See also MC047

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: **MC048**

DATE VERIFIED: **December 3, 2012**

QUALITY ASSURANCE TECHNICIAN: **Leah Hardenbergh**

Leah Hardenbergh

LOCATION: WILLIAMSBURG, VIRGINIA

Stormwater Division

MEMORANDUM

Date: March 28, 2012

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

From: Leah Hardenbergh

PO: 110426

Re: Files Approved for Scanning

General File ID or BMP ID: **MC048**

PIN: **3841600003**

Owner Name (if known): **MIDLANDS OFFICE BUILDING (THE)**

Legal Property Description: **L-3 S-1 MIDLANDS**

Site Address: **3909 MIDLANDS ROAD**

(For internal use only):

Box # 3

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

MC-048

ontents for Stormwater Management Facilities As-built Files

ach 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

COPY

AGREEMENT AND DECLARATION OF COVENANTS TO CONSTRUCT, MAINTAIN AND PROVIDE ACCESS TO A STORMWATER FACILITY

This AGREEMENT, made this 16th day of June 2000, by and between Andy and Peggy Piplico and all successors in interest, (CONVENANTORS) and the COUNTY OF JAMES CITY, VIRGINIA (COUNTY), a political subdivision of the Commonwealth of Virginia.

The COVENANTORS are the owners of the real property, with improvements thereon, designated as Lot 2 and Lot 3 , The Midlands, ref. Tax map (38-4)(16-2), & (38-4) (16-3) commonly known as 3917 Midlands Road and 3909 Midlands Road.

NOW, THEREFORE, in consideration of the mutual covenants herein contained it is agreed that the COUNTY will allow the COVENANTORS to develop, complete and occupy an office building on Lot 3, in accordance with the Site Plan (designated SP- 100-00) approved by the COUNTY, in conjuction with constructing and maintaining a stormwater facility serving lots 2 and 3 in accordance with the conditions contained within this AGREEMENT, on Lot 2.

WITNESSETH:

We, the COVENANTORS, with full authority to execute deeds, mortages, other convenants, and all rights, titles and interests in the property described above, do hereby covenant with the COUNTY as follows:

1. The COVENANTORS shall provide surety in the amount of $20,000.00 acceptable to the County Attorney, for performance of this AGREEMENT in the amount agreed to by both parties.

2. The COVENANTORS shall construct the stormwater water quality facility(FACILITY) as shown on a County approved BMP plan facility to be designed by Ralph Simmons,P.E., and that the construction will conform with the "Virginia Erosion and Sedimentation Control Handbook" third edition, and the James City County Guidelines for Design and Construction of Stormwater Management BMPs.

3. The COVENANTORS agree that the construction of said FACILITY will be completed, accepted and approved by the COUNTY no later than June 30th, 2001.

4. If the COVENANTORS fail to construct the facility in accordance with the stipulations contained in this AGREEMENT, the COUNTY may use the surety to construct or complete the FACILITY. On satisfactory completion of the FACILITY, the COUNTY shall release the surety provided in paragraph 1.

Instrument # 000022218

Recorded on: Nov. 28, 2000

5. The COVENANTORS shall provide maintenance for the FACILITY located on and serving the above described property to ensure that the FACILITY is and remains in proper working condition in accordance with the approved design standards, and with the law and applicable executive regulations.

6. The COVENANTORS shall provide and maintain perpetual access from public right-of-ways to the FACILITY for the COUNTY, its agents, and its contractors.

7. The COVENANTORS shall grant the COUNTY, its agents and its contractors a right of entry to the FACILITY for the purpose of inspecting, operation, installing, constructing, reconstructing, maintaining or repairing the FACILITY.

8. If after fifteen (15) days written notice by the COUNTY, the COVENANTORS SHALL FAIL TO MAINTAIN THE FACILITY in accordance with the approved design standards and with the law and applicable executive regulations, the COUNTY may assess the COVENANTORS and/or all property serviced by the FACILITY for the cost of the work and any applicable penalties.

9. The COVENANTORS shall indemnify and save the COUNTY harmless from any and all claims for damages to persons or property arising from the installation, constructing, maintenance, repair, operation or use of the FACILITY. Except as to such claims that may arise out of maintenance or construction activities undertaken by the COUNTY or its agents.

10. The COVENANTORS shall promptly notify the County when the COVENANTORS legally transfer any of the COVENANTORS ownership in or responsibilities for the FACILITY. THE COVENANTORS shall supply the County with a copy of the document of transfer, executed by both parties.

11. The COVENANTS contained herein shall run with the land and shall bind the COVENANTORS and the COVENANTORS'S heirs, executors, administrators, sucessors and assignees, and shall bind all present and subsequent owners of the property served by the FACILITY.

12. This AGREEMENT shall be recorded in the circuit court clerks office for the County of James City, Virginia.

IN WITNESS WHERE[redacted] the COVENANTOR(S) have execute[redacted]s DECLARATION OF VENANTS as of this _____ day of _____, 19____.

COVENANTOR(S)

Print Name/Title Andy Piplico / Owner

ATTEST:

Laurie A. Rupert

COVENANTOR(S)

Peggy K. Piplico

Print Name/Title Peggy K. Piplico / Owner

ATTEST:

Laurie A. Rupert

COMMONWEALTH OF VIRGINIA
CITY/COUNTY OF James City

I hereby certify that on this 14 day of November, 19 2000, before the subscribed, a Notary Public of the State of Virginia, and for the City/County of James City, aforesaid personally appeared Andy + Peggy Piplico and did acknowledge the aforegoing instrument to be their Act.

IN WITNESS WHEREOF, I have hereunto set my hand and official seal this 14 day of November, 19 2000.

Merrie L. Smith
Notary Public

My Commission expires: 8/31/2002

Approved as to form:

Leo P. Rogers
Deputy County Attorney

The form of this deed is approved and pursuant to Resolution of the Board of Supervisors of James City County, Virginia, duly adopted on the 17th day of May, 1993, this conveyance is hereby accepted on behalf of said County.

Leo P. Rogers
~~Frank Morton III~~, County Attorney
Leo P. Rogers, Deputy

This Declaration of Covenants prepared by:

Andy Piplico
(Print Name)

owner
(Title)

118 Newport Dr
(Address)

Williamsburg, VA 23185
(City) (State) (Zip)

James City County, Virginia
Environmental Division

Stormwater Management / BMP Facilities
Record Drawing and Construction Certification Forms

(Note: In accordance with the requirements of the Chesapeake Bay Preservation Ordinance, Chapter 23, Section 23-10(4), BMP's shall be designed and constructed in accordance with the manual entitled James City County Guidelines for Design and Construction of Stormwater Management BMP's. Erosion and sediment control policy and approved plans generally require that at the completion of the project and prior to release of surety, an "as-built" plan prepared by a registered Professional Engineer or Certified Land Surveyor must be provided for the drainage system for the project, including any Best Management Practice (BMP) facilities. In addition, for BMP facilities involving the construction of an impounding structure or dam embankment, certification is required by a Professional Engineer who has inspected the structure during its construction. Currently there are over 20 water quality type BMP's accepted by the County.)

Section 1 - Site Information:

Project Name: Lot 2, Midlands Road
Structure/BMP Name: BMP 1 & BMP 2
Project Location: 3917 Midlands Road
BMP Location: Lots 3 & 2 (respectively)
County Plan No.: SP - 76 - 01

Project Type:
- ☐ Residential
- ☐ Commercial
- ☐ Institutional
- ☐ Public
- ☐ Other
- ☐ Business
- ☑ Office
- ☐ Industrial
- ☐ Roadway

Tax Map/Parcel No.: 38-4, 16-2
BMP ID Code (if known): MC047 and MC048
Zoning District:: Limited Business, LB
Land Use: Business/office
Site Area (sf or acres): 0.85 Acres

Brief Description of Stormwater Management/BMP Facility: BMP #1 (Dry Extended Detention), located on lot 3 provided WQ Storage & rout all storms to flow to BMP #2. Approx. 0.77 acres is served by BMP #1. BMP #2 (Dry Extended Detention) serves 3.34 acres for WQ (2.57 Acres) & One year Channel Erosion

Nearest Visible Landmark to SWM/BMP Facility: Existg bldg on Lot 3.

Nearest Vertical Ground Control (if known):
- ☐ JCC Geodetic Ground Control
- ☐ USGS
- ☐ Temporary
- ☑ Arbitrary
- ☐ Other

Station Number or Name: MH Rim on property
Datum or Reference Elevation: 86.74
Control Description: Property Boundary
Control Location from Subject Facility: Property boundary

Section 2 - Stormwater Management / BMP Facility Construction Information:

PreConstruction Meeting Held for Construction of SWM/BMP Facility: ☑ Yes ☐ No ☐ Unknown
Approx. Construction Start Date for SWM/BMP Facility: 2/1/01
Facility Monitored by County Representative during Construction: ☐ Yes ☐ No ☑ Unknown
Name of Site Work Contractor Who Constructed Facility: William Cowan Construction
Name of Professional Firm Who Routinely Monitored Construction: Ralph C. Simmons, PE
Date of Completion for SWM/BMP Facility: 3/15/01
Date of Record Drawing/Construction Certification Submittal: 12/27/01

(Note: Record Drawing and Construction Certifications are required within thirty (30) days of the completion of Stormwater Management and/or BMP facility construction. Record Drawings and Construction Certifications must be reviewed and approved by the James City County Environmental Division prior to final inspection, acceptance and bond or surety release.)

Section 3 - Owner / Designer / Contractor Information:

Owner/Developer: *(Note: Site Owner or Applicant responsible for development of the project.)*

Name: Andy Piplico
Mailing Address: 118 Northpoint Drive
Williamsburg VA 23185
Business Phone: 565-0003 Fax: 565-0416
Contact Person: Andy Piplico Title: Owner

Design Professional: *(Note: Professional Engineer or Certified Land Surveyor responsible for the design and preparation of plans and specifications for the Stormwater Management / BMP facility.)*

Firm Name: Simmons Engineering Inc
Mailing Address: 4732 Longhill Rd, Suite 3103
Williamsburg VA 23188
Business Phone: 258-5000
Fax: 258-3758
Responsible Plan Preparer: Ralph C. Simmons PE
Title: President
Plan Name: Lot 2, Midlands Road
Firm's Project No. 00-105
Plan Date: 28 Jun 00 Rev'd 8/4/01
Sheet No.'s Applicable to SWM/BMP Facility: C1 / C2 / C3 / C4 / C5

BMP Contractor: *(Note: Site Work Contractor directly responsible for construction of the Stormwater Management / BMP facility.)*

Name: William Cowan Construction
Mailing Address: PO Box 695
Toano VA 23168
Business Phone: 566-4809
Fax:
Contact Person: William Cowan
Site Foreman/Supervisor: Same as Contact Person
Specialty Subcontractors & Purpose (for BMP Construction Only):
None

Section 4 - Professional Certifications:

Certifying Professionals: *(Note: A Registered Professional Engineer or Certified Land Surveyor is responsible for preparation of a Record Drawing, sometimes referred to as an As-Built plan, for the drainage system for the project including any Stormwater Management/BMP Facilities. A Registered Professional Engineer is responsible for the inspection, monitoring and certification of Stormwater Management / BMP facilities during its construction.)*

Record Drawing and Construction Certifications for Stormwater Management / BMP Facilities

Record Drawing Certification

Firm Name: Simmons Engineering Inc.
Mailing Address: 4732 Longhill Rd
Suite 3103, Williamsburg VA 23188
Business Phone: 258-5000
Fax: 258 3758

Name: Ralph C. Simmons PE
Title: President
Signature: Ralph Simmons
Date: 27 Sep 01

I hereby certify to the best of my knowledge and belief that this record drawing represents the actual condition of the Stormwater Management / BMP facility. The facility appears to conform with the provisions of the approved design plan, specifications and stormwater management plan, except as specifically noted.

Asbuilt conditions are field verified with modifications checked to confirm original design.

COMMONWEALTH OF VIRGINIA
RALPH C. SIMMONS
No.018289
PROFESSIONAL ENGINEER

(Seal)

Virginia Registered Professional Engineer or Certified Land Surveyor

Construction Certification

Firm Name: Simmons Engineering Inc
Mailing Address: 4732 Longhill Rd
Suite 3103, Williamsburg VA 23188
Business Phone: 258-5000
Fax: 258-3758

Name: Ralph C. Simmons, PE
Title: President
Signature: Ralph Simmons
Date: 27 Sep 01

I hereby certify to the best of my knowledge and belief that this Stormwater Management/BMP facility was monitored and constructed in accordance with the provisions of the approved design plan, specifications and stormwater management plan, except as specifically noted.

Continuous onsite, inspection of backfill, compaction or other soils work is not certified.

COMMONWEALTH OF VIRGINIA
RALPH C. SIMMONS
No.018289
PROFESSIONAL ENGINEER

(Seal)

Virginia Registered Professional Engineer

Section 5 - Record Drawing and Construction Certification Requirements and Instructions:

☑ PreConstruction Meeting - Provides an opportunity to review SWM / BMP facility construction, maintenance and operation plans and address any questions regarding construction and/or monitoring of the structure. The ~~design engineer~~, ~~certifying professionals (if different)~~, Owner/Applicant, Contractor and County representative(s) are encouraged to attend the preconstruction meeting. Advanced notice to the Environmental Division is requested. Usually, this requirement can be met simultaneously with Erosion and Sediment Control preconstruction meetings held for the project.

☑ A fully completed ***STORMWATER MANAGEMENT / BMP FACILITIES, RECORD DRAWING and CONSTRUCTION CERTIFICATION FORM*** and ***RECORD DRAWING CHECKLIST***. All applicable sections shall be completed in their entirety and certification statements signed and sealed by the registered professional responsible for individual record drawing and/or construction certification.

☑ The Record Drawing shall be prepared by a Registered Professional Engineer or Certified Land Surveyor for the drainage system of the project including any Best Management Practices.

☐ No RCS

Construction Certification. Construction of Stormwater Management / BMP facilities which contain impoundments, embankments and related engineered appurtenances including subgrade preparation, compacted soils, structural fills, liners, geosynthetics, filters, seepage controls, cutoffs, toe drains, hydraulic flow control structures, etc. shall be visually observed and monitored by a Registered Professional Engineer or his/her authorized representative. The Engineer must certify that the structure, embankment and associated appurtenances were built in accordance with the approved design plan, specifications and stormwater management plan and standard accepted construction practice and shall submit a written certification and/or drawings to the Environmental Division as required. Soil and compaction test reports, concrete test reports, inspection reports, logs and other required construction material or installation documentation may be required by the Environmental Division to substantiate the certification, if specifically requested. The Engineer shall have the authority and responsibility to make minor changes to the approved plan, in coordination with the assigned County inspector, in order to compensate for unsafe or unusual conditions encountered during construction such as those related to bedrock, soils, groundwater, topography, etc. as long as changes do not adversely affect the integrity of the structure(s). Major changes to the approved design plan or structure must be reviewed and approved by the original design professional and the James City County Environmental Division.

☐ Submitted 12/27/01

Record Drawing and Construction Certifications are required within **thirty (30) days** of the completion of Stormwater Management / BMP facility construction. Submittals must be reviewed and accepted by James City County Environmental Division prior to final inspection, acceptance and bond/surety release.

N/A

Dual Purpose Facilities - Completion of construction also includes an interim stage for Stormwater Management / BMP facilities which serve dual purpose as temporary sediment basins during construction and as permanent stormwater management / BMP facilities following construction, once development and stabilization are substantially complete. For these dual purpose facilities, construction certification is required once the temporary sediment basin phase of construction is complete. Final record drawing and construction certification of additional permanent components is required once permanent facility construction is complete.

Interim Construction Certification is required for those dual purpose embankment-type facilities that are generally ten (10) feet or greater in dam height (*) and may not be converted, modified or begin function as a permanent SWM / BMP structure for a period generally ranging from six (6) to eighteen (18) months or more from issuance of a Land Disturbance permit for construction.

Interim or final record drawing and construction certifications are not required for temporary sediment basins which are designed and constructed in accordance with current minimum standards and specifications for temporary sediment basins per the Virginia Erosion and Sediment Control Handbook (VESCH); have a temporary service life of less than eighteen (18) months; and will be removed completely once associated disturbed areas are stabilized, unless a distinct hazard to the public's health, safety and welfare is determined by the Environmental Division due to the size or presence of the structure or due to evidence of improper construction.

(*Note: Dam Height as referenced above is generally defined as the vertical distance from the natural bed of the stream or waterway at the downstream toe of the embankment to the top of the embankment structure in accordance with 4VAC50-20-30, Virginia Impoundment Structure Regulations and the Virginia Dam Safety Program.)

☑ Record Drawings shall provide, at a minimum, all information as shown within these requirements and the attached **RECORD DRAWING CHECKLIST** specific to the type of SWM/BMP facility being constructed. Other additional record data may be formally requested by the James City County Environmental Division. *(Note: Refer to the current edition of the James City County Guidelines for Design and Construction of Stormwater Management BMP's manual for a complete list of acceptable BMP's. Currently there are over 20 acceptable water quality type BMP's accepted by the County.)*

☐ Record Drawings shall consist of blue/black line prints and a reproducible (mylar, sepia, diazo, etc.) set of the approved stormwater management plan including applicable plan views, profiles, sections, details, maintenance plans, etc. as related to the subject SWM / BMP facility. The set shall indicate "**RECORD DRAWING** " in large text in the lower right hand corner of each sheet with record elevations, dimensions and data drawn in a clearly annotated format and/or boxed beside design values. Approved design plan values, dimensions and data shall not be removed or erased. Drawing sheet revision blocks shall be modified as required to indicate record drawing status. Elevations to the nearest 0.1' are sufficiently accurate except where higher accuracy is needed to show positive drainage. Certification statements as shown in Section 4 of the Record Drawing and Construction Certification Form, ***or similar forms thereof***, and professional signatures and seals, with dates matching that of the record drawing status in the revision or title block, are also required on all associated record drawing plans, prints or reproducibles.

☑ Submission Requirements. Initial and subsequent submissions for review shall consist of a minimum of one (1) blue/black line set for record drawings and one copy of the construction certification documents with appropriate transmittal. Under certain circumstances, it is understood that the record drawing and construction certification submissions may be performed by different professional firms. Therefore, record drawing submission may be in advance of construction certification or vice versa. Upon approval and prior to release of bond/surety, final submission shall include one (1) reproducible set of the record drawings, one (1) blue/black line set of the record drawings and one (1) copy of the construction certification. Also for current and/or future incorporation into the County BMP database and GIS system, it is requested that the record drawings also be submitted to the Environmental Division on a diskette or CD-ROM in an acceptable electronic file format such as *.dxf, *.dwg, etc. or in a standard scanned and readable format. The electronic file requirement can be discussed and coordinated with Environmental Division staff at the time of final submission.

STORMWATER MANAGEMENT / BMP FACILITIES
RECORD DRAWING CHECKLIST

(Key for Checklist is as follows: XX Acceptable N/A Not Applicable Inc Incomplete)

I. Methods and Presentation: *(Required for all Stormwater Management / BMP facilities.)*

XX 1. All constructed facilities meet approved design plans, unless otherwise shown. Record information or deviations from approved design plan shown in clearly annotated format and/or boxed beside design values.

XX 2. Elevations to the nearest 0.1' unless higher accuracy is needed to show positive drainage.

XX 3. All plan sheets labeled with "RECORD DRAWING" in large text in lower right hand corner (Approved County Plan Number and BMP ID Code can be included if known).

XX 4. All plan sheet revision blocks modified to indicate date and record drawing status.

XX 5. All plan sheets have certification statements and certifying professional's signature and seal.

II. Minimum Standards: *(Required for all Stormwater Management / BMP facilities, as applicable.)*

____ 1. All requirements of Section I (Methods and Presentation) apply to this section.

XX 2. Plan Views: Show general location, arrangement and dimensions. Location and alignment shall generally match approved design plans.

XX 3. Profile or elevations along top or berm of the facility. At a minimum, elevations are required at each end, at intervals not to exceed 50 feet and where low spots may be present. Top of embankment or berm elevations must be no less than design elevation plus any settlement allowances.

XX 4. Top widths, berm widths and embankment side slopes.

XX 5. Show length, width and depth of facility or grading, contours or spot elevations as required to verify permanent pool and design storage volumes were met or were reasonably close to the approved design. Evaluation of as-built grading, contours, spot elevations, or cross-sections, may be necessary by the professional to ensure approved design configurations, depths and volumes were closely maintained. If grading or elevations are significantly different from the approved plan, the Environmental Division shall be contacted immediately to determine whether the variation is acceptable or whether further evidence will be required. Facilities which do not closely resemble approved plan grades, elevations or configurations may require regrading by the Contractor; check volumetric computations; and/or a check hydraulic routing to ensure approved design water surface elevations, discharges or freeboard were closely maintained.

INC 6. Cross-section of the embankment through the principal spillway or outlet barrel. Must extend at least 100 ft. downstream of the pipe outlet or to recorded site property line, whichever is closer. Proper correlation is required between principal spillway (control structure) crest, emergency spillway crest, orifice and weirs and the top of the dam or facility. All elevations and dimensions must reasonably match the design plan or be sequentially relative to each other and the facility must reflect the required design storage volume(s) and/or design depth.

INC 7. Profile or elevations along the entire centerline of the emergency spillway. Emergency spillway may be steeper, but no flatter or narrower than design.

XX 8. Elevation of the principal spillway crest or outlet crest of the structure.

XX 9. Primary control structure (riser) diameter or dimensions, height, type of material and base size. Indicate provisions for access that are present such as steps, ladders, etc.

XX 10. Dimensions, locations and elevations of outlet orifices, weirs, slots and drains.

XX 11. Type and size of anti-vortex and trash rack device. Height, diameter, dimensions, bar spacings (if applicable) and elevations relative to the principal spillway crest. Indicate if lockable hatch is present or not.

INC 12. Type, location, size and number of anti-seep collars or documentation of other methods utilized for seepage control. **May need to obtain this information during construction.**

INC 13. Top of impervious core embankment, core trench limits and elevation of cut-off trench bottom. **May need to obtain this information during construction.**

XX 14. Elevation of the principal spillway barrel (outlet pipe) inlet and outlet invert.

XX 15. Outlet barrel diameter, length, slope, type and thickness class of material and type of flared end sections, headwall or endwall.

INC 16. Outfall protection dimension, type and depth of rock and if underlain filter fabric is present.

INC 17. BMP interior and periphery landscaping zones conform with arrangements and requirements of the approved design plan

INC 18. Maintenance plan taken from approved design plan transposed onto record drawing set.

N/A 19. Fencing location and type, if applicable to facility.

XX 20. BMP vicinity properly cleaned of stockpiles and construction debris.

XX 21. No visual signs of erosion or channel degradation immediately downstream of facility.

N/A 22. Any other information formally requested by the Environmental Division specific to the constructed SWM/BMP facility.

3-11 N/A

STORMWATER MANAGEMENT / BMP FACILITIES
AS-BUILT PLAN CHECKLIST

(Key for Checklist is as follows: XX Acceptable N/A Not Applicable Inc Incomplete)

VII. Group E - Open Channel Systems

(Includes E-1 Wet Swales (Check Dams); E-2 Dry Swales; and E-3 Biofilters)

____ E1. All requirements of Section II, Minimum Standards, apply to Group E facilities as applicable.

____ E2. Open channel system has constructed longitudinal slope of less than four (4) percent.

____ E3. No visual signs of erosion in the open channel system's soil and/or vegetative cover.

____ E4. Open channel side slopes are no steeper than 2H:1V at any location. Preferred channel sideslope is 3H:1V or flatter.

____ E5. No visual signs of ponding are present at any location in the open channel system, except at rock check dam locations for E-1 systems (Wet Swales).

____ E6. For E-2 BMPs (Dry Swales), an underdrain system was provided.

____ E7. Treated timber or rock check dams provided as pretreatment devices for the open channel system.

____ E8. Gravel diaphragm provided in areas where lateral sheet flow from impervious surfaces are directly connected to the open channel system.

____ E9. Grass cover/stabilization in the open channel system appears adaptable to the specific soils and hydric conditions for the site and along the channel system.

____ E10. Open channel system areas with grass covers higher than four (4) to six (6) inches were properly mowed.

____ E11. Facility was not used for erosion and sediment control purposes and sediment was prevented from entering the facility to the greatest extent possible during construction.

____ E12. No visible signs of accumulated silt/sediment were present in the facility following construction or alternately, accumulated silt/sediment was properly removed and no adverse affects to the function of the facility are anticipated.

____ E13. For E-3 BMPs (Biofilters), the bottom width is six (6) feet maximum at any location.

____ E14. For E-3 BMPs (Biofilters), sideslopes are 3H:1V maximum at any location.

____ E15. For E-3 BMPs (Biofilters), the constructed channel slope is less than or equal to three (3) percent at any location.

____ E16. For E-3 BMPs (Biofilters), the constructed grass channel is approximately equivalent to the constructed roadway length.

Lot 3
BMP #1
Lot 4
Lot 5

STORMWATER MANAGEMENT / BMP FACILITIES
RECORD DRAWING CHECKLIST

(Key for Checklist is as follows: XX Acceptable N/A Not Applicable Inc Incomplete)

VIII. Group F - Extended Dry Detention

(Includes F-1 Timber Walls; and F-2 Dry Extended Detention with Forebay)

XX F1. All requirements of Section II, Minimum Standards, apply to Group F facilities.

XX F2. Basin bottom has positive slope and drainage from all basin inflow points to the riser (or outflow) location.

N/A F3. Timber wall BMP used in intermittent stream only. (ie. Prohibited in perennial streams.)

N/A F4. Forebay provided approximately 20 ft. upstream of the facility. Forebays generally 4 to 6 feet in depth.

XX F5. A ~~reverse slope pipe~~, vertical stand pipe ~~or mini-barrel~~ and riser was provided to prevent clogging.

N/A F6. Principal spillway and outlet barrel provided consisting of reinforced concrete pipe with O-Ring gaskets for watertight joint construction.

N/A F7. Mini-barrel and riser, if used, contains a removable trash rack to reduce clogging.

XX F8. Low flow orifice, if used, has a ~~minimum diameter of three (3) inches or two (2)~~ 5/8" Ø inches ~~if~~ internal orifice control was utilized and a small, cage type external trash rack.

N/A F9. Timbers properly reinforced or concrete footing provided if soil conditions were prohibitive.

N/A F10. Timber wall cross members extended to a minimum depth of two (2) feet below ground elevation.

XX F11. Protection against erosion and scour from the low flow orifice and weir-flow trajectory provided.

XX F12. ~~Stilling basin or~~ standard outlet protection provided at principal spillway outlet.

XX F13. Adequate, direct access provided to the facility. Access corridor to facility is at least ten (10) feet wide, ~~slope is less than twenty (20) percent~~ and appropriate stabilization provided for equipment and vehicle use. Access extends to ~~forebay,~~ standpipe ~~and timber wall~~, as applicable.

XX F14. No visual signs of ~~undercutting of timber walls or~~ clogging of the low orifice were present.

XX F15. No visual signs of erosion or channel degradation immediately downstream of facility.

XX F16. No visible signs of accumulated silt/sediment were present in the facility following construction or alternately, accumulated silt/sediment was properly removed and no adverse affects to the function of the facility are anticipated.

MC048_3909_MIDLANDS_ROAD_BIORETENTION_CELL - 015

LOT 2
BMP #2

STORMWATER MANAGEMENT / BMP FACILITIES
RECORD DRAWING CHECKLIST

(Key for Checklist is as follows: XX Acceptable N/A Not Applicable Inc Incomplete)

VIII. Group F - Extended Dry Detention

(Includes F-1 Timber Walls; and F-2 Dry Extended Detention with Forebay)

XX F1. All requirements of Section II, Minimum Standards, apply to Group F facilities.

XX F2. Basin bottom has positive slope and drainage from all basin inflow points to the riser (or outflow) location.

N/A F3. Timber wall BMP used in intermittent stream only. (ie. Prohibited in perennial streams.)

XX F4. Forebay provided ~~approximately 20 ft. upstream of the facility~~. ~~Forebays generally 4 to 6 feet in depth~~. W/ 3'± Depth.

XX F5. A ~~reverse slope pipe, vertical stand pipe or mini-barrel and~~ riser was provided to prevent clogging.

XX F6. Principal spillway and outlet barrel ~~provided consisting of reinforced concrete pipe with O-Ring gaskets for watertight joint construction~~.

XX F7. ~~Mini-barrel and~~ riser, if used, contains a removable trash rack to reduce clogging.

XX F8. Low flow orifice, if used, has a ~~minimum diameter of three (3) inches or two (2) inches if~~ 1-3/8" ϕ internal orifice control was utilized and a small, cage type external trash rack.

N/A F9. Timbers properly reinforced or concrete footing provided if soil conditions were prohibitive.

N/A F10. Timber wall cross members extended to a minimum depth of two (2) feet below ground elevation.

XX F11. Protection against erosion and scour from the low flow orifice and weir-flow trajectory provided.

XX F12. Stilling basin or standard outlet protection provided at principal spillway outlet.

XX F13. Adequate, direct access provided to the facility. Access corridor to facility is at least ten (10) feet wide, ~~slope is less than twenty (20) percent~~ and appropriate stabilization provided for equipment and vehicle use. Access extends to forebay, ~~standpipe and timber wall,~~ as applicable.

XX F14. No visual signs of ~~undercutting of timber walls or~~ clogging of the low orifice were present.

XX F15. No visual signs of erosion or channel degradation immediately downstream of facility.

XX F16. No visible signs of accumulated silt/sediment were present in the facility following construction or alternately, accumulated silt/sediment was properly removed and no adverse affects to the function of the facility are anticipated.

STORMWATER MANAGEMENT / BMP FACILITIES
RECORD DRAWING CHECKLIST

(Key for Checklist is as follows: XX Acceptable N/A Not Applicable Inc Incomplete)

IX. Group G - Open Spaces *(Includes All Open Space Types G-1; G-2; and G-3)*

_____ G1. All requirements of Section II, Minimum Standards, apply to Group G facilities as applicable.

_____ G2. Constructed impervious areas appear to conform with locations indicated on the approved plan and appear less than sixty (60) percent impervious in accordance with the requirements of the James City County Chesapeake Bay Preservation Ordinance.

_____ G3. Dedicated open space areas are in undisturbed common areas, conservation easements or are protected by other enforceable instruments that ensures perpetual protection.

_____ G4. Provisions included to clearly specify how the natural vegetated areas utilized as dedicated open space will be managed and field identified (marked).

_____ G5. Adequate protection measures were implemented during construction to protect the defined dedicated open space areas.

_____ G6. Dedicated open space areas were not disturbed during construction (ie. cleared, grubbed or graded).

STORMWATER MANAGEMENT / BMP FACILITIES
RECORD DRAWING CHECKLIST

(Key for Checklist is as follows: XX Acceptable N/A Not Applicable Inc Incomplete)

X. Storm Drainage Systems (Associated with BMP's Only)

(Includes all incidental stormwater drainage conveyance systems associated with SWM/BMP facilities such as onsite or offsite storm drains, open channels, inlets, manholes, junctions, outlet protections, deflectors, etc. These facilities are external to the treatment function of, but are directly associated with drainage to and/or from a constructed SWM/BMP facility. The intent of this portion of the certification is to accurately identify the type and quantity of inflow or outflow points associated with the facility for future reference. The Professional may use his/her own discretion to determine inclusive facilities to meet the intent of this section. As a general rule, storm drainage systems would include incidental facilities to the nearest access structure upslope or downslope from the normal physical limits of the facility or 800 feet of storm drainage conveyance system length, whichever is less.)

XX SD1. All requirements of Section II, Minimum Standards, apply to Storm Drainage Systems.

XX SD2. Horizontal location of all pipe and structures relative to the SWM/BMP facility.

XX SD3. Type, top elevation and invert elevation of all access type structures (inlets, manholes, etc.).

XX SD4. Material type, size or diameter, class, invert elevations, lengths and slopes for all pipe segments.

XX SD5. Class, length, width and depth of riprap and outlet protections or dimensions of special energy dissipation structures.

XII. Other Systems

(Includes any non-typical, specialty, manufactured or innovative stormwater management/BMP practices or systems generally accepted for use as or in conjunction with other acceptable stormwater management / BMP practices. Requires evidence of prior satisfactory industry use and prior Environmental Division approval, waiver or exception .)

N/A

____ O1. All requirements of Section II, Minimum Standards, apply to this section.

____ O2. Certification criteria to be determined on a case-by-case basis by the Environmental Division specific to the proposed SWM/BMP facility.

STORMWATER MANAGEMENT / BMP FACILITIES
RECORD DRAWING CHECKLIST

XIII. References

(The James City County Record Drawing and Construction Certification Forms and Checklists for Stormwater Management / BMP facilities were developed using the following sources and references.)

- ☐ Baltimore County, Maryland Soil Conservation District, As-Built Stormwater Management Pond Checklist.
- ☑ James City County, Virginia, Guidelines for Design and Construction of Stormwater Management BMP's (October 1999).
- ☑ James City County, Virginia, Stormwater Detention/Retention Basin Design Checklist and Erosion and Sediment Control and Stormwater Management Design Plan Checklists.
- ☑ James City County Stormwater Policy Framework, Final Report of the James City County BMP Policy Project, October 1998, The Center for Watershed Protection.
- ☐ Prince Georges County, Maryland, As-Built Requirements Retention or Detention Pond/Basin.
- ☐ Prince William County, Virginia, Stormwater Management Fact Sheet.
- ☐ Stafford County, Virginia, As-Built Plan Checklist.
- ☐ Stormwater Management Design Manual, NRCS Maryland Code No. 378, Pond Standards and Specifications.
- ☐ USEPA/Watershed Management Institute, Stormwater Management Inspection Forms.
- ☐ Virginia Impounding Structure Regulations (Dam Safety), Department of Conservation & Recreation, 1997.
- ☑ Virginia Erosion and Sediment Control Handbook, Third Edition 1992, Virginia Department of Conservation and Recreation, Division of Soil and Water Conservation.
- ☑ Virginia Stormwater Management Handbook, 1999 edition, Virginia Department of Conservation and Recreation, Division of Soil and Water Conservation.

File: Shared\SWMProg\BMP\Certif\RDCC.wpd

GPIN 384 16000
ZONE LB 0.46AC.

James City County, Virginia
Environmental Division

Stormwater Management/BMP Facilities
Record Drawing/Construction Certification
Review Tracking Form

County Plan No.: SP-89-99
Project Name: MIDLANDS ROAD LOT 3, 1
Stormwater Management Facility: BMP #1 BIORET CELL 3909 MIDLANDS RD
Phase: ☐ I ☒ II ☐ III

- ☑ Information Received. Date:
- ☑ Administrative Check.
  - ☑ Record Drawing Date: 10/01/2001 27Sept01; 5/22/02
  - ☑ Construction Certification Date: 27Sept01
  - ☑ RD/CC Standard Forms (Required after Feb 1st 2001Only)
  - ☑ Insp/Maint Agreement Info: 99001822 Aug26 99
  - ☐ BMP Maintenance Plan Location: NO
  - ☐ Other:
- ☒ Standard E&SC Note on Approved Plan Requiring RD/CC or County comment in plan review file.
  ☒ Yes ☐ No Location: Note 1 Sheet 19
- ☒ Assign County BMP ID Code Code: MC048
- ☒ Log into Division's "As-Built" Tracking Log
- ☒ Add Location to GIS Database Map. Obtain GIS site information (GPIN, Owner, Site Area, Address, etc.)
- ☒ Preliminary Log into BMP Database (BMP ID #, Site Plan #, GPIN, Project Name)
- ☒ Active Project File Review (correspondence, H&H, etc.).
- ☒ Initial As-Built File setup (label, copy hydraulics, BMP information, etc.).
- ☒ Inspector Check of RD/CC.
- ☒ Pre-Inspection Drawing Review - Approved Plan (Quick look prior to field inspection).
- ☑ Final Inspection (FI) Performed Date: 1/15/02; Reinspect 5/20/02
- ☑ Record Drawing (RD) Review Date: 1/14/02; 5/23/02
- ☑ Construction Certification (CC) Review Date: 1/14/02
- ☐ Actions:
  - ☐ No comments.
  - ☑ Comments. Letter Forwarded. Date: 1/16/02
    - ☐ Record Drawing (RD)
    - ☐ Construction Certification (CC)
    - ☐ Construction-Related (CR)
    - ☐ Site Issues (SI)
    - ☐ Other :
- ☐ Second Submission: RO 5/22/02
- ☐ Third Submission:
- ☑ Acceptable for stormwater managment facility purposes (RD/CC/CR/Other). Proceed with bond release.
- ☑ Notify Darryl/Joan/Pat of acceptability ~~using email (preferred)~~, form or verbal. FORM
- ☑ Check/Clean active file of any remaining material and finish "As-Built" file.
- ☑ Add to County BMP Inventory/Inspection schedule (Phase I, II or III).
- ☑ Copy Final Inspection Report into County BMP Inspection Program file.
- ☒ Digital Photographs obtained.
- ☐ NO Add to JCC Hydrology & Hydraulic database (optional).

BMP Certification Information Acceptable

Plan Reviewer: Geoff Thomas Date: 5/23/02

Record Drawing Notes:

These Record Drawings are of BMPs #1 and #2 of Lots 3 & 2 (respevtively) of Midlands Road. Oringinal design of BMP #1 for Lot 3 was perpared as a Bio-Retention Basin and approved by JCC Staff under site plan number SP-89-99. The construction of two Dry Extended Detention Basins provides a total of 27.2 Chesapeake Bay BMP Points.

Field survey was performed by LandTech Resources, Inc.

Summary of design concept:

BMP#1 lies upstream of BMP#2. BMP#1 provides for Water Quality (WQ) Treatment of 0.77 post-development acres (0.35 imperivous acres). WQ storage and control are provided by the primary spillway (modified DI). The 100-Year Storm Event is routed thru the structure via the secondary spillway (6' weir). All flows are directed to BMP#2.

BMP#2 discharges to an existing natural swale to off-property. The primary structure is a 36"Φ CMP Riser and controls the Water Quality Treatment volume for 2.57 post-development acres (1.24 imperivous acres). The BMP also stores and controls the 1-Year Channel Erosion Storm Event to below the riser's rim. The 10 Year Storm Event is stored and controlled by the primary spillway's rim.

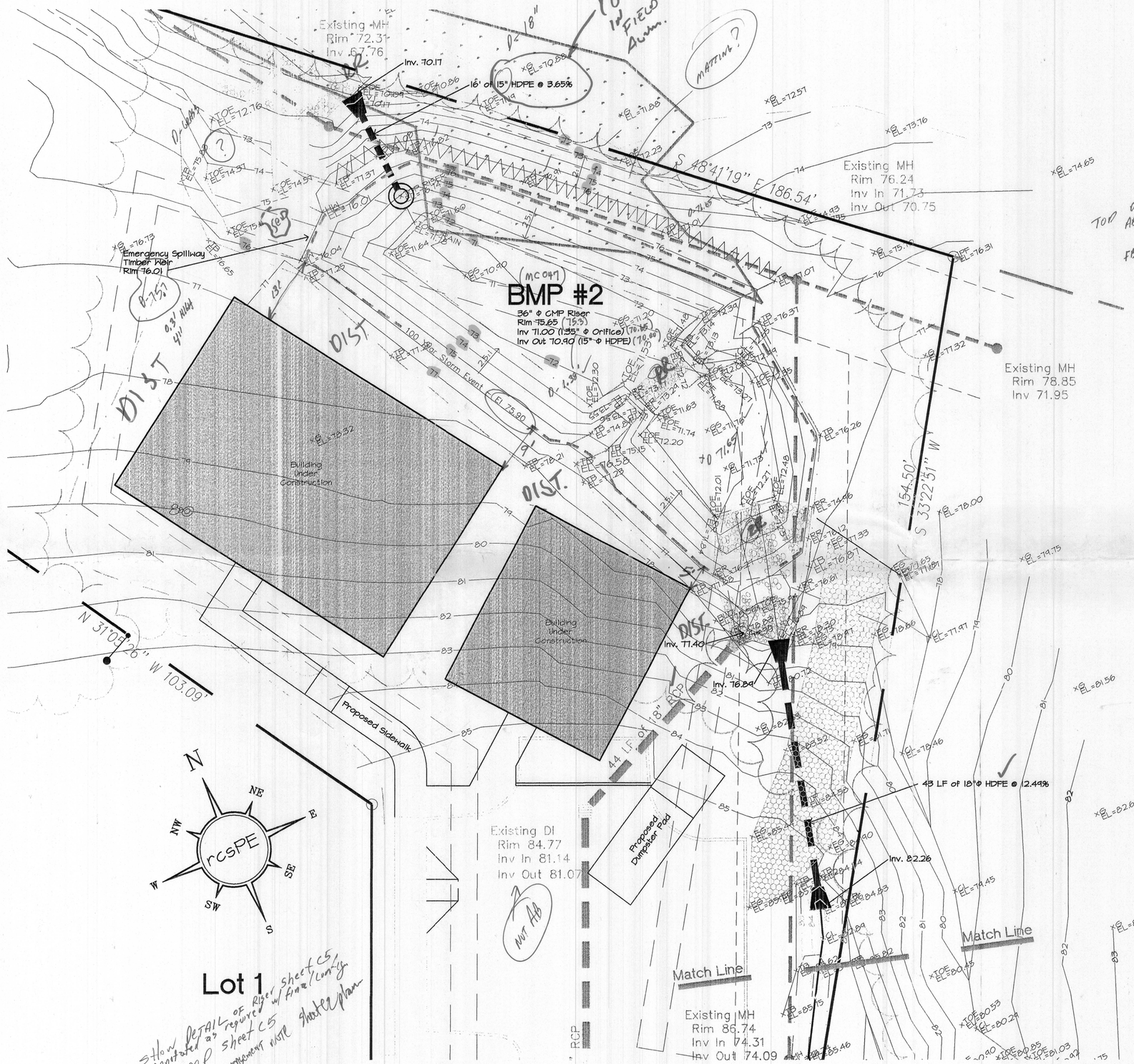
The 100-Year Storm Event for the entire 3.34 acre watershed is routed and designed to remain below BMP#2's Emergency Spillway rim.

BMP #2 Table

	Design			As-Built		
	Elevation	Volume (cf)	Flow (cfs)	Elevation	Volume (cf)	Flow (cfs)
Water Quality	73.80	4,497	0.08	74.10	4,495	0.08
Channel Erosion	75.03	7,840	0.09	75.24	7,976	0.10
100 Year	75.65	-	13.59	75.90	-	14.75
Emergency Spillway	75.70	-	-	76.01	-	-
Top of Berm	76.65	-	-	76.80	-	-

Stage-Storgage-Discharge Worksheet BMP #2
BMP #2 Record Drawing
Project No. 00-105

		Storage Volume		Water Quality Orifice a = 0.01 El = 71.00		Weir Length = 9.42 El = 75.24		Total Q	
Elev		CF	Ac. Ft.	h	Q	h	Q	CFS	Elev
71	Orifice Invert	0	0.000	0.00	0.000	0.00	0.00	0.00	71
72		592	0.014	1.00	0.048	0.00	0.00	0.05	72
73		2119	0.049	2.00	0.068	0.00	0.00	0.07	73
73.1		2339.3	0.054	2.10	0.070	0.00	0.00	0.07	73.1
73.2		2557.6	0.059	2.20	0.071	0.00	0.00	0.07	73.2
73.3		2776.9	0.064	2.30	0.073	0.00	0.00	0.07	73.3
73.4		2996.2	0.069	2.40	0.075	0.00	0.00	0.07	73.4
73.5		3215.5	0.074	2.50	0.076	0.00	0.00	0.08	73.5
73.6		3434.8	0.079	2.60	0.078	0.00	0.00	0.08	73.6
73.7		3654.1	0.084	2.70	0.079	0.00	0.00	0.08	73.7
73.8		3873.4	0.089	2.80	0.081	0.00	0.00	0.08	73.8
73.9		4092.7	0.094	2.90	0.082	0.00	0.00	0.08	73.9
74		4312	0.099	3.00	0.083	0.00	0.00	0.08	74
74.1	V_{wq}	4584.6	0.105	3.10	0.085	0.00	0.00	0.08	74.1
74.2		4877.2	0.112	3.20	0.086	0.00	0.00	0.09	74.2
74.3		5169.8	0.118	3.30	0.087	0.00	0.00	0.09	74.3
74.4		5462.4	0.125	3.40	0.089	0.00	0.00	0.09	74.4
74.45		5583.7	0.128	3.45	0.089	0.00	0.00	0.09	74.45
74.5		5725	0.131	3.50	0.090	0.00	0.00	0.09	74.5
74.55		5866.3	0.135	3.55	0.091	0.00	0.00	0.09	74.55
74.6		6007.6	0.138	3.60	0.091	0.00	0.00	0.09	74.6
74.7		6290.2	0.144	3.70	0.093	0.00	0.00	0.09	74.7
74.8		6572.8	0.151	3.80	0.094	0.00	0.00	0.09	74.8
74.9		6855.4	0.157	3.90	0.095	0.00	0.00	0.10	74.9
75		7138	0.164	4.00	0.096	0.00	0.00	0.10	75
75.24	V_{ce}	7975.6	0.183	4.24	0.099	0.00	0.00	0.10	75.24
75.9	Q_{100}	10279	0.236	4.90	0.107	0.66	14.65	14.75	75.9
76	Emergency Spillway	10628	0.244	5.00	0.108	0.76	18.10	18.21	76
76.82	Top of Berm								



Record Drawing Plan
Scale: 1" = 10'

BEFORE DIGGING CALL "MISS UTILITY" OF VIRGINIA AT 1-800-552-7001

Simmons Engineering, Inc.
Civil Engineering Design And Consulting
Williamsburg Business Center
4732 Longhill Road, Suite 3103
Williamsburg, VA 23188
Voice: (757) 258-5000
Fax: (757) 258-3758
E-mail: rcsPE@Quixlet.net

Designed By:	Drawn By:	Scale:	Date:
rcs	C.A.N.	1" = 10'	October 11, 2001

COMMONWEALTH OF VIRGINIA
RALPH C. SIMMONS
No. 018289
PROFESSIONAL ENGINEER

By	Revision	App.	Date

Lot 2, Midlands Road
Record Drawing Plan
James City County, Virginia

00-105	RD1

Record Drawing Notes:

These Record Drawings are of BMPs #1 and #2 of Lots 3 & 2 (respevtively) of Midlands Road. Oringinal design of BMP #1 for Lot 3 was perpared as a Bio-Retention Basin and approved by JCC Staff under site plan number SP-89-99. The construction of two Dry Extended Detention Basins provides a total of 27.2 Chesapeake Bay BMP Points.

Field survey was performed by LandTech Resources, Inc.

Summary of design concept:

BMP#1 lies upstream of BMP#2. BMP#1 provides for Water Quality (WQ) Treatment of 0.77 post-development acres (0.35 imperivous acres). WQ storage and control are provided by the primary spillway (modified DI). The 100-Year Storm Event is routed thru the structure via the secondary spillway (6' weir). All flows are directed to BMP#2.

BMP#2 discharges to an existing natural swale to off-property. The primary structure is a 36"Φ CMP Riser and controls the Water Quality Treatment volume for **2.57 post-development acres (1.24 imperivous acres)**. The BMP also stores and controls the 1-Year Channel Erosion Storm Event to below the riser's rim. The 10 Year Storm Event is stored and controlled by the primary spillway's rim.

The 100-Year Storm Event for the entire 3.34 acre watershed is routed and designed to remain below BMP#2's Emergency Spillway rim.

Now 0.1' below ES crest OK.

BMP #2 Table

	Design			As-Built		
	Elevation	Volume (cf)	Flow (cfs)	Elevation	Volume (cf)	Flow (cfs)
Water Quality	73.80	4,497 ✓	0.08	74.10	4,495 ✓	0.08
Channel Erosion	75.03	7,840 ✓	0.09	75.24	7,976 ✓	0.10
100 Year	75.65	-	13.59	75.90	-	14.75
Emergency Spillway	75.70	-	-	76.0	-	-
Top of Berm	76.65	-	-	76.80	-	-

Stage-Storgage-Discharge Worksheet BMP #2
BMP #2 Record Drawing
Project No. 00-105

		Storage Volume		Water Quality Orifice a = 0.01		Weir Length = 9.42		Total Q	
				El = 71.00		El = 75.24			
Elev		CF	Ac. Ft.	h	Q	h	Q	CFS	Elev
71	Orifice Invert	0	0.000	0.00	0.000	0.00	0.00	0.00	71
72		592	0.014	1.00	0.048	0.00	0.00	0.05	72
73		2119	0.049	2.00	0.068	0.00	0.00	0.07	73
73.1		2338.3	0.054	2.10	0.070	0.00	0.00	0.07	73.1
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73.5		3215.5	0.074	2.50	0.076	0.00	0.00	0.08	73.5
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73.7		3654.1	0.084	2.70	0.079	0.00	0.00	0.08	73.7
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73.9		4092.7	0.094	2.90	0.082	0.00	0.00	0.08	73.9
74		4312	0.099	3.00	0.083	0.00	0.00	0.08	74
74.1	V_{WQ}	4594.6	0.105	3.10	0.085	0.00	0.00	0.08	74.1
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74.3		5159.8	0.118	3.30	0.087	0.00	0.00	0.09	74.3
74.4		5442.4	0.125	3.40	0.089	0.00	0.00	0.09	74.4
74.45		5583.7	0.128	3.45	0.089	0.00	0.00	0.09	74.45
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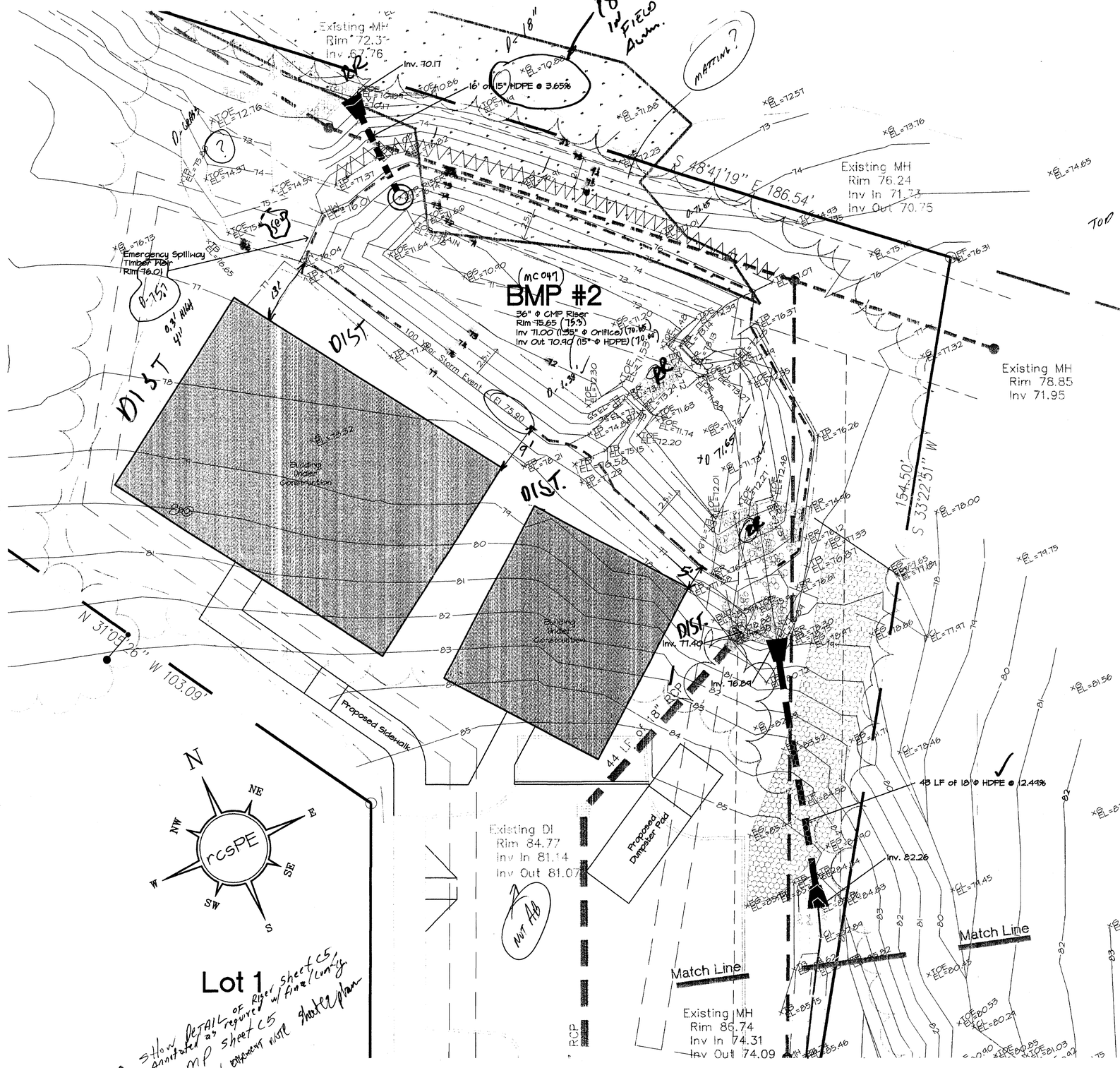
75		7138	0.164	4.00	0.096	0.00	0.00	0.10	75
75.24	V_{CE}	7975.6	0.183	4.24	0.099	0.00	0.00	0.10	75.24
75.9	Q_{100}	10279	0.236	4.90	0.107	0.66	14.65	14.75	75.9
76	Emergency Spillway	10628	0.244	5.00	0.108	0.76	18.10	18.21	76
76.82	Top of Berm								



Not AB

Show DETAIL of Riser sheet C5, Annotated as required w/ final/County ADD MP sheet C5 and 5th MAW EASEMENT WITH Shade/plan

Record Drawing Plan

Scale: 1" = 10'

MC 047
SP-100-00

BEFORE DIGGING CALL "MISS UTILITY" OF VIRGINIA AT 1-800-552-7001

REVIEW SET MC 047 (SP-100-00); MC 048 (SP-89-99)

Simmons Engineering, Inc.
Civil Engineering Design And Consulting
Williamsburg Business Center
4732 Longhill Road, Suite 3103
Williamsburg, VA 23188
Voice: (757) 258-5000
Fax: (757) 258-3738
E-mail: rcsPE@quix.net

Designed By: rcs | Drawn By: C.A.N. | Scale: 1" = 10' | Date: October 1, 2001

COMMONWEALTH OF VIRGINIA
RALPH C. SIMMONS
No. 018289
PROFESSIONAL ENGINEER

By	Revision	App.	Date

Lot 2, Midlands Road
Record Drawing Plan
James City County, Virginia

00-105 | RD1

MC048_3909_MIDLANDS_ROAD_BIORETENTION_CELL_022

Record Drawing Notes:

These Record Drawings are of BMPs #1 and #2 of Lots 3 & 2 (respectively) of Midlands Road. Oringinal design of BMP #1 for Lot 3 was prepared as a Bio-Retention Basin and approved by JCC Staff under site plan number SP-89-99. The construction of two Dry Extended Detention Basins provides a total of 27.2 Chesapeake Bay BMP Points.

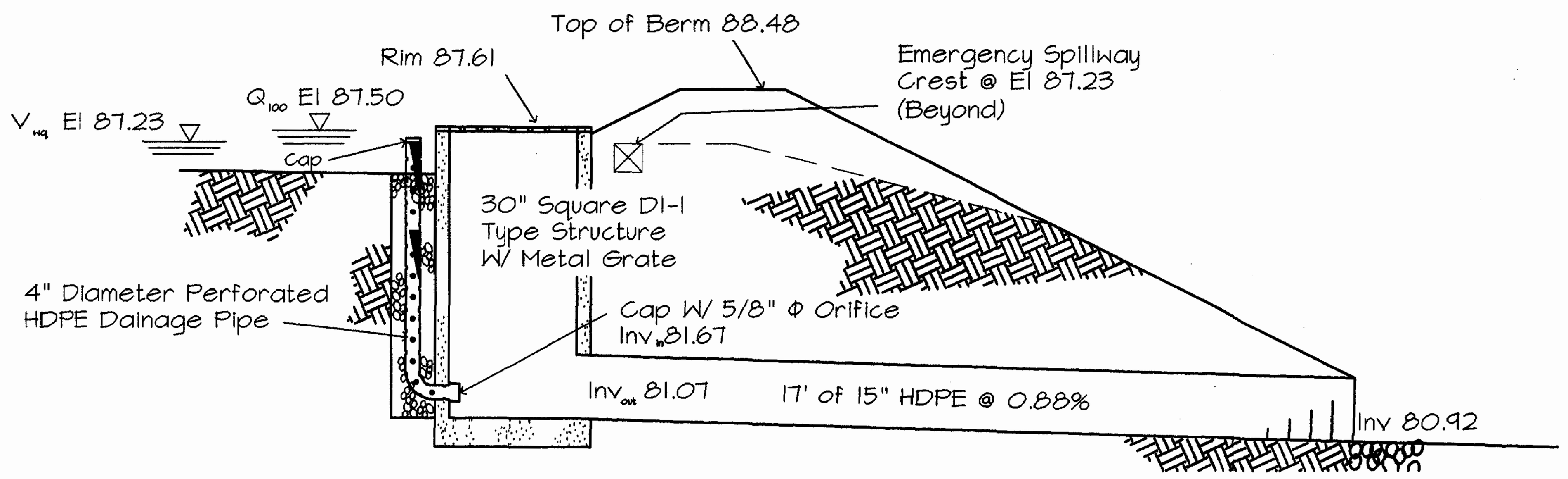
Field survey was performed by LandTech Resources, Inc.

Summary of design concept:

BMP#1 lies upstream of BMP#2. BMP#1 provides for Water Quality (WQ) Treatment of 0.77 post-development acres (0.35 impervious acres). WQ storage and control are provided by the primary spillway (modified DI-1). The 100-Year Storm Event is routed thru the structure via the secondary spillway (6' weir). All flows are directed to BMP#2.

BMP#2 discharges to an existing natural swale to off-property. The primary structure is a 36"Φ Aluminized Metal Pipe Riser and controls the Water Quality Treatment volume for 2.57 post-development acres (1.24 impervious acres). The BMP also stores and controls the 1-Year Channel Erosion Storm Event to below the riser's rim. The 10 Year Storm Event is stored and controlled by the primary spillway's rim.

The 100-Year Storm Event for the entire 3.34 acre watershed is routed and designed to remain below BMP#2's Emergency Spillway rim.



BMP #1 Outlet Structure

NTS

BMP #1 Table

	Design			As-Built		
	Elevation	Volume (cf)	Flow (cfs)	Elevation	Volume (cf)	Flow (cfs)
Water Quality	87.34	1,264	0.02	87.23	1,266	0.02
100 Year	87.61	-	2.47	87.50	-	2.47
Emergency Spillway	87.34	-	-	87.23	-	-
Top of Berm	89.00	-	-	88.48	-	-

Maintenance Plan for BMP #1 of Lot 3 – Midlands Road

A maintenance program is required to ensure the Stormwater Management (SWM) / Best Management Practice (BMP) facility functions as designed and to provide for reasonable aesthetic conditions. Proper maintenance is encouraged to prevent the introduction of debris and sediment at inflow locations, pretreatment areas, the BMP itself, its principal control structures and downstream waterways. Following installation and establishment of vegetation in disturbed site areas, inspections for sediment buildups will be performed at least quarterly. It is anticipated that under normal conditions, sediment removal will be required once every 5 to 10 years. If other construction or related land-disturbing activities are performed upslope of the BMP, adequate protection measures should be implemented with inspections performed at least once weekly.

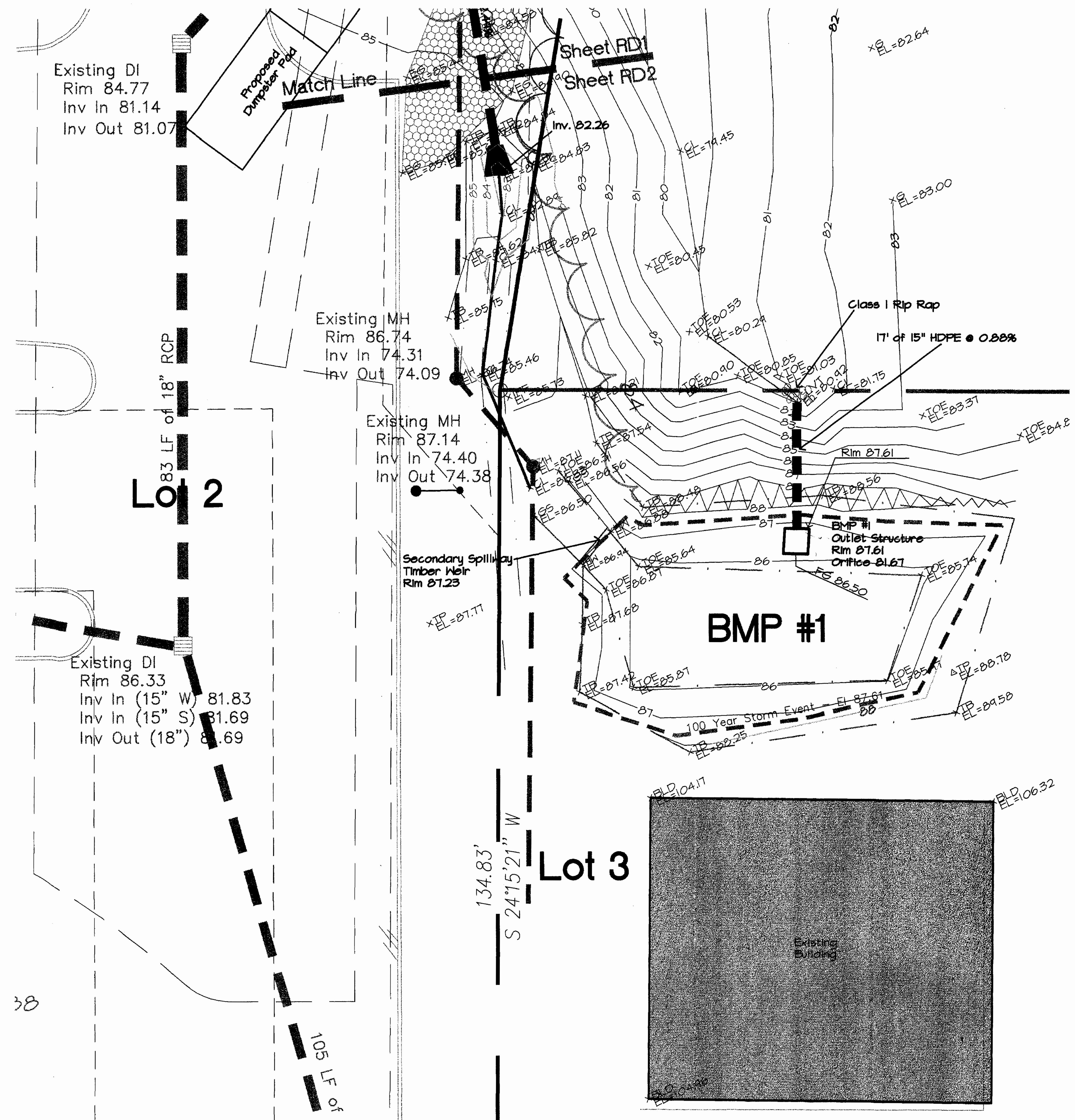
The Owner or its designated representative will inspect the SWM/BMP structure after each significant rainfall event or the following working day if a weekend or holiday occurs. A significant rainfall for this structure is defined as one (1) inch or more of gauged rainfall within a 24 hour period. Once per year (more or less) a representative of the County may jointly inspect the structure. Appropriate action, performed at the cost of the owner will be taken to ensure appropriate maintenance. Where structures are to be maintained jointly, allocation of maintenance costs will be in accordance with terms established in maintenance agreements. Keys to locked access points or structures shall be made available to the County upon request.

BMP Description:

BMP #1 serves a drainage area of 0.77 acres associated with the Midlands Road area. The facility is a 4-point, dry-type detention facility, County Type F-2 BMP. A dry-type detention pond temporarily stores runoff and is normally dry during non-rainfall periods. Typically draw down times range from 24 to 72 hours following a storm event. Principal structures associated with the BMP consist of a 30-inch square modified DI-1 type structure, 4" perforated plastic riser pipe in a stone and fabric jacket, and an 18 inch HDPE outlet barrel. During the 100-year storm, the maximum water level should rise to about 0.27 feet above the top of the DI-1 grate. During this type of larger storm event, the emergency spillway, which is located through the embankment directly west of the riser structure, will normally discharge flow. If functioning properly, normal storm events should reach an elevation just below the top of the riser and the pond should draw down in about 24 to 36 hours.}

Inspection and maintenance of the facility will consist of the following additional measures:

1. Inspect for sediment buildup by visual observation and a physical determination of sediment depth within pond storage areas. Sediment should not be allowed to cover the stone or 4" plastic pipe control device at the outlet structure of the pond (or Cleanout Elevation of 86.24), removal is required. At the same time, or at least once per year, clean pretreatment devices, the riser bottom and outlet pipes of accumulated sediments. Dispose of sediments removed from the facility at an acceptable disposal area.
2. Perform maintenance mowing of pond grasses at least twice each year. Grasses such as tall fescue should be mowed in early summer after emergence of the heads on cool season grasses and in late fall to prevent seeds of annual weeds from maturing. Mowing of legumes can be less frequent. Trees, shrubs and woody vegetation are not permitted to grow along or on any part of the embankment that was constructed using engineered (compacted) fills.
3. Perform soil sampling on stabilized pond soil areas at least once every 4 years. Soil sampling and testing should be performed by qualified independent soil testing laboratory such as VPI&SU. Apply additional lime and fertilizer in accordance with test recommendations.
4. In stabilized pond areas, if vegetation covers less than 40 % of soil surfaces, lime, fertilize and seed in accordance with recommendations for new seedlings. If vegetation covers more than 40 % but less than 70 % of soil surfaces, lime, fertilize and over seed in accordance with current seeding recommendations or requirements of the Virginia Erosion and Sediment Control Handbook (VESCH).
5. Perform quarterly inspections of the riser section and crest spillway for the observance of collected trash and debris. Immediately remove any trash or debris that prevents the movement of water. Remove any trash and litter downstream and at storm drain or channel inflow locations to maintain the integrity of the structure and provide an attractive appearance.
6. Perform yearly structural inspections of the facility for damage. Structural inspection shall be performed on the riser, anti-vortex device, trash rack, orifices/weirs, outlet barrel and pond embankment. Exposed metal surfaces shall be re-painted or re-galvanized to minimize rust damage or replaced if rust damage is irreversible. If damage is evident, further investigation by a professional engineer may be required to assess the integrity of the structure.
7. Perform quarterly inspections of the graded side slopes of the facility for signs of animal/rodent borrows or slope erosion. Immediately perform necessary repairs, refilling or reseeding.
8. Perform yearly observations of perimeter areas surrounding the facility to ensure changes in land use, topography or access have not occurred and do not affect the operation, maintenance, access or safety features as provided. Appropriate action is required to ensure adequacy and to provide a clear, safe passage for maintenance vehicles to the engineered embankment and principal flow control structures.
9. Record Keeping. The owner or designated representative shall keep reasonable, accurate written records of inspections performed for the structure. Records shall document routine maintenance and/or repairs performed. Copies shall be provided to the County upon request.
10. The facility shall not accept additional drainage or be modified in any way without prior consent or approval by the Environmental Division of James City County.



Record Drawing Plan

Scale: 1" = 10'

Simmons Engineering, Inc.
Civil Engineering Design And Consulting

Williamsburg Business Center
4732 Longhill Road, Suite 3103
Williamsburg, VA 23188

Voice: (757) 258-5000
Fax: (757) 258-3758
E-mail: rcsPE@QuixNet.net

Designed By:	Drawn By:	Scale:	Date:
rcs	C.A.N.	1" = 10'	October 1, 2001

Commonwealth of Virginia — Ralph C. Simmons No. 018289 — Professional Engineer — 5/20/02

1	rcs	Per Envrnmntl Staff Comment Ltr Dtd 1/15/02	rcs 5.14.02
	By	Revision	App. Date

Lot 2, Midlands Road
Record Drawing Plan
County Plan Number SP-89-99
BMP ID No. MC 048

James City County, Virginia

00-105	RD2

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MC048_3909_MIDLANDS_ROAD_BIORETENTION_CELL - 023

APPROVED MAY 2 3 2002

TIVE REPORT

:SS. ON JUNE 17, 1999, THE PLANNING COMMISSION
ON FROM 50 FEET TO 35 FEET.

S TO CONSTUCT A 4,500 SQ. FT. OFFICE
NG LOT TO SERVE THIS BUILDING.
ORDANCE WITH THE JAMES CITY COUNTY
GINIA DEPARTMENT OF TRANSPORTATION

DERAT. STORMWATER RUNOFF FROM THE SITE IS
THE REAR OF THE PROPERTY. SITES TO THE EAST
EN DEVELOPED. THE SITE TO THE NORTH IS ZONED
ENTS HAVE BEEN MEET (SEE LANDSCAPE PLAN).

) BY ECS.

JRES:

RACTICES SHALL BE
S PRESCRIBED IN THE 1992 VIRGINIA EROSION

MC0418A3909 MIDLANDS ROAD RETENTION_CELL - 024

SITE PLAN FOR
LOT 3
MIDLANDS, SECTION I

GENERAL NOTES

1. ALL CONSTRUCTION SHALL CONFORM WITH THE SPECIFICATIONS AND STANDARDS OF THE VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY (DEQ), THE VIRGINIA DEPARTMENT OF TRANSPORTATION (VDOT) AND JAMES CITY COUNTY, VIRGINIA.
2. ALL SIGNS WILL BE IN ACCORDANCE WITH ARTICLE II, DIVISION 2 OF THE JAMES CITY COUNTY ZONING ORDINANCE.
3. THE LAND SURVEYOR FOR THIS PROJECT IS JOHNNY S. WALTERS, III , C.L.S., WALTERS LAND SURVEYING, LTD., NEWPORT NEWS, VIRGINIA (757)898-1057.
4. CONTRACT ADMINISTRATION WILL BE MANAGED BY THE OWNER.
5. CLEARING AND GRUBBING OPERATIONS SHALL BE LIMITED TO THE AREAS APPROVED AND SHOWN ON THE PLAN.
6. ELEVATIONS SHOWN HEREON ARE BASED ON N.G.V.D. 1929 DATUM. SEE PLAN FOR LOCATION AND IDENTIFICATION OF REFERENCE BENCHMARK.
7. THE CONTRACTOR SHALL CALL "MISS UTILITIES OF VIRGINIA" AT 1-800-552-7001 48 HOURS PRIOR TO BEGINNING ANY EXCAVATION.
8. THIS PLAN DOES NOT GUARANTEE THE EXISTENCE OR LOCATION OF UNDERGROUND UTILITIES. THE UNDERGROUND UTILITIES SHOWN HEREON WERE ESTABLISHED USING ABOVE GROUND STRUCTURES (VALVES, METERS, MANHOLES, ETC.), AS SHOWN ON THE PLAN. PRIOR TO ANY EXCAVATION OR CONSTRUCTION THE CONTRACTOR SHALL UNCOVER ALL UTILITIES WHICH ARE SHOWN ON THE PLANS OR WHICH HAVE BEEN MARKED BY MISS UTILITIES AS BEING IN THE AREA OF EXCAVATION OR CONSTRUCTION. THE CONTRACTOR SHALL TAKE VERTICAL AND HORIZONTAL MEASUREMENTS ADEQUATE TO DETERMINE IF ANY CONFLICT WILL OCCUR. IF ANY CONFLICT IS FOUND, THE CONTRACTOR SHALL NOTIFY THE SURVEYOR PRIOR TO BEGINNING ANY EXCAVATION OR CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVING AND RE-INSTALLING AT HIS EXPENSE ANY UTILITY WHICH MUST BE RELOCATED BECAUSE OF A CONFLICT WHICH WAS NOT REPORTED TO THE SURVEYOR PRIOR TO THE BEGINNING OF ANY EXCAVATION OR CONSTRUCTION.
9. THE CONTRACTOR SHALL NOTIFY ALL UTILITY COMPANIES 24 HOURS IN ADVANCE OF ANY EXCAVATION IN THE PROXIMITY OF THEIR UTILITIES.
10. THE CONTRACTOR SHALL PROVIDE TEMPORARY DRAINAGE AND EROSION CONTROL DURING CONSTRUCTION AS SHOWN ON THE PLANS, OR AS DIRECTED BY THE OWNER, THE SURVEYOR OR THE COUNTY.
13. THE CONTRACTOR SHALL USE ONLY APPROVED MATERIAL IN THE BACKFILL OF UTILITY TRENCHES. BACKFILL MATERIAL MUST BE APPROVED IN ADVANCE OF PLACEMENT BY THE SURVEYOR.
14. ALL UTILITY TRENCHES SHALL BE COMPACTED AND BACKFILLED WITHIN 0.2' OF FINAL

ADDENDUM NO. 4

JAMES CITY SERVICE AUTHORITY

GENERAL NOTES - SANITARY SEWER

1. ALL COMPONENTS OF THE SANITARY SEWER SYSTEM SHALL BE INSTALLED WITH THE LATEST EDITION OF THE JAMES CITY SERVICE AUTHORITY STANDA SANITARY SEWER SYSTEM AND THE VIRGINIA SEWERAGE REGULATIONS.
2. THE DEVELOPER'S REPRESENTATIVE SHALL SUBMIT A LIST OF MATERIALS FC CITY SERVICE AUTHORITY PRIOR TO COMMENCEMENT OF CONSTRUCTIO.
3. SEWER LINES SHALL BE INSTALLED AFTER ROUGH GRADING AND PRIOR TO F
4. ALL APPROVED EROSION AND SEDIMENT CONTROL REQUIREMENTS SHALL BE LINE CONSTRUCTION.
5. ALL SEWERS SHALL BE MIRRORED AND PRESSURE TESTED IN ACCORDANCE AUTHOUITY STANDARDS.
6. AFTER TESTING IS COMPLETE AND ALL COMPONENTS OF THE SEWER SYSTEM JAMES CITY SERVICE AUTHORITY, 'AS-BUILT DRAWINGS SHALL BE SUBMITTED NO WASTEWATER FLOW SHALL BE ALLOWED TO ENTER THE SANITARY SEWER DRAWINGS ARE RECEIVED AND CHECKED FOR ACCURACY BY THE JAMES CIT DISCREPANCIES NOTED, DURING THE AS-BUILT INSPECTION, SHALL BE CORR REPRESENTATIVES WITHIN 30 DAYS.
7. ROUTINE PERIODIC INSPECTIONS DURING CONSTRUCTION WILL BE PROVIDED E AUTHORITY. THESE INSPECTIONS DO NOT RELIEVE THE DEVELOPER FROM HIS FOR CONSTRUCTION A SANITARY SEWER SYSTEM IN STRICT ACCORDANCE WI SPECIFICATIONS OF JAMES CITY SERVICE AUTHORITY.
8. ANY CHANGES TO THE FINAL PLANS SHALL BE APPROVED BY THE JAMES C SHALL BE ACCURATELY INDICATED ON THE AS-BUILT DRAWINGS.
9. ALL LOTS SHALL BE PROVIDED WITH SEWER-SERVICE CONNECTIONS. THE CO EXTEND FROM THE MAIN TO THE PROPERTY LINE OR EASEMENT LINE, AND S WYE, FITTING,PLUG, AND CLEAN OUT WITH REMOVABLE PLUG AND METAL CO
10. THE DEVELOPER IS REQUIRED TO SUBMIT SEWER DATA SHEETS AND SHALL CONSTRUCT PRIOR TO COMMENCEMENT OF CONSTRUCTION.

James City County
Erosion and Sediment Control

THE PURPOSE OF THE EROSION CONTROL MEASURES SHOWN ON THESE PLAI THE TRANSPORT OF ALL WATER BORNE SEDIMENTS RESULTING FROM CONST ENTERING ONTO ADJACENT PROPERTIES OR STATE WATERS. IF FIELD INSPEC OF THE PLAN TO CONFINE SEDIMENT TO THE PROJECT SITE, APPROPRIATE M TO CORRECT ANY PLAN DEFICIENCIES. IN ADDITION TO THESE NOTES, ALL PF EROSION AND SEDIMENT CONTROL REGULATIONS SHALL APPLY TO THIS PROJ

1. ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSTALLED ACCORDANCE WITH THE "VIRGINIA EROSION AND SEDIMENT CONTROL HA SHALL BE THOROUGHLY FAMILIAR WITH ALL APPLICABLE MEASURES CO BE PERTINENT TO THIS PROJECT.
2. ALL POINTS OF CONSTRUCTION INGRESS AND EGRESS SHALL BE PROTE

ASSESS THEIR CONDITION. ANY NECESSARY MAINTENANCE OF THE MEASURES SHALL BE
COMPLISHED IMMEDIATELY UPON NOTIFICATION BY THE COUNTY AND SHALL INCLUDE THE REPAIR
MEASURES DAMAGED BY ANY SUBCONTRACTOR INCLUDING THOSE OF THE PUBLIC UTILITY
MPANIES.

RFACE FLOWS OVER CUT AND FILL SLOPES SHALL BE CONTROLLED BY EITHER REDIRECTION
OWS FROM TRANSVERSING THE SLOPES OR BY INSTALLING MECHANICAL DEVICES TO SAFELY
WER WATER DOWNSLOPE WITHOUT CAUSING EROSION. A TEMPORARY FILL DIVERSION (STD. &
EC. 3.10) SHALL BE INSTALLED PRIOR TO THE END OF EACH WORKING DAY.

DIMENT CONTROL MEASURES MAY REQUIRE MINOR FIELD ADJUSTMENTS AT TIME OF CONSTRUCTION
INSURE THEIR INTENDED PURPOSE IS ACCOMPLISHED. ENVIRONMENTAL DIVISION APPROVAL WILL
REQUIRED FOR OTHER DEVIATIONS FROM THE APPROVED PLANS.

E CONTRACTOR SHALL PLACE SOIL STOCKPILES AT THE LOCATIONS SHOWN ON THIS PLAN OR
DIRECTED BY THE ENGINEER. SIOL STOCKPILES SHALL BE STABILIZED OR PROTECTED WITH
DIMENT TRAPPING MEASURES. OFF-SITE WASTE OR BORROW AREAS SHALL BE APPROVED BY THE
VIRONMENTAL DIVISION PRIOR TO THE IMPORT OF ANY BORROW OR EXPORT OF ANY WASTE TO
FROM THE PROJECT SITE.

E CONTRACTOR SHALL COMPLETE DRAINAGE FACILITIES WITHIN 30 DAYS FOLLOWING COMPLETION
ROUGH GRADING AT ANY POINT WITHIN THE PROJECT. THE INSTALLATION OF DRAINAGE FACILITIES
ALL TAKE PRECEDENCE OVER ALL UNDERGROUND UTILITIES. OUT FALL DITCHES FROM DRAINAGE
RUCTURES SHALL BE STABILIZED IMMEDIATELY AFTER CONSTRUCTION OF SAME. THIS INCLUDES
STALLATION OF EROSION CONTROL STONE OR PAVED DITHCES WHERE REQUIRED. ANY DRAINAGE
TFALLS REQUIRED FOR A STREET MUST BE COMPLETED BEFORE STREET GRADING OR UTILITY
STALLATION BEGINS.

RMANENT OR TEMPORARY SOIL STABILIZATION MUST BE APPLIED TO ALL DENUDED AREAS
HIN 7 DAYS AFTER FINAL GRADE IS REACHED ON ANY PORITON OF THE SITE. SOIL STABILIZATION
ST ALSO BE APPLIED TO DENUDED AREAS WHICH MAY NOT BE AT FINAL GRADE BUT WILL REMAIN
RMANT (UNDISTURBED) FOR LONGER THAN 30 DAYS. SOIL STABILIZATION MEASURES INCLUDE
GETATIVE ESTABLISHMENT, MULCHING AND THE ERALY APPLICATION OF GRAVEL BASE MATERIAL
AREAS TO BE PAVED.

MORE THAN 300 FEET OF SANITARY SEWER, STORM SEVER, WATERLINES, OR UNDERGROUND
LITY LINES ARE TO BE OPEN AT ONE TIME. FOLLOWING INSTALLATION OF ANY PORTION OF THESE
MS, ALL DISTURBED AREAS ARE TO BE IMMEDIATELY STABILIZED (i.e., THE SAME DAY).

DISTURBED AREA STABILIZATION IS TO BE ACCOMPLISHED DURING THE MONTHS OF DECEMBER,
NUARY, OR FEBRUARY, STABILIZATION SHALL CONSIST OF MULCHING IN ACCORDANCE WITH
ECIFICATION 3.35. SEEDING WILL THEN TAKE PLACE AS SOON AS THE SEASON PERMITS.

E TERM SEEDING, FINAL VEGETATIVE COVER OR STABILIZATION, ON THIS PLAN SHALL MEAN THE
CCESSFUL GERMINATION AND ESTABLISHMENT OF A STABLE GRASS COVER FROM A PROPERLY
EPARED SEEDBED CONTAINING THE SPECIFIED AMOUNTS OF SEED, LIME, AND FERTILIZER IN
CORDANCE WITH SPECIFICATION 3.32, PERMANENT SEEDING. IRRIGATION SHALL BE REQUIRED AS
CESSARY TO ENSURE ESTABLISHMENT OF GRASS COVER.

. SLOPES STEEPER THAN 3:1 SHALL REQUIRE THE USE OF EROSION CONTROL BLANKETS SUCH
EXCELSIOR BLANKETS TO AID IN THE ESTABLISHMENT OF A VEGETATIVE COVER. INSTALLATION
ALL BE IN ACCORDANCE WITH SPECIFICATION 3.36, MULCHING AND MANUFACTURE'S INSTRUCTIONS.
SLOPES SHALL BE CREATED STEEPER THAN 2:1.

ET PROTECTION IN ACCORDANCE WITH SPECIFICATION 3.07 SHALL BE PROVIDED FOR ALL STORM
AIN INLETS AS SOON AS PRACTICAL FOLLOWING CONSTRUCTION OF SAME.

MPORARY LINERS, SUCH AS POLYETHYLENE SHEETS, SHALL BE PROVIDED FOR ALL PAVED DITCHES
TIL THE PERMANENT CONCRETE LINER IS INSTALLED.

VED DITCHES SHALL BE REQUIRED WHEREVER EROSION IS EVIDENT. PARTICULAR ATTENTION SHALL
PAID TO THOSE AREAS WHERE GRADES EXCEED 3 PERCENT.

MPORARY EROSION CONTROL MEASURES ARE NOT TO BE REMOVED UNTIL ALL DISTURBED AREAS
E STABILIZED. AFTER STABILIZATION IS COMPLETE, ALL MEASURES SHALL BE REMOVED WITHIN
DAYS. TRAPPED SEDIMENT SHALL BE SPREAD AND SEEDED.

. SEDIMENT TRAPS AND BASINS SHALL REMAIN IN PLACE UNTIL THE MAJORITY OF SINGLE-FAMILY
USES HAVE BEEN CONSTRUCTED AND SHALL NOT BE REMOVED WITHOUT AUTHORIZATION FROM THE
MES CITY COUNTY ENVIRONMENTAL DIVISION.

-BUILT DRAWINGS MUST BE PROVIDED FOR ALL DETENTION/BMP FACILITIES. ALSO UPON
MPLETION, THE CONSTRUCTION OF ALL DETENTION/BMP FACILITIES SHALL BE CERTIFIED BY A
OFESSIONAL ENGINERR WHO INSPECTED THE STRUCTURE DURING CONSTRUCTION. THE CERTIFICATION
ALL STATE THAT TO THE BEST OF HIS/HER JUDGMENT, KNOWLEDGE, AND BELIVE, THE STRUCTURE
S CONSTRUCTED IN ACCORDANCE WITH THE APPROVAL PLANS AND SPECIFICATIONS.

MC048 3909 MIDLANDS ROAD BIORETENTION CELL - 025

TRENCH. INSTALL SOIL STABILIZATION BLANKET.

15. FINISH GRADE DRAINAGE BASIN AND SITE.

16. INSTALL LANDSCAPING AND LIGHTING.

SP-89-99

SHEET INDEX

SHEET 1 OF 4	COVER SHEET AND NOTES
SHEET 2 OF 4	SITE LAYOUT
SHEET 3 OF 4	EROSION & SEDIMENT CONTROL
SHEET 4 OF 4	LANDSCAPING & LIGHTING PLAN

JUN 2000
RECEIVED
PLANNING DEPARTMENT

COUNTY OF JAMES CITY
FINAL SITE PLAN

APPROVALS	DATE
Fire Dept	
Health Dept	
VDOT	
Planning	6/6/00
Environ.	DEC/JS 4-25-00
Zoning Adm.	6/6/00
JCSA	
County Eng.	
REA	
Other	

WALTERS LAND SURVEYING, LTD.
710 DENBIGH BOULEVARD, SUITE 4C
NEWPORT NEWS, VIRGINIA 23602
(P.O. BOX 1594 YORKTOWN, VIRGINIA 23692)
PHONE: (757)898-1057 FAX: (757)898-2862

SCALE: NONE	REVISED 3/30/00 DATE: 2-7-2000	PROJ. NO.: 990531	SHEET 1 OF 4

PARKING AND PAVING NOTES

P1. OFF STREET PARKING SPACES REQUIRED: 18
1 SPACE PER 250 SQ. FT. OF BUILDING AREA
OFF STREET PARKING SPACES PROVIDED: 18
1 VAN ACCESSIBLE HANDICAP SPACE
17 9'x18' PARKING SPACES

P2. REFER TO DETAIL FOR RECOMMENDED PAVEMENT SECTION. SUBASE THICKNESS AND MATERIAL REQUIREMENTS TO BE DETERMINED BY A GEOTECHNICAL ENGINEER.

P3. ALL ON SITE PAVEMENT MARKINGS SHALL BE REFLECTORIZED TYPE MARKINGS IN ACCORDANCE WITH VDOT STANDARDS.

P4. AREA OF PARKING AND DRIVE LANE: 5,739 SQ. FT..

UTILITIES NOTES:

S1. ALL CONSTRUCTION AND COMPONENTS OF THE SANITARY SEWER SYSTEM ARE TO COMPLY WITH THE STANDARDS AS SET BY THE J.C.S.A..

W1. ALL CONSTRUCTION AND COMPONENTS OF THE WATER DISTRIBUTION SYSTEM SHALL COMPLY WITH THE STANDARDS OF THE CITY OF WILLIAMSBURG.

GENERAL NOTES:

G1. EXISTING IMPERVIOUS SURFACE: 0 S.F.
PROPOSED IMPERVIOUS SURFACE: 8,227 S.F.(41% OF SITE AREA)

G2. SITE ZONING: LIMITED BUSINESS

G3. TAX MAP NO.: 38-4 16 00003

G4. BUILDING SETBACKS: 35' FRONT
20' SIDE
35' REAR

G5. SITE AREA: 20,209 S.F.; 0.4639 AC.

G6. BUILDING FOOTPRINT AREA: 2016 S.F.(10% OF SITE AREA)

G7. MAXIMUM BUILDING HEIGHT: 35'

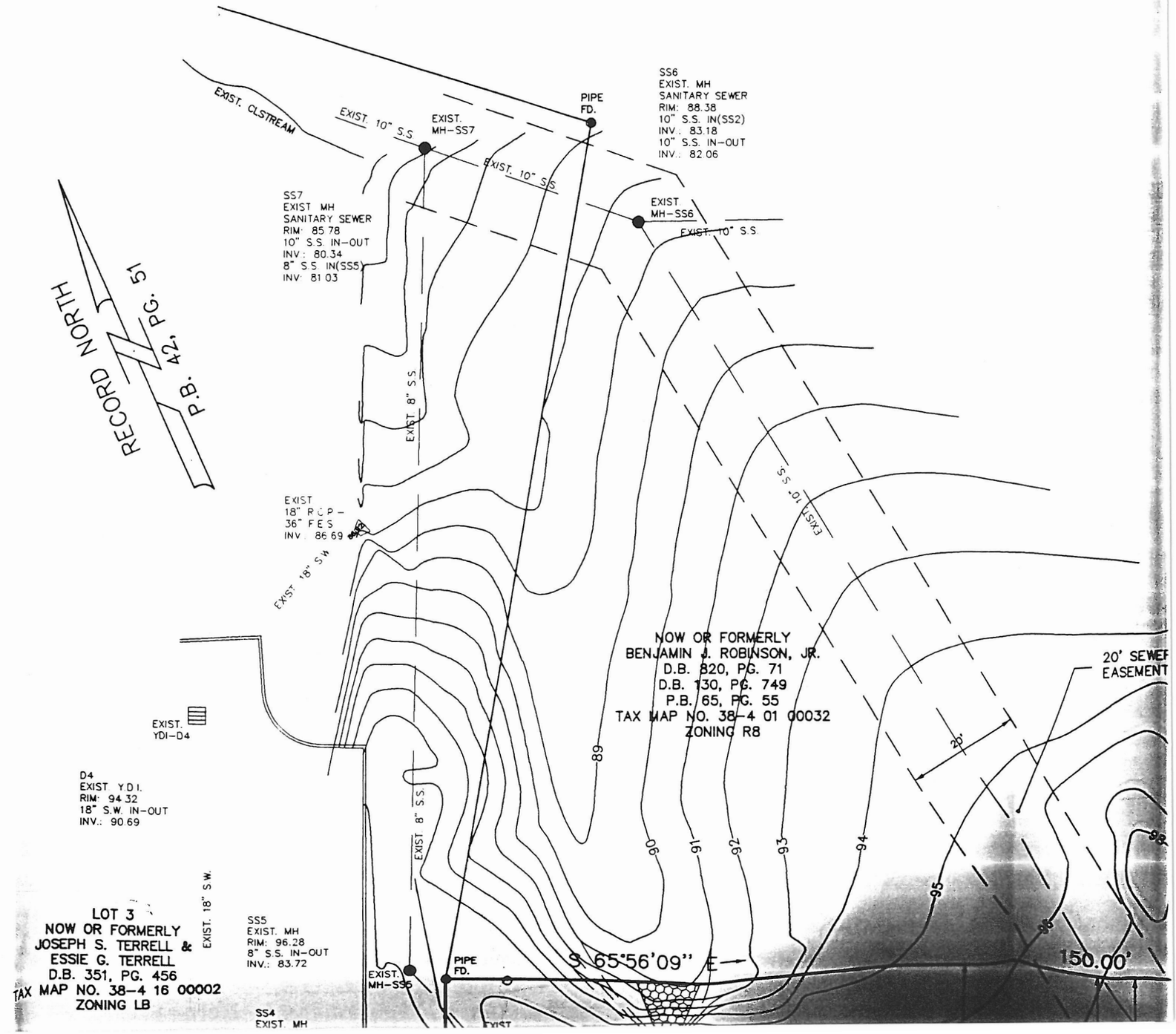
G8. A SOILS TEST MUST BE DONE PRIOR TO CONSTRUCTION TO TEST FOR THE PRESENCE OF SHRINK SWELL SOILS. BUILDING FOUNDATIONS AND SUBASES SHOULD BE DESIGNED ACCORDINGLY.

G9. THIS SITE IS NOT IMPACTED BY WETLANDS.

G10. THE PROPERTY SHOWN HEREON LIES IN FLOOD ZONE X (OUTSIDE THE 100 YEAR FLOOD PLAIN) AS SHOWN ON FLOOD PANEL 510201 0035 B, INDEX DATED 2-6-91

G11. TRASH COLLECTION IS BY MOBILE TOTTER.

G12. THIS SITE IS ZONED LIMITED BUSINESS. ON JUNE 17, 1999 THE PLANNING COMMISION APPROVED A FRONT SETBACK REDUCTION FROM 50 FEET TO 35 FEET.



SYSTEM

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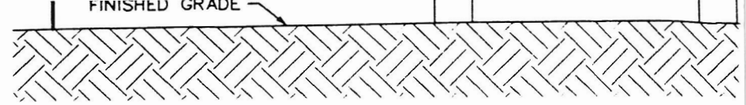


IDENTIFICATION SIGN DETAIL

NOT TO SCALE

RECORD NORTH

P.B. 42, PG. 51

INV. 80.54
8" S.S. IN(SS5)
INV. 81.03

EXIST. 8" S.S.

EXIST. 18" R.C.P. – 36" F.E.S.
INV.: 86.69

EXIST. 18" S.W.

EXIST. 10" S.S.

NOW OR FORMERLY
BENJAMIN J. ROBINSON, JR.
D.B. 820, PG. 71
D.B. 130, PG. 749
P.B. 65, PG. 55
TAX MAP NO. 38-4 01 00032
ZONING R8

20' SEWER EASEMENT

20'

EXIST. YDI-D4

D4
EXIST. Y.D.I.
RIM: 94.32
18" S.W. IN-OUT
INV.: 90.69

EXIST. 8" S.S.

89 90 91 92 93 94 95 96 97 98

LOT 3
NOW OR FORMERLY
JOSEPH S. TERRELL &
ESSIE G. TERRELL
D.B. 351, PG. 456
TAX MAP NO. 38-4 16 00002
ZONING LB

EXIST. 18" S.W.

SS5
EXIST. MH
RIM: 96.28
8" S.S. IN-OUT
INV.: 83.72

SS4
EXIST. MH
RIM: 96.64
8" S.S. IN-OUT
INV.: 83.95

PIPE FD.

S 65°56'09" E

150.00'

ROD FD.

EXIST. MH-SS6

EXIST. MH-SS4

EXIST. LP

18' – 15" HDPE @ 3.00%

DRAINAGE BASIN
SEE SHEET 3 OF 4

30'

30'

35' B.S.L.

134.63'

LOT 4
NOW OR FORMERL
MIDLANDS OFFICE BUILDI
D.B. 787, PG. 11
TAX MAP NO. 38-4 16
ZONING LB

POINT OF CONNECTION TO J.C.S.A. SYSTEM
INV.: 90.57

EXIST. YDI-D3

D3
EXIST. Y.D.I.
RIM: 95.88
15" S.W. IN
18" S.W. OUT
INV.: 91.28

EXIST. ASPHALT PARKING LOT

134.83'

4" PVC UNDERDRAIN

BIOFILTRATION BASIN

PRO. WOOD FENCE FOR TRASH RECPT. & H.V.A.C. SCREENING

PRO. CONC.

PRO. HC3

PRO. HANDICAP RAMP SEE NOTE H3

PRO. STANDARD 6" CURB, VDOT CG-2

PRO. 9'x18' VAN ACCESS. PARKING SPACE AND 8'x18' ACCESS ZONE SEE NOTE H1

PRO. HC PARKING SIGN SEE DETAIL

PRO. CONC.

38.00'

38.0'

6.33'

14.67'

PROPOSED ASPHALT PARKING LOT

PROPOSED 4" SANITARY SEWER LATERAL

PROP. S.C.O. INV.: 91.68

PROP. S.C.O. INV.: 92.28

PROP. S.C.O. INV.: 96.68

PROPOSED 10' SANITARY SEWER EASEMENT TO BE DEDICATED TO J.C.S.A.

10'

20' B.S.L.

42.00'

PROPOSED 2-1/2 STORY OFFICE BUILDING

1,991 S.F. FIRST FLOOR
1,964 S.F. SECOND FLOOR
545 S.F. THIRD FLOOR
4,500 S.F TOTAL

12.67'

3.33'

3.33'

PROPOSED 18' 90° PARKING SPACES

PROPOSED 9' x 18' 90° PARKING SPACES

S 15°21'21" E

N 15°21'21" W

CURB

EXIST. 10" S.S.

SS2
EXIST. MH
SANITARY SEWER
RIM: 99.54
10" S.S. IN-OUT
INV.: 92.19

EXISTING 2 STORY FRAME OFFICE BUILDING

EXIST. MH-SS2

MC048_3909_MIDLANDS_ROAD_BIORETENTION_CELL - 027

FERATED UNDERDRAIN TO BE
PPED WITH TREVIRA SPUNBOND
14 GEOSYNTHETIC FABRIC.
EQUIVALENT)
HT – 4.2 OZ/YD
KNESS – 65 MIL
ER FLOW RATE – 150 gpm/ft
EABILITY – 0.31 cm/sec
E SIZE – 70

Do=1 25'
W=Dc+La
W= 11.25'
STONE SIZE FOR GRADED RIP RA
d =0.5'
RIP RAP TO BE INSTALLED
2' THICK ON FILTER FABRIC

LOT 3
NOW OR FORMERLY
JOSEPH S. TERRELL &
ESSIE G. TERRELL
D.B. 351, PG. 456
TAX MAP NO. 38-4 16 00002
ZONING LB

18" S.W. IN-OUT
INV.: 90.69

SS5
EXIST. MH
RIM: 96.28
8" S.S. IN-OUT
INV.: 83.72

SS4
EXIST. MH
RIM: 96.64
8" S.S. IN-OUT
INV.: 83.95

S 65°56'09" E 150.00'

TOP OF BERM
ELEV.: 98.00

LIMITS OF CLEARING

DRAINAGE BASIN

OUTFALL STRUCTURE

GRASS SWALE 100' @ 0.2%

CLEANOUT STRUCTURE

4" PVC UNDERDRAIN (PERFORATED)

ALL SIDE SLOPES 3:1 MAX.

D3
EXIST. Y.D.I.
RIM: 95.88
15" S.W. IN
18" S.W. OUT
INV.: 91.28

TREATED 4"x4" TIMBER CHECK DAM (TYP.)

PROPOSED 10' SANITARY SEWER EASEMENT TO BE DEDICATED TO J.C.S.A.

PROPOSED 2-1/2 STORY OFFICE BUILDING

1,991 S.F. FIRST FLOOR
1,964 S.F. SECOND FLOOR
545 S.F. THIRD FLOOR
4,500 S.F TOTAL
FL. EL.: 101.17

TEMPORARY SOIL STOCKPILE

PRO. ASPHALT PARKING LOT
GRADED @ 1.0% MIN.

PRO. HC PARKING SIGN SEE DETAIL

PRO. PARKING BLOCK (TYP.)

TREATED 4"x4" TIMBER CHECK DAM (TYP.)

N 24°15'21" E

S 24°15'21" W

134.83'

134.63'

T.B.M
R.R. SPIKE IN
LIGHT POLE
ELEV.: 99.41

15' D&U EASEMENT

LOT 3
20,209 S.F.
0.4639 AC.

PRO. ASPHALT ENTRANCE
GRADED @ 2.5%

N 66°00'48" W 150.00'

PRO. ASPHALT APRON
GRADED @ 5.0%

EXIST. ASPHALT ENTRANCE

EXIST. EDGE OF PAVEMENT

REGRADE 90' OF EARTH SWALE @ 1.8%

REGRADE 55' OF EARTH SWALE @ 1.5%

55' PRO. STANDARD GUTTER VDOT CG-8

RIGHT-OF-WAY 0.75%
PAVEMENT DESIGN
2" SM-2A
3" BM-2
6" 21-B

MIDLANDS ROAD 55'R/W
STATE ROUTE 780

EXIST. WATERLINE

EXIST. WM ELEV.: 99.78

EXIST. WV ELEV.: 99.50

SS2
EXIST. MH
SANITARY SEWER
RIM: 99.54
10" S.S. IN-OUT
INV.: 92.19

EXIST. ASPHALT

MIDLANDS

TAX M

2 ST
OFFIC

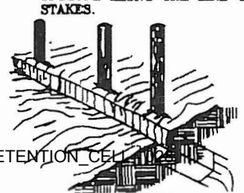
COMMERCIAL
ALONG HIGH

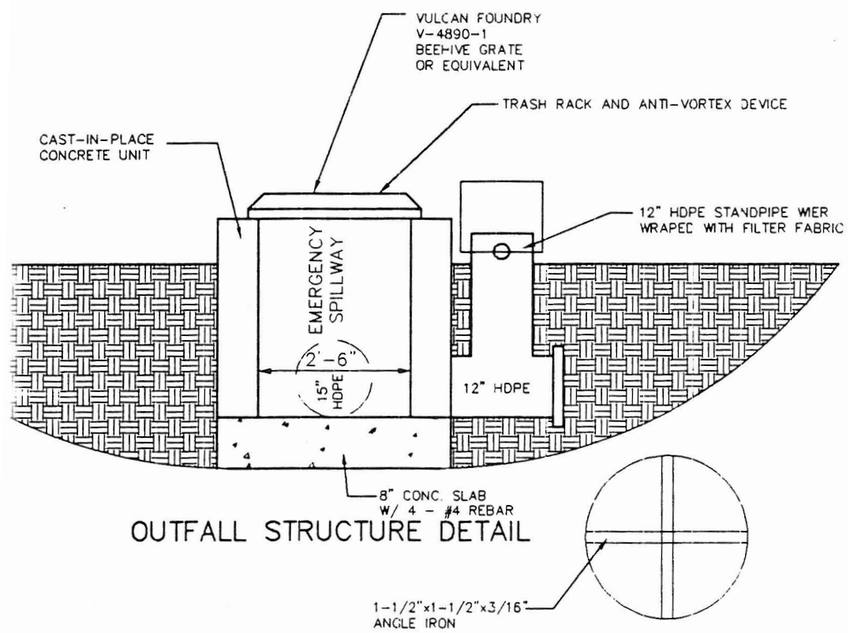
SINGLE

CONSTRUCTION OF A SILT FENCE (WITHOUT WIRE SUPPORT)

1. SET THE STAKES.

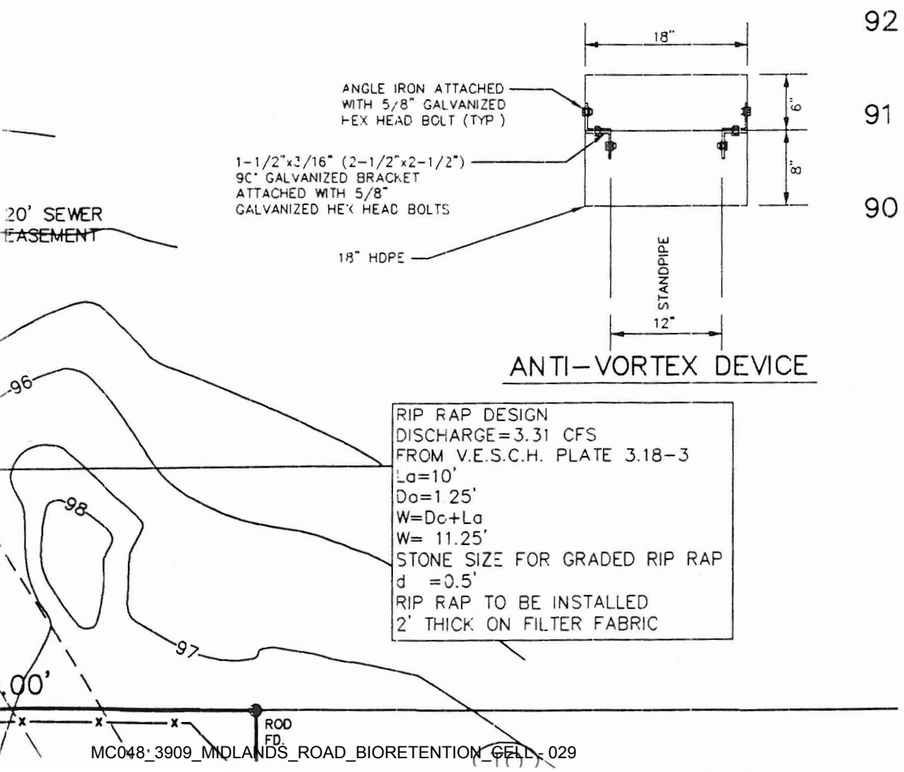
2. EXCAVATE A 4"X 4" TRENCH UPSLOPE ALONG THE LINE OF STAKES.



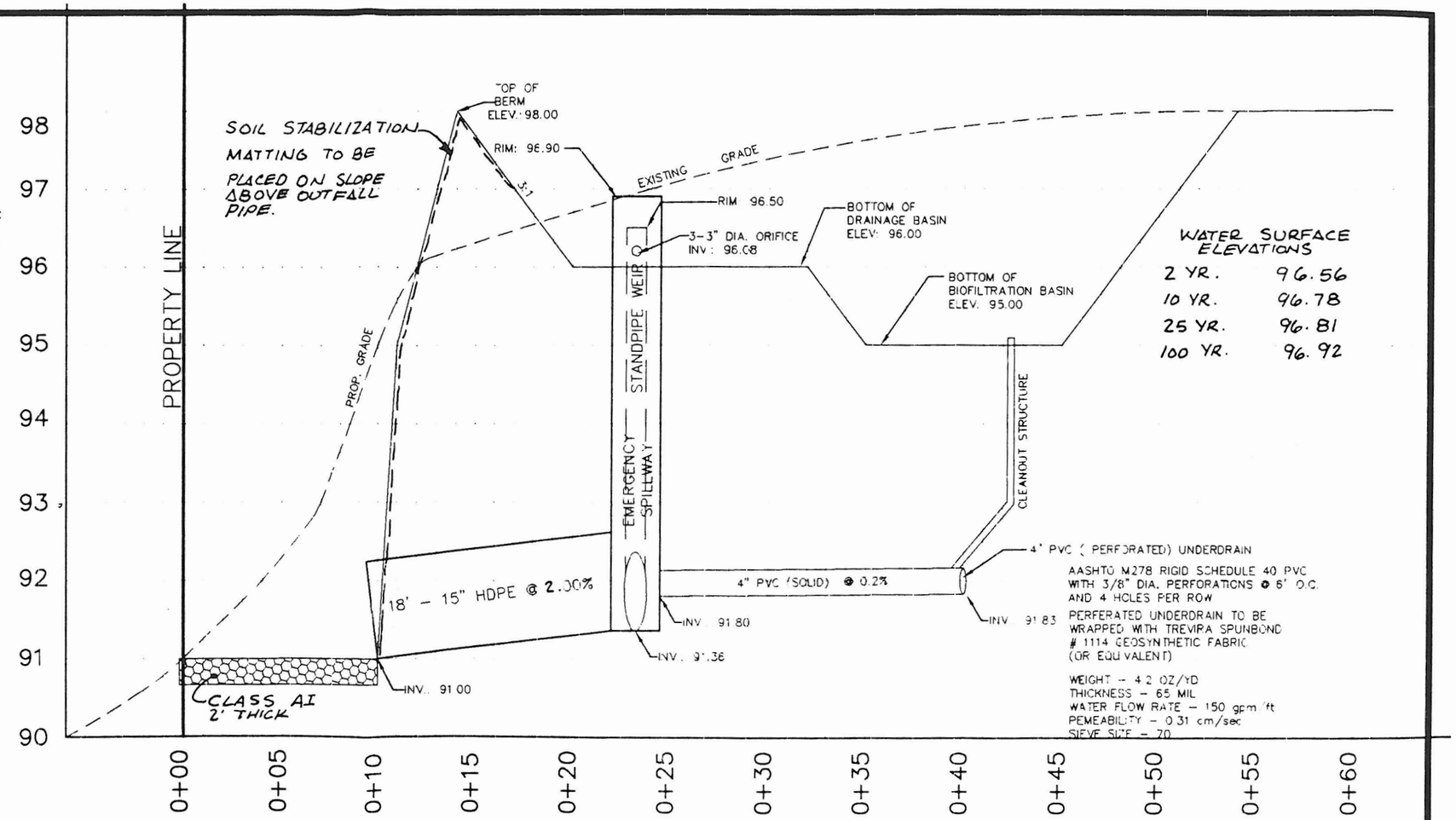


OUTFALL STRUCTURE DETAIL

ANTI-VORTEX DEVICE



RIP RAP DESIGN
DISCHARGE=3.31 CFS
FROM V.E.S.C.H. PLATE 3.18-3
La=10'
Do=1.25'
W=Do+La
W= 11.25'
STONE SIZE FOR GRADED RIP RAP
d =0.5'
RIP RAP TO BE INSTALLED
2' THICK ON FILTER FABRIC

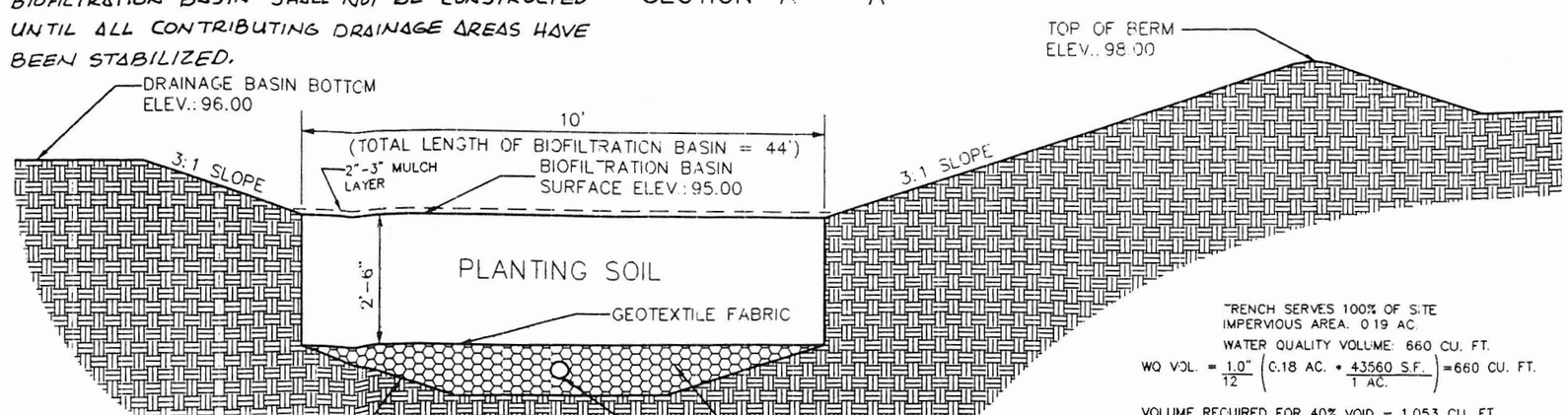


WATER SURFACE ELEVATIONS

2 YR.	96.56
10 YR.	96.78
25 YR.	96.81
100 YR.	96.92

SECTION 'A' - 'A'

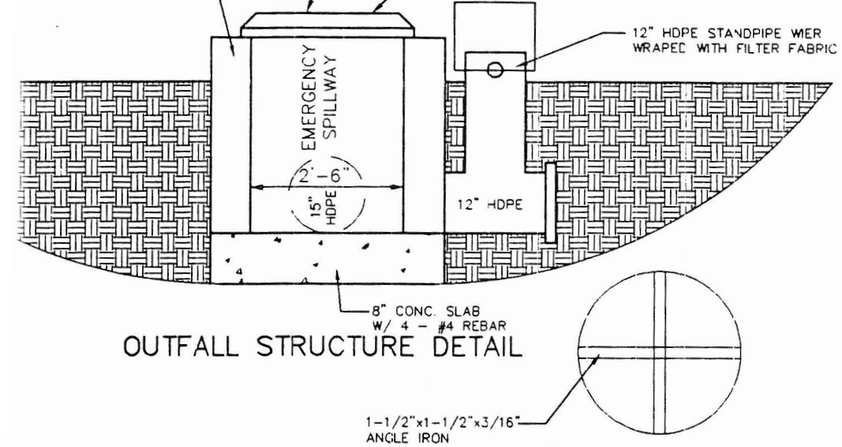
NOTE:
BIOFILTRATION BASIN SHALL NOT BE CONSTRUCTED UNTIL ALL CONTRIBUTING DRAINAGE AREAS HAVE BEEN STABILIZED.



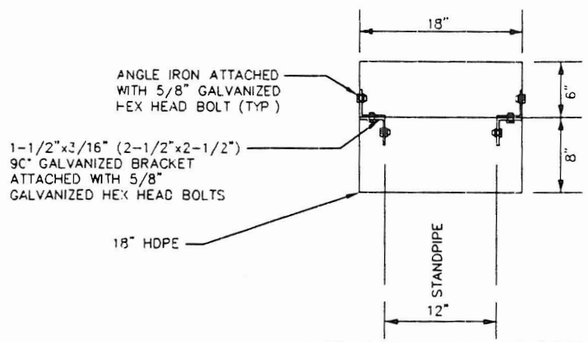
TRENCH SERVES 100% OF SITE
IMPERVIOUS AREA: 0.19 AC.
WATER QUALITY VOLUME: 660 CU. FT.

$$WQ\ VOL. = \frac{1.0"}{12}\left(0.18\ AC. * \frac{43560\ S.F.}{1\ AC.}\right) = 660\ CU.\ FT.$$

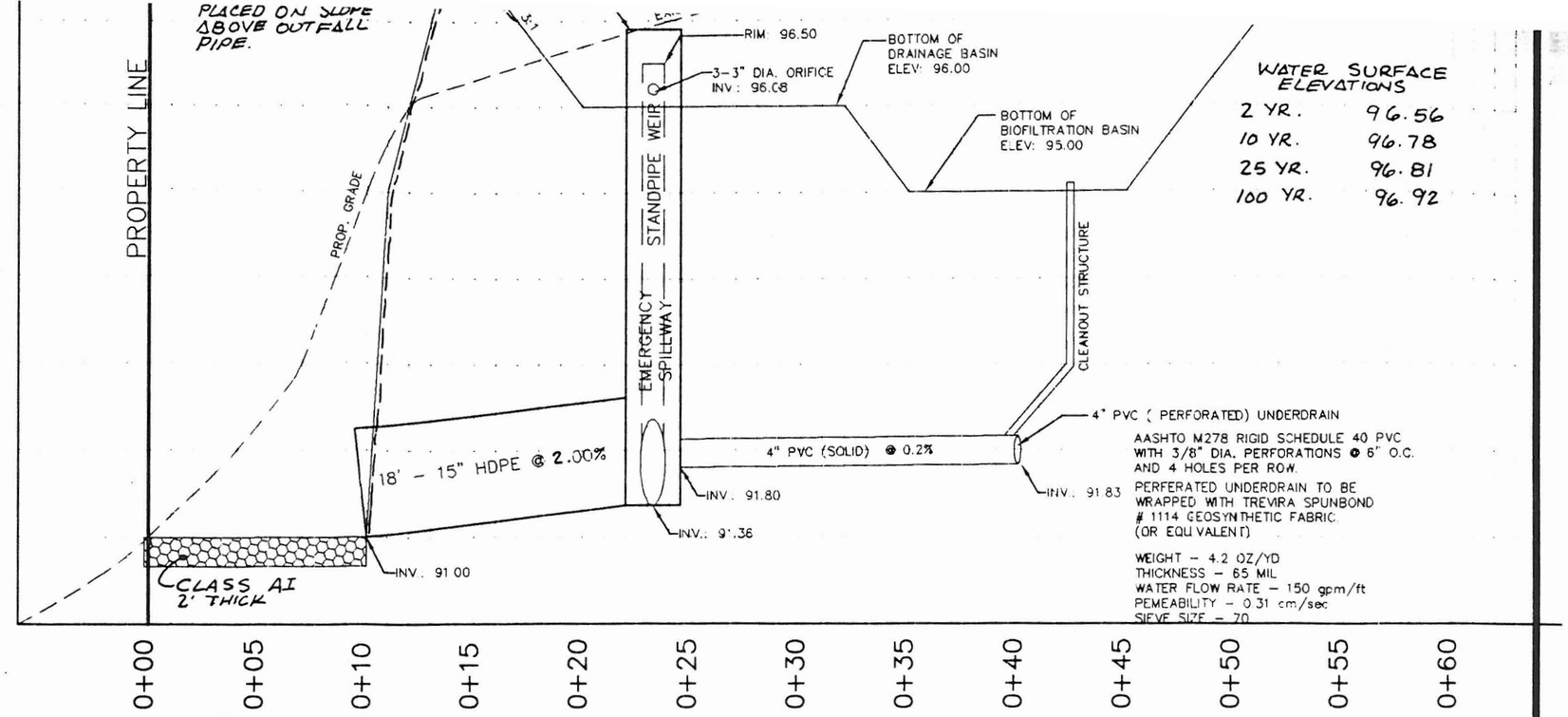
VOLUME REQUIRED FOR 40% VOID = 1,053 CU. FT.



OUTFALL STRUCTURE DETAIL



ANTI-VORTEX DEVICE



WATER SURFACE ELEVATIONS

2 YR.	96.56
10 YR.	96.78
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SECTION 'A' - 'A'

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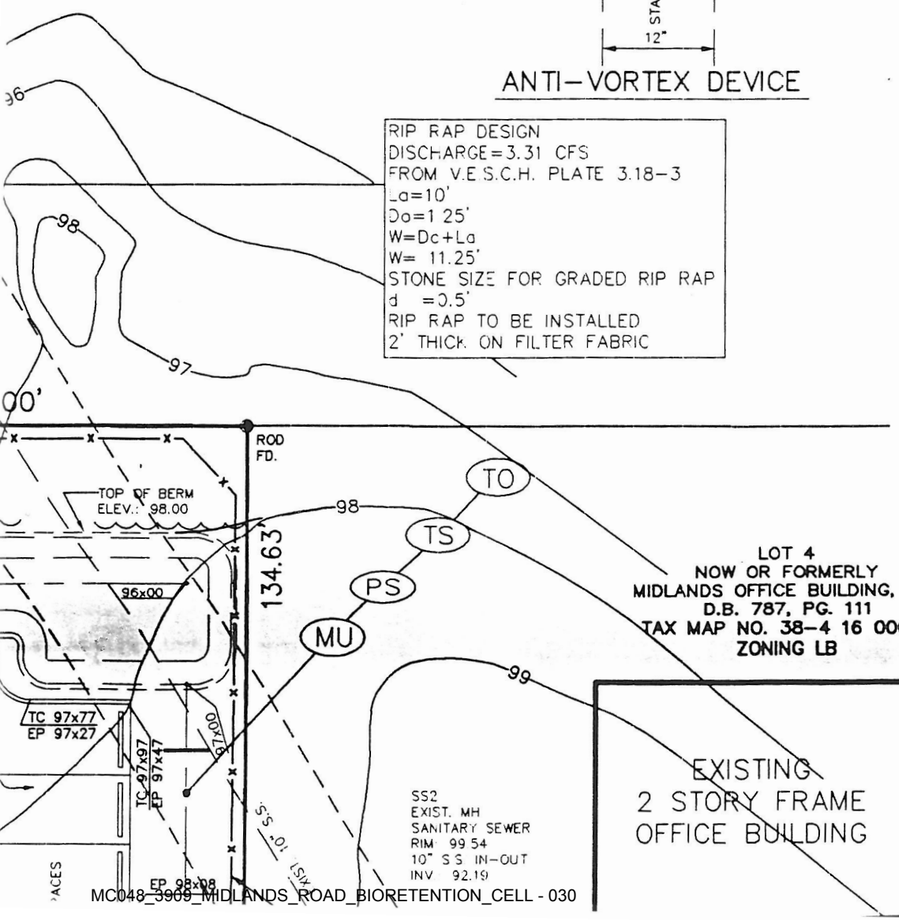
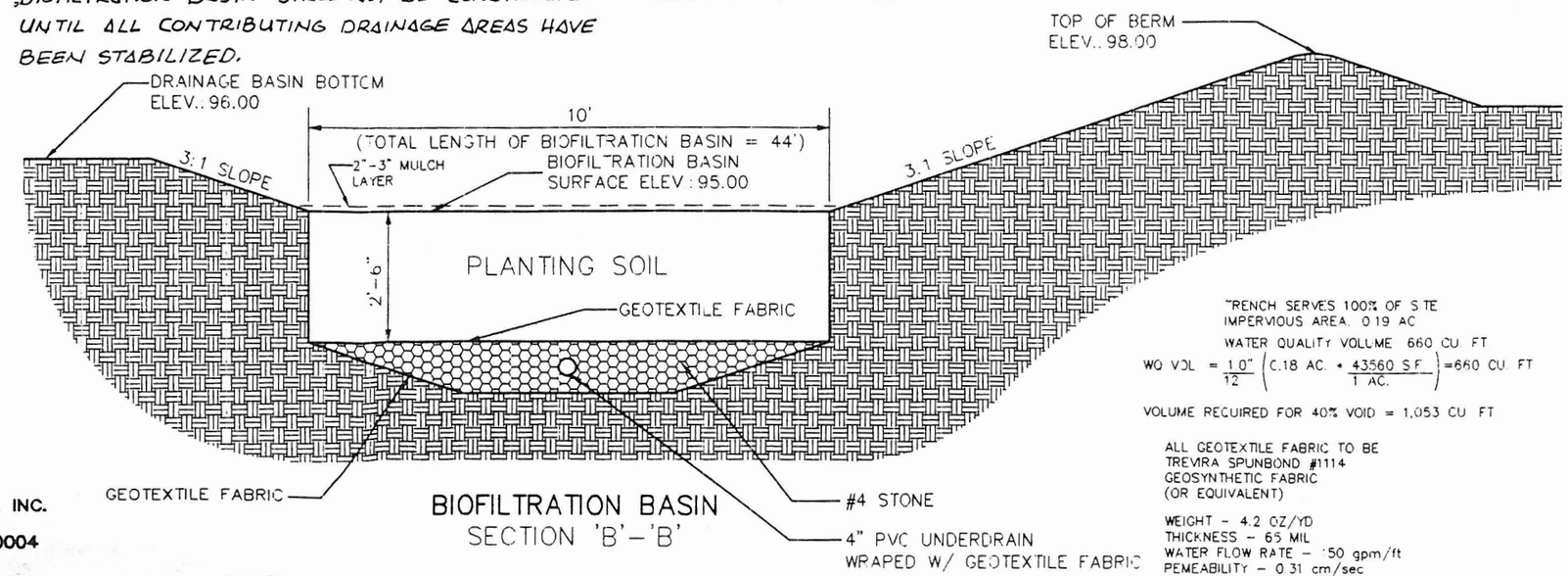




BIOFILTRATION BASIN
SECTION 'B'-'B'

TRENCH SERVES 100% OF SITE IMPERVIOUS AREA. 0.19 AC

WATER QUALITY VOLUME 660 CU. FT

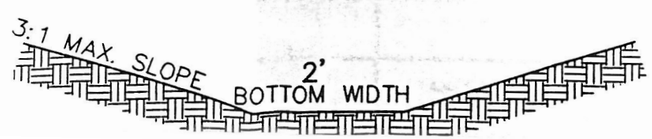
$$WQ\ VOL = \frac{1.0"}{12}\left(0.18\ AC. * \frac{43560\ S.F.}{1\ AC.}\right) = 660\ CU.\ FT$$

VOLUME REQUIRED FOR 40% VOID = 1,053 CU. FT

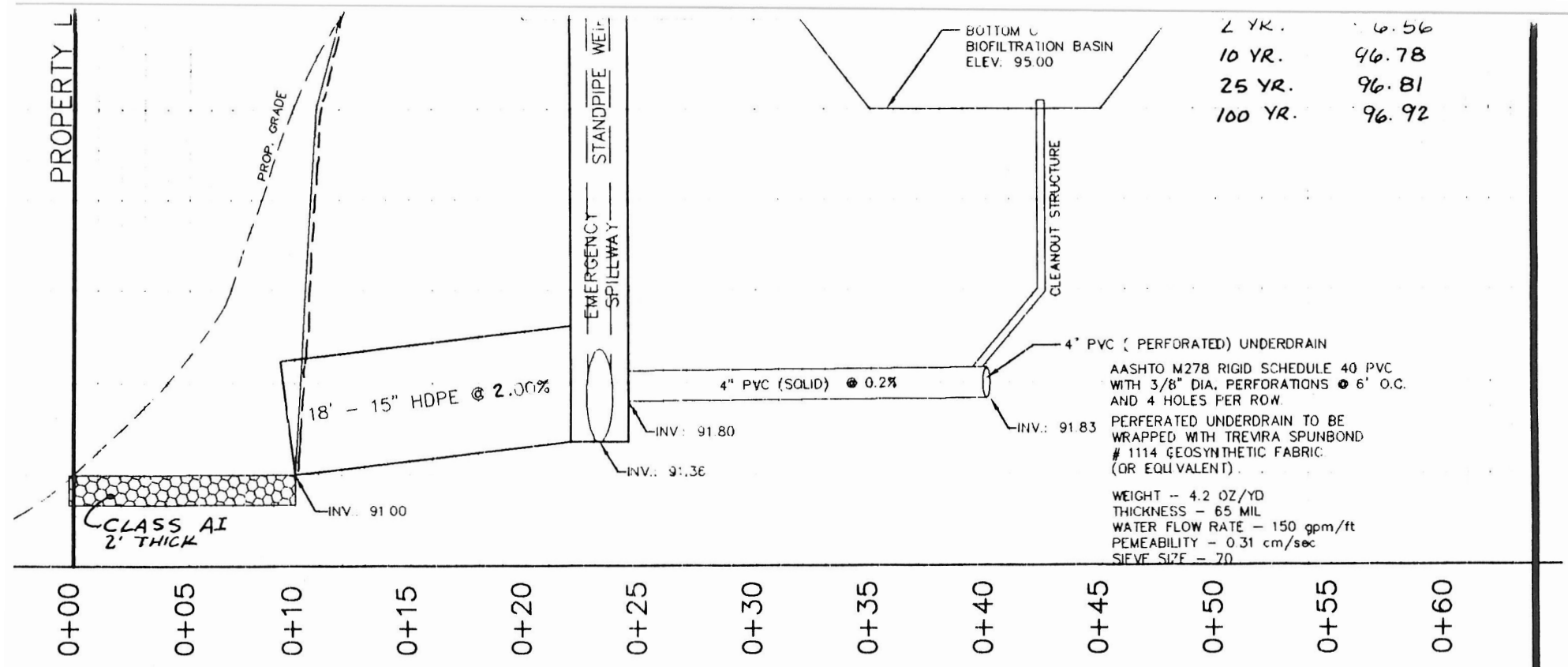
ALL GEOTEXTILE FABRIC TO BE TREVIRA SPUNBOND #1114 GEOSYNTHETIC FABRIC (OR EQUIVALENT)

WEIGHT - 4.2 OZ/YD
THICKNESS - 65 MIL
WATER FLOW RATE - 150 gpm/ft
PEMEABILITY - 0.31 cm/sec
SIEVE SIZE - 70

NOTE:
BIOFILTRATION BASIN MUST BE PROTECTED FROM DISTURBANCE OR COMPACTION OF UNDERLYING SOILS DURING CONSTRUCTION ACTIVITIES.

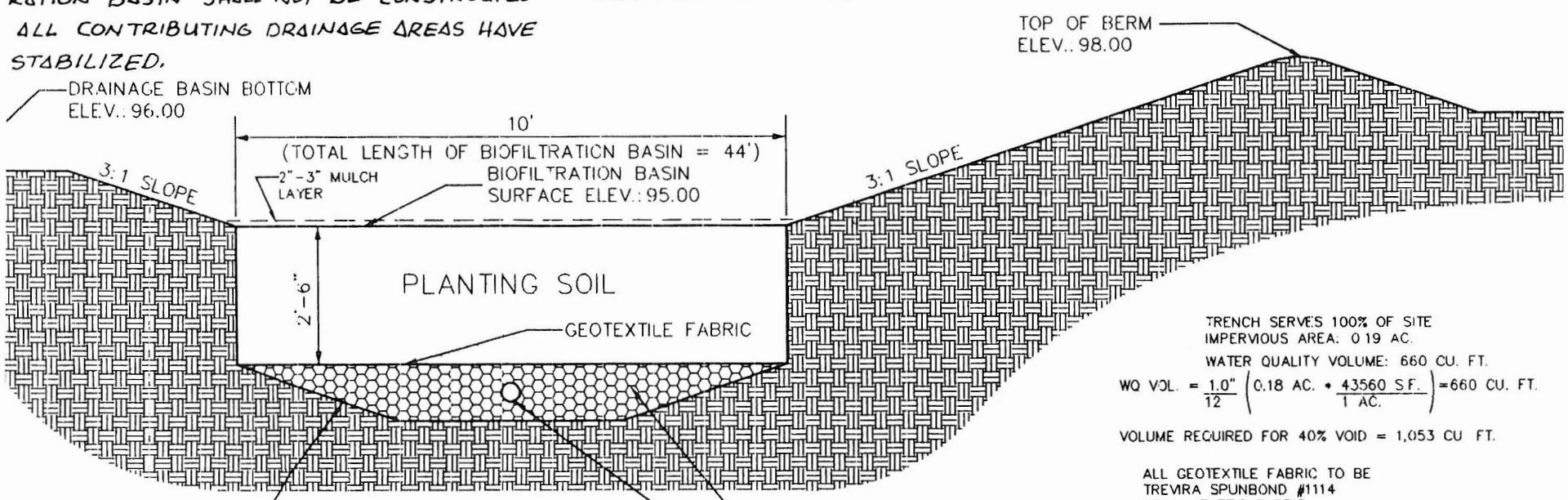


NOTE:
SOILS AND PLANTINGS SHALL COMPLY WITH MINIMUM STATE STANDARDS AS OUTLINED IN THE VIRGINIA STORMWATER MANAGEMENT HANDBOOK. MINIMUM STANDARDS 3.10, 3.11 AND 3.11A FOR INFILTRATION AND BIORETENTION BASIN PRACTICES AND THE JAMES CITY COUNTY BMP GUIDELINES MANUAL FOR GROUP D, FILTERING SYSTEMS. TREE AND SHRUB PLANTING ARRANGEMENTS,



SECTION 'A' – 'A'

RATION BASIN SHALL NOT BE CONSTRUCTED ALL CONTRIBUTING DRAINAGE AREAS HAVE STABILIZED.



BIOFILTRATION BASIN
SECTION 'B'–'B'

TRENCH SERVES 100% OF SITE
IMPERVIOUS AREA: 0.19 AC.
WATER QUALITY VOLUME: 660 CU. FT.

$$\text{WQ VOL.} = \frac{1.0"}{12}\left(0.18\ \text{AC.} * \frac{43560\ \text{S.F.}}{1\ \text{AC.}}\right) = 660\ \text{CU. FT.}$$

VOLUME REQUIRED FOR 40% VOID = 1,053 CU FT.

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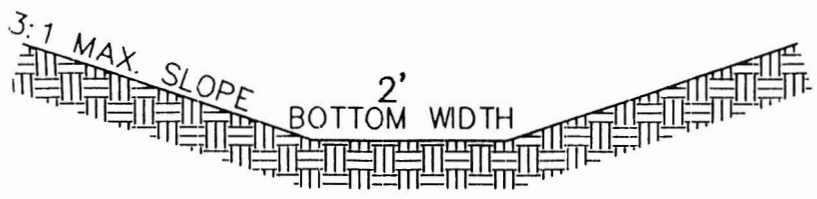


MIN. 1.0% HORIZONTAL GRADE ON SWALE

TYPICAL GRASS SWALE

PERMANENT SEEDING SCHEDULE FOR GRASSED SWALE

HIGH-MAINTENANCE LAWN
KENTUCKY 31(MARCH-APRIL&AUG. 15-SEPT. 30) 200-250 LBS./ACRE
DURING OTHER PERIODS OF THE YEAR USE SEASONAL NURSE CROP FOR TEMPORARY SEEDING AS SHOWN ON SHEET 1.

NOTE:
SOILS AND PLANTINGS SHALL COMPLY WITH MINIMUM STATE STANDARDS AS OUTLINED IN THE VIRGINIA STORMWATER MANAGEMENT HANDBOOK, MINIMUM STANDARDS 3.10, 3.11 AND 3.11A FOR INFILTRATION AND BIORETENTION BASIN PRACTICES AND THE JAMES CITY COUNTY BMP GUIDELINES MANUAL FOR GROUP D, FILTERING SYSTEMS. TREE AND SHRUB PLANTING ARRANGEMENTS, DENSITIES, SPECIES AND INSTALLATIONS IN THE BIORENTENTION CELL SHALL FOLLOW RECOMMENDATIONS OUTLINED IN THE VSMH, MINIMUM STANDARD 3.11 AND INSTALLATION SHALL BE OVERSEEN BY A PERSON QUALIFIED IN NURSERY AND LANDSCAPING TECHNIQUES

SEE LANDSCAPE PLAN FOR PLANT SELECTION AND REQUIREMENTS

LEGEND

DS — DENOTES PROPOSED DOWN SPOUT & FLOW DIRECTION

95 — DENOTES PROPOSED CONTOUR

95 — DENOTES EXISTING CONTOUR

SCALE 1"=20'

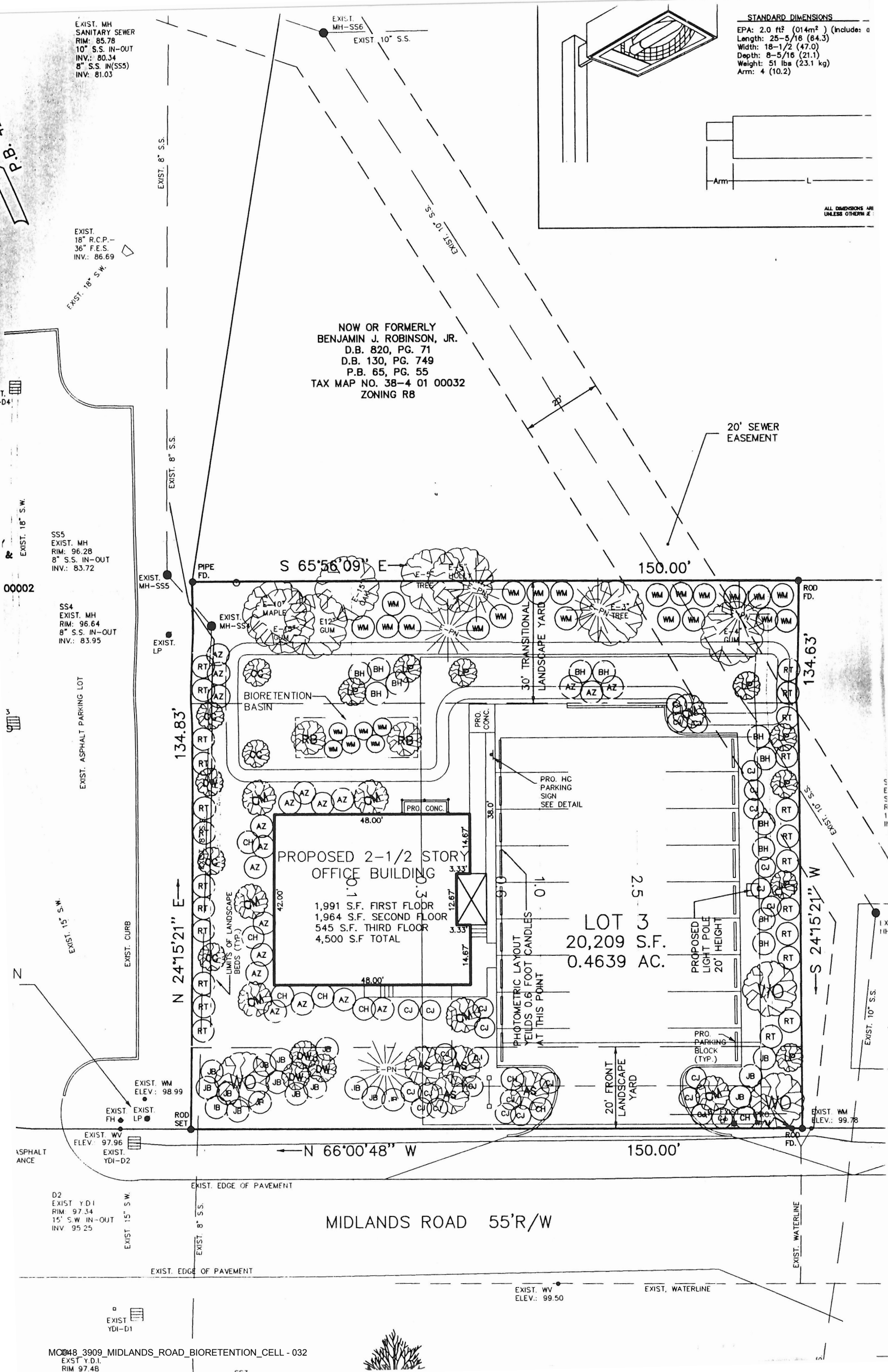
20 10 0 20

LETTER SYMBOL	DIMENSIONS
A	As determined by the Engineer
B	150 minimum
F	10 minimum
G	Equal width of one approach lane with a minimum of 10'

COMMONWEALTH OF VIRGINIA
JAMES E. WIRKNER

DRAINAGE, GRADING AND EROSION & SEDIMENT CONTROL

SITE PLAN OF


STANDARD DIMENSIONS
EPA: 2.0 ft² (014m²) (Includes a
Length: 25-5/16 (64.3)
Width: 18-1/2 (47.0)
Depth: 8-5/16 (21.1)
Weight: 51 lbs (23.1 kg)
Arm: 4 (10.2)
Arm
L
EXIST. MH
SANITARY SEWER
RIM: 85.78
10" S.S. IN-OUT
INV.: 80.34
8" S.S. IN(SS5)
INV: 81.03
EXIST. MH-SS6
EXIST. 10" S.S.
EXIST. 8" S.S.
EXIST. 10" S.S.
EXIST. 18" R.C.P.-
36" F.E.S.
INV.: 86.69
EXIST. 18" S.W.
NOW OR FORMERLY
BENJAMIN J. ROBINSON, JR.
D.B. 820, PG. 71
D.B. 130, PG. 749
P.B. 65, PG. 55
TAX MAP NO. 38-4 01 00032
ZONING R8
20'
20' SEWER
EASEMENT
SS5
EXIST. MH
RIM: 96.28
8" S.S. IN-OUT
INV.: 83.72
SS4
EXIST. MH
RIM: 96.64
8" S.S. IN-OUT
INV.: 83.95
EXIST. MH-SS5
EXIST. MH-SS4
EXIST. LP
PIPE FD.
S 65°56'09" E
150.00'
ROD FD.
134.83'
134.63'
30' TRANSITIONAL LANDSCAPE YARD
BIORETENTION BASIN
PRO. CONC.
PRO. HC PARKING SIGN SEE DETAIL
PRO CONC.
48.00'
PROPOSED 2-1/2 STORY
OFFICE BUILDING
1,991 S.F. FIRST FLOOR
1,964 S.F. SECOND FLOOR
545 S.F. THIRD FLOOR
4,500 S.F TOTAL
LIMITS OF LANDSCAPE BEDS (TYP.)
LOT 3
20,209 S.F.
0.4639 AC.
PROPOSED LIGHT POLE 20' HEIGHT
PHOTOMETRIC LAYOUT YEILDS 0.6 FOOT CANDLES AT THIS POINT
PRO. PARKING BLOCK (TYP.)
20' FRONT LANDSCAPE YARD
N 24°15'21" E
S 24°15'21" W
N 66°00'48" W
150.00'
EXIST. ASPHALT PARKING LOT
EXIST. CURB
EXIST. 15" S.W.
EXIST. WM
ELEV.: 98.99
EXIST. FH
EXIST. LP
ROD SET
EXIST. WV
ELEV.: 97.96
EXIST. YDI-D2
EXIST. WM
ELEV.: 99.78
ROD FD.
EXIST. EDGE OF PAVEMENT
D2
EXIST. Y.D.I.
RIM: 97.34
15" S.W. IN-OUT
INV. 95.25
EXIST. 15" S.W.
EXIST. 8" S.S.
MIDLANDS ROAD 55'R/W
EXIST. WATERLINE
EXIST. EDGE OF PAVEMENT
EXIST. WV
ELEV.: 99.50
EXIST. WATERLINE
EXIST. YDI-D1
EXST. Y.D.I.
RIM 97.48

REQUIREMENTS		TREES			SHRUBS		
ITEM	AREA	RATIO	MINIMUM REQUIRED	NUMBER PROVIDED	RATIO	MINIMUM REQUIRED	NUMBER PROVIDED
20' FRONT LANDSCAPE YARD (LANDSCAPED AS THOUGH 30')	3,000 SQ. FT. (4,500) SQ. FT.	1 TREE PER 400 SQ. FT	12	11 (PROP.) 1 (EXIST.) 12	3 SHRUBS PER 400 SQ. FT	36	36
15' SIDE LANDSCAPE YARD	2,542 SQ. FT.	1 TREE PER 400 SQ. FT.	7	9	3 SHRUBS PER 400 SQ. FT.	21	32
30' REAR LANDSCAPE YARD (TRANSITIONAL BUFFER)	4,500 SQ. FT.	1 TREE PER 400 SQ. FT	12	5 (PROP.) 12 (EXIST.) 16	3 SHRUBS PER 400 SQ. FT	36	36
10' BUILDING PERIMETER LANDSCAPE YARD	2,114 SQ. FT.	1 TREE PER 200 SQ. FT	11	4	5 SHRUBS PER 200 SQ. FT.	33	21
PARKING LOT	431 SQ. FT. (7.5% OF 5,739 SQ. FT.)	1 TREE PER 10 PARKING SPACES	2	3	2 SHRUBS PER 10 PARKING SPACES	4	5
BIORETENTION BASIN	450 SQ. FT.	10 TREES & SHRUBS PER 1000 SQ. FT.	2	2	3 SHRUBS PER 1 TREE	6	6
		TREE TOTAL	46	47	SHRUB TOTAL	136	136

0.6 0.3 0.1

PHOTOMETRIC CONTOURS (FOOT CANDLES)

OLE
CALE

SYMBOL	COMMON NAME	BOTANICAL NAME	QUANTITY	HEIGHT	CALIPER	SPREAD
CC	CHANTICLEER	PYRUS CALLERYANA	6	8'	2-1/2"	4'
DW	FLOWERING DOG WOOD	CORNUS FLORIDA	4	8'	1-1/4"	4'
CM	CRAPE MYRTLE	LAGERSTROEMIA INDICA	7	8'	MULTI-TRUNK	4'
AS	AMERICAN SYCAMORE	PLATANUS OCCIDENTALIS	4	8'	MULTI-TRUNK	4'
WO	WILLOW OAK	QUERCUS PHELLOS	3	8'	2-1/2"	4'
LP	LOBLOLLY PINE	PINUS TAEDA	8	8'	1-1/4"	4'
RB	RIVER BIRCH	BETULA NIGRA	2	8'	1-1/4"	4'
BH	BURFORD HOLLY	ILEX CORNUTA "BURFORDI"	12	18"	N/A	N/A
WM	WAX MYRTLE	MYRICA CERIFERA	26	10'	2-1/2"	4'
CH	CHINESE HOLLY	LLEX CORNUTA	8	18"	N/A	N/A
CH	DWARF COMMON JUNIPER	JUNIPERUS PROCUMBENS NANA	28	18"	N/A	N/A
RT	RED TIP PHOTINIA	PHOTINIA FRASERI	24	18"	N/A	N/A
JB	JAPANESE BOXWOOD	BUXUS MICROPHYLLA JAPONICA	18	18"	N/A	N/A
AZ	AZALEA (HARDY EVERGREEN)	AZALEA VARIETIES	20	18"	N/A	N/A

RMERLY
BUILDING, INC.
PG. 111
-4 16 00004
LB

AME
DING

CONC. ENTRANCE

ROD
FD.

ILLUMINATION NOTES:

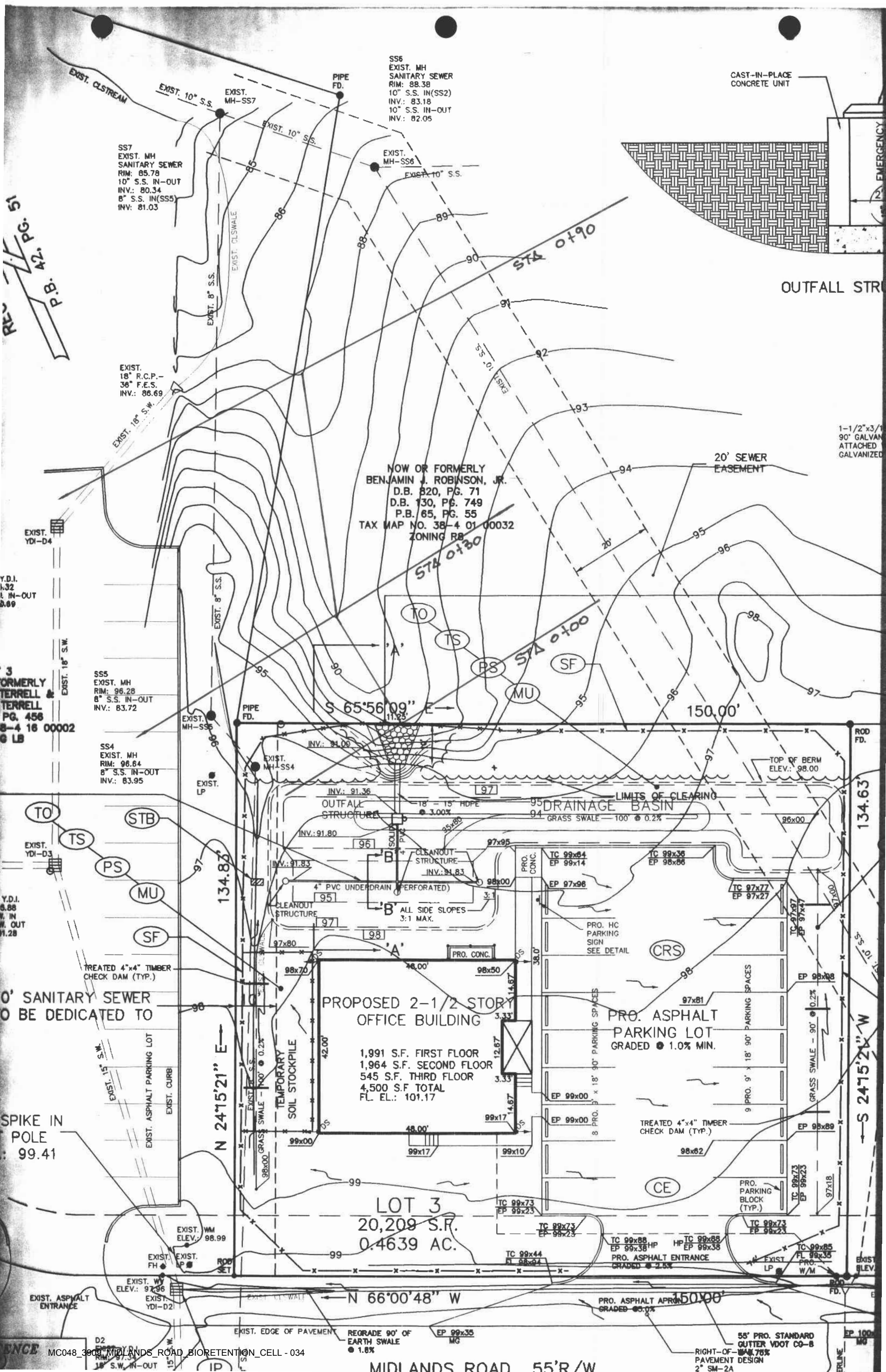

EXIST. CLSTREAM
EXIST. 10" S.S.
EXIST. MH-SS7
PIPE FD.
SS6
EXIST. MH
SANITARY SEWER
RIM: 88.38
10" S.S. IN(SS2)
INV.: 83.18
10" S.S. IN-OUT
INV.: 82.05
CAST-IN-PLACE CONCRETE UNIT
SS7
EXIST. MH
SANITARY SEWER
RIM: 85.78
10" S.S. IN-OUT
INV.: 80.34
8" S.S. IN(SS5)
INV: 81.03
EXIST. MH-SS6
EXIST. CLSWALE
EXIST. 8" S.S.
STA 0+90
OUTFALL STRU
EXIST. 18" R.C.P.-
36" F.E.S.
INV.: 86.69
EXIST. 18" S.W.
1-1/2"x3/1
90° GALVAN
ATTACHED
GALVANIZED
NOW OR FORMERLY
BENJAMIN J. ROBINSON, JR.
D.B. 820, PG. 71
D.B. 130, PG. 749
P.B. 65, PG. 55
TAX MAP NO. 38-4 01 00032
ZONING RB
20' SEWER EASEMENT
STA 0+80
STA 0+00
EXIST. YDI-D4
SS5
EXIST. MH
RIM: 96.28
8" S.S. IN-OUT
INV.: 83.72
EXIST. MH-SS5
SS4
EXIST. MH
RIM: 96.64
8" S.S. IN-OUT
INV.: 83.95
EXIST. MH-SS4
EXIST. LP
S 65°56'09" E
150.00'
INV.: 91.00
TOP OF BERM
ELEV.: 98.00
INV.: 91.36
OUTFALL STRUCTURE
18" - 15" HDPE @ 3.00%
LIMITS OF CLEARING
DRAINAGE BASIN
GRASS SWALE - 100' @ 0.2%
INV.: 91.80
CLEANOUT STRUCTURE
INV.: 91.83
4" PVC UNDERDRAIN (PERFORATED)
ALL SIDE SLOPES 3:1 MAX.
PRO. CONC.
TC 99x64
EP 99x14
TC 99x36
EP 98x86
EP 97x96
TC 97x77
EP 97x27
PRO. HC PARKING SIGN SEE DETAIL
134.83'
134.63'
TREATED 4"x4" TIMBER CHECK DAM (TYP.)
PROPOSED 2-1/2 STORY OFFICE BUILDING
1,991 S.F. FIRST FLOOR
1,964 S.F. SECOND FLOOR
545 S.F. THIRD FLOOR
4,500 S.F TOTAL
FL. EL.: 101.17
PRO. ASPHALT PARKING LOT
GRADED @ 1.0% MIN.
8 PRO. 9' x 18' 90° PARKING SPACES
9 PRO. 9' x 18' 90° PARKING SPACES
EP 99x00
EP 98x89
TREATED 4"x4" TIMBER CHECK DAM (TYP.)
TEMPORARY SOIL STOCKPILE
GRASS SWALE - 90' @ 0.2%
N 24°15'21" E
S 24°15'21" W
EXIST. ASPHALT PARKING LOT
EXIST. CURB
EXIST. 15" S.W.
SPIKE IN POLE
: 99.41
LOT 3
20,209 S.F.
0.4639 AC.
PRO. PARKING BLOCK (TYP.)
EXIST. WM
ELEV.: 98.99
EXIST. FH
EXIST. LP
ROD SET
EXIST. WV
ELEV.: 97.96
EXIST. YDI-D2
EXIST. ASPHALT ENTRANCE
N 66°00'48" W
150.00'
PRO. ASPHALT ENTRANCE
GRADED @ 2.5%
PRO. ASPHALT APRON
GRADED @ 5.0%
EXIST. EDGE OF PAVEMENT
REGRADE 90' OF EARTH SWALE @ 1.8%
EP 99x35
MG
55' PRO. STANDARD GUTTER VDOT CG-8
RIGHT-OF-WAY
PAVEMENT DESIGN
2" SM-2A
MIDLANDS ROAD 55'R/W
MC048_3909_MIDLANDS_ROAD_BIORETENTION_CELL - 034

TABLE OF CONTENTS

STORM WATER MANAGEMENT PLAN
FOR
SITE PLAN OF
LOT 3, MIDLANDS, SECTION 1
#3909 MIDLANDS ROAD
JAMES CITY COUNTY, VIRGINIA 23188

1.0 INTRODUCTION

2.0 SITE

3.0 METHODOLOGY

4.0 SOILS

5.0 WATER QUALITY

MC048_3909_MIDLANDS_ROAD_BIORETENTION_CELL - 035

STORM WATER MANAGEMENT PLAN

1.0 INTRODUCTION

THIS REPORT DESCRIBES A STORMWATER MANAGEMENT PLAN THAT WILL BE IMPLEMENTED TO DRAIN THE RUNOFF RESULTING FROM DEVELOPMENT OF 0.46 ACRES, #2909 MIDLANDS ROAD. THE SITE WILL BE DEVELOPED AS AN OFFICE BUILDING. ACCESS TO THE SITE IS FROM MIDLANDS ROAD, A PUBLIC RIGHT-OF-WAY. THE STORMWATER MANAGEMENT PLAN COMPLIES WITH THE MINIUM STANDARDS OF THE 1996 VIRGINIA EROSION AND SEDIMENT CONTROL LAWS AND REGULATIONS.

PRE-DEVELOPMENT RUNOFF IS CONVEYED TO A RAVINE ON THE NORTH SIDE OF THE PROPERTY. A STORMDRAIN SYSTEM HAS BEEN DESIGNED BASED ON A 10 YEAR STORM EVENT. THE SYSTEM WILL RELEASE POST DEVELOPMENT RUNOFF AT THE PRE-DEVELOPMENT LEVELS FOR 2, 10 AND 25 YEAR STORMS. AN EMERGENCY SPILLWAY HAS BEEN PROVIDED TO SAFELY CONTROL THE RUNOFF OF A 100 YEAR STORM.

THIS SITE LIES WITHIN THE RESOURCE MANAGEMENT AREA AS DETERMINED BY JAMES CITY COUNTY. B.M.P. DESIGN #9 HAS BEEN EMPLOYED TO INFILTRATE TWO (2) TIMES THE WATER QUALITY VOLUME AS REQUIRED.

2.0 SITE

THE SITE IS CURRENTLY UNDEVELOPED. THE SITE IS PARTIALY WOOD ON THE NORTH SIDE. SITES ON THE EAST AND WEST HAVE BEEN DEVELOPED. THIS PLAN PROVIDES FOR THE DEVELOPMENT OF A 4500 S.F. OFFICE BUILDING AND A PARKING LOT TO SERVE THE BUILDING.

3.0 METHODOLOGY

CALCULATIONS FOR STORMWATER RUNOFF RATES ARE BASED ON THE 2 AND 10 YEAR TYPE II, 24-HOUR RAINFALL PROVIDED BY S.C.S. TR-55. THE TOTAL 24-HOUR RAINFALL FOR THE 2-YEAR STORM IS 4 INCHES AND FOR THE 10-YEAR STORM IS 6 INCHES.
(3.5) (8)

EAGLE POINT SOFTWARE WAS EMPLOYED IN THE DESIGN OF THE STORM SEWER SYSTEM. THE S.C.S. CURVILINEAR METHOD AS OUTLINED IN SECTION 5.2.2. OF THE HYDROLOGY ENGINEERING CIRCULAR NO. 19 WAS USED TO DETERMINE PRE-DEVELOPMENT AND POST DEVELOPMENT RUNOFF OF S.C.S. TYPE II RAINFALL.

COPIES OF THE EAGLE POINT PRINTOUT ARE ATTACHED FOR THE 2-YEAR AND 10-YEAR PRE-DEVELOPMENT FLOWS AND 2, 10, AND 25-YEAR POST DEVELOPMENT FLOWS. THE PRINTOUTS ALSO SUMMARIZE ASSUMPTIONS UTILIZED TO DETERMINE THE TIME OF CONCENTRATION AND INFLOW HYDROGRAPHS.

4.0 SOIL

SOILS REPORT PREPARED BY ECS AND WILL BE PROVIDED BY THE OWNER/DEVELOPER.

5.0 WATER QUALITY

B.M.P. DESIGN # 9 HAS BEEN EMPLOYED TO COMPLY WITH THE J.C.C. 10 POINT B.M.P. REQUIREMENT. THIS DESIGN TREATS 100% OF THE SITE AND YEILDS 10 POINTS AS OUTLINED IN TABLE 2 OF THE J.C.C. B.M.P. EVALUATION PROCEDURE. SEE PLANS FOR DESIGN AND DETAILS.

APPENDIX

A.) DRAINAGE AREA MAP

B.) PRE-DEVELOPMENT 2YR STORM

C.) PRE-DEVELOPMENT 10YR STORM

D.) PRE-DEVELOPMENT 25YR STORM

E.) PRE-DEVELOPMENT 100YR STORM

F.) POST-DEVELOPMENT 2YR STORM

G.) POST-DEVELOPMENT 10YR STORM

H.) POST-DEVELOPMENT 25YR STORM

I.) POST-DEVELOPMENT 100YR STORM

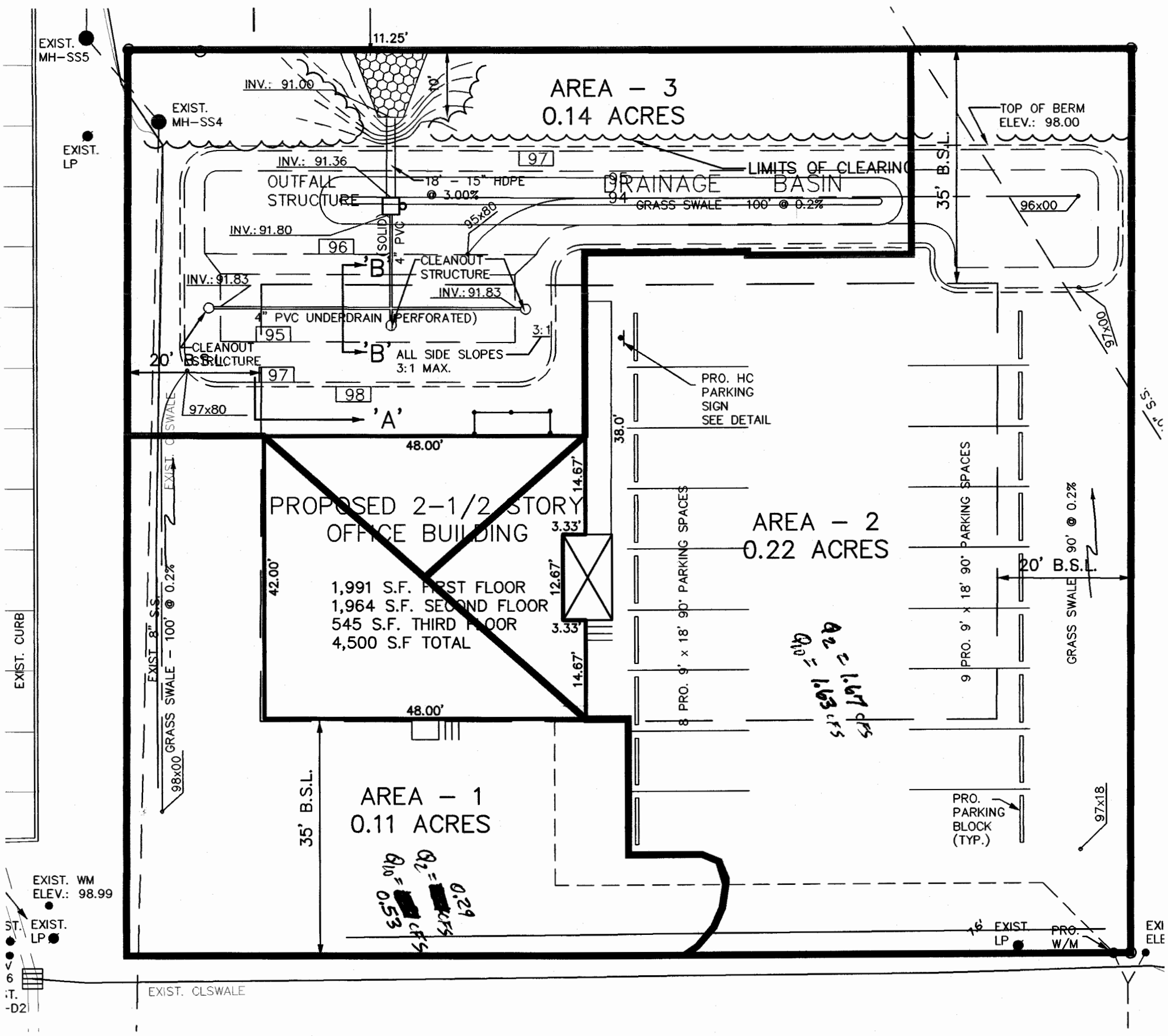
J.) GRASSED SWALE - EAST SIDE

K.) GRASSED SWALE – WEST SIDE

L.) RECEIVING CHANNEL

APPENDIX A

DRAINAGE AREA MAP


EXIST. MH-SS5
EXIST. MH-SS4
EXIST. LP
11.25'
INV.: 91.00
AREA - 3
0.14 ACRES
TOP OF BERM
ELEV.: 98.00
LIMITS OF CLEARING
INV.: 91.36
OUTFALL STRUCTURE
18" - 15" HDPE @ 3.00%
DRAINAGE BASIN
GRASS SWALE - 100' @ 0.2%
35' B.S.L.
96x00
INV.: 91.80
95x80
4" PVC (SOLID)
'B'
CLEANOUT STRUCTURE
INV.: 91.83
4" PVC UNDERDRAIN (PERFORATED)
3:1
ALL SIDE SLOPES 3:1 MAX.
20' B.S.L.
97x80
'A'
PRO. HC PARKING SIGN SEE DETAIL
48.00'
38.0'
PROPOSED 2-1/2 STORY OFFICE BUILDING
1,991 S.F. FIRST FLOOR
1,964 S.F. SECOND FLOOR
545 S.F. THIRD FLOOR
4,500 S.F TOTAL
14.67'
3.33'
12.67'
42.00'
AREA - 2
0.22 ACRES
8 PRO. 9' x 18' 90° PARKING SPACES
9 PRO. 9' x 18' 90° PARKING SPACES
GRASS SWALE 90' @ 0.2%
EXIST. CURB
EXIST. 8" S.S.
GRASS SWALE - 100' @ 0.2%
98x00
AREA - 1
0.11 ACRES
PRO. PARKING BLOCK (TYP.)
97x18
EXIST. WM
ELEV.: 98.99
EXIST. LP
EXIST. CLSWALE
PRO. W/M

APPENDIX B

PRE-DEVELOPMENT 2YR STORM

EDSC WATERSHED MODELING

HYDROGRAPH REPORT

RECORD NUMBER : 1

```
TYPE            : COMPUTED FLOOD
DESCRIPTION     : PRE-DEV. 2yr
```

[HYDROGRAPH INFORMATION]

```
Peak Discharge............................ =        1.08 (cfs)
Volume.................................... =        0.06 (acft)
Time Interval............................. =        2.00 (min)
Time to Peak.............................. =      720.00 (min)
Time of Base.............................. =     1471.39 (min)
Multiplication factor..................... =        1.00
```

[UNIT HYDROGRAPH INFORMATION]

```
Unit hydrograph #......................... =        1
Unit hydrograph type...................... =   CURVILINEAR UH
Peak Discharge............................ =        3.25 (cfs)
Shape Factor.............................. =      484.00

Time Interval............................. =        2.00 (min)
Time to Peak.............................. =        6.48 (min)
Time of Base.............................. =       32.40 (min)
Rainfall Excess........................... =        1.00 (in)
Basin Lag Time............................ =        5.83 (min)
```

[BASIN DESCRIPTION]

```
Watershed Area............................ =        0.46 (ac)
Curve Number.............................. =       73
```

[TIME CONCENTRATION—TR-55]

SHEET FLOW

```
Manning's Roughness Coef. (n)............. =     0.20000
Flow Length (L)........................... =      135.00 (ft)
2-yr  24-hr  Rainfall ®................... =      4.00 (in)
Land Slope (S)............................ =     0.05000
Travel Time of Sheet Flow................. =        9.72 (min)
```

SHALLOW FLOW

```
K_Coef (surface description) (K).......... =     0.00000
Watercourse Slope (S)..................... =     0.00000
Velocity (V).............................. =        0.00 (ft/s)
Flow Length (L)........................... =        0.00 (ft)
Travel Time of Shallow Flow............... =        0.00 (min)
```

CHANNEL FLOW

```
Hydraulic Radius ®...................... =          0.00 (ft)
Channel Slope (S)....................... =       0.00000
Manning's Roughness Coef. (n)........... =       0.20000
Channel Velocity (V).................... =          0.00 (ft/s)
Flow Length (L)......................... =          0.00 (ft)
Travel Time of Shallow Flow............. =          0.00 (min)
```

TIME OF CONCENTRATION

Time of Concentration..... = 9.72 (min)

[RAINFALL DESCRIPTION]

```
Distribution Type....................... =          SCS II
Total Precipitation..................... =            4.00 (in)
Return Period........................... =            2    (yr)
Storm Duration.......................... =           24.00 (hr)
```

[Unit Hydrograph Flow Values Time vs. Flow]

(The time interval is 10.0 min)

TIME INTV	TIME (min)	FLOW (cfs)
0	0.00	0.00
1	2.00	0.65
6	12.00	1.17
11	22.00	0.10
16	32.00	0.00

[Hydrograph Flow Values Time vs. Flow]

(The time interval is 10.0 min)

TIME INTV	TIME (min)	INCREMENTAL RAINFALL (in)	CUMULATIVE RAINFALL (in)	INCREMENTAL OUTFLOW (cfs)	DESIGN OUTFLOW (cfs)
325	650.0	0.01	0.89	0.00	0.00
330	660.0	0.01	0.94	0.00	0.01
335	670.0	0.01	0.99	0.00	0.01
340	680.0	0.01	1.06	0.00	0.02
345	690.0	0.02	1.13	0.00	0.03
350	700.0	0.06	1.34	0.03	0.09
355	710.0	0.15	1.88	0.09	0.37
360	720.0	0.06	2.65	0.06	1.08
365	730.0	0.02	2.77	-0.10	0.35
370	740.0	0.02	2.87	-0.02	0.18
375	750.0	0.01	2.94	-0.01	0.13
380	760.0	0.01	3.00	0.00	0.10
385	770.0	0.01	3.04	0.00	0.08
390	780.0	0.01	3.09	0.00	0.08
395	790.0	0.01	3.13	0.00	0.07
400	800.0	0.01	3.16	0.00	0.06
405	810.0	0.01	3.20	0.00	0.06
410	820.0	0.01	3.23	0.00	0.05
415	830.0	0.01	3.25	0.00	0.05
420	840.0	0.00	3.28	0.00	0.04
425	850.0	0.00	3.30	0.00	0.04
430	860.0	0.00	3.33	0.00	0.04
435	870.0	0.00	3.35	0.00	0.04
440	880.0	0.00	3.37	0.00	0.04
445	890.0	0.00	3.39	0.00	0.04
450	900.0	0.00	3.41	0.00	0.04
455	910.0	0.00	3.43	0.00	0.03
460	920.0	0.00	3.45	0.00	0.03
465	930.0	0.00	3.47	0.00	0.03
470	940.0	0.00	3.49	0.00	0.03
475	950.0	0.00	3.50	0.00	0.03
480	960.0	0.00	3.52	0.00	0.03
485	970.0	0.00	3.54	0.00	0.03
490	980.0	0.00	3.55	0.00	0.03
495	990.0	0.00	3.56	0.00	0.02
500	1000.0	0.00	3.58	0.00	0.02
505	1010.0	0.00	3.59	0.00	0.02
510	1020.0	0.00	3.61	0.00	0.02
515	1030.0	0.00	3.62	0.00	0.02
520	1040.0	0.00	3.63	0.00	0.02
525	1050.0	0.00	3.65	0.00	0.02
530	1060.0	0.00	3.66	0.00	0.02
535	1070.0	0.00	3.67	0.00	0.02
540	1080.0	0.00	3.68	0.00	0.02

[Hydrograph Flow Values Time vs. Flow]

(The time interval is 10.0 min)

TIME INTV	TIME (min)	INCREMENTAL RAINFALL (in)	CUMULATIVE RAINFALL (in)	INCREMENTAL OUTFLOW (cfs)	DESIGN OUTFLOW (cfs)
545	1090.0	0.00	3.70	0.00	0.02
550	1100.0	0.00	3.71	0.00	0.02
555	1110.0	0.00	3.72	0.00	0.02
560	1120.0	0.00	3.73	0.00	0.02
565	1130.0	0.00	3.74	0.00	0.02
570	1140.0	0.00	3.75	0.00	0.02
575	1150.0	0.00	3.76	0.00	0.02
580	1160.0	0.00	3.77	0.00	0.02
585	1170.0	0.00	3.78	0.00	0.02
590	1180.0	0.00	3.79	0.00	0.02
595	1190.0	0.00	3.80	0.00	0.01
600	1200.0	0.00	3.81	0.00	0.01
605	1210.0	0.00	3.82	0.00	0.01
610	1220.0	0.00	3.83	0.00	0.01
615	1230.0	0.00	3.83	0.00	0.01
620	1240.0	0.00	3.84	0.00	0.01
625	1250.0	0.00	3.85	0.00	0.01
630	1260.0	0.00	3.86	0.00	0.01
635	1270.0	0.00	3.87	0.00	0.01
640	1280.0	0.00	3.88	0.00	0.01
645	1290.0	0.00	3.88	0.00	0.01
650	1300.0	0.00	3.89	0.00	0.01
655	1310.0	0.00	3.90	0.00	0.01
660	1320.0	0.00	3.91	0.00	0.01
665	1330.0	0.00	3.92	0.00	0.01
670	1340.0	0.00	3.92	0.00	0.01
675	1350.0	0.00	3.93	0.00	0.01
680	1360.0	0.00	3.94	0.00	0.01
685	1370.0	0.00	3.95	0.00	0.01
690	1380.0	0.00	3.96	0.00	0.01
695	1390.0	0.00	3.96	0.00	0.01
700	1400.0	0.00	3.97	0.00	0.01
705	1410.0	0.00	3.98	0.00	0.01
710	1420.0	0.00	3.99	0.00	0.01
715	1430.0	0.00	3.99	0.00	0.01
720	1440.0	0.00	4.00	0.00	0.01

APPENDIX C

PRE-DEVELOPMENT 10YR STORM

EDSC WATERSHED MODELING

HYDROGRAPH REPORT

RECORD NUMBER : 1

```
TYPE            : COMPUTED FLOOD
DESCRIPTION     : PRE-DEV. 10yr
```

[HYDROGRAPH INFORMATION]

```
Peak Discharge............................ =        2.20 (cfs)
Volume.................................... =        0.12 (acft)
Time Interval............................. =        2.00 (min)
Time to Peak.............................. =      720.00 (min)
Time of Base.............................. =     1471.39 (min)
Multiplication factor..................... =        1.00
```

[UNIT HYDROGRAPH INFORMATION]

```
Unit hydrograph #......................... =        1
Unit hydrograph type...................... =   CURVILINEAR UH
Peak Discharge............................ =        3.25 (cfs)
Shape Factor.............................. =      484.00

Time Interval............................. =        2.00 (min)
Time to Peak.............................. =        6.48 (min)
Time of Base.............................. =       32.40 (min)
Rainfall Excess........................... =        1.00 (in)
Basin Lag Time............................ =        5.83 (min)
```

[BASIN DESCRIPTION]

```
Watershed Area............................ =        0.46 (ac)
Curve Number.............................. =       73
```

[TIME CONCENTRATION—TR-55]

SHEET FLOW

```
Manning's Roughness Coef. (n)............. =     0.20000
Flow Length (L)........................... =      135.00 (ft)
2-yr  24-hr  Rainfall ®................... =      4.00 (in)
Land Slope (S)............................ =     0.05000
Travel Time of Sheet Flow................. =        9.72 (min)
```

SHALLOW FLOW

```
K_Coef (surface description) (K).......... =     0.00000
Watercourse Slope (S)..................... =     0.00000
Velocity (V).............................. =        0.00 (ft/s)
Flow Length (L)........................... =        0.00 (ft)
Travel Time of Shallow Flow............... =        0.00 (min)
```

CHANNEL FLOW

Hydraulic Radius ®.....	=	0.00 (ft)
Channel Slope (S).....	=	0.00000
Manning's Roughness Coef. (n).....	=	0.20000
Channel Velocity (V).....	=	0.00 (ft/s)
Flow Length (L).....	=	0.00 (ft)
Travel Time of Shallow Flow.....	=	0.00 (min)

TIME OF CONCENTRATION

Time of Concentration..... = 9.72 (min)

[RAINFALL DESCRIPTION]

Distribution Type.....	=	SCS II
Total Precipitation.....	=	6.00 (in)
Return Period.....	=	10 (yr)
Storm Duration.....	=	24.00 (hr)

[Unit Hydrograph Flow Values Time vs. Flow]

(The time interval is 10.0 min)

TIME INTV	TIME (min)	FLOW (cfs)
0	0.00	0.00
1	2.00	0.65
6	12.00	1.17
11	22.00	0.10
16	32.00	0.00

[Hydrograph Flow Values Time vs. Flow]

(The time interval is 10.0 min)

TIME INTV	TIME (min)	INCREMENTAL RAINFALL (in)	CUMULATIVE RAINFALL (in)	INCREMENTAL OUTFLOW (cfs)	DESIGN OUTFLOW (cfs)
275	550.0	0.01	0.91	0.00	0.00
280	560.0	0.01	0.95	0.00	0.01
285	570.0	0.01	0.98	0.00	0.01
290	580.0	0.01	1.01	0.00	0.01
295	590.0	0.01	1.05	0.00	0.01
300	600.0	0.01	1.09	0.00	0.01
305	610.0	0.01	1.13	0.00	0.02
310	620.0	0.01	1.17	0.00	0.02
315	630.0	0.01	1.22	0.00	0.03
320	640.0	0.01	1.28	0.00	0.03
325	650.0	0.01	1.34	0.00	0.04
330	660.0	0.01	1.41	0.00	0.05

[Hydrograph Flow Values Time vs. Flow]

(The time interval is 10.0 min)

TIME INTV	TIME (min)	INCREMENTAL RAINFALL (in)	CUMULATIVE RAINFALL (in)	INCREMENTAL OUTFLOW (cfs)	DESIGN OUTFLOW (cfs)
335	670.0	0.02	1.49	0.00	0.06
340	680.0	0.02	1.59	0.00	0.08
345	690.0	0.02	1.70	0.01	0.10
350	700.0	0.10	2.02	0.07	0.27
355	710.0	0.23	2.81	0.18	0.89
360	720.0	0.09	3.98	0.08	2.20
365	730.0	0.03	4.16	-0.21	0.69
370	740.0	0.03	4.30	-0.03	0.34
375	750.0	0.02	4.41	-0.02	0.24
380	760.0	0.02	4.49	-0.01	0.18
385	770.0	0.01	4.57	0.00	0.16
390	780.0	0.01	4.63	0.00	0.14
395	790.0	0.01	4.69	0.00	0.13
400	800.0	0.01	4.74	0.00	0.12
405	810.0	0.01	4.79	0.00	0.11
410	820.0	0.01	4.84	0.00	0.10
415	830.0	0.01	4.88	0.00	0.09
420	840.0	0.01	4.92	0.00	0.08
425	850.0	0.01	4.96	0.00	0.08
430	860.0	0.01	4.99	0.00	0.08
435	870.0	0.01	5.03	0.00	0.07
440	880.0	0.01	5.06	0.00	0.07
445	890.0	0.01	5.09	0.00	0.07
450	900.0	0.01	5.12	0.00	0.07
455	910.0	0.01	5.15	0.00	0.06
460	920.0	0.01	5.18	0.00	0.06
465	930.0	0.01	5.21	0.00	0.06
470	940.0	0.01	5.23	0.00	0.06
475	950.0	0.00	5.26	0.00	0.05
480	960.0	0.00	5.28	0.00	0.05
485	970.0	0.00	5.30	0.00	0.05
490	980.0	0.00	5.33	0.00	0.05
495	990.0	0.00	5.35	0.00	0.05
500	1000.0	0.00	5.37	0.00	0.05
505	1010.0	0.00	5.39	0.00	0.05
510	1020.0	0.00	5.41	0.00	0.04
515	1030.0	0.00	5.43	0.00	0.04
520	1040.0	0.00	5.45	0.00	0.04
525	1050.0	0.00	5.47	0.00	0.04
530	1060.0	0.00	5.49	0.00	0.04
535	1070.0	0.00	5.51	0.00	0.04
540	1080.0	0.00	5.53	0.00	0.04
545	1090.0	0.00	5.54	0.00	0.04
550	1100.0	0.00	5.56	0.00	0.04
555	1110.0	0.00	5.58	0.00	0.04
560	1120.0	0.00	5.59	0.00	0.04
565	1130.0	0.00	5.61	0.00	0.03
570	1140.0	0.00	5.63	0.00	0.03

[Hydrograph Flow Values Time vs. Flow]

(The time interval is 10.0 min)

TIME INTV	TIME (min)	INCREMENTAL RAINFALL (in)	CUMULATIVE RAINFALL (in)	INCREMENTAL OUTFLOW (cfs)	DESIGN OUTFLOW (cfs)
575	1150.0	0.00	5.64	0.00	0.03
580	1160.0	0.00	5.66	0.00	0.03
585	1170.0	0.00	5.67	0.00	0.03
590	1180.0	0.00	5.69	0.00	0.03
595	1190.0	0.00	5.70	0.00	0.03
600	1200.0	0.00	5.71	0.00	0.03
605	1210.0	0.00	5.72	0.00	0.03
610	1220.0	0.00	5.74	0.00	0.03
615	1230.0	0.00	5.75	0.00	0.03
620	1240.0	0.00	5.76	0.00	0.03
625	1250.0	0.00	5.78	0.00	0.03
630	1260.0	0.00	5.79	0.00	0.03
635	1270.0	0.00	5.80	0.00	0.03
640	1280.0	0.00	5.81	0.00	0.03
645	1290.0	0.00	5.83	0.00	0.02
650	1300.0	0.00	5.84	0.00	0.03
655	1310.0	0.00	5.85	0.00	0.03
660	1320.0	0.00	5.86	0.00	0.02
665	1330.0	0.00	5.87	0.00	0.02
670	1340.0	0.00	5.89	0.00	0.02
675	1350.0	0.00	5.90	0.00	0.02
680	1360.0	0.00	5.91	0.00	0.02
685	1370.0	0.00	5.92	0.00	0.02
690	1380.0	0.00	5.93	0.00	0.02
695	1390.0	0.00	5.94	0.00	0.02
700	1400.0	0.00	5.96	0.00	0.02
705	1410.0	0.00	5.97	0.00	0.02
710	1420.0	0.00	5.98	0.00	0.02
715	1430.0	0.00	5.99	0.00	0.02
720	1440.0	0.00	6.00	0.00	0.02
725	1450.0	0.00	6.00	0.00	0.00

APPENDIX D

PRE-DEVELOPMENT 25YR STORM

EDSC WATERSHED MODELING

HYDROGRAPH REPORT
RECORD NUMBER : 1

```
TYPE            : COMPUTED FLOOD
DESCRIPTION     : PRE-DEV. 25yr
```

[HYDROGRAPH INFORMATION]

```
Peak Discharge............................  =        2.79 (cfs)
Volume....................................  =        0.15 (acft)
Time Interval.............................  =        2.00 (min)
Time to Peak..............................  =      720.00 (min)
Time of Base..............................  =     1471.39 (min)
Multiplication factor.....................  =        1.00
```

[UNIT HYDROGRAPH INFORMATION]

```
Unit hydrograph #.........................  =        1
Unit hydrograph type......................  =   CURVILINEAR UH
Peak Discharge............................  =        3.25 (cfs)
Shape Factor..............................  =      484.00

Time Interval.............................  =        2.00 (min)
Time to Peak..............................  =        6.48 (min)
Time of Base..............................  =       32.40 (min)
Rainfall Excess...........................  =        1.00 (in)
Basin Lag Time............................  =        5.83 (min)
```

[BASIN DESCRIPTION]

```
Watershed Area............................  =        0.46 (ac)
Curve Number..............................  =       73
```

11/12/99 WATERSHED MODELING...continued... Page 2

[TIME CONCENTRATION—TR-55]

SHEET FLOW

```
Manning's Roughness Coef. (n).............  =     0.20000
Flow Length (L)...........................  =      135.00 (ft)
2-yr  24-hr  Rainfall ®................  =      4.00 (in)
Land Slope (S)............................  =     0.05000
Travel Time of Sheet Flow.................  =        9.72 (min)
```

SHALLOW FLOW

```
K_Coef (surface description) (K)..........  =        0.00000
Watercourse Slope (S)....................  =        0.00000
Velocity (V)............................  =           0.00 (ft/s)
Flow Length (L)..........................  =           0.00 (ft)
Travel Time of Shallow Flow..............  =           0.00 (min)
```

CHANNEL FLOW

```
Hydraulic Radius ®......................  =          0.00 (ft)
Channel Slope (S)........................  =        0.00000
Manning's Roughness Coef. (n)............  =        0.20000
Channel Velocity (V)....................  =           0.00 (ft/s)
Flow Length (L)..........................  =           0.00 (ft)
Travel Time of Shallow Flow..............  =           0.00 (min)
```

TIME OF CONCENTRATION

Time of Concentration..... = 9.72 (min)

[RAINFALL DESCRIPTION]

```
Distribution Type........................  =          SCS II
Total Precipitation......................  =            7.00 (in)
Return Period............................  =           25    (yr)
Storm Duration...........................  =           24.00 (hr)
```

[Unit Hydrograph Flow Values Time vs. Flow]

(The time interval is 10.0 min)

TIME INTV	TIME (min)	FLOW (cfs)
0	0.00	0.00
1	2.00	0.65
6	12.00	1.17
11	22.00	0.10
16	32.00	0.00

[Hydrograph Flow Values Time vs. Flow]

(The time interval is 10.0 min)

TIME INTV	TIME (min)	INCREMENTAL RAINFALL (in)	CUMULATIVE RAINFALL (in)	INCREMENTAL OUTFLOW (cfs)	DESIGN OUTFLOW (cfs)
255	510.0	0.01	0.93	0.00	0.00
260	520.0	0.01	0.96	0.00	0.01
265	530.0	0.01	0.99	0.00	0.01
270	540.0	0.01	1.03	0.00	0.01
275	550.0	0.01	1.07	0.00	0.01
280	560.0	0.01	1.10	0.00	0.01
285	570.0	0.01	1.14	0.00	0.02
290	580.0	0.01	1.18	0.00	0.02
295	590.0	0.01	1.22	0.00	0.02
300	600.0	0.01	1.27	0.00	0.02
305	610.0	0.01	1.32	0.00	0.03
310	620.0	0.01	1.37	0.00	0.03
315	630.0	0.01	1.43	0.00	0.04
320	640.0	0.01	1.49	0.00	0.05
325	650.0	0.02	1.56	0.00	0.06
330	660.0	0.02	1.64	0.00	0.07
335	670.0	0.02	1.74	0.00	0.09
340	680.0	0.02	1.85	0.01	0.11
345	690.0	0.03	1.98	0.01	0.14
350	700.0	0.11	2.35	0.09	0.37
355	710.0	0.27	3.28	0.23	1.18
360	720.0	0.11	4.64	0.09	2.79
365	730.0	0.04	4.85	-0.26	0.86
370	740.0	0.03	5.02	-0.04	0.42
375	750.0	0.02	5.14	-0.02	0.30
380	760.0	0.02	5.24	-0.01	0.23
385	770.0	0.02	5.33	0.00	0.20
390	780.0	0.01	5.40	0.00	0.17
395	790.0	0.01	5.47	0.00	0.16
400	800.0	0.01	5.54	0.00	0.14
405	810.0	0.01	5.59	0.00	0.13
410	820.0	0.01	5.65	0.00	0.12
415	830.0	0.01	5.69	0.00	0.11
420	840.0	0.01	5.74	0.00	0.10
425	850.0	0.01	5.78	0.00	0.10
430	860.0	0.01	5.82	0.00	0.09
435	870.0	0.01	5.86	0.00	0.09
440	880.0	0.01	5.90	0.00	0.09
445	890.0	0.01	5.94	0.00	0.08
450	900.0	0.01	5.97	0.00	0.08
455	910.0	0.01	6.01	0.00	0.08
460	920.0	0.01	6.04	0.00	0.07
465	930.0	0.01	6.07	0.00	0.07
470	940.0	0.01	6.10	0.00	0.07

[Hydrograph Flow Values Time vs. Flow]

(The time interval is 10.0 min)

TIME INTV	TIME (min)	INCREMENTAL RAINFALL (in)	CUMULATIVE RAINFALL (in)	INCREMENTAL OUTFLOW (cfs)	DESIGN OUTFLOW (cfs)
475	950.0	0.01	6.13	0.00	0.07
480	960.0	0.01	6.16	0.00	0.06
485	970.0	0.01	6.19	0.00	0.06
490	980.0	0.01	6.21	0.00	0.06
495	990.0	0.01	6.24	0.00	0.06
500	1000.0	0.00	6.26	0.00	0.06
505	1010.0	0.00	6.29	0.00	0.06
510	1020.0	0.00	6.31	0.00	0.05
515	1030.0	0.00	6.34	0.00	0.05
520	1040.0	0.00	6.36	0.00	0.05
525	1050.0	0.00	6.38	0.00	0.05
530	1060.0	0.00	6.40	0.00	0.05
535	1070.0	0.00	6.43	0.00	0.05
540	1080.0	0.00	6.45	0.00	0.05
545	1090.0	0.00	6.47	0.00	0.05
550	1100.0	0.00	6.49	0.00	0.05
555	1110.0	0.00	6.51	0.00	0.04
560	1120.0	0.00	6.53	0.00	0.04
565	1130.0	0.00	6.55	0.00	0.04
570	1140.0	0.00	6.56	0.00	0.04
575	1150.0	0.00	6.58	0.00	0.04
580	1160.0	0.00	6.60	0.00	0.04
585	1170.0	0.00	6.62	0.00	0.04
590	1180.0	0.00	6.63	0.00	0.04
595	1190.0	0.00	6.65	0.00	0.04
600	1200.0	0.00	6.66	0.00	0.03
605	1210.0	0.00	6.68	0.00	0.03
610	1220.0	0.00	6.69	0.00	0.03
615	1230.0	0.00	6.71	0.00	0.03
620	1240.0	0.00	6.72	0.00	0.03
625	1250.0	0.00	6.74	0.00	0.03
630	1260.0	0.00	6.75	0.00	0.03
635	1270.0	0.00	6.77	0.00	0.03
640	1280.0	0.00	6.78	0.00	0.03
645	1290.0	0.00	6.80	0.00	0.03
650	1300.0	0.00	6.81	0.00	0.03
655	1310.0	0.00	6.82	0.00	0.03
660	1320.0	0.00	6.84	0.00	0.03
665	1330.0	0.00	6.85	0.00	0.03
670	1340.0	0.00	6.87	0.00	0.03
675	1350.0	0.00	6.88	0.00	0.03
680	1360.0	0.00	6.89	0.00	0.03
685	1370.0	0.00	6.91	0.00	0.03
690	1380.0	0.00	6.92	0.00	0.03

[Hydrograph Flow Values Time vs. Flow]

(The time interval is 10.0 min)

TIME INTV	TIME (min)	INCREMENTAL RAINFALL (in)	CUMULATIVE RAINFALL (in)	INCREMENTAL OUTFLOW (cfs)	DESIGN OUTFLOW (cfs)
695	1390.0	0.00	6.93	0.00	0.03
700	1400.0	0.00	6.95	0.00	0.03
705	1410.0	0.00	6.96	0.00	0.03
710	1420.0	0.00	6.97	0.00	0.03
715	1430.0	0.00	6.99	0.00	0.03
720	1440.0	0.00	7.00	0.00	0.03
725	1450.0	0.00	7.00	0.00	0.00

APPENDIX E

PRE-DEVELOPMENT 100YR STORM

EDSC WATERSHED MODELING

HYDROGRAPH REPORT
RECORD NUMBER : 1

```
TYPE            : COMPUTED FLOOD
DESCRIPTION     : PRE-DEV. 100 yr
```

[HYDROGRAPH INFORMATION]

```
Peak Discharge............................ =        3.39 (cfs)
Volume.................................... =        0.18 (acft)
Time Interval............................. =        2.00 (min)
Time to Peak.............................. =      720.00 (min)
Time of Base.............................. =     1471.39 (min)
Multiplication factor..................... =        1.00
```

[UNIT HYDROGRAPH INFORMATION]

```
Unit hydrograph #......................... =        1
Unit hydrograph type...................... =   CURVILINEAR UH
Peak Discharge............................ =        3.25 (cfs)
Shape Factor.............................. =      484.00

Time Interval............................. =        2.00 (min)
Time to Peak.............................. =        6.48 (min)
Time of Base.............................. =       32.40 (min)
Rainfall Excess........................... =        1.00 (in)
Basin Lag Time............................ =        5.83 (min)
```

[BASIN DESCRIPTION]

```
Watershed Area............................ =        0.46 (ac)
Curve Number.............................. =       73
```

[TIME CONCENTRATION—TR-55]

SHEET FLOW

```
Manning's Roughness Coef. (n)............. =     0.20000
Flow Length (L)........................... =      135.00 (ft)
2-yr  24-hr  Rainfall ®................... =      4.00 (in)
Land Slope (S)............................ =     0.05000
Travel Time of Sheet Flow................. =        9.72 (min)
```

SHALLOW FLOW

```
K_Coef (surface description) (K).......... =     0.00000
Watercourse Slope (S)..................... =     0.00000
Velocity (V).............................. =        0.00 (ft/s)
Flow Length (L)........................... =        0.00 (ft)
Travel Time of Shallow Flow............... =        0.00 (min)
```

CHANNEL FLOW

```
Hydraulic Radius ®..................... =          0.00 (ft)
Channel Slope (S)...................... =       0.00000
Manning's Roughness Coef. (n)..........  =       0.20000
Channel Velocity (V)................... =          0.00 (ft/s)
Flow Length (L)........................ =          0.00 (ft)
Travel Time of Shallow Flow............ =          0.00 (min)
```

TIME OF CONCENTRATION

Time of Concentration..... = 9.72 (min)

[RAINFALL DESCRIPTION]

```
Distribution Type...................... =         SCS II
Total Precipitation.................... =           8.00 (in)
Return Period.......................... =         100    (yr)
Storm Duration......................... =          24.00 (hr)
```


[Unit Hydrograph Flow Values Time vs. Flow]
(The time interval is 10.0 min)

TIME INTV	TIME (min)	FLOW (cfs)
0	0.00	0.00
1	2.00	0.65
6	12.00	1.17
11	22.00	0.10
16	32.00	0.00

[Hydrograph Flow Values Time vs. Flow]
(The time interval is 10.0 min)

TIME INTV	TIME (min)	INCREMENTAL RAINFALL (in)	CUMULATIVE RAINFALL (in)	INCREMENTAL OUTFLOW (cfs)	DESIGN OUTFLOW (cfs)
235	470.0	0.01	0.93	0.00	0.00
240	480.0	0.01	0.96	0.00	0.01
245	490.0	0.01	0.99	0.00	0.01
250	500.0	0.01	1.02	0.00	0.01
255	510.0	0.01	1.06	0.00	0.01

[Hydrograph Flow Values Time vs. Flow]
(The time interval is 10.0 min)

TIME INTV	TIME (min)	INCREMENTAL RAINFALL (in)	CUMULATIVE RAINFALL (in)	INCREMENTAL OUTFLOW (cfs)	DESIGN OUTFLOW (cfs)
260	520.0	0.01	1.10	0.00	0.01
265	530.0	0.01	1.13	0.00	0.02
270	540.0	0.01	1.18	0.00	0.02
275	550.0	0.01	1.22	0.00	0.02
280	560.0	0.01	1.26	0.00	0.02
285	570.0	0.01	1.30	0.00	0.03
290	580.0	0.01	1.35	0.00	0.03
295	590.0	0.01	1.40	0.00	0.03
300	600.0	0.01	1.45	0.00	0.04
305	610.0	0.01	1.50	0.00	0.04
310	620.0	0.01	1.57	0.00	0.05
315	630.0	0.01	1.63	0.00	0.06
320	640.0	0.02	1.71	0.00	0.07
325	650.0	0.02	1.79	0.00	0.08
330	660.0	0.02	1.88	0.00	0.10
335	670.0	0.02	1.99	0.01	0.12
340	680.0	0.03	2.11	0.01	0.15
345	690.0	0.03	2.26	0.01	0.19
350	700.0	0.13	2.69	0.12	0.48
355	710.0	0.31	3.75	0.28	1.47
360	720.0	0.12	5.30	0.10	3.39
365	730.0	0.04	5.55	-0.32	1.03
370	740.0	0.03	5.74	-0.05	0.50
375	750.0	0.02	5.88	-0.02	0.36
380	760.0	0.02	5.99	-0.01	0.27
385	770.0	0.02	6.09	-0.01	0.24
390	780.0	0.02	6.18	0.00	0.21
395	790.0	0.02	6.25	0.00	0.19
400	800.0	0.01	6.33	0.00	0.17
405	810.0	0.01	6.39	0.00	0.16
410	820.0	0.01	6.45	0.00	0.14
415	830.0	0.01	6.51	0.00	0.13
420	840.0	0.01	6.56	0.00	0.12
425	850.0	0.01	6.61	0.00	0.11
430	860.0	0.01	6.66	0.00	0.11
435	870.0	0.01	6.70	0.00	0.11
440	880.0	0.01	6.74	0.00	0.10
445	890.0	0.01	6.79	0.00	0.10
450	900.0	0.01	6.83	0.00	0.10

[Hydrograph Flow Values Time vs. Flow]

(The time interval is 10.0 min)

TIME INTV	TIME (min)	INCREMENTAL RAINFALL (in)	CUMULATIVE RAINFALL (in)	INCREMENTAL OUTFLOW (cfs)	DESIGN OUTFLOW (cfs)
455	910.0	0.01	6.87	0.00	0.09
460	920.0	0.01	6.90	0.00	0.09
465	930.0	0.01	6.94	0.00	0.08
470	940.0	0.01	6.98	0.00	0.08
475	950.0	0.01	7.01	0.00	0.08
480	960.0	0.01	7.04	0.00	0.07
485	970.0	0.01	7.07	0.00	0.07
490	980.0	0.01	7.10	0.00	0.07
495	990.0	0.01	7.13	0.00	0.07
500	1000.0	0.01	7.16	0.00	0.07
505	1010.0	0.01	7.19	0.00	0.07
510	1020.0	0.01	7.21	0.00	0.06
515	1030.0	0.01	7.24	0.00	0.06
520	1040.0	0.01	7.27	0.00	0.06
525	1050.0	0.01	7.29	0.00	0.06
530	1060.0	0.01	7.32	0.00	0.06
535	1070.0	0.00	7.34	0.00	0.06
540	1080.0	0.00	7.37	0.00	0.06
545	1090.0	0.00	7.39	0.00	0.06
550	1100.0	0.00	7.41	0.00	0.05
555	1110.0	0.00	7.44	0.00	0.05
560	1120.0	0.00	7.46	0.00	0.05
565	1130.0	0.00	7.48	0.00	0.05
570	1140.0	0.00	7.50	0.00	0.05
575	1150.0	0.00	7.52	0.00	0.05
580	1160.0	0.00	7.54	0.00	0.05
585	1170.0	0.00	7.56	0.00	0.04
590	1180.0	0.00	7.58	0.00	0.04
595	1190.0	0.00	7.60	0.00	0.04
600	1200.0	0.00	7.62	0.00	0.04
605	1210.0	0.00	7.63	0.00	0.04
610	1220.0	0.00	7.65	0.00	0.04
615	1230.0	0.00	7.67	0.00	0.04
620	1240.0	0.00	7.68	0.00	0.04
625	1250.0	0.00	7.70	0.00	0.04
630	1260.0	0.00	7.72	0.00	0.04
635	1270.0	0.00	7.73	0.00	0.04
640	1280.0	0.00	7.75	0.00	0.04
645	1290.0	0.00	7.77	0.00	0.04
650	1300.0	0.00	7.78	0.00	0.04
655	1310.0	0.00	7.80	0.00	0.04
660	1320.0	0.00	7.82	0.00	0.04
665	1330.0	0.00	7.83	0.00	0.04
670	1340.0	0.00	7.85	0.00	0.04

[Hydrograph Flow Values Time vs. Flow]

(The time interval is 10.0 min)

TIME INTV	TIME (min)	INCREMENTAL RAINFALL (in)	CUMULATIVE RAINFALL (in)	INCREMENTAL OUTFLOW (cfs)	DESIGN OUTFLOW (cfs)
675	1350.0	0.00	7.86	0.00	0.04
680	1360.0	0.00	7.88	0.00	0.04
685	1370.0	0.00	7.89	0.00	0.04
690	1380.0	0.00	7.91	0.00	0.04
695	1390.0	0.00	7.93	0.00	0.04
700	1400.0	0.00	7.94	0.00	0.03
705	1410.0	0.00	7.96	0.00	0.03
710	1420.0	0.00	7.97	0.00	0.03
715	1430.0	0.00	7.99	0.00	0.03
720	1440.0	0.00	8.00	0.00	0.03
725	1450.0	0.00	8.00	-0.01	0.01

APPENDIX F

POST DEVELOPMENT 2YR STORM

EDSC WATERSHED MODELING

UNIT HYDROGRAPH REPORT

RECORD NUMBER : 1

```
TYPE            : CURVILINEAR UH
DESCRIPTION     : AREA - 1 POST DEV. 2yr
```

[UNIT HYDROGRAPH INFORMATION]

```
Peak Discharge............................ =        0.51 (cfs)
Time Interval............................. =        2.00 (min)
Time to Peak.............................. =        9.65 (min)
Time of Base.............................. =       48.26 (min)
Rainfall Excess........................... =        1.00 (in)
Storm Duration............................ =        1.93 (min)
Basin Lag Time............................ =        8.69 (min)
Shape Factor.............................. =      484.00
```

[BASIN DESCRIPTION]

```
Watershed Area............................ =        0.11 (ac)
Curve Number.............................. =       80
```

[TIME CONCENTRATION-TR-55]

SHEET FLOW

```
Manning's Roughness Coef. (n)............ =      0.23930
Flow Length (L)........................... =       180.00 (ft)
2-yr  24-hr  Rainfall ®................... =        4.00 (in)
Land Slope (S)............................ =      0.04700
Travel Time of Sheet Flow................. =        14.48 (min)
```

SHALLOW FLOW

```
K_Coef (surface description) (K).......... =      0.00000
Watercourse Slope (S)..................... =      0.00000
Velocity (V).............................. =         0.00 (ft/s)
Flow Length (L)........................... =         0.00 (ft)
Travel Time of Shallow Flow............... =         0.00 (min)
```

CHANNEL FLOW

Hydraulic Radius ®.....	=	0.00	(ft)
Channel Slope (S).....	=	0.00000	
Manning's Roughness Coef. (n).....	=	0.20000	
Channel Velocity (V).....	=	0.00	(ft/s)
Flow Length (L).....	=	0.00	(ft)
Travel Time of Shallow Flow.....	=	0.00	(min)

TIME OF CONCENTRATION

Time of Concentration..... = 14.48 (min)

[Unit Hydrograph Flow Values Time vs. Flow]

(The time interval is 10.0 min)

TIME INTV	TIME (min)	FLOW (cfs)
0	0.00	0.00
1	2.00	0.05
6	12.00	0.46
11	22.00	0.09
16	32.00	0.02
21	42.00	0.00

EDSC WATERSHED MODELING

UNIT HYDROGRAPH REPORT

RECORD NUMBER : 2

TYPE : CURVILINEAR UH
DESCRIPTION : AREA - 2 POST DEV. 2yr
[UNIT HYDROGRAPH INFORMATION]

Peak Discharge	=	1.67	(cfs)
Time Interval	=	2.00	(min)
Time to Peak	=	5.96	(min)
Time of Base	=	29.80	(min)
Rainfall Excess	=	1.00	(in)
Storm Duration	=	1.19	(min)
Basin Lag Time	=	5.36	(min)
Shape Factor	=	484.00	

[BASIN DESCRIPTION]

Watershed Area	=	0.22	(ac)
Curve Number	=	94	

[TIME CONCENTRATION-TR-55]

SHEET FLOW

Manning's Roughness Coef. (n)	=	0.10350	
Flow Length (L)	=	182.00	(ft)
2-yr 24-hr Rainfall ®	=	4.00	(in)
Land Slope (S)	=	0.03000	
Travel Time of Sheet Flow	=	8.94	(min)

SHALLOW FLOW

K_Coef (surface description) (K)	=	0.00000	
Watercourse Slope (S)	=	0.00000	
Velocity (V)	=	0.00	(ft/s)
Flow Length (L)	=	0.00	(ft)
Travel Time of Shallow Flow	=	0.00	(min)

CHANNEL FLOW

```
Hydraulic Radius ®...................... =          0.00 (ft)
Channel Slope (S)....................... =       0.00000
Manning's Roughness Coef. (n)........... =       0.20000
Channel Velocity (V).................... =          0.00 (ft/s)
Flow Length (L)......................... =          0.00 (ft)
Travel Time of Shallow Flow............. =          0.00 (min)
```

TIME OF CONCENTRATION

Time of Concentration..... = 8.94 (min)
[Unit Hydrograph Flow Values Time vs. Flow]
(The time interval is 10.0 min)

TIME INTV	TIME (min)	FLOW (cfs)
0	0.00	0.00
1	2.00	0.39
6	12.00	0.46
11	22.00	0.03

EDSC WATERSHED MODELING

UNIT HYDROGRAPH REPORT

RECORD NUMBER : 3

TYPE : CURVILINEAR UH

DESCRIPTION : AREA - 3 POST DEV. 2yr

[UNIT HYDROGRAPH INFORMATION]

Peak Discharge.....	=	1.16	(cfs)
Time Interval.....	=	2.00	(min)
Time to Peak.....	=	5.33	(min)
Time of Base.....	=	26.67	(min)
Rainfall Excess.....	=	1.00	(in)
Storm Duration.....	=	1.06	(min)
Basin Lag Time.....	=	4.80	(min)
Shape Factor.....	=	484.00	

[BASIN DESCRIPTION]

Watershed Area.....	=	0.14	(ac)
Curve Number.....	=	79	

[TIME CONCENTRATION-USER DEFINED]
Time of Concentration..... = 8.00 (min)
[Unit Hydrograph Flow Values Time vs. Flow]
(The time interval is 10.0 min)

TIME INTV	TIME (min)	FLOW (cfs)
0	0.00	0.00
1	2.00	0.32
6	12.00	0.22
11	22.00	0.01

EDSC WATERSHED MODELING

HYDROGRAPH REPORT

RECORD NUMBER : 1

TYPE : COMPUTED FLOOD
DESCRIPTION : AREA - 1 POST DEV. 2yr

[HYDROGRAPH INFORMATION]

Peak Discharge	=	0.29	(cfs)
Volume	=	0.01	(acft)
Time Interval	=	2.00	(min)
Time to Peak	=	722.00	(min)
Time of Base	=	1486.77	(min)
Multiplication factor	=	1.00	

[UNIT HYDROGRAPH INFORMATION]

Unit hydrograph #	=	1	
Unit hydrograph type	=	CURVILINEAR UH	
Peak Discharge	=	0.51	(cfs)
Shape Factor	=	484.00	
Time Interval	=	2.00	(min)
Time to Peak	=	9.65	(min)
Time of Base	=	48.26	(min)
Rainfall Excess	=	1.00	(in)
Basin Lag Time	=	8.69	(min)

[BASIN DESCRIPTION]

Watershed Area	=	0.11	(ac)
Curve Number	=	80	

[TIME CONCENTRATION-TR-55]

SHEET FLOW

Manning's Roughness Coef. (n)	=	0.23930	
Flow Length (L)	=	180.00	(ft)
2-yr 24-hr Rainfall ®	=	4.00	(in)
Land Slope (S)	=	0.04700	
Travel Time of Sheet Flow	=	14.48	(min)

SHALLOW FLOW

```
K_Coef (surface description) (K)..........  =        0.00000
Watercourse Slope (S)....................  =        0.00000
Velocity (V)..............................  =           0.00 (ft/s)
Flow Length (L)...........................  =           0.00 (ft)
Travel Time of Shallow Flow...............  =           0.00 (min)
```

CHANNEL FLOW

```
Hydraulic Radius ®.......................  =           0.00 (ft)
Channel Slope (S)........................  =        0.00000
Manning's Roughness Coef. (n)............  =        0.20000
Channel Velocity (V).....................  =           0.00 (ft/s)
Flow Length (L)..........................  =           0.00 (ft)
Travel Time of Shallow Flow..............  =           0.00 (min)
```

TIME OF CONCENTRATION

Time of Concentration..... = 14.48 (min)

[RAINFALL DESCRIPTION]

```
Distribution Type........................  =          SCS II
Total Precipitation......................  =            4.00 (in)
Return Period............................  =            2    (yr)
Storm Duration...........................  =           24.00 (hr)
```

[Unit Hydrograph Flow Values Time vs. Flow]
(The time interval is 10.0 min)

TIME INTV	TIME (min)	FLOW (cfs)
0	0.00	0.00
1	2.00	0.05
6	12.00	0.46
11	22.00	0.09
16	32.00	0.02
21	42.00	0.00

[Hydrograph Flow Values Time vs. Flow]
(The time interval is 10.0 min)

TIME INTV (cfs)	TIME (min)	INCREMENTAL RAINFALL (in)	CUMULATIVE RAINFALL (in)	INCREMENTAL OUTFLOW (cfs)	DESIGN OUTFLOW (cfs)
330	660.0	0.01	0.94	0.00	0.00
335	670.0	0.01	0.99	0.00	0.01
340	680.0	0.01	1.06	0.00	0.01
345	690.0	0.02	1.13	0.00	0.01
350	700.0	0.06	1.34	0.01	0.03
355	710.0	0.15	1.88	0.02	0.10
360	720.0	0.06	2.65	0.03	0.27
365	730.0	0.02	2.77	-0.04	0.17
370	740.0	0.02	2.87	-0.01	0.07
375	750.0	0.01	2.94	0.00	0.04
380	760.0	0.01	3.00	0.00	0.03
385	770.0	0.01	3.04	0.00	0.02
390	780.0	0.01	3.09	0.00	0.02
395	790.0	0.01	3.13	0.00	0.02
400	800.0	0.01	3.16	0.00	0.02
405	810.0	0.01	3.20	0.00	0.01
410	820.0	0.01	3.23	0.00	0.01
415	830.0	0.01	3.25	0.00	0.01
420	840.0	0.00	3.28	0.00	0.01
425	850.0	0.00	3.30	0.00	0.01
430	860.0	0.00	3.33	0.00	0.01
435	870.0	0.00	3.35	0.00	0.01
440	880.0	0.00	3.37	0.00	0.01
445	890.0	0.00	3.39	0.00	0.01
450	900.0	0.00	3.41	0.00	0.01
455	910.0	0.00	3.43	0.00	0.01
460	920.0	0.00	3.45	0.00	0.01
465	930.0	0.00	3.47	0.00	0.01
470	940.0	0.00	3.49	0.00	0.01
475	950.0	0.00	3.50	0.00	0.01
480	960.0	0.00	3.52	0.00	0.01
485	970.0	0.00	3.54	0.00	0.00
490	980.0	0.00	3.55	0.00	0.00
495	990.0	0.00	3.56	0.00	0.00
500	1000.0	0.00	3.58	0.00	0.00
505	1010.0	0.00	3.59	0.00	0.00
510	1020.0	0.00	3.61	0.00	0.00
515	1030.0	0.00	3.62	0.00	0.00
520	1040.0	0.00	3.63	0.00	0.00
525	1050.0	0.00	3.65	0.00	0.00

EDSC WATERSHED MODELING

HYDROGRAPH REPORT

RECORD NUMBER : 2

TYPE : COMPUTED FLOOD
DESCRIPTION : AREA - 2 POST DEV. 2yr

[HYDROGRAPH INFORMATION]

Peak Discharge	=	1.05	(cfs)
Volume	=	0.06	(acft)
Time Interval	=	2.00	(min)
Time to Peak	=	718.00	(min)
Time of Base	=	1468.68	(min)
Multiplication factor	=	1.00	

[UNIT HYDROGRAPH INFORMATION]

Unit hydrograph #	=	2	
Unit hydrograph type	=	CURVILINEAR UH	
Peak Discharge	=	1.67	(cfs)
Shape Factor	=	484.00	
Time Interval	=	2.00	(min)
Time to Peak	=	5.96	(min)
Time of Base	=	29.80	(min)
Rainfall Excess	=	1.00	(in)
Basin Lag Time	=	5.36	(min)

[BASIN DESCRIPTION]

Watershed Area	=	0.22	(ac)
Curve Number	=	94	

[TIME CONCENTRATION-TR-55]

SHEET FLOW

Manning's Roughness Coef. (n)	=	0.10350	
Flow Length (L)	=	182.00	(ft)
2-yr 24-hr Rainfall ®	=	4.00	(in)
Land Slope (S)	=	0.03000	
Travel Time of Sheet Flow	=	8.94	(min)

SHALLOW FLOW

K_Coef (surface description) (K)	=	0.00000	
Watercourse Slope (S)	=	0.00000	
Velocity (V)	=	0.00	(ft/s)
Flow Length (L)	=	0.00	(ft)
Travel Time of Shallow Flow	=	0.00	(min)

CHANNEL FLOW

Hydraulic Radius ®.....	=	0.00 (ft)
Channel Slope (S).....	=	0.00000
Manning's Roughness Coef. (n).....	=	0.20000
Channel Velocity (V).....	=	0.00 (ft/s)
Flow Length (L).....	=	0.00 (ft)
Travel Time of Shallow Flow.....	=	0.00 (min)

TIME OF CONCENTRATION

Time of Concentration..... = 8.94 (min)

[RAINFALL DESCRIPTION]

Distribution Type.....	=	SCS II
Total Precipitation.....	=	4.00 (in)
Return Period.....	=	10 (yr)
Storm Duration.....	=	24.00 (hr)

[Unit Hydrograph Flow Values Time vs. Flow]
(The time interval is 10.0 min)

TIME INTV	TIME (min)	FLOW (cfs)
0	0.00	0.00
1	2.00	0.39
6	12.00	0.46
11	22.00	0.03

[Hydrograph Flow Values Time vs. Flow]
(The time interval is 10.0 min)

TIME INTV	TIME (min)	INCREMENTAL RAINFALL (in)	CUMULATIVE RAINFALL (in)	INCREMENTAL OUTFLOW (cfs)	DESIGN OUTFLOW (cfs)
190	380.0	0.00	0.34	0.00	0.00
195	390.0	0.00	0.36	0.00	0.00
200	400.0	0.00	0.37	0.00	0.01
205	410.0	0.00	0.38	0.00	0.01
210	420.0	0.00	0.40	0.00	0.01
215	430.0	0.00	0.41	0.00	0.01
220	440.0	0.00	0.42	0.00	0.01
225	450.0	0.00	0.44	0.00	0.01
230	460.0	0.00	0.45	0.00	0.01
235	470.0	0.00	0.47	0.00	0.01
240	480.0	0.00	0.48	0.00	0.01
245	490.0	0.00	0.50	0.00	0.01
250	500.0	0.00	0.51	0.00	0.01
255	510.0	0.00	0.53	0.00	0.01
260	520.0	0.00	0.55	0.00	0.01
265	530.0	0.00	0.57	0.00	0.01
270	540.0	0.00	0.59	0.00	0.02
275	550.0	0.00	0.61	0.00	0.02
280	560.0	0.00	0.63	0.00	0.02
285	570.0	0.00	0.65	0.00	0.02

TIME INTV	TIME (min)	INCREMENTAL RAINFALL (in)	CUMULATIVE RAINFALL (in)	INCREMENTAL OUTFLOW (cfs)	DESIGN OUTFLOW (cfs)
290	580.0	0.00	0.67	0.00	0.02
295	590.0	0.00	0.70	0.00	0.02
300	600.0	0.01	0.72	0.00	0.02
305	610.0	0.01	0.75	0.00	0.02
310	620.0	0.01	0.78	0.00	0.03
315	630.0	0.01	0.82	0.00	0.03
320	640.0	0.01	0.85	0.00	0.03
325	650.0	0.01	0.89	0.00	0.04
330	660.0	0.01	0.94	0.00	0.05
335	670.0	0.01	0.99	0.00	0.05
340	680.0	0.01	1.06	0.00	0.07
345	690.0	0.02	1.13	0.00	0.08
350	700.0	0.06	1.34	0.05	0.20
355	710.0	0.15	1.88	0.09	0.53
360	720.0	0.06	2.65	-0.02	1.04
365	730.0	0.02	2.77	-0.08	0.27
370	740.0	0.02	2.87	-0.01	0.14
375	750.0	0.01	2.94	-0.01	0.09
380	760.0	0.01	3.00	0.00	0.07
385	770.0	0.01	3.04	0.00	0.06
390	780.0	0.01	3.09	0.00	0.05
395	790.0	0.01	3.13	0.00	0.05
400	800.0	0.01	3.16	0.00	0.04
405	810.0	0.01	3.20	0.00	0.04
410	820.0	0.01	3.23	0.00	0.04
415	830.0	0.01	3.25	0.00	0.03
420	840.0	0.00	3.28	0.00	0.03
425	850.0	0.00	3.30	0.00	0.03
430	860.0	0.00	3.33	0.00	0.03
435	870.0	0.00	3.35	0.00	0.03
440	880.0	0.00	3.37	0.00	0.03
445	890.0	0.00	3.39	0.00	0.02
450	900.0	0.00	3.41	0.00	0.02
455	910.0	0.00	3.43	0.00	0.02
460	920.0	0.00	3.45	0.00	0.02
465	930.0	0.00	3.47	0.00	0.02
470	940.0	0.00	3.49	0.00	0.02
475	950.0	0.00	3.50	0.00	0.02
480	960.0	0.00	3.52	0.00	0.02
485	970.0	0.00	3.54	0.00	0.02
490	980.0	0.00	3.55	0.00	0.02
495	990.0	0.00	3.56	0.00	0.02
500	1000.0	0.00	3.58	0.00	0.02
505	1010.0	0.00	3.59	0.00	0.02
510	1020.0	0.00	3.61	0.00	0.01
515	1030.0	0.00	3.62	0.00	0.01
520	1040.0	0.00	3.63	0.00	0.01
525	1050.0	0.00	3.65	0.00	0.01
530	1060.0	0.00	3.66	0.00	0.01
535	1070.0	0.00	3.67	0.00	0.01
540	1080.0	0.00	3.68	0.00	0.01

TIME INTV	TIME (min)	INCREMENTAL RAINFALL (in)	CUMULATIVE RAINFALL (in)	INCREMENTAL OUTFLOW (cfs)	DESIGN OUTFLOW (cfs)
545	1090.0	0.00	3.70	0.00	0.01
550	1100.0	0.00	3.71	0.00	0.01
555	1110.0	0.00	3.72	0.00	0.01
560	1120.0	0.00	3.73	0.00	0.01
565	1130.0	0.00	3.74	0.00	0.01
570	1140.0	0.00	3.75	0.00	0.01
575	1150.0	0.00	3.76	0.00	0.01
580	1160.0	0.00	3.77	0.00	0.01
585	1170.0	0.00	3.78	0.00	0.01
590	1180.0	0.00	3.79	0.00	0.01
595	1190.0	0.00	3.80	0.00	0.01
600	1200.0	0.00	3.81	0.00	0.01
605	1210.0	0.00	3.82	0.00	0.01
610	1220.0	0.00	3.83	0.00	0.01
615	1230.0	0.00	3.83	0.00	0.01
620	1240.0	0.00	3.84	0.00	0.01
625	1250.0	0.00	3.85	0.00	0.01
630	1260.0	0.00	3.86	0.00	0.01
635	1270.0	0.00	3.87	0.00	0.01
640	1280.0	0.00	3.88	0.00	0.01
645	1290.0	0.00	3.88	0.00	0.01
650	1300.0	0.00	3.89	0.00	0.01
655	1310.0	0.00	3.90	0.00	0.01
660	1320.0	0.00	3.91	0.00	0.01
665	1330.0	0.00	3.92	0.00	0.01
670	1340.0	0.00	3.92	0.00	0.01
675	1350.0	0.00	3.93	0.00	0.01
680	1360.0	0.00	3.94	0.00	0.01
685	1370.0	0.00	3.95	0.00	0.01
690	1380.0	0.00	3.96	0.00	0.01
695	1390.0	0.00	3.96	0.00	0.01
700	1400.0	0.00	3.97	0.00	0.01
705	1410.0	0.00	3.98	0.00	0.01
710	1420.0	0.00	3.99	0.00	0.01
715	1430.0	0.00	3.99	0.00	0.01
720	1440.0	0.00	4.00	0.00	0.01

EDSC WATERSHED MODELING

HYDROGRAPH REPORT

RECORD NUMBER : 3

TYPE : COMPUTED FLOOD
DESCRIPTION : AREA - 3 POST DEV. 2yr

[HYDROGRAPH INFORMATION]

Peak Discharge	=	0.43	(cfs)
Volume	=	0.02	(acft)
Time Interval	=	2.00	(min)
Time to Peak	=	718.00	(min)
Time of Base	=	1466.26	(min)
Multiplication factor	=	1.00	

[UNIT HYDROGRAPH INFORMATION]

Unit hydrograph #	=	3	
Unit hydrograph type	=	CURVILINEAR UH	
Peak Discharge	=	1.16	(cfs)
Shape Factor	=	484.00	
Time Interval	=	2.00	(min)
Time to Peak	=	5.33	(min)
Time of Base	=	26.67	(min)
Rainfall Excess	=	1.00	(in)
Basin Lag Time	=	4.80	(min)

[BASIN DESCRIPTION]

Watershed Area	=	0.14	(ac)
Curve Number	=	79	

[TIME CONCENTRATION-USER DEFINED]
Time of Concentration..... = 8.00 (min)
[RAINFALL DESCRIPTION]

Distribution Type	=	SCS II	
Total Precipitation	=	4.00	(in)
Return Period	=	10	(yr)
Storm Duration	=	24.00	(hr)

[Unit Hydrograph Flow Values Time vs. Flow]
(The time interval is 10.0 min)

TIME INTV	TIME (min)	FLOW (cfs)
0	0.00	0.00
1	2.00	0.32
6	12.00	0.22
11	22.00	0.01

[Hydrograph Flow Values Time vs. Flow]
(The time interval is 10.0 min)

TIME INTV	TIME (min)	INCREMENTAL RAINFALL (in)	CUMULATIVE RAINFALL (in)	INCREMENTAL OUTFLOW (cfs)	DESIGN OUTFLOW (cfs)
325	650.0	0.01	0.89	0.00	0.00
330	660.0	0.01	0.94	0.00	0.01
335	670.0	0.01	0.99	0.00	0.01
340	680.0	0.01	1.06	0.00	0.01
345	690.0	0.02	1.13	0.00	0.02
350	700.0	0.06	1.34	0.02	0.05
355	710.0	0.15	1.88	0.04	0.18
360	720.0	0.06	2.65	-0.01	0.43
365	730.0	0.02	2.77	-0.03	0.10
370	740.0	0.02	2.87	0.00	0.05
375	750.0	0.01	2.94	0.00	0.04
380	760.0	0.01	3.00	0.00	0.03
385	770.0	0.01	3.04	0.00	0.03
390	780.0	0.01	3.09	0.00	0.02
395	790.0	0.01	3.13	0.00	0.02
400	800.0	0.01	3.16	0.00	0.02
405	810.0	0.01	3.20	0.00	0.02
410	820.0	0.01	3.23	0.00	0.02
415	830.0	0.01	3.25	0.00	0.01
420	840.0	0.00	3.28	0.00	0.01
425	850.0	0.00	3.30	0.00	0.01
430	860.0	0.00	3.33	0.00	0.01
435	870.0	0.00	3.35	0.00	0.01
440	880.0	0.00	3.37	0.00	0.01
445	890.0	0.00	3.39	0.00	0.01

TIME INTV	TIME (min)	INCREMENTAL RAINFALL (in)	CUMULATIVE RAINFALL (in)	INCREMENTAL OUTFLOW (cfs)	DESIGN OUTFLOW (cfs)
450	900.0	0.00	3.41	0.00	0.01
455	910.0	0.00	3.43	0.00	0.01
460	920.0	0.00	3.45	0.00	0.01
465	930.0	0.00	3.47	0.00	0.01
470	940.0	0.00	3.49	0.00	0.01
475	950.0	0.00	3.50	0.00	0.01
480	960.0	0.00	3.52	0.00	0.01
485	970.0	0.00	3.54	0.00	0.01
490	980.0	0.00	3.55	0.00	0.01
495	990.0	0.00	3.56	0.00	0.01
500	1000.0	0.00	3.58	0.00	0.01
505	1010.0	0.00	3.59	0.00	0.01
510	1020.0	0.00	3.61	0.00	0.01
515	1030.0	0.00	3.62	0.00	0.01
520	1040.0	0.00	3.63	0.00	0.01
525	1050.0	0.00	3.65	0.00	0.00
530	1060.0	0.00	3.66	0.00	0.00
535	1070.0	0.00	3.67	0.00	0.00
540	1080.0	0.00	3.68	0.00	0.00
545	1090.0	0.00	3.70	0.00	0.00
550	1100.0	0.00	3.71	0.00	0.00
555	1110.0	0.00	3.72	0.00	0.00
560	1120.0	0.00	3.73	0.00	0.00

EDSC WATERSHED MODELING

HYDROGRAPH REPORT

RECORD NUMBER : 4

TYPE : COMBINE
DESCRIPTION : COMBINED POST DEV. 2yr

[HYDROGRAPH INFORMATION]

```
Peak Discharge..............................  =        1.74 (cfs)
  Volume.....................................  =        0.09 (acft)
  Time Interval..............................  =        2.00 (min)
  Time to Peak...............................  =      720.00 (min)
  Time of Base...............................  =     1446.00 (min)
```

[COMBINE HYDROGRAPH RECORD #]
HYDROGRAPH # 1 TYPE : COMPUTED FLOOD
DESCRIPTION : AREA - 1 POST DEV. 2yr

```
Peak Discharge........................ =        0.29 (cfs)
Time to Peak......................... =      722.00 (min)
Time Interval........................ =        2.00 (min)
HYDROGRAPH #   2    TYPE : COMPUTED FLOOD
```

DESCRIPTION : AREA - 2 POST DEV. 2yr

Peak Discharge..... = 1.05 (cfs)

Time to Peak..... = 718.00 (min)

Time Interval..... = 2.00 (min)

HYDROGRAPH # 3 TYPE : COMPUTED FLOOD

DESCRIPTION : AREA - 3 POST DEV. 2yr

Peak Discharge..... = 0.43 (cfs)

Time to Peak..... = 718.00 (min)

Time Interval..... = 2.00 (min)

[Combine Hydrograph Flow Values]
(The time interval is 10.0 min)

INTV #	TIME (min)	OUTFLOW (cfs)
191	382.00	0.00
196	392.00	0.00
201	402.00	0.00
206	412.00	0.01
211	422.00	0.01
216	432.00	0.01
221	442.00	0.01
226	452.00	0.01
231	462.00	0.01
236	472.00	0.01
241	482.00	0.01
246	492.00	0.01
251	502.00	0.01
256	512.00	0.01
261	522.00	0.01
266	532.00	0.01
271	542.00	0.02
276	552.00	0.02
281	562.00	0.02
286	572.00	0.02
291	582.00	0.02
296	592.00	0.02
301	602.00	0.02
306	612.00	0.02
311	622.00	0.03
316	632.00	0.03
321	642.00	0.04
326	652.00	0.04
331	662.00	0.06
336	672.00	0.07
341	682.00	0.09
346	692.00	0.11
351	702.00	0.36
356	712.00	1.01
361	722.00	1.53
366	732.00	0.44
371	742.00	0.24
376	752.00	0.16

[Combine Hydrograph Flow Values]
(The time interval is 10.0 min)

INTV #	TIME (min)	OUTFLOW (cfs)
381	762.00	0.13
386	772.00	0.11
391	782.00	0.10
396	792.00	0.08
401	802.00	0.08
406	812.00	0.07
411	822.00	0.06
416	832.00	0.06
421	842.00	0.05
426	852.00	0.05
431	862.00	0.05
436	872.00	0.05
441	882.00	0.04
446	892.00	0.04
451	902.00	0.04
456	912.00	0.04
461	922.00	0.04
466	932.00	0.04
471	942.00	0.03
476	952.00	0.03
481	962.00	0.03
486	972.00	0.03
491	982.00	0.03
496	992.00	0.03
501	1002.00	0.03
506	1012.00	0.03
511	1022.00	0.02
516	1032.00	0.02
521	1042.00	0.02
526	1052.00	0.02
531	1062.00	0.02
536	1072.00	0.02
541	1082.00	0.02
546	1092.00	0.02
551	1102.00	0.02
556	1112.00	0.01
561	1122.00	0.02
566	1132.00	0.01
571	1142.00	0.01
576	1152.00	0.01
581	1162.00	0.01
586	1172.00	0.01
591	1182.00	0.01
596	1192.00	0.01
601	1202.00	0.01
606	1212.00	0.01
611	1222.00	0.01
616	1232.00	0.01
621	1242.00	0.01
626	1252.00	0.01
631	1262.00	0.01
636	1272.00	0.01

[Combine Hydrograph Flow Values]
(The time interval is 10.0 min)

INTV #	TIME (min)	OUTFLOW (cfs)
641	1282.00	0.01
646	1292.00	0.01
651	1302.00	0.01
656	1312.00	0.01
661	1322.00	0.01
666	1332.00	0.01
671	1342.00	0.01
676	1352.00	0.01
681	1362.00	0.01
686	1372.00	0.01
691	1382.00	0.01
696	1392.00	0.01
701	1402.00	0.01
706	1412.00	0.01
711	1422.00	0.01
716	1432.00	0.01
721	1442.00	0.01

EDSC WATERSHED MODELING

HYDROGRAPH REPORT

RECORD NUMBER : 5

```
TYPE            : RESER STOR. IND
DESCRIPTION     : ROUTED POST DEV. 2yr
```

[HYDROGRAPH INFORMATION]

```
Peak Discharge............................ =        0.64 (cfs)
Volume.................................... =        0.07 (acft)
Time Interval............................. =        2.00 (min)
Time to Peak.............................. =      728.00 (min)
Time of Base.............................. =     1536.00 (min)
Peak Elevation............................ =       96.57 (ft)
```

[RESERVOIR STRUCTURE INFORMATION]
Reservoir #..... = 1
Description..... = BASIN - 1
Storage type..... = MAN STAGE/AREA
Max storage..... = 3137.64 Cuft
Discharge type..... = COMP STAGE/DIS
Max discharge..... = 4.36 cfs

[RESERVOIR INFORMATION]
Reservoir #..... = 1
Reservoir Description..... = BASIN – 1

[INFLOW HYDROGRAPH INFORMATION]
Hydrograph #..... = 4
Hydrograph Description..... = COMBINED POST DEV. 2yr

[Computation of Reservoir Outflow Table of Storage Indication Method]
(The time interval is 10.0 min)

INTV#	TIME (min)	INFLOW (cfs)	EQUATION 0.5(I1+I2)dt	+	S1-0.5(O1)dt	=	S2+0.5(O2)dt	OUTFLOW O2(cfs)	STORAGE (cuft)	ELEVATION (ft)
354	708.0	0.66	72.30	+	635.76	=	708.07	0.02	706.72	96.13
355	710.0	0.81	88.43	+	705.38	=	793.80	0.05	790.70	96.16
360	720.0	1.74	207.80	+	1304.55	=	1512.35	0.34	1491.82	96.44
365	730.0	0.53	73.19	+	1794.40	=	1867.59	0.64	1829.31	96.56
370	740.0	0.26	32.77	+	1705.94	=	1738.71	0.47	1710.49	96.52
375	750.0	0.18	22.17	+	1597.10	=	1619.27	0.37	1597.03	96.48
380	760.0	0.13	15.95	+	1478.19	=	1494.14	0.34	1473.90	96.43
385	770.0	0.11	13.58	+	1358.21	=	1371.80	0.30	1353.67	96.39
390	780.0	0.10	12.02	+	1251.19	=	1263.22	0.26	1247.41	96.35
395	790.0	0.09	10.52	+	1158.37	=	1168.89	0.23	1155.11	96.31
400	800.0	0.08	9.66	+	1079.70	=	1089.36	0.19	1077.82	96.28
405	810.0	0.07	8.70	+	1018.94	=	1027.64	0.16	1018.08	96.26
410	820.0	0.07	7.93	+	971.67	=	979.60	0.13	971.59	96.24
415	830.0	0.06	7.24	+	934.69	=	941.93	0.11	935.13	96.22
420	840.0	0.06	6.65	+	905.63	=	912.28	0.10	906.43	96.21
425	850.0	0.05	6.07	+	882.31	=	888.38	0.08	883.30	96.20
430	860.0	0.05	5.82	+	863.45	=	869.28	0.08	864.64	96.19
435	870.0	0.05	5.63	+	847.11	=	852.74	0.07	848.44	96.19
440	880.0	0.04	5.39	+	833.25	=	838.63	0.07	834.62	96.18
445	890.0	0.04	5.15	+	820.49	=	825.64	0.06	821.89	96.18
450	900.0	0.04	4.97	+	809.52	=	814.49	0.06	810.97	96.17

[Computation of Reservoir Outflow Table of Storage Indication Method]
(The time interval is 10.0 min)

INTV#	TIME (min)	INFLOW (cfs)	EQUATION 0.5(I1+I2)dt	+	S1-0.5(O1)dt	=	S2+0.5(O2)dt	OUTFLOW O2(cfs)	STORAGE (cuft)	ELEVATION (ft)
455	910.0	0.04	4.78	+	799.49	=	804.26	0.06	800.95	96.17
460	920.0	0.04	4.48	+	790.53	=	795.02	0.05	791.89	96.16
465	930.0	0.04	4.30	+	781.92	=	786.22	0.05	783.28	96.16
470	940.0	0.03	4.13	+	774.35	=	778.48	0.05	775.70	96.16
475	950.0	0.03	3.71	+	767.05	=	770.75	0.04	768.13	96.15
480	960.0	0.03	3.65	+	759.99	=	763.65	0.04	761.17	96.15
485	970.0	0.03	3.34	+	753.50	=	756.84	0.04	754.50	96.15
490	980.0	0.03	3.33	+	747.24	=	750.57	0.04	748.36	96.14
495	990.0	0.03	3.16	+	741.94	=	745.10	0.04	743.00	96.14
500	1000.0	0.03	3.22	+	737.29	=	740.51	0.03	738.50	96.14
505	1010.0	0.03	2.98	+	732.97	=	735.95	0.03	734.04	96.14
510	1020.0	0.02	2.99	+	729.16	=	732.15	0.03	730.31	96.14
515	1030.0	0.02	2.86	+	725.71	=	728.57	0.03	726.81	96.14
520	1040.0	0.02	2.75	+	722.49	=	725.24	0.03	723.54	96.13
525	1050.0	0.02	2.64	+	719.26	=	721.90	0.03	720.27	96.13
530	1060.0	0.02	2.23	+	716.06	=	718.29	0.03	716.73	96.13
535	1070.0	0.02	2.10	+	711.71	=	713.81	0.02	712.35	96.13
540	1080.0	0.02	2.09	+	708.10	=	710.19	0.02	708.80	96.13
545	1090.0	0.02	1.96	+	704.74	=	706.70	0.02	705.38	96.13
550	1100.0	0.02	1.95	+	701.82	=	703.77	0.02	702.51	96.13
555	1110.0	0.02	1.82	+	699.04	=	700.86	0.02	699.66	96.12
560	1120.0	0.01	1.82	+	696.48	=	698.30	0.02	697.15	96.12
565	1130.0	0.01	1.50	+	694.10	=	695.59	0.02	694.50	96.12
570	1140.0	0.01	1.47	+	690.85	=	692.32	0.02	691.30	96.12

[Computation of Reservoir Outflow Table of Storage Indication Method]
(The time interval is 10.0 min)

INTV#	TIME (min)	INFLOW (cfs)	0.5(I1+I2)dt	+	EQUATION S1-0.5(O1)dt	=	S2+0.5(O2)dt	OUTFLOW O2(cfs)	STORAGE (cuft)	ELEVATION (ft)
575	1150.0	0.01	1.22	+	687.39	=	688.61	0.02	687.66	96.12
580	1160.0	0.01	1.17	+	684.23	=	685.40	0.01	684.52	96.12
585	1170.0	0.01	1.13	+	681.46	=	682.59	0.01	681.76	96.12
590	1180.0	0.01	1.08	+	679.02	=	680.11	0.01	679.33	96.12
595	1190.0	0.01	1.10	+	676.91	=	678.01	0.01	677.27	96.11
600	1200.0	0.01	1.00	+	674.99	=	675.99	0.01	675.30	96.11
605	1210.0	0.01	1.02	+	673.26	=	674.29	0.01	673.63	96.11
610	1220.0	0.01	0.95	+	671.75	=	672.70	0.01	672.07	96.11
615	1230.0	0.01	0.99	+	670.45	=	671.44	0.01	670.84	96.11
620	1240.0	0.01	0.97	+	669.42	=	670.39	0.01	669.82	96.11
625	1250.0	0.01	0.96	+	668.50	=	669.46	0.01	668.91	96.11
630	1260.0	0.01	0.94	+	667.69	=	668.63	0.01	668.09	96.11
635	1270.0	0.01	0.92	+	667.06	=	667.99	0.01	667.46	96.11
640	1280.0	0.01	0.96	+	666.53	=	667.50	0.01	666.98	96.11
645	1290.0	0.01	0.89	+	666.02	=	666.91	0.01	666.41	96.11
650	1300.0	0.01	0.93	+	665.54	=	666.47	0.01	665.97	96.11
655	1310.0	0.01	0.91	+	665.17	=	666.08	0.01	665.59	96.11
660	1320.0	0.01	0.90	+	664.79	=	665.69	0.01	665.21	96.11
665	1330.0	0.01	0.88	+	664.42	=	665.30	0.01	664.82	96.11
670	1340.0	0.01	0.86	+	664.15	=	665.01	0.01	664.54	96.11
675	1350.0	0.01	0.91	+	663.90	=	664.81	0.01	664.34	96.11

[Computation of Reservoir Outflow Table of Storage Indication Method]

(The time interval is 10.0 min)

INTV#	TIME (min)	INFLOW (cfs)	EQUATION 0.5(I1+I2)dt	+	S1-0.5(O1)dt	=	S2+0.5(O2)dt	OUTFLOW O2(cfs)	STORAGE (cuft)	ELEVATION (ft)
680	1360.0	0.01	0.83	+	663.63	=	664.45	0.01	664.00	96.11
685	1370.0	0.01	0.87	+	663.33	=	664.21	0.01	663.76	96.11
690	1380.0	0.01	0.85	+	663.12	=	663.98	0.01	663.53	96.11
695	1390.0	0.01	0.84	+	662.87	=	663.71	0.01	663.27	96.11
700	1400.0	0.01	0.82	+	662.60	=	663.42	0.01	662.99	96.11
705	1410.0	0.01	0.81	+	662.41	=	663.22	0.01	662.79	96.11
710	1420.0	0.01	0.79	+	662.18	=	662.97	0.01	662.55	96.11
715	1430.0	0.01	0.77	+	661.93	=	662.70	0.01	662.28	96.11
720	1440.0	0.01	0.81	+	661.69	=	662.51	0.01	662.09	96.11
725	1450.0	0.00	0.00	+	660.41	=	660.41	0.01	660.04	96.11
730	1460.0	0.00	0.00	+	656.98	=	656.98	0.01	656.68	96.11
735	1470.0	0.00	0.00	+	654.20	=	654.20	0.00	653.95	96.10
740	1480.0	0.00	0.00	+	651.93	=	651.93	0.00	651.74	96.10
745	1490.0	0.00	0.00	+	650.10	=	650.10	0.00	649.94	96.10
750	1500.0	0.00	0.00	+	648.61	=	648.61	0.00	648.48	96.10
755	1510.0	0.00	0.00	+	647.40	=	647.40	0.00	647.30	96.10
760	1520.0	0.00	0.00	+	646.42	=	646.42	0.00	646.33	96.10
765	1530.0	0.00	0.00	+	645.62	=	645.62	0.00	645.55	96.10

EDSC WATERSHED MODELING

RESERVOIR REPORT

RECORD NUMBER : 1

STORAGE TYPE : MAN STAGE/AREA
DISCHARGE TYPE : COMP STAGE/DIS
DESCRIPTION : BASIN - 1

[RATING CURVE LIMIT]

```
Minimum Elevation........................  =        91.00 (ft)
Maximum Elevation........................  =        97.00 (ft)
Elevation Increment......................  =         0.10 (ft)
```

[STAGE STORAGE INFORMATION]
Input file = NULL
Output file = NULL

[Manual Contour Area vs. Elevation]

ELEVATION (ft)	CONTOUR AREA (sqft)
95.00	80.78
95.25	204.91
95.50	332.57
95.75	463.76
95.95	598.48
96.00	2221.72
96.25	2469.04
96.50	2719.89
96.75	2974.27
97.00	3232.19

[STAGE DISCHARGE INFORMATION]

OUTLET STRUCTURE:

```
STR #       :   1
TYPE        : STAND PIPE WEIR
```

DESCRIPTION : PRINCIPLE SPILLWAY

```
STR #       :   2
TYPE        : STAND PIPE WEIR
```

DESCRIPTION : EMERGENCY SPILLWAY

[Reservoir Discharge Value vs. Stage]
(the elevation increment is 0.5)

STAGE (ft)	ELEVATION (ft)	CONTOUR AREA (sqft)	STORAGE (cuft)	DISCHARGE (cfs)
0.00	91.00	80.78	0.00	0.00
0.50	91.50	0.00	0.00	0.00
1.00	92.00	0.00	0.00	0.00
1.50	92.50	0.00	0.00	0.00
2.00	93.00	0.00	0.00	0.00
2.50	93.50	0.00	0.00	0.00
3.00	94.00	0.00	0.00	0.00
3.50	94.50	0.00	0.00	0.00
4.00	95.00	0.00	0.00	0.00
4.50	95.50	332.57	98.87	0.00
5.00	96.00	2221.72	415.07	0.00
5.50	96.50	2719.89	1650.05	0.38
6.00	97.00	3232.19	3137.64	4.36

EDSC WATERSHED MODELING

OUTLET STRUCTURE REPORT

RECORD NUMBER : 1

```
TYPE            : STAND PIPE WEIR
DESCRIPTION     : PRINCIPLE SPILLWAY
```

[RATING CURVE LIMIT]

```
Minimum Elevation........................  =        91.00 (ft)
Maximum Elevation........................  =        97.00 (ft)
Elevation Increment......................  =         0.10 (ft)
```

[STANDPIPE INFORMATION]
CIRC. STAND PIPE WEIR DESCRIPTION :
[OUTLET STRUCTURE INFORMATION]

```
Radius...................................  =         0.50 (ft)
Crest Length.............................  =         3.14 (ft)
Crest Elevation..........................  =        96.50 (ft)
Fraction Open Area.......................  =      1.00000
```

[RECTANGULAR STAND PIPE EQUATION]
ORIFICE EQ: Q = Co*A(2gh)^0.5

```
WEIR    EQ:  Q = Cw*L*H^exp
Coefficient Co ..........................  =      0.60000
Coefficient Cw ..........................  =      3.33000
Exponential..............................  =      1.50000
```

[DEFINITIONS]

H = Headwater depth above inlet control section invert, (ft)
A = Wetted area, (sqft)
L = Crest length, (ft)

[ORIFICE INFORMATION]

1 SUBRECORD :
CIRCULAR DESCRIPTION :

[OUTLET STRUCTURE INFORMATION]

```
Radius..................................  =          0.12 (ft)
Invert Elevation........................  =         96.08 (ft)
Coefficient Co..........................  =       0.60000
# of Openings...........................  =          3
```

[CIRCULAR ORIFICE EQUATION]

Q = Co*A*[2gh]/k]^0.5
A = Wetted area, (sqft)
K = 1

[CULVERT INFORMATION]

DESCRIPTION : CIRCULAR PIPE /15" HDPE [OUTLET STRUCTURE INFORMATION]

```
Circular Radius.........................  =       0.62500 (ft)
Culvert Invert Elevation................  =      91.00000 (ft)
Pipe Length.............................  =      15.00000 (ft)
Slope...................................  =       0.03000
Manning's N-value.......................  =       0.01300
Orifice Coefficient.....................  =       0.60000
Tailwater...............................  =      92.25000 (ft)
Number barrels..........................  =          1
```

[UNSUBMERGED EQUATION]

H/Diam = Hc/Diam + K *(Q/A*Diam^0.5))^M - 0.5*S^2

```
Coefficient K...........................  =        0.00180
coefficient M...........................  =        2.50000
```

[SUBMERGED EQUATION]

H/Diam = c*(Q/(A*Diam^0.5))^Z + Y - 0.5*S^2

```
Coefficient c...........................  =        0.03000
Coefficient Y...........................  =        0.74000
```

[DEFINITIONS]

H = Headwater depth above inlet control section invert, (ft)
Diam = Inerior height of culvert barrel, (ft)

```
Hc   = Specific head at critical depth (dc + Vc^2/2g), (ft)
Q    = Discharge, (cuft/s)
A    = Full cross sectional area of culvert barrel, (sqft)
S    = Culvert barrel slope, (ft/ft)
```

[Stand Pipe Discharge Value vs. Stage]
(the elevation increment is 0.5)

STAGE (ft)	ELEVATION (cfs)	ORIFICE (cfs)	WEIR (cfs)	STAND PIPE (cfs)	CULVERT	TOTAL FLOW
0.00	91.00	0.00	0.00	0.00	0.00	0.00
0.50	91.50	0.00	0.00	0.00	0.00	0.00
1.00	92.00	0.00	0.00	0.00	0.00	0.00
1.50	92.50	0.00	0.00	0.00	3.52	0.00
2.00	93.00	0.00	0.00	0.00	6.11	0.00
2.50	93.50	0.00	0.00	0.00	7.89	0.00
3.00	94.00	0.00	0.00	0.00	9.33	0.00
3.50	94.50	0.00	0.00	0.00	10.58	0.00
4.00	95.00	0.00	0.00	0.00	11.70	0.00
4.50	95.50	0.00	0.00	0.00	12.72	0.00
5.00	96.00	0.00	0.00	0.00	13.66	0.00
5.50	96.50	0.38	0.00	0.00	14.55	0.38
6.00	97.00	0.63	0.00	2.67	15.38	3.30

[Weir Discharge Value vs. Stage]
(the elevation increment is 0.5)

STAGE	ELEVATION (ft)	WEIR1 (cfs)	WEIR2 (cfs)	WEIR3 (cfs)	WEIR4 (cfs)	TOTAL (cfs)
0.00	91.00	0.00	0.00	0.00	0.00	0.00
0.50	91.50	0.00	0.00	0.00	0.00	0.00
1.00	92.00	0.00	0.00	0.00	0.00	0.00
1.50	92.50	0.00	0.00	0.00	0.00	0.00
2.00	93.00	0.00	0.00	0.00	0.00	0.00
2.50	93.50	0.00	0.00	0.00	0.00	0.00
3.00	94.00	0.00	0.00	0.00	0.00	0.00
3.50	94.50	0.00	0.00	0.00	0.00	0.00
4.00	95.00	0.00	0.00	0.00	0.00	0.00
4.50	95.50	0.00	0.00	0.00	0.00	0.00
5.00	96.00	0.00	0.00	0.00	0.00	0.00
5.50	96.50	0.00	0.00	0.00	0.00	0.00
6.00	97.00	0.00	0.00	0.00	0.00	0.00

[Orifices Discharge Value vs. Stage]
(the elevation increment is 0.5)

STAGE	ELEVATION (ft)	ORIF1 (cfs)	ORIF2 (cfs)	ORIF3 (cfs)	ORIF4 (cfs)	TOTAL (cfs)
0.00	91.00	0.00	0.00	0.00	0.00	0.00
0.50	91.50	0.00	0.00	0.00	0.00	0.00
1.00	92.00	0.00	0.00	0.00	0.00	0.00
1.50	92.50	0.00	0.00	0.00	0.00	0.00
2.00	93.00	0.00	0.00	0.00	0.00	0.00
2.50	93.50	0.00	0.00	0.00	0.00	0.00
3.00	94.00	0.00	0.00	0.00	0.00	0.00
3.50	94.50	0.00	0.00	0.00	0.00	0.00
4.00	95.00	0.00	0.00	0.00	0.00	0.00
4.50	95.50	0.00	0.00	0.00	0.00	0.00
5.00	96.00	0.00	0.00	0.00	0.00	0.00
5.50	96.50	0.38	0.00	0.00	0.00	0.38
6.00	97.00	0.63	0.00	0.00	0.00	0.63

EDSC WATERSHED MODELING

OUTLET STRUCTURE REPORT

RECORD NUMBER : 2

```
TYPE            : STAND PIPE WEIR
DESCRIPTION     : EMERGENCY SPILLWAY
```

[RATING CURVE LIMIT]

```
Minimum Elevation........................  =        91.00 (ft)
Maximum Elevation........................  =        97.00 (ft)
Elevation Increment......................  =         0.10 (ft)
```

[STANDPIPE INFORMATION]
RECT. STAND PIPE WEIR DESCRIPTION :
[OUTLET STRUCTURE INFORMATION]

```
Width....................................  =         2.50 (ft)
Height...................................  =         2.50 (ft)
Crest Length.............................  =        10.00 (ft)
Crest Elevation..........................  =        96.90 (ft)
Fraction Open Area.......................  =      0.60000
```

[RECTANGULAR STAND PIPE EQUATION]
ORIFICE EQ: Q = Co*A(2gh)^0.5

```
WEIR    EQ:  Q = Cw*L*H^exp
Coefficient Co ..........................  =      0.60000
Coefficient Cw ..........................  =      3.33000
Exponential..............................  =      1.50000
```

[DEFINITIONS]

```
H   = Headwater depth above inlet control section invert, (ft)
A   = Wetted area, (sqft)
L   = Crest length, (ft)
```

[CULVERT INFORMATION]

DESCRIPTION : CIRCULAR PIPE /15" HDPE [OUTLET STRUCTURE INFORMATION]

```
Circular Radius..........................  =       0.62500 (ft)
Culvert Invert Elevation.................  =      91.00000 (ft)
Pipe Length..............................  =      15.00000 (ft)
Slope....................................  =       0.03000
Manning's N-value........................  =       0.01300
Orifice Coefficient......................  =       0.60000
Tailwater................................  =      92.25000 (ft)
Number barrels...........................  =             1
```

[UNSUBMERGED EQUATION]
H/Diam = Hc/Diam + K *(Q/A*Diam^0.5))^M - 0.5*S^2

```
Coefficient K............................  =       0.00180
coefficient M............................  =       2.50000
```

[SUBMERGED EQUATION]
H/Diam = c*(Q/(A*Diam^0.5))^Z + Y - 0.5*S^2

Coefficient c..... = 0.03000

Coefficient Y..... = 0.74000

[DEFINITIONS]
H = Headwater depth above inlet control section invert, (ft)
Diam = Inerior height of culvert barrel, (ft)

Hc = Specific head at critical depth (dc + Vc^2/2g), (ft)
Q = Discharge, (cuft/s)
A = Full cross sectional area of culvert barrel, (sqft)
S = Culvert barrel slope, (ft/ft)

[Stand Pipe Discharge Value vs. Stage]
(the elevation increment is 0.5)

STAGE	ELEVATION (ft)	ORIFICE (cfs)	WEIR (cfs)	STAND PIPE (cfs)	CULVERT (cfs)	TOTAL FLOW (cfs)
0.00	91.00	0.00	0.00	0.00	0.00	0.00
0.50	91.50	0.00	0.00	0.00	0.00	0.00
1.00	92.00	0.00	0.00	0.00	0.00	0.00
1.50	92.50	0.00	0.00	0.00	3.52	0.00
2.00	93.00	0.00	0.00	0.00	6.11	0.00
2.50	93.50	0.00	0.00	0.00	7.89	0.00
3.00	94.00	0.00	0.00	0.00	9.33	0.00
3.50	94.50	0.00	0.00	0.00	10.58	0.00
4.00	95.00	0.00	0.00	0.00	11.70	0.00
4.50	95.50	0.00	0.00	0.00	12.72	0.00
5.00	96.00	0.00	0.00	0.00	13.66	0.00
5.50	96.50	0.00	0.00	0.00	14.55	0.00
6.00	97.00	0.00	0.00	1.05	15.38	1.05

[Weir Discharge Value vs. Stage]
(the elevation increment is 0.5)

STAGE	ELEVATION (ft)	WEIR1 (cfs)	WEIR2 (cfs)	WEIR3 (cfs)	WEIR4 (cfs)	TOTAL (cfs)
0.00	91.00	0.00	0.00	0.00	0.00	0.00
0.50	91.50	0.00	0.00	0.00	0.00	0.00
1.00	92.00	0.00	0.00	0.00	0.00	0.00
1.50	92.50	0.00	0.00	0.00	0.00	0.00
2.00	93.00	0.00	0.00	0.00	0.00	0.00

[Weir Discharge Value vs. Stage]

(the elevation increment is 0.5)

STAGE	ELEVATION (ft)	WEIR1 (cfs)	WEIR2 (cfs)	WEIR3 (cfs)	WEIR4 (cfs)	TOTAL (cfs)
2.50	93.50	0.00	0.00	0.00	0.00	0.00
3.00	94.00	0.00	0.00	0.00	0.00	0.00
3.50	94.50	0.00	0.00	0.00	0.00	0.00
4.00	95.00	0.00	0.00	0.00	0.00	0.00
4.50	95.50	0.00	0.00	0.00	0.00	0.00
5.00	96.00	0.00	0.00	0.00	0.00	0.00
5.50	96.50	0.00	0.00	0.00	0.00	0.00
6.00	97.00	0.00	0.00	0.00	0.00	0.00

[Orifices Discharge Value vs. Stage]
(the elevation increment is 0.5)

STAGE	ELEVATION (ft)	ORIF1 (cfs)	ORIF2 (cfs)	ORIF3 (cfs)	ORIF4 (cfs)	TOTAL (cfs)
0.00	91.00	0.00	0.00	0.00	0.00	0.00
0.50	91.50	0.00	0.00	0.00	0.00	0.00
1.00	92.00	0.00	0.00	0.00	0.00	0.00
1.50	92.50	0.00	0.00	0.00	0.00	0.00
2.00	93.00	0.00	0.00	0.00	0.00	0.00
2.50	93.50	0.00	0.00	0.00	0.00	0.00
3.00	94.00	0.00	0.00	0.00	0.00	0.00
3.50	94.50	0.00	0.00	0.00	0.00	0.00
4.00	95.00	0.00	0.00	0.00	0.00	0.00
4.50	95.50	0.00	0.00	0.00	0.00	0.00
5.00	96.00	0.00	0.00	0.00	0.00	0.00
5.50	96.50	0.00	0.00	0.00	0.00	0.00
6.00	97.00	0.00	0.00	0.00	0.00	0.00

APPENDIX G

POST DEVELOPMENT 10YR STORM

EDSC WATERSHED MODELING

HYDROGRAPH REPORT

RECORD NUMBER : 1

```
TYPE            : COMPUTED FLOOD
DESCRIPTION     : AREA - 1 POST DEV. 10yr
```

[HYDROGRAPH INFORMATION]

```
Peak Discharge............................  =          0.53 (cfs)
Volume....................................  =          0.03 (acft)
Time Interval.............................  =          2.00 (min)
Time to Peak..............................  =        722.00 (min)
Time of Base..............................  =       1486.77 (min)
Multiplication factor.....................  =          1.00
```

[UNIT HYDROGRAPH INFORMATION]

Unit hydrograph #..... = 1
Unit hydrograph type..... = CURVILINEAR UH

Peak Discharge.....	=	0.51	(cfs)
Shape Factor.....	=	484.00	
Time Interval.....	=	2.00	(min)
Time to Peak.....	=	9.65	(min)
Time of Base.....	=	48.26	(min)
Rainfall Excess.....	=	1.00	(in)
Basin Lag Time.....	=	8.69	(min)

[BASIN DESCRIPTION]

Watershed Area.....	=	0.11	(ac)
Curve Number.....	=	80	

[TIME CONCENTRATION-TR-55]

SHEET FLOW

Manning's Roughness Coef. (n).....	=	0.23930	
Flow Length (L).....	=	180.00	(ft)
2-yr 24-hr Rainfall ®.....	=	4.00	(in)
Land Slope (S).....	=	0.04700	
Travel Time of Sheet Flow.....	=	14.48	(min)

SHALLOW FLOW

K_Coef (surface description) (K).....	=	0.00000	
Watercourse Slope (S).....	=	0.00000	
Velocity (V).....	=	0.00	(ft/s)
Flow Length (L).....	=	0.00	(ft)
Travel Time of Shallow Flow.....	=	0.00	(min)

CHANNEL FLOW

Hydraulic Radius ®.....	=	0.00	(ft)
Channel Slope (S).....	=	0.00000	
Manning's Roughness Coef. (n).....	=	0.20000	
Channel Velocity (V).....	=	0.00	(ft/s)
Flow Length (L).....	=	0.00	(ft)
Travel Time of Shallow Flow.....	=	0.00	(min)

TIME OF CONCENTRATION

Time of Concentration..... = 14.48 (min)

[RAINFALL DESCRIPTION]

```
Distribution Type........................  =          SCS II
Total Precipitation......................  =            6.00 (in)
Return Period............................  =           10    (yr)
Storm Duration...........................  =           24.00 (hr)
```

[Unit Hydrograph Flow Values Time vs. Flow]
(The time interval is 10.0 min)

TIME INTV (min)	TIME (cfs)	FLOW
0	0.00	0.00
1	2.00	0.05
6	12.00	0.46
11	22.00	0.09
16	32.00	0.02
21	42.00	0.00

[Hydrograph Flow Values Time vs. Flow]
(The time interval is 10.0 min)

TIME INTV	TIME (min)	INCREMENTAL RAINFALL (in)	CUMULATIVE RAINFALL (in)	INCREMENTAL OUTFLOW (cfs)	DESIGN OUTFLOW (cfs)
295	590.0	0.01	1.05	0.00	0.00
300	600.0	0.01	1.09	0.00	0.00
305	610.0	0.01	1.13	0.00	0.01
310	620.0	0.01	1.17	0.00	0.01
315	630.0	0.01	1.22	0.00	0.01
320	640.0	0.01	1.28	0.00	0.01
325	650.0	0.01	1.34	0.00	0.01
330	660.0	0.01	1.41	0.00	0.02
335	670.0	0.02	1.49	0.00	0.02
340	680.0	0.02	1.59	0.00	0.02
345	690.0	0.02	1.70	0.00	0.03
350	700.0	0.10	2.02	0.01	0.06
355	710.0	0.23	2.81	0.04	0.20
360	720.0	0.09	3.98	0.06	0.51
365	730.0	0.03	4.16	-0.07	0.30
370	740.0	0.03	4.30	-0.02	0.13
375	750.0	0.02	4.41	-0.01	0.08
380	760.0	0.02	4.49	0.00	0.05
385	770.0	0.01	4.57	0.00	0.04
390	780.0	0.01	4.63	0.00	0.04
395	790.0	0.01	4.69	0.00	0.03
400	800.0	0.01	4.74	0.00	0.03
405	810.0	0.01	4.79	0.00	0.03
410	820.0	0.01	4.84	0.00	0.02
415	830.0	0.01	4.88	0.00	0.02
420	840.0	0.01	4.92	0.00	0.02
425	850.0	0.01	4.96	0.00	0.02
430	860.0	0.01	4.99	0.00	0.02

[Hydrograph Flow Values Time vs. Flow]

(The time interval is 10.0 min)

TIME INTV	TIME (min)	INCREMENTAL RAINFALL (in)	CUMULATIVE RAINFALL (in)	INCREMENTAL OUTFLOW (cfs)	DESIGN OUTFLOW (cfs)
435	870.0	0.01	5.03	0.00	0.02
440	880.0	0.01	5.06	0.00	0.02
445	890.0	0.01	5.09	0.00	0.02
450	900.0	0.01	5.12	0.00	0.01
455	910.0	0.01	5.15	0.00	0.01
460	920.0	0.01	5.18	0.00	0.01
465	930.0	0.01	5.21	0.00	0.01
470	940.0	0.01	5.23	0.00	0.01
475	950.0	0.00	5.26	0.00	0.01
480	960.0	0.00	5.28	0.00	0.01
485	970.0	0.00	5.30	0.00	0.01
490	980.0	0.00	5.33	0.00	0.01
495	990.0	0.00	5.35	0.00	0.01
500	1000.0	0.00	5.37	0.00	0.01
505	1010.0	0.00	5.39	0.00	0.01
510	1020.0	0.00	5.41	0.00	0.01
515	1030.0	0.00	5.43	0.00	0.01
520	1040.0	0.00	5.45	0.00	0.01
525	1050.0	0.00	5.47	0.00	0.01
530	1060.0	0.00	5.49	0.00	0.01
535	1070.0	0.00	5.51	0.00	0.01
540	1080.0	0.00	5.53	0.00	0.01
545	1090.0	0.00	5.54	0.00	0.01
550	1100.0	0.00	5.56	0.00	0.01
555	1110.0	0.00	5.58	0.00	0.01
560	1120.0	0.00	5.59	0.00	0.01
565	1130.0	0.00	5.61	0.00	0.01
570	1140.0	0.00	5.63	0.00	0.01
575	1150.0	0.00	5.64	0.00	0.01
580	1160.0	0.00	5.66	0.00	0.01
585	1170.0	0.00	5.67	0.00	0.01
590	1180.0	0.00	5.69	0.00	0.01
595	1190.0	0.00	5.70	0.00	0.00
600	1200.0	0.00	5.71	0.00	0.00
605	1210.0	0.00	5.72	0.00	0.00
610	1220.0	0.00	5.74	0.00	0.00
615	1230.0	0.00	5.75	0.00	0.00
620	1240.0	0.00	5.76	0.00	0.00
625	1250.0	0.00	5.78	0.00	0.00
630	1260.0	0.00	5.79	0.00	0.00
635	1270.0	0.00	5.80	0.00	0.00
640	1280.0	0.00	5.81	0.00	0.00
645	1290.0	0.00	5.83	0.00	0.00
650	1300.0	0.00	5.84	0.00	0.00
655	1310.0	0.00	5.85	0.00	0.00
660	1320.0	0.00	5.86	0.00	0.00
665	1330.0	0.00	5.87	0.00	0.00
670	1340.0	0.00	5.89	0.00	0.00

[Hydrograph Flow Values Time vs. Flow]
(The time interval is 10.0 min)

TIME INTV	TIME (min)	INCREMENTAL RAINFALL (in)	CUMULATIVE RAINFALL (in)	INCREMENTAL OUTFLOW (cfs)	DESIGN OUTFLOW (cfs)
675	1350.0	0.00	5.90	0.00	0.00
680	1360.0	0.00	5.91	0.00	0.00
685	1370.0	0.00	5.92	0.00	0.00

EDSC WATERSHED MODELING

HYDROGRAPH REPORT

RECORD NUMBER : 2

TYPE : COMPUTED FLOOD
DESCRIPTION : AREA - 2 POST DEV. 10yr

[HYDROGRAPH INFORMATION]

Peak Discharge	=	1.63	(cfs)
Volume	=	0.09	(acft)
Time Interval	=	2.00	(min)
Time to Peak	=	718.00	(min)
Time of Base	=	1468.68	(min)
Multiplication factor	=	1.00	

[UNIT HYDROGRAPH INFORMATION]

Unit hydrograph #	=	2	
Unit hydrograph type	=	CURVILINEAR UH	
Peak Discharge	=	1.67	(cfs)
Shape Factor	=	484.00	
Time Interval	=	2.00	(min)
Time to Peak	=	5.96	(min)
Time of Base	=	29.80	(min)
Rainfall Excess	=	1.00	(in)
Basin Lag Time	=	5.36	(min)

[BASIN DESCRIPTION]

Watershed Area	=	0.22	(ac)
Curve Number	=	94	

[TIME CONCENTRATION-TR-55]

SHEET FLOW

Manning's Roughness Coef. (n)..... = 0.10350
Flow Length (L)..... = 182.00 (ft)
2-yr 24-hr Rainfall ®..... = 4.00 (in)

Land Slope (S).....	=	0.03000	
Travel Time of Sheet Flow.....	=	8.94	(min)

SHALLOW FLOW

K_Coef (surface description) (K).....	=	0.00000	
Watercourse Slope (S).....	=	0.00000	
Velocity (V).....	=	0.00	(ft/s)
Flow Length (L).....	=	0.00	(ft)
Travel Time of Shallow Flow.....	=	0.00	(min)

CHANNEL FLOW

Hydraulic Radius ®.....	=	0.00	(ft)
Channel Slope (S).....	=	0.00000	
Manning's Roughness Coef. (n).....	=	0.20000	
Channel Velocity (V).....	=	0.00	(ft/s)
Flow Length (L).....	=	0.00	(ft)
Travel Time of Shallow Flow.....	=	0.00	(min)

TIME OF CONCENTRATION

Time of Concentration..... = 8.94 (min)

[RAINFALL DESCRIPTION]

Distribution Type.....	=	SCS II	
Total Precipitation.....	=	6.00	(in)
Return Period.....	=	10	(yr)
Storm Duration.....	=	24.00	(hr)

[Unit Hydrograph Flow Values Time vs. Flow]
(The time interval is 10.0 min)

TIME INTV	TIME (min)	FLOW (cfs)
0	0.00	0.00
1	2.00	0.39
6	12.00	0.46
11	22.00	0.03

[Hydrograph Flow Values Time vs. Flow]
(The time interval is 10.0 min)

TIME INTV	TIME (min)	INCREMENTAL RAINFALL (in)	CUMULATIVE RAINFALL (in)	INCREMENTAL OUTFLOW (cfs)	DESIGN OUTFLOW (cfs)
125	250.0	0.00	0.30	0.00	0.00
130	260.0	0.00	0.32	0.00	0.00
135	270.0	0.00	0.33	0.00	0.00
140	280.0	0.00	0.35	0.00	0.01
145	290.0	0.00	0.36	0.00	0.01
150	300.0	0.00	0.38	0.00	0.01
155	310.0	0.00	0.39	0.00	0.01
160	320.0	0.00	0.41	0.00	0.01
165	330.0	0.00	0.43	0.00	0.01
170	340.0	0.00	0.44	0.00	0.01
175	350.0	0.00	0.46	0.00	0.01
180	360.0	0.00	0.48	0.00	0.01
185	370.0	0.00	0.50	0.00	0.01
190	380.0	0.00	0.52	0.00	0.01
195	390.0	0.00	0.54	0.00	0.01
200	400.0	0.00	0.55	0.00	0.01
205	410.0	0.00	0.57	0.00	0.01
210	420.0	0.00	0.59	0.00	0.01
215	430.0	0.00	0.61	0.00	0.01
220	440.0	0.00	0.63	0.00	0.02
225	450.0	0.00	0.66	0.00	0.02
230	460.0	0.00	0.68	0.00	0.02
235	470.0	0.00	0.70	0.00	0.02
240	480.0	0.00	0.72	0.00	0.02
245	490.0	0.00	0.74	0.00	0.02
250	500.0	0.01	0.77	0.00	0.02
255	510.0	0.01	0.79	0.00	0.02
260	520.0	0.01	0.82	0.00	0.03
265	530.0	0.01	0.85	0.00	0.03
270	540.0	0.01	0.88	0.00	0.03
275	550.0	0.01	0.91	0.00	0.03
280	560.0	0.01	0.95	0.00	0.03
285	570.0	0.01	0.98	0.00	0.03
290	580.0	0.01	1.01	0.00	0.03
295	590.0	0.01	1.05	0.00	0.04
300	600.0	0.01	1.09	0.00	0.04
305	610.0	0.01	1.13	0.00	0.04
310	620.0	0.01	1.17	0.00	0.05
315	630.0	0.01	1.22	0.00	0.05
320	640.0	0.01	1.28	0.00	0.06
325	650.0	0.01	1.34	0.00	0.07
330	660.0	0.01	1.41	0.00	0.08
335	670.0	0.02	1.49	0.00	0.09
340	680.0	0.02	1.59	0.00	0.11

[Hydrograph Flow Values Time vs. Flow]
(The time interval is 10.0 min)

TIME INTV	TIME (min)	INCREMENTAL RAINFALL (in)	CUMULATIVE RAINFALL (in)	INCREMENTAL OUTFLOW (cfs)	DESIGN OUTFLOW (cfs)
345	690.0	0.02	1.70	0.00	0.13
350	700.0	0.10	2.02	0.07	0.32
355	710.0	0.23	2.81	0.14	0.84
360	720.0	0.09	3.98	-0.03	1.60
365	730.0	0.03	4.16	-0.13	0.41
370	740.0	0.03	4.30	-0.02	0.21
375	750.0	0.02	4.41	-0.01	0.15
380	760.0	0.02	4.49	0.00	0.11
385	770.0	0.01	4.57	0.00	0.10
390	780.0	0.01	4.63	0.00	0.08
395	790.0	0.01	4.69	0.00	0.08
400	800.0	0.01	4.74	0.00	0.07
405	810.0	0.01	4.79	0.00	0.06
410	820.0	0.01	4.84	0.00	0.06
415	830.0	0.01	4.88	0.00	0.05
420	840.0	0.01	4.92	0.00	0.05
425	850.0	0.01	4.96	0.00	0.04
430	860.0	0.01	4.99	0.00	0.04
435	870.0	0.01	5.03	0.00	0.04
440	880.0	0.01	5.06	0.00	0.04
445	890.0	0.01	5.09	0.00	0.04
450	900.0	0.01	5.12	0.00	0.04
455	910.0	0.01	5.15	0.00	0.04
460	920.0	0.01	5.18	0.00	0.03
465	930.0	0.01	5.21	0.00	0.03
470	940.0	0.01	5.23	0.00	0.03
475	950.0	0.00	5.26	0.00	0.03
480	960.0	0.00	5.28	0.00	0.03
485	970.0	0.00	5.30	0.00	0.03
490	980.0	0.00	5.33	0.00	0.03
495	990.0	0.00	5.35	0.00	0.03
500	1000.0	0.00	5.37	0.00	0.03
505	1010.0	0.00	5.39	0.00	0.03
510	1020.0	0.00	5.41	0.00	0.02
515	1030.0	0.00	5.43	0.00	0.02
520	1040.0	0.00	5.45	0.00	0.02
525	1050.0	0.00	5.47	0.00	0.02
530	1060.0	0.00	5.49	0.00	0.02
535	1070.0	0.00	5.51	0.00	0.02
540	1080.0	0.00	5.53	0.00	0.02
545	1090.0	0.00	5.54	0.00	0.02
550	1100.0	0.00	5.56	0.00	0.02
555	1110.0	0.00	5.58	0.00	0.02
560	1120.0	0.00	5.59	0.00	0.02

[Hydrograph Flow Values Time vs. Flow]
(The time interval is 10.0 min)

TIME INTV	TIME (min)	INCREMENTAL RAINFALL (in)	CUMULATIVE RAINFALL (in)	INCREMENTAL OUTFLOW (cfs)	DESIGN OUTFLOW (cfs)
565	1130.0	0.00	5.61	0.00	0.02
570	1140.0	0.00	5.63	0.00	0.02
575	1150.0	0.00	5.64	0.00	0.02
580	1160.0	0.00	5.66	0.00	0.02
585	1170.0	0.00	5.67	0.00	0.02
590	1180.0	0.00	5.69	0.00	0.02
595	1190.0	0.00	5.70	0.00	0.01
600	1200.0	0.00	5.71	0.00	0.01
605	1210.0	0.00	5.72	0.00	0.01
610	1220.0	0.00	5.74	0.00	0.01
615	1230.0	0.00	5.75	0.00	0.01
620	1240.0	0.00	5.76	0.00	0.01
625	1250.0	0.00	5.78	0.00	0.01
630	1260.0	0.00	5.79	0.00	0.01
635	1270.0	0.00	5.80	0.00	0.01
640	1280.0	0.00	5.81	0.00	0.01
645	1290.0	0.00	5.83	0.00	0.01
650	1300.0	0.00	5.84	0.00	0.01
655	1310.0	0.00	5.85	0.00	0.01
660	1320.0	0.00	5.86	0.00	0.01
665	1330.0	0.00	5.87	0.00	0.01
670	1340.0	0.00	5.89	0.00	0.01
675	1350.0	0.00	5.90	0.00	0.01
680	1360.0	0.00	5.91	0.00	0.01
685	1370.0	0.00	5.92	0.00	0.01
690	1380.0	0.00	5.93	0.00	0.01
695	1390.0	0.00	5.94	0.00	0.01
700	1400.0	0.00	5.96	0.00	0.01
705	1410.0	0.00	5.97	0.00	0.01
710	1420.0	0.00	5.98	0.00	0.01
715	1430.0	0.00	5.99	0.00	0.01
720	1440.0	0.00	6.00	0.00	0.01

EDSC WATERSHED MODELING
HYDROGRAPH REPORT
RECORD NUMBER : 3

```
TYPE            : COMPUTED FLOOD
DESCRIPTION     : AREA - 3 POST DEV. 10yr
```

[HYDROGRAPH INFORMATION]

```
Peak Discharge............................ =        0.81 (cfs)
Volume.................................... =        0.04 (acft)
Time Interval............................. =        2.00 (min)
Time to Peak.............................. =      718.00 (min)
Time of Base.............................. =     1466.26 (min)
Multiplication factor..................... =        1.00
```

[UNIT HYDROGRAPH INFORMATION]

```
Unit hydrograph #......................... =        3
Unit hydrograph type...................... =   CURVILINEAR UH
Peak Discharge............................ =        1.16 (cfs)
Shape Factor.............................. =      484.00

Time Interval............................. =        2.00 (min)
Time to Peak.............................. =        5.33 (min)
Time of Base.............................. =       26.67 (min)
Rainfall Excess........................... =        1.00 (in)
Basin Lag Time............................ =        4.80 (min)
```

[BASIN DESCRIPTION]

```
Watershed Area............................ =        0.14 (ac)
Curve Number.............................. =       79
```

[TIME CONCENTRATION-USER DEFINED]
Time of Concentration..... = 8.00 (min)
[RAINFALL DESCRIPTION]

```
Distribution Type......................... =      SCS II
Total Precipitation....................... =        6.00 (in)
Return Period............................. =       10    (yr)
Storm Duration............................ =       24.00 (hr)
```

[Unit Hydrograph Flow Values Time vs. Flow]
(The time interval is 10.0 min)

TIME INTV	TIME (min)	FLOW (cfs)
0	0.00	0.00
1	2.00	0.32
6	12.00	0.22
11	22.00	0.01

[Hydrograph Flow Values Time vs. Flow]
(The time interval is 10.0 min)

TIME INTV	TIME (min)	INCREMENTAL RAINFALL (in)	CUMULATIVE RAINFALL (in)	INCREMENTAL OUTFLOW (cfs)	DESIGN OUTFLOW (cfs)
290	580.0	0.01	1.01	0.00	0.00
295	590.0	0.01	1.05	0.00	0.01
300	600.0	0.01	1.09	0.00	0.01
305	610.0	0.01	1.13	0.00	0.01
310	620.0	0.01	1.17	0.00	0.01
315	630.0	0.01	1.22	0.00	0.01
320	640.0	0.01	1.28	0.00	0.01
325	650.0	0.01	1.34	0.00	0.02
330	660.0	0.01	1.41	0.00	0.02
335	670.0	0.02	1.49	0.00	0.03
340	680.0	0.02	1.59	0.00	0.03
345	690.0	0.02	1.70	0.00	0.04
350	700.0	0.10	2.02	0.03	0.12
355	710.0	0.23	2.81	0.07	0.37
360	720.0	0.09	3.98	-0.02	0.78
365	730.0	0.03	4.16	-0.05	0.18
370	740.0	0.03	4.30	-0.01	0.10
375	750.0	0.02	4.41	0.00	0.07
380	760.0	0.02	4.49	0.00	0.06
385	770.0	0.01	4.57	0.00	0.05
390	780.0	0.01	4.63	0.00	0.04
395	790.0	0.01	4.69	0.00	0.04
400	800.0	0.01	4.74	0.00	0.03
405	810.0	0.01	4.79	0.00	0.03
410	820.0	0.01	4.84	0.00	0.03
415	830.0	0.01	4.88	0.00	0.03
420	840.0	0.01	4.92	0.00	0.02
425	850.0	0.01	4.96	0.00	0.02
430	860.0	0.01	4.99	0.00	0.02
435	870.0	0.01	5.03	0.00	0.02
440	880.0	0.01	5.06	0.00	0.02
445	890.0	0.01	5.09	0.00	0.02
450	900.0	0.01	5.12	0.00	0.02
455	910.0	0.01	5.15	0.00	0.02
460	920.0	0.01	5.18	0.00	0.02
465	930.0	0.01	5.21	0.00	0.02
470	940.0	0.01	5.23	0.00	0.02
475	950.0	0.00	5.26	0.00	0.01
480	960.0	0.00	5.28	0.00	0.01
485	970.0	0.00	5.30	0.00	0.01
490	980.0	0.00	5.33	0.00	0.01
495	990.0	0.00	5.35	0.00	0.01
500	1000.0	0.00	5.37	0.00	0.01
505	1010.0	0.00	5.39	0.00	0.01

[Hydrograph Flow Values Time vs. Flow]
(The time interval is 10.0 min)

TIME INTV	TIME (min)	INCREMENTAL RAINFALL (in)	CUMULATIVE RAINFALL (in)	INCREMENTAL OUTFLOW (cfs)	DESIGN OUTFLOW (cfs)
510	1020.0	0.00	5.41	0.00	0.01
515	1030.0	0.00	5.43	0.00	0.01
520	1040.0	0.00	5.45	0.00	0.01
525	1050.0	0.00	5.47	0.00	0.01
530	1060.0	0.00	5.49	0.00	0.01
535	1070.0	0.00	5.51	0.00	0.01
540	1080.0	0.00	5.53	0.00	0.01
545	1090.0	0.00	5.54	0.00	0.01
550	1100.0	0.00	5.56	0.00	0.01
555	1110.0	0.00	5.58	0.00	0.01
560	1120.0	0.00	5.59	0.00	0.01
565	1130.0	0.00	5.61	0.00	0.01
570	1140.0	0.00	5.63	0.00	0.01
575	1150.0	0.00	5.64	0.00	0.01
580	1160.0	0.00	5.66	0.00	0.01
585	1170.0	0.00	5.67	0.00	0.01
590	1180.0	0.00	5.69	0.00	0.01
595	1190.0	0.00	5.70	0.00	0.01
600	1200.0	0.00	5.71	0.00	0.01
605	1210.0	0.00	5.72	0.00	0.01
610	1220.0	0.00	5.74	0.00	0.01
615	1230.0	0.00	5.75	0.00	0.01
620	1240.0	0.00	5.76	0.00	0.01
625	1250.0	0.00	5.78	0.00	0.01
630	1260.0	0.00	5.79	0.00	0.01
635	1270.0	0.00	5.80	0.00	0.01
640	1280.0	0.00	5.81	0.00	0.01
645	1290.0	0.00	5.83	0.00	0.01
650	1300.0	0.00	5.84	0.00	0.01
655	1310.0	0.00	5.85	0.00	0.01
660	1320.0	0.00	5.86	0.00	0.01
665	1330.0	0.00	5.87	0.00	0.01
670	1340.0	0.00	5.89	0.00	0.01
675	1350.0	0.00	5.90	0.00	0.01
680	1360.0	0.00	5.91	0.00	0.01
685	1370.0	0.00	5.92	0.00	0.01
690	1380.0	0.00	5.93	0.00	0.00
695	1390.0	0.00	5.94	0.00	0.01
700	1400.0	0.00	5.96	0.00	0.00
705	1410.0	0.00	5.97	0.00	0.00
710	1420.0	0.00	5.98	0.00	0.01
715	1430.0	0.00	5.99	0.00	0.00
720	1440.0	0.00	6.00	0.00	0.01

EDSC WATERSHED MODELING

HYDROGRAPH REPORT

RECORD NUMBER : 4

TYPE : COMBINE
DESCRIPTION : COMBINED POST DEV. 10yr

[HYDROGRAPH INFORMATION]

```
Peak Discharge............................ =          2.90 (cfs)
Volume.................................... =          0.16 (acft)
Time Interval............................. =          2.00 (min)
Time to Peak.............................. =        720.00 (min)
Time of Base.............................. =       1448.00 (min)
```

[COMBINE HYDROGRAPH RECORD #]
HYDROGRAPH # 1 TYPE : COMPUTED FLOOD
DESCRIPTION : AREA - 1 POST DEV. 10yr

```
Peak Discharge........................ =          0.53 (cfs)
Time to Peak......................... =        722.00 (min)
Time Interval........................ =          2.00 (min)
HYDROGRAPH #   2    TYPE : COMPUTED FLOOD
```

DESCRIPTION : AREA - 2 POST DEV. 10yr

```
Peak Discharge........................ =          1.63 (cfs)
Time to Peak......................... =        718.00 (min)
Time Interval........................ =          2.00 (min)
HYDROGRAPH #   3    TYPE : COMPUTED FLOOD
```

DESCRIPTION : AREA - 3 POST DEV. 10yr

```
Peak Discharge........................ =          0.81 (cfs)
Time to Peak......................... =        718.00 (min)
Time Interval........................ =          2.00 (min)
```

[Combine Hydrograph Flow Values]
(The time interval is 10.0 min)

INTV #	TIME (min)	OUTFLOW (cfs)
126	252.00	0.00
131	262.00	0.00
136	272.00	0.01
141	282.00	0.01
146	292.00	0.01
151	302.00	0.01
156	312.00	0.01
161	322.00	0.01
166	332.00	0.01
171	342.00	0.01
176	352.00	0.01
181	362.00	0.01
186	372.00	0.01
191	382.00	0.01
196	392.00	0.01
201	402.00	0.01
206	412.00	0.01
211	422.00	0.01
216	432.00	0.01
221	442.00	0.02
226	452.00	0.02

[Combine Hydrograph Flow Values]
(The time interval is 10.0 min)

INTV #	TIME (min)	OUTFLOW (cfs)
231	462.00	0.02
236	472.00	0.02
241	482.00	0.02
246	492.00	0.02
251	502.00	0.02
256	512.00	0.02
261	522.00	0.03
266	532.00	0.03
271	542.00	0.03
276	552.00	0.03
281	562.00	0.03
286	572.00	0.04
291	582.00	0.04
296	592.00	0.05
301	602.00	0.05
306	612.00	0.06
311	622.00	0.07
316	632.00	0.08
321	642.00	0.09
326	652.00	0.10
331	662.00	0.11
336	672.00	0.14
341	682.00	0.17
346	692.00	0.21
351	702.00	0.64
356	712.00	1.74
361	722.00	2.55
366	732.00	0.73
371	742.00	0.40
376	752.00	0.28
381	762.00	0.21
386	772.00	0.18
391	782.00	0.16
396	792.00	0.14
401	802.00	0.13
406	812.00	0.12
411	822.00	0.11
416	832.00	0.10
421	842.00	0.09
426	852.00	0.09
431	862.00	0.08
436	872.00	0.08
441	882.00	0.08
446	892.00	0.07
451	902.00	0.07

[Combine Hydrograph Flow Values]
(The time interval is 10.0 min)

INTV #	TIME (min)	OUTFLOW (cfs)
456	912.00	0.07
461	922.00	0.07
466	932.00	0.06
471	942.00	0.06
476	952.00	0.06
481	962.00	0.05
486	972.00	0.05
491	982.00	0.05
496	992.00	0.05
501	1002.00	0.05
506	1012.00	0.05
511	1022.00	0.05
516	1032.00	0.04
521	1042.00	0.04
526	1052.00	0.04
531	1062.00	0.04
536	1072.00	0.04
541	1082.00	0.04
546	1092.00	0.04
551	1102.00	0.04
556	1112.00	0.04
561	1122.00	0.03
566	1132.00	0.03
571	1142.00	0.03
576	1152.00	0.03
581	1162.00	0.03
586	1172.00	0.03
591	1182.00	0.03
596	1192.00	0.03
601	1202.00	0.03
606	1212.00	0.02
611	1222.00	0.02
616	1232.00	0.02
621	1242.00	0.02
626	1252.00	0.02
631	1262.00	0.02
636	1272.00	0.02
641	1282.00	0.02
646	1292.00	0.02
651	1302.00	0.02
656	1312.00	0.02
661	1322.00	0.02
666	1332.00	0.02

[Combine Hydrograph Flow Values]
(The time interval is 10.0 min)

INTV #	TIME (min)	OUTFLOW (cfs)
671	1342.00	0.02
676	1352.00	0.02
681	1362.00	0.02
686	1372.00	0.02
691	1382.00	0.02
696	1392.00	0.02
701	1402.00	0.02
706	1412.00	0.02
711	1422.00	0.02
716	1432.00	0.02
721	1442.00	0.01

EDSC WATERSHED MODELING

HYDROGRAPH REPORT

RECORD NUMBER : 5

TYPE : RESER STOR. IND
DESCRIPTION : ROUTED POST DEV. 10yr

[HYDROGRAPH INFORMATION]

Peak Discharge	=	2.06	(cfs)
Volume	=	0.14	(acft)
Time Interval	=	2.00	(min)
Time to Peak	=	724.00	(min)
Time of Base	=	1582.00	(min)
Peak Elevation	=	96.78	(ft)

[RESERVOIR STRUCTURE INFORMATION]
Reservoir #..... = 1
Description..... = BASIN - 1
Storage type..... = MAN STAGE/AREA
Max storage..... = 3137.64 Cuft
Discharge type..... = COMP STAGE/DIS
Max discharge..... = 4.36 cfs

[RESERVOIR INFORMATION]
Reservoir #..... = 1
Reservoir Description..... = BASIN - 1

[INFLOW HYDROGRAPH INFORMATION]
Hydrograph #..... = 4
Hydrograph Description..... = COMBINED POST DEV. 10yr

[Computation of Reservoir Outflow Table of Storage Indication Method]
(The time interval is 10.0 min)

INTV#	TIME (min)	INFLOW (cfs)	EQUATION 0.5(I1+I2)dt	+	S1-0.5(O1)dt	=	S2+0.5(O2)dt	OUTFLOW O2(cfs)	STORAGE (cuft)	ELEVATION (ft)
331	662.0	0.11	13.62	+	637.64	=	651.25	0.00	651.07	96.10
332	664.0	0.12	14.05	+	650.88	=	664.94	0.01	664.47	96.11
337	674.0	0.15	17.11	+	716.43	=	733.54	0.03	731.67	96.14
342	684.0	0.18	21.24	+	785.37	=	806.61	0.06	803.25	96.17
347	694.0	0.24	27.12	+	860.75	=	887.88	0.08	882.81	96.20
352	704.0	0.80	86.45	+	1011.87	=	1098.32	0.20	1086.50	96.28
357	714.0	2.15	233.51	+	1511.18	=	1744.69	0.48	1716.01	96.52
362	724.0	2.02	274.10	+	2294.92	=	2569.02	2.06	2445.70	96.78
367	734.0	0.61	80.41	+	2106.07	=	2186.48	1.20	2114.19	96.67
372	744.0	0.36	45.67	+	1854.29	=	1899.97	0.68	1859.15	96.58
377	754.0	0.26	31.96	+	1701.20	=	1733.16	0.46	1705.38	96.52
382	764.0	0.20	24.46	+	1596.47	=	1620.93	0.37	1598.67	96.48
387	774.0	0.18	21.62	+	1496.95	=	1518.56	0.34	1497.93	96.44
392	784.0	0.16	18.94	+	1399.85	=	1418.79	0.32	1399.75	96.41
397	794.0	0.14	17.06	+	1307.54	=	1324.60	0.29	1307.49	96.37
402	804.0	0.13	15.55	+	1225.65	=	1241.20	0.26	1225.87	96.34
407	814.0	0.12	14.12	+	1153.85	=	1167.97	0.23	1154.22	96.31
412	824.0	0.11	12.87	+	1090.85	=	1103.72	0.20	1091.72	96.29
417	834.0	0.10	11.92	+	1040.14	=	1052.06	0.17	1041.72	96.27
422	844.0	0.09	10.82	+	999.93	=	1010.74	0.15	1001.73	96.25
427	854.0	0.09	10.21	+	967.02	=	977.23	0.13	969.30	96.24
432	864.0	0.08	9.85	+	941.71	=	951.57	0.12	944.46	96.23
437	874.0	0.08	9.44	+	921.75	=	931.19	0.11	924.74	96.22
442	884.0	0.08	9.17	+	906.08	=	915.25	0.10	909.31	96.21

[Computation of Reservoir Outflow Table of Storage Indication Method]

(The time interval is 10.0 min)

INTV#	TIME (min)	INFLOW (cfs)	EQUATION 0.5(I1+I2)dt	+	S1-0.5(O1)dt	=	S2+0.5(O2)dt	OUTFLOW O2(cfs)	STORAGE (cuft)	ELEVATION (ft)
447	894.0	0.07	8.80	+	893.49	=	902.29	0.09	896.76	96.21
452	904.0	0.07	8.43	+	882.65	=	891.08	0.09	885.91	96.20
457	914.0	0.07	8.03	+	873.53	=	881.56	0.08	876.67	96.20
462	924.0	0.06	7.79	+	864.82	=	872.61	0.08	867.91	96.20
467	934.0	0.06	7.28	+	856.50	=	863.78	0.08	859.25	96.19
472	944.0	0.06	6.98	+	847.66	=	854.64	0.07	850.30	96.19
477	954.0	0.05	6.62	+	839.32	=	845.94	0.07	841.78	96.18
482	964.0	0.05	6.28	+	830.85	=	837.13	0.07	833.15	96.18
487	974.0	0.05	6.01	+	822.51	=	828.52	0.06	824.72	96.18
492	984.0	0.05	6.01	+	814.93	=	820.94	0.06	817.29	96.17
497	994.0	0.05	5.79	+	808.53	=	814.32	0.06	810.81	96.17
502	1004.0	0.05	5.69	+	802.48	=	808.17	0.06	804.78	96.17
507	1014.0	0.05	5.44	+	797.07	=	802.51	0.05	799.24	96.17
512	1024.0	0.05	5.47	+	792.08	=	797.55	0.05	794.38	96.16
517	1034.0	0.04	5.23	+	787.64	=	792.87	0.05	789.79	96.16
522	1044.0	0.04	5.13	+	783.30	=	788.44	0.05	785.45	96.16
527	1054.0	0.04	4.97	+	779.07	=	784.04	0.05	781.15	96.16
532	1064.0	0.04	4.92	+	775.29	=	780.21	0.05	777.39	96.16
537	1074.0	0.04	4.81	+	771.68	=	776.49	0.05	773.75	96.16
542	1084.0	0.04	4.58	+	768.07	=	772.66	0.04	769.99	96.15
547	1094.0	0.04	4.54	+	764.47	=	769.01	0.04	766.42	96.15
552	1104.0	0.04	4.39	+	761.19	=	765.58	0.04	763.06	96.15
557	1114.0	0.04	4.33	+	757.98	=	762.31	0.04	759.86	96.15
562	1124.0	0.03	4.06	+	754.82	=	758.87	0.04	756.49	96.15

[Computation of Reservoir Outflow Table of Storage Indication Method]
(The time interval is 10.0 min)

INTV#	TIME (min)	INFLOW (cfs)	EQUATION 0.5(I1+I2)dt + S1	-	0.5(O1)dt = S2	+	0.5(O2)dt	OUTFLOW O2(cfs)	STORAGE (cuft)	ELEVATION (ft)
567	1134.0	0.03	4.01	+	751.43	=	755.44	0.04	753.13	96.15
572	1144.0	0.03	3.85	+	748.36	=	752.21	0.04	749.96	96.15
577	1154.0	0.03	3.75	+	745.30	=	749.06	0.04	746.87	96.14
582	1164.0	0.03	3.52	+	742.01	=	745.54	0.04	743.43	96.14
587	1174.0	0.03	3.49	+	738.84	=	742.33	0.03	740.28	96.14
592	1184.0	0.03	3.26	+	735.81	=	739.07	0.03	737.09	96.14
597	1194.0	0.03	3.17	+	732.44	=	735.61	0.03	733.70	96.14
602	1204.0	0.02	3.02	+	729.24	=	732.26	0.03	730.42	96.14
607	1214.0	0.02	2.91	+	726.24	=	729.16	0.03	727.38	96.14
612	1224.0	0.02	2.84	+	723.22	=	726.06	0.03	724.34	96.13
617	1234.0	0.02	2.94	+	720.84	=	723.78	0.03	722.11	96.13
622	1244.0	0.02	2.86	+	718.83	=	721.68	0.03	720.06	96.13
627	1254.0	0.02	2.91	+	717.22	=	720.12	0.03	718.53	96.13
632	1264.0	0.02	2.82	+	715.40	=	718.23	0.03	716.67	96.13
637	1274.0	0.02	2.75	+	714.02	=	716.77	0.03	715.25	96.13
642	1284.0	0.02	2.79	+	712.71	=	715.50	0.02	714.00	96.13
647	1294.0	0.02	2.65	+	711.67	=	714.32	0.02	712.84	96.13
652	1304.0	0.02	2.70	+	710.42	=	713.12	0.02	711.67	96.13
657	1314.0	0.02	2.61	+	709.29	=	711.90	0.02	710.48	96.13
662	1324.0	0.02	2.66	+	708.41	=	711.06	0.02	709.66	96.13
667	1334.0	0.02	2.64	+	707.53	=	710.17	0.02	708.78	96.13
672	1344.0	0.02	2.50	+	706.59	=	709.09	0.02	707.73	96.13
677	1354.0	0.02	2.55	+	705.60	=	708.15	0.02	706.80	96.13
682	1364.0	0.02	2.47	+	704.83	=	707.30	0.02	705.97	96.13

[Computation of Reservoir Outflow Table of Storage Indication Method]
(The time interval is 10.0 min)

INTV#	TIME (min)	INFLOW (cfs)	EQUATION 0.5(I1+I2)dt	+	S1-0.5(O1)dt	=	S2+0.5(O2)dt	OUTFLOW O2(cfs)	STORAGE (cuft)	ELEVATION (ft)
687	1374.0	0.02	2.15	+	704.10	=	706.24	0.02	704.93	96.13
692	1384.0	0.02	2.05	+	701.58	=	703.63	0.02	702.37	96.13
697	1394.0	0.02	2.07	+	699.60	=	701.67	0.02	700.46	96.12
702	1404.0	0.02	2.09	+	697.77	=	699.86	0.02	698.68	96.12
707	1414.0	0.02	2.00	+	696.31	=	698.31	0.02	697.16	96.12
712	1424.0	0.02	2.02	+	694.89	=	696.90	0.02	695.78	96.12
717	1434.0	0.02	1.92	+	693.75	=	695.67	0.02	694.58	96.12
722	1444.0	0.01	1.54	+	692.60	=	694.14	0.02	693.08	96.12
727	1454.0	0.00	0.00	+	685.56	=	685.56	0.01	684.67	96.12
732	1464.0	0.00	0.00	+	677.40	=	677.40	0.01	676.68	96.11
737	1474.0	0.00	0.00	+	670.77	=	670.77	0.01	670.18	96.11
742	1484.0	0.00	0.00	+	665.39	=	665.39	0.01	664.91	96.11
747	1494.0	0.00	0.00	+	661.02	=	661.02	0.01	660.64	96.11
752	1504.0	0.00	0.00	+	657.48	=	657.48	0.01	657.16	96.11
757	1514.0	0.00	0.00	+	654.60	=	654.60	0.00	654.34	96.11
762	1524.0	0.00	0.00	+	652.26	=	652.26	0.00	652.06	96.10
767	1534.0	0.00	0.00	+	650.37	=	650.37	0.00	650.20	96.10
772	1544.0	0.00	0.00	+	648.83	=	648.83	0.00	648.69	96.10
777	1554.0	0.00	0.00	+	647.58	=	647.58	0.00	647.47	96.10
782	1564.0	0.00	0.00	+	646.56	=	646.56	0.00	646.47	96.10
787	1574.0	0.00	0.00	+	645.74	=	645.74	0.00	645.67	96.10

EDSC WATERSHED MODELING

RESERVOIR REPORT

RECORD NUMBER : 1

```
STORAGE TYPE   : MAN STAGE/AREA
DISCHARGE TYPE : COMP STAGE/DIS
DESCRIPTION    : BASIN - 1

[RATING CURVE LIMIT]

          Minimum Elevation.......................  =          91.00 (ft)
          Maximum Elevation.......................  =          97.00 (ft)
          Elevation Increment.....................  =           0.10 (ft)
```

[STAGE STORAGE INFORMATION]
Input file = NULL
Output file = NULL

[Manual Contour Area vs. Elevation]

ELEVATION (ft)	CONTOUR AREA (sqft)
95.00	80.78
95.25	204.91
95.50	332.57
95.75	463.76
95.95	598.48
96.00	2221.72
96.25	2469.04
96.50	2719.89
96.75	2974.27
97.00	3232.19

[STAGE DISCHARGE INFORMATION]

OUTLET STRUCTURE:

```
STR #       :   1
TYPE        : STAND PIPE WEIR
```

DESCRIPTION : PRINCIPLE SPILLWAY

```
STR #       :   2
TYPE        : STAND PIPE WEIR
```

DESCRIPTION : EMERGENCY SPILLWAY

[Reservoir Discharge Value vs. Stage]
(the elevation increment is 0.5)

STAGE (ft)	ELEVATION (ft)	CONTOUR AREA (sqft)	STORAGE (cuft)	DISCHARGE (cfs)
0.00	91.00	80.78	0.00	0.00
0.50	91.50	0.00	0.00	0.00
1.00	92.00	0.00	0.00	0.00
1.50	92.50	0.00	0.00	0.00
2.00	93.00	0.00	0.00	0.00
2.50	93.50	0.00	0.00	0.00
3.00	94.00	0.00	0.00	0.00
3.50	94.50	0.00	0.00	0.00
4.00	95.00	0.00	0.00	0.00
4.50	95.50	332.57	98.87	0.00
5.00	96.00	2221.72	415.07	0.00
5.50	96.50	2719.89	1650.05	0.38
6.00	97.00	3232.19	3137.64	4.36

EDSC WATERSHED MODELING

OUTLET STRUCTURE REPORT

RECORD NUMBER : 1

TYPE : STAND PIPE WEIR
DESCRIPTION : PRINCIPLE SPILLWAY

[RATING CURVE LIMIT]

```
Minimum Elevation........................  =        91.00 (ft)
Maximum Elevation........................  =        97.00 (ft)
Elevation Increment......................  =         0.10 (ft)
```

[STANDPIPE INFORMATION]
CIRC. STAND PIPE WEIR DESCRIPTION :
[OUTLET STRUCTURE INFORMATION]

```
Radius...................................  =         0.50 (ft)
Crest Length.............................  =         3.14 (ft)
Crest Elevation..........................  =        96.50 (ft)
Fraction Open Area.......................  =      1.00000
```

[RECTANGULAR STAND PIPE EQUATION]
ORIFICE EQ: Q = Co*A(2gh)^0.5

```
WEIR    EQ:  Q = Cw*L*H^exp
Coefficient Co ..........................  =      0.60000
Coefficient Cw ..........................  =      3.33000
Exponential..............................  =      1.50000
```

[DEFINITIONS]

```
H   = Headwater depth above inlet control section invert, (ft)
A   = Wetted area, (sqft)
L   = Crest length, (ft)
```

[ORIFICE INFORMATION]
1 SUBRECORD :
CIRCULAR DESCRIPTION :

[OUTLET STRUCTURE INFORMATION]

```
Radius..................................... =      0.12 (ft)
   Invert Elevation........................ =          96.08 (ft)
   Coefficient Co.......................... =        0.60000
   # of Openings........................... =           3
```

[CIRCULAR ORIFICE EQUATION]

Q = Co*A*[2gh]/k]^0.5
A = Wetted area, (sqft)
K = 1

[CULVERT INFORMATION]
DESCRIPTION : CIRCULAR PIPE / 15" HDPE [OUTLET STRUCTURE INFORMATION]

```
   Circular Radius......................... =        0.62500 (ft)
   Culvert Invert Elevation................ =       91.00000 (ft)
   Pipe Length............................ =       15.00000 (ft)
   Slope................................... =        0.03000
   Manning's N-value....................... =        0.01300
   Orifice Coefficient..................... =        0.60000
   Tailwater............................... =       92.25000 (ft)
   Number barrels.......................... =           1
```

[UNSUBMERGED EQUATION]
H/Diam = Hc/Diam + K *(Q/A*Diam^0.5))^M - 0.5*S^2

```
   Coefficient K........................... =        0.00180
   coefficient M........................... =        2.50000
```

[SUBMERGED EQUATION]
H/Diam = c*(Q/(A*Diam^0.5))^Z + Y - 0.5*S^2

```
   Coefficient c........................... =        0.03000
   Coefficient Y........................... =        0.74000
```

[DEFINITIONS]
H = Headwater depth above inlet control section invert, (ft)
Diam = Inerior height of culvert barrel, (ft)

```
   Hc   = Specific head at critical depth (dc + Vc^2/2g), (ft)
   Q    = Discharge, (cuft/s)
   A    = Full cross sectional area of culvert barrel, (sqft)
   S    = Culvert barrel slope, (ft/ft)
```

[Stand Pipe Discharge Value vs. Stage]
(the elevation increment is 0.5)

STAGE	ELEVATION (ft)	ORIFICE (cfs)	WEIR (cfs)	STAND PIPE (cfs)	CULVERT (cfs)	TOTAL FLOW (cfs)
0.00	91.00	0.00	0.00	0.00	0.00	0.00
0.50	91.50	0.00	0.00	0.00	0.00	0.00
1.00	92.00	0.00	0.00	0.00	0.00	0.00
1.50	92.50	0.00	0.00	0.00	3.52	0.00
2.00	93.00	0.00	0.00	0.00	6.11	0.00
2.50	93.50	0.00	0.00	0.00	7.89	0.00
3.00	94.00	0.00	0.00	0.00	9.33	0.00
3.50	94.50	0.00	0.00	0.00	10.58	0.00
4.00	95.00	0.00	0.00	0.00	11.70	0.00
4.50	95.50	0.00	0.00	0.00	12.72	0.00
5.00	96.00	0.00	0.00	0.00	13.66	0.00
5.50	96.50	0.38	0.00	0.00	14.55	0.38
6.00	97.00	0.63	0.00	2.67	15.38	3.30

[Weir Discharge Value vs. Stage]
(the elevation increment is 0.5)

STAGE	ELEVATION (ft)	WEIR1 (cfs)	WEIR2 (cfs)	WEIR3 (cfs)	WEIR4 (cfs)	TOTAL (cfs)
0.00	91.00	0.00	0.00	0.00	0.00	0.00
0.50	91.50	0.00	0.00	0.00	0.00	0.00
1.00	92.00	0.00	0.00	0.00	0.00	0.00
1.50	92.50	0.00	0.00	0.00	0.00	0.00
2.00	93.00	0.00	0.00	0.00	0.00	0.00
2.50	93.50	0.00	0.00	0.00	0.00	0.00
3.00	94.00	0.00	0.00	0.00	0.00	0.00
3.50	94.50	0.00	0.00	0.00	0.00	0.00
4.00	95.00	0.00	0.00	0.00	0.00	0.00
4.50	95.50	0.00	0.00	0.00	0.00	0.00
5.00	96.00	0.00	0.00	0.00	0.00	0.00
5.50	96.50	0.00	0.00	0.00	0.00	0.00
6.00	97.00	0.00	0.00	0.00	0.00	0.00

[Orifices Discharge Value vs. Stage]
(the elevation increment is 0.5)

STAGE	ELEVATION (ft)	ORIF1 (cfs)	ORIF2 (cfs)	ORIF3 (cfs)	ORIF4 (cfs)	TOTAL (cfs)
0.00	91.00	0.00	0.00	0.00	0.00	0.00
0.50	91.50	0.00	0.00	0.00	0.00	0.00
1.00	92.00	0.00	0.00	0.00	0.00	0.00
1.50	92.50	0.00	0.00	0.00	0.00	0.00
2.00	93.00	0.00	0.00	0.00	0.00	0.00
2.50	93.50	0.00	0.00	0.00	0.00	0.00
3.00	94.00	0.00	0.00	0.00	0.00	0.00
3.50	94.50	0.00	0.00	0.00	0.00	0.00
4.00	95.00	0.00	0.00	0.00	0.00	0.00
4.50	95.50	0.00	0.00	0.00	0.00	0.00
5.00	96.00	0.00	0.00	0.00	0.00	0.00
5.50	96.50	0.38	0.00	0.00	0.00	0.38
6.00	97.00	0.63	0.00	0.00	0.00	0.63

EDSC WATERSHED MODELING

OUTLET STRUCTURE REPORT

RECORD NUMBER : 2
TYPE : STAND PIPE WEIR
DESCRIPTION : EMERGENCY SPILLWAY

[RATING CURVE LIMIT]

```
Minimum Elevation........................ =        91.00 (ft)
Maximum Elevation........................ =        97.00 (ft)
Elevation Increment...................... =         0.10 (ft)
```

[STANDPIPE INFORMATION]
RECT. STAND PIPE WEIR DESCRIPTION :
[OUTLET STRUCTURE INFORMATION]

```
Width.................................... =         2.50 (ft)
Height................................... =         2.50 (ft)
Crest Length............................. =        10.00 (ft)
Crest Elevation.......................... =        96.90 (ft)
Fraction Open Area....................... =      0.60000
```

[RECTANGULAR STAND PIPE EQUATION]
ORIFICE EQ: Q = Co*A(2gh)^0.5

```
WEIR    EQ:  Q = Cw*L*H^exp
Coefficient Co .......................... =      0.60000
Coefficient Cw .......................... =      3.33000
Exponential.............................. =      1.50000
```

[DEFINITIONS]

```
H   = Headwater depth above inlet control section invert, (ft)
A   = Wetted area, (sqft)
L   = Crest length, (ft)
```

[CULVERT INFORMATION]

DESCRIPTION : CIRCULAR PIPE / 15" HDPE [OUTLET STRUCTURE INFORMATION]

```
Circular Radius.......................... =      0.62500 (ft)
Culvert Invert Elevation................. =     91.00000 (ft)
Pipe Length.............................. =     15.00000 (ft)
Slope.................................... =      0.03000
Manning's N-value........................ =      0.01300
Orifice Coefficient...................... =      0.60000
Tailwater................................ =     92.25000 (ft)
Number barrels........................... =          1
```

[UNSUBMERGED EQUATION]
H/Diam = Hc/Diam + K *(Q/A*Diam^0.5))^M - 0.5*S^2

```
Coefficient K............................ =       0.00180
coefficient M............................ =       2.50000
```

[SUBMERGED EQUATION]
H/Diam = c*(Q/(A*Diam^0.5))^Z + Y - 0.5*S^2

```
Coefficient c.............................  =        0.03000
Coefficient Y............................  =        0.74000
```

[DEFINITIONS]
H = Headwater depth above inlet control section invert, (ft)
Diam = Inerior height of culvert barrel, (ft)

```
Hc   = Specific head at critical depth (dc + Vc^2/2g), (ft)
Q    = Discharge, (cuft/s)
A    = Full cross sectional area of culvert barrel, (sqft)
S    = Culvert barrel slope, (ft/ft)
```

[Stand Pipe Discharge Value vs. Stage]
(the elevation increment is 0.5)

STAGE	ELEVATION (ft)	ORIFICE (cfs)	WEIR (cfs)	STAND PIPE (cfs)	CULVERT (cfs)	TOTAL FLOW (cfs)
0.00	91.00	0.00	0.00	0.00	0.00	0.00
0.50	91.50	0.00	0.00	0.00	0.00	0.00
1.00	92.00	0.00	0.00	0.00	0.00	0.00
1.50	92.50	0.00	0.00	0.00	3.52	0.00
2.00	93.00	0.00	0.00	0.00	6.11	0.00
2.50	93.50	0.00	0.00	0.00	7.89	0.00
3.00	94.00	0.00	0.00	0.00	9.33	0.00
3.50	94.50	0.00	0.00	0.00	10.58	0.00
4.00	95.00	0.00	0.00	0.00	11.70	0.00
4.50	95.50	0.00	0.00	0.00	12.72	0.00
5.00	96.00	0.00	0.00	0.00	13.66	0.00
5.50	96.50	0.00	0.00	0.00	14.55	0.00
6.00	97.00	0.00	0.00	1.05	15.38	1.05

[Weir Discharge Value vs. Stage]
(the elevation increment is 0.5)

STAGE	ELEVATION (ft)	WEIR1 (cfs)	WEIR2 (cfs)	WEIR3 (cfs)	WEIR4 (cfs)	TOTAL (cfs)
0.00	91.00	0.00	0.00	0.00	0.00	0.00
0.50	91.50	0.00	0.00	0.00	0.00	0.00
1.00	92.00	0.00	0.00	0.00	0.00	0.00
1.50	92.50	0.00	0.00	0.00	0.00	0.00
2.00	93.00	0.00	0.00	0.00	0.00	0.00
2.50	93.50	0.00	0.00	0.00	0.00	0.00
3.00	94.00	0.00	0.00	0.00	0.00	0.00
3.50	94.50	0.00	0.00	0.00	0.00	0.00
4.00	95.00	0.00	0.00	0.00	0.00	0.00
4.50	95.50	0.00	0.00	0.00	0.00	0.00
5.00	96.00	0.00	0.00	0.00	0.00	0.00
5.50	96.50	0.00	0.00	0.00	0.00	0.00
6.00	97.00	0.00	0.00	0.00	0.00	0.00

[Orifices Discharge Value vs. Stage]
(the elevation increment is 0.5)

STAGE	ELEVATION (ft)	ORIF1 (cfs)	ORIF2 (cfs)	ORIF3 (cfs)	ORIF4 (cfs)	TOTAL (cfs)
0.00	91.00	0.00	0.00	0.00	0.00	0.00
0.50	91.50	0.00	0.00	0.00	0.00	0.00
1.00	92.00	0.00	0.00	0.00	0.00	0.00
1.50	92.50	0.00	0.00	0.00	0.00	0.00
2.00	93.00	0.00	0.00	0.00	0.00	0.00
2.50	93.50	0.00	0.00	0.00	0.00	0.00
3.00	94.00	0.00	0.00	0.00	0.00	0.00
3.50	94.50	0.00	0.00	0.00	0.00	0.00
4.00	95.00	0.00	0.00	0.00	0.00	0.00
4.50	95.50	0.00	0.00	0.00	0.00	0.00
5.00	96.00	0.00	0.00	0.00	0.00	0.00
5.50	96.50	0.00	0.00	0.00	0.00	0.00
6.00	97.00	0.00	0.00	0.00	0.00	0.00

APPENDIX H

POST DEVELOPMENT 25YR STORM

EDSC WATERSHED MODELING

HYDROGRAPH REPORT

RECORD NUMBER : 1

```
TYPE            : COMPUTED FLOOD
DESCRIPTION     : AREA - 1 POST DEV. 25yr
```

[HYDROGRAPH INFORMATION]

```
Peak Discharge............................ =        0.65 (cfs)
Volume.................................... =        0.04 (acft)
Time Interval............................. =        2.00 (min)
Time to Peak.............................. =      722.00 (min)
Time of Base.............................. =     1486.77 (min)
Multiplication factor..................... =        1.00
```

[UNIT HYDROGRAPH INFORMATION]

```
Unit hydrograph #......................... =        1
Unit hydrograph type...................... =   CURVILINEAR UH
Peak Discharge............................ =        0.51 (cfs)
Shape Factor.............................. =      484.00

Time Interval............................. =        2.00 (min)
Time to Peak.............................. =        9.65 (min)
Time of Base.............................. =       48.26 (min)
Rainfall Excess........................... =        1.00 (in)
Basin Lag Time............................ =        8.69 (min)
```

[BASIN DESCRIPTION]

```
Watershed Area............................ =        0.11 (ac)
Curve Number.............................. =       80
```

[TIME CONCENTRATION-TR-55]

SHEET FLOW

Manning's Roughness Coef. (n)..... = 0.23930

```
Flow Length (L)........................  =        180.00 (ft)
2-yr  24-hr  Rainfall ®................  =          4.00 (in)
Land Slope (S)........................  =        0.04700
Travel Time of Sheet Flow..............  =          14.48 (min)
```

SHALLOW FLOW

```
K_Coef (surface description) (K)........  =        0.00000
Watercourse Slope (S)..................  =        0.00000
Velocity (V)...........................  =           0.00 (ft/s)
Flow Length (L)........................  =           0.00 (ft)
Travel Time of Shallow Flow............  =           0.00 (min)
```

CHANNEL FLOW

```
Hydraulic Radius ®.....................  =           0.00 (ft)
Channel Slope (S)......................  =        0.00000
Manning's Roughness Coef. (n)..........  =        0.20000
Channel Velocity (V)...................  =           0.00 (ft/s)
Flow Length (L)........................  =           0.00 (ft)
Travel Time of Shallow Flow............  =           0.00 (min)
```

TIME OF CONCENTRATION

Time of Concentration..... = 14.48 (min)

[RAINFALL DESCRIPTION]

```
Distribution Type......................  =          SCS II
Total Precipitation....................  =            7.00 (in)
Return Period..........................  =           25    (yr)
Storm Duration.........................  =           24.00 (hr)
```

[Unit Hydrograph Flow Values Time vs. Flow]
(The time interval is 10.0 min)

TIME INTV	TIME (min)	FLOW (cfs)
0	0.00	0.00
1	2.00	0.05
6	12.00	0.46
11	22.00	0.09
16	32.00	0.02
21	42.00	0.00

[Hydrograph Flow Values Time vs. Flow]
(The time interval is 10.0 min)

TIME INTV	TIME (min)	INCREMENTAL RAINFALL (in)	CUMULATIVE RAINFALL (in)	INCREMENTAL OUTFLOW (cfs)	DESIGN OUTFLOW (cfs)
270	540.0	0.01	1.03	0.00	0.00
275	550.0	0.01	1.07	0.00	0.00
280	560.0	0.01	1.10	0.00	0.00
285	570.0	0.01	1.14	0.00	0.01
290	580.0	0.01	1.18	0.00	0.01
295	590.0	0.01	1.22	0.00	0.01
300	600.0	0.01	1.27	0.00	0.01
305	610.0	0.01	1.32	0.00	0.01
310	620.0	0.01	1.37	0.00	0.01
315	630.0	0.01	1.43	0.00	0.01
320	640.0	0.01	1.49	0.00	0.02
325	650.0	0.02	1.56	0.00	0.02
330	660.0	0.02	1.64	0.00	0.02
335	670.0	0.02	1.74	0.00	0.03
340	680.0	0.02	1.85	0.00	0.03
345	690.0	0.03	1.98	0.00	0.04
350	700.0	0.11	2.35	0.02	0.08
355	710.0	0.27	3.28	0.05	0.25
360	720.0	0.11	4.64	0.07	0.63
365	730.0	0.04	4.85	-0.09	0.37
370	740.0	0.03	5.02	-0.02	0.15
375	750.0	0.02	5.14	-0.01	0.09
380	760.0	0.02	5.24	0.00	0.06
385	770.0	0.02	5.33	0.00	0.05
390	780.0	0.01	5.40	0.00	0.04
395	790.0	0.01	5.47	0.00	0.04
400	800.0	0.01	5.54	0.00	0.04
405	810.0	0.01	5.59	0.00	0.03
410	820.0	0.01	5.65	0.00	0.03
415	830.0	0.01	5.69	0.00	0.03
420	840.0	0.01	5.74	0.00	0.02
425	850.0	0.01	5.78	0.00	0.02
430	860.0	0.01	5.82	0.00	0.02
435	870.0	0.01	5.86	0.00	0.02
440	880.0	0.01	5.90	0.00	0.02
445	890.0	0.01	5.94	0.00	0.02
450	900.0	0.01	5.97	0.00	0.02
455	910.0	0.01	6.01	0.00	0.02
460	920.0	0.01	6.04	0.00	0.02
465	930.0	0.01	6.07	0.00	0.02
470	940.0	0.01	6.10	0.00	0.02
475	950.0	0.01	6.13	0.00	0.01
480	960.0	0.01	6.16	0.00	0.01
485	970.0	0.01	6.19	0.00	0.01

[Hydrograph Flow Values Time vs. Flow]
(The time interval is 10.0 min)

TIME INTV	TIME (min)	INCREMENTAL RAINFALL (in)	CUMULATIVE RAINFALL (in)	INCREMENTAL OUTFLOW (cfs)	DESIGN OUTFLOW (cfs)
490	980.0	0.01	6.21	0.00	0.01
495	990.0	0.01	6.24	0.00	0.01
500	1000.0	0.00	6.26	0.00	0.01
505	1010.0	0.00	6.29	0.00	0.01
510	1020.0	0.00	6.31	0.00	0.01
515	1030.0	0.00	6.34	0.00	0.01
520	1040.0	0.00	6.36	0.00	0.01
525	1050.0	0.00	6.38	0.00	0.01
530	1060.0	0.00	6.40	0.00	0.01
535	1070.0	0.00	6.43	0.00	0.01
540	1080.0	0.00	6.45	0.00	0.01
545	1090.0	0.00	6.47	0.00	0.01
550	1100.0	0.00	6.49	0.00	0.01
555	1110.0	0.00	6.51	0.00	0.01
560	1120.0	0.00	6.53	0.00	0.01
565	1130.0	0.00	6.55	0.00	0.01
570	1140.0	0.00	6.56	0.00	0.01
575	1150.0	0.00	6.58	0.00	0.01
580	1160.0	0.00	6.60	0.00	0.01
585	1170.0	0.00	6.62	0.00	0.01
590	1180.0	0.00	6.63	0.00	0.01
595	1190.0	0.00	6.65	0.00	0.01
600	1200.0	0.00	6.66	0.00	0.01
605	1210.0	0.00	6.68	0.00	0.01
610	1220.0	0.00	6.69	0.00	0.01
615	1230.0	0.00	6.71	0.00	0.01
620	1240.0	0.00	6.72	0.00	0.01
625	1250.0	0.00	6.74	0.00	0.01
630	1260.0	0.00	6.75	0.00	0.01
635	1270.0	0.00	6.77	0.00	0.01
640	1280.0	0.00	6.78	0.00	0.01
645	1290.0	0.00	6.80	0.00	0.01
650	1300.0	0.00	6.81	0.00	0.01
655	1310.0	0.00	6.82	0.00	0.01
660	1320.0	0.00	6.84	0.00	0.01
665	1330.0	0.00	6.85	0.00	0.01
670	1340.0	0.00	6.87	0.00	0.01
675	1350.0	0.00	6.88	0.00	0.00
680	1360.0	0.00	6.89	0.00	0.01
685	1370.0	0.00	6.91	0.00	0.01
690	1380.0	0.00	6.92	0.00	0.01
695	1390.0	0.00	6.93	0.00	0.00
700	1400.0	0.00	6.95	0.00	0.00
705	1410.0	0.00	6.96	0.00	0.00

[Hydrograph Flow Values Time vs. Flow]
(The time interval is 10.0 min)

TIME INTV	TIME (min)	INCREMENTAL RAINFALL (in)	CUMULATIVE RAINFALL (in)	INCREMENTAL OUTFLOW (cfs)	DESIGN OUTFLOW (cfs)
710	1420.0	0.00	6.97	0.00	0.01
715	1430.0	0.00	6.99	0.00	0.00
720	1440.0	0.00	7.00	0.00	0.00

EDSC WATERSHED MODELING
HYDROGRAPH REPORT
RECORD NUMBER : 2

```
TYPE            : COMPUTED FLOOD
DESCRIPTION     : AREA - 2 POST DEV. 25yr
```

[HYDROGRAPH INFORMATION]

```
Peak Discharge............................ =          1.92 (cfs)
Volume.................................... =          0.11 (acft)
Time Interval............................. =          2.00 (min)
Time to Peak.............................. =        718.00 (min)
Time of Base.............................. =       1468.68 (min)
Multiplication factor..................... =          1.00
```

[UNIT HYDROGRAPH INFORMATION]

```
Unit hydrograph #......................... =          2
Unit hydrograph type...................... =     CURVILINEAR UH
Peak Discharge............................ =          1.67 (cfs)
Shape Factor.............................. =        484.00

Time Interval............................. =          2.00 (min)
Time to Peak.............................. =          5.96 (min)
Time of Base.............................. =         29.80 (min)
Rainfall Excess........................... =          1.00 (in)
Basin Lag Time............................ =          5.36 (min)
```

[BASIN DESCRIPTION]

```
Watershed Area............................ =          0.22 (ac)
Curve Number.............................. =         94
```

[TIME CONCENTRATION-TR-55]

SHEET FLOW

Manning's Roughness Coef. (n).....	=	0.10350
Flow Length (L).....	=	182.00 (ft)
2-yr 24-hr Rainfall ®.....	=	4.00 (in)
Land Slope (S).....	=	0.03000
Travel Time of Sheet Flow.....	=	8.94 (min)

SHALLOW FLOW

K_Coef (surface description) (K).....	=	0.00000
Watercourse Slope (S).....	=	0.00000
Velocity (V).....	=	0.00 (ft/s)
Flow Length (L).....	=	0.00 (ft)
Travel Time of Shallow Flow.....	=	0.00 (min)

CHANNEL FLOW

Hydraulic Radius ®.....	=	0.00 (ft)
Channel Slope (S).....	=	0.00000
Manning's Roughness Coef. (n).....	=	0.20000
Channel Velocity (V).....	=	0.00 (ft/s)
Flow Length (L).....	=	0.00 (ft)
Travel Time of Shallow Flow.....	=	0.00 (min)

TIME OF CONCENTRATION

Time of Concentration..... = 8.94 (min)

[RAINFALL DESCRIPTION]

Distribution Type.....	=	SCS II
Total Precipitation.....	=	7.00 (in)
Return Period.....	=	25 (yr)
Storm Duration.....	=	24.00 (hr)

[Unit Hydrograph Flow Values Time vs. Flow]
(The time interval is 10.0 min)

TIME INTV	TIME (min)	FLOW (cfs)
0	0.00	0.00
1	2.00	0.39
6	12.00	0.46
11	22.00	0.03

[Hydrograph Flow Values Time vs. Flow]
(The time interval is 10.0 min)

TIME INTV	TIME (min)	INCREMENTAL RAINFALL (in)	CUMULATIVE RAINFALL (in)	INCREMENTAL OUTFLOW (cfs)	DESIGN OUTFLOW (cfs)
105	210.0	0.00	0.29	0.00	0.00
110	220.0	0.00	0.30	0.00	0.00
115	230.0	0.00	0.32	0.00	0.01
120	240.0	0.00	0.34	0.00	0.01
125	250.0	0.00	0.35	0.00	0.01
130	260.0	0.00	0.37	0.00	0.01
135	270.0	0.00	0.39	0.00	0.01
140	280.0	0.00	0.40	0.00	0.01
145	290.0	0.00	0.42	0.00	0.01
150	300.0	0.00	0.44	0.00	0.01
155	310.0	0.00	0.46	0.00	0.01
160	320.0	0.00	0.48	0.00	0.01
165	330.0	0.00	0.50	0.00	0.01
170	340.0	0.00	0.52	0.00	0.01
175	350.0	0.00	0.54	0.00	0.01
180	360.0	0.00	0.56	0.00	0.01
185	370.0	0.00	0.58	0.00	0.02
190	380.0	0.00	0.60	0.00	0.02
195	390.0	0.00	0.62	0.00	0.02
200	400.0	0.00	0.65	0.00	0.02
205	410.0	0.00	0.67	0.00	0.02
210	420.0	0.00	0.69	0.00	0.02
215	430.0	0.00	0.72	0.00	0.02
220	440.0	0.00	0.74	0.00	0.02
225	450.0	0.00	0.76	0.00	0.02
230	460.0	0.00	0.79	0.00	0.02
235	470.0	0.01	0.81	0.00	0.02
240	480.0	0.01	0.84	0.00	0.02
245	490.0	0.01	0.87	0.00	0.02
250	500.0	0.01	0.90	0.00	0.03
255	510.0	0.01	0.93	0.00	0.03
260	520.0	0.01	0.96	0.00	0.03
265	530.0	0.01	0.99	0.00	0.03
270	540.0	0.01	1.03	0.00	0.04
275	550.0	0.01	1.07	0.00	0.04
280	560.0	0.01	1.10	0.00	0.04
285	570.0	0.01	1.14	0.00	0.04
290	580.0	0.01	1.18	0.00	0.04
295	590.0	0.01	1.22	0.00	0.04
300	600.0	0.01	1.27	0.00	0.05
305	610.0	0.01	1.32	0.00	0.05
310	620.0	0.01	1.37	0.00	0.06
315	630.0	0.01	1.43	0.00	0.06
320	640.0	0.01	1.49	0.00	0.07

[Hydrograph Flow Values Time vs. Flow]
(The time interval is 10.0 min)

TIME INTV	TIME (min)	INCREMENTAL RAINFALL (in)	CUMULATIVE RAINFALL (in)	INCREMENTAL OUTFLOW (cfs)	DESIGN OUTFLOW (cfs)
325	650.0	0.02	1.56	0.00	0.08
330	660.0	0.02	1.64	0.00	0.09
335	670.0	0.02	1.74	0.00	0.11
340	680.0	0.02	1.85	0.00	0.13
345	690.0	0.03	1.98	0.01	0.15
350	700.0	0.11	2.35	0.09	0.38
355	710.0	0.27	3.28	0.16	0.99
360	720.0	0.11	4.64	-0.04	1.88
365	730.0	0.04	4.85	-0.15	0.48
370	740.0	0.03	5.02	-0.02	0.24
375	750.0	0.02	5.14	-0.01	0.17
380	760.0	0.02	5.24	0.00	0.13
385	770.0	0.02	5.33	0.00	0.11
390	780.0	0.01	5.40	0.00	0.10
395	790.0	0.01	5.47	0.00	0.09
400	800.0	0.01	5.54	0.00	0.08
405	810.0	0.01	5.59	0.00	0.07
410	820.0	0.01	5.65	0.00	0.07
415	830.0	0.01	5.69	0.00	0.06
420	840.0	0.01	5.74	0.00	0.06
425	850.0	0.01	5.78	0.00	0.05
430	860.0	0.01	5.82	0.00	0.05
435	870.0	0.01	5.86	0.00	0.05
440	880.0	0.01	5.90	0.00	0.05
445	890.0	0.01	5.94	0.00	0.05
450	900.0	0.01	5.97	0.00	0.04
455	910.0	0.01	6.01	0.00	0.04
460	920.0	0.01	6.04	0.00	0.04
465	930.0	0.01	6.07	0.00	0.04
470	940.0	0.01	6.10	0.00	0.04
475	950.0	0.01	6.13	0.00	0.03
480	960.0	0.01	6.16	0.00	0.03
485	970.0	0.01	6.19	0.00	0.03
490	980.0	0.01	6.21	0.00	0.03
495	990.0	0.01	6.24	0.00	0.03
500	1000.0	0.00	6.26	0.00	0.03
505	1010.0	0.00	6.29	0.00	0.03
510	1020.0	0.00	6.31	0.00	0.03
515	1030.0	0.00	6.34	0.00	0.03
520	1040.0	0.00	6.36	0.00	0.03
525	1050.0	0.00	6.38	0.00	0.03
530	1060.0	0.00	6.40	0.00	0.03
535	1070.0	0.00	6.43	0.00	0.03
540	1080.0	0.00	6.45	0.00	0.03

[Hydrograph Flow Values Time vs. Flow]
(The time interval is 10.0 min)

TIME INTV	TIME (min)	INCREMENTAL RAINFALL (in)	CUMULATIVE RAINFALL (in)	INCREMENTAL OUTFLOW (cfs)	DESIGN OUTFLOW (cfs)
545	1090.0	0.00	6.47	0.00	0.02
550	1100.0	0.00	6.49	0.00	0.02
555	1110.0	0.00	6.51	0.00	0.02
560	1120.0	0.00	6.53	0.00	0.02
565	1130.0	0.00	6.55	0.00	0.02
570	1140.0	0.00	6.56	0.00	0.02
575	1150.0	0.00	6.58	0.00	0.02
580	1160.0	0.00	6.60	0.00	0.02
585	1170.0	0.00	6.62	0.00	0.02
590	1180.0	0.00	6.63	0.00	0.02
595	1190.0	0.00	6.65	0.00	0.02
600	1200.0	0.00	6.66	0.00	0.02
605	1210.0	0.00	6.68	0.00	0.02
610	1220.0	0.00	6.69	0.00	0.02
615	1230.0	0.00	6.71	0.00	0.02
620	1240.0	0.00	6.72	0.00	0.02
625	1250.0	0.00	6.74	0.00	0.02
630	1260.0	0.00	6.75	0.00	0.02
635	1270.0	0.00	6.77	0.00	0.02
640	1280.0	0.00	6.78	0.00	0.02
645	1290.0	0.00	6.80	0.00	0.02
650	1300.0	0.00	6.81	0.00	0.02
655	1310.0	0.00	6.82	0.00	0.02
660	1320.0	0.00	6.84	0.00	0.02
665	1330.0	0.00	6.85	0.00	0.01
670	1340.0	0.00	6.87	0.00	0.02
675	1350.0	0.00	6.88	0.00	0.02
680	1360.0	0.00	6.89	0.00	0.01
685	1370.0	0.00	6.91	0.00	0.02
690	1380.0	0.00	6.92	0.00	0.01
695	1390.0	0.00	6.93	0.00	0.01
700	1400.0	0.00	6.95	0.00	0.01
705	1410.0	0.00	6.96	0.00	0.01
710	1420.0	0.00	6.97	0.00	0.01
715	1430.0	0.00	6.99	0.00	0.01
720	1440.0	0.00	7.00	0.00	0.01

EDSC WATERSHED MODELING

HYDROGRAPH REPORT

RECORD NUMBER : 3

TYPE : COMPUTED FLOOD
DESCRIPTION : AREA - 3 POST DEV. 25yr

[HYDROGRAPH INFORMATION]

Peak Discharge	=	1.00	(cfs)
Volume	=	0.05	(acft)
Time Interval	=	2.00	(min)
Time to Peak	=	718.00	(min)
Time of Base	=	1466.26	(min)
Multiplication factor	=	1.00	

[UNIT HYDROGRAPH INFORMATION]

Unit hydrograph #	=	3	
Unit hydrograph type	=	CURVILINEAR UH	
Peak Discharge	=	1.16	(cfs)
Shape Factor	=	484.00	
Time Interval	=	2.00	(min)
Time to Peak	=	5.33	(min)
Time of Base	=	26.67	(min)
Rainfall Excess	=	1.00	(in)
Basin Lag Time	=	4.80	(min)

[BASIN DESCRIPTION]

Watershed Area	=	0.14	(ac)
Curve Number	=	79	

[TIME CONCENTRATION-USER DEFINED]
Time of Concentration..... = 8.00 (min)
[RAINFALL DESCRIPTION]

Distribution Type	=	SCS II	
Total Precipitation	=	7.00	(in)
Return Period	=	25	(yr)
Storm Duration	=	24.00	(hr)

[Unit Hydrograph Flow Values Time vs. Flow]
(The time interval is 10.0 min)

TIME INTV	TIME (min)	FLOW (cfs)
0	0.00	0.00
1	2.00	0.32
6	12.00	0.22
11	22.00	0.01

[Hydrograph Flow Values Time vs. Flow]
(The time interval is 10.0 min)

TIME INTV	TIME (min)	INCREMENTAL RAINFALL (in)	CUMULATIVE RAINFALL (in)	INCREMENTAL OUTFLOW (cfs)	DESIGN OUTFLOW (cfs)
265	530.0	0.01	0.99	0.00	0.00
270	540.0	0.01	1.03	0.00	0.01
275	550.0	0.01	1.07	0.00	0.01
280	560.0	0.01	1.10	0.00	0.01
285	570.0	0.01	1.14	0.00	0.01
290	580.0	0.01	1.18	0.00	0.01
295	590.0	0.01	1.22	0.00	0.01
300	600.0	0.01	1.27	0.00	0.01
305	610.0	0.01	1.32	0.00	0.01
310	620.0	0.01	1.37	0.00	0.02
315	630.0	0.01	1.43	0.00	0.02
320	640.0	0.01	1.49	0.00	0.02
325	650.0	0.02	1.56	0.00	0.02
330	660.0	0.02	1.64	0.00	0.03
335	670.0	0.02	1.74	0.00	0.04
340	680.0	0.02	1.85	0.00	0.05
345	690.0	0.03	1.98	0.00	0.06
350	700.0	0.11	2.35	0.04	0.16
355	710.0	0.27	3.28	0.09	0.47
360	720.0	0.11	4.64	-0.03	0.96
365	730.0	0.04	4.85	-0.06	0.22
370	740.0	0.03	5.02	-0.01	0.12
375	750.0	0.02	5.14	-0.01	0.09
380	760.0	0.02	5.24	0.00	0.07
385	770.0	0.02	5.33	0.00	0.06
390	780.0	0.01	5.40	0.00	0.05
395	790.0	0.01	5.47	0.00	0.05
400	800.0	0.01	5.54	0.00	0.04
405	810.0	0.01	5.59	0.00	0.04
410	820.0	0.01	5.65	0.00	0.04
415	830.0	0.01	5.69	0.00	0.03
420	840.0	0.01	5.74	0.00	0.03
425	850.0	0.01	5.78	0.00	0.03
430	860.0	0.01	5.82	0.00	0.03
435	870.0	0.01	5.86	0.00	0.03
440	880.0	0.01	5.90	0.00	0.03
445	890.0	0.01	5.94	0.00	0.02
450	900.0	0.01	5.97	0.00	0.02
455	910.0	0.01	6.01	0.00	0.02
460	920.0	0.01	6.04	0.00	0.02
465	930.0	0.01	6.07	0.00	0.02
470	940.0	0.01	6.10	0.00	0.02
475	950.0	0.01	6.13	0.00	0.02
480	960.0	0.01	6.16	0.00	0.02

[Hydrograph Flow Values Time vs. Flow]
(The time interval is 10.0 min)

TIME INTV	TIME (min)	INCREMENTAL RAINFALL (in)	CUMULATIVE RAINFALL (in)	INCREMENTAL OUTFLOW (cfs)	DESIGN OUTFLOW (cfs)
485	970.0	0.01	6.19	0.00	0.02
490	980.0	0.01	6.21	0.00	0.02
495	990.0	0.01	6.24	0.00	0.02
500	1000.0	0.00	6.26	0.00	0.02
505	1010.0	0.00	6.29	0.00	0.02
510	1020.0	0.00	6.31	0.00	0.01
515	1030.0	0.00	6.34	0.00	0.01
520	1040.0	0.00	6.36	0.00	0.01
525	1050.0	0.00	6.38	0.00	0.01
530	1060.0	0.00	6.40	0.00	0.01
535	1070.0	0.00	6.43	0.00	0.01
540	1080.0	0.00	6.45	0.00	0.01
545	1090.0	0.00	6.47	0.00	0.01
550	1100.0	0.00	6.49	0.00	0.01
555	1110.0	0.00	6.51	0.00	0.01
560	1120.0	0.00	6.53	0.00	0.01
565	1130.0	0.00	6.55	0.00	0.01
570	1140.0	0.00	6.56	0.00	0.01
575	1150.0	0.00	6.58	0.00	0.01
580	1160.0	0.00	6.60	0.00	0.01
585	1170.0	0.00	6.62	0.00	0.01
590	1180.0	0.00	6.63	0.00	0.01
595	1190.0	0.00	6.65	0.00	0.01
600	1200.0	0.00	6.66	0.00	0.01
605	1210.0	0.00	6.68	0.00	0.01
610	1220.0	0.00	6.69	0.00	0.01
615	1230.0	0.00	6.71	0.00	0.01
620	1240.0	0.00	6.72	0.00	0.01
625	1250.0	0.00	6.74	0.00	0.01
630	1260.0	0.00	6.75	0.00	0.01
635	1270.0	0.00	6.77	0.00	0.01
640	1280.0	0.00	6.78	0.00	0.01
645	1290.0	0.00	6.80	0.00	0.01
650	1300.0	0.00	6.81	0.00	0.01
655	1310.0	0.00	6.82	0.00	0.01
660	1320.0	0.00	6.84	0.00	0.01
665	1330.0	0.00	6.85	0.00	0.01
670	1340.0	0.00	6.87	0.00	0.01
675	1350.0	0.00	6.88	0.00	0.01
680	1360.0	0.00	6.89	0.00	0.01
685	1370.0	0.00	6.91	0.00	0.01
690	1380.0	0.00	6.92	0.00	0.01
695	1390.0	0.00	6.93	0.00	0.01
700	1400.0	0.00	6.95	0.00	0.01

[Hydrograph Flow Values Time vs. Flow]
(The time interval is 10.0 min)

TIME INTV	TIME (min)	INCREMENTAL RAINFALL (in)	CUMULATIVE RAINFALL (in)	INCREMENTAL OUTFLOW (cfs)	DESIGN OUTFLOW (cfs)
705	1410.0	0.00	6.96	0.00	0.01
710	1420.0	0.00	6.97	0.00	0.01
715	1430.0	0.00	6.99	0.00	0.01
720	1440.0	0.00	7.00	0.00	0.01

EDSC WATERSHED MODELING

HYDROGRAPH REPORT

RECORD NUMBER : 4

```
TYPE            : COMBINE
DESCRIPTION     : COMBINED POST DEV. 25yr
```

[HYDROGRAPH INFORMATION]

```
Peak Discharge............................ =          3.49 (cfs)
Volume.................................... =          0.20 (acft)
Time Interval............................. =          2.00 (min)
Time to Peak.............................. =        718.00 (min)
Time of Base.............................. =       1448.00 (min)
```

[COMBINE HYDROGRAPH RECORD #]
HYDROGRAPH # 1 TYPE : COMPUTED FLOOD
DESCRIPTION : AREA - 1 POST DEV. 25yr

```
Peak Discharge........................ =          0.65 (cfs)
Time to Peak......................... =        722.00 (min)
Time Interval........................ =          2.00 (min)
HYDROGRAPH #   2    TYPE : COMPUTED FLOOD
```

DESCRIPTION : AREA - 2 POST DEV. 25yr

```
Peak Discharge........................ =          1.92 (cfs)
Time to Peak......................... =        718.00 (min)
Time Interval........................ =          2.00 (min)
HYDROGRAPH #   3    TYPE : COMPUTED FLOOD
```

DESCRIPTION : AREA - 3 POST DEV. 25yr

```
Peak Discharge........................ =          1.00 (cfs)
Time to Peak......................... =        718.00 (min)
Time Interval........................ =          2.00 (min)
```

[Combine Hydrograph Flow Values]
(The time interval is 10.0 min)

INTV #	TIME (min)	OUTFLOW (cfs)
106	212.00	0.00
111	222.00	0.00
116	232.00	0.01
121	242.00	0.01
126	252.00	0.01
131	262.00	0.01
136	272.00	0.01
141	282.00	0.01
146	292.00	0.01
151	302.00	0.01
156	312.00	0.01
161	322.00	0.01
166	332.00	0.01
171	342.00	0.01
176	352.00	0.01
181	362.00	0.01
186	372.00	0.02
191	382.00	0.02
196	392.00	0.02
201	402.00	0.02
206	412.00	0.02
211	422.00	0.02
216	432.00	0.02
221	442.00	0.02
226	452.00	0.02
231	462.00	0.02
236	472.00	0.02
241	482.00	0.02
246	492.00	0.02
251	502.00	0.03
256	512.00	0.03
261	522.00	0.03
266	532.00	0.04
271	542.00	0.05
276	552.00	0.05
281	562.00	0.05
286	572.00	0.05
291	582.00	0.05
296	592.00	0.06
301	602.00	0.07
306	612.00	0.08
311	622.00	0.09
316	632.00	0.10
321	642.00	0.11
326	652.00	0.13

[Combine Hydrograph Flow Values]
(The time interval is 10.0 min)

INTV #	TIME (min)	OUTFLOW (cfs)
331	662.00	0.15
336	672.00	0.18
341	682.00	0.22
346	692.00	0.27
351	702.00	0.79
356	712.00	2.11
361	722.00	3.06
366	732.00	0.87
371	742.00	0.48
376	752.00	0.33
381	762.00	0.25
386	772.00	0.22
391	782.00	0.19
396	792.00	0.17
401	802.00	0.16
406	812.00	0.14
411	822.00	0.13
416	832.00	0.12
421	842.00	0.11
426	852.00	0.10
431	862.00	0.10
436	872.00	0.10
441	882.00	0.09
446	892.00	0.09
451	902.00	0.08
456	912.00	0.08
461	922.00	0.08
466	932.00	0.08
471	942.00	0.07
476	952.00	0.07
481	962.00	0.06
486	972.00	0.06
491	982.00	0.06
496	992.00	0.06
501	1002.00	0.06
506	1012.00	0.06
511	1022.00	0.05
516	1032.00	0.05
521	1042.00	0.05
526	1052.00	0.05
531	1062.00	0.05
536	1072.00	0.05
541	1082.00	0.05
546	1092.00	0.05
551	1102.00	0.04

[Combine Hydrograph Flow Values]
(The time interval is 10.0 min)

INTV #	TIME (min)	OUTFLOW (cfs)
556	1112.00	0.04
561	1122.00	0.04
566	1132.00	0.04
571	1142.00	0.04
576	1152.00	0.04
581	1162.00	0.04
586	1172.00	0.04
591	1182.00	0.03
596	1192.00	0.03
601	1202.00	0.03
606	1212.00	0.03
611	1222.00	0.03
616	1232.00	0.03
621	1242.00	0.03
626	1252.00	0.03
631	1262.00	0.03
636	1272.00	0.03
641	1282.00	0.03
646	1292.00	0.03
651	1302.00	0.03
656	1312.00	0.03
661	1322.00	0.03
666	1332.00	0.03
671	1342.00	0.03
676	1352.00	0.03
681	1362.00	0.03
686	1372.00	0.03
691	1382.00	0.03
696	1392.00	0.03
701	1402.00	0.03
706	1412.00	0.03
711	1422.00	0.03
716	1432.00	0.02
721	1442.00	0.02

EDSC WATERSHED MODELING

HYDROGRAPH REPORT

RECORD NUMBER : 5

TYPE : RESER STOR. IND
DESCRIPTION : ROUTED POST DEV. 25yr

[HYDROGRAPH INFORMATION]

Peak Discharge	=	2.58	(cfs)
Volume	=	0.18	(acft)
Time Interval	=	2.00	(min)
Time to Peak	=	724.00	(min)
Time of Base	=	1602.00	(min)
Peak Elevation	=	96.85	(ft)

[RESERVOIR STRUCTURE INFORMATION]
Reservoir #..... = 1
Description..... = BASIN - 1
Storage type..... = MAN STAGE/AREA
Max storage..... = 3137.64 Cuft
Discharge type..... = COMP STAGE/DIS
Max discharge..... = 4.36 cfs

[RESERVOIR INFORMATION]
Reservoir #..... = 1
Reservoir Description..... = BASIN - 1

[INFLOW HYDROGRAPH INFORMATION]
Hydrograph #..... = 4
Hydrograph Description..... = COMBINED POST DEV. 25yr

[Computation of Reservoir Outflow Table of Storage Indication Method]
(The time interval is 10.0 min)

INTV#	TIME (min)	INFLOW (cfs)	0.5(I1+I2)dt	+	EQUATION S1-0.5(O1)dt	=	S2+0.5(O2)dt	OUTFLOW O2(cfs)	STORAGE (cuft)	ELEVATION (ft)
314	628.0	0.09	11.09	+	642.83	=	653.93	0.00	653.69	96.10
315	630.0	0.10	11.39	+	653.45	=	664.84	0.01	664.37	96.11
320	640.0	0.11	12.82	+	703.86	=	716.69	0.03	715.16	96.13
325	650.0	0.12	14.75	+	752.27	=	767.02	0.04	764.47	96.15
330	660.0	0.14	17.00	+	800.82	=	817.81	0.06	814.23	96.17
335	670.0	0.17	19.89	+	850.46	=	870.35	0.08	865.69	96.19
340	680.0	0.21	24.47	+	905.93	=	930.40	0.11	923.97	96.22
345	690.0	0.25	29.89	+	966.28	=	996.17	0.14	987.63	96.24
350	700.0	0.62	65.46	+	1054.54	=	1120.00	0.21	1107.48	96.29
355	710.0	1.72	188.16	+	1436.16	=	1624.32	0.37	1602.01	96.48
360	720.0	3.48	417.83	+	2269.72	=	2687.54	2.31	2548.84	96.81
365	730.0	1.07	146.84	+	2395.43	=	2542.27	1.99	2422.66	96.77
370	740.0	0.52	65.57	+	2006.29	=	2071.86	0.97	2013.42	96.63
375	750.0	0.35	44.12	+	1807.28	=	1851.40	0.62	1814.38	96.56
380	760.0	0.26	31.72	+	1677.37	=	1709.09	0.43	1683.19	96.51
385	770.0	0.22	27.18	+	1588.99	=	1616.17	0.37	1593.98	96.48
390	780.0	0.20	23.92	+	1502.14	=	1526.06	0.35	1505.31	96.45
395	790.0	0.18	21.40	+	1414.52	=	1435.92	0.32	1416.60	96.41
400	800.0	0.16	19.38	+	1330.09	=	1349.47	0.29	1331.82	96.38
405	810.0	0.14	17.59	+	1253.97	=	1271.56	0.27	1255.58	96.35
410	820.0	0.13	16.13	+	1185.17	=	1201.30	0.24	1186.83	96.32
415	830.0	0.12	14.88	+	1123.97	=	1138.85	0.22	1125.72	96.30
420	840.0	0.11	13.54	+	1071.49	=	1085.03	0.19	1073.63	96.28
425	850.0	0.11	12.65	+	1028.99	=	1041.63	0.17	1031.63	96.26

[Computation of Reservoir Outflow Table of Storage Indication Method]

(The time interval is 10.0 min)

INTV#	TIME (min)	INFLOW (cfs)	EQUATION 0.5(I1+I2)dt	+	S1-0.5(O1)dt	=	S2+0.5(O2)dt	OUTFLOW O2(cfs)	STORAGE (cuft)	ELEVATION (ft)
430	860.0	0.10	12.03	+	995.51	=	1007.55	0.15	998.64	96.25
435	870.0	0.10	11.71	+	969.27	=	980.97	0.13	972.92	96.24
440	880.0	0.09	11.25	+	949.16	=	960.42	0.12	953.02	96.23
445	890.0	0.09	10.82	+	932.70	=	943.53	0.11	936.68	96.22
450	900.0	0.09	10.37	+	919.18	=	929.55	0.11	923.15	96.22
455	910.0	0.08	10.03	+	907.71	=	917.75	0.10	911.72	96.21
460	920.0	0.08	9.48	+	897.87	=	907.35	0.09	901.66	96.21
465	930.0	0.08	9.09	+	888.74	=	897.82	0.09	892.44	96.21
470	940.0	0.07	8.72	+	880.72	=	889.44	0.09	884.33	96.20
475	950.0	0.07	8.15	+	873.07	=	881.22	0.08	876.34	96.20
480	960.0	0.06	7.77	+	865.12	=	872.89	0.08	868.18	96.20
485	970.0	0.06	7.42	+	856.81	=	864.23	0.08	859.70	96.19
490	980.0	0.06	7.20	+	849.03	=	856.22	0.07	851.85	96.19
495	990.0	0.06	7.02	+	841.63	=	848.65	0.07	844.43	96.19
500	1000.0	0.06	6.95	+	835.18	=	842.13	0.07	838.04	96.18
505	1010.0	0.06	6.81	+	829.28	=	836.08	0.07	832.12	96.18
510	1020.0	0.05	6.69	+	824.12	=	830.80	0.06	826.95	96.18
515	1030.0	0.05	6.48	+	818.72	=	825.20	0.06	821.46	96.18
520	1040.0	0.05	6.36	+	813.93	=	820.29	0.06	816.65	96.17
525	1050.0	0.05	6.23	+	809.47	=	815.71	0.06	812.16	96.17
530	1060.0	0.05	5.98	+	805.25	=	811.22	0.06	807.77	96.17

[Computation of Reservoir Outflow Table of Storage Indication Method]

(The time interval is 10.0 min)

INTV#	TIME (min)	INFLOW (cfs)	EQUATION 0.5(I1+I2)dt	+	S1-0.5(O1)dt	=	S2+0.5(O2)dt	OUTFLOW O2(cfs)	STORAGE (cuft)	ELEVATION (ft)
535	1070.0	0.05	5.86	+	800.84	=	806.69	0.06	803.33	96.17
540	1080.0	0.05	5.71	+	796.60	=	802.31	0.05	799.04	96.17
545	1090.0	0.05	5.59	+	792.78	=	798.38	0.05	795.18	96.16
550	1100.0	0.05	5.41	+	788.84	=	794.24	0.05	791.14	96.16
555	1110.0	0.04	5.28	+	784.97	=	790.24	0.05	787.22	96.16
560	1120.0	0.04	5.21	+	781.06	=	786.27	0.05	783.33	96.16
565	1130.0	0.04	4.95	+	777.54	=	782.49	0.05	779.63	96.16
570	1140.0	0.04	4.83	+	773.62	=	778.45	0.05	775.66	96.16
575	1150.0	0.04	4.60	+	769.84	=	774.44	0.05	771.74	96.15
580	1160.0	0.04	4.59	+	766.07	=	770.66	0.04	768.03	96.15
585	1170.0	0.04	4.41	+	762.62	=	767.03	0.04	764.48	96.15
590	1180.0	0.03	4.21	+	758.87	=	763.08	0.04	760.61	96.15
595	1190.0	0.03	4.03	+	755.15	=	759.19	0.04	756.80	96.15
600	1200.0	0.03	3.98	+	751.48	=	755.45	0.04	753.14	96.15
605	1210.0	0.03	3.70	+	748.07	=	751.77	0.04	749.53	96.15
610	1220.0	0.03	3.75	+	744.66	=	748.41	0.04	746.24	96.14
615	1230.0	0.03	3.64	+	741.69	=	745.33	0.04	743.22	96.14
620	1240.0	0.03	3.69	+	739.38	=	743.08	0.03	741.02	96.14
625	1250.0	0.03	3.78	+	737.39	=	741.17	0.03	739.15	96.14
630	1260.0	0.03	3.52	+	735.63	=	739.15	0.03	737.17	96.14
635	1270.0	0.03	3.63	+	733.73	=	737.36	0.03	735.42	96.14
640	1280.0	0.03	3.53	+	732.30	=	735.83	0.03	733.92	96.14

[Computation of Reservoir Outflow Table of Storage Indication Method]
(The time interval is 10.0 min)

INTV#	TIME (min)	INFLOW (cfs)	EQUATION 0.5(I1+I2)dt	+	S1-0.5(O1)dt	=	S2+0.5(O2)dt	OUTFLOW O2(cfs)	STORAGE (cuft)	ELEVATION (ft)
645	1290.0	0.03	3.58	+	731.14	=	734.72	0.03	732.83	96.14
650	1300.0	0.03	3.42	+	729.79	=	733.22	0.03	731.36	96.14
655	1310.0	0.03	3.41	+	728.60	=	732.01	0.03	730.17	96.14
660	1320.0	0.03	3.51	+	727.40	=	730.92	0.03	729.10	96.14
665	1330.0	0.03	3.35	+	726.65	=	730.01	0.03	728.21	96.14
670	1340.0	0.03	3.46	+	725.72	=	729.18	0.03	727.40	96.14
675	1350.0	0.03	3.25	+	724.67	=	727.92	0.03	726.17	96.14
680	1360.0	0.03	3.30	+	723.83	=	727.12	0.03	725.39	96.14
685	1370.0	0.03	3.28	+	722.81	=	726.09	0.03	724.38	96.13
690	1380.0	0.03	3.24	+	722.21	=	725.45	0.03	723.75	96.13
695	1390.0	0.03	3.22	+	721.33	=	724.55	0.03	722.87	96.13
700	1400.0	0.03	3.08	+	720.35	=	723.43	0.03	721.77	96.13
705	1410.0	0.03	3.18	+	719.50	=	722.68	0.03	721.04	96.13
710	1420.0	0.03	3.10	+	718.80	=	721.90	0.03	720.27	96.13
715	1430.0	0.02	3.01	+	718.29	=	721.30	0.03	719.68	96.13
720	1440.0	0.03	2.98	+	717.07	=	720.06	0.03	718.47	96.13
725	1450.0	0.00	0.28	+	712.61	=	712.89	0.02	711.44	96.13
730	1460.0	0.00	0.00	+	699.58	=	699.58	0.02	698.41	96.12
735	1470.0	0.00	0.00	+	688.78	=	688.78	0.02	687.82	96.12
740	1480.0	0.00	0.00	+	680.01	=	680.01	0.01	679.23	96.12
745	1490.0	0.00	0.00	+	672.89	=	672.89	0.01	672.26	96.11
750	1500.0	0.00	0.00	+	667.11	=	667.11	0.01	666.60	96.11
755	1510.0	0.00	0.00	+	662.42	=	662.42	0.01	662.00	96.11

[Computation of Reservoir Outflow Table of Storage Indication Method]
(The time interval is 10.0 min)

INTV#	TIME (min)	INFLOW (cfs)	EQUATION 0.5(I1+I2)dt	+	S1-0.5(O1)dt	=	S2+0.5(O2)dt	OUTFLOW O2(cfs)	STORAGE (cuft)	ELEVATION (ft)
760	1520.0	0.00	0.00	+	658.61	=	658.61	0.01	658.27	96.11
765	1530.0	0.00	0.00	+	655.52	=	655.52	0.00	655.25	96.11
770	1540.0	0.00	0.00	+	653.01	=	653.01	0.00	652.79	96.10
775	1550.0	0.00	0.00	+	650.97	=	650.97	0.00	650.79	96.10
780	1560.0	0.00	0.00	+	649.32	=	649.32	0.00	649.17	96.10
785	1570.0	0.00	0.00	+	647.98	=	647.98	0.00	647.86	96.10
790	1580.0	0.00	0.00	+	646.89	=	646.89	0.00	646.79	96.10
795	1590.0	0.00	0.00	+	646.00	=	646.00	0.00	645.92	96.10
800	1600.0	0.00	0.00	+	645.28	=	645.28	0.00	645.22	96.10

EDSC WATERSHED MODELING

RESERVOIR REPORT

RECORD NUMBER : 1

STORAGE TYPE : MAN STAGE/AREA
DISCHARGE TYPE : COMP STAGE/DIS
DESCRIPTION : BASIN - 1

[RATING CURVE LIMIT]

```
Minimum Elevation........................  =        91.00 (ft)
Maximum Elevation........................  =        97.00 (ft)
Elevation Increment......................  =         0.10 (ft)
```

[STAGE STORAGE INFORMATION]
Input file = NULL
Output file = NULL

[Manual Contour Area vs. Elevation]

ELEVATION (ft)	CONTOUR AREA (sqft)
95.00	80.78
95.25	204.91
95.50	332.57
95.75	463.76
95.95	598.48
96.00	2221.72
96.25	2469.04
96.50	2719.89
96.75	2974.27
97.00	3232.19

[STAGE DISCHARGE INFORMATION]

OUTLET STRUCTURE:

```
STR #        :   1
TYPE         : STAND PIPE WEIR
```

DESCRIPTION : PRINCIPLE SPILLWAY

```
STR #        :   2
TYPE         : STAND PIPE WEIR
```

DESCRIPTION : EMERGENCY SPILLWAY

[Reservoir Discharge Value vs. Stage]
(the elevation increment is 0.5)

STAGE (ft)	ELEVATION (ft)	CONTOUR AREA (sqft)	STORAGE (cuft)	DISCHARGE (cfs)
0.00	91.00	80.78	0.00	0.00
0.50	91.50	0.00	0.00	0.00
1.00	92.00	0.00	0.00	0.00
1.50	92.50	0.00	0.00	0.00
2.00	93.00	0.00	0.00	0.00
2.50	93.50	0.00	0.00	0.00
3.00	94.00	0.00	0.00	0.00
3.50	94.50	0.00	0.00	0.00
4.00	95.00	0.00	0.00	0.00
4.50	95.50	332.57	98.87	0.00
5.00	96.00	2221.72	415.07	0.00
5.50	96.50	2719.89	1650.05	0.38
6.00	97.00	3232.19	3137.64	4.36

EDSC WATERSHED MODELING

OUTLET STRUCTURE REPORT

RECORD NUMBER : 1

TYPE : STAND PIPE WEIR
DESCRIPTION : PRINCIPLE SPILLWAY

[RATING CURVE LIMIT]
Minimum Elevation..... = 91.00 (ft)

```
Maximum Elevation.......................  =        97.00 (ft)
Elevation Increment.....................  =         0.10 (ft)
```

[STANDPIPE INFORMATION]
CIRC. STAND PIPE WEIR DESCRIPTION :
[OUTLET STRUCTURE INFORMATION]

```
Radius..................................  =         0.50 (ft)
Crest Length............................  =         3.14 (ft)
Crest Elevation.........................  =        96.50 (ft)
Fraction Open Area......................  =      1.00000
```

12" STANDPIPE

[RECTANGULAR STAND PIPE EQUATION]
ORIFICE EQ: Q = Co*A(2gh)^0.5

```
WEIR    EQ:  Q = Cw*L*H^exp
Coefficient Co .........................  =      0.60000
Coefficient Cw .........................  =      3.33000
Exponential.............................  =      1.50000
```

[DEFINITIONS]

```
H   = Headwater depth above inlet control section invert, (ft)
A   = Wetted area, (sqft)
L   = Crest length, (ft)
```

[ORIFICE INFORMATION]

```
1    SUBRECORD    :
CIRCULAR    DESCRIPTION :
```

[OUTLET STRUCTURE INFORMATION]

```
Radius..................................  =         0.12 (ft)
Invert Elevation........................  =        96.08 (ft)
Coefficient Co..........................  =      0.60000
# of Openings...........................  =            3
```

3-3" ϕ

[CIRCULAR ORIFICE EQUATION]
Q = Co*A*[2gh]/k]^0.5
A = Wetted area, (sqft)
K = 1

[CULVERT INFORMATION]
DESCRIPTION : CIRCULAR PIPE / 15" HDPE [OUTLET STRUCTURE INFORMATION]

```
Circular Radius..........................  =      0.62500 (ft)
Culvert Invert Elevation.................  =     91.00000 (ft)
Pipe Length..............................  =     15.00000 (ft)
Slope....................................  =      0.03000
Manning's N-value........................  =      0.01300
Orifice Coefficient......................  =      0.60000
Tailwater................................  =     92.25000 (ft)
Number barrels...........................  =          1
```

[UNSUBMERGED EQUATION]
H/Diam = Hc/Diam + K *(Q/A*Diam^0.5))^M - 0.5*S^2

```
Coefficient K............................  =      0.00180
coefficient M............................  =      2.50000
```

[SUBMERGED EQUATION]
H/Diam = c*(Q/(A*Diam^0.5))^Z + Y - 0.5*S^2

```
Coefficient c............................  =      0.03000
Coefficient Y............................  =      0.74000
```

[DEFINITIONS]
H = Headwater depth above inlet control section invert, (ft)
Diam = Inerior height of culvert barrel, (ft)

```
Hc   = Specific head at critical depth (dc + Vc^2/2g), (ft)
Q    = Discharge, (cuft/s)
A    = Full cross sectional area of culvert barrel, (sqft)
S    = Culvert barrel slope, (ft/ft)
```

[Stand Pipe Discharge Value vs. Stage]
(the elevation increment is 0.5)

STAGE	ELEVATION (ft)	ORIFICE (cfs)	WEIR (cfs)	STAND PIPE (cfs)	CULVERT (cfs)	TOTAL FLOW (cfs)
0.00	91.00	0.00	0.00	0.00	0.00	0.00
0.50	91.50	0.00	0.00	0.00	0.00	0.00
1.00	92.00	0.00	0.00	0.00	0.00	0.00
1.50	92.50	0.00	0.00	0.00	3.52	0.00
2.00	93.00	0.00	0.00	0.00	6.11	0.00
2.50	93.50	0.00	0.00	0.00	7.89	0.00
3.00	94.00	0.00	0.00	0.00	9.33	0.00
3.50	94.50	0.00	0.00	0.00	10.58	0.00
4.00	95.00	0.00	0.00	0.00	11.70	0.00
4.50	95.50	0.00	0.00	0.00	12.72	0.00
5.00	96.00	0.00	0.00	0.00	13.66	0.00
5.50	96.50	0.38	0.00	0.00	14.55	0.38
6.00	97.00	0.63	0.00	2.67	15.38	3.30

[Weir Discharge Value vs. Stage]
(the elevation increment is 0.5)

STAGE	ELEVATION (ft)	WEIR1 (cfs)	WEIR2 (cfs)	WEIR3 (cfs)	WEIR4 (cfs)	TOTAL (cfs)
0.00	91.00	0.00	0.00	0.00	0.00	0.00
0.50	91.50	0.00	0.00	0.00	0.00	0.00
1.00	92.00	0.00	0.00	0.00	0.00	0.00
1.50	92.50	0.00	0.00	0.00	0.00	0.00
2.00	93.00	0.00	0.00	0.00	0.00	0.00
2.50	93.50	0.00	0.00	0.00	0.00	0.00
3.00	94.00	0.00	0.00	0.00	0.00	0.00
3.50	94.50	0.00	0.00	0.00	0.00	0.00
4.00	95.00	0.00	0.00	0.00	0.00	0.00
4.50	95.50	0.00	0.00	0.00	0.00	0.00
5.00	96.00	0.00	0.00	0.00	0.00	0.00
5.50	96.50	0.00	0.00	0.00	0.00	0.00
6.00	97.00	0.00	0.00	0.00	0.00	0.00

[Orifices Discharge Value vs. Stage]
(the elevation increment is 0.5)

STAGE	ELEVATION (ft)	ORIF1 (cfs)	ORIF2 (cfs)	ORIF3 (cfs)	ORIF4 (cfs)	TOTAL (cfs)
0.00	91.00	0.00	0.00	0.00	0.00	0.00
0.50	91.50	0.00	0.00	0.00	0.00	0.00
1.00	92.00	0.00	0.00	0.00	0.00	0.00
1.50	92.50	0.00	0.00	0.00	0.00	0.00
2.00	93.00	0.00	0.00	0.00	0.00	0.00
2.50	93.50	0.00	0.00	0.00	0.00	0.00
3.00	94.00	0.00	0.00	0.00	0.00	0.00
3.50	94.50	0.00	0.00	0.00	0.00	0.00
4.00	95.00	0.00	0.00	0.00	0.00	0.00
4.50	95.50	0.00	0.00	0.00	0.00	0.00
5.00	96.00	0.00	0.00	0.00	0.00	0.00
5.50	96.50	0.38	0.00	0.00	0.00	0.38
6.00	97.00	0.63	0.00	0.00	0.00	0.63

EDSC WATERSHED MODELING

OUTLET STRUCTURE REPORT

RECORD NUMBER : 2

```
TYPE            : STAND PIPE WEIR
DESCRIPTION     : EMERGENCY SPILLWAY
```

[RATING CURVE LIMIT]

```
Minimum Elevation........................  =        91.00 (ft)
Maximum Elevation........................  =        97.00 (ft)
Elevation Increment......................  =         0.10 (ft)
```

[STANDPIPE INFORMATION]
RECT. STAND PIPE WEIR DESCRIPTION :
[OUTLET STRUCTURE INFORMATION]

```
Width....................................  =         2.50 (ft)
Height...................................  =         2.50 (ft)
Crest Length.............................  =        10.00 (ft)
Crest Elevation..........................  =        96.90 (ft)
Fraction Open Area.......................  =      0.60000
```

[RECTANGULAR STAND PIPE EQUATION]
ORIFICE EQ: Q = Co*A(2gh)^0.5

```
WEIR    EQ:  Q = Cw*L*H^exp
Coefficient Co ..........................  =      0.60000
Coefficient Cw ..........................  =      3.33000
Exponential..............................  =      1.50000
```

[DEFINITIONS]

```
H   = Headwater depth above inlet control section invert, (ft)
A   = Wetted area, (sqft)
L   = Crest length, (ft)
```

[CULVERT INFORMATION]

DESCRIPTION : CIRCULAR PIPE / 15" HDPE [OUTLET STRUCTURE INFORMATION]

```
Circular Radius..........................  =       0.62500 (ft)
Culvert Invert Elevation.................  =      92.00000 (ft)
Pipe Length..............................  =      25.00000 (ft)
Slope....................................  =       0.02000
Manning's N-value........................  =       0.01300
Orifice Coefficient......................  =       0.60000
Tailwater................................  =      93.25000 (ft)
Number barrels...........................  =           1
```

[UNSUBMERGED EQUATION]
H/Diam = Hc/Diam + K *(Q/A*Diam^0.5))^M - 0.5*S^2

```
Coefficient K............................  =       0.00450
coefficient M............................  =       2.00000
```

[SUBMERGED EQUATION]
H/Diam = c*(Q/(A*Diam^0.5))^Z + Y - 0.5*S^2

```
Coefficient c.............................  =        0.03170
Coefficient Y.............................  =        0.69000
```

[DEFINITIONS]
H = Headwater depth above inlet control section invert, (ft)
Diam = Inerior height of culvert barrel, (ft)

```
Hc   = Specific head at critical depth (dc + Vc^2/2g), (ft)
Q    = Discharge, (cuft/s)
A    = Full cross sectional area of culvert barrel, (sqft)
S    = Culvert barrel slope, (ft/ft)
```

[Stand Pipe Discharge Value vs. Stage]
(the elevation increment is 0.5)

STAGE	ELEVATION (ft)	ORIFICE (cfs)	WEIR (cfs)	STAND PIPE (cfs)	CULVERT (cfs)	TOTAL FLOW (cfs)
0.00	91.00	0.00	0.00	0.00	0.00	0.00
0.50	91.50	0.00	0.00	0.00	0.00	0.00
1.00	92.00	0.00	0.00	0.00	0.00	0.00
1.50	92.50	0.00	0.00	0.00	0.00	0.00
2.00	93.00	0.00	0.00	0.00	0.00	0.00
2.50	93.50	0.00	0.00	0.00	3.33	0.00
3.00	94.00	0.00	0.00	0.00	5.78	0.00
3.50	94.50	0.00	0.00	0.00	7.46	0.00
4.00	95.00	0.00	0.00	0.00	8.83	0.00
4.50	95.50	0.00	0.00	0.00	10.01	0.00
5.00	96.00	0.00	0.00	0.00	11.06	0.00
5.50	96.50	0.00	0.00	0.00	12.03	0.00
6.00	97.00	0.00	0.00	1.05	12.92	1.05

[Weir Discharge Value vs. Stage]
(the elevation increment is 0.5)

STAGE	ELEVATION (ft)	WEIR1 (cfs)	WEIR2 (cfs)	WEIR3 (cfs)	WEIR4 (cfs)	TOTAL (cfs)
0.00	91.00	0.00	0.00	0.00	0.00	0.00
0.50	91.50	0.00	0.00	0.00	0.00	0.00
1.00	92.00	0.00	0.00	0.00	0.00	0.00
1.50	92.50	0.00	0.00	0.00	0.00	0.00
2.00	93.00	0.00	0.00	0.00	0.00	0.00
2.50	93.50	0.00	0.00	0.00	0.00	0.00
3.00	94.00	0.00	0.00	0.00	0.00	0.00
3.50	94.50	0.00	0.00	0.00	0.00	0.00
4.00	95.00	0.00	0.00	0.00	0.00	0.00
4.50	95.50	0.00	0.00	0.00	0.00	0.00
5.00	96.00	0.00	0.00	0.00	0.00	0.00
5.50	96.50	0.00	0.00	0.00	0.00	0.00
6.00	97.00	0.00	0.00	0.00	0.00	0.00

[Orifices Discharge Value vs. Stage]
(the elevation increment is 0.5)

STAGE	ELEVATION (ft)	ORIF1 (cfs)	ORIF2 (cfs)	ORIF3 (cfs)	ORIF4 (cfs)	TOTAL (cfs)
0.00	91.00	0.00	0.00	0.00	0.00	0.00
0.50	91.50	0.00	0.00	0.00	0.00	0.00
1.00	92.00	0.00	0.00	0.00	0.00	0.00
1.50	92.50	0.00	0.00	0.00	0.00	0.00
2.00	93.00	0.00	0.00	0.00	0.00	0.00
2.50	93.50	0.00	0.00	0.00	0.00	0.00
3.00	94.00	0.00	0.00	0.00	0.00	0.00
3.50	94.50	0.00	0.00	0.00	0.00	0.00
4.00	95.00	0.00	0.00	0.00	0.00	0.00
4.50	95.50	0.00	0.00	0.00	0.00	0.00
5.00	96.00	0.00	0.00	0.00	0.00	0.00
5.50	96.50	0.00	0.00	0.00	0.00	0.00
6.00	97.00	0.00	0.00	0.00	0.00	0.00

APPENDIX I

POST DEVELOPMENT 100YR STORM

MISSING
ROUTED
100-YEAR.

EDSC WATERSHED MODELING

HYDROGRAPH REPORT

RECORD NUMBER : 1

```
TYPE            : COMPUTED FLOOD
DESCRIPTION     : AREA - 1 POST DEV. 100yr
```

[HYDROGRAPH INFORMATION]

```
Peak Discharge............................ =        0.78 (cfs)
Volume.................................... =        0.05 (acft)
Time Interval............................. =        2.00 (min)
Time to Peak.............................. =      722.00 (min)
Time of Base.............................. =     1486.77 (min)
Multiplication factor..................... =        1.00
```

[UNIT HYDROGRAPH INFORMATION]

```
Unit hydrograph #......................... =        1
Unit hydrograph type...................... =   CURVILINEAR UH
Peak Discharge............................ =        0.51 (cfs)
Shape Factor.............................. =      484.00

Time Interval............................. =        2.00 (min)
Time to Peak.............................. =        9.65 (min)
Time of Base.............................. =       48.26 (min)
Rainfall Excess........................... =        1.00 (in)
Basin Lag Time............................ =        8.69 (min)
```

[BASIN DESCRIPTION]

```
Watershed Area............................ =        0.11 (ac)
Curve Number.............................. =       80
```

[TIME CONCENTRATION-TR-55]

SHEET FLOW

```
Manning's Roughness Coef. (n)............. =     0.23930
Flow Length (L)........................... =      180.00 (ft)
2-yr  24-hr  Rainfall ®................... =      4.00 (in)
Land Slope (S)............................ =     0.04700
Travel Time of Sheet Flow................. =       14.48 (min)
```

SHALLOW FLOW

```
K_Coef (surface description) (K)..........  =     0.00000
Watercourse Slope (S)....................... =     0.00000
Velocity (V)............................... =        0.00 (ft/s)
Flow Length (L)............................ =        0.00 (ft)
Travel Time of Shallow Flow................ =        0.00 (min)
```

CHANNEL FLOW

Hydraulic Radius ®..... = 0.00 (ft)
Channel Slope (S)..... = 0.00000
Manning's Roughness Coef. (n)..... = 0.20000
Channel Velocity (V)..... = 0.00 (ft/s)

```
Flow Length (L)..........................  =        0.00 (ft)
Travel Time of Shallow Flow..............  =        0.00 (min)
```

TIME OF CONCENTRATION

Time of Concentration..... = 14.48 (min)

[RAINFALL DESCRIPTION]

```
Distribution Type........................  =      SCS II
Total Precipitation......................  =        8.00 (in)
Return Period............................  =      100    (yr)
Storm Duration...........................  =       24.00 (hr)
```

[Unit Hydrograph Flow Values Time vs. Flow]
(The time interval is 10.0 min)

TIME INTV	TIME (min)	FLOW (cfs)
0	0.00	0.00
1	2.00	0.05
6	12.00	0.46
11	22.00	0.09
16	32.00	0.02
21	42.00	0.00

[Hydrograph Flow Values Time vs. Flow]
(The time interval is 10.0 min)

TIME INTV	TIME (min)	INCREMENTAL RAINFALL (in)	CUMULATIVE RAINFALL (in)	INCREMENTAL OUTFLOW (cfs)	DESIGN OUTFLOW (cfs)
255	510.0	0.01	1.06	0.00	0.00
260	520.0	0.01	1.10	0.00	0.00
265	530.0	0.01	1.13	0.00	0.01
270	540.0	0.01	1.18	0.00	0.01
275	550.0	0.01	1.22	0.00	0.01
280	560.0	0.01	1.26	0.00	0.01
285	570.0	0.01	1.30	0.00	0.01
290	580.0	0.01	1.35	0.00	0.01
295	590.0	0.01	1.40	0.00	0.01
300	600.0	0.01	1.45	0.00	0.01

[Hydrograph Flow Values Time vs. Flow]
(The time interval is 10.0 min)

TIME INTV	TIME (min)	INCREMENTAL RAINFALL (in)	CUMULATIVE RAINFALL (in)	INCREMENTAL OUTFLOW (cfs)	DESIGN OUTFLOW (cfs)
305	610.0	0.01	1.50	0.00	0.01
310	620.0	0.01	1.57	0.00	0.02
315	630.0	0.01	1.63	0.00	0.02
320	640.0	0.02	1.71	0.00	0.02
325	650.0	0.02	1.79	0.00	0.02
330	660.0	0.02	1.88	0.00	0.03
335	670.0	0.02	1.99	0.00	0.03
340	680.0	0.03	2.11	0.00	0.04
345	690.0	0.03	2.26	0.00	0.05
350	700.0	0.13	2.69	0.02	0.10
355	710.0	0.31	3.75	0.06	0.31
360	720.0	0.12	5.30	0.08	0.75
365	730.0	0.04	5.55	-0.10	0.44
370	740.0	0.03	5.74	-0.03	0.18
375	750.0	0.02	5.88	-0.01	0.11
380	760.0	0.02	5.99	0.00	0.07
385	770.0	0.02	6.09	0.00	0.06
390	780.0	0.02	6.18	0.00	0.05
395	790.0	0.02	6.25	0.00	0.05
400	800.0	0.01	6.33	0.00	0.04
405	810.0	0.01	6.39	0.00	0.04
410	820.0	0.01	6.45	0.00	0.04
415	830.0	0.01	6.51	0.00	0.03
420	840.0	0.01	6.56	0.00	0.03
425	850.0	0.01	6.61	0.00	0.03
430	860.0	0.01	6.66	0.00	0.03
435	870.0	0.01	6.70	0.00	0.02
440	880.0	0.01	6.74	0.00	0.02
445	890.0	0.01	6.79	0.00	0.02
450	900.0	0.01	6.83	0.00	0.02
455	910.0	0.01	6.87	0.00	0.02
460	920.0	0.01	6.90	0.00	0.02
465	930.0	0.01	6.94	0.00	0.02
470	940.0	0.01	6.98	0.00	0.02

[Hydrograph Flow Values Time vs. Flow]
(The time interval is 10.0 min)

TIME INTV	TIME (min)	INCREMENTAL RAINFALL (in)	CUMULATIVE RAINFALL (in)	INCREMENTAL OUTFLOW (cfs)	DESIGN OUTFLOW (cfs)
475	950.0	0.01	7.01	0.00	0.02
480	960.0	0.01	7.04	0.00	0.02
485	970.0	0.01	7.07	0.00	0.02
490	980.0	0.01	7.10	0.00	0.02
495	990.0	0.01	7.13	0.00	0.02
500	1000.0	0.01	7.16	0.00	0.01
505	1010.0	0.01	7.19	0.00	0.01
510	1020.0	0.01	7.21	0.00	0.01
515	1030.0	0.01	7.24	0.00	0.01
520	1040.0	0.01	7.27	0.00	0.01
525	1050.0	0.01	7.29	0.00	0.01
530	1060.0	0.01	7.32	0.00	0.01
535	1070.0	0.00	7.34	0.00	0.01
540	1080.0	0.00	7.37	0.00	0.01
545	1090.0	0.00	7.39	0.00	0.01
550	1100.0	0.00	7.41	0.00	0.01
555	1110.0	0.00	7.44	0.00	0.01
560	1120.0	0.00	7.46	0.00	0.01
565	1130.0	0.00	7.48	0.00	0.01
570	1140.0	0.00	7.50	0.00	0.01
575	1150.0	0.00	7.52	0.00	0.01
580	1160.0	0.00	7.54	0.00	0.01
585	1170.0	0.00	7.56	0.00	0.01
590	1180.0	0.00	7.58	0.00	0.01
595	1190.0	0.00	7.60	0.00	0.01
600	1200.0	0.00	7.62	0.00	0.01
605	1210.0	0.00	7.63	0.00	0.01
610	1220.0	0.00	7.65	0.00	0.01
615	1230.0	0.00	7.67	0.00	0.01
620	1240.0	0.00	7.68	0.00	0.01
625	1250.0	0.00	7.70	0.00	0.01
630	1260.0	0.00	7.72	0.00	0.01
635	1270.0	0.00	7.73	0.00	0.01
640	1280.0	0.00	7.75	0.00	0.01
645	1290.0	0.00	7.77	0.00	0.01
650	1300.0	0.00	7.78	0.00	0.01
655	1310.0	0.00	7.80	0.00	0.01
660	1320.0	0.00	7.82	0.00	0.01
665	1330.0	0.00	7.83	0.00	0.01
670	1340.0	0.00	7.85	0.00	0.01
675	1350.0	0.00	7.86	0.00	0.01
680	1360.0	0.00	7.88	0.00	0.01
685	1370.0	0.00	7.89	0.00	0.01
690	1380.0	0.00	7.91	0.00	0.01

[Hydrograph Flow Values Time vs. Flow]
(The time interval is 10.0 min)

TIME INTV	TIME (min)	INCREMENTAL RAINFALL (in)	CUMULATIVE RAINFALL (in)	INCREMENTAL OUTFLOW (cfs)	DESIGN OUTFLOW (cfs)
695	1390.0	0.00	7.93	0.00	0.01
700	1400.0	0.00	7.94	0.00	0.01
705	1410.0	0.00	7.96	0.00	0.01
710	1420.0	0.00	7.97	0.00	0.01
715	1430.0	0.00	7.99	0.00	0.01
720	1440.0	0.00	8.00	0.00	0.01
725	1450.0	0.00	8.00	0.00	0.00

EDSC WATERSHED MODELING

HYDROGRAPH REPORT

RECORD NUMBER : 2

TYPE : COMPUTED FLOOD
DESCRIPTION : AREA - 2 POST DEV. 100yr

[HYDROGRAPH INFORMATION]

Peak Discharge	=	2.21	(cfs)
Volume	=	0.13	(acft)
Time Interval	=	2.00	(min)
Time to Peak	=	718.00	(min)
Time of Base	=	1468.68	(min)
Multiplication factor	=	1.00	

[UNIT HYDROGRAPH INFORMATION]

Unit hydrograph #	=	2	
Unit hydrograph type	=	CURVILINEAR UH	
Peak Discharge	=	1.67	(cfs)
Shape Factor	=	484.00	
Time Interval	=	2.00	(min)
Time to Peak	=	5.96	(min)
Time of Base	=	29.80	(min)
Rainfall Excess	=	1.00	(in)
Basin Lag Time	=	5.36	(min)

[BASIN DESCRIPTION]

Watershed Area	=	0.22	(ac)
Curve Number	=	94	

[TIME CONCENTRATION-TR-55]

SHEET FLOW

```
Manning's Roughness Coef. (n)............  =      0.10350
Flow Length (L)..........................  =       182.00 (ft)
2-yr  24-hr  Rainfall ®.................  =       4.00 (in)
Land Slope (S)...........................  =      0.03000
Travel Time of Sheet Flow................  =         8.94 (min)
```

SHALLOW FLOW

```
K_Coef (surface description) (K).........  =      0.00000
Watercourse Slope (S)....................  =      0.00000
Velocity (V).............................  =         0.00 (ft/s)
Flow Length (L)..........................  =         0.00 (ft)
Travel Time of Shallow Flow..............  =         0.00 (min)
```

CHANNEL FLOW

```
Hydraulic Radius ®.......................  =        0.00 (ft)
Channel Slope (S)........................  =      0.00000
Manning's Roughness Coef. (n)............  =      0.20000
Channel Velocity (V).....................  =         0.00 (ft/s)
Flow Length (L)..........................  =         0.00 (ft)
Travel Time of Shallow Flow..............  =         0.00 (min)
```

TIME OF CONCENTRATION

Time of Concentration..... = 8.94 (min)

[RAINFALL DESCRIPTION]

```
Distribution Type........................  =        SCS II
Total Precipitation......................  =          8.00 (in)
Return Period............................  =        100    (yr)
Storm Duration...........................  =         24.00 (hr)
```

[Unit Hydrograph Flow Values Time vs. Flow]
(The time interval is 10.0 min)

TIME INTV	TIME (min)	FLOW (cfs)
0	0.00	0.00
1	2.00	0.39
6	12.00	0.46
11	22.00	0.03

[Hydrograph Flow Values Time vs. Flow]
(The time interval is 10.0 min)

TIME INTV	TIME (min)	INCREMENTAL RAINFALL (in)	CUMULATIVE RAINFALL (in)	INCREMENTAL OUTFLOW (cfs)	DESIGN OUTFLOW (cfs)
90	180.0	0.00	0.28	0.00	0.00
95	190.0	0.00	0.29	0.00	0.00
100	200.0	0.00	0.31	0.00	0.01
105	210.0	0.00	0.33	0.00	0.01
110	220.0	0.00	0.35	0.00	0.01
115	230.0	0.00	0.37	0.00	0.01
120	240.0	0.00	0.38	0.00	0.01
125	250.0	0.00	0.40	0.00	0.01
130	260.0	0.00	0.42	0.00	0.01
135	270.0	0.00	0.44	0.00	0.01
140	280.0	0.00	0.46	0.00	0.01
145	290.0	0.00	0.48	0.00	0.01
150	300.0	0.00	0.50	0.00	0.01
155	310.0	0.00	0.53	0.00	0.01
160	320.0	0.00	0.55	0.00	0.02
165	330.0	0.00	0.57	0.00	0.02
170	340.0	0.00	0.59	0.00	0.02
175	350.0	0.00	0.62	0.00	0.02
180	360.0	0.00	0.64	0.00	0.02
185	370.0	0.00	0.66	0.00	0.02
190	380.0	0.00	0.69	0.00	0.02
195	390.0	0.01	0.71	0.00	0.02
200	400.0	0.01	0.74	0.00	0.02
205	410.0	0.01	0.77	0.00	0.02
210	420.0	0.01	0.79	0.00	0.02
215	430.0	0.01	0.82	0.00	0.02
220	440.0	0.01	0.85	0.00	0.02
225	450.0	0.01	0.87	0.00	0.03
230	460.0	0.01	0.90	0.00	0.03
235	470.0	0.01	0.93	0.00	0.03
240	480.0	0.01	0.96	0.00	0.03
245	490.0	0.01	0.99	0.00	0.03
250	500.0	0.01	1.02	0.00	0.03
255	510.0	0.01	1.06	0.00	0.03
260	520.0	0.01	1.10	0.00	0.04
265	530.0	0.01	1.13	0.00	0.04
270	540.0	0.01	1.18	0.00	0.04
275	550.0	0.01	1.22	0.00	0.05
280	560.0	0.01	1.26	0.00	0.05
285	570.0	0.01	1.30	0.00	0.05
290	580.0	0.01	1.35	0.00	0.05
295	590.0	0.01	1.40	0.00	0.05
300	600.0	0.01	1.45	0.00	0.06
305	610.0	0.01	1.50	0.00	0.06

[Hydrograph Flow Values Time vs. Flow]
(The time interval is 10.0 min)

TIME INTV	TIME (min)	INCREMENTAL RAINFALL (in)	CUMULATIVE RAINFALL (in)	INCREMENTAL OUTFLOW (cfs)	DESIGN OUTFLOW (cfs)
310	620.0	0.01	1.57	0.00	0.07
315	630.0	0.01	1.63	0.00	0.08
320	640.0	0.02	1.71	0.00	0.08
325	650.0	0.02	1.79	0.00	0.10
330	660.0	0.02	1.88	0.00	0.11
335	670.0	0.02	1.99	0.00	0.12
340	680.0	0.03	2.11	0.01	0.15
345	690.0	0.03	2.26	0.01	0.18
350	700.0	0.13	2.69	0.10	0.43
355	710.0	0.31	3.75	0.19	1.15
360	720.0	0.12	5.30	-0.04	2.16
365	730.0	0.04	5.55	-0.17	0.55
370	740.0	0.03	5.74	-0.02	0.28
375	750.0	0.02	5.88	-0.01	0.20
380	760.0	0.02	5.99	-0.01	0.15
385	770.0	0.02	6.09	0.00	0.13
390	780.0	0.02	6.18	0.00	0.11
395	790.0	0.02	6.25	0.00	0.10
400	800.0	0.01	6.33	0.00	0.09
405	810.0	0.01	6.39	0.00	0.09
410	820.0	0.01	6.45	0.00	0.08
415	830.0	0.01	6.51	0.00	0.07
420	840.0	0.01	6.56	0.00	0.07
425	850.0	0.01	6.61	0.00	0.06
430	860.0	0.01	6.66	0.00	0.06
435	870.0	0.01	6.70	0.00	0.06
440	880.0	0.01	6.74	0.00	0.06
445	890.0	0.01	6.79	0.00	0.05
450	900.0	0.01	6.83	0.00	0.05
455	910.0	0.01	6.87	0.00	0.05
460	920.0	0.01	6.90	0.00	0.05
465	930.0	0.01	6.94	0.00	0.05
470	940.0	0.01	6.98	0.00	0.04
475	950.0	0.01	7.01	0.00	0.04
480	960.0	0.01	7.04	0.00	0.04
485	970.0	0.01	7.07	0.00	0.04
490	980.0	0.01	7.10	0.00	0.04
495	990.0	0.01	7.13	0.00	0.04
500	1000.0	0.01	7.16	0.00	0.03
505	1010.0	0.01	7.19	0.00	0.03
510	1020.0	0.01	7.21	0.00	0.03
515	1030.0	0.01	7.24	0.00	0.03
520	1040.0	0.01	7.27	0.00	0.03
525	1050.0	0.01	7.29	0.00	0.03

[Hydrograph Flow Values Time vs. Flow]
(The time interval is 10.0 min)

TIME INTV	TIME (min)	INCREMENTAL RAINFALL (in)	CUMULATIVE INCREMENTAL RAINFALL (in)	DESIGN OUTFLOW OUTFLOW (cfs)	(cfs)
530	1060.0	0.01	7.32	0.00	0.03
535	1070.0	0.00	7.34	0.00	0.03
540	1080.0	0.00	7.37	0.00	0.03
545	1090.0	0.00	7.39	0.00	0.03
550	1100.0	0.00	7.41	0.00	0.03
555	1110.0	0.00	7.44	0.00	0.03
560	1120.0	0.00	7.46	0.00	0.03
565	1130.0	0.00	7.48	0.00	0.03
570	1140.0	0.00	7.50	0.00	0.02
575	1150.0	0.00	7.52	0.00	0.02
580	1160.0	0.00	7.54	0.00	0.02
585	1170.0	0.00	7.56	0.00	0.02
590	1180.0	0.00	7.58	0.00	0.02
595	1190.0	0.00	7.60	0.00	0.02
600	1200.0	0.00	7.62	0.00	0.02
605	1210.0	0.00	7.63	0.00	0.02
610	1220.0	0.00	7.65	0.00	0.02
615	1230.0	0.00	7.67	0.00	0.02
620	1240.0	0.00	7.68	0.00	0.02
625	1250.0	0.00	7.70	0.00	0.02
630	1260.0	0.00	7.72	0.00	0.02
635	1270.0	0.00	7.73	0.00	0.02
640	1280.0	0.00	7.75	0.00	0.02
645	1290.0	0.00	7.77	0.00	0.02
650	1300.0	0.00	7.78	0.00	0.02
655	1310.0	0.00	7.80	0.00	0.02
660	1320.0	0.00	7.82	0.00	0.02
665	1330.0	0.00	7.83	0.00	0.02
670	1340.0	0.00	7.85	0.00	0.02
675	1350.0	0.00	7.86	0.00	0.02
680	1360.0	0.00	7.88	0.00	0.02
685	1370.0	0.00	7.89	0.00	0.02
690	1380.0	0.00	7.91	0.00	0.02
695	1390.0	0.00	7.93	0.00	0.02
700	1400.0	0.00	7.94	0.00	0.02
705	1410.0	0.00	7.96	0.00	0.02
710	1420.0	0.00	7.97	0.00	0.02
715	1430.0	0.00	7.99	0.00	0.02
720	1440.0	0.00	8.00	0.00	0.02
725	1450.0	0.00	8.00	0.00	0.00

EDSC WATERSHED MODELING

HYDROGRAPH REPORT

RECORD NUMBER : 3

TYPE : COMPUTED FLOOD
DESCRIPTION : AREA - 3 POST DEV. 100yr

[HYDROGRAPH INFORMATION]

Peak Discharge	=	1.19	(cfs)
Volume	=	0.06	(acft)
Time Interval	=	2.00	(min)
Time to Peak	=	718.00	(min)
Time of Base	=	1466.26	(min)
Multiplication factor	=	1.00	

[UNIT HYDROGRAPH INFORMATION]

Unit hydrograph #	=	3	
Unit hydrograph type	=	CURVILINEAR UH	
Peak Discharge	=	1.16	(cfs)
Shape Factor	=	484.00	
Time Interval	=	2.00	(min)
Time to Peak	=	5.33	(min)
Time of Base	=	26.67	(min)
Rainfall Excess	=	1.00	(in)
Basin Lag Time	=	4.80	(min)

[BASIN DESCRIPTION]

Watershed Area	=	0.14	(ac)
Curve Number	=	79	

[TIME CONCENTRATION-USER DEFINED]
Time of Concentration..... = 8.00 (min)
[RAINFALL DESCRIPTION]

Distribution Type	=	SCS II	
Total Precipitation	=	8.00	(in)
Return Period	=	100	(yr)
Storm Duration	=	24.00	(hr)

[Unit Hydrograph Flow Values Time vs. Flow]
(The time interval is 10.0 min)

TIME INTV	TIME (min)	FLOW (cfs)
0	0.00	0.00
1	2.00	0.32
6	12.00	0.22
11	22.00	0.01

[Hydrograph Flow Values Time vs. Flow]
(The time interval is 10.0 min)

TIME INTV	TIME (min)	INCREMENTAL RAINFALL (in)	CUMULATIVE RAINFALL (in)	INCREMENTAL OUTFLOW (cfs)	DESIGN OUTFLOW (cfs)
250	500.0	0.01	1.02	0.00	0.00
255	510.0	0.01	1.06	0.00	0.01
260	520.0	0.01	1.10	0.00	0.01
265	530.0	0.01	1.13	0.00	0.01
270	540.0	0.01	1.18	0.00	0.01
275	550.0	0.01	1.22	0.00	0.01
280	560.0	0.01	1.26	0.00	0.01
285	570.0	0.01	1.30	0.00	0.01
290	580.0	0.01	1.35	0.00	0.01
295	590.0	0.01	1.40	0.00	0.01
300	600.0	0.01	1.45	0.00	0.02
305	610.0	0.01	1.50	0.00	0.02
310	620.0	0.01	1.57	0.00	0.02
315	630.0	0.01	1.63	0.00	0.02
320	640.0	0.02	1.71	0.00	0.03
325	650.0	0.02	1.79	0.00	0.03
330	660.0	0.02	1.88	0.00	0.04
335	670.0	0.02	1.99	0.00	0.05
340	680.0	0.03	2.11	0.00	0.06
345	690.0	0.03	2.26	0.00	0.07
350	700.0	0.13	2.69	0.05	0.20
355	710.0	0.31	3.75	0.11	0.57
360	720.0	0.12	5.30	-0.04	1.15
365	730.0	0.04	5.55	-0.08	0.26
370	740.0	0.03	5.74	-0.02	0.14
375	750.0	0.02	5.88	-0.01	0.11
380	760.0	0.02	5.99	0.00	0.08
385	770.0	0.02	6.09	0.00	0.07
390	780.0	0.02	6.18	0.00	0.06
395	790.0	0.02	6.25	0.00	0.06
400	800.0	0.01	6.33	0.00	0.05
405	810.0	0.01	6.39	0.00	0.05
410	820.0	0.01	6.45	0.00	0.04
415	830.0	0.01	6.51	0.00	0.04
420	840.0	0.01	6.56	0.00	0.04
425	850.0	0.01	6.61	0.00	0.03
430	860.0	0.01	6.66	0.00	0.03
435	870.0	0.01	6.70	0.00	0.03
440	880.0	0.01	6.74	0.00	0.03
445	890.0	0.01	6.79	0.00	0.03
450	900.0	0.01	6.83	0.00	0.03
455	910.0	0.01	6.87	0.00	0.03
460	920.0	0.01	6.90	0.00	0.03
465	930.0	0.01	6.94	0.00	0.02

[Hydrograph Flow Values Time vs. Flow]
(The time interval is 10.0 min)

TIME INTV	TIME (min)	INCREMENTAL RAINFALL (in)	CUMULATIVE RAINFALL (in)	INCREMENTAL OUTFLOW (cfs)	DESIGN OUTFLOW (cfs)
470	940.0	0.01	6.98	0.00	0.02
475	950.0	0.01	7.01	0.00	0.02
480	960.0	0.01	7.04	0.00	0.02
485	970.0	0.01	7.07	0.00	0.02
490	980.0	0.01	7.10	0.00	0.02
495	990.0	0.01	7.13	0.00	0.02
500	1000.0	0.01	7.16	0.00	0.02
505	1010.0	0.01	7.19	0.00	0.02
510	1020.0	0.01	7.21	0.00	0.02
515	1030.0	0.01	7.24	0.00	0.02
520	1040.0	0.01	7.27	0.00	0.02
525	1050.0	0.01	7.29	0.00	0.02
530	1060.0	0.01	7.32	0.00	0.02
535	1070.0	0.00	7.34	0.00	0.02
540	1080.0	0.00	7.37	0.00	0.02
545	1090.0	0.00	7.39	0.00	0.01
550	1100.0	0.00	7.41	0.00	0.01
555	1110.0	0.00	7.44	0.00	0.01
560	1120.0	0.00	7.46	0.00	0.01
565	1130.0	0.00	7.48	0.00	0.01
570	1140.0	0.00	7.50	0.00	0.01
575	1150.0	0.00	7.52	0.00	0.01
580	1160.0	0.00	7.54	0.00	0.01
585	1170.0	0.00	7.56	0.00	0.01
590	1180.0	0.00	7.58	0.00	0.01
595	1190.0	0.00	7.60	0.00	0.01
600	1200.0	0.00	7.62	0.00	0.01
605	1210.0	0.00	7.63	0.00	0.01
610	1220.0	0.00	7.65	0.00	0.01
615	1230.0	0.00	7.67	0.00	0.01
620	1240.0	0.00	7.68	0.00	0.01
625	1250.0	0.00	7.70	0.00	0.01
630	1260.0	0.00	7.72	0.00	0.01
635	1270.0	0.00	7.73	0.00	0.01
640	1280.0	0.00	7.75	0.00	0.01
645	1290.0	0.00	7.77	0.00	0.01
650	1300.0	0.00	7.78	0.00	0.01
655	1310.0	0.00	7.80	0.00	0.01
660	1320.0	0.00	7.82	0.00	0.01
665	1330.0	0.00	7.83	0.00	0.01
670	1340.0	0.00	7.85	0.00	0.01
675	1350.0	0.00	7.86	0.00	0.01
680	1360.0	0.00	7.88	0.00	0.01
685	1370.0	0.00	7.89	0.00	0.01

[Hydrograph Flow Values Time vs. Flow]
(The time interval is 10.0 min)

TIME INTV	TIME (min)	INCREMENTAL RAINFALL (in)	CUMULATIVE RAINFALL (in)	INCREMENTAL OUTFLOW (cfs)	DESIGN OUTFLOW (cfs)
690	1380.0	0.00	7.91	0.00	0.01
695	1390.0	0.00	7.93	0.00	0.01
700	1400.0	0.00	7.94	0.00	0.01
705	1410.0	0.00	7.96	0.00	0.01
710	1420.0	0.00	7.97	0.00	0.01
715	1430.0	0.00	7.99	0.00	0.01
720	1440.0	0.00	8.00	0.00	0.01

EDSC WATERSHED MODELING

HYDROGRAPH REPORT

RECORD NUMBER : 4

~~Post~~ Post Dev without Detention

```
TYPE            : COMBINE
DESCRIPTION     : COMBINED POST DEV. 100yr
```

[HYDROGRAPH INFORMATION]

```
Peak Discharge............................ =          4.07 (cfs)
Volume.................................... =          0.23 (acft)
Time Interval............................. =          2.00 (min)
Time to Peak.............................. =        718.00 (min)
Time of Base.............................. =       1450.00 (min)
```

[COMBINE HYDROGRAPH RECORD #]
HYDROGRAPH # 1 TYPE : COMPUTED FLOOD
DESCRIPTION : AREA - 1 POST DEV. 100yr

```
Peak Discharge........................ =          0.78 (cfs)
Time to Peak......................... =        722.00 (min)
Time Interval........................ =          2.00 (min)
HYDROGRAPH #   2    TYPE : COMPUTED FLOOD
```

DESCRIPTION : AREA - 2 POST DEV. 100yr

```
Peak Discharge........................ =          2.21 (cfs)
Time to Peak......................... =        718.00 (min)
Time Interval........................ =          2.00 (min)
HYDROGRAPH #   3    TYPE : COMPUTED FLOOD
```

DESCRIPTION : AREA - 3 POST DEV. 100yr

```
Peak Discharge........................ =          1.19 (cfs)
Time to Peak......................... =        718.00 (min)
Time Interval........................ =          2.00 (min)
```

[Combine Hydrograph Flow Values]
(The time interval is 10.0 min)

INTV #	TIME (min)	OUTFLOW (cfs)
91	182.00	0.00
96	192.00	0.01
101	202.00	0.01
106	212.00	0.01
111	222.00	0.01
116	232.00	0.01
121	242.00	0.01
126	252.00	0.01
131	262.00	0.01
136	272.00	0.01
141	282.00	0.01
146	292.00	0.01
151	302.00	0.01
156	312.00	0.01
161	322.00	0.02
166	332.00	0.02
171	342.00	0.02
176	352.00	0.02
181	362.00	0.02
186	372.00	0.02
191	382.00	0.02
196	392.00	0.02
201	402.00	0.02
206	412.00	0.02
211	422.00	0.02
216	432.00	0.02
221	442.00	0.02
226	452.00	0.03
231	462.00	0.03
236	472.00	0.03
241	482.00	0.03
246	492.00	0.03
251	502.00	0.04
256	512.00	0.04
261	522.00	0.05
266	532.00	0.05
271	542.00	0.06
276	552.00	0.06
281	562.00	0.06
286	572.00	0.07
291	582.00	0.07
296	592.00	0.08
301	602.00	0.09
306	612.00	0.10
311	622.00	0.11

[Combine Hydrograph Flow Values]
(The time interval is 10.0 min)

INTV #	TIME (min)	OUTFLOW (cfs)
316	632.00	0.12
321	642.00	0.14
326	652.00	0.16
331	662.00	0.18
336	672.00	0.21
341	682.00	0.26
346	692.00	0.32
351	702.00	0.94
356	712.00	2.49
361	722.00	3.57
366	732.00	1.02
371	742.00	0.55
376	752.00	0.38
381	762.00	0.29
386	772.00	0.26
391	782.00	0.22
396	792.00	0.20
401	802.00	0.18
406	812.00	0.17
411	822.00	0.15
416	832.00	0.14
421	842.00	0.13
426	852.00	0.12
431	862.00	0.12
436	872.00	0.11
441	882.00	0.11
446	892.00	0.10
451	902.00	0.10
456	912.00	0.10
461	922.00	0.09
466	932.00	0.09
471	942.00	0.08
476	952.00	0.08
481	962.00	0.07
486	972.00	0.07
491	982.00	0.07
496	992.00	0.07
501	1002.00	0.07
506	1012.00	0.07
511	1022.00	0.07
516	1032.00	0.06
521	1042.00	0.06
526	1052.00	0.06
531	1062.00	0.06
536	1072.00	0.06

[Combine Hydrograph Flow Values]
(The time interval is 10.0 min)

INTV #	TIME (min)	OUTFLOW (cfs)
541	1082.00	0.06
546	1092.00	0.05
551	1102.00	0.05
556	1112.00	0.05
561	1122.00	0.05
566	1132.00	0.05
571	1142.00	0.05
576	1152.00	0.05
581	1162.00	0.04
586	1172.00	0.04
591	1182.00	0.04
596	1192.00	0.04
601	1202.00	0.04
606	1212.00	0.04
611	1222.00	0.04
616	1232.00	0.04
621	1242.00	0.04
626	1252.00	0.04
631	1262.00	0.04
636	1272.00	0.04
641	1282.00	0.03
646	1292.00	0.04
651	1302.00	0.03
656	1312.00	0.04
661	1322.00	0.03
666	1332.00	0.03
671	1342.00	0.03
676	1352.00	0.03
681	1362.00	0.03
686	1372.00	0.03
691	1382.00	0.03
696	1392.00	0.03
701	1402.00	0.03
706	1412.00	0.03
711	1422.00	0.03
716	1432.00	0.03
721	1442.00	0.03

APPENDIX J

GRASSED SWALE – EAST SIDE

GRASSED SWALE - EAST SIDE 2 YEAR STORM EVENT
Worksheet for Trapezoidal Channel

Project Description	
Worksheet	GRASSED SWALE -
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coeffic	0.030	
Slope	002000	ft/ft
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	3.00	ft/ft (H:V)
Bottom Width	2.00	ft
Discharge	1.05	cfs

1.67 CFS HYDROGRAPH

Results		
Depth	0.37	ft
Flow Area	1.1	ft²
Wetted Perim	4.34	ft
Top Width	4.22	ft
Critical Depth	0.19	ft
Critical Slope	0.025190	ft/ft
Velocity	0.91	ft/s
Velocity Head	0.01	ft
Specific Energ	0.38	ft
Froude Numb	0.31	
Flow Type	Subcritical	

< 2.05' & 0.5'

< 1.5 FPS

OK FOR VELOCITY & CAPACITY

Curve
Plotted Curves for Trapezoidal Channel

Project Description	
Worksheet	GRASSED SWALE -
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coeffic	0.030	
Slope	002000	ft/ft
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	3.00	ft/ft (H:V)
Bottom Width	2.00	ft

Attribute	Minimum	Maximum	Increment
Discharge (cfs)	0.00	1.67	0.05

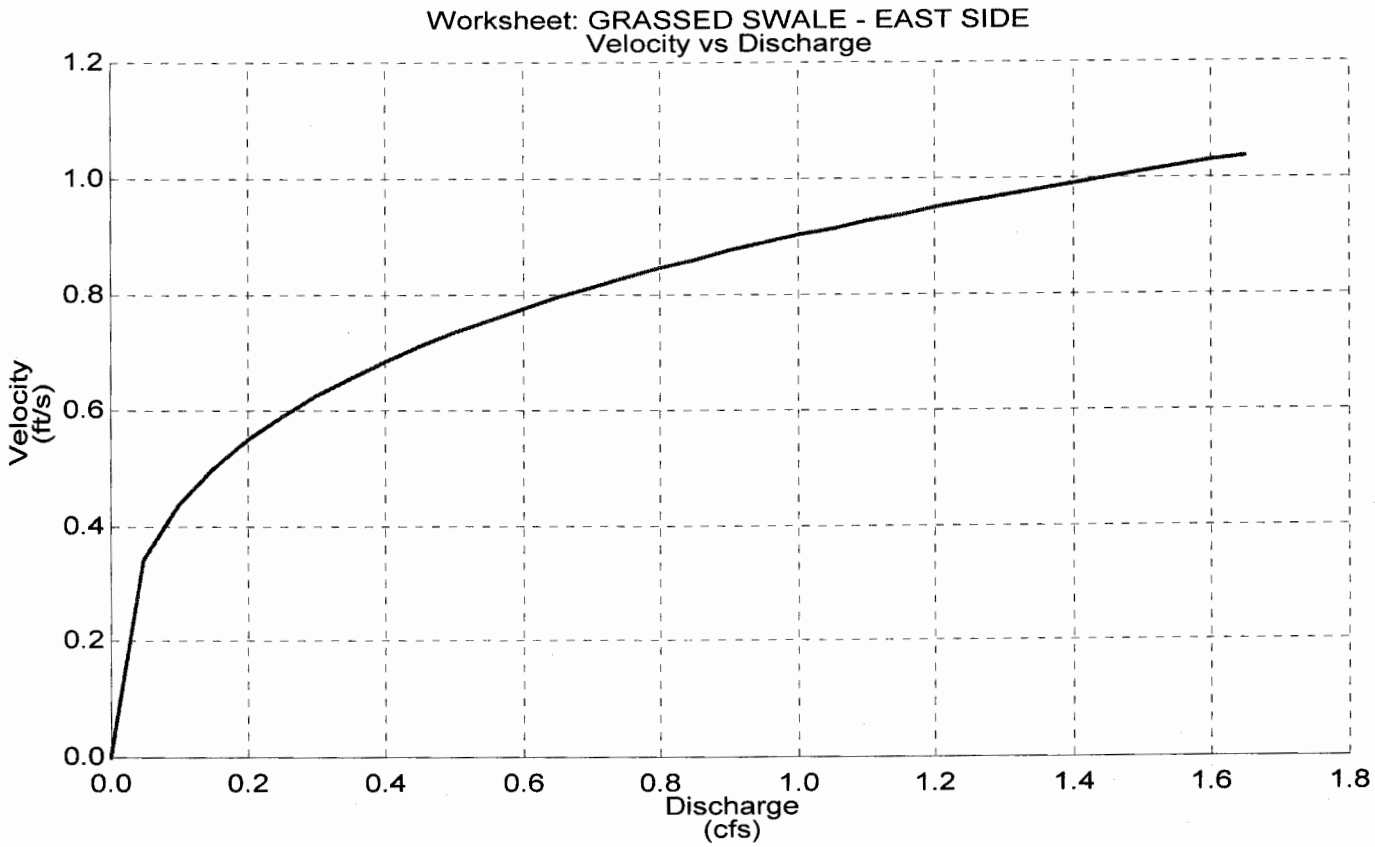


Table
Rating Table for Trapezoidal Channel

Project Description	
Worksheet	GRASSED SWALE -
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coeffic	0.030	
Slope	002000	ft/ft
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	3.00	ft/ft (H:V)
Bottom Width	2.00	ft

Attribute	Minimum	Maximum	Increment
Discharge (cfs)	0.00	0.51	0.05

Discharge (cfs)	Depth (ft)	Velocity (ft/s)	Flow Area (ft^2)	Wetted Perimeter (ft)	Top Width (ft)
0.00	0.00	0.00	0.0	0.00	4.22
0.05	0.07	0.34	0.1	2.42	2.40
0.10	0.10	0.44	0.2	2.63	2.60
0.15	0.13	0.50	0.3	2.80	2.76
0.20	0.15	0.55	0.4	2.94	2.89
0.25	0.17	0.59	0.4	3.07	3.01
0.30	0.19	0.63	0.5	3.18	3.12
0.35	0.20	0.66	0.5	3.29	3.22
0.40	0.22	0.69	0.6	3.39	3.32
0.45	0.23	0.71	0.6	3.48	3.41
0.50	0.25	0.73	0.7	3.57	3.49

GRASSED SWALE - EAST SIDE 10 YEAR STORM EVENT
Worksheet for Trapezoidal Channel

Project Description	
Worksheet	GRASSED SWALE -
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coeffic	0.030	
Slope	002000	ft/ft
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	3.00	ft/ft (H:V)
Bottom Width	2.00	ft
Discharge	1.63	cfs

Results		
Depth	0.46	ft
Flow Area	1.6	ft²
Wetted Perim	4.94	ft
Top Width	4.79	ft
Critical Depth	0.24	ft
Critical Slope	0.023475	ft/ft
Velocity	1.03	ft/s
Velocity Head	0.02	ft
Specific Energ	0.48	ft
Froude Numb	0.32	
Flow Type	Subcritical	

OK V & CAP.

Curve
Plotted Curves for Trapezoidal Channel

Project Description	
Worksheet	GRASSED SWALE -
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coeffic	0.030	
Slope	002000	ft/ft
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	3.00	ft/ft (H:V)
Bottom Width	2.00	ft

Attribute	Minimum	Maximum	Increment
Discharge (cfs)	0.00	1.67	0.05

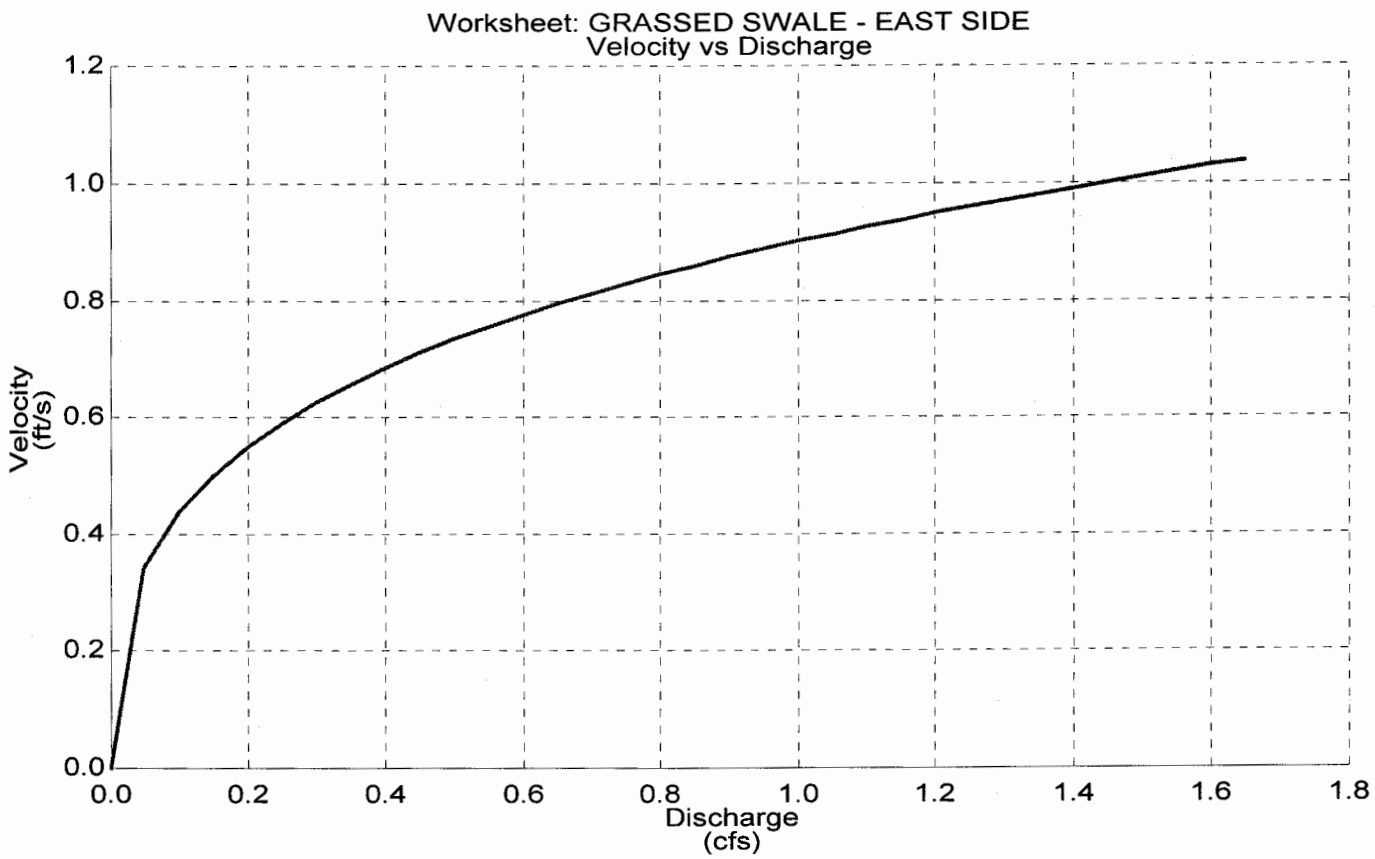


Table
Rating Table for Trapezoidal Channel

Project Description	
Worksheet	GRASSED SWALE -
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coeffic	0.030	
Slope	002000	ft/ft
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	3.00	ft/ft (H:V)
Bottom Width	2.00	ft

Attribute	Minimum	Maximum	Increment
Discharge (cfs)	0.00	0.51	0.05

Discharge (cfs)	Depth (ft)	Velocity (ft/s)	Flow Area (ft^2)	Wetted Perimeter (ft)	Top Width (ft)
0.00	0.00	0.00	0.0	0.00	4.79
0.05	0.07	0.34	0.1	2.42	2.40
0.10	0.10	0.44	0.2	2.63	2.60
0.15	0.13	0.50	0.3	2.80	2.76
0.20	0.15	0.55	0.4	2.94	2.89
0.25	0.17	0.59	0.4	3.07	3.01
0.30	0.19	0.63	0.5	3.18	3.12
0.35	0.20	0.66	0.5	3.29	3.22
0.40	0.22	0.69	0.6	3.39	3.32
0.45	0.23	0.71	0.6	3.48	3.41
0.50	0.25	0.73	0.7	3.57	3.49

APPENDIX K

GRASSED SWALE – WEST SIDE

GRASSED SWALE - WEST SIDE 2 YEAR STORM EVENT
Worksheet for Trapezoidal Channel

Project Description	
Worksheet	GRASSED SWALE -
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coeffic	0.030	
Slope	002000	ft/ft
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	3.00	ft/ft (H:V)
Bottom Width	2.00	ft
Discharge	0.29	cfs

0.51 cfs HYDROGRAPH

Results		
Depth	0.18	ft
Flow Area	0.5	ft²
Wetted Perim	3.16	ft
Top Width	3.10	ft
Critical Depth	0.08	ft
Critical Slope	0.031571	ft/ft
Velocity	0.62	ft/s
Velocity Head	0.01	ft
Specific Energ	0.19	ft
Froude Numb	0.28	
Flow Type	Subcritical	

Curve
Plotted Curves for Trapezoidal Channel

Project Description	
Worksheet	GRASSED SWALE -
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coeffic	0.030	
Slope	002000	ft/ft
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	3.00	ft/ft (H:V)
Bottom Width	2.00	ft

Attribute	Minimum	Maximum	Increment
Discharge (cfs)	0.00	1.67	0.05

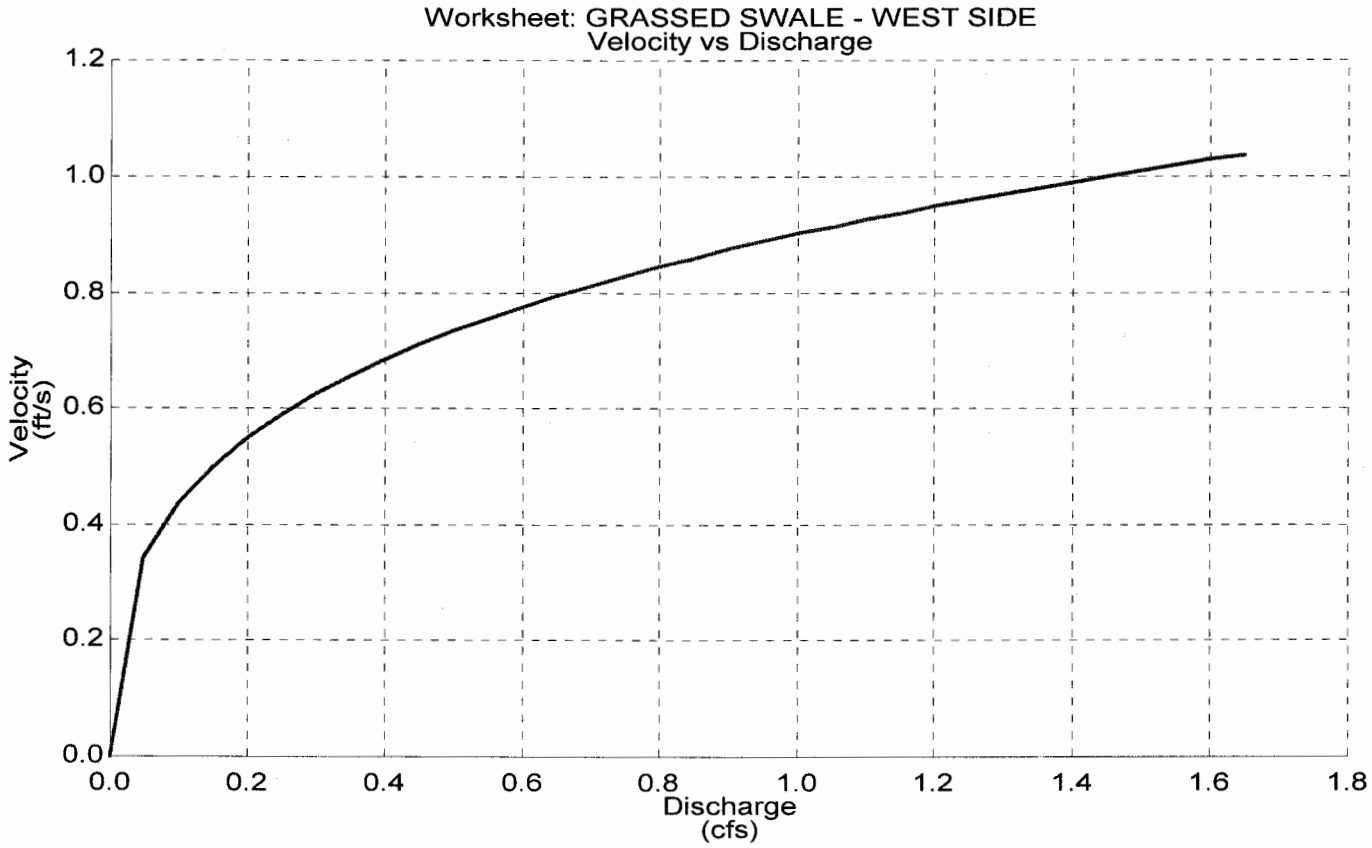


Table
Rating Table for Trapezoidal Channel

Project Description	
Worksheet	GRASSED SWALE -
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coeffic	0.030	
Slope	002000	ft/ft
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	3.00	ft/ft (H:V)
Bottom Width	2.00	ft

Attribute	Minimum	Maximum	Increment
Discharge (cfs)	0.00	0.51	0.05

Discharge (cfs)	Depth (ft)	Velocity (ft/s)	Flow Area (ft^2)	Wetted Perimeter (ft)	Top Width (ft)
0.00	0.00	0.00	0.0	0.00	3.10
0.05	0.07	0.34	0.1	2.42	2.40
0.10	0.10	0.44	0.2	2.63	2.60
0.15	0.13	0.50	0.3	2.80	2.76
0.20	0.15	0.55	0.4	2.94	2.89
0.25	0.17	0.59	0.4	3.07	3.01
0.30	0.19	0.63	0.5	3.18	3.12
0.35	0.20	0.66	0.5	3.29	3.22
0.40	0.22	0.69	0.6	3.39	3.32
0.45	0.23	0.71	0.6	3.48	3.41
0.50	0.25	0.73	0.7	3.57	3.49

GRASSED SWALE - WEST SIDE 10 YEAR STORM EVENT
Worksheet for Trapezoidal Channel

Project Description	
Worksheet	GRASSED SWALE -
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coeffic	0.030	
Slope	002000	ft/ft
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	3.00	ft/ft (H:V)
Bottom Width	2.00	ft
Discharge	0.53	cfs

Qre = 0.81

Results		
Depth	0.26	ft
Flow Area	0.7	ft²
Wetted Perim	3.62	ft
Top Width	3.54	ft
Critical Depth	0.12	ft
Critical Slope	0.028299	ft/ft
Velocity	0.75	ft/s
Velocity Head	0.01	ft
Specific Energ	0.26	ft
Froude Numb	0.29	
Flow Type	Subcritical	

Curve
Plotted Curves for Trapezoidal Channel

Project Description	
Worksheet	GRASSED SWALE -
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coeffic	0.030	
Slope	002000	ft/ft
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	3.00	ft/ft (H:V)
Bottom Width	2.00	ft

Attribute	Minimum	Maximum	Increment
Discharge (cfs)	0.00	1.67	0.05

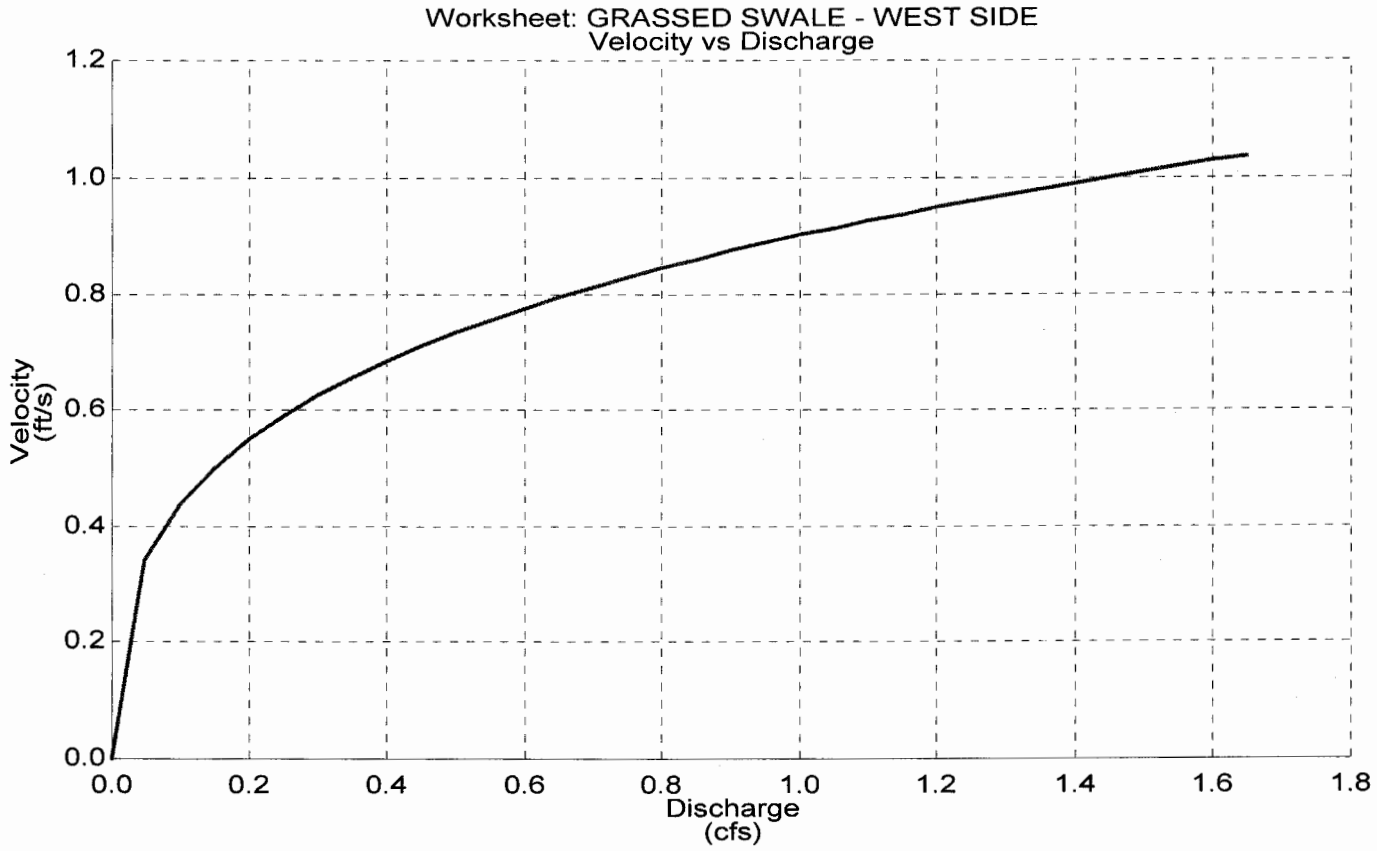


Table
Rating Table for Trapezoidal Channel

Project Description	
Worksheet	GRASSED SWALE -
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coeffic	0.030	
Slope	002000	ft/ft
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	3.00	ft/ft (H:V)
Bottom Width	2.00	ft

Attribute	Minimum	Maximum	Increment
Discharge (cfs)	0.00	0.51	0.05

Discharge (cfs)	Depth (ft)	Velocity (ft/s)	Flow Area (ft^2)	Wetted Perimeter (ft)	Top Width (ft)
0.00	0.00	0.00	0.0	0.00	3.54
0.05	0.07	0.34	0.1	2.42	2.40
0.10	0.10	0.44	0.2	2.63	2.60
0.15	0.13	0.50	0.3	2.80	2.76
0.20	0.15	0.55	0.4	2.94	2.89
0.25	0.17	0.59	0.4	3.07	3.01
0.30	0.19	0.63	0.5	3.18	3.12
0.35	0.20	0.66	0.5	3.29	3.22
0.40	0.22	0.69	0.6	3.39	3.32
0.45	0.23	0.71	0.6	3.48	3.41
0.50	0.25	0.73	0.7	3.57	3.49

APPENDIX L

RECEIVING CHANNEL

Table
Rating Table for Trapezoidal Channel

Project Description	
Worksheet	GRASSED SWALE -
Flow Element	Trapezoidal Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Mannings Coeffic	0.030	
Slope	002000	ft/ft
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	3.00	ft/ft (H:V)
Bottom Width	2.00	ft

Attribute	Minimum	Maximum	Increment
Discharge (cfs)	0.00	0.51	0.05

Discharge (cfs)	Depth (ft)	Velocity (ft/s)	Flow Area (ft^2)	Wetted Perimeter (ft)	Top Width (ft)
0.00	0.00	0.00	0.0	0.00	3.54
0.05	0.07	0.34	0.1	2.42	2.40
0.10	0.10	0.44	0.2	2.63	2.60
0.15	0.13	0.50	0.3	2.80	2.76
0.20	0.15	0.55	0.4	2.94	2.89
0.25	0.17	0.59	0.4	3.07	3.01
0.30	0.19	0.63	0.5	3.18	3.12
0.35	0.20	0.66	0.5	3.29	3.22
0.40	0.22	0.69	0.6	3.39	3.32
0.45	0.23	0.71	0.6	3.48	3.41
0.50	0.25	0.73	0.7	3.57	3.49

Receiving Channel - 2 YEAR STORM EVENT (STATION 0+30)
Worksheet for Irregular Channel

Project Description	
Worksheet	Receiving Channel - Statio
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Slope	040000 ft/ft
Discharg	2.90 cfs

POST DEV W/O DET. WITH DET Q_{10} = 2.06 CFS.

Options	
Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Results		
Mannings Coefficie	0.060	
Water Surface Elev	89.44	ft
Elevation Range	.00 to 95.00	
Flow Area	1.6	ft²
Wetted Perimeter	7.49	ft
Top Width	7.43	ft
Actual Depth	0.44	ft
Critical Elevation	89.37	ft
Critical Slope	0.092819	ft/ft
Velocity	1.79	ft/s ✓
Velocity Head	0.05	ft
Specific Energy	89.49	ft
Froude Number	0.67	
Flow Type	Subcritical	

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00	0+66	0.060

Natural Channel Points

Station (ft)	Elevation (ft)
0+00	95.00
0+04	94.00
0+08	93.00
0+12	92.00
0+15	91.00
0+18	90.00
0+23	89.00
0+35	90.00
0+43	91.00
0+53	92.00
0+66	93.00

V = 1.79 FPS < 2.5 FPS

CAP = 89.44 < 93.0

0.060 RIPRAP OK

~~TO HIGH~~

93

Curve
Plotted Curves for Irregular Channel

Project Description	
Worksheet	Receiving Channel - Statio
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Slope	040000 ft/ft

Options	
Current Roughness Methoved	Lotter's Method
Open Channel Weighting oved	Lotter's Method
Closed Channel Weightin	Horton's Method

Attribute	Minimum	Maximum	Increment
Discharge (cfs)	0.00	2.90	0.10

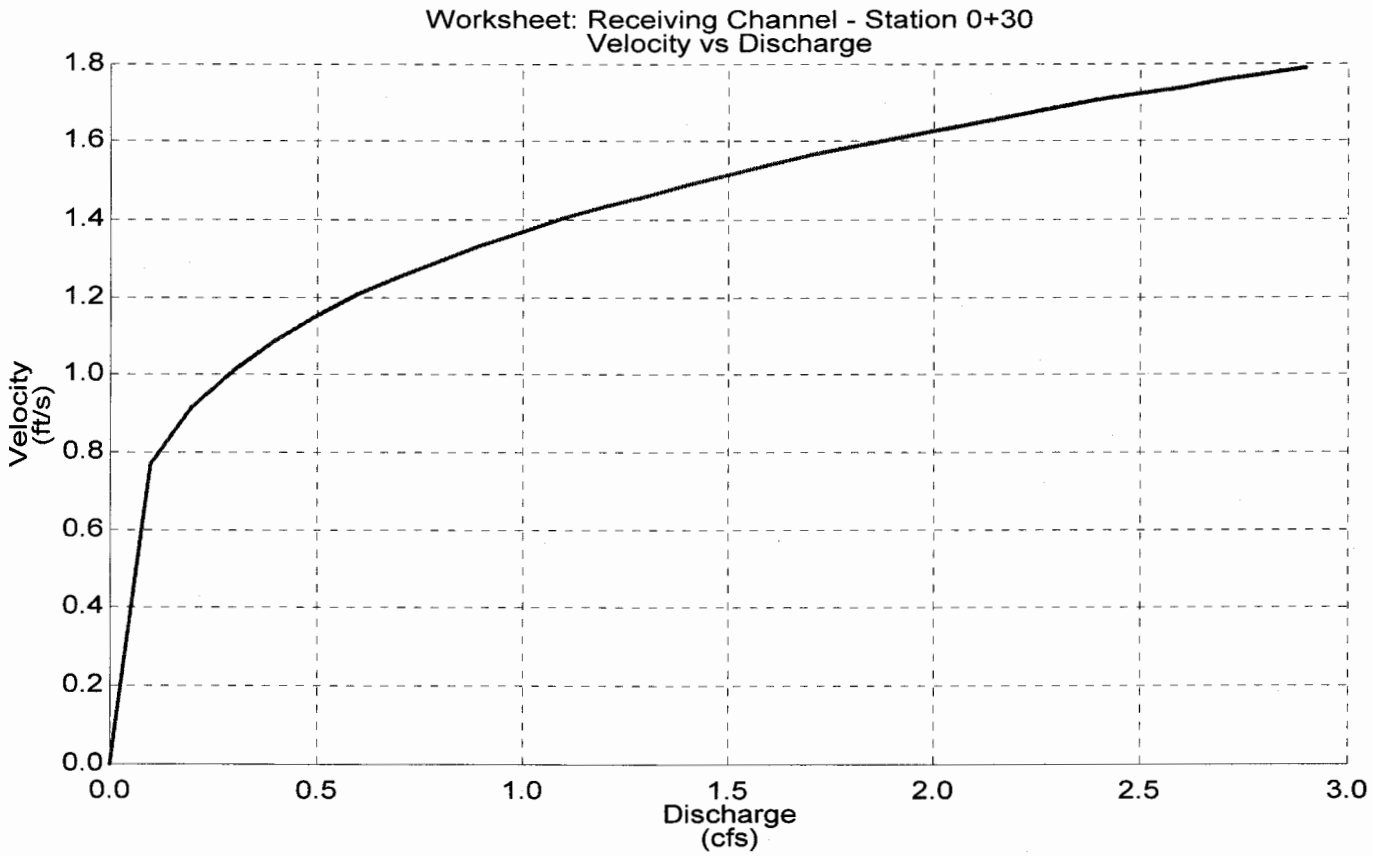


Table
Rating Table for Irregular Channel

Project Description	
Worksheet	Receiving Channel - Statio
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Slope	040000 ft/ft

Options	
Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Attribute	Minimum	Maximum	Increment
Discharge (cfs)	0.00	2.90	0.10

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
0.00	89.00	0.00	0.0	0.00	0.00
0.10	89.12	0.77	0.1	2.12	2.10
0.20	89.16	0.92	0.2	2.75	2.73
0.30	89.19	1.01	0.3	3.20	3.17
0.40	89.21	1.09	0.4	3.56	3.53
0.50	89.23	1.15	0.4	3.87	3.84
0.60	89.24	1.21	0.5	4.15	4.11
0.70	89.26	1.25	0.6	4.40	4.36
0.80	89.27	1.29	0.6	4.62	4.58
0.90	89.28	1.33	0.7	4.83	4.79
1.00	89.29	1.37	0.7	5.02	4.98
1.10	89.30	1.40	0.8	5.21	5.16
1.20	89.31	1.43	0.8	5.38	5.34
1.30	89.32	1.46	0.9	5.54	5.50
1.40	89.33	1.49	0.9	5.70	5.65
1.50	89.34	1.52	1.0	5.85	5.80
1.60	89.35	1.54	1.0	5.99	5.94
1.70	89.36	1.56	1.1	6.13	6.08
1.80	89.37	1.59	1.1	6.26	6.21
1.90	89.37	1.61	1.2	6.39	6.34
2.00	89.38	1.63	1.2	6.52	6.46
2.10	89.39	1.65	1.3	6.64	6.58
2.20	89.39	1.67	1.3	6.75	6.70
2.30	89.40	1.69	1.4	6.87	6.81
2.40	89.41	1.70	1.4	6.98	6.92
2.50	89.41	1.72	1.5	7.08	7.03
2.60	89.42	1.74	1.5	7.19	7.13
2.70	89.43	1.76	1.5	7.29	7.23
2.80	89.43	1.77	1.6	7.39	7.33
2.90	89.44	1.79	1.6	7.49	7.43

Receiving Channel - 2 YEAR STORM EVENT (STATION 0+90)
Worksheet for Irregular Channel

Project Description	
Worksheet	Receiving Channel - Statio
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data		
Slope	040000	ft/ft
Discharg	2.90	cfs

Options	
Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Results		
Mannings Coefficie	0.060	
Water Surface Elev	87.40	ft
Elevation Range	'.00 to 90.00	
Flow Area	1.7	ft²
Wetted Perimeter	8.51	ft
Top Width	8.47	ft
Actual Depth	0.40	ft
Critical Elevation	87.34	ft
Critical Slope	0.095009	ft/ft
Velocity	1.70	ft/s
Velocity Head	0.04	ft
Specific Energy	87.45	ft
Froude Number	0.67	
Flow Type	Subcritical	

Roughness Segments

Start Station	End Station	Mannings Coefficient
0+00	0+60	0.060

Natural Channel Points

Station (ft)	Elevation (ft)
0+00	90.00
0+10	89.00
0+18	88.00
0+27	87.00
0+39	88.00
0+49	89.00
0+60	90.00

✓ 1.7 FPS < 2.5 OK
CAP 87.40 < 90.0

Curve
Plotted Curves for Irregular Channel

Project Description	
Worksheet	Receiving Channel - Statio
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Slope	040000 ft/ft

Options	
Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Attribute	Minimum	Maximum	Increment
Discharge (cfs)	0.00	2.90	0.10

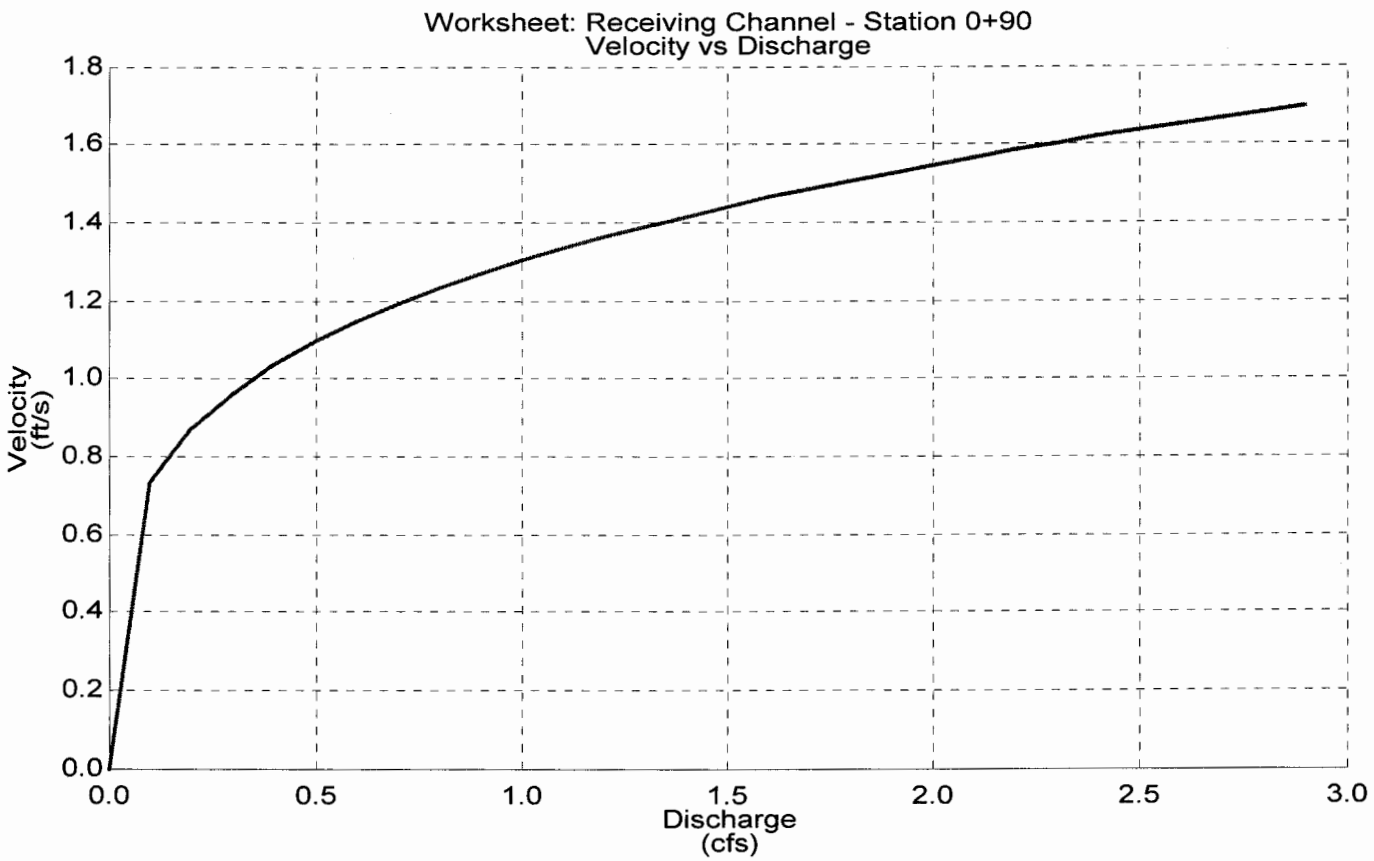


Table
Rating Table for Irregular Channel

Project Description	
Worksheet	Receiving Channel - Statio
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Channel Depth

Input Data	
Slope	040000 ft/ft

Options	
Current Roughness Meth	ved Lotter's Method
Open Channel Weighting	ved Lotter's Method
Closed Channel Weightin	Horton's Method

Attribute	Minimum	Maximum	Increment
Discharge (cfs)	0.00	2.90	0.10

Discharge (cfs)	Water Surface Elevation (ft)	Velocity (ft/s)	Flow Area (ft²)	Wetted Perimeter (ft)	Top Width (ft)
0.00	87.00	0.00	0.0	0.00	0.00
0.10	87.11	0.73	0.1	2.41	2.40
0.20	87.15	0.87	0.2	3.12	3.11
0.30	87.17	0.96	0.3	3.63	3.62
0.40	87.19	1.03	0.4	4.05	4.03
0.50	87.21	1.09	0.5	4.40	4.38
0.60	87.22	1.15	0.5	4.71	4.69
0.70	87.24	1.19	0.6	4.99	4.97
0.80	87.25	1.23	0.7	5.25	5.23
0.90	87.26	1.27	0.7	5.49	5.46
1.00	87.27	1.30	0.8	5.71	5.68
1.10	87.28	1.33	0.8	5.92	5.89
1.20	87.29	1.36	0.9	6.11	6.08
1.30	87.30	1.39	0.9	6.30	6.27
1.40	87.31	1.42	1.0	6.48	6.45
1.50	87.31	1.44	1.0	6.64	6.61
1.60	87.32	1.46	1.1	6.81	6.78
1.70	87.33	1.49	1.1	6.96	6.93
1.80	87.34	1.51	1.2	7.12	7.08
1.90	87.34	1.53	1.2	7.26	7.23
2.00	87.35	1.55	1.3	7.40	7.37
2.10	87.36	1.57	1.3	7.54	7.50
2.20	87.36	1.58	1.4	7.67	7.64
2.30	87.37	1.60	1.4	7.80	7.76
2.40	87.38	1.62	1.5	7.93	7.89
2.50	87.38	1.64	1.5	8.05	8.01
2.60	87.39	1.65	1.6	8.17	8.13
2.70	87.39	1.67	1.6	8.28	8.25
2.80	87.40	1.68	1.7	8.40	8.36
2.90	87.40	1.70	1.7	8.51	8.47

STORM WATER MANAGEMENT PLAN
FOR
SITE PLAN OF
LOT 3, MIDLANDS, SECTION 1
#3909 MIDLANDS ROAD
JAMES CITY COUNTY, VIRGINIA 23188

1.0 INTRODUCTION

2.0 SITE

3.0 METHODOLOGY

4.0 SOILS

5.0 WATER QUALITY

COMMONWEALTH OF VIRGINIA
JAMES E. WIRKNER
No. 8246
6/23/99
CERTIFIED PROFESSIONAL ENGINEER

STORM WATER MANAGEMENT PLAN

1.0 INTRODUCTION

THIS REPORT DESCRIBES A STORMWATER MANAGEMENT PLAN THAT WILL BE IMPLEMENTED TO DRAIN THE RUNOFF RESULTING FROM DEVELOPMENT OF 0.46 ACRES, #2909 MIDLANDS ROAD. THE SITE WILL BE DEVELOPED AS AN OFFICE BUILDING. ACCESS TO THE SITE IS FROM MIDLANDS ROAD, A PUBLIC RIGHT-OF-WAY. THE STORMWATER MANAGEMENT PLAN COMPLIES WITH THE MINIUM STANDARDS OF THE 1996 VIRGINIA EROSION AND SEDIMENT CONTROL LAWS AND REGULATIONS.

PRE-DEVELOPMENT RUNOFF IS CONVEYED TO A RAVINE ON THE NORTH SIDE OF THE PROPERTY. A STORMDRAIN SYSTEM HAS BEEN DESIGNED BASED ON A 10 YEAR STORM EVENT. THE SYSTEM WILL RELEASE POST DEVELOPMENT RUNOFF AT THE PRE-DEVELOPMENT LEVELS FOR 2, 10 AND 25 YEAR STORMS. AN EMERGENCY SPILLWAY HAS BEEN PROVIDED TO SAFELY CONTROL THE RUNOFF OF A 100 YEAR STORM.

THIS SITE LIES WITHIN THE RESOURCE MANAGEMENT AREA AS DETERMINED BY JAMES CITY COUNTY. B.M.P. DESIGN #9 HAS BEEN EMPLOYED TO INFILTRATE TWO (2) TIMES THE WATER QUALITY VOLUME AS REQUIRED.

2.0 SITE

THE SITE IS CURRENTLY UNDEVELOPED. THE SITE IS PARTIALY WOOD ON THE NORTH SIDE. SITES ON THE EAST AND WEST HAVE BEEN DEVELOPED. THIS PLAN PROVIDES FOR THE DEVELOPMENT OF A 4500 S.F. OFFICE BUILDING AND A PARKING LOT TO SERVE THE BUILDING.

3.0 METHODOLOGY

CALCULATIONS FOR STORMWATER RUNOFF RATES ARE BASED ON THE 2 AND 10 YEAR TYPE II, 24-HOUR RAINFALL PROVIDED BY S.C.S. TR-55. THE TOTAL 24-HOUR RAINFALL FOR THE 2-YEAR STORM IS 4 INCHES AND FOR THE 10-YEAR STORM IS 6 INCHES.

EAGLE POINT SOFTWARE WAS EMPLOYED IN THE DESIGN OF THE STORM SEWER SYSTEM. THE S.C.S. CURVILINEAR METHOD AS OUTLINED IN SECTION 5.2.2. OF THE HYDROLOGY ENGINEERING CIRCULAR NO. 19 WAS USED TO DETERMINE PRE-DEVELOPMENT AND POST DEVELOPMENT RUNOFF OF S.C.S. TYPE II RAINFALL.

COPIES OF THE EAGLE POINT PRINTOUT ARE ATTACHED FOR THE 2-YEAR AND 10-YEAR PRE-DEVELOPMENT FLOWS AND 2, 10, AND 25-YEAR POST DEVELOPMENT FLOWS. THE PRINTOUTS ALSO SUMMARIZE ASSUMPTIONS UTILIZED TO DETERMINE THE TIME OF CONCENTRATION AND INFLOW HYDROGRAPHS.

4.0 SOIL

SOILS REPORT PREPARED BY ECS AND WILL BE PROVIDED BY THE OWNER/DEVELOPER.

Calc Worksheet

5.0 WATER QUALITY

B.M.P. DESIGN # 9 HAS BEEN EMPLOYED TO COMPLY WITH THE J.C.C. 10 POINT B.M.P. REQUIREMENT. THIS DESIGN TREATS 100% OF THE SITE AND YEILDS 10 POINTS AS OUTLINED IN TABLE 2 OF THE J.C.C. B.M.P. EVALUATION PROCEDURE. SEE PLANS FOR DESIGN AND DETAILS.

APPENDIX

A.) DRAINAGE AREA MAP

B.) PRE-DEVELOPMENT 2YR STORM
POST DEVELOPMENT 2YR STORM

C.) PRE-DEVELOPMENT 10YR STORM
POST DEVELOPMENT 10YR STORM

D.) PRE-DEVELOPMENT 25YR STORM
POST DEVELOPMENT 25YR STORM

E.) PRE-DEVELOPMENT 100YR STORM
POST DEVELOPMENT 100YR STORM

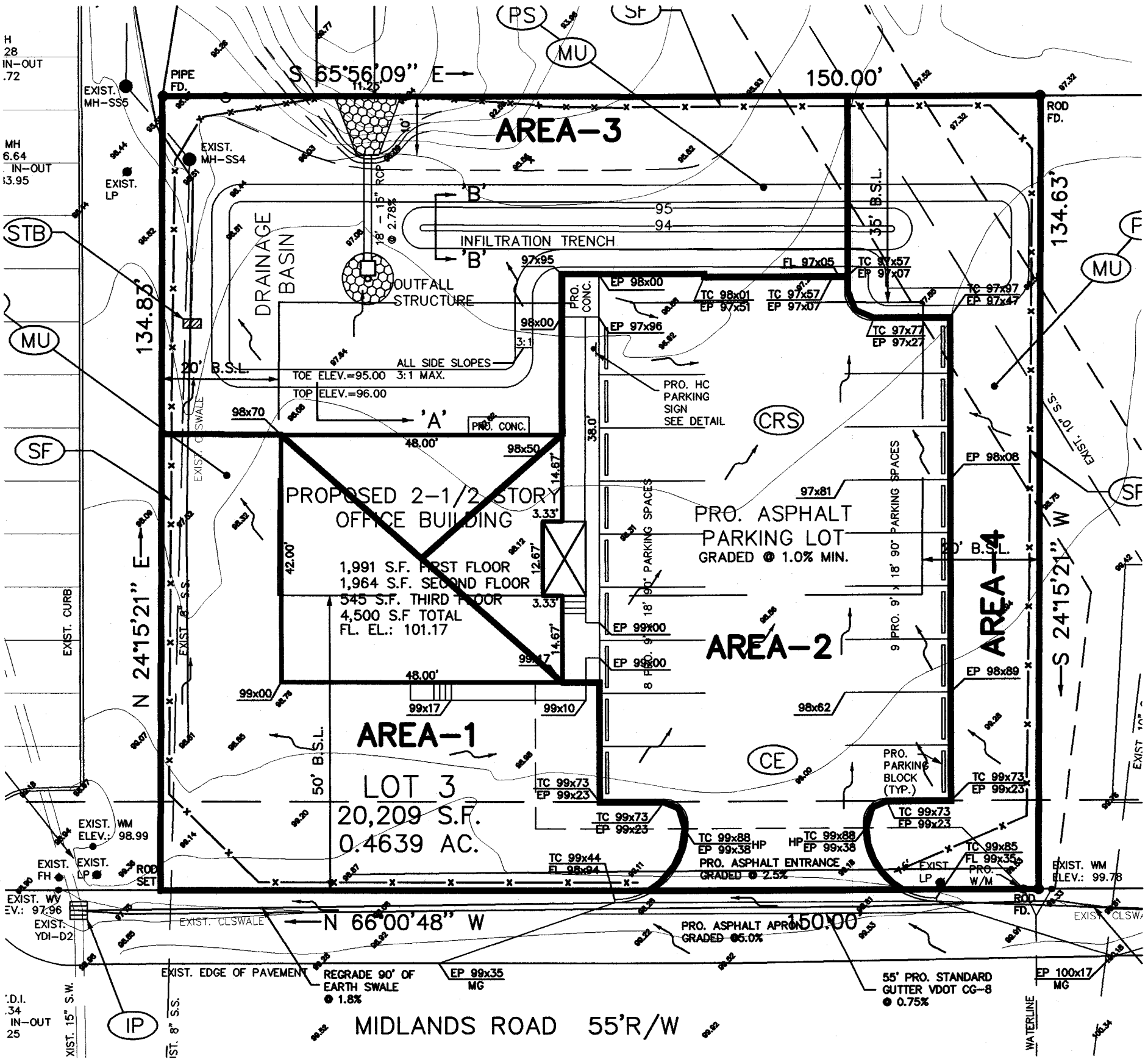
F.) DRAINAGE BASIN STAGE STORAGE/DISCHARGE

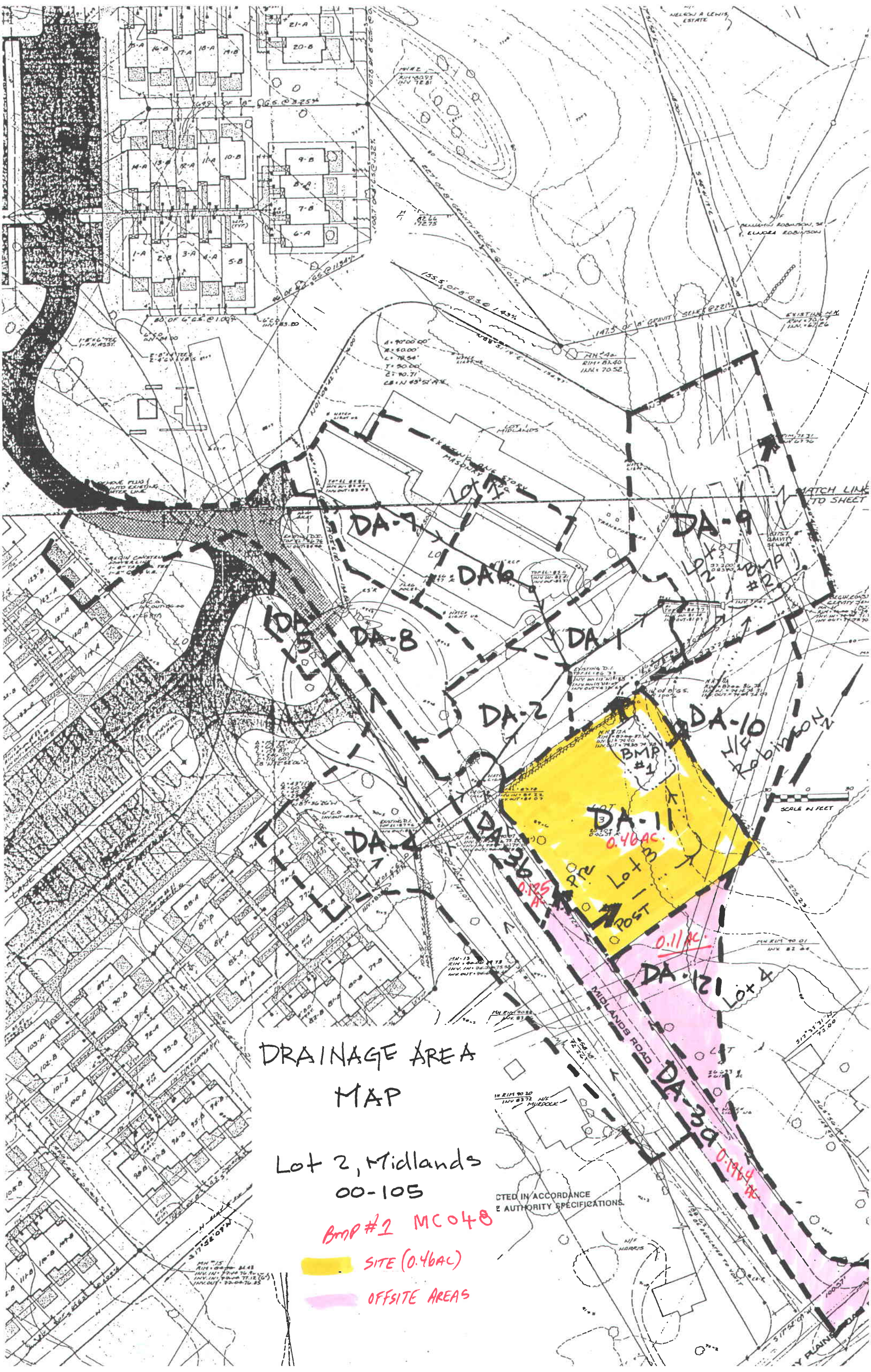
APPENDIX 'A'

DRAINAGE AREA MAP

4.

Watershed map


S 65°56'09" E
150.00'
AREA-3
PIPE FD.
ROD FD.
EXIST. MH-SS5
EXIST. MH-SS4
EXIST. LP
DRAINAGE BASIN
OUTFALL STRUCTURE
INFILTRATION TRENCH
18" - 15" RCP @ 2.78%
134.87'
134.63'
35' B.S.L.
20' B.S.L.
ALL SIDE SLOPES
TOE ELEV.=95.00 3:1 MAX.
TOP ELEV.=96.00
PRO. CONC.
PROPOSED 2-1/2 STORY OFFICE BUILDING
1,991 S.F. FIRST FLOOR
1,964 S.F. SECOND FLOOR
545 S.F. THIRD FLOOR
4,500 S.F TOTAL
FL. EL.: 101.17
PRO. HC PARKING SIGN SEE DETAIL
PRO. ASPHALT PARKING LOT
GRADED @ 1.0% MIN.
8 PRO. 9' x 18' 90° PARKING SPACES
9 PRO. 9' x 18' 90° PARKING SPACES
AREA-2
AREA-4
AREA-1
LOT 3
20,209 S.F.
0.4639 AC.
50' B.S.L.
PRO. PARKING BLOCK (TYP.)
PRO. ASPHALT ENTRANCE GRADED @ 2.5%
PRO. ASPHALT APRON GRADED @5.0%
N 24°15'21" E
S 24°15'21" W
N 66°00'48" W
150.00'
EXIST. CURB
EXIST. CLSWALE
EXIST. 8" S.S.
EXIST. WM ELEV.: 98.99
EXIST. FH
EXIST. LP
ROD SET
EXIST. WV ELEV.: 97.96
EXIST. YDI-D2
EXIST. WM ELEV.: 99.78
EXIST. EDGE OF PAVEMENT
REGRADE 90' OF EARTH SWALE @ 1.8%
55' PRO. STANDARD GUTTER VDOT CG-8 @ 0.75%
MIDLANDS ROAD 55'R/W
WATERLINE
EXIST. 15" S.W.
EXIST. 8" S.S.
EXIST. 10" S.S.


DRAINAGE AREA
MAP
Lot 2, Midlands
00-105
BMP #2 MC048
SITE (0.46AC)
OFFSITE AREAS
DA-7
DA-9
DA-6
DA-5
DA-8
DA-1
DA-2
DA-10
DA-11
DA-4
DA-3b
DA-12
DA-3a
0.46 AC.
0.125 AC.
0.11 AC.
0.194 AC.
BMP #1
BMP #2
Lot 3
Lot 4
MIDLANDS ROAD
MATCH LINE
TO SHEET
SCALE IN FEET

APPENDIX 'B'

PRE-DEVELOPMENT 2YR STORM
POST DEVELOPMENT 2YR STORM

EDSC WATERSHED MODELING

6/23/99 Page 1

HYDROGRAPH REPORT

RECORD NUMBER : 1
TYPE : COMPUTED FLOOD
DESCRIPTION : PRE-DEV. 2yr

[HYDROGRAPH INFORMATION]

Peak Discharge	=	1.14	(cfs)
Volume	=	0.06	(acft)
Time Interval	=	2.00	(min)
Time to Peak	=	720.00	(min)
Time of Base	=	1466.26	(min)
Multiplication factor	=	1.00	

[UNIT HYDROGRAPH INFORMATION]

Unit hydrograph #	=	1	
Unit hydrograph type	=	CURVILINEAR UH	
Peak Discharge	=	3.95	(cfs)
Shape Factor	=	484.00	
Time Interval	=	2.00	(min)
Time to Peak	=	5.33	(min)
Time of Base	=	26.67	(min)
Rainfall Excess	=	1.00	(in)
Basin Lag Time	=	4.80	(min)

[BASIN DESCRIPTION]

Watershed Area	=	0.46	(ac)
Curve Number	=	73	

too short

[TIME CONCENTRATION -- USER DEFINED]

Time of Concentration	=	8.00	(min)

[RAINFALL DESCRIPTION]

Distribution Type	=	SCS II	
Total Precipitation	=	4.00	(in)
Return Period	=	2	(yr)
Storm Duration	=	24.00	(hr)

[Unit Hydrograph Flow Values Time vs. Flow]
(The time interval is 30.0 min)

TIME INTV	TIME (min)	FLOW (cfs)
0	0.00	0.00
1	2.00	1.11

[Hydrograph Flow Values Time vs. Flow]
(The time interval is 30.0 min)

TIME INTV	TIME (min)	INCREMENTAL RAINFALL (in)	CUMULATIVE RAINFALL (in)	INCREMENTAL OUTFLOW (cfs)	DESIGN OUTFLOW (cfs)
330	660.0	0.01	0.94	0.00	0.01
345	690.0	0.02	1.13	0.00	0.03
360	720.0	0.06	2.65	0.00	1.14
375	750.0	0.01	2.94	-0.01	0.12
390	780.0	0.01	3.09	0.00	0.07
405	810.0	0.01	3.20	0.00	0.06
420	840.0	0.00	3.28	0.00	0.04
[illegible]	870.0	0.00	3.35	0.00	0.04
450	900.0	0.00	3.41	0.00	0.03
465	930.0	0.00	3.47	0.00	0.03
480	960.0	0.00	3.52	0.00	0.03
495	990.0	0.00	3.56	0.00	0.03
510	1020.0	0.00	3.61	0.00	0.02
525	1050.0	0.00	3.65	0.00	0.02
540	1080.0	0.00	3.68	0.00	0.02
555	1110.0	0.00	3.72	0.00	0.02
570	1140.0	0.00	3.75	0.00	0.02
585	1170.0	0.00	3.78	0.00	0.02
600	1200.0	0.00	3.81	0.00	0.01
615	1230.0	0.00	3.83	0.00	0.01
630	1260.0	0.00	3.86	0.00	0.01
645	1290.0	0.00	3.88	0.00	0.01
660	1320.0	0.00	3.91	0.00	0.01
[illegible]	1350.0	0.00	3.93	0.00	0.01
[illegible]	1380.0	0.00	3.96	0.00	0.01
705	1410.0	0.00	3.98	0.00	0.01
720	1440.0	0.00	4.00	0.00	0.01

HYDROGRAPH REPORT

RECORD NUMBER : 6
TYPE : RESER STOR. IND
DESCRIPTION : ROUTED POST DEV. 2yr

[HYDROGRAPH INFORMATION]

Peak Discharge..... = 0.58 (cfs)
Volume..... = 0.06 (acft)
Time Interval..... = 2.00 (min)
Time to Peak..... = 728.00 (min)
Time of Base..... = 1464.00 (min)
Peak Elevation..... = 95.55 (ft)

[RESERVOIR STRUCTURE INFORMATION]

Reservoir #..... = 1
Description..... = BASIN - 1
Storage type..... = MAN STAGE/AREA
Max storage..... = 3137.64 Cuft
Discharge type..... = COMP STAGE/DIS
Max discharge..... = 4.36 cfs

[RESERVOIR INFORMATION]

Reservoir #..... = 1
Reservoir Description..... = BASIN - 1

[INFLOW HYDROGRAPH INFORMATION]

Hydrograph #..... = 5
Hydrograph Description..... = COMBINED POST DEV. 2yr

[Computation of Reservoir Outflow Table of Storage Indication Method]

(The time interval is 30.0 min)

INTV#	TIME (min)	INFLOW (cfs)	EQUATION 0.5(I1+I2)dt	+	S1-0.5(O1)dt	=	S2+0.5(O2)dt	OUTFLOW O2(cfs)	STORAGE (cuft)	ELEVATION (ft)
354	708.0	0.67	73.55	+	640.49	=	714.04	0.02	712.58	95.13
355	710.0	0.83	89.91	+	711.11	=	801.01	0.05	797.77	95.17
370	740.0	0.21	25.94	+	1651.06	=	1677.00	0.39	1653.61	95.50
385	770.0	0.10	12.37	+	1303.60	=	1315.97	0.28	1299.04	95.37
400	800.0	0.07	8.69	+	1043.59	=	1052.28	0.17	1041.93	95.27
415	830.0	0.05	6.47	+	913.35	=	919.82	0.10	913.73	95.21
430	860.0	0.04	4.72	+	844.03	=	848.75	0.07	844.53	95.19
445	890.0	0.04	4.23	+	798.97	=	803.20	0.05	799.91	95.17
[illegible]	920.0	0.03	3.63	+	768.96	=	772.59	0.04	769.92	95.15
[illegible]	950.0	0.03	2.99	+	746.24	=	749.23	0.04	747.04	95.14
490	980.0	0.02	2.66	+	728.50	=	731.16	0.03	729.35	95.14
505	1010.0	0.02	2.36	+	715.75	=	718.11	0.03	716.56	95.13
520	1040.0	0.02	2.19	+	705.52	=	707.71	0.02	706.37	95.13
535	1070.0	0.01	1.58	+	694.80	=	696.38	0.02	695.27	95.12
550	1100.0	0.01	1.45	+	686.85	=	688.30	0.02	687.35	95.12
565	1130.0	0.01	1.03	+	680.79	=	681.82	0.01	681.01	95.12
580	1160.0	0.01	0.73	+	671.98	=	672.71	0.01	672.09	95.11
595	1190.0	0.01	0.64	+	665.61	=	666.25	0.01	665.76	95.11
610	1220.0	0.00	0.52	+	660.91	=	661.43	0.01	661.03	95.11
625	1250.0	0.00	0.52	+	658.03	=	658.55	0.01	658.22	95.11
640	1280.0	0.00	0.53	+	656.28	=	656.81	0.00	656.51	95.11
655	1310.0	0.00	0.43	+	655.08	=	655.50	0.00	655.23	95.11
670	1340.0	0.00	0.45	+	654.21	=	654.65	0.00	654.40	95.11
685	1370.0	0.00	0.46	+	653.36	=	653.82	0.00	653.59	95.10
[illegible]	1400.0	0.00	0.00	+	651.28	=	651.28	0.00	651.09	95.10
[illegible]	1430.0	0.00	0.00	+	648.19	=	648.19	0.00	648.07	95.10
730	1460.0	0.00	0.00	+	645.40	=	645.40	0.00	645.34	95.10

APPENDIX 'C'

PRE-DEVELOPMENT 10YR STORM
POST DEVELOPMENT 10YR STORM

HYDROGRAPH REPORT

RECORD NUMBER : 1
TYPE : COMPUTED FLOOD
DESCRIPTION : PRE-DEV. 10yr

[HYDROGRAPH INFORMATION]

Peak Discharge	=	2.34	(cfs)
Volume	=	0.12	(acft)
Time Interval	=	2.00	(min)
Time to Peak	=	718.00	(min)
Time of Base	=	1466.26	(min)
Multiplication factor	=	1.00	

[UNIT HYDROGRAPH INFORMATION]

Unit hydrograph #	=	1	
Unit hydrograph type	=	CURVILINEAR UH	
Peak Discharge	=	3.95	(cfs)
Shape Factor	=	484.00	
Time Interval	=	2.00	(min)
Time to Peak	=	5.33	(min)
Time of Base	=	26.67	(min)
Rainfall Excess	=	1.00	(in)
Basin Lag Time	=	4.80	(min)

[BASIN DESCRIPTION]

Watershed Area	=	0.46	(ac)
Curve Number	=	73	

[TIME CONCENTRATION -- USER DEFINED]

Time of Concentration	=	8.00	(min)

[RAINFALL DESCRIPTION]

Distribution Type	=	SCS II	
Total Precipitation	=	6.00	(in)
Return Period	=	10	(yr)
Storm Duration	=	24.00	(hr)

[Unit Hydrograph Flow Values Time vs. Flow]
(The time interval is 30.0 min)

TIME INTV	TIME (min)	FLOW (cfs)
0	0.00	0.00
1	2.00	1.11

[Hydrograph Flow Values Time vs. Flow]
(The time interval is 30.0 min)

TIME INTV	TIME (min)	INCREMENTAL RAINFALL (in)	CUMULATIVE RAINFALL (in)	INCREMENTAL OUTFLOW (cfs)	DESIGN OUTFLOW (cfs)
285	570.0	0.01	0.98	0.00	0.01
300	600.0	0.01	1.09	0.00	0.01
315	630.0	0.01	1.22	0.00	0.03
330	660.0	0.01	1.41	0.00	0.05
345	690.0	0.02	1.70	0.00	0.11
360	720.0	0.09	3.98	-0.05	2.29
375	750.0	0.02	4.41	-0.01	0.23
[illegible]	780.0	0.01	4.63	0.00	0.14
405	810.0	0.01	4.79	0.00	0.10
420	840.0	0.01	4.92	0.00	0.08
435	870.0	0.01	5.03	0.00	0.07
450	900.0	0.01	5.12	0.00	0.07
465	930.0	0.01	5.21	0.00	0.06
480	960.0	0.00	5.28	0.00	0.05
495	990.0	0.00	5.35	0.00	0.05
510	1020.0	0.00	5.41	0.00	0.04
525	1050.0	0.00	5.47	0.00	0.04
540	1080.0	0.00	5.53	0.00	0.04
555	1110.0	0.00	5.58	0.00	0.04
570	1140.0	0.00	5.63	0.00	0.03
585	1170.0	0.00	5.67	0.00	0.03
600	1200.0	0.00	5.71	0.00	0.03
615	1230.0	0.00	5.75	0.00	0.03
630	1260.0	0.00	5.79	0.00	0.03
[illegible]	1290.0	0.00	5.83	0.00	0.03
660	1320.0	0.00	5.86	0.00	0.03
675	1350.0	0.00	5.90	0.00	0.02
690	1380.0	0.00	5.93	0.00	0.02
705	1410.0	0.00	5.97	0.00	0.02
720	1440.0	0.00	6.00	0.00	0.02

HYDROGRAPH REPORT

RECORD NUMBER : 6
TYPE : RESER STOR. IND
DESCRIPTION : ROUTED POST DEV. 10yr

[HYDROGRAPH INFORMATION]

Peak Discharge	=	2.03	(cfs)
Volume	=	0.13	(acft)
Time Interval	=	2.00	(min)
Time to Peak	=	724.00	(min)
Time of Base	=	1566.00	(min)
Peak Elevation	=	95.77	(ft)

[RESERVOIR STRUCTURE INFORMATION]

Reservoir #	=	1
Description	=	BASIN - 1
Storage type	=	MAN STAGE/AREA
Max storage	=	3137.64 Cuft
Discharge type	=	COMP STAGE/DIS
Max discharge	=	4.36 cfs

[RESERVOIR INFORMATION]

Reservoir #	=	1
Reservoir Description	=	BASIN - 1

[INFLOW HYDROGRAPH INFORMATION]

Hydrograph #	=	5
Hydrograph Description	=	COMBINED POST DEV. 10yr

[Computation of Reservoir Outflow Table of Storage Indication Method]
(The time interval is 30.0 min)

INTV#	TIME (min)	INFLOW (cfs)	EQUATION 0.5(I1+I2)dt	+	S1-0.5(O1)dt	=	S2+0.5(O2)dt	OUTFLOW O2(cfs)	STORAGE (cuft)	ELEVATION (ft)
333	666.0	0.11	13.16	+	643.13	=	656.30	0.00	656.01	95.11
334	668.0	0.12	13.77	+	655.72	=	669.49	0.01	668.93	95.11
349	698.0	0.39	41.26	+	872.82	=	914.08	0.10	908.17	95.21
364	728.0	0.85	121.78	+	2265.09	=	2386.86	1.63	2288.81	95.73
379	758.0	0.21	25.25	+	1624.00	=	1649.25	0.38	1626.54	95.49
394	788.0	0.14	16.87	+	1325.88	=	1342.75	0.29	1325.24	95.38
409	818.0	0.11	12.69	+	1098.10	=	1110.79	0.20	1098.57	95.29
424	848.0	0.08	9.78	+	967.59	=	977.37	0.13	969.43	95.24
[illegible]	878.0	0.07	8.67	+	902.04	=	910.71	0.10	904.92	95.21
[illegible]	908.0	0.06	7.73	+	868.12	=	875.84	0.08	871.07	95.20
469	938.0	0.05	6.61	+	840.59	=	847.21	0.07	843.02	95.18
484	968.0	0.05	5.57	+	814.10	=	819.66	0.06	816.04	95.17
499	998.0	0.04	5.04	+	792.38	=	797.42	0.05	794.25	95.16
514	1028.0	0.04	4.41	+	774.15	=	778.56	0.05	775.78	95.16
529	1058.0	0.03	4.06	+	758.90	=	762.96	0.04	760.49	95.15
544	1088.0	0.03	3.77	+	747.07	=	750.84	0.04	748.62	95.14
559	1118.0	0.03	3.45	+	737.30	=	740.74	0.03	738.73	95.14
574	1148.0	0.03	3.07	+	728.28	=	731.35	0.03	729.53	95.14
589	1178.0	0.02	2.73	+	719.89	=	722.62	0.03	720.97	95.13
604	1208.0	0.02	2.28	+	711.19	=	713.48	0.02	712.02	95.13
619	1238.0	0.02	2.27	+	704.63	=	706.90	0.02	705.58	95.13
634	1268.0	0.02	2.29	+	700.03	=	702.32	0.02	701.09	95.12
649	1298.0	0.02	2.11	+	696.68	=	698.79	0.02	697.63	95.12
664	1328.0	0.01	1.77	+	694.12	=	695.90	0.02	694.80	95.12
679	1358.0	0.01	1.60	+	689.82	=	691.41	0.02	690.41	95.12
[illegible]	1388.0	0.01	1.61	+	684.75	=	686.37	0.02	685.46	95.12
709	1418.0	0.01	1.44	+	681.37	=	682.81	0.01	681.98	95.12
724	1448.0	0.00	0.10	+	677.87	=	677.97	0.01	677.24	95.11
739	1478.0	0.00	0.00	+	661.33	=	661.33	0.01	660.94	95.11
754	1508.0	0.00	0.00	+	652.43	=	652.43	0.00	652.22	95.10
769	1538.0	0.00	0.00	+	647.66	=	647.66	0.00	647.55	95.10

APPENDIX 'D'

PRE-DEVELOPMENT 25YR STORM
POST DEVELOPMENT 25YR STORM

HYDROGRAPH REPORT

RECORD NUMBER : 1
TYPE : COMPUTED FLOOD
DESCRIPTION : PRE-DEV. 25yr

[HYDROGRAPH INFORMATION]

Peak Discharge	=	2.97	(cfs)
Volume	=	0.15	(acft)
Time Interval	=	2.00	(min)
Time to Peak	=	718.00	(min)
Time of Base	=	1466.26	(min)
Multiplication factor	=	1.00	

[UNIT HYDROGRAPH INFORMATION]

Unit hydrograph #	=	1	
Unit hydrograph type	=	CURVILINEAR UH	
Peak Discharge	=	3.95	(cfs)
Shape Factor	=	484.00	
Time Interval	=	2.00	(min)
Time to Peak	=	5.33	(min)
Time of Base	=	26.67	(min)
Rainfall Excess	=	1.00	(in)
Basin Lag Time	=	4.80	(min)

[BASIN DESCRIPTION]

Watershed Area	=	0.46	(ac)
Curve Number	=	73	

[TIME CONCENTRATION -- USER DEFINED]

Time of Concentration	=	8.00	(min)

[RAINFALL DESCRIPTION]

Distribution Type	=	SCS II	
Total Precipitation	=	7.00	(in)
Return Period	=	25	(yr)
Storm Duration	=	24.00	(hr)

[Unit Hydrograph Flow Values Time vs. Flow]
(The time interval is 30.0 min)

TIME INTV	TIME (min)	FLOW (cfs)
0	0.00	0.00
1	2.00	1.11

[Hydrograph Flow Values Time vs. Flow]
(The time interval is 30.0 min)

TIME INTV	TIME (min)	INCREMENTAL RAINFALL (in)	CUMULATIVE RAINFALL (in)	INCREMENTAL OUTFLOW (cfs)	DESIGN OUTFLOW (cfs)
255	510.0	0.01	0.93	0.00	0.00
270	540.0	0.01	1.03	0.00	0.01
285	570.0	0.01	1.14	0.00	0.02
300	600.0	0.01	1.27	0.00	0.03
315	630.0	0.01	1.43	0.00	0.04
330	660.0	0.02	1.64	0.00	0.07
345	690.0	0.03	1.98	0.01	0.15
[illegible]	720.0	0.11	4.64	-0.07	2.90
375	750.0	0.02	5.14	-0.02	0.28
390	780.0	0.01	5.40	0.00	0.17
405	810.0	0.01	5.59	0.00	0.13
420	840.0	0.01	5.74	0.00	0.10
435	870.0	0.01	5.86	0.00	0.09
450	900.0	0.01	5.97	0.00	0.08
465	930.0	0.01	6.07	0.00	0.07
480	960.0	0.01	6.16	0.00	0.06
495	990.0	0.01	6.24	0.00	0.06
510	1020.0	0.00	6.31	0.00	0.05
525	1050.0	0.00	6.38	0.00	0.05
540	1080.0	0.00	6.45	0.00	0.05
555	1110.0	0.00	6.51	0.00	0.04
570	1140.0	0.00	6.56	0.00	0.04
585	1170.0	0.00	6.62	0.00	0.04
600	1200.0	0.00	6.66	0.00	0.03
[illegible]	1230.0	0.00	6.71	0.00	0.03
630	1260.0	0.00	6.75	0.00	0.03
645	1290.0	0.00	6.80	0.00	0.03
660	1320.0	0.00	6.84	0.00	0.03
675	1350.0	0.00	6.88	0.00	0.03
690	1380.0	0.00	6.92	0.00	0.03
705	1410.0	0.00	6.96	0.00	0.03
720	1440.0	0.00	7.00	0.00	0.03

HYDROGRAPH REPORT

RECORD NUMBER : 6
TYPE : RESER STOR. IND
DESCRIPTION : ROUTED POST DEV. 25yr

[HYDROGRAPH INFORMATION]

Peak Discharge	=	2.60	(cfs)
Volume	=	0.17	(acft)
Time Interval	=	2.00	(min)
Time to Peak	=	722.00	(min)
Time of Base	=	1590.00	(min)
Peak Elevation	=	95.86	(ft)

[RESERVOIR STRUCTURE INFORMATION]

Reservoir #	=	1
Description	=	BASIN - 1
Storage type	=	MAN STAGE/AREA
Max storage	=	3137.64 Cuft
Discharge type	=	COMP STAGE/DIS
Max discharge	=	4.36 cfs

[RESERVOIR INFORMATION]

Reservoir #	=	1
Reservoir Description	=	BASIN - 1

[INFLOW HYDROGRAPH INFORMATION]

Hydrograph #	=	5
Hydrograph Description	=	COMBINED POST DEV. 25yr

[Computation of Reservoir Outflow Table of Storage Indication Method]
(The time interval is 30.0 min)

INTV#	TIME (min)	INFLOW (cfs)	EQUATION 0.5(I1+I2)dt	+	S1-0.5(O1)dt	=	S2+0.5(O2)dt	OUTFLOW O2(cfs)	STORAGE (cuft)	ELEVATION (ft)
316	632.0	0.09	10.31	+	642.40	=	652.71	0.00	652.50	95.10
317	634.0	0.09	10.61	+	652.28	=	662.89	0.01	662.47	95.11
332	664.0	0.14	16.37	+	794.56	=	810.93	0.06	807.48	95.17
347	694.0	0.29	32.46	+	967.30	=	999.75	0.14	991.10	95.25
362	724.0	2.08	297.78	+	2529.75	=	2827.53	2.58	2672.97	95.85
377	754.0	0.28	34.47	+	1710.82	=	1745.29	0.48	1716.56	95.52
392	784.0	0.18	21.41	+	1434.95	=	1456.36	0.33	1436.71	95.42
407	814.0	0.13	16.00	+	1195.99	=	1211.99	0.25	1197.29	95.33
[illegible]	844.0	0.10	12.23	+	1032.54	=	1044.77	0.17	1034.67	95.26
[illegible]	874.0	0.09	10.95	+	946.65	=	957.61	0.12	950.30	95.23
452	904.0	0.08	9.63	+	903.42	=	913.04	0.10	907.17	95.21
467	934.0	0.07	8.34	+	875.72	=	884.07	0.08	879.13	95.20
482	964.0	0.06	7.06	+	850.91	=	857.98	0.07	853.57	95.19
497	994.0	0.05	6.45	+	827.37	=	833.82	0.07	829.91	95.18
512	1024.0	0.05	6.09	+	809.77	=	815.86	0.06	812.32	95.17
527	1054.0	0.05	5.60	+	795.24	=	800.84	0.05	797.60	95.17
542	1084.0	0.04	5.19	+	782.48	=	787.67	0.05	784.70	95.16
557	1114.0	0.04	4.32	+	769.05	=	773.36	0.04	770.68	95.15
572	1144.0	0.03	3.85	+	754.72	=	758.56	0.04	756.18	95.15
587	1174.0	0.03	3.50	+	742.82	=	746.32	0.04	744.19	95.14
602	1204.0	0.03	3.17	+	731.95	=	735.11	0.03	733.22	95.14
617	1234.0	0.03	3.03	+	723.24	=	726.27	0.03	724.55	95.13
632	1264.0	0.02	2.85	+	717.75	=	720.60	0.03	719.00	95.13
647	1294.0	0.02	2.81	+	713.93	=	716.74	0.03	715.22	95.13
662	1324.0	0.02	2.77	+	710.86	=	713.63	0.02	712.17	95.13
[illegible]	1354.0	0.02	2.74	+	708.33	=	711.06	0.02	709.66	95.13
692	1384.0	0.02	2.50	+	706.18	=	708.68	0.02	707.32	95.13
707	1414.0	0.02	2.51	+	704.05	=	706.56	0.02	705.24	95.13
722	1444.0	0.01	1.87	+	701.63	=	703.50	0.02	702.25	95.13
737	1474.0	0.00	0.00	+	675.74	=	675.74	0.01	675.05	95.11
752	1504.0	0.00	0.00	+	660.13	=	660.13	0.01	659.77	95.11
767	1534.0	0.00	0.00	+	651.79	=	651.79	0.00	651.59	95.10
782	1564.0	0.00	0.00	+	647.32	=	647.32	0.00	647.22	95.10

APPENDIX 'E'

PRE-DEVELOPMENT 100 YR STORM
POST DEVELOPMENT 100 YR STORM

HYDROGRAPH REPORT

RECORD NUMBER : 1
TYPE : COMPUTED FLOOD
DESCRIPTION : PRE-DEV. 100 yr

[HYDROGRAPH INFORMATION]

Peak Discharge	=	3.62	(cfs)
Volume	=	0.18	(acft)
Time Interval	=	2.00	(min)
Time to Peak	=	718.00	(min)
Time of Base	=	1466.26	(min)
Multiplication factor	=	1.00	

[UNIT HYDROGRAPH INFORMATION]

Unit hydrograph #	=	1	
Unit hydrograph type	=	CURVILINEAR UH	
Peak Discharge	=	3.95	(cfs)
Shape Factor	=	484.00	
Time Interval	=	2.00	(min)
Time to Peak	=	5.33	(min)
Time of Base	=	26.67	(min)
Rainfall Excess	=	1.00	(in)
Basin Lag Time	=	4.80	(min)

[BASIN DESCRIPTION]

Watershed Area	=	0.46	(ac)
Curve Number	=	73	

[TIME CONCENTRATION -- USER DEFINED]

Time of Concentration	=	8.00	(min)

[RAINFALL DESCRIPTION]

Distribution Type	=	SCS II	
Total Precipitation	=	8.00	(in)
Return Period	=	100	(yr)
Storm Duration	=	24.00	(hr)

[Unit Hydrograph Flow Values Time vs. Flow]
(The time interval is 30.0 min)

TIME INTV	TIME (min)	FLOW (cfs)
0	0.00	0.00
1	2.00	1.11

[Hydrograph Flow Values Time vs. Flow]
(The time interval is 30.0 min)

TIME INTV	TIME (min)	INCREMENTAL RAINFALL (in)	CUMULATIVE RAINFALL (in)	INCREMENTAL OUTFLOW (cfs)	DESIGN OUTFLOW (cfs)
240	480.0	0.01	0.96	0.00	0.01
255	510.0	0.01	1.06	0.00	0.01
270	540.0	0.01	1.18	0.00	0.02
285	570.0	0.01	1.30	0.00	0.03
300	600.0	0.01	1.45	0.00	0.04
315	630.0	0.01	1.63	0.00	0.06
330	660.0	0.02	1.88	0.00	0.10
[illegible]	690.0	0.03	2.26	0.01	0.20
[illegible]	720.0	0.12	5.30	-0.11	3.51
375	750.0	0.02	5.88	-0.02	0.34
390	780.0	0.02	6.18	-0.01	0.21
405	810.0	0.01	6.39	0.00	0.15
420	840.0	0.01	6.56	0.00	0.12
435	870.0	0.01	6.70	0.00	0.11
450	900.0	0.01	6.83	0.00	0.10
465	930.0	0.01	6.94	0.00	0.08
480	960.0	0.01	7.04	0.00	0.07
495	990.0	0.01	7.13	0.00	0.07
510	1020.0	0.01	7.21	0.00	0.06
525	1050.0	0.01	7.29	0.00	0.06
540	1080.0	0.00	7.37	0.00	0.06
555	1110.0	0.00	7.44	0.00	0.05
570	1140.0	0.00	7.50	0.00	0.05
[illegible]	1170.0	0.00	7.56	0.00	0.04
[illegible]	1200.0	0.00	7.62	0.00	0.04
615	1230.0	0.00	7.67	0.00	0.04
630	1260.0	0.00	7.72	0.00	0.04
645	1290.0	0.00	7.77	0.00	0.04
660	1320.0	0.00	7.82	0.00	0.04
675	1350.0	0.00	7.86	0.00	0.04
690	1380.0	0.00	7.91	0.00	0.04
705	1410.0	0.00	7.96	0.00	0.03
720	1440.0	0.00	8.00	0.00	0.03

HYDROGRAPH REPORT

RECORD NUMBER : 6
TYPE : RESER STOR. IND
DESCRIPTION : ROUTED POST DEV. 100yr

[HYDROGRAPH INFORMATION]

Peak Discharge	=	3.31	(cfs)
Volume	=	0.21	(acft)
Time Interval	=	2.00	(min)
Time to Peak	=	722.00	(min)
Time of Base	=	1600.00	(min)
Peak Elevation	=	95.93	(ft)

[RESERVOIR STRUCTURE INFORMATION]

Reservoir #	=	1
Description	=	BASIN - 1
Storage type	=	MAN STAGE/AREA
Max storage	=	3137.64 Cuft
Discharge type	=	COMP STAGE/DIS
Max discharge	=	4.36 cfs

[RESERVOIR INFORMATION]

Reservoir #	=	1
Reservoir Description	=	BASIN - 1

[INFLOW HYDROGRAPH INFORMATION]

Hydrograph #	=	5
Hydrograph Description	=	COMBINED POST DEV. 100yr

[Computation of Reservoir Outflow Table of Storage Indication Method]
(The time interval is 30.0 min)

INTV#	TIME (min)	INFLOW (cfs)	EQUATION 0.5(I1+I2)dt	+	S1-0.5(O1)dt	=	S2+0.5(O2)dt	OUTFLOW O2(cfs)	STORAGE (cuft)	ELEVATION (ft)
298	596.0	0.07	8.11	+	638.21	=	646.32	0.00	646.24	95.10
299	598.0	0.07	8.31	+	646.15	=	654.47	0.00	654.22	95.11
314	628.0	0.11	12.43	+	757.90	=	770.33	0.04	767.71	95.15
329	658.0	0.16	18.78	+	872.05	=	890.83	0.09	885.68	95.20
344	688.0	0.28	33.06	+	1016.43	=	1049.50	0.17	1039.24	95.26
359	718.0	4.32	494.02	+	2321.86	=	2815.88	2.55	2662.64	95.85
374	748.0	0.40	49.01	+	1838.61	=	1887.62	0.66	1847.77	95.57
389	778.0	0.22	27.22	+	1543.98	=	1571.20	0.36	1549.73	95.46
[illegible]	808.0	0.16	19.97	+	1307.95	=	1327.92	0.29	1310.73	95.37
[illegible]	838.0	0.13	15.42	+	1118.53	=	1133.95	0.22	1120.97	95.30
434	868.0	0.11	13.13	+	1000.87	=	1014.00	0.15	1004.88	95.25
449	898.0	0.10	11.58	+	943.29	=	954.87	0.12	947.66	95.23
464	928.0	0.08	10.16	+	908.55	=	918.71	0.10	912.65	95.21
479	958.0	0.07	8.65	+	882.27	=	890.92	0.09	885.76	95.20
494	988.0	0.07	7.99	+	859.83	=	867.82	0.08	863.21	95.19
509	1018.0	0.06	7.32	+	842.13	=	849.45	0.07	845.22	95.19
524	1048.0	0.06	6.89	+	826.78	=	833.66	0.07	829.75	95.18
539	1078.0	0.05	6.26	+	812.82	=	819.08	0.06	815.47	95.17
554	1108.0	0.05	5.84	+	799.42	=	805.26	0.06	801.93	95.17
569	1138.0	0.04	5.18	+	786.49	=	791.67	0.05	788.61	95.16
584	1168.0	0.04	4.32	+	772.91	=	777.23	0.05	774.47	95.16
599	1198.0	0.03	3.82	+	756.77	=	760.60	0.04	758.18	95.15
614	1228.0	0.03	3.64	+	744.20	=	747.83	0.04	745.68	95.14
629	1258.0	0.03	3.59	+	736.15	=	739.74	0.03	737.74	95.14
644	1288.0	0.03	3.48	+	730.84	=	734.33	0.03	732.45	95.14
[illegible]	1318.0	0.03	3.36	+	726.97	=	730.33	0.03	728.53	95.14
674	1348.0	0.03	3.28	+	724.05	=	727.33	0.03	725.59	95.14
689	1378.0	0.03	3.22	+	721.44	=	724.66	0.03	722.97	95.13
704	1408.0	0.03	3.06	+	718.97	=	722.03	0.03	720.40	95.13
719	1438.0	0.03	3.01	+	716.64	=	719.65	0.03	718.07	95.13
734	1468.0	0.00	0.00	+	689.38	=	689.38	0.02	688.41	95.12
749	1498.0	0.00	0.00	+	667.43	=	667.43	0.01	666.91	95.11
764	1528.0	0.00	0.00	+	655.69	=	655.69	0.00	655.41	95.11
779	1558.0	0.00	0.00	+	649.41	=	649.41	0.00	649.26	95.10
794	1588.0	0.00	0.00	+	646.05	=	646.05	0.00	645.97	95.10

APPENDIX 'F'

DRAINAGE BASIN
STAGE STORAGE/DISCHARGE

RESERVOIR REPORT

RECORD NUMBER : 1
STORAGE TYPE : MAN STAGE/AREA
DISCHARGE TYPE : COMP STAGE/DIS
DESCRIPTION : BASIN - 1

[RATING CURVE LIMIT]

Minimum Elevation..... = 92.00 (ft)
Maximum Elevation..... = 96.00 (ft)
Elevation Increment..... = 0.10 (ft)

[STAGE STORAGE INFORMATION]

Input file = NULL
Output file = NULL

[Manual Contour Area vs. Elevation]

ELEVATION (ft)	CONTOUR AREA (sqft)
94.00	80.79
94.25	204.91
94.50	332.57
94.75	463.76
94.95	598.48
95.00	2221.72
95.25	2469.04
95.50	2719.89
95.75	2974.27
96.00	3232.19

[STAGE DISCHARGE INFORMATION]

OUTLET STRUCTURE:

STR # : 1
TYPE : STAND PIPE WEIR
DESCRIPTION : PRINCIPLE SPILLWAY

STR # : 2
TYPE : STAND PIPE WEIR
DESCRIPTION : EMERGENCY SPILLWAY

[Reservoir Discharge Value vs. Stage]
(the elevation increment is 0.1)

STAGE (ft)	ELEVATION (ft)	CONTOUR AREA (sqft)	STORAGE (cuft)	DISCHARGE (cfs)
0.00	92.00	80.79	0.00	0.00
0.10	92.10	0.00	0.00	0.00
0.20	92.20	0.00	0.00	0.00
0.30	92.30	0.00	0.00	0.00
0.40	92.40	0.00	0.00	0.00
0.50	92.50	0.00	0.00	0.00
0.60	92.60	0.00	0.00	0.00
0.70	92.70	0.00	0.00	0.00
0.80	92.80	0.00	0.00	0.00
0.90	92.90	0.00	0.00	0.00
1.00	93.00	0.00	0.00	0.00
1.10	93.10	0.00	0.00	0.00
1.20	93.20	0.00	0.00	0.00
1.30	93.30	0.00	0.00	0.00
1.40	93.40	0.00	0.00	0.00
1.50	93.50	0.00	0.00	0.00
1.60	93.60	0.00	0.00	0.00
1.70	93.70	0.00	0.00	0.00
1.80	93.80	0.00	0.00	0.00
1.90	93.90	0.00	0.00	0.00
2.00	94.00	0.00	0.00	0.00
2.10	94.10	130.43	6.52	0.00
2.20	94.20	180.08	22.05	0.00
2.30	94.30	230.44	42.57	0.00
2.40	94.40	281.50	68.17	0.00
2.50	94.50	332.57	98.87	0.00
2.60	94.60	385.04	134.76	0.00
2.70	94.70	437.52	175.88	0.00
2.80	94.80	497.44	222.63	0.00
2.90	94.90	564.80	275.74	0.00
3.00	95.00	2221.72	415.07	0.00
3.10	95.10	2320.65	642.19	0.00
3.20	95.20	2419.57	879.20	0.08
3.30	95.30	2519.21	1126.14	0.22
3.40	95.40	2619.55	1383.08	0.31
3.50	95.50	2719.89	1650.05	0.38
3.60	95.60	2821.64	1927.12	0.78
3.70	95.70	2923.39	2214.37	1.43
3.80	95.80	3025.85	2511.84	2.23
3.90	95.90	3129.02	2819.58	2.89
4.00	96.00	3232.19	3137.64	4.36
4.00	96.00	0.00	0.00	4.36

OUTLET STRUCTURE REPORT

RECORD NUMBER : 1
TYPE : STAND PIPE WEIR
DESCRIPTION : PRINCIPLE SPILLWAY

[RATING CURVE LIMIT]

Minimum Elevation..... = 92.00 (ft)
Maximum Elevation..... = 96.00 (ft)
Elevation Increment..... = 0.10 (ft)

Prin. spwy - 12" ϕ

[STANDPIPE INFORMATION]

CIRC. STAND PIPE WEIR DESCRIPTION :

[OUTLET STRUCTURE INFORMATION]

Radius..... = 0.50 (ft)
Crest Length..... = 3.14 (ft)
Crest Elevation..... = 95.50 (ft)
Fraction Open Area..... = 1.00000

[RECTANGULAR STAND PIPE EQUATION]

ORIFICE EQ: Q = Co*A(2gh)^0.5
WEIR EQ: Q = Cw*L*H^exp
Coefficient Co ..... = 0.60000
Coefficient Cw ..... = 3.33000
Exponential..... = 1.50000

[DEFINITIONS]

H = Headwater depth above inlet control section invert, (ft)
A = Wetted area, (sqft)
L = Crest length, (ft)

[ORIFICE INFORMATION]

3 - 3" orifices

1 SUBRECORD :
CIRCULAR DESCRIPTION :

[OUTLET STRUCTURE INFORMATION]

Radius..... = 0.12 (ft)
Invert Elevation..... = 95.08 (ft)
Coefficient Co..... = 0.60000
# of Openings..... = 3

[CIRCULAR ORIFICE EQUATION]

Q = Co*A*[2gh]/k]^0.5
A = Wetted area, (sqft)
K = 1

[CULVERT INFORMATION]

DESCRIPTION : CIRCULAR CONCRETE w/ groove end projecting

[OUTLET STRUCTURE INFORMATION]

Circular Radius..... = 0.62500 (ft)
Culvert Invert Elevation..... = 92.00000 (ft)
Pipe Length..... = 25.00000 (ft)
Slope..... = 0.02000
Manning's N-value..... = 0.01300
Orifice Coefficient..... = 0.60000
Tailwater..... = 93.25000 (ft)
Number barrels..... = 1

barrel

[UNSUBMERGED EQUATION]

H/Diam = Hc/Diam + K *(Q/A*Diam^0.5))^M - 0.5*S^2
Coefficient K..... = 0.00450
coefficient M..... = 2.00000

[SUBMERGED EQUATION]

H/Diam = c*(Q/(A*Diam^0.5))^Z + Y - 0.5*S^2
Coefficient c..... = 0.03170
Coefficient Y..... = 0.69000

[DEFINITIONS]

H = Headwater depth above inlet control section invert, (ft)
Diam = Inerior height of culvert barrel, (ft)
Hc = Specific head at critical depth (dc + Vc^2/2g), (ft)
Q = Discharge, (cuft/s)
A = Full cross sectional area of culvert barrel, (sqft)
S = Culvert barrel slope, (ft/ft)

[Stand Pipe Discharge Value vs. Stage]
(the elevation increment is 0.1)

STAGE	ELEVATION (ft)	ORIFICE (cfs)	WEIR (cfs)	STAND PIPE (cfs)	CULVERT (cfs)	TOTAL FLOW (cfs)
0.00	92.00	0.00	0.00	0.00	0.00	0.00
0.10	92.10	0.00	0.00	0.00	0.00	0.00
0.20	92.20	0.00	0.00	0.00	0.00	0.00
0.30	92.30	0.00	0.00	0.00	0.00	0.00
0.40	92.40	0.00	0.00	0.00	0.00	0.00
0.50	92.50	0.00	0.00	0.00	0.00	0.00
0.60	92.60	0.00	0.00	0.00	0.00	0.00
0.70	92.70	0.00	0.00	0.00	0.00	0.00
0.80	92.80	0.00	0.00	0.00	0.00	0.00

[Stand Pipe Discharge Value vs. Stage]
(the elevation increment is 0.1)

STAGE	ELEVATION (ft)	ORIFICE (cfs)	WEIR (cfs)	STAND PIPE (cfs)	CULVERT (cfs)	TOTAL FLOW (cfs)
0.90	92.90	0.00	0.00	0.00	0.00	0.00
1.00	93.00	0.00	0.00	0.00	0.00	0.00
1.10	93.10	0.00	0.00	0.00	0.00	0.00
1.20	93.20	0.00	0.00	0.00	0.00	0.00
1.30	93.30	0.00	0.00	0.00	1.48	0.00
1.40	93.40	0.00	0.00	0.00	2.58	0.00
1.50	93.50	0.00	0.00	0.00	3.33	0.00
1.60	93.60	0.00	0.00	0.00	3.94	0.00
1.70	93.70	0.00	0.00	0.00	4.47	0.00
1.80	93.80	0.00	0.00	0.00	4.94	0.00
1.90	93.90	0.00	0.00	0.00	5.37	0.00
2.00	94.00	0.00	0.00	0.00	5.78	0.00
2.10	94.10	0.00	0.00	0.00	6.15	0.00
2.20	94.20	0.00	0.00	0.00	6.50	0.00
2.30	94.30	0.00	0.00	0.00	6.84	0.00
2.40	94.40	0.00	0.00	0.00	7.15	0.00
2.50	94.50	0.00	0.00	0.00	7.46	0.00
2.60	94.60	0.00	0.00	0.00	7.75	0.00
2.70	94.70	0.00	0.00	0.00	8.03	0.00
2.80	94.80	0.00	0.00	0.00	8.31	0.00
2.90	94.90	0.00	0.00	0.00	8.57	0.00
3.00	95.00	0.00	0.00	0.00	8.83	0.00
3.10	95.10	0.00	0.00	0.00	9.08	0.00
3.20	95.20	0.08	0.00	0.00	9.32	0.08
3.30	95.30	0.22	0.00	0.00	9.55	0.22
3.40	95.40	0.31	0.00	0.00	9.78	0.31
3.50	95.50	0.38	0.00	0.00	10.01	0.38
3.60	95.60	0.45	0.00	0.33	10.23	0.78
3.70	95.70	0.50	0.00	0.94	10.44	1.43
3.80	95.80	0.55	0.00	1.69	10.65	2.23
3.90	95.90	0.59	0.00	2.30	10.86	2.89
4.00	96.00	0.63	0.00	2.67	11.06	3.30
4.00	96.00	0.63	0.00	2.67	11.07	3.30

[Weir Discharge Value vs. Stage]
(the elevation increment is 0.1)

STAGE	ELEVATION (ft)	WEIR1 (cfs)	WEIR2 (cfs)	WEIR3 (cfs)	WEIR4 (cfs)	TOTAL (cfs)
0.00	92.00	0.00	0.00	0.00	0.00	0.00
0.10	92.10	0.00	0.00	0.00	0.00	0.00
0.20	92.20	0.00	0.00	0.00	0.00	0.00
0.30	92.30	0.00	0.00	0.00	0.00	0.00
0.40	92.40	0.00	0.00	0.00	0.00	0.00

[Weir Discharge Value vs. Stage]
(the elevation increment is 0.1)

STAGE	ELEVATION (ft)	WEIR1 (cfs)	WEIR2 (cfs)	WEIR3 (cfs)	WEIR4 (cfs)	TOTAL (cfs)
0.50	92.50	0.00	0.00	0.00	0.00	0.00
0.60	92.60	0.00	0.00	0.00	0.00	0.00
0.70	92.70	0.00	0.00	0.00	0.00	0.00
0.80	92.80	0.00	0.00	0.00	0.00	0.00
0.90	92.90	0.00	0.00	0.00	0.00	0.00
1.00	93.00	0.00	0.00	0.00	0.00	0.00
1.10	93.10	0.00	0.00	0.00	0.00	0.00
1.20	93.20	0.00	0.00	0.00	0.00	0.00
1.30	93.30	0.00	0.00	0.00	0.00	0.00
1.40	93.40	0.00	0.00	0.00	0.00	0.00
1.50	93.50	0.00	0.00	0.00	0.00	0.00
1.60	93.60	0.00	0.00	0.00	0.00	0.00
1.70	93.70	0.00	0.00	0.00	0.00	0.00
1.80	93.80	0.00	0.00	0.00	0.00	0.00
1.90	93.90	0.00	0.00	0.00	0.00	0.00
2.00	94.00	0.00	0.00	0.00	0.00	0.00
2.10	94.10	0.00	0.00	0.00	0.00	0.00
2.20	94.20	0.00	0.00	0.00	0.00	0.00
2.30	94.30	0.00	0.00	0.00	0.00	0.00
2.40	94.40	0.00	0.00	0.00	0.00	0.00
2.50	94.50	0.00	0.00	0.00	0.00	0.00
2.60	94.60	0.00	0.00	0.00	0.00	0.00
2.70	94.70	0.00	0.00	0.00	0.00	0.00
2.80	94.80	0.00	0.00	0.00	0.00	0.00
2.90	94.90	0.00	0.00	0.00	0.00	0.00
3.00	95.00	0.00	0.00	0.00	0.00	0.00
3.10	95.10	0.00	0.00	0.00	0.00	0.00
3.20	95.20	0.00	0.00	0.00	0.00	0.00
3.30	95.30	0.00	0.00	0.00	0.00	0.00
3.40	95.40	0.00	0.00	0.00	0.00	0.00
3.50	95.50	0.00	0.00	0.00	0.00	0.00
3.60	95.60	0.00	0.00	0.00	0.00	0.00
3.70	95.70	0.00	0.00	0.00	0.00	0.00
3.80	95.80	0.00	0.00	0.00	0.00	0.00
3.90	95.90	0.00	0.00	0.00	0.00	0.00
4.00	96.00	0.00	0.00	0.00	0.00	0.00
4.00	96.00	0.00	0.00	0.00	0.00	0.00

[Orifices Discharge Value vs. Stage]
(the elevation increment is 0.1)

STAGE	ELEVATION (ft)	ORIF1 (cfs)	ORIF2 (cfs)	ORIF3 (cfs)	ORIF4 (cfs)	TOTAL (cfs)
0.00	92.00	0.00	0.00	0.00	0.00	0.00
0.10	92.10	0.00	0.00	0.00	0.00	0.00
0.20	92.20	0.00	0.00	0.00	0.00	0.00
0.30	92.30	0.00	0.00	0.00	0.00	0.00
0.40	92.40	0.00	0.00	0.00	0.00	0.00
0.50	92.50	0.00	0.00	0.00	0.00	0.00
0.60	92.60	0.00	0.00	0.00	0.00	0.00
0.70	92.70	0.00	0.00	0.00	0.00	0.00
0.80	92.80	0.00	0.00	0.00	0.00	0.00
0.90	92.90	0.00	0.00	0.00	0.00	0.00
1.00	93.00	0.00	0.00	0.00	0.00	0.00
1.10	93.10	0.00	0.00	0.00	0.00	0.00
1.20	93.20	0.00	0.00	0.00	0.00	0.00
1.30	93.30	0.00	0.00	0.00	0.00	0.00
1.40	93.40	0.00	0.00	0.00	0.00	0.00
1.50	93.50	0.00	0.00	0.00	0.00	0.00
1.60	93.60	0.00	0.00	0.00	0.00	0.00
1.70	93.70	0.00	0.00	0.00	0.00	0.00
1.80	93.80	0.00	0.00	0.00	0.00	0.00
1.90	93.90	0.00	0.00	0.00	0.00	0.00
2.00	94.00	0.00	0.00	0.00	0.00	0.00
2.10	94.10	0.00	0.00	0.00	0.00	0.00
2.20	94.20	0.00	0.00	0.00	0.00	0.00
2.30	94.30	0.00	0.00	0.00	0.00	0.00
2.40	94.40	0.00	0.00	0.00	0.00	0.00
2.50	94.50	0.00	0.00	0.00	0.00	0.00
2.60	94.60	0.00	0.00	0.00	0.00	0.00
2.70	94.70	0.00	0.00	0.00	0.00	0.00
2.80	94.80	0.00	0.00	0.00	0.00	0.00
2.90	94.90	0.00	0.00	0.00	0.00	0.00
3.00	95.00	0.00	0.00	0.00	0.00	0.00
3.10	95.10	0.00	0.00	0.00	0.00	0.00
3.20	95.20	0.08	0.00	0.00	0.00	0.08
3.30	95.30	0.22	0.00	0.00	0.00	0.22
3.40	95.40	0.31	0.00	0.00	0.00	0.31
3.50	95.50	0.38	0.00	0.00	0.00	0.38
3.60	95.60	0.45	0.00	0.00	0.00	0.45
3.70	95.70	0.50	0.00	0.00	0.00	0.50
3.80	95.80	0.55	0.00	0.00	0.00	0.55
3.90	95.90	0.59	0.00	0.00	0.00	0.59
4.00	96.00	0.63	0.00	0.00	0.00	0.63
4.00	96.00	0.63	0.00	0.00	0.00	0.63

OUTLET STRUCTURE REPORT

RECORD NUMBER : 2
TYPE : STAND PIPE WEIR
DESCRIPTION : EMERGENCY SPILLWAY

Emer. Spwy

[RATING CURVE LIMIT]

Minimum Elevation..... = 92.00 (ft)
Maximum Elevation..... = 96.00 (ft)
Elevation Increment..... = 0.10 (ft)

[STANDPIPE INFORMATION]

RECT. STAND PIPE WEIR DESCRIPTION :

[OUTLET STRUCTURE INFORMATION]

Width..... = 2.50 (ft)
Height..... = 2.50 (ft)
Crest Length..... = 10.00 (ft)
Crest Elevation..... = 95.90 (ft)
Fraction Open Area..... = 0.60000

[RECTANGULAR STAND PIPE EQUATION]

ORIFICE EQ: Q = Co*A(2gh)^0.5
WEIR EQ: Q = Cw*L*H^exp
Coefficient Co ..... = 0.60000
Coefficient Cw ..... = 3.33000
Exponential..... = 1.50000

[DEFINITIONS]

H = Headwater depth above inlet control section invert, (ft)
A = Wetted area, (sqft)
L = Crest length, (ft)

[CULVERT INFORMATION]

DESCRIPTION : CIRCULAR CONCRETE w/ groove end projecting

[OUTLET STRUCTURE INFORMATION]

Circular Radius..... = 0.62500 (ft)
Culvert Invert Elevation..... = 92.00000 (ft)
Pipe Length..... = 25.00000 (ft)
Slope..... = 0.02000
Manning's N-value..... = 0.01300
Orifice Coefficient..... = 0.60000
Tailwater..... = 93.25000 (ft)
Number barrels..... = 1

[UNSUBMERGED EQUATION]

H/Diam = Hc/Diam + K *(Q/A*Diam^0.5))^M - 0.5*S^2
Coefficient K..... = 0.00450
coefficient M..... = 2.00000

[SUBMERGED EQUATION]

H/Diam = c*(Q/(A*Diam^0.5))^Z + Y - 0.5*S^2
Coefficient c..... = 0.03170
Coefficient Y..... = 0.69000

[DEFINITIONS]

H = Headwater depth above inlet control section invert, (ft)
Diam = Inerior height of culvert barrel, (ft)
Hc = Specific head at critical depth (dc + Vc^2/2g), (ft)
Q = Discharge, (cuft/s)
A = Full cross sectional area of culvert barrel, (sqft)
S = Culvert barrel slope, (ft/ft)

[Stand Pipe Discharge Value vs. Stage]
(the elevation increment is 0.1)

STAGE	ELEVATION (ft)	ORIFICE (cfs)	WEIR (cfs)	STAND PIPE (cfs)	CULVERT (cfs)	TOTAL FLOW (cfs)
0.00	92.00	0.00	0.00	0.00	0.00	0.00
0.10	92.10	0.00	0.00	0.00	0.00	0.00
0.20	92.20	0.00	0.00	0.00	0.00	0.00
0.30	92.30	0.00	0.00	0.00	0.00	0.00
0.40	92.40	0.00	0.00	0.00	0.00	0.00
0.50	92.50	0.00	0.00	0.00	0.00	0.00
0.60	92.60	0.00	0.00	0.00	0.00	0.00
0.70	92.70	0.00	0.00	0.00	0.00	0.00
0.80	92.80	0.00	0.00	0.00	0.00	0.00
0.90	92.90	0.00	0.00	0.00	0.00	0.00
1.00	93.00	0.00	0.00	0.00	0.00	0.00

[Stand Pipe Discharge Value vs. Stage]
(the elevation increment is 0.1)

STAGE	ELEVATION (ft)	ORIFICE (cfs)	WEIR (cfs)	STAND PIPE (cfs)	CULVERT (cfs)	TOTAL FLOW (cfs)
1.10	93.10	0.00	0.00	0.00	0.00	0.00
1.20	93.20	0.00	0.00	0.00	0.00	0.00
1.30	93.30	0.00	0.00	0.00	1.48	0.00
1.40	93.40	0.00	0.00	0.00	2.58	0.00
1.50	93.50	0.00	0.00	0.00	3.33	0.00
1.60	93.60	0.00	0.00	0.00	3.94	0.00
1.70	93.70	0.00	0.00	0.00	4.47	0.00
1.80	93.80	0.00	0.00	0.00	4.94	0.00
1.90	93.90	0.00	0.00	0.00	5.37	0.00
2.00	94.00	0.00	0.00	0.00	5.78	0.00
2.10	94.10	0.00	0.00	0.00	6.15	0.00
2.20	94.20	0.00	0.00	0.00	6.50	0.00
2.30	94.30	0.00	0.00	0.00	6.84	0.00
2.40	94.40	0.00	0.00	0.00	7.15	0.00
2.50	94.50	0.00	0.00	0.00	7.46	0.00
2.60	94.60	0.00	0.00	0.00	7.75	0.00
2.70	94.70	0.00	0.00	0.00	8.03	0.00
2.80	94.80	0.00	0.00	0.00	8.31	0.00
2.90	94.90	0.00	0.00	0.00	8.57	0.00
3.00	95.00	0.00	0.00	0.00	8.83	0.00
3.10	95.10	0.00	0.00	0.00	9.08	0.00
3.20	95.20	0.00	0.00	0.00	9.32	0.00
3.30	95.30	0.00	0.00	0.00	9.55	0.00
3.40	95.40	0.00	0.00	0.00	9.78	0.00
3.50	95.50	0.00	0.00	0.00	10.01	0.00
3.60	95.60	0.00	0.00	0.00	10.23	0.00
3.70	95.70	0.00	0.00	0.00	10.44	0.00
3.80	95.80	0.00	0.00	0.00	10.65	0.00
3.90	95.90	0.00	0.00	0.00	10.86	0.00
4.00	96.00	0.00	0.00	1.05	11.06	1.05
4.00	96.00	0.00	0.00	1.05	11.07	1.05

[Weir Discharge Value vs. Stage]
(the elevation increment is 0.1)

STAGE	ELEVATION (ft)	WEIR1 (cfs)	WEIR2 (cfs)	WEIR3 (cfs)	WEIR4 (cfs)	TOTAL (cfs)
0.00	92.00	0.00	0.00	0.00	0.00	0.00
0.10	92.10	0.00	0.00	0.00	0.00	0.00
0.20	92.20	0.00	0.00	0.00	0.00	0.00
0.30	92.30	0.00	0.00	0.00	0.00	0.00
0.40	92.40	0.00	0.00	0.00	0.00	0.00
0.50	92.50	0.00	0.00	0.00	0.00	0.00
0.60	92.60	0.00	0.00	0.00	0.00	0.00

[Weir Discharge Value vs. Stage]
(the elevation increment is 0.1)

STAGE	ELEVATION (ft)	WEIR1 (cfs)	WEIR2 (cfs)	WEIR3 (cfs)	WEIR4 (cfs)	TOTAL (cfs)
0.70	92.70	0.00	0.00	0.00	0.00	0.00
0.80	92.80	0.00	0.00	0.00	0.00	0.00
0.90	92.90	0.00	0.00	0.00	0.00	0.00
1.00	93.00	0.00	0.00	0.00	0.00	0.00
1.10	93.10	0.00	0.00	0.00	0.00	0.00
1.20	93.20	0.00	0.00	0.00	0.00	0.00
1.30	93.30	0.00	0.00	0.00	0.00	0.00
1.40	93.40	0.00	0.00	0.00	0.00	0.00
1.50	93.50	0.00	0.00	0.00	0.00	0.00
1.60	93.60	0.00	0.00	0.00	0.00	0.00
1.70	93.70	0.00	0.00	0.00	0.00	0.00
1.80	93.80	0.00	0.00	0.00	0.00	0.00
1.90	93.90	0.00	0.00	0.00	0.00	0.00
2.00	94.00	0.00	0.00	0.00	0.00	0.00
2.10	94.10	0.00	0.00	0.00	0.00	0.00
2.20	94.20	0.00	0.00	0.00	0.00	0.00
2.30	94.30	0.00	0.00	0.00	0.00	0.00
2.40	94.40	0.00	0.00	0.00	0.00	0.00
2.50	94.50	0.00	0.00	0.00	0.00	0.00
2.60	94.60	0.00	0.00	0.00	0.00	0.00
2.70	94.70	0.00	0.00	0.00	0.00	0.00
2.80	94.80	0.00	0.00	0.00	0.00	0.00
2.90	94.90	0.00	0.00	0.00	0.00	0.00
3.00	95.00	0.00	0.00	0.00	0.00	0.00
3.10	95.10	0.00	0.00	0.00	0.00	0.00
3.20	95.20	0.00	0.00	0.00	0.00	0.00
3.30	95.30	0.00	0.00	0.00	0.00	0.00
3.40	95.40	0.00	0.00	0.00	0.00	0.00
3.50	95.50	0.00	0.00	0.00	0.00	0.00
3.60	95.60	0.00	0.00	0.00	0.00	0.00
3.70	95.70	0.00	0.00	0.00	0.00	0.00
3.80	95.80	0.00	0.00	0.00	0.00	0.00
3.90	95.90	0.00	0.00	0.00	0.00	0.00
4.00	96.00	0.00	0.00	0.00	0.00	0.00
4.00	96.00	0.00	0.00	0.00	0.00	0.00

[Orifices Discharge Value vs. Stage]
(the elevation increment is 0.1)

STAGE	ELEVATION (ft)	ORIF1 (cfs)	ORIF2 (cfs)	ORIF3 (cfs)	ORIF4 (cfs)	TOTAL (cfs)
0.00	92.00	0.00	0.00	0.00	0.00	0.00
0.10	92.10	0.00	0.00	0.00	0.00	0.00
0.20	92.20	0.00	0.00	0.00	0.00	0.00
0.30	92.30	0.00	0.00	0.00	0.00	0.00
0.40	92.40	0.00	0.00	0.00	0.00	0.00
0.50	92.50	0.00	0.00	0.00	0.00	0.00
0.60	92.60	0.00	0.00	0.00	0.00	0.00
0.70	92.70	0.00	0.00	0.00	0.00	0.00
0.80	92.80	0.00	0.00	0.00	0.00	0.00
0.90	92.90	0.00	0.00	0.00	0.00	0.00
1.00	93.00	0.00	0.00	0.00	0.00	0.00
1.10	93.10	0.00	0.00	0.00	0.00	0.00
1.20	93.20	0.00	0.00	0.00	0.00	0.00
1.30	93.30	0.00	0.00	0.00	0.00	0.00
1.40	93.40	0.00	0.00	0.00	0.00	0.00
1.50	93.50	0.00	0.00	0.00	0.00	0.00
1.60	93.60	0.00	0.00	0.00	0.00	0.00
1.70	93.70	0.00	0.00	0.00	0.00	0.00
1.80	93.80	0.00	0.00	0.00	0.00	0.00
1.90	93.90	0.00	0.00	0.00	0.00	0.00
2.00	94.00	0.00	0.00	0.00	0.00	0.00
2.10	94.10	0.00	0.00	0.00	0.00	0.00
2.20	94.20	0.00	0.00	0.00	0.00	0.00
2.30	94.30	0.00	0.00	0.00	0.00	0.00
2.40	94.40	0.00	0.00	0.00	0.00	0.00
2.50	94.50	0.00	0.00	0.00	0.00	0.00
2.60	94.60	0.00	0.00	0.00	0.00	0.00
2.70	94.70	0.00	0.00	0.00	0.00	0.00
2.80	94.80	0.00	0.00	0.00	0.00	0.00
2.90	94.90	0.00	0.00	0.00	0.00	0.00
3.00	95.00	0.00	0.00	0.00	0.00	0.00
3.10	95.10	0.00	0.00	0.00	0.00	0.00
3.20	95.20	0.00	0.00	0.00	0.00	0.00
3.30	95.30	0.00	0.00	0.00	0.00	0.00
3.40	95.40	0.00	0.00	0.00	0.00	0.00
3.50	95.50	0.00	0.00	0.00	0.00	0.00
3.60	95.60	0.00	0.00	0.00	0.00	0.00
3.70	95.70	0.00	0.00	0.00	0.00	0.00
3.80	95.80	0.00	0.00	0.00	0.00	0.00
3.90	95.90	0.00	0.00	0.00	0.00	0.00
4.00	96.00	0.00	0.00	0.00	0.00	0.00
4.00	96.00	0.00	0.00	0.00	0.00	0.00

EDSC WATERSHED MODELING

HYDROGRAPH REPORT

RECORD NUMBER : 5

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TYPE            : RESER STOR. IND
DESCRIPTION     : ROUTED POST DEV. 100yr

[HYDROGRAPH INFORMATION]

    Peak Discharge............................  =          3.16 (cfs)
    Volume....................................  =          0.22 (acft)
    Time Interval.............................  =          2.00 (min)
    Time to Peak..............................  =        724.00 (min)
    Time of Base..............................  =       1612.00 (min)
    Peak Elevation............................  =         96.92 (ft)


[RESERVOIR STRUCTURE INFORMATION]

     Reservoir #..............................  =           1
     Description..............................  = BASIN - 1
     Storage type.............................  = MAN STAGE/AREA
     Max storage..............................  =       3137.64 Cuft
     Discharge type...........................  = COMP STAGE/DIS
     Max discharge............................  =           4.36 cfs


[RESERVOIR INFORMATION]

     Reservoir #..............................  =           1
     Reservoir Description....................  = BASIN - 1


[INFLOW HYDROGRAPH INFORMATION]

    Hydrograph #..............................  =           4
    Hydrograph Description....................  = COMBINED POST DEV. 100yr
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[Computation of Reservoir Outflow Table of Storage Indication Method]
(The time interval is 10.0 min)

INTV#	TIME (min)	INFLOW (cfs)	EQUATION 0.5(I1+I2)dt	+	S1-0.5(O1)dt	=	S2+0.5(O2)dt	OUTFLOW O2(cfs)	STORAGE (cuft)	ELEVATION (ft)
296	592.0	0.08	9.23	+	640.18	=	649.41	0.00	649.26	96.10
297	594.0	0.08	9.39	+	649.12	=	658.51	0.01	658.18	96.11
302	604.0	0.09	10.40	+	691.13	=	701.52	0.02	700.31	96.12
307	614.0	0.10	11.68	+	730.15	=	741.83	0.03	739.80	96.14
312	624.0	0.11	13.13	+	767.94	=	781.07	0.05	778.24	96.16
317	634.0	0.12	14.65	+	805.08	=	819.73	0.06	816.11	96.17
322	644.0	0.14	16.67	+	842.62	=	859.29	0.07	854.85	96.19
327	654.0	0.16	19.13	+	882.71	=	901.84	0.09	896.33	96.21
332	664.0	0.18	21.61	+	922.59	=	944.20	0.11	937.33	96.22
337	674.0	0.22	26.20	+	964.63	=	990.83	0.14	982.46	96.24
342	684.0	0.27	32.10	+	1016.30	=	1048.40	0.17	1038.18	96.26
347	694.0	0.36	40.49	+	1078.80	=	1119.29	0.21	1106.79	96.29
352	704.0	1.16	126.23	+	1263.51	=	1389.73	0.31	1371.22	96.40
357	714.0	3.06	332.55	+	1921.25	=	2253.80	1.34	2173.37	96.69
362	724.0	2.83	384.12	+	2683.69	=	3067.81	3.16	2878.27	96.92
367	734.0	0.86	112.59	+	2323.39	=	2435.98	1.75	2331.11	96.74
372	744.0	0.51	63.95	+	1964.45	=	2028.40	0.89	1975.22	96.62
377	754.0	0.36	44.59	+	1793.10	=	1837.69	0.60	1801.74	96.55
382	764.0	0.28	34.53	+	1675.21	=	1709.74	0.43	1683.79	96.51
387	774.0	0.25	30.20	+	1600.42	=	1630.62	0.37	1608.20	96.48
392	784.0	0.22	26.52	+	1524.97	=	1551.48	0.35	1530.33	96.46
397	794.0	0.20	23.82	+	1445.42	=	1469.24	0.33	1449.40	96.42
402	804.0	0.18	21.88	+	1366.99	=	1388.88	0.31	1370.38	96.40
407	814.0	0.16	19.83	+	1293.91	=	1313.75	0.28	1296.86	96.37
412	824.0	0.15	18.13	+	1226.94	=	1245.07	0.26	1229.65	96.34
417	834.0	0.14	16.84	+	1166.12	=	1182.96	0.23	1168.88	96.32
422	844.0	0.13	15.35	+	1111.61	=	1126.96	0.21	1114.21	96.30
427	854.0	0.12	14.45	+	1065.08	=	1079.53	0.19	1068.31	96.28
432	864.0	0.12	13.99	+	1029.20	=	1043.19	0.17	1033.14	96.26
437	874.0	0.11	13.39	+	1001.17	=	1014.55	0.15	1005.42	96.25
442	884.0	0.11	12.98	+	979.04	=	992.03	0.14	983.62	96.24
447	894.0	0.10	12.47	+	961.30	=	973.78	0.13	965.95	96.24
452	904.0	0.10	11.98	+	946.47	=	958.45	0.12	951.12	96.23

TOP 98.0
96.92
1.08' FB

457	914.0	0.10	11.43	+	933.66	=	945.09	0.12	938.19	96.22
462	924.0	0.09	11.06	+	922.60	=	933.66	0.11	927.13	96.22
467	934.0	0.09	10.35	+	912.72	=	923.07	0.10	916.88	96.22
472	944.0	0.08	10.04	+	903.32	=	913.36	0.10	907.48	96.21
477	954.0	0.08	9.48	+	894.69	=	904.18	0.09	898.59	96.21
482	964.0	0.07	8.95	+	886.47	=	895.42	0.09	890.12	96.20
487	974.0	0.07	8.65	+	878.64	=	887.30	0.08	882.25	96.20
492	984.0	0.07	8.54	+	871.80	=	880.34	0.08	875.47	96.20
497	994.0	0.07	8.33	+	866.02	=	874.35	0.08	869.61	96.20
502	1004.0	0.07	8.13	+	860.13	=	868.26	0.08	863.64	96.19
507	1014.0	0.07	7.89	+	854.65	=	862.54	0.08	858.04	96.19
512	1024.0	0.07	7.87	+	849.45	=	857.32	0.07	852.92	96.19

[Computation Table of Storage Indication Method]
(The time interval is 10.0 min)

INTV#	TIME (min)	INFLOW (cfs)	EQUATION 0.5(I1+I2)dt	+	S1-0.5(O1)dt	=	S2+0.5(O2)dt	OUTFLOW O2(cfs)	STORAGE (cuft)	ELEVATION (ft)
517	1034.0	0.06	7.58	+	844.60	=	852.18	0.07	847.89	96.19
522	1044.0	0.06	7.44	+	839.74	=	847.18	0.07	842.99	96.18
527	1054.0	0.06	7.17	+	834.99	=	842.16	0.07	838.08	96.18
532	1064.0	0.06	7.12	+	830.36	=	837.48	0.07	833.49	96.18
537	1074.0	0.06	6.91	+	825.99	=	832.91	0.06	829.01	96.18
542	1084.0	0.06	6.70	+	821.46	=	828.15	0.06	824.36	96.18
547	1094.0	0.06	6.55	+	816.89	=	823.44	0.06	819.74	96.17
552	1104.0	0.05	6.41	+	812.73	=	819.14	0.06	815.53	96.17
557	1114.0	0.05	6.23	+	808.53	=	814.76	0.06	811.24	96.17
562	1124.0	0.05	5.98	+	804.15	=	810.13	0.06	806.70	96.17
567	1134.0	0.05	5.88	+	799.77	=	805.65	0.06	802.31	96.17
572	1144.0	0.05	5.67	+	795.67	=	801.34	0.05	798.09	96.17
577	1154.0	0.05	5.47	+	791.63	=	797.10	0.05	793.94	96.16
582	1164.0	0.04	5.25	+	787.23	=	792.48	0.05	789.41	96.16
587	1174.0	0.04	5.17	+	783.00	=	788.17	0.05	785.19	96.16
592	1184.0	0.04	4.95	+	778.88	=	783.83	0.05	780.94	96.16
597	1194.0	0.04	4.75	+	774.83	=	779.58	0.05	776.78	96.16
602	1204.0	0.04	4.56	+	770.44	=	775.00	0.05	772.29	96.15
607	1214.0	0.04	4.54	+	766.49	=	771.04	0.04	768.41	96.15
612	1224.0	0.04	4.51	+	763.07	=	767.59	0.04	765.02	96.15
617	1234.0	0.04	4.36	+	759.97	=	764.33	0.04	761.84	96.15
622	1244.0	0.04	4.40	+	757.16	=	761.55	0.04	759.12	96.15
627	1254.0	0.04	4.38	+	754.91	=	759.29	0.04	756.89	96.15
632	1264.0	0.04	4.34	+	752.98	=	757.32	0.04	754.97	96.15
637	1274.0	0.04	4.37	+	751.27	=	755.64	0.04	753.33	96.15
642	1284.0	0.04	4.23	+	749.67	=	753.89	0.04	751.61	96.15
647	1294.0	0.04	4.26	+	748.06	=	752.32	0.04	750.07	96.15
652	1304.0	0.04	4.18	+	746.73	=	750.91	0.04	748.69	96.14
657	1314.0	0.03	4.20	+	745.57	=	749.77	0.04	747.57	96.14
662	1324.0	0.03	4.11	+	744.64	=	748.75	0.04	746.57	96.14
667	1334.0	0.03	4.03	+	743.46	=	747.49	0.04	745.34	96.14
672	1344.0	0.03	4.05	+	742.14	=	746.20	0.04	744.07	96.14
677	1354.0	0.03	4.04	+	741.26	=	745.30	0.04	743.19	96.14
682	1364.0	0.03	4.07	+	740.50	=	744.57	0.03	742.47	96.14

687	1374.0	0.03	3.85	+	739.58	=	743.43	0.03	741.36	96.14
692	1384.0	0.03	3.89	+	738.44	=	742.33	0.03	740.28	96.14
697	1394.0	0.03	3.85	+	737.45	=	741.31	0.03	739.28	96.14
702	1404.0	0.03	3.84	+	736.73	=	740.57	0.03	738.56	96.14
707	1414.0	0.03	3.92	+	735.88	=	739.81	0.03	737.81	96.14
712	1424.0	0.03	3.72	+	735.01	=	738.73	0.03	736.76	96.14
717	1434.0	0.03	3.75	+	734.01	=	737.76	0.03	735.81	96.14
722	1444.0	0.02	3.06	+	732.97	=	736.03	0.03	734.11	96.14
727	1454.0	0.00	0.00	+	722.01	=	722.01	0.03	720.38	96.13
732	1464.0	0.00	0.00	+	706.98	=	706.98	0.02	705.66	96.13
737	1474.0	0.00	0.00	+	694.79	=	694.79	0.02	693.71	96.12

[Computation of Reservoir Outflow Table of Storage Indication Method]
(The time interval is 10.0 min)

INTV#	TIME (min)	INFLOW (cfs)	EQUATION 0.5(I1+I2)dt	+	S1-0.5(O1)dt	=	S2+0.5(O2)dt	OUTFLOW O2(cfs)	STORAGE (cuft)	ELEVATION (ft)
742	1484.0	0.00	0.00	+	684.88	=	684.88	0.01	684.01	96.12
747	1494.0	0.00	0.00	+	676.85	=	676.85	0.01	676.14	96.11
752	1504.0	0.00	0.00	+	670.32	=	670.32	0.01	669.75	96.11
757	1514.0	0.00	0.00	+	665.03	=	665.03	0.01	664.56	96.11
762	1524.0	0.00	0.00	+	660.73	=	660.73	0.01	660.35	96.11
767	1534.0	0.00	0.00	+	657.24	=	657.24	0.01	656.93	96.11
772	1544.0	0.00	0.00	+	654.40	=	654.40	0.00	654.15	96.11
777	1554.0	0.00	0.00	+	652.10	=	652.10	0.00	651.90	96.10
782	1564.0	0.00	0.00	+	650.24	=	650.24	0.00	650.07	96.10
787	1574.0	0.00	0.00	+	648.72	=	648.72	0.00	648.59	96.10
792	1584.0	0.00	0.00	+	647.49	=	647.49	0.00	647.38	96.10
797	1594.0	0.00	0.00	+	646.49	=	646.49	0.00	646.41	96.10
802	1604.0	0.00	0.00	+	645.68	=	645.68	0.00	645.61	96.10

MIDLANDS OFFICE PARK

- Bioretention BMP - 8 pts
- Grass Swale - 2 pts.
- Bldg + Parking lot must drain to grass swale

Min 10' W, 15' L

MAX PONDING 6"

Drainage areas from 0.25 - 1.0 Acres.

floor of basin to be 5% / 4.0% (minimum) of the impervious area of the watershed, to capture the first 1.0" (w/ a minimum 150 # area.)

Bldg. 2000 #

Parking lot 5400 #

7400 # x 5% = 370 #

19' x 19' = 361 #

DEVELOPMENT MANAGEMENT

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

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

January 16, 2002

Andrew M. Piplico
118 Northpoint Drive
Williamsburg, Va. 23185

Re: Midlands Lot 3 (3909 Midlands Road)
County Plan SP-89-99
Stormwater Management Facility BMP # 1
County BMP ID Code: MC 048

Dear Mr. Piplico:

The Environmental Division has reviewed a record drawing and construction certification as submitted December 27th 2001 for the above referenced project. The record drawing provides as-built information for a small detention basin located north of the existing building on Lot 3. This facility was previously a bioretention cell per approved plan SP-89-99; however, it was converted to a small dry detention facility in accordance with concept sketches offered in the stormwater management plan for Lot 2 (SP-100-00; BMP ID Code MC 047).

Based on our review of information as submitted and a concurrent field observation as performed on January 15th 2002, the following items must be addressed prior to release of the developer's surety instrument for the stormwater management/BMP facility:

Construction Certification:

1. The construction certification dated September 27th 2001 is satisfactory.

Record Drawing:

2. Provide a sketch (detail or section) to show the final configuration of the principal flow control structure for the basin on record drawing RD2. The principal flow control structure is riser box connected to the 12-inch barrel through the dam. Annotate the detail as necessary with constructed information. *(Note: The final configuration of the principal flow control structure for this basin was not on the approved plan for BMP # 2, S-100-00; nor does the current arrangement match that on previously approved plan SP-89-99 for BMP # 1. Only rough sketches of proposed changes to BMP # 1 were presented in the design report for BMP # 2. Therefore, the as-built needs to reflect current conditions.)* Complete

RCL

3. Provide a maintenance plan for BMP # 1 on record drawing RD2. The maintenance plan per approved plan SP-89-99 is invalid. Complete.

RCL

RCL 4. Show the following additional information on record drawing RD2: the location of the outlet barrel; outlet barrel type and size; and outlet protection and riprap class at the barrel outfall. Complete

RCL 5. Sign and date the professional seal on record drawing sheet RD2. ✓

RCL 6. If possible add the following County identifiers to the lower right hand corner of record drawing RD2: County Plan Number SP-89-99 and BMP ID No. MC 048. Done

Construction-Related Items:

7 As the dam embankment is now stabilized, remove silt fence present at the downstream right (east) toe of the dam embankment.

8 Remove the straw bale barrier in the open channel east of the BMP.

9. Regrade and stabilize with matting, seed and mulch a small erosion area present in bottom of the open channel. This area is located at the east side of the BMP where flow from the channel enters the BMP.

Once this work is satisfactorily completed, contact our office appropriately. We can then proceed with final release of the surety on the project. One reproducible and one blue/black line set of the record drawings will be required once the above items are adequately addressed.

Please contact me at 757-253-6639 or the assigned Environmental Division inspector, Joe Butchite, at 757-253-6643 if you have any further comments or questions.

Sincerely,

Scott J. Thomas

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

cc: Ralph Simmons, Simmons Engineering Inc. (via fax)

O:\ WMProg\AsBuilts\SP10000.mc047

DEVELOPMENT MANAGEMENT

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

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

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

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

COUNTY ENGINEER
(757) 253-6678

INTEGRATED PEST MANAGEMENT
(757) 253-2620

January 16, 2002

Andrew M. Piplico
118 Northpoint Drive
Williamsburg, Va. 23185

Re: Midlands Lot 3 (3909 Midlands Road)
County Plan SP-89-99
Stormwater Management Facility BMP # 1
County BMP ID Code: MC 048

Dear Mr. Piplico:

The Environmental Division has reviewed a record drawing and construction certification as submitted December 27th 2001 for the above referenced project. The record drawing provides as-built information for a small detention basin located north of the existing building on Lot 3. This facility was previously a bioretention cell per approved plan SP-89-99; however, it was converted to a small dry detention facility in accordance with concept sketches offered in the stormwater management plan for Lot 2 (SP-100-00; BMP ID Code MC 047).

Based on our review of information as submitted and a concurrent field observation as performed on January 15th 2002, the following items must be addressed prior to release of the developer's surety instrument for the stormwater management/BMP facility:

Construction Certification:

1. The construction certification dated September 27th 2001 is **satisfactory**.

Record Drawing:

2. Provide a sketch (detail or section) to show the final configuration of the principal flow control structure for the basin on record drawing RD2. The principal flow control structure is riser box connected to the 12-inch barrel through the dam. Annotate the detail as necessary with constructed information. *(Note: The final configuration of the principal flow control structure for this basin was not on the approved plan for BMP # 2, S-100-00; nor does the current arrangement match that on previously approved plan SP-89-99 for BMP # 1. Only rough sketches of proposed changes to BMP # 1 were presented in the design report for BMP # 2. Therefore, the as-built needs to reflect current conditions.)*

3. Provide a maintenance plan for BMP # 1 on record drawing RD2. The maintenance plan per approved plan SP-89-99 is invalid.

4. Show the following additional information on record drawing RD2: the location of the outlet barrel; outlet barrel type and size; and outlet protection and riprap class at the barrel outfall.

5. Sign and date the professional seal on record drawing sheet RD2.

6. If possible add the following County identifiers to the lower right hand corner of record drawing RD2: County Plan Number SP-89-99 and BMP ID No. MC 048.

Construction-Related Items:

7. As the dam embankment is now stabilized, remove silt fence present at the downstream right (east) toe of the dam embankment.

8. Remove the straw bale barrier in the open channel east of the BMP.

9. Regrade and stabilize with matting, seed and mulch a small erosion area present in bottom of the open channel. This area is located at the east side of the BMP where flow from the channel enters the BMP.

Once this work is satisfactorily completed, contact our office appropriately. We can then proceed with final release of the surety on the project. One reproducible and one blue/black line set of the record drawings will be required once the above items are adequately addressed.

Please contact me at 757-253-6639 or the assigned Environmental Division inspector, Joe Buchite, at 757-253-6643 if you have any further comments or questions.

Sincerely,

Scott J. Thomas

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

cc: Ralph Simmons, Simmons Engineering Inc. (via fax)

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

January 16, 2002

Reinspect 5-20-02 SA.

Andrew M. Piplico
118 Northpoint Drive
Williamsburg, Va. 23185

Re: Midlands Lot 3 (3909 Midlands Road)
County Plan SP-89-99
Stormwater Management Facility BMP # 1
County BMP ID Code: MC 048

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Based on our review of information as submitted and a concurrent field observation as performed on January 15th 2002, the following items must be addressed prior to release of the developer's surety instrument for the stormwater management/BMP facility:

Construction Certification:

1. The construction certification dated September 27th 2001 is **satisfactory**.

Record Drawing:

5-23-02 LO Revwd OK.

2. Provide a sketch (detail or section) to show the final configuration of the principal flow control structure for the basin on record drawing RD2. The principal flow control structure is riser box connected to the 12-inch barrel through the dam. Annotate the detail as necessary with constructed information. *(Note: The final configuration of the principal flow control structure for this basin was not on the approved plan for BMP # 2, S-100-00; nor does the current arrangement match that on previously approved plan SP-89-99 for BMP # 1. Only rough sketches of proposed changes to BMP # 1 were presented in the design report for BMP # 2. Therefore, the as-built needs to reflect current conditions.)*

5-23-02 LO Revwd OK

3. Provide a maintenance plan for BMP # 1 on record drawing RD2. The maintenance plan per approved plan SP-89-99 is invalid.

5-23-02 4. Show the following additional information on record drawing RD2: the location of the outlet barrel; outlet barrel type and size; and outlet protection and riprap class at the barrel outfall.

5-23-02 5. Sign and date the professional seal on record drawing sheet RD2.

5-23-02 6. If possible add the following County identifiers to the lower right hand corner of record drawing RD2: County Plan Number SP-89-99 and BMP ID No. MC 048.

Construction-Related Items:

5-21-02 7. As the dam embankment is now stabilized, remove silt fence present at the downstream right (east) toe of the dam embankment.

5-21-02 8. Remove the straw bale barrier in the open channel east of the BMP.

5-21-02 9. Regrade and stabilize with matting, seed and mulch a small erosion area present in bottom of the open channel. This area is located at the east side of the BMP where flow from the channel enters the BMP.

Once this work is satisfactorily completed, contact our office appropriately. We can then proceed with final release of the surety on the project. One reproducible and one blue/black line set of the record drawings will be required once the above items are adequately addressed.

Please contact me at 757-253-6639 or the assigned Environmental Division inspector, Joe Buchite, at 757-253-6643 if you have any further comments or questions.

Sincerely,

Scott J. Thomas

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

cc: Ralph Simmons, Simmons Engineering Inc. (via fax)

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Transmittal

Simmons Engineering, Inc
Civil Engineering Design and Consulting

4732 Longhill Road, Suite 3103
Williamsburg Business Center
Williamsburg, VA 23188
(757) 258-5000
mobile: (757) 871-4538
fax: (757) 258-3758

e-mail: rcsPE@QuixNet.net

MAY 2002
RECEIVED
ENVIRONMENTAL DIVISION

To: Ms. Scott Thomas, PE **Date:** May 20, 2002

JCC Environmental Division

Mounts Bay Road

Williamsburg VA 23187

Re: Record Drawing Submittal

Lot 2, Midlands Road, Project No. 00-105

Number of Copies	Date	Number of Pages	Description
1	5/14/02	2	Revised Record Drawings, Prints
1	5/14/02	2	Revised Record Drawings, Film
1	1/15/02	4	Environmental Division Review Comments

SP-89-99
MC048

x **For Approval** ☐ **For Your Action** ☐ **For Information** ☐ **As Requested** ☐ **For Your Use**

- **Comments:**. Thanks for your support.

Ralph C. Simmons, PE
President

cc: Andy Piplico

James City County Environmental Division

Stormwater Management / BMP Inspection Report
Detention and Retention Pond Facilities

SP-89-99
GPIN 3841600003
PH 2

County BMP ID Code (if known): MC048

Name of Facility: MIDLANDS LOT 3 BMP No.: 2 of 2 Date: 1-15-02

Location: 3909 MIDLANDS ROAD

Name of Owner: Andrew Piplico

Name of Inspector: S/Thomas

Type of Facility: SMALL DRY BASIN behind Building (Form BIORET PER DESIGN)

Weather Conditions: Sunny Mild 50's Type: ☒ Final Inspection ☐ County BMP Inspection Program ☐ Owner Inspection

N A

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

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

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

Facility Item	O.K.	Routine	Urgent	Comments
Embankments and Side Slopes:	5' HIGH EARTH EMBANK; BMP 30' W x 35' LONG			
Grass Height	✓			Little grass
Vegetation Condition	✓			Weeds + Leaves, STABLE
Tree Growth	✓			Three trees, existing ok.
Erosion	✓			None.
Trash & Debris		✓		Silt Fence DS (RIGHT SIDE)
Seepage	✓			None.
Fencing or Benches				
Interior Landscaping/Planted Areas:	☐ None ☐ Constructed Wetland/Shallow Marsh ☑ Naturally Established Vegetation			
Vegetated Conditions	✓			Grasses, LANDSCAPING
Trash & Debris	✓			Crepe MYRTLES
Floating Material	✓			
Erosion	✓			
Sediment	✓			None.
Dead Plant	✓			Winter
Aesthetics	✓			Good.
Other				
Notes: Services Building + Parking Area.				

Facility Item	O.K.	Routine	Urgent	Comments
Water Pools: ☐ Permanent Pool (Retention Basin) ☐ Shallow Marsh (Detention Basin) ☒ None. Dry (Detention Basin)				
Shoreline Erosion	✓			None, EC-2 interior matted slopes
Algae	✓			None.
Trash & Debris	✓			Some straw from stabilization
Sediment	✓			
Aesthetics	✓			
Other				
Inflows (Describe Types/Locations): Open Channel / From Parking Area				
Condition of Structure	✓			
Erosion	✓			
Trash and Debris	✓			
Sediment	✓			
Outlet Protection				
Other				
Principal Flow Control Structure - Riser, Intake, etc. (Describe Type): 5' Deep; 30"x30" conc. inlet box				
Condition of Structure	✓			SMALL DIA ORIF Bottom of box
Corrosion	✓			
Trash and Debris	✓			Some leaves in invert
Sediment	✓			
Vegetation	✓			
Other				SS Grate; 4' Perf Pipe w/ Rock; SMALL DIA ORIF
Principal Outlet Structure - Barrel, Conduit, etc. : 12 Corr. PE Pipe barrel thru dam				
Condition of Structure	✓			
Settlement	✓			
Trash & Debris	✓			
Erosion/Sediment	✓			
Outlet Protection	✓			5'x5' CLASS I OP.
Other				
Emergency Spillway (Overflow): 6' wide GRASS SPILLWAY TO BMP MC047				
Vegetation	✓			
Lining	✓			
Erosion	✓			
Trash & Debris	✓			
Other	✓			Timber Check.

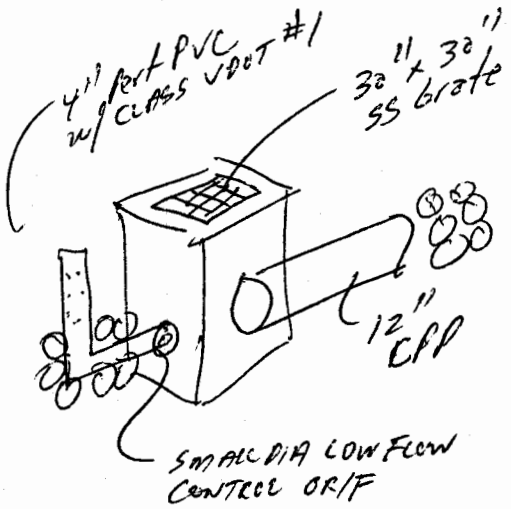
Notes: This BMP overflows high flow to DS MC047. Normal Low flow thru riser box to natural DS open channel. No sign of DS degrad.

Nuisance Type Conditions:				
Mosquito Breeding	✓			
Animal Burrows	✓			
Graffiti	✓			
Other	✓			
Surrounding Perimeter Conditions: Building on Lot 3 15' from BMP				
Land Uses				
Vegetation				
Trash & Debris				
Aesthetics				
Access /Maintenance Roads or Paths				
Other				

Remarks:

o Remove SF from D/S Right & SBB from open channel to BMP.

o Fix erosion where OC enters BMP BASIN



Overall Environmental Division Internal Rating: 3

Signature: [signature] **Date:** 1-15-02

Title: Civil Eng ENV DIV

SWMProg\BMP\CoInspProg\DetRet.wpd

WATERSHED	MC
BMP ID NO	048
PLAN NO	SP-89-99
TAX PARCEL	(38-04)(16-03)
PIN NO	3841600003
CONSTRUCTION DATE	1/1/2000
PROJECT NAME	Midlands Road Lot 3 BMP # 1
FACILITY LOCATION	3909 Midlands Road
CITY-STATE	Williamsburg, Va. 23188
CURRENT OWNER	Andrew M. & Peggy K. Piplico
OWNER ADDRESS	118 North Point Drive
OWNER ADDRESS 2	
CITY-STATE-ZIP CODE	Williamsburg, Va. 23185
OWNER PHONE	532-2888
MAINT AGREEMENT	Yes
EMERG ACTION PLAN	No

Get Last BMP No

Return to Menu

MAINTENANCE PLAN	Yes
SITE AREA acre	0.4639
LAND USE	Limited Business
old BMP TYP	Small Dry Basin
JCC BMP CODE	
POINT VALUE	4
SVC DRAIN AREA acres	0.77
SERVICE AREA DESCRI	Onsite roads & buildings
IMPERV AREA acres	0.35
RECV STREAM	UT of Mill Creek
EXT DET-WQ-CTRL	Yes
WTR QUAL VOL acre-ft	0.03
CHAN PROT CTRL	No
CHAN PROT VOL acre-ft	0
SW/FLOOD CONTROL	Yes
GEOTECH REPORT	No

CTRL STRUC DESC	Conc Inlet
CTRL STRUC SIZE inches	30 x 30
OTLT BARRL DESC	CPP Barrel
OTLT BARRL SIZE inch	12
EMERG SPILLWAY	Yes
DESIGN HW ELEV	87.61
PERM POOL ELE	na
2-YR OUTFLOW cfs	0.02
10-YR OUTFLOW cfs	0.02
REC DRAWING	Yes
CONSTR CERTI	Yes
LAST INSP DATE	1/15/2002
INTERNAL RATING	3

MISC/COMMENTS

Bio Cell per app plan. Convert to dry pond SP-100-00. See MC 047. 4" perf Lfo.

MC047
Lot 2
Dry Pond
Serves Offsite DA
MC048
Lot 3
Bio-Cell

MIDLAND ROAD LOT 2
BMP # 2
SP-100-00; AMEND SP-76-01
MC 047

RD: 11/1/01; 5/14/02
CL: 9/27/01
F1: 1/15/02
R1: 5/20/02

MIDLAND ROAD LOT 3
3909 MIDLANDS
BMP #1
SP-89-99
MC 048

[Note: Basin converted from Bioretention to small dry pond via SP-100-00]

Reinspections: 5/20/02
RD Resubmit: 5/23/02

James City County, Virginia
Environmental Division
Stormwater Management Program

PREVIOUS COMMENTS
AUG 6 1999 MCE/DE
SEPT 29 1999 SIT/DEL
OCT 01 1999 DEL

Stormwater Management Design Plan
Staff "Quick" Review

Plan No. SP - 89 - 99 Date/Time: 3RD REVIEW 03/06/00 10:00AM
Project Name: MIDLANDS OFFICE BUILDING (LOT 3, SECTION 1
Rough Location: NORTH SIDE MIDLANDS ROAD SR 780, 1000' WEST SR 616 STRAWBERRY PLAINS RD.
ADC Map: Sheet 5 Grid: H - 9
Flood Map / Zone: 510201- 00 35B Zone: X
Description: Outside 500-YEAR FLOOD
Drainage Area: ☒ Onsite Only ☐ Offsite Only ☐ Combination of Both
Submitted:

Y	N		
☐	☒	Demolition Plan (If Applicable)	Sheets:
☒	☐	Site Plan	Sheets: 2
☒	☐	Grading Plan	Sheets: 3
☒	☐	Drainage Plan	Sheets: 3
☒	☐	E&SC Plan	Sheets: 3
☒	☐	Environmental Inventory	Sheets:
☒	☐	Notes & Details	Sheets: 2 + 3
☒	☐	Drainage Map(s)	
☐	☒	Soils Map	
☒	☐	Standard E&SC and SWM Checklist. PREVIOUSLY PROVIDED	
☒	☐	E&SC Design Report (Attachment).	
☒	☐	Stormwater Management / Drainage Narrative.	
☒	☐	Stormwater Management Design Report (Attachment).	
☐	☒	Waivers, Variances, Exceptions included (Attached in Writing).	
		☐ VESCH ☐ CBPO ☐ Other,	
☒	☐	Other (List): BIORETENTION PLAN	

JCC GIS Database: Zoning: L - B Tax Parcel ID: (38-4)(16-0-0003)
Receiving Water: MILL CREEK (BMP) Site Acreage: 0.46 acres / s.f.
(BMP ALONG SOUTH SIDE US 199.)

Site Plan Information: Owner: ANDY PIPLICO
Zoning: LB - Description: LIMITED BUSINESS
Site Area: 0.4639 acres / s.f
Disturbed Area: 0.45 ± acres / s.f. (97.0 %)
☐ Disturbance > 5 acres, NPDES Notice of Intent required.
Impervious: 8,227 (0.1889) acres / s.f. (40.71 %)
☒ Less than or equal to 60 percent. Meets CBP Ordinance requirements.
☐ More than 60 percent. Does Not Meet CBP Ordinance requirements.
Open / Green Space: ?? acres / s.f. (. %)

BUILDING 4500 S.F.

Site Development Plan:

☐ Residential, Lots, etc.	☒ Commercial (B / O / R)	☐ Industrial	☐ Governmental
☒ Roadways or Entrances	☒ Parking or Loading	☒ Water	☒ Sewer
☒ Landscaping	☒ SWM/BMP control	☒ Manmade Drainage	☐ Parks, Amenities
☐ Pump/Lift Station	☐ Dams	☐ Other, SWM - BIORETENTION	

Soils Information: Site: 19B Hydric: ☐ Yes ☒ No
Soil Survey Sheet DA: 19B HSG: B/C
22 BMP: 19B Hydric: ☐ Yes ☒ No
Description of Soils at Site / DA / BMP: 19B, Kempsville-Emporia fine sandy loam, 2 to 6%; Perm. moderate; EH moderate; N

BMP Control: ☐ None ☒ Onsite ☐ Offsite ☐ Previous Approved
BMP Types: 1- Name: BIORETENTION (JCC BMP Type D - 1), Points 8
~~2- Name: (JCC BMP Type), Points~~

OnSite Drainage Type: ☐ Reinforced Concrete Pipe ☐ Corrugated Metal Pipe ☐ Aluminum Type Pipe
☐ Corrugated Polyethylene Pipe ☒ PVC Type Pipe ☒ Open Channel Type
☐ Culverts Type:
☒ Other (Specify): BIORETENTION, VC Pretreatment
1. VDOT Standards & Specifications Referenced for work within R/W: ☒ Yes ☐ No
2. VDOT Standards & Specifications Referenced for work outside R/W: ☒ Yes ☐ No

Site Limitations: ☐ RPA ☐ RMA ☐ Steep Slopes ☐ Delineated Wetlands
☐ Hydric Soils ☐ Critical Soils ☐ Vegetated ☐ Buffers
☒ Defined Natural Drainage Features onsite ☐ Downstream Storm/Culv.
☐ Evidence of Downstream Channel Erosion (by Field Observation)
☐ Floodplain or Problem Drainage Area ☐ Stormwater Hotspot
☒ Other (Specify): NATURAL CHANNEL JUST OFFSITE (North)

Site Stormwater Management / BMP Control: D-1 BIORETENTION (2x WQv)

☒ Yes ☐ No (#1 / #2)	#1	#2
Predev (Present) DA = 0.46 ac. C/CN = 73		Tc = 9.72 min / hrs.
2-year	1.08 cfs	cfs
10-year	2.20 cfs	cfs
100-year	3.39 cfs	cfs
PostDev w/o Detention DA = 0.47 ac. C/CN = 80		Tc = 16.94 min / hrs.
2-year	~~0.54~~ 1.74 cfs	cfs
10-year	2.90 cfs	cfs
100-year	4.07 cfs	cfs
PostDev w/ Detention DA = / ac. C/CN = /		Tc = / min / hrs.
2-year	0.64 cfs at El. 96.57	cfs at El.
10-year	2.06 cfs at El. 96.78	cfs at El.
100-year	– cfs at El. –	cfs at El.

POSTDEV SUBAREAS
1-0.11
2-0.22
3-0.14
0.47AC.
Tc 8.94 + 8.00 = 16.94

NOTE: Post Tc > Pre Tc DUE TO LOW IMPACT DEV & BIORET.

Downstream Tailwater Assumption for Pond Routing: 92.25 ft.
Routed Peak Discharges (Outflows) from BMP - 1 meets Predevelopment Allowables: ☒ Yes ☐ No
~~Routed Peak Discharges (Outflows) from BMP - 2 meets Predevelopment Allowables: ☐ Yes ☐ No~~
Appears to Meet VESCH / E&SC Ordinance / CBP Ordinance Requirements: ☒ Yes ☐ No

POSTDEV 25-YR ROUTED 2.58 CFS @ 96.85
(OCD 100-YR 95.93)
PREVIOUS HYDRAULIS REPORT

Pond / BMP Design Data (Add Sheet If Necessary for Multiple Facilities):

☐ Check if None ☒ Provided: BMP # 1 Type: BIORETENTION

Y	N				
☒	☐	Top of Facility	El.	98.0	
☐	☒	Design High Water	El.	?	
☒	☐	Emergency Spillway (E.S.) Crest	El.	96.90	~~BW:~~ ~~SS:~~ 2.5'x 2.5' BOX
☐	☐	FreeBoard			1 ft. or > with E.S.
		☐ Acceptable ☐ Not Acceptable.			2 ft. or > w/o E.S.
☒	☐	Principal Spillway (Riser) Crest	El.	96.5	Size/Type: 12" HDPE STANDPIPE
☒	☐	Principal Spillway Crest 1 ft. below crest of emergency spillway.			☐ Yes ☒ No ☐ N/A
☒	☐	Stage-Storage Curve or Data			
☒	☐	Outlet Rating Curve or Table (Discharge Structure Rating)			
☐	☒	1-year design storm	El.		or Volume
☐	☒	1-year, 24 hour detention criteria for stream channel protection.			☐ Yes ☐ No ☐ N/A
☐	☒	Extended Detention Provided (Min. 24 hours)		6"	☐ Yes ☐ No ☒ N/A
☐	☒	Normal/Permanent Pool	El.		
☒	☐	Orifice/Weir #1 (highest El.)	El.	96.90	Type: 2.5'x 2.5' Box
☒	☐	Orifice/Weir #2	El.	96.50	Type: 12" HDPE STANDPIPE
☒	☐	Orifice/Weir #3	El.	96.08	Type: 3-3"ϕ ORIFICE (TRIPLE)
☐	☒	Orifice/Weir #4	El.		Type:
☐	☒	Orifice/Weir #5 (lowest El.)	El.		Type:
☐	☒	Low Flow Orifice (ExDet, CPv)	El.		Type:
☐	☒	Pond Drain w/ Valve	El.		Type:
☒	☐	Pond Bottom	El.	95°	Riser Height: N/A SEE BELOW.
☐	☒	Steps or Access Provided (for over 4 ft. depth)			
☐	☒	Riser Base	Bottom El.		Type:
☐	☒	Core Trench			
☐	☒	Anti-Seep Collars or other acceptable Seepage Control Method.			VULCAN Beehive Grate
☒	☐	Principal Spillway Anti-Vortex Device and Trash Rack.			Type:
☒	☐	Low Flow Orifice Cage-Type Trash Rack.			Type:
☒	☐	Outlet Barrel:	Type/Class: HDPE		Size: 15"
			Inv. U/S: 91.36		Inv D/S: 91.00
			Slope: 3.00% (2.00%)		Length: 18' (ft.)
☐	☒	Flared End Section. Matches Outlet Barrel material type.			
☒	☐	Outlet Protection.			
		☒ Standard riprap outlet protection (OP)			Type: ~~None Shown~~ NO DIMENSIONS OR RIPRAP CLASS SHOWN.
		☐ Special Dissipator Structure (SDS)			Type:
☐	☒	Sediment / Cleanout Elevation			El. or Depth
☒	☐	Adequate Channel Downstream of BMP using MS #19 or 1-year, 24-hour detention criteria.			

Sketch and Notes, If Needed: STANDPIPE: TOP 96.50, BOTTOM 91.36 = 5.14' HEIGHT
RISER BOX: TOP 96.90, BOTTOM 91.36 = 5.54' HEIGHT
PRIOR TO 1-YEAR, 24 HOUR CRITERIA.

Sediment Trap & Basins NONE.

☐ Temporary Sediment Trap # 1 _____ DA = _____ < 3 acres
☐ Temporary Sediment Trap # 2 _____ DA = _____ < 3 acres
☐ Temporary Sediment Trap # 3 _____ DA = _____ < 3 acres

☐ Temporary Sediment Basin # 1 _____ DA = _____ ☐ BMP # ____ convert.
☐ Temporary Sediment Basin # 2 _____ DA = _____ ☐ BMP # ____ convert.

Plan Review Steps & Components:

Y	N	
☒	☐	First "Look-Thru". Quick look through plan for familiarity.
☐	☒	Worksheet for BMP Point System. Check for 10 BMP points.
☒	☐	FEMA Special Flood Hazard Area check against property, site and development.
☒	☐	Check Tax Parcel Maps for RPA/RMA locations.
☐	☒	Stormwater Hotspots or Separation Distance Requirements.
☒	☐	Environmental Inventory components based on Chesapeake Bay Ordinance requirements.
☒	☐	Highlight environmental sensitive areas (wetlands, RPA, steep slope,etc.).
☐	☒	Demolition Plan (if any). Identification of offsite LD, borrow or waste areas and E&SC.
☒	☐	Review existing topography to determine adequacy of E&SC plan (Phase I).
☒	☒	Review Grading Plan to check for conflicts (offsite grading, cut-fills, slopes,) & Phase II E&SC. STEEP SLOPE EMBANK 0.7H:1V
☒	☐	Review Development Plan to check for conflicts (drainage, buffers, etc.).
☒	☐	Highlight storm drain system. Check for major utility conflicts and cover situations.
☒	☐	Review Storm Drain component specifications, notes, and details.
☒	☐	Review Sequence of Construction (E&SC and SWM plan purposes).
☐	☒	Review plan based on Chapter 19 Subdivision ordinance as it relates to SWM.
☒	☐	Review plan based on Chapter 24 Zoning as it relates to SWM.
☒	☐	Review plan based on Chapter 23 Chesapeake Bay ordinance requirements.
☒	☐	Review plan based on General Knowledge and Experience for Design/Construction.
☒	☐	Review plan based on Virginia Erosion and Sediment Control Handbook (VESCH).
☒	☐	Review plan based on JCC BMP manual for the BMP type(s) selected for project.
☐	☐	Review plan based on Hampton Roads BMP Design Guidance manual (Optional).
☐	☒	Review plan based on JCC E&SC and SWM Design Plan Checklist. (Pre-final).
☒	☐	Review plan based on Virginia Stormwater Management Handbook (VSMH). PREVIOUS COMMENT REFERENCE SOURCE FOR BIORETENTION.
☐	☒	Review plan based on JCC Stormwater Conveyance System D/C Guidelines (Pre-final).
☐	☒	Review plan based on JCC BMP Construction Specifications (Future).
☐	☒	Review Maintenance Plan for SWM / BMP facility and SOC as it relates to SWM plan. NONE PROVIDED
☐	☐	Review E&SC Plan Design Report or computations (Attachment). Sediment Filter Devices.
☒	☒	Review SWM Design Report or computations (Attachment). Pond Hydraulics/Conveyances NO 100-YEAR ROUTING.
☒	☐	Adequate Channel Information downstream of both uncontrolled or BMP areas.
☒	☐	Provisions on plan requiring proper As-Built and Certification of facility during construction.
☒	☐	Inclusion of SWM/BMP data into any Departmental databases.
☐	☐	Reserved.

Prepared Environmental Division comments for the following based on above components:

☒	☐	***General Comments:***
☒	☐	***Erosion & Sediment Control Plan:***
☐	☒	***Floodplain:***
☒	☐	***Chesapeake Bay Preservation:***
☒	☐	***Stormwater Management / Drainage:***

Additional Notes & Comments:
- NO COMPUTATIONS SHOWN FOR THE ROUTED POST DEV 100-YEAR TO SHOW DAM LEVEL IN THE BIORET CELL + IF ADEQUATE FB EXISTS. (OLD REPORT SAID 2-95.55, 10-95.77; 100-95.93)
- NO Maintenance Plan.
- Sheet 2 Grading shown Offsite. Corrected on Sheet 3. OK
- EXCESSIVE STEEP SLOPES ON D/S PORTION OF BIORETENTION AREA. (0.7H:1V).
- RIPRAP(OP) SPECS. PIPE SLOPE WRONG SEC A-A SHEET 3
- PREVIOUS APPROVED NOTE WAS REMOVED ON SHEET 3

(Note: THIS FORM FOR COUNTY USE ONLY.)

Signature: [signature] Date: 03-07-00 10:00AM