James
City
County
VIRGINIA
Jamestown
1607

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.
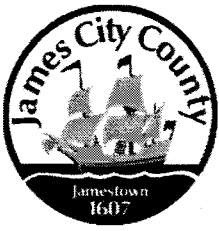

BMP NUMBER: CC-018

DATE VERIFIED: March 15, 2012

QUALITY ASSURANCE TECHNICIAN: Leah Hardenbergh

LOCATION: WILLIAMSBURG, VIRGINIA

Stormwater Division

MEMORANDUM

DATE: March 11, 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: CC018

PIN: 5020900013

Subdivision, Tract, Business or Owner

Name (if known):   Busch Corporate Center

Property Description: Site 13

Site Address: 348 Mclaws Circle

(For Internal use only)   **Box**   12   **Drawer:**   7

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

Comments
As of 3/11/2010 the owner of the property is Goodfarb Family Virginia Land LLC

CC018

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

FIFTH AMENDMENT TO CONTRACT BETWEEN

BUSCH PROPERTIES, INC.

AND

LOUIS C. GOODFARD

for the purchase of Site 13

THIS AMENDMENT entered into by and between BUSCH PROPERTIES, INC., a Delaware Corporation (Seller) and LOUIS C. GOODFARB, Trading as VIRBY REALTY COMPANY, a sole partnership (Buyer).

WHEREAS, Seller and Buyer have heretofore entered into a contract dated July 13, 1979 and amended on July 22, 1980, July 14, 1981 and July 22, 1982, which provided that Buyer shall purchase from Seller certain property located within the Busch Corporate Center - Williamsburg, and identified as Site 13 (11.24 acres) on that certain plat entitled, "Busch Corporate Center - Williamsburg, Plat of Site 13, and 18, to be Conveyed to Louis C. Goodfarb, Trading as Virby Realty Company, from Busch Properties, Inc., James City County, Virginia", dated June 1, 1979, revised June 21, 1979, revised June 22, 1979, prepared by Langley and McDonald, Consulting Engineers, Virginia Beach, Virginia, and recorded in the Circuit Court for the City of Williamsburg and County of James City in Plat Book 35 on Page 86, and;

WHEREAS, Buyer and Seller mutually agree to alter certain terms of the aforesaid contract;

NOW, THEREFORE in consideration of and reliance upon the premises set forth above and the undertakings hereinafter set forth, the parties hereto agree as follows:

1. Plat. The aforesaid plat dated June 1, 1979, revised June 21, 1979 and June 22, 1979, shall be extinguished by Seller and a new plat entitled "Busch Corporate Center - Williamsburg, Plat of Phase IV, to be conveyed to Louis C. Goodfarb, Trading as Virby Realty Company, from Busch Properties, Inc.", dated August 4, 1982, prepared by Langley and McDonald, Consulting Engineers, Virginia Beach, Virginia incorporated herewith as Exhibit "D", and to be recorded by Seller.

2. Property. The "Property" to be purchased by Buyer is hereby reduced to 5.41 acres, to include 3.03 acres hereafter referred to as Site 13 plus the 2.38 acre storm water retention pond between Site 13 and Buyer's Phase I, II and III property, to be conveyed to Buyer at no cost as per the provisions of paragraph 19 of the Contract, and shown on Exhibit "D".

18. <u>ROAD AND UTILITY IMPROVEMENTS</u>. This Agreement is contingent upon Seller completing construction of an extension of McLaws Circle Road shown on Exhibit "A" from its present terminus at the eastern property line of Site 13 to the western property line of Site 12 by November 30, 1979, but only if Closing shall take place on or before August 15, 1979; however, if Closing shall not take place until after August 15, 1979, then construction of the road will be completed by July 15, 1980.

19. <u>CONVEYANCE OF DRAINAGE POND</u>. Seller agrees to convey at no cost to Buyer and Buyer agrees to accept title to that area 2.38 acres between Phase IV and Phases I, II and III, purchased by buyer under a contract of sale with Seller dated April 13, 1977, currently used as a storm water retention pond so that the southeasterly property line of Phase IV will be coterminous with that of Phase III. Seller agrees to have his representatives on the Williamsburg Corporate Center Association Board of Trustee support a resolution for the Williamsburg Corporate Center Association to accept responsibility for the maintenance of this storm water retention pond. Buyer agrees that he will support similar resolutions regarding all other storm water retention ponds constructed or to be constructed within the area shown on Exhibit "A".

These provisions shall survive Closing.

IN WITNESS WHEREOF, the parties have executed this Agreement as of the day and year hereinbelow written. The latter of the dates appearing below shall be the effective date of this Agreement.

SELLER:

BUSCH PROPERTIES, INC.

By W. Randolph Baker   Date: 4/27/79

BUYER:

VIRBY REALTY COMPANY

By _____   Date: 7/13/79

AMENDMENT

THIS AMENDMENT, entered into by and between BUSCH PROPERTIES, INC., a Delaware Corporation (Seller), and LOUIS C. GOODFARB, Trading as VIRBY REALTY COMPANY, a sole proprietorship (Buyer),

WHEREAS, Seller and Buyer have entered into a contract of sale dated July 13, 1979 which provides that Buyer shall purchase certain real estate from Seller located within the Busch Corporate Center-Williamsburg identified in said contract as "Phase IV (Contract)," and further identified as Site 13 on a plat dated June 20, 1979 by Langley and McDonald Engineers of property to be conveyed to Buyer; and

WHEREAS, Seller and Buyer desire to modify and amend the Contract as hereinafter set forth, and

WHEREAS, it will be necessary for Seller to construct a sanitary sewer line across Site 13 at a future date generally from the right of way of McLaws Circle on the east and north of Site 13 to a 30' sanitary sewer easement retained by Seller on the west and south of Site 13 to serve Buyer's property and that of others, and

WHEREAS, the location of the sanitary sewer line easement has been deferred by Seller to allow it to be located to better serve the buildings Buyer is to construct on Site 13,

NOW, THEREFORE, in consideration of and reliance upon the premises set forth above and the undertakings hereinafter set forth, the parties hereto agree as follows:

1. Buyer hereby agrees that there shall be a 20' or 30' wide sanitary sewer easement crossing Site 13 from McLaws Circle on the north or east and the 30' wide sanitary sewer easement on the south or west of Site 13.

-1-

2. The location of said easement is to be subsequently determined by Langley and McDonald Consulting Engineers in consultation with Buyer, Seller and requisite public officials.

3. Buyer hereby agrees to convey said sanitary sewer easement to Seller or James City County, as appropriate, at no cost, in a timely manner when its location has been determined. Buyer further agrees to allow Seller and its contractors, engineers, surveyors, or public officials and their equipment and material to enter onto Site 13 to survey, design and construct the sanitary sewer line.

4. The provisions of this Amendment shall survive delivery of the Deed at closing.

WITNESS the following signatures and seals:

SELLER:

BUSCH PROPERTIES, INC.

By _____   Date 9/27/82

BUYER:

VIRBY REALTY COMPANY

By _____   Date 9/8/82

-2-
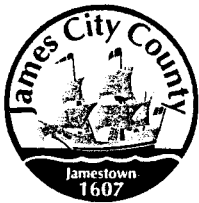
101-E MOUNTS BAY ROAD, P.O. BOX 8784, WILLIAMSBURG, VIRGINIA 23187-8784
(757) 253-6671   Fax: (757) 253-6850   E-MAIL: devtman@james-city.va.us

			COUNTY ENGINEER
CODE COMPLIANCE	ENVIRONMENTAL DIVISION	PLANNING	(757) 253-6678
(757) 253-6626	(757) 253-6670	(757) 253-6685	INTEGRATED PEST MANAGEMENT
codecomp@james-city.va.us	environ@james-city.va.us	planning@james-city.va.us	(757) 253-2620

April 22, 1998

Mr. Paul Cathcart
Printpack, Inc.
400 Packets Court
Williamsburg, VA 23185

RE: Printpack Expansion and BMP Maintenance

Dear Mr. Cathcart:

Attached are documents from the Busch Corporate Center Association that address the long-term maintenance of the Best Management Practice (BMP), or detention pond adjacent to the Printpack property. The information presents that the BMP's maintenance is the responsibility of the Association. This information satisfies the concerns the Environmental Division raised during the review of the Printpack expansion site plan allowing approval of the plan by the Division.

Please contact me at 253-6673 if you have any further questions.

Sincerely,

Darryl E. Cook, P.E.
Environmental Director

busch
corporate
center®
williamsburg

April 15, 1998

Mr. Darryl Cook
Civil Engineer, Environmental Services
James City County
P.O. Box 8784
Williamsburg, Virginia 23187

RE: Retention Pond - Busch Corporate Center

Dear Mr. Cook:

Please find attached property transfer documents identifying the responsibility of drainage maintenance and repair for the retention pond located in the Busch Corporate Center as the responsibility of the Busch Corporate Center Association.

Should the County, during the course of inspections, find the need to repair or address maintenance issues relative to the drainage system within the Busch Corporate Center please contact the Association office at 253-3950.

If we may be of further assistance please contact us.

Sincerely,

William B. Voliva, Jr.
President
Busch Corporate Center Association

cc: Mr. William F. Brown

Attachments

STD. HANDICAP SIGN
N.T.S.

RESERVED PARKING
VAN ACCESSIBLE

12"
18"
6"
3'-0" MIN.
7'-0" MAX.

ABOVE GRADE SIGN

ADDITIONAL SIGN TO INDICATE A VAN ACCESSIBLE HANDICAP SPACE

4" BLUE TRAFFIC LINES

VAN DISABLED PARKING RAMP;
SLOPE 1:10
2" ASPHALT RAMP
EXISTING CURB

LOT 20Y

SEE ENLARGED PLAN SH NO 4

EXISTING 12Ø NWW MAIN WATER LINE
TAPPING SLEEVE & VALVE 12"
FIRE HYDRANT
VAULT & 10Ø DETECTOR CHECK BY NWW

PROPERTY LINE
SETBACK LINE

5'x10' SPRINKLER SYSTEM PUMP HOUSE SEE ARCH & MECH. DWG.

PRIMARY UNDERGROUND ELECTRIC SERVICE TO FIRE PUMP

JAMES CITY COUNTY PUMP STATION

6" CHAIN LINK FENCE WITH BARB WIRE

8" DI SPRINKLER FIRE LINE MINIMUM DEPTH 3.5

EXISTING BUILDING

LOT 13

CC018

EXISTING BUILDING

NEW CG-2 SEE SH NO.5

DISABLED
FIRE HYDRANT
EXISTING CG-2
CONC WALK

RELOCATE EXTG. DISABLED SIGN ON NEW POST TO NEW SIGNS PER DETAIL SH NO 3
NEW 4" CONC. SIDEWALK IN THIS AREA TO MATCH EXISTING

NEW VAN DISABLED SIGNS SEE DETAIL SH. NO. 3

RELOCATE EXTG. DISABLED SIGN ON NEW POST TO MATCH DETAIL

REPLACE EXISTING CMP RISER FOR DRY PMP WITH NEW RELIEF CONC. RISER SEE DETAIL SHEET NO.5

RUN FIRE LINE GRASS STRIP BETWEEN SIDEWALK & PLANTING BEDS, PROTECT ALL SHRUBBERY REMOVE, BALL & REPLACE ANY SHRUB WHICH INTERFERE WITH CONSTRUCTION.

EXISTING LINK:
CHEMICAL STORAGE ROOM

RELOCATED POSITION FOR TRASH COMPACTOR CONC PAD SEE ARCH & STRUCTURAL DWG.

NEW ADDITION:
FIN FLOOR ELEV. 79.41
11,927 SF
EXIST. F.F. = 79.41
TBM = 78.25

EDGE OF DOCK ELEV. 79.3

STANDARD GUTTER DETAIL ACROSS ENTRANCE SEE SH NO.5

RELOCATED PORTION OF 6" CCA SALT TREATED WOOD CURB
4 NEW 4" CONDUITS BY VA POWER
CONC. HVAC PAD
ELEVATED HVAC PAD
EXISTING HVAC PAD
STOOP W/ STEP
GRAVEL

SETBACK LINE

NOT IN CONTRACT:

30.0 x 36.0 x 7" REINF. CONC. A.C. PAD. SEE "STRUCTURAL & ARCH DWG.

8'-0" TALL WOOD SCREEN FENCE ON 2 SIDES SEE DETAIL SH NO.5

NEW SECTION OF CCA SALT TREATED WOOD CURB

NEW 7" THICK CONC ENTRANCE DRIVE OVER 4" CRUSHED STONE PER CONC. DETAIL
NEW 18" RCP @ APPROX. 1.4 % SLOPE SH NO 2
NEW MH-1 RIM 75.71 INVERT 71.8
CG-2 SEE DETAIL SH NO. 5
18.0 x 30.0 x 3.5 DEEP REINFORCED CONC. SILO PAD. SEE DETAIL THIS SHEET. SILO'S BY OTHERS
APPROX INVERT OUTS 71.09
APPROX ELEV OF EXTG STORM 70.69
EXTEND 15Ø RCP TO NEW MH-1

OUTSIDE RADIUS 145'
INSIDE RADIUS 125'

PATCH ALL BIT CONC. ROAD & PARKING SURFACE PER THIS DETAIL

TYP. HEAVY DUTY PAVEMENT SECTION
SCALE NONE

(1) SILO FOUNDATION - PLAN
(1) SILO FOUNDATION - ELEVATION
FOUNDATION ANCHOR BOLTS DETAIL

CONCRETE DESIGN SHOWN FOR GENERAL INFORMATION ONLY - NOT FOR FABRICATION -

LAYOUT and UTILITIES PLAN:

GRAPHIC SCALE 1"=30
0   30   60   90

MANHOLE FOR 12"-48" PIPE CULVERTS
Virginia Department of Transportation

STANDARD 6" CURB
Virginia Department of Transportation

COMBINATION 6" CURB & GUTTER
Virginia Department of Transportation

STANDARD GUTTER
FOR ENTRANCES AND STREET CONNECTIONS
Virginia Department of Transportation

PRECAST ANTI-VORTEX DEVICE
(CAP AND RISER)
CONCRETE PIPE & PRODUCTS CO., INC.

CROSS SECTION THRU NEW RISER
CC018

A.C. FENCE DETAIL
NOT IN CONTRACT:

FENCING AND ARMORING
CORRECT METHODS OF TREE FENCING
CORRECT TRUNK ARMORING
TRIANGULAR BOARD FENCE

BLOCK & GRAVEL CURB INLET SEDIMENT FILTER

SPECIAL APPLICATION

STONE CONSTRUCTION ENTRANCE
SIDE ELEVATION
PLAN VIEW
SECTION A-A
SECTION B-B

CONSTRUCTION OF A SILT FENCE (WITH WIRE SUPPORT)

CONSTRUCTION OPERATIONS RELATIVE TO THE LOCATION OF PROTECTED TREES

Langley and McDonald, P.C.
Engineers · Surveyors · Planners
Landscape Architects · Environmental Consultants
WILLIAMSBURG VIRGINIA BEACH

ADDITION TO PRINTPACK INC
400 PACKETS COURT
WILLIAMSBURG, VIRGINIA

PROJ. NO. 186200
SHEET 5 OF 7
DWG 6924W

MEMORANDUM

Langley and McDonald, P.C.

Engineers
Surveyors
Planners
Landscape Architects
Environmental Consultants

CC-018

To: Darryl Cook, James City County

From: Diana Browne, L&M

Date: January 29, 1998

Subject: Printpack Expansion
             L&M 86120-103

As requested, enclosed please find additional calculations regarding the 100-year storm for the referenced project. The results indicate that the existing 100-year flood elevation for the detention pond is **73.23 feet**, which overtops the dam crest (dam crest elevation is 73.1). Under the proposed conditions, the 100-year flood elevation is **73.4 feet.**

Please call us if you have any questions or comments.

Printpack Plant Expansion
Stormwater Management

L&M Job 86120-103
January 16, 1998

Printpack is located at 400 Packets Court in the Busch Corporate Center in James City County. The Printpack property is approximately 9.7 acres in area, and consists of two buildings, paved parking and sidewalks, and open areas. Printpack is proposing to expand their plant by constructing a 70' x 160' addition to one of the existing buildings, along with a new gravel road for fire truck access. Since the building expansion will be located over an existing paved area, there will be no increase in impervious area with the proposed expansion.

The Printpack site currently drains to an off-site dry detention pond that is owned by Busch. The drainage area to the pond is **18.7 acres**, which includes the Printpack site, as well as Eastern International and the adjacent parking lot. No increase in peak flowrates to the pond from the contributing watershed are anticipated with the proposed plant expansion.

Under the County's Chesapeake Bay Preservation Regulations, the proposed expansion is considered redevelopment, and a 10% reduction in pollutant loads from the project is required. Since the site currently drains to a stormwater management pond, James City County has indicated that no additional treatment is necessary as long as the pond is in good operating condition. Based upon field observations, the existing outfall structure is a 24" CMP riser with 1" diameter holes around its perimeter, and a 24" CMP barrel. The riser structure needs to be upgraded for the pond to be considered in good operating condition.

A 48" RCP riser is proposed to replace the existing 24" CMP riser. The riser crest elevation will increase from the existing elevation of 67.43 to 70.6 to allow for additional water quality drawdown volume. The volume of water at Elev. 70.6 (41,347 c.f.) is equivalent to 0.6 inches of runoff over the 18.7-acre drainage area. An **8" diameter orifice** at the bottom of the riser is proposed to allow gradual drawdown for water quality enhancement. No changes to the barrel or dam are anticipated. The modeling results for existing and proposed conditions are as follows:

Langley and McDonald, P.C.

Engineers
Surveyors
Planners
Landscape Architects
Environmental Consultants

GEORGE E. LANGLEY
Consultant
T. JOSEPH McDONALD
1906-1982

JAN 1998
RECEIVED
ENVIRONMENTAL DIVISION
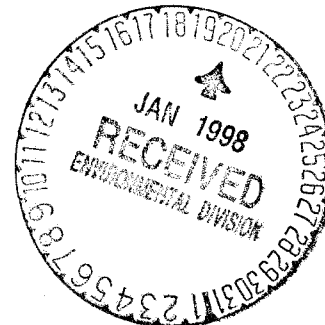
January 19, 1998

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

Re: Retrofit of BMP at Packets Court for Printpack Inc.

Dear Darryl:

Thank you for your prompt reply to our request for a meeting with Diana Brown and myself yesterday. Both Diana and I were pleased with the meeting and have worked to meet the modified criteria you spoke of.

The results of this are provided at enclosure, Printpack Plant Expansion Stormwater Management, Langley and McDonald Job Number 86120-103, January 16, 1998.

As this project is a County expedited review process, we request your comments as soon as possible so that we can make any necessary changes and/or adjustments.

Respectfully yours,

LANGLEY AND McDONALD, P.C.

100 year storm ?

Willard E. Gwilliam, F.A.I.A.
Senior Project Manager

WEG/tmp
Enclosure

cc: Mr. Paul Holt, w/ enclosure
        Mr. Paul Cathcart, w/enclosure

MAIN OFFICE
5544 Greenwich Road
Virginia Beach, VA 23462
(757) 473-2000
FAX: (757) 497-7933

201 Packets Court
Williamsburg, VA 23185
(757) 253-2975
FAX: (757) 229-0049

PRINTPACK PLANT EXPANSION
STORMWATER MANAGEMENT

L&M JOB 86120-103
JANUARY 16, 1998

Printpack Plant Expansion
Stormwater Management

L&M Job 86120-103
January 16, 1998

Printpack is located at 400 Packets Court in the Busch Corporate Center in James City County. The Printpack property is approximately 9.7 acres in area, and consists of two buildings, paved parking and sidewalks, and open areas. Printpack is proposing to expand their plant by constructing a 70' x 160' addition to one of the existing buildings, along with a new gravel road for fire truck access. Since the building expansion will be located over an existing paved area, there will be no increase in impervious area with the proposed expansion.

The Printpack site currently drains to an off-site dry detention pond that is owned by Busch. The drainage area to the pond is 18.7 acres, which includes the Printpack site, as well as Eastern International and the adjacent parking lot. No increase in peak flowrates to the pond from the contributing watershed are anticipated with the proposed plant expansion.

Under the County's Chesapeake Bay Preservation Regulations, the proposed expansion is considered redevelopment, and a 10% reduction in pollutant loads from the project is required. Since the site currently drains to a stormwater management pond, James City County has indicated that no additional treatment is necessary as long as the pond is in good operating condition. Based upon field observations, the existing outfall structure is a 24" CMP riser with 1" diameter holes around its perimeter, and a 24" CMP barrel. The riser structure needs to be upgraded for the pond to be considered in good operating condition.

A 48" RCP riser is proposed to replace the existing 24" CMP riser. The riser crest elevation will increase from the existing elevation of 67.43 to 70.6 to allow for additional water quality drawdown volume. The volume of water at Elev. 70.6 (41,347 c.f.) is equivalent to 0.6 inches of runoff over the 18.7-acre drainage area. An 8" diameter orifice at the bottom of the riser is proposed to allow gradual drawdown for water quality enhancement. No changes to the barrel or dam are anticipated. The modeling results for existing and proposed conditions are as follows:

Existing Conditions

Storm Event	Peak Inflow	Peak Outflow	Peak Elevation
2-year	54 cfs	26 cfs	70.16
10-year	91 cfs	32 cfs	71.69

Drawdown time from Elev 70.6 = 3.7 hours   67.43 - riser

Proposed Conditions

Storm Event	Peak Inflow	Peak Outflow	Peak Elevation
2-year	54 cfs	24 cfs	71.20
10-year	91 cfs	47 cfs	72.10

Drawdown time from Elev 70.6 = 5.1 hours   70.6 - riser elw

Under proposed conditions,

- there is a reduction in the 2-year peak flowrate from 26 cfs to 24 cfs.
- the drawdown time for water quality enhancement is increased.
- the 10-year peak elevation increases by 0.4 feet; however, 1 foot of freeboard is maintained (top of dam elev. = 73.1).

With the proposed changes in outlet structure, the pond should continue to provide stormwater management for the entire 18.7-acre drainage area.

NORTH

13
1 Ac.

1
3.0 Ac.

EASTERN INTERNATIONAL

EASTERN INTERNATIONAL

STORM WATER DETENTION POND 2.38 Ac.

GIG ASSOCIATES

BUSCH PROPERTIES SALES CENTER

JEFFERSON ROAD

KINGAM ROAD

PANY 30' EASEMENT

NTRY ROAD

RVATION ZONE

RAMPART

SITE

18.7 AC

DRAINAGE AREA = 18.7 Ac
CN = 90
T_c = 10 MIN.

SCALE 1" = 200'
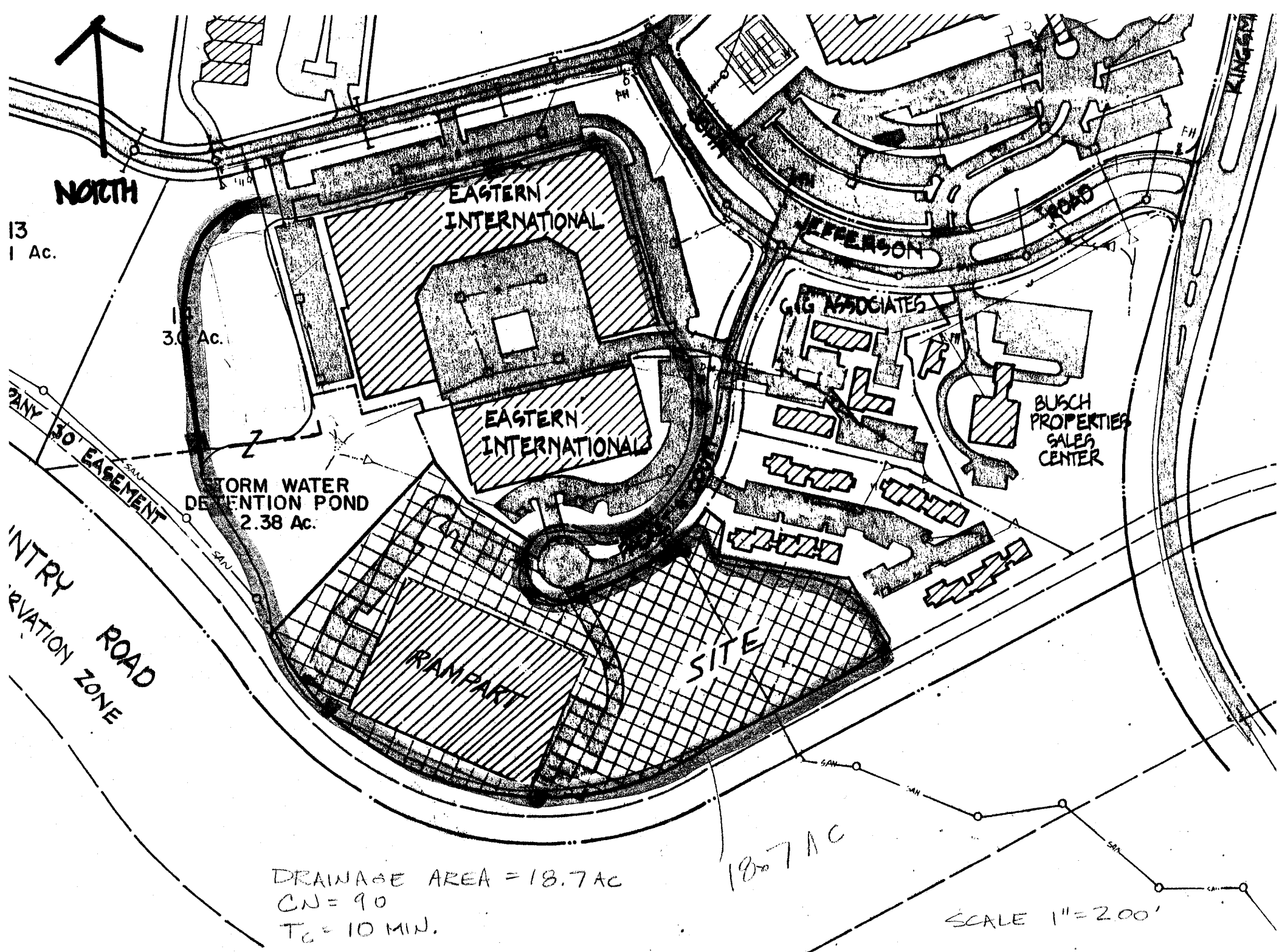
EXISTING CONDITIONS

```
                  TR-55 TABULAR HYDROGRAPH METHOD
                       Type II. Distribution
                      (24 hr. Duration Storm)

                 Executed:  01-16-1998  11:11:39
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            Hydrograph file: --> C:\86120-~1\SITE2YR.HYD

                           PrintPack
                           86120-103
           Hydrographs for drainage area to existing BMP
          No changes in hydrographs for Print Pack project
```

```
          >>>> Input Parameters Used to Compute Hydrograph <<<<
------------------------------------------------------------------------
```

Subarea Description	AREA (acres)	CN	Tc (hrs)	* Tt (hrs)	Precip. (in)	Runoff (in)	Ia/p input/used
area to BMP	18.70	90.0	0.20	0.00	3.36	2.32	I.07 .10

```
* Travel time from subarea outfall to composite watershed outfall point.
I -- Subarea where user specified interpolation between Ia/p tables.

              Total area = 18.70 acres  or  0.02922 sq.mi
                      Peak discharge =  54 cfs
```

```
          >>>> Computer Modifications of Input Parameters <<<<
------------------------------------------------------------------------
```

Subarea Description	Input Values Tc (hr)	* Tt (hr)	Rounded Values Tc (hr)	* Tt (hr)	Ia/p Interpolated (Yes/No)	Ia/p Messages
area to BMP	0.17	0.00	0.20	0.00	No	Computed Ia/p < .1

```
* Travel time from subarea outfall to composite watershed outfall point.
```

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 01-16-1998 11:11:39
Watershed file: --> C:\86120-~1\WSHED   .MOP
Hydrograph file: --> C:\86120-~1\SITE2YR.HYD

PrintPack
86120-103
Hydrographs for drainage area to existing BMP
No changes in hydrographs for Print Pack project

>>>> Summary of Subarea Times to Peak <<<<

Subarea	Peak Discharge at Composite Outfall (cfs)	Time to Peak at Composite Outfall (hrs)
area to BMP	54	12.2
Composite Watershed	54	12.2

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 01-16-1998   11:11:39
Watershed file: --> C:\86120-~1\WSHED   .MOP
Hydrograph file: --> C:\86120-~1\SITE2YR.HYD

PrintPack
86120-103
Hydrographs for drainage area to existing BMP
No changes in hydrographs for Print Pack project

Composite Hydrograph Summary (cfs)

Subarea Description	11.0 hr	11.3 hr	11.6 hr	11.9 hr	12.0 hr	12.1 hr	12.2 hr	12.3 hr	12.4 hr
area to BMP	2	2	3	14	27	50	54	33	17
Total (cfs)	2	2	3	14	27	50	54	33	17

Subarea Description	12.5 hr	12.6 hr	12.7 hr	12.8 hr	13.0 hr	13.2 hr	13.4 hr	13.6 hr	13.8 hr
area to BMP	11	9	7	6	5	4	4	3	3
Total (cfs)	11	9	7	6	5	4	4	3	3

Subarea Description	14.0 hr	14.3 hr	14.6 hr	15.0 hr	15.5 hr	16.0 hr	16.5 hr	17.0 hr	17.5 hr
area to BMP	3	2	2	2	2	2	1	1	1
Total (cfs)	3	2	2	2	2	2	1	1	1

Subarea Description	18.0 hr	19.0 hr	20.0 hr	22.0 hr	26.0 hr
area to BMP	1	1	1	1	0
Total (cfs)	1	1	1	1	0

                   TR-55 TABULAR HYDROGRAPH METHOD
                         Type II. Distribution
                        (24 hr. Duration Storm)

                   Executed: 01-16-1998 11:11:39
           Watershed file: --> C:\86120-~1\WSHED   .MOP
           Hydrograph file: --> C:\86120-~1\SITE10YR.HYD

                              PrintPack
                              86120-103
             Hydrographs for drainage area to existing BMP
           No changes in hydrographs for Print Pack project

           >>>> Input Parameters Used to Compute Hydrograph <<<<

   Subarea   AREA   CN   Tc   * Tt   Precip. | Runoff   Ia/p
  Description   (acres)   (hrs) (hrs)   (in) | (in) input/used
----
area to BMP   18.70   90.0   0.20   0.00   5.04 | 3.91   I.04   .10
----
* Travel time from subarea outfall to composite watershed outfall point.
I -- Subarea where user specified interpolation between Ia/p tables.

               Total area = 18.70 acres or 0.02922 sq.mi
                    Peak discharge = 91 cfs

           >>>> Computer Modifications of Input Parameters <<<<<

               Input Values   Rounded Values   Ia/p
   Subarea   Tc   * Tt   Tc   * Tt   Interpolated   Ia/p
  Description   (hr)   (hr)   (hr)   (hr)   (Yes/No)   Messages
----
area to BMP   0.17   0.00   0.20   0.00   No   Computed Ia/p < .1
----
* Travel time from subarea outfall to composite watershed outfall point.

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 01-16-1998 11:11:39
Watershed file: --> C:\86120-~1\WSHED   .MOP
Hydrograph file: --> C:\86120-~1\SITE10YR.HYD

PrintPack
86120-103
Hydrographs for drainage area to existing BMP
No changes in hydrographs for Print Pack project

>>>> Summary of Subarea Times to Peak <<<<

Subarea	Peak Discharge at Composite Outfall (cfs)	Time to Peak at Composite Outfall (hrs)
area to BMP	91	12.2
Composite Watershed	91	12.2

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 01-16-1998 11:11:39
Watershed file: --> C:\86120-~1\WSHED   .MOP
Hydrograph file: --> C:\86120-~1\SITE10YR.HYD

PrintPack
86120-103
Hydrographs for drainage area to existing BMP
No changes in hydrographs for Print Pack project

Composite Hydrograph Summary (cfs)

Subarea Description	11.0 hr	11.3 hr	11.6 hr	11.9 hr	12.0 hr	12.1 hr	12.2 hr	12.3 hr	12.4 hr
area to BMP	3	4	5	24	46	84	91	55	29
Total (cfs)	3	4	5	24	46	84	91	55	29

Subarea Description	12.5 hr	12.6 hr	12.7 hr	12.8 hr	13.0 hr	13.2 hr	13.4 hr	13.6 hr	13.8 hr
area to BMP	19	15	12	10	8	7	6	6	5
Total (cfs)	19	15	12	10	8	7	6	6	5

Subarea Description	14.0 hr	14.3 hr	14.6 hr	15.0 hr	15.5 hr	16.0 hr	16.5 hr	17.0 hr	17.5 hr
area to BMP	5	4	4	3	3	3	2	2	2
Total (cfs)	5	4	4	3	3	3	2	2	2

Subarea Description	18.0 hr	19.0 hr	20.0 hr	22.0 hr	26.0 hr
area to BMP	2	2	1	1	0
Total (cfs)	2	2	1	1	0

POND-2 Version: 5.20
S/N:

<center>Print Pack
86120-103
existing volume from 87 calculations</center>

<center>CALCULATED   01-16-1998   11:12:41
DISK FILE: c:\86120-~1\EXIST   .VOL</center>

<center>Planimeter scale: 1 inch = 1 ft.</center>

Elevation (ft)	Planimeter (sq.in.)	Area (sq.ft)	A1+A2+sqr(A1*A2) (sq.ft)	* Volume (cubic-ft)	Volume Sum (cubic-ft)
66.50	0.00	0	0	0	0
67.00	1,980.00	1,980	1,980	330	330
67.30	*I*	2,926	7,313	731	1,061
67.40	*I*	3,282	7,812	1,042	1,372
68.00	5,850.00	5,850	11,233	3,744	4,074
69.00	12,690.00	12,690	27,156	9,052	13,126
69.40	*I*	15,090	41,618	5,549	18,676
69.90	*I*	18,383	46,346	13,904	27,030
70.00	19,080.00	19,080	47,330	15,777	28,903
70.30	*I*	20,728	59,695	5,970	34,873
70.60	*I*	22,445	62,219	12,444	41,347
71.00	24,840.00	24,840	65,690	21,897	50,800
72.00	31,140.00	31,140	83,792	27,931	78,731
73.00	37,440.00	37,440	102,725	34,242	112,972

I ---> Interpolated area from closest two planimeter readings.

$$IA = (sq.rt(Area1) + ((Ei-E1)/(E2-E1))*(sq.rt(Area2)-sq.rt(Area1)))^2$$

where: E1, E2   = Closest two elevations with planimeter data
       Ei   = Elevation at which to interpolate area
       Area1,Area2 = Areas computed for E1, E2, respectively
       IA   = Interpolated area for Ei

* Incremental volume computed by the Conic Method for Reservoir Volumes.

Volume = (1/3) * (EL2-EL1) * (Area1 + Area2 + sq.rt.(Area1*Area2))

where: EL1, EL2   = Lower and upper elevations of the increment
       Area1,Area2 = Areas computed for EL1, EL2, respectively
       Volume   = Incremental volume between EL1 and EL2

Outlet Structure File: EXIST   .STR

POND-2 Version: 5.20   S/N:
Date Executed: Time Executed:


```
*************
 Print Pack
 86120-103
existing pond

*************
```


***** COMPOSITE OUTFLOW SUMMARY ****

Elevation (ft)	Q (cfs)	Contributing Structures
66.50	0.0	1 +7
67.00	0.2	1 +7
67.50	0.8	3 +2 +6 +1 +7
68.00	9.4	3 +2 +6 +1 +7
68.50	16.3	3 +2 +6 +1 +7
69.00	19.7	3 +2 +6 +1 +7
69.50	22.5	3 +2 +6 +1 +7
70.00	25.1	3 +2 +6 +1 +7
70.50	27.4	3 +2 +6 +1 +7
71.00	29.6	3 +2 +6 +1 +7
71.50	31.6	3 +2 +6 +1 +7
72.00	33.4	3 +2 +6 +1 +7
72.50	35.2	3 +2 +6 +1 +7
73.00	36.9	3 +2 +6 +1 +7

2' riser 1"∅ ? 1"∅ ?

#4- 24" barrel

Outlet Structure File: EXIST   .STR

POND-2 Version: 5.20   S/N:
Date Executed: Time Executed:


```
             *************
              Print Pack
              86120-103
             existing pond

             *************
```


    Outlet Structure File: c:\86120-~1\EXIST   .STR
    Planimeter Input File: c:\86120-~1\EXIST   .VOL
    Rating Table Output File: c:\86120-~1\EXIST   .PND

Min. Elev.(ft) = 66.5   Max. Elev.(ft) = 73   Incr.(ft) = .5

    Additional elevations (ft) to be included in table:
    *


```
        ************************************************
                       SYSTEM CONNECTIVITY
        ************************************************

            Structure     No.   Q Table   Q Table
            ----------     ---   -------   -------
            STAND PIPE      3               ->   3
            CULVERT-CR      4    ?   3      ->   5
            ORIFICE-VC      2               ->   2
            TABLE           6               ->   6
            ORIFICE-VC      1               ->   1
            TABLE           7               ->   7
```


Outflow rating table summary was stored in file:
c:\86120-~1\EXIST   .PND

Outlet Structure File: EXIST   .STR

POND-2 Version: 5.20   S/N:
Date Executed: Time Executed:


```
            *************
             Print Pack
             86120-103
            existing pond

            *************


      >>>>>> Structure No. 3 <<<<<<
             (Input Data)

   STAND PIPE
   Stand Pipe with weir or orifice flow


   E1 elev.(ft)?          67.43
   E2 elev.(ft)?           73.001
   Crest elev.(ft)?       67.43
   Diameter (ft)?         2
   Weir coefficient?      3.3
   Orifice coefficient?   0.6
   Start transition elev.(ft) @ ?
   Transition height (ft)?
```

Outlet Structure File: EXIST   .STR

POND-2 Version: 5.20   S/N:
Date Executed: Time Executed:


```
             *************
              Print Pack
               86120-103
             existing pond

             *************


       >>>>>> Structure No. 4 <<<<<<
                (Input Data)

       CULVERT-CR
       Circular Culvert (With Inlet Control)


       E1 elev.(ft)?           67.43
       E2 elev.(ft)?            73.001
       Diam. (ft)?             2
       Inv. el.(ft)?           63.62
       Slope (ft/ft)?           .02
       T1 ratio?
       T2 ratio?
       K Coeff.?                .0078
       M Coeff.?               2.0
       c Coeff.?                .0379
       Y Coeff.?                .69
       Form 1 or 2?            1
       Slope factor?           -0.5
```

Outlet Structure File: EXIST   .STR

POND-2 Version: 5.20   S/N:
Date Executed: Time Executed:

```
                    *************
                     Print Pack
                      86120-103
                    existing pond

                    *************


            >>>>>> Structure No. 2 <<<<<<
                    (Input Data)

         ORIFICE-VC
         Orifice - Vertical Circular


         E1 elev.(ft)?              67.31
         E2 elev.(ft)?               73.001
         Orifice coeff.?            0.6
         Invert elev.(ft)?          67.23
         Datum  elev.(ft)?          67.27
         Diameter (ft)?             .083
```

1″ ⌀

Outlet Structure File: EXIST   .STR

POND-2 Version: 5.20   S/N:
Date Executed: Time Executed:


```
             *************
              Print Pack
               86120-103
             existing pond

             *************
```


```
        >>>>>> Structure No. 6 <<<<<<
                (Input Data)

     TABLE
     Input your own rating table.
     E1 (ft) =67.31      E2 (ft) = 73.001

     Constant (ft) added to each elevation was:

             Elev. (ft)      Q (cfs)
             ----------      -------
                66.5           0
                67             0
                68            .18
                69            .28
                70            .35
                71            .41
                72            .46
                73            .5
```

Outlet Structure File: EXIST   .STR

POND-2 Version: 5.20   S/N:
Date Executed: Time Executed:


```
             *************
              Print Pack
               86120-103
             existing pond

             *************


        >>>>>> Structure No. 1 <<<<<<
                (Input Data)

        ORIFICE-VC
        Orifice - Vertical Circular


        E1 elev.(ft)?            66.2
        E2 elev.(ft)?             73.001
        Orifice coeff.?          0.6
        Invert elev.(ft)?        66.12
        Datum  elev.(ft)?        66.16
        Diameter (ft)?           .083
```

Outlet Structure File: EXIST   .STR

POND-2 Version: 5.20   S/N:
Date Executed: Time Executed:


```
             *************
              Print Pack
               86120-103
             existing pond

             *************
```


```
       >>>>>> Structure No. 7 <<<<<<
               (Input Data)
```

TABLE
Input your own rating table.
E1 (ft) =66.2   E2 (ft) = 73.001

Constant (ft) added to each elevation was:

Elev. (ft)	Q (cfs)
66.5	0
67	.19
68	.28
69	.35
70	.41
71	.46
72	.51
73	.55

Outlet Structure File: EXIST   .STR

POND-2 Version: 5.20   S/N:
Date Executed: Time Executed:

                    ****
                     Print Pack
                     86120-103
                     existing pond

                    ****

Outflow Rating Table for Structure #3
STAND PIPE Stand Pipe with weir or orifice flow

          ***** INLET CONTROL ASSUMED *****

Elevation (ft)   Q (cfs)   Computation Messages
--------------   -------   ------------------------
       66.50   0.0   E < Inv.El.= 67.43
       67.00   0.0   E < E1=67.43
       67.50   0.4   Weir: H =.07
       68.00   8.9   Weir: H =.570
       68.50   15.6   Orifice: H =1.07
       69.00   19.0   Orifice: H =1.57
       69.50   21.8   Orifice: H =2.07
       70.00   24.2   Orifice: H =2.57
       70.50   26.5   Orifice: H =3.07
       71.00   28.6   Orifice: H =3.57
       71.50   30.5   Orifice: H =4.07
       72.00   32.3   Orifice: H =4.57
       72.50   34.1   Orifice: H =5.07
       73.00   35.7   Orifice: H =5.57

    Weir   Cw = 3.3   Weir length = 6.283186 ft
    Orifice Co = .6   Orifice area = 3.141593 sq.ft.
    Q (cfs) = (Cw * L * H**1.5) or (Co * A * sqr(2*g*H))
    No transition used, transition height = 0.0
    Weir equation = Orifice equation @ elev.= 68.15955 ft

Outlet Structure File: EXIST   .STR

POND-2 Version: 5.20   S/N:
Date Executed: Time Executed:

             ****
              Print Pack
              86120-103
             existing pond

             ****

Outflow Rating Table for Structure #4
CULVERT-CR Circular Culvert (With Inlet Control)

        ***** INLET CONTROL ASSUMED *****

Elevation (ft)   Q (cfs)   Computation Messages
--------------   -------   -------------------------
        66.50   0.0   E < E1=67.43
        67.00   0.0   E < E1=67.43
        67.50   25.7   Submerged: HW =3.88
        68.00   28.0   Submerged: HW =4.38
        68.50   30.3   Submerged: HW =4.88
        69.00   32.3   Submerged: HW =5.38
        69.50   34.3   Submerged: HW =5.88
        70.00   36.1   Submerged: HW =6.38
        70.50   37.9   Submerged: HW =6.88
        71.00   39.6   Submerged: HW =7.38
        71.50   41.2   Submerged: HW =7.880
        72.00   42.8   Submerged: HW =8.38
        72.50   44.3   Submerged: HW =8.88
        73.00   45.7   Submerged: HW =9.38

   Used Unsubmerged Equ. Form (1) for elev. less than 65.87 ft
   Used Submerged Equation for elevations greater than 66.189 ft
   HW=Headwater (ft) dc=Critical depth (ft) Ac=Area (sq.ft) at dc

   Transition flows interpolated from the following values:
   E1=65.87 ft; Q1=15.55 cfs; Dc=1.42 ft; E2=66.189 ft; Q2=17.77 cfs

```
Outlet Structure File: EXIST    .STR

POND-2 Version: 5.20              S/N:
Date Executed:                    Time Executed:


                     *************
                      Print Pack
                      86120-103
                     existing pond

                     *************


Outflow Rating Table for Structure #2
ORIFICE-VC  Orifice - Vertical Circular


Elevation (ft)     Q (cfs)      Computation  Messages
---------------    -------      -------------------------
       66.50        0.0         E < E1=67.31
       67.00        0.0         E < E1=67.31
       67.50        0.0         H =.23
       68.00        0.0         H =.73
       68.50        0.0         H =1.23
       69.00        0.0         H =1.73
       69.50        0.0         H =2.23
       70.00        0.0         H =2.73
       70.50        0.0         H =3.23
       71.00        0.1         H =3.73
       71.50        0.1         H =4.23
       72.00        0.1         H =4.73
       72.50        0.1         H =5.23
       73.00        0.1         H =5.73

   C = .6     A = 5.410608E-03 sq.ft.
   H (ft)  = Table elev. - Datum elev. ( 67.27 ft )
   Q (cfs) = C * A * sqr(2g * H)
```

Outlet Structure File: EXIST   .STR

POND-2 Version: 5.20   S/N:
Date Executed: Time Executed:


```
              *************
               Print Pack
               86120-103
              existing pond

              *************
```


Outflow Rating Table for Structure #6
TABLE   Input your own rating table.

Elevation (ft)	Q (cfs)	Computation Messages
66.50	0.0	E < E1=67.31
67.00	0.0	E < E1=67.31
67.50	0.1	Interpolated from input table
68.00	0.2	
68.50	0.2	Interpolated from input table
69.00	0.3	
69.50	0.3	Interpolated from input table
70.00	0.3	
70.50	0.4	Interpolated from input table
71.00	0.4	
71.50	0.4	Interpolated from input table
72.00	0.5	
72.50	0.5	Interpolated from input table
73.00	0.5	

Outlet Structure File: EXIST   .STR

POND-2 Version: 5.20   S/N:
Date Executed: Time Executed:


```
             *************
              Print Pack
              86120-103
             existing pond

             *************
```


Outflow Rating Table for Structure #1
ORIFICE-VC Orifice - Vertical Circular

Elevation (ft)	Q (cfs)	Computation Messages
66.50	0.0	H =.34
67.00	0.0	H =.84
67.50	0.0	H =1.34
68.00	0.0	H =1.84
68.50	0.0	H =2.34
69.00	0.0	H =2.84
69.50	0.0	H =3.34
70.00	0.1	H =3.84
70.50	0.1	H =4.34
71.00	0.1	H =4.84
71.50	0.1	H =5.34
72.00	0.1	H =5.84
72.50	0.1	H =6.34
73.00	0.1	H =6.84

$C = .6$ $A = 5.410608E\text{-}03$ sq.ft.
H (ft) = Table elev. - Datum elev. (66.16 ft)
Q (cfs) = $C * A * \text{sqr}(2g * H)$

Outlet Structure File: EXIST   .STR

POND-2 Version: 5.20   S/N:
Date Executed: Time Executed:


```
              *************
               Print Pack
               86120-103
              existing pond

              *************
```


Outflow Rating Table for Structure #7
TABLE   Input your own rating table.

Elevation (ft)	Q (cfs)	Computation Messages
66.50	0.0	
67.00	0.2	
67.50	0.2	Interpolated from input table
68.00	0.3	
68.50	0.3	Interpolated from input table
69.00	0.3	
69.50	0.4	Interpolated from input table
70.00	0.4	
70.50	0.4	Interpolated from input table
71.00	0.5	
71.50	0.5	Interpolated from input table
72.00	0.5	
72.50	0.5	Interpolated from input table
73.00	0.6	

Outlet Structure File: EXIST   .STR

POND-2 Version: 5.20   S/N:
Date Executed: Time Executed:


```
              *************
               Print Pack
               86120-103
             existing pond

              *************
```


```
              Outflow Rating Table 5
                Table 5  =  3  ?  4
```


Elevation (ft)	Q (cfs)	Contributing Structures
66.50	0.0	-
67.00	0.0	-
67.50	0.4	3
68.00	8.9	3
68.50	15.6	3
69.00		

```
         **************************************************
         *                                                *
         *                    PrintPack.                   *
         *                    86120-103                    *
         *     Routing for existing BMP, existing structures *
         *                                                *
         *                                                *
         **************************************************
```

Inflow Hydrograph: c:\86120-~1\SITE2YR .HYD
Rating Table file: c:\86120-~1\EXIST   .PND

----INITIAL CONDITIONS----
Elevation =   66.50 ft
Outflow   =   0.00 cfs
Storage   =   0 cu-ft

	GIVEN POND DATA			INTERMEDIATE ROUTING COMPUTATIONS	
ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (cu-ft)		2S/t (cfs)	2S/t + 0 (cfs)
66.50	0.0	0		0.0	0.0
67.00	0.2	330		1.8	2.0
67.50	0.8	1,718		9.5	10.3
68.00	9.4	4,075		22.6	32.0
68.50	16.3	7,745		43.0	59.3
69.00	19.7	13,126		72.9	92.6
69.50	22.5	20,216		112.3	134.8
70.00	25.1	28,903		160.6	185.7
70.50	27.4	39,132		217.4	244.8
71.00	29.6	50,800		282.2	311.8
71.50	31.6	63,978		355.4	387.0
72.00	33.4	78,731		437.4	470.8
72.50	35.2	95,064		528.1	563.3
73.00	36.9	112,972		627.6	664.5

Time increment (t) =   6.0 min.

***************** SUMMARY OF ROUTING COMPUTATIONS *****************

Pond File: c:\86120-~1\EXIST   .PND
Inflow Hydrograph: c:\86120-~1\SITE2YR .HYD
Outflow Hydrograph: c:\86120-~1\OUT-2   .HYD

Starting Pond W.S. Elevation =   66.50 ft

        ***** Summary of Peak Outflow and Peak Elevation *****

                    Peak Inflow   =   54.00 cfs
                    Peak Outflow =   25.83 cfs
                    Peak Elevation =   70.16 ft

        ***** Summary of Approximate Peak Storage *****

            Initial Storage   =   0 cu-ft
            Peak Storage From Storm =   32,150 cu-ft

            Total Storage in Pond   =   32,150 cu-ft

    Warning: Inflow hydrograph truncated on left side.

```
**************************************************
*                                                *
*                    PrintPack                   *
*                    86120-103                   *
*     Routing for existing BMP, existing structures *
*                                                *
*                                                *
**************************************************
```

Inflow Hydrograph: c:\86120-~1\SITE10YR.HYD
Rating Table file: c:\86120-~1\EXIST   .PND

----INITIAL CONDITIONS----
Elevation =   66.50 ft
Outflow   =   0.00 cfs
Storage   =   0 cu-ft

GIVEN POND DATA		INTERMEDIATE ROUTING COMPUTATIONS	
ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (cu-ft)	2S/t (cfs)	2S/t + 0 (cfs)
66.50	0.0	0	0.0	0.0
67.00	0.2	330	1.8	2.0
67.50	0.8	1,718	9.5	10.3
68.00	9.4	4,075	22.6	32.0
68.50	16.3	7,745	43.0	59.3
69.00	19.7	13,126	72.9	92.6
69.50	22.5	20,216	112.3	134.8
70.00	25.1	28,903	160.6	185.7
70.50	27.4	39,132	217.4	244.8
71.00	29.6	50,800	282.2	311.8
71.50	31.6	63,978	355.4	387.0
72.00	33.4	78,731	437.4	470.8
72.50	35.2	95,064	528.1	563.3
73.00	36.9	112,972	627.6	664.5

Time increment (t) =   6.0 min.

****************** SUMMARY OF ROUTING COMPUTATIONS ******************

Pond File: c:\86120-~1\EXIST   .PND
Inflow Hydrograph: c:\86120-~1\SITE10YR.HYD
Outflow Hydrograph: c:\86120-~1\OUT-10   .HYD

Starting Pond W.S. Elevation =   66.50 ft

         ***** Summary of Peak Outflow and Peak Elevation *****

                   Peak Inflow   =   91.00 cfs
                   Peak Outflow   =   32.28 cfs
                   Peak Elevation =   71.69 ft

       ***** Summary of Approximate Peak Storage *****

            Initial Storage   =

PROPOSED CONDITIONS

Outlet Structure File: MODEXST3.STR

POND-2 Version: 5.20   S/N:
Date Executed: Time Executed:


```
                    ***********************
                          Print Pack
                          86120-103
                      change riser structure

                    ***********************



            *****  COMPOSITE OUTFLOW SUMMARY ****


   Elevation (ft)        Q (cfs)      Contributing  Structures
   --------------        -------      ------------------------
          66.50            0.0        1 - 8" orifice - weir
          67.00            0.8        1 - 6" orifice
          67.18            1.0        2
          67.50            1.4        2
          68.00            1.8        2
          68.50            2.2        2
          69.00            2.5        2
          69.50            2.8        2
          70.00            3.0        2
          70.50            3.3        2 / 4'∅ riser
          71.00           14.0        3 +2
          71.50           39.1        3 +2
          72.00           46.6        4 +2
          72.50           48.3        4 +2
          73.00           49.9        4 +2
                                      /
                                   2'∅ barrel
```

Outlet Structure File: MODEXST3.STR

POND-2 Version: 5.20   S/N:
Date Executed: Time Executed:


```
                **********************
                     Print Pack
                     86120-103
                change riser structure

                **********************
```


    Outlet Structure File: c:\86120-~1\MODEXST3.STR
    Planimeter Input File: c:\86120-~1\EXIST   .VOL
    Rating Table Output File: c:\86120-~1\MODEXST3.PND

Min. Elev.(ft) = 66.5   Max. Elev.(ft) = 73   Incr.(ft) = .5

    Additional elevations (ft) to be included in table:
    *
    67.18


```
        ************************************************
                      SYSTEM CONNECTIVITY
        ************************************************
```

Structure	No.	Q Table	Q Table
STAND PIPE	3		-> 3
CULVERT-CR	4	? 3	-> 5
ORIFICE-VC	2		-> 2
TABLE	1		-> 1

Outflow rating table summary was stored in file:
c:\86120-~1\MODEXST3.PND

Outlet Structure File: MODEXST3.STR

POND-2 Version: 5.20   S/N:
Date Executed: Time Executed:


```
        **********************
              Print Pack
              86120-103
          change riser structure

        **********************


     >>>>>> Structure No. 3 <<<<<<
              (Input Data)

     STAND PIPE
     Stand Pipe with weir or orifice flow


     E1 elev.(ft)?           70.6
     E2 elev.(ft)?            73.001
     Crest elev.(ft)?        70.6
     Diameter (ft)?          4
     Weir coefficient?       3.3
     Orifice coefficient?    0.6
     Start transition elev.(ft) @ ?
     Transition height (ft)?
```

Outlet Structure File: MODEXST3.STR

POND-2 Version: 5.20   S/N:
Date Executed: Time Executed:


```
        **********************
                Print Pack
                 86120-103
            change riser structure

        *********************


     >>>>>> Structure No. 4 <<<<<<
             (Input Data)

     CULVERT-CR
     Circular Culvert (With Inlet Control)


     E1 elev.(ft)?            70.6
     E2 elev.(ft)?             73.001
     Diam. (ft)?              2
     Inv. el.(ft)?            63.62
     Slope (ft/ft)?           .02
     T1 ratio?
     T2 ratio?
     K Coeff.?                .0078
     M Coeff.?                2.0
     c Coeff.?                .0379
     Y Coeff.?                .69
     Form 1 or 2?             1
     Slope factor?            -0.5
```

Outlet Structure File: MODEXST3.STR

POND-2 Version: 5.20   S/N:
Date Executed: Time Executed:


```
        **********************
              Print Pack
              86120-103
          change riser structure

        **********************


     >>>>>> Structure No. 2 <<<<<<
            (Input Data)

     ORIFICE-VC
     Orifice - Vertical Circular


     E1 elev.(ft)?           67.17
     E2 elev.(ft)?            73.001
     Orifice coeff.?         0.6
     Invert elev.(ft)?       66.5
     Datum  elev.(ft)?       66.83
     Diameter (ft)?          0.67
```

Outlet Structure File: MODEXST3.STR

POND-2 Version: 5.20   S/N:
Date Executed: Time Executed:


```
          **********************
                Print Pack
                86120-103
            change riser structure

          *********************


       >>>>>> Structure No. 1 <<<<<<
              (Input Data)

       TABLE
       Input your own rating table.
       E1 (ft) =66.5        E2 (ft) =67.16

       Constant (ft) added to each elevation was:

           Elev. (ft)      Q (cfs)
           ----------      -------
             66.5             0
             66.83            .5
             67.16            1
```

Outlet Structure File: MODEXST3.STR

POND-2 Version: 5.20   S/N:
Date Executed: Time Executed:


```
        **********************
              Print Pack
              86120-103
          change riser structure

        **********************
```


Outflow Rating Table for Structure #3
STAND PIPE Stand Pipe with weir or orifice flow

        ***** INLET CONTROL ASSUMED *****

Elevation (ft)	Q (cfs)	Computation Messages	
66.50	0.0	E < Inv.El.= 70.6	
67.00	0.0	E < E1=70.6	
67.18	0.0	E < E1=70.6	
67.50	0.0	E < E1=70.6	
68.00	0.0	E < E1=70.6	
68.50	0.0	E < E1=70.6	
69.00	0.0	E < E1=70.6	
69.50	0.0	E < E1=70.6	
70.00	0.0	E < E1=70.6	
70.50	0.0	E < E1=70.6	
71.00	10.5	Weir:	H =.4
71.50	35.4	Weir:	H =.9
72.00	68.7	Weir:	H =1.4
72.50	83.4	Orifice:	H =1.9
73.00	93.7	Orifice:	H =2.4

Weir   Cw = 3.3   Weir length = 12.56637 ft
Orifice Co = .6   Orifice area = 12.56637 sq.ft.
Q (cfs) = (Cw * L * H**1.5) or (Co * A * sqr(2*g*H))
No transition used, transition height = 0.0
Weir equation = Orifice equation @ elev.= 72.05908 ft

Outlet Structure File: MODEXST3.STR

POND-2 Version: 5.20   S/N:
Date Executed: Time Executed:


```
            **********************
                   Print Pack
                   86120-103
               change riser structure

            **********************
```


Outflow Rating Table for Structure #4
CULVERT-CR Circular Culvert (With Inlet Control)

          ***** INLET CONTROL ASSUMED *****

Elevation (ft)	Q (cfs)	Computation Messages
66.50	0.0	E < E1=70.6
67.00	0.0	E < E1=70.6
67.18	0.0	E < E1=70.6
67.50	0.0	E < E1=70.6
68.00	0.0	E < E1=70.6
68.50	0.0	E < E1=70.6
69.00	0.0	E < E1=70.6
69.50	0.0	E < E1=70.6
70.00	0.0	E < E1=70.6
70.50	0.0	E < E1=70.6
71.00	39.6	Submerged: HW =7.38
71.50	41.2	Submerged: HW =7.880
72.00	42.8	Submerged: HW =8.38
72.50	44.3	Submerged: HW =8.88
73.00	45.7	Submerged: HW =9.38

Used Unsubmerged Equ. Form (1) for elev. less than 65.87 ft
Used Submerged Equation for elevations greater than 66.189 ft
HW=Headwater (ft) dc=Critical depth (ft) Ac=Area (sq.ft) at dc

Transition flows interpolated from the following values:
E1=65.87 ft; Q1=15.55 cfs; Dc=1.42 ft; E2=66.189 ft; Q2=17.77 cfs

Outlet Structure File: MODEXST3.STR

POND-2 Version: 5.20   S/N:
Date Executed: Time Executed:


```
                **********************
                     Print Pack
                     86120-103
                change riser structure

                **********************
```

Outflow Rating Table for Structure #2
ORIFICE-VC Orifice - Vertical Circular

Elevation (ft)	Q (cfs)	Computation Messages
66.50	0.0	E < E1=67.17
67.00	0.0	E < E1=67.17
67.18	1.0	H =.35
67.50	1.4	H =.67
68.00	1.8	H =1.17
68.50	2.2	H =1.67
69.00	2.5	H =2.17
69.50	2.8	H =2.67
70.00	3.0	H =3.17
70.50	3.3	H =3.67
71.00	3.5	H =4.17
71.50	3.7	H =4.67
72.00	3.9	H =5.17
72.50	4.0	H =5.67
73.00	4.2	H =6.17

C = .6   A = .3525653 sq.ft.
H (ft) = Table elev. - Datum elev. (66.83 ft)
Q (cfs) = C * A * sqr(2g * H)

Outlet Structure File: MODEXST3.STR

POND-2 Version: 5.20   S/N:
Date Executed: Time Executed:


```
          **********************
             Print Pack
             86120-103
          change riser structure

          **********************
```

Outflow Rating Table for Structure #1
TABLE   Input your own rating table.

Elevation (ft)	Q (cfs)	Computation Messages
66.50	0.0	
67.00	0.8	Interpolated from input table
67.18	0.0	E = or > E2=67.16
67.50	0.0	E = or > E2=67.16
68.00	0.0	E = or > E2=67.16
68.50	0.0	E = or > E2=67.16
69.00	0.0	E = or > E2=67.16
69.50	0.0	E = or > E2=67.16
70.00	0.0	E = or > E2=67.16
70.50	0.0	E = or > E2=67.16
71.00	0.0	E = or > E2=67.16
71.50	0.0	E = or > E2=67.16
72.00	0.0	E = or > E2=67.16
72.50	0.0	E = or > E2=67.16
73.00	0.0	E = or > E2=67.16

Outlet Structure File: MODEXST3.STR

POND-2 Version: 5.20   S/N:
Date Executed: Time Executed:


```
                    **********************
                         Print Pack
                         86120-103
                    change riser structure

                    **********************
```


                    Outflow Rating Table 5
                       Table 5 = 3 ? 4

Elevation (ft)	Q (cfs)	Contributing Structures
66.50	0.0	-
67.00	0.0	-
67.18	0.0	-
67.50	0.0	-
68.00	0.0	-
68.50	0.0	-
69.00	0.0	-
69.50	0.0	-
70.00	0.0	-
70.50	0.0	-
71.00	10.5	3
71.50	35.4	3
72.00	42.8	4
72.50	44.3	4
73.00	45.7	4

```
        ************************************************
        *                                              *
        *                  PrintPack                   *
        *                  86120-103                   *
        *     Routing for existing BMP, modified structure  *
        *                                              *
        *                                              *
        ************************************************
```

Inflow Hydrograph: c:\86120-~1\SITE2YR .HYD
Rating Table file: c:\86120-~1\MODEXST3.PND

----INITIAL CONDITIONS----
Elevation =   66.50 ft
Outflow   =   0.00 cfs
Storage   =   0 cu-ft

| | GIVEN POND DATA | | | INTERMEDIATE ROUTING COMPUTATIONS | |
ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (cu-ft)		2S/t (cfs)	2S/t + 0 (cfs)
66.50	0.0	0		0.0	0.0
67.00	0.8	330		1.8	2.6
67.18	1.0	734		4.1	5.1
67.50	1.4	1,718		9.5	10.9
68.00	1.8	4,075		22.6	24.4
68.50	2.2	7,745		43.0	45.2
69.00	2.5	13,126		72.9	75.4
69.50	2.8	20,216		112.3	115.1
70.00	3.0	28,903		160.6	163.6
70.50	3.3	39,132		217.4	220.7
71.00	14.0	50,800		282.2	296.2
71.50	39.1	63,978		355.4	394.5
72.00	46.6	78,731		437.4	484.0
72.50	48.3	95,064		528.1	576.4
73.00	49.9	112,972		627.6	677.5

Time increment (t) =   6.0 min.

***************** SUMMARY OF ROUTING COMPUTATIONS ******************

```
Pond File:           c:\86120-~1\MODEXST3.PND
Inflow Hydrograph:   c:\86120-~1\SITE2YR .HYD
Outflow Hydrograph:  c:\86120-~1\MOD2     .HYD


Starting Pond W.S. Elevation =    66.50 ft
```

       ***** Summary of Peak Outflow and Peak Elevation *****

```
                    Peak Inflow    =    54.00 cfs
                    Peak Outflow   =    23.90 cfs
                    Peak Elevation =    71.20 ft
```

        ***** Summary of Approximat

```
          ***************************************************
          *                                                 *
          *                   PrintPack                      *
          *                   86120-103                      *
          *    Routing for existing BMP, modified structure  *
          *                                                 *
          *                                                 *
          ***************************************************
```

Inflow Hydrograph: c:\86120-~1\SITE10YR.HYD
Rating Table file: c:\86120-~1\MODEXST3.PND

----INITIAL CONDITIONS----
Elevation =   66.50 ft
Outflow   =   0.00 cfs
Storage   =   0 cu-ft

GIVEN POND DATA			**INTERMEDIATE ROUTING COMPUTATIONS**	
ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (cu-ft)	2S/t (cfs)	2S/t + 0 (cfs)
66.50	0.0	0	0.0	0.0
67.00	0.8	330	1.8	2.6
67.18	1.0	734	4.1	5.1
67.50	1.4	1,718	9.5	10.9
68.00	1.8	4,075	22.6	24.4
68.50	2.2	7,745	43.0	45.2
69.00	2.5	13,126	72.9	75.4
69.50	2.8	20,216	112.3	115.1
70.00	3.0	28,903	160.6	163.6
70.50	3.3	39,132	217.4	220.7
71.00	14.0	50,800	282.2	296.2
71.50	39.1	63,978	355.4	394.5
72.00	46.6	78,731	437.4	484.0
72.50	48.3	95,064	528.1	576.4
73.00	49.9	112,972	627.6	677.5

Time increment (t) =   6.0 min.

```
***************** SUMMARY OF ROUTING COMPUTATIONS ******************

Pond File:          c:\86120-~1\MODEXST3.PND
Inflow Hydrograph:  c:\86120-~1\SITE10YR.HYD
Outflow Hydrograph: c:\86120-~1\MOD10    .HYD


Starting Pond W.S. Elevation =    66.50 ft


        ***** Summary of Peak Outflow and Peak Elevation *****

                   Peak Inflow    =    91.00 cfs
                   Peak Outflow   =    46.94 cfs
                   Peak Elevation =    72.10 ft


        ***** Summary of Approximat
```

DRAWDOWN CALCULATIONS

```
              ***************************
              *                         *
              *   Drawdown calculations *
              *   Existing conditions   *
              *                         *
              *                         *
              *                         *
              ***************************
```

Inflow Hydrograph: c:\86120-~1\DRAWDOWN.HYD
Rating Table file: c:\86120-~1\EXIST   .PND

----INITIAL CONDITIONS----
Elevation =   70.60 ft
Outflow   =   27.84 cfs
Storage   =   41,465 cu-ft

GIVEN POND DATA			INTERMEDIATE ROUTING COMPUTATIONS	
ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (cu-ft)	2S/t (cfs)	2S/t + 0 (cfs)
66.50	0.0	0	0.0	0.0
67.00	0.2	330	1.8	2.0
67.50	0.8	1,718	9.5	10.3
68.00	9.4	4,075	22.6	32.0
68.50	16.3	7,745	43.0	59.3
69.00	19.7	13,126	72.9	92.6
69.50	22.5	20,216	112.3	134.8
70.00	25.1	28,903	160.6	185.7
70.50	27.4	39,132	217.4	244.8
71.00	29.6	50,800	282.2	311.8
71.50	31.6	63,978	355.4	387.0
72.00	33.4	78,731	437.4	470.8
72.50	35.2	95,064	528.1	563.3
73.00	36.9	112,972	627.6	664.5

Time increment (t) =   6.0 min.

EXISTING
DRAWDOWN TIME = 882 - 660 = 222 MIN
OR 3.7 HR

```
***************************
*                         *
*   Drawdown calculations  *
*   Change riser structure *
*                         *
*                         *
*                         *
***************************
```

Inflow Hydrograph: c:\86120-~1\DRAWDOWN.HYD
Rating Table file: c:\86120-~1\MODEXST3.PND

----INITIAL CONDITIONS----
Elevation =   70.60 ft
Outflow   =   5.44 cfs
Storage   =   41,465 cu-ft

GIVEN POND DATA

INTERMEDIATE ROUTING COMPUTATIONS

ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (cu-ft)	2S/t (cfs)	2S/t + 0 (cfs)
66.50	0.0	0	0.0	0.0
67.00	0.8	330	1.8	2.6
67.18	1.0	734	4.1	5.1
67.50	1.4	1,718	9.5	10.9
68.00	1.8	4,075	22.6	24.4
68.50	2.2	7,745	43.0	45.2
69.00	2.5	13,126	72.9	75.4
69.50	2.8	20,216	112.3	115.1
70.00	3.0	28,903	160.6	163.6
70.50	3.3	39,132	217.4	220.7
71.00	14.0	50,800	282.2	296.2
71.50	39.1	63,978	355.4	394.5
72.00	46.6	78,731	437.4	484.0
72.50	48.3	95,064	528.1	576.4
73.00	49.9	112,972	627.6	677.5

Time increment (t) =   6.0 min.

PROPOSED
DRAWDOWN TIME = 966 - 660 = 306 MIN
OR 5.1 HR

Pond File: c:\86120-~1\MODEXST3.PND
Inflow Hydrograph: c:\86120-~1\DRAWDOWN.HYD
Outflow Hydrograph: c:\86120-~1\OUT   .HYD

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (min)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
660.0	0.00	-----	224.9	235.8	5.44	70.60
666.0	0.00	0.0	217.1	224.9	3.90	70.53
672.0	0.00	0.0	210.6	217.1	3.28	70.47
678.0	0.00	0.0	204.1	210.6	3.25	70.41
684.0	0.00	0.0	197.6	204.1	3.21	70.35
690.0	0.00	0.0	191.3	197.6	3.18	70.30
696.0	0.00	0.0	185.0	191.3	3.15	70.24
702.0	0.00	0.0	178.8	185.0	3.11	70.19
708.0	0.00	0.0	172.6	178.8	3.08	70.13
714.0	0.00	0.0	166.5	172.6	3.05	70.08
720.0	0.00	0.0	160.5	166.5	3.02	70.03
726.0	0.00	0.0	154.5	160.5	2.99	69.97
732.0	0.00	0.0	148.6	154.5	2.96	69.91
738.0	0.00	0.0	142.7	148.6	2.94	69.85
744.0	0.00	0.0	136.9	142.7	2.91	69.78
750.0	0.00	0.0	131.1	136.9	2.89	69.72
756.0	0.00	0.0	125.4	131.1	2.87	69.66
762.0	0.00	0.0	119.7	125.4	2.84	69.61
768.0	0.00	0.0	114.0	119.7	2.82	69.55
774.0	0.00	0.0	108.5	114.0	2.79	69.49
780.0	0.00	0.0	103.0	108.5	2.75	69.42
786.0	0.00	0.0	97.5	103.0	2.71	69.35
792.0	0.00	0.0	92.2	97.5	2.67	69.28
798.0	0.00	0.0	87.0	92.2	2.63	69.21
804.0	0.00	0.0	81.8	87.0	2.59	69.15
810.0	0.00	0.0	76.7	81.8	2.55	69.08
816.0	0.00	0.0	71.7	76.7	2.51	69.02
822.0	0.00	0.0	66.7	71.7	2.46	68.94
828.0	0.00	0.0	61.9	66.7	2.41	68.86
834.0	0.00	0.0	57.2	61.9	2.37	68.78
840.0	0.00	0.0	52.5	57.2	2.32	68.70
846.0	0.00	0.0	48.0	52.5	2.27	68.62
852.0	0.00	0.0	43.5	48.0	2.23	68.55
858.0	0.00	0.0	39.2	43.5	2.17	68.46
864.0	0.00	0.0	35.0	39.2	2.08	68.36
870.0	0.00	0.0	31.0	35.0	2.00	68.26
876.0	0.00	0.0	27.2	31.0	1.93	68.16
882.0	0.00	0.0	23.5	27.2	1.85	68.07
888.0	0.00	0.0	19.9	23.5	1.77	67.96
894.0	0.00	0.0	16.6	19.9	1.67	67.83
900.0	0.00	0.0	13.5	16.6	1.57	67.71
906.0	0.00	0.0	10.5	13.5	1.47	67.59
912.0	0.00	0.0	7.8	10.5	1.37	67.48
918.0	0.00	0.0	5.4	7.8	1.18	67.33
924.0	0.00	0.0	3.4	5.4	1.02	67.20

Pond File: c:\86120-~1\MODEXST3.PND
Inflow Hydrograph: c:\86120-~1\DRAWDOWN.HYD
Outflow Hydrograph: c:\86120-~1\OUT   .HYD

INFLOW HYDROGRAPH   ROUTING COMPUTATIONS

TIME (min)	INFLOW (cfs)	I1+I2 (cfs)	2S/t - O (cfs)	2S/t + O (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
930.0	0.00	0.0	1.6	3.4	0.86	67.05
936.0	0.00	0.0	0.6	1.6	0.50	66.81
942.0	0.00	0.0	0.3	0.6	0.20	66.62
948.0	0.00	0.0	0.1	0.3	0.08	66.55
954.0	0.00	0.0	0.0	0.1	0.03	66.52
960.0	0.00	0.0	0.0	0.0	0.01	66.51
966.0	0.00	0.0	0.0	0.0	0.00	66.50
972.0	0.00	0.0	0.0	0.0	0.00	66.50
978.0	0.00	0.0	0.0	0.0	0.00	66.50
984.0	0.00	0.0	0.0	0.0	0.00	66.50
990.0	0.00	0.0	0.0	0.0	0.00	66.50
996.0	0.00	0.0	0.0	0.0	0.00	66.50
1002.0	0.00	0.0	0.0	0.0	0.00	66.50
1008.0	0.00	0.0	0.0	0.0	0.00	66.50
1014.0	0.00	0.0	0.0	0.0	0.00	66.50
1020.0	0.00	0.0	0.0	0.0	0.00	66.50
1026.0	0.00	0.0	0.0	0.0	0.00	66.50
1032.0	0.00	0.0	0.0	0.0	0.00	66.50
1038.0	0.00	0.0	0.0	0.0	0.00	66.50
1044.0	0.00	0.0	0.0	0.0	0.00	66.50
1050.0	0.00	0.0	0.0	0.0	0.00	66.50
1056.0	0.00	0.0	0.0	0.0	0.00	66.50
1062.0	0.00	0.0	0.0	0.0	0.00	66.50
1068.0	0.00	0.0	0.0	0.0	0.00	66.50
1074.0	0.00	0.0	0.0	0.0	0.00	66.50
1080.0	0.00	0.0	0.0	0.0	0.00	66.50
1086.0	0.00	0.0	0.0	0.0	0.00	66.50
1092.0	0.00	0.0	0.0	0.0	0.00	66.50
1098.0	0.00	0.0	0.0	0.0	0.00	66.50
1104.0	0.00	0.0	0.0	0.0	0.00	66.50
1110.0	0.00	0.0	0.0	0.0	0.00	66.50
1116.0	0.00	0.0	0.0	0.0	0.00	66.50
1122.0	0.00	0.0	0.0	0.0	0.00	66.50
1128.0	0.00	0.0	0.0	0.0	0.00	66.50
1134.0	0.00	0.0	0.0	0.0	0.00	66.50
1140.0	0.00	0.0	0.0	0.0	0.00	66.50
1146.0	0.00	0.0	0.0	0.0	0.00	66.50
1152.0	0.00	0.0	0.0	0.0	0.00	66.50
1158.0	0.00	0.0	0.0	0.0	0.00	66.50
1164.0	0.00	0.0	0.0	0.0	0.00	66.50
1170.0	0.00	0.0	0.0	0.0	0.00	66.50
1176.0	0.00	0.0	0.0	0.0	0.00	66.50
1182.0	0.00	0.0	0.0	0.0	0.00	66.50
1188.0	0.00	0.0	0.0	0.0	0.00	66.50
1194.0	0.00	0.0	0.0	0.0	0.00	66.50
1200.0	0.00	0.0	0.0	0.0	0.00	66.50

proposed RISER REPLACEMENT FOR PRINTPACT INC.

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 01-29-1998 12:53:58
Watershed file: --> C:\86120-~1\WSHED .MOP
Hydrograph file: --> C:\86120-~1\SITE100.HYD

PrintPack
86120-103
Hydrographs for drainage area to existing BMP
No changes in hydrographs for Print Pack project

>>>> Input Parameters Used to Compute Hydrograph <<<<

Subarea Description	AREA (acres)	CN	Tc (hrs)	* Tt (hrs)	Precip. (in)	Runoff (in)	Ia/p input/used
area to BMP	18.70	90.0	0.20	0.00	7.68	6.49	I.03 .10

* Travel time from subarea outfall to composite watershed outfall point.
I -- Subarea where user specified interpolation between Ia/p tables.

Total area = 18.70 acres or 0.02922 sq.mi
Peak discharge = 152 cfs

>>>> Computer Modifications of Input Parameters <<<<<

Subarea Description	Input Values Tc (hr)	* Tt (hr)	Rounded Values Tc (hr)	* Tt (hr)	Ia/p Interpolated (Yes/No)	Ia/p Messages
area to BMP	0.17	0.00	0.20	0.00	No	Computed Ia/p < .1

* Travel time from subarea outfall to composite watershed outfall point.

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 01-29-1998 12:53:58
Watershed file: --> C:\86120-~1\WSHED   .MOP
Hydrograph file: --> C:\86120-~1\SITE100.HYD

PrintPack
86120-103
Hydrographs for drainage area to existing BMP
No changes in hydrographs for Print Pack project

>>>> Summary of Subarea Times to Peak <<<<

Subarea	Peak Discharge at Composite Outfall (cfs)	Time to Peak at Composite Outfall (hrs)
area to BMP	152	12.2
Composite Watershed	152	12.2

TR-55 TABULAR HYDROGRAPH METHOD
Type II. Distribution
(24 hr. Duration Storm)

Executed: 01-29-1998 12:53:58
Watershed file: --> C:\86120-~1\WSHED   .MOP
Hydrograph file: --> C:\86120-~1\SITE100.HYD

PrintPack
86120-103
Hydrographs for drainage area to existing BMP
No changes in hydrographs for Print Pack project

Composite Hydrograph Summary (cfs)

Subarea Description	11.0 hr	11.3 hr	11.6 hr	11.9 hr	12.0 hr	12.1 hr	12.2 hr	12.3 hr	12.4 hr
area to BMP	4	6	9	40	76	140	152	91	47
Total (cfs)	4	6	9	40	76	140	152	91	47

Subarea Description	12.5 hr	12.6 hr	12.7 hr	12.8 hr	13.0 hr	13.2 hr	13.4 hr	13.6 hr	13.8 hr
area to BMP	31	24	19	16	13	12	10	9	8
Total (cfs)	31	24	19	16	13	12	10	9	8

Subarea Description	14.0 hr	14.3 hr	14.6 hr	15.0 hr	15.5 hr	16.0 hr	16.5 hr	17.0 hr	17.5 hr
area to BMP	8	7	6	6	5	5	4	4	4
Total (cfs)	8	7	6	6	5	5	4	4	4

Subarea Description	18.0 hr	19.0 hr	20.0 hr	22.0 hr	26.0 hr
area to BMP	3	3	2	2	0
Total (cfs)	3	3	2	2	0

Outlet Structure File: MODEXST3.STR

POND-2 Version: 5.20   S/N:
Date Executed: Time Executed:


```
              **********************
                   Print Pack
                   86120-103
               change riser structure

              **********************
```


```
          ***** COMPOSITE OUTFLOW SUMMARY ****
```

Elevation (ft)	Q (cfs)	Contributing Structures
66.50	0.0	1
67.00	0.8	1
67.18	1.0	2
67.50	1.4	2
68.00	1.8	2
68.50	2.2	2
69.00	2.5	2
69.50	2.8	2
70.00	3.0	2
70.50	3.3	2
71.00	14.0	3 +2
71.50	39.1	3 +2
72.00	46.6	4 +2
72.50	48.3	4 +2
73.00	49.9	4 +2
73.50	127.4	4 +2 +8
74.00	309.1	4 +2 +8

Outlet Structure File: MODEXST3.STR

POND-2 Version: 5.20   S/N:
Date Executed: Time Executed:


```
                ***********************
                      Print Pack
                      86120-103
                change riser structure

                ***********************
```


    Outlet Structure File: C:\86120-~1\MODEXST3.STR
    Planimeter Input File: C:\86120-~1\EXIST   .VOL
    Rating Table Output File: C:\86120-~1\MODEXST3.PND

Min. Elev.(ft) = 66.5   Max. Elev.(ft) = 74   Incr.(ft) = .5

    Additional elevations (ft) to be included in table:
    *
    67.18


```
        **************************************************
                        SYSTEM CONNECTIVITY
        **************************************************
```

Structure	No.	Q Table		Q Table
STAND PIPE	3		->	3
CULVERT-CR	4	? 3	->	5
ORIFICE-VC	2		->	2
TABLE	1		->	1
WEIR-VR	8		->	8

Outflow rating table summary was stored in file:
C:\86120-~1\MODEXST3.PND

Outlet Structure File: MODEXST3.STR

POND-2 Version: 5.20   S/N:
Date Executed: Time Executed:

                    ****
                        Print Pack
                        86120-103
                    change riser structure

                    ****

            >>>>>> Structure No. 3 <<<<<<
                    (Input Data)

        STAND PIPE
        Stand Pipe with weir or orifice flow

        E1 elev.(ft)?   70.6
        E2 elev.(ft)?   74.001
        Crest elev.(ft)?   70.6
        Diameter (ft)?   4
        Weir coefficient?   3.3
        Orifice coefficient?   0.6
        Start transition elev.(ft) @ ?
        Transition height (ft)?

Outlet Structure File: MODEXST3.STR

POND-2 Version: 5.20   S/N:
Date Executed: Time Executed:


```
            **********************
                  Print Pack
                  86120-103
            change riser structure

            **********************
```

```
            >>>>>> Structure No. 4 <<<<<<
                    (Input Data)

            CULVERT-CR
            Circular Culvert (With Inlet Control)


            E1 elev.(ft)?            70.6
            E2 elev.(ft)?             74.001
            Diam. (ft)?             2
            Inv. el.(ft)?           63.62
            Slope (ft/ft)?          .02
            T1 ratio?
            T2 ratio?
            K Coeff.?               .0078
            M Coeff.?               2.0
            c Coeff.?               .0379
            Y Coeff.?               .69
            Form 1 or 2?            1
            Slope factor?           -0.5
```

Outlet Structure File: MODEXST3.STR

POND-2 Version: 5.20   S/N:
Date Executed: Time Executed:

                    ****
                         Print Pack
                         86120-103
                    change riser structure

                    ****

            >>>>>> Structure No. 2 <<<<<<
                    (Input Data)

            ORIFICE-VC
            Orifice - Vertical Circular

            E1 elev.(ft)?   67.17
            E2 elev.(ft)?   74.001
            Orifice coeff.?   0.6
            Invert elev.(ft)?   66.5
            Datum elev.(ft)?   66.83
            Diameter (ft)?   0.67

Outlet Structure File: MODEXST3.STR

POND-2 Version: 5.20   S/N:
Date Executed: Time Executed:


```
                **********************
                     Print Pack
                     86120-103
                change riser structure

                **********************


           >>>>>> Structure No. 1 <<<<<<
                   (Input Data)

           TABLE
           Input your own rating table.
           E1 (ft) =66.5       E2 (ft) =67.16

           Constant (ft) added to each elevation was:

                Elev. (ft)      Q (cfs)
                ----------      -------
                   66.5            0
                   66.83          .5
                   67.16          1
```

Outlet Structure File: MODEXST3.STR

POND-2 Version: 5.20   S/N:
Date Executed: Time Executed:


```
          *********************
               Print Pack
               86120-103
          change riser structure

          *********************


     >>>>>> Structure No. 8 <<<<<<
              (Input Data)

     WEIR-VR
     Weir - Vertical Rectangular


     E1 elev.(ft)?            73.1
     E2 elev.(ft)?             74.001
     Weir coefficient?        3.0
     Weir elev.(ft)?          73.1
     Length (ft)?             100
     Contracted/Suppressed (C/S)?   S
```

Outlet Structure File: MODEXST3.STR

POND-2 Version: 5.20   S/N:
Date Executed: Time Executed:

****
Print Pack
86120-103
change riser structure

****

Outflow Rating Table for Structure #3
STAND PIPE Stand Pipe with weir or orifice flow

***** INLET CONTROL ASSUMED *****

Elevation (ft)	Q (cfs)	Computation Messages
66.50	0.0	E < Inv.El.= 70.6
67.00	0.0	E < E1=70.6
67.18	0.0	E < E1=70.6
67.50	0.0	E < E1=70.6
68.00	0.0	E < E1=70.6
68.50	0.0	E < E1=70.6
69.00	0.0	E < E1=70.6
69.50	0.0	E < E1=70.6
70.00	0.0	E < E1=70.6
70.50	0.0	E < E1=70.6
71.00	10.5	Weir: H =.4
71.50	35.4	Weir: H =.9
72.00	68.7	Weir: H =1.4
72.50	83.4	Orifice: H =1.9
73.00	93.7	Orifice: H =2.4
73.50	103.0	Orifice: H =2.9
74.00	111.6	Orifice: H =3.4

Weir   Cw = 3.3   Weir length = 12.56637 ft
Orifice Co = .6   Orifice area = 12.56637 sq.ft.
Q (cfs) = (Cw * L * H**1.5) or (Co * A * sqr(2*g*H))
No transition used, transition height = 0.0
Weir equation = Orifice equation @ elev.= 72.05908 ft

Outlet Structure File: MODEXST3.STR

POND-2 Version: 5.20   S/N:
Date Executed: Time Executed:


```
                 ***********************
                       Print Pack
                       86120-103
                   change riser structure

                 ***********************
```


Outflow Rating Table for Structure #4
CULVERT-CR Circular Culvert (With Inlet Control)

```
          *****  INLET CONTROL ASSUMED  *****
```

Elevation (ft)	Q (cfs)	Computation Messages
66.50	0.0	E < E1=70.6
67.00	0.0	E < E1=70.6
67.18	0.0	E < E1=70.6
67.50	0.0	E < E1=70.6
68.00	0.0	E < E1=70.6
68.50	0.0	E < E1=70.6
69.00	0.0	E < E1=70.6
69.50	0.0	E < E1=70.6
70.00	0.0	E < E1=70.6
70.50	0.0	E < E1=70.6
71.00	39.6	Submerged: HW =7.38
71.50	41.2	Submerged: HW =7.880
72.00	42.8	Submerged: HW =8.38
72.50	44.3	Submerged: HW =8.88
73.00	45.7	Submerged: HW =9.38
73.50	47.1	Submerged: HW =9.88
74.00	48.4	Submerged: HW =10.38

Used Unsubmerged Equ. Form (1) for elev. less than 65.87 ft
Used Submerged Equation for elevations greater than 66.189 ft
HW=Headwater (ft) dc=Critical depth (ft) Ac=Area (sq.ft) at dc

Transition flows interpolated from the following values:
E1=65.87 ft; Q1=15.55 cfs; Dc=1.42 ft; E2=66.189 ft; Q2=17.77 cfs

Outlet Structure File: MODEXST3.STR

POND-2 Version: 5.20   S/N:
Date Executed: Time Executed:


```
            ***********************
                  Print Pack
                  86120-103
             change riser structure

            ***********************
```

Outflow Rating Table for Structure #2
ORIFICE-VC   Orifice - Vertical Circular

Elevation (ft)	Q (cfs)	Computation Messages
66.50	0.0	E < E1=67.17
67.00	0.0	E < E1=67.17
67.18	1.0	H =.35
67.50	1.4	H =.67
68.00	1.8	H =1.17
68.50	2.2	H =1.67
69.00	2.5	H =2.17
69.50	2.8	H =2.67
70.00	3.0	H =3.17
70.50	3.3	H =3.67
71.00	3.5	H =4.17
71.50	3.7	H =4.67
72.00	3.9	H =5.17
72.50	4.0	H =5.67
73.00	4.2	H =6.17
73.50	4.4	H =6.670
74.00	4.5	H =7.170

C = .6   A = .3525653 sq.ft.
H (ft) = Table elev. - Datum elev. (66.83 ft)
Q (cfs) = C * A * sqr(2g * H)

Outlet Structure File: MODEXST3.STR

POND-2 Version: 5.20   S/N:
Date Executed: Time Executed:


```
                  **********************
                        Print Pack
                        86120-103
                    change riser structure

                  **********************
```


Outflow Rating Table for Structure #1
TABLE   Input your own rating table.

Elevation (ft)	Q (cfs)	Computation Messages
66.50	0.0	
67.00	0.8	Interpolated from input table
67.18	0.0	E = or > E2=67.16
67.50	0.0	E = or > E2=67.16
68.00	0.0	E = or > E2=67.16
68.50	0.0	E = or > E2=67.16
69.00	0.0	E = or > E2=67.16
69.50	0.0	E = or > E2=67.16
70.00	0.0	E = or > E2=67.16
70.50	0.0	E = or > E2=67.16
71.00	0.0	E = or > E2=67.16
71.50	0.0	E = or > E2=67.16
72.00	0.0	E = or > E2=67.16
72.50	0.0	E = or > E2=67.16
73.00	0.0	E = or > E2=67.16
73.50	0.0	E = or > E2=67.16
74.00	0.0	E = or > E2=67.16

Outlet Structure File: MODEXST3.STR

POND-2 Version: 5.20   S/N:
Date Executed: Time Executed:


```
              **********************
                    Print Pack
                    86120-103
               change riser structure

              **********************
```


Outflow Rating Table for Structure #8
WEIR-VR   Weir - Vertical Rectangular

          ***** INLET CONTROL ASSUMED *****

Elevation (ft)	Q (cfs)	Computation Messages
66.50	0.0	E < Inv.El.= 73.1
67.00	0.0	E < Inv.El.= 73.1
67.18	0.0	E < Inv.El.= 73.1
67.50	0.0	E < Inv.El.= 73.1
68.00	0.0	E < Inv.El.= 73.1
68.50	0.0	E < Inv.El.= 73.1
69.00	0.0	E < Inv.El.= 73.1
69.50	0.0	E < Inv.El.= 73.1
70.00	0.0	E < Inv.El.= 73.1
70.50	0.0	E < Inv.El.= 73.1
71.00	0.0	E < Inv.El.= 73.1
71.50	0.0	E < Inv.El.= 73.1
72.00	0.0	E < Inv.El.= 73.1
72.50	0.0	E < Inv.El.= 73.1
73.00	0.0	E < Inv.El.= 73.1
73.50	75.9	H =.4
74.00	256.1	H =.9

```
  C = 3    L (ft) = 100
  H (ft)  = Table elev. - Invert elev. ( 73.1 ft )
  Q (cfs) = C * L * (H**1.5) -- Suppressed Weir
```

Outlet Structure File: MODEXST3.STR

POND-2 Version: 5.20   S/N:
Date Executed: Time Executed:


```
                    **********************
                         Print Pack
                         86120-103
                    change riser structure

                    **********************
```


```
                    Outflow Rating Table 5
                       Table 5  =  3  ?  4
```

Elevation (ft)	Q (cfs)	Contributing Structures
66.50	0.0	-
67.00	0.0	-
67.18	0.0	-
67.50	0.0	-
68.00	0.0	-
68.50	0.0	-
69.00	0.0	-
69.50	0.0	-
70.00	0.0	-
70.50	0.0	-
71.00	10.5	3
71.50	35.4	3
72.00	42.8	4
72.50	44.3	4
73.00	45.7	4
73.50	47.1	4
74.00	48.4	4

```
                        ******************
                        *                *
                        *  Print Pack    *
                        *   86120-103    *
                        *  existing pond *
                        *                *
                        *                *
                        ******************
```

Inflow Hydrograph: C:\86120-~1\SITE100 .HYD
Rating Table file: C:\86120-~1\EXIST   .PND

----INITIAL CONDITIONS----
Elevation =   66.50 ft
Outflow   =   0.00 cfs
Storage   =   0.00 ac-ft

| GIVEN POND DATA | | INTERMEDIATE ROUTING COMPUTATIONS | |
ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (ac-ft)		2S/t (cfs)	2S/t + 0 (cfs)
66.50	0.0	0.000		0.0	0.0
67.00	0.2	0.008		1.8	2.0
67.50	0.8	0.039		9.5	10.3
68.00	9.4	0.094		22.6	32.0
68.50	16.3	0.178		43.0	59.3
69.00	19.7	0.301		72.9	92.6
69.50	22.5	0.464		112.3	134.8
70.00	25.1	0.664		160.6	185.7
70.50	27.4	0.898		217.4	244.8
71.00	29.6	1.166		282.2	311.8
71.50	31.6	1.469		355.4	387.0
72.00	33.4	1.807		437.4	470.8
72.50	35.2	2.182		528.1	563.3
73.00	36.9	2.593		627.6	664.5
73.50	114.4	3.023		731.6	846.0
74.00	296.2	3.453		835.6	1131.8

Time increment (t) =   6.0 min.

```
**************** SUMMARY OF ROUTING COMPUTATIONS ******************

Pond File:          C:\86120-~1\EXIST    .PND
Inflow Hydrograph:  C:\86120-~1\SITE100 .HYD
Outflow Hydrograph: C:\86120-~1\OUT      .HYD


Starting Pond W.S. Elevation =     66.50 ft


        ***** Summary of Peak Outflow and Peak Elevation *****

                    Peak Inflow    =    152.00 cfs
                    Peak Outflow   =     72.37 cfs
                    Peak Elevation =     73.23 ft


        ***** Summary of Approximate Peak Storage *****

             Initial Storage          =      0.00 ac-ft
             Peak Storage From Storm   =      2.79 ac-ft
                                          ---------------
             Total Storage in Pond    =      2.79 ac-ft


     Warning: Inflow hydrograph truncated on left side.
```

Pond File: C:\86120-~1\EXIST   .PND
Inflow Hydrograph: C:\86120-~1\SITE100 .HYD
Outflow Hydrograph: C:\86120-~1\OUT   .HYD

Peak Inflow   =   152.00 cfs
Peak Outflow   =   72.37 cfs
Peak Elevation   =   73.23 ft

```
        ***************************
        *                         *
        *       Print Pack        *
        *       86120-103         *
        *  change riser structure *
        *                         *
        *                         *
        ***************************
```

Inflow Hydrograph: C:\86120-~1\SITE100 .HYD
Rating Table file: C:\86120-~1\MODEXST3.PND

----INITIAL CONDITIONS----
Elevation =   66.50 ft
Outflow   =   0.00 cfs
Storage   =   0.00 ac-ft

GIVEN POND DATA / INTERMEDIATE ROUTING COMPUTATIONS

ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (ac-ft)	2S/t (cfs)	2S/t + 0 (cfs)
66.50	0.0	0.000	0.0	0.0
67.00	0.8	0.008	1.8	2.6
67.18	1.0	0.017	4.1	5.1
67.50	1.4	0.039	9.5	10.9
68.00	1.8	0.094	22.6	24.4
68.50	2.2	0.178	43.0	45.2
69.00	2.5	0.301	72.9	75.4
69.50	2.8	0.464	112.3	115.1
70.00	3.0	0.664	160.6	163.6
70.50	3.3	0.898	217.4	220.7
71.00	14.0	1.166	282.2	296.2
71.50	39.1	1.469	355.4	394.5
72.00	46.6	1.807	437.4	484.0
72.50	48.3	2.182	528.1	576.4
73.00	49.9	2.593	627.6	677.5
73.50	127.4	3.023	731.6	859.0
74.00	309.1	3.453	835.6	1144.7

Time increment (t) =   6.0 min.

```
**************** SUMMARY OF ROUTING COMPUTATIONS ******************

Pond File:          C:\86120-~1\MODEXST3.PND
Inflow Hydrograph:  C:\86120-~1\SITE100 .HYD
Outflow Hydrograph: C:\86120-~1\OUT     .HYD


Starting Pond W.S. Elevation =    66.50 ft


        ***** Summary of Peak Outflow and Peak Elevation *****

                    Peak Inflow    =    152.00 cfs
                    Peak Outflow   =    111.46 cfs
                    Peak Elevation =     73.40 ft


        ***** Summary of Approximate Peak Storage *****

            Initial Storage         =      0.00 ac-ft
            Peak Storage From Storm  =      2.93 ac-ft
                                          ---------------
            Total Storage in Pond    =      2.93 ac-ft


    Warning: Inflow hydrograph truncated on left side.
```

Pond File: C:\86120-~1\MODEXST3.PND
Inflow Hydrograph: C:\86120-~1\SITE100 .HYD
Outflow Hydrograph: C:\86120-~1\OUT   .HYD

Peak Inflow   =   152.00 cfs
Peak Outflow   =   111.46 cfs
Peak Elevation =   73.40 ft

Date Record Created:		WS_BMPNO: CC018	Print Record
Created By:			

PRINTED ON Thursday, March 11, 2010 11:13:39 AM

WATERSHED	CC
BMP ID NO	018
PLAN NO	SP-21-98
TAX PARCEL	(50-2)(9-13)
PIN NO	5020900013
CONSTRUCTION DATE	
PROJECT NAME	PrintPack-Busch Corporate Center
FACILITY LOCATION	400 Packets Court
CITY-STATE	Williamsburg, Va. 23185
CURRENT OWNER	Busch Corporate Center Association
OWNER ADDRESS	100 Kingsmill Road
OWNER ADDRESS 2	
CITY-STATE-ZIP CODE	Williamsburg, Va. 23185
OWNER PHONE	253-3933
MAINT AGREEMENT	Yes
EMERG ACTION PLAN	No

MAINTENANCE PLAN	No
SITE AREA acre	9.7
LAND USE	
old BMP TYP	Dry Pond
JCC BMP CODE	F2 Dry ED with forebay
POINT VALUE	4
SVC DRAIN AREA acres	18.7
SERVICE AREA DESCRI	Printpack & Eastern Intern
IMPERV AREA acres	0.00
RECV STREAM	UT of Halfway Creek
EXT DET-WQ-CTRL	Yes
WTR QUAL VOL acre-ft	0.94
CHAN PROT CTRL	No
CHAN PROT VOL acre-ft	0
SW/FLOOD CONTROL	Yes
GEOTECH REPORT	No

CTRL STRUC DESC	RCP Riser
CTRL STRUC SIZE inches	48
OTLT BARRL DESC	CMP Barrel
OTLT BARRL SIZE inch	24
EMERG SPILLWAY	No
DESIGN HW ELEV	73.4
PERM POOL ELEV	na
2-YR OUTFLOW cfs	23.90
10-YR OUTFLOW cfs	46.94
REC DRAWING	No
CONSTR CERTIF	No

LAST INSP DATE   Inspected by:

INTERNAL RATING

MISC/COMMENTS

Offsite BMP, old BMP, riser modified to RCP.

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Additional Comments:

CC018

CC018_PRINTPACK_BUILDING_EXPANSION - 091