



## 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.

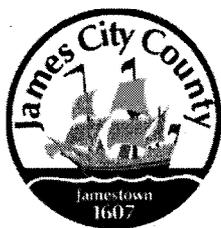
**BMP NUMBER:** MC-059

**DATE VERIFIED:** May 4, 2012

**QUALITY ASSURANCE TECHNICIAN:** Leah Hardenbergh

*Leah Hardenbergh*  
\_\_\_\_\_

**LOCATION:** WILLIAMSBURG, VIRGINIA



# Stormwater Division

## MEMORANDUM

**DATE:** March 12, 2010  
**TO:** Michael J. Gillis, Virginia Correctional Enterprises Document Management Services  
**FROM:** Jo Anna Ripley, Stormwater  
**PO:** 270712  
**RE:** Files Approved for Scanning

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**General File ID or BMP ID:** MC059

**PIN:** 3830100018

**Subdivision, Tract, Business or Owner**

**Name (if known):**

Saint Bedes Catholic Church

**Property Description:**

Church Site

**Site Address:**

3686 Ironbound Road

*(For internal use only)*

**Box** 18

**Drawer:** N/A

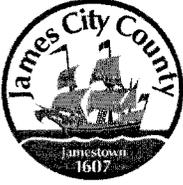
**Agreements:** (in file as of scan date)

N

**Book or Doc#:**

**Page:**

Comments



**James City County Environmental Division  
Stormwater Management/BMP Record Drawing and  
Construction Certification Review Tracking Form**

- Project Name: Saint Bede's Catholic Church Rectory and Parking Lot Expansion  
County Plan No.: Amended to SP-28-01  
Stormwater Management Facility: \_\_\_\_\_  
BMP Phase #:  I  II  III  
 Information Package Received. Date/By: 10/20/08 Linwood Burton  
 Completeness Check:  
 Record Drawing Date/By: 8/13/08 Peter Farrell  
 Construction Certification Date/By: 10/15/08 Michael J. Galli  
 RD/CC Standard Forms (Required for all BMPs after Feb 1<sup>st</sup> 2001 Only)  
 Insp/Maint Agreement # / Date: Not Required  
 BMP Maintenance Plan Location: Not Required  
 Other: \_\_\_\_\_  
 Standard E&SC Note on Approved Plan Requiring RD/CC or County comment in plan review  
 Yes  No Location: Page C-2 Item # 20  
 Assign County BMP ID Code #: Code: MC-53  
 Preliminary Input/Log into Division's "As-Built Tracking Log"  
 Add Location to GIS Map. Obtain basic site information (GPIN, Owner, Address, etc.)  
 Preliminary Log into Access Database (BMP ID #, Plan No., GPIN, Project Name, etc.)  
 Active Project File Review (correspondence, H&H, design computations, etc.)  
 Initial As-Built File setup (File label, folder, copy plan/details/design information, etc.)  
 Inspector Check of RD/CC (forward to Inspector using transmittal for cursory review).  
 Pre-Inspection Drawing Review of Approved Plan (Quick look prior to Field Inspection).  
 Final Inspection (FI) Performed Date: 11/20/2008  
 Record Drawing (RD) Review Date: 10/23/2008  
 Construction Certification (CC) Review Date: 10/23/2008  
 Actions:  
 No comments.  
 Comments. Letter Forwarded. Date: 10/08  
 Record Drawing (RD)  
 Construction Certification (CC)  
 Construction-Related (CR)  
 Site Issues (SI)  
 Other : \_\_\_\_\_  
 Second Submission: NA  
 Reinspection (if necessary): 11/20/08  
 Acceptable for SWM Purposes (RD/CC/CR/Other). Ok to proceed with bond release.  
 Complete "Surety Request Form".  
 Check/Clean active file of any remaining material and finish "As-Built" file.  
 Add to County BMP Inventory/Inspection schedule (Phase I, II or III).  
 Copy Final Inspection Report into County BMP Inspection Program file.  
 Obtain Digital Photographs of BMP and save into County BMP Inventory.  
 Request mylar/reproducible from As-Built plan preparer.  
 Complete "As-built Tracking Log".  
 Last check of BMP Access Database (County BMP Inventory).  
 Add BMP to JCC Hydrology & Hydraulic database (optional).  
 Add BMP to Municipal BMP list (if a County-owned facility)  
 Add BMP to PRIDE BMP ratings database.

**Final Sign-Off**

Inspector: [Signature]

Date: \_\_\_\_\_

Chief Engineer: \_\_\_\_\_

Date: \_\_\_\_\_

\*\*\* See separate checklist, if needed.

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: Saint Bede Catholic Church  
Structure/BMP Name: Rectory & Parking Expansion Raintank  
Project Location: East of Ironbound Road approximately 0.9 Mi. North of the intersection of State Route 5 and Ironbound Road (S.R. 615)  
BMP Location: Approximately 300' southwest of the southwest corner of St. Bede Catholic Church Building

County Plan No.: Amendment to SP-28-01

Project Type:  Residential  Business  Commercial  Office  Institutional  Industrial  Public  Roadway  House of Worship  
Tax Map/Parcel No.: (38-3) (1-18)  
BMP ID Code (if known):  
Zoning District: R-8  
Land Use: House of Worship (Sup-15-00 Approved)  
Site Area (sf or acres): 42.90 +/- Ac.

Brief Description of Stormwater Management/BMP Facility: Underground Storage Facility

Nearest Visible Landmark to SWM/BMP Facility: St. Bede Catholic Church

Nearest Vertical Ground Control (if known):  
 JCC Geodetic Ground Control  USGS  Temporary  Arbitrary  Other  
Station Number or Name: 321 Reset  
Datum or Reference Elevation: 78.72' MSL, NGVD 29  
Control Description: Disk in concrete  
Control Location from Subject Facility: Approximately 500' southwest of Bmp

**Section 2 - Stormwater Management / BMP Facility Construction Information:**

Pre-Construction Meeting Held for Construction of SWM/BMP Facility:  Yes  No  Unknown  
Approx. Construction Start Date for SWM/BMP Facility: June, 2008  
Facility Monitored by County Representative during Construction:  Yes  No  unknown  
Name of Site Work Contractor Who Constructed Facility: Bush Construction  
Name of Professional Firm Who Routinely Monitored Construction: ECS  
Date of Completion for SWM/BMP Facility: June, 2008  
Date of Record Drawing/Construction Certification Submittal: \_\_\_\_\_

( 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: St. Bede Parish  
Catholic Diocese of Richmond  
Mailing Address: 3686 Ironbound Road  
Williamsburg, Va. 23188  
Business Phone: (757-229-3700) Fax:  
Contact Person:

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: Land Mark Design Group, Inc.  
Mailing Address: 4029 Ironbound Road  
Williamsburg, VA 23188  
Business Phone: 757-253-2975  
Fax: 757-229-0049  
Responsible Plan Preparer: Alistar J. Ramsay  
Title:  
Plan Name: Plan of Development Saint Bedes Rectory and Parking Expansion  
Firm's Project No. 1970077-02.00  
Plan Date: 11/11/04, Revised 02/03/05  
Sheet No.'s C-3 & C4-A

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

Name: Bush Construction Company  
Mailing Address: 4029 Ironbound Road  
Williamsburg, Virginia 23188  
Business Phone: 757-220-7800  
Fax:  
Contact Person: Linwood Burton  
Site Foreman/Supervisor: Larry Slaughter  
Specialty Subcontractors & Purpose (for BMP Construction Only):

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**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**

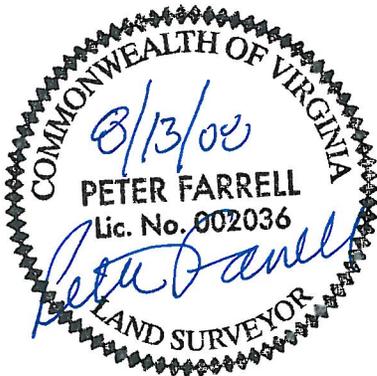
**Record Drawing Certification**

Firm Name: Landmark Design Group, Inc.  
Mailing Address: 4029 Ironbound Rd.  
Williamsburg, VA 23188  
Business Phone: 757-253-2975  
Fax: 757-229-0049

Name: Peter Farrell, L.S.  
Title: Director of Surveys

Signature: *Peter Farrell*  
Date: 8-13-08

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.



( Seal )

Virginia Registered Professional Engineer  
or Licensed Land Surveyor

**Construction Certification**

Firm Name: ECS Mid-Atlantic, LLC  
Mailing Address: 108 Ingram Kd., suite 1  
Business Phone: 229 6677  
Fax: 229 9978

Name: Michael J. Galli, P.E.  
Title: principal Engineer

Signature: *[Signature]*  
Date: 10/15/08

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.



( Seal )

Virginia Registered  
Professional Engineer

# SAINT BEDE CATHOLIC CHURCH

BERKELEY MAGISTERIAL DISTRICT  
JAMES CITY COUNTY, VIRGINIA

MARCH 26, 2001

REV. JUNE 1, 2001

REV. JULY 26, 2001

REV. OCTOBER 3, 2001

REV. OCTOBER 16, 2001

100% CD/PERMIT SET  
SITE PLAN

SITE PLAN AMENDMENT

FEBRUARY 10, 2003

APRIL 18, 2003

## SITE PLAN AMENDMENT FOR RECTORY

### Legend

(UG) INDICATES UNDERGROUND UTILITY  
(OH) INDICATES OVERHEAD UTILITY

EXISTING	DESCRIPTION	PROPOSED
SAN	SANITARY SEWER	SAN
W	WATER	W
S	STORM SEWER	S
E	ELECTRIC LINE	E
G	GAS LINE	G
T	TELEPHONE	T
TV	CABLE TV LINE	TV
CO	CLEANOUT	CO
FM	FORCE MAIN	FM
MH	MANHOLE	MH
CB	CATCH BASIN/CURB BASIN	CB
DI	DROP INLET	DI
PI	PLASTIC YARD DROP INLET	PI
FES	HEADWALL (W/ WINGS)	FES
W	FLARED END SECTION	W
YH	WATER METER	YH
FH	METER VAULT	FH
YH	YARD HYDRANT (SIAMASE CONNECTION)	YH
FH	FIRE HYDRANT	FH
	VALVE	
	TELEPHONE PEDESTAL	
	TELEPHONE POLE	
	POLE W/ LIGHT	
	POWER POLE	
	GUY WIRE	
	POLE MOUNTED SIGN	
18.55	GROUND ELEVATION	18.55
20	GROUND CONTOUR	20
	CONCRETE CURB	
	CURB & GUTTER	
	REV. CONC. CURB & GUTTER	
	WARPED CURB & GUTTER	
	GRAVEL PAVEMENT	
	CEMENT CONCRETE	
	BITUMINOUS CONCRETE	
	BUILDING	
	PROJECT LIMITS	
	RIGHT-OF-WAY	
	CENTERLINE/BASELINE	
	PROPERTY LINE	
	DITCH, SWALE LINE	
	TREE LINE	
	FENCE	
	GUARDRAIL	
B-12	BORING LOCATION W/ No.	B-12
	BENCHMARK	

NOTE: SOME SYMBOLS SHOWN IN THIS LEGEND MAY NOT NECESSARILY BE USED FOR THIS PROJECT.

### NOTES:

ANY EXISTING UNUSED WELLS SHALL BE ABANDONED IN ACCORDANCE WITH STATE PRIVATE WELL REGULATIONS AND JAMES CITY COUNTY CODE.

ALL COMPONENTS OF THE WATER DISTRIBUTION SYSTEM AND PUBLIC SANITARY SEWER FACILITIES SHALL BE INSTALLED, TESTED, AND CONVEYED TO THE JAMES CITY SERVICE AUTHORITY IN ACCORDANCE WITH THE LATEST EDITION OF THE JAMES CITY SERVICE AUTHORITY STANDARDS AND SPECIFICATIONS AND THE VIRGINIA DEPARTMENT OF HEALTH WATERWORKS AND SEWERAGE REGULATIONS. A COPY OF THE JCSA STANDARDS MUST BE KEPT ON SITE BY THE CONTRACTOR DURING THE FULL TIME OF INSTALLING, TESTING, AND CONVEYING THE FACILITIES TO JCSA. COPIES OF THE STANDARDS MAY BE OBTAINED FROM JCSA.



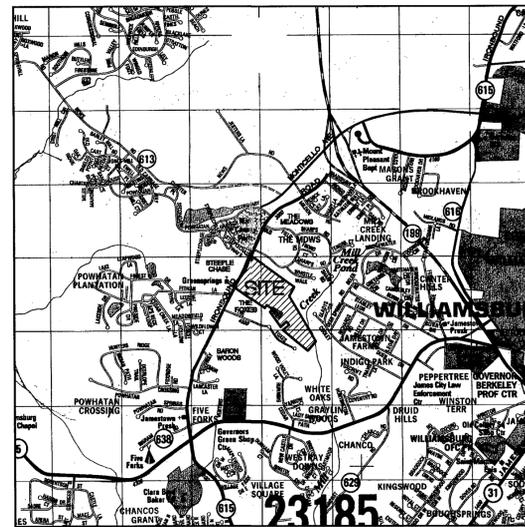
BEFORE YOU DIG ANYWHERE IN VIRGINIA CALL 1-800-552-7001  
VA LAW REQUIRES 48 HOURS NOTICE BEFORE YOU DIG ANYWHERE

## LANDMARK DESIGN GROUP

Engineers • Planners • Surveyors  
Landscape Architects • Environmental Consultants

4029 Ironbound Rd., Suite 100  
Williamsburg, VA 23188  
Tel. (757) 253-2975  
Fax (757) 229-0048  
Email: info@landgroup.com

5544 Greenwich Road - Suite 200  
Virginia Beach, VA 23464  
Tel. (757) 473-2000  
Fax (757) 497-7933  
Email: info@landgroup.com



VICINITY MAP

SCALE: 1"=2,000'

*SP-28-01  
SP-18-03  
SP-122-03 AMENDED  
SHOW STATISTICS FOR RECTORY + PARKING.*

### SHEET INDEX

SHEET NO.	DESCRIPTION
C-1	COVER SHEET
C-2	OVERALL PLAN
C-3	SITE DEVELOPMENT PLAN

### STATISTICAL DATA

TAX MAP AND PARCEL:	(38-3)(1-18)
ZONING:	R-8, RURAL RESIDENTIAL DISTRICT
PROPOSED USE:	HOUSE OF WORSHIP (SUP-15-00 APPROVED)
GROSS SITE ACREAGE:	42.9 AC.
SITE COVERAGE BY BUILDINGS:	33,052 SQ. FT.
PROJECT AREA:	13.29 AC. (31.1% OF PROPERTY)
TOTAL SITE IMPERVIOUS AREA, (PERCENT):	5.1 AC. (11.9% OF PROPERTY)
AREA DISTURBED:	11.27 AC. (26.3% OF PROPERTY)
F.E.M.A. PANEL NUMBER	510201 0035 B - DATED: FEB. 6, 1991
F.E.M.A. F.I.R.M. ZONE	ZONE X
BUILDING DATA:	
TOTAL FLOOR AREA OF CHURCH:	38,280 SQ. FT.
PROPOSED HEIGHT OF CHURCH:	44 FT.
PROPOSED FLOORS IN CHURCH:	TWO FLOORS
PROPOSED CHURCH BUILDING TYPE:	TYPE 2C, USE GROUP A4
NUMBER OF SEATS	1500
PARKING REQUIREMENTS:	
USE CATEGORY:	CATEGORY C
PARKING REQUIRED:	300 SPACES
PARKING PROPOSED:	378 SPACES ( PHASE I : 305 ) ( PHASE II : 73 )
HANDICAPPED SPACES REQUIRED:	8 H.C. SPACES (1 VAN ACCESSIBLE)
HANDICAPPED SPACES PROPOSED:	8 H.C. SPACES (2 VAN ACCESSIBLE)
TOTAL PROPOSED SITE PARKING:	388 SPACES
OWNER / DEVELOPER:	SANT BEDE PARISH CATHOLIC DIOCESE OF RICHMOND
SITE ENGINEER:	LANDMARK DESIGN GROUP 4029 IRONBOUND ROAD, SUITE 100 WILLIAMSBURG, VA 23185 TELEPHONE: (757)-253-2975 FAX: (757)-229-0049

C-111-04

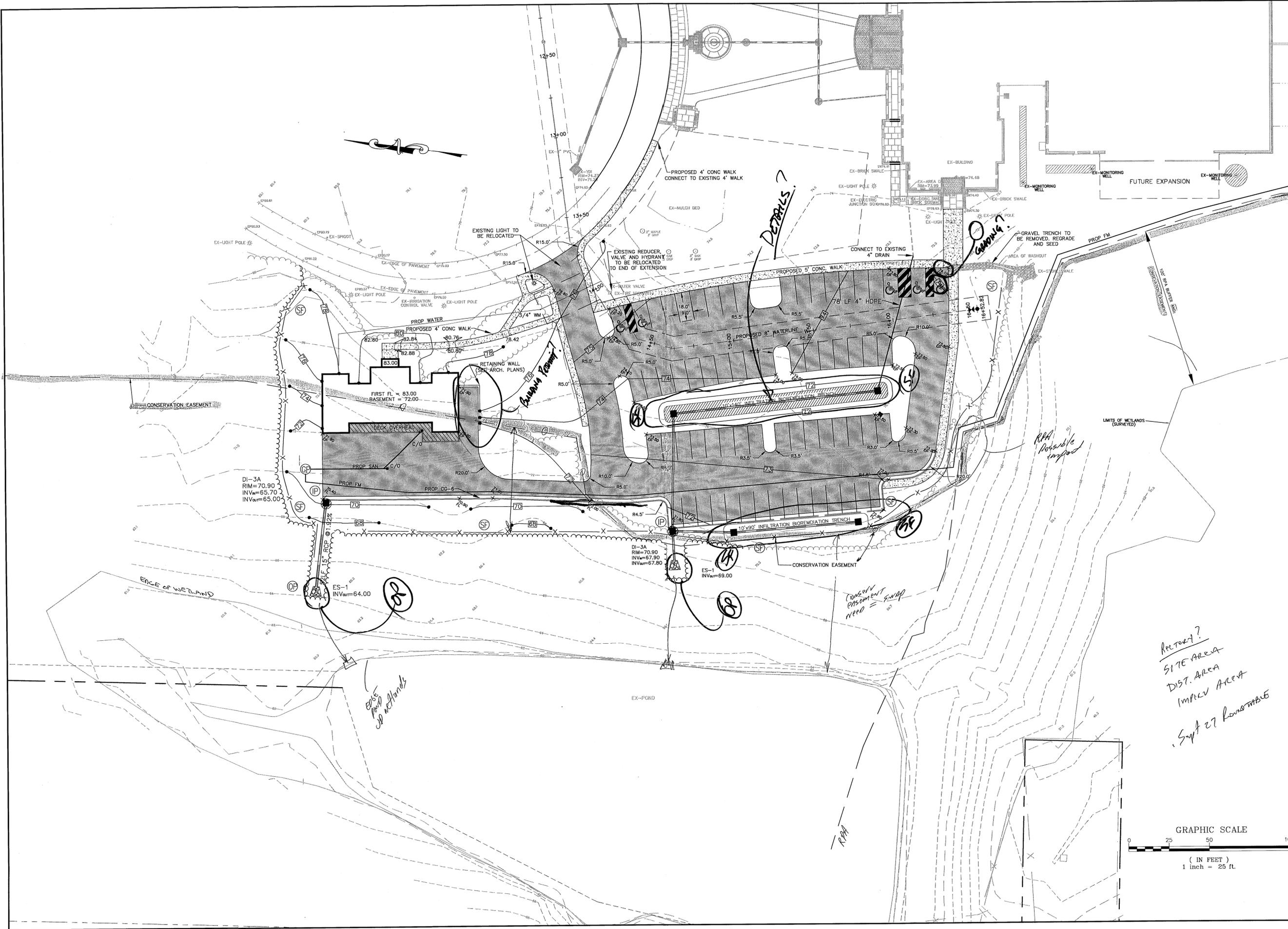


Project Number: 170077-00015  
Drawing Number: 12350W

1 of 3

C-1





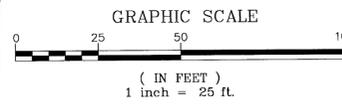
REVISIONS:

No.	Date	Comment

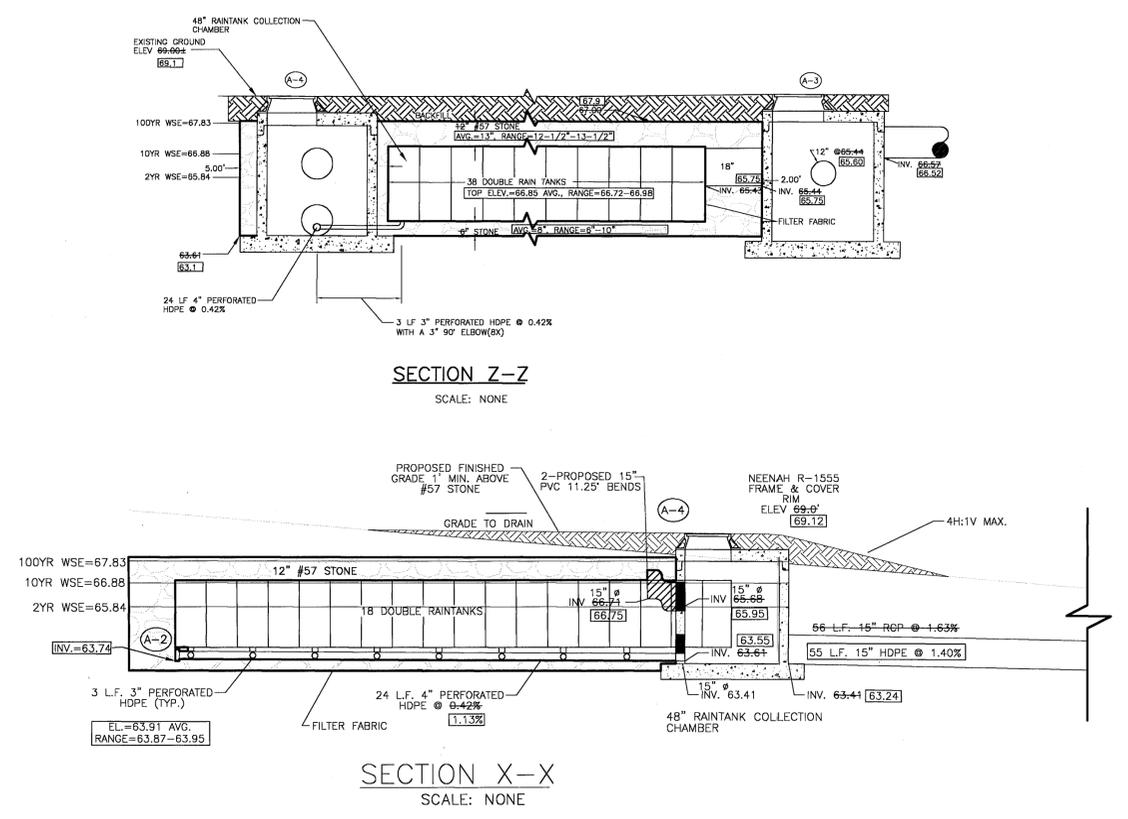
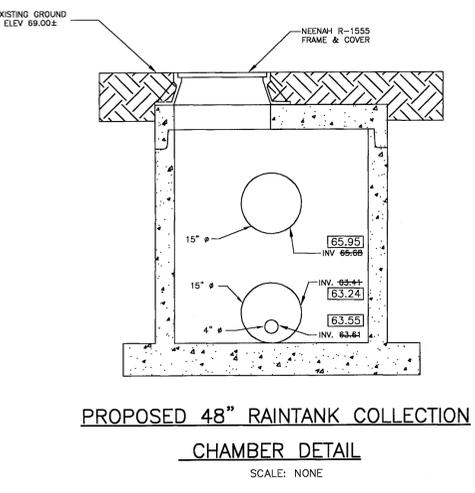
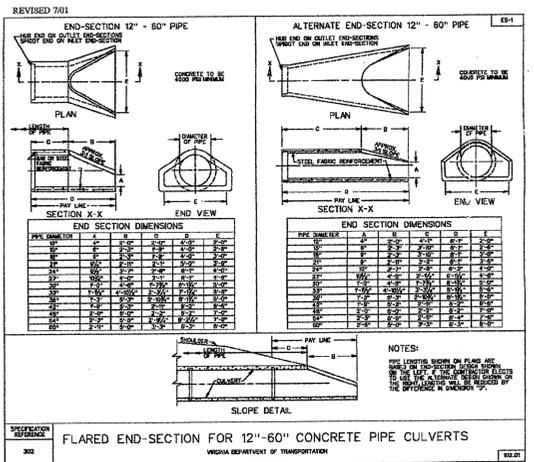
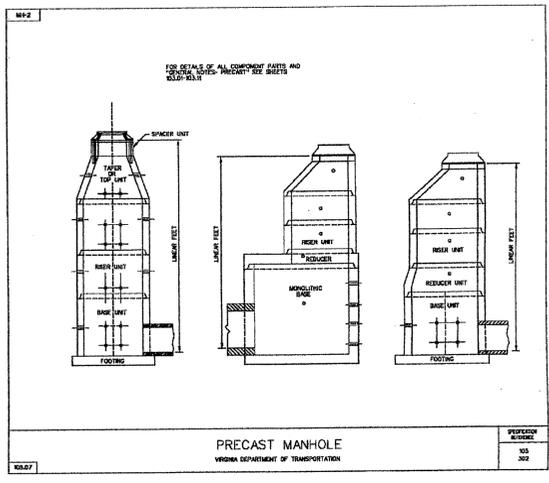
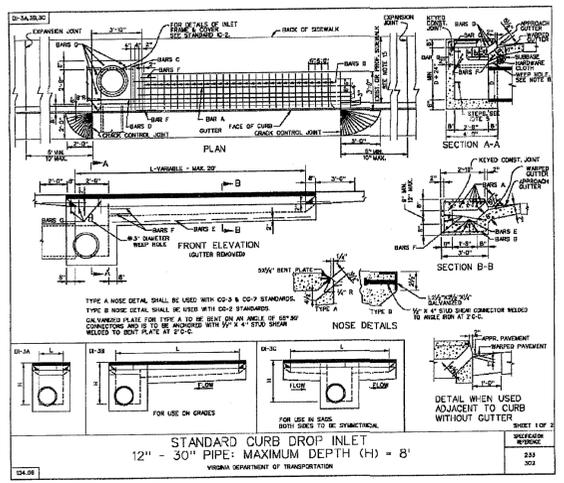
DRAWING STATUS:

	Interoffice Review
	Client for Review
	Final Approval
	Fire Approval Bidding
	COUNTY APPROVAL
	1st Submitted
	2nd Submitted
	3rd Submitted
	Approved

**SITE PLAN**  
PLAN OF DEVELOPMENT  
SAINT BEDES RECTORY  
JAMES CITY COUNTY, VIRGINIA



Designed: CRO	Date: MO/DAY/YR
Checked: CRO	Scale: 1"=25'
File Mgr./Drawn: MHL	CAOD File name: SHEET2.dwg
Project Number: 1870077-002.00	Dwg. File No.: XXXXX X
Drawing Number	



THESE RECORD DRAWINGS ARE BASED ON AN ACTUAL FIELD SURVEY OF STORMWATER MANAGEMENT FACILITIES PERFORMED BY LANDMARK DESIGN GROUP JUNE, 2008. IMPROVEMENTS SHOWN OTHER THAN STORMWATER MANAGEMENT FACILITIES, WERE TAKEN FROM THE APPROVED SITE PLAN AND WERE NOT FIELD VERIFIED.

### RainTank Maintenance

With adequate pre-treatment of storm water before it enters the RainTank, heavy sediments, trash, and other debris will not enter the system. Therefore, most maintenance efforts should be directed at the pre-treatment structures to ensure they are functioning properly.

To monitor the accumulation of fine sediments that may enter the detention/retention area, RainTank systems may include a monitoring well, flush ports, or both (see image 2).

**Monitoring Wells**  
 Typically made from perforated 6" PVC pipe that runs from the bottom of the RainTank up to ground level, these are typically used to visually inspect the system and take simple measurements to gauge the depth of accumulated sediments (see image 1).

**Flush Ports**  
 Running from the bottom of the RainTank up to ground level, flush ports are made from solid PVC pipe with notches cut into the bottom. As water is pumped into the port the notches will direct water down to the bottom of the system to create turbulence, thereby re-suspending accumulated sediments.

After pumping water into the tanks, flushing is completed by vacuuming sediment laden water out of the system either through the inlet structure or through the flush port. The diameter of the flush port is determined by a number of factors including the rate at which water will be pumped into the system, the number of flush ports incorporated, and the possible requirement of vacuuming through the port. Experience has shown that an 18" port is more than adequate for virtually any required use, with 6" - 12" ports more common when vacuuming will be performed at the inlet structure.

2831 Cardwell Road  
 Richmond, VA 23234  
 800-448-3636  
 www.acfenv.com

### RainTank Maintenance

**Installing the Maintenance System**  
 To install the PVC pipe, the RainTank can be easily cut with a reciprocating saw (see image 3). Whenever possible cut between the interior baffles of the Tank.

Both types of penetrations of the RainTank system should be capped at the surface. In landscaped areas, this may be accomplished with a simple pipe cap or plastic valve box (see image 4 lower inset). In paved areas, metal lids are more appropriate (see image 4).

**Maintenance Intervals**  
 Maintenance Schedules for the RainTank System are a function of the contributing area and the type of pre-treatment specified. A standard maintenance schedule may include quarterly inspections through the first year of use, with yearly inspections thereafter. Flushing should be performed if sediment should reach a predetermined depth or volume of the storage capacity which reduces performance of the system to unacceptable levels.

**Availability**  
 All system components, including caps, lids, and valve boxes are available from ACF Environmental. Contact your local sales representative or our Sales Office at 800-448-3636 for assistance.

2831 Cardwell Road  
 Richmond, VA 23234  
 800-448-3636  
 www.acfenv.com

Water Management for Life



5544 Greenwich Road  
 Suite 200  
 Virginia Beach, VA 23462  
 Fax (757) 497-7933  
 Email: info@landmarkdesign.com

0329 Westshore Road  
 Suite 100  
 Portsmouth, VA 23705  
 Fax (757) 228-6848  
 Email: info@landmarkdesign.com

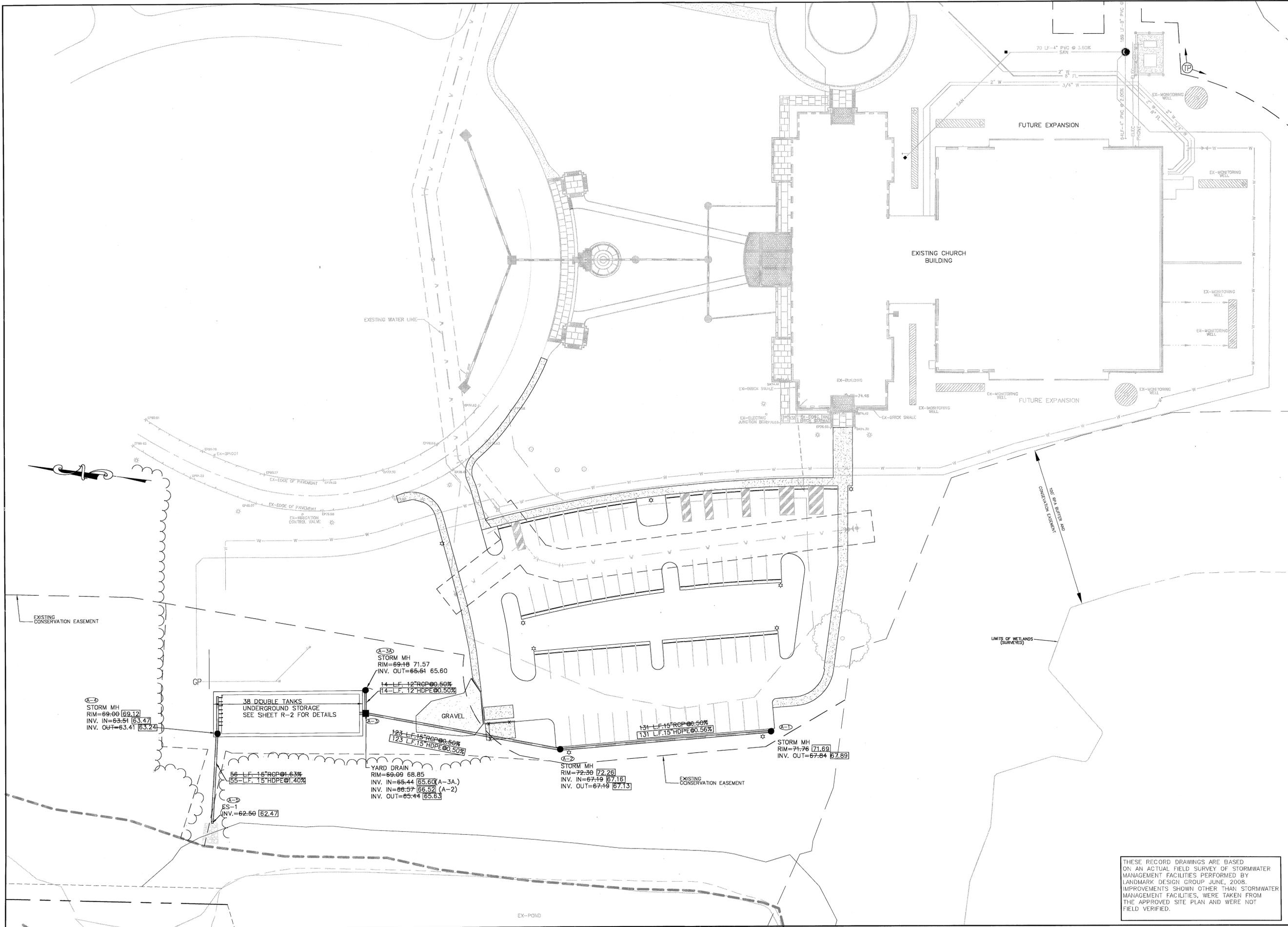
**LANDMARK DESIGN GROUP**  
 Engineers • Planners • Surveyors  
 Landscape Architects • Environmental Scientists

RECEIVED  
 OCT 22 2008  
 ENVIRONMENTAL DIVISION

STORMWATER RECORD DRAWING  
 ST. BEDE CATHOLIC CHURCH  
 JAMES CITY COUNTY, VIRGINIA

Designed: LMDG	Date: 07/09/08
Checked: PF	Scale: 1"=25'
File Mgr./Drawn: AST	CADD File name: REC BASE DWG
Project Number: 1970077-003.05	Dwg. File No.: 18639W

Drawing Number  
**R-1**  
 1 OF 2



THESE RECORD DRAWINGS ARE BASED ON AN ACTUAL FIELD SURVEY OF STORMWATER MANAGEMENT FACILITIES PERFORMED BY LANDMARK DESIGN GROUP JUNE, 2008. IMPROVEMENTS SHOWN OTHER THAN STORMWATER MANAGEMENT FACILITIES, WERE TAKEN FROM THE APPROVED SITE PLAN AND WERE NOT FIELD VERIFIED.



# ST. BEDE CATHOLIC CHURCH RECTORY

NOVEMBER 12, 2004  
REVISED FEBRUARY 4, 2005  
REVISED MARCH 17, 2005

LMDG Project # 1970077-002.00

## SUPPORTING ENGINEERING CALCULATIONS

1. Project Narrative
2. Pre-Developed Routing
3. Post-Developed Routing and Channel Protection Worksheet
4. Storm Sewer Design and HGL
5. Inlet Calculations
6. Outlet Protection
7. JCC 10 Point BMP Calculations
8. Water Data Sheet and Fixture Counts
9. Erosion and Sediment Control and Stormwater Management Design Plan Checklist

SP-132-04  
3RD SUB

**LANDMARK**  
**DESIGN GROUP**

**PROJECT NARRATIVE**

### Project Description:

The purpose of this site plan amendment is to add the additional parking lot as previously proposed and the rectory. Silt fence and inlet protection has been proposed for sediment runoff.

### Soils:

According to the Soil Survey of James City, York County and the City of Williamsburg, Virginia, the predominant soils that will be disturbed are: Craven-Uchee Complex, Emporia Complex, and Craven fine sandy loam.

Craven-Uchee complex (11C) consists of moderately well drained Craven soils and well-drained Uchee soils. Areas of this complex are on narrow ridge tops. Slopes are relatively uneven. Typically, the surface layer of this soil is dark grayish brown fine sandy loam about 4 inches thick. The subsurface layer is pale olive fine sandy loam 5 inches thick. The subsoil extends to a depth of 42 inches and is yellowish brown clay in the upper part and yellowish brown sandy clay loam mottled with gray in the middle and lower parts. The permeability of this soil is slow, and available water capacity is moderate. Surface runoff is medium. The erosion hazard is moderate. The subsoil has moderate shrink-swell potential. A seasonal high water table is at a depth of 2 to 3 feet in the Craven soils and 3.5 to 5 feet in the Uchee soils. This soil is in capability subclass IIIe. The hydrologic soil group for this soil is C.

Emporia complex (15D) appears on side slopes along drainage ways. Typically, the surface layer of this soil is dark grayish brown fine sandy loam about 4 inches thick. The subsoil extends to a depth of 45-50 inches and is yellowish brown loam with mostly strong brown mottles in the upper parts; yellowish brown, firm sandy clay loam with strong brown and gray mottles in the middle part; and mottled gray and brown, firm sandy clay loam in the lower part. The substratum is variegated gray, brown, and red, firm sandy clay loam to a depth of at least 75 inches. In this Emporia soil, permeability is moderate in the upper part of the subsoil and moderately slow to slow in the lower part. The available water capacity is moderate. Surface runoff is medium. The erosion hazard is moderate. The subsoil has moderate shrink-swell potential. A perched high water table is at a depth of 3 to 4 ½ feet in winter and spring. This soil is in capability subclass VIIe. The hydrologic soil group for this soil is C.

Craven fine sandy loam (10B) is deep, gentle sloping, and moderately well drained. Slopes range from 2 to 6 percent. It is on broad upland flats and narrow to broad ridges and side slopes. Typically, the surface layer of this soil is dark grayish brown fine sandy loam about 4 inches thick. The subsurface layer is pale olive fine sandy loam 5 inches thick. The subsoil extends to a depth of 42 inches and is yellowish brown clay loam with gray matter in the middle and lower parts. The substratum to a depth of at least 72 inches is brownish yellow fine sandy loam mottled with gray in the upper part and gray loamy fine sand mottled with yellow in the lower part. Included with this soil in mapping are small areas of well drained Caroline, Emporia, Kempsville, and Uchee soils and moderately well drained Slagle soils. The permeability of this Craven soil is slow, and available water capacity is moderate. Surface runoff is medium. The erosion hazard is moderate. The subsoil has a moderate shrink-swell potential. A high water table is at a depth of 2 to 3 feet in winter and early spring. This soil is in capability subclass IIe. The hydrologic soil group for this soil is C.

### Erosion and Sediment Measures:

All vegetative and structural erosion and sediment control practices will be constructed and maintained in accordance with the minimum standards and specifications of the Virginia Erosion and Sediment Control Handbook, Third edition dated 1992.

#### Structural Practices:

1. Temporary Construction Entrance (3.02): Construction entrance will be installed to prevent tracking onto the existing roadway.
2. Silt Fence (3.05): Silt fence shall be installed along the toe of all slopes and all other areas that may carry silt beyond the project area. Silt fence shall also be installed on the down hill side of the utility extensions.
3. Storm Drain Inlet Protection (3.07): All storm drain inlets shall be protected during construction.
4. Outlet Protection (3.18): Will be utilized at the outfall points using class I riprap.
5. Permanent Seeding (3.32): Permanent seeding shall be applied to all disturbed area on the site once final grades have been established.
6. Slope Stabilization Blankets & Matting (3.36): Treatment I matting to be installed per plan.

### Management Strategies and Sequence of Construction:

1. Contractor must organize a pre-construction meeting between the Owner, the Engineer, the Contractor and the James City County Inspector prior to starting any construction, clearing and grubbing or earthwork.
2. Flag limits the clearing and install silt fence and tree protection where required at perimeter of work areas indicated, or as otherwise necessary to prevent sediment from migrating into adjacent areas. The owner must be notified prior to any clearing operations.
3. Install construction entrance as indicated on the site plans.
4. Clear and grub areas within flagged limits of clearing. Protect trees within these areas as indicated by Owner to be saved. As most of site is cleared only a limited amount of clearing and grubbing will be required.
5. Rough grade main entrance road for site access and continue grading parking lot.
6. Rough grade rectory site and start construction of rectory.
7. Install storm sewer pipes and inlets. Provide inlet protection at each inlet.
8. Install temporary 15" CPEP from structure No: A-3 to structure No: A-4 (rain tank BMP should not be constructed until final stages of construction).

9. Install CG-6 curb and gutter along rear parking lot and at the rear of the rectory. This will capture runoff from the eastern portion of site.
10. Install water line and other utilities. Excavation for 1" water service and 1 ½ " force main should be performed with a small trenching machine to minimum land disturbance.
11. Fine grade parking lots, drive ways, and place finish stone as indicated.
12. Pave parking lots and driveways.
13. Begin construction of underground storage BMP.
14. All denuded areas that will remain denuded for a longer period of time than 7 days must receive temporary seeding.
15. Clean and remove sediment from erosion and sediment control devices as necessary.
16. All disturbed areas must receive permanent seeding as soon as finished grades are achieved.
17. Complete permanent seeding, landscaping, fertilizing and mulching as required.
18. After an acceptable and stable ground cover has been established and with the authorization of James City County, remove silt fence, tree protection and sediment control measures.

Stormwater Management:

Storm water has been directed to three inlets and then into underground storage. The BMP system was sized to meet the County's stream channel protection requirements. The storm routings have been provided in the calculations. The post developed runoff has been reduced to or below the pre-developed runoff rate for both the 2 and 10 year storms.

By adding the rectory we are impacting approximately 0.36 acres of the existing 10-point conservation easement. We have enclosed a revised 10-point BMP Sheet and the previously submitted map. Upon evaluating the previous 10-point BMP calculations it has come to our attention that 0.38 acres of 15-point conservation easement had not been included. The two areas that make this up have been highlighted. We have taken the 0.36 Acres of impact out of the 10-point conservation easement calculation. The overall result is a total of 10.458 points.

**PRE-DEVELOPED ROUTING**

DA TO RAINTANK = 1.78 AC

Tc = 10 min  
C = 0.61

DA-1  
DA-2  
+ DA-3A  

---

1.78 AC.

~~DA-1~~ = 0.98 AC

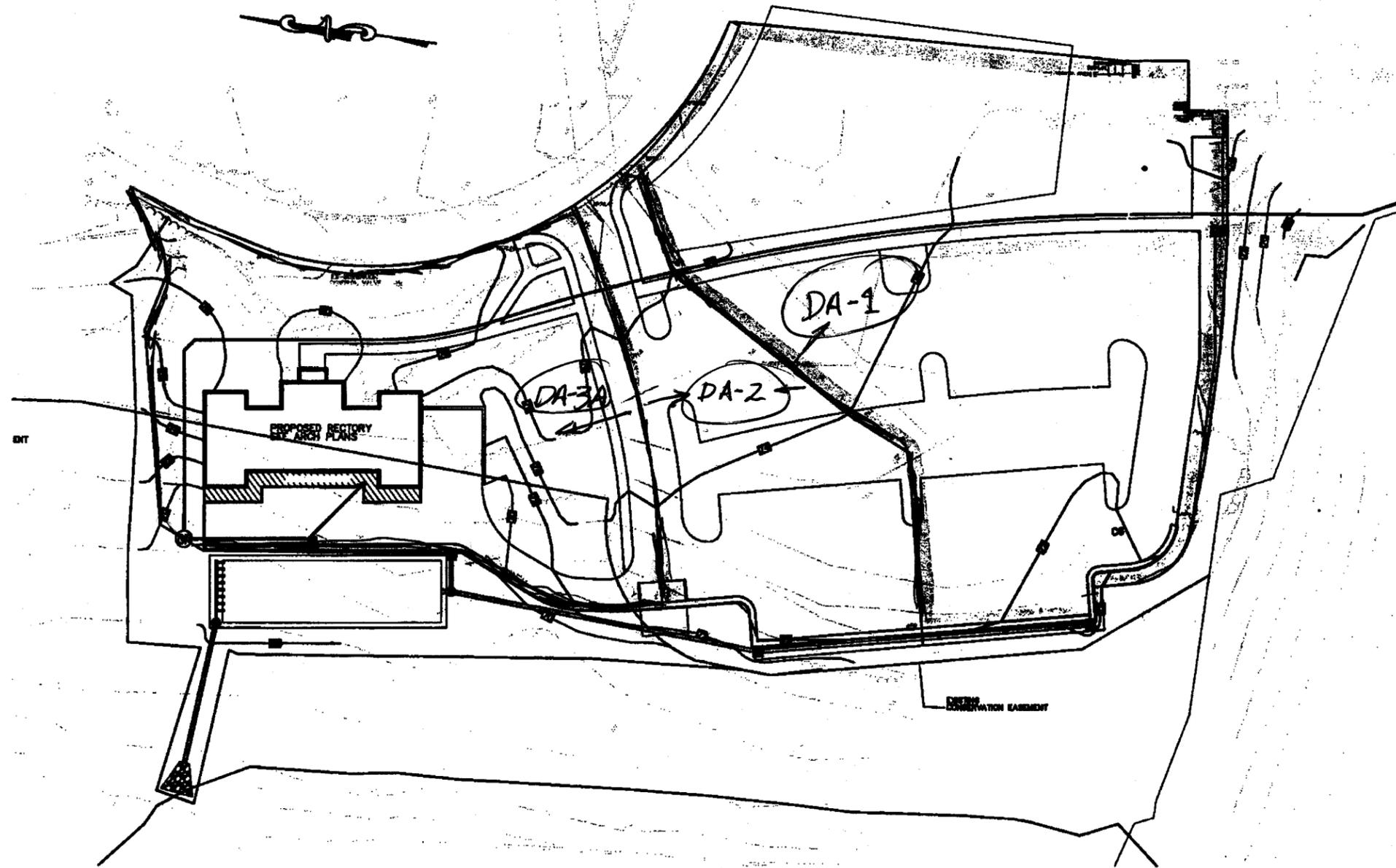
Tc = 10 min  
C = 0.54

DA H-2 = 0.28

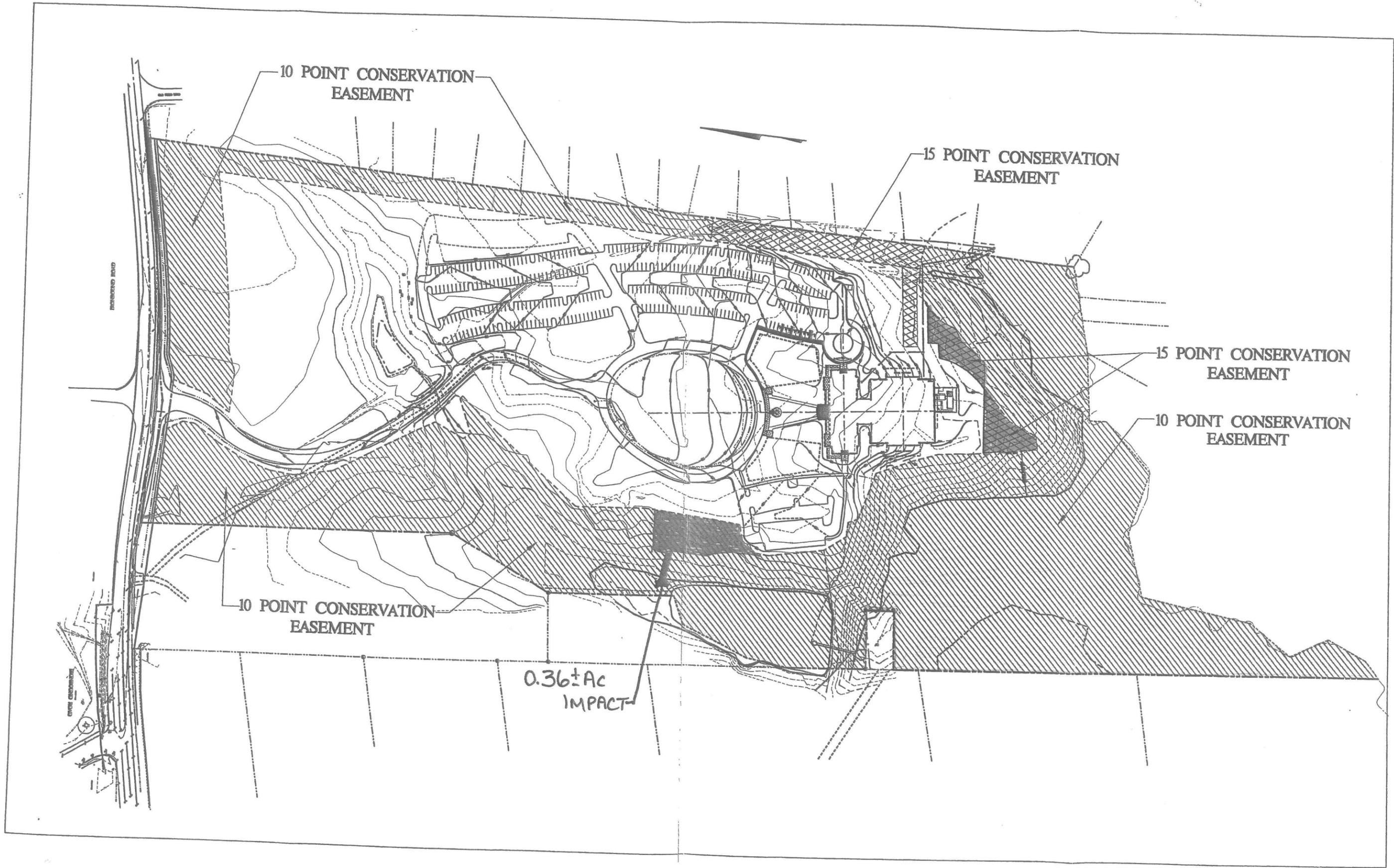
Tc = 10.54 min  
C = 0.86

DA H-3A = 0.52 AC

Tc = 10 min  
C = 0.63



1" = 50'  
POST DEVELOPED  
DRAINAGE AREA MAP



10 POINT CONSERVATION  
EASEMENT

15 POINT CONSERVATION  
EASEMENT

15 POINT CONSERVATION  
EASEMENT

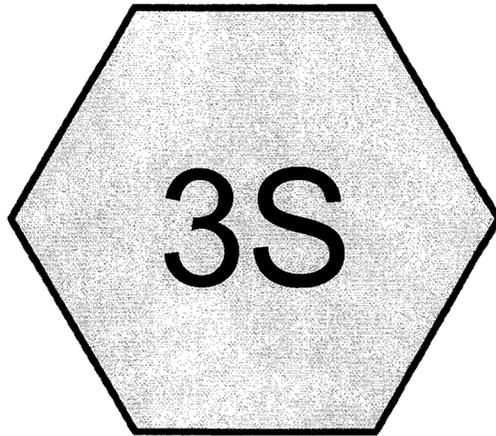
10 POINT CONSERVATION  
EASEMENT

10 POINT CONSERVATION  
EASEMENT

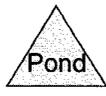
0.36±Ac  
IMPACT

DUNSTON ROAD

GOLF COURSE



Pre-Developed



**St Bede Rectory2**

James City County 2-Year Duration=15 min, Inten=2.83 in/hr

Prepared by LandMark Design Group

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2/4/2005

**Subcatchment 3S: Pre-Developed**

Runoff = 0.50 cfs @ 0.25 hrs, Volume= 0.013 af, Depth= 0.31"

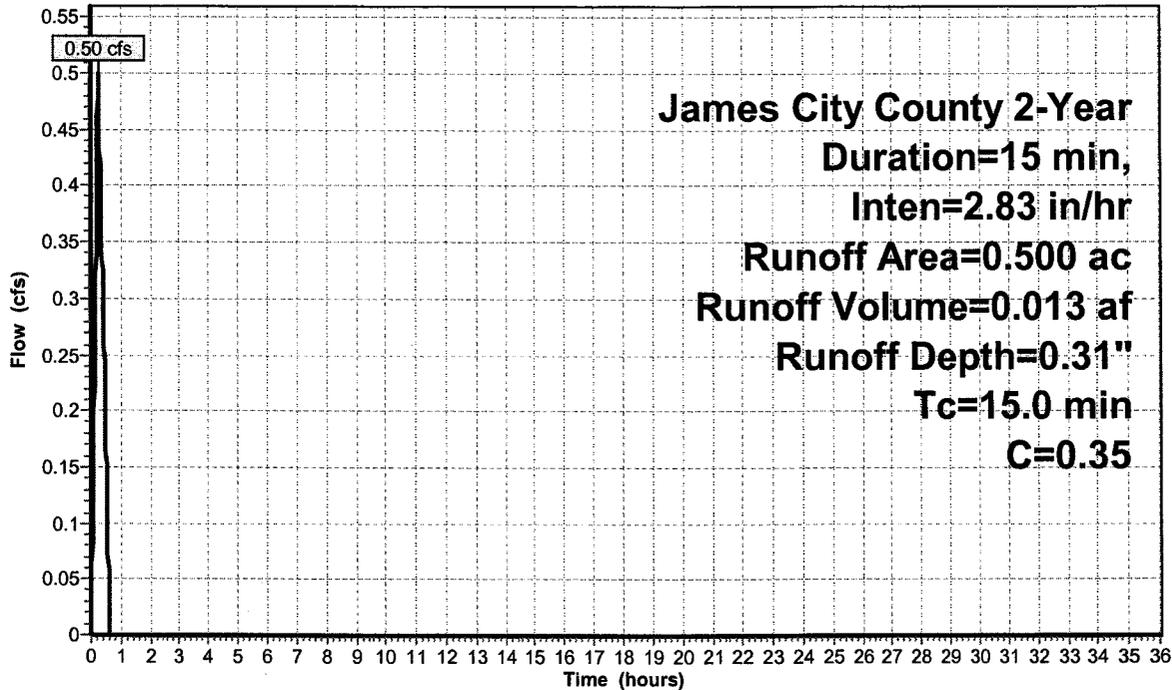
Runoff by Rational method, Rise/Fall=1.0/1.5 xTc, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
 James City County 2-Year Duration=15 min, Inten=2.83 in/hr

Area (ac)	C	Description
0.500	0.35	Woods/grass comb., Good, HSG C

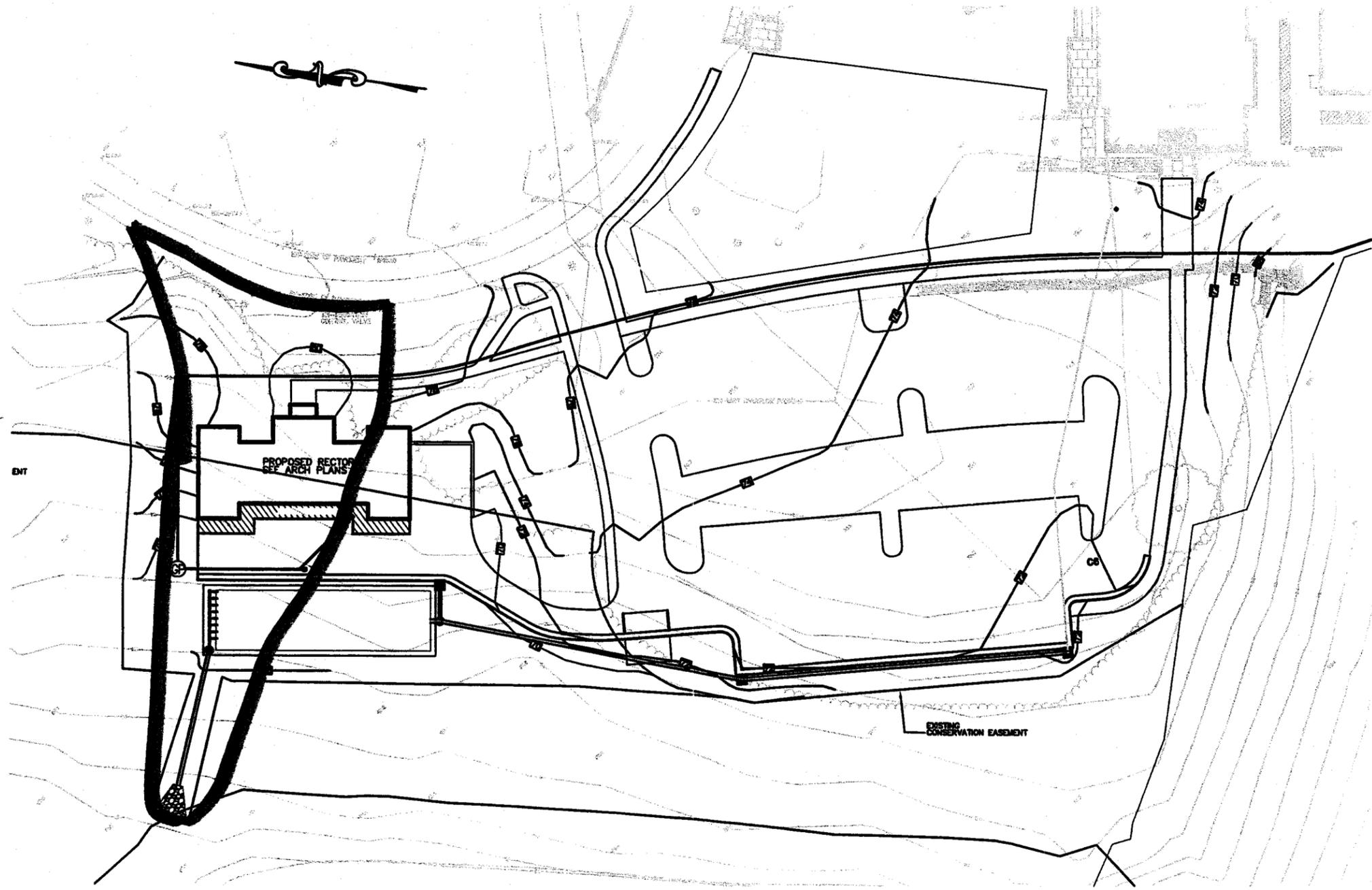
Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					Direct Entry,

**Subcatchment 3S: Pre-Developed**

Hydrograph

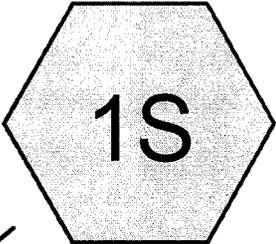


DA = 0.50Ac  
Tc = 15min  
C = 0.35

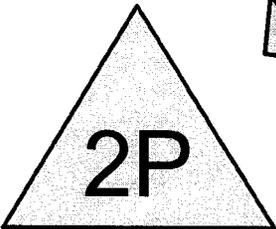


1" = 50'  
PREDEVELOPED DRAINAGE  
AREA MAP

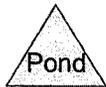
**POST-DEVELOPED ROUTING  
AND  
CHANNEL PROTECTION WORKSHEET**



Post Development



RainTank Volume



# St Bede Rectory2

James City County 2-Year Duration=93 min, Inten=1.04 in/hr

Prepared by LandMark Design Group

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2/4/2005

## Subcatchment 1S: Post Development

Runoff = 1.14 cfs @ 0.17 hrs, Volume= 0.150 af, Depth= 1.01"

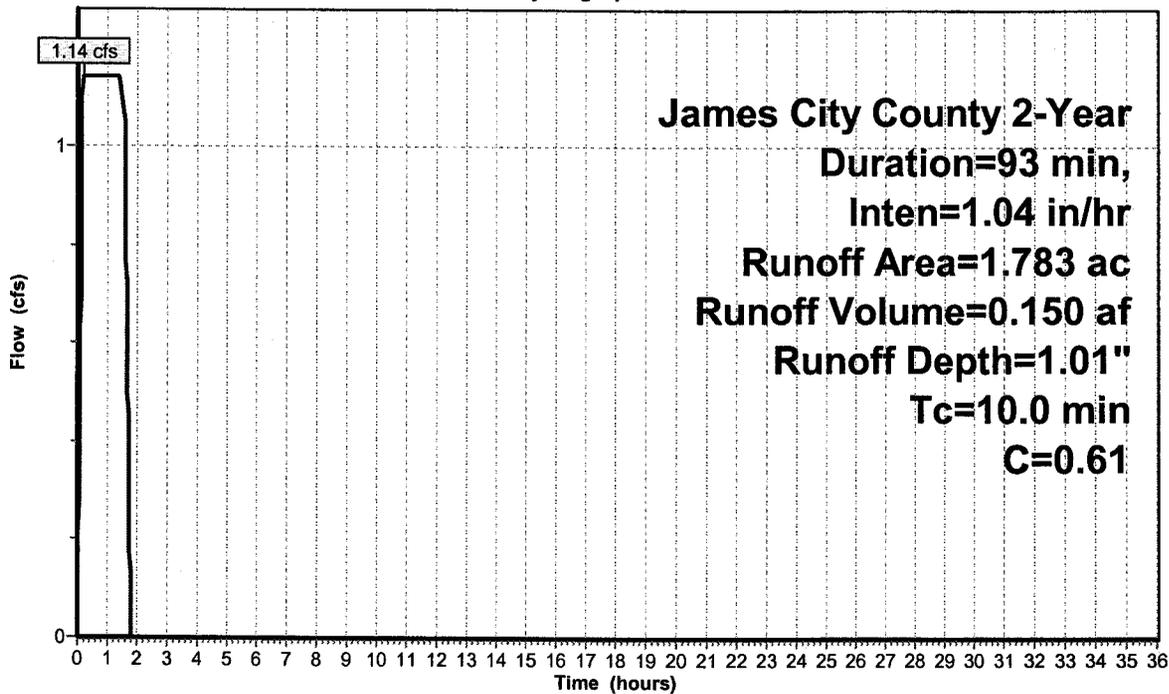
Runoff by Rational method, Rise/Fall=1.0/1.5 xTc, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
James City County 2-Year Duration=93 min, Inten=1.04 in/hr

Area (ac)	C	Description
0.065	0.90	New Building
0.788	0.90	Paved parking & Sidewalks
0.930	0.35	Woods/grass comb. & Existing Roof
1.783	0.61	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

## Subcatchment 1S: Post Development

Hydrograph



**St Bede Rectory2**

James City County 2-Year Duration=93 min, Inten=1.04 in/hr

Prepared by LandMark Design Group

HydroCAD® 7.00 s/n 001765 © 1986-2003 Applied Microcomputer Systems

2/4/2005

**Pond 2P: RainTank Volume**

Inflow Area = 1.783 ac, Inflow Depth = 1.01" for 2-Year event  
 Inflow = 1.14 cfs @ 0.17 hrs, Volume= 0.150 af  
 Outflow = 0.50 cfs @ 1.69 hrs, Volume= 0.150 af, Atten= 57%, Lag= 91.3 min  
 Primary = 0.50 cfs @ 1.69 hrs, Volume= 0.150 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
 Peak Elev= 65.84' @ 1.69 hrs Surf.Area= 2,170 sf Storage= 4,425 cf  
 Plug-Flow detention time= 110.9 min calculated for 0.150 af (100% of inflow)  
 Center-of-Mass det. time= 111.3 min ( 164.1 - 52.8 )

#	Invert	Avail.Storage	Storage Description
1	63.61'	7,992 cf	<b>Custom Stage Data (Prismatic)</b> Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
63.61	1,038	0	0
63.83	1,038	228	228
64.11	2,170	449	677
67.00	2,170	6,271	6,949
67.01	1,038	16	6,965
67.50	1,038	509	7,473
68.00	1,038	519	7,992

#	Routing	Invert	Outlet Devices
1	Primary	63.41'	<b>15.0" x 56.0' long Culvert</b> RCP, rounded edge headwall, Ke= 0.100 Outlet Invert= 62.50' S= 0.0163 '/' n= 0.012 Cc= 0.900
2	Device 1	63.61'	<b>4.0" x 24.0' long Culvert</b> RCP, groove end projecting, Ke= 0.200 Outlet Invert= 63.51' S= 0.0042 '/' n= 0.012 Cc= 0.900
3	Device 1	66.75'	<b>15.0" Vert. Orifice/Grate</b> C= 0.600

**Primary OutFlow** Max=0.50 cfs @ 1.69 hrs HW=65.84' (Free Discharge)

- 1=Culvert (Passes 0.50 cfs of 9.56 cfs potential flow)
- 2=Culvert (Barrel Controls 0.50 cfs @ 5.7 fps)
- 3=Orifice/Grate ( Controls 0.00 cfs)

**St Bede Rectory2**

James City County 2-Year Duration=93 min, Inten=1.04 in/hr

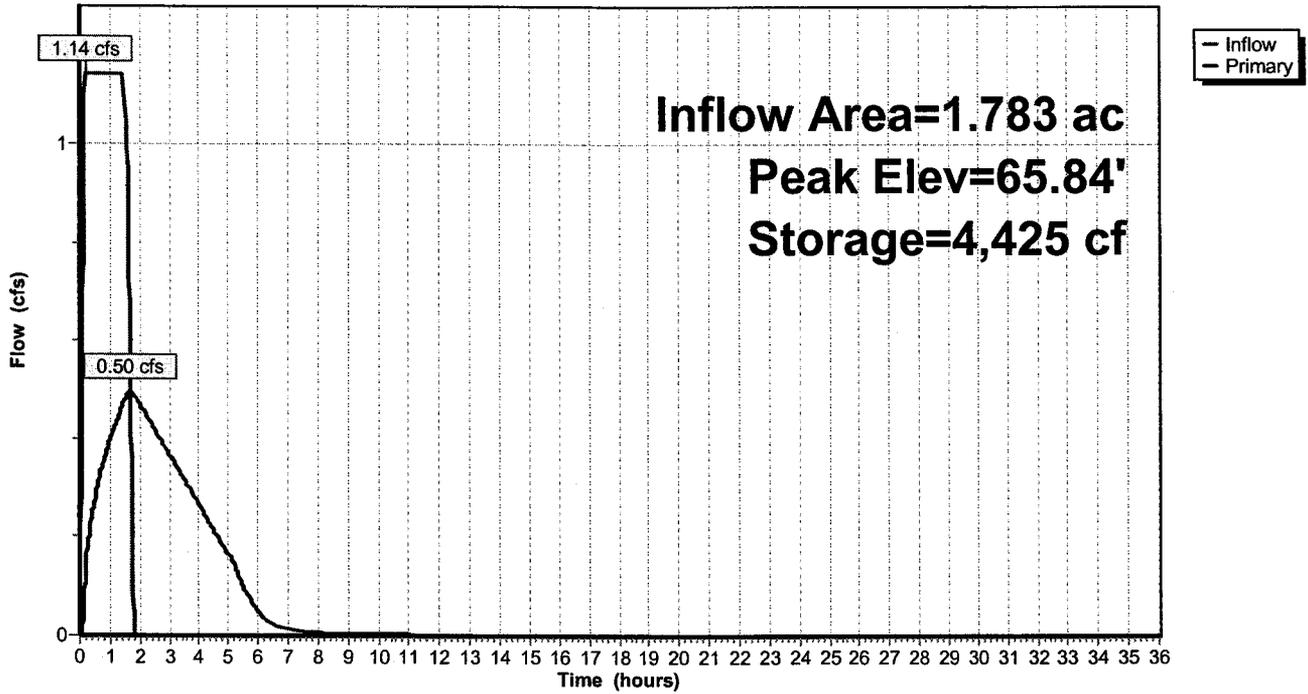
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2/4/2005

**Pond 2P: RainTank Volume**

Hydrograph



**St Bede Rectory2**

James City County 10-Year Duration=96 min, Inten=1.45 in/hr

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2/4/2005

**Subcatchment 1S: Post Development**

Runoff = 1.59 cfs @ 0.17 hrs, Volume= 0.216 af, Depth= 1.45"

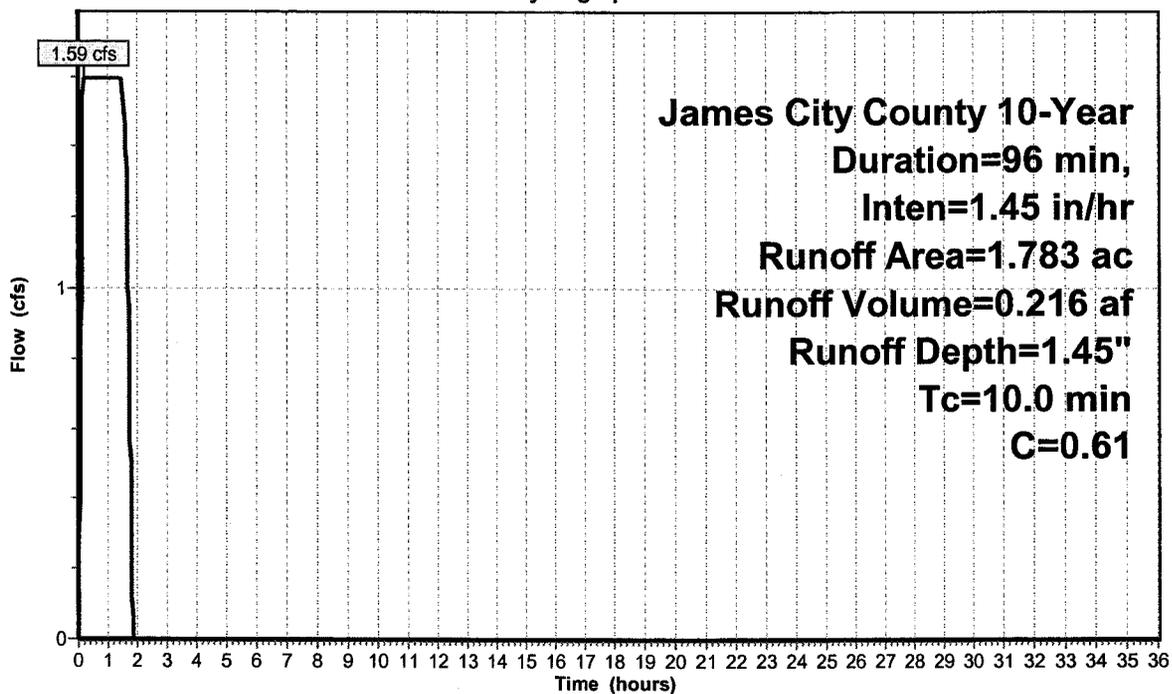
Runoff by Rational method, Rise/Fall=1.0/1.5 xTc, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
 James City County 10-Year Duration=96 min, Inten=1.45 in/hr

Area (ac)	C	Description
0.065	0.90	New Building
0.788	0.90	Paved parking & Sidewalks
0.930	0.35	Woods/grass comb. & Existing Roof
1.783	0.61	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Subcatchment 1S: Post Development**

Hydrograph



**St Bede Rectory2**

James City County 10-Year Duration=96 min, Inten=1.45 in/hr

Prepared by LandMark Design Group

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**Pond 2P: RainTank Volume**

Inflow Area = 1.783 ac, Inflow Depth = 1.45" for 10-Year event  
 Inflow = 1.59 cfs @ 0.17 hrs, Volume= 0.216 af  
 Outflow = 0.69 cfs @ 1.74 hrs, Volume= 0.216 af, Atten= 57%, Lag= 94.3 min  
 Primary = 0.69 cfs @ 1.74 hrs, Volume= 0.216 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
 Peak Elev= 66.88' @ 1.74 hrs Surf.Area= 2,170 sf Storage= 6,679 cf  
 Plug-Flow detention time= 131.6 min calculated for 0.216 af (100% of inflow)  
 Center-of-Mass det. time= 131.5 min ( 185.8 - 54.3 )

#	Invert	Avail.Storage	Storage Description
1	63.61'	7,992 cf	<b>Custom Stage Data (Prismatic)</b> Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
63.61	1,038	0	0
63.83	1,038	228	228
64.11	2,170	449	677
67.00	2,170	6,271	6,949
67.01	1,038	16	6,965
67.50	1,038	509	7,473
68.00	1,038	519	7,992

#	Routing	Invert	Outlet Devices
1	Primary	63.41'	<b>15.0" x 56.0' long Culvert</b> RCP, rounded edge headwall, Ke= 0.100 Outlet Invert= 62.50' S= 0.0163 '/' n= 0.012 Cc= 0.900
2	Device 1	63.61'	<b>4.0" x 24.0' long Culvert</b> RCP, groove end projecting, Ke= 0.200 Outlet Invert= 63.51' S= 0.0042 '/' n= 0.012 Cc= 0.900
3	Device 1	66.75'	<b>15.0" Vert. Orifice/Grate</b> C= 0.600

**Primary OutFlow** Max=0.69 cfs @ 1.74 hrs HW=66.88' (Free Discharge)

- 1=Culvert (Passes 0.69 cfs of 11.70 cfs potential flow)
- 2=Culvert (Barrel Controls 0.61 cfs @ 7.0 fps)
- 3=Orifice/Grate (Orifice Controls 0.08 cfs @ 1.2 fps)

**St Bede Rectory2**

James City County 10-Year Duration=96 min, Inten=1.45 in/hr

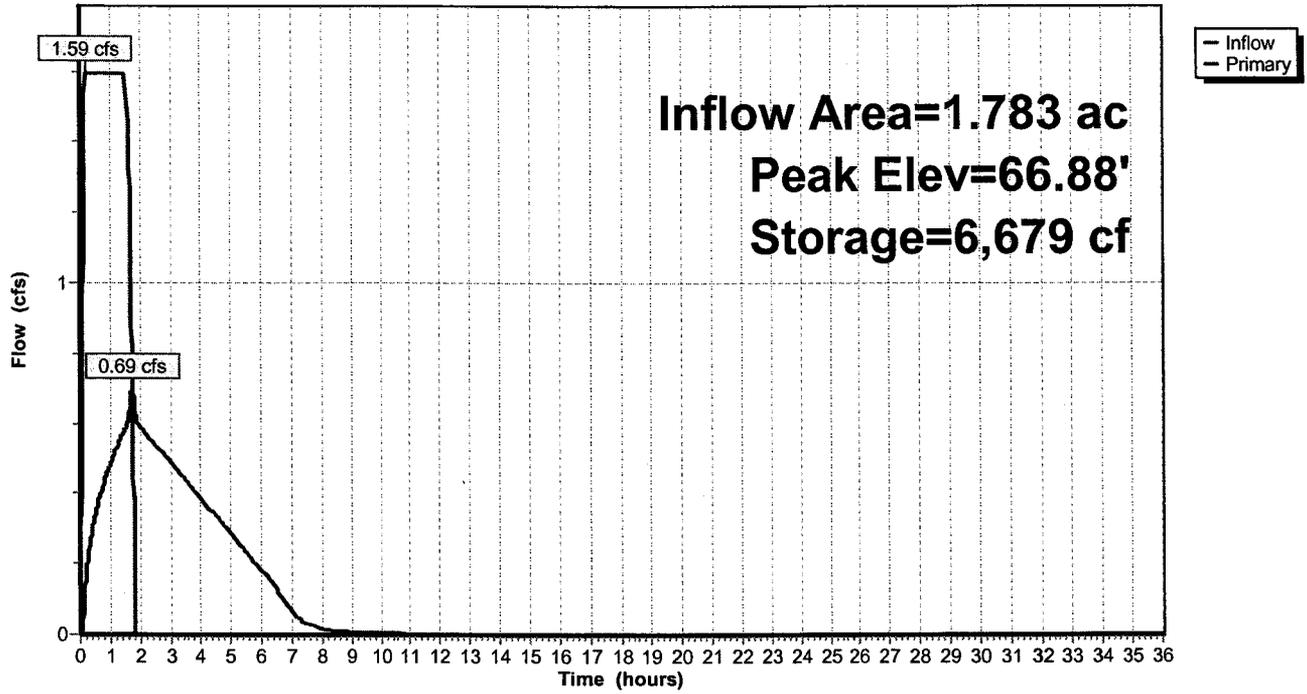
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**Pond 2P: RainTank Volume**

Hydrograph



**St Bede Rectory2**

James City County 100-Year Duration=35 min, Inten=4.83 in/hr

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**Subcatchment 1S: Post Development**

Runoff = 5.29 cfs @ 0.17 hrs, Volume= 0.273 af, Depth= 1.84"

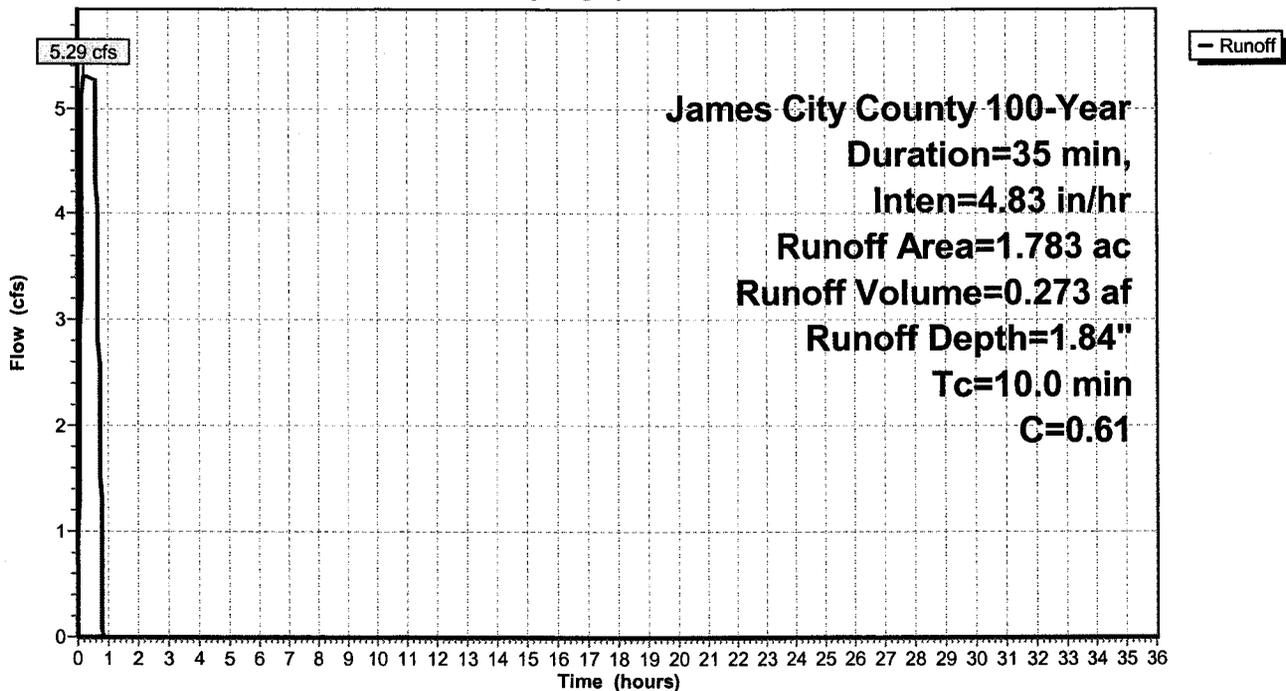
Runoff by Rational method, Rise/Fall=1.0/1.5 xTc, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
 James City County 100-Year Duration=35 min, Inten=4.83 in/hr

Area (ac)	C	Description
0.065	0.90	New Building
0.788	0.90	Paved parking & Sidewalks
0.930	0.35	Woods/grass comb. & Existing Roof
1.783	0.61	Weighted Average

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

**Subcatchment 1S: Post Development**

Hydrograph



**St Bede Rectory2**

James City County 100-Year Duration=35 min, Inten=4.83 in/hr

Prepared by LandMark Design Group

HydroCAD® 7.00 s/n 001765 © 1986-2003 Applied Microcomputer Systems

2/4/2005

**Pond 2P: RainTank Volume**

Inflow Area = 1.783 ac, Inflow Depth = 1.84" for 100-Year event  
 Inflow = 5.29 cfs @ 0.17 hrs, Volume= 0.273 af  
 Outflow = 4.69 cfs @ 0.61 hrs, Volume= 0.273 af, Atten= 11%, Lag= 26.5 min  
 Primary = 4.69 cfs @ 0.61 hrs, Volume= 0.273 af

Routing by Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
 Peak Elev= 67.83' @ 0.61 hrs Surf.Area= 1,038 sf Storage= 7,816 cf  
 Plug-Flow detention time= 95.7 min calculated for 0.273 af (100% of inflow)  
 Center-of-Mass det. time= 96.1 min ( 120.0 - 23.9 )

#	Invert	Avail.Storage	Storage Description
1	63.61'	7,992 cf	<b>Custom Stage Data (Prismatic)</b> Listed below

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
63.61	1,038	0	0
63.83	1,038	228	228
64.11	2,170	449	677
67.00	2,170	6,271	6,949
67.01	1,038	16	6,965
67.50	1,038	509	7,473
68.00	1,038	519	7,992

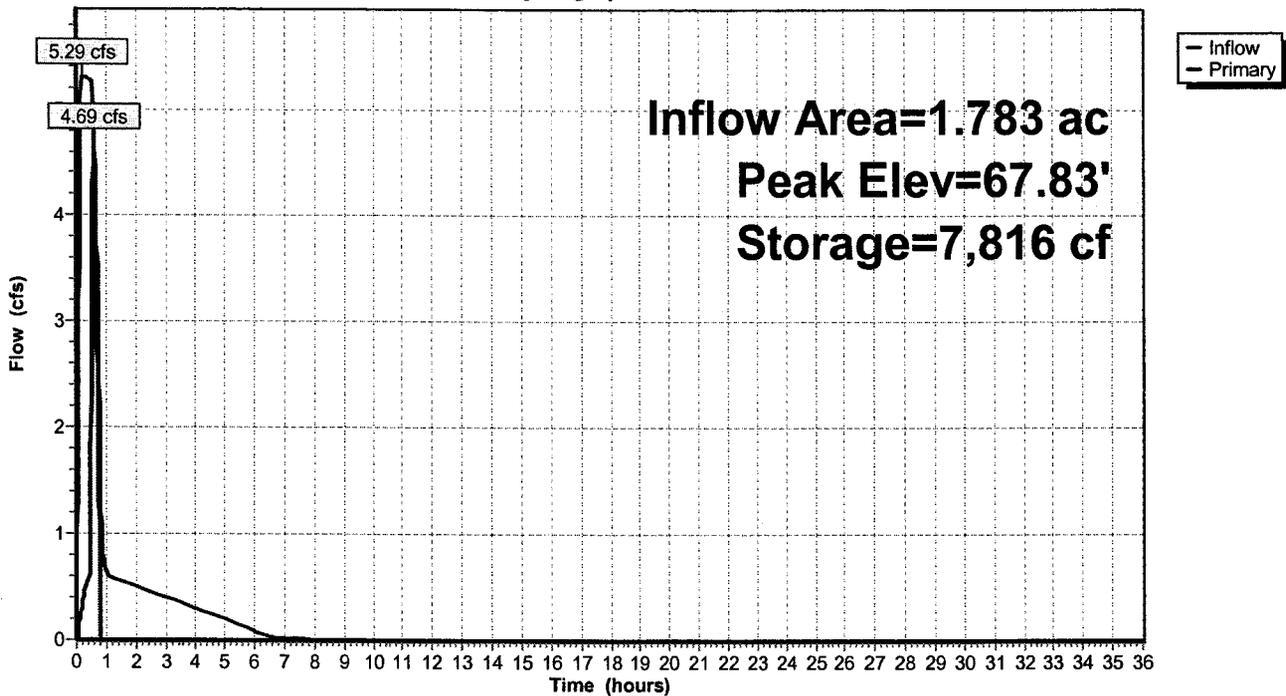
#	Routing	Invert	Outlet Devices
1	Primary	63.41'	<b>15.0" x 56.0' long Culvert</b> RCP, rounded edge headwall, Ke= 0.100 Outlet Invert= 62.50' S= 0.0163 '/' n= 0.012 Cc= 0.900
2	Device 1	63.61'	<b>4.0" x 24.0' long Culvert</b> RCP, groove end projecting, Ke= 0.200 Outlet Invert= 63.51' S= 0.0042 '/' n= 0.012 Cc= 0.900
3	Device 1	66.75'	<b>15.0" Vert. Orifice/Grate</b> C= 0.600

**Primary OutFlow** Max=4.69 cfs @ 0.61 hrs HW=67.83' (Free Discharge)

- 1=Culvert (Passes 4.69 cfs of 13.37 cfs potential flow)
- 2=Culvert (Barrel Controls 0.70 cfs @ 8.0 fps)
- 3=Orifice/Grate (Orifice Controls 3.98 cfs @ 3.5 fps)

Pond 2P: RainTank Volume

Hydrograph



# CHANNEL PROTECTION STORAGE VOLUME COMPUTATION SHEET

**PROJECT** St Bede Rectory  
**JOB NO:** 1920077-002.00  
**DATE:** 1/31/2005

### Pre Developed Condition

Cover Description	Soil Name/type	CN	Area
woods & grass(good)	c	72	0.50

<b>WEIGHTED CN</b>	<b>TOTAL AREA</b>
72	0.50

### Time of Concentration

sheet	0.23
shallow	0.01
channel	0.00
total	0.24

### Post Developed Condition

Cover Description	Soil Name/type	CN	Area
woods & grass(good) Exist bldg	c	74	0.93
Impervious	c	98	0.85

<b>WEIGHTED CN</b>	<b>TOTAL AREA</b>
85	1.78

### Time of Concentration

sheet	0.15
shallow	0.01
channel	0.01
total	0.17

condition	CN	Tc hrs	Qa 1 yr storm inches	Q 1 year cfs	Q 2 year cfs	Q 10 year cfs	Q 100 year cfs
pre-developed	72	0.24	0.70	1.05	0.63	1.37	2.38
post developed	85	0.17	1.40	3.32	0.00	0.00	0.00

Storm	P	Pre-dev.		Post Dev	
		la	0.8	la	0.35
		la/P	qu	la/P	qu
1 Year	2.8	0.28	540	0.13	850
2 Year	3.6	0.22	675		
10 Year	5.8	0.13	620		
100 Year	8	0.10	650		

**Qo/Qi** 0.021  
**Qo 1yr** 0.07 cfs  
**Vs/Vr** 0.65  
**Vs 1yr** 0.14 ac-ft

Exhibit 4-II Unit peak discharge ( $q_u$ ) for NRCS (SCS) type II rainfall distribution

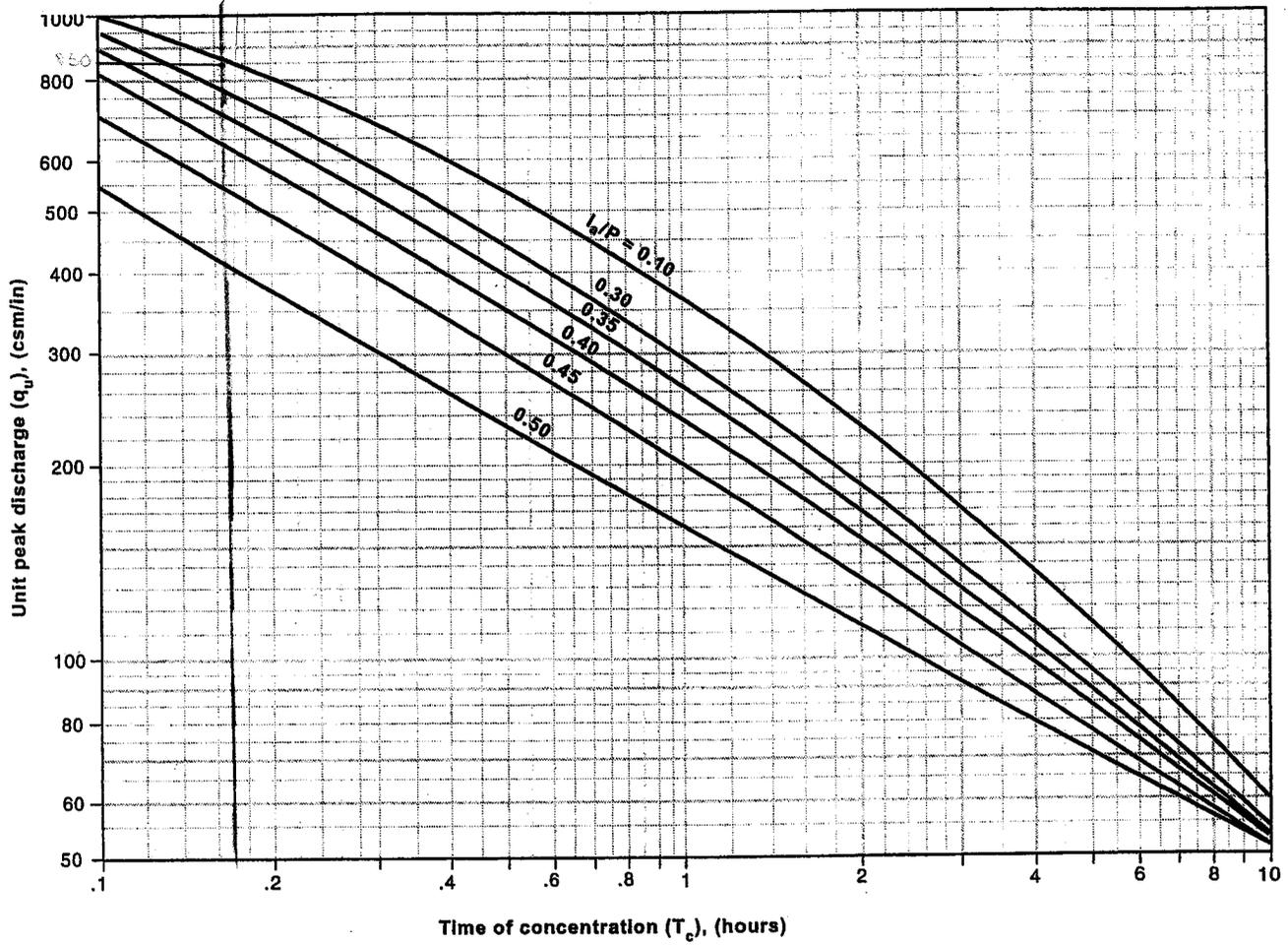
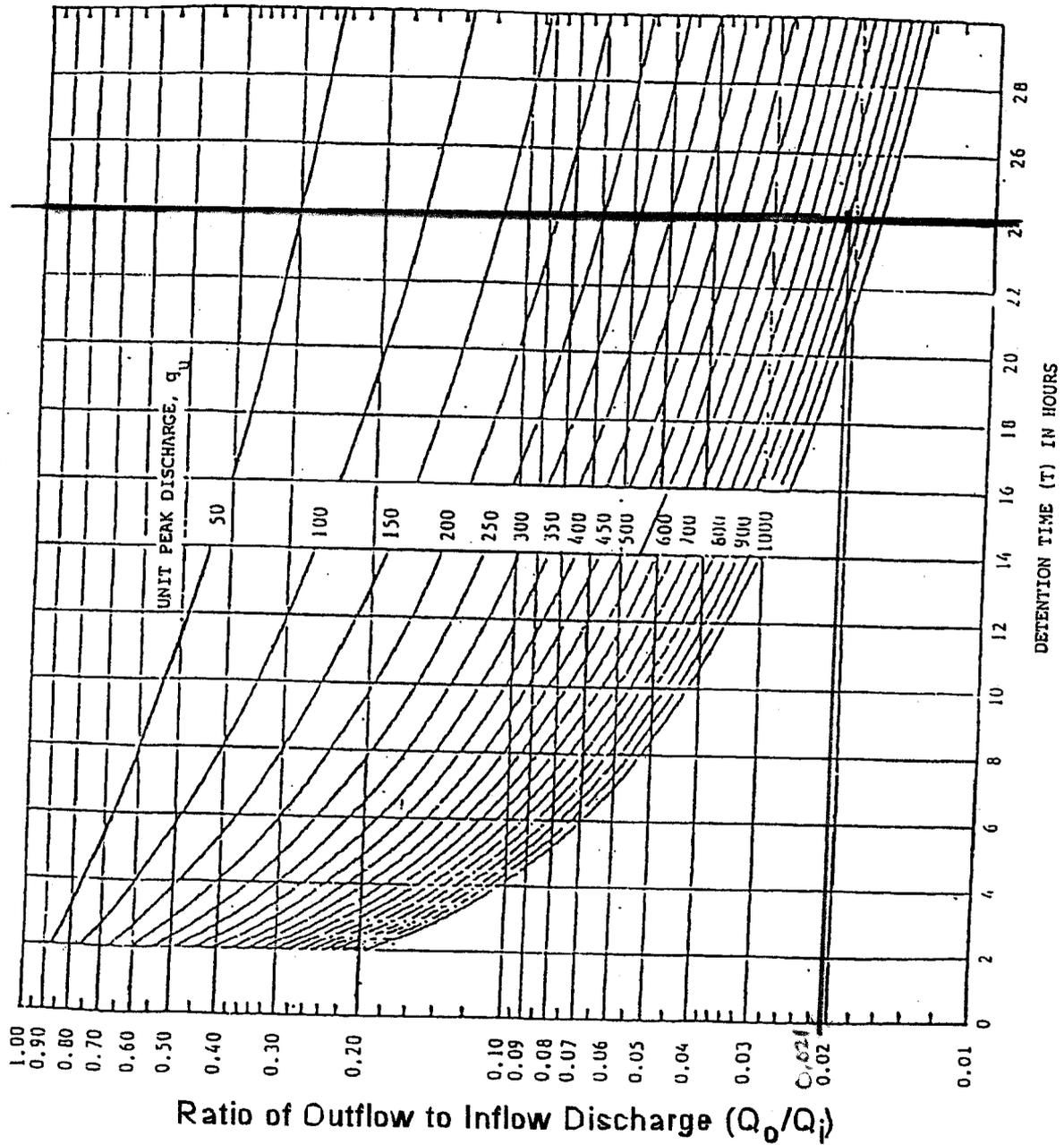


Figure B.7: Detention Time vs. Discharge Ratios ( $Q_o/Q_i$ )  
(Source: Maryland Stormwater Design Manual, 1997)



**St Bede Rectory2**

James City County 2-Year Duration=93 min, Inten=1.04 in/hr

Prepared by LandMark Design Group

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2/4/2005

**Stage-Area-Storage for Pond 2P: RainTank Volume**

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
63.61	1,038	0	66.21	2,170	5,234
63.66	1,038	52	66.26	2,170	5,343
63.71	1,038	104	66.31	2,170	5,451
63.76	1,038	156	66.36	2,170	5,560
63.81	1,038	208	66.41	2,170	5,668
63.86	1,159	276	66.46	2,170	5,777
63.91	1,361	357	66.51	2,170	5,885
63.96	1,564	437	66.56	2,170	5,994
64.01	1,766	517	66.61	2,170	6,102
64.06	1,968	597	66.66	2,170	6,211
64.11	<b>2,170</b>	677	66.71	2,170	6,319
64.16	2,170	786	66.76	2,170	6,428
64.21	2,170	894	66.81	2,170	6,536
64.26	2,170	1,003	66.86	2,170	6,645
64.31	2,170	1,111	66.91	2,170	6,753
64.36	2,170	1,220	66.96	2,170	6,862
64.41	2,170	1,328	67.01	1,038	6,965
64.46	2,170	1,437	67.06	1,038	7,017
64.51	2,170	1,545	67.11	1,038	7,069
64.56	2,170	1,654	67.16	1,038	7,121
64.61	2,170	1,762	67.21	1,038	7,172
64.66	2,170	1,871	67.26	1,038	7,224
64.71	2,170	1,979	67.31	1,038	7,276
64.76	2,170	2,088	67.36	1,038	7,328
64.81	2,170	2,196	67.41	1,038	7,380
64.86	2,170	2,305	67.46	1,038	7,432
64.91	2,170	2,413	67.51	1,038	7,484
64.96	2,170	2,522	67.56	1,038	7,536
65.01	2,170	2,630	67.61	1,038	7,588
65.06	2,170	2,739	67.66	1,038	7,640
65.11	2,170	2,847	67.71	1,038	7,691
65.16	2,170	2,956	67.76	1,038	7,743
65.21	2,170	3,064	67.81	1,038	7,795
65.26	2,170	3,173	67.86	1,038	7,847
65.31	2,170	3,281	67.91	1,038	7,899
65.36	2,170	3,390	67.96	1,038	<b>7,951</b>
65.41	2,170	3,498			
65.46	2,170	3,607			
65.51	2,170	3,715			
65.56	2,170	3,824			
65.61	2,170	3,932			
65.66	2,170	4,041			
65.71	2,170	4,149			
65.76	2,170	4,258			
65.81	2,170	4,366			
65.86	2,170	4,475			
65.91	2,170	4,583			
65.96	2,170	4,692			
66.01	2,170	4,800			
66.06	2,170	4,909			
66.11	2,170	5,017			
66.16	2,170	5,126			

185 =a 20.81 =b 10 YR STM		AREA DRAIN. "A"	RUNOFF COEF.	CA		INLET TIME	RAIN FALL	RUNOFF "Q"		INVERT ELEVATIONS		PIPE LNTH	SLOPE	DIA	CAPA-CITY	VEL.	FLOW TIME	REMARKS	
FROM POINT	TO POINT	ACRES	C	INCRE-MENT	ACCUM-ULATED	MIN-UTES	IN.AHR	INCRE-MENT	ACCUM-ULATED	UPPER END	LOWER END	FT.	FT./FT.	IN.	C.F.S.	F.P.S.	MIN.		MANN. N
A-3A	A-3	0.52	0.63	0.33	0.33	10.00	6.01	1.95	1.95	65.51	65.44	14	0.0050	12	2.52	3.54	0.07	DI-3C,L=6'	0.013
A-1	A-2	0.98	0.54	0.53	0.53	10.00	6.01	3.18	3.18	67.84	67.19	131	0.0050	15	4.57	4.02	0.54	DI-3B,L=6'	0.013
A-2	A-3	0.28	0.86	0.24	0.77	10.54	5.90	1.42	4.54	67.19	66.57	123	0.0050	15	4.57	4.24	0.48	DI-3A	0.013
A-3	RAINTANK	0.00	0.00	0.00	1.10	11.03	5.81	0.00	6.37	65.44	65.43	3	0.0050	18	7.42	4.72	0.01	MH	0.013

122 =a 16.58 =b 2 YR STM		AREA DRAIN. "A"	RUNOFF COEF.	CA		INLET TIME	RAIN FALL	RUNOFF "Q"		INVERT ELEVATIONS		PIPE LNTH	SLOPE	DIA	CAPA-CITY	VEL.	FLOW TIME	REMARKS	
FROM POINT	TO POINT	ACRES	C	INCRE-MENT	ACCUM-ULATED	MIN-UTES	IN.AHR	INCRE-MENT	ACCUM-ULATED	UPPER END	LOWER END	FT.	FT./FT.	IN.	C.F.S.	F.P.S.	MIN.		MANN. N
A-3A	A-3	0.52	0.63	0.33	0.33	10.00	4.58	1.49	1.49	65.51	65.44	14	0.0050	12	2.52	3.34	0.07	DI-3C,L=6'	0.013
A-1	A-2	0.98	0.54	0.53	0.53	10.00	4.58	2.43	2.43	67.84	67.19	131	0.0050	15	4.57	3.78	0.58	DI-3B,L=6'	0.013
A-2	A-3	0.28	0.86	0.24	0.77	10.58	4.49	1.08	3.46	67.19	66.57	123	0.0050	15	4.57	4.09	0.50	DI-3A	0.013
A-3	RAINTANK	0.00	0.00	0.00	1.10	11.08	4.41	0.00	4.82	65.44	65.43	3	0.0050	18	7.42	4.47	0.01	MH	0.013

HYDRAULIC GRADE LINE

CONC		PIPE n=		0.013		JUNCTION LOSS															FINAL H	INLET SURFACE ELEV	RIM ELEV
INLET STATION	OUTLET SURFACE ELEV	D(O)	Q(O)	L(O)	SF(O)	H(F)	V(O)	H(O)	Q(I)	D(I)	V(I)	Q*V	V^2/2G	H(I)	ANGLE	E K	H(>)	H(T)	1*3 H(T)	0.5* H(T)			
A-3	66.88	18	6.3	3	0.0036	0.01	3.59	0.05	6.3	15	5.17	33	0.41	0.15	164	0.66	0.27	0.47	0.61	0.30	0.32	67.20	69.09
A-2	67.20	15	4.5	123	0.0049	0.61	3.70	0.05	3.2	15	2.61	8	0.11	0.04	180	0.66	0.07	0.16	0.21	0.10	0.71	67.91	72.30
A-1	67.91	15	3.2	131	0.0024	0.32	2.59	0.03	0.0	0	0.00	0	0.00	0.00	55	0.47	0.00	0.03	0.03	0.02	0.33	68.24	71.76

**STORM SEWER DESIGN & HGL**

DA TO RAIN TANK = 1.78 AC

DA A-1 = 0.78 AC

DA A-2 = 0.60 AC

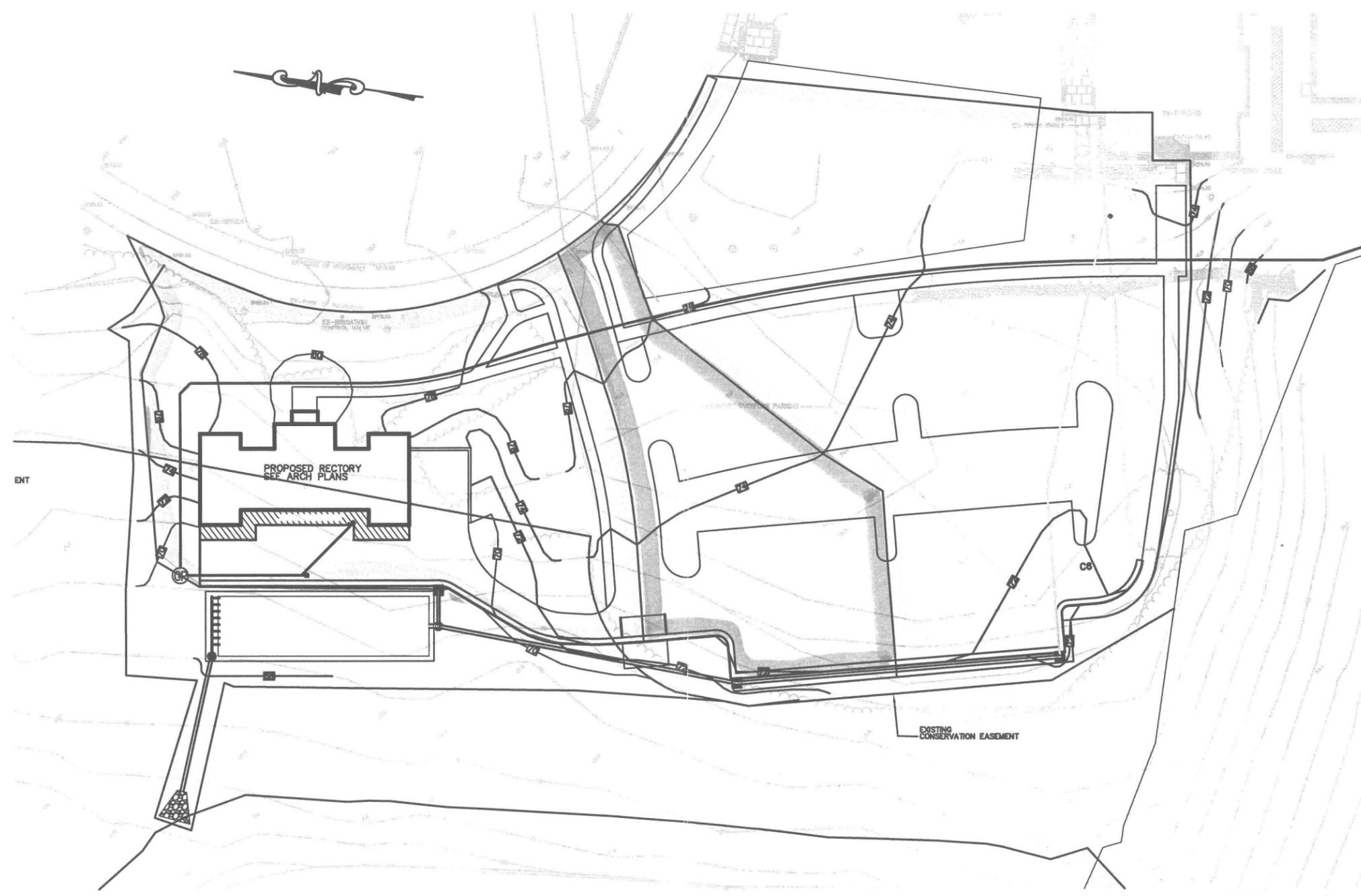
DA A-3 = 0.52 AC

$T_c = 10 \text{ min}$   
 $C = 0.61$

$T_c = 10 \text{ min}$   
 $C = 0.54$

$T_c = 10.54 \text{ min}$   
 $C = 0.86$

$T_c = 10 \text{ min}$   
 $C = 0.63$



1" = 50'  
POST DEVELOPED  
DRAINAGE AREA MAP

**INLET CALCULATIONS**

**Worksheet**  
**Worksheet for Curb Inlet In Sag**

---

Project Description	
Worksheet	Curb Inlet - 1
Type	Curb Inlet In Sag
Solve For	Spread

---

---

Input Data	
Discharge	2.12 cfs
Gutter Width	2.00 ft
Gutter Cross Slope	0.083333 ft/ft
Road Cross Slope	0.020000 ft/ft
Curb Opening Length	6.00 ft
Opening Height	0.46 ft
Curb Throat Type	Horizontal
Local Depression	2.0 in
Local Depression Width	2.00 ft

---

---

Results	
Spread	10.48 ft
Throat Incline Angle	90.00 degrees
Depth	0.50 ft
Gutter Depression	1.5 in
Total Depression	3.5 in

---

**Worksheet**  
**Worksheet for Curb Inlet In Sag**

---

Project Description	
Worksheet	Curb Inlet - 2
Type	Curb Inlet In Sag
Solve For	Spread

---

---

Input Data	
Discharge	0.96 cfs
Gutter Width	2.00 ft
Gutter Cross Slope	0.083333 ft/ft
Road Cross Slope	0.020000 ft/ft
Curb Opening Length	2.50 ft
Opening Height	0.46 ft
Curb Throat Type	Horizontal
Local Depression	2.0 in
Local Depression Width	2.00 ft

---

---

Results	
Spread	8.36 ft
Throat Incline Angle	90.00 degrees
Depth	0.46 ft
Gutter Depression	1.5 in
Total Depression	3.5 in

---

**Worksheet**  
**Worksheet for Curb Inlet In Sag**

---

<b>Project Description</b>	
Worksheet	Curb Inlet - 3a
Type	Curb Inlet In Sag
Solve For	Spread

---

---

<b>Input Data</b>	
Discharge	1.31 cfs
Gutter Width	2.00 ft
Gutter Cross Slope	0.083330 ft/ft
Road Cross Slope	0.020000 ft/ft
Curb Opening Length	6.00 ft
Opening Height	0.46 ft
Curb Throat Type	Horizontal
Local Depression	2.0 in
Local Depression Width	2.00 ft

---

---

<b>Results</b>	
Spread	7.61 ft
Throat Incline Angle	90.00 degrees
Depth	0.45 ft
Gutter Depression	1.5 in
Total Depression	3.5 in

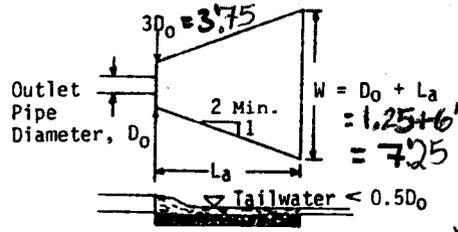
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**OUTLET PROTECTION**

# OUTLET PROTECTION A-5

Source: USDA-SCS

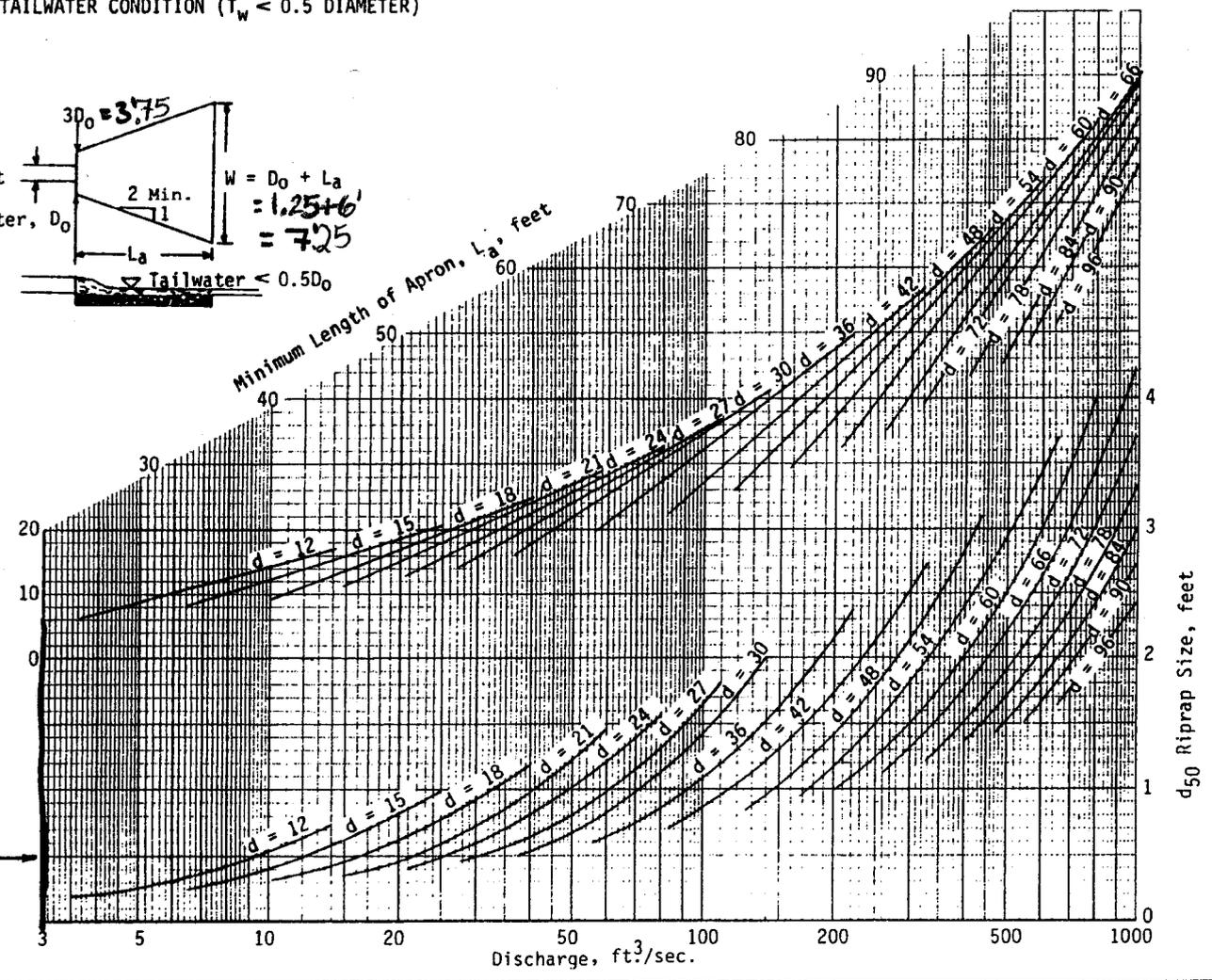
DESIGN OF OUTLET PROTECTION FROM A ROUND PIPE FLOWING FULL  
 MINIMUM TAILWATER CONDITION ( $T_w < 0.5$  DIAMETER)



$L_a = 6'$

Recommended Min.  $d_{50} = 6''$

$Q_{10} = 0.69$



III - 164

Plate 3.18-3

1992

318

**JCC 10 POINT BMP CALCULATIONS**

2/3/2005

PROJECT NAME  
 LMDG JOB NO.

ST Bede Amendment for Rectory  
1970077

TABLE 2

WORKSHEET FOR BMP POINT SYSTEM

TOTAL SITE	=	42.8	ACRES
Conservation Easement Not Draining to a Structural BMP	=	18.78	ACRES
STRUCTURAL SITE AREA	=	<u>24.02</u>	ACRES

A. STRUCTURAL BMP POINT ALLOCATION

BMP	BMP POINTS	FRACTION OF SITE SERVED BY BMP	WEIGHTED BMP POINTS
Pond #1 Infiltration Basin, 1"/ac	10	x 11.95 / 24.02	= 4.975
Median biofilters/swales to creek	4	x 1.55 / 24.02	= 0.258
Rear roof runoff treatment - infiltration trench @ 1 "/imp. ac	10	x 0.50 / 24.02	= 0.208
TOTAL WEIGHTED STRUCTURAL BMP POINTS:			<u>5.441</u>

B. NATURAL OPEN SPACE CREDIT

FRACTION OF SITE	NATURAL OPEN SPACE CREDIT	POINTS FOR NATURAL OPEN SPACE
20.09 / 42.8	x ( 0.1 per 1%)	= 4.694
0.92 / 42.8	x ( 0.15 per 1%)	= 0.322
TOTAL NATURAL OPWN SPACE CREDIT:		<u>5.016</u>

C. TOTAL WEIGHTED POINTS

<u>5.44</u>	+	<u>5.02</u>	=	<u>10.458</u>
STRUCTURAL BMP POINTS		NATURAL OPEN SPACE POINTS		TOTAL

**WATER DATA SHEET  
AND  
FIXTURE COUNTS**

## WATER DATA SHEET

Date: 02/04/05

1. Project Name: ST BEDE RECTORY AND PARKING
2. Project Location: 3686 IRONBOUND RD
3. Engineer: LandMark Design Group
4. Source of Water: existing 12" main in IRONBOUND RD
5. Design Population (Number and Type of Dwellings): \_\_\_\_\_
  - 5a. Industrial: \_\_\_\_\_
  - 5b. Domestic: \_\_\_\_\_
  - 5c. Fire Flow: \_\_\_\_\_
  - 5d. Pressure Maximum: \_\_\_\_\_  
Minimum: \_\_\_\_\_
  - 5e. Computed Design Flow (Fire + Max. Day Domestic): \_\_\_\_\_ gpm avail @ \_\_\_\_\_ psi
  - 5f. Computed Flow (Fire + Max. Day Domestic) Available: \_\_\_\_\_ gpm @ 20 psi
  - 5g. Computed Max. Hour Domestic Demand: \_\_\_\_\_ gpm avail @ \_\_\_\_\_ psi
  - 5h. Actual Fire Flow Available: \_\_\_\_\_ gpm @ 20 psi Hydrant No. \_\_\_\_\_
6. Water Distribution System Piping:

Pipe Diameter (Inches)	Length (Feet)	Material (DI, PVC, etc.)
8"	234	PVC
6"	58	PVC

7. Water Meter Assemblies: \_\_\_\_\_ (Size), \_\_\_\_\_ (Number)  
 \_\_\_\_\_ (Size), \_\_\_\_\_ (Number)  
 \_\_\_\_\_ (Size), \_\_\_\_\_ (Number)  
 \_\_\_\_\_ (Size), \_\_\_\_\_ (Number)
8. Number of Hydrants Required: 2

---

Fire Department Approval (County use only):  
 Approved by: \_\_\_\_\_ Date: \_\_\_\_\_

# ORIGINAL ST. BEDE METER CALCS

CURRENT FIXTURE COUNT AND DOMESTIC WATER DEMAND  
ST BEDE CATHOLIC CHURCH  
(per 7/03/01 email from Bansal and Associates)

	QTY	FU	TOTAL FU
WATER CLOSET (FLUSH VALVE)	17	10	170
WATER CLOSET FUTURE (FLUSH VALVE)	5	10	50
URINALS ( FLUSH VALVE)	2	5	10
URINALS FUTURE	2	5	10
LAVATORY	10	2	20
LAVATORY (FUTURE)	3	2	6
KITCHEN SINK	2	4	8
KITCHEN SINK (FUTURE)	1	4	4
MOP SINK	1	3	3
SACRISTY SINK	1	2	2
DRINKING FOUNTAIN	2	.25	.50

GRAND TOTAL FIXTURE UNITS = 283.50

TOTAL DEMAND = 106 GPM

ALLOWANCE FOR SIMI CONTINUOUS DEMAND:

HOSE BIBB = 5GPM

FONT FILL = 10 GPM

GRAND TOTAL DOMESTIC WATER DEMAND = 121 GPM

**Proposed Fixture Counts**

Rectory				
Development Area	Design Units	Design Value	<sup>a</sup> Water Fixture Value	Water Supply Fixture Unit (WSFU)
Bathroom Group	# of Units	5	3.60	18.00
Water Closet (Tank)	# of Units	2	2.20	4.40
Lavatory	# of Units	3	0.70	2.10
Washing Machine	# of Units	2	1.40	2.80
Dishwasher	# of Units	1	1.40	1.40
Kitchen Sink	# of Units	1	1.40	1.40
Service Sink	# of Units	1	3.00	3.00
Ice Maker	# of Units	1	0.25	0.25
Total Water Supply Fixture Units (WSFU)				33.35

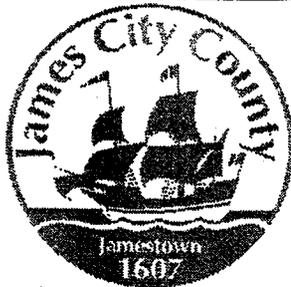
<sup>a</sup> Reference Table E101B, Load Values Assigned to Fixtures, 2000 International Plumbing Code , page 113

<sup>b</sup> Reference Table E102, Table For Estimating Demand, 2000 International Plumbing Code, Appendix E, Page 114

<sup>b</sup> Table for Estimating Demand	
WSFU	Demand gpm
30	23.30
33.35	24.37
35	24.90

Use existing **2-inch** meter in accordance with TABLE 5.6 *Displacement-Type Meter Meeting AWWA Specifications Flow-Pressure-Loss Average of 2000-Model Meters* page 45 in the AWWA Sizing Water Service Lines and Meters

**EROSION AND SEDIMENT CONTROL  
AND  
STORMWATER MANAGEMENT DESIGN PLAN CHECKLIST**



James City County, Virginia  
Environmental Division

**Erosion and Sediment Control and  
Stormwater Management Design Plan Checklists**

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**GENERAL INFORMATION**

Project Name: ST BEDE'S RECTORY AND PARKING EXPANSION  
Owner / Applicant: ST BEDE PARISH  
Plan Preparer: LANDMARK DESIGN GROUP Email: \_\_\_\_\_  
Project Location: 3686 IRON BOUND RD  
Tax Map / Parcel: (38-3)(1-18)  
County Plan No. (if known): SP-132-04  
County BMP Type: \_\_\_\_\_ ( - )

Other information submitted in addition to this checklist (Check all that apply):

- Design or Construction Drawings (Plans, Profiles, Details, etc.).
- Erosion & Sediment Control Plan (Plans, Details, etc.).
- Erosion & Sediment Control Plan Design Report.
- Stormwater Management Design Plan (Plans, Profiles, Details, etc.).
- Stormwater Management Design Report.
- Other, List: \_\_\_\_\_

**Issue Date**  
**March 1, 2001**

**JAMES CITY COUNTY, VIRGINIA  
ENVIRONMENTAL DIVISION**

***EROSION AND SEDIMENT CONTROL PLAN CHECKLIST***

**I. GENERAL:**

Yes No N/A

**FAMILIARITY** with current versions of Chapter 8, Erosion and Sedimentation Control and Chapter 23, Chesapeake Bay Preservation ordinances of the Code of James City County, Virginia and the Virginia Erosion and Sediment Control Handbook (VESCH).

**LAND DISTURBING PERMIT AND SILTATION AGREEMENT** with surety are required for the project.

**VARIANCE** if necessary, requested in writing, for the plan approving authority to waive or modify any of the minimum standards and specifications of the VESCH deemed inappropriate based on site conditions specific to this review case only. Variances which are approved shall be properly documented in the plan and become part of the approved erosion and sediment control plan for the site.

**II. SITE PLAN:**

Yes No N/A

**VICINITY MAP** locating the site in relation to the surrounding area. Include any major landmarks which might assist in physically locating the site.

**INDICATE NORTH** direction in relation to the site.

**LIMITS OF CLEARING AND GRADING** for the site including that required for implementation of erosion and sediment controls, stockpile areas and utilities.

**DISTURBED AREA ESTIMATES** in acres or square feet for the project.

**EXISTING TOPOGRAPHY** or contours for the site at no more than 5 foot contour interval.

**FINAL TOPOGRAPHY**, contours or proposed site grading in accordance with the design plan which indicates changes to existing topography and drainage patterns at no more than 2 foot contour interval (or 1 foot contours where required).

**EXISTING AND PROPOSED SPOT ELEVATIONS** to supplement existing and proposed contours, topography or site grading information. Spot elevations may replace final contours in some instances, especially if terrain is in a low lying area or relatively flat.

**EXISTING VEGETATION** including existing tree lines, grassed or unique vegetation areas.

Yes No N/A

**EXISTING SITE FEATURES** including roads, buildings, homes, utilities, streams, fences, structures and other important surface features of the site.

**SOILS MAP** with soil symbols, boundaries and legend in accordance with the current Soil Survey of James City and York Counties and the City of Williamsburg, Virginia.

**ENVIRONMENTAL INVENTORY** in accordance with Section 23-10(2) of the Chesapeake Bay Preservation Ordinance of James City County. Inventory generally includes: tidal shores and wetlands, non-tidal wetlands, resource protection area, hydric soils and slopes steeper than 25 percent. For wetlands, provide a copy of issued permits or satisfactory evidence that appropriate permits are being pursued for the entire project.

**100-YEAR FLOODPLAIN LIMITS** or any special flood hazard areas or flood zones based on appropriate Federal Management Agency Flood Insurance Rate Maps (FIRMs) or Flood Hazard Boundary Maps (FHBMs) of James City County, Virginia.

**DRAINAGE AREAS** for offsite and onsite areas, existing or proposed as applicable. Include drainage divides and directional labels for all subareas at points of interest and size (in acres), weighted runoff coefficient or curve number and times of concentration for each subarea.

**CRITICAL EROSION AREAS** which require special consideration or unique erosion and sediment control measures. Refer to the VESCH, Chapter 6 for criteria.

**DEVELOPMENT PLAN** for the site showing all improvements such as buildings, structures, parking areas, access roadways, above and below ground utilities, stormwater management and drainage facilities, trails or sidewalks, proposed vegetation and landscaping, amenities, etc.

**LOCATION OF PRACTICES** proposed for erosion and sediment control, tree protection and temporary stormwater management due to land disturbance activities at the site. Use standard abbreviations, labels and symbols consistent for plan views based on minimum standards and specifications in Chapter 3 of the VESCH.

**TEMPORARY STOCKPILE AREAS** or staging and equipment storage areas as required for onsite or offsite construction activities or indicate that none are anticipated for this project.

**OFFSITE LAND DISTURBING AREAS** including borrow sites, waste areas, utility extensions, etc. and required erosion and sediment controls. If none are anticipated for the project, then indicate on the plans by general or erosion and sediment control notes.

**DETAILS** or alternately, appropriate reference to current minimum standards and specifications of the VESCH for each measure proposed for the project. Non-modified, standard duplicated details (silt fence, diversion dikes, etc.) may be referenced to the current version of the VESCH. Specific dimensional or modified standards (basins, traps, outlet protections, check dams, etc.) require presentation on detail sheets. Schedules or tables may be used for multiple site measures such as sediment traps, basins, channels, slope drains, etc. Any modification to standard details should be clearly defined, explained and illustrated.

Yes No N/A

*MAINTENANCE PLAN* or alternately, appropriate reference to current minimum standards and specifications of the VESCH, outlining the inspection frequency and maintenance requirements for all erosion and sediment control measures proposed for the project.

*TRENCH DEWATERING* methods and erosion and sediment controls, if anticipated for the project.

*CONSTRUCTION SEQUENCE* outlining the anticipated sequence for installation of erosion and sediment controls and site, grading and utility work to be performed for the project by the site contractor.

*PHASING PLAN* if required for larger project sites that are to be developed in stages or phases.

*STANDARD COUNTY NOTES* are required to be placed on the erosion and sediment control plan. Refer to the standard James City County Erosion and Sediment Control Notes dated May 5, 1999.

*PROFESSIONAL SEAL AND SIGNATURE* required on final and complete approved plans, drawings, technical reports and specifications.

### III. NARRATIVE:

Yes No N/A

*PROJECT DESCRIPTION* briefly describing the nature and purpose of the land disturbing activity and the acreage to be disturbed.

*EXISTING SITE CONDITIONS* description of existing topography, land use, cover and drainage patterns at the site.

*ADJACENT AREA* descriptions of neighboring onsite or offsite areas such as streams, lakes, property, roads, etc. and potential impacts due to concentrated flow or runoff from the land disturbing activity.

*OFFSITE DISTURBED AREA* descriptions of proposed borrow sites, waste or surplus areas, utility extensions and erosion and sediment controls to be implemented.

*SOILS DESCRIPTION* briefly summarizing site, disturbed area and drainage basin soils including name, unit, hydrologic soil group (HSG) classification, surface runoff potential, erodibility, permeability, depth, texture, structure, erosion hazards, shrink-swell potential, limitations for use and anticipated depths to bedrock and the seasonal water table, as applicable.

*CRITICAL AREAS* on the site which many have potentially serious erosion and sediment control problems and special considerations required (ie. steep slopes, hydric soils, channels, springs, sinkholes, water supply reservoirs, groundwater recharge areas, etc.)

Yes No N/A

**PROPOSED EROSION & SEDIMENT CONTROL MEASURES** inclusive to the specific erosion and sediment control plan as proposed for the land disturbing activity. Measures should be consistent with those proposed on the site drawings. Address general use, installation, limitations, sequencing and maintenance requirements for each control measure.

**STABILIZATION MEASURES** required for the site, either temporary or permanent, and during and following construction including temporary and permanent seeding and mulching, paving, stone, soil stabilization blankets and matting, sodding, landscaping or special stabilization techniques to be utilized at the site.

**STORMWATER MANAGEMENT CONSIDERATIONS** for the site, either of temporary or permanent nature, and strategies, sequences and measures required for control. May reference the stormwater management plan for the site, if prepared, for permanent stormwater management facilities and control of drainage once the site is stabilized.

#### IV. CALCULATIONS:

Yes No N/A

**CALCULATIONS AND COMPUTATIONS** associated with hydrology, hydraulics and design of proposed temporary and permanent erosion and sediment control measures including: sediment traps and basins, diversions, stormwater conveyance channels, culverts, slope drains, outlet protections, etc. Computations are not required on the construction plan and may be attached in a supplemental erosion and sediment control plan design report, if presented in a clear and organized format.

**TEMPORARY SEDIMENT BASIN DESIGN DATA SHEET** submitted for each basin along with schematic or sketch cross-section showing applicable design and construction data, storage volumes (wet-dry), dimensions and elevations. Peak design runoff to be based on the 2- or 25-year design storm event based on maximum disturbed site conditions (existing, interim or proposed conditions) in accordance with Minimum Standard 3.14 of the VESCH.

**JAMES CITY COUNTY, VIRGINIA  
ENVIRONMENTAL DIVISION**

**STORMWATER MANAGEMENT DESIGN PLAN CHECKLIST**

**I. GENERAL:**

Yes No N/A

- FAMILIARITY** with current versions of the James City County Guidelines for Design and Construction of Stormwater Management BMPs manual; Chapter 8, Erosion and Sediment Control and Chapter 23, Chesapeake Bay Preservation ordinances of the Code of James City County, Virginia; the Virginia Erosion and Sediment Control Handbook (VESCH); and the Virginia Stormwater Management Handbook (VSMH).
  
- WAIVER OR EXCEPTION** if necessary, requested in writing, for the plan approving authority to waive or except the requirements of Chapter 23, Chesapeake Bay Preservation ordinance in accordance with procedure established in Sections 23-14 through 23-17 of the ordinance. Applies to this review case only.
  
- VARIANCE REQUEST** if necessary, requested in writing for the plan approving authority to waive or modify any of the minimum standards and specifications of the VESCH deemed inappropriate based on site conditions specific to this review case only. Variances which are approved shall be properly documented in the plan and become part of the approved erosion and sediment control plan for the site.
  
- PROFESSIONAL SEAL AND SIGNATURE** required on final and complete approved stormwater management plans, drawings, technical reports and specifications.
  
- WORKSHEET FOR BMP POINT SYSTEM** to ensure the stormwater management plan for the project attains at least 10 BMP points (New Development) or traditional pollutant load reduction computations per the Chesapeake Bay Local Assistance Manual (Redevelopment Only).
  
- PROPOSED CONSERVATION EASEMENT AREAS** for any natural open space points claimed in the BMP worksheet.
  
- INSPECTION/MAINTENANCE AGREEMENT** is required to be prepared and executed with the County for the project.
  
- FEMA FIRM PANEL** reference with designated special flood hazard areas or zone designations associated with the site, as applicable.
  
- DRAINAGE AREA MAP** at a maximum scale of 1"=200' scale showing drainage area boundaries for pre- and postdevelopment conditions and associated time of concentration flow paths. Labels to include drainage area size, runoff coefficient or curve number and time of concentration for each subarea shown on the map.

Yes No N/A

**SOILS MAP** with soil symbols, boundaries and legend in accordance with the current Soil Survey of James City and York Counties and the City of Williamsburg, Virginia with approximate locations of the project site, BMPs and applicable drainage basins.

**STORMWATER MANAGEMENT NARRATIVE** in a brief and simple format which describes the project; location; site and drainage basin soil characteristics; receiving water or drainage facility; existing site and drainage basin conditions (topography, land use, cover, slopes, etc.); proposed site development; proposed stormwater management and drainage plan including County BMP type selected; summary of hydrology and hydraulics; maintenance program; and any special assumptions utilized for development of the stormwater management and drainage design plan or computations.

**TEMPORARY STORMWATER MANAGEMENT** (if applicable) for control of stormwater runoff encountered during construction activities in addition to measures provided in the erosion and sediment control plan or stormwater management/drainage plan for the site. Adequate protection measures or sequencing provided.

**MODIFICATION PLAN** clearly defined for temporary sediment control structures which will be converted to permanent SWM/BMP structures. Includes appropriate hydrologic and hydraulic computations, conversions, sequencing and cleanout information or details. Normally related to primary control structures associated with dry detention or wet retention ponds. Normally not permitted for Group C or D categories such as bioretention, infiltration and filtering system facilities.

**STORMWATER MANAGEMENT and DRAINAGE DESIGN REPORT** in a bound 8-1/2 x 11 inch size format. Report shall generally include a title sheet, date, project identification, owner and preparer information, table of contents, narrative, summaries and computations as required. Computations may include: backwater, closed conduit, headwater, hydraulic, hydraulic grade line, hydrology, inlet, open channel, storm sewer, water quality, extended detention or stream channel protection and multi-stage storm routing calculations, as applicable, for the project. Computation data may include hand or computer generated computations, maps or schematics. All information should be presented in a clear, easy to follow format and should closely match construction plan information.

**PLAN VIEW** at 1 inch = 50 ft. scale or less (1" = 40', 1" = 30', etc.)

North arrow and plan legend.

Property lines.

Adjacent property information.

Existing site features and existing impervious cover areas.

Impervious cover tabulations.

Existing drainage facilities (natural or manmade).

Existing environmentally sensitive areas (RPA, wetlands, floodplain, steep slopes, critical soils, buffers, etc.).

Existing and proposed contours (1' or 2' contour interval) and spot elevations as necessary to define high and low topography.

Existing and proposed easement locations.

Yes No N/A

- |                                     |                          |                                     |   |
|-------------------------------------|--------------------------|-------------------------------------|---|
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | Proposed site improvements and proposed impervious cover areas.   |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | Proposed stormwater conveyance, drainage and management facilities with appropriate labeled construction data and information.  |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | Proposed landscaping and seeding plans (disturbed areas, pond interior, etc.).  |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | Proposed slope stabilization areas (riprap, blankets, mattings, walls, etc.).   |
| <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> | Delineation of permanent pools and the 1-, 2-, 10- and 100-year Design Water Surface Elevations.  |
| <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> | Delineation of ponding, headwater, surcharge or backwater areas which may affect adjacent existing or proposed buildings, structures or upstream adjacent properties. |
| <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> | Test boring locations with reference surface elevations (if known).   |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | Risers, barrels, underdrains, overflows and outlet protections.   |
| <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> | Emergency spillway level section and outlet channel.  |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | Existing and proposed site utilities and protection measures.   |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | Erosion and sediment control measures (for site or BMP).  |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | Maintenance or access corridors to permanent stormwater management, BMP or drainage facilities.   |

## II. STORMWATER CONVEYANCE SYSTEMS:

Yes No N/A

- |                                     |                          |                                     |  |
|-------------------------------------|--------------------------|-------------------------------------|--|
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | <b>PLAN VIEWS</b>  |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | Storm drain lengths, sizes, types, classes and slopes for all segments. Label directly on plan or use structure/pipe schedule.   |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | Access structure (inlets, manholes, junctions, etc.) rim elevations, inverts, type and required grate or top unit and lengths labeled.   |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | All structure numbers labeled.   |
| <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> | Adequate horizontal clearance from other site utilities or structures.   |
| <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <b>PROFILES</b> generally are not required but are encouraged to expedite review. If not provided, ensure all pipe segments have adequate minimum cover, do not exceed maximum depths of cover for the type/class of pipe specified and do not conflict with other site utilities or excavation areas. |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | <b>DETAILS</b>   |
| <input type="checkbox"/>            | <input type="checkbox"/> | <input type="checkbox"/>            | Typical storm drain bedding details or reference note.   |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | Standard details or reference note for all proposed access structure types (inlets, manholes, junctions, etc.).  |
| <input type="checkbox"/>            | <input type="checkbox"/> | <input type="checkbox"/>            | Inlet shaping detail or applicable reference note.   |
| <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> | Step detail or applicable reference note (if depth 4 ft. or more).   |
| <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> | Typical open channel details with designation, location, shape, type, bottom width, top width, lining, slope, length, side slope, and installation depth required for construction. Channel design data as necessary may also be included.   |
| <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | Outlet protections at all pipe outfalls.   |

Yes No N/A

**STORMWATER CONVEYANCE SYSTEM COMPUTATIONS**

- Storm Sewer Design computations based on 10-year design event.
- Hydraulic Grade Line computations based on 10-year design event.
- Inlet computations based on current VDOT procedure for spread, ponding depth and grate size required.
- Culvert Headwater computations. Design based on 10-year design storm event and check only for 100-year storm event.
- Open Channel computations based on 2-year design event for velocity and 10-year design event for capacity.
- Standard outlet protection or special energy dissipators.
- Pipe thickness design computations, as required, for selected pipe type (live load, minimum cover, maximum height of cover, etc.).
- Adequate channel computations for receiving channels (based on field measured channel section data).

**III. STORMWATER MANAGEMENT / BMP FACILITIES:**

Yes No N/A

**HYDROLOGY** - An SCS based methodology is required for the design of stormwater management/BMP facilities with watersheds exceeding 20 acres. Under 20 acres, other generally accepted methodologies such as the modified rational, critical storm are allowable. Refer to Chapter 5 of the VESCH or Chapter 5 of the VSMH.

- Runoff Curve Number or Coefficient determinations: predeveloped and ultimate development land use scenarios.
- Time of concentration: predeveloped and ultimate development indicating overland, shallow concentrated, and channel flow components (200 ft. maximum length for overland flow).
- Hydrograph generation (tabular or graphical): pre- and postdevelopment conditions for the 1-, 2-, 10-, and 100-year design storm events.

**FACILITY CONFIGURATION and MINIMUM SEPARATIONS**

- Screening and layout consistent with Section 24-98(d) of the Chapter 24 Zoning ordinance (landscaping, screening, visibility, etc.).
- Basic considerations for safety and unauthorized entry.
- Proper length to width ratio (Typically 2H:1V).
- Facilities with deep pools (4 feet or more in depth) provided with two benches. Fifteen (15) ft. safety bench outward from normal pool at maximum 6 percent slope and aquatic bench inward from normal shoreline below normal pool. Narrower widths may be considered on a case-by-case basis.
- Pond buffer minimum 25 feet outward from maximum design WSEL. Additional setbacks may be required to permanent structures.
- No trees, shrubs or woody plants within 15 feet of embankment toe or 25 feet from principal spillway structure.

Yes No N/A

- Infiltration and filtering system facilities generally located at least 100 feet horizontally from any water supply well; 100 feet from any downslope building; and 25 feet from any upslope buildings, unless site specific investigation allows for reduced separation.

Yes No N/A

#### **HYDRAULIC COMPUTATIONS**

- Elevation- or Stage- Storage curve and/or tabular data.
- Weir / Orifice Control - Extended Detention.
- Weir / Orifice Control - riser 1-year control for channel protection.
- Weir / Orifice Control - riser 2-year control for quantity (if required).
- Weir / Orifice Control - riser 10-year control for quantity (if required).
- Inlet / Outlet (barrel) control - (All Storms).
- Check for barrel control prior to riser orifice flow to prevent slug flow-water hammer conditions.
- Emergency spillway capacity and depth of flow.
- Elevation - Discharge (Outlet Rating) curve and/or table. Provide all supporting calculations and/or design assumptions.
- Adequate channel computations for receiving channel. May be waived if facility is designed based on current Stream Channel Protection criteria.

#### **POND or RESERVOIR ROUTING**

- Storage-Indication Routing of postdeveloped inflow hydrographs for the 1-, 2-, 10-, and 100-year design storms. Preference is for structure to discharge up to the 10-year storm through the principal spillway and pass the 100-year storm with a minimum 1 foot of freeboard through a combination principal and emergency spillways. If no emergency spillway is provided, riser must be large enough to pass the design high water flow and trash without overtopping the facility, have 3 square feet or more of cross-sectional area, contain a hood type inlet and have a minimum freeboard of 2 feet. Token spillways with minimum 8 ft. width are also recommended at or above the design 100-year storm elevation.
- Downstream hydrographs at established study points, if conditions warrant (ie. facility discharge combined with uncontrolled bypass).

#### **MISCELLANEOUS COMPUTATIONS**

- Water quality volume for permanent pool based on selected BMP treatment volume (WQv).
- Water quality volume for extended detention based on selected BMP treatment volume (WQv) with drawdown computations.
- Drawdown computations for the 1-year, 24 hour detention for stream channel protection criteria.
- Pond drain computations (within 24 hours).
- Anti-seep collar design (concrete preferred) or match material type.
- Filter diaphragm design (or alternative method of controlling seepage).

Yes No N/A

- Riser / base structure flotation analyses. FS = 1.25 minimum.
- Downstream danger reach study and/or emergency action plan (if conditions warrant).
- Upstream backwater analyses onto offsite adjacent property (if conditions warrant).
- 100 year floodplain impacts (if conditions warrant).

Yes No N/A

**GEOTECHNICAL REQUIREMENTS**

- Geotechnical Report with recommendations specific to BMP facility type selected. Report prepared by a registered professional engineer. Requires submission, review and approval prior to issuance of Land Disturbance Permit.
- Initial Feasibility Testing requirements satisfied as per Appendix E of the James City County Guidelines for Design and Construction of Stormwater Management BMPs manual. (Infiltration, Bioretention and Filtering System BMP types only).
- Concept Design Testing requirements satisfied as per Appendix E of the James City County Guidelines for Design and Construction of Stormwater Management BMPs manual. (Infiltration, Bioretention and Filtering System BMP types only).
- Minimum Boring locations: borrow area, pool area, principal control structure, top of facility near one abutment and emergency spillway if provided.
- Boring logs with Unified Soil Classification (ASTM D2487), soils descriptions and depths to bedrock and the seasonal water table indicated.
- Standard County Record Drawing/Construction Certification note provided on plan. *Note: It is understood that preparation of record drawings and construction certifications as required for project facilities may not necessarily be performed by the plan preparer. These components may be performed by others.*

**PRINCIPAL SPILLWAY PROFILE AND ASSOCIATED DETAILS**

**EXISTING GROUND AND PROPOSED GRADE**

- Embankment or excavation side slopes labeled (3H:1V maximum).
- Minimum top width labeled (per VESCH or VSMH requirements).
- Removal of unsuitable material under proposed facility (per Geotechnical Report requirements).

Yes No N/A

**CORE TRENCH**

- Material (per plan or Geotechnical Report).
- Bottom width (4' minimum or greater as dictated by Geotechnical Report recommendations).
- Side slopes (1:1 maximum steepness)
- Depth (4' minimum or greater as dictated by Geotechnical Report).

**PRINCIPAL CONTROL STRUCTURE. RISER OR SIMILAR STRUCTURE (DETAILS REQUIRED FOR ALL ITEMS)**

- Durable, watertight, resistant material (concrete preferred).
- Riser diameter is at least 1.25 times larger than barrel diameter.
- All pertinent dimensions and elevations shown.
- Control orifice or weir dimensions and elevations shown.
- Trash rack - removable - for each release.
- Anti-vortex device, baffle or plate.
- Riser base structure with dimensions and embedment specifications (concrete preferred).
- Interior access (steps, ladders, etc.) for maintenance for structures over 4 feet in height. Excessively high risers may need some form of exterior access on top portion.
- Low flow orifice with trash rack device.

**PRINCIPAL CONTROL STRUCTURE OUTLET BARREL**

- Material (ASTM C-361 reinforced concrete pipe) with watertight joints. Prior approval required for all other pipe material (other RCP types, CMP, CPP, PVC, etc.).
- Support and bedding requirements for barrel - concrete cradles, etc. or as recommended by the Geotechnical Report.
- Pipe inverts, length, size, class and slope shown.
- Flared end section or endwall provided on barrel outlet.

**SEEPAGE CONTROL**

- Phreatic line shown (4:1 slope measured from the intersection of the embankment and the principal spillway design high water).

**ANTI-SEEP COLLARS**

- Anti-seep collar, concrete preferred.
- Size - 15 percent increase in length of saturation using outside pipe diameter.
- Spacing and location on barrel (located at least 2 feet from a pipe joint).

- FILTER DIAPHRAGMS**
  - Design based on latest NRCS design methods and certified by a professional engineer.

Yes No N/A

- ELEVATION AND DIMENSIONAL DESIGN DATA**
  - Top of facility - construction height and settled height (10 percent settlement).
  - Crest of principal control structure spillway at least one (1) foot below crest of emergency spillway, if provided.
  - Minimum freeboard of one (1) foot above the 100-year design high water elevation for facilities with an emergency spillway.
  - Minimum freeboard of two (2) feet above the 100-year design high water elevation for facilities without an emergency spillway or in accordance with the SCS National Engineering Handbook (prior approval required).
  - Basin Sediment Clean-Out elevation (permanent mode). Typically 10 to 25 percent of water quality volume.

- CROSS SECTION THROUGH FACILITY**
  - Existing Ground.
  - Proposed grade.
  - Top of facility - constructed and settled.
  - Location of emergency spillway with side slopes labeled (emergency spillway in cut).
  - Bottom of core trench (4' minimum).
  - Location of each soil boring.
  - Barrel location.
  - Existing and proposed utility location/protection.

- EMERGENCY SPILLWAY PROFILE**
  - Existing ground.
  - Inlet, level (control) and outlet sections per SCS.
  - Spillway and crest elevations.

- PRETREATMENT DEVICES** of adequate depth and properly designed using required pretreatment volumes for the selected County BMP facility type. Including, but not limited to: sediment forebays, sediment basins, sumps, grass channels, gravel diaphragms, plunge pools, chamber separators, manufactured systems or other acceptable methods.

Yes No N/A

**CONSTRUCTION SPECIFICATIONS and NOTES**

- Anticipated sequence of construction for BMP (consistent with erosion and sediment control plan).
- Provisions to control base stream or storm flow conditions encountered during construction.
- Site and subgrade preparation requirements.
- Embankment, fill and backfill material soil and placement (lift) thickness requirements.
- Compaction and soil moisture content requirements.
- Geosynthetics for drainage, filtration, moisture barrier, separation, and reinforcement purposes.
- Clay or synthetic (PVC or HDPE) pond liners.
- Storm drain, underdrain and pipe conduit requirements.
- Minimum depth of pipe cover for temporary (construction) and final cover conditions.
- Permanent shutoff valve and pond drain.
- Concrete requirements for structural components.
- Riprap and slope protection.
- Access or maintenance road surface, base, subbase.
- Temporary and permanent stabilization measures.
- Temporary or permanent safety fencing.
- BMP Landscaping (deep, shallow, fringe, perimeter, etc.)
- Dust and traffic control (if warranted).
- Construction monitoring and certification by professional.
- Other: \_\_\_\_\_
- Other: \_\_\_\_\_

**MAINTENANCE PROVISIONS**

- Entity responsible for maintenance identified..
- Maintenance Plan which outlines the long-term schedule for inspection/maintenance of the facility and forebays
- Maintenance access from public right-of-way or publicly traveled road.
- Maintenance easement provided encompassing high water pool and buffer, principal and emergency spillways, outlet structures, forebays, embankment area and possible sediment-removal stockpile areas.
- Minimum 6 foot wide public safety shelf (landing) or alternative fencing.



**St Bede Rectory2**

James City County 10-Year Duration=15 min, Inten=4.03 in/hr

Prepared by LandMark Design Group

HydroCAD® 7.00 s/n 001765 © 1986-2003 Applied Microcomputer Systems

2/4/2005

**Subcatchment 3S: Pre-Developed**

Runoff = 0.71 cfs @ 0.25 hrs, Volume= 0.018 af, Depth= 0.44"

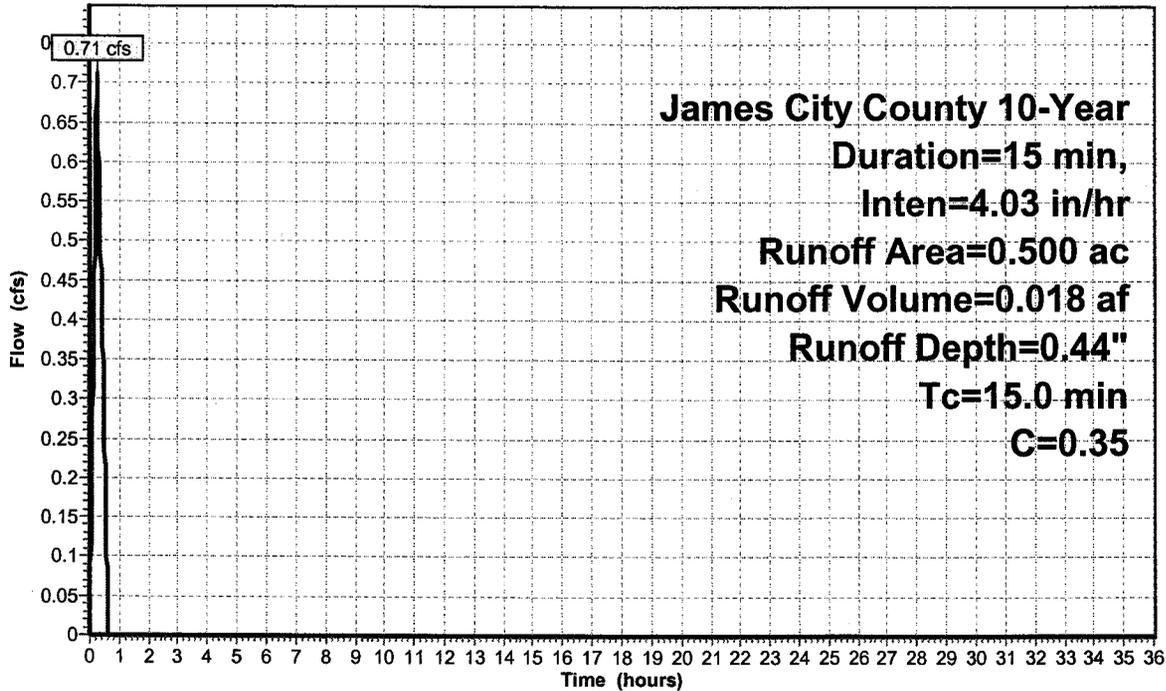
Runoff by Rational method, Rise/Fall=1.0/1.5 xTc, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
 James City County 10-Year Duration=15 min, Inten=4.03 in/hr

Area (ac)	C	Description
0.500	0.35	Woods/grass comb., Good, HSG C

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					Direct Entry,

**Subcatchment 3S: Pre-Developed**

Hydrograph



— Runoff

**St Bede Rectory2**

James City County 100-Year Duration=15 min, Inten=7.33 in/hr

Prepared by LandMark Design Group

HydroCAD® 7.00 s/n 001765 © 1986-2003 Applied Microcomputer Systems

2/4/2005

**Subcatchment 3S: Pre-Developed**

Runoff = 1.29 cfs @ 0.25 hrs, Volume= 0.033 af, Depth= 0.80"

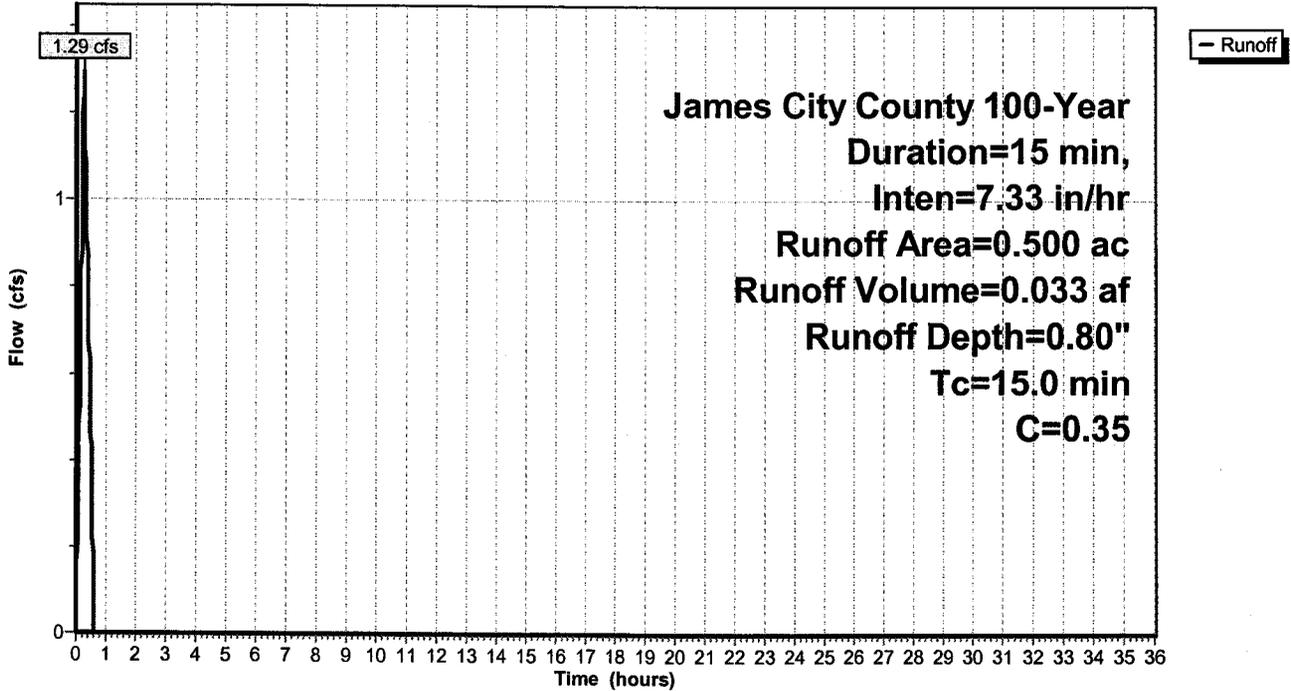
Runoff by Rational method, Rise/Fall=1.0/1.5 xTc, Time Span= 0.00-36.00 hrs, dt= 0.01 hrs  
James City County 100-Year Duration=15 min, Inten=7.33 in/hr

Area (ac)	C	Description
0.500	0.35	Woods/grass comb., Good, HSG C

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.0					Direct Entry,

**Subcatchment 3S: Pre-Developed**

Hydrograph



Date Record Created:

WS\_BMPNO:

Print Record

Created By:

MC059

PRINTED ON  
Thursday, March 11, 2010  
4:27:48 PM

WATERSHED MC  
BMP ID NO 059  
PLAN NO SP-122-03

TAX PARCEL  
PIN NO  
CONSTRUCTION DATE  
PROJECT NAME St. Bedes Prayer Garden

FACILITY LOCATION  
CITY-STATE

CURRENT OWNER

OWNER ADDRESS

OWNER ADDRESS 2

CITY-STATE-ZIP CODE

OWNER PHONE

MAINT AGREEMENT No

EMERG ACTION PLAN No

Get Last BMP No

Return to Menu

MAINTENANCE PLAN

No

SITE AREA acre

LAND USE

old BMP TYP

JCC BMP CODE

POINT VALUE

SVC DRAIN AREA acres

SERVICE AREA DESCRI

IMPERV AREA acres

0.00

RECV STREAM

EXT DET-WQ-CTRL

No

WTR QUAL VOL acre-ft

CHAN PROT CTRL

No

CHAN PROT VOL acre-ft

SW/FLOOD CONTROL

No

GEOTECH REPORT

No

CTRL STRUC DESC

CTRL STRUC SIZE inches

OTLT BARRL DESC

OTLT BARRL SIZE inch

Manufactured BMP

ZI Manuf BMP systems

EMERG SPILLWAY No

DESIGN HW ELEV

PERM POOL ELEV

2-YR OUTFLOW cfs 0.00

10-YR OUTFLOW cfs 0.00

REC DRAWING No

CONSTR CERTIF No

LAST INSP DATE

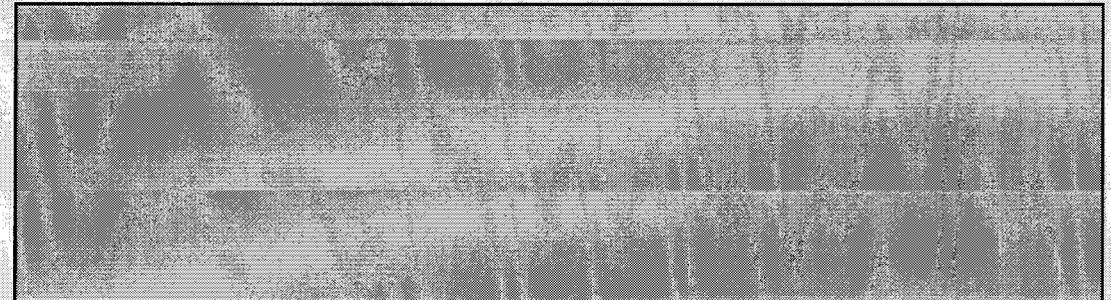
Inspected by:

INTERNAL RATING

MISC/COMMENTS

Rain Tanks.

Additional Comments:



JAMES CITY COUNTY ENVIRONMENTAL DIVISION

Surety Tracking Sheet

Date: \_\_\_\_\_

Due Date: \_\_\_\_\_

Project Name: Saint Beles Catholic Church Parking and Paving

Requested By: Linwood Burton Phone #: 220-7841

Date Notified: \_\_\_\_\_ Case Number: SP-2801

Sitation Surety: Original \$ \_\_\_\_\_ Current \$ 49,000.00 Needed \$ 0  
\*maximum reduction of 80% of original bond amount unless project is to be released

Calculate  Evaluate/Reduce  Release

Work to be completed for SILTATION Surety

- Stabilization of all disturbed areas
- Removal of temporary erosion control measures
- Submission of as-built drawings for stormwater management facility
- Submission of construction certification for the stormwater management facility
- Completion of field-related BMP items
- Other -
- Comments- Project complete all construction issues addressed. Ok to release bond and close out project.

Subdivision Surety: Original \$ \_\_\_\_\_ Current \$ \_\_\_\_\_ Needed \$ \_\_\_\_\_  
\*maximum reduction of 80% of original bond amount unless project is to be released

Calculate  Evaluate/Reduce  Release

Work to be completed for SUBDIVISION Surety

- Paving of streets
- Dedication of streets to Virginia Dept of Transportation VDOT  
Amount Needed \$ \_\_\_\_\_
- Completion of water and sewer systems JCSA  
Amount Needed \$ \_\_\_\_\_
- Completion of water and sewer punchlist items
- Submission of as-built drawings for water and sewer systems
- Installation of street lights and street signs
- Other -
- Comments-

INDICATE YOUR APPROVAL BY INITIALING THE APPROPRIATE BLANK:

INSP CBH    
  SUPV \_\_\_\_\_    
  CHF \_\_\_\_\_    
  ENG \_\_\_\_\_    
  DIR \_\_\_\_\_    
  RELEASE PROJECT \_\_\_\_\_