

**GENERAL NOTES:**

1. THIS PROJECT IS IN CONFORMANCE WITH THE LATEST HOWARD COUNTY STANDARDS UNLESS WAIVERS HAVE BEEN APPROVED.
2. THE EXISTING TOPOGRAPHY SHOWN HEREON IS TAKEN FROM A FIELD RUN TOPOGRAPHICAL SURVEY, WITH 2-FOOT CONTOUR INTERVALS, PREPARED BY ROBERT H. VOGEL ENGINEERING, INC., DATED FEBRUARY 2010. SUPPLEMENTAL TOPOGRAPHY FROM CURRENT HOWARD COUNTY GIS DATA.
3. THE PROJECT BOUNDARY IS BASED ON PLAT 4193 (F-79-056).
4. THE COORDINATES SHOWN HEREON ARE BASED UPON THE HOWARD COUNTY GEODETIC CONTROL WHICH IS BASED UPON THE MARYLAND STATE PLANE COORDINATE SYSTEM. HOWARD COUNTY MONUMENT NOS. 158A AND 158B WERE USED FOR THIS PROJECT.
5. THE SUBJECT PROPERTY IS ZONED "RC-DEO" IN ACCORDANCE WITH THE OCTOBER 6, 2013 COMPREHENSIVE ZONING PLAN.
6. THIS PROPERTY IS NOT LOCATED WITHIN THE METROPOLITAN DISTRICT.
7. WATER AND SEWER SERVICE TO BE PROVIDED BY PRIVATE WELL AND SEPTIC SYSTEM.
8. THE WETLAND AND FOREST STAND DELINEATION ASSESSMENT WAS PERFORMED BY JOHN CANOLES OF ECO-SCIENCE PROFESSIONALS, INC., DATED 08/15/2023.
9. THE PROPOSED DEVELOPMENT OF THE RESIDENTIALLY ZONED LOT DOES NOT INVOLVE A SUBDIVISION AND CLEARING SHALL BE LIMITED TO LESS THAN 20,000 SQ. FT. OF FOREST AS SUCH, THE PROJECT WILL QUALIFY FOR A SINGLE LOT EXEMPTION FROM THE FOREST CONSERVATION ACT REQUIREMENTS. THIS INCLUDES THE PROTECTION OF SPECIMEN TREES AND ANY AFFORESTATION OR REFORESTATION REQUIREMENTS. FOREST RESOURCES TO BE RETAINED OUTSIDE THE PROPOSED LIMITS OF DISTURBANCE WILL BE PROTECTED DURING THE CONSTRUCTION PROCESS. A DECLARATION OF INTENT WILL ALSO BE FILED AS PART OF THE CONDITIONS OF THE EXEMPTION DURING THE SITE DEVELOPMENT PLAN STAGE.
10. THERE ARE NO 100-YEAR FLOODPLANS, OR STEEP SLOPES WITH A CONTIGUOUS AREA OF 20,000 SF LOCATED ON THE SUBJECT PROPERTY.
11. THERE IS BOTH WETLANDS AND AN INTERMITTENT STREAM AND BUFFER PRESENT ON THE SUBJECT PROPERTY.
12. THIS PROPERTY IS LOCATED WITHIN THE USE IV WATERSHED OF THE MIDDLE PATUXENT RIVER.
13. TO THE BEST OF THE OWNERS KNOWLEDGE, THERE ARE NO BURIAL GROUNDS OR CEMETERIES LOCATED ON THIS PROPERTY. THERE ARE NO HISTORIC HOUSES LOCATED ON THIS PROPERTY.
14. A NOISE STUDY IS NOT REQUIRED FOR THIS PROJECT.
15. MD ROUTE 144, FREDERICK ROAD, IS CLASSIFIED AS A MINOR ARTERIAL AND A SCENIC ROAD.
16. STORM WATER MANAGEMENT TO BE PROVIDED FOR THIS DEVELOPMENT BY ENVIRONMENTAL SITE DESIGN UTILIZING MICRO-BIORETENTION FACILITIES (M-6) AND DRY WELLS (M-5). THE FACILITIES WILL BE PRIVATELY OWNED AND MAINTAINED. REFERENCE 2010 MDE STORMWATER DESIGN MANUAL (CHAPTER 5).
17. APPROVAL OF THIS ECP DOES NOT CONSTITUTE AN APPROVAL OF ANY SUBSEQUENT AND ASSOCIATED SUBDIVISION PLAN/PLAT AND/OR SITE DEVELOPMENT PLAN AND/OR RED-LINE REVISION PLAN. REVIEW OF THIS PROJECT FOR COMPLIANCE WITH THE HOWARD COUNTY SUBDIVISION AND LAND DEVELOPMENT REGULATIONS SHALL OCCUR AT THE SUBDIVISION PLAN/PLAT AND/OR SITE DEVELOPMENT PLAN STAGES AND/OR RED-LINE REVISION PROCESS. THE APPLICANT AND CONSULTANT SHOULD EXPECT ADDITIONAL, AND MORE DETAILED, REVIEW COMMENTS (INCLUDING COMMENTS THAT MAY ALTER THE OVERALL SITE DESIGN) AS THIS PROJECT PROGRESSES THROUGH THE PLAN REVIEW PROCESS.
18. APPROVAL OF THIS ENVIRONMENTAL CONCEPT PLAN (ECP) BY THE HOWARD SOIL CONSERVATION DISTRICT DOES NOT GRANT APPROVAL OF THE PROPOSED SEDIMENT CONTROL SCHEME. THE SITE DEVELOPMENT PLAN SHALL INCLUDE A SEQUENCE OF CONSTRUCTION WHICH WILL DETAIL SEDIMENT & EROSION CONTROLS.

**SITE DATA:**

LOCATION: WEST FRIENDSHIP, MD.; TAX MAP 15, BLOCK 10, PARCEL 237, LOT 1  
3RD ELECTION DISTRICT  
PRESENT ZONING: RC-DEO  
PROJECT AREA: 5.20 AC.  
DTZ REFERENCES: PLAT 4193, F-79-056; BA-17-037&V  
DEED REFERENCES: L 20650/F 482, L 15821/F 324, L 18111/F 171, L 392/F 14  
EXISTING USE: RESIDENTIAL  
PROPOSED USE: ASSISTED LIVING FACILITY  
TOTAL BUILDING COVERAGE: 9,196 SF (0.21 AC. OR 4.03% OF GROSS AREA)  
PAVED PARKING LOT/AREA ON SITE: 24,343 SF (0.56 AC. OR 10.77% OF GROSS AREA)  
AREA OF LANDSCAPE ISLANDS: 1,156 SF (0.03 AC. OR 0.57% OF GROSS AREA)  
LIMIT OF DISTURBED AREA: 3.05 AC.  
WETLANDS WITHIN LOD: 0.006 AC.  
WETLAND BUFFERS WITHIN LOD: 0.07 AC.  
STREAMS AND THEIR BUFFERS WITHIN LOD: 0.13 AC.  
AREA OF ON-SITE 100 YEAR FLOODPLAIN WITHIN LOD: 0.00 AC.  
AREA OF EXISTING FOREST WITHIN LOD: 0.25 AC.  
AREA OF ON-SITE MODERATE SLOPES (15% - 24.99%): 0.47 AC.  
AREA OF ON-SITE STEEP SLOPES (25% OR GREATER): 0.21 AC.  
AREA OF ON-SITE MDS/MDS OR GREATER STEEP SLOPES (20% OR GREATER): 0.22 AC.  
AREA OF ERODIBLE SOILS: 0.17 AC.  
AREA MANAGED BY ESDV (THIS PLAN): 2.52 AC.  
IMPERVIOUS AREA (MANAGED BY ESDV): 0.92 AC.  
GREEN AREA (MANAGED BY ESDV): 1.62 AC.

**ENVIRONMENTAL SITE DESIGN NARRATIVE:**

1. THE SITE NATURALLY SLOPES FROM NORTHWEST TO SOUTHEAST. THE SITE HAS BEEN DESIGNED TO MAINTAIN THE NATURAL DRAINAGE PATTERNS, WITH NO DRAMATIC CHANGES TO THE NATURAL DRAINAGE.
2. THE CONCEPTUAL REDUCTION IN IMPERVIOUS AREA THROUGH BETTER SITE DESIGN IS ACHIEVED THROUGH THE ENVIRONMENTAL SITE DESIGN (ESD) FOR THE PROJECT TO THE MAXIMUM EXTENT PRACTICABLE (MEP). THE RESULTS OF THE ENVIRONMENTAL SITE DESIGN FOR THIS PROJECT WILL REFLECT "WOODS IN GOOD CONDITION". THE ESD CONCEPT SHALL TREAT THE BUILDING, PARKING, AND PATHWAY. THE TARGET P<sub>10</sub>=1.6" AND THE TARGET SITE ESDV REQUIRED IS 5,978 CF. THIS PLAN PROVIDES 5,125 CF ESDV.
3. SEDIMENT CONTROL FOR THIS SPECIFIC SITE PLAN WILL BE PROVIDED THROUGH THE USE OF DIVERSION FENCE, SILT FENCE AND SUPER SILT FENCE. SEDIMENT CONTROL SHALL BE IN ACCORDANCE WITH CURRENT REQUIREMENTS AND SHALL BE APPROVED BY THE HOWARD SOIL CONSERVATION DISTRICT DURING THE FUTURE SITE DEVELOPMENT PLAN PHASE OF THE PROJECT.
4. STORMWATER MANAGEMENT FOR THE PROJECT SHALL BE MET THROUGH THE USE OF TWO MICRO-BIORETENTION FACILITIES (M-6), FIVE DRYWELLS (M-5), AND NON-ROOFTOP DISCONNECT AREAS (M-2). THE PROPOSED PRACTICES HAVE BEEN MANAGED TO THE EXTENT PRACTICAL.
5. WE DO NOT ANTICIPATE ANY ALTERNATIVE COMPLIANCE PETITIONS BEING REQUIRED FOR THE ESSENTIAL ENVIRONMENTAL DISTURBANCES OF THIS PLAN.

# ENVIRONMENTAL CONCEPT PLAN

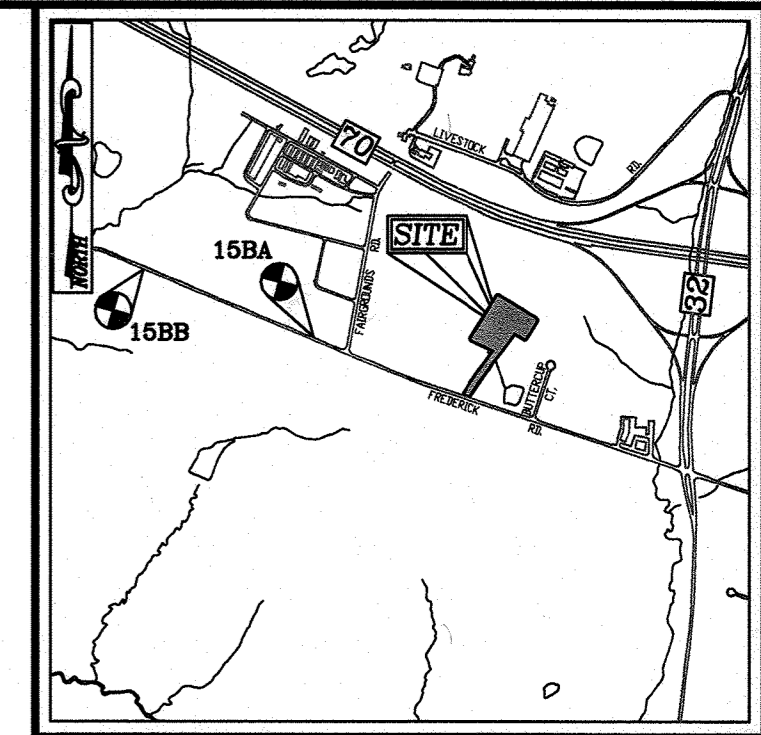
## ANGEL'S TOUCH ASSISTED LIVING

12900 FREDERICK ROAD  
WEST FRIENDSHIP, MD 21794

**BENCHMARKS**

HOWARD COUNTY BENCHMARK 158A (CONC. MON.)  
N 597228.16 E 1321719.35 ELEV. 590.20  
LOCATION: RT-144 IN FRONT OF HOWARD COUNTY FAIR GROUNDS

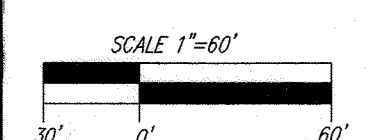
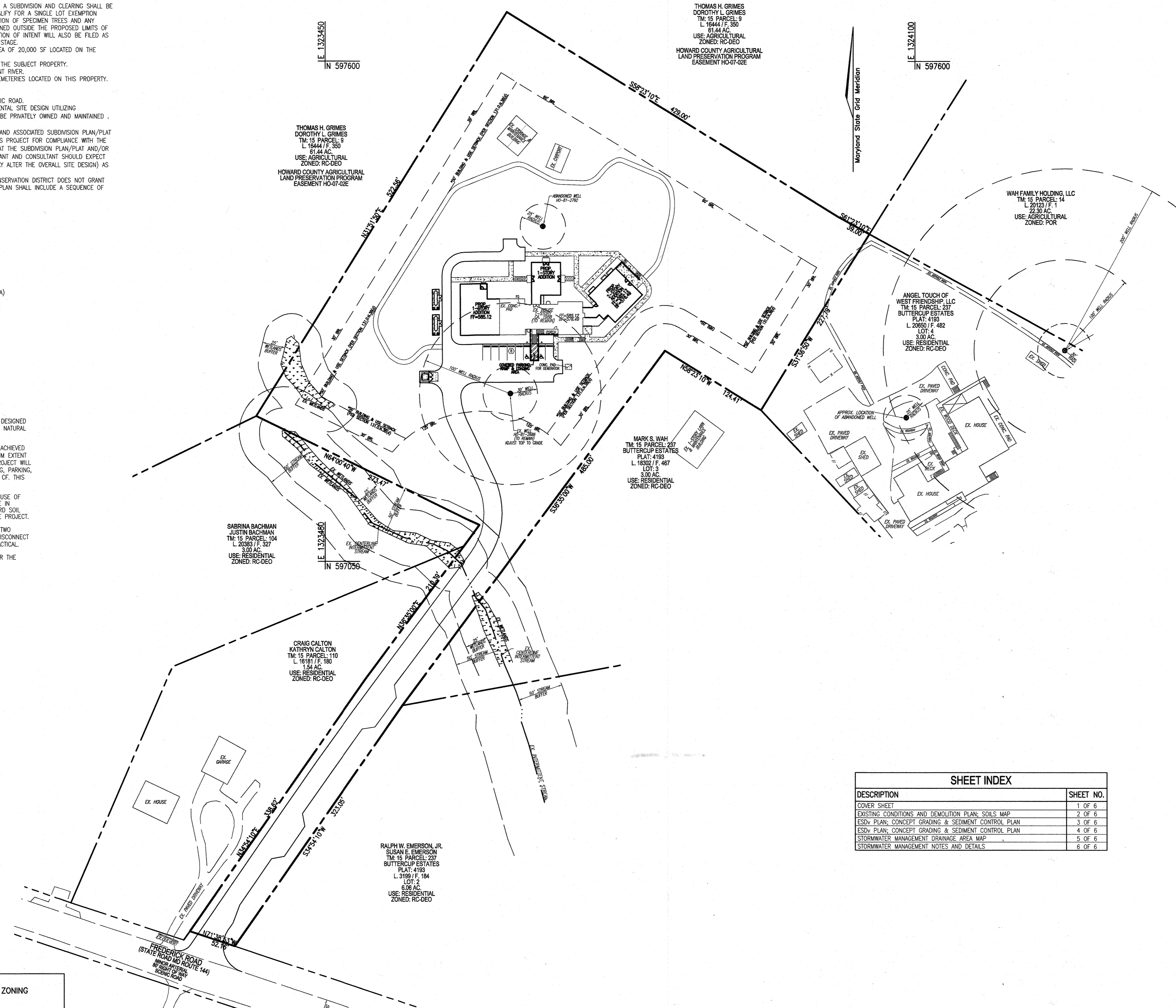
HOWARD COUNTY BENCHMARK 158B (CONC. MON.)  
N 597926.93 E 1319949.87 ELEV. 527.47  
LOCATION: RT-144 WEST OF HOWARD COUNTY FAIR GROUNDS



**VICINITY MAP**  
SCALE: 1"=2000'  
ADC MAP/GRID NO: 18D2

**LEGEND:**

- PROPERTY LINE
- - - RIGHT-OF-WAY LINE
- - - ADJACENT PROPERTY LINE
- - - EXISTING EDGE OF PAVING
- - - EXISTING STREAM BUFFER
- - - EXISTING STREAM
- ⊙ EXISTING WELL



APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

*[Signature]* 1/29/24  
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

*[Signature]* 1/11/24  
CHIEF, DIVISION OF LAND DEVELOPMENT DATE

**LOCATION MAP**  
SCALE: 1"=60'

SHEET INDEX	
DESCRIPTION	SHEET NO.
COVER SHEET	1 OF 6
EXISTING CONDITIONS AND DEMOLITION PLANS; SOILS MAP	2 OF 6
ESDV PLAN; CONCEPT GRADING & SEDIMENT CONTROL PLAN	3 OF 6
ESDV PLAN; CONCEPT GRADING & SEDIMENT CONTROL PLAN	4 OF 6
STORMWATER MANAGEMENT DRAINAGE AREA MAP	5 OF 6
STORMWATER MANAGEMENT NOTES AND DETAILS	6 OF 6

**OWNER/DEVELOPER**  
ANGEL TOUCH OF WEST FRIENDSHIP, LLC  
C/O MARK WAH  
12799 BUTTERCUP COURT  
WEST FRIENDSHIP, MD 21794  
(410) 442-9800

NO.	REVISION	DATE

ENVIRONMENTAL CONCEPT PLAN

**COVER SHEET**

ANGEL'S TOUCH ASSISTED LIVING  
12900 FREDERICK ROAD  
WEST FRIENDSHIP, MD 21794  
ZONED: RC-DEO

TAX MAP 15 BLOCK 10 LOT 1  
3RD ELECTION DISTRICT PARCEL 237  
HOWARD COUNTY, MARYLAND

**VOGEL ENGINEERING**  
+  
**TIMMONS GROUP**  
3300 NORTH RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043  
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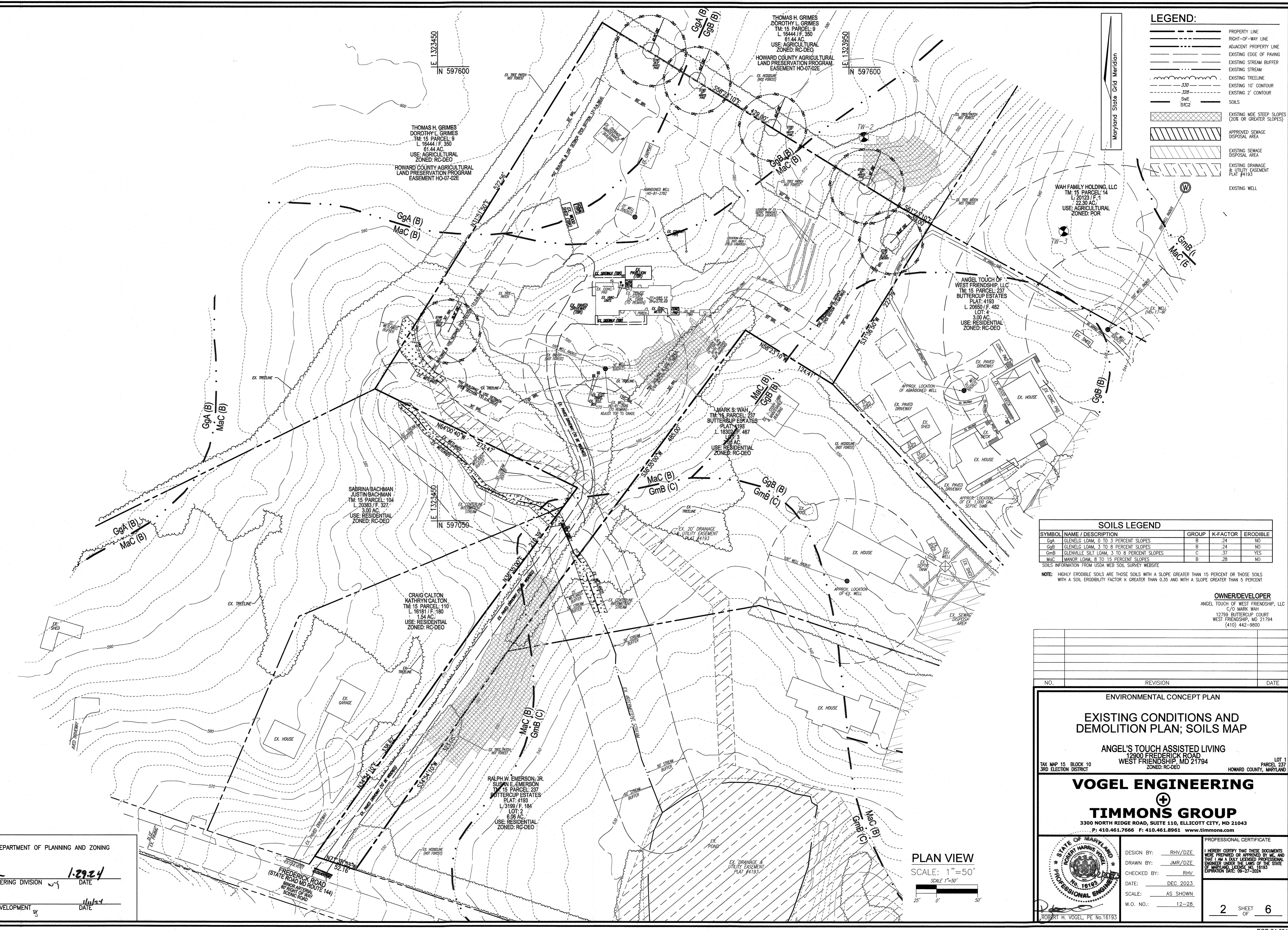
PROFESSIONAL CERTIFICATE

I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A FULLY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 16193, EXPIRATION DATE: 09-27-2024

DESIGN BY: RHW/DZE  
DRAWN BY: JMR/DZE  
CHECKED BY: RHW  
DATE: DEC 2023  
SCALE: AS SHOWN  
W.O. NO.: 12-28

ROBERT H. VOGEL, PE No. 16193

1 SHEET OF 6



**LEGEND:**

- PROPERTY LINE
- - - RIGHT-OF-WAY LINE
- - - ADJACENT PROPERTY LINE
- - - EXISTING EDGE OF PAVING
- - - EXISTING STREAM BUFFER
- - - EXISTING STREAM
- - - EXISTING TREETLINE
- - - EXISTING 10' CONTOUR
- - - EXISTING 2' CONTOUR
- - - SOILS
- ▨ EXISTING MOE STEEP SLOPES (20% OR GREATER SLOPES)
- ▨ APPROVED SEWAGE DISPOSAL AREA
- ▨ EXISTING SEWAGE DISPOSAL AREA
- ▨ EXISTING DRAINAGE & UTILITY EASEMENT PLAT #4193
- ⊙ EXISTING WELL

**SOILS LEGEND**

SYMBOL	NAME / DESCRIPTION	GROUP	K-FACTOR	ERODIBLE
GgA	GLENELG LOAM, 0 TO 5 PERCENT SLOPES	B	.24	NO
GgB	GLENELG LOAM, 3 TO 8 PERCENT SLOPES	B	.24	NO
GmB	GLENVILLE SILT LOAM, 3 TO 8 PERCENT SLOPES	C	.37	YES
Mac	MANOR LOAM, 8 TO 15 PERCENT SLOPES	B	.28	NO

SOILS INFORMATION FROM USDA WEB SOIL SURVEY WEBSITE

NOTE: HIGHLY ERODIBLE SOILS ARE THOSE SOILS WITH A SLOPE GREATER THAN 15 PERCENT OR THOSE SOILS WITH A SOIL ERODIBILITY FACTOR K GREATER THAN 0.35 AND WITH A SLOPE GREATER THAN 5 PERCENT

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 C/O MARK WAH  
 12799 BUTTERCUP COURT  
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NO.	REVISION	DATE

**ENVIRONMENTAL CONCEPT PLAN**

**EXISTING CONDITIONS AND DEMOLITION PLAN; SOILS MAP**

ANGEL'S TOUCH ASSISTED LIVING  
 12900 FREDERICK ROAD  
 WEST FRIENDSHIP, MD 21794  
 ZONED: RC-DEO

TAX MAP 15 BLOCK 10 LOT 1  
 3RD ELECTION DISTRICT PARCEL 237  
 HOWARD COUNTY, MARYLAND

**VOGEL ENGINEERING**  
 +  
**TIMMONS GROUP**  
 3300 NORTH RIDGE ROAD, SUITE 110, ELLICOTT CITY, MD 21043  
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APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

*[Signature]* 1-29-24  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

*[Signature]* 1/29/24  
 CHIEF, DIVISION OF LAND DEVELOPMENT DATE

**PLAN VIEW**  
 SCALE: 1" = 50'  
 SCALE 1"=50'  
 25' 0' 50'

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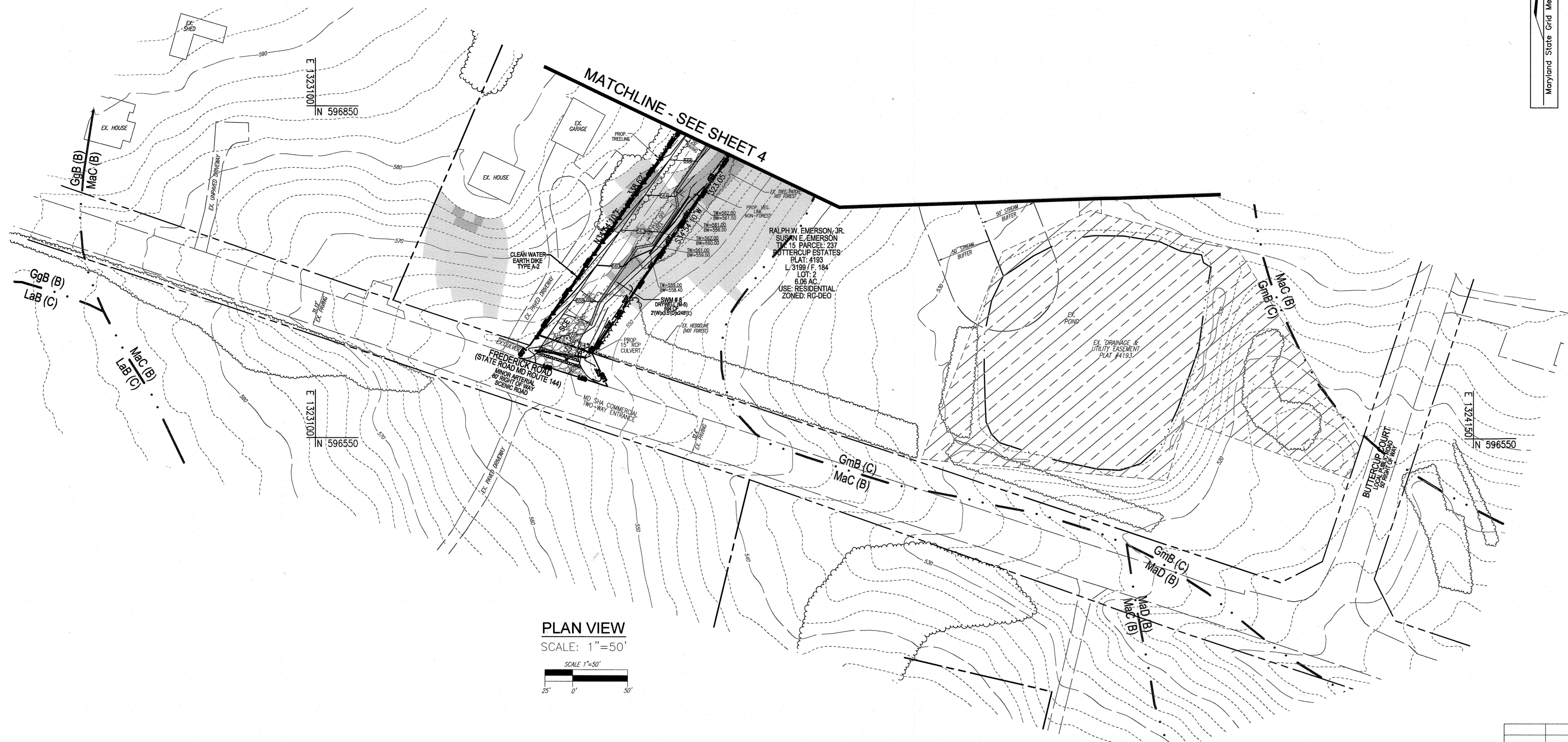
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2 SHEET OF 6

**LEGEND:**

- PROPERTY LINE
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- ADJACENT PROPERTY LINE
- EXISTING EDGE OF PAVING
- EXISTING STREAM BUFFER
- EXISTING STREAM
- EXISTING TREELINE
- PROPOSED TREELINE
- 130 --- EXISTING 10' CONTOUR
- 128 --- EXISTING 2' CONTOUR
- SsE --- SOILS
- S/C2 --- PROPOSED 2' CONTOUR
- 127 --- PROPOSED 10' CONTOUR
- 130 --- PROPOSED 2' CONTOUR
- +328.42 --- PROPOSED SPOT ELEVATION
- EXISTING MODERATE SLOPES (15%-24.99% SLOPES)
- EXISTING STEEP SLOPES (25% OR GREATER SLOPES)
- APPROVED SEWAGE DISPOSAL AREA
- PROPOSED PRIVATE 10' SEPTIC EASEMENT
- EXISTING SEWAGE DISPOSAL AREA
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- EXISTING WELL
- PROPOSED WELL
- LOD --- LIMIT OF DISTURBANCE
- EARTH DIKE
- SILT FENCE
- SSF --- SUPER SILT FENCE
- SCE --- STABILIZED CONSTRUCTION ENTRANCE W/ MOUNTABLE BERM
- AGIP --- AT GRADE INLET PROTECTION
- SIP --- STANDARD INLET PROTECTION

Maryland State Grid Meridian



**PLAN VIEW**  
SCALE: 1"=50'  
SCALE 1"=50'

**OWNER/DEVELOPER**  
ANGEL TOUCH OF WEST FRIENDSHIP, LLC  
C/O MARK WAH  
12799 BUTTERCUP COURT  
WEST FRIENDSHIP, MD 21794  
(410) 442-9800

NO.	REVISION	DATE

**ENVIRONMENTAL CONCEPT PLAN**

**ESDv PLAN, GRADING, AND SEDIMENT CONTROL PLAN**

**ANGEL'S TOUCH ASSISTED LIVING**  
12900 FREDERICK ROAD  
WEST FRIENDSHIP, MD 21794  
ZONED: RC-DEO

TAX MAP 15 BLOCK 10 3RD ELECTION DISTRICT      LOT 1 PARCEL 237      HOWARD COUNTY, MARYLAND

**VOGEL ENGINEERING**

**TIMMONS GROUP**

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	DESIGN BY: RHV/DZE	<b>PROFESSIONAL CERTIFICATE</b> I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 16193, EXPIRATION DATE: 08-27-2024.
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	CHECKED BY: RHV	
	DATE: DEC. 2023	
	SCALE: AS SHOWN	
W.O. NO.: 12-28	3 SHEET OF 6	

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

*[Signature]* 1-29-24  
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

*[Signature]* 1/11/24  
CHIEF, DIVISION OF LAND DEVELOPMENT DATE



**LEGEND:**

	PROPERTY LINE
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	ADJACENT PROPERTY LINE
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	EXISTING STREAM BUFFER
	EXISTING STREAM
	EXISTING TREELINE
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	EXISTING 10' CONTOUR
	EXISTING 2' CONTOUR
	SOILS
	PROPOSED 2' CONTOUR
	PROPOSED 10' CONTOUR
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	APPROVED SEWAGE DISPOSAL AREA
	PROPOSED PRIVATE 10' SEPTIC EASEMENT
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	EARTH DIKE
	SILT FENCE
	SUPER SILT FENCE
	STABILIZED CONSTRUCTION ENTRANCE W/ MOUNTABLE BERM
	AT GRADE INLET PROTECTION
	STANDARD INLET PROTECTION

Maryland State Grid Meridian

E 1323450  
N 597600

E 1324200  
N 597600

E 1323450  
N 597050

MATCHLINE - SEE SHEET 3

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

*Chad Clark*  
CHIEF, DEVELOPMENT ENGINEERING DIVISION  
DATE: 1/29/24

*[Signature]*  
CHIEF, DIVISION OF LAND DEVELOPMENT  
DATE: 1/11/24

**PLAN VIEW**  
SCALE: 1" = 50'  
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ENVIRONMENTAL CONCEPT PLAN

**ESDv PLAN, GRADING, AND SEDIMENT CONTROL PLAN**

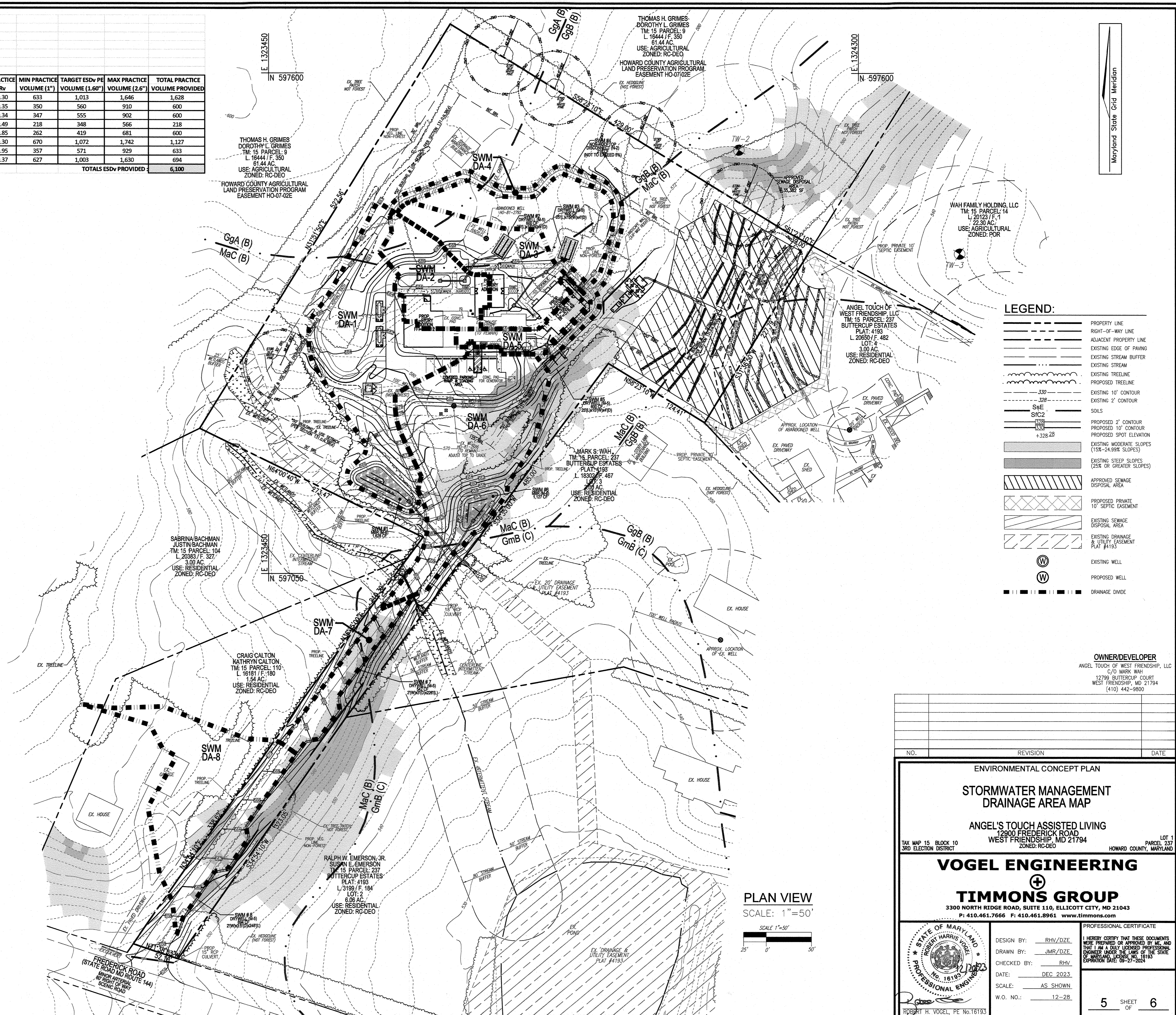
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	DRAWN BY: JMR/DZE	
	CHECKED BY: RHW	
	DATE: DEC 2023	
	SCALE: AS SHOWN	
W.O. NO.: 12-28	4 SHEET OF 6	

Project Name: Angel's Touch Assisted Living  
 Target Site P(E) = 1.60  
 Target Site ESDv = 5,979 cf.  
 ESDv = (PexRvA)/12  
 Rv = 0.05 + 0.009 x 1  
 Vmin 1yr rainfall = 1"  
 Vmax 1yr rainfall = 2.6"

DRAINAGE AREA	SWMF NAME	SWMF TYPE	PRACTICE DA (AC)	IMPERV (AC)	PERV AREA (AC)	PRACTICE % IMPERV	PRACTICE Rv	MIN PRACTICE VOLUME (1")	TARGET ESDv PE VOLUME (1.60")	MAX PRACTICE VOLUME (2.6")	TOTAL PRACTICE VOLUME PROVIDED
1	SWM #1	MBR (M-6)	0.57	0.16	0.41	28	0.30	633	1,013	1,646	1,628
2	SWM #2	DRYWELL (M-5)	0.28	0.09	0.19	33	0.35	350	560	910	600
3	SWM #3	DRYWELL (M-5)	0.28	0.09	0.19	32	0.34	347	555	902	600
4	SWM #4	NON-ROOFTOPDISCONNECT(N-2)	0.12	0.06	0.06	49	0.49	218	348	566	218
5	SWM #5	DRYWELL (M-5)	0.08	0.08	0.01	89	0.85	262	419	681	600
6	SWM #6	MBR (M-6)	0.61	0.17	0.44	28	0.30	670	1,072	1,742	1,127
7	SWM #7	DRYWELL (M-5)	0.10	0.10	0.00	100	0.95	357	571	929	633
8	SWM #8	DRYWELL (M-5)	0.47	0.17	0.31	35	0.37	627	1,003	1,630	694
TOTALS			2.52	0.92	1.60				TOTALS ESDv PROVIDED		6,100



**LEGEND:**

	PROPERTY LINE
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	ADJACENT PROPERTY LINE
	EXISTING EDGE OF PAVING
	EXISTING STREAM BUFFER
	EXISTING STREAM
	EXISTING TREELINE
	PROPOSED TREELINE
	EXISTING 10' CONTOUR
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	PROPOSED 2' CONTOUR
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	PROPOSED PRIVATE 10' SEPTIC EASEMENT
	EXISTING SEWAGE DISPOSAL AREA
	EXISTING DRAINAGE & UTILITY EASEMENT PLAT #4193
	EXISTING WELL
	PROPOSED WELL
	DRAINAGE DIVIDE

**OWNER/DEVELOPER**  
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NO.	REVISION	DATE

ENVIRONMENTAL CONCEPT PLAN  
**STORMWATER MANAGEMENT DRAINAGE AREA MAP**  
 ANGEL'S TOUCH ASSISTED LIVING  
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 WEST FRIENDSHIP, MD 21794  
 ZONED: RC-DEO  
 TAX MAP 15 BLOCK 10 3RD ELECTION DISTRICT  
 LOT 1 PARCEL 237  
 HOWARD COUNTY, MARYLAND

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DESIGN BY: RHW/DZE  
 DRAWN BY: JMR/DZE  
 CHECKED BY: RHW  
 DATE: DEC. 2023  
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 W.O. NO.: 12-28

5 SHEET OF 6

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION NY DATE 1/27/24

CHIEF, DIVISION OF LAND DEVELOPMENT EX DATE 1/11/24

PLAN VIEW  
 SCALE: 1"=50'

**APPENDIX B.4.C SPECIFICATIONS FOR MICRO-BIORETENTION, RAIN GARDEN, LANDSCAPE INFILTRATION & INFILTRATION BERMS**

**1. MATERIAL SPECIFICATIONS**

THE ALLOWABLE MATERIALS TO BE USED IN THESE PRACTICES ARE DETAILED IN TABLE B.4.1.

**2. FILTERING MEDIA OR PLANTING SOIL**  
 THE SOIL SHALL BE A UNIFORM MIXTURE OF STONES, STUMPS, ROOTS OR OTHER SIMILAR OBJECTS LARGER THAN TWO INCHES, NO OTHER MATERIALS OR SUBSTANCES SHALL BE MIXED OR DUMPED WITHIN THE MICRO-BIORETENTION PRACTICE THAT MAY BE HARMFUL TO PLANT GROWTH. THE PLANTING SOIL SHALL BE A UNIFORM MIXTURE OF PLANTING SOIL, COMPOST, SAND, COARSE SAND (30%), AND COMPOST (40%). GRASS, CLOVERGRASS, HOUSING GRASS, OR OTHER NOXIOUS WEEDS AS SPECIFIED UNDER COMAR 16.08.01.05, THE PLANTING SOIL SHALL BE TESTED AND SHALL MEET THE FOLLOWING CRITERIA:  
 • SOIL COMPONENT - LOAMY SAND OR SANDY LOAM (USDA SOIL TEXTURAL CLASSIFICATION).  
 • ORGANIC CONTENT - MINIMUM 10% BY DRY WEIGHT (ASTM D 2974). IN GENERAL, THIS CAN BE MET WITH A MIXTURE OF LOAMY SAND (30%) AND COMPOST (20%) TO ADD OR SANDY LOAM (20%), COMPOST (10%), AND COMPOST (40%).  
 • CLAY CONTENT - MEDIA SHALL HAVE A CLAY CONTENT OF LESS THAN 5%.  
 • PH RANGE - SHOULD BE BETWEEN 5.5 - 7.0. AMENDMENTS (E.G., LIME, NON SULFATE PLUS SULFUR) MAY BE MIXED IN TO THE SOIL TO INCREASE OR DECREASE PH.  
 THERE SHALL BE AT LEAST ONE TEST PER PROJECT. EACH TEST SHALL CONSIST OF BOTH THE STANDARD SOIL TEST FOR PH, AND ADDITIONAL TESTS OF ORGANIC MATTER AND SOLUBLE SALTS. A TEXTURAL ANALYSIS IS REQUIRED FROM THE SITE STOCKPILED TOPSOIL. IF TOPSOIL IS IMPORTED, THEN A TEXTURE ANALYSIS SHALL BE PERFORMED FOR EACH LOCATION WHERE THE TOPSOIL WAS EXCAVATED.

**3. COMPACTION**  
 IT IS VERY IMPORTANT TO MINIMIZE COMPACTION OF BOTH THE BASE OF THE BIORETENTION FACILITY AND THE REQUIRED BACKFILL. WHEN POSSIBLE, USE EXCAVATION HOES TO REMOVE ORGANIC SOIL. IF PRACTICES ARE EXCAVATED USING LOADERS, THE CONTRACTOR SHOULD USE WIDE TRACKS OR MARCH TRACK EQUIPMENT, OR LIGHT EQUIPMENT WITH TIRE TREADS. USE OF EQUIPMENT WITH NARROW TRACKS OR NARROW TIRES RUBBER TIRES WITH LARGE LUGS OR HIGH-PRESSURE TIRES WILL CAUSE EXCESSIVE COMPACTION RESULTING IN REDUCED INFILTRATION RATES AND IS NOT ACCEPTABLE. COMPACTION WILL SIGNIFICANTLY CONTRIBUTE TO DESIGN FAILURE.

COMPACTION CAN BE ALLEVIATED AT THE BASE OF THE BIORETENTION FACILITY BY USING A PRIMARY TILLING OPERATION SUCH AS CHESEL PLOW, RIPPERS OF SUBSOILER. THESE TILLING OPERATIONS ARE TO REPRODUCE THE SOIL PROFILE THROUGH THE 12 INCH COMPACTION ZONE. SUBSTITUTE METHODS MUST BE APPROVED BY THE ENGINEER. ROTOTILLERS TYPICALLY DO NOT TILL DEEP ENOUGH TO REDUCE THE EFFECTS OF COMPACTION FROM HEAVY EQUIPMENT.

ROTOTILL 2 TO 3 INCHES OF SAND INTO THE BASE OF THE BIORETENTION FACILITY BEFORE BACKFILLING THE OPTIONAL SAND LAYER. PUMP ANY POUNDED WATER BEFORE PREPARING (ROTOTILLING) BASE. WHEN BACKFILLING THE TOPSOIL OVER THE SAND LAYER, FIRST PLACE 3 TO 4 INCHES OF TOPSOIL OVER THE SAND, THEN ROTOTILL THE SAND/TOPSOIL TO CREATE A GRADATION ZONE. BACKFILL THE REMAINDER OF THE TOPSOIL TO FINAL GRADE. WHEN BACKFILLING THE BIORETENTION FACILITY, PLACE SOIL IN LIFTS 12" TO 18". DO NOT USE HEAVY EQUIPMENT WITHIN THE BIORETENTION BASIN. HEAVY EQUIPMENT SHOULD BE USED TO PREPARE THE SAND/TOPSOIL MIXTURE TO SUPPLY SANDS AND SAND. GRADE BIORETENTION MATERIALS WITH LIGHT EQUIPMENT SUCH AS A COMPACT LOADER OR A DOZER/LOADER WITH MARSH TRACKS.

**4. PLANT MATERIAL**  
 RECOMMENDED PLANT MATERIAL FOR MICRO-BIORETENTION PRACTICES CAN BE FOUND IN APPENDIX A, SECTION A.2.3.

**5. PLANT INSTALLATION**  
 COMPOST IS A BETTER ORGANIC MATERIAL SOURCE, IS LESS LIKELY TO FLOAT, AND SHOULD BE PLACED IN THE WETTEST AND OTHER LOW AREAS. MULCH SHOULD BE PLACED IN SURROUNDING TO A UNIFORM THICKNESS OF 2" TO 3". SHROUDED OR CHIPPED HARDWOOD MULCH IS THE ONLY ACCEPTED MULCH. MULCH AND WOOD CHIPS WILL FLECK AND MOVE TO THE PERIMETER OF THE BIORETENTION AREA DURING A STORM EVENT AND ARE NOT ACCEPTABLE. SHROUDED MULCH MUST BE WELL AERATED (6 TO 12 MONTHS) FOR ACCEPTANCE.

ROOTSTOCK OF THE PLANT MATERIAL SHALL BE KEPT MOIST DURING TRANSPORT AND ON-SITE STORAGE. THE PLANT ROOT BALL SHOULD BE PLANTED SO 1/3RD OF THE BALL IS ABOVE FINAL GRADE SURFACE. THE DIAMETER OF THE PLANTING PIT SHALL BE AT LEAST SIX INCHES LARGER THAN THE DIAMETER OF THE PLANTING BALL AND MAINTAIN THE PLANT STRAIGHT DURING THE ENTIRE PLANTING PROCESS. THOROUGHLY WATER GROUND BED COVER AFTER INSTALLATION. TREES SHALL BE BRANDED USING 7" BY 2" STAKES ONLY AS NECESSARY AND FOR THE FIRST GROWING SEASON ONLY. STAKES ARE TO BE EQUALLY SPACED ON THE OUTSIDE OF THE TREE BALL.

GRASSES AND LEGUME SEED SHOULD BE DRILLED INTO THE SOIL TO A DEPTH OF AT LEAST ONE INCH. GRASS AND LEGUME PLUGS SHALL BE PLANTED FOLLOWING THE NON-GRASS GROUND COVER PLANTING SPECIFICATIONS.

THE TOPSOIL SPECIFICATIONS PROVIDE ENOUGH ORGANIC MATERIAL TO ADEQUATELY SUPPLY NUTRIENTS FROM NATURAL CYCLING. THE PRIMARY FUNCTION OF THE BIORETENTION STRUCTURE IS TO IMPROVE WATER QUALITY. ADDING FERTILIZERS, SEEDS, OR AT A MINIMUM, IMPROVES THIS GOAL. ONLY A FERTILIZER IF WOOD CHIPS OR MULCH ARE USED TO AMEND THE SOIL. ROTOTILL UREA FERTILIZER AT A RATE OF 10 POUNDS PER 1000 SQUARE FEET.

**6. UNDERDRAINS**  
 UNDERDRAINS SHOULD MEET THE FOLLOWING CRITERIA:  
 • PIPE - SHOULD BE 4" TO 6" DIAMETER, SLOTTED OR PERFORATED RIGID PLASTIC PIPE (ASTM F756, TYPE PS 28, OR AASHTO-M-278) IN A GRAVEL LAYER. THE PREFERRED MATERIAL IS SLOTTED, 4" RIGID PIPE (E.G., PVC OF HDPE).  
 • PERFORATIONS - IF PERFORATED PIPE IS USED, PERFORATIONS SHOULD BE 3/8" DIAMETER LOCATED 6" ON CENTER WITH A MINIMUM OF FOUR HOLES PER ROW. PIPE SHALL BE WRAPPED WITH A 1/4" (NO. 4 OR 4x4) GALVANIZED HARDWARE CLOTH.  
 • GRVEL - THE SAND LAYER AND 3" STONE FILLER SHOULD BE AT LEAST 3" THICK ABOVE AND BELOW THE UNDERDRAIN.  
 • THE MAIN COLLECTOR PIPE SHALL BE AT A MINIMUM 0.5% SLOPE.  
 • A RIGID, NON-PERFORATED OBSERVATION WELL MUST BE PROVIDED (ONE PER EVERY 1,000 SQUARE FEET) TO PROVIDE A CLEAN-OUT POINT AND MONITOR PERFORMANCE OF THE FILTER.  
 • A 2" LAYER OF PEA GRAVEL (1/8" TO 3/8" STONE) SHALL BE LOCATED BETWEEN THE FILTER MEDIA AND UNDERDRAIN TO PREVENT MIXTURE OF FINES IN TO THE UNDERDRAIN. THIS LAYER IS CONSIDERED PART OF THE FILTER BED WHEN BED THICKNESS EXCEEDS 2".

THIS MAIN COLLECTOR PIPE FOR UNDERDRAIN SYSTEMS SHALL BE CONSTRUCTED AT A MINIMUM SLOPE OF 0.5% OBSERVATION WELLS AND/OR CLEAN-OUT PIPES MUST BE PROVIDED (ONE MINIMUM PER EVERY 1000 SQUARE FEET OF SURFACE AREA).

**7. MISCELLANEOUS**  
 THESE PRACTICES MAY NOT BE CONSTRUCTED UNTIL ALL CONTRIBUTING DRAINAGE AREA HAS BEEN STABILIZED.

**Appendix B.4. Construction Specifications for Environmental Site Design Practices**

**Table B.4.1 Materials Specifications for Micro-Bioretenion, Rain Gardens & Landscape Infiltration-**

Material	Specification	Size	Notes
Plantings	see Appendix A, Table A.4	n/a	plantings are site-specific
Planting soil [2" to 4" deep]	loamy sand (60 - 65%) & compost (35 - 40%) or sandy loam (30%), coarse sand (30%) & compost (40%)	n/a	USDA soil types loamy sand or sandy loam; clay content < 5%
Organic content	Min. 10% by dry weight (ASTM D 2974)		
Mulch	shredded hardwood		aged 6 months, minimum; no pine or wood chips
Pea gravel diaphragm	pea gravel: ASTM-D-448	NO. 8 OR NO. 9 (1/8" TO 3/8")	
Curtain drain	ornamental stone: washed cobbles	stone: 2" to 5"	
Geotextile		n/a	PE Type 1 nonwoven
Gravel (underdrains and infiltration berms)	AASHTO M-43	NO. 57 OR NO. 6 AGGREGATE (3/8" to 3/4")	
Underdrain piping	F 758, Type PS 28 or AASHTO M-278	4" to 6" rigid schedule 40 PVC or SDR35	Slotted or perforated pipe; 3/8" perf. @ 6" on center, 4 holes per row; minimum of 3" of gravel over pipes; not necessary underneath pipes. Perforated pipe shall be wrapped with 1/4-inch galvanized hardware cloth
Poured in place concrete (if required)	MSHA Mix No. 3; F <sub>c</sub> = 3500 psi @ 28 days, normal weight, air-entrained; reinforcing to meet ASTM-615-60	n/a	on-site testing of poured-in-place concrete required: 28 day strength and slump test; all concrete design (cast-in-place or pre-cast) not using previously approved State or local standards requires design drawings sealed and approved by a professional structural engineer licensed in the State of Maryland - design to include meeting ACI Code 350.R/89; vertical loading [H-10 or H-20]; allowable horizontal loading (based on soil pressures); and analysis of potential cracking.
Sand	AASHTO-M-6 or ASTM-C-33	0.02" to 0.04"	Sand substitutions such as Diabase and Graystone (AASHTO) #10 are not acceptable. No calcium carbonated or dolomitic sand substitutions are acceptable. No "rock dust" can be used for sand.

**APPENDIX B.2. CONSTRUCTION SPECIFICATIONS FOR INFILTRATION PRACTICES B.2.A INFILTRATION TRENCH GENERAL NOTES AND SPECIFICATIONS**

AN INFILTRATION TRENCH MAY NOT RECEIVE RUN-OFF UNTIL THE ENTIRE CONTRIBUTING DRAINAGE AREA TO THE INFILTRATION TRENCH IS MINIMIZE COMPACTION OF THE SOIL.

- HEAVY EQUIPMENT AND TRAFFIC SHALL BE RESTRICTED FROM TRAVELING OVER THE PROPOSED LOCATION OF THE INFILTRATION TRENCH TO MINIMIZE COMPACTION OF THE SOIL.
- EXCAVATE THE INFILTRATION TRENCH TO THE DESIGN DIMENSIONS. EXCAVATED MATERIALS SHALL BE PLACED AWAY FROM THE TRENCH SIDES TO ENHANCE TRENCH WALL STABILITY. LARGE TREE ROOTS MUST BE TRIMMED FLUSH WITH THE TRENCH SIDES IN ORDER TO PREVENT FABRIC PUNCTURING OR TEARING OF THE FILTER FABRIC DURING SUBSEQUENT INSTALLATION PROCEDURES. THE SIDE WALLS OF THE TRENCH SHALL BE REINFORCED WHERE SHEARED AND SEALED BY HEAVY EQUIPMENT.
- A CLASS "C" GEOTEXTILE OR BETTER (SEE SECTION 24.0 - MATERIAL SPECIFICATIONS, 1994 STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL, MCE, 1994) SHALL INTERFACE BETWEEN THE TRENCH SIDE WALLS AND BETWEEN THE STONE RESERVOIR AND GRAVEL FILTER LAYERS. A PARTIAL LIST OF NON-WOVEN FILTER FABRICS THAT MEET THE CLASS "C" CRITERIA FOLLOWS. ANY ALTERNATIVE FILTER FABRIC MUST BE APPROVED BY THE PLAN APPROVAL AUTHORITY.  
 (MWC) 4522 CARTRIDGE FX-808  
 GEOLON N70 MIRA1 180-N  
 WEGRET 407

THE WIDTH OF THE GEOTEXTILE MUST INCLUDE SUFFICIENT MATERIAL TO CONFORM TO TRENCH PERIMETER IRREGULARITIES AND FOR A 6-INCH MINIMUM TOP OVERLAP. THE FILTER FABRIC SHALL BE TUCKED UNDER THE SAND LAYER ON THE BOTTOM OF THE INFILTRATION TRENCH FOR A DISTANCE OF 6 TO 12 INCHES. STONES OR OTHER ANCHORING OBJECTS SHOULD BE PLACED ON THE FABRIC AT THE EDGE OF THE TRENCH TO KEEP THE TRENCH OPEN DURING WINDY PERIODS. WHEN OVERLAPS ARE REQUIRED BETWEEN ROLLS, THE OVERLAP SHOULD LAP A MINIMUM OF 2 FEET OVER THE DOWNHILL ROLL IN ORDER TO PROVIDE A SINGLED EFFECT.

IF A 6 INCH SAND FILTER LAYER IS PLACED ON THE BOTTOM OF THE INFILTRATION TRENCH, THE SAND FOR THE INFILTRATION TRENCH SHALL BE WASHED AND MEET AASHTO-M-43, SIZE NO. 9 OR NO. 10. ANY ALTERNATIVE SAND GRADATION MUST BE APPROVED BY THE PLAN APPROVAL AUTHORITY.

THE STONE AGGREGATE SHOULD BE PLACED IN A MAXIMUM LOOSE LIFT THICKNESS OF 12 INCHES. THE GRAVEL (ROUNDED "BANK RUN" GRAVEL IS PREFERRED) FOR THE INFILTRATION TRENCH SHALL BE WASHED AND MEET ON OF THE FOLLOWING AASHTO-M-43, SIZE NO. 2 OR NO. 3.

FOLLOWING THE STONE AGGREGATE PLACEMENT, THE FILTER FABRIC SHALL BE FOLDED OVER THE STONE AGGREGATE TO FORM A 6-INCH MINIMUM LONGITUDINAL LAP. THE DESIRED FULL SOIL OR STONE AGGREGATE SHALL BE PLACED OVER THE LAP AT SUFFICIENT INTERVALS TO MAINTAIN THE LAP DURING SUBSEQUENT BACKFILLING.

CARE SHALL BE EXERCISED TO PREVENT NATURAL OR FILL SOILS FROM INTERMIXING WITH THE STONE AGGREGATE. ALL CONTAMINATED STONE AGGREGATE SHALL BE REMOVED AND REPLACED WITH UNCONTAMINATED STONE AGGREGATE.

VOIDS MAY OCCUR BETWEEN THE FABRIC AND THE EXCAVATION SIDES SHALL BE WIDENED, REMOVING Boulders OR OTHER OBSTACLES FROM THE TRENCH WALLS IS ONE SOURCE OF SUCH VOIDS. THEREFORE, NATURAL SOILS SHOULD BE PLACED IN THESE VOIDS AT THE MOST CONVENIENT TIME DURING CONSTRUCTION TO ENSURE FABRIC CONFORMITY TO THE EXCAVATION SIDES.

VERTICALLY EXCAVATED WALLS WILL BE DIFFICULT TO MAINTAIN IN AREAS WHERE SOIL MOISTURE IS HIGH OR WHERE SOFT COHESIVE OR COHESIONLESS SOILS ARE DOMINANT. THESE CONDITIONS MAY REQUIRE LAYING BACK OF THE SIDE SLOPE TO MAINTAIN STABILITY.

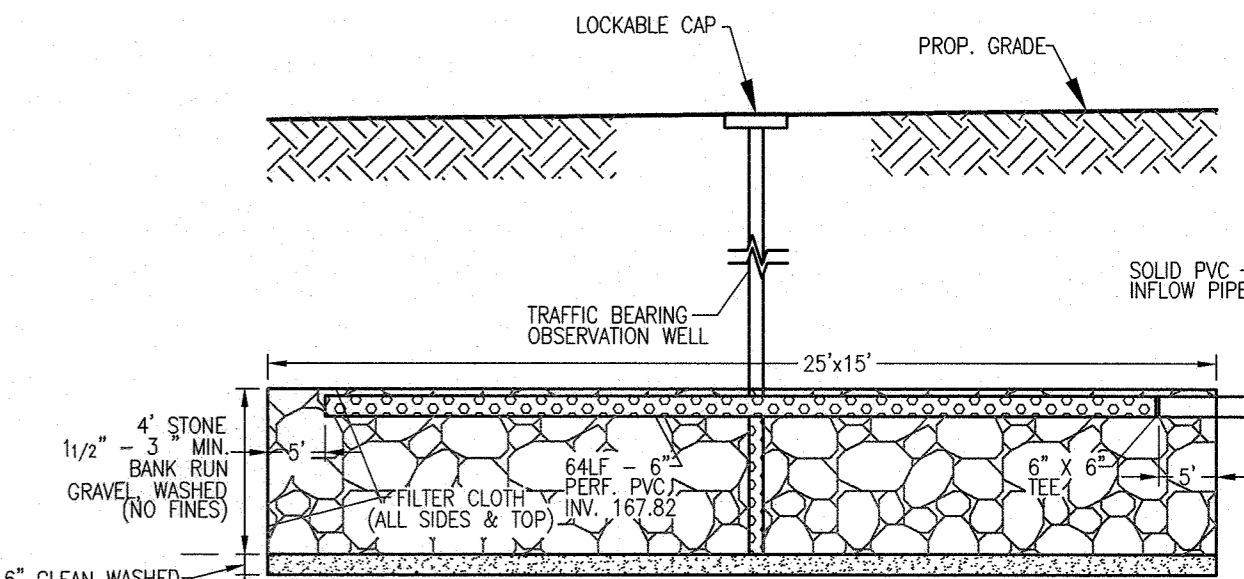
PVC DISTRIBUTION PIPES SHALL BE SCHEDULE 40 AND MEET ASTM-D-1785. ALL FITTINGS SHALL MEET ASTM-D-2729. PERFORATIONS SHALL BE 3/8 INCH IN DIAMETER. A PERFORATED PIPE SHALL BE PROVIDED ONLY WITHIN THE INFILTRATION TRENCH AND SHALL TERMINATE 1 FOOT SHORT OF THE INFILTRATION TRENCH WALL. THE END OF THE PVC PIPE SHALL BE CAPPED. NOTE: PVC PIPE WITH A WALL THICKNESS CLASSIFICATION OF SDR-35 MEETING ASTM-D-3034 IS AN ACCEPTABLE SUBSTITUTE FOR THE SCHEDULE 40 PIPE.

THE OBSERVATION WELL IS TO CONSIST OF 6-INCH DIAMETER PERFORATED PVC SCHEDULE 40 PIPE (M 278 OR F758, TYPE PS 28) WITH A CAP SET 6 INCHES ABOVE GROUND LEVEL AND IS TO BE LOCATED NEAR THE LONGITUDINAL CENTER OF THE INFILTRATION TRENCH. THE PIPE SHALL HAVE A PLASTIC COLLAR WITH RIBS TO PREVENT ROTATION WHEN REMOVING THE CAP. THE SCREW TOP LID SHALL BE A CLEANOUT WITH A LOCKING MECHANISM OR SPROCKET BOLT TO DISCOURAGE MINIMUM. THE DEPTH TO THE INVERT SHALL BE MARKED ON THE LID. THE PIPE SHALL BE PLACED VERTICALLY WITHIN THE GRAVEL PORTION OF THE INFILTRATION TRENCH AND A COP PROVIDED AT THE BOTTOM OF THE PIPE. THE BOTTOM OF THE CAP SHALL REST ON THE INFILTRATION TRENCH BOTTOM.

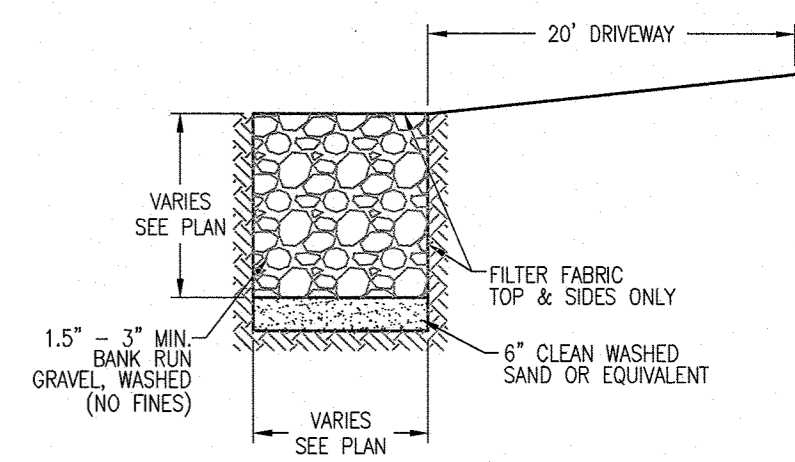
CORRUGATED METAL DISTRIBUTION PIPES SHALL CONFORM TO AASHTO-M-36, AND SHALL BE ALUMINIZED IN ACCORDANCE WITH AASHTO-M-274. ALUMINIZED PIPE CONTACT WITH CONCRETE SHALL BE COATED WITH AN INERT COMPOUND CAPABLE OF PREVENTING THE DELETERIOUS EFFECT OF THE ALUMINUM ON THE CONCRETE. PERFORATED DISTRIBUTION PIPES SHALL CONFORM TO AASHTO-M-36, CLASS 2 AND SHALL BE PROVIDED ONLY WITHIN THE INFILTRATION TRENCH AND SHALL TERMINATE 1 FOOT SHORT OF THE INFILTRATION TRENCH WALL. AN ALUMINIZED METAL PLATE SHALL BE WELDED TO THE END OF THE PIPE.

IF A DISTRIBUTION STRUCTURE WITH A WET WELLS USED, A 4-INCH DRAIN PIPE SHALL BE PROVIDED AT OPPOSITE ENDS OF THE INFILTRATION TRENCH DISTRIBUTION STRUCTURE. TWO (2) CUBIC FEET OF POROUS BACKFILL MEETING AASHTO-M-43, SIZE NO. 57 SHALL BE PROVIDED AT EACH DRAIN.

IF A DISTRIBUTION STRUCTURE IS USED, THE MANHOLE COVER SHALL BE BOLTED TO THE FRAME.



**STONE INFILTRATION TRENCH (M-6)**  
NOT TO SCALE



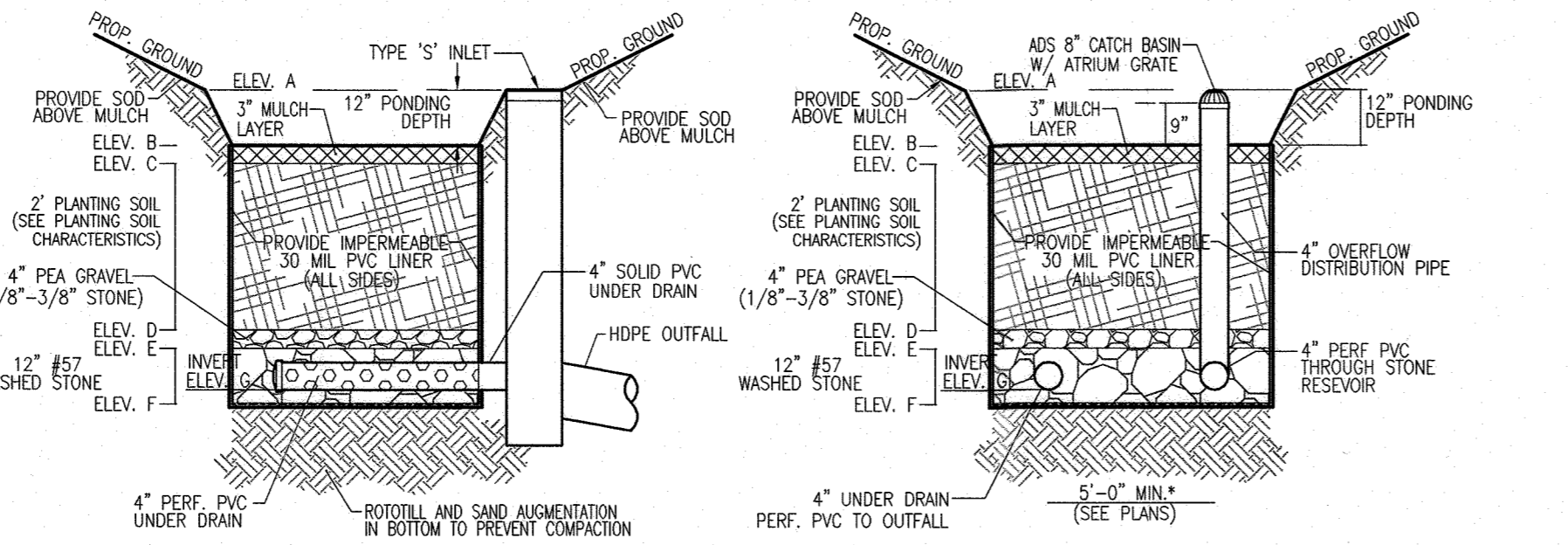
**ROAD-SIDE INFILTRATION (M-5) TRENCH DETAIL**  
NOT TO SCALE

**OPERATION AND MAINTENANCE SCHEDULE FOR PRIVATELY OWNED AND MAINTAINED STORMWATER INFILTRATION TRENCHES (M-5)**

- THE MONITORING WELLS AND STRUCTURES SHALL BE INSPECTED ON A QUARTERLY BASIS AND AFTER EVERY LARGE STORM EVENT.
- WATER LEVELS AND SEDIMENT BUILD UP IN THE MONITORING WELLS SHALL BE RECORDED OVER A PERIOD OF SEVERAL DAYS TO INSURE TRENCH DRAINAGE.
- A LOGBOOK SHALL BE MAINTAINED TO DETERMINE THE RATE AT WHICH THE FACILITY DRAINS.
- WHEN THE FACILITY BECOMES CLOGGED SO THAT IT DOES NOT DRAIN DOWN WITHIN THE xxx HOUR PERIOD, CORRECTIVE ACTION SHALL BE TAKEN.
- THE MAINTENANCE LOGBOOK SHALL BE AVAILABLE TO HOWARD COUNTY FOR INSPECTION TO INSURE COMPLIANCE WITH OPERATION AND MAINTENANCE CRITERIA.
- ONCE THE PERFORMANCE CHARACTERISTICS OF THE INFILTRATION FACILITY HAVE BEEN VERIFIED, THE MONITORING SCHEDULE CAN BE REDUCED TO AN ANNUAL BASIS UNLESS THE PERFORMANCE DATA INDICATES THAT A MORE FREQUENT SCHEDULE IS REQUIRED.

**OPERATION AND MAINTENANCE SCHEDULE FOR LANDSCAPE INFILTRATION (M-3), MICRO-BIORETENTION (M-6), RAIN GARDENS (M-7), BIORETENTION SWALE (M-8), AND ENHANCED FILTERS (M-9)**

- THE OWNER SHALL MAINTAIN THE PLANT MATERIAL, MULCH LAYER AND SOIL LAYER ANNUALLY. MAINTENANCE OF MULCH AND SOIL IS LIMITED TO CORRECTING AREAS OF EROSION OR WASH OUT. ANY MULCH REPLACEMENT SHALL BE DONE IN THE SPRING. PLANT MATERIAL SHALL BE CHECKED FOR DISEASE AND INSECT INFESTATION AND MAINTENANCE WILL ADDRESS DEAD MATERIAL. PRUNING, ACCEPTABLE REPLACEMENT PLANT MATERIAL IS LIMITED TO THE FOLLOWING: 2000 MARYLAND STORMWATER DESIGN MANUAL, VOLUME II, TABLE A.4.1 AND 2.
- THE OWNER SHALL PERFORM A PLANT IN THE SPRING AND IN THE FALL OF EACH YEAR. DURING THE INSPECTION THE OWNER SHALL REMOVE DEAD AND DISEASED VEGETATION CONSIDERED BEYOND TREATMENT, REPLACE DEAD PLANT MATERIAL WITH ACCEPTABLE REPLACEMENT PLANT MATERIAL, TREAT DISEASED TREES AND SHRUBS, AND REPLACE ALL DEFICIENT STAKES AND WIRES.
- THE OWNER SHALL INSPECT THE MULCH EACH SPRING. THE MULCH SHALL BE REPLACED EVERY TWO TO THREE YEARS. THE PREVIOUS MULCH LAYER SHALL BE REMOVED BEFORE THE NEW LAYER IS APPLIED.
- THE OWNER SHALL CORRECT SOIL EROSION ON AN AS NEEDED BASIS, WITH A MINIMUM OF ONCE PER MONTH AND AFTER EACH WET STORM.



**MICRO-BIORETENTION (UNDERDRAIN)** NOT TO SCALE  
**MICRO-BIORETENTION (OVERFLOW)** NOT TO SCALE

- MICROBIORETENTION NOTES:**
- ALL SIDES OF MICROBIORETENTION ARE TO BE WRAPPED IN IMPERMEABLE 30 MIL PVC LINER. REV TO BE PROVIDED BY OTHER METHODS/FACILITIES.
  - WRAP THE PERFORATED MESH UNDERDRAIN PIPE WITH 1/4" MESH (4x4) OR SMALLER GALVANIZED HARDWARE CLOTH.
  - PROVIDE 5" MINIMUM SPACING BETWEEN UNDER DRAIN AND PERFORATED PIPE THROUGH STONE RESERVOIR OR SAND PIPE EQUALLY ACROSS BOTTOM FOR SMALL BIOS. (SEE PLANS)

**OPERATION AND MAINTENANCE SCHEDULE FOR PRIVATELY OWNED AND MAINTAINED DISCONNECTION OF ROOFTOP RUNOFF (N-1) AND DISCONNECTION OF NON-ROOFTOP RUNOFF (N-2)**

- MAINTENANCE OF AREAS RECEIVING DISCONNECTED RUNOFF IS GENERALLY NO DIFFERENT THAN THAT REQUIRED FOR OTHER LAWN OR LANDSCAPED AREAS. THE AREAS RECEIVING RUNOFF SHOULD BE PROTECTED FROM FUTURE COMPACTION OR DEVELOPMENT OF IMPERVIOUS AREA. IN COMMERCIAL.

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

*[Signature]* 1/29/24  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION NY DATE

*[Signature]* 1/11/24  
 CHIEF, DIVISION OF LAND DEVELOPMENT DATE

OWNER/DEVELOPER  
 ANGEL TOUCH OF WEST FRIENDSHIP, LLC  
 C/O MARK WAH  
 12799 BUTTERCUP COURT  
 WEST FRIENDSHIP, MD 21794  
 (410) 442-9800

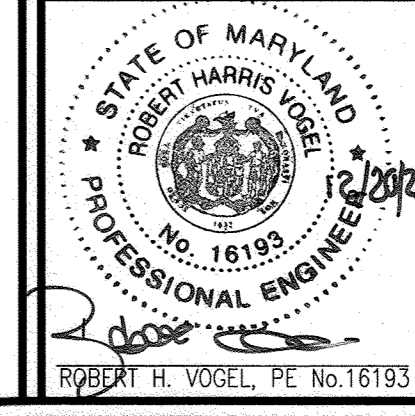
NO.	REVISION	DATE

ENVIRONMENTAL CONCEPT PLAN  
**STORMWATER MANAGEMENT NOTES AND DETAILS**

ANGEL'S TOUCH ASSISTED LIVING  
 12900 FREDERICK ROAD  
 WEST FRIENDSHIP, MD 21794  
 ZONED: RO-DEO

TAX MAP 15 BLOCK 10 LOT 1 PARCEL 237  
 3RD ELECTION DISTRICT HOWARD COUNTY, MARYLAND

**VOGEL ENGINEERING**  
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DESIGN BY: RHW/DZE  
 DRAWN BY: JMR/DZE  
 CHECKED BY: RHW  
 DATE: DEC 2023  
 SCALE: AS SHOWN  
 W.O. NO.: 12-28

PROFESSIONAL CERTIFICATE  
 I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A duly LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND.  
 EXPIRATION DATE: 08-27-2024

6 SHEET OF 6