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: **DC010**

DATE VERIFIED: **May 18, 2012**

QUALITY ASSURANCE TECHNICIAN: **Leah Hardenbergh**

Leah Hardenbergh

LOCATION: WILLIAMSBURG, VIRGINIA

Stormwater Division

MEMORANDUM

DATE: March 10, 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: DC010

PIN: 1110100007

Subdivision, Tract, Business or Owner Name (if known): Donald L Hazelwood Subdivision

Property Description: Vacant Parcel

Site Address: 8902 Richmond Road

(For internal use only) **Box** 10 **Drawer:** 6

Agreements: (in file as of scan date) **Y** **Book or Doc#:** 000002560 **Page:** 980023643

Comments

Pond with private dam spans across parcels (11-1)(01-7, 7E, 7C, and 7A) multiple owners

DC-010

Contents for Stormwater Management Facilities As-built Files

Each file is to contain:

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

DC 010

720 Main Street
Suite 112
P.O. Box 1269
West Point, Virginia 23181-1269
(804) 843-9744

Mitchell-Wilson Associates, P.C.

DEC 2001
RECEIVED
ENVIRONMENTAL DIVISION

December 3, 2001

Mr. Darryl E. Cook, Director
Environmental Division
P.O. Box 8784
Williamsburg, Virginia 23187-8784

Dear Mr. Cook:

RE: Earth Dam & Recreational Pond for Don Hazelwood, James City County, Virginia

At the request of Don Hazelwood, on November 30, 2001 I observed the completed construction associated with the referenced project. Based on my visual observations, the completed construction appears to be in general conformance with the projects plans entitled Earth Dam & Recreational Pond for Don Hazelwood, dated November 23, 1999 and revision dated December 31, 1999.

All land disturbing activities appear to be complete, and the site is fully stabilized. I concur with your staff's recommendation that the low flow pipe riser assembly trash rack/anti-vortex device should have a top plate installed to prevent floating debris from entering the riser through the open top.

Sincerely,

Jonathan Blair Wilson, P.E.
President

cc. Don Hazelwood
file 1391

COMMONWEALTH OF VIRGINIA
JONATHAN BLAIR WILSON
NO. 019961
12-3-01
PROFESSIONAL ENGINEER

000 002560

AMENDMENT TO DECLARATION OF RESTRICTIONS, CONDITIONS AND COVENANTS OF "PLAT OF PROPERTY BEING PARCEL A1, A2, A3 & A4 & PARCEL B WITH EXISTING POND STANDING IN THE NAME OF DONALD L. HAZELWOOD, INC."

FEB-99 0007

WHEREAS, the said Declarant previously entered upon the records of said Clerk's Office **James City County Deed Book as document No. 980023643, a Declaration of Restrictions, Conditions and Covenants Applicable to the subject property, described as Parcels A-1, A-2, A-3, A-4, & B** [hereinafter the **"Declarations"**] and provided therein that the Declarant hereby reserved the right at any time to annul, waive, change or modify any of the restrictions, conditions, covenants, agreements or provisions contained herein for so long as it shall be the owner of fifty percent (50%) of the lots shown upon such plat of subdivision; and

WHEREAS, the Declarant meets the requirements of annulment, waiver, change and modification of said referenced Declarations;

NOW THEREFORE, the Declarant hereby declares that the prior restrictions as to the named lots herein are revoked and declared null and void, and as to all of the property described herein, together with such additions as hereafter may be made thereto, shall be modified as follows:

The following declaration of restrictions and conditions, dedicated as set out herein shall be covenants for a period of Thirty years or as renewed, as set out herein, running with the land applicable and binding upon the present and future owners of:

All of the numbered lots of land shown on the Plat of Subdivision entitled " **PLAT, OF**

PREPARED BY:
SPIRN, TARLEY,
ROBINSON & TARLEY
1313 JAMESTOWN ROAD
SUITE 202
POST OFFICE BOX 584
WILLIAMSBURG, VA
23187
(757) 229-4281

Darryl, see attached Declaration. Can surety be released? Yes - 6/11

DC010_DONALD_L_HAZELWOOD_EARTH - 005

PROPERTY, BEING PARECL A1, A2, A3 & A4, WITH EXISTING POND, STANDING IN THE NAME OF, DONALD L. HAZELWOOD, INC., LOCATED: STONEHOUSE MAGISTERIAL DISTRICT, LOCATED: JAMES CITY, COUNTY, VIRGINIA, DATE: FEBRUARY 2, 1999, SCALE 1"=200', REVISED DATE: FEBRUARY 7, 2000", made by James E. Mitchell, Land Surveyor, Mitchell-Wilson Associates, P.C., West Point, Virginia, a copy of which plat is attached hereto and incorporated herein by reference, to be duly recorded contemporaneously with this instrument in the Clerk's Office of the Circuit Court of the City of Williamsburg and County of James City, Virginia, to which plat reference is here made for a more complete description of the subject real estate. The said property was previously described on that certain plat recorded in the registry of the aforesaid Clerk's Office on December 7, 1998 **along with document No. 980023643** and further found in the Plat Book _____ at page _____.

1. THE LAND and ITS USE

1.1 No lots may be utilized as a home site for a mobile home or trailer.

1.2 No lot shall be used or maintained as a dumping ground for rubbish or other material prior to construction. During any construction the area will be kept in a reasonably neat and clean condition by the builder 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 except in sanitary containers which shall be enclosed in a screening structure or shall be installed underground. Incinerators will not be permitted and all trash and refuse must be picked up and hauled away.

1.3 Excepting that the Declarant reserved the right to require additional easements not to exceed five feet in which along any property line if drainage problems occur at a later date and require such easements, easements shown on the referenced plat for streets, drainage, utilities, screening, beautification, or recreation are for the benefit of the land owners and those adjacent to it and may be changed only by the County of James City.

1.4 A perpetual easement and right of way is hereby reserved upon, over and along the parcels on the plat herein before referred to, within twenty (20) feet of each boundary line of each lot, including any sidewalks, for the purposes of the construction of the underground wires, and conduits and the necessary and proper attachments in connection therewith for the transmission of electricity and for telephone lines; to erect, put down and maintain sewers, gas, water, electrical wires, conduits, pipes, wires and fixtures, and right to use the said streets, roads, lanes, avenues and driveways, and the right to lease, assign or grant the rights hereby reserved to any person, firm or corporation at such time and upon such terms as it may decide upon, and as well for any and all public utility purposes and services of whatever character.

2. LAKE FRONT OWNERS.

2.1 "Lake front owners", [hereinafter referred to as owners] are defined as owners of lots contiguous to the recreation "pond" or "lake" as shown on said plat of subdivision, along with the

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FEB-9 00 0008

DC010_DONALD_L_HAZELWOOD_EARTH - 006

declarant or any of his successors in interest to the parcels of land abutting said lake.

2.2 Each of the said owners shall be obligated to maintain the lake and the associated dam, if any, in their present size, shape and condition in accordance with the following provisions and/or period requirements:

Lot owners, whose land is adjacent to the lake shall:

a. At least two times per year cause the grasses adjacent to the lake front to be mowed pursuant and in conformance with the following schedule: Grasses such as tall fescue shall be mowed in early summer after the emergence of the heads on cool season grasses and in late fall to prevent the seeds of annual weeds from maturing. Mowing of legumes can be less frequent Trees and shrubs should not be permitted to grow on any part of the graded embankment.

b. Perform soil sampling on stabilized dam embankment areas if poor stabilization is evident. Soil sampling and testing shall be performed by a qualified independent soil testing laboratory such as VPI & SU. Additional lime and fertilizer shall be applied in accordance with such test recommendations.

c. Perform at least quarterly inspections of the riser section and crest spillway for the observance of collected debris. Immediately remove any debris to prevent the obstruction of water, the movement of trash and litter downstream and to maintain the integrity of the structure and provide an attractive appearance.

d. Perform, at least annually, structural inspections of the facility for damage. Structural inspections shall be performed on the concrete spillway, anti-vortex device, trash rack, outlet barrel and pond embankment. If damage is evident from such inspection, further investigation by a professional engineer may be required to assess the integrity of the structure.

e. Perform, at least quarterly, inspections of the graded side slopes of the detention facility for signs of animal/rodent borrows and/or slope erosion. Any necessary repairs, refilling or re-seeding shall be performed immediately upon discovery during such inspections.

2.3 Each such owner shall have a right of enjoyment in the common with other lake front owners in and to the lake for the purposes herein set out.

2.4 Such owners shall constitute a committee of owners. Which committee, by vote of seventy-five percent (75%) of its members shall have the power to adopt rules and regulations, assess its members the pro-rated cost of necessary maintenance and repair of the lake and any associated dam, or take such other action reasonably calculated to serve the best interest of the owners of lots contiguous of such lake. All of said owners shall have equal use of the lake. Pro-ration shall be based upon the number of lots or parcels of real estate contiguous to and abutting said lake, owned by each of said owners, and shall have no relation to the amount frontage available to any individual lot owner.

2.5 The owners herein grant to the County of James City a right of entry from the contiguous right of way to the lake and the associated dam for the purpose of inspection of the lake and associated dam. This provision gives the County the authority but not an obligation to inspect the lake and dam.

FEB-98 0009

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3. ADDITIONAL MATTERS

These covenants and restrictions are to run with the land and shall be binding on all parties owning lots in this tract and all persons claiming under them until thirty (30) years from the date of this instrument, at which time said covenants are to renewed for ten (10) year periods unless the majority of lot owners at that time agree to change the covenants in whole or in part, excepting that any covenant dealing with the lake front owners shall not be changed without the prior approval of the County of James City.

3.1 All covenants, conditions, agreements and restrictions herein shall inure to the benefit of and be enforceable by the owner of any lot shown on said plat, their respective heirs, successors and assigns, and failure by any land owner to enforce any restriction shall in no event be deemed a waiver of the right to do so thereafter as to the same breach or as to one occurring prior or subsequent thereto.

3.2 In the event one or more of these covenants, conditions, agreements, provisions and restrictions shall have been adjudicated invalid and unenforceable by a court of competent jurisdiction, then and in that event all other covenants, conditions, agreements, provisions, and restrictions herein contained shall not be adversely affected and shall remain in full force and effect.

3.3 The Declarant hereby expressly reserves the right at any time to annul, waive, change or modify any of the restrictions, conditions, covenants, agreements or provisions contained herein for so long as it shall be the owner of fifty percent (50%) of the lots shown upon such plat of subdivision including those lots in any future or additional parcels of adjacent property to be developed by Declarant, and thereafter with the Declarant, with sufficient of the owners to constitute with the Declarant fifty percent (50%) of the lots in said development may likewise annul, waive, change or modify any of the restrictions, covenants, or provisions contained herein. The Declarant also reserves unto itself to the right to convey these rights to any of its successors in interest in the development of these parcels.

In all other respects all of the remaining restrictions, covenants and conditions previously recorded affecting said property shall remain in full force and effect except as amended by this instrument.

IN WITNESS WHEREOF the said **DONALD LEE HAZELWOOD**, owner and developer, has caused these restrictions to be executed, on the 8 of February, 2000.

Donald L. Hazelwood, Inc.

By Donald L. Hazelwood (SEAL)
Donald Lee Hazelwood, President
Owner & Developer

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ROBINSON & TARLEY
1313 JAMESTOWN ROAD
SUITE 202
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FEB-9 00 0010

DC010_DONALD_L_HAZELWOOD_EARTH - 008

COMMONWEALTH OF VIRGINIA, At-Large;
In the County of James City, to wit:

I, Stuart D. Spirn, a Notary Public in and for the jurisdiction, aforesaid, whose commission expires on the 30th day of September, 2000, do hereby certify that Donald Lee Hazelwood, Owner/Developer of the described property to be subdivided, whose name is signed to the forgoing writing, bearing date on the 8th day of February, 2000, has acknowledged the same before me in my jurisdiction aforesaid.

Given under by hand this 8th day of February, 2000.

Notary Public

FEB-98 00011

VIRGINIA: City of Williamsburg and County of James City, to-wit:
This Amended Restrictions + Plat **was presented with certificate annexed and admitted to record on** 9 February, 2000, **at** 9:07 **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**

PLAT RECORDED IN
P.B. NO. 76 PAGE 60

PREPARED BY:
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DC010_DONALD_L_HAZELWOOD_EARTH - 009

Hazelwood Pond

(11-1)(1-7)

Analysis of downstream hazard

Road ≈ 600 feet downstream of Pond

Surface Area = 1.3 ft.

Height of dam = 10'

Vol = 0.4 x 10' x 1.5 = 6 acft

Width of Valley bottom below - 150'

From Approximate Method of Deter. Danger Reach

W = 125', H = 10, Stor = 6 acft

D = 1' for a distance of 580 x 6 = 3480'

@ road depth will exceed several feet

Need to have inspection provisions.

From MD 378

$Q_{max} = 3.2 H_w^{5/2} = 3.2 \times (9')^{5/2} = 777$ cfs

Bottom Width = 125'

Side Slopes = 5:1

n = 0.06, underbrush, wooded

Approx. Slope = $\frac{32-30}{600} = \frac{2}{600} = 0.33\%$ slope

Depth = 2.4'

1) C900 Pipe

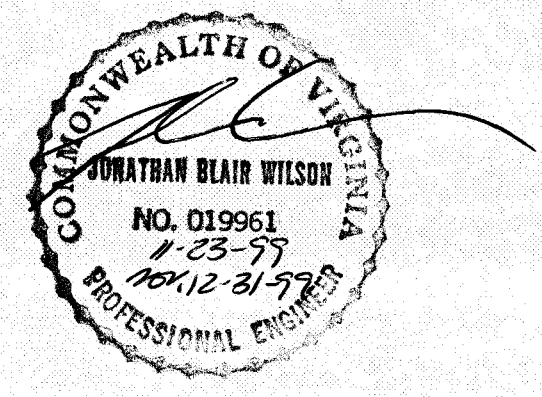
2) Reduce ~~orifice~~ Pipe Ø to prevent plug flow
~~prevent orifice flow~~
7" Ø

3) Easement document
- to Leo 4/12

DAM & RECREATIONAL POND HYDROLOGIC & HYDRAULIC ANALYSIS FOR DON HAZELWOOD

James City County, Virginia

REVISED 12-31-99



Prepared by:
Mitchell-Wilson Associates, P.C.
Civil Engineers & Land Surveyors
P.O. Box 1269
West Point, Virginia 23181
(804) 843-9744

DAM & RECREATIONAL POND HYDROLOGIC & HYDRAULIC ANALYSIS FOR DON HAZELWOOD

James City County, Virginia

REVISED 12-31-99

Prepared by:
Mitchell-Wilson Associates, P.C.
Civil Engineers & Land Surveyors
P.O. Box 1269
West Point, Virginia 23181
(804) 843-9744

NARRATIVE REPORT

PROJECT DESCRIPTION:

The proposed recreational pond and earth dam project is located off U.S. Route 60, in James City County, Virginia. The facility will be located on James City County Tax Parcel (11-1)(1-7), and is further identified as 8920 Richmond Road. The owner has obtained a permit from the U.S. Army Corps of Engineers, Norfolk District Regulatory Branch, for the disturbance of non-tidal wetlands associated with the construction of the earth dam and the impoundment area. The property is zoned A-1, Agricultural and may be subject to the requirements of the James City County Erosion and Sediment Control Ordinance.

PROJECT SITE CONDITIONS:

The proposed earth dam and recreational pond is located along an existing drainageway and will receive storm runoff from approximately **103.54 acres**. The majority of the drainage area is mature woodland. Topography of the area ranges from moderate to severe. The footprint of the facility is located within a Chesapeake Bay Preservation Area Resource Management Area (RMA). The existing drainageway downstream from the pond site appears to be stable.

No development of the surrounding properties are currently proposed.

STATISTICAL DATA:

Current Zoning	= A-1
Tax Map & Parcel No.	= (11-1)(1-7)
Total Site Area	= na
Total Area of Disturbance	= 1.32 Ac. (57618 s.f.)

PROPERTY OWNER:

Donald Hazelwood

ADJACENT PROPERTY:

See Plans

OFFSITE AREAS:

No offsite areas are associated with the project.

SOILS:

The predominate soils located within the project boundaries appear to be classified as Emporia

DC010_DONALD_L_HAZELWOOD_EARTH - 014

fine sandy loam based on the Soil Survey of James City and York Counties and the City of Williamsburg, Virginia. Emporia series soils typically have a low shrink-swell potential in the upper 37-inches and moderate shrink-swell potential below 37-inches beneath the ground surface. Emporia fine sandy loam soils are hydrologic soil class "C". The erosion factor for Emporia fine sandy loam is K=0.28 (moderately erodible).

CRITICAL EROSION AREAS:

Critical erosion areas which must be protected to the maximum extent practical include the existing drainageway and non-tidal wetlands downstream from the proposed earth dam, and steeper side slopes surrounding the proposed recreational pond. No other areas are considered to be critical.

EROSION AND SEDIMENT CONTROL MEASURES:

See the project's erosion control plan. All erosion and sediment control practices shall be in accordance with the standards and specifications as prescribed in the 1992 Virginia Erosion and Sediment Control Handbook, the Virginia Erosion and Sediment Control Regulations, VR 625-02-00, and the James City County Erosion and Sediment Control Ordinance.

STRUCTURAL PRACTICES & VEGETATIVE PRACTICES PROPOSED:

3.02 Construction Entrance
3.05 Silt Fence
3.18 Outlet Protection
3.26 Dewatering Structure (as required)
3.30 Topsoiling
3.31 Temporary Seeding (as required)
3.32 Permanent Seeding
3.35 Mulching
3.39 Dust Control (as required)

MANAGEMENT STRATEGIES:

See the project development plan.

PERMANENT STABILIZATION:

All denuded areas will be stabilized with a firm and mature stand of grass. Turf type fescue will be established on all areas designated for grass coverage. The contractor is required to adhere to the following minimum seeding schedule and application rate unless equivalent seeding

DC010_DONALD_L_HAZELWOOD_EARTH - 015

schedules and application rates are approved in advance:

Lime	2 tons/acre
Fertilizer	1000 lbs./acre 10-20-10
Grass Seed Mixture	
Turf Tall Fescue	250 lbs./acre
Mulch	2 tons/acre

STORMWATER MANAGEMENT:

See stormwater management/drainage calculations. No modifications or alteration of the hydrology of the watershed upstream from the facility is proposed.

MAINTENANCE:

Erosion and sediment control measures are to be inspected at the end of each workday, and after each rainfall. Damaged or inoperative control measures should be replaced and/or repaired immediately. Sediment accumulations shall be removed and disposed of in approved spoil areas, so as to insure satisfactory performance of the drainage system.

CONSTRUCTION SEQUENCE:

Note: The majority of the earthwork for the dam construction was completed prior to the preparation of this plan. The construction sequence is for remaining work to be completed.

1. Install silt fencing along the proposed earth dam downstream toe;
2. Finish remaining earth dam earthwork to raise top of dam to elevation 44.0;
3. Install concrete spillway, spillway flume and stilling basin apron;
4. Install rip-rap outlet protection downstream from stilling basin apron;
5. Apply topsoil as required on all denuded areas above the permanent pool level, amend soil with lime and fertilizer as required and apply permanent seeding.
6. Irrigate permanently seeded area to aid seed germination.
7. Upon complete and permanent stabilization of the disturbed area, remove remaining temporary erosion and sediment controls. Leave site with a clean and neat appearance.

DC010_DONALD_L_HAZELWOOD_EARTH - 016

Erosion and Sediment Control Cost Estimate:
(work remaining to be completed)

Item		*Quantity*	*Unit*	*Unit Price($)*	*Total Cost($)*
1.	Silt Fence	200	lf	2.00	400.00
2.	Spillway Structure	40	cy	120.00	4800.00
3.	Rip-Rap Stone	35	cy	67.00	2345.00
4.	Seeding	1	ac	1500.00	1500.00
				Total =	9045.00

DC010_DONALD_L_HAZELWOOD_EARTH - 017

Hydrologic Analysis:

```
1


 ******************80-80 LIST OF INPUT DATA FOR TR-20 HYDROLOGY******************

 JOB TR-20                    FULLPRINT
 TITLE 001
 TITLE     DON HAZELWOOD DAM 103.54 AC. WATERSHED    2-YEAR STORM
  3 STRUCT      01
  9 ENDTBL
  6 RUNOFF 1    01     1  0.161781300        71.0        1.63  1   1   1
    ENDATA
  7 INCREM 6              0.1
  7 COMPUT 7    01    01          0.0         3.6         1.02 2  01   1
    ENDCMP 1
    ENDJOB 2
0*******************************END OF 80-80 LIST*********************************
1


 TR20 XEQ 11-15-99  09:03                                                                    JOB  1   PASS   1
      REV PC 09/83(.2)          DON HAZELWOOD DAM 103.54 AC. WATERSHED    2-YEAR STORM                   PAGE   1


 EXECUTIVE CONTROL OPERATION INCREM                                                                    RECORD ID
+                                   MAIN TIME INCREMENT =    .10 HOURS

 EXECUTIVE CONTROL OPERATION COMPUT                                                                    RECORD ID
+                                   FROM STRUCTURE  1
+                                                        TO STRUCTURE  1
        STARTING TIME =    .00    RAIN DEPTH =  3.60    RAIN DURATION=  1.00    RAIN TABLE NO.= 2    ANT. MOIST. COND= 2
        ALTERNATE NO.= 1         STORM NO.= 1    MAIN TIME INCREMENT =    .10 HOURS


 OPERATION RUNOFF   STRUCTURE  1
           OUTPUT HYDROGRAPH=  1
           AREA=     .16 SQ MI    INPUT RUNOFF CURVE= 71.    TIME OF CONCENTRATION=  1.63 HOURS
           INTERNAL HYDROGRAPH TIME INCREMENT=  .0988 HOURS

           PEAK TIME(HRS)              PEAK DISCHARGE(CFS)            PEAK ELEVATION(FEET)
              13.06                          39.18                          (RUNOFF)
              23.70                           2.89                          (RUNOFF)
+                                                 *                                  * FIRST POINT OF FLAT PEAK

 TIME(HRS)          FIRST HYDROGRAPH POINT =    .00 HOURS      TIME INCREMENT =  .10 HOURS      DRAINAGE AREA =     .16 SQ.MI.
   11.00    DISCHG          .00       .00       .01       .03       .05       .11       .22       .44       .91       1.91
   12.00    DISCHG         3.68      6.29      9.72     13.97     18.91     24.11     29.00     33.08     36.11     38.08
   13.00    DISCHG        39.05     39.11     38.39     37.08     35.25     32.96     30.46     28.07     25.94     24.05
   14.00    DISCHG        22.36     20.84     19.45     18.16     16.95     15.87     14.88     13.97     13.14     12.38
   15.00    DISCHG        11.68     11.03     10.45      9.93      9.45      9.02      8.63      8.28      7.96      7.66
   16.00    DISCHG         7.39      7.15      6.93      6.73      6.56      6.41      6.27      6.14      6.02      5.90
   17.00    DISCHG         5.79      5.68      5.57      5.46      5.37      5.28      5.19      5.11      5.04      4.97
   18.00    DISCHG         4.91      4.84      4.78      4.72      4.65      4.57      4.50      4.42      4.34      4.27
   19.00    DISCHG         4.20      4.14      4.08      4.03      3.99      3.95      3.92      3.89      3.87      3.85
   20.00    DISCHG         3.83      3.80      3.77      3.73      3.68      3.62      3.56      3.49      3.43      3.36
   21.00    DISCHG         3.30      3.24      3.18      3.14      3.09      3.06      3.03      3.00      2.98      2.97
   22.00    DISCHG         2.95      2.94      2.93      2.92      2.91      2.91      2.90      2.90      2.89      2.89
   23.00    DISCHG         2.89      2.89      2.89      2.89      2.89      2.89      2.89      2.89      2.89      2.89
   24.00    DISCHG         2.88      2.86      2.83      2.78      2.70      2.59      2.46      2.29      2.11      1.92
   25.00    DISCHG         1.73      1.53      1.35      1.17      1.01       .87       .74       .64       .55       .47
   26.00    DISCHG          .41       .35       .30       .26       .22       .19       .16       .14       .12       .10
   27.00    DISCHG          .09       .08       .06       .05       .05       .04       .03       .03       .02       .02
   28.00    DISCHG          .02       .01       .01       .01       .01       .01       .00

   RUNOFF VOLUME ABOVE BASEFLOW =  1.13 WATERSHED INCHES,    117.75 CFS-HRS,     9.73 ACRE-FEET;   BASEFLOW =    .00 CFS

 EXECUTIVE CONTROL OPERATION ENDCMP                                                                    RECORD ID
+                                   COMPUTATIONS COMPLETED FOR PASS   1


 EXECUTIVE CONTROL OPERATION ENDJOB                                                                    RECORD ID
1
```


DC010_DONALD_L_HAZELWOOD_EARTH - 018

```
TR20 XEQ 11-15-99  09:03                                                                                    JOB  1   SUMMARY
     REV PC 09/83(.2)          DON HAZELWOOD DAM 103.54 AC. WATERSHED    2-YEAR STORM                              PAGE   2


SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
                  (A STAR(*) AFTER THE PEAK DISCHARGE TIME AND RATE (CFS) VALUES INDICATES A FLAT TOP HYDROGRAPH
                   A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

 SECTION/    STANDARD              RAIN  ANTEC  MAIN         PRECIPITATION                                  PEAK DISCHARGE
 STRUCTURE    CONTROL   DRAINAGE  TABLE  MOIST  TIME   ------------------------  RUNOFF   ------------------------------------
    ID       OPERATION    AREA      #    COND  INCREM BEGIN    AMOUNT  DURATION  AMOUNT   ELEVATION   TIME        RATE       RATE
                        (SQ MI)                (HR)   (HR)     (IN)     (HR)     (IN)      (FT)      (HR)       (CFS)      (CSM)


    ALTERNATE    1   STORM    1
+ ____________________________
 STRUCTURE  1  RUNOFF      .16      2      2     .10      .0     3.60    24.00     1.13       ---      13.06      39.18      242.2
1


TR20 XEQ 11-15-99  09:03                                                                                    JOB  1   SUMMARY
     REV PC 09/83(.2)          DON HAZELWOOD DAM 103.54 AC. WATERSHED    2-YEAR STORM                              PAGE   3


SUMMARY TABLE 3 - DISCHARGE (CFS) AT XSECTIONS AND STRUCTURES FOR ALL STORMS AND ALTERNATES

 XSECTION/          DRAINAGE
 STRUCTURE            AREA       STORM NUMBERS..........
   ID               (SQ MI)            1

0 STRUCTURE   1          .16
+____________________________
    ALTERNATE    1                 39.18
1END OF  1 JOBS IN THIS RUN
```


DC010_DONALD_L_HAZELWOOD_EARTH - 019

```
1


 ******************80-80 LIST OF INPUT DATA FOR TR-20 HYDROLOGY******************

 JOB TR-20                    FULLPRINT
 TITLE 001
 TITLE     DON HAZELWOOD DAM 103.54 AC. WATERSHED   10-YEAR STORM
  3 STRUCT      01
  9 ENDTBL
  6 RUNOFF 1    01      1  0.161781300        71.0        1.63  1   1   1
    ENDATA
  7 INCREM 6              0.1
  7 COMPUT 7    01    01          0.0         5.8         1.02 2  01   1
    ENDCMP 1
    ENDJOB 2
0*****************************END OF 80-80 LIST*******************************
1


 TR20 XEQ 11-15-99  09:03                                                                    JOB  1   PASS   1
      REV PC 09/83(.2)          DON HAZELWOOD DAM 103.54 AC. WATERSHED   10-YEAR STORM                PAGE   1


 EXECUTIVE CONTROL OPERATION INCREM                                                                  RECORD ID
+                                      MAIN TIME INCREMENT =    .10 HOURS


 EXECUTIVE CONTROL OPERATION COMPUT                                                                  RECORD ID
+                                      FROM STRUCTURE  1
+                                                        TO STRUCTURE  1
         STARTING TIME =    .00    RAIN DEPTH =  5.80    RAIN DURATION=  1.00    RAIN TABLE NO.= 2    ANT. MOIST. COND= 2
         ALTERNATE NO.= 1          STORM NO.= 1    MAIN TIME INCREMENT =    .10 HOURS


 OPERATION RUNOFF   STRUCTURE  1
            OUTPUT HYDROGRAPH=  1
            AREA=    .16 SQ MI   INPUT RUNOFF CURVE= 71.    TIME OF CONCENTRATION=  1.63 HOURS
            INTERNAL HYDROGRAPH TIME INCREMENT=  .0988 HOURS

            PEAK TIME(HRS)              PEAK DISCHARGE(CFS)           PEAK ELEVATION(FEET)
               13.00                          102.83                        (RUNOFF)

 TIME(HRS)          FIRST HYDROGRAPH POINT =   .00 HOURS      TIME INCREMENT =  .10 HOURS      DRAINAGE AREA =    .16 SQ.MI.
    9.00    DISCHG          .00        .00        .01        .02        .03        .05        .09        .13        .18        .25
   10.00    DISCHG          .33        .43        .54        .66        .80        .96       1.14       1.34       1.56       1.83
   11.00    DISCHG         2.13       2.48       2.88       3.34       3.88       4.52       5.38       6.63       8.62      12.03
   12.00    DISCHG        17.43      24.90      34.32      45.59      58.21      71.04      82.62      91.84      98.21     101.79
   13.00    DISCHG       102.82     101.57      98.44      93.91      88.20      81.55      74.61      68.11      62.41      57.39
   14.00    DISCHG        52.94      48.97      45.37      42.03      38.97      36.22      33.75      31.49      29.44      27.57
   15.00    DISCHG        25.87      24.32      22.92      21.67      20.54      19.52      18.60      17.77      17.01      16.32
   16.00    DISCHG        15.70      15.14      14.63      14.17      13.78      13.43      13.10      12.80      12.52      12.25
   17.00    DISCHG        11.99      11.73      11.48      11.25      11.04      10.85      10.67      10.50      10.34      10.19
   18.00    DISCHG        10.05       9.91       9.78       9.64       9.49       9.33       9.17       9.01       8.85       8.70
   19.00    DISCHG         8.55       8.42       8.29       8.19       8.09       8.01       7.95       7.89       7.84       7.80
   20.00    DISCHG         7.74       7.69       7.62       7.54       7.43       7.32       7.19       7.05       6.91       6.78
   21.00    DISCHG         6.65       6.53       6.41       6.31       6.23       6.15       6.09       6.04       5.99       5.96
   22.00    DISCHG         5.93       5.90       5.87       5.85       5.84       5.82       5.81       5.80       5.79       5.79
   23.00    DISCHG         5.78       5.78       5.78       5.77       5.77       5.77       5.77       5.77       5.77       5.76
   24.00    DISCHG         5.74       5.71       5.64       5.53       5.37       5.16       4.89       4.57       4.21       3.83
   25.00    DISCHG         3.44       3.05       2.68       2.33       2.02       1.73       1.48       1.27       1.09        .94
   26.00    DISCHG          .81        .70        .60        .51        .44        .38        .33        .28        .24        .20
   27.00    DISCHG          .18        .15        .13        .11        .09        .08        .07        .06        .05        .04
   28.00    DISCHG          .03        .03        .02        .02        .02        .01        .01        .01        .00

   RUNOFF VOLUME ABOVE BASEFLOW =  2.74 WATERSHED INCHES,    285.90 CFS-HRS,    23.63 ACRE-FEET;   BASEFLOW =    .00 CFS


 EXECUTIVE CONTROL OPERATION ENDCMP                                                                  RECORD ID
+                                      COMPUTATIONS COMPLETED FOR PASS   1



 EXECUTIVE CONTROL OPERATION ENDJOB                                                                  RECORD ID
1
```


DC010_DONALD_L_HAZELWOOD_EARTH - 020

```
TR20 XEQ 11-15-99  09:03                                                                                    JOB  1   SUMMARY
     REV PC 09/83(.2)          DON HAZELWOOD DAM 103.54 AC. WATERSHED   10-YEAR STORM                                PAGE   2


SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
                  (A STAR(*) AFTER THE PEAK DISCHARGE TIME AND RATE (CFS) VALUES INDICATES A FLAT TOP HYDROGRAPH
                   A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

SECTION/    STANDARD              RAIN  ANTEC  MAIN         PRECIPITATION                                PEAK DISCHARGE
STRUCTURE    CONTROL   DRAINAGE  TABLE  MOIST  TIME   ------------------------  RUNOFF   ------------------------------------
   ID       OPERATION    AREA      #    COND  INCREM BEGIN    AMOUNT  DURATION AMOUNT   ELEVATION   TIME       RATE       RATE
                        (SQ MI)                (HR)  (HR)     (IN)     (HR)    (IN)       (FT)      (HR)      (CFS)      (CSM)


   ALTERNATE     1   STORM     1
+ ____________________________
STRUCTURE  1  RUNOFF      .16      2      2     .10      .0     5.80    24.00    2.74       ---      13.00     102.83      635.6
1


TR20 XEQ 11-15-99  09:03                                                                                    JOB  1   SUMMARY
     REV PC 09/83(.2)          DON HAZELWOOD DAM 103.54 AC. WATERSHED   10-YEAR STORM                                PAGE   3


SUMMARY TABLE 3 - DISCHARGE (CFS) AT XSECTIONS AND STRUCTURES FOR ALL STORMS AND ALTERNATES

XSECTION/          DRAINAGE
STRUCTURE            AREA       STORM NUMBERS..........
  ID               (SQ MI)            1

0 STRUCTURE   1          .16
+____________________________
   ALTERNATE     1                 102.83
1END OF  1 JOBS IN THIS RUN
```


DC010_DONALD_L_HAZELWOOD_EARTH - 021

```
1


 ******************80-80 LIST OF INPUT DATA FOR TR-20 HYDROLOGY******************

 JOB TR-20                    FULLPRINT
 TITLE 001
 TITLE     DON HAZELWOOD DAM 103.54 AC. WATERSHED  100-YEAR STORM
  3 STRUCT      01
  9 ENDTBL
  6 RUNOFF 1    01      1  0.161781300        71.0        1.63  1   1   1
    ENDATA
  7 INCREM 6               0.1
  7 COMPUT 7    01     01          0.0         8.5         1.02 2  01   1
    ENDCMP 1
    ENDJOB 2
0*******************************END OF 80-80 LIST*********************************
1


 TR20 XEQ 11-15-99  09:07                                                                    JOB  1   PASS   1
      REV PC 09/83(.2)          DON HAZELWOOD DAM 103.54 AC. WATERSHED  100-YEAR STORM                    PAGE   1


 EXECUTIVE CONTROL OPERATION INCREM                                                                    RECORD ID
+                                      MAIN TIME INCREMENT =    .10 HOURS


 EXECUTIVE CONTROL OPERATION COMPUT                                                                    RECORD ID
+                                      FROM STRUCTURE  1
+                                                   TO STRUCTURE  1
         STARTING TIME =    .00    RAIN DEPTH =  8.50    RAIN DURATION=  1.00    RAIN TABLE NO.= 2    ANT. MOIST. COND= 2
         ALTERNATE NO.= 1          STORM NO.= 1    MAIN TIME INCREMENT =    .10 HOURS


 OPERATION RUNOFF   STRUCTURE  1
            OUTPUT HYDROGRAPH=  1
            AREA=     .16 SQ MI    INPUT RUNOFF CURVE= 71.    TIME OF CONCENTRATION=  1.63 HOURS
            INTERNAL HYDROGRAPH TIME INCREMENT=  .0988 HOURS

            PEAK TIME(HRS)                PEAK DISCHARGE(CFS)            PEAK ELEVATION(FEET)
               12.97                           191.88                          (RUNOFF)

 TIME(HRS)          FIRST HYDROGRAPH POINT =   .00 HOURS      TIME INCREMENT =  .10 HOURS      DRAINAGE AREA =     .16 SQ.MI.
    7.00    DISCHG          .00        .00        .01        .01        .03        .05        .07        .11        .15        .20
    8.00    DISCHG          .27        .34        .42        .52        .62        .74        .87       1.01       1.17       1.34
    9.00    DISCHG         1.53       1.72       1.94       2.16       2.39       2.64       2.89       3.17       3.45       3.75
   10.00    DISCHG         4.06       4.38       4.73       5.09       5.47       5.88       6.32       6.82       7.37       7.99
   11.00    DISCHG         8.71       9.53      10.47      11.54      12.76      14.20      16.09      18.77      22.90      29.73
   12.00    DISCHG        40.21      54.44      72.14      92.99     116.02     139.05     159.44     175.27     185.70     191.00
   13.00    DISCHG       191.63     188.12     181.25     171.92     160.57     147.69     134.47     122.23     111.54     102.16
   14.00    DISCHG        93.87      86.51      79.84      73.69      68.09      63.07      58.56      54.47      50.76      47.40
   15.00    DISCHG        44.34      41.56      39.07      36.84      34.84      33.03      31.41      29.94      28.61      27.40
   16.00    DISCHG        26.30      25.32      24.43      23.63      22.94      22.33      21.76      21.23      20.73      20.26
   17.00    DISCHG        19.80      19.36      18.93      18.53      18.18      17.85      17.55      17.26      17.00      16.75
   18.00    DISCHG        16.51      16.27      16.04      15.81      15.56      15.30      15.03      14.76      14.50      14.24
   19.00    DISCHG        14.00      13.77      13.57      13.39      13.23      13.10      12.99      12.89      12.81      12.73
   20.00    DISCHG        12.64      12.55      12.43      12.29      12.12      11.93      11.72      11.49      11.27      11.04
   21.00    DISCHG        10.83      10.63      10.44      10.28      10.13      10.01       9.91       9.82       9.75       9.69
   22.00    DISCHG         9.63       9.59       9.55       9.51       9.48       9.46       9.44       9.42       9.41       9.40
   23.00    DISCHG         9.39       9.38       9.37       9.37       9.36       9.36       9.36       9.35       9.35       9.34
   24.00    DISCHG         9.31       9.25       9.14       8.96       8.70       8.36       7.92       7.40       6.81       6.19
   25.00    DISCHG         5.56       4.94       4.34       3.78       3.26       2.80       2.40       2.06       1.77       1.52
   26.00    DISCHG         1.31       1.13        .97        .83        .71        .61        .53        .45        .39        .33
   27.00    DISCHG          .28        .24        .21        .18        .15        .13        .11        .09        .08        .07
   28.00    DISCHG          .05        .05        .04        .03        .02        .02        .02        .01        .01        .01
   29.00    DISCHG          .00

   RUNOFF VOLUME ABOVE BASEFLOW =  5.02 WATERSHED INCHES,    523.71 CFS-HRS,    43.28 ACRE-FEET;   BASEFLOW =    .00 CFS


 EXECUTIVE CONTROL OPERATION ENDCMP                                                                    RECORD ID
+                                      COMPUTATIONS COMPLETED FOR PASS   1


1
```


DC010_DONALD_L_HAZELWOOD_EARTH - 022

```
TR20 XEQ 11-15-99  09:07                                                                    JOB  1   PASS   2
     REV PC 09/83(.2)          DON HAZELWOOD DAM 103.54 AC. WATERSHED  100-YEAR STORM                 PAGE   2


EXECUTIVE CONTROL OPERATION ENDJOB                                                          RECORD ID
1


TR20 XEQ 11-15-99  09:07                                                                    JOB  1   SUMMARY
     REV PC 09/83(.2)          DON HAZELWOOD DAM 103.54 AC. WATERSHED  100-YEAR STORM                 PAGE   3


SUMMARY TABLE 1 - SELECTED RESULTS OF STANDARD AND EXECUTIVE CONTROL INSTRUCTIONS IN THE ORDER PERFORMED
                  (A STAR(*) AFTER THE PEAK DISCHARGE TIME AND RATE (CFS) VALUES INDICATES A FLAT TOP HYDROGRAPH
                   A QUESTION MARK(?) INDICATES A HYDROGRAPH WITH PEAK AS LAST POINT.)

 SECTION/    STANDARD              RAIN  ANTEC  MAIN        PRECIPITATION                          PEAK DISCHARGE
 STRUCTURE    CONTROL   DRAINAGE  TABLE  MOIST  TIME   ------------------------  RUNOFF   ------------------------------------
    ID       OPERATION    AREA      #     COND  INCREM  BEGIN    AMOUNT  DURATION  AMOUNT  ELEVATION   TIME       RATE       RATE
                         (SQ MI)                (HR)    (HR)     (IN)     (HR)     (IN)      (FT)     (HR)       (CFS)      (CSM)

   ALTERNATE    1   STORM    1
+  ____________________________
 STRUCTURE  1  RUNOFF      .16      2      2     .10      .0     8.50    24.00     5.02       ---     12.97     191.88     1186.1
1


TR20 XEQ 11-15-99  09:07                                                                    JOB  1   SUMMARY
     REV PC 09/83(.2)          DON HAZELWOOD DAM 103.54 AC. WATERSHED  100-YEAR STORM                 PAGE   4


SUMMARY TABLE 3 - DISCHARGE (CFS) AT XSECTIONS AND STRUCTURES FOR ALL STORMS AND ALTERNATES

 XSECTION/          DRAINAGE
 STRUCTURE            AREA       STORM NUMBERS..........
   ID               (SQ MI)            1

0 STRUCTURE   1          .16
+____________________________
   ALTERNATE    1                191.88
1END OF  1 JOBS IN THIS RUN
```


DC010_DONALD_L_HAZELWOOD_EARTH - 023

HYDRAULIC ANALYSIS:

```
SW    1  10 0
MM    1  2  3  0
@     10 'DON2.BIN'
$EXTRAN
A1  'DON HAZELWOOD DAM STORMWATER MANAGEMENT ANALYSIS 12-30-99'
A1  '24-HOUR TYPE II RAINFALL,  2 YEAR STORM EVENT DEVELOPED CONDITIONS'
B1   8640 10.0   0.00  360 360 36   0
B2    0  1  12.566  30  0.05
B3    1 3 1 3  0
B4    1
B5    200 201 202
B6    1
B7    200 201 202
*    NCOND  N1  N2  Qi  TYP AFULL DEEP WIDE LENGTH ZP1   ZP2   ROUGH SS1 SS2
*    NEGLECT 12" RISER & OUTLET BARREL
*    REPLACE SPILLWAY BARRELS & EMERG. SPILLWAY W/ CONCRETE SPILLWAY
*    TOP OF DAM SET AT ELEVATION 44.00
C1    200   1   2   0.0  6  0.000 5.38 10.0   28   0.00  0.00  .0150 3.0 3.0
C1    201   2   3   0.0  6  0.000 5.38 10.0   17   0.00  0.00  .0150 3.0 3.0
C1    202   3   10  0.0  6  0.000 5.38 10.0   23   0.00  0.00  .0150 3.0 3.0
*  JUNCTION GROUND INV.  Qc   Yi
*   NUMBER   ELEV  ELEV  cfs   ft
D1     3    100.0 32.89 0.0   0.00
D1     2    100.0 38.60 0.0   0.00
D1     1    100.0 38.62 0.0   0.00
D1     10   100.0 32.87 0.0   0.00
*  STORAGE NODES
E1     1    45.00 -0.10  2
E2     1.32 0.00  4.80 6.38
*  OUTFALL @ JUNCTION 10
I1   10  1
J1    1
$ENDPROGRAM
```

```
1          ************************************************
           *          ENVIRONMENTAL PROTECTION AGENCY     *
           *           STORM WATER MANAGEMENT MODEL       *
           *                  VERSION 4.0                 *
           ************************************************

                          DEVELOPED BY

           ************************************************
           *             METCALF & EDDY, INC.             *
           *            UNIVERSITY OF FLORIDA             *
           *       WATER RESOURCES ENGINEERS, INC.        *
           *              SEPTEMBER 1970                  *
           ************************************************

                          UPDATED BY

           ************************************************
           *            UNIVERSITY OF FLORIDA             *
           *          CAMP DRESSER & MCKEE, INC.          *
           *                                              *
           *   MARCH      1975          NOVEMBER  1977    *
           *   NOVEMBER  1981           SEPTEMBER 1988    *
           ************************************************

           ************************************************
           *    THIS IS A NEW RELEASE OF SWMM.  IF ANY    *
           *     PROBLEMS OCCUR IN RUNNING THIS MODEL     *
           *            CONTACT WAYNE HUBER               *
           *           UNIVERSITY OF FLORIDA              *
           *            PHONE 1-904-392-0846              *
           ************************************************

           ************************************************
           *  THIS IS AN IMPLEMENTATION OF EPA SWMM 4.0   *
           *  "NATURE IS FULL OF INFINITE CAUSES WHICH    *
           *   HAVE NEVER OCCURED IN EXPERIENCE" da Vinci *
           ************************************************

           ************************************************
           *       DISK OR TAPE ASSIGNMENTS BY BLOCK      *
           *         JIN  -> INPUT TO A BLOCK             *
           *        JOUT  -> OUTPUT FROM A BLOCK          *
           ************************************************

            BLOCK( 1)      JIN( 1) 10      JOUT( 1)  0

           ************************************************
           *             SCRATCH DISKS OR TAPES           *
           *        THESE CAN BE USED BY ANY BLOCK        *
           ************************************************

    NSCRAT(1) NCSRAT(2) NSCRAT(3) NSCRAT(4) NSCRAT(5) NSCRAT(6) NSCRAT(7)
        2         0         0         0         0         0         0

  *******************************************************
  * ENTRY MADE TO EXTENDED TRANSPORT MODEL (EXTRAN)     *
  * UPDATED BY THE UNIVERSITY OF FLORIDA (UF) AND       *
  * CAMP DRESSER AND MCKEE INC. (CDM), SEPTEMBER, 1988. *
  *                                                     *
  * "Smooth runs the water where the brook is deep."    *
  *                  Shakespeare, Henry VI, II, III, 1 *
  *******************************************************

1-----------------------------------------------------------------------------
 ENVIRONMENTAL PROTECTION AGENCY          ****   EXTENDED TRANSPORT PROGRAM   ****      WATER RESOURCES DIVISION
 WASHINGTON, D.C.                         ****                                ****      CAMP DRESSER & MCKEE INC.
                                          ****         ANALYSIS MODULE        ****      ANNANDALE, VIRGINIA

     DON HAZELWOOD DAM STORMWATER MANAGEMENT ANALYSIS 12-30-99
     24-HOUR TYPE II RAINFALL,  2 YEAR STORM EVENT DEVELOPED CONDITIONS


  CONTROL INFORMATION FOR SIMULATION
  ----------------------------------

  INTEGRATION CYCLES................  8640

  LENGTH OF INTEGRATION STEP IS......    10. SECONDS

  CREATE EQUIVALENT CONDUITS BASED
  ON THE COURANT CONDITION..........     1
```


DC010_DONALD_L_HAZELWOOD_EARTH - 025

```
USE U.S. CUSTOMARY UNITS FOR I/O...      0

PRINTING STARTS IN CYCLE...........    360

INTERMEDIATE PRINTOUT INTERVALS OF.    360 CYCLES

SUMMARY PRINTOUT INTERVALS OF......     42 CYCLES

HOT START FILE MANIPULATION(REDO)..      0

INITIAL TIME.......................  0.00 HOURS

ITERATION VARIABLES: ITMAX.........     30
                     SURTOL........ 0.050

DEFAULT SURFACE AREA OF JUNCTIONS.. 12.57 CUB FT.

EXPLICIT EXTRAN SOLUTION.(ISOL=0)..

A PREISSMAN SLOT IS NOT USED DURING SURCHARGE.

NORMAL FLOW OPTION WHEN THE WATER
SURFACE SLOPE IS LESS THAN THE
GROUND SURFACE SLOPE (KSUPER=0)....

NUSW INPUT HYDROGRAPH JUNCTIONS....      0

PRINTED OUTPUT FOR THE FOLLOWING  1 JUNCTIONS

            1

PRINTED OUTPUT FOR THE FOLLOWING  3 CONDUITS

          200       201       202

WATER SURFACE ELEVATIONS WILL BE PLOTTED FOR THE FOLLOWING   1 JUNCTIONS

            1

FLOW RATE WILL BE PLOTTED FOR THE FOLLOWING   3 CONDUITS

          200       201       202
1-----------------------------------------------------------------------------
ENVIRONMENTAL PROTECTION AGENCY              ****   EXTENDED TRANSPORT PROGRAM   ****        WATER RESOURCES DIVISION
WASHINGTON, D.C.                             ****                                ****        CAMP DRESSER & MCKEE INC.
                                             ****         ANALYSIS MODULE        ****        ANNANDALE, VIRGINIA

    DON HAZELWOOD DAM STORMWATER MANAGEMENT ANALYSIS 12-30-99
    24-HOUR TYPE II RAINFALL,  2 YEAR STORM EVENT DEVELOPED CONDITIONS

1
 ****************************************************
 *                    CONDUIT DATA                  *
 ****************************************************

     CONDUIT   LENGTH   CLASS     AREA    MANNING       MAX WIDTH       DEPTH   JUNCTIONS        INVERT HEIGHT         TRAPEZOID
      NUMBER    (FT)             (SQ FT)   COEF.          (FT)          (FT)    AT ENDS         ABOVE JUNCTIONS        SIDE SLOPE
       -----    ----             -------   -----          ----          ----    -------         ---------------        ----------
  1     200     28.      6      140.63    0.015          10.00         5.38      1     2          0.00    0.00         3.00 3.00
  2     201     17.      6      140.63    0.015          10.00         5.38      2     3          0.00    0.00         3.00 3.00
  3     202     23.      6      140.63    0.015          10.00         5.38      3    10          0.00    0.00         3.00 3.00

 ===> WARNING !!! (C*DELT/LEN) IN CONDUIT   200 IS  4.7 AT FULL DEPTH.
 ===> THE NEW EQUIVALENT LENGTH/ROUGHNESS/RATIO FOR CONDUIT   200 IS      131.6 /  0.0069185 /  1.000

 ===> WARNING !!! (C*DELT/LEN) IN CONDUIT   201 IS  7.7 AT FULL DEPTH.
 ===> THE NEW EQUIVALENT LENGTH/ROUGHNESS/RATIO FOR CONDUIT   201 IS      131.6 /  0.0053908 /  1.000

 ===> WARNING !!! (C*DELT/LEN) IN CONDUIT   202 IS  5.7 AT FULL DEPTH.
 ===> THE NEW EQUIVALENT LENGTH/ROUGHNESS/RATIO FOR CONDUIT   202 IS      131.6 /  0.0062704 /  1.000
1-----------------------------------------------------------------------------
ENVIRONMENTAL PROTECTION AGENCY              ****   EXTENDED TRANSPORT PROGRAM   ****        WATER RESOURCES DIVISION
WASHINGTON, D.C.                             ****                                ****        CAMP DRESSER & MCKEE INC.
                                             ****         ANALYSIS MODULE        ****        ANNANDALE, VIRGINIA

    DON HAZELWOOD DAM STORMWATER MANAGEMENT ANALYSIS 12-30-99
    24-HOUR TYPE II RAINFALL,  2 YEAR STORM EVENT DEVELOPED CONDITIONS

1
 ****************************************************
 *                   JUNCTION DATA                  *
 ****************************************************
```

	JUNCTION NUMBER	GROUND ELEV.	CROWN ELEV.	INVERT ELEV.	QINST CFS	DEPTH FEET	CONNECTING CONDUITS	
1	3	100.00	38.27	32.89	0.00	0.00	201	202
2	2	100.00	43.98	38.60	0.00	0.00	200	201
3	1	100.00	44.00	38.62	0.00	0.00	200	
4	10	100.00	38.25	32.87	0.00	0.00	202	

```
1-----------------------------------------------------------------------------
 ENVIRONMENTAL PROTECTION AGENCY              ****   EXTENDED TRANSPORT PROGRAM   ****        WATER RESOURCES DIVISION
 WASHINGTON, D.C.                             ****                                ****        CAMP DRESSER & MCKEE INC.
                                              ****         ANALYSIS MODULE        ****        ANNANDALE, VIRGINIA

     DON HAZELWOOD DAM STORMWATER MANAGEMENT ANALYSIS 12-30-99
     24-HOUR TYPE II RAINFALL,  2 YEAR STORM EVENT DEVELOPED CONDITIONS


 ******************************************************
 *              STORAGE JUNCTION DATA                 *
 ******************************************************

 STORAGE JUNCTION       SURFACE AREA       VOLUME       CROWN ELEVATION
                           (FT2)            (CF)            (FT)
                           -----            ----            ----
          1                 -0.10           -0.64           45.00


 ***************************************************
 *                 FREE OUTFALL DATA               *
 *                    DATA GROUP I1                *
 *         BOUNDARY CONDITION ON DATA GROUP J1     *
 ***************************************************


 OUTFALL AT JUNCTION....         10 HAS BOUNDARY CONDITION NUMBER...          1
1-----------------------------------------------------------------------------
 ENVIRONMENTAL PROTECTION AGENCY              ****   EXTENDED TRANSPORT PROGRAM   ****        WATER RESOURCES DIVISION
 WASHINGTON, D.C.                             ****                                ****        CAMP DRESSER & MCKEE INC.
                                              ****         ANALYSIS MODULE        ****        ANNANDALE, VIRGINIA

     DON HAZELWOOD DAM STORMWATER MANAGEMENT ANALYSIS 12-30-99
     24-HOUR TYPE II RAINFALL,  2 YEAR STORM EVENT DEVELOPED CONDITIONS



 ***************************************************
 *        INTERNAL CONNECTIVITY INFORMATION        *
 ***************************************************

          CONDUIT      JUNCTION      JUNCTION
          -------      --------      --------
          90004           10            0
1
 *****************************************************
 *        BOUNDARY CONDITON INFORMATION              *
 *                 DATA GROUPS J1-J4                 *
 *****************************************************


 BOUNDARY CONDITION NUMBER..          1 HAS NO CONTROL WATER SURFACE.


 *****************************************
 * HEADER INFORMATION FROM INTERFACE FILE: *
 *****************************************

 TITLE FROM FIRST COMPUTATIONAL BLOCK:
001
    DON HAZELWOOD DAM 103.54 AC. WATERSHED    2-YEAR STORM

 TITLE FROM IMMEDIATELY PRECEDING COMPUTATIONAL BLOCK
001
    DON HAZELWOOD DAM 103.54 AC. WATERSHED    2-YEAR STORM
```


DC010_DONALD_L_HAZELWOOD_EARTH - 027

```
NAME OF PRECEDING BLOCK:................TR20EXT V1.02
INITIAL JULIAN DATE (IDATEZ)......................   99319
INITIAL TIME OF DAY IN SECONDS (TZERO)........... 39600.0
NO. TRANSFERED INPUT LOCATIONS....................       1
NO. TRANSFERED POLLUTANTS........................       0
SIZE OF TOTAL CATCHMENT AREA (ACRES)..............  103.54

************************************************
* ELEMENT NUMBERS OF INTERFACE INLET LOCATIONS: *
************************************************
      1

*******************************************************
*               SURCHARGE ITERATION SUMMARY           *
*******************************************************

MAXIMUM NUMBER OF ITERATIONS IN A TIME STEP.....        1
TOTAL NUMBER OF ITERATIONS IN THE SIMULATION....    17336
SURCHARGE ITERATIONS DURING THE SIMULATION......       56
MAXIMUM SURCHARGE FLOW ERROR DURING SIMULATION.. 0.00E-01 CFS
TOTAL NUMBER OF TIME STEPS DURING SIMULATION....     8668

1- - - - - - - - - - - - - CONTINUITY BALANCE AT END OF RUN - - - - - - - - - - - - -

INITIAL SYSTEM VOLUME       =          0.04 CU FT
TOTAL SYSTEM INFLOW VOLUME =     423909.72 CU FT
INFLOW + INITIAL VOLUME     =     423909.75 CU FT

JUNCTION OUTFLOWS/STREET FLOODING

   JUNCTION  OUTFLOW, FT3
   --------  ------------
        10     422294.25

TOTAL SYSTEM OUTFLOW       =     422294.25 CU FT
VOLUME LEFT IN SYSTEM      =       3656.12 CU FT
OUTFLOW + FINAL VOLUME     =     425950.37 CU FT
ERROR IN CONTINUITY, PERCENT =       -0.48

1-------------------------------------------------------------------------------------
ENVIRONMENTAL PROTECTION AGENCY *** EXTENDED TRANSPORT PROGRAM *** WATER RESOURCES DIVISION
WASHINGTON, D.C.                ***                            *** CAMP DRESSER & MCKEE INC.
                                ***      ANALYSIS MODULE       *** ANNANDALE, VIRGINIA

    DON HAZELWOOD DAM STORMWATER MANAGEMENT ANALYSIS 12-30-99
    24-HOUR TYPE II RAINFALL,  2 YEAR STORM EVENT DEVELOPED CONDITIONS


1 * * * * * * * * * T I M E   H I S T O R Y   O F   H. G. L. * * * * * * * * *
                          (VALUES IN FEET)


          JUNCTION        1
  TIME        GRND   100.00
 HR:MIN       ELEV    DEPTH
 ------       ----    -----
  11: 7      38.62     0.00
  11:14      38.62     0.00
  11:21      38.62     0.00
  11:28      38.62     0.00
  11:35      38.62     0.00
  11:42      38.62     0.00
  11:49      38.63     0.01
  11:56      38.64     0.02
  12: 3      38.67     0.05
  12:10      38.71     0.09
  12:17      38.78     0.16
  12:24      38.85     0.23
  12:31      38.90     0.28
  12:38      38.93     0.31
  12:45      38.94     0.32
  12:52      38.95     0.33
  12:59      38.96     0.34
  13: 6      38.96     0.34
  13:13      38.96     0.34
  13:20      38.95     0.33
  13:27      38.95     0.33
  13:34      38.94     0.32
  13:41      38.93     0.31
  13:48      38.93     0.31
  13:55      38.92     0.30
  14: 2      38.91     0.29
```

14: 9	38.90	0.28
14:16	38.90	0.28
14:23	38.89	0.27
14:30	38.89	0.27
14:37	38.88	0.26
14:44	38.88	0.26
14:51	38.87	0.25
14:58	38.87	0.25
15: 5	38.87	0.25
15:12	38.86	0.24
15:19	38.86	0.24
15:26	38.86	0.24
15:33	38.85	0.23
15:40	38.85	0.23
15:47	38.85	0.23
15:54	38.84	0.22
16: 1	38.84	0.22
16: 8	38.84	0.22
16:15	38.84	0.22
16:22	38.84	0.22
16:29	38.83	0.21
16:36	38.83	0.21
16:43	38.83	0.21
16:50	38.83	0.21
16:57	38.83	0.21
17: 4	38.83	0.21
17:11	38.83	0.21
17:18	38.83	0.21
17:25	38.82	0.20
17:32	38.82	0.20
17:39	38.82	0.20
17:46	38.82	0.20
17:53	38.82	0.20
18: 0	38.82	0.20
18: 7	38.82	0.20
18:14	38.82	0.20
18:21	38.82	0.20
18:28	38.82	0.20
18:35	38.82	0.20
18:42	38.81	0.19
18:49	38.81	0.19
18:56	38.81	0.19
19: 3	38.81	0.19
19:10	38.81	0.19
19:17	38.81	0.19
19:24	38.81	0.19
19:31	38.81	0.19
19:38	38.81	0.19
19:45	38.81	0.19
19:52	38.81	0.19
19:59	38.81	0.19
20: 6	38.81	0.19
20:13	38.80	0.18
20:20	38.80	0.18
20:27	38.80	0.18
20:34	38.80	0.18
20:41	38.80	0.18
20:48	38.80	0.18
20:55	38.80	0.18
21: 2	38.80	0.18
21: 9	38.80	0.18
21:16	38.80	0.18
21:23	38.80	0.18
21:30	38.80	0.18
21:37	38.79	0.17
21:44	38.79	0.17
21:51	38.79	0.17
21:58	38.79	0.17
22: 5	38.79	0.17
22:12	38.79	0.17
22:19	38.79	0.17
22:26	38.79	0.17
22:33	38.79	0.17
22:40	38.79	0.17
22:47	38.79	0.17
22:54	38.79	0.17
23: 1	38.79	0.17
23: 8	38.79	0.17
23:15	38.79	0.17
23:22	38.79	0.17
23:29	38.79	0.17
23:36	38.79	0.17

DC010_DONALD_L_HAZELWOOD_EARTH - 029

23:43	38.79	0.17
23:50	38.79	0.17
23:57	38.79	0.17
24: 4	38.79	0.17
24:11	38.79	0.17
24:18	38.79	0.17
24:25	38.79	0.17
24:32	38.79	0.17
24:39	38.79	0.17
24:46	38.78	0.16
24:53	38.78	0.16
25: 0	38.78	0.16
25: 7	38.77	0.15
25:14	38.77	0.15
25:21	38.76	0.14
25:28	38.76	0.14
25:35	38.76	0.14
25:42	38.75	0.13
25:49	38.75	0.13
25:56	38.74	0.12
26: 3	38.74	0.12
26:10	38.73	0.11
26:17	38.73	0.11
26:24	38.73	0.11
26:31	38.72	0.10
26:38	38.72	0.10
26:45	38.72	0.10
26:52	38.71	0.09
26:59	38.71	0.09
27: 6	38.71	0.09
27:13	38.70	0.08
27:20	38.70	0.08
27:27	38.70	0.08
27:34	38.70	0.08
27:41	38.69	0.07
27:48	38.69	0.07
27:55	38.69	0.07
28: 2	38.69	0.07
28: 9	38.69	0.07
28:16	38.69	0.07
28:23	38.68	0.06
28:30	38.68	0.06
28:37	38.68	0.06
28:44	38.68	0.06
28:51	38.68	0.06
28:58	38.68	0.06
29: 5	38.68	0.06
29:12	38.67	0.05
29:19	38.67	0.05
29:26	38.67	0.05
29:33	38.67	0.05
29:40	38.67	0.05
29:47	38.67	0.05
29:54	38.67	0.05
30: 1	38.67	0.05
30: 8	38.67	0.05
30:15	38.67	0.05
30:22	38.67	0.05
30:29	38.66	0.04
30:36	38.66	0.04
30:43	38.66	0.04
30:50	38.66	0.04
30:57	38.66	0.04
31: 4	38.66	0.04
31:11	38.66	0.04
31:18	38.66	0.04
31:25	38.66	0.04
31:32	38.66	0.04
31:39	38.66	0.04
31:46	38.66	0.04
31:53	38.66	0.04
32: 0	38.66	0.04
32: 7	38.66	0.04
32:14	38.66	0.04
32:21	38.66	0.04
32:28	38.65	0.03
32:35	38.65	0.03
32:42	38.65	0.03
32:49	38.65	0.03
32:56	38.65	0.03
33: 3	38.65	0.03
33:10	38.65	0.03

33:17	38.65	0.03
33:24	38.65	0.03
33:31	38.65	0.03
33:38	38.65	0.03
33:45	38.65	0.03
33:52	38.65	0.03
33:59	38.65	0.03
34: 6	38.65	0.03
34:13	38.65	0.03
34:20	38.65	0.03
34:27	38.65	0.03
34:34	38.65	0.03
34:41	38.65	0.03
34:48	38.65	0.03
34:55	38.65	0.03
35: 2	38.65	0.03
MEAN	38.76	0.14
MAXIMUM	38.96	0.34
MINIMUM	38.62	0.00

1----------

ENVIRONMENTAL PROTECTION AGENCY *** EXTENDED TRANSPORT PROGRAM *** WATER RESOURCES DIVISION
WASHINGTON, D.C. *** *** CAMP DRESSER & MCKEE INC.
*** ANALYSIS MODULE *** ANNANDALE, VIRGINIA

DON HAZELWOOD DAM STORMWATER MANAGEMENT ANALYSIS 12-30-99
24-HOUR TYPE II RAINFALL, 2 YEAR STORM EVENT DEVELOPED CONDITIONS

* * * * * * S U M M A R Y S T A T I S T I C S F O R J U N C T I O N S * * * * * *

JUNCTION NUMBER	GROUND ELEVATION (FT)	UPPERMOST PIPE CROWN ELEVATION (FT)	MAXIMUM COMPUTED DEPTH (FT)	TIME OF OCCURENCE HR.	TIME OF OCCURENCE MIN.	FEET OF SURCHARGE AT MAX DEPTH	FEET MAX. DEPTH IS BELOW GROUND ELEVATION	LENGTH OF SURCHARGE (MIN)	LENGTH OF FLOODING (MIN)	MAXIMUM JUNCTION AREA ACRES
3	100.00	38.27	0.75	13	6	0.00	66.36	0.0	0.0	7.089E-07
2	100.00	43.98	0.20	13	6	0.00	61.20	0.0	0.0	7.040E-07
1	100.00	45.00	0.34	13	6	0.00	61.04	0.0	0.0	3.100E-05
10	100.00	38.25	0.72	13	6	0.00	66.41	0.0	0.0	7.035E-07

1----------

ENVIRONMENTAL PROTECTION AGENCY *** EXTENDED TRANSPORT PROGRAM *** WATER RESOURCES DIVISION
WASHINGTON, D.C. *** *** CAMP DRESSER & MCKEE INC.
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DON HAZELWOOD DAM STORMWATER MANAGEMENT ANALYSIS 12-30-99
24-HOUR TYPE II RAINFALL, 2 YEAR STORM EVENT DEVELOPED CONDITIONS

1 * * * * * * * * * * T I M E H I S T O R Y O F F L O W A N D V E L O C I T Y * * * * * * * * *
Q(CFS), VEL(FPS), TOTAL(CUBIC FEET)

TIME HR:MIN	CONDUIT FLOW	200 VELOC.	CONDUIT FLOW	201 VELOC.	CONDUIT FLOW	202 VELOC.
11: 7	0.00	0.00	0.00	0.00	0.00	0.00
11:14	0.00	0.00	0.00	0.00	0.00	0.00
11:21	0.00	0.01	0.00	0.00	0.00	0.00
11:28	0.00	0.01	0.00	0.00	0.00	0.00
11:35	0.00	0.03	0.00	0.00	0.00	0.00
11:42	0.00	0.05	0.00	0.02	0.00	0.00
11:49	0.00	0.09	0.00	0.32	0.00	0.01
11:56	0.02	0.20	0.02	0.80	0.00	0.04
12: 3	0.12	0.44	0.10	0.92	0.01	0.16
12:10	0.55	0.97	0.51	1.22	0.28	0.70
12:17	2.25	2.19	2.16	2.38	1.89	1.74
12:24	8.66	5.20	8.50	4.21	7.86	2.61
12:31	19.80	8.90	19.62	5.64	18.95	3.48
12:38	27.65	10.98	27.55	6.36	27.07	3.92
12:45	32.87	12.18	32.82	6.67	32.53	4.10
12:52	36.28	12.90	36.26	6.89	36.14	4.25
12:59	38.23	13.30	38.22	7.01	38.17	4.33
13: 6	**38.99**	13.45	38.99	7.06	38.97	4.36
13:13	38.51	13.37	38.53	7.02	38.61	4.34
13:20	37.05	13.09	37.07	6.92	37.20	4.29
13:27	34.95	12.66	34.98	6.78	35.10	4.21
13:34	32.44	12.13	32.46	6.59	32.56	4.10
13:41	29.84	11.56	29.86	6.43	29.95	4.02

DC010_DONALD_L_HAZELWOOD_EARTH - 031

13:48	27.42	11.00	27.43	6.27	27.50	3.94
13:55	24.91	10.41	24.96	6.07	25.13	3.84
14: 2	22.77	9.85	22.81	5.88	22.96	3.74
14: 9	20.97	9.37	20.99	5.70	21.10	3.63
14:16	19.41	8.93	19.42	5.54	19.50	3.53
14:23	18.01	8.52	18.02	5.38	18.08	3.43
14:30	16.75	8.14	16.76	5.23	16.82	3.35
14:37	15.49	7.76	15.52	5.10	15.61	3.29
14:44	14.36	7.40	14.38	4.97	14.47	3.23
14:51	13.37	7.07	13.39	4.86	13.46	3.17
14:58	12.51	6.77	12.52	4.75	12.57	3.11
15: 5	11.74	6.49	11.74	4.64	11.79	3.05
15:12	11.04	6.24	11.05	4.54	11.08	2.99
15:19	10.38	6.00	10.39	4.43	10.44	2.93
15:26	9.78	5.77	9.79	4.33	9.84	2.87
15:33	9.26	5.57	9.27	4.23	9.31	2.82
15:40	8.80	5.39	8.81	4.14	8.84	2.76
15:47	8.40	5.23	8.41	4.06	8.43	2.71
15:54	8.05	5.08	8.05	3.99	8.07	2.66
16: 1	7.70	4.94	7.71	3.91	7.73	2.62
16: 8	7.39	4.81	7.40	3.84	7.42	2.57
16:15	7.12	4.69	7.12	3.78	7.14	2.53
16:22	6.88	4.59	6.88	3.72	6.90	2.49
16:29	6.67	4.50	6.68	3.67	6.69	2.46
16:36	6.50	4.42	6.50	3.62	6.51	2.43
16:43	6.33	4.34	6.33	3.58	6.34	2.40
16:50	6.17	4.27	6.17	3.53	6.19	2.37
16:57	6.03	4.21	6.03	3.50	6.04	2.35
17: 4	5.89	4.15	5.90	3.46	5.91	2.32
17:11	5.77	4.09	5.77	3.43	5.78	2.31
17:18	5.64	4.03	5.65	3.41	5.66	2.30
17:25	5.52	3.98	5.53	3.39	5.54	2.30
17:32	5.41	3.92	5.41	3.36	5.43	2.29
17:39	5.30	3.87	5.31	3.34	5.32	2.29
17:46	5.21	3.83	5.21	3.33	5.22	2.28
17:53	5.12	3.78	5.12	3.31	5.13	2.27
18: 0	5.04	3.75	5.04	3.29	5.05	2.27
18: 7	4.96	3.71	4.96	3.27	4.97	2.26
18:14	4.88	3.67	4.88	3.26	4.89	2.26
18:21	4.81	3.63	4.81	3.24	4.82	2.25
18:28	4.73	3.60	4.73	3.22	4.74	2.25
18:35	4.65	3.56	4.65	3.20	4.66	2.24
18:42	4.57	3.52	4.57	3.19	4.58	2.23
18:49	4.48	3.48	4.49	3.16	4.49	2.23
18:56	4.40	3.43	4.40	3.14	4.41	2.22
19: 3	4.31	3.39	4.32	3.12	4.33	2.21
19:10	4.24	3.35	4.24	3.10	4.25	2.21
19:17	4.17	3.32	4.17	3.08	4.18	2.20
19:24	4.11	3.28	4.11	3.06	4.11	2.19
19:31	4.05	3.26	4.05	3.05	4.06	2.19
19:38	4.00	3.23	4.00	3.03	4.00	2.18
19:45	3.96	3.21	3.96	3.02	3.96	2.18
19:52	3.92	3.19	3.92	3.01	3.93	2.17
19:59	3.89	3.17	3.89	3.00	3.89	2.17
20: 6	3.86	3.16	3.86	2.99	3.87	2.16
20:13	3.83	3.14	3.83	2.98	3.84	2.16
20:20	3.79	3.12	3.80	2.97	3.80	2.16
20:27	3.75	3.10	3.75	2.96	3.76	2.15
20:34	3.70	3.07	3.70	2.94	3.71	2.14
20:41	3.64	3.04	3.64	2.92	3.65	2.14
20:48	3.58	3.01	3.58	2.90	3.58	2.13
20:55	3.51	2.97	3.51	2.88	3.52	2.12
21: 2	3.44	2.93	3.44	2.85	3.45	2.11
21: 9	3.37	2.90	3.37	2.83	3.38	2.10
21:16	3.30	2.86	3.30	2.81	3.31	2.09
21:23	3.24	2.83	3.24	2.78	3.25	2.08
21:30	3.19	2.80	3.19	2.76	3.19	2.07
21:37	3.14	2.77	3.14	2.75	3.14	2.06
21:44	3.09	2.75	3.10	2.73	3.10	2.05
21:51	3.06	2.73	3.06	2.71	3.06	2.05
21:58	3.03	2.71	3.03	2.70	3.03	2.04
22: 5	3.00	2.69	3.00	2.69	3.01	2.04
22:12	2.98	2.68	2.98	2.68	2.98	2.03
22:19	2.96	2.67	2.96	2.68	2.96	2.03
22:26	2.95	2.66	2.95	2.67	2.95	2.03
22:33	2.93	2.66	2.93	2.66	2.94	2.03
22:40	2.92	2.65	2.92	2.66	2.93	2.02
22:47	2.92	2.65	2.92	2.66	2.92	2.02
22:54	2.91	2.64	2.91	2.65	2.91	2.02
23: 1	2.90	2.64	2.90	2.65	2.90	2.02
23: 8	2.90	2.64	2.90	2.65	2.90	2.02
23:15	2.90	2.63	2.90	2.65	2.90	2.02

DC010_DONALD_L_HAZELWOOD_EARTH - 032

23:22	2.89	2.63	2.89	2.65	2.89	2.02
23:29	2.89	2.63	2.89	2.65	2.89	2.02
23:36	2.89	2.63	2.89	2.65	2.89	2.02
23:43	2.89	2.63	2.89	2.65	2.89	2.02
23:50	2.89	2.63	2.89	2.65	2.89	2.02
23:57	2.89	2.63	2.89	2.65	2.89	2.02
24: 4	2.89	2.63	2.89	2.64	2.89	2.02
24:11	2.88	2.62	2.88	2.64	2.88	2.01
24:18	2.86	2.61	2.86	2.63	2.86	2.01
24:25	2.82	2.59	2.82	2.61	2.82	2.00
24:32	2.75	2.55	2.76	2.59	2.76	1.99
24:39	2.67	2.50	2.67	2.55	2.68	1.97
24:46	2.55	2.44	2.56	2.49	2.57	1.95
24:53	2.42	2.36	2.42	2.43	2.43	1.92
25: 0	2.27	2.27	2.27	2.35	2.28	1.88
25: 7	2.10	2.17	2.11	2.26	2.12	1.83
25:14	1.93	2.06	1.94	2.17	1.96	1.78
25:21	1.76	1.95	1.77	2.07	1.79	1.72
25:28	1.61	1.84	1.61	1.96	1.63	1.66
25:35	1.46	1.74	1.46	1.86	1.48	1.60
25:42	1.32	1.64	1.33	1.76	1.34	1.54
25:49	1.20	1.55	1.20	1.67	1.22	1.48
25:56	1.09	1.47	1.09	1.58	1.11	1.42
26: 3	0.99	1.39	0.99	1.50	1.01	1.36
26:10	0.90	1.32	0.91	1.42	0.92	1.30
26:17	0.82	1.25	0.83	1.35	0.84	1.25
26:24	0.75	1.19	0.76	1.28	0.77	1.20
26:31	0.69	1.13	0.69	1.22	0.70	1.15
26:38	0.63	1.08	0.64	1.16	0.65	1.10
26:45	0.58	1.03	0.59	1.10	0.60	1.06
26:52	0.54	0.99	0.54	1.05	0.55	1.02
26:59	0.50	0.94	0.50	1.01	0.51	0.98
27: 6	0.46	0.91	0.46	0.97	0.47	0.95
27:13	0.43	0.87	0.43	0.93	0.44	0.91
27:20	0.40	0.84	0.40	0.89	0.41	0.88
27:27	0.37	0.81	0.37	0.85	0.38	0.85
27:34	0.35	0.78	0.35	0.82	0.36	0.82
27:41	0.33	0.75	0.33	0.79	0.33	0.80
27:48	0.31	0.72	0.31	0.76	0.31	0.77
27:55	0.29	0.70	0.29	0.74	0.29	0.75
28: 2	0.27	0.68	0.27	0.71	0.28	0.73
28: 9	0.26	0.66	0.26	0.69	0.26	0.70
28:16	0.24	0.64	0.24	0.67	0.25	0.68
28:23	0.23	0.62	0.23	0.65	0.23	0.67
28:30	0.22	0.60	0.22	0.63	0.22	0.65
28:37	0.21	0.59	0.21	0.61	0.21	0.63
28:44	0.20	0.57	0.20	0.59	0.20	0.61
28:51	0.19	0.56	0.19	0.58	0.19	0.60
28:58	0.18	0.54	0.18	0.56	0.18	0.58
29: 5	0.17	0.53	0.17	0.55	0.17	0.57
29:12	0.16	0.52	0.16	0.53	0.16	0.56
29:19	0.15	0.50	0.15	0.52	0.16	0.54
29:26	0.15	0.49	0.15	0.51	0.15	0.53
29:33	0.14	0.48	0.14	0.50	0.14	0.52
29:40	0.14	0.47	0.14	0.49	0.14	0.51
29:47	0.13	0.46	0.13	0.47	0.13	0.50
29:54	0.12	0.45	0.13	0.46	0.13	0.49
30: 1	0.12	0.44	0.12	0.46	0.12	0.48
30: 8	0.12	0.43	0.12	0.45	0.12	0.47
30:15	0.11	0.43	0.11	0.44	0.11	0.46
30:22	0.11	0.42	0.11	0.43	0.11	0.45
30:29	0.10	0.41	0.10	0.42	0.11	0.45
30:36	0.10	0.40	0.10	0.41	0.10	0.44
30:43	0.10	0.40	0.10	0.41	0.10	0.43
30:50	0.09	0.39	0.09	0.40	0.10	0.42
30:57	0.09	0.38	0.09	0.39	0.09	0.42
31: 4	0.09	0.38	0.09	0.38	0.09	0.41
31:11	0.08	0.37	0.09	0.38	0.09	0.40
31:18	0.08	0.37	0.08	0.37	0.08	0.40
31:25	0.08	0.36	0.08	0.37	0.08	0.39
31:32	0.08	0.35	0.08	0.36	0.08	0.39
31:39	0.08	0.35	0.08	0.36	0.08	0.38
31:46	0.07	0.34	0.07	0.35	0.07	0.37
31:53	0.07	0.34	0.07	0.34	0.07	0.37
32: 0	0.07	0.33	0.07	0.34	0.07	0.36
32: 7	0.07	0.33	0.07	0.33	0.07	0.36
32:14	0.07	0.33	0.07	0.33	0.07	0.35
32:21	0.06	0.32	0.06	0.33	0.07	0.35
32:28	0.06	0.32	0.06	0.32	0.06	0.34
32:35	0.06	0.31	0.06	0.32	0.06	0.34
32:42	0.06	0.31	0.06	0.31	0.06	0.34
32:49	0.06	0.30	0.06	0.31	0.06	0.33

DC010_DONALD_L_HAZELWOOD_EARTH - 033

32:56	0.06	0.30	0.06	0.30	0.06	0.33
33: 3	0.05	0.30	0.05	0.30	0.06	0.32
33:10	0.05	0.29	0.05	0.30	0.05	0.32
33:17	0.05	0.29	0.05	0.29	0.05	0.32
33:24	0.05	0.29	0.05	0.29	0.05	0.31
33:31	0.05	0.28	0.05	0.29	0.05	0.31
33:38	0.05	0.28	0.05	0.28	0.05	0.30
33:45	0.05	0.28	0.05	0.28	0.05	0.30
33:52	0.05	0.27	0.05	0.28	0.05	0.30
33:59	0.05	0.27	0.05	0.27	0.05	0.29
34: 6	0.04	0.27	0.04	0.27	0.05	0.29
34:13	0.04	0.27	0.04	0.27	0.04	0.29
34:20	0.04	0.26	0.04	0.26	0.04	0.29
34:27	0.04	0.26	0.04	0.26	0.04	0.28
34:34	0.04	0.26	0.04	0.26	0.04	0.28
34:41	0.04	0.25	0.04	0.26	0.04	0.28
34:48	0.04	0.25	0.04	0.25	0.04	0.27
34:55	0.04	0.25	0.04	0.25	0.04	0.27
35: 2	0.04	0.25	0.04	0.25	0.04	0.27
MEAN	4.87	2.86	4.87	2.27	4.87	1.63
MAXIMUM	38.99	13.45	38.99	7.06	38.98	4.36
MINIMUM	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL	4.22E+05		4.22E+05		4.22E+05	

1----------

ENVIRONMENTAL PROTECTION AGENCY *** EXTENDED TRANSPORT PROGRAM *** WATER RESOURCES DIVISION
WASHINGTON, D.C. *** *** CAMP DRESSER & MCKEE INC.
*** ANALYSIS MODULE *** ANNANDALE, VIRGINIA

DON HAZELWOOD DAM STORMWATER MANAGEMENT ANALYSIS 12-30-99
24-HOUR TYPE II RAINFALL, 2 YEAR STORM EVENT DEVELOPED CONDITIONS

* * * * * * * S U M M A R Y S T A T I S T I C S F O R C O N D U I T S * * * * * * *

CONDUIT NUMBER	DESIGN FLOW (CFS)	DESIGN VELOCITY (FPS)	CONDUIT VERTICAL DEPTH (IN)	MAXIMUM COMPUTED FLOW (CFS)	TIME OF OCCURENCE HR.	TIME OF OCCURENCE MIN.	MAXIMUM COMPUTED VELOCITY (FPS)	TIME OF OCCURENCE HR.	TIME OF OCCURENCE MIN.	RATIO OF MAX. TO DESIGN FLOW	MAXIMUM DEPTH ABOVE INVERT AT CONDUIT ENDS UPSTREAM (FT)	DOWNSTREAM (FT)	LENGTH OF SUPERCRITICAL FLOW (MIN)	GROUND SLOPE (FT/FT)
200	807.62	5.74	64.56	38.99	13	6	13.45	13	6	0.05	0.34	0.20	0.0	0.00015
201	17513.01	124.53	64.56	38.99	13	6	7.06	13	6	0.00	0.20	0.75	1389.8	0.04338
202	891.09	6.34	64.56	38.98	13	6	4.36	13	6	0.04	0.75	0.72	0.0	0.00015
90004	********	********	64.56	38.98	13	6	********	0	0	********	********	********	**********	**********

1----------

ENVIRONMENTAL PROTECTION AGENCY *** EXTENDED TRANSPORT PROGRAM *** WATER RESOURCES DIVISION
WASHINGTON, D.C. *** *** CAMP DRESSER & MCKEE INC.
*** ANALYSIS MODULE *** ANNANDALE, VIRGINIA

DON HAZELWOOD DAM STORMWATER MANAGEMENT ANALYSIS 12-30-99
24-HOUR TYPE II RAINFALL, 2 YEAR STORM EVENT DEVELOPED CONDITIONS

1

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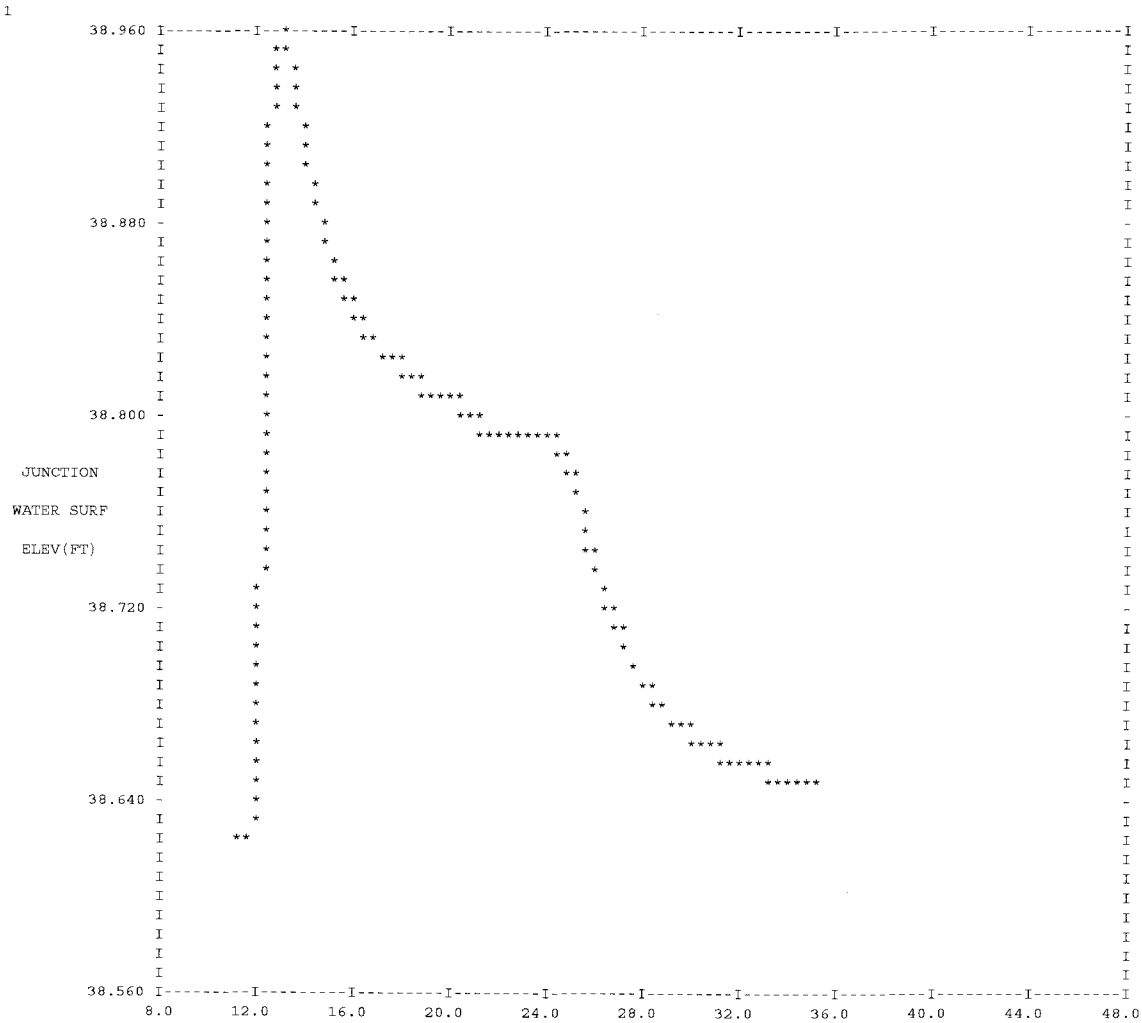
**************************************************
* SUBCRITICAL AND CRITICAL FLOW ASSUMPTIONS FROM *
* SUBROUTINE HEAD.  SEE FIGURE 5-4 IN THE EXTRAN *
*       MANUAL FOR FURTHER INFORMATION.          *
**************************************************
```

CONDUIT NUMBER	LENGTH OF DRY FLOW(MIN)	LENGTH OF SUBCRITICAL FLOW(MIN)	LENGTH OF UPSTR. CRITICAL FLOW(MIN)	LENGTH OF DOWNSTR. CRITICAL FLOW(MIN)
200	17.00	1427.67	0.00	0.00
201	40.33	1404.33	0.00	0.00
202	47.17	1397.50	0.00	0.00

DC010_DONALD_L_HAZELWOOD_EARTH - 034

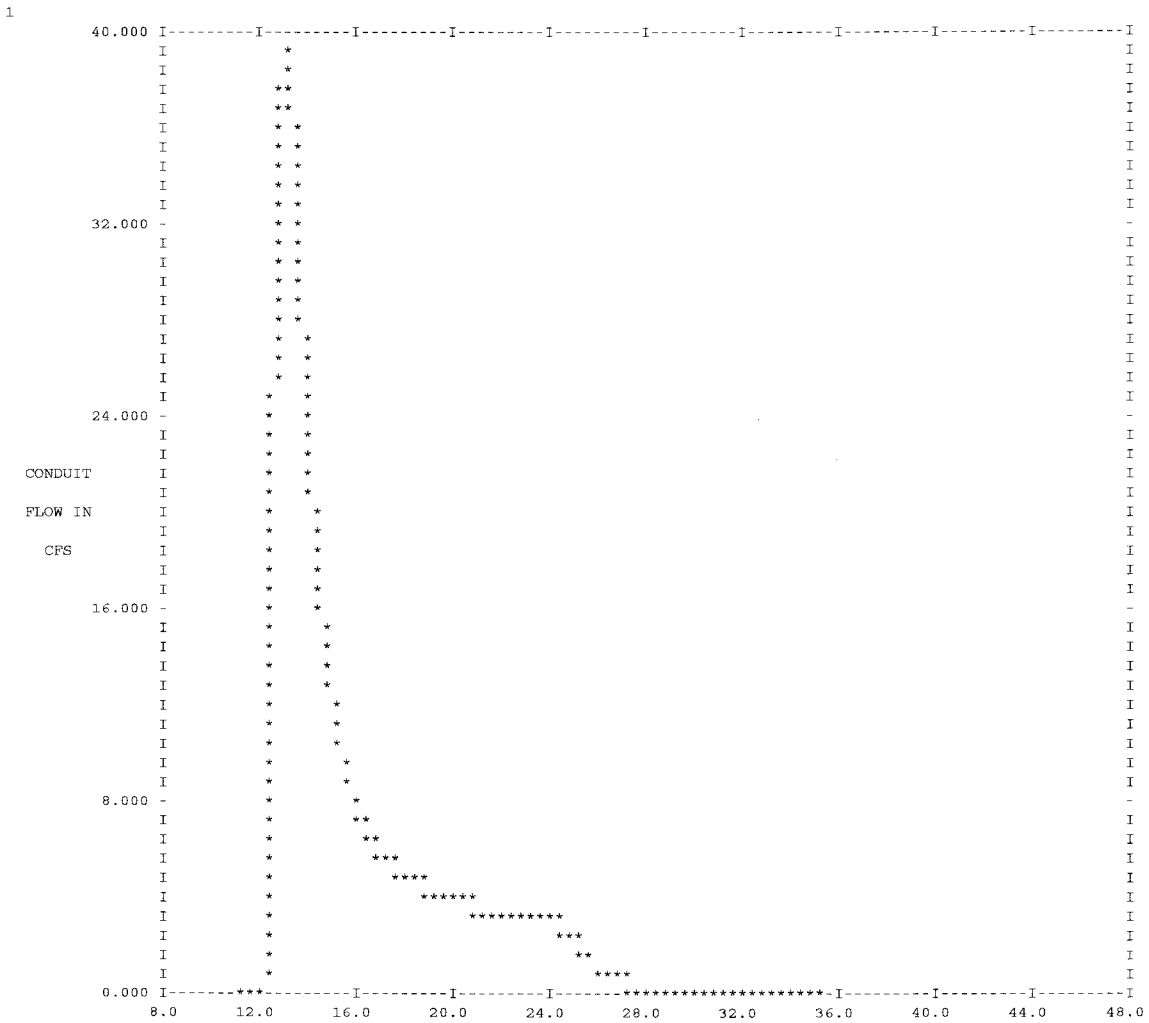


LOCATION NO. : 1 CLOCK TIME IN HOURS

PLOT OF JUNCTION ELEVATION

INVERT ELEV - 38.62 FEET
CROWN ELEV - 45.00 FEET
GROUND ELEV - 100.00 FEET

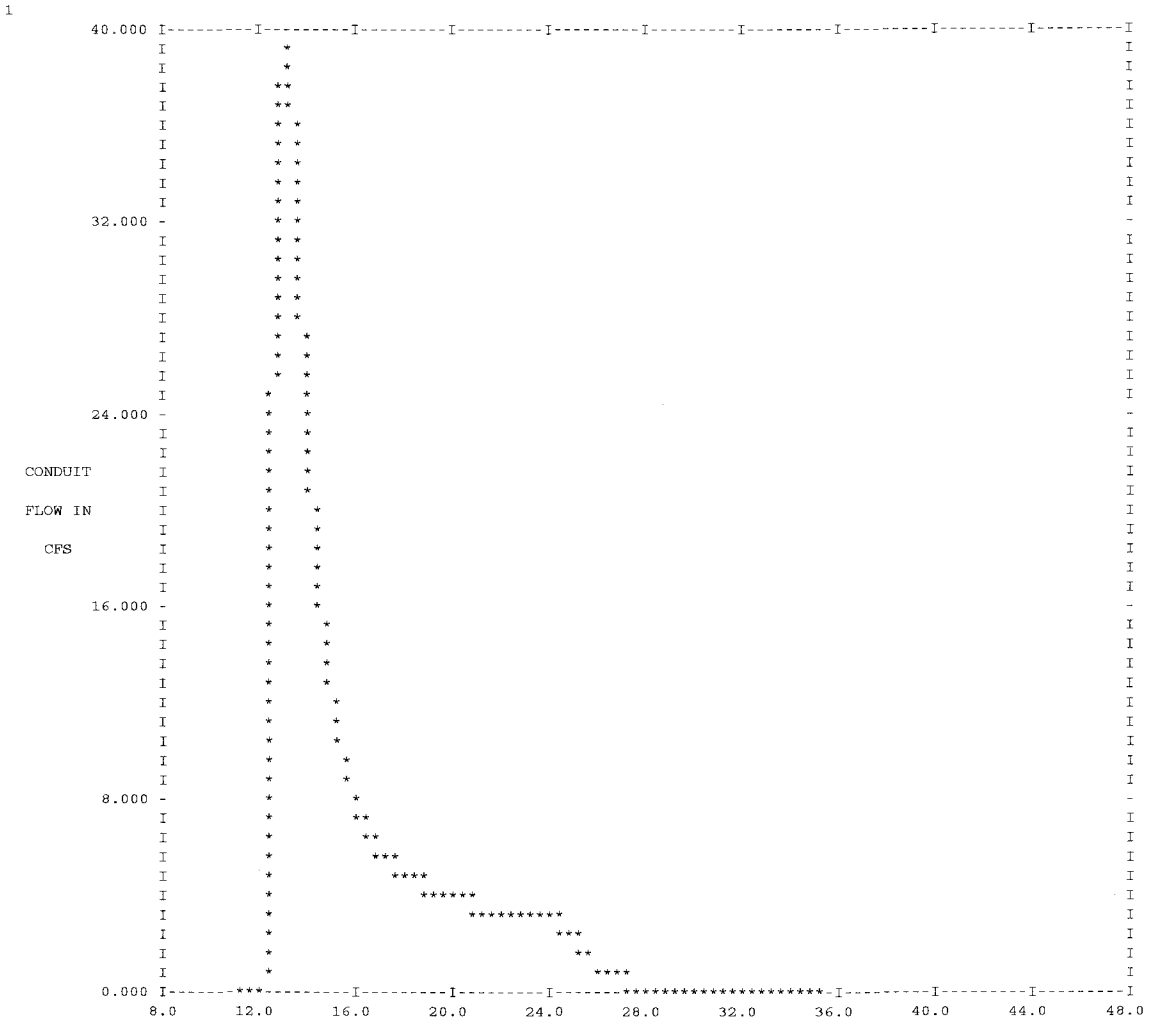
DC010_DONALD_L_HAZELWOOD_EARTH - 035



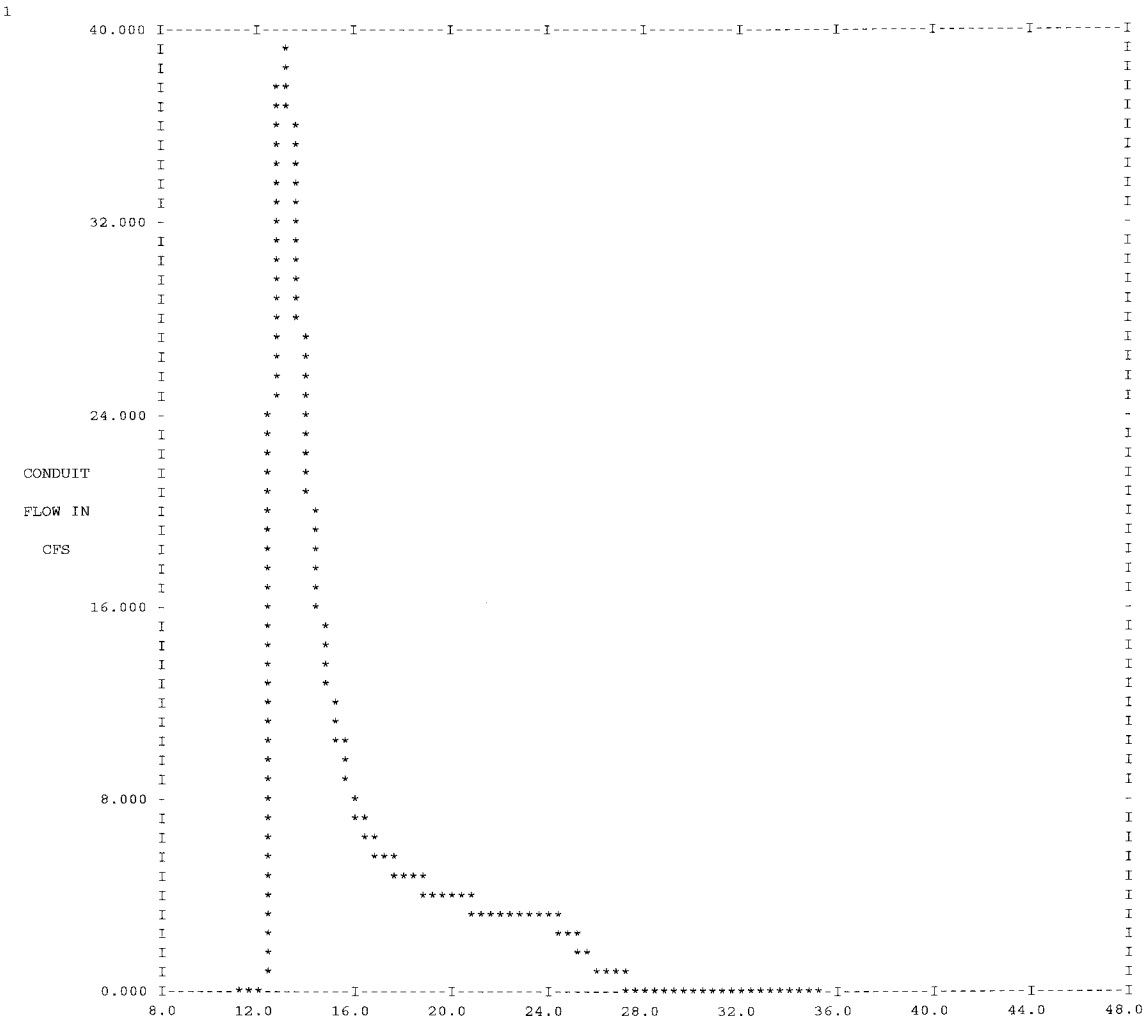
LOCATION NO. : 200 CLOCK TIME IN HOURS

PLOT OF CONDUIT FLOW

DC010_DONALD_L_HAZELWOOD_EARTH - 036



DC010_DONALD_L_HAZELWOOD_EARTH - 037



PLOT OF CONDUIT FLOW

===> EXTENDED TRANSPORT MODEL SIMULATION ENDED NORMALLY.

===> SWMM 4.0 SIMULATION ENDED NORMALLY.

===> YOUR INPUT FILE WAS NAMED : DON2C.DAT
===> YOUR OUTPUT FILE WAS NAMED: DON2C.OUT

```
SW     1  10 0
MM     1  2  3  0
@      10 'DON10.BIN'
$EXTRAN
A1  'DON HAZELWOOD DAM STORMWATER MANAGEMENT ANALYSIS 12-30-99'
A1  '24-HOUR TYPE II RAINFALL, 10 YEAR STORM EVENT DEVELOPED CONDITIONS'
B1   8640 10.0   0.00  360 360 36   0
B2    0  1  12.566  30  0.05
B3    1 3 1 3  0
B4    1
B5    200 201 202
B6    1
B7    200 201 202
*    NCOND  N1  N2  Qi  TYP AFULL DEEP WIDE LENGTH ZP1   ZP2   ROUGH SS1 SS2
*    NEGLECT 12" RISER & OUTLET BARREL
*    REPLACE SPILLWAY BARRELS & EMERG. SPILLWAY W/ CONCRETE SPILLWAY
*    TOP OF DAM SET AT ELEVATION 44.00
C1    200   1   2   0.0  6  0.000 5.38 10.0   28   0.00  0.00  .0150 3.0 3.0
C1    201   2   3   0.0  6  0.000 5.38 10.0   17   0.00  0.00  .0150 3.0 3.0
C1    202   3   10  0.0  6  0.000 5.38 10.0   23   0.00  0.00  .0150 3.0 3.0
*  JUNCTION GROUND INV.  Qc   Yi
*   NUMBER   ELEV  ELEV  cfs   ft
D1     3    100.0 32.89 0.0   0.00
D1     2    100.0 38.60 0.0   0.00
D1     1    100.0 38.62 0.0   0.00
D1     10   100.0 32.87 0.0   0.00
*  STORAGE NODES
E1     1    45.00 -0.10  2
E2     1.32 0.00  4.80 6.38
*  OUTFALL @ JUNCTION 10
I1   10  1
J1    1
$ENDPROGRAM
```

```
1          ************************************************
           *          ENVIRONMENTAL PROTECTION AGENCY     *
           *           STORM WATER MANAGEMENT MODEL       *
           *                  VERSION 4.0                 *
           ************************************************

                         DEVELOPED BY

           ************************************************
           *             METCALF & EDDY, INC.             *
           *            UNIVERSITY OF FLORIDA             *
           *       WATER RESOURCES ENGINEERS, INC.        *
           *              SEPTEMBER 1970                  *
           ************************************************

                         UPDATED BY

           ************************************************
           *            UNIVERSITY OF FLORIDA             *
           *          CAMP DRESSER & MCKEE, INC.          *
           *                                              *
           *   MARCH      1975          NOVEMBER  1977    *
           *   NOVEMBER  1981           SEPTEMBER 1988    *
           ************************************************

           ************************************************
           *    THIS IS A NEW RELEASE OF SWMM.  IF ANY    *
           *     PROBLEMS OCCUR IN RUNNING THIS MODEL     *
           *            CONTACT WAYNE HUBER               *
           *           UNIVERSITY OF FLORIDA              *
           *            PHONE 1-904-392-0846              *
           ************************************************

           ************************************************
           *  THIS IS AN IMPLEMENTATION OF EPA SWMM 4.0   *
           *  "NATURE IS FULL OF INFINITE CAUSES WHICH    *
           *   HAVE NEVER OCCURED IN EXPERIENCE" da Vinci *
           ************************************************

           ************************************************
           *       DISK OR TAPE ASSIGNMENTS BY BLOCK      *
           *         JIN  -> INPUT TO A BLOCK             *
           *        JOUT  -> OUTPUT FROM A BLOCK          *
           ************************************************

            BLOCK( 1)      JIN( 1) 10      JOUT( 1)  0

           ************************************************
           *            SCRATCH DISKS OR TAPES            *
           *        THESE CAN BE USED BY ANY BLOCK        *
           ************************************************

      NSCRAT(1) NCSRAT(2) NSCRAT(3) NSCRAT(4) NSCRAT(5) NSCRAT(6) NSCRAT(7)
          2         0         0         0         0         0         0

   *******************************************************
   * ENTRY MADE TO EXTENDED TRANSPORT MODEL (EXTRAN)     *
   * UPDATED BY THE UNIVERSITY OF FLORIDA (UF) AND       *
   * CAMP DRESSER AND MCKEE INC. (CDM), SEPTEMBER, 1988. *
   *                                                     *
   * "Smooth runs the water where the brook is deep."    *
   *                  Shakespeare, Henry VI, II, III, 1 *
   *******************************************************

1-----------------------------------------------------------------------------
 ENVIRONMENTAL PROTECTION AGENCY          ****   EXTENDED TRANSPORT PROGRAM   ****        WATER RESOURCES DIVISION
 WASHINGTON, D.C.                         ****                                ****        CAMP DRESSER & MCKEE INC.
                                          ****         ANALYSIS MODULE        ****        ANNANDALE, VIRGINIA

     DON HAZELWOOD DAM STORMWATER MANAGEMENT ANALYSIS 12-30-99
     24-HOUR TYPE II RAINFALL, 10 YEAR STORM EVENT DEVELOPED CONDITIONS


 CONTROL INFORMATION FOR SIMULATION
 ----------------------------------

 INTEGRATION CYCLES................  8640

 LENGTH OF INTEGRATION STEP IS......    10. SECONDS

 CREATE EQUIVALENT CONDUITS BASED
 ON THE COURANT CONDITION..........     1
```

```
USE U.S. CUSTOMARY UNITS FOR I/O...      0

PRINTING STARTS IN CYCLE...........   360

INTERMEDIATE PRINTOUT INTERVALS OF.   360 CYCLES

SUMMARY PRINTOUT INTERVALS OF......    42 CYCLES

HOT START FILE MANIPULATION(REDO)..      0

INITIAL TIME.......................  0.00 HOURS

ITERATION VARIABLES: ITMAX.........    30
                     SURTOL........ 0.050

DEFAULT SURFACE AREA OF JUNCTIONS.. 12.57 CUB FT.

EXPLICIT EXTRAN SOLUTION.(ISOL=0)..

A PREISSMAN SLOT IS NOT USED DURING SURCHARGE.

NORMAL FLOW OPTION WHEN THE WATER
SURFACE SLOPE IS LESS THAN THE
GROUND SURFACE SLOPE (KSUPER=0)....

NJSW INPUT HYDROGRAPH JUNCTIONS....      0

PRINTED OUTPUT FOR THE FOLLOWING  1 JUNCTIONS

             1

PRINTED OUTPUT FOR THE FOLLOWING  3 CONDUITS

           200       201       202

WATER SURFACE ELEVATIONS WILL BE PLOTTED FOR THE FOLLOWING   1 JUNCTIONS

             1

FLOW RATE WILL BE PLOTTED FOR THE FOLLOWING   3 CONDUITS

           200       201       202
1-----------------------------------------------------------------------------
 ENVIRONMENTAL PROTECTION AGENCY              ****   EXTENDED TRANSPORT PROGRAM   ****        WATER RESOURCES DIVISION
 WASHINGTON, D.C.                             ****                                ****        CAMP DRESSER & MCKEE INC.
                                              ****         ANALYSIS MODULE        ****        ANNANDALE, VIRGINIA

     DON HAZELWOOD DAM STORMWATER MANAGEMENT ANALYSIS 12-30-99
     24-HOUR TYPE II RAINFALL, 10 YEAR STORM EVENT DEVELOPED CONDITIONS

1
 ****************************************************
 *                    CONDUIT DATA                  *
 ****************************************************

      CONDUIT   LENGTH   CLASS     AREA    MANNING       MAX WIDTH       DEPTH   JUNCTIONS        INVERT HEIGHT         TRAPEZOID
       NUMBER     (FT)             (SQ FT)   COEF.           (FT)         (FT)     AT ENDS        ABOVE JUNCTIONS        SIDE SLOPE
        -----     ----             -------   -----           ----         ----     -------        ---------------        ----------
   1      200      28.      6      140.63    0.015          10.00         5.38       1     2         0.00   0.00         3.00 3.00
   2      201      17.      6      140.63    0.015          10.00         5.38       2     3         0.00   0.00         3.00 3.00
   3      202      23.      6      140.63    0.015          10.00         5.38       3    10         0.00   0.00         3.00 3.00

 ===> WARNING !!! (C*DELT/LEN) IN CONDUIT   200 IS  4.7 AT FULL DEPTH.
 ===> THE NEW EQUIVALENT LENGTH/ROUGHNESS/RATIO FOR CONDUIT   200 IS      131.6 /  0.0069185 /  1.000

 ===> WARNING !!! (C*DELT/LEN) IN CONDUIT   201 IS  7.7 AT FULL DEPTH.
 ===> THE NEW EQUIVALENT LENGTH/ROUGHNESS/RATIO FOR CONDUIT   201 IS      131.6 /  0.0053908 /  1.000

 ===> WARNING !!! (C*DELT/LEN) IN CONDUIT   202 IS  5.7 AT FULL DEPTH.
 ===> THE NEW EQUIVALENT LENGTH/ROUGHNESS/RATIO FOR CONDUIT   202 IS      131.6 /  0.0062704 /  1.000
1-----------------------------------------------------------------------------
 ENVIRONMENTAL PROTECTION AGENCY              ****   EXTENDED TRANSPORT PROGRAM   ****        WATER RESOURCES DIVISION
 WASHINGTON, D.C.                             ****                                ****        CAMP DRESSER & MCKEE INC.
                                              ****         ANALYSIS MODULE        ****        ANNANDALE, VIRGINIA

     DON HAZELWOOD DAM STORMWATER MANAGEMENT ANALYSIS 12-30-99
     24-HOUR TYPE II RAINFALL, 10 YEAR STORM EVENT DEVELOPED CONDITIONS

1
 ****************************************************
 *                   JUNCTION DATA                  *
 ****************************************************
```

	JUNCTION NUMBER	GROUND ELEV.	CROWN ELEV.	INVERT ELEV.	QINST CFS	DEPTH FEET	CONNECTING CONDUITS	
1	3	100.00	38.27	32.89	0.00	0.00	201	202
2	2	100.00	43.98	38.60	0.00	0.00	200	201
3	1	100.00	44.00	38.62	0.00	0.00	200	
4	10	100.00	38.25	32.87	0.00	0.00	202	

```
1-----------------------------------------------------------------------------
 ENVIRONMENTAL PROTECTION AGENCY              ****   EXTENDED TRANSPORT PROGRAM   ****        WATER RESOURCES DIVISION
 WASHINGTON, D.C.                             ****                                ****        CAMP DRESSER & MCKEE INC.
                                              ****         ANALYSIS MODULE        ****        ANNANDALE, VIRGINIA

     DON HAZELWOOD DAM STORMWATER MANAGEMENT ANALYSIS 12-30-99
     24-HOUR TYPE II RAINFALL, 10 YEAR STORM EVENT DEVELOPED CONDITIONS


 ******************************************************
 *              STORAGE JUNCTION DATA                 *
 ******************************************************

 STORAGE JUNCTION       SURFACE AREA       VOLUME       CROWN ELEVATION
                           (FT2)            (CF)             (FT)
                           -----            ----             ----
          1                -0.10           -0.64            45.00


 ***************************************************
 *                 FREE OUTFALL DATA               *
 *                    DATA GROUP I1                *
 *         BOUNDARY CONDITION ON DATA GROUP J1     *
 ***************************************************


 OUTFALL AT JUNCTION....        10 HAS BOUNDARY CONDITION NUMBER...         1
1-----------------------------------------------------------------------------
 ENVIRONMENTAL PROTECTION AGENCY              ****   EXTENDED TRANSPORT PROGRAM   ****        WATER RESOURCES DIVISION
 WASHINGTON, D.C.                             ****                                ****        CAMP DRESSER & MCKEE INC.
                                              ****         ANALYSIS MODULE        ****        ANNANDALE, VIRGINIA

     DON HAZELWOOD DAM STORMWATER MANAGEMENT ANALYSIS 12-30-99
     24-HOUR TYPE II RAINFALL, 10 YEAR STORM EVENT DEVELOPED CONDITIONS



 ***************************************************
 *        INTERNAL CONNECTIVITY INFORMATION        *
 ***************************************************

          CONDUIT     JUNCTION     JUNCTION
          -------     --------     --------
          90004          10            0
1
 *******************************************************
 *        BOUNDARY CONDITON INFORMATION                *
 *                 DATA GROUPS J1-J4                   *
 *******************************************************


 BOUNDARY CONDITION NUMBER..         1 HAS NO CONTROL WATER SURFACE.


 *****************************************
 * HEADER INFORMATION FROM INTERFACE FILE: *
 *****************************************

 TITLE FROM FIRST COMPUTATIONAL BLOCK:
001
    DON HAZELWOOD DAM 103.54 AC. WATERSHED   10-YEAR STORM

 TITLE FROM IMMEDIATELY PRECEDING COMPUTATIONAL BLOCK
001
    DON HAZELWOOD DAM 103.54 AC. WATERSHED   10-YEAR STORM
```


DC010_DONALD_L_HAZELWOOD_EARTH - 042

```
NAME OF PRECEDING BLOCK:................TR20EXT V1.02
INITIAL JULIAN DATE (IDATEZ)......................   99319
INITIAL TIME OF DAY IN SECONDS (TZERO)............ 32400.0
NO. TRANSFERED INPUT LOCATIONS....................       1
NO. TRANSFERED POLLUTANTS........................       0
SIZE OF TOTAL CATCHMENT AREA (ACRES)..............  103.54

***************************************************
* ELEMENT NUMBERS OF INTERFACE INLET LOCATIONS: *
***************************************************
      1

*********************************************************
*               SURCHARGE ITERATION SUMMARY             *
*********************************************************

MAXIMUM NUMBER OF ITERATIONS IN A TIME STEP.....        1
TOTAL NUMBER OF ITERATIONS IN THE SIMULATION....    17336
SURCHARGE ITERATIONS DURING THE SIMULATION......       56
MAXIMUM SURCHARGE FLOW ERROR DURING SIMULATION.. 0.00E-01 CFS
TOTAL NUMBER OF TIME STEPS DURING SIMULATION....     8668

1- - - - - - - - - - - - -  CONTINUITY BALANCE AT END OF RUN - - - - - - - - - - - - -

INITIAL SYSTEM VOLUME      =          0.04 CU FT
TOTAL SYSTEM INFLOW VOLUME =    1029244.69 CU FT
INFLOW + INITIAL VOLUME    =    1029244.75 CU FT

JUNCTION OUTFLOWS/STREET FLOODING

   JUNCTION  OUTFLOW, FT3
   --------  ------------
        10    1027214.56

TOTAL SYSTEM OUTFLOW      =     1027214.56 CU FT
VOLUME LEFT IN SYSTEM     =        4612.05 CU FT
OUTFLOW + FINAL VOLUME    =     1031826.62 CU FT
ERROR IN CONTINUITY, PERCENT =       -0.25

1-----------------------------------------------------------------------------------------
ENVIRONMENTAL PROTECTION AGENCY *** EXTENDED TRANSPORT PROGRAM *** WATER RESOURCES DIVISION
WASHINGTON, D.C.                ***                            *** CAMP DRESSER & MCKEE INC.
                                ***      ANALYSIS MODULE       *** ANNANDALE, VIRGINIA

    DON HAZELWOOD DAM STORMWATER MANAGEMENT ANALYSIS 12-30-99
    24-HOUR TYPE II RAINFALL, 10 YEAR STORM EVENT DEVELOPED CONDITIONS


1 * * * * * * * * * * T I M E   H I S T O R Y   O F   H. G. L. * * * * * * * * * *
                          (VALUES IN FEET)
```

TIME HR:MIN	JUNCTION 1 GRND ELEV	100.00 DEPTH
9: 7	38.62	0.00
9:14	38.62	0.00
9:21	38.62	0.00
9:28	38.62	0.00
9:35	38.62	0.00
9:42	38.62	0.00
9:49	38.62	0.00
9:56	38.62	0.00
10: 3	38.63	0.01
10:10	38.63	0.01
10:17	38.63	0.01
10:24	38.64	0.02
10:31	38.65	0.03
10:38	38.65	0.03
10:45	38.66	0.04
10:52	38.67	0.05
10:59	38.68	0.06
11: 6	38.70	0.08
11:13	38.71	0.09
11:20	38.73	0.11
11:27	38.75	0.13
11:34	38.77	0.15
11:41	38.79	0.17
11:48	38.82	0.20
11:55	38.85	0.23
12: 2	38.88	0.26

DC010_DONALD_L_HAZELWOOD_EARTH - 043

12: 9	38.92	0.30
12:16	38.95	0.33
12:23	38.99	0.37
12:30	39.02	0.40
12:37	39.05	0.43
12:44	39.07	0.45
12:51	39.09	0.47
12:58	39.09	0.47
13: 5	39.09	0.47
13:12	39.09	0.47
13:19	39.08	0.46
13:26	39.07	0.45
13:33	39.05	0.43
13:40	39.04	0.42
13:47	39.02	0.40
13:54	39.01	0.39
14: 1	39.00	0.38
14: 8	38.98	0.36
14:15	38.97	0.35
14:22	38.96	0.34
14:29	38.96	0.34
14:36	38.95	0.33
14:43	38.94	0.32
14:50	38.93	0.31
14:57	38.93	0.31
15: 4	38.92	0.30
15:11	38.91	0.29
15:18	38.91	0.29
15:25	38.90	0.28
15:32	38.90	0.28
15:39	38.90	0.28
15:46	38.89	0.27
15:53	38.89	0.27
16: 0	38.89	0.27
16: 7	38.88	0.26
16:14	38.88	0.26
16:21	38.88	0.26
16:28	38.88	0.26
16:35	38.87	0.25
16:42	38.87	0.25
16:49	38.87	0.25
16:56	38.87	0.25
17: 3	38.87	0.25
17:10	38.87	0.25
17:17	38.86	0.24
17:24	38.86	0.24
17:31	38.86	0.24
17:38	38.86	0.24
17:45	38.86	0.24
17:52	38.86	0.24
17:59	38.86	0.24
18: 6	38.86	0.24
18:13	38.86	0.24
18:20	38.86	0.24
18:27	38.85	0.23
18:34	38.85	0.23
18:41	38.85	0.23
18:48	38.85	0.23
18:55	38.85	0.23
19: 2	38.85	0.23
19: 9	38.85	0.23
19:16	38.85	0.23
19:23	38.85	0.23
19:30	38.85	0.23
19:37	38.84	0.22
19:44	38.84	0.22
19:51	38.84	0.22
19:58	38.84	0.22
20: 5	38.84	0.22
20:12	38.84	0.22
20:19	38.84	0.22
20:26	38.84	0.22
20:33	38.84	0.22
20:40	38.84	0.22
20:47	38.84	0.22
20:54	38.84	0.22
21: 1	38.84	0.22
21: 8	38.83	0.21
21:15	38.83	0.21
21:22	38.83	0.21
21:29	38.83	0.21
21:36	38.83	0.21

DC010_DONALD_L_HAZELWOOD_EARTH - 044

21:43	38.83	0.21
21:50	38.83	0.21
21:57	38.83	0.21
22: 4	38.83	0.21
22:11	38.83	0.21
22:18	38.83	0.21
22:25	38.83	0.21
22:32	38.83	0.21
22:39	38.83	0.21
22:46	38.83	0.21
22:53	38.83	0.21
23: 0	38.83	0.21
23: 7	38.83	0.21
23:14	38.83	0.21
23:21	38.83	0.21
23:28	38.83	0.21
23:35	38.83	0.21
23:42	38.83	0.21
23:49	38.83	0.21
23:56	38.83	0.21
24: 3	38.83	0.21
24:10	38.83	0.21
24:17	38.83	0.21
24:24	38.82	0.20
24:31	38.82	0.20
24:38	38.82	0.20
24:45	38.82	0.20
24:52	38.81	0.19
24:59	38.81	0.19
25: 6	38.80	0.18
25:13	38.80	0.18
25:20	38.79	0.17
25:27	38.79	0.17
25:34	38.78	0.16
25:41	38.78	0.16
25:48	38.77	0.15
25:55	38.76	0.14
26: 2	38.76	0.14
26: 9	38.75	0.13
26:16	38.75	0.13
26:23	38.74	0.12
26:30	38.74	0.12
26:37	38.73	0.11
26:44	38.73	0.11
26:51	38.73	0.11
26:58	38.72	0.10
27: 5	38.72	0.10
27:12	38.72	0.10
27:19	38.71	0.09
27:26	38.71	0.09
27:33	38.71	0.09
27:40	38.70	0.08
27:47	38.70	0.08
27:54	38.70	0.08
28: 1	38.70	0.08
28: 8	38.69	0.07
28:15	38.69	0.07
28:22	38.69	0.07
28:29	38.69	0.07
28:36	38.69	0.07
28:43	38.69	0.07
28:50	38.68	0.06
28:57	38.68	0.06
29: 4	38.68	0.06
29:11	38.68	0.06
29:18	38.68	0.06
29:25	38.68	0.06
29:32	38.68	0.06
29:39	38.67	0.05
29:46	38.67	0.05
29:53	38.67	0.05
30: 0	38.67	0.05
30: 7	38.67	0.05
30:14	38.67	0.05
30:21	38.67	0.05
30:28	38.67	0.05
30:35	38.67	0.05
30:42	38.67	0.05
30:49	38.67	0.05
30:56	38.66	0.04
31: 3	38.66	0.04
31:10	38.66	0.04

DC010_DONALD_L_HAZELWOOD_EARTH - 045

31:17	38.66	0.04
31:24	38.66	0.04
31:31	38.66	0.04
31:38	38.66	0.04
31:45	38.66	0.04
31:52	38.66	0.04
31:59	38.66	0.04
32: 6	38.66	0.04
32:13	38.66	0.04
32:20	38.66	0.04
32:27	38.66	0.04
32:34	38.66	0.04
32:41	38.66	0.04
32:48	38.66	0.04
32:55	38.65	0.03
33: 2	38.65	0.03
MEAN	38.80	0.18
MAXIMUM	39.09	0.47
MINIMUM	38.62	0.00

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ENVIRONMENTAL PROTECTION AGENCY *** EXTENDED TRANSPORT PROGRAM *** WATER RESOURCES DIVISION
WASHINGTON, D.C. *** *** CAMP DRESSER & MCKEE INC.
*** ANALYSIS MODULE *** ANNANDALE, VIRGINIA

DON HAZELWOOD DAM STORMWATER MANAGEMENT ANALYSIS 12-30-99
24-HOUR TYPE II RAINFALL, 10 YEAR STORM EVENT DEVELOPED CONDITIONS

* * * * * * S U M M A R Y S T A T I S T I C S F O R J U N C T I O N S * * * * * *

JUNCTION NUMBER	GROUND ELEVATION (FT)	UPPERMOST PIPE CROWN ELEVATION (FT)	MAXIMUM COMPUTED DEPTH (FT)	TIME OF OCCURENCE HR.	TIME OF OCCURENCE MIN.	FEET OF SURCHARGE AT MAX DEPTH	FEET MAX. DEPTH IS BELOW GROUND ELEVATION	LENGTH OF SURCHARGE (MIN)	LENGTH OF FLOODING (MIN)	MAXIMUM JUNCTION AREA ACRES
3	100.00	38.27	1.32	13	6	0.00	65.79	0.0	0.0	7.111E-07
2	100.00	43.98	0.35	13	5	0.00	61.05	0.0	0.0	7.051E-07
1	100.00	45.00	0.47	13	6	0.00	60.91	0.0	0.0	3.109E-05
10	100.00	38.25	1.29	13	4	0.00	65.84	0.0	0.0	7.045E-07

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ENVIRONMENTAL PROTECTION AGENCY *** EXTENDED TRANSPORT PROGRAM *** WATER RESOURCES DIVISION
WASHINGTON, D.C. *** *** CAMP DRESSER & MCKEE INC.
*** ANALYSIS MODULE *** ANNANDALE, VIRGINIA

DON HAZELWOOD DAM STORMWATER MANAGEMENT ANALYSIS 12-30-99
24-HOUR TYPE II RAINFALL, 10 YEAR STORM EVENT DEVELOPED CONDITIONS

1 * * * * * * * * * * T I M E H I S T O R Y O F F L O W A N D V E L O C I T Y * * * * * * * * *
Q(CFS), VEL(FPS), TOTAL(CUBIC FEET)

TIME HR:MIN	CONDUIT 200 FLOW	CONDUIT 200 VELOC.	CONDUIT 201 FLOW	CONDUIT 201 VELOC.	CONDUIT 202 FLOW	CONDUIT 202 VELOC.
9: 7	0.00	0.00	0.00	0.00	0.00	0.00
9:14	0.00	0.00	0.00	0.00	0.00	0.00
9:21	0.00	0.01	0.00	0.00	0.00	0.00
9:28	0.00	0.01	0.00	0.00	0.00	0.00
9:35	0.00	0.02	0.00	0.00	0.00	0.00
9:42	0.00	0.02	0.00	0.00	0.00	0.00
9:49	0.00	0.04	0.00	0.00	0.00	0.00
9:56	0.00	0.05	0.00	0.21	0.00	0.01
10: 3	0.00	0.07	0.00	0.35	0.00	0.01
10:10	0.01	0.10	0.00	0.38	0.00	0.02
10:17	0.01	0.13	0.01	0.38	0.00	0.04
10:24	0.02	0.17	0.02	0.39	0.00	0.07
10:31	0.03	0.23	0.03	0.40	0.01	0.12
10:38	0.05	0.30	0.05	0.42	0.02	0.20
10:45	0.09	0.38	0.09	0.48	0.05	0.30
10:52	0.15	0.49	0.14	0.56	0.10	0.43
10:59	0.23	0.62	0.22	0.69	0.18	0.58
11: 6	0.36	0.79	0.35	0.86	0.31	0.76
11:13	0.56	1.00	0.55	1.09	0.50	0.97
11:20	0.86	1.27	0.85	1.39	0.79	1.21
11:27	1.31	1.62	1.29	1.76	1.23	1.47
11:34	1.99	2.07	1.96	2.21	1.88	1.75
11:41	3.03	2.69	3.00	2.74	2.88	2.02

DC010_DONALD_L_HAZELWOOD_EARTH - 046

11:48	4.74	3.57	4.70	3.30	4.51	2.24
11:55	8.20	5.05	8.07	4.04	7.71	2.60
12: 2	14.98	7.46	14.82	5.19	14.11	3.22
12: 9	24.90	10.29	24.77	6.17	24.10	3.79
12:16	36.68	12.94	36.58	6.95	36.10	4.25
12:23	49.77	15.34	49.71	7.66	49.34	4.64
12:30	63.37	17.44	63.34	8.25	63.13	4.98
12:37	79.65	19.49	79.45	8.86	78.50	5.25
12:44	91.54	20.92	91.44	9.24	90.87	5.48
12:51	98.64	21.71	98.61	9.41	98.36	5.58
12:58	101.91	22.06	101.90	9.48	101.83	5.62
13: 5	102.19	22.09	102.19	9.48	102.19	5.62
13:12	100.13	21.88	100.14	9.43	100.16	5.60
13:19	94.50	21.32	94.59	9.26	95.01	5.54
13:26	87.54	20.54	87.61	9.05	88.03	5.43
13:33	80.00	19.65	80.06	8.81	80.37	5.30
13:40	72.65	18.73	72.68	8.55	72.92	5.15
13:47	66.07	17.84	66.09	8.33	66.23	5.04
13:54	60.41	17.04	60.42	8.10	60.50	4.92
14: 1	54.23	16.14	54.32	7.80	54.72	4.78
14: 8	49.21	15.31	49.26	7.55	49.60	4.64
14:15	45.01	14.58	45.05	7.37	45.27	4.54
14:22	41.37	13.92	41.39	7.18	41.53	4.44
14:29	38.17	13.30	38.19	7.00	38.28	4.33
14:36	35.37	12.74	35.39	6.81	35.44	4.22
14:43	32.37	12.14	32.42	6.58	32.62	4.11
14:50	29.78	11.55	29.82	6.41	30.01	4.02
14:57	27.59	11.04	27.61	6.27	27.75	3.95
15: 4	25.70	10.58	25.71	6.13	25.80	3.87
15:11	24.04	10.17	24.05	6.00	24.11	3.79
15:18	22.59	9.79	22.60	5.87	22.64	3.72
15:25	21.11	9.41	21.14	5.72	21.24	3.64
15:32	19.82	9.05	19.84	5.58	19.93	3.56
15:39	18.72	8.73	18.74	5.46	18.80	3.49
15:46	17.78	8.45	17.79	5.35	17.83	3.42
15:53	16.95	8.20	16.96	5.25	17.00	3.35
16: 0	16.22	7.98	16.22	5.18	16.26	3.32
16: 7	15.49	7.76	15.51	5.11	15.56	3.29
16:14	14.84	7.55	14.86	5.04	14.91	3.26
16:21	14.29	7.37	14.30	4.98	14.34	3.22
16:28	13.83	7.21	13.84	4.92	13.87	3.20
16:35	13.44	7.08	13.44	4.88	13.46	3.17
16:42	13.08	6.96	13.08	4.83	13.10	3.15
16:49	12.72	6.84	12.73	4.79	12.76	3.12
16:56	12.39	6.72	12.39	4.74	12.42	3.10
17: 3	12.08	6.61	12.08	4.70	12.10	3.08
17:10	11.78	6.51	11.79	4.65	11.81	3.05
17:17	11.51	6.41	11.51	4.61	11.52	3.03
17:24	11.26	6.32	11.26	4.58	11.27	3.01
17:31	11.01	6.23	11.01	4.54	11.03	2.99
17:38	10.78	6.15	10.78	4.50	10.80	2.97
17:45	10.58	6.07	10.58	4.47	10.59	2.95
17:52	10.39	6.00	10.39	4.44	10.40	2.93
17:59	10.22	5.93	10.22	4.41	10.23	2.91
18: 6	10.06	5.87	10.06	4.38	10.07	2.90
18:13	9.90	5.81	9.90	4.35	9.91	2.88
18:20	9.73	5.75	9.73	4.32	9.75	2.86
18:27	9.56	5.68	9.56	4.29	9.58	2.84
18:34	9.38	5.61	9.39	4.26	9.40	2.83
18:41	9.21	5.55	9.21	4.23	9.22	2.81
18:48	9.03	5.48	9.03	4.19	9.04	2.78
18:55	8.85	5.40	8.85	4.16	8.87	2.76
19: 2	8.67	5.33	8.67	4.12	8.69	2.74
19: 9	8.50	5.27	8.51	4.09	8.52	2.72
19:16	8.36	5.21	8.36	4.06	8.37	2.70
19:23	8.23	5.16	8.23	4.03	8.24	2.69
19:30	8.12	5.11	8.12	4.01	8.13	2.67
19:37	8.03	5.07	8.03	3.99	8.04	2.66
19:44	7.95	5.04	7.95	3.97	7.96	2.65
19:51	7.88	5.01	7.88	3.95	7.89	2.64
19:58	7.82	4.99	7.82	3.94	7.83	2.63
20: 5	7.76	4.96	7.76	3.93	7.77	2.62
20:12	7.70	4.93	7.70	3.91	7.70	2.61
20:19	7.62	4.90	7.62	3.90	7.63	2.60
20:26	7.51	4.86	7.52	3.87	7.53	2.59
20:33	7.39	4.81	7.40	3.84	7.41	2.57
20:40	7.26	4.75	7.26	3.81	7.27	2.55
20:47	7.11	4.69	7.11	3.78	7.12	2.53
20:54	6.96	4.62	6.97	3.74	6.98	2.50
21: 1	6.81	4.56	6.81	3.70	6.83	2.48
21: 8	6.66	4.49	6.66	3.66	6.68	2.46
21:15	6.52	4.43	6.53	3.63	6.54	2.43

DC010_DONALD_L_HAZELWOOD_EARTH - 047

21:22	6.40	4.38	6.40	3.60	6.41	2.41
21:29	6.29	4.33	6.30	3.57	6.30	2.39
21:36	6.20	4.29	6.21	3.54	6.21	2.38
21:43	6.12	4.25	6.13	3.52	6.13	2.36
21:50	6.06	4.22	6.06	3.50	6.06	2.35
21:57	6.01	4.20	6.01	3.49	6.01	2.34
22: 4	5.96	4.18	5.96	3.48	5.97	2.33
22:11	5.93	4.16	5.93	3.47	5.93	2.33
22:18	5.89	4.15	5.89	3.46	5.89	2.32
22:25	5.87	4.13	5.87	3.45	5.87	2.31
22:32	5.84	4.12	5.85	3.45	5.85	2.31
22:39	5.83	4.12	5.83	3.44	5.83	2.31
22:46	5.81	4.11	5.81	3.44	5.81	2.31
22:53	5.80	4.10	5.80	3.44	5.80	2.31
23: 0	5.79	4.10	5.79	3.44	5.79	2.31
23: 7	5.79	4.10	5.79	3.44	5.79	2.31
23:14	5.78	4.09	5.78	3.44	5.78	2.31
23:21	5.78	4.09	5.78	3.44	5.78	2.31
23:28	5.77	4.09	5.77	3.43	5.77	2.31
23:35	5.77	4.09	5.77	3.43	5.77	2.31
23:42	5.77	4.09	5.77	3.43	5.77	2.31
23:49	5.77	4.09	5.77	3.43	5.77	2.31
23:56	5.76	4.09	5.77	3.43	5.77	2.31
24: 3	5.75	4.08	5.75	3.43	5.75	2.31
24:10	5.72	4.07	5.72	3.42	5.72	2.31
24:17	5.66	4.04	5.66	3.41	5.67	2.30
24:24	5.56	3.99	5.56	3.39	5.57	2.30
24:31	5.40	3.92	5.40	3.36	5.43	2.29
24:38	5.17	3.81	5.18	3.31	5.21	2.28
24:45	4.89	3.68	4.90	3.25	4.93	2.26
24:52	4.56	3.52	4.57	3.17	4.60	2.24
24:59	4.21	3.34	4.21	3.08	4.25	2.20
25: 6	3.84	3.15	3.85	2.98	3.88	2.17
25:13	3.46	2.95	3.47	2.85	3.51	2.12
25:20	3.10	2.75	3.11	2.72	3.15	2.06
25:27	2.76	2.56	2.77	2.58	2.81	2.00
25:34	2.46	2.39	2.47	2.45	2.50	1.93
25:41	2.19	2.22	2.20	2.31	2.22	1.86
25:48	1.95	2.07	1.96	2.18	1.98	1.79
25:55	1.74	1.93	1.75	2.05	1.77	1.72
26: 2	1.56	1.81	1.56	1.93	1.58	1.64
26: 9	1.40	1.70	1.40	1.82	1.42	1.57
26:16	1.26	1.59	1.26	1.71	1.28	1.51
26:23	1.13	1.50	1.14	1.62	1.15	1.44
26:30	1.03	1.42	1.03	1.53	1.04	1.38
26:37	0.93	1.34	0.94	1.45	0.95	1.32
26:44	0.85	1.27	0.85	1.37	0.86	1.27
26:51	0.77	1.21	0.78	1.30	0.79	1.21
26:58	0.71	1.15	0.71	1.23	0.72	1.16
27: 5	0.65	1.09	0.65	1.17	0.66	1.12
27:12	0.60	1.04	0.60	1.12	0.61	1.07
27:19	0.55	1.00	0.55	1.07	0.56	1.03
27:26	0.51	0.95	0.51	1.02	0.52	0.99
27:33	0.47	0.91	0.47	0.97	0.48	0.95
27:40	0.44	0.88	0.44	0.93	0.45	0.92
27:47	0.41	0.84	0.41	0.90	0.41	0.89
27:54	0.38	0.81	0.38	0.86	0.39	0.86
28: 1	0.35	0.78	0.35	0.83	0.36	0.83
28: 8	0.33	0.75	0.33	0.80	0.34	0.80
28:15	0.31	0.73	0.31	0.77	0.32	0.78
28:22	0.29	0.70	0.29	0.74	0.30	0.75
28:29	0.27	0.68	0.27	0.72	0.28	0.73
28:36	0.26	0.66	0.26	0.69	0.26	0.71
28:43	0.24	0.64	0.24	0.67	0.25	0.69
28:50	0.23	0.62	0.23	0.65	0.24	0.67
28:57	0.22	0.60	0.22	0.63	0.22	0.65
29: 4	0.21	0.59	0.21	0.61	0.21	0.63
29:11	0.20	0.57	0.20	0.59	0.20	0.61
29:18	0.19	0.56	0.19	0.58	0.19	0.60
29:25	0.18	0.54	0.18	0.56	0.18	0.58
29:32	0.17	0.53	0.17	0.55	0.17	0.57
29:39	0.16	0.52	0.16	0.53	0.16	0.56
29:46	0.15	0.50	0.15	0.52	0.16	0.54
29:53	0.15	0.49	0.15	0.51	0.15	0.53
30: 0	0.14	0.48	0.14	0.50	0.14	0.52
30: 7	0.14	0.47	0.14	0.49	0.14	0.51
30:14	0.13	0.46	0.13	0.47	0.13	0.50
30:21	0.12	0.45	0.13	0.46	0.13	0.49
30:28	0.12	0.44	0.12	0.46	0.12	0.48
30:35	0.12	0.43	0.12	0.45	0.12	0.47
30:42	0.11	0.43	0.11	0.44	0.11	0.46
30:49	0.11	0.42	0.11	0.43	0.11	0.45

DC010_DONALD_L_HAZELWOOD_EARTH - 048

30:56	0.10	0.41	0.10	0.42	0.11	0.45
31: 3	0.10	0.40	0.10	0.41	0.10	0.44
31:10	0.10	0.40	0.10	0.41	0.10	0.43
31:17	0.09	0.39	0.09	0.40	0.10	0.42
31:24	0.09	0.38	0.09	0.39	0.09	0.42
31:31	0.09	0.38	0.09	0.39	0.09	0.41
31:38	0.08	0.37	0.09	0.38	0.09	0.40
31:45	0.08	0.37	0.08	0.37	0.08	0.40
31:52	0.08	0.36	0.08	0.37	0.08	0.39
31:59	0.08	0.35	0.08	0.36	0.08	0.39
32: 6	0.08	0.35	0.08	0.36	0.08	0.38
32:13	0.07	0.34	0.07	0.35	0.07	0.37
32:20	0.07	0.34	0.07	0.34	0.07	0.37
32:27	0.07	0.33	0.07	0.34	0.07	0.36
32:34	0.07	0.33	0.07	0.33	0.07	0.36
32:41	0.07	0.32	0.07	0.33	0.07	0.35
32:48	0.06	0.32	0.06	0.33	0.07	0.35
32:55	0.06	0.32	0.06	0.32	0.06	0.34
33: 2	0.06	0.31	0.06	0.32	0.06	0.34
MEAN	11.85	4.74	11.85	3.12	11.85	2.09
MAXIMUM	102.19	22.09	102.19	9.48	102.19	5.62
MINIMUM	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL	1.03E+06		1.03E+06		1.03E+06	

1----------

ENVIRONMENTAL PROTECTION AGENCY *** EXTENDED TRANSPORT PROGRAM *** WATER RESOURCES DIVISION
WASHINGTON, D.C. *** *** CAMP DRESSER & MCKEE INC.
*** ANALYSIS MODULE *** ANNANDALE, VIRGINIA

DON HAZELWOOD DAM STORMWATER MANAGEMENT ANALYSIS 12-30-99
24-HOUR TYPE II RAINFALL, 10 YEAR STORM EVENT DEVELOPED CONDITIONS

* * * * * * * S U M M A R Y S T A T I S T I C S F O R C O N D U I T S * * * * * * *

CONDUIT NUMBER	DESIGN FLOW (CFS)	DESIGN VELOCITY (FPS)	CONDUIT VERTICAL DEPTH (IN)	MAXIMUM COMPUTED FLOW (CFS)	TIME OF OCCURENCE HR.	TIME OF OCCURENCE MIN.	MAXIMUM COMPUTED VELOCITY (FPS)	TIME OF OCCURENCE HR.	TIME OF OCCURENCE MIN.	RATIO OF MAX. TO DESIGN FLOW	MAXIMUM DEPTH ABOVE INVERT AT CONDUIT ENDS UPSTREAM (FT)	DOWNSTREAM (FT)	LENGTH OF SUPERCRITICAL FLOW (MIN)	GROUND SLOPE (FT/FT)
200	807.62	5.74	64.56	102.19	13	5	22.09	13	5	0.13	0.47	0.35	0.0	0.00015
201	17513.01	124.53	64.56	102.19	13	5	9.48	13	6	0.01	0.35	1.32	1382.3	0.04338
202	891.09	6.34	64.56	102.19	13	4	5.62	13	5	0.11	1.32	1.29	0.0	0.00015
90004	********	********	64.56	102.19	13	4	********	0	0	********	********	********	**********	**********

1----------

ENVIRONMENTAL PROTECTION AGENCY *** EXTENDED TRANSPORT PROGRAM *** WATER RESOURCES DIVISION
WASHINGTON, D.C. *** *** CAMP DRESSER & MCKEE INC.
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DON HAZELWOOD DAM STORMWATER MANAGEMENT ANALYSIS 12-30-99
24-HOUR TYPE II RAINFALL, 10 YEAR STORM EVENT DEVELOPED CONDITIONS

1

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**************************************************
* SUBCRITICAL AND CRITICAL FLOW ASSUMPTIONS FROM *
* SUBROUTINE HEAD.  SEE FIGURE 5-4 IN THE EXTRAN *
*       MANUAL FOR FURTHER INFORMATION.          *
**************************************************
```
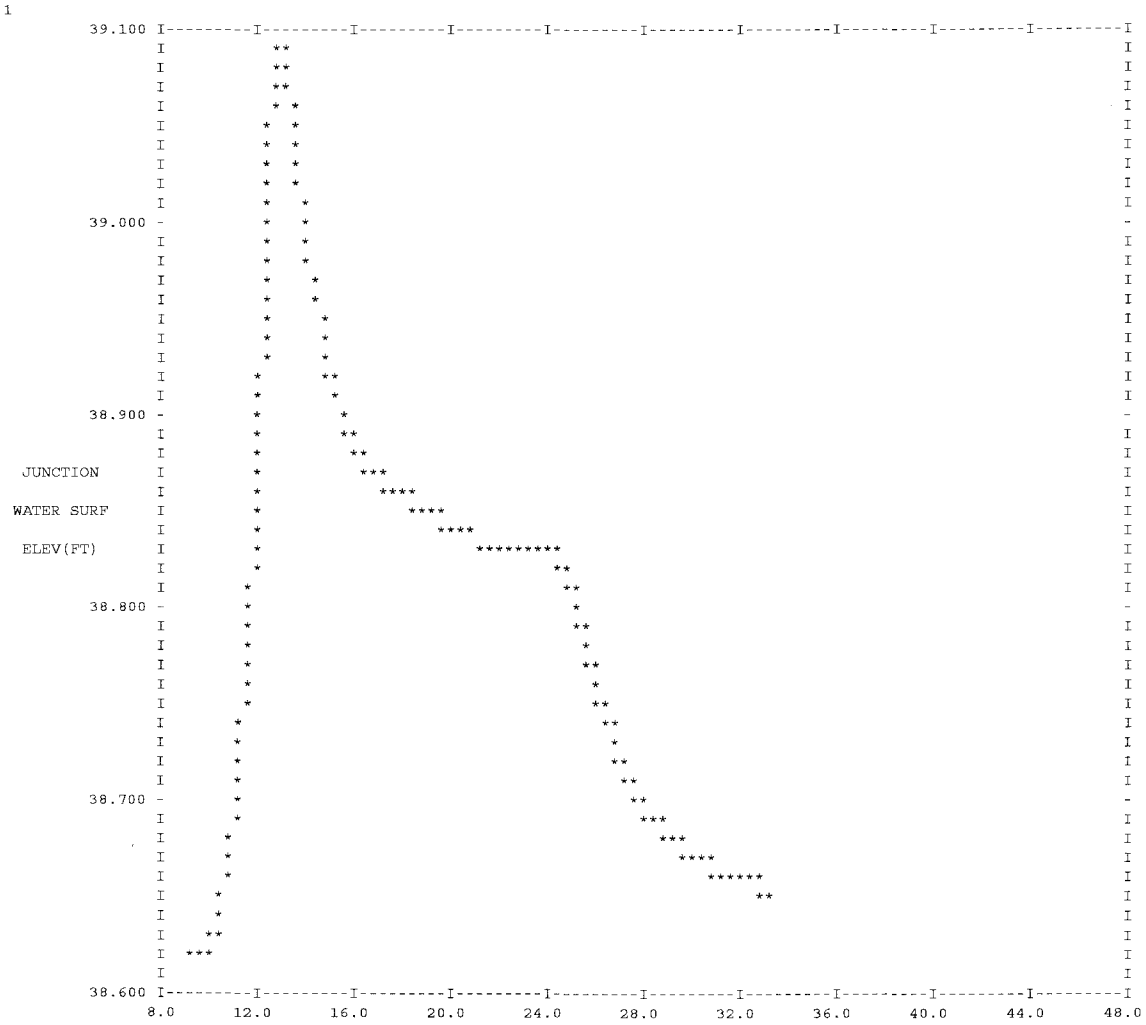

CONDUIT NUMBER	LENGTH OF DRY FLOW(MIN)	LENGTH OF SUBCRITICAL FLOW(MIN)	LENGTH OF UPSTR. CRITICAL FLOW(MIN)	LENGTH OF DOWNSTR. CRITICAL FLOW(MIN)
200	18.33	1426.33	0.00	0.00
201	51.17	1393.50	0.00	0.00
202	50.00	1394.67	0.00	0.00

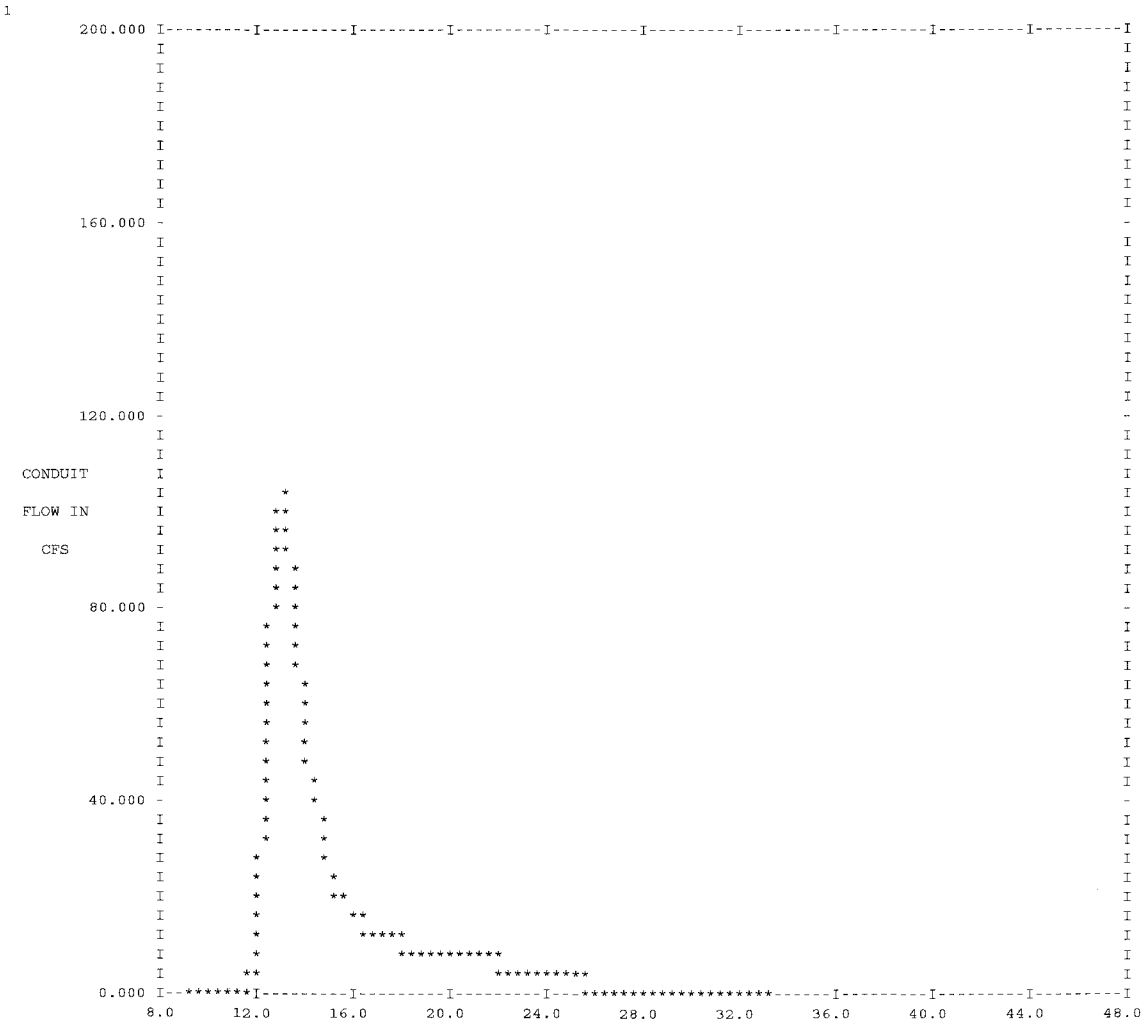
DC010_DONALD_L_HAZELWOOD_EARTH - 049



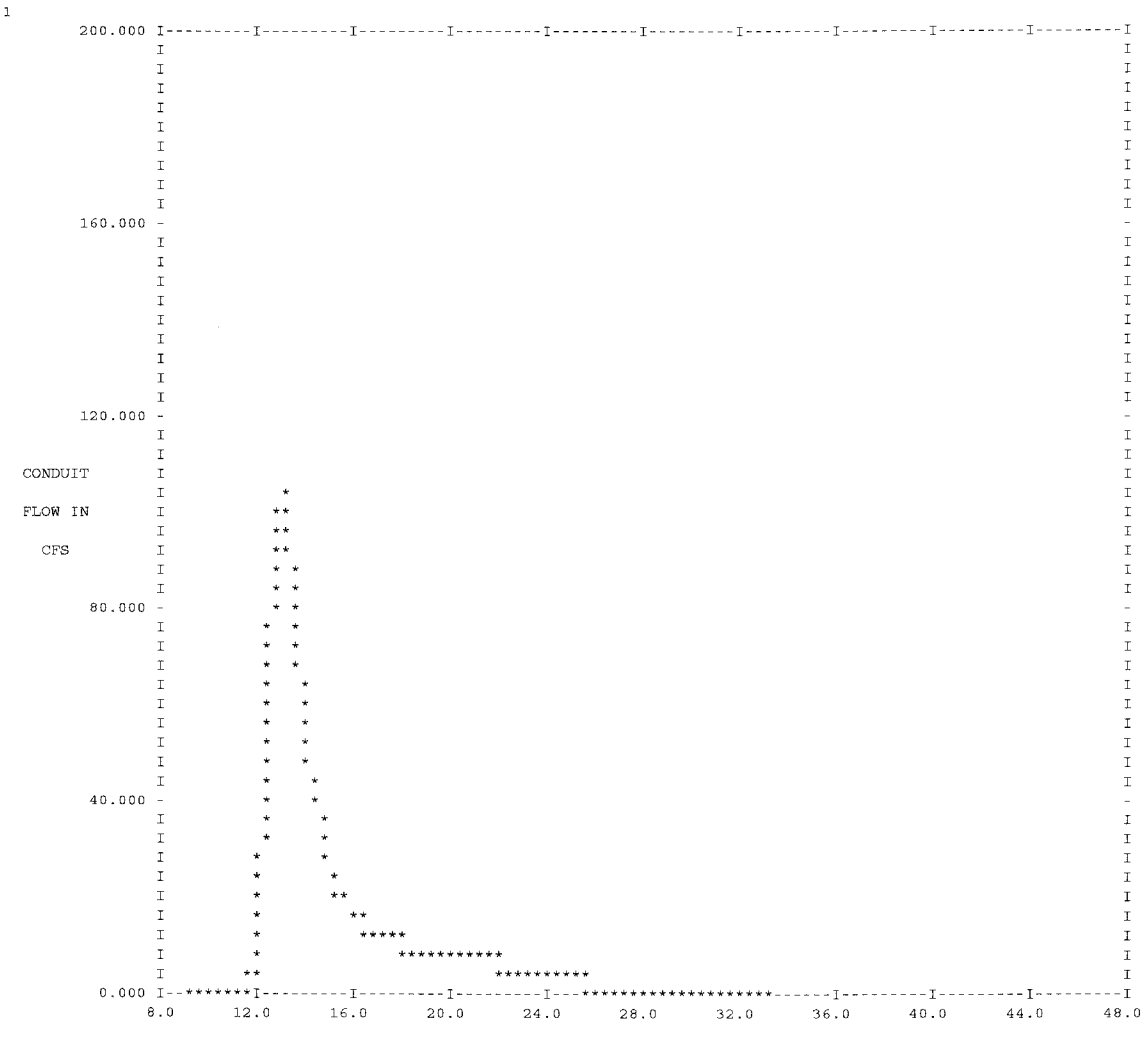
LOCATION NO. : 1 CLOCK TIME IN HOURS

PLOT OF JUNCTION ELEVATION

INVERT ELEV - 38.62 FEET
CROWN ELEV - 45.00 FEET
GROUND ELEV - 100.00 FEET



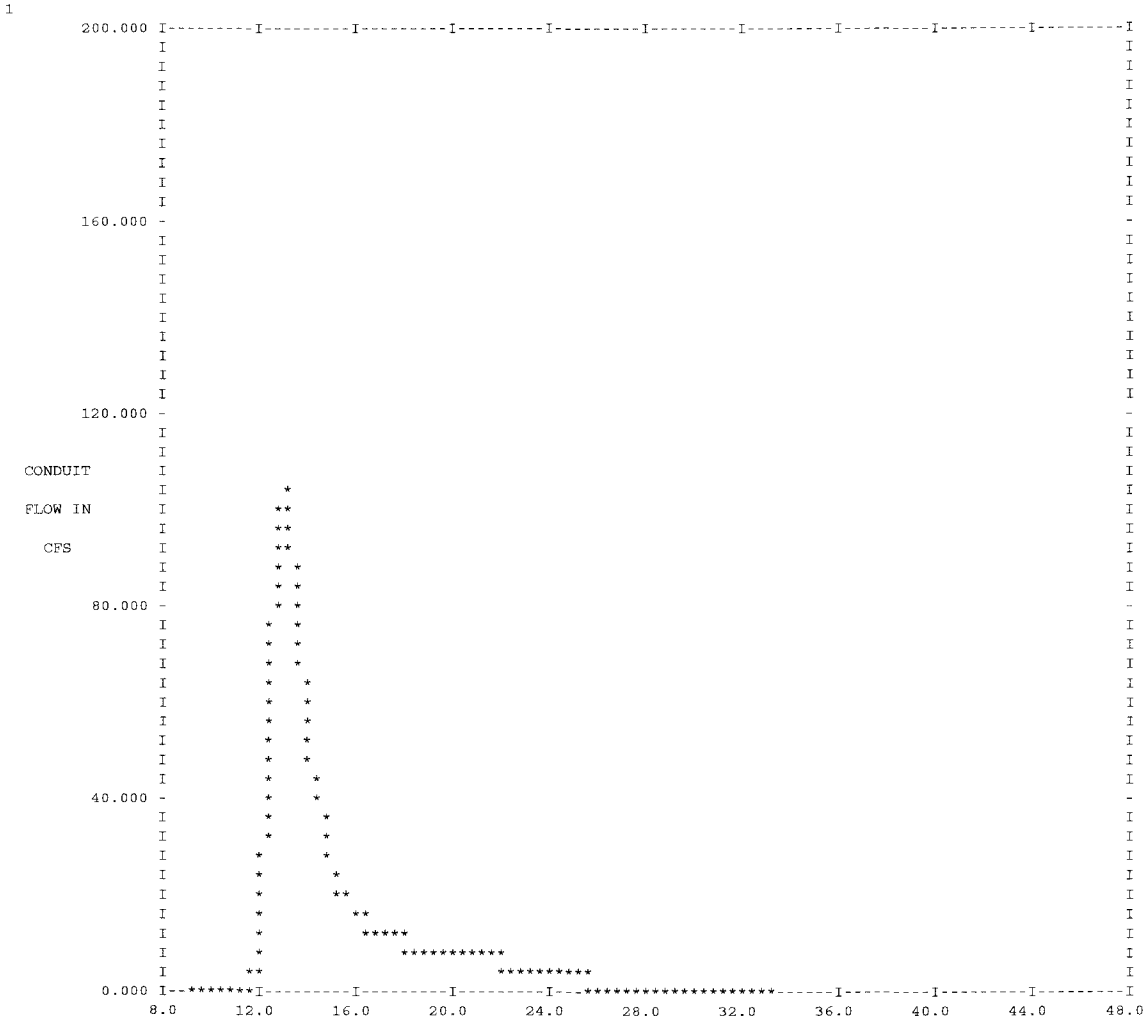
DC010_DONALD_L_HAZELWOOD_EARTH - 051



LOCATION NO. : 201 CLOCK TIME IN HOURS

PLOT OF CONDUIT FLOW

DC010_DONALD_L_HAZELWOOD_EARTH - 052




```
===> EXTENDED TRANSPORT MODEL SIMULATION ENDED NORMALLY.

===> SWMM 4.0 SIMULATION ENDED NORMALLY.

===> YOUR INPUT FILE WAS NAMED : DON10C.DAT
===> YOUR OUTPUT FILE WAS NAMED: DON10C.OUT
```

```
SW     1  10 0
MM     1  2  3  0
@      10 'DON100.BIN'
$EXTRAN
A1  'DON HAZELWOOD DAM STORMWATER MANAGEMENT ANALYSIS 12-30-99'
A1  '24-HOUR TYPE II RAINFALL, 100 YEAR STORM EVENT DEVELOPED CONDITIONS'
B1   86400 1.0   0.00  360 360 36   0
B2     0  1  12.566  30  0.05
B3     1 3 1 3  0
B4     1
B5     200 201 202
B6     1
B7     200 201 202
*    NCOND  N1  N2  Qi  TYP AFULL DEEP WIDE LENGTH ZP1   ZP2   ROUGH SS1 SS2
*    NEGLECT 12" RISER & OUTLET BARREL
*    REPLACE SPILLWAY BARRELS & EMERG. SPILLWAY W/ CONCRETE SPILLWAY
*    TOP OF DAM SET AT ELEVATION 44.00
C1     200   1   2   0.0  6  0.000 11.3 10.0   28   0.00  0.00  .0150 3.0 3.0
C1     201   2   3   0.0  6  0.000 11.3 10.0   17   0.00  0.00  .0150 3.0 3.0
C1     202   3   4   0.0  6  0.000 11.3 10.0   23   0.00  0.00  .0150 3.0 3.0
*    ADD "NATURAL" CHANNEL AT DOWNSTREAM END TO STABILIZE EXIT FLOWS NEGLECT
*    BASE FLOW CHANNEL, SET BOTTOM WIDTH EQUAL TO RAVINE WIDTH (B=40'Sb=2%)
C1     203   4   10  0.0  6  0.000 11.3 40.0   50   0.00  0.00  .0350 3.0 3.0
*  JUNCTION GROUND INV.  Qc   Yi
*   NUMBER   ELEV  ELEV  cfs   ft
D1      4    100.0 32.87 0.0   0.00
D1      3    100.0 32.89 0.0   0.00
D1      2    100.0 38.60 0.0   0.00
D1      1    100.0 38.62 0.0   0.00
D1      10   100.0 31.87 0.0   0.00
*  STORAGE NODES
E1      1    50.00 -0.10  3
E2      1.32 0.00  4.80 6.38 10.00 11.38
*  OUTFALL @ JUNCTION 10
I1    10  1
J1     1
$ENDPROGRAM
```

```
1          ************************************************
           *          ENVIRONMENTAL PROTECTION AGENCY     *
           *           STORM WATER MANAGEMENT MODEL       *
           *                  VERSION 4.0                 *
           ************************************************

                         DEVELOPED BY

           ************************************************
           *             METCALF & EDDY, INC.             *
           *            UNIVERSITY OF FLORIDA             *
           *       WATER RESOURCES ENGINEERS, INC.        *
           *              SEPTEMBER 1970                  *
           ************************************************

                         UPDATED BY

           ************************************************
           *            UNIVERSITY OF FLORIDA             *
           *          CAMP DRESSER & MCKEE, INC.          *
           *                                              *
           *   MARCH     1975           NOVEMBER  1977    *
           *   NOVEMBER  1981           SEPTEMBER 1988    *
           ************************************************

           ************************************************
           *    THIS IS A NEW RELEASE OF SWMM.  IF ANY    *
           *     PROBLEMS OCCUR IN RUNNING THIS MODEL     *
           *            CONTACT WAYNE HUBER               *
           *           UNIVERSITY OF FLORIDA              *
           *            PHONE 1-904-392-0846              *
           ************************************************

           ************************************************
           *  THIS IS AN IMPLEMENTATION OF EPA SWMM 4.0   *
           *  "NATURE IS FULL OF INFINITE CAUSES WHICH    *
           *   HAVE NEVER OCCURED IN EXPERIENCE" da Vinci *
           ************************************************

           ************************************************
           *       DISK OR TAPE ASSIGNMENTS BY BLOCK      *
           *         JIN  -> INPUT TO A BLOCK             *
           *        JOUT  -> OUTPUT FROM A BLOCK          *
           ************************************************

            BLOCK( 1)      JIN( 1) 10      JOUT( 1)  0

           ************************************************
           *             SCRATCH DISKS OR TAPES           *
           *        THESE CAN BE USED BY ANY BLOCK        *
           ************************************************

   NSCRAT(1) NCSRAT(2) NSCRAT(3) NSCRAT(4) NSCRAT(5) NSCRAT(6) NSCRAT(7)
       2         0         0         0         0         0         0

 *******************************************************
 * ENTRY MADE TO EXTENDED TRANSPORT MODEL (EXTRAN)     *
 * UPDATED BY THE UNIVERSITY OF FLORIDA (UF) AND       *
 * CAMP DRESSER AND MCKEE INC. (CDM), SEPTEMBER, 1988. *
 *                                                     *
 * "Smooth runs the water where the brook is deep."    *
 *                   Shakespeare, Henry VI, II, III, 1 *
 *******************************************************

1-----------------------------------------------------------------------------
 ENVIRONMENTAL PROTECTION AGENCY          ****   EXTENDED TRANSPORT PROGRAM   ****      WATER RESOURCES DIVISION
 WASHINGTON, D.C.                         ****                                ****      CAMP DRESSER & MCKEE INC.
                                          ****         ANALYSIS MODULE        ****      ANNANDALE, VIRGINIA

     DON HAZELWOOD DAM STORMWATER MANAGEMENT ANALYSIS 12-30-99
     24-HOUR TYPE II RAINFALL, 100 YEAR STORM EVENT DEVELOPED CONDITIONS


 CONTROL INFORMATION FOR SIMULATION
 ----------------------------------

 INTEGRATION CYCLES................ 86400

 LENGTH OF INTEGRATION STEP IS......     1. SECONDS

 CREATE EQUIVALENT CONDUITS BASED
 ON THE COURANT CONDITION...........     1
```


DC010_DONALD_L_HAZELWOOD_EARTH - 055

```
USE U.S. CUSTOMARY UNITS FOR I/O...      0

PRINTING STARTS IN CYCLE...........    360

INTERMEDIATE PRINTOUT INTERVALS OF.    360 CYCLES

SUMMARY PRINTOUT INTERVALS OF......    431 CYCLES

HOT START FILE MANIPULATION(REDO)..      0

INITIAL TIME.......................  0.00 HOURS

ITERATION VARIABLES: ITMAX.........     30
                     SURTOL........ 0.050

DEFAULT SURFACE AREA OF JUNCTIONS.. 12.57 CUB FT.

EXPLICIT EXTRAN SOLUTION.(ISOL=0)..

A PREISSMAN SLOT IS NOT USED DURING SURCHARGE.

NORMAL FLOW OPTION WHEN THE WATER
SURFACE SLOPE IS LESS THAN THE
GROUND SURFACE SLOPE (KSUPER=0)....

NJSW INPUT HYDROGRAPH JUNCTIONS....      0

PRINTED OUTPUT FOR THE FOLLOWING  1 JUNCTIONS

            1

PRINTED OUTPUT FOR THE FOLLOWING  3 CONDUITS

           200       201       202

WATER SURFACE ELEVATIONS WILL BE PLOTTED FOR THE FOLLOWING   1 JUNCTIONS

            1

FLOW RATE WILL BE PLOTTED FOR THE FOLLOWING   3 CONDUITS

           200       201       202
1-----------------------------------------------------------------------------
ENVIRONMENTAL PROTECTION AGENCY              ****   EXTENDED TRANSPORT PROGRAM   ****        WATER RESOURCES DIVISION
WASHINGTON, D.C.                             ****                                ****        CAMP DRESSER & MCKEE INC.
                                             ****         ANALYSIS MODULE        ****        ANNANDALE, VIRGINIA

    DON HAZELWOOD DAM STORMWATER MANAGEMENT ANALYSIS 12-30-99
    24-HOUR TYPE II RAINFALL, 100 YEAR STORM EVENT DEVELOPED CONDITIONS

1
 ****************************************************
 *                    CONDUIT DATA                  *
 ****************************************************

     CONDUIT   LENGTH   CLASS     AREA    MANNING       MAX WIDTH       DEPTH   JUNCTIONS        INVERT HEIGHT         TRAPEZOID
      NUMBER     (FT)             (SQ FT)   COEF.          (FT)          (FT)    AT ENDS        ABOVE JUNCTIONS        SIDE SLOPE
       -----     ----             -------   -----          ----          ----    -------        ---------------        ----------
  1      200      28.      6      496.07    0.015         10.00         11.30      1     2         0.00   0.00         3.00 3.00
  2      201      17.      6      496.07    0.015         10.00         11.30      2     3         0.00   0.00         3.00 3.00
  3      202      23.      6      496.07    0.015         10.00         11.30      3     4         0.00   0.00         3.00 3.00
  4      203      50.      6      835.07    0.035         40.00         11.30      4    10         0.00   0.00         3.00 3.00

===> WARNING !!! (C*DELT/LEN) IN CONDUIT   201 IS  1.1 AT FULL DEPTH.
===> THE NEW EQUIVALENT LENGTH/ROUGHNESS/RATIO FOR CONDUIT   201 IS       19.1 /  0.0141606 /  1.000
1-----------------------------------------------------------------------------
ENVIRONMENTAL PROTECTION AGENCY              ****   EXTENDED TRANSPORT PROGRAM   ****        WATER RESOURCES DIVISION
WASHINGTON, D.C.                             ****                                ****        CAMP DRESSER & MCKEE INC.
                                             ****         ANALYSIS MODULE        ****        ANNANDALE, VIRGINIA

    DON HAZELWOOD DAM STORMWATER MANAGEMENT ANALYSIS 12-30-99
    24-HOUR TYPE II RAINFALL, 100 YEAR STORM EVENT DEVELOPED CONDITIONS

1
 ****************************************************
 *                   JUNCTION DATA                  *
 ****************************************************

     JUNCTION     GROUND      CROWN     INVERT     QINST     DEPTH              CONNECTING CONDUITS
       NUMBER      ELEV.      ELEV.     ELEV.       CFS      FEET
       ------      -----     ------     -----      ----      ----
  1        4      100.00     44.17     32.87      0.00      0.00                  202    203
```

```
  2        3      100.00     44.19      32.89      0.00      0.00                  201    202
  3        2      100.00     49.90      38.60      0.00      0.00                  200    201
  4        1      100.00     49.92      38.62      0.00      0.00                  200
  5       10      100.00     43.17      31.87      0.00      0.00                  203


-----------------------------------------------------------------------------------------------------------------------------------


1-----------------------------------------------------------------------------
 ENVIRONMENTAL PROTECTION AGENCY              ****   EXTENDED TRANSPORT PROGRAM   ****        WATER RESOURCES DIVISION
 WASHINGTON, D.C.                             ****                                ****        CAMP DRESSER & MCKEE INC.
                                              ****         ANALYSIS MODULE        ****        ANNANDALE, VIRGINIA

     DON HAZELWOOD DAM STORMWATER MANAGEMENT ANALYSIS 12-30-99
     24-HOUR TYPE II RAINFALL, 100 YEAR STORM EVENT DEVELOPED CONDITIONS



 ****************************************************
 *              STORAGE JUNCTION DATA               *
 ****************************************************

 STORAGE JUNCTION       SURFACE AREA       VOLUME       CROWN ELEVATION
                           (FT2)            (CF)             (FT)
                           -----            ----             ----
          1                 -0.10           -1.14            50.00


 ***************************************************
 *                 FREE OUTFALL DATA               *
 *                    DATA GROUP I1                *
 *         BOUNDARY CONDITION ON DATA GROUP J1     *
 ***************************************************


 OUTFALL AT JUNCTION....        10 HAS BOUNDARY CONDITION NUMBER...         1
1-----------------------------------------------------------------------------
 ENVIRONMENTAL PROTECTION AGENCY              ****   EXTENDED TRANSPORT PROGRAM   ****        WATER RESOURCES DIVISION
 WASHINGTON, D.C.                             ****                                ****        CAMP DRESSER & MCKEE INC.
                                              ****         ANALYSIS MODULE        ****        ANNANDALE, VIRGINIA

     DON HAZELWOOD DAM STORMWATER MANAGEMENT ANALYSIS 12-30-99
     24-HOUR TYPE II RAINFALL, 100 YEAR STORM EVENT DEVELOPED CONDITIONS



 ***************************************************
 *        INTERNAL CONNECTIVITY INFORMATION        *
 ***************************************************

          CONDUIT      JUNCTION      JUNCTION
          -------      --------      --------
          90005           10            0
1
 ****************************************************
 *        BOUNDARY CONDITON INFORMATION             *
 *                 DATA GROUPS J1-J4                *
 ****************************************************



 BOUNDARY CONDITION NUMBER..          1 HAS NO CONTROL WATER SURFACE.


 *******************************************
 * HEADER INFORMATION FROM INTERFACE FILE: *
 *******************************************

 TITLE FROM FIRST COMPUTATIONAL BLOCK:
001
    DON HAZELWOOD DAM 103.54 AC. WATERSHED  100-YEAR STORM

 TITLE FROM IMMEDIATELY PRECEDING COMPUTATIONAL BLOCK
001
    DON HAZELWOOD DAM 103.54 AC. WATERSHED  100-YEAR STORM

 NAME OF PRECEDING BLOCK:................TR20EXT V1.02
 INITIAL JULIAN DATE (IDATEZ)......................   99319
 INITIAL TIME OF DAY IN SECONDS (TZERO)............ 25200.0
```


DC010_DONALD_L_HAZELWOOD_EARTH - 057

```
NO. TRANSFERED INPUT LOCATIONS....................        1
NO. TRANSFERED POLLUTANTS.........................        0
SIZE OF TOTAL CATCHMENT AREA (ACRES)..............   103.54

************************************************
* ELEMENT NUMBERS OF INTERFACE INLET LOCATIONS: *
************************************************
      1


*******************************************************
*               SURCHARGE ITERATION SUMMARY           *
*******************************************************

MAXIMUM NUMBER OF ITERATIONS IN A TIME STEP.....        1
TOTAL NUMBER OF ITERATIONS IN THE SIMULATION....   172800
SURCHARGE ITERATIONS DURING THE SIMULATION......        0
MAXIMUM SURCHARGE FLOW ERROR DURING SIMULATION.. 0.00E-01 CFS
TOTAL NUMBER OF TIME STEPS DURING SIMULATION....    86400

1- - - - - - - - - - - - - -  CONTINUITY BALANCE AT END OF RUN - - - - - - - - - - - - -

INITIAL SYSTEM VOLUME       =          0.01 CU FT
TOTAL SYSTEM INFLOW VOLUME =    1885185.25 CU FT
INFLOW + INITIAL VOLUME     =    1885185.25 CU FT

JUNCTION OUTFLOWS/STREET FLOODING

   JUNCTION  OUTFLOW, FT3
   --------  ------------
        10    1882651.25

TOTAL SYSTEM OUTFLOW       =     1882651.25 CU FT
VOLUME LEFT IN SYSTEM      =        6116.06 CU FT
OUTFLOW + FINAL VOLUME     =     1888767.37 CU FT
ERROR IN CONTINUITY, PERCENT =        -0.19

1-----------------------------------------------------------------------------------------
ENVIRONMENTAL PROTECTION AGENCY *** EXTENDED TRANSPORT PROGRAM *** WATER RESOURCES DIVISION
WASHINGTON, D.C.                ***                            *** CAMP DRESSER & MCKEE INC.
                                ***      ANALYSIS MODULE       *** ANNANDALE, VIRGINIA

    DON HAZELWOOD DAM STORMWATER MANAGEMENT ANALYSIS 12-30-99
    24-HOUR TYPE II RAINFALL, 100 YEAR STORM EVENT DEVELOPED CONDITIONS


1 * * * * * * * * * T I M E   H I S T O R Y   O F   H. G. L. * * * * * * * * *
                          (VALUES IN FEET)
```

TIME HR:MIN	JUNCTION 1 GRND ELEV	100.00 DEPTH
7: 7	38.62	0.00
7:14	38.62	0.00
7:22	38.62	0.00
7:29	38.62	0.00
7:36	38.62	0.00
7:43	38.62	0.00
7:50	38.62	0.00
7:57	38.62	0.00
8: 5	38.63	0.01
8:12	38.63	0.01
8:19	38.63	0.01
8:26	38.64	0.02
8:33	38.64	0.02
8:41	38.65	0.03
8:48	38.66	0.04
8:55	38.66	0.04
9: 2	38.67	0.05
9: 9	38.69	0.07
9:16	38.70	0.08
9:24	38.71	0.09
9:31	38.72	0.10
9:38	38.74	0.12
9:45	38.75	0.13
9:52	38.77	0.15
9:60	38.78	0.16
10: 7	38.79	0.17
10:14	38.80	0.18
10:21	38.81	0.19

DC010_DONALD_L_HAZELWOOD_EARTH - 058

10:28	38.82	0.20
10:35	38.82	0.20
10:43	38.83	0.21
10:50	38.84	0.22
10:57	38.84	0.22
11: 4	38.85	0.23
11:11	38.85	0.23
11:19	38.86	0.24
11:26	38.87	0.25
11:33	38.88	0.26
11:40	38.89	0.27
11:47	38.90	0.28
11:55	38.92	0.30
12: 2	38.96	0.34
12: 9	39.00	0.38
12:16	39.07	0.45
12:23	39.14	0.52
12:30	39.23	0.61
12:38	39.30	0.68
12:45	39.36	0.74
12:52	39.39	0.77
12:59	39.40	0.78
13: 6	39.40	0.78
13:14	39.38	0.76
13:21	39.35	0.73
13:28	39.32	0.70
13:35	39.28	0.66
13:42	39.24	0.62
13:49	39.20	0.58
13:57	39.16	0.54
14: 4	39.13	0.51
14:11	39.10	0.48
14:18	39.08	0.46
14:25	39.05	0.43
14:33	39.03	0.41
14:40	39.01	0.39
14:47	38.99	0.37
14:54	38.98	0.36
15: 1	38.97	0.35
15: 8	38.96	0.34
15:16	38.96	0.34
15:23	38.95	0.33
15:30	38.95	0.33
15:37	38.94	0.32
15:44	38.93	0.31
15:52	38.93	0.31
15:59	38.92	0.30
16: 6	38.92	0.30
16:13	38.92	0.30
16:20	38.91	0.29
16:27	38.91	0.29
16:35	38.91	0.29
16:42	38.91	0.29
16:49	38.90	0.28
16:56	38.90	0.28
17: 3	38.90	0.28
17:11	38.90	0.28
17:18	38.90	0.28
17:25	38.89	0.27
17:32	38.89	0.27
17:39	38.89	0.27
17:46	38.89	0.27
17:54	38.89	0.27
18: 1	38.89	0.27
18: 8	38.89	0.27
18:15	38.89	0.27
18:22	38.88	0.26
18:30	38.88	0.26
18:37	38.88	0.26
18:44	38.88	0.26
18:51	38.88	0.26
18:58	38.88	0.26
19: 6	38.88	0.26
19:13	38.88	0.26
19:20	38.87	0.25
19:27	38.87	0.25
19:34	38.87	0.25
19:41	38.87	0.25
19:49	38.87	0.25
19:56	38.87	0.25
20: 3	38.87	0.25
20:10	38.87	0.25

DC010_DONALD_L_HAZELWOOD_EARTH - 059

20:17	38.87	0.25
20:25	38.87	0.25
20:32	38.87	0.25
20:39	38.87	0.25
20:46	38.87	0.25
20:53	38.86	0.24
21: 0	38.86	0.24
21: 8	38.86	0.24
21:15	38.86	0.24
21:22	38.86	0.24
21:29	38.86	0.24
21:36	38.86	0.24
21:44	38.86	0.24
21:51	38.86	0.24
21:58	38.86	0.24
22: 5	38.85	0.23
22:12	38.85	0.23
22:19	38.85	0.23
22:27	38.85	0.23
22:34	38.85	0.23
22:41	38.85	0.23
22:48	38.85	0.23
22:55	38.85	0.23
23: 3	38.85	0.23
23:10	38.85	0.23
23:17	38.85	0.23
23:24	38.85	0.23
23:31	38.85	0.23
23:38	38.85	0.23
23:46	38.85	0.23
23:53	38.85	0.23
24: 0	38.85	0.23
24: 7	38.85	0.23
24:14	38.85	0.23
24:22	38.85	0.23
24:29	38.85	0.23
24:36	38.85	0.23
24:43	38.84	0.22
24:50	38.84	0.22
24:58	38.83	0.21
25: 5	38.83	0.21
25:12	38.82	0.20
25:19	38.82	0.20
25:26	38.81	0.19
25:33	38.80	0.18
25:41	38.79	0.17
25:48	38.79	0.17
25:55	38.78	0.16
26: 2	38.77	0.15
26: 9	38.77	0.15
26:17	38.76	0.14
26:24	38.76	0.14
26:31	38.75	0.13
26:38	38.75	0.13
26:45	38.74	0.12
26:52	38.74	0.12
26:60	38.73	0.11
27: 7	38.73	0.11
27:14	38.72	0.10
27:21	38.72	0.10
27:28	38.72	0.10
27:36	38.71	0.09
27:43	38.71	0.09
27:50	38.71	0.09
27:57	38.70	0.08
28: 4	38.70	0.08
28:11	38.70	0.08
28:19	38.70	0.08
28:26	38.69	0.07
28:33	38.69	0.07
28:40	38.69	0.07
28:47	38.69	0.07
28:55	38.69	0.07
29: 2	38.69	0.07
29: 9	38.68	0.06
29:16	38.68	0.06
29:23	38.68	0.06
29:30	38.68	0.06
29:38	38.68	0.06
29:45	38.68	0.06
29:52	38.67	0.05
29:59	38.67	0.05

DC010_DONALD_L_HAZELWOOD_EARTH - 060

30: 6	38.67	0.05
30:14	38.67	0.05
30:21	38.67	0.05
30:28	38.67	0.05
30:35	38.67	0.05
30:42	38.67	0.05
30:49	38.67	0.05
30:57	38.67	0.05
MEAN	38.84	0.23
MAXIMUM	39.40	0.78
MINIMUM	38.62	0.00

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ENVIRONMENTAL PROTECTION AGENCY *** EXTENDED TRANSPORT PROGRAM *** WATER RESOURCES DIVISION
WASHINGTON, D.C. *** *** CAMP DRESSER & MCKEE INC.
*** ANALYSIS MODULE *** ANNANDALE, VIRGINIA

DON HAZELWOOD DAM STORMWATER MANAGEMENT ANALYSIS 12-30-99
24-HOUR TYPE II RAINFALL, 100 YEAR STORM EVENT DEVELOPED CONDITIONS

* * * * * * S U M M A R Y S T A T I S T I C S F O R J U N C T I O N S * * * * * *

JUNCTION NUMBER	GROUND ELEVATION (FT)	UPPERMOST PIPE CROWN ELEVATION (FT)	MAXIMUM COMPUTED DEPTH (FT)	TIME OF OCCURENCE HR.	MIN.	FEET OF SURCHARGE AT MAX DEPTH	FEET MAX. DEPTH IS BELOW GROUND ELEVATION	LENGTH OF SURCHARGE (MIN)	LENGTH OF FLOODING (MIN)	MAXIMUM JUNCTION AREA ACRES
4	100.00	44.17	0.86	13	0	0.00	66.27	0.0	0.0	5.963E-07
3	100.00	44.19	0.94	13	0	0.00	66.17	0.0	0.0	1.196E-07
2	100.00	49.90	0.67	12	59	0.00	60.73	0.0	0.0	1.318E-07
1	100.00	50.00	0.78	13	0	0.00	60.60	0.0	0.0	3.096E-05
10	100.00	43.17	0.85	13	0	0.00	67.28	0.0	0.0	1.061E-06

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ENVIRONMENTAL PROTECTION AGENCY *** EXTENDED TRANSPORT PROGRAM *** WATER RESOURCES DIVISION
WASHINGTON, D.C. *** *** CAMP DRESSER & MCKEE INC.
*** ANALYSIS MODULE *** ANNANDALE, VIRGINIA

DON HAZELWOOD DAM STORMWATER MANAGEMENT ANALYSIS 12-30-99
24-HOUR TYPE II RAINFALL, 100 YEAR STORM EVENT DEVELOPED CONDITIONS

1 * * * * * * * * * T I M E H I S T O R Y O F F L O W A N D V E L O C I T Y * * * * * * * * *
Q(CFS), VEL(FPS), TOTAL(CUBIC FEET)

TIME HR:MIN	CONDUIT FLOW	200 VELOC.	CONDUIT FLOW	201 VELOC.	CONDUIT FLOW	202 VELOC.
7: 7	0.00	0.00	0.00	0.00	0.00	0.00
7:14	0.00	0.00	0.00	0.00	0.00	0.00
7:22	0.00	0.01	0.00	0.00	0.00	0.00
7:29	0.00	0.01	0.00	0.00	0.00	0.00
7:36	0.00	0.02	0.00	0.00	0.00	0.00
7:43	0.00	0.02	0.00	0.11	0.00	0.01
7:50	0.00	0.04	0.00	0.09	0.00	0.02
7:57	0.00	0.05	0.00	0.10	0.00	0.03
8: 5	0.00	0.07	0.00	0.10	0.00	0.05
8:12	0.00	0.09	0.00	0.12	0.00	0.08
8:19	0.01	0.12	0.01	0.15	0.01	0.11
8:26	0.01	0.16	0.01	0.19	0.01	0.15
8:33	0.03	0.20	0.02	0.25	0.02	0.19
8:41	0.04	0.26	0.04	0.32	0.04	0.24
8:48	0.07	0.33	0.07	0.40	0.06	0.30
8:55	0.11	0.41	0.10	0.50	0.10	0.38
9: 2	0.16	0.52	0.16	0.61	0.16	0.46
9: 9	0.25	0.64	0.24	0.75	0.24	0.56
9:16	0.36	0.79	0.36	0.91	0.35	0.68
9:24	0.52	0.96	0.52	1.09	0.51	0.81
9:31	0.73	1.17	0.73	1.30	0.72	0.96
9:38	1.02	1.41	1.01	1.53	1.01	1.13
9:45	1.37	1.68	1.37	1.78	1.36	1.32
9:52	1.81	1.97	1.80	2.05	1.80	1.51
9:60	2.31	2.29	2.31	2.33	2.30	1.71
10: 7	2.89	2.63	2.88	2.61	2.87	1.92
10:14	3.50	2.97	3.50	2.88	3.49	2.12
10:21	4.13	3.30	4.13	3.14	4.12	2.31
10:28	4.76	3.61	4.75	3.38	4.75	2.49
10:35	5.37	3.90	5.37	3.61	5.36	2.66

DC010_DONALD_L_HAZELWOOD_EARTH - 061

10:43	6.02	4.20	6.01	3.83	6.01	2.82
10:50	6.73	4.52	6.73	4.07	6.72	3.00
10:57	7.51	4.85	7.51	4.31	7.50	3.19
11: 4	8.38	5.21	8.38	4.58	8.37	3.38
11:11	9.37	5.61	9.37	4.86	9.36	3.60
11:19	10.59	6.07	10.58	5.19	10.57	3.85
11:26	12.11	6.62	12.10	5.59	12.09	4.15
11:33	13.92	7.24	13.91	6.03	13.90	4.50
11:40	16.28	7.99	16.28	6.57	16.27	4.92
11:47	19.74	9.01	19.74	7.31	19.73	5.51
11:55	26.45	10.74	26.41	8.60	26.35	6.55
12: 2	39.49	13.54	39.45	10.75	39.40	8.31
12: 9	57.10	16.48	57.07	13.09	57.06	10.30
12:16	74.41	17.40	74.37	14.40	74.33	11.79
12:23	97.85	18.51	97.81	15.64	97.78	13.12
12:30	125.69	19.61	125.53	16.89	125.41	14.45
12:38	153.47	20.51	153.41	17.90	153.34	15.53
12:45	173.45	21.08	173.41	18.52	173.37	16.19
12:52	185.36	21.39	185.35	18.86	185.34	16.55
12:59	190.42	21.52	190.41	18.99	190.41	16.69
13: 6	189.37	21.49	189.39	18.96	189.42	16.66
13:14	182.01	21.29	182.04	18.75	182.07	16.44
13:21	171.23	21.00	171.26	18.44	171.29	16.11
13:28	158.34	20.64	158.35	18.04	158.37	15.68
13:35	144.41	20.21	144.43	17.56	144.44	15.18
13:42	129.76	19.71	129.83	17.01	129.90	14.59
13:49	115.13	19.19	115.17	16.41	115.21	13.95
13:57	103.40	18.73	103.42	15.89	103.45	13.39
14: 4	93.75	18.32	93.77	15.43	93.79	12.89
14:11	85.57	17.95	85.58	15.01	85.59	12.44
14:18	78.14	17.58	78.16	14.60	78.16	11.99
14:25	70.47	17.17	70.50	14.15	70.53	11.53
14:33	64.23	16.85	64.25	13.68	64.26	10.98
14:40	58.92	16.57	58.94	13.25	58.94	10.48
14:47	53.60	16.00	53.61	12.68	53.62	9.93
14:54	49.39	15.32	49.41	12.14	49.43	9.48
15: 1	45.04	14.57	45.05	11.55	45.06	8.98
15: 8	41.57	13.94	41.58	11.05	41.59	8.57
15:16	38.73	13.40	38.73	10.63	38.73	8.22
15:23	36.32	12.93	36.32	10.26	36.33	7.91
15:30	34.24	12.50	34.24	9.93	34.24	7.64
15:37	31.93	12.01	31.93	9.55	31.94	7.33
15:44	30.07	11.60	30.07	9.24	30.08	7.07
15:52	28.52	11.25	28.52	8.97	28.52	6.85
15:59	27.18	10.93	27.19	8.74	27.19	6.66
16: 6	26.03	10.65	26.03	8.53	26.03	6.49
16:13	24.79	10.35	24.79	8.30	24.80	6.30
16:20	23.77	10.09	23.78	8.11	23.78	6.15
16:27	22.95	9.88	22.95	7.95	22.95	6.02
16:35	22.25	9.70	22.25	7.81	22.25	5.91
16:42	21.64	9.53	21.64	7.69	21.64	5.81
16:49	20.96	9.35	20.97	7.56	20.97	5.71
16:56	20.36	9.18	20.36	7.44	20.36	5.61
17: 3	19.82	9.03	19.82	7.33	19.82	5.52
17:11	19.32	8.89	19.32	7.22	19.32	5.44
17:18	18.86	8.76	18.86	7.13	18.86	5.36
17:25	18.37	8.62	18.37	7.02	18.38	5.28
17:32	17.95	8.50	17.95	6.93	17.95	5.21
17:39	17.58	8.39	17.58	6.85	17.58	5.15
17:46	17.25	8.29	17.25	6.78	17.26	5.09
17:54	16.96	8.20	16.96	6.72	16.96	5.04
18: 1	16.65	8.11	16.65	6.65	16.65	4.99
18: 8	16.35	8.01	16.35	6.58	16.35	4.93
18:15	16.07	7.93	16.07	6.52	16.07	4.89
18:22	15.80	7.84	15.80	6.46	15.80	4.84
18:30	15.52	7.76	15.52	6.40	15.53	4.79
18:37	15.20	7.65	15.20	6.32	15.20	4.73
18:44	14.86	7.55	14.86	6.25	14.86	4.67
18:51	14.55	7.44	14.55	6.17	14.55	4.61
18:58	14.26	7.35	14.26	6.11	14.26	4.56
19: 6	13.99	7.26	13.99	6.04	13.99	4.51
19:13	13.72	7.17	13.72	5.98	13.72	4.46
19:20	13.48	7.09	13.48	5.92	13.48	4.42
19:27	13.28	7.02	13.28	5.87	13.28	4.38
19:34	13.12	6.97	13.12	5.83	13.12	4.35
19:41	12.99	6.93	12.99	5.80	12.99	4.32
19:49	12.88	6.89	12.88	5.77	12.88	4.30
19:56	12.77	6.85	12.77	5.75	12.77	4.28
20: 3	12.66	6.81	12.67	5.72	12.66	4.26
20:10	12.55	6.77	12.55	5.69	12.55	4.24
20:17	12.42	6.73	12.42	5.66	12.42	4.21
20:25	12.25	6.67	12.25	5.62	12.25	4.18

20:32	12.02	6.59	12.03	5.56	12.03	4.14
20:39	11.78	6.50	11.78	5.50	11.78	4.09
20:46	11.53	6.41	11.53	5.44	11.53	4.04
20:53	11.28	6.32	11.28	5.37	11.28	3.99
21: 0	11.02	6.23	11.02	5.30	11.03	3.94
21: 8	10.76	6.14	10.76	5.24	10.76	3.89
21:15	10.53	6.05	10.53	5.17	10.53	3.84
21:22	10.33	5.97	10.33	5.12	10.33	3.80
21:29	10.16	5.91	10.16	5.08	10.16	3.76
21:36	10.02	5.86	10.02	5.04	10.02	3.73
21:44	9.89	5.81	9.89	5.00	9.90	3.71
21:51	9.79	5.77	9.79	4.97	9.80	3.69
21:58	9.71	5.74	9.71	4.95	9.72	3.67
22: 5	9.65	5.72	9.65	4.93	9.65	3.66
22:12	9.60	5.69	9.60	4.92	9.60	3.65
22:19	9.54	5.67	9.54	4.91	9.54	3.63
22:27	9.50	5.66	9.50	4.89	9.50	3.63
22:34	9.47	5.65	9.47	4.89	9.47	3.62
22:41	9.45	5.64	9.45	4.88	9.45	3.61
22:48	9.43	5.63	9.43	4.87	9.43	3.61
22:55	9.41	5.62	9.41	4.87	9.41	3.61
23: 3	9.40	5.62	9.40	4.86	9.40	3.60
23:10	9.38	5.61	9.38	4.86	9.38	3.60
23:17	9.38	5.61	9.38	4.86	9.38	3.60
23:24	9.37	5.61	9.37	4.86	9.37	3.60
23:31	9.36	5.60	9.36	4.86	9.36	3.60
23:38	9.36	5.60	9.36	4.85	9.36	3.60
23:46	9.35	5.60	9.35	4.85	9.35	3.59
23:53	9.35	5.60	9.35	4.85	9.35	3.59
24: 0	9.33	5.59	9.33	4.85	9.34	3.59
24: 7	9.28	5.57	9.28	4.83	9.28	3.58
24:14	9.18	5.53	9.18	4.80	9.18	3.56
24:22	9.00	5.46	9.00	4.75	9.00	3.52
24:29	8.73	5.36	8.73	4.68	8.74	3.46
24:36	8.37	5.21	8.37	4.57	8.38	3.38
24:43	7.85	5.00	7.85	4.41	7.85	3.26
24:50	7.24	4.74	7.24	4.22	7.24	3.12
24:58	6.59	4.46	6.60	4.02	6.60	2.97
25: 5	5.94	4.17	5.95	3.80	5.95	2.80
25:12	5.32	3.88	5.32	3.59	5.32	2.64
25:19	4.68	3.57	4.68	3.35	4.69	2.47
25:26	4.10	3.28	4.10	3.12	4.11	2.30
25:33	3.59	3.01	3.59	2.91	3.59	2.15
25:41	3.14	2.77	3.14	2.72	3.15	2.00
25:48	2.76	2.56	2.76	2.54	2.77	1.87
25:55	2.42	2.36	2.43	2.38	2.43	1.75
26: 2	2.14	2.18	2.14	2.23	2.14	1.64
26: 9	1.89	2.03	1.89	2.09	1.90	1.54
26:17	1.68	1.89	1.68	1.97	1.69	1.46
26:24	1.50	1.77	1.50	1.86	1.51	1.37
26:31	1.34	1.65	1.34	1.75	1.35	1.30
26:38	1.20	1.55	1.20	1.66	1.21	1.23
26:45	1.08	1.46	1.08	1.57	1.09	1.17
26:52	0.98	1.38	0.98	1.49	0.98	1.11
26:60	0.89	1.30	0.89	1.42	0.89	1.06
27: 7	0.80	1.23	0.80	1.35	0.81	1.01
27:14	0.73	1.17	0.73	1.29	0.73	0.96
27:21	0.67	1.11	0.67	1.23	0.67	0.92
27:28	0.61	1.06	0.61	1.18	0.61	0.88
27:36	0.56	1.01	0.56	1.13	0.56	0.84
27:43	0.52	0.96	0.52	1.08	0.52	0.81
27:50	0.48	0.92	0.48	1.04	0.48	0.78
27:57	0.44	0.88	0.44	1.00	0.44	0.75
28: 4	0.41	0.85	0.41	0.96	0.41	0.72
28:11	0.38	0.81	0.38	0.93	0.38	0.70
28:19	0.35	0.78	0.35	0.90	0.36	0.67
28:26	0.33	0.75	0.33	0.86	0.33	0.65
28:33	0.31	0.73	0.31	0.84	0.31	0.63
28:40	0.29	0.70	0.29	0.81	0.29	0.61
28:47	0.27	0.68	0.27	0.78	0.27	0.59
28:55	0.25	0.66	0.26	0.76	0.26	0.58
29: 2	0.24	0.64	0.24	0.74	0.24	0.56
29: 9	0.23	0.62	0.23	0.72	0.23	0.54
29:16	0.21	0.60	0.21	0.70	0.21	0.53
29:23	0.20	0.58	0.20	0.68	0.20	0.52
29:30	0.19	0.56	0.19	0.66	0.19	0.50
29:38	0.18	0.55	0.18	0.64	0.18	0.49
29:45	0.17	0.54	0.17	0.63	0.17	0.48
29:52	0.16	0.52	0.16	0.61	0.17	0.47
29:59	0.16	0.51	0.16	0.60	0.16	0.46
30: 6	0.15	0.50	0.15	0.59	0.15	0.45
30:14	0.14	0.49	0.14	0.57	0.14	0.44

DC010_DONALD_L_HAZELWOOD_EARTH - 063

30:21	0.14	0.47	0.14	0.56	0.14	0.43
30:28	0.13	0.46	0.13	0.55	0.13	0.42
30:35	0.13	0.45	0.13	0.54	0.13	0.41
30:42	0.12	0.45	0.12	0.53	0.12	0.41
30:49	0.12	0.44	0.12	0.52	0.12	0.40
30:57	0.11	0.43	0.11	0.51	0.11	0.39
MEAN	21.79	6.30	21.79	5.38	21.79	4.21
MAXIMUM	190.63	21.52	190.63	19.00	190.63	16.70
MINIMUM	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL	1.88E+06		1.88E+06		1.88E+06	

1----------

ENVIRONMENTAL PROTECTION AGENCY *** EXTENDED TRANSPORT PROGRAM *** WATER RESOURCES DIVISION
WASHINGTON, D.C. *** *** CAMP DRESSER & MCKEE INC.
*** ANALYSIS MODULE *** ANNANDALE, VIRGINIA

DON HAZELWOOD DAM STORMWATER MANAGEMENT ANALYSIS 12-30-99
24-HOUR TYPE II RAINFALL, 100 YEAR STORM EVENT DEVELOPED CONDITIONS

* * * * * * * S U M M A R Y S T A T I S T I C S F O R C O N D U I T S * * * * * * *

CONDUIT NUMBER	DESIGN FLOW (CFS)	DESIGN VELOCITY (FPS)	CONDUIT VERTICAL DEPTH (IN)	MAXIMUM COMPUTED FLOW (CFS)	TIME OF OCCURENCE HR.	TIME OF OCCURENCE MIN.	MAXIMUM COMPUTED VELOCITY (FPS)	TIME OF OCCURENCE HR.	TIME OF OCCURENCE MIN.	RATIO OF MAX. TO DESIGN FLOW	MAXIMUM DEPTH ABOVE INVERT AT CONDUIT ENDS UPSTREAM (FT)	DOWNSTREAM (FT)	LENGTH OF SUPERCRITICAL FLOW (MIN)	GROUND SLOPE (FT/FT)
200	4379.76	8.83	135.60	190.63	12	59	21.52	12	59	0.04	0.78	0.67	0.0	0.00071
201	94973.67	191.45	135.60	190.63	13	0	19.00	13	0	0.00	0.67	0.94	1244.2	0.29934
202	4832.43	9.74	135.60	190.63	13	0	16.70	13	0	0.04	0.94	0.86	0.0	0.00087
203	19197.21	22.99	135.60	190.62	13	0	5.23	13	0	0.01	0.86	0.85	0.0	0.02000
90005	********	********	135.60	190.62	13	0	********	0	0	********	********	********	**********	**********

1----------

ENVIRONMENTAL PROTECTION AGENCY *** EXTENDED TRANSPORT PROGRAM *** WATER RESOURCES DIVISION
WASHINGTON, D.C. *** *** CAMP DRESSER & MCKEE INC.
*** ANALYSIS MODULE *** ANNANDALE, VIRGINIA

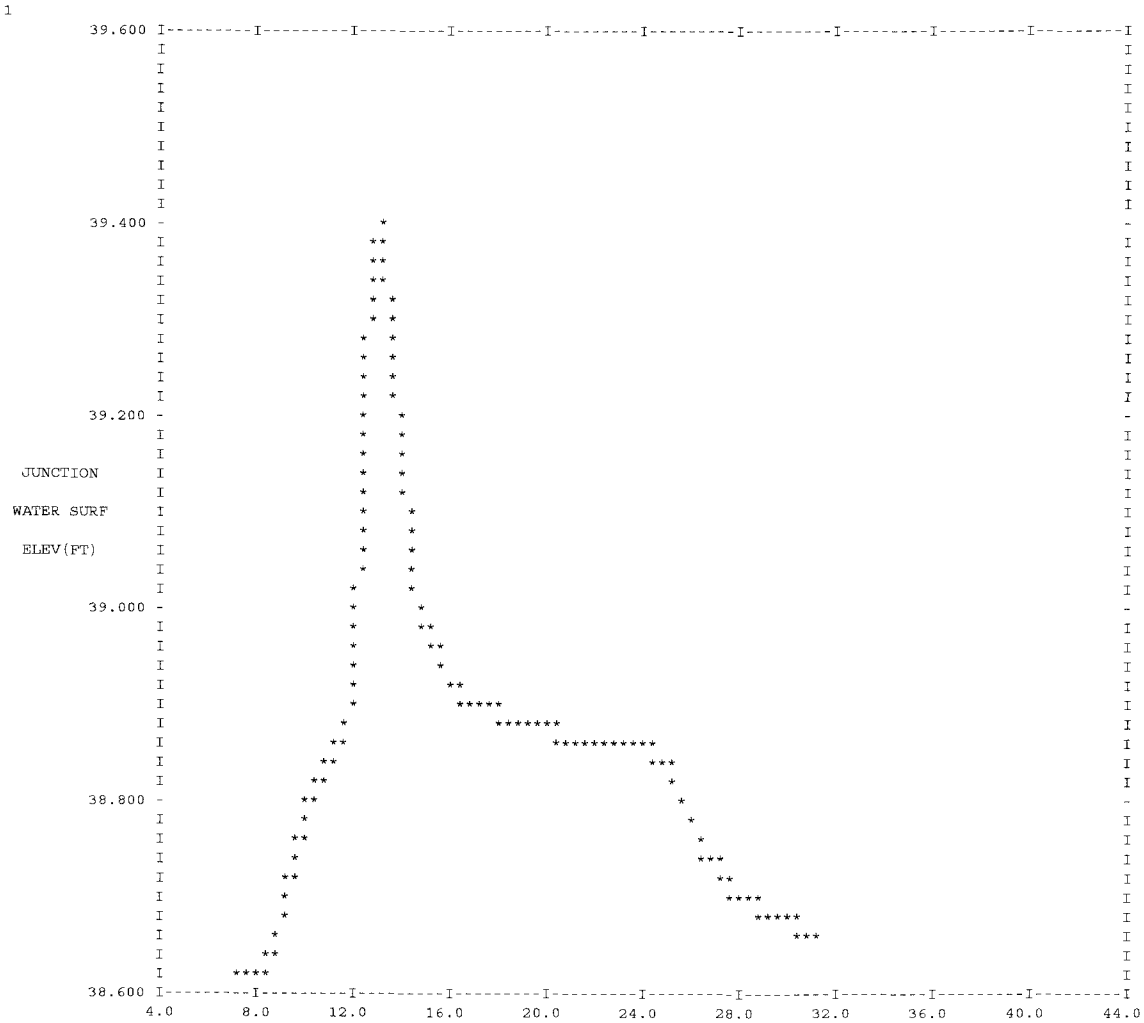
DON HAZELWOOD DAM STORMWATER MANAGEMENT ANALYSIS 12-30-99
24-HOUR TYPE II RAINFALL, 100 YEAR STORM EVENT DEVELOPED CONDITIONS

1

```
**************************************************
* SUBCRITICAL AND CRITICAL FLOW ASSUMPTIONS FROM *
* SUBROUTINE HEAD.  SEE FIGURE 5-4 IN THE EXTRAN *
*       MANUAL FOR FURTHER INFORMATION.          *
**************************************************
```

CONDUIT NUMBER	LENGTH OF DRY FLOW(MIN)	LENGTH OF SUBCRITICAL FLOW(MIN)	LENGTH OF UPSTR. OF CRITICAL FLOW(MIN)	LENGTH OF DOWNSTR. CRITICAL FLOW(MIN)
200	19.87	1420.13	0.00	0.00
201	38.02	1401.98	0.00	0.00
202	40.52	1399.48	0.00	0.00
203	59.80	1380.20	0.00	0.00

DC010_DONALD_L_HAZELWOOD_EARTH - 064

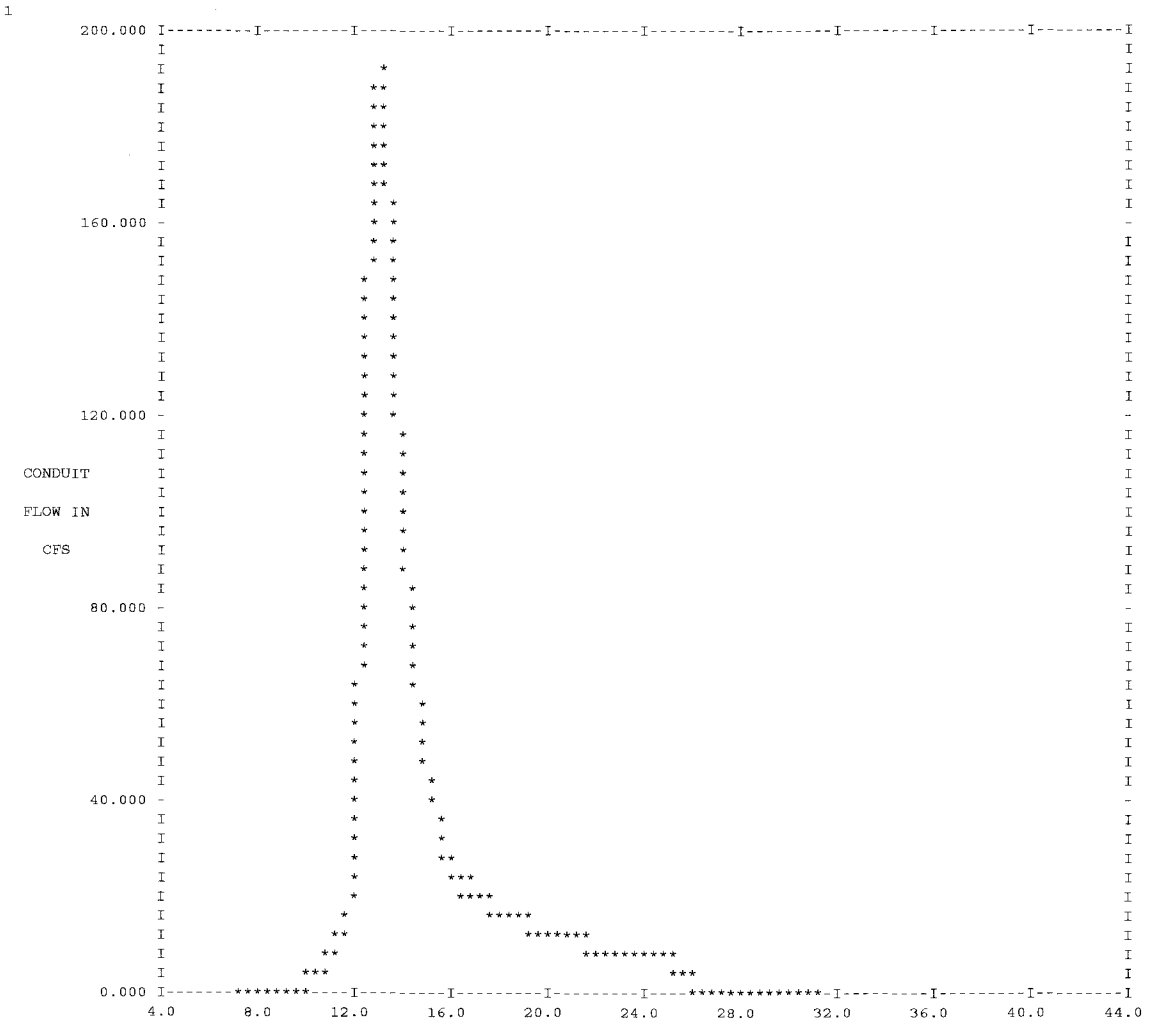


LOCATION NO. : 1 CLOCK TIME IN HOURS

PLOT OF JUNCTION ELEVATION

INVERT ELEV - 38.62 FEET
CROWN ELEV - 50.00 FEET
GROUND ELEV - 100.00 FEET

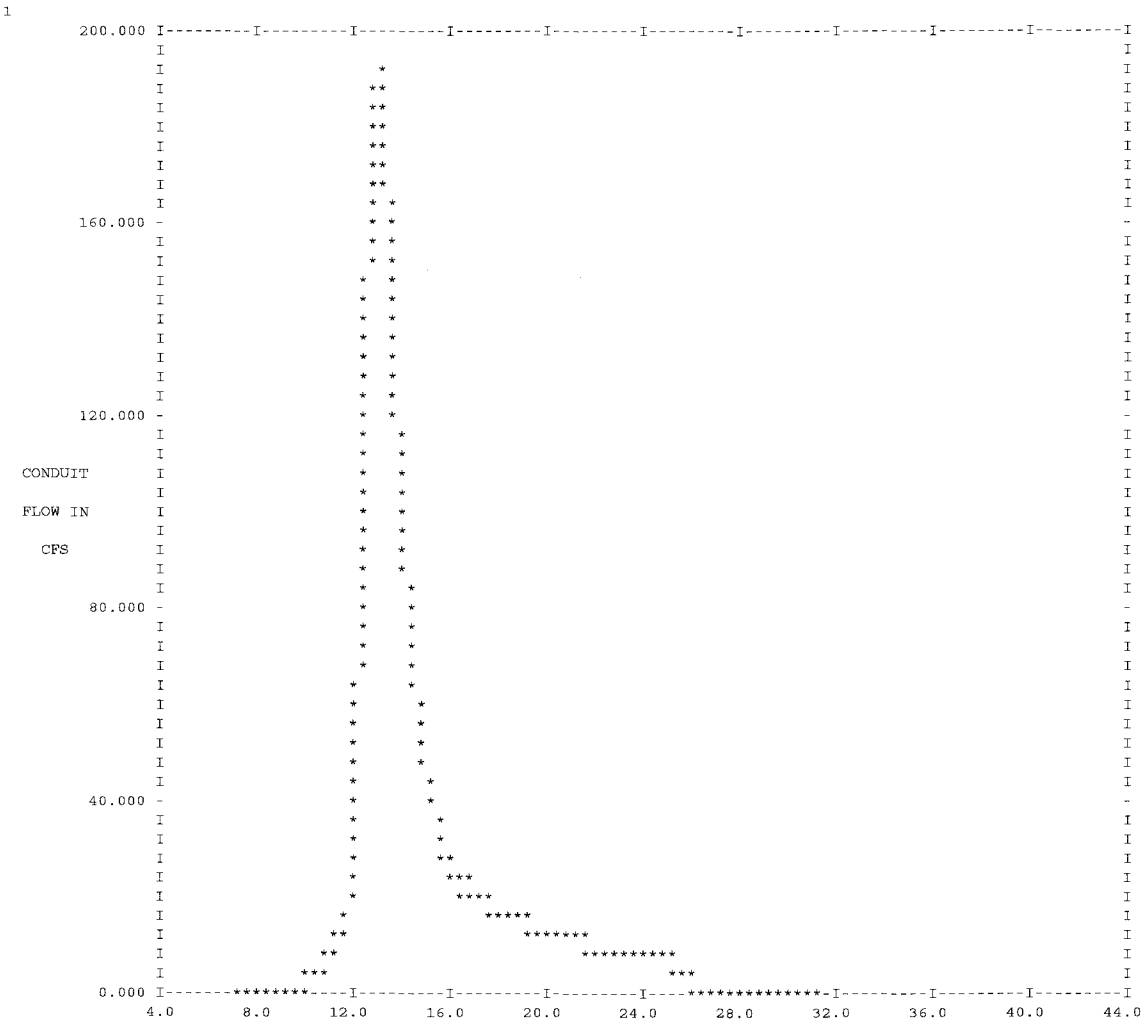
DC010_DONALD_L_HAZELWOOD_EARTH - 065



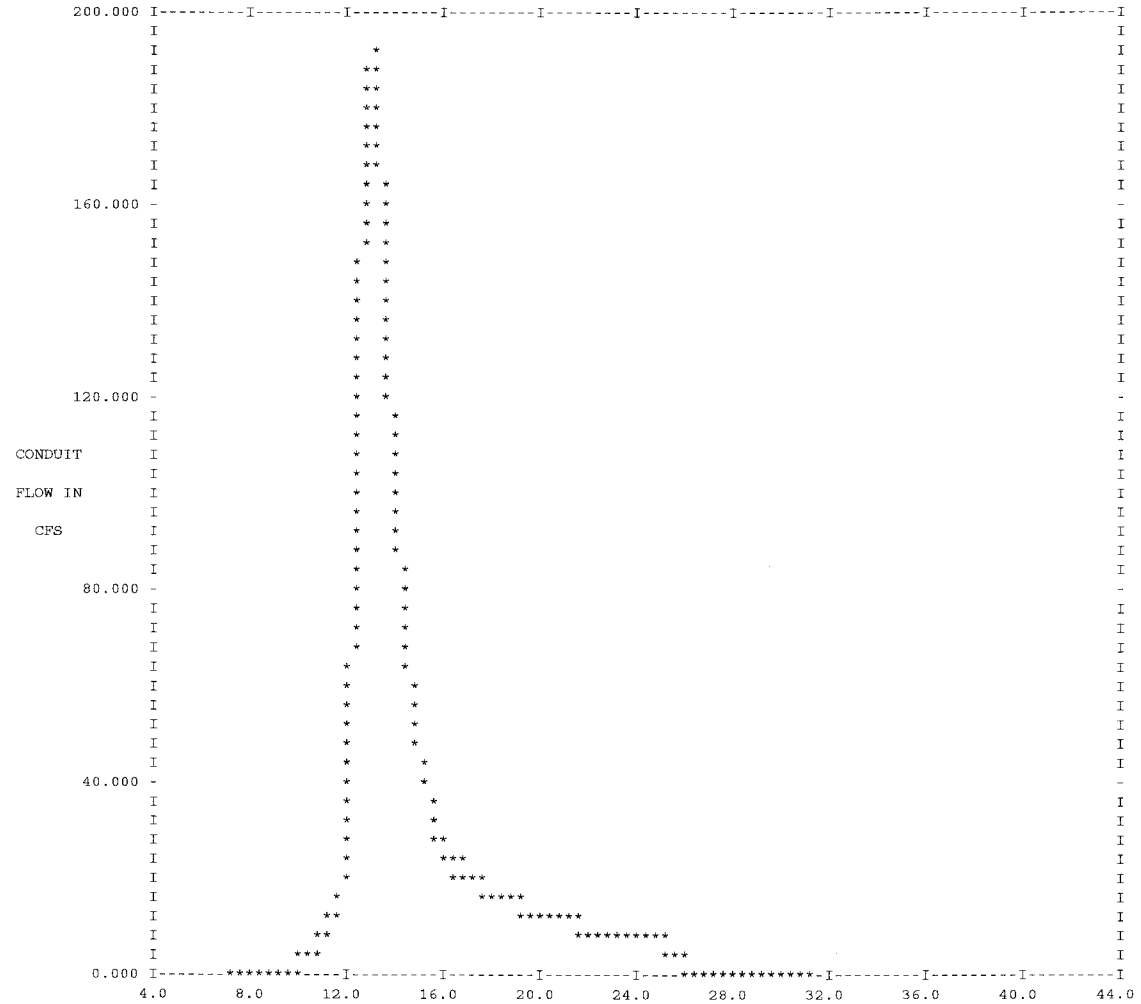
LOCATION NO. : 200 CLOCK TIME IN HOURS

PLOT OF CONDUIT FLOW

DC010_DONALD_L_HAZELWOOD_EARTH - 066



DC010_DONALD_L_HAZELWOOD_EARTH - 067



LOCATION NO. : 202 CLOCK TIME IN HOURS

PLOT OF CONDUIT FLOW

===> EXTENDED TRANSPORT MODEL SIMULATION ENDED NORMALLY.

===> SWMM 4.0 SIMULATION ENDED NORMALLY.

===> YOUR INPUT FILE WAS NAMED : DON100C.DAT
===> YOUR OUTPUT FILE WAS NAMED: DON100C.OUT

12-31-99 JGW

DON HAZELWOOD'S RECREATIONAL POND

CONCRETE SPILLWAY DESIGN:

$Q_{100} = 191.88$ (PEAK INFLOW - UNROUTED)

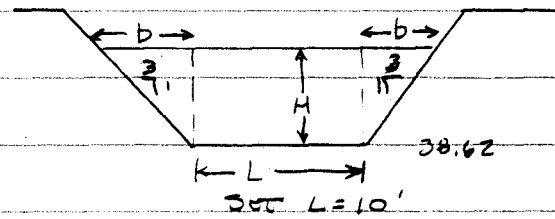
SIZE WEIR TO CONVEY 100-YEAR STORM INFLOW

SET SPILLWAY CREST @ EL = 38.62 (6" ABOVE N.W.S.)

TRY: TRAPEZOIDAL SECTION

$Q_w = C_2 L H^{3/2} + C_3 Z H^{5/2}$

WHERE $Z = b/H$



ASSUME $C_2 = C_3 = 3.1$

$Q_w = (3.1)(10)(H)^{3/2} + (3.1)\left(\frac{3H}{H}\right)(H)^{5/2}$

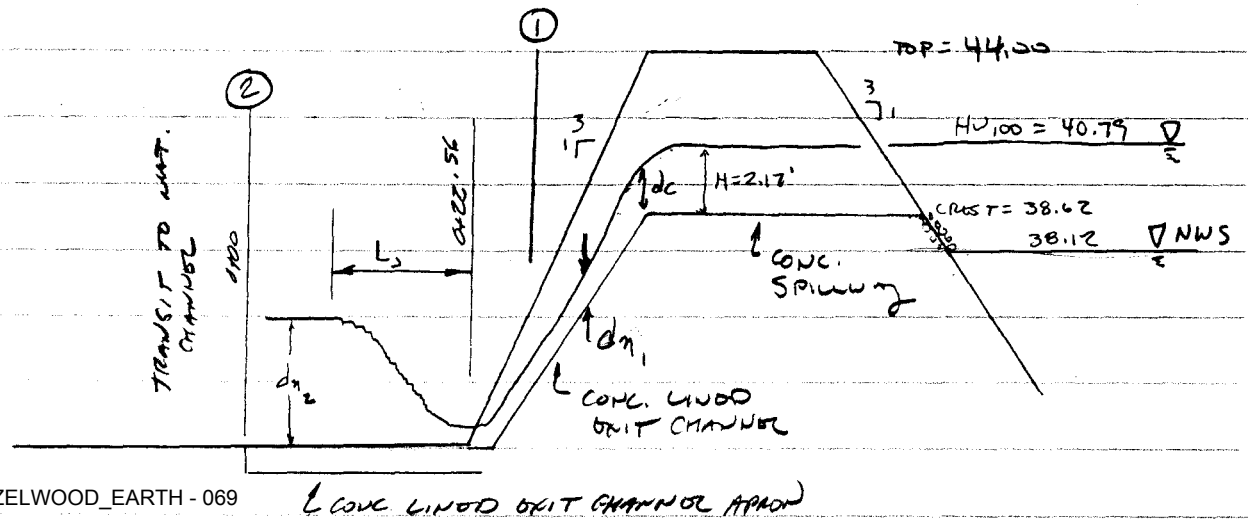
$191.88 = 31\ H^{3/2} + 6.2\ H^{7/2}$

$H = 2.17'$

SET TOP OF DAM @ 44.00

$HW_{100} = 40.79$

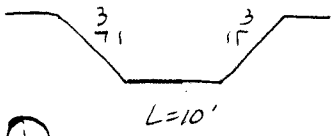
FREEBOARD = 3.21'



12-31-99 JBJ

SPILLWAY DISCHARGE FLUME / EXIT CHANNEL

FLUME



$\eta = 0.015$

$S_b = 33.3\%$

(1)

$Q_{100} = 191.88$ cfs

$V = 33.08$ fps

$d_{\eta_1} = 0.50$ ft.

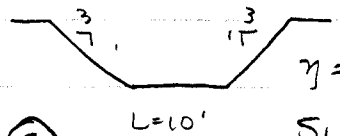
$d_c = 1.86$ ft

$V_c = 6.64$ fps

$F_{\eta_1} = 8.7348$

$F_c = 1.00$

EXIT



$\eta = 0.015$

$S_b = 0.10\%$

(2)

$Q_{100} = 191.88$ cfs

$V = 4.43$ fps

$d_{\eta_2} = 2.48$ ft.

$d_c = 1.86$ ft

$V_c = 6.64$ fps

$F_{\eta_2} = 0.5927$

$F_c = 1.00$

NO STORAGE ROUTING EFFECTS

$F_{\eta_1} = 8.7348 \rightarrow L/d_2 \cong 6.18$ (SEE L/d_2 VS F_1 CURVE, FIG 21.50 STD. HANDBOOK FOR CIVIL ENGINEERS 4th ED)

THEREFORE $L_j = 6.18 \times 2.48' = 15.33'$

EXTENSION OF THE EXIT CHANNEL APRON TO 20' FROM TOE OF DAM SHOULD BE SUFFICIENT TO ALLOW HYDRAULIC JUMP TO FORM WITHIN CONCRETE LINED EXIT CHANNEL.

WITH ROUTING EFFECT

CHECK WITH SWMM4 EXTRAN: (WITH STORAGE ROUTING)

		ROUTED FLOW	VELOCITY	DEPTH	ELEV.
2-YEAR STORM	(DON2C.DAT/OUT)	$Q_2 = 38.99$ cfs	$V_2 = 4.36$ fps	$HW_2 =$	38.96'
* 10-YEAR STORM	(DON10C.DAT/OUT)	$Q_{10} = 102.19$ cfs	$V_{10} = 5.62$ fps	$HW_{10} =$	39.09
100-YEAR STORM	(DON100C.DAT/OUT)	$Q_{100} = 190.63$ cfs	$V_{100} = 16.70$	$HW_{100} =$	39.40

* DEPTH OF EXIT CHANNEL APRON CONC LINING NEEDS TO BE 18" TO KEEP 10-YEAR STORM DISCHARGE WITHIN HEIGHT OF LINING (D=1.32')

SEE CONDUIT 203 FLOW DEPTHS, DON10C.OUT FILE.

PRINCIPAL SPILLWAY DESIGN

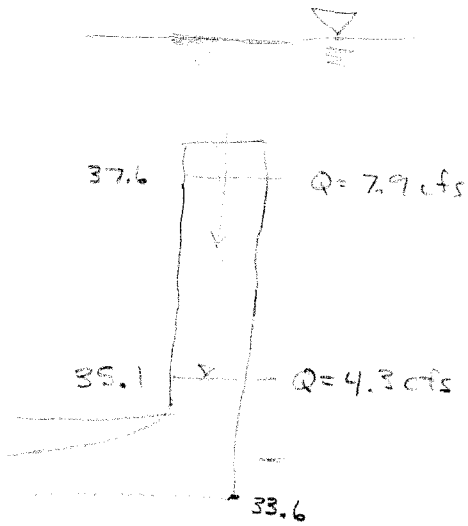
12" Riser

Goes into orifice flow @ $H = 0.4'$

$Q = 2.35$ cfs

Max Head $= 39.4 - 38.1 = 1.3'$

$Q_{max} = 4.3$ cfs



12" Barrel

72' long, $n = 0.013$

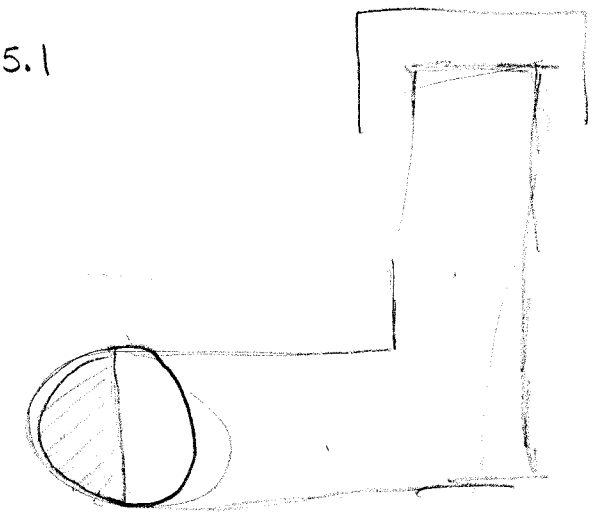
Inv. = 32.89'

$H = 38.12 + .4 = 38.5 - (32.89 + .5) = 5.1$

$Q_{barrel} = 7.19$ cfs

Q_{max} @ $39.4 - (33.4) = 6'$

$= 7.88$ cfs



Inlet Control

$\frac{HW}{D} \approx 4$ for $Q = 7.8$ cfs

$D = 1'$ $\therefore$ $HW = 4'$

Elev $= 33.6$ (inv.) $+ 4 = 37.6$

- just below riser crest

for $Q = 4.3$ cfs

$\frac{HW}{D} = 1.5$

Limit flow to ≈ 2.5 cfs

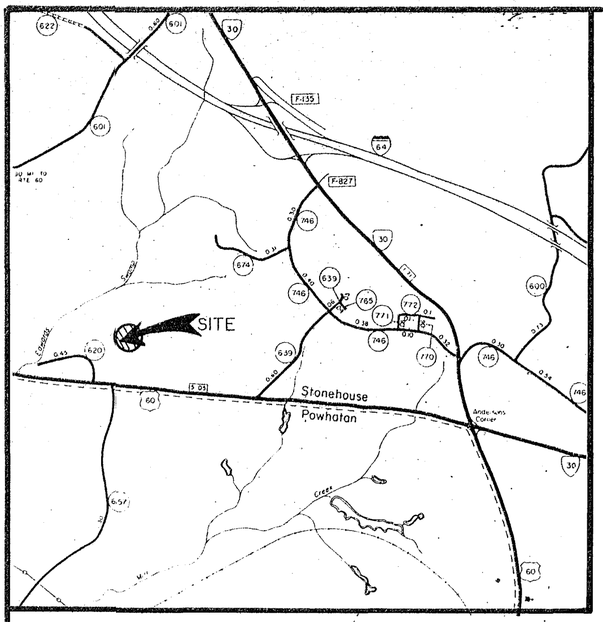
$H = 38.5 - (33.6 + .4) = 4.5$

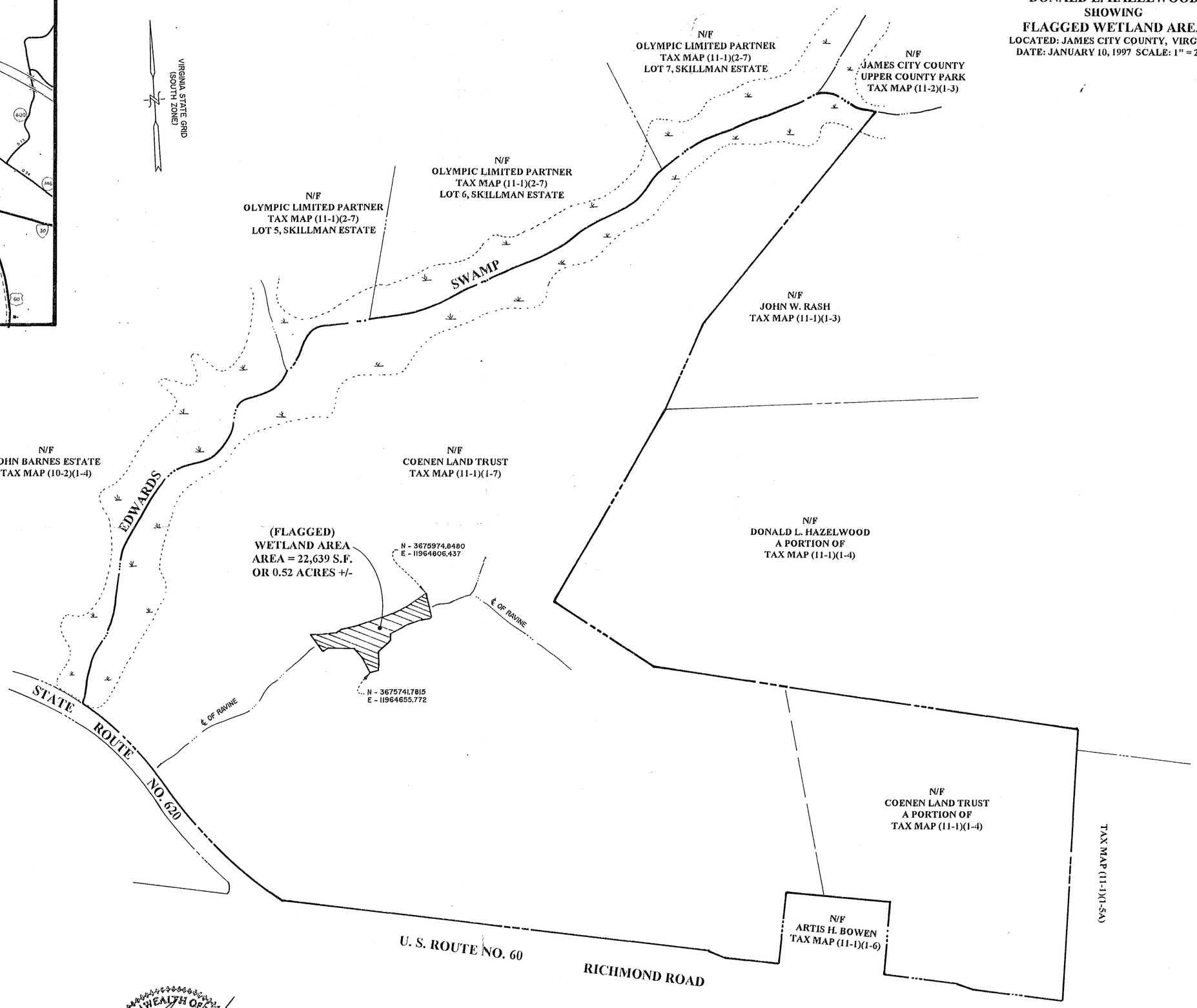
$$a = \frac{Q}{C\sqrt{2gh}} = \frac{2.5}{0.6\sqrt{(2)(32.2)(4.5)}} = 0.24 \text{ ft}^2$$

$Q = \sqrt{\frac{4a}{\pi}}$ $\phi = 7.4''$ limit to 7" ϕ

DC010 DONALD H HAZELWOOD EARTH 071

SKETCH
PREPARED FOR
DONALD L. HAZELWOOD
SHOWING
FLAGGED WETLAND AREA
LOCATED: JAMES CITY COUNTY, VIRGINIA
DATE: JANUARY 10, 1997 SCALE: 1" = 200'

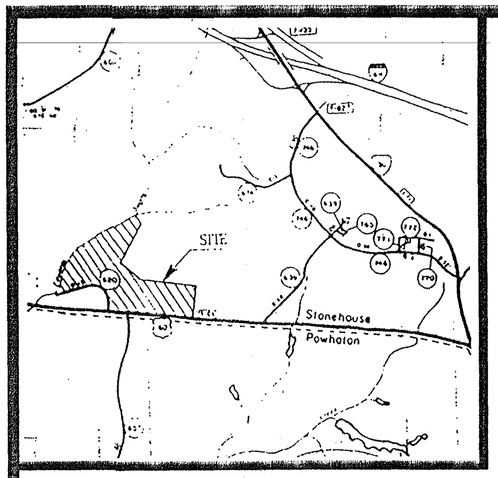




COMMONWEALTH OF VIRGINIA
JAMES E. MITCHELL
No. 001452B
1-10-97
LAND SURVEYOR

NOTE:
THIS PLAT DOES NOT REPRESENT A BOUNDARY SURVEY. PROPERTY LINES SHOWN ARE BASED UPON PLATS OF RECORD AND JAMES CITY COUNTY TOPOGRAPHIC MAPS. THE PURPOSE OF THIS DRAWING IS TO SHOW THE LOCATION OF THE FLAGGED WETLAND AREA.

PREPARED BY:
MITCHELL- WILSON ASSOCIATES, P.C.
CIVIL ENGINEERS & LAND SURVEYORS
720 MAIN STREET, SUITE 112, 2ND FLOOR
P.O. BOX 1269
WEST POINT, VIRGINIA 23181
(804) 843-9744



VICINITY MAP
SCALE: 1" = 2640'

GENERAL NOTES:

1. PROPERTY IS ZONED A1, GENERAL AGRICULTURAL.
   TAX MAP NUMBERS (11-1)(1-7)
2. ADDRESS: 8902 RICHMOND ROAD
3. EACH LOT IS TO BE SERVED BY PRIVATE WELL AND SEPTIC.
   THE PROPERTY IS IN FLOOD ZONE "X" AREAS DETERMINED TO BE OUTSIDE THE 500-YEAR FLOODPLAIN PER COMMUNITY PANEL No. 510201 0005 B, PREPARED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY, EFFECTIVE DATE
4. FEBRUARY 6, 1991.
   BUILDING SETBACKS FRONT = 75'
   SIDE = 15'
   REAR = 35'
5. ALL UTILITES ARE TO BE PLACED UNDGROUND.
6. ALL DRAINFIELDS ARE SIZED FOR (4) BEDROOM DWELLINGS. EXCEPT PARCEL A4 IS SIZED FOR (3) BEDROOM DWELLING.

P&R PROPOSED PRIMARY/RESERVE DRAINFIELD LOCATIONS

NOTES:
LOTS OF FIVE ACRES OR MORE SHALL HAVE A MINIMUM LOT WIDTH AT THE SETBACK LINE OF 250 FEET.

LOTS OF THREE ACRES OR MORE BUT LESS THAN FIVE ACRES SHALL HAVE A MINIMUM LOT WIDTH AT THE SETBACK LINE OF 200 FEET.

UNLESS OTHERWISE NOTED, ALL DRAINAGE EASEMENTS DESIGNATED ON THIS PLAT SHALL REMAIN PRIVATE.

NEW MONUMENTATION SHALL BE SET PER THE REQUIREMENTS OF SECTIONS 19-34 - 19-36 OF THE JAMES CITY COUNTY SUBDIVISION ORDINANCE

PLAT BOOK 60, PAGE 46

SUBDIVISION PLAT

OF PROPERTY STANDING IN THE NAME OF

DONALD L. HAZELWOOD

BEING : PARCEL A

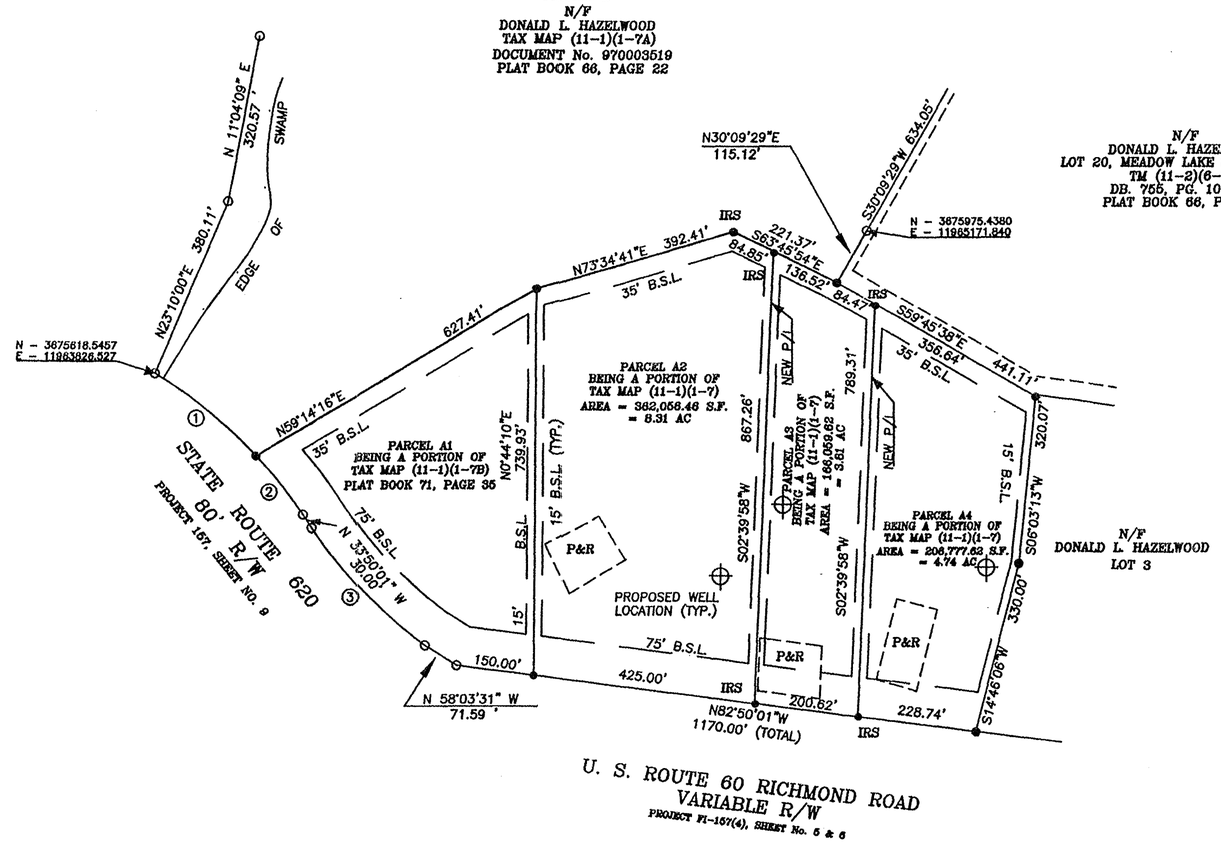
LOCATED: STONEHOUSE MAGISTERIAL DISTRICT

LOCATED: JAMES CITY COUNTY, VIRGINIA

DATE: FEBRUARY 2, 1999 SCALE: 1" = 200'

MITCHELL-WILSON ASSOCIATES, P.C.
CIVIL ENGINEERS & LAND SURVEYORS
720 MAIN STREET, SUITE 112
P.O. BOX 1269
WEST POINT, VIRGINIA 23181
(804) 843-9744

200' 0' 200'



OWNERS CERTIFICATE:

THE SUBDIVISION OF LAND SHOWN ON THIS PLAT IS WITH THE FREE CONSENT AND IN ACCORDANCE WITH THE DESIRE OF THE UNDERSIGNED OWNERS, PROPRIETORS AND OR TRUSTEES.

2-5-99 Donald Lee Hazelwood
DATE DONALD LEE HAZELWOOD

CERTIFICATE OF NOTARIZATION:

STATE OF VIRGINIA
CITY-COUNTY OF James City County
I Carol M. Mitchell

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 IN THIS 5th DAY OF February 1999

MY COMMISION EXPIRES 12/31/2000

Carol M Mitchell
NAME

CERTIFICATE OF SOURCE OF TITLE:

THE PROPERTY SHOWN ON THIS PLAT WAS CONVEYED BY E. THOMAS COX AND WILLIAM M. MARTIN, III AS TRUSTEES OF COENEN LAND TRUST TO DONALD LEE HAZELWOOD BY DEED DATED MARCH 3, 1997 AND RECORDED IN THE OFFICE OF THE CLERK OF THE CIRCUIT COURT OF THE COUNTY OF JAMES CITY IN DOCUMENT No. 970003519.

SURVEYORS 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.

2-22-99
2-2-99
DATE JAMES E. MITCHELL, LAND SURVEYOR

CERTIFICATE OF APPROVAL:

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

2-8-99 David B Zilles
DATE VIRGINIA DEPARTMENT OF HEALTH

2-5-99 Ronald C. Brooks
DATE VIRGINIA DEPARTMENT OF TRANSPORTATION

2/25/99
DATE SUBDIVISION AGENT OF JAMES CITY COUNTY

COMMONWEALTH OF VIRGINIA
JAMES E. MITCHELL
No. 001452B
2-22-99
LAND SURVEYOR

#	DELTA	R	L	TAN.	CH.	C. BEARING
1	15°31'55"	921.95'	249.93'	125.73'	249.16'	N50°33'37"W
2	08°54'23"	921.95'	143.31'	71.80'	143.17'	N38°20'27"W
3	19°33'47"	915.37'	312.52'	157.79'	311.00'	N43°36'52"W

WATERSHED	DC	MAINTENANCE PLAN	No	CTRL STRUC DESC	PVC Riser
BMP ID NO	010	SITE AREA acre		CTRL STRUC SIZE inches	12
PLAN NO	None	LAND USE	Gen Agricultural	OTLT BARRL DESC	PVC Barrel
TAX PARCEL	(11-01)(01-07)	old BMP TYP	Wet Pond	OTLT BARRL SIZE inch	12
PIN NO	1110100007	JCC BMP CODE			
CONSTRUCTION DATE	11/30/2001	POINT VALUE	0	EMERG SPILLWAY	Yes
PROJECT NAME	Hazelwood Earth Dam & Rec Pond			DESIGN HW ELEV	39.40
FACILITY LOCATION	Behind (North of) 8902 Richmond Road			PERM POOL ELE	38.12
CITY-STATE	Toano, Va. 23168	SVC DRAIN AREA acres	103.54	2-YR OUTFLOW cfs	38.99
CURRENT OWNER	Donald R. Hazelwood			10-YR OUTFLOW cfs	102.19
OWNER ADDRESS	8630 Richmond Road			REC DRAWING	No
OWNER ADDRESS 2		SERVICE AREA DESCRI	Wooded & SF Lots (Meadow Lake Sec 2)		
CITY-STATE-ZIP CODE	Toano, Va. 23168	IMPERV AREA acres	10.00	CONSTR CERTI	Yes
OWNER PHONE	566-8760	RECV STREAM	UT of Diascund		
MAINT AGREEMENT	No	EXT DET-WQ-CTRL	No	LAST INSP DATE	
		WTR QUAL VOL acre-ft	0	INTERNAL RATING	
EMERG ACTION PLAN	No	CHAN PROT CTRL	No	MISC/COMMENTS	
		CHAN PROT VOL acre-ft	0	Private Dam. 10% imperv. Conc spillway El. 38.62. USACOE permit 96-5732.	
		SW/FLOOD CONTROL	Yes		
		GEOTECH REPORT	No		

Get Last BMP No

Return to Menu

DC010_DONALD_L_HAZELWOOD_EARTH - 075

ENVIRONMENTAL DIVISION REVIEW COMMENTS
DON HAZLEWOOD POND
TAX PARCEL (11-1)(1-7)
December 17, 1999

DEC

$10,000

OK JBJ 12-31-99

A Land Disturbing Permit and Siltation Agreement, with surety, are required for this project.

DON 2. An Inspection/Maintenance Agreement shall be executed with the county for the long-term maintenance of this dam.

conc. spillway provided 12-31-99 JBJ

Emergency Spillway. The embankment needs an emergency spillway in the event the pipes partially or fully clog. This should be ten feet wide with a bottom elevation of 43.0. It appears the easiest location would be on the south end of the dam. If located in natural ground, it would not need to be lined.

Replaced w/ conc. spillway 12-31-99 JBJ

4. Principal Spillway.

12" RISER TO REMAIN FOR VERY LOW FLOWS — NOT NECESSARY FOR STORM CONVEYANCE — CAN BE PLUGGED W/NO IMPACT ON HYDRAULICS

A. The principal spillway combination of a 12-inch riser and a 12-inch barrel is not acceptable. The spillway needs to transition from riser to barrel control prior to the riser entering orifice flow conditions to avoid plug flow conditions. The riser will need to be increased in size to meet this criteria.

DON B. Acceptable PVC pipe is PVC-1120 or PVC-1220 conforming to ASTM D-1785 or ASTM D-2241. Submit information to demonstrate this pipe meets those specifications. Also specifiy the SDR rating or the class of pipe used.

12-31-99 JBJ 5. Seepage Control. Seepage control must be provided on any pipe through the dam located within the phreatic zone. This control must consist of either anti-seep collars or filter/drainage diaphragms. Anti-seep collars must increase the flow length by 15%. — DOD indicated he poured (2) collars around 12" pipe barrel

12-31-99 JBJ 6. Drain Pipe. It is strongly recommended that a drain be provided in the dam to facilitate maintenance activities. NO ACTION REQ'D.

replaced w/ conc. spillway 12-31-99 JBJ 7. Secondary Spillway Pipes. The four 18-inch diamater pipes need to be supported, and protected from erosion and clogging. One method of doing this would be to create a headwall around all four pipes and then create a cage-type trash protection. An alternative would be a modified EW-11 structure.

8. Embankment. The top width of the dam needs to be specified with a minimum width of eight feet. SPECIFIED AS 12'

DON 9. Wetlands Permits. Provide evidence that any necessary wetlands permits are being pursued or have been obtained for this project.

U.S. Army Corps of Engineers
Norfolk District, Southern Virginia Regulatory Section
803 Front Street
Norfolk, Virginia 23510-1096

January 17, 1997

Project Number: 96-5732

Waterway: Edwards Swamp

1. Applicant
Don Hazelwood
8630 Richmond Road
Toano, VA 23168

2. Agent

3. Address of Job Site:
Off Rt. 620

4. Project Description:
Impact 0.52 acres of headwater wetlands for a road and a storm water detention area, as shown on the drawing dated January 10, 1997.

5. Findings

This is regarding your request to perform work in the waters of the United States, as described in part 4 above. This activity has been reviewed and found to satisfy the criteria contained in the Corps Nationwide Permit (26), attached. (The Corps Nationwide Permits and Regulations can be found in 33 CFR 330 published in Volume 56, Number 226 of the Federal Register dated November 22, 1991.) Provided the enclosed conditions are met, an individual Department of the Army Permit will not be required. The Virginia Department of Environmental Quality 's 401 Certificate is also attached. Please note that the special conditions of the 401 Certificate are part of the Corps Nationwide Permit 33 CFR 330 Appendix A (Part B, Number 26).

Authorization under the current NWP-26 expires on January 21, 1997; however, if you have commenced or are under contract to commence the work before this date, you will have twelve (12) months from this date to complete the activity (i.e., the maximum expiration date under the current NWP-26 is January 21, 1998). Activities completed under the authorization of a nationwide permit which was in effect at the time the activity was completed continue to be authorized by that nationwide permit.

It is your responsibility to remain informed of changes to the nationwide permits. We will issue a special public notice announcing any changes to the nationwide permits when they occur. You are responsible for complying with all the permit requirements and conditions; therefore, you should be certain the party performing the work authorized by this permit fully understands all the conditions and has a copy of this letter and the enclosed documents with them at the project site during construction.

6. Corps Contact: Melissa Schaup (804) 441-7489

R. Harold Jones
Chief, Southern Virginia Regulatory Section

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