

SUBDIVISION PLAN

MOUNTAIN SHADE SUBDIVISION

SITE PLAN AMENDMENT

MARSHALL MAGISTERIAL DISTRICT FAUQUIER COUNTY, VIRGINIA SEPTEMBER 14, 1998

LAST REVISED: FEBRUARY 16, 1999
VDH REVISIONS: JULY 11, 2000

ADJACENT OWNERS

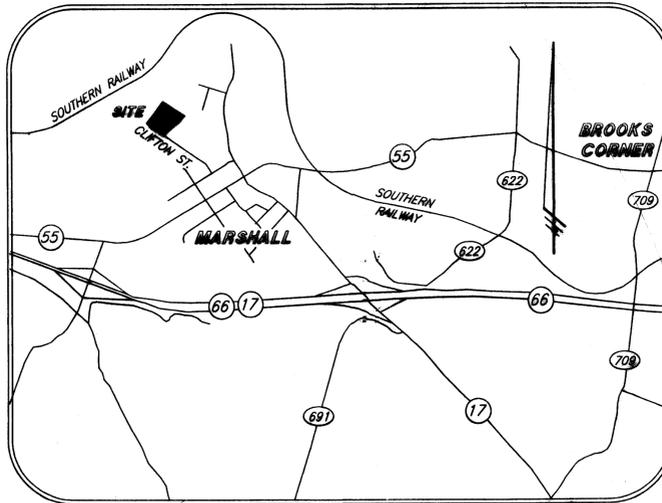
P.I.N.	OWNER/ ADDRESS
6060-31-0787	JOHN P. LEACHMAN, TEE. P.O. BOX 3539 ALEXANDRIA, VIRGINIA 22302
6969-38-4701	MARY F. CUNNINGHAM P.O. BOX 38 MARSHALL, VIRGINIA 22115

GOLDEN ACRES SUBDIVISION

LOT #	P.I.N.	OWNER/ ADDRESS
LOT 8	6060-41-8028	KERRY & CINDY JOHNSON 4052 ROBERTS CIRCLE MARSHALL, VIRGINIA 22115
LOT 9	6060-40-8999	STEPHEN & SUSAN LETOLE 4056 ROBERTS CIRCLE MARSHALL, VIRGINIA 22115
LOT 10	6060-50-0967	HUBERT & KAREN HUMPHREY 4058 ROBERTS CIRCLE MARSHALL, VIRGINIA 22115
LOT 11	6060-50-0890	RICHARD & KIMBERLY STOUTMYER 4062 ROBERTS CIRCLE MARSHALL, VIRGINIA 22115
LOT 12	6060-50-1841	ANDREW JOHNSON & SHIRLEY LENTI 4058 ROBERTS CIRCLE MARSHALL, VIRGINIA 22115
LOT 13	6060-50-2743	RODNEY & LYNETTE RIDGLEY 4070 ROBERTS CIRCLE MARSHALL, VIRGINIA 22115
LOT 14	6060-50-3658	ROBERTY & GERMANNE WRIGHT 4073 ROBERTS CIRCLE MARSHALL, VIRGINIA 22115

HICKORY HEIGHTS SUBDIVISION

LOT #	P.I.N.	OWNER/ ADDRESS
LOT 1R	6060-5R-0233	THE STORY GROUP, INC. P.O. BOX 309 MARSHALL, VIRGINIA 22115
LOT 2R	6060-40-8221	DOLORES M. GLEASON 8864 CLIFTON STREET MARSHALL, VIRGINIA 22115
LOTS 3 & 4	6060-50-1238	JAMES & MAUREEN LAWRENCE P.O. BOX 10 MARSHALL, VIRGINIA 22115
LOT 5	6060-50-4402	MARSHALL WATER WORKS, INC. P.O. BOX 171 MARSHALL, VIRGINIA 22115



VICINITY MAP
(1" = 2000')

SHEET INDEX

SHEET	DESCRIPTION
1	COVER SHEET
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3	SUBDIVISION PLAN
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14	SANITARY SEWER CONSTRUCTION DETAILS

AREA TABULATION

TOTAL PROJECT AREA = 10.725 ACRES
TOTAL NUMBER OF LOTS = 27
TOTAL AREA IN LOTS = 7.82 ACRES
POND LOT = .63 ACRES
AVERAGE LOT SIZE = 12,745 SF
TOTAL ROW AREA = 2.20 ACRES
OVERALL GROSS DENSITY = 2.52 DU/ACRES



CARSON, HARRIS & ASSOCIATES, LLC

CIVIL ENGINEERING . LAND SURVEYING . LAND PLANNING
39 GARRETT STREET; WARRENTON, VIRGINIA 20186
PHONE: (540) 347-9191 FAX: (540) 349-1905

SEAL & SIGNATURE

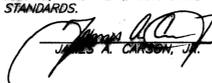
GENERAL NOTES

1. OWNER: HELTZEL MORTGAGE CORP.
9393 FORESTWOOD LANE
MANASSAS, VA 20110
PHONE: (703) 368-0288
2. ENGINEER: CARSON, HARRIS, AND ASSOCIATES, LLC
39 GARRETT STREET
WARRENTON, VA 20186
PHONE: (540) 347-9191
3. MARSHALL MAGISTERIAL DISTRICT
4. MARSHALL SERVICE DISTRICT
5. BOUNDARY INFORMATION SHOWN HEREON IS THE RESULT OF A FIELD SURVEY BY BENCHMARK ENGINEERING AND SURVEYING, INC.
6. TOPOGRAPHIC INFORMATION SHOWN HEREON IS THE RESULT OF A FIELD SURVEY BY BENCHMARK ENGINEERING AND SURVEYING, INC.
CONTOUR INTERVAL: 2'
DATUM: USGS
7. PROPERTY DESCRIPTION
A. PIN: 6060-40-6891
B. RECORDED AT DEED BOOK 815, PAGE 10
C. PARCEL SIZE: 10.75283 ACRES
D. CURRENT USE: VACANT
E. PROPOSED USE: 27 LOT SUBDIVISION
F. ZONING: P-2 RESIDENTIAL, AFFORDABLE HOUSING
G. ZONING: P-2 RESIDENTIAL, AFFORDABLE HOUSING
1. MINIMUM LOT SIZE: 10,000 S.F.
2. MINIMUM LOT WIDTH: 70'
3. SET-BACK REQUIREMENTS:
a. FRONT YARD:
i. LOCAL COLLECTOR: 50' FROM STREET C/L
b. SIDE & REAR YARD: 10'
4. MAXIMUM BUILDING HEIGHT: 35'
8. WATER USAGE:
A. EXISTING - 0 GPD
B. PROPOSED - 10,800 GPD
(BASED ON 400 GPD/LOT AND 27 LOTS)
9. ANTICIPATED SEWAGE FLOWS
27 UNITS X 4 PERSONS/ UNIT X 75 GPD/PERSON = 8,100 GPD
10. ALL CONSTRUCTION SHALL CONFORM TO THE STANDARD OF THE VIRGINIA DEPARTMENT OF TRANSPORTATION UNLESS OTHERWISE NOTED. ALL MATERIALS AND CONSTRUCTION SPECIFICATIONS SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE VIRGINIA DEPARTMENT OF TRANSPORTATION IN EFFECT AT THE TIME OF PLAN AND SPECIFICATION SUBMISSION.
11. PRIOR TO RECORDATION OF THE FINAL SUBDIVISION PLAT, THE OWNER SHALL SIGN AN AGREEMENT WITH FAUQUIER COUNTY AGREEING TO MAKE THE AFFORDABLE HOUSING UNITS IDENTIFIED ON THE PLAT AVAILABLE EXCLUSIVELY FOR SALE TO BUYERS WHO MEET THE LOW AND MODERATE INCOME ELIGIBILITY REQUIREMENTS AS DEFINED IN ARTICLE 15 (SECTION 4-206 E) OF THE FAUQUIER COUNTY ZONING ORDINANCE.
12. HOUSES CONSTRUCTED ON LOTS IDENTIFIED AS AFFORDABLE SHALL BE BUILT WITH AN EXTERIOR APPEARANCE SIMILAR TO OTHER HOUSING UNITS IN THE DEVELOPMENT.
13. A PORTION OF THE PARCEL SHOWN HEREON DOES LIE WITHIN A 100 YEAR FLOOD HAZARD AS SHOWN ON THE H. U. D. F. I. R. M. MAPS COMMUNITY PANEL # 510085 0800 A. EFFECTIVE DATE: NOVEMBER 1, 1979

THIS DOES NOT CONSTITUTE A FLOOD STUDY BY THIS FIRM.
14. THE COUNTY RECOMMENDS THAT NO BELOW GRADE BASEMENT BE CONSTRUCTED ON SOIL MAPPING UNITS 38B AND 22B DUE TO WETNESS, UNLESS THE FOUNDATION DRAINAGE SYSTEM OF THE STRUCTURE IS DESIGNED BY A VIRGINIA LICENSED PROFESSIONAL ENGINEER. (SEE SOILS MAP SHEET 10 OF 14)

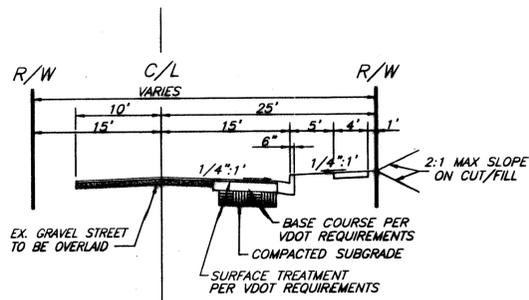
ENGINEER'S CERTIFICATE

I, JAMES A. CARSON, JR., A PROFESSIONAL ENGINEER IN THE COMMONWEALTH OF VIRGINIA, DO HEREBY CERTIFY THAT, TO THE BEST OF MY KNOWLEDGE, THIS PLAN CONFORMS TO ALL APPLICABLE STATE AND LOCAL STANDARDS.

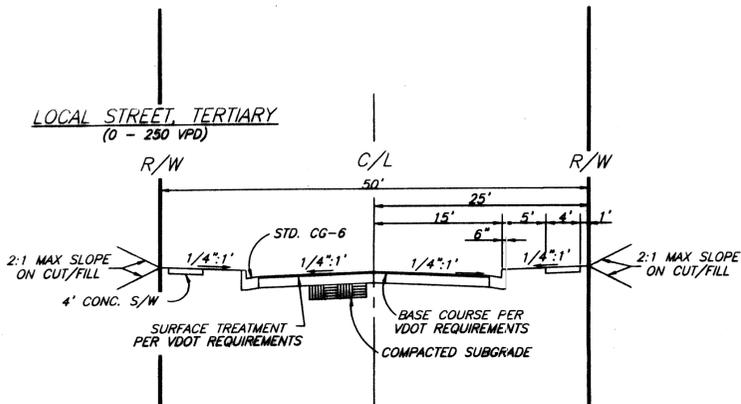
7/13/00
DATE:  JAMES A. CARSON, JR. P.E. VA021624

Approved Set of Plans ROAD

CLIFTON STREET



LOCAL STREET, TERTIARY
(0 - 250 VPD)



MINIMUM VDOT STANDARDS

TYPICAL SECTIONS
(NO SCALE)

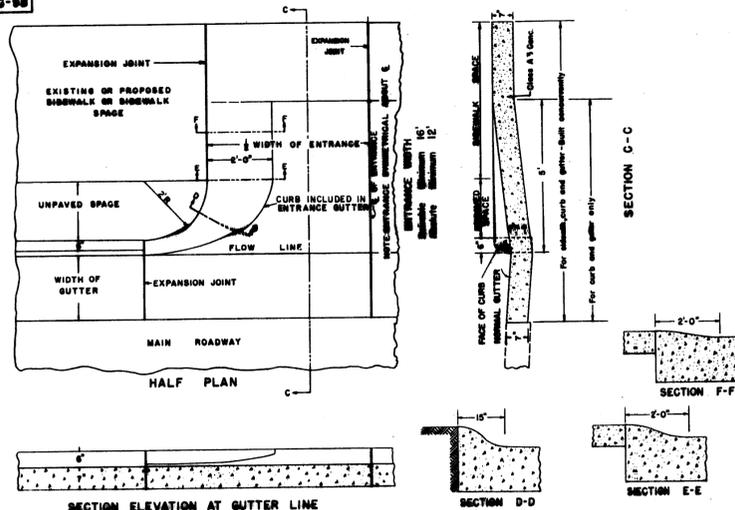
ALTERNATIVE PAVEMENT SECTIONS

UP TO 250 ADT	3.5" BM-2 ASPH. CONC.	165 PSY SM-2A ASPH. CONC.
OR	6.0" 21-A AGGREGATE	165 PSY SM-2A ASPH. CONC.

NOTE: TYPICAL SECTIONS

- THESE TYPICAL SECTIONS ARE BASED ON MODIFIED FAUQUIER COUNTY STANDARDS WHICH REFLECT THE USE OF STANDARD VDOT CG-6.
- THE PAVEMENT DESIGNS SHOWN ARE BASED ON THE SUBGRADE SOILS IMMEDIATELY UNDER THE PAVEMENT STRUCTURE HAVING A SOIL SUPPORT VALUE (SSV) OF 10. REPRESENTATIVE CALIFORNIA BEARING RATIO (CBR) SAMPLES SHALL BE TAKEN DURING CONSTRUCTION AND USED TO DETERMINE THE ACTUAL (SSV). IF THE ACTUAL SSV IS FOUND TO BE SOMETHING OTHER THAN 10, THE ENGINEER SHALL BE NOTIFIED AND ALTERNATE PAVEMENT SECTIONS WILL BE RECOMMENDED SUBJECT TO VDOT'S APPROVAL.

CG-08



When used in conjunction with Standard CG-3 or CG-7, the curb face on this Standard is to be adjusted to match the measurable curb configuration.

STANDARD ENTRANCE GUTTER FOR USE WITH UNPAVED SPACE BETWEEN CURB & SIDEWALK

VIRGINIA DEPARTMENT OF TRANSPORTATION

SPECIFICATION REFERENCE
808

CONSTRUCTION NOTES

- ALL MATERIALS AND CONSTRUCTION METHODS SHALL CONFORM TO VDOT STANDARDS UNLESS OTHERWISE NOTED.
- EROSION AND SEDIMENT CONTROL DEVICES NECESSARY SHALL BE INSTALLED PRIOR TO ANY CLEARING, GRADING OR OTHER CONSTRUCTION.
- THE LOCATION OF EXISTING UNDERGROUND UTILITIES HAVE NOT BEEN VERIFIED. THERE MAY BE ADDITIONAL UTILITIES THAT ARE NOT SHOWN ON THIS PLAN.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE EXACT LOCATION AND DEPTH OF ALL UTILITIES BEFORE COMMENCING WORK AND FOR ANY DAMAGES WHICH MAY OCCUR BY HIS FAILURE TO LOCATE OR PRESERVE THESE UNDERGROUND UTILITY LINES.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR COSTS INCURRED FOR THE RELOCATIONS OR DAMAGES TO ANY PUBLIC UTILITIES BECAUSE OF CONSTRUCTION.
- THE CONTRACTOR SHALL NOTIFY OPERATORS WHO MAINTAIN UNDERGROUND UTILITY LINES IN THE AREA OF PROPOSED EXCAVATION OR BLASTING AT LEAST TWO DAYS BUT NOT MORE THAN TEN WORKING DAYS PRIOR TO COMMENCEMENT OF EXCAVATION OR BLASTING. MISS UTILITY # 1-800-257-7777
- SITE GRADING (CUT & FILL OPERATION) TO BE COMPLETED IN SUCH A MANNER TO PROVIDE POSITIVE DRAINAGE.
- EXCESS MATERIALS WHICH ARE TO BE DISPOSED OFF-SITE SHALL BE DONE IN ACCORDANCE WITH THE REQUIREMENTS OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK, CURRENT EDITION. IF OFF-SITE AREAS ARE USED FOR BORROW OR FILL THE CONTRACTOR SHALL SUBMIT AN EROSION & SEDIMENT CONTROL PLAN FOR THAT AREA TO THE LOCAL SOILS & WATER CONSERVATION DISTRICT
- THE SUBGRADE UNDER PAVED AREAS SHALL BE COMPACTED TO 95% MAXIMUM DENSITY. FILLS TO BE PLACED IN 4 TO 6 INCH LIFTS.
- THE CONTRACTOR SHALL PROVIDE RESULTS OF CBR TESTING ON THE AREAS TO BE PAVED. THE STONE BASE THICKNESS WILL BE INCREASED WHERE RESULTS OF THE CBR TEST IS LESS THAN 10.

LEGEND

CL	CENTERLINE
CO	CLEANOUT
EX	EXISTING
HC	HANDICAPPED
EP	EDGE OF PAVEMENT
S/C	SEWER CONNECTION
IPS	IRON PIPE SET
IPF	IRON PIPE FOUND
RET	RETAINING
PKS	PK-NAIL SET
CONC	CONCRETE
CONN	CONNECTION
TELE	TELEPHONE
STM STR	STORM SEWER STRUCTURE
STM MH	STORM SEWER MANHOLE
SAN MH	SANITARY SEWER MANHOLE
ELEC TRANS	ELECTRIC TRANSFORMER
WV	WATER VALVE UNLESS NOTED
SIGN	SIGN
FH	FIRE HYDRANT
LUP	LIGHT OR UTILITY POLE
X-X-X	FENCE
FC	FACE OF CURB
7	NUMBER OF PARKING SPACES
8	NUMBER OF LOADING SPACES
9	NUMBER OF HANDICAP SPACES
---	PROPERTY OR R/W LINES
---	CENTER LINE
---	EASEMENT LINE
---	EXISTING TRAVEL WAY/ EDGE OF PAVEMENT
---	PROPOSED EDGE OF PAVEMENT
---	EXISTING CURB AND GUTTER
---	PROPOSED CURB AND GUTTER
X-X	FENCE LINE
---	ROADSIDE DELINEATORS
---	RAILROAD
---	ADJACENT PROPERTY OWNERS
---	EXISTING CULVERT OR STORM LINE
---	PROPOSED CULVERT OR STORM LINE
---	STORM SEWER (PROPOSED BY OTHERS)
---	EXISTING WATERLINE
---	PROPOSED WATERLINE
---	WATERLINE (PROPOSED BY OTHERS)
---	EXISTING FIRE HYDRANT
---	PROPOSED FIRE HYDRANT
---	EXISTING SANITARY SEWER
---	PROPOSED SANITARY SEWER
---	SANITARY SEWER (PROPOSED BY OTHERS)
---	EXISTING GAS LINE
---	PROPOSED GAS LINE
---	EXISTING OVERHEAD TELEPHONE
---	EXISTING OVERHEAD ELECTRIC
---	EXISTING OVERHEAD TELEPHONE & ELECTRIC
---	EXISTING UNDERGROUND TELEPHONE
---	EXISTING UNDERGROUND ELECTRIC
---	EXISTING RETAINING WALL
---	PROPOSED RETAINING WALL
---	EXISTING POWER OR TELEPHONE POLE
---	LIGHT POLE
---	EXISTING CONTOUR W/ ELEVATION
---	PROPOSED CONTOUR W/ ELEVATION
---	EXISTING SPOT ELEVATION
---	PROPOSED SPOT ELEVATION
---	DITCH, SWALE, STREAM OR SPRING
---	SWAMP OR MARSH AREA
---	DRAINAGE DWAIVE
---	PATH (DIRT, GRAVEL, CRUSHED STONE, ETC.)
---	EDGE OF WOODS (DRIP LINE)
---	LIMITS OF CONSTRUCTION
---	NORTH ARROW
---	TREES AND SHRUBS
---	STD. VDOT CG-12, CURB RAMP
---	PROPOSED CONCRETE
---	PROPOSED GRAVEL
---	PROPOSED UNDERDRAIN

SHEET REFERENCES

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STORM SEWER DETAILS	14

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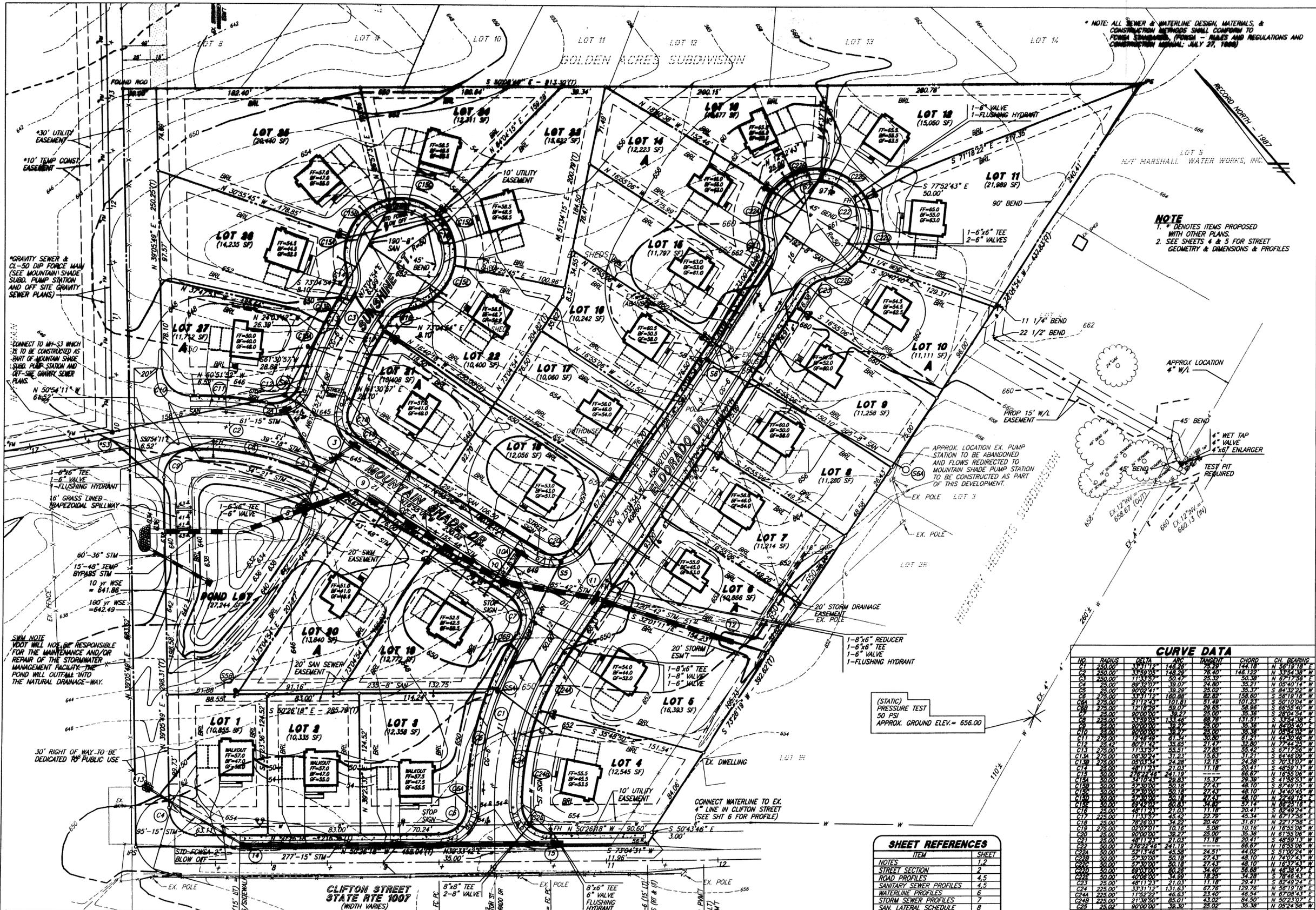
NOTES & DETAILS
MOUNTAIN SHADE SUBDIVISION
FAUQUIER COUNTY, VIRGINIA
MARSHALL MAGISTERIAL DISTRICT

REVISIONS

DESCRIPTION	DATE
DOT COMMENTS	12/17/98
VDOT COMMENTS	2/16/99

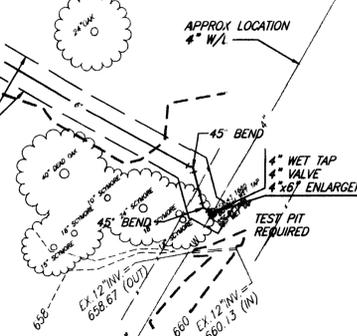
DATE: 9/14/98
SCALE: NONE
SHEET 2 OF 14

Professional Engineer Seal for James A. Carson, Jr., No. 021824, dated 2-28-99.



* NOTE: ALL SEWER & WATERLINE DESIGN, MATERIALS, & CONSTRUCTION METHODS SHALL CONFORM TO PENNSYLVANIA DEPARTMENT OF TRANSPORTATION, FEDERAL AID REGULATIONS AND CONSTRUCTION MANUAL, JULY 27, 1998

NOTE
 1. * DENOTES ITEMS PROPOSED WITH OTHER PLANS.
 2. SEE SHEETS 4 & 5 FOR STREET GEOMETRY & DIMENSIONS & PROFILES



CURVE DATA

NO.	RADIUS	DELTA	ARC	TANGENT	CHORD	CH. BEARING
C1	250.00	134.11°	148.39	78.39	144.18	N 56°19'18" E
C2	250.00	134.11°	148.39	78.39	144.18	N 56°19'18" E
C3	250.00	134.11°	148.39	78.39	144.18	N 56°19'18" E
C4	250.00	134.11°	148.39	78.39	144.18	N 56°19'18" E
C5	250.00	134.11°	148.39	78.39	144.18	N 56°19'18" E
C6	250.00	134.11°	148.39	78.39	144.18	N 56°19'18" E
C7	250.00	134.11°	148.39	78.39	144.18	N 56°19'18" E
C8	250.00	134.11°	148.39	78.39	144.18	N 56°19'18" E
C9	250.00	134.11°	148.39	78.39	144.18	N 56°19'18" E
C10	250.00	134.11°	148.39	78.39	144.18	N 56°19'18" E
C11	250.00	134.11°	148.39	78.39	144.18	N 56°19'18" E
C12	250.00	134.11°	148.39	78.39	144.18	N 56°19'18" E
C13	250.00	134.11°	148.39	78.39	144.18	N 56°19'18" E
C14	250.00	134.11°	148.39	78.39	144.18	N 56°19'18" E
C15	250.00	134.11°	148.39	78.39	144.18	N 56°19'18" E
C16	250.00	134.11°	148.39	78.39	144.18	N 56°19'18" E
C17	250.00	134.11°	148.39	78.39	144.18	N 56°19'18" E
C18	250.00	134.11°	148.39	78.39	144.18	N 56°19'18" E
C19	250.00	134.11°	148.39	78.39	144.18	N 56°19'18" E
C20	250.00	134.11°	148.39	78.39	144.18	N 56°19'18" E
C21	250.00	134.11°	148.39	78.39	144.18	N 56°19'18" E
C22	250.00	134.11°	148.39	78.39	144.18	N 56°19'18" E
C23	250.00	134.11°	148.39	78.39	144.18	N 56°19'18" E
C24	250.00	134.11°	148.39	78.39	144.18	N 56°19'18" E
C25	250.00	134.11°	148.39	78.39	144.18	N 56°19'18" E

SHEET REFERENCES

ITEM	SHEET
NOTES	1, 2
STREET SECTION	2
ROAD PROFILES	4, 5
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WATERLINE PROFILES	6
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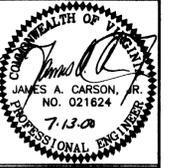


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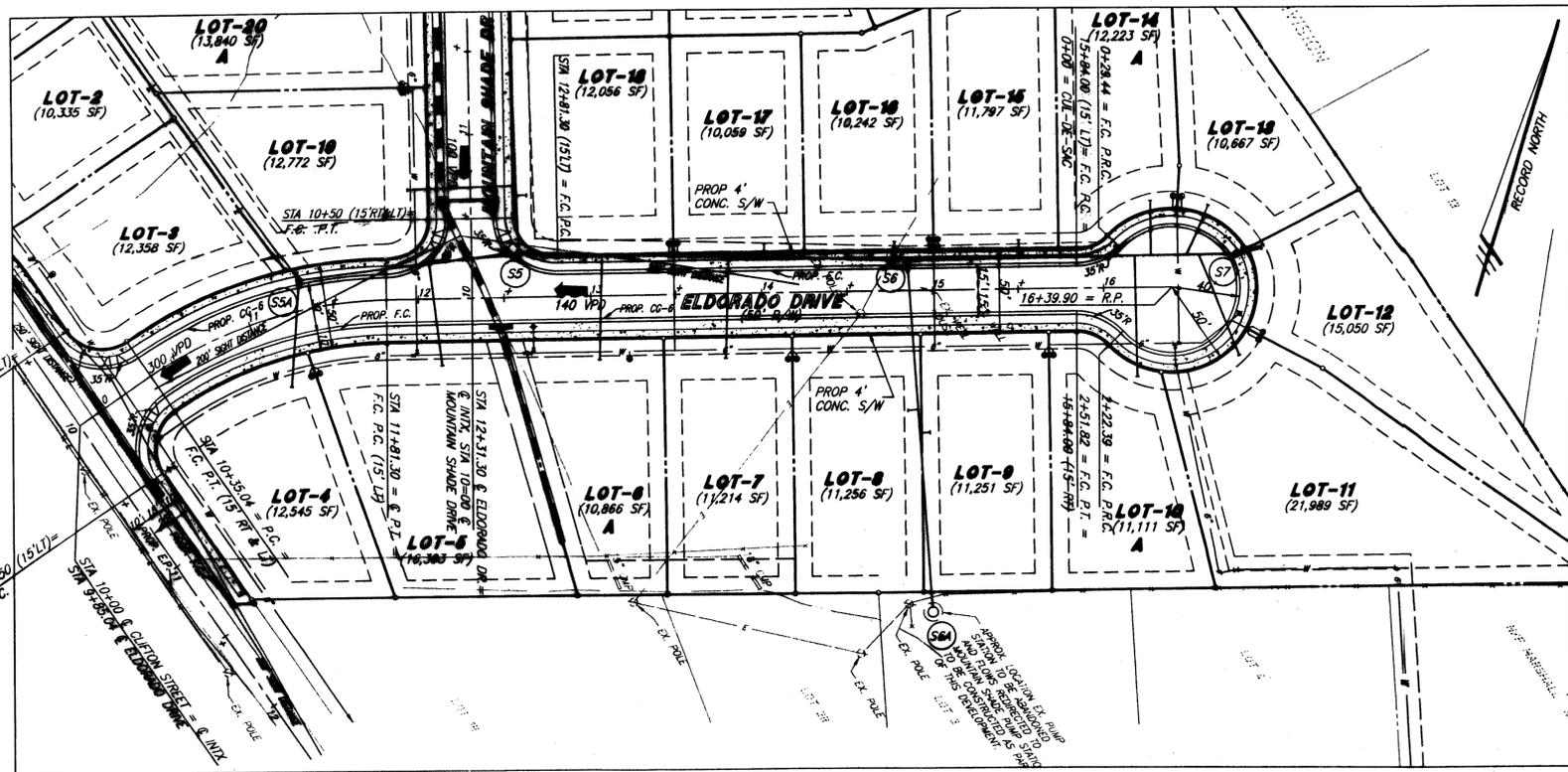
SUBDIVISION PLAN
 MOUNTAIN SHADE SUBDIVISION
 MARSHALL MAGISTERIAL DISTRICT
 FAUQUIER COUNTY, VIRGINIA

REVISIONS

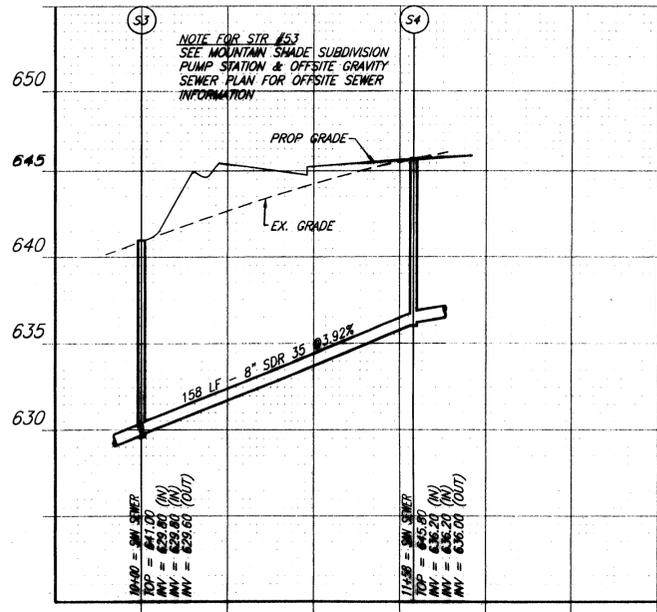
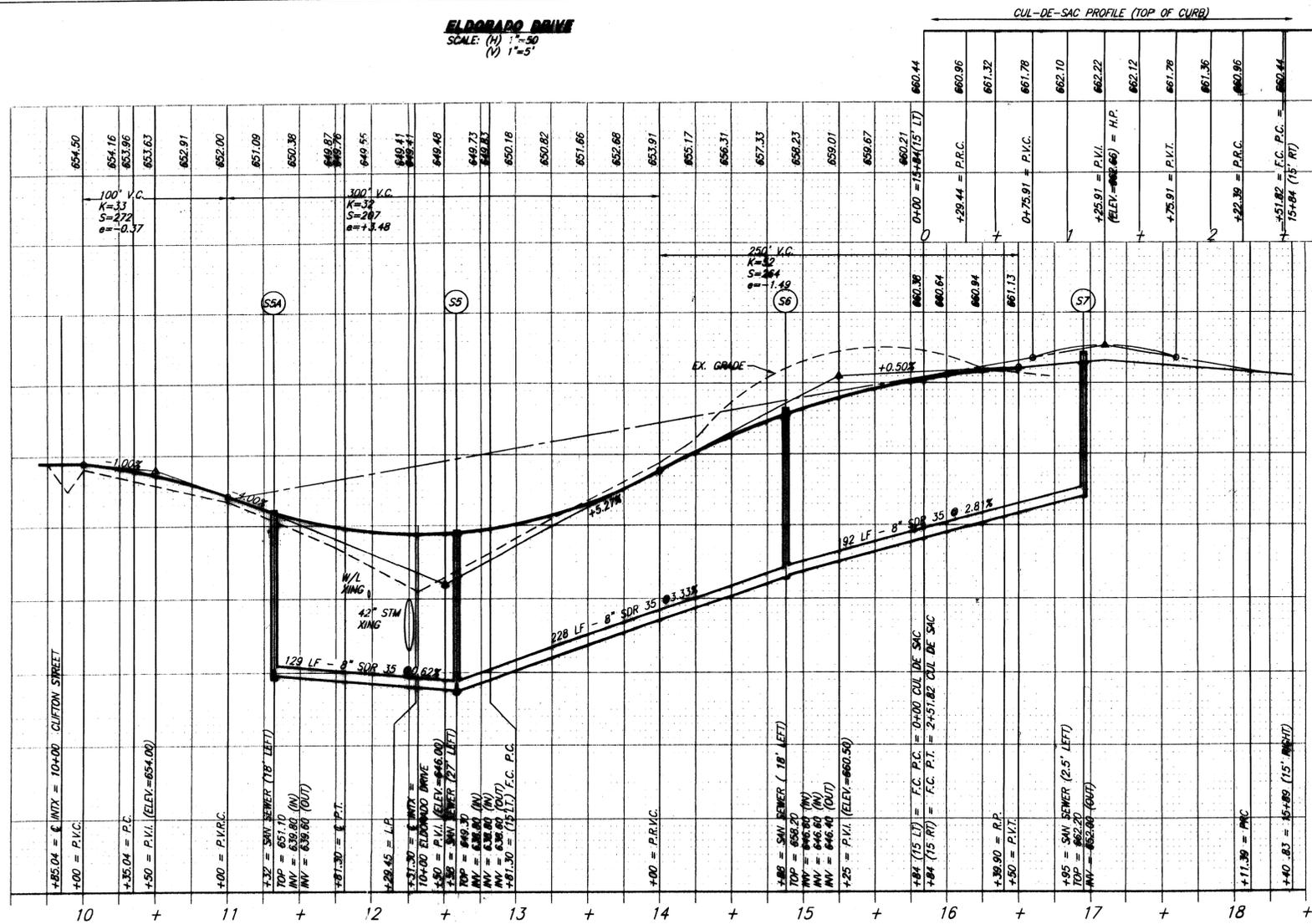
DESCRIPTION	DATE
GOVT COMMENTS	12/17/98
NOT COMMENTS	2/16/99
VDH REV.	1/8/00
VDH REV.	7/11/00



DATE: 9/14/98
 SCALE: 1" = 40'
 SHEET 3
 OF 14

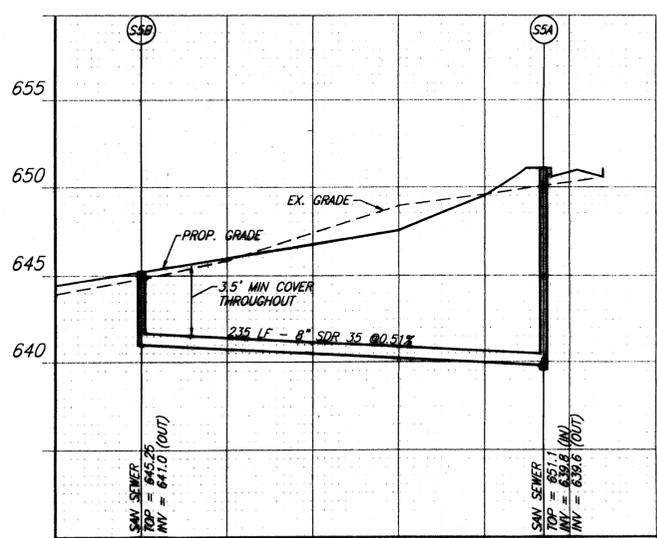
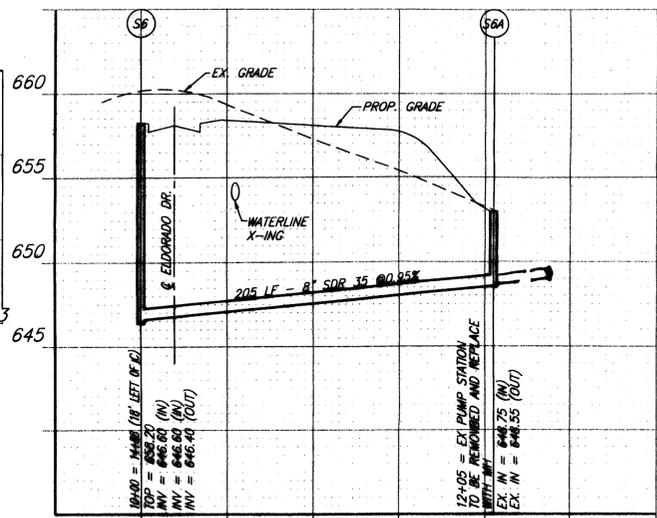


ELDORADO DRIVE
SCALE: (H) 1"=50'
(V) 1"=5'



SHEET REFERENCES

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NOTES	1,2
STREET SECTION	2
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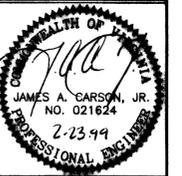


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PLAN & PROFILE
ELDORADO DRIVE
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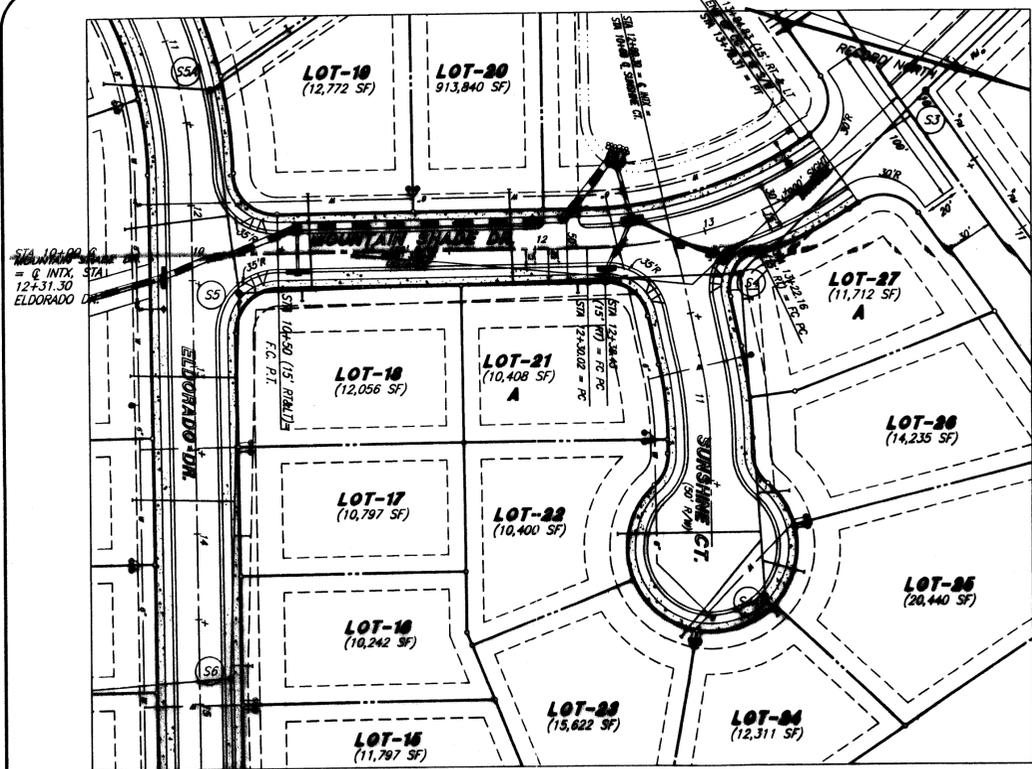
DESCRIPTION	DATE
GOVT COMMENTS	12/17/98
NOT COMMENTS	2/16/99



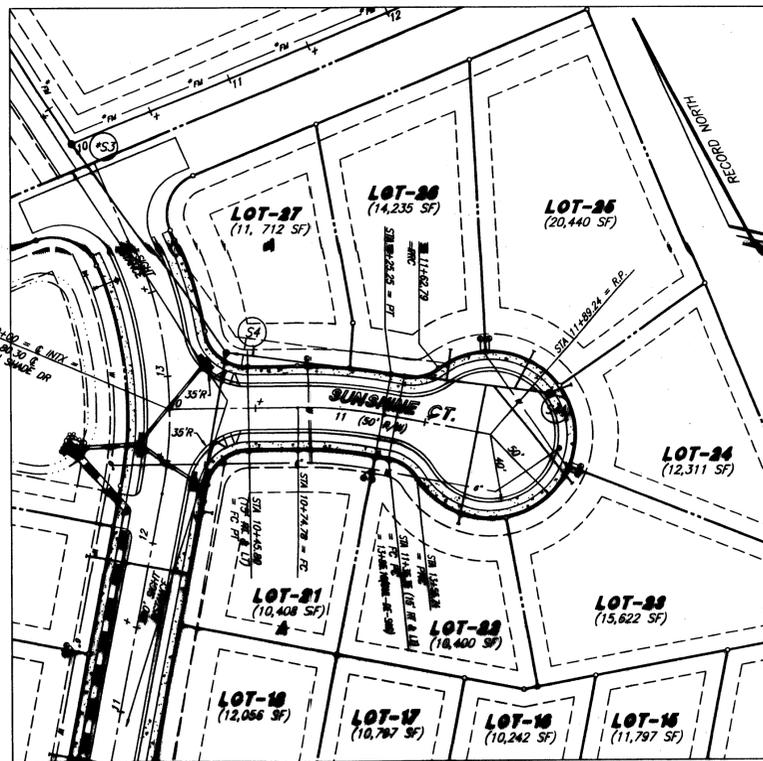
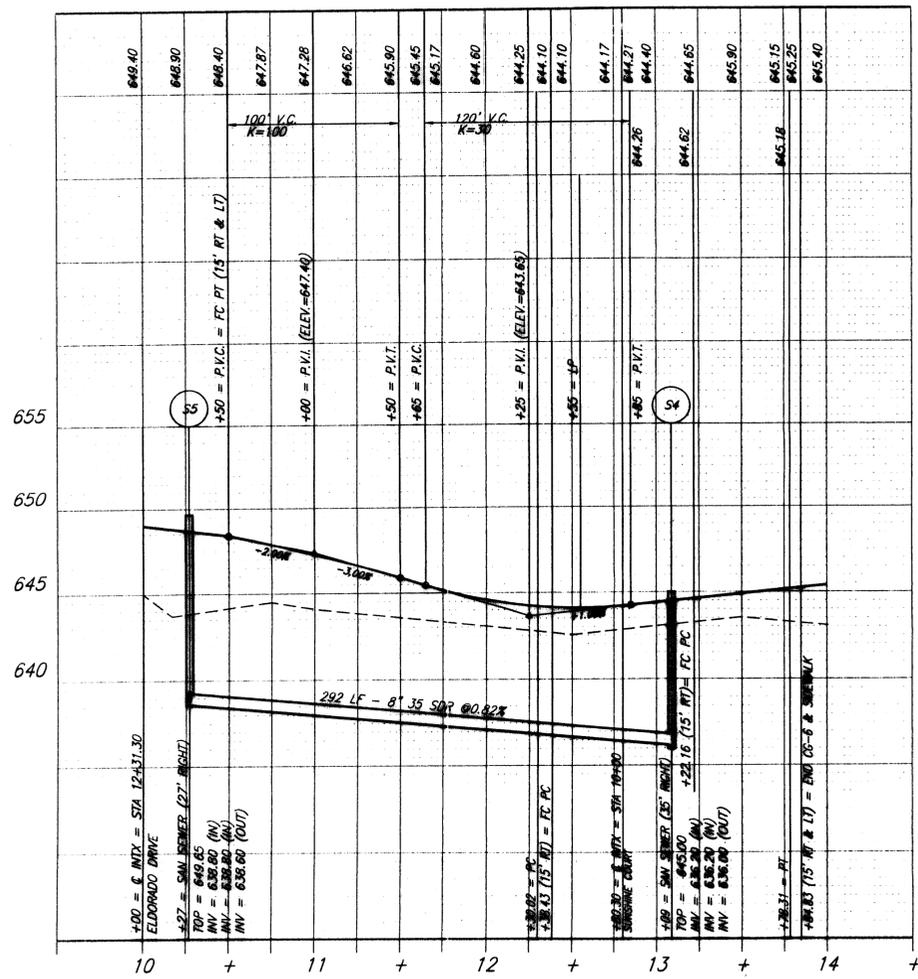
DATE: 9/14/98

SCALE: AS NOTED

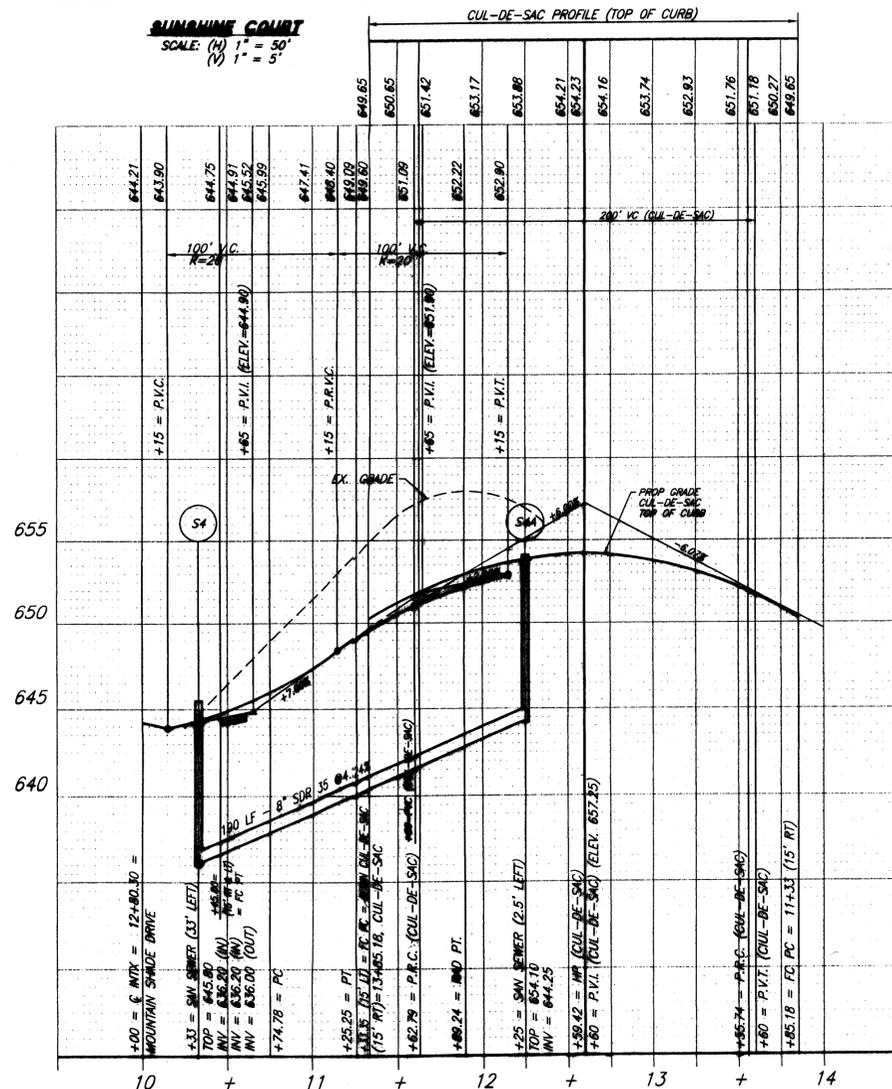
SHEET 4
OF 14



MOUNTAIN SHADE DRIVE
SCALE: (H) 1" = 50'
(V) 1" = 5'



SUNSHINE COURT
SCALE: (H) 1" = 50'
(V) 1" = 5'



SHEET REFERENCES

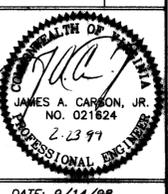
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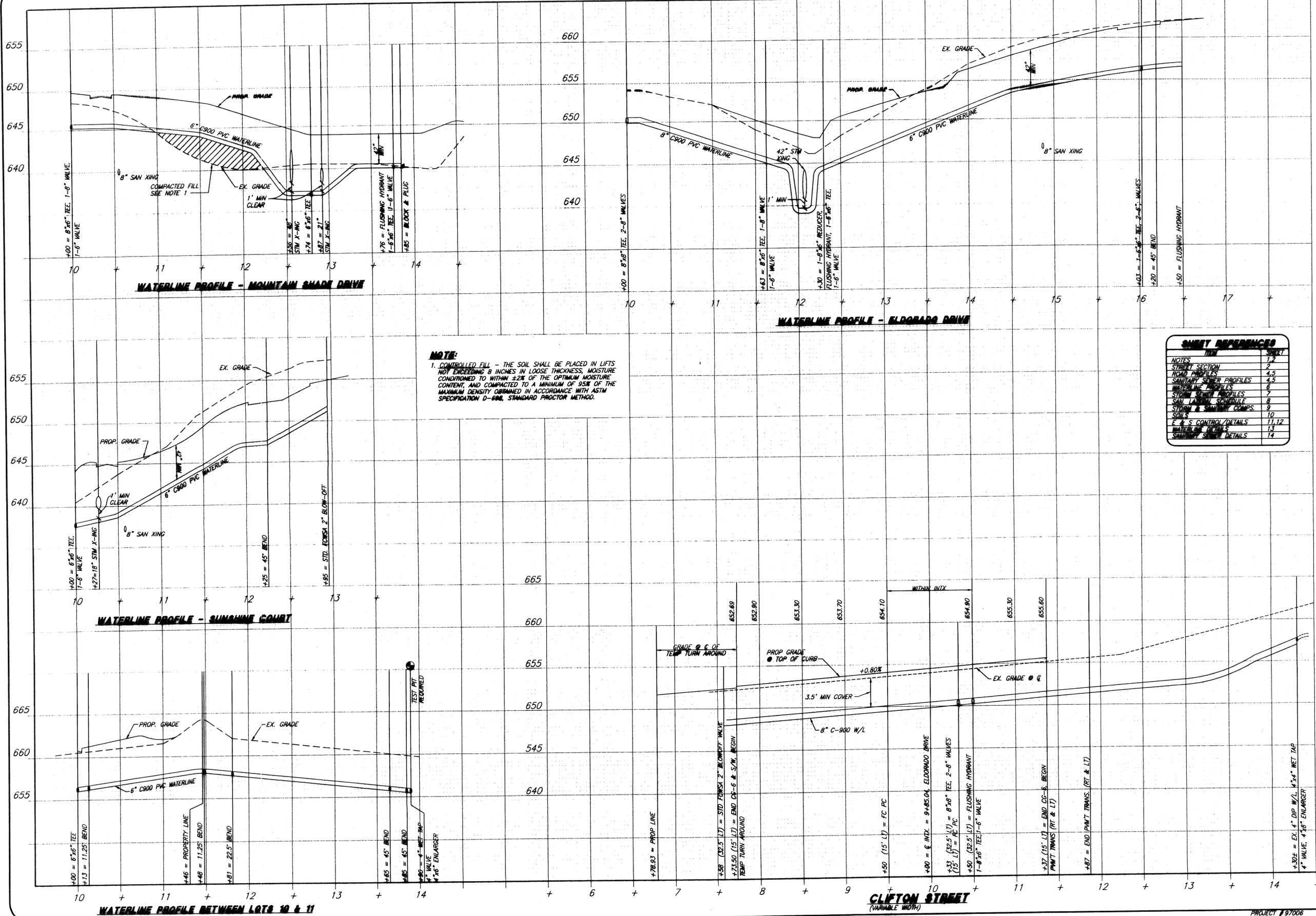
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MOUNTAIN SHADE DRIVE & SUNSHINE COURT
MOUNTAIN SHADE SUBDIVISION
MARSHALL MAGISTERIAL DISTRICT FAUQUIER COUNTY, VIRGINIA

REVISIONS

DESCRIPTION	DATE
GOVT COMMENTS	12/17/98
VOOT COMMENTS	2/16/99



DATE: 9/14/98
SCALE: AS NOTES
SHEET 5 OF 14

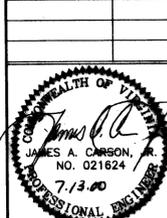


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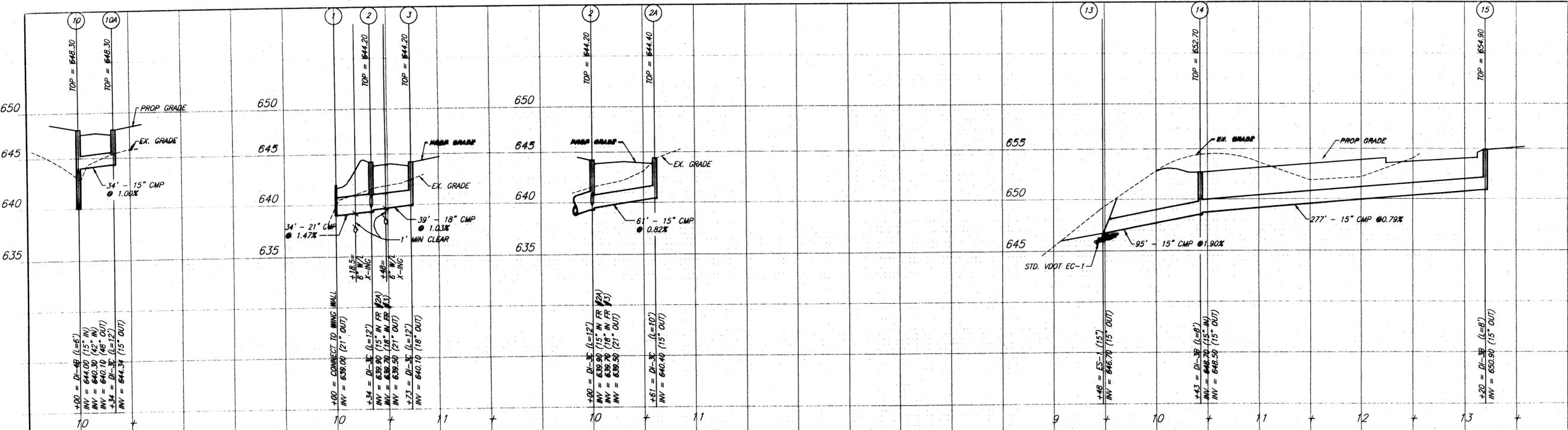
UTILITY PROFILES
 MOUNTAIN SHADE SUBDIVISION
 MARSHALL MAGISTERIAL DISTRICT
 FAUQUIER COUNTY, VIRGINIA

REVISIONS

DESCRIPTION	DATE
GOVT COMMENTS	12/17/98
VDT COMMENTS	2/16/99
VDT REV.	1/6/00
VDT REV.	7/11/00



DATE: 9/14/98
 SCALE: (H) 1" = 50'
 (V) 1" = 5'
 SHEET 6 OF 14
 PROJECT # 97006



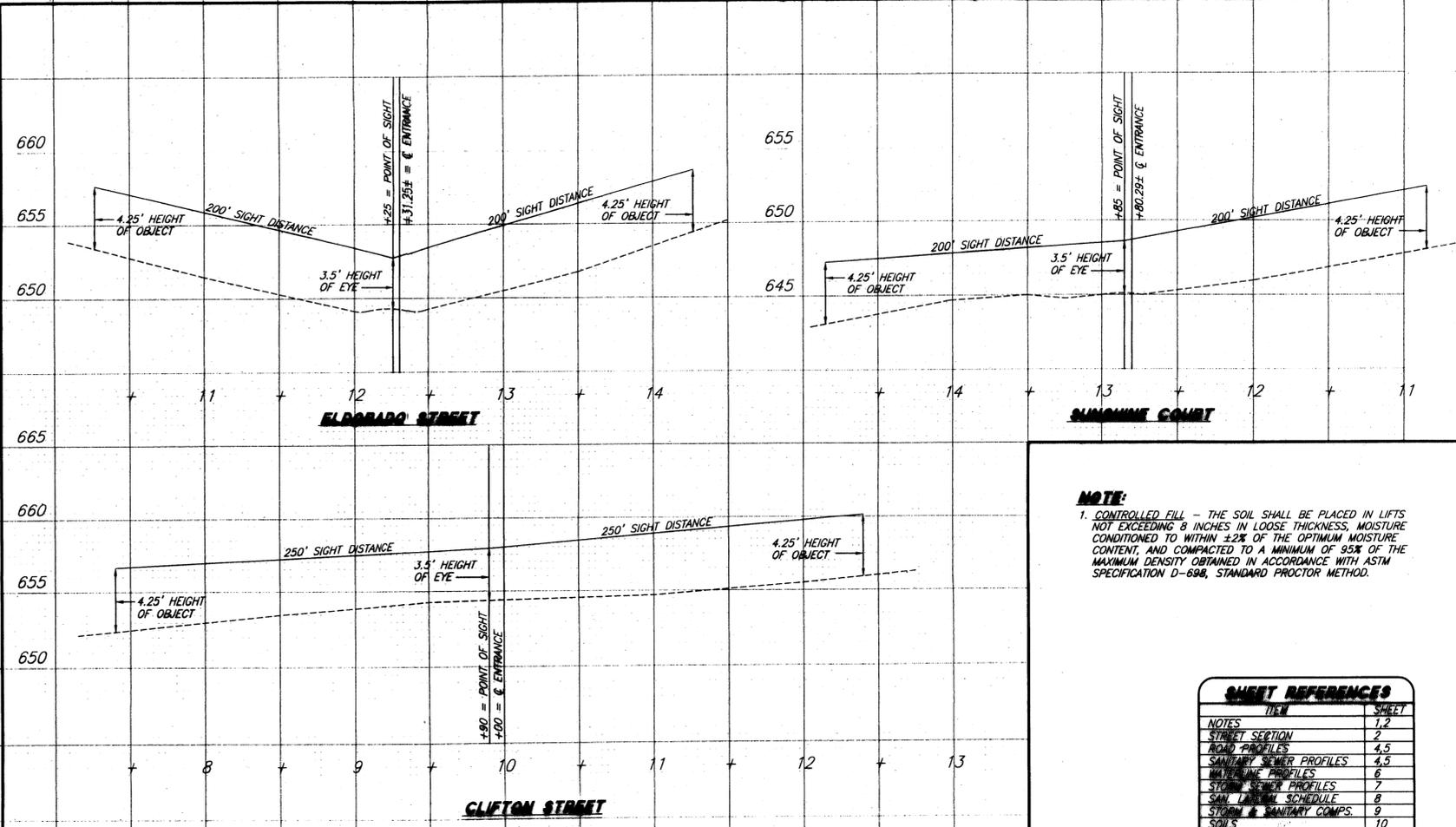
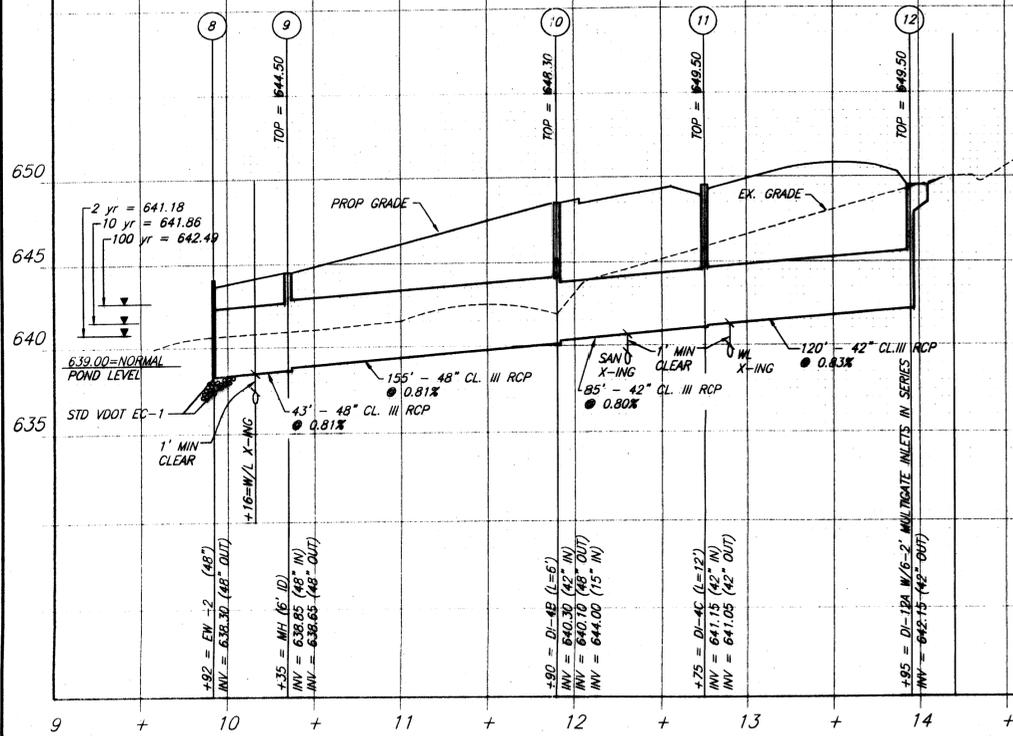
SECTION DATA

MANNING COEFFICIENT 0.035
 SLOPE 0.0331/ft
 DEPTH 0.58 ft
 LEFT SIDE SLOPE 4.00 ft/ft (H:V)
 RIGHT SIDE SLOPE 4.00 ft/ft (H:V)
 DISCHARGE 4.50 cfs

NOTES: SIDE SLOPES DETERMINED LOOKING DOWNSTREAM
 CHANNEL DEPTH - 1ft
 10 yr DISCHARGE CAPACITY = 10.05 cfs
 10 yr DISCHARGE INTO THE CHANNEL = 4.50 cfs
 2 yr VELOCITY = 3.09 cps

CHANNEL LINED WITH TALL FESCUE REINFORCED w/ JUTE MESH (EC-2)

STRUCTURE 13 OUTFALL CHANNEL
 CROSS SECTION FOR TRIANGULAR CHANNEL



NOTE:
 1. CONTROLLED FILL - THE SOIL SHALL BE PLACED IN LIFTS NOT EXCEEDING 8 INCHES IN LOOSE THICKNESS, MOISTURE CONDITIONED TO WITHIN ±2% OF THE OPTIMUM MOISTURE CONTENT, AND COMPACTED TO A MINIMUM OF 95% OF THE MAXIMUM DENSITY OBTAINED IN ACCORDANCE WITH ASTM SPECIFICATION D-698, STANDARD PROCTOR METHOD.

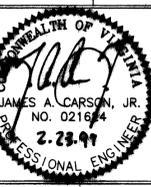
SHEET REFERENCES

ITEM	SHEET
NOTES	1,2
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ROAD PROFILES	4,5
SANITARY SEWER PROFILES	4,5
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STORM SEWER PROFILES	7
SAN. LAYOUT SCHEDULE	8
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SOILS	10
E & S CONTROL/DETAILS	11,12
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SIGHT DISTANCE PROFILES
 SCALE: (H) 1" = 50'
 (V) 1" = 5'

REVISIONS

DESCRIPTION	DATE
GOVT COMMENTS	12/17/98
VDOT COMMENTS	2/16/99



DATE: 9/14/98

SCALE: (H) 1" = 50'
 (V) 1" = 5'

SANITARY SEWER COMPUTATIONS												
MANHOLE FROM TO	UNITS OF AREA	FLOW PER UNIT	PEAKFLOW (cpd) INCR. TOTAL	SLOPE (%)	PIPE DIA (in)	VELOCITY (fps)	CAPACITY (mgd)	d/D (%)	LENGTH (ft)	INVERT ELEV.		MH ELEV. UPPER
S7 S6	6	300	1800 1800	2.81	8	1.02	1.31	2.8	192	652.00	646.60	661.45
S6A S6	36	300	11400 13200	0.95	8	1.28	0.76	9.1	205	648.55	646.60	
S6 S5	4	300	1200 14400	3.33	8	2.04	1.42	7.1	228	648.40	638.80	658.20
S5B S5A	3	300	900 900	0.51	8	0.46	0.55	3.0	235	641.00	639.80	645.25
S5A S5	2	300	600 1500	0.62	8	0.57	0.60	3.6	129	639.60	638.80	651.10
S5 S4	4	300	1200 17100	0.82	8	1.32	0.71	10.7	292	638.60	636.20	649.65
S4A S4	6	300	1800 1800	4.19	8	1.17	1.60	2.5	192	644.25	636.20	654.10
S4 S3	0	300	0 18900	3.92	8	2.34	1.52	7.7	158	636.00	628.80	645.00
EX S6A	360	300	36000		8							

* INCLUDES 36 OFFSITE LOTS

SANITARY LATERAL SCHEDULE (4" LATERALS)							
MANHOLE FROM TO	LOT #	STATION	LENGTH	MAIN INVERT	LAT. INVERT @ MAIN	LAT. INVERT @ END	GROUND ELEV.
S5 S5A	5	0+52	60	639.40	640.15	641.40	650.05
S5A S5B	4	1+29@MH	60	639.60	640.00	641.25	652.15
S5 S6	3	1+87	6	640.10	640.85	640.97	648.25
S5 S6	2	2+76	6	640.55	641.30	641.42	646.50
S5 S6	1	3+64@MH	6	641.00	641.40	641.52	645.25
S5 S6	6	0+49	60	640.42	641.19	642.44	650.90
S5 S6	7	1+23	60	642.90	643.67	644.92	653.20
S5 S6	17	1+43	10	643.57	644.34	644.54	653.70
S5 S6	16	2+20	10	646.13	646.90	647.17	658.00
S6 S7	15	2+94	10	648.45	649.20	649.41	660.00
S6 S7	10	3+80	70	650.31	651.06	652.52	661.00
S6 S7	14	3+70	35	650.59	651.34	652.06	662.00
S6 S7	13	3+90	35	651.15	651.90	652.63	662.00
S6 S7	11	4+00	65	651.43	652.18	653.53	662.00
S6 S7	12	4+20@MH	15	652.00	652.40	652.71	661.80
S6 S6A	8	0+87	6	647.43	648.17	648.10	658.00
S6 S6A	9	1+00	6	647.55	648.30	648.42	658.00
S4 S5	21	0+95	8	636.98	637.75	637.92	646.00
S4 S5	20	1+33	60	637.28	638.05	638.10	647.00
S4 S5	19	2+50	62	638.25	639.00	640.19	649.50
S4 S5	18	2+55	7	638.29	639.06	639.71	648.00
S4 S4A	27	0+15	6	636.84	637.59	637.71	646.20
S4 S4A	26	1+30	20	641.71	642.46	642.88	651.80
S4 S4A	22	1+53	85	642.68	643.44	645.30	652.80
S4 S4A	23	1+58	75	642.80	643.65	645.71	654.00
S4 S4A	25	1+70	25	643.41	644.16	644.88	653.80
S4 S4A	24	1+80@MH	15	644.25	644.65	644.86	654.00

STORM DRAIN INLET COMPUTATIONS

INLET NO. TYPE	L	STATION	LENGTH DRAIN (FEET)	DRAIN AREA (ACRES)	C	CA	I	RUNOFF Q (CFS)	CARRY-OVER Qc (CFS)	GUTTER FLOW Qg (CFS)	GUTTER SLOPE (FT/FT)	CROSS SLOPE (FT/FT)	SPREAD (FT)	W	W/F	Sw	Sw/Sx	Eo	a	S'w	Se	L/P	L/d	E	Q/d/h	Ob/Tsmg	REMARKS
2 3C	12			0.33	0.77	0.25		7.1	1.80	0	1.804	0.0024	0.0208	6.54	2		0.0833	4									SUMP
3 3C	12			1.48	0.51	0.75		7.1	5.34	0		0.0176	0.0208	14.30	2		0.0833	4									SUMP
10A 3B	12			0.65	0.70	0.46		7.1	3.23	0	3.230	0.0108	0.0208	8.84	2	23	0.0833	4	.63	3.5	0.146	0.113	12.6	0.95	1.00	3.22	
2A 3C	10			0.55	0.71	0.39		7.1	2.77	0		0.0100	0.0208	9.80	2		0.0833	4									SUMP
10 4B	6			0.16	0.90	0.14		7.1	1.02	0	1.02	0.0108	0.0208	4.60	2	43	0.0833	4	.91	3.5	0.146	0.154	6.5	0.92	0.99	1.01	
11 4C	12			1.40	0.77	1.08		7.1	7.65	0		0.0080	0.0208	13.02	2		0.0833	4									SUMP
14 3B	8			0.27	0.72	0.19		7.1	1.35	0	1.35	0.0080	0.0208	7.30	2	27	0.0833	4	.73	3.5	0.146	0.127	8.6	0.93	0.99	1.88	
15 3B	8			0.28	0.90	0.23		7.1	1.78	0	1.78	0.0080	0.0208	7.09	2	28	0.0833	4	.74	3.5	0.146	0.129	8.3	0.96	1.00	1.78	
12 0-12A	12			38.68	0.40	15.47		5.80	89.71																		TYPE I GRATE

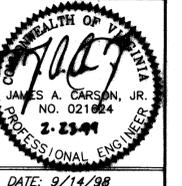
STORM SEWER DESIGN COMPUTATIONS

STRUCTURE FROM TO	DRAIN AREA A' (ACRES)	RUN-OFF COEF. C	INCRE-MENT	ACCUM-ULATED	INLET TIME Tc (MIN)	RAINFALL INTENSITY 'i' (IN/HR)	RUN-OFF 'Q' (CFS)	PIPE DIAMETER 'D' (IN)	PIPE SLOPE (FT/FT)	CAPACITY FULL 'Qf' (CFS)	ACTUAL VELOCITY 'V' (FPS)	PIPE LENGTH 'L' (FT)	PIPE INVERT ELEVATIONS		STRUCTURE TOP ELEV.	REMARKS
													UPPER END	LOWER END	UPPER END	
12 11	38.68	0.40	15.47	15.47	10	5.80	89.73	42"	0.0083	91.7	9.50	120	642.15	641.15	649.50	
11 10	1.40	0.77	1.08		5	7.1	97.40	42"	0.0088	94.4	9.80	85	641.05	640.30	649.50	
10 9	0.16	0.90	0.60*		5	7.1	101.70	48"	0.0081	129.3	10.30	155	640.10	638.85	648.30	*INCLUDE IN-FLOW FROM STR #10A
9 8					5	7.1	101.70	48"	0.0081	129.3	10.30	43	638.65	638.30	644.50	SYSTEM OUTFALL
10A 10	0.65	0.70	0.46	0.46	5	7.1	3.23	15"	0.01	3.50	2.90	34	644.34	644.00	648.30	
3 2	1.48	0.51	0.75	0.75	5	7.1	5.33	18"	0.0103	5.69	3.20	39	540.10	639.70	644.20	
2 1	0.33	0.77	0.25	1.39*	5	7.1	9.87	21"	0.0147	10.4	4.30	34	639.50	639.00	644.20	*INCLUDE IN-FLOW FROM STR #2A
2A 2	0.55	0.71	0.39	0.39	5	7.1	2.77	15"	0.082	3.17	2.60	61	640.40	639.90	644.40	
15 14	0.28	0.90	0.25	0.25	5	7.1	1.79	15"	0.0080	3.13	2.2	277	650.90	648.70	654.90	
14 13	0.27	0.72	0.19	0.44	5	7.1	3.12	15"	0.0190	4.82	3.7	95	648.50	646.70	652.70	SYSTEM OUTFALL

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STORM & SANITARY COMPUTATIONS
 MOUNTAIN SHADE SUBDIVISION
 MARSHALL MAGISTERIAL DISTRICT
 FAUQUIER COUNTY, VIRGINIA

REVISIONS	
DESCRIPTION	DATE
GOVT COMMENTS	12/17/98
VDOT COMMENTS	2/16/99



DATE: 9/14/98
 SCALE: NONE
 SHEET 8
 OF 14

SHEET REFERENCES	
ITEM	SHEET
NOTES	1,2
STREET SECTION	2
ROAD PROFILES	4,5
SANITARY SEWER PROFILES	4,5
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SEE "STORMWATER MANAGEMENT AND BMP CALCULATIONS AND INFORMATION" BOOKLET FOR DESIGN COMPUTATIONS.

MOUNTAIN SHADE SUBDIVISION STORMWATER MANAGEMENT AND BEST MANAGEMENT PRACTICE CALCULATIONS AND INFORMATION

MOUNTAIN SHADE SUBDIVISION CONSISTS OF 10.75 ACRES OF MODERATELY SLOPED LAND BOUNDED BY EXISTING SUBDIVISIONS ON TWO SIDES, AND BY FARMLAND AND A ROAD ON THE OTHER TWO SIDES. THE ENTIRE PROPERTY DRAINS TO THE GOOSE CREEK WATERSHED BY MEANS OF A SMALL STREAM WHICH CROSSES THE PARCEL. A TOTAL OF 36.80 ACRES OF OFF-SITE DEVELOPED PROPERTY (SINGLE FAMILY SUBDIVISIONS) ALSO DRAINS ACROSS THE SITE. THIS OFF-SITE PROPERTY WAS INCLUDED IN ALL SWM CALCULATIONS, WHILE BMP COMPUTATIONS SHOW THAT BMP REQUIREMENTS CAN BE MET WITHOUT TAKING OFF-SITE CREDIT. STORMWATER MANAGEMENT AND BMP REQUIREMENTS WERE MET USING A SMALL WET POND WITH BOTTOM ELEVATION 632.00 FEET AND TOP OF DAM AT ELEVATION 643.50 FEET.

THE REQUIRED BMP VOLUME, (33/9272) = 27,816 CF (0.6386 AC-FE), IS CONTAINED BETWEEN ELEVATIONS 632.30 FEET AND 639.30 FEET, WHICH IS THE DESIGN WATER SURFACE ELEVATION FOR THE WET POND.

THE SWM POND PRINCIPAL OUTLET STRUCTURE CONSISTS OF A STANDARD DI-7 GRATE INLET ON A STANDARD PRECAST MANHOLE /STANDPIPE. ELEVATION OF THE DI-7 INLET SHALL BE SET AT ELEVATION 639.30 FEET. A GRASS-LINED, TRAPEZOIDAL SPILLWAY WITH 16 FOOT BOTTOM WIDTH AT ELEVATION 641.5 FEET, ALLOWS DISCHARGE OF THE 100-YEAR STORM RUNOFF WHILE MAINTAINING AT LEAST ONE FOOT OF FREEBOARD IN THE POND. THE POND IS DESIGNED SO THAT THE SUM OF THE 2-YEAR, POST-DEVELOPMENT DISCHARGE FROM THE SWM POND AND THE DISCHARGE FROM THE 2-YEAR POST-DEVELOPMENT BYPASS AREAS, DOES NOT EXCEED THE TOTAL PRE-DEVELOPMENT FLOWS. OFFSITE AREAS ARE INCLUDED AS PART OF THE TOTAL DRAINAGE AREA. DETAILED INFORMATION ON TIMES OF CONCENTRATION, RUNOFF, AND POND ROUTING ARE PROVIDED IN A BINDER SUBMITTED WITH THESE PLANS. ALL RUN-OFF CALCULATIONS AND POND ROUTINGS WERE PERFORMED USING HASTAD METHODS' POND PACK 8.0 SOFTWARE AND THE MODIFIED RATIONAL METHOD. THE AVAILABLE I-D-F CURVES FOR FAUQUIER COUNTY WERE USED THROUGHOUT. SWM ROUTING INFORMATION IS SUMMARIZED BELOW:

PRE-DEVELOPMENT STORMWATER RUNOFF SUMMARY

ON-SITE + OFF-SITE AREAS | 47.55 AC | C=0.42 | Tc = 15 MIN | Qp = 69.83 CFS

POST-DEVELOPMENT STORMWATER RUNOFF SUMMARY

DRAINAGE AREA	AREA	C	Tc	2-YEAR FLOW
BYPASS AREA	1.97 ACRES	0.47	5 MIN	4.40 CFS
POST-DEV AREA TO SWM	45.58 ACRES	0.41	11 MIN	89.81 CFS
POND DISCHARGE	---	---	---	59.42 CFS
TOTALS	47.55 ACRES	---	---	63.82 CFS

* POST-DEV AREAS FLOW TO THE POND AND ARE ROUTED THROUGH IT. PEAK FLOWS TO THE POND ARE NOT INCLUDED IN THE TOTAL SITE FLOW.

CONCLUSION

THE TOTAL 2-YEAR POST-DEVELOPMENT PEAK FLOW (63.82 CFS) IS LESS THAN THE TOTAL 2-YEAR PRE-DEVELOPMENT PEAK FLOW (69.83 CFS). THE 10-YEAR AND 100-YEAR RETURN PERIOD FLOWS ARE ALSO TOTALLY CONTAINED WITHIN THE POND, WHILE MAINTAINING 1 FOOT OF FREE-BOARD DURING A 100-YEAR EVENT. STORMWATER MANAGEMENT AND BMP DETENTION REQUIREMENTS ARE MET FOR MOUNTAIN SHADE SUBDIVISION.

BYPASS FLOW

PRE & POST DEVELOPMENT FLOW PASSING THROUGH MOUNTAIN SHADE AND DISCHARGING TO GOLDEN ACRES SUBDIVISION.

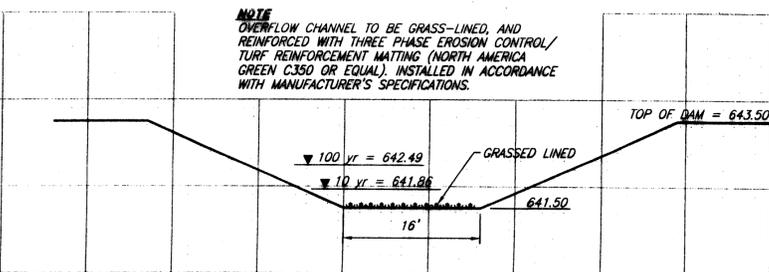
PRE-DEVELOPMENT

2.82 ACRES
C = 0.35
Qp = 7.27 * 2.82 * .35 = 7.81 CFS

POST DEVELOPMENT

1.74 ACRES @ .30
C = .41
Qp = 7.27 * 1.97 * .41 = 5.93 CFS

POST DEVELOPMENT FLOW < PRE DEVELOPMENT FLOW.



EMERGENCY SPILLWAY

SCALE: (H) 1" = 10'
(V) 1" = 2'

EMERGENCY SPILLWAY

Spillway Data	
Manning Coefficient	0.050
Slope	0.000000 R/L
Depth	1.50 R
Left Side Slope	3.00 R/L (4:1V)
Right Side Slope	3.00 R/L (4:1V)
Bottom Width	16.00 R
Results	
Discharge	66.70 cfs
Flow Area	16.0 R
Wetted Perimeter	25.32 R
Top Width	25.00 R
Critical Depth	0.76 R
Critical Slope	0.016411 R/L
Velocity	2.16 R/s
Velocity Head	0.16 R
Specific Energy	1.16 R
Froude Number	0.80
Flow Type	Subcritical

BMP FACILITY DESIGN WORKSHEET

- STEP 1. DETERMINE THE REQUIRED BMP STORAGE VOLUME FOR THE SITE.
- SITE ARE DRAINING INTO THE GOCCOQUAN WATERSHED
 - IMPERVIOUS OF AREA IN STEP 1A: 10.75 ACRES
- IMPERVIOUS = 27.6%
or C VALUE =
(SHOW COMPUTATIONS FOR OBTAINING WEIGHTED VALUES)
CHART A VALUE =
C) TOTAL REQUIRED BMP STORAGE FOR THE SITE (A)(C) = 862.5 cf/AC
(x3)=27816 cf
- STEP 2. DETERMINE THE REQUIRED BMP STORAGE FOR THE PROPOSED FACILITY.
- ON-SITE AREA (AND OFF-SITE AREA IF CREDIT IS TO BE TAKEN) DRAINING TO THE PROPOSED FACILITY: 8.78 ACRES
 - IMPERVIOUS OF AREA IN STEP 2A: 27.6%
- IMPERVIOUS = 27.6%
or C VALUE =
CHART A VALUE =
C) TOTAL REQUIRED BMP STORAGE FOR THE SITE (A)(C) = 862.5 cf/AC
(x3)=27816 cf
- NOTE: REPEAT STEP 2 FOR EACH PROPOSED BMP FACILITY.
- 27.659 cf PROVIDED

- STEP 3 CHECK UNCONTROLLED AREAS:
- IN THE UNCONTROLLED PORTIONS OF THE SITE, MEASURES THE OPEN AREAS AND ANY IMPERVIOUS AREAS THAT DRAIN BY SHEET FLOW OVER AN OPEN AREA: 1.97 ACRES
0.98 ACRES
845 cf
 - DIVIDE (A) BY 2
 - MULTIPLY (B) BY THE ANSWER FROM 1 (C)
- STEP 4 CHECK SITE COVERAGE
- TOTAL BMP VOLUMES PROVIDED: SUM ALL OF STEPS 2(D) AND ADD TO 3 (C): 8418 cf
 - PERCENTAGE OF STORAGE VOLUME PROVIDED: DIVIDED 4 (A) BY 1 (D): 90.8%
 - COMPARE 4 (B) TO 70%
DESIGN IS ACCEPTABLE IF 4 (B) 90.8% > 70%
DESIGN IS UNACCEPTABLE IF 4 (B) < 70%
- IF OFF-SITE CREDIT IS NOT TO BE TAKEN:
- TOTAL EQUIVALENT CONTROLLED AREA: ADD SUM STEPS 2(A) TO 3 (B): 9.76 ACRES
 - PERCENTAGES OF THE SITE IS CONTROLLED: DIVIDE 4 (D) BY 1 (A): 90.8%
 - COMPARE 4 (E) TO 70%
DESIGN IS ACCEPTABLE IF 4 (E) 90.8% > 70%
DESIGN IS UNACCEPTABLE IF 4 (E) < 70%

- STEP 5. IMPERVIOUS ACRES SERVED
- MEASURE TOTAL IMPERVIOUS AREA (INCLUDING OFF-SITE AREA IF CREDIT IS TO BE TAKEN): 2.96 ACRES
- IMPERVIOUS AREA FROM HOUSES: 27*900 SF = 24,300 SF
 - DOUBLE GARAGES: 27*400 SF = 10,800 SF
 - PORCHES, STOODS, & DRIVEWAYS = 31,453 SF
 - ELDORADO DRIVE (W/WALK) = 16,763 SF
 - MOUNTAIN SHADE DRIVE (W/WALK) = 13,850 SF
 - SUNSHINE COURT (W/WALK) TOTAL = 129,018 SF
- 129,018 SF = 2.96 ACRES
2.96/10.75 = 27.6% IMP

SEDIMENT BASIN CALCULATIONS

5.57 ACRES DRAINED TO POND
STORAGE REQUIRED - TOTAL VOLUME DRY & WET
134 cu/AC x 5.57 AC = 746 cu yd
746 cu yd x 27 $\frac{cu\ ft}{cu\ yd}$ = 20,152 cu ft
WET VOLUME = 10,076 cu ft
DRY VOLUME = 10,076 $\frac{cu\ ft}{1.35}$ = 7471 cu ft
CLEAN OUT VOLUME = 5171 cu ft

SEDIMENT BASIN ELEVATIONS

ELEVATIONS DETERMINED FROM VOLUME STORAGE TABLE CALCULATED FOR SWM/BMP POND
TOP OF DAM = 643.50
TOP OF SPILLWAY = 641.50
RISER CREST = 639.30
DRY POND ELEVATION = 638.40
DEWATERING DEVICE = 636.60
WET POND ELEVATION = 636.60
CLEAN OUT ELEVATION = 635.30
BOTTOM OF POND = 632.00

ORIFICE CALCULATIONS

$Q = 10,076\ cu\ ft / 21,600\ sec = 0.4665\ CFS$

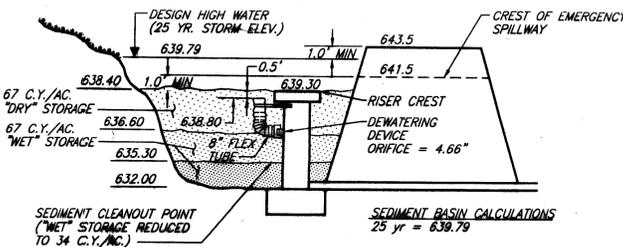
$h = (639.30 - 636.60) / 2 = 1.35$

$A = \frac{0.4665}{(64.32 \times ((1.35/2)^2))^{0.5}} = 0.1180$

$d = 2 \times (0.1180/3.14)^{0.5} = .39\ in = 4.06"$

NOTE

THE POND IS TO BE BUILT AS DESIGNED AND USED AS A TEMPORARY SEDIMENT BASIN. THE OUTFALL FOR THE POND WILL BE THE SAME OUTFALL AS FOR THE SEDIMENT BASIN, WITH THE ONLY MODIFICATION BEING THAT THE DEWATERING DEVICE IS TO BE BLOCKED & PLUGGED WHILE TRANSITION FROM BASIN TO SWM/BMP POND. A TEMPORARY BYPASS PIPING SYSTEM TO DIVERT OFF-SITE WATER FROM THE SEDIMENT BASIN SHALL BE CONSTRUCTED ALONG WITH THE BASIN. WHEN THE SITE IS COMPLETED AND STABILIZED THE SEDIMENT IS TO BE REMOVED AND THE TEMPORARY BYPASS PIPING SHALL BE CUT IN ORDER TO TRANSITION TO THE SWM/BMP POND.



SEDIMENT BASIN SCHEMATIC ELEVATIONS

SCALE: NTS

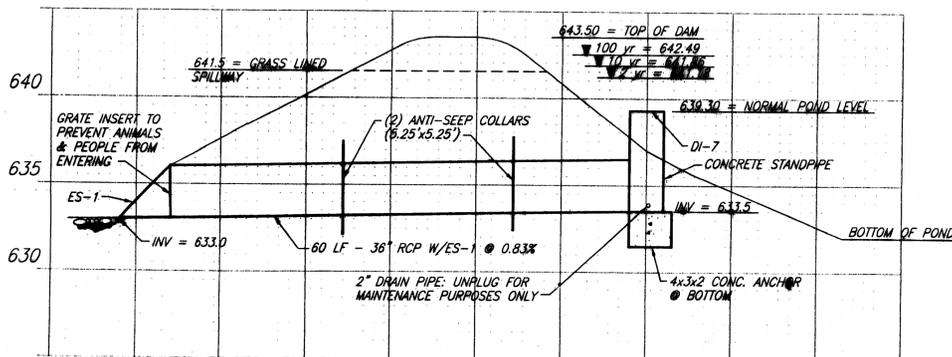
ANTI-SEEP COLLARS

$L_s = Y(2+4) (1 + (S/(25-S)))$

$L_s = 7.3(2+4) (1 + (0.11/25-0.11))$

$L_s = 45.8$

2 COLLARS - 5.25'x5.25'



DAM & SPILLWAY X-SECTION

SCALE: (H) 1" = 10'
(V) 1" = 5'

Elevation (ft)	Flow (cfs)	Area (sq. ft)	Velocity (ft/sec)	Volume (cu. ft)	Volume (cu. yd)
643.00	0.00	0.00	0.00	0.00	0.00
642.00	0.00	0.00	0.00	0.00	0.00
641.00	0.00	0.00	0.00	0.00	0.00
640.00	0.00	0.00	0.00	0.00	0.00
639.00	0.00	0.00	0.00	0.00	0.00
638.00	0.00	0.00	0.00	0.00	0.00
637.00	0.00	0.00	0.00	0.00	0.00
636.00	0.00	0.00	0.00	0.00	0.00
635.00	0.00	0.00	0.00	0.00	0.00
634.00	0.00	0.00	0.00	0.00	0.00
633.00	0.00	0.00	0.00	0.00	0.00
632.00	0.00	0.00	0.00	0.00	0.00

Elevation (ft)	Flow (cfs)	Area (sq. ft)	Velocity (ft/sec)	Volume (cu. ft)	Volume (cu. yd)
632.00	0.00	0.00	0.00	0.00	0.00
633.00	0.00	0.00	0.00	0.00	0.00
634.00	0.00	0.00	0.00	0.00	0.00
635.00	0.00	0.00	0.00	0.00	0.00
636.00	0.00	0.00	0.00	0.00	0.00
637.00	0.00	0.00	0.00	0.00	0.00
638.00	0.00	0.00	0.00	0.00	0.00
639.00	0.00	0.00	0.00	0.00	0.00
640.00	0.00	0.00	0.00	0.00	0.00
641.00	0.00	0.00	0.00	0.00	0.00
642.00	0.00	0.00	0.00	0.00	0.00
643.00	0.00	0.00	0.00	0.00	0.00
643.50	0.00	0.00	0.00	0.00	0.00

SHEET REFERENCES

ITEM	SHEET
NOTES	1,2
STREET SECTION	2,2
ROAD PROFILES	4,5
SANITARY SEWER PROFILES	4,5
MOUNTAIN SHADE SUBDIVISION	6
SWM BASIN PROFILES	7
SWM BASIN DETAILS	8
SWM BASIN DETAILS	9
I & S CONTROL/DETAILS	10
SWM BASIN DETAILS	11,12
SWM BASIN DETAILS	13
SWM BASIN DETAILS	14

Type: Pond Routing Summary
Date: 2/25/1999
File: C:\MOUNTAIN SHADE\97006\97006SP05.DWG
LEVEL BOOK SUMMARY
NYS DIR
Inflow NYC file = MOUNTAIN SHADE - 25YR
Outflow NYC file = MOUNTAIN SHADE - 25YR
Pond Mode Data = HYDROLOG2
Pond Volume Data = 100000
Pond Outlet Data = SET SWM CONTROL
No Infiltration
INITIAL CONDITIONS
Starting Wt Elev = 638.10 ft
Starting Volume = 28610 cu. ft
Starting Outflow = 1.66 cfs
Starting Inflow = 1.66 cfs
Starting Total Inlet = 1.66 cfs
Time Interval = 1.00 min
INFLOW/OUTFLOW HYDROGRAPH SUMMARY
Peak Inflow = 24.72 cfs at 9.00 min
Peak Outflow = 13.00 cfs at 7.00 min
Peak Elevation = 639.79 ft
Pond Storage = 35048 cu. ft

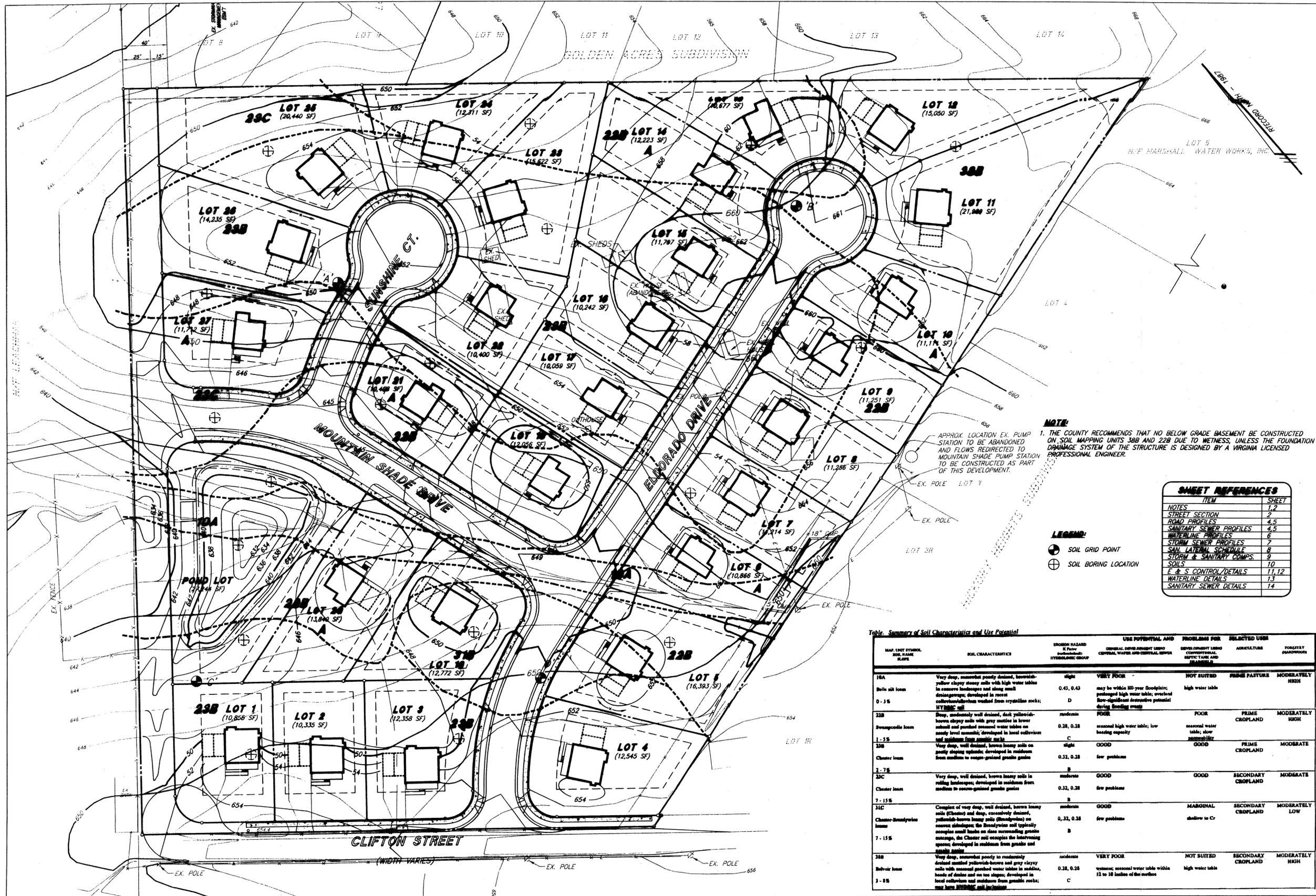
CARSON, HARRIS & ASSOCIATES, LLC
CIVIL ENGINEERING - LAND SURVEYING - LAND PLANNING
39 GARRETT STREET, WRENTON, VIRGINIA 20186
PHONE: (540) 347-9151 FAX: (540) 346-1905

SWM CALCULATIONS & DETAILS
MOUNTAIN SHADE SUBDIVISION
MARSHALL MAGISTERIAL DISTRICT
FAUQUIER COUNTY, VIRGINIA

REVISIONS

DESCRIPTION	DATE
GOVT COMMENTS	12/17/98

DATE: 7/29/98
SCALE: NONE
SHEET 9 OF 14



NOTE:
1. THE COUNTY RECOMMENDS THAT NO BELOW GRADE BASEMENT BE CONSTRUCTED ON SOIL MAPPING UNITS 38B AND 22B DUE TO WETNESS, UNLESS THE FOUNDATION DRAINAGE SYSTEM OF THE STRUCTURE IS DESIGNED BY A VIRGINIA LICENSED PROFESSIONAL ENGINEER.

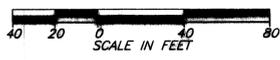
APPROX. LOCATION EX. PUMP STATION TO BE ABANDONED AND FLOWS REDIRECTED TO MOUNTAIN SHADE PUMP STATION TO BE CONSTRUCTED AS PART OF THIS DEVELOPMENT.

SHEET REFERENCES	
ITEM	SHEET
NOTES	1, 2
STREET SECTION	2
ROAD PROFILES	4, 5
SANITARY SEWER PROFILES	4, 5
WATERLINE PROFILES	6
STORM SEWER PROFILES	7
SOIL LATERAL SCHEDULE	8
STORM & SANITARY COMPS.	9
SOILS	10
F & S CONTROL/DETAILS	11, 12
WATERLINE DETAILS	13
SANITARY SEWER DETAILS	14

- LEGEND:**
- SOIL GRID POINT
 - ⊕ SOIL BORING LOCATION

Table: Summary of Soil Characteristics and Use Potential

MAP UNIT SYMBOL, SOIL NAME & SLOPE	SOIL CHARACTERISTICS	STORM HAZARD (% Flow Excess) HYDRAULIC GROUP	USE POTENTIAL AND GENERAL DEVELOPMENT USAGE CENTRAL WATER AND CENTRAL SEWER	PROBLEMS FOR DEVELOPMENT USING CONVENTIONAL SEPTIC TANKS AND DRAINAGE	SELECTED USES
18A Belle silt loam	Very deep, somewhat poorly drained, brownish-yellow clayey silty soils with high water tables in coarse sandstones and strong small desiccation cracks developed in recent calcareous sandstones washed from crystalline rocks; HYDRAULIC: nil	slight 0.43, 0.43	VERY POOR may be within 100-year floodplain; prolonged high water table; overland flow-significant destructive potential during flooding stage	NOT SUITED high water table	PASTURE MODERATELY HIGH
22B Swampy loam	Deep, moderately well drained, dark yellowish-brown clayey soils with gray mottles in lower subsoil and perched seasonal water tables on sandy level sandstone developed in local calcivium and medium from granitic rocks	moderate 0.28, 0.28	POOR seasonal high water table; low bearing capacity	POOR seasonal water table; slow permeability	PRIME CROPLAND MODERATELY HIGH
1-15 23B Chester loam	Very deep, well drained, brown loamy soils on gently sloping uplands developed in medium to medium to coarse-grained granitic gneiss	slight 0.33, 0.28	GOOD few problems	GOOD	PRIME CROPLAND MODERATE
2-7B 23C Chester loam	Very deep, well drained, brown loamy soils in rolling landscapes developed in medium to medium to coarse-grained granitic gneiss	moderate 0.33, 0.28	GOOD few problems	GOOD	SECONDARY CROPLAND MODERATE
7-15B 31C Chester-Beadyrite loam	Complete of very deep, well drained, brown loamy soils (Chester) and deep, excessively drained, yellowish-brown loamy soils (Beadyrite) on coarse sandstones; the Beadyrite soil typically occupies small knobs on close surrounding granitic outcrops; the Chester soil occupies the intervening spaces; developed in medium to medium to coarse-grained granitic gneiss	moderate 0.33, 0.28	GOOD few problems	MARGINAL shallow to Cr	SECONDARY CROPLAND MODERATELY LOW
3-15 38B Belvoir loam	Very deep, somewhat poorly to moderately drained medium yellowish-brown and gray clayey soils with seasonal ground water tables in nodules, beds of dolerite and on two slopes; developed in local calcivium and medium from granitic rocks; may have HYDRIC soil inclusion	moderate 0.38, 0.28	VERY POOR wetness; seasonal water table within 12 to 18 inches of the surface	NOT SUITED high water table	SECONDARY CROPLAND MODERATELY HIGH



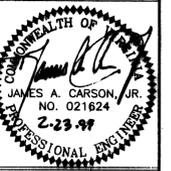
CARSON, HARRIS & ASSOCIATES, LLC
CIVIL ENGINEERING - LAND SURVEYING - LAND PLANNING
39 GARRETT STREET, WARRENTON, VIRGINIA 20786
PHONE: (540) 347-9191 FAX: (540) 349-1905

SOILS MAP
MOUNTAIN SHADE SUBDIVISION

FAUQUIER COUNTY, VIRGINIA
MARSHALL MAGISTERIAL DISTRICT

REVISIONS

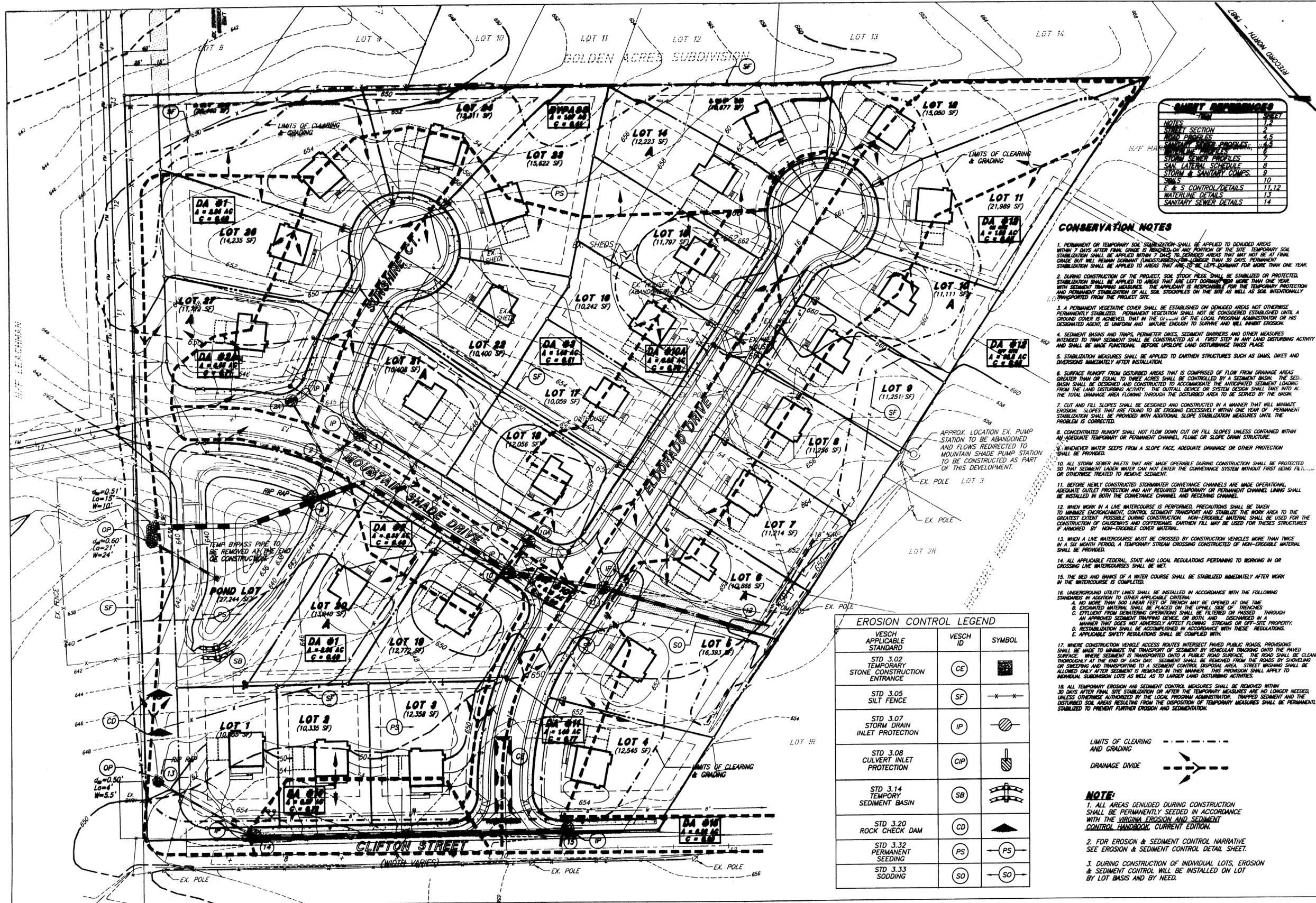
DESCRIPTION	DATE
GOVT COMMENTS	12/17/98



DATE: 9/14/98

SCALE: 1" = 40'

SHEET 10
OF 14



SHEET REFERENCES	
NO.	SHEET
NOTES	1, 2
SHED SECTION	1, 2
SHED ELEVATIONS	4, 5
STORM SEWER PROFILES	4, 5
STORM SEWER DETAILS	7
SAN LATERAL SCHEDULE	8
STORM & SANITARY DETAILS	9
SEWER CONTROL/DETAILS	10
SEWER CONTROL/DETAILS	11, 12
WATERLINE DETAILS	13
SANITARY SEWER DETAILS	14

- ### CONSERVATION NOTES
- PERMANENT OR TEMPORARY SOIL STABILIZATION SHALL BE APPLIED TO DENUDED AREAS WITHIN 7 DAYS AFTER FINAL GRADE IS REACHED ON ANY PORTION OF THE SITE. TEMPORARY SOIL STABILIZATION SHALL BE APPLIED TO AREAS THAT ARE LEFT DORMANT FOR MORE THAN ONE YEAR. PERMANENT STABILIZATION SHALL BE APPLIED TO AREAS THAT ARE TO BE LEFT DORMANT FOR MORE THAN ONE YEAR.
 - DURING CONSTRUCTION OF THE PROJECT, SOIL STOCK PILES SHALL BE STABILIZED OR PROTECTED. INTENDED TO TRAP SEDIMENT SHALL BE CONSIDERED AS PART OF THE EROSION AND SEDIMENT CONTROL PLAN. THE APPLICANT IS RESPONSIBLE FOR THE TEMPORARY PROTECTION AND PERMANENT STABILIZATION OF ALL SOIL STOCKPILES ON THE SITE AS WELL AS SOIL INTERNATIONALLY TRANSPORTED FROM THE PROJECT SITE.
 - A PERMANENT VEGETATIVE COVER SHALL BE ESTABLISHED ON DENUDED AREAS NOT OTHERWISE PERMANENTLY STABILIZED. PERMANENT VEGETATION SHALL NOT BE CONSIDERED ESTABLISHED UNTIL A GRASS COVER IS ACHIEVED. THAT IN THE OPINION OF THE LOCAL PROGRAM ADMINISTRATOR OR HIS DESIGNATED AGENT, IS UNIFORM AND MATURE ENOUGH TO SURVIVE AND WELL MAINTAINED CROUCH.
 - SEDIMENT BASINS AND TRAPS, PERIMETER DIKES, SEDIMENT BARRIERS AND OTHER MEASURES INTENDED TO TRAP SEDIMENT SHALL BE CONSTRUCTED AS PART OF THE EROSION AND SEDIMENT CONTROL PLAN AND SHALL BE MADE FUNCTIONAL BEFORE UP-SLOPE LAND DISTURBANCE TAKES PLACE.
 - STABILIZATION MEASURES SHALL BE APPLIED TO EARTHEN STRUCTURES SUCH AS DAMS, DIKES AND DIVERSIONS IMMEDIATELY AFTER INSTALLATION.
 - SURFACE RUNOFF FROM DISTURBED AREAS THAT IS COMPOSED OF FLOW FROM DRAINAGE AREAS GREATER THAN OR EQUAL TO THREE ACRES SHALL BE CONTROLLED BY A SEDIMENT BASIN. THE SEDIMENT BASIN SHALL BE DESIGNED AND CONSTRUCTED TO ACCOMMODATE THE ANTICIPATED SEDIMENT LOADING FROM THE LAND DISTURBING ACTIVITY. THE OUTFALL DEVICE OR SYSTEM DESIGN SHALL TAKE INTO ACCOUNT THE TOTAL DRAINAGE AREA FLOWING THROUGH THE DISTURBED AREA TO BE SERVED BY THE BASIN.
 - CUT AND FILL SLOPES SHALL BE DESIGNED AND CONSTRUCTED IN A MANNER THAT WILL MINIMIZE EROSION. SLOPES THAT ARE FOUND TO BE ERODING EXCESSIVELY WITHIN ONE YEAR OF PERMANENT STABILIZATION SHALL BE PROVIDED WITH ADDITIONAL SOIL STABILIZATION MEASURES UNTIL THE PROBLEM IS CORRECTED.
 - CONCENTRATED RUNOFF SHALL NOT FLOW DOWN CUT OR FILL SLOPES UNLESS CONTAINED WITHIN AN ADEQUATE TEMPORARY OR PERMANENT CHANNEL, FLUME OR SLOPE DRAIN STRUCTURE.
 - WHENEVER WATER SEEPS FROM A SLOPE FACE, ADEQUATE DRAINAGE OR OTHER PROTECTION SHALL BE PROVIDED.
 - ALL STORM SEWER INLETS THAT ARE MADE OPERABLE DURING CONSTRUCTION SHALL BE PROTECTED SO THAT SEDIMENT CANNOT ENTER THE CONVEYANCE SYSTEM WITHOUT FIRST BEING FILTERED OR OTHERWISE TREATED TO REMOVE SEDIMENT.
 - BEFORE NEWLY CONSTRUCTED STORMWATER CONVEYANCE CHANNELS ARE MADE OPERATIONAL, ADEQUATE OUTLET PROTECTION AND ANY REQUIRED TEMPORARY OR PERMANENT CHANNEL LINING SHALL BE INSTALLED IN BOTH THE CONVEYANCE CHANNEL AND RECEIVING CHANNEL.
 - WHEN WORK IN A LIVE WATERCOURSE IS PERFORMED, PRECAUTIONS SHALL BE TAKEN TO MINIMIZE ENCROACHMENT, CONTROL SEDIMENT TRANSPORT AND STABILIZE THE WORK AREA TO THE GREATEST EXTENT POSSIBLE DURING CONSTRUCTION. NON-ERODIBLE MATERIAL SHALL BE USED FOR THE CONSTRUCTION OF CAUSEWAYS AND COfferINGS. EARTHEN FILL MAY BE USED FOR THESE STRUCTURES IF APPROVED BY NON-ERODIBLE COVER MATERIAL.
 - WHEN A LIVE WATERCOURSE MUST BE CROSSED BY CONSTRUCTION VEHICLES MORE THAN TWICE IN A SIX MONTH PERIOD, A TEMPORARY STREAM CROSSING CONSTRUCTED OF NON-ERODIBLE MATERIAL SHALL BE PROVIDED.
 - ALL APPLICABLE FEDERAL, STATE AND LOCAL REGULATIONS PERTAINING TO WORKING IN OR CROSSING LIVE WATERCOURSES SHALL BE MET.
 - THE BED AND BANKS OF A WATER COURSE SHALL BE STABILIZED IMMEDIATELY AFTER WORK IN THE WATERCOURSE IS COMPLETED.
 - UNDERGROUND UTILITY LINES SHALL BE INSTALLED IN ACCORDANCE WITH THE FOLLOWING STANDARDS IN ADDITION TO OTHER APPLICABLE CRITERIA:
 - NO MORE THAN 500 LINEAR FEET OF TRENCH MAY BE OPENED AT ONE TIME.
 - EXCAVATED MATERIAL SHALL BE PLACED ON THE UP-SLOPE SIDE OF TRENCHES.
 - EFFLUENT FROM DEWATERING OPERATIONS SHALL BE FILTERED OR PASSED THROUGH AN APPROVED SEDIMENT TRAPPING DEVICE OR BOTH, AND DISCHARGED IN A MANNER THAT DOES NOT ADVERSELY AFFECT FLOWING STREAMS OR OFF-SITE PROPERTY.
 - RESTABILIZATION SHALL BE ACCOMPLISHED IN ACCORDANCE WITH THESE REGULATIONS.
 - APPLICABLE SAFETY REGULATIONS SHALL BE COMPLIED WITH.
 - WHERE CONSTRUCTION VEHICLE ACCESS ROUTES INTERSECT PAVED PUBLIC ROADS, PROVISIONS SHALL BE MADE TO MINIMIZE THE TRANSPORT OF SEDIMENT BY VEHICULAR TRACKING ONTO THE PAVED SURFACE. WHERE SEDIMENT IS TRANSPORTED ONTO A PUBLIC ROAD SURFACE, THE ROAD SHALL BE CLEANED THOROUGHLY AT THE END OF EACH DAY. SEDIMENT SHALL BE REMOVED FROM THE ROADS BY SHOVELING OR SWEEPING AND TRANSPORTING TO A SEDIMENT CONTROL DISPOSAL AREA. STREET WASHING SHALL BE ALLOWED ONLY AFTER SEDIMENT IS REMOVED IN THIS MANNER. THIS PROVISION SHALL APPLY TO INDIVIDUAL SUBDIVISION LOTS AS WELL AS TO LARGER LAND DISTURBING ACTIVITIES.
 - ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES SHALL BE REMOVED WITHIN 30 DAYS AFTER FINAL SITE STABILIZATION OR AFTER THE TEMPORARY MEASURES ARE NO LONGER NEEDED, UNLESS OTHERWISE AUTHORIZED BY THE LOCAL PROGRAM ADMINISTRATOR. TRAPPED SEDIMENT AND THE DISTURBED SOIL AREAS RESULTING FROM THE DISPOSITION OF TEMPORARY MEASURES SHALL BE PERMANENTLY STABILIZED TO PREVENT FURTHER EROSION AND SEDIMENTATION.

EROSION CONTROL LEGEND

VESCH APPLICABLE STANDARD	VESCH ID	SYMBOL
STD 3.02 TEMPORARY STONE CONSTRUCTION ENTRANCE	CE	
STD 3.05 SILT FENCE	SF	
STD 3.07 STORM DRAIN INLET PROTECTION	IP	
STD 3.08 CULVERT INLET PROTECTION	CIP	
STD 3.14 TEMPORARY SEDIMENT BASIN	SB	
STD 3.20 ROCK CHECK DAM	CD	
STD 3.32 PERMANENT SEEDING	PS	
STD 3.33 SODDING	SO	



- ### NOTE
- ALL AREAS DENUDED DURING CONSTRUCTION SHALL BE PERMANENTLY SEEDING IN ACCORDANCE WITH THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK, CURRENT EDITION.
 - FOR EROSION & SEDIMENT CONTROL NARRATIVE SEE EROSION & SEDIMENT CONTROL DETAIL SHEET.
 - DURING CONSTRUCTION OF INDIVIDUAL LOTS, EROSION & SEDIMENT CONTROL WILL BE INSTALLED ON LOT BY LOT BASIS AND BY MEANS.

THIS SHEET TO BE USED FOR DRAINAGE DIVIDE & EROSION AND SEDIMENT CONTROL PURPOSES ONLY!!!

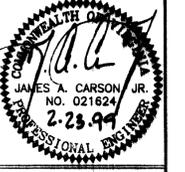


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 39 GARRETT STREET, WIREMOUNT, VIRGINIA 20186
 PHONE: (540) 347-9181 FAX: (540) 349-1905

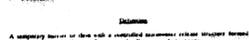
EROSION & SEDIMENT CONTROL PLAN
MOUNTAIN SHADE SUBDIVISION
 FAUQUIER COUNTY, VIRGINIA
 MARSHALL MAGISTERIAL DISTRICT

REVISIONS	
NO.	DATE
1	12/17/98
2	1/16/99

DATE: 9/14/98
 SCALE: 1" = 40'
 SHEET 11 OF 14



TEMPORARY SEDIMENT BASIN



Definition: A temporary basin for the collection and retention of sediment...

Purpose: To prevent sediment from entering drainage systems...

Construction Specifications: Details on the construction of the basin walls and floor.

Maintenance: Instructions on how to inspect and maintain the basin.

Removal: Guidelines for when and how to remove the basin.

Notes: Additional information and clarifications regarding the basin.

CULVERT INLET PROTECTION



Definition: A sediment filter located at the inlet to sewer culverts...

Purpose: To prevent sediment from entering drainage systems...

Construction Specifications: Details on the filter material and structure.

Maintenance: Instructions on how to inspect and maintain the filter.

Removal: Guidelines for when and how to remove the filter.

Notes: Additional information and clarifications regarding the filter.

STORM DRAIN INLET PROTECTION



Definition: A sediment filter or an excavated impounding area around a storm drain inlet...

Purpose: To prevent sediment from entering drainage systems...

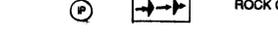
Construction Specifications: Details on the structure and materials.

Maintenance: Instructions on how to inspect and maintain the protection.

Removal: Guidelines for when and how to remove the protection.

Notes: Additional information and clarifications regarding the protection.

ROCK CHECK DAMS



Definition: Small temporary stone dams constructed across a swale or drainage ditch...

Purpose: To reduce the velocity of concentrated stormwater flow...

Construction Specifications: Details on the dam structure and materials.

Maintenance: Instructions on how to inspect and maintain the dam.

Removal: Guidelines for when and how to remove the dam.

Notes: Additional information and clarifications regarding the dam.

SILT FENCE



Definition: A temporary sediment barrier consisting of a synthetic filter fabric stretched across and anchored to supporting posts and end anchors...

Purpose: To intercept and detain small amounts of sediment from disturbed areas...

Construction Specifications: Details on the fabric and posts.

Maintenance: Instructions on how to inspect and maintain the fence.

Removal: Guidelines for when and how to remove the fence.

Notes: Additional information and clarifications regarding the fence.

TEMPORARY STONE CONSTRUCTION ENTRANCE



Definition: A stabilized stone pad with a filter fabric underlayer located at points of vehicular ingress and egress on a construction site...

Purpose: To reduce the amount of mud transported onto paved public roads...

Construction Specifications: Details on the stone and fabric.

Maintenance: Instructions on how to inspect and maintain the entrance.

Removal: Guidelines for when and how to remove the entrance.

Notes: Additional information and clarifications regarding the entrance.

PERMANENT SEEDING



Definition: The establishment of permanent vegetative cover on disturbed areas by planting seed...

Purpose: To reduce erosion and stabilize disturbed areas...

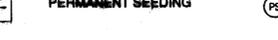
Construction Specifications: Details on the seed and application method.

Maintenance: Instructions on how to care for the seeded area.

Removal: Guidelines for when and how to remove the seeding.

Notes: Additional information and clarifications regarding the seeding.

SPACING BETWEEN CHECK DAMS



Definition: The distance between two check dams to ensure effective sediment control...

Purpose: To ensure that sediment is captured between dams...

Construction Specifications: Details on the dam placement and spacing.

Maintenance: Instructions on how to inspect and maintain the spacing.

Removal: Guidelines for when and how to remove the dams.

Notes: Additional information and clarifications regarding the spacing.

EROSION & SEDIMENT CONTROL NARRATIVE

PROJECT DESCRIPTION - THIS PROJECT CONSISTS OF THE SUBDIVISION OF A 10.75 ACRES LOT INTO A 27 LOT SUBDIVISION WITH A 20' ROAD...

EXISTING SITE CONDITIONS - THIS SITE HAS MODERATE SLOPES WITH A RIDGE RUNNING ALONG THE NORTHERN PORTION OF THE SITE...

ADJACENT AREAS - THIS PROJECT IS ADJACENT TO GOLDEN ACRE SUBDIVISION TO THE NORTH, HUNTERS HILLS SUBDIVISION TO THE EAST AND CLIFTON ROAD TO THE SOUTH...

OFF-SITE AREAS - OFF-SITE GRADING OR CONSTRUCTION WILL BE LIMITED TO THE CONSTRUCTION OF THE WATERLINE, SANITARY SEWER, AND THE CONNECTION OF THE ROAD...

CRITICAL AREAS - THE ONLY AREA THAT MAY CAUSE POTENTIALLY SERIOUS EROSION PROBLEMS WILL BE THE OUTFALL LEADING TO THE CULVERT BETWEEN LOTS 5 & 8...

EROSION & SEDIMENT CONTROL - FIRST CONTROLS TO BE INSTALLED WILL BE A SILT FENCE ALONG THE NORTHERN BOUNDARY AND A CONSTRUCTION ENTRANCE AFTER THESE ARE INSTALLED...

SEE THE CONSTRUCTION NOTES ON THE EROSION & SEDIMENT CONTROL SHEET FOR THE MINIMUM STANDARDS LISTED ABOVE.

SEE THE "MAINTENANCE" SECTION FOR EACH INDIVIDUAL CONTROL ON THE EROSION & SEDIMENT CONTROL SHEET FOR THE MINIMUM STANDARDS LISTED ABOVE.

ALL CONTROLS ARE RECOMMENDATIONS BY THIS FIRM AND ARE TO BE FOLLOWED UNLESS AN ALTERNATE CONTROL IS APPROVED BY THE LOCAL FIELD INSPECTOR.

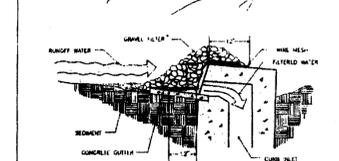
NOTE: DURING CONSTRUCTION OF INDIVIDUAL LOTS EROSION & SEDIMENT CONTROL WILL BE INSTALLED ON A LOT TO LOT BASIS.

PERMANENT STABILIZATION - THE RECOMMENDED SEEDING AND MULCHING SPECIFICATIONS ARE ON THE EROSION & SEDIMENT CONTROL SHEET...

SOILS - SEE MAP AND CHARACTERISTICS ON SHEET 10.

OFF-SITE DRAINAGE MAP - THIS MAP WILL BE USED TO DETERMINE THE LOCATION OF THE OFF-SITE DRAINAGE SYSTEM...

GRAVEL CURB INLET SEDIMENT FILTER



Definition: A method of inlet protection for storm drains using gravel and concrete aggregate...

Purpose: To filter sediment from stormwater entering the drain.

Construction Specifications: Details on the gravel and aggregate.

Maintenance: Instructions on how to inspect and maintain the filter.

Removal: Guidelines for when and how to remove the filter.

Notes: Additional information and clarifications regarding the filter.

ROCK CHECK DAM



Definition: A structure used to reduce the velocity of concentrated stormwater flow...

Purpose: To reduce erosion and stabilize disturbed areas.

Construction Specifications: Details on the dam structure and materials.

Maintenance: Instructions on how to inspect and maintain the dam.

Removal: Guidelines for when and how to remove the dam.

Notes: Additional information and clarifications regarding the dam.

CONSTRUCTION OF A SILT FENCE (WITH WIRE SUPPORT)

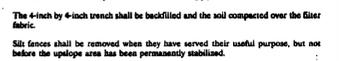


Definition: A method of silt fence construction using wire support for stability.

Purpose: To provide a more stable and effective sediment barrier.

Construction Specifications: Details on the wire and fabric.

ROCK CHECK DAM



Definition: A structure used to reduce the velocity of concentrated stormwater flow...

Purpose: To reduce erosion and stabilize disturbed areas.

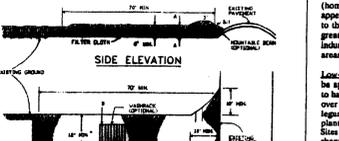
Construction Specifications: Details on the dam structure and materials.

Maintenance: Instructions on how to inspect and maintain the dam.

Removal: Guidelines for when and how to remove the dam.

Notes: Additional information and clarifications regarding the dam.

STONE CONSTRUCTION ENTRANCE



Definition: A stabilized stone pad with a filter fabric underlayer located at points of vehicular ingress and egress on a construction site...

Purpose: To reduce the amount of mud transported onto paved public roads...

Construction Specifications: Details on the stone and fabric.

Maintenance: Instructions on how to inspect and maintain the entrance.

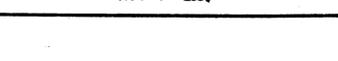
Removal: Guidelines for when and how to remove the entrance.

Notes: Additional information and clarifications regarding the entrance.

SHEET REFERENCES

Table listing sheet references for various items like notes, street section, rock profiles, sanitary sewer profiles, waterline profiles, storm sewer profiles, etc.

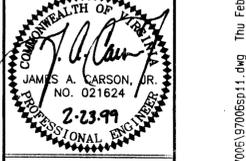
OFF-SITE DRAINAGE MAP



Carson, Harris & Associates, LLC logo and contact information including address and phone number.

Large vertical text block containing 'EROSION & SEDIMENT CONTROL DETAILS', 'MOUNTAIN SHADE SUBDIVISION', 'FAUQUIER COUNTY, VIRGINIA', and 'MARSHALL MAGISTERIAL DISTRICT'. Includes a revision table and a professional seal for James A. Carson, Jr.

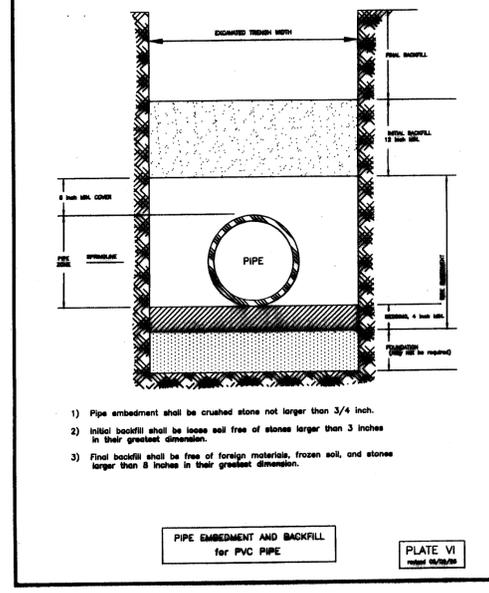
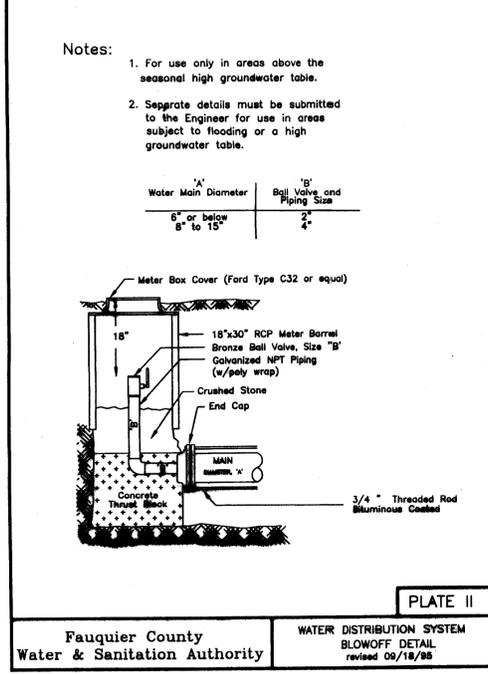
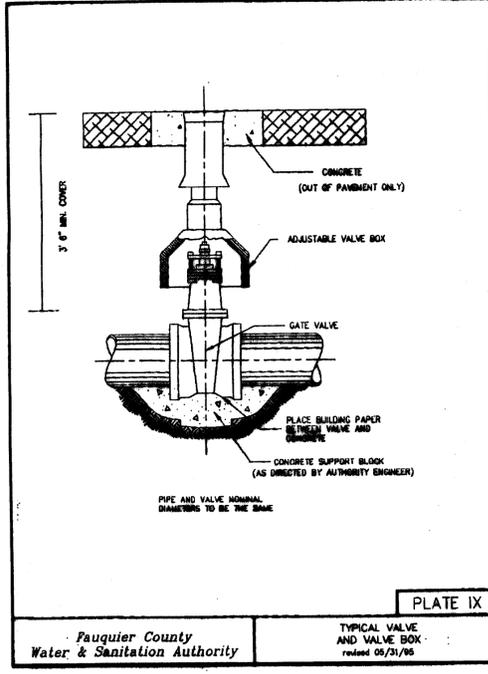
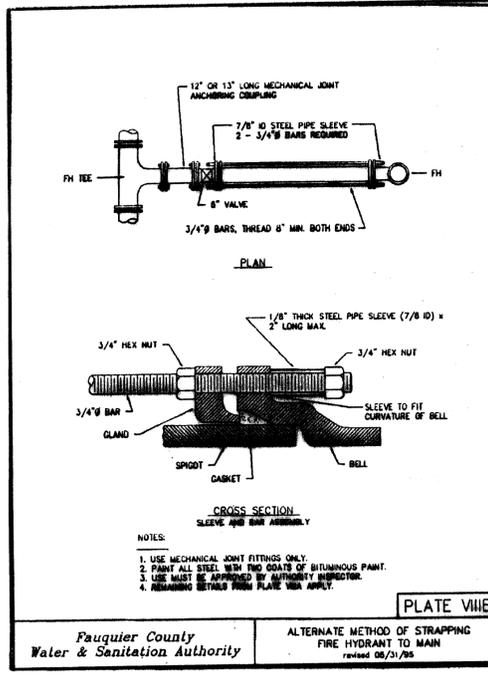
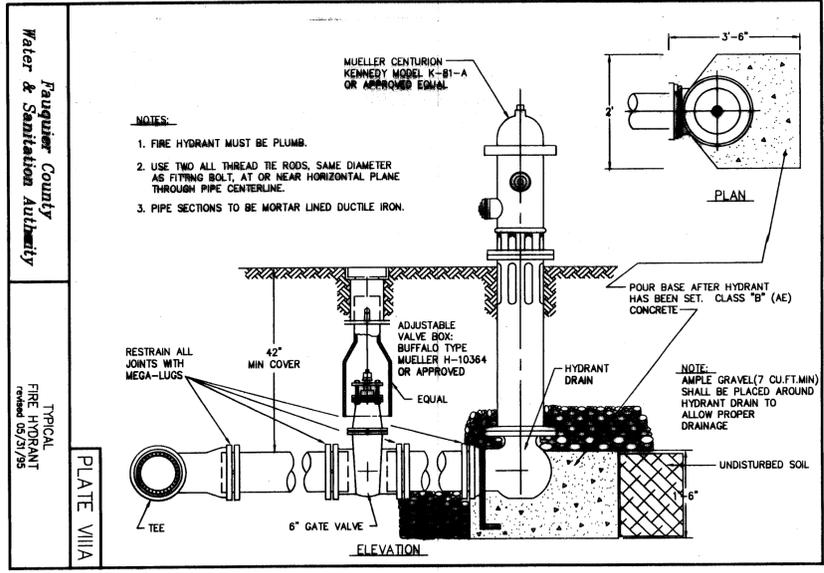
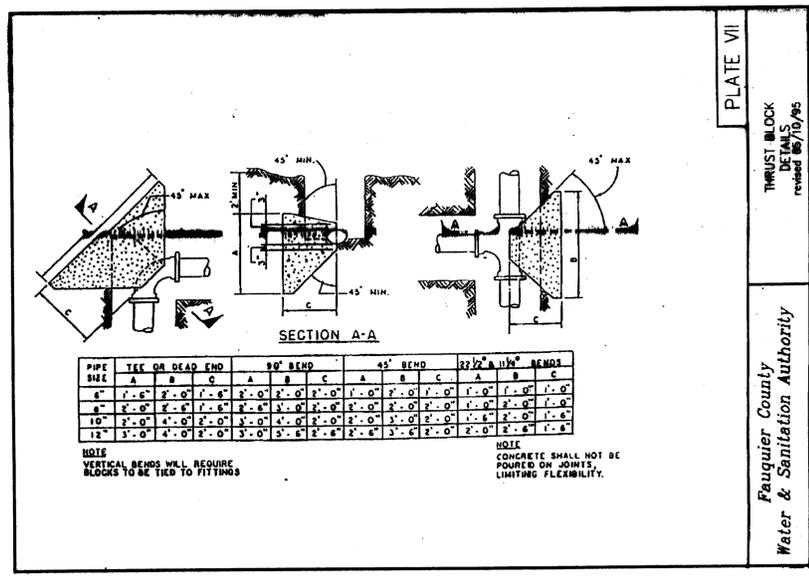
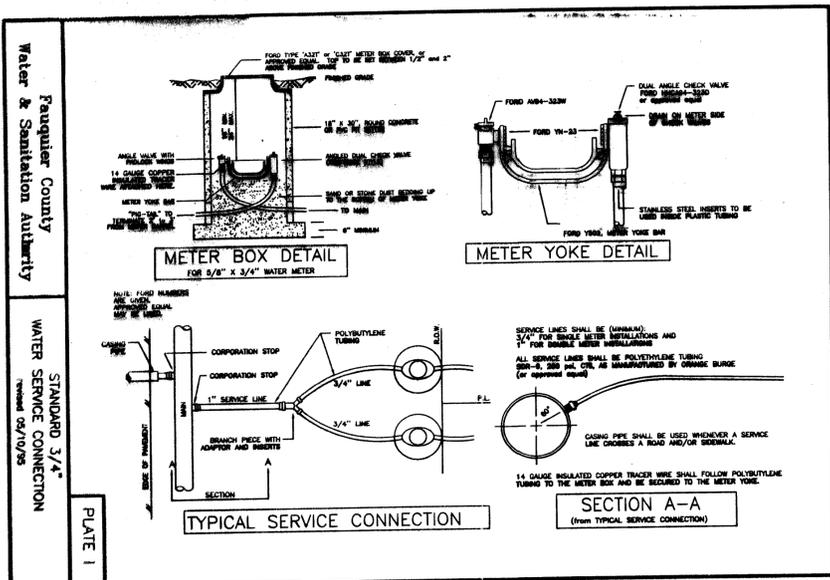
Table with 3 columns: REVISIONS, DESCRIPTION, DATE. Shows a revision on 12/17/98.



DATE: 9/14/98

SCALE: NONE

SHEET 12 OF 14



Disinfection of Water Mains

During the course of the work, all reasonable precautions shall be taken to protect the pipe fittings and valves against contamination. When pipe-laying is not in progress, all openings in the pipe line shall be closed by watertight plugs.

The water main shall be closed and flushed prior to disinfection with a sufficient flow to produce a flushing velocity of at least 2 1/2 feet per second. Finished water shall be flushed through the system until no traces of foreign matter are visible. This water shall be discharged or wasted only at points specifically designated by the Authority.

The new pipe line shall be disinfected by chlorination in accordance with AWWA Specification C601-68. The disinfection agent of the chlorine solution shall be sodium hypochlorite solution, Grade D, conforming to Federal Specification O-S-602b, dry hypochlorite equal to "HTH" as manufactured by Olin Chemical Co.

The chlorine solution at any point in the line, shall have a minimum concentration of 50 parts per million (ppm) or 50 milligrams per liter (mg/L) and shall be applied to the system at a constant, measured rate by pumping in accordance with the continuous feed method, AWWA Specification C601-68, Subsection 7.1. Finished water from an approved source shall be made to flow at a constant, measured rate into the new pipeline. The two rates shall be properly proportioned so that the chlorine concentration in the pipeline is maintained at a minimum of 20 ppm available chlorine. To insure that this concentration is maintained, the chlorine residual shall be measured at regular intervals in accordance with procedures described in the current edition of Standard Methods and AWWA Specification 802.

When considered applicable, disinfection will also be permitted by the following methods:

A. **Tablet Method** - Disinfection may be accomplished with the use of five gran HTH tablets applied to the interior of the pipe by approved methods and in quantities specified as follows:

Diameter of Pipe	No. of Tablets Per 18 Feet
6" and 8"	3
10"	5
12"	8

This method is based on at least a 24 hour contact period since it is utilized in concert with main filling and pressure testing.

B. **Slug Method** - Disinfection may also be accomplished by the "slug" method. A chlorine gas-water mixture shall be applied to the system by means of an approved chlorinating device. The method of application of the chlorine applied shall be sufficient to provide a concentration of 200 parts per million of free chlorine. The chlorinated water shall be retained in the pipe long enough to destroy all non-spore forming bacteria, or a minimum retention period of at least three hours. During the retention period, all valves and other appurtenances shall be operated while the system is filled with chlorinating agent.

Chlorine application shall not cease until the entire main is completely filled with solution. The chlorinated water shall be retained in the system for at least 24 hours, during which time all valves and hydrants shall be operated in order to disinfest the appurtenances. At the end of the 24 hour period, the pipeline water shall contain not less than 25 parts per million chlorine throughout the entire pipeline. After the specified retention period, the chlorinated water shall be flushed from the main until the residual chlorine concentration is no higher than that prevailing in the existing system or less than 10 parts per million.

After final flushing and before the water main is placed in service, not less than two samples of water at points not to exceed 2,000 feet apart shall be collected at least 24 hours apart in sterile bottles treated with sodium thiosulfate. All sampling shall be witnessed by the Service Authority. The samples shall be forwarded to the Virginia Department of Health for bacterial examination. If this examination indicates the presence of coliform organisms, the entire disinfection process shall be repeated or continued until the examination indicates the absence of such pollution.

Pipe, taps and fittings used at connections to the existing system shall be thoroughly disinfected before installation. Excavation for such connections shall be kept free from water until the connection is completed, and extreme care shall be exercised to prevent contamination of the pipe and connection fittings. The inside of the existing pipe within 3 feet of the point of connection shall be disinfected by spraying with a solution containing not less than 200 ppm of chlorine immediately before connection is made. If at any time the water in the existing piping becomes contaminated, this piping shall be disinfected as specified for new piping, back to the nearest gate valve or valve, or beyond those points as necessary to include all contaminated piping.

The complete disinfection process and methods followed, especially if materially different from those specified, shall be in accordance with the directives of the Virginia Department of Health, and all methods employed shall meet with this approval. Definite instructions as to the collection and shipment of the samples shall be requested from the Department of Health and shall be followed explicitly. Final approval of the bacterial examination shall be received from the Department of Health prior to placing the new pipeline into operation.

SHEET REFERENCES

ITEM	SHEET
NOTES	1,2
STREET SECTION	2
ROAD PROFILES	4,5
SANITARY SEWER PROFILES	4,5
WATERLINE PROFILES	6
STORM SEWER PROFILES	7
SAN. LATERAL SCHEDULE	8
STORM & SANITARY COMPS.	9
SOILS	10
E & S CONTROL DETAILS	11,12
WATERLINE DETAILS	13
SANITARY SEWER DETAILS	14

Line Location Markers

For purposes of future line location, all new construction will include 3M-Brand (or approved equal) line marker devices. The markers are to be placed on top of the pipe, along the pipe route, at each change in direction, i.e. cross, valve, corporation stop, and all other fittings. In any case, the maximum spacing between markers shall be 40 feet. Marker tape shall be buried 18 inches above the pipe for the entire length of the pipe. (Note: This requirement also applies to sewer force mains).

Testing

Tests shall be made on all sections of pipe throughout the entire project and shall be conducted only in the presence of the Authority or its authorized representative. Tests shall be made between adjacent valves.

Care shall be taken to insure that the entire test run of pipe is securely braced and blocked against thrust when pressure is applied. All thrust blocks must be completely set and approved. All pipe must be firmly supported and weighted down by partial backfill soil on top.

All water for testing purposes shall be potable water and procured and paid for by the Owner or Developer or his Contractor. Prior to testing, the pipe shall be filled slowly and carefully with water from the nearest practical source, or by other approved methods. Under normal atmospheric pressure the pipe shall be allowed to soak for a minimum period of 24 hours. All trapped air shall be expelled. The Owner, Developer or Contractor shall provide all the apparatus or other accessories necessary to conduct the tests.

The completed piping shall be subjected to a hydrostatic pressure test equal to 150% of the rated working pressure of the pipe or not less than 150 psi. This pressure shall be maintained for two hours. All pipe, joints, valves and fittings in the test section shall be examined. Leakage shall not exceed the amount given by:

$$L = S \cdot D \cdot P^{1/2} / 133,200$$

Where:
L is allowable leakage, in gallons per hour;
S is the length of pipe tested, in feet;
D is the nominal pipe diameter, in inches;
P is the test pressure, in psi.

If the flow of water or loss of air pressure is in excess of the allowable limits, or if leaks of appreciable size are encountered, the Contractor shall repair or rebuild, at his expense, those portions of the piping which are faulty. These tests will be repeated until the work is deemed acceptable in accordance with the allowable limits.

Services shall be tested to the yoke angle valve at working pressure by visual inspection in the open trench and shall show no signs of leakage.

Defective material disclosed as a consequence of the tests shall be removed and replaced by sound material at the Owner's or Developer's expense. Any joint showing visible leakage shall be made airtight. The test shall be repeated until its results are satisfactory to the Authority or its authorized representative.

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WATERLINE CONSTRUCTION DETAILS
MOUNTAIN SHADE SUBDIVISION

FAUQUIER COUNTY, VIRGINIA
MARSHALL MAGISTERIAL DISTRICT

REVISIONS

DESCRIPTION	DATE
GUNT COMMENTS	12/17/98

DATE: 9/14/98
SCALE: NONE
SHEET 13 OF 14

PROJECT # 97006

