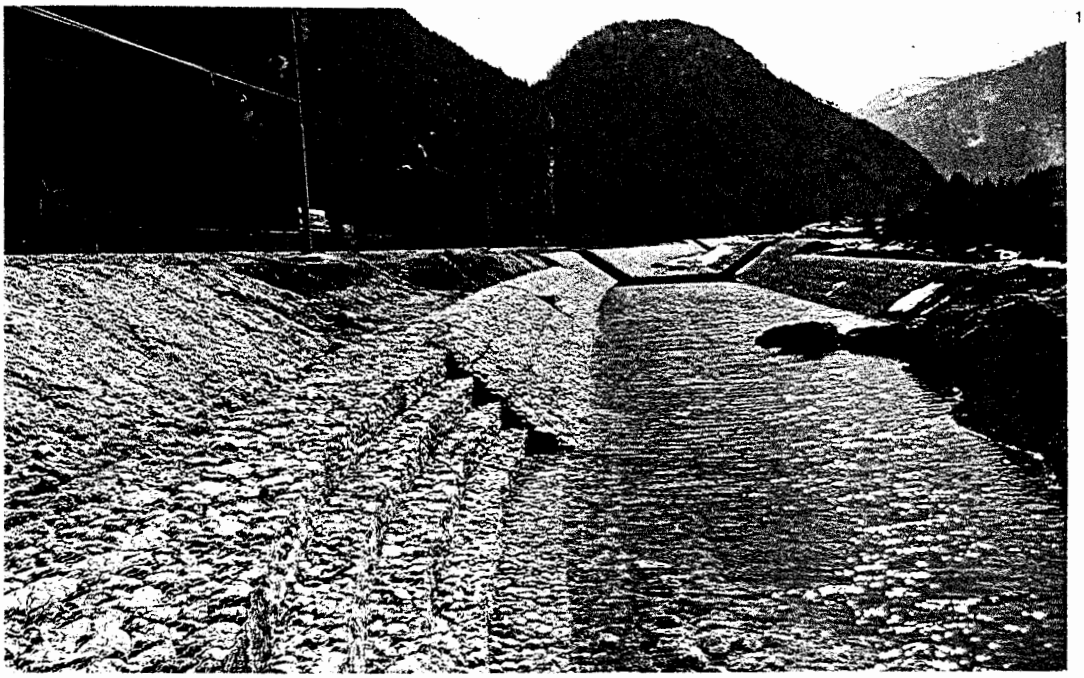


Gabions and Reno mattresses

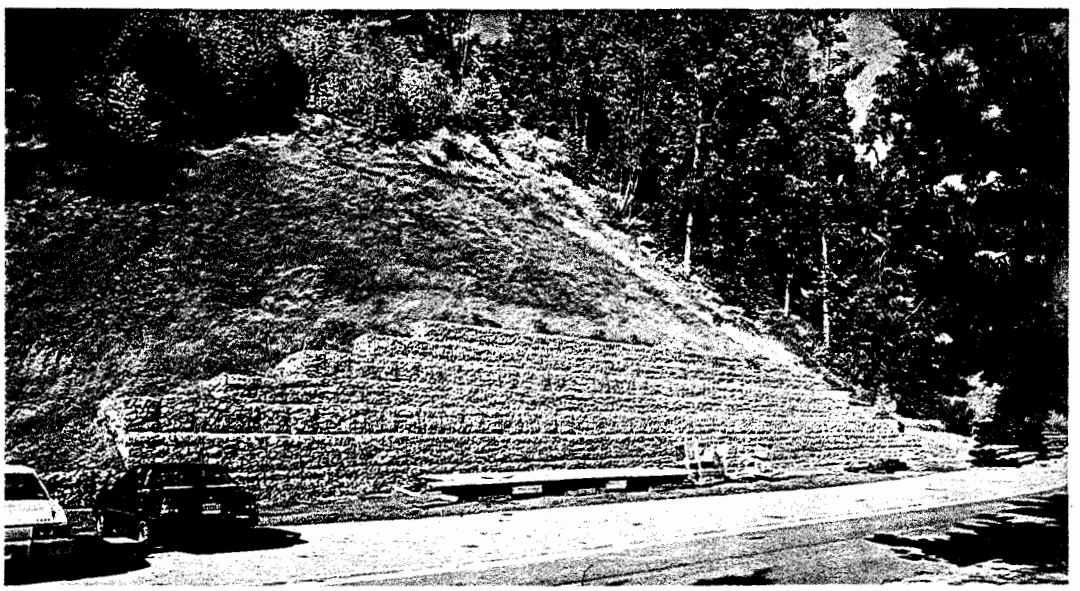
could be the best answer for your next project. Their installations are more economical than rigid or semi-rigid structures. Maccaferri gabions and Reno mattresses, delivered in handy collapsed form, are easily assembled and require no technical skill to erect. Filled with stone, they become a large, flexible and permeable building block from which a broad range of structures may be built.

Maccaferri gabion and Reno mattress design and construction assure strength and lasting effectiveness. No footings are required. They are completely unaffected by frost heave and because they are permeable, they are self-draining and hydrostatic heads do not develop behind them.

Further reliability is assured by the flexibility of Maccaferri gabions and Reno mattresses. Each unit yields to earth movement to retain its full efficiency while maintaining its structural integrity. In the long term picture, gabion efficiency increases with age. Silt and neighbouring earth build up between the rock fill, vegetation takes root and the entire gabion structure solidifies into a durable and eye-pleasing form. Overall there is no other type of structure to match this system for economy, performance and appearance.



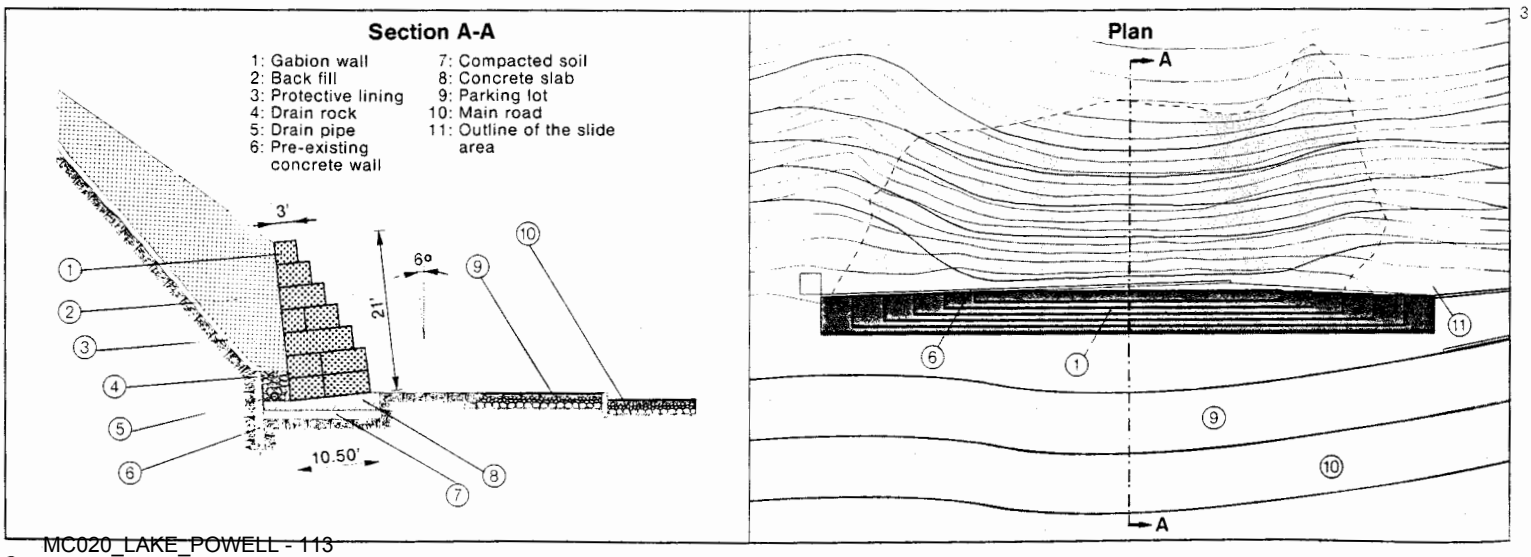
1



2

1- ITALY - Friuli Venezia Giulia
Channeling of the Fella stream carried out with Reno mattress.

2, 3 - U.S.A. - California
Gabion retaining wall to support a landslide near Yerba Buena Island, San Francisco. Drawing shows plan and section.



3

Fig. 4. Flexibility of Gabions permits them to settle, without breaking.

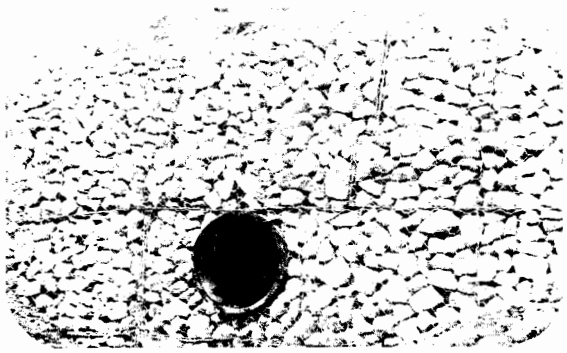


Fig. 5. Hexagonal triple-twist mesh in Bekaert Gabions can be cut to fit requirements without unraveling.

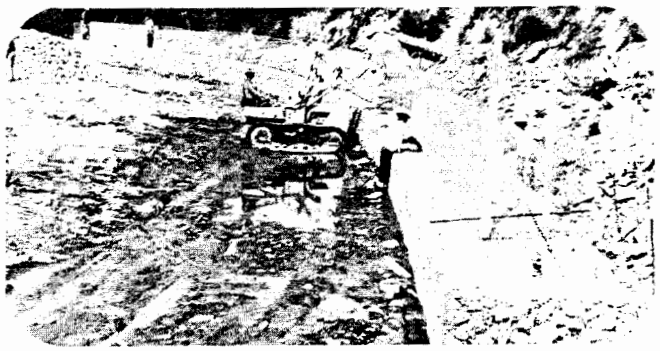


Fig. 6. Strong monolithic structure is formed as workers carefully lace second course to lower one in constructing this Bekaert Gabion retaining wall.

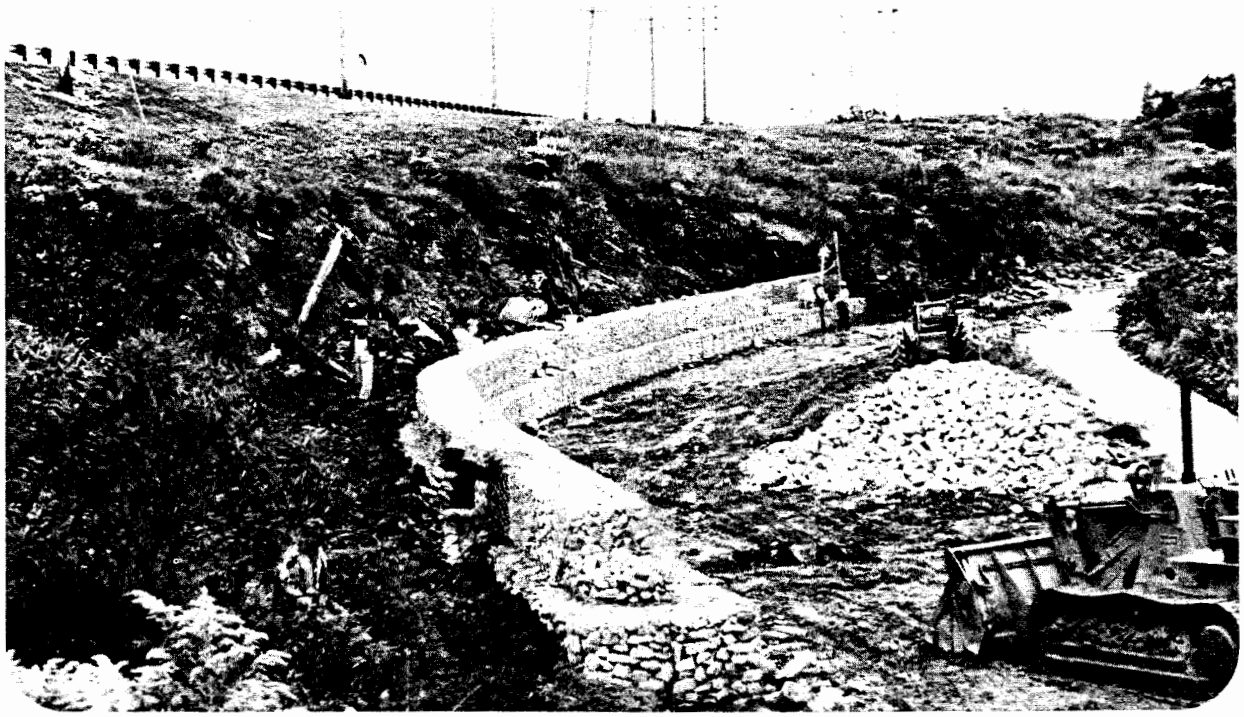


Fig. 7. Bekaert Gabions being used to protect toe of embankment. Permeability of gabions prevents buildup of hydraulic pressure, stabilizes even the wettest slopes.

NOTE: Letter designations in drawings indicate gabion sizes. See Fig. 3, page 3.

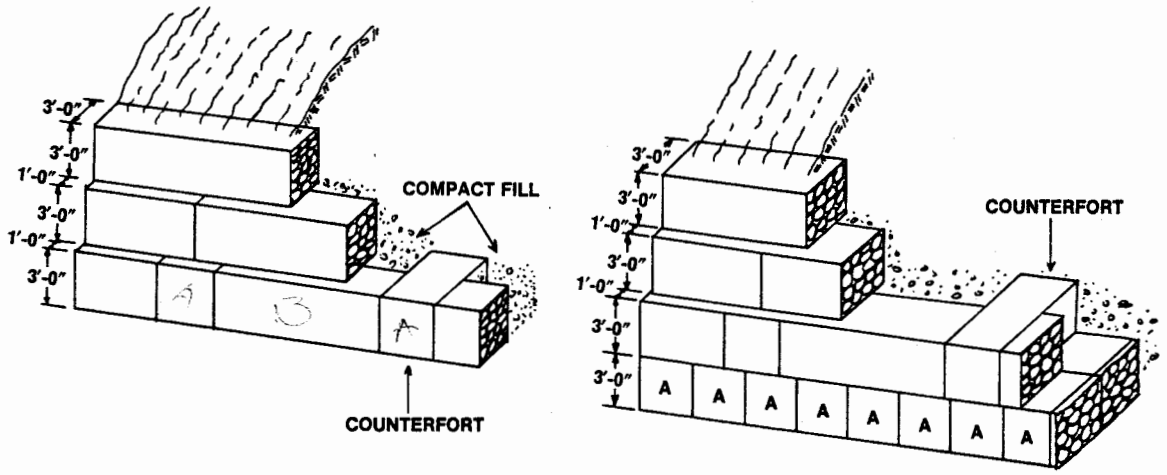
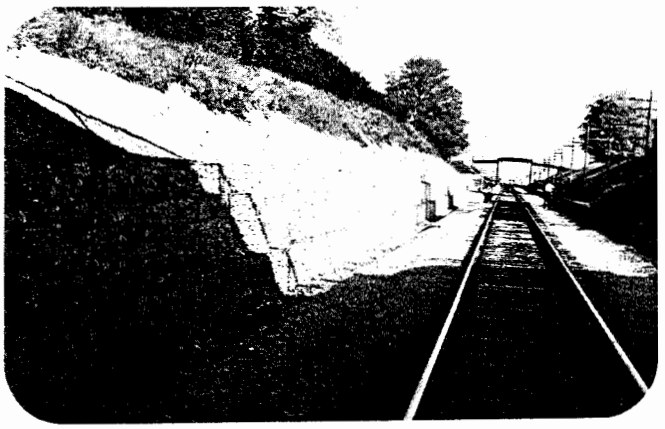
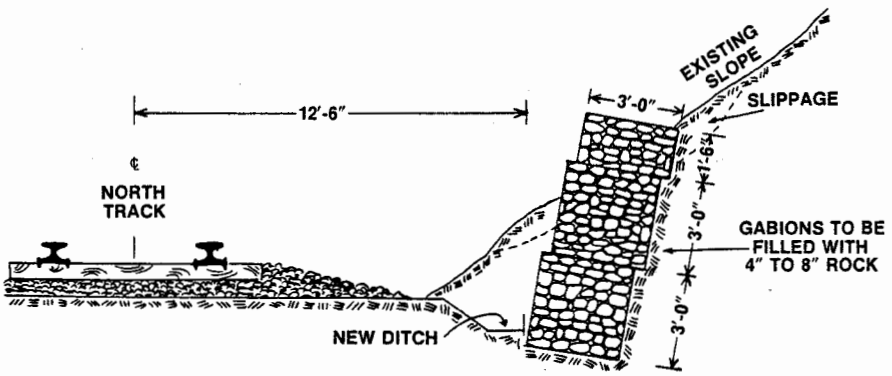


Fig. 39. Isometric views of gabion retaining walls show addition of counterforts. These should extend at least one gabion length beyond the slip circle of the bank.



Figs. 40 and 40A. Gabions are frequently used to stabilize slopes along the rights of way of railroads.

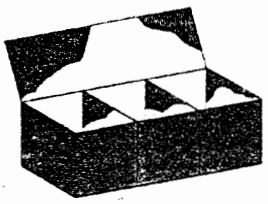


Welded Steel Wire Mesh Gabions & Gabion Mattresses
Conforming to ASTM A974-97
US Federal Specification QQ-W-461H Class 3, ASTM A-641, ASTM A-90, ASTM A-185

Gabions

Galvanized		PVC Coated	
3" X 3" (7.5 X 7.5 cm)	Mesh Opening	3" X 3" (7.5 X 7.5 cm)	
0.106" - US Gauge 12 (2.7 mm)	Mesh Wire	0.106" - US Gauge 12 (2.7 mm)	Plus PVC Coating
0.120" - US Gauge 11 (3.0 mm)	Mesh Wire	0.120" - US Gauge 11 (3.0 mm)	Plus PVC Coating
0.087" - US Gauge 13.5 (2.2 mm)	Lacing Wire	0.087" - US Gauge 13.5 (2.2 mm)	Plus PVC Coating
0.106" - US Gauge 12 (2.7 mm)	Spiral Binders	0.106" - US Gauge 12 (2.7 mm)	Plus PVC Coating
ASTM A-90	Zinc Coating	ASTM A-90	

Minimum PVC Coating Thickness 0.015" Per Side
Nominal PVC Coating Thickness 0.0216" Per Side



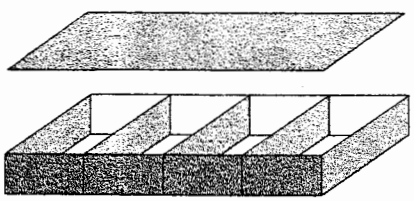
Letter Code	Length	Width	Height	No. of Cells	Capacity Cu. Yds.	Color Code
A	6'	3'	3'	2	2.00	Blue
B	9'	3'	3'	3	3.00	White
C	12'	3'	3'	4	4.00	Black
CC	12'	6'	3'	8	8.00	Blue/White
CF	12'	4.5'	3'	8	6.00	Red/White
D	6'	3'	1.5'	2	1.00	Red
E	9'	3'	1.5'	3	1.50	Green
F	12'	3'	1.5'	4	2.00	Yellow
G	6'	3'	1'	2	0.66	Blue/Red
H	9'	3'	1'	3	1.00	Blue/Yellow
I	12'	3'	1'	4	1.33	Blue/Green
II	12'	6'	1'	8	2.66	Blue/Black

Gabions also available in metric sizes.

Gabion Mattresses

Galvanized		PVC Coated	
1.5" X 3" (3.8 X 7.5 cm)	Mesh Opening	1.5" X 3" (3.8 X 7.5 cm)	
0.087" - US Gauge 13.5 (2.2 mm)	Mesh Wire	0.087" - US Gauge 13.5 (2.2 mm)	Plus PVC Coating
0.087" - US Gauge 13.5 (2.2 mm)	Lacing Wire	0.087" - US Gauge 13.5 (2.2 mm)	Plus PVC Coating
0.106" - US Gauge 12 (2.7 mm)	Spiral Binders	0.106" - US Gauge 12 (2.7 mm)	Plus PVC Coating
ASTM A-90	Zinc Coating	ASTM A-90	

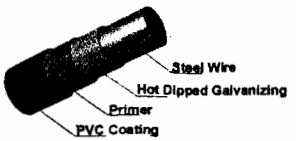
Minimum PVC Coating Thickness 0.015" per Side
Nominal PVC Coating Thickness 0.0216" per Side



Letter Code	Length	Width	Height	No. of Cells	Capacity Cu. Yds.	Color Code
Q	9'	6'	6"	3	1.00	White/Yellow
R	12'	6'	6"	4	1.33	White/Green
T	9'	6'	9"	3	1.50	Red/Yellow
U	12'	6'	9"	4	2.00	Red/Green
W	12'	6'	12"	4	2.66	Red/Black
X	12'	6'	18"	4	4.00	White/Black

Gabion Mattresses also available in metric sizes.

Typical Cross Section of Modular Gabion Wire



Modular Gabion Systems

Erosion & Flood Control Specialists

PO Box 9445, Houston, TX 77261-9445
(800) 324-8282 . (713) 924-4381 FAX Houston, TX Office
(334) 380-0332 . (334) 380-0746 FAX Mobile, AL Office

Letter Code	Length	Width	Height	Number of Diaphragms	Capacity Cubic Yards	Color Code
A	6'	3'	3'	1	2.0	BLUE
B	9'	3'	3'	2	3.0	WHITE
C	12'	3'	3'	3	4.0	BLACK
D	6'	3'	1'6"	1	1.0	RED
E	9'	3'	1'6"	2	1.5	GREEN
F	12'	3'	1'6"	3	2.0	YELLOW
G	6'	3'	1'	1	0.66	BLUE-RED
H	9'	3'	1'	2	1.0	BLUE-YELLOW
I	12'	3'	1'	3	1.33	BLUE-GREEN

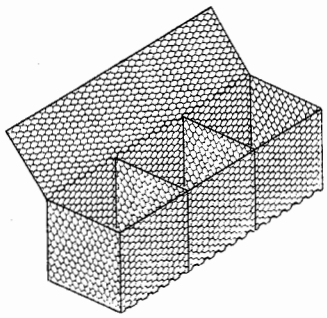
SPECIFICATIONS

	ZINC COATED	PVC COATED
Mesh opening	Hex. nom. $3^{1/4}$" x $4^{1/2}$"	Hex. nom. $3^{1/4}$" x $4^{1/2}$"
Wire for netting	0.1181" nom. diam.	0.1062" nom. diam. plus nom. 0.02165" PVC
Wire for selvedges	0.1535" nom. diam.	0.1338" nom. diam. plus nom. 0.02165" PVC
Wire for binding	0.0866" nom. diam.	0.0866" nom. diam. plus nom. 0.02165" PVC
Zinc coating	0.80 ozs. per sq. ft.	0.80 ozs. per sq. ft. plus nom. 0.02165" PVC

Minimum thickness of PVC coating shall be not less than 0.015".

Gabions

Also available in P.V.C. coated wire



Letter Code	Length	Width	No. of Thickness	No. of Cells	Area Square Yards	Capacity Cubic Yards	Color Code
Q	9'	6'	6"	3	6	1	WHITE-YELLOW
R	12'	6'	6"	4	8	1.33	WHITE-GREEN
T	9'	6'	9"	3	6	1.5	RED-YELLOW
U	12'	6'	9"	4	8	2	RED-GREEN

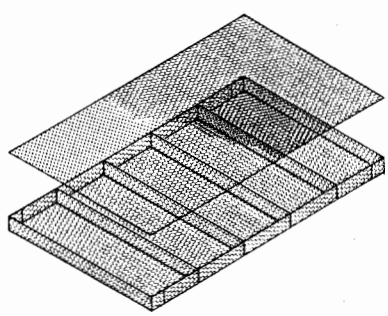
SPECIFICATIONS

	ZINC COATED	PVC COATED
Mesh opening	Hex. nom. $2^{1/2}$" x $3^{1/4}$"	Hex. nom. $2^{1/2}$" x $3^{1/4}$"
Wire for netting	0.0866" nom. diam.	0.0866" nom. diam. plus nom. 0.02165" PVC
Wire for selvedges	0.1062" nom. diam.	0.1062" nom. diam. plus nom. 0.02165" PVC
Wire for binding	0.0866" nom. diam.	0.0866" nom. diam. plus nom. 0.02165" PVC
Zinc coating	0.70 ozs. per sq. ft.	0.70 ozs. per sq. ft. plus nom. 0.02165" PVC

Minimum thickness of PVC coating shall be not less than 0.015".

Reno mattres

Also available in P.V.C. coated wire



Tolerances are in conformity with U.S. Federal Specification QQ-W-461H and A.S.T.M. A641.

HEL-COR CL saves time, money for Amtrak culvert reline job

Using HEL-COR CL to reline a culvert under an Amtrak line in Maryland last year proved a significantly better solution compared with the previous practice of using gunite, and the job made a believer out of a skeptical owner.

The project began in May, 1989, when Jerry Edwards, Senior Regional Sales Engineer, Mid-Atlantic Region, was asked by the Baltimore County, Maryland, Department of Public Utilities to recommend ways to repair a 160-foot-long, 72-inch-diameter tunnel liner culvert under Amtrak's mainline tracks at its Aero Acres property.

After 35 years of service, the invert of the liner was corroded and Amtrak, as part of its bridge and structures rehabilitation program, wanted the county to repair the installation and bring it up to current standards as required by the county's maintenance agreement with Amtrak.

County's objective: faster installation

Adjacent tunnels had been repaired with gunite, a process that typically took three to four weeks to finish a 160-foot-long tunnel. The county was looking for a faster, more economical solution.

The solution that Jerry proposed was a 60-inch-diameter, 12-gage HEL-COR CL Pipe made of Armco ALUMINIZED STEEL Type 2, and jacked or pulled through the existing tunnel. Because of HEL-COR CL's relatively light weight, a design based on HCCL was given to Amtrak for them to perform the installation and bill the county.

The Greencastle Plant fabricated the pipe and shipped it on September 22, 1989. The order included 2-inch grout holes, using Liner Plate couplings and plugs (three per 10-foot length at the 12, 3, and 9 o'clock positions), and special joint guides on the ends of pipe sections as they were pulled into place.

Installation made in only one shift

The entire 160-foot line was installed in one shift. Limited clearance precluded use of continuous rails to ride the pipe on, and it was pulled over the liner plate flanges. Grouting completed the installation.

On October 5, 1989, Larry Lewis, Area Construction Engineer/Baltimore for Amtrak, sent a letter to the Baltimore County DPW complimenting the agency for its selection of HEL-COR CL. His letter said:

"The operation went extremely well. I would like to compliment you on your research and recommendation of the use of concrete-lined corrugated steel pipe. I must admit I was very skeptical of its practical application. The dimensioning of the liner made it appear very fragile for this type of work. The application thoroughly expedited the labor requirements for installing the repair liner."

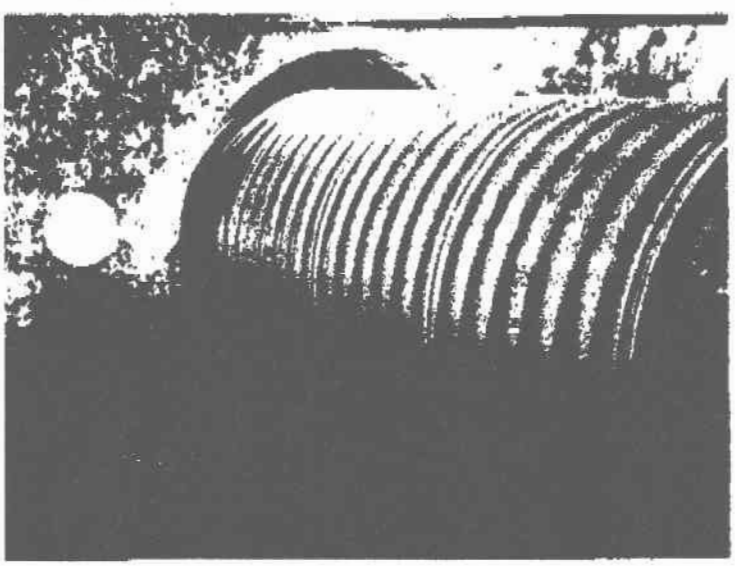
"The pipe proved to be extremely durable, and I would recommend its application on similar types of projects. It could even prove to be extremely useful

End view of HEL-COR CL Pipe on rails outside the culvert to be relined. Note special joint guides on the pipe end.

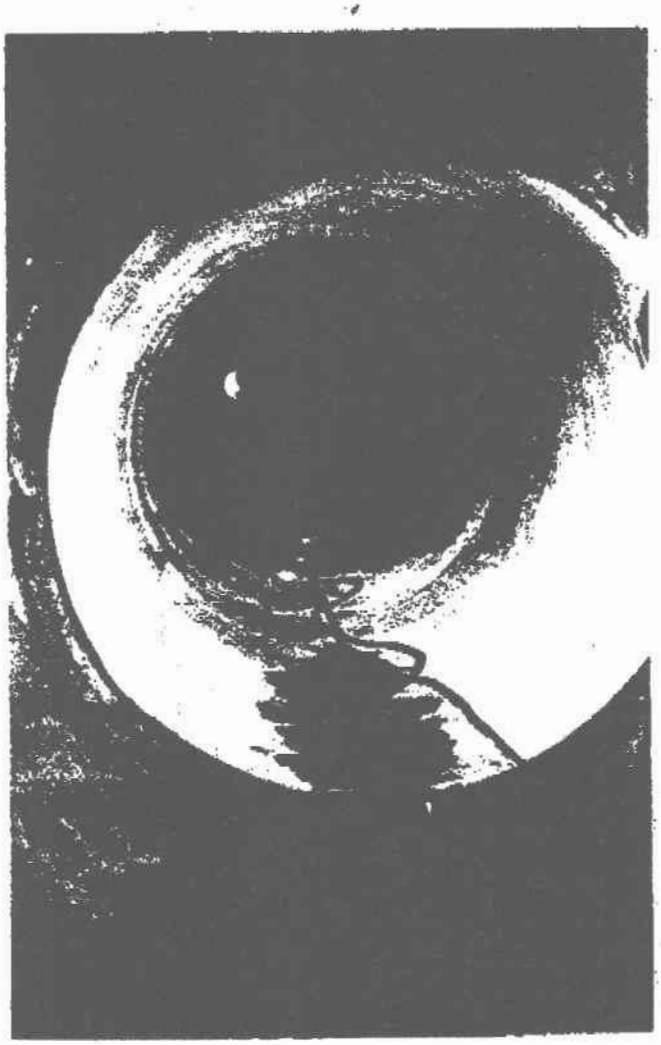
Side view of HCCL section entering the vert.

Photos by Jerry Edwards

Note the grout hole at the 9 o'clock position.



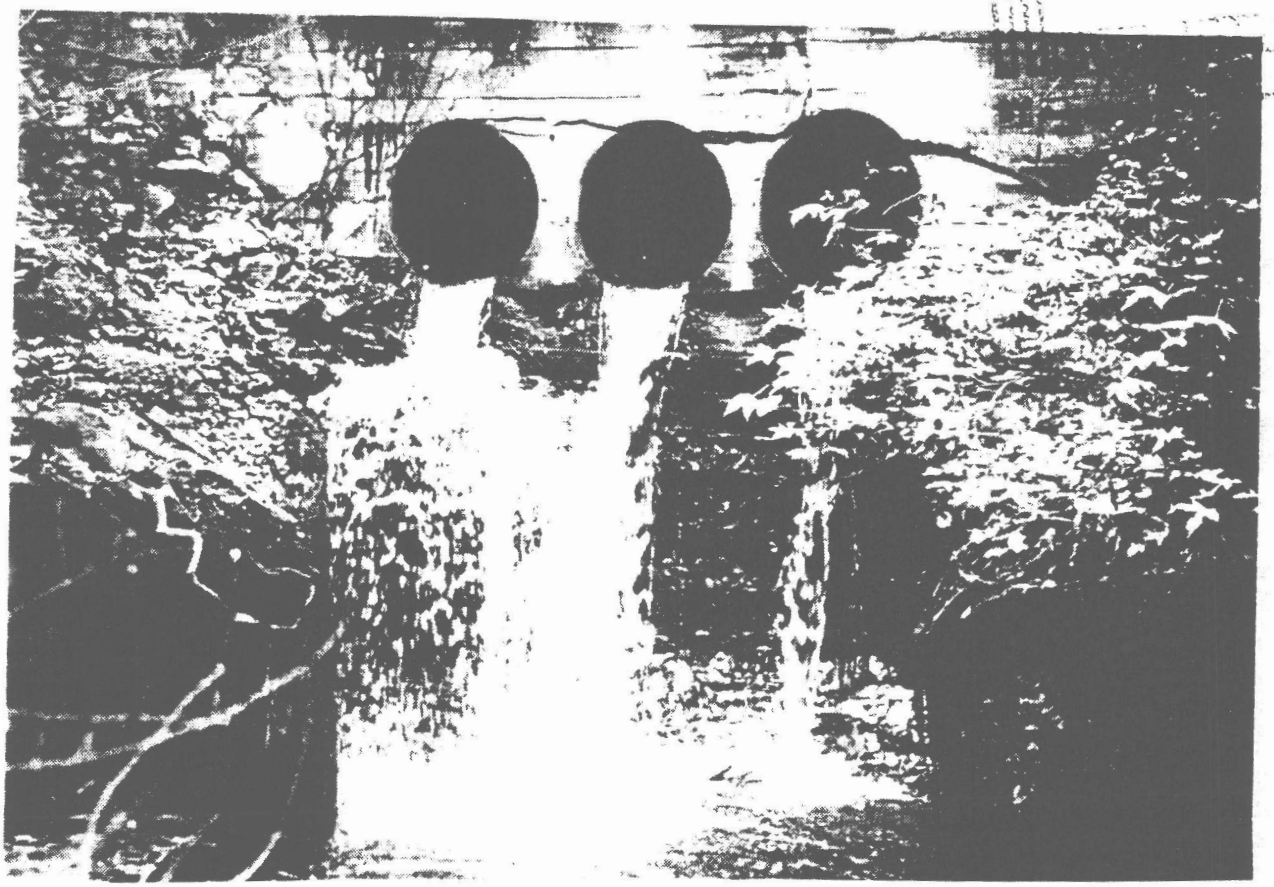
on new storm water management projects."

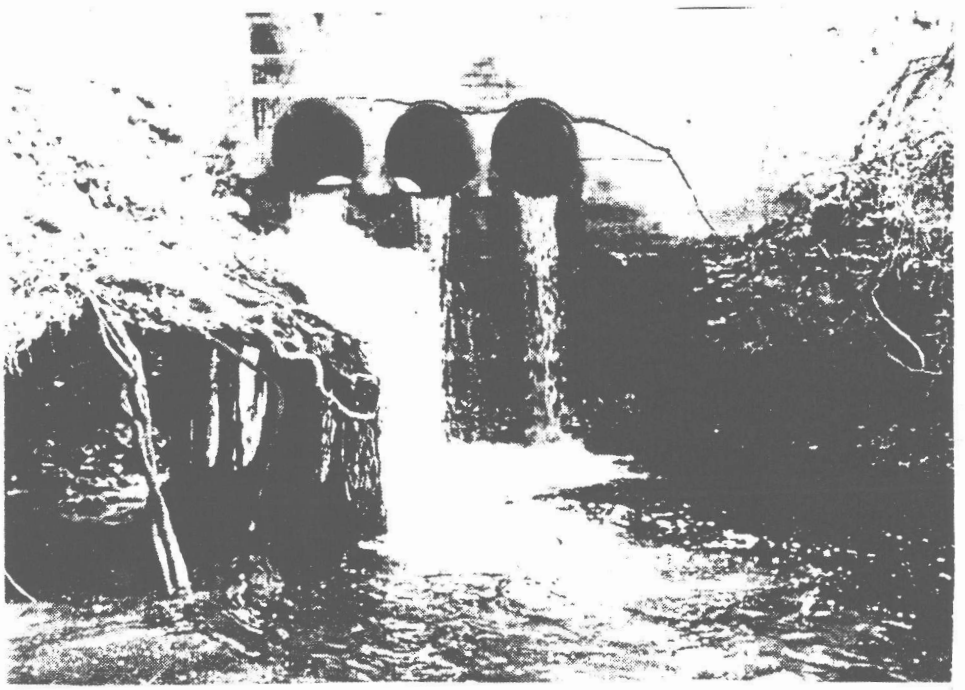


View from termination end of several lengths of pipe pulled into alignment. Note the excellent condition of the lining and the cable leading to the installation end.

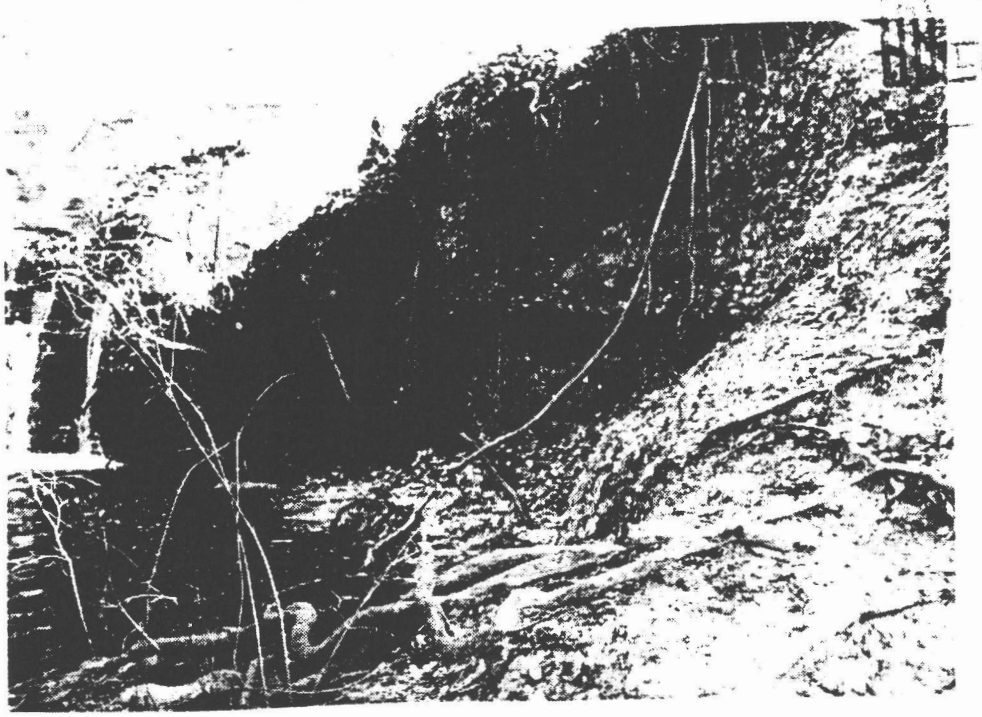
Please provide comments by 1/4/93 — this will go to wetlands Board in Jan.

Jack





LAKE POWELL DAM
TIDAL SIDE



LAKE POWELL DAM
NON TIDAL SIDE

The first encounter they found with salinity of any measurable quantity was down around Chickahomony Haven at the Marina. This occurred during the Fall months following some extended dry weather. They didn't have any flood flows through any of the creek systems at that time. He further stated that was fairly indicative of a dry situation where salt could begin to migrate up into the system. This was approximately ten miles away from the site. He stated that during a special use permit hearing they did some calculations using the VIMS Salinity Model for the James River, and found that the expected withdrawals at the golf course site might have an impact of one meter in the salt wedge. He stated that the salt in the James River System migrates sixty kilometers in any given year. He stated that he feels that this type of withdrawal is so minute that it wouldn't have an impact.

Ms. McCleary stated to Mr. Boyd that Mr. Penland was right when he stated that the Williamsburg Environment Group was being paid to advocate this project. She stated that she would be more comfortable if she had someone who is an impartial judge of these things to be certain there would be no impact. She stated that she is personally uncomfortable with granting the permit until she had more objective information.

Mr. Kelly asked to speak and stated that she did have scientific and technical advice from VIMS. He stated that VIMS reviewed this project and if they felt there would be a local impact of tidal wetlands they would have brought it out in their comments.

Mr. Lindsey stated that he agreed with Mr. Hughes that the board need concern themselves only with the wetlands involved.

The motion to grant the permit was carried 4 to 1 with Ms. McCleary dissenting.

W-39-92; Florence P. Adsit

Mr. Farmer presented the staff report saying that Colonel Herbert Bell as agent, on behalf of Mrs. Florence P. Adsit, owner, has applied for a wetlands permit to install 200 Square feet of riprap revetment and fill for repair of the Lake Powell spillway. The site is on the southern end of the dam along Lake Powell Road and is identified as the southern boundary of parcel (1-31) found on James City County Real Estate Tax Map (47-4). The site is at the beginning of the tidally influenced portion of Mill Creek. He

stated it is the applicant's desire to undertake some limited repair of the spillway and outfall to prevent failure of the dam and resulting drainage of the lake. Substantial erosion of the downstream area has occurred to the point that the headwall has leaned away from the dam, has had its structural support completely undermined, and presently appears to be supported mainly be cantilever action of the 3 pipes. Several large cracks have appeared in the concrete headwall. He stated that ideally, any project undertaken should only be done consistent with the following factors:

-The area of wetlands disturbance should be limited to the minimum absolutely necessary to accomplish the project

-The frequency of disturbance to the wetlands should be limited to an absolute minimum, and if possible be only once for permanent repairs

-Work done should not cause increased damage to the wetlands environment.

Mr. Farmer stated that after evaluating those factors in relation to the proposed project it was staff's belief that this project would not prevent further degradation of the spillway and would likely result in additional damage to tidal wetlands due to continued scouring. Additional disturbance is also likely when further repairs have to be made in the immediate future. However, staff was unable to say whether the additional damage caused by this work proposal would be more than the damage which might be caused by catastrophic failure of the dam and spillway. He also stated that staff believed that construction of a proper energy dissipation device would be necessary, and when done would likely result in disturbance of greater wetlands area than shown on the application, but would prevent further erosion and damage downstream. He stated that staff supports any undertaking to save Lake Powell and prevent further damage, but does not recommend support of this specific project. He recommended several conditions for the board to consider if they wanted to grant a permit.

Mr. Hughes questioned Mr. Farmer about Colonel Bell's letter.

Mr. Lindsey opened the public hearing.

Mr. Hughes stated that any help to save Lake Powell was certainly supported by the Wetlands Board.

Colonel Herbert Bell, agent and close friend of Mrs. Adsit, stated his concern for Lake Powell. He also stated that Mr. Dellinger, the contractor for this proposed project, is here with him. He stated he had received a phone call from a gentleman with the Corps of Engineers and his comments were along the lines of Mr. Hughes's question about dewatering. He stated that he explained the dewatering process to this gentleman and that it was understood. Colonel Bell stated that the VMRC had received comments back from the Health Dept., Historic Resources, Conservation of Recreation, and VDOT stating that each had no objections to accomplishing the project as submitted. He stated that he had received no response from VIMS and the Virginia Game & Inland Fisheries to date. He also stated that he realized this project was only a temporary repair and that it would not necessarily be something that would solve the problems of Lake Powell forever, but that there are resource limitations and he felt that those things had been considered. Colonel Bell said there are things that had been suggested that could extend the life of the repair by reducing the amount of undercut, and certainly the elimination of heavy transportation of trucks or vehicles across that area would help.

Mr. R. E. Gilley stated that he and his wife reside at 227 Gatehouse Blvd. He stated that they live on Mill Creek, which is approximately 600 yards from the spillway at Lake Powell. He further stated that he and his wife own approximately 100 acres of marsh land in Mill Creek. Mr. Gilley respectively asked that the Wetlands Board deny Mrs. Adsit's application for this permit because it was inadequate and would only be a temporary solution to the problem. He stated that he felt it would be a hazard for his land and possibly for himself and his family. He further went on to read from documentation that he had obtained as well as from letters he had received from the Department of Conservation and Historic Resources and the Virginia Department of Game & Inland Fisheries stating that the owner of the land in which the dam was erected is responsible for any damage or injury incurred to adjacent property.

Mr. Spencer Adsit, son of Mrs. Adsit stated that they are only proposing a repair of the spillway. He stated that all of the fill and the riprap would be concreted down. This proposed project is what they could afford at this time.

Mr. William Matthews stated that he supports the repair of the dam.

Mr. Gerald Mephanm stated that The Virginia Department of Transportation had abandoned the Road and that he was in support of repair to the dam.

Mitchell Norman stated on behalf of Virginia Department of Game & Inland Fisheries that they did not foresee any problems with spawning and that he was in favor of the proposed repairs also.

Mr. Gussman questioned Mr. Norman as to any fish kill with the concrete being used to hold the riprap.

Mr. Norman stated that he didn't feel that this concrete would have an ill effect.

Mr. Farmer stated some facts referring to the concrete and how it could affect the fish.

Mr. H. R. Dellinger stated that he is the contractor hired to do the proposed project and described the work to be done and the machinery to be used in doing the work. He also commented on the additional cost of using the filter fabric, the graded course granular material and the Class II material as opposed to what had been proposed.

Mr. Edwin Gilley stated his feelings against the spillway repairs and questioned who would be at fault if damage was incurred by the heavy machinery needed to place the riprap.

Mr. Lindsey closed the public hearing.

Ms. McCleary stated she cannot judge exactly how much wetlands is being impacted by this project. She stated that she doesn't see how she could support the project because she does not have a clear understanding of the proposed project.

Colonel Bell stated that the undercut is actually 1/2 of what it looks in the pictures.

Ms. McCleary stated that with one good drawing that matched what the photographs showed, she would be able to better judge what was being impacted.

Mr. Hughes stated that he agreed with Ms. McCleary, but his concern is with the crushed concrete to be used.

Mr. Cobb stated that he feels that "doing something as opposed to doing nothing is better."

Ms. McCleary proposed that the board grant time for Colonel Bell to come up with better, more accurate drawings, and also resolve some of the problems such as the proposed crushed concrete.

Colonel Bell stated that it would cause more of a financial burden on Ms. Adsit and that he would not request a continuation.

Mr. Gussman questioned Colonel Bell asking if the board were to adopt the project with staff's suggestions if he would still be able to carry out the project.

Mr. Farmer commented that he had no objection to omitting items three and four of staff's recommendations. He stated that the board should give serious consideration to items one and two because those items are an attempt to limit any damage that may occur from the activity.

Mr. Hughes stated that he believed that Colonel Bell and staff could work on these recommendations so that they would not have to come back out in another two years and do the work over again. He further stated that he would have to go with staff's recommendation that crushed concrete not be used.

Mr. Hughes made a motion that the board accept staff's recommendations, deleting items three and four.

Mr. Lindsey granted a five minute recess.

Mr. Lindsey reconvened the meeting at the end of the recess.

Colonel Bell stated that he, as well as his colleagues, would have no problem proceeding with the project with staff's recommendations, omitting items three and four.

Ms. McCleary questioned Mr. Farmer in reference to his foreseeing any problem with the use of heavy equipment reaching down to place riprap.

Mr. Farmer stated that the work could be done.

Ms. McCleary commented that she felt that it was not a good idea for the board to set a precedent of approving a project that was so ill defined in the application.

Motion was carried 4 to 1 with Ms. McCleary dissenting.

E. MATTERS OF SPECIAL PRIVILEGE

Mr. Farmer stated that the annual wetlands symposium is to be held on February 20, 1993 at the Hampton University Marine Science Center and that staff needs to know who will be attending by the end of January.

Mr. Farmer briefly described the new amendments to the Wetlands Ordinance.

F. ADJOURNMENT

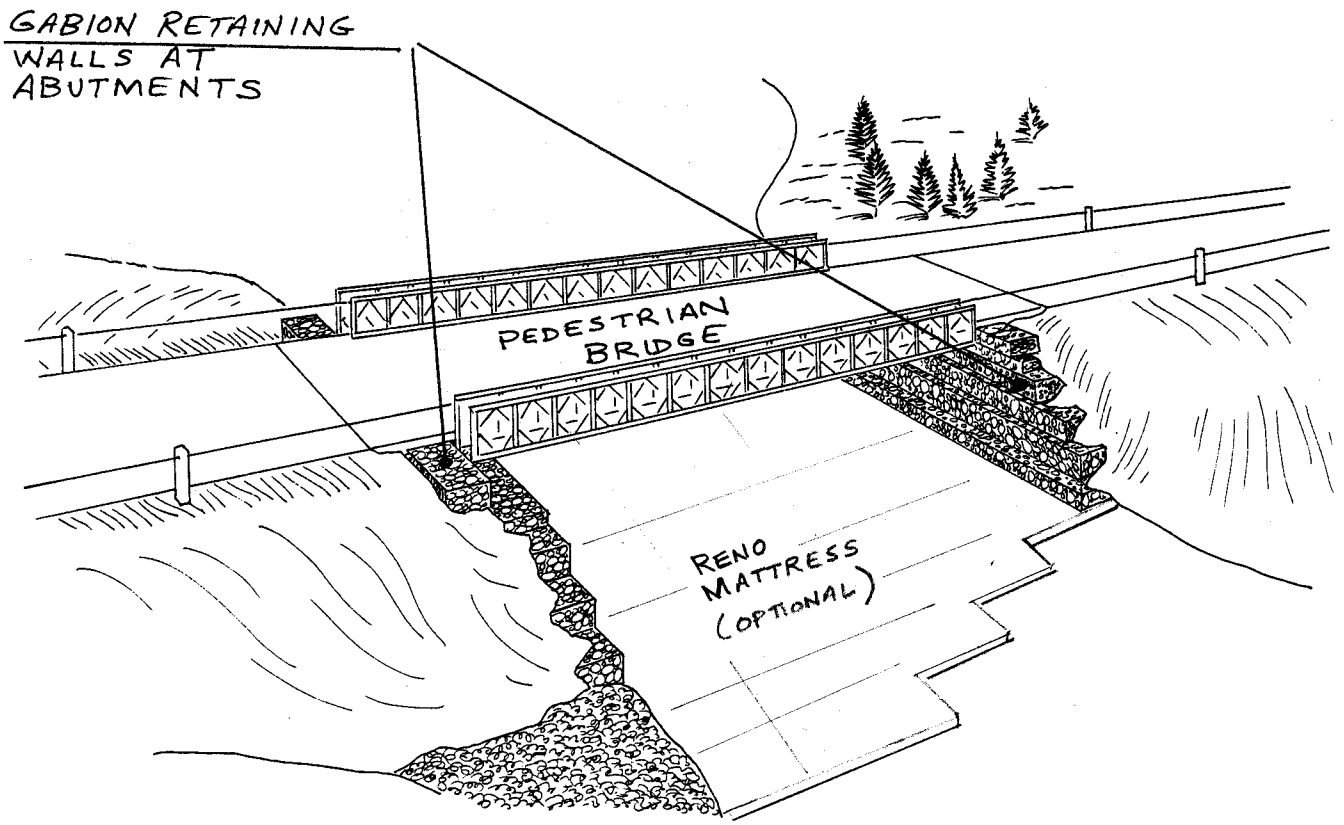
Mr. Lindsey adjourned the meeting at 9:37pm.

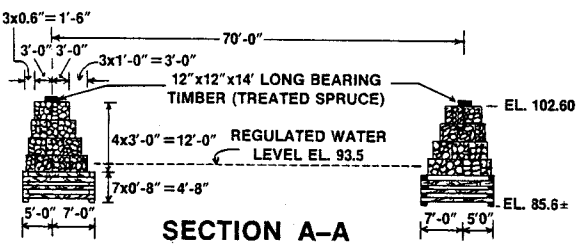
Henry Lindsey
Chairman

Bernard M. Farmer, Jr.
Secretary

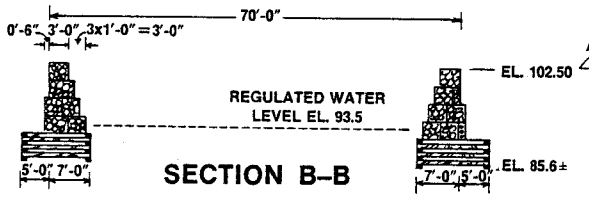
IDEA for Slope/Erosion Control at Abutments. Gave copy to Wayland.

LAKE POWELL PEDESTRIAN BRIDGE AT EMERGENCY SPILLWAY

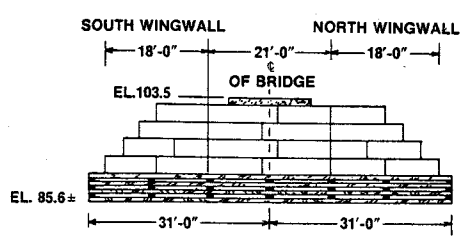




SECTION A–A

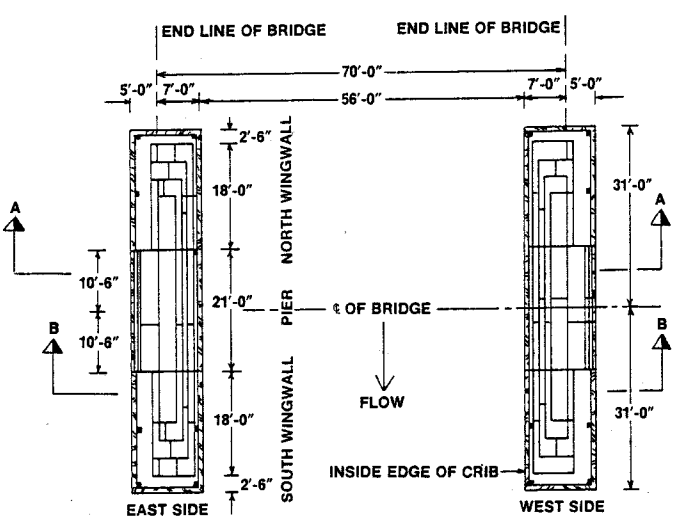


SECTION B–B



ELEVATION OF EAST STRUCTURE

* NOTE: DIMENSION NOT FOR PROJECT.



PLAN OF PIER AND WINGWALLS

2/28/00

John Philipi - DCR Dam Safety

How to anchor blocks into the ground

- sliding failure
- overturning failure

Dowel into the strata below

Shale underlayment peels off in chunks

Joints grouted tight

Fill everything w/concrete

Dowel blocks together

Use PVC pipe for drain - avoid sharp bends - use 45° or 22½° bends

- don't recommend bottom drains - 5-6' below surface

Drill holes into blue marl - 2" ø - relatively small

¾" to 1" bars concrete - 2 feet into ground - solid matl.

Geotechnical calculations for sliding

review whole dam design

every 12'x8' spacing - every other block length wise - every 4th block sidewise

Recommends removing trees -

root mass got saturated

tree mass caught wind + pulled root mat out

- particularly downstream slope

Inform us of their decision about what they are going to do w/ the recommendations

cc BOS, Sandy

Addl comments by State

JAMES CITY COUNTY - ENVIRONMENTAL DIVISION

Office Phone: 757-253-6670 Fax Number: 757-259-4032

DATE SENT: 03/02/00

Name: RANDY COOPER

Firm or Company:

Facsimile Number: 253-7568

Number of pages including this transmittal: 4

From: SCOTT J. THOMAS

James City County
P O Box 8784
Williamsburg VA 23187-8784

Comments:

AS DISCUSSED, LAKE POWELL PROJECT.

If you do not receive all pages, call 757-253-6670 as soon as possible

SCOTT J. THOMAS, P.E.
CIVIL ENGINEER

ENVIRONMENTAL DIVISION

101 MOUNTS BAY ROAD, P.O. BOX 8784 (757) 253-6639
WILLIAMSBURG, VIRGINIA 23187-8784 FAX: (757) 259-4032
E-MAIL: scottt@james-city.va.us

DEVELOPMENT MANAGEMENT

101-E MOUNTS BAY ROAD, P.O. BOX 8784, WILLIAMSBURG, VIRGINIA 23187-8784
(757) 253-6671 Fax: (757) 253-6850 E-MAIL: devtman@james-city.va.us

CODE COMPLIANCE
(757) 253-6626
codecomp@james-city.va.us

ENVIRONMENTAL DIVISION
(757) 253-6670
environ@james-city.va.us

PLANNING
(757) 253-6685
planning@james-city.va.us

COUNTY ENGINEER
(757) 253-6678

INTEGRATED PEST MANAGEMENT
(757) 253-2620

February 10, 2000

Mr. Joe Haugh
Dam Safety Program
Division of Soil and Water Conservation
203 Governor Street, Suite 206
Richmond, VA 23219

RE: Lake Powell Dam Repair

Dear Mr. Haugh:

Lake Powell Dam in James City County failed during Hurricane Floyd when we received 17 inches of rain in about 28 hours. As the dam is less than 25 feet in height, I understand that the dam is not regulated under Virginia's Dam Safety Program. However, as we discussed on the telephone, I appreciate your willingness to do a cursory review of the proposed repair to the Lake Powell Dam.

I have enclosed copies of the proposed repair for your comment. Essentially, the repair consists of a concrete structure constructed of large interlocking concrete blocks that will fill in the breach and act as the principal spillway. The previous spillway that served as both the principal and emergency spillways will be repaired and will function as an emergency spillway. There is no downstream hazard associated with the dam. However, when the dam failed, it caused a portion of Jamestown Road (SR 31) to wash out. The road crossed the lake as a causeway with a relatively small box culvert to allow passage of water from the upper into the lower section of the lake. The repair of the road is nearing completion with a bridge crossing replacing the causeway.

Again, I appreciate your willingness to review the repairs proposed by the lake owner. We have reviewed the plan as well and I included our comments for your information. If you need any additional information, please feel free to contact me at 757-253-6673.

Sincerely,

Darryl E Cook

Darryl E. Cook, P.E.
Environmental Director

ENGAGEMENT LETTER

December 10, 1999

We, the undersigned, being all the owners of Lake Powell in James City County, Virginia do hereby authorize H. R. Dellinger to make repairs to the breach in the dam. We further appoint Randall K. Cooper to act as project coordinator.

It is understood and agreed that Florence P. Adsit will assume responsibility for payment of the repair.

Florence P. Adsit

Florence P. Adsit

Lee A. Reed

Lee A. Reed

Stanley H. Powell

Stanley H. Powell

I am not financially obligated in any way

Dec. 14, 1999.

November 8, 1999

You have permission to repair the dam at Lake Powell. However, not responsible for the cost of construction or any associated legal fees. Also, not liable in anyway for any occurances resulting during or after construction.

* ~~Stanley W. Powell~~ → witnessed Dr. Powell's signature on 11/8/99 James K. Powell

* Mark R. Powell

ENVIRONMENTAL DIVISION REVIEW COMMENTS
LAKE POWELL DAM REPAIR PROJECT
February 1, 2000

These comments pertain to the proposed work plan dated Winter of 1999-2000 as prepared by Randall K. Cooper, acting project coordinator and liaison with James City County.

General Comments:

1. It appears that land disturbance at the dam repair site and borrow and waste disposal sites will exceed 2,500 square feet for this project; therefore, an approved Erosion & Sediment Control Plan and Land Disturbing Permit will be required for this project. Due to the nature of this project, a surety instrument will not be required for the permit.

Erosion & Sediment Control Plan:

2. Rock Construction Entrances. Specify that rock construction entrances in accordance with the Virginia Erosion and Sediment Control Handbook, Minimum Standard 3.02, are required at all access points to public or paved roads for the dam repair site and borrow/waste areas.

3. Sealed Rock Check Dams. The clay-sealed rock check dam (cofferdam) method appears acceptable to prevent base flow from entering the embankment repair zone. However, it was also anticipated that dewatering (pumping) operations will be required to remove surface and seepage water from the work zone. Specify what erosion and sediment control structures will be utilized to filter sediment from the pumped water (ie. filtering pits, bags, etc.).

4. Borrow Material. It was estimated that up to 3,500 cubic yards of compacted material may be required to fill the space between the new concrete structure and the existing dam embankments. Provide further information as to where this borrow material is to originate from and erosion and sediment controls anticipated for that offsite operation.

5. Waste Material. Due to the nature of the dam failure, it is expected that a large quantity of unsuitable material will be present from the existing repair zone surface layer to an identified "acceptable sound base". Provide further information as to where this excavated (unsuitable) waste material is to be disposed of and any erosion and sediment controls anticipated for that offsite activity.

Other Suggestions:

(Note: The following are suggestive comments pertaining to the planning, design, construction or function of reconstructed facilities as presented in the Lake Powell Dam Repair Project work plan and are not required for erosion and sediment control plan or Land Disturbance Permit review, approval or issuance. The comments are for consideration by the owners/contractor, however, incorporation of these comments should result in an improved, longer lasting dam repair.)

6. Anti-Seep Collars/Anchors. It is recommended that at least two (2) sets of concrete seep-anchor collars be extended outward from each side of the mass concrete channel block structure to prevent piping from along contact areas, specifically the concrete block/engineered fill interface and the engineered fill/existing embankment interface. In addition to preventing seepage and piping, the concrete seep-anchor collars should extend into the existing earthen embankment to serve as anchors for sliding stability. The anchors will reduce susceptibility of the entire repair zone from sliding due to hydrostatic forces associated with the dam and due to non-homogenous characteristics between the engineered fill (cohesive type) material and the existing embankment (cohesionless type) material. The concrete seep-anchor collars should be constructed as monolithic extensions of the concrete block structures to the greatest extent possible using drilled dowels, concrete pours, etc.

7. 8 inch Drain. It is recommended that an 8 inch drain be incorporated into the repair plan. The drain would serve for future interim drawdown purposes, if required for general maintenance or inspection of the block structure, and as a potential water sampling point for the impoundment pool. The drain could consist of 8 inch ductile iron, push-on joint pipe, Class 50, meeting the requirements of ANSI/AWWA C150 and C151 and C104/C111. A gate valve meeting the requirements of ANSI/AWWA C500 (for water and sewage systems) could be placed on the downstream side of the 8 inch drain for shutoff control and throttling purposes. The valve should be enclosed in a minimum 3.5 foot deep VDOT MH-1 type concrete manhole or an equivalent buried vault structure. The purpose of the manhole/vault structure would be to prevent valve vandalism, provide for accessibility if maintenance or normal replacement of the valve is necessary and to reduce the potential for valve corrosion and freezing. The inlet side of the drain could be located at (through) the proposed wingwall and should be provided with a simple small cage-type trash rack on the inlet end.

   Temporary Use of the Drain. Once installed, the 8 inch drain could also be used during construction by extending the drain from the proposed wingwall location to and through the upstream clay-sealed rock check dam. The pipe could serve as a temporary constant drawdown orifice for the permanent pool which will start to backup once the upstream cofferdam is installed. In addition, a simple wye fitting could be temporarily attached to the end or any upper section of the 8 inch drain to direct pumped water from the excavation (work zone) area, if needed, instead of placing discharge hoses through the downstream work zone. Once work is completed and prior to removal of the upstream cofferdam, the extended portion of the pipe can be trimmed to the proposed wingwall. The drain could also be easily flushed clean of any sediment following its use as a temporary diversion for runoff or pumped water.

8. Embankment Fill. Provide information on how the proposed "fill dirt" material will be keyed into both sides of the existing dam embankment. The "fill dirt"indicated between the existing earthen embankment and the new concrete structure should consist of material suitable for dam construction and compacted in accordance with standard accepted engineering practice for dam embankments (95% of Standard Proctor recommended). It is highly recommended that a professional engineer, qualified in the design and construction of dam structures, be present to observe and certify the existing soil subgrade beneath the mass concrete structure prior to fill placement and that proper testing, monitoring, placement and compaction of surrounding fill material is achieved.

G:\LakePowell.conc

ENVIRONMENTAL DIVISION REVIEW COMMENTS
LAKE POWELL DAM REPAIR PROJECT
February 1, 2000

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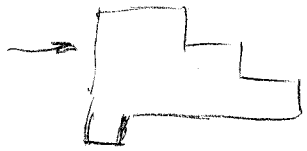
Erosion & Sediment Control Plan:

2. Rock Construction Entrances. Specify that rock construction entrances in accordance with the Virginia Erosion and Sediment Control Handbook, Minimum Standard 3.02, are required at all access points to public or paved roads for the dam repair site and borrow/waste areas. - only trucks on hard surface - may need a turnaround
3. Sealed Rock Check Dams. The clay-sealed rock check dam (cofferdam) method appears acceptable to prevent base flow from entering the embankment repair zone. However, it was also anticipated that dewatering (pumping) operations will be required to remove surface and seepage water from the work zone. Specify what erosion and sediment control structures will be utilized to filter sediment from the pumped water (ie. filtering pits, bags, etc.). - only pump upstream - any discharge ds
4. Borrow Material. It was estimated that up to 3,500 cubic yards of compacted material may be required to fill the space between the new concrete structure and the existing dam embankments. Provide further information as to where this borrow material is to originate from and erosion and sediment controls anticipated for that offsite operation. - will be purchased commercially
5. Waste Material. Due to the nature of the dam failure, it is expected that a large quantity of unsuitable material will be present from the existing repair zone surface layer to an identified "acceptable sound base". Provide further information as to where this excavated (unsuitable) waste material is to be disposed of and any erosion and sediment controls anticipated for that offsite activity. - All excavation will be used for backfill - not transported

Other Suggestions:

(Note: The following are suggestive comments pertaining to the planning, design, construction or function of reconstructed facilities as presented in the Lake Powell Dam Repair Project work plan and are not required for erosion and sediment control plan or Land Disturbance Permit review, approval or issuance. The comments are for consideration by the owners/contractor, however, incorporation of these comments should result in an improved, longer lasting dam repair.)



- may put in a cutoff trench as an anchor

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Erosion and Sediment Control Preconstruction Meeting Checklist

Project: Lake Powell Dam Repair Date: 4/24/00 Time: 8:30 (AM)/PM

Permittee: _____ Address: _____

Contractor: _____ _____

1. Phasing of Erosion and Sediment Control Practices

   A. Narrative Plan

   B. Contractor-Developed Sequence of Construction

2. Installation Procedure for Erosion and Sediment Control Practices

_____ Construction Entrance	_____ Outlet Protection
_____ Silt Fence	_____ Sediment Traps
_____ Straw Bale Barrier	_____ Sediment Basins
_____ Rock Check Dams	_____ Diversions
_____ Inlet Protection	_____ Soil Retention Matting
_____ Paved Channels	_____ Mulching
_____ Temporary Seeding	_____ Permanent Seeding
_____ Other	_____ Storm Drainage System

3. Inspection and Enforcement Procedures

   A. Permittee/Contractor Inspections _____

   B. County Inspections _____

   C. Enforcement Actions _____

      1. Informal Contact _____

      2. Inspection Report _____

Erosion and Sediment Control
Preconstruction Meeting Checklist

3. Notice to Comply _____

4. Legal Proceedings _____

4. Limits of Clearing, Tree and Other Critical Areas Protection Measures Inspection

A. Clearing limits properly flagged? ☐ Yes ☐ No

B. Color of flagging _____

C. Tree Preservation/Critical Areas protected adequately? ☐ Yes ☐ No

D. Color of Flagging _____

E. Tree Preservation/Critical Areas Protection Measures, Type _____

5. Attendees - Identify Contact Person for Erosion Control

Signature: R.R. Cooper Pres- Friends of Lake Powell Inc

Printed Name: Randall Cooper 229-5150
H P Dellinger Beeper 820-5122

Company Affiliation: _____

Address: _____

_____

Phone No.: _____

6. Comments: _____

_____

_____

_____

County Agent: _____ Date: _____

Title: _____

espolicy.frm

Interim Environmental Division Report for the Lake Powell Dam Repair Project

Here is a brief summary of construction activities for the Lake Powell Dam Repair project from Environmental Division staff and some warranted concerns and recommendations based on our cursory field observations.

Brief History

January 2000	County initial review of work plan for the dam repair project.
February 1st 2000	County prepares initial comments on project. Holds workshop meeting with Contractor (HR Dellinger) and Randall Cooper (Acting Project Coordinator). General discussion of erosion and sediment control plan and engineering recommendations for the work plan.
February 10th 2000	Env. Div. forwards copy of work plan to Division of Dam Safety for cursory review.
February 28th 2000	Env. Div receives response from Division of Dam Safety (Mr. Jon Phillippe) via telephone.
March 2nd 2000	Env. Div. prepares comment letter to Randall Cooper. Comments from Division of Dam Safety incorporated into County review letter.
April 13th 2000	Response from Randall Cooper. Some of the recommendations from the County/State will be considered and incorporated in repair plan but not all.
April 24th 2000	Preconstruction meeting held for project. Issuance of Land Disturbance Permit # 00-75 for project. Bond amount waived. Construction begins.

Erosion & Sediment Control Inspections

Since the preconstruction meeting and start of construction, approximately 18 general inspections were performed by Gerry Lewis and Mike Woolson, Engineering Inspectors for the Environmental Division. The general inspections were performed to ensure adequate implementation of erosion and sediment control for the land disturbance portions of the project per the Chapter 8 Erosion and Sediment Control ordinance.

Engineering Inspections

Since the start of construction, Darryl Cook, P.E. and Scott Thomas, P.E. performed several cursory visits to the site. Most recently, two engineering inspections were performed on August 2nd and August 25th by Scott Thomas. The engineering inspections were cursory in nature and were performed to monitor structural and stormwater related activities as they relate to standard accepted practice for engineering and construction of dams. Staff was not officially instructed or formally involved with engineering or construction inspections for the project, nor obligated to provide professional geotechnical advice to the Contractor during construction.

Inspection Summary

From an ***erosion and sediment control*** standpoint, the control plan for the project is currently deficient, especially on the downslope portion of the work area. Adjacent runoff and overflow from the lake has not been controlled nor properly dealt with via cofferdams or diversions. Downslope silt fence is not adequately filtering runoff from the disturbed area and seepage was observed along the new concrete structure. No outlet protection is present at the end of a temporary small diameter PVC pipe being used

to collect and drain the observed seepage. In addition, no outlet protection is present to control scour at the outfall of a large 8 inch PVC pipe (and valve) which was incorporated into the design to serve as a drain for the lake pool. This drain was discharging at full flow directly into Mill Creek. The outflow from this drain is creating a scour hole which is slowly undercutting into the downstream toe of the dam repair zone.

From an ***engineering*** standpoint, two critical observations are noted related to repair activities. These observations include seepage along the new concrete structure and improper fill placement within the repair zone. These issues were items of primary concern prior to construction during the initial review of the project (comments # A and # C from the March 2nd letter) and based on our most recent construction inspections, these two items continue to be of primary concern.

Seepage was observed along the concrete block/soil fill interface and along interior vertical and horizontal (bottom) joint sections of the new concrete block structure. Seepage from these three locations combine at the end of the new concrete structure and is being temporarily collected by a PVC pipe and conveyed to Mill Creek. For a relatively "dry" weather day, observed seepage was quite significant. Based on some rough flow channel measurements and conversions, combined seepage from along the structure approaches approximately 30-35 gallon per minute. If not controlled in a standard accepted fashion, a seepage condition of this kind can result in internal and subsurface erosion within the embankment portion of the dam repair and result in failure by "piping". Piping is well documented to be a leading cause of dam failure.

Improper fill placement was also observed within the repair zone. There is no indication that the replacement fill is a proper soil material type for dam construction or if the material is being "zoned" with a relatively impervious inner zone (or core) and an outer shell of more pervious material to provide for stability. There is also no visible indication that the replacement fill material in the repair zone is being properly "keyed" in to the existing embankment nor if the replacement fill material is being compacted properly. No compaction equipment was present on-site and there were no visible signs that the replacement fill was being compacted in layers or if the lifts were properly tested for compaction and moisture content. Compaction is an essential component for the construction of earth fill dams. Compaction generally increases strength and resistance to erosion.

<u>Recommendations</u>

Additional erosion and sediment control measures are required to control lake flow and surface runoff through the disturbed area and to prevent scour to the downstream embankment toe at the temporary and permanent PVC pipe outfalls. Also based on our engineering observations, the combination of seepage along the new concrete structure and improper fill placement conditions as previous stated could likely result in subsurface erosion and failure of the embankment in the repair zone. It is highly recommended that the Owner/Contractor retain the services of a qualified professional engineer to design and implement seepage control measures along the new concrete structure and downstream toe and to monitor and ensure proper placement and compaction of fill material within the dam repair zone. A downstream toe filter drain could effectively be used along the concrete structure to control seepage and prevent piping.

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Land Disturbing Permit Application

MC-113

James City County
Environmental Division
P.O. Box 8784
Williamsburg, VA 23187-8784
Telephone: (757) 253-6670

Landowner

Name: Florence P. Adsit Date: 3-1-00

Mailing Address: 2187 Lake Powell Road

Williamsburg, VA 23185 Phone: 229-2245

Project: Lake Powell Dam Repair

Project Street Address: _____

Total Size of Tract or Lot: _____

Total Area to Be Disturbed: 2500' + -

Description of Land Disturbing Activity: Repair Earth Dam

Right of Entry

X I, Florence P. Adsit (Signature) hereby grant designated officials of James City County,
(Florence P. Adsit-Owner (Print Name and Title))
Virginia, the right to enter my property for the purpose of inspection or monitoring for compliance with the approved erosion and sediment plan on the above-referenced project.

Released
11/9/2000
per DEC

Land Disturbing Permit Application

X I, Florence P. Adsit, (Signature) certify that I fully understand the provisions of the James City County, Virginia, Erosion and Sediment Control Ordinance and agree to carry out the approved erosion and sedimentation control plan on the above-referenced project. I also understand that the approved erosion and sedimentation control plan becomes null and void on 10/24/00 and no further work subject to Chapter 5A of the County code shall be allowed unless and until an additional or updated erosion and sedimentation control plan has been submitted and approved in accordance with Chapter 5A or unless all requirements of the approved control plan have been completed by 10/24/00 in accord with such plan and verified by the on-site inspection by the Administrator or his designee.

00-75 (For Office Use Only)

Permit No.: ~~00-60~~ already used Bond Amount: $ N/A

Reviewed by: EJ Date: _____

Specific Requirements: Any

Approved by: Daryl E Cook Administrator - Erosion and Sediment Control Ordinance

Date: 4/24/00

Renewal of E&S plan requested by:

Renewal Reviewed By: Renewal Date:

Renewal Approved By: Undated Erosion and Sedimentation Control Plan becomes null and void on:
