

WATER QUALITY CONTROL (BMP) NARRATIVE:

THE AREA OF ANALYSIS IS THE SITE AREA AFTER DEDICATION I.E. 0.81 ACRES. BMP REQUIREMENTS FOR THIS SITE ARE PROPOSED TO BE MET WITH ONE FILTERRA DEVICE TREATING 0.15 ACRES.

PER AMENDMENT TO PFM 6-0400 (STORMWATER RUNOFF QUALITY CONTROL CRITERIA) SECTION 6-401.2 6-0401.2B, FOR REDEVELOPMENT OF ANY PROPERTY NOT CURRENTLY SERVED BY ONE OR MORE BMPs, THE REQUIRED REDUCTION IN PHOSPHORUS LOADS WILL BE COMPUTED FOR EACH SITE BASED ON THE FOLLOWING FORMULA:

$$[1 - 0.9 \left(\frac{I_{pre}}{I_{post}} \right)] \times 100 = \% \text{ P REMOVAL BUT NOT LESS THAN } 10\%$$

WHERE "I"PRE IS THE PREDEVELOPMENT PERCENT IMPERVIOUS AREA AND "I"POST IS THE POSTDEVELOPMENT PERCENT IMPERVIOUS AREA.

PERCENT PHOSPHORUS REMOVAL REQUIREMENT NOW BEING:

$$[1 - 0.9 (\% \text{ IMPERVIOUS AREA}) / (\% \text{ IMPERVIOUS AREA})] \times 100 = \% \text{ P REMOVAL REQ.}$$

PRE % IMPERVIOUS AREA = 0.71 AC / 0.81 AC = 88 %
 POST % IMPERVIOUS AREA = 0.53 AC / 0.81 AC = 65 %

$$[1 - 0.9(0.88)/(0.65)] \times 100 = -20 \% \text{ (USE = } 10\% \text{ REMOVAL REQUIREMENT)}$$

THE 10 % PHOSPHORUS REMOVAL REQUIREMENT IS PROPOSED TO BE FULFILLED BY THE USE OF FILTERRA™ STORMWATER BIORETENTION FILTRATION SYSTEMS. ONE FILTERRA CAN TREAT 0.25 AC WITH 65 % PHOSPHORUS REMOVAL EFFICIENCY. ONE FILTERRA DEVICE PROVIDES 15.45 % PHOSPHORUS REMOVAL, AND SATISFIES 10% REQUIRED PHOSPHORUS REMOVAL (SEE BMP COMPUTATIONS, THIS SHEET). ALSO, A MAP IS PROVIDED TO BETTER EXPLAIN OUR BMP ANALYSIS AND COMPUTATIONS.

BMP FACILITY DESIGN CALCULATIONS

I. WATERSHED INFORMATION

Part 1: LIST OF SUBAREAS AND "C" FACTORS USED

SUBAREA DESIGNATION AND DESCRIPTION	C	AC
F1 ONSITE AREA TO FILTERRA	0.90	0.15
Ai ONSITE IMPERVIOUS AREA NOT TREATED	0.90	0.38
Ap ONSITE PERVIOUS AREA NOT TREATED	0.35	0.28

II. PHOSPHORUS REMOVAL USE DA: 0.81 AC = TOTAL SITE AREA (AFTER DEDICATION)

Part 2: COMPUTE WEIGHTED AVERAGE "C" FACTOR FOR THE SITE

(A) SUBAREA DESIGNATION	(a)	0.80	X	Ac	=	PRODUCT
F1 ONSITE AREA TO FILTERRA	0.90	X	0.15	=	0.13	
Ai ONSITE IMPERVIOUS AREA NOT TREATED	0.90	X	0.38	=	0.34	
Ap ONSITE PERVIOUS AREA NOT TREATED	0.35	X	0.28	=	0.10	
TOTAL=					0.57 (b)	

WEIGHTED POST DEVELOPMENT "C" FACTOR = (b)/(a)=(c) 0.70

FAIRFAX COUNTY PFM 6-401.2B STATES THAT A SITE PLAN QUALIFIES AS REDEVELOPMENT WHEN THE NET INCREASE WITHIN AN RMA (AS WE ARE) LESS THAN 20%.

Cpre = 0.83 IMPERV. Apr = 0.71 AC
 Cpost = 0.70 IMPERV. Apost = 0.53 AC
 $[1 - 0.9 \left(\frac{I_{pre}}{I_{post}} \right)] \times 100 = \% \text{ P removal (but no less than } 10\%)$
 where "I"pre is the predevelopment percent impervious area and "I"post is the postdevelopment percent impervious area.
 SO % P removal = 10 %

Part 3: COMPUTE THE TOTAL PHOSPHORUS REMOVAL FOR THE SITE

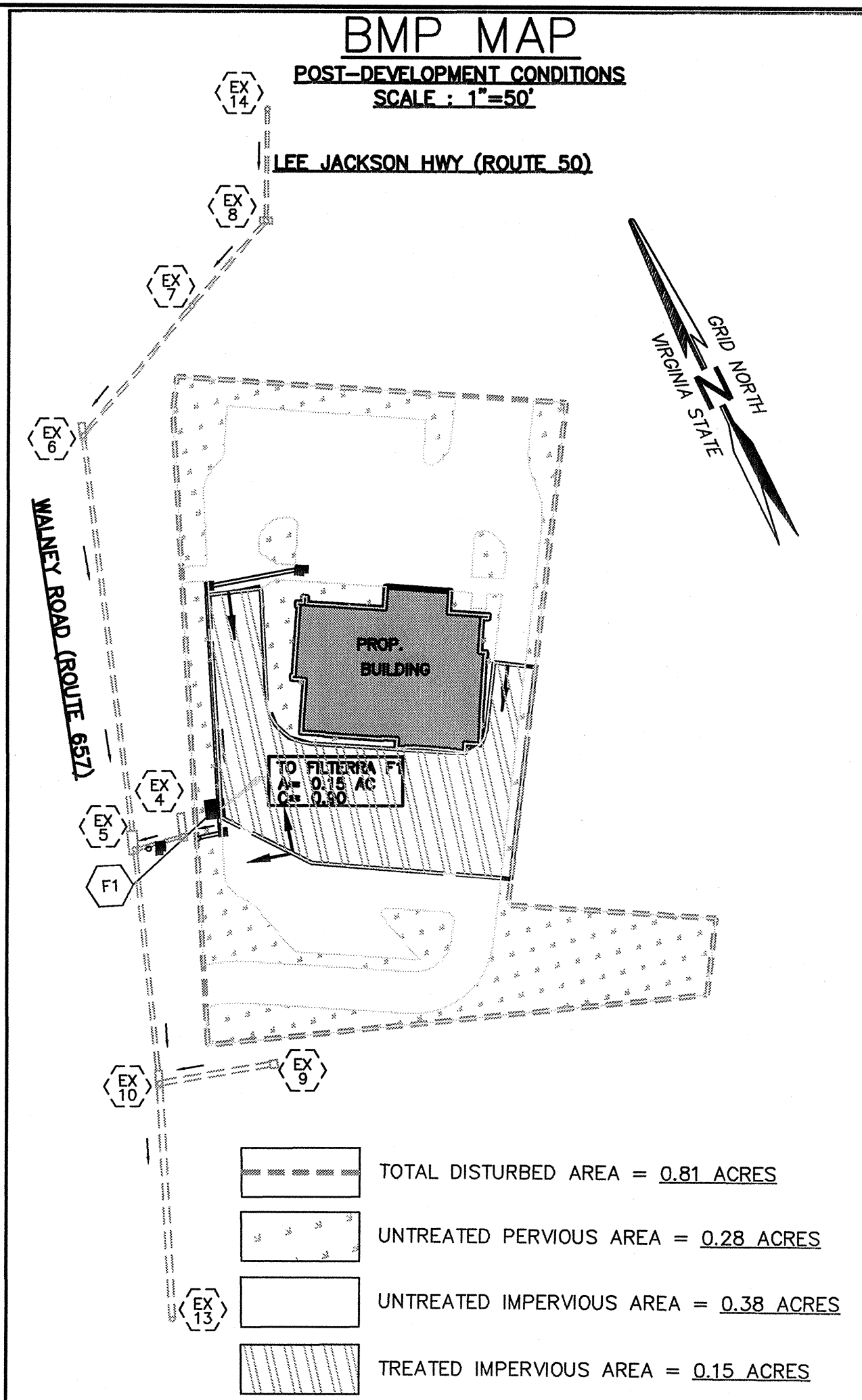
SUBAREA DESIGNATION (1)	BMP TYPE (2)	REMOVAL EFF (3)	AREA RATIO (4)	"C" FACTOR RATIO (5)	PRODUCT (6)
F1	ONSITE AREA TO FILTERRA	65	0.15 / 0.81	0.90 / 0.70	15.47

TOTAL SITE PHOSPHORUS REMOVAL = (a) 15.47

Part 4: DETERMINE COMPLIANCE WITH PHOSPHORUS REMOVAL REQUIREMENT

- (A) SELECT CHESAPEAKE BAY PRESERVATION AREA (REDEVELOPMENT) REQUIREMENT
 $[1 - 0.9 \times (I_{pre}/I_{post})] \times 100 = \% \text{ P REMOVAL REQ.} = (a) \underline{10}$
 (B) IF LINE 3(a) \geq LINE 4(a) $\underline{10}$
 THEN PHOSPHORUS REMOVAL REQUIREMENT IS SATISFIED. **OK**

BMP STATEMENT:
 "A REQUEST FOR PERMISSION TO USE "FILTERRA" AS AN INNOVATIVE BMP TO BE SUBMITTED FOR APPROVAL WITH FINAL ENGINEERING."



- TOTAL DISTURBED AREA = 0.81 ACRES
- UNTREATED PERVIOUS AREA = 0.28 ACRES
- UNTREATED IMPERVIOUS AREA = 0.38 ACRES
- TREATED IMPERVIOUS AREA = 0.15 ACRES

STORMWATER MANAGEMENT (SWM) NARRATIVE :

THE AREA OF ANALYSIS IS ASSUMED TO BE THE SITE AREA AFTER DEDICATION. UNDER EXISTING CONDITIONS, RUNOFF FROM THE EXISTING ANITA'S RESTAURANT SITE IS NOT DETAILED FOR PEAK-SHAVING CONTROL. THE IMPROVEMENTS PROPOSED BY THE NEW COMMERCE BANK HAVE BEEN CALCULATED TO REDUCE THE IMPERVIOUS COVER, AND AS SUCH, WILL NOT INCREASE SITE RUNOFF (SEE COMPUTATIONS BELOW).

SITE AREA (BEFORE DEDICATION) = 38,399 Sq.Ft. OR 0.88 ACRES
 SITE AREA (AFTER DEDICATION) = 35,101 Sq.Ft. OR 0.81 ACRES
 SITE AREA (DEDICATED) = 3,298 Sq.Ft. OR 0.07 ACRES

PRE-DEVELOPED DISTURBED AREA = 35,101 Sq.Ft. OR 0.81 ACRES
 IMPERVIOUS AREA = 31,292 Sq.Ft. OR 0.71 ACRES
 PERVIOUS AREA = 3,810 Sq.Ft. OR 0.09 ACRES
 $C_{post} = \frac{(0.35 \times (0.09) + (0.90) \times (0.71))}{0.81} = 0.83$

POST-DEVELOPED DISTURBED AREA = 35,101 Sq.Ft. OR 0.81 ACRES
 IMPERVIOUS AREA = 22,904 Sq.Ft. OR 0.53 ACRES
 PERVIOUS AREA = 12,197 Sq.Ft. OR 0.28 ACRES
 $C_{post} = \frac{(0.35 \times (0.28) + (0.90) \times (0.53))}{0.81} = 0.70$

-PRIOR TO RE-DEVELOPMENT, THE EXISTING RUNOFF COEFFICIENT ('C' FACTOR) WAS 0.83 FOR THE 0.81 ACRES DISTURBED AREA.

-AFTER RE-DEVELOPMENT, THE PROPOSED RUNOFF COEFFICIENT ('C' FACTOR) IS 0.70 FOR THE 0.81 ACRES DISTURBED AREA.

-PER LETTER TO THE INDUSTRY #21-88, (ABBREVIATED STORMWATER DETENTION WAIVER PROCEDURE), STORMWATER DETENTION FOR THIS SITE PLAN IS NOT INCLUDED OR REQUIRED BECAUSE OF THE DECREASE IN RUNOFF.

SWM STATEMENT:
 "DETENTION/PEAK SHAVING IS NOT REQUIRED BECAUSE THE IMPERVIOUS AREA AFTER RE-DEVELOPMENT IS REDUCED."

OUTFALL NARRATIVE:

DESCRIPTION:
 THE COMMERCE BANK, CHANTILLY SITE PLAN PROPOSES A NEW BUILDING, TRAVELWAY, PARKING, DEDICATION AREA, AND DEMOLITION OF THE EXISTING ANITA'S RESTAURANT BUILDING. THE DEVELOPMENT SITE IS LOCATED AT THE INTERSECTION OF LEE JACKSON HWY (RTE. 50) AND WALNEY ROAD (RTE. 657). THE SITE AREA OF THIS ANALYSIS IS THE SITE AREA (AFTER DEDICATION) I.E. 0.81 ACRES.

OUTFALL ANALYSIS FLOW PATH:
 THE STUDY POINT IS DETERMINED IN ACCORDANCE WITH PFM REQUIREMENTS 6-0203.2B AS WELL AS ZONING REQUIREMENTS FOR SPECIAL EXCEPTION APPLICATIONS, THAT STATES THAT THE ANALYSIS FLOW PATH FOR ADEQUATE OUTFALL OUTFALL EXTENDS TO A POINT AT WHICH THE TOTAL DRAINAGE AREA IS AT LEAST 100 TIMES GREATER THAN THE CONTRIBUTING DRAINAGE AREA OF THE DEVELOPMENT SITE.

FOR THE COMMERCE BANK, CHANTILLY, THE STUDY POINT IS LOCATED AT SECTION A-A (ENTRANCE OF THE TRIPLE 60" RCP CULVERTS, AND THE EXISTING SWM WET POND APPROVED UNDER SULLYFIELD BUSINESS PARK, FFAX #4948-SD-01). THE DEVELOPMENT SITE IS PART OF 90 ACRES SHED THAT FLOWS SOUTHWEST THROUGH AN EXISTING CONCRETE DITCH, TWIN 60" CULVERTS, TRIPLE 60" CULVERTS, AN ON-SITE SWM WET POND, THROUGH A 60" CULVERT UNDER SULLY ROAD (RTE. 28), AND FINALLY TO SCHNEIDER BRANCH THAT IS PART OF THE CUB RUN WATERSHED.

THE FLOW PATH EXITS THE SITE WITH A FLOW OF APPROXIMATELY 4.12 CFS (A = 0.81 ACRES, C = 0.70) THROUGH AN EXISTING CLOSED CONDUIT UNDER WALNEY ROAD TO AN EXISTING 60" CULVERT BEFORE IT EXITS TO THE OPEN EXISTING CONCRETE DITCH FOR ABOUT A LENGTH OF 2000' (INCLUDES 80' OF TWIN 60" CULVERTS AND 70' OF TRIPLE 60" CULVERTS). REFER TO THE MINOR SYSTEM DIVIDES CONTRIBUTING AREAS TABULATIONS, EXISTING OUTFALL CONCRETE DITCH CALCULATIONS, AND EXISTING OUTFALL CULVERTS CALCULATIONS ON THIS SHEET.

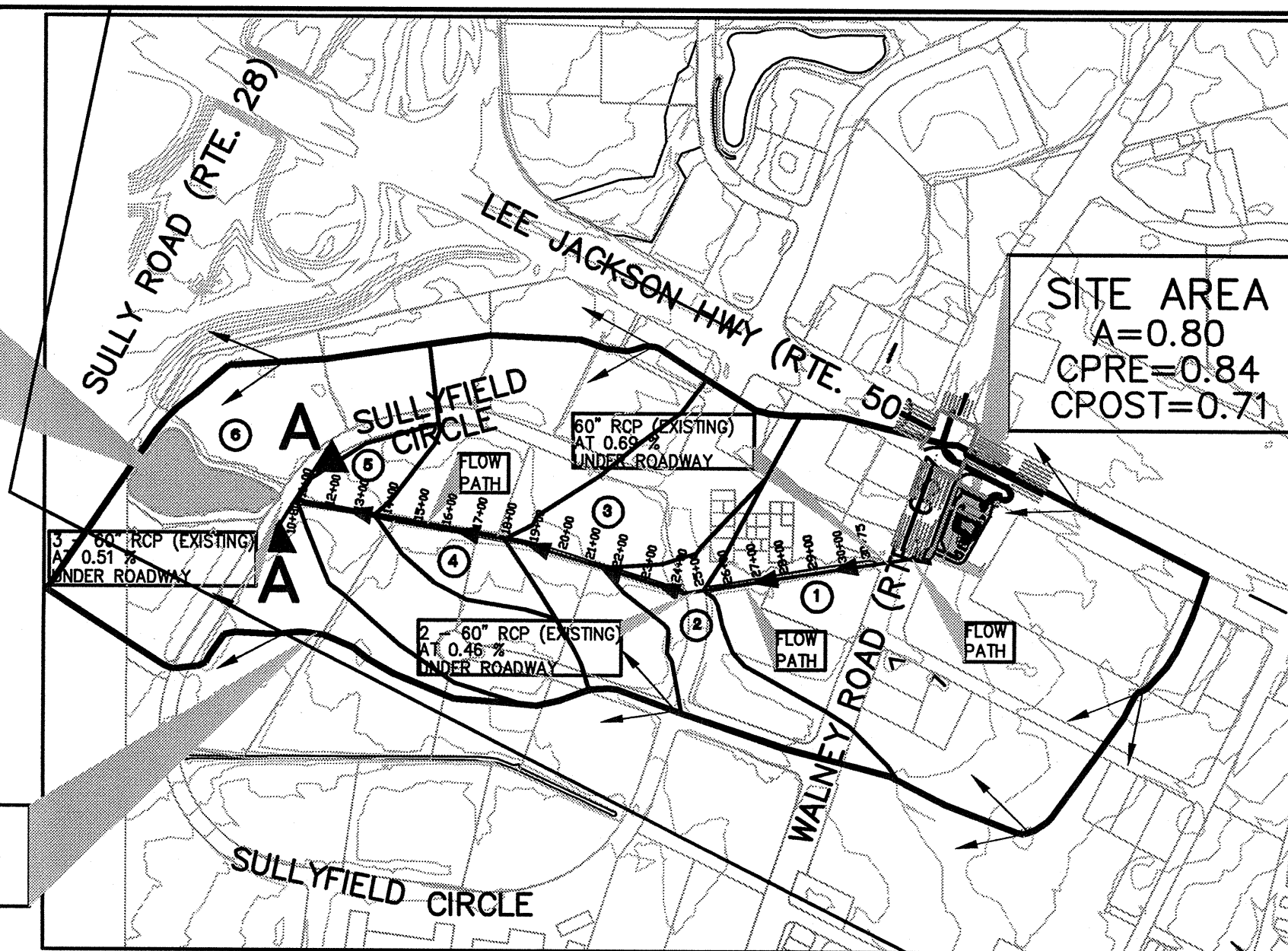
SUMMARY:
 THE INFORMATION PROVIDED ON THIS SHEET INDICATES THAT THE OUTFALL CHANNEL DOWNSTREAM OF THE SITE CONSISTS OF A CLOSED CONDUIT SYSTEM, A CONCRETE TRAPEZOIDAL DITCH (SEE SECTION ON THIS SHEET), AND ROADWAY CULVERT CROSSINGS ALL OF WHICH ARE IN SERVICABLE CONDITIONS. WHERE THE CONTRIBUTING DRAINAGE AREA IS 100 X THAN THE AREA OF THE PROPOSED DEVELOPMENT, THE OUTFALL IS STABLE AND HAS SUFFICIENT CAPACITY TO CARRY THE ANTICIPATED DISCHARGE FROM THE SITE.

OUTFALL ADEQUACY STATEMENT:
 "BASED ON THE COMPUTATIONS BELOW, THE EXISTING OUTFALL CONCRETE CHANNEL/CIRCULAR CULVERTS WITHIN THE FLOW PATH HAVE SUFFICIENT CAPACITY TO CONVEY THE ANTICIPATED DISCHARGE. THEREFORE, IT IS OUR OPINION THAT THE DEVELOPMENT CONDITIONS WOULD NOT CAUSE ADVERSE IMPACTS TO DOWNSTREAM PROPERTIES".

DRAINAGE MAP SCALE : 1" = 500'

EXISTING SWM FACILITY
 BMP VOLUME = 235,227 CF
 DETENTION STORAGE = 638,000 CF

SHED AREA
 A = 90 AC



MINOR SYSTEM DIVIDES

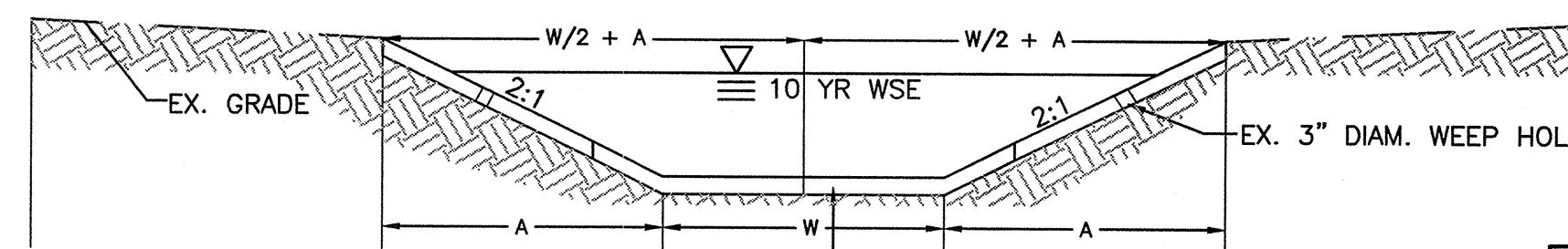
NO.	AREA (ACRES)	C FACTOR
1	34.10	0.85
2	5.37	0.85
3	10.45	0.85
4	12.94	0.85
5	8.04	0.85
6	19.10	0.85

EXISTING OUTFALL CONCRETE DITCH CALCULATIONS

STATION	STATION	SLOPE %	W (FT)	A (FT)	Tc (MIN)	Q (CF/S)	d (FT)	Q FULL (CF/S)	V (FT/S)
30+75	25+10	0.30	4	6.40	5	34.10	2.67	310.30	8.44
24+00	21+50	0.75	2	6.80	5	5.37	2.67	428.30	12.43
21+50	18+00	1.50	2	5.80	5	10.45	2.55	416.98	17.09
18+00	13+50	0.60	2	7.20	5	12.94	3.42	438.70	12.85
13+50	10+80	1.20	2	6.30	5	8.04	3.11	452.52	17.17

EXISTING OUTFALL CULVERTS CALCULATIONS

FROM	TO	Q (CF/S)	CAPACITY (CF/S)	VELOCITY (FT/S)	SLOPE %	LENGTH (FT)	n	INV IN	INV OUT	DESCRIPTION
ND 6	ND 5	210.72	353.26	9.39	0.46	80	0.013	300.42	300.05	TWIN 60" RCP CULVERTS UNDER SULLYFIELD CIRCLE
ND 4	ND 3	438.11	557.94	10.49	0.51	70	0.013	283.97	283.61	TRIPLE 60" RCP CULVERTS UNDER SULLYFIELD CIRCLE



SECTION A-A
 STATION 10+80 TO 30+75
 DETAIL: STORM OUTFALL END VIEW EX. CONCRETE CHANNEL BED
 SCALE: N.T.S.

MINIMUM STORMWATER INFORMATION FOR REZONING, SPECIAL EXCEPTION, SPECIAL PERMIT AND DEVELOPMENT PLAN APPLICATIONS

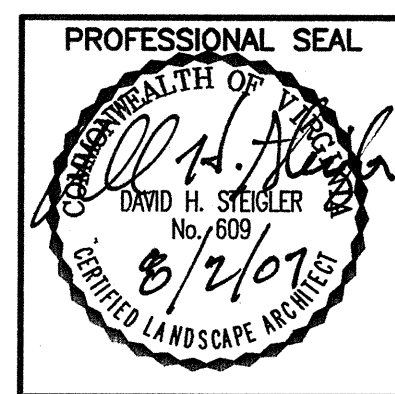
The following information is required to be shown or provided in all zoning applications, or a waiver request of the submission requirement with justification shall be attached. Note: Waivers will be acted upon separately. Failure to adequately address the required submission information may result in a delay in processing this application.

This information is required under the following Zoning Ordinance paragraphs:
 Special Permits (8-011 2J & 2L) Special Exceptions (9-011 2J & 2L)
 Cluster Subdivision (9-615 1G & 1N) Commercial Revitalization Districts (9-622 2A (12) & (14))
 Development Plans PRG District (16-302 3 & 4L) PRG Plan (16-303 1E & 1O)
 FDP P Districts (except PRG) (16-502 1F & 1Q) Amendments (18-202 10F & 10I)

- 1. Plat is at a minimum scale of 1"=50' (unless it is depicted on one sheet with a minimum scale of 1"=100').
- 2. A graphic depicting the stormwater management facility(ies) and limits of clearing and grading accommodate the stormwater management facility(ies), storm drainage pipe systems and outlet protection, pond spillways, access roads, site outfalls, energy dissipation devices, and stream stabilization measures as shown on Sheet 4.
- 3. Provide:

Facility Name/Type & No.	On-site area served (acres)	Off-site area served (acres)	Drainage area (acres)	Footprint area (sf)	Storage Volume (cf)	If pond, dam height (ft)
N/A	N/A	N/A	N/A	N/A	N/A	N/A
Totals						
- 4. Onsite drainage channels, outfalls and pipe systems are shown on Sheet 4.
 Pond inlet and outlet pipe systems are shown on Sheet N/A.
- 5. Maintenance access (road) to stormwater management facility(ies) are shown on Sheet N/A.
 Type of maintenance access road surface noted on the plat is N/A (asphalt, geoblock, gravel, etc.).
- 6. Landscaping and tree preservation shown in and near the stormwater management facility is shown on Sheet N/A.
- 7. A "stormwater management narrative" which contains a description of how detention and best management practices requirements will be met is provided on Sheet 4.
- 8. A description of the existing conditions of each numbered site outfall extended downstream from the site to a point which is at least 100 times the site area or which has a drainage area of at least one square mile (640 acres) is provided on Sheet 4.
- 9. A description of how the outfall requirements, including known changes to contributing drainage areas (i.e. drainage diversions), of the Public Facilities Manual will be satisfied is provided on Sheet 4.
- 10. Existing topography with maximum contour intervals of two (2) feet and a note as to whether it is an air survey or field run is provided on Sheets 2, 3.
- 11. A submission waiver is requested for "FILTERRA AS AN INNOVATIVE BMP".
- 12. Stormwater management is not required because OF A REDUCTION OF IMPERVIOUS AREA

NO.	DESCRIPTION	DATE	REV'S'D	REV'W'D	APR'V'D	DATE
4	REVISED REAR PARKING LOT LAYOUT	3/03/07				
3	REVISED LAYOUT	5/11/07				
2	COUNTY COMMENTS & BUILDING SF	3/9/07				
1	ADD EVM SUMMARY	2/8/07				



PROJECT
SPECIAL EXCEPTION
COMMERCE BANK - CHANTILLY
 SULLY DISTRICT
 FAIRFAX, VA

TITLE
PRELIMINARY STORMWATER
MANAGEMENT & BMP PLAN

Patton Harris Rust & Associates, p.c.
 Engineers. Surveyors. Planners. Landscape Architects.

 14532 Lee Road
 Chantilly, VA 20151-1679
 T 703.449.6700
 F 703.449.6714

DESIGN	YB	SURVEY	PHR+A
DRAWN	YB <td>DATE</td> <td>JAN. 2, 2007</td>	DATE	JAN. 2, 2007
CHECKED	SWS <td>SCALE</td> <td>AS SHOWN</td>	SCALE	AS SHOWN
SHEET	4 OF 6	FILE NO.	14785-1-0