PC020 PC021 PC022 PC119 PC120 LONGHILL STATION

The paper files for the Longhill Station BMPs were mingled so all are included here; if information isn't apparent in the section in question, please see if it might be in another. The key to the pond letters, BMP numbers, locations, and county plan numbers is on the following page.

Stormwater Management / BMP Facilities - Longhill Station

Name	Approximate Location	Assigned BMP ID Code	County Plan No.
Pond A	Near Lot 87, 6033 Allegheny Road	PC 022	S-47-95
Pond B	Near Lot 76, 3913 Blue Ridge Court	PC 021	S-47-95
Pond C	Near Rec Center at Longhill Station Road	PC 020	S-47-95
Pond D	Behind Lot 181, end of Allegheny Court	PC 120	S-19-99
Pond E	Behind Lot 137, 5989 Allegheny Road	PC 119	S-47-98

Stormwater Division

MEMORANDUM

DATE: March 13, 2010

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

FROM: Jo Anna Ripley, Stormwater

PO: 270712

RE: Files Approved for Scanning

General File ID or BMP ID: PC020

PIN: 3110900001B

Subdivision, Tract, Business or Owner Name (if known): Longhill Station

Property Description: Natural Open Space Section 1A & 1B

Site Address:

(For internal use only) **Box** 3 **Drawer:** 2

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

Comments

Combined file with PC020, PC021, PC119 and PC120. According to the County's Real Estate Assessment Division the common area has not been turned over to the HOA. Ownership as of 3/3/10 is Wallace Associates LLC

S-47-95
SECT 1 (1A+1B)
POND A (PC022)
POND B (PC021)
POND C (PC 020)

COPY

DECLARATION OF COVENANTS

INSPECTION/MAINTENANCE OF RUNOFF CONTROL FACILITY

THIS DECLARATION, made this 2nd day of April, 1996, between Atlantic Homes Dev., and all successors in interest, hereinafter referred to as the "COVENANTOR(S)," owner(s) of the following property: Longhill Station Sections 1A+1B Deed Book 626, Page 50, and James City County, Virginia. hereinafter referred to as the "COUNTY."

WITNESSETH:

We, the COVENANTOR(S), with full authority to execute deeds, mortgages, other covenants, and all rights, titles and interests in the property described above, do hereby covenant with the COUNTY as follows:

1. The COVENANTOR(S) shall provide maintenance for the runoff control facility, hereinafter referred to as the "FACILITY," located on and serving the above-described property to ensure that the FACILITY is and remains in proper working condition in accordance with approved design standards, and with the law and applicable executive regulations.

2. If necessary, the COVENANTOR(S) shall levy regular or special assessments against all present or subsequent owners of property served by the FACILITY to ensure that the FACILITY is properly maintained.

3. The COVENANTOR(S) shall provide and maintain perpetual access from public right-of-ways to the FACILITY for the COUNTY, its agent and its contractor.

4. The COVENANTOR(S) shall grant the COUNTY, its agent and its contractor a right of entry to the FACILITY for the purpose of inspecting, operating, installing, constructing, reconstructing, maintaining or repairing the FACILITY.

5. If, after reasonable notice by the COUNTY, the COVENANTOR(S) shall fail to maintain the FACILITY in accordance with the approved design standards and with the law and applicable executive regulations, the COUNTY may perform all necessary repair or maintenance work. and the COUNTY may assess the COVENANTOR(S) and/or all property served by the FACILITY for the cost of the work and any applicable penalties.

6. The COVENANTOR(S) shall indemnify and save the COUNTY harmless from any and all claims for damages to persons or property arising from the installation, construction, maintenance. repair, operation or use of the FACILITY.

7. The COVENANTOR(s) shall promptly notify the COUNTY when the COVENANTOR(S) legally transfers any of the COVENANTOR(S)' responsibilities for the FACILITY. The COVENANTOR(S)' shall supply the COUNTY with a copy of any document of transfer, executed by both parties.

8. The covenants contained herein shall run with the land and shall bind the COVENANTOR(S) and the COVENANTOR(S)' heirs, executors, administrators, successors and assignees, and shall bind all present and subsequent owners of property served by the FACILITY.

9. This DECLARATION shall be recorded in the County Land Records.

Book 781
Page 887

IN WITNESS WHEREOF, the COVENANTOR(S) have executed this DECLARATION OF COVENANTS as of this ~~29th~~ 2nd day of ~~March~~ April, 1996.

COVENANTOR(S)

Pope Woodard, Pres.

ATTEST:

Frances K Barber

COVENANTOR(S)

Kenneth Allen, V-Pres.

ATTEST:

Frances K Barber

COMMONWEALTH OF VIRGINIA
CITY/~~COUNTY~~ OF Hampton

I, the undersigned Notary Public, in and for the jurisdiction aforesaid, do certify that J. Pope Woodard, whose name is signed as such to the foregoing writing bearing date 29th day of March, 1996 this day sworn the same before me in my jurisdiction aforesaid.

GIVEN under my hand this 1st day of April, of 1996.

Frances K Barber
Notary Public

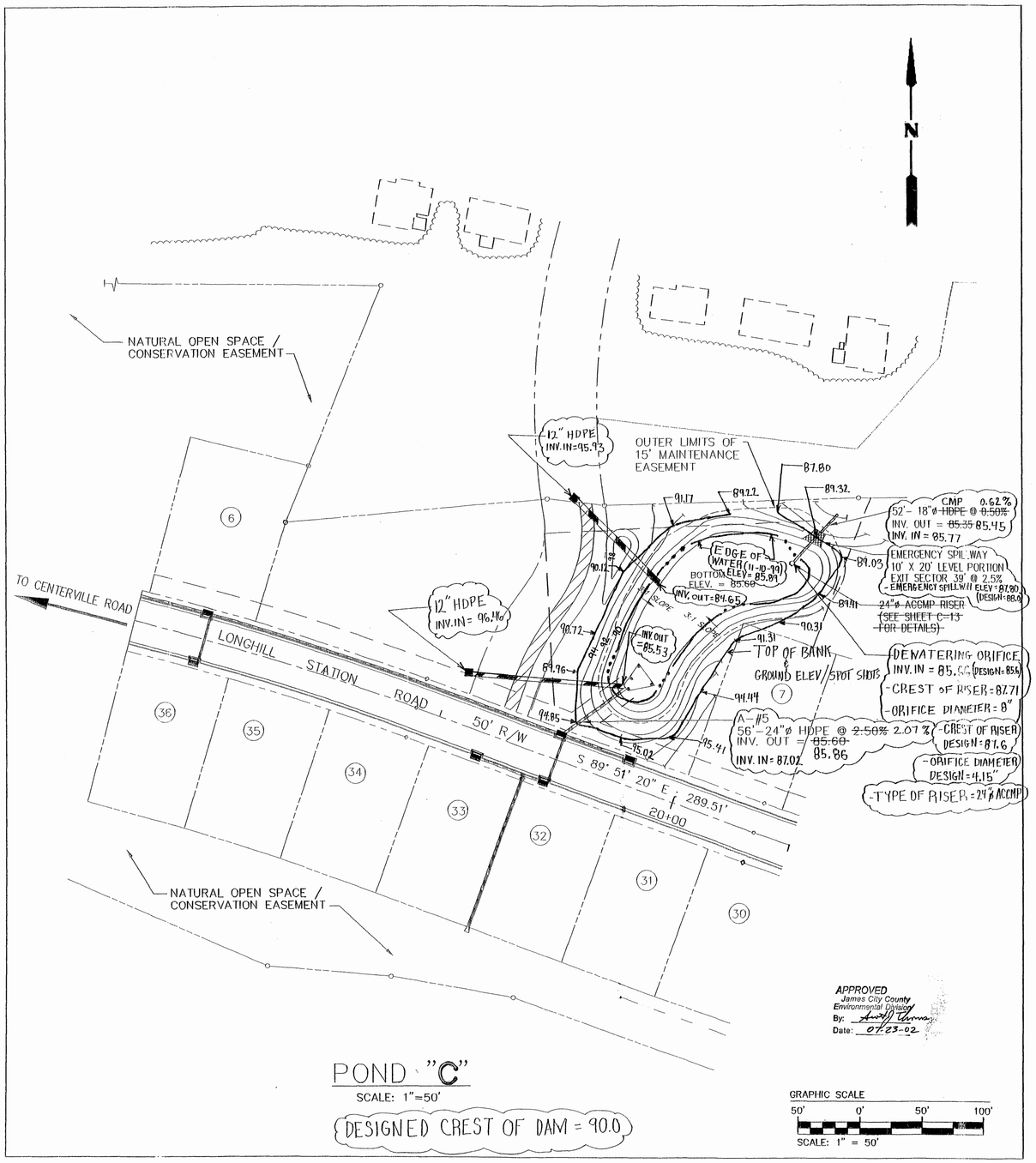
My Commission expires: Nov 30, 1998

Approved as to form:

Leo P Rogers

0261U.Wpf
Revised 9/92

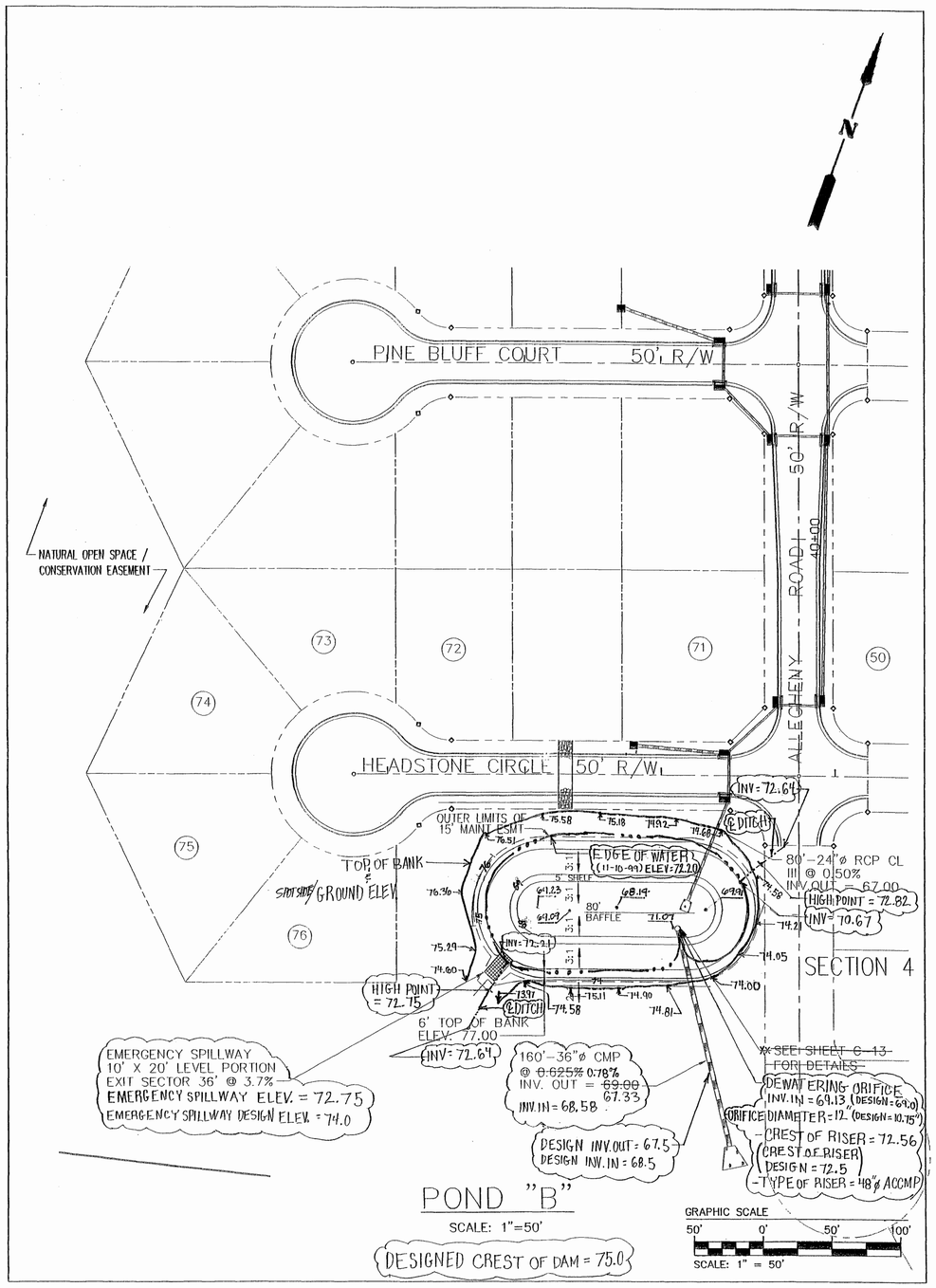
PC020_PC021_PC022_PC119_PC120_LONGHALL_STATION - 005



POND "C"

SCALE: 1"=50'

DESIGNED CREST OF DAM = 90.0



POND "B"

SCALE: 1"=50'

DESIGNED CREST OF DAM = 75.0

PC 020
S-47-95
SECTION 1A

REVISIONS

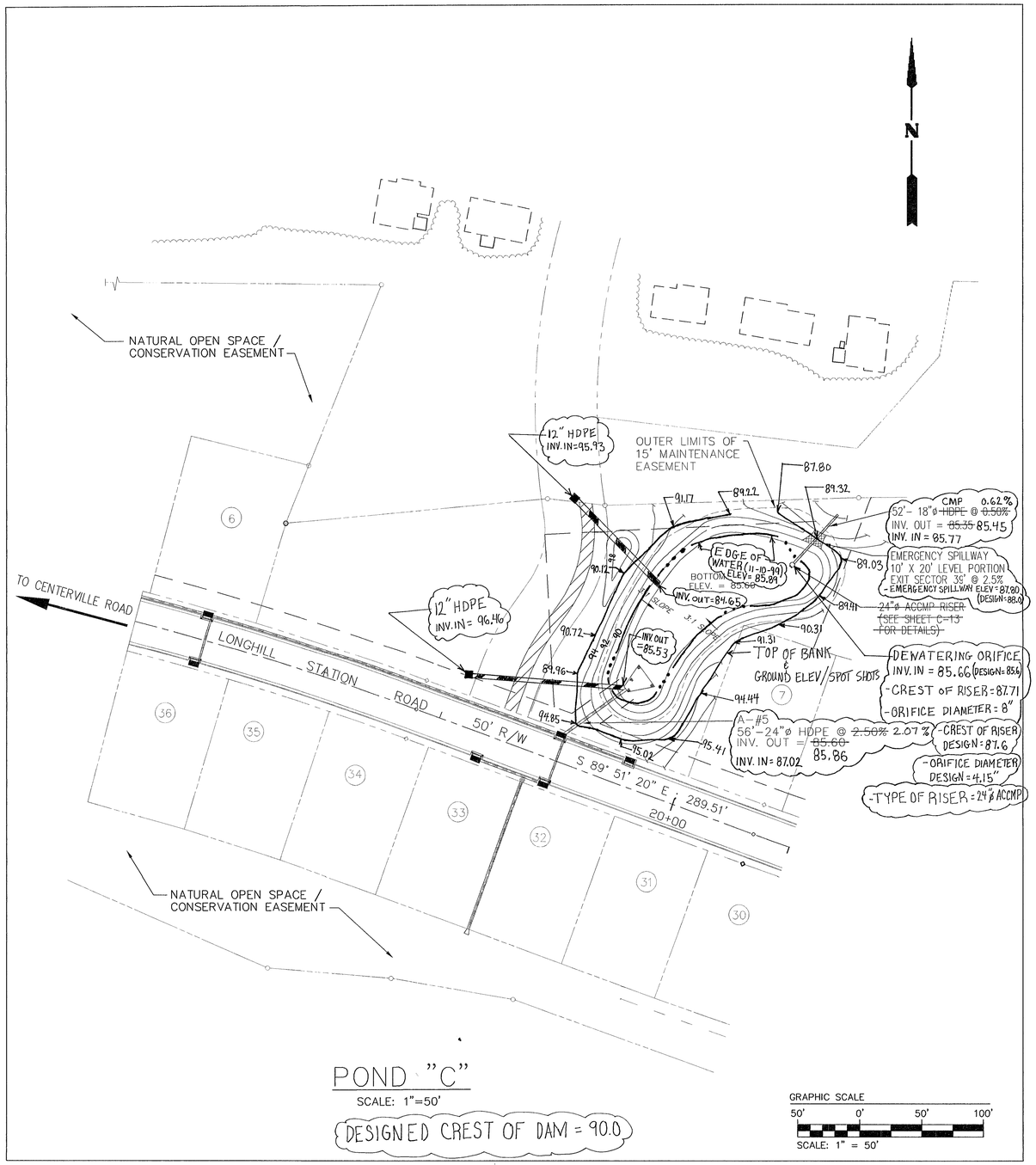
NO.	DATE	DESCRIPTION
1	1-4-00	ADDITIONAL ELEV. - POND "B"

ENGINEERS · ARCHITECTS · SURVEYORS
INTERIOR DESIGNERS · PLANNERS
P.O. BOX 3505 WILLIAMSBURG, VIRGINIA 23187 (804)253-0673 (804)874-5015

POND AS-BUILTS - SECTION 1

LONGHILL STATION SUBDIVISION
ATLANTIC HOMES DEVELOPMENT CORPORATION
JAMES CITY COUNTY VIRGINIA

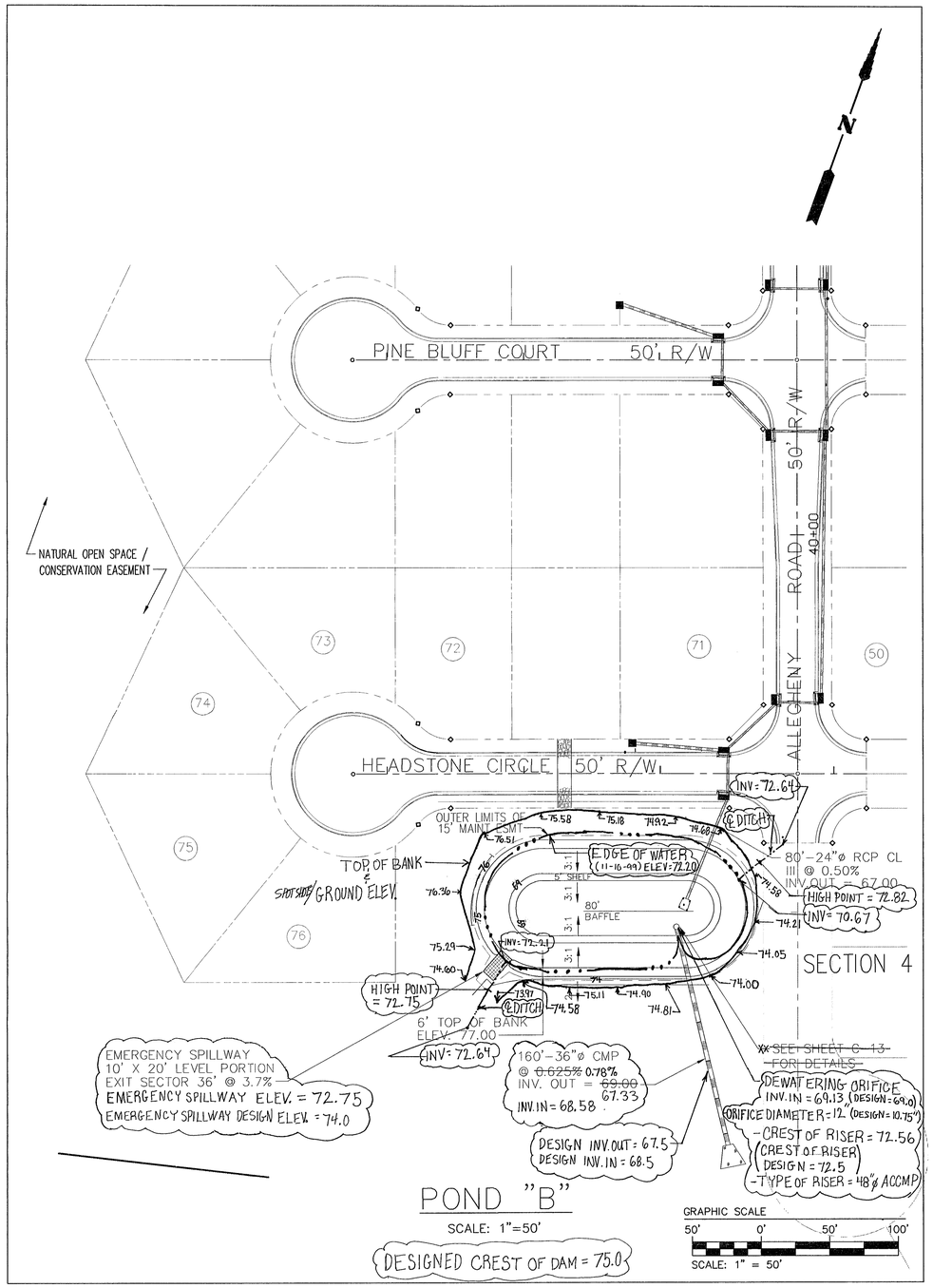
SCALE	1"=50'
DESIGNED	XXX
DRAWN	XXX
CHECKED	NLHT ~~XXX~~
DATE	11-15-99
COMMISSION NO.	1940220
SHEET	C1 ~~C-2~~ 1 OF 1 ~~3 OF 18~~



POND "C"

SCALE: 1"=50'

DESIGNED CREST OF DAM = 90.0



POND "B"

SCALE: 1"=50'

DESIGNED CREST OF DAM = 75.0

REVISIONS

NO.	DATE	DESCRIPTION

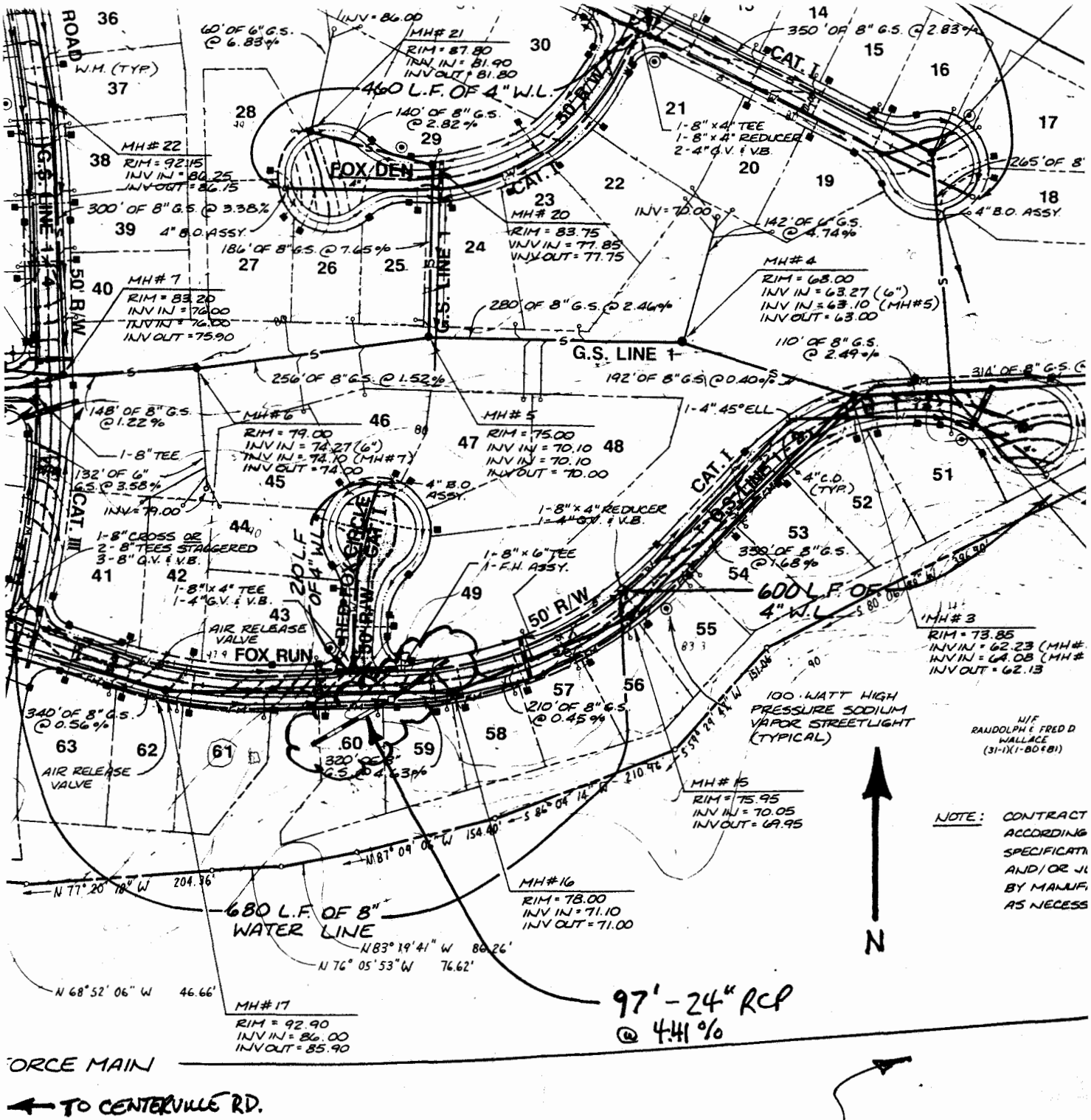
ENGINEERS · ARCHITECTS · SURVEYORS
INTERIOR DESIGNERS · PLANNERS
P.O. BOX 3505 WILLIAMSBURG, VIRGINIA 23187 (804)253-0673 (804)874-5015

POND AS-BUILTS - SECTION 1

LONGHILL STATION SUBDIVISION
ATLANTIC HOMES DEVELOPMENT CORPORATION
JAMES CITY COUNTY VIRGINIA

SCALE	1"=50'
DESIGNED	XXX
DRAWN	XXX
CHECKED	NLHT ~~XXX~~
DATE	11-15-99
COMMISSION NO.	1940220
SHEET	C1 ~~C-2~~ 1 OF 1 ~~3 OF 18~~

FOX RIDGE CONSTRUCTION PLANS BY AES INC.



OK

LONGHILL STATION POND C POST-DEVELOPMENT

LONGHILL STATION POND C POST-DEVELOPMENT

INPUT DESIGN DATA

DESIGN STORM FOR ANALYSIS = 25 YEAR
DRAINAGE AREA (ACRES) = 26.78
AVERAGE SLOPE OF DRAINAGE AREA (%) = 1.9
HYDRAULIC LENGTH (FT) = 1750
IMPERVIOUS SURFACE (%) = 18.5
HYDRAULIC LENGTH MODIFIED (%) = 11
COMPOSITE CURVE NUMBER = 70 OK
SLOPE ADJUSTMENT FACTOR = 1.25
PONDING ADJUSTMENT FACTOR = .83

RESULTS OF HYDRAULIC CALCULATIONS
(SCS TR-55 & TP-149 PROCEDURES)

WATERSHED LAG ADJUSTED (IMPER. AREAS & CHAN. IMPROV.) IS .387 HOURS
TIME OF CONCENTRATION ADJUSTED IS .645 HOURS
THE PEAK DISCHARGE FROM THIS WATERSHED IS 58 C.F.S.

THE FOLLOWING ARE TIME INCREMENTS AND ORDINATES OF THE
INFLOW HYDROGRAPH

15 soils - Lower low

20 @ 65 > 69.7
6.8 @ 85

(HOURS)	(C.F.S.)
0,0	
.155	.43
.309	1.401
.464	4.078
.619	11.209
.774	27.886
.928	46.474
1.083	58.491
1.238	53.849
1.393	42.039
1.547	27.905
1.702	14.795
1.857	4.771
2.012	.993
2.166	0

STAGE (FT)	DISCHARGE (CFS)	STORAGE (CF)
0	0	0
.5	.26	4394
1	.41	9351
1.5	5.54	14545
2	6.33	19900
2.5	26.1	26070
3	85.6	33080

THE FOLLOWING ARE TIME INCREMENTS AND ORDINATES OF THE
OUTFLOW HYDOGRAPH

(HOURS)	(C.F.S.)
0.000	0.007

0.155	0.036
0.309	0.124
0.464	0.316
0.619	5.674
0.774	29.241
0.928	61.907
1.083	53.844
1.238	45.551
1.393	30.682
1.547	20.373
1.702	10.385
1.857	6.077
2.012	5.637
2.166	3.636
2.321	2.067
2.476	1.175
2.631	0.668
2.785	0.409
2.940	0.402
3.095	0.395
3.250	0.389
3.404	0.382
3.559	0.376
3.714	0.370
3.869	0.363
4.023	0.357
4.178	0.351
4.333	0.345
4.487	0.340
4.642	0.334
4.797	0.328
4.952	0.323
5.106	0.317
5.261	0.312
5.416	0.307
5.571	0.302
5.725	0.297
5.880	0.292

MAXIMUM OUTFLOW IS 53.844 C.F.S.
MAXIMUM STAGE IS 2.733143 FT.
MAXIMUM STORAGE IS 29338 CUBIC FEET

LONGHILL STATION POND C POST-DEVELOPMENT

LONGHILL STATION POND C POST-DEVELOPMENT

INPUT DESIGN DATA

DESIGN STORM FOR ANALYSIS = 100 YEAR
DRAINAGE AREA (ACRES) = 26.78
AVERAGE SLOPE OF DRAINAGE AREA (%) = 1.9
HYDRAULIC LENGTH (FT) = 1750
IMPERVIOUS SURFACE (%) = 18.5
HYDRAULIC LENGTH MODIFIED (%) = 11
COMPOSITE CURVE NUMBER = 70
SLOPE ADJUSTMENT FACTOR = 1.25
PONDING ADJUSTMENT FACTOR = .88

RESULTS OF HYDRAULIC CALCULATIONS
(SCS TR-55 & TP-149 PROCEDURES)

WATERSHED LAG ADJUSTED (IMPER. AREAS & CHAN. IMPROV.) IS .387 HOURS
TIME OF CONCENTRATION ADJUSTED IS .645 HOURS
THE PEAK DISCHARGE FROM THIS WATERSHED IS 87 C.F.S.

THE FOLLOWING ARE TIME INCREMENTS AND ORDINATES OF THE
INFLOW HYDROGRAPH

(HOURS)	(C.F.S.)
0,0	
.155	.744
.309	2.402
.464	6.847
.619	18.062
.774	43.121
.928	70.36901
1.083	87.233
1.238	79.607
1.393	61.79
1.547	40.757
1.702	21.397
1.857	6.812
2.012	1.412
2.166	0

STAGE (FT)	DISCHARGE (CFS)	STORAGE (CF)
0	0	0
.5	.26	4394
1	.41	9351
1.5	5.54	14543
2	6.33	19900
2.5	26.1	26070
3	85.6	33080

THE FOLLOWING ARE TIME INCREMENTS AND ORDINATES OF THE
OUTFLOW HYDOGRAPH

(HOURS)	(C.F.S.)
0.000	0.012

0.155	0.063
0.309	0.211
0.464	1.164
0.619	15.081
0.774	68.238
0.928	83.084
1.083	83.557
1.238	65.485
1.393	45.511
1.547	25.512
1.702	14.753
1.857	6.195
2.012	5.762
2.166	4.266
2.321	2.425
2.476	1.379
2.631	0.784
2.785	0.446
2.940	0.404
3.095	0.397
3.250	0.391
3.404	0.384
3.559	0.378
3.714	0.371
3.869	0.365
4.023	0.359
4.178	0.353
4.333	0.347
4.487	0.341
4.642	0.336
4.797	0.330
4.952	0.324
5.106	0.319
5.261	0.314
5.416	0.308
5.571	0.303
5.725	0.298
5.880	0.293

MAXIMUM OUTFLOW IS 83.557 C.F.S.
MAXIMUM STAGE IS 2.982832 FT.
MAXIMUM STORAGE IS 32839 CUBIC FEET

FILE -
Longhill Station

1008 Richmond Road
Williamsburg, VA 23185
804 253-0673
Fax: 804 253-2319

FAX TRANSMISSION

PLEASE DELIVER THE FOLLOWING 6 PAGES (INCLUDING THIS COVER SHEET)

TO DARRYL COOK	DATE 8-29-95
CODE COMPLIANCE	
FAX NUMBER 253-6663	
FROM PHILLIP GOERING	FAX NUMBER 804 253-2319
SHOULD ANY PART OF THIS TRANSMITTAL BE ILLEGIBLE OR INCOMPLETE, PLEASE CONTACT PHIL	PHONE NUMBER 804 253-0673

MESSAGE

DARRYL -

LET ME KNOW WHAT YOU THINK OR IF YOU HAVE ANY QUESTIONS.

THANKS
— PHIL

DJG
P.O. Box 3505
Williamsburg, Virginia 23187
(804) 253-0673
Fax (804) 253-2319

PROJECT LONGHILL STATION
DATE 8-29-95 COMM NO.
CAL HCPG CKD PAGE # 1
TITLE GRAPHICAL STORAGE METHOD

- $\frac{Q_o}{Q_i} = \frac{20\ cfs}{27\ cfs} = 0.7407 \Longrightarrow \frac{V_s}{V_r} = 0.2$ (FROM E&S PLATE 5-27, TYPE II STORM)

$$\frac{\overset{(I\ cover)}{0.2}\,(26.78\ ac)(43560\ ft^2/ac)\overset{(0.5)}{(1.0'')}}{12\ in/ft} = 19{,}445\ ft^3$$ STORAGE NEEDED FOR 1" RUNOFF

(WHERE Q_o & Q_i WERE OBTAINED FROM TR-55 METHOD FOR THE 2-YR STORM).

- 6 HR DETENTION $\Longrightarrow Q_{avg}$

$Q_{avg} = 19{,}445\ ft^3 / (6\ hrs \times 3600\ sec/hr) = 0.9\ cfs$

PERFORATION AREA $= \dfrac{0.9\ cfs}{(0.6 \times \sqrt{64.4 \times (\frac{MAX.\ HEAD}{2} - RADIUS)}}$ GIVEN: PIPE = 6" PVC

$= 0.9 / (0.6 \times \sqrt{64.4\,(\frac{2' - 0.25'}{2})}$

$= 0.20\ ft^2$ = TOTAL PERFORATION AREA

$\approx 64 - 3/4''\ \phi$ PERFORATIONS

LONGHILL STATION POND C

PRE —

LONGHILL STATION POND C

INPUT DESIGN DATA

DESIGN STORM FOR ANALYSIS = 2 YEAR
DRAINAGE AREA (ACRES) = 26.78
AVERAGE SLOPE OF DRAINAGE AREA (%) = 1.9
HYDRAULIC LENGTH (FT) = 1750
IMPERVIOUS SURFACE (%) = 7
HYDRAULIC LENGTH MODIFIED (%) = 10
COMPOSITE CURVE NUMBER = 71
SLOPE ADJUSTMENT FACTOR = 1.24
PONDING ADJUSTMENT FACTOR = 1

RESULTS OF HYDRAULIC CALCULATIONS
(SCS TR-55 & TP-149 PROCEDURES)

WATERSHED LAG ADJUSTED (IMPER. AREAS & CHAN. IMPROV.) IS .415 HOURS
TIME OF CONCENTRATION ADJUSTED IS .692 HOURS
THE PEAK DISCHARGE FROM THIS WATERSHED IS 20 C.F.S.

$= Q_o$

POST —

INPUT DESIGN DATA

DESIGN STORM FOR ANALYSIS = 2 YEAR
DRAINAGE AREA (ACRES) = 26.78
AVERAGE SLOPE OF DRAINAGE AREA (%) = 1.9
HYDRAULIC LENGTH (FT) = 1750
IMPERVIOUS SURFACE (%) = 18.5
HYDRAULIC LENGTH MODIFIED (%) = 25
COMPOSITE CURVE NUMBER = 73
SLOPE ADJUSTMENT FACTOR = 1.24
PONDING ADJUSTMENT FACTOR = 1

RESULTS OF HYDRAULIC CALCULATIONS
(SCS TR-55 & TP-149 PROCEDURES)

WATERSHED LAG ADJUSTED (IMPER. AREAS & CHAN. IMPROV.) IS .324 HOURS
TIME OF CONCENTRATION ADJUSTED IS .54 HOURS
THE PEAK DISCHARGE FROM THIS WATERSHED IS 27 C.F.S.

$= Q_i$

DJG
P.O. Box 3505
Williamsburg, Virginia 23187
(804) 253-0873
Fax (804) 253-2319

PROJECT LONGHILL STATION
DATE 8-29-95 COMM NO.
CAL HLPG CKD PAGE # 2
TITLE

STORAGE MUST BE ≥ 19,445 ft³

STORAGE OF EXTENDED DRY DETENTION POND C

ELEV	AREA (ft²)	Σ(Ai+Ai)/2	VOL. (ft³)	ΣVOL. (ft³)
84	8400	–	–	–
84.5	9175	8787.5	4394	4394
86.0	11500	10337.5	15506	19900

✓ ok

STORAGE ALGORITHM: $Z_1 = 0.5$ $Z_2 = 2.0$
$S_1 = 4394$ $S_2 = 19900$

$b = \frac{\ln\left(\frac{S_2}{S_1}\right)}{\ln\left(\frac{Z_2}{Z_1}\right)} = 1.0896$ $k = \frac{S_2}{Z_2^{\,b}} = 9350.97$ $S = 9350.97(Z)^{1.0896}$

• 64 - 3/4" Ø PERFORATIONS = 0.2 ft² $Q = CA\sqrt{64.4\,H_o}$
$A = 0.2$ ft² $C = 0.60$ $2 \times G = 64.4$

STAGE – STORAGE – DISCHARGE

ELEV	STAGE	H_p	Q_p	H_o	Q_o	ΣQ (cfs)	STORAGE (ft³)
84.0	–	–	–	–	–	–	–
84.5	0.5	–	–	0.3	0.45	0.45	4394
85.0	1.0	–	–	0.8	0.73	0.73	9351
85.5	1.5	–	–	1.3	0.93	0.93	14545
86.0	2.0	–	–	1.8	1.10	1.10	19900

THE FOLLOWING ARE TIME INCREMENTS AND ORDINATES OF THE INFLOW HYDROGRAPH

(HOURS)	(C.F.S.)
0,0	
.13	.102
.259	.409
.389	1.409
.519	4.465
.648	11.678
.778	20.633
.908	26.884
1.037	25.956
1.167	20.528
1.297	13.872
1.426	7.633
1.556	2.723
1.685	.506
1.815	0

STAGE - STORAGE - DISCHARGE

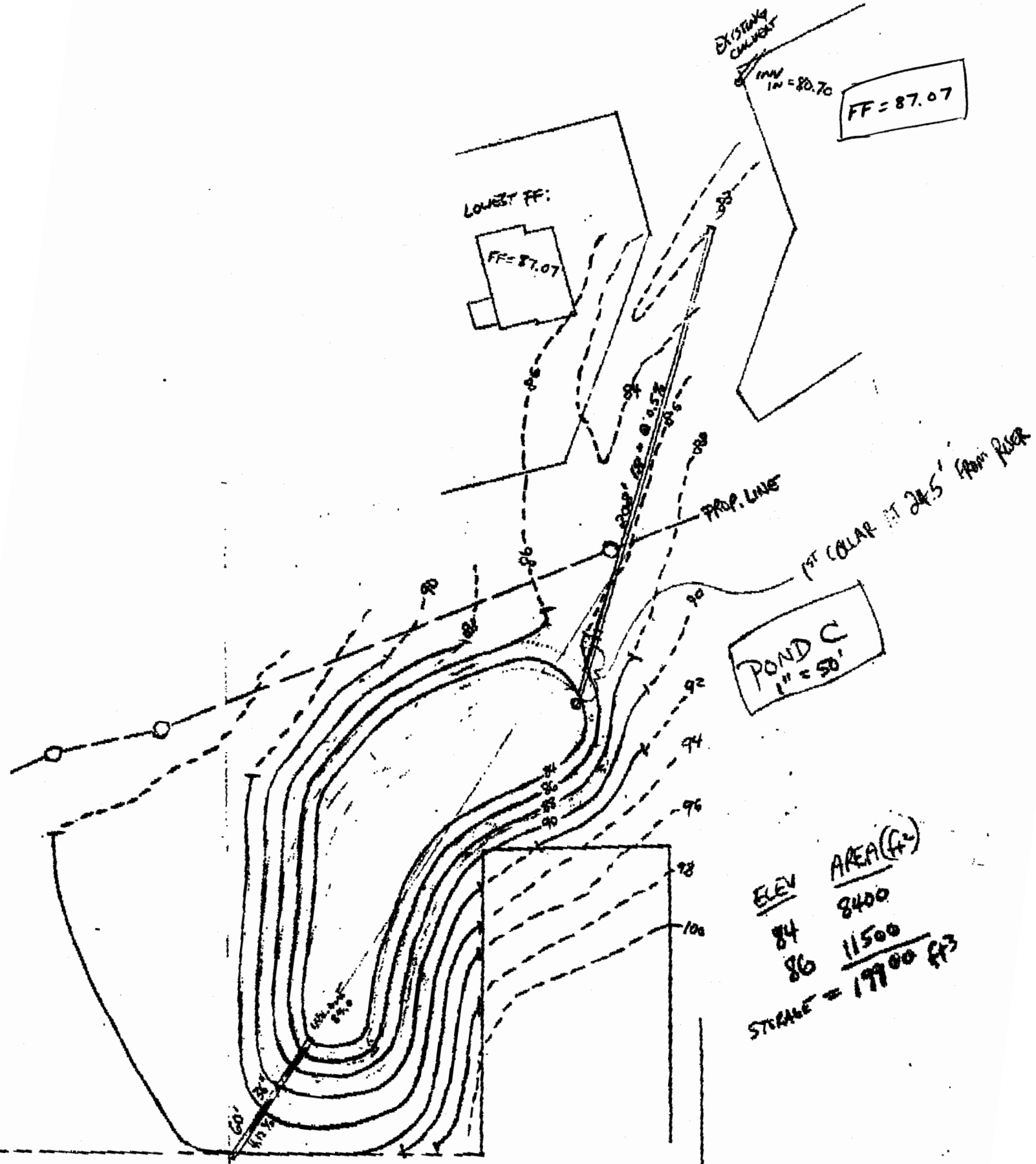
	.5	.45	4394
	1	.73	9351
	1.5	.93	14545
CREST OF RIVER AND/OR DAM →	2	1.1	19900 ←
	2.5	27	24000 } EMERGENCY SPILLWAY USE
	3	60	27000 }

THE FOLLOWING ARE TIME INCREMENTS AND ORDINATES OF THE OUTFLOW HYDROGRAPH

(HOURS)	(C.F.S.)
0.000	0.002
0.130	0.014
0.259	0.056
0.389	0.190
0.519	0.510
0.648	0.858
0.778	9.822
0.908	30.142
1.037	21.379
1.167	16.399
1.297	9.670
1.426	4.317
1.556	1.100
1.685	1.088
1.815	1.077
1.945	1.056
2.074	1.040
2.204	1.025
2.334	1.010
2.463	0.995
2.593	0.980
2.723	0.966
2.852	0.952
2.982	0.938
3.112	0.923
3.241	0.906
3.371	0.890
3.501	0.874
3.630	0.859
3.760	0.843
3.890	0.828
4.019	0.814
4.149	0.799
4.278	0.785
4.408	0.771
4.538	0.757
4.667	0.744
4.797	0.730
4.927	0.712

MAXIMUM OUTFLOW IS 30.142 C.F.S.
MAXIMUM STAGE IS 2.547606 FT.
MAXIMUM STORAGE IS 24285 CUBIC FEET

ANALYSIS: POND OVERFLOWS INTO EMERG. SPILLWAY



DJG, INC. 4:49 PM 23-05 TUE
FAX NO. 8042532319 P. 6

DJG
P.O. Box 3505
Williamsburg, Virginia 23187
(804) 253-0673
Fax (804) 253-2319

PROJECT LONGHILL STATION
DATE 9-6-95 COMM NO. 1940220
CAL HLPG CKD PAGE # 11
TITLE REVISION # 1

- POND C BMP # 2 DESIGN -

TYPE BMP

- REQUIRED STORAGE:

$$V_s = 0.5'' \times \frac{1ft}{12''} \times I \times A \times \frac{43560\,ft^2}{1ac.}$$

I = IMPERVIOUS % = 18.5% ⇒ 0.185
A = 26.78 ac.

$$V_s = 0.5'' \times \frac{1ft}{12''} \times 0.185 \times 26.78_{ac.} \times \frac{43560\,ft^2}{1ac.} = 8992\,ft^3 \Rightarrow 9000\,ft^3$$

- BASIN STORAGE:

ELEV.	AREA (ft^2)	$\Sigma(A_i + A_j/2)$	VOL. (ft^3)	Σ VOL. (ft^3)
84.0	8400	–	–	–
84.5	9175	8787.5	4394	4394
86.0	11500	10337.5	15506	19900

STORAGE ALGORITHM: $z_1 = 0.5$ $z_2 = 2.0$
$S_1 = 4394$ $S_2 = 19900$

$$b = \frac{\ln\left(\frac{S_2}{S_1}\right)}{\ln\left(\frac{z_2}{z_1}\right)} = 1.0896 \qquad K = \frac{S_2}{z_2^{\,b}} = 9350.97 \qquad S = 9350.97(z)^{1.0896}$$

- ORIFICE SIZING: 6hr DETENTION ⇒ $Q_{AVG.}$ (DRAWDOWN)

$$Q_{AVG} = 9000\,ft^3 / (6hrs \times 3600\,sec/hr) = 0.42\,cfs$$

$$\text{ORIFICE AREA} = \frac{0.42\,cfs}{0.6 \times \sqrt{64.4 \times \left(\frac{\text{MAX HEAD} - \text{RADIUS}}{2}\right)}}$$

GIVEN: 6" PVC PIPE
$H_{max} = 2'$

$$= 0.09\,ft^2 \Rightarrow 4.15''\ \text{ORIFICE}$$

DJG
P.O. Box 3505
Williamsburg, Virginia 23187
(804) 253-0673
Fax (804) 253-2319

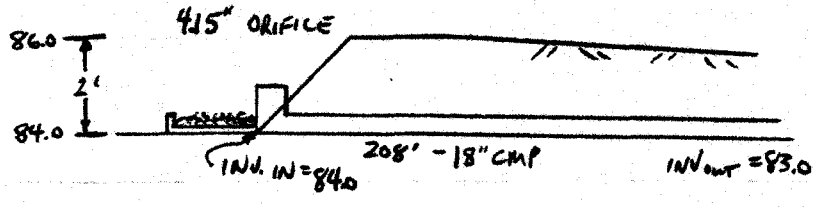
PROJECT LONGHILL STATION
DATE 9-6-95 COMM NO. 1940220
CAL HLPG CKD PAGE # 12
TITLE REVISION #1

- POND C BMP #2 DESIGN CONTINUED -

- STAGE STORAGE DISCHARGE

$$Q = CA\sqrt{2gH_o}$$
$$C = 0.6$$
$$A = 0.09\ ft^2$$

24" RISER
18" BARREL
4.5" ORIFICE



	ELEV.	STAGE	H_p	Q_p	H_o	Q_o	ΣQ	STORAGE
	84.0	-	-	-	-	-	-	-
	84.5	0.5	-	-	0.33	0.26	0.26	4394
C.R.	85.0	1.0	-	-	0.83	0.41	0.41	9351
	85.5	1.5	2.0	5.02	1.33	0.52	5.54	14595
E.S.	86.0	2.0	2.5	5.72	1.83	0.61	6.33	19900

* NOTE: DUE TO SITE RESTRICTIONS, THIS POND HAS BEEN DESIGNED TO DETAIN THE REQUIRED VOLUME OF RUNOFF, WHILE ALLOWING ANY EXCESS RUNOFF TO BE RELEASED VIA THE EMERGENCY SPILLWAY. DOWNSTREAM CULVERTS HAVE BEEN ANALYZED AND WERE DETERMINED TO CARRY A MAXIMUM OF 48 cfs. THIS Q CAPACITY IS GREATER THAN THE 10-YR FLOW (46.16 cfs) RELEASED FROM THE DETENTION POND. - See AES/Fox Ridge Construction Plans - Attached

- OUTLET PROTECTION FOR BARREL: PIPE ϕ = 18" Q_{AVG} = 0.42 cfs

ASSUME MIN. TAILWATER COND
APRON LENGTH = 9' (E&S pg III-164)
APRON WIDTH UPSTREAM: $3 \times \phi$ = 4.5'
DOWNSTREAM: ϕ + APRON LENGTH = 10.5'
RIPRAP: d_{50} = 0.5' depth = 18" min.

DJG
P.O. Box 3505
Williamsburg, Virginia 23187
(804) 253-0673
Fax (804) 253-2319

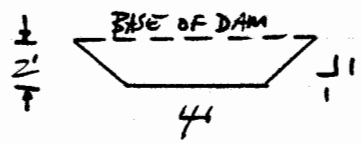
PROJECT LONGHILL STATION
DATE 9-6-95 COMM NO. 1940220
CAL HLPO CKD PAGE # 13
TITLE REVISION #1

- POND C BMP #2 -

- ANTI-VORTEX DESIGN: (ES S, pg III-104)
  - RISER DIA. = 24"
  - CYLINDER DIA. = 36"
  - THICKNESS = 16 ga
  - HEIGHT = 13"
  - SUPPORT BAR/SPACER BAR = #6 REBAR
  - TOP THICKNESS = 16 ga. (CORREGATED)

- ANTI-SEEP COLLAR DESIGN:
  - $y = 85.0 - 84.0 = 1.0'$
  - $S = 0.005\%$
  - UPSTREAM EMBANK. SLOPE = 3:1
  - $\Rightarrow L_s = 15'$
  - PIPE ϕ = 18"
  - $\Rightarrow$ 2 COLLARS, 2' x 2'

- CORE TRENCH DETAIL:



- CORE TRENCH RUNS ALONG ℄ OF DAM, UP EMBANKMENTS, TO ELEV. 85.0

TEMPORARY SEDIMENT BASIN DESIGN DATA SHEET

(with or without an emergency spillway)

Project LONGHILL STATION REVISION #1

Basin # POND C Location _____

Total area draining to basin: 26.78 acres. (TOTAL ACREAGE)

8.5 AC DISTURBED ACREAGE

Basin Volume Design

Wet Storage: N/A - need wet storage

1. Minimum required volume = 67 cu. yds. x Total Drainage Area (acres).

   67 cu. yds. x _____ acres = _____ cu. yds.

2. Available basin volume = _____ cu. yds. at elevation _____. (From storage - elevation curve)

3. Excavate _____ cu. yds. to obtain required volume*.

   * Elevation corresponding to required volume = invert of the dewatering orifice.

4. Available volume before cleanout required.

   33 cu. yds. x _____ acres = _____ cu. yds.

5. Elevation corresponding to cleanout level = _____.

   (From Storage - Elevation Curve)

6. Distance from invert of the dewatering orifice to cleanout level = _____ ft. (Min. = 1.0 ft.)

Dry Storage:

7. Minimum required volume = 67 cu. yds. x Total Drainage Area (acres).

   67 cu. yds. x 8.5 acres = 569.5 cu. yds.

8. Total available basin volume at crest of riser* = 369 cu. yds. at elevation 85.0. (From Storage - Elevation Curve)

* Minimum = 134 cu. yds./acre of total drainage area.

9. Diameter of dewatering orifice = 4.5 in.

10. Diameter of flexible tubing = 6 in. (diameter of dewatering orifice plus 2 inches).

Preliminary Design Elevations

11. Crest of Riser = 85.0

Top of Dam = 86.0

Design High Water = 86.7

Upstream Toe of Dam = 84.0

Basin Shape

12. Length of Flow L = 200'
Effective Width We = 40'

If > 2, baffles are not required ✓

If < 2, baffles are required N/A

Runoff

13. Q_2 = 13 cfs cfs (From Chapter 5)

14. Q_{25} = 93 cfs (From Chapter 5)

Principal Spillway Design

15. With emergency spillway, required spillway capacity $Q_p = Q_2$ = 13 cfs. (riser and barrel)

Without emergency spillway, required spillway capacity $Q_p = Q_{25}$ = N/A cfs. (riser and barrel)

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16. With emergency spillway:

Assumed available head (h) = 1.0 ft. (Using Q_2)

h = Crest of Emergency Spillway Elevation - Crest of Riser Elevation

Without emergency spillway:

Assumed available head (h) = N/A ft. (Using Q_{25})

h = Design High Water Elevation - Crest of Riser Elevation

17. Riser diameter (D_r) = 24 in. Actual head (h) = 1.0 ft.

(From Plate 3.14-8.)

Note: Avoid orifice flow conditions.

18. Barrel length (l) = 208 ft.

Head (H) on barrel through embankment = 1.0 ft.

(From Plate 3.14-7).

19. Barrel diameter = 18 in.

(From Plate 3.14-B [concrete pipe] or Plate 3.14-A [corrugated pipe]).

20. Trash rack and anti-vortex device

Diameter = 36 inches.

Height = 13 inches.

(From Table 3.14-D).

Emergency Spillway Design

21. Required spillway capacity $Q_e = Q_{25} - Q_p$ = 80 cfs.

22. Bottom width (b) = 22 ft.; the slope of the exit channel (s) = 27 ft./foot; and the minimum length of the exit channel (x) = 63 ft.
(From Table 3.14-C).

Anti-Seep Collar Design

23. Depth of water at principal spillway crest (Y) = 1 ft.

Slope of upstream face of embankment (Z) = 3 :1.

Slope of principal spillway barrel (S_b) = 0.5 %

Length of barrel in saturated zone (L_s) = 15 ft.

24. Number of collars required = 2 dimensions = 2.0' x 2.0'

(from Plate 3.14-12).

Final Design Elevations

25. Top of Dam = 86

Design High Water = 86.7

Emergency Spillway Crest = 86.0

Principal Spillway Crest = 85.0

Dewatering Orifice Invert = 84.0

Cleanout Elevation = N/A

Elevation of Upstream Toe of Dam or Excavated Bottom of "Wet Storage Area" (if excavation was performed) = 84.0

LONGHILL STATION POND C PRE-DEVELOPMENT

LONGHILL STATION POND C PRE-DEVELOPMENT

INPUT DESIGN DATA

DESIGN STORM FOR ANALYSIS = 2 YEAR
DRAINAGE AREA (ACRES) = 26.78
AVERAGE SLOPE OF DRAINAGE AREA (%) = 1.9
HYDRAULIC LENGTH (FT) = 1750
IMPERVIOUS SURFACE (%) = 7
HYDRAULIC LENGTH MODIFIED (%) = 4
COMPOSITE CURVE NUMBER = 68
SLOPE ADJUSTMENT FACTOR = 1.24
PONDING ADJUSTMENT FACTOR = .92

RESULTS OF HYDRAULIC CALCULATIONS
(SCS TR-55 & TP-149 PROCEDURES)

WATERSHED LAG ADJUSTED (IMPER. AREAS & CHAN. IMPROV.) IS .468 HOURS
TIME OF CONCENTRATION ADJUSTED IS .781 HOURS
THE PEAK DISCHARGE FROM THIS WATERSHED IS 13 C.F.S.

THE FOLLOWING ARE TIME INCREMENTS AND ORDINATES OF THE
INFLOW HYDROGRAPH

(HOURS)	(C.F.S.)
0,0	
.187	0
.375	0
.562	.056
.749	.814
.937	4.534
1.124	9.291001
1.311	13.469
1.499	12.909
1.686	10.547
1.874	7.312
2.061	4.11
2.248	1.33
2.436	.327
2.623	0

LONGHILL STATION POND C POST-DEVELOPMENT

LONGHILL STATION POND C POST-DEVELOPMENT

INPUT DESIGN DATA

DESIGN STORM FOR ANALYSIS = 2 YEAR
DRAINAGE AREA (ACRES) = 26.78
AVERAGE SLOPE OF DRAINAGE AREA (%) = 1.9
HYDRAULIC LENGTH (FT) = 1750
IMPERVIOUS SURFACE (%) = 18.5
HYDRAULIC LENGTH MODIFIED (%) = 11
COMPOSITE CURVE NUMBER = 70
SLOPE ADJUSTMENT FACTOR = 1.25
PONDING ADJUSTMENT FACTOR = .8

RESULTS OF HYDRAULIC CALCULATIONS
(SCS TR-55 & TP-149 PROCEDURES)

WATERSHED LAG ADJUSTED (IMPER. AREAS & CHAN. IMPROV.) IS .387 HOURS
TIME OF CONCENTRATION ADJUSTED IS .645 HOURS
THE PEAK DISCHARGE FROM THIS WATERSHED IS 16 C.F.S.

THE FOLLOWING ARE TIME INCREMENTS AND ORDINATES OF THE
INFLOW HYDROGRAPH

(HOURS)	(C.F.S.)
0,0	
.155	.016
.309	.071
.464	.344
.619	1.673
.774	5.943
.928	11.391

1.083	15.673
1.238	15.148
1.393	12.19
1.547	8.354
1.702	4.649
1.857	1.592
2.012	.338
2.166	0

STAGE (FT)	DISCHARGE (CFS)	STORAGE (CF)
0	0	0
.5	.26	4394
1	.41	9351
1.5	5.54	14545
2	6.33	19900
2.5	26.1	26070

THE FOLLOWING ARE TIME INCREMENTS AND ORDINATES OF THE OUTFLOW HYDOGRAPH

(HOURS)	(C.F.S.)
0.000	0.000
0.155	0.002
0.309	0.008
0.464	0.041
0.619	0.163
0.774	0.352
0.928	4.602
1.083	6.222
1.238	12.059
1.393	10.374
1.547	6.721
1.702	6.079
1.857	5.675
2.012	3.902
2.166	2.218
2.321	1.261
2.476	0.717
2.631	0.410
2.785	0.403
2.940	0.396
3.095	0.390
3.250	0.383
3.404	0.377
3.559	0.370
3.714	0.364
3.869	0.358
4.023	0.352
4.178	0.346
4.333	0.341
4.487	0.335
4.642	0.329
4.797	0.324
4.952	0.318
5.106	0.313
5.261	0.308
5.416	0.303
5.571	0.298
5.725	0.293
5.880	0.288

MAXIMUM OUTFLOW IS 12.059 C.F.S. 86.15
MAXIMUM STAGE IS 2.144891 FT.
MAXIMUM STORAGE IS 21687 CUBIC FEET

LONGHILL STATION POND C POST-DEVELOPMENT

LONGHILL STATION POND C POST-DEVELOPMENT

INPUT DESIGN DATA

DESIGN STORM FOR ANALYSIS = 10 YEAR
DRAINAGE AREA (ACRES) = 26.78
AVERAGE SLOPE OF DRAINAGE AREA (%) = 1.9
HYDRAULIC LENGTH (FT) = 1750
IMPERVIOUS SURFACE (%) = 18.5
HYDRAULIC LENGTH MODIFIED (%) = 11
COMPOSITE CURVE NUMBER = 70
SLOPE ADJUSTMENT FACTOR = 1.25
PONDING ADJUSTMENT FACTOR = .81

RESULTS OF HYDRAULIC CALCULATIONS
(SCS TR-55 & TP-149 PROCEDURES)

WATERSHED LAG ADJUSTED (IMPER. AREAS & CHAN. IMPROV.) IS .387 HOURS
TIME OF CONCENTRATION ADJUSTED IS .645 HOURS
THE PEAK DISCHARGE FROM THIS WATERSHED IS 46 C.F.S.

THE FOLLOWING ARE TIME INCREMENTS AND ORDINATES OF THE
INFLOW HYDROGRAPH

(HOURS)	(C.F.S.)
0,0	
.155	.3
.309	.985
.464	2.919
.619	8.3
.774	21.324
.928	36.096
1.083	45.929
1.238	42.55
1.393	33.353
1.547	22.237
1.702	11.871
1.857	3.861
2.012	.806
2.166	0

STAGE (FT)	DISCHARGE (CFS)	STORAGE (CF)
0	0	0
.5	.26	4394
1	.41	9351
1.5	5.54	14545
2	6.33	19900
2.5	26.1	26070
3	85.6	33080

THE FOLLOWING ARE TIME INCREMENTS AND ORDINATES OF THE
OUTFLOW HYDOGRAPH

(HOURS)	(C.F.S.)
0.000	0.005
0.155	0.026
0.309	0.088
0.464	0.264
0.619	2.910
0.774	15.476
0.928	46.160
1.083	43.461
1.238	35.718
1.393	25.082
1.547	17.510

1.702	8.414
1.857	6.024
2.012	5.581
2.166	3.354
2.321	1.907
2.476	1.084
2.631	0.616
2.785	0.408
2.940	0.401
3.095	0.394
3.250	0.388
3.404	0.381
3.559	0.375
3.714	0.368
3.869	0.362
4.023	0.356
4.178	0.350
4.333	0.344
4.487	0.339
4.642	0.333
4.797	0.327
4.952	0.322
5.106	0.317
5.261	0.311
5.416	0.306
5.571	0.301
5.725	0.296
5.880	0.291

MAXIMUM OUTFLOW IS 46.16 C.F.S.
MAXIMUM STAGE IS 2.668572 FT.
MAXIMUM STORAGE IS 28433 CUBIC FEET

LONGHILL STATION POND C POST-DEVELOPMENT

LONGHILL STATION POND C POST-DEVELOPMENT

INPUT DESIGN DATA

DESIGN STORM FOR ANALYSIS = 25 YEAR
DRAINAGE AREA (ACRES) = 26.78
AVERAGE SLOPE OF DRAINAGE AREA (%) = 1.9
HYDRAULIC LENGTH (FT) = 1750
IMPERVIOUS SURFACE (%) = 18.5
HYDRAULIC LENGTH MODIFIED (%) = 11
COMPOSITE CURVE NUMBER = 70
SLOPE ADJUSTMENT FACTOR = 1.94
PONDING ADJUSTMENT FACTOR = .85

RESULTS OF HYDRAULIC CALCULATIONS
(SCS TR-55 & TP-149 PROCEDURES)

WATERSHED LAG ADJUSTED (IMPER. AREAS & CHAN. IMPROV.) IS .387 HOURS
TIME OF CONCENTRATION ADJUSTED IS .645 HOURS
THE PEAK DISCHARGE FROM THIS WATERSHED IS 93 C.F.S.

GEOTECHNICAL ENGINEERING STUDY REPORT
LONGHILL SUBDIVISION – SECTION I
EARTHEN DAM CERTIFICATION – POND C
JAMES CITY COUNTY, VIRGINIA
FES PROPOSAL NO. 1-83151.043

CLIENT: MR. KEN DODD

PC020

JUN 2003
RECEIVED
ENVIRONMENTAL DIVISION

APPROVED
James City County
Environmental Division
By: _____
Date: 6-25-03

Geotechnical Engineering Study Report
Longhill Station Subdivision, Section I
Earthen Dam Certification – Pond C
James City County, Virginia

Prepared for

Atlantic Homes, LLC

Prepared by

Foundation Engineering Science, Inc.

February 13, 2003

FOUNDATION ENGINEERING SCIENCE, INC.

- Drilling Services [Geotechnical & Environmental]
- Geotechnical Engineering [Shallow & Deep Foundations, Retaining Walls & Pavement Design]
- Environmental Management [Phase I & II]
- Construction Inspection Services [Quality Control & Quality Assurance]
- Foundation/Structure & Pavement Distress Evaluations
- Value Engineering During Design & Construction
- Design & Build Segmental Reinforced Retaining Walls [SRRW]

Mr. Ken Dodd
Atlantic Homes, LLC
10 San Jose Drive
Newport News, Virginia 23606

February 13, 2002

Re: Geotechnical Engineering Study Report
Longhill Subdivision - Section I
Earthen Dam Certification – Pond C
James City County, Virginia
FES Report No. 1-83151.043

Dear Mr. Dodd:

Foundation Engineering Science, Inc. (FES) has completed a geotechnical engineering study at the existing project site. This geotechnical engineering study was performed in general accordance with FES Proposal No. NP706.001, dated July 29, 2002, following your written authorization on August 1, 2002 and per your request to delay field testing due to limited access to the site and your verbal authorization on august 6, 2002 to start back the field testing. Additionally, the geotechnical engineering study report was delayed due to unavailability of the approved plans and as built plans from DJG, Inc. as we discussed few times on the phone with you. The geotechnical engineering study consisted of performing two (2) Standard Penetration Test (SPT) borings to an approximate depth of twenty (20) feet below the existing grades, obtained one (1) bulk soil sample for laboratory testing, performed one (1) hand auger boring to six (6) feet in depth, performed one (1) field permeability test and performed compaction density tests on the final grade for the existing Earthen Dam.

Briefly, the results of our analyses indicated that there were silty sand (SM) and sandy clay (CL) within the borings performed. The sandy clay (CL) soils are acceptable for use as fill material for the core of the earthen dam. Additionally, all the soils are acceptable as fill material for the earthen dam embankment [outer shell].

The side slopes of the earthen dam appear to be greater than three (3) horizontal to one (1) vertical [3H:1V] as shown in the plans. The contour lines shown on the plans appear to be 3H:1V. The global stability indicated that the down stream slopes will not be breached during a flooded condition, based on a factor of safety of greater than one (1) for a draw down analysis.

Briefly the results of our analysis and on-site visits indicated that the earthen dam was constructed by excavating natural soils and the embankment material placed was approximately two (2) feet. The back slope of the earthen dam is equal to the existing natural ground elevation, in this regard, FES expects no stability concerns during flooded conditions.

11843-B CANON BOULEVARD ► NEWPORT NEWS, VIRGINIA 23606 ► PHONE: 757-873-4113 FAX: 757-873-4114
PC020_PC021_PC022_PC119_PC120_LONGHILL_STATION 032

FES did not inspect the earthen dam during construction. Additionally, the existing subgrade in the earthen dam area and the key trench were not evaluated prior to placement of the fill materials. The concrete cradle was not inspected.

FES appreciates the opportunity to be of service to the **Atlantic Homes, LLC** on this important project and looks forward to its approval. If we can be of any further assistance or you have any questions regarding this report, please do not hesitate to contact the undersigned.

Respectfully submitted,

FOUNDATION ENGINEERING SCIENCE, INC.

Idres Hawarry
Project Engineer

2/14/03

Raja S. El-Awar, P.E.
Principal Engineer
VA Reg. No. 26383

COMMONWEALTH OF VIRGINIA
RAJA S. ELAWAR
No. 026383
PROFESSIONAL ENGINEER

Attachments: *Appendix*

Figure- 1 USDA Soil Survey Map
Figure- 2 USGS Quadrangle Map
Figure- 3 Permeability and Borings Location Sketch
Figure- 4 Compaction Density Test Locations
Borings Profile Sheets
Laboratory Testing Program Results

X Copies: *(1) James City County – Environmental Division, Mr. Scott Thomas, P.E.*

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1.0 INTRODUCTION

1.1 Site Characteristics and Project Information

The project site is located in James City County, Virginia. Specifically, the project site is located within the Longhill Station Subdivision, Section 1A along Longhill Station Road. The site currently contains one (1) existing Earthen Dam and is identified in the project plans as Pond C.

Our review of the project plans and specifications prepared by DJG, Inc., dated May 26, 1995 and revised dated January 29, 1996 indicated that the dimension for the earthen dam are approximately 180 feet in length and ranges approximately from 40 to 60 feet in plan width [toe to toe]. The side slopes are three (3) horizontal to one (1) vertical [3H:1V], the plans did not show design high water elevation in Pond C.

2.0 PURPOSE AND SCOPE OF SERVICES

The purpose of this study was to obtain information on the soils located within the Earthen Dam and degree of compaction of the soils placed for the existing Earthen Dam. The existing materials encountered were then evaluated with respect to the available project information and site characteristics. In this regard, the following items were formulated:

1. Development of shallow and deep subsurface soil and ground water conditions at the existing Earthen Dam area.

2. Performed compaction density testing on the final grade and approximately one (1) to two (2) feet below the final grade to develop correlation between the Standard Penetration Test (SPT) boring N-values and relative compaction.

3. General location and description of potentially deleterious materials encountered in the borings performed, including existing fills or surficial organic.

4. Certify the existing Earthen Dam in general accordance with the plans and specifications. If the existing Earthen Dam does not meet the approved project plans and specifications and James City County requirements, FES will provide parameters required for improving and/or replacing the existing Earthen Dam.

The following services were provided in order to achieve the preceding objectives:

1. Reviewed readily available published geologic and topographic information. This published information was obtained from quadrangle maps published by the United States Geologic Survey (USGS) and Soil Survey published by the United States Department of Agriculture (USDA) Soil Conservation Service (SCS), if available.

2. FES executed a program of subsurface exploration that consisted of subsurface sampling, filed and laboratory testing.

3. Performed one (1) hand auger boring to six (6) feet in depth and obtained one (1) bulk soil sample for laboratory testing and analyses. The bulk sample was collected from the existing materials placed for the existing Earthen Dam area. FES performed one (1) field permeability test within the existing Earthen Dam fill materials.

4. Visually classified and stratified representative soil samples in the laboratory using the Unified Soil Classification System (USCS)), in general accordance with ASTM D-2487 and D-2488. Conducted a laboratory program, that consisted of performing natural moisture content [ASTM D-2216], Atterberg Limits [ASTM D-4318], grain size determination [(-#200) ASTM D-1140] and moisture-density relationships [Standard Proctor, ASTM D-698] tests.

5. Collected ground water level measurements in the borings performed.

6. The results of the field exploration and laboratory testing program were utilized in performing engineering evaluation, analysis and in the formulation of suitability and stability of the existing Earthen Dam. The results of the field exploration, laboratory testing program, conclusions and recommendations are presented in a comprehensive geotechnical engineering study report prepared by an **FES** experienced Professional Engineer registered in the Commonwealth of Virginia.

2.1 Report Format

This report begins with a discussion of the field and laboratory programs followed by a description of the general subsurface conditions, field permeability testing, compaction density testing, suitability of the existing materials within the existing Earthen Dam and report limitations. The USDA soil survey, USGS quadrangle map, the borings and sample location and compaction density test location sketches are presented in Figures 1, 2, 3 and 4, respectively in the Appendix of this report. Additionally, the boring profile sheets and laboratory test figures are also presented in the Appendix of this report.

3.0 FIELD EXPLORATION

3.1 General

A total of two (2) Standard Penetration Test (SPT) borings were drilled within the existing Earthen Dam area to explore the general soil types. The SPT borings were drilled to an approximate depth of twenty (20) feet below the existing top of the Earthen Dam grades. The approximate location of the borings is illustrated in Figure 3. Performed one (1) hand auger boring, one (1) field permeability test and obtained one (1) bulk soil sample for the laboratory testing program.

3.2 SPT Borings

The SPT borings were performed with the use of an All Terrain Vehicle (ATV) mounted drill rig by utilizing hollow steam auger (HSA) procedures. The soil sampling was performed in general accordance with the American Society of Testing and Materials (ASTM) Test Designation D-1586. These samples were taken continuously from the final grade to an approximate depth of twenty (20) feet below the final/existing grade elevations. Representative portions of these soil samples were collected, labeled and transported to our office for laboratory testing, analysis and classification.

3.3 Bulk Soil Sampling

One (1) bulk soil sample was obtained in the field from the existing materials placed for the Earthen Dam at approximate depths ranging from one (1) to two (2) feet below the existing subgrade elevations. The location of the bulk soil sample is shown in Figure 3 in the Appendix of this report.

3.4 Auger Boring

The auger boring was performed with the use of a three (3) inch bucket auger, the soil sampling was performed in general accordance with American Society for Testing and Materials (ASTM) test designation D-1452, titled "Soil Investigation and Sampling by Auger Borings". The soil samples were obtained virtually continuously from the ground surface to boring termination an approximate depth of six (6) feet below the final grades. Representative portions of these soil samples were collected, labeled and transported to our office for laboratory testing, analysis and classification.

3.5 Field Permeability

One (1) field permeability test [open-hole, falling head method] were performed by installing a two (2) inch inside diameter PVC pipe (ground water observation well) with flush joints to an approximate depth of six (6) feet below the existing grades. The permeability testing equipment consisted of a PVC pipe with a close-ended section and a twenty-four (24) inch screen (using a 0.01-inch slot size opening) from four (4) to six (6) feet below the existing grades. Coarse sand (#2) was backfilled to six (6) inches above the screened annual space of the well, followed by a six (6) inch bentonite seal placed over the sand. The purpose of this construction method was to restrict upward (test) water flow between the well hole and the outside wall of the augered hole.

The wells were developed by pumping water into them and allowing them to soak for a period of one (1) hour. Following a soaking period of one (1) hour, water was added until it reached the top of the well casing and allowed to fall a known distance over a measured time. This procedure was repeated a minimum of three (3) times or until time deviation between the tests was less than ten (10) percent.

The collected field data was utilized in the equation found in the "Stormwater Retention Pond Infiltration Analyses in Unconfined Aquifers" for determining the coefficient of permeability of the subject soil stratum. The infiltration rates calculated are presented in tabular format below:

TEST LOCATION	PB-1
PERMEABILITY (In/hr)	5.7

4.0 LABORATORY TESTING

4.1 General

The soil samples were transported to our laboratory and were classified by an experienced Geologist and Geotechnical Engineer using the Unified Soil Classification System (USCS) in general accordance with ASTM test designations D-2487 and D-2488.

4.2 Tests Performed

Representative soil samples were subjected to a laboratory program. The laboratory program consisted of performing natural moisture content [ASTM D-2216], Atterberg Limits [ASTM D-4318], grain size determination [(-#200) ASTM D-1140] and moisture-density relation ship [Standard Proctor ASTM D-698] tests. The laboratory test results are presented in tabular formats below and in the Appendix of this report.

LABORATORY TEST	ASTM PROCEDURE	NO. OF TESTS
Moisture Content Determination	ASTM D-2216	5
Grain-Size Determination (-#200 Sieve)	ASTM D-1140	5
Atterberg Limits (Liquid and Plastic)	ASTM D-4318	3
Moisture-Density Relationship (Std. Proctor)	ASTM D-698	1

4.3 Test Results

LOCATION	APPROX. SAMPLE DEPTH (Feet)	NATURAL MOIST. CONTENT (%)	#200 SIEVE (%)	ATTERBERG LIMITS		USCS	OPT. MOIST. CONTENT (%)	MAX. DRY DENSITY (pcf)	CBR VALUE (%)
				LL (%)	PI (%)				
Proctor-1	1.5	6.2	30.5	---	NP	SM	11.5	116.5	---
FES-1	5	13.2	50.3	31	22	CL	---	---	---
FES-1	7	19.0	77.0	45	22	CL	---	---	---
FES-2	3	8.4	37.0	---	---	SM	---	---	---
FES-2	7	17.5	71.1	38	18	CL	---	---	---

5.0 GENERALIZED SUBSURFACE CONDITIONS

5.1 USGS Topographic Survey

The topographic survey map published by the United States Geological Survey titled "Williamsburg, Virginia" dated 1984, was reviewed for ground surface features at the proposed project location. Based on this review, the natural ground surface elevation approximately fifty (50) to sixty (60) feet National Geodetic Vertical Datum (NGVD) of 1929. The USGS topographic map for the project vicinity is presented in Figure 1 in the Appendix of this report.

5.2 USDA Soil Survey

The "James City County, Virginia" Soil Survey, developed by the United States Department of Agriculture (USDA) Soil Conservation Service (SCS), was reviewed for general near-surface soil information within the general site vicinity. This information indicated that there are three (3) primary mapping units (11C and 14B) within the proposed site area. The USDA Soil Conservation Service (SCS) Survey map for the project vicinity is presented in Figure 2 in the Appendix of this report. The map soil units encountered are as follows:

SOIL SERIES	DEPTH (IN.)	SOIL DESCRIPTION	USCS	USDA SEASONAL HIGH GROUNDWATER TABLE (%)		K [2] (IN/HR)	SHRINK/ SWELL POTENTIAL
				DEPTH (FEET)	MON.		
Craven (11C)	0 – 9	Fine sandy loam	ML, CL-ML,	2.0 – 3.0	Dec –Apr	0.6 – 2.0	Low
	9 – 30	Clay, silty clay, silty clay, loam	SM, SM-SC CH			0.06 – 0.2	Moderate
	30 – 72	Sandy clay loam, sandy loam, fine, sandy loam	SM, SM-SC, SC			0.2 – 6.0	Low
Emporia (14B)	0 – 13	Fine sandy loam	CL, SC, SM, ML	3.0 – 4.5	Nov – Apr	2.0 – 6.0	Low
	13 – 37	Sandy clay loam, Sandy loam, Clay loam	SC, CL			0.2 – 2	Low
	37 – 58	Sandy clay loam, Clay loam, Sandy clay	SC, CL			0.06 – 0.6	Moderate
	58 – 75	Stratified sandy loam to clay loam	SM, SC, ML, CL			0.06 – 2.0	Moderate

[1] USCS = Unified Soil Classification System
[2] K = Permeability

5.3 General

Soil stratification was based on visual examination of the recovered soil samples, laboratory testing and interpretation of the field boring log by an experienced Geologist and Geotechnical Engineer. The boring stratification lines represent the approximate boundaries between soil types of significantly different engineering properties; however, the actual transition may be gradual. In some cases, small variations in properties not considered pertinent to our engineering evaluation may have been abbreviated or omitted for clarity. The boring profiles present the conditions at the particular boring location and variations do occur among the borings and between soil samples.

5.4 Subsurface Soil Conditions

The subsurface soils encountered at each structure location have been summarized and are presented in tabular format below:

BORING LOCATION	SOIL LAYER	SOIL DESCRIPTION	DEPTH RANGE (FEET)	AVARAGE SPT "N" VALUES (BPF)	AASHTO SYMBOL
FES-1	1	Light brown, dry to moist, silty SAND with roots "Topsoil"	0 – 0.5	---	SM
	2	Light brown to brown, moist, silty SAND	0.5 – 4	9	SM
	3	Light brown, moist, sandy CLAY	4 – 10	10	CL
	4	Reddish brown, moist, silty SAND	10 – 20	11	SM
Ground Water Conditions: The ground water table was not encountered in the borings performed on August 9, 2002.					

BORING LOCATION	SOIL LAYER	SOIL DESCRIPTION	DEPTH RANGE (FEET)	AVARAGE SPT "N" VALUES (BPF)	AASHTO SYMBOL
FES-2	1	Light brown, dry to moist, silty SAND with roots "Topsoil"	0 – 0.5	---	SM
	2	Light brown, moist, silty SAND	0.5 – 6	7	SM
	3	Reddish brown, moist, sandy CLAY with trace silt	6 – 8	10	CL
	4	Light brown to tan, moist, silty SAND	8 – 20	11	SM
AB-1	1	Light brown, dry to moist, silty SAND with roots "Topsoil"	0 – 0.5	---	SM
	2	Light brown to reddish brown, moist, silty SAND	0.5 – 6	---	SM
Ground Water Conditions: The ground water table was not encountered in the borings performed on August 9, 2002.					

Based on our extensive experience with similar soil types, it is expected that the majority of the subsurface soils encountered within the borings performed, will consist of cohesive and cohesion less soils. Please refer to the soil boring profiles located in the Appendix of this report for specific information at each boring location.

5.5 Ground Water Conditions

The ground water table was not encountered in the SPT borings performed during the field exploration program on August 9, 2002. Ground water levels tend to fluctuate in response to variations in seasonal rainfall, infiltration, site topography and drainage. Based on the soil conditions encountered and the USGS Topographic Map, FES estimates the seasonal normal high ground water level to be encountered at an approximate depth of three (3) feet below the existing grades. However, a "perched" ground water condition, which dissipates with time may be encountered within the top three (3) feet following periods of significant rainfall during and immediately following the wet season.

6.0 EARTEN DAM SOIL SUITABILITY AND STABILITY

6.1 Soil Suitability

The sandy clay (CL) soils are acceptable material for the core of the Earthen Dam. Additionally, all the soils are suitable as fill material for the Earthen Dam embankment [outer shell].

6.2 Stability

FES representative performed slope stability analyses by a two-dimensional limit equilibrium method using the computer program PCSTABL6. This program was developed at Purdue University under sponsorship of the Federal Highway Administration (FHWA). The program uses the method of slices to determine the safety factor against deep seated circular failure.

Using a 2.75H:1V and 2.33H:1V side slopes, we evaluated the stability against slope failure at the highest embankment of eight (8) feet. The soil parameters were developed from the SPT borings performed for the existing Earthen Dam. Input data for the subsurface soils were obtained using general correlations from laboratory test data and Standard Penetration Test N-values.

The global stability safety factors for the Earthen Dam and the draw down analysis were computed to be 1.5 and 1.1, respectively [the required design factors of safety for the assumed design embankment and draw down should be 1.25 and 1.0, respectively]. The computed factors of safety for the assumed highest embankment met the required factors of safety.

7.0 COMPACTION DENSITY TESTING

Foundation Engineering Science, Inc. (FES) performed compaction density testing on the final subgrade material for the existing Earthen Dam. These tests were performed in general accordance with the American Society for Testing and Materials (ASTM) Test Designation D-2922, titled "Compaction Density Testing with Portable Nuclear Gauge". The results of the compaction density tests are tabulated below:

FIELD COMPACTION DENSITY REPORT[1]

Gauge #	26814	Model #	3430	Density Std. Ct.	2516	Moisture Std. Ct.	633	FES REP.:	CD

Proctor	Dry Density[2] (pcf)	Opt. Moist. (%)	Passing #200[3] (%)	Material Description & Classification[4]	Source	Compaction Requirement
1	116.5	11.5	30.5	Brown silty SAND (SM)	On-site	Moderate effort

TEST NO.	DEPTH (inches)	ELEVATION (feet)	PROC. NO.	D.D. (PCF)	MOIST (%)	W.D. (PCF)	% COMP	PASS	FAIL	
1	12	Final Subgrade	1	111.1	5.5	117.2	95.3	X		Low Moisture
2	12	Final Subgrade	1	110.8	8.0	119.0	95.1	X		Low moisture
3	12	Final Subgrade	1	110.7	8.4	120.0	95.0	X		Low moisture

TEST NO.	TEST LOCATION
1	Site No. 1, See Attached Figure 4
2	Site No. 2, See Attached Figure 4
3	Site No. 3, See Attached Figure 4

SPEC. REQUIREMENTS	Utility Trench	Sidewalk	Structure	Roadway/Parking	Earthen Dam
COMPACTION (%)					95.0
MOISTURE (%)					O.M. ± 20
Comments					

Compaction density testing was performed in general accordance with [1]ASTM D2922, [2]ASTM D698, [3]ASTM D1140, [4]ASTM D2488

A correlation between the SPT N-values and the relative density was developed based on the laboratory test data shown above. The relative density of the subsurface soils within the upper ten (10) feet of the Earthen Dam indicates that the compaction is approximately

CORRELATION BETWEEN SPT N-VALUES & RELATIVE DENSITY				
TEST LOCATION	N-VALUE (BPF)	WET DENSITY (PCF)	RELATIVE COMPACTION (%)	REMARKS
1	9	117.2	95.3	Pass
2	8	119.0	95.1	Pass
3	8	120.0	95.0	Pass

8.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the results of the subsurface exploration and laboratory testing programs, our site observations, engineering judgment, review of the plans and specifications, the following conclusions and recommendations are presented.

1. Compaction density testing was performed on the final/existing grade elevations. The subgrade soils were compacted to 95.0 percent of the laboratory maximum dry density in general accordance with ASTM D-698 [Standard Proctor] and to an approximate depth of twelve (12) inches. Based on the limited tests performed, **the fill material within the final grade of the earthen dam placed appears to meet the intent of the project plans and specifications.** Additionally, the fill material placed within the earthen dam embankment appears to have been compacted to a minimum relative density on the order of 90.0 percent of the laboratory maximum dry density. A minimum relative compaction of 90.0 percent is sufficient for similar projects.

2. The existing soils encountered within the earthen dam are sandy clay (CL) and silty sand (SM) soils. The sandy clay (CL) **soils are acceptable as core and embankment fill** materials. The silty sand (SM) soils are acceptable as fill materials for the outer shells of the earthen dam (embankment).

3. The side slopes of the earthen dam appears to be three (3) horizontal to one (1) vertical [3H:1V] as shown in the as built plans. Additionally, the down stream elevation is the same as the existing ground surface elevation, in this regard, **FES expects no stability concerns during flooded conditions.**

4. The global stability indicated that the down stream slopes will be stable during a flooded condition, based on a factor of safety of 1.1 which is greater than 1.0 for a draw down analysis.

5. Inspection was not performed during construction of the earthen dam. However, the earthen dam was excavated to below the natural existing grades.

6. Considering that a core was not constructed and the material encountered within the Earthen Dam consisted of silty sand (SM) and sandy clay (CL), the storm water management area of the dam may not be impounded due to the presence of silty sand (SM) within the embankment and core.

7. During extended and heavy rain fall events, the water within the Earthen Dam will rise but may not rise enough to seep through the over flow structure, thus seeping through the embankment of the Earthen Dam. However, above design storm events may occur thus overflowing above the embankment of the Earthen Dam.

9.0 REPORT LIMITATIONS

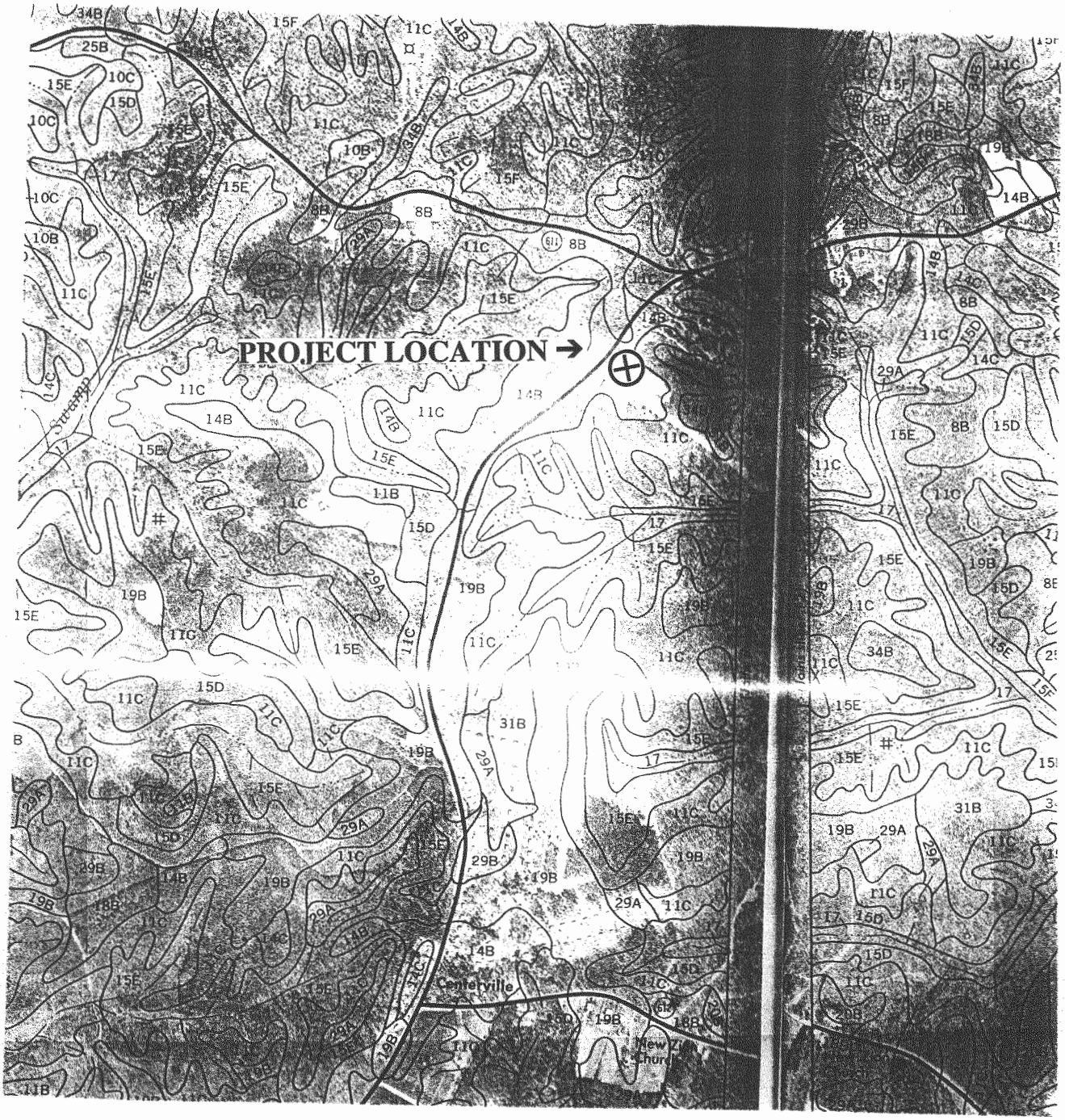
The engineering evaluation and analysis have been developed on the basis of the previously described project characteristics and subsurface conditions. These engineering evaluation and analysis were developed from the information obtained in the test borings, which depict subsurface conditions only at these specific locations and at the particular time designated on the boring profiles. Soil conditions at other locations may differ from conditions occurring at these boring locations. In addition, the passage of time may result in a change to the soil conditions at these boring locations.

Our professional services have been performed, our findings obtained, and our engineering evaluation and analysis prepared in accordance with generally accepted Geotechnical Engineering Principles and Practices. Foundation Engineering Science, Inc. is not responsible for the conclusions, opinions or recommendations made by others based on this geotechnical engineering study report.

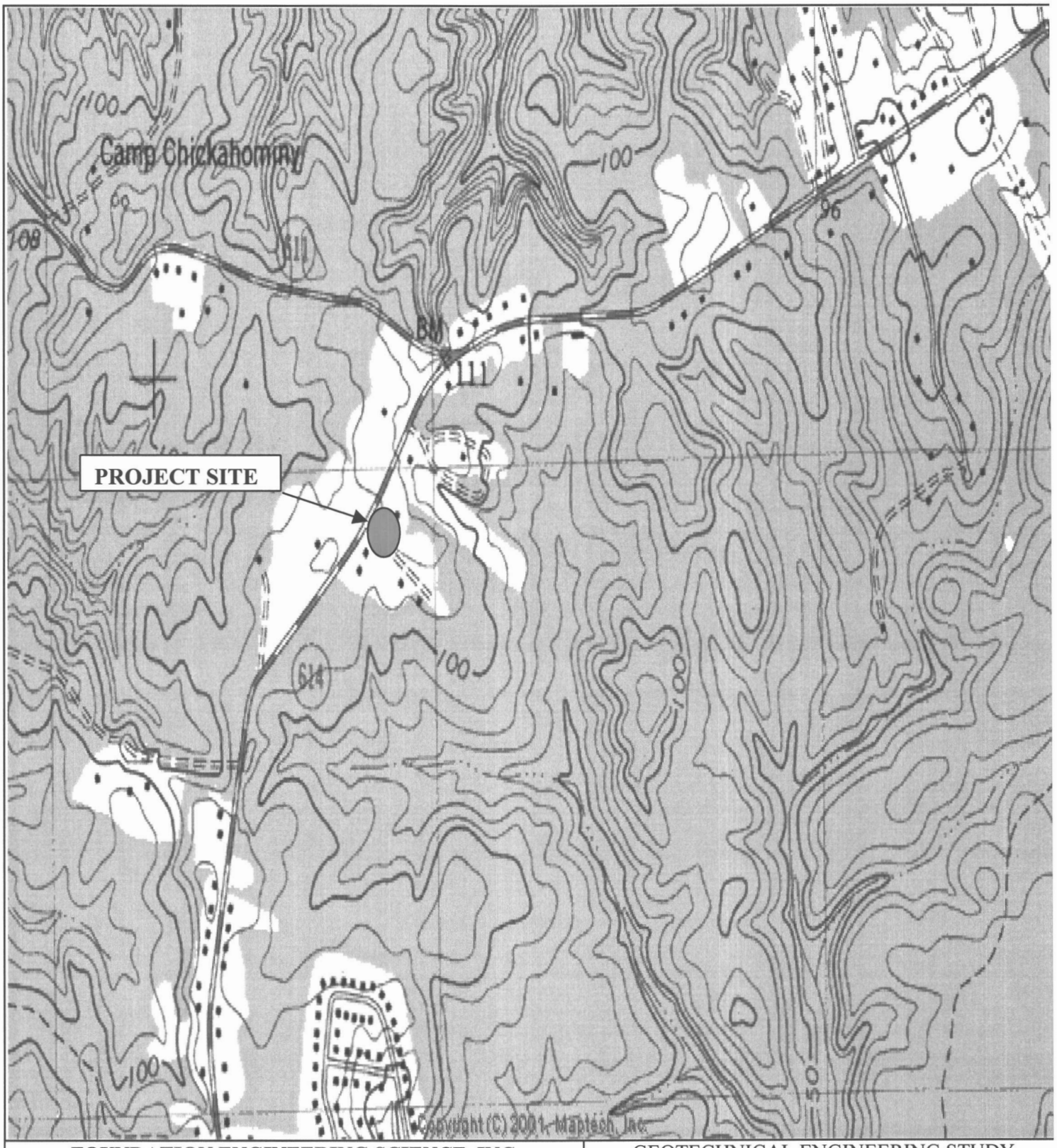
APPENDIX

FIGURES

Figure 1 – USDA Soil Survey Map
Figure 2 - USGS Quadrangle Map
Figure 3 – Boring & Sample Location Sketch
Figure 4 – Compaction Density Test Location Sketch



FOUNDATION ENGINEERING SCIENCE, INC. GEOTECHNICAL, ENVIRONMENTAL & CONSTRUCTION INSPECTION 11843-B CANON BOULEVARD NEWPORT NEWS, VIRGINIA 23606 PHONE: 757-873-4113 FAX: 757-873-4114 EMAIL: RELAWAR@FESVA.COM			GEOTECHNICAL ENGINEERING STUDY **LONGHILL SUBDIVISION, SECTION I** **EARTHEN DAM CERTIFICATON** JAMES CITY COUNTY, VIRGINIA
DATE: **AUGUST 9, 2002**	SCALE: **N/A**	FES REPORT NO. **1-83151.043**	**FIGURE – 1** **USDA SOIL SURVEY MAP**



FOUNDATION ENGINEERING SCIENCE, INC.
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GEOTECHNICAL ENGINEERING STUDY

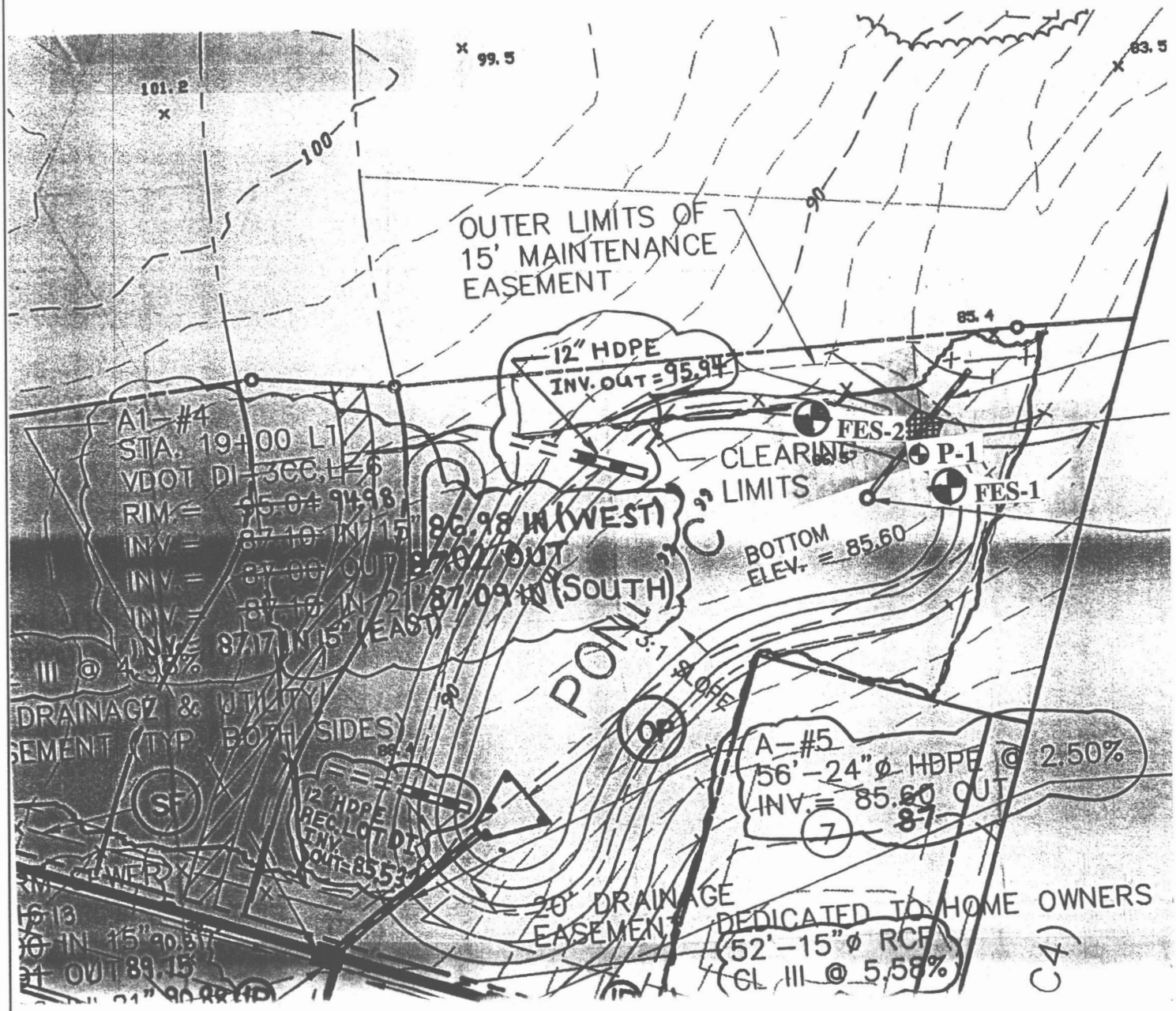
LONGHILL SUBDIVISION, SECTION I
EARTHEN DAM CERTIFICATON

JAMES CITY COUNTY, VIRGINIA

DATE:	SCALE:	FES REPORT NO.
AUGUST 9, 2002	**N/A**	**1-83151.043**

FIGURE – 2

USGS QUADRANGLE MAP



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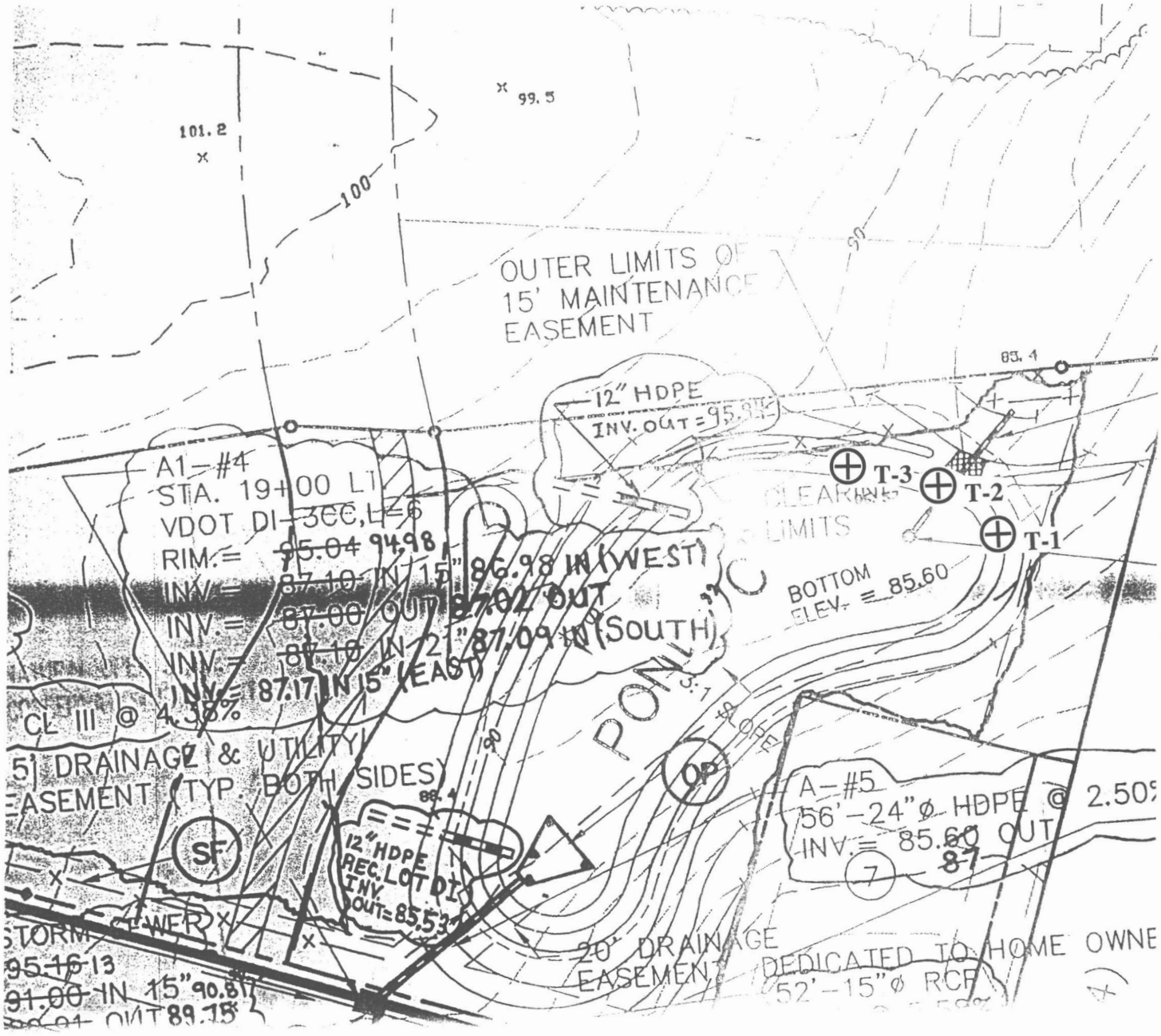
DATE: **AUGUST 9, 2002**	SCALE: **N/A**	FES REPORT NO. **1-83151.043**	**FIGURE – 3** **PERMEABILITY, BORING AND SAMPLE LOCTIONS SKETCH**



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DATE: **AUGUST 9, 2002**	SCALE: **N/A**	FES REPORT NO. **1-83151.043**	**FIGURE – 4** **FIELD COMPACTION DENSITY LOCATION SKETCH**

BORINGS PROFILE SHEETS

FES

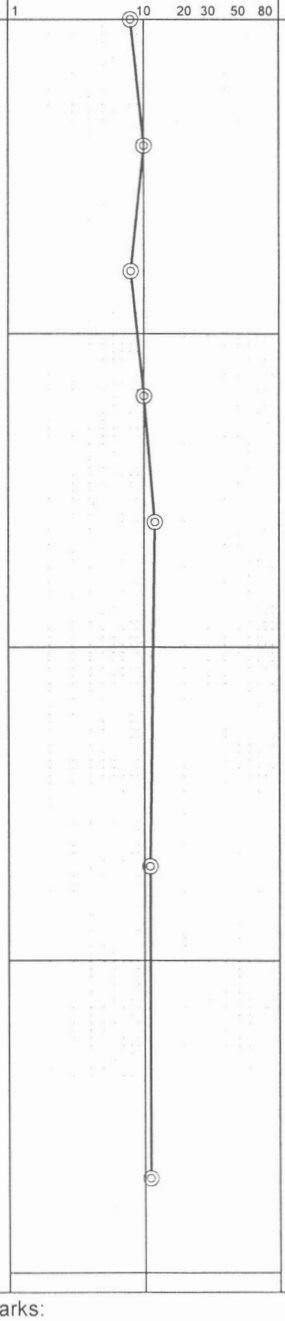
FOUNDATION ENGINEERING SCIENCE, INC.

· Geotechnical Engineering
· Environmental Management
· Construction Materials Testing

11843-B Canon Boulevard
Newport News, Virginia 23606
Phone: 757-873-4113 Fax:757-873-4114
Email: relawar@fesva,com

PROJECT NAME:	Longhill Station	PROJECT NO.:	1-83151
CLIENT:	Atlantic Homes, LLC.	DRILLING METHOD:	HSA
PROJECT LOCATION:	James City County, Virginia	OBSERVED G.W.T.:	Not Encountered
BORING LOCATION:	See Figure 3	STATION NO.:	

ELEVATION (Feet)	DEPTH (Feet)	SOIL LEGEND & SAMPLE TYPES	SAMPLE NO.	SOIL CLASSIFICATION	MATERIAL DESCRIPTION	SPT, N VALUE OR RQD %	STANDARD PENETRATION TEST N-VALUE (Blows/Ft)	HOLE COMPLETION & REMARKS
	0		1	SM	Light brown, dry to moist, silty SAND with roots	8		
				SM	"Topsoil"			
					Light brown, moist, silty SAND			
			2			10		
			3	CL	Light brown, moist, sandy CLAY	8		
	5							
			4			10		
			5			12		
	10			SM	Reddish brown, moist, silty SAND			
			6			11		
	15							
			7			11		
	20							



COMPLETION DEPTH:	20.0 feet
DATE BORING STARTED:	8/9/02
DATE BORING COMPLETED:	8/9/02
ENGINEER/GEOLOGIST:	IH
DRILLING CONTRACTOR:	FES

Sample Types:

- Auger Cutting
- Vane Shear
- SPT
- UD
- Penetrometer
- Rock Core

Remarks:

Unless otherwise noted, water encountered but not recorded

The stratification lines represent approximate boundaries.

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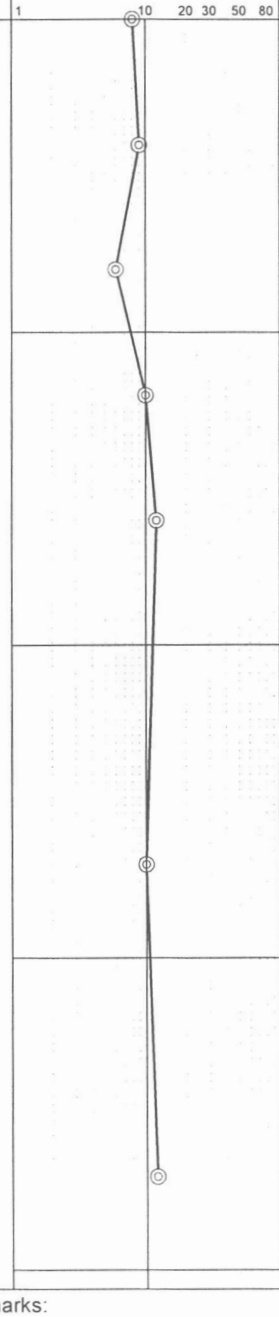
· Geotechnical Engineering
· Environmental Management
· Construction Materials Testing

11843-B Canon Boulevard
Newport News, Virginia 23606
Phone: 757-873-4113 Fax:757-873-4114
Email: relawar@fesva.com

PROJECT NAME:	Longhill Station	PROJECT NO.:	1-83151
CLIENT:	Atlantic Homes, LLC.	DRILLING METHOD:	HSA
PROJECT LOCATION:	James City County, Virginia	OBSERVED G.W.T.:	Not Encountered
BORING LOCATION:	See Figure 3	STATION NO.:	

ELEVATION (Feet)	DEPTH (Feet)	SOIL LEGEND & SAMPLE TYPES	SAMPLE NO.	SOIL CLASSIFICATION	MATERIAL DESCRIPTION	SPT, N VALUE OR RQD %
	0		1	SM	Light brown, dry to moist, silty SAND with roots "Topsoil"	8
				SM	Light brown, moist, silty SAND	
			2			9
			3			6
	5					
			4	CL	Reddish brown, moist, sandy CLAY with trace silt	10
			5	SM	Light brown to tan, moist, silty SAND	12
	10					
			6			10
	15					
			7			12
	20					

STANDARD PENETRATION TEST N-VALUE (Blows/Ft)



HOLE COMPLETION & REMARKS

COMPLETION DEPTH:	20.0 feet
DATE BORING STARTED:	8/9/02
DATE BORING COMPLETED:	8/9/02
ENGINEER/GEOLOGIST:	IH
DRILLING CONTRACTOR:	FES

Sample Types:

- Auger Cutting
- Vane Shear
- SPT
- UD
- Penetrometer
- Rock Core

Remarks:

Unless otherwise noted, water encountered but not

The stratification lines represent approximate boundaries.

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A

Sheet 1 c

PROJECT NAME:	Longhill Station	PROJECT NO.:	1-83151
CLIENT:	Atlantic Homes, LLC.	DRILLING METHOD:	Hand Auger
PROJECT LOCATION:	James City County, Virginia	OBSERVED G.W.T.:	Not Encountered
BORING LOCATION:	See Figure 3	STATION NO.:	

ELEVATION (Feet)	DEPTH (Feet)	SOIL LEGEND & SAMPLE TYPES	SAMPLE NO.	SOIL CLASSIFICATION	MATERIAL DESCRIPTION	SPT, N VALUE OR RQD %	STANDARD PENETRATION TEST N-VALUE ◎ (Blows/Ft) 1 10 20 30 50 80	HOLE COMPLETION & REMARKS
	0			SM	Light brown, dry to moist, silty SAND with roots "Topsoil"			
				SM	Light brown to reddish brown, moist, silty SAND			
	5							

COMPLETION DEPTH:	6.0 feet
DATE BORING STARTED:	8/9/02
DATE BORING COMPLETED:	8/9/02
ENGINEER/GEOLOGIST:	IH
DRILLING CONTRACTOR:	FES

Sample Types:

Auger Cutting
Vane Shear
SPT
UD
Penetrometer
Rock Core

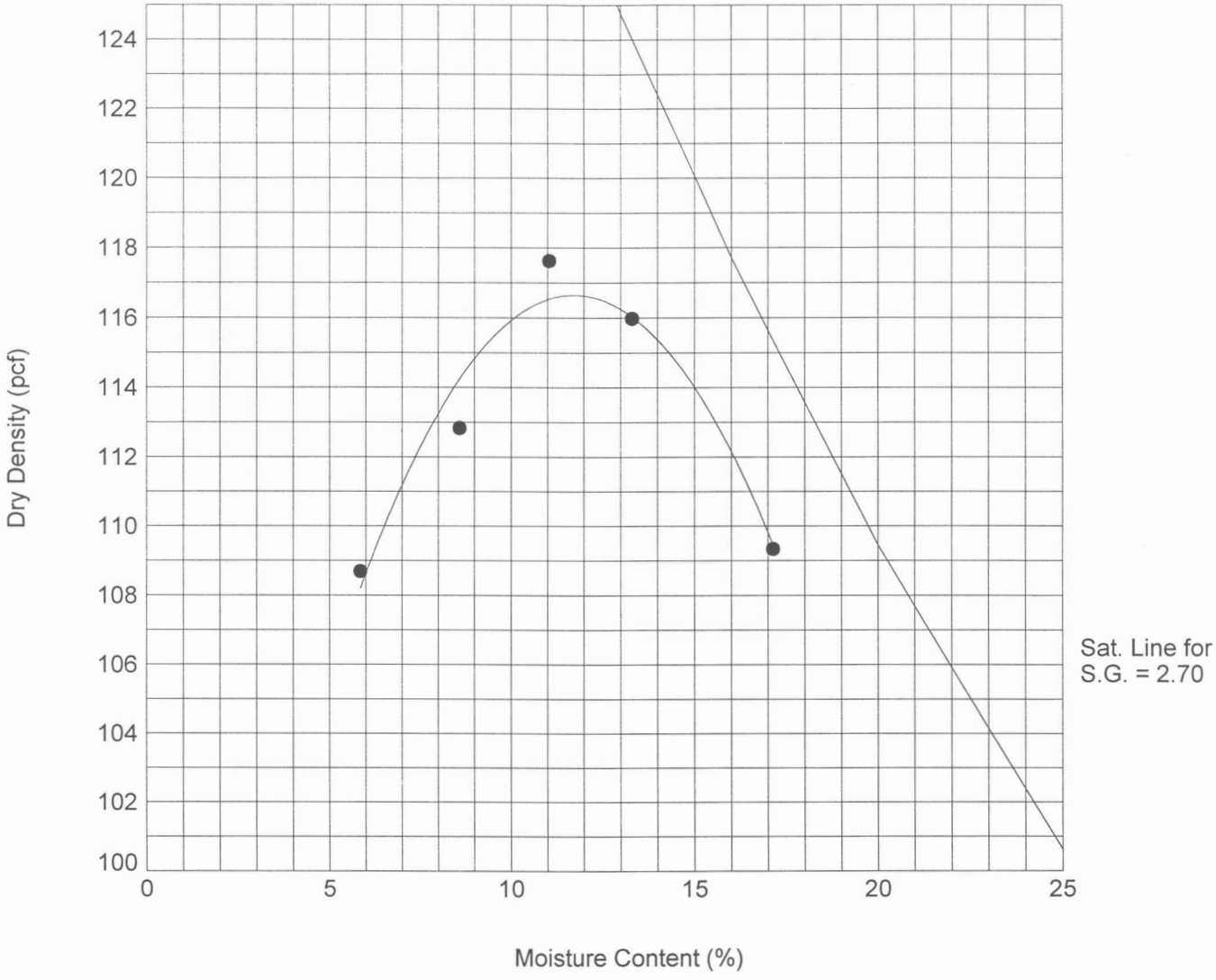
Remarks:

Unless otherwise noted, water encountered but not recorded

The stratification lines represent approximate boundaries.

LABORATORY TEST RESULTS

MOISTURE-DENSITY RELATIONSHIP REPORT



Sample Depth	Classification		Nat'l Moist.	S.G.	LL	PI	% > No. 4	% < No. 200
	USCS	AASHTO						
1 1.5	SM	A-2-4	6.2	2.70		NP	0	30.5

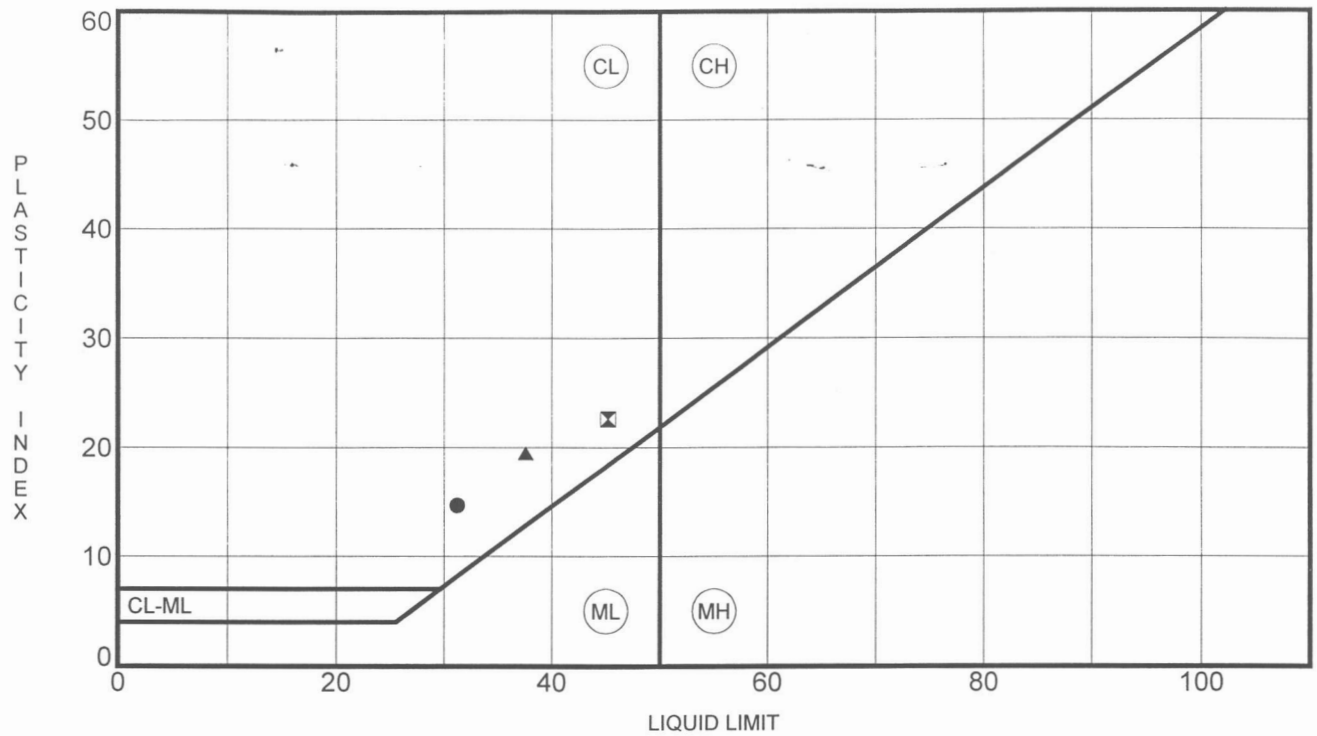
Test Results	Material Description
Optimum Moisture Content = 11.5 Maximum Dry Density = 116.5	Brown silty SAND (SM)
Project No.: 1-83151 Project Name: Longhill Station Location: James City County, Virginia Date: 08/12/2002	Remarks: On August 8, 2002 an FES Inc. representative obtained a bulk soil sample from the in-place Dam #1 Procedure: ASTM D-698, Method A Rammer: Manual Preparation: Dry

RCTOR 1-83151.GPJ FES.GDT 8/16/02

FOUNDATION ENGINEERING SCIENCE, INC.

Figure 2

PC020_PC021_PC022_PC119_PC120_LONGHILL_STATION - 054



	Specimen Identification		LL	PL	PI	Fines	Classification
●	D-1 B-1(4-6)	6.0	31	17	14	50.3	Reddish brown sandy CLAY
⧗	D-1 B-1(6-8)	8.0	45	23	22	77.0	Reddish brown sandy CLAY
▲	D-1 B-2(6-8)	8.0	38	18	20	71.1	Reddish brown sandy CLAY

USATTERBERG_LIMITS 1-83151.GPJ US_LAB.GDT 10/22/02

FES
Foundation Engineering Science, Inc.
11843-B Canon Boulevard
Newport News, VA 23608
Telephone: (757)873-4113
Fax: (757)873-4114

ATTERBERG LIMITS RESULTS

Project: Longhill Station

Location: James City County, Virginia

Number: 1-83151

September 15, 1995

Mr. Bernard Farmer
Director of Code Compliance
James City County
101 E Mounts Bay Road
Williamsburg, Va 23185

RE: Longhill Station Subdivision
Case No. 5-47-95
DJG # 1940220

Dear Mr. Farmer:

Due to slightly unusual circumstances and conditions found on the Longhill Station Subdivision site, a stormwater management plan that meets James City County's 10-point BMP Plan, while maintaining responsibilities to property and public safety, was found to be unattainable.

More specifically, Pond "C" is limited in size and scope by the finished floor elevations of existing down gradient residences. After meetings with Darryl Cook of James City County, we concurred that the maximum surface elevation of this pond should not exceed these finished floor elevations, as would be necessary in order to increase our BMP point total. Furthermore, in an attempt to limit wetland impact and maximize drainage area, Ponds "A" and "B" were also limited in size and scope. During the meetings with Mr. Cook, we also concurred that in the interest of public safety, it was advantageous to decrease the storage volumes of the ponds in order to limit the depth of water above the 5' level safety-shelf to one (1) foot.

Thus, for the reasons described above, and previous discussions with your department, we would like to request an exception to James City County's 10-point BMP Plan, and submit a total of 9.32 BMP-points. Please review our plans, at your convenience, and observe the unique conditions with which we endeavored to overcome.

RESPOND TO:
P. O. Box 3505
1006 Richmond Road
Williamsburg. VA 23187
(804) 253-0673
(804) 874-5015
Fax (804) 253-2319

Engineers
Architects
Surveyors • Planners

We Can Do
Certified Environmental Inspections

American Consulting Engineers Council • American Institute of Architects • Virginia Association of Surveyors

Finally, should you have any questions, do not hesitate to contact me at the number provided below. Thank you for your time and assistance.

Sincerely,

H.L. Phillip Goering
Environmental Engineer

HLPG/ap

cc: Mr. Steven Kelly, Atlantic Homes Development Corporation

December 20, 1995

Mr. Darryl Cook
Office of Code Compliance
James City County
PO Box JC
Williamsburg, Virginia 23187

RE: Atlantic Homes - Longhill Station Subdivision
DJG #1940220

Dear Mr. Cook:

In order to address conflicting conditions associated with the proposed Longhill Station Subdivision, Pond C has been designed as a reduced volume sediment basin.

The proposed Phase I of Longhill Station Subdivision is largely located in-between two existing subdivisions: Forest Glenn (up gradient) and Fox Ridge (down gradient). Storm water run-off from Forest Glenn is currently discharged in such a manner that runs across Longhill Station property and negatively impacts several Fox Ridge structures down hill. In an attempt to correct the previously created problem, DJG, Inc., has designed a storm water sewer system and a dry-detention pond that intercepts this run-off and improves the downstream quantity and quality impacts. However, the existing Fox Ridge improvements limit the size and scope of Pond C as a sediment basin.

Pond C has been designed as an extended dry-detention (6-12 hour), 4-point Best Management Practice (BMP). The generally accepted requirements of such a detention pond have been met by the proposed decision, although enlarging Pond C to accept a total volume of 134 cubic yards per drainage acre is not an option. By enlarging the capacity of Pond C one would have to raise the top of the dam to an elevation higher than the finished floor elevations of downstream Fox Ridge structures; thereby endangering them in the event of catastrophic storms and dam failure. Increasing the volume of the pond by additional excavation is not a viable option because then the pond would no longer have positive drainage to the existing downstream culverts of Fox Ridge. Therefore, on behalf of Atlantic Homes and Longhill Station Subdivision, and in the interest of James City County, and the

RESPOND TO:
P. O. Box 3505
1006 Richmond Road
Williamsburg, VA 23187
(804) 253-0673
(804) 874-5015
Fax (804) 253-2319

Engineers
Architects
Surveyors • Planners

American Consulting Engineers Council • American Institute of Architects • Virginia Association of Surveyors

residents of Forest Glenn and Fox Ridge Subdivisions, we would like to request an exception for Pond C from the 134 cubic yards acre sediment basin requirement. Instead, we offer the maximum safe pond volume as designed which provides for a total of 43.4 cubic yards of dry-storage per disturbed acre, and more than satisfies the generally accepted BMP standards of an extended dry-detention (6-12 hour) pond.

Should you have any comments or questions concerning this variance, do no hesitate to contact me. Thank you, in advance, for your assistance with this complicated site and issue.

Sincerely,

H. L. Phillip Goering
Environmental Engineer

HLPG:kmr

AB FILE "C"

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

July 23, 2002

Mr. Ken Dodd, Development Manager
McCale Development Corporation
729 Thimble Shoals Boulevard, Suite 4A
Newport News, Va. 23606

Re: Longhill Station Section 1 (1A & 1B)
County Plan No. S-47-95
Stormwater Management Facilities A, B, C and D
County BMP ID Codes: PC 022; PC 021; PC 020 and PC 120

Dear Dodd:

In response to your recent request concerning release of erosion and sediment control surety being held for the above referenced project, personnel from the Environmental Division met with you on Tuesday July 23rd 2002 and performed final inspections on Ponds A, B and C. These ponds are associated with bond being held for the project. Pond D is also associated with the Phase 1 bond; however, due to active construction being performed in Section 4, it was determined mutually that since this facility is still serving as a temporary sediment basin and as-built drawings have not been submitted, it was not warranted to perform a final inspection for this facility at this time.

Based on our review of the project and a concurrent field inspection as performed on July 23rd 2002, the following items must be addressed prior to release of the developer's surety instrument for the stormwater management/BMP facilities associated with this site:

Record Drawings:

1. The record drawing dated December 6th 1999 for **Pond A** (PC 022) is satisfactory.

2. The record drawing dated November 15th 1999 and supplemental information supplied March 22nd 2000 for **Pond B** are satisfactory.

3. The record drawing dated November 15th 1999 for **Pond C** is satisfactory.

4. Note # 18 on Sheet C-5 of the approved plan for Section 3 & 4 required as-built drawings for Pond D. None were received. *(Note: This facility was determined to still be serving as a temporary sediment basin due to active construction in the area and has not been converted to final BMP mode. A final inspection was not performed during our meeting.)*

Construction Certifications:

5. For Ponds A, B and C, Note # 18 on Sheet C-14 of the approved plan required construction certifications. None were provided.

6. For Pond D, Note # 18 on Sheet C-5 of the approved plan required construction certification. None was provided.

Construction certifications are especially important since each of the BMP facilities have engineered and compacted earthen embankments. The certifications can be in letter format or by use of the certification statements in Section 4 of the *James City County, Stormwater Management/BMP Facilities, Record Drawing and Construction Certification, Standard Forms & Instructions*. Please contact our office if you need a copy of the certification statement page.

Construction - Related Items:

Pond A (PC 022) - Near 6033 Allegheny Lot 87

7. Remove silt fence present in the natural channel downstream of the barrel through the dam.

8. Clear trees and woody vegetation along the entire downstream face of the pond embankment and from within the emergency spillway. Usually trees, shrubs and woody vegetation are not permitted to grow on any part of pond embankments constructed using engineered (compacted) fills. Saturated roots mats combined with high wind can cause trees to overtop and accelerate soil erosion and embankment failure. For older facilities which may have established tree growth, we recommend that trees be cut flush to or below ground level and be maintained in that fashion as to not disturb root systems that may already be extensive. Efforts should then be made to reduce tree restablishment and to replace tree growth with an acceptable low-maintenance grass covering.

9. Remove the dewatering orifice and convert to riser to final BMP mode by use of a turn down in accordance with the approved plan.

10. The riser structure was inaccessible as it is situated in the middle of the pond. When removing the dewatering orifice, perform an inspection on the interior of the riser. Clean all trash and debris from the interior of the riser, especially at the entrance to the outlet barrel. Clean and coat the exterior of the riser as necessary to remove visible surface corrosion.

11. Clean and remove debris and vegetation within 10 feet of the outfall end of the 24-inch storm drain inflow pipe which enters the basin from Allegheny Drive at the southwest corner of the pond. Flow into the facility shall not be obstructed by vegetation.

Pond B (PC 021) - Near 3913 Blue Ridge Court

12. Remove the dewatering orifice and convert the riser to final BMP mode by use of a turn down elbow in accordance with the approved plan.

13. Clean and coat the exterior of the riser as necessary to remove visible surface corrosion.

14. Repair the puncture hole on the east side of the riser to stop leakage.

✓ 15. Clear and remove all vegetation within 10 feet of the principal flow control (riser) structure. Flow into the riser shall not be obstructed by vegetation.
8-7-02

✓ 16. Clean and remove vegetation within 10 feet of the outfall end of the outlet barrel through the dam. Flow out of the BMP shall not be obstructed by vegetation.
8-7-02

✓ 17. Remove silt fence present at the downstream end of the emergency spillway. The emergency spillway is situated at the west side of the dam.
8-7-02

✓ 18. Stabilize with seed and mulch disturbed soil areas present on the interior side slope of the basin at the west end of the pond. This area is near the electrical service box for the fountain.
8-7-02
11-5-02 DO FILL + SEED/MULCH DEPRESSION AREA ON D/S EMB North of riser (Pond A)

Pond C (PC 020) - Near the Recreation Center on Longhill Station Road ~~Incomplete~~ ~~CED 8-19-02~~

✓ 19. Clean and remove debris and vegetation within 10 feet of the outfall ends of the two storm drain inflow pipes which enter the basin from Longhill Station Road and the Recreation Center. These pipes are situated at the south end of the basin.
8-7-02 OK

✓ 20. Clear and remove all vegetation within 10 feet of the principal flow control (riser) structure.
8-7-02 NOT DONE. WILL DO TODAY. Beth to reinspect.
CED 8-19-02

✓ 21. Clear trees and woody vegetation along the entire downstream face of the dam and the emergency spillway. This is especially important on the right (east) side of the dam in the vicinity of the riser and barrel structures. (Note: The emergency spillway is situated over the outlet barrel through the dam.)
8-7-02
<10 ft. but OK
11-5-02 needs to be removed will obstruct and will build-up vegetation and debris around riser.

Also, for all the BMPs listed above which have access hatches into the riser structure, a padlock should be added to prevent future unauthorized entry into the risers. Provide an extra set of keys to the Environmental Division office and the Homeowner's Association.

Once this work is satisfactorily completed, contact our office appropriately. We can then proceed with final release of surety for the project. Please contact me at 757-253-6639 or the assigned Environmental Division inspector, Beth Davis, at 757-253-6702 if you have any additional comments or questions regarding these issues.

Sincerely,

Scott J. Thomas

Scott J. Thomas, P.E.
Senior Engineer
Environmental Division

cc: Pat Menichino, Environmental Division

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15. Clear and remove all vegetation within 10 feet of the principal flow control (riser) structure. Flow into the riser shall not be obstructed by vegetation.

16. Clean and remove vegetation within 10 feet of the outfall end of the outlet barrel through the dam. Flow out of the BMP shall not be obstructed by vegetation.

17. Remove silt fence present at the downstream end of the emergency spillway. The emergency spillway is situated at the west side of the dam.

18. Stabilize with seed and mulch disturbed soil areas present on the interior side slope of the basin at the west end of the pond. This area is near the electrical service box for the fountain.

Pond C (PC 020) - Near the Recreation Center on Longhill Station Road

19. Clean and remove debris and vegetation within 10 feet of the outfall ends of the two storm drain inflow pipes which enter the basin from Longhill Station Road and the Recreation Center. These pipes are situated at the south end of the basin.

20. Clear and remove all vegetation within 10 feet of the principal flow control (riser) structure.

21. Clear trees and woody vegetation along the entire downstream face of the dam and the emergency spillway. This is especially important on the right (east) side of the dam in the vicinity of the riser and barrel structures. (Note: The emergency spillway is situated over the outlet barrel through the dam.)

Also, for all the BMPs listed above which have access hatches into the riser structure, a padlock should be added to prevent future unauthorized entry into the risers. Provide an extra set of keys to the Environmental Division office and the Homeowner's Association.

Once this work is satisfactorily completed, contact our office appropriately. We can then proceed with final release of surety for the project. Please contact me at 757-253-6639 or the assigned Environmental Division inspector, Beth Davis, at 757-253-6702 if you have any additional comments or questions regarding these issues.

Sincerely,

Scott J. Thomas, P.E.
Senior Engineer
Environmental Division

cc: Pat Menichino, Environmental Division

G:\SWMProg\AsBuilts\S4795.pc020

DJG, INC.
P.O. Box 3505 1006 Richmond Rd
WILLIAMSBURG, VIRGINIA 23187

(804) 253-0673 or 874-5015
FAX (804) 253-2319

LETTER OF TRANSMITTAL

DATE 11/29/99	JOB NO. 1940220
ATTENTION KEN DODD	
RE: LONGHILL STATION SUBDIVISION & PHASE I - PONDS "C" & "B" AS-BUILTS	

TO KEN DODD

WE ARE SENDING YOU ☒ Attached ☐ Under separate cover via _____ the following items:

☐ Shop drawings ☒ Prints ☐ Plans ☐ Samples ☐ Specifications

☐ Copy of letter ☐ Change order ☐ _____

COPIES	DATE	NO.	DESCRIPTION
3	11-29-99		LONGHILL STATION SUBDIVISION - PH I, PONDS "C" & "B" AS-BUILTS

THESE ARE TRANSMITTED as checked below:

☒ For approval ☐ Approved as submitted ☐ Resubmit _____ copies for approval

☐ For your use ☐ Approved as noted ☐ Submit _____ copies for distribution

☐ As requested ☐ Returned for corrections ☐ Return _____ corrected prints

☐ For review and comment ☐ _____

☐ FOR BIDS DUE _____ 19 _____ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS

If there are any questions, please call

Thank You,
Ronald Aaron Mickiewicz

COPY TO File
JAMES CITY COUNTY

SIGNED: Ronald Aaron Mickiewicz

If enclosures are not as noted, kindly notify us at once.

James City County Environmental Division
Stormwater Management / BMP Inspection Report
Detention and Retention Pond Facilities

S-47-95
PH 1

County BMP ID Code (if known): PC020

Name of Facility: Longhill Sta. Pond C BMP No.: 3 of 5 Date: 7/23/02

Location: Near 3949 Longhill Sta. Road

Name of Owner:

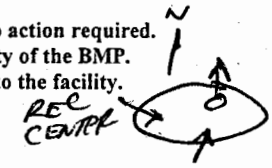
Name of Inspector: SJ Thomas

Type of Facility: Wet Pond

Weather Conditions: Sunny Hot 80s Type: ☒ Final Inspection ☐ County BMP Inspection Program ☐ Owner Inspection

If an inspection item is not applicable, mark NA, otherwise mark the appropriate column.

O.K. - The item checked is in adequate condition and the maintenance program is currently satisfactory. No action required.
Routine - The item checked requires attention, but does not present an immediate threat to the function/integrity of the BMP.
Urgent - The item checked requires immediate attention to keep the BMP operational and to prevent damage to the facility.



Provide an explanation and details in the comment column, if routine or urgent are marked.

Facility Item	O.K.	Routine	Urgent	Comments
Embankments and Side Slopes:	Small Earthen Dam 3H:1V SS, 5' High			
Grass Height	✓			
Vegetation Condition	✓			
Tree Growth		✓		Trees on Embankment @ barrel
Erosion	✓			(Pines)
Trash & Debris	✓			
Seepage	✓			None Observed
Fencing or Benches				
Interior Landscaping/Planted Areas:	☐ None ☐ Constructed Wetland/Shallow Marsh ☒ Naturally Established Vegetation			
Vegetated Conditions	✓			Cattails
Trash & Debris	✓			
Floating Material				
Erosion				
Sediment				
Dead Plant				
Aesthetics				
Other				
Notes:				

Facility Item	O.K.	Routine	Urgent	Comments
Water Pools: ☐ Permanent Pool (Retention Basin) ☐ Shallow Marsh (Detention Basin) ☑ None, Dry (Detention Basin)				
Shoreline Erosion	✓			
Algae	✓			
Trash & Debris	✓			
Sediment	✓			No significant
Aesthetics				
Other				
Inflows (Describe Types/Locations): CPP 18-24" southend @ road				
Condition of Structure	✓			
Erosion	✓			
Trash and Debris	✓			
Sediment	✓			
Outlet Protection		✓		clear veg 10' from outfall
Other				
Principal Flow Control Structure - Riser, Intake, etc. (Describe Type): CMP Riser w/ CMP CAP 3' deep				
Condition of Structure	✓			
Corrosion	✓			
Trash and Debris	✓			
Sediment	✓			
Vegetation		✓		Clear veg 10' from riser
Other				Access LID
Principal Outlet Structure - Barrel, Conduit, etc. :				
Condition of Structure	✓			
Settlement	✓			None observed
Trash & Debris	✓			
Erosion/Sediment	✓			
Outlet Protection	✓			Adequate
Other				
Emergency Spillway (Overflow): None.				
Vegetation				
Lining				
Erosion				
Trash & Debris				
Other				
Notes: NO signs of O/S Erosion Nat Channel.				

Facility Item	O.K.	Routine	Urgent	Comments
Nuisance Type Conditions:				
Mosquito Breeding	✓			
Animal Burrows	✓			
Graffiti	✓			
Other	✓			
Surrounding Perimeter Conditions:				
Land Uses	✓			Houses East + Rec Center West
Vegetation	✓			
Trash & Debris	✓			
Aesthetics	✓			
Access /Maintenance Roads or Paths	✓			
Other				

Remarks:

- clear veg 10' from inflow pipe
- clear veg 10' from riser
- clear trees on embank right east side
- slope erosion near house SE corner.

Overall Environmental Division Internal Rating: 3

Signature: [illegible] P.E. **Date:** 7/23/12

Title: Civil Engineer ENV DIV

SWMProg\BMP\CoInspProg\DetRet.wpd

Date Record Created:

Created By:

WS_BMPNO: PC020

PRINTED ON
Thursday, March 04
11:09:38 AM

2010

WATERSHED	PC
BMP ID NO	020
PLAN NO	S-47-95
TAX PARCEL	
PIN NO	3110900001B
CONSTRUCTION DATE	
PROJECT NAME	Longhill Station Sec 1A (Pond C)
FACILITY LOCATION	Near 3940 Longhill Sta. Road
CITY-STATE	Williamsburg, VA 23188
CURRENT OWNER	Wallace Associates, LLC (c/o Henry Stephens)
OWNER ADDRESS	2 Eaton St., Suite 1101
OWNER ADDRESS 2	
CITY-STATE-ZIP CODE	Hampton, Va. 23669
OWNER PHONE	
MAINT AGREEMENT	Yes
EMERG ACTION PLAN	No

Get Last BMP No | Return to Menu | Print Record

MAINTENANCE PLAN	No	CTRL STRUC DESC	ACCMP Rise
SITE AREA acre	104.5	CTRL STRUC SIZE inches	24
LAND USE	SF Residential	OTLT BARRL DESC	ACCMP
old BMP TYP	Dry Pond	OTLT BARRL SIZE inch	18
JCC BMP CODE	F2 Dry ED with forebay		
POINT VALUE		EMERG SPILLWAY	Yes
		DESIGN HW ELEV	89.0
		PERM POOL ELEV	
SVC DRAIN AREA acres	40	2-YR OUTFLOW cfs	
		10-YR OUTFLOW cfs	
		REC DRAWING	Yes
SERVICE AREA DESCRI	Section 1A & Part Forest Glen		
IMPERV AREA acres		CONSTR CERTIF	Yes
RECV STREAM	UT of Powhatan Creek		
EXT DET-WQ-CTRL	No	LAST INSP DATE 7/23/2002	Inspected by:
WTR QUAL VOL acre-ft		INTERNAL RATING	3
CHAN PROT CTRL	No	MISC/COMMENTS	
CHAN PROT VOL acre-ft			
SW/FLOOD CONTROL	Yes	Near pool center, main entrance road. See PC 021, 022, 119 & 120.	
GEOTECH REPORT	No		

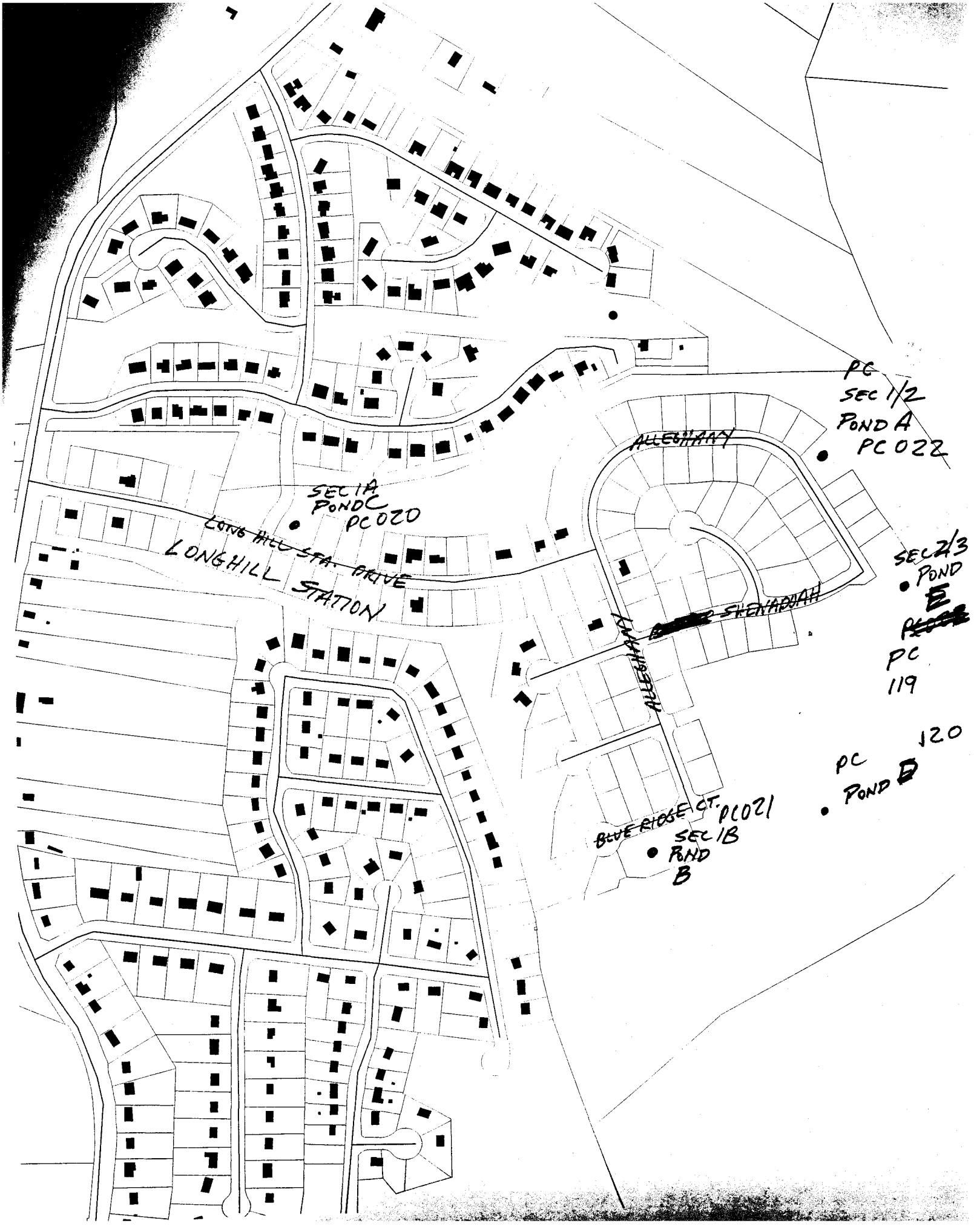
Additional Comments:

WATERSHED	PC	MAINTENANCE PLAN	No	CTRL STRUC DESC	ACCMP Rise
BMP ID NO	020	SITE AREA acre	104.5	CTRL STRUC SIZE inches	24
PLAN NO	S-47-95	LAND USE	SF Residential	OTLT BARRL DESC	ACCMP
TAX PARCEL		old BMP TYP	Dry Pond	OTLT BARRL SIZE inch	18
PIN NO	3110900001B	JCC BMP CODE			
CONSTRUCTION DATE		POINT VALUE		EMERG SPILLWAY	Yes
PROJECT NAME	Longhill Station Sec 1A (Pond C)			DESIGN HW ELEV	89.0
FACILITY LOCATION	Near 3940 Longhill Sta. Road			PERM POOL ELEV	
CITY-STATE	Williamsburg, VA 23188	SVC DRAIN AREA acres		2-YR OUTFLOW cfs	
CURRENT OWNER	Wallace Associates, LLC (c/o Henry Stephens)			10-YR OUTFLOW cfs	
OWNER ADDRESS	2 Eaton St., Suite 1101			REC DRAWING	Yes
OWNER ADDRESS 2		SERVICE AREA DESCRI	Section 1A & Part Forest Glen		
CITY-STATE-ZIP CODE	Hampton, Va. 23669	IMPERV AREA acres		CONSTR CERTI	No
OWNER PHONE		RECV STREAM	UT of Powhatan Creek		
MAINT AGREEMENT	Yes	EXT DET-WQ-CTRL	No	LAST INSP DATE	12/12/2000
EMERG ACTION PLAN	No	WTR QUAL VOL acre-ft		INTERNAL RATING	3
		CHAN PROT CTRL	No	MISC/COMMENTS	
		CHAN PROT VOL acre-ft		Near Lot 32, main entrance road. See PC 021, 022, 119 & 120.	
		SW/FLOOD CONTROL	Yes		
		GEOTECH REPORT	No		

Get Last BMP No

Return to Menu

PC020_PC021_PC022_PC119_PC120_LONGHILL_STATION - 070



PC020_PC021_PC022_PC119_PC120_LONGHILL_STATION - 071

Stormwater Division

MEMORANDUM

DATE: March 13, 2010

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

FROM: Jo Anna Ripley, Stormwater

PO: 270712

RE: Files Approved for Scanning

General File ID or BMP ID: PC021

PIN: 3110900001B

Subdivision, Tract, Business or Owner Name (if known): Longhill Station

Property Description: Natural Open Space Section 1A & 1B

Site Address:

(For internal use only) **Box** 3 **Drawer:** 2

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

Comments

Combined file with PC020, PC021, PC119 and PC120. According to the County's Real Estate Assessment Division the common area has not been turned over to the HOA. Ownership as of 3/3/10 is Wallace Associates LLC

S-47-95
SECT 1 (1A+1B)
POND A (PC022)
POND B (PC021)
POND C (PC 020)

COPY

DECLARATION OF COVENANTS

INSPECTION/MAINTENANCE OF RUNOFF CONTROL FACILITY

THIS DECLARATION, made this 2nd day of April, 1996, between Atlantic Homes Dev., and all successors in interest, hereinafter referred to as the "COVENANTOR(S)," owner(s) of the following property: Longhill Station Sections 1A+1B Deed Book 626, Page 50, and James City County, Virginia. hereinafter referred to as the "COUNTY."

WITNESSETH:

We, the COVENANTOR(S), with full authority to execute deeds, mortgages, other covenants, and all rights, titles and interests in the property described above, do hereby covenant with the COUNTY as follows:

1. The COVENANTOR(S) shall provide maintenance for the runoff control facility, hereinafter referred to as the "FACILITY," located on and serving the above-described property to ensure that the FACILITY is and remains in proper working condition in accordance with approved design standards, and with the law and applicable executive regulations.

2. If necessary, the COVENANTOR(S) shall levy regular or special assessments against all present or subsequent owners of property served by the FACILITY to ensure that the FACILITY is properly maintained.

3. The COVENANTOR(S) shall provide and maintain perpetual access from public right-of-ways to the FACILITY for the COUNTY, its agent and its contractor.

4. The COVENANTOR(S) shall grant the COUNTY, its agent and its contractor a right of entry to the FACILITY for the purpose of inspecting, operating, installing, constructing, reconstructing, maintaining or repairing the FACILITY.

5. If, after reasonable notice by the COUNTY, the COVENANTOR(S) shall fail to maintain the FACILITY in accordance with the approved design standards and with the law and applicable executive regulations, the COUNTY may perform all necessary repair or maintenance work. and the COUNTY may assess the COVENANTOR(S) and/or all property served by the FACILITY for the cost of the work and any applicable penalties.

6. The COVENANTOR(S) shall indemnify and save the COUNTY harmless from any and all claims for damages to persons or property arising from the installation, construction, maintenance. repair, operation or use of the FACILITY.

7. The COVENANTOR(s) shall promptly notify the COUNTY when the COVENANTOR(S) legally transfers any of the COVENANTOR(S)' responsibilities for the FACILITY. The COVENANTOR(S)' shall supply the COUNTY with a copy of any document of transfer, executed by both parties.

8. The covenants contained herein shall run with the land and shall bind the COVENANTOR(S) and the COVENANTOR(S)' heirs, executors, administrators, successors and assignees, and shall bind all present and subsequent owners of property served by the FACILITY.

9. This DECLARATION shall be recorded in the County Land Records.

Book 781
Page 887

IN WITNESS WHEREOF, the COVENANTOR(S) have executed this DECLARATION OF COVENANTS as of this ~~29th~~ 2nd day of ~~March~~ April, 1996.

COVENANTOR(S)

Pope Woodard, Pres.

ATTEST:

Frances K Barber

COVENANTOR(S)

Kenneth Allen, V-Pres.

ATTEST:

Frances K Barber

COMMONWEALTH OF VIRGINIA
CITY/~~COUNTY~~ OF Hampton

I, the undersigned Notary Public, in and for the jurisdiction aforesaid, do certify that J. Pope Woodard, whose name is signed as such to the foregoing writing bearing date 29th day of March, 1996 this day sworn the same before me in my jurisdiction aforesaid.

GIVEN under my hand this 1st day of April, of 1996.

Frances K Barber
Notary Public

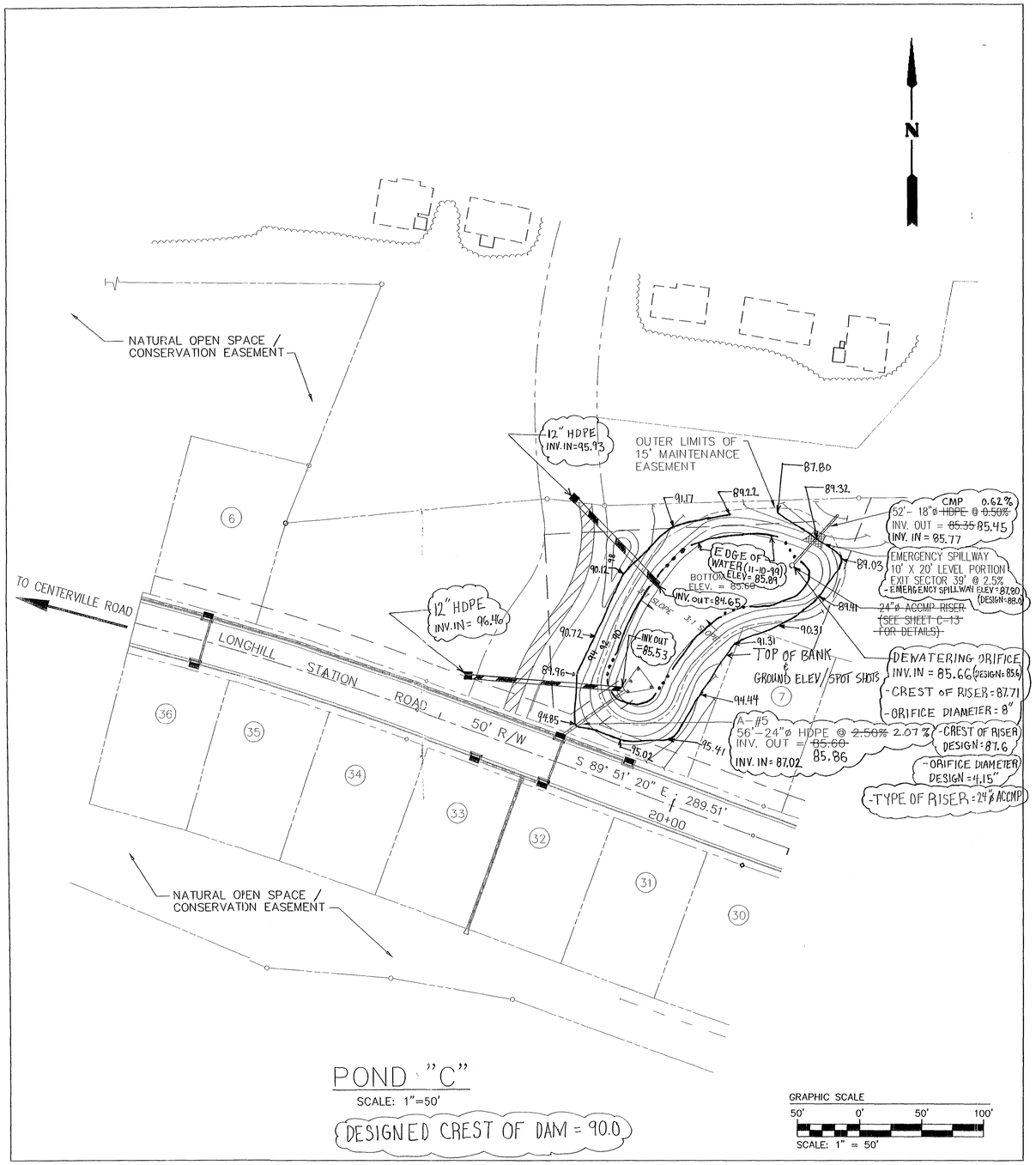
My Commission expires: Nov 30, 1998

Approved as to form:

Leo P Rogers

0261U.Wpf
Revised 9/92

PC020_PC021_PC022_PC119_PC120_LONGHALL_STATION - 074



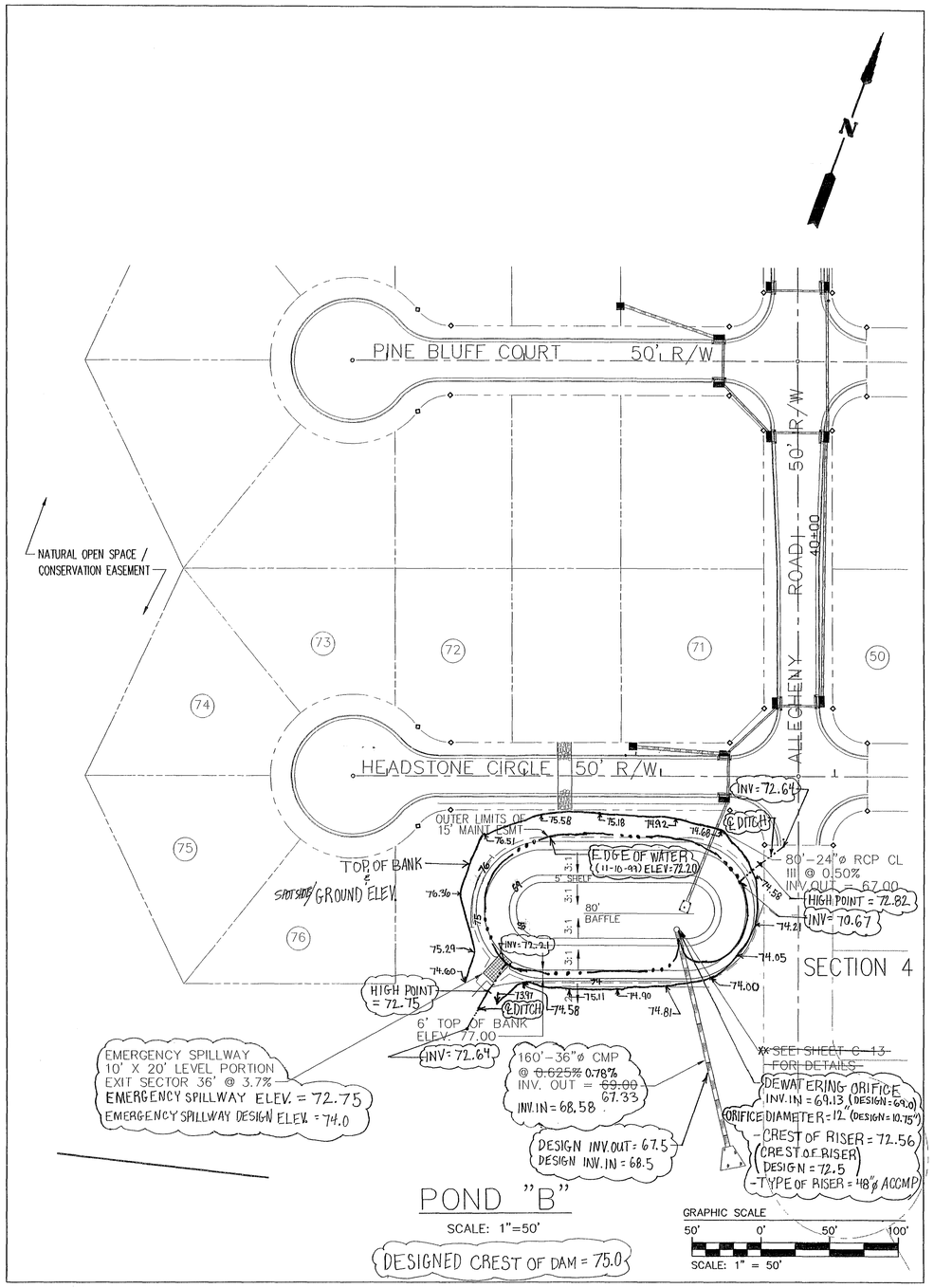
POND "C"

SCALE: 1"=50'

DESIGNED CREST OF DAM = 90.0

GRAPHIC SCALE 50' 0' 50' 100'

SCALE: 1" = 50'



POND "B"

SCALE: 1"=50'

DESIGNED CREST OF DAM = 75.0

GRAPHIC SCALE 50' 0' 50' 100'

SCALE: 1" = 50'

REVISIONS

NO.	DATE	DESCRIPTION

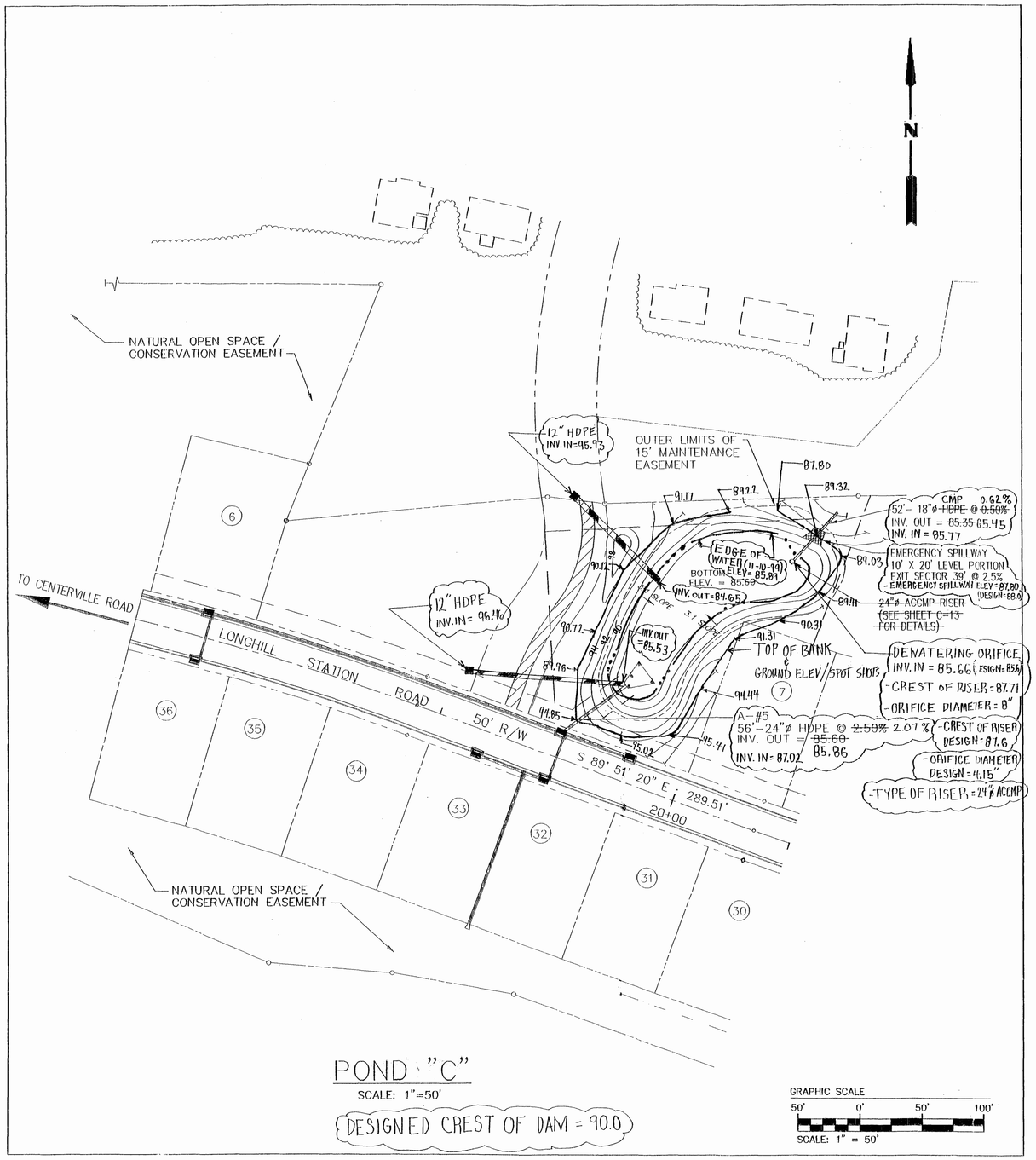
ENGINEERS · ARCHITECTS · SURVEYORS
INTERIOR DESIGNERS · PLANNERS
P.O. BOX 3505 WILLIAMSBURG, VIRGINIA 23187 (804)253-0673 (804)874-5015

POND AS-BUILTS – SECTION 1

LONGHILL STATION SUBDIVISION
ATLANTIC HOMES DEVELOPMENT CORPORATION
JAMES CITY COUNTY VIRGINIA

SCALE	1"=50'
DESIGNED	XXX
DRAWN	XXX
CHECKED	NLHT ~~XXX~~
DATE	11-15-99
COMMISSION NO.	1940220
SHEET	C1 ~~C-2~~ 1 of 1 ~~3 of 18~~

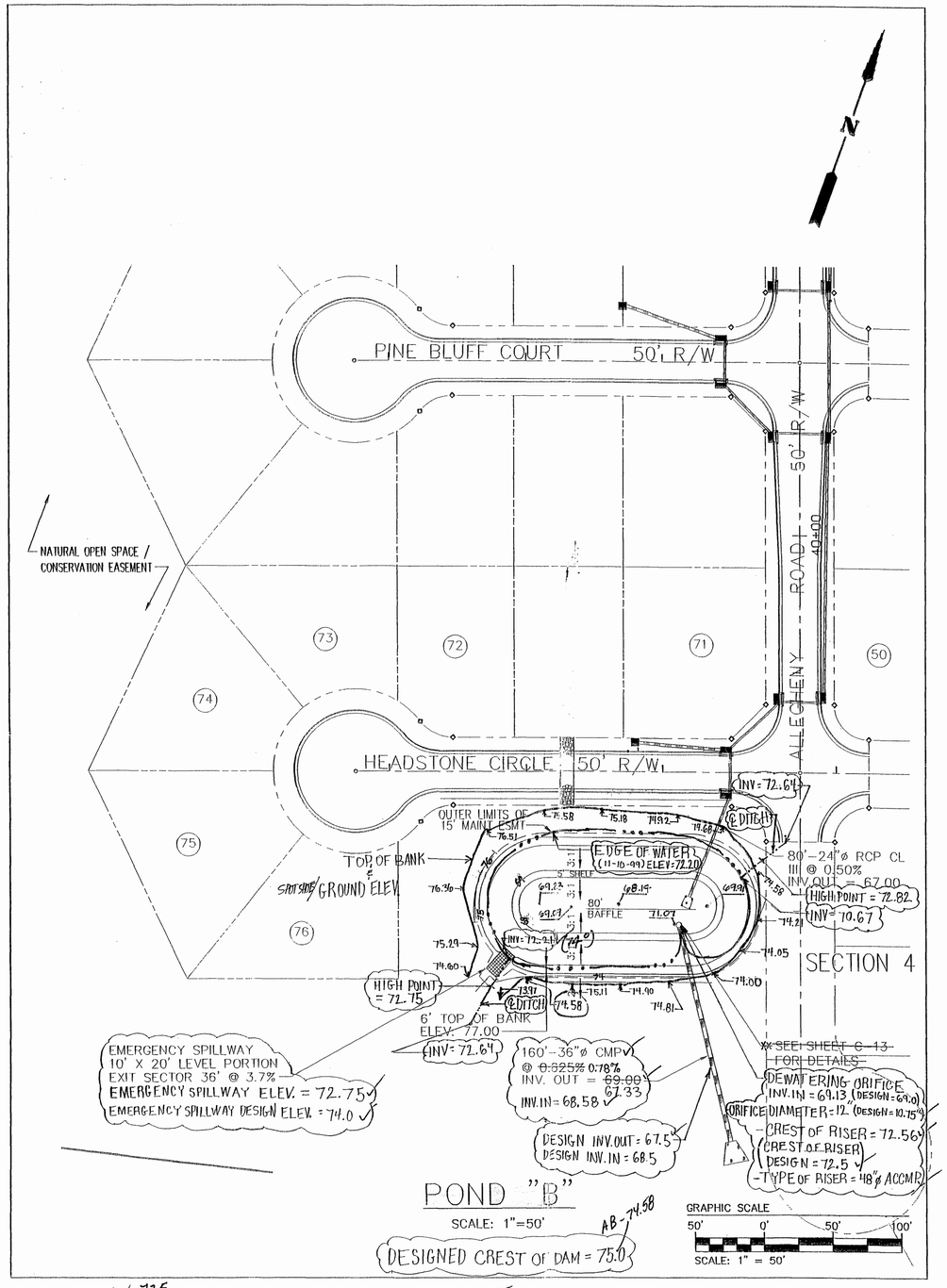
PC020_PC021_PC022_PC119_PC120_LONGHILL_STATION - 075



POND "C"

SCALE: 1"=50'

DESIGNED CREST OF DAM = 90.0



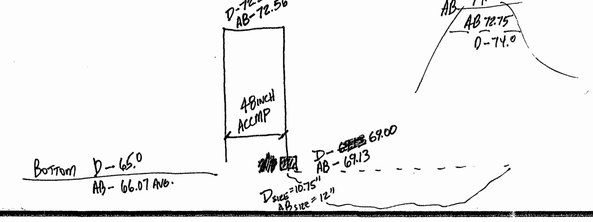
POND "B"

SCALE: 1"=50'

AB-74.58

DESIGNED CREST OF DAM = 75.0

DAM 73.5



REVISIONS

NO.	DATE	DESCRIPTION
1	1-4-00	ADDITIONAL ELEV. - POND "B"

ENGINEERS · ARCHITECTS · SURVEYORS
INTERIOR DESIGNERS · PLANNERS

P.O. BOX 3505 WILLIAMSBURG, VIRGINIA 23187 (804)253-0673 (804)874-5015

POND AS-BUILTS - SECTION 1

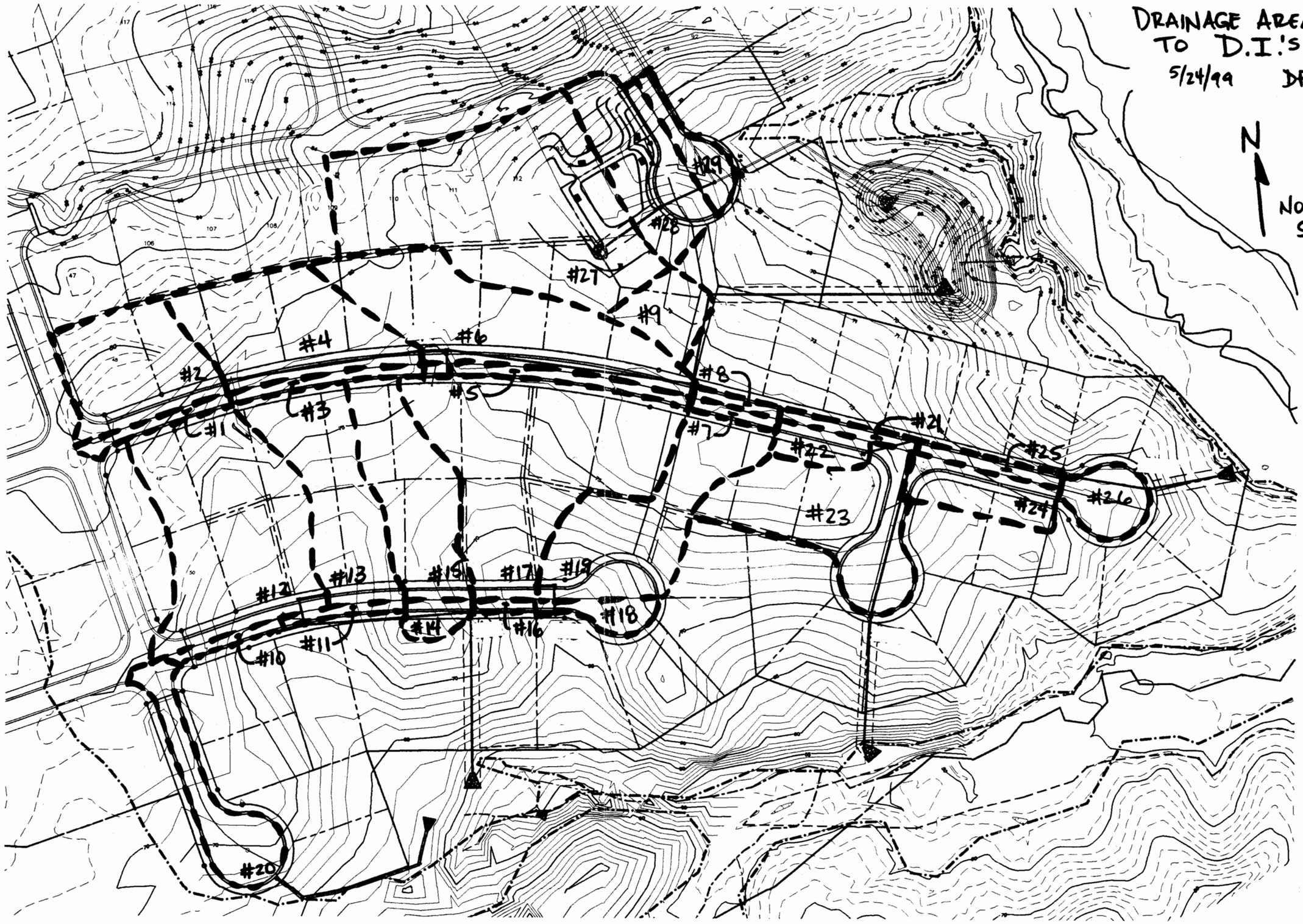
LONGHILL STATION SUBDIVISION
ATLANTIC HOMES DEVELOPMENT CORPORATION
JAMES CITY COUNTY VIRGINIA

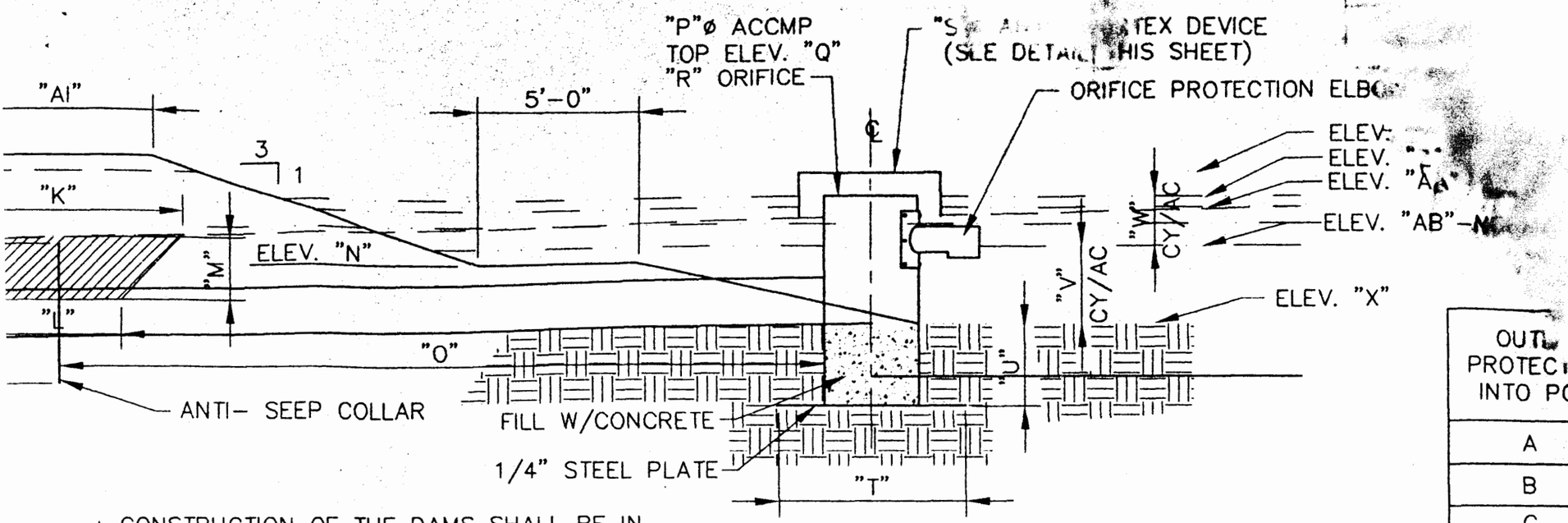
SCALE	1"=50'
DESIGNED	XXX
DRAWN	XXX
CHECKED	NLHT ~~XXX~~
DATE	11-15-99
COMMISSION NO.	1940220
SHEET	C1 ~~C-2~~ 1 OF 1 ~~3 OF 18~~

LONGHILL PHASES 3+4

DRAINAGE AREAS TO D.I.'S

5/24/99 DFL



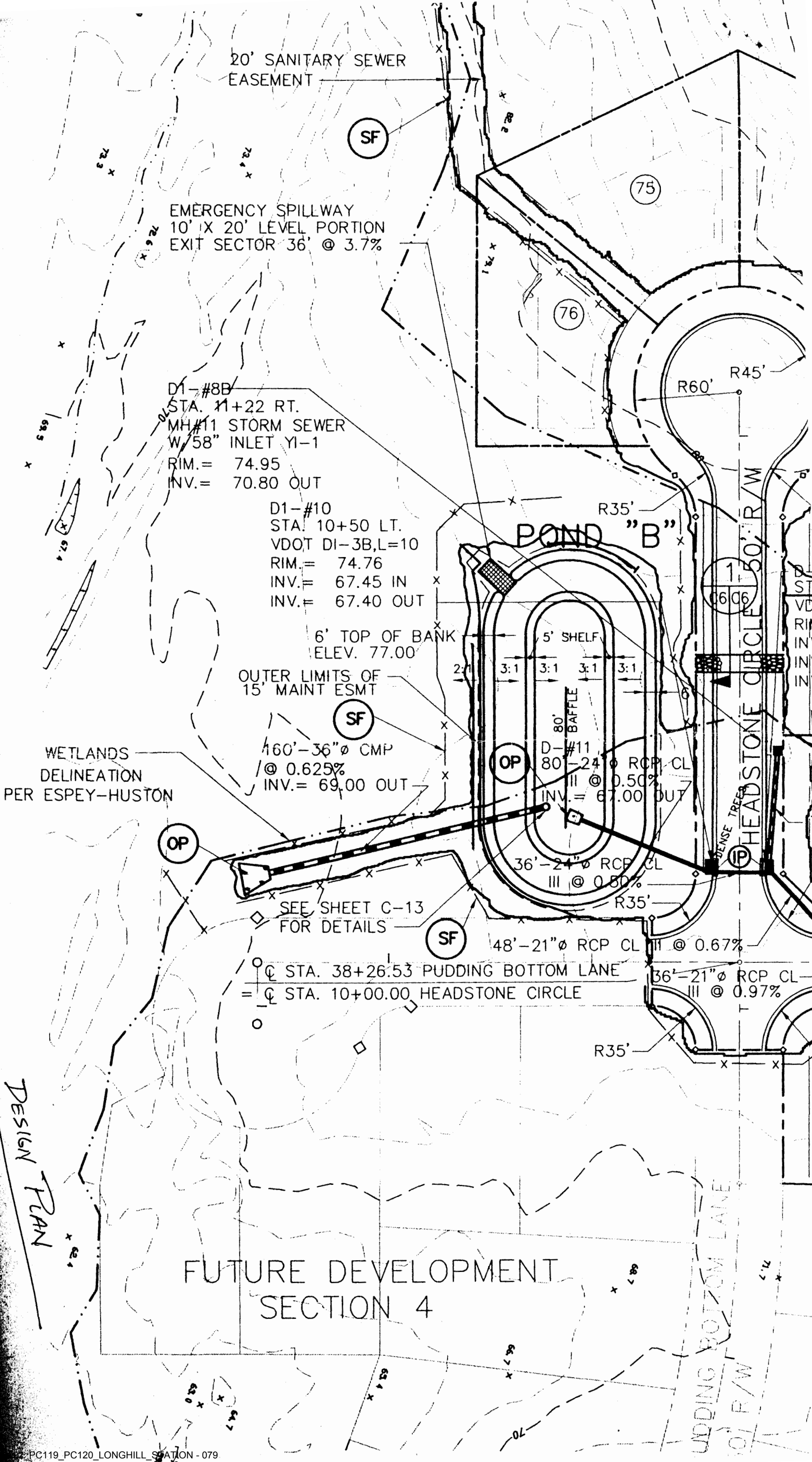


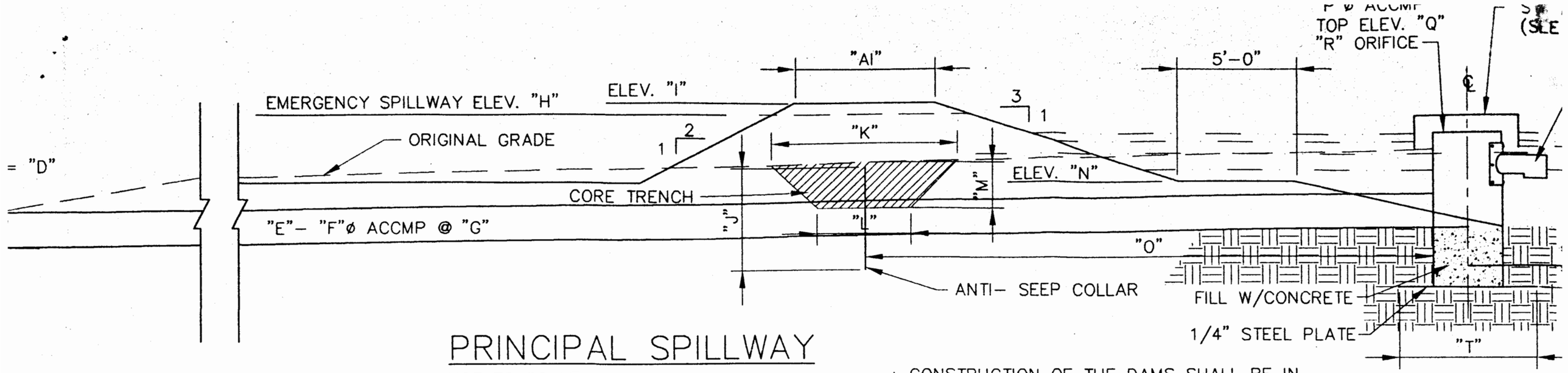
OUT PROTECT INTO POND	DOWNSTREAM WIDTH
A	
B	
C	

* CONSTRUCTION OF THE DAMS SHALL BE IN ACCORDANCE WITH THE SPECIFICATIONS AS OUTLINED IN VESCH STD. & SPEC. 3.14 TEMPORARY SEDIMENT POND.

T RIPRAP									CORE TRENCH						
DOWNSTREAM WIDTH B	APRON LENGTH, C	INV. OUT OF BARREL, D	BARREL LENGTH, E	BARREL DIAMETER, F	BARREL SLOPE, G	EMERG. SPILLWAY ELEVATION, H	CREST OF DAM ELEVATION, I	ANTI-SEEP COLLAR DIMENSION' J	TOP WIDTH, K	BOTTOM WIDTH, L	DEPTH, M	5' LEVEL SHELF ELEVATION, N	1ST COLLAR DISTANCE FROM RISER, O	RISER DIAMETER, P	CREST OF RISER ELEVATION, Q
20.5'	18.0'	56.0'	84'	30"	1.2%	67.5'	68.5'	5.5' (3)	11'	5'	3'	60.5'	10'	48"	66.5'
18.5'	16.0'	67.5'	160'	30"	0.625%	74.0'	75.0'	4.00'X4.00' (4)	8'	4'	2'	68.0'	20'	48"	72.5'
10.5'	9.0'	85.35'	52.0'	18"	0.5%	88.0'	90.0'	2.0'X2.0' (2)	4'	4'	2'	N/A	20'	24"	87.6'

K DIAM., S			NORMAL	CREST		EVATION, Y	VATION, Z	VATION, AA	B	ANTI-VORTEX DEVICE					WEEN OLLARS	TOP
		TEL								SE, AC	)	, AE	AF			


20' SANITARY SEWER EASEMENT
SF
EMERGENCY SPILLWAY
10' X 20' LEVEL PORTION
EXIT SECTOR 36' @ 3.7%
75
76
R45'
R60'
D1-#8B
STA. 11+22 RT.
MH#11 STORM SEWER
W/58" INLET YI-1
RIM.= 74.95
INV.= 70.80 OUT
D1-#10
STA. 10+50 LT.
VDOT DI-3B,L=10
RIM.= 74.76
INV.= 67.45 IN
INV.= 67.40 OUT
R35'
POND "B"
6' TOP OF BANK
ELEV. 77.00
5' SHELF
2:1
3:1
3:1
3:1
3:1
6'
OUTER LIMITS OF
15' MAINT ESMT
80' BAFFLE
160'-36"ø CMP
@ 0.625%
INV.= 69.00 OUT
D-#11
80'-24"ø RCP CL
III @ 0.50%
INV.= 67.00 OUT
OP
WETLANDS
DELINEATION
PER ESPEY-HUSTON
DENSE TREES
IP
HEADSTONE CIRCLE 50' R/W
36'-24"ø RCP CL
III @ 0.50%
R35'
SEE SHEET C-13
FOR DETAILS
SF
48'-21"ø RCP CL III @ 0.67%
℄ STA. 38+26.53 PUDDING BOTTOM LANE
= ℄ STA. 10+00.00 HEADSTONE CIRCLE
36'-21"ø RCP CL
III @ 0.97%
R35'
DESIGN PLAN
FUTURE DEVELOPMENT
SECTION 4
PUDDING BOTTOM LANE
50' R/W



PRINCIPAL SPILLWAY

NOT TO SCALE

* CONSTRUCTION OF THE DAMS SHALL BE IN ACCORDANCE WITH THE SPECIFICATIONS AS OUTLINED IN VESCH STD. & SPEC. 3.14 TEMPORARY SEDIMENT POND.

:OVIDE ADEQUATE STRAPPING

— POLYETHYLENE CAP — CREST OF RISER

— PERFORATED POLYETHYLENE* DRAINAGE TUBING ø = 2" + ORIFICE ø ,R

— "FERNCO-STYLE" COUPLING

TERING ORIFICE WITH 1' STEEL , MIN. ø = ORIFICE ø, R

WET STORAGE

METAL RISER

)ULE 40 STUB FOR DEWATERING ORIFICE.

'H ASTM F667 AND AASHTO M294

'STEM DETAIL — FOR PONDS A & B ONLY

POND SCHEDULES	OUTLET RIPRAP			INV. OUT OF BARREL, D	BARREL LENGTH, E	BARREL DIAMETER, F	BARREL SLOPE, G	EMERG. SPILLWAY ELEVATION, H	CREST OF DAM ELEVATION, I
	UPSTREAM WIDTH, A	DOWNSTREAM WIDTH B	APRON LENGTH, C						
POND A	7.5'	20.5'	18.0'	56.0'	84'	30"	1.2%	67.5'	68.5'
POND B	7.5'	18.5'	16.0'	AB 67.33 67.5' ✓	160' ✓	AB 36" ~~30"~~ 36" AB	0.784% 0.625%	72.25 72.21 AB 74.0'	74.58 75.0'
POND C	4.5'	10.5'	9.0'	85.35'	52.0'	18"	0.5%	88.0'	90.0'

POND SCHEDULES	E DIAM., R	VORTEX DIAM., S	PLATE SION, T	TO STEEL , U	AGE AT NORMAL ACE, V	AGE AT CREST SER, W	BOTTOM TION, X	EAR ELEVATION, Y	EAR ELEVATION, Z

PC020_PC021_PC022_PC119_PC120_LONGHILL_STATION - 080

RNCO–STYLE" COUPLING

; ORIFICE WITH 1' STEEL
ø ≐ ORIFICE ø, R

WET STORAGE

RISER

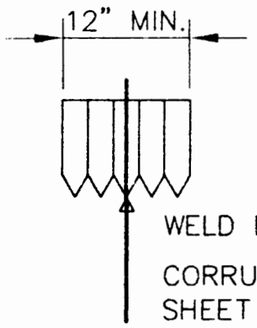
0 STUB FOR DEWATERING ORIFICE.

M F667 AND AASHTO M294

EM DETAIL – FOR PONDS A & B ONLY

LLAR TO BE OF SAME
GE AS THE PIPE WITH
ICH IT IS USED

2"x 2" SLOTTED
LES FOR 3/8"
METER BOLTS.



TTED HOLES
3" C.C.

R

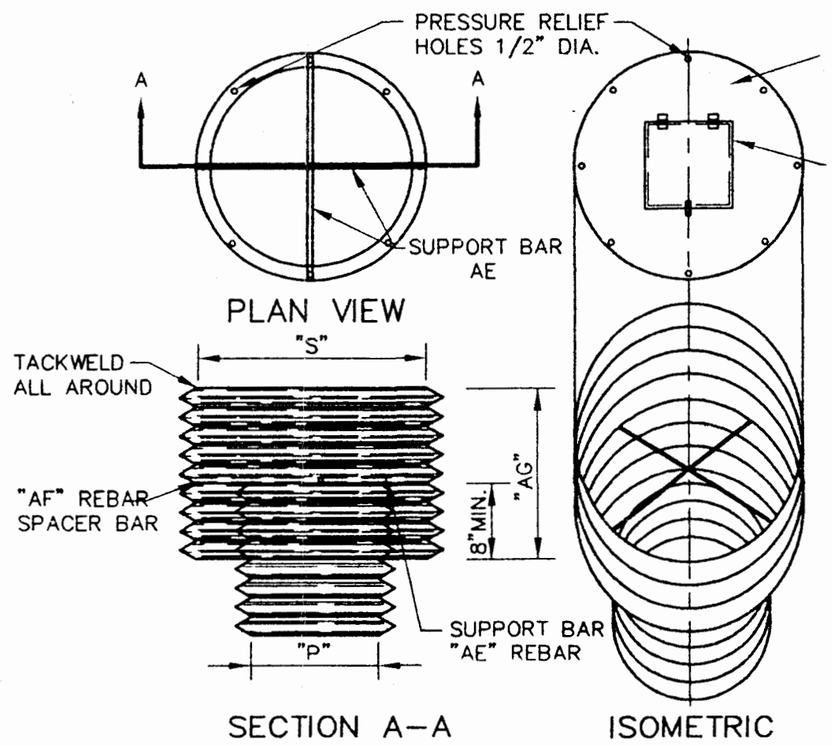
SECTION B–B

UNASSEMBLED COLLARS SHALL BE MARKED BY
PAINTING OR TAGGING TO IDENTIFY MATCHING
PAIRS.
THE LAP BETWEEN THE PIPE AND CONNECTING
BAND SHALL BE CAULKED WITH ASPHALT
MASTIC AT TIME OF INSTALLATION.
EACH COLLAR SHALL BE FURNISHED WITH TWO
/2" DIAMETER RODS WITH STANDARD TANK
UGS FOR CONNECTING COLLARS TO PIPE.

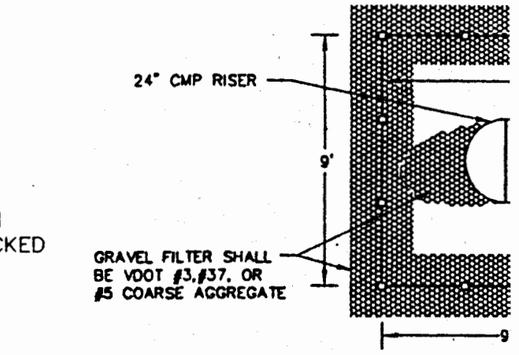
COLLAR

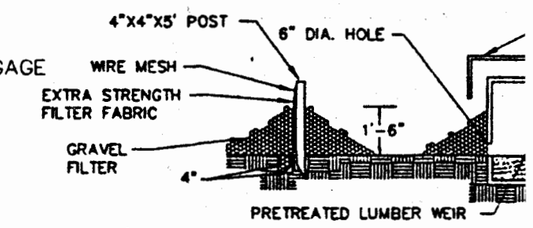
POND A	7.5'	20.5'	18.0'	56.0'	84'	30"	1.2%	67.5'	68.5'	5.
POND B	7.5'	18.5'	16.0'	67.5'	160'	30"	0.625%	74.0'	75.0'	4.00')
POND C	4.5'	10.5'	9.0'	85.35'	52.0'	18"	0.5%	88.0'	90.0'	2.0')

POND SCHEDULES	ORIFICE DIAM., R	ANTI–VORTEX DIAM., S	STEEL PLATE DIMENSION, T	DEPTH TO STEEL PLATE, U	STORAGE AT NORMAL SURFACE, V	STORAGE AT CREST OF RISER, W	POND BOTTOM ELEVATION, X	100–YEAR ELEVATION, Y	50–YEAR ELEVATION, Z	25–YEAR ELEVATION, AA
POND A	11"	72"	8'	30"	1768.0	4279.0	54.0'	67.5'	67.2'	66.74
POND B AB 12"	10.75"	72"	8'	30"	398.0	1195.3	66.07 AB 65.0'	73.5'	73.1'	72.63
POND C	4.15"	36"	4'	30"	N/A	445.3'	85.6'	89.0'	88.6'	88.4'



NOTES:
1. THE CYLINDER MUST BE FIRMLY FASTENED TO THE TOP OF THE RISER.
2. SUPPORT BARS ARE WELDED TO THE TOP OF THE RISER OR ATTACHED BY STRAPS BOLTED TO TOP OF RISER.

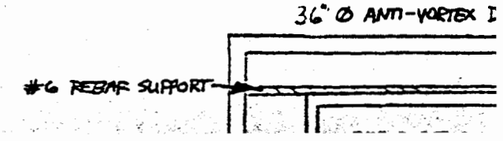




NOT TO SCALE

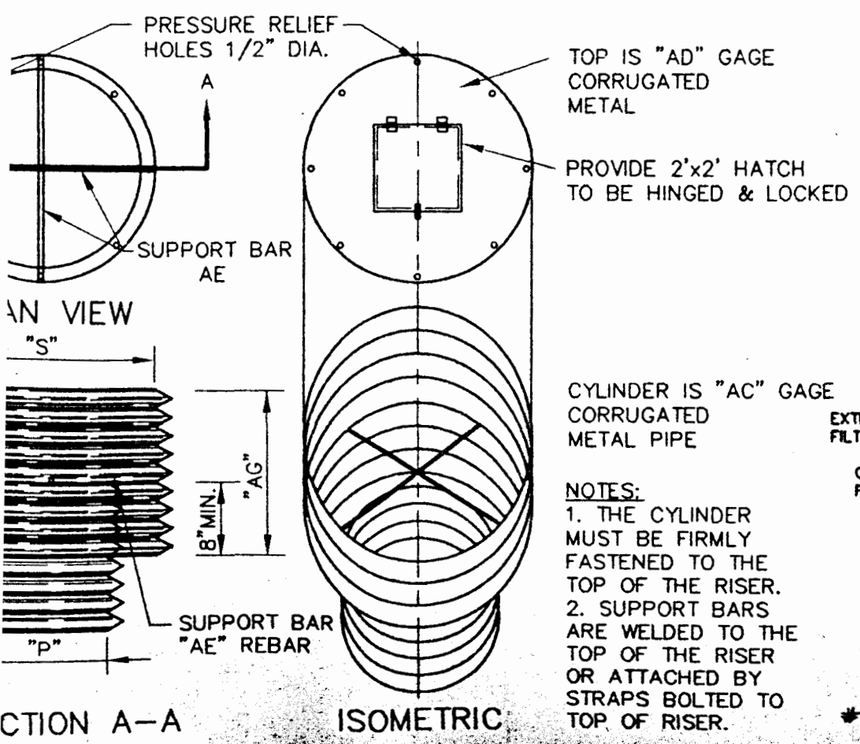
POND "C" RISER DURING CONSTRUCT

36" Ø ANTI-VORTEX



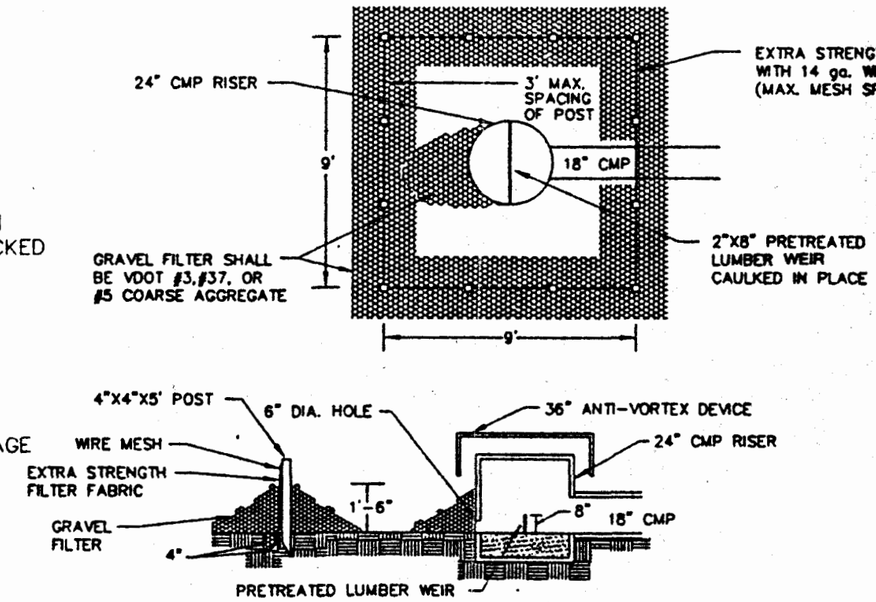
20.5'	18.0'	56.0	84	30	[illegible]	[illegible]	[illegible]	[illegible]								
18.5'	16.0'	67.5'	160'	30"	0.625%	74.0'	75.0'	4.00'X4.00' (4)	8'	4'	2'	68.0'	20'	48"	72.5'
10.5'	9.0'	85.35'	52.0'	18"	0.5%	88.0'	90.0'	2.0'X2.0' (2)	4'	4'	2'	N/A	20'	24"	87.6'

ANTI-VORTEX DIAM., S	STEEL PLATE DIMENSION, T	DEPTH TO STEEL PLATE, U	STORAGE AT NORMAL SURFACE, V	STORAGE AT CREST OF RISER, W	POND BOTTOM ELEVATION, X	100-YEAR ELEVATION, Y	50-YEAR ELEVATION, Z	25-YEAR ELEVATION, AA	NORMAL POOL ELEVATION, AB	ANTI-VORTEX DEVICE					DISTANCE BETWEEN ANTI-SEEP COLLARS	MINIMUM DAM TOP WIDTH, AI
										CYLINDER GAGE, AC	TOP GAGE, AD	SUPPORT BAR, AE	SPACER BAR, AF	HEIGHT, AG		
72"	8'	30"	1768.0	4279.0	54.0'	67.5'	67.2'	66.74'	61.5'	16	14	1 ¼"PIPE	1 ¼"PIPE	21"	21'	8'
72"	8'	30"	398.0	1195.3	65.0'	73.5'	73.1'	72.63'	69.0'	16	14	1 ¼"PIPE	1 ¼"PIPE	21"	12.25'	6'
36"	4'	30"	N/A	445.3'	85.6'	89.0'	88.6'	88.4'	N/A	16	16	#6 REBAR	#6 REBAR	13"	10'	6'



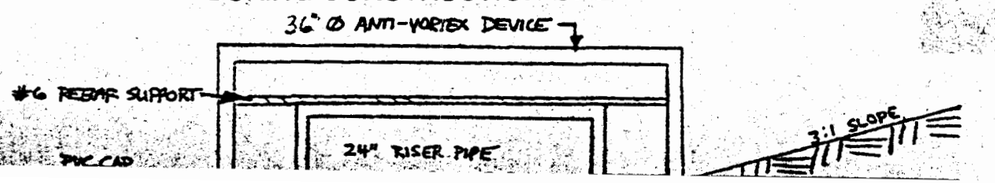
CYLINDER IS "AC" GAGE CORRUGATED METAL PIPE

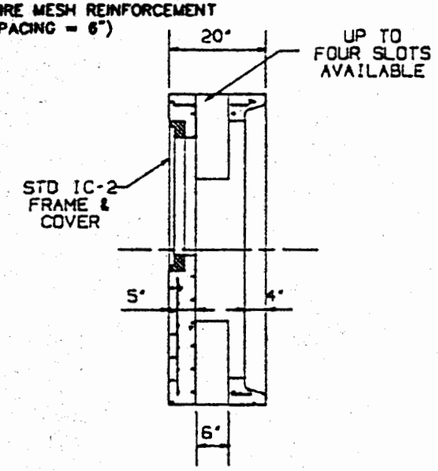
NOTES:
1. THE CYLINDER MUST BE FIRMLY FASTENED TO THE TOP OF THE RISER.
2. SUPPORT BARS ARE WELDED TO THE TOP OF THE RISER OR ATTACHED BY STRAPS BOLTED TO TOP OF RISER.



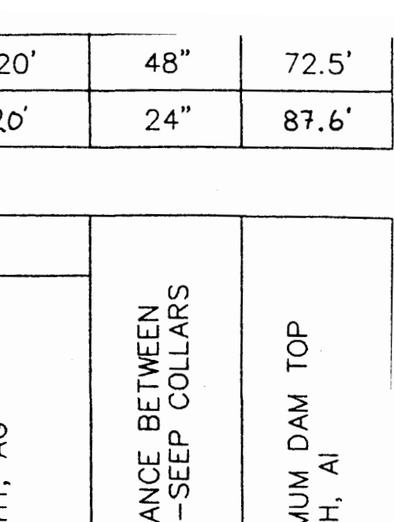
NOT TO SCALE

POND "C" RISER DETAIL DURING CONSTRUCTION ONLY



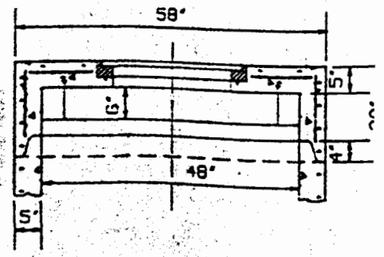


SECTION B-B

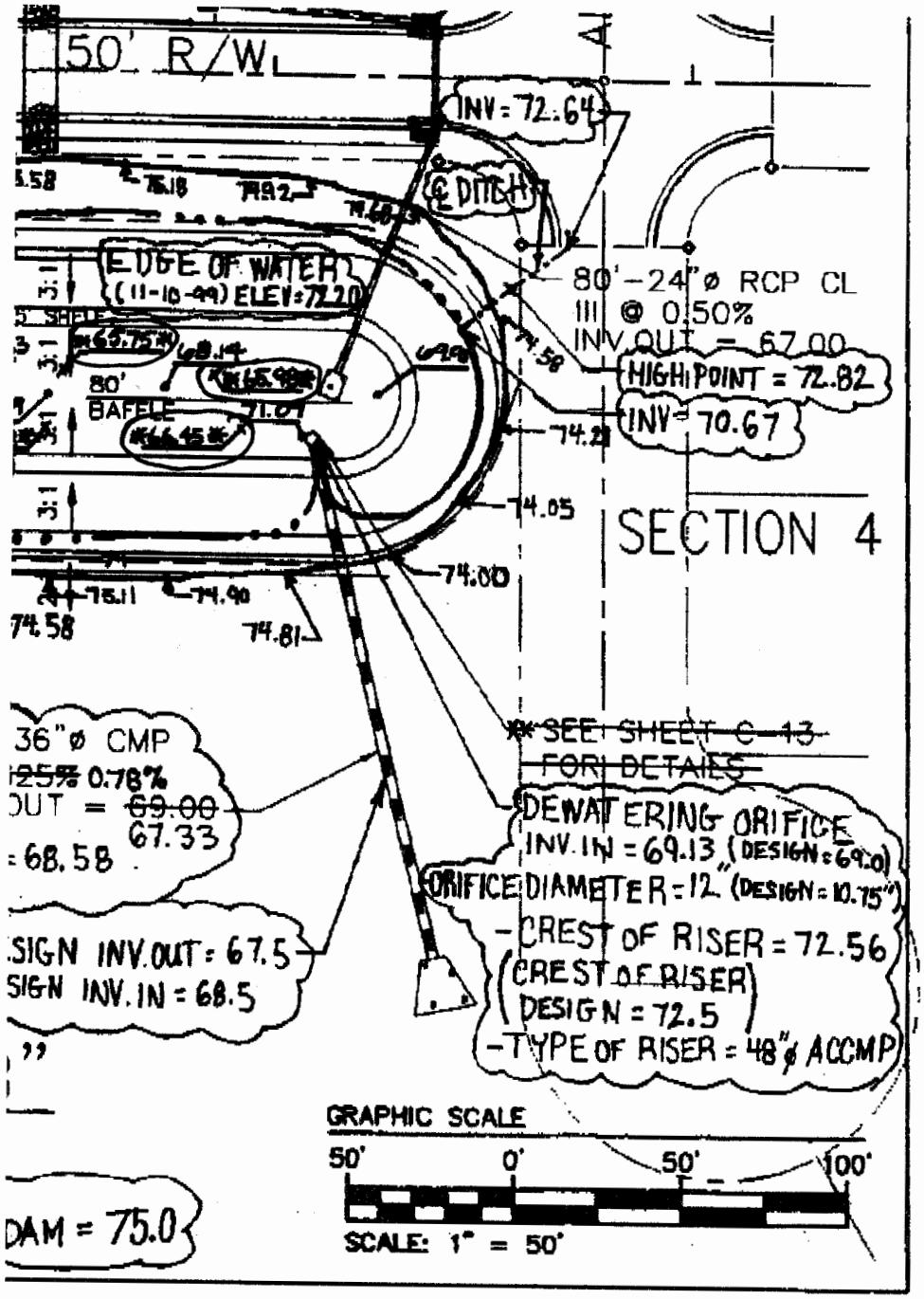


PLAN

NOTES:
1. ADAPTS TO THE SALEM PLANT'S STD. 48" MANHOLE JOINT.
2. WEIGHT 3875 LBS.



SECTION A-A



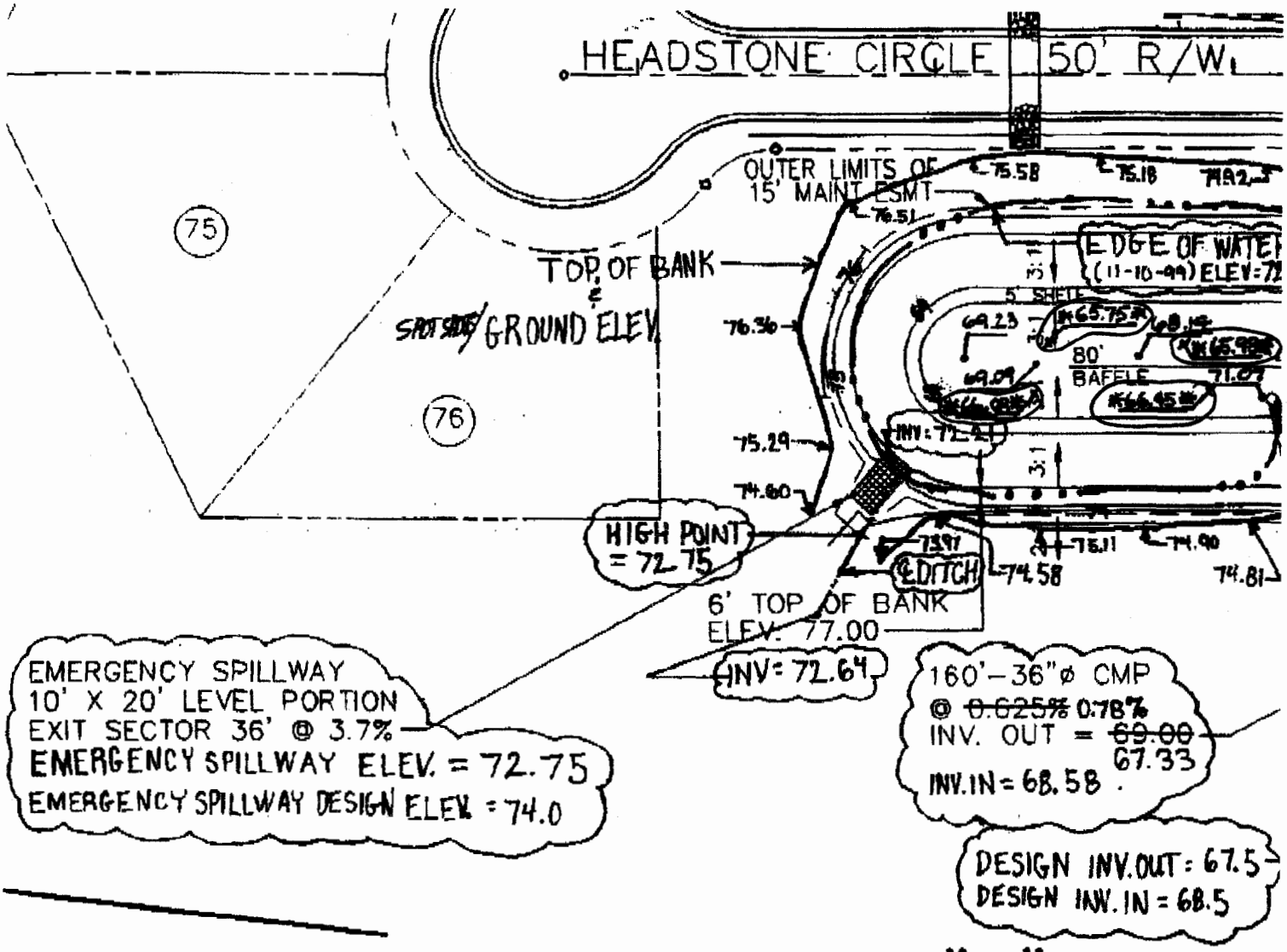
POND AS-BUILTS - SECTION 1

LONGHILL STATION SUBDIVISION
ATLANTIC HOMES DEVELOPMENT CORPORATION
JAMES CITY COUNTY
VIRGINIA

SCALE	1"=50'
DESIGNED	XXX
DRAWN	XXX
CHECKED	NLHT ~~XXX~~
DATE	11-15-99
COMMISSION NO.	1940220
SHEET	C1 ~~C-2~~ 1 of 1 ~~1 of 10~~

REVISIONS

NO.	DATE	DESCRIPTION
1	1-4-00	ADDITIONAL ELEV. - POND "B"
2	3-21-00	* ELEVATIONS OF BOTTOM OF POND "B" * (ATYP.)



POND "B"

SCALE: 1"=50'

DESIGNED CREST OF DAM = 75.0

REVISIO

NO.	B
1	1-
2	3-

MAR-23-00 09:00 FROM:DJG INC 757-253-2318
PC020_PC022_PC119_PC120_PC121_DJG STATION - 084

SCALE: 1"=50'

PERCELL D.B. 224 071 (090)

VIRGINIA ELLIS PIGGOTT
D.B. 450 Pg. 671
2.0 Acres

BESSIE B. JONES
D.B. 36A Pg. 527
2.0 Acres

EARL FAUNTLEROY
D.B. 243 PG. 203
1.893 Ac.

GENEVA ELEANOR PATTERSON WALLACE
D.B. 86 Pg. 218
2.0 Acres

ANNIEBELLE W. PARKER ET ALS
D.B. 208 PG. 712
D.B. 233 PG. 431
3.0 Acres

BELL TAYLOR
D.B. 34 Pg. 347
0.43 Acres

BELL TAYLOR
3.0 Acres

ROUTE 614 CENTERVILLE ROAD

30' R. CONST. ℄

WEST DI.

PROPOSED DI

AREA W

AREA E

EASTSIDE

1-FLARED END SECTION
LT. ST'D. ES-1 or 2.
44'-15" PIPE REQ'D. X-DRAIN
(HEIGHT OF COVER 1.5')

36' of 10" Steel Casing
P.O.T. 206+58.94 Rte. 614
P.I. 10+00.00 Conn. For Run
Δ = 79°18'27" Rt.

10' WIDTH S. ESMT. REQ.

*10'x15' STD. ESMT. REQ. FOR VA. POWER

*10'x20' STD. ESMT. REQ'D. FOR VA. POWER

PROP. R/W

Exist. R/W

N 189°37'01" E

PC020_PC021_PC022_PC119_PC120_LONGHILL_STATION_085

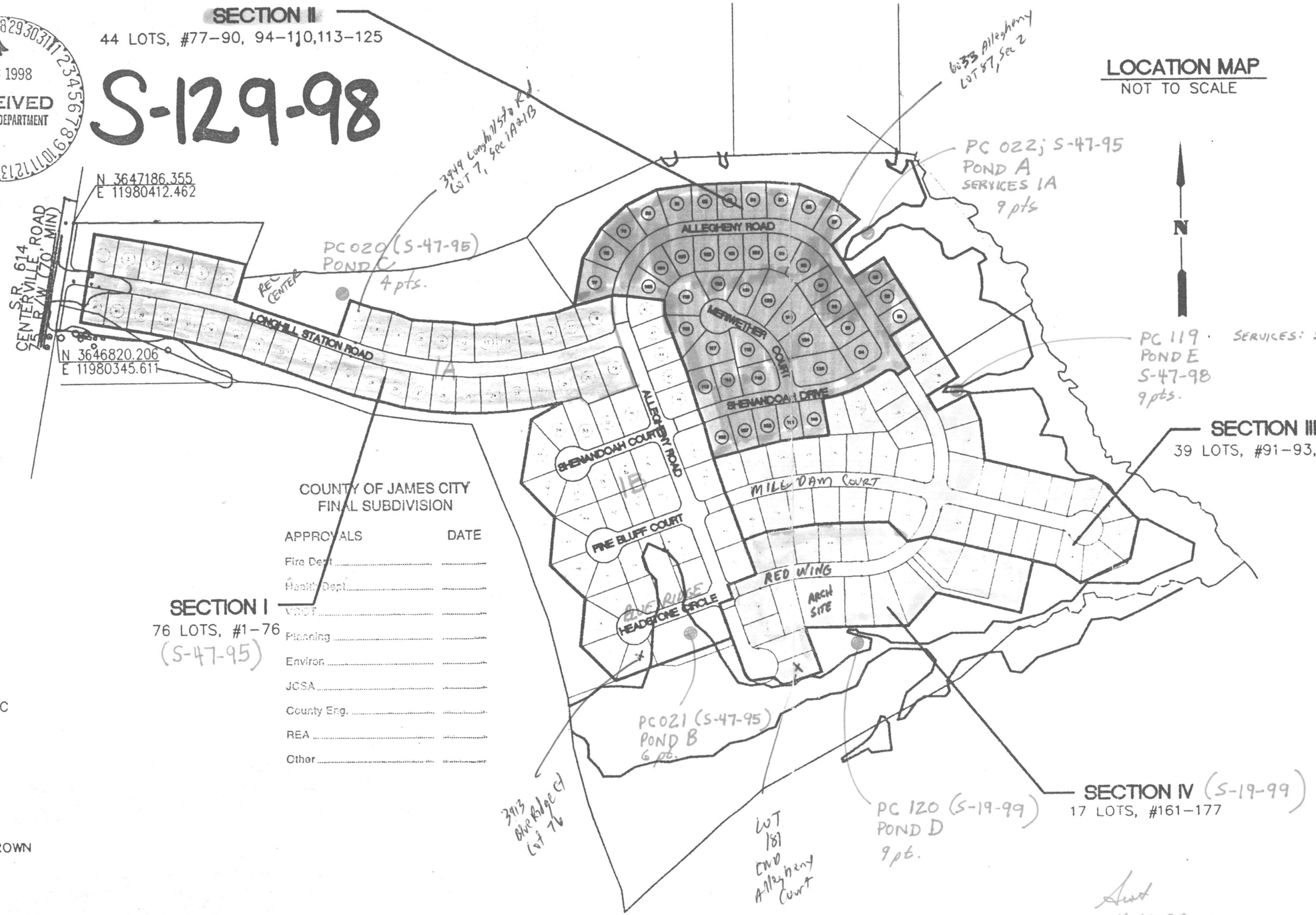
DEC 1998
RECEIVED
PLANNING DEPARTMENT

S-129-98

SECTION II
44 LOTS, #77–90, 94–110,113–125

Bonds
SEC 1A+1B
SEC 2 40,000
Sec 3+4 25,000

LOCATION MAP
NOT TO SCALE



COUNTY OF JAMES CITY
FINAL SUBDIVISION

APPROVALS	DATE
Fire Dept	
Health Dept	
VDOT	
Planning	
Environ	
JCSA	
County Eng.	
REA	
Other	

NGHILL
CE
OR

RY PUBLIC
CERTIFY
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AID.
, 19___.

BELLE BROWN
996 AND
COUNTY
OMES
28, 1996 AND
COUNTY

BELIEF,
RD OF
GINIA

SECTION II:
* LOT AREA (44 LOTS) : 533,777 S.F./12.254 AC.
* R/W DEDICATION: 138,195 S.F./ 3.173 AC.
* NATURAL OPEN SPACE/ CONSERVATION EASEMENT : 392,211 S.F./ 9.004 AC.

Aust
CK LOCATION OF BMP's on ORTHO_G23

LOT AREA

NO.	SQUARE FEET
77	15,104
78	12,696
79	12,696
80	12,696
81	12,409
82	10,732
83	10,732
84	10,732
85	12,370
86	12,662
87	12,662
88	10,000
89	10,000
90	10,000
94	12,314
95	10,960
96	10,960
97	10,960
98	11,550
99	11,550
100	10,732
101	10,732
102	10,732
103	10,449

DJG
P.O. Box 3505
Williamsburg, Virginia 23187
(804) 253-0673
Fax (804) 253-2319

PROJECT LONGHILL STATION
DATE 9-5-95 COMM NO. 1940220
CAL HLPG CKD PAGE # 7
TITLE REVISION # 1

POND B – CN CALCULATIONS:

· PRE-DEVELOPMENT:

AREA (%)	SOIL	GROUP	COVER	CN	WEIGHTED CN
90	CRAVEN	C	GOOD WOOD	70	6300
10	EMPORIA	C	GOOD WOOD	70	700
100					7000

7000/100 = 70

· POST-DEVELOPMENT:

AREA (%)	SOIL	GROUP	COVER	CN	WEIGHTED CN
94	CRAVEN	C	1/4 AC LOTS	83	7802
6	EMPORIA	C	PAR WOOD	77	462
100					8264

8264/100 = 83

POND B BMP # 5 DESIGN:

· BASIN STORAGE TO LEVEL @ 68.0

ELEV	AREA (ft^3)	$\Sigma(A_i+A_j)/2$	VOL (ft^3)	Σ VOL (ft^3)
65	120	–	–	–
66	1320	720	720	720
68	3015	2167.5	4335	5055

REQUIRED STORAGE (pg 10) – AVAILABLE = STORAGE NEEDED
8500 ft^3 – 5055 ft^3 = 3445 ft^3

· BASIN STORAGE FROM SHELF TO NORMAL SURFACE

ELEV.	AREA (ft^3)	$\Sigma(A_i+A_j)/2$	VOL (ft^3)	Σ VOL (ft^3)
68	4470	–	–	–
68.25	4775	4622.5	1156	1156
69	5690	5233	3924	5080

DJG
P.O. Box 3505
Williamsburg, Virginia 23187
(804) 253-0673
Fax (804) 253-2319

PROJECT LONGHILL STATION
DATE 9-5-95 COMM NO. 1940220
CAL HLPG CKD PAGE # 8
TITLE REVISION #1

POND B BMP # 5 CONTINUED:

69 - N Pool
$V_s = 398$ CY

STORAGE ALGORITHM: $z_1 = 0.25$ $z_2 = 1.0$
$S_1 = 1156$ $S_2 = 5080$

$$b = \frac{\ln\left(\frac{S_2}{S_1}\right)}{\ln\left(\frac{z_2}{z_1}\right)} = 1.0678 \qquad K_s = \frac{S_2}{z_2^b} = 5080 \qquad z = \left(\frac{3445\,ft^3}{K_s}\right)^{1/b} = 0.695'$$

$0.695' \Rightarrow 1.0'$ ∴ $68.0 + 1.0 = 69.0$ = NORMAL SURFACE ELEV.

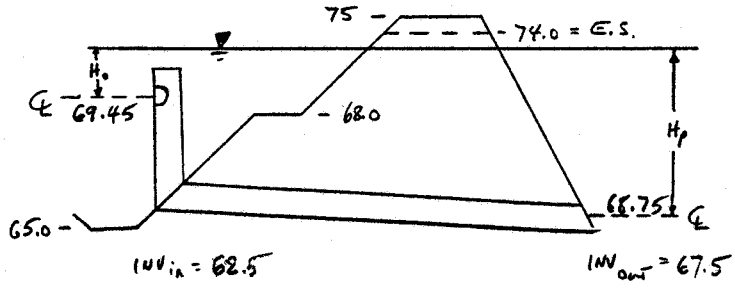
- BASIN STORAGE ABOVE NORMAL SURFACE

ELEV.	AREA (ft^2)	$\Sigma(A_i + A_j)/2$	VOL. (ft^3)	Σ VOL (ft^3)
69	5690	–	–	–
70	7890	6790	6790	6790
71	9190	8540	8540	15330 ← 72.5'
75	14700	11945	47780	63110 riser crest
				78 → 39,000

STORAGE ALGORITHM: $z_1 = 1.0$ $z_2 = 6.0$
$S_1 = 6790$ $S_2 = 63110$

$$b = \frac{\ln\left(\frac{S_2}{S_1}\right)}{\ln\left(\frac{z_2}{z_1}\right)} = 1.2443 \qquad K_s = \frac{S_2}{z_2^b} = 6790 \Longrightarrow S = 6790(z)^{1.2443}$$

- PRINCIPAL SPILLWAY:



48" CMP RISER
30" CMP BARREL, PIPE FLOW CAP. = 0.77
10.75" ORIFICE @ 69.0
$Q = CA\sqrt{2gH_o}$
$C = 0.60$

DJG
P.O. Box 3505
Williamsburg, Virginia 23187
(804) 253-0673
Fax (804) 253-2319

PROJECT LONGHILL STATION
DATE 9-5-95 COMM NO.
CAL HLPG CKD PAGE # 9
TITLE REVISION #1

POND B BMP #5 CONTINUED:

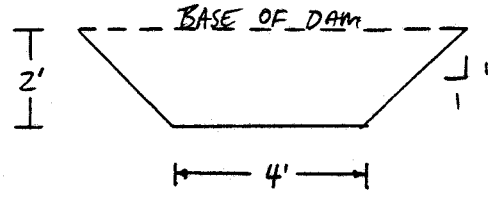
- STAGE – STORAGE – DISCHARGE

	ELEV	STAGE	H_p	Q_p	H_o	Q_o	ΣQ	STORAGE
	69.0	–	–	–	–	–	–	–
	69.5	0.5	–	–	0.05	0.68	0.68	2866
	70.0	1	–	–	0.55	2.25	2.25	6790
	70.5	1.5	–	–	1.05	3.11	3.11	11245
	71.0	2	–	–	1.55	3.78	3.78	16085
	71.5	2.5	–	–	2.05	4.35	4.35	21233
	72.0	3	–	–	2.55	4.85	4.85	26640
C.R.	72.5	3.5	–	–	3.05	5.30	5.30	32273
	73.0	4	4.25	(WEIR) 8.5	3.55	5.72	14.22	38106
	75.0	6	6.25	– 36.2	5.55	7.15	43.35	63110

- ANTI-SEEP COLLAR CALCULATIONS (USING E&S PLATE 3.14-11)

$Y = 72.5 - 65.0 = 7.5'$
$S = 0.625\%$
UPSTREAM EMBANK. SLOPE = 3:1
$\Rightarrow L_s = 55'$
PIPE ϕ = 30"
$\Rightarrow$ 4 COLLARS, 4.0' × 4.0'

- CORE TRENCH DETAIL



– CORE TRENCH RUNS ALONG ℄ OF DAM, UP EMBANK. TO ELEV. = 72.5

- ANTI-VORTEX DESIGN:

RISER ϕ = 48.0" CYLINDER ϕ = 72"
THICKNESS = 16 ga HEIGHT = 21.0"
SUPPORT/SPACER BARS = 1¼" PIPE
TOP THICKNESS = 14 ga (CORREGATED)

DJG
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PROJECT LONGHILL STATION
DATE 9-5-95 COMM NO. 1940220
CAL HLPG CKD PAGE # 10
TITLE REVISION #1

POND B BMP #5 DESIGN CONTINUED:

$V_r = 7056 ft^3$
$2.5V_r = 17,641 ft^3$ - 8 PTS

• REQUIRED STORAGE

$V_p = V_r \times 0.45$
$V_r = 0.5 \times R_v \times A \times 3630$
$R_v = 0.05 + 0.009 \times IMP\%$
$A = 11.9$

$V_r = 0.5 \times (0.05 + 0.009 \times 38\%) \times 11.9 \times 3630 = 8466 \approx 8500 ft^3$

$V_p = 8500 ft^3$

½" × Imp Area = 11.9" × 38% = 8207 ft³ - ok

• OUTLET PROTECTION FOR BARREL:

PIPE Ø = 30" $Q_p(100) = 22.0$

ASSUME MIN. TAILWATER COND.
APRON LENGTH = (ESS pg III-164) = 16.0'
APRON WIDTH UPSTREAM = 3 × Ø = 3 × 2.5' = 7.5'
DOWNSTREAM = Ø + APRON LENGTH = 2.5' + 16.0' = 18.5'
RIPRAP: $d_{50} = 0.6'$
depth = 18" min.

LONGHILL STATION POND B PRE-DEVELOPMENT

LONGHILL STATION POND B PRE-DEVELOPMENT

INPUT DESIGN DATA

DESIGN STORM FOR ANALYSIS = 2 YEAR
DRAINAGE AREA (ACRES) = 9.899999
AVERAGE SLOPE OF DRAINAGE AREA (%) = 3.6
HYDRAULIC LENGTH (FT) = 1200
IMPERVIOUS SURFACE (%) = 10
HYDRAULIC LENGTH MODIFIED (%) = 15
COMPOSITE CURVE NUMBER = 70
SLOPE ADJUSTMENT FACTOR = .98
PONDING ADJUSTMENT FACTOR = .59

RESULTS OF HYDRAULIC CALCULATIONS
(SCS TR-55 & TP-149 PROCEDURES)

WATERSHED LAG ADJUSTED (IMPER. AREAS & CHAN. IMPROV.) IS .215 HOURS
TIME OF CONCENTRATION ADJUSTED IS .359 HOURS
THE PEAK DISCHARGE FROM THIS WATERSHED IS 5 C.F.S.

THE FOLLOWING ARE TIME INCREMENTS AND ORDINATES OF THE
INFLOW HYDROGRAPH

(HOURS)	(C.F.S.)
0,0	
.086	.03
.172	.135
.258	.405
.344	1.056
.431	2.235
.5170001	3.876
.603	4.972
.689	5.031
.775	3.944
.861	2.679
.947	1.513
1.033	.604
1.119	.084
1.206	0

LONGHILL STATION POND B POST-DEVELOPMENT

LONGHILL STATION POND B POST-DEVELOPMENT

INPUT DESIGN DATA

DESIGN STORM FOR ANALYSIS = 2 YEAR
DRAINAGE AREA (ACRES) = 11.9
AVERAGE SLOPE OF DRAINAGE AREA (%) = 3.2
HYDRAULIC LENGTH (FT) = 1450
IMPERVIOUS SURFACE (%) = 38
HYDRAULIC LENGTH MODIFIED (%) = 50
COMPOSITE CURVE NUMBER = 83
SLOPE ADJUSTMENT FACTOR = .94
PONDING ADJUSTMENT FACTOR = .51

RESULTS OF HYDRAULIC CALCULATIONS
(SCS TR-55 & TP-149 PROCEDURES)

WATERSHED LAG ADJUSTED (IMPER. AREAS & CHAN. IMPROV.) IS .125 HOURS
TIME OF CONCENTRATION ADJUSTED IS .209 HOURS
THE PEAK DISCHARGE FROM THIS WATERSHED IS 13 C.F.S.

THE FOLLOWING ARE TIME INCREMENTS AND ORDINATES OF THE
INFLOW HYDROGRAPH

(HOURS)	(C.F.S.)
0,0	
.05	.411
.1	1.413
.151	3.356
.201	5.757
.251	8.467
.301	11.015

.351	13.028
.402	13.034
.452	11.139
.502	7.596
.552	4.617
.602	2.308
.652	.751
.703	0

STAGE (FT)	DISCHARGE (CFS)	STORAGE (CF)
0	0	0
.5	.68	2866
1	2.25	6790
1.5	3.11	11245
2	3.78	16085
2.5	4.35	21233

THE FOLLOWING ARE TIME INCREMENTS AND ORDINATES OF THE OUTFLOW HYDOGRAPH

(HOURS)	(C.F.S.)
0.000	0.009
0.050	0.047
0.100	0.145
0.151	0.330
0.201	0.614
0.251	1.208
0.301	1.962
0.351	2.488
0.402	2.817
0.452	3.042
0.502	3.136
0.552	3.145
0.602	3.103
0.652	3.009
0.703	2.906
0.753	2.806
0.803	2.710
0.853	2.617
0.903	2.527
0.954	2.441
1.004	2.357
1.054	2.276
1.104	2.145
1.154	1.995
1.205	1.856
1.255	1.726
1.305	1.606
1.355	1.494
1.405	1.390
1.456	1.293
1.506	1.203
1.556	1.119
1.606	1.041
1.656	0.968
1.706	0.900
1.757	0.838
1.807	0.779
1.857	0.725
1.907	0.677

MAXIMUM OUTFLOW IS 3.145 C.F.S.
MAXIMUM STAGE IS 1.52612 FT. +6a = 70.5
MAXIMUM STORAGE IS 11497 CUBIC FEET

LONGHILL STATION POND B POST-DEVELOPMENT

LONGHILL STATION POND B POST-DEVELOPMENT

INPUT DESIGN DATA

DESIGN STORM FOR ANALYSIS = 10 YEAR
DRAINAGE AREA (ACRES) = 11.9

AVERAGE SLOPE OF DRAINAGE AREA (%) = 3.2
HYDRAULIC LENGTH (FT) = 1450
IMPERVIOUS SURFACE (%) = 38
HYDRAULIC LENGTH MODIFIED (%) = 50
COMPOSITE CURVE NUMBER = 83
SLOPE ADJUSTMENT FACTOR = .94
PONDING ADJUSTMENT FACTOR = .54

RESULTS OF HYDRAULIC CALCULATIONS
(SCS TR-55 & TP-149 PROCEDURES)

WATERSHED LAG ADJUSTED (IMPER. AREAS & CHAN. IMPROV.) IS .125 HOURS
TIME OF CONCENTRATION ADJUSTED IS .209 HOURS
THE PEAK DISCHARGE FROM THIS WATERSHED IS 28 C.F.S.

THE FOLLOWING ARE TIME INCREMENTS AND ORDINATES OF THE INFLOW HYDROGRAPH

(HOURS)	(C.F.S.)
0,0	
.05	1.01
.1	3.426
.151	8.002
.201	13.434
.251	19.314
.301	24.553
.351	28.408
.402	27.948
.452	23.592
.502	15.962
.552	9.627
.602	4.777
.652	1.544
.703	0

STAGE (FT)	DISCHARGE (CFS)	STORAGE (CF)
0	0	0
.5	.68	2866
1	2.25	6790
1.5	3.11	11245
2	3.78	16085
2.5	4.35	21233
3	4.85	26648
3.5	5.3	32273

THE FOLLOWING ARE TIME INCREMENTS AND ORDINATES OF THE OUTFLOW HYDOGRAPH

(HOURS)	(C.F.S.)
0.000	0.021
0.050	0.113
0.100	0.348
0.151	0.852
0.201	1.935
0.251	2.781
0.301	3.458
0.351	4.012
0.402	4.427
0.452	4.681
0.502	4.816
0.552	4.854
0.602	4.827
0.652	4.760
0.703	4.681
0.753	4.604
0.803	4.528
0.853	4.453
0.903	4.379
0.954	4.298
1.004	4.213
1.054	4.129
1.104	4.048
1.154	3.967

1.205	3.889
1.255	3.812
1.305	3.726
1.355	3.634
1.405	3.544
1.456	3.456
1.506	3.371
1.556	3.288
1.606	3.206
1.656	3.127
1.706	3.027
1.757	2.923
1.807	2.823
1.857	2.726
1.907	2.632

MAXIMUM OUTFLOW IS 4.855 C.F.S.
MAXIMUM STAGE IS 3.005556 FT.
MAXIMUM STORAGE IS 26702 CUBIC FEET

LONGHILL STATION POND B POST-DEVELOPMENT

LONGHILL STATION POND B POST-DEVELOPMENT

INPUT DESIGN DATA

DESIGN STORM FOR ANALYSIS = 25 YEAR
DRAINAGE AREA (ACRES) = 11.9
AVERAGE SLOPE OF DRAINAGE AREA (%) = 3.2
HYDRAULIC LENGTH (FT) = 1450
IMPERVIOUS SURFACE (%) = 38
HYDRAULIC LENGTH MODIFIED (%) = 50
COMPOSITE CURVE NUMBER = 83
SLOPE ADJUSTMENT FACTOR = .94
PONDING ADJUSTMENT FACTOR = .58

RESULTS OF HYDRAULIC CALCULATIONS
(SCS TR-55 & TP-149 PROCEDURES)

WATERSHED LAG ADJUSTED (IMPER. AREAS & CHAN. IMPROV.) IS .125 HOURS
TIME OF CONCENTRATION ADJUSTED IS .209 HOURS
THE PEAK DISCHARGE FROM THIS WATERSHED IS 36 C.F.S.

THE FOLLOWING ARE TIME INCREMENTS AND ORDINATES OF THE
INFLOW HYDROGRAPH

(HOURS)	(C.F.S.)
0,0	
.05	1.301
.1	4.403
.151	10.252
.201	17.149
.251	24.555
.301	31.089
.351	35.83
.402	35.143
.452	29.6
.502	19.998
.552	12.045
.602	5.968
.652	1.927
.703	0

STAGE (FT)	DISCHARGE (CFS)	STORAGE (CF)
0	0	0
.5	.68	2866
1	2.25	6790
1.5	3.11	11245
2	3.78	16085
2.5	4.35	21233
3	4.85	26640
3.5	5.3	32273
4	14.22	38106

6 43.35 63110

THE FOLLOWING ARE TIME INCREMENTS AND ORDINATES OF THE OUTFLOW HYDOGRAPH

(HOURS)	(C.F.S.)
0.000	0.027
0.050	0.146
0.100	0.447
0.151	1.218
0.201	2.416
0.251	3.237
0.301	3.944
0.351	4.533
0.402	4.975
0.452	5.259
0.502	7.212
0.552	7.648
0.602	6.750
0.652	5.345
0.703	5.226
0.753	5.151
0.803	5.077
0.853	5.005
0.903	4.933
0.954	4.862
1.004	4.783
1.054	4.704
1.104	4.626
1.154	4.550
1.205	4.474
1.255	4.400
1.305	4.323
1.355	4.237
1.405	4.153
1.456	4.071
1.506	3.990
1.556	3.911
1.606	3.834
1.656	3.752
1.706	3.660
1.757	3.569
1.807	3.481
1.857	3.395
1.907	3.311

MAXIMUM OUTFLOW IS 7.648 C.F.S.
MAXIMUM STAGE IS 3.631614 FT.
MAXIMUM STORAGE IS 33808 CUBIC FEET

LONGHILL STATION POND B POST-DEVELOPMENT

LONGHILL STATION POND B POST-DEVELOPMENT

INPUT DESIGN DATA

DESIGN STORM FOR ANALYSIS = 100 YEAR
DRAINAGE AREA (ACRES) = 11.9
AVERAGE SLOPE OF DRAINAGE AREA (%) = 3.2
HYDRAULIC LENGTH (FT) = 1450
IMPERVIOUS SURFACE (%) = 38
HYDRAULIC LENGTH MODIFIED (%) = 50
COMPOSITE CURVE NUMBER = 83
SLOPE ADJUSTMENT FACTOR = .94
PONDING ADJUSTMENT FACTOR = .67

RESULTS OF HYDRAULIC CALCULATIONS
(SCS TR-55 & TP-149 PROCEDURES)

WATERSHED LAG ADJUSTED (IMPER. AREAS & CHAN. IMPROV.) IS .125 HOURS
TIME OF CONCENTRATION ADJUSTED IS .209 HOURS
THE PEAK DISCHARGE FROM THIS WATERSHED IS 54 C.F.S.

THE FOLLOWING ARE TIME INCREMENTS AND ORDINATES OF THE INFLOW HYDROGRAPH

(HOURS)	(C.F.S.)
0,0	
.05	2.008
.1	6.774
.151	15.71
.201	26.137
.251	37.212
.301	46.841
.351	53.682
.402	52.425
.452	44.013
.502	29.674
.552	17.837
.602	8.821999
.652	2.843
.703	0

STAGE (FT)	DISCHARGE (CFS)	STORAGE (CF)
0	0	0
.5	.68	2886
1	2.25	6790
1.5	3.11	11245
2	3.78	16085
2.5	4.35	21233
3	4.85	26640
3.5	5.3	32273
4	14.22	38106
6	43.35	63110

THE FOLLOWING ARE TIME INCREMENTS AND ORDINATES OF THE OUTFLOW HYDOGRAPH

(HOURS)	(C.F.S.)
0.000	0.042
0.050	0.223
0.100	0.684
0.151	2.103
0.201	3.169
0.251	4.060
0.301	4.870
0.351	9.709

0.402	18.016
0.452	21.601
0.502	22.012
0.552	20.358
0.602	17.592
0.652	14.512
0.703	11.069
0.753	8.382
0.803	6.347
0.853	5.271
0.903	5.195
0.954	5.121
1.004	5.047
1.054	4.975
1.104	4.904
1.154	4.831
1.205	4.751
1.255	4.672
1.305	4.595
1.355	4.519
1.405	4.444
1.456	4.370
1.506	4.288
1.556	4.203
1.606	4.119
1.656	4.038
1.706	3.958
1.757	3.879
1.807	3.803
1.857	3.714
1.907	3.622

MAXIMUM OUTFLOW IS 22.012 C.F.S.
MAXIMUM STAGE IS 4.534982 FT.
MAXIMUM STORAGE IS 44794 CUBIC FEET

Calculated By: HLPG
Checked By: WDJ

Date: AUGUST 22, 1995
Date: AUGUST 22, 1995

N: CONC. 0.013 GRASS = 0.05
Storm Frequency 10-YR

DJG, INC

P. O. BOX 3505
WILLIAMSBURG, VIRGINA 23187
STORM DRAINAGE COMPUTATION SHEET

PROJECT NO. 1940220 revision II (11/28/95)
PROJECT DESC. LONGHILL STATION SUBDIVISION ROAD A

SHEET 1 OF 2 SHEETS

LOCATION				AREA-ACRES		RUN-OFF			TIME OF FLOW (MIN.)					PIPE-CHANNEL DESIGN						HYDRAULIC GRADE LINE								
LINE	RUN	FROM	TO	INCREMENTAL	TOTAL	RUN-OFF COEFF.	INCREMENTAL CA	ACCUMULATED CA	TO INLET/UPPER RCH.	WITHIN REACH CONVEYANC	TIME OF CONCENTRATION	INTENSITY	DISCHARGE/CFS	PIPE SIZE	CHANNEL SECTION	SLOPE FT/FT	CAPACITY FULL/C.F.S.	VELOCITY FULL/C.F.S.	DESIGN VELOCITY/F.P.S.	CONVEYANCE LENGTH/FT.	INVERT UPSTREAM	INVERT DOWNSTREAM	FRICTION SLOPE/FT./FT.	VELOCITY FACTOR	V2/2G/FT.	H.G.L. ELEV. UPSTREAM	H.G.L. DOWNSTREAM	RIM ELEVATION
A	I	1	2	0.41	0.41	0.6	0.25	0.25	21	0.24	21.2	4.5	1.107	15		0.0048	4.46	3.64	3.04	44	112.56	112.35	0.00478	0.836	0.144	113.81	113.58	116.48
		2	3a	0.2	0.61	0.6	0.12	0.37	12	0.68	12.7	4.5	1.647	15		0.0397	12.87	10.49	7.34	300	112.25	100.34	0.03973	0.700	0.837	113.58	101.54	116.48
	II	1	3a	0.4	0.4	0.6	0.24	0.24	23	0.24	23.2	4.5	1.080	15		0.0050	4.57	3.72	3.08	44	100.56	100.34	0.00500	0.828	0.147	101.54	101.30	104.48
	I	3a	4	0.3	1.31	0.6	0.18	0.79	13	0.53	13.5	4.5	3.537	15		0.0438	13.52	11.02	9.36	300	100.24	87.10	0.04383	0.850	1.362	101.30	87.90	104.48
	III	1a	2	0.8	0.8	0.6	0.48	0.48	17	0.11	17.1	4.5	2.160	15		0.0071	5.46	4.45	4.15	28	91.20	91.00	0.00715	0.933	0.268	93.36	93.13	95.40
		1b	2	23	23	0.25	5.75	6.23	41	0.23	41.2	3	18.690	21		0.0176	21.05	8.75	9.87	136	94.00	91.60	0.01766	1.128	1.513	95.72	93.13	95.75
		2	3	0	23.8	0.6	0.00	6.23	0.5	0.02	0.5	4.5	28.035	21		0.0444	33.38	13.88	15.82	16	89.91	89.20	0.04440	1.140	3.886	93.13	91.14	95.16
		3	4	0.9	24.7	0.6	0.54	6.77	19	0.05	19.0	4.5	30.465	21		0.0466	34.20	14.22	16.21	44	87.80	85.75	0.04662	1.140	4.080	91.14	87.90	95.04
	I	3b	4	0.15	0.15	0.6	0.09	0.09	12	0.17	12.2	4.5	0.405	15		0.0558	15.26	12.43	5.18	52	90.00	87.10	0.05581	0.417	0.417	90.85	87.90	95.49
		4	5	0.62	26.78	0.45	0.28	7.93	18	0.08	18.1	4.5	35.663	24		0.0250	35.77	11.39	12.96	60	85.50	84.00	0.02501	1.138	2.607	87.90	86.00	95.04
B	I	1	2	3.3	3.3	0.54	1.78	1.78	27	0.24	27.2	4.5	8.019	15		0.0239	9.98	8.13	9.11	132	96.00	92.85	0.02388	1.120	1.288	101.41	98.09	103.25
		2	3	0.9	4.2	0.55	0.50	2.31	22	0.11	22.1	4.5	10.395	15		0.0367	12.38	10.09	9.99	64	92.75	90.40	0.03675	0.990	1.548	98.09	94.97	99.69
		3	4	0.2	4.4	0.55	0.11	2.42	9	0.41	9.4	4.5	10.890	21		0.0066	12.87	5.35	5.86	144	90.30	89.35	0.00660	1.095	0.533	94.97	93.25	100.89
		4	5	0.85	5.25	0.6	0.51	3.15	27	0.73	27.7	4.5	14.175	24		0.0052	16.38	5.21	5.68	250	89.25	87.94	0.00524	1.090	0.501	93.25	91.77	93.92
		5	6	0.0	5.25	0.6	0.00	3.15	1	0.34	1.3	4.5	14.175	24		0.0052	16.34	5.20	5.67	115	87.84	87.24	0.00522	1.090	0.499	91.77	90.98	91.92
		6	7	0.0	5.25	0.6	0.00	3.15	1	0.16	1.2	4.5	14.175	24		0.0222	33.69	10.72	12.65	124	86.65	83.90	0.02219	1.180	2.486	90.98	87.82	92.00
	II	1a	2a	0.2	0.2	0.6	0.12	0.12	11	0.39	11.4	4.5	0.540	15		0.0166	8.32	6.78	7.39	172	100.70	97.85	0.01658	1.090	0.847	101.71	98.76	104.95
		1b	2b	0.82	1.02	0.6	0.49	0.61	18	0.26	18.3	4.5	2.754	15		0.0341	11.93	9.72	8.55	132	103.00	98.50	0.03412	0.880	1.136	104.44	99.79	104.50
		2b	2a	0.0	1.02	0.6	0.00	0.61	12	0.16	12.2	4.5	2.754	15		0.0091	6.16	5.02	4.62	44	97.65	97.25	0.00910	0.920	0.331	99.79	98.76	102.41
		2a	3	0.65	1.67	0.6	0.39	1.00	13	0.14	13.1	4.5	4.509	18		0.0091	10.02	5.67	5.33	44	96.50	96.10	0.00910	0.940	0.441	98.76	98.13	102.02
		3	4	0.2	1.87	0.6	0.12	1.12	9	0.09	9.1	4.5	5.049	18		0.0107	10.87	6.15	5.05	28	95.35	95.05	0.01072	0.820	0.395	98.13	97.55	102.02
		4	5	0.24	2.11	0.6	0.14	1.26	12	0.35	12.4	4.5	5.670	18		0.0092	10.07	5.70	6.44	136	94.30	93.05	0.00920	1.130	0.644	97.55	96.13	102.23
		5	7	0.0	2.11	0.6	0.00	1.26	1	0.30	1.3	4.5	5.670	18		0.0344	19.48	11.02	12.45	224	91.60	83.90	0.03440	1.130	2.408	96.13	87.82	96.20
	I	7	8	2.05	9.41	0.6	1.23	5.65	20	0.15	20.2	4.5	25.407	24		0.0147	27.40	8.72	9.93	92	83.00	81.65	0.01468	1.138	1.530	87.82	86.17	87.92
		8	9	0.9	10.31	0.6	6.19	6.19	19	0.65	19.6	4.5	27.837	24		0.0208	32.61	10.38	11.60	450	81.00	71.65	0.02079	1.118	2.091	86.17	76.11	87.92
		9	10	0.0	10.31	0.6	0.00	6.19	1	0.87	1.9	4.5	27.837	30		0.0119	44.71	9.11	9.64	505	71.00	65.00	0.01188	1.058	1.442	76.11	69.17	76.2
		10	11	0.0	10.31	0.6	0.00	6.19	1	0.39	1.4	4.5	27.837	30		0.0185	55.71	11.35	11.46	271	64.00	59.00	0.01846	1.010	2.041	69.17	63.66	75.5

Calculated By: HLPG Date: AUGUST 22, 1995
Checked By: WDJ Date: AUGUST 22, 1995

N: CONC. 0.009 GRASS = 0.05
Storm Frequency 10-YR

DJG, INC

P. O. BOX 3505
WILLIAMSBURG, VIRGINA 23187
STORM DRAINAGE COMPUTATION SHEET

PROJECT NO. 1940220 revision II (11/28/95)
PROJECT DESC. LONGHILL STATION SUBDIVISION ROADs B - E

SHEET 1 OF 2 SHEETS

LOCATION				AREA-ACRES		RUN-OFF			TIME OF FLOW (MIN.)					PIPE-CHANNEL DESIGN						HYDRAULIC GRADE LINE								
LINE	RUN	FROM	TO	INCREMENTAL	TOTAL	RUN-OFF COEFF.	INCREMENTAL CA	ACCUMULATED CA	TO INLET/UPPER RCH.	WITHIN REACH CONVEYANCE	TIME OF CONCENTRATION	INTENSITY	DISCHARGE/CFS	PIPE SIZE	CHANNEL SECTION	SLOPE FT/FT	CAPACITY FULL/C.F.S.	VELOCITY FULL/C.F.S.	DESIGN VELOCITY/F.P.S.	CONVEYANCE LENGTH/FT.	INVERT UPSTREAM	INVERT DOWNSTREAM	FRICTION SLOPE/FT./FT.	VELOCITY FACTOR	V²/2G/FT.	H.G.L. ELEV. UPSTREAM	H.G.L. DOWNSTREAM	RIM ELEVATION
D	I	1	2	0.50	0.50	0.50	0.25	0.25	14	0.09	14.1	4.5	1.13	15		0.0208	13.47	10.97	6.80	36	84.00	83.25	0.04350	0.620	0.719	92.67	91.02	94.16
		2	3	2.70	3.20	0.50	1.35	1.60	24	0.08	24.1	4.0	6.40	15		0.0156	11.66	9.50	9.74	48	83.00	82.25	0.03263	1.025	1.474	91.02	89.00	94.16
		3	4	0.30	3.50	0.50	0.15	1.75	13	0.10	13.1	4.5	7.88	15		0.0080	8.32	6.78	7.70	44	82.00	81.65	0.01661	1.135	0.920	89.00	87.38	96.90
		4	5	0.20	3.70	0.50	0.10	1.85	11	0.64	11.6	4.5	8.33	15		0.0080	8.35	6.80	7.75	300	81.40	79.00	0.01670	1.140	0.933	87.38	82.10	96.90
	II	1	5	0.60	0.60	0.50	0.30	0.30	15	0.17	15.2	4.5	1.35	15		0.0050	6.60	5.38	4.30	44	79.22	79.00	0.01044	0.800	0.287	82.59	82.10	83.90
	I	5	6	0.20	4.50	0.50	0.10	2.25	9	0.18	9.2	4.5	10.13	15		0.0118	10.14	8.26	9.42	100	70.93	69.75	0.02464	1.140	1.377	82.10	79.41	83.90
	III	1	2	2.60	2.60	0.50	1.30	1.30	21	0.06	21.1	4.0	5.20	15		0.0194	13.01	10.60	9.80	36	71.90	71.20	0.04060	0.924	1.490	82.55	80.91	82.85
		2	3	0.70	3.30	0.50	0.35	1.65	11	0.10	11.1	4.5	7.43	15		0.0083	8.52	6.94	7.79	48	70.70	70.30	0.01740	1.122	0.942	80.91	79.41	82.85
		3	6	0.14	3.44	0.50	0.07	1.72	8	0.09	8.1	4.5	7.74	15		0.0102	9.44	7.69	8.56	44	70.20	69.75	0.02135	1.113	1.137	79.41	77.83	81.25
	I	6	7	0.06	8.00	0.45	0.03	3.60	4	0.44	4.4	4	14.40	21		0.0050	16.18	6.73	7.59	200	69.70	68.70	0.01044	1.128	0.894	77.83	75.04	81.25
		7	8a	0.15	8.15	0.45	0.07	3.67	10	0.06	10.1	4	14.67	21		0.0097	22.57	9.38	9.99	36	68.60	68.25	0.02030	1.065	1.550	75.04	73.76	75.70
		8a	9	0.15	8.30	0.45	0.07	3.74	10	0.11	10.1	4	14.94	21		0.0067	18.69	7.77	7.30	48	68.00	67.68	0.01392	0.940	0.828	73.76	72.43	75.70
		8b	9	1.80	1.80	0.45	0.81	0.81	26	0.18	26.2	4	3.24	15		0.0111	9.84	8.01	6.80	72	70.80	70.00	0.02320	0.848	0.717	74.19	72.43	74.95
		9	10	0.90	11.00	0.45	0.41	4.95	14	0.07	14.1	4	19.80	24		0.0050	23.11	7.35	8.25	36	67.63	67.45	0.01044	1.122	1.057	72.43	71.68	74.76
		10	11	0.30	11.30	0.45	0.14	5.09	9	0.16	9.2	4	20.34	24		0.0050	23.11	7.35	8.26	80	67.40	67.00	0.01044	1.123	1.059	71.68	70.53	74.76

The formula: $Q = C_f \; C \; i \; A$

Where

Q - peak discharge in C.F.S.

C - weighted runoff coefficient

C_f- Correction Factor for ground saturation

i - Rainfall intensity (fig. 1.5.1.3 - 1.5.1.18)

A - Drainage area (acres)

C_f Vs Frequency (Recommended Values)

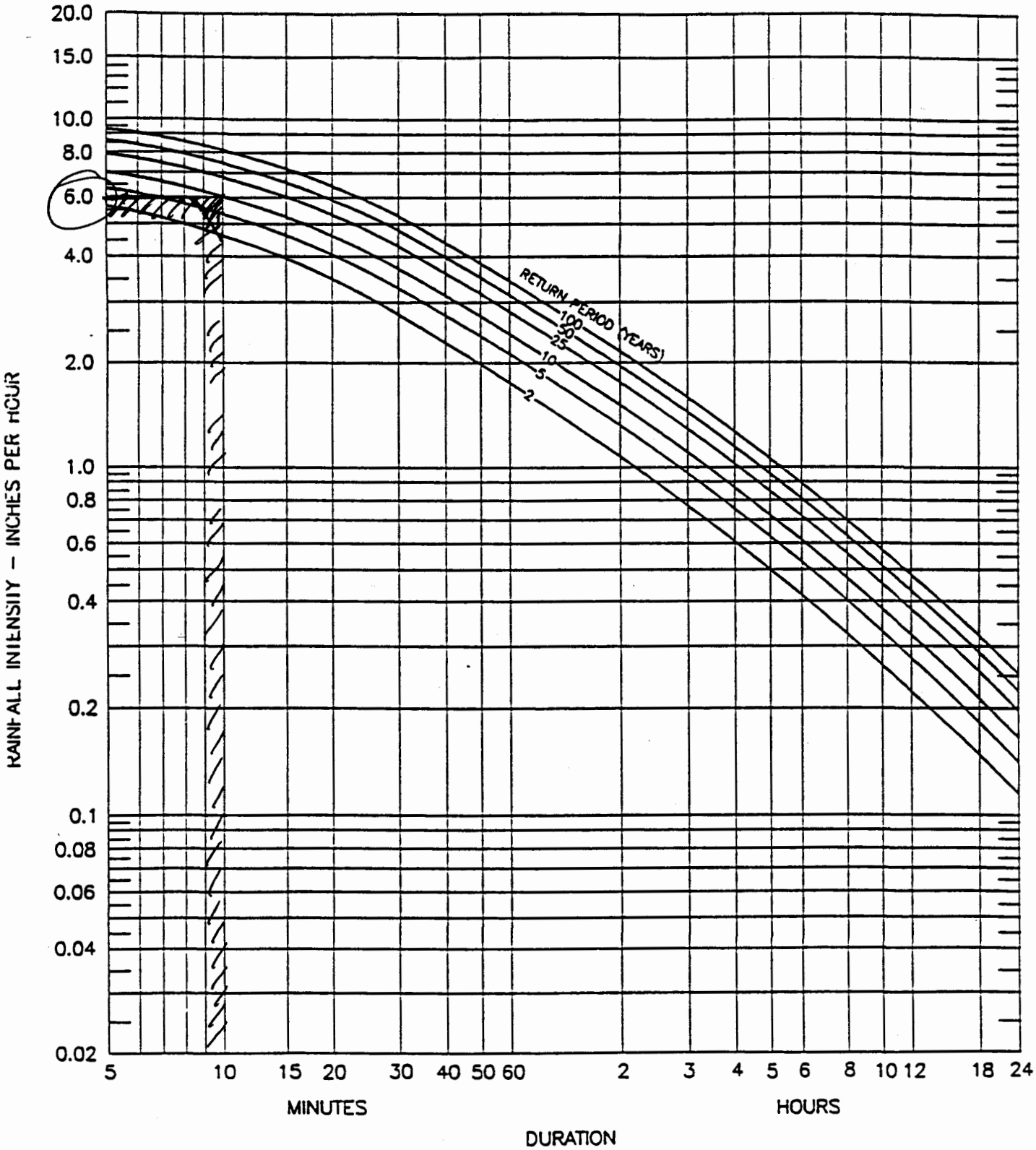
1.0	10 yr. or less
1.1	25 yr.
1.2	50 yr.
1.25	100 yr.

Runoff Coefficients:

Business, Industrial and Commercial	0.80 to 0.90
Apartments	0.65 to 0.75
Schools	0.50 to 0.60
Residential - lots 10,000 sq. ft.	0.40 to 0.50
- lots 12,000 sq. ft.	0.40 to 0.45
- lots 17,000 sq. ft.	0.35 to 0.45
- lots 1/2 acre or more	0.30 to 0.40
Parks, cemeteries and unimproved areas	0.20 to 0.35
Paved and Roof Areas	0.9
Cultivated Areas	0.5 to 0.7
Pasture	0.35 to 0.45
Forest	0.2 to 0.3

NORFOLK, VA.

Fig. 1.5.1.7



Rev. 6/92

Longhill Station Subdivision - Centerville Road

DJG # 1940221

RUNOFF DESIGN

RATIONAL METHOD AND VDOT DRAINAGE MANUAL

DATA ENTRY SHEET

STEP 1: AREA E

Compute the drainage area defined by each runoff cofficient value, then enter below both the runoff coefficient value and the drainage area in acres.

	C	A	C*A
ENTER "C" AND "A" FOR DRAINAGE AREA 1	0.95	0.22	0.209
ENTER "C" AND "A" FOR DRAINAGE AREA 2	0.4	0.35	0.14
ENTER "C" AND "A" FOR DRAINAGE AREA 3	0	0	0
ENTER "C" AND "A" FOR DRAINAGE AREA 4	0	0	0
ENTER "C" AND "A" FOR DRAINAGE AREA 5	0	0	0
ENTER "C" AND "A" FOR DRAINAGE AREA 6	0	0	0
ENTER "C" AND "A" FOR DRAINAGE AREA 7	0	0	0
ENTER "C" AND "A" FOR DRAINAGE AREA 8	0	0	0
ENTER "C" AND "A" FOR DRAINAGE AREA 9	0	0	0
SUM		0.57	0.349

STEP 2:

Determine the time of concentration "Tc" and enter below

	Tc
ENTER TIME OF CONCENTRATION	10

STEP 3;

From appropriate Intensity/Duration nomograph, determine the appropriate rainfall intensity for the appropriate design storm and enter below

	i
ENTER RAINFALL INTENSITY	6

Longhill Station Subdivision - Centerville Road

DJG # 1940221

RUNOFF DESIGN

RATIONAL METHOD AND VDOT DRAINAGE MANUAL

COMPUTATION WORKSHEET

Determine peak discharge flow - Q=CiA

Q - peak discharge flow.
C - composite runoff coefficient
i = rainfall intensity for the design storm
A - contributing drainage area to point of interest

FIND WEIGHTED COEFFICIENT OF RUNOFF - C

C= (sum Cn * An)/Atotal

C= 0.612281

FIND TOTAL CONTRIBUTING DRAINAGE AREA

A= 0.57

FIND RUNOFF VOLUME

Q= 2.094

Longhill Station Subdivision - Centerville Road

DJG #1940221

RUNOFF DESIGN

RATIONAL METHOD AND VDOT DRAINAGE MANUAL

DATA ENTRY SHEET

STEP 1: AREA W

Compute the drainage area defined by each runoff cofficient value, then enter below both the runoff coefficient value and the drainage area in acres.

	C	A	C*A
ENTER "C" AND "A" FOR DRAINAGE AREA 1	0.95	0.22	0.209
ENTER "C" AND "A" FOR DRAINAGE AREA 2	0.4	2.16	0.864
ENTER "C" AND "A" FOR DRAINAGE AREA 3	0	0	0
ENTER "C" AND "A" FOR DRAINAGE AREA 4	0	0	0
ENTER "C" AND "A" FOR DRAINAGE AREA 5	0	0	0
ENTER "C" AND "A" FOR DRAINAGE AREA 6	0	0	0
ENTER "C" AND "A" FOR DRAINAGE AREA 7	0	0	0
ENTER "C" AND "A" FOR DRAINAGE AREA 8	0	0	0
ENTER "C" AND "A" FOR DRAINAGE AREA 9	0	0	0
SUM		2.38	1.073

STEP 2:

Determine the time of concentration "Tc" and enter below

	Tc
ENTER TIME OF CONCENTRATION	10

STEP 3;

From appropriate Intensity/Duration nomograph, determine the appropriate rainfall intensity for the appropriate design storm and enter below

	i
ENTER RAINFALL INTENSITY	6

Longhill Station Subdivision - Centerville Road

DJG #1940221

RUNOFF DESIGN

RATIONAL METHOD AND VDOT DRAINAGE MANUAL

COMPUTATION WORKSHEET

Determine peak discharge flow - Q=CiA

Q - peak discharge flow.
C - composite runoff coefficient
i = rainfall intensity for the design storm
A - contributing drainage area to point of interest

FIND WEIGHTED COEFFICIENT OF RUNOFF - C

C= (sum Cn * An)/Atotal

C= 0.45084

FIND TOTAL CONTRIBUTING DRAINAGE AREA

A= 2.38

FIND RUNOFF VOLUME

Q= 6.438

DJG
P.O. Box 3505
Williamsburg, Virginia 23187
(804) 253-0673
Fax (804) 253-2319

PROJECT LONGHILL STATION SUBDIVISION
DATE 1-29-97 COMM NO. 1940221
CAL MRK CKD _____ PAGE # _____
TITLE CENTERVILLE ROAD IMPROVEMENTS

DESIGN INLET FOR 1/2 Q_{TOTAL} TO MATCH EXISTING DESIGN BASIS FOR CULVERT FLOW ACROSS CENTERVILLE ROAD

GIVEN: $Q_T = 6.4$ FT³/S

Q_{DESIGN}: $Q_D = 3.2$ FT³/S

$n = 0.015$
$S = 0.015$ FT/FT
$S_x = 0.0208$ FT/FT
STD CG-6
$W = 2$ FT
$S_w = 0.0833$ FT/FT

FIND REQ'D LENGTH OF INLET L_T

FROM CHART 6:
SPREAD(T) = 12'

FIND ALLOWABLE SPREAD (T)

$T_{ALLOWABLE}$ = 2' GUTTER
4' BIKE LANE
6' 1/2 DRIVELANE
12'

SPREAD IS OK

$W/T = 2'/12' = 0.167$

$S_w/S_x = 4.0$

FROM CHART 10:

$E_o = 0.49$

FIND S_e

$S_e = S_x + S_w E_o$

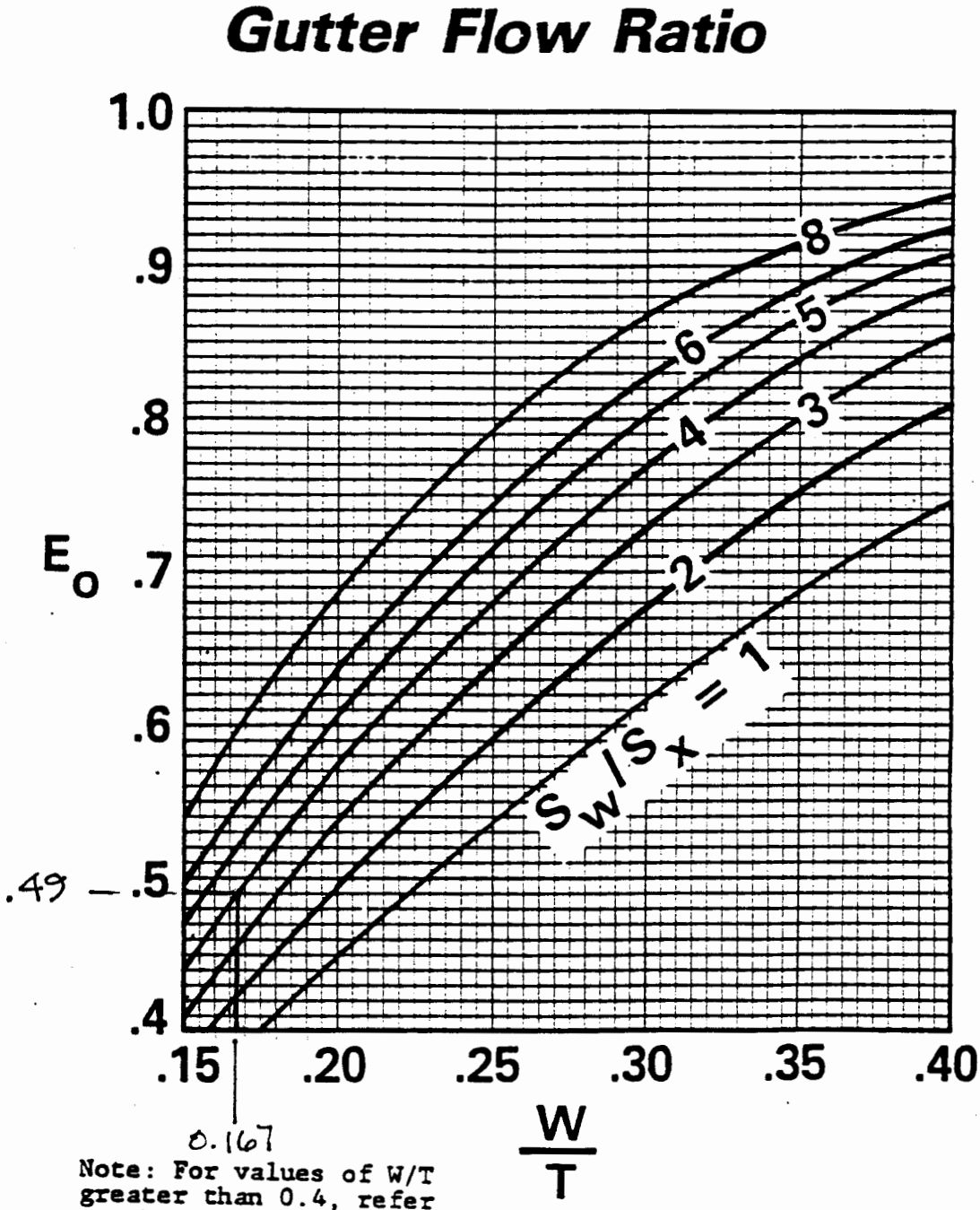
$= 0.0208 + 0.146(0.49)$

$= 0.92$

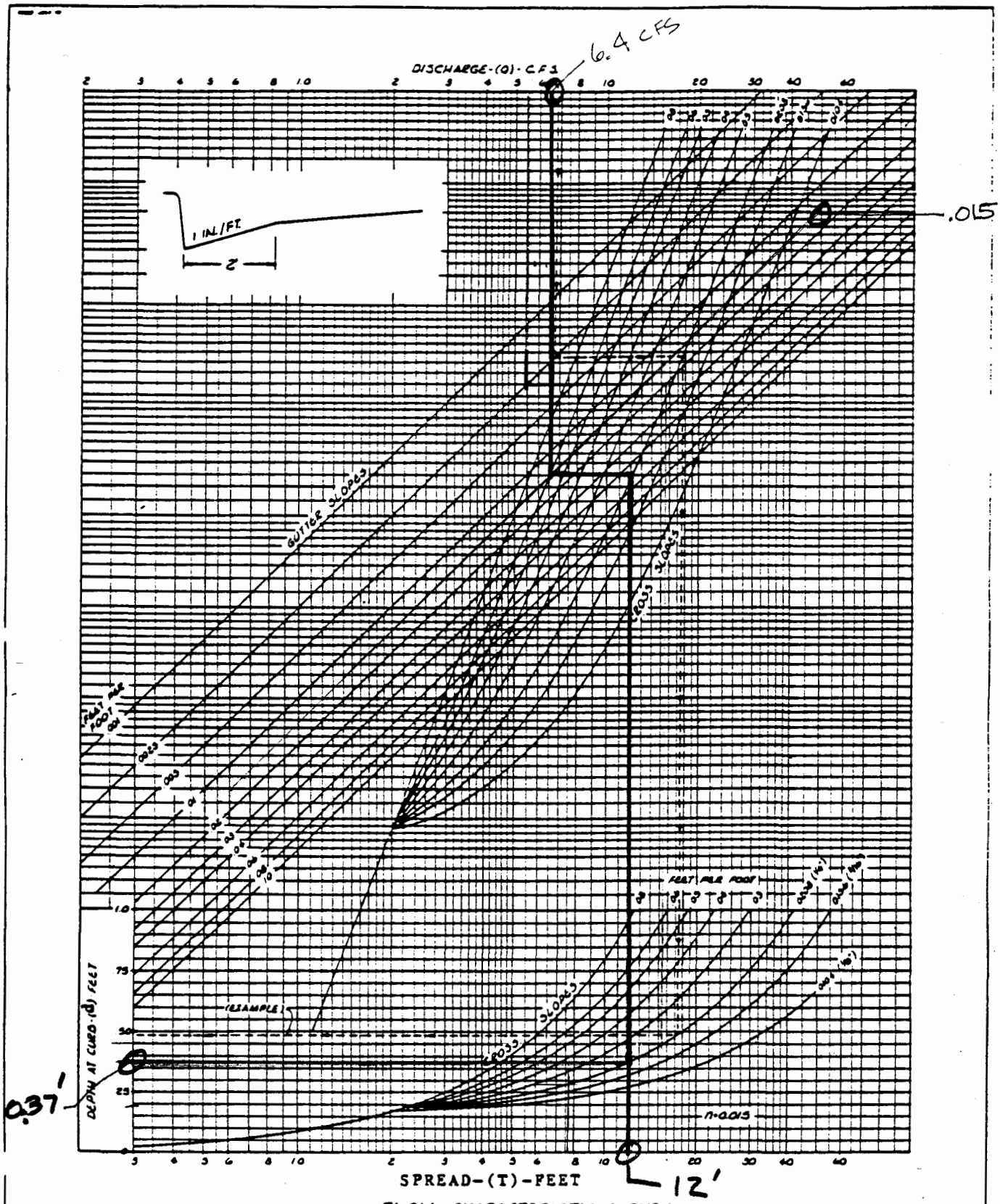
FROM CHART 15:

$L_T = 15'$

CHART 10 RATIO OF FRONTAL FLOW TO TOTAL GUTTER FLOW



Note: For values of W/T greater than 0.4, refer to Chart 10-A on the following page.



FLOW CHARACTERISTIC CURVES

STRAIGHT CROSS SLOPES

CURB + 2FT. GUTTER - LIN. FT.

CHART 6

Rev (6-85)

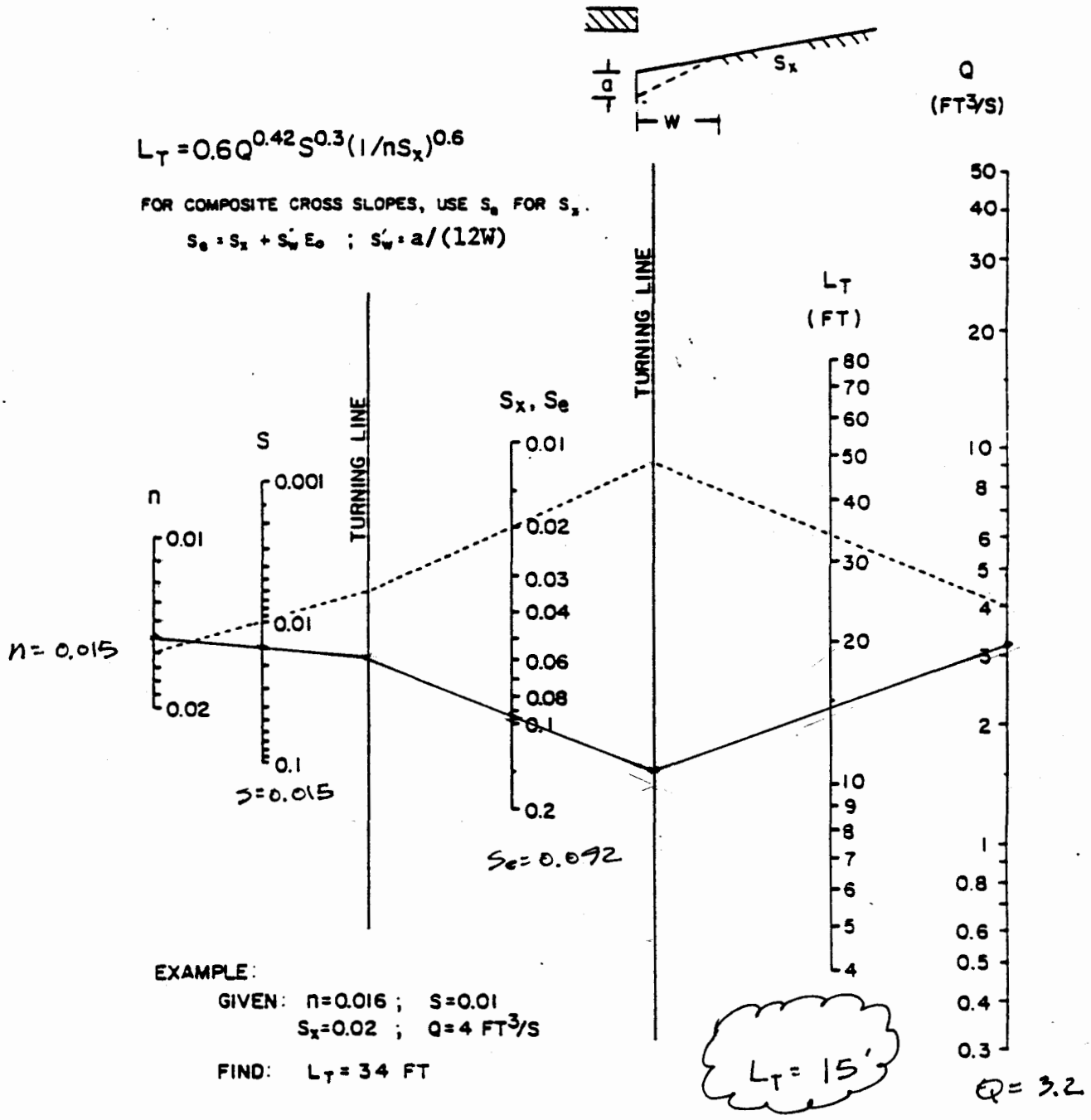


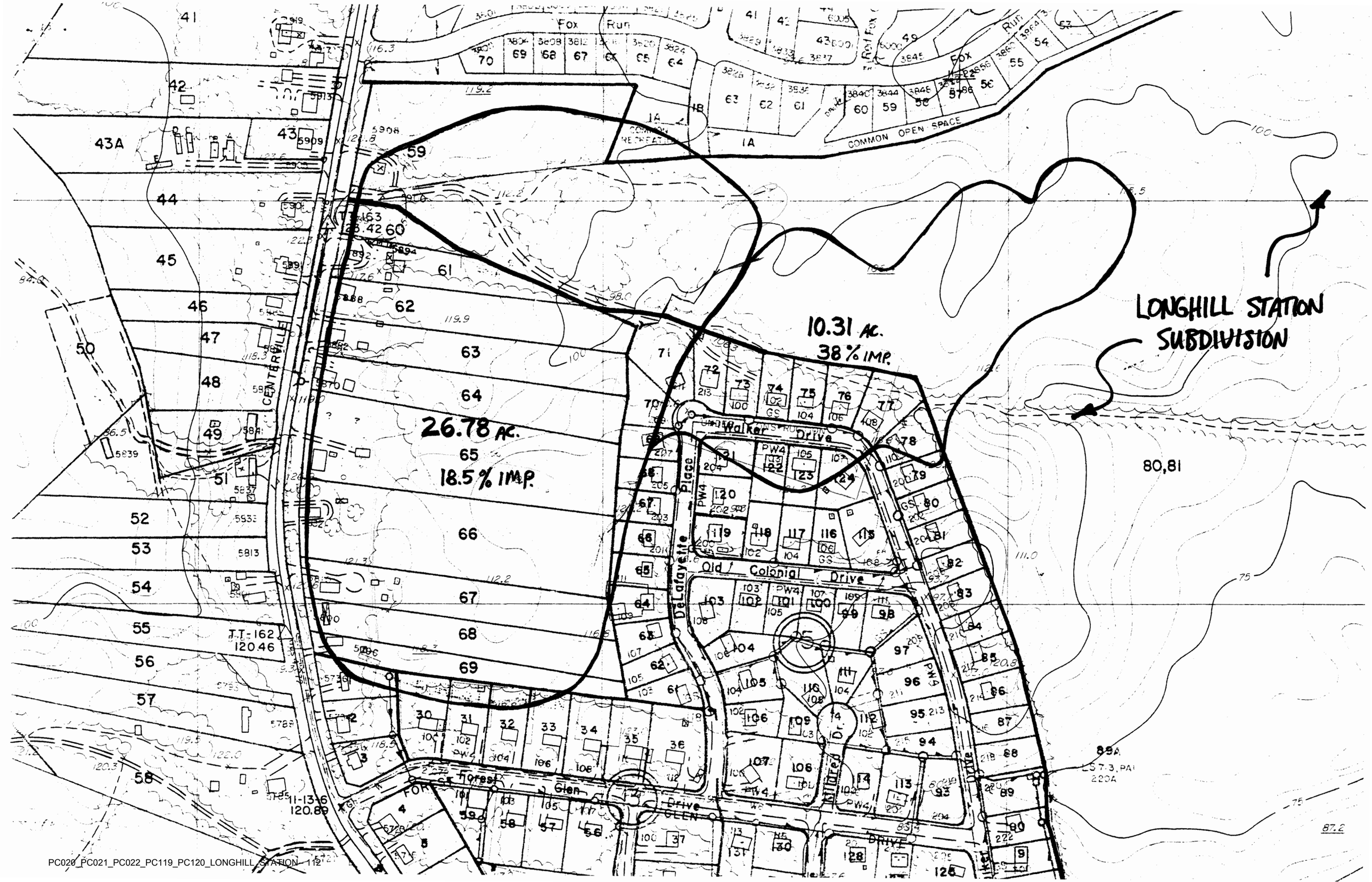
CHART 15 **Curb-opening and slotted drain inlet length for total interception.**

LONGHILL STATION
CENTERVILLE ROAD REDESIGN

COST ESTIMATE

Construction Cost Estimate				
Longhill Station Subdivision				
Centerville Road Improvements				
ORIGNIAL DESIGN				
ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Base Course	120	TN	$ 20	$ 2,400
Pavement	720	SY	$ 20	$ 14,400
Overlay	1,920	SY	$ 4	$ 6,720
Compacted Fill	300	CY	$ 15	$ 4,500
Ditch Construction	757	LF	$ 2	$ 1,514
Sidewalk	807	LF	$ 10	$ 8,070
Culvert pipe	35	LF	$ 20	$ 700
Telephone Relocation	1	EA	$ 16,000	$ 16,000
Landscaping	1	EA	$ 2,000	$ 2,000
Clearing	0	AC	$ 6,000	$ 1,779
Sidewalk Demolition	356	SY	$ 8	$ 2,844
TOTAL				**$ 60,927**
PROPOSED DESIGN				
ITEM	QUANTITY	UNITS	UNIT COST	TOTAL
Pavement	360	SY	$ 20	$ 7,200
Overlay	960	SY	$ 4	$ 3,360
Compacted Fill	88	CF	$ 15	$ 1,314
RipRap Outfall	1	EA	$ 100	$ 100
Curb & Gutter	767	LF	$ 15	$ 11,505
DI	1	EA	$ 1,500	$ 1,500
Embankment Fill	667	CY	$ 15	$ 10,000
Driveway entrances	6	EA	$ 500	$ 3,000
TOTAL				**$ 37,979**
NET SAVINGS				**$ 22,948**

8.6 AC.
40% IMP.
26.78 AC.
18.5% IMP.
(SEE ATTACHMENT FOR ENTIRE DRAINAGE AREA)
10.31 AC.
38% IMP.
(SEE ATTACHMENT FOR ENTIRE DRAINAGE AREA)
11.9 AC.
38% IMP.


LONGHILL STATION SUBDIVISION
10.31 AC.
38% IMP.
26.78 AC.
18.5% IMP.
80,81
COMMON OPEN SPACE
Fox Run
Walker Drive
Old Colonial Drive
DeLafayette Place
Forest Glen Drive
CENTERVILLE
T.T.-162
120.46
11-13-6
120.89

LONGHILL STATION PHASE 3 & 4 - DI DESIGN

DATE: 4/1/99
DFL

I.D. #	Area A (ft^2)	Area Through throat (ft^2)	Coefficient C	Time of Concn. (Tc) S (min.)	Time of Concn. (Tc) K (min.)	TOTAL Tc (min.)	Intensity i (in/hr)	Flow Q_{10} (cfs)	DI TYPE	CURB LENGTH
1	5900	5900	0.85	1.00	3.30	4.30	7.10	**0.82**	DI-3B	6
2	22400	22400	0.53	8.50	2.50	11.00	5.80	**1.59**	DI-3B	6
3	2800	2800	0.85	1.00	2.30	3.30	7.50	**0.41**	DI-3B	4
4	21030	21030	0.55	8.50	1.00	9.50	6.00	**1.61**	DI-3B	6
5	4075	4075	0.85	1.00	0.15	1.15	8.10	**0.65**	DI-3C	6
6	23175	23175	0.52	8.25	0.15	8.40	6.25	**1.74**	DI-3C	16
7	1450	1450	0.85	1.00	3.30	4.30	7.10	**0.20**	DI-3B	4
8	1450	1450	0.85	1.00	3.30	4.30	7.10	**0.20**	DI-3BB	4
YDI-9	7500	7500	0.45	11.00	0.00	11.00	5.80	**0.45**	-	-
10	2540	2540	0.85	1.00	2.50	3.50	7.40	**0.37**	DI-3B	6
11	3425	3425	0.85	1.00	0.15	1.15	8.10	**0.55**	DI-3C	6
12	49475	30675	0.47	11.80	0.20	12.00	5.60	**1.87**	DI-3C	18
13	31750	31750	0.5	13.00	0.25	13.25	5.40	**1.98**	DI-3B	8
14	3875	3875	0.65	6.25	0.20	6.45	6.60	**0.38**	DI-3BB	4
15	24650	1175	0.85	1.00	1.00	2.00	7.90	**0.18**	DI-3B	4
16	1775	1775	0.85	1.00	1.00	2.00	7.90	**0.28**	DI-3B	4
17	57425	27800	0.48	14.00	0.25	14.25	5.20	**1.61**	DI-3B	6
18	4475	4475	0.85	1.00	0.15	1.15	8.10	**0.71**	DI-3C	8
19	21700	21700	0.47	11.00	1.00	12.00	5.60	**1.32**	DI-3C	14
20	19325	15500	0.85	6.10	0.20	6.30	6.55	**2.00**	DI-3C	10
21	3250	3250	0.85	1.50	0.50	2.00	7.80	**0.50**	DI-3B	8
22	9750	9750	0.75	1.90	0.20	2.10	7.85	**1.33**	DI-3C	6
23	30000	30000	0.53	11.10	1.15	12.25	5.65	**2.08**	DI-3C	10
24	9500	9500	0.78	3.10	0.20	3.30	7.45	**1.28**	DI-3B	8
25	5250	5250	0.85	2.30	0.20	2.50	8.00	**0.83**	DI-3B	8
26	11750	11750	0.8	1.75	0.35	2.10	8.65	**1.88**	DI-3C	8
YDI-27	66400	66400	0.45	15.50	0.00	15.50	5.00	**3.46**	-	-
28	22000	22000	0.53	5.10	1.40	6.50	6.65	**1.79**	DI-3C	8
29	7000	7000	0.85	3.90	0.20	4.10	7.00	**0.96**	DI-3A	4

LONGHILL PH. 3 + 4 (2/17/99 DFL)
D.I. DESIGN

DI #1

FLOW RESULTS (cfs)

Total Flow to inlet	= 0.82	PONDING WIDTH (ft)		= 4.96
		DEPTH AT CURB (ft)		= 0.20
		EFFICIENCY (%)		
		Curb = 84.23		
Intercepted by current inlet	= 0.69	Grate = *	Total =	84.23
Bypassed by current inlet	= 0.13	Slot = *		

INPUT PARAMETERS:

Inlet Type	= CURB ON GRADE	Longitudinal Slope (ft/ft)	= 0.010
Gutter Width (ft)	= 1.500	Pavement Cross Slope (ft/ft)	= 0.021
Inlet n-value	= 0.013	Gutter Cross Slope (ft/ft)	= 0.083
Downstream Inlet Number	= 0	Gutter depression (in)	= 0.00
Curb Throat Type	= Inclined		
Curb Length (ft)	= 6.00		

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DI #2

```
 FLOW RESULTS (cfs)                                  PONDING WIDTH (ft)        =   6.92
   Total Flow to inlet              =    1.59        DEPTH AT CURB (ft)        =   0.24
                                                     EFFICIENCY (%)
                                                       Curb  =  65.03
   Intercepted by current inlet     =    1.03          Grate =      *    Total =  65.03
   Bypassed by current inlet        =    0.56          Slot  =      *

INPUT PARAMETERS:
 Inlet Type           = CURB ON GRADE  Longitudinal Slope (ft/ft)      =  0.010
 Gutter Width (ft)              = 1.500  Pavement Cross Slope (ft/ft)  =  0.021
 Inlet n-value                  = 0.013  Gutter Cross Slope (ft/ft)    =  0.083
 Downstream Inlet Number        =     0  Gutter depression (in)        =  0.00
 Curb Throat Type     = Inclined
 Curb Length (ft)     =    6.00
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DI#3

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FLOW RESULTS (cfs)                                   PONDING WIDTH (ft)           =   3.19
  Total Flow to inlet              =   0.41  DEPTH AT CURB (ft)           =   0.16
                                             EFFICIENCY (%)
                                               Curb  =  82.53
  Intercepted by current inlet     =   0.34    Grate =      *    Total =  82.53
  Bypassed by current inlet        =   0.07    Slot  =      *

INPUT PARAMETERS:
 Inlet Type           = CURB ON GRADE  Longitudinal Slope (ft/ft)    =  0.010
 Gutter Width (ft)            =  1.500  Pavement Cross Slope (ft/ft) =  0.021
 Inlet n-value                =  0.013  Gutter Cross Slope (ft/ft)   =  0.083
 Downstream Inlet Number      =      0  Gutter depression (in)       =  0.00
 Curb Throat Type     = Inclined
 Curb Length (ft)       =    4.00
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DI #4

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FLOW RESULTS (cfs)                                 PONDING WIDTH (ft)          =   6.96
  Total Flow to inlet               =    1.61      DEPTH AT CURB (ft)          =   0.24
                                                   EFFICIENCY (%)
                                                     Curb  =  64.68
  Intercepted by current inlet      =    1.04        Grate =       *     Total =  64.68
  Bypassed by current inlet         =    0.57        Slot  =       *

INPUT PARAMETERS:
 Inlet Type            = CURB ON GRADE  Longitudinal Slope (ft/ft)     =  0.010
 Gutter Width (ft)            =  1.500  Pavement Cross Slope (ft/ft) =  0.021
 Inlet n-value                =  0.013  Gutter Cross Slope (ft/ft)     =  0.083
 Downstream Inlet Number      =      0  Gutter depression (in)         =  0.00
 Curb Throat Type      = Inclined
 Curb Length (ft)      =    6.00
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DI #5

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FLOW RESULTS (cfs)                                    PONDING WIDTH (ft)        =   7.42
  Total Flow to inlet                 =    0.65      DEPTH AT CURB (ft)        =   0.16
                                                     EFFICIENCY (%)
                                                       Curb  = 100.00
  Intercepted by current inlet        =    0.65        Grate =      *    Total = 100.00
  Bypassed by current inlet           =    0.00        Slot  =      * -

INPUT PARAMETERS:
 Inlet Type              = CURB IN SAG  Longitudinal Slope (ft/ft)    =  0.000
 Gutter Width (ft)             =  1.500  Pavement Cross Slope (ft/ft) =  0.021
 Inlet n-value                 =  0.013  Gutter Cross Slope (ft/ft)   =  0.083
 Downstream Inlet Number       =      0  Gutter depression (in)       =  0.00
 Curb Throat Type      = Inclined
 Inlet Opening Ht (in)  =   0.50
 Curb Length (ft)       =   6.00
 Curb Weir Coeff.       =  2.300
 Curb Orifice Coeff.    =  0.670
 Incline Angle (deg)    =  45.00
ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ
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DI #6

```
FLOW RESULTS (cfs)                                 PONDING WIDTH (ft)         =   7.51
  Total Flow to inlet              =    1.74  DEPTH AT CURB (ft)          =   0.16
                                              EFFICIENCY (%)
                                                Curb  = 100.00
  Intercepted by current inlet     =    1.74    Grate =      *    Total = 100.00
  Bypassed by current inlet        =    0.00    Slot  =      *

INPUT PARAMETERS:
 Inlet Type              = CURB IN SAG  Longitudinal Slope (ft/ft)    =  0.000
 Gutter Width (ft)             =  1.500  Pavement Cross Slope (ft/ft) =  0.021
 Inlet n-value                 =  0.013  Gutter Cross Slope (ft/ft)   =  0.083
 Downstream Inlet Number       =      0  Gutter depression (in)       =  0.00
 Curb Throat Type        = Inclined
 Inlet Opening Ht (in)   =    0.50
 Curb Length (ft)        =   16.00
 Curb Weir Coeff.        =   2.300
 Curb Orifice Coeff.     =   0.670
 Incline Angle (deg)     =   45.00
ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ
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DI #7

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FLOW RESULTS (cfs)                                  PONDING WIDTH (ft)          =   2.76
  Total Flow to inlet              =   0.20         DEPTH AT CURB (ft)          =   0.15
                                                    EFFICIENCY (%)
                                                      Curb  = 100.00
  Intercepted by current inlet     =   0.20           Grate =      *     Total = 100.00
  Bypassed by current inlet        =   0.00           Slot  =      *

INPUT PARAMETERS:
 Inlet Type           = CURB ON GRADE  Longitudinal Slope (ft/ft)    =  0.003
 Gutter Width (ft)           =  1.500  Pavement Cross Slope (ft/ft)  =  0.021
 Inlet n-value               =  0.013  Gutter Cross Slope (ft/ft)    =  0.083
 Downstream Inlet Number     =      0  Gutter depression (in)        =  0.00
 Curb Throat Type     = Inclined
 Curb Length (ft)       =   4.00
ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ
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DI # 8

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FLOW RESULTS (cfs)                                  PONDING WIDTH (ft)              =   2.76
  Total Flow to inlet              =   0.20   DEPTH AT CURB (ft)              =   0.15
                                                    EFFICIENCY (%)
                                                      Curb   = 100.00
  Intercepted by current inlet     =   0.20     Grate =        *     Total = 100.00
  Bypassed by current inlet        =   0.00     Slot  =        *

INPUT PARAMETERS:
 Inlet Type             = CURB ON GRADE  Longitudinal Slope (ft/ft)     =  0.003
 Gutter Width (ft)              =  1.500  Pavement Cross Slope (ft/ft) =  0.021
 Inlet n-value                  =  0.013  Gutter Cross Slope (ft/ft)   =  0.083
 Downstream Inlet Number        =      0  Gutter depression (in)       =  0.00
 Curb Throat Type       = Inclined
 Curb Length (ft)       =   4.00
ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ
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DI #10

User Name: Daniel DeYoung, DJG, Inc.
Project: C:\DFL\LONG3&4\Ph34base.STM

Date: 04-30-99
Time: 13:59:12
Page: 1

STORM SEWER HEC 12 SINGLE INLET REPORT

FLOW RESULTS (cfs)
Total Flow to inlet = 0.37
Intercepted by current inlet = 0.30
Bypassed by current inlet = 0.07

PONDING WIDTH (ft) = 1.37
DEPTH AT CURB (ft) = 0.11
EFFICIENCY (%)
Curb = 80.89
Grate = *
Slot = *
Total = 80.89

INPUT PARAMETERS:

Inlet Type	= CURB ON GRADE	Longitudinal Slope (ft/ft)	= 0.055
Gutter Width (ft)	= 1.500	Pavement Cross Slope (ft/ft)	= 0.021
Inlet n-value	= 0.013	Gutter Cross Slope (ft/ft)	= 0.083
Downstream Inlet Number	= 0	Gutter depression (in)	= 0.00
Curb Throat Type	= Horizontal		
Curb Length (ft)	= 6.00		

DI # 11

FLOW RESULTS (cfs)				
Total Flow to inlet	=	0.55	PONDING WIDTH (ft)	= 4.34
			DEPTH AT CURB (ft)	= 0.09
			EFFICIENCY (%)	
			Curb = 100.00	
Intercepted by current inlet	=	0.55	Grate = *	Total = 100.00
Bypassed by current inlet	=	0.00	Slot = *	

INPUT PARAMETERS:

Inlet Type	= CURB IN SAG	Longitudinal Slope (ft/ft)	=	0.000
Gutter Width (ft)	= 1.500	Pavement Cross Slope (ft/ft)	=	0.021
Inlet n-value	= 0.013	Gutter Cross Slope (ft/ft)	=	0.083
Downstream Inlet Number	= 0	Gutter depression (in)	=	0.00
Curb Throat Type	= Inclined			
Inlet Opening Ht (in)	= 0.50			
Curb Length (ft)	= 6.00			
Curb Weir Coeff.	= 2.300			
Curb Orifice Coeff.	= 0.670			
Incline Angle (deg)	= 45.00			

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DI #12

FLOW RESULTS (cfs)

Total Flow to inlet	=	1.87	PONDING WIDTH (ft)	=	6.53
			DEPTH AT CURB (ft)	=	0.14
			EFFICIENCY (%)		
			Curb = 100.00		
Intercepted by current inlet	=	1.87	Grate = *	Total =	100.00
Bypassed by current inlet	=	0.00	Slot = *		

INPUT PARAMETERS:

Inlet Type	=	CURB IN SAG	Longitudinal Slope (ft/ft)	=	0.000
Gutter Width (ft)	=	1.500	Pavement Cross Slope (ft/ft)	=	0.021
Inlet n-value	=	0.013	Gutter Cross Slope (ft/ft)	=	0.083
Downstream Inlet Number	=	0	Gutter depression (in)	=	0.00
Curb Throat Type	=	Inclined			
Inlet Opening Ht (in)	=	0.50			
Curb Length (ft)	=	18.00			
Curb Weir Coeff.	=	2.300			
Curb Orifice Coeff.	=	0.670			
Incline Angle (deg)	=	45.00			

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DI # 13

```
FLOW RESULTS (cfs)                            PONDING WIDTH (ft)          =   5.42
  Total Flow to inlet              =   1.98   DEPTH AT CURB (ft)          =   0.21
                                              EFFICIENCY (%)
                                                Curb   =  57.15
  Intercepted by current inlet     =   1.13     Grate  =       *    Total =  57.15
  Bypassed by current inlet        =   0.85     Slot   =       *

INPUT PARAMETERS:
 Inlet Type           = CURB ON GRADE  Longitudinal Slope (ft/ft)    =  0.042
 Gutter Width (ft)             = 1.500 Pavement Cross Slope (ft/ft) =  0.021
 Inlet n-value                 = 0.013 Gutter Cross Slope (ft/ft)    =  0.083
 Downstream Inlet Number       =     0 Gutter depression (in)        =  0.00
 Curb Throat Type     = Inclined
 Curb Length (ft)       =   8.00
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DI # 14

FLOW RESULTS (cfs)			PONDING WIDTH (ft)	=	1.40
Total Flow to inlet	=	0.38	DEPTH AT CURB (ft)	=	0.12
			EFFICIENCY (%)		
			Curb = 60.22		
Intercepted by current inlet	=	0.23	Grate = *	Total =	60.22
Bypassed by current inlet	=	0.15	Slot = *		

INPUT PARAMETERS:

Inlet Type	=	CURB ON GRADE	Longitudinal Slope (ft/ft)	=	0.053
Gutter Width (ft)	=	1.500	Pavement Cross Slope (ft/ft)	=	0.021
Inlet n-value	=	0.013	Gutter Cross Slope (ft/ft)	=	0.083
Downstream Inlet Number	=	0	Gutter depression (in)	=	0.00
Curb Throat Type	=	Inclined			
Curb Length (ft)	=	4.00			

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DI# 15

```
FLOW RESULTS (cfs)                                   PONDING WIDTH (ft)           =   1.06
  Total Flow to inlet              =   0.18          DEPTH AT CURB (ft)           =   0.09
                                                     EFFICIENCY (%)
                                                       Curb   =   76.11
  Intercepted by current inlet     =   0.14            Grate  =       *    Total =  76.11
  Bypassed by current inlet        =   0.04            Slot   =       *

INPUT PARAMETERS:
 Inlet Type             = CURB ON GRADE  Longitudinal Slope (ft/ft)    =  0.053
 Gutter Width (ft)             =  1.500  Pavement Cross Slope (ft/ft)  =  0.021
 Inlet n-value                 =  0.013  Gutter Cross Slope (ft/ft)    =  0.083
 Downstream Inlet Number       =      0  Gutter depression (in)        =  0.00
 Curb Throat Type       = Inclined
 Curb Length (ft)         =    4.00
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DI # 16

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FLOW RESULTS (cfs)                               PONDING WIDTH (ft)          =   2.17
  Total Flow to inlet              =   0.28      DEPTH AT CURB (ft)          =   0.14
                                                 EFFICIENCY (%)
                                                   Curb  =  90.36
  Intercepted by current inlet     =   0.25        Grate =      *     Total =  90.36
  Bypassed by current inlet        =   0.03        Slot  =      *

INPUT PARAMETERS:
 Inlet Type              = CURB ON GRADE  Longitudinal Slope (ft/ft)    =  0.011
 Gutter Width (ft)              =  1.500  Pavement Cross Slope (ft/ft) =  0.021
 Inlet n-value                  =  0.013  Gutter Cross Slope (ft/ft)    =  0.083
 Downstream Inlet Number        =      0  Gutter depression (in)        =  0.00
 Curb Throat Type        = Inclined
 Curb Length (ft)        =   4.00
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DI#17

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FLOW RESULTS (cfs)                                PONDING WIDTH (ft)         =   6.81
  Total Flow to inlet              =    1.61     DEPTH AT CURB (ft)         =   0.24
                                                  EFFICIENCY (%)
                                                    Curb   =   63.61
  Intercepted by current inlet     =    1.02       Grate  =        *   Total =  63.61
  Bypassed by current inlet        =    0.59       Slot   =        *

INPUT PARAMETERS:
 Inlet Type              = CURB ON GRADE  Longitudinal Slope (ft/ft)    =  0.011
 Gutter Width (ft)              =  1.500  Pavement Cross Slope (ft/ft)  =  0.021
 Inlet n-value                  =  0.013  Gutter Cross Slope (ft/ft)    =  0.083
 Downstream Inlet Number        =      0  Gutter depression (in)        =  0.00
 Curb Throat Type        = Inclined
 Curb Length (ft)        =    6.00
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18

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FLOW RESULTS (cfs)                            PONDING WIDTH (ft)          =   4.48
  Total Flow to inlet          =    0.71      DEPTH AT CURB (ft)          =   0.09
                                              EFFICIENCY (%)
                                                Curb  = 100.00
  Intercepted by current inlet =    0.71        Grate =      *    Total = 100.00
  Bypassed by current inlet    =    0.00        Slot  =      *

INPUT PARAMETERS:
 Inlet Type                = CURB IN SAG  Longitudinal Slope (ft/ft)    =  0.000
 Gutter Width (ft)              =  1.500  Pavement Cross Slope (ft/ft)  =  0.021
 Inlet n-value                  =  0.013  Gutter Cross Slope (ft/ft)    =  0.083
 Downstream Inlet Number        =      0  Gutter depression (in)        =  0.00
 Curb Throat Type       = Inclined
 Inlet Opening Ht (in)  =   0.50
 Curb Length (ft)       =   8.00
 Curb Weir Coeff.       =  2.300
 Curb Orifice Coeff.    =  0.670
 Incline Angle (deg)    =  45.00
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DI #19

FLOW RESULTS (cfs)			PONDING WIDTH (ft)	=	5.03
Total Flow to inlet	=	1.32	DEPTH AT CURB (ft)	=	0.11
			EFFICIENCY (%)		
			Curb = 100.00		
Intercepted by current inlet	=	1.32	Grate = *	Total =	100.00
Bypassed by current inlet	=	0.00	Slot = *		

INPUT PARAMETERS:

Inlet Type	=	CURB IN SAG	Longitudinal Slope (ft/ft)	=	0.000
Gutter Width (ft)	=	1.500	Pavement Cross Slope (ft/ft)	=	0.021
Inlet n-value	=	0.013	Gutter Cross Slope (ft/ft)	=	0.083
Downstream Inlet Number	=	0	Gutter depression (in)	=	0.00
Curb Throat Type	=	Inclined			
Inlet Opening Ht (in)	=	0.50			
Curb Length (ft)	=	14.00			
Curb Weir Coeff.	=	2.300			
Curb Orifice Coeff.	=	0.670			
Incline Angle (deg)	=	45.00			

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DI #20

User Name: Daniel DeYoung, DJG, Inc.
Project: C:\DFL\LONG3&4\Ph34base.STM

Date: 04-30-99
Time: 14:02:58
Page: 1

STORM SEWER HEC 12 SINGLE INLET REPORT

FLOW RESULTS (cfs)
Total Flow to inlet = 2.00
Intercepted by current inlet = 2.00
Bypassed by current inlet = 0.00

PONDING WIDTH (ft) = 7.97
DEPTH AT CURB (ft) = 0.17
EFFICIENCY (%)
Curb = 100.00
Grate = *
Slot = *
Total = 100.00

INPUT PARAMETERS:

Inlet Type	= CURB IN SAG	Longitudinal Slope (ft/ft)	= 0.000
Gutter Width (ft)	= 1.500	Pavement Cross Slope (ft/ft)	= 0.021
Inlet n-value	= 0.013	Gutter Cross Slope (ft/ft)	= 0.083
Downstream Inlet Number	= 0	Gutter depression (in)	= 0.00
Curb Throat Type	= Inclined		
Inlet Opening Ht (in)	= 6.00		
Curb Length (ft)	= 10.00		
Curb Weir Coeff.	= 2.300		
Curb Orifice Coeff.	= 0.450		
Incline Angle (deg)	= 45.00		

DI #21

User Name: Daniel DeYoung, DJG, Inc.
Project: C:\DFL\LONG3&4\Ph34base.STM

Date: 02-18-99
Time: 17:36:41
Page: 1

STORM SEWER HEC 12 SINGLE INLET REPORT

FLOW RESULTS (cfs)
Total Flow to inlet = 0.50
Intercepted by current inlet = 0.46
Bypassed by current inlet = 0.04

PONDING WIDTH (ft) = 1.96
DEPTH AT CURB (ft) = 0.13
EFFICIENCY (%)
Curb = 92.64
Grate = *
Slot = *
Total = 92.64

INPUT PARAMETERS:

Inlet Type	= CURB ON GRADE	Longitudinal Slope (ft/ft)	= 0.042
Gutter Width (ft)	= 1.500	Pavement Cross Slope (ft/ft)	= 0.021
Inlet n-value	= 0.013	Gutter Cross Slope (ft/ft)	= 0.083
Downstream Inlet Number	= 0	Gutter depression (in)	= 0.00
Curb Throat Type	= Inclined		
Curb Length (ft)	= 8.00		

DI #22

User Name: Daniel DeYoung, DJG, Inc.
Project: C:\DFL\LONG3&4\Ph34base.STM

Date: 02-18-99
Time: 17:12:07
Page: 1

STORM SEWER HEC 12 SINGLE INLET REPORT

FLOW RESULTS (cfs)
Total Flow to inlet = 1.33
Intercepted by current inlet = 1.33
Bypassed by current inlet = 0.00

PONDING WIDTH (ft) = 6.89
DEPTH AT CURB (ft) = 0.14
EFFICIENCY (%)
Curb = 100.00
Grate = *
Slot = *
Total = 100.00

INPUT PARAMETERS:

Inlet Type	= CURB IN SAG	Longitudinal Slope (ft/ft)	= 0.000
Gutter Width (ft)	= 2.500	Pavement Cross Slope (ft/ft)	= 0.021
Inlet n-value	= 0.013	Gutter Cross Slope (ft/ft)	= 0.083
Downstream Inlet Number	= 0	Gutter depression (in)	= 0.00
Curb Throat Type	= Inclined		
Inlet Opening Ht (in)	= 6.00		
Curb Length (ft)	= 6.00		
Curb Weir Coeff.	= 2.300		
Curb Orifice Coeff.	= 0.450		
Incline Angle (deg)	= 45.00		

DI #25

User Name: Daniel DeYoung, DJG, Inc.
Project: C:\DFL\LONG3&4\Ph34base.STM

Date: 02-18-99
Time: 17:44:32
Page: 1

STORM SEWER HEC 12 SINGLE INLET REPORT

FLOW RESULTS (cfs)
Total Flow to inlet = 0.83
Intercepted by current inlet = 0.81
Bypassed by current inlet = 0.02

PONDING WIDTH (ft) = 5.29
DEPTH AT CURB (ft) = 0.20
EFFICIENCY (%)
Curb = 98.19
Grate = *
Slot = *
Total = 98.19

INPUT PARAMETERS:

Inlet Type	= CURB ON GRADE	Longitudinal Slope (ft/ft)	= 0.008
Gutter Width (ft)	= 1.500	Pavement Cross Slope (ft/ft)	= 0.021
Inlet n-value	= 0.013	Gutter Cross Slope (ft/ft)	= 0.083
Downstream Inlet Number	= 0	Gutter depression (in)	= 0.00
Curb Throat Type	= Inclined		
Curb Length (ft)	= 8.00		

DI #26

User Name: Daniel DeYoung, DJG, Inc.
Project: C:\DFL\LONG3&4\Ph34base.STM

Date: 02-18-99
Time: 17:45:09
Page: 1

STORM SEWER HEC 12 SINGLE INLET REPORT

FLOW RESULTS (cfs)
Total Flow to inlet = 1.88
Intercepted by current inlet = 1.88
Bypassed by current inlet = 0.00

PONDING WIDTH (ft) = 7.73
DEPTH AT CURB (ft) = 0.16
EFFICIENCY (%)
Curb = 100.00
Grate = *
Slot = *
Total = 100.00

INPUT PARAMETERS:

Inlet Type	= CURB IN SAG	Longitudinal Slope (ft/ft)	= 0.000
Gutter Width (ft)	= 2.500	Pavement Cross Slope (ft/ft)	= 0.021
Inlet n-value	= 0.013	Gutter Cross Slope (ft/ft)	= 0.083
Downstream Inlet Number	= 0	Gutter depression (in)	= 0.00
Curb Throat Type	= Inclined		
Inlet Opening Ht (in)	= 6.00		
Curb Length (ft)	= 8.00		
Curb Weir Coeff.	= 2.300		
Curb Orifice Coeff.	= 0.450		
Incline Angle (deg)	= 45.00		

DI #28

User Name: Daniel DeYoung, DJG, Inc.
Project: C:\DFL\LONG3&4\Ph34base.STM

Date: 02-18-99
Time: 17:13:26
Page: 1

STORM SEWER HEC 12 SINGLE INLET REPORT

FLOW RESULTS (cfs)
Total Flow to inlet = 1.79
Intercepted by current inlet = 1.79
Bypassed by current inlet = 0.00

PONDING WIDTH (ft) = 7.48
DEPTH AT CURB (ft) = 0.16
EFFICIENCY (%)
Curb = 100.00
Grate = * Total = 100.00
Slot = *

INPUT PARAMETERS:

Inlet Type	= CURB IN SAG	Longitudinal Slope (ft/ft)	= 0.000
Gutter Width (ft)	= 2.500	Pavement Cross Slope (ft/ft)	= 0.021
Inlet n-value	= 0.013	Gutter Cross Slope (ft/ft)	= 0.083
Downstream Inlet Number	= 0	Gutter depression (in)	= 0.00
Curb Throat Type	= Inclined		
Inlet Opening Ht (in)	= 6.00		
Curb Length (ft)	= 8.00		
Curb Weir Coeff.	= 2.300		
Curb Orifice Coeff.	= 0.450		
Incline Angle (deg)	= 45.00		

DI #29

User Name: Daniel DeYoung, DJG, Inc.
Project: C:\DFL\LONG3&4\Ph34base.STM

Date: 02-18-99
Time: 17:16:25
Page: 1

STORM SEWER HEC 12 SINGLE INLET REPORT

FLOW RESULTS (cfs)
Total Flow to inlet = 0.96
Intercepted by current inlet = 0.96
Bypassed by current inlet = 0.00

PONDING WIDTH (ft) = 6.39
DEPTH AT CURB (ft) = 0.13
EFFICIENCY (%)
Curb = 100.00
Grate = *
Slot = *
Total = 100.00

INPUT PARAMETERS:

Inlet Type	= CURB IN SAG	Longitudinal Slope (ft/ft)	= 0.000
Gutter Width (ft)	= 2.500	Pavement Cross Slope (ft/ft)	= 0.021
Inlet n-value	= 0.013	Gutter Cross Slope (ft/ft)	= 0.083
Downstream Inlet Number	= 0	Gutter depression (in)	= 0.00
Curb Throat Type	= Inclined		
Inlet Opening Ht (in)	= 6.00		
Curb Length (ft)	= 4.00		
Curb Weir Coeff.	= 2.300		
Curb Orifice Coeff.	= 0.450		
Incline Angle (deg)	= 45.00		

Calculated By: DFL
Checked By: HLPG
N= 0.013
Storm Frequency: 10-YEAR

Date: 05/03/99

DJG, INC

P. O. BOX 3505
WILLIAMSBURG, VIRGINA 23187
STORM DRAINAGE COMPUTATION SHEET

PROJECT NO. 1960150
PROJECT DESC. LONGHILL STATION PHASE 3 & 4 - ALLEGHENY ROAD TO POND "E"
SHEET OF SHEETS

LOCATION				RUN-OFF										PIPE-CHANNEL DESIGN						HYDRAULIC GRADE LINE								
				AREA-ACRES					TIME OF FLOW (MIN.)																			
LINE	RUN	FROM	TO	INCREMENTAL	TOTAL	RUN-OFF COEFF.	INCREMENTAL CA	ACCUMULATED CA	TO INLET/UPPER RCH.	WITHIN REACH CONVEYANCE	TIME OF CONCENTRATION	INTENSITY	DISCHARGE/CFS	PIPE SIZE	CHANNEL SECTION	SLOPE FT/FT	CAPACITY FULL/C.F.S.	VELOCITY FULL/C.F.S.	DESIGN VELOCITY/F.P.S.	CONVEYANCE LENGTH/FT.	INVERT OUT - UPSTREAM	INVERT IN - DOWNSTREAM	FRICTION SLOPE/FT./FT.	VELOCITY FACTOR	V2/2G/FT.	H.G.L. ELEV. UPSTREAM	H.G.L. DOWNSTREAM	COVER ELEV
I	1	YDI #27	DI #28	1.52	1.52	0.45	0.68	0.68	15.5	0.00	15.50	5	3.4	15		0.0281	10.44	8.50	7.65	100	68.50	65.89	0.00281	0.90	0.910	64.76	64.19	72.50
		DI #28	DI #29	0.51	2.03	0.53	0.27	0.95	5.1	1.40	6.50	6.65	6.3	15		0.0474	14.06	11.46	11.00	76	65.79	62.19	0.00967	0.96	1.878	64.19	63.05	71.10
		DI #29	EX. MH	0.16	2.19	0.85	0.14	1.09	3.9	0.20	4.10	7	7.6	24		0.0165	29.04	9.24	7.86	88	62.13	60.68	0.00114	0.85	0.959	63.05	61.98	71.14
		EX. MH	OUTFALL	0.00	2.19	0.00	0.00	1.09			0.00		0.0	24		0.0202	32.12	10.22	0.00	128	60.58	58.00	0.00000	0.00	0.000	61.98	61.80	63.30

Calculated By: DFL
Checked By: HLPG
N= 0.013
Storm Frequency: 10-YEAR

Date: 05/03/99

DJG, INC

P. O. BOX 3505
WILLIAMSBURG, VIRGINIA 23187
STORM DRAINAGE COMPUTATION SHEET

PROJECT NO. 1980150
PROJECT DESC. LONGHILL STATION PHASE 3 & 4 - RED WING COURT TO POND "D"
SHEET OF SHEETS

LOCATION				RUN-OFF										PIPE-CHANNEL DESIGN						HYDRAULIC GRADE LINE								
				AREA-ACRES					TIME OF FLOW (MIN.)																			
LINE	RUN	FROM	TO	INCREMENTAL	TOTAL	RUN-OFF COEFF.	INCREMENTAL CA	ACCUMULATED CA	TO INLET/UPPER RCH.	WITHIN REACH CONVEYANCE	TIME OF CONCENTRATION	INTENSITY	DISCHARGE/CFS	PIPE SIZE	CHANNEL SECTION	SLOPE FT/FT	CAPACITY FULL/C.F.S.	VELOCITY FULL/C.F.S.	DESIGN VELOCITY/F.P.S.	CONVEYANCE LENGTH/FT.	INVERT OUT - UPSTREAM	INVERT IN - DOWNSTREAM	FRICTION SLOPE/FT./FT.	VELOCITY FACTOR	V2/2G/FT.	H.G.L. ELEV. UPSTREAM	H.G.L. DOWNSTREAM	COVER ELEV
I	1	DI #13	DI #12	0.73	0.73	0.50	0.36	0.36	13	0.25	13.25	5.4	2.0	15		0.0122	7.14	5.82	4.89	36	66.44	66.00	0.00093	0.84	0.371	61.57	61.29	70.44
		DI #12	DI #11	1.14	1.86	0.47	0.53	0.90	11.8	0.20	12.00	5.6	5.0	15		0.0138	7.57	6.17	6.54	32	65.90	65.46	0.00608	1.06	0.665	61.29	60.84	69.99
		DI #10	DI #11	0.06	0.06	0.85	0.05	0.05	1	2.50	3.50	7.4	0.4	15		0.0195	9.02	7.35	4.56	40	66.24	65.46	0.00003	0.62	0.323	60.14	59.95	70.24
		DI #11	DI #14	0.08	2.00	0.85	0.07	1.02	1	0.15	1.15	8.1	8.2	15		0.0188	8.85	7.21	8.22	220	65.36	61.23	0.01627	1.14	1.050	64.90	60.84	69.99
		DI #17	DI #19	1.32	1.32	0.48	0.63	0.63	14	0.25	14.25	5.2	3.3	15		0.0222	9.63	7.85	8.16	36	63.84	63.04	0.00260	1.04	1.034	62.87	62.09	67.84
		DI #19	DI #18	0.50	1.82	0.47	0.23	0.87	11	1.00	12.00	5.6	4.9	15		0.0147	7.63	6.38	6.76	32	62.94	62.47	0.00566	1.06	0.710	62.09	61.27	67.59
		DI #18	DI #16	0.10	1.92	0.85	0.09	0.95	1	0.15	1.15	8.1	7.7	18		0.0100	10.50	5.94	6.54	36	62.37	62.01	0.00542	1.10	0.664	61.27	60.64	67.59
		DI #16	DI #14	0.04	1.96	0.85	0.03	0.99	1	1.00	2.00	7.9	7.8	18		0.0080	9.40	5.32	5.95	85	61.91	61.23	0.00553	1.12	0.551	60.64	59.95	67.84
		DI #15	DI #14	0.57	0.57	0.85	0.48	0.48	1	1.00	2.00	7.9	3.8	15		0.0659	16.59	13.52	10.00	32	63.34	61.23	0.00347	0.74	1.554	59.95	59.55	70.74
		DI #14	OUTFALL	0.09	4.62	0.65	0.06	2.54	6.25	0.20	6.45	6.45	16.4	24		0.0243	35.25	11.22	12.79	220	61.34	56.00	0.00526	1.14	2.540	59.55	57.60	70.74

Calculated By: DFL
Checked By: HLPG
N= 0.013
Storm Frequency: 10-YEAR

Date: 05/03/99

DJG, INC

P. O. BOX 3505
WILLIAMSBURG, VIRGINA 23187
STORM DRAINAGE COMPUTATION SHEET

PROJECT NO. 1980150
PROJECT DESC. LONGHILL STATION PHASE 3 & 4 - MILL DAM COURT TO POND "E"
SHEET OF SHEETS

LOCATION				RUN-OFF										PIPE-CHANNEL DESIGN						HYDRAULIC GRADE LINE								
				AREA-ACRES					TIME OF FLOW (MIN.)																			
LINE	RUN	FROM	TO	INCREMENTAL	TOTAL	RUN-OFF COEFF.	INCREMENTAL CA	ACCUMULATED CA	TO INLET/UPPER RCH.	WITHIN REACH CONVEYANCE	TIME OF CONCENTRATION	INTENSITY	DISCHARGE/CFS	PIPE SIZE	CHANNEL SECTION	SLOPE FT/FT	CAPACITY FULL/C.F.S.	VELOCITY FULL/C.F.S.	DESIGN VELOCITY/F.P.S.	CONVEYANCE LENGTH/FT.	INVERT OUT - UPSTREAM	INVERT IN - DOWNSTREAM	FRICTION SLOPE/FT./FT.	VELOCITY FACTOR	V2/2G/FT.	H.G.L. ELEV. UPSTREAM	H.G.L. DOWNSTREAM	COVER ELEV
I	1	DI #1	DI #2	0.14	0.14	0.85	0.12	0.12	1	3.30	4.30	7.1	0.8	15		0.0063	5.11	4.16	3.12	32	73.80	73.60	0.000161	0.75	0.151	68.09	67.98	78.64
		DI #2	DI #4	0.51	0.65	0.53	0.27	0.39	8.5	2.50	11.00	5.8	2.2	15		0.0106	6.66	5.43	4.89	252	73.50	70.82	0.00121	0.90	0.371	67.98	67.59	78.64
		DI #4	DI #6	0.48	1.13	0.55	0.27	0.65	8.5	1.00	9.50	6	3.9	15		0.0064	5.16	4.21	4.63	36	70.72	70.49	0.00369	1.10	0.333	67.86	67.59	76.19
		DI #3	DI #5	0.06	0.06	0.85	0.05	0.05	1	2.30	3.30	7.5	0.4	15		0.0178	8.61	7.02	3.65	36	72.19	71.55	0.00004	0.52	0.207	71.83	71.63	76.19
		DI #5	DI #6	0.09	0.16	0.85	0.08	0.13	1	0.15	1.15	8.1	1.1	15		0.0300	11.19	9.12	6.02	32	71.45	70.49	0.00028	0.66	0.562	71.63	71.37	76.05
		DI #6	DI #8	0.53	1.82	0.52	0.28	1.06	8.25	0.15	8.40	6.25	6.7	15		0.0125	7.21	5.88	6.64	320	70.39	66.40	0.01062	1.13	0.685	71.37	67.59	76.05
		DI #7	DI #8	0.03	0.03	0.85	0.03	0.03	1	3.30	4.30	7.1	0.2	15		0.0856	18.90	15.40	10.17	32	69.14	66.40	0.00001	0.66	1.605	67.59	67.27	77.04
		DI #8	YDI #9	0.03	1.89	0.85	0.03	1.12	1	3.30	4.30	7.1	8.0	18		0.0100	10.50	5.94	6.54	120	66.30	65.10	0.00574	1.10	0.664	67.27	65.66	77.04
		YDI #9	OUTFALL	0.17	2.06	0.45	0.08	1.20	11	0.00	11.00	5.8	6.9	18		0.0226	15.78	8.93	8.66	310	65.00	58.00	0.01160	0.97	1.166	65.66	61.80	73.00

Calculated By: DFL
Checked By: HLPG
N= 0.013
Storm Frequency: 10-YEAR

Date: 05/03/99

DJG, INC

P. O. BOX 3505
WILLIAMSBURG, VIRGINA 23187
STORM DRAINAGE COMPUTATION SHEET

PROJECT NO. 1980150
PROJECT DESC. LONGHILL STATION PHASE 3 & 4 - MILL DAM COURT TO RIP-RAP
SHEET OF SHEETS

LOCATION				RUN-OFF										PIPE-CHANNEL DESIGN						HYDRAULIC GRADE LINE								
				AREA-ACRES					TIME OF FLOW (MIN.)																			
LINE	RUN	FROM	TO	INCREMENTAL	TOTAL	RUN-OFF COEFF.	INCREMENTAL CA	ACCUMULATED CA	TO INLET/UPPER RCH.	WITHIN REACH CONVEYANCE	TIME OF CONCENTRATION	INTENSITY	DISCHARGE/CFS	PIPE SIZE	CHANNEL SECTION	SLOPE FT/FT	CAPACITY FULL/C.F.S.	VELOCITY FULL/C.F.S.	DESIGN VELOCITY/F.P.S.	CONVEYANCE LENGTH/FT.	INVERT OUT - UPSTREAM	INVERT IN - DOWNSTREAM	FRICTION SLOPE/FT./FT.	VELOCITY FACTOR	V2/2G/FT.	H.G.L. ELEV. UPSTREAM	H.G.L. DOWNSTREAM	COVER ELEV
1	1	DI #24	DI #25	0.22	0.22	0.78	0.17	0.17	3.1	0.20	3.30	7.45	1.3	15		0.0128	7.31	5.96	4.47	32	64.84	64.23	0.000386	0.75	0.310	58.03	57.92	68.64
		DI #25	DI #26	0.12	0.34	0.85	0.10	0.27	2.3	0.20	2.50	8	2.2	15		0.0122	7.14	5.82	4.19	117	64.13	62.70	0.00114	0.72	0.273	57.92	57.70	68.64
		DI #26	OUTFALL	0.27	0.61	0.85	0.23	0.50	1.75	0.35	2.10	8.65	4.3	15		0.0609	15.94	12.99	11.04	92	62.60	57.00	0.00453	0.85	1.892	57.70	57.00	66.60

Calculated By: DFL
Checked By: HLPG
N= 0.013
Storm Frequency: 10-YEAR

Date: 05/03/99

DJG, INC

P. O. BOX 3505
WILLIAMSBURG, VIRGINA 23187
STORM DRAINAGE COMPUTATION SHEET

PROJECT NO. 1980150
PROJECT DESC. LONGHILL STATION PHASE 3 & 4 - NEW COURT TO RIP-RAP OUTFALL
SHEET OF SHEETS

LOCATION				RUN-OFF										PIPE-CHANNEL DESIGN						HYDRAULIC GRADE LINE								
				AREA-ACRES					TIME OF FLOW (MIN.)																			
LINE	RUN	FROM	TO	INCREMENTAL	TOTAL	RUN-OFF COEFF.	INCREMENTAL CA	ACCUMULATED CA	TO INLET/UPPER RCH.	WITHIN REACH CONVEYANCE	TIME OF CONCENTRATION	INTENSITY	DISCHARGE/CFS	PIPE SIZE	CHANNEL SECTION	SLOPE FT/FT	CAPACITY FULL/C.F.S.	VELOCITY FULL/C.F.S.	DESIGN VELOCITY/F.P.S.	CONVEYANCE LENGTH/FT.	INVERT OUT - UPSTREAM	INVERT IN - DOWNSTREAM	FRICTION SLOPE/FT./FT.	VELOCITY FACTOR	V2/2G/FT.	H.G.L. ELEV. UPSTREAM	H.G.L. DOWNSTREAM	COVER ELEV
I	1	DI #22	DI #21	0.22	0.22	0.75	0.17	0.17	1.9	0.20	2.10	7.85	1.3	15		0.0279	10.78	8.79	7.03	70	71.59	69.84	0.000417	0.80	0.767	54.70	54.15	75.59
		DI #21	DI #23	0.07	0.30	0.85	0.06	0.23	1.5	0.50	2.00	7.8	1.8	15		0.0127	7.28	5.93	4.81	240	69.54	66.49	0.00076	0.81	0.359	54.15	53.77	73.54
		DI #23	OUTFALL	0.69	0.99	0.53	0.37	0.60	11.1	1.15	12.25	5.65	3.4	15		0.0773	17.96	14.63	11.27	170	66.14	53.00	0.00273	0.77	1.972	53.77	53.00	70.14

Calculated By: DFL
Checked By: HLPG
N= 0.013
Storm Frequency: 10-YEAR

Date: 05/03/99

DJG, INC

P. O. BOX 3505
WILLIAMSBURG, VIRGINA 23187
STORM DRAINAGE COMPUTATION SHEET

PROJECT NO. 1980150
PROJECT DESC. LONGHILL STATION PHASE 3 & 4 - MILL DAM COURT TO POND "E"
SHEET OF SHEETS

LOCATION				RUN-OFF										PIPE-CHANNEL DESIGN						HYDRAULIC GRADE LINE								
				AREA-ACRES					TIME OF FLOW (MIN.)																			
LINE	RUN	FROM	TO	INCREMENTAL	TOTAL	RUN-OFF COEFF.	INCREMENTAL CA	ACCUMULATED CA	TO INLET/UPPER RCH.	WITHIN REACH CONVEYANCE	TIME OF CONCENTRATION	INTENSITY	DISCHARGE/CFS	PIPE SIZE	CHANNEL SECTION	SLOPE FT/FT	CAPACITY FULL/C.F.S.	VELOCITY FULL/C.F.S.	DESIGN VELOCITY/F.P.S.	CONVEYANCE LENGTH/FT.	INVERT OUT - UPSTREAM	INVERT IN - DOWNSTREAM	FRICTION SLOPE/FT./FT.	VELOCITY FACTOR	V2/2G/FT.	H.G.L. ELEV. UPSTREAM	H.G.L. DOWNSTREAM	COVER ELEV
I	1	DI #1	DI #2	0.14	0.14	0.85	0.12	0.12	1	3.30	4.30	7.1	0.8	15		0.0063	5.11	4.16	3.12	32	73.80	73.60	0.000161	0.75	0.151	68.09	67.98	78.64
		DI #2	DI #4	0.51	0.65	0.53	0.27	0.39	8.5	2.50	11.00	5.8	2.2	15		0.0106	6.66	5.43	4.89	252	73.50	70.82	0.00121	0.90	0.371	67.98	67.59	78.64
		DI #4	DI #6	0.48	1.13	0.55	0.27	0.65	8.5	1.00	9.50	6	3.9	15		0.0064	5.16	4.21	4.63	36	70.72	70.49	0.00369	1.10	0.333	67.86	67.59	76.19
		DI #3	DI #5	0.06	0.06	0.85	0.05	0.05	1	2.30	3.30	7.5	0.4	15		0.0178	8.61	7.02	3.65	36	72.19	71.55	0.00004	0.52	0.207	71.83	71.63	76.19
		DI #5	DI #6	0.09	0.16	0.85	0.08	0.13	1	0.15	1.15	8.1	1.1	15		0.0300	11.19	9.12	6.02	32	71.45	70.49	0.00028	0.66	0.562	71.63	71.37	76.05
		DI #6	DI #8	0.53	1.82	0.52	0.28	1.06	8.25	0.15	8.40	6.25	6.7	15		0.0125	7.21	5.88	6.64	320	70.39	66.40	0.01062	1.13	0.665	71.37	67.59	76.05
		DI #7	DI #8	0.03	0.03	0.85	0.03	0.03	1	3.30	4.30	7.1	0.2	15		0.0856	18.90	15.40	10.17	32	69.14	66.40	0.00001	0.66	1.605	67.59	67.27	77.04
		DI #8	YDI #9	0.03	1.89	0.85	0.03	1.12	1	3.30	4.30	7.1	8.0	18		0.0100	10.50	5.94	6.54	120	66.30	65.10	0.00574	1.10	0.664	67.27	65.66	77.04
		YDI #9	OUTFALL	0.17	2.06	0.45	0.08	1.20	11	0.00	11.00	5.8	6.9	18		0.0226	15.78	8.93	8.66	310	65.00	58.00	0.01160	0.97	1.166	65.66	61.80	73.00

Calculated By: DFL
Checked By: HLPG
N= 0.013
Storm Frequency: 10-YEAR

Date: 05/03/99

DJG, INC

P. O. BOX 3505
WILLIAMSBURG, VIRGINA 23187
STORM DRAINAGE COMPUTATION SHEET

PROJECT NO. 1980150
PROJECT DESC. LONGHILL STATION PHASE 3 & 4 - MILL DAM COURT TO RIP-RAP
SHEET OF SHEETS

LOCATION				RUN-OFF										PIPE-CHANNEL DESIGN						HYDRAULIC GRADE LINE								
				AREA-ACRES					TIME OF FLOW (MIN.)																			
LINE	RUN	FROM	TO	INCREMENTAL	TOTAL	RUN-OFF COEFF.	INCREMENTAL CA	ACCUMULATED CA	TO INLET/UPPER RCH.	WITHIN REACH CONVEYANCE	TIME OF CONCENTRATION	INTENSITY	DISCHARGE/CFS	PIPE SIZE	CHANNEL SECTION	SLOPE FT/FT	CAPACITY FULL/C.F.S.	VELOCITY FULL/C.F.S.	DESIGN VELOCITY/F.P.S.	CONVEYANCE LENGTH/FT.	INVERT OUT - UPSTREAM	INVERT IN - DOWNSTREAM	FRICTION SLOPE/FT./FT.	VELOCITY FACTOR	V2/2g/FT.	H.G.L. ELEV. UPSTREAM	H.G.L. DOWNSTREAM	COVER ELEV
1	1	DI #24	DI #25	0.22	0.22	0.78	0.17	0.17	3.1	0.20	3.30	7.45	1.3	15		0.0128	7.31	5.96	4.47	32	64.64	64.23	0.000386	0.75	0.310	58.03	57.92	66.64
		DI #25	DI #26	0.12	0.34	0.85	0.10	0.27	2.3	0.20	2.50	8	2.2	15		0.0122	7.14	5.82	4.19	117	64.13	62.70	0.00114	0.72	0.273	57.92	57.70	66.64
		DI #26	OUTFALL	0.27	0.61	0.85	0.23	0.50	1.75	0.35	2.10	8.65	4.3	15		0.0609	15.94	12.99	11.04	92	62.60	57.00	0.00453	0.85	1.892	57.70	57.00	66.60

Calculated By: DFL
Checked By: HLPG
N= 0.013
Storm Frequency: 10-YEAR

Date: 05/03/99

DJG, INC

P. O. BOX 3505
WILLIAMSBURG, VIRGINA 23187
STORM DRAINAGE COMPUTATION SHEET

PROJECT NO. 1980150
PROJECT DESC. LONGHILL STATION PHASE 3 & 4 - NEW COURT TO RIP-RAP OUTFALL
SHEET OF SHEETS

LOCATION				RUN-OFF										PIPE-CHANNEL DESIGN						HYDRAULIC GRADE LINE								
				AREA-ACRES					TIME OF FLOW (MIN.)																			
LINE	RUN	FROM	TO	INCREMENTAL	TOTAL	RUN-OFF COEFF.	INCREMENTAL CA	ACCUMULATED CA	TO INLET/UPPER RCH.	WITHIN REACH CONVEYANCE	TIME OF CONCENTRATION	INTENSITY	DISCHARGE/CFS	PIPE SIZE	CHANNEL SECTION	SLOPE FT/FT	CAPACITY FULL/C.F.S.	VELOCITY FULL/C.F.S.	DESIGN VELOCITY/F.P.S.	CONVEYANCE LENGTH/FT.	INVERT OUT - UPSTREAM	INVERT IN - DOWNSTREAM	FRICTION SLOPE/FT./FT.	VELOCITY FACTOR	V2/2g/FT.	H.G.L. ELEV. UPSTREAM	H.G.L. DOWNSTREAM	COVER ELEV
I	1	DI #22	DI #21	0.22	0.22	0.75	0.17	0.17	1.9	0.20	2.10	7.85	1.3	15		0.0279	10.78	8.79	7.03	70	71.59	69.64	0.000417	0.80	0.767	54.70	54.15	75.59
		DI #21	DI #23	0.07	0.30	0.85	0.06	0.23	1.5	0.50	2.00	7.8	1.8	15		0.0127	7.28	5.93	4.81	240	69.54	66.49	0.00078	0.81	0.359	54.15	53.77	73.54
		DI #23	OUTFALL	0.69	0.99	0.53	0.37	0.60	11.1	1.15	12.25	5.65	3.4	15		0.0773	17.96	14.63	11.27	170	66.14	53.00	0.00273	0.77	1.972	53.77	53.00	70.14

DJG
P.O. Box 3505
Williamsburg, Virginia 23187
(757) 253-0673
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PROJECT LONGHILL PH. 3 + 4
DATE 4/8/99 COMM NO. 1980152
CAL DFL CKD PAGE # 1/2
TITLE RIP-RAP SIZING

RIP-RAP FOR 18" OUTFALL TO POND "E":

$Q_{10} = 6.9$ CFS
OUTLET PIPE, $D_o = 18"$
WIDTH UPSTREAM, $3D_o = 4.5'$
APRON LENGTH, $L_a = 10'$
WIDTH DOWNSTREAM, $W = D_o + L_a = 11.5'$
RIP-RAP $d_{50} = 0.5'$ (CLASS AI)
DEPTH = 18"

RIP-RAP FOR 24" OUTFALL TO POND "D":

$Q_{10} = 16.7$ cfs
OUTLET PIPE, $D_o = 24"$
APRON LENGTH, $L_a = 10'$
WIDTH UPSTREAM, $3D_o = 6'$
" DOWNSTREAM, $W = D_o + L_a = 12'$
RIP-RAP $d_{50} = 0.5'$ (CLASS AI)
DEPTH = 18"

RIP-RAP FOR 15" OUTFALL AT REAR OF LOTS 146 & 147:

$Q_{10} = 1.88$ CFS
OUTLET PIPE, $D_o = 15"$
APRON LENGTH, $L_a = 10'$
WIDTH UPSTREAM, $3D_o = 3.75'$ (4')
" DOWNSTREAM, $W = D_o + L_a = 11.25'$ (12')
RIP-RAP $d_{50} = 0.5'$ (CLASS AI)
DEPTH = 18"

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PROJECT LONGHILL PH. 3 & 4
DATE 5/28/99 COMM NO. 1980152
CAL DFL CKD _____ PAGE # 2/2
TITLE RIP-RAP SIZING

RIP-RAP FOR 15" OUTFALL BTWN LOTS. 170 & 171 AND OUTFALL OF V-DITCH TO POND "D":

Q_{10} = MINIMUM
OUTLET PIPE = D_o = 15"
WIDTH UPSTREAM = $3D_o$ = 9'
WIDTH DOWNSTREAM = W = $D_o + La$ = 11'
LENGTH OF APRON = La = 9'
RIP-RAP d_{50} = 0.5' (CLASS AI) DEPTH = 18"

RIP-RAP FOR 24" OUTFALL FROM POND "D":

Q_{10} = MINIMUM
OUTLET PIPE = D_o = 24"
WIDTH UPSTREAM = $3D_o$ = 6'
LENGTH OF APRON = 12'
WIDTH DOWNSTREAM = W = $D_o + La$ = 14'
RIP-RAP d_{50} = 0.5' (CLASS AI) DEPTH = 18"

449 McLaws Circle
Williamsburg, VA 23185
757 253-0673
Fax 757 253-2319

FAX TRANSMISSION

PLEASE DELIVER THE FOLLOWING 4 PAGES (INCLUDING THIS COVER SHEET)

TO DARRYL COOK / PAT MENICHINI 259-4032 — DATE 3/22/00

JCC CODE COMPLIANCE.

FAX NUMBER

CC: KEN DODD / ATLANTIC HOMES 596-8516

FROM PHILLIP GOERING — FAX NUMBER 757 253-2319

SHOULD ANY PART OF THIS TRANSMITTAL BE ILLEGIBLE OR INCOMPLETE, PLEASE CONTACT — PHONE NUMBER 757 253-0673

MESSAGE

RE: JOB NO.:

DARRYL/PAT,

WE HAVE RESURVEYED THE AS-BUILT CONDITIONS OF LONGHILL'S POND B SINCE H.B. HAWKINS HAS DRAINED IT. WE HAVE COMPARED THE AS-BUILT CONDITIONS WITH THE DESIGN AND CALCULATIONS. POND B, AS-BUILT, HAS AN AVERAGE OF 1' OF SEDIMENTATION IN IT YET, STILL SATISFIES THE REQUIRED WET STORAGE/WATER QUALITY VOLUME.

PLEASE CALL WITH ANY QUESTIONS/COMMENTS.

THANKS, PHIL

CC:

MAR-23-00 08:59 FROM:DJG INC 757-253-2319 PC020_PC024_PC022_PC119_PC120_PC121_PC124_PC125_PC126_PC127_PC128_PC129_PC130_PC131_PC132_PC133_PC134_PC135_PC136_PC137_PC138_PC139_PC140_PC141_PC142_PC143_PC144_PC145_PC146_PC147_PC148_PC149_PC150_PC151_PC152_PC153_PC154_PC155_PC156_PC157_PC158_PC159_PC160_PC161_PC162_PC163_PC164_PC165_PC166_PC167_PC168_PC169_PC170_PC171_PC172_PC173_PC174_PC175_PC176_PC177_PC178_PC179_PC180_PC181_PC182_PC183_PC184_PC185_PC186_PC187_PC188_PC189_PC190_PC191_PC192_PC193_PC194_PC195_PC196_PC197_PC198_PC199_PC200_PC201_PC202_PC203_PC204_PC205_PC206_PC207_PC208_PC209_PC210_PC211_PC212_PC213_PC214_PC215_PC216_PC217_PC218_PC219_PC220_PC221_PC222_PC223_PC224_PC225_PC226_PC227_PC228_PC229_PC230_PC231_PC232_PC233_PC234_PC235_PC236_PC237_PC238_PC239_PC240_PC241_PC242_PC243_PC244_PC245_PC246_PC247_PC248_PC249_PC250_PC251_PC252_PC253_PC254_PC255_PC256_PC257_PC258_PC259_PC260_PC261_PC262_PC263_PC264_PC265_PC266_PC267_PC268_PC269_PC270_PC271_PC272_PC273_PC274_PC275_PC276_PC277_PC278_PC279_PC280_PC281_PC282_PC283_PC284_PC285_PC286_PC287_PC288_PC289_PC290_PC291_PC292_PC293_PC294_PC295_PC296_PC297_PC298_PC299_PC300_PC301_PC302_PC303_PC304_PC305_PC306_PC307_PC308_PC309_PC310_PC311_PC312_PC313_PC314_PC315_PC316_PC317_PC318_PC319_PC320_PC321_PC322_PC323_PC324_PC325_PC326_PC327_PC328_PC329_PC330_PC331_PC332_PC333_PC334_PC335_PC336_PC337_PC338_PC339_PC340_PC341_PC342_PC343_PC344_PC345_PC346_PC347_PC348_PC349_PC350_PC351_PC352_PC353_PC354_PC355_PC356_PC357_PC358_PC359_PC360_PC361_PC362_PC363_PC364_PC365_PC366_PC367_PC368_PC369_PC370_PC371_PC372_PC373_PC374_PC375_PC376_PC377_PC378_PC379_PC380_PC381_PC382_PC383_PC384_PC385_PC386_PC387_PC388_PC389_PC390_PC391_PC392_PC393_PC394_PC395_PC396_PC397_PC398_PC399_PC400_PC401_PC402_PC403_PC404_PC405_PC406_PC407_PC408_PC409_PC410_PC411_PC412_PC413_PC414_PC415_PC416_PC417_PC418_PC419_PC420_PC421_PC422_PC423_PC424_PC425_PC426_PC427_PC428_PC429_PC430_PC431_PC432_PC433_PC434_PC435_PC436_PC437_PC438_PC439_PC440_PC441_PC442_PC443_PC444_PC445_PC446_PC447_PC448_PC449_PC450_PC451_PC452_PC453_PC454_PC455_PC456_PC457_PC458_PC459_PC460_PC461_PC462_PC463_PC464_PC465_PC466_PC467_PC468_PC469_PC470_PC471_PC472_PC473_PC474_PC475_PC476_PC477_PC478_PC479_PC480_PC481_PC482_PC483_PC484_PC485_PC486_PC487_PC488_PC489_PC490_PC491_PC492_PC493_PC494_PC495_PC496_PC497_PC498_PC499_PC500_PC501_PC502_PC503_PC504_PC505_PC506_PC507_PC508_PC509_PC510_PC511_PC512_PC513_PC514_PC515_PC516_PC517_PC518_PC519_PC520_PC521_PC522_PC523_PC524_PC525_PC526_PC527_PC528_PC529_PC530_PC531_PC532_PC533_PC534_PC535_PC536_PC537_PC538_PC539_PC540_PC541_PC542_PC543_PC544_PC545_PC546_PC547_PC548_PC549_PC550_PC551_PC552_PC553_PC554_PC555_PC556_PC557_PC558_PC559_PC560_PC561_PC562_PC563_PC564_PC565_PC566_PC567_PC568_PC569_PC570_PC571_PC572_PC573_PC574_PC575_PC576_PC577_PC578_PC579_PC580_PC581_PC582_PC583_PC584_PC585_PC586_PC587_PC588_PC589_PC590_PC591_PC592_PC593_PC594_PC595_PC596_PC597_PC598_PC599_PC600_PC601_PC602_PC603_PC604_PC605_PC606_PC607_PC608_PC609_PC610_PC611_PC612_PC613_PC614_PC615_PC616_PC617_PC618_PC619_PC620_PC621_PC622_PC623_PC624_PC625_PC626_PC627_PC628_PC629_PC630_PC631_PC632_PC633_PC634_PC635_PC636_PC637_PC638_PC639_PC640_PC641_PC642_PC643_PC644_PC645_PC646_PC647_PC648_PC649_PC650_PC651_PC652_PC653_PC654_PC655_PC656_PC657_PC658_PC659_PC660_PC661_PC662_PC663_PC664_PC665_PC666_PC667_PC668_PC669_PC670_PC671_PC672_PC673_PC674_PC675_PC676_PC677_PC678_PC679_PC680_PC681_PC682_PC683_PC684_PC685_PC686_PC687_PC688_PC689_PC690_PC691_PC692_PC693_PC694_PC695_PC696_PC697_PC698_PC699_PC700_PC701_PC702_PC703_PC704_PC705_PC706_PC707_PC708_PC709_PC710_PC711_PC712_PC713_PC714_PC715_PC716_PC717_PC718_PC719_PC720_PC721_PC722_PC723_PC724_PC725_PC726_PC727_PC728_PC729_PC730_PC731_PC732_PC733_PC734_PC735_PC736_PC737_PC738_PC739_PC740_PC741_PC742_PC743_PC744_PC745_PC746_PC747_PC748_PC749_PC750_PC751_PC752_PC753_PC754_PC755_PC756_PC757_PC758_PC759_PC760_PC761_PC762_PC763_PC764_PC765_PC766_PC767_PC768_PC769_PC770_PC771_PC772_PC773_PC774_PC775_PC776_PC777_PC778_PC779_PC780_PC781_PC782_PC783_PC784_PC785_PC786_PC787_PC788_PC789_PC790_PC791_PC792_PC793_PC794_PC795_PC796_PC797_PC798_PC799_PC800_PC801_PC802_PC803_PC804_PC805_PC806_PC807_PC808_PC809_PC810_PC811_PC812_PC813_PC814_PC815_PC816_PC817_PC818_PC819_PC820_PC821_PC822_PC823_PC824_PC825_PC826_PC827_PC828_PC829_PC830_PC831_PC832_PC833_PC834_PC835_PC836_PC837_PC838_PC839_PC840_PC841_PC842_PC843_PC844_PC845_PC846_PC847_PC848_PC849_PC850_PC851_PC852_PC853_PC854_PC855_PC856_PC857_PC858_PC859_PC860_PC861_PC862_PC863_PC864_PC865_PC866_PC867_PC868_PC869_PC870_PC871_PC872_PC873_PC874_PC875_PC876_PC877_PC878_PC879_PC880_PC881_PC882_PC883_PC884_PC885_PC886_PC887_PC888_PC889_PC890_PC891_PC892_PC893_PC894_PC895_PC896_PC897_PC898_PC899_PC900_PC901_PC902_PC903_PC904_PC905_PC906_PC907_PC908_PC909_PC910_PC911_PC912_PC913_PC914_PC915_PC916_PC917_PC918_PC919_PC920_PC921_PC922_PC923_PC924_PC925_PC926_PC927_PC928_PC929_PC930_PC931_PC932_PC933_PC934_PC935_PC936_PC937_PC938_PC939_PC940_PC941_PC942_PC943_PC944_PC945_PC946_PC947_PC948_PC949_PC950_PC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1940220
3/22/00

LONGHILL POND B AS-BUILT CONDITIONS

HLPG

69.23, 68.14, 69.09
71.07 & 69.91

- GIVEN AS-BUILT ELEVATIONS OF POND B:

  BOTTOM ELEV. = (65.75 + 65.98 + 66.45 + 66.08)/4 = 66.07 avg.

  DESIGN ELEV. = 65.0

  DO NOT MATCH AS-BUILT PLAN.

- DESIGNED STORAGE, WET VOLUME = 5055 ft³ (BELOW SHELF)

  5080 ft³ (ABOVE SHELF)

  10,135 ft³

WQ VOL STORAGE BASIS?

- REQUIRED STORAGE, WET VOLUME = 8500 ft³ (FOR WATER QUALITY)

  8500 ≯ 10,135

- STORAGE VOLUME DESIGNED BETWEEN ELEVATIONS 65.0 AND 66.07

  = 720 ft³ (SEDIMENT)

- DOES AS-BUILT POND STILL ACHIEVE REQUIRED WET STORAGE VOLUME?

  10,135 ft³ − 720 ft³ (SEDIMENT) = 9,415 ft³

  9415 ft³ > 8500 ft³ ∴ YES OKAY ✓

  (POND DEPTH AS-BUILT = 69.13 − 66.07 = 3.06' AVG.)
  DEWATER ORIFICE

→ THE ABOVE IS PREDICATED ON THE FIELD SURVEYS DATED 3/21/00 AND 11/10/99 WHICH INDICATE THAT THE POND IS ACTUALLY A LITTLE LARGER THAN DESIGNED (IN SURFACE AREA). THEREFORE, AFTER CONFIRMING SIDE SLOPES AND SHELF LOCATION, IT CAN BE CONCLUDED THAT THE CORRECT VOLUME HAS BEEN MET OR EXCEEDED.

TEMPORARY SEDIMENT BASIN DESIGN DATA SHEET

(with or without an emergency spillway)

Project LONGHILL STATION REVISION #1

Basin # PHASE I POND B Location

Total area draining to basin: 11.87 acres. (POST-CONSTRUCTION) Don't understand

5.0 AC MAX. (DURING CONSTRUCTION)
DISTURBED

Basin Volume Design

Wet Storage:

1. Minimum required volume = 67 cu. yds. x Total Drainage Area (acres).

   67 cu. yds. x 5.0 acres = 335 cu. yds.

2. Available basin volume = 398 cu. yds. at elevation 69.0. (From storage - elevation curve)

3. Excavate 398 cu. yds. to obtain required volume*.

   * Elevation corresponding to required volume = invert of the dewatering orifice.

4. Available volume before cleanout required.

   33 cu. yds. x 5.0 acres = 165 cu. yds.

5. Elevation corresponding to cleanout level = 69.71.

   (From Storage - Elevation Curve)

6. Distance from invert of the dewatering orifice to cleanout level = 0.71 ft. (Min. = 1.0 ft.)

Dry Storage:

7. Minimum required volume = 67 cu. yds. x Total Drainage Area (acres).

   67 cu. yds. x 5.0 acres = 335 cu. yds.

8. Total available basin volume at crest of riser* = 1195.3 cu. yds. at elevation 72.5. (From Storage - Elevation Curve)

* Minimum = 134 cu. yds./acre of total drainage area.

9. Diameter of dewatering orifice = 10.75 in.

10. Diameter of flexible tubing = 13 in. (diameter of dewatering orifice plus 2 inches).

Preliminary Design Elevations

11. Crest of Riser = 72.5

Top of Dam = 75.0

Design High Water = 73.54

Upstream Toe of Dam = 65

Basin Shape

12. $\frac{\text{Length of Flow}}{\text{Effective Width}}$ $\frac{L}{We}$ = $\frac{15}{40'}$ = 0.4'

If > 2, baffles are not required N/A

If < 2, baffles are required ✓

Runoff

13. Q_2 = 5 cfs (From Chapter 5)

14. Q_{25} = 18 cfs (From Chapter 5)

Principal Spillway Design

15. With emergency spillway, required spillway capacity $Q_p = Q_2$ = 5 cfs. (riser and barrel)

Without emergency spillway, required spillway capacity $Q_p = Q_{25}$ = N/A cfs. (riser and barrel)

16. With emergency spillway:

Assumed available head (h) = 1.0 ft. (Using Q_2)

h = Crest of Emergency Spillway Elevation - Crest of Riser Elevation

Without emergency spillway:

Assumed available head (h) = NA ft. (Using Q_{25})

h = Design High Water Elevation - Crest of Riser Elevation

17. Riser diameter (D_r) = 48 in. Actual head (h) = 0.8 ft.

(From Plate 3.14-8.)

Note: Avoid orifice flow conditions.

18. Barrel length (l) = 160 ft.

Head (H) on barrel through embankment = 5.55 ft.

(From Plate 3.14-7).

19. Barrel diameter = 30 in.

(From Plate 3.14-B [concrete pipe] or Plate 3.14-A [corrugated pipe]).

20. Trash rack and anti-vortex device

Diameter = 72 inches.

Height = 21 inches.

(From Table 3.14-D).

Emergency Spillway Design

21. Required spillway capacity $Q_e = Q_{25} - Q_p$ = 13 cfs.

22. Bottom width (b) = 10 ft.; the slope of the exit channel (s) = 3.5 ft./foot; and the minimum length of the exit channel (x) = 40 ft.
(From Table 3.14-C).

Anti-Seep Collar Design

23. Depth of water at principal spillway crest (Y) = 7.5 ft.

Slope of upstream face of embankment (Z) = 3 :1.

Slope of principal spillway barrel (S_b) = 0.625 %

Length of barrel in saturated zone (L_s) = 55 ft.

24. Number of collars required = 4 dimensions = 4.0' x 4.0'

(from Plate 3.14-12).

Final Design Elevations

25. Top of Dam = 75.0

Design High Water = 73.54

Emergency Spillway Crest = 74

Principal Spillway Crest = 72.5

Dewatering Orifice Invert = 69.0

Cleanout Elevation = 69.71

Elevation of Upstream Toe of Dam or Excavated Bottom of "Wet Storage Area" (if excavation was performed) = 65

PC020_PC021_PC022_PC119_PC120_LONGHILL_STATION - 154

DJG
P.O. Box 3505
Williamsburg, Virginia 23187
(804) 253-0673
Fax (804) 253-2319

PROJECT LONGHILL STATION SUBDIVISION
DATE 5-11-95 COMM NO. 1940220
CAL HLPG CKD PAGE # 1
TITLE PHASE I – IV BMP/OPEN SPACE POINT CREDIT

BMP POINT SYSTEM:

- NATURAL OPEN SPACE CREDIT:

TOTAL SITE ACREAGE = 104.53
OPEN SPACE =
% OPEN SPACE = 43.60 / 104.53 ac. = 41.71 %

POINTS = 41.71 % × 0.1 ≃ 4.17

- PHASE I BMP CONSTRUCTION CREDIT:

POND A ⇒ 18.9 ACRES / 104.53 ac. × 9 ≃ 1.63
POND B ⇒ 11.9 ACRES / 104.53 ac. × 9 ≃ 1.03
POND C ⇒ ~~8.0~~ 26.78 ACRES / 104.53 ac. × ~~6~~ = ~~0.46~~ 1.025
SUBTOTAL 4; = 3.12 3.69

- PHASES II → IV:

POND D ⇒ 8.9 ACRES / 104.53 ac. × 9 ≃ 0.77
POND E ⇒ 12.1 ACRES / 104.53 ac. × 9 ≃ 1.04
SUBTOTAL = 1.81

- TOTAL BMP POINTS: 4.17 + ~~3.12~~ 3.69 + 1.81 = $\boxed{9.1}$ 9.7

POND C – 26.78 ac
4 PT BMP ½" × I × DA = ½" × 0.2 (20%) × 26.78 × 43,560 / 12 = 9721 cu ft
30% = 14,641 cu ft

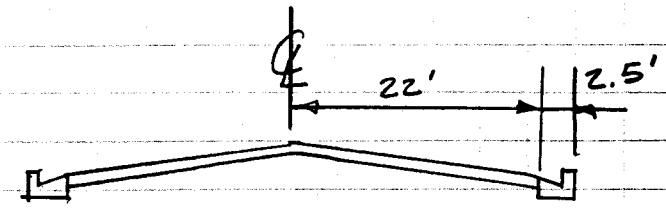
DJG
P.O. Box 3505
Williamsburg, Virginia 23187
(804) 253-0673
Fax (804) 253-2319

PROJECT LONGHILL STATION SUBDIVISION
DATE 1-28-97 COMM NO. 1940221
CAL MRK CKD _____ PAGE # _____
TITLE CENTERVILLE ROAD IMPROVEMENTS

STORM DRAINAGE DESIGN

COMPUTE DRAINAGE AREA CONTRIBUTING TO CENTERVILLE ROAD

(SEE FIGURE 1)



TYPICAL SECTION

AREA CONTRIBUTING TO PROPOSED DI - WEST SIDE OF ROAD

FUTURE PAVEMENT AREA: A_{PAV}

$A_{PAV} = 24.5' \times 400'$
$= 9,800 \text{ FT}^2$
$= 0.22 \text{ AC}$

YARD DRAINAGE: A_Y
(FROM AREA MEASUREMENT)
$A_Y = 94,400 \text{ FT}^2$
$= 2.16$

AREA CONTRIBUTING TO FOX RIDGE RD OUTFALL EAST SIDE

FUTURE PAVEMENT (SAME AS WEST SIDE) $A_{PAV} = 0.22 \text{ AC.}$

YARD DRAINAGE
$A_Y = 0.35 \text{ AC.}$

RUNOFF COEFFICIENTS

$C_{A_{PAV}} = 0.95$

$C_{A_Y} = 0.40$

(SEE PAGE 1-11 OF DRAINAGE MANUAL)

TIME OF CONCENTRATION

ASSUME $T_c = 10$ MIN.

DETERMINE RAINFALL INTENSITY

USE 10 YEAR STORM NORFOLK VA CURVES (PG. 1-19 OF VDOT DRAINAGE MANUAL)

$i = 6 \text{ IN/HR}$

AB FILE "B"

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

July 23, 2002

Mr. Ken Dodd, Development Manager
McCale Development Corporation
729 Thimble Shoals Boulevard, Suite 4A
Newport News, Va. 23606

Re: Longhill Station Section 1 (1A & 1B)
County Plan No. S-47-95
Stormwater Management Facilities A, B, C and D
County BMP ID Codes: PC 022; PC 021; PC 020 and PC 120

Dear Dodd:

In response to your recent request concerning release of erosion and sediment control surety being held for the above referenced project, personnel from the Environmental Division met with you on Tuesday July 23rd 2002 and performed final inspections on Ponds A, B and C. These ponds are associated with bond being held for the project. Pond D is also associated with the Phase 1 bond; however, due to active construction being performed in Section 4, it was determined mutually that since this facility is still serving as a temporary sediment basin and as-built drawings have not been submitted, it was not warranted to perform a final inspection for this facility at this time.

Based on our review of the project and a concurrent field inspection as performed on July 23rd 2002, the following items must be addressed prior to release of the developer's surety instrument for the stormwater management/BMP facilities associated with this site:

Record Drawings:

1. The record drawing dated December 6th 1999 for **Pond A** (PC 022) is satisfactory.

2. The record drawing dated November 15th 1999 and supplemental information supplied March 22nd 2000 for **Pond B** are satisfactory.

3. The record drawing dated November 15th 1999 for **Pond C** is satisfactory.

4. Note # 18 on Sheet C-5 of the approved plan for Section 3 & 4 required as-built drawings for Pond D. None were received. *(Note: This facility was determined to still be serving as a temporary sediment basin due to active construction in the area and has not been converted to final BMP mode. A final inspection was not performed during our meeting.)*

Construction Certifications:

5. For Ponds A, B and C, Note # 18 on Sheet C-14 of the approved plan required construction certifications. None were provided.

6. For Pond D, Note # 18 on Sheet C-5 of the approved plan required construction certification. None was provided.

Construction certifications are especially important since each of the BMP facilities have engineered and compacted earthen embankments. The certifications can be in letter format or by use of the certification statements in Section 4 of the *James City County, Stormwater Management/BMP Facilities, Record Drawing and Construction Certification, Standard Forms & Instructions*. Please contact our office if you need a copy of the certification statement page.

Construction - Related Items:

Pond A (PC 022) - Near 6033 Allegheny Lot 87

7. Remove silt fence present in the natural channel downstream of the barrel through the dam.

8. Clear trees and woody vegetation along the entire downstream face of the pond embankment and from within the emergency spillway. Usually trees, shrubs and woody vegetation are not permitted to grow on any part of pond embankments constructed using engineered (compacted) fills. Saturated roots mats combined with high wind can cause trees to overtop and accelerate soil erosion and embankment failure. For older facilities which may have established tree growth, we recommend that trees be cut flush to or below ground level and be maintained in that fashion as to not disturb root systems that may already be extensive. Efforts should then be made to reduce tree restablishment and to replace tree growth with an acceptable low-maintenance grass covering.

9. Remove the dewatering orifice and convert to riser to final BMP mode by use of a turn down in accordance with the approved plan.

10. The riser structure was inaccessible as it is situated in the middle of the pond. When removing the dewatering orifice, perform an inspection on the interior of the riser. Clean all trash and debris from the interior of the riser, especially at the entrance to the outlet barrel. Clean and coat the exterior of the riser as necessary to remove visible surface corrosion.

11. Clean and remove debris and vegetation within 10 feet of the outfall end of the 24-inch storm drain inflow pipe which enters the basin from Allegheny Drive at the southwest corner of the pond. Flow into the facility shall not be obstructed by vegetation.

Pond B (PC 021) - Near 3913 Blue Ridge Court

12. Remove the dewatering orifice and convert the riser to final BMP mode by use of a turn down elbow in accordance with the approved plan.

13. Clean and coat the exterior of the riser as necessary to remove visible surface corrosion.

14. Repair the puncture hole on the east side of the riser to stop leakage.

15. Clear and remove all vegetation within 10 feet of the principal flow control (riser) structure. Flow into the riser shall not be obstructed by vegetation.

16. Clean and remove vegetation within 10 feet of the outfall end of the outlet barrel through the dam. Flow out of the BMP shall not be obstructed by vegetation.

17. Remove silt fence present at the downstream end of the emergency spillway. The emergency spillway is situated at the west side of the dam.

18. Stabilize with seed and mulch disturbed soil areas present on the interior side slope of the basin at the west end of the pond. This area is near the electrical service box for the fountain.

Pond C (PC 020) - Near the Recreation Center on Longhill Station Road

19. Clean and remove debris and vegetation within 10 feet of the outfall ends of the two storm drain inflow pipes which enter the basin from Longhill Station Road and the Recreation Center. These pipes are situated at the south end of the basin.

20. Clear and remove all vegetation within 10 feet of the principal flow control (riser) structure.

21. Clear trees and woody vegetation along the entire downstream face of the dam and the emergency spillway. This is especially important on the right (east) side of the dam in the vicinity of the riser and barrel structures. (Note: The emergency spillway is situated over the outlet barrel through the dam.)

Also, for all the BMPs listed above which have access hatches into the riser structure, a padlock should be added to prevent future unauthorized entry into the risers. Provide an extra set of keys to the Environmental Division office and the Homeowner's Association.

Once this work is satisfactorily completed, contact our office appropriately. We can then proceed with final release of surety for the project. Please contact me at 757-253-6639 or the assigned Environmental Division inspector, Beth Davis, at 757-253-6702 if you have any additional comments or questions regarding these issues.

Sincerely,

Scott J. Thomas, P.E.
Senior Engineer
Environmental Division

cc: Pat Menichino, Environmental Division

G:\SWMProg\AsBuilts\S4795.pc020

Scott Thomas

From: Scott Thomas
Sent: Friday, July 05, 2002 5:32 PM
To: Beth Davis
Cc: Pat Menichino
Subject: Longhill Station Bond Reductions

Beth

I will need to speak with you about the Surety Request forms given to me for Longhill Station. I have looked through the 3 project files:

File 1: Section 1a & 1b S-47-95
File 2: Section 2 S-47-98
File 3: Sections 3 & 4 S-19-99

I am having a hard time for some reason sorting out where we still hold bond and what BMPs are still in the process for certification review. It appears that all of them may still be subject to the process as although we got as-builts for all the BMPs, there are no construction certifications. All the approved plans for Longhill Station required clearly required construction certification, both by notes in the plan set and by ENV DIV review comments.

Pond A	PC 022	Section 1 & 2	S-47-95	AB-yes	CC-no	
Pond B	PC 021	Section 1B	S-47-95	AB-yes	CC-no	
Pond C	PC 020	Section 1A	S-47-95	AB-yes	CC-no	
Pond D	PC 120	Section 4	S-19-99	AB-~~yes~~ No	CC-no	
Pond E	PC 119	Section 3 & 4	S-47-98	AB-yes	CC-no	Letter Sent

The only one I have a handle on is Pond E on the section 3 and 4 plan. The form requests release of Section 1 and release of Section 2. As I see it (unless you differ), I can only release up to 50% of the BMP cost, or whatever remains, due to the lack of construction certification on Ponds A, B, C and E and as I have not performed final inspections on these BMPs. These are the ones which are tied to Sections 1 & 2. I also found a note that says that Pond D, which is Section 3 and 4, was added to the Section 1 bond? Do you know if this is the case?

(PS. Also, I have rescheduled my meeting with Cenella Swiney with the Longhill Station HOA for Thursday July 11th at 9:00 am).

Scott

- Need Asbuilt Dwg Pond "D"
- Need Const Certs All Ponds
- No I/M Agreement, Sect 3+4 S-47-98 Pond D (PC 120).

Bell Atlantic

Bell Atlantic - Virginia, Inc.
52 Richneck Road
Newport News, Virginia 23608

December 18, 1996

Atlantic Homes Development
Attention: Donna Darnley
2 Eaton Street
Hampton, Virginia 23669

RE: RELOCATION OF EXISTING ABOVE GROUND INTERFACE AT
5920 CENTERVILLE ROAD, WILLIAMSBURG, VIRGINIA

Ms. Darnley:

Please be advised of the cost for Bell Atlantic to relocate this interface. The cost is $16,070.00. We will schedule this work as soon as we have a check in the amount of $16 ,070.00. We require 60 to 90 days to complete the work from receipt of check.

Please forward the check made payable to the order of Bell Atlantic, 52 Richneck Road, Newport News, Virginia 236087, Attention: E. Johnson, Jr.

Thanks,

Eugene Johnson, Jr.

file: NE-60299

DJG, INC.
P.O. Box 3505 1006 Richmond Rd
WILLIAMSBURG, VIRGINIA 23187

(804) 253-0673 or 874-5015
FAX (804) 253-2319

LETTER OF TRANSMITTAL

DATE 11/29/99	JOB NO. 1940220
ATTENTION KEN DODD	
RE: LONGHILL STATION SUBDIVISION PHASE I - PONDS "C" & "B" AS-BUILTS	

TO KEN DODD

WE ARE SENDING YOU ☒ Attached ☐ Under separate cover via _____ the following items:

☐ Shop drawings ☒ Prints ☐ Plans ☐ Samples ☐ Specifications

☐ Copy of letter ☐ Change order ☐ _____

COPIES	DATE	NO.	DESCRIPTION
3	11-29-99		LONGHILL STATION SUBDIVISION - PH I, PONDS "C" & "B" AS-BUILTS

THESE ARE TRANSMITTED as checked below:

☒ For approval ☐ Approved as submitted ☐ Resubmit _____ copies for approval

☐ For your use ☐ Approved as noted ☐ Submit _____ copies for distribution

☐ As requested ☐ Returned for corrections ☐ Return _____ corrected prints

☐ For review and comment ☐ _____

☐ FOR BIDS DUE _____ 19 _____ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS

If there are any questions, please call

Thank You,
Ronald Aaron Mickiewicz

COPY TO File
JAMES CITY COUNTY

SIGNED: Ronald Aaron Mickiewicz

If enclosures are not as noted, kindly notify us at once.

James City County Environmental Division
Stormwater Management / BMP Inspection Report
Detention and Retention Pond Facilities

S-47-95
PH 1

County BMP ID Code (if known): PC021

Name of Facility: Longhill Station Pond B BMP No.: 2 of 5 Date: 7/23/02

Location: 3913 Blue Ridge Court

Name of Owner:

Name of Inspector: SJ Thomas

Type of Facility: Wet Pond

Weather Conditions: Sunny Hot 80's Type: ☒ Final Inspection ☐ County BMP Inspection Program ☐ Owner Inspection

If an inspection item is not applicable, mark NA, otherwise mark the appropriate column.

O.K. - The item checked is in adequate condition and the maintenance program is currently satisfactory. No action required.
Routine - The item checked requires attention, but does not present an immediate threat to the function/integrity of the BMP.
Urgent - The item checked requires immediate attention to keep the BMP operational and to prevent damage to the facility.

Provide an explanation and details in the comment column, if routine or urgent are marked.

Facility Item	O.K.	Routine	Urgent	Comments
Embankments and Side Slopes: SMALL Earth Emb; 2H:1VSS; 4' High				
Grass Height	✓			
Vegetation Condition	✓			
Tree Growth	✓			None, some (landscaping (minor)
Erosion	✓			
Trash & Debris	✓			
Seepage	✓			None Observed.
Fencing or Benches				None,
Interior Landscaping/Planted Areas: ☐ None ☐ Constructed Wetland/Shallow Marsh ☐ Naturally Established Vegetation				
Vegetated Conditions	✓			Fountain & Chemically
Trash & Debris	✓			treated.
Floating Material	✓			
Erosion	✓			Slope erosion west SS near
Sediment	✓			electric box
Dead Plant	✓			
Aesthetics	✓			
Other	✓			
Notes: SF Lots & Roads				

Facility Item	O.K.	Routine	Urgent	Comments
Water Pools: ☒ Permanent Pool (Retention Basin) ☐ Shallow Marsh (Detention Basin) ☐ None, Dry (Detention Basin)				
Shoreline Erosion	✓			
Algae	✓			None, treated.
Trash & Debris	✓			
Sediment	✓			
Aesthetics	✓			
Other				
Inflows (Describe Types/Locations): Storm drain pipe from intersection				
Condition of Structure	✓			Visible in pond, submerged.
Erosion	✓			
Trash and Debris	✓			
Sediment	✓			
Outlet Protection	✓			Submerged.
Other				
Principal Flow Control Structure - Riser, Intake, etc. (Describe Type): 48" CMP w/ CMP CAP				
Condition of Structure		✓		Hole & Dent.
Corrosion		✓		Coating is deficient
Trash and Debris	✓			
Sediment	✓			
Vegetation		✓		Remove veg 10' from riser.
Other				
Principal Outlet Structure - Barrel, Conduit, etc. : OVAL shaped CMP 12-15" (PLAN 30")				
Condition of Structure	✓			Long barrel 160'
Settlement	✓			
Trash & Debris	✓			
Erosion/Sediment	✓			
Outlet Protection		✓		Remove veg 10' from outfall
Other				
Emergency Spillway (Overflow): 12' wide GRASSED; WEST END				
Vegetation	✓			clean, grass
Lining	✓			
Erosion	✓			
Trash & Debris	✓			Some landscaping, incidental
Other				
Notes: Outfall from pond stable.				

Facility Item	O.K.	Routine	Urgent	Comments
Nuisance Type Conditions:				
Mosquito Breeding	✓			
Animal Burrows	✓			
Graffiti	✓			
Other	✓			
Surrounding Perimeter Conditions:				
Land Uses	✓			North road
Vegetation	✓			
Trash & Debris	✓			
Aesthetics	✓			Treated
Access /Maintenance Roads or Paths	✓			Allegheny Court
Other				

Remarks:

- Riser – remove DW orifice, convert to BMP mode
- Riser – Coat Riser
- Riser – Fix Dent & Hole (EAST SIDE)
- Riser – Clear veg 20' from riser.
- Barrel – clear veg 10' from barrel end
- Remove 5F End ES
- Slope erosion bare soil area west SS near electric box.
- Need Key for hatch.

Overall Environmental Division Internal Rating: 3

Signature: Scott Thorne PE **Date:** 7/23/12

Title: Civil Engineer ENV DIV

SWMProg\BMP\CoInspProg\DetRet.wpd

Date Record Created:

Created By:

WS_BMPNO: PC021

PRINTED ON
Thursday, March 04
11:10:16 AM

2010

WATERSHED	PC
BMP ID NO	021
PLAN NO	S-47-95
TAX PARCEL	
PIN NO	3110900001B
CONSTRUCTION DATE	
PROJECT NAME	Longhill Sta. Sec 1B (Pond B)
FACILITY LOCATION	Near 3913 Blue Ridge Court
CITY-STATE	Williamsburg, VA 23188
CURRENT OWNER	Wallace Associates, LLC
OWNER ADDRESS	2 Eaton St., Suite 1101
OWNER ADDRESS 2	
CITY-STATE-ZIP CODE	Hampton, Va. 23669
OWNER PHONE	
MAINT AGREEMENT	Yes
EMERG ACTION PLAN	No

Get Last BMP No | Return to Menu | Print Record

MAINTENANCE PLAN	No	CTRL STRUC DESC	ACCMP Rise
SITE AREA acre	104.5	CTRL STRUC SIZE inches	48
LAND USE	SF Residential	OTLT BARRL DESC	CMP
old BMP TYP	Wet Pond	OTLT BARRL SIZE inch	36
JCC BMP CODE	A2 Wet Pond		
POINT VALUE		EMERG SPILLWAY	Yes
		DESIGN HW ELEV	73.5
		PERM POOL ELEV	69.13
SVC DRAIN AREA acres	16	2-YR OUTFLOW cfs	
		10-YR OUTFLOW cfs	
		REC DRAWING	Yes
SERVICE AREA DESCRI	Sec 1B SF Lots & Roadways		
IMPERV AREA acres		CONSTR CERTIF	No
RECV STREAM	UT of Powhatan Creek		
EXT DET-WQ-CTRL	No	LAST INSP DATE 7/23/2002	Inspected by:
WTR QUAL VOL acre-ft		INTERNAL RATING	3
CHAN PROT CTRL	No	MISC/COMMENTS	
CHAN PROT VOL acre-ft			
SW/FLOOD CONTROL	Yes	Intx. Blue Ridge and Alleghany. See PC 020, 022, 119 & 120.	
GEOTECH REPORT	No		

Additional Comments:

WATERSHED	PC	MAINTENANCE PLAN	No	CTRL STRUC DESC	ACCMP Rise
BMP ID NO	021	SITE AREA acre	104.5	CTRL STRUC SIZE inches	48
PLAN NO	S-47-95	LAND USE	SF Residential	OTLT BARRL DESC	CMP
TAX PARCEL		old BMP TYP	Wet Pond	OTLT BARRL SIZE inch	36
PIN NO	3110900001B	JCC BMP CODE			
CONSTRUCTION DATE		POINT VALUE		EMERG SPILLWAY	Yes
PROJECT NAME	Longhill Sta. Sec 1B (Pond B)			DESIGN HW ELEV	73.5
FACILITY LOCATION	Near 3913 Blue Ridge Court			PERM POOL ELEV	69.13
CITY-STATE	Williamsburg, VA 23188	SVC DRAIN AREA acres		2-YR OUTFLOW cfs	
CURRENT OWNER	Wallace Associates, LLC			10-YR OUTFLOW cfs	
OWNER ADDRESS	2 Eaton St., Suite 1101			REC DRAWING	Yes
OWNER ADDRESS 2		SERVICE AREA DESCRI	Sec 1B SF Lots & Roadways		
CITY-STATE-ZIP CODE	Hampton, Va. 23669	IMPERV AREA acres		CONSTR CERTI	No
OWNER PHONE		RECV STREAM	UT of Powhatan Creek		
MAINT AGREEMENT	Yes	EXT DET-WQ-CTRL	No	LAST INSP DATE	10/18/2000
EMERG ACTION PLAN	No	WTR QUAL VOL acre-ft		INTERNAL RATING	3
		CHAN PROT CTRL	No	MISC/COMMENTS	
		CHAN PROT VOL acre-ft		Intx. Blue Ridge and Alleghany. See PC 020, 022, 119 & 120.	
		SW/FLOOD CONTROL	Yes		
		GEOTECH REPORT	No		

Get Last BMP No

Return to Menu

LONGHILL STATION BMPs

[redacted]

S-47-95

Section 1 (1A + 1B)
POND C; POND B; POND A (NOTE: POND D ALSO ADDED TO PH 1 BOND)

	RD	CC
POND A	X YES	NO
POND B	X YES	NO
POND C	X YES	NO
POND D	NO	NO

SHEET C-14, NOTE #18 REQUIRED AB + CC.

"As-Built Drawings must be provided for all detention/BMP facilities. Also upon completion, the construction of all detention/BMP facilities shall be certified by a professional engineer who inspected the structure during construction. The certification shall state that to the best of his/her judgement, knowledge and belief, the structure was constructed in accordance with the approval plans + specifications.

ENV DIV Comment # 4 dated June 21 1995 (S-47-95) required I/m Agreement.
ENV DIV Comment # 5 dated June 21 1995 (S-47-95) required AB drawings.

S-47-98

SECTION 2
POND E

	RD	CC
POND E	YES	NO

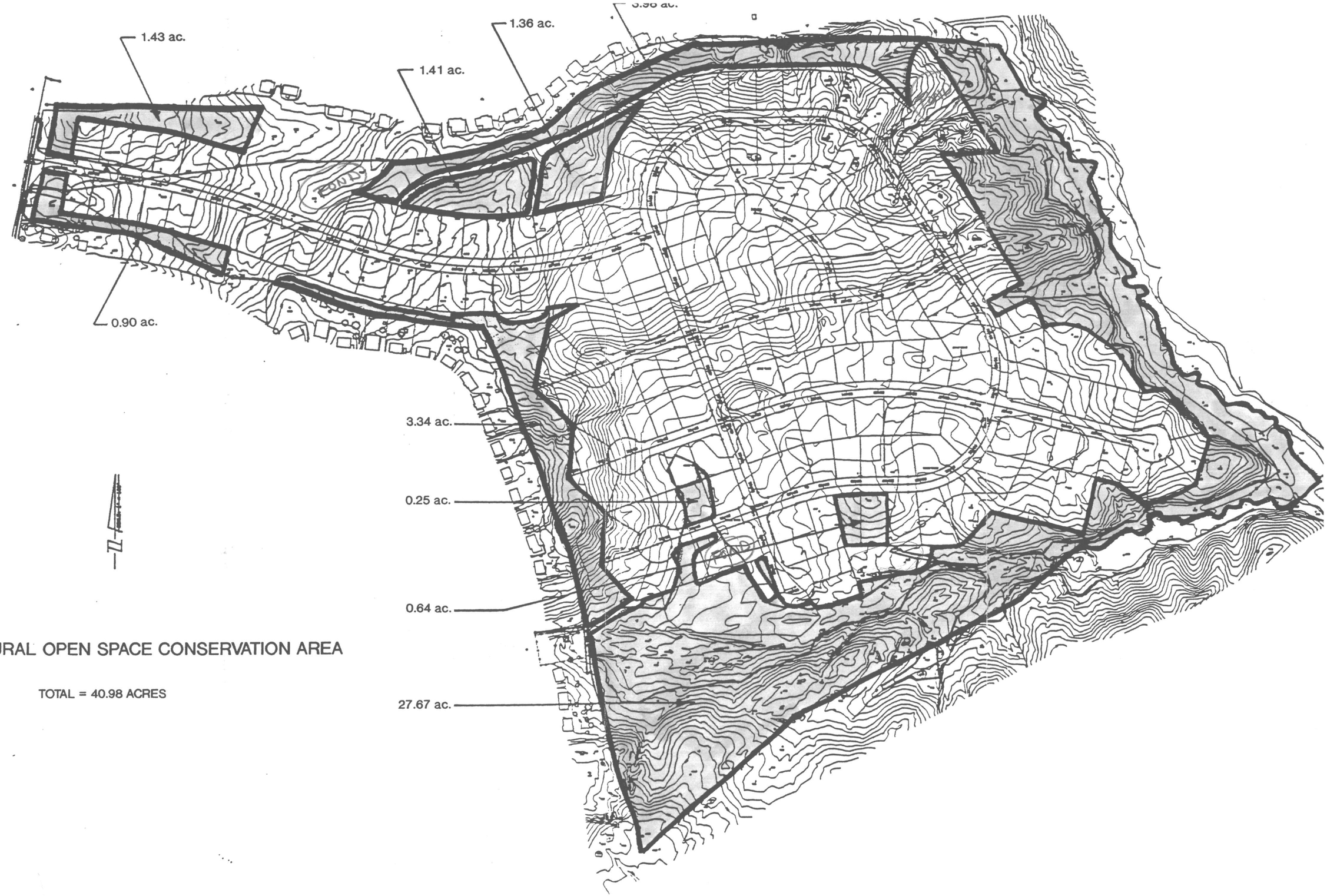
Note # 18, sheet C5. REQUIRES AB & CC +
Comment #8 ENV DIV dated July 1 1998 (REQUIRED AB+CC)
Comment #5 " " " " " required I/m Agreement

S-19-99

SECTIONS 3 + 4
POND D

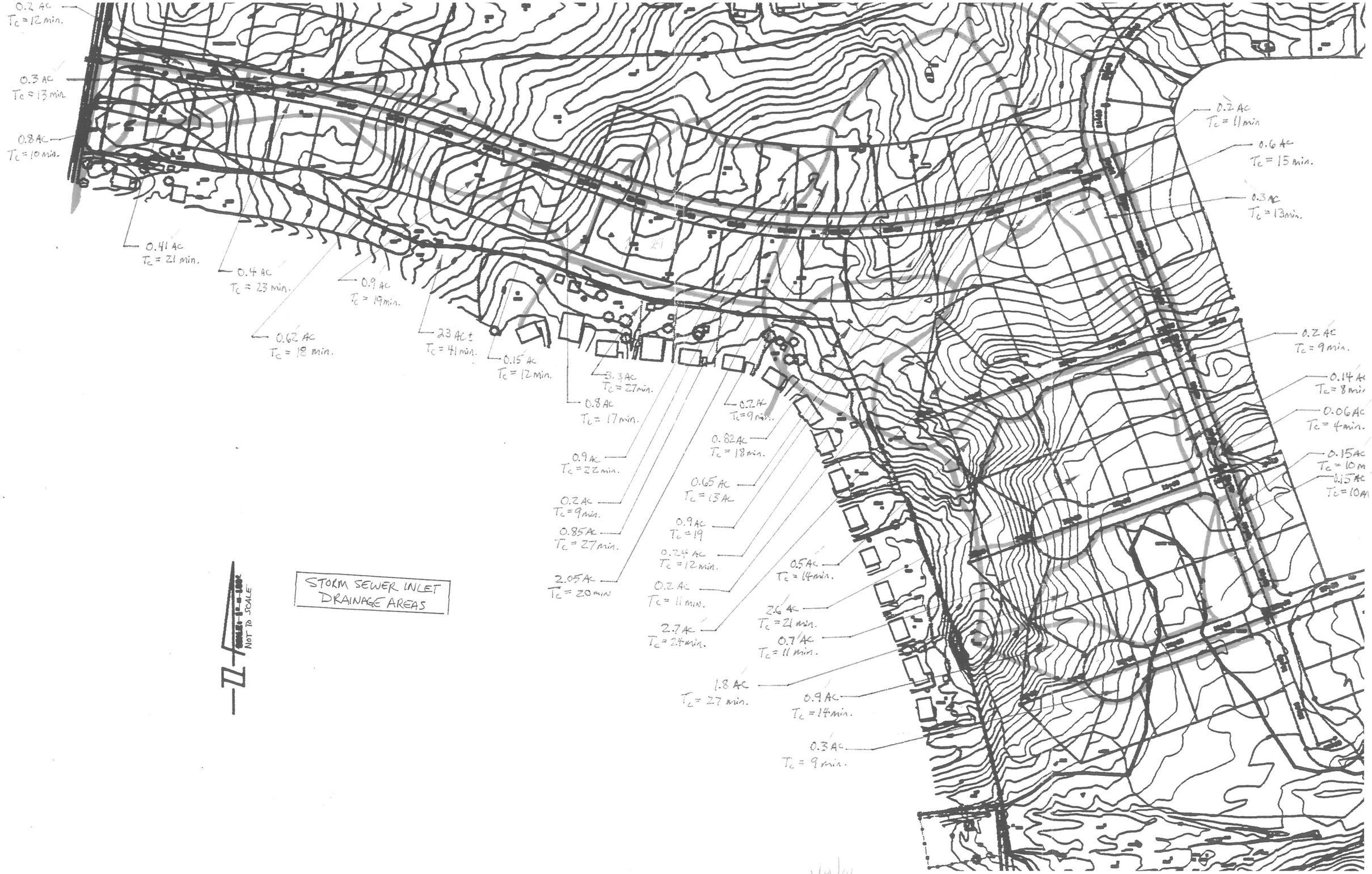
	RD	CC
POND D	NO	NO

Note #18 Sheet C-5 required AB + CC.
Comment # 5 ENV DIV dated MARCH 26 1999 requires AB + CC
Comment # 4 ENV DIV " " " " requires I/m Agree.



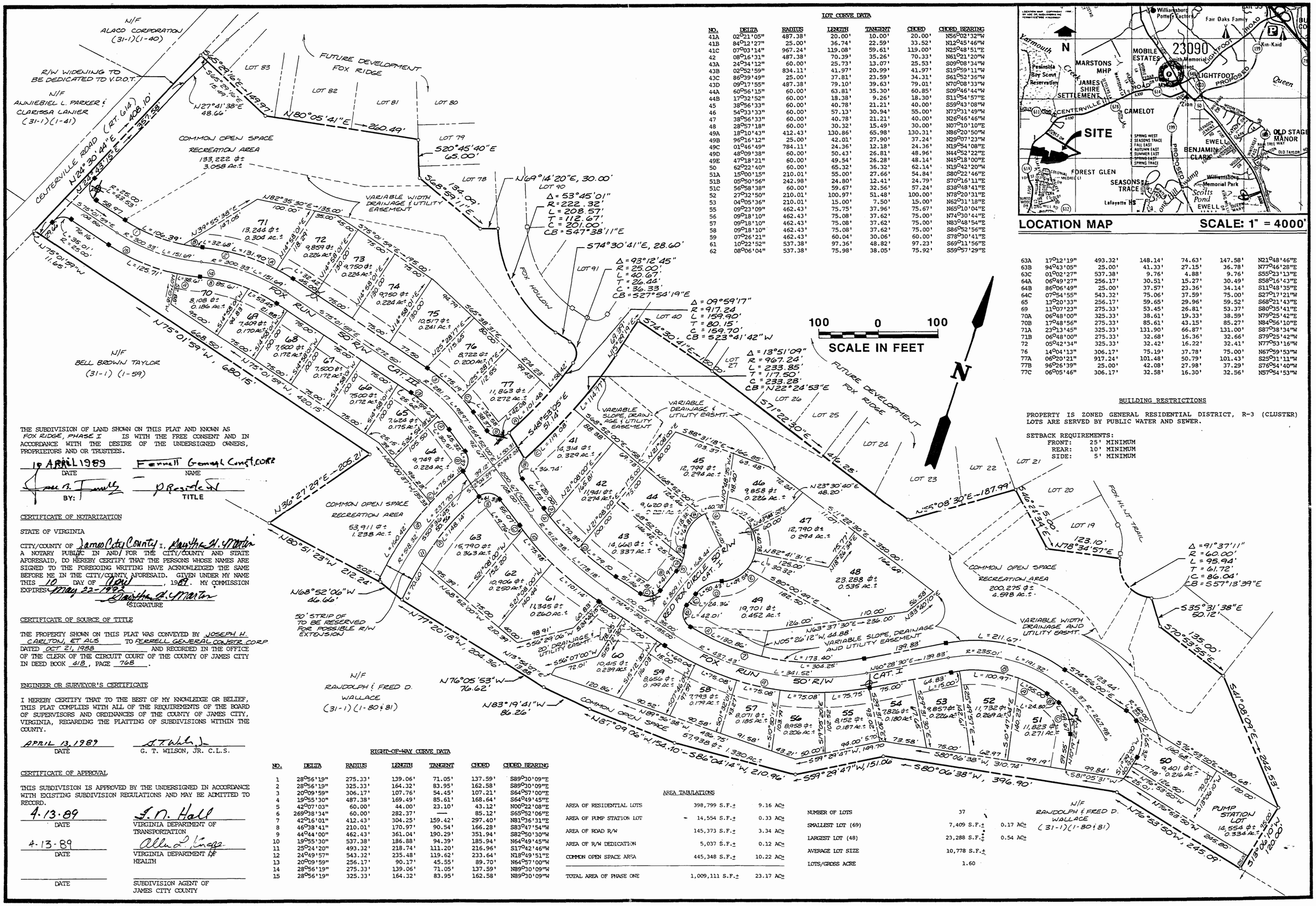
NATURAL OPEN SPACE CONSERVATION AREA

TOTAL = 40.98 ACRES



STORM SEWER INLET DRAINAGE AREAS

1" = 100' NOT TO SCALE



LOCATION MAP

SCALE: 1" = 4000'

THE SUBDIVISION OF LAND SHOWN ON THIS PLAT AND KNOWN AS *FOX RIDGE, PHASE I* IS WITH THE FREE CONSENT AND IN ACCORDANCE WITH THE DESIRE OF THE UNDERSIGNED OWNERS, PROPRIETORS AND OR TRUSTEES.

10 APRIL 1989
DATE

Ferrell General Const. Corp
NAME

BY: [signature]

President
TITLE

CERTIFICATE OF NOTARIZATION

STATE OF VIRGINIA

CITY/COUNTY OF James City County I, Martha H. Martin A NOTARY PUBLIC IN AND/ FOR THE CITY/COUNTY AND STATE AFORESAID, DO HEREBY CERTIFY THAT THE PERSONS WHOSE NAMES ARE SIGNED TO THE FOREGOING WRITING HAVE ACKNOWLEDGED THE SAME BEFORE ME IN THE CITY/COUNTY AFORESAID. GIVEN UNDER MY NAME THIS 10 DAY OF April, 1989. MY COMMISSION EXPIRES May 22-1992

[signature]
SIGNATURE

CERTIFICATE OF SOURCE OF TITLE

THE PROPERTY SHOWN ON THIS PLAT WAS CONVEYED BY JOSEPH H. CARLTON, ET ALS TO FERRELL GENERAL CONSTR. CORP DATED OCT 21, 1988 AND RECORDED IN THE OFFICE OF THE CLERK OF THE CIRCUIT COURT OF THE COUNTY OF JAMES CITY IN DEED BOOK 418, PAGE 768.

ENGINEER OR SURVEYOR'S CERTIFICATE

I HEREBY CERTIFY THAT TO THE BEST OF MY KNOWLEDGE OR BELIEF, THIS PLAT COMPLIES WITH ALL OF THE REQUIREMENTS OF THE BOARD OF SUPERVISORS AND ORDINANCES OF THE COUNTY OF JAMES CITY, VIRGINIA, REGARDING THE PLATTING OF SUBDIVISIONS WITHIN THE COUNTY.

APRIL 13, 1989
DATE

G. T. Wilson, Jr.
G. T. WILSON, JR. C.L.S.

CERTIFICATE OF APPROVAL

THIS SUBDIVISION IS APPROVED BY THE UNDERSIGNED IN ACCORDANCE WITH EXISTING SUBDIVISION REGULATIONS AND MAY BE ADMITTED TO RECORD.

4.13.89
DATE

J. D. Hall
VIRGINIA DEPARTMENT OF TRANSPORTATION

4-13-89
DATE

Allen L. Finger
VIRGINIA DEPARTMENT OF HEALTH

DATE

SUBDIVISION AGENT OF JAMES CITY COUNTY

LOT CURVE DATA

NO.	DELTA	RADIUS	LENGTH	TANGENT	CHORD	CHORD BEARING
41A	02°21'05"	487.38'	20.00'	10.00'	20.00'	N56°02'32"W
41B	84°12'27"	25.00'	36.74'	22.59'	33.52'	N12°45'46"W
41C	07°03'14"	967.24'	119.08'	59.61'	119.00'	N25°48'51"E
42	08°16'31"	487.38'	70.39'	35.26'	70.33'	N61°21'20"W
43A	24°34'12"	60.00'	25.73'	13.07'	25.53'	S09°08'34"W
43B	02°52'59"	834.11'	41.97'	20.99'	41.97'	S19°59'11"W
43C	86°39'49"	25.00'	37.81'	23.59'	34.31'	S61°52'36"W
43D	09°17'55"	487.38'	79.10'	39.63'	79.01'	N70°08'33"W
44A	60°56'15"	60.00'	63.81'	35.30'	60.85'	S09°46'44"W
44B	17°32'52"	60.00'	18.38'	9.26'	18.30'	S11°54'57"E
45	38°56'33"	60.00'	40.78'	21.21'	40.00'	S59°43'08"W
46	54°33'33"	60.00'	57.13'	30.94'	55.00'	N73°31'49"W
47	38°56'33"	60.00'	40.78'	21.21'	40.00'	N26°46'46"W
48	28°57'18"	60.00'	30.32'	15.49'	30.00'	N07°10'10"E
49A	18°10'43"	412.43'	130.86'	65.98'	130.31'	N86°20'50"W
49B	96°16'12"	25.00'	42.01'	27.90'	37.24'	N29°07'23"W
49C	01°46'49"	784.11'	24.36'	12.18'	24.36'	N19°54'08"E
49D	48°09'38"	60.00'	50.43'	26.81'	48.96'	N44°52'22"E
49E	47°18'21"	60.00'	49.54'	26.28'	48.14'	N45°18'00"E
50	62°22'40"	60.00'	65.32'	36.32'	62.14'	N19°42'20"W
51A	15°00'15"	210.01'	55.00'	27.66'	54.84'	S80°22'46"E
51B	05°50'56"	242.98'	24.80'	12.41'	24.79'	S70°16'11"E
51C	56°58'38"	60.00'	59.67'	32.56'	57.24'	S38°48'41"E
52	27°32'50"	210.01'	100.97'	51.48'	100.00'	N78°20'31"E
53	04°05'36"	210.01'	15.00'	7.50'	15.00'	N62°31'18"E
55	09°23'09"	462.43'	75.75'	37.96'	75.67'	N65°10'04"E
56	09°18'10"	462.43'	75.08'	37.62'	75.00'	N74°30'44"E
57	09°18'10"	462.43'	75.08'	37.62'	75.00'	N83°48'54"E
58	09°18'10"	462.43'	75.08'	37.62'	75.00'	S86°52'56"E
59	07°26'21"	462.43'	60.04'	30.06'	60.00'	S78°30'41"E
61	10°22'52"	537.38'	97.36'	48.82'	97.23'	S69°11'56"E
62	08°06'04"	537.38'	75.98'	38.05'	75.92'	S59°57'29"E
63A	17°12'19"	493.32'	148.14'	74.63'	147.58'	N21°48'46"E
63B	94°43'05"	25.00'	41.33'	27.15'	36.78'	N77°46'28"E
63C	01°02'27"	537.38'	9.76'	4.88'	9.76'	S55°23'13"E
64A	06°49'27"	256.17'	30.51'	15.27'	30.49'	S58°16'43"E
64B	86°06'49"	25.00'	37.57'	23.36'	34.14'	S11°48'35"E
64C	07°54'55"	543.32'	75.06'	37.59'	75.00'	S27°17'21"W
65	13°20'33"	256.17'	59.65'	29.96'	59.52'	S68°21'43"E
69	11°07'23"	275.33'	53.45'	26.81'	53.37'	S80°35'41"E
70A	06°48'00"	325.33'	38.61'	19.33'	38.59'	N79°25'42"E
70B	17°48'56"	275.33'	85.61'	43.15'	85.27'	N84°56'10"E
71A	23°13'45"	325.33'	131.90'	66.87'	131.00'	S87°38'34"W
71B	06°48'00"	275.33'	32.68'	16.36'	32.66'	S79°25'42"W
72	05°42'34"	325.33'	32.42'	16.22'	32.41'	N77°53'16"W
76	14°04'13"	306.17'	75.19'	37.78'	75.00'	N67°59'53"W
77A	06°20'21"	917.24'	101.48'	50.79'	101.43'	S25°11'11"W
77B	96°26'39"	25.00'	42.08'	27.98'	37.29'	S76°54'40"W
77C	06°05'46"	306.17'	32.58'	16.30'	32.56'	N57°54'53"W

BUILDING RESTRICTIONS

PROPERTY IS ZONED GENERAL RESIDENTIAL DISTRICT, R-3 (CLUSTER) LOTS ARE SERVED BY PUBLIC WATER AND SEWER.

SETBACK REQUIREMENTS:
FRONT: 25' MINIMUM
REAR: 10' MINIMUM
SIDE: 5' MINIMUM

RIGHT-OF-WAY CURVE DATA

NO.	DELTA	RADIUS	LENGTH	TANGENT	CHORD	CHORD BEARING
1	28°56'19"	275.33'	139.06'	71.05'	137.59'	S89°30'09"E
2	28°56'19"	325.33'	164.32'	83.95'	162.58'	S89°30'09"E
3	20°09'59"	306.17'	107.76'	54.45'	107.21'	S64°57'00"E
4	19°55'30"	487.38'	169.49'	85.61'	168.64'	S64°49'45"E
5	42°07'03"	60.00'	44.00'	23.10'	43.12'	N00°22'08"E
6	269°38'34"	60.00'	282.37'	—	85.12'	S65°52'06"E
7	42°16'01"	412.43'	304.25'	159.42'	297.40'	N81°36'31"E
8	46°38'41"	210.01'	170.97'	90.54'	166.28'	S83°47'54"W
9	44°44'00"	462.43'	361.04'	190.29'	351.94'	S82°50'30"W
10	19°55'30"	537.38'	186.88'	94.39'	185.94'	N64°49'45"W
11	25°24'20"	493.32'	218.74'	111.20'	216.96'	S17°42'46"W
12	24°49'57"	543.32'	235.48'	119.62'	233.64'	N18°49'51"E
13	20°09'59"	256.17'	90.17'	45.55'	89.70'	N64°57'00"W
14	28°56'19"	275.33'	139.06'	71.05'	137.59'	N89°30'09"W
15	28°56'19"	325.33'	164.32'	83.95'	162.58'	N89°30'09"W

AREA TABULATIONS

AREA OF RESIDENTIAL LOTS	398,799 S.F.±	9.16 AC±
AREA OF PUMP STATION LOT	14,554 S.F.±	0.33 AC±
AREA OF ROAD R/W	145,373 S.F.±	3.34 AC±
AREA OF R/W DEDICATION	5,037 S.F.±	0.12 AC±
COMMON OPEN SPACE AREA	445,348 S.F.±	10.22 AC±
TOTAL AREA OF PHASE ONE	1,009,111 S.F.±	23.17 AC±

NUMBER OF LOTS	37	
SMALLEST LOT (69)	7,409 S.F.±	0.17 AC±
LARGEST LOT (48)	23,288 S.F.±	0.54 AC±
AVERAGE LOT SIZE	10,778 S.F.±	
LOTS/GROSS ACRE	1.60	

AES, a professional corporation
5248 Olde Towne Road, Suite 1
Williamsburg, Virginia 23185
(804) 253-0040
Engineering, Planning, Surveying

RECORD PLAT
FOX RIDGE
PHASE ONE

OWNER/DEVELOPER: FERRELL GENERAL CONSTRUCTION CORPORATION

JAMES CITY COUNTY — VIRGINIA

COMMONWEALTH OF VIRGINIA
G. T. WILSON, JR.
CERTIFICATE No. 1183
CERTIFIED LAND SURVEYOR

No.	DATE	REVISION / COMMENT / NOTE	BY

Designed GAM/HWP	Drawn RMS
Scale 1" = 100'	Date APR. 1989
Project No. 7105	
Drawing No. PLAT	

SECTION 1 (1A + 1B)

CODE COMPLIANCE REVIEW COMMENTS
LONGHILL STATION
PLAN NO. S-47-95 DEC
June 21, 1995

#1 - #6 NOTED BY A/E & DEVELOPER

1. A Land Disturbing Permit and Siltation Agreement, with surety, are required for this project.
2. A Subdivision Agreement, with surety, shall be executed with the County prior to recordation of lots.
3. Water and sewer inspection fees must be paid prior to the issuance of a Land Disturbing Permit.
4. An Inspection/Maintenance Agreement shall be executed with the county for the BMP facilities for this project.
5. As-built drawings must be provided for the detention basins on completion.
6. A streetlight rental fee for 12 lights must be paid prior to the recordation of the subdivision plat.
7. The drawdown for the sediment basins need to be based on the dry storage volume not the 25-year storm volume. This will decrease the size of the dewatering orifices.
   DRAWDOWN CALCULATIONS REVISED AND INCLUDED IN CALCULATION BOOKLET (ATTACHED)
8. Provide proposed contours for all areas to be graded.
   APPROPRIATE FINAL CONTOURS PROVIDED
9. Provide a drainage area map for the storm drainage system and the ponds to verify the design assumptions. This shall include the impervious cover determinations for each pond and the times of concentration calculations for all systems. DRAINAGE AREA MAP CONTAINED IN CALCULATION BOOKLET. PERCENT (%) IMPERVIOUS HAS BEEN ADDED TO DRAINAGE MAP
10. Provide a signed professional seal on the drawings. TC CAN BE FOUND ON STORM SEWER DRAIN
    PROVIDED ON ALL SHEETS
11. The natural open space areas claimed as credit towards meeting the 10-point BMP criteria must be identified on the plan and be placed in conservation easements. SHOWN ON PLANS
12. Provide a sequence of construction for the project including any phasing that will occur.
    NOT PROVIDED IN DETAIL — SECTION 1A & 1B IN FIRST PHASE
13. Submit a request to the Director of Code Compliance for an exception to disturb any slopes in excess of 25%. State what special measures, sodding etc., will be undertaken to restabilize these slopes. LETTER OF REQUEST ATTACHED — SLOPES IN EXCESS OF 25% HATCHED ON PLANS
14. Provide evidence that any required wetlands permits have been obtained.
    LETTER ATTACHED
15. Provide inlet protection for all storm drain inlets.
    PROVIDED
16. Provide silt fence at the following locations:
    a. On the left side of Longhill Station Road from station 16+50 to 19+00 and from 25+00 to 27+00.
    b. On the right side of Pudding Bottom Lane from station 41+00 to 43+00 and from the existing end of the silt fence at the intersection of Pudding Bottom and Headstone Circle to lot 50.
    c. Along the left side of Pine Bluff Court from lot 68 to 70.
    d. Along the left side of Shenandoah Court from lot 58 to 60.

#16a-d PROVIDED

17. Provision needs to be made to drain the area between lots 71 and 72. Also, the lots on the right side of the cul-de-sacs are below the street elevation so provision will need to be made to drain these lots. ALL LOTS HAVE POSITIVE DRAINAGE BY EITHER EARTH FILL OR PROVISION OF D.I.'S

18. Specify the amount of riprap to be provided at the end of all storm drain systems in accordance with the VESCH. The correct amount has been computed in the calculations but it must also appear on the drawings. SEE SHEET C-13 CHART & INFO ADDED TO PLANS

19. Provide HW/D calculations for all pipe culverts utilized.
PROVIDED ON STORM SEWER DRAINAGE SHEETS

20. To minimize clearing and maintenance problems, replace the ditch behind lots 9 through 14 with a pipe. Utilize swales or berms as necessary to keep flows from Longhill Station from Fox Ridge properties. HDPE PIPE AND D.I.'S HAVE REPLACED DITCH

21. Analyze the downstream impacts of the release from Pond C to ensure protection of downstream properties from damage or flooding. MAXIMUM SURFACE ELEV. OF POND IS BELOW F.F. ELEV. OF DOWNSTREAM HOUSES, PLUS DOWNSTREAM CULVERT CAN HANDLE 10-YR. FLOW FROM POND "C"

22. The following comments pertain to the design of the detention basins:

a. The core trench for Pond C needs to be modified to be 4' wide and 2' deep to meet VESCH sediment basin requirements. MODIFICATION MADE ON PLANS

b. The safety shelf needs to be 1 foot below the normal pool for Ponds A and B. * SEE NOTE BELOW

c. For Pond B, the normal pool is stated as 72.75 in the calculations but 72.25 on the plan. Please resolve. PLANS REVISED

d. On sheet C-2, the riser for Pond C is specified as RCP while the table on sheet C-13 indicates that it needs to be steel. Please resolve. CMP USED → PLANS REVISED

e. Maintenance easements must be provided for all the detention basins. This shall include a 20-foot wide access easement as needed and a 15-foot wide easement extending from the 100-year storm elevation to include the dam and outlet structure. PLANS REVISED

f. Due to the small projection of the collars, I recommend the use of 2 anti-seep collars for Pond C rather than 3. 2 COLLARS COME TOO CLOSE TO GROUND, THEREFORE ONLY 3 COLLARS WORK

g. For Pond C, use one larger orifice with trash protection rather than a perforated pipe for a controlled release structure. SEE PLANS FOR REVISED RELEASE STRUCTURE

h. The emergency spillways for all basins must be in cut on natural ground or else be lined with concrete. * CUT INTO NATURAL GROUND & SHOWN ON PLANS

i. Provide an access hatch in the top of the anti-vortex device for maintenance purposes.
ACCESS HATCH HAS BEEN ADDED TO PLANS

23. The plans do not accurately reflect the clearing and grading necessary to install the sewer from MH-6 to MH-8. Please revise this to show the removal of the overburden and the clearing necessary to install the 20-foot plus deep sewer. CONTRACTOR CONSULTED RE: EARTHWORK OPERATIONS — NO REVISION TO CLEARING LIMITS PROPOSED AT THIS TIME

24. Investigate the possible realignment of the storm drain to Pond A to minimize the depth of the installation. The plans need to accurately reflect the clearing and grading necessary to install this pipe. PIPE WILL BE EXPOSED IF REALIGNED OR RAISED — THEREFORE, PIPE DESIGN HAS NOT BEEN REVISED

25. All the ponds need to be designed with consideration for the entire drainage area. The Pond C water quality volume appears to be based solely on the portion of the site that drains to it. The volume must be based on the entire 26.8 acre drainage area which will increase the BMP points allowed for the basin. Also to qualify as a 6-point BMP requires 2.5Vr not 2.0Vr as calculated on sheet 38. I would recommend the basin be designed as a 4-point BMP if space allows. This would a storage volume of 21,800 cubic feet and would increase the overall point count for the basin from 0.46 to 1.03. The 2-, 10-, and 100-year storms must be computed and routed for this pond. FOR DRY POND DESIGN #2, 2.0 Vr IS REQUIRED. DRAINAGE AREA HAS BEEN MODIFIED & ALL STORMS HAVE BEEN ROUTED — POND SIZE CANNOT BE ENLARGED

26. An exception to the 10-point BMP criteria must be applied for to the Director of Code

LETTER ATTACHED

* NOTE (22b): AFTER DISCUSSION W/ DARRYL COOK & RECOGNIZING SITE LIMITATIONS, ALL AGREED TO LOWER NORMAL SURFACE OF POND 2 TO 1 FOOT BELOW SHELF & SACRIFICE POND STORAGE VOLUME FOR PUBLIC SAFETY.

Compliance before approval of this stormwater management plan.

27. There appears to be an error in the storm drain calculations for the CA value for line A, run 3. The accumulated CA decreases from line 1b-2 to 2-3. Also provide supporting data for the C value for 1b-2. REVISIONS MADE ON STORM SEWER DRAINAGE SHEETS
C = 0.3 FOR SINGLE FAMILY AREAS (E&S pg. V-29)

28. The hydraulic grade calculations must start at the 2- or 10-year elevation in the ponds not the normal pool elevation for those systems that outfall into a pond.
HGL CALCULATIONS REVISED ON STORM SEWER DRAINAGE CALCULATIONS

29. To help prevent lot to lot drainage problems, indicate on the plan that swales will be provided between lots 39/40, 38/39, 35/36, 24/25, 22/23, 64/65, 66/67, 55/56, and 56/57. Also provide swales from 57/58 to 63/64 with a side connecting swale on lots 57/64. Swale the property lines for lots 72/73 and 67/68 to the back corner and then connect these swales to a third swale located between lots 68/72. All swales need to be at a minimum 1% slope to ensure adequate drainage. SWALES ADDED TO PLANS

30. Provision needs to be made to drain lots 23 and 24 as they below the street elevation. A drainage swale needs to be provided behind lots 23-25 to direct water to the property line on 23/24 where a culvert needs to be installed to convey water to the front of the lots. Then an inlet needs to be provided to collect water from the lots and convey it to the storm drain system in the street.
DRAINAGE PROVIDED AND ADDED TO PLANS

31. Lot 69 appears to consist primarily of wetlands and is, therefore, not suitable as a lot. Please show the full delineation of the wetlands on this lot. LOT 69 IS BEING FILLED AND HAS BEEN INCLUDED IN "WETLAND TAKING" CALCULATIONS

32. Provide notes regarding construction of the dams specifying removal of unsuitable material under the dams, acceptable material and compaction requirements for the dams, etc. or reference the VESCH sediment basin construction specifications.

NOTES ADDED TO PLANS

JUL 1998
RECEIVED
PLANNING DEPARTMENT

RESPONSES TO COMMENTS 8-5-98 1980150 (SECT 2)

ENVIRONMENTAL DIVISION REVIEW COMMENTS
LONGHILL STATION PHASE 2
PLAN NO. S-47-98 PTM/DEC
July 1, 1998

1. A Land Disturbing Permit and Siltation Agreement, with surety, are required for this project. THE PERMIT AND AGREEMENT, WITH SURETY, WILL BE ADDRESSED BY THE DEVELOPER.

2. A Subdivision Agreement, with surety, shall be executed with the County prior to recordation of lots. THE AGREEMENT, WITH SURETY, WILL BE HANDLED BY THE DEVELOPER.

3. Water and sewer inspection fees must be paid prior to the issuance of a Land Disturbing Permit. INSPECTION FEES WILL BE PAID BY THE DEVELOPER.

4. OK Revise the stone construction entrance at the entrance to the project; the entrance should be the full width of ingress and egress. NO NOTES ON C1 OR C2
* CONSTRUCTION ENTRANCE REVISED TO FULL WIDTH OF INGRESS AND EGRESS, SEE SHEETS C1 & C2.

5. An Inspection/Maintenance Agreement shall be executed with the county for the BMP facility for this project. THE AGREEMENT WILL BE HANDLED BY THE DEVELOPER.

6. OK? Provide conservation easements for all Natural Open Space areas claimed in the BMP worksheet.
* MAP PROVIDED (ATTACHED) FOR ALL NATURAL OPEN SPACE AREAS CLAIMED IN THE BMP WORKSHEET. EASEMENTS WILL BE RECORDED WITH FINAL PLAT.

7. OK Provide evidence that any required wetlands permits have been obtained.
WETLANDS ARE NOT BEING IMPACTED IN THIS PHASE. WETLANDS IMPACTED DURING CONSTRUCTION OF PHASE I WERE APPROVED BY THE CORPS AND SUCH EVIDENCE WAS PROVIDED TO THE COUNTY.

8. [redacted] must be provided for the detention basin on completion. Also, a note shall be provided on the plan stating that upon completion, the construction of the dam will be certified by a professional engineer who has inspected the structure during construction. * NOTE CONCERNING THE CERTIFICATION OF THE DAM BY A PROFESSIONAL ENGINEER PROVIDED ON SHEET C2. AS-BUILTS WILL BE PROVIDED ONCE CONSTRUCTION IS COMPLETE.

9. Provide streetlights at the following locations: between lots 79/80, 83/84, 97/98, and 119/120. Street light rental fee must be paid for six lights prior to the recordation of the subdivision plat. * STREETLIGHTS PROVIDED AT ALL THE ABOVE LOCATIONS, SEE SHEETS C1 & C2. FEE WILL BE PROVIDED BY DEVELOPER.

10. OK The limits of clearing shown on the plan sheet C-2 for lots 94-96 and 123-125 are excessive, please revise. Clearing needs to be limited to that needed to install the subdivision improvements. * CLEARING LIMITS REVISED FOR LOTS 94-96 AND 123-125, SEE SHEET C2. PLEASE NOTE THAT THE REMAINING AREA TO BE CLEARED IS DUE TO THESE LOTS BE FILLED TO PROVIDE POSITIVE DRAINAGE.

11. More Detail Either provide and label the limits of cut and fill slopes on the plan or provide final contours on the plan. The final contours are to be at no greater than 2-foot intervals. * LIMITS OF CUT & FILL PROVIDED ON SHEET C2.
Review lots 98-99-103, 121, 122

12. Provide an environmental inventory in accordance with Chesapeake Bay Ordinance Section 23-10B. Identify any 25% and steeper slopes.
* IN ACCORDANCE WITH CHESAPEAKE BAY ORDINANCE, LIMITS OF HYDRIC SOILS WERE ADDED TO THE PLANS (SHEET C2 & C3). SLOPES AT THIS LOCATION DO NOT EXCEED THE 25%, THEREFORE NONE ARE IDENTIFIED.

JUL. -08. 98 (WED) 10:50 JCC/JCSA TEL:757-253-6850 P. 006

13. Based on the information provided for Pond E, it would qualify as a 9 point BMP. If so, this needs to be accounted for in the 10-point calculation as it should bring the total number of points up to 10 for the entire site.
* BMP CALCULATION FOR THE ENTIRE SITE PROVIDED IN ATTACHMENTS.

14. There are numerous difference between the storm drainage calculations, the DI design spreadsheet, and the drainage area map provided. For example, DIs 6, 8, 10 and 20 have different values for drainage area on the calculation spreadsheet and the DI spreadsheet. Also, DI 16, 18, 19, and 20 seem to have different values between the map and the DI design sheet. Please evaluate and revise as necessary. * DRAINAGE AREAS TO DI'S AND YDI'S REVISED AND CLARIFIED IN ATTACHMENTS.

15. Identify any critical erosion areas. See VESCH, Chapter 6 for criteria.
* CRITICAL EROSION AREAS WERE IDENTIFIED AND ARE SHOWN ON MAP WITHIN THE ATTACHMENTS.

16. Show any temporary soil stockpile areas, staging and equipment storage areas.
* TEMPORARY SOIL STOCKPILE AREAS LABELED ON SHEET C2.
- add silt fence

17. Provide a sediment trap (ST) on plan sheet C-2, along Allegheny Rd. on the north side at Sta. 55+00. Provide diversion dikes (DD) from Sta. 52+50 to 55+50.
* SEDIMENT TRAP PROVIDED ALONG ALLEGHENY RD. WITH DIVERSION DIKES FROM STA. 52+50 TO 55+50, SEE SHEET C2.

18. Provide a sediment trap (ST) on plan sheet C-2, on the south side of Shenandoah Dr., Sta. 16+90, at about the property of lots 93 and 112. Provide diversion dikes from Sta. 13+50 to 18+00 to direct the flows to the trap.
* SEDIMENT TRAP PROVIDED ALONG SHENANDOAH DR. WITH DIVERSION DIKES FROM STA. 13+50 TO 18+00, SEE SHEET C2.

19. Submit a design information for all sediment traps proposed to ensure their design is in accordance with the 1992 VESCH criteria.
* DESIGN INFORMATION FOR THE TWO PROPOSED TRAPS PROVIDED IN ATTACHMENTS.

20. Provide silt fence (SF) on plan sheet C-2, along the North side of Colleen Ct. From Sta. 12+50 to 14+00.
* SILT FENCE PROVIDED ALONG COLLEEN CT. STA. 12+50 TO 14+00, SEE SHEET C2.

21. Provide storm drainage system extensions to prevent lot to lot drainage at lots 96-97 and provide storm yard drain inlets along the property line at contour line 87 and at contour 80.
* STORM YARD DRAINS PROVIDED AT ABOVE LOCATIONS, AS WELL AS SWALES TO PREVENT LOT TO LOT DRAINAGE, SEE SHEET C2.

22. Provide a storm drainage system extension to the rear property lines of lots 99, 100, 101 to prevent lot to lot drainage. Provide storm yard drain inlets at the rear corner of lots 101 and 100, and at 99 and 100.
* STORM YARD DI'S ARE PROVIDED AT THE ABOVE LOCATIONS AS WELL AS NECESSARY SWALES, SEE SHEET C2.

23. Provide a storm drainage system extension for lots 115 and 116, provide a storm drainage yard drain inlets along the lot line at contour 93 to prevent lot to lot drainage.
* STORM DRAINAGE SYSTEM EXTENSION FOR LOTS 115 AND 116 ALONG WITH A YARD D.I. AT CONTOUR 93, SEE SHEET C2.

24. Provide swales as required to direct the runoff to the new yard drain inlets.
* SWALES PROVIDED WHERE NECESSARY AND ARE SHOWN AND LABELED ON SHEET C2.

25. Identify any off-site land disturbing areas required with proper erosion control measures. THERE ARE NO OFF-SITE LAND DISTURBING AREAS PROPOSED.

easements on 95+96; 103-105, 19+20

26. Replace the Erosion Control Notes on sheet C-5 with the revised James City County Erosion Control Notes dated 4/7/97.
REVISED NOTES PROVIDED ON SHEET C-5.

27. Submit an adequacy analysis for all receiving channels to ensure that the channel is stable for the 2-year velocity. ALL PONDS DISCHARGE TO RECEIVING CHANNELS BELOW PREDEVELOPMENT RATES FOR THE 2 & 10-YR STORMS; THEREFORE ADEQUACY ANALYSIS IS UNNECESSARY.

28. The Following comments apply to the existing Pond shown on plan sheet C-2, (Pond "A" section 1).

A. This pond is to serve as a sediment basin for section 2. Provide a baffle wall within the basin. SEE NOTE BELOW.

B. The basin has never been properly stabilized, and is currently exhibiting significant erosion problems. Remove any eroded material from within the safety bench area. Remove any eroded material from the downstream side of the dam embankment. Regrade the slopes and place topsoil, lime and fertilizer prior to seeding. Provide stabilization details including the use of EC-2 type blanket materials. SEE NOTE BELOW.

ok C. Lot 87 property line encroaches into the BMP, provide a permanent drainage and maintenance easement for that area. LOT 87 DOES NOT ENCROACH INTO THE BMP BUT RATHER A GRADED SIDE-SLOPE. NO EASEMENT IS NECESSARY

D. Safety benches were required to be installed around the perimeter of the basin 1' below the normal pool elevation. If it has not been installed please provide note and a detail on the plan. SAFETY BENCHES WERE PROVIDED 1' BELOW THE SURFACE OF THE EXISTING BASIN, PER TELCON W/ CONTRACTOR.

needed – E. Provide a gate vale or similar bottom drain within the riser structure to facilitate the complete drawdown of the pond. THIS POND AND OUTLET STRUCTURE WAS BUILT ACCORDING TO PREVIOUSLY APPROVED PLANS. WE ARE NOT PROPOSING TO MAKE ANY MODIFICATIONS TO THIS POND (INCLUDING IT'S BUILD-OUT DRAINAGE AREAS) THEREFORE WE DO NOT BELIEVE THIS REQUES. IS VIABLE.

29. The following comments refer to Pond "E":

A. Provide a gate valve or similar bottom drain within the riser structure to facilitate the complete draw down of the pond. GATE VALVE PROVIDED ON SHEET C-5.

B. Provide EC-2 blanket for the Pond "E" slopes which exceed 3:1 and show on plan sheet C-3. *EC-2 BLANKET PROVIDED AT POND "E" WHERE SLOPES EXCEED 3:1, SEE SHEET C3. DETAIL PROVIDED ON SHEET C5.

C. On the Pond "E" detail on plan sheet C-5 provide elevations for the required dam core trench depth and embankment depth. DAM CORE DEPTH PROVIDED AND DETAIL CLARIFIED (AS DISCUSSED VIA TELEPHONE 8-5-98).

D. On sheet C-5, provide a note requiring water tight joints in the 24" ACCMP. * NOTE PROVIDED FOR 24" ACCMP WATER-TIGHT JOINTS, SEE SHEET C5.

E. Provide a 24" FES at the end of the ACCMP barrel. *24" FES PROVIDED ON SHEET C5 (DETAIL)

F. Calculations need to be provided to verify the sizing of the nine-inch orifice to be used as the drawdown while the pond is used as a sediment basin. THE 9" ORIFICE HAS BEEN REDUCED TO 7" IN ORDER TO COMPLY WITH THE 6 HOUR DRAWDOWN REQUIREMENT. ALL SUPPORTING CALCULATIONS ARE ATTACHED.

NOTE (ADDRESSING COMMENTS #28 A & B): THESE COMMENTS ARE BOTH "PUNCH LIST" ITEMS TO BE ADDRESSED BY THE CONTRACTOR/DEVELOPER AS APPROVED PLANS FOR PHASE I COVERED THESE ISSUES. THEREFORE, THESE ISSUES SHOULD AFFECT THE RELEASE OF SURETY FOR PHASE I E&S, NOT WHETHER THE PHASE II PLANS SHOULD BE APPROVED.

MAR 1999
RECEIVED
PLANNING DEPARTMENT

ENVIRONMENTAL DIVISION REVIEW COMMENTS
LONGHILL STATION PHASES 3 AND 4
PLAN NO. S-19-97 MCE/DEC
March 26, 1999

1. A Land Disturbing Permit and Siltation Agreement, with surety, are required for this project.
   - TO BE PROVIDED BY CLIENT.
2. A Subdivision Agreement, with surety, shall be executed with the County prior to recordation of lots.
   - TO BE PROVIDED BY CLIENT.
3. Water and sewer inspection fees must be paid prior to the issuance of a Land Disturbing Permit.
   - TO BE PROVIDED BY CLIENT.
4. An Inspection/Maintenance Agreement shall be executed with the county for the BMP facility for this project.
   - TO BE PROVIDED BY CLIENT.
5. As-built drawings must be provided for the detention basin on completion. Also, a note shall be provided on the plan stating that upon completion, the construction of the dam will be certified by a professional engineer who has inspected the structure during construction.
   - NOTE PROVIDED ON SHEET C2.
6. Provide a streetlight plan for this subdivision that meets the county's policy. A streetlight rental fee for the required number of lights must be paid prior to the recordation of the subdivision plat. - STREETLIGHT PLAN THAT MEETS COUNTY POLICY HAS BEEN PROVIDED. SEE C1, C3 SHEETS.
7. Provide and label the limits of clearing on the plan. The area of pond D has already been cleared. Show this cleared area for reference. - Comment Addressed accordingly SEE SHEET C2, C3
8. Provide an environmental inventory in accordance with Chesapeake Bay Preservation Ordinance Section 23-10B.
   - TO BE PROVIDED AT LATER DATE AS NECESSARY.
9. Provide a soils map to delineate the different soil types in accordance with the James City County Soil Survey. - SOILS MAP PROVIDED
10. Provide a drainage area map to show the existing and proposed drainage patterns. Include the size of each drainage area.
    larger scale would be more useful
    - PROVIDED IN ATTACHED CALCULATIONS.
11. Show the limit of the 100-year floodplain. - 100-YEAR FLOOD PLAIN SHOWN. SEE SHEETS C1, C2, C3
12. Show any temporary soil stockpile areas, staging and equipment storage areas.
    See #20
    - AREA PROVIDED ON SHEET C2.
13. Identify any off-site land disturbing areas required with proper erosion control measures.
    - NONE.
14. Lot to lot drainage appears to be a problem at the following location: Provide a method of capturing the runoff from lots 152,153,154, before it runs onto lots 168, 169. SWALES
    - PROVIDED to HINDER RUNOFF. SEE SHEET C2
    will tie into lots 154 & 153

*WE ARE AWARE THAT YOU HAVE REQUESTED SEDIMENT TRAPS AND WE HAVE LOOKED INTO THE MATTER AND FOUND THIS WOULD ENCROACH SET BACK LINES OF ADJACENT LOTS. WE ASK THAT YOU PLEASE CONSIDER OUR PROPOSAL OF WIRE-REINFORED SILT-FENCE, WHICH THROUGH CALCULATION DOES SATISFY "VESCH" CRITERIA.

where is path shown? they will check w/ developer - planning if any improv. need to be made

15. Provide information on the proposed clearing between lots 154 and 155.
- CLEARING PROVIDED FOR BIKE PATH, SEE SHEETS C1 + C2.

16. Show limits of clearing for all swales provided for lot drainage. Provide invert elevations and spot elevations along the length of the swales.
- SWALES + CLEARING FOR SWALES TO BE PROVIDED AT TIME OF HOME CONSTRUCTION. THIS WAS AGREED UPON IN OUR MEETING WITH DARYLL COOK. INVERTS PROVIDED ON SHEET C2

17. Provide additional silt fence at the following locations:
1. Around the bulb of the cul-de-sac of Allegheny Road. *ALL Additional silt Fence Provided accordingly SEE SHEETS C2.
2. Along the south side of ~~Blue Ridge Drive~~ REDWING CT from station 14+27 to the end of the cul-de-sac.
3. Around the bulb of the other cul-de-sac of Allegheny Road, in the vicinity of lots 136-138.
4. At the base of fill for the construction of pond D.

18. Provide properly sized sediment traps for the three storm sewer outfalls that do not drain into a sediment basin. Provide diversion dikes to direct the flows to the traps until the storm sewer system and curb is installed. 2 OUTFALLS HAVE MINIMAL DRAINAGE AREAS IN WHICH CAN BE SATISFIED WITH SILT FENCE. WE HAVE PROVIDED SUCH FENCE & HAVE ADDED WIRE REINFOREMENT IN THESE LOCATIONS FOR BETTER RESULTS. SEE ABOVE (*

19. Provide a note on the plan that all sediment traps and basins are to remain in place until the majority of single family construction is complete. The JCC Environmental Division will determine the timing of removal of all sediment trapping devices. If any of the traps or basins are on individual lots, they will need to be contained within a temporary construction easement to ensure access for the developer and the county to remove them when appropriate. - N/A.

20. The clearing and filling of residential lots are not a part of this plan. Provide alternative drainage for lot 135 to avoid clearing and grading.
- THIS ISSUE WAS DISCUSSED WITH DARYLL COOK AND IT WAS UNDERSTOOD AS PART OF THIS PLAN, LOT 135 SHOWN AS THE TEMPORARY STOCKPILE AREA ON SHEET C

21. Submit an adequacy analysis for all receiving channels to ensure that the channel is stable for the 2-year velocity. The channel to receive flows from pond D already shows signs of erosion and overtopping of banks.
- POND D OUTFALL ENTERS THE RECEIVING CHANNEL BELOW PREDEVELOPMENT RATES, SEE ATTACHED CALCULATIONS.

pre dev rates too high - need to reduce

22. Provide calculations that show there is adequate capacity in existing pond E for the additional drainage from this section.
- DRAINAGE FROM THIS SECTION ALREADY IN DESIGN FOR POND E, SEE PH. 2 CALCULATIONS.

23. Provide stormwater management facility easement to include a 20-foot wide access easement and a 15-foot wide maintenance easement measured from the 100-year storm elevation and including the dam and outlet structure. - EASEMENT HAS BEEN PROVIDED SEE SHEET C2

24. Provide calculations to support the design of all drainage conveyances including pipes, culverts, inlets, ditches, etc. Provide hydraulic grade line calculations based on the 10-year storm. - CALCULATIONS PROVIDED, SEE ATTACHED.

Not Sym for

25. Provide riprap outlet protection for all pipe systems and culverts. Specify the amount and of stone to be used and the dimensions in accordance with Spec 3.19 of the third edition of the Virginia Erosion Control Handbook (VESCH).
Pond D, DI 23
- RIP-RAP DIMENSIONS CALLED OUT ON SHEET C2 & C3, SEE ATTACHED FOR CALCULATIONS.

26. Submit a request to the Director of the Environmental Division for an exception to disturb

slopes in excess of 25%. State what special measures, sodding etc., will be undertaken to restabilize these slopes.

– NOT APPLICABLE.

27. Provide evidence that any required wetlands permits ~~have been~~ obtained.

– EVIDENCE TO BE PROVIDED IF NECESSARY.

DEC 28. The site does not attain 10 BMP points. Either additional BMP facilities will need to be provided or additional natural open space placed in conservation easements.

– SITE DOES ATTAIN 10 POINTS, SEE ATTACHED CALCULATIONS.

29. The following comments pertain to the BMP design:

A. The calculations include information on a 3" diameter orifice but the detail on sheet C5 does not show the presence of any 3" diameter orifice. Please clarify. – DETAIL ON C5 IS CORRECT, A WEIR STRUCTURE IS TO B USED.

not enough detention time < 1 hr. B. The drawdown needs to be calculated for the basin's dry storage volume while it is acting as a sediment basin. – PROVIDED IN CALCULATIONS.

only shows drainage area C. Provide a drainage area map and additional information on the design assumptions used for the pond such as time of concentration, runoff curve number, etc. for both the pre- and post-development conditions. – CALCULATIONS PROVIDED, SEE ATTACHED.

D. The pre- and post-development calculations do not use the ponding adjustment factors consistently. This appears to have reduced the post-development flow levels. Revise the calculations using these factors consistently between the pre-and post-development cases. – SEE ATTACHED CALCULATIONS.

NEED SLOPES CALCULATIONS E. Baffles are required while the basin is in sediment basin mode. – NOTE PROVIDED ON C2.

F. The trash rack needs to be increased in diameter because concrete pipe is being used. The charts in the VESCH are for metal pipe only. The open space required between the riser and anti-vortex device is stated in the handbook. – ONLY THE PIPE LEADING THE POND IS CONCRETE, ∴ CALCS. ARE NOT CHANGED FOR TRASH RACK.

NOT TRUE - 30" RCP is riser

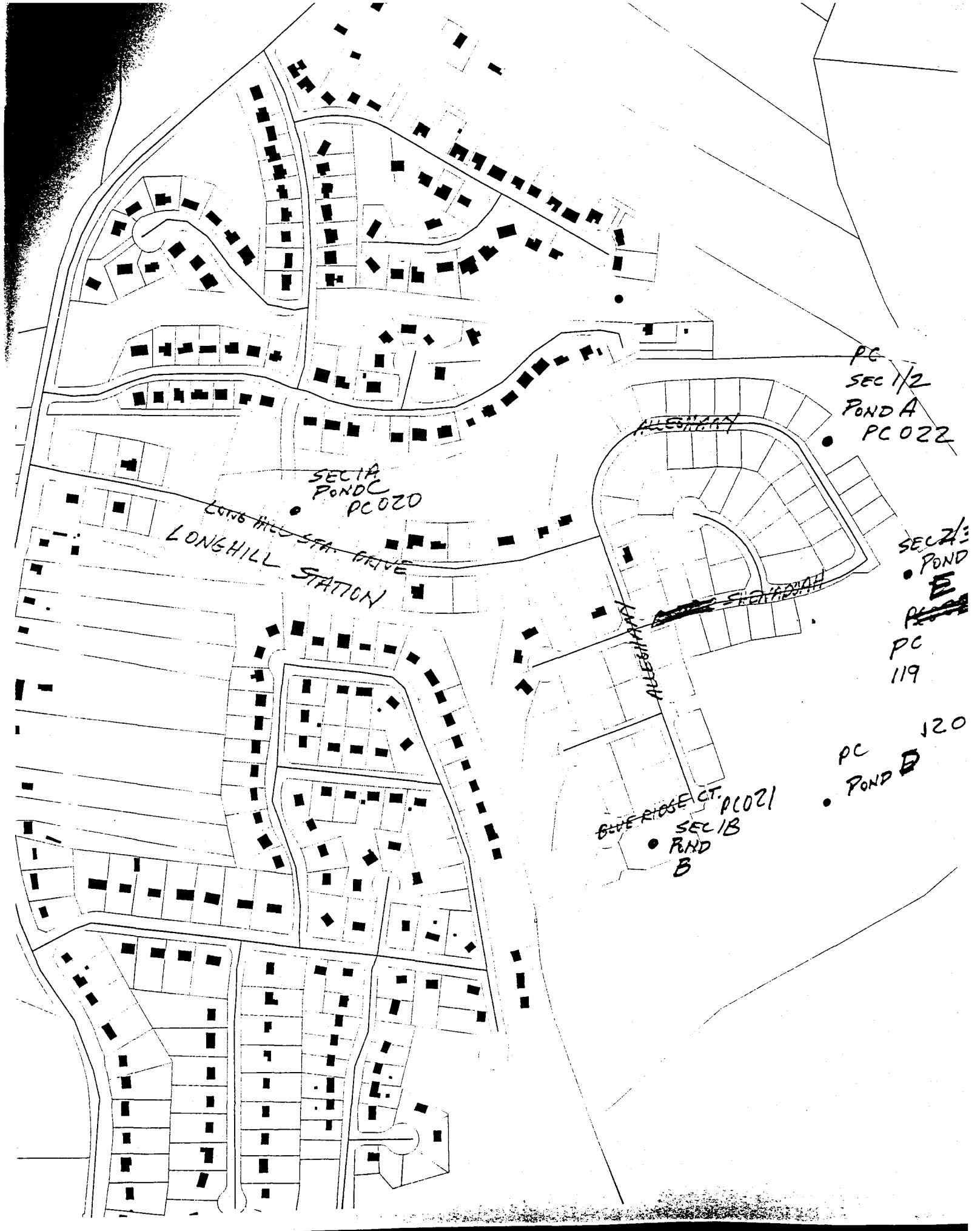
G. Complete the attached JCC Detention Basin Design Checklist to ensure the basin meets JCC criteria. – NOTED & COMPLETED IN FILES.

Not enough storage @ elev. 57.5 for 9 Pt BMP

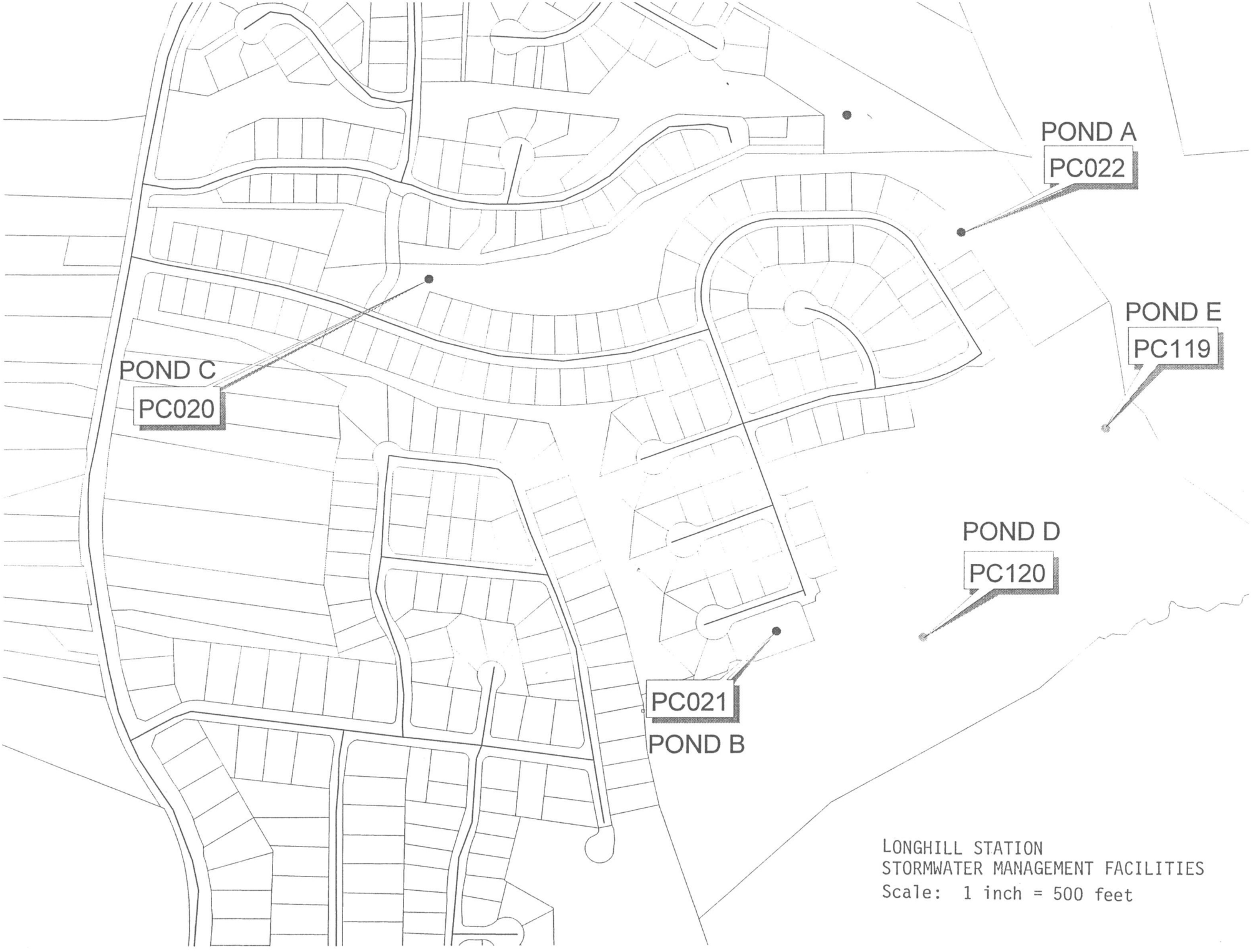
Bogle

Stormwater Management / BMP Facilities - Longhill Station

Name	Approximate Location	Assigned BMP ID Code	County Plan No.
Pond A	Near Lot 87, 6033 Allegheny Road	PC 022	S-47-95
Pond B	Near Lot 76, 3913 Blue Ridge Court	PC 021	S-47-95
Pond C	Near Rec Center at Longhill Station Road	PC 020	S-47-95
Pond D	Behind Lot 181, end of Allegheny Court	PC 120	S-19-99
Pond E	Behind Lot 137, 5989 Allegheny Road	PC 119	S-47-98


PC
SEC 1/2
POND A
PC 022
ALLEGHANY
SEC 1A
POND C
PC 020
LONG HILL STA. DRIVE
LONGHILL STATION
SEC 2/3
POND
E
PC
119
ALLEGHANY
PC
120
POND D
BLUE ROSE CT.
PC021
SEC 1B
POND
B

PC003
PC022
Longhill Station
PC020
PC119
PC021
PC120


POND A
PC022
POND E
PC119
POND C
PC020
POND D
PC120
PC021
POND B
LONGHILL STATION
STORMWATER MANAGEMENT FACILITIES
Scale: 1 inch = 500 feet

LONGHILL STATION BMPs

[redacted]

S-47-95

Section 1 (1A + 1B)
POND C; POND B; POND A (NOTE: POND D ALSO ADDED TO PH 1 BOND)

	RD	CC
POND A	X YES	NO
POND B	X YES	NO
POND C	X YES	NO
POND D	NO	NO

SHEET C-14, NOTE #18 REQUIRED AB + CC.

"As-Built Drawings must be provided for all detention/BMP facilities. Also upon completion, the construction of all detention/BMP facilities shall be certified by a professional engineer who inspected the structure during construction. The certification shall state that to the best of his/her judgement, knowledge and belief, the structure was constructed in accordance with the approval plans + specifications.

ENV DIV Comment # 4 dated June 21 1995 (S-47-95) required I/m Agreement.
ENV DIV Comment # 5 dated June 21 1995 (S-47-95) required AB drawings.

S-47-98

SECTION 2
POND E

	RD	CC
POND E	YES	NO

Note # 18, Sheet C5. REQUIRES AB & CC +
Comment #8 ENV DIV dated July 1 1998 (REQUIRED AB+CC)
Comment #5 " " " " " required I/m Agreement

S-19-99

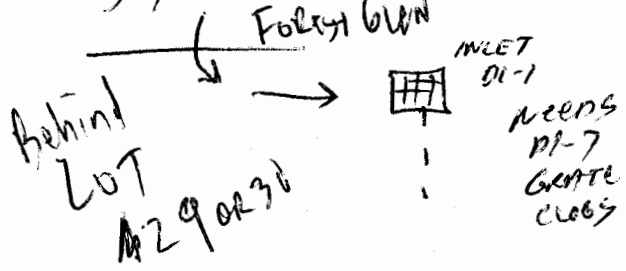
SECTIONS 3 + 4
POND D

	RD	CC
POND D	NO	NO

Note #18 Sheet C-5 required AB + CC.
Comment # 5 ENV DIV dated MARCH 26 1999 requires AB + CC
Comment # 4 ENV DIV " " " " requires I/m Agree.

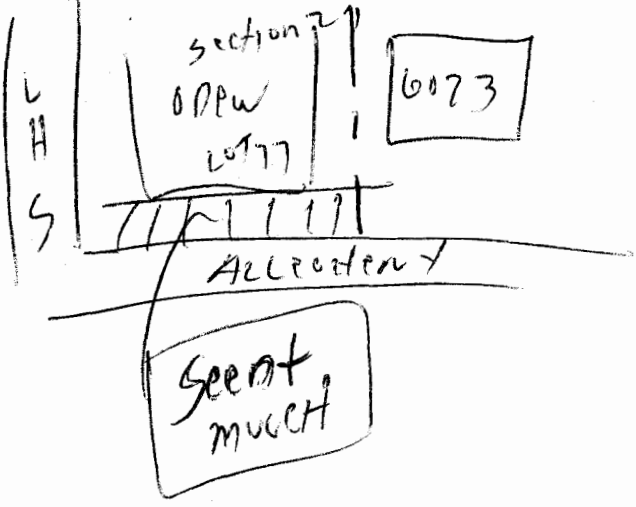
7/11/02
SJ Thomas
Cinello Swaney
Mike Stefanowicz
CNW and Crumrite

(1.) Drainage/Erosion Problem @ Fence: Behind 3952 Longhill Sta. (Robert Frazier)



SJT Walk with HOA Members 1/11/02

(2.) INTX Allegheny & LHS.

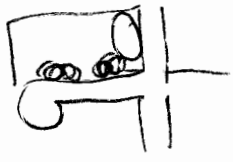


(3) Trash-Stockpile on Lot 58 (Shenandoah) Between 3917 + 3905

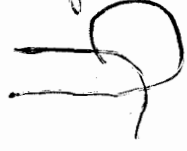
(4) Open Space Pine Bluff Dead Trees O.S. Mgmt ?? Should Dev Remove?

(5) Const Trailer - unsightly trash @ INTX Blue Ridge - Alles

(6) NAT OS Pond B - Remove Logs & Const Pathing (Allegheny End Ct.)



Tree Falling - End of Cul-de-sac?

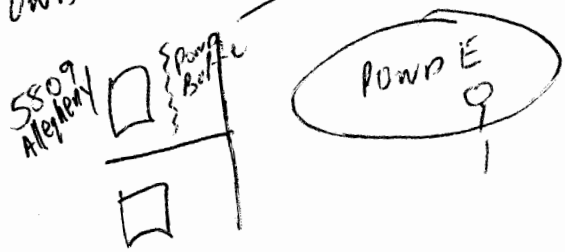


CIP at end of Allegheny Ct. (Remove)
- Remove VDOT #1
- CONST Debris NOS

- Plat Pipe at end of Allegheny Ct. Pipe to PG-2A to pond.
  IF on property? (5815)

- CLEAN SED / Debris @ end of PG-2A (5815)

- Pond Buffer — work w/ RESIDENT.



- Remove Debris Archaeological Site (Red wing)
  Temp Soil Stockpile (Next to 4008 RW)
  (WHOLE LOT)

- Remove Debris + Trash Open lot (End Red Wing)
  Between ~~[illegible]~~ 4031 + 4032

Stormwater Division

MEMORANDUM

DATE: March 13, 2010

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

FROM: Jo Anna Ripley, Stormwater

PO: 270712

RE: Files Approved for Scanning

General File ID or BMP ID: PC022

PIN: 3110900001B

Subdivision, Tract, Business or Owner Name (if known): Longhill Station

Property Description: Natural Open Space Section 1A & 1B

Site Address:

(For internal use only) **Box** 3 **Drawer:** 2

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

Comments

According to the County's Real Estate Assessment Division the common area has not been turned over to the HOA. Ownership as of 3/3/10 is Wallace Associates LLC

S-47-95
SECT 1 (1A+1B)
POND A (PC022)
POND B (PC021)
POND C (PC 020)

COPY

DECLARATION OF COVENANTS

INSPECTION/MAINTENANCE OF RUNOFF CONTROL FACILITY

THIS DECLARATION, made this 2nd day of April, 1996, between Atlantic Homes Dev., and all successors in interest, hereinafter referred to as the "COVENANTOR(S)," owner(s) of the following property: Longhill Station Sections 1A+1B Deed Book 626, Page 50, and James City County, Virginia. hereinafter referred to as the "COUNTY."

WITNESSETH:

We, the COVENANTOR(S), with full authority to execute deeds, mortgages, other covenants, and all rights, titles and interests in the property described above, do hereby covenant with the COUNTY as follows:

1. The COVENANTOR(S) shall provide maintenance for the runoff control facility, hereinafter referred to as the "FACILITY," located on and serving the above-described property to ensure that the FACILITY is and remains in proper working condition in accordance with approved design standards, and with the law and applicable executive regulations.

2. If necessary, the COVENANTOR(S) shall levy regular or special assessments against all present or subsequent owners of property served by the FACILITY to ensure that the FACILITY is properly maintained.

3. The COVENANTOR(S) shall provide and maintain perpetual access from public right-of-ways to the FACILITY for the COUNTY, its agent and its contractor.

4. The COVENANTOR(S) shall grant the COUNTY, its agent and its contractor a right of entry to the FACILITY for the purpose of inspecting, operating, installing, constructing, reconstructing, maintaining or repairing the FACILITY.

5. If, after reasonable notice by the COUNTY, the COVENANTOR(S) shall fail to maintain the FACILITY in accordance with the approved design standards and with the law and applicable executive regulations, the COUNTY may perform all necessary repair or maintenance work. and the COUNTY may assess the COVENANTOR(S) and/or all property served by the FACILITY for the cost of the work and any applicable penalties.

6. The COVENANTOR(S) shall indemnify and save the COUNTY harmless from any and all claims for damages to persons or property arising from the installation, construction, maintenance. repair, operation or use of the FACILITY.

7. The COVENANTOR(s) shall promptly notify the COUNTY when the COVENANTOR(S) legally transfers any of the COVENANTOR(S)' responsibilities for the FACILITY. The COVENANTOR(S)' shall supply the COUNTY with a copy of any document of transfer, executed by both parties.

8. The covenants contained herein shall run with the land and shall bind the COVENANTOR(S) and the COVENANTOR(S)' heirs, executors, administrators, successors and assignees, and shall bind all present and subsequent owners of property served by the FACILITY.

9. This DECLARATION shall be recorded in the County Land Records.

Book 781
Page 887

IN WITNESS WHEREOF, the COVENANTOR(S) have executed this DECLARATION OF COVENANTS as of this ~~29th~~ 2nd day of ~~March~~ April, 1996.

COVENANTOR(S)

Pope Woodard, Pres.

ATTEST:

Frances K Barber

COVENANTOR(S)

Kenneth Allen, V-Pres.

ATTEST:

Frances K Barber

COMMONWEALTH OF VIRGINIA
CITY/~~COUNTY~~ OF Hampton

I, the undersigned Notary Public, in and for the jurisdiction aforesaid, do certify that J. Pope Woodard, whose name is signed as such to the foregoing writing bearing date 29th day of March, 1996 this day sworn the same before me in my jurisdiction aforesaid.

GIVEN under my hand this 1st day of April, of 1996.

Frances K Barber
Notary Public

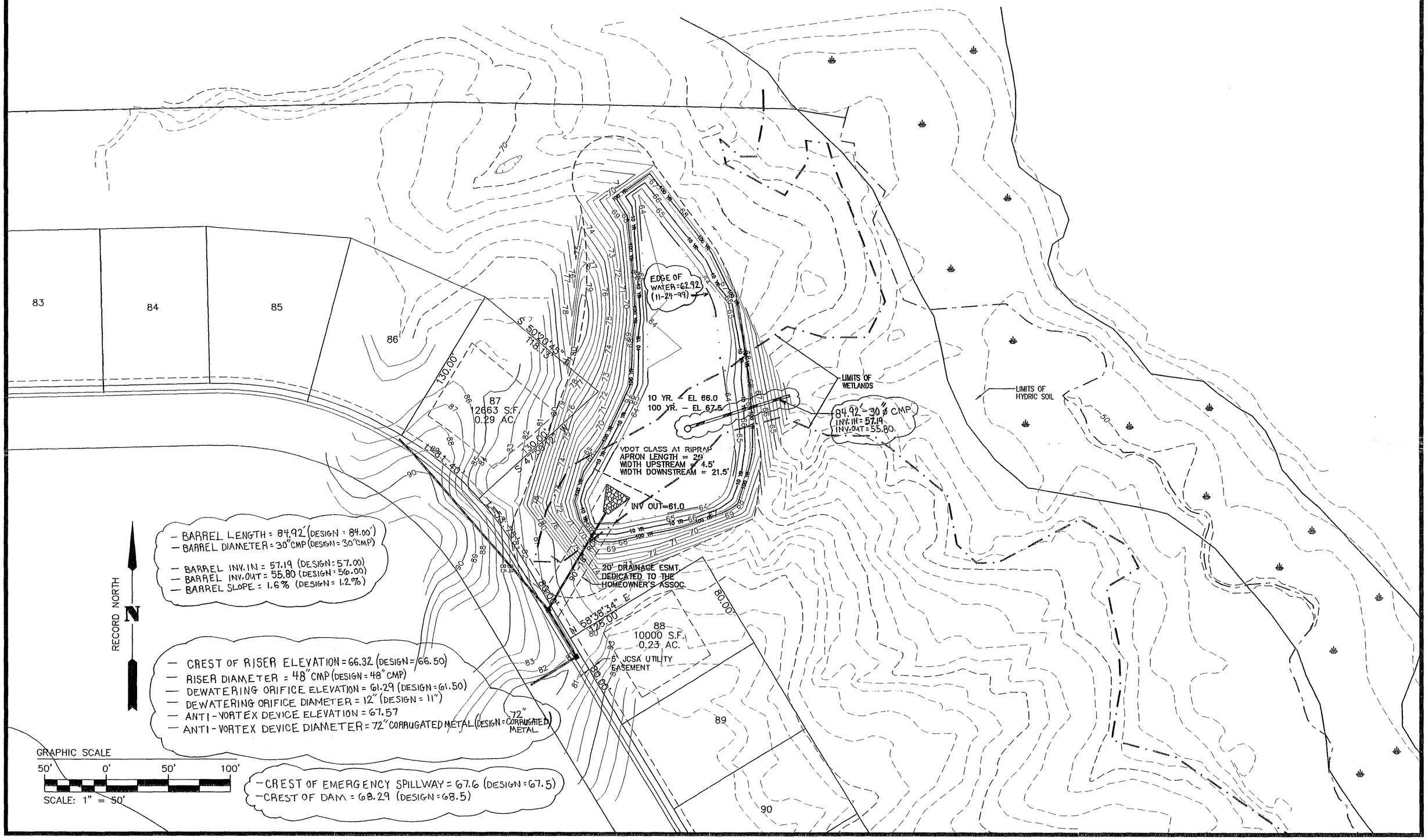
My Commission expires: Nov 30, 1998

Approved as to form:

Leo P Rogers

0261U.Wpf
Revised 9/92

PC020_PC021_PC022_PC119_PC120_LONG_WALL_STATION - 190



COMMISSION NUMBER 1940220	SCALE AS NOTED	POND "A" AS-BUILT
SHEET NUMBER C1	DESIGNED XXX	ATLANTIC HOMES DEVELOPMENT CORPORATION
1 OF 1	DRAWN RAM	LONGHILL STATION SUBDIVISIONS
	CHECKED HLPG	SECTION 1
	DATE 12-6-99	JAMES CITY COUNTY, VIRGINIA

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NO.	DATE	DESCRIPTION

REVISIONS

DJG INC.
Committed to Excellence
ENGINEERS • ARCHITECTS • SURVEYORS
1006 RICHMOND ROAD, P.O. BOX 3505 WILLIAMSBURG, VIRGINIA 23187
(757)253-0673 FAX: (757)253-2319 E-MAIL: djginc@visi.net
NORFOLK - VIRGINIA BEACH AREA (757)874-5015

PC022; 5-47-95

STORMWATER DRAINAGE AND BMP CALCULATIONS

FOR

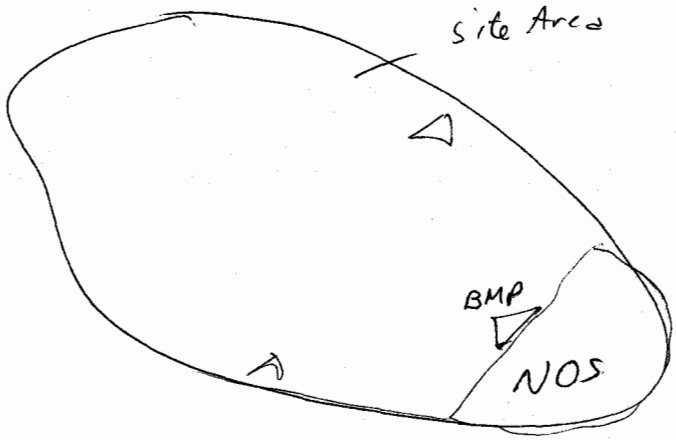
LONGHILL STATION SUBDIVISION

RESUBMITTAL #1

BY

DJG, INC.
1006 RICHMOND ROAD
WILLIAMSBURG, VA 23185

DJG COMMISSION NO. 1940220



Assume ~~10~~ 25 acres of NOS below BMPs

site Area for BMP Calcs = 104.53 − 25 = 79.53

A - $\frac{18.9}{79.53} \times 9 = 2.14$

B $\frac{11.9}{79.53} \times 6 = 0.90$

C $\frac{26.8}{79.53} \times 4 = 1.35$

D $\frac{8.9}{79.53} \times 9 = 1.01$

E $\frac{12.1}{79.53} \times 9 = 1.37$

6.77

NOS = $\frac{41}{104.53} \times 10 = 3.92$

10.69

DJG
P.O. Box 3505
Williamsburg, Virginia 23187
(804) 253-0673
Fax (804) 253-2319

PROJECT LONGHILL STATION
DATE 9-5-95 COMM NO. 1940220
CAL HLDG CKD PAGE # 1
TITLE REVISION #1

BMP POINT SYSTEM:

$\frac{41}{104.53} = 3.92$ - NOS

- NATURAL OPEN SPACE CREDIT

TOTAL SITE = 104.53 AC
OPEN SPACE = 43.60 AC
% = $\frac{43.60 \text{ AC}}{104.53 \text{ AC}}$ = 41.71 %

why changed to 6 pt

POINTS = 41.71% x 0.1 = 4.17

- PHASE I BMP CONSTRUCTION CREDIT:

used to be 9 pt.

✓ POND A 18.9 AC / 104.53 AC x 9 = 1.63
POND B 11.9 AC / 104.53 AC x 6 = 0.68 1.02
✓ POND C 26.8 AC / 104.53 AC x 4 = 1.03 ✓
3.34

- PHASES II - IV:

POND D 8.9 AC / 104.53 x 9 = 0.77
POND E 12.1 AC / 104.53 x 9 = 1.04
1.81

- TOTAL BMP POINTS: 4.17 + 3.34 + 1.81 = $\boxed{9.32}$

Pond C - 4 Pt BMP - 9721 ft^3
30% I → 14,641 ft^3

DJG
P.O. Box 3505
Williamsburg, Virginia 23187
(804) 253-0673
Fax (804) 253-2319

PROJECT LONGHILL STATION SUBDIVISION
DATE 5-11-95 COMM NO. 1940220
CAL HLPG CKD PAGE # 2
TITLE PHASE I POND A - REVISION #1

CN CALCULATIONS:

- PREDEVELOPMENT

AREA(%)	SOIL	GROUP	COVER	CN	WEIGHTED CN
70	CRAVEN	C	GOOD WOOD	70	4900
30	EMPORIA	C	GOOD WOOD	70	2100
					7000

$7000/100\% = \underline{70}$

- POST-DEVELOPMENT

AREA(%)	SOIL	GROUP	COVER	CN	WEIGHTED CN
85	CRAVEN	C	1/4 AC. LOTS	83	7055
15	EMPORIA	C	FAIR WOOD/GRASS	76	1140
					8195

$8195/100\% = 81.95 \Rightarrow \underline{82}$

BMP #7 DESIGN CALCULATIONS:

- BASIN STORAGE TO LEVEL SHELF @ 60.5

ELEV	AREA (ft^2)	$\Sigma(A_i+A_j)/2$	VOL (ft^3)	Σ VOL (ft^3)
54.0	920	—	—	—
56.0	2275	1597.5	3195	3195
58.0	5270	3772.5	7545	10740
60.0	9040	7155	14310	25050
60.5	11210	10125	5062.5	30112

REQ'D STORAGE − AVAILABLE = NEEDED STORAGE ABOVE SHELF
53788 ft^3 − 30112 ft^3 = 23676 ft^3
← FROM PAGE 5

DJG
P.O. Box 3505
Williamsburg, Virginia 23187
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PROJECT LONGHILL STATION
DATE 9-5-95 COMM NO. 1940220
CAL HLPG CKD PAGE # 3
TITLE REVISION #1

- BMP #7 (POND A) DESIGN CALCULATIONS CONTINUED -

· ESTABLISH NORMAL POOL ELEVATION

ELEV	AREA (ft^2)	$\Sigma(A_i+A_j)/2$	VOL (ft^3)	Σ VOL. (ft^3)
60.5	15923	–	–	–
62.0	18465	17194	25791	25791
64.0	24050	21258	42515	68306

· STORAGE ALGORITHM: $z_1 = 1.5'$ $z_2 = 3.5'$
$S_1 = 25791$ $S_2 = 68306$

$$b = \frac{\ln\left(\frac{S_2}{S_1}\right)}{\ln\left(\frac{z_2}{z_1}\right)} = 1.1495 \qquad k = \frac{S_2}{z_2^b} = 16182.7 \qquad z = \left(\frac{23676}{k}\right)^{1/b} = 1.39'$$

$1.39' + 60.5 = 61.89$ ← NORMAL SURFACE SHOULD BE SET HERE

* HOWEVER, DUE TO SITE CONSTRAINTS AND THE NEED FOR A LEVEL SAFETY SHELF ONE FOOT BELOW THE NORMAL SURFACE, THE NORMAL SURFACE WILL BE SET AT ELEVATION 61.50. THIS WAS DISCUSSED WITH DARRYL COOK OF J.C.C. AND WAS CONSIDERED ACCEPTABLE.

· STORAGE ABOVE N.S. @ 61.50

ELEV.	AREA (ft^2)	$\Sigma(A_i+A_j)/2$	vol. (ft^3)	Σ VOL. (ft^3)
61.5	17618	–	–	–
62	18465	18041.5	9021	9021
64	24050	21257.5	42515	51536
66	30050	27050	54100	105636
68	36460	33255	66510	172146
68.5	38150	37305	18652	190798

· STORAGE ALGORITHM: $z_1 = 0.5$ $z_2 = 7.0$
$S_1 = 9021$ $S_2 = 190797$

$$b = \frac{\ln\left(\frac{S_2}{S_1}\right)}{\ln\left(\frac{z_2}{z_1}\right)} = 1.1564 \qquad k = \frac{S_2}{z_2^b} = 20106.65 \qquad S = 20106.65\,(z)^{1.1564}$$

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PROJECT LONGHILL STATION
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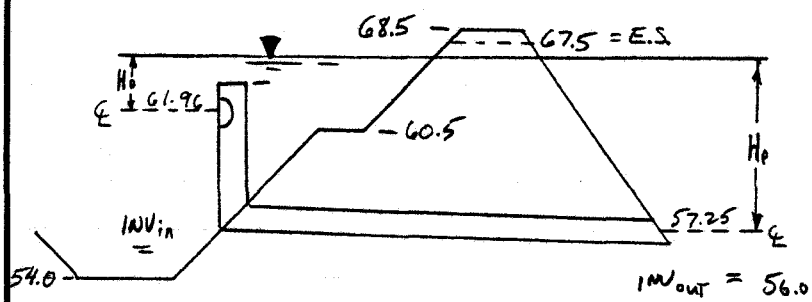
CAL HCDG CKD PAGE # 4
TITLE REVISION #1

- BMP # 7 (POND A) DESIGN CALCULATIONS CONTINUED -

• PRINCIPAL SPILLWAY:



48" CMP RISER
30" CMP BARREL, PIPE FLOW CORR. = 0.96
11" ORIFICE @ 61.5
$Q = CA\sqrt{2gH_o}$ $C = 0.6$

• STAGE-STORAGE-DISCHARGE -

	ELEV.	STAGE (ft)	H_p	Q_p	H_o	Q_o	ΣQ	STORAGE
	61.5	-	-	-	-	-	-	-
	62	0.5	-	-	0.04	0.64	0.64	9021
	63	1.5	-	-	1.04	3.24	3.24	32134
	64	2.5	-	-	2.04	4.53	4.53	58010
	65	3.5	-	-	3.04	5.54	5.54	85600
	66	4.5	-	-	4.04	6.39	6.39	114468
C.R.	66.5	5.0	-	-	4.54	6.77	6.77	129299 ←
	67.0	5.5	9.75	(RISER) 13.8	5.04	7.13	20.93	144365
	68.0	6.5	10.75	59.2	6.04	7.81	67.01	175128
	68.5	7.0	11.25	63.1	6.54	8.13	71.23	190797

• ANTI-SEEP COLLARS (USING E&S PLATE 3.14-11)

$Y = 66.5 - 54 = 12.5'$
$S = 1.2\%$
UPSTREAM EMBANK. SLOPE = 3:1
$\Rightarrow L_s = 90'$
PIPE DIA. = 30"
$\Rightarrow$ 3 COLLARS, 5.5' x 5.5'

LONGHILL STATION
5-11-95 1940220
PHASE I POND A HLPG
PAGE 5
REVISION # 1

WET POND
BMP DESIGN 7

Volume of permanent pool equal to 4 * Vr; where Vr = volume of runoff generated by the mean storm over the contributing onsite watershed. (offsite area included if credit is taken)

Volume: Vp = 4 * Vr

Vp = volume of permanent pool

Vr = 0.5 * Rv * A * 3630

Rv = 0.05 + 0.009 * I

I = percent impervious cover of the contributing onsite watershed (offsite area included if credit is taken) (expressed as a whole number)

A = area of contributing onsite watershed (acres) (offsite area included if credit is taken)

3630 = conversion factor (cu.ft./acre-in)

Vr = 0.5 * (0.05 + 0.009 * 38%) * 18.9 ac * 3630

Vr = 13447 cu.ft.

Vp = 4.0 * 13447 = 53788 cu.ft.

verify

Although Qin may equal Qout for this facility, any stormwater management concerns should be addressed. Storage volume for stormwater management purposes begins at the maximum elevation of the permanent pool.

$$Eqs = (134\,cy/ACRE)(27\,ft^3/cy)(18.9\,AC) = 68380.2\,ft^3$$

CONSTRUCTION PLANS SHALL INCLUDE THE FINAL DETAILED BMP DESIGN

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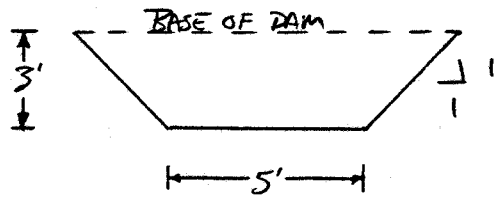
PROJECT LONGHILL STATION
DATE 9-5-95 COMM NO. 1940220
CAL HLPG CKD PAGE # 6
TITLE REVISION #1

- POND A DESIGN CONTINUED -

- CORE TRENCH DETAIL:



- CORE TRENCH RUNS ALONG ℄ OF DAM, UP EMBANK. TO ELEV. = 66.5

- OUTLET PROTECTION FOR BARREL: PIPE ø = 30" Q_p (100 YR) = 41.6

- ASSUME MIN. TAILWATER COND.
  APRON LENGTH = (pg III-164, Eqs) = 18.0'
  APRON WIDTH UPSTREAM = 3 × DIA. = 3 × 2.5' = 7.5'
  DOWNSTREAM = DIA. + APRON LENGTH = 2.5' + 18' = 20.5'
  RIPRAP: d_{50} = 0.75'
  DEPTH = 18" MIN.

- ANTI-VORTEX DESIGN:
  RISER ø = 48"
  CYLINDER ø = 72"
  THICKNESS = 16 ga.
  HEIGHT = 21"
  SUPPORT/SPACER BARS = 1¼" PIPE
  TOP THICKNESS = 14 ga (CORREGATED)

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PROJECT LONGHILL STATION SUBDIVISION
DATE 5-11-95 COMM NO. 1940220
CAL HLPG CKD PAGE # 6
TITLE PHASE I POND A

· DRAWDOWN CALCULATIONS:

DESIGN: 25-YR STORM
ELEV = 66.96
VOL. = 130105 ft³

Dry Drawdown of Dry Storage Vol

$$\frac{68,350\ ft^3}{6 \times 3600} = 3.1\ cfs$$

8.2" ϕ

$$6\ hr\ DRAWDOWN\ Q_{AVG.} = \frac{VOL.\ DETAINED}{6\ hrs \times 3600}$$

$$Q_{AVG.} = 6.02\ cfs$$

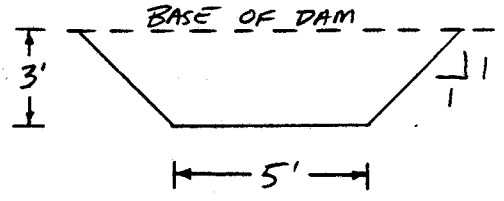
ACTUAL: 25-YR STORM
ELEV. = 66.96
VOL. = 130105 ft³

$Q_{AVG} = 5.69$ cfs (DETERMINED FROM TR-55 METHOD, RESULTS INCLUDED)

$$5.69\ cfs = \frac{130105\ ft^3}{T \times 3600}$$

$$\Rightarrow \boxed{T = 6.35\ hrs}$$

· CORE TRENCH DETAIL:



- CORE TRENCH RUNS ALONG CENTERLINE OF DAM, UP EMBANKMENTS, TO ELEV. = 66.5

· OUTLET PROTECTION FOR BARREL:

PIPE DIA. = 30" $Q_p(100) = 45.7$ cfs

- ASSUME MIN. TAILWATER CONDITION
- APRON LENGTH = (E&S pg III-164) = 20'
- APRON WIDTH UPSTREAM = 3 × DIA. = 3 × 2.5' = 7.5'
  DOWNSTREAM = DIA + APRON LENGTH = 2.5' + 20' = 22.5'
- RIP RAP: d_{50} = 0.7' DEPTH = 18" MIN.

TEMPORARY SEDIMENT BASIN DESIGN DATA SHEET

(with or without an emergency spillway)

Project LONGHILL STATION REVISION #1

Basin # PHASE I POND A Location _____

Total area draining to basin: 18.9 acres.

Basin Volume Design

Wet Storage:

1. Minimum required volume = 67 cu. yds. x Total Drainage Area (acres).

   67 cu. yds. x 18.9 acres = 1266.3 cu. yds.

2. Available basin volume = 1768 cu. yds. at elevation 61.5. (From storage - elevation curve)

3. Excavate 1266.3 cu. yds. to obtain required volume*.

   * Elevation corresponding to required volume = invert of the dewatering orifice.

4. Available volume before cleanout required.

   33 cu. yds. x 18.9 acres = 623.7 cu. yds.

5. Elevation corresponding to cleanout level = ~~63.1~~ 62.1.

   (From Storage - Elevation Curve)

6. Distance from invert of the dewatering orifice to cleanout level = 1.59 ft. (Min. = 1.0 ft.)

Dry Storage:

7. Minimum required volume = 67 cu. yds. x Total Drainage Area (acres).

   67 cu. yds. x 18.9 acres = 1266.3 cu. yds.

8. Total available basin volume at crest of riser* = 4278.7 cu. yds. at elevation 66.5. (From Storage - Elevation Curve)

* Minimum = 134 cu. yds./acre of total drainage area.

9. Diameter of dewatering orifice = 11 reduce to 8" in.

10. Diameter of flexible tubing = 13 in. (diameter of dewatering orifice plus 2 inches).

Preliminary Design Elevations

11. Crest of Riser = 66.5

Top of Dam = 68.5

Design High Water = 67.45

Upstream Toe of Dam = 54

Basin Shape

12. Length of Flow / Effective Width $\frac{L}{We} = \frac{125}{60} = 2.1$

If > 2, baffles are not required ✓

If < 2, baffles are required N/A

Runoff

13. Q_2 = 4 cfs (From Chapter 5)

14. Q_{25} = 16 cfs (From Chapter 5)

Principal Spillway Design

15. With emergency spillway, required spillway capacity $Q_p = Q_2$ = 4 cfs. (riser and barrel)

Without emergency spillway, required spillway capacity $Q_p = Q_{25}$ = N/A cfs. (riser and barrel)

PC020_PC021_PC022_PC119_PC120_LONGHILL_STATION - 202

16. With emergency spillway:

Assumed available head (h) = 1.0 ft. (Using Q_2)

h = Crest of Emergency Spillway Elevation - Crest of Riser Elevation

Without emergency spillway:

Assumed available head (h) = N/A ft. (Using Q_{25})

h = Design High Water Elevation - Crest of Riser Elevation

17. Riser diameter (D_r) = 48 in. Actual head (h) = 1.1 ft.

(From Plate 3.14-8.)

Note: Avoid orifice flow conditions.

18. Barrel length (l) = 84 ft.

Head (H) on barrel through embankment = 10.35 ft.

(From Plate 3.14-7).

19. Barrel diameter = 30 in.

(From Plate 3.14-B [concrete pipe] or Plate 3.14-A [corrugated pipe]).

20. Trash rack and anti-vortex device

Diameter = 72 inches.

Height = 21 inches.

(From Table 3.14-D).

Emergency Spillway Design

21. Required spillway capacity $Q_e = Q_{25} - Q_p$ = 12 cfs.

22. Bottom width (b) = 9 ft.; the slope of the exit channel (s) = 3.5 ft./foot; and the minimum length of the exit channel (x) = 40 ft.
(From Table 3.14-C).

Anti-Seep Collar Design

23. Depth of water at principal spillway crest (Y) = 12.5 ft.

Slope of upstream face of embankment (Z) = 3 :1.

Slope of principal spillway barrel (S_b) = 1.2 %

Length of barrel in saturated zone (L_s) = 90 ft.

24. Number of collars required = 3 dimensions = 5.5' x 5.5'

(from Plate 3.14-12).

Final Design Elevations

25. Top of Dam = 68.5

Design High Water = 67.45

Emergency Spillway Crest = 67.5

Principal Spillway Crest = 66.5

Dewatering Orifice Invert = 61.5

Cleanout Elevation = 63.1 62.1

Elevation of Upstream Toe of Dam or Excavated Bottom of "Wet Storage Area" (if excavation was performed) = 54

PC020_PC021_PC022_PC119_PC120_LONGHILL_STATION - 204

LONGHILL STATION POND A PRE-DEVELOPMENT

LONGHILL STATION POND A PRE-DEVELOPMENT

INPUT DESIGN DATA

DESIGN STORM FOR ANALYSIS = 2 YEAR
DRAINAGE AREA (ACRES) = 5.9
AVERAGE SLOPE OF DRAINAGE AREA (%) = 5.6
HYDRAULIC LENGTH (FT) = 1050
IMPERVIOUS SURFACE (%) = 10
HYDRAULIC LENGTH MODIFIED (%) = 15
COMPOSITE CURVE NUMBER = 70
SLOPE ADJUSTMENT FACTOR = 1.06
PONDING ADJUSTMENT FACTOR = .63

RESULTS OF HYDRAULIC CALCULATIONS
(SCS TR-55 & TP-149 PROCEDURES)

WATERSHED LAG ADJUSTED (IMPER. AREAS & CHAN. IMPROV.) IS .155 HOURS
TIME OF CONCENTRATION ADJUSTED IS .259 HOURS
THE PEAK DISCHARGE FROM THIS WATERSHED IS 4 C.F.S.

THE FOLLOWING ARE TIME INCREMENTS AND ORDINATES OF THE
INFLOW HYDROGRAPH

(HOURS)	(C.F.S.)
0,0	
.062	.057
.124	.214
.186	.577
.248	1.186
.31	2.082
.372	3.179
.434	4.041
.496	4.186
.558	3.518
.62	2.423
.683	1.452
.745	.683
.807	.183
.869	0

LONGHILL STATION POND A POST-DEVELOPMENT

LONGHILL STATION POND A POST-DEVELOPMENT

INPUT DESIGN DATA

DESIGN STORM FOR ANALYSIS = 2 YEAR
DRAINAGE AREA (ACRES) = 18.9
AVERAGE SLOPE OF DRAINAGE AREA (%) = 1.8
HYDRAULIC LENGTH (FT) = 3250
IMPERVIOUS SURFACE (%) = 38
HYDRAULIC LENGTH MODIFIED (%) = 35
COMPOSITE CURVE NUMBER = 82
SLOPE ADJUSTMENT FACTOR = 1.24
PONDING ADJUSTMENT FACTOR = .8

RESULTS OF HYDRAULIC CALCULATIONS
(SCS TR-55 & TP-149 PROCEDURES)

WATERSHED LAG ADJUSTED (IMPER. AREAS & CHAN. IMPROV.) IS .362 HOURS
TIME OF CONCENTRATION ADJUSTED IS .603 HOURS
THE PEAK DISCHARGE FROM THIS WATERSHED IS 23 C.F.S.

THE FOLLOWING ARE TIME INCREMENTS AND ORDINATES OF THE
INFLOW HYDROGRAPH

(HOURS)	(C.F.S.)
0,0	
.145	.179
.29	.603
.434	1.782
.579	4.76
.724	11.253
.869	18.463

1.014	22.969
1.159	21.22
1.303	16.498
1.448	10.917
1.593	5.788
1.738	1.91
1.883	.378
2.027	0

STAGE (FT)	DISCHARGE (CFS)	STORAGE (CF)
0	0	0
.5	.64	9021
1.5	3.24	32134
2.5	4.53	58010

THE FOLLOWING ARE TIME INCREMENTS AND ORDINATES OF THE OUTFLOW HYDOGRAPH

(HOURS)	(C.F.S.)
0.000	0.003
0.145	0.017
0.290	0.060
0.434	0.177
0.579	0.461
0.724	1.179
0.869	2.293
1.014	3.321
1.159	3.720
1.303	3.976
1.448	4.089
1.593	4.082
1.738	4.007
1.883	3.909
2.027	3.809
2.172	3.711
2.317	3.616
2.462	3.523
2.607	3.433
2.752	3.345
2.896	3.259
3.041	3.096
3.186	2.920
3.331	2.753
3.476	2.596
3.621	2.449
3.765	2.309
3.910	2.177
4.055	2.053
4.200	1.936
4.345	1.826
4.489	1.722
4.634	1.624
4.779	1.531
4.924	1.444
5.069	1.362
5.214	1.284
5.358	1.211
5.503	1.142

MAXIMUM OUTFLOW IS 4.089 C.F.S.
MAXIMUM STAGE IS 2.15814 FT.
MAXIMUM STORAGE IS 49164 CUBIC FEET

MAXIMUM OUTFLOW IS 4.089 C.F.S.
MAXIMUM STAGE IS 2.15814 FT.
MAXIMUM STORAGE IS 49164 CUBIC FEET

LONGHILL STATION POND A POST-DEVELOPMENT

LONGHILL STATION POND A POST-DEVELOPMENT

INPUT DESIGN DATA

DESIGN STORM FOR ANALYSIS = 10 YEAR
DRAINAGE AREA (ACRES) = 18.9
AVERAGE SLOPE OF DRAINAGE AREA (%) = 1.8
HYDRAULIC LENGTH (FT) = 3250
IMPERVIOUS SURFACE (%) = 38
HYDRAULIC LENGTH MODIFIED (%) = 35
COMPOSITE CURVE NUMBER = 82
SLOPE ADJUSTMENT FACTOR = 1.24
PONDING ADJUSTMENT FACTOR = .83

RESULTS OF HYDRAULIC CALCULATIONS
(SCS TR-55 & TP-149 PROCEDURES)

WATERSHED LAG ADJUSTED (IMPER. AREAS & CHAN. IMPROV.) IS .362 HOURS
TIME OF CONCENTRATION ADJUSTED IS .603 HOURS
THE PEAK DISCHARGE FROM THIS WATERSHED IS 51 C.F.S.

THE FOLLOWING ARE TIME INCREMENTS AND ORDINATES OF THE INFLOW HYDROGRAPH

(HOURS)	(C.F.S.)
0,0	
.145	.5120001
.29	1.704
.434	4.855
.579	12.099
.724	26.643
.869	41.978
1.014	50.717
1.159	46.037
1.303	35.383
1.448	23.114
1.593	12.019
1.738	3.873
1.883	.759
2.027	0

STAGE (FT)	DISCHARGE (CFS)	STORAGE (CF)
0	0	0
.5	.64	9021
1.5	3.24	32134
2.5	4.53	58010
3.5	5.54	85600
4.5	6.39	114468
5	6.77	129299
5.5	20.93	144365

THE FOLLOWING ARE TIME INCREMENTS AND ORDINATES OF THE OUTFLOW HYDOGRAPH

(HOURS)	(C.F.S.)
0.000	0.009
0.145	0.049
0.290	0.167
0.434	0.468
0.579	1.448
0.724	3.276
0.869	4.381
1.014	5.252
1.159	5.848
1.303	6.205

1.448	6.378
1.593	6.400
1.738	6.339
1.883	6.249
2.027	6.153
2.172	6.060
2.317	5.967
2.462	5.876
2.607	5.787
2.752	5.699
2.896	5.612
3.041	5.523
3.186	5.419
3.331	5.316
3.476	5.216
3.621	5.117
3.765	5.020
3.910	4.926
4.055	4.832
4.200	4.741
4.345	4.651
4.489	4.564
4.634	4.458
4.779	4.344
4.924	4.233
5.069	4.124
5.214	4.018
5.358	3.915
5.503	3.815

61.5 + 4.5 = 66

MAXIMUM OUTFLOW IS 6.4 C.F.S.
MAXIMUM STAGE IS 4.513159 FT.
MAXIMUM STORAGE IS 114858 CUBIC FEET

LONGHILL STATION POND A POST-DEVELOPMENT

LONGHILL STATION POND A POST-DEVELOPMENT

INPUT DESIGN DATA

DESIGN STORM FOR ANALYSIS = 25 YEAR
DRAINAGE AREA (ACRES) = 18.9
AVERAGE SLOPE OF DRAINAGE AREA (%) = 1.8
HYDRAULIC LENGTH (FT) = 3250
IMPERVIOUS SURFACE (%) = 38
HYDRAULIC LENGTH MODIFIED (%) = 35
COMPOSITE CURVE NUMBER = 82
SLOPE ADJUSTMENT FACTOR = 1.24
PONDING ADJUSTMENT FACTOR = .85

RESULTS OF HYDRAULIC CALCULATIONS
(SCS TR-55 & TP-149 PROCEDURES)

WATERSHED LAG ADJUSTED (IMPER. AREAS & CHAN. IMPROV.) IS .362 HOURS
TIME OF CONCENTRATION ADJUSTED IS .603 HOURS
THE PEAK DISCHARGE FROM THIS WATERSHED IS 61 C.F.S.

THE FOLLOWING ARE TIME INCREMENTS AND ORDINATES OF THE
INFLOW HYDROGRAPH

(HOURS)	(C.F.S.)
0,0	
.145	.647
.29	2.148
.434	6.086
.579	14.999
.724	32.64
.869	51.062
1.014	61.369
1.159	55.53
1.303	42.589
1.448	27.753
1.593	14.38
1.738	4.614
1.883	.903
2.027	0

STAGE (FT)	DISCHARGE (CFS)	STORAGE (CF)
0	0	0
.5	.64	9020
1.5	3.24	32134
2.5	4.53	58010
3.5	5.54	85600
4.5	6.39	114468
5	6.77	129299
5.5	20.93	144365
6.5	67.01	175128

THE FOLLOWING ARE TIME INCREMENTS AND ORDINATES OF THE
OUTFLOW HYDOGRAPH

(HOURS)	(C.F.S.)
0.000	0.012
0.145	0.062
0.290	0.209
0.434	0.585
0.579	1.877
0.724	3.652
0.869	4.877
1.014	5.822
1.159	6.469
1.303	9.128
1.448	13.827
1.593	12.123
1.738	8.437
1.883	6.720
2.027	6.631

2.172	6.543
2.317	6.456
2.462	6.368
2.607	6.271
2.752	6.175
2.896	6.081
3.041	5.988
3.186	5.897
3.331	5.807
3.476	5.719
3.621	5.632
3.765	5.546
3.910	5.443
4.055	5.340
4.200	5.239
4.345	5.140
4.489	5.043
4.634	4.947
4.779	4.854
4.924	4.762
5.069	4.672
5.214	4.584
5.358	4.485
5.503	4.370

MAXIMUM OUTFLOW IS 13.827 C.F..S.
MAXIMUM STAGE IS 5.249188 FT. +61.5 = 66.75
MAXIMUM STORAGE IS 136807 CUBIC FEET

LONGHILL STATION POND A POST-DEVELOPMENT

LONGHILL STATION POND A POST-DEVELOPMENT

INPUT DESIGN DATA

DESIGN STORM FOR ANALYSIS = 100 YEAR
DRAINAGE AREA (ACRES) = 18.9
AVERAGE SLOPE OF DRAINAGE AREA (%) = 1.8
HYDRAULIC LENGTH (FT) = 3250
IMPERVIOUS SURFACE (%) = 38
HYDRAULIC LENGTH MODIFIED (%) = 35
COMPOSITE CURVE NUMBER = 82
SLOPE ADJUSTMENT FACTOR = 1.24
PONDING ADJUSTMENT FACTOR = .89

RESULTS OF HYDRAULIC CALCULATIONS
(SCS TR-55 & TP-149 PROCEDURES)

WATERSHED LAG ADJUSTED (IMPER. AREAS & CHAN. IMPROV.) IS .362 HOURS
TIME OF CONCENTRATION ADJUSTED IS .603 HOURS
THE PEAK DISCHARGE FROM THIS WATERSHED IS 84 C.F.S.

THE FOLLOWING ARE TIME INCREMENTS AND ORDINATES OF THE INFLOW HYDROGRAPH

(HOURS)	(C.F.S.)
0,0	
.145	.944
.29	3.12
.434	8.769
.579	21.279
.724	45.53
.869	70.505
1.014	84.098
1.159	75.75
1.303	57.918
1.448	37.609
1.593	19.384
1.738	6.181
1.883	1.206
2.027	0

STAGE (FT)	DISCHARGE (CFS)	STORAGE (CF)

0	0	0
.5	.64	9020
1.5	3.24	32134
2.5	4.53	58010
3.5	5.54	85600
4.5	6.39	114468
5.5	20.93	144365
6.5	67.01	175128

THE FOLLOWING ARE TIME INCREMENTS AND ORDINATES OF THE OUTFLOW HYDOGRAPH

(HOURS)	(C.F.S.)
0.000	0.017
0.145	0.090
0.290	0.303
0.434	0.950
0.579	2.799
0.724	4.458
0.869	5.793
1.014	14.256
1.159	33.801
1.303	41.643
1.448	34.259
1.593	22.197
1.738	17.274
1.883	13.523
2.027	10.480
2.172	8.121
2.317	6.383
2.462	6.286
2.607	6.190
2.752	6.096
2.896	6.003
3.041	5.912
3.186	5.822
3.331	5.733
3.476	5.646
3.621	5.560
3.765	5.459
3.910	5.356
4.055	5.255
4.200	5.156
4.345	5.058
4.489	4.963
4.634	4.869
4.779	4.777
4.924	4.686
5.069	4.598
5.214	4.504
5.358	4.388
5.503	4.276

MAXIMUM OUTFLOW IS 41.643 C.F.S. - 61.5 + 6 = 67.5
MAXIMUM STAGE IS 5.949501 FT.
MAXIMUM STORAGE IS 158193 CUBIC FEET

DJG
P.O. Box 3505
Williamsburg, Virginia 23187
(804) 253-0673
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PROJECT LONGHILL STATION SUB.
DATE JULY 31, 1995 COMM NO. 1940220
CAL HLDG CKD PAGE # 14
TITLE RESUB. I, CODE COMPLIANCE COMMENT # 7

DRAWDOWN CALCULATIONS

- POND A (DESIGN) $Q = S / 21{,}600$ SECONDS
  S = DRY STORAGE VOLUME = 129,299 ft^3
  $Q = 5.99$ cfs

  $A = Q / ((64.32 \times h/2)^{1/2} (0.6))$
  $Q = 5.99$ cfs
  $h = 2.04$ ft
  $A = 1.23\ ft^2$ = MAXIMUM ORIFICE SIZE IN ORDER TO DETAIN STORMWATER FOR MIN. OF 6 HOURS

  (ACTUAL) $A = 0.66\ ft^2$
  $T = S / (Q_{AVG} \times 3600)$
  $S = 115{,}525\ ft^3$
  $Q_{AVG} = 4.47$ cfs
  $\boxed{T = 7.18 \text{ hrs}}$

- POND B (DESIGN) $Q = S / 21{,}600$ SECONDS
  S = DRY STORAGE VOLUME = 63110 39,000
  $Q = 2.92$ cfs

  $A = Q / ((64.32 \times h/2)^{1/2} (0.6))$
  $Q = 2.92$ cfs
  $h = 1.75$ ft
  $A = 0.649\ ft^2$ = MAXIMUM ORIFICE SIZE IN ORDER TO DETAIN STORMWATER FOR MIN. OF 6 HOURS

  (ACTUAL) $A = 0.632\ ft^2$
  $T = S / (Q_{AVG} \times 3600)$
  $S = 32273$
  $Q_{AVG} = 1.39$
  $\boxed{T = 6.45 \text{ hrs}}$

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PROJECT LONGHILL STATION
DATE 9-6-95 COMM NO. 1940220
CAL HCPG CKD PAGE # 15
TITLE REVISION #1

- OUTLET PROTECTION FOR LINE A DISCHARGE (E&S pg III-164)
  - ASSUME MIN. TAILWATER CONDITION
  - PIPE ϕ = 24" Q_{10} = 35.2 cfs
  - LENGTH OF APRON = 21'
  - WIDTH OF APRON UPSTREAM: $3 \times \phi$ = 6'
    DOWNSTREAM: ϕ + LENGTH = 2' + 21' = 23'
  - RIPRAP: d_{50} = 0.8' depth = 18" min.

- OUTLET PROTECTION FOR LINE B DISCHARGE (E&S pg III-164)
  - ASSUME MAX. TAILWATER CONDITION
  - PIPE ϕ = 30" Q_{10} = 27.8 cfs
  - LENGTH OF APRON = 12'
  - APRON WIDTH UPSTREAM: $3 \times \phi$ = 7.5'
    DOWNSTREAM: ϕ + (LENGTH)0.4 = 2.5' + (12') × 0.4 = 7.3' MIN.
  - RIPRAP: d_{50} = 0.5' depth = 18" min.

- OUTLET PROTECTION FOR LINE D DISCHARGE (E&S, pg III-164)
  - ASSUME MAX. TAILWATER CONDITION
  - PIPE ϕ = 24" Q_{10} = 20.3 cfs
  - LENGTH OF APRON = 10'
  - APRON WIDTH UPSTREAM: $3 \times \phi$ = 6'
    DOWNSTREAM: ϕ + 0.4(LENGTH) = 6'
  - RIPRAP: d_{50} = 0.5' depth = 18" min.

- OUTLET PROTECTION FOR LINE F DISCHARGE (E&S, pg III-164)
  - ASSUME MIN. TAILWATER CONDITION
  - PIPE ϕ = 15" Q_{10} = 2.3
  - LENGTH OF APRON = 6' MIN.
  - APRON WIDTH UPSTREAM: $3 \times \phi$ = 3.75' MIN.
    DOWNSTREAM: ϕ + LENGTH = 1.25' + 6 = 7.25' MIN.
  - RIPRAP: d_{50} = 0.5' depth = 18" min.

User Name: PC NO. 9
Project: C:\ACAD\1950220\SPDCALC.STM

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STORM SEWER HEC 12 SINGLE INLET REPORT A#1 STA. 13+00 RT.
LONGHILL STATION ROAD

FLOW RESULTS (cfs)
Total Flow to inlet = 1.11

Intercepted by current inlet = 0.92
Bypassed by current inlet = 0.19

PONDING WIDTH (ft) = 5.18
DEPTH AT CURB (ft) = 0.17
EFFICIENCY (%)
Curb = 82.78
Grate = *
Slot = *
Total = 82.78

INPUT PARAMETERS:

Inlet Type = CURB ON GRADE
Gutter Width (ft) = 1.000
Inlet n-value = 0.015
Downstream Inlet Number = 0
Curb Throat Type = Inclined
Curb Length (ft) = 10.00

Longitudinal Slope (ft/ft) = 0.034
Pavement Cross Slope (ft/ft) = 0.021
Gutter Cross Slope (ft/ft) = 0.083

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STORM SEWER HEC 12 SINGLE INLET REPORT A#1 STA. 16+00 RT.
LONGHILL STATION ROAD

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FLOW RESULTS (cfs)
Total Flow to inlet = 1.27

Intercepted by current inlet = 1.10
Bypassed by current inlet = 0.17

PONDING WIDTH (ft) = 5.30
DEPTH AT CURB (ft) = 0.17
EFFICIENCY (%)
Curb = 86.29
Grate = * Total = 86.29
Slot = *

INPUT PARAMETERS:
Inlet Type = CURB ON GRADE
Gutter Width (ft) = 1.000
Inlet n-value = 0.015
Downstream Inlet Number = 0
Curb Throat Type = Inclined
Curb Length (ft) = 12.00

Longitudinal Slope (ft/ft) = 0.040
Pavement Cross Slope (ft/ft) = 0.021
Gutter Cross Slope (ft/ft) = 0.083

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User Name: PC NO. 9
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STORM SEWER HEC 12 SINGLE INLET REPORT A#1A STATION 18+44 LONGHILL STATION ROAD

FLOW RESULTS (cfs)

Total Flow to inlet	= 2.33	PONDING WIDTH (ft)	= 7.03		
		DEPTH AT CURB (ft)	= 0.21		
		EFFICIENCY (%)			
		Curb	= 78.04		
Intercepted by current inlet	= 1.82	Grate	= *	Total	= 78.04
Bypassed by current inlet	= 0.51	Slot	= *		

INPUT PARAMETERS:

Inlet Type	= CURB ON GRADE	Longitudinal Slope (ft/ft)	= 0.036
Gutter Width (ft)	= 1.000	Pavement Cross Slope (ft/ft)	= 0.021
Inlet n-value	= 0.015	Gutter Cross Slope (ft/ft)	= 0.083
Downstream Inlet Number	= 0		
Curb Throat Type	= Inclined		
Curb Length (ft)	= 14.00		

User Name: PC NO. 9
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STORM SEWER HEC 12 SINGLE INLET REPORT A#3 STA. 19+00 RT. SA
COMPATIC STATION ROAD

FLOW RESULTS (cfs)
Total Flow to inlet = 2.30

PONDING WIDTH (ft) = 5.32
DEPTH AT CURB (ft) = 0.17
EFFICIENCY (%)
Curb = 100.00
Intercepted by current inlet = 2.30 Grate = * Total = 100.00
Bypassed by current inlet = 0.00 Slot = *

INPUT PARAMETERS:

Inlet Type	= CURB IN SAG	Longitudinal Slope (ft/ft)	= 0.000
Gutter Width (ft)	= 1.000	Pavement Cross Slope (ft/ft)	= 0.021
Inlet n-value	= 0.015	Gutter Cross Slope (ft/ft)	= 0.083
Downstream Inlet Number	= 0	Gutter depression (in)	= 1.00
Curb Throat Type	= Inclined		
Inlet Opening Ht (in)	= 5.50		
Curb Length (ft)	= 12.00		
Curb Weir Coeff.	= 2.300		
Curb Orifice Coeff.	= 0.670		
Incline Angle (deg)	= 45.00		

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STORM SEWER HEC 12 SINGLE INLET REPORT B#2 STA. 21+19 RT.

LONGHILL STATION ROAD

```
FLOW RESULTS (cfs)                                PONDING WIDTH (ft)          =   7.83
  Total Flow to inlet                 =   2.33    DEPTH AT CURB (ft)          =   0.23
                                                  EFFICIENCY (%)
                                                    Curb   =   76.60
  Intercepted by current inlet        =   1.78    Grate =        *     Total =   76.60
  Bypassed by current inlet           =   0.55    Slot  =        *
```

INPUT PARAMETERS:

```
Inlet Type              = CURB ON GRADE  Longitudinal Slope (ft/ft)    =  0.021
Gutter Width (ft)               =  1.000  Pavement Cross Slope (ft/ft) =  0.021
Inlet n-value                   =  0.015  Gutter Cross Slope (ft/ft)   =  0.083
Downstream Inlet Number         =      0
Curb Throat Type        = Inclined
Curb Length (ft)          =  12.00
```

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STORM SEWER HEC 12 SINGLE INLET REPORT B#2A STA. 26+30 RT. LONGHILL STATION ROAD

FLOW RESULTS (cfs)
Total Flow to inlet = 1.84

PONDING WIDTH (ft) = 6.01
DEPTH AT CURB (ft) = 0.19
EFFICIENCY (%)
Curb = 100.00

Intercepted by current inlet = 1.84
Bypassed by current inlet = 0.00

Grate = *
Slot = *
Total = 100.00

INPUT PARAMETERS:

Inlet Type	= CURB IN SAG	Longitudinal Slope (ft/ft)	= 0.000
Gutter Width (ft)	= 1.000	Pavement Cross Slope (ft/ft)	= 0.021
Inlet n-value	= 0.015	Gutter Cross Slope (ft/ft)	= 0.083
Downstream Inlet Number	= 0	Gutter depression (in)	= 1.00
Curb Throat Type	= Inclined		
Inlet Opening Ht (in)	= 5.50		
Curb Length (ft)	= 8.00		
Curb Weir Coeff.	= 2.300		
Curb Orifice Coeff.	= 0.670		
Incline Angle (deg)	= 45.00		

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STORM SEWER HEC 12 SINGLE INLET REPORT B#1A STA. 28+00 RT LONGHILL STATION ROAD

FLOW RESULTS (cfs)
Total Flow to inlet = 0.54

PONDING WIDTH (ft) = 4.30
DEPTH AT CURB (ft) = 0.15
EFFICIENCY (%)
Curb = 84.86
Grate = * Total = 84.86
Slot = *

Intercepted by current inlet = 0.46
Bypassed by current inlet = 0.08

INPUT PARAMETERS:

Inlet Type	= CURB ON GRADE	Longitudinal Slope (ft/ft)	= 0.018
Gutter Width (ft)	= 1.000	Pavement Cross Slope (ft/ft)	= 0.021
Inlet n-value	= 0.015	Gutter Cross Slope (ft/ft)	= 0.083
Downstream Inlet Number	= 0		
Curb Throat Type	= Inclined		
Curb Length (ft)	= 6.00		

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STORM SEWER HEC 12 SINGLE INLET REPORT A#2 STA. 13+00 LT.
LONGHILL STATION ROAD

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FLOW RESULTS (cfs)
Total Flow to inlet = 0.54

Intercepted by current inlet = 0.42
Bypassed by current inlet = 0.12

PONDING WIDTH (ft) = 3.67
DEPTH AT CURB (ft) = 0.14
EFFICIENCY (%)
Curb = 77.35
Grate = * Total = 77.35
Slot = *

INPUT PARAMETERS:
Inlet Type = CURB ON GRADE
Gutter Width (ft) = 1.000
Inlet n-value = 0.015
Downstream Inlet Number = 0
Curb Throat Type = Inclined
Curb Length (ft) = 6.00

Longitudinal Slope (ft/ft) = 0.034
Pavement Cross Slope (ft/ft) = 0.021
Gutter Cross Slope (ft/ft) = 0.083

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User Name: PC NO. 9 Date: 09-06-95
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STORM SEWER HEC 12 SINGLE INLET REPORT A#3A STA. 16+00 LT. CONTRIBUTING STATION 1 ROAD

```
FLOW RESULTS (cfs)                          PONDING WIDTH (ft)        =   4.60
  Total Flow to inlet              =   0.93  DEPTH AT CURB (ft)        =   0.16
                                             EFFICIENCY (%)
                                               Curb   =  85.96
  Intercepted by current inlet     =   0.80    Grate  =      *    Total =  85.96
  Bypassed by current inlet        =   0.13    Slot   =      *

INPUT PARAMETERS:
 Inlet Type            = CURB ON GRADE  Longitudinal Slope (ft/ft)   =  0.040
 Gutter Width (ft)              =  1.000  Pavement Cross Slope (ft/ft) =  0.021
 Inlet n-value                  =  0.015  Gutter Cross Slope (ft/ft)  =  0.083
 Downstream Inlet Number        =      0
 Curb Throat Type       = Inclined
 Curb Length (ft)       =  10.00
```

User Name: PC NO. 9 Date: 09-13-95
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STORM SEWER HEC 12 SINGLE INLET REPORT A #4 STA. 19+00 LT. SAG
LONGHILL STATION ROAD

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FLOW RESULTS (cfs) PONDING WIDTH (ft) = 4.23
Total Flow to inlet = 1.05 DEPTH AT CURB (ft) = 0.15
EFFICIENCY (%)
Curb = 100.00
Intercepted by current inlet = 1.05 Grate = * Total = 100.00
Bypassed by current inlet = 0.00 Slot = *

INPUT PARAMETERS:
Inlet Type = CURB IN SAG Longitudinal Slope (ft/ft) = 0.000
Gutter Width (ft) = 1.000 Pavement Cross Slope (ft/ft) = 0.021
Inlet n-value = 0.015 Gutter Cross Slope (ft/ft) = 0.083
Downstream Inlet Number = 0 Gutter depression (in) = 1.00
Curb Throat Type = Inclined
Inlet Opening Ht (in) = 5.50
Curb Length (ft) = 6.00
Curb Weir Coeff. = 2.300
Curb Orifice Coeff. = 0.670
Incline Angle (deg) = 45.00
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STORM SEWER HEC 12 SINGLE INLET REPORT A# 3B STA. 19+56.0
LONGHILL STATION ROAD

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FLOW RESULTS (cfs)
Total Flow to inlet = 0.48

Intercepted by current inlet = 0.37
Bypassed by current inlet = 0.11

PONDING WIDTH (ft) = 3.24
DEPTH AT CURB (ft) = 0.13
EFFICIENCY (%)
Curb = 77.95
Grate = * Total = 77.95
Slot = *

INPUT PARAMETERS:

Inlet Type	= CURB ON GRADE	Longitudinal Slope (ft/ft)	= 0.043
Gutter Width (ft)	= 1.000	Pavement Cross Slope (ft/ft)	= 0.021
Inlet n-value	= 0.015	Gutter Cross Slope (ft/ft)	= 0.083
Downstream Inlet Number	= 0		
Curb Throat Type	= Inclined		
Curb Length (ft)	= 6.00		

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User Name: PC NO. 9
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Time: 16:34:56
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STORM SEWER HEC 12 SINGLE INLET REPORT B#3 STA. 21+66 LT. LONGHILL STATION ROAD

FLOW RESULTS (cfs)
Total Flow to inlet = 0.50

PONDING WIDTH (ft) = 4.04
DEPTH AT CURB (ft) = 0.15
EFFICIENCY (%)
Curb = 85.83
Grate = * Total = 85.83
Slot = *

Intercepted by current inlet = 0.43
Bypassed by current inlet = 0.07

INPUT PARAMETERS:

Inlet Type	= CURB ON GRADE	Longitudinal Slope (ft/ft)	= 0.020
Gutter Width (ft)	= 1.000	Pavement Cross Slope (ft/ft)	= 0.021
Inlet n-value	= 0.015	Gutter Cross Slope (ft/ft)	= 0.083
Downstream Inlet Number	= 0		
Curb Throat Type	= Inclined		
Curb Length (ft)	= 6.00		

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STORM SEWER HEC 12 SINGLE INLET REPORT B#3 STA - 86+30 LT. SAG LONGHILL STATION ROAD

FLOW RESULTS (cfs)
Total Flow to inlet = 0.59
Intercepted by current inlet = 0.59
Bypassed by current inlet = 0.00

PONDING WIDTH (ft) = 1.94
DEPTH AT CURB (ft) = 0.10
EFFICIENCY (%)
Curb = 100.00
Grate = * Total = 100.00
Slot = *

INPUT PARAMETERS:

Inlet Type	= CURB IN SAG	Longitudinal Slope (ft/ft)	= 0.000
Gutter Width (ft)	= 1.000	Pavement Cross Slope (ft/ft)	= 0.021
Inlet n-value	= 0.015	Gutter Cross Slope (ft/ft)	= 0.083
Downstream Inlet Number	= 0	Gutter depression (in)	= 1.00
Curb Throat Type	= Inclined		
Inlet Opening Ht (in)	= 5.50		
Curb Length (ft)	= 6.00		
Curb Weir Coeff.	= 2.300		
Curb Orifice Coeff.	= 0.670		
Incline Angle (deg)	= 45.00		

User Name: PC NO. 9
Project: C:\ACAD\1950220\SPDCALC.STM

Date: 09-07-95
Time: 11:17:40
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STORM SEWER HEC 12 SINGLE INLET REPORT B#4 STA. 26+55 Lt.
LONGHILL STATION ROAD

FLOW RESULTS (cfs)
Total Flow to inlet = 0.65
Intercepted by current inlet = 0.60
Bypassed by current inlet = 0.05

PONDING WIDTH (ft) = 4.58
DEPTH AT CURB (ft) = 0.16
EFFICIENCY (%)
Curb = 92.42
Grate = *
Slot = *
Total = 92.42

INPUT PARAMETERS:
Inlet Type = CURB ON GRADE
Gutter Width (ft) = 1.000
Inlet n-value = 0.015
Downstream Inlet Number = 0
Curb Throat Type = Inclined
Curb Length (ft) = 8.00

Longitudinal Slope (ft/ft) = 0.020
Pavement Cross Slope (ft/ft) = 0.021
Gutter Cross Slope (ft/ft) = 0.083

User Name: PC NO. 9
Project: C:\ACAD\1950220\SPDCALC.STM

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Time: 14:10:23
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STORM SEWER HEC 12 SINGLE INLET REPORT D#1 STA. 10+56 LT. SHENANDOAH CIRCLE

FLOW RESULTS (cfs)

Total Flow to inlet	=	1.13	PONDING WIDTH (ft)	=	5.29
			DEPTH AT CURB (ft)	=	0.17
			EFFICIENCY (%)		
			Curb = 82.97		
Intercepted by current inlet	=	0.94	Grate = *	Total =	82.97
Bypassed by current inlet	=	0.19	Slot = *		

INPUT PARAMETERS:

Inlet Type	= CURB ON GRADE	Longitudinal Slope (ft/ft)	= 0.032
Gutter Width (ft)	= 1.000	Pavement Cross Slope (ft/ft)	= 0.021
Inlet n-value	= 0.015	Gutter Cross Slope (ft/ft)	= 0.083
Downstream Inlet Number	= 0		
Curb Throat Type	= Inclined		
Curb Length (ft)	= 10.00		

User Name: PC NO. 9
Project: C:\ACAD\1950220\SPDCALC.STM

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STORM SEWER HEC 12 SINGLE INLET REPORT D#2 STA. 10+56 RT. SHENANDOAH CIRCLE

FLOW RESULTS (cfs)

Total Flow to inlet	= 2.78	PONDING WIDTH (ft)	= 7.75		
		DEPTH AT CURB (ft)	= 0.22		
		EFFICIENCY (%)			
		Curb = 74.41			
Intercepted by current inlet	= 2.07	Grate = *		Total =	74.41
Bypassed by current inlet	= 0.71	Slot = *			

INPUT PARAMETERS:

Inlet Type	= CURB ON GRADE	Longitudinal Slope (ft/ft)	= 0.032
Gutter Width (ft)	= 1.000	Pavement Cross Slope (ft/ft)	= 0.021
Inlet n-value	= 0.015	Gutter Cross Slope (ft/ft)	= 0.083
Downstream Inlet Number	= 0		
Curb Throat Type	= Inclined		
Curb Length (ft)	= 14.00		

User Name: PC NO. 9
Project: C:\ACAD\1950220\SPDCALC.STM

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STORM SEWER HEC 12 SINGLE INLET REPORT D#2 STA. 10+56 LT. PINE BLUFF COURT

FLOW RESULTS (cfs)
Total Flow to inlet = 1.58

Intercepted by current inlet = 1.10
Bypassed by current inlet = 0.48

PONDING WIDTH (ft) = 5.72
DEPTH AT CURB (ft) = 0.18
EFFICIENCY (%)
Curb = 69.39
Grate = * Total = 69.39
Slot = *

INPUT PARAMETERS:
Inlet Type = CURB ON GRADE
Gutter Width (ft) = 1.000
Inlet n-value = 0.015
Downstream Inlet Number = 0
Curb Throat Type = Inclined
Curb Length (ft) = 10.00

Longitudinal Slope (ft/ft) = 0.044
Pavement Cross Slope (ft/ft) = 0.021
Gutter Cross Slope (ft/ft) = 0.083

User Name: PC NO. 9
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Date: 09-12-95
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STORM SEWER HEC 12 SINGLE INLET REPORT D#1 STA. 10+56 RT. PINE BLUFF COURT

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FLOW RESULTS (cfs)
Total Flow to inlet = 3.02
Intercepted by current inlet = 2.06
Bypassed by current inlet = 0.96

PONDING WIDTH (ft) = 7.51
DEPTH AT CURB (ft) = 0.22
EFFICIENCY (%)
Curb = 68.18
Grate = * Total = 68.18
Slot = *

INPUT PARAMETERS:
Inlet Type = CURB ON GRADE
Gutter Width (ft) = 1.000
Inlet n-value = 0.015
Downstream Inlet Number = 0
Curb Throat Type = Inclined
Curb Length (ft) = 14.00

Longitudinal Slope (ft/ft) = 0.044
Pavement Cross Slope (ft/ft) = 0.021
Gutter Cross Slope (ft/ft) = 0.083

DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD

User Name: PC NO. 9
Project: C:\ACAD\1950220\SPDCALC.STM

Date: 09-12-95
Time: 16:24:16
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STORM SEWER HEC 12 SINGLE INLET REPORT D#9 STA. 10+50 RT.

HEADSTONE CIRCLE

FLOW RESULTS (cfs)
Total Flow to inlet = 1.62

Intercepted by current inlet = 1.30
Bypassed by current inlet = 0.32

PONDING WIDTH (ft) = 6.04
DEPTH AT CURB (ft) = 0.19
EFFICIENCY (%)
Curb = 80.54
Grate = * Total = 80.54
Slot = *

INPUT PARAMETERS:

Inlet Type	= CURB ON GRADE	Longitudinal Slope (ft/ft)	= 0.036
Gutter Width (ft)	= 1.000	Pavement Cross Slope (ft/ft)	= 0.021
Inlet n-value	= 0.015	Gutter Cross Slope (ft/ft)	= 0.083
Downstream Inlet Number	= 0		
Curb Throat Type	= Inclined		
Curb Length (ft)	= 12.00		

User Name: PC NO. 9 Date: 09-12-95
Project: C:\ACAD\1950220\SPDCALC.STM Time: 16:26:37
Page: 1

STORM SEWER HEC 12 SINGLE INLET REPORT D#10 STA. 10+50 LT.

HEADSTONE CIRCLE

```
FLOW RESULTS (cfs)                          PONDING WIDTH (ft)          =   3.62
  Total Flow to inlet            =   0.54   DEPTH AT CURB (ft)          =   0.14
                                            EFFICIENCY (%)
                                              Curb   =   99.03
  Intercepted by current inlet   =   0.53     Grate =       *     Total =  99.03
  Bypassed by current inlet      =   0.01     Slot  =       *

INPUT PARAMETERS:
 Inlet Type            = CURB ON GRADE  Longitudinal Slope (ft/ft)    =  0.036
 Gutter Width (ft)             =  1.000  Pavement Cross Slope (ft/ft) =  0.021
 Inlet n-value                 =  0.015  Gutter Cross Slope (ft/ft)   =  0.083
 Downstream Inlet Number       =      0
 Curb Throat Type      = Inclined
 Curb Length (ft)          =  10.00
```

User Name: PC NO. 9
Project: C:\ACAD\1950220\SPDCALC.STM

Date: 09-12-95
Time: 15:00:14
Page: 1

STORM SEWER HEC 12 SINGLE INLET REPORT D#4 STA. 44+79 RT.
PUDDING BOTTOM LANE

MMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM

FLOW RESULTS (cfs)
Total Flow to inlet = 0.45
Intercepted by current inlet = 0.36
Bypassed by current inlet = 0.09

PONDING WIDTH (ft) = 3.14
DEPTH AT CURB (ft) = 0.13
EFFICIENCY (%)
Curb = 80.09
Grate = * Total = 80.09
Slot = *

INPUT PARAMETERS:
Inlet Type = CURB ON GRADE
Gutter Width (ft) = 1.000
Inlet n-value = 0.015
Downstream Inlet Number = 0
Curb Throat Type = Inclined
Curb Length (ft) = 6.00

Longitudinal Slope (ft/ft) = 0.042
Pavement Cross Slope (ft/ft) = 0.021
Gutter Cross Slope (ft/ft) = 0.083

DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD

User Name: PC NO. 9
Project: C:\ACAD\1950220\SPDCALC.STM

Date: 09-12-95
Time: 16:18:43
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STORM SEWER HEC 12 SINGLE INLET REPORT D#5 STA. 41+79 RT.
PUDDING BOTTOM GATE

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MMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM
 FLOW RESULTS (cfs)                              PONDING WIDTH (ft)        =   3.45
   Total Flow to inlet            =    0.54     DEPTH AT CURB (ft)        =   0.13
                                                 EFFICIENCY (%)
                                                   Curb   =  89.20
   Intercepted by current inlet   =    0.48        Grate  =      *    Total =  89.20
   Bypassed by current inlet      =    0.06        Slot   =      *

INPUT PARAMETERS:
 Inlet Type          = CURB ON GRADE  Longitudinal Slope (ft/ft)    =  0.043
 Gutter Width (ft)          =  1.000  Pavement Cross Slope (ft/ft)  =  0.021
 Inlet n-value              =  0.015  Gutter Cross Slope (ft/ft)    =  0.083
 Downstream Inlet Number    =      0
 Curb Throat Type     = Inclined
 Curb Length (ft)       =   8.00
DDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDDD
```

User Name: PC NO. 9
Project: C:\ACAD\1950220\SPDCALC.STM

Date: 09-12-95
Time: 16:52:10
Page: 1

STORM SEWER HEC 12 SINGLE INLET REPORT #D6-STA. 40+75 RT. PUDDING BOTTOM CURVE

FLOW RESULTS (cfs)
Total Flow to inlet = 0.17
Intercepted by current inlet = 0.15
Bypassed by current inlet = 0.02

PONDING WIDTH (ft) = 1.86
DEPTH AT CURB (ft) = 0.10
EFFICIENCY (%)
Curb = 90.44
Grate = *
Slot = *
Total = 90.44

INPUT PARAMETERS:
Inlet Type = CURB ON GRADE
Gutter Width (ft) = 1.000
Inlet n-value = 0.015
Downstream Inlet Number = 0
Curb Throat Type = Inclined
Curb Length (ft) = 4.00
Longitudinal Slope (ft/ft) = 0.028
Pavement Cross Slope (ft/ft) = 0.021
Gutter Cross Slope (ft/ft) = 0.083

User Name: PC NO. 9
Project: C:\ACAD\1950220\SPDCALC.STM

Date: 09-12-95
Time: 16:53:37
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STORM SEWER HEC 12 SINGLE INLET REPORT #D7 STA. 38+75 RT

PUDDING BOTTOM LANE

FLOW RESULTS (cfs)

Total Flow to inlet	= 0.29	PONDING WIDTH (ft)	= 2.73		
		DEPTH AT CURB (ft)	= 0.12		
		EFFICIENCY (%)			
		Curb = 95.82			
Intercepted by current inlet	= 0.28	Grate =	*	Total =	95.82
Bypassed by current inlet	= 0.01	Slot =	*		

INPUT PARAMETERS:

Inlet Type	= CURB ON GRADE	Longitudinal Slope (ft/ft)	= 0.028
Gutter Width (ft)	= 1.000	Pavement Cross Slope (ft/ft)	= 0.021
Inlet n-value	= 0.015	Gutter Cross Slope (ft/ft)	= 0.083
Downstream Inlet Number	= 0		
Curb Throat Type	= Inclined		
Curb Length (ft)	= 6.00		

User Name: PC NO. 9
Project: C:\HGAC\950220\SPDCALC.STM

Date: 09-12-95
Time: 14:43:19
Page: 1

STORM SEWER HEC 12 SINGLE INLET REPORT D#3 STA. 44+79 LT. PUDDLING BOTTOM LANE

FLOW RESULTS (cfs)
Total Flow to inlet = 0.68

PONDING WIDTH (ft) = 3.91
DEPTH AT CURB (ft) = 0.14

EFFICIENCY (%)
Curb = 93.64
Grate = *
Slot = *
Total = 93.64

Intercepted by current inlet = 0.64
Bypassed by current inlet = 0.04

INPUT PARAMETERS:

Inlet Type	= CURB ON GRADE	Longitudinal Slope (ft/ft)	= 0.042
Gutter Width (ft)	= 1.000	Pavement Cross Slope (ft/ft)	= 0.021
Inlet n-value	= 0.015	Gutter Cross Slope (ft/ft)	= 0.083
Downstream Inlet Number	= 0		
Curb Throat Type	= Inclined		
Curb Length (ft)	= 10.00		

User Name: PC NO. 9
Project: C:\ACAD\1950220\SPDCALC.STM

Date: 09-12-95
Time: 16:35:23
Page: 1

STORM SEWER HEC 12 SINGLE INLET REPORT D#1 STA. 41+79 CT. PUDDLING BOTTOM CURVE

FLOW RESULTS (cfs)

Total Flow to inlet	= 2.29	PONDING WIDTH (ft)	= 6.73
		DEPTH AT CURB (ft)	= 0.20
		EFFICIENCY (%)	
		Curb = 68.39	
Intercepted by current inlet	= 1.57	Grate = *	Total = 68.39
Bypassed by current inlet	= 0.72	Slot = *	

INPUT PARAMETERS:

Inlet Type	= CURB ON GRADE	Longitudinal Slope (ft/ft)	= 0.043
Gutter Width (ft)	= 1.000	Pavement Cross Slope (ft/ft)	= 0.021
Inlet n-value	= 0.015	Gutter Cross Slope (ft/ft)	= 0.083
Downstream Inlet Number	= 0		
Curb Throat Type	= Inclined		
Curb Length (ft)	= 12.00		

User Name: PC NO. 9
Project: C:\ACAD\1950220\SPDCALC.STM

Date: 09-12-95
Time: 16:44:35
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STORM SEWER HEC 12 SINGLE INLET REPORT D#3 STA. 40+75 LT. PUDDING BOTTOM CURB

FLOW RESULTS (cfs)

Total Flow to inlet	= 2.48	PONDING WIDTH (ft)	= 7.60		
		DEPTH AT CURB (ft)	= 0.22		
		EFFICIENCY (%)			
		Curb = 51.80			
Intercepted by current inlet	= 1.28	Grate =	*	Total =	51.80
Bypassed by current inlet	= 1.20	Slot =	*		

INPUT PARAMETERS:

Inlet Type	= CURB ON GRADE	Longitudinal Slope (ft/ft)	= 0.028
Gutter Width (ft)	= 1.000	Pavement Cross Slope (ft/ft)	= 0.021
Inlet n-value	= 0.015	Gutter Cross Slope (ft/ft)	= 0.083
Downstream Inlet Number	= 0		
Curb Throat Type	= Inclined		
Curb Length (ft)	= 8.00		

User Name: PC NO. 9 Date: 09-12-95
Project: C:\ACAD\1950220\SPDCALC.STM Time: 16:47:36
Page: 1

STORM SEWER HEC 12 SINGLE INLET REPORT D#8A STA. 38+75 CT. PODDING BOTTOM CAPE

FLOW RESULTS (cfs)
Total Flow to inlet = 1.47
Intercepted by current inlet = 1.13
Bypassed by current inlet = 0.34

PONDING WIDTH (ft) = 6.11
DEPTH AT CURB (ft) = 0.19
EFFICIENCY (%)
Curb = 76.89
Grate = * Total = 76.89
Slot = *

INPUT PARAMETERS:
Inlet Type = CURB ON GRADE
Gutter Width (ft) = 1.000
Inlet n-value = 0.015
Downstream Inlet Number = 0
Curb Throat Type = Inclined
Curb Length (ft) = 10.00
Longitudinal Slope (ft/ft) = 0.028
Pavement Cross Slope (ft/ft) = 0.021
Gutter Cross Slope (ft/ft) = 0.083

Calculated By: HLPG Date: AUGUST 22, 1995
Checked By: WDJ Date: AUGUST 22, 1995
N: CONC. 0.013 GRASS = 0.05
Storm Frequency 10-YR

DJG, INC

P. O. BOX 3505
WILLIAMSBURG, VIRGINA 23187
STORM DRAINAGE COMPUTATION SHEET

PROJECT NO. 1940220 revision I (8/31/95)
PROJECT DESC. LONGHILL STATION SUBDIVISION ROAD A
SHEET 1 OF 2 SHEETS

LOCATION				RUN-OFF										PIPE-CHANNEL DESIGN						HYDRAULIC GRADE LINE							
				AREA-ACRES					TIME OF FLOW (MIN.)																		
LINE	RUN	FROM	TO	INCREMENTAL	TOTAL	RUN-OFF COEFF.	INCREMENTAL CA	ACCUMULATED CA	TO INLET/UPPER RCH.	WITHIN REACH CONVEYANC	TIME OF CONCENTRATION	INTENSITY	DISCHARGE/CFS	PIPE SIZE	CHANNEL SECTION	SLOPE FT/FT	CAPACITY FULL/C.F.S.	VELOCITY FULL/C.F.S.	DESIGN VELOCITY/F.P.S.	CONVEYANCE LENGTH/FT.	INVERT UPSTREAM	INVERT DOWNSTREAM	FRICTION SLOPE/FT./FT.	VELOCITY FACTOR	V2/2G/FT.	H.G.L. ELEV. UPSTREAM	H.G.L. DOWNSTREAM	RIM ELEVATION
A	I	1	2	0.41	0.41	0.6	0.25	0.25	21	0.24	21.2	4.5	1.107	15		0.0048	4.46	3.64	3.04	44	112.56	112.35	0.00478	0.836	0.144	113.81	113.58	116.48
		2	3a	0.2	0.61	0.6	0.12	0.37	12	0.68	12.7	4.5	1.647	15		0.0397	12.87	10.49	7.34	300	112.25	100.34	0.03973	0.700	0.837	113.58	101.54	116.48
	II	1	3a	0.4	0.4	0.6	0.24	0.24	23	0.24	23.2	4.5	1.080	15		0.0050	4.57	3.72	3.08	44	100.56	100.34	0.00500	0.828	0.147	101.54	101.30	104.48
	I	3a	4	0.3	1.31	0.6	0.18	4 0.79	13	0.53	13.5	4.5	3.537	15		0.0438	13.52	11.02	9.36	300	100.24	87.10	0.04383	0.850	1.362	101.30	87.90	104.48
	III	1a	2	0.8	0.8	0.8	0.6	0.48	0.48	17	0.11	17.1	4.5	2.160	15		0.0071	5.46	4.45	4.15	28	91.20	91.00	0.00715	0.933	0.268	93.36	93.13	95.40
		1b	2	23	23		0.3	6.90	6.90	41	0.23	41.2	4.5	20.700	21		0.0176	21.05	8.75	9.87	136	94.00	91.60	0.01766	1.128	1.513	95.72	93.13	95.75
		2	3	0	23.8		0.31	0.00	7.38	0.5	0.02	0.5	4.5	33.201	21		0.0444	33.38	13.88	15.82	16	89.91	89.20	0.04440	1.140	3.886	93.13	91.14	95.16
		3	4	0.9	24.7	0.3073	0.28	4 7.59	19	0.05	19.0	4.5	34.156	21		0.0466	34.20	14.22	16.21	44	87.60	85.75	0.04662	1.140	4.080	91.14	87.90	95.04
	I	3b	4	0.15	0.15	0.6	0.09	4 0.09	12	0.17	12.2	4.5	0.405	15		0.0558	15.26	12.43	5.18	52	90.00	87.10	0.05581	0.417	0.417	90.85	87.90	95.49
		4	5	0.62	26.78	0.292	0.18	7.82	18	0.08	18.1	4.5	35.189	24		0.0250	35.77	11.39	12.96	60	85.50	84.00	0.02501	1.138	2.607	87.90	86.00	95.04
								8.47					38.1														
B	I	1	2	4.1 3.3	3.3	0.54	1.78	1.78	27	0.24	27.2	4.5	8.019	15		0.0239	9.98	8.13	9.11	132	96.00	92.85	0.02388	1.120	1.288	101.41	98.09	103.25
		2	3	0.9	4.2	0.55	0.50	2.31	22	0.11	22.1	4.5	10.395	15		0.0367	12.38	10.09	9.99	64	92.75	90.40	0.03675	0.990	1.548	98.09	94.97	99.69
		3	4	0.2	4.4	0.55	0.11	2.42	9	0.41	9.4	4.5	10.890	21		0.0066	12.87	5.35	5.86	144	90.30	89.35	0.00660	1.095	0.533	94.97	93.25	100.89
		4	5	0.85	5.25	0.6	0.51	3.15	27	0.73	27.7	4.5	14.175	24		0.0052	16.38	5.21	5.68	250	89.25	87.94	0.00524	1.090	0.501	93.25	91.77	93.92
		5	6	0.0	5.25	0.6	0.00	3.15	1	0.34	1.3	4.5	14.175	24		0.0052	16.34	5.20	5.67	115	87.84	87.24	0.00522	1.090	0.499	91.77	90.98	91.92
		6	7	0.0	5.25	0.6	0.00	3.15	1	0.16	1.2	4.5	14.175	24		0.0222	33.69	10.72	12.65	124	86.65	83.90	0.02219	1.180	2.486	90.98	87.82	92.00
	II	1a	2a	0.2	0.2	0.6	0.12	0.12	11	0.39	11.4	4.5	0.540	15		0.0166	8.32	6.78	7.39	172	100.70	97.85	0.01658	1.090	0.847	101.71	98.76	104.95
		1b	2b	0.82	1.02	0.6	0.49	0.61	18	0.26	18.3	4.5	2.754	15		0.0341	11.93	9.72	8.55	132	103.00	98.50	0.03412	0.880	1.136	104.44	99.79	104.50
		2b	2a	0.0	1.02	0.6	0.00	0.61	12	0.16	12.2	4.5	2.754	15		0.0091	6.16	5.02	4.62	44	97.65	97.25	0.00910	0.920	0.331	99.79	98.76	102.41
		2a	3	0.65	1.67	0.6	0.39	1.00 1.12	13	0.14	13.1	4.5	4.509	18		0.0091	10.02	5.67	5.33	44	96.50	96.10	0.00910	0.940	0.441	98.76	98.13	102.02
		3	4	0.2	1.87	0.6	0.12	1.12 1.24	9	0.09	9.1	4.5	5.049	18		0.0107	10.87	6.15	5.05	28	95.35	95.05	0.01072	0.820	0.395	98.13	97.55	102.02
		4	5	0.24	2.11	0.6	0.14	1.27 1.4	12	0.35	12.4	4.5	5.697	18		0.0092	10.07	5.70	6.44	136	94.30	93.05	0.00920	1.130	0.644	97.55	96.13	102.23
		5	B1-7	0.0	2.11	0.6	0.00	1.27 1.4	1	0.30	1.3	4.5	5.697	18		0.0344	19.48	11.02	12.45	224	91.60	83.90	0.03440	1.130	2.408	96.13	87.82	96.20
	I	7	8	2.05	9.41	0.6	1.23	5.65	20	0.15	20.2	4.5	25.407	24		0.0147	27.40	8.72	9.93	92	83.00	81.65	0.01468	1.138	1.530	87.82	86.17	87.92
		8	9	0.9	10.31	0.6	6.19	6.19	19	0.65	19.6	4.5	27.837	24		0.0208	32.61	10.38	11.60	450	81.00	71.65	0.02079	1.118	2.091	86.17	76.11	87.92
		9	10	0.0	10.31	0.6	0.00	6.19	1	0.87	1.9	4.5	27.837	30		0.0119	44.71	9.11	9.64	505	71.00	65.00	0.01188	1.058	1.442	76.11	69.17	76.2
		10	11	0.0	10.31	0.6	0.00	6.19	1	0.39	1.4	4.5	27.837	30		0.0185	55.71	11.35	11.46	271	64.00	59.00	0.01846	1.010	2.041	69.17	63.69	75.5

HWD for 20.7 cfs 21" pipe
= 2' x 2' 42" = 3.5'
or dw 97 - ok

3.15
1.4
1.23
5.78

ok

Calculated By: HLPG
Checked By: WDJ
N: CONC. 0.009 GRASS = 0.05
Storm Frequency 10-YR

Date: AUGUST 22, 1995
Date: AUGUST 22, 1995

DJG, INC

P. O. BOX 3505
WILLIAMSBURG, VIRGINA 23187
STORM DRAINAGE COMPUTATION SHEET

PROJECT NO. 1940220 revision I (8/31/95)
PROJECT DESC. LONGHILL STATION SUBDIVISION ROADs B - E
SHEET 1 OF 2 SHEETS

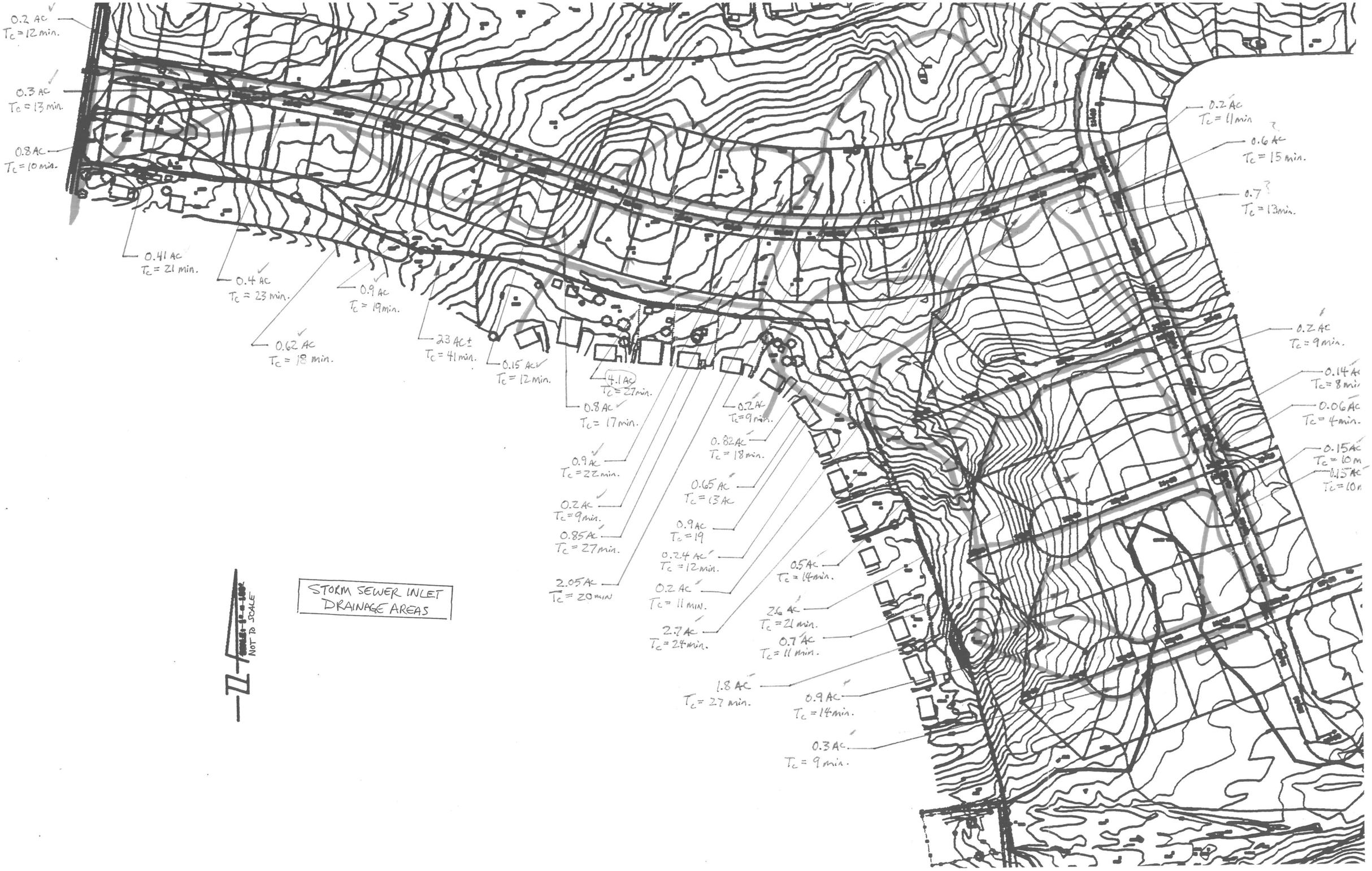
LOCATION				RUN-OFF										PIPE-CHANNEL DESIGN							HYDRAULIC GRADE LINE								
				AREA-ACRES					TIME OF FLOW (MIN.)																				
LINE	RUN	FROM	TO	INCREMENTAL	TOTAL	RUN-OFF COEFF.	INCREMENTAL CA	ACCUMULATED CA	TO INLET/UPPER RCH.	WITHIN REACH CONVEYANCE	TIME OF CONCENTRATION	INTENSITY	DSCHARGE/CFS	PIPE SIZE	CHANNEL SECTION	SLOPE FT/FT	CAPACITY FULL/C.F.S.	VELOCITY FULL/C.F.S.	DESIGN VELOCITY/F.P.S.	CONVEYANCE LENGTH/FT.	INVERT UPSTREAM	INVERT DOWNSTREAM	FRICTION SLOPE/FT./FT.	VELOCITY FACTOR	V2/2G/FT.	H.G.L. ELEV. UPSTREAM	H.G.L. DOWNSTREAM	RIM ELEVATION
D	I	1	2	0.50	0.50	0.50	0.25	0.25	14	0.09	14.1	4.5	1.13	15		0.0208	13.47	10.97	6.80	36	84.00	83.25	0.04350	0.620	0.719	92.67	91.02	94.16
		2	3	2.70	3.20	0.50	1.35	1.60	24	0.08	24.1	4.0	6.40	15		0.0156	11.66	9.50	9.74	48	83.00	82.25	0.03263	1.025	1.474	91.02	89.00	94.16
		3	4	0.30	3.50	0.50	0.15	1.75	13	0.10	13.1	4.5	7.88	15		0.0080	8.32	6.78	7.70	44	82.00	81.65	0.01661	1.135	0.920	89.00	87.38	96.90
		4	5	0.20	3.70	0.50	0.10	1.85	11	0.64	11.6	4.5	8.33	15		0.0080	8.35	6.80	7.75	300	81.40	79.00	0.01670	1.140	0.933	87.38	82.10	96.90
	II	1	5	0.60	0.60	0.50	0.30	0.30	15	0.17	15.2	4.5	1.35	15		0.0050	6.60	5.38	4.30	44	79.22	79.00	0.01044	0.800	0.287	82.59	82.10	83.90
	I	5	6	0.20	4.50	0.50	0.10	2.25	9	0.18	9.2	4.5	10.13	15		0.0118	10.14	8.26	9.42	100	70.93	69.75	0.02464	1.140	1.377	82.10	79.41	83.90
	III	1	2	2.60	2.60	0.50	1.30	1.30	21	0.06	21.1	4.0	5.20	15		0.0194	13.01	10.60	9.80	36	71.90	71.20	0.04060	0.924	1.490	82.55	80.91	82.85
		2	3	0.70	3.30	0.50	0.35	1.65	11	0.10	11.1	4.5	7.43	15		0.0083	8.52	6.94	7.79	48	70.70	70.30	0.01740	1.122	0.942	80.91	79.41	82.85
		3	6	0.14	3.44	0.50	0.07	1.72	8	0.09	8.1	4.5	7.74	15		0.0102	9.44	7.69	8.56	44	70.20	69.75	0.02135	1.113	1.137	79.41	77.83	81.25
	I	6	7	0.06	8.00	0.45	0.03	3.60	4	0.44	4.4	4	14.40	21		0.0050	16.18	6.73	7.59	200	69.70	68.70	0.01044	1.128	0.894	77.83	75.04	81.25
		7	8a	0.15	8.15	0.45	0.07	3.67	10	0.06	10.1	4	14.67	21		0.0097	22.57	9.38	9.99	36	68.60	68.25	0.02030	1.065	1.550	75.04	73.76	75.70
		8a	9	0.15	8.30	0.45	0.07	3.74	10	0.11	10.1	4	14.94	21		0.0067	18.69	7.77	7.30	48	68.00	67.68	0.01392	0.940	0.828	73.76	72.43	75.70
		8b	9	1.80	1.80	0.45	0.81	0.81	26	0.18	26.2	4	3.24	15		0.0111	9.84	8.01	6.80	72	70.90	70.00	0.02320	0.848	0.717	74.19	72.43	74.95
		9	10	0.90	11.00	0.45	0.41	4.95	14	0.07	14.1	4	19.80	24		0.0050	23.11	7.35	8.25	36	67.63	67.45	0.01044	1.122	1.057	72.43	71.68	74.76
		10	11	0.30	11.30	0.45	0.14	5.09	9	0.16	9.2	4	20.34	24		0.0050	23.11	7.35	8.26	80	67.40	67.00	0.01044	1.123	1.059	71.68	70.53	74.76
~~F~~	~~I~~	~~1~~	~~2~~	~~0.60~~	~~0.60~~	~~0.60~~	~~0.48~~	~~0.48~~	~~10~~	~~7.00~~	~~17.0~~	~~4.0~~	~~2.30~~	~~15~~		~~0.0083~~	~~8.48~~	~~6.91~~	~~6.10~~	~~52~~	~~119.73~~	~~119.30~~	~~0.01727~~	~~0.691~~	~~0.589~~	~~128.65~~	~~119.66~~	~~128.60~~

NOT TO SCALE

DRAINAGE AREAS:

POST-DEVEL. ———

PRE-DEVEL. ———



NOT TO SCALE

STORM SEWER INLET
DRAINAGE AREAS

GEOTECHNICAL ENGINEERING STUDY REPORT – REVISED
LONGHILL SUBDIVISION, SECTION 2
EARTHEN DAM CERTIFICATION – POND A
JAMES CITY COUNTY, VIRGINIA
FES REPORT NO. 1-83151.044A

PC022

CLIENT: ATLANTIC HOMES, LLC
MR. KEN DODD

JUN 2003
RECEIVED
ENVIRONMENTAL DIVISION

APPROVED
James City County
Environmental Division
By: _____
Date: 6-25-03

Geotechnical Engineering Study Report
Longhill Station Subdivision, Section II
Earthen Dam Certification – Pond A

James City County, Virginia

Prepared for

Atlantic Homes, LLC

Prepared by

Foundation Engineering Science, Inc.

June 19, 2003

FOUNDATION ENGINEERING SCIENCE, INC.

FES

- Drilling Services [Geotechnical & Environmental]
- Geotechnical Engineering [Shallow & Deep Foundations, Retaining Walls & Pavement Design]
- Environmental Management [Phase I & II]
- Construction Inspection Services [Quality Control & Quality Assurance]
- Foundation/Structure & Pavement Distress Evaluations
- Value Engineering During Design & Construction
- Design & Build Segmental Reinforced Retaining Walls [SRRW]

Mr. Ken Dodd
Atlantic Homes, LLC
10 San Jose Drive
Newport News, Virginia 23606

June 19, 2003

Re: Geotechnical Engineering Study Report - Revised
Longhill Subdivision, Section 2
Earthen Dam Certification – Pond A
James City County, Virginia
FES Report No. 1-83151.044a

Dear Mr. Dodd:

Foundation Engineering Science, Inc. (FES) has completed a geotechnical engineering study at the existing project site. This geotechnical engineering study was performed in general accordance with FES Proposal No. NP706.001, dated July 29, 2002, following your written authorization on August 1, 2002 and per your request to delay field testing due to limited access to the site and your verbal authorization on august 6, 2002 to start back the field testing. Additionally, the geotechnical engineering study report was delayed due to unavailability of the approved plans and as built plans from DJG, Inc. as we discussed few times on the phone with you. The geotechnical engineering study consisted of performing two (2) Standard Penetration Test (SPT) borings to an approximate depth of twenty (20) feet below the existing grades, obtained two (2) bulk soil samples for laboratory testing, performed one (1) hand auger boring to six (6) feet in depth, performed one (1) field permeability test and performed compaction density tests on the final grade for the existing Earthen Dam.

Briefly, the results of our analyses indicated that there were silty sand (SM), clayey sand (SC) and sandy clay to sandy silt (CL-ML) within the borings performed. The clayey sand (SC) and sandy clay to sandy silt (CL-ML) soils are acceptable for use as fill material for the core of the earthen dam. Additionally, all the soils are acceptable as fill material for the earthen dam embankment [outer shell].

The side slopes of the earthen dam appear to be approximately three (3) horizontal to one (1) vertical [3H:1V] as shown in the as built plans dated June 17, 2003 prepared by Rickmond Engineering, Inc.. The global stability indicated that the down stream slopes will not be breached during a flooded condition, based on a factor of safety of greater than one (1) for a draw down analysis.

FES did not inspect the earthen dam during construction. Additionally, the existing subgrade in the earthen dam area and the key trench were not evaluated prior to placement of the fill materials.

11843-B CANON BOULEVARD ► NEWPORT NEWS, VIRGINIA 23606 ► PHONE: 757-873-4113 FAX: 757-873-4114

FES appreciates the opportunity to be of service to the **Atlantic Homes, LLC** on this important project and looks forward to its approval. If we can be of any further assistance or you have any questions regarding this report, please do not hesitate to contact the undersigned.

Respectfully submitted,

FOUNDATION ENGINEERING SCIENCE, INC.

Idres Hawairy
Project Engineer

6/19/03
Raja S. El-Awar, P.E.
Principal Engineer
VA Reg. No. 26383

COMMONWEALTH OF VIRGINIA
RAJA S ELAWAR
No. 026383
PROFESSIONAL ENGINEER

Attachments: *Appendix*

Figure- 1 USDA Soil Survey Map
Figure- 2 USGS Quadrangle Map
Figure- 3 Permeability and Borings Location Sketch
Figure- 4 Compaction Density Test Locations
Borings Profile Sheets
Laboratory Testing Program Results

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1.0 INTRODUCTION

1.1 Site Characteristics and Project Information

The project site is located in James City County, Virginia. Specifically, the project site is located within the Longhill Station Subdivision, Section 2 along Allegheny Drive. The site currently contains one (1) existing Earthen Dam and is identified in the project plans as Pond A.

Our review of the project plans and specifications prepared by DJG, Inc. and dated May 29, 1998 and revised dated December 4, 1998 indicated that the dimension for the earthen dam are approximately from 300 to 350 feet in length and ranges approximately 100 feet in plan width [toe to toe]. The side slopes are three (3) horizontal to one (1) vertical [3H:1V]. The design high water elevation for 10 years in the pond is 66.0 and for 100 years is 67.5 feet National Geodetic Vertical Datum (NGVD) of 1929.

2.0 PURPOSE AND SCOPE OF SERVICES

The purpose of this study was to obtain information on the soils located within the Earthen Dam and degree of compaction of the soils placed for the existing Earthen Dam. The existing materials encountered were then evaluated with respect to the available project information and site characteristics. In this regard, for the following items were formulated:

1. Development of shallow and deep subsurface soil and ground water conditions at the existing Earthen Dam area.

2. Performed compaction density testing on the final grade and approximately one (1) to two (2) feet below the final grade to develop correlation between the Standard Penetration Test (SPT) boring N-values and relative compaction.

3. General location and description of potentially deleterious materials encountered in the borings performed, including existing fills or surficial organic.

4. Certify the existing Earthen Dam in general accordance with the plans and specifications. If the existing Earthen Dam does not meet the approved project plans and specifications and James City County requirements, FES will provide parameters required for improving and/or replacing the existing Earthen Dam.

The following services were provided in order to achieve the preceding objectives:

1. Reviewed readily available published geologic and topographic information. This published information was obtained from quadrangle maps published by the United States Geologic Survey (USGS) and Soil Survey published by the United States Department of Agriculture (USDA) Soil Conservation Service (SCS).

2. FES executed a program of subsurface exploration that consisted of subsurface sampling, filed and laboratory testing.

3. Performed one (1) hand auger boring to six (6) feet in depth and obtained one (1) bulk soil sample for laboratory testing and analyses. The bulk sample was collected from the existing materials placed for the existing Earthen Dam area. FES performed one (1) field permeability test within the existing Earthen Dam fill materials.

4. Visually classify and stratify representative soil samples in the laboratory using the Unified Soil Classification System (USCS)), in general accordance with ASTM D-2487 and D-2488. Conducted a laboratory program, that consisted of performing natural moisture content [ASTM D-2216], Atterberg Limits [ASTM D-4318], grain size determination [(-#200) ASTM D-1140] and Standard Proctor [ASTM D-698 tests.

5. Collected ground water level measurements in the borings performed.

6. The results of the field exploration and laboratory testing program were utilized in performing engineering evaluation, analysis and in the formulation of suitability and stability of the existing Earthen Dam. The results of the field exploration, laboratory testing program, conclusions and recommendations are presented in a comprehensive geotechnical engineering study report prepared by an **FES** experienced Professional Engineer registered in the Commonwealth of Virginia.

2.1 Report Format

This report begins with a discussion of the field and laboratory programs followed by a description of the general subsurface conditions, field permeability testing, compaction density testing suitability of the existing materials within the existing Earthen Dam and report limitations. The USDA soil survey, USGS quadrangle map, the borings and sample locations sketches are presented in Figures 1, 2, 3 and 4, respectively in the appendix of this report. Additionally, the boring profile sheets and laboratory test figures are also presented in the Appendix of this report.

3.0 FIELD EXPLORATION

3.1 General

A total of two (2) Standard Penetration Test (SPT) borings were drilled within the existing Earthen Dam area to explore the general soil types. The SPT borings were drilled to approximate depth of twenty (20) feet below the existing top of the Earthen Dam grades. The approximate location of the borings is illustrated in Figure 3. Performed one (1) hand auger boring, one (1) field permeability test and obtained one (1) bulk soil sample for the laboratory testing program.

3.2 SPT Borings

The SPT borings were performed with the use of an All Terrain Vehicle (ATV) mounted drill rig by utilizing hollow steam auger (HSA) procedures. The soil sampling was performed in general accordance with the American Society of Testing and Materials (ASTM) Test Designation D-1586. These samples were taken continuously from the final grade to approximate depths ranging from fifteen (15) to twenty (20) feet below the final/existing grade elevations. Representative portions of these soil samples were collected, labeled and transported to our office for laboratory testing, analysis and classification.

3.3 Bulk Soil Sampling

Two (2) bulk soil samples were obtained in the field from the existing materials placed for the Earthen Dam at approximate depths ranging from one (1) to two (2) feet below the existing subgrade elevations. The locations of the bulk soil samples are shown in Figure 3 in the Appendix of this report.

3.4 Auger Boring

The auger boring was performed with the use of a three (3) inch bucket auger, the soil sampling was performed in general accordance with American Society for Testing and Materials (ASTM) test designation D-1452, titled "Soil Investigation and Sampling by Auger Borings". The soil samples were obtained virtually continuously from the ground surface to boring termination an approximate depth of six (6) feet below the final grades. Representative portions of these soil samples were collected, labeled and transported to our office for laboratory testing, analysis and classification.

3.5 Field Permeability

One (1) field permeability test [open-hole, falling head method] were performed by installing a two (2) inch inside diameter PVC pipe (ground water observation well) with flush joints to an approximate depth of six (6) feet below the existing grades. The permeability testing equipment consisted of a PVC pipe with a close-ended section and a twenty-four (24) inch screen (using a 0.01-inch slot size opening) from four (4) to six (8) feet below the existing grades. Coarse sand (#2) was backfilled to six (6) inches above the screened annual space of the well, followed by a six (6) inch bentonite seal placed over the sand. The purpose of this construction method was to restrict upward (test) water flow between the well hole and the outside wall of the augered hole.

The wells were developed by pumping water into them and allowing them to soak for a period of one (1) hour. Following a soaking period of one (1) hour, water was added until it reached the top of the well casing and allowed to fall a known distance over a measured time. This procedure was repeated a minimum of three (3) times or until time deviation between the tests was less than ten (10) percent.

The collected field data was utilized in the equation found in the "Stormwater Retention Pond Infiltration Analyses in Unconfined Aquifers" for determining the coefficient of permeability of the subject soil stratum. The infiltration rates calculated are presented in tabular format below:

TEST LOCATION	PB-1
PERMEABILITY (In/hr)	2.2

4.0 LABORATORY TESTING

4.1 General

The soil samples were transported to our laboratory and were classified by an **FES** experienced Project Engineer using the Unified Soil Classification System (USCS) in general accordance with ASTM test designations D-2487 and D-2488.

4.2 Tests Performed

Representative soil samples were subjected to a laboratory program. The laboratory program consisted of performing natural moisture content [ASTM D-2216], Atterberg Limits [ASTM D-4318], grain size determination [(-#200) ASTM D-1140] and moisture-density relation ship [Standard Proctor ASTM D-698] tests. The laboratory test results are presented in tabular formats below and in the Appendix of this report.

LABORATORY TEST	ASTM PROCEDURE	NO. OF TESTS
Moisture Content Determination	ASTM D-2216	6
Grain-Size Determination (-#200 Sieve)	ASTM D-1140	6
Atterberg Limits (Liquid and Plastic)	ASTM D-4318	4
Moisture-Density Relationship (Std. Proctor)	ASTM D-698	1

4.3 Test Results

LOCATION	APPROX. SAMPLE DEPTH (Feet)	NATURAL MOIST. CONTENT (%)	#200 SIEVE (%)	ATTERBERG LIMITS		USCS	OPT. MOIST. CONTENT (%)	MAX. DRY DENSITY (pcf)	CBR VALUE (%)
				LL (%)	PI (%)				
Proctor-2	1.5	4.5	26.5	---	NP	SM	12.0	115.5	---
Proctor-3	1.5	4.7	30.3	---	NP	SM	11.5	117.5	---
FES-3	3	7.3	28.3	---	---	SM	---	---	---
FES-3	7	38.1	24.1	---	---	SM	---	---	---
FES-3	9	16.7	44.9	34	17	SC	---	---	---
FES-4	5	11.9	36.5	29	11	SC	---	---	---
FES-4	9	18.5	48.1	39	20	SC	---	---	---
FES-4	14	15.4	37.6	39	23	SC	---	---	---
FES-4	19	18.5	43.8	21	2	SM	---	---	---

5.0 GENERALIZED SUBSURFACE CONDITIONS

5.1 USGS Topographic Survey

The topographic survey map published by the United States Geological Survey titled "Williamsburg, Virginia" dated 1984, was reviewed for ground surface features at the proposed project location. Based on this review, the natural ground surface elevation approximately sixty to (60) to eighty (80) feet National Geodetic Vertical Datum (NGVD) of 1929. The USGS topographic map for the project vicinity is presented in Figure 1 in the Appendix of this report.

5.2 USDA Soil Survey

The "James City County, Virginia" Soil Survey, developed by the United States Department of Agriculture (USDA) Soil Conservation Service (SCS), was reviewed for general near-surface soil information within the general site vicinity. This information indicated that there are two (2) primary mapping units (11C and 15E) within the proposed site area. The USDA Soil Conservation Service (SCS) Survey map for the project vicinity is presented in Figure 1 in the Appendix of this report. The map soil units encountered are as follows:

SOIL SERIES	DEPTH (IN.)	SOIL DESCRIPTION	USCS(1)	USDA SEASONAL HIGH GROUNDWATER TABLE (%)		K(2) (IN/HR)	SHRINK/ SWELL POTENTIAL
				DEPTH (FEET)	MON.		
Craven (11C)	0 - 9	Fine sandy loam	ML, CL-ML, SM, SM-SC	2.0 - 3.0	Dec - Apr	0.6 - 2.0	Low
	9 - 30	Clay, silty clay, silty clay, loam	CH			0.06 - 0.2	Moderate
	30 - 72	Sandy clay loam, sandy loam, fine, sandy loam	SM, SM-SC, SC			0.2 - 6.0	Low
Emporia (15E)	0 - 9	Fine sandy loam	CL, SC, SM, ML	3.0 - 4.5	Nov - Apr	2.0 - 6.0	Low
	9 - 37	Sandy clay loam, sandy loam, clay loam	SC, CL			0.2 - 2	Low
	37 - 50	Sandy clay loam, clay loam, clay loam	SC, CL			0.06 - 0.6	Moderate
	50 - 75	Stratified sandy loam to clay loam	SM, SC, ML, CL			0.06 - 2.0	Moderate

(1) USCS = Unified Soil Classification System
(2) K = Permeability

5.3 General

Soil stratification was based on visual examination of the recovered soil samples, laboratory testing and interpretation of the field boring log by an **FES** experienced Project Engineer. The boring stratification lines represent the approximate boundaries between soil types of significantly different engineering properties; however, the actual transition may be gradual. In some cases, small variations in properties not considered pertinent to our engineering evaluation may have been abbreviated or omitted for clarity. The boring profiles present the conditions at the particular boring location and variations do occur among the borings and between soil samples.

5.4 Subsurface Soil Conditions

The subsurface soils encountered at each structure location have been summarized and are presented in tabular format below:

BORING LOCATION	SOIL LAYER	SOIL DESCRIPTION	DEPTH RANGE (FEET)	AVARAGE SPT "N" VALUES (BPF)	AASHTO SYMBOL
FES-3	1	Light brown, dry to moist, silty SAND with roots "Topsoil"	0 – 0.5	---	SM
	2	Light brown, moist, silty SAND	0.5 – 4	10	SM
	3	Reddish brown, moist, sandy CLAY to sandy SILT	4 – 6	8	CL-ML
	4	Gray to black to brown, moist, clayey SAND with peat from 6 to 8 feet	6 – 10	9	SC
	5	Brown, moist, silty SAND	10 – 20	11	SM
Ground Water Conditions: The ground water table was not encountered in the borings performed on August 9, 2002.					

BORING LOCATION	SOIL LAYER	SOIL DESCRIPTION	DEPTH RANGE (FEET)	AVARAGE SPT "N" VALUES (BPF)	AASHTO SYMBOL
FES-4	1	Light brown, dry to moist, silty SAND with roots "Topsoil"	0 – 0.5	---	SM
	2	Light brown, moist, silty SAND	0.5 – 8	10	SM
	3	Brown, moist, clayey SAND	8 – 10	10	SC
	4	Brown, moist, silty SAND	10 – 15	11	SM
	5	Brown, moist, clayey SAND	15 – 20	10	SC
AB-1	1	Light brown, dry to moist, silty SAND with roots "Topsoil"	0 – 0.5	---	SM
	2	Brown to reddish brown, moist, silty SAND	0.5 – 6	---	SM
Ground Water Conditions: The ground water table was not encountered in the borings performed on August 9, 2002.					

Based on our extensive experience with similar soil types, it is expected that the majority of the subsurface soils encountered within the borings performed, will consist of cohesion less and cohesive soils. Please refer to the soil boring profiles located in the Appendix of this report for specific information at each boring location.

5.5 Ground Water Conditions

The ground water table was not encountered in the SPT borings performed during the field exploration program on August 9, 2002. Ground water levels tend to fluctuate in response to variations in seasonal rainfall, infiltration, site topography and drainage. Based on the soil conditions encountered and the USGS Topographic Map, FES estimates the seasonal normal high ground water level to be encountered at an approximate depth of three (3) feet below the existing grades. However, a "perched" ground water condition, which dissipates with time may be encountered within the top three (3) feet following periods of significant rainfall during and immediately following the wet season.

6.0 EARTEN DAM SOIL SUITABILITY AND STABILITY

6.1 Soil Suitability

The clayey sand (SC) and sandy clay to sandy silt (CL-ML) soils are acceptable materials for the core of the Earthen Dam. The silty sand (SM) soils are marginal as fill material for the core of the Earthen Dam. Additionally, all the soils are suitable as fill material for the Earthen Dam embankment [outer shell].

6.2 Stability

FES representative performed slope stability analyses by a two-dimensional limit equilibrium method using the computer program PCSTABL6. This program was developed at Purdue University under sponsorship of the Federal Highway Administration (FHWA). The program uses the method of slices to determine the safety factor against deep seated circular failure.

Using a 3H:1V and 2H:1V side slopes, we evaluated the stability against slope failure at the highest embankment of eight (8) feet. The soil parameters were developed from the SPT borings performed for the existing Earthen Dam. Input data for the subsurface soils were obtained using general correlations from laboratory test data and Standard Penetration Test N-values.

The global stability safety factors for the Earthen Dam and the draw down analysis were computed to be 1.0 and 0.59, respectively [the required design factors of safety for the assumed design embankment and draw down should be 1.25 and 1.0, respectively]. The computed factors of safety for the assumed highest embankment met the required factors of safety.

7.0 COMPACTION DENSITY TESTING

Foundation Engineering Science, Inc. (FES) performed compaction density testing on the final subgrade material for the existing Earthen Dam. These tests were performed in general accordance with the American Society for Testing and Materials (ASTM) Test Designation D-2922, titled "Compaction Density Testing with Portable Nuclear Gauge". The results of the compaction density tests are tabulated below:

FIELD COMPACTION DENSITY REPORT[1]

Gauge #	26814	Model #	3430	Density Std. Ct.	2516	Moisture Std. Ct.	633	FES REP.:	CD

Proctor	Dry Density[2] (pcf)	Opt. Moist. (%)	Passing #200[3] (%)	Material Description & Classification[4]	Source	Compaction Requirement
2	115.5	12.0	26.5	Brown silty SAND (SM)	On-site	Moderate effort

TEST NO.	DEPTH (inches)	ELEVATION (feet)	PROC. NO.	D.D. (PCF)	MOIST (%)	W.D. (PCF)	% COMP	PASS	FAIL	
1	12	Final Subgrade	1	111.9	5.5	121.2	96.8	X		Low Moisture
2	12	Final Subgrade	1	114.0	5.4	120.2	98.7	X		Low moisture
3	12	Final Subgrade	1	110.9	4.5	115.4	96.0	X		Low moisture

TEST NO.	TEST LOCATION
1	Site No. 1, See Attached Figure 4
2	Site No. 2, See Attached Figure 4
3	Site No. 3, See Attached Figure 4

SPEC. REQUIREMENTS	Utility Trench	Sidewalk	Structure	Roadway/Parking	Earthen Dam
COMPACTION (%)					95.0
MOISTURE (%)					O.M. ± 20

Comments

Compaction density testing was performed in general accordance with [1]ASTM D2922, [2]ASTM D698, [3]ASTM D1140, [4]ASTM D2488

A correlation between the SPT N-values and the relative density was developed based on the laboratory test data shown above. The relative density of the subsurface soils within the upper eight (8) feet of the Earthen Dam indicates that the compaction is approximately

CORRELATION BETWEEN SPT N-VALUES & RELATIVE DENSITY				
TEST LOCATION	N-VALUE (BPF)	WET DENSITY (PCF)	RELATIVE COMPACTION (%)	REMARKS
1	10	121.2	96.8	Pass
2	10	120.0	98.7	Pass
3	10	115.5	96.0	Pass

8.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the results of the subsurface exploration and laboratory testing programs, our site observations, engineering judgment, review of the plans and specifications, the following conclusions and recommendations are presented.

1. Compaction density testing was performed on the final/existing grade elevations. The subgrade soils were compacted to 95.0 percent of the laboratory maximum dry density in general accordance with ASTM D-698 [Standard Proctor] and to an approximate depth of twelve (12) inches. Based on the limited tests performed, **the fill material within the final grade of the earthen dam placed appears to meet the intent of the project plans and specifications.** Additionally, the fill material placed within the earthen dam embankment appears to have been compacted to a minimum relative density on the order of 90.0 percent of the laboratory maximum dry density. A minimum relative compaction of 90.0 percent is sufficient for similar projects.

2. The existing soils encountered within the earthen dam are clayey sand (SC) and sandy clay to sandy silt (CL-ML) **soils are acceptable as core and embankment fill materials.** The silty sand (SM) soils are marginal as core fill material and acceptable as fill materials for the outer shells of the earthen dam (embankment).

3. The side slopes of the earthen dam appear to be three (3) horizontal to one (1) vertical [3H:1V] as shown in the as built plans with exception of the down stream slopes around the drainage pipe which appears to be less than 3H:1V. The contour lines shown on the plans do not appear to be 3H:1V.

4. The global stability indicated that the down stream slopes will be stable during a flooded condition, based on a factor of safety of 1.1 which is greater than 1.0 for a draw down analysis.

5. Inspection was not performed during construction of the earthen dam. Additionally, a core was not shown for the earthen dam in the project plans.

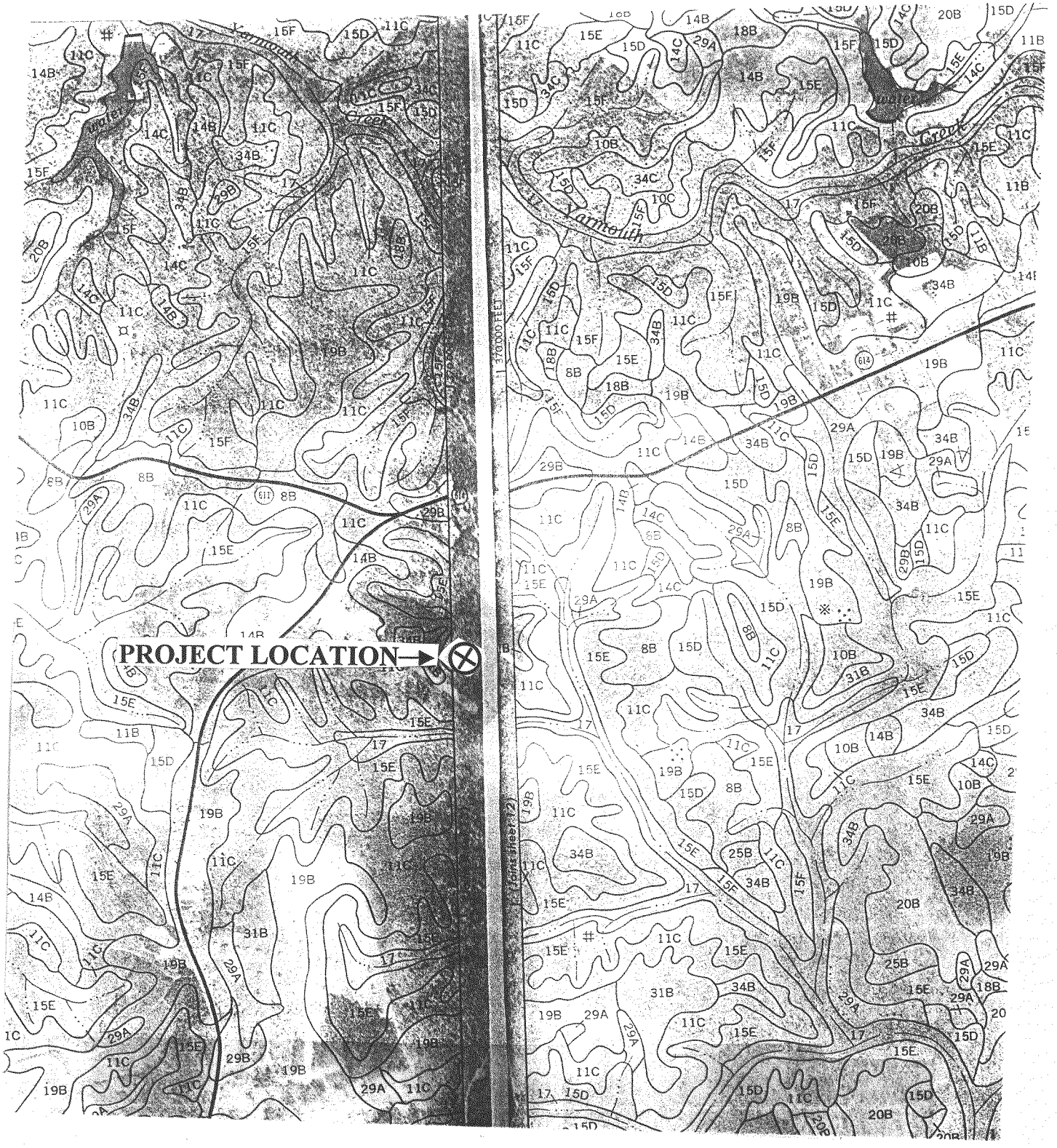
6. Considering that a core was not constructed and the material encountered within the Earthen Dam, water within the storm water management area dam may not be impounded due to the presence of silty sand (SM) within the embankment and core.

7. During extended and heavy rain fall events, the water within the Earthen Dam will rise but may not rise enough to seep through the over flow structure, thus seeping through the embankment of the Earthen Dam. However, above design storm events may occur thus overflowing above the embankment of the Earthen Dam.

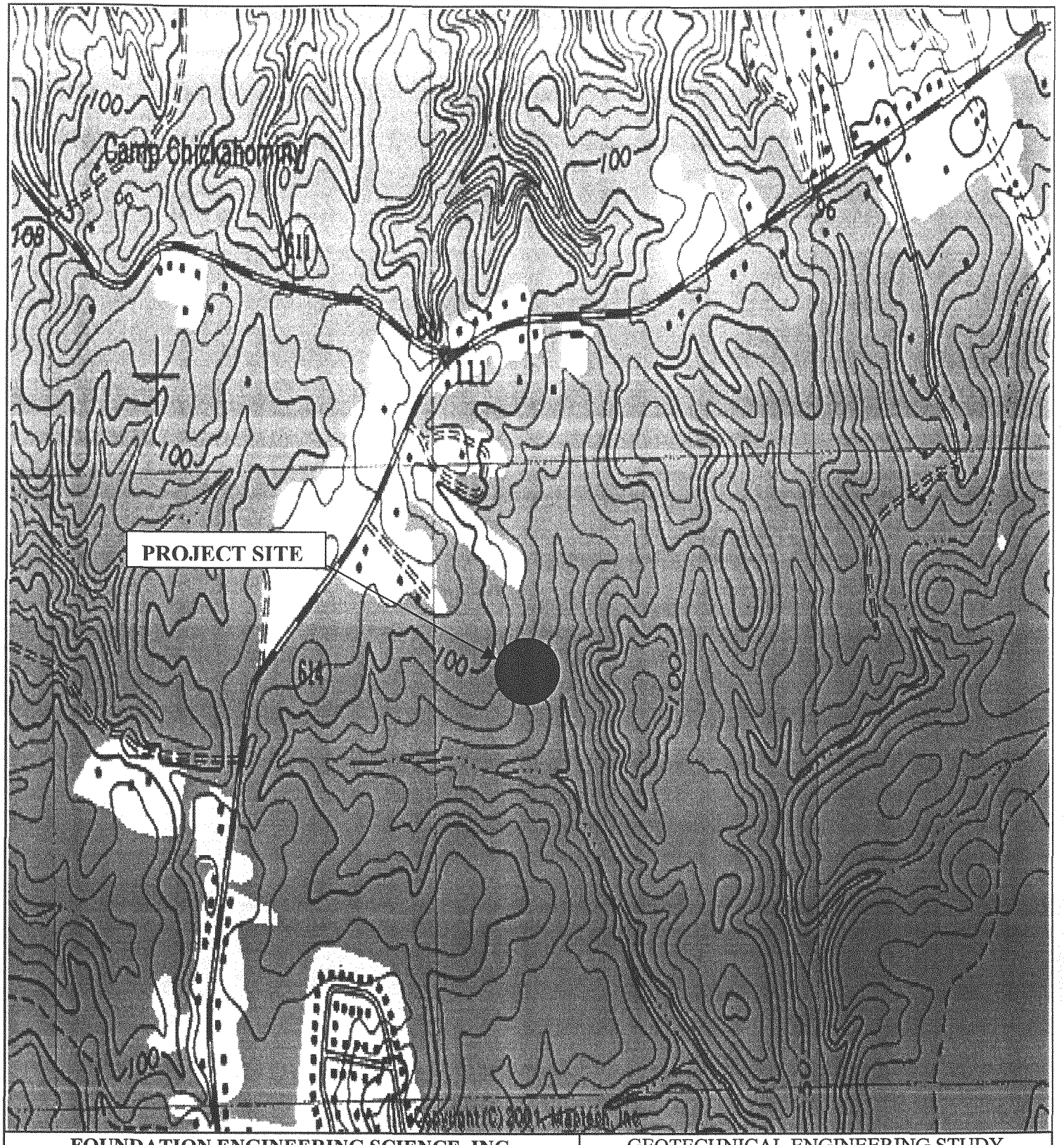
9.0 REPORT LIMITATIONS

The engineering evaluation and analysis have been developed on the basis of the previously described project characteristics and subsurface conditions. These engineering evaluation and analysis were developed from the information obtained in the test borings, which depict subsurface conditions only at these specific locations and at the particular time designated on the boring profiles. Soil conditions at other locations may differ from conditions occurring at these boring locations. In addition, the passage of time may result in a change to the soil conditions at these boring locations.

Our professional services have been performed, our findings obtained, and our engineering evaluation and analysis prepared in accordance with generally accepted Geotechnical Engineering Principles and Practices. Foundation Engineering Science, Inc. is not responsible for the conclusions, opinions or recommendations made by others based on this geotechnical engineering study report.



FOUNDATION ENGINEERING SCIENCE, INC. GEOTECHNICAL, ENVIRONMENTAL & CONSTRUCTION INSPECTION 11843-B CANON BOULEVARD NEWPORT NEWS, VIRGINIA 23606 PHONE: 757-873-4113 FAX: 757-873-4114 EMAIL: RELAWAR@FESVA.COM			GEOTECHNICAL ENGINEERING STUDY **LONGHILL SUBDIVISION, SECTION II** **EARTHEN DAM CERTIFICATION – POND A** JAMES CITY COUNTY, VIRGINIA
DATE: **AUGUST 9, 2002**	SCALE: **N/A**	FES REPORT NO. **1-83151.044**	**FIGURE – 1** **USDA SOIL SURVEY MAP**



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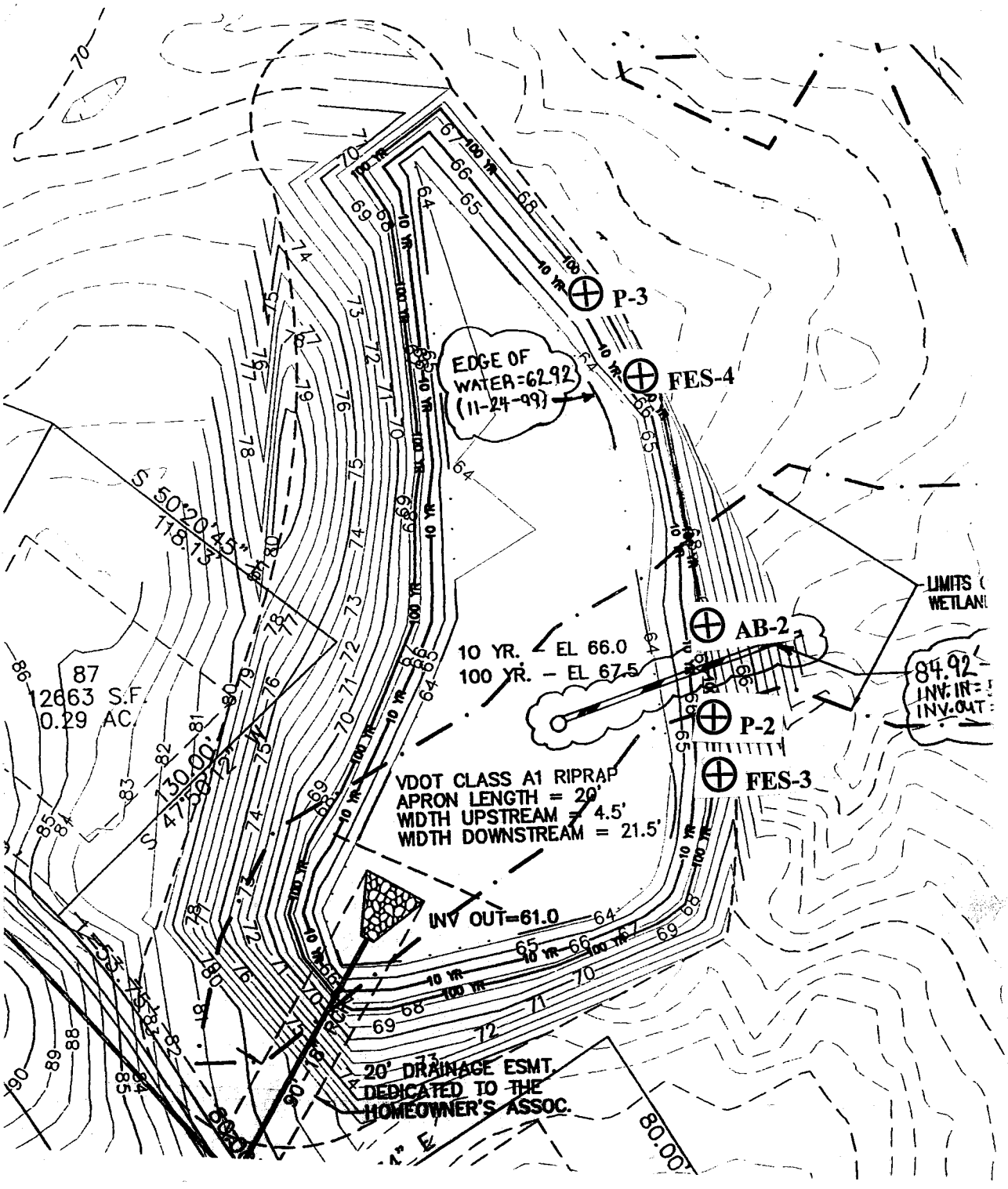
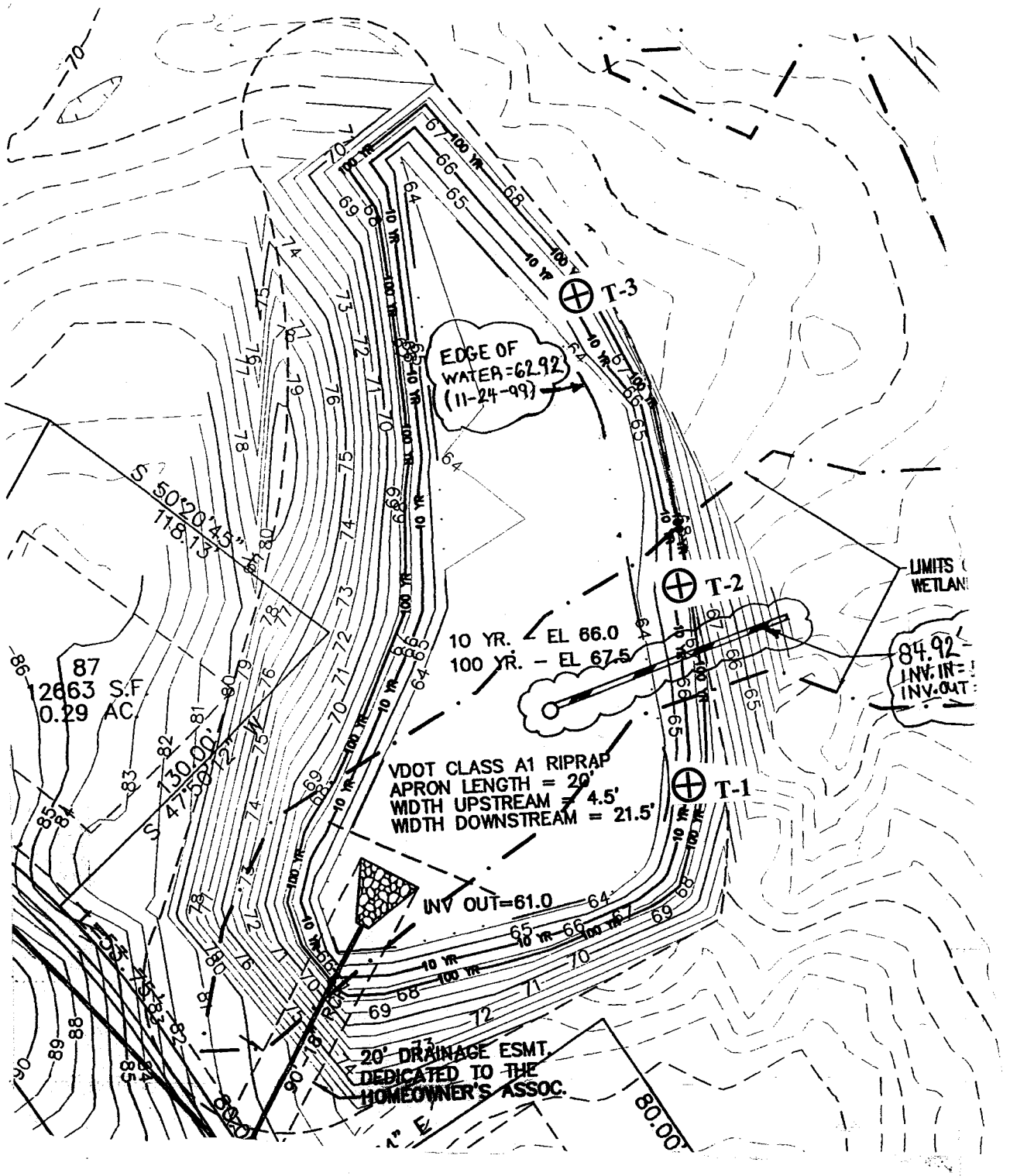
DATE:	SCALE:	FES REPORT NO.	**FIGURE – 2**
AUGUST 9, 2002	**N/A**	**1-83151.044**	**USGS QUADRANGLE MAP**



FOUNDATION ENGINEERING SCIENCE, INC. GEOTECHNICAL, ENVIRONMENTAL & CONSTRUCTION INSPECTION 11843-B CANON BOULEVARD NEWPORT NEWS, VIRGINIA 23606 PHONE: 757-873-4113 FAX: 757-873-4114 EMAIL: RELAWAR@FESVA.COM			GEOTECHNICAL ENGINEERING STUDY **LONGHILL SUBDIVISION, SECTION II** **EARTHEN DAM CERTIFICATION – POND A** JAMES CITY COUNTY, VIRGINIA
DATE: **AUGUST 9, 2002**	SCALE: **N/A**	FES REPORT NO. **1-83151.044**	**FIGURE – 3** **PERMEABILITY, BORING AND SAMPLE LOCATIONS SKETCH**

PC020_PC021_PC022_PC119_PC120_LONGHILL_STATION - 262



FOUNDATION ENGINEERING SCIENCE, INC. GEOTECHNICAL, ENVIRONMENTAL & CONSTRUCTION INSPECTION 11843-B CANON BOULEVARD NEWPORT NEWS, VIRGINIA 23606 PHONE: 757-873-4113 FAX: 757-873-4114 EMAIL: RELAWAR@FESVA.COM			GEOTECHNICAL ENGINEERING STUDY **LONGHILL SUBDIVISION, SECTION II** **EARTHEN DAM CERTIFICATION – POND A** JAMES CITY COUNTY, VIRGINIA
DATE: **AUGUST 9, 2002**	SCALE: **N/A**	FES REPORT NO. **1-83151.044**	**FIGURE – 4** **FIELD COMPACTION DENSITY LOCATION SKETCH**

BORINGS PROFILE SHEETS

FES

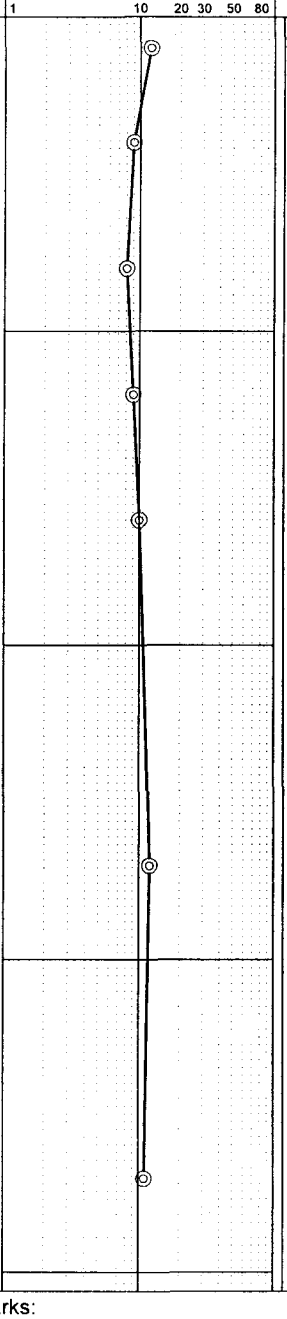
FOUNDATION ENGINEERING SCIENCE, INC.
· Geotechnical Engineering
· Environmental Management
· Construction Inspection Services

11843-B Canon Boulevard
Newport News, Virginia 23606
Phone: 757-873-4113 Fax: 757-873-4114
Email: relawar@fesva.com

PROJECT NAME:	Longhill Station - Section II, Pond A	PROJECT NO.:	1-83151
CLIENT:	Atlantic Homes, LLC.	DRILLING METHOD:	HSA
PROJECT LOCATION:	James City County, Virginia	OBSERVED G.W.T.:	Not Encountered
BORING LOCATION:	See Figure 3	STATION NO.:	

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE NO.	SOIL CLASSIFICATION	MATERIAL DESCRIPTION	SPT, N VALUE OR RQD %
	0		SM	Light brown, dry to moist, silty SAND with roots "Topsoil"	
		1	SM	Light brown, moist, silty SAND	12
		2			9
		3	CL-ML	Reddish brown, moist, sandy CLAY to sandy SILT	8
	5	4	SC	Gray to black to brown, moist, clayey SAND with peat from 6 to 8 feet	9
		5			10
	10		SM	Brown, moist, silty SAND	
		6			12
	15				
		7			11
	20				

STANDARD PENETRATION TEST N-VALUE (Blows/Ft)



HOLE COMPLETION & REMARKS

COMPLETION DEPTH:	20.0 feet
DATE BORING STARTED:	8/9/02
DATE BORING COMPLETED:	8/9/02
ENGINEER/GEOLOGIST:	IH
DRILLING CONTRACTOR:	FES

Sample Types:
- Auger Cutting
- Vane Shear
- SPT
- UD
- Penetrometer
- Rock Core

Remarks:

Unless otherwise noted, water encountered but not recorded.

The stratification lines represent approximate boundaries. The transition may be gradual.

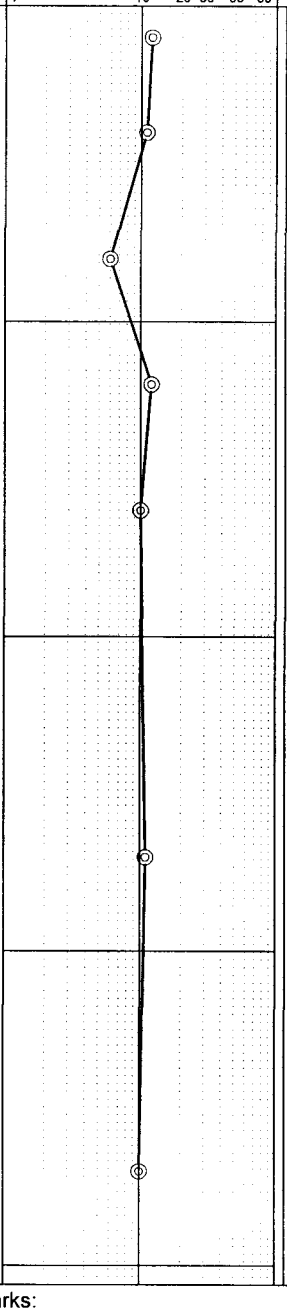
FES

FOUNDATION ENGINEERING SCIENCE, INC.
· Geotechnical Engineering
· Environmental Management
· Construction Inspection Services

11843-B Canon Boulevard
Newport News, Virginia 23606
Phone: 757-873-4113 Fax: 757-873-4114
Email: relawar@fesva.com

PROJECT NAME:	Longhill Station - Section II, Pond A	PROJECT NO.:	1-83151
CLIENT:	Atlantic Homes, LLC.	DRILLING METHOD:	HSA
PROJECT LOCATION:	James City County, Virginia	OBSERVED G.W.T.:	Not Encountered
BORING LOCATION:	See Figure 3	STATION NO.:	

ELEVATION (Feet)	DEPTH (Feet)	SOIL LEGEND & SAMPLE TYPES	SAMPLE NO.	SOIL CLASSIFICATION	MATERIAL DESCRIPTION	SPT, N VALUE OR RQD %	STANDARD PENETRATION TEST N-VALUE ◎ (Blows/Ft)	HOLE COMPLETION & REMARKS
	0			SM	Light brown, dry to moist, silty SAND with roots "Topsoil"			
			1	SM	Light brown, moist, silty SAND	12		
			2			11		
			3			6		
	5		4			12		
			5	SC	Brown, moist, clayey SAND	10		
	10			SM	Brown, moist, silty SAND			
			6			11		
	15			SC	Brown, moist, clayey SAND			
			7			10		
	20							



COMPLETION DEPTH:	20.0 feet
DATE BORING STARTED:	8/9/02
DATE BORING COMPLETED:	8/9/02
ENGINEER/GEOLOGIST:	IH
DRILLING CONTRACTOR:	FES

Sample Types:
- Auger Cutting
- Vane Shear
- SPT
- UD
- Penetrometer
- Rock Core

Remarks:

Unless otherwise noted, water encountered but not recorded.

The stratification lines represent approximate boundaries. The transition may be gradual.

FES

FOUNDATION ENGINEERING SCIENCE, INC.

· Geotechnical Engineering
· Environmental Management
· Construction Inspection Services

11843-B Canon Boulevard
Newport News, Virginia 23606
Phone: 757-873-4113 Fax: 757-873-4114
Email: relawar@fesva.com

PROJECT NAME:	Longhill Station - Section II, Pond A	PROJECT NO.:	1-83151
CLIENT:	Atlantic Homes, LLC.	DRILLING METHOD:	Hand Auger
PROJECT LOCATION:	James City County, Virginia	OBSERVED G.W.T.:	Not Encountered
BORING LOCATION:	See Figure 3	STATION NO.:	

ELEVATION (Feet)	DEPTH (Feet)	SOIL LEGEND & SAMPLE TYPES	SAMPLE NO.	SOIL CLASSIFICATION	MATERIAL DESCRIPTION	SPT, N VALUE OR RQD %	STANDARD PENETRATION TEST N-VALUE ◎ (Blows/Ft) 1 10 20 30 50 80	HOLE COMPLETION & REMARKS
	0			SM	Light brown, dry to moist, silty SAND with roots "Topsoil"			
				SM	Brown to reddish brown, moist, silty SANd			
	5							

COMPLETION DEPTH:	6.0 feet
DATE BORING STARTED:	8/9/02
DATE BORING COMPLETED:	8/9/02
ENGINEER/GEOLOGIST:	IH
DRILLING CONTRACTOR:	FES

Sample Types:

- Auger Cutting
- Vane Shear
- SPT
- UD
- Penetrometer
- Rock Core

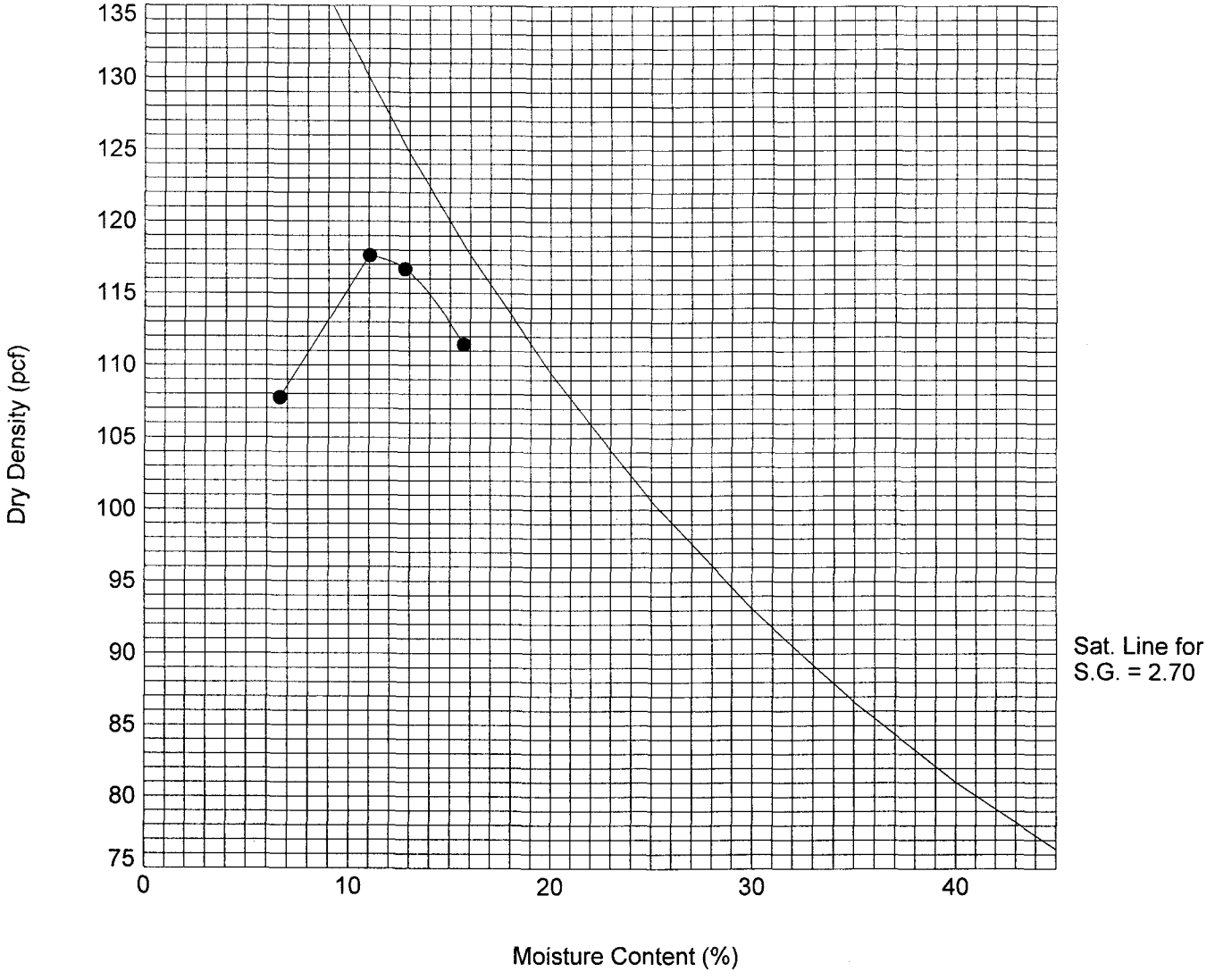
Remarks:

Unless otherwise noted, water encountered but not recorded.

The stratification lines represent approximate boundaries. The transition may be gradual.

LABORATORY TEST RESULTS

MOISTURE-DENSITY RELATIONSHIP REPORT



Sample Depth	Classification		Nat'l Moist.	S.G.	LL	PI	% > No. 4	% < No. 200
	USCS	AASHTO						
2 1.5	SM	A-2-4	4.5	2.70		NP	0	26.5

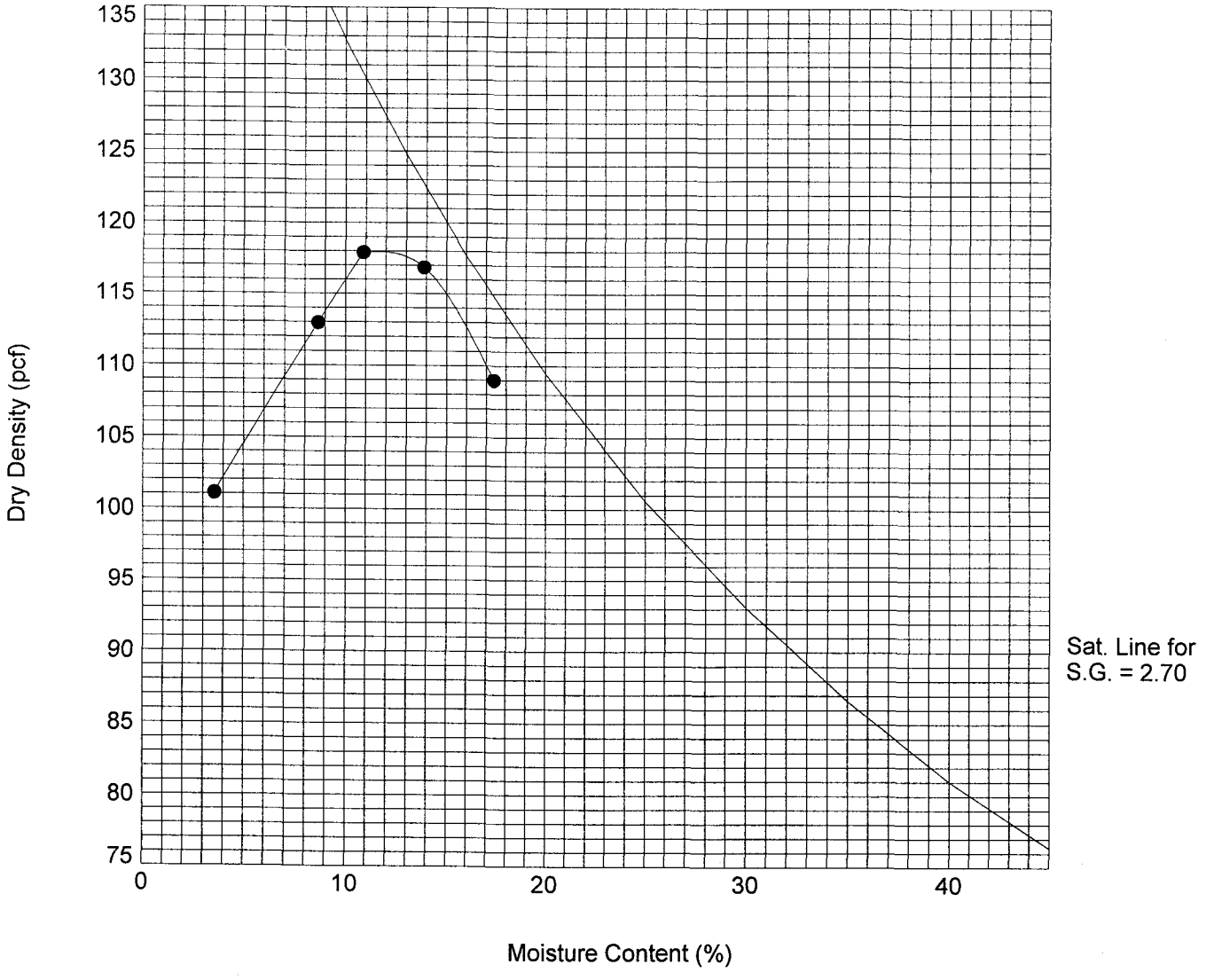
Test Results	Material Description
Optimum Moisture Content = 12.0 Maximum Dry Density = 115.5	Brown silty SAND
Project No.: 1-83151 Project Name: Longhill Station - Section II, Pond A Location: James City County, Virginia Date: 08/09/2002	Remarks: On August 8, 2002 an FES Inc. representative obtained a bulk soil sample from the in-place Pond A Procedure: ASTM D-698, Method A Rammer: Manual Preparation: Dry

FOUNDATION ENGINEERING SCIENCE, INC.

Figure 3

PROCTOR 1-83151.GPJ FES.GDT 2/25/03

MOISTURE-DENSITY RELATIONSHIP REPORT



Sample Depth	Classification		Nat'l Moist.	S.G.	LL	PI	% > No. 4	% < No. 200
	USCS	AASHTO						
3 1.5	SM	A-2-4	4.7	2.70		NP	0	30.3

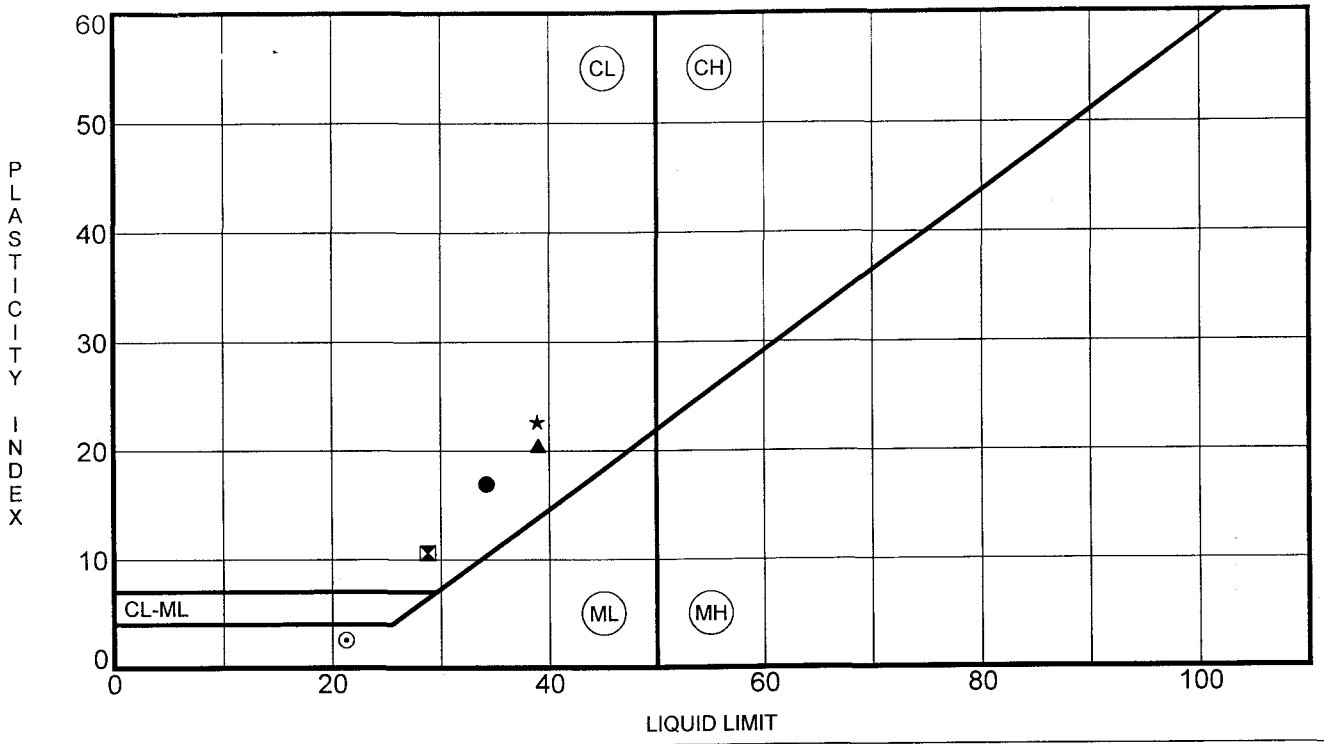
Test Results	Material Description
Optimum Moisture Content = 11.5 Maximum Dry Density = 117.5	Brown silty SAND
Project No.: 1-83151 Project Name: Longhill Station - Section II, Pond A Location: James City County, Virginia Date: 08/09/2002	Remarks: On August 8, 2002 an FES Inc. representative obtained a bulk soil sample from the in-place Pond A Procedure: ASTM D-698, Method A Rammer: Manual Preparation: Dry

FOUNDATION ENGINEERING SCIENCE, INC.

Figure 4

PROCTOR 1-83151.GPJ FES.GDT 2/25/03

PC020_PC021_PC022_PC119_PC120_LONGHILL_STATION - 270



	Specimen Identification		LL	PL	PI	Fines	Classification
●	**FES-3 (08-10)**	**9.0**	**34**	**17**	**17**	**44.9**	**Reddish brown clayey SAND**
⊠	**FES-4 (04-06)**	**5.0**	**29**	**18**	**11**	**36.5**	**Reddish brown clayey SAND**
▲	**FES-4 (08-10)**	**9.0**	**39**	**19**	**20**	**48.1**	**Reddish brown clayey SAND**
★	**FES-4 (13-15)**	**14.0**	**39**	**16**	**23**	**37.6**	**Reddish brown clayey SAND**
⊙	**FES-4 (18-20)**	**19.0**	**21**	**19**	**2**	**43.8**	**Reddish brown silty SAND**

US_ATTERBERG_LIMITS 1-83151.GPJ US_LAB.GDT 2/27/03

FES

Foundation Engineering Science, Inc
11843-B Canon Boulevard
Newport News, Virginia
Telephone: (757) 873-4113
Fax: (757) 873-4113

ATTERBERG LIMITS RESULTS

Project: Longhill Station - Section II, Pond A

Location: James City County, Virginia

Number: 1-83151

FILE:
LONGHILL STATION

COUNTY ATTORNEY

101-C MOUNTS BAY ROAD, P.O. BOX 8784, WILLIAMSBURG, VIRGINIA 23187-8784
(757) 253-6612
Fax: (757) 253-6833

FRANK M. MORTON, III
COUNTY ATTORNEY
E-MAIL ADDRESS: fmmorton@james-city.va.us
(757) 253-6613

LEO P. ROGERS
DEPUTY COUNTY ATTORNEY
E-MAIL ADDRESS: lprogers@james-city.va.us
(757) 253-6614

GREG H. DOHRMAN
ASSISTANT COUNTY ATTORNEY
E-MAIL ADDRESS: ghdohrman@james-city.va.us
(757) 253-6832

January 2, 2002

Robert and Rae Beavers
3936 Longhill Station Road
Williamsburg, Virginia 23188

Kevin and Colleen Diven
3940 Longhill Station Road
Williamsburg, Virginia 23188

Dear Mr. and Mrs. Beavers and Mr. and Mrs. Diven:

RE: Drainage way in Longhill Station

Pat Menichino of the County's Environmental Division let me know about a problem concerning a drainage pipe that runs between your two properties. I understand that this drainage pipe is part of the Longhill Station community drainage system but that no easement was ever recorded for the drainage way. The reason this is coming up at this time is that the developer is looking to dedicate the drainage facilities to the Longhill Station Homeowners Association. Also, Mr. Menichino told me that the County is still holding surety to guaranty the adequacy of the drainage system.

I would like to arrange a meeting some evening or weekend with the four of you and Mr. Menichino. The purpose of the meeting would be to discuss possible resolutions to the issue and the long maintenance responsibilities needed for the drainage way. I suggest that we meet at the property.

Please call me to arrange the meeting or if you have any questions about this letter.

Sincerely,

Leo P. Rogers
Deputy County Attorney

cc: Pat Menichino

FILE -
Longhill Sta. Sect 1A+1B

COUNTY ATTORNEY

101-C MOUNTS BAY ROAD, P.O. BOX 8784, WILLIAMSBURG, VIRGINIA 23187-8784
(757) 253-6612 Fax: (757) 253-6833

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(757) 253-6614

GREG H. DOHRMAN
ASSISTANT COUNTY ATTORNEY
E-MAIL ADDRESS: ghdohrman@james-city.va.us
(757) 253-6832

August 7, 2002

AUG 2002
RECEIVED
ENVIRONMENTAL DIVISION

Allan R. Staley, Esquire
Patten, Wornom, Hatten & Diamonstein, L.C.
12350 Jefferson Avenue, Suite 360
Newport News, Virginia 23602

Dear Allan:

RE: Longhill Station, LLC and Longhill Station Homeowners' Association
Deed of Easement Lots 32 and 33, Sections 1A and 1B
File No. 040766.41

Enclosed is the recorded Deed of Easement for the above referenced matter. By copy of this letter I have forwarded a copy of the Deed of Easement to Mr. & Mrs. Beavers for their records.

Thank you for your assistance in this matter.

Sincerely,

Leo

Leo P. Rogers
Deputy County Attorney

LPR/bk

Enclosure

cc: Mr. & Mrs. Robert L. Beavers
✓Darryl Cook, Environmental Director

DJG, INC.
P.O. Box 3505 1006 Richmond Rd
WILLIAMSBURG, VIRGINIA 23187

(804) 253-0673 or 874-5015
FAX (804) 253-2319

LETTER OF TRANSMITTAL

DATE 1/5/2000 JOB NO. 1940220

ATTENTION PAT MENICHINO

RE: LONGHILL STA. PH. 1 – POND "B" AS-BUILT INFORMATION

TO PAT MENICHINO
JCC – ENGINEERING INSPECTOR
(HAND DELIVERED)

JAN 2000 RECEIVED ENGINEERING DIVISION

WE ARE SENDING YOU ☑ Attached ☐ Under separate cover via _____ the following items:

☐ Shop drawings ☑ Prints ☐ Plans ☐ Samples ☐ Specifications

☐ Copy of letter ☐ Change order ☐ _____

COPIES	DATE	NO.	DESCRIPTION
3	Rev. 1/4/00	1	SHEET C1 – POND AS-BUILTS
			POND A

THESE ARE TRANSMITTED as checked below:

☐ For approval ☐ Approved as submitted ☐ Resubmit _____ copies for approval

☑ For your use ☐ Approved as noted ☐ Submit _____ copies for distribution

☑ As requested ☐ Returned for corrections ☐ Return _____ corrected prints

☐ For review and comment ☐ _____

☐ FOR BIDS DUE _____ 19 _____ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS PLEASE CALL IF YOU HAVE ANY QUESTIONS (253-0673)
THANK YOU!
DAWN LEMON

COPY TO KEN DODD
FILE

SIGNED: Dawn T. Lemon

Enclosures are not as noted, kindly notify us at once.

James City County Environmental Division
Stormwater Management / BMP Inspection Report
Detention and Retention Pond Facilities

S-47-95
PH 1

County BMP ID Code (if known): PC022

Name of Facility: Longhill Station Pond A BMP No.: 1 of 5 Date: 7/23/02

Location: Near 6033 Allegheny Lot 87 Sec 2

Name of Owner:

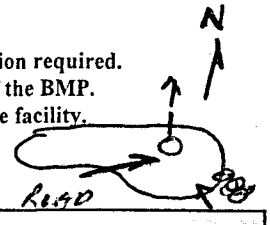
Name of Inspector: SJ Thomas

Type of Facility: Wet Pond

Weather Conditions: Sunny, Hot, 80's Type: ☑ Final Inspection ☐ County BMP Inspection Program ☐ Owner Inspection

If an inspection item is not applicable, mark NA, otherwise mark the appropriate column.

O.K. - The item checked is in adequate condition and the maintenance program is currently satisfactory. No action required.
Routine - The item checked requires attention, but does not present an immediate threat to the function/integrity of the BMP.
Urgent - The item checked requires immediate attention to keep the BMP operational and to prevent damage to the facility.



Provide an explanation and details in the comment column, if routine or urgent are marked.

Facility Item	O.K.	Routine	Urgent	Comments
Embankments and Side Slopes: Large Earth Emb; 2H:1V SS; 12' HIGH +; Tw = 12'				
Grass Height	✓			
Vegetation Condition	✓			
Tree Growth		✓		Remove trees o/s FACE OF DAM Pines & other trees
Erosion	✓			Some above barrel thru dam
Trash & Debris	✓			
Seepage	✓			None Observed.
Fencing or Benches				None
Interior Landscaping/Planted Areas: ☑ None ☐ Constructed Wetland/Shallow Marsh ☑ Naturally Established Vegetation				
Vegetated Conditions	✓			Wet pool w/ perimeter veg.
Trash & Debris	✓			Pond 7.5' deep
Floating Material	✓			
Erosion	✓			Some SS Erosion, negligible.
Sediment	✓			
Dead Plant	✓			
Aesthetics	✓			
Other				
Notes: SF Lots & Roads Sect 1A + 2				

Prudential McCardle
Realty Allegheny
253-5682
6033 Allegheny

Facility Item	O.K.	Routine	Urgent	Comments
Water Pools: ☒ Permanent Pool (Retention Basin) ☐ Shallow Marsh (Detention Basin) ☐ None, Dry (Detention Basin)				
Shoreline Erosion	✓			Pool 2-8' deep @ riser
Algae	✓			Chemical treated w/ fountain
Trash & Debris	✓			
Sediment	✓			
Aesthetics	✓			
Other				
Inflows (Describe Types/Locations): (1) 30" CMP from NW SEC 1; (2) 24" pipe from east (at riprap)				
Condition of Structure	✓			1 + 2 ok
Erosion	✓			1 + 2 ok
Trash and Debris	✓			1 + 2 ok
Sediment	✓			Sed 2' deep at #1 out. NOT OBSTRUCTED
Outlet Protection		✓		clean debris end of pipe #1
Other				
Principal Flow Control Structure - Riser, Intake, etc. (Describe Type): 48 CMP Riser w/ CMP Cap; Access hatch				
Condition of Structure	✓			somewhat rusty but ok.
Corrosion	✓			Still in BMP Mode - convert
Trash and Debris				
Sediment				
Vegetation				
Other				Riser is inaccessible in middle pond.
Principal Outlet Structure - Barrel, Conduit, etc. : 30" CMP Coated.				
Condition of Structure	✓			
Settlement	✓			
Trash & Debris	✓			
Erosion/Sediment	✓			
Outlet Protection	✓			6' + 6' CLASS I
Other				
Emergency Spillway (Overflow): North End; 20' wide GRASS				
Vegetation		✓		Trees in ES
Lining	✓			
Erosion	✓			
Trash & Debris	✓			
Other	✓			
Notes: Nat Channel D/S BMP stable				

Facility Item	O.K.	Routine	Urgent	Comments
Nuisance Type Conditions:				
Mosquito Breeding	✓			
Animal Burrows	✓			
Graffiti	✓			
Other	✓			
Surrounding Perimeter Conditions:	EAST WOODS O.S; West Allegheny Road + Lots			
Land Uses	✓			
Vegetation	✓			
Trash & Debris	✓			
Aesthetics	✓			
Access /Maintenance Roads or Paths	✓			Allegheny Road
Other				

Remarks:

- Remove SF D/S of Barrel in NAT Channel.
- Clear trees entire D/S toe of dam (4-10' high)
- Remove DW orifice, convert to BMD w/ turndown elbow
- Inspect riser interior, clean & coat exterior as necessary.
- clear trees from ES full crest length.
- clean 24" inflow pipe
- Need Key Lock on Access hatch

Overall Environmental Division Internal Rating: 3

Signature: [signature] P.E. **Date:** 7/23/12

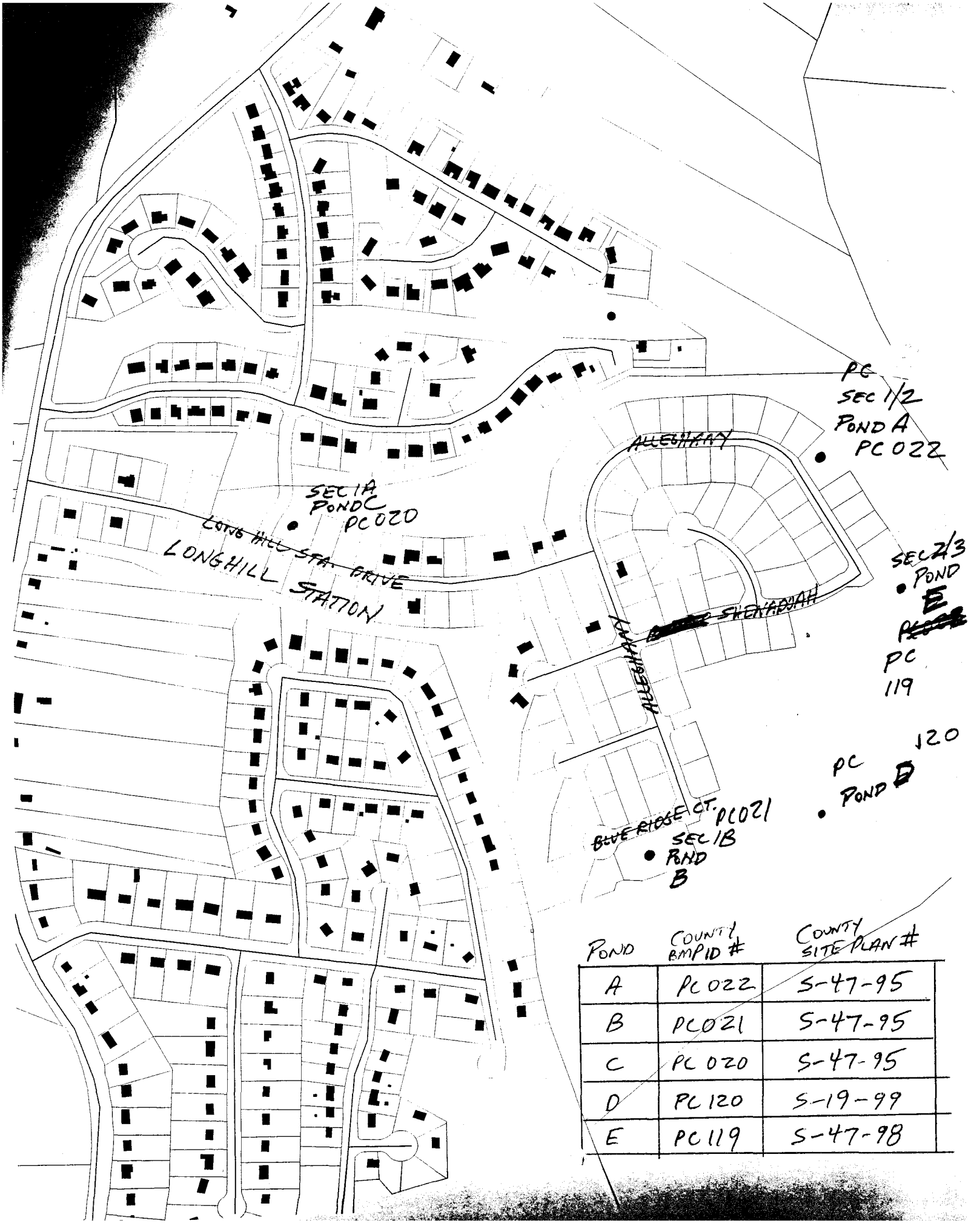
Title: Civil Engineer Env Div

SWMProg\BMP\CoInspProg\DetRet.wpd

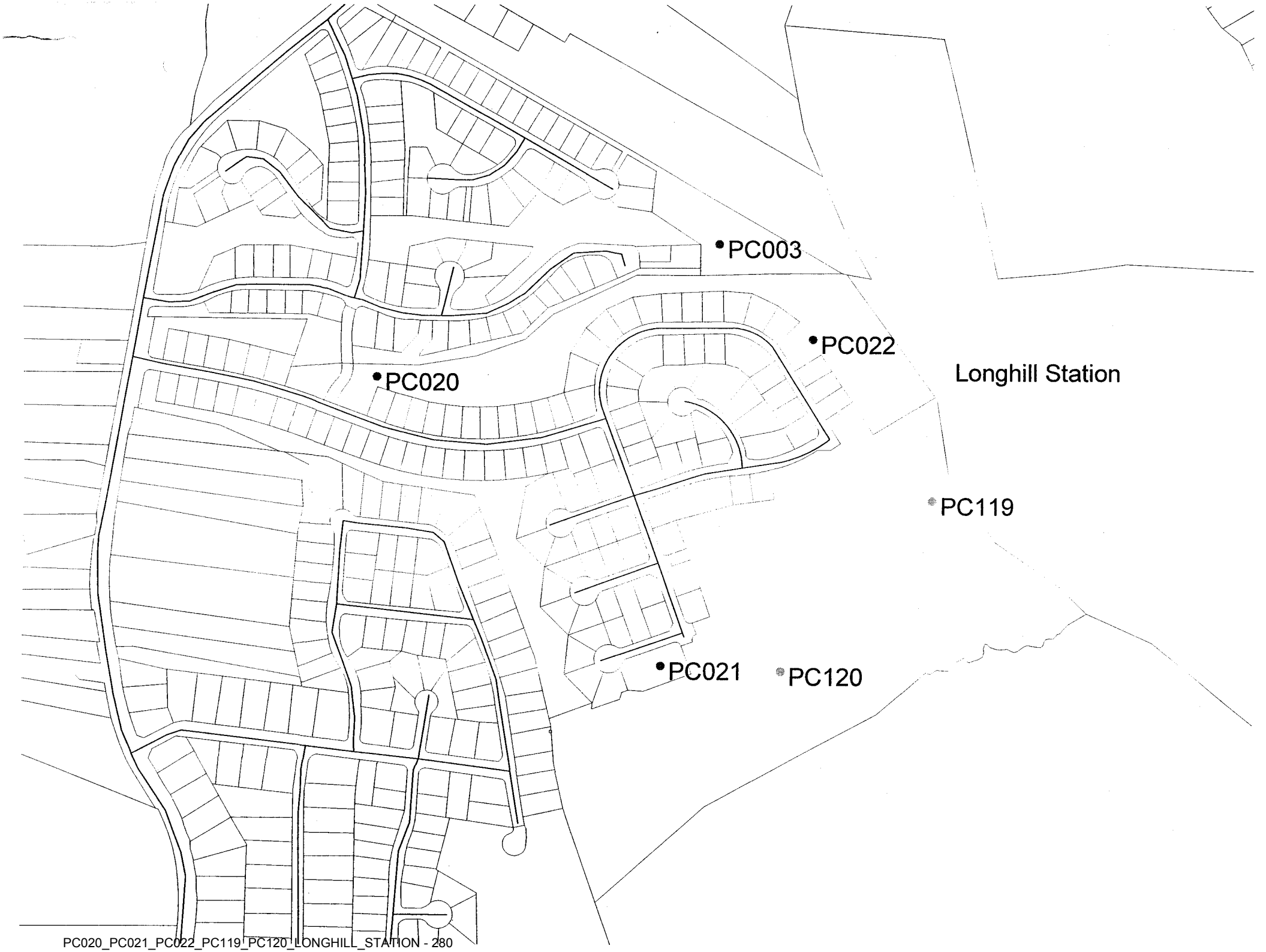
WATERSHED	PC	MAINTENANCE PLAN	No	CTRL STRUC DESC	CMP Riser
BMP ID NO	022	SITE AREA acre	104.5	CTRL STRUC SIZE inches	48
PLAN NO	S-47-95	LAND USE	SF Residential	OTLT BARRL DESC	CMP
TAX PARCEL		old BMP TYP	Wet Pond	OTLT BARRL SIZE inch	30
PIN NO	3110900001B	JCC BMP CODE			
CONSTRUCTION DATE		POINT VALUE		EMERG SPILLWAY	Yes
PROJECT NAME	Longhill Station Sec 1/2 (Pond A)			DESIGN HW ELEV	67.5
FACILITY LOCATION	Near 6033 Alleghany Road			PERM POOL ELEV	61.29
CITY-STATE	Williamsburg, VA 23188	SVC DRAIN AREA acres		2-YR OUTFLOW cfs	
CURRENT OWNER	Wallace Associates, LLC (c/o Henry Stephens)			10-YR OUTFLOW cfs	
OWNER ADDRESS	2 Eaton Street			REC DRAWING	Yes
OWNER ADDRESS 2	Suite 1101	SERVICE AREA DESCRI	Sec 2 SF Lots & Roadways		
CITY-STATE-ZIP CODE	Hampton, Va. 23669	IMPERV AREA acres		CONSTR CERTI	No
OWNER PHONE		RECV STREAM	UT of Powhatan Creek		
MAINT AGREEMENT	Yes	EXT DET-WQ-CTRL	No	LAST INSP DATE	10/17/2000
EMERG ACTION PLAN	No	WTR QUAL VOL acre-ft		INTERNAL RATING	3
		CHAN PROT CTRL	No	MISC/COMMENTS	
		CHAN PROT VOL acre-ft		Larger BMP in Sec 2 near Lot 87, northeast corner. See PC 020, 021, 119 & 120.	
		SW/FLOOD CONTROL	Yes		
		GEOTECH REPORT	No		

Get Last BMP No

Return to Menu



POND	COUNTY BMP ID #	COUNTY SITE PLAN #
A	PC 022	S-47-95
B	PC021	S-47-95
C	PC 020	S-47-95
D	PC 120	S-19-99
E	PC 119	S-47-98



PC020_PC021_PC022_PC119_PC120_LONGHILL_STATION - 280

020016637

COPY

This document drafted by: Patten, Wornom, Hatten & Diamonstein, L.C.
12350 Jefferson Avenue, Suite 360
Newport News, Virginia 23602

Tax Map #: (Lot 32) (31-1) (09-32)
Tax Map #: (Lot 33) (31-1) (09-33)

DEED OF EASEMENT

THIS DEED OF EASEMENT, made this 17th day of April, 2002, by and between Robert L. BEAVERS and Rae Elizabeth BEAVERS, husband and wife, Grantors ("Beavers"), and LONGHILL STATION, LLC, a Virginia limited liability company, Grantor ("Longhill"), and LONGHILL STATION HOMEOWNERS' ASSOCIATION, INC., a Virginia non-profit corporation, Grantee ("Longhill HOA"), whose address is c/o Abbitt Management, 13441 Warwick Blvd., Newport News, Virginia 23602,

WHEREAS, Longhill HOA desires to locate a twelve and one/half (12 ½) foot drainage easement (the "Easement") over and across the common boundary line of Lots 32 and 33, Longhill Station, Section 1A and 1B; and

WHEREAS, the Beavers are the record owners of Lot 33; and

WHEREAS, the Beavers desire to grant Longhill HOA that certain seven and one/half foot (7 ½') portion of the Easement which is located on Lot 33 and which abuts the common boundary line of Lots 32 and 33; and

WHEREAS, Longhill is the Declarant under the Declaration of Covenants, Conditions and Restrictions of Longhill Station, Section 1A & 1B (the "Declaration"), dated February 10, 1997, and recorded February 10, 1997, in the Clerk's Office of the Circuit Court of the City of Williamsburg and James City County, Virginia, as document number 970002164; and

WHEREAS, Pursuant to Section 11 of the Declaration, Longhill reserved for itself the right to require additional easements not to exceed five (5) feet in width along

JUL 24 02 0279

PC020_PC021_PC022_PC119_PC120_LONGHILL_STATION - 281

any property line or any Lot if drainage problems were to develop subsequent to the date of the Declaration; and

WHEREAS, Longhill has determined that drainage problems have developed which necessitate the need for the Easement; and

WHEREAS, pursuant to Section 11 of the Declaration, Longhill desires to grant to Longhill HOA that certain five (5) foot portion of the Easement which is located on Lot 32 and which abuts the common boundary line of Lots 32 and 33; and

NOW THEREFORE, for and in consideration of the sum of TEN DOLLARS ($10.00), cash in hand paid, and other good and valuable consideration, the sufficiency of which are hereby acknowledged:

1. Beavers do grant and convey unto Longhill HOA, its successors and assigns, a seven and one/half foot (7 ½') drainage easement over and across Lot 33, as shown on that certain plat entitled, "PROPOSED 12.5' DRAINAGE EASEMENT ACROSS LOTS 32 AND 33, LONGHILL STATION, SEC. 1A AND 1B, Powhatan District, James City County, Virginia" dated May 7, 2002, and made by DJG, Inc., Engineers – Architects - Surveyors, 449 McLaws Circle, P.O. Box 3505, Williamsburg, Virginia, 23187, a copy of which is attached hereto as Exhibit A and made a part hereof (the "Plat").

2. Longhill does grant and convey unto Longhill HOA, its successors and assigns, a five foot (5') drainage easement over and across Lot 32, as shown on the Plat.

3. The owners of Lot 32 and 33 shall have the right to install fencing and landscaping within the drainage easement area located on their respective lots, provided such fencing and landscaping does not impede drainage across said drainage easements. In the event Longhill HOA removes or damages any landscaping and/or fencing within said drainage easements, then Longhill HOA shall repair and replace such fencing and/or landscaping to its same condition immediately prior to such removal or damage, at Longhill HOA's sole cost and expense.

SIGNATURES APPEAR ON NEXT PAGE

JUL 24 02 0280

Signature page to Deed of Easement, Lots 32 and 33, Longhill Station, Sec. 1A and 1B.

WITNESS the following signatures and seals:

Robert L. Beavers

Robert L. Beavers

Rae Elizabeth Beavers

Rae Elizabeth Beavers

LONGHILL STATION, L.L.C.
a Virginia limited liability company

By: Atlantic Homes Development Corporation
Its: Managing Member

By: _____
Kenneth L. Allen
Its: President

JUL 24 02 0281

State of Virginia
~~City/~~County of James City, to-wit:

The foregoing instrument was acknowledged before me this 18th day of July, 2002, by Robert L. Beavers.

Joan Eckberger (SEAL)
Notary Public

My Commission Expires: 9-25-04

State of Virginia
~~City~~/County of James City, to-wit:

The foregoing instrument was acknowledged before me this 18th day of July, 2002, by Rae Elizabeth Beavers.

Joan Eckberger (SEAL)
Notary Public

My Commission Expires: 9-25-04

State of Virginia
City of Newport News, to-wit:

The foregoing instrument was acknowledged before me this 14 day of May, 2002, by Kenneth L. Allen, as president of Atlantic Homes Development Corporation, a Virginia corporation, the Managing Member of Longhill Station, L.L.C., a Virginia limited liability company.

Stephanie Kay Sere (SEAL)
Notary Public

My Commission Expires: 10/31/04

JUL 24 02 02882

VIRGINIA: CITY OF WILLIAMSBURG & COUNTY OF JAMES CITY
This document was admitted to record on 24 July 02
at 1:10 AM/PM. The taxes imposed by Virginia Code
Section 58.1-801, 58.1-802 & 58.1-814 have been paid.

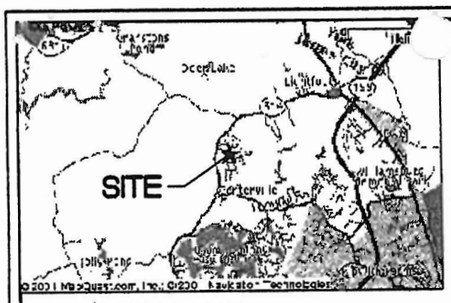
STATE TAX	LOCAL TAX	ADDITIONAL TAX
$	$ —	$ —

TESTE: BETSY B. WOOLRIDGE, CLERK

BY Betsy B. Woolridge Clerk

PLAT ATTACHED

PC020_PC002_PC002_PC110_PC120_LONGHILL_STATION 284



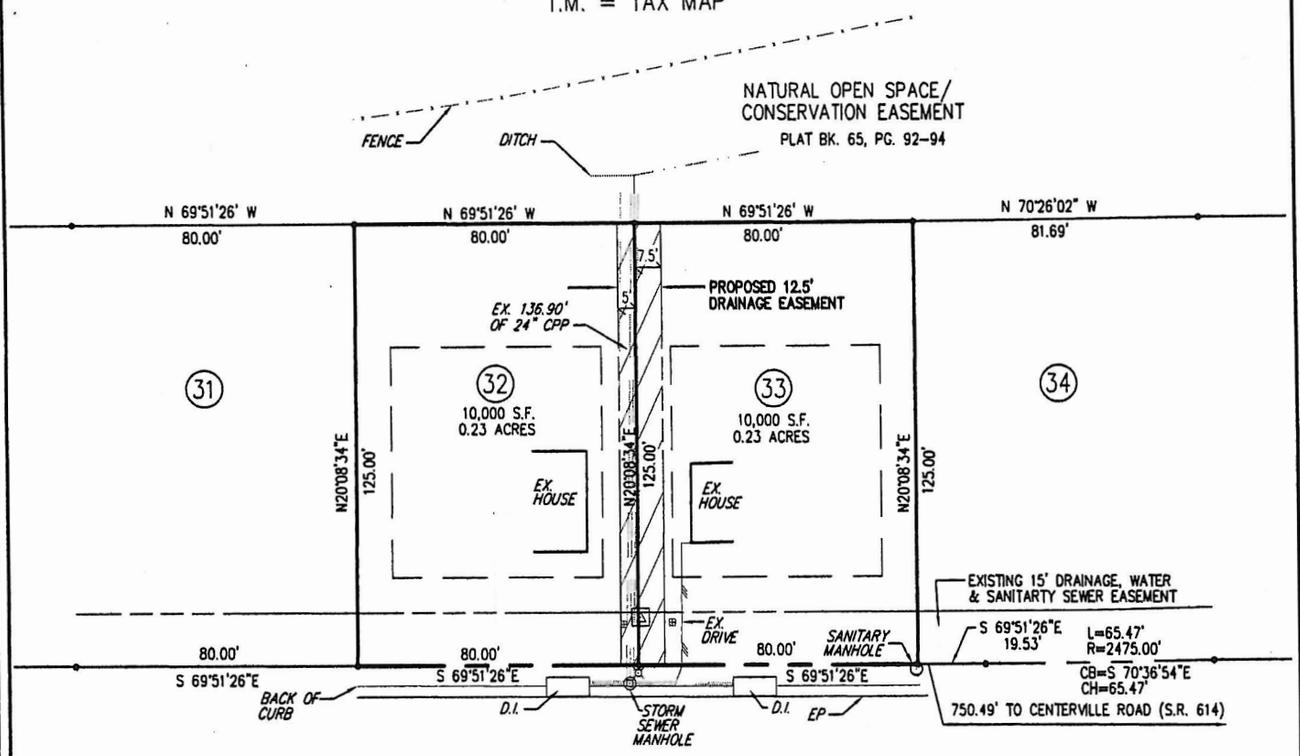
VICINITY MAP
(N.T.S.)

LEGEND: Exhibit A

- ELECTRIC TRANSFORMER
- WATER METER
- LIGHT POLE
- D.I. – DROP INLET (STORM SEWER)

CPP = CORRUGATED PLASTIC PIPE
EP = EDGE OF PAVEMENT
S.F. = SQUARE FEET
AC. = ACRES
INST = INSTRUMENT
T.M. = TAX MAP

RECORD MERIDIAN
PB 65, PG. 95
N



NOTES:

1. OWNERS/REFERENCE/TAX MAP/ADDRESS:
   LOT 32 – KEVIN P. DIVEN AND WIFE COLLEEN A. DIVEN
   INST. #980021079, T.M. #(31–1)09–32), 3940 LONGHILL STATION ROAD.
   LOT 33 – ROBERT L. BEAVERS AND WIFE RAE ELIZABETH BEAVERS
   INST #980018966, T.M. #(31–1)(09–33), 3936 LONGHILL STATION ROAD.
2. RECORDED REFERENCES:
   PLAT BOOK 65, PAGE 92–94
   OFFICE OF THE CLERK OF THE CIRCUIT COURT, JAMES CITY COUNTY, VIRGINIA.
3. A CURRENT TITLE REPORT HAS NOT BEEN FURNISHED TO THIS OFFICE.
4. THIS PLAT DOES NOT REPRESENT A CURRENT FIELD BOUNDARY SURVEY OF T.M.#(31–1)(09–32) AND (31–1)(09–33).

50' 0' 50' 100'
GRAPHIC SCALE: 1" = 50'

COMMONWEALTH OF VIRGINIA
NANCY L. HERMAN-THOMPSON
No. 002254
5/7/02
LAND SURVEYOR

REF:

DRAWN: DNW/NLHT
CHECKED: NLHT

PROPOSED 12.5' DRAINAGE EASEMENT ACROSS
LOTS 32 AND 33, LONGHILL STATION, SEC. 1A AND 1B

POWHATAN DISTRICT, JAMES CITY COUNTY VIRGINIA

DATE : MAY 7, 2002 | SCALE: 1"= 50'

DJG INC
Committed to Excellence
ENGINEERS · ARCHITECTS · SURVEYORS
449 McLAWS CIRCLE, P.O. BOX 3505 WILLIAMSBURG, VIRGINIA 23187
(757)253–0673 FAX: (757)253–2319 E–MAIL: djginc@visi.net
NORFOLK – VIRGINIA BEACH AREA (757)874–5015

JOB NO. 6396

JUL 24 8 02 83

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: **PC022**

DATE VERIFIED: **June 28, 2012**

QUALITY ASSURANCE TECHNICIAN: **Leah Hardenbergh**

Leah Hardenbergh

LOCATION: WILLIAMSBURG, VIRGINIA

Stormwater Division

MEMORANDUM

DATE: March 13, 2010

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

FROM: Jo Anna Ripley, Stormwater

PO: 270712

RE: Files Approved for Scanning

General File ID or BMP ID: PC022

PIN: 3110900001B

Subdivision, Tract, Business or Owner Name (if known): Longhill Station

Property Description: Natural Open Space Section 1A & 1B

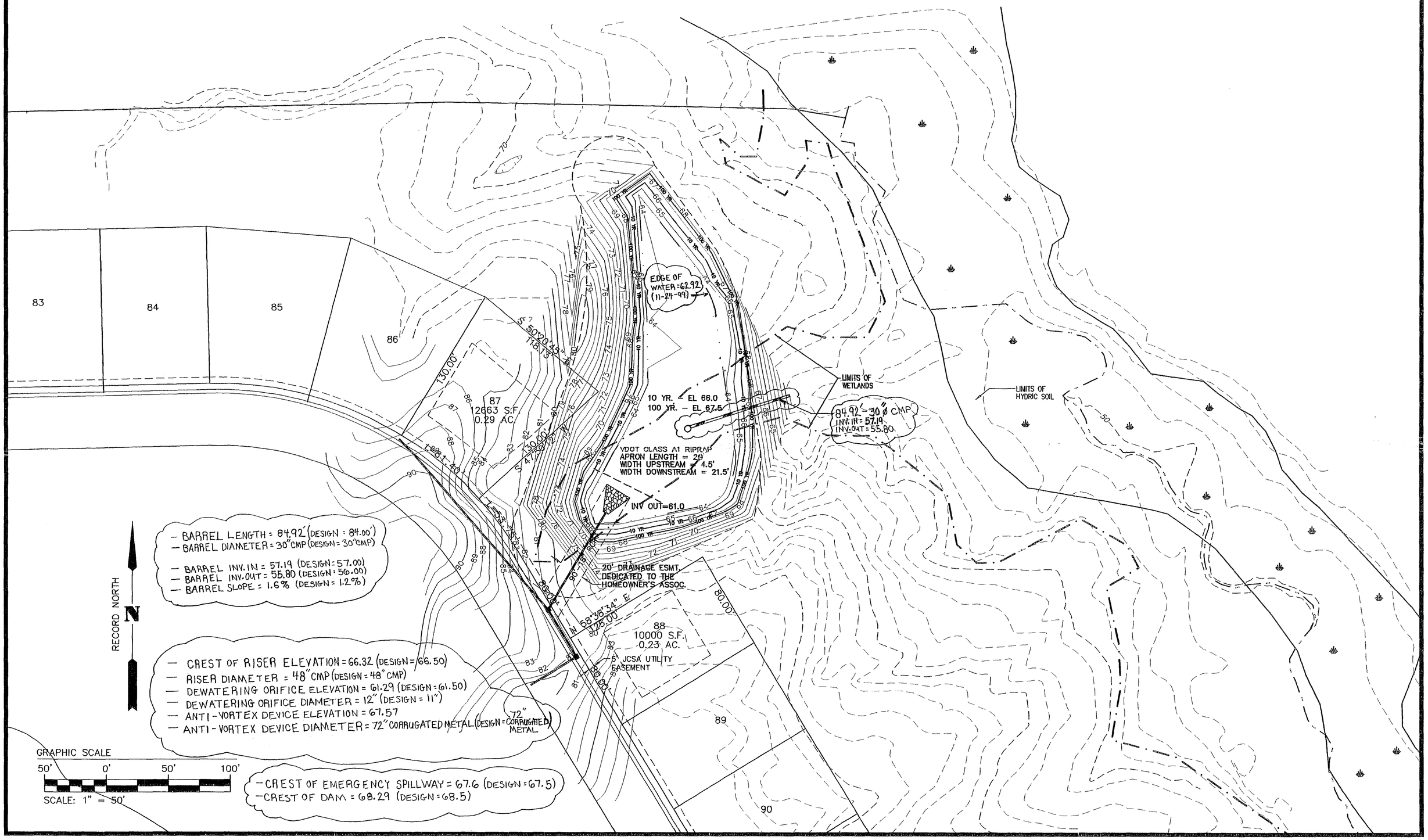
Site Address:

(For internal use only) **Box** 3 **Drawer:** 2

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

Comments

According to the County's Real Estate Assessment Division the common area has not been turned over to the HOA. Ownership as of 3/3/10 is Wallace Associates LLC



COMMISSION NUMBER 1940220	SCALE AS NOTED	POND "A" AS-BUILT
SHEET NUMBER C1	DESIGNED XXX	ATLANTIC HOMES DEVELOPMENT CORPORATION
1 OF 1	DRAWN RAM	LONGHILL STATION SUBDIVISIONS
	CHECKED HLPG	SECTION 1
	DATE 12-6-99	JAMES CITY COUNTY, VIRGINIA

THIS DOCUMENT IS THE SOLE PROPERTY OF DJG, INC. OF WILLIAMSBURG, VIRGINIA. THE REPRODUCTION, IN WHOLE OR PART, OR THE MODIFICATION OF ANY DETAIL OR DESIGN IS NOT TO BE MADE WITHOUT THE EXPRESS WRITTEN CONSENT OF DJG, INC., COPYRIGHT 1997.

NO.	DATE	DESCRIPTION

REVISIONS

DJG INC.
Committed to Excellence
ENGINEERS • ARCHITECTS • SURVEYORS
1006 RICHMOND ROAD, P.O. BOX 3505 WILLIAMSBURG, VIRGINIA 23187
(757)253-0673 FAX: (757)253-2319 E-MAIL: djginc@visi.net
NORFOLK - VIRGINIA BEACH AREA (757)874-5015

PC022; 5-47-95

DJG, INC.
P.O. Box 3505 1006 Richmond Rd
WILLIAMSBURG, VIRGINIA 23187

(804) 253-0673 or 874-5015
FAX (804) 253-2319

LETTER OF TRANSMITTAL

DATE 1/5/2000 JOB NO. 1940220

ATTENTION PAT MENICHINO

RE: LONGHILL STA. PH. 1 – POND "B" AS-BUILT INFORMATION

TO PAT MENICHINO
JCC – ENGINEERING INSPECTOR
(HAND DELIVERED)

JAN 2000 RECEIVED ENVIRONMENTAL DIVISION

WE ARE SENDING YOU ☑ Attached ☐ Under separate cover via _____ the following items:

☐ Shop drawings ☑ Prints ☐ Plans ☐ Samples ☐ Specifications

☐ Copy of letter ☐ Change order ☐ _____

COPIES	DATE	NO.	DESCRIPTION
3	Rev. 1/4/00	1	SHEET C1 – POND AS-BUILTS POND A

THESE ARE TRANSMITTED as checked below:

☐ For approval ☐ Approved as submitted ☐ Resubmit _____ copies for approval

☑ For your use ☐ Approved as noted ☐ Submit _____ copies for distribution

☑ As requested ☐ Returned for corrections ☐ Return _____ corrected prints

☐ For review and comment ☐ _____

☐ FOR BIDS DUE _____ 19 _____ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS PLEASE CALL IF YOU HAVE ANY QUESTIONS (253-0673)
THANK YOU!
DAWN LEMON

COPY TO KEN DODD
FILE

SIGNED: Dawn T. Lemon

 If enclosures are not as noted, kindly notify us at once.

DJG
P.O. Box 3505
Williamsburg, Virginia 23187
(804) 253-0673
Fax (804) 253-2319

PROJECT LONGHILL STATION SUBDIVISION
DATE 5-11-95 COMM NO. 1940220
CAL HLPG CKD PAGE # 6
TITLE PHASE I POND A

· DRAWDOWN CALCULATIONS:

Dry Drawdown of Dry Storage Vol

$$\frac{68,350\ ft^3}{6 \times 3600} = 3.1\ cfs$$

8.2" ϕ

DESIGN: 25-YR STORM
ELEV = 66.96
VOL. = 130105 ft^3

$$6\ hr\ DRAWDOWN\ Q_{AVG.} = \frac{VOL.\ DETAINED}{6\ hrs \times 3600}$$

$$Q_{AVG.} = 6.02\ cfs$$

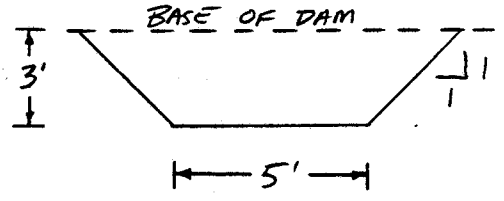
ACTUAL: 25-YR STORM
ELEV. = 66.96
VOL. = 130105 ft^3

$Q_{AVG} = 5.69$ cfs (DETERMINED FROM TR-55 METHOD, RESULTS INCLUDED)

$$5.69\ cfs = \frac{130105\ ft^3}{T \times 3600}$$

$$\Rightarrow \boxed{T = 6.35\ hrs}$$

· CORE TRENCH DETAIL:



- CORE TRENCH RUNS ALONG CENTERLINE OF DAM, UP EMBANKMENTS, TO ELEV. = 66.5

· OUTLET PROTECTION FOR BARREL:

PIPE DIA. = 30" $Q_p(100) = 45.7$ cfs

- ASSUME MIN. TAILWATER CONDITION
- APRON LENGTH = (E&S pg III-164) = 20'
- APRON WIDTH UPSTREAM = 3 × DIA. = 3 × 2.5' = 7.5'
  DOWNSTREAM = DIA + APRON LENGTH = 2.5' + 20' = 22.5'
- RIP RAP: d_{50} = 0.7' DEPTH = 18" MIN.

GEOTECHNICAL ENGINEERING STUDY REPORT – REVISED
LONGHILL SUBDIVISION, SECTION 2
EARTHEN DAM CERTIFICATION – POND A
JAMES CITY COUNTY, VIRGINIA
FES REPORT NO. 1-83151.044A

PC022

CLIENT: ATLANTIC HOMES, LLC
MR. KEN DODD

JUN 2003
RECEIVED
ENVIRONMENTAL DIVISION

APPROVED
James City County
Environmental Division
By: _____
Date: 6-25-03

Geotechnical Engineering Study Report
Longhill Station Subdivision, Section II
Earthen Dam Certification – Pond A

James City County, Virginia

Prepared for

Atlantic Homes, LLC

Prepared by

Foundation Engineering Science, Inc.

June 19, 2003

FOUNDATION ENGINEERING SCIENCE, INC.

FES

- Drilling Services [Geotechnical & Environmental]
- Geotechnical Engineering [Shallow & Deep Foundations, Retaining Walls & Pavement Design]
- Environmental Management [Phase I & II]
- Construction Inspection Services [Quality Control & Quality Assurance]
- Foundation/Structure & Pavement Distress Evaluations
- Value Engineering During Design & Construction
- Design & Build Segmental Reinforced Retaining Walls [SRRW]

Mr. Ken Dodd
Atlantic Homes, LLC
10 San Jose Drive
Newport News, Virginia 23606

June 19, 2003

Re: Geotechnical Engineering Study Report - Revised
Longhill Subdivision, Section 2
Earthen Dam Certification – Pond A
James City County, Virginia
FES Report No. 1-83151.044a

Dear Mr. Dodd:

Foundation Engineering Science, Inc. (FES) has completed a geotechnical engineering study at the existing project site. This geotechnical engineering study was performed in general accordance with FES Proposal No. NP706.001, dated July 29, 2002, following your written authorization on August 1, 2002 and per your request to delay field testing due to limited access to the site and your verbal authorization on august 6, 2002 to start back the field testing. Additionally, the geotechnical engineering study report was delayed due to unavailability of the approved plans and as built plans from DJG, Inc. as we discussed few times on the phone with you. The geotechnical engineering study consisted of performing two (2) Standard Penetration Test (SPT) borings to an approximate depth of twenty (20) feet below the existing grades, obtained two (2) bulk soil samples for laboratory testing, performed one (1) hand auger boring to six (6) feet in depth, performed one (1) field permeability test and performed compaction density tests on the final grade for the existing Earthen Dam.

Briefly, the results of our analyses indicated that there were silty sand (SM), clayey sand (SC) and sandy clay to sandy silt (CL-ML) within the borings performed. The clayey sand (SC) and sandy clay to sandy silt (CL-ML) soils are acceptable for use as fill material for the core of the earthen dam. Additionally, all the soils are acceptable as fill material for the earthen dam embankment [outer shell].

The side slopes of the earthen dam appear to be approximately three (3) horizontal to one (1) vertical [3H:1V] as shown in the as built plans dated June 17, 2003 prepared by Rickmond Engineering, Inc.. The global stability indicated that the down stream slopes will not be breached during a flooded condition, based on a factor of safety of greater than one (1) for a draw down analysis.

FES did not inspect the earthen dam during construction. Additionally, the existing subgrade in the earthen dam area and the key trench were not evaluated prior to placement of the fill materials.

11843-B CANON BOULEVARD ► NEWPORT NEWS, VIRGINIA 23606 ► PHONE: 757-873-4113 FAX: 757-873-4114
PC022_LONGHILL_STA_WET_POND_A_ALLEGHANY_DRIVE_S-47-95 - 008

FES appreciates the opportunity to be of service to the **Atlantic Homes, LLC** on this important project and looks forward to its approval. If we can be of any further assistance or you have any questions regarding this report, please do not hesitate to contact the undersigned.

Respectfully submitted,

FOUNDATION ENGINEERING SCIENCE, INC.

Idres Hawairy
Project Engineer

6/19/03
Raja S. El-Awar, P.E.
Principal Engineer
VA Reg. No. 26383

COMMONWEALTH OF VIRGINIA
RAJA S ELAWAR
No. 026383
PROFESSIONAL ENGINEER

Attachments: *Appendix*

Figure- 1 USDA Soil Survey Map
Figure- 2 USGS Quadrangle Map
Figure- 3 Permeability and Borings Location Sketch
Figure- 4 Compaction Density Test Locations
Borings Profile Sheets
Laboratory Testing Program Results

C:\company\1998\cmt\1-83151.044a

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1.0 INTRODUCTION

1.1 Site Characteristics and Project Information

The project site is located in James City County, Virginia. Specifically, the project site is located within the Longhill Station Subdivision, Section 2 along Allegheny Drive. The site currently contains one (1) existing Earthen Dam and is identified in the project plans as Pond A.

Our review of the project plans and specifications prepared by DJG, Inc. and dated May 29, 1998 and revised dated December 4, 1998 indicated that the dimension for the earthen dam are approximately from 300 to 350 feet in length and ranges approximately 100 feet in plan width [toe to toe]. The side slopes are three (3) horizontal to one (1) vertical [3H:1V]. The design high water elevation for 10 years in the pond is 66.0 and for 100 years is 67.5 feet National Geodetic Vertical Datum (NGVD) of 1929.

2.0 PURPOSE AND SCOPE OF SERVICES

The purpose of this study was to obtain information on the soils located within the Earthen Dam and degree of compaction of the soils placed for the existing Earthen Dam. The existing materials encountered were then evaluated with respect to the available project information and site characteristics. In this regard, for the following items were formulated:

1. Development of shallow and deep subsurface soil and ground water conditions at the existing Earthen Dam area.

2. Performed compaction density testing on the final grade and approximately one (1) to two (2) feet below the final grade to develop correlation between the Standard Penetration Test (SPT) boring N-values and relative compaction.

3. General location and description of potentially deleterious materials encountered in the borings performed, including existing fills or surficial organic.

4. Certify the existing Earthen Dam in general accordance with the plans and specifications. If the existing Earthen Dam does not meet the approved project plans and specifications and James City County requirements, FES will provide parameters required for improving and/or replacing the existing Earthen Dam.

The following services were provided in order to achieve the preceding objectives:

1. Reviewed readily available published geologic and topographic information. This published information was obtained from quadrangle maps published by the United States Geologic Survey (USGS) and Soil Survey published by the United States Department of Agriculture (USDA) Soil Conservation Service (SCS).

2. FES executed a program of subsurface exploration that consisted of subsurface sampling, filed and laboratory testing.

3. Performed one (1) hand auger boring to six (6) feet in depth and obtained one (1) bulk soil sample for laboratory testing and analyses. The bulk sample was collected from the existing materials placed for the existing Earthen Dam area. FES performed one (1) field permeability test within the existing Earthen Dam fill materials.

4. Visually classify and stratify representative soil samples in the laboratory using the Unified Soil Classification System (USCS)), in general accordance with ASTM D-2487 and D-2488. Conducted a laboratory program, that consisted of performing natural moisture content [ASTM D-2216], Atterberg Limits [ASTM D-4318], grain size determination [(-#200) ASTM D-1140] and Standard Proctor [ASTM D-698 tests.

5. Collected ground water level measurements in the borings performed.

6. The results of the field exploration and laboratory testing program were utilized in performing engineering evaluation, analysis and in the formulation of suitability and stability of the existing Earthen Dam. The results of the field exploration, laboratory testing program, conclusions and recommendations are presented in a comprehensive geotechnical engineering study report prepared by an **FES** experienced Professional Engineer registered in the Commonwealth of Virginia.

2.1 Report Format

This report begins with a discussion of the field and laboratory programs followed by a description of the general subsurface conditions, field permeability testing, compaction density testing suitability of the existing materials within the existing Earthen Dam and report limitations. The USDA soil survey, USGS quadrangle map, the borings and sample locations sketches are presented in Figures 1, 2, 3 and 4, respectively in the appendix of this report. Additionally, the boring profile sheets and laboratory test figures are also presented in the Appendix of this report.

3.0 FIELD EXPLORATION

3.1 General

A total of two (2) Standard Penetration Test (SPT) borings were drilled within the existing Earthen Dam area to explore the general soil types. The SPT borings were drilled to approximate depth of twenty (20) feet below the existing top of the Earthen Dam grades. The approximate location of the borings is illustrated in Figure 3. Performed one (1) hand auger boring, one (1) field permeability test and obtained one (1) bulk soil sample for the laboratory testing program.

3.2 SPT Borings

The SPT borings were performed with the use of an All Terrain Vehicle (ATV) mounted drill rig by utilizing hollow steam auger (HSA) procedures. The soil sampling was performed in general accordance with the American Society of Testing and Materials (ASTM) Test Designation D-1586. These samples were taken continuously from the final grade to approximate depths ranging from fifteen (15) to twenty (20) feet below the final/existing grade elevations. Representative portions of these soil samples were collected, labeled and transported to our office for laboratory testing, analysis and classification.

3.3 Bulk Soil Sampling

Two (2) bulk soil samples were obtained in the field from the existing materials placed for the Earthen Dam at approximate depths ranging from one (1) to two (2) feet below the existing subgrade elevations. The locations of the bulk soil samples are shown in Figure 3 in the Appendix of this report.

3.4 Auger Boring

The auger boring was performed with the use of a three (3) inch bucket auger, the soil sampling was performed in general accordance with American Society for Testing and Materials (ASTM) test designation D-1452, titled "Soil Investigation and Sampling by Auger Borings". The soil samples were obtained virtually continuously from the ground surface to boring termination an approximate depth of six (6) feet below the final grades. Representative portions of these soil samples were collected, labeled and transported to our office for laboratory testing, analysis and classification.

3.5 Field Permeability

One (1) field permeability test [open-hole, falling head method] were performed by installing a two (2) inch inside diameter PVC pipe (ground water observation well) with flush joints to an approximate depth of six (6) feet below the existing grades. The permeability testing equipment consisted of a PVC pipe with a close-ended section and a twenty-four (24) inch screen (using a 0.01-inch slot size opening) from four (4) to six (8) feet below the existing grades. Coarse sand (#2) was backfilled to six (6) inches above the screened annual space of the well, followed by a six (6) inch bentonite seal placed over the sand. The purpose of this construction method was to restrict upward (test) water flow between the well hole and the outside wall of the augered hole.

The wells were developed by pumping water into them and allowing them to soak for a period of one (1) hour. Following a soaking period of one (1) hour, water was added until it reached the top of the well casing and allowed to fall a known distance over a measured time. This procedure was repeated a minimum of three (3) times or until time deviation between the tests was less than ten (10) percent.

The collected field data was utilized in the equation found in the "Stormwater Retention Pond Infiltration Analyses in Unconfined Aquifers" for determining the coefficient of permeability of the subject soil stratum. The infiltration rates calculated are presented in tabular format below:

TEST LOCATION	PB-1
PERMEABILITY (In/hr)	2.2

4.0 LABORATORY TESTING

4.1 General

The soil samples were transported to our laboratory and were classified by an **FES** experienced Project Engineer using the Unified Soil Classification System (USCS) in general accordance with ASTM test designations D-2487 and D-2488.

4.2 Tests Performed

Representative soil samples were subjected to a laboratory program. The laboratory program consisted of performing natural moisture content [ASTM D-2216], Atterberg Limits [ASTM D-4318], grain size determination [(-#200) ASTM D-1140] and moisture-density relation ship [Standard Proctor ASTM D-698] tests. The laboratory test results are presented in tabular formats below and in the Appendix of this report.

LABORATORY TEST	ASTM PROCEDURE	NO. OF TESTS
Moisture Content Determination	ASTM D-2216	6
Grain-Size Determination (-#200 Sieve)	ASTM D-1140	6
Atterberg Limits (Liquid and Plastic)	ASTM D-4318	4
Moisture-Density Relationship (Std. Proctor)	ASTM D-698	1

4.3 Test Results

LOCATION	APPROX. SAMPLE DEPTH (Feet)	NATURAL MOIST. CONTENT (%)	#200 SIEVE (%)	ATTERBERG LIMITS		USCS	OPT. MOIST. CONTENT (%)	MAX. DRY DENSITY (pcf)	CBR VALUE (%)
				LL (%)	PI (%)				
Proctor-2	1.5	4.5	26.5	---	NP	SM	12.0	115.5	---
Proctor-3	1.5	4.7	30.3	---	NP	SM	11.5	117.5	---
FES-3	3	7.3	28.3	---	---	SM	---	---	---
FES-3	7	38.1	24.1	---	---	SM	---	---	---
FES-3	9	16.7	44.9	34	17	SC	---	---	---
FES-4	5	11.9	36.5	29	11	SC	---	---	---
FES-4	9	18.5	48.1	39	20	SC	---	---	---
FES-4	14	15.4	37.6	39	23	SC	---	---	---
FES-4	19	18.5	43.8	21	2	SM	---	---	---

5.0 GENERALIZED SUBSURFACE CONDITIONS

5.1 USGS Topographic Survey

The topographic survey map published by the United States Geological Survey titled "Williamsburg, Virginia" dated 1984, was reviewed for ground surface features at the proposed project location. Based on this review, the natural ground surface elevation approximately sixty to (60) to eighty (80) feet National Geodetic Vertical Datum (NGVD) of 1929. The USGS topographic map for the project vicinity is presented in Figure 1 in the Appendix of this report.

5.2 USDA Soil Survey

The "James City County, Virginia" Soil Survey, developed by the United States Department of Agriculture (USDA) Soil Conservation Service (SCS), was reviewed for general near-surface soil information within the general site vicinity. This information indicated that there are two (2) primary mapping units (11C and 15E) within the proposed site area. The USDA Soil Conservation Service (SCS) Survey map for the project vicinity is presented in Figure 1 in the Appendix of this report. The map soil units encountered are as follows:

SOIL SERIES	DEPTH (IN.)	SOIL DESCRIPTION	USCS(1)	USDA SEASONAL HIGH GROUNDWATER TABLE (%)		K(2) (IN/HR)	SHRINK/ SWELL POTENTIAL
				DEPTH (FEET)	MON.		
Craven (11C)	0 - 9	Fine sandy loam	ML, CL-ML, SM, SM-SC	2.0 - 3.0	Dec - Apr	0.6 - 2.0	Low
	9 - 30	Clay, silty clay, silty clay, loam	CH			0.06 - 0.2	Moderate
	30 - 72	Sandy clay loam, sandy loam, fine, sandy loam	SM, SM-SC, SC			0.2 - 6.0	Low
Emporia (15E)	0 - 9	Fine sandy loam	CL, SC, SM, ML	3.0 - 4.5	Nov - Apr	2.0 - 6.0	Low
	9 - 37	Sandy clay loam, sandy loam, clay loam	SC, CL			0.2 - 2	Low
	37 - 50	Sandy clay loam, clay loam, clay loam	SC, CL			0.06 - 0.6	Moderate
	50 - 75	Stratified sandy loam to clay loam	SM, SC, ML, CL			0.06 - 2.0	Moderate

(1) USCS = Unified Soil Classification System
(2) K = Permeability

5.3 General

Soil stratification was based on visual examination of the recovered soil samples, laboratory testing and interpretation of the field boring log by an **FES** experienced Project Engineer. The boring stratification lines represent the approximate boundaries between soil types of significantly different engineering properties; however, the actual transition may be gradual. In some cases, small variations in properties not considered pertinent to our engineering evaluation may have been abbreviated or omitted for clarity. The boring profiles present the conditions at the particular boring location and variations do occur among the borings and between soil samples.

5.4 Subsurface Soil Conditions

The subsurface soils encountered at each structure location have been summarized and are presented in tabular format below:

BORING LOCATION	SOIL LAYER	SOIL DESCRIPTION	DEPTH RANGE (FEET)	AVARAGE SPT "N" VALUES (BPF)	AASHTO SYMBOL
FES-3	1	Light brown, dry to moist, silty SAND with roots "Topsoil"	0 – 0.5	---	SM
	2	Light brown, moist, silty SAND	0.5 – 4	10	SM
	3	Reddish brown, moist, sandy CLAY to sandy SILT	4 – 6	8	CL-ML
	4	Gray to black to brown, moist, clayey SAND with peat from 6 to 8 feet	6 – 10	9	SC
	5	Brown, moist, silty SAND	10 – 20	11	SM
Ground Water Conditions: The ground water table was not encountered in the borings performed on August 9, 2002.					

BORING LOCATION	SOIL LAYER	SOIL DESCRIPTION	DEPTH RANGE (FEET)	AVARAGE SPT "N" VALUES (BPF)	AASHTO SYMBOL
FES-4	1	Light brown, dry to moist, silty SAND with roots "Topsoil"	0 – 0.5	---	SM
	2	Light brown, moist, silty SAND	0.5 – 8	10	SM
	3	Brown, moist, clayey SAND	8 – 10	10	SC
	4	Brown, moist, silty SAND	10 – 15	11	SM
	5	Brown, moist, clayey SAND	15 – 20	10	SC
AB-1	1	Light brown, dry to moist, silty SAND with roots "Topsoil"	0 – 0.5	---	SM
	2	Brown to reddish brown, moist, silty SAND	0.5 – 6	---	SM
Ground Water Conditions: The ground water table was not encountered in the borings performed on August 9, 2002.					

Based on our extensive experience with similar soil types, it is expected that the majority of the subsurface soils encountered within the borings performed, will consist of cohesion less and cohesive soils. Please refer to the soil boring profiles located in the Appendix of this report for specific information at each boring location.

5.5 Ground Water Conditions

The ground water table was not encountered in the SPT borings performed during the field exploration program on August 9, 2002. Ground water levels tend to fluctuate in response to variations in seasonal rainfall, infiltration, site topography and drainage. Based on the soil conditions encountered and the USGS Topographic Map, FES estimates the seasonal normal high ground water level to be encountered at an approximate depth of three (3) feet below the existing grades. However, a "perched" ground water condition, which dissipates with time may be encountered within the top three (3) feet following periods of significant rainfall during and immediately following the wet season.

6.0 EARTEN DAM SOIL SUITABILITY AND STABILITY

6.1 Soil Suitability

The clayey sand (SC) and sandy clay to sandy silt (CL-ML) soils are acceptable materials for the core of the Earthen Dam. The silty sand (SM) soils are marginal as fill material for the core of the Earthen Dam. Additionally, all the soils are suitable as fill material for the Earthen Dam embankment [outer shell].

6.2 Stability

FES representative performed slope stability analyses by a two-dimensional limit equilibrium method using the computer program PCSTABL6. This program was developed at Purdue University under sponsorship of the Federal Highway Administration (FHWA). The program uses the method of slices to determine the safety factor against deep seated circular failure.

Using a 3H:1V and 2H:1V side slopes, we evaluated the stability against slope failure at the highest embankment of eight (8) feet. The soil parameters were developed from the SPT borings performed for the existing Earthen Dam. Input data for the subsurface soils were obtained using general correlations from laboratory test data and Standard Penetration Test N-values.

The global stability safety factors for the Earthen Dam and the draw down analysis were computed to be 1.0 and 0.59, respectively [the required design factors of safety for the assumed design embankment and draw down should be 1.25 and 1.0, respectively]. The computed factors of safety for the assumed highest embankment met the required factors of safety.

7.0 COMPACTION DENSITY TESTING

Foundation Engineering Science, Inc. (FES) performed compaction density testing on the final subgrade material for the existing Earthen Dam. These tests were performed in general accordance with the American Society for Testing and Materials (ASTM) Test Designation D-2922, titled "Compaction Density Testing with Portable Nuclear Gauge". The results of the compaction density tests are tabulated below:

FIELD COMPACTION DENSITY REPORT[1]

Gauge #	26814	Model #	3430	Density Std. Ct.	2516	Moisture Std. Ct.	633	FES REP.:	CD

Proctor	Dry Density[2] (pcf)	Opt. Moist. (%)	Passing #200[3] (%)	Material Description & Classification[4]	Source	Compaction Requirement
2	115.5	12.0	26.5	Brown silty SAND (SM)	On-site	Moderate effort

TEST NO.	DEPTH (inches)	ELEVATION (feet)	PROC. NO.	D.D. (PCF)	MOIST (%)	W.D. (PCF)	% COMP	PASS	FAIL	
1	12	Final Subgrade	1	111.9	5.5	121.2	96.8	X		Low Moisture
2	12	Final Subgrade	1	114.0	5.4	120.2	98.7	X		Low moisture
3	12	Final Subgrade	1	110.9	4.5	115.4	96.0	X		Low moisture

TEST NO.	TEST LOCATION
1	Site No. 1, See Attached Figure 4
2	Site No. 2, See Attached Figure 4
3	Site No. 3, See Attached Figure 4

SPEC. REQUIREMENTS	Utility Trench	Sidewalk	Structure	Roadway/Parking	Earthen Dam
COMPACTION (%)					95.0
MOISTURE (%)					O.M. ± 20
Comments					

Compaction density testing was performed in general accordance with [1]ASTM D2922, [2]ASTM D698, [3]ASTM D1140, [4]ASTM D2488

A correlation between the SPT N-values and the relative density was developed based on the laboratory test data shown above. The relative density of the subsurface soils within the upper eight (8) feet of the Earthen Dam indicates that the compaction is approximately

CORRELATION BETWEEN SPT N-VALUES & RELATIVE DENSITY				
TEST LOCATION	N-VALUE (BPF)	WET DENSITY (PCF)	RELATIVE COMPACTION (%)	REMARKS
1	10	121.2	96.8	Pass
2	10	120.0	98.7	Pass
3	10	115.5	96.0	Pass

8.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the results of the subsurface exploration and laboratory testing programs, our site observations, engineering judgment, review of the plans and specifications, the following conclusions and recommendations are presented.

1. Compaction density testing was performed on the final/existing grade elevations. The subgrade soils were compacted to 95.0 percent of the laboratory maximum dry density in general accordance with ASTM D-698 [Standard Proctor] and to an approximate depth of twelve (12) inches. Based on the limited tests performed, **the fill material within the final grade of the earthen dam placed appears to meet the intent of the project plans and specifications.** Additionally, the fill material placed within the earthen dam embankment appears to have been compacted to a minimum relative density on the order of 90.0 percent of the laboratory maximum dry density. A minimum relative compaction of 90.0 percent is sufficient for similar projects.

2. The existing soils encountered within the earthen dam are clayey sand (SC) and sandy clay to sandy silt (CL-ML) **soils are acceptable as core and embankment fill materials.** The silty sand (SM) soils are marginal as core fill material and acceptable as fill materials for the outer shells of the earthen dam (embankment).

3. The side slopes of the earthen dam appear to be three (3) horizontal to one (1) vertical [3H:1V] as shown in the as built plans with exception of the down stream slopes around the drainage pipe which appears to be less than 3H:1V. The contour lines shown on the plans do not appear to be 3H:1V.

4. The global stability indicated that the down stream slopes will be stable during a flooded condition, based on a factor of safety of 1.1 which is greater than 1.0 for a draw down analysis.

5. Inspection was not performed during construction of the earthen dam. Additionally, a core was not shown for the earthen dam in the project plans.

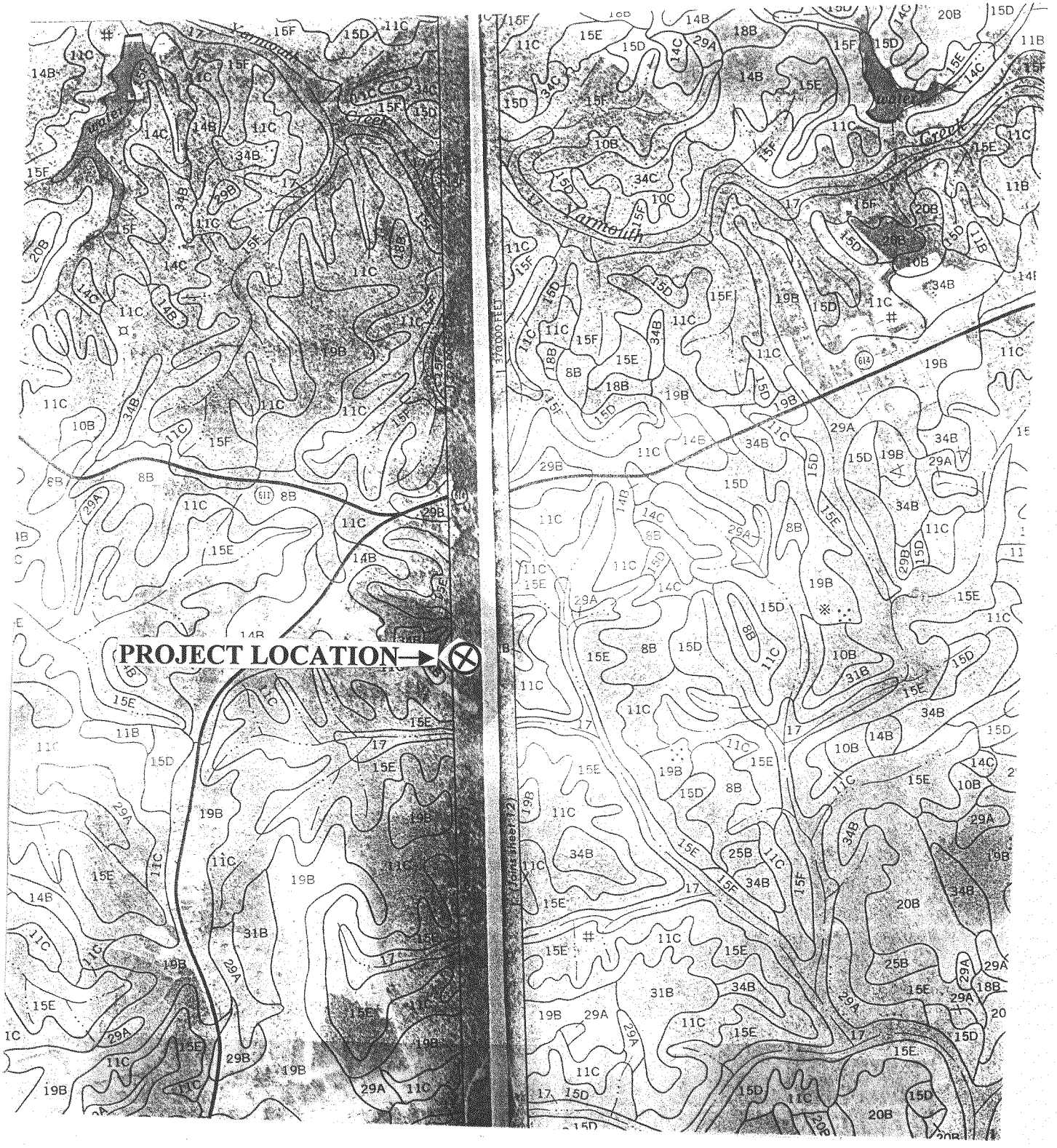
6. Considering that a core was not constructed and the material encountered within the Earthen Dam, water within the storm water management area dam may not be impounded due to the presence of silty sand (SM) within the embankment and core.

7. During extended and heavy rain fall events, the water within the Earthen Dam will rise but may not rise enough to seep through the over flow structure, thus seeping through the embankment of the Earthen Dam. However, above design storm events may occur thus overflowing above the embankment of the Earthen Dam.

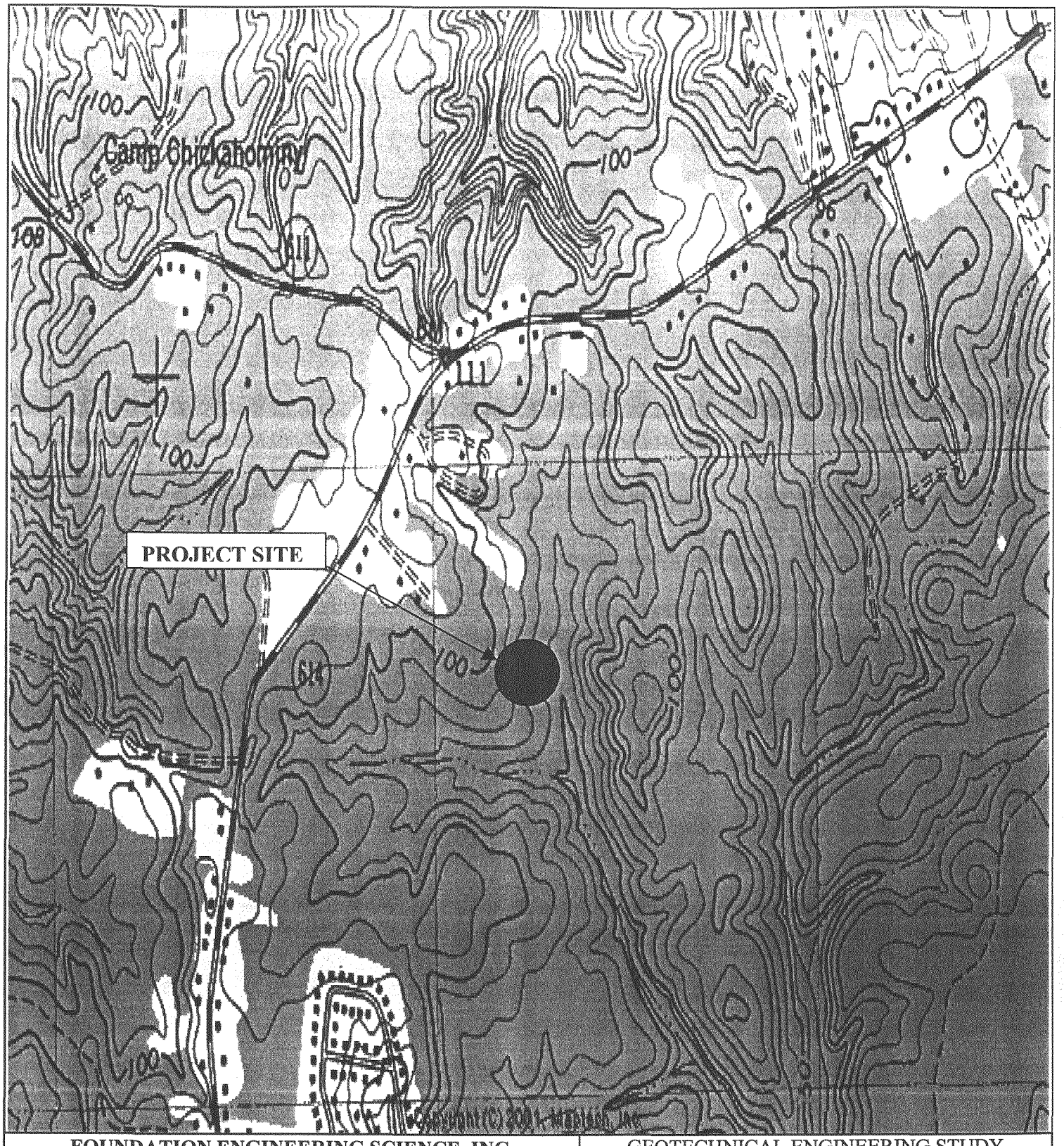
9.0 REPORT LIMITATIONS

The engineering evaluation and analysis have been developed on the basis of the previously described project characteristics and subsurface conditions. These engineering evaluation and analysis were developed from the information obtained in the test borings, which depict subsurface conditions only at these specific locations and at the particular time designated on the boring profiles. Soil conditions at other locations may differ from conditions occurring at these boring locations. In addition, the passage of time may result in a change to the soil conditions at these boring locations.

Our professional services have been performed, our findings obtained, and our engineering evaluation and analysis prepared in accordance with generally accepted Geotechnical Engineering Principles and Practices. Foundation Engineering Science, Inc. is not responsible for the conclusions, opinions or recommendations made by others based on this geotechnical engineering study report.



FOUNDATION ENGINEERING SCIENCE, INC. GEOTECHNICAL, ENVIRONMENTAL & CONSTRUCTION INSPECTION 11843-B CANON BOULEVARD NEWPORT NEWS, VIRGINIA 23606 PHONE: 757-873-4113 FAX: 757-873-4114 EMAIL: RELAWAR@FESVA.COM			GEOTECHNICAL ENGINEERING STUDY **LONGHILL SUBDIVISION, SECTION II** **EARTHEN DAM CERTIFICATION – POND A** JAMES CITY COUNTY, VIRGINIA
DATE: **AUGUST 9, 2002**	SCALE: **N/A**	FES REPORT NO. **1-83151.044**	**FIGURE – 1** **USDA SOIL SURVEY MAP**



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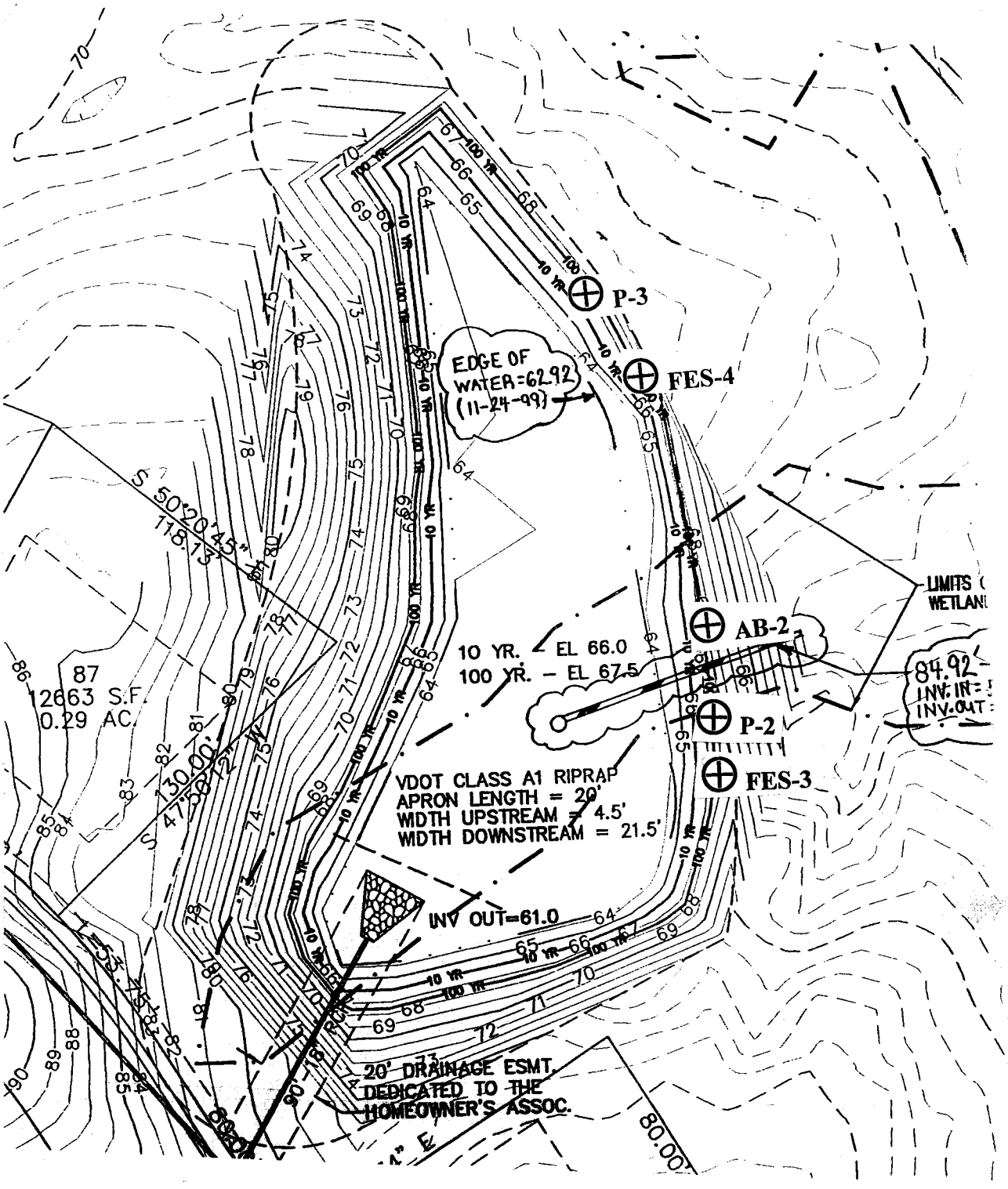
DATE:	SCALE:	FES REPORT NO.	**FIGURE – 2**
AUGUST 9, 2002	**N/A**	**1-83151.044**	**USGS QUADRANGLE MAP**



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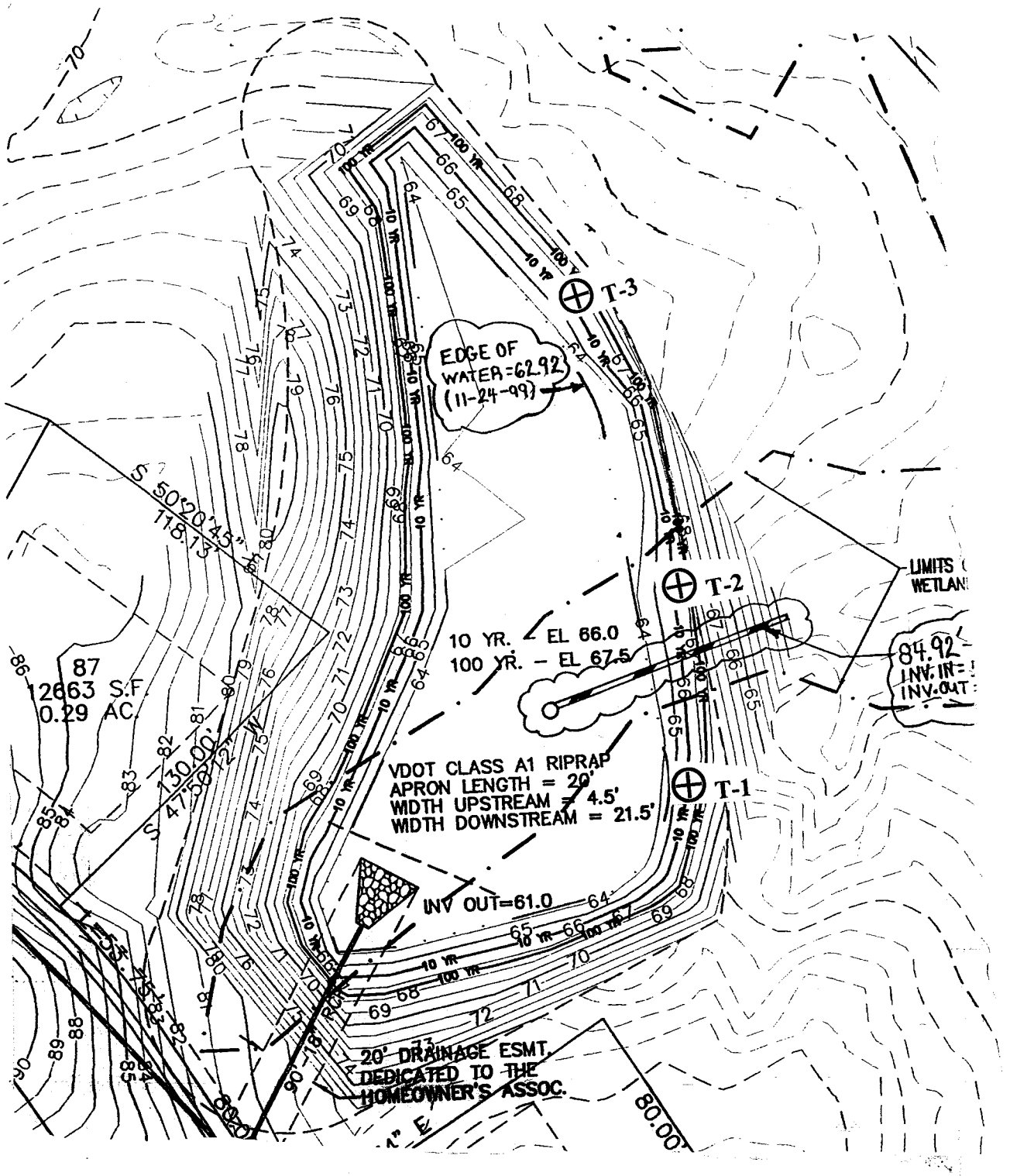
DATE: **AUGUST 9, 2002**	SCALE: **N/A**	FES REPORT NO. **1-83151.044**	**FIGURE – 3** **PERMEABILITY, BORING AND SAMPLE LOCATIONS SKETCH**

PC022_LONGHILL_STA_WET_ POND_ A_ALLEGHANY_ DRIVE_S-47-95 - 022



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DATE: **AUGUST 9, 2002**	SCALE: **N/A**	FES REPORT NO. **1-83151.044**	**FIGURE – 4** **FIELD COMPACTION DENSITY LOCATION SKETCH**

BORINGS PROFILE SHEETS

FES

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· Environmental Management
· Construction Inspection Services

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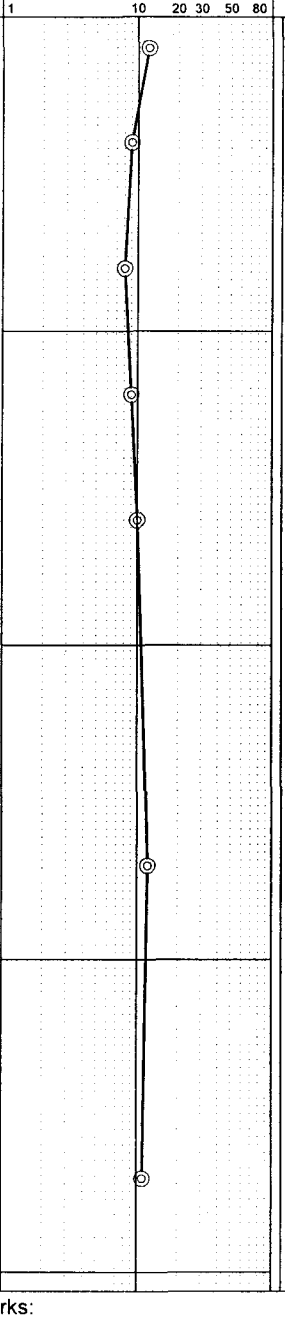
Newport News, Virginia 23606
Phone: 757-873-4113 Fax: 757-873-4114
Email: relawar@fesva.com

PROJECT NAME:	Longhill Station - Section II, Pond A	PROJECT NO.:	1-83151
CLIENT:	Atlantic Homes, LLC.	DRILLING METHOD:	HSA
PROJECT LOCATION:	James City County, Virginia	OBSERVED G.W.T.:	Not Encountered
BORING LOCATION:	See Figure 3	STATION NO.:	

ELEVATION (Feet)	DEPTH (Feet)	SAMPLE NO.	SOIL CLASSIFICATION	MATERIAL DESCRIPTION	SPT, N VALUE OR RQD %
	0		SM	Light brown, dry to moist, silty SAND with roots "Topsoil"	
		1	SM	Light brown, moist, silty SAND	12
		2			9
		3	CL-ML	Reddish brown, moist, sandy CLAY to sandy SILT	8
	5	4	SC	Gray to black to brown, moist, clayey SAND with peat from 6 to 8 feet	9
		5			10
	10		SM	Brown, moist, silty SAND	
		6			12
	15				
		7			11
	20				

STANDARD PENETRATION TEST N-VALUE (Blows/Ft)



HOLE COMPLETION & REMARKS

COMPLETION DEPTH:	20.0 feet
DATE BORING STARTED:	8/9/02
DATE BORING COMPLETED:	8/9/02
ENGINEER/GEOLOGIST:	IH
DRILLING CONTRACTOR:	FES

Sample Types:
- Auger Cutting
- Vane Shear
- SPT
- UD
- Penetrometer
- Rock Core

Remarks:

Unless otherwise noted, water encountered but not recorded.

The stratification lines represent approximate boundaries. The transition may be gradual.

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· Environmental Management
· Construction Inspection Services

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FES-4

PROJECT NAME:	Longhill Station - Section II, Pond A	PROJECT NO.:	1-83151
CLIENT:	Atlantic Homes, LLC.	DRILLING METHOD:	HSA
PROJECT LOCATION:	James City County, Virginia	OBSERVED G.W.T.:	Not Encountered
BORING LOCATION:	See Figure 3	STATION NO.:	

ELEVATION (Feet)	DEPTH (Feet)	SOIL LEGEND & SAMPLE TYPES	SAMPLE NO.	SOIL CLASSIFICATION	MATERIAL DESCRIPTION	SPT, N VALUE OR RQD %	STANDARD PENETRATION TEST N-VALUE ◎ (Blows/Ft)	HOLE COMPLETION & REMARKS
	0			SM	Light brown, dry to moist, silty SAND with roots "Topsoil"			
			1	SM	Light brown, moist, silty SAND	12		
			2			11		
			3			6		
	5		4			12		
			5	SC	Brown, moist, clayey SAND	10		
	10			SM	Brown, moist, silty SAND			
			6			11		
	15			SC	Brown, moist, clayey SAND			
			7			10		
	20							

Scale: 1, 10, 20, 30, 50, 80

COMPLETION DEPTH:	20.0 feet
DATE BORING STARTED:	8/9/02
DATE BORING COMPLETED:	8/9/02
ENGINEER/GEOLOGIST:	IH
DRILLING CONTRACTOR:	FES

Sample Types:

- Auger Cutting
- Vane Shear
- SPT
- UD
- Penetrometer
- Rock Core

Remarks:

Unless otherwise noted, water encountered but not recorded.

The stratification lines represent approximate boundaries. Transitions may be gradual.

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PROJECT NAME:	Longhill Station - Section II, Pond A	PROJECT NO.:	1-83151
CLIENT:	Atlantic Homes, LLC.	DRILLING METHOD:	Hand Auger
PROJECT LOCATION:	James City County, Virginia	OBSERVED G.W.T.:	Not Encountered
BORING LOCATION:	See Figure 3	STATION NO.:	

ELEVATION (Feet)	DEPTH (Feet)	SOIL LEGEND & SAMPLE TYPES	SAMPLE NO.	SOIL CLASSIFICATION	MATERIAL DESCRIPTION	SPT, N VALUE OR RQD %	STANDARD PENETRATION TEST N-VALUE ◎ (Blows/Ft) 1 10 20 30 50 80	HOLE COMPLETION & REMARKS
	0			SM	Light brown, dry to moist, silty SAND with roots "Topsoil"			
				SM	Brown to reddish brown, moist, silty SANd			
	5							

COMPLETION DEPTH:	6.0 feet
DATE BORING STARTED:	8/9/02
DATE BORING COMPLETED:	8/9/02
ENGINEER/GEOLOGIST:	IH
DRILLING CONTRACTOR:	FES

Sample Types:

- Auger Cutting
- Vane Shear
- SPT
- UD
- Penetrometer
- Rock Core

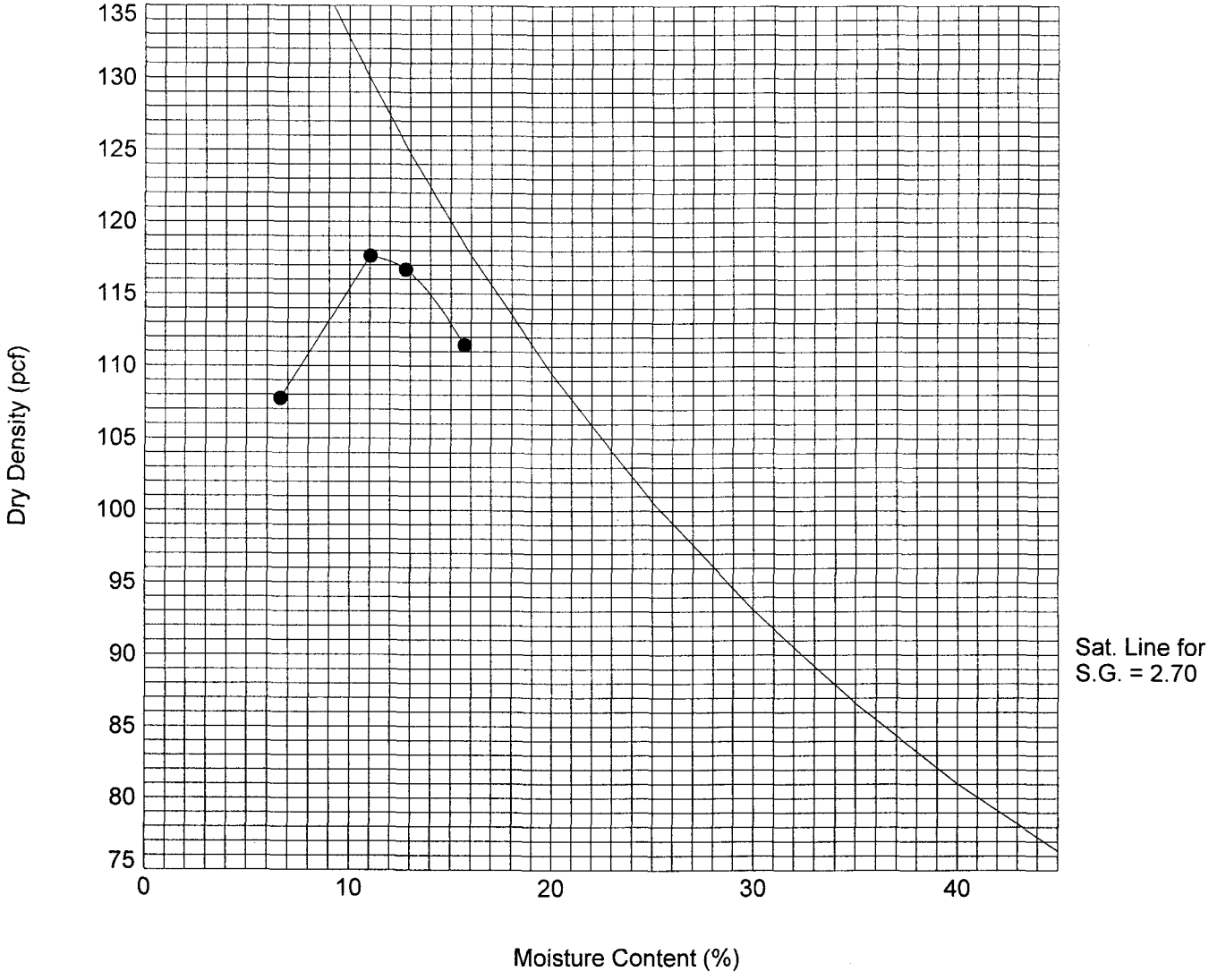
Remarks:

Unless otherwise noted, water encountered but not recorded.

The stratification lines represent approximate boundaries. The transition may be gradual.

LABORATORY TEST RESULTS

MOISTURE-DENSITY RELATIONSHIP REPORT



Sample Depth	Classification		Nat'l Moist.	S.G.	LL	PI	% > No. 4	% < No. 200
	USCS	AASHTO						
2 1.5	SM	A-2-4	4.5	2.70		NP	0	26.5

Test Results	Material Description
Optimum Moisture Content = 12.0 Maximum Dry Density = 115.5	Brown silty SAND
Project No.: 1-83151 Project Name: Longhill Station - Section II, Pond A Location: James City County, Virginia Date: 08/09/2002	Remarks: On August 8, 2002 an FES Inc. representative obtained a bulk soil sample from the in-place Pond A Procedure: ASTM D-698, Method A Rammer: Manual Preparation: Dry

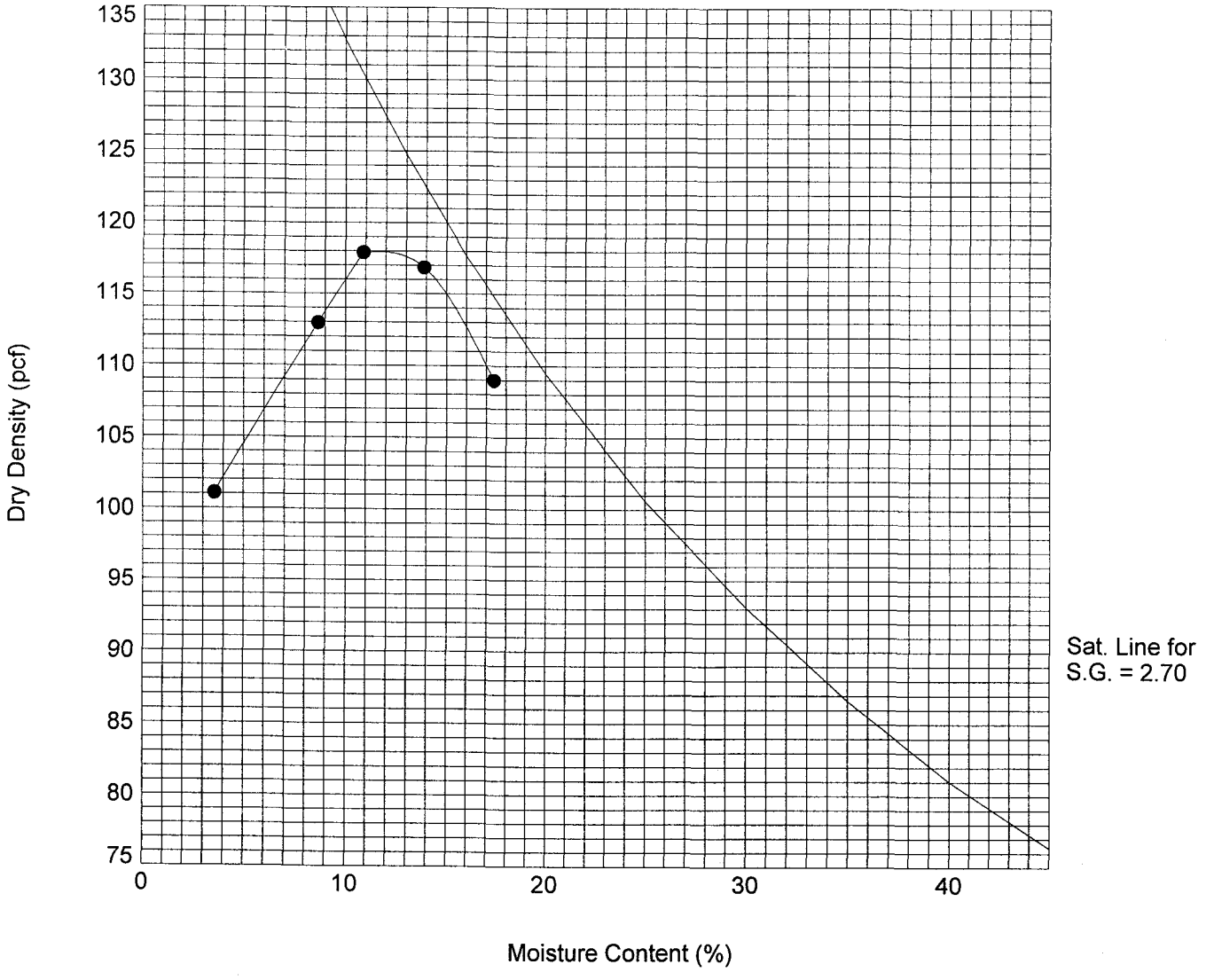
FOUNDATION ENGINEERING SCIENCE, INC.

Figure 3

PROCTOR 1-83151.GPJ FES.GDT 2/25/03

PC022_LONGHILL_STA_WET_ POND_ A_ALLEGHANY_ DRIVE_S-47-95 - 029

MOISTURE-DENSITY RELATIONSHIP REPORT



Sample Depth	Classification		Nat'l Moist.	S.G.	LL	PI	% > No. 4	% < No. 200
	USCS	AASHTO						
3 1.5	SM	A-2-4	4.7	2.70		NP	0	30.3

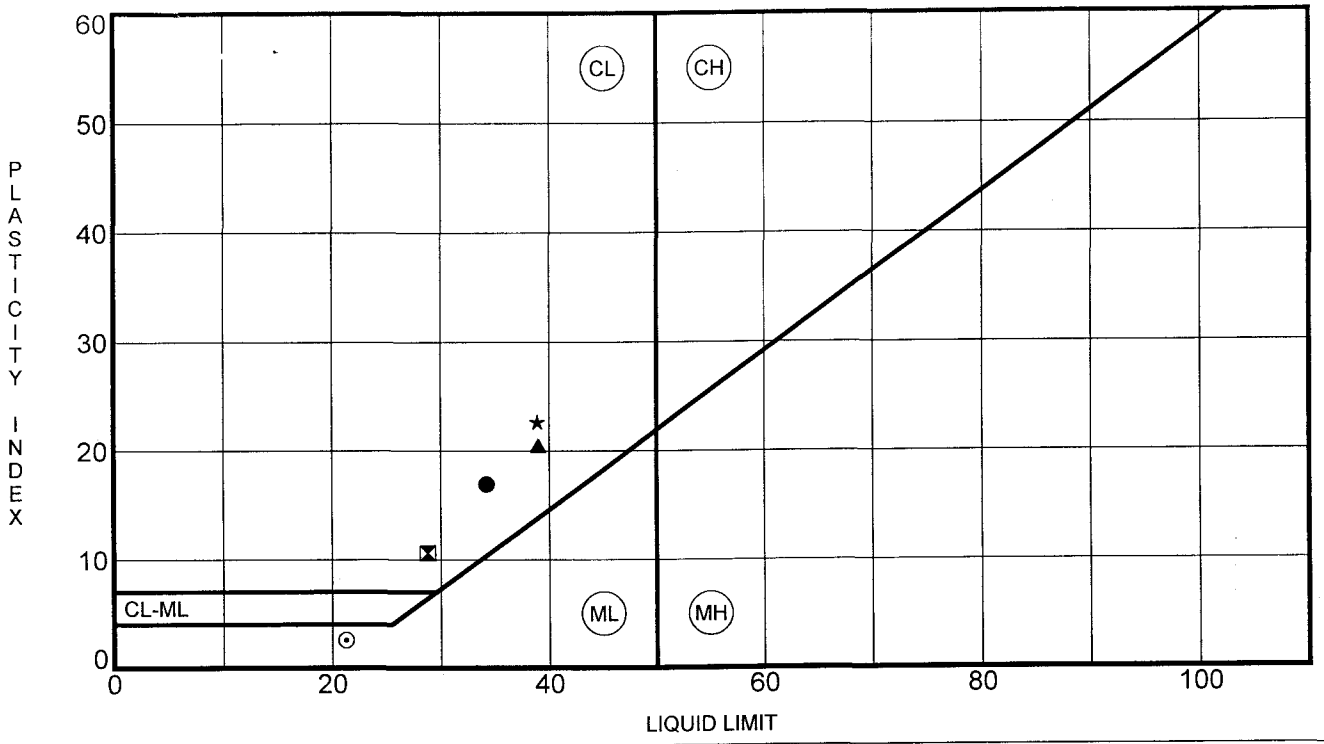
Test Results	Material Description
Optimum Moisture Content = 11.5 Maximum Dry Density = 117.5	Brown silty SAND
Project No.: 1-83151 Project Name: Longhill Station - Section II, Pond A Location: James City County, Virginia Date: 08/09/2002	Remarks: On August 8, 2002 an FES Inc. representative obtained a bulk soil sample from the in-place Pond A Procedure: ASTM D-698, Method A Rammer: Manual Preparation: Dry

FOUNDATION ENGINEERING SCIENCE, INC.

Figure 4

PROCTOR 1-83151.GPJ FES.GDT 2/25/03

PC022_LONGHILL_STA_WET_ POND_ A_ALLEGHANY_ DRIVE_S-47-95 - 030



	Specimen Identification		LL	PL	PI	Fines	Classification
●	**FES-3 (08-10)**	**9.0**	**34**	**17**	**17**	**44.9**	**Reddish brown clayey SAND**
⊠	**FES-4 (04-06)**	**5.0**	**29**	**18**	**11**	**36.5**	**Reddish brown clayey SAND**
▲	**FES-4 (08-10)**	**9.0**	**39**	**19**	**20**	**48.1**	**Reddish brown clayey SAND**
★	**FES-4 (13-15)**	**14.0**	**39**	**16**	**23**	**37.6**	**Reddish brown clayey SAND**
⊙	**FES-4 (18-20)**	**19.0**	**21**	**19**	**2**	**43.8**	**Reddish brown silty SAND**

US_ATTERBERG_LIMITS 1-83151.GPJ US_LAB.GDT 2/27/03

FES

Foundation Engineering Science, Inc
11843-B Canon Boulevard
Newport News, Virginia
Telephone: (757) 873-4113
Fax: (757) 873-4113

ATTERBERG LIMITS RESULTS

Project: Longhill Station - Section II, Pond A

Location: James City County, Virginia

Number: 1-83151

James City County Environmental Division
Stormwater Management / BMP Inspection Report
Detention and Retention Pond Facilities

S-47-95
PH 1

County BMP ID Code (if known): PC022

Name of Facility: Longhill Station Pond A BMP No.: 1 of 5 Date: 7/23/02

Location: Near 6033 Allegheny Lot 87 Sec 2

Name of Owner:

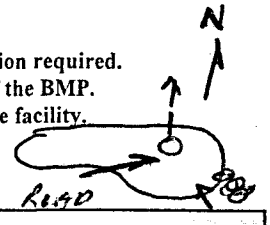
Name of Inspector: SJ Thomas

Type of Facility: Wet Pond

Weather Conditions: Sunny, Hot, 80's Type: ☑ Final Inspection ☐ County BMP Inspection Program ☐ Owner Inspection

If an inspection item is not applicable, mark NA, otherwise mark the appropriate column.

O.K. - The item checked is in adequate condition and the maintenance program is currently satisfactory. No action required.
Routine - The item checked requires attention, but does not present an immediate threat to the function/integrity of the BMP.
Urgent - The item checked requires immediate attention to keep the BMP operational and to prevent damage to the facility.



Provide an explanation and details in the comment column, if routine or urgent are marked.

Facility Item	O.K.	Routine	Urgent	Comments
Embankments and Side Slopes: Large Earth Emb; 2H:1V SS; 12' HIGH +; Tw = 12'				
Grass Height	✓			
Vegetation Condition	✓			
Tree Growth		✓		Remove trees o/s FACE OF DAM Pines & other trees
Erosion	✓			Some above barrel thru dam
Trash & Debris	✓			
Seepage	✓			None Observed.
Fencing or Benches				None
Interior Landscaping/Planted Areas: ☑ None ☐ Constructed Wetland/Shallow Marsh ☑ Naturally Established Vegetation				
Vegetated Conditions	✓			Wet pool w/ perimeter veg.
Trash & Debris	✓			Pond 7.5' deep
Floating Material	✓			
Erosion	✓			Some SS Erosion, negligible.
Sediment	✓			
Dead Plant	✓			
Aesthetics	✓			
Other				
Notes: SF Lots & Roads Sect 1A + 2				

Prudential McCardle
Realty Allegheny
253-5682
6033 Allegheny

Facility Item	O.K.	Routine	Urgent	Comments
Water Pools: ☒ Permanent Pool (Retention Basin) ☐ Shallow Marsh (Detention Basin) ☐ None, Dry (Detention Basin)				
Shoreline Erosion	✓			Pool 2-8' deep @ riser
Algae	✓			Chemical treated w/ fountain
Trash & Debris	✓			
Sediment	✓			
Aesthetics	✓			
Other				
Inflows (Describe Types/Locations): (1) 30" CMP from NW SEC 1; (2) 24" pipe from east (at riprap)				
Condition of Structure	✓			1 + 2 ok
Erosion	✓			1 + 2 ok
Trash and Debris	✓			1 + 2 ok
Sediment	✓			Sed 2' deep at #1 out. NOT OBSTRUCTED
Outlet Protection		✓		clean debris end of pipe #1
Other				
Principal Flow Control Structure - Riser, Intake, etc. (Describe Type): 48 CMP Riser w/ CMP Cap; Access hatch				
Condition of Structure	✓			somewhat rusty but ok.
Corrosion	✓			Still in BMP Mode - convert
Trash and Debris				
Sediment				
Vegetation				
Other				Riser is inaccessible in middle pond.
Principal Outlet Structure - Barrel, Conduit, etc. : 30" CMP Coated.				
Condition of Structure	✓			
Settlement	✓			
Trash & Debris	✓			
Erosion/Sediment	✓			
Outlet Protection	✓			6' + 6' CLASS I
Other				
Emergency Spillway (Overflow): North End; 20' wide GRASS				
Vegetation		✓		Trees in ES
Lining	✓			
Erosion	✓			
Trash & Debris	✓			
Other	✓			
Notes: Nat Channel D/S BMP stable				

Facility Item	O.K.	Routine	Urgent	Comments
Nuisance Type Conditions:				
Mosquito Breeding	✓			
Animal Burrows	✓			
Graffiti	✓			
Other	✓			
Surrounding Perimeter Conditions:	EAST WOODS O.S; West Allegheny Road + Lots			
Land Uses	✓			
Vegetation	✓			
Trash & Debris	✓			
Aesthetics	✓			
Access /Maintenance Roads or Paths	✓			Allegheny Road
Other				

Remarks:

- Remove SF D/S of Barrel in NAT Channel.
- Clear trees entire D/S toe of dam (4-10' high)
- Remove DW orifice, convert to BMD w/ turndown elbow
- Inspect riser interior, clean & coat exterior as necessary.
- clear trees from ES full crest length.
- clean 24" inflow pipe
- Need Key Lock on Access hatch

Overall Environmental Division Internal Rating: 3

Signature: [signature] P.E. **Date:** 7/23/12

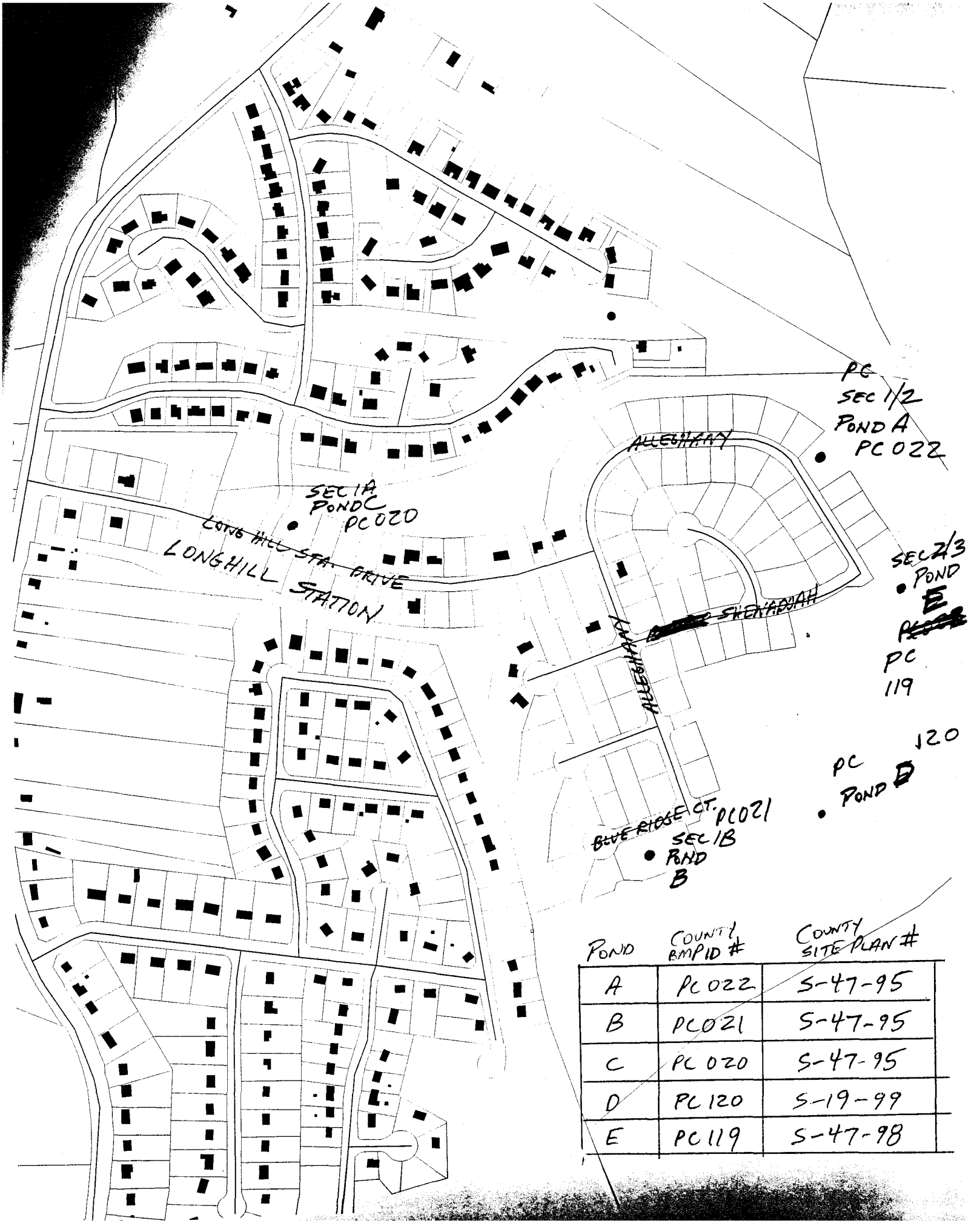
Title: Civil Engineer Env Div

SWMProg\BMP\CoInspProg\DetRet.wpd

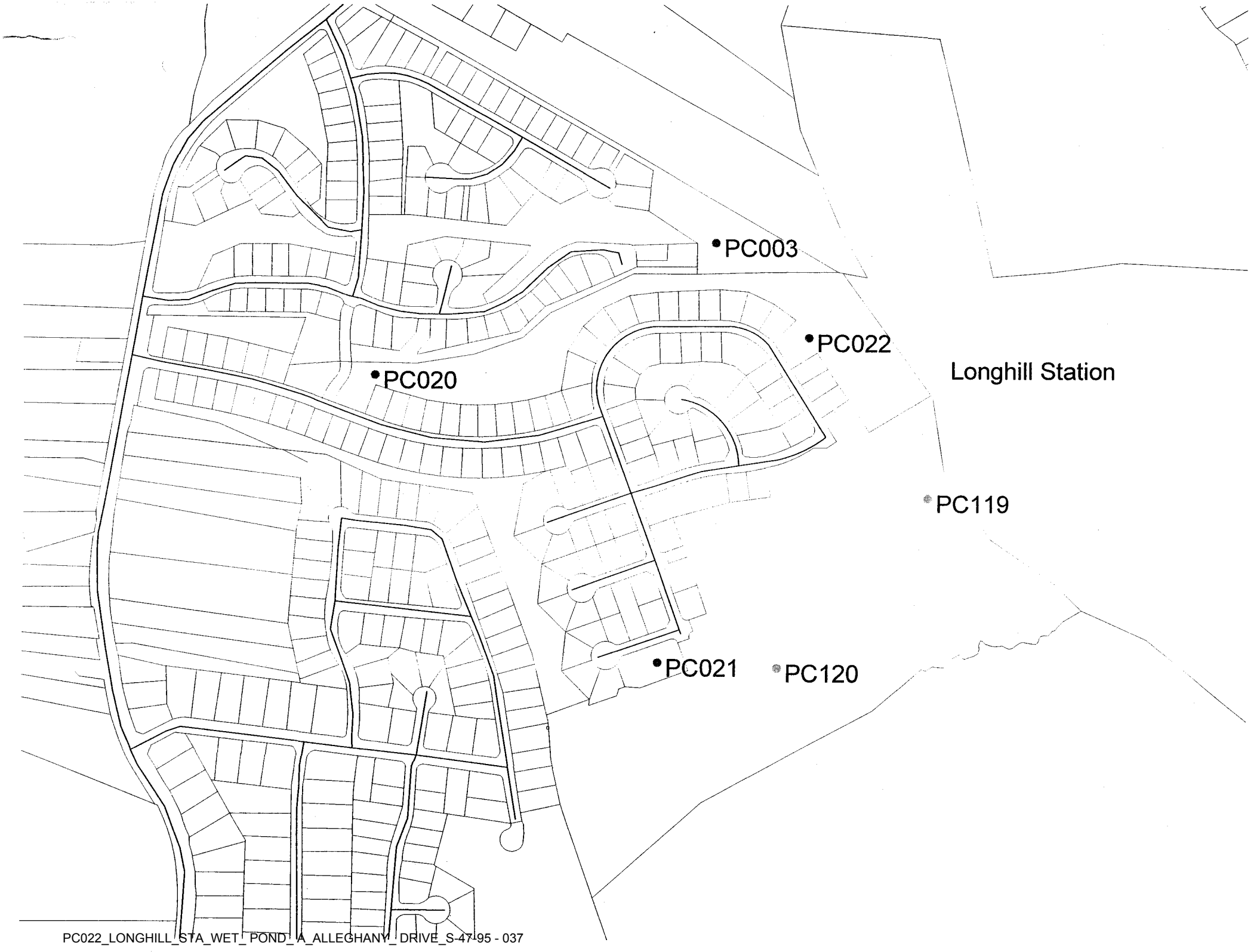
WATERSHED	PC	MAINTENANCE PLAN	No	CTRL STRUC DESC	CMP Riser
BMP ID NO	022	SITE AREA acre	104.5	CTRL STRUC SIZE inches	48
PLAN NO	S-47-95	LAND USE	SF Residential	OTLT BARRL DESC	CMP
TAX PARCEL		old BMP TYP	Wet Pond	OTLT BARRL SIZE inch	30
PIN NO	3110900001B	JCC BMP CODE			
CONSTRUCTION DATE		POINT VALUE		EMERG SPILLWAY	Yes
PROJECT NAME	Longhill Station Sec 1/2 (Pond A)			DESIGN HW ELEV	67.5
FACILITY LOCATION	Near 6033 Alleghany Road			PERM POOL ELEV	61.29
CITY-STATE	Williamsburg, VA 23188	SVC DRAIN AREA acres		2-YR OUTFLOW cfs	
CURRENT OWNER	Wallace Associates, LLC (c/o Henry Stephens)			10-YR OUTFLOW cfs	
OWNER ADDRESS	2 Eaton Street			REC DRAWING	Yes
OWNER ADDRESS 2	Suite 1101	SERVICE AREA DESCRI	Sec 2 SF Lots & Roadways		
CITY-STATE-ZIP CODE	Hampton, Va. 23669	IMPERV AREA acres		CONSTR CERTI	No
OWNER PHONE		RECV STREAM	UT of Powhatan Creek		
MAINT AGREEMENT	Yes	EXT DET-WQ-CTRL	No	LAST INSP DATE	10/17/2000
EMERG ACTION PLAN	No	WTR QUAL VOL acre-ft		INTERNAL RATING	3
		CHAN PROT CTRL	No	MISC/COMMENTS	
		CHAN PROT VOL acre-ft		Larger BMP in Sec 2 near Lot 87, northeast corner. See PC 020, 021, 119 & 120.	
		SW/FLOOD CONTROL	Yes		
		GEOTECH REPORT	No		

Get Last BMP No

Return to Menu



POND	COUNTY BMP ID #	COUNTY SITE PLAN #
A	PC 022	S-47-95
B	PC021	S-47-95
C	PC 020	S-47-95
D	PC 120	S-19-99
E	PC 119	S-47-98



PC022_LONGHILL_STA_WET_POND_A_ALLEGHANY_DRIVE_S-47-95 - 037

Stormwater Division

MEMORANDUM

DATE: March 13, 2010

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

FROM: Jo Anna Ripley, Stormwater

PO: 270712

RE: Files Approved for Scanning

General File ID or BMP ID: PC119

PIN: 3110100080

Subdivision, Tract, Business or Owner Name (if known): Longhill Station

Property Description: Common Area

Site Address: 5900 Centerville Road

(For internal use only) **Box** 3 **Drawer:** 2

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

Comments

Combined file with PC020, PC021, PC119 and PC120. This parcel is owned by Longhill Station Homeowners Association.

Sec 2
5-47-98
Pond E

DECLARATION OF COVENANTS

COPY

INSPECTION/MAINTENANCE OF DRAINAGE SYSTEM

THIS DECLARATION, made this 8th day of September, 1998, between Atlantic Homes Developers and all successors in interest, hereinafter referred to as the "COVENANTOR(S)," owner(s) of the following property: Longhill Station, Section 2, Deed Book 626, Page No. 50 or Instrument No. _____, and James City County, Virginia, hereinafter referred to as the "COUNTY."

WITNESSETH:

We, the COVENANTOR(S), with full authority to execute deeds, mortgages, other covenants, and all rights, titles and interests in the property described above, do hereby covenant with the COUNTY as follows:

1. The COVENANTOR(S) shall provide maintenance for the drainage system including any runoff control facilities, conveyance systems and associated easements, hereinafter referred to as the "SYSTEM," located on and serving the above-described property to ensure that the SYSTEM is and remains in proper working condition in accordance with approved design standards, and with the law and applicable executive regulations. The SYSTEM shall not include any elements located within any Virginia Department of Transportation rights-of-way.

2. If necessary, the COVENANTOR(S) shall levy regular or special assessments against all present or subsequent owners of property served by the SYSTEM to ensure that the SYSTEM is properly maintained.

3. The COVENANTOR(S) shall provide and maintain perpetual access from public right-of-ways to the SYSTEM for the COUNTY, its agent and its contractor.

4. The COVENANTOR(S) shall grant the COUNTY, its agent and its contractor a right of entry to the SYSTEM for the purpose of inspecting, operating, installing, constructing, reconstructing, maintaining or repairing the SYSTEM.

5. If, after reasonable notice by the COUNTY, the COVENANTOR(S) shall fail to maintain the SYSTEM in accordance with the approved design standards and with the law and applicable executive regulations, the COUNTY may perform all necessary repair or maintenance work, and the COUNTY may assess the COVENANTOR(S) and/or all property served by the SYSTEM for the cost of the work and any applicable penalties.

6. The COVENANTOR(S) shall indemnify and save the COUNTY harmless from any and all claims for damages to persons or property arising from the installation, construction, maintenance, repair, operation or use of the SYSTEM.

7. The COVENANTOR(s) shall promptly notify the COUNTY when the COVENANTOR(S) legally transfers any of the COVENANTOR(S)' responsibilities for the SYSTEM. The COVENANTOR(S)' shall supply the COUNTY with a copy of any document of transfer, executed by both parties.

8. The covenants contained herein shall run with the land and shall bind the COVENANTOR(S) and the COVENANTOR(S)' heirs, executors, administrators, successors and assignees, and shall bind all present and subsequent owners of property served by the SYSTEM.

9. This COVENANT shall be recorded in the County Land Records.

Instrument # 980017745
Recorded on Sept. 17, 1998
Page 0283

PC020_PC021_PC022_PC119_PC120_LONGHILL_STATION - 287

IN WITNESS WHEREOF, the COVENANTOR(S) have executed this DECLARATION OF COVENANTS as of this 11th day of September, 1998.

COVENANTOR(S)

William W. Morris, President
Atlantic Homes Development Co.

ATTEST:

Carole C. Giuliano

COVENANTOR(S)

ATTEST:

COMMONWEALTH OF VIRGINIA
~~CITY~~/COUNTY OF James City

I hereby certify that on this 11 day of September, 1998, before the subscribed, a Notary Public of the State of Virginia, and for the County of James City, aforesaid personally appeared William W. Morris and did acknowledge the aforegoing instrument to be their Act.

IN WITNESS WHEREOF, I have hereunto set my hand and official seal this 11 day of September, 1998.

Carole C. Giuliano
Notary Public

My Commission expires: May 31, 2002

Approved as to form:

Leo P. Rogers
Deputy County Attorney

This Declaration of Covenants prepared by:

William W. Morris
(Print Name)

President, Atlantic Homes Devel. Co.
(Title)

2600 Quarterpath #1161
(Address)

Williamsburg VA 23185
(City) (State) (Zip)

drainage.pre
Revised 2/97

GPIN 3110100080

Atlantic Homes Dev
2 Eaton St #1101
Hampton VA 23669
Skip Morris 896-3430

Mr. Ken Allen
10 San Jose Dr
NW VA 23606

James City County, Virginia
Environmental Division

Stormwater Management/BMP Facilities
Record Drawing/Construction Certification
Review Tracking Form

County Plan No.: S-47-98
Project Name: Longhill Station Sec 2
Stormwater Management Facility: POND E - (Alleghany + Shenadoah)
Phase: ☐ I ☒ II ☐ III

☒ Information Received. Date: MAY 02 '01
☒ Administrative Check.
- ☒ Record Drawing Date: Richmond 3/22/01
- ☐ Construction Certification Date:
- ☐ RD/CC Standard Forms (Required after Feb 1st 2001Only)
- ☒ Insp/Maint Agreement Info: Inst # 980017745 Sept 17 1998 p. 0283
- ☒ BMP Maintenance Plan NO Location:
- ☐ Other:

☒ Standard E&SC Note on Approved Plan Requiring RD/CC or County comment in plan review file. Comment #8 July 1 1998
☒ Yes ☐ No Location: Note #18, Sheet C5 (6 of 9)
☒ Assign County BMP ID Code Code: pc 119.
☒ Log into Division's "As-Built" Tracking Log
☒ Add Location to GIS Database Map. Obtain GIS site information (GPIN, Owner, Site Area, Address, etc.)
☒ Preliminary Log into BMP Database (BMP ID #, Site Plan #, GPIN, Project Name)
☒ Active Project File Review (correspondence, H&H, etc.).
☒ Initial As-Built File setup (label, copy hydraulics, BMP information, etc.).
☒ Inspector Check of RD/CC. Gerry
☒ Pre-Inspection Drawing Review - Approved Plan (Quick look prior to field inspection).
☐ Final Inspection (FI) Performed Date: 1-30-02 SJT
☒ Record Drawing (RD) Review Date: 12-05-01
☐ Construction Certification (CC) Review Date: 2/17/03 OK.
☐ Actions:
- ☐ No comments.
- ☒ Comments. Letter Forwarded. Date: Feb 06 '02
  - ☒ Record Drawing (RD)
  - ☒ Construction Certification (CC) Post Const Geotech FES 2/17/03 OK.
  - ☒ Construction-Related (CR)
  - ☐ Site Issues (SI)
  - ☐ Other :

☐ Second Submission:
☐ Third Submission:
☐ Acceptable for stormwater managment facility purposes (RD/CC/CR/Other). Proceed with bond release.
☐ Notify Darryl/Joan/Pat of acceptability using email (preferred), form or verbal.
☒ Check/Clean active file of any remaining material and finish "As-Built" file.
☒ Add to County BMP Inventory/Inspection schedule (Phase I, II or III).
☒ Copy Final Inspection Report into County BMP Inspection Program file.
☐ Digital Photographs obtained.
☒ Add to JCC Hydrology & Hydraulic database (optional).

BMP Certification Information Acceptable

Plan Reviewer: Date:

RZ
26.28

owner: Longhill Sta. LLC
10 San Jose Drive
Suite 4C
NW VA 23606-3599

CONST
1/1/99

Record Drawing/Construction Certification Submittal for a BMP Facility

Date: 5/11/01

Inspector:
- ☒ Pat Menichino
- ☐ Gerry Lewis
- ☐ Beth Davis
- ☐ Mike Woolson
- ☐ Other: _____

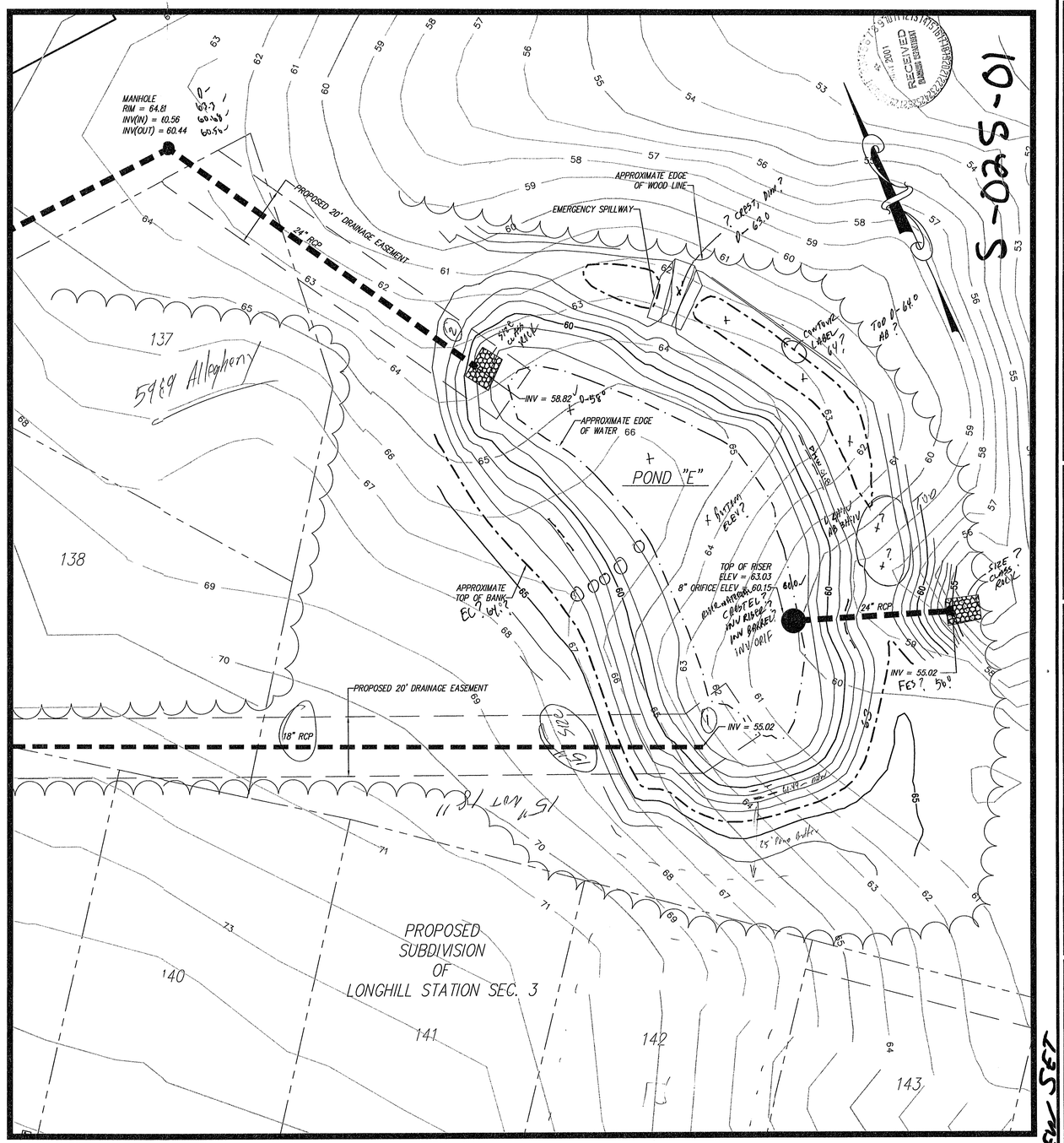
Project: LONGHILL STATION
BMP Facility: POND E - WET POND
Plan No. S-47-98
BMP ID Code: PC 119

I have received a transmittal for a ☒ Record Drawing and ☐ Construction Certification for the above referenced facility on 5/10/01. Prior to full review of these items and field inspection, I am first forwarding the items to you to cursory review in case any major field changes were performed that I should be aware of and/or to ensure the record drawing accurately portrays what you saw in the field. Please review the drawing and return to me promptly so I can proceed with performing a final engineering inspection for certification purposes.

During my review, I will look at issues related to the BMP and its primary inflow and outflow conveyance systems, and will make comment in the following areas: record drawing (RD), construction certification (CC) and construction-related (CR) punch list items. If you have any other related non-BMP site issues such as erosion, stabilization, removal of erosion & sediment controls, etc. that are not related to the BMP, I can easily add these items to any comment letter that I may forward to the owner/engineer. You can let me know of any outstanding site issues or we can schedule to perform a joint inspection.

If I don't hear from you I will ask you if any other outstanding issues remain before I forward any letters to the owner/engineer.

Scott



Riser Detail w/orifice size Pole or 1F 8-12"

Scale 1" = 20'

• No Prof Seal
• Des Plan Showed Safety (El. 59.0) Bench along Riser. Do does not reflect Brookinfield 8/10/00
○ Address Cor 157 & Site of 50 ~~Sys Comments~~ order detail ○ Pipe 15" Pipe 18"

SWM/WQ Review Set

BEFORE DIGGING CALL "MISS UTILITY" OF VIRGINIA AT 1-800-552-7001

FB 165, PG 6-7

Rickmond Engineering, Inc.
Engineering Surveying Land Planning
1643 Merrimac Trail
Williamsburg, VA 23185
Voice: (757)229-1776
Fax: (757)229-4683
Vint Hill • P.O. Box 861647
Warrenton, VA 20187
Voice: (540)349-7730
Fax: (540)349-7731
www.rickmond.com

Checked By: CBD | Drawn By: CBK | Scale: AS NOTED | Date: 3/22/01

PRELIMINARY For Plan Review Only NOT for Construction

No.	By	Revision	App.	Date

LONGHILL STATION

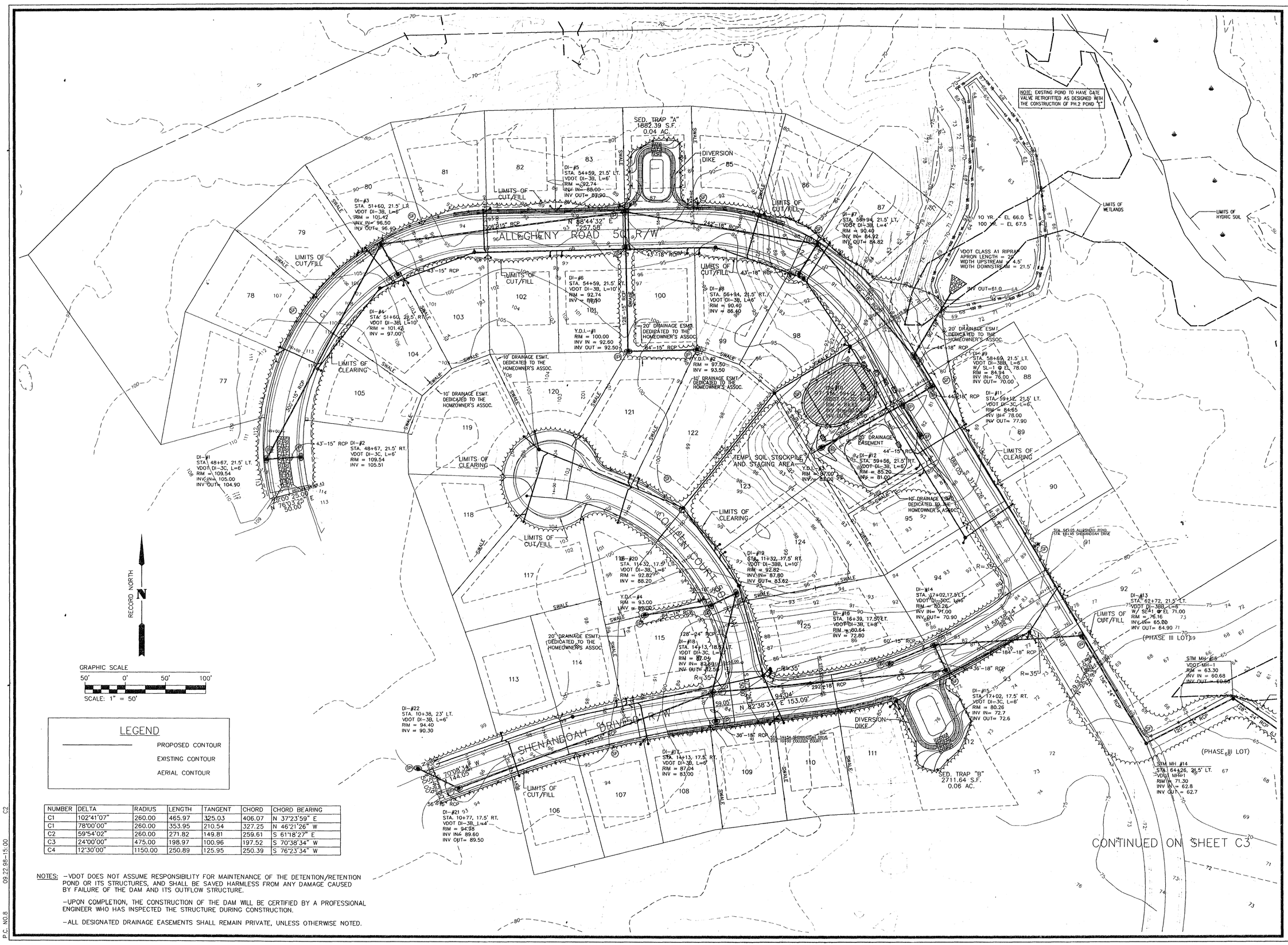
RECORD DRAWING OF POND "E"

JAMES CITY COUNTY VIRGINIA

Job Number	Sheet No.
01109	1 OF 1

S-42-98 #C 119

PC020_PC021_PC022_PC119_PC120_LONGHILL_STATION - 291



RECORD NORTH

GRAPHIC SCALE
50' 0' 50' 100'
SCALE: 1" = 50'

LEGEND

- PROPOSED CONTOUR
- EXISTING CONTOUR
- AERIAL CONTOUR

NUMBER	DELTA	RADIUS	LENGTH	TANGENT	CHORD	CHORD BEARING
C1	102°41'07"	260.00	465.97	325.03	406.07	N 37°23'59" E
C1	78°00'00"	260.00	353.95	210.54	327.25	N 46°21'26" W
C2	59°54'02"	260.00	271.82	149.81	259.61	S 61°18'27" E
C3	24°00'00"	475.00	198.97	100.96	197.52	S 70°38'34" W
C4	12°30'00"	1150.00	250.89	125.95	250.39	S 76°23'34" W

NOTES: -VDOT DOES NOT ASSUME RESPONSIBILITY FOR MAINTENANCE OF THE DETENTION/RETENTION POND OR ITS STRUCTURES, AND SHALL BE SAVED HARMLESS FROM ANY DAMAGE CAUSED BY FAILURE OF THE DAM AND ITS OUTFLOW STRUCTURE.

-UPON COMPLETION, THE CONSTRUCTION OF THE DAM WILL BE CERTIFIED BY A PROFESSIONAL ENGINEER WHO HAS INSPECTED THE STRUCTURE DURING CONSTRUCTION.

-ALL DESIGNATED DRAINAGE EASEMENTS SHALL REMAIN PRIVATE, UNLESS OTHERWISE NOTED.

Committed to Excellence
DJG INC.
ENGINEERS • ARCHITECTS • SURVEYORS
1006 RICHMOND ROAD, P.O. BOX 3505 WILLIAMSBURG, VIRGINIA 23187
(757)253-0673 FAX: (757)253-2319 E-MAIL: djgino@visi.net
NORFOLK - VIRGINIA BEACH AREA (757)874-5015

THESE ARE THE APPROVED SHEETS 2,3,5

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REVISIONS

NO.	DATE	DESCRIPTION
1	8/5/98	REVISIONS PER ENVIRONMENTAL DIV. COMMENTS (7/1/98)
2	8/17/98	REVISIONS PER COUNTY COMMENTS (DATED 7/7/98)
3	9/22/98	REVISIONS PER COUNTY COMMENTS (DATED 9/1/98)

STORM DRAINAGE AND E AND S

ATLANTIC HOMES DEVELOPMENT CORPORATION
LONGHILL STATION SUBDIVISION
SECTION 2
JAMES CITY COUNTY VIRGINIA

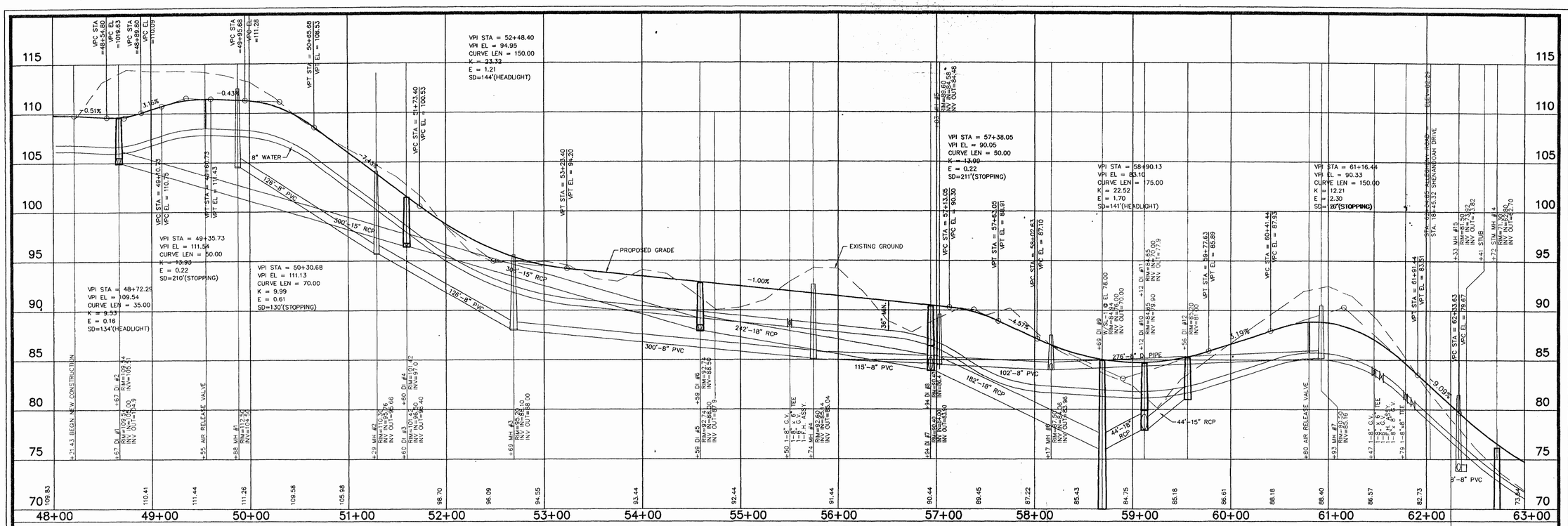
SCALE	DESIGNED	DRAWN	CHECKED	DATE
1" = 50'	HLPG	CLJ	DJD	5/29/98

COMMISSION NUMBER
1980150

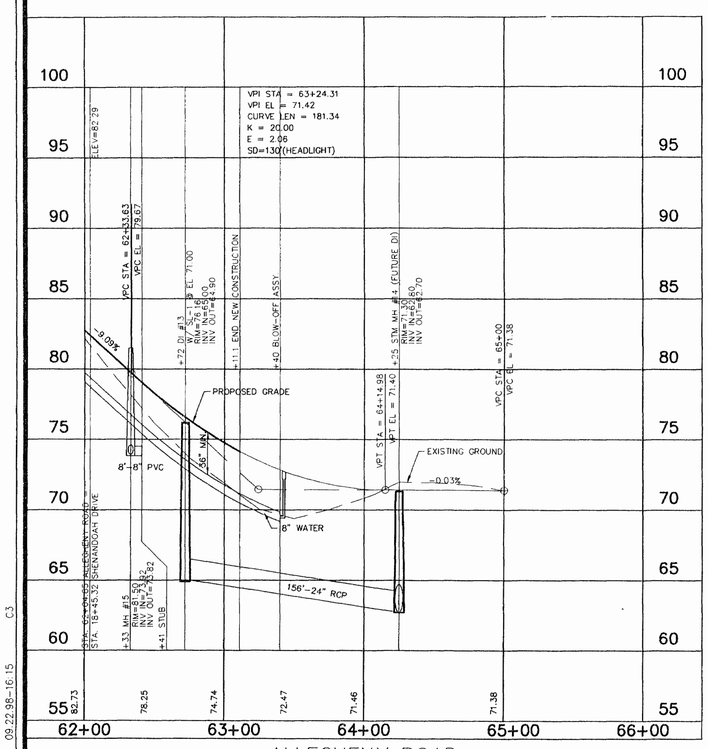
SHEET NUMBER
C2
3 OF 9

C2 09.22.98-15.00 P.C. NO.8

PC020_PC021_PC022_PC119_PC120_LONGHILL_STATION - 292

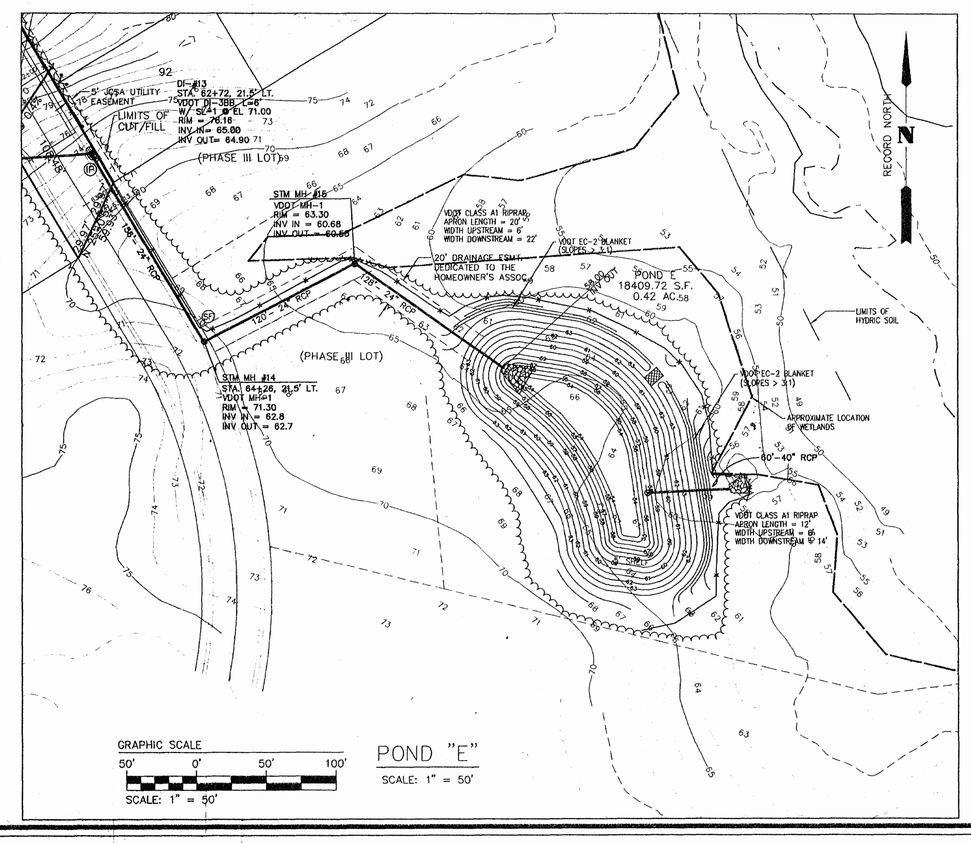


ALLEGHENY ROAD
SCALE: HORZ.: 1"= 50'
VERT.: 1"= 5'



ALLEGHENY ROAD
SCALE: HORZ.: 1"= 50'
VERT.: 1"= 5'

CONTINUATION FROM SHEET C2



POND "E"
SCALE: 1" = 50'

DJG INC.
Committed to Excellence
ENGINEERS • ARCHITECTS • SURVEYORS
1006 RICHMOND ROAD, P.O. BOX 3305, WILLIAMSBURG, VIRGINIA 23187
(757)253-0671 FAX (757)253-1814 E-MAIL djgwb@aol.net
NORFOLK - VIRGINIA BEACH AREA (757)671-5015

REVISIONS

NO.	DATE	DESCRIPTION
1	8/5/98	REVISIONS PER ENVIRONMENTAL DIV. COMMENTS (7/7/98)
2	8/12/98	REVISIONS PER COUNTY COMMENTS (DATED 7/7/98)
3	9/22/98	REVISIONS PER COUNTY COMMENTS (DATED 9/17/98)

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PROFILES AND DETAILS

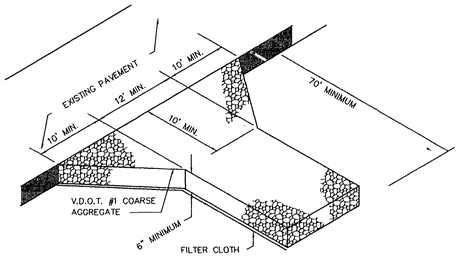
ATLANTIC HOMES DEVELOPMENT CORPORATION
LONGHILL STATION SUBDIVISION
SECTION 2
JAMES CITY COUNTY VIRGINIA

SCALE: AS NOTED
DESIGNED: HLF/CJ/DFL
DRAWN: CLJ
CHECKED: DJD
DATE: 5/29/98

COMMISSION NUMBER
1980150

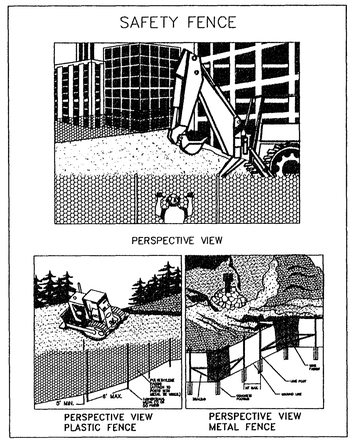
SHEET NUMBER
C3
4 OF 9

P.C. NO.8 09.22.98-16:15 C3



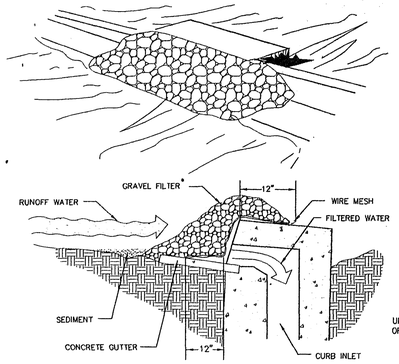
TEMPORARY STONE CONSTRUCTION ENTRANCE VESCH 3.02

(CE) NOT TO SCALE



SOURCE: CONWED PLASTICS
VDOT ROAD AND BRIDGE STANDARDS
VA. DSWC

PLATE. 3.1-1

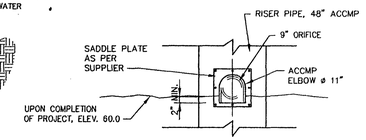


THIS METHOD OF INLET PROTECTION IS APPLICABLE AT CURB INLETS WHERE PONDING IN FRONT OF THE STRUCTURE IS NOT LIKELY TO CAUSE INCONVENIENCE OR DAMAGE TO ADJACENT STRUCTURES AND UNPROTECTED AREAS.

* GRAVEL SHALL BE VDOT #3, #357 OR 5 COARSE AGGREGATE.

GRAVEL CURB INLET SEDIMENT FILTER 3.07-6

(IP) NOT TO SCALE



ORIFICE PROTECTION ELBOW

NOT TO SCALE

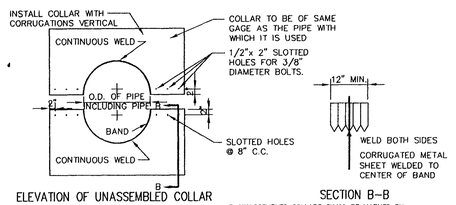
REVISED BY JCC: 4/7/97

EROSION AND SEDIMENT CONTROL NOTES

THE PURPOSE OF THE EROSION CONTROL MEASURES SHOWN ON THESE PLANS SHALL BE TO PRECLUDE THE TRANSPORT OF ALL WATERBORNE SEDIMENTS RESULTING FROM CONSTRUCTION ACTIVITIES FROM ENTERING ONTO ADJACENT PROPERTIES OR STATE WATERS. IF FIELD INSPECTION REVEALS THE INADEQUACY OF THE PLAN TO CONFINE SEDIMENT TO THE PROJECT SITE, APPROPRIATE MODIFICATIONS WILL BE MADE TO CORRECT ANY PLAN DEFICIENCIES. IN ADDITION TO THESE NOTES, ALL PROVISIONS OF THE VIRGINIA EROSION AND SEDIMENT CONTROL REGULATIONS SHALL APPLY TO THIS PROJECT.

1. ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE "VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK." THE CONTRACTOR SHALL BE THOROUGHLY FAMILIAR WITH ALL APPLICABLE MEASURES CONTAINED THEREIN WHICH MAY BE PERTINENT TO THIS PROJECT.
2. ALL POINTS OF CONSTRUCTION INGRESS AND EGRESS SHALL BE PROTECTED BY A TEMPORARY CONSTRUCTION ENTRANCE TO PREVENT TRACKING OF MUD ONTO PUBLIC RIGHT-OF-WAYS. AN ENTRANCE PERMIT FROM VDOT IS REQUIRED PRIOR TO ANY CONSTRUCTION ACTIVITIES WITHIN STATE RIGHT-OF-WAYS. WHERE SEDIMENT IS TRANSPORTED ONTO A PUBLIC ROAD SURFACE, THE ROAD SHALL BE THOROUGHLY CLEANED AT THE END OF EACH DAY.
3. A PRECONSTRUCTION MEETING SHALL BE HELD ON SITE BETWEEN THE COUNTY, THE DEVELOPER, THE PROJECT ENGINEER, AND THE CONTRACTOR PRIOR TO THE ISSUANCE OF THE LAND DISTURBING PERMIT. THE CONTRACTOR SHALL SUBMIT A SEQUENCE OF CONSTRUCTION TO THE COUNTY FOR APPROVAL PRIOR TO THE PRECONSTRUCTION MEETING. THE CONTRACTOR WILL SUPPLY THE ENVIRONMENTAL DIVISION WITH THE NAME OF THE INDIVIDUAL WHO WILL BE RESPONSIBLE FOR ENSURING MAINTENANCE OF INSTALLED MEASURES ON A DAILY BASIS.
4. SEDIMENT BASINS AND TRAPS, PERIMETER DIKES, SEDIMENT BARRIERS AND OTHER MEASURES INTENDED TO TRAP SEDIMENT ON-SITE MUST BE CONSTRUCTED AS A FIRST STEP IN GRADING AND BE MADE FUNCTIONAL BEFORE UPSLOPE LAND DISTURBANCE TAKES PLACE. EARTHEN STRUCTURES SUCH AS DAMS, DIKES, AND DIVERSIONS MUST BE SEEDED AND MULCHED IMMEDIATELY AFTER INSTALLATION. PERIODIC INSPECTIONS OF THE EROSION CONTROL MEASURES SHALL BE MADE TO ACCESS THEIR CONDITION. ANY NECESSARY MAINTENANCE OF THE MEASURES SHALL BE ACCOMPLISHED IMMEDIATELY UPON NOTIFICATION BY THE COUNTY AND SHALL INCLUDE THE REPAIR OF MEASURES DAMAGED BY ANY SUBCONTRACTOR INCLUDING THOSE OF THE PUBLIC UTILITY COMPANIES.
5. SURFACE FLOWS OVER CUT AND FILL SLOPES SHALL BE CONTROLLED BY EITHER REDIRECTING FLOWS FROM TRANSVERSING THE SLOPES OR BY INSTALLING MECHANICAL DEVICES TO SAFELY LOWER WATER DOWNSLOPE WITHOUT CAUSING EROSION. A TEMPORARY FILL DIVERSION (STD. & SPEC. 3.10) SHALL BE INSTALLED PRIOR TO THE END OF EACH WORKING DAY.
6. SEDIMENT CONTROL MEASURES MAY REQUIRE MINOR FIELD ADJUSTMENTS AT TIME OF CONSTRUCTION TO INSURE THEIR INTENDED PURPOSE IS ACCOMPLISHED. ENVIRONMENTAL DIVISION APPROVAL WILL BE REQUIRED FOR OTHER DEVIATIONS FROM THE APPROVED PLANS.
7. THE CONTRACTOR SHALL PLACE SOIL STOCKPILES AT THE LOCATIONS SHOWN ON THIS PLAN OR AS DIRECTED BY THE ENGINEER. SOIL STOCKPILES SHALL BE STABILIZED OR PROTECTED WITH SEDIMENT TRAPPING MEASURES. OFF-SITE WASTE OR BORROW AREAS SHALL BE APPROVED BY THE ENVIRONMENTAL DIVISION PRIOR TO THE IMPORT OF ANY BORROW OR EXPORT OF ANY WASTE TO OR FROM THE PROJECT SITE.
8. THE CONTRACTOR SHALL COMPLETE DRAINAGE FACILITIES WITHIN 30 DAYS FOLLOWING COMPLETION OF ROUGH GRADING AT ANY POINT WITHIN THE PROJECT. THE INSTALLATION OF DRAINAGE FACILITIES SHALL TAKE PRECEDENCE OVER ALL UNDERGROUND UTILITIES. OUTFALL DITCHES FROM DRAINAGE STRUCTURES SHALL BE STABILIZED IMMEDIATELY AFTER CONSTRUCTION OF SAME. THIS INCLUDES INSTALLATION OF EROSION CONTROL STONE OR PAVED DITCHES WHERE REQUIRED. ANY DRAINAGE OUTFALLS REQUIRED FOR A STREET MUST BE COMPLETED BEFORE STREET GRADING OR UTILITY INSTALLATION BEGINS.
9. PERMANENT OR TEMPORARY SOIL STABILIZATION MUST BE APPLIED TO ALL DENUDED AREAS WITHIN 7 DAYS AFTER FINAL GRADE IS REACHED ON ANY PORTION OF THE SITE. SOIL STABILIZATION MUST ALSO BE APPLIED TO DENUDED AREAS WHICH MAY NOT BE AT FINAL GRADE BUT WILL REMAIN DORMANT (UNDISTURBED) FOR LONGER THAN 30 DAYS. SOIL STABILIZATION MEASURES INCLUDE VEGATATIVE ESTABLISHMENT, MULCHING AND THE EARLY APPLICATION OF GRAVEL BASE MATERIAL ON AREAS TO BE PAVED.
10. NO MORE THAN 300 FEET OF SANITARY SEWER, STORM SEWER, WATERLINES, OR UNDERGROUND UTILITY LINES ARE TO BE OPEN AT ONE TIME. FOLLOWING INSTALLATION OF ANY PORTION OF THESE ITEMS, ALL DISTURBED AREAS ARE TO BE IMMEDIATELY STABILIZED (I.E., THE SAME DAY).
11. IF DISTURBED AREA STABILIZATION IS TO BE ACCOMPLISHED DURING THE MONTHS OF DECEMBER, JANUARY, OR FEBRUARY, STABILIZATION SHALL CONSIST OF MULCHING IN ACCORDANCE WITH SPECIFICATION 3.35. SEEDING WILL THEN TAKE PLACE AS SOON AS THE SEASON PERMITS.
12. THE TERM SEEDING, FINAL VEGETATIVE COVER OR STABILIZATION, ON THIS PLAN SHALL MEAN THE SUCCESSFUL GERMINATION AND ESTABLISHMENT OF A STABLE GRASS COVER FROM A PROPERLY PREPARED SEEDBED CONTAINING THE SPECIFIED AMOUNTS OF SEED, LIME, AND FERTILIZER IN ACCORDANCE WITH SPECIFICATION 3.32, PERMANENT SEEDING. IRRIGATION SHALL BE REQUIRED AS NECESSARY TO ENSURE THE ESTABLISHMENT OF GRASS COVER.
13. ALL SLOPES STEEPER THAN 3:1 SHALL REQUIRE THE USE OF EROSION CONTROL BLANKETS SUCH AS EXCELSIOR BLANKETS TO AID IN THE ESTABLISHMENT OF A VEGETATIVE COVER. INSTALLATION SHALL BE IN ACCORDANCE WITH SPECIFICATION 3.35, MULCHING AND MANUFACTURER'S INSTRUCTIONS. NO SLOPES SHALL BE CREATED STEEPER THAN 2:1.
14. INLET PROTECTION IN ACCORDANCE WITH SPECIFICATION 3.07 SHALL BE PROVIDED FOR ALL STORM DRAIN INLETS AS SOON AS PRACTICAL FOLLOWING CONSTRUCTION OF SAME.
15. TEMPORARY LINERS, SUCH AS POLYETHYLENE SHEETS, SHALL BE PROVIDED FOR ALL PAVED DITCHES UNTIL THE PERMANENT CONCRETE LINER IS INSTALLED.
16. PAVED DITCHES SHALL BE REQUIRED WHEREVER EROSION IS EVIDENT. PARTICULAR ATTENTION SHALL BE PAID TO THOSE AREAS WHERE GRADES EXCEED 3 PERCENT.
17. TEMPORARY EROSION CONTROL MEASURES ARE NOT TO BE REMOVED UNTIL ALL DISTURBED AREAS ARE STABILIZED. AFTER STABILIZATION IS COMPLETE, ALL MEASURES SHALL BE REMOVED WITHIN 30 DAYS. TRAPPED SEDIMENT SHALL BE SPREAD AND SEEDED.
18. AS-BUILT DRAWINGS MUST BE PROVIDED FOR ALL DETENTION/BMP FACILITIES. ALSO UPON COMPLETION, THE CONSTRUCTION OF ALL DETENTION/BMP FACILITIES SHALL BE CERTIFIED BY A PROFESSIONAL ENGINEER WHO INSPECTED THE STRUCTURE DURING CONSTRUCTION. THE CERTIFICATION SHALL STATE THAT TO THE BEST OF HIS/HER JUDGMENT, KNOWLEDGE, AND BELIEF, THE STRUCTURE WAS CONSTRUCTED IN ACCORDANCE WITH THE APPROVAL PLANS AND SPECIFICATIONS.

REFERENCE : VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK, THIRD EDITION, 1992

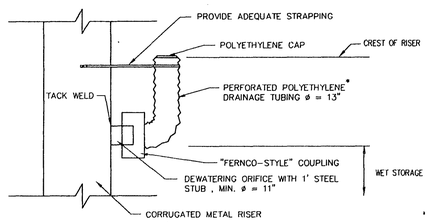


ELEVATION OF UNASSEMBLED COLLAR — SECTION B-B

NOTES FOR COLLAR
1. ALL MATERIALS TO BE IN ACCORDANCE WITH CONSTRUCTION AND CONSTRUCTION MATERIAL SPECIFICATIONS.
2. WHEN SPECIFIED ON THE PLANS, COATING OF COLLARS SHALL BE IN ACCORDANCE WITH CONSTRUCTION AND CONSTRUCTION MATERIAL SPECIFICATIONS.
3. UNASSEMBLED COLLARS SHALL BE MARKED BY PAINTING OR TAGGING TO IDENTIFY MATCHING PAIRS.
4. THE LAP BETWEEN THE PIPE AND CONNECTING BAND SHALL BE CAULKED WITH ASPHALT MASTIC AT TIME OF INSTALLATION.
5. EACH COLLAR SHALL BE FURNISHED WITH TWO 1/2" DIAMETER RODS WITH STANDARD TANK LUGS FOR CONNECTING COLLARS TO PIPE.
6. COLLAR SHOULD NOT BE LOCATED CLOSER THAN 2' TO PIPE JOINT.

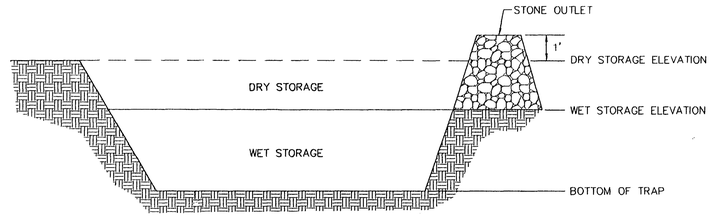
ANTI - SEEP COLLAR

NOT TO SCALE



DEWATERING SYSTEM DETAIL 1

NOT TO SCALE



TEMPORARY SEDIMENT TRAP

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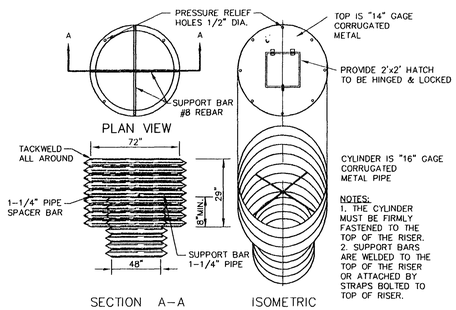
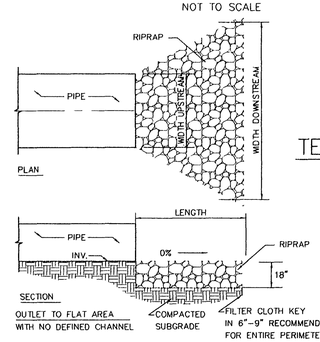


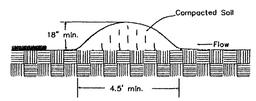
ANTI - VORTEX DEVICE

NOT TO SCALE



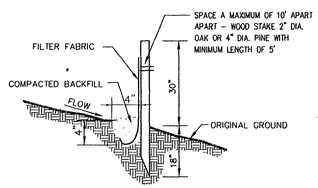
RIPRAP VESCH 3.19

(RR) NOT TO SCALE



TEMPORARY DIVERSION DIKE 3.09-1

NOT TO SCALE



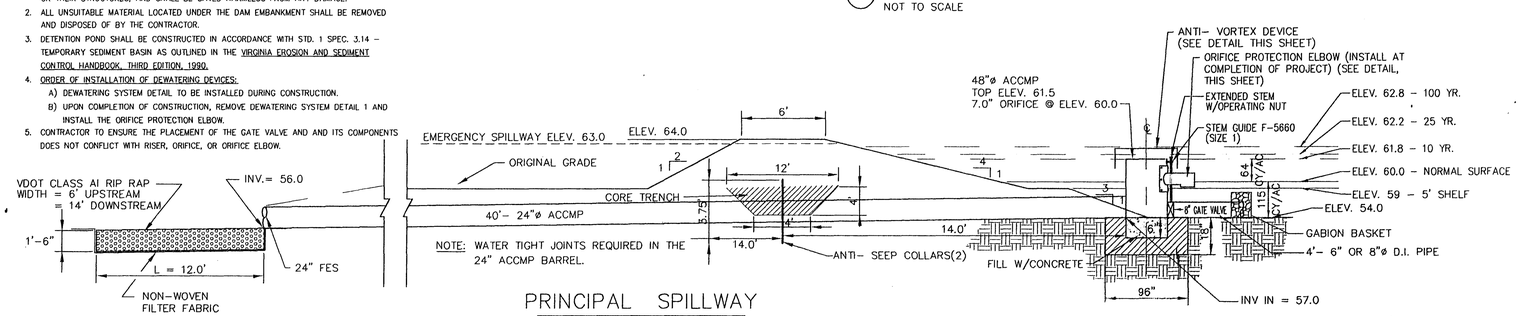
SILT FENCE VESCH 3.05

(SF) NOT TO SCALE

TEMPORARY SEDIMENT TRAP DESIGN

TRAP	"A"	"B"
SURFACE AREA	1882.39 S.F. (0.04 AC.)	2711.64 S.F. (0.06 AC.)
TOP OF STONE OUTLET ELEV.	86.5'	78.0'
TOP WIDTH OF STONE OUTLET	3.0'	3.0'
LENGTH OF STONE OUTLET	11.5'	18.0'
TOP OF TRAP ELEV.	85.5'	77.0'
BOTTOM OF TRAP ELEV.	79.0'	70.0'
WET STORAGE ELEV.	83.0'	74.0'
DRY STORAGE ELEV.	85.5'	77.0'
WET STORAGE DEPTH	4' @ 1:1 SLOPE	4' @ 1:1 SLOPE
DRY STORAGE DEPTH	2.5' @ 2:1 SLOPE	3' @ 2:1 SLOPE

NOTES:
1. VDOT DOES NOT ASSUME RESPONSIBILITY FOR MAINTENANCE OF THE STORMWATER PONDS OR THEIR STRUCTURES, AND SHALL BE SAVED HARMLESS FROM ANY DAMAGE.
2. ALL UNSUITABLE MATERIAL LOCATED UNDER THE DAM EMBANKMENT SHALL BE REMOVED AND DISPOSED OF BY THE CONTRACTOR.
3. DETENTION POND SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. 1 SPEC. 3.14 - TEMPORARY SEDIMENT BASIN AS OUTLINED IN THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK, THIRD EDITION, 1990.
4. ORDER OF INSTALLATION OF DEWATERING DEVICES:
   A) DEWATERING SYSTEM DETAIL TO BE INSTALLED DURING CONSTRUCTION.
   B) UPON COMPLETION OF CONSTRUCTION, REMOVE DEWATERING SYSTEM DETAIL 1 AND INSTALL THE ORIFICE PROTECTION ELBOW.
5. CONTRACTOR TO ENSURE THE PLACEMENT OF THE GATE VALVE AND AND ITS COMPONENTS DOES NOT CONFLICT WITH RISER, ORIFICE, OR ORIFICE ELBOW.



PRINCIPAL SPILLWAY

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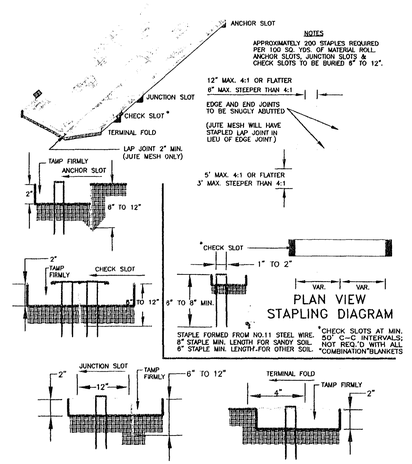

ES-2 (SOIL STABILIZATION) BLANKET INSTALLATION CRITERIA 3.36-2

NOT TO SCALE

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1006 RICHMOND ROAD, P.O. BOX 3505 WILLIAMSBURG, VIRGINIA 23187
(757)253-0673 FAX: (757)253-2319 E-MAIL: djgnc@visi.net
NORFOLK - VIRGINIA BEACH AREA (757)874-5015

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REVISIONS

NO.	DATE	DESCRIPTION
1	8/5/98	REVISIONS PER ENVIRONMENTAL DIV. COMMENTS (7/1/98)
2	9/22/98	REVISIONS PER COUNTY COMMENTS (DATED 9/17/98)

E & S CONTROL DETAILS AND NOTES

ATLANTIC HOMES DEVELOPMENT CORPORATION
LONGHILL STATION SUBDIVISION
SECTION 2

JAMES CITY COUNTY — VIRGINIA

SCALE	DESIGNED	DRAWN	CHECKED	DATE
AS NOTED	---	CJJ	DJD	05/29/98

COMMISSION NUMBER 1980150

SHEET NUMBER C5

6 OF 9

COPY DESIGN PLAN S-47-98

VISION – SECTION 2

, VIRGINIA

ES
S

Pond E
Behind 5989 Allegheny
(east of) Lot 137

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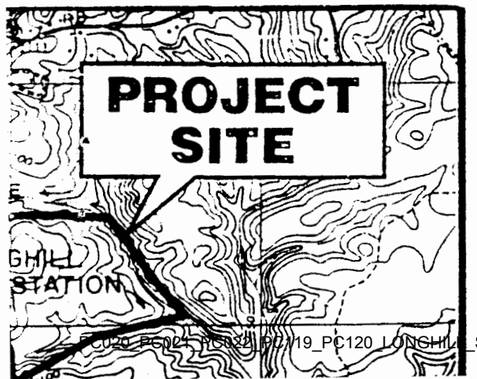

AREA TABULATION

TOTAL ACREAGE:	1,144,569 S.F.	26.28 AC.
AREA OF RESIDENTIAL LOTS (49 LOTS):	591,282 S.F.	13.57 AC.
R/W DEDICATION:	141,076 S.F.	3.24 AC.
BUFFER:	412,211 S.F.	9.46 AC.

49 LOTS

AVERAGE LOT SIZE:	12,067 S.F.	0.28 AC.
LARGEST LOT (#125):	18,983 S.F.	0.44 AC.
SMALLEST LOT (#88–92):	10,000 S.F.	0.23 AC.
NUMBER OF LOTS PER GROSS ACREAGE:	1.86 LOTS / ACRE	

TAX MAP 31–1 PARCELS (1–80,81), (1–59), & (1–60)

ALL CONSTRUCTION SHALL CONFORM TO THE CURRENT VIRGINIA SOIL AND WATER CONSERVATION COMMISSION AND THE VIRGINIA DEPARTMENT OF TRANSPORTATION (VDOT) STANDARDS AND SPECIFICATIONS.
METHODS AND MATERIALS USED IN THE CONSTRUCTION OF THE IMPROVEMENTS HEREIN SHALL CONFORM TO THE CURRENT VDOT CONSTRUCTION STANDARDS AND SPECIFICATIONS

BUILDING RESTRICTIONS

PROPERTY IS ZONED GENERAL RESIDENTIAL DISTRICT R–2. LOTS ARE SERVED BY PUBLIC WATER AND SEWER.
ALL UTILITIES SHALL BE PLACED UNDERGROUND
MINIMUM LOT SIZE ALLOWABLE – 10,000 S.F. /0.2296 ACRES

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(757)253-0673 FAX: (757)253-2319 E-MAIL: dgincoxit
NORFOLK – VIRGINIA BEACH AREA (757)874-5015
DGI INC.

REVISED 11/4/98

REVISIONS

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COPY DESIGN PLAN S-47-98

VISION – SECTION 2

, VIRGINIA

ES
S

Pond E
Behind 5989 Allegheny
(east of) Lot 137

AND NOTES
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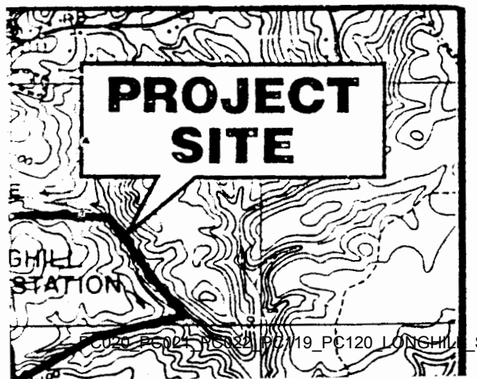

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REVISIONS
7/7/98)
ED 11/4/98)

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N 3647186.355
E 11980412.462

SITE 44JC844

CENTERVILLE ROAD (S.R. 614)

TM (31-1); PARCEL(8-1A)
"FOX RIDGE – PHASE ONE"
PB 51; PG. 4
FOX RIDGE OF WILLIAMSBURG
HOMEOWNERS ASSOCIATION
DB 443; PG. 292
PB 50; PG. 4

RECREATION AREA #1
TM(31-1); PARCEL(8-1C)

ERNEST JONES
DB 33; PAGE 338

SITE 44JC721

LONGHILL

SECTION 1A

STATION ROAD

ALLEGHENY

SECTION 2

MERIWETHER COURT

SHENANDOAH DRIVE

TM (31-2)(1-17)
PART OF WAPHILL
N/F R.T. ARMISTEAD
PB 4; PAGE 21

POND E
PC 119

SITE 44JC726

SITE 44JC820

TM (31-1)(1-61)
N/F GERALDINE WALLACE
DB 30/577

TM (31-1)(1-62)
N/F SAUNDERS
DB 262/452

N 3646820.206
E 11980345.611

ALLEGHENY DRIVE

SECTION 3

PINE BLUFF ROAD

SITE 4

SHENANDOAH COURT

SECTION 1B

PINE BLUFF DRIVE

PINE BLUFF COURT

LANE

SECTION 4

HEADSTONE CIRCLE

MILL DA

N

"FOREST GLEN – SECTION FOUR"
PB 31; PAGE 42
TM (31-3); PARCELS (5)-(71 TO 92)

SITE 44JC842

TM (31-3); PARCEL (1-29
N/F R.T. ARMISTEAD

SITE 44JC800 – ARCHAEOLOGICAL RESOURCE SITE LOCATIONS (BY OTHERS)

SITE 44JC843

TM (31-1)(1-82)
N/F FISCELLA
DB 563/188

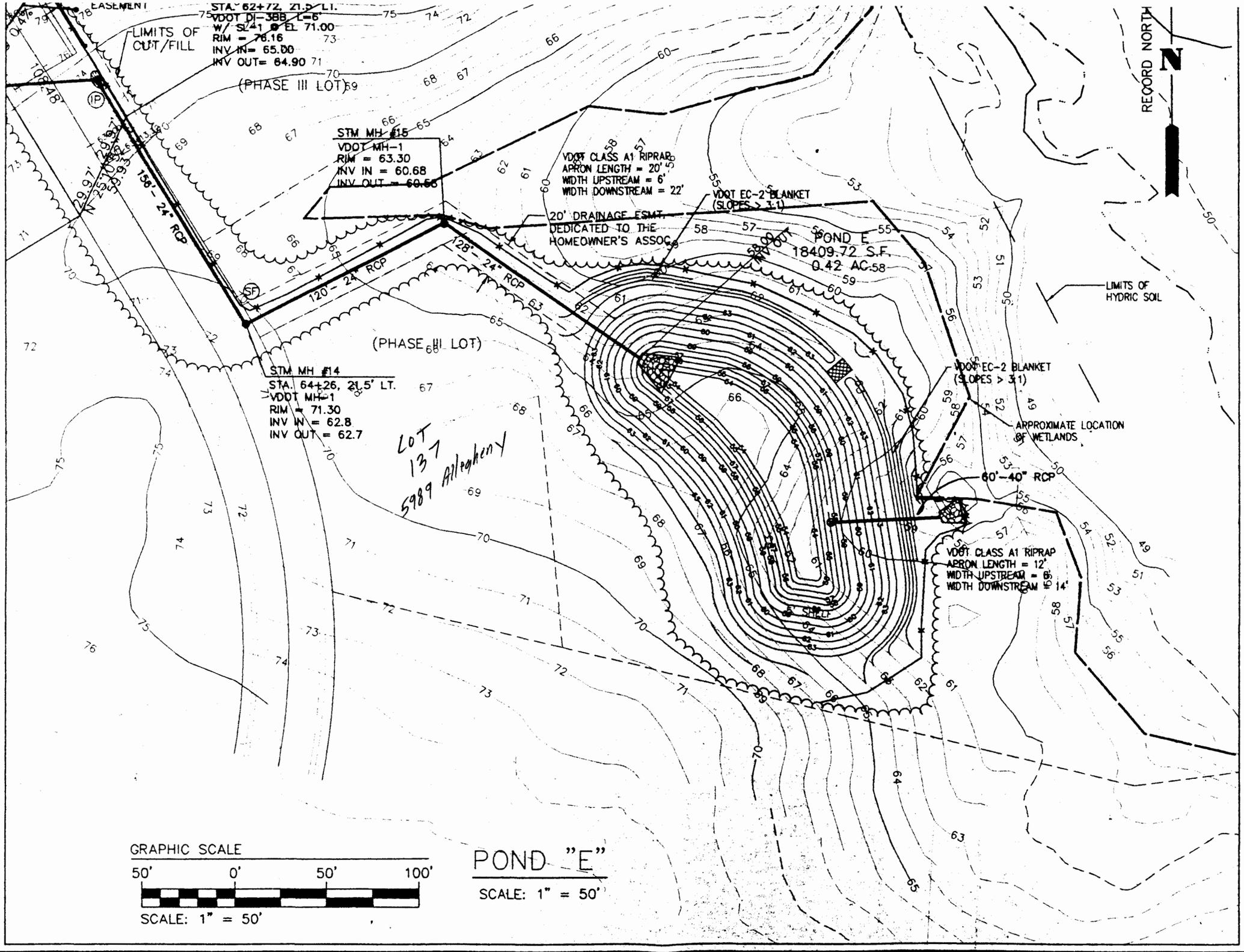
PLAN

NOT TO SCALE

08.12.98–14:03 TS1

PC02_PC021_PC022_PC119_PC120_LONGHILL_STATION - 297

CONTINUATION FROM SHEET C2



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NO.	DATE	REVISION
1	8/5/98	REVISION
2	8/12/98	REVISION

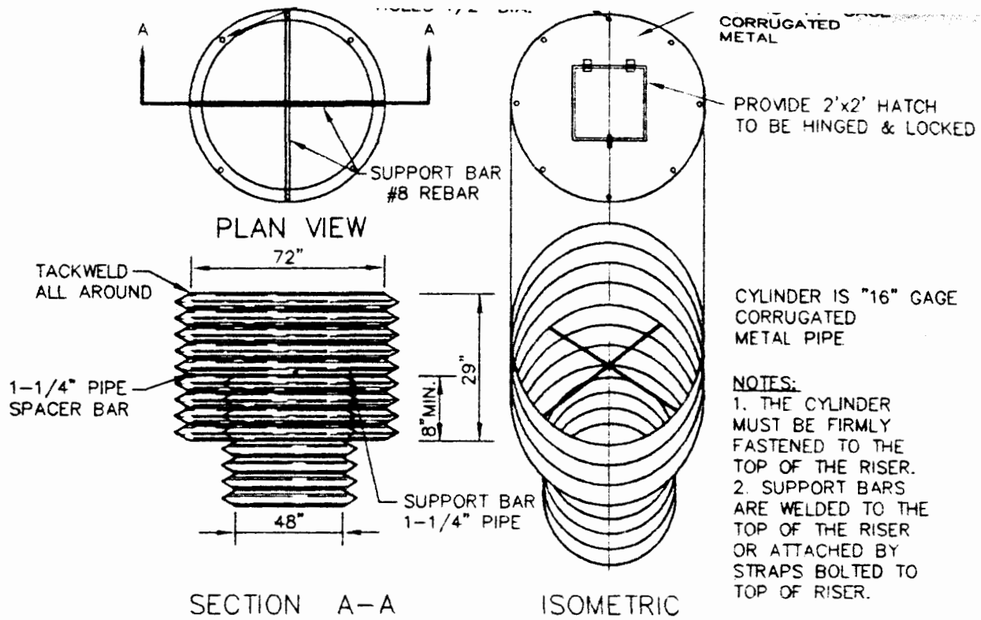
PROFILES AND DETAILS

ATLANTIC HOMES DEVELOPMENT CORPORATION
LONGHILL STATION SUBDIVISION

SCALE	DESIGNED	DRAWN	CHECKED
AS NOTED	HLPG/DFL	CLJ	

COMMISSION NU
19801

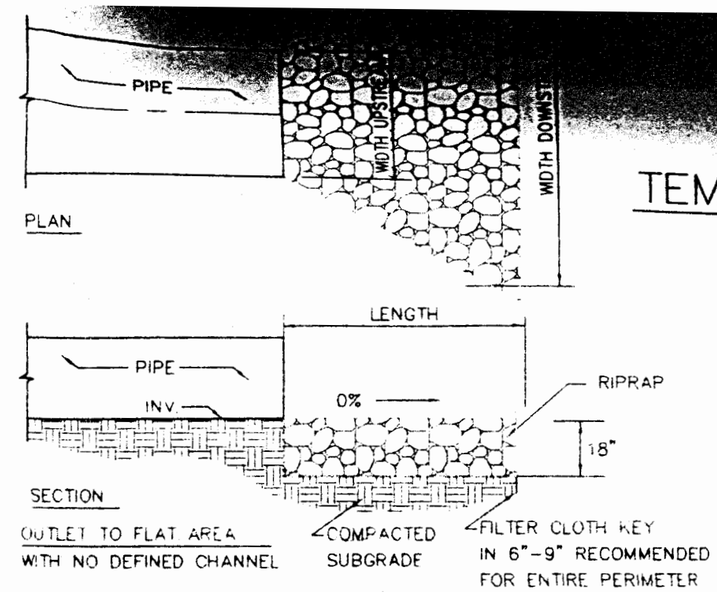
SHEET NUMB
C3
4 OF 9



NOTES:
1. THE CYLINDER MUST BE FIRMLY FASTENED TO THE TOP OF THE RISER.
2. SUPPORT BARS ARE WELDED TO THE TOP OF THE RISER OR ATTACHED BY STRAPS BOLTED TO TOP OF RISER.

ANTI – VORTEX DEVICE

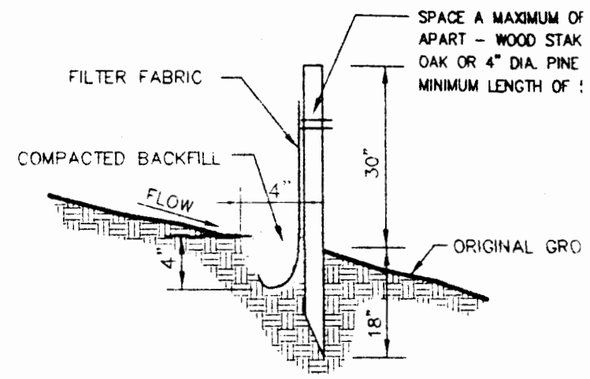
NOT TO SCALE



RIPRAP VESCH 3.19

RR

NOT TO SCALE



SILT FENCE VESCH

SF

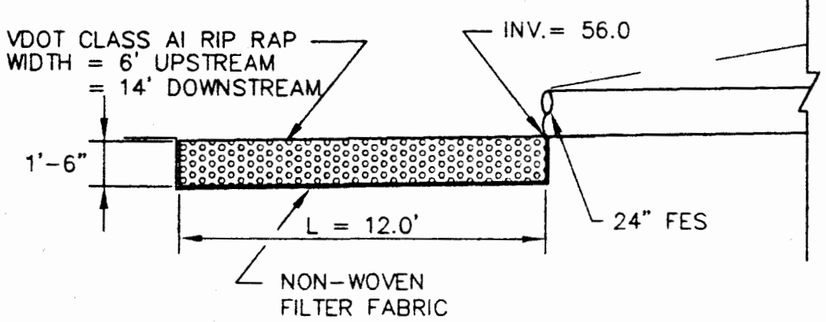
NOT TO SCALE

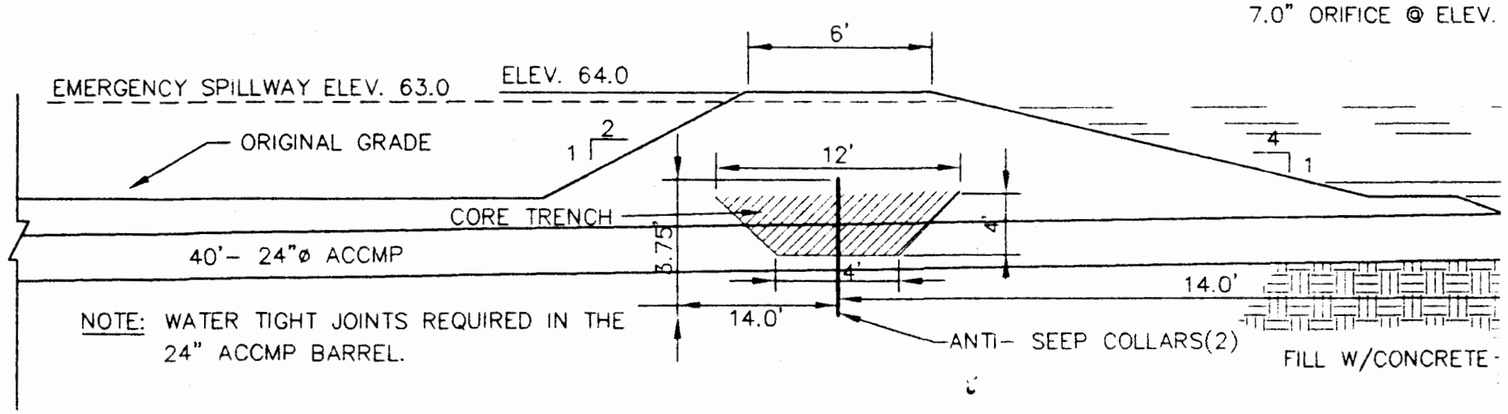
TEMPORARY DIVERSION DIKE

NOT TO SCALE

NOTES:

1. VDOT DOES NOT ASSUME RESPONSIBILITY FOR MAINTENANCE OF THE STORMWATER PONDS OR THEIR STRUCTURES, AND SHALL BE SAVED HARMLESS FROM ANY DAMAGE.
2. ALL UNSUITABLE MATERIAL LOCATED UNDER THE DAM EMBANKMENT SHALL BE REMOVED AND DISPOSED OF BY THE CONTRACTOR.
3. DETENTION POND SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. 1 SPEC. 3.14 – TEMPORARY SEDIMENT BASIN AS OUTLINED IN THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK, THIRD EDITION, 1990.
4. ORDER OF INSTALLATION OF DEWATERING DEVICES:
   A) DEWATERING SYSTEM DETAIL TO BE INSTALLED DURING CONSTRUCTION.
   B) UPON COMPLETION OF CONSTRUCTION, REMOVE DEWATERING SYSTEM DETAIL 1 AND INSTALL THE ORIFICE PROTECTION ELBOW.
5. CONTRACTOR TO ENSURE THE PLACEMENT OF THE GATE VALVE AND AND ITS COMPONENTS DOES NOT CONFLICT WITH RISER, ORIFICE, OR ORIFICE ELBOW.

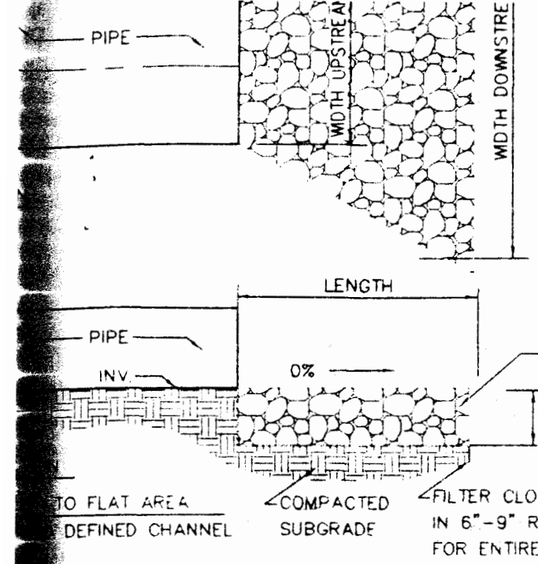




NOTE: WATER TIGHT JOINTS REQUIRED IN THE 24" ACCMP BARREL.

PRINCIPAL SPILLWAY

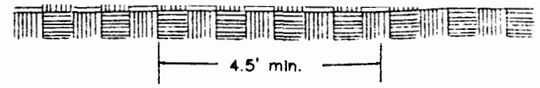
NOT TO SCALE



RIPRAP VESCH 3.19

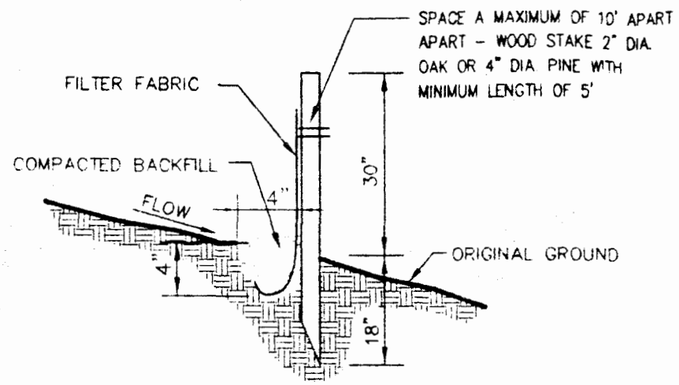
RR

NOT TO SCALE



TEMPORARY DIVERSION DIKE 3.09-1

NOT TO SCALE



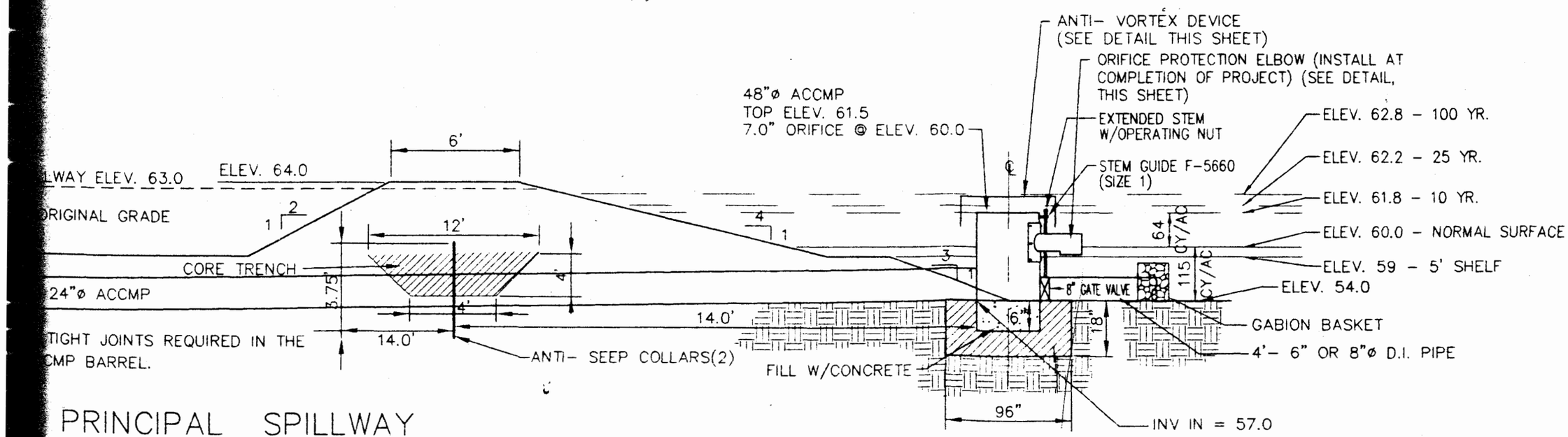
SILT FENCE VESCH 3.05

SF

NOT TO SCALE

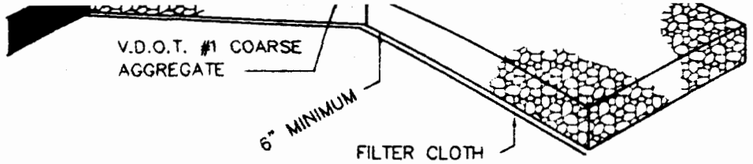
TEMPORARY SEDIMENT TRAP DESIGN

TRAP	"A"	"B"
SURFACE AREA	1882.39 S.F. (0.04 AC.)	2711.64 S.F. (0.06 AC.)
TOP OF STONE OUTLET ELEV.	86.5'	78.0'
TOP WIDTH OF STONE OUTLET	3.0'	3.0'
LENGTH OF STONE OUTLET	11.5'	18.0'
TOP OF TRAP ELEV.	85.5'	77.0'
BOTTOM OF TRAP ELEV.	79.0'	70.0'
WET STORAGE ELEV.	83.0'	74.0'
DRY STORAGE ELEV.	85.5'	77.0'
WET STORAGE DEPTH	4' @ 1:1 SLOPE	4' @ 1:1 SLOPE
DRY STORAGE DEPTH	2.5' @ 2:1 SLOPE	3' @ 2:1 SLOPE



PRINCIPAL SPILLWAY

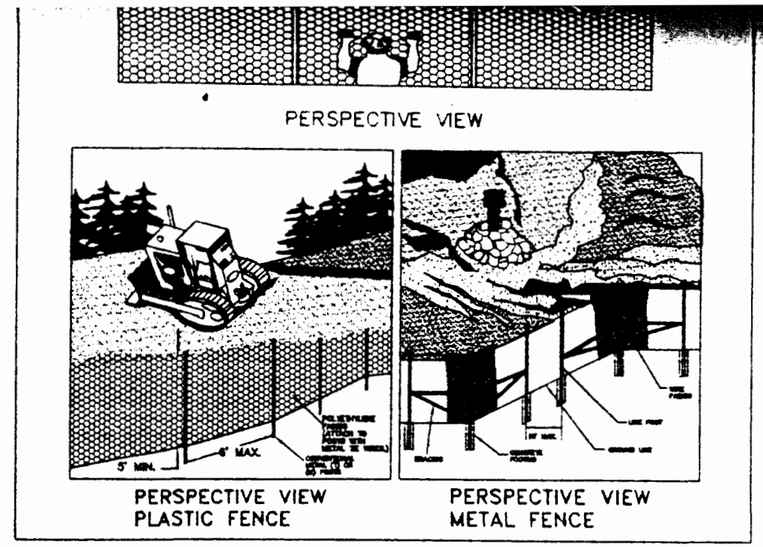
NOT TO SCALE



TEMPORARY STONE CONSTRUCTION ENTRANCE VESCH 3.02

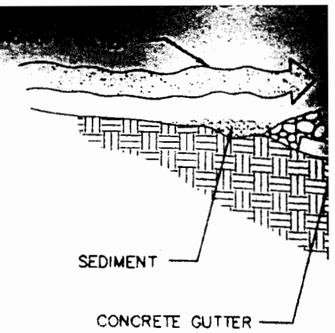
(CE)

NOT TO SCALE



SOURCE: CONWED PLASTICS
VDOT ROAD AND BRIDGE STANDARDS
VA. DSWC

PLATE. 3.1-1



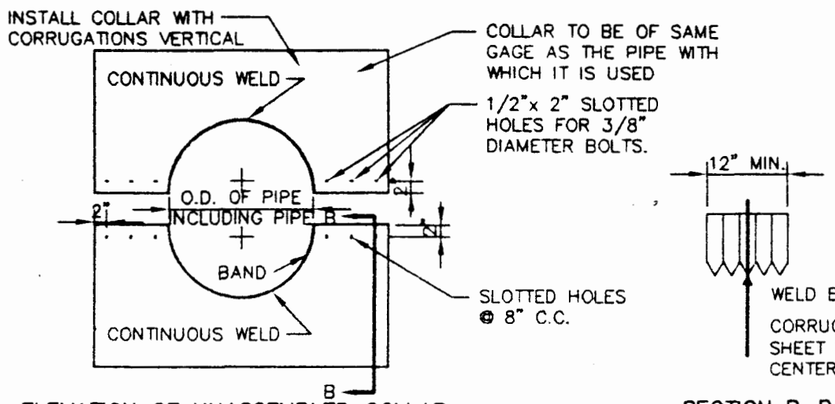
SPECIFIC

THIS METHOD OF INLET PROTECTI
WHERE PONDING IN FRONT OF TH
INCONVENIENCE OR DAMAGE TO
AREAS.

* GRAVEL SHALL BE VDOT #3, #

(IP) GRAVEL CURB

NOT TO SCALE



ELEVATION OF UNASSEMBLED COLLAR

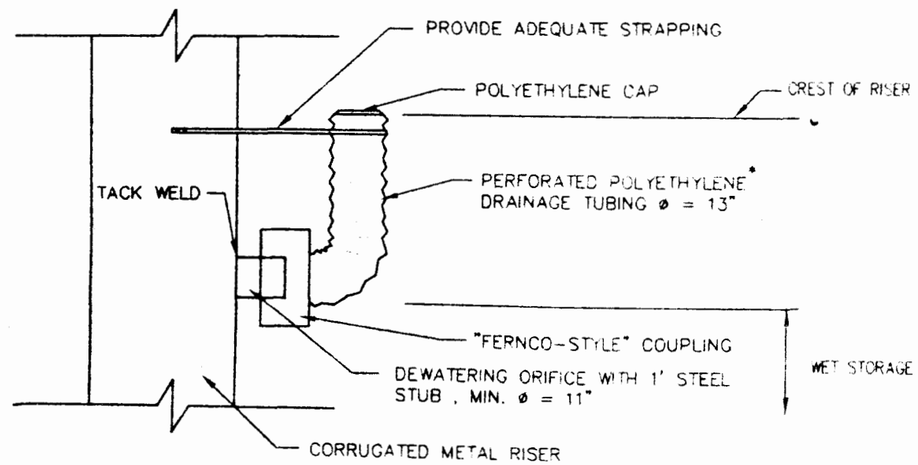
SECTION B-B

NOTES FOR COLLAR

1. ALL MATERIALS TO BE IN ACCORDANCE WITH CONSTRUCTION AND CONSTRUCTION MATERIAL SPECIFICATIONS.
2. WHEN SPECIFIED ON THE PLANS, COATING OF COLLARS SHALL BE IN ACCORDANCE WITH CONSTRUCTION AND CONSTRUCTION MATERIAL SPECIFICATIONS.
3. UNASSEMBLED COLLARS SHALL BE MARKED BY PAINTING OR TAGGING TO IDENTIFY MATCHING PAIRS.
4. THE LAP BETWEEN THE PIPE AND CONNECTING BAND SHALL BE CAULKED WITH ASPHALT MASTIC AT TIME OF INSTALLATION.
5. EACH COLLAR SHALL BE FURNISHED WITH TWO 1/2" DIAMETER RODS WITH STANDARD TANK LUGS FOR CONNECTING COLLARS TO PIPE.
6. COLLAR SHOULD NOT BE LOCATED CLOSER THAN 2' TO PIPE JOINT.

ANTI - SEEP COLLAR

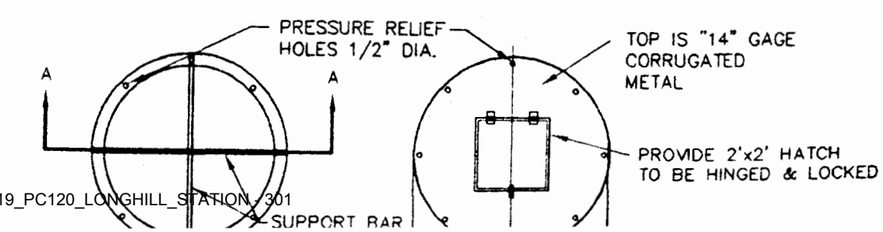
NOT TO SCALE

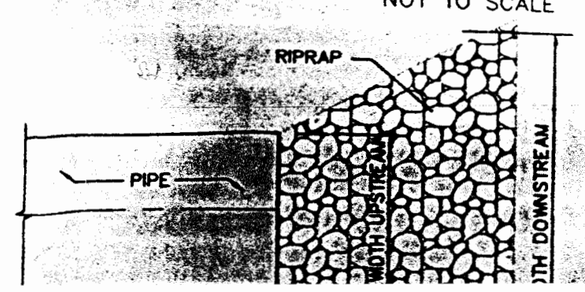


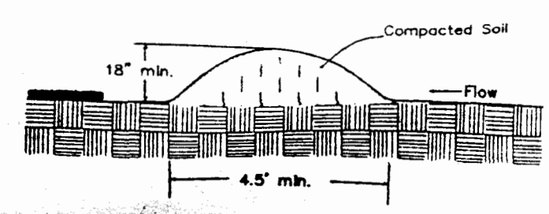
DEWATERING SYSTEM DETAIL 1

NOT TO SCALE

TE







REVISED BY JCC: 4/7/97

EROSION AND SEDIMENT CONTROL NOTES

THE PURPOSE OF THE EROSION CONTROL MEASURES SHOWN ON THESE PLANS SHALL BE TO PRECLUDE THE TRANSPORT OF ALL WATERBORNE SEDIMENTS RESULTING FROM CONSTRUCTION ACTIVITIES FROM ENTERING ONTO ADJACENT PROPERTIES OR STATE WATERS. IF FIELD INSPECTION REVEALS THE INADEQUACY OF THE PLAN TO CONFINE SEDIMENT TO THE PROJECT SITE, APPROPRIATE MODIFICATIONS WILL BE MADE TO CORRECT ANY PLAN DEFICIENCIES. IN ADDITION TO THESE NOTES, ALL PROVISIONS OF THE VIRGINIA EROSION AND SEDIMENT CONTROL REGULATIONS SHALL APPLY TO THIS PROJECT.

1. ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE "VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK." THE CONTRACTOR SHALL BE THOROUGHLY FAMILIAR WITH ALL APPLICABLE MEASURES CONTAINED THEREIN WHICH MAY BE PERTINENT TO THIS PROJECT.

2. ALL POINTS OF CONSTRUCTION INGRESS AND EGRESS SHALL BE PROTECTED BY A TEMPORARY CONSTRUCTION ENTRANCE TO PREVENT TRACKING OF MUD ONTO PUBLIC RIGHT-OF-WAYS. AN ENTRANCE PERMIT FROM VDOT IS REQUIRED PRIOR TO ANY CONSTRUCTION ACTIVITIES WITHIN STATE RIGHT-OF-WAYS. WHERE SEDIMENT IS TRANSPORTED ONTO A PUBLIC ROAD SURFACE, THE ROAD SHALL BE THOROUGHLY CLEANED AT THE END OF EACH DAY.

3. A PRECONSTRUCTION MEETING SHALL BE HELD ON SITE BETWEEN THE COUNTY, THE DEVELOPER, THE PROJECT ENGINEER, AND THE CONTRACTOR PRIOR TO THE ISSUANCE OF THE LAND DISTURBING PERMIT. THE CONTRACTOR SHALL SUBMIT A SEQUENCE OF CONSTRUCTION TO THE COUNTY FOR APPROVAL PRIOR TO THE PRECONSTRUCTION MEETING. THE CONTRACTOR WILL SUPPLY THE ENVIRONMENTAL DIVISION WITH THE NAME OF THE INDIVIDUAL WHO WILL BE RESPONSIBLE FOR ENSURING MAINTENANCE OF INSTALLED MEASURES ON A DAILY BASIS.

4. SEDIMENT BASINS AND TRAPS, PERIMETER DIKES, SEDIMENT BARRIERS AND OTHER MEASURES INTENDED TO TRAP SEDIMENT ON-SITE MUST BE CONSTRUCTED AS A FIRST STEP IN GRADING AND BE MADE FUNCTIONAL BEFORE UPSLOPE LAND DISTURBANCE TAKES PLACE. EARTHEN STRUCTURES SUCH AS DAMS, DIKES, AND DIVERSIONS MUST BE SEEDED AND MULCHED IMMEDIATELY AFTER INSTALLATION. PERIODIC INSPECTIONS OF THE EROSION CONTROL MEASURES SHALL BE MADE TO ACCESS THEIR CONDITION. ANY NECESSARY MAINTENANCE OF THE MEASURES SHALL BE ACCOMPLISHED IMMEDIATELY UPON NOTIFICATION BY THE COUNTY AND SHALL INCLUDE THE REPAIR OF MEASURES DAMAGED BY ANY SUBCONTRACTOR INCLUDING THOSE OF THE PUBLIC UTILITY COMPANIES.

5. SURFACE FLOWS OVER CUT AND FILL SLOPES SHALL BE CONTROLLED BY EITHER REDIRECTING FLOWS FROM TRANSVERSING THE SLOPES OR BY INSTALLING MECHANICAL DEVICES TO SAFELY LOWER WATER DOWNSLOPE WITHOUT CAUSING EROSION. A TEMPORARY FILL DIVERSION (STD. & SPEC. 3.10) SHALL BE INSTALLED PRIOR TO THE END OF EACH WORKING DAY.

6. SEDIMENT CONTROL MEASURES MAY REQUIRE MINOR FIELD ADJUSTMENTS AT TIME OF CONSTRUCTION TO INSURE THEIR INTENDED PURPOSE IS ACCOMPLISHED. ENVIRONMENTAL DIVISION APPROVAL WILL BE REQUIRED FOR OTHER DEVIATIONS FROM THE APPROVED PLANS.

7. THE CONTRACTOR SHALL PLACE SOIL STOCKPILES AT THE LOCATIONS SHOWN ON THIS PLAN OR AS DIRECTED BY THE ENGINEER. SOIL STOCKPILES SHALL BE STABILIZED OR PROTECTED WITH SEDIMENT TRAPPING MEASURES. OFF-SITE WASTE OR BORROW AREAS SHALL BE APPROVED BY THE ENVIRONMENTAL DIVISION PRIOR TO THE IMPORT OF ANY BORROW OR EXPORT OF ANY WASTE TO OR FROM THE PROJECT SITE.

8. THE CONTRACTOR SHALL COMPLETE DRAINAGE FACILITIES WITHIN 30 DAYS FOLLOWING COMPLETION OF ROUGH GRADING AT ANY POINT WITHIN THE PROJECT. THE INSTALLATION OF DRAINAGE FACILITIES SHALL TAKE PRECEDENCE OVER ALL UNDERGROUND UTILITIES. OUTFALL DITCHES FROM DRAINAGE STRUCTURES SHALL BE STABILIZED IMMEDIATELY AFTER CONSTRUCTION OF SAME. THIS INCLUDES INSTALLATION OF EROSION CONTROL STONE OR PAVED DITCHES WHERE REQUIRED. ANY DRAINAGE OUTFALLS REQUIRED FOR A STREET MUST BE COMPLETED BEFORE STREET GRADING OR UTILITY INSTALLATION BEGINS.

9. PERMANENT OR TEMPORARY SOIL STABILIZATION MUST BE APPLIED TO ALL DENUDED AREAS WITHIN 7 DAYS AFTER FINAL GRADE IS REACHED ON ANY PORTION OF THE SITE. SOIL STABILIZATION MUST ALSO BE APPLIED TO DENUDED AREAS WHICH MAY NOT BE AT FINAL GRADE BUT WILL REMAIN DORMANT (UNDISTURBED) FOR LONGER THAN 30 DAYS. SOIL STABILIZATION MEASURES INCLUDE VEGATATIVE ESTABLISHMENT, MULCHING AND THE EARLY APPLICATION OF GRAVEL BASE MATERIAL ON AREAS TO BE PAVED.

10. NO MORE THAN 300 FEET OF SANITARY SEWER, STORM SEWER, WATERLINES, OR UNDERGROUND UTILITY LINES ARE TO BE OPEN AT ONE TIME. FOLLOWING INSTALLATION OF ANY PORTION OF THESE ITEMS, ALL DISTURBED AREAS ARE TO BE IMMEDIATELY STABILIZED (I.E., THE SAME DAY).

11. IF DISTURBED AREA STABILIZATION IS TO BE ACCOMPLISHED DURING THE MONTHS OF DECEMBER, JANUARY, OR FEBRUARY. STABILIZATION SHALL CONSIST OF MULCHING IN ACCORDANCE WITH SPECIFICATION 3.35. SEEDING WILL THEN TAKE PLACE AS SOON AS THE SEASON PERMITS.

12. THE TERM SEEDING, FINAL VEGETATIVE COVER OR STABILIZATION, ON THIS PLAN SHALL MEAN THE SUCCESSFUL GERMINATION AND ESTABLISHMENT OF A STABLE GRASS COVER FROM A PROPERLY PREPARED SEEDBED CONTAINING THE SPECIFIED AMOUNTS OF SEED, LIME, AND FERTILIZER IN ACCORDANCE WITH SPECIFICATION 3.32, PERMANENT SEEDING. IRRIGATION SHALL BE REQUIRED AS NECESSARY TO ENSURE THE ESTABLISHMENT OF GRASS COVER.

13. ALL SLOPES STEEPER THAN 3:1 SHALL REQUIRE THE USE OF EROSION CONTROL BLANKETS SUCH AS EXCELSIOR BLANKETS TO AID IN THE ESTABLISHMENT OF A VEGETATIVE COVER. INSTALLATION SHALL BE IN ACCORDANCE WITH SPECIFICATION 3.35, MULCHING AND MANUFACTURER'S INSTRUCTIONS. NO SLOPES SHALL BE CREATED STEEPER THAN 2:1.

14. INLET PROTECTION IN ACCORDANCE WITH SPECIFICATION 3.07 SHALL BE PROVIDED FOR ALL STORM DRAIN INLETS AS SOON AS PRACTICAL FOLLOWING CONSTRUCTION OF SAME.

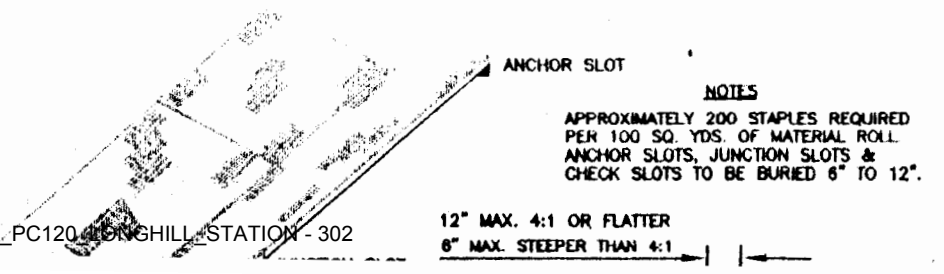
15. TEMPORARY LINERS, SUCH AS POLYETHYLENE SHEETS, SHALL BE PROVIDED FOR ALL PAVED DITCHES UNTIL THE PERMANENT CONCRETE LINER IS INSTALLED.

16. PAVED DITCHES SHALL BE REQUIRED WHEREVER EROSION IS EVIDENT. PARTICULAR ATTENTION SHALL BE PAID TO THOSE AREAS WHERE GRADES EXCEED 3 PERCENT.

17. TEMPORARY EROSION CONTROL MEASURES ARE NOT TO BE REMOVED UNTIL ALL DISTURBED AREAS ARE STABILIZED. AFTER STABILIZATION IS COMPLETE, ALL MEASURES SHALL BE REMOVED WITHIN 30 DAYS. TRAPPED SEDIMENT SHALL BE SPREAD AND SEEDED.

18. AS-BUILT DRAWINGS MUST BE PROVIDED FOR ALL DETENTION/BMP FACILITIES. ALSO UPON COMPLETION, THE CONSTRUCTION OF ALL DETENTION/BMP FACILITIES SHALL BE CERTIFIED BY A PROFESSIONAL ENGINEER WHO INSPECTED THE STRUCTURE DURING CONSTRUCTION. THE CERTIFICATION SHALL STATE THAT TO THE BEST OF HIS/HER JUDGMENT, KNOWLEDGE, AND BELIEF, THE STRUCTURE WAS CONSTRUCTED IN ACCORDANCE WITH THE APPROVAL PLANS AND SPECIFICATIONS.

REFERENCE : VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK, THIRD EDITION, 1992



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ENGINEERS • ARCHITECTS • SURVEYORS
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(757)253-0673 FAX: (757)253-2319 E-MAIL: djginc@visi.net
NORFOLK - VIRGINIA BEACH AREA (757)874-5015
DJG INC.

COMMONWEALTH OF VIRGINIA
KENNETH WILLET STEWART
No. 032339
9/22/98
PROFESSIONAL ENGINEER

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REVISIONS

NO.	DATE	DESCRIPTION
1	8/5/98	REVISIONS PER ENVIRONMENTAL DIV. COMMENTS (7/1/98)
2	9/22/98	REVISIONS PER COUNTY COMMENTS (DATED 9/17/98)

AND NOTES

CORPORATION
BDIVISION

VIRGINIA

CMP

BOW

VATION

VATION

N

AC.)

LONGHILL STATION SUBDIVISION
PHASE 2

STORMWATER MANAGEMENT CALCULATIONS

FOR

ATLANTIC HOMES DEVELOPMENT CORPORATION

RESUBMITTAL #2

BY

DJG, INC.
1006 RICHMOND ROAD
WILLIAMSBURG, VIRGINIA 23185
PHONE: (757) 253-0673
FAX: (757) 253-2319

AUGUST 14, 1998

DJG COMMISSION NO: 1980150

PC 119
POND E
S-47-98

NOTE: Also limited info on PONDS A, B & C

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Committed to Excellence
1006 Richmond Rd. • P. O. Box 3505, Williamsburg, VA 23187
(757) 253-0673 • Fax (757) 253-239 • E-Mail: djginc@visi.net
Norfolk - Virginia Beach Area (757) 874-5015

PROJECT LONGHILL STA. - PH. 2
DATE 7/15/98 COMM NO. 1980150
CAL DFL CKD _____ PAGE # _____
TITLE POND "E" DESIGN

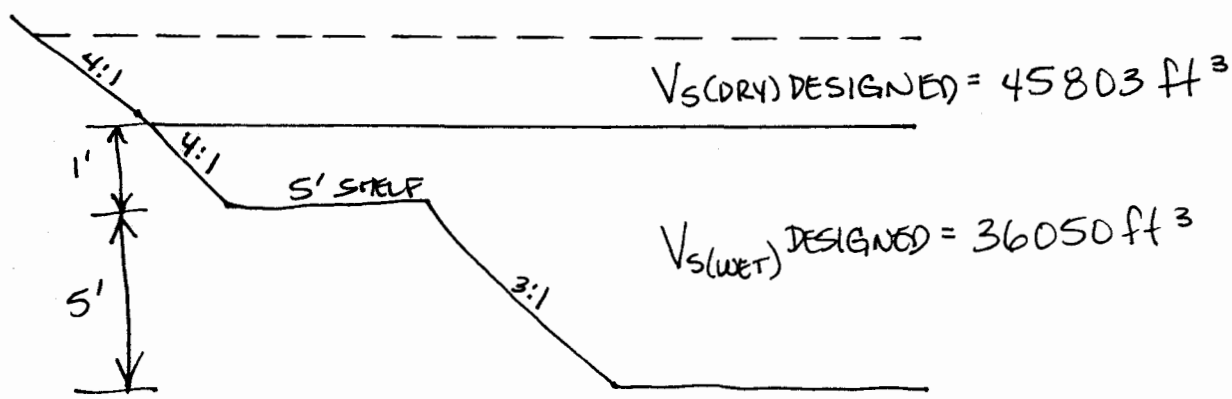
- E&S: $V_{S(WET)} = 12.1AC \times 67 yd^3/AC \times 27 = 21889 ft^3$

  $V_{S(DRY)} = \underline{21889 ft^3}$ ← DESIGN $V_{S(DRY)}$ TO THIS

- PONDING VOLUME (QUALITY):

$$V_p = 4 \times V_r$$
$$V_r = 0.5 \times (.05 + .009 \times I) \times A \times 3630$$
$$V_r = 0.5 \times (.05 + .009 \times 40) \times 12.1 \times 3630$$
$$V_r = 9004.25 ft^3$$

$V_p = 4 \times 9004.25 ft^3 = \underline{36017 ft^3}$ ← DESIGN $V_{S(WET)}$ TO THIS



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Norfolk - Virginia Beach Area (757) 874-5015

PROJECT LONGHILL PH. 2
DATE 8/5/98 COMM NO. 1980150
CAL DFL CKD _____ PAGE # _____
TITLE DRAWDOWN (POND E)

USING 7" ORIFICE AT ELEVATION 60.0: (6 HR. DRAWDOWN)

- $Q = \frac{\text{VOLUME AT C.R.}}{21{,}600\,\text{sec}\,(=6\,\text{HRS})} = \frac{20927\,ft^3}{21{,}600\,\text{sec}} = \underline{0.97\,ft^3/sec}$

- MAX. ORIFICE SIZE $= \frac{Q}{\left(64.32 \times \frac{h}{2}\right)^{1/2} \times 0.6}$ (h = CENTER OF ORIFICE TO C.R.)

$$= \frac{0.97}{\left(64.32\left(\frac{1.2}{2}\right)\right)^{1/2} \times 0.6} = \underline{0.26\,ft^2}$$

- ACTUAL ORIFICE SIZE = 7" $\boxed{\therefore \text{ SUFFICIENT}}$

Calculated By: DFL Date: 8/4/98

Checked By: HLPG Date:

DJG, INC
P.O. BOX 3505
WILLIAMSBURG, VIRGINIA 23187
STORMWATER MANAGEMENT POND DESIGN

PROJECT NO. 1980150
PROJECT DESC. LONGHILL STATION
POND E
SHEET 1 OF 1 SHEETS

BASIN STORAGE VOLUME:

ELEV.	AREA (FT)	SUM (Ai+Aj)/2	VOL. (CU.FT)	SUM VOL. (CU.FT)
60	12260	-	-	-
61	14209	13235	13235	13234.5
62	16259	15234	15234	28468.5
63	18410	17335	17335	45803

STORAGE ALGORITHM:

Z1 =	1	S1 =	13234.5	S2/S1 =	3.4609
Z2 =	3	S2 =	45803	Z2/Z1 =	3.0

b = (ln(S2/S1))/(ln(Z2/Z1)) Ks = S2/(Z2^b) S(CU.FT)=Ks(Z^b)

b = 1.130 Ks = 13234.50

PRINCIPAL SPILLWAY:

RISER	ORIFICE DIA. (IN)	BARREL DIA. (IN)	BARREL LEN. (FT)
48	7	24	40

ORIFICE AREA, A (SQ.FT) = 0.26

n = 0.013

C = 0.6

Q = CA(64.4*Ho)^0.5

BARREL INV.OUT 56

CORRECTION FACTOR = 1.08

(FROM VESCH, TABLE 3.14-A)

STAGE-DISCHARGE-STORAGE:

	ELEV.	STAGE (FT)	Hp (FT)	Qp (CFS)	Ho (FT)	Qo (CFS)	SUM Q (CFS)	STORAGE (CU.FT)
ORIFICE	60	-	-	-	-	-	-	-
	61	1	-	-	0.70833	1.08247	1.08247	13235
C.R.	61.5	1.5	-	-	1.20833	1.41381	1.41381	20927
	62	2	6	14	1.70833	1.68106	15.6811	28967
	63	3	6	45.4	2.70833	2.11665	47.5166	45803
	64	4	8	48.5	3	2.22771	50.7277	63399

REV. 8/4/98

LONGHILL PHASE 2 - POND E POSTDEVELOPMENT

LONGHILL PHASE 2

INPUT DESIGN DATA

DESIGN STORM FOR ANALYSIS = 2 YEAR
DRAINAGE AREA (ACRES) = 12.1
AVERAGE SLOPE OF DRAINAGE AREA (%) = 4
HYDRAULIC LENGTH (FT) = 1200
IMPERVIOUS SURFACE (%) = 40
HYDRAULIC LENGTH MODIFIED (%) = 70
COMPOSITE CURVE NUMBER = 82
SLOPE ADJUSTMENT FACTOR = 1
PONDING ADJUSTMENT FACTOR = .8

RESULTS OF HYDRAULIC CALCULATIONS
(SCS TR-55 & TP-149 PROCEDURES)

WATERSHED LAG ADJUSTED (IMPER. AREAS & CHAN. IMPROV.) IS .082 HOURS
TIME OF CONCENTRATION ADJUSTED IS .136 HOURS
THE PEAK DISCHARGE FROM THIS WATERSHED IS 23 C.F.S.

THE FOLLOWING ARE TIME INCREMENTS AND ORDINATES OF THE INFLOW HYDROGRAPH

(HOURS)	(C.F.S.)
0,0	
.033	1.163
.065	3.832
.098	8.248
.131	12.694
.164	16.772
.196	20.211
.229	22.845
.262	22.213
.294	18.83
.327	12.796
.36	7.81
.392	3.959
.425	1.333
.458	0

STAGE (FT)	DISCHARGE (CFS)	STORAGE (CF)
60	0	0
61	1.08	13235
61.5	1.41	20927
62	15.68	28967

THE FOLLOWING ARE TIME INCREMENTS AND ORDINATES OF THE OUTFLOW HYDOGRAPH

(HOURS)	(C.F.S.)
0.000	0.006
0.033	0.029

0.065	0.087	
0.098	0.186	
0.131	0.325	
0.164	0.499	
0.196	0.700	
0.229	0.909	
0.262	1.089	
0.294	1.163	
0.327	1.209	
0.360	1.232	
0.392	1.240	— pre- 8 cts
0.425	1.237	
0.458	1.230	
0.491	1.224	
0.523	1.218	
0.556	1.212	
0.589	1.206	
0.621	1.200	
0.654	1.194	
0.687	1.188	
0.720	1.182	
0.752	1.176	
0.785	1.170	
0.818	1.164	
0.850	1.158	
0.883	1.152	
0.916	1.146	
0.949	1.141	
0.981	1.135	
1.014	1.129	
1.047	1.123	
1.079	1.118	
1.112	1.112	
1.145	1.107	
1.177	1.101	
1.210	1.095	
1.243	1.090	

MAXIMUM OUTFLOW IS 1.24 C.F.S.
MAXIMUM STAGE IS 61.24243 FT.
MAXIMUM STORAGE IS 16964 CUBIC FEET

LONGHILL PHASE 2

LONGHILL PHASE 2

INPUT DESIGN DATA

DESIGN STORM FOR ANALYSIS = 10 YEAR
DRAINAGE AREA (ACRES) = 12.1
AVERAGE SLOPE OF DRAINAGE AREA (%) = 4
HYDRAULIC LENGTH (FT) = 1200
IMPERVIOUS SURFACE (%) = 40
HYDRAULIC LENGTH MODIFIED (%) = 70
COMPOSITE CURVE NUMBER = 82
SLOPE ADJUSTMENT FACTOR = 1
PONDING ADJUSTMENT FACTOR = .8

RESULTS OF HYDRAULIC CALCULATIONS
(SCS TR-55 & TP-149 PROCEDURES)

WATERSHED LAG ADJUSTED (IMPER. AREAS & CHAN. IMPROV.) IS .082 HOURS
TIME OF CONCENTRATION ADJUSTED IS .136 HOURS
THE PEAK DISCHARGE FROM THIS WATERSHED IS 39 C.F.S.

THE FOLLOWING ARE TIME INCREMENTS AND ORDINATES OF THE INFLOW HYDROGRAPH

(HOURS)	(C.F.S.)
0,0	
.033	2.136
.065	6.983
.098	14.912
.131	22.703
.164	29.641
.196	35.275
.229	39.357
.262	37.865
.294	31.848
.327	21.547
.36	13.095
.392	6.611
.425	2.217
.458	0

STAGE (FT)	DISCHARGE (CFS)	STORAGE (CF)
60	0	0
61	1.08	13235
61.5	1.41	20927
62	15.68	28967
63	47.52	45803

THE FOLLOWING ARE TIME INCREMENTS AND ORDINATES OF THE OUTFLOW HYDOGRAPH

(HOURS)	(C.F.S.)	
0.000	0.010	
0.033	0.054	
0.065	0.158	
0.098	0.336	
0.131	0.583	
0.164	0.888	
0.196	1.162	
0.229	1.351	
0.262	5.539	
0.294	9.542	
0.327	11.014	- Qpre=18cfs
0.360	10.794	
0.392	9.587	
0.425	7.983	
0.458	6.472	
0.491	5.248	
0.523	4.255	
0.556	3.450	
0.589	2.797	
0.621	2.268	
0.654	1.839	
0.687	1.491	
0.720	1.405	
0.752	1.398	
0.785	1.391	
0.818	1.384	
0.850	1.377	
0.883	1.370	
0.916	1.363	
0.949	1.356	
0.981	1.349	
1.014	1.342	
1.047	1.335	
1.079	1.329	
1.112	1.322	
1.145	1.315	
1.177	1.309	
1.210	1.302	
1.243	1.296	

```
MAXIMUM OUTFLOW IS    11.014    C.F.S.
MAXIMUM STAGE IS    61.83651    FT.
MAXIMUM STORAGE IS    26338    CUBIC FEET
```

LONGHILL PHASE 2 - POND E POSTDEVELOPMENT

LONGHILL PHASE 2 - POND E POSTDEVELOPMENT

INPUT DESIGN DATA

DESIGN STORM FOR ANALYSIS = 25 YEAR
DRAINAGE AREA (ACRES) = 12.1
AVERAGE SLOPE OF DRAINAGE AREA (%) = 4
HYDRAULIC LENGTH (FT) = 1200
IMPERVIOUS SURFACE (%) = 40
HYDRAULIC LENGTH MODIFIED (%) = 70
COMPOSITE CURVE NUMBER = 82
SLOPE ADJUSTMENT FACTOR = 1
PONDING ADJUSTMENT FACTOR = .8

RESULTS OF HYDRAULIC CALCULATIONS
(SCS TR-55 & TP-149 PROCEDURES)

WATERSHED LAG ADJUSTED (IMPER. AREAS & CHAN. IMPROV.) IS .082 HOURS
TIME OF CONCENTRATION ADJUSTED IS .136 HOURS
THE PEAK DISCHARGE FROM THIS WATERSHED IS 56 C.F.S.

THE FOLLOWING ARE TIME INCREMENTS AND ORDINATES OF THE
INFLOW HYDROGRAPH

(HOURS)	(C.F.S.)
0,0	
.033	3.16
.065	10.286
.098	21.878
.131	33.118
.164	42.968
.196	50.799
.229	56.286
.262	53.842
.294	45.095
.327	30.435
.36	18.453
.392	9.293999
.425	3.11
.458	0

STAGE (FT)	DISCHARGE (CFS)	STORAGE (CF)
60	0	0
61	1.08	13235
61.5	1.41	20927
62	15.68	28967
63	47.52	45803
64	50.73	63399

THE FOLLOWING ARE TIME INCREMENTS AND ORDINATES OF THE

OUTFLOW HYDOGRAPH

(HOURS)	(C.F.S.)
0.000	0.015
0.033	0.079
0.065	0.232
0.098	0.493
0.131	0.852
0.164	1.192
0.196	3.124
0.229	12.951
0.262	20.108
0.294	23.646
0.327	23.806
0.360	21.816
0.392	18.687
0.425	15.278
0.458	12.387
0.491	10.043
0.523	8.143
0.556	6.602
0.589	5.353
0.621	4.340
0.654	3.519
0.687	2.853
0.720	2.313
0.752	1.875
0.785	1.521
0.818	1.405
0.850	1.398
0.883	1.391
0.916	1.384
0.949	1.377
0.981	1.370
1.014	1.363
1.047	1.356
1.079	1.350
1.112	1.343
1.145	1.336
1.177	1.329
1.210	1.323
1.243	1.316

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MAXIMUM OUTFLOW IS   23.806   C.F.S.
MAXIMUM STAGE IS   62.25522   FT.
MAXIMUM STORAGE IS   33263   CUBIC FEET
```

LONGHILL PHASE 2 - POND E POSTDEVELOPMENT

LONGHILL PHASE 2 - POND E POSTDEVELOPMENT

INPUT DESIGN DATA

DESIGN STORM FOR ANALYSIS = 100 YEAR
DRAINAGE AREA (ACRES) = 12.1
AVERAGE SLOPE OF DRAINAGE AREA (%) = 4
HYDRAULIC LENGTH (FT) = 1200
IMPERVIOUS SURFACE (%) = 40
HYDRAULIC LENGTH MODIFIED (%) = 70
COMPOSITE CURVE NUMBER = 82
SLOPE ADJUSTMENT FACTOR = 1
PONDING ADJUSTMENT FACTOR = .87

RESULTS OF HYDRAULIC CALCULATIONS
(SCS TR-55 & TP-149 PROCEDURES)

WATERSHED LAG ADJUSTED (IMPER. AREAS & CHAN. IMPROV.) IS .082 HOURS
TIME OF CONCENTRATION ADJUSTED IS .136 HOURS
THE PEAK DISCHARGE FROM THIS WATERSHED IS 80 C.F.S.

THE FOLLOWING ARE TIME INCREMENTS AND ORDINATES OF THE
INFLOW HYDROGRAPH

(HOURS)	(C.F.S.)
0,0	
.033	4.569
.065	14.835
.098	31.472
.131	47.473
.164	61.354
.196	72.24
.229	79.698
.262	75.965
.294	63.455
.327	42.76
.36	25.889
.392	13.021
.425	4.351
.458	0

STAGE (FT)	DISCHARGE (CFS)	STORAGE (CF)
60	0	0
61	1.08	13235
61.5	1.41	20927
62	15.68	28967
63	47.52	45803
64	50.73	63399

THE FOLLOWING ARE TIME INCREMENTS AND ORDINATES OF THE

OUTFLOW HYDOGRAPH

(HOURS)	(C.F.S.)
0.000	0.022
0.033	0.114
0.065	0.335
0.098	0.709
0.131	1.155
0.164	4.259
0.196	17.954
0.229	29.952
0.262	37.918
0.294	40.962
0.327	39.632
0.360	35.589
0.392	30.198
0.425	24.583
0.458	19.657
0.491	15.719
0.523	12.742
0.556	10.331
0.589	8.376
0.621	6.791
0.654	5.506
0.687	4.464
0.720	3.620
0.752	2.935
0.785	2.380
0.818	1.929
0.850	1.564
0.883	1.406
0.916	1.399
0.949	1.392
0.981	1.385
1.014	1.378
1.047	1.371
1.079	1.364
1.112	1.357
1.145	1.351
1.177	1.344
1.210	1.337
1.243	1.330

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MAXIMUM OUTFLOW IS   40.962   C.F.S.
MAXIMUM STAGE IS   62.79404   FT.
MAXIMUM STORAGE IS   42335   CUBIC FEET
```

DJG INC.
Committed to Excellence
1006 Richmond Rd. • P. O. Box 3505, Williamsburg, VA 23187
(757) 253-0673 • Fax (757) 253-2319 • E-Mail: djginc@visi.net
Norfolk - Virginia Beach Area (757) 874-5015

PROJECT LONGHILL - PH. 2
DATE 7/13/98 COMM NO. 1980150
CAL DFL CKD _____ PAGE # _____
TITLE SEDIMENT TRAP DESIGN (PER CO. COMMENTS)

① ALLEGHENY RD. ⇒ DRAINAGE AREA = 1.92 AC

V_S (WET/EXCAVATED) = 1.92 AC × 67 yd³/AC × 27 = 3483 ft³
⇒ V_S (WET) DESIGNED = 3516 ft³ (4')

V_S (DRY) = 3483 ft³
⇒ V_S (DRY) DESIGNED = 3723 ft³ (2.5')

SED. TRAP: AREA = 1882.4 ft² = 0.04 AC

H = 3.5'
H_0 = 2.5'
W = 3.0'
LENGTH = 11.5'

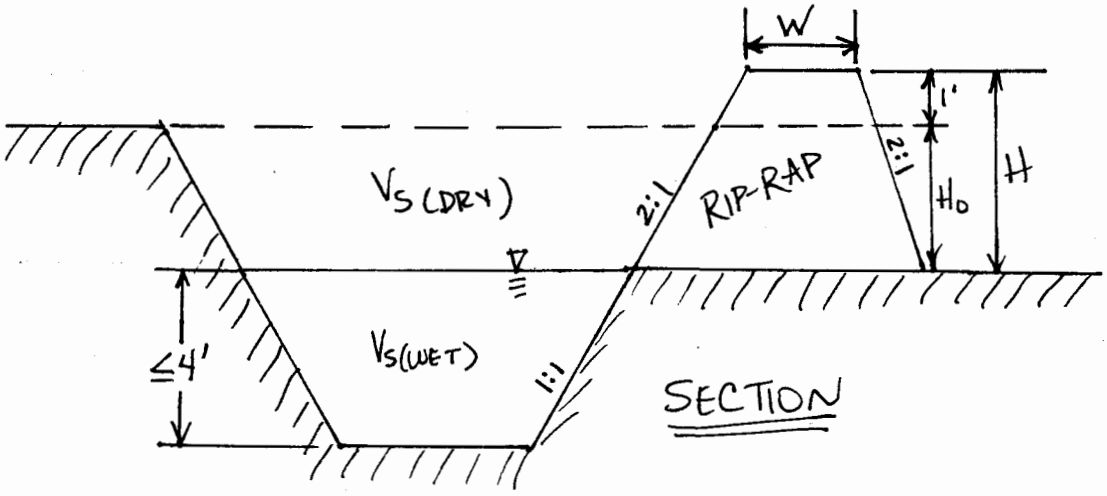
② SHENANDOAH DR. ⇒ DRAINAGE AREA = 3 AC

V_S (WET/EXCAVATED) = 3 AC × 67 yd³/AC × 27 = 5427 ft³
⇒ V_S (WET) DESIGNED = 5432 ft³ (4')

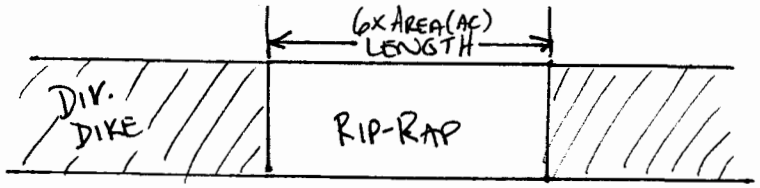
V_S (DRY) = 5427 ft³
V_S (DRY) DESIGNED = 6471 ft³ (3')

SED. TRAP: AREA = 2711.6 ft² = 0.06 AC

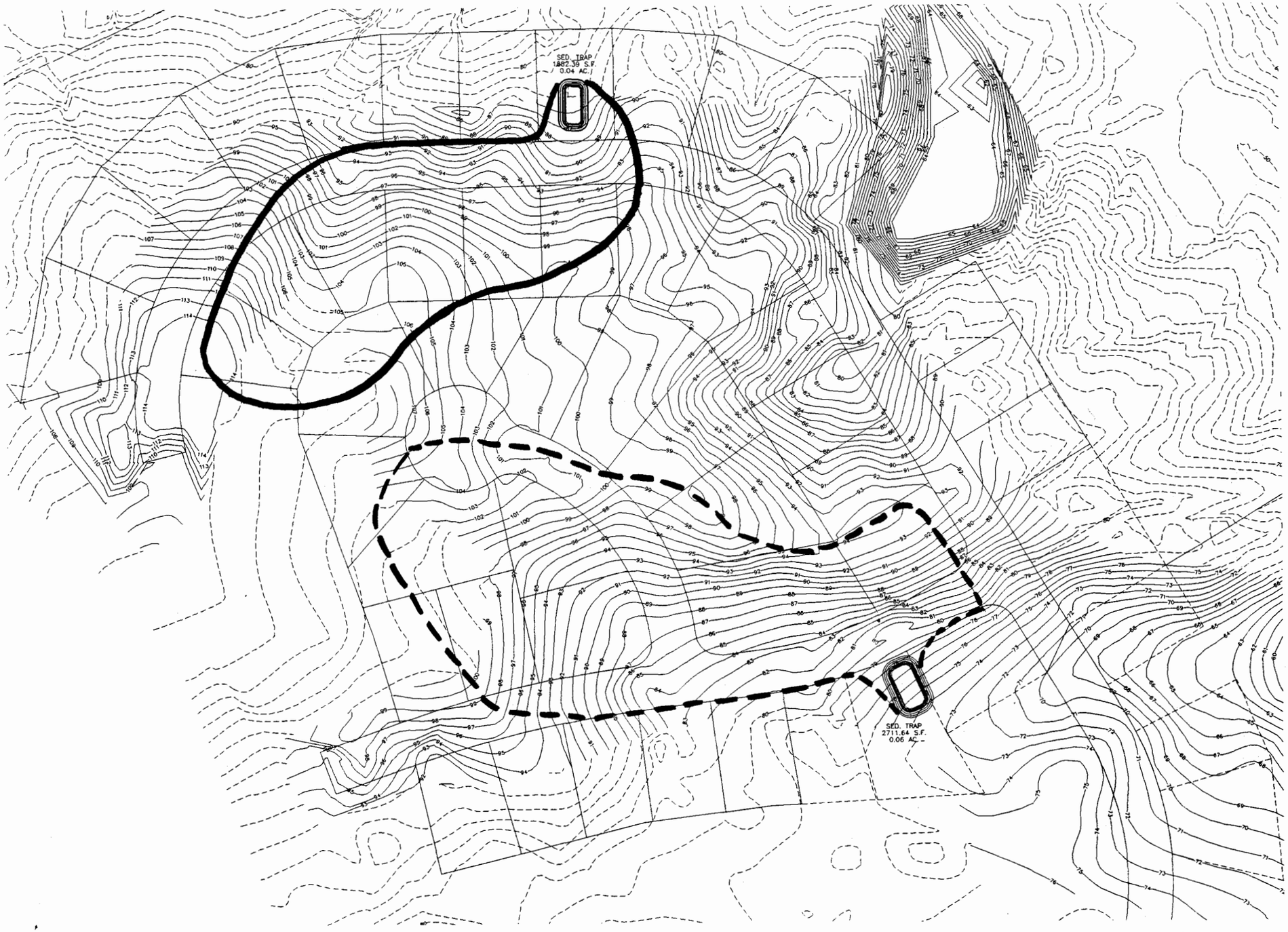
H = 4.0'
H_0 = 3.0'
W = 3.0'
LENGTH = 18.0'



SECTION



OUTLET



DRAINAGE AREAS TO TEMPORARY SEDIMENT TRAPS

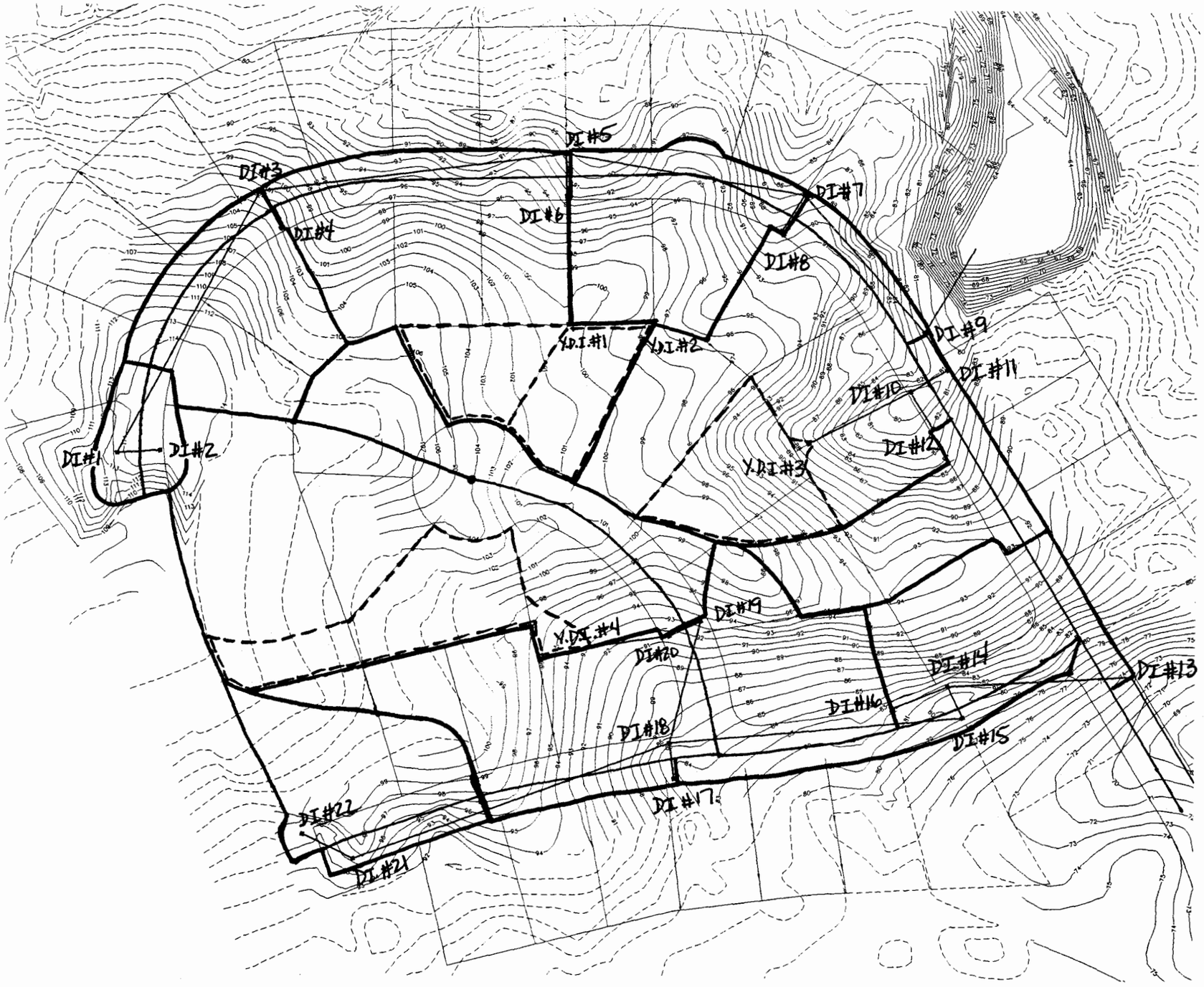
LONGHILL PH. 2 - 1980150

N

NOT TO SCALE

DRAINAGE AREA TO SED. TRAP OFF ALLEGHENY RD. (1.92 AC)

DRAINAGE AREA TO SED. TRAP OFF SHENANDOAH DR. (3.0AC)



DRAINAGE AREAS TO PROPOSED D.I.'s AND Y.D.I's 7/14/98

LONGHILL PH. 2 - 1980150

SCALE: 1" = 125'

N

——— DRAINAGE AREAS TO PROPOSED D.I.'s

- - - - - DRAINAGE AREAS TO PROPOSED Y.D.I.'s

Calculated By: DFL
Checked By: HLPG
N= 0.013
Storm Frequency: 10-YEAR

Date: Revised 7/15/1998

DJG, INC

P. O. BOX 3505
WILLIAMSBURG, VIRGINA 23187
STORM DRAINAGE COMPUTATION SHEET

PROJECT NO. 1980150
PROJECT DESC. LONGHILL STATION PHASE 2 - SHENANDOAH
SHEET 2 OF 2 SHEETS

LOCATION				RUN-OFF										PIPE-CHANNEL DESIGN						HYDRAULIC GRADE LINE								
				AREA-ACRES					TIME OF																			
LINE	RUN	FROM	TO	INCREMENTAL	TOTAL	RUN-OFF COEFF.	INCREMENTAL CA	ACCUMULATED CA	TO INLET/UPPER RCH.	WITHIN REACH CONVEYANCE	TIME OF CONCENTRATION	INTENSITY	DISCHARGE/CFS	PIPE SIZE	CHANNEL SECTION	SLOPE FT/FT	CAPACITY FULL/C.F.S.	VELOCITY FULL/C.F.S.	DESIGN VELOCITY/F.P.S.	CONVEYANCE LENGTH/FT.	INVERT OUT - UPSTREAM	INVERT IN - DOWNSTREAM	FRICTION SLOPE/FT./FT.	VELOCITY FACTOR	V2/2G/FT.	H.G.L. ELEV. UPSTREAM	H.G.L. DOWNSTREAM	COVER ELEV
I	1	DI #22	DI #21	0.54	0.54	0.51	0.27	0.27	9.6	0.10	9.70	6	1.6	15		0.0125	7.22	5.89	4.94	56	90.30	89.60	0.00065	0.84	0.379	84.47	84.27	94.40
		DI #21	DI #18	0.07	0.60	0.85	0.06	0.33	1	0.24	1.24	8.25	2.7	15		0.0205	9.24	7.53	6.55	337	89.50	82.60	0.00179	0.87	0.667	84.27	83.49	94.98
		DI #17	DI #18	0.11	0.11	0.85	0.10	0.10	1	0.35	1.35	8.2	0.8	15		0.0111	6.81	5.55	3.77	36	83.00	82.60	0.00015	0.68	0.221	83.88	83.49	87.04
		YDI #4	DI #20	0.56	0.56	0.45	0.25	0.25	9.75	0.75	10.50	5.5	1.4	15		0.0094	6.27	5.11	4.19	85	89.00	88.20	0.00046	0.82	0.272	85.03	84.91	93.00
		DI #20	DI #19	2.03	2.03	0.73	1.48	1.48	6.75	0.16	6.91	5.7	8.5	18		0.0114	11.23	6.35	7.12	35	88.20	87.80	0.00649	1.12	0.787	84.91	84.46	92.82
		DI #19	DI #18	0.61	2.64	0.81	0.49	1.98	5.5	0.01	5.51	6.85	13.5	24		0.0081	20.35	6.48	6.87	126	83.62	82.60	0.00358	1.06	0.732	84.46	83.49	92.82
		DI #18	DI #15	0.88	4.24	0.55	0.48	2.40	11	0.35	11.35	5.8	13.9	18		0.0336	19.24	10.89	12.31	292	82.50	72.70	0.01762	1.13	2.351	83.49	77.66	87.04
		DI #15	DI #14	0.25	4.49	0.85	0.21	2.62	1	0.52	1.52	8.1	21.2	18		0.0457	22.46	12.71	14.23	35	72.60	71.00	0.04069	1.12	3.148	77.66	74.58	80.26
		DI #16	DI #14	0.61	0.61	0.53	0.33	0.33	9.75	0.25	10.00	6	2.0	15		0.0300	11.19	9.12	7.11	60	72.80	71.00	0.00091	0.78	0.785	75.44	74.58	80.64
		DI #14	DI #13	0.55	5.65	0.59	0.32	3.27	8.75	0.10	8.85	5.3	17.3	18		0.0319	18.76	10.62	12.10	185	70.90	65.00	0.02715	1.14	2.274	74.58	68.99	80.26
		DI #13	STM-MH#14	0.11	5.76	0.84	0.09	3.36	5.5	0.28	5.78	6.86	23.0	24		0.0135	26.25	8.35	9.44	156	64.90	62.80	0.01036	1.13	1.384	68.99	66.00	76.16

Calculated By: HLPG
Checked By: DD
N= 0.013
Storm Frequency: 10-YEAR

Date: Revised 8/12/1998

DJG, INC
P. O. BOX 3505
WILLIAMSBURG, VIRGINA 23187
STORM DRAINAGE COMPUTATION SHEET

PROJECT NO. 1980150
PROJECT DESC. LONGHILL STATION PHASE 2 - ALLEGHENY
SHEET 1 OF 2 SHEETS

LOCATION				RUN-OFF										PIPE-CHANNEL DESIGN							HYDRAULIC GRADE LINE								
				AREA-ACRES					TIME OF FLOW (MIN.)																				
LINE	RUN	FROM	TO	INCREMENTAL	TOTAL	RUN-OFF COEFF.	INCREMENTAL CA	ACCUMULATED CA	TO INLET/UPPER RCH.	WITHIN REACH CONVEYANCE	TIME OF CONCENTRATION	INTENSITY	DISCHARGE/CFS	PIPE SIZE	CHANNEL SECTION	SLOPE FT/FT	CAPACITY FULL/C.F.S.	VELOCITY FULL/C.F.S.	DESIGN VELOCITY/F.P.S.	CONVEYANCE LENGTH/FT.	INVERT OUT - UPSTREAM	INVERT IN - DOWNSTREAM	FRICTION SLOPE/FT./FT.	VELOCITY FACTOR	V2/2G/FT.	H.G.L. ELEV. UPSTREAM	H.G.L. DOWNSTREAM	COVER ELEV
	1	DI #2	DI #1	0.14	0.14	0.76	0.11	0.11	3.25	0.25	3.25	7.5	0.8	15		0.0119	7.0	5.73	3.84	43	105.51	105.00	0.00015	0.67	0.229	83.02	82.86	109.54
		DI #1	DI #3	0.14	0.28	0.76	0.11	0.21	3.25	0.25	3.25	7.5	1.6	15		0.0280	10.8	8.81	6.43	300	104.90	96.50	0.00061	0.73	0.642	82.86	82.53	109.54
		DI #4	DI #3	0.59	0.59	0.53	0.31	0.31	7.5	0.75	8.25	6.25	2.0	15		0.0116	7.0	5.68	4.88	43	97.00	96.50	0.00092	0.86	0.370	82.96	82.53	101.42
		DI #3	DI #5	0.13	1.00	0.85	0.11	0.64	1	0.83	1.83	8	5.1	15		0.0275	10.7	8.72	8.63	306	96.40	88.00	0.00622	0.99	1.158	82.53	80.40	101.42
		YDI #2	YDI #1	0.31	0.31	0.45	0.14	0.14	10.75	0.01	10.76	5.3	0.7	15		0.0102	6.5	5.32	3.57	88	93.50	92.60	0.00013	0.67	0.198	82.07	81.42	97.50
		YDI #1	DI #6	0.25	0.56	0.45	0.11	0.25	11.5	0.01	11.51	4.8	1.2	15		0.0305	11.3	9.19	6.06	128	92.50	88.60	0.00035	0.66	0.571	81.42	81.27	100.00
		DI #6	DI #5	0.84	1.40	0.50	0.42	0.67	8.4	0.40	8.80	6.2	4.2	15		0.0116	7.0	5.68	5.90	43	88.50	88.00	0.00418	1.04	0.541	81.27	80.40	92.74
		DI #5	DI #7	0.16	2.56	0.85	0.14	1.44	1	0.54	1.54	8.1	11.7	18		0.0123	11.7	6.60	7.39	242	87.90	84.92	0.01241	1.12	0.848	80.40	77.09	92.74
		DI #8	DI #7	0.61	0.61	0.61	0.37	0.37	9.5	0.15	9.65	6	2.2	15		0.0344	12.0	9.77	7.42	43	86.40	84.92	0.00120	0.76	0.855	77.70	77.09	90.40
		DI #7	DI #9	0.14	3.31	0.79	0.11	1.93	3.75	0.20	3.95	7.2	13.9	18		0.0265	17.1	9.67	11.03	182	84.82	80.00	0.01745	1.14	1.888	77.09	73.22	90.40
		DI #12	DI #10	0.48	0.48	0.53	0.25	0.25	6.8	0.01	6.81	6.6	1.7	15		0.0227	9.7	7.94	5.16	44	81.00	80.00	0.00068	0.65	0.413	76.03	74.96	85.20
		YDI #3	DI #10	0.38	0.38	0.45	0.17	0.17	10.25	0.01	10.26	5.7	1.0	15		0.0268	10.6	8.62	5.51	112	83.00	80.00	0.00023	0.64	0.472	75.12	74.96	87.00
		DI #10	DI #11	1.28	2.14	0.51	0.65	1.08	13.75	0.01	13.76	5.3	5.7	18		0.0442	22.1	12.50	10.37	43	79.90	78.00	0.00295	0.83	1.670	74.96	74.41	84.65
		DI #11	DI #9	0.13	2.27	0.83	0.11	1.19	2	0.23	2.23	7.8	9.2	18		0.0432	21.8	12.35	11.61	44	77.90	76.00	0.00775	0.94	2.093	74.41	73.22	84.65
		DI #9	outfall	0.10	5.68	0.85	0.09	3.20	1	0.26	1.26	8.2	26.2	18		0.0918	31.8	18.01	19.64	98	70.00	61.00	0.06231	1.09	5.987	73.22	66.00	84.94

LONGHILL STATION (PHASE 2) - DI DESIGN

Revision Date:7/15/98

DFL

I.D.	Area A (ft^2)	Area through throat (ft^2)	Coefficient C	Time of Concn. (Tc) S (min.)	K (min.)	TOTAL Tc (min.)	Intensity i (in/hr)	Flow Q_{10} (cfs)	DI TYPE	CURB LENGTH
1	6200	6200	0.76	3.00	0.25	3.25	7.50	**0.82**	DI-3C	6
2	5925	5925	0.76	3.00	0.25	3.25	7.50	**0.78**	DI-3C	6
3	5575	5575	0.85	1.00	0.83	1.83	8.00	**0.88**	DI-3B	6
4	25875	25875	0.53	7.50	0.75	8.25	6.25	**1.98**	DI-3B	10
5	7075	7075	0.85	1.00	0.54	1.54	8.10	**1.13**	DI-3B	6
6	61300	36536	0.50	8.40	0.40	8.80	6.20	**2.62**	DI-3B	10
7	6200	6200	0.79	3.75	0.20	3.95	7.20	**0.82**	DI-3B	4
8	26400	26400	0.61	9.50	0.15	9.65	6.00	**2.24**	DI-3B	6
9	4350	4350	0.85	1.00	0.26	1.26	8.20	**0.70**	DI-3B	6
10	72500	55940	0.51	13.75	0.01	13.76	5.30	**3.50**	DI-3C	8
11	5700	5700	0.83	2.00	0.23	2.23	7.80	**0.85**	DI-3C	6
12	20930	20930	0.53	6.80	0.01	6.81	6.60	**1.69**	DI-3B	6
13	4750	4750	0.84	5.50	0.28	5.78	6.86	**0.63**	DI-3B	6
14	23980	23980	0.59	8.75	0.10	8.85	5.30	**1.74**	DI-3C	6
15	10850	10850	0.85	1.00	0.52	1.52	8.10	**1.73**	DI-3C	6
16	26715	26715	0.53	9.75	0.25	10.00	6.00	**1.97**	DI-3B	8
17	4925	4925	0.85	1.00	0.35	1.35	8.20	**0.79**	DI-3B	6
18	38300	38300	0.55	11.00	0.35	11.35	5.80	**2.83**	DI-3B	10
19	26450	26450	0.81	5.50	0.01	5.51	6.85	**3.40**	DI-3B	10
20	88594	10700	0.73	6.75	0.16	6.91	5.70	**1.03**	DI-3B	6
21	2925	2925	0.85	1.00	0.24	1.24	8.25	**0.47**	DI-3B	4
22	23425	23425	0.51	9.60	0.10	9.70	6.00	**1.66**	DI-3B	6

lot drainage thru a stub pipe (incl. the throat)

street drainage

DI-#1

User Name: P.C. NO.26
Project: C:\ACAD\0JOBS\LONGHILL\OVERALL.STM

Date: 05-20-98
Time: 14:24:09
Page: 1

STORM SEWER HEC 12 SINGLE INLET REPORT

FLOW RESULTS (cfs)
Total Flow to inlet = 0.82
Intercepted by current inlet = 0.82
Bypassed by current inlet = 0.00

PONDING WIDTH (ft) = 1.43
DEPTH AT CURB (ft) = 0.12
EFFICIENCY (%)
Curb = 100.00
Grate = * Total = 100.00
Slot = *

INPUT PARAMETERS:

Inlet Type	= CURB IN SAG	Longitudinal Slope (ft/ft)	= 0.000
Gutter Width (ft)	= 1.500	Pavement Cross Slope (ft/ft)	= 0.021
Inlet n-value	= 0.015	Gutter Cross Slope (ft/ft)	= 0.083
Downstream Inlet Number	= 0	Gutter depression (in)	= 0.00
Curb Throat Type	= Inclined		
Inlet Opening Ht (in)	= 6.00		
Curb Length (ft)	= 6.00		
Curb Weir Coeff.	= 2.300		
Curb Orifice Coeff.	= 0.670		
Incline Angle (deg)	= 45.00		

DI-3C

DI-#2

User Name: P.C. NO.26
Project: C:\ACAD\0JOBS\LONGHILL\OVERALL.STM

Date: 05-20-98
Time: 14:24:25
Page: 1

STORM SEWER HEC 12 SINGLE INLET REPORT

FLOW RESULTS (cfs)			PONDING WIDTH (ft)	=	1.39
Total Flow to inlet	=	0.78	DEPTH AT CURB (ft)	=	0.11
			EFFICIENCY (%)		
			Curb = 100.00		
Intercepted by current inlet	=	0.78	Grate = *	Total =	100.00
Bypassed by current inlet	=	0.00	Slot = *		

INPUT PARAMETERS:

Inlet Type	= CURB IN SAG		Longitudinal Slope (ft/ft)	=	0.000
Gutter Width (ft)	=	1.500	Pavement Cross Slope (ft/ft)	=	0.021
Inlet n-value	=	0.015	Gutter Cross Slope (ft/ft)	=	0.083
Downstream Inlet Number	=	0	Gutter depression (in)	=	0.00
Curb Throat Type	= Inclined				
Inlet Opening Ht (in)	=	6.00			
Curb Length (ft)	=	6.00			
Curb Weir Coeff.	=	2.300			
Curb Orifice Coeff.	=	0.670			
Incline Angle (deg)	=	45.00			

DI-3C

DI - #3

User Name: P.C. NO.26
Project: C:\ACAD\0JOBS\LONGHILL\OVERALL.STM

Date: 05-20-98
Time: 11:50:25
Page: 1

STORM SEWER HEC 12 SINGLE INLET REPORT

FLOW RESULTS (cfs)			PONDING WIDTH (ft)	=	2.96
Total Flow to inlet	=	0.88	DEPTH AT CURB (ft)	=	0.16
			EFFICIENCY (%)		
			Curb = 60.97		
Intercepted by current inlet	=	0.54	Grate = *	Total =	60.97
Bypassed by current inlet	=	0.34	Slot = *		

INPUT PARAMETERS:

Inlet Type	= CURB ON GRADE		Longitudinal Slope (ft/ft)	=	0.074
Gutter Width (ft)	=	1.500	Pavement Cross Slope (ft/ft)	=	0.021
Inlet n-value	=	0.015	Gutter Cross Slope (ft/ft)	=	0.083
Downstream Inlet Number	=	0			
Curb Throat Type	= Inclined				
Curb Length (ft)	=	6.00			

DI - 3B

DI- #4

User Name: P.C. NO.26
Project: C:\ACAD\0JOBS\LONGHILL\OVERALL.STM

Date: 05-20-98
Time: 11:51:05
Page: 1

STORM SEWER HEC 12 SINGLE INLET REPORT

FLOW RESULTS (cfs)			PONDING WIDTH (ft)	=	5.03
Total Flow to inlet	=	1.98	DEPTH AT CURB (ft)	=	0.20
			EFFICIENCY (%)		
			Curb = 64.78		
Intercepted by current inlet	=	1.28	Grate = *	Total =	64.78
Bypassed by current inlet	=	0.70	Slot = *		

INPUT PARAMETERS:

Inlet Type	= CURB ON GRADE		Longitudinal Slope (ft/ft)	=	0.074
Gutter Width (ft)	=	1.500	Pavement Cross Slope (ft/ft)	=	0.021
Inlet n-value	=	0.015	Gutter Cross Slope (ft/ft)	=	0.083
Downstream Inlet Number	=	0			
Curb Throat Type	= Inclined				
Curb Length (ft)	=	10.00			

DI-3B

DI-#5

User Name: P.C. NO.26
Project: C:\ACAD\0JOBS\LONGHILL\OVERALL.STM

Date: 05-20-98
Time: 11:52:57
Page: 1

STORM SEWER HEC 12 SINGLE INLET REPORT

FLOW RESULTS (cfs)			PONDING WIDTH (ft)	=	6.30
Total Flow to inlet	=	1.13	DEPTH AT CURB (ft)	=	0.23
			EFFICIENCY (%)		
			Curb = 78.33		
Intercepted by current inlet	=	0.89	Grate = *	Total =	78.33
Bypassed by current inlet	=	0.24	Slot = *		

INPUT PARAMETERS:

Inlet Type	= CURB ON GRADE		Longitudinal Slope (ft/ft)	=	0.010
Gutter Width (ft)	=	1.500	Pavement Cross Slope (ft/ft)	=	0.021
Inlet n-value	=	0.015	Gutter Cross Slope (ft/ft)	=	0.083
Downstream Inlet Number	=	0			
Curb Throat Type	= Inclined				
Curb Length (ft)	=	6.00			

DI-3B

DI-#6 (REV. 7/15/98)

User Name: P.C. NO. 10
Project: [redacted]

Date: 07-15-98
Time: 14:57:29
Page: 1

STORM SEWER HEC 12 SINGLE INLET REPORT

FLOW RESULTS (cfs)			PONDING WIDTH (ft)	=	9.20
Total Flow to inlet	=	2.62	DEPTH AT CURB (ft)	=	0.29
			EFFICIENCY (%)		
			Curb = 80.27		
Intercepted by current inlet	=	2.10	Grate = *	Total =	80.27
Bypassed by current inlet	=	0.52	Slot = *		

INPUT PARAMETERS:

Inlet Type	= CURB ON GRADE		Longitudinal Slope (ft/ft)	=	0.010
Gutter Width (ft)	=	1.500	Pavement Cross Slope (ft/ft)	=	0.021
Inlet n-value	=	0.015	Gutter Cross Slope (ft/ft)	=	0.083
Downstream Inlet Number	=	0			
Curb Throat Type	= Inclined				
Curb Length (ft)	=	10.00			

DI-3B

DI-#7

User Name: P.C. NO.26
Project: C:\ACAD\0JOBS\LONGHILL\OVERALL.STM

Date: 05-20-98
Time: 11:55:02
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STORM SEWER HEC 12 SINGLE INLET REPORT

FLOW RESULTS (cfs)			PONDING WIDTH (ft)	=	5.36
Total Flow to inlet	=	0.82	DEPTH AT CURB (ft)	=	0.21
			EFFICIENCY (%)		
			Curb = 66.69		
Intercepted by current inlet	=	0.55	Grate = *	Total =	66.69
Bypassed by current inlet	=	0.27	Slot = *		

INPUT PARAMETERS:

Inlet Type	= CURB ON GRADE		Longitudinal Slope (ft/ft)	=	0.010
Gutter Width (ft)	=	1.500	Pavement Cross Slope (ft/ft)	=	0.021
Inlet n-value	=	0.015	Gutter Cross Slope (ft/ft)	=	0.083
Downstream Inlet Number	=	0			
Curb Throat Type	= Inclined				
Curb Length (ft)	=	4.00			

DI-3B

DI-#8 (REV. 7/15/98)

User Name: P.C. NO. 10
Project: [redacted]

Date: 07-15-98
Time: 15:12:37
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STORM SEWER HEC 12 SINGLE INLET REPORT

FLOW RESULTS (cfs)			PONDING WIDTH (ft)	=	8.60
Total Flow to inlet	=	2.24	DEPTH AT CURB (ft)	=	0.27
			EFFICIENCY (%)		
			Curb = 58.82		
Intercepted by current inlet	=	1.32	Grate = *	Total =	58.82
Bypassed by current inlet	=	0.92	Slot = *		

INPUT PARAMETERS:

Inlet Type	= CURB ON GRADE		Longitudinal Slope (ft/ft)	=	0.010
Gutter Width (ft)	=	1.500	Pavement Cross Slope (ft/ft)	=	0.021
Inlet n-value	=	0.015	Gutter Cross Slope (ft/ft)	=	0.083
Downstream Inlet Number	=	0			
Curb Throat Type	= Inclined				
Curb Length (ft)	=	6.00			

DI-3B

DI-#9

User Name: P.C. NO.26
Project: C:\ACAD\0JOBS\LONGHILL\OVERALL.STM

Date: 05-20-98
Time: 11:56:13
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STORM SEWER HEC 12 SINGLE INLET REPORT

FLOW RESULTS (cfs)			PONDING WIDTH (ft)	=	3.51
Total Flow to inlet	=	0.70	DEPTH AT CURB (ft)	=	0.17
			EFFICIENCY (%)		
			Curb = 78.62		
Intercepted by current inlet	=	0.55	Grate = *	Total =	78.62
Bypassed by current inlet	=	0.15	Slot = *		

INPUT PARAMETERS:

Inlet Type	= CURB ON GRADE		Longitudinal Slope (ft/ft)	=	0.030
Gutter Width (ft)	=	1.500	Pavement Cross Slope (ft/ft)	=	0.021
Inlet n-value	=	0.015	Gutter Cross Slope (ft/ft)	=	0.083
Downstream Inlet Number	=	0			
Curb Throat Type	= Inclined				
Curb Length (ft)	=	6.00			

DI-3B

DI-#10 (REV. 7/15/98)

User Name: P.C. NO. 10
Project: [redacted]

Date: 07-15-98
Time: 15:15:43
Page: 1

STORM SEWER HEC 12 SINGLE INLET REPORT

FLOW RESULTS (cfs)			PONDING WIDTH (ft)	=	8.55
Total Flow to inlet	=	3.50	DEPTH AT CURB (ft)	=	0.27
			EFFICIENCY (%)		
			Curb = 100.00		
Intercepted by current inlet	=	3.50	Grate = *	Total = 100.00	
Bypassed by current inlet	=	0.00	Slot = *		

INPUT PARAMETERS:

Inlet Type	= CURB IN SAG		Longitudinal Slope (ft/ft)	=	0.000
Gutter Width (ft)	=	1.500	Pavement Cross Slope (ft/ft)	=	0.021
Inlet n-value	=	0.015	Gutter Cross Slope (ft/ft)	=	0.083
Downstream Inlet Number	=	0	Gutter depression (in)	=	0.00
Curb Throat Type	= Inclined				
Inlet Opening Ht (in)	=	6.00			
Curb Length (ft)	=	8.00			
Curb Weir Coeff.	=	2.300			
Curb Orifice Coeff.	=	0.670			
Incline Angle (deg)	=	45.00			

DI-3C

DI-#11

User Name: P.C. NO.26
Project: C:\ACAD\0JOBS\LONGHILL\OVERALL.STM

Date: 05-20-98
Time: 14:24:39
Page: 1

STORM SEWER HEC 12 SINGLE INLET REPORT

FLOW RESULTS (cfs)			PONDING WIDTH (ft)	=	1.47
Total Flow to inlet	=	0.85	DEPTH AT CURB (ft)	=	0.12
			EFFICIENCY (%)		
			Curb = 100.00		
Intercepted by current inlet	=	0.85	Grate = *	Total =	100.00
Bypassed by current inlet	=	0.00	Slot = *		

INPUT PARAMETERS:

Inlet Type	=	CURB IN SAG	Longitudinal Slope (ft/ft)	=	0.000
Gutter Width (ft)	=	1.500	Pavement Cross Slope (ft/ft)	=	0.021
Inlet n-value	=	0.015	Gutter Cross Slope (ft/ft)	=	0.083
Downstream Inlet Number	=	0	Gutter depression (in)	=	0.00
Curb Throat Type	=	Inclined			
Inlet Opening Ht (in)	=	6.00			
Curb Length (ft)	=	6.00			
Curb Weir Coeff.	=	2.300			
Curb Orifice Coeff.	=	0.670			
Incline Angle (deg)	=	45.00			

DI-3C

DI-#12 (REV. 7/15/98)

User Name: P.C. NO. 10
Project: [redacted]

Date: 07-15-98
Time: 15:16:42
Page: 1

STORM SEWER HEC 12 SINGLE INLET REPORT

FLOW RESULTS (cfs)			PONDING WIDTH (ft)	=	6.47
Total Flow to inlet	=	1.69	DEPTH AT CURB (ft)	=	0.23
			EFFICIENCY (%)		
			Curb = 58.86		
Intercepted by current inlet	=	0.99	Grate = *	Total =	58.86
Bypassed by current inlet	=	0.70	Slot = *		

INPUT PARAMETERS:

Inlet Type	= CURB ON GRADE		Longitudinal Slope (ft/ft)	=	0.020
Gutter Width (ft)	=	1.500	Pavement Cross Slope (ft/ft)	=	0.021
Inlet n-value	=	0.015	Gutter Cross Slope (ft/ft)	=	0.083
Downstream Inlet Number	=	0			
Curb Throat Type	= Inclined				
Curb Length (ft)	=	6.00			

DI-3B

DI-#13

User Name: P.C. NO.26
Project: C:\ACAD\0JOBS\LONGHILL\OVERALL.STM

Date: 05-20-98
Time: 14:25:53
Page: 1

STORM SEWER HEC 12 SINGLE INLET REPORT

FLOW RESULTS (cfs)
Total Flow to inlet = 0.63
Intercepted by current inlet = 0.42
Bypassed by current inlet = 0.21

PONDING WIDTH (ft) = 1.93
DEPTH AT CURB (ft) = 0.13
EFFICIENCY (%)
Curb = 65.89
Grate = * Total = 65.89
Slot = *

INPUT PARAMETERS:
Inlet Type = CURB ON GRADE
Gutter Width (ft) = 1.500
Inlet n-value = 0.015
Downstream Inlet Number = 0
Curb Throat Type = Inclined
Curb Length (ft) = 6.00

Longitudinal Slope (ft/ft) = 0.091
Pavement Cross Slope (ft/ft) = 0.021
Gutter Cross Slope (ft/ft) = 0.083

DI-3B

DI-#14 (REV. 7/15/98)

User Name: P.C. NO. 10
Project: [redacted]

Date: 07-15-98
Time: 15:17:57
Page: 1

STORM SEWER HEC 12 SINGLE INLET REPORT

FLOW RESULTS (cfs)			PONDING WIDTH (ft)	=	4.92
Total Flow to inlet	=	1.74	DEPTH AT CURB (ft)	=	0.20
			EFFICIENCY (%)		
			Curb = 100.00		
Intercepted by current inlet	=	1.74	Grate = *	Total = 100.00	
Bypassed by current inlet	=	0.00	Slot = *		

INPUT PARAMETERS:

Inlet Type	= CURB IN SAG		Longitudinal Slope (ft/ft)	=	0.000
Gutter Width (ft)	=	1.500	Pavement Cross Slope (ft/ft)	=	0.021
Inlet n-value	=	0.015	Gutter Cross Slope (ft/ft)	=	0.083
Downstream Inlet Number	=	0	Gutter depression (in)	=	6.00
Curb Throat Type	= Inclined				
Inlet Opening Ht (in)	=	6.00			
Curb Length (ft)	=	6.00			
Curb Weir Coeff.	=	2.300			
Curb Orifice Coeff.	=	0.670			
Incline Angle (deg)	=	45.00			

DI-3C

DI-#15

User Name: P.C. NO.26
Project: C:\ACAD\0JOBS\LONGHILL\OVERALL.STM

Date: 05-20-98
Time: 14:26:54
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STORM SEWER HEC 12 SINGLE INLET REPORT

FLOW RESULTS (cfs)			PONDING WIDTH (ft)	=	4.88
Total Flow to inlet	=	1.73	DEPTH AT CURB (ft)	=	0.20
			EFFICIENCY (%)		
			Curb = 100.00		
Intercepted by current inlet	=	1.73	Grate = *	Total =	100.00
Bypassed by current inlet	=	0.00	Slot = *		

INPUT PARAMETERS:

Inlet Type	=	CURB IN SAG	Longitudinal Slope (ft/ft)	=	0.000
Gutter Width (ft)	=	1.500	Pavement Cross Slope (ft/ft)	=	0.021
Inlet n-value	=	0.015	Gutter Cross Slope (ft/ft)	=	0.083
Downstream Inlet Number	=	0	Gutter depression (in)	=	0.00
Curb Throat Type	=	Inclined			
Inlet Opening Ht (in)	=	6.00			
Curb Length (ft)	=	6.00			
Curb Weir Coeff.	=	2.300			
Curb Orifice Coeff.	=	0.670			
Incline Angle (deg)	=	45.00			

DI-3C

DI-#16 (REV. 7/15/98)

User Name: P.C. NO. 10
Project: [redacted]

Date: 07-15-98
Time: 15:18:57
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STORM SEWER HEC 12 SINGLE INLET REPORT

FLOW RESULTS (cfs)			PONDING WIDTH (ft)	=	6.95
Total Flow to inlet	=	1.97	DEPTH AT CURB (ft)	=	0.24
			EFFICIENCY (%)		
			Curb = 68.77		
Intercepted by current inlet	=	1.35	Grate = *	Total =	68.77
Bypassed by current inlet	=	0.62	Slot = *		

INPUT PARAMETERS:

Inlet Type	= CURB ON GRADE		Longitudinal Slope (ft/ft)	=	0.020
Gutter Width (ft)	=	1.500	Pavement Cross Slope (ft/ft)	=	0.021
Inlet n-value	=	0.015	Gutter Cross Slope (ft/ft)	=	0.083
Downstream Inlet Number	=	0			
Curb Throat Type	= Inclined				
Curb Length (ft)	=	8.00			

DI-3B

DI-#17

User Name: P.C. NO.26
Project: C:\ACAD\0JOBS\LONGHILL\OVERALL.STM

Date: 05-20-98
Time: 14:31:08
Page: 1

STORM SEWER HEC 12 SINGLE INLET REPORT

FLOW RESULTS (cfs)			PONDING WIDTH (ft)	=	3.45
Total Flow to inlet	=	0.79	DEPTH AT CURB (ft)	=	0.17
			EFFICIENCY (%)		
			Curb = 71.60		
Intercepted by current inlet	=	0.57	Grate = *	Total =	71.60
Bypassed by current inlet	=	0.22	Slot = *		

INPUT PARAMETERS:

Inlet Type	= CURB ON GRADE		Longitudinal Slope (ft/ft)	=	0.040
Gutter Width (ft)	=	1.500	Pavement Cross Slope (ft/ft)	=	0.021
Inlet n-value	=	0.015	Gutter Cross Slope (ft/ft)	=	0.083
Downstream Inlet Number	=	0			
Curb Throat Type	= Inclined				
Curb Length (ft)	=	6.00			

DI-3B

DI-#18

User Name: P.C. NO.26
Project: C:\ACAD\0JOBS\LONGHILL\OVERALL.STM

Date: 05-20-98
Time: 14:32:51
Page: 1

STORM SEWER HEC 12 SINGLE INLET REPORT

FLOW RESULTS (cfs)
Total Flow to inlet = 2.83

PONDING WIDTH (ft) = 7.00
DEPTH AT CURB (ft) = 0.24
EFFICIENCY (%)
Curb = 61.82
Grate = * Total = 61.82
Slot = *

Intercepted by current inlet = 1.75
Bypassed by current inlet = 1.08

INPUT PARAMETERS:
Inlet Type = CURB ON GRADE
Gutter Width (ft) = 1.500
Inlet n-value = 0.015
Downstream Inlet Number = 0
Curb Throat Type = Inclined
Curb Length (ft) = 10.00

Longitudinal Slope (ft/ft) = 0.040
Pavement Cross Slope (ft/ft) = 0.021
Gutter Cross Slope (ft/ft) = 0.083

DI-3B

DI- #19

User Name: P.C. NO.26
Project: C:\ACAD\0JOBS\LONGHILL\OVERALL.STM

Date: 05-20-98
Time: 14:33:17
Page: 1

STORM SEWER HEC 12 SINGLE INLET REPORT

FLOW RESULTS (cfs)			PONDING WIDTH (ft)	=	7.05
Total Flow to inlet	=	3.40	DEPTH AT CURB (ft)	=	0.24
			EFFICIENCY (%)		
			Curb = 53.43		
Intercepted by current inlet	=	1.82	Grate = *	Total =	53.43
Bypassed by current inlet	=	1.58	Slot = *		

INPUT PARAMETERS:

Inlet Type	=	CURB ON GRADE	Longitudinal Slope (ft/ft)	=	0.056
Gutter Width (ft)	=	1.500	Pavement Cross Slope (ft/ft)	=	0.021
Inlet n-value	=	0.015	Gutter Cross Slope (ft/ft)	=	0.083
Downstream Inlet Number	=	0			
Curb Throat Type	=	Inclined			
Curb Length (ft)	=	10.00			

DI-3B

DI-#20 (REV. 7/15/98)

User Name: P.C. NO. 10
Project: [redacted]

Date: 07-15-98
Time: 15:19:51
Page: 1

STORM SEWER HEC 12 SINGLE INLET REPORT

FLOW RESULTS (cfs)			PONDING WIDTH (ft)	=	3.69
Total Flow to inlet	=	1.03	DEPTH AT CURB (ft)	=	0.17
			EFFICIENCY (%)		
			Curb = 60.45		
Intercepted by current inlet	=	0.62	Grate = *	Total =	60.45
Bypassed by current inlet	=	0.41	Slot = *		

INPUT PARAMETERS:

Inlet Type	= CURB ON GRADE		Longitudinal Slope (ft/ft)	=	0.056
Gutter Width (ft)	=	1.500	Pavement Cross Slope (ft/ft)	=	0.021
Inlet n-value	=	0.015	Gutter Cross Slope (ft/ft)	=	0.083
Downstream Inlet Number	=	0			
Curb Throat Type	= Inclined				
Curb Length (ft)	=	6.00			

DI-3B

DI-#21

User Name: P.C. NO.26
Project: C:\ACAD\0JOBS\LONGHILL\OVERALL.STM

Date: 05-20-98
Time: 14:35:00
Page: 1

STORM SEWER HEC 12 SINGLE INLET REPORT

FLOW RESULTS (cfs)
Total Flow to inlet = 0.47
Intercepted by current inlet = 0.39
Bypassed by current inlet = 0.08

PONDING WIDTH (ft) = 3.88
DEPTH AT CURB (ft) = 0.17
EFFICIENCY (%)
Curb = 82.52
Grate = *
Slot = *
Total = 82.52

INPUT PARAMETERS:
Inlet Type = CURB ON GRADE
Gutter Width (ft) = 1.500
Inlet n-value = 0.015
Downstream Inlet Number = 0
Curb Throat Type = Inclined
Curb Length (ft) = 4.00

Longitudinal Slope (ft/ft) = 0.010
Pavement Cross Slope (ft/ft) = 0.021
Gutter Cross Slope (ft/ft) = 0.083

DI-3B

DI-#22

User Name: P.C. NO.26
Project: C:\ACAD\0JOBS\LONGHILL\OVERALL.STM

Date: 05-20-98
Time: 14:35:30
Page: 1

STORM SEWER HEC 12 SINGLE INLET REPORT

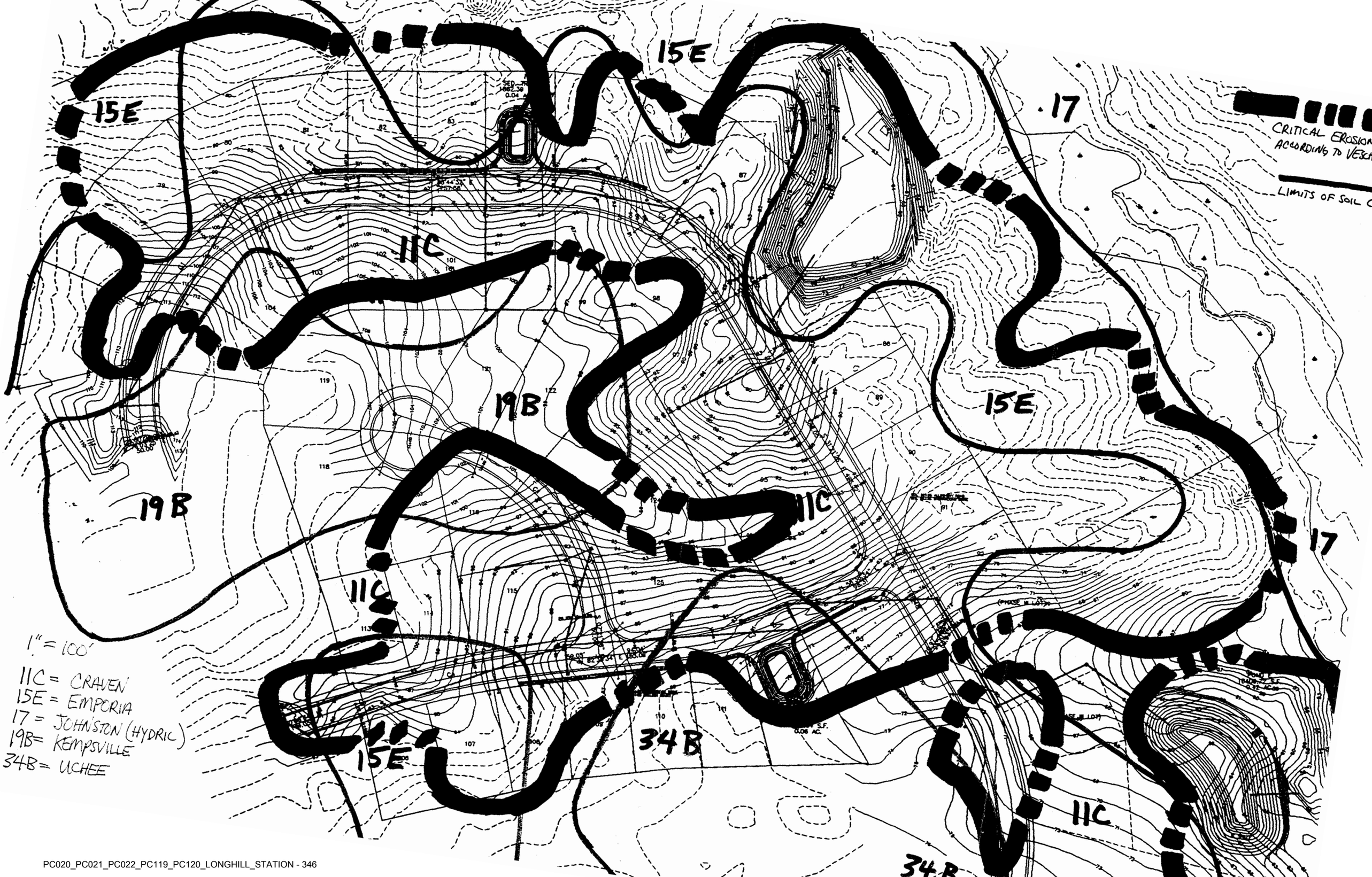
FLOW RESULTS (cfs)
Total Flow to inlet = 1.66
Intercepted by current inlet = 1.11
Bypassed by current inlet = 0.55

PONDING WIDTH (ft) = 7.54
DEPTH AT CURB (ft) = 0.25
EFFICIENCY (%)
Curb = 67.09
Grate = * Total = 67.09
Slot = *

INPUT PARAMETERS:
Inlet Type = CURB ON GRADE
Gutter Width (ft) = 1.500
Inlet n-value = 0.015
Downstream Inlet Number = 0
Curb Throat Type = Inclined
Curb Length (ft) = 6.00

Longitudinal Slope (ft/ft) = 0.010
Pavement Cross Slope (ft/ft) = 0.021
Gutter Cross Slope (ft/ft) = 0.083

DI-3B



PC020_PC021_PC022_PC119_PC120_LONGHILL_STATION - 346

PREDEVELOPMENT FLOWS
DFL 5/22/98

LONGHILL STATION - POND E DESIGN

LONGHILL STATION - POND E DESIGN

INPUT DESIGN DATA

DESIGN STORM FOR ANALYSIS = 2 YEAR
DRAINAGE AREA (ACRES) = 12
AVERAGE SLOPE OF DRAINAGE AREA (%) = 6
HYDRAULIC LENGTH (FT) = 1120
IMPERVIOUS SURFACE (%) = 10 where?
HYDRAULIC LENGTH MODIFIED (%) = 15
COMPOSITE CURVE NUMBER = 70
SLOPE ADJUSTMENT FACTOR = 1.08
PONDING ADJUSTMENT FACTOR = .63

RESULTS OF HYDRAULIC CALCULATIONS
(SCS TR-55 & TP-149 PROCEDURES)

WATERSHED LAG ADJUSTED (IMPER. AREAS & CHAN. IMPROV.) IS .158 HOURS
TIME OF CONCENTRATION ADJUSTED IS .263 HOURS
THE PEAK DISCHARGE FROM THIS WATERSHED IS 8 C.F.S.

THE FOLLOWING ARE TIME INCREMENTS AND ORDINATES OF THE INFLOW HYDROGRAPH

(HOURS)	(C.F.S.)
0,0	
.063	.112
.126	.426
.189	1.157
.252	2.403
.316	4.252
.379	6.535
.442	8.307
.505	8.594
.568	7.189
.631	4.947
.694	2.955
.757	1.379
.821	.359
.884	0

LONGHILL STATION - POND E DESIGN

LONGHILL STATION - POND E DESIGN

INPUT DESIGN DATA

DESIGN STORM FOR ANALYSIS = 10 YEAR
DRAINAGE AREA (ACRES) = 12
AVERAGE SLOPE OF DRAINAGE AREA (%) = 6
HYDRAULIC LENGTH (FT) = 1120
IMPERVIOUS SURFACE (%) = 10
HYDRAULIC LENGTH MODIFIED (%) = 15
COMPOSITE CURVE NUMBER = 70
SLOPE ADJUSTMENT FACTOR = 1.08
PONDING ADJUSTMENT FACTOR = .66

RESULTS OF HYDRAULIC CALCULATIONS

LONGHILL STATION - POND E

LONGHILL STATION - POND E

INPUT DESIGN DATA

DESIGN STORM FOR ANALYSIS = 10 YEAR
DRAINAGE AREA (ACRES) = 12.1
AVERAGE SLOPE OF DRAINAGE AREA (%) = 6
HYDRAULIC LENGTH (FT) = 1120
IMPERVIOUS SURFACE (%) = 10
HYDRAULIC LENGTH MODIFIED (%) = 15
COMPOSITE CURVE NUMBER = 70
SLOPE ADJUSTMENT FACTOR = 1.08
PONDING ADJUSTMENT FACTOR = .63

RESULTS OF HYDRAULIC CALCULATIONS
(SCS TR-55 & TP-149 PROCEDURES)

WATERSHED LAG ADJUSTED (IMPER. AREAS & CHAN. IMPROV.) IS .158 HOURS
TIME OF CONCENTRATION ADJUSTED IS .263 HOURS
THE PEAK DISCHARGE FROM THIS WATERSHED IS 18 C.F.S.

THE FOLLOWING ARE TIME INCREMENTS AND ORDINATES OF THE INFLOW HYDROGRAPH

(HOURS)	(C.F.S.)
0,0	
.063	.389
.126	1.38
.189	3.449
.252	6.497
.316	10.556
.379	15.1
.442	18.247
.505	18.233
.568	14.918
.631	10.102
.694	5.932
.757	2.722
.821	.699
.884	0

(SCS TR-55 & TP-149 PROCEDURES)

WATERSHED LAG ADJUSTED (IMPER. AREAS & CHAN. IMPROV.) IS .158 HOURS
TIME OF CONCENTRATION ADJUSTED IS .263 HOURS ?
THE PEAK DISCHARGE FROM THIS WATERSHED IS 25 C.F.S.

THE FOLLOWING ARE TIME INCREMENTS AND ORDINATES OF THE
INFLOW HYDROGRAPH

(HOURS)	(C.F.S.)
0,0	
.063	.573
.126	2.014
.189	4.962
.252	9.178001
.316	14.647
.379	20.613
.442	24.601
.505	24.362
.568	19.816
.631	13.359
.694	7.808
.757	3.567
.821	.911
.884	0

LONGHILL STATION - POND E DESIGN

LONGHILL STATION - POND E DESIGN

INPUT DESIGN DATA

DESIGN STORM FOR ANALYSIS = 25 YEAR
DRAINAGE AREA (ACRES) = 12
AVERAGE SLOPE OF DRAINAGE AREA (%) = 6
HYDRAULIC LENGTH (FT) = 1120
IMPERVIOUS SURFACE (%) = 10
HYDRAULIC LENGTH MODIFIED (%) = 15
COMPOSITE CURVE NUMBER = 70
SLOPE ADJUSTMENT FACTOR = 1.08
PONDING ADJUSTMENT FACTOR = .7

RESULTS OF HYDRAULIC CALCULATIONS
(SCS TR-55 & TP-149 PROCEDURES)

WATERSHED LAG ADJUSTED (IMPER. AREAS & CHAN. IMPROV.) IS .158 HOURS
TIME OF CONCENTRATION ADJUSTED IS .263 HOURS
THE PEAK DISCHARGE FROM THIS WATERSHED IS 32 C.F.S.

THE FOLLOWING ARE TIME INCREMENTS AND ORDINATES OF THE
INFLOW HYDROGRAPH

(HOURS)	(C.F.S.)
0,0	
.063	.801
.126	2.794
.189	6.821
.252	12.461
.316	19.641

.379	27.318
.442	32.309
.505	31.783
.568	25.738
.631	17.294
.694	10.071
.757	4.585
.821	1.167
.884	0

LONGHILL STATION - POND E DESIGN

LONGHILL STATION - POND E DESIGN

INPUT DESIGN DATA

DESIGN STORM FOR ANALYSIS = 100 YEAR
DRAINAGE AREA (ACRES) = 12
AVERAGE SLOPE OF DRAINAGE AREA (%) = 6
HYDRAULIC LENGTH (FT) = 1120
IMPERVIOUS SURFACE (%) = 10
HYDRAULIC LENGTH MODIFIED (%) = 15
COMPOSITE CURVE NUMBER = 70
SLOPE ADJUSTMENT FACTOR = 1.08
PONDING ADJUSTMENT FACTOR = .76

RESULTS OF HYDRAULIC CALCULATIONS
(SCS TR-55 & TP-149 PROCEDURES)

WATERSHED LAG ADJUSTED (IMPER. AREAS & CHAN. IMPROV.) IS .158 HOURS
TIME OF CONCENTRATION ADJUSTED IS .263 HOURS
THE PEAK DISCHARGE FROM THIS WATERSHED IS 49 C.F.S.

THE FOLLOWING ARE TIME INCREMENTS AND ORDINATES OF THE
INFLOW HYDROGRAPH

(HOURS)	(C.F.S.)
0,0	
.063	1.322
.126	4.568
.189	11.02
.252	19.806
.316	30.704
.379	42.027
.442	49.081
.505	47.831
.568	38.489
.631	25.739
.694	14.911
.757	6.754
.821	1.711
.884	0

LONGHILL STATION - POND E

LONGHILL STATION - POND E

INPUT DESIGN DATA

DESIGN STORM FOR ANALYSIS = 100 YEAR
DRAINAGE AREA (ACRES) = 12
AVERAGE SLOPE OF DRAINAGE AREA (%) = 6
HYDRAULIC LENGTH (FT) = 1120
IMPERVIOUS SURFACE (%) = 10
HYDRAULIC LENGTH MODIFIED (%) = 15
COMPOSITE CURVE NUMBER = 70
SLOPE ADJUSTMENT FACTOR = 1.08
PONDING ADJUSTMENT FACTOR = .8

RESULTS OF HYDRAULIC CALCULATIONS
(SCS TR-55 & TP-149 PROCEDURES)

WATERSHED LAG ADJUSTED (IMPER. AREAS & CHAN. IMPROV.) IS .158 HOURS
TIME OF CONCENTRATION ADJUSTED IS .263 HOURS
THE PEAK DISCHARGE FROM THIS WATERSHED IS 52 C.F.S.

THE FOLLOWING ARE TIME INCREMENTS AND ORDINATES OF THE
INFLOW HYDROGRAPH

(HOURS)	(C.F.S.)
0,0	
.063	1.392
.126	4.809
.189	11.6
.252	20.849
.316	32.32
.379	44.239
.442	51.664
.505	50.349
.568	40.515
.631	27.093
.694	15.696
.757	7.11
.821	1.801
.884	0

LONGHILL STATION SUBDIVISION - PHASE 2

ATLANTIC HOMES DEVELOPMENT CORPORATION

ATTACHMENTS FOR RESUBMITTAL #3

BY

DJG, INC.
1006 RICHMOND ROAD
WILLIAMSBURG, VIRGINIA 23185
PHONE: (757)253-0673
FAX: (757)253-2319

SEPTEMBER 24, 1998
DJG COMMISSION NO: 1980150

LONGHILL STATION PHASE 2 - DI DESIGN

Revision Date: 9/17/98
DFL

I.D.	Area A (ft^2)	Area Through throat (ft^2)	Coefficient C	Time of Concn. (Tc) S (min.)	K (min.)	TOTAL Tc (min.)	Intensity i (in/hr)	Flow Q_{10} (cfs)	DI TYPE	CURB LENGTH
1	6200	6200	0.76	3.00	0.25	3.25	7.50	**0.82**	DI-3C	6
2	5925	5925	0.76	3.00	0.25	3.25	7.50	**0.78**	DI-3C	6
3	5575	5575	0.85	1.00	0.83	1.83	8.00	**0.88**	DI-3B	6
4	25875	25875	0.53	7.50	0.75	8.25	6.25	**1.98**	DI-3B	10
5	7075	7075	0.85	1.00	0.54	1.54	8.10	**1.13**	DI-3B	6
6	61300	36536	0.5	8.40	0.40	8.80	6.20	**2.62**	DI-3B	10
7	6200	6200	0.79	3.75	0.20	3.95	7.20	**0.82**	DI-3B	4
8	26400	26400	0.61	9.50	0.15	9.65	6.00	**2.24**	DI-3B	6
9	4350	4350	0.85	1.00	0.26	1.26	8.20	**0.70**	DI-3B	6
10	72500	55940	0.51	13.75	0.01	13.76	5.30	**3.50**	DI-3C	10
11	5700	5700	0.83	2.00	0.23	2.23	7.80	**0.85**	DI-3C	6
12	20930	20930	0.53	6.80	0.01	6.81	6.60	**1.69**	DI-3B	6
13	4750	4750	0.84	5.50	0.28	5.78	6.86	**0.63**	DI-3B	6
14	23980	23980	0.59	8.75	0.10	8.85	5.30	**1.74**	DI-3C	6
15	10850	10850	0.85	1.00	0.52	1.52	8.10	**1.73**	DI-3C	6
16	26715	26715	0.53	9.75	0.25	10.00	6.00	**1.97**	DI-3B	8
17	4925	4925	0.85	1.00	0.35	1.35	8.20	**0.79**	DI-3B	6
18	38300	38300	0.55	11.00	0.35	11.35	5.80	**2.83**	DI-3B	10
19	26450	26450	0.81	5.50	0.01	5.51	6.85	**3.40**	DI-3B	10
20	88594	64033	0.55	12.60	0.40	13.00	5.30	**4.30**	DI-3B	10
21	2925	2925	0.85	1.00	0.24	1.24	8.25	**0.47**	DI-3B	4
22	23425	23425	0.51	9.60	0.10	9.70	6.00	**1.66**	DI-3B	6

DI #10
(Rev. 9/17/98)

User Name: P.C. NO.26
Project: C:\ACAD\0JOBS\TOPO1.STM

Date: 09-17-98
Time: 09:48:00
Page: 1

STORM SEWER HEC 12 SINGLE INLET REPORT

FLOW RESULTS (cfs)		PONDING WIDTH (ft)	= 6.64
Total Flow to inlet	= 3.50	DEPTH AT CURB (ft)	= 0.24
		EFFICIENCY (%)	
		Curb = 100.00	
Intercepted by current inlet	= 3.50	Grate = *	Total = 100.00
Bypassed by current inlet	= 0.00	Slot = *	

INPUT PARAMETERS:

Inlet Type	= CURB IN SAG	Longitudinal Slope (ft/ft)	= 0.000
Gutter Width (ft)	= 1.625	Pavement Cross Slope (ft/ft)	= 0.021
Inlet n-value	= 0.013	Gutter Cross Slope (ft/ft)	= 0.083
Downstream Inlet Number	= 0	Gutter depression (in)	= 0.00
Curb Throat Type	= Inclined		
Inlet Opening Ht (in)	= 6.00		
Curb Length (ft)	= 10.00		
Curb Weir Coeff.	= 2.300		
Curb Orifice Coeff.	= 0.670		
Incline Angle (deg)	= 45.00		

DI-3C

DI #20
(REV. 9/17/98)

User Name: P.C. NO.26
Project: C:\ACAD\0JOBS\TOPO1.STM

Date: 09-17-98
Time: 10:10:17
Page: 1

STORM SEWER HEC 12 SINGLE INLET REPORT

FLOW RESULTS (cfs)			PONDING WIDTH (ft)	=	7.22
Total Flow to inlet	=	4.30	DEPTH AT CURB (ft)	=	0.25
			EFFICIENCY (%)		
			Curb = 46.40		
Intercepted by current inlet	=	2.00	Grate = *	Total =	46.40
Bypassed by current inlet	=	2.30	Slot = *		

INPUT PARAMETERS:

Inlet Type	= CURB ON GRADE		Longitudinal Slope (ft/ft)	=	0.056
Gutter Width (ft)	=	1.625	Pavement Cross Slope (ft/ft)	=	0.021
Inlet n-value	=	0.013	Gutter Cross Slope (ft/ft)	=	0.083
Downstream Inlet Number	=	0			
Curb Throat Type	= Inclined				
Curb Length (ft)	=	10.00			

DI-3B

DJG INC.
Committed to Excellence
1006 Richmond Rd. • P. O. Box 3505, Williamsburg, VA 23187
(757) 253-0673 • Fax (757) 253-2319 • E-Mail: djginc@visi.net
Norfolk - Virginia Beach Area (757) 874-5015

PROJECT LONGHILL PH. 2
DATE 7/10/98 COMM NO.
CAL DFL CKD PAGE #
TITLE BMP POINTS FOR PH. 2 (REV. PER CO. COMMENTS)

- NATURAL OPEN SPACE CREDIT:

TOTAL SITE = 104.53 AC
OPEN SPACE = 43.60 AC
FUTURE PHASES + 18.84 AC

$$\% = \frac{62.44\,AC}{104.53\,AC} = 59.73\%$$

POINTS = 59.73 x .1 = 5.97 PTS.

- PHASE I AND II BMP CREDIT:

POND A	18.9 AC / 104.53 AC x 9	= 1.63
POND B	11.9 AC / 104.53 AC x 6	= 0.68
POND C	26.8 AC / 104.53 AC x 4	= 1.03
POND E	12.1 AC / 104.53 AC x 9	= 1.04
		4.38

- TOTAL BMP POINTS: 5.97 + 4.38 = **10.35 PTS.**

LONGHILL STATION - PHASE 2
1980150

NATURAL OPEN SPACE
(TO DETERMINE BMP POINTS)

FUTURE PHASES (18.84 AC)

NATURAL OPEN SPACE (43.6 AC)

TOTAL OPEN SPACE = 62.44 AC

GEOTECHNICAL ENGINEERING STUDY REPORT
LONGHILL SUBDIVISION – SECTION III
EARTHEN DAM CERTIFICATION – POND E
JAMES CITY COUNTY, VIRGINIA
FES REPORT NO. 1-83151.042

CLIENT: MR. KEN DODD

PC119
S-47-98

FEB 2003
RECEIVED
ENVIRONMENTAL DIVISION

APPROVED
James City County
Environmental Division
By: Scott Thomas
Date: 3-12-03

Geotechnical Engineering Study Report
Longhill Station Subdivision, Section III
Earthen Dam Certification – Pond E
James City County, Virginia

Prepared for

Atlantic Homes, LLC

Prepared by

Foundation Engineering Science, Inc.

February 17, 2003

FOUNDATION ENGINEERING SCIENCE, INC.

FES

- Drilling Services [Geotechnical & Environmental]
- Geotechnical Engineering [Shallow & Deep Foundations, Retaining Walls & Pavement Design]
- Environmental Management [Phase I & II]
- Construction Inspection Services [Quality Control & Quality Assurance]
- Foundation/Structure & Pavement Distress Evaluations
- Value Engineering During Design & Construction
- Design & Build Segmental Reinforced Retaining Walls [SRRW]

Mr. Ken Dodd
Atlantic Homes, LLC
10 San Jose Drive
Newport News, Virginia 23606

February 17, 2003

Re: Geotechnical Engineering Study Report
Longhill Subdivision - Section III
Earthen Dam Certification – Pond E
James City County, Virginia
FES Report No. 1-83151.042

Dear Mr. Dodd:

Foundation Engineering Science, Inc. (FES) has completed a geotechnical engineering study at the existing project site. This geotechnical engineering study was performed in general accordance with FES Proposal No. NP706.001, dated July 29, 2002, following your written authorization on August 1, 2002 and per your request to delay field testing due to limited access to the site and your verbal authorization on August 6, 2002 to re-initiate the field testing. Additionally, the geotechnical engineering study report was delayed due to the unavailability of the approved plans and as built plans from DJG, Inc. as we discussed few times on the phone with you. The geotechnical engineering study consisted of performing two (2) Standard Penetration Test (SPT) borings to an approximate depth of twenty (20) feet below the existing grades, obtained one (1) bulk soil sample for laboratory testing, performed one (1) hand auger boring to six (6) feet in depth, performed one (1) field permeability test and performed compaction density tests on the final grade for the existing Earthen Dam.

Briefly, the results of our analyses indicated that there was silty sand (SM) within the borings performed.

The side slopes of the earthen dam appear to be three (3) horizontal to one (1) vertical [3H:1V] and two (2) horizontal to one (1) vertical [2H:1V] as shown in the as built plans. The global stability indicated that the down stream slopes will not be breached during a flooded condition, based on a factor of safety of greater than one (1) for a draw down analysis.

FES did not inspect the earthen dam during construction. Additionally, the existing subgrade in the earthen dam area and the key trench were not evaluated prior to placement of the fill materials. The concrete cradle was not inspected.

11843-B CANON BOULEVARD ► NEWPORT NEWS, VIRGINIA 23606 ► PHONE: 757-873-4113 FAX: 757-873-4114

FES appreciates the opportunity to be of service to the **Atlantic Homes, LLC** on this important project and looks forward to its approval. If we can be of any further assistance or you have any questions regarding this report, please do not hesitate to contact the undersigned.

Respectfully submitted,

FOUNDATION ENGINEERING SCIENCE, INC.

Idres Hawarry
Project Engineer

2/21/03
Raja S. El-Awar, P.E.
Principal Engineer
VA Reg. No. 26383

Attachments: *Appendix*

Figure- 1 USDA Soil Survey Map
Figure- 2 USGS Quadrangle Map
Figure- 3 Permeability and Borings Location Sketch
Figure- 4 Compaction Density Test Locations
Borings Profile Sheets
Laboratory Testing Program Results

X Copies: *(1) James City County – Environmental Division, Mr. Scott Thomas, P.E.*

C:\company\Old File\1998\cmt\1-83151.042

COMMONWEALTH OF VIRGINIA
RAJA S. ELAWAR
No. 026383
PROFESSIONAL ENGINEER

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1.0 INTRODUCTION

1.1 Site Characteristics and Project Information

The project site is located in James City County, Virginia. Specifically, the project site is located within the Longhill Station Subdivision, Section III approximately three hundred (300) feet from Allegheny Drive. The site currently contains one (1) existing Earthen Dam and is identified in the project plans as Pond E.

Our review of the project plans and specifications prepared by DJG, Inc., dated May 26, 1995 and revised dated February 20, 1996 indicated that the dimension for the earthen dam are approximately 200 feet in length and ranges approximately from 50 to 75 feet in plan width [toe to toe]. The side slopes are three (3) horizontal to one (1) vertical [3H:1V] and two (2) horizontal to one (1) vertical [2H:1V], the plans did not show the design high water elevation in Pond E.

2.0 PURPOSE AND SCOPE OF SERVICES

The purpose of this study was to obtain information on the soils located within the Earthen Dam and degree of compaction of the soils placed for the existing Earthen Dam. The existing materials encountered were then evaluated with respect to the available project information and site characteristics. In this regard, the following items were formulated:

1. Development of shallow and deep subsurface soil and ground water conditions at the existing Earthen Dam area.

2. Performed compaction density testing on the final grade and approximately one (1) to two (2) feet below the final grade to develop correlation between the Standard Penetration Test (SPT) boring N-values and relative compaction.

3. General location and description of potentially deleterious materials encountered in the borings performed, including existing fills or surficial organic.

4. Certify the existing Earthen Dam in general accordance with the plans and specifications. If the existing Earthen Dam does not meet the approved project plans and specifications and James City County requirements, FES will provide parameters required for improving and/or replacing the existing Earthen Dam.

The following services were provided in order to achieve the preceding objectives:

1. Reviewed readily available published geologic and topographic information. This published information was obtained from quadrangle maps published by the United States Geologic Survey (USGS) and Soil Survey published by the United States Department of Agriculture (USDA) Soil Conservation Service (SCS), if available.

2. FES executed a program of subsurface exploration that consisted of subsurface sampling, filed and laboratory testing.

3. Performed one (1) hand auger boring to six (6) feet in depth and obtained one (1) bulk soil sample for laboratory testing and analyses. The bulk sample was collected from the existing materials placed for the existing Earthen Dam area. FES performed one (1) field permeability test within the existing Earthen Dam fill materials.

4. Visually classified and stratified representative soil samples in the laboratory using the Unified Soil Classification System (USCS)), in general accordance with ASTM D-2487 and D-2488. Conducted a laboratory program, that consisted of performing natural moisture content [ASTM D-2216], Atterberg Limits [ASTM D-4318], grain size determination [(-#200) ASTM D-1140] and moisture-density relationships [Standard Proctor, ASTM D-698] tests.

5. Collected ground water level measurements in the borings performed.

6. The results of the field exploration and laboratory testing program were utilized in performing engineering evaluation, analysis and in the formulation of suitability and stability of the existing Earthen Dam. The results of the field exploration, laboratory testing program, conclusions and recommendations are presented in a comprehensive geotechnical engineering study report prepared by an **FES** experienced Professional Engineer registered in the Commonwealth of Virginia.

2.1 Report Format

This report begins with a discussion of the field and laboratory programs followed by a description of the general subsurface conditions, field permeability testing, compaction density testing, suitability of the existing materials within the existing Earthen Dam and report limitations. The USDA soil survey, USGS quadrangle map, the borings and sample location and compaction density test location sketches are presented in Figures 1, 2, 3 and 4, respectively in the Appendix of this report. Additionally, the boring profile sheets and laboratory test figure are also presented in the Appendix of this report.

3.0 FIELD EXPLORATION

3.1 General

A total of two (2) Standard Penetration Test (SPT) borings were drilled within the existing Earthen Dam area to explore the general soil types. The SPT borings were drilled to an approximate depth of twenty (20) feet below the existing top of the Earthen Dam grades. The approximate location of the borings is illustrated in Figure 3. Performed one (1) hand auger boring, one (1) field permeability test and obtained one (1) bulk soil sample for the laboratory testing program.

3.2 SPT Borings

The SPT borings were performed with the use of an All Terrain Vehicle (ATV) mounted drill rig by utilizing hollow steam auger (HSA) procedures. The soil sampling was performed in general accordance with the American Society of Testing and Materials (ASTM) Test Designation D-1586. These samples were taken continuously from the final grade to an approximate depth of twenty (20) feet below the final/existing grade elevations. Representative portions of these soil samples were collected, labeled and transported to our office for laboratory testing, analysis and classification.

3.3 Bulk Soil Sampling

One (1) bulk soil sample was obtained in the field from the existing materials placed for the Earthen Dam at approximate depths ranging from one (1) to two (2) feet below the existing subgrade elevations. The location of the bulk soil sample is shown in Figure 3 in the Appendix of this report.

3.4 Auger Boring

The auger boring was performed with the use of a three (3) inch bucket auger, the soil sampling was performed in general accordance with American Society for Testing and Materials (ASTM) test designation D-1452, titled "Soil Investigation and Sampling by Auger Borings". The soil samples were obtained virtually continuously from the ground surface to boring termination an approximate depth of six (6) feet below the final grades. Representative portions of these soil samples were collected, labeled and transported to our office for laboratory testing, analysis and classification.

3.5 Field Permeability

One (1) field permeability test [open-hole, falling head method] were performed by installing a two (2) inch inside diameter PVC pipe (ground water observation well) with flush joints to an approximate depth of six (6) feet below the existing grades. The permeability testing equipment consisted of a PVC pipe with a close-ended section and a twenty-four (24) inch screen (using a 0.01-inch slot size opening) from four (4) to six (6) feet below the existing grades. Coarse sand (#2) was backfilled to six (6) inches above the screened annual space of the well, followed by a six (6) inch bentonite seal placed over the sand. The purpose of this construction method was to restrict upward (test) water flow between the well hole and the outside wall of the augered hole.

The wells were developed by pumping water into them and allowing them to soak for a period of one (1) hour. Following a soaking period of one (1) hour, water was added until it reached the top of the well casing and allowed to fall a known distance over a measured time. This procedure was repeated a minimum of three (3) times or until time deviation between the tests was less than ten (10) percent.

The collected field data was utilized in the equation found in the "Stormwater Retention Pond Infiltration Analyses in Unconfined Aquifers" for determining the coefficient of permeability of the subject soil stratum. The infiltration rates calculated are presented in tabular format below:

TEST LOCATION	PB-1
PERMEABILITY (In/hr)	6.22

4.0 LABORATORY TESTING

4.1 General

The soil samples were transported to our laboratory and were classified by an experienced Project Engineer using the Unified Soil Classification System (USCS) in general accordance with ASTM test designations D-2487 and D-2488.

4.2 Tests Performed

Representative soil samples were subjected to a laboratory program. The laboratory program consisted of performing natural moisture content [ASTM D-2216], grain size determination [(-#200) ASTM D-1140] and moisture-density relation ship [Standard Proctor ASTM D-698] tests. The laboratory test results are presented in tabular formats below and in the Appendix of this report.

LABORATORY TEST	ASTM PROCEDURE	NO. OF TESTS
Moisture Content Determination	ASTM D-2216	5
Grain-Size Determination (-#200 Sieve)	ASTM D-1140	5
Atterberg Limits (Liquid and Plastic)	ASTM D-4318	0
Moisture-Density Relationship (Std. Proctor)	ASTM D-698	1

4.3 Test Results

LOCATION	APPROX. SAMPLE DEPTH (Feet)	NATURAL MOIST. CONTENT (%)	#200 SIEVE (%)	ATTERBERG LIMITS		USCS	OPT. MOIST. CONTENT (%)	MAX. DRY DENSITY (pcf)	CBR VALUE (%)
				LL (%)	PI (%)				
Proctor-3	1.5	6.7	36.9	---	NP	SM	11.0	122.0	---
FES-5	3	10.8	31.1	---	NP	SM	---	---	---
FES-5	5	14.0	21.4	---	NP	SM	---	---	---
FES-6	3	5.9	28.3	---	NP	SM	---	---	---
FES-6	5	15.7	24.7	---	NP	SM	---	---	---

5.0 GENERALIZED SUBSURFACE CONDITIONS

5.1 USGS Topographic Survey

The topographic survey map published by the United States Geological Survey titled "Williamsburg, Virginia" dated 1984, was reviewed for ground surface at the existing project location. Based on this review, the natural ground surface elevation approximately sixty (60) to seventy (70) feet National Geodetic Vertical Datum (NGVD) of 1929. The USGS topographic map for the project vicinity is presented in Figure 1 in the Appendix of this report.

5.2 USDA Soil Survey

The "James City County, Virginia" Soil Survey, developed by the United States Department of Agriculture (USDA) Soil Conservation Service (SCS), was reviewed for general near-surface soil information within the general site vicinity. This information indicated that there are three (3) primary mapping units (11C and 15E) within the proposed site area. The USDA Soil Conservation Service (SCS) Survey map for the project vicinity is presented in Figure 2 in the Appendix of this report. The map soil units encountered are as follows:

SOIL SERIES	DEPTH (IN.)	SOIL DESCRIPTION	USCS	USDA SEASONAL HIGH GROUNDWATER TABLE (%)		K [2] (IN/HR)	SHRINK/ SWELL POTENTIAL
				DEPTH (FEET)	MON.		
Craven (11C)	0 – 9	Fine sandy loam	ML, CL-ML,	2.0 – 3.0	Dec –Apr	0.6 – 2.0	Low
	9 – 30	Clay, silty clay, silty clay, loam	SM, SM-SC CH			0.06 – 0.2	Moderate
	30 – 72	Sandy clay loam, sandy loam, fine, sandy loam	SM, SM-SC, SC			0.2 – 6.0	Low
Emporia (15E)	0 – 9	Fine sandy loam	CL, SC, SM, ML	3.0 – 4.5	Nov – Apr	2.0 – 6.0	Low
	9 – 37	Sandy clay loam, Sandy loam, Clay loam	SC, CL			0.2 – 2	Low
	37 – 50	Sandy clay loam, Clay loam, Sandy clay	SC, CL			0.06 – 0.6	Moderate
	50 – 75	Stratified sandy loam to clay loam	SM, SC, ML, CL			0.06 – 2.0	Moderate

[1] USCS = Unified Soil Classification System
[2] K = Permeability

5.3 General

Soil stratification was based on visual examination of the recovered soil samples, laboratory testing and interpretation of the field boring log by an FES experienced Project Engineer. The boring stratification lines represent the approximate boundaries between soil types of significantly different engineering properties; however, the actual transition may be gradual. In some cases, small variations in properties not considered pertinent to our engineering evaluation may have been abbreviated or omitted for clarity. The boring profiles present the conditions at the particular boring location and variations do occur among the borings and between soil samples.

5.4 Subsurface Soil Conditions

The subsurface soils encountered at each structure location have been summarized and are presented in tabular format below:

BORING LOCATION	SOIL LAYER	SOIL DESCRIPTION	DEPTH RANGE (FEET)	AVARAGE SPT "N" VALUES (BPF)	AASHTO SYMBOL
FES-5	1	Reddish brown, dry to moist, silty SAND with roots "Topsoil"	0 – 0.5	---	SM
	2	Reddish brown, moist, **silty SAND** with fine to coarse gravel	0.5 – 2	11	SM
	3	Dark gray to black to tan, moist, **silty SAND** with roots and organic matter from 2 to 10 feet	2 – 20	10	SM
Ground Water Conditions: The ground water table was not encountered in the borings performed on August 9, 2002.					

BORING LOCATION	SOIL LAYER	SOIL DESCRIPTION	DEPTH RANGE (FEET)	AVARAGE SPT "N" VALUES (BPF)	AASHTO SYMBOL
FES-6	1	Brown, dry to moist, silty SAND with roots "Topsoil"	0 – 0.5	---	SM
	2	Brown to dark gray to tan, moist, silty SAND with organic matter from 2 to 6 feet	0.5 – 20	10	SM
AB-3	1	Brown, dry to moist, silty SAND with roots "Topsoil"	0 – 0.5	---	SM
	2	Brown to tan, moist, silty SAND with organic matter from 2 to 6 feet	0.5 – 6	---	SM
Ground Water Conditions: The ground water table was not encountered in the borings performed on August 9, 2002.					

Based on our extensive experience with similar soil types, it is expected that the majority of the subsurface soils encountered within the borings performed, will consist of cohesion less soils. Please refer to the soil boring profiles located in the Appendix of this report for specific information at each boring location.

5.5 Ground Water Conditions

The ground water table was not encountered in the SPT borings performed during the field exploration program on August 9, 2002. Ground water levels tend to fluctuate in response to variations in seasonal rainfall, infiltration, site topography and drainage. Based on the soil conditions encountered and the USGS Topographic Map, FES estimates the seasonal normal high ground water level to be encountered at an approximate depth of three (3) feet below the existing grades. However, a "perched" ground water condition, which dissipates with time may be encountered within the top three (3) feet following periods of significant rainfall during and immediately following the wet season.

6.0 EARTHEN DAM SOIL SUITABILITY AND STABILITY

6.1 Soil Suitability

The silty sand (SM) soils are marginal material for the core of the Earthen Dam. Additionally, all the soils are suitable as fill material for the Earthen Dam embankment [outer shell].

6.2 Stability

FES representative performed slope stability analyses by a two-dimensional limit equilibrium method using the computer program PCSTABL6. This program was developed at Purdue University under sponsorship of the Federal Highway Administration (FHWA). The program uses the method of slices to determine the safety factor against deep seated circular failure. Using a 3H:1V and 2H:1V side slopes, we evaluated the stability against slope failure at the highest embankment of eight (8) feet. The soil parameters were developed from the SPT borings performed for the existing Earthen Dam. Input data for the subsurface soils were obtained using general correlations from laboratory test data and Standard Penetration Test N-values.

The global stability safety factors for the Earthen Dam and the draw down analysis were computed to be 1.5 and 1.2, respectively [the required design factors of safety for the assumed design embankment and draw down should be 1.25 and 1.0, respectively]. The computed factors of safety for the assumed highest embankment met the required factors of safety.

7.0 COMPACTION DENSITY TESTING

Foundation Engineering Science, Inc. (FES) performed compaction density testing on the final subgrade material for the existing Earthen Dam. These tests were performed in general accordance with the American Society for Testing and Materials (ASTM) Test Designation D-2922, titled "Compaction Density Testing with Portable Nuclear Gauge". The results of the compaction density tests are tabulated below:

FIELD COMPACTION DENSITY REPORT[1]

Gauge #	26814	Model #	3430	Density Std. Ct.	2516	Moisture Std. Ct.	633	FES REP.:	CD

Proctor	Dry Density[2] (pcf)	Opt. Moist. (%)	Passing #200[3] (%)	Material Description & Classification[4]	Source	Compaction Requirement
4	122.0	11.0	36.9	Reddish brown silty SAND (SM)	On-site	Moderate effort

TEST NO.	DEPTH (inches)	ELEVATION (feet)	PROC. NO.	D.D. (PCF)	MOIST (%)	W.D. (PCF)	% COMP	PASS	FAIL	
1	12	Final Subgrade	4	115.7	7.6	122.7	95.0	X		Low Moisture
2	12	Final Subgrade	4	118.9	5.7	125.7	97.4	X		Low moisture
3	12	Final Subgrade	4	117.9	5.9	124.9	96.6	X		Low moisture

TEST NO.	TEST LOCATION
1	Site No. 1, See Attached Figure 4
2	Site No. 2, See Attached Figure 4
3	Site No. 3, See Attached Figure 4

SPEC. REQUIREMENTS	Utility Trench	Sidewalk	Structure	Roadway/Parking	Earthen Dam
COMPACTION (%)					95.0
MOISTURE (%)					O.M. ± 2
Comments					

Compaction density testing was performed in general accordance with [1]ASTM D2922, [2]ASTM D698, [3]ASTM D1140, [4]ASTM D2488

A correlation between the SPT N-values and the relative density was developed based on the laboratory test data shown above. The relative density of the subsurface soils within the upper ten (10) feet of the Earthen Dam indicates that the compaction is approximately

CORRELATION BETWEEN SPT N-VALUES & RELATIVE DENSITY				
TEST LOCATION	N-VALUE (BPF)	WET DENSITY (PCF)	RELATIVE COMPACTION (%)	REMARKS
1	11	122.7	95.0	**Pass**
2	10	125.7	97.4	**Pass**
3	10	124.9	96.6	**Pass**

8.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the results of the subsurface exploration and laboratory testing programs, our site observations, engineering judgment, review of the plans and specifications, the following conclusions and recommendations are presented.

1. Compaction density testing was performed on the final/existing grade elevations. The subgrade soils were compacted to 95.0 percent of the laboratory maximum dry density in general accordance with ASTM D-698 [Standard Proctor] and to an approximate depth of twelve (12) inches. Based on the limited tests performed, **the fill material within the final grade of the earthen dam placed appears to meet the intent of the project plans and specifications. Additionally, the fill material placed within the earthen dam embankment appears to have been compacted to a minimum relative density on the order of 90.0 percent of the laboratory maximum dry density. A minimum relative compaction of 90.0 percent is sufficient for similar projects.**

2. The existing soils encountered within the earthen dam are silty sand (SM) soils. The silty **sand (SM) soils are marginal as fill materials for the core of the dam and acceptable for the outer shells of the earthen dam (embankment).**

3. The side slopes of the earthen dam appears to be three (3) horizontal to one (1) vertical [3H:1V] and two (2) horizontal to one (1) vertical [2H:1V] as shown in the as built plans.

4. The global stability indicated that the down stream slopes will be stable during a flooded condition, based on a factor of safety of 1.1 which is greater than 1.0 for a draw down analysis.

5. Inspection was not performed during construction of the earthen dam. However, the earthen dam was excavated to below the natural existing grades.

6. Considering that a core was not constructed and the material encountered within the Earthen Dam consisted of silty sand (SM), the storm water management area of the dam may not be impounded due to the presence of silty sand (SM) within the embankment and core.

7. During extended and heavy rain fall events, the water within the Earthen Dam will rise but may not rise enough to seep through the over flow structure, thus seeping through the embankment of the Earthen Dam. However, above design storm events may occur thus overflowing above the embankment of the Earthen Dam.

9.0 REPORT LIMITATIONS

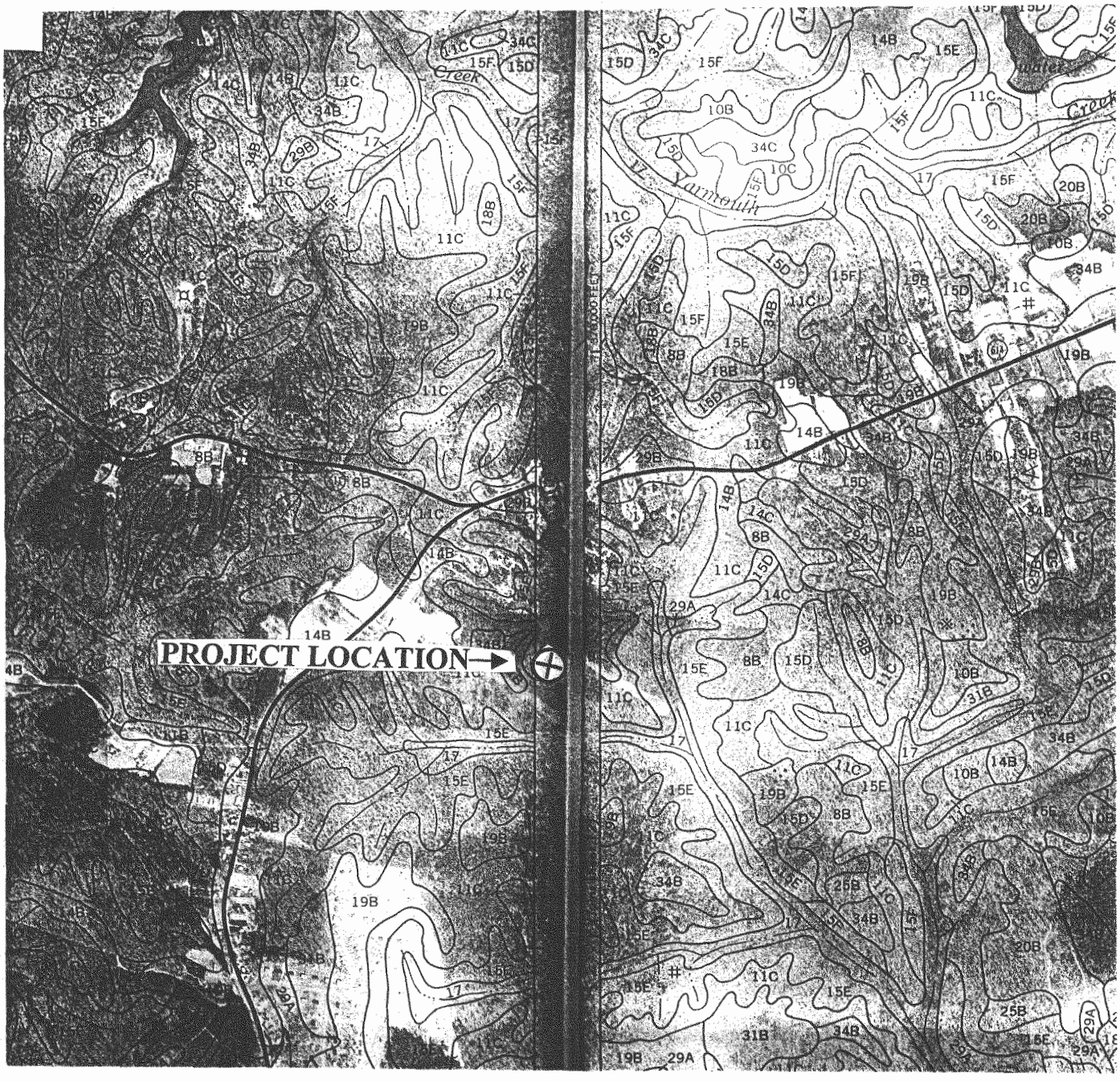
The engineering evaluation and analysis have been developed on the basis of the previously described project characteristics and subsurface conditions. These engineering evaluation and analysis were developed from the information obtained in the test borings, which depict subsurface conditions only at these specific locations and at the particular time designated on the boring profiles. Soil conditions at other locations may differ from conditions occurring at these boring locations. In addition, the passage of time may result in a change to the soil conditions at these boring locations.

Our professional services have been performed, our findings obtained, and our engineering evaluation and analysis prepared in accordance with generally accepted Geotechnical Engineering Principles and Practices. Foundation Engineering Science, Inc. is not responsible for the conclusions, opinions or recommendations made by others based on this geotechnical engineering study report.

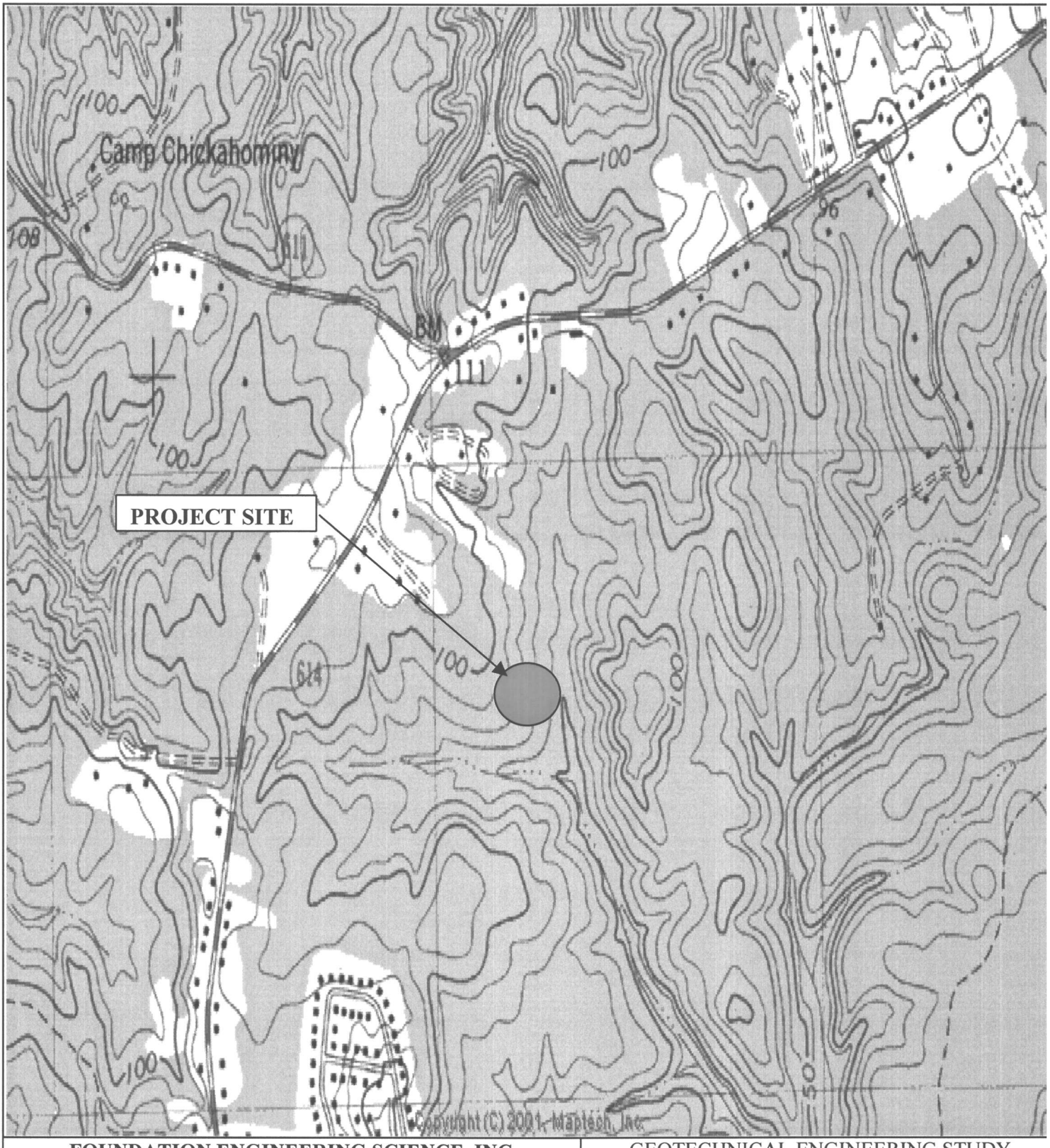
APPENDIX

FIGURES

Figure 1 – USDA Soil Survey Map
Figure 2 - USGS Quadrangle Map
Figure 3 – Boring & Sample Location Sketch
Figure 4 – Compaction Density Test Location Sketch



FOUNDATION ENGINEERING SCIENCE, INC. GEOTECHNICAL, ENVIRONMENTAL & CONSTRUCTION INSPECTION 11843-B CANON BOULEVARD NEWPORT NEWS, VIRGINIA 23606 PHONE: 757-873-4113 FAX: 757-873-4114 EMAIL: RELAWAR@FESVA.COM			GEOTECHNICAL ENGINEERING STUDY **LONGHILL SUBDIVISION, SECTION III** **EARTHEN DAM CERTIFICATON – POND E** JAMES CITY COUNTY, VIRGINIA
DATE: **AUGUST 9, 2002**	SCALE: **N/A**	FES REPORT NO. **1-83151.042**	**FIGURE – 1** **USDA SOIL SURVEY MAP**



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GEOTECHNICAL, ENVIRONMENTAL & CONSTRUCTION INSPECTION

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GEOTECHNICAL ENGINEERING STUDY

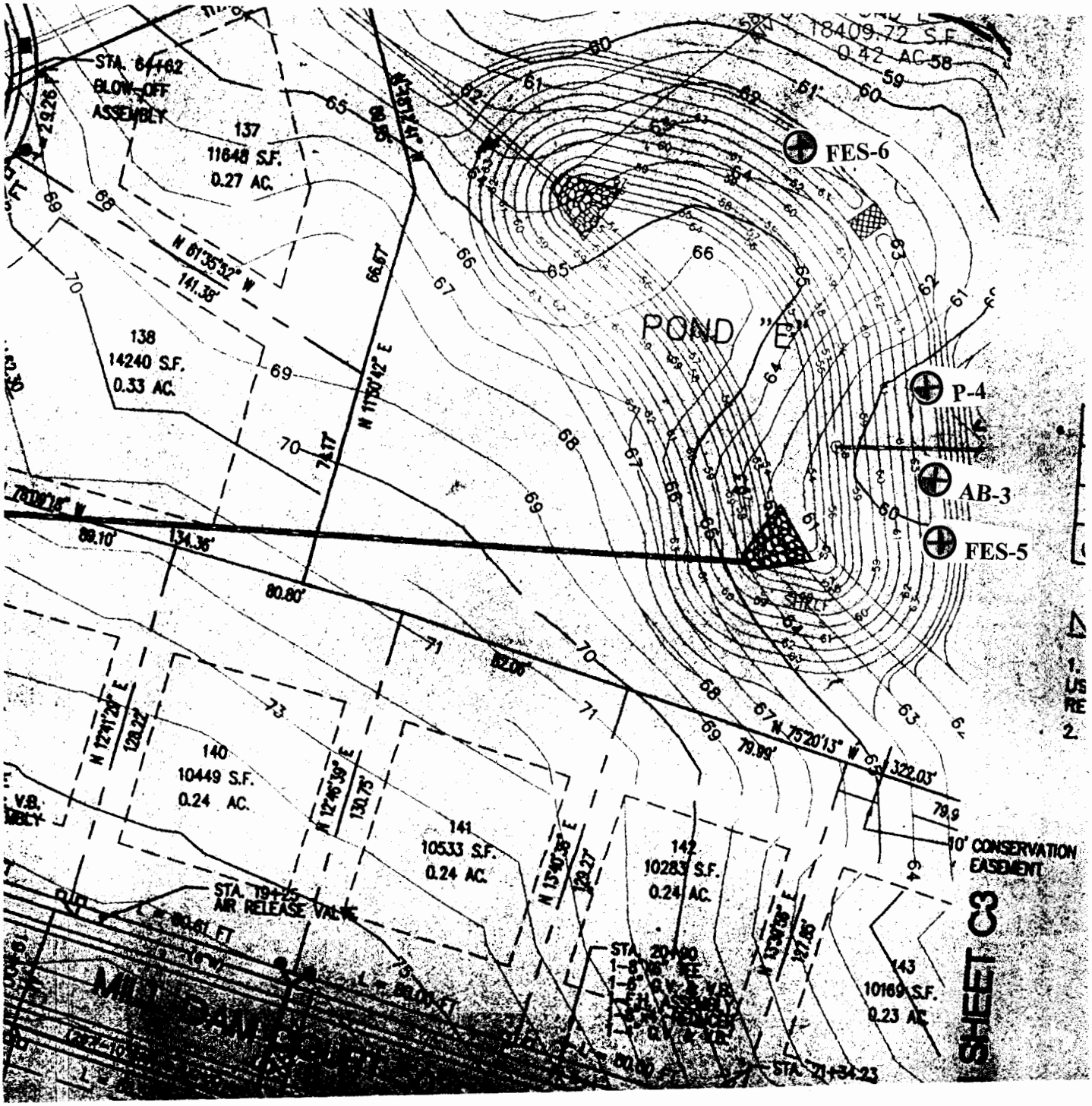
LONGHILL SUBDIVISION, SECTION III
EARTHEN DAM CERTIFICATON-POND E

JAMES CITY COUNTY, VIRGINIA

DATE:	SCALE:	FES REPORT NO.
AUGUST 9, 2002	**N/A**	**1-83151.042**

FIGURE – 2

USGS QUADRANGLE MAP



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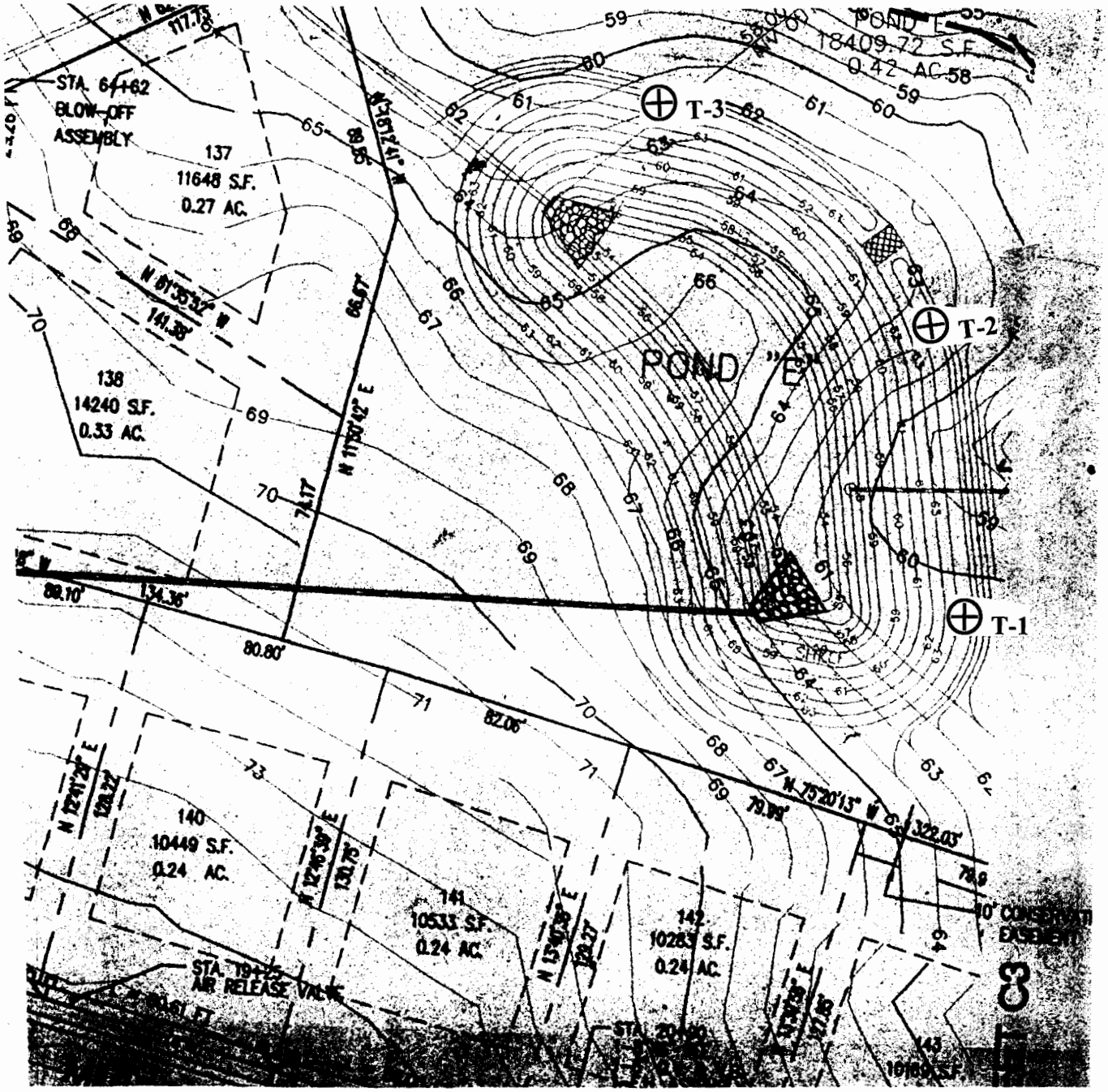
DATE: **AUGUST 9, 2002**	SCALE: **N/A**	FES REPORT NO. **1-83151.042**	**FIGURE – 3** **PERMEABILITY, BORING AND SAMPLE LOCTIONS SKETCH**



FOUNDATION ENGINEERING SCIENCE, INC. GEOTECHNICAL, ENVIRONMENTAL & CONSTRUCTION INSPECTION 11843-B CANON BOULEVARD NEWPORT NEWS, VIRGINIA 23606 PHONE: 757-873-4113 FAX: 757-873-4114 EMAIL: RELAWAR@FESVA.COM			GEOTECHNICAL ENGINEERING STUDY **LONGHILL SUBDIVISION, SECTION III** **EARTHEN DAM CERTIFICATON – POND E** JAMES CITY COUNTY, VIRGINIA
DATE: **AUGUST 9, 2002**	SCALE: **N/A**	FES REPORT NO. **1-83151.042**	**FIGURE – 4** **FIELD COMPACTION DENSITY LOCATION SKETCH**

BORINGS PROFILE SHEETS

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Newport News, Virginia 23606
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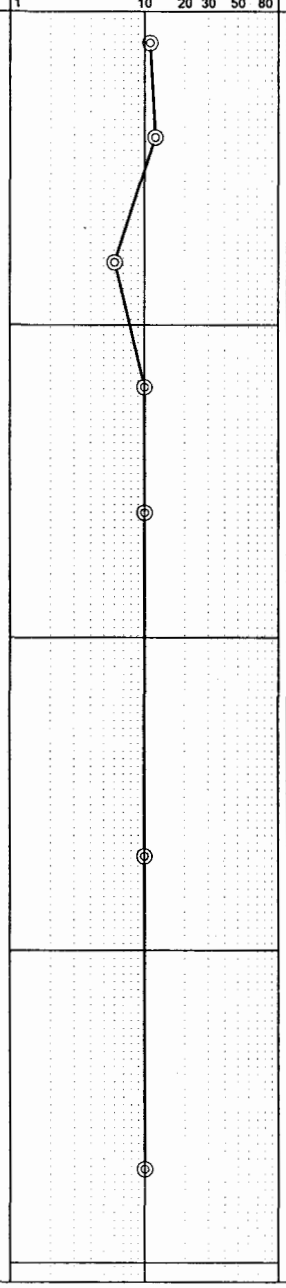
Email:relawar@fesva.com

PROJECT NAME:	Longhill Station, Pond E	PROJECT NO.:	1-83151
CLIENT:	Atlantic Homes, LLC.	DRILLING METHOD:	HSA
PROJECT LOCATION:	James City County, Virginia	OBSERVED G.W.T.:	Not Encountered
BORING LOCATION:	See Figure 3	STATION NO.:	

ELEVATION (Feet)	DEPTH (Feet)	SOIL LEGEND & SAMPLE TYPES	SAMPLE NO.	SOIL CLASSIFICATION	MATERIAL DESCRIPTION	SPT, N VALUE OR RQD %	STANDARD PENETRATION TEST N-VALUE (Blows/Ft)	HOLE COMPLETION & REMARKS
	0			SM	Reddish brown, dry to moist, silty SAND with roots "Topsoil"			
			1	SM	Reddish brown to dark gray to black to tan, moist, silty SAND with roots, gravel and organic matter from 2 to 10 feet	11		
			2			12		
			3			6		
	5							
			4			10		
			5			10		
	10							
			6			10		
	15							
			7			10		
	20							



COMPLETION DEPTH:	20.0 feet
DATE BORING STARTED:	8/9/02
DATE BORING COMPLETED:	8/9/02
ENGINEER/GEOLOGIST:	IH
DRILLING CONTRACTOR:	FES

Sample Types:
- Auger Cutting
- Vane Shear
- SPT
- UD
- Penetrometer
- Rock Core

Remarks:

Unless otherwise noted, water encountered but not recorded.

The stratification lines represent approximate boundaries. The transition may be gradual.

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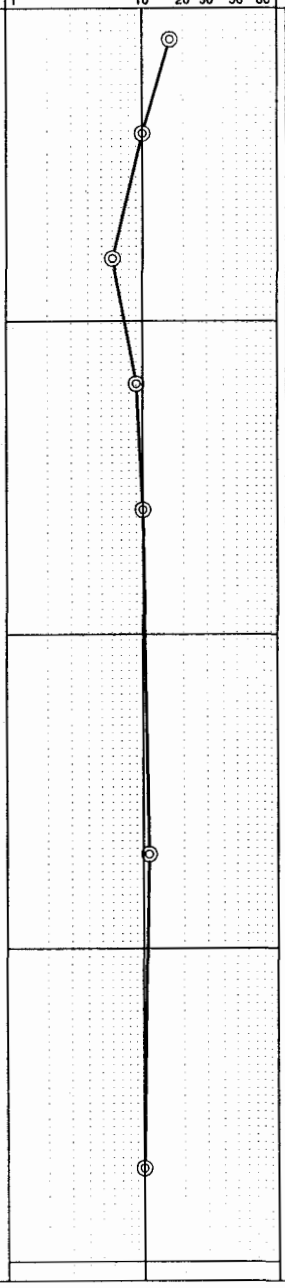
Email:relawar@fesva.com

PROJECT NAME:	Longhill Station, Pond E	PROJECT NO.:	1-83151
CLIENT:	Atlantic Homes, LLC.	DRILLING METHOD:	HSA
PROJECT LOCATION:	James City County, Virginia	OBSERVED G.W.T.:	Not Encountered
BORING LOCATION:	See Figure 3	STATION NO.:	

ELEVATION (Feet)	DEPTH (Feet)	SOIL LEGEND & SAMPLE TYPES	SAMPLE NO.	SOIL CLASSIFICATION	MATERIAL DESCRIPTION	SPT, N VALUE OR RQD %	STANDARD PENETRATION TEST N-VALUE (Blows/Ft)	HOLE COMPLETION & REMARKS
	0			SM	Brown, dry to moist, silty SAND with roots "Topsoil"			
			1	SM	Brown to dark gray to tan, moist, silty SAND with organic matter from 2 to 6 feet	16		
			2			10		
			3			6		
	5		4			9		
			5			10		
	10							
			6			11		
	15							
			7			10		
	20							



COMPLETION DEPTH:	20.0 feet
DATE BORING STARTED:	8/9/02
DATE BORING COMPLETED:	8/9/02
ENGINEER/GEOLOGIST:	IH
DRILLING CONTRACTOR:	FES

Sample Types:
Auger Cutting
Vane Shear
SPT
UD
Penetrometer
Rock Core

Remarks:

Unless otherwise noted, water encountered but not recorded.

The stratification lines represent approximate boundaries. The transition may be gradual.

FES

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· Environmental Management
· Construction Materials Testing

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Email:relawar@fesva.com

AB-3

PROJECT NAME:	Longhill Station, Pond E	PROJECT NO.:	1-83151
CLIENT:	Atlantic Homes, LLC.	DRILLING METHOD:	Han Auger
PROJECT LOCATION:	James City County, Virginia	OBSERVED G.W.T.:	Not Encountered
BORING LOCATION:	See Figure 3	STATION NO.:	

ELEVATION (Feet)	DEPTH (Feet)	SOIL LEGEND & SAMPLE TYPES	SAMPLE NO.	SOIL CLASSIFICATION	MATERIAL DESCRIPTION	SPT, N VALUE OR RQD %	STANDARD PENETRATION TEST N-VALUE ◎ (Blows/Ft) 1 10 20 30 50 80	HOLE COMPLETION & REMARKS
	0			SM	Brown, dry to moist, silty SAND with roots "Topsoil"			
				SM	Brown to tan, moist, silty SAND with organic matter from 2 to 6 feet			
	5							

COMPLETION DEPTH:	6.0 feet
DATE BORING STARTED:	8/9/02
DATE BORING COMPLETED:	8/9/02
ENGINEER/GEOLOGIST:	IH
DRILLING CONTRACTOR:	FES

Sample Types:

- Auger Cutting
- Vane Shear
- SPT
- UD
- Penetrometer
- Rock Core

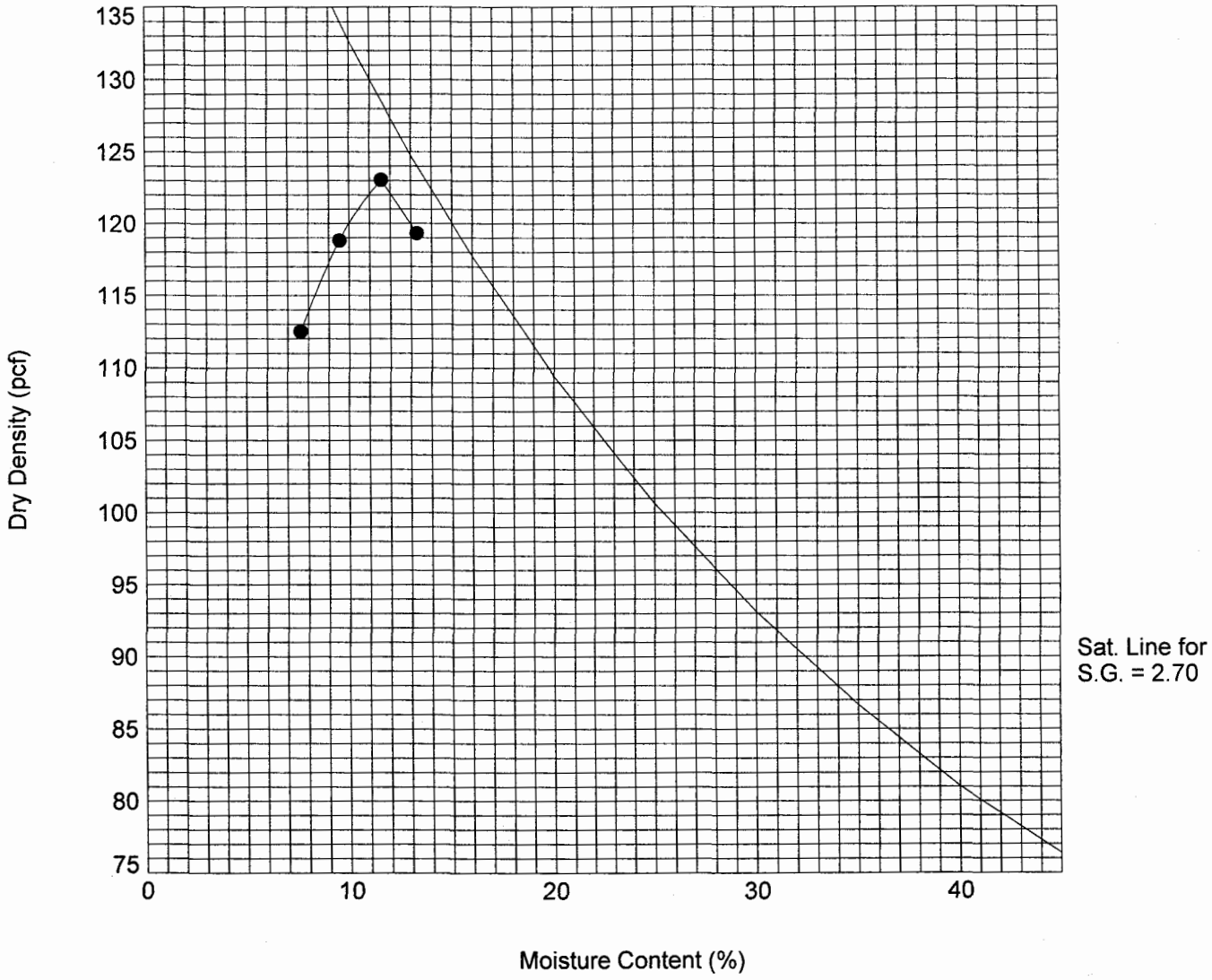
Remarks:

Unless otherwise noted, water encountered but not recorded

The stratification lines represent approximate boundaries. The transition may be gradual.

LABORATORY TEST RESULTS

MOISTURE-DENSITY RELATIONS REPORT



Boring/ Depth	Classification		Nat'l Moist.	S.G.	LL	PI	% > No. 4	% < No. 200
	USCS	AASHTO						
4 1.5	SM	A-2-4	6.7	2.70		NP	0	36.9

Test Results	Material Description
Optimum Moisture Content = 11.0 Maximum Dry Density = 122.0	Reddish brown silty SAND
Project No.: 1-83151 Project Name: Longhill Station, Pond E Location: See attached sketch, Figure 1 Date: 9/8/02	Remarks: On August 8, 2002 an FES Inc. representative obtained a bulk soil sample from the in-place Pond E. Procedure: ASTM D-698, Method A Rammer: Manual Preparation: Dry

FOUNDATION ENGINEERING SCIENCE, INC.

Figure 5

PROCTOR 1-83151.GPJ FES.GDT 2/19/03

AB FILE
Porio E

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 6, 2002

Ken Dodd
Atlantic Homes Development
Harbour Centre
2 Eaton Street, Suite 1101
Hampton, Va. 23669

Re: Longhill Station Section 2
County Plan S-47-98
Stormwater Management Facility - Pond E
County BMP ID Code: PC 119

Dear Mr. Dodd:

The Environmental Division has reviewed a record drawing as submitted to our office in May of 2001for the above referenced project. The record drawing provides as-built information for a wet pond facility known as Pond E located southeast of the intersection of Shenandoah and Allegheny.

Based on our review of information as submitted and a concurrent field observation as performed on January 30th 2002, the following items must be addressed prior to release of the developer's surety instrument for the stormwater management/BMP facility:

Construction Certification:

1. In accordance with the Note # 18 on Sheet C5 (6 of 9) of the approved plan, construction certification for the stormwater management/BMP facility is required. None was provided. This is especially important since the facility has an engineered and compacted earthen embankment along it's east side. The certification can be in letter format or by use of the certification statements in Section 4 of the JCC, Stormwater Management/BMP Facilities, Record Drawing and Construction Certification, Standard Forms & Instructions.

Record Drawing:

2. Along with the record drawing set, submit completed record drawing and construction certification forms, Sections 1 through 5, and applicable record drawing checklists from the James City County, Stormwater Management/BMP Facilities, Record Drawing and Construction Certification, Standard Forms & Instructions (packet). The Environmental Division began use of the forms and checklist in this packet effective February 1st 2001.

3. Show additional top of dam spot elevations or contours to show whether or not constructed height of dam reached El. 64.0 per the approved plan. Spot elevations at sufficient intervals were not provided and top of bank delineations are not labeled for contour elevation. Based on the plan provided, it appears top of dam elevation was not reached in an area just north of where the barrel goes through the dam embankment.

4. Provide additional spot elevation, contour or depth (from normal pool) data to show bottom of pond elevation is in conformance with the approved plan. The approved grading plan and details for the basin show design bottom elevation at or near to El. 54.0.

5. Show the following additional information on the record drawing: crest elevation and dimensions for the emergency spillway; riser crest elevation; riser size and crest elevation; riser material type; invert (bottom) elevation of the riser; upstream invert of the 24-inch barrel; riprap class and dimensions for the barrel's outlet protection; label all as-built graded pond contours; and label Lot 137 (5989 Allegheny).

6. Provide a label for the aquatic bench around the inside perimeter of the basin (El. 59 +/-). The as-built should reflect the general presence of the bench for future maintenance and inspection purposes.

7. The inflow pipe within the 20' easement adjacent to the southwest corner of the basin is 15-inch, not 18-inch RCP as shown on the record drawing.

8. A professional seal and signature is required on the record drawing.

9. If possible add the following County identifiers to the lower right hand corner of the record drawing: County Plan Number S-47-98 and BMP ID Code: PC 119.

Construction-Related Items:

10. Grass along the downstream embankment was 2 to 4 feet in height. Mow grass on the embankment to no less than 4-inch height.

11. Remove silt fence present along the entire downstream toe of embankment.

12. Clean trash, litter and debris from the pond interior sideslope in the northwest corner near the 24-inch inflow pipe and adjacent to the back lot area of Lot 137 (5989 Allegheny).

13. Severe rill and gully erosion was present on the pond interior sideslope in the southwest corner of the basin near the 15-inch inflow pipe. Regrade and repair these areas and stabilize with seed and mulch. Erosion on this slope has also caused migration of sediment into the bottom of the basin at this location. Clean and remove sediment accumulations from the bottom of the basin (in this corner) and from within the 15-inch RCP pipe which inflows into the basin. Sediment was 6 inch deep at the outfall end of the storm drain pipe.

14. Backfill over the 15-inch storm drain pipe (which inflows to the southwest corner of the basin) was very loose and erosive. Repair and place compacted fill above the pipe where it enters the basin. Continued erosion could result in piping failure along the storm drain.

15. Clean and remove sediment accumulations at the outfall end of the 24-inch RCP storm drain pipe which enters the basin at the northwest corner of the pond and restore the outlet protection (riprap) pad. Sediment accumulations was 2 ft. deep at the outfall end of the pipe and covered most of the outlet protection pad.

16. An approximate 60 ft. length of the aquatic bench along the north side of the basin was bare soil. This area needs stabilized with seed and mulch.

17. Clear and remove all vegetation and brush within 10 feet of the riser structure (48-inch concrete standpipe). Flow into the riser shall not be obstructed by vegetation.

18. Conversion of the riser to BMP mode is incomplete. Add the turn down elbow to the 8-inch orifice on the riser structure per the approved plan.

19. Construct the outlet protection (riprap) pad at the outfall end of the 24-inch pipe barrel through the dam. The approved plan called for a 12 ft. long Class A1 riprap pad at the pipe outfall.

Also, as a note, during our field inspection several recreational-type vehicles (4 different motorcycles and a go-cart) were using the top of dam, west pond perimeter (common area) and the north side aquatic bench within the basin as a impromptu motocross track. Obviously, this type of condition may be very difficult to control or solve completely; however, from a safety and stabilization perspective, efforts should be made to the greatest extent possible to limit unauthorized access and use of the BMP facility for such purposes.

Once this work is satisfactorily completed, contact our office appropriately. We can then proceed with final release of the surety on the project. One reproducible and one blue/black line set of the record drawings will be required once the above items are adequately addressed.

Please contact me at 757-253-6639 or the assigned Environmental Division inspector, Gerry Lewis at 757-253-6672 if you have any further comments or questions.

Sincerely,

Scott J. Thomas, P.E.
Civil Engineer
Environmental Division

cc: Ken Jenkins, Rickmond Engineering Inc. (via fax)
Hank Mullins, HB Hankins Inc. (via fax)

G:\SWMProg\AsBuilts\S4798.pc119

DJG, INC.
P.O. Box 3505 1006 Richmond Rd
WILLIAMSBURG, VIRGINIA 23187

(804) 253-0673 or 874-5015
FAX (804) 253-2319

LETTER OF TRANSMITTAL

DATE 8/5/98	JOB NO. 1980150
ATTENTION DARYLL COOK	
RE: RESUBMITTAL #1 PER ENVIRONMENTAL DIV. COMMENTS (DATED 7/1/98) LONGHILL STATION PH. 2	

TO JCC ENVIRONMENTAL DIVISION
ATTN: DARYLL COOK

WE ARE SENDING YOU [X] Attached ☐ Under separate cover via _____ the following items:

☐ Shop drawings [X] Prints ☐ Plans ☐ Samples ☐ Specifications
☐ Copy of letter ☐ Change order ☐ _____

COPIES	DATE	NO.	DESCRIPTION
3	5/29/98	9	LONGHILL STATION PH.2 DEVELOPMENT PLANS
3	8/5/98	—	STORMWATER MGMT. CALCULATIONS - RESUBMITTAL #1
3	8/5/98	3	RESPONSES TO COMMENTS (DATED 7-1-98) FROM ENVIRONMENTAL DIV.

THESE ARE TRANSMITTED as checked below:

[X] For approval ☐ Approved as submitted ☐ Resubmit _____ copies for approval
☐ For your use ☐ Approved as noted ☐ Submit _____ copies for distribution
☐ As requested ☐ Returned for corrections ☐ Return _____ corrected prints
☐ For review and comment ☐ _____
☐ FOR BIDS DUE _____ 19 _____ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS THE FOLLOWING IS:
RESUBMITTAL #1 FOR LONGHILL STA. PHASE 2 DEVELOPMENT PLANS PER ENVIRONMENTAL DIVISION REVIEW COMMENTS. PLEASE DO NOT HESITATE TO CALL US IF YOU NEED MORE INFORMATION. STORMWATER MGMT. CALCULATIONS ARE ATTACHED.
Thanks! DAWN LEMON

COPY TO File

SIGNED: Dawn J. Lemon

RECEIPT OF THESE PRINTS, unless noted, kindly notify us at once.

James City County Environmental Division
Stormwater Management / BMP Inspection Report
Detention and Retention Pond Facilities

S-47-98
3110100080

County BMP ID Code (if known): PC 119

Name of Facility: Longhill Station Sec 2/3 Pond E BMP No.: 3 of 6 Date: 1-30-02 4:00pm

Location: East of 5989 Allegheny (Lot 137)

Name of Owner: LONGHILL STATION LLC

Name of Inspector: SJ Thomas

Type of Facility: Wet Pond

Weather Conditions: Sunny Warm 70's Type: ☒ Final Inspection ☐ County BMP Inspection Program ☐ Owner Inspection

N

If an inspection item is not applicable, mark NA, otherwise mark the appropriate column.

O.K. - The item checked is in adequate condition and the maintenance program is currently satisfactory. No action required.
Routine - The item checked requires attention, but does not present an immediate threat to the function/integrity of the BMP.
Urgent - The item checked requires immediate attention to keep the BMP operational and to prevent damage to the facility.

Provide an explanation and details in the comment column, if routine or urgent are marked.

Facility Item	O.K.	Routine	Urgent	Comments
Embankments and Side Slopes: EARTH EMBANK; TOP WIDTH 10'; MOD SIZE; 3H:1V DOWN + UP.				
Grass Height	✓			2-4' CLUMPS ANNUAL RYE; GROUND COV
Vegetation Condition	✓	✓		MOW GRASS FOR HEALTH.
Tree Growth	✓			None, LARGE Trees Along Toe.
Erosion	✓			None.
Trash & Debris	✓	✓ SF	✓	"
Seepage	✓			None observed. Pond holding level.
Fencing or Benches				None o/s EMB.
Interior Landscaping/Planted Areas: ☒ None ☐ Constructed Wetland/Shallow Marsh ☐ Naturally Established Vegetation				
Vegetated Conditions	✓			Wet Pool w/ edge cattails
Trash & Debris		✓	✓	70% of perimeter shoreline.
Floating Material	✓			Turbid + discolored pool.
Erosion	✓			
Sediment	✓			
Dead Plant	✓			
Aesthetics	✓			Normal for WP.
Other				
Notes: Services SF Lots, Roads & Natural Woods.				

Facility Item	O.K.	Routine	Urgent	Comments
Water Pools: ☒ Permanent Pool (Retention Basin) ☐ Shallow Marsh (Detention Basin) ☐ None, Dry (Detention Basin)				
Shoreline Erosion	✓	✓	✓ *	Some along Aquatic bench. Negligible
Algae	✓			None
Trash & Debris		✓	✓	NW corner from LOT 137 CONST.
Sediment				
Aesthetics				
Other	✓			8-10' Bench entire perimeter
Inflows (Describe Types/Locations): 2 PIPES 1) 15" RCP SW Corner; 2) 24" RCP NW corner				
Condition of Structure	✓			
Erosion		✓	✓	EROSION ABOVE Pipe 1. Pipe 2 deep gully At outfall
Trash and Debris				
Sediment		✓	✓	Pipe 1 6" deep in pipe. Pipe 2 see 21 DEEP AT OUTFALL
Outlet Protection				PIPE 1 10' X 10' CLASS 1.
Other		✓	✓	FILL over Pipe 1 LOOSE SAND. PROBED 18"
Principal Flow Control Structure - Riser, Intake, etc. (Describe Type): 48" RCP w/ 8' CONC CAP; STEPS; 6' DEEP				
Condition of Structure	✓			ALUM BILCO ACCESS HATCH; DUCTILE IRON
Corrosion	✓			DRAIN PIPE (12") with DI GATE VALVE;
Trash and Debris	✓ Some stones			VALVE CLOSED. 6" ORIF, 3' UP FROM BOTTOM OF POND
Sediment	✓			
Vegetation		✓	✓	Clear veg 10' from riser.
Other	✓			Current LF Orif w/ 5' VDOT No. 1 Filter.
Principal Outlet Structure - Barrel, Conduit, etc. : 24" RCP Barrel w/ ES-1				
Condition of Structure	✓			
Settlement	✓			
Trash & Debris	✓			
Erosion/Sediment	✓			
Outlet Protection		✓	✓	OP is sparse. Construct per PLAN
Other				
Emergency Spillway (Overflow): 8' WIDE PARABOLIC SHAPE; NORTH SIDE				
Vegetation	✓			
Lining	✓			
Erosion	✓			Some due to UNAUTHORIZED ACCESS.
Trash & Debris	✓			
Other	✓			
Notes:				

Facility Item	O.K.	Routine	Urgent	Comments
Nuisance Type Conditions:				
Mosquito Breeding	✓			
Animal Burrows	✓			
Graffiti	✓			
Other		✓	✓	UNAUTHORIZED REC VEHICLE USE OF T.O.D. AND AQUATIC BENCH. **
Surrounding Perimeter Conditions:				
Land Uses				
Vegetation				
Trash & Debris				
Aesthetics				
Access /Maintenance Roads or Paths				
Other				

Remarks: o CLEAN TRASH + DEBRIS (CONST DEBRIS) from SS of POND NW Corner near 24" pipe. (LOT 137 CONST)
o MOW GRASS O/S EMBANK TO 4-6" HEIGHT. (CURRENTLY 2-4' HIGH)
o Remove SF DOWNSTREAM EMB. TOE.
* Major Rill + Gully erosion @ pond SS in SW Corner Near Pipe 1. Regrade slope, seed + mulch and clean and remove sediment which washed from slope into basin. (3 MAIN AREAS, one above 18" pipe.)
o CLEAR SED FROM OUTFALL END PIPE 1 SW Corner. 6" deep in pipe Also in general clean sed from OP from pipe 1 AND in corner of basin due to slope erosion. Gen CLEAN SED SW Corner of basin.
o FILL OUPR PIPE 1 LOOSE SAND, Probed 18" w/ RANGE POLE.
o CLEAN SEDIMENT 2' deep at pipe 2 (24") outfall. Restore OP back to spec. (Deep gully wash at pipe outfall.)
o 60' LENGTH OF AQUATIC BENCH IS BARE SOIL (North side). Seed + mulch.
o CLEAR vegetation (trees + cattails) 10' from riser.
o ADD TURN DOWN ELBOW TO 8" ORIFICE ON RISER PER PLAN
o CONSTRUCT OP @ 24" BARREL OUTFALL PER PLAN -

Overall Environmental Division Internal Rating: 3

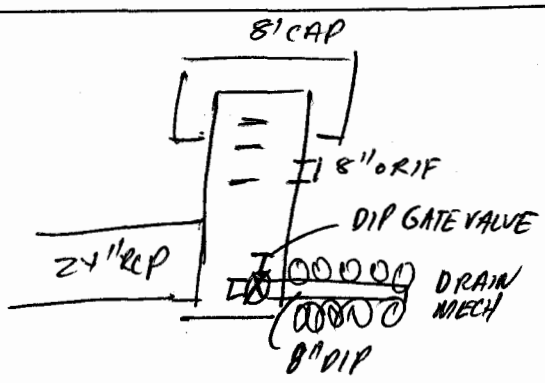
** AT TIME OF INSPECTION, 5 DIFFERENT REC VEHICLES WERE USING BMP AS MOTOCROSS. 4 DIFFERENT SIZE MOTORCYCLES AND 1 GO-KART. USING TOP OF DAM AND NORTH SIDE AQUATIC BENCH. JUMP BUILT IN EMERG SPILLWAY.

Signature: Scott Thomas P.E. **Date:** 1-31-02 4:40pm

Title: Civil Engineer ENV DIV

SWMProg\BMP\CoInspProg\DetRet.wpd

o STABILIZE WITH SEED & MULCH COMMON AND DRAINAGE EASEMENT DISTURBED AREAS NORTH OF LOT 137 (5989 Allegheny).



Date Record Created: [redacted]

Created By: [redacted]

WS_BMPNO: PC119

PRINTED ON
Thursday, March 04
11:08:50 AM

2010

WATERSHED	PC
BMP ID NO	119
PLAN NO	S-47-98
TAX PARCEL	(31-1)(1-8D)
PIN NO	311010008D
CONSTRUCTION DATE	1/1/1999
PROJECT NAME	Longhill Station Sec 2/3 (Pond E)
FACILITY LOCATION	Near Intersection Alleghany & Shenadoah
CITY-STATE	Williamsburg, Va. 23188
CURRENT OWNER	Longhill Station LLC
OWNER ADDRESS	10 San Jose Drive
OWNER ADDRESS 2	Suite 4C
CITY-STATE-ZIP CODE	Newport News, Va. 23606
OWNER PHONE	896-3430
MAINT AGREEMENT	Yes
EMERG ACTION PLAN	No

Get Last BMP No | Return to Menu | Print Record

MAINTENANCE PLAN	No
SITE AREA acre	26.28
LAND USE	SF Residential
old BMP TYP	Wet Pond
JCC BMP CODE	A2 Wet Pond
POINT VALUE	
SVC DRAIN AREA acres	12.1
SERVICE AREA DESCRI	Sec 2/3 SF Lots & Roadways
IMPERV AREA acres	4.84
RECV STREAM	UT of Powhatan Creek
EXT DET-WQ-CTRL	Yes
WTR QUAL VOL acre-ft	0.83
CHAN PROT CTRL	No
CHAN PROT VOL acre-ft	0
SW/FLOOD CONTROL	Yes
GEOTECH REPORT	No

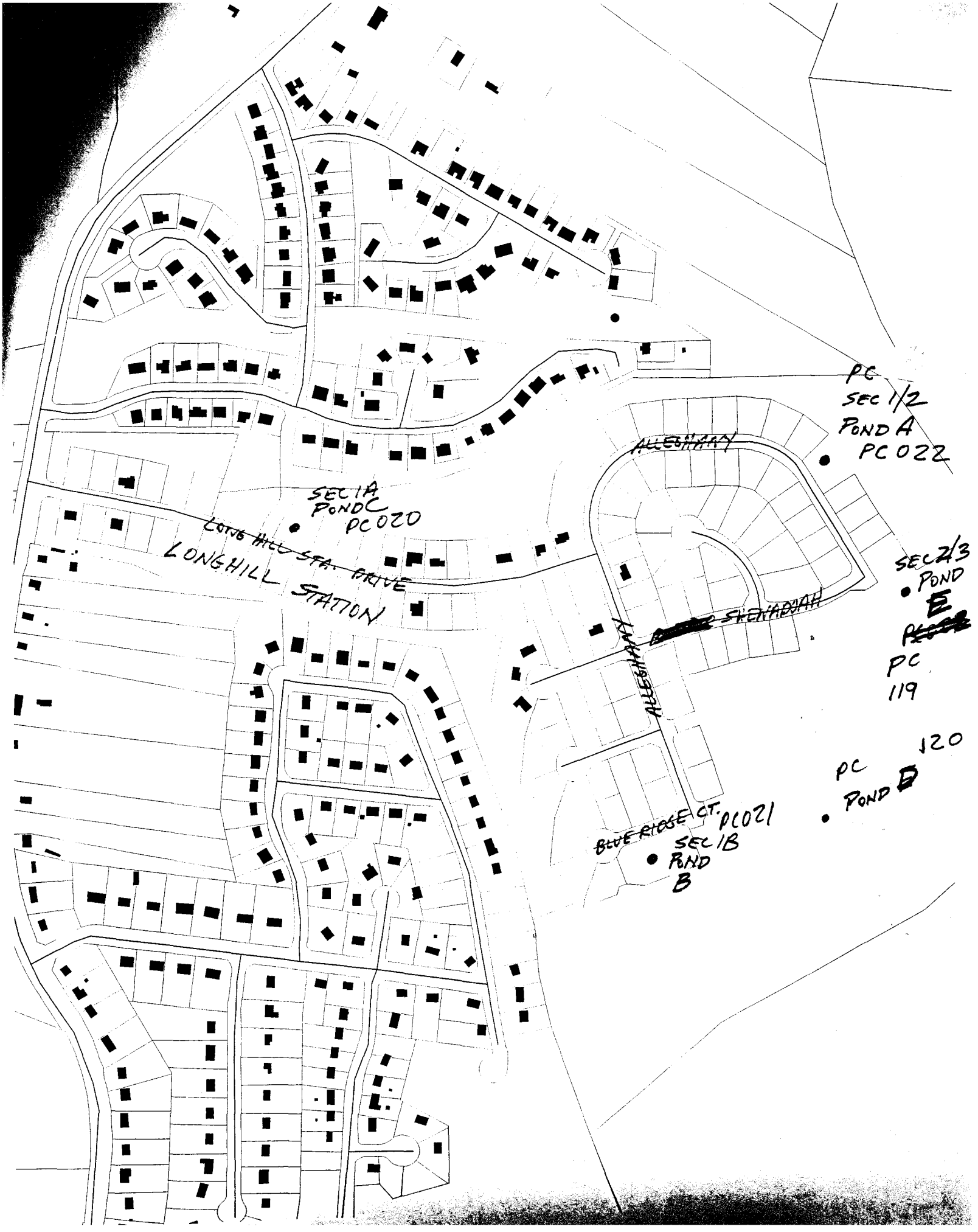
CTRL STRUC DESC	ACCMP Rise
CTRL STRUC SIZE inches	48
OTLT BARRL DESC	ACCMP
OTLT BARRL SIZE inch	24
EMERG SPILLWAY	Yes
DESIGN HW ELEV	62.8
PERM POOL ELEV	60.0
2-YR OUTFLOW cfs	1.24
10-YR OUTFLOW cfs	11.01
REC DRAWING	Yes
CONSTR CERTIF	No
LAST INSP DATE	1/30/2002
Inspected by:	[redacted]
INTERNAL RATING	3

MISC/COMMENTS

East of intx. Alleghany & Shenadoah in Sec 3. See PC 020, 021, 022 & 120.

Additional Comments: [redacted]

WATERSHED	PC	MAINTENANCE PLAN	No	CTRL STRUC DESC	ACCMP Rise
BMP ID NO	119	SITE AREA acre		CTRL STRUC SIZE inches	48
PLAN NO	S-47-98	LAND USE	SF Residential	OTLT BARRL DESC	ACCMP
TAX PARCEL		old BMP TYP	Wet Pond	OTLT BARRL SIZE inch	24
PIN NO	3110900001B	JCC BMP CODE			
CONSTRUCTION DATE		POINT VALUE		EMERG SPILLWAY	Yes
PROJECT NAME	Longhill Station Sec 2/3 (Pond E)			DESIGN HW ELEV	62.8
FACILITY LOCATION	Near Intersection Alleghany & Shenadoah			PERM POOL ELEV	60.0
CITY-STATE	Williamsburg, Va. 23188	SVC DRAIN AREA acres		2-YR OUTFLOW cfs	
CURRENT OWNER	Wallace Associates, LLC (c/o Henry Stephens)			10-YR OUTFLOW cfs	
OWNER ADDRESS	2 Eaton St.			REC DRAWING	Yes
OWNER ADDRESS 2	Suite 1101	SERVICE AREA DESCRI	Sec 2/3 SF Lots & Roadways		
CITY-STATE-ZIP CODE	Hampton, Va. 23669	IMPERV AREA acres		CONSTR CERTI	No
OWNER PHONE		RECV STREAM	UT of Powhatan Creek		
MAINT AGREEMENT	Yes	EXT DET-WQ-CTRL	No	LAST INSP DATE	
		WTR QUAL VOL acre-ft		INTERNAL RATING	
EMERG ACTION PLAN	No	CHAN PROT CTRL	No	MISC/COMMENTS	
		CHAN PROT VOL acre-ft		East on intx. Of Alleghany & Shenadoah in Sec 3. See PC 020, 021, 022 & 120.	
Get Last BMP No		SW/FLOOD CONTROL	Yes		
Return to Menu		GEOTECH REPORT	No		


PC
SEC 1/2
POND A
PC 022
ALLEGHANY
SEC 1A
POND C
PC 020
LONG HILL STA. DRIVE
LONGHILL STATION
SEC 2/3
POND
E
SHENANDOAH
ALLEGHANY
PC
119
120
PC
POND D
BLUE RIDGE CT.
PC021
SEC 1B
POND
B

PC020_PC021_PC022_PC119_PC120_LONGHILL_STATION - 394

Stormwater Division

MEMORANDUM

DATE: March 13, 2010

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

FROM: Jo Anna Ripley, Stormwater

PO: 270712

RE: Files Approved for Scanning

General File ID or BMP ID: PC120

PIN: 3110900001B

Subdivision, Tract, Business or Owner Name (if known): Longhill Station

Property Description: Natural Open Space Section 1A & 1B

Site Address:

(For internal use only) **Box** 3 **Drawer:** 2

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

Comments

Combined file with PC020, PC021, PC119 and PC120. According to the County's Real Estate Assessment Division the common area has not been turned over to the HOA. Ownership as of 3/3/10 is Wallace Associates LLC

FILE COPY of recorded CCR's as ORIGINAL 1A+1B 2/10/97

DECLARATION OF
COVENANTS, CONDITIONS AND RESTRICTIONS
OF
LONGHILL STATION, SECTION 1A & 1B

THIS DECLARATION, made this 10TH day of February, 1997, by WALLACE ASSOCIATES, L.L.C., a Virginia limited liability company (hereinafter referred to as "Declarant"), index as "Grantor."

R E C I T A L S:

There has been duly approved under the ordinances of James City County, Virginia, a subdivision known as "Longhill Station, Section 1A & 1B" as shown on the subdivision plat entitled "Subdivision Plat, Longhill Station, Section 1A & 1B, owner/developer Atlantic Homes Development Corp., Powhatan District, James City County, Virginia", dated December 19, 1996, made by DJG Engineers-Surveyors-Planners, Landscape Architects - Environmental Consultants recorded in Plat Book 65, at pages 92 - 94 in the Clerk's Office of the Circuit Court of the City of Williamsburg and James City County, Virginia, all of said property as shown on the subdivision and re-subdivision plats (hereinafter collectively referred to as "Subdivision"); the purpose of this Declaration is to improve and protect the Subdivision.

NOW, THEREFORE, Declarant, as owner of all of the property is the Subdivision, hereby declares that all of the property as shown on Exhibit A, which is attached hereto and made a part hereof, shall be held, sold and conveyed subject to the following easements, restrictions, covenants and conditions, which are for

PC020_PC021_PC022_PC119_PC120_LONGHILL_STATION - 396

the purpose of protecting the value and desirability of, and which shall run with, the real property and be binding on all parties having any right, title or interest in the described properties or any part thereof, their heirs, successors and assigns, and shall inure to the benefit of each owner thereof.

ARTICLE I
DEFINITIONS

Section 1. "Association" shall mean and refer to Longhill Station Homeowners Association, Inc., a Virginia non-stock corporation, its successors and assigns.

Section 2. "Owner" shall mean and refer to the record owner, whether one(1) or more persons or entities, of a fee simple title to any Lot which is a part of the Subdivision, including contract sellers, but excluding those having such interest merely as security for the performance of any obligation.

Section 3. "Properties" shall mean and refer to all of the land within the Subdivision as shown on the plat of Longhill Station and all other property which may be annexed hereto pursuant to the Annexation provisions set forth hereinafter.

Section 4. "Common Area" shall mean the area identified as open space, conservation areas and/or recreation areas of the Subdivision Plat, together with such additional areas of Common Area as may be annexed.

Section 5. "Lot" shall mean and refer to the seventy-six (76) numbered lots intended for the purpose of constructing

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residential homes thereon, as shown in the Subdivision of Lots 1 through 76 of said Subdivision; "Lot" as used herein is intended to refer to residential lots and not to any Common Area.

Section 6. "Declarant" shall mean and refer collectively to Wallace Associates, L.L.C., a Virginia limited liability company, its successor and assigns, if such successor or assigns should acquire more that one (1) undeveloped Lot from the Declarant for the purpose of development.

Section 7. "Mortgage" as used herein shall mean a mortgage or deed of trust, said terms having the same meaning and may be used interchangeably.

Section 8. "Board of Directors" shall mean and refer collectively to the Board of Directors of Longhill Station Homeowners Association, Inc.

Section 9. "Membership" shall mean and refer collectively to the Class A and Class B members of the Association eligible to vote.

Section 10. "Builder" shall mean and refer to Atlantic Homes Corporation.

Section 11. "Architectural Review Committee" shall mean and refer to the committee of that name, which shall be formed and operated by the Longhill Station Homeowner's Association for the purpose of reviewing, evaluating, negotiating changes or revisions, establishing architectural standards, and approving or rejecting plans for architectural changes to the Lots or improvements thereto.

PC020_PC021_PC022_PC119_PC120_LONGHILL_STATION - 398

ARTICLE II
PROPERTY RIGHTS AS TO COMMON AREAS

AS TO COMMON AREA, the following provisions apply:

Section 1. Owners' Easements of Enjoyment. Every Owner shall have a right and easement of enjoyment in and to the benefits which derive from the conservation area located in the Common Area and the benefits derived therefrom and the adjacent or other property which is now or subsequently becomes a part of the Common Area, and aesthetic beauty to the Lots within the Subdivision which shall be appurtenant to and shall pass with the title to every Lot, subject to the following provisions:

(a) the right of the Association to charge reasonable fees for the maintenance of the Common Area.

(b) the right of the Association to suspend the voting rights of an Owner for any period during which any assessment against his Lot remains unpaid.

(c) the right of the Association to dedicate or transfer all or any part of the Common Area to any public agency, authority or utility for such purposes and subject to such conditions as may be agreed to or be authorized by the Board of Directors of the Association; in addition thereto, the Declarant may at anytime hereafter deed, or cause the Association to deed, all of any part of the Common Area to the County of James City or other public body, who shall thereafter maintain the Common Area;

(d) the transfer of a Lot automatically transfers membership in the Association and all rights of the transferrer

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with respect to the Common Area and facilities to which ownership of such Lot relates;

(e) the right of the Association to establish reasonable rules and regulations, from time to time, for the use and enjoyment of the Common Area and Properties, and enforce such rules and regulations against the Owners, thier family members, guests and invitees.

(f) the right of the Association to allow persons other than Owners, their family members, guests and invitees, to use the Swimming Pool facilities and gain access to same by establishing an outside pool membership for a fee to be established, from time to time, by the Association.

Section 2. Delegation of Use. Any Owner may delegate, in accordance with the By-laws, his right of enjoyment to the Common Area facilities to the members of his family, his tenants or contract purchasers who reside on the Property.

Section 3. Leasing. Any Owner may lease or rent his Lot as long as the use of the Lot is consistent with the restrictions herein and provided that the lease agreement between Owner and lessee shall be written, shall be for a term of not less that thirty (30) days and shall provide that the terms of the lease shall be subject in all respects to the provisions of this Declaration and all other documents of the Association and that the failure of the lessee to comply with the terms of such documents shall constitute a default under the lease.

ARTICLE III
MEMBERSHIP AND VOTING RIGHTS

AS TO THE ASSOCIATION, the following membership and voting rights shall apply:

Section 1. Every Owner of a Lot shall be subject to assessment in the manner herein set forth and shall be a member of the Association with each such Lot Owner having an equal voting right with every other Lot Owner. Membership shall be appurtenant to and may not be separated from ownership of any Lot which is subject to assessment.

Section 2. The Association shall have two (2) classes of voting membership:

(a) Class A. Class A members shall be all Owners of Lots with the exception of the Declarant, and shall be entitled to one (1) vote for each Lot owned. When more than one (1) person holds an interest in any Lot, all such persons shall be members. The vote for such Lot shall be exercised as they determine, but in no event shall more than one (1) vote be cast with respect to any Lot.

(b) Class B. The Class B member shall be the Declarant, who shall be entitled to two (2) votes for each Lot owned during the seven (7) year period following the date of this Declaration. Such entitlement to two (2) votes shall be in effect only during the seven (7) year period following the date of this Declaration and when the total votes outstanding in the Class A membership is less than the total votes outstanding in the Class B membership. For so long as the total votes

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outstanding in the Class A membership equal or exceed the total votes outstanding in the Class B membership, then the Class B membership shall be entitled to only one (1) vote for each Lot owned. All such calculations shall be on a cumulative basis in the event of Annexation as provided herein. In any event, Declarant shall turn over control of the Association to the Owners of Lots having Class A membership on the seventh (7th) anniversary following the date of this Declaration first above written.

ARTICLE IV
COVENANT FOR MAINTENANCE ASSESSMENT

AS GENERAL ASSESSMENTS FOR ALL LOTS:

Section 1. Creation of the Lien and Personal Obligation of General Assessments. The Declarant, for each Lot owned within the Properties, hereby covenants and each Owner of any Lot by acceptance of a deed therefor, whether or not it shall be so expressed in such deed, is deemed to covenant and agree to pay to the Association as general assessments the following:

(a) general annual assessments or charges ("General Assessment"); and

(b) general special assessments for capital improvements, such assessments to be established and collected as hereinafter provided ("Special Assessments").

The general annual and general special assessments, together with interest, costs and reasonable attorney's fees, shall be a charge on the land and shall be a continuing lien upon the

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property against which each such assessment is made in accordance with the Virginia Property Owner's Association Act, being Sections 55-508, et seq., of the Code of Virginia, 1950, as amended (the "Act"). Each such assessment, together with interest, costs and reasonable attorney's fees, shall also be the personal obligation of the person who was the Owner of such property at the time when the assessment fell due. The personal obligation for delinquent assessments shall not pass to his successors in title unless expressly assumed by them.

Section 3. Maximum General Assessment. Until January 1 of the year immediately following the conveyance of the first Lot to an Owner, the maximum General Assessment shall not exceed THREE HUNDRED AND NO/100 DOLLARS ($300.00) per year per Lot.

(a) From and after January 1 of the year immediately following the conveyance of the first Lot to an Owner, the maximum General Assessment may be increased each year not more that **ten percent (10%)** above the maximum assessment for the previous year without a vote of the Membership.

(b) From and after January 1 of the year immediately following the conveyance of the first Lot to an Owner, the maximum General Assessment may be increased above **ten percent (10%)** by a majority vote of members who are voting in person or by proxy, at a meeting duly called for this purpose.

(c) The Board of Directors may fix the general annual assessment at an amount not in excess of the maximum without further vote or authorization by the Membership.

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Section 4. Working Capital Fund. The Declarant, as Agent of the Association, may establish for the Association a Working Capital Fund by collecting from each Owner of an improved Lot up to six (6) months of the annual General Assessment for each improved Lot at the time the improved Lot is purchased to serve as a reserve fund for capital expenditures, replacements or general operating expenses. The Declarant shall not use the Working Capital Fund to pay any construction costs, but shall only use the Working Capital Fund for capital expenditures, replacements and general operating expenses of the Association. The Declarant shall maintain this as a segregated fund separate and apart from other funds of the Association.

Section 5. Special Assessment for Capital Improvements. In addition to the General Assessments authorized above, the Association may levy, in any assessment year, a Special Assessment applicable to that year only for the purpose of defraying, in whole or in part, the cost of any construction, reconstruction, repair or replacement of a capital improvement upon the Common Area, including fixtures and personal property related thereto, provided that any such assessment shall have the assent of a majority of members who are voting in person or by proxy at a meeting duly called for this purpose.

Section 6. Notice and Quorum for any Action Authorized under Sections 3 and 4. Written notice of any meeting called for the purpose of taking any action authorized under Section 3 or 4 shall be sent to all members not less than five (5) days nor more

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than thirty (30) days in advance of the meeting. At the first such meeting called, the presence of members or of proxies entitled to cast thirty percent (30%) of all the votes of membership shall constitute a quorum. If the required quorum is not present, another meeting may be called subject to the same notice requirement, and the required quorum at the subsequent meeting shall be one-half (1/2) of the required quorum at the preceding meeting. No such subsequent meeting shall be held more that sixty (60) days following the preceding meeting.

Section 7. Uniform Rate of Assessment. Both General Assessments and Special Assessments must be fixed at a uniform rate for all Lots and may be collected on a monthly basis.

Section 8. Date of Commencement of General Assessments: Due Dates. The General Assessments provided for herein shall commence as to any Lot on which improvements have been completed on the first day of the month following the completion of the improvements and after the conveyance of the first Lot by the Declarant to any Owner other than the Declarant. The Declarant shall not be required to pay the General Assessment on Lots on which improvements are not completed and sold to an Owner, provided the Declarant shall be responsible for the maintenance and upkeep of such unimproved Lots. The first General Assessment shall be adjusted according to the number of months remaining in the calendar year. The Board of Directors shall fix the amount of the General Assessment against each Lot at least thirty (30) days in advance of each General Assessment period. Written

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notice of the General Assessment shall be sent to every Owner subject thereto. The due dates shall be established by the Board of Directors. The Association shall, upon demand and for a reasonable charge, furnish a certificate signed by an officer of the Association setting forth whether the assessments on a specified Lot have been paid. A properly executed certificate of the Association as to the status of assessment on a Lot is binding upon the Association as of the date of its issuance.

Section 9. Effect of Nonpayment of General Assessments: Remedies of the Association. Any General Assessment not paid within thirty (30) days after the due date shall bear interest from the due date at the rate of prime rate plus four (4) points per annum, where the prime rate shall mean and refer to the interest rate established and offered under that name from time to time by Nations Bank, N.A., or its successor bank. The Association may record a memorandum of lien, bring an action at law against the Owner personally obligated to pay the same, foreclose the lien against the Property, or pursue any other remedy available at law or in equity. No Owner may waive or otherwise escape liability for the General Assessments provided for herein by non-use of the Common Area or non-use or abandonment of his Lot.

Section 10. Subordination of the Lien to Mortgages. The lien of the assessments provided for herein shall be subordinate to the lien of any first mortgage. Sale or transfer of any Lot shall not affect the assessment lien. However, the sale or

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transfer of any Lot pursuant to mortgage foreclosure or any proceeding in lieu thereof shall extinguish the lien of such assessments as to payments which became due prior to such sale or transfer. No sale or transfer shall relieve such Lot from liability for any assessments thereafter becoming due or from the lien thereof. Such subordination shall not release the Owner from personal liability for such assessment.

ARTICLE V
PROPERTY RESTRICTIONS

Section 1. Land Use and Building Type. No Lot shall be used except for residential purposes; provided, however, this shall in no way restrict the Common Area Lots being used for their intended purposes. No additional, adjacent or connected buildings to house additional persons for rent or other purposes will be permitted.

Section 2. No businesses shall be conducted from these residences or on these Lots wherein any evidence of said businesses is visible from without the residence. This includes signs, marked vehicles, equipment and materials. Neither may any home business generate a stream of traffic to constitute a nuisance to the neighbors. As long as Declarant owns any Lot, Declarant may maintain a model and/or sales trailer on the Properties.

Section 3. No Lots may be subdivided by any person other than the Declarant, except Lot line adjustments may be permitted, provided the total number of Lots is not increased.

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Notwithstanding the foregoing, the Declarant shall have the right to subdivide Lots and/or make Lot line adjustments which increase the total number of Lots, subject only to municipal approval.

Section 4. No animals, livestock or poultry of any kind may be kept on any Lot except dogs, cats or other household pets, provided that they are not kept, bred or maintained for any commercial purpose. Animals must be property managed so as not to be a nuisance to neighbors by barking, trespass or maintenance of their bodily functions.

Section 5. No Lot shall be used or maintained as a dumping ground for rubbish or other material prior to construction. During construction the area will be kept in a reasonably neat and clean condition, although some debris must be expected. After occupancy the property shall be kept in a good state of maintenance by the owner. Trash, garbage and other waste shall not be kept in or on the Properties, except in sanitary containers which shall be enclosed in a screening structure, including but not limited to a lattice structure, or located on the lot such that it can not be viewed from the street(s) in the Subdivision. Incinerators will not be permitted and all trash and refuse must be picked up and hauled away, except as otherwise allowed by local ordinance.

Section 6. No construction or improvements shall be permitted within any area designated under the heading "Open Space," "Conservation Area" or "Easement" as reflected on the

plat of this subdivision unless approved by Declarant and/or James City County.

Section 7. All Owners, except Builder, shall submit to the Declarant for its review and approval, architectural elevation and floor plans for all dwelling units to be constructed on the Lots, in accordance with the following procedures:

(a) Within fifteen (15) days after Declarant shall have received proposed elevations and floor plans for one (1) or more units to be constructed on the Lots, Declarant shall give Owner notice or its approval or disapproval thereof, specifying, in the case of the latter, its reason therefor. Declarant's right to disapprove such plans and specifications shall be exercised in conformance with the following criteria: (1) Subsection (a) of this paragraph; (2) architectural compatibility with units constructed in adjoining sections and (3) adverse impact on marketability of Lots within the Properties.

(b) An Owner, upon receipt of a notice of disapproval given pursuant to the above, may promptly undertake to amend and modify the proposed design so as to meet the reasons for Declarant's disapproval specified in the notice of disapproval and, upon completion thereof, the same shall be approved or disapproved in writing by Declarant within fifteen (15) days after receipt of same, provided that each submission by Owner shall constitute a new proposal. If there shall be a bona fide dispute between the parties as to whether Declarant's disapproval of any design submitted to it is permitted hereunder, the parties

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shall enter into discussions of points of disagreement and use their best efforts to resolve such issues to their mutual satisfaction.

(c) If Declarant fails to give notice of its approval or disapproval within fifteen (15) days after receipt of any architectural elevations or other supporting documentation submitted to it for its approval, or of any required modification or amendment thereof, the same shall be deemed to have been approved by Declarant.

Section 8. All dwellings shall be served by underground utility service, including sewer, gas, electric, telephone and cable television. No above ground utilities will be permitted.

Section 9. The following additional restrictions will be observed in the intent of preserving the architectural integrity of the Properties:

(a) No external antennas of any description, except satellite dishes of less than two feet (2') in diameter, which are located entirely below all roof lines of the house on the Lot and is not visible from the street(s) of the Subdivision.

(b) No window air conditioners.

(c) No clothes lines, unless said lines are small and well-screened and approved by the Architectural Review Committee in advance of their construction, installation or creation.

(d) No fencing shall be allowed nearer to the street than the front of the residence, and no fencing, which is otherwise permitted, shall be erected prior to obtaining the

approval of the Architectural Review Committee, however, Builder does not need approval from the Architectural Review Committee, nor must Builder comply with the locational requirements of this Section 9(d).

(e) No solar or energy panels may be visible from the street or to any other residence.

(f) No car ports shall be erected on any Lot or attached to any residence.

(g) No temporary structure, trailer, tent, shack, shed or other outbuilding shall be built or used on any Lot as a residence or for storage.

(h) No chain link fence is permitted, except around dog runs, which are limited to one hundred twenty (120) square feet of area, and must be located on the Lot so as not to be seen from the streets of the Subdivision.

(i) No sign of any kind shall be displayed to the public view on any Lot except one (1) sign of not more than five (5) square feet advertising the property for sale or rent, or any sign used by the builder to advertise or market the Properties.

(j) All driveways shall extend to the street and shall be either aggregate or concrete so as to blend with the streets.

(k) Outbuildings and fencing may be constructed or installed only with the permission of the Architectural Review Committee.

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Section 10. Vehicles. Since the unregulated use of vehicles can destroy the appearance of a neighborhood, the following restrictions will apply:

(a) No more than three (3) ungaraged vehicles will be permitted to be consistently parked on the premises, and such vehicles must be in the driveway or on a parking apron off the driveway. These vehicles will be restricted to licensed, operable automobiles, mini-vans and pickup trucks not to exceed three-quarters (3/4) ton in capacity.

(b) No major vehicle maintenance or overhaul of ungaraged vehicles will be permitted.

(c) Unless garaged, no inoperable or unlicensed vehicle may remain on the Properties for more than two (2) days, unless garaged.

(d) All vehicles on the Properties must have all major body panels and doors (except tailgates on trucks) properly installed and closed.

(e) No recreational vehicles, boats, jet skis, trailers, campers, mobile homes or equipment, except passenger automobiles and passenger trucks, may be parked on the streets or on any Lot within the front property set back line.

Section 11. Easements. Easements for installation and maintenance of utilities and drainage facilities are reserved as shown on the recorded plat of subdivision. The drainage and utility easements may also be used by the Declarant for ingress and egress to or to benefit the Common Area and/or the Lots as

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provided for herein. Easements shown on the plan of other deeds of record for streets, drainage, utilities, screening, open space or conservation areas are for the benefit of the residents of Longhill Station Subdivision and may be changed by the Declarant or the County of James City, Virginia. The Declarant reserves the right to require additional easements not to exceed five (5) feet in width along any property line or any Lot if drainage problems develop at a later date and require such easements as may be necessary in the Declarant's opinion.

ARTICLE VI
INSURANCE

Section 1. The Board of Directors is authorized (but not directed) to secure such insurance as it deems advisable and prudent and the coverage, proceeds and benefits from any such insurance policy shall be equal for all Lot Owners. No director shall be liable for the failure to obtain any such insurance. Each Owner is hereby encouraged and entitled to secure and provide their respective insurance coverage. The Association has no duty to provide any insurance of any type on the Common Areas, the Properties or elsewhere.

ARTICLE VII
GENERAL PROVISIONS

Section 1. Enforcement. The Association or any Owner shall have the right to enforce, by any proceeding at law or in equity in the Circuit Court of the City of Williamsburg and County of James City, Virginia, all restrictions, conditions, covenants

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reservations, liens and charges now or hereafter imposed by the provisions of this Declaration in accordance with the Act and all other applicable laws. Failure by the Association or by any Owner to enforce any covenant or restriction herein contained shall in no event be deemed a waiver of the right to do so thereafter. The Court is hereby specifically empowered and authorized to use its equitable powers and authorities to correct any arbitrary, capricious or unreasonable act by the Association or any Lot Owner or committee connected therewith.

Section 2. Severability. Invalidation of any one of these covenants or restrictions by any judgment or court order shall in no way affect any other provisions which shall remain in full force and effect.

Section 3. Amendment. The covenants and restrictions of this Declaration shall run with and bind the land for a term of forty (40) years from the date this Declaration is recorded, after which time they shall be automatically extended for successive periods of ten (10) years. This Declaration may be amended by an instrument signed by not less than seventy-five percent (75%) of the Lot Owners and fifty-one percent (51%) of first mortgagees as hereinafter defined. Any amendment, upon receiving the necessary approval, shall be recorded in a document executed on behalf of the Association by its duly authorized officers. Any amendment must be recorded. In no event shall these covenants and restrictions terminate for so long as the Association owns any Common Area.

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Section 4. Association Documents. In accordance with the Act, the Association shall maintain current copies of the Declaration, Articles of Incorporation, Bylaws, Rules and Regulations and budgets and shall provide copies upon request to Owners and Purchasers. The Association shall annually cause to be prepared a statement for each fiscal year which shall be provided to the Owners at each annual meeting.

Section 5. Additional Covenants. It is understood and agreed, anything to the contrary contained herein notwithstanding, as follows:

(a) A first mortgagee will be provided written notification of any default by the mortgagor of such Lot in the performance of such mortgagor's obligation under the Subdivision documents which is not cured within thirty (30) days; as used herein, the terms "first mortgage," "mortgage" or "mortgagor" shall have the same meaning and import as "first deed of trust noteholder" or "first deed of trust" or "grantor of a deed of trust"; the terms "mortgage" and "deed of trust" for the purposes herein shall have the same meaning and intent.

(b) Any first mortgagee who comes into possession of a Lot in the Properties pursuant to the remedies provided in the mortgage, or foreclosure of the mortgage, or deed (or assignment) in lieu of foreclosure shall be exempt from all "rights of first refusal," if any.

(c) Any first mortgagee who comes into possession of a Lot pursuant to the remedies provided in the mortgage,

foreclosure of the mortgage, or deed (or assignment) in lieu of foreclosure shall take the Property free of any claims for unpaid assessments or charges against the mortgaged unit which accrue prior to the time such holder comes into possession of the Lot.

(d) Unless at least fifty-one percent (51%) of the first mortgagees (based upon one [1] vote for each first mortgagee) of individual Lots in the Properties have given their prior written approval, the Association shall not be entitled to:

(1) By act or omission seek to abandon, petition, subdivide, encumber, sell or transfer real estate or improvements thereon which are owned, directly or indirectly, by such Association for the benefit of the Owners and Lots in the Properties, provided, however, that the Declarant, or the Association by a vote of its Board of Directors, at any time may convey all or any part of the Common Area to the County of James City, Virginia, or to any other public body, who shall thereafter maintain the same. The conveyance to the County of James City of other public body, or the granting of easements for public utilities or for other public purposes consistent with the intended use of such property by the Association shall not be deemed a prohibited transfer within the meaning of this clause.

(2) Change the method of determining the obligations, assessments, dues or other charges which may be levied against an Owner.

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(3) Use hazard insurance proceeds for losses to any Common Area property for other than the repair, replacement or reconstruction of such improvements.

(e) First mortgagees shall have the right to examine the books and records of the Association or any entity which owns the Common Area or the property of the Association.

(f) First mortgagees of Lots in the Properties may, jointly or singly, pay taxes or other charges which are in default and which may have become a charge against any Common Area property and may pay overdue premiums on hazard insurance policies, or secure new hazard insurance coverage on the lapse of a policy, for such property, and first mortgagees making such payment shall be owed immediate reimbursement therefor from the Association. Entitlement to such reimbursement is hereby agreed to and this instrument shall constitute an agreement in favor of all first mortgagees of Lots in the Properties.

(g) No provision of the Association Articles of Incorporation, or the declaration of easements, restrictions and covenants, or any similar instrument pertaining to the Properties or to Lots therein gives a Lot Owner or any other party priority over any rights of first mortgagees of Lots herein pursuant to their mortgages in the case of a distribution to Lot Owners of insurance proceeds or condemnation awards for losses to or taking of the Association's common property.

(h) Lot Owners have a right to enjoyment of the Common Areas as provided herein and such Property is owned in fee by the

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Association. The Common Area properties were conveyed to the Association unencumbered except for any easements granted for public utilities or for other public purposes consistent with the intended use of such Property by the Association.

(i) In the event that management other than self-management is required of the Association ("Outside Management"), and in the event that the Association elects or decides to terminate said Outside Management, then all first mortgagees shall be given at least thirty (30) days notice of said action.

(j) All first mortgagees shall be entitled to receive reasonable written notice of damage to or condemnation of any part of the Common Area.

(k) Any approval herein required by a first mortgagee shall be implied if a first mortgagee has failed to submit a response within fourteen (14) days to a written proposal or notice, provided the proposal or notice was delivered by certified or registered mail, with a return receipt requested.

Section 6. Easement for Public Necessity. Upon recordation of this Declaration, there is hereby granted to the County of James City, Virginia, its employees and agents a perpetual right of ingress and egress over and upon the Common Area in order to assure the performance of all public duties, including but not limited to law enforcement officers, rescue squad personnel, fire fighting personnel and government building officials and inspectors. In addition, Declarant shall have the right to construct storm water management facilities on the Common Area

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and to have an easement for ingress and egress and for all type easements over, under and upon the Common Area for the benefit of the Lots.

ARTICLE VIII
DECLARANT'S RIGHTS AND REPRESENTATIVES

Section 1. Rights. Anything herein to the contrary notwithstanding, the Declarant shall at all times have and does hereby reserve to itself, its successors and assigns:

(a) the right to use Lots for sales models and/or a sales office for sale of all Lots within the Subdivision.

(b) A non-exclusive easement over and upon the Common Area and for purposes of making improvements to the Common Area and on all Lots located within the Subdivision.

ARTICLE IX
CONDEMNATION

In the event of a condemnation or taking by eminent domain by any local, state or federal authority of all or any part of the Common Area, the Association is hereby designated and appointed as attorney-in-fact for all Owners for purposes of representing all Owners in any proceedings, negotiations, settlements or agreements. Any funds received by the Association shall be held for the benefit of the Association and be used by the Association for the purposes herein set forth, unless there is a total taking of all the Common Area, in which event the funds shall be distributed pro rata among the Owners and their respective first mortgagees.

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ARTICLE X
ANNEXATION

Section 1. Annexation. All or any part of the following described Properties may be annexed hereto at any time hereafter solely by Declarant without the consent of the Class A or Class B members of the Association; and upon the same happening, Declarant shall be deemed the "Declarant" as herein defined and shall be entitled to any and subject to all of the privileges, rights and liabilities herein set for Declarant. Said Properties which may be so annexed being described as all or any portion of the property described as follows:

> All those certain pieces, parcels or tracts of land as described on the attached Exhibit A, which are hereby made a part hereof by reference thereto, and any and all adjacent parcel or parcels of land now or hereafter acquired by Declarant.

Section 2. Method of Annexation. Declarant may cause such annexation to be made by including the provisions of such annexation to be shown on such recordation plat or by an instrument executed by Declarant and duly recorded describing the parcel or parcels to be annexed and referring to and making such parcel or parcels subject to the within Covenants, Conditions and Restrictions, or both.

Upon any such annexation being so made, the real estate or "Properties" covered thereby together with the Declarant and all Owners thereof and their heirs, successors and assigns shall be entitled to, and subject to, all of the terms of the within Covenants, Conditions and Restrictions in the same manner as if

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such annexed parcel had been included within the legal description as contained in said Longhill Station, Section 1A and 1B.

It is further understood and agreed that such annexation of all or of any part of the real estate hereinabove described shall be solely at the option of the Declarant, and Declarant may from time to time annex all or any part or parts thereof as determined solely by the Declarant without the necessity of approval of any Lot Owner of the Association, anything to the contrary notwithstanding in the Articles of Incorporation or Bylaws of the Association.

Section 3. Encroachments. In the event any portion of any improvement on any Lot encroaches upon the Common Areas and facilities, or an encroachment for an improvement in the Common Areas exists upon a Lot, as result of construction, reconstruction, repair, shifting, settlement or movement of any portion thereof, a valid easement for the encroachment and for the maintenance of the same shall exist so long as the encroachment exists. In addition, there is hereby created an easement for the encroachment of the entrance sign or signs to Longhill Station on any adjacent Lot(s).

IN WITNESS WHEREOF, the undersigned Declarant, Wallace Associates, L.L.C., a Virginia limited liability company, has caused this instrument to be executed on its behalf as of the date and year first above written.

[SIGNATURE ON NEXT PAGE]

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WALLACE ASSOCIATES, L.L.C.
By: Atlantic Homes Development Corporation
Its: Operating Manager

By: _____
Joseph P. Byrne
Its: Vice President

COMMONWEALTH OF VIRGINIA
City of Hampton, to wit:

I, Heather J Ford, a Notary Public in and for the city and Commonwealth aforesaid, do hereby certify that Joseph P. Byrne, as Vice President of Alantic Homes Development Corporation, the Operating Manager of Wallace Associates, L.L.C., a Virginia limited liability company, whose name is signed to the foregoing writing bearing date on the 10th day of February, 1997, has acknowledged the same before me in my city and Commonwealth aforesaid.

Given under my hand this 10th day of February, 1997.

Heather J Ford
Notary Public

My commission expires: 2/28/98

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EXHIBIT "A"

Parcel 1:

All that certain lot, piece or parcel of land situate, lying and being in Jamestown Magisterial District, James City County, Virginia, containing .43 of an acre, more or less, shown and delineated on blue print of map attached to Deed dated February 26, 1941, and recorded in Deed Book 34, page 347, entitled, "PLAT OF LOT TO BE CONVEYED, BY S. R. CURTIS TO BELLE TAYLOR, SITUATE IN JAMESTOWN DISTRICT, JAMES CITY COUNTY, VIRGINIA," made by F. G. Farthing, Certified Land Surveyor, July 27th, 1938, and bounded and described as follows: Beginning at a point in the center of the road leading from Centerville to Lightfoot, where the land herein conveyed joins other lands of Belle Taylor, running thence S 69 degrees 00′ E a distance of 164.7 feet to a point marked by a 24" Hickory; thence S 49 degrees 23′ E a distance of 168 feet to a pipe; thence along the ditch line N 75 degrees 30′ W a distance of 319 feet to a point in the center of the road; thence N 22 degrees 15′ E a distance of 87 feet along the road leading from Centerville to Lightfoot to the point of beginning; and bounded on the North by other lands now or formerly of Belle Taylor; on the Northwest by nor or formerly Fred Wallace; on the South by lands formerly owned by S. R. Curtis; and on the West by the road leading from Centerville to Lightfoot.

It being a part of the same property conveyed to Wallace Associates, L.L.C., a Virginia limited liability company, by deed dated May 10, 1996, from George W. Taylor, et al, the heirs at law of Bell Brown Taylor, a/k/a Belle Taylor a/k/a Bell V. Brown, deceased, recorded prior hereto.

The parcel herein conveyed is more particularly shown and described as "Parcel 1, ± 0.38 acres," on that certain plat entitled, "A SURVEY OF 3 PARCELS OF LAND, PARCELS 1 & 2 LANDS OF THE HEIRS OF BELLE B. TAYLOR & PARCEL 3 THE WALLACE ESTATE, FOR CONVEYANCE TO WALLACE ASSOCIATES, L.L.C., POWHATAN DISTRICT, JAMES CITY COUNTY, VIRGINIA," dated January 26, 1996 and made by DJG, Williamsburg, Virginia, which said plat is recorded prior hereto with the Deed dated May 10, 1996, from E. Thomas Cox, Special Commissioner, et als, to Atlantic Homes Development Corporation.

PARCEL 2:

All that piece or tract of land containing three acres, more or less, known as part of Puden Bottom tract and bounded as follows, on the North by the land now or formerly of Wyatt Williams, deceased, on the South by the land now or formerly of George W. Hicks, deceased, and on the East by the land now or formerly of Adam Byrd and on the West by the main road leading form Centerville to Lightfoot.

LESS AND EXCEPT: That certain property conveyed to the Commonwealth by Deed dated February 10, 1939 and recorded in Deed Book 30 Page 548.

LESS AND EXCEPT: That certain property described in Certificate of Take recorded at Deed Book 626, page 150 and Order after Certified of record at Deed Book 684, page 389.

It being a part of the same property conveyed to Wallace Associates, L.L.C., a limited liability company, by deed dated May 10, 1996, from George W. Taylor, et al, the heirs at law of Bell Brown Taylor, a/k/a Belle Taylor a/k/a Bell V. Brown, deceased, recorded prior hereto.

The parcel herein conveyed is more particularly shown and described as "Parcel 2, ± 3.39 acres," on that certain plat entitled, "A SURVEY OF 3 PARCELS OF LAND, PARCELS 1 & 2 LANDS OF THE HEIRS OF BELLE B. TAYLOR & PARCEL 3 THE WALLACE ESTATE, FOR CONVEYANCE TO WALLACE ASSOCIATES, L.L.C., POWHATAN DISTRICT, JAMES CITY COUNTY, VIRGINIA," dated January 26, 1996 and made by DJG, Williamsburg, Virginia, which said plat is recorded prior hereto with the Deed dated May 10, 1996, from E. Thomas Cox, Special Commissioner, et als, to Atlantic Homes Development Corporation.

PARCEL 3:

All that certain tract or parcel of land situate in Jamestown District, James City County, Virginia, near Centerville, containing 47 acres, more or less, known as Pudding Bottom and bounded and described as follows: On the North by the land now or formerly owned by George W. Hicks; on the east by the land formerly owned by Nann Spencer and Robert Chandler; and on the west by the land known as "Hot Water".

This conveyance specifically includes the 20 acre parcel conveyed to Fred Douglas Wallace by Deed recorded at James City County Deed Book 26, page 143, pursuant to the Order of the Court in this proceeding entered May 24,1995 of recorded at Chancery Order Book 54, page 912.

It being the same property conveyed to Wallace Associates, L.L.C., a Virginia limited liability company, by deed dated May 17, 1996, from Atlantic Homes Development Corporation, a Virginia corporation, and recorded prior hereto.

The parcel herein conveyed is more particularly shown and described as "Parcel 3, 4,391,898 SQ. FT. ±100.8 acres," on that certain plat entitled, "A SURVEY OF 3 PARCELS OF LAND, PARCELS 1 & 2 LANDS OF THE HEIRS OF BELLE B. TAYLOR & PARCEL 3 THE WALLACE ESTATE, FOR CONVEYANCE TO WALLACE ASSOCIATES, L.L.C., POWHATAN DISTRICT, JAMES CITY COUNTY, VIRGINIA," dated January 26, 1996 and made by DJG, Williamsburg, Virginia, which said plat is recorded prior hereto with the Deed dated May 10, 1996, from E. Thomas Cox, Special Commissioner, et als, to Atlantic Homes Development Corporation.

00029811

This Document Prepared By:
David, Kamp & Frank, L.L.C.
301 Hiden Boulevard, Suite 200
Newport News, VA 23606

990 017154

ADDS SEC 2 AS part OF 1A + 1B

FIRST SUPPLEMENTAL DECLARATION OF COVENANTS, CONDITIONS AND RESTRICTIONS OF LONGHILL STATION, SECTION 1A & 1B AND ANNEXATION INSTRUMENT ADDING LONGHILL STATION, SECTION II

THIS FIRST SUPPLEMENTAL DECLARATION OF COVENANTS, CONDITIONS AND RESTRICTIONS OF LONGHILL STATION, SECTION 1A & 1B AND ANNEXATION INSTRUMENT ADDING LONGHILL STATION, SECTION II made this 10th day of August, 1999, by **LONGHILL STATION, L.L.C.**, a Virginia limited liability company, and **ATLANTIC HOMES, L.L.C.**, a Virginia limited liability company, hereinafter collectively referred to as "Declarant," successor in interest to **WALLACE ASSOCIATES, L.L.C.**, a Virginia limited liability company, hereinafter referred to as "Wallace."

AUG 11 99 0126

WHEREAS, Wallace, as owner of certain real property in James City County, Virginia, caused to be recorded the "Declaration of Covenants, Conditions and Restrictions of Longhill Station, Section 1A & 1B" subjecting the real property described on Exhibit A thereto to the provisions therein; and

WHEREAS, the "Declaration of Covenants, Conditions and Restrictions of Longhill Station, Section 1A & 1B" also provides that all or any portion of certain real property described therein could be annexed thereto; and

WHEREAS, by various deeds, Wallace conveyed to Declarant certain real property, hereinafter referred to as "Section II," which is described as follows:

See **Exhibit A** attached hereto and made a part hereof

WHEREAS, Declarant desires that the above property be annexed to that certain real property hereinafter referred to as "Section 1A & 1B" which is described as follows:

See **Exhibit B** attached hereto and made a part hereof

NOW, THEREFORE, Declarant hereby declares that Section II shall be annexed to Section 1A & 1B and shall be subject to the "Declaration of Covenants, Conditions and Restrictions of Longhill Station, Section 1A & 1B" dated February 10, 1997, and recorded in the Clerk's Office of the Circuit Court for the City of Williamsburg and County of James City, Virginia (the "Clerk's Office") on February 10, 1997, as Instrument No. 970002164, and as amended by the "First Amendment to Declaration of Covenants, Conditions and Restrictions," dated September 24, 1997, and recorded in the Clerk's Office on October 10, 1997, as Instrument No. 970016383, both documents hereinafter collectively referred to as the "Covenants."

Declarant further declares that Section II, together with the Declarant and all owners thereof, and their heirs, successors and assigns, shall be entitled to, and subject to, all of the terms of the Covenants in the same manner as if Section II had been included in the legal description as contained in Exhibit A of the Covenants and is hereby within the jurisdiction of Longhill Station Homeowners Association, Inc., its successors and assigns.

AUG 11 '99 0127

00029811

IN WITNESS WHEREOF, the undersigned Declarant has caused the execution hereof as of the date and year first above written.

Declarant

LONGHILL STATION, L.L.C.,
a Virginia limited liability company

By: _____(SEAL)
Kenneth L. Allen, Operating Manager

ATLANTIC HOMES, L.L.C.,
a Virginia limited liability company

By: _____(SEAL)
Kenneth L. Allen, Operating Manager

COMMONWEALTH OF VIRGINIA
City of Newport News, to wit:

The foregoing instrument was acknowledged before me this 10th day of August, 1999, by Kenneth L. Allen, Operating Manager, of Longhill Station, L.L.C., a Virginia limited liability company, and Atlantic Homes, L.L.C., a Virginia limited liability company

_____
Notary Public

My commission expires: 7/31/2001

AUG 11 99 0128

EXHIBIT A

All those certain parcels of land situate, lying and being in James City County, Virginia, known and designated as Lots Seventy-Seven (77) through Ninety (90), Ninety-Four (94) through One Hundred Ten (110), One Hundred Thirteen (113) through One Hundred Twenty-Five (125), and those certain parcels labeled "Natural Open Space Easement Area" all as shown on that certain plat entitled, "SUBDIVISION PLAT, LONGHILL STATION SUBDIVISION, SECTION II, OWNER/DEVELOPER, ATLANTIC HOMES DEVELOPMENT CORPORATION, POWHATAN DISTRICT, JAMES CITY COUNTY, VIRGINIA," prepared by DJG, Engineers-Architects-Surveyors, Williamsburg, Virginia, dated December 11, 1998, and duly recorded in the Clerk's Office of the Circuit Court for the City of Williamsburg and the County of James City, Virginia, in Plat Book 72, pages 17-18, to which reference is here made.

AUG 1166 0129

00029811

EXHIBIT B

All those certain parcels of land situate, lying and being in James City County, Virginia, known and designated as Lots Numbered One (1) through Sixty-Eight (68) and Seventy (70) through Seventy-Six (76), and those certain parcels labeled "Natural Open Space/Conservation Easement" all as shown on that certain plat entitled, "SUBDIVISION PLAT, LONGHILL STATION, SECTION 1A & 1B, OWNER/DEVELOPER: ATLANTIC HOMES DEVELOPMENT CORP., POWHATAN DISTRICT, JAMES CITY COUNTY, VIRGINIA," prepared by DJG, Engineers-Architects-Surveyors-Interior Designers-Planners, Williamsburg, Virginia, dated December 19, 1996, and duly recorded in the Clerk's Office of the Circuit Court for the City of Williamsburg and the County of James City, Virginia, in Plat Book 65, pages 92-94, to which reference is here made.

AUG 11 '99 0130

VIRGINIA City of Williamsburg and County of James City, to Wit:
In the Clerk's Office of the Circuit Court for the City of Williamsburg and County of James City the 11 day of Aug, 1999 this Certificate was presented with the certificate annexed and admitted to record at 3:12 o'clock.
Teste: Helene S. Ward, Clerk
By: Claudia H. Bullock
Deputy Clerk

00040301

This Document Prepared By:
David, Kamp & Frank, L.L.C.
301 Hiden Boulevard, Suite 200
Newport News, VA 23606

DID 000129

ADD'S SEC 4

SECOND SUPPLEMENTAL DECLARATION OF COVENANTS, CONDITIONS AND RESTRICTIONS OF LONGHILL STATION, SECTION 1A & 1B AND ANNEXATION INSTRUMENT ADDING LONGHILL STATION, SECTION 4

THIS SECOND SUPPLEMENTAL DECLARATION OF COVENANTS, CONDITIONS AND RESTRICTIONS OF LONGHILL STATION, SECTION 1A & 1B AND ANNEXATION INSTRUMENT ADDING LONGHILL STATION, SECTION 4, made this 29th day of December, 2000, by and between **LONGHILL STATION, L.L.C.,** a Virginia limited liability company, and **ATLANTIC HOMES, L.L.C.,** a Virginia limited liability company, hereinafter collectively referred to as "Declarant," successor in interest to **WALLACE ASSOCIATES, L.L.C.,** a Virginia limited liability company, hereinafter referred to as "Wallace."

WHEREAS, Wallace, as owner of certain real property in James City County, Virginia, caused to be recorded the "Declaration of Covenants, Conditions and Restrictions of Longhill Station, Section 1A & 1B" subjecting the real property described on Exhibit A thereto to the provisions therein; and

WHEREAS, the "Declaration of Covenants, Conditions and Restrictions of Longhill Station, Section 1A & 1B" also provides that all or any portion of certain real property described therein could be annexed thereto; and

JAN-4-2 0205

00040301

WHEREAS, by First Supplemental Declaration of Covenants, Conditions and Restrictions of Longhill Station, Section 1A & 1B, dated August 10, 1999, and recorded as Instrument No. 990017154, the Declarant annexed Longhill Station, Section II; and

WHEREAS, by various deeds, Wallace conveyed to Declarant certain real property, hereinafter referred to as "Section 4," which is described as follows:

See **Exhibit A** attached hereto and made a part hereof, and

WHEREAS, Declarant desires that "Section 4" be annexed to that certain real property hereinafter described as "Section 1A & 1B" and "Section II" described as follows:

See **Exhibit B** attached hereto and made a part hereof.

NOW, THEREFORE, Declarant hereby declares that Section 4 shall be annexed to Section 1A & 1B and Section II and shall be subject to the "Declaration of Covenants, Conditions and Restrictions of Longhill Station, Section 1A & 1B" dated February 10, 1997, and recorded in the Clerk's Office of the Circuit Court for the City of Williamsburg and County of James City, Virginia (the "Clerk's Office") as Instrument No. 970002164, and as amended by the "First Amendment to Declaration of Covenants, Conditions and Restrictions" dated September 24, 1997 and recorded in the Clerk's Office on October 10, 1997, as Instrument No. 970016383, as supplemented by "First Supplemental Declaration of Covenants, Conditions and Restrictions of Longhill Station, Section 1A & 1B and Annexation Instrument Adding Longhill Station, Section II," dated August 10, 1999, and recorded in the Clerk's Office as Instrument No. 990017154, the aforesaid documents together hereinafter collectively referred to as the "Covenants."

JAN-4 10 0206

00040301

Declarant further declares that Section 4, together with the Declarant and all owners thereof, and their heirs, successors and assigns, shall be entitled to, and subject to, all of the terms of the Covenants in the same manner as if Section 4 had been included in the legal description as contained in Exhibit A of the Covenants and is hereby within the jurisdiction of Longhill Station Homeowners Association, Inc., its successors and assigns.

IN WITNESS WHEREOF, the undersigned Declarant has caused the execution hereof as of the date and year first above written.

Declarant

LONGHILL STATION, L.L.C.,
a Virginia limited liability company

By: _____(SEAL)
Kenneth L. Allen, Operating Manager

ATLANTIC HOMES, L.L.C.,
a Virginia limited liability company

By: _____(SEAL)
Kenneth L. Allen, Operating Manager

JAN-4-02 0207

COMMONWEALTH OF VIRGINIA
City of Newport News, to wit:

The foregoing instrument was acknowledged before me this 29th day of December, 2000, by Kenneth L. Allen, Operating Manager of Longhill Station, L.L.C., a Virginia limited liability company and Operating Manager of Atlantic Homes, L.L.C. a Virginia limited liability company.

_____
Notary Public

My commission expires: 7/31/2001

00040301

EXHIBIT A

All those certain parcels of land situate, lying and being in James City County, Virginia, known and designated as Lots ONE HUNDRED SIXTY-TWO (162) through ONE HUNDRED SIXTY-EIGHT (168) and Lots ONE SEVENTY-THREE (173) through ONE HUNDRED EIGHTY-ONE (181), and those certain parcels labeled "Natural Open Space/Conservation Easement" all as shown on that certain plat entitled, "SUBDIVISION PLAT OF LONGHILL STATION, SECTION 4, POWHATAN DISTRICT, JAMES CITY COUNTY, VIRGINIA," prepared by Rickmond Engineering, Inc., Engineering-Surveying-Land Planning, Williamsburg, Virginia, dated January 24, 2000, and duly recorded in the Clerk's Office of the Circuit Court for the City of Williamsburg and the County of James City, Virginia, in Plat Book 78, pages 54 and 55, to which reference is here made.

JAN-4-5 0208

00040301

EXHIBIT B

Section 1A & 1B:

All those certain parcels of land situate, lying and being in James City County, Virginia, known and designated as Lots Numbered One (1) through Sixty-Eight (68) and Seventy (70) through Seventy-Six (76), and those certain parcels labeled "Natural Open Space/Conservation Easement" all as shown on that certain plat entitled, "SUBDIVISION PLAT, LONGHILL STATION, SECTION 1A & 1B, OWNER/DEVELOPER: ATLANTIC HOMES DEVELOPMENT CORP., POWHATAN DISTRICT, JAMES CITY COUNTY, VIRGINIA," prepared by DJG, Engineers-Architects-Surveyors-Interior Designers-Planners, Williamsburg, Virginia, dated December 19, 1996, and duly recorded in the Clerk's Office of the Circuit Court for the City of Williamsburg and the County of James City, Virginia, in Plat Book 65, pages 92-94, to which reference is here made.

And

Section II

All those certain parcels of land situate, lying and being in James City County, Virginia, known and designated as Lots Seventy-Seven (77) through Ninety (90), Ninety-Four (94) through One Hundred Ten (110), One Hundred Thirteen (113) through One Hundred Twenty-Five (125), and those certain parcels labeled "Natural Open Space Easement Area" all as shown on that certain plat entitled, "SUBDIVISION PLAT, LONGHILL STATION SUBDIVISION, SECTION II, OWNER/DEVELOPER, ATLANTIC HOMES DEVELOPMENT CORPORATION, POWHATAN DISTRICT, JAMES CITY COUNTY, VIRGINIA," prepared by DJG, Engineers-Architects-Surveyors, Williamsburg, Virginia, dated December 11, 1998, and duly recorded in the Clerk's Office of the Circuit Court for the City of Williamsburg and the County of James City, Virginia, in Plat Book 72, pages 17-18, to which reference is here made.

JAN-4-01 0209

VIRGINIA: City of Williamsburg and County of James City, to-wit:
This 2nd Supplemental Declaration was presented with certificate annexed and admitted to record on 4 Jan, 2001, at 2:26 AM/PM in the Clerk's Office of the Circuit Court of the City of Williamsburg and County of James City.
TESTE: BETSY B. WOOLRIDGE, CLERK
BY: Betsy B. Woolridge Deputy Clerk

00047442

This Document Prepared By:
David, Kamp & Frank, L.L.C.
301 Hiden Boulevard, Suite 200
Newport News, VA 23606

010 017633

THIRD SUPPLEMENTAL DECLARATION OF COVENANTS, CONDITIONS AND RESTRICTIONS OF LONGHILL STATION, SECTION 1A & 1B AND ANNEXATION INSTRUMENT ADDING LONGHILL STATION, SECTION 3 AND RESUBDIVISION OF LOTS 167 AND 168, SECTION 4

THIS THIRD SUPPLEMENTAL DECLARATION OF COVENANTS, CONDITIONS AND RESTRICTIONS OF LONGHILL STATION, SECTION 1A & 1B AND ANNEXATION INSTRUMENT ADDING LONGHILL STATION, SECTION 3 AND RESUBDIVISION OF LOTS 167 AND 168, SECTION 4, made this 20th day of September, 2001, by and between **LONGHILL STATION, L.L.C.**, a Virginia limited liability company, and **ATLANTIC HOMES, L.L.C.,** a Virginia limited liability company, hereinafter collectively referred to as "Declarant," successor in interest to **WALLACE ASSOCIATES, L.L.C.,** a Virginia limited liability company, hereinafter referred to as "Wallace."

SEP 28 = 0437

WHEREAS, Wallace, as owner of certain real property in James City County, Virginia, caused to be recorded the "Declaration of Covenants, Conditions and Restrictions of Longhill Station, Section 1A & 1B" subjecting the real property described on Exhibit A thereto to the provisions therein; and

WHEREAS, the "Declaration of Covenants, Conditions and Restrictions of Longhill Station, Section 1A & 1B" also provides that all or any portion of certain real property described therein could be annexed thereto; and

WHEREAS, by First Supplemental Declaration of Covenants, Conditions and Restrictions of Longhill Station, Section 1A & 1B, dated August 10, 1999, and recorded as Instrument No. 990017154, the Declarant annexed Longhill Station, Section II; and

WHEREAS, by Second Supplemental Declaration of Covenants, Conditions and Restrictions of Longhill Station, Section 4, dated December 29, 2000, and recorded as Instrument No. 010000129, the Declarant annexed Longhill Station, Section 4; and

WHEREAS, by various deeds, Wallace conveyed to Declarant certain real property, hereinafter referred to as "Section 3," which is described as follows:

See **Exhibit A, Parcel I** attached hereto and made a part hereof, and

WHEREAS, pursuant to the provisions of the Declaration of Covenants, Conditions and Restrictions of Longhill Station, Section 1A & 1B, the Declarant wishes to adjust the lot line for Lots 167 and 168, Longhill Station, Section 4, by adding thereto additional real property conveyed to Declarant by Wallace in various deeds, and to redesignate said lots as "Lots 167-A and 168-A, Section 4" which are described as follows:

See **Exhibit A, Parcel II** attached hereto and made a part hereof; and

WHEREAS, Declarant desires that "Section 3" and "Lots 167-A and 168-A, Section 4" be annexed to that certain real property hereinafter described as "Section 1A & 1B, " "Section II," and "Section 4" described as follows:

See **Exhibit B** attached hereto and made a part hereof.

SEP 28 = 0438

NOW, THEREFORE, Declarant hereby declares that Section 3 and Lots 167-A and 168-A, Section 4, shall be annexed to Section 1A & 1B, Section II and Section 4 and shall be subject to the "Declaration of Covenants, Conditions and Restrictions of Longhill Station, Section 1A & 1B" dated February 10, 1997, and recorded in the Clerk's Office of the Circuit Court for the City of Williamsburg and County of James City, Virginia (the "Clerk's Office") as Instrument No. 970002164, and as amended by the "First Amendment to Declaration of Covenants, Conditions and Restrictions" dated September 24, 1997 and recorded in the Clerk's Office on October 10, 1997, as Instrument No. 970016383, as supplemented by "First Supplemental Declaration of Covenants, Conditions and Restrictions of Longhill Station, Section 1A & 1B and Annexation Instrument Adding Longhill Station, Section II," dated August 10, 1999, and recorded in the Clerk's Office as Instrument No. 990017154, and further supplemented by the "Second Supplemental Declaration of Covenants, Conditions and Restrictions of Longhill Station, Section 1A & 1B and Annexation Instrument Adding Longhill Station, Section 4," dated December 29, 2000, as Instrument No. 010000129, the aforesaid documents together hereinafter collectively referred to as the "Covenants."

Declarant further declares that Section 3 and Lots 167-A and 168-A, Section 4, together with the Declarant and all owners thereof, and their heirs, successors and assigns, shall be entitled to, and subject to, all of the terms of the Covenants in the same manner as if Section 3 and Lots 167-A and 168-A, Section 4, had been included in the legal description as contained in Exhibit A of the Covenants and is hereby within the jurisdiction of Longhill Station Homeowners Association, Inc., its successors and assigns.

SEP 28 = 04 39

IN WITNESS WHEREOF, the undersigned Declarant has caused the execution hereof as of the date and year first above written.

Declarant

LONGHILL STATION, L.L.C.,
a Virginia limited liability company

By: _____(SEAL)
Kenneth L. Allen, Operating Manager

ATLANTIC HOMES, L.L.C.,
a Virginia limited liability company

By: _____(SEAL)
Kenneth L. Allen, Operating Manager

COMMONWEALTH OF VIRGINIA
City of Newport News, to wit:

The foregoing instrument was acknowledged before me this 27th day of September, 2001, by Kenneth L. Allen, Operating Manager of Longhill Station, L.L.C., a Virginia limited liability company and Operating Manager of Atlantic Homes, L.L.C, a Virginia limited liability company.

_____
Notary Public

My commission expires: 5/31/02

SEP 28 = 0440

EXHIBIT A

Parcel I

All those certain parcels of land situate, lying and being in James City County, Virginia, known and designated as Lots ONE HUNDRED FORTY (140) THROUGH ONE HUNDRED FIFTY-THREE (153) INCLUSIVE, and LOTS ONE HUNDRED SIXTY-NINE (169) THROUGH ONE HUNDRED SEVENTY-TWO (172), INCLUSIVE, and those certain parcels labeled "Natural Open Space/Conservation Easement" all as shown on that certain plat entitled, "SUBDIVISION PLAT OF LONGHILL STATION, SECTION 3, AND RESUBDIVISION OF LOTS 167 & 168, SUBDIVISION OF LONGHILL STATION, SECTION 4, POWHATAN DISTRICT, JAMES CITY COUNTY, VIRGINIA," prepared by Engineering, Inc., Engineering-Surveying-Land Planning, Williamsburg, Virginia, dated November 8, 2000, and duly recorded in the Clerk's Office of the Circuit Court for the City of Williamsburg and the County of James City, Virginia, in Plat Book 82, pages 63-66, to which reference is here made.

Parcel II:

All those certain parcels of land situate, lying and being in James City County, Virginia, known and designated as Lots ONE HUNDRED SIXTY-SEVEN-A (167-A) AND ONE HUNDRED SIXTY-EIGHT-A (168-A), as shown on that certain plat entitled, "SUBDIVISION PLAT OF LONGHILL STATION, SECTION 3, AND RESUBDIVISION OF LOTS 167 & 168, SUBDIVISION OF LONGHILL STATION, SECTION 4, POWHATAN DISTRICT, JAMES CITY COUNTY, VIRGINIA," prepared by Rickmond Engineering, Inc., Engineering-Surveying-Land Planning, Williamsburg, Virginia, dated November 8, 2000, and duly recorded in the Clerk's Office of the Circuit Court for the City of Williamsburg and the County of James City, Virginia, in Plat Book 82, pages 63-66, to which reference is here made.

SEP 28 2 0441

EXHIBIT B

Section 1A & 1B:

All those certain parcels of land situate, lying and being in James City County, Virginia, known and designated as Lots Numbered One (1) through Sixty-Eight (68) and Seventy (70) through Seventy-Six (76), and those certain parcels labeled "Natural Open Space/Conservation Easement" all as shown on that certain plat entitled, "SUBDIVISION PLAT, LONGHILL STATION, SECTION 1A & 1B, OWNER/DEVELOPER: ATLANTIC HOMES DEVELOPMENT CORP., POWHATAN DISTRICT, JAMES CITY COUNTY, VIRGINIA," prepared by DJG, Engineers-Architects-Surveyors-Interior Designers-Planners, Williamsburg, Virginia, dated December 19, 1996, and duly recorded in the Clerk's Office of the Circuit Court for the City of Williamsburg and the County of James City, Virginia, in Plat Book 65, pages 92-94, to which reference is here made.

Section II

All those certain parcels of land situate, lying and being in James City County, Virginia, known and designated as Lots Seventy-Seven (77) through Ninety (90), Ninety-Four (94) through One Hundred Ten (110), One Hundred Thirteen (113) through One Hundred Twenty-Five (125), and those certain parcels labeled "Natural Open Space Easement Area" all as shown on that certain plat entitled, "SUBDIVISION PLAT, LONGHILL STATION SUBDIVISION, SECTION II, OWNER/DEVELOPER, ATLANTIC HOMES DEVELOPMENT CORPORATION, POWHATAN DISTRICT, JAMES CITY COUNTY, VIRGINIA," prepared by DJG, Engineers-Architects-Surveyors, Williamsburg, Virginia, dated December 11, 1998, and duly recorded in the Clerk's Office of the Circuit Court for the City of Williamsburg and the County of James City, Virginia, in Plat Book 72, pages 17-18, to which reference is here made.

And

Section 4

All those certain parcels of land situate, lying and being in James City County, Virginia, known and designated as Lots ONE HUNDRED SIXTY-TWO (162) through ONE HUNDRED SIXTY-EIGHT (168) and

SEP 28 = 0442

Lots ONE SEVENTY-THREE (173) through ONE HUNDRED EIGHTY-ONE (181), and those certain parcels labeled "Natural Open Space/Conservation Easement" all as shown on that certain plat entitled, "SUBDIVISION PLAT OF LONGHILL STATION, SECTION 4, POWHATAN DISTRICT, JAMES CITY COUNTY, VIRGINIA," prepared by Rickmond Engineering, Inc., Engineering-Surveying-Land Planning, Williamsburg, Virginia, dated January 24, 2000, and duly recorded in the Clerk's Office of the Circuit Court for the City of Williamsburg and the County of James City, Virginia, in Plat Book 78, pages 54 and 55, to which reference is here made.

VIRGINIA: City of Williamsburg and County of James City, to Wit:
In the Clerk's Office at the Circuit Court for the City of Williamsburg and County of James City the 28 day of Sept, 2001 this Dec. was presented with the certificate annexed and admitted to record at 1:04 PM o'clock.
Teste:
By: Betty B. Weedridge
Deputy Clerk

SEP 28 ⊟ 0443

James City County Environmental Division
Stormwater Management/BMP Record Drawing & Construction Certification Review
Tracking Form

Project Name: Longhill Station Sec. 3+4 (Pond D)
County Plan No.: 5-19-99
Stormwater Management Facility: Wet Pond
BMP Phase #: ☐ I ☒ II ☐ III
☑ Information Package Received. Date/By: JAN 17 2006 LANDTECH
☐ Completeness Check:
- ☑ Record Drawing Date/By: JAN 17 2006 LANDTECH
- ☑ Construction Certification Date/By: NOV 3 2006 GET
- ☒ RD/CC Standard Forms N/A (Required for all BMPs after Feb 1st 2001Only)
- ☐ Insp/Maint Agreement # / Date: *
- ☑ BMP Maintenance Plan Location: N/A
- ☐ Other:

☑ Standard E&SC Note on Approved Plan Requiring RD/CC or County comment in plan review
- ☑ Yes ☐ No Location: Note 18 on Sheet C5 (AB, CC)

☑ Assign **County BMP ID Code #**: Code: PC-120
☑ Preliminary Input/Log into Division's "As-Built Tracking Log"
☑ Add Location to GIS Map. Obtain basic site information (GPIN, Owner, Address, etc.)
☑ Preliminary Log into Access Database (BMP ID #, Plan No., GPIN, Project Name, etc.)
☑ Active Project File Review (correspondence, H&H, design computations, etc.).
☑ Initial As-Built File setup (File label, folder, copy plan/details/design information, etc.).
☑ Inspector Check of RD/CC (forward to Inspector using transmittal for cursory review).
☑ Pre-Inspection Drawing Review of Approved Plan (Quick look prior to Field Inspection).
☑ Final Inspection (FI) Performed Date: 12/9/06
☑ Record Drawing (RD) Review Date: 12/9/06
☐ Construction Certification (CC) Review Date: N/A
☒ Actions:
- ☐ No comments.
- ☒ Comments. Letter Forwarded. Date: 1/3/07
- ☒ Record Drawing (RD)
- ☐ Construction Certification (CC)
- ☒ Construction-Related (CR)
- ☐ Site Issues (SI)
- ☐ Other :

☒ Second Submission: 6/18/07 + 7/3/07
☒ Reinspection (if necessary): 6/27/07 + 4/07
☒ Acceptable for SWM Purposes (RD/CC/CR/Other). Ok to proceed with bond release.
☒ Complete "Surety Request Form".
☒ Check/Clean active file of any remaining material and finish "As-Built" file.
☒ Add to County BMP Inventory/Inspection schedule (Phase I, II or III).
☒ Copy Final Inspection Report into County BMP Inspection Program file.
☒ Obtain Digital Photographs of BMP and save into County BMP Inventory.
☒ Request mylar/reproducible from As-Built plan preparer.
☒ Complete "As-built Tracking Log".
☒ Last check of BMP Access Database (County BMP Inventory).
~~☐ Add BMP to JCC Hydrology & Hydraulic database (optional).~~
~~☐ Add BMP to Municipal BMP list (if a County-owned facility).~~
☒ Add BMP to PRIDE BMP ratings database.

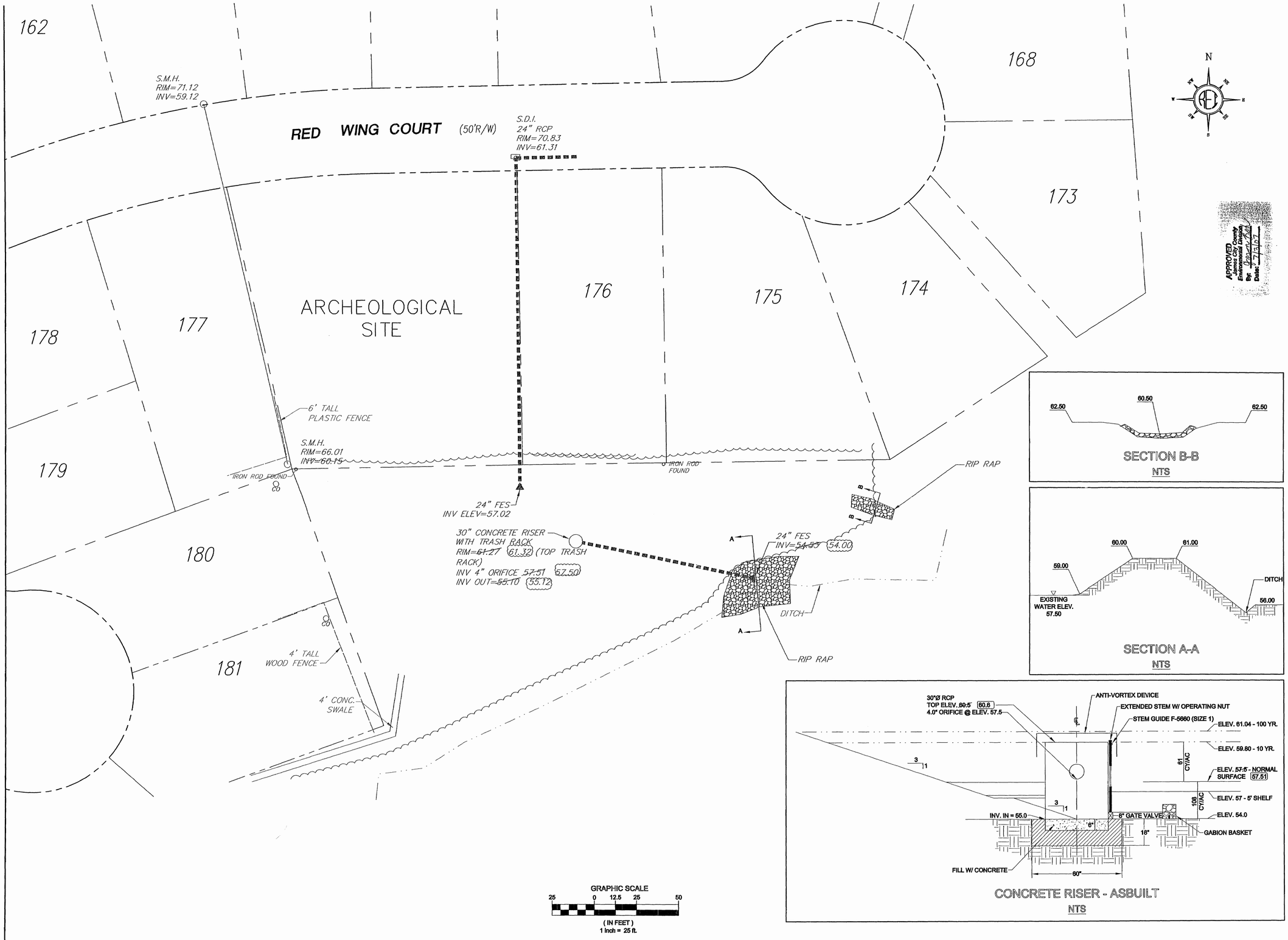
Final Sign-Off

Plan Reviewer: Jason Beck Date: 7/5/07

*** See separate checklist, if needed.

07-05-07

* Tried to get maintenance agreement from devoloper, but HOA Longhill Station had already taking control. Scott noted that the Pond D Agreement was probably transfer to HOA with the other ponds when the developer turned them over to the HOA.



APPROVED
James City County
Environmental Division
By: [illegible]
Date: 7/13/07

NO.	DATE	REVISION	APPROVAL
1	06/14/07	REVISIONS TO BMP STRUCTURES	LDE

Bury+Partners
ENGINEERING SOLUTIONS
4005 Ironbound Road, Suite 200
Williamsburg, Virginia 23188
Tel. (757) 229-1776 Fax (757) 229-4683
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COMMONWEALTH OF VIRGINIA
LYNN D. EVANS
1279
6/13/07
LAND SURVEYOR

POND "D" AS-BUILT
LONGHILL STATION SUBDIVISION
JAMES CITY COUNTY, VIRGINIA

RED WING COURT

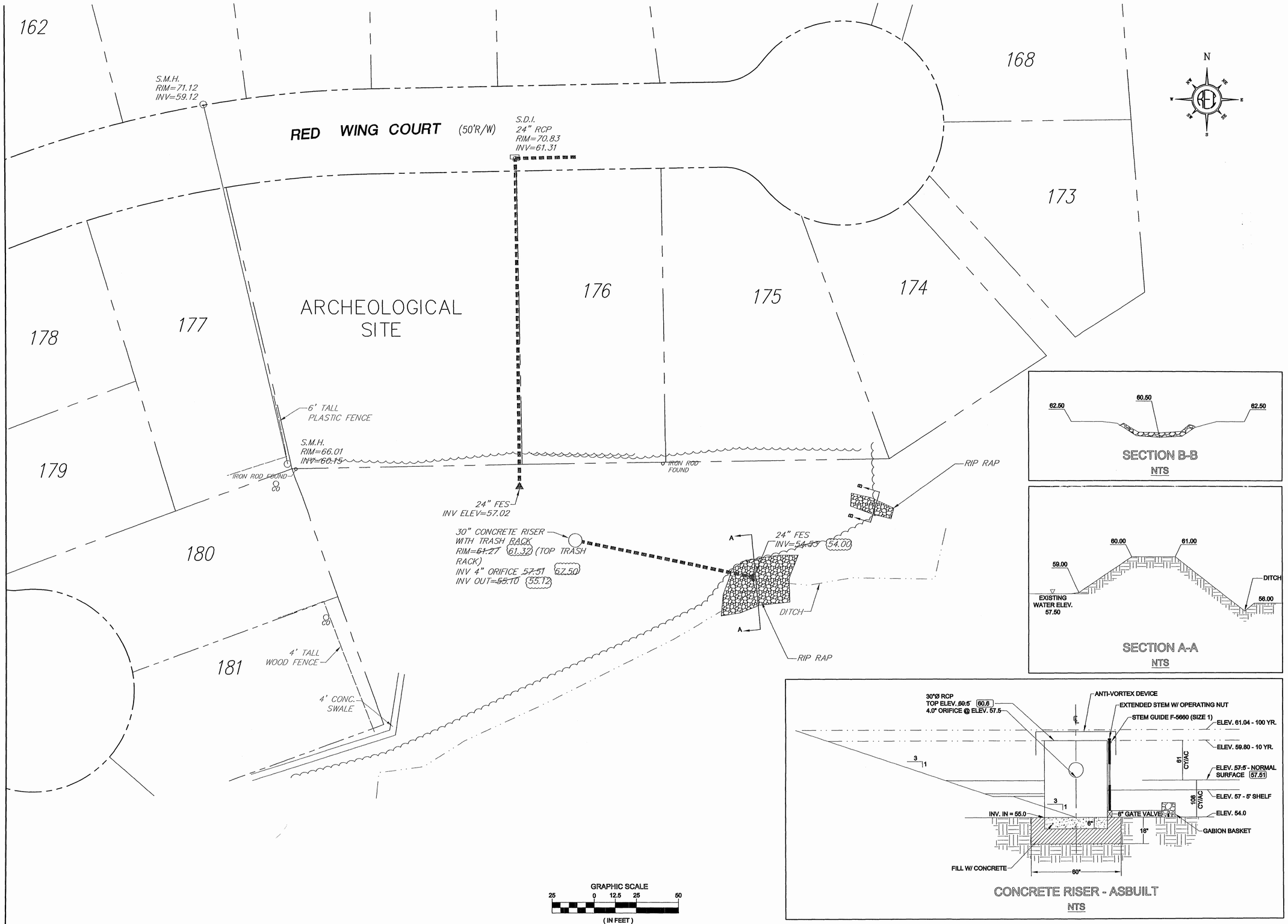
JAMES CITY COUNTY VIRGINIA

PLOTTING SCALE: 1"=25'
DATE PLOTTED: 1/6/06
FILE: Revised Pond as-built.dwg
DRAWN BY: DRD
DESIGNED BY: LDE
REVIEWED BY: LDE
PROJECT NO.: 212090005

SHEET 1 OF 1

h:\21209 - McCale Development Corporation\0005 - Long Hill Station Pond As-Built\survey\Revised Pond as-built.dwg 6/14/2007 2:51:19 PM EDT

PC020_PC021_PC022_PC119_PC120_LONGHILL_STATION - 444



NO.	DATE	REVISION	APPROVAL
1	06/14/07	REVISIONS TO BMP STRUCTURES	LDE

Bury+Partners
ENGINEERING SOLUTIONS
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COMMONWEALTH OF VIRGINIA
LYNN D. EVANS
1279
6/18/07
LAND SURVEYOR

POND "D" AS-BUILT
LONGHILL STATION SUBDIVISION
JAMES CITY COUNTY, VIRGINIA

RED WING COURT

JAMES CITY COUNTY VIRGINIA

PLOTTING SCALE: 1"=25'
DATE PLOTTED: 1/6/06
FILE: Revised Pond as-built.dwg
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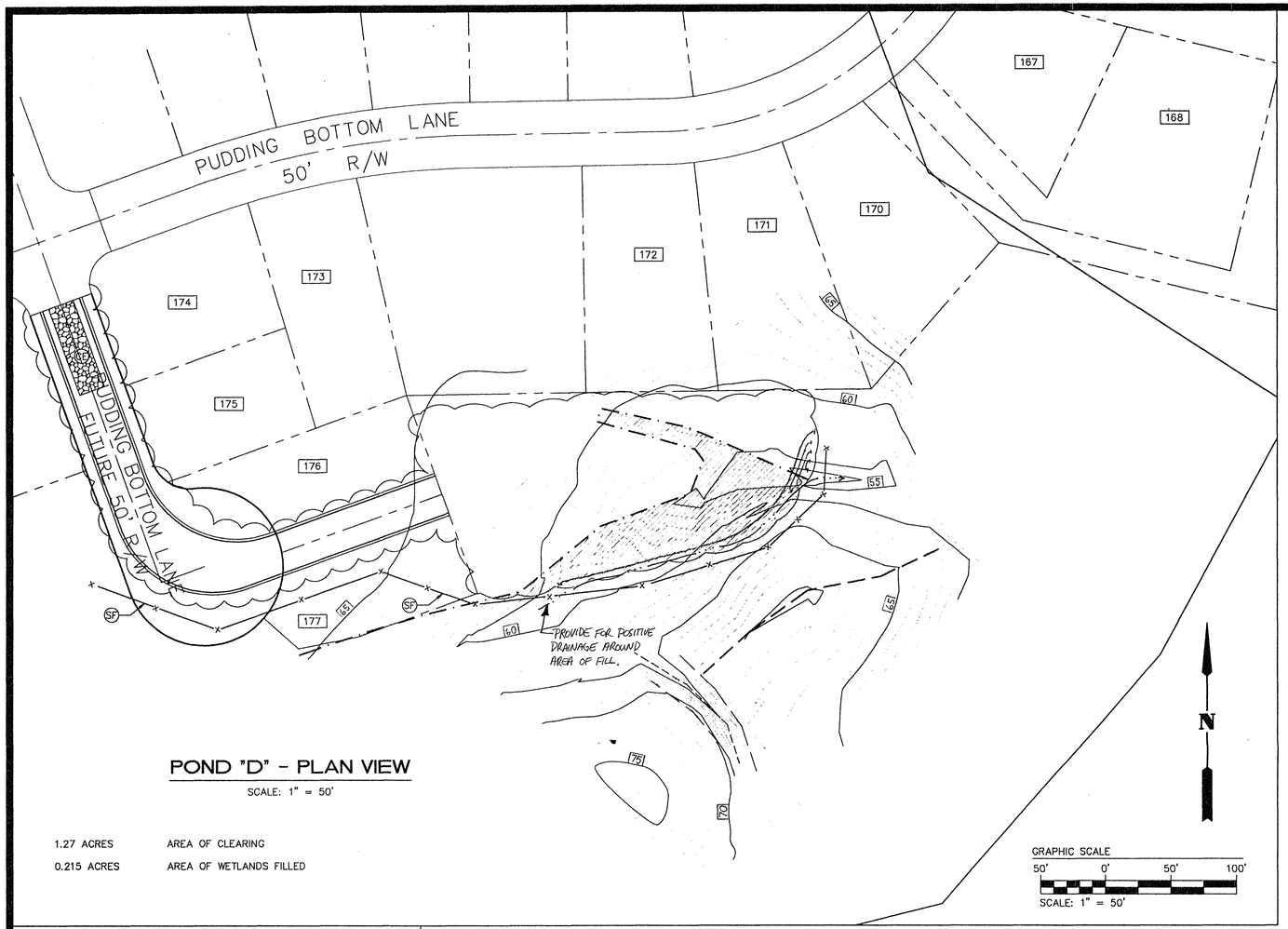
SHEET 1 OF 1

I:\21209 - McCale Development Corporation\0005 - Long Hill Station Pond As-Built\survey\Revised Pond as-built.dwg 6/14/2007 2:51:19 PM EDT



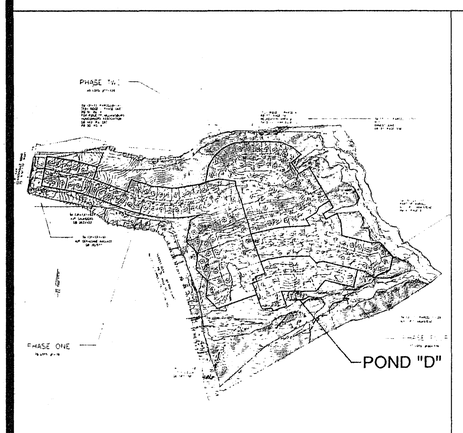
POND "D" - PLAN VIEW

SCALE: 1" = 50'

1.27 ACRES	AREA OF CLEARING
0.215 ACRES	AREA OF WETLANDS FILLED

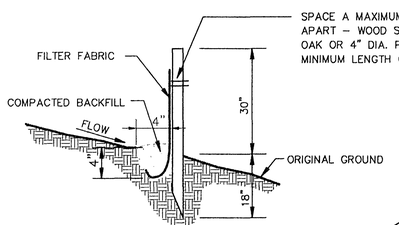
LEGEND

AREA OF WETLANDS CLEARED



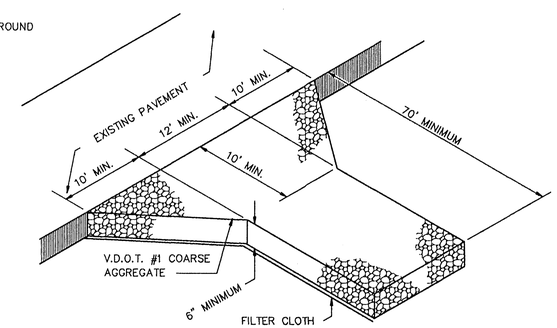
VICINITY MAP

N.T.S.



(SF) SILT FENCE VESCH 3.05

NOT TO SCALE



(CE) TEMPORARY STONE CONSTRUCTION ENTRANCE VESCH 3.02

NOT TO SCALE

REVISED BY JCC: 4/7/97

EROSION AND SEDIMENT CONTROL NOTES

THE PURPOSE OF THE EROSION CONTROL MEASURES SHOWN ON THESE PLANS SHALL BE TO PRECLUDE THE TRANSPORT OF ALL WATERBORNE SEDIMENTS RESULTING FROM CONSTRUCTION ACTIVITIES FROM ENTERING ONTO ADJACENT PROPERTIES OR STATE WATERS. IF FIELD INSPECTION REVEALS THE INADEQUACY OF THE PLAN TO CONFINE SEDIMENT TO THE PROJECT SITE, APPROPRIATE MODIFICATIONS WILL BE MADE TO CORRECT ANY PLAN DEFICIENCIES. IN ADDITION TO THESE NOTES, ALL PROVISIONS OF THE VIRGINIA EROSION AND SEDIMENT CONTROL REGULATIONS SHALL APPLY TO THIS PROJECT.

1. ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE "VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK." THE CONTRACTOR SHALL BE THOROUGHLY FAMILIAR WITH ALL APPLICABLE MEASURES CONTAINED THEREIN WHICH MAY BE PERTINENT TO THIS PROJECT.

2. ALL POINTS OF CONSTRUCTION INGRESS AND EGRESS SHALL BE PROTECTED BY A TEMPORARY CONSTRUCTION ENTRANCE TO PREVENT TRACKING OF MUD ONTO PUBLIC RIGHT-OF-WAYS. AN ENTRANCE PERMIT FROM VDOT IS REQUIRED PRIOR TO ANY CONSTRUCTION ACTIVITIES WITHIN STATE RIGHT-OF-WAYS. WHERE SEDIMENT IS TRANSPORTED ONTO A PUBLIC ROAD SURFACE, THE ROAD SHALL BE THOROUGHLY CLEANED AT THE END OF EACH DAY.

3. A PRECONSTRUCTION MEETING SHALL BE HELD ON SITE BETWEEN THE COUNTY, THE DEVELOPER, THE PROJECT ENGINEER, AND THE CONTRACTOR PRIOR TO THE ISSUANCE OF THE LAND DISTURBING PERMIT. THE CONTRACTOR SHALL SUBMIT A SEQUENCE OF CONSTRUCTION TO THE COUNTY FOR APPROVAL PRIOR TO THE PRECONSTRUCTION MEETING. THE CONTRACTOR WILL SUPPLY THE ENVIRONMENTAL DIVISION WITH THE NAME OF THE INDIVIDUAL WHO WILL BE RESPONSIBLE FOR ENSURING MAINTENANCE OF INSTALLED MEASURES ON A DAILY BASIS.

4. SEDIMENT BASINS AND TRAPS, PERIMETER DIKES, SEDIMENT BARRIERS AND OTHER MEASURES INTENDED TO TRAP SEDIMENT ON-SITE MUST BE CONSTRUCTED AS A FIRST STEP IN GRADING AND BE MADE FUNCTIONAL BEFORE UPSLOPE LAND DISTURBANCE TAKES PLACE. EARTHEN STRUCTURES SUCH AS DAMS, DIKES, AND DIVERSIONS MUST BE SEEDED AND MULCHED IMMEDIATELY AFTER INSTALLATION. PERIODIC INSPECTIONS OF THE EROSION CONTROL MEASURES SHALL BE MADE TO ACCESS THEIR CONDITION. ANY NECESSARY MAINTENANCE OF THE MEASURES SHALL BE ACCOMPLISHED IMMEDIATELY UPON NOTIFICATION BY THE COUNTY AND SHALL INCLUDE THE REPAIR OF MEASURES DAMAGED BY ANY SUBCONTRACTOR INCLUDING THOSE OF THE PUBLIC UTILITY COMPANIES.

5. SURFACE FLOWS OVER CUT AND FILL SLOPES SHALL BE CONTROLLED BY EITHER REDIRECTING FLOWS FROM TRANSVERSING THE SLOPES OR BY INSTALLING MECHANICAL DEVICES TO SAFELY LOWER WATER DOWNSLOPE WITHOUT CAUSING EROSION. A TEMPORARY FILL DIVERSION (STD. & SPEC. 3.10) SHALL BE INSTALLED PRIOR TO THE END OF EACH WORKING DAY.

6. SEDIMENT CONTROL MEASURES MAY REQUIRE MINOR FIELD ADJUSTMENTS AT TIME OF CONSTRUCTION TO INSURE THEIR INTENDED PURPOSE IS ACCOMPLISHED. ENVIRONMENTAL DIVISION APPROVAL WILL BE REQUIRED FOR OTHER DEVIATIONS FROM THE APPROVED PLANS.

7. THE CONTRACTOR SHALL PLACE SOIL STOCKPILES AT THE LOCATIONS SHOWN ON THIS PLAN OR AS DIRECTED BY THE ENGINEER. SOIL STOCKPILES SHALL BE STABILIZED OR PROTECTED WITH SEDIMENT TRAPPING MEASURES. OFF-SITE WASTE OR BORROW AREAS SHALL BE APPROVED BY THE ENVIRONMENTAL DIVISION PRIOR TO THE IMPORT OF ANY BORROW OR EXPORT OF ANY WASTE TO OR FROM THE PROJECT SITE.

8. THE CONTRACTOR SHALL COMPLETE DRAINAGE FACILITIES WITHIN 30 DAYS FOLLOWING COMPLETION OF ROUGH GRADING AT ANY POINT WITHIN THE PROJECT. THE INSTALLATION OF DRAINAGE FACILITIES SHALL TAKE PRECEDENCE OVER ALL UNDERGROUND UTILITIES. OUTFALL DITCHES FROM DRAINAGE STRUCTURES SHALL BE STABILIZED IMMEDIATELY AFTER CONSTRUCTION OF SAME. THIS INCLUDES INSTALLATION OF EROSION CONTROL STONE OR PAVED DITCHES WHERE REQUIRED. ANY DRAINAGE OUTFALLS REQUIRED FOR A STREET MUST BE COMPLETED BEFORE STREET GRADING OR UTILITY INSTALLATION BEGINS.

9. PERMANENT OR TEMPORARY SOIL STABILIZATION MUST BE APPLIED TO ALL DENUDED AREAS WITHIN 7 DAYS AFTER FINAL GRADE IS REACHED ON ANY PORTION OF THE SITE. SOIL STABILIZATION MUST ALSO BE APPLIED TO DENUDED AREAS WHICH MAY NOT BE AT FINAL GRADE BUT WILL REMAIN DORMANT (UNDISTURBED) FOR LONGER THAN 30 DAYS. SOIL STABILIZATION MEASURES INCLUDE VEGATATIVE ESTABLISHMENT, MULCHING AND THE EARLY APPLICATION OF GRAVEL BASE MATERIAL ON AREAS TO BE PAVED.

10. NO MORE THAN 300 FEET OF SANITARY SEWER, STORM SEWER, WATERLINES, OR UNDERGROUND UTILITY LINES ARE TO BE OPEN AT ONE TIME. FOLLOWING INSTALLATION OF ANY PORTION OF THESE ITEMS, ALL DISTURBED AREAS ARE TO BE IMMEDIATELY STABILIZED (I.E., THE SAME DAY).

11. IF DISTURBED AREA STABILIZATION IS TO BE ACCOMPLISHED DURING THE MONTHS OF DECEMBER, JANUARY, OR FEBRUARY. STABILIZATION SHALL CONSIST OF MULCHING IN ACCORDANCE WITH SPECIFICATION 3.35. SEEDING WILL THEN TAKE PLACE AS SOON AS THE SEASON PERMITS.

12. THE TERM SEEDING, FINAL VEGETATIVE COVER OR STABILIZATION, ON THIS PLAN SHALL MEAN THE SUCCESSFUL GERMINATION AND ESTABLISHMENT OF A STABLE GRASS COVER FROM A PROPERLY PREPARED SEEDBED CONTAINING THE SPECIFIED AMOUNTS OF SEED, LIME, AND FERTILIZER IN ACCORDANCE WITH SPECIFICATION 3.32, PERMANENT SEEDING. IRRIGATION SHALL BE REQUIRED AS NECESSARY TO ENSURE THE ESTABLISHMENT OF GRASS COVER.

13. ALL SLOPES STEEPER THAN 3:1 SHALL REQUIRE THE USE OF EROSION CONTROL BLANKETS SUCH AS EXCELSIOR BLANKETS TO AID IN THE ESTABLISHMENT OF A VEGETATIVE COVER. INSTALLATION SHALL BE IN ACCORDANCE WITH SPECIFICATION 3.35, MULCHING AND MANUFACTURER'S INSTRUCTIONS. NO SLOPES SHALL BE CREATED STEEPER THAN 2:1.

14. INLET PROTECTION IN ACCORDANCE WITH SPECIFICATION 3.07 SHALL BE PROVIDED FOR ALL STORM DRAIN INLETS AS SOON AS PRACTICAL FOLLOWING CONSTRUCTION OF SAME.

15. TEMPORARY LINERS, SUCH AS POLYETHYLENE SHEETS, SHALL BE PROVIDED FOR ALL PAVED DITCHES UNTIL THE PERMANENT CONCRETE LINER IS INSTALLED.

16. PAVED DITCHES SHALL BE REQUIRED WHEREVER EROSION IS EVIDENT. PARTICULAR ATTENTION SHALL BE PAID TO THOSE AREAS WHERE GRADES EXCEED 3 PERCENT.

17. TEMPORARY EROSION CONTROL MEASURES ARE NOT TO BE REMOVED UNTIL ALL DISTURBED AREAS ARE STABILIZED. AFTER STABILIZATION IS COMPLETE, ALL MEASURES SHALL BE REMOVED WITHIN 30 DAYS. TRAPPED SEDIMENT SHALL BE SPREAD AND SEEDED.

18. AS-BUILT DRAWINGS MUST BE PROVIDED FOR ALL DETENTION/BMP FACILITIES. ALSO UPON COMPLETION, THE CONSTRUCTION OF ALL DETENTION/BMP FACILITIES SHALL BE CERTIFIED BY A PROFESSIONAL ENGINEER WHO INSPECTED THE STRUCTURE DURING CONSTRUCTION. THE CERTIFICATION SHALL STATE THAT TO THE BEST OF HIS/HER JUDGMENT, KNOWLEDGE, AND BELIEF, THE STRUCTURE WAS CONSTRUCTED IN ACCORDANCE WITH THE APPROVAL PLANS AND SPECIFICATIONS.

REFERENCE : VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK, THIRD EDITION, 1992

REVISIONS

NO.	DATE	DESCRIPTION

DJC
ENGINEERS · ARCHITECTS · SURVEYORS
INTERIOR DESIGNERS · PLANNERS
P.O. BOX 3505 WILLIAMSBURG, VIRGINIA 23187 (757)253-0673 (757)874-5015

DANIEL J. DE YOUNG No. 3317 LICENSED PROFESSIONAL ENGINEER COMMONWEALTH OF VIRGINIA

REVISED SITE PLAN – "POND D"

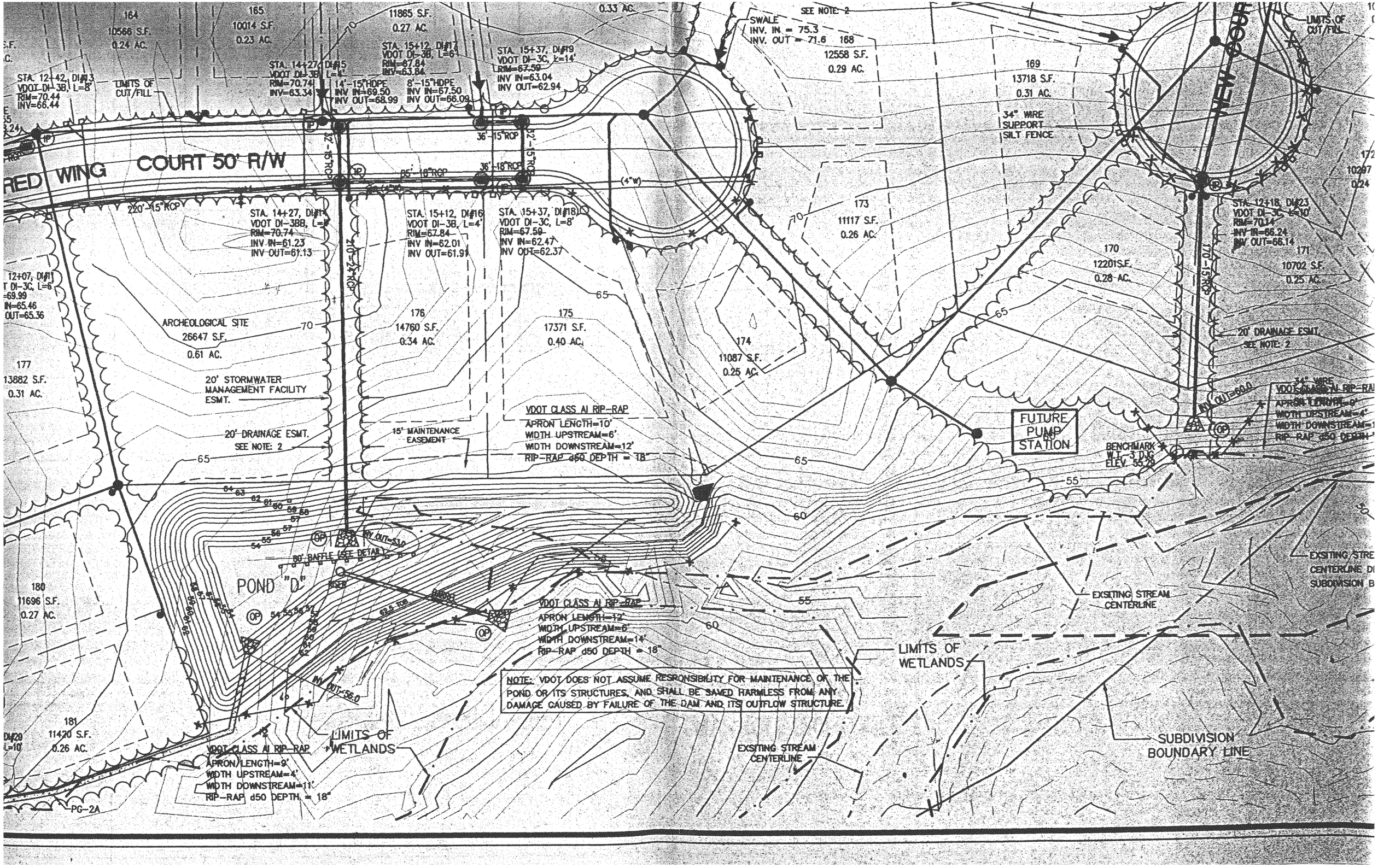
LONGHILL STATION SUBDIVISION
ATLANTIC HOMES DEVELOPMENT CORPORATION
JAMES CITY COUNTY, VIRGINIA

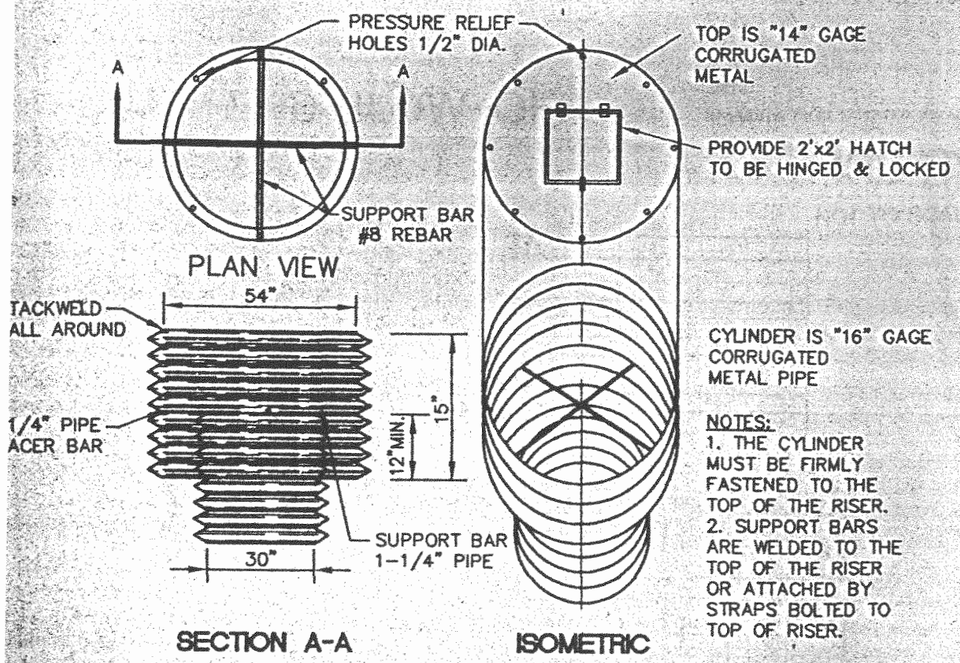
SCALE	AS SHOWN
DESIGNED	HLPG
DRAWN	CLJ
CHECKED	HLPG
DATE	7/23/97

1940221
COMMISSION NO.

SHEET
C1
1 OF 1

FILENAME: POND.DWG
PLOT DATE: 7/23/97
PLOT SCALE: 1"=1'


RED WING COURT 50' R/W
164
10566 S.F.
0.24 AC.
165
10014 S.F.
0.23 AC.
11865 S.F.
0.27 AC.
0.33 AC.
SEE NOTE: 2
SWALE
INV. IN = 75.3
INV. OUT = 71.6
168
12558 S.F.
0.29 AC.
169
13718 S.F.
0.31 AC.
34" WIRE SUPPORT SILT FENCE
LIMITS OF CUT/FILL
STA. 12+42, DI#3
VDOT DI-3B, L=8'
RIM=70.44
INV=66.44
STA. 14+27, DI#5
VDOT DI-3B, L=4'
RIM=70.74
INV=63.34
STA. 15+12, DI#17
VDOT DI-3B, L=6'
RIM=67.84
INV=63.84
STA. 15+37, DI#19
VDOT DI-3C, L=14'
RIM=67.59
INV IN=63.04
INV OUT=62.94
14'-15"HDPE
INV IN=69.50
INV OUT=68.99
8'-15"HDPE
INV IN=67.50
INV OUT=66.09
36'-15"RCP
32'-15"RCP
85'-18"RCP
36'-18"RCP
220'-15"RCP
STA. 14+27, DI#14
VDOT DI-3BB, L=8'
RIM=70.74
INV IN=61.23
INV OUT=61.13
STA. 15+12, DI#16
VDOT DI-3B, L=4'
RIM=67.84
INV IN=62.01
INV OUT=61.91
STA. 15+37, DI#18
VDOT DI-3C, L=8'
RIM=67.59
INV IN=62.47
INV OUT=62.37
210'-24"RCP
173
11117 S.F.
0.26 AC.
170
12201S.F.
0.28 AC.
171
10702 S.F.
0.25 AC.
STA. 12+18, DI#23
VDOT DI-3C, L=10'
RIM=70.14
INV IN=66.24
INV OUT=66.14
170'-15"RCP
20' DRAINAGE ESMT.
SEE NOTE: 2
12+07, DI#1
DI-3C, L=6
=69.99
IN=65.46
OUT=65.36
ARCHEOLOGICAL SITE
26647 S.F.
0.61 AC.
176
14760 S.F.
0.34 AC.
175
17371 S.F.
0.40 AC.
174
11087 S.F.
0.25 AC.
177
13882 S.F.
0.31 AC.
20' STORMWATER MANAGEMENT FACILITY ESMT.
20' DRAINAGE ESMT.
SEE NOTE: 2
15' MAINTENANCE EASEMENT
VDOT CLASS AI RIP-RAP
APRON LENGTH=10'
WIDTH UPSTREAM=6'
WIDTH DOWNSTREAM=12'
RIP-RAP d50 DEPTH = 18"
FUTURE PUMP STATION
BENCHMARK
W.T.-3 D.G.
ELEV. 55.28
34" WIRE
VDOT CLASS AI RIP-RAP
APRON LENGTH=9'
WIDTH UPSTREAM=4'
WIDTH DOWNSTREAM=
RIP-RAP d50 DEPTH
INV OUT=60.0
INV OUT=53.0
80' BAFFLE (SEE DETAIL)
POND "D"
INV OUT=56.0
VDOT CLASS AI RIP-RAP
APRON LENGTH=12'
WIDTH UPSTREAM=6'
WIDTH DOWNSTREAM=14'
RIP-RAP d50 DEPTH = 18"
NOTE: VDOT DOES NOT ASSUME RESPONSIBILITY FOR MAINTENANCE OF THE POND OR ITS STRUCTURES, AND SHALL BE SAVED HARMLESS FROM ANY DAMAGE CAUSED BY FAILURE OF THE DAM AND ITS OUTFLOW STRUCTURE.
180
11696 S.F.
0.27 AC.
181
11420 S.F.
0.26 AC.
LIMITS OF WETLANDS
EXSITING STREAM CENTERLINE
SUBDIVISION BOUNDARY LINE
VDOT CLASS AI RIP-RAP
APRON LENGTH=9'
WIDTH UPSTREAM=4'
WIDTH DOWNSTREAM=11'
RIP-RAP d50 DEPTH = 18"
PG-2A



ANTI - VORTEX DEVICE

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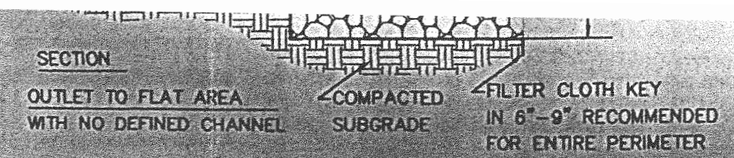
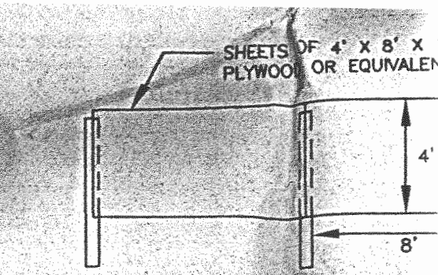


RIPRAP VESCH 3.19

OP

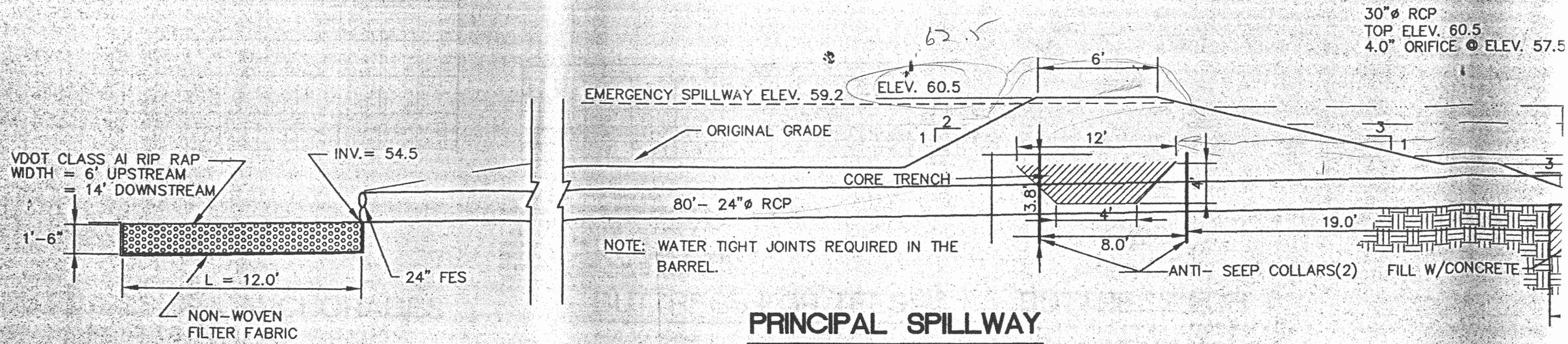
NOT TO SCALE



BA

NOTES:

1. VDOT DOES NOT ASSUME RESPONSIBILITY FOR MAINTENANCE OF THE STORMWATER PONDS OR THEIR STRUCTURES, AND SHALL BE SAVED HARMLESS FROM ANY DAMAGE.
2. ALL UNSUITABLE MATERIAL LOCATED UNDER THE DAM EMBANKMENT SHALL BE REMOVED AND DISPOSED OF BY THE CONTRACTOR.
3. DETENTION POND SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. 1 SPEC. 3.14 – TEMPORARY SEDIMENT BASIN AS OUTLINED IN THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK, THIRD EDITION, 1990.
4. ORDER OF INSTALLATION OF DEWATERING DEVICES:
   A) DEWATERING SYSTEM DETAIL TO BE INSTALLED DURING CONSTRUCTION.
   B) UPON COMPLETION OF CONSTRUCTION, REMOVE DEWATERING SYSTEM DETAIL 1 AND INSTALL THE ORIFICE PROTECTION ELBOW.
5. CONTRACTOR TO ENSURE THE PLACEMENT OF THE GATE VALVE AND AND ITS COMPONENTS DOES NOT CONFLICT WITH RISER, ORIFICE, OR ORIFICE ELBOW.



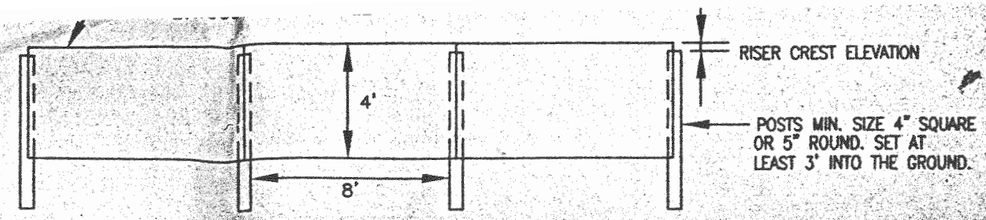
NOTE: WATER TIGHT JOINTS REQUIRED IN THE BARREL.

PRINCIPAL SPILLWAY

NOT TO SCALE

FOR ENTIRE PERIMETER

SCH 3.19



BAFFLE DETAIL

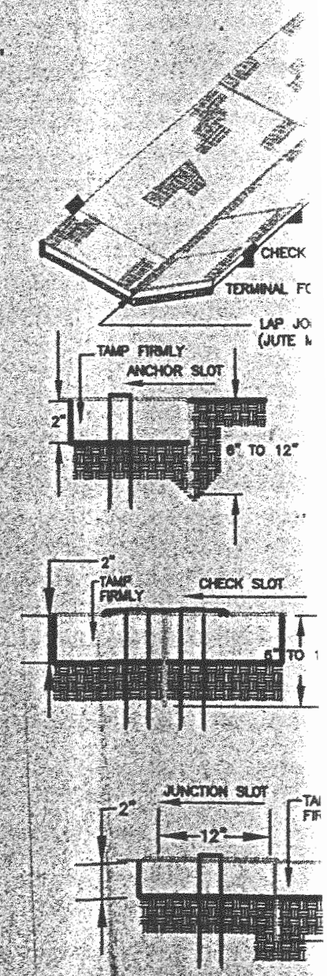
NOT TO SCALE

TO THOSE AREAS WHERE GRADES

17. TEMPORARY EROSION CONTROL ME
STABILIZED. AFTER STABILIZATION
TRAPPED SEDIMENT SHALL BE SPR

18. AS-BUILT DRAWINGS MUST BE PRO
CONSTRUCTION OF ALL DETENTION/
INSPECTED THE STRUCTURE DURING
HIS/HER JUDGMENT, KNOWLEDGE, A
THE APPROVAL PLANS AND SPECIF

REFERENCE : VIRGINIA EROSION AN



ES-2 (SOIL
INSTALLA

NOTES:

1. VDOT DOES NOT ASSUME RESPONSIBILITY FOR MAINTENANCE OF THE STORMWATER PONDS OR THEIR STRUCTURES, AND SHALL BE SAVED HARMLESS FROM ANY DAMAGE.
2. ALL UNSUITABLE MATERIAL LOCATED UNDER THE DAM EMBANKMENT SHALL BE REMOVED AND DISPOSED OF BY THE CONTRACTOR.
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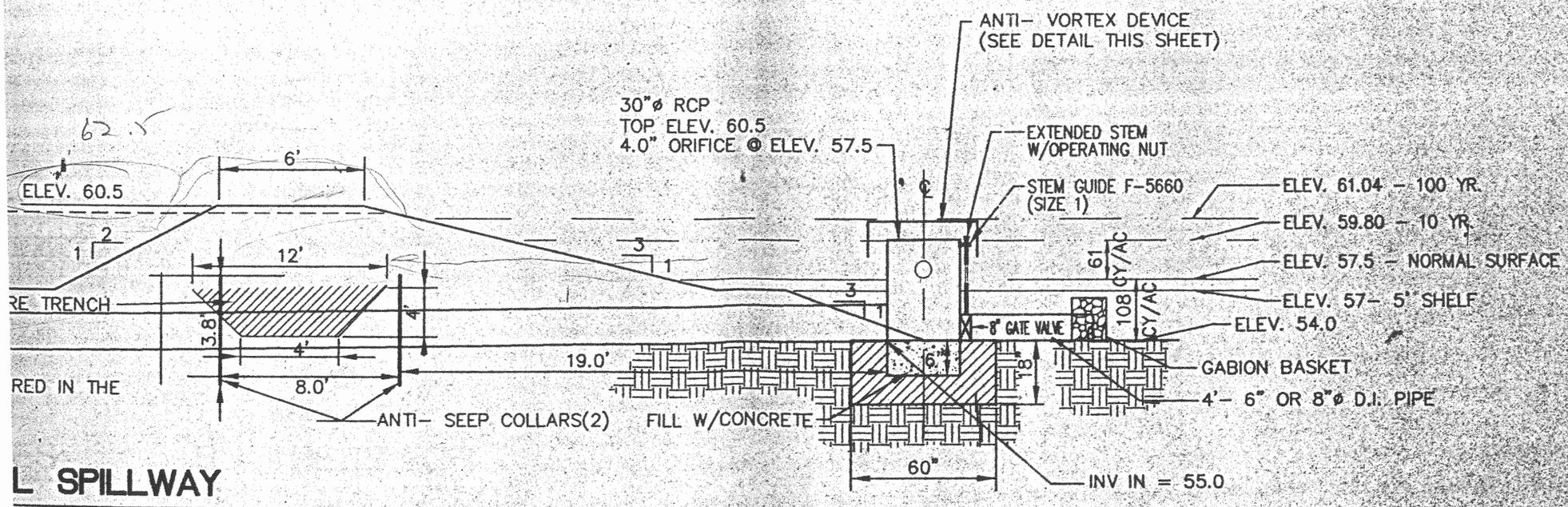
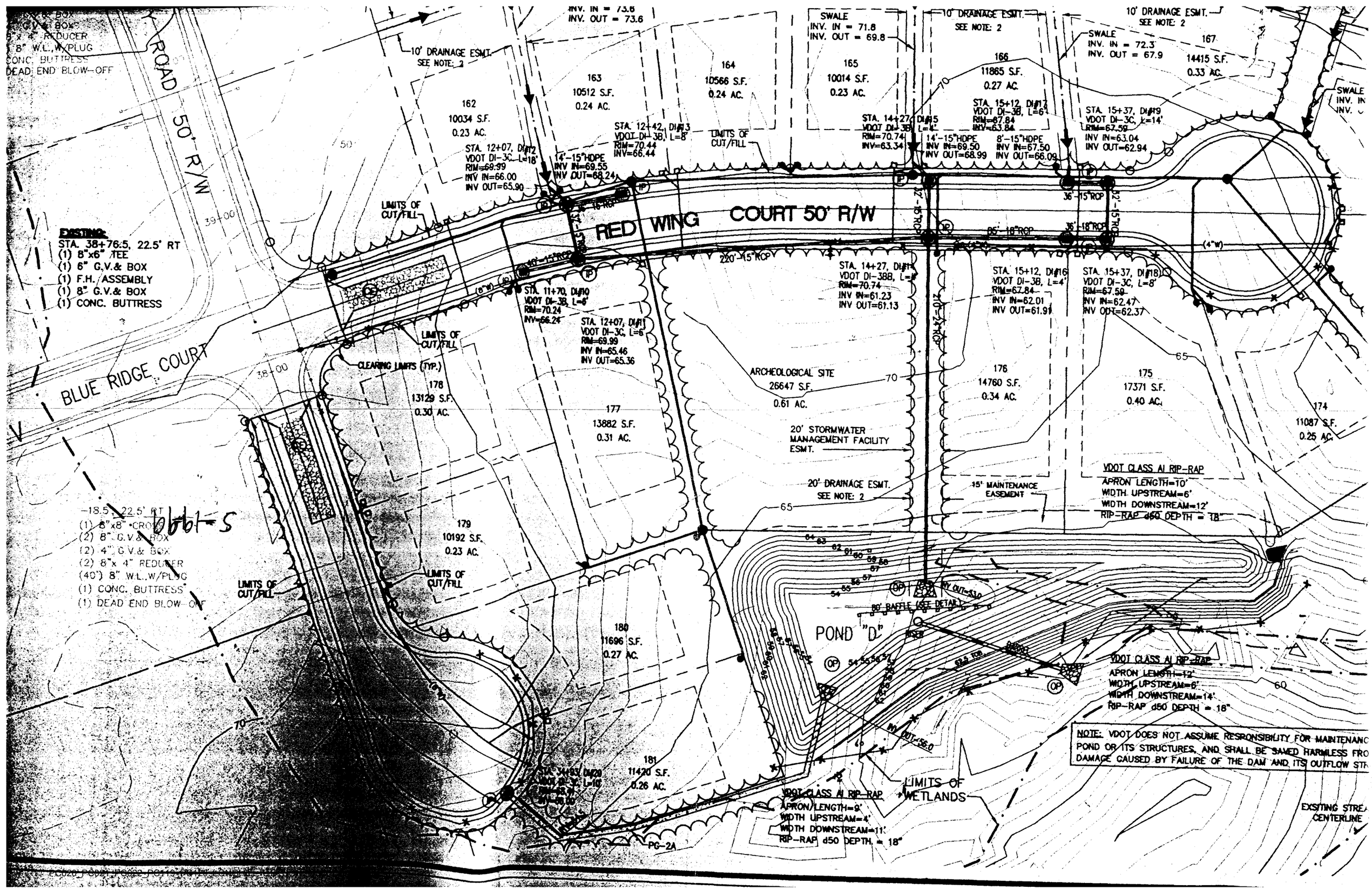
5. CONTRACTOR TO ENSURE THE PLACEMENT OF THE GATE VALVE AND AND ITS COMPONENTS DOES NOT CONFLICT WITH RISER, ORIFICE, OR QRIFICE ELBOW.



L SPILLWAY

TO SCALE


RED WING COURT 50' R/W
BLUE RIDGE COURT
50' R/W
EXISTING:
STA. 38+76.5, 22.5' RT
(1) 8"x6" TEE
(1) 6" G.V.& BOX
(1) F.H. ASSEMBLY
(1) 8" G.V.& BOX
(1) CONC. BUTTRESS
-18.5, 22.5' RT
(1) 8"x8" CROSS
(2) 8" G.V.& BOX
(2) 4" G.V.& BOX
(2) 8"x 4" REDUCER
(40') 8" W.L.W/PLUG
(1) CONC. BUTTRESS
(1) DEAD END BLOW-OFF
6661-5
162
10034 S.F.
0.23 AC.
163
10512 S.F.
0.24 AC.
164
10566 S.F.
0.24 AC.
165
10014 S.F.
0.23 AC.
166
11865 S.F.
0.27 AC.
167
14415 S.F.
0.33 AC.
174
11087 S.F.
0.25 AC.
175
17371 S.F.
0.40 AC.
176
14760 S.F.
0.34 AC.
177
13882 S.F.
0.31 AC.
178
13129 S.F.
0.30 AC.
179
10192 S.F.
0.23 AC.
180
11696 S.F.
0.27 AC.
181
11420 S.F.
0.26 AC.
ARCHEOLOGICAL SITE
26647 S.F.
0.61 AC.
POND "D"
20' STORMWATER MANAGEMENT FACILITY ESMT.
20' DRAINAGE ESMT.
SEE NOTE: 2
10' DRAINAGE ESMT.
SEE NOTE: 2
15' MAINTENANCE EASEMENT
LIMITS OF CUT/FILL
CLEARING LIMITS (TYP.)
LIMITS OF WETLANDS
SWALE
INV. IN = 71.8
INV. OUT = 69.8
SWALE
INV. IN = 72.3
INV. OUT = 67.9
INV. IN = 73.6
INV. OUT = 73.6
STA. 12+07, DI#12
VDOT DI-3C, L=18'
RIM=69.99
INV IN=66.00
INV OUT=65.90
STA. 12+42, DI#13
VDOT DI-3B, L=8'
RIM=70.44
INV=66.44
14'-15"HDPE
INV IN=69.55
INV OUT=68.24
STA. 14+27, DI#15
VDOT DI-3B, L=4'
RIM=70.74
INV=63.34
14'-15"HDPE
INV IN=69.50
INV OUT=68.99
8'-15"HDPE
INV IN=67.50
INV OUT=66.09
STA. 15+12, DI#17
VDOT DI-3B, L=6'
RIM=67.84
INV=63.84
STA. 15+37, DI#19
VDOT DI-3C, L=14'
RIM=67.59
INV IN=63.04
INV OUT=62.94
STA. 11+70, DI#10
VDOT DI-3B, L=6'
RIM=70.24
INV=66.24
STA. 12+07, DI#11
VDOT DI-3C, L=6
RIM=69.99
INV IN=65.46
INV OUT=65.36
STA. 14+27, DI#14
VDOT DI-3BB, L=4'
RIM=70.74
INV IN=61.23
INV OUT=61.13
STA. 15+12, DI#16
VDOT DI-3B, L=4'
RIM=67.84
INV IN=62.01
INV OUT=61.91
STA. 15+37, DI#18
VDOT DI-3C, L=8'
RIM=67.59
INV IN=62.47
INV OUT=62.37
VDOT CLASS AI RIP-RAP
APRON LENGTH=10'
WIDTH UPSTREAM=6'
WIDTH DOWNSTREAM=12'
RIP-RAP d50 DEPTH = 18"
VDOT CLASS AI RIP-RAP
APRON LENGTH=12'
WIDTH UPSTREAM=6'
WIDTH DOWNSTREAM=14'
RIP-RAP d50 DEPTH = 18"
VDOT CLASS AI RIP-RAP
APRON LENGTH=9'
WIDTH UPSTREAM=4'
WIDTH DOWNSTREAM=11'
RIP-RAP d50 DEPTH = 18"
80' BAFFLE (SEE DETAIL)
INV OUT=53.0
INV OUT=56.0
NOTE: VDOT DOES NOT ASSUME RESPONSIBILITY FOR MAINTENANC
POND OR ITS STRUCTURES, AND SHALL BE SAVED HARMLESS FRO
DAMAGE CAUSED BY FAILURE OF THE DAM AND ITS OUTFLOW STR
EXISTING STREA
CENTERLINE
PG-2A

NOTES:

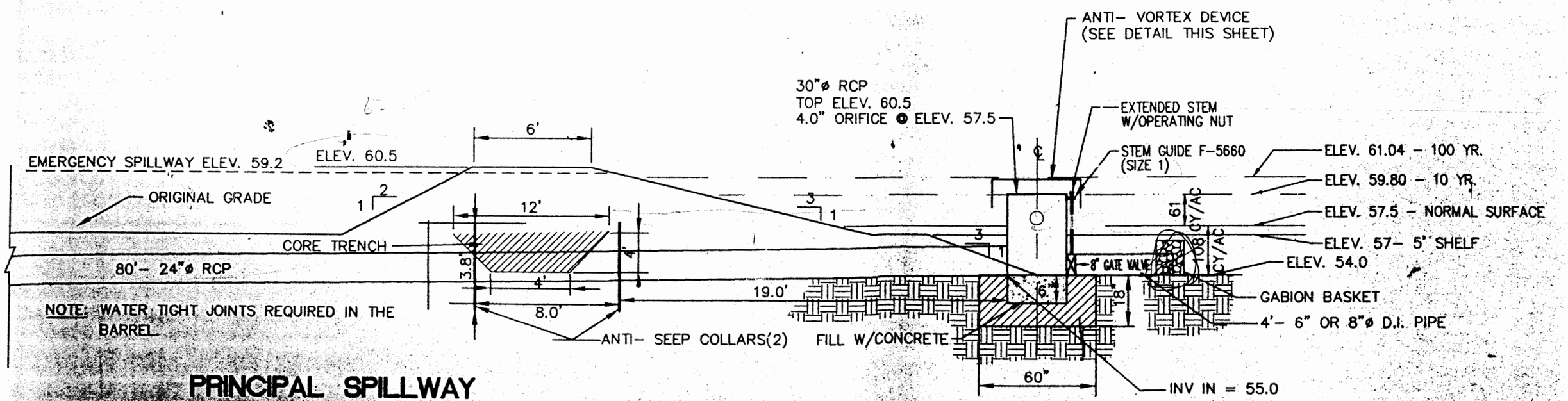
1. VDOT DOES NOT ASSUME RESPONSIBILITY FOR MAINTENANCE OF THE STORMWATER PONDS OR THEIR STRUCTURES, AND SHALL BE SAVED HARMLESS FROM ANY DAMAGE.
2. ALL UNSUITABLE MATERIAL LOCATED UNDER THE DAM EMBANKMENT SHALL BE REMOVED AND DISPOSED OF BY THE CONTRACTOR.
3. DETENTION POND SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. 1 SPEC. 3.14 – TEMPORARY SEDIMENT BASIN AS OUTLINED IN THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK, THIRD EDITION, 1990.
4. ORDER OF INSTALLATION OF DEWATERING DEVICES:
   A) DEWATERING SYSTEM DETAIL TO BE INSTALLED DURING CONSTRUCTION.
   B) UPON COMPLETION OF CONSTRUCTION, REMOVE DEWATERING SYSTEM DETAIL 1 AND INSTALL THE ORIFICE PROTECTION ELBOW.
5. CONTRACTOR TO ENSURE THE PLACEMENT OF THE GATE VALVE AND AND ITS COMPONENTS DOES NOT CONFLICT WITH RISER, ORIFICE, OR ORIFICE ELBOW.

BAFFLE DETAIL

NOT TO SCALE

POND D

S-19-99



PRINCIPAL SPILLWAY

NOT TO SCALE

LONGHILL STATION SUBDIVISION
PHASES 3 & 4

RESUBMITTAL #2 - STORMWATER MANAGEMENT CALCULATIONS

5-19-99
SEC 3+4
"POND D"
PC 120

BY

DJG, INC.
1006 RICHMOND ROAD
WILLIAMSBURG, VIRGINIA 23185
PHONE: (757)253-0673
FAX: (757)253-2319

MAY 28, 1999
DJG COMMISSION NO: 1980152

DJG
P.O. Box 3505
Williamsburg, Virginia 23187
(757) 253-0673
Fax (757) 253-2319

PROJECT LONGHILL PH. 3+4
DATE 4/29/99 COMM NO. 1980152
CAL DFL CKD PAGE # 1/3
TITLE BMP POINTS / STORMWATER MGMT.

- TOTAL SITE = 104.53 AC.
- NATURAL OPEN SPACE BELOW BMP's SITE AREA FOR BMP CALCULATIONS = 25 AC
- AREA FOR TOTAL BMP POINTS = 104.53 − 25 = 79.53 AC.
- TOTAL OPEN SPACE = 43.64 AC.
- OPEN SPACE POINT CREDIT = $\frac{43.64}{104.53} \times 10 = 4.18$ PTS.

- BMP POINT CREDIT: POND A = 18.9 AC / 79.53 AC × 9 = 2.14 PTS.
  POND B = 11.9 AC / 79.53 AC × 6 = 0.90 PTS.
  POND C = 26.8 AC / 79.53 AC × 4 = 1.35 PTS.
  POND D = 8.83 AC / 79.53 AC × 9 = 1.00 PTS.
  POND E = 12.1 AC / 79.53 AC × 9 = 1.37 PTS
  6.76 PTS.

TOTAL = 10.94 POINTS

- E & S VOLUME = 67 yd^3/AC WET STORAGE
  67 yd^3/AC DRY STORAGE

FOR 8.83 AC: WET STORAGE = 8.83 AC × 67 yd^3/AC × 27 ft^3/yd^3 = 15,973.5 ft^3
DRY STORAGE = " " " = 15,973.5 ft^3

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PROJECT Longhill 3+4
DATE 2-15-99 COMM NO. 1980152
CAL HLPG CKD PAGE # 2 of 3
TITLE Stormwater Mgmt.

• 9-Pt. BMP REQ'D = DESIGN #7 (4.0 × V_r) WET POND

$V = 4.0 \times V_r$

$V_r = 0.5 \times R_v \times A \times 3630$

$R_v = 0.05 + 0.009 \times I$

$I = 38\%$

$A = 8.83$ AC.

$V = 4.0 \times [0.5 \times (0.05 + 0.009 \times 38) \times 8.83_{AC.} \times 3630]$

$V = 25{,}130\ ft^3$

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PROJECT LONGHILL PH. 3 & 4
DATE 5/28/99 COMM NO.
CAL DFL CKD PAGE #
TITLE POND "D" REVISIONS

POND "D" REVISIONS PER MEETING WITH D. COOK (JCC)

- POND "D" REVISED TO DETAIN THE 24-HR. 1-YR STORM AND RELEASE OVER 24-HR. PERIOD.

1-YR STORM = 2.8" RAINFALL
CURVE # 83 = 1.29" ACTUAL RUNOFF

– V_S = 1.29" × DRAINAGE AREA
= 0.107 FT × 384,634.8 FT^2 = 41,156 FT^3

– DRY STORAGE AVAILABLE = 36,089 FT^3
∴ NECESSARY STORAGE = + 5,067 FT^3

- OUTLET STRUCTURE CALCULATION:

$$Q = \frac{S(FT^3)}{T(sec)} = \frac{41{,}156 FT^3}{86400 sec} = 0.5 cfs$$ FLOWRATE FOR 24-HR RUNOFF

A = AREA OF ORIFICE (FT^2):

$$A = \frac{Q}{(64.4 \times \frac{h}{2})^{1/2}(0.6)} = 0.1 FT^2$$

d = DIAM. OF ORIFICE FOR DESIGN:

$$d(in.) = 24 \times \left(\frac{A}{3.14}\right)^{1/2} = 4" \text{ ORIFICE}$$

TEMPORARY SEDIMENT BASIN DESIGN DATA SHEET

(with or without an emergency spillway)

Project LONGHILL STATION PH. 3/4

Basin # "D" Location JCC

Total area draining to basin: 8.83 acres.

Basin Volume Design

Wet Storage:

1. Minimum required volume = 67 cu. yds. x Total Drainage Area (acres).

   67 cu. yds. x 8.83 acres = 591.6 cu. yds.

2. Available basin volume = 958 cu. yds. at elevation 57.5. (From storage - elevation curve)

3. Excavate +/- 200 cu. yds. to obtain required volume*.

   * Elevation corresponding to required volume = invert of the dewatering orifice.

4. Available volume before cleanout required.

   33 cu. yds. x 8.83 acres = 291.6 cu. yds.

5. Elevation corresponding to cleanout level = 55.5.

   (From Storage - Elevation Curve)

6. Distance from invert of the dewatering orifice to cleanout level = 2 ft. (Min. = 1.0 ft.)

Dry Storage:

7. Minimum required volume = 67 cu. yds. x Total Drainage Area (acres).

   67 cu. yds. x 8.83 acres = 591.6 cu. yds.

PC020_PC021_PC022_PC119_PC120_LONGHILL_STATION - 456

8. Total available basin volume at crest of riser* = 2783 cu. yds. at elevation 60.5. (From Storage - Elevation Curve)

* Minimum = 134 cu. yds./acre of total drainage area.

9. Diameter of dewatering orifice = 4 in.

10. Diameter of flexible tubing = 6 in. (diameter of dewatering orifice plus 2 inches).

Preliminary Design Elevations

11. Crest of Riser = 60.5

Top of Dam = 62.5

Design High Water = 61.0 (100-YR)

Upstream Toe of Dam = 54.0

Basin Shape

12. Length of Flow / Effective Width — L / We = <2

If > 2, baffles are not required _____

If < 2, baffles are required ✓

Runoff

13. Q_2 = 19 cfs (From Chapter 5)

14. Q_{25} = 47 cfs (From Chapter 5)

Principal Spillway Design

15. With emergency spillway, required spillway capacity $Q_p = Q_2$ = 19 cfs. (riser and barrel)

Without emergency spillway, required spillway capacity $Q_p = Q_{25}$ = ___ cfs. (riser and barrel)

16. With emergency spillway:

Assumed available head (h) = 1.0 ft. (Using Q_2)

h = Crest of Emergency Spillway Elevation - Crest of Riser Elevation

Without emergency spillway:

Assumed available head (h) = ____ ft. (Using Q_{25})

h = Design High Water Elevation - Crest of Riser Elevation

17. Riser diameter (D_r) = 30 in. Actual head (h) = 0.8 ft.

(From Plate 3.14-8.)

Note: Avoid orifice flow conditions.

18. Barrel length (l) = 80 ft.

Head (H) on barrel through embankment = 3 ft.

(From Plate 3.14-7).

19. Barrel diameter = 24 in.

(From Plate 3.14-B [concrete pipe] or Plate 3.14-A [corrugated pipe]).

20. Trash rack and anti-vortex device

Diameter = 54 inches.

Height = 15 inches.

(From Table 3.14-D).

Emergency Spillway Design * EMERGENCY SPILLWAY NOT NECESSARY, BUT PROVIDED ON PLANS (SEE DEVELOPMENT PLAN

21. Required spillway capacity $Q_e = Q_{25} - Q_p$ = ____ cfs.

22. Bottom width (b) = ____ ft.; the slope of the exit channel (s) = ____ ft./foot; and the minimum length of the exit channel (x) = ____ ft.
(From Table 3.14-C).

Anti-Seep Collar Design

23. Depth of water at principal spillway crest (Y) = 6.5 ft.

Slope of upstream face of embankment (Z) = 3 :1.

Slope of principal spillway barrel (S_b) = 0.63 %

Length of barrel in saturated zone (L_s) = 33 ft.

24. Number of collars required = 2 dimensions = 3.8' x 3.8' (MIN.)

(from Plate 3.14-12).

Final Design Elevations

25. Top of Dam = 62.5

Design High Water = 61.0 (100-YR)

Emergency Spillway Crest = 61.5

Principal Spillway Crest = 60.5

Dewatering Orifice Invert = 57.5

Cleanout Elevation = 55.5

Elevation of Upstream Toe of Dam or Excavated Bottom of "Wet Storage Area" (if excavation was performed) = 54.0

PC020_PC021_PC022_PC119_PC120_LONGHILL_STATION - 459

PORTATION

SOILS MAP
PER JCC SOIL SURVEY

RE FABRIC

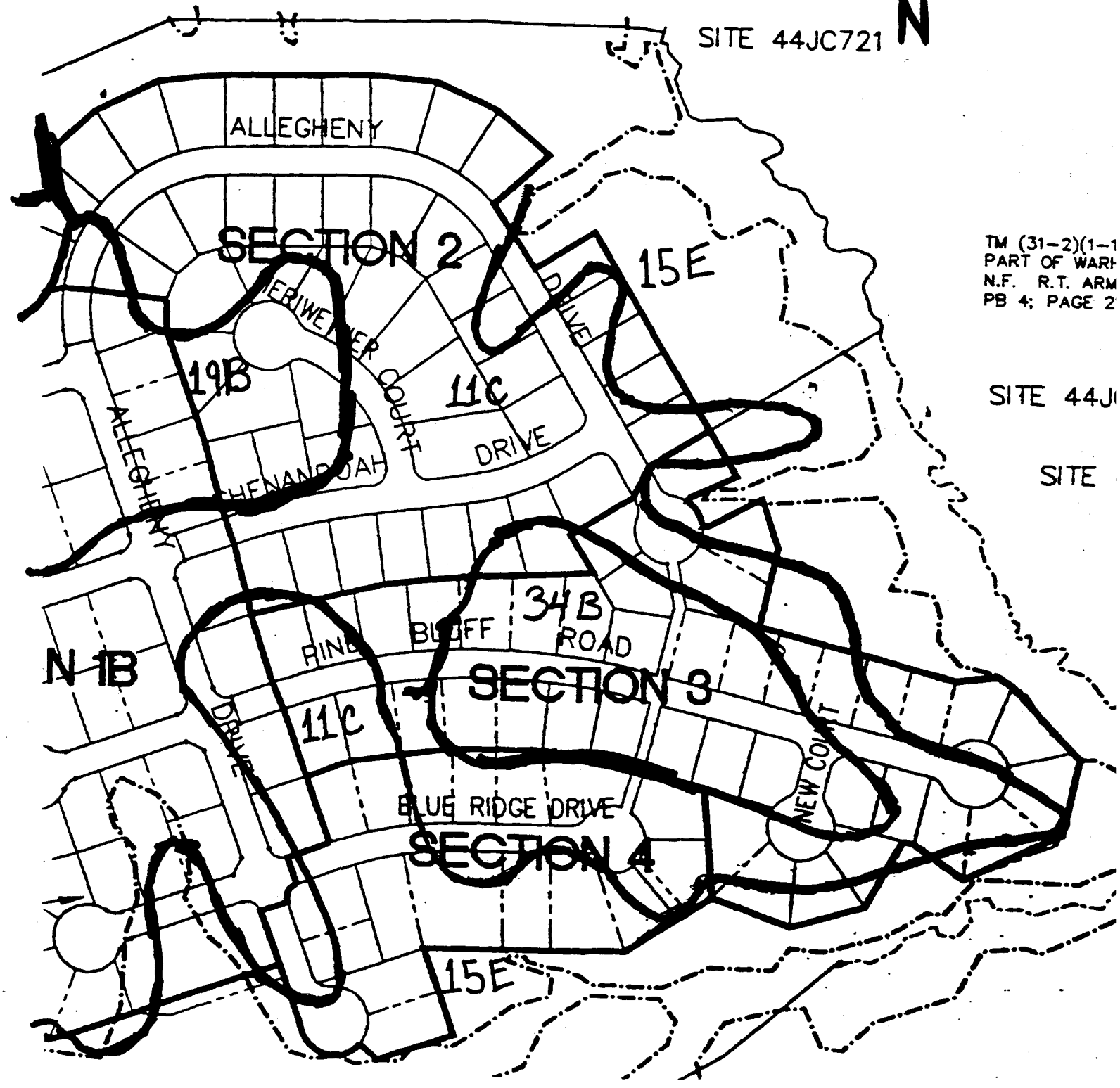
NTS

"FOX RIDGE - PHASE III"
PB 57: PAGE 14
RECREATION AREA #1
TM(31-1); PARCEL(8-1C)

TM (31-1); PARCEL (1-31)
N/F
ERNEST JONES
DB 33; PAGE 338

N

SITE 44JC721



TM (31-2)(1-1
PART OF WARH
N.F. R.T. ARM
PB 4; PAGE 2

SITE 44J

SITE

Calculated By: DFL Date: 5/27/99
Checked By: HLPG Date:

DJG, INC
P.O. BOX 3505
WILLIAMSBURG, VIRGINIA 23187
STORMWATER MANAGEMENT POND DESIGN

PROJECT NO. 1980152
PROJECT DESC. LONGHILL PH.3&4
POND "D"
SHEET 1 OF 1 SHEETS

BASIN STORAGE VOLUME:

ELEV.	AREA (FT)	SUM (Ai+Ai)/2	VOL. (CU.FT)	SUM VOL. (CU.FT)
54	3717	-	-	-
55	4851	4284	5472	5472
56	6118	5484.5	5485	10957
57	7516	6817	6817	17774
57	10634	9075	0	17774
58	12740	11687	11687	29461
59	14910	13825	13825	43286
60	17137	16024	16024	59309
60.5	18272	17705	8852	68161
61.5	20587	19430	19430	87591
62.5	22959	21773	21773	109364

WQV

STORAGE ALGORITHM:

Z1 =	1	S1 =	5472	S2/S1 =	19.9861
Z2 =	8.5	S2 =	109364	Z2/Z1 =	8.5

b = (ln(S2/S1))/(ln(Z2/Z1)) Ks = S2/(Z2^b) S(CU.FT)=Ks(Z^b)

b = 1.400 Ks = 5472

PRINCIPAL SPILLWAY:

RISER	ORIFICE (1) DIA. (IN)	BARREL DIA. (IN)	BARREL LEN. (FT)
30	4	24	80

ORIFICE (1) AREA, A (SQ.FT) =		0.08722
BARREL AREA (SQ. FT)=		3.14
n =	0.013	
C =	0.6	
Q = CA(64.4*Ho)^0.5		
BARREL INV.OUT =	54.5	
CORRECTION FACTOR =		0.98
(FROM VESCH, TABLE 3.14-A)		

STAGE-DISCHARGE-STORAGE:

	ELEV.	STAGE (FT)	Hp (FT)	Qp (CFS)	$Ho_{(1)}$ (FT)	$Qo_{(1)}$ (CFS)	He.s.(FT)	Qe.s. (CFS)	SUM Q (CFS)	STORAGE (CU.FT)
	54	-	-	-	-	-	-	-	-	-
	55	1	-	-	-	-	-	-	-	5472
	56	2	-	-	-	-	-	-	-	14436
	57	3	-	-	-	-	-	-	-	25461
OR.(4")	57.5	3.5	-	-	-	-	-	-	-	31592
	58	4	-	-	0.33333	0.24	-	-	0.24	38083
	59	5	-	-	1.33333	0.48	-	-	0.48	52043
	60	6	-	-	2.33333	0.64	-	-	0.64	67170
C.R.	60.5	6.5	-	-	2.83333	0.71	-	-	0.71	75132
E.S.	61.5	7.5	6	37.03	3.83333	0.82	-	-	37.86	91791
T.O.B.	62.5	8.5	7	40.00	4.83333	0.92	1	30.87	71.79	109364

Rev. 5/27/99
DFL

LONGHILL PH 3&4 - POND "D"

LONGHILL PH 3&4 - POND "D"

Post?

INPUT DESIGN DATA

DESIGN STORM FOR ANALYSIS = 2 YEAR
DRAINAGE AREA (ACRES) = 8.83
AVERAGE SLOPE OF DRAINAGE AREA (%) = 3.5
HYDRAULIC LENGTH (FT) = 1010
IMPERVIOUS SURFACE (%) = 38
HYDRAULIC LENGTH MODIFIED (%) = 40
COMPOSITE CURVE NUMBER = 83
SLOPE ADJUSTMENT FACTOR = 1
PONDING ADJUSTMENT FACTOR = 1

RESULTS OF HYDRAULIC CALCULATIONS
(SCS TR-55 & TP-149 PROCEDURES)

WATERSHED LAG ADJUSTED (IMPER. AREAS & CHAN. IMPROV.) IS .097 HOURS
TIME OF CONCENTRATION ADJUSTED IS .161 HOURS
THE PEAK DISCHARGE FROM THIS WATERSHED IS 19 C.F.S.

THE FOLLOWING ARE TIME INCREMENTS AND ORDINATES OF THE INFLOW HYDROGRAPH

(HOURS)	(C.F.S.)
0,0	
.039	.777
.077	2.76
.116	6.177
.154	9.962
.193	13.584
.232	16.792
.27	19.352
.309	19.086
.348	16.278
.386	11.104
.425	6.791
.463	3.445
.502	1.158
.541	0

STAGE (FT)	DISCHARGE (CFS)	STORAGE (CF)
57.5	0	0
58	.24	6491
59	.48	20451
60	.64	35578

THE FOLLOWING ARE TIME INCREMENTS AND ORDINATES OF THE OUTFLOW HYDOGRAPH

(HOURS)	(C.F.S.)
0.000	0.002
0.039	0.011
0.077	0.034
0.116	0.075
0.154	0.135
0.193	0.212
0.232	0.270
0.270	0.315
0.309	0.356
0.348	0.388
0.386	0.409
0.425	0.420
0.463	0.424
0.502	0.425
0.541	0.424
0.579	0.423
0.618	0.422
0.656	0.421
0.695	0.420
0.734	0.419
0.772	0.418
0.811	0.417
0.850	0.416
0.888	0.415
0.927	0.414
0.965	0.413
1.004	0.412
1.043	0.411
1.081	0.410
1.120	0.409
1.158	0.408
1.197	0.407
1.236	0.406
1.274	0.405
1.313	0.404
1.352	0.403
1.390	0.402
1.429	0.401
1.467	0.400

MAXIMUM OUTFLOW IS .425 C.F.S.
MAXIMUM STAGE IS 58.77083 FT.
MAXIMUM STORAGE IS 17251 CUBIC FEET

LONGHILL PH 3&4 - POND "D"

LONGHILL PH 3&4 - POND "D"

INPUT DESIGN DATA

DESIGN STORM FOR ANALYSIS = 10 YEAR
DRAINAGE AREA (ACRES) = 8.83
AVERAGE SLOPE OF DRAINAGE AREA (%) = 3.5
HYDRAULIC LENGTH (FT) = 1010
IMPERVIOUS SURFACE (%) = 38
HYDRAULIC LENGTH MODIFIED (%) = 40
COMPOSITE CURVE NUMBER = 83
SLOPE ADJUSTMENT FACTOR = 1
PONDING ADJUSTMENT FACTOR = 1

RESULTS OF HYDRAULIC CALCULATIONS
(SCS TR-55 & TP-149 PROCEDURES)

WATERSHED LAG ADJUSTED (IMPER. AREAS & CHAN. IMPROV.) IS .097 HOURS
TIME OF CONCENTRATION ADJUSTED IS .161 HOURS
THE PEAK DISCHARGE FROM THIS WATERSHED IS 36 C.F.S.

THE FOLLOWING ARE TIME INCREMENTS AND ORDINATES OF THE INFLOW HYDROGRAPH

(HOURS)	(C.F.S.)
0,0	
.039	1.583
.077	5.559
.116	12.307
.154	19.562
.193	26.251
.232	31.918
.27	36.169
.309	35.199
.348	29.72
.386	20.159
.425	12.26
.463	6.186
.502	2.07
.541	0

STAGE (FT)	DISCHARGE (CFS)	STORAGE (CF)
57.5	0	0
58	.24	6491
59	.48	20451
60	.64	35578
60.5	.71	43540
61.5	37.86	60199

THE FOLLOWING ARE TIME INCREMENTS AND ORDINATES OF THE OUTFLOW HYDOGRAPH

(HOURS)	(C.F.S.)
0.000	0.004
0.039	0.022
0.077	0.068
0.116	0.149
0.154	0.252
0.193	0.321
0.232	0.401
0.270	0.483
0.309	0.530
0.348	0.566
0.386	0.589
0.425	0.602
0.463	0.607
0.502	0.608
0.541	0.607
0.579	0.606
0.618	0.605
0.656	0.604
0.695	0.603
0.734	0.602
0.772	0.602
0.811	0.601
0.850	0.600
0.888	0.599
0.927	0.598
0.965	0.597
1.004	0.596
1.043	0.595
1.081	0.595
1.120	0.594
1.158	0.593
1.197	0.592
1.236	0.591
1.274	0.590
1.313	0.589
1.352	0.588
1.390	0.588
1.429	0.587
1.467	0.586

MAXIMUM OUTFLOW IS .608 C.F.S.
MAXIMUM STAGE IS 59.8 FT.
MAXIMUM STORAGE IS 32552 CUBIC FEET

LONGHILL PH 3&4 - POND "D"

LONGHILL PH 3&4 - POND "D"

INPUT DESIGN DATA

DESIGN STORM FOR ANALYSIS = 100 YEAR
DRAINAGE AREA (ACRES) = 8.83
AVERAGE SLOPE OF DRAINAGE AREA (%) = 3.5
HYDRAULIC LENGTH (FT) = 1010
IMPERVIOUS SURFACE (%) = 38
HYDRAULIC LENGTH MODIFIED (%) = 40
COMPOSITE CURVE NUMBER = 83
SLOPE ADJUSTMENT FACTOR = 1
PONDING ADJUSTMENT FACTOR = 1

RESULTS OF HYDRAULIC CALCULATIONS
(SCS TR-55 & TP-149 PROCEDURES)

WATERSHED LAG ADJUSTED (IMPER. AREAS & CHAN. IMPROV.) IS .097 HOURS
TIME OF CONCENTRATION ADJUSTED IS .161 HOURS
THE PEAK DISCHARGE FROM THIS WATERSHED IS 67 C.F.S.

THE FOLLOWING ARE TIME INCREMENTS AND ORDINATES OF THE
INFLOW HYDROGRAPH

(HOURS)	(C.F.S.)
0,0	
.039	3.095
.077	10.79
.116	23.704
.154	37.296
.193	49.484
.232	59.462
.27	66.572
.309	64.155
.348	53.77
.386	36.317
.425	21.997
.463	11.055
.502	3.685
.541	0

STAGE (FT)	DISCHARGE (CFS)	STORAGE (CF)
57.5	0	0
58	.24	6491
59	.48	20451
60	.64	35578
60.5	.71	43540
61.5	37.86	60199
62.5	71.79	77772

THE FOLLOWING ARE TIME INCREMENTS AND ORDINATES OF THE OUTFLOW HYDOGRAPH

(HOURS)	(C.F.S.)
0.000	0.008
0.039	0.043
0.077	0.132
0.116	0.262
0.154	0.365
0.193	0.489
0.232	0.581
0.270	0.670
0.309	7.510
0.348	17.584
0.386	20.691
0.425	19.573
0.463	16.297
0.502	12.418
0.541	9.085
0.579	6.646
0.618	4.862
0.656	3.557
0.695	2.603
0.734	1.904
0.772	1.393
0.811	1.019
0.850	0.746
0.888	0.709
0.927	0.708
0.965	0.708
1.004	0.707
1.043	0.706
1.081	0.705
1.120	0.704
1.158	0.703
1.197	0.702
1.236	0.701
1.274	0.701
1.313	0.700
1.352	0.699
1.390	0.698
1.429	0.697
1.467	0.696

```
MAXIMUM OUTFLOW IS    20.69    C.F.S.
MAXIMUM STAGE IS    61.03782    FT.
MAXIMUM STORAGE IS    52499    CUBIC FEET
```

Pre DA = 12 TC = 15.8 min CN = 70

2 - 8cfs
10 - 18cfs

Post Dev

DA = 12.1 CN = 82
TC = 8.16 min

2 - 23cfs
10 - 39cfs
100 - 80cfs

Routt

2 - 1.24 CFS 61.24
10 - 11.014 cfs 61.84
100 - 40.96 61.79.

HANK MULLINS
AB HAWKINS INC.
FAX: 873-0943

LONGHILL STATION SUBDIVISION
PHASES 3 & 4

RESUBMITTAL #2 - STORMWATER MANAGEMENT CALCULATIONS

BY

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FAX: (757)253-2319

MAY 28, 1999
DJG COMMISSION NO: 1980152

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(757) 253-0673
Fax (757) 253-2319

PROJECT LONGHILL PH. 3+4
DATE 4/29/99 COMM NO. 1980152
CAL DFL CKD PAGE # 1/3
TITLE BMP POINTS / STORMWATER MGMT.

- TOTAL SITE = 104.53 AC.
- NATURAL OPEN SPACE BELOW BMP's SITE AREA FOR BMP CALCULATIONS = 25 AC
- AREA FOR TOTAL BMP POINTS = 104.53 - 25 = 79.53 AC.
- TOTAL OPEN SPACE = 43.64 AC.
- OPEN SPACE POINT CREDIT = $\frac{43.64}{104.53} \times 10 = 4.18$ PTS.

- BMP POINT CREDIT: POND A = 18.9 AC / 79.53 AC × 9 = 2.14 PTS.
  POND B = 11.9 AC / 79.53 AC × 6 = 0.90 PTS.
  POND C = 26.8 AC / 79.53 AC × 4 = 1.35 PTS.
  POND D = 8.83 AC / 79.53 AC × 9 = 1.00 PTS.
  POND E = 12.1 AC / 79.53 AC × 9 = 1.37 PTS
  6.76 PTS.

TOTAL = 10.94 POINTS ←

- E & S VOLUME = 67 yd^3/AC WET STORAGE
  67 yd^3/AC DRY STORAGE

FOR 8.83 AC: WET STORAGE = 8.83 AC × 67 yd^3/AC × 27 ft^3/yd^3 = 15,973.5 ft^3
DRY STORAGE = " " " = 15,973.5 ft^3

DJG
P.O. Box 3505
Williamsburg, Virginia 23187
(757) 253-0673
Fax (757) 253-2319

PROJECT Longhill 3+4
DATE 2-15-99 COMM NO. 1980152
CAL HLPG CKD PAGE # 2 of 3
TITLE Stormwater Mgmt.

• 9-Pt. BMP REQ'D = DESIGN #7 (4.0 × V_r) WET POND

$V = 4.0 \times V_r$

$V_r = 0.5 \times R_v \times A \times 3630$

$R_v = 0.05 + 0.009 \times I$

$I = 38\%$

$A = 8.83$ AC.

$V = 4.0 \times [0.5 \times (0.05 + 0.009 \times 38) \times 8.83_{AC.} \times 3630]$

$V = 25{,}130\ ft^3$

DJG
P.O. Box 3505
Williamsburg, Virginia 23187
(757) 253-0673
Fax (757) 253-2319

PROJECT LONGHILL PH. 3 & 4
DATE 5/28/99 COMM NO.
CAL DFL CKD PAGE #
TITLE POND "D" REVISIONS

POND "D" REVISIONS PER MEETING WITH D. COOK (JCC)

- POND "D" REVISED TO RETAIN THE 24-HR. 1-YR STORM AND RELEASE OVER 24-HR. PERIOD.

1-YR STORM = 2.8" RAINFALL
CURVE # 83 = 1.29" ACTUAL RUNOFF

– V_S = 1.29" × DRAINAGE AREA
= 0.107 FT × 384634.8 FT² = 41,156 FT³

– DRY STORAGE AVAILABLE = 36,089 FT³
∴ NECESSARY STORAGE = + 5,067 FT³

- OUTLET STRUCTURE CALCULATION:

$$Q = \frac{S(FT^3)}{T(sec)} = \frac{41{,}156\,FT^3}{86400\,sec} = 0.5\,cfs$$ FLOWRATE FOR 24-HR RELEASE

A = AREA OF ORIFICE (FT²):

$$A = \frac{Q}{\left(64.4 \times \frac{h}{2}\right)^{1/2}(0.6)} = 0.1\,FT^2$$

d = DIAM. OF ORIFICE FOR DESIGN:

$$d(in.) = 24 \times \left(\frac{A}{3.14}\right)^{1/2} = 4''\ \text{ORIFICE}$$

TEMPORARY SEDIMENT BASIN DESIGN DATA SHEET

(with or without an emergency spillway)

Project LONGHILL STATION PH. 3/4

Basin # "D" Location JCC

Total area draining to basin: 8.83 acres.

Basin Volume Design

Wet Storage:

1. Minimum required volume = 67 cu. yds. x Total Drainage Area (acres).

   67 cu. yds. x 8.83 acres = 591.6 cu. yds.

2. Available basin volume = 958 cu. yds. at elevation 57.5. (From storage - elevation curve)

3. Excavate ±200 cu. yds. to obtain required volume*.

   * Elevation corresponding to required volume = invert of the dewatering orifice.

4. Available volume before cleanout required.

   33 cu. yds. x 8.83 acres = 291.6 cu. yds.

5. Elevation corresponding to cleanout level = 55.5.

   (From Storage - Elevation Curve)

6. Distance from invert of the dewatering orifice to cleanout level = 2 ft. (Min. = 1.0 ft.)

Dry Storage:

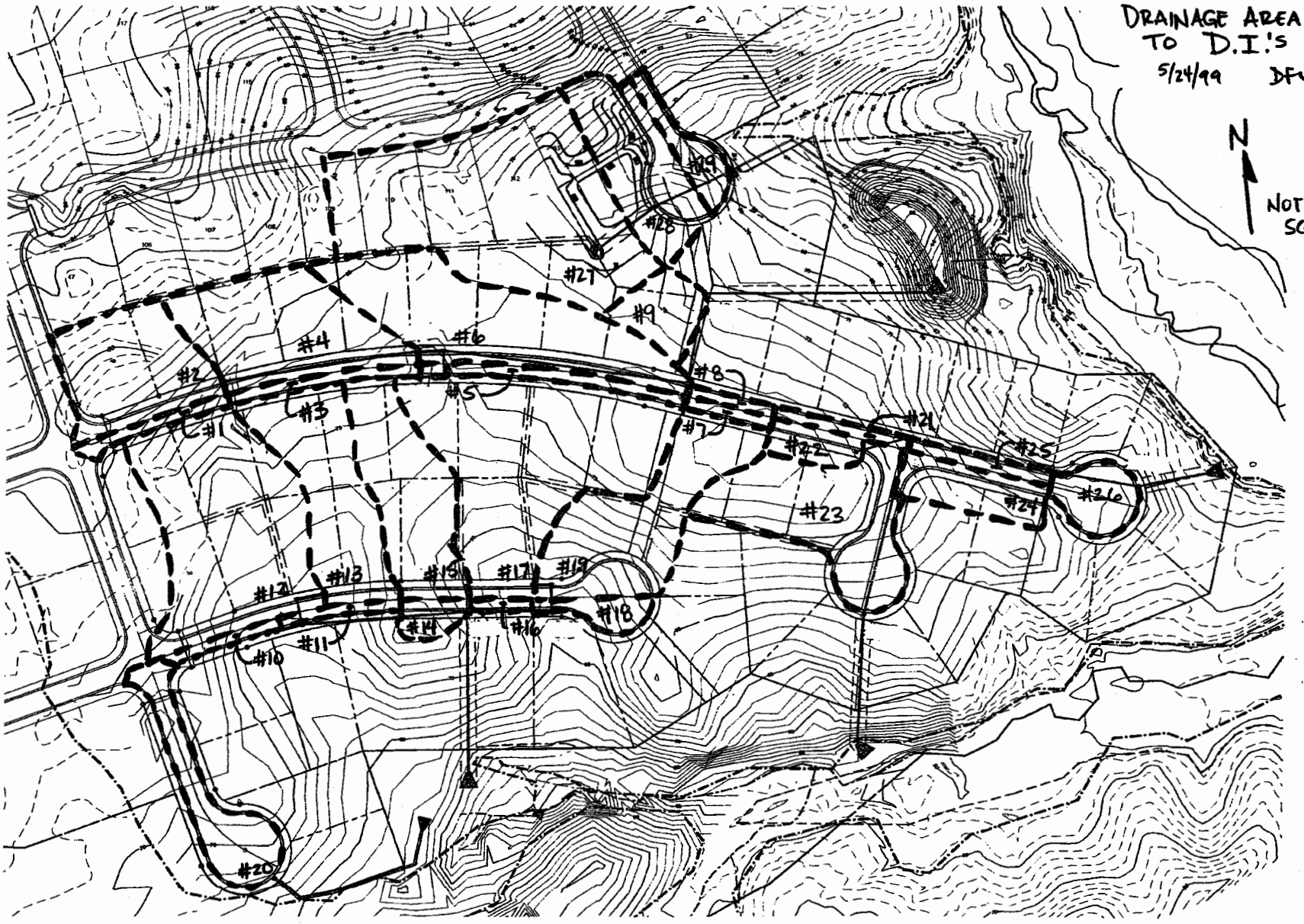
7. Minimum required volume = 67 cu. yds. x Total Drainage Area (acres).

   67 cu. yds. x 8.83 acres = 591.6 cu. yds.

LONGHILL PHASES 3+4

DRAINAGE AREAS TO D.I.'S

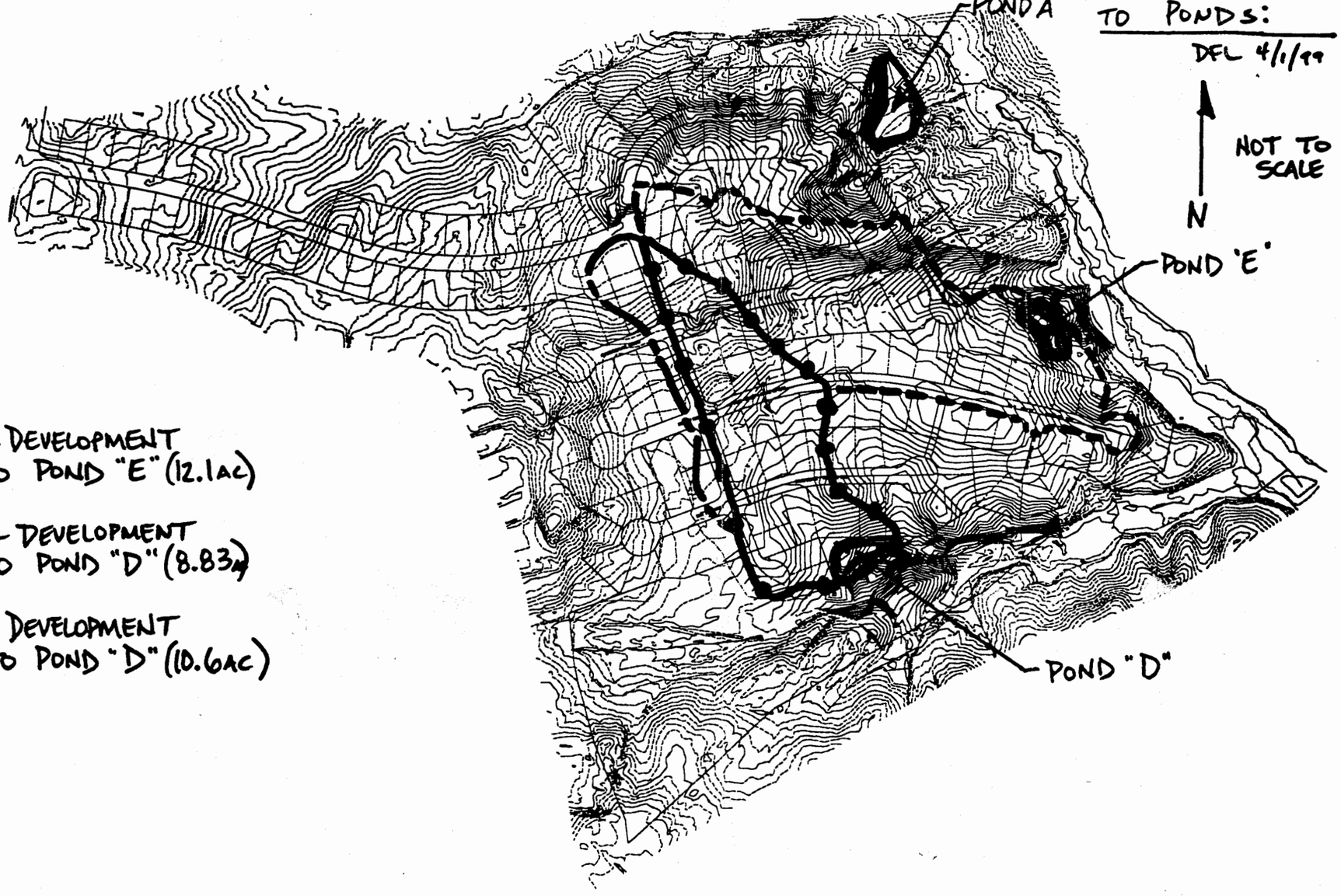
5/24/99 DFL



LONGHILL PH. 3 & 4 1980152

DRAINAGE AREAS TO PONDS:

DFL 4/1/99



POST-DEVELOPMENT TO POND "E" (12.1AC)

POST-DEVELOPMENT TO POND "D" (8.83AC)

PRE-DEVELOPMENT TO POND "D" (10.6AC)

GET Solutions, Inc.

Geotechnical · Environmental · Testing

RECEIVED
NOV 13 2006
DEVELOPMENT MANAGEMENT

November 3, 2006

TO: **McCale Development Corporation**
729 Thimble Shoals Boulevard
Suite 6C
Newport News, VA 23606

Attn: Mr. Eason Park

RE: Report of Subsurface Investigation and Geotechnical Engineering Services
Dam Evaluation – Pond "D"
Longhill Station Subdivision
James City County, Virginia
GET Project No. WM06-188G

Dear Mr. Park:

G E T Solutions Inc. has completed our geotechnical engineering services and review of the project plans of the existing dam for the BMP facility designated as **Pond "D"** within the Longhill Station Subdivision. Longhill Station Subdivision is located to the east of Centerville Road within James City County, Virginia. Specifically, the BMP facility is located to the south of Red Wing Court and to the east of Allegheny Road which is located within the southern portion of Longhill Station Subdivision.

The purpose of our geotechnical engineering services was to obtain information on the general subsurface conditions of the dam in order to evaluate its suitability.

Project Description:

The current BMP facility includes an earthen dam, which rises about 4 to 5 feet above the current water level in the pond. Based on the review of the provided construction plans, the dam height is about 8.5 feet above the bottom of pond elevation. At the time of our field investigation, the dam alignment and the banks around the rest of the pond were generally grass covered. There were no visual signs of erosion around the dam alignment or water seepage along the downstream side of the dam.

Field Exploration:

Our field exploration consisted of advancing two (2) hand auger borings along with performing Dynamic Cone Penetrometer (DCP) testing within the top of dam alignment. The hand auger borings were advanced to depths ranging from 4 to 6.5 feet. In addition, two (2) in-situ infiltration tests were performed within the hand auger borings at depths ranging from 1 to 2 feet in order to evaluate the permeability of these shallow subsurface soils. The subsurface conditions encountered were then evaluated to determine the conditions of the dam, including degree of compaction and permeability rates.

1592 Penniman Road, Suite E • Williamsburg, VA 23185 • Phone (757) 564-6452 • Fax (757) 564-6453
info@getsolutionsinc.com

The hand auger boring locations were established, located and staked in the field by a representative of **G E T Solutions, Inc.** The approximate boring locations are shown on the "Boring Location Plan" attached to this report. This plan was developed by DJG, Inc. and reproduced by **G E T Solutions, Inc.**

The groundwater table was encountered at a depth of 4 feet below existing grades (dam crest) within hand auger boring HA-1 and was not encountered to the depth explored (4 feet below existing grades) within hand auger boring HA-2. Groundwater conditions will vary with environmental variations and seasonal conditions, such as the frequency and magnitude of rainfall patterns, as well as man-made influences, such as existing swales, drainage ponds, underdrains and areas of covered soil (paved parking lots, side walks, etc.). It is estimated normal seasonal high groundwater level will fluctuate within 2 to 3 feet above the current (unexplored) levels. We recommend that the contractor determine the actual groundwater levels at the time of the construction to determine groundwater impact on this project.

Laboratory Testing:

Representative portions of soil samples collected during drilling were collected, labeled and transferred to our laboratory for classification and analysis. The soil classification was performed by an experienced Geologist in accordance with ASTM D2488.

Seven representative soil samples were selected and subjected to laboratory testing, which included natural moisture, passing #200 sieve, and Atterberg Limits analysis, in order to corroborate the visual classification of the subsurface soils encountered within the hand auger borings. These test results are noted in Table 1 and are presented on the "Log of Boring" sheets attached to this report.

Table 1 – Laboratory Test Results

Boring No.	Depth (Feet)	Natural Moisture (%)	Percent Passing #200	Atterberg Limits (LL/PL/PI)	Classification
HA-1	1-2	14.0	33.5	Non Plastic	SM
HA-1	3-4	20.3	35.1	Non Plastic	SM
HA-1	4-5	27.9	30.2	Non Plastic	SM
HA-1	5-6	18.6	22.4	Non Plastic	SM
HA-2	0.67-1	16.5	43.6	Non Plastic	SM
HA-2	1-2	12.2	39.8	Non Plastic	SM
HA-2	2-3	12.8	35.6	Non Plastic	SM

Subsurface Soil Conditions:

The results of our field exploration program indicated the presence of 8 inches of topsoil material at the boring locations. Underlying the topsoil, the soils recovered primarily consisted of Silty, fine to medium SAND (SM). Some of these soils contained trace amounts of organics, Gravel, and Clay. Dynamic Cone Penetrometer (DCP) testing was performed within both hand auger borings at 1-foot intervals. Based on the DCP test results, these granular soils generally had a medium dense relative density (estimated to have a degree of compaction in excess of 95% of the standard proctor maximum dry density, ASTM D698).

The subsurface description is of a generalized nature provided to highlight the major soil strata encountered. The records of the subsurface exploration and the Generalized Soil Profile are attached to this report and should be reviewed for specific information as to the individual borings. The stratifications shown on the records of the subsurface exploration represent the conditions only at the actual boring locations. Variations may occur and should be expected between boring locations. The stratifications represent the approximate boundary between subsurface materials and the transition may be gradual.

Infiltration Testing:

Two infiltration tests (designated as INF-1 and INF-2) were performed within the existing dam alignment. The infiltration test boreholes were prepared utilizing a planer auger to remove soil clippings from its base (test level ranging from 1 to 2 feet below the existing ground surface). Infiltration testing was then conducted within the vadose zone utilizing a Precision Permeameter and the following testing procedures.

A support stand was assembled and placed adjacent to the boreholes. This stand holds a calibrated reservoir (2000 ml) and a cable used to raise and lower the water control unit (WCU). The WCU establishes a constant water head within the boreholes during testing by use of a precision valve and float assembly. The WCU was attached to the flow reservoir with a 2-meter (6.6 foot) braided PVC hose and then lowered by cable into the boreholes to the test depth elevation. As required by the Glover solution, the WCU was suspended above the bottom of the boreholes at an elevation of approximately 5 times the borehole diameter. The shut-off valve was then opened allowing water to pass through the WCU to fill the boreholes to the constant water level elevation. The absorption rate slowed as the soil voids became filled and an equilibrium developed as a wetting bulb developed around the boreholes. Water was continuously added until the flow rate stabilized. The reservoir was then re-filled in order to begin testing. During testing, as the water drained into the boreholes and surrounding soils, the water level within the calibrated reservoir was recorded as well as the elapsed time during each interval. The tests were continued until relatively consistent flow rates were documented. During testing the quick release connections and shutoff valve were monitored to ensure that no leakage occurred. The flow rate (Q), height of the constant water level (H), and borehole diameter (D) were used to calculate K_s utilizing the Glover Solution.

Based on the field testing and corroborated with laboratory testing results (published values compared to classification results), the hydraulic conductivity of the shallow soils at the tested depths (ranging from 1 to 2 feet) as identified at the location of the infiltration tests ranged from $k = 9.77 \times 10^{-6}$ cm/sec to $k = 1.04 \times 10^{-5}$ cm/sec indicating a moderately low to low Ksat Class soils. The following table provides the infiltration test results corresponding to the specific locations and depths.

Table 2 – Infiltration Test Results

Infiltration Test	Boring Location	Test Depth (ft)	Percent Fines (%)	Hydraulic Conductivity (cm/sec)
INF-1	HA-1	1-2	33.5	9.77×10^{-6}
INF-2	HA-2	1-2	39.8	1.04×10^{-5}

Conclusions:

Based on our field testing procedures, the embankment fill was determined to have been properly compacted during construction. The embankment fill exhibited moderately low to low permeability rates as indicated by the infiltration test results. Additionally, the dam slopes which appeared to be constructed at about a 3:1 slope along the pond side (upstream) of the dam and about a 2:1 along the downstream side of the dam appeared to be stable. No significant signs of erosion or water seepage along the downstream side of the dam were observed during our field exploration. Based on our visual observations, soil classification, laboratory testing, the degree of compaction of the embankment soils, the infiltration test results and age and history of the structure, it is our professional opinion that the dam is properly constructed and functioning satisfactorily.

We appreciate the opportunity to offer our services to you, and trust that you will call this office with any questions that you may have.

Respectfully Submitted,
G E T Solutions, Inc.

James R. Wheeler
Project Geologist

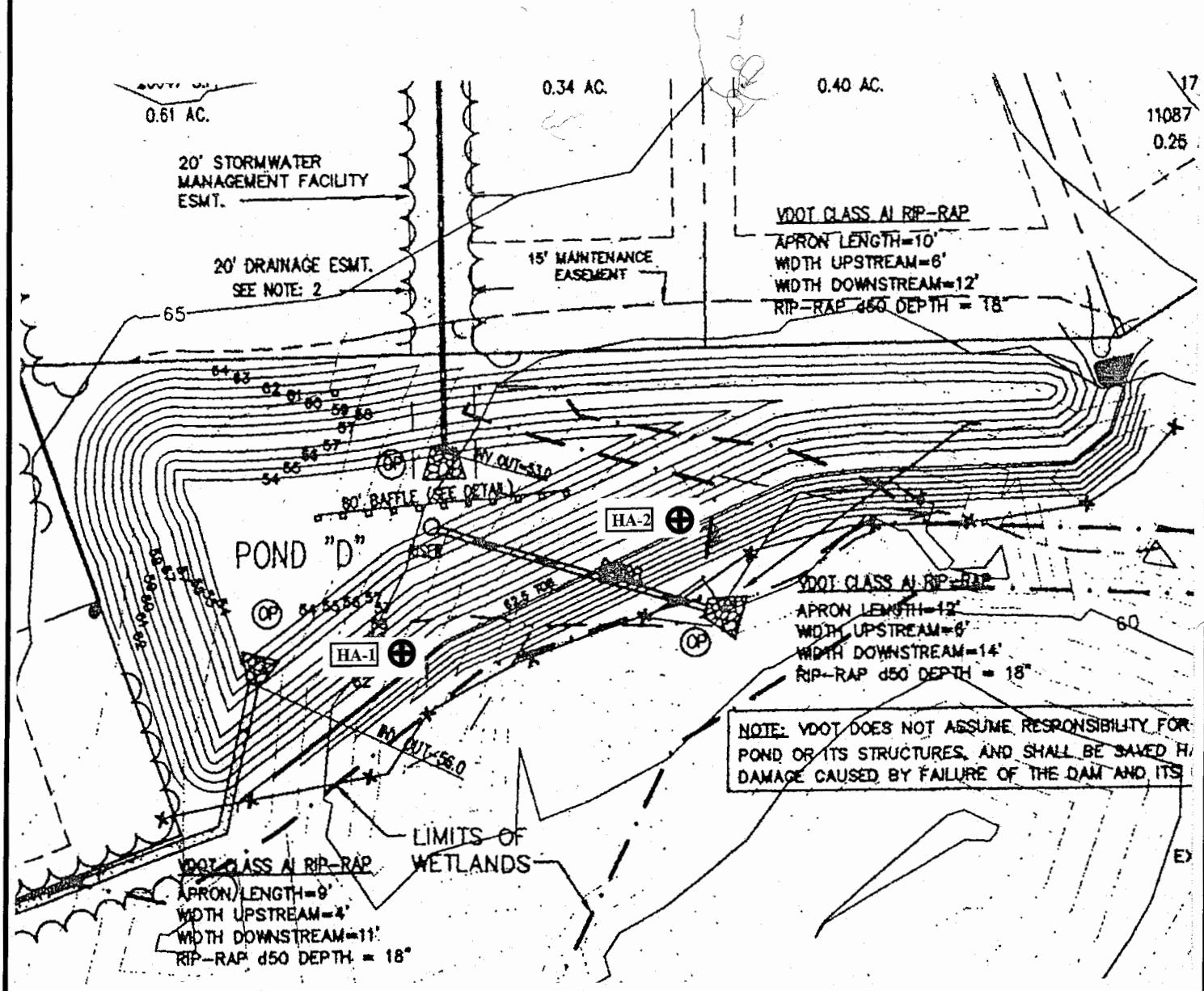
Camille A. Kattan, P. E.
Principal Engineer
VA Lic. # 18045

Copies: (2) Client

Attachments: Boring Location Plan
Log of Borings
Generalized Soil Profile
Infiltration Test Results

BORING LOCATION PLAN

Figure 1



Locations are approximate

BORING LOCATION SKETCH

PROJECT:	**Longhill Station**	
	James City County, Virginia	**SCALE: NTS**
PROJECT NO:	**WM06-188G**	**DATE: 10/12/06**
CLIENT:	**McCale Development**	**PLOT BY: KT**

LOG OF BORINGS

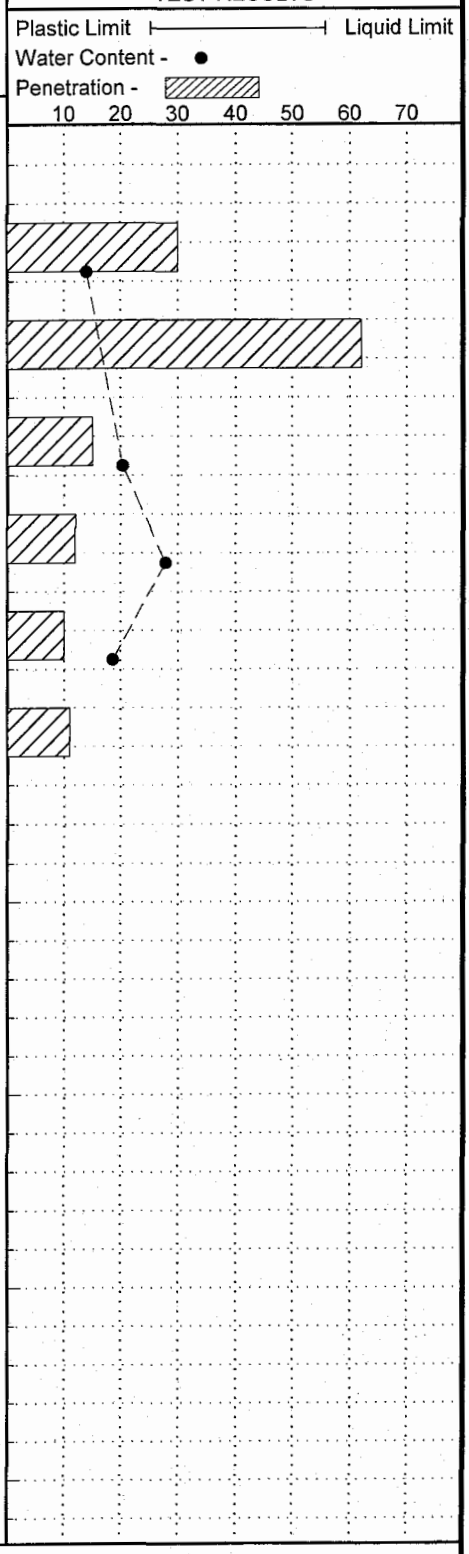
GET Solutions, Inc.
Geotechnical • Environmental • Testing

LOG OF BORING No. HA-1

PROJECT: Pond "D" at Longhill Station Subdivision **PROJECT NO.:** WM06-188G
CLIENT: McCale Development
PROJECT LOCATION: James City County, Virginia
LOCATION: See Attached Boring Location Plan **ELEVATION:**
DRILLER: GET Solutions, Inc. **LOGGED BY:** KT
DRILLING METHOD: Hand Auger **DATE:** 10/12/06
DEPTH TO - WATER> INITIAL: ▽ 4 **AFTER 24 HOURS:** ▽ **CAVING>** C 6.5

Depth (feet)	Description	Graphic	Sample No.	DCP Blow Counts	% < #200
0	8 inches of topsoil				
	0.67 Brown, moist, Silty, fine to medium SAND (SM), Medium Dense		1	6 14 16	34
2	2 Dark brown, moist, Silty, fine to medium SAND (SM) with trace organics, Medium Dense		2	20 22 40	
	3 Grayish brown, moist to wet, Silty, fine to medium SAND (SM) with trace organics, Loose to Medium Dense		3	10 5 10	35
4 ▽			4	6 6 6	30
			5	2 5 5	22
6 C	Boring terminated at 6.5 ft.		6	4 5 6	
8					
10					
12					
14					

TEST RESULTS



This information pertains only to this boring and should not be interpreted as being indicitive of the site.

GET Solutions, Inc.

LOG OF BORING No. HA-2

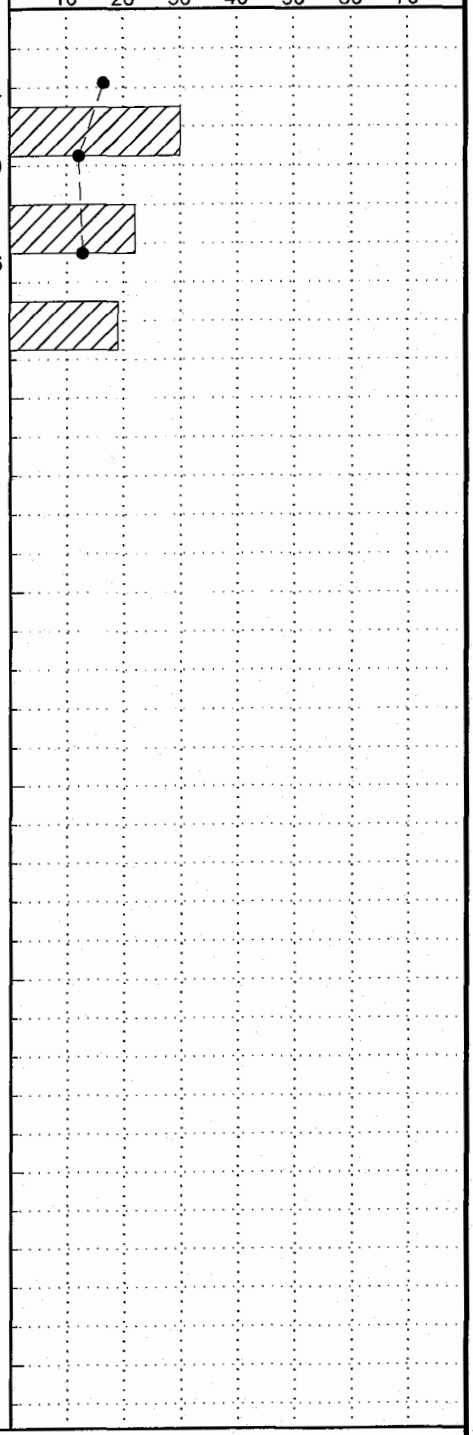
PROJECT: Pond "D" at Longhill Station Subdivision **PROJECT NO.:** WM06-188G
CLIENT: McCale Development
PROJECT LOCATION: James City County, Virginia
LOCATION: See Attached Boring Location Plan **ELEVATION:**
DRILLER: GET Solutions, Inc. **LOGGED BY:** KT
DRILLING METHOD: Hand Auger **DATE:** 10/12/06
DEPTH TO - WATER> INITIAL: ▽ **AFTER 24 HOURS:** ▽ **CAVING>** C

Depth (feet)	Description	Graphic	Sample No.	DCP Blow Counts	% < #200
0					
	8 inches of topsoil				
	0.67				
	Orangish brown, moist, Silty, fine to medium SAND (SM) with trace Clay, Medium Dense		1	11 14 16	44 40
2	2				
	Brown, moist, Silty, fine to medium SAND (SM) with trace Clay, Gravel and organics, Medium Dense		2	10 11 11	36
			3	6 7 12	
4	Boring terminated at 4 ft.				
6					
8					
10					
12					
14					

TEST RESULTS

Plastic Limit ⊢——⊣ Liquid Limit
Water Content - ●
Penetration - ▨

10 20 30 40 50 60 70

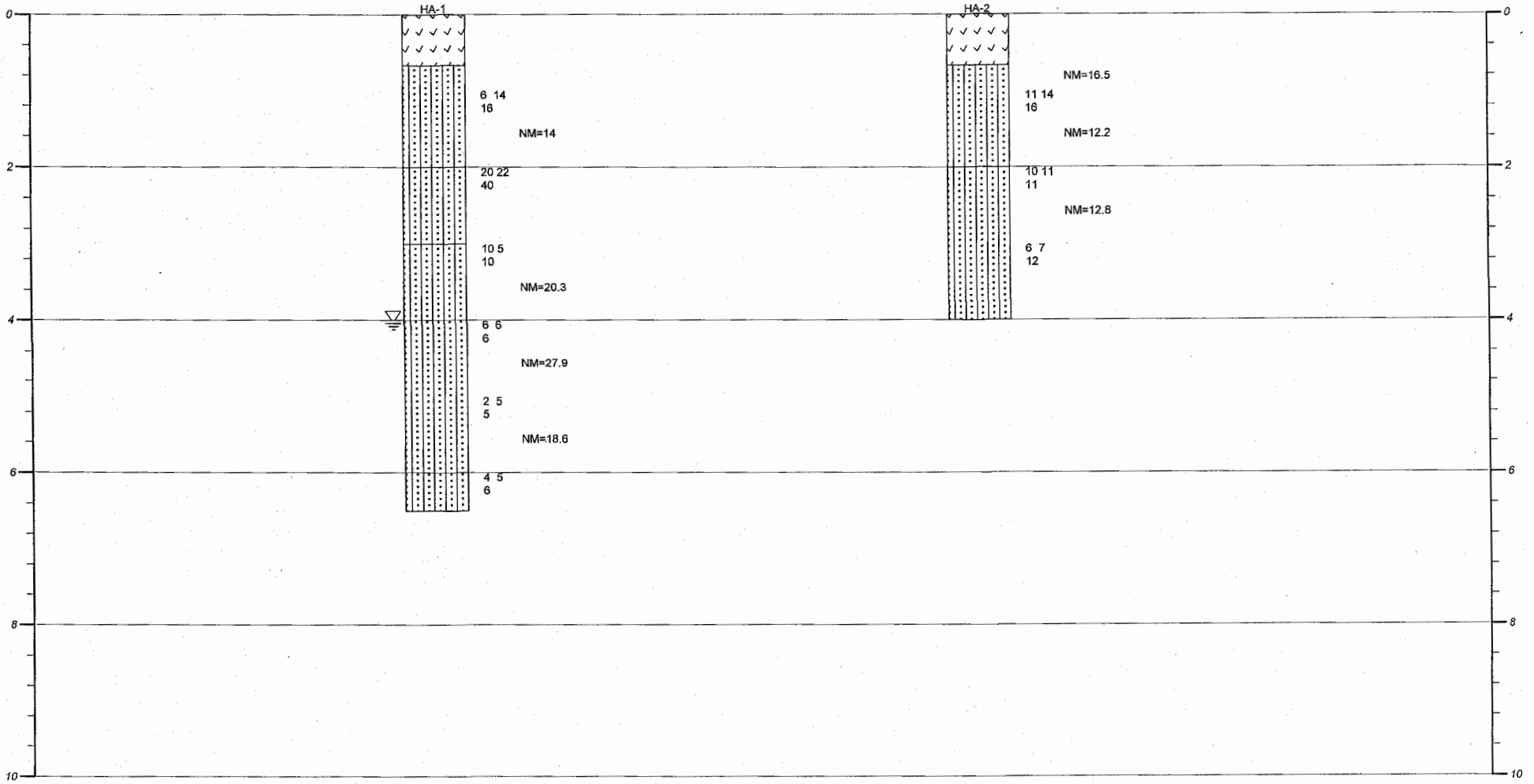


This information pertains only to this boring and should not be interpreted as being indicitive of the site.

Boring Refusal Encountered at 4 Feet Due to Gravel

Figure

GENERALIZED SOIL PROFILE



Strata symbols

Topsoil

Silty sand

GET Solutions, Inc. GENERALIZED SOIL PROFILE		
HORIZONTAL SCALE:	DRAWN BY/APPROVED BY	DATE DRAWN
VERTICAL SCALE: 1"=2'	KT	11/1/2006
Pond "D" at Longhill Station Subdivision James City County, Virginia		
PROJECT NO. WM06-188G		FIGURE NUMBER 1

INFILTRATION TEST RESULTS

GET SOLUTIONS, INC.	SATURATED HYDRAULIC CONDUCTIVITY WORKSHEET	Sheet No.: 1

Project Name.:	Longhill Station - Pond "D"	**Location.....**	HA-1	**Terminology and Solution**	
Boring No.....:	INF-1	**Date.....:**	10/23/2006	Ksat :	Saturated hydraulic conductivity
Investigators.:	D. Mitchell/T. Bieckert	**File Name.....:**	WM06-188G	Q:	Steady-state rate of water flow into the soil
Boring Depth.:	24.0 **in**	**WCU Base. Ht. h:**	15.0 **cm**	H:	Constant height of water in borehole
Boring Dia.....:	8.3 **cm**	**WCU Susp. Ht. S:**	15.2 **cm**	r:	Radius of cylindrical borehole
Boring Rad. (r):	4.15 **cm**	**Const. Wtr. Ht. H:**	30.2 **cm**	Ksat = Q[sinh-1(H/r) - (r2/H2+1).5 + r/H] / (2pH2)	[Glover Solution]

VOLUME (ml)	Volume Out (ml) [a]	TIME (hr:min:sec a/p)	Elapsed Time (hr:min:sec)	Elapsed Time (min) [b]	Flow Rate Q (ml/min) [a/b]	Ksat Equivalent Values (cm/min)	(cm/sec)	(cm/day)	(in/hr)	(ft/day)
2000		9:15:00 AM								
1990	10	9:20:20 AM	0:05:20	5.33	1.88	0.001	9.87E-06	0.9	0.014	0.03
1980	10	9:25:40 AM	0:05:20	5.33	1.88	0.001	9.87E-06	0.9	0.014	0.03
1970	10	9:31:14 AM	0:05:34	5.57	1.80	0.001	9.46E-06	0.8	0.013	0.03
1960	10	9:36:34 AM	0:05:20	5.33	1.88	0.001	9.87E-06	0.9	0.014	0.03
Natural Moisture:	Moist	**Init. Satur.Time:**	9:00:00 AM	**ESTIMATED FIELD KSAT:**		0.001	9.77E-06	0.8	0.014	0.03

Texture/Classif:	SAND (SM)	**Consistency:**	Medium Dense	**Depth to an Impermeable**	N/A
Structure/Fabric:	N/A	**Slope/Landsc:**	N/A	**Depth to Bedrock.....:**	N/A

Notes: Ksat Class = Low

ksatReport1.xls **Precision Permeameter**[tm] Rev. 4/5/002

GET SOLUTIONS, INC.	SATURATED HYDRAULIC CONDUCTIVITY WORKSHEET	Sheet No.: 2

Project Name.:	Longhill Station - Pond "D"	**Location.....**	HA-2	**Terminology and Solution**	
Boring No.....:	INF-2	**Date.....:**	10/23/2006	Ksat :	Saturated hydraulic conductivity
Investigators.:	D. Mitchell/T. Bieckert	**File Name.....:**	WM06-188G	Q:	Steady-state rate of water flow into the soil
Boring Depth.:	24.0 **in**	**WCU Base. Ht. h:**	15.0 **cm**	H:	Constant height of water in borehole
Boring Dia.....:	8.3 **cm**	**WCU Susp. Ht. S:**	15.2 **cm**	r:	Radius of cylindrical borehole
Boring Rad. (r):	4.15 **cm**	**Const. Wtr. Ht. H:**	30.2 **cm**	Ksat = Q[sinh-1(H/r) - (r2/H2+1).5 + r/H] / (2pH2)	[Glover Solution]

VOLUME (ml)	Volume Out (ml) [a]	TIME (hr:min:sec a/p)	Elapsed Time (hr:min:sec)	Elapsed Time (min) [b]	Flow Rate Q (ml/min) [a/b]	Ksat Equivalent Values (cm/min)	(cm/sec)	(cm/day)	(in/hr)	(ft/day)
2000		10:00:00 AM								
1990	10	10:04:55 AM	0:04:55	4.92	2.03	0.001	1.07E-05	0.9	0.015	0.03
1980	10	10:10:05 AM	0:05:10	5.17	1.94	0.001	1.02E-05	0.9	0.014	0.03
1970	10	10:15:27 AM	0:05:22	5.37	1.86	0.001	9.81E-06	0.8	0.014	0.03
1960	10	10:20:19 AM	0:04:52	4.87	2.05	0.001	1.08E-05	0.9	0.015	0.03
1950	10	10:25:27 AM	0:05:08	5.13	1.95	0.001	1.03E-05	0.9	0.015	0.03
Natural Moisture:	Moist	**Init. Satur.Time:**	9:45:00 AM		**ESTIMATED FIELD KSAT:**	0.001	1.04E-05	0.9	0.015	0.03

Texture/Classif:	SAND (SM)	**Consistency:**	Medium Dense	**Depth to an Impermeable**	N/A
Structure/Fabric:	N/A	**Slope/Landsc:**	N/A	**Depth to Bedrock.....:**	N/A

Notes: Ksat Class = Moderately Low

ksatReport1.xls **Precision Permeameter**tm Rev. 4/5/002

"A"

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

July 23, 2002

Mr. Ken Dodd, Development Manager
McCale Development Corporation
729 Thimble Shoals Boulevard, Suite 4A
Newport News, Va. 23606

Reinspect
8-07-02

Re: Longhill Station Section 1 (1A & 1B)
County Plan No. S-47-95
Stormwater Management Facilities A, B, C and D
County BMP ID Codes: PC 022; PC 021; PC 020 and PC 120

Dear Dodd:

In response to your recent request concerning release of erosion and sediment control surety being held for the above referenced project, personnel from the Environmental Division met with you on Tuesday July 23rd 2002 and performed final inspections on Ponds A, B and C. These ponds are associated with bond being held for the project. Pond D is also associated with the Phase 1 bond; however, due to active construction being performed in Section 4, it was determined mutually that since this facility is still serving as a temporary sediment basin and as-built drawings have not been submitted, it was not warranted to perform a final inspection for this facility at this time.

Based on our review of the project and a concurrent field inspection as performed on July 23rd 2002, the following items must be addressed prior to release of the developer's surety instrument for the stormwater management/BMP facilities associated with this site:

Record Drawings:

1. The record drawing dated December 6th 1999 for **Pond A** (PC 022) is satisfactory.

2. The record drawing dated November 15th 1999 and supplemental information supplied March 22nd 2000 for **Pond B** are satisfactory.

3. The record drawing dated November 15th 1999 for **Pond C** is satisfactory.

4. Note # 18 on Sheet C-5 of the approved plan for Section 3 & 4 required as-built drawings for Pond D. None were received. *(Note: This facility was determined to still be serving as a temporary sediment basin due to active construction in the area and has not been converted to final BMP mode. A final inspection was not performed during our meeting.)*

"A" OK 6/25/03 "C" OK 6-25-03

Construction Certifications:

5. For Ponds A, B and C, Note # 18 on Sheet C-14 of the approved plan required construction certifications. None were provided.

6. For Pond D, Note # 18 on Sheet C-5 of the approved plan required construction certification. None was provided.

Construction certifications are especially important since each of the BMP facilities have engineered and compacted earthen embankments. The certifications can be in letter format or by use of the certification statements in Section 4 of the *James City County, Stormwater Management/BMP Facilities, Record Drawing and Construction Certification, Standard Forms & Instructions*. Please contact our office if you need a copy of the certification statement page.

Construction - Related Items:

Pond A (PC 022) - Near 6033 Allegheny Lot 87

✓ 8-7-02 7. Remove silt fence present in the natural channel downstream of the barrel through the dam.

✓ 8-19-02 CED 8. Clear trees and woody vegetation along the entire downstream face of the pond embankment and from within the emergency spillway. Usually trees, shrubs and woody vegetation are not permitted to grow on any part of pond embankments constructed using engineered (compacted) fills. Saturated roots mats combined with high wind can cause trees to overtop and accelerate soil erosion and embankment failure. For older facilities which may have established tree growth, we recommend that trees be cut flush to or below ground level and be maintained in that fashion as to not disturb root systems that may already be extensive. Efforts should then be made to reduce tree restablishment and to replace tree growth with an acceptable low-maintenance grass covering. 90% Done, ES not clear. will continue + clear ES, Beth to reinspect.

✓ 8-7-02 9. Remove the dewatering orifice and convert to riser to final BMP mode by use of a turn down in accordance with the approved plan.

✓ 8-7-02 10. The riser structure was inaccessible as it is situated in the middle of the pond. When removing the dewatering orifice, perform an inspection on the interior of the riser. Clean all trash and debris from the interior of the riser, especially at the entrance to the outlet barrel. Clean and coat the exterior of the riser as necessary to remove visible surface corrosion.

✓ 8-7-02 11. Clean and remove debris and vegetation within 10 feet of the outfall end of the 24-inch storm drain inflow pipe which enters the basin from Allegheny Drive at the southwest corner of the pond. Flow into the facility shall not be obstructed by vegetation.

* Added item, see next page

Pond B (PC 021) - Near 3913 Blue Ridge Court

8-19-02 CED ✓ Didn't remove trees holding flex tubes as discussed. 12. Remove the dewatering orifice and convert the riser to final BMP mode by use of a turn down elbow in accordance with the approved plan. Flex Tube was turned down, needs hard elbow. Beth to reinspect.

✓ 8-7-02 13. Clean and coat the exterior of the riser as necessary to remove visible surface corrosion. ✓ Not painted green like other turn down elbows

11-5-02 ✓ 8-7-02 14. Repair the puncture hole on the east side of the riser to stop leakage.

✓ 8-7-02 15. Clear and remove all vegetation within 10 feet of the principal flow control (riser) structure. Flow into the riser shall not be obstructed by vegetation.

✓ 8-7-02 16. Clean and remove vegetation within 10 feet of the outfall end of the outlet barrel through the dam. Flow out of the BMP shall not be obstructed by vegetation.

✓ 8-7-02 17. Remove silt fence present at the downstream end of the emergency spillway. The emergency spillway is situated at the west side of the dam.

✓ 8-7-02 18. Stabilize with seed and mulch disturbed soil areas present on the interior side slope of the basin at the west end of the pond. This area is near the electrical service box for the fountain.

11-5-02 ADD FILL + SEED/MULCH DEPRESSION AREA ON D/S EMB North of riser (Pond A)

Pond C (PC 020) - Near the Recreation Center on Longhill Station Road ~~Incomplete~~ ~~CEO 8-19-02~~

✓ 8-7-02 OK 19. Clean and remove debris and vegetation within 10 feet of the outfall ends of the two storm drain inflow pipes which enter the basin from Longhill Station Road and the Recreation Center. These pipes are situated at the south end of the basin.

✓ 8-7-02 CEO 8-9-02 20. Clear and remove all vegetation within 10 feet of the principal flow control (riser) structure.

NOT DONE. WILL DO TODAY. Beth to reinspect.

✓ 8-7-02 21. Clear trees and woody vegetation along the entire downstream face of the dam and the emergency spillway. This is especially important on the right (east) side of the dam in the vicinity of the riser and barrel structures. (Note: The emergency spillway is situated over the outlet barrel through the dam.)

<10 ft. but OK 11-5-02 Trees needs to be removed will obstruct and will build-up vegetation and debris around riser.

Also, for all the BMPs listed above which have access hatches into the riser structure, a padlock should be added to prevent future unauthorized entry into the risers. Provide an extra set of keys to the Environmental Division office and the Homeowner's Association.

Once this work is satisfactorily completed, contact our office appropriately. We can then proceed with final release of surety for the project. Please contact me at 757-253-6639 or the assigned Environmental Division inspector, Beth Davis, at 757-253-6702 if you have any additional comments or questions regarding these issues.

Sincerely,

Scott J. Thomas, P.E.
Senior Engineer
Environmental Division

cc: Pat Menichino, Environmental Division

G:\SWMProg\AsBuilts\S4795.pc020

McCale
DEVELOPMENT CORPORATION
LAND DEVELOPMENT
REAL ESTATE INVESTMENTS

RECEIVED
DEC 13 2006
ENVIRONMENTAL DIVISION

729 Thimble Shoals Blvd. • Suite 6-C
Newport News, Virginia 23606
(757) 873-0011
Fax (757) 873-0651
info@mccaledev.com

December 12, 2006

Mr. Scott ~~James~~ Thomas
James City County
Development Management
P.O. Box 8784
Williamsburg, Va. 23187-8784

Re: Longhill Station-Section 3 & 4
Resource Letter of Credit #295-$10,000.00

Dear Mr. James,

In reference to my letter of November 14, 2006 regarding the release of the above captioned surety. All items have been completed as stated in my earlier letter and we are requesting release of the letter of credit in the amount of $10,000.00.

Please advise as to the status of this release as soon as possible.

Thank you,

Joan W. Smith

Joan W. Smith

12/13/06 Called. Need Construction Certification and Final BMP Inspection.
JLB

Rickenbond + Bury
ENGINEERING SOLUTIONS

Bury+Partners - Virginia, Inc.
1643 Merrimac Trail
Williamsburg, Virginia 23185
(757) 229-1776 - Phone
(757) 229-3694- Fax

Letter of Transmittal

To: JOAN ETCHBERGER

Project No.: 212090005

Company: JAMES CITY COUNTY

Date: JAN 17, 2006

Address: ENVIRONMENTAL DIV.

CC:

Phone:

Re:

RECEIVED
JAN 17 2006
ENVIRONMENTAL DIVISION

☑ Delivery ☐ Overnight ☐ Pick-Up ☐ Courier ☐ Other

Quantity	Description of Item(s)
3	AS BUILT DRAWINGS POND "D" LONGHILL STATION

PC 120
5-19-99
Sec 3+4

~Notes~

Please call if we can be of further assistance or should this information not meet all of your needs.

Prepared By: LYNN EVANS

AB FILE "D"

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

July 23, 2002

Mr. Ken Dodd, Development Manager
McCale Development Corporation
729 Thimble Shoals Boulevard, Suite 4A
Newport News, Va. 23606

Re: Longhill Station Section 1 (1A & 1B)
County Plan No. S-47-95
Stormwater Management Facilities A, B, C and D
County BMP ID Codes: PC 022; PC 021; PC 020 and PC 120

Dear Dodd:

In response to your recent request concerning release of erosion and sediment control surety being held for the above referenced project, personnel from the Environmental Division met with you on Tuesday July 23rd 2002 and performed final inspections on Ponds A, B and C. These ponds are associated with bond being held for the project. Pond D is also associated with the Phase 1 bond; however, due to active construction being performed in Section 4, it was determined mutually that since this facility is still serving as a temporary sediment basin and as-built drawings have not been submitted, it was not warranted to perform a final inspection for this facility at this time.

Based on our review of the project and a concurrent field inspection as performed on July 23rd 2002, the following items must be addressed prior to release of the developer's surety instrument for the stormwater management/BMP facilities associated with this site:

Record Drawings:

1. The record drawing dated December 6th 1999 for **Pond A** (PC 022) is satisfactory.

2. The record drawing dated November 15th 1999 and supplemental information supplied March 22nd 2000 for **Pond B** are satisfactory.

3. The record drawing dated November 15th 1999 for **Pond C** is satisfactory.

4. Note # 18 on Sheet C-5 of the approved plan for Section 3 & 4 required as-built drawings for Pond D. None were received. *(Note: This facility was determined to still be serving as a temporary sediment basin due to active construction in the area and has not been converted to final BMP mode. A final inspection was not performed during our meeting.)*

GOT JAN 17 2006.

Construction Certifications:

5. For Ponds A, B and C, Note # 18 on Sheet C-14 of the approved plan required construction certifications. None were provided.

6. For Pond D, Note # 18 on Sheet C-5 of the approved plan required construction certification. None was provided.

Construction certifications are especially important since each of the BMP facilities have engineered and compacted earthen embankments. The certifications can be in letter format or by use of the certification statements in Section 4 of the *James City County, Stormwater Management/BMP Facilities, Record Drawing and Construction Certification, Standard Forms & Instructions*. Please contact our office if you need a copy of the certification statement page.

Construction - Related Items:

Pond A (PC 022) - Near 6033 Allegheny Lot 87

7. Remove silt fence present in the natural channel downstream of the barrel through the dam.

8. Clear trees and woody vegetation along the entire downstream face of the pond embankment and from within the emergency spillway. Usually trees, shrubs and woody vegetation are not permitted to grow on any part of pond embankments constructed using engineered (compacted) fills. Saturated roots mats combined with high wind can cause trees to overtop and accelerate soil erosion and embankment failure. For older facilities which may have established tree growth, we recommend that trees be cut flush to or below ground level and be maintained in that fashion as to not disturb root systems that may already be extensive. Efforts should then be made to reduce tree restablishment and to replace tree growth with an acceptable low-maintenance grass covering.

9. Remove the dewatering orifice and convert to riser to final BMP mode by use of a turn down in accordance with the approved plan.

10. The riser structure was inaccessible as it is situated in the middle of the pond. When removing the dewatering orifice, perform an inspection on the interior of the riser. Clean all trash and debris from the interior of the riser, especially at the entrance to the outlet barrel. Clean and coat the exterior of the riser as necessary to remove visible surface corrosion.

11. Clean and remove debris and vegetation within 10 feet of the outfall end of the 24-inch storm drain inflow pipe which enters the basin from Allegheny Drive at the southwest corner of the pond. Flow into the facility shall not be obstructed by vegetation.

Pond B (PC 021) - Near 3913 Blue Ridge Court

12. Remove the dewatering orifice and convert the riser to final BMP mode by use of a turn down elbow in accordance with the approved plan.

13. Clean and coat the exterior of the riser as necessary to remove visible surface corrosion.

14. Repair the puncture hole on the east side of the riser to stop leakage.

15. Clear and remove all vegetation within 10 feet of the principal flow control (riser) structure. Flow into the riser shall not be obstructed by vegetation.

16. Clean and remove vegetation within 10 feet of the outfall end of the outlet barrel through the dam. Flow out of the BMP shall not be obstructed by vegetation.

17. Remove silt fence present at the downstream end of the emergency spillway. The emergency spillway is situated at the west side of the dam.

18. Stabilize with seed and mulch disturbed soil areas present on the interior side slope of the basin at the west end of the pond. This area is near the electrical service box for the fountain.

Pond C (PC 020) - Near the Recreation Center on Longhill Station Road

19. Clean and remove debris and vegetation within 10 feet of the outfall ends of the two storm drain inflow pipes which enter the basin from Longhill Station Road and the Recreation Center. These pipes are situated at the south end of the basin.

20. Clear and remove all vegetation within 10 feet of the principal flow control (riser) structure.

21. Clear trees and woody vegetation along the entire downstream face of the dam and the emergency spillway. This is especially important on the right (east) side of the dam in the vicinity of the riser and barrel structures. (Note: The emergency spillway is situated over the outlet barrel through the dam.)

Also, for all the BMPs listed above which have access hatches into the riser structure, a padlock should be added to prevent future unauthorized entry into the risers. Provide an extra set of keys to the Environmental Division office and the Homeowner's Association.

Once this work is satisfactorily completed, contact our office appropriately. We can then proceed with final release of surety for the project. Please contact me at 757-253-6639 or the assigned Environmental Division inspector, Beth Davis, at 757-253-6702 if you have any additional comments or questions regarding these issues.

Sincerely,

Scott J. Thomas, P.E.
Senior Engineer
Environmental Division

cc: Pat Menichino, Environmental Division

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JAMES CITY COUNTY - ENVIRONMENTAL DIVISION

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

DATE SENT: 3/26/07

Name: Easton Park
Firm or Company: McCale Development Corporation
Facsimile Number: 7
Number of pages including this transmittal: 873-0651
From: Jason Beck 259-4026

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

Comments:
Declaration of Covenants Form + Longhill Station Pond D Letter.

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

JAMES CITY COUNTY - ENVIRONMENTAL DIVISION

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

DATE SENT: 3/24/07

Name: Lynn Evans

Firm or Company:

Facsimile Number: 229-4683

Number of pages including this transmittal: 3

From: Jason Beck - JCC ENV 259-4026

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

Comments: Items under ~~the~~ record drawing.

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

PC020_PC021_PC022_PC119_PC120_LONGHILL_STATION - 500

JAMES CITY COUNTY - ENVIRONMENTAL DIVISION

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

DATE SENT: 1/10/07

Name: Ken Dobbs
Firm or Company:
Facsimile Number: 873- ~~0615~~ 0651
Number of pages including this transmittal: 4
From: Jason Beck 259-4026

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

Comments:
BMP/ Maintenance agreement Form

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

Faxed 1/10/07

McDale
873-0651

PC020_PC021_PC022_PC119_PC120_LONGHILL_STATION - 501

DEVELOPMENT MANAGEMENT

101-E MOUNTS BAY ROAD, P.O. BOX 8784, WILLIAMSBURG, VIRGINIA 23187-8784
(757) 253-6671 Fax: (757) 259-4032 E-MAIL: devtman@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
MOSQUITO CONTROL (757) 259-4116

January 3, 2007

McCale Development Corporation
Attn: Joan Smith
729 Thimble Shoals Boulevard Suite 6C
Newport News, VA 23606

Re: Longhill Station Section 3 & 4
County Plan No. S-19-99
Stormwater Management Pond D
County BMP ID Code: PC 120

Dear Ms. Smith:

The Environmental Divisions has received a record drawing (asbuilt) and construction certification for the stormwater management facility for the above referenced project. The record drawing provides as-built information for a wet pond situated just to the south of Red Wing Court.

Based on our review of the project and a concurrent field inspection as performed on December 19, 2006, the following items must be addressed prior to release of the developer's surety instrument for the stormwater management/BMP facility at the site and to proceed with closing out the project:

Inspection Maintenance Agreement:

Check

1. Based on a review of our active file and records for the project, Environmental Division comments under S-19-99 (Comment # 4; March 26, 1999), required a Declaration of Covenants, Inspection/Maintenance agreement to be executed with the County for the BMP facility for this project. Based on a review of our records none was found.

Record Drawing:

2. It appears that lot lines shown on the plan Sheet 1 are not in the correct location as the 24-inch storm drain pipe from Red Wing Court is supposed to be along the property line between Lot 176 and the Archaeological site. Either the pond needs shifted westward or the lot lines need shifted eastward.

3. Show the existing concrete paved flume which enters the pond at the southwest corner. Annotate as required with construction information.

4. Show the invert elevation out of the 24-inch storm drain pipe from Red Wing Court.

5. Show topography or spot elevations for the pond bottom below permanent pool. It must be verified that the pond has adequate depth or volume in accordance with the approved plan (Elevation 54.0).

6. Show the pipe section from Sheet C5 of the approved plan, annotated as required with construction information, on the record drawing. This detail shows all pertinent information about the riser and barrel structure of the dam.

7. Show the location of the emergency spillway on the record drawing.

Construction - Related Items:

8. Clean trash, litter and debris from the pond interior near riser.

9. Remove trees and woody vegetation on the downslope embankment. Usually trees, shrubs and woody vegetation are not permitted to grow on any part of pond embankments constructed using engineered (compacted) fills. Saturated roots mats combined with high wind can cause trees to overtop and accelerate soil erosion and embankment failure. For older facilities which may have established tree growth, we recommend that trees be cut flush to or below ground level and be maintained in that fashion as to not disturb root systems that may already be extensive. Efforts should then be made to reduce tree restablishment and to replace tree growth with an acceptable low-maintenance grass covering.

10. Clear and remove all debris and within 10 feet of the principal flow control (riser) structure and clean all weirs and orifices. The riser for the BMP is a 30-inch vertical concrete standpipe situated in the pond along the south bank. Flow into the riser shall not be obstructed.

11. It does not appear that the emergency spillway was installed in accordance with information shown on Sheet C5 of the approved plan. Construct the emergency spillway in accordance with the approve plan or provide certified data from a professional engineer that one is not needed.

12. The outfall end of the 24-inch storm drain pipe from Red Wing Court could not be found in the field, indicative of a submerged or clogged condition. Ensure the outfall end of the pipe is not obstructed with sediment.

12. Install outlet protection at the end of the paved flume which enters the southwest corner of the basin and at the end of the 24- inch RCP storm drain pipe from Red Wing Court.

13. To prevent unauthorized access, a padlock be added to the hatch which provides access to the principal riser structure. Should a lock be added, provide an extra set of keys or combination for the lock to the Environmental Division office.

It is your responsibility to provide proper advance notification to homeowner association members or residents who border the BMP, as appropriate, of any proposed work activity that is required at the pond location to address construction-related or routine maintenance items. Also, caution shall be exercised to avoid rapid drawdown of the normal water pool. Rapid drawdown could cause a slide in saturated portions of the upstream embankment and other shoreline areas or cause alarm to residents who live adjacent to the facility. Generally, the facility should not be left unattended during drawdown and draining rate should not exceed 6 inches per day.

Once this work is satisfactorily completed, contact our office appropriately for a re-inspection. We can then proceed with final release of the surety and/or closing out the project. One reproducible and one blue/black line set of the record drawings will be required once the above items are adequately addressed.

Please contact me at 757-259-4026 or Scott Thomas, Chief Engineer at 757-253-6639 if you have any further comments or questions.

Sincerely,

Jason Beck

Jason L. Beck
Environmental Inspector II
Environmental Division

cc: Scott Thomas, Chief Engineer - Storm Water

G:\AsBuilts\reviews\final\S1999.pc120

McCale
DEVELOPMENT CORPORATION
LAND DEVELOPMENT
REAL ESTATE INVESTMENTS

729 Thimble Shoals Blvd. • Suite 6-C
Newport News, Virginia 23606
(757) 873-0011
Fax (757) 873-0651
info@mccaledev.com

DEVELOPMENT MANAGEMENT
NOV 1 7 2006
RECEIVED

RECEIVED
NOV 17 2006
ENVIRONMENTAL
DIVISION

November 14, 2006

Mr. Scott James
James City County
Development Management
P.O. Box 8784
Williamsburg, Va. 23187-8784

Re: Longhill Station – Section 3 & 4
Resource Letter of Credit #295 - $10,000.00

Dear Mr. James,

Enclosed please find a copy of letter dated September 25, 2006 from Darryl E. Cook regarding the renewal of the above captioned bond. As stated in his letter the only remaining item for completion is the construction certification for Pond D. I am also enclosing an original certification from GET Solutions, Inc. dated November 3, 2006. Upon review and acceptance of the certification please release our existing bond as listed above.

If you have any questions please do not hesitate to give me a call at 757-873-0011.

Thank you,

Joan W. Smith

Joan W. Smith

ResourceBank

COPY

735 Thimble Shoals Blvd. • Suite 170 • Newport News, Virginia 23606 • Phone (757) 596-9122 • Fax (757) 596-9124

RECEIVED
NOV 15 2006
DEVELOPMENT MANAGEMENT

IRREVOCABLE LETTER OF CREDIT NO. 295- RENEWAL

September 27, 2006

Beneficiary:
James City County
Environmental Division
P. O. Box 8784
Williamsburg, VA 23187
Attn: Darryl E. Cook

Applicant:
Longhill Station, L.L.C.
109 Nat Turner Boulevard
Newport News, VA 23606

Amount: $10,000.00
Ten Thousand and
00/100's Only U. S. Dollars

Expiry: November 2, 2007
Or any future extended expiry as provided herein.

We hereby renew this Irrevocable Letter of Credit in your favor, which is available against your drafts at sight on Resource Bank. Each draft hereunder must bear upon its face "Drawn under Letter of Credit No.: 295, dated September 27, 2006" of the Resource Bank, 735 Thimble Shoals Boulevard, Suite 170, Newport News, VA 23606, and be accompanied by the following documents.

- Your written signed statement reading: "Longhill Station, L.L.C. has failed to satisfactorily perform, prior to the expiration of this Letter of Credit all or part of the terms and conditions of the Siltation Agreement dated November 2, 1999, pertaining to the Longhill Station subdivision – Sections 3 & 4, or any plans approved by and on file with the County of James City and that James City County, is in consequence entitled to the amount of the accompanying draft."

- The Original Letter of Credit.

In addition to the location listed above, this Letter of Credit may be drawn at Resource Bank, 735 Thimble Shoals Boulevard, Suite 170, Newport News, VA 23606. A draw at this location shall be deemed made when received and shall have the same cause and effect as a draw at the main office of Resource Bank.

Multiple Drawings are prohibited.

Except so far as otherwise expressly stated, this documentary credit is subject to the Uniform Customs and Practice for Documentary Credits (1993 Revision), International Chamber of Commerce Publication No. 500.

Very truly yours,
Resource Bank

Henry L. Singleton
Senior Vice President

Bury+Partners
ENGINEERING SOLUTIONS

Bury+Partners-Virginia, Inc.
4095 Ironbound Road
Suite 200
Williamsburg, VA 23188
(757) 229-1776 - Phone
(757) 229-4683 - Fax

Letter of Transmittal

RECEIVED
JUL
ENVIRONMENTAL DIVISION

To: JASON BECK

Project No.:

Company: J. C. Co.

Date: 7/3/07

Address:

CC:

Phone:

Re:

☐ Delivery ☐ Overnight ☐ Pick-Up ☐ Courier ☐ Other

Quantity	Description of Item(s)
1	MYLAR - POND "D" LONGHILL STA. ASBUILT

~Notes~

Please call if we can be of further assistance or should this information not meet all of your needs.

Prepared By:

Bury+Partners
ENGINEERING SOLUTIONS

Bury+Partners-Virginia, Inc.
4095 Ironbound Road
Suite 200
Williamsburg, VA 23188
(757) 229-1776 - Phone
(757) 229-4683 - Fax

Letter of Transmittal

To: JASON PECK

Project No.: 21209

Company: JCC ENVIRONMENTAL

Date: 6/18/07

Address:

CC:

Phone:

Re: LONGHILL STA. POND "D" ASBUILTS

☑ Delivery ☐ Overnight ☐ Pick-Up ☐ Courier ☐ Other

Quantity	Description of Item(s)
3	AS BUILT DWGS

~Notes~

Please call if we can be of further assistance or should this information not meet all of your needs.

Prepared By:

Bury+Partners
ENGINEERING SOLUTIONS

Bury+Partners-Virginia, Inc.
4095 Ironbound Road
Suite 200
Williamsburg, VA 23188
(757) 229-1776 Phone
(757) 229-4[illegible] Fax

RECEIVED
MAY 18 2007
ENVIRONMENTAL DIVISION

Letter of Transmittal

To: JASON BECK

Project No.: 21209

Company: JCCo. ENVIRONMENTAL

Date: 5/18/07

Address:

CC:

Phone:

Re: LONGHILL STA POND "D" ASBUILT

☐ Delivery ☐ Overnight ☐ Pick-Up ☐ Courier ☐ Other

Quantity	Description of Item(s)
1	PAPER COPY POND "D" REVISIONS
1	MYLAR " " " "

~Notes~

Please call if we can be of further assistance or should this information not meet all of your needs.

Prepared By:

DJG, INC.
P.O. Box 3505 1006 Richmond Rd
WILLIAMSBURG, VIRGINIA 23187

(804) 253-0673 or 874-5015
FAX (804) 253-2319

LETTER OF TRANSMITTAL

DATE 7-28-97	JOB NO. 1940220
ATTENTION DARRYL COOK	
RE: LONGHILL POND "D"	

TO JAMES CITY COUNTY
CODE COMPLIANCE
MOUNTS BAY RD.

RECEIVED JUL 1997 CODE COMPLIANCE OFFICE

WE ARE SENDING YOU ☒ Attached ☐ Under separate cover via _____ the following items:

☐ Shop drawings ☐ Prints ☒ Plans ☐ Samples ☐ Specifications
☐ Copy of letter ☐ Change order ☐ _____

COPIES	DATE	NO.	DESCRIPTION
3	7-23-97	1	LONGHILL STATION SUBDIVISION, REVISED SITE PLAN - "POND D"

THESE ARE TRANSMITTED as checked below:

☒ For approval ☐ Approved as submitted ☐ Resubmit _____ copies for approval
☐ For your use ☐ Approved as noted ☐ Submit _____ copies for distribution
☐ As requested ☐ Returned for corrections ☐ Return _____ corrected prints
☐ For review and comment ☐ _____
☐ FOR BIDS DUE _____ 19 _____ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS

DARRYL,
HERE IS THE DRAWING FOR POND "D" AT LONGHILL STATION SUBDIVISION. PLEASE PROCEED TO REVISE THE EXISTING E&S PERMIT FOR THIS SITE TO INCLUDE THE CONSTRUCTION CALLED FOR ON THE DRAWING. SHOULD YOU NEED ANY ADDITIONAL INFORMATION OR ASSISTANCE, PLEASE CALL ME. I AM AVAILABLE TO COME IN TO ASSIST YOU AND MAKE THE REVIEW OF THIS PLAN AS EASY AS POSSIBLE. THANK YOU FOR YOUR HELP!
PHL

H.L. PHILLIP GOERING

COPY TO FILE

SIGNED: H.L. Phillip Goering

PC020_PC021_PC022_PC119_PC120_LONGHILL_STATION - 510

If enclosures are not as noted, kindly notify us at once.

James City County Environmental Division
Stormwater Management / BMP Inspection Report
Detention and Retention Pond Facilities

County BMP ID Code (if known): PC-120

Name of Facility: Longhill Station Sec. 3+4 (Pond D) BMP No.: 1 of 1 Date: 12/19/06

Location: Longhill Station Subdivision by Red Ring Court

Name of Owner: Longhill Station Home Owners Association

Name of Inspector: Jason Beck

Type of Facility: Wet Pond

Weather Conditions: OVERCAST Type: ☒ Final Inspection ☐ County BMP Inspection Program ☐ Owner Inspection

If an inspection item is not applicable, mark NA, otherwise mark the appropriate column.

O.K. - The item checked is in adequate condition and the maintenance program is currently satisfactory. No action required.
Routine - The item checked requires attention, but does not present an immediate threat to the function/integrity of the BMP.
Urgent - The item checked requires immediate attention to keep the BMP operational and to prevent damage to the facility.

Provide an explanation and details in the comment column, if routine or urgent are marked.

Facility Item	O.K.	Routine	Urgent	Comments
Embankments and Side Slopes:				
Grass Height	✓			
Vegetation Condition	✓			
Tree Growth			✓	Need to cut trees down
Erosion				
Trash & Debris		✓		
Seepage	✓			
Fencing or Benches	✓			
Interior Landscaping/Planted Areas: ☐ None ☐ Constructed Wetland/Shallow Marsh ☒ Naturally Established Vegetation				
Vegetated Conditions	✓			
Trash & Debris	✓			
Floating Material	✓			
Erosion	✓			
Sediment	✓			
Dead Plant	✓			
Aesthetics	✓			
Other				
Notes:				
Water Pools: ☒ Permanent Pool (Retention Basin) ☐ Shallow Marsh (Detention Basin) ☐ None, Dry (Detention Basin)				
Shoreline Erosion	✓			
Algae	✓			some Algae along perimeter

Facility Item	O.K.	Routine	Urgent	Comments
Trash & Debris		✓		Milk carton, drink can floating in pool
Sediment	✓			
Aesthetics	✓			
Other	✓			
Inflows (Describe Types/Locations):				SW Corner Pave flume 4' width x 1'½" depth
Condition of Structure	✓		✓	~~Concrete structure~~ 24" RCP - can not locate in Pond
Erosion	✓		✓	Pave flume minor erosion at outfall
Trash and Debris				
Sediment				
Outlet Protection			✓	Pave flume - None 24 RCP - None
Other				
Principal Flow Control Structure - Riser, Intake, etc. (Describe Type):				
Condition of Structure	✓			
Corrosion	✓			
Trash and Debris		✓		around antix votex device (remove)
Sediment	✓			← CFS
Vegetation	✓			
Other	✓			water is flowing
Principal Outlet Structure - Barrel, Conduit, etc. :				
Condition of Structure	✓	✓		24" RCP / Remove Trees above pipe
Settlement	✓			
Trash & Debris	✓			
Erosion/Sediment	✓			
Outlet Protection	✓			24 FES / Rip Rap
Other	✓			Channel Erosion From stream
Emergency Spillway (Overflow): None Existed				
Vegetation				
Lining				
Erosion				
Trash & Debris				
Other				
Notes:				
Nuisance Type Conditions:				
Mosquito Breeding	✓			
Animal Burrows	✓			

Facility Item	O.K.	Routine	Urgent	Comments
Graffiti	✓			
Other	✓			
Surrounding Perimeter Conditions:				
Land Uses	✓			Residential N & W
Vegetation	✓			Woods to S & stream
Trash & Debris	✓			
Aesthetics	✓			
Access /Maintenance Roads or Paths	✓			
Other	✓			Stream head ~~Star~~ is ~~West~~ SW of pond

Remarks:

Overall Environmental Division Internal Rating: 3

Signature: Jason Buck **Date:** 12/19/06 & 7/3/07

Title: Environmental Inspector

SWMProg\BMP\CoInspProg\DetRet.wpd

Date Record Created:

Created By:

WS_BMPNO: PC120

PRINTED ON
Thursday, March 04
11:07:40 AM

2010

WATERSHED	PC
BMP ID NO	120
PLAN NO	S-19-99
TAX PARCEL	(311)(1-80)
PIN NO	3110100080
CONSTRUCTION DATE	6/18/2007
PROJECT NAME	Longhill Station Sec 3/4 (Pond D)
FACILITY LOCATION	Near Intx Alleghany & Red Wing Ct.
CITY-STATE	Williamsburg, Va. 23188
CURRENT OWNER	Wallace Associates, LLC (c/o Henry Stephens)
OWNER ADDRESS	2 Eaton St.
OWNER ADDRESS 2	Suite 1101
CITY-STATE-ZIP CODE	Hampton, Va. 23669
OWNER PHONE	
MAINT AGREEMENT	Yes
EMERG ACTION PLAN	No

Get Last BMP No | Return to Menu | Print Record

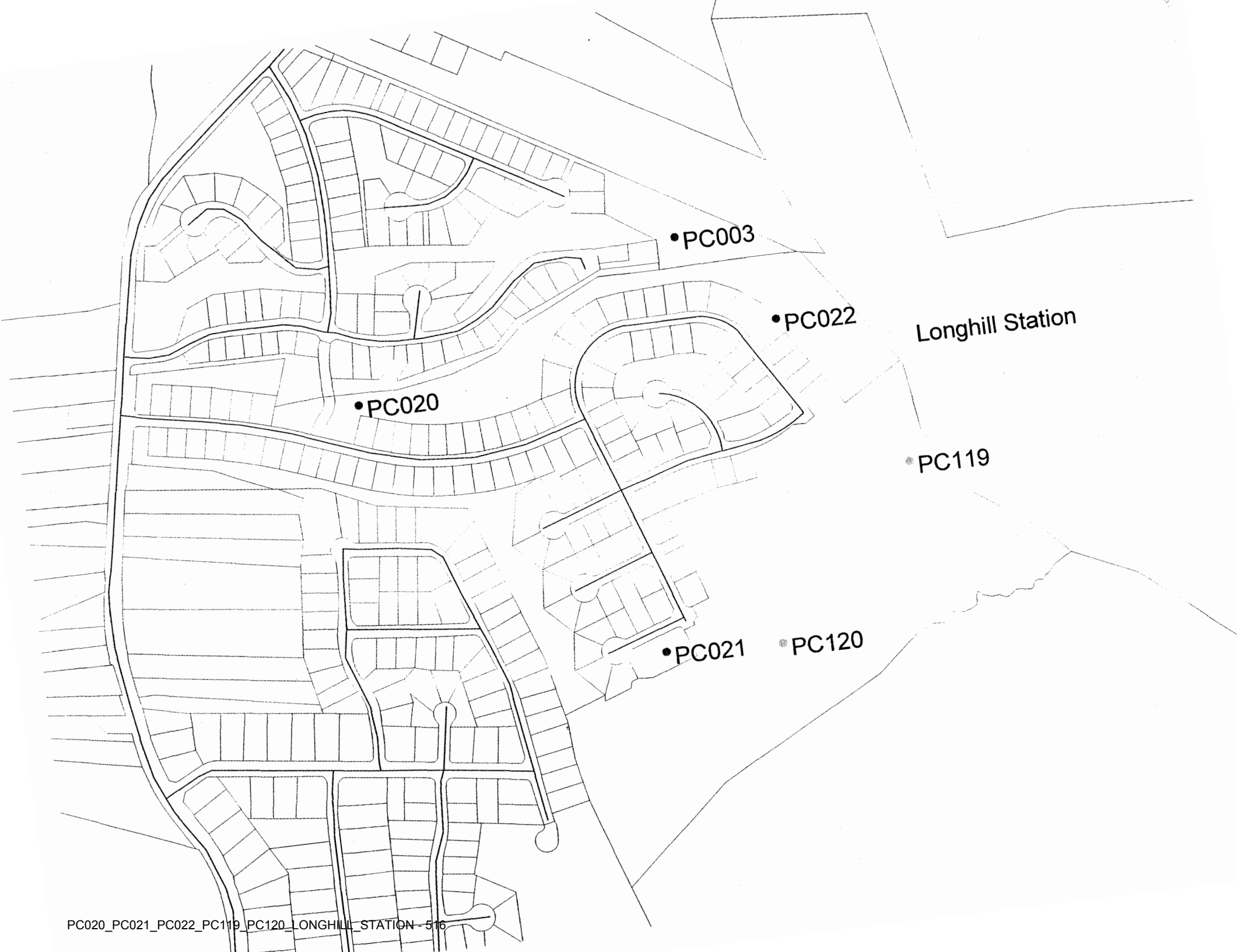
MAINTENANCE PLAN	No	CTRL STRUC DESC	RCP Riser
SITE AREA acre	41.86	CTRL STRUC SIZE inches	30
LAND USE	Residential	OTLT BARRL DESC	RCP
old BMP TYP	Wet Pond	OTLT BARRL SIZE inch	24
JCC BMP CODE	A2 Wet Pond		
POINT VALUE		EMERG SPILLWAY	Yes
		DESIGN HW ELEV	61.04
		PERM POOL ELEV	57.5
SVC DRAIN AREA acres	13	2-YR OUTFLOW cfs	
		10-YR OUTFLOW cfs	
		REC DRAWING	Yes
SERVICE AREA DESCRI	Sec 3/4 SF Lots & Roadways		
IMPERV AREA acres	1000.00	CONSTR CERTIF	No
RECV STREAM	UT of Powhatan Creek		
EXT DET-WQ-CTRL	No	LAST INSP DATE 7/3/2007	Inspected by:
WTR QUAL VOL acre-ft		INTERNAL RATING	3
CHAN PROT CTRL	No	MISC/COMMENTS	
CHAN PROT VOL acre-ft			
SW/FLOOD CONTROL	Yes	Southeast of Intx. Alleghany & Red Wing. See PC 020, 021, 022 & PC 119.	
GEOTECH REPORT	No		

Additional Comments:

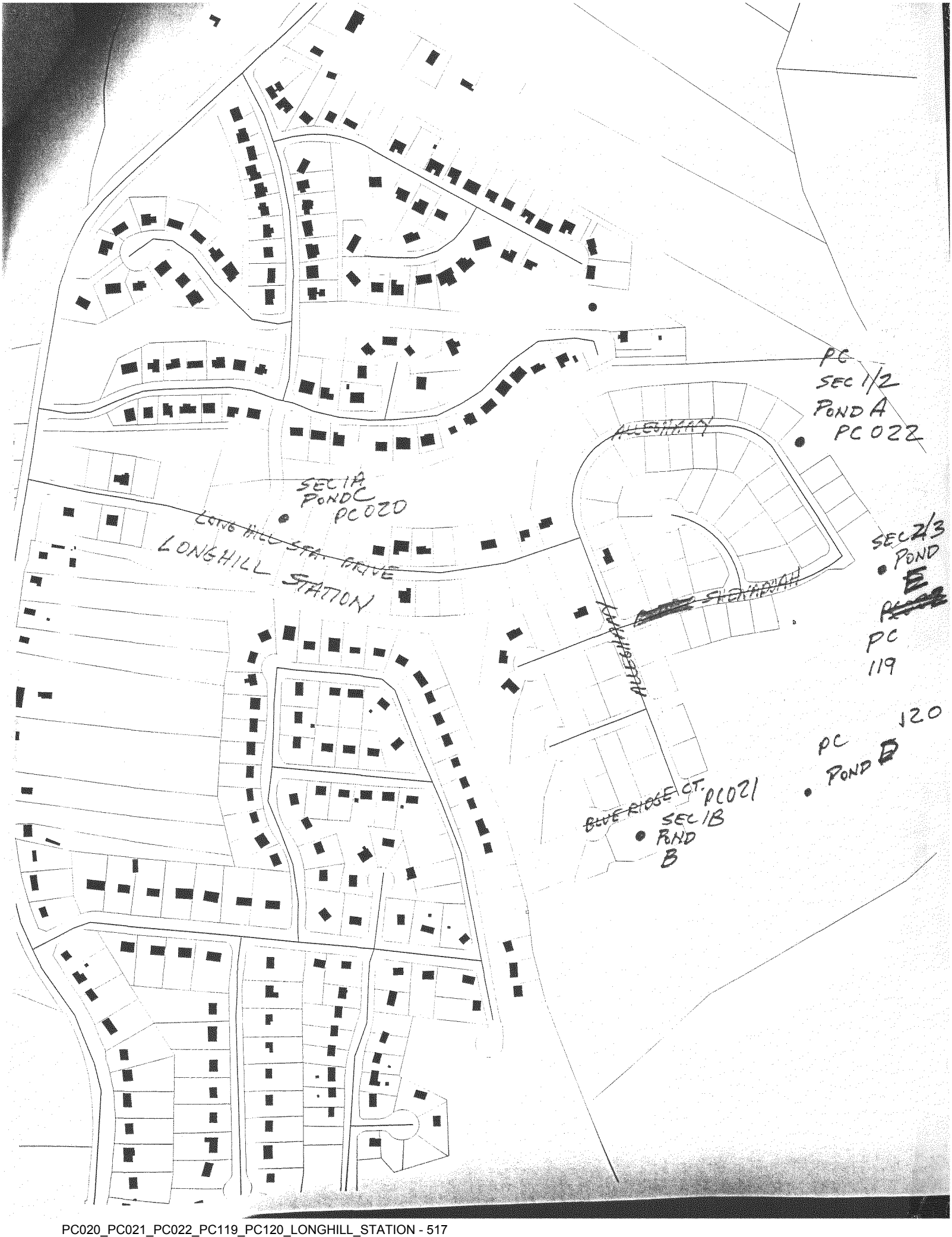
WATERSHED	PC	MAINTENANCE PLAN	No	CTRL STRUC DESC	RCP Riser
BMP ID NO	120	SITE AREA acre		CTRL STRUC SIZE inches	30
PLAN NO	S-19-99	LAND USE		OTLT BARRL DESC	RCP
TAX PARCEL		old BMP TYP	Wet Pond	OTLT BARRL SIZE inch	24
PIN NO	3110900001B	JCC BMP CODE			
CONSTRUCTION DATE		POINT VALUE		EMERG SPILLWAY	Yes
PROJECT NAME	Longhill Station Sec 3/4 (Pond D)			DESIGN HW ELEV	61.04
FACILITY LOCATION	Near Intx Alleghany & Red Wing Ct.			PERM POOL ELEV	57.5
CITY-STATE	Williamsburg, Va. 23188	SVC DRAIN AREA acres		2-YR OUTFLOW cfs	
CURRENT OWNER	Wallace Associates, LLC (c/o Henry Stephens)			10-YR OUTFLOW cfs	
OWNER ADDRESS	2 Eaton St.			REC DRAWING	Yes
OWNER ADDRESS 2	Suite 1101	SERVICE AREA DESCRI	Sec 3/4 SF Lots & Roadways		
CITY-STATE-ZIP CODE	Hampton, Va. 23669	IMPERV AREA acres		CONSTR CERTI	No
OWNER PHONE		RECV STREAM	UT of Powhatan Creek		
MAINT AGREEMENT	Yes	EXT DET-WQ-CTRL	No	LAST INSP DATE	
EMERG ACTION PLAN	No	WTR QUAL VOL acre-ft		INTERNAL RATING	
		CHAN PROT CTRL	No	MISC/COMMENTS	
		CHAN PROT VOL acre-ft		Southeast of Intx. Alleghany & Red Wing. See PC 020, 021, 022 & PC 119.	
		SW/FLOOD CONTROL	Yes		
		GEOTECH REPORT	No		

Get Last BMP No

Return to Menu



PC020_PC021_PC022_PC119_PC120_LONGHILL_STATION - 516


PC
SEC 1/2
POND A
PC 022
ALLEGHANY
SEC 1A
POND C
PC 020
LONG HILL STA. DRIVE
LONGHILL STATION
SEC 2/3
POND
E
PC
119
SAVANNAH
ALLEGHANY
120
PC
POND D
BLUE RIDGE CT.
PC021
SEC 1B
POND
B

MAR 1999 RECEIVED PLANNING DEPARTMENT

ENVIRONMENTAL DIVISION REVIEW COMMENTS
LONGHILL STATION PHASES 3 AND 4
PLAN NO. S-19-97 MCE/DEC
March 26, 1999

1. A Land Disturbing Permit and Siltation Agreement, with surety, are required for this project.
   - TO BE PROVIDED BY CLIENT.
2. A Subdivision Agreement, with surety, shall be executed with the County prior to recordation of lots.
   - TO BE PROVIDED BY CLIENT.
3. Water and sewer inspection fees must be paid prior to the issuance of a Land Disturbing Permit.
   - TO BE PROVIDED BY CLIENT.
4. An Inspection/Maintenance Agreement shall be executed with the county for the BMP facility for this project.
   - TO BE PROVIDED BY CLIENT.
5. As-built drawings must be provided for the detention basin on completion. Also, a note shall be provided on the plan stating that upon completion, the construction of the dam will be certified by a professional engineer who has inspected the structure during construction.
   - NOTE PROVIDED ON SHEET C2.
6. Provide a streetlight plan for this subdivision that meets the county's policy. A streetlight rental fee for the required number of lights must be paid prior to the recordation of the subdivision plat.- STREET LIGHT PLAN THAT MEETS COUNTY POLICY HAS BEEN PROVIDED. SEE C1, C3 SHEETS.
7. Provide and label the limits of clearing on the plan. The area of pond D has already been cleared. Show this cleared area for reference.- Comment Addressed accordingly SEE SHEET C2, C3
8. Provide an environmental inventory in accordance with Chesapeake Bay Preservation Ordinance Section 23-10B.
   - TO BE PROVIDED AT LATER DATE AS NECESSARY.
9. Provide a soils map to delineate the different soil types in accordance with the James City County Soil Survey.- SOILS MAP PROVIDED
10. Provide a drainage area map to show the existing and proposed drainage patterns. Include the size of each drainage area.
    - PROVIDED IN ATTACHED CALCULATIONS.
11. Show the limit of the 100-year floodplain.- 100-YEAR FLOOD PLAIN SHOWN. SEE SHEETS C1, C2, C3
12. Show any temporary soil stockpile areas, staging and equipment storage areas.
    - AREA PROVIDED ON SHEET C2.
13. Identify any off-site land disturbing areas required with proper erosion control measures.
    - NONE.
14. Lot to lot drainage appears to be a problem at the following location: Provide a method of capturing the runoff from lots 152,153,154, before it runs onto lots 168, 169. SWALES
    - PROVIDED to HINDER RUNOFF. SEE SHEET C2

* WE ARE AWARE THAT YOU HAVE REQUESTED SEDIMENT TRAPS AND WE HAVE LOOKED INTO THE MATTER AND FOUND THIS WOULD ENCROACH SET BACK LINES OF ADJACENT LOTS. WE ASK THAT YOU PLEASE CONSIDER OUR PROPOSAL OF WIRE-REINFORED SILT-FENCE, WHICH THROUGH CALCULATIONS DOES SATISFY "VESCH" CRITERIA.

15. Provide information on the proposed clearing between lots 154 and 155.
- CLEARING PROVIDED FOR BIKE PATH, SEE SHEETS C1 + C2.

16. Show limits of clearing for all swales provided for lot drainage. Provide invert elevations and spot elevations along the length of the swales.
- SWALES + CLEARING FOR SWALES TO BE PROVIDED AT TIME OF HOME CONSTRUCTION. THIS WAS AGREED UPON IN OUR MEETING WITH DARYLL COOK. INVERTS PROVIDED ON SHEET C2.

17. Provide additional silt fence at the following locations:
1. Around the bulb of the cul-de-sac of Allegheny Road. * ALL Additional silt Fence Provided accordingly SEE SHEETS C2.
2. Along the south side of Blue Ridge Drive from station 14+27 to the end of the cul-de-sac.
3. Around the bulb of the other cul-de-sac of Allegheny Road, in the vicinity of lots 136-138.
4. At the base of fill for the construction of pond D.

18. Provide properly sized sediment traps for the three storm sewer outfalls that do not drain into a sediment basin. Provide diversion dikes to direct the flows to the traps until the storm sewer system and curb is installed. 2 OUTFALLS HAVE MINIMAL DRAINAGE AREAS IN WHICH CAN BE SATISFIED WITH SILT FENCE. WE HAVE PROVIDED SUCH FENCE + HAVE ADDED WIRE REINFORCEMENT IN THESE LOCATIONS FOR BETTER RESULTS. SEE ABOVE (*)

19. Provide a note on the plan that all sediment traps and basins are to remain in place until the majority of single family construction is complete. The JCC Environmental Division will determine the timing of removal of all sediment trapping devices. If any of the traps or basins are on individual lots, they will need to be contained within a temporary construction easement to ensure access for the developer and the county to remove them when appropriate. - N/A.

20. The clearing and filling of residential lots are not a part of this plan. Provide alternative drainage for lot 135 to avoid clearing and grading.
- THIS ISSUE WAS DISCUSSED WITH DARYLL COOK AND IT WAS UNDERSTOOD AS PART OF THE PLAN, LOT 135 SHOWN AS THE TEMPORARY STOCKPILE AREA ON SHEET C2

21. Submit an adequacy analysis for all receiving channels to ensure that the channel is stable for the 2-year velocity. The channel to receive flows from pond D already shows signs of erosion and overtopping of banks.
- POND D OUTFALL ENTERS THE RECEIVING CHANNEL BELOW PREDEVELOPMENT RATES, SEE ATTACHED CALCULATIONS.

22. Provide calculations that show there is adequate capacity in existing pond E for the additional drainage from this section.
- DRAINAGE FROM THIS SECTION ALREADY IN DESIGN FOR POND E, SEE PH. 2 CALCULATIONS.

23. Provide stormwater management facility easement to include a 20-foot wide access easement and a 15-foot wide maintenance easement measured from the 100-year storm elevation and including the dam and outlet structure. - EASEMENT HAS BEEN PROVIDED SEE SHEET C2

24. Provide calculations to support the design of all drainage conveyances including pipes, culverts, inlets, ditches, etc. Provide hydraulic grade line calculations based on the 10-year storm. - CALCULATIONS PROVIDED, SEE ATTACHED.

25. Provide riprap outlet protection for all pipe systems and culverts. Specify the amount and of stone to be used and the dimensions in accordance with Spec 3.19 of the third edition of the Virginia Erosion Control Handbook (VESCH).
- RIP-RAP DIMENSIONS CALLED OUT ON SHEET C2 + C3, SEE ATTACHED FOR CALCULATIONS.

26. Submit a request to the Director of the Environmental Division for an exception to disturb

slopes in excess of 25%. State what special measures, sodding etc., will be undertaken to restabilize these slopes.

– NOT APPLICABLE.

27. Provide evidence that any required wetlands permits have been obtained.

– EVIDENCE TO BE PROVIDED IF NECESSARY.

28. The site does not attain 10 BMP points. Either additional BMP facilities will need to be provided or additional natural open space placed in conservation easements.

– SITE DOES ATTAIN 10 POINTS, SEE ATTACHED CALCULATIONS.

29. The following comments pertain to the BMP design:

A. The calculations include information on a 3" diameter orifice but the detail on sheet C5 does not show the presence of any 3" diameter orifice. Please clarify. – DETAIL ON C5 IS CORRECT, A WEIR STRUCTURE IS TO BE USED.

B. The drawdown needs to be calculated for the basin's dry storage volume while it is acting as a sediment basin. – PROVIDED IN CALCULATIONS.

C. Provide a drainage area map and additional information on the design assumptions used for the pond such as time of concentration, runoff curve number, etc. for both the pre- and post-development conditions. – CALCULATIONS PROVIDED, SEE ATTACHED.

D. The pre- and post-development calculations do not use the ponding adjustment factors consistently. This appears to have reduced the post-development flow levels. Revise the calculations using these factors consistently between the pre-and post-development cases. – SEE ATTACHED CALCULATIONS.

E. Baffles are required while the basin is in sediment basin mode. – NOTE PROVIDED ON C2.

F. The trash rack needs to be increased in diameter because concrete pipe is being used. The charts in the VESCH are for metal pipe only. The open space required between the riser and anti-vortex device is stated in the handbook. – ONLY THE PIPE LEAVING THE POND IS CONCRETE, ∴ CALCS. ARE NOT CHANGED FOR TRASH RACK.

G. Complete the attached JCC Detention Basin Design Checklist to ensure the basin meets JCC criteria. – NOTED & COMPLETED IN FILE.

ENVIRONMENTAL DIVISION REVIEW COMMENTS
LONGHILL STATION PHASES 3 AND 4
PLAN NO. S-19-99 MCE/DEC
March 26, 1999

MAR 1999
RECEIVED
PLANNING DEPARTMENT

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7. Provide and label the limits of clearing on the plan. The area of pond D has already been cleared. Show this cleared area for reference.

8. Provide an environmental inventory in accordance with Chesapeake Bay Preservation Ordinance Section 23-10B.

9. Provide a soils map to delineate the different soil types in accordance with the James City County Soil Survey.

10. Provide a drainage area map to show the existing and proposed drainage patterns. Include the size of each drainage area.

11. Show the limit of the 100-year floodplain.

12. Show any temporary soil stockpile areas, staging and equipment storage areas.

13. Identify any off-site land disturbing areas required with proper erosion control measures.

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22. Provide calculations that show there is adequate capacity in existing pond E for the additional drainage from this section.

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24. Provide calculations to support the design of all drainage conveyances including pipes, culverts, inlets, ditches, etc. Provide hydraulic grade line calculations based on the 10-year storm.

25. Provide riprap outlet protection for all pipe systems and culverts. Specify the amount and of stone to be used and the dimensions in accordance with Spec 3.19 of the third edition of the Virginia Erosion Control Handbook (VESCH).

26. Submit a request to the Director of the Environmental Division for an exception to disturb

I don't see anything in this agreement which binds the Association for/to maintenance of drainage systems or BMPs.

RE: Longhill Section 4 I/M agreement.

If we can't find anything in Sec 1, 2 + 3 such as an I/M agreement which is general, I think we have a lost case now in getting an I/M agreement for Longhill Sta Sec. 4. Write it off + proceed forward with getting all other issues addressed with bondholders.

Jason,
when I get back Friday see me on this

Art

7-18-01
CHECK WITH KEITH ON AMOUNT
KEEP ALL AS PER KEITH 7/18

PC020_PC021_PC022_PC119_PC120_LONGHILL_STATION - 524