Shell

FRANCONIA SHELL

ABBREVIATIONS

AC -- ACRE
AC-FT -- ACRE-FEET
ASPH -- ASPHALT
AVG -- AVERAGE
BF -- BASEMENT FLOOR
BLDG -- BUILDING
BMP -- BEST MANAGEMENT PRACTICE
CB -- CATCH BASIN
CIP -- CAST IRON PIPE
CFS -- CUBIC FEET PER SECOND
CMP -- CORRUGATED METAL PIPE
CO -- CLEAN OUT
CONC -- CONCRETE
CTV -- CABLE TV
CUM -- CUMULATIVE
C&G -- CURB AND GUTTER
D.I. -- DROP INLET
DIA -- DIAMETER
DIP -- DUCTILE IRON PIPE
DWG -- DRAWING
D/W -- DRIVEWAY
EC -- EROSION CONTROL
ECC -- EDGE OF CONCRETE
ELEC -- ELECTRIC
ELEV -- ELEVATION
EG -- EDGE OF GRAVEL
EP -- EDGE OF PAVEMENT
ES -- END SECTION
ESMT -- EASEMENT
EW -- END WALL
EX -- EXISTING
FC -- FACE OF CURB
FCWA -- FAIRFAX COUNTY WATER AUTH.
FCPS -- FAIRFAX COUNTY PUBLIC SCHOOLS
FF -- FINISH FLOOR
FM -- FORCE MAIN
FOY -- FOYER
FP -- FLOOD PLAIN
FT -- FEET
G -- GAS MAIN
G/V -- GAS VALVE
GALV -- GALVANIZED
GFA -- GROSS FLOOR AREA
GR -- GUARD RAIL
GW -- GUY WIRE
HC -- HANDICAP
HEC -- HYDROLOGIC ENGINEERING CENTER
HGL -- HYDRAULIC GRADE LINE
HP -- HIGH POINT
HR -- HOUR
HT -- HEIGHT
H20 -- HIGHWAY LOAD FOR TRUCKS
I -- INTENSITY
ID -- INSIDE DIAMETER
IN -- INCHES
INV -- INVERT
IP -- IRON PIPE
IPF -- IRON PIPE FOUND
IPS -- IRON PIPE SET
JB -- JUNCTION BOX
L -- LENGTH
LAT -- LATERAL
LP -- LOW POINT
M -- METER
MAX -- MAXIMUM
MIN -- MINIMUM
MH -- MANHOLE
MM -- MILLIMETER
MON -- MONUMENT
MW -- MONITORING WELL
N/F -- NOW OR FORMERLY
NO. -- NUMBER
OC -- ON CENTER
OHE -- OVER HEAD ELECTRIC
PC -- POINT OF CURVATURE
PCC -- POINT OF COMPOUND CURVE
PG -- PAGE
PI -- POINT OF INTERSECTION
PL -- PROPERTY LINE
PMP -- PROBABLE MAXIMUM PRECIPITATION
PP -- POWER POLE
PRC -- POINT OF REVERSE CURVE
PRECIP -- PRECIPITATION
PROP -- PROPOSED
PSI -- POINTS PER SQUARE INCH
PT -- POINT OF TANGENCY
PVMT -- PAVEMENT
Q -- FLOW RATE
RAD -- RADIUS
RC -- REINFORCED CONCRETE
RCP -- REINFORCED CONCRETE PIPE
REV -- REVISION
RPA -- RESOURCE PROTECTION AREA
R/W -- RIGHT-OF-WAY
SAN -- SANITARY
SEC -- SECTION
SCS -- U.S. SOIL CONSERVATION SERVICE
SDF -- SPILLWAY DESIGN FLOOD
SHT -- SHEET
SPEC -- SPECIFICATION
STD -- STANDARD
STA -- STATION
S/W -- SIDEWALK
SWM -- STORM WATER MANAGEMENT
TC -- TOP OF CURB
THR -- THROAT
TOB -- TOP OF BANK
TYP -- TYPICAL
TW -- TOP OF WALL
UD -- UNDERDRAIN
UG -- UNDERGROUND
UGE -- UNDERGROUND ELECTRIC
UP -- UTILITY POLE
VDOT -- VIRGINIA DEPT. OF TRANSPORTATION
W -- WATER
WM -- WATER METER
W/M -- WATER MAIN
W/V -- WATER VALVE
YR -- YEAR
% -- PERCENT
' -- FOOT OR MINUTE
" -- INCH/INCHES OR SECOND
-- POUND/NUMBER

LEGEND

132 — EXISTING INTERMEDIATE CONTOUR
130 — EXISTING INDEX CONTOUR
EX. E/P — EXISTING EDGE OF PAVEMENT
EX. C & G — EXISTING CURB AND GUTTER
T — EXISTING TELEPHONE LINE
T — EXISTING TELEPHONE BOX
EX. 15" RCP — EXISTING STORM SEWER
D — EXISTING STORM SEWER MH
S — EXISTING SANITARY SEWER MH
S — EXISTING SANITARY SEWER
C.O. — EXISTING SANITARY CLEANOUT
E — EXISTING ELECTRIC SERVICE
E — EXISTING ELECTRIC SERVICE BOX
EXISTING SATELLITE DISH
G — EXISTING GAS LINE
GV — EXISTING GASE VALVE
PROPERTY LINE
CENTERLINE
×85.10 — EXISTING SPOT ELEVATION
EXISTING TREE CANOPY LINE
15" OAK — EXISTING TREE
PROP. TREE
EXISTING WHEELSTOP
x — EX. FENCELINE
EXISTING WOODFENCE
EXISTING CHAIN LINK FENCE
EXISTING UTILITY POLE
W — EXISTING WATERLINE MH
W — EXISTING WATERLINE W/ TEE
WV — EXISTING WATER VALVE
EXISTING FIRE HYDRANT
WM — EXISTING WATER METER
EXISTING WELL
EXISTING SIGN
EXISTING HC RAMP/SPACE
12 — EXISTING PARKING INDICATOR INDICATES THE NUMBER OF TYPICAL PARKING SPACES
EXISTING BOLLARD
EXISTING DOOR
EXISTING STREET LIGHT
EXISTING SIGHT LIGHT FIXTURE (SEE LIGHTING PLAN)
EXISTING LANDSCAPE LIGHT
AC — EXISTING A/C UNIT
BENCHMARK
LIMITS OF CLEARING & GRADING

ADDRESS

6136 FRANCONIA ROAD
ALEXANDRIA, VA 22310
TAX MAP #0813 04 0004A

OWNER

NOVA PETROLEUM REALTY, LLC
6820-B COMMERCIAL DRIVE,
SPRINGFIELD, VA 22151

APPLICANT

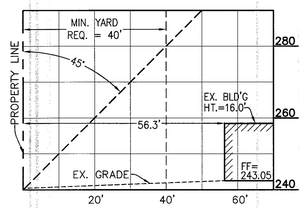
FRANCONIA SQUARE, LLC
6136 FRANCONIA ROAD,
ALEXANDRIA, VA 22310

SITE TABULATIONS (C-5 ZONE)

	EXISTING	REQUIRED	PROPOSED
MINIMUM LOT SIZE	32,088 SF	40,000 SF	32,088 SF**
MINIMUM LOT WIDTH	179 FT	200 FT	179 FT**
MAXIMUM BUILDING HEIGHT	16.0 FT	40 FT	16.0 FT
MINIMUM YARD REQUIREMENTS:			
FRONT	56.3 FT	40 FT *	56.3 FT
SIDE	46.4 FT	NONE	46.4 FT
REAR	57.6 FT	20 FT	57.6 FT
G.F.A.	2,366 SF		2,475 SF
MAXIMUM F.A.R.	0.07	0.30	0.08
MINIMUM OPEN SPACE	29.6% (9,485 SF)	20% (6,418 SF)	30.2% (9,700 SF)

* CONTROLLED BY A 45 DEGREE ANGLE OF BULK PLANE BUT NOT LESS THAN 40 FEET.

** THE SERVICE STATION WAS BUILT IN 1964 AND MET ALL ZONING BULK REGULATIONS AT THAT TIME, AND NO CHANGES HAVE BEEN MADE NOR HAVE BEEN PROPOSED. THEREFORE, PURSUANT TO THE PROVISION OF SECT. 2-405, COMPLIANCE WITH THE MINIMUM LOT SIZE AND THE MINIMUM LOT WIDTH REQUIREMENTS OF THE CURRENT ZONING ORDINANCE IS NOT REQUIRED.



EXISTING ANGLE OF BULK PLANE

SCALE: HOR. 1"=20'
VERT. 1"=20'

AMERICANS WITH DISABILITIES ACT NOTE

THIS PLAN, IN OUR OPINION, MEETS THE A.D.A. REGULATIONS REGARDING HANDICAP SPACES AND SIGNAGE, ACCESSIBLE ROUTE, AND CURB RAMPS, INCLUDING DETECTABLE WARNINGS.

PARKING TABULATIONS

EXISTING PARKING

STD PARKING SPACES	5	SPACES
HANDICAPPED PARKING SPACES (INCLUDING VAN ACCESSIBLE)	2	SPACES
TOTAL	7	SPACES
NUMBER OF FULL-TIME EMPLOYEES	6	EMPLOYEES

REQUIRED PARKING FOR ZONE C-5
(PER ZONING ORDINANCE SECTION 11-104-21)

MIN. (2) SPACES PER SERVICE BAY (5 BAYS)	10	SPACES
MIN. (1) SPACE PER EMPLOYEE (6 PEOPLE)	6	SPACES
TOTAL REQUIRED	16	SPACES
REQUIRED HANDICAPPED SPACES	2	SPACES

PROPOSED PARKING

STD PARKING SPACES	21	SPACES
HANDICAPPED PARKING SPACES (INCLUDING 2 VAN ACCESSIBLE)	2	SPACES
TOTAL PROPOSED	23	SPACES

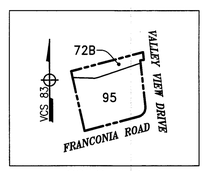
LOADING SPACE TABULATIONS

REQUIRED LOADING SPACES PER ZONING ORDINANCE SECTION 11-200 FOR VEHICLE LIGHT SERVICE ESTABLISHMENT.

STANDARD B: ONE (1) SPACE FOR THE FIRST 10,000 SQUARE FEET OF GROSS FLOOR AREA, PLUS ONE (1) SPACE FOR EACH ADDITIONAL 15,000 SQUARE FEET OR MAJOR FRACTION THEREOF.

REQUIRED
FIRST 10,000 SF OF G.F.A. = 1 SPACE
PROPOSED
PROP. G.F.A. = 2,475 SF

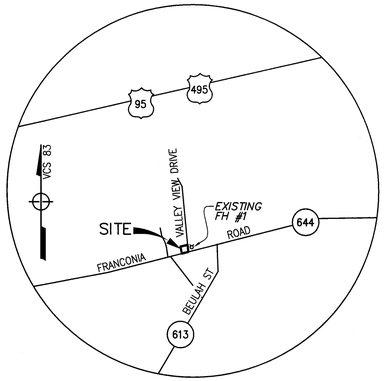
TOTAL REQUIRED 1 SPACE
TOTAL PROPOSED 1 SPACE



SOILS MAP
SCALE: 1" = 200'

SOIL ID NUMBERS	SOIL NAME	PROBLEM CLASS
72B	KINGSTOWNE SASSAFRRAS NEABSCO COMPLEX	IVB
95	URBAN LAND	NA

(NOTE: NO BUILDING FOUNDATION WORK IS PROPOSED)



VICINITY MAP
SCALE 1"=2000'

NOTES

1. THE PROPERTY DELINEATED ON THIS PLAN IS LOCATED ON FAIRFAX COUNTY TAX MAP NO. 81-3 ((4)) 0004A.
2. THE PROPERTY IS CURRENTLY IN THE NAME OF NOVA PETROLEUM REALTY, LLC, AS RECORDED IN DEED BOOK 20378 AT PAGE 174 AMONG LAND RECORDS OF FAIRFAX COUNTY.
3. TOPOGRAPHIC INFORMATION IS FROM A FIELD RUN SURVEY BY LAND DEVELOPMENT CONSULTANTS INC. AND IS ON ASSUMED DATUM. CONTOUR INTERVAL OF 1.0 FOOT.
4. BOUNDARY INFORMATION IS FROM PUBLIC RECORDS.
5. TOTAL SITE AREA IS 32,088 S.F.
6. THIS PLAT DOES NOT SHOW ALL COVENANTS, RESTRICTIONS, EASEMENTS OR DEDICATIONS OF RECORD WHICH MAY EXIST IN THE CHAIN OF TITLE. NO TITLE REPORT FURNISHED.
7. NO GRAVE OR BURIAL SITE IS KNOWN TO EXIST ON THIS PROPERTY.
8. THE SITE IS NOT LOCATED WITHIN THE RESOURCE MANAGEMENT AREA AS DELINEATED ON THE COUNTY'S CHESAPEAKE BAY PRESERVATION AREA MAP. NO RESOURCE PROTECTION AREAS (RPA) OR FLOOD PLAINS ARE LOCATED ON THE SITE.
9. THE SERVICE STATION BUILDING, WHICH WAS BUILT IN 1963, IS SERVED BY PUBLIC WATER AND PUBLIC SANITARY SEWER AND IS TO BE RETAINED. THERE ARE NO KNOWN PRIVATE WELLS OR SEPTIC FIELDS ON THIS SITE.
10. OPEN SPACE AND PROPOSED LANDSCAPING SHALL BE MAINTAINED BY OWNER.
11. THE LIMITS OF CLEARING & GRADING, UTILITIES, LANDSCAPING AND SITE LAYOUT SHOWN HEREON ARE APPROXIMATE AND SUBJECT TO NECESSARY ADJUSTMENTS WITH FINAL ENGINEERING AND DESIGN.
12. THE PROPOSED DEVELOPMENT WILL CONFORM TO THE PROVISIONS OF ALL APPLICABLE ORDINANCES, REGULATIONS AND ADOPTED STANDARDS OF FAIRFAX COUNTY.
13. ALL AREAS AND DIMENSIONS SHOWN HEREON ARE NECESSARILY APPROXIMATE AND THE APPLICANT RESERVES THE RIGHT TO INCREASE OR DECREASE AS NECESSARY TO FACILITATE FINAL DESIGN.
14. ALL LIGHTING SHALL BE BUILDING MOUNTED WITH FULL CUT AND DIRECTED DOWNWARD TO MINIMIZE GLARE AND MEET MINIMUM REQUIREMENTS.
15. ALL PROPOSED SIGNAGE SHALL COMPLY WITH SECTION 12 OF THE ZONING ORDINANCE.
16. THE APPLICANT IS HEREBY REQUESTING A WAIVER OF THE TRAIL REQUIREMENTS ALONG FRANCONIA ROAD IN FAVOR OF THE EXISTING FIVE (5) FEET WIDE CONCRETE SIDEWALK AS SHOWN ON THIS PLAT.
17. THE APPLICANT IS HEREBY REQUESTING A MODIFICATION OF THE TRANSITIONAL SCREENING REQUIREMENTS ALONG THE NORTHERN PROPERTY LINE IN FAVOR OF THAT AS SHOWN ON THIS PLAT.

Application No: SE 2013-LE-005 Staff: MAT

APPROVED DEVELOPMENT PLAN
(_GDP) (_CDP) (_FDP) (_PRC) (_DP) (_EP) (X SE) (_CSP) (_SP) (_VC)
SEE PROFFERS DATED:
SEE CONDITIONS DATED: Oct 24, 2013
Date of Final Approval: Dec 3, 2013 (X BOS) (_PC) (_BZA)
Comments:
PLANNING & ZONING
Sheet 1 of 8

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2. EXISTING CONDITIONS AND DEMOLITION PLAN
3. PROPOSED CONDITIONS PLAN
4. EXISTING VEGETATION MAP
5. LANDSCAPE PLAN, NOTES & DETAILS
6. ADEQUATE OUTFALL ANALYYSIS
6A. ADEQUATE OUTFALL ANALYYSIS
7. SWM/ BMP COMPUTATIONS

LAND DEVELOPMENT CONSULTANTS, INC.
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www.landdevelopmentconsultants.com

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COVER SHEET
SPECIAL EXCEPTION PLAT
FRANCONIA SHELL
PART OF LOT 4, FRANCONIA HILLS
6136 FRANCONIA ROAD
LEE DISTRICT, FAIRFAX COUNTY, VIRGINIA

COMMONWEALTH OF VIRGINIA
JOHN C. MANGANELLO
Lic. No. 20732
8-29-13
PROFESSIONAL ENGINEER

REV. NO.	DATE	REVISIONS PRIOR TO APPROVAL
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3.	07/08/13	APPLICATION COMMENTS
2.	03/22/13	ADDITIONAL APPLICATION COMMENTS
1.	02/14/13	APPLICATION ACCEPTANCE COMMENTS

LDCI PROJ. NO.: 11046.04
COUNTY PLAN NO.:
SCALE: AS SHOWN
DATE: 01/03/2008
SHEET: 1 OF 7

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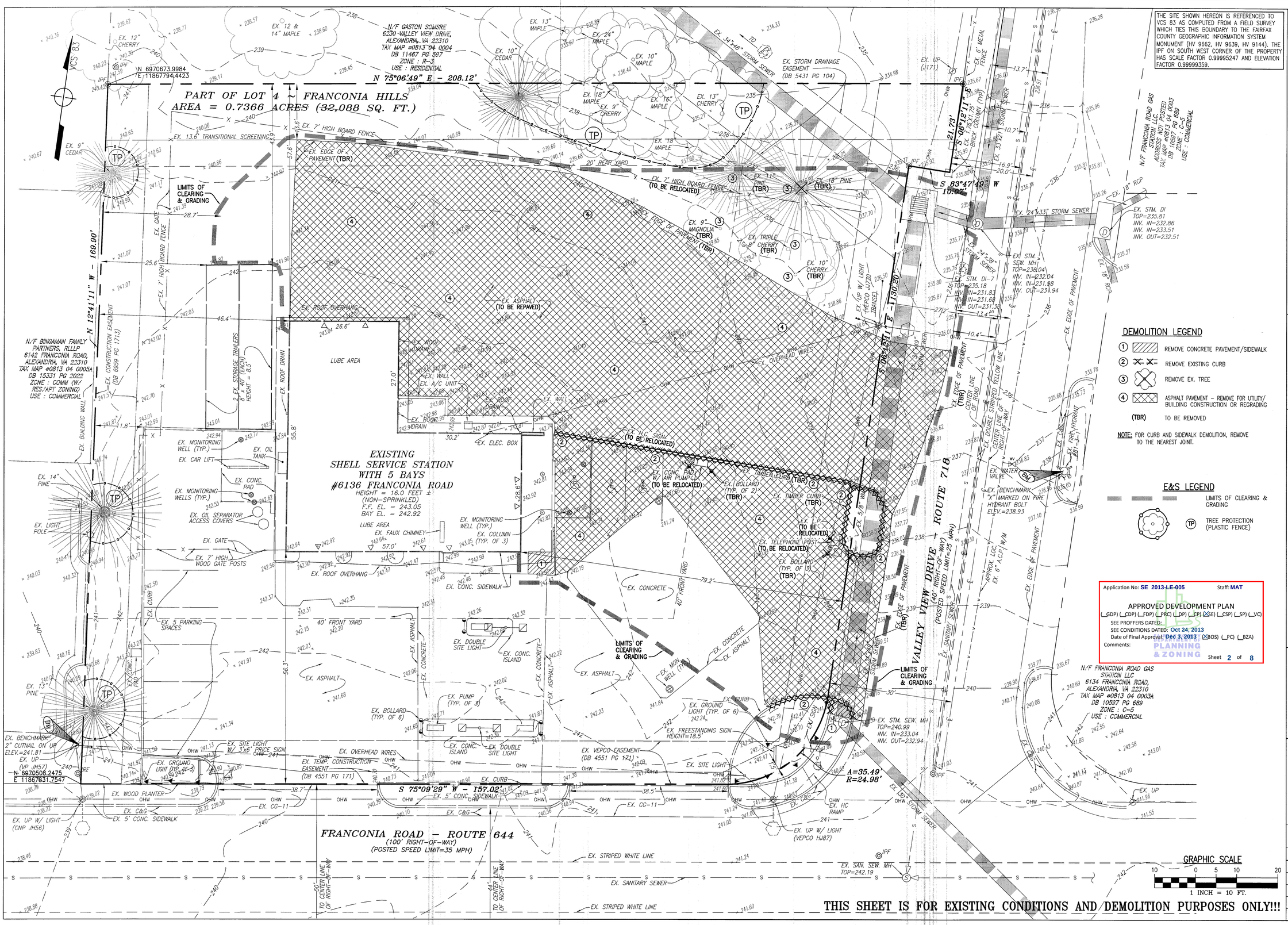

THIS SITE SHOWN HEREON IS REFERENCED TO VCS 83 AS COMPUTED FROM A FIELD SURVEY WHICH TIES THIS BOUNDARY TO THE FAIRFAX COUNTY GEOGRAPHIC INFORMATION SYSTEM MONUMENT (HV 9662, HV 9639, HV 9144). THE IPF ON SOUTH WEST CORNER OF THE PROPERTY HAS SCALE FACTOR 0.99995247 AND ELEVATION FACTOR 0.99999359.

DEMOLITION LEGEND

1. REMOVE CONCRETE PAVEMENT/SIDEWALK
2. REMOVE EXISTING CURB
3. REMOVE EX. TREE
4. ASPHALT PAVEMENT - REMOVE FOR UTILITY/ BUILDING CONSTRUCTION OR REGRADING

(TBR) TO BE REMOVED

NOTE: FOR CURB AND SIDEWALK DEMOLITION, REMOVE TO THE NEAREST JOINT.

E&S LEGEND

LIMITS OF CLEARING & GRADING

TP TREE PROTECTION (PLASTIC FENCE)

Application No: SE 2013-LE-005 Staff: MAT

APPROVED DEVELOPMENT PLAN

(_GDP) (_CDP) (_FDP) (_PRC) (_PD) (_CP) (XSE) (_CSP) (_SP) (_VC)

SEE PROFFERS DATED:

SEE CONDITIONS DATED: Oct 24, 2013

Date of Final Approval: Dec 3, 2013 (XBOS) (_PC) (_BZA)

Comments:

PLANNING & ZONING

Sheet 2 of 8

THIS SHEET IS FOR EXISTING CONDITIONS AND DEMOLITION PURPOSES ONLY!!!

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EXISTING CONDITIONS AND DEMOLITION PLAN
SPECIAL EXCEPTION PLAT
FRANCONIA SHELL

PART OF LOT 4, FRANCONIA HILLS
6136 FRANCONIA ROAD
LEE DISTRICT, FAIRFAX COUNTY, VIRGINIA

COMMONWEALTH OF VIRGINIA
JOHN C. MANGANELLO
No. 020732
8/29/13
PROFESSIONAL ENGINEER

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LDCI PROJ. NO.: 11046.04
COUNTY PLAN NO.:
SCALE: 1" = 10'
DATE: 01/03/2008
SHEET: 2 OF 7

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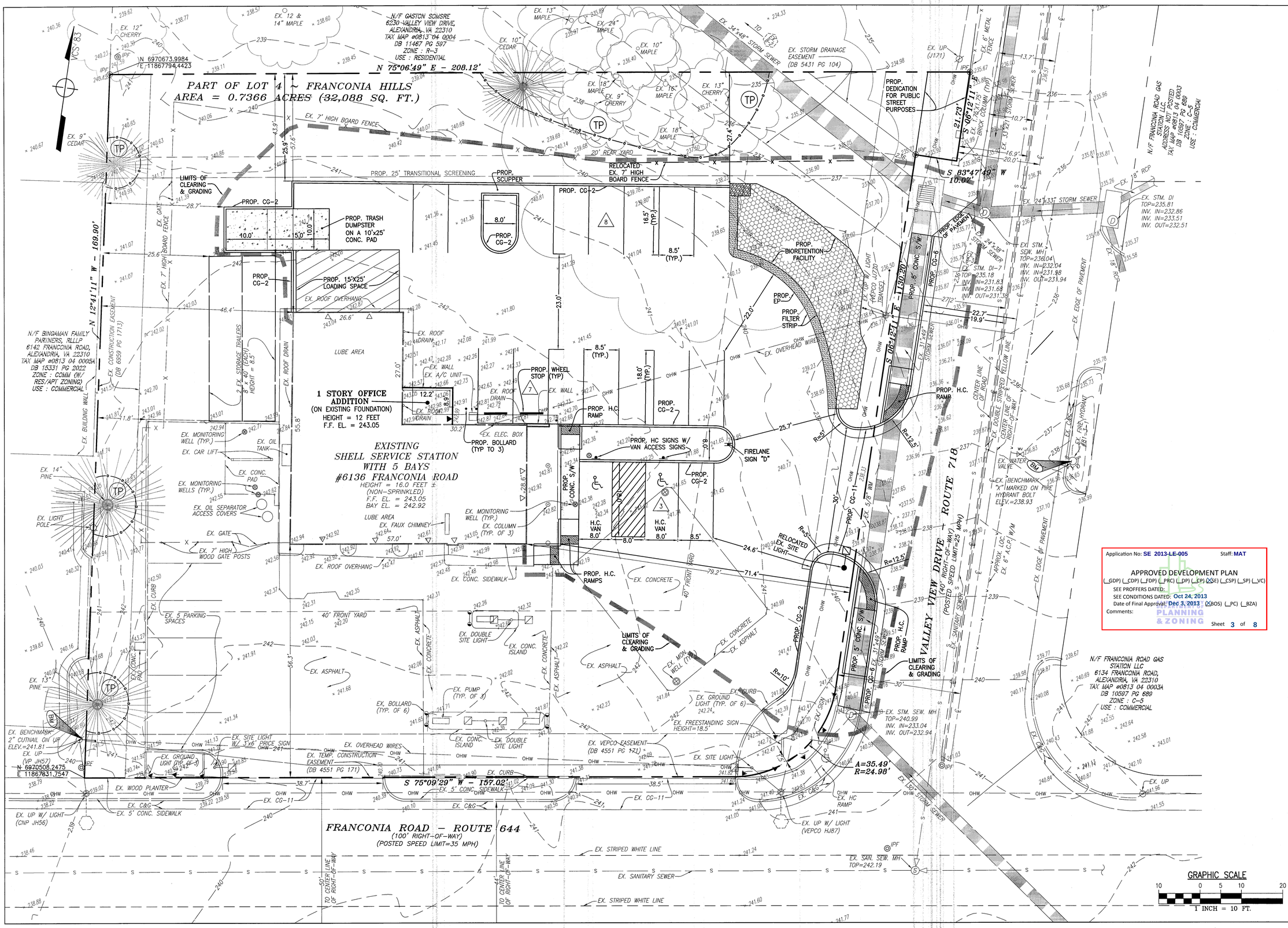

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PROPOSED CONDITIONS PLAN
SPECIAL EXCEPTION PLAT
FRANCONIA SHELL

PART OF LOT 4, FRANCONIA HILLS

6136 FRANCONIA ROAD

LEE DISTRICT, FAIRFAX COUNTY, VIRGINIA

COMMONWEALTH OF VIRGINIA
JOHN C. MANGARELLO
Lic. No. 20732
3-29-13
PROFESSIONAL ENGINEER

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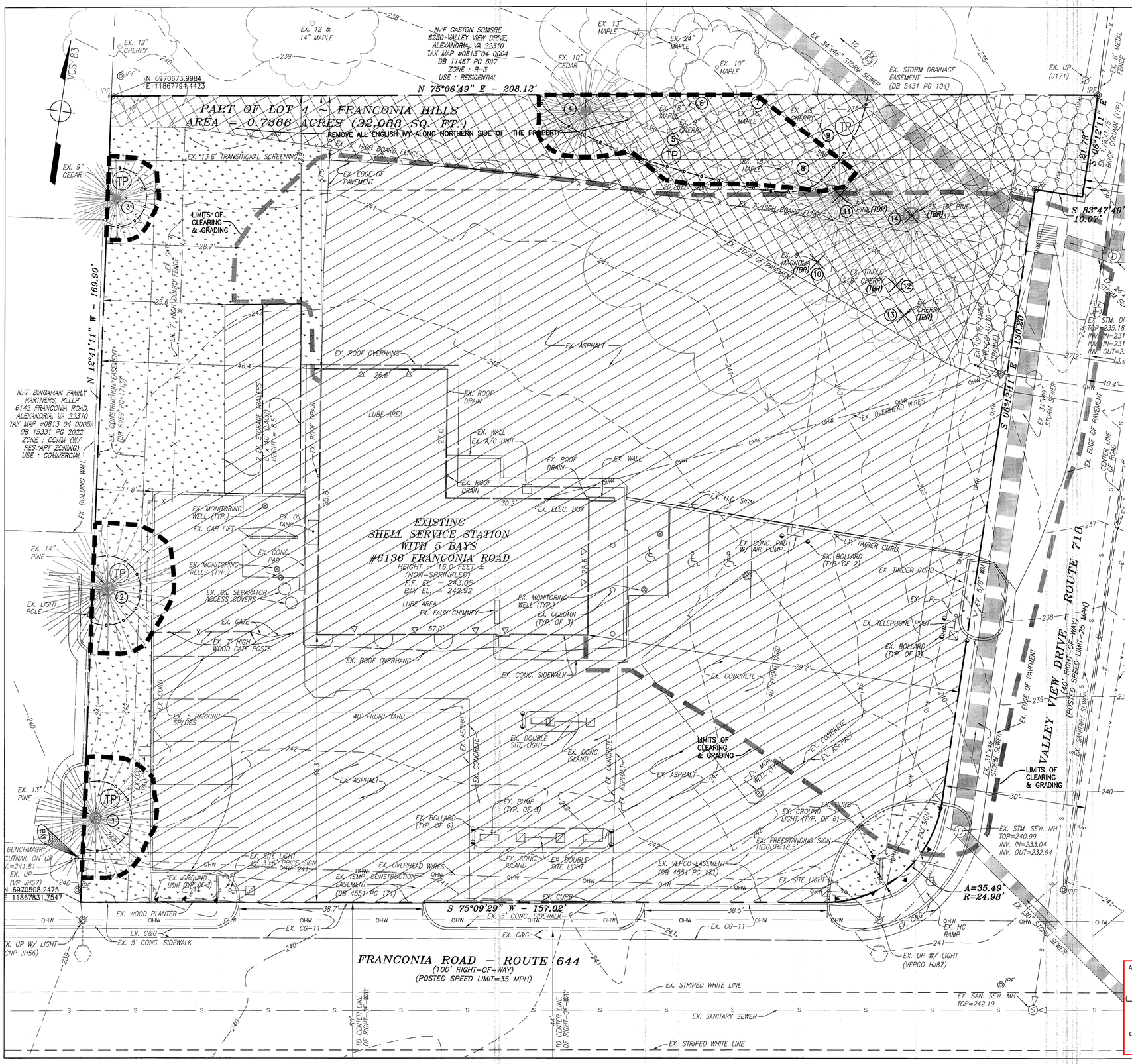

Tree Inventory Schedule

Tree #	Species	Size *DBH (in.)	*CRZ R (ft)	Condition	Crown Density %	Crown Spread	Problems	Status
1	PINE	13"	13	GOOD	100	26'	NONE	PRESERVE
2	PINE	14"	14	GOOD	100	28'	NONE	PRESERVE
3	CEDAR	9"	9	GOOD	100	18'	NONE	PRESERVE
4	CEDAR	10"	10	GOOD	100	20'	NONE	PRESERVE
5	CHERRY	9"	9	GOOD	100	18'	NONE	PRESERVE
6	MAPLE	18"	18	GOOD	100	36'	NONE	PRESERVE
7	MAPLE	16"	16	GOOD	100	32'	NONE	PRESERVE
8	MAPLE	18"	18	GOOD	100	96'	NONE	PRESERVE
9	CHERRY	13"	13	GOOD	100	26'	NONE	PRESERVE
10	MAGNOLIA	9"	9	GOOD	100	18'	NONE	REMOVE
11	PINE	11"	11	GOOD	100	22'	NONE	REMOVE
12	TRIPLE CHERRY	8"	8	GOOD	100	16'	NONE	REMOVE
13	CHERRY	10"	10	GOOD	100	20'	NONE	REMOVE
14	PINE	18"	18	GOOD	100	36'	NONE	REMOVE

DBH = Diameter at Breast Height (measured 4.5 feet above ground)

CRZ = Critical Root Zone (measured as a radius in feet per Fairfax County standards)

Condition ratings are provided as percentages based on methods outlined in the latest edition of the Guide for Plant Appraisal.

EXISTING VEGETATION COVER TYPES

- OPEN FIELD 686 SF
- UPLAND FOREST 4,430 SF
- DEVELOPED LAND 22,645 SF
- MAINTAINED GRASSLANDS 4,327 SF

TO INSURE THE HEALTH AND SURVIVAL OF BOTH EXISTING AND PROPOSED PLANTING IN THE TRANSITIONAL SCREENING YARD ALONG THE NORTHERN PROPERTY BOUNDARY, ANY DEBRIS AND DUMPED TRASH SHALL BE REMOVED BY HAND WITHOUT THE USE OF HEAVY EQUIPMENT, PRIOR TO THE PROPOSED ADDITIONAL PLANTINGS. FURTHERMORE, ALL ENGLISH IVY SHALL BE REMOVED FROM THIS AREA PRIOR TO PLANTING.

LEGEND

- LOD — LIMITS OF DISTURBANCE
- SF — SILT FENCE
- TP — TREE PROTECTION FENCE
- PROPERTY LINE
- 382 — EXISTING CONTOUR
- TREE CANOPY
- EXISTING TREE CANOPY AREA MEETING TREE PRESERVATION REQUIREMENTS
- (TBR) — TO BE REMOVED
- REMOVE EXISTING TREE
- 7 — TREE INVENTORY NUMBER

GRAPHIC SCALE

10 0 5 10 20

1 INCH = 10 FT.

Application No: SE 2013-LE-005 Staff: MAT

APPROVED DEVELOPMENT PLAN

(_GDP) (_CDP) (_FDP) (_PRC) (_PD) (_CP) (XSE) (_CSP) (_SP) (_VC)

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EXISTING VEGETATION MAP
SPECIAL EXCEPTION PLAT
FRANCONIA SHELL

PART OF LOT 4, FRANCONIA HILLS
6136 FRANCONIA ROAD
LEE DISTRICT, FAIRFAX COUNTY, VIRGINIA

COMMONWEALTH OF VIRGINIA — JOHN C. LAMANCELLO — No. 020732 — PROFESSIONAL ENGINEER

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SHEET: 4 OF 7

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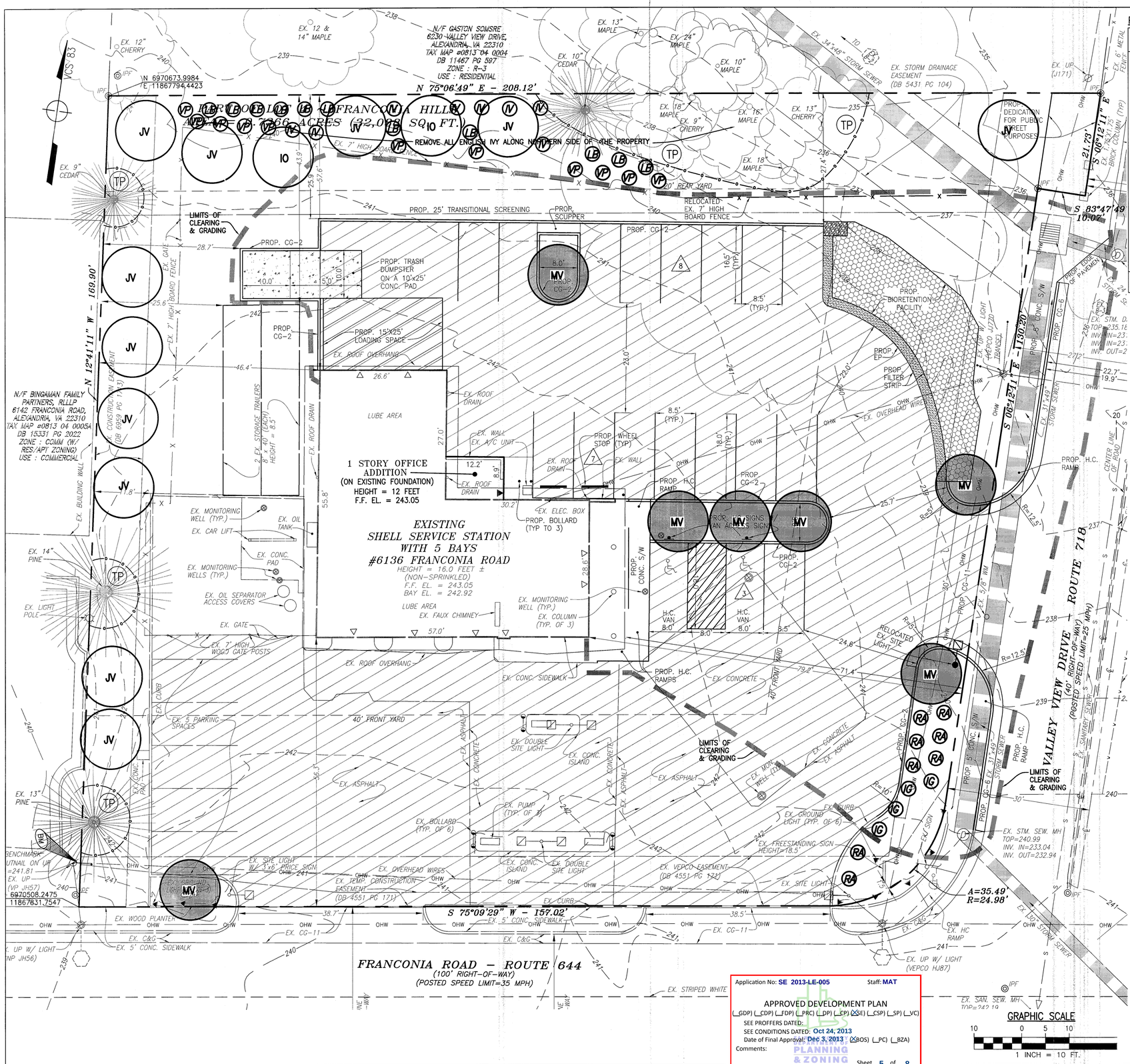


Application No: SE 2013-LE-005 Staff: MAT

APPROVED DEVELOPMENT PLAN
(_GDP) (_CDP) (_FDP) (_PRC) (_DP) (_CP) (XSE) (_CSP) (_SP) (_VC)
SEE PROFFERS DATED:
SEE CONDITIONS DATED: Oct 24, 2013
Date of Final Approval: Dec 3, 2013 (XBOS) (_PC) (_BZA)
Comments:
DEPARTMENT OF PLANNING & ZONING
Sheet 5 of 8

PLANTING SCHEDULE

COUNT	SYMBOL	BOTANICAL NAME	COMMON NAME	STOCK SIZE (HT/CAL.)	STOCK TYPE	10 YR. COVER SQ. FT	TREE COVER SUB TOTAL FT
7	MV	MAGNOLIA VIRGINIANA	SWEETBAY MAGNOLIA	3" CAL.	B & B	125	875
2	IO	ILEX OPACA	AMERICAN HOLLY	6' HT	B & B	125	250
11	JV	JUNIPERUS VIRGINIANA	EASTERN RED CEDAR	6' HT	B & B	125	1,375
4	IG	ILEX GLABRA	INKBERRY	3 GAL.	CONT	N/A	N/A
8	IV	ITEA VIRGINICA	VIRGINIA WILLOW	3 GAL.	CONT	N/A	N/A
11	LB	LINDERA BENZOIN	SPICEBUSH	3 GAL	CONT	N/A	N/A
11	VP	VIBURNUM PRUNIFOLUM	BLACHAW VIBURNUM	3 GAL	CONT	N/A	N/A
8	RA	RHODODENDRON ATLANTICUM	DWARF AZALEA	3 GAL	CONT	N/A	N/A

TOTAL TREE COVER PROVIDE BY PLANTING = 2,500 SF

TREE COVER CALCULATIONS

COVER REQUIRED FOR C-5	= 10%
GROSS SITE AREA	= 32,088 SF (0.7366 Ac.)
TOTAL 10-YR TREE COVER REQUIRED = 10% X 32,088	= 3,209 SF
EXISTING TREES RETAINED	= 3,512 SF
EXISTING 10-YR TREE COVER = 3,512 SF x 1.25	= 4,390 SF
PROPOSED TREES TO BE PLANTED	= 2,500 SF
PROPOSED 10-YR TREE COVER (NATIVE TREES) = 2,500 x 1.5*	= 3,750 SF
TOTAL 10-YR TREE COVER PROVIDED	= 8,140 SF (25.4%)

* A LETTER SHALL BE FURNISHED CERTIFYING THAT ALL PLANT MATERIAL USED TO GAIN ADDITIONAL CREDIT HAS BEEN PROPAGATED FROM SEED OR GERMOPLASM COLLECTED WITHIN THE MID-ATLANTIC REGION.

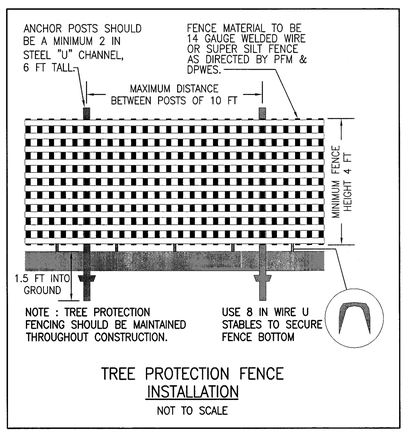
INTERIOR PARKING LOT LANDSCAPING

PARKING LOT AREA	= 16,081 SF
LANDSCAPING REQUIRED	= 804 SF (5%)
LANDSCAPING PROVIDED 7 TREES x 125 SF	= 875 SF (5.4%)

TREE COVER WITHIN PROPOSED TRANSITIONAL SCREENING

PROPOSED TRANSITIONAL SCREENING AREA	4,913 SF
EXISTING TREES COVER	2,668 SF
EXISTING 10-YR TREE COVER = 2,668 SF x 1.25	3,335 SF
PROPOSED TREES TO BE PLANTED	875 SF
PROPOSED 10-YR TREE COVER (NATIVE TREES) = 875 x 1.5	1,313 SF
TOTAL 10-YR TREE COVER PROVIDED	4,648 SF
TRANSITIONAL SCREENING CANOPY COVERAGE REQUIRED (PER PFM 13-303.3C(1))	75 %
TRANSITIONAL SCREENING CANOPY COVERAGE PROVIDED	94.6 %

THE APPLICANT IS HEREBY REQUESTING A MODIFICATION OF THE TRANSITIONAL SCREENING REQUIREMENTS ALONG THE NORTHERN PROPERTY LINE IN FAVOR OF THAT AS SHOWN ON THIS PLAT.



TREE PROTECTION FENCE INSTALLATION
NOT TO SCALE

LAND DEVELOPMENT CONSULTANTS, INC.
CIVIL ENGINEERING · LAND PLANNING · SURVEYING
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LANDSCAPE PLAN, NOTES & DETAILS
SPECIAL EXCEPTION PLAT
FRANCONIA SHELL

PART OF LOT 4, FRANCONIA HILLS
6136 FRANCONIA ROAD
LEE DISTRICT, FAIRFAX COUNTY, VIRGINIA

COMMONWEALTH OF VIRGINIA
JOHN C. MARGANELLO
No. 020732
8/29/13
PROFESSIONAL ENGINEER

REV. NO.	DATE	REVISIONS PRIOR TO APPROVAL
4.	08/29/13	URBAN FORESTRY COMMENTS
3.	07/08/13	APPLICATION COMMENTS
2.	03/22/13	ADDITIONAL APPLICATION COMMENTS
1.	02/14/13	APPLICATION ACCEPTANCE COMMENTS

LDCI PROJ. NO.: 11046.04
COUNTY PLAN NO.:
SCALE: 1" = 10'
DATE: 01/03/2008
SHEET: 5 OF 7

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ADEQUATE OUTFALL NARRATIVE

THE SUBJECT PROPERTY SITS AT A HIGH POINT ROAD INTERSECTION OF VALLEY VIEW DRIVE (RTE 718) AND FRANCONIA ROAD (RTE 644). THE SITE NATURAL DIVIDES VIRTUALLY SPLITS THE PROPERTY LINE DIAGONALLY IN HALF – THE NORTHEAST DIAGONAL AREA TO AN EXISTING STORM PIPE AND THE SOUTHWEST DIAGONAL AREA ALONG FRANCONIA ROAD THAT WILL BE PICKED UP BY AN EXISTING STORM PIPE SYSTEM AT APPROX. 500 FT FURTHER DOWNSTREAM.

THE PROPOSED REDEVELOPMENT OF THE GAS STATION WILL RESULT IN NET DECREASE OF SURFACE RUNOFF LEAVING THE SITE.

HOWEVER, TO DEMONSTRATE THE SITE REQUIREMENTS ON OUTFALL ADEQUACY AS PER PFM § 6–0203, WE HAVE EVALUATED THE RECEIVING PIPES AND CHANNEL FOR ANY EROSIVE VELOCITIES AT LOW FLOW EVENT (2–YRS) AND DEPTH AT 10YRS.

BASED ON THE EXISTING TOPOGRAPHY AND DELINEATED DRAINAGE AREAS, THE SITE WILL BE EVALUATED IN ACCORDANCE WITH PFM §6–0203.2A WHICH STATES:

"To a point that is at least 150 feet downstream of a point where the receiving pipe or channel is joined by another that has a drainage area that is at least 90 percent of the size of the first drainage area at the point of confluence"

THEY KEY DRAINAGE AREAS (IN ACRES) ARE AS FOLLOWS: (SEE THIS SHEET)

A1 (NORTHEAST SIDE INCL OFFSITE – FIRST D.A.#1) = 11.10
A1 CONFLUENCING = 70.65

A2 (SOUTHWEST SIDE INCL OFFSITE – FIRST D.A.#2) = 0.41
A2 CONFLUENCING = 70.65 – 0.41 – 11.10 = 81.34

AT CONFLUENCING POINT 'O', BOTH CONFLUENCING AREAS ARE MORE THAN 90% OF THE SIZE OF THEIR FIRST DRAINAGE AREAS, RESPECTIVELY.

TO CHECK ADEQUACY OF THE RECEIVING CHANNEL BEYOND CONFLUENCING POINT "O", THREE CROSS–SECTIONS (NAMELY: A–A, B–B, C–C) AT 150 FEET APART ARE BEING EVALUATED FOR ANY EROSIVENESS AND OVERFLOWS. FOR FLOW CALCULATIONS, TR–20, AN ALLOWED HYDROLOGY TOOL PER PFM §6–0802, IS UTILIZED. THE ANALYSES ASSUME A CN–VALUE OF 88, CONSIDERING UNDERLYING SOILS TYPE, CURRENT LAND USE OF COMMERCIAL, LOW & HIGH–DENSITY RESIDENTIAL. IN ADDITION, TIME OF CONCENTRATION IS CALCULATED WITH THE SEGMENT "SHALLOW CONCENTRATED FLOW" AS PIPED SYSTEM WITH AVERAGE SIZE OF 36". (SEE THIS SHEET FOR TC COMPS). SUMMARIZED BELOW ARE THE FLOWS, VELOCITIES AND DEPTHS AT THESE CROSS–SECTIONS.

SUMMARY OF CROSS SECTIONAL ANALYSES

	XSEC A–A	XSEC B–B	XSEC C–C
Q2YRS (cfs)	157	163	176
Q10YRS (cfs)	299	311	338
V2YRS (fps)	6.25	5.24	3.58
DEPTH10YRS (ft)	3.87	3.98	3.17
WSE10YRS (ft)	206.15	202.48	198.54'

RESULTS INDICATE ALL CROSS–SECTIONS HAVE RELATIVELY LOW VELOCITIES. THE CORRESPONDING DEPTHS AT 10–YEARS LESS THAN 4 FEET AND ARE WELL WITHIN THE DEFINED BED AND BANKS OF THE RECEIVING CHANNEL. MOST IMPORTANT, THE SITE REDEVELOPMENT ITSELF WILL HAVE A NET DECREASE IN OFFSITE RUNOFF. THEREFORE, IT IS THE OPINION OF THE SUBMITTING ENGINEER THAT ADEQUATE OUTFALL IS ACHIEVED FOR THE SITE.

Worksheet 3: Time of concentration (Tc) or travel time (Tt)

Project: *FRANCONIA SHELL* By: *OBY* Date: *09-Aug-13*
Location: *Lee District, Xsec A-A* Checked: *OBY* Date:
Condition: *Existing / Predeveloped* *REVISED:*

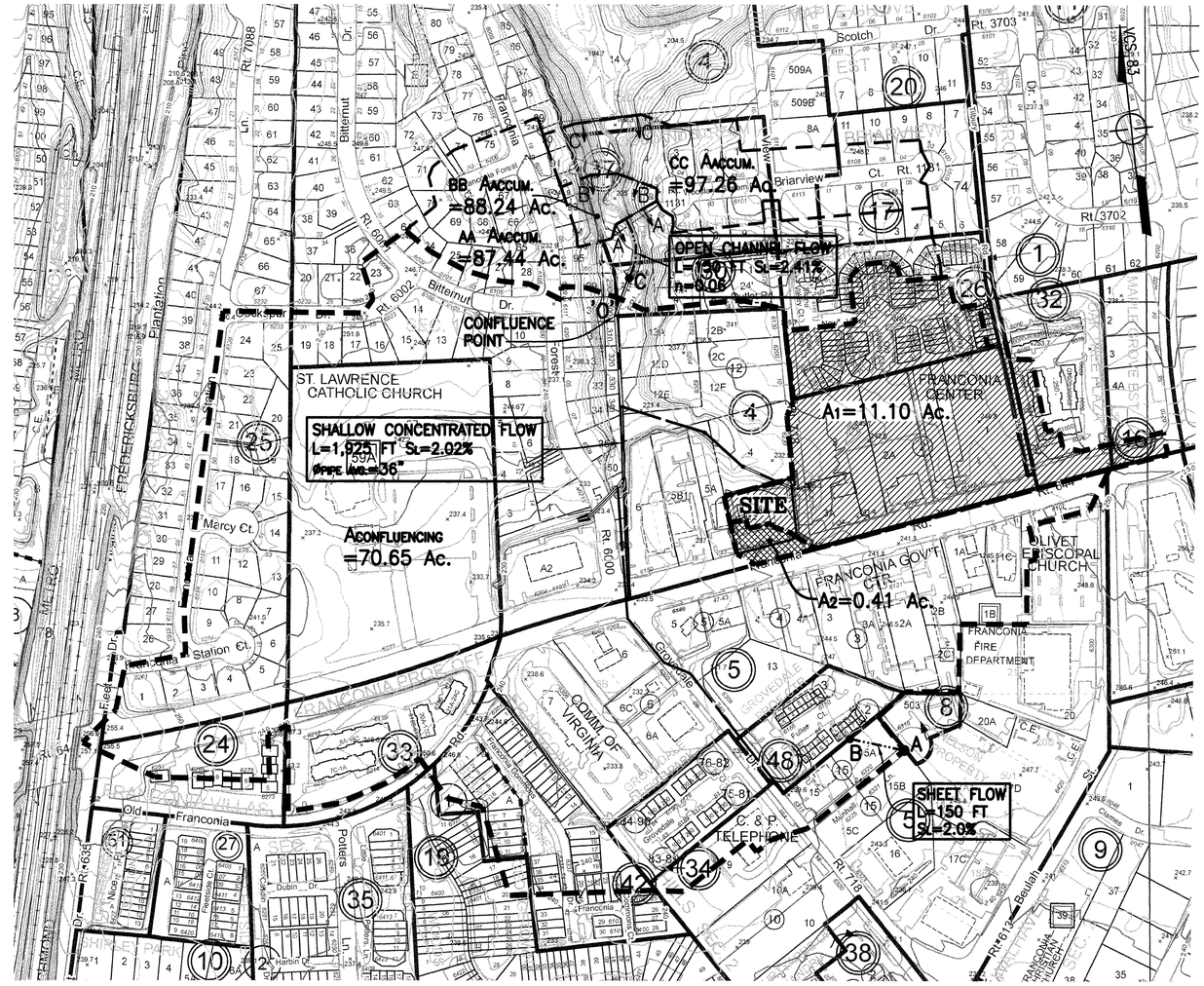
Sheet Flow (Applicable to Tc only)	Segment ID	*A-B*			
1. Surface description (table 3-1)		*SH. GRASS*			
2. Manning's roughness coefficient, n (table 3-1)		*0.15*			
3. Flow length, L (total L <= 300 feet)	feet	*150*			
4. Two-year, 24-hour rainfall, P2	inches	*3.2*			
5. Land slope, s	feet/foot	*0.02*			
6. Travel time, Tt = 0.007 $(nL)^{0.8}$ / $(P_2^{0.5}\ s^{0.4})$	hours	*0.23*			*0.23*

Shallow concentrated flow	Segment ID	*B-C*			
7. Surface description (paved or unpaved)		*Piped Ave size: 36"*			
8. Flow length, L	feet	*1925*			
9a. Watercourse slope (paved), s_P	feet/foot	*0.02*			
9b. Watercourse slope (unpaved), s_U	feet/foot				
10. Average velocity, V (figure 3-1)	feet/sec	*2.87*			
11. Travel time, Tt = L / (3600 * V) =	hours	*0.19*			*0.19*

Channel flow	Segment ID	*C to Xsec A-A*			
12. Cross-sectional flow area, a	sq. feet	*20*			
13. Wetted perimeter, pw	feet	*15*			
14. Hydraulic radius, r = a / pw	feet	*1.333333333*			
15. Channel slope, s	feet/foot	*0.0241*			
16. Manning's roughness coefficient, n		*0.06*			
17. Velocity, V = 1.49 * r^(2/3) * s^(1/2) / n	feet/sec	*4.67*			
18. Flow length, L	feet	*150*			
19. Travel time, Tt = L / (3600 * V) =	hours	*0.01*			*0.01*
20. Watershed or subarea Tc or Tt (add Tt in steps 6, 11 an 19)	hours				*0.42*

Channel flow	Segment ID	*C to Xsec B-B*			
12. Cross-sectional flow area, a	sq. feet	*20*			
13. Wetted perimeter, pw	feet	*15*			
14. Hydraulic radius, r = a / pw	feet	*1.333333333*			
15. Channel slope, s	feet/foot	*0.0241*			
16. Manning's roughness coefficient, n		*0.06*			
17. Velocity, V = 1.49 * r^(2/3) * s^(1/2) / n	feet/sec	*4.67*			
18. Flow length, L	feet	*300*			
19. Travel time, Tt = L / (3600 * V) =	hours	*0.02*			*0.02*
20. Watershed or subarea Tc or Tt (add Tt in steps 6, 11 an 19)	hours				*0.43*

Channel flow	Segment ID	*C to Xsec C-C*			
12. Cross-sectional flow area, a	sq. feet	*20*			
13. Wetted perimeter, pw	feet	*15*			
14. Hydraulic radius, r = a / pw	feet	*1.333333333*			
15. Channel slope, s	feet/foot	*0.0241*			
16. Manning's roughness coefficient, n		*0.06*			
17. Velocity, V = 1.49 * r^(2/3) * s^(1/2) / n	feet/sec	*4.67*			
18. Flow length, L	feet	*450*			
19. Travel time, Tt = L / (3600 * V) =	hours	*0.03*			*0.03*
20. Watershed or subarea Tc or Tt (add Tt in steps 6, 11 an 19)	hours				*0.44*



LEGEND

CONTRIBUTING DEVELOPMENT A1=11.10 ACRES

CONTRIBUTING DEVELOPMENT A2=0.41 ACRES

DRAINAGE MAP
SCALE: 1" = 200'

GRAPHIC SCALE
200 0 100 200 400
1 INCH = 200 FT.

Application No: SE 2013-LE-005 Staff: MAT

APPROVED DEVELOPMENT PLAN
(_GDP) (_CDP) (_FDP) (_PRC) (_DP) (_CP) (XSE) (_CSP) (_SP) (_VC)
SEE PROFFERS DATED:
SEE CONDITIONS DATED: Oct 24, 2013
Date of Final Approval: Dec 3, 2013 (XBOS) (_PC) (_BZA)
Comments:
PLANNING & ZONING
Sheet 6 of 8

LAND DEVELOPMENT CONSULTANTS, INC.
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ADEQUATE OUTFALL ANALYSIS
SPECIAL EXCEPTION PLAT
FRANCONIA SHELL

PART OF LOT 4, FRANCONIA HILLS
6136 FRANCONIA ROAD
LEE DISTRICT, FAIRFAX COUNTY, VIRGINIA

COMMONWEALTH OF VIRGINIA
JOHN C. MANGANELLO
No. 020732
8-29-13
PROFESSIONAL ENGINEER

REV. NO.	DATE	REVISIONS PRIOR TO APPROVAL
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LDCI PROJ. NO.: 11046.04
COUNTY PLAN NO.:
SCALE: AS SHOWN
DATE: 01/03/2008
SHEET: 6 OF 7

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Worksheet
Worksheet for Irregular Channel

Project Description	
Project File	c:\docume~1\vale\desktop\11046.fm2
Worksheet	Franconia Shell XSec A-A 2yrs
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data

Channel Slope 0.024100 ft/ft

Elevation range: 202.28 ft to 226.00 ft.

Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	226.00	0.00	61.00	0.030
52.00	210.00	61.00	70.00	0.060
55.00	208.00	70.00	153.00	0.030
57.00	206.00			
61.00	204.00			
63.00	202.28			
65.00	202.28			
70.00	204.00			
75.00	206.00			
107.00	208.00			
128.00	210.00			
153.00	220.00			

Discharge 157.00 cfs → Q2YRS

Results		
Wtd. Mannings Coefficient	0.049	
Water Surface Elevation	205.31	ft
Flow Area	25.13	ft²
Wetted Perimeter	16.39	ft
Top Width	14.90	ft
Height	3.03	ft
Critical Depth	205.10	ft
Critical Slope	0.035786	ft/ft
Velocity	6.25	ft/s → V2YRS
Velocity Head	0.61	ft
Specific Energy	205.92	ft
Froude Number	0.85	
Flow is subcritical.		

Worksheet for Irregular Channel

Project Description	
Project File	c:\docume~1\vale\desktop\11046.fm2
Worksheet	Franconia Shell XSec A-A 10yrs
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data

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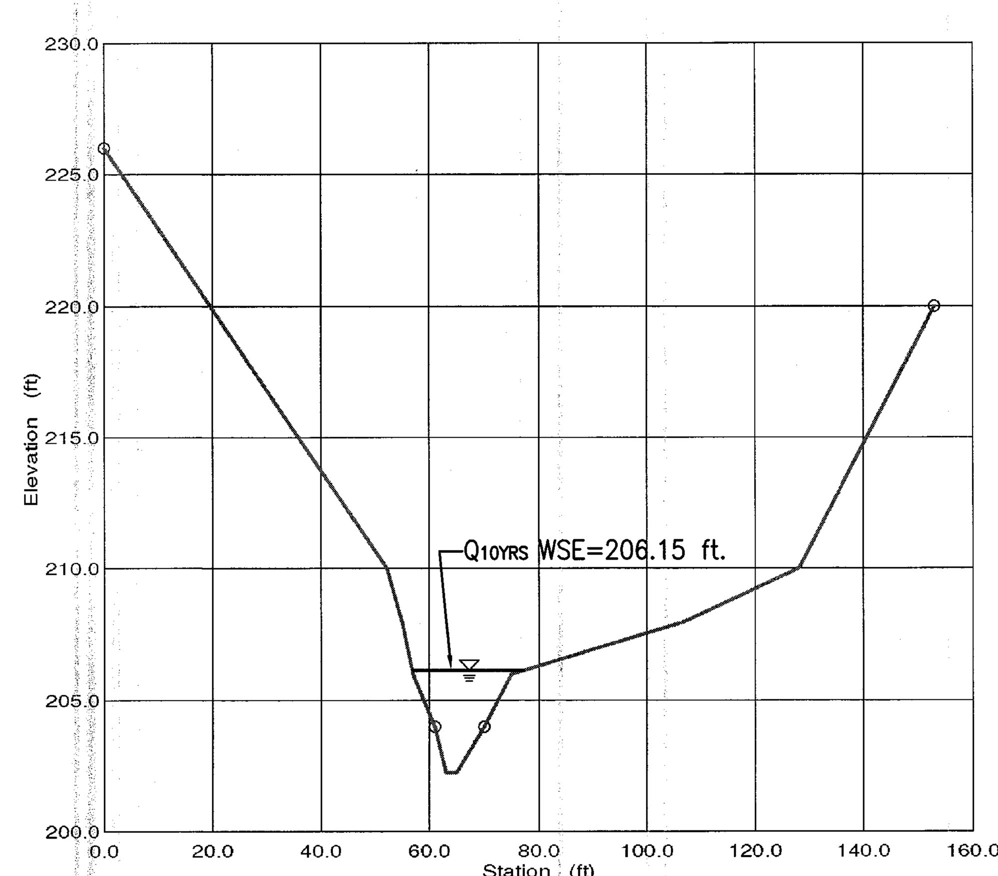
Elevation range: 202.28 ft to 226.00 ft.

Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	226.00	0.00	61.00	0.030
52.00	210.00	61.00	70.00	0.060
55.00	208.00	70.00	153.00	0.030
57.00	206.00			
61.00	204.00			
63.00	202.28			
65.00	202.28			
70.00	204.00			
75.00	206.00			
107.00	208.00			
128.00	210.00			
153.00	220.00			

Discharge 299.00 cfs

Results		
Wtd. Mannings Coefficient	0.044	
Water Surface Elevation	206.15	ft → 10YRS WSE
Flow Area	39.41	ft²
Wetted Perimeter	22.45	ft
Top Width	20.60	ft
Height	3.87	ft → d10YRS
Critical Depth	206.05	ft
Critical Slope	0.027191	ft/ft
Velocity	7.59	ft/s
Velocity Head	0.89	ft
Specific Energy	207.05	ft
Froude Number	0.97	
Flow is subcritical.		

Section Data		
Wtd. Mannings Coefficient	0.044	
Channel Slope	0.024100	ft/ft
Water Surface Elevation	206.15	ft
Discharge	299.00	cfs → Q10YRS



XSec B-B 2years V2=5.24 fps
Worksheet for Irregular Channel

Project Description	
Project File	c:\docume~1\vale\desktop\11046.fm2
Worksheet	XSec B-B 2yrs
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data

Channel Slope 0.014500 ft/ft

Elevation range: 198.50 ft to 220.00 ft.

Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	220.00	0.00	69.00	0.030
32.00	210.00	69.00	84.00	0.050
53.00	204.00	84.00	153.00	0.030
69.00	202.00			
76.00	200.00			
78.00	198.50			
81.00	198.50			
84.00	200.00			
115.00	210.00			
153.00	220.00			

Discharge 163.00 cfs → Q2YRS

Results		
Wtd. Mannings Coefficient	0.045	
Water Surface Elevation	201.68	ft
Flow Area	31.09	ft²
Wetted Perimeter	20.47	ft
Top Width	19.12	ft
Height	3.18	ft
Critical Depth	201.28	ft
Critical Slope	0.029495	ft/ft
Velocity	5.24	ft/s → V2YRS
Velocity Head	0.43	ft
Specific Energy	202.11	ft
Froude Number	0.72	
Flow is subcritical.		

Worksheet for Irregular Channel

Project Description	
Project File	c:\docume~1\vale\desktop\11046.fm2
Worksheet	XSec B-B 10yrs
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data

Channel Slope 0.014500 ft/ft

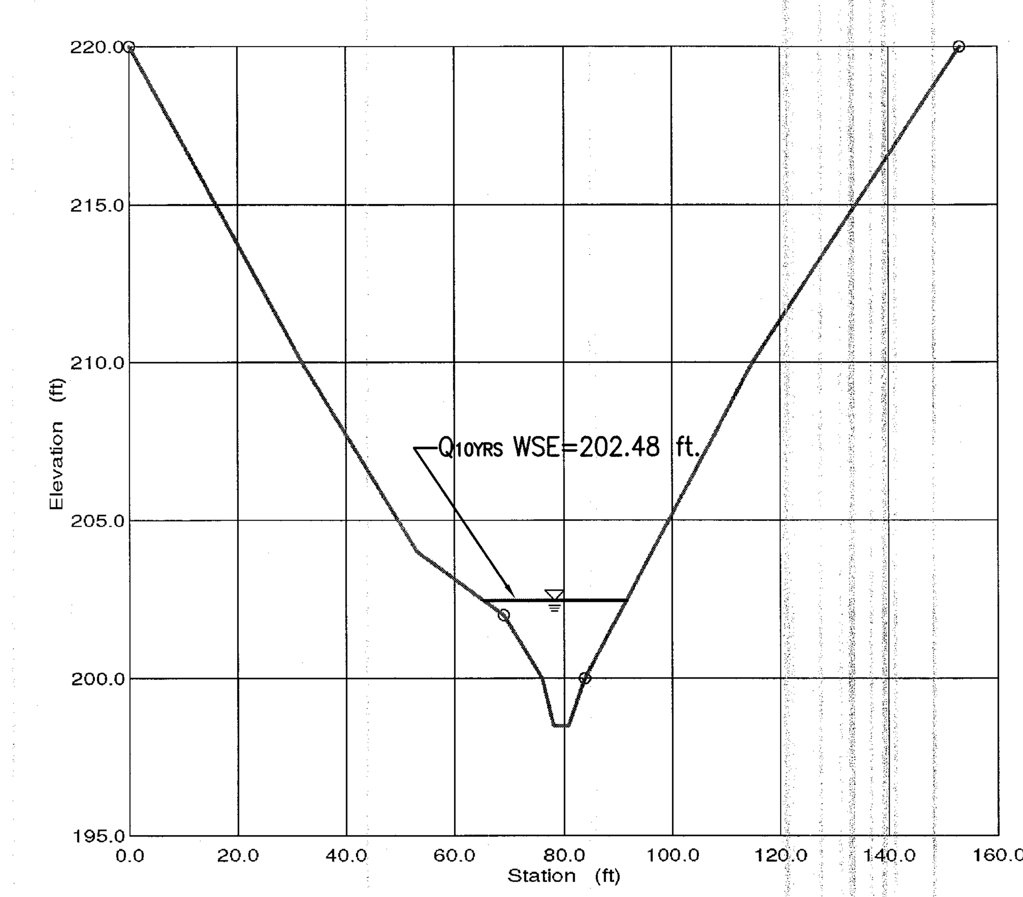
Elevation range: 198.50 ft to 220.00 ft.

Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	220.00	0.00	69.00	0.030
32.00	210.00	69.00	84.00	0.050
53.00	204.00	84.00	153.00	0.030
69.00	202.00			
76.00	200.00			
78.00	198.50			
81.00	198.50			
84.00	200.00			
115.00	210.00			
153.00	220.00			

Discharge 311.00 cfs

Results		
Wtd. Mannings Coefficient	0.041	
Water Surface Elevation	202.48	ft → 10YRS WSE
Flow Area	48.89	ft²
Wetted Perimeter	28.08	ft
Top Width	26.52	ft
Height	3.98	ft → d10YRS
Critical Depth	202.16	ft
Critical Slope	0.024112	ft/ft
Velocity	6.36	ft/s
Velocity Head	0.63	ft
Specific Energy	203.11	ft
Froude Number	0.83	
Flow is subcritical.		

Section Data		
Wtd. Mannings Coefficient	0.041	
Channel Slope	0.014500	ft/ft
Water Surface Elevation	202.48	ft
Discharge	311.00	cfs → Q10YRS



XSec C-C 2years V2yr=3.58 fps
Worksheet for Irregular Channel

Project Description	
Project File	c:\docume~1\vale\desktop\11046.fm2
Worksheet	XSec C-C 2yrs
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data

Channel Slope 0.012000 ft/ft

Elevation range: 195.37 ft to 220.00 ft.

Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	220.00	0.00	64.00	0.030
29.00	210.00	64.00	149.00	0.050
64.00	200.00	149.00	228.00	0.030
79.00	196.00			
81.00	195.37			
83.00	195.37			
86.00	196.00			
116.00	198.00			
149.00	200.00			
163.00	204.00			
178.00	206.00			
190.00	210.00			
209.00	214.00			
228.00	220.00			

Discharge 176.00 cfs → Q2YRS

Results		
Wtd. Mannings Coefficient	0.050	
Water Surface Elevation	197.88	ft
Flow Area	49.22	ft²
Wetted Perimeter	42.76	ft
Top Width	42.29	ft
Height	2.51	ft
Critical Depth	197.43	ft
Critical Slope	0.037700	ft/ft
Velocity	3.58	ft/s → V2YRS
Velocity Head	0.20	ft
Specific Energy	198.08	ft
Froude Number	0.58	
Flow is subcritical.		

Worksheet for Irregular Channel

Project Description	
Project File	c:\docume~1\vale\desktop\11046.fm2
Worksheet	XSec C-C 10yrs
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Input Data

Channel Slope 0.012000 ft/ft

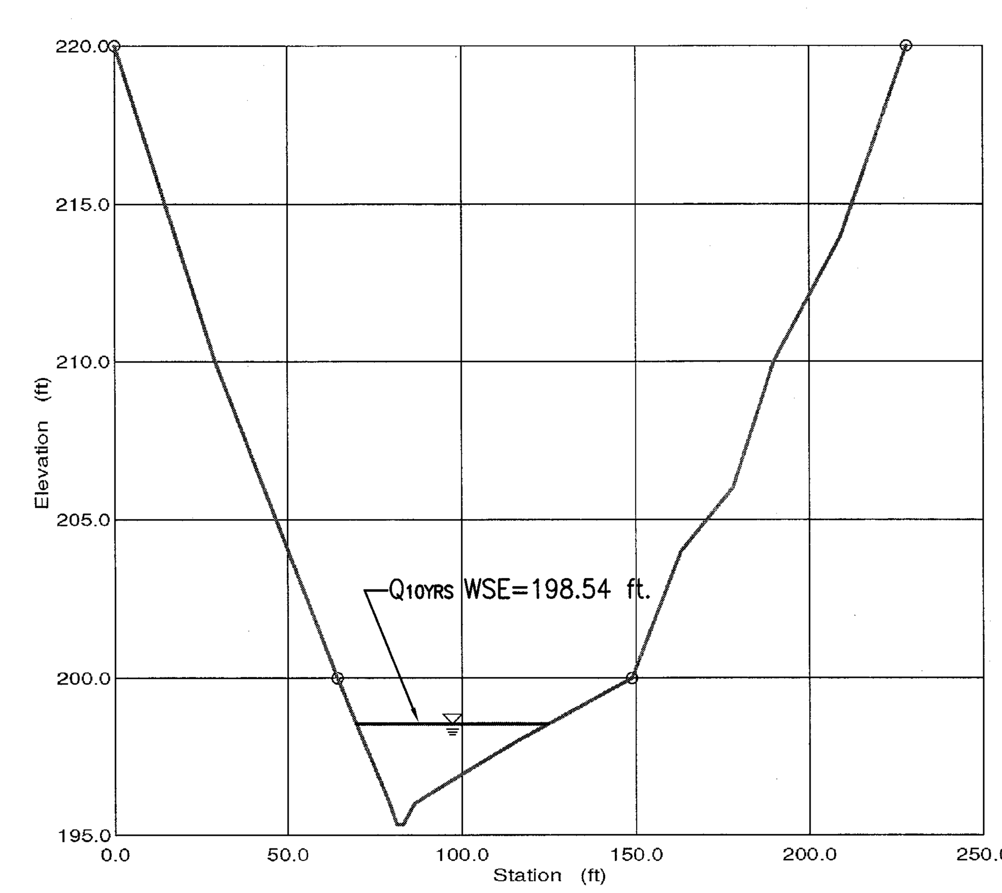
Elevation range: 195.37 ft to 220.00 ft.

Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	220.00	0.00	64.00	0.030
29.00	210.00	64.00	149.00	0.050
64.00	200.00	149.00	228.00	0.030
79.00	196.00			
81.00	195.37			
83.00	195.37			
86.00	196.00			
116.00	198.00			
149.00	200.00			
163.00	204.00			
178.00	206.00			
190.00	210.00			
209.00	214.00			
228.00	220.00			

Discharge 338.00 cfs

Results		
Wtd. Mannings Coefficient	0.050	
Water Surface Elevation	198.54	ft → 10YRS WSE
Flow Area	81.06	ft²
Wetted Perimeter	55.92	ft
Top Width	55.34	ft
Height	3.17	ft → d10YRS
Critical Depth	197.99	ft
Critical Slope	0.034621	ft/ft
Velocity	4.17	ft/s
Velocity Head	0.27	ft
Specific Energy	198.81	ft
Froude Number	0.61	
Flow is subcritical.		

Section Data		
Wtd. Mannings Coefficient	0.050	
Channel Slope	0.012000	ft/ft
Water Surface Elevation	198.54	ft
Discharge	338.00	cfs → Q10YRS



Application No: SE 2013-LE-005 Staff: MAT

APPROVED DEVELOPMENT PLAN

(_GDP) (_CDP) (_FDP) (_PRC) (_DP) (_CP) (X SE) (_CSP) (_SP) (_VC)

SEE PROFFERS DATED:

SEE CONDITIONS DATED: Oct 24, 2013

Date of Final Approval: Dec 3, 2013 (X BOS) (_PC) (_BZA)

Comments:

DEPARTMENT OF PLANNING & ZONING

Sheet 7 of 8

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ADEQUATE OUTFALL ANALYSIS
SPECIAL EXCEPTION PLAT
FRANCONIA SHELL
PART OF LOT 4, FRANCONIA HILLS
6136 FRANCONIA ROAD
LEE DISTRICT, FAIRFAX COUNTY, VIRGINIA

COMMONWEALTH OF VIRGINIA
JOHN C. MANGANELLO
No. 020732
8-29-13
PROFESSIONAL ENGINEER

REV. NO.	DATE	REVISIONS PRIOR TO APPROVAL
1.	02/14/13	APPLICATION ACCEPTANCE COMMENTS
2.	03/22/13	ADDITIONAL APPLICATION COMMENTS
3.	07/08/13	APPLICATION COMMENTS
4.	08/29/13	URBAN FORESTRY COMMENTS

LDCI PROJ. NO.: 11046.04

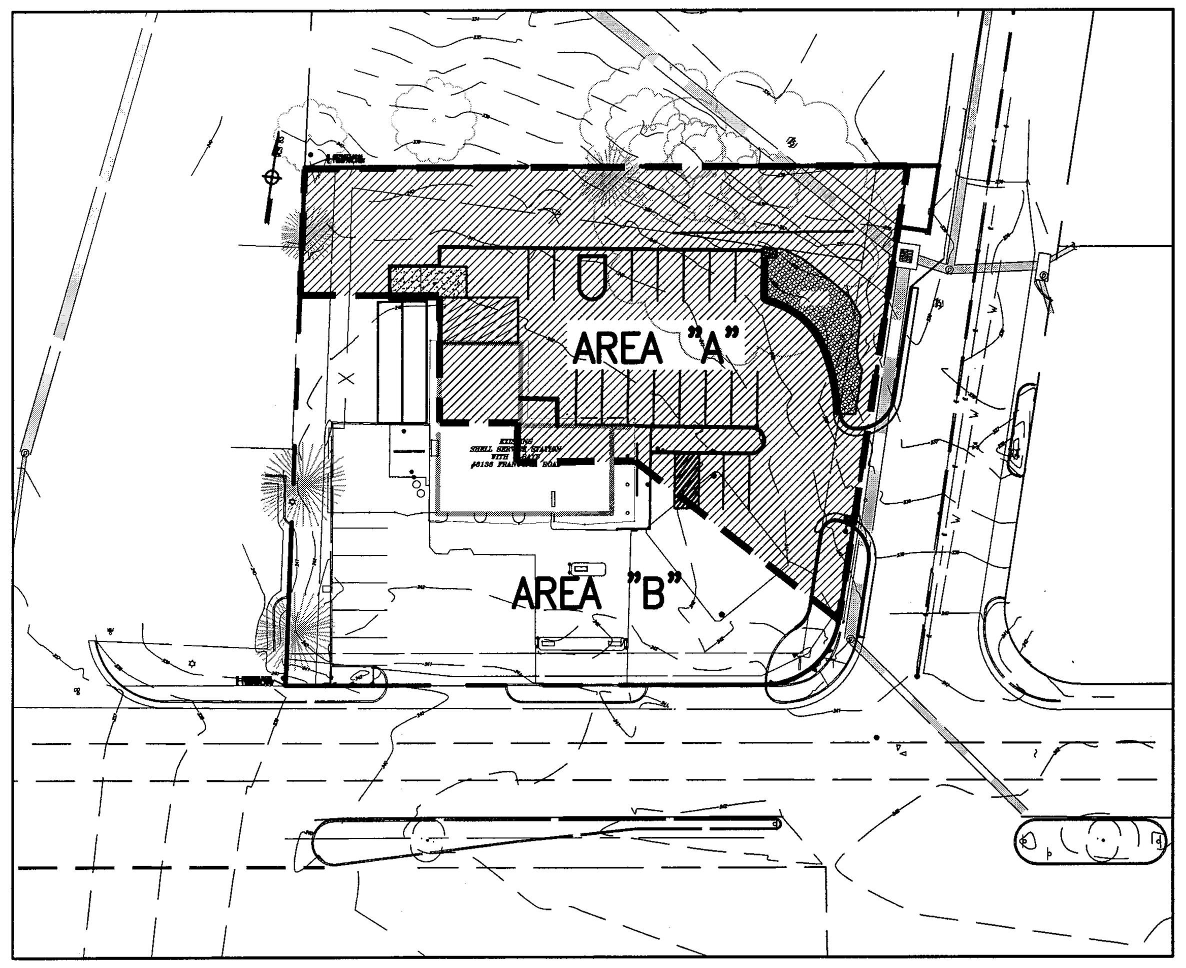
COUNTY PLAN NO.:

SCALE: AS SHOWN

DATE: 01/03/2008

SHEET: 6A OF 7

F:\PROJECTS\11046 - Franconia Shell - 6136 Franconia Road\DWG\6136FranconiaRd-SEP-2013.dwg



BMP MAP
SCALE: 1" = 50'

BMP COMPUTATIONS

1. EXISTING CONDITIONS

1.1 TOTAL SITE AREA	32,079 SF	0.74 AC
1.2 IMPERVIOUS AREA		
BUILDING	2,298 SF	
STORAGE TRAILER	640 SF	
FRONT YARD PARKING, CONC. WALK & MISC.	11,367 SF	
BACK YARD PAVEMENT	7,104 SF	
SUBTOTAL	21,409 SF	0.49 AC
1.3 PERVIOUS AREA	10,670 SF	0.25 AC

2. PROPOSED CONDITIONS

1.1 TOTAL AREA	32,079 SF	0.74 AC
1.2 IMPERVIOUS AREA		
BUILDING	2,470 SF	
STORAGE TRAILER	640 SF	
PARKING AND MISC. IMP. AREA	17,764 SF	0.41 AC
SUBTOTAL	20,874 SF	0.48 AC
1.3 PERVIOUS AREA	11,205 SF	0.26 AC

3. PHOSPHORUS REMOVAL RATE COMPUTATIONS
FOR RE-DEVELOPMENT PER PFM 6-0401.2B & 6-0401.2D

% P = [1 − 0.9 (Ipre/Ipost)] x 100

WHERE:
Ipre = PRE-DEVELOPMENT PERCENT IMPERVIOUS AREA
Ipost = POST-DEVELOPMENT PERCENT IMPERVIOUS AREA

Ipre = 0.49/0.74 x 100 = 66.22 %

Ipost =0.48/0.74 x 100 = 64.86 %

%P = [1−0.9(66.22/64.86)] x 100 = 8.11 %

PROVIDE BIORETENTION FACILITY
AREA TO BE COVERED BY BIORETENTION FACILITY = 0.175 AC

PHOSPHORUS REMOVAL RATE COMPUTATIONS

AREA 'A' COVERED BY BMP					
	IMPERVIOUS AREA	0.136	AC	C=	0.90
	PERVIOUS AREA	0.003	AC	C=	0.30
	SUBTOTAL	0.139	AC	C=	0.89
AREA 'B' NO BMP AREA					
	IMPERVIOUS AREA	0.343	AC	C=	0.90
	PERVIOUS AREA	0.258	AC	C=	0.30
	SUBTOATAL	0.601	AC	C=	0.64
TOTAL		0.740	AC	C=	0.69

PHOSPHORUS REMOVAL RATE COMPUTATION

SUBAREA NAME	AREA (ACRE)	C	C x A	AREA RATIO	C FACTOR RATIO		BMP %	TOTAL BMP %
A	0.150	0.89	0.114	0.20	1.29	BIORETENTION FACILITY	65	16.77
B	0.700	0.64	0.378	0.80	0.93	NO BMP	0	0.00
TOATL ON-SITE	0.740		0.512			SUBTOTAL %		16.77
Weighted Average C=		0.69						

BIORETENTION FACILITY (Unrestricted Underdrain)

BIORETENTION #1
DRAINAGE AREA TO PROPOSED BMP FACILITY = 7,850 SF= 0.180 Acres
A_{imp}, IMPERVIOUS AREA = 7,850 SF= 0.180 Acres

NOTE:
Area of imperviousness was based on 53 % of total area, which equates to C-factor of 0.62

Ceff = Apervious (0.3) + Aimpervious (0.9) / A_{TOTAL} ⟹ 0.62 = 0.35 (0.3) + 0.39 (0.9) / 0.74

*Per PFM Amendment to § 6-0402, Table 6.3 (Phosphorous Removal Efficiencies), the proposed Bioretention Facility with **65%** Phosphorous Removal Efficiency shall treat **1.0 in/impervious area.***

W_{QV} = 3,630 ft³/Ac of A_{imp}
W_{QV}= 3,630 ft³/Ac x 0.18 Ac = 654.17 ft³

Per PFM § 6-1307, 6E, Use Filter Bed design for the Bioretention Facility

$A_f = WQ_V / h_f$; Assume h_f = 1' (maximum ponding depth)

Af Required = 654.17 ft³ / 1 ft 654.17 ft²

Drain time, **t_f**, through the Filter

$t_f = \frac{(WQv)\, d_f}{[(k_f/12)(0.5h_f + d_f) A_f]}$ Assume k_f for soil media = 1.5 in/hr (§6-1307.5C); Assume d_f, filter depth = 2.50 ft (Min)

$tr = \frac{(654.17\ ft^3 \times 2.5\ ft)}{[(1.5\ in/hr / 12)((0.5 (1\ ft)) + 2.5\ ft)(654.17\ ft^2)]}$ = 6.67 Hrs

6.67 Hrs < 24 Hrs, Therefore **OK!** (§6-1307.5C)

FACILITY SIZE

Length (ave)=	55	ft
Width (ave)=	12	ft
A_f Provided=	660	ft² **OK!**

Proposed Pipe Outfall Capacity Check

Try pipe diameter, Ø =	8	inches
n=	0.013	
Area=	0.35	sf
At full capacity, Area=0.80 x Diameter, Wetted Perimeter=	1.48	ft
Hydraulic Radius, R=A/P=	0.24	ft
Slope, S_L=	0.0115	

(Per proposed plan, the analysis will assume flattest slope at 1.15%)

$Q_{capacity} = \frac{1.436}{n} A R^{2/3} S^{1/2}$ = 1.58 cfs

Time, $t = \frac{WQ_V}{Q_{capacity}}$ = 654.17 / 1.58 = 414.43

Time, t = 414.43 sec, or
0.115 Hrs < 48 Hrs, ***Good!***

Therefore, USE 8" DIAMETER PIPE Outfall

SWM COMPUTATIONS

A_{TOTAL} = 0.74 Ac

EXISTING CONDITIONS

Aimp =	0.49	Cimp =	0.9
Aperv =	0.25	Cperv =	0.3
C-effective =	0.70		

Tc = 5 min I2 = 5.45 in/hr; I10 = 7.27 in/hr

Q2pre = Ceff x I_2 x A_{TOTAL} = 2.81 cfs
Q10pre = Ceff x I_{10} x A_{TOTAL} = 3.75 cfs

PROPOSED CONDITIONS

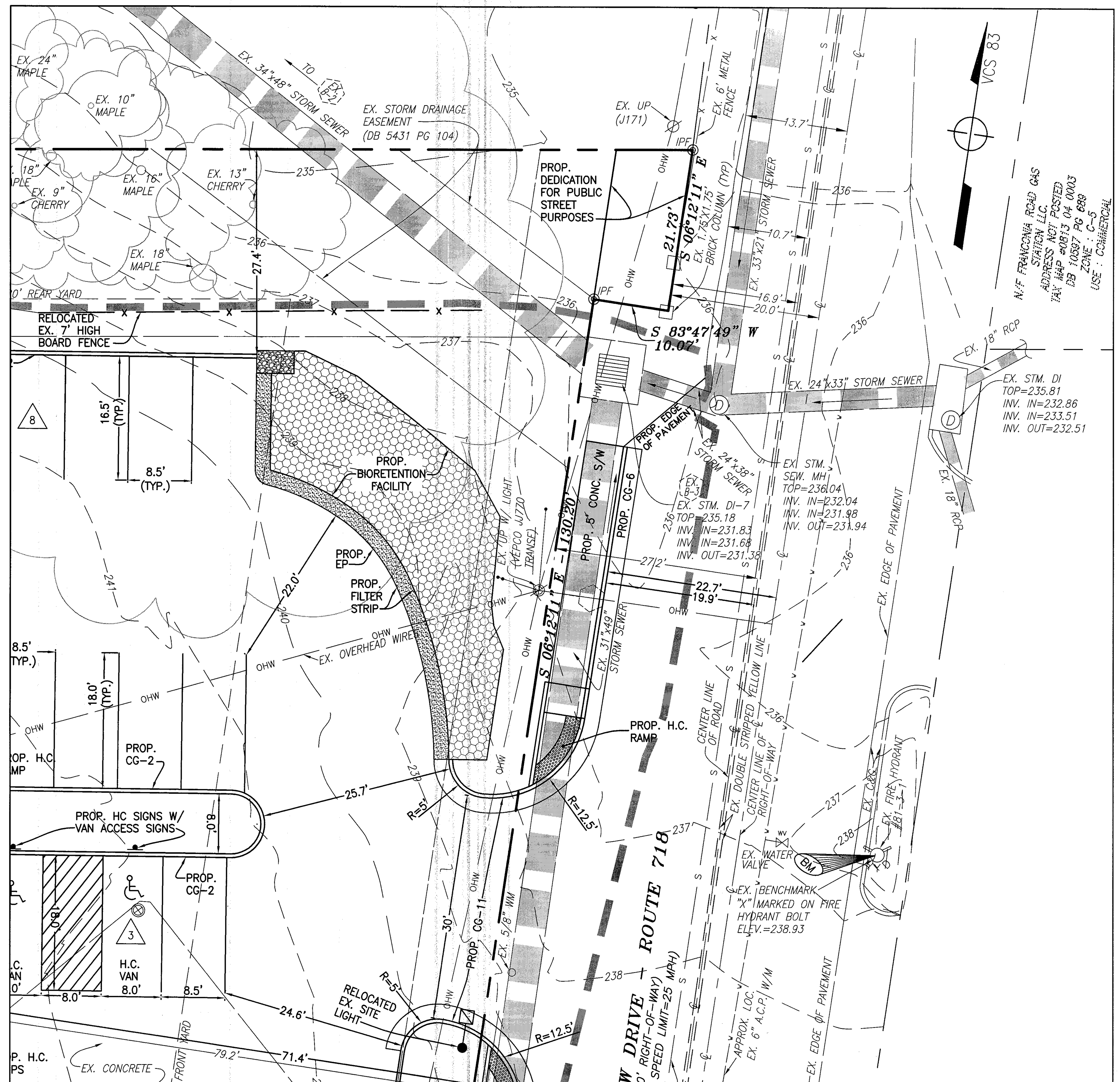
Aimp =	0.48	Cimp =	0.9
Aperv =	0.26	Cperv =	0.3
C-effective =	0.69		

Tc = 5 min I2 = 5.45 in/hr; I10 = 7.27 in/hr

Q2post = Ceff x I_2 x A_{TOTAL} = 2.78 cfs
Q10post = Ceff x I_{10} x A_{TOTAL} = 3.71 cfs

NET CHANGE IN RUNOFF
Q2 = Q2post - Q2pre = 2.78 - 2.81 = -0.03 cfs *(decrease)*
Q10 = Q10post - Q10pre = 3.71 - 3.75 = -0.04 cfs *(decrease)*

THE PROPOSED REDEVELOPMENT RESULTED IN NET **DECREASE** OF SURFACE RUNOFF. THEREFORE, STORMWATER DETENTION IS NOT REQUIRED FOR THE SITE.



BIORETENTION FACILITY LAYOUT
SCALE: 1" = 10'

GRAPHIC SCALE
10 0 5 10 20
1 INCH = 10 FT.

BIORETENTION FACILITY BMP NARRATIVE

THE PROJECT SITE IS A 0.74 ACRE LOT GAS STATION IN CAMERON RUN WATERSHED DISTRICT. THE SITE PROPOSES ONE BIORETENTION FACILITY (1" DEPTH FIRST FLUSH – RATED 65% EFFICIENCY) IN ORDER TO MEET REDEVELOPMENT PHOSPHOROUS RATE REQUIREMENT AT 8.11%

THE PROPOSED BMP FACILITY WILL BE LOCATED AT THE NORTHEAST CORNER OF THE PROPERTY – THE SITE LOWEST POINT – TO TREAT 0.18 ACRE OF THE SITE IMPERVIOUS AREA. THE PROPOSED GRADING ENSURES SHEET FLOW SURFACE RUNOFF AT SHALLOW SLOPES INTO THE FACILITY. FURTHERMORE, A 2-FOOT WIDE VEGETATIVE FILTER STRIP IS PROPOSED TO PROTECT IT FROM ANY DEBRIS. THE ULTIMATE DISCHARGE POINT IS AN EXISTING 34" X 48" STROM SEWER CUTTING THROUGH THE PROPERTY, ALSO LOCATED AT THE NORTHEAST CORNER AND FLOWS AT NORTHWEST DIRECTION. THE EXISTING STORM IS APPROXIMATELY 20-FT FROM THE BMP AND A PROPOSED MANHOLE CONNECTS THE FACILITY BYPASS FLOW.

THE CALCULATED DRAINAGE AREA OF IMPERVIOUSNESS TO THIS FACILITY WAS BASED ON A 0.62 C-FACTOR, MAINLY FOR PARKING AREA AND BUILDING ROOF. DEPENDING ON GEOTECHNICAL FIELD TESTS, THE FACILITY COULD BE WITH OR WITHOUT INFILTRATION. THE DESIGN DETAILS AS SHOWN WILL HAVE AT LEAST 2.5" DEEP OF SOIL MEDIA.

THE ONE-INCH FIRST FLUSH, WHERE MOST OF THE PHOSPHOROUS POLLUTANTS ARE TRANSPORTED, WILL BE COLLECTED BY A 4" DIAMETER HDPE PERFORATED PIPES WITH CLEAN OUTS AT CERTAIN INTERVALS FOR EASY MAINTENANCE AND ENSURE ITS EFFICIENCY.

PLANTING DETAILS AND SPECIES ALLOWED FOR THE FACILITY SHALL BE BASED ON THE RECOMMENDED PLANT LIST PER COUNTY PFM.

MAINTENANCE AGREEMENT

THE BIORETENTION FACILITY SHALL BE PRIVATELY OWNED AND MAINTAINED.

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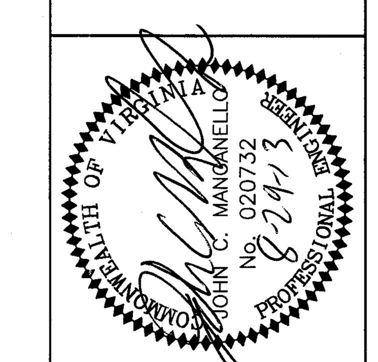

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