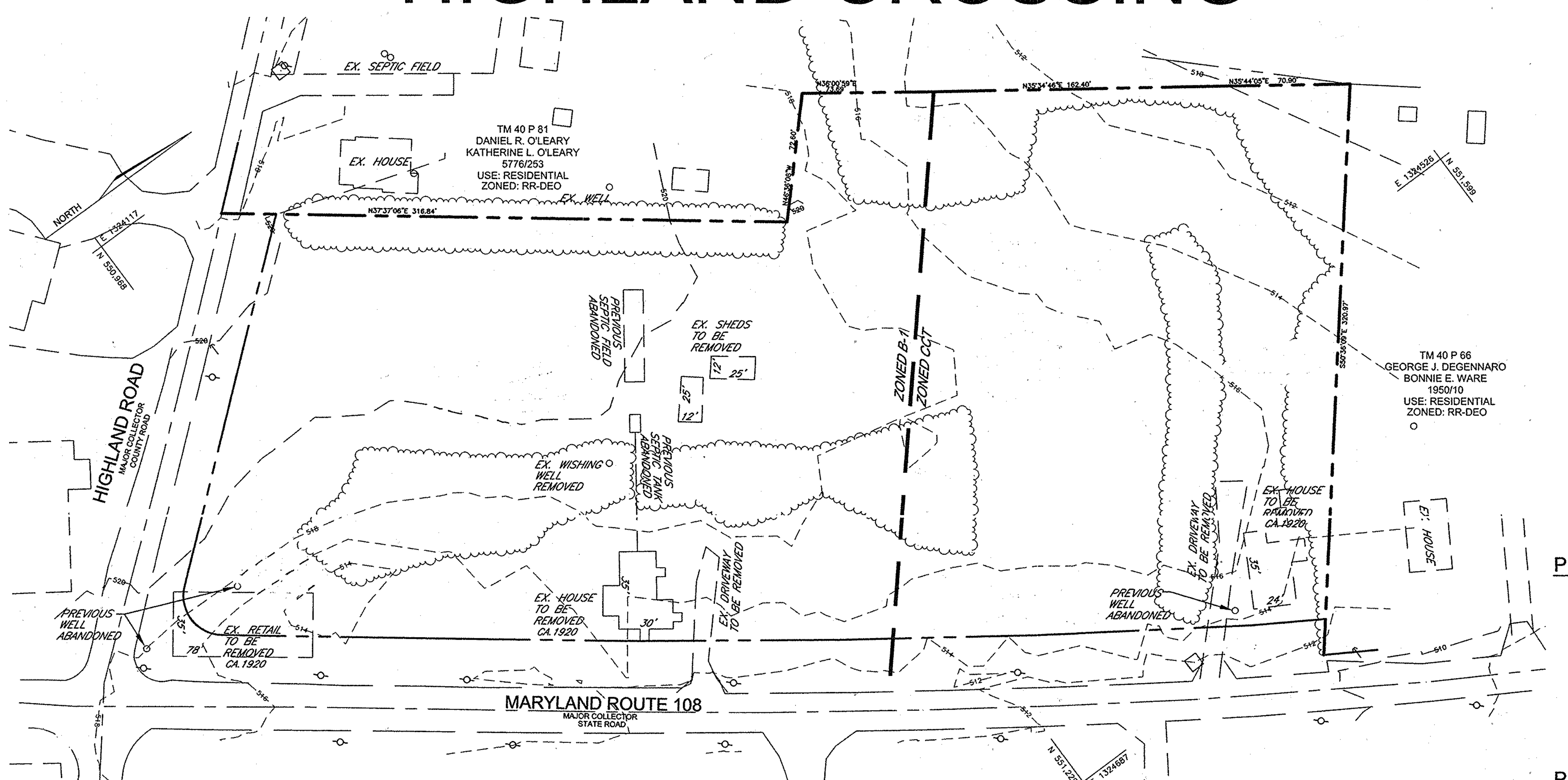
SITE DEVELOPMENT PLAN
HIGHLAND CROSSING

GENERAL NOTES

1. THE CONTRACTOR SHALL NOTIFY "MISS UTILITY" AT 1-800-257-7777 AT LEAST 48 HOURS PRIOR TO ANY EXCAVATION WORK.
2. THE CONTRACTOR IS TO NOTIFY THE FOLLOWING UTILITIES OR AGENCIES AT LEAST FIVE DAYS BEFORE STARTING WORK ON THESE DRAWINGS:

MISS UTILITY	1-800-257-7777
BELL ATLANTIC TELEPHONE CO:	725-9976
HOWARD COUNTY BUREAU OF UTILITIES:	313-2366
VERIZON CABLE LOCATION DIVISION:	393-3553
B.G.&E. CO. CONTRACTOR SERVICES:	850-4620
B.G.&E. CO. UNDERGROUND DAMAGE CONTROL:	787-4620
STATE HIGHWAY ADMINISTRATION:	531-5533

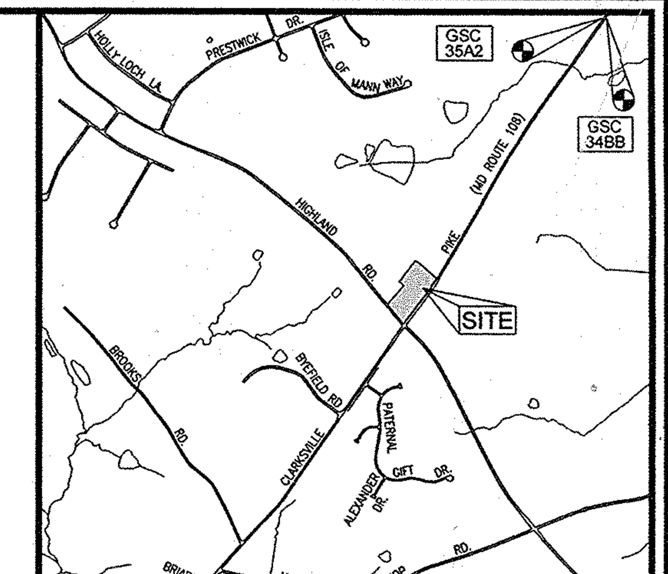
3. THE CONTRACTOR SHALL NOTIFY THE DEPARTMENT OF PUBLIC WORKS/BUREAU OF ENGINEERING/ CONSTRUCTION INSPECTION DIVISION AT (410) 313-1880 AT LEAST FIVE (5) WORKING DAYS PRIOR TO START OF WORK.
4. ANY DAMAGE TO PUBLIC RIGHTS-OF-WAY, PAVING, OR EXISTING UTILITIES WILL BE CORRECTED AT THE CONTRACTOR'S EXPENSE.
5. EXISTING UTILITIES LOCATED FROM ROAD CONSTRUCTION PLANS AND AVAILABLE RECORD DRAWINGS. APPROXIMATE LOCATION OF EXISTING UTILITIES ARE SHOWN FOR THE CONTRACTORS INFORMATION. CONTRACTOR SHALL LOCATE EXISTING UTILITIES WELL IN ADVANCE OF CONSTRUCTION ACTIVITIES AND TAKE ALL NECESSARY PRECAUTIONS TO PROTECT THE EXISTING UTILITIES AND TO MAINTAIN UNINTERRUPTED SERVICE.
6. TRAFFIC CONTROL DEVICES, MARKINGS AND SIGNING SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD). ALL STREET AND REGULATORY SIGNS SHALL BE IN PLACE PRIOR TO THE PLACEMENT OF ANY ASPHALT.
7. IN ACCORDANCE WITH SECTION 128 OF THE HOWARD COUNTY ZONING REGULATIONS, BAY WINDOWS, CHIMNEYS, OR EXTERIOR STAIRWAYS NOT MORE THAN 16 FEET IN WIDTH MAY PROJECT NOT MORE THAN 4 FEET INTO ANY SETBACKS. PORCHES OR DECKS, OPEN OR ENCLOSED MAY PROJECT NOT MORE THAN 10 FEET INTO THE FRONT OR REAR YARD SETBACK.
8. PARCELS 83 AND 85 ARE ZONED B-1 PER THE FEBRUARY 2, 2004 COMPREHENSIVE ZONING PLAN. PARCELS 150 AND 247 ARE ZONED CCT IN ACCORDANCE WITH ZONING BOARD CASE ZB-1047M.
9. COORDINATES AND ELEVATIONS ARE BASED ON HOWARD COUNTY MONUMENT NO'S. 34BB AND 35A2.
10. PROPERTY LINES ARE BASED ON A BOUNDARY SURVEY PERFORMED BY ROBERT H. VOGEL ENGINEERING, INC. DATED JANUARY 2005.
11. TOPOGRAPHY SHOWN HEREON IS BASED ON A FIELD RUN TOPOGRAPHICAL SURVEY PERFORMED BY ROBERT H. VOGEL ENGINEERING, INC. DATED JANUARY 2005.
12. A NOISE STUDY IS NOT REQUIRED FOR THIS PROJECT.
13. A WETLAND DELINEATION WAS PERFORMED BY ECO-SCIENCE PROFESSIONALS, INC. DATED FEBRUARY 2005.
14. AN APFO AND TRAFFIC STUDY WAS PERFORMED BY STREET TRAFFIC STUDIES, LTD. DATED SEPTEMBER 2004.
15. A SIMPLIFIED FOREST STAND DELINEATION WAS PERFORMED BY ECO-SCIENCE PROFESSIONALS, INC. DATED FEBRUARY 2005.
16. A GEOTECHNICAL STUDY WAS PERFORMED BY SPECIALIZED ENGINEERING, DATED FEBRUARY 2005.
17. NO 100 YEAR FLOODPLAINS EXIST ON THIS SITE.
18. NO WETLANDS EXIST ON THIS SITE.
19. NO BURIAL GROUNDS OR CEMETERIES EXIST ON THIS PROPERTY.
20. THE FOREST CONSERVATION OBLIGATION OF 0.65 ACRES OF AFFORESTATION FOR THIS PLAN HAS BEEN MET BY A FEE-IN-LIEU PAYMENT OF $ 14,157.00 MADE TO THE HOWARD COUNTY FOREST CONSERVATION FUND.
21. STORMWATER MANAGEMENT HAS BEEN PROVIDED FOR THIS PROJECT UTILIZING THE 2000 MDE STORMWATER DESIGN MANUAL VOLUMES I AND II. CPv, WQv AND REv FOR THIS PROJECT IS PROVIDED BY THE PROPOSED INFILTRATION TRENCH. THE FACILITY WILL BE PRIVATELY OWNED AND MAINTAINED BY THE PROPERTY OWNER. WQv AND REv IS PROVIDED BY GRASS CHANNEL CREDIT FOR THE AREA LOCATED AT THE NORTH CORNER ADJACENT TO HIGHLAND ROAD.
22. PERIMETER LANDSCAPING SHALL BE IN ACCORDANCE WITH SECTION 16.124 OF THE HOWARD COUNTY CODE AND LANDSCAPE MANUAL. FINANCIAL SURETY FOR THE REQUIRED LANDSCAPING HAS BEEN POSTED AS PART OF THE DEVELOPER'S AGREEMENT IN THE AMOUNT OF $21,690.00 FOR 47 SHADE TREES, 23 EVERGREEN TREES AND 138 SHRUBS.
23. THIS SITE DEVELOPMENT PLAN IS SUBJECT TO THE AMENDED FIFTH EDITION OF THE SUBDIVISION AND LAND DEVELOPMENT REGULATIONS EFFECTIVE OCTOBER 2, 2003.
24. SEWER SERVICE FOR THIS SITE WILL BE PRIVATE.
25. WATER AND FIRE SUPPRESSION SERVICE FOR THIS SITE WILL BE PRIVATE.
26. THIS PROPERTY IS NOT IN THE METROPOLITAN DISTRICT.
27. ALL TRASH COLLECTION TO BE PRIVATE.
28. ALL CURB AND GUTTER TO BE HOWARD COUNTY STANDARD DETAIL R3.01. GUTTER PANS AT THE HIGH SIDE OF SUPERELEVATED SECTIONS SHALL BE SLOPED AT THE SAME RATE AND IN THE SAME DIRECTION AS THE PAVING.
29. ALL PAVING TO BE P-2 PAVING, HOWARD COUNTY STANDARD DETAIL R-2.01. THE PAVING SECTION WILL BE CONFIRMED OR MODIFIED BY THE PROJECT GEOTECHNICAL ENGINEER PRIOR TO CONSTRUCTION BASED ON ACTUAL TESTING.
30. FOUNDATION SOILS MUST BE EXAMINED BY THE SOILS ENGINEER TO ASSURE THE ACTUAL FOUNDATION SOIL STRENGTH MEETS OR EXCEEDS ASSUMED DESIGN STRENGTHS.
31. STREET LIGHTING IS PROVIDED FOR THIS SITE.
32. THERE ARE NO STEEP SLOPES ON THIS SITE.
30. FAST FOOD RESTAURANT IS NOT PERMITTED USE ON THIS SITE, AND ANY TYPE OF RESTAURANT AND/OR RETAIL ARE NOT PERMITTED USES ON THE CCT ZONED AREA OF THIS SITE.
31. ALL OUTDOOR LIGHTING SHALL COMPLY WITH THE REQUIREMENTS OF ZONING SECTION 134.
32. ALL EXISTING WELLS AND SEPTIC SYSTEMS ONSITE ARE TO BE PROPERLY ABANDONED PRIOR TO GRADING PROCEDURES. CONTRACTOR IS TO CONTACT THE HEALTH DEPART FOR PROPER ABANDONMENT.
33. ALL WELL ONSITE TO BE DRILLED PRIOR TO PLAN SIGNATURE.
34. A MAINTENANCE AGREEMENT BETWEEN THE UNITS IS REQUIRED FOR THE MICROFAST SYSTEM.
35. A DESIGN MANUAL WAIVER TO REDUCE THE REQUIRED ENTRANCE FILLET RADII TO 25' AND 45' AND TO WAIVE THE REQUIRED INTERSECTION SIGHT DISTANCE ON HIGHLAND ROAD WAS APPROVED, DATED NOVEMBER 9, 2005.
36. AN ALTERNATIVE COMPLIANCE TO THE DESIGN MANUAL, VOLUME I, SECTION 5.2.4.I, TO REDUCE THE REQUIRED POND BUFFER FROM 25' TO 15', AND SECTION 5.2.1.A, WHICH ALLOWS THE COUNTY TO REQUIRE THE PEAK MANAGEMENT OF THE 10 AND 100 YEAR DESIGN STORMS TO PREDEVELOPMENT RATES, TO ALLOW THE RELEASE RATES NOT TO EXCEED THE PEAK RUNOFF RATES FOR THE ORIGINAL DRAINAGE AREA OF 2.15 ACRES AS IF IT WERE TO BE DEVELOPED AS COMMERCIAL WAS APPROVED, DATED JUNE 7, 2005.
37. THIS PROJECT IS SUBJECT TO ZRA 60, APPROVED JULY 11, 2005, TO AMEND THE ZONING REGULATIONS CONCERNING 'BULK REGULATIONS SPECIFIC TO HIGHLAND' TO MAKE THESE REGULATIONS ALSO APPLICABLE TO PROPERTIES ZONED CCT, IN ADDITION TO B-1 ZONED PROPERTIES AS CURRENTLY APPLICABLE AND TO MAKE THE SETBACK REQUIREMENTS APPLY TO USES AS WELL AS STRUCTURES, FOR NEW STRUCTURES, AND FOR USES.
38. THIS PROJECT IS SUBJECT TO ZB 1047M, APPROVED JANUARY 12, 2006, TO AMEND THE ZONING MAP OF HOWARD COUNTY, MARYLAND SO AS TO REZONE 2.11 ACRES OF LAND FROM THE RR-DEO TO THE CCT ZONING DISTRICT ON LAND LOCATED IN THE NORTHWEST QUADRANT OF THE INTERSECTION OF MD 108 AND HIGHLAND ROAD AND IDENTIFIED AS TAX MAP 40, GRID 5, PARCELS 150 AND 247 IN THE FIFTH ELECTION DISTRICT OF HOWARD COUNTY.
39. ALL MARYLAND ROUTE 108 ROAD WIDENING AND CONSTRUCTION TO CONFORM TO MSHA ACCESS PERMIT. CONTRACTOR IS RESPONSIBLE TO CONFIRM THAT ALL WORK PERFORMED IS IN CONFORMANCE WITH THE PERMIT.
40. CONTRACTOR IS RESPONSIBLE TO ESTABLISH PAVEMENT CROSS SECTION AND PROPOSED CURB ELEVATIONS FROM THE EDGE OF EXISTING PAVEMENT.
41. THE BIOMICROBICS TANK WILL BE CONSTRUCTED TO WITHSTAND AT LEAST 4 FEET OF COVER OVER IT.



PLAN
SCALE: 1"=50'

BENCHMARKS			
NO.	NORTHING	EASTING	ELEVATION
34BB	562,176.458	1,329,641.876	485.261'
35A2	564,154.799	1,331,201.065	488.647'

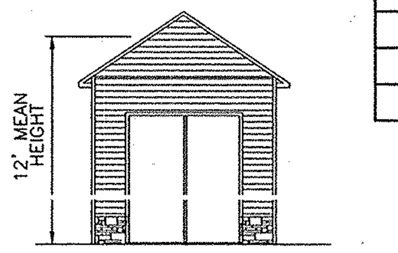
LEGEND	
----202----	EXISTING 2 FT CONTOUR
— —200— —	EXISTING 10 FT CONTOUR
⌒⌒⌒⌒	EXISTING TREELINE



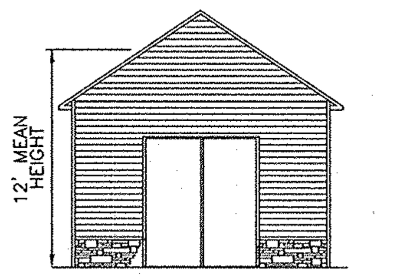
VICINITY MAP
SCALE: 1"=2000'

BUILDING USE CHART				
BUILDING	USE	PARKING RATIO	FLOOR AREA	PARKING REQUIRED
D	KARATE STUDIO	5.0 SPACES PER 1,000 SF	3,360 SF	17 SPACES
A	OFFICE	3.3 SPACES PER 1,000 SF	3,700 SF	13 SPACES
B	RETAIL	5.0 SPACES PER 1,000 SF	10,813 SF	54 SPACES
C	GENERAL OFFICE	3.3 SPACES PER 1,000 SF	6,720 SF	23 SPACES
D	DAYCARE	3.0 SPACES PER 1,000 SF	3,360 SF	10 SPACES
E	GENERAL OFFICE	3.3 SPACES PER 1,000 SF	8,960 SF	30 SPACES
A	RETAIL	5 SPACES PER 1,000 SF	2,300 SF	12 SPACES

NOTES:
1. SEE THE SHARED PARKING TABULATION THIS SHEET.
2. NO CHANGE IN USE IS PERMITTED WITHOUT COMPLIANCE WITH THE PARKING REQUIREMENTS OF ZONING SECTION 133, AND THE APPROVAL OF THE DPZ.
3. RETAIL INCLUDES 407 SQ.FT PATIO (BUILDING B)



PUMP HOUSE #1 ELEVATION
NOT TO SCALE

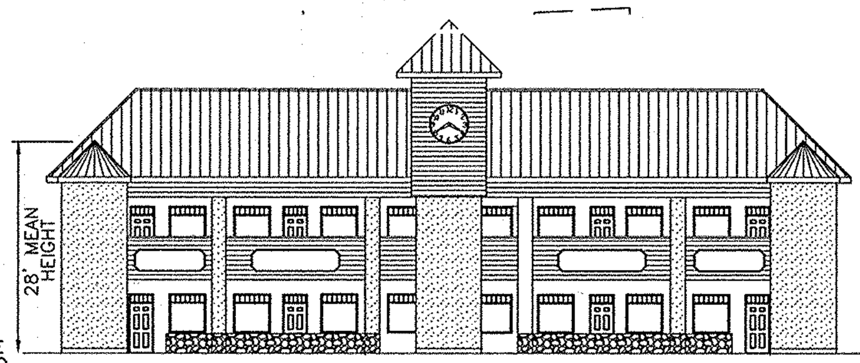


PUMP HOUSE #2 ELEVATION
NOT TO SCALE

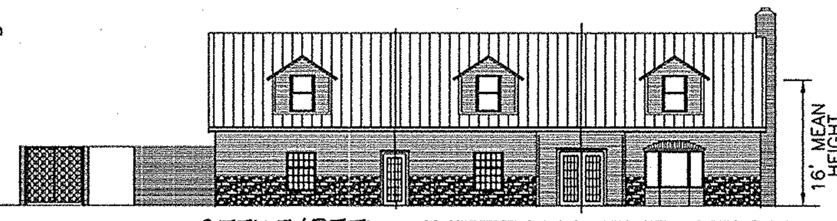
SITE ANALYSIS DATA CHART			
TOTAL PROJECT AREA 167,706 SF (3.85 AC)	AREA OF PLAN SUBMISSION 167,706 SF (3.85 AC)	LIMIT OF DISTURBED AREA 4.45 AC	PRESENT ZONING B-1/CCT
PROPOSED USE OFFICE/RETAIL/	TYPE OF UNIT OFFICE/RETAIL/	TOTAL UNITS ALLOWED NA	TOTAL UNITS PROPOSED 10
PARKING SPACES REQUIRED 128	PARKING SPACES PROVIDED 165	HANDICAP SPACES REQUIRED 8	HANDICAP SPACES PROVIDED 10
OPEN SPACE REQUIRED NA	OPEN SPACE PROVIDED NA	RECREATION OPEN SPACE REQUIRED NA	RECREATION OPEN SPACE PROVIDED NA
DPZ FILE REFERENCE NA		DEED REFERENCE L.8797 F.450, L.8797 F.458	

PERMIT INFORMATION CHART					
SUBDIVISION NAME HIGHLAND CROSSING		SECTION/AREA NA		PARCEL NUMBER 83, 85, 150, 247	
PLAT REF. 18394	TAX MAP 40	GRID NO. 5	ZONE B-1/CCT	ELECT. DIST. 5TH	CENSUS TR. 6051.01
WATER CODE: NA			SEWER CODE: NA		

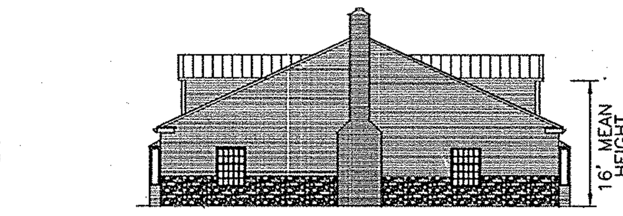
SHEET INDEX	
DESCRIPTION	SHEET NO.
COVER SHEET	1
SITE LAYOUT PLAN	2
GRADING AND SEDIMENT EROSION CONTROL PLAN	3
LANDSCAPING AND FOREST CONSERVATION PLAN	4
WATER AND SEPTIC SYSTEMS PLAN	5
WATER AND SEPTIC SYSTEMS DETAILS	6
STORMWATER MANAGEMENT DETAILS	7
SEDIMENT CONTROL DETAILS AND NOTES	8
TRAFFIC SIGNAL MODIFICATION PLANS	9
TRAFFIC SIGNAL MODIFICATION PLANS	10
PAVEMENT MARKING PLANS	11



RETAIL BUILDING INTERNAL ELEVATION
NOT TO SCALE

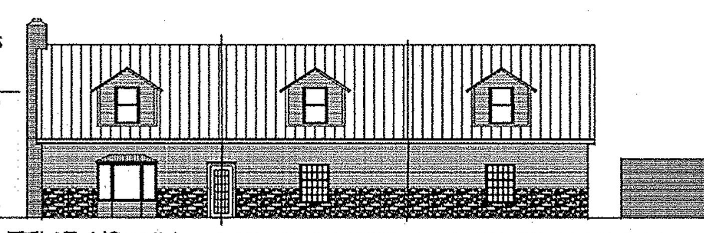


OFFICE/RETAIL INTERNAL ELEVATION
NOT TO SCALE

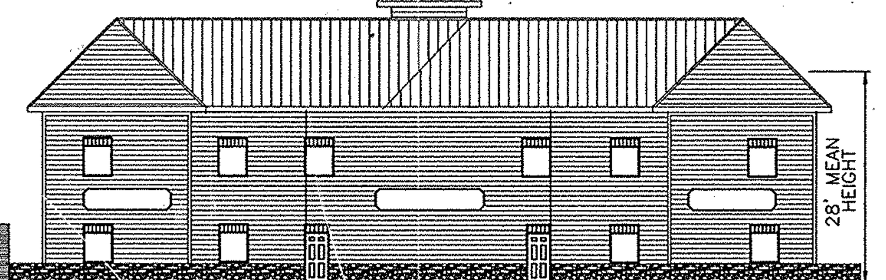


OFFICE/RETAIL HIGHLAND ROAD ELEVATION
NOT TO SCALE

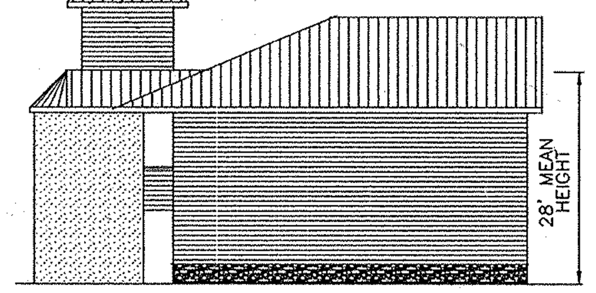
3 OFFICE BUILDING MD ROUTE 108 ELEVATION
NOT TO SCALE



OFFICE/RETAIL MD ROUTE 108 ELEVATION
NOT TO SCALE



RETAIL BUILDING MD ROUTE 108 ELEVATION
NOT TO SCALE



RETAIL BUILDING SIDE ELEVATION
NOT TO SCALE

4 OFFICE BUILDING INTERNAL ELEVATION
NOT TO SCALE

SHARED PARKING TABULATION							
USE	WEEKDAY				WEEKEND		NIGHT
	MORNING	MID-DAY	AFTERNOON	EVENING	DAYTIME	EVENING	MIDNIGHT
OFFICE**	80%	100%	100%	10%	10%	5%	5%
76	61	76	76	8	8	4	4
RETAIL*	20%	60%	60%	90%	100%	70%	5%
83	17	50	50	75	83	59	5
159	78	126	126	83	91	63	9

TOTAL PARKING REQUIRED WITHOUT SHARING = 159 SPACES
TOTAL PARKING REQUIRED WITH SHARING = 126 SPACES
NOTES:
1. THIS PARKING SPACE REDUCTION FOR SHARED PARKING PERMITTED PER ZONING SECTION 133.E.1.

* INCLUDES KARATE STUDIO (BUILDING D)
TOTAL SPACES PROVIDED = 165 SPACES
** INCLUDES DAY CARE (BLDG.D)

APPROVED: FOR PRIVATE WATER AND PRIVATE SEWERAGE SYSTEMS

Robert J. Weber 6/26/06
COUNTY HEALTH OFFICER — HOWARD COUNTY HEALTH DEPARTMENT — DATE
KN MJD

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

6/29/06
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

Cindy Hamilton 7/11/06
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE

Marsha McLaughlin 7/14/06
DIRECTOR — DATE

STORMWATER MANAGEMENT REQUIREMENTS - AREA 'A'					
AREA 3.24 AC.	REQUIREMENT	VOLUME REQUIREMENT WITHOUT CREDITS	CREDITS	VOLUME REQUIREMENT WITH CREDITS	NOTES
1	WATER QUALITY VOLUME (WQv)	0.22 AC. FT.	——	0.22 AC. FT.	INFILTRATION TRENCH
2	RECHARGE VOLUME (REv)	0.0373 AC. FT.	——	0.0373 AC. FT.	INFILTRATION TRENCH
3	CHANNEL PROTECTION VOLUME (CPv)	0.3341 AC. FT.	——	0.3341 AC. FT.	INFILTRATION TRENCH
4	OVERHEAD FLOOD PROTECTION ($Q_{10}P$)	0.8399 AC. FT.	——	0.8399 AC. FT.	INFILTRATION TRENCH
5	EXTREME FLOOD VOLUME ($Q_{100}P$)	1.1292 AC. FT.	——	1.1292 AC. FT.	INFILTRATION TRENCH

STORMWATER MANAGEMENT REQUIREMENTS - AREA 'C-1'					
AREA 0.06 AC.	REQUIREMENT	VOLUME REQUIREMENT WITHOUT CREDITS	CREDITS	VOLUME REQUIREMENT WITH CREDITS	NOTES
1	WATER QUALITY VOLUME (WQv)	0.0041 AC. FT.	——	0.00 AC. FT.	GRASS CHANNEL CREDIT WQv AND REv
2	RECHARGE VOLUME (REv)	0.0005 AC FT. 289 SF	——	0.00 AC. FT.	GRASS CHANNEL CREDIT WQv AND REv
3	CHANNEL PROTECTION VOLUME (CPv)	——	——	——	Q_1 YR = 0.50 CFS FOR C1 + C2
4	OVERHEAD FLOOD PROTECTION ($Q_{10}P$)	——	——	——	
5	EXTREME FLOOD VOLUME ($Q_{100}P$)	——	——	——	

STORMWATER MANAGEMENT REQUIREMENTS - AREA 'B'					
AREA 0.26 AC.	REQUIREMENT	VOLUME REQUIREMENT WITHOUT CREDITS	CREDITS	VOLUME REQUIREMENT WITH CREDITS	NOTES
1	WATER QUALITY VOLUME (WQv)	0.0177 AC. FT.	——	0.00 AC. FT.	700 SF SIDEWALK DISCONNECTED BY GRASS STRIP
2	RECHARGE VOLUME (REv)	0.0023 AC. FT. 1,251 SF	——	0.0023 AC. FT. 1,251 SF	
3	CHANNEL PROTECTION VOLUME (CPv)	——	——	——	Q_1 YR = 0.65 CFS
4	OVERHEAD FLOOD PROTECTION ($Q_{10}P$)	——	——	——	
5	EXTREME FLOOD VOLUME ($Q_{100}P$)	——	——	——	

STORMWATER MANAGEMENT REQUIREMENTS - AREA 'C-2'					
AREA 0.11 AC.	REQUIREMENT	VOLUME REQUIREMENT WITHOUT CREDITS	CREDITS	VOLUME REQUIREMENT WITH CREDITS	NOTES
1	WATER QUALITY VOLUME (WQv)	0.0075 AC. FT.	——	0.00 AC. FT.	GRASS CHANNEL CREDIT WQv AND REv
2	RECHARGE VOLUME (REv)	0.0010 AC. FT. 529 SF	——	0.00 AC. FT.	GRASS CHANNEL CREDIT WQv AND REv
3	CHANNEL PROTECTION VOLUME (CPv)	——	——	——	Q_1 YR = 0.50 CFS FOR C1 + C2
4	OVERHEAD FLOOD PROTECTION ($Q_{10}P$)	——	——	——	
5	EXTREME FLOOD VOLUME ($Q_{100}P$)	——	——	——	

ADDRESS CHART	
UNIT #	STREET ADDRESS
1	13330 CLARKSVILLE PIKE
2	13332 CLARKSVILLE PIKE
3	13334 CLARKSVILLE PIKE
4	13340 CLARKSVILLE PIKE
5	13342 CLARKSVILLE PIKE
6	13344 CLARKSVILLE PIKE
7	13360 CLARKSVILLE PIKE
8	13362 CLARKSVILLE PIKE
9	13364 CLARKSVILLE PIKE
10	13366 CLARKSVILLE PIKE
RETAIL	13380 CLARKSVILLE PIKE
RESTAURANT	13390 CLARKSVILLE PIKE

8	ADD CANOPY TO RETAIL BUILDING	4/2/15
7	REVISE THE PLAN TO DELETE THE ORIGINAL PATIO LOCATION TO BLDG. 'A' & RELOCATE IT ADJACENT TO BLDG 'B' & RELOCATE DUMPSTER	12/04/13
6	UPDATE SEPTIC INFORMATION SHEET 5	1/27/10
No.	REVISION	DATE

5	ADD DAY CARE + PLAYGROUND	7/22/09
3	REVISE BLDG A USE TO OFFICE/RETAIL, ADD KARATE STUDIO TO BLDG D USE	10-23-07
2	ADD EXTERNAL STEPS TO BUILDING 'D'	10-8-07
1	REVISE DIMENSIONS OF PUMPHOUSE #1 AND #2	3-27-07
NO.	REVISION	DATE

OWNER / DEVELOPER

HIGHLAND CROSSING, L.L.C.
14190 TWISTING LANE
DAYTON, MD 21036

COVER SHEET
HIGHLAND CROSSING

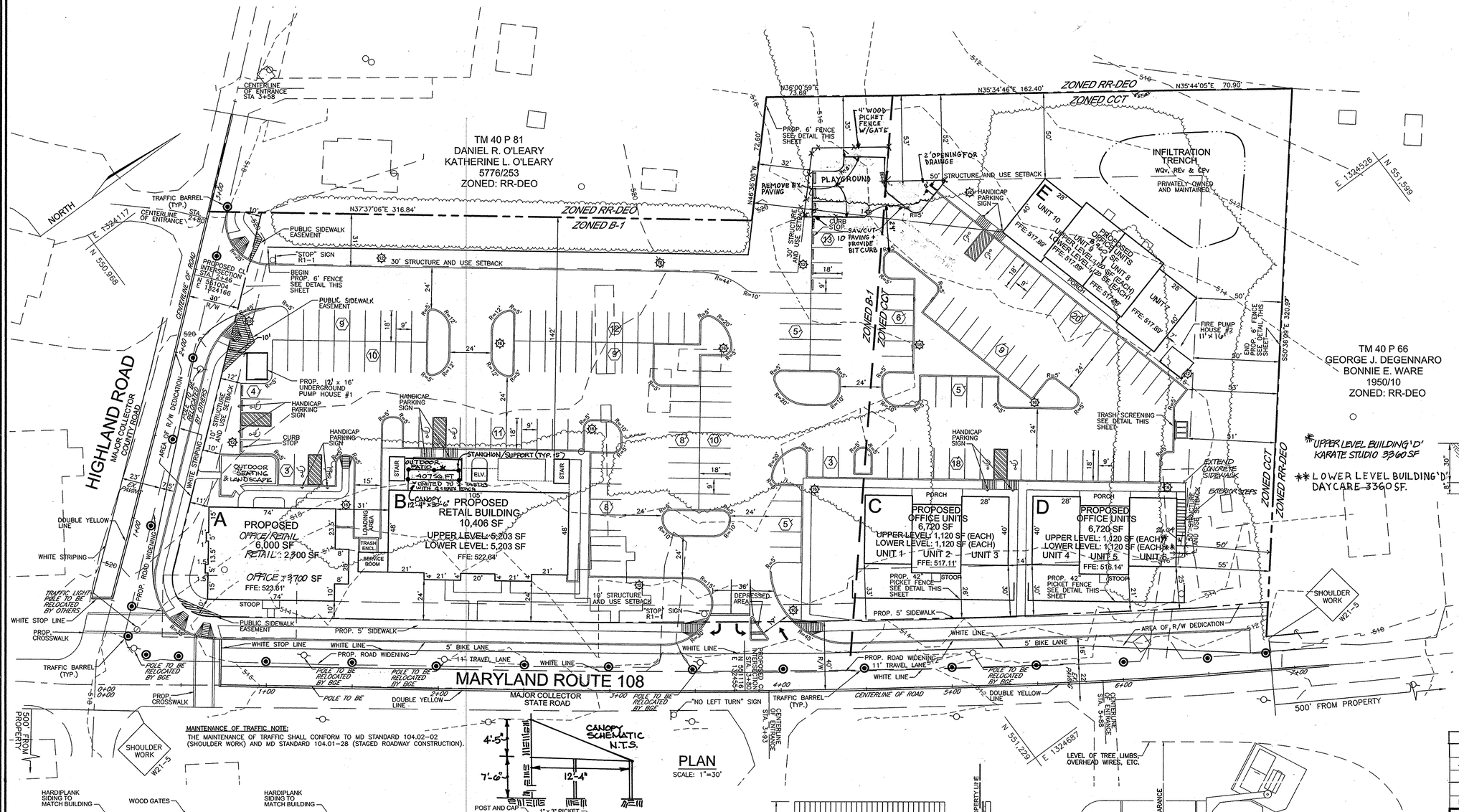
TAX MAP 40 BLOCK 5 — PARCEL A
5TH ELECTION DISTRICT — HOWARD COUNTY, MARYLAND

ROBERT H. VOGEL ENGINEERING, INC.
ENGINEERS • SURVEYORS • PLANNERS
8407 MAIN STREET
ELLICOTT CITY, MD 21043
TEL: 410.461.7666
FAX: 410.461.8961

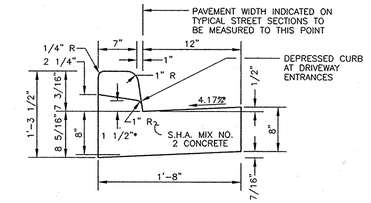
STATE OF MARYLAND — ROBERT HARRIS VOGEL — No. 16193 — PROFESSIONAL ENGINEER
ROBERT H. VOGEL, PE #16193

DESIGN BY:	RHV/LJT
DRAWN BY:	LJT
CHECKED BY:	RHV
DATE:	JUNE 1, 2006
SCALE:	1"=30'
W.O. NO.:	04-12.00

SDP-05-108



LEGEND	
----202----	EXISTING 2 FT CONTOUR
----200----	EXISTING 10 FT CONTOUR
	EXISTING TREELINE
	PROPOSED TREELINE
	PROPOSED LIGHT (HEIGHT)

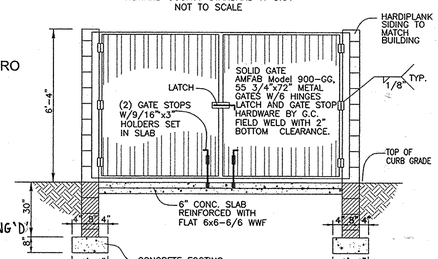


NOTES :

1. DEPRESSED CURB IN HANDICAP ACCESSABLE AREASSHALL HAVE A 0.0417'(1/2") RISE FROM PAVING TO TOP OF CURB.
2. GUTTER PAN AT THE MEDIAN EDGE OF INTERMEDIATE ARTERIALS OR THE HIGH SIDE OF SUPERELEVATED SECTIONS SHALL BE SLOPED AT THE SAME RATE AND INTHE SAME DIRECTION AS THE PAVEMENT. MATCH PAVEMENT CROSS SLOPE WHEN CURB IS LOCATED ON THE LOW SIDE OF SUPERELEVATED SECTION AND THE RATE OF SUPERELEVATION IS GREATER THAN 3% FOR MODIFIED CURB AND GUTTER.

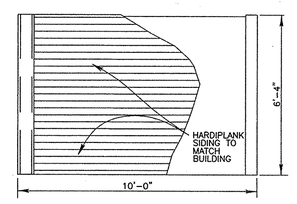
STANDARD COMBINATION CURB AND GUTTER

HOWARD COUNTY STANDARD R-3.01
NOT TO SCALE



TRASH ENCLOSURE GATE DETAIL

NOT TO SCALE



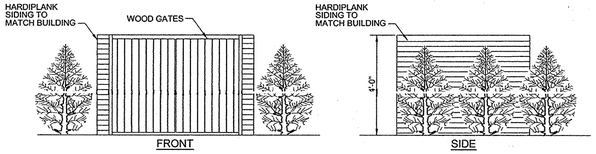
TRASH ENCLOSURE ELEVATION

NOT TO SCALE

MAINTENANCE OF TRAFFIC NOTE:
THE MAINTENANCE OF TRAFFIC SHALL CONFORM TO MD STANDARD 104.02-02 (SHOULDER WORK) AND MD STANDARD 104.01-28 (STAGED ROADWAY CONSTRUCTION).

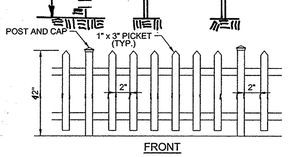
PLAN

SCALE: 1"=30'



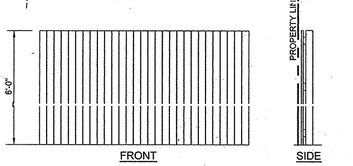
TRASH SCREENING DETAIL

NOT TO SCALE



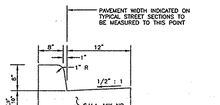
PICKET FENCE DETAIL

NOT TO SCALE



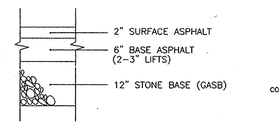
BOARD ON BOARD FENCE DETAIL

NOT TO SCALE

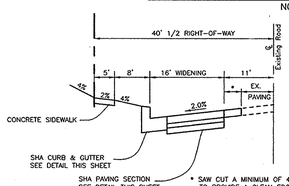


MD. TYPE 'A' CONCRETE COMBINATION CURB AND GUTTER
MD. NO. 620.02
NOT TO SCALE

* GUTTER PAN AT THE MEDIAN EDGE OF INTERMEDIATE ARTERIAL OR THE HIGH SIDE OF SUPERELEVATED SECTIONS SHALL BE SLOPED AT THE SAME RATE AND IN THE SAME DIRECTION AS THE PAVEMENT. MATCH PAVEMENT CROSS SLOPE WHEN CURB IS LOCATED ON THE LOW SIDE OF SUPERELEVATED SECTION AND THE RATE OF SUPERELEVATION IS GREATER THAN 3% FOR MODIFIED CURB AND GUTTER.



MD RTE. 108 (SHA) PAVING SECTION
N.T.S



WIDENING DETAIL
MD ROUTE 108)

NOT TO SCALE

NOTES:
1. ALL MARYLAND ROUTE 100 ROAD WIDENING AND CONSTRUCTION TO CONFORM TO MSHA ACCESS PERMIT. CONTRACTOR IS RESPONSIBLE TO CONFIRM THAT ALL WORK PERFORMED IS IN CONFORMANCE WITH THE PERMIT.
2. CONTRACTOR IS RESPONSIBLE TO ESTABLISH PAVEMENT CROSS SECTION AND PROPOSED CURB ELEVATIONS FROM THE EDGE OF EXISTING PAVEMENT.

SOLID WASTE SERVICE PAD

HOWARD COUNTY STD. R 11.01
NOT TO SCALE

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION	DATE 6/26/06
CHIEF, DIVISION OF LAND DEVELOPMENT	DATE 7/11/06
DIRECTOR	DATE 7/17/06

NO.	REVISION	DATE
7	REVISE THE PLAN TO DELETE THE ORIGINAL PATIO LOCATION TO BLDG 'A' & RE-LOCATE IT ADJACENT TO BLDG 'B' AND RELOCATE THE DUMPSTER.	
5	ADD DAYCARE AND PLAYGROUND	7/22/09
3	REVISE BLDG 'A' USE TO OFFICE/RETAIL, ADD KARATE STUDIO TO BLDG 'C' USE	10-23-07
2	ADD EXTERNAL STEPS TO BUILDING 'D'	10-8-07
1	REVISE DIMENSIONS OF PUMP HOUSE #1 AND #2	3-22-07
NO.	REVISION	DATE

NO.	REVISION	DATE
8	ADD CANOPY TO RETAIL BUILDING	4/2/15

OWNER / DEVELOPER

HIGHLAND CROSSING, L.L.C.
14190 TWILING LANE
DAYTON, MD 21036

SITE LAYOUT PLAN
HIGHLAND CROSSING

TAX MAP 40 BLOCK 5
5TH ELECTION DISTRICT

PARCEL A
HOWARD COUNTY, MARYLAND

ROBERT H. VOGEL ENGINEERING, INC.
ENGINEERS • SURVEYORS • PLANNERS
8407 MAIN STREET TEL: 410.461.7666
ELLICOTT CITY, MD 21043 FAX: 410.461.8961

STATE OF MARYLAND ROBERT HARRIS VOGEL No. 16193 PROFESSIONAL ENGINEER
ROBERT H. VOGEL, PE #16193

DESIGN BY:	RHV/LJT
DRAWN BY:	LJT
CHECKED BY:	RHV
DATE:	JUNE 1, 2006
SCALE:	1"=30'
W.O. NO.:	04-12.00

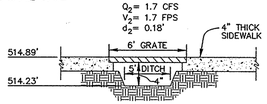
SHEET 2 OF 11

SDP-05-108

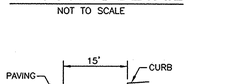
STORMWATER MANAGEMENT AS-BUILT CERTIFICATION
I HEREBY CERTIFY THAT THE FACILITY SHOWN ON THIS PLAN WAS CONSTRUCTED AS SHOWN ON THE "AS-BUILT" PLANS AND MEETS THE APPROVED PLANS AND SPECIFICATIONS"
7/9/08
ROBERT H. VOGEL, P.E. No 16193

STATE OF MARYLAND · ROBERT HARRIS VOGEL · No. 16193 · PROFESSIONAL ENGINEER

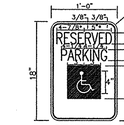
Q_2= 1.7 CFS
V_2= 1.7 FPS
d_2= 0.18'



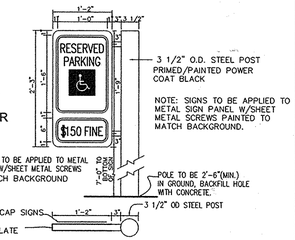
SIDEWALK SWALE CROSSING DETAIL
NOT TO SCALE



RIP-RAP CHANNEL SECTION
NOT TO SCALE

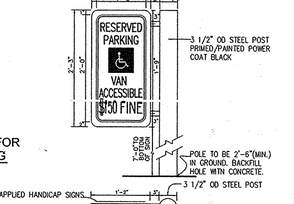


PARKING RESTRICTION SIGN FOR HANDICAPPED PARKING
NOT TO SCALE

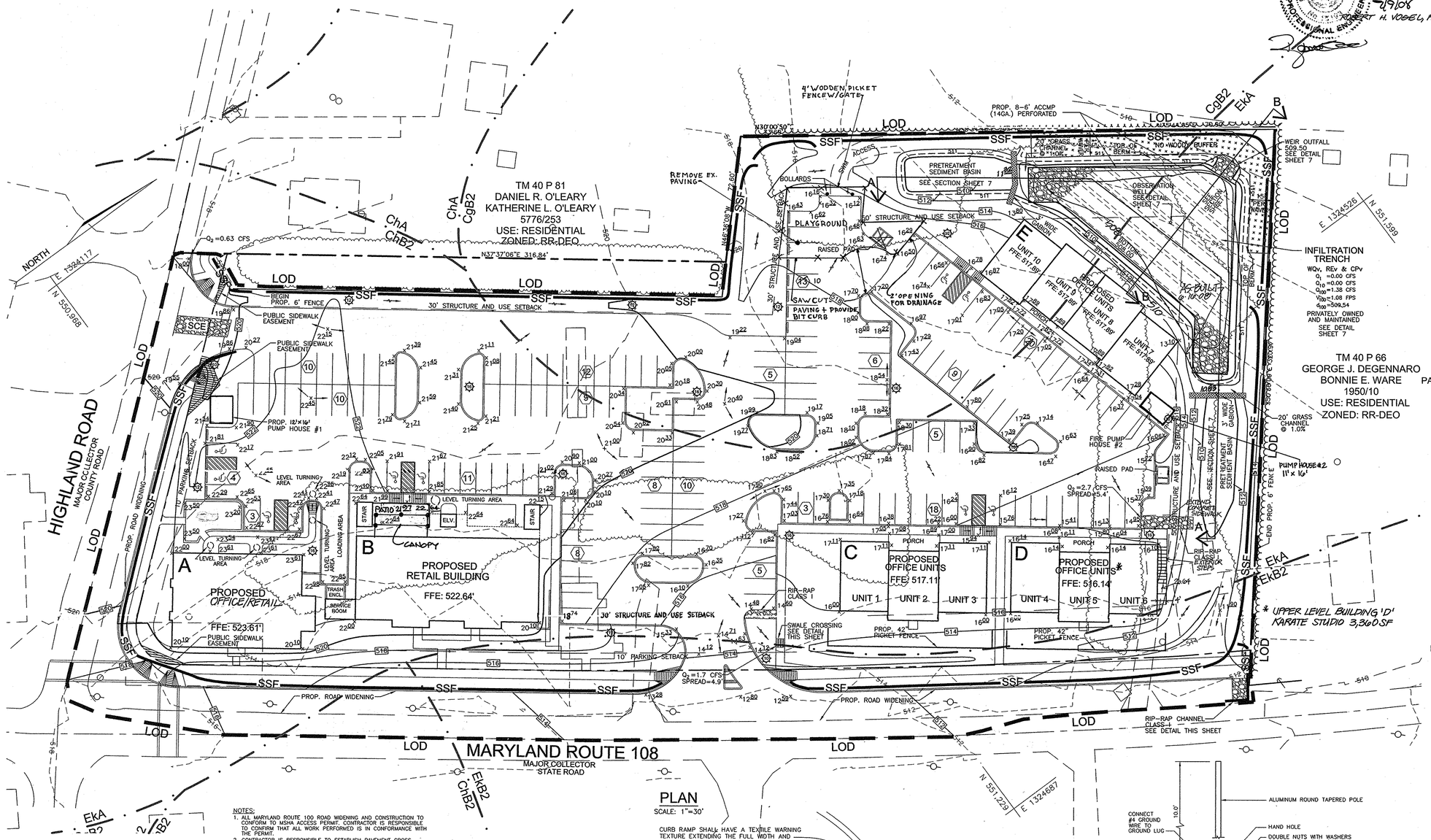


MOUNTING DETAIL FOR HANDICAPPED PARKING
NOT TO SCALE

PARKING RESTRICTION SIGN FOR VAN HANDICAPPED PARKING
NOT TO SCALE



MOUNTING DETAIL FOR PARKING RESTRICTION SIGN
NOT TO SCALE



PLAN
SCALE: 1"=30'

NOTES:
1. ALL MARYLAND ROUTE 100 ROAD WIDENING AND CONSTRUCTION TO CONFORM TO MSHA ACCESS PERMIT. CONTRACTOR IS RESPONSIBLE TO CONFIRM THAT ALL WORK PERFORMED IS IN CONFORMANCE WITH THE PERMIT.
2. CONTRACTOR IS RESPONSIBLE TO ESTABLISH PAVEMENT CROSS SECTION AND PROPOSED CURB ELEVATIONS FROM THE EDGE OF EXISTING PAVEMENT.

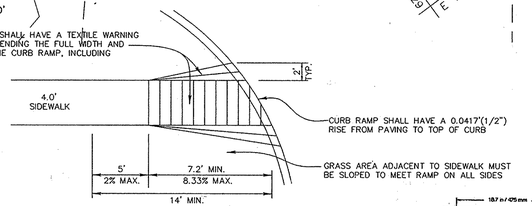
LEGEND

202	EXISTING 2 FT CONTOUR
200	EXISTING 10 FT CONTOUR
202	PROPOSED 2 FT CONTOUR
200	PROPOSED 10 FT CONTOUR
	EXISTING TREELINE
	PROPOSED TREELINE
	PROPOSED LIGHT (HEIGHT)

SOILS LEGEND

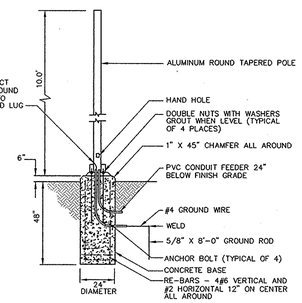
SYMBOL	NAME / DESCRIPTION	GROUP
CgB2	CHESTER GRAVELLY SILT LOAM, 3 TO 8 PERCENT SLOPES, MODERATELY ERODED	B
ChB2	CHESTER SILT LOAM, 3 TO 8 PERCENT SLOPES, MODERATELY ERODED	C
EkA	ELIOAK SILT LOAM, 0 TO 3 PERCENT SLOPES	C
EkB2	ELIOAK SILT LOAM, 3 TO 8 PERCENT SLOPES, MODERATELY ERODED	C

NO.	REVISION	DATE
8	ADD CANOPY TO RETAIL BUILDING	4/2/15
7	REVISE THE PLAN TO DELETE THE ORIGINAL PROP. LOADING & BLDG 'A' AND PROPOSE IT ADJACENT TO BLDG 'B'S RELOCATE THE DUMPSTER	10/7/15
NO.	REVISION	DATE



HANDICAP RAMP
NOT TO SCALE

LAMP DETAIL
NOT TO SCALE



POLE BASE DETAIL
NOT TO SCALE

NOTES:
1. LIGHTING DETAIL FOR INFORMATIONAL PURPOSES ONLY. SEE ELECTRICAL AND ARCHITECTURAL PLANS FOR ACTUAL LIGHTING DETAILS AND SPECIFICATIONS.
2. LAMPS TO BE 7,125 MEAN LUMENS, INDIRECT REFLECTIVE OPTIC, FULL CUT-OFF ON A 10' POLE.
3. LIGHTING SHALL BE DIRECTED DOWN AND AWAY FROM ADJOINING PROPERTIES AND STREETS.

OWNER / DEVELOPER
HIGHLAND CROSSING, L.L.C.
14190 TWISTING LANE
DAYTON, MD 21036

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 6/29/06
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 7/6/06
DIRECTOR — DATE 7/6/06

REVIEWED FOR HOWARD SCD AND MEETS TECHNICAL REQUIREMENTS

USDA-NATURAL RESOURCES CONSERVATION SERVICE — DATE 6/15/06

THIS DEVELOPMENT PLAN IS APPROVED FOR SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT

HOWARD SCD — DATE 6/15/06

ENGINEERS CERTIFICATE

"I CERTIFY THAT THIS PLAN FOR SEDIMENT AND EROSION CONTROL REPRESENTS A PRACTICAL AND WORKABLE PLAN BASED ON MY PERSONAL KNOWLEDGE OF THE SITE CONDITIONS AND THAT IT WAS PREPARED IN ACCORDANCE WITH THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT.

ROBERT H. VOGEL, PE #16193 — DATE 6/1/06

DEVELOPER'S CERTIFICATE

"I/WE CERTIFY THAT ALL DEVELOPMENT AND CONSTRUCTION WILL BE DONE ACCORDING TO THIS PLAN FOR SEDIMENT AND EROSION CONTROL, AND THAT ALL RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF ATTENDANCE AT A DEPARTMENT OF THE ENVIRONMENT APPROVED TRAINING PROGRAM FOR THE CONTROL OF SEDIMENT AND EROSION BEFORE BEGINNING THE PROJECT. I ALSO AUTHORIZE PERIODIC ON-SITE INSPECTION BY THE HOWARD SOIL CONSERVATION DISTRICT.

HIGHLAND CROSSING, L.L.C. — DATE 6/1/06

GRADING AND SEDIMENT EROSION CONTROL PLAN

HIGHLAND CROSSING

TAX MAP 40 BLOCK 5
5TH ELECTION DISTRICT

PARCEL A
HOWARD COUNTY, MARYLAND

ROBERT H. VOGEL ENGINEERING, INC.
ENGINEERS · SURVEYORS · PLANNERS
8407 MAIN STREET
ELLICOTT CITY, MD 21043
TEL: 410.461.7666
FAX: 410.461.8961

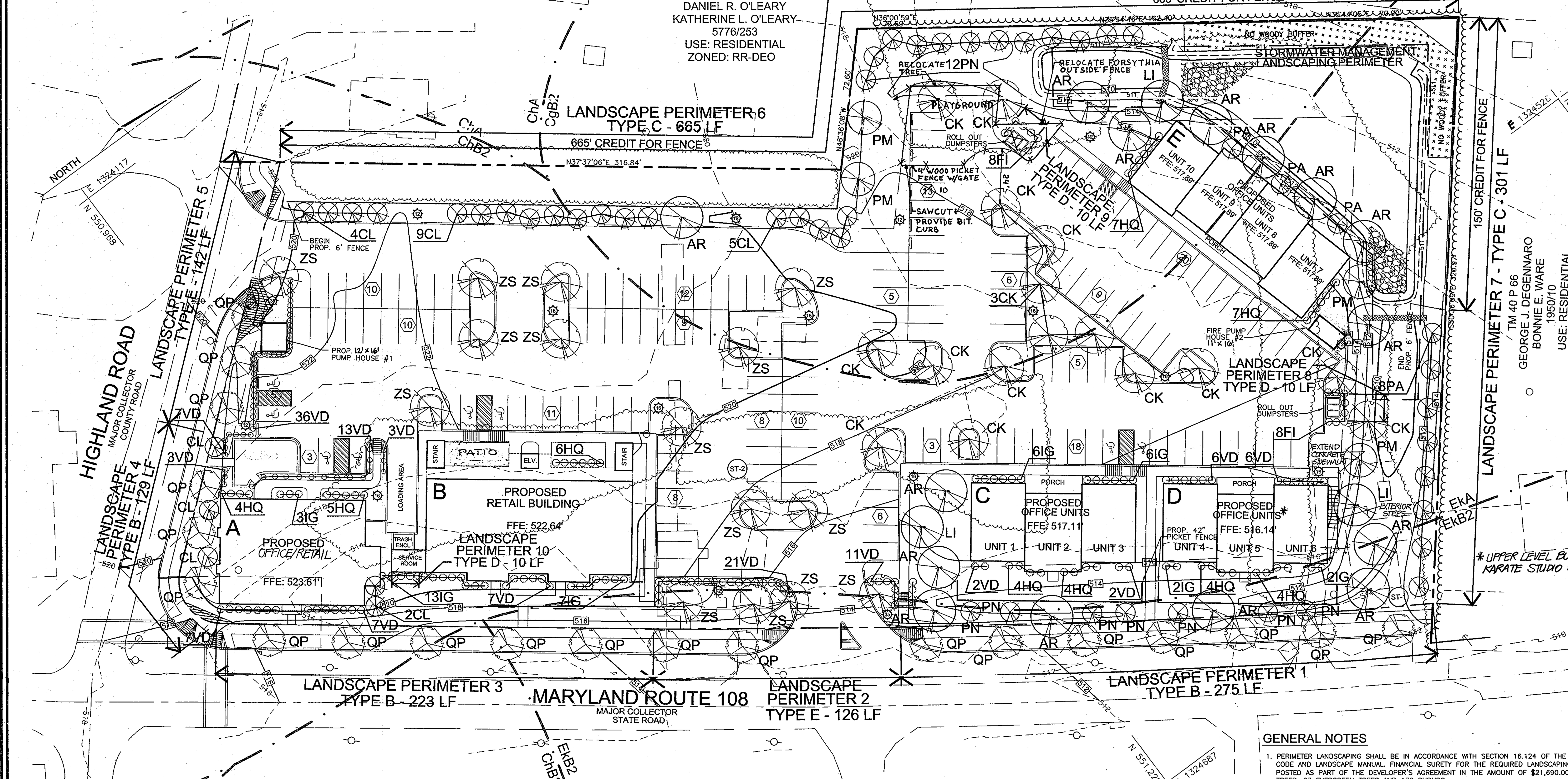
STATE OF MARYLAND · ROBERT HARRIS VOGEL · No. 16193 · PROFESSIONAL ENGINEER
ROBERT H. VOGEL, PE #16193

DESIGN BY:	RHV/LJT
DRAWN BY:	LJT
CHECKED BY:	RHV
DATE:	JUNE 1, 2006
SCALE:	
W.O. NO.:	04-12.00

SHEET 3 OF 11

SDP-05-108

SOILS LEGEND		
SYMBOL	NAME / DESCRIPTION	GROUP
CgB2	CHESTER GRAVELLY SILT LOAM, 3 TO 8 PERCENT SLOPES, MODERATELY ERODED	B
ChB2	CHESTER SILT LOAM, 3 TO 8 PERCENT SLOPES, MODERATELY ERODED	C
EkA	ELIOAK SILT LOAM, 0 TO 3 PERCENT SLOPES	C
EkB2	ELIOAK SILT LOAM, 3 TO 8 PERCENT SLOPES, MODERATELY ERODED	C



PLAN
SCALE: 1"=30'

SCHEDULE A PERIMETER LANDSCAPE EDGE										
CATEGORY	ADJACENT TO ROADWAYS						ADJACENT TO PERIMETER PROPERTIES			
Perimeter/Frontage Designation Landscape Type	1 B	2 E	3 B	4 B	5 E	10 D	6 C	7 C	8 D	9 D
Linear Feet of Roadway Frontage/Perimeter	275'	126'	223'	129'	142'	10'	665'	301'	10'	10'
Credit for Existing Vegetation (Yes, No, Linear Feet Describe below if needed)	No	No	No	No	No	No	No	No	No	No
Credit for Wall, Fence or Berm (Yes, No, Linear Feet Describe below if needed)	No	No	No	No	No	Yes** 10	Yes* 665'	Yes* 150	Yes** 10	Yes** 10
Number of Plants Required Shade Trees Evergreen Trees Shrubs	1:50 2 6 1:40 2 7 -	1:40 4 - 1:4 32	1:50 5 1:40 6 -	1:50 3 1:40 4 -	1:40 4 - 1:4 36	1:60 1 1:10 1 -	1:40 0 1:20 0 -	1:40 4 1:20 8 -	1:60 1 1:10 1 -	1:60 1 1:10 1 -
Number of Plants Provided Shade Trees Evergreen Trees Other Trees (2:1 Substitution) Shrubs (10:1 Substitution) Describe Plant Substitution Credits Below if needed)	2 6 0 7 - 20	4 - - 32	5 2 - 40	3 3 - 10	4 - - 36	0 0 - -	0 0 - -	4 8 - -	0 0 - -	0 0 - -

* CREDIT FOR 6' BOARD ON BOARD PRIVACY FENCE
** CREDIT FOR ASTETIC SCREENING/ENCLOSURE (SUPPLEMENTAL SHRUBS ARE PROVIDED AROUND SCREENING)

SCHEDULE B PARKING LOT INTERNAL LANDSCAPING	
NUMBER OF PARKING SPACES	171
NUMBER OF TREES AND ISLANDS REQUIRED	18
NUMBER OF TREES AND ISLANDS PROVIDED SHADE TREES OTHER TREES (2:1 SUBSTITUTION)	 18 –

LANDSCAPE SCHEDULE				
KEY	QUAN.	BOTANICAL NAME	SIZE	REM.
QP	20	QUERCUS PALUSTRIS 'PIN OAK'	2 1/2"–3" Cal.	B & B
ALTERNATE				
		QUERCUS FALCATA 'SOUTHERN RED OAK'	2 1/2"–3" Cal.	B & B
ZS	15	ZELKOVA SERRATA 'ZELKOVA'	2 1/2"–3" Cal.	B & B
CK	16	CORNUS KOUSA 'KOUSA DOGWOOD'	8'–10' Ht.	B & B
ALTERNATE				
		AMELANCHIER ARBOREA 'DOWNY SERVICEBERRY'	8'–10' Ht.	B & B
HQ	51	HYDRANGEA QUERCIFOLIA 'OAKLEAF HYDRANGEA'	2 1/2'–3' Ht.	B & B
IG	39	ILEX GLABRA 'INKBERRY'	2 1/2'–3' Ht.	B & B
VD	131	VIBURNUM DENTATUM 'SOUTHERN ARROWWOOD'	2 1/2'–3' Ht.	B & B
ALTERNATE				
		EUONYMUS KIAUTSCHOVICUS 'MANHATTAN' 'MANHATTAN EUONYMUS'	2 1/2'–3' Ht.	B & B
LI	3	LAGERSTROEMIA INDICA 'MUSKOGEE' 'MUSKOGEE CRAPE MYRTLE'	2 1/2"–3" Cal.	B & B
AR	15	ACER RUBRUM 'OCTOBER GLORY' 'OCTOBER GLORY RED MAPLE'	2 1/2"–3" Cal.	B & B
CL	23	CYPRESS OCYPARIS LEYLANDI 'LEYLAND CYPRESS'	5'–6' Ht.	B & B
PN	19	PINUS NIGRA 'AUSTRIAN PINE'	6'–8' Ht.	B & B
PA	11	PICEA ABIES 'NORWAY SPRUCE'	6'–8' Ht.	B & B
PM	4	PSEUDOTSUGA MENZIESII 'DOUGLAS FIR'	6'–8' Ht.	B & B
ALTERNATE				
		ACER RUBRUM 'RED SUNSET' 'RED SUNSET RED MAPLE'	2 1/2"–3" Cal.	B & B
		CYPTOMERIA JAPONICA 'JAPANESE CRYPTOMERIA'	2 1/2"–3" Cal.	B & B
FI	16	FORSYTHIA X INTERMEDIA 'NANA' 'NANA FORSYTHIA'	2 1/2'–3' Ht.	B & B

1. ALL PLANT MATERIALS SHALL BE FULL AND HEAVY, BE WELL FORMED AND SYMMETRICAL, CONFORM TO THE MOST CURRENT AAN SPECIFICATIONS AND BE INSTALLED IN ACCORDANCE WITH LCAMW PLANTING SPECIFICATIONS.
2. CONTRACTOR SHALL VERIFY LOCATION OF ALL UNDERGROUND UTILITIES PRIOR TO DIGGING.
3. FINAL LOCATION OF PLANT MATERIAL MAY NEED TO VARY TO MEET FINAL FIELD CONDITIONS. TREES SHALL NOT BE PLANTED IN THE BOTTOM OF DRAINAGE SWALES.
4. CONTRACTOR SHALL VERIFY PLANT QUANTITIES PRIOR TO BIDDING. IF PLAN DIFFERS FROM LANDSCAPE SCHEDULE, THE PLAN SHALL GOVERN.

GENERAL NOTES

1. PERIMETER LANDSCAPING SHALL BE IN ACCORDANCE WITH SECTION 16.124 OF THE HOWARD COUNTY CODE AND LANDSCAPE MANUAL. FINANCIAL SURETY FOR THE REQUIRED LANDSCAPING HAS BEEN POSTED AS PART OF THE DEVELOPER'S AGREEMENT IN THE AMOUNT OF $21,690.00 FOR 47 SHADE TREES, 23 EVERGREEN TREES AND 138 SHRUBS.
2. THE FOREST CONSERVATION OBLIGATION OF 0.65 ACRES OF AFFORESTATION FOR THIS PLAN HAS BEEN MET BY A FEE-IN-LIEU PAYMENT OF $14,157.00 MADE TO THE HOWARD COUNTY FOREST CONSERVATION FUND.

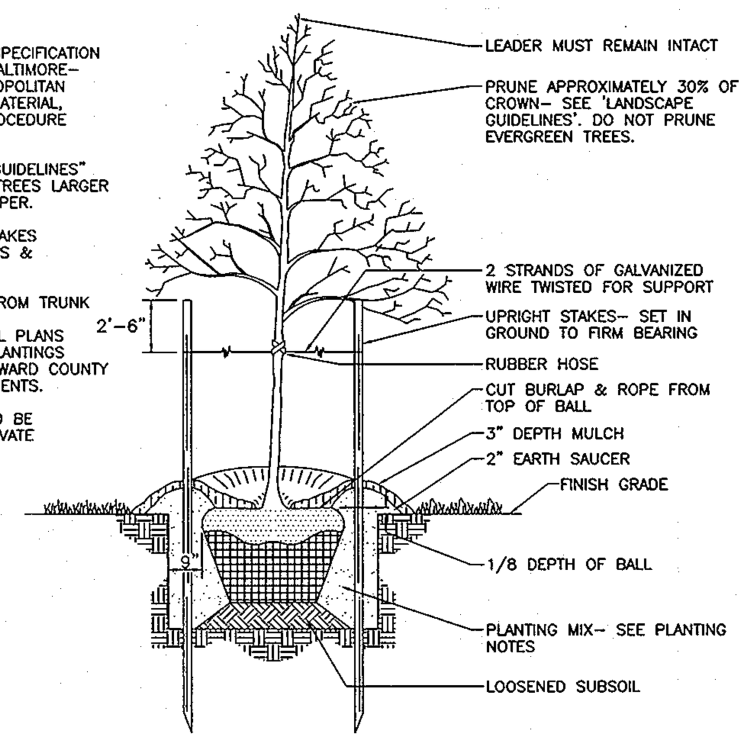
NO.	REVISION	DATE
7	REVISE THE PLAN TO DELETE THE ORIGINAL PATIO LOCATION TO BLDG 'A' & RELOCATE IT ADJACENT TO BLDG 'B' AND RELOCATE THE DUMPSTER	12/04/13
5	ADD DAYCARE AND PLAYGROUND	7/22/09
3	REVISE BLDG 'A' USE TO OFFICE/RETAIL, ADD KARATE STUDIO TO BLDG 'D' USE	10-23-07
2	ADD EXTERNAL STEPS TO BUILDING 'D'	10-8-07
1	REVISE DIMENSIONS OF PUMPHOUSE #1 AND #2	3-27-07

POND #1 SCHEDULE D: STORMWATER MANAGEMENT AREA LANDSCAPING	
LINEAR FEET OF PERIMETER	690 LF
CREDIT FOR EXISTING VEGETATION (NO, YES AND LINEAR FEET)	NO
CREDIT FOR OTHER LANDSCAPING (NO, YES AND %)	YES, 585 LF (6' FENCE AND INTERIOR LANDSCAPING)
NUMBER OF TREES REQUIRED SHADE TREES EVERGREEN TREES	(105 LF) 3 SHADE TREES 3 EVERGREEN TREES
NUMBER OF TREES PROVIDED SHADE TREES EVERGREEN TREES OTHER TREES (2:1 SUBSTITUTION)	 3 SHADE TREES 3 EVERGREEN TREES 0 TREES (0 SUBSTITUTION TREES)

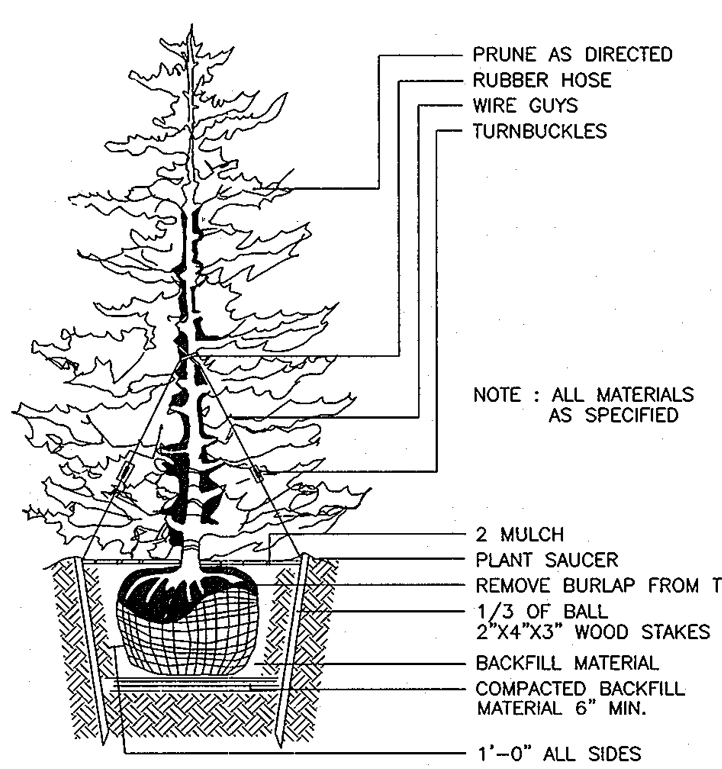
LEGEND	
----202----	EXISTING 2 FT CONTOUR
— —200— —	EXISTING 10 FT CONTOUR
—[202]—	PROPOSED 2 FT CONTOUR
—[200]—	PROPOSED 10 FT CONTOUR
(scalloped line)	EXISTING TREELINE
(scalloped line)	PROPOSED TREELINE
(35)	PROPOSED LIGHT (HEIGHT)
(ST-1)	SPECIMEN TREE

NOTES

1. SEE "LANDSCAPE SPECIFICATION GUIDELINES FOR BALTIMORE–WASHINGTON METROPOLITAN AREAS" FOR ALL MATERIAL, PRODUCT, AND PROCEDURE SPECIFICATIONS.
2. SEE "LANDSCAPE GUIDELINES" FOR SUPPORTING TREES LARGER THAN 2–1/2" CALIPER.
3. PLACE UPRIGHT STAKES PARALLEL TO WALKS & BUILDINGS.
4. KEEP MULCH 1" FROM TRUNK
5. SEE ARCHITECTURAL PLANS FOR ADDITIONAL PLANTINGS WHICH EXCEED HOWARD COUNTY MINIMUM REQUIREMENTS.
6. TREES ARE NOT TO BE PLANTED OVER PRIVATE SEWAGE EASEMENT.



TREE PLANTING AND STAKING
DECIDUOUS TREES UP TO 2–1/2" CALIPER
NOT TO SCALE



TYPICAL EVERGREEN TREE PLANTING DETAIL
NOT TO SCALE

FOREST CONSERVATION WORKSHEET

NET TRACT AREA:
- A. TOTAL TRACT AREA 4.33 AC
- B. AREA WITHIN 100 YEAR FLOODPLAIN 0.00 AC
- C. NET TRACT AREA 4.33 AC

LAND USE CATEGORY (FROM TABLE 3.2.1, PAGE 40, MANUAL)
INPUT THE NUMBER "1" UNDER THE APPROPIATE LAND USE ZONING, AND LIMIT TO ONLY ONE ENTRY.

ARA	MDR	IDA	HDR	MPD	CIA
0	0	0	0	0	1

- D. AFFORESTATION THRESHOLD 15% X D = 0.65 AC
- E. CONSERVATION THRESHOLD 15% X D = 0.65 AC

EXISTING FOREST COVER:
- F. EXISTING FOREST COVER 0.00 AC
- G. AREA OF FOREST ABOVE CONSERVATION THRESHOLD 0.00 AC

BREAK EVEN POINT:
- H. BREAK EVEN POINT 0.00 AC
- I. FOREST CLEARING PERMITTED WITHOUT MITIGATION 0.00 AC

PROPOSED FOREST CLEARING:
- J. TOTAL AREA OF FOREST TO BE CLEARED 0.00 AC
- K. TOTAL AREA OF FOREST TO BE RETAINED 0.00 AC

PLANTING REQUIREMENTS:
- L. REFORESTATION FOR CLEARING ABOVE THE CONSERVATION THRESHOLD 0.00 AC
- M. REFORESTATION FOR CLEARING BELOW THE CONSERVATION THRESHOLD 0.00 AC
- N. CREDIT FOR RETENTION ABOVE CONSERVATION THRESHOLD 0.00 AC
- P. TOTAL REFORESTATION REQUIRED 0.00 AC
- Q. TOTAL AFFORESTATION REQUIRED 0.65 AC
- R. TOTAL PLANTING REQUIRED 0.65 AC

LARRY J. THOMPSON 6/1/06
DNR QUALIFIED PROFESSIONAL

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 6/28/06
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 7/11/06
DIRECTOR — DATE 7/14/06

LANDSCAPE CERTIFICATE

I/WE CERTIFY THAT THE LANDSCAPING SHOWN ON THIS PLAN WILL BE DONE ACCORDING TO THE PLAN, SECTION 16.124 OF THE HOWARD COUNTY CODE AND THE HOWARD COUNTY LANDSCAPE MANUAL. I/WE FURTHER CERTIFY THAT UPON COMPLETION, A CERTIFICATION OF LANDSCAPE INSTALLATION, ACCOMPANIED BY AN EXECUTED ONE(1) YEAR GUARANTEE OF PLANT MATERIALS, WILL BE SUBMITTED TO THE DEPARTMENT OF PLANNING AND ZONING.

HIGHLAND CROSSING L.L.C. — Managing Member — DATE 6/1/06

OWNER / DEVELOPER

HIGHLAND CROSSING, L.L.C.
14190 TWISTING LANE
DAYTON, MD 21036

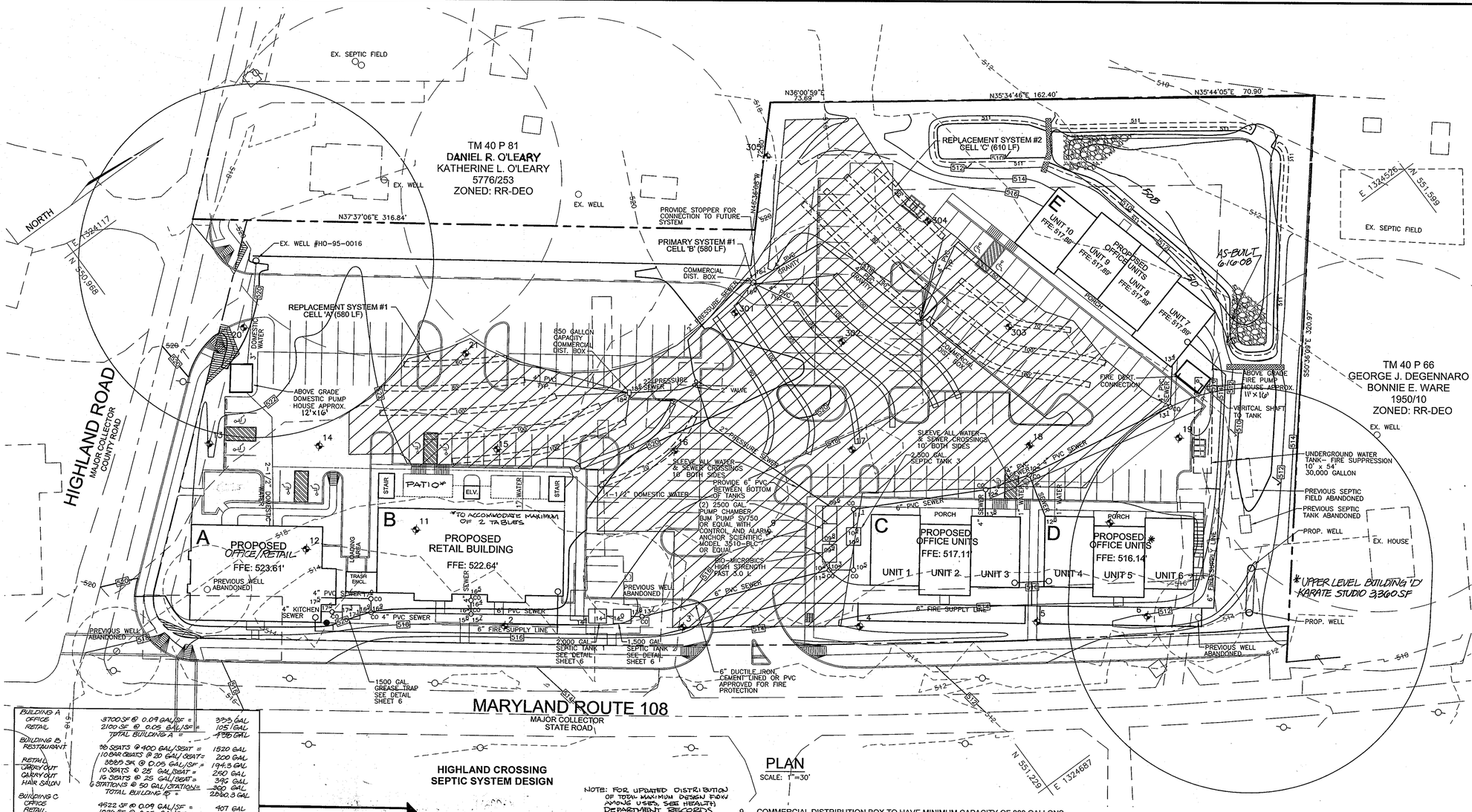
LANDSCAPING AND FOREST CONSERVATION PLAN
HIGHLAND CROSSING

TAX MAP 40 BLOCK 5 — PARCEL A
5TH ELECTION DISTRICT — HOWARD COUNTY, MARYLAND

ROBERT H. VOGEL ENGINEERING, INC.
ENGINEERS • SURVEYORS • PLANNERS
8407 MAIN STREET, ELLICOTT CITY, MD 21043
TEL: 410.461.7666 FAX: 410.461.8961

STATE OF MARYLAND — ROBERT HARRIS VOGEL — No. 18193 — PROFESSIONAL ENGINEER
ROBERT H. VOGEL, PE #16193

DESIGN BY:	RHV/LJT
DRAWN BY:	LJT
CHECKED BY:	RHV
DATE:	JUNE 1, 2006
SCALE:	
W.O. NO.:	04-12.00



HIGHLAND CROSSING SEPTIC SYSTEM DESIGN

PLAN
SCALE: 1"=30'

NOTE: FOR UPDATED DISTRIBUTION OF TOTAL MAXIMUM DESIGN FLOW AMONG USES, SEE HEALTH) DEPARTMENT RECORDS

BUILDING A		
OFFICE	3700 SF @ 0.09 GAL/SF =	333 GAL
RETAIL	2100 SF @ 0.05 GAL/SF =	105 GAL
	TOTAL BUILDING A =	438 GAL
BUILDING B, RESTAURANT	76 SEATS @ 400 GAL/SEAT =	1520 GAL
	10 BAR SEATS @ 20 GAL/SEAT=	200 GAL
RETAIL, CARRY OUT HAIR SALON	3889 SF @ 0.05 GAL/SF =	194.5 GAL
	10 SEATS @ 25 GAL/SEAT =	250 GAL
	15 SEATS @ 25 GAL/SEAT=	375 GAL
	6 STATIONS @ 50 GAL/STATION=	300 GAL
	TOTAL BUILDING B =	2890.3 GAL
BUILDING C	4522 SF @ 0.09 GAL/SF =	407 GAL
OFFICE	1028 SF @ 0.05 GAL/SF =	51.3 GAL
RETAIL	TOTAL BUILDING C =	458.3 GAL
BUILDING D	36 STUDENTS @ 10 GAL/STUDENT =	360 GAL
DAYCARE KARATE	12 STUDENTS @ 15 GAL/STUDENT=	180 GAL
	TOTAL BUILDING D =	540 GAL
BUILDING E	7545 SF @ 0.09 GAL/SF =	689 GAL
OFFICE	TOTAL BUILDING E =	689 GAL

TOTAL MAXIMUM DESIGN FLOW 4986 GALLONS

AERATION AND NITOGEN REDUCTION, LOADING 1.2 GAL/SF=4155 SF

STANDARD TRENCH, 3 FT WIDE 4155 SF/3 FT WIDTH = 1385 LF

UTILIZE DEEP TRENCH REDUCTION, 3 FT X 4 FT TRENCH = 582 LF

PRIMARY SYSTEM, CELL A = 590 LF TRENCH

REPLACEMENT SYSTEM #1, CELL B = 590 LF TRENCH

REPLACEMENT SYSTEM #2, CELL C = 610 LF TRENCH

STATE GROUNDWATER APPROPRIATION PERMIT NO. HO2005G005 (01)

SEPTIC SYSTEM NOTES

1. CONTRACTOR TO INSTALL LOCATION TAPE WITH 4-INCH AND 6- INCH PVC GRAVITY SEWER, 2-INCH PRESSURE SEWER AND DISTRIBUTION BOXES.
2. 2-INCH PVC TO BE FLEXIBLE PRESSURE PIPE
3. CLEANOUTS LOCATED IN PAVING TO BE TRAFFIC BEARING
4. CONTRACTOR TO PROVIDE 4-INCH PVC STUB WITH VALVE TO EXTENDFROM CELL B DISTRIBUTION BOX TO CELL C DISTRIBUTION BOX
5. CONTRACTOR TO INSTALL CELL A AND B WITH THIS PHASE. CELL C TO BE CONSTRUCTED IN THE FUTURE AS NEEDED.
6. OWNER IS RESPONSIBLE TO PROVIDE ON-GOING MAINTENANCE OF THE SEPTIC SYSTEM AND THE PRETREATMENT UNIT.
7. CONTRCTOR TO INSTALL WATER METER FOR EACH TENANT TO MONITOR ACTUAL USEAGE
8. THE PRE-TREATMENT MAINTENANCE AGREEMENT MUST RUN IN PERPETUITY WHILE THE PROPERTY IS UNDER ITS CURRENT PROPOSED USE.
9. COMMERCIAL DISTRIBUTION BOX TO HAVE MINIMUM CAPACITY OF 800 GALLONS.
10. PUMP LEVELS TO BE SET TO DELIVER NO MORE THAN 500 GALLONS PER DOSE.

SEPTIC & WELL GENERAL NOTES:

1. THE PURPOSE OF THIS PERCOLATION CERTIFICATION PLAN IS TO IDENTIFY ACCEPTABLE SEWAGE DISPOSAL AREAS BASED ON TESTING DATED 6/4/2004.
2. PARCELS 150, 247, 83, AND 85 TO BE CONSOLIDATED BY RECORD PLAT.
3. TOPOGRAPHY SHOWN HEREON IS BASED ON HOWARD COUNTY AERIAL TOPOGRAPHY AND FIELD RUN LOCATION.
4. PROPERTY LINES ARE BASED ON BOUNDARY SURVEY PREPARED BY FREDERICK WARD ASSOCIATES, INC..
5. EXISTING ABOVE GROUND SEPTIC FEATURES SHOWN HAVE BEEN FIELD LOCATED, SUBSURFACE UTILITIES ARE BASED ON BEST AVAILABLE RECORDS WHICH ARE SUBJECT TO VERIFICATION.
6. ALL EXISTING WELLS AND SEPTIC AREAS WITHIN 100' OF THE SITE HAVE BEEN SHOWN TO THE BEST OF OUR KNOWLEDGE.
7. ////// THIS AREA DESIGNATES A PRIVATE SEWAGE RESERVE AREA REQUIRED BY THE MARYLAND STATE DEPARTMENT OF THE ENVIRONMENT FOR INDIVIDUAL SEWAGE DISPOSAL, IMPROVEMENTS OF ANY NATURE IN THIS AREA ARE RESTRICTED UNTIL PUBLIC SEWAGE IS AVAILABLE. THIS RESERVE AREA SHALL BE NULL AND VOID UPON CONNECTION TO A PUBLIC SYSTEM. THE COUNTY HEALTH OFFICER SHALL HAVE AUTHORITY TO GRANT ADJUSTMENTS TO THE PRIVATE RESERVE AREA. RECORDATION OF A MODIFIED SEWAGE EASEMENT SHALL NOT BE NECESSARY.
8. PARCELS 247, 83, AND 85– EXISTING STRUCTURES AND DRIVEWAYS TO BE DEMOLISHED EXISTING SEPTIC SYSTEMS TO BE ABANDONED. EXISTING WELLS TO BE ABANDONED AND SEALED BY LICENSED WELL DRILLER PRIOR TO SITE DEVELOPMENT PLAN SIGNATURE.
9. THE SEPTIC AREA SHOWN HEREON IS PER THE APPROVED PERCOLATION CERTIFICATION PLAN, DATED JUNE 28, 2004.
10. FIRE DEPARTMENT SIAMESE CONNECTIONS TO BE PLACED ON THE FRONT OF THE BUILDINGS.
11. THERE SHALL BE NO LANDSCAPING PLACED WITHIN 7.5' OF EACH SIDE OF THE FIRE DEPARTMENT CONNECTIONS.
12. RURAL STATIC WATER SUPPLY TANK TO BE LOCATED WITHIN 100' OF THE FIRE DEPARTMENT CONNECTIONS.

"STORMWATER MANAGEMENT AS-BUILT CERTIFICATION
I HEREBY CERTIFY THAT THE FACILITY SHOWN ON THIS PLAN WAS CONSTRUCTED AS SHOWN ON THE "AS-BUILT" PLANS AND MEETS THE APPROVED PLANS AND SPECIFICATIONS"
7/7/06
ROBERT H. VOGEL, PE NO. 16193

STATE OF MARYLAND — ROBERT HARRIS VOGEL — NO. 16193 — PROFESSIONAL ENGINEER

APPROVED: FOR PRIVATE WATER AND PRIVATE SEWERAGE SYSTEMS

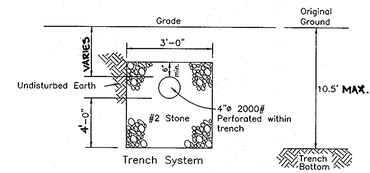
COUNTY HEALTH OFFICER, HOWARD COUNTY HEALTH DEPARTMENT — DATE 6/26/06

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 6/28/06

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 7/11/06

DIRECTOR — DATE 7/12/06



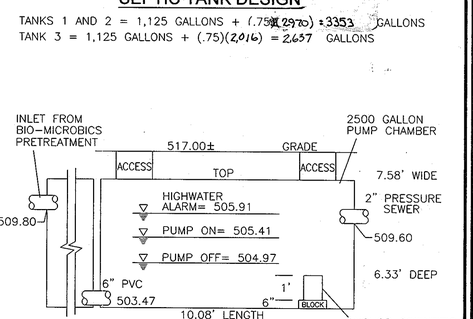
TYPICAL SEPTIC SYSTEM TRENCH DETAIL
NOT TO SCALE

STRUCTURE SCHEDULE

TYPE	INV. IN	INV. OUT
2500 GAL SEPTIC TANK	510.90	510.60
2000 GAL SEPTIC TANK	514.40	514.10
1500 GAL SEPTIC TANK	514.00	513.80
1500 GAL GREASE TRAP	517.30	517.10
BIO-MICROBICS CHAMBER	510.20	509.90
5000 GAL PUMP CHAMBER (2 X 2500)	509.80	509.60
PRIMARY DISTRIBUTION BOX	516.10	516.00
REPLACEMENT SYSTEM 1 DISTRIBUTION BOX	518.60	518.50
REPLACEMENT SYSTEM 2 DISTRIBUTION BOX	513.76	513.66

SEPTIC TANK DESIGN

TANKS 1 AND 2 = 1,125 GALLONS + (.75)(2970) = 3353 GALLONS
TANK 3 = 1,125 GALLONS + (.75)(2,016) = 2,637 GALLONS



SEPTIC PUMP DETAIL
NOT TO SCALE

NO.	REVISION	DATE
7	REVISE THE PLAN TO DELETE THE ORIGINAL PATIO LOCATION TO BLDG 'A' & RE-LOCATE IT ADJACENT TO BLDG 'B' AND RELOCATE THE DUMPSTER	12/04/13
6	REVISE SEPTIC SYSTEM USAGE INFORMATION	1/27/10
5	REVISE BLDG 'A' USE TO OFFICE/RETAIL, ADD KARATE STUDIO TO BLDG 'D' USE/UNDOT	10-8-07
4	ADD EXTERNAL STEPS TO BUILDINGS	10-8-07
1	REVISE DIMENSIONS PUMP HOUSE #1 AND #2	3-27-07

WATER AND SEPTIC SYSTEMS PLAN
HIGHLAND CROSSING

TAX MAP 40 BLOCK 5
5TH ELECTION DISTRICT

PARCEL A
HOWARD COUNTY, MARYLAND

ROBERT H. VOGEL ENGINEERING, INC.
ENGINEERS • SURVEYORS • PLANNERS
8407 MAIN STREET TEL: 410.461.7666
ELLICOTT CITY, MD 21043 FAX: 410.461.8961

STATE OF MARYLAND — ROBERT HARRIS VOGEL — NO. 16193 — PROFESSIONAL ENGINEER
ROBERT H. VOGEL, PE #16193

DESIGN BY:	RHV/LJT
DRAWN BY:	LJT
CHECKED BY:	RHV
DATE:	JUNE 1, 2006
SCALE:	1"=30'
W.O. NO.:	04-12.00

OWNER / DEVELOPER
HIGHLAND CROSSING, L.L.C.
14190 TWISTING LANE
DAYTON, MD 21036

SHEET 5 OF 11

SDP-05-108

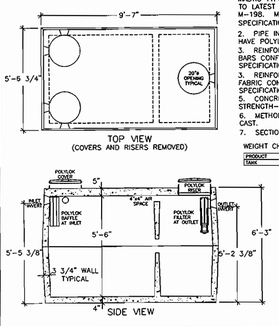
1500 GALLON REGULAR SEPTIC TANK

TANK DESIGN SPECIFICATION CONFORMS TO LATEST: ASTM DESIGNATION C1227

NOTES:
1. JOINT SEALANT IS BUTYL RUBBER MASTIC TYPE SEAL THAT CONFORMS TO LATEST AASHTO SPECIFICATION M-198. MEETS FEDERAL SPECIFICATION SS-S-0021(210-A).
2. PIPE INLET AND OUTLET LOCATIONS HAVE POLYLOK II PIPE SEALS.
3. REINFORCING STEEL DEFORMED BARS CONFORM TO LATEST ASTM SPECIFICATION A615.
3. REINFORCING STEEL WELDED WIRE FABRIC CONFORM TO LATEST ASTM SPECIFICATION A185.
5. CONCRETE COMPRESSIVE STRENGTH– 4000 PSI AT 28 DAYS.
6. METHOD OF MANUFACTURE: WET CAST.
7. SECTIONS ARE MONOLITHIC.

WEIGHT CHART

PRODUCT	APPROX WEIGHT
TANK	13400 LBS.



UNITED CONCRETE PRODUCTS INC.
173 CHURCH STREET YALESVILLE, CT 06492 TEL. 800 234-3119 (203) 269-3119 FAX. (203) 265-4941

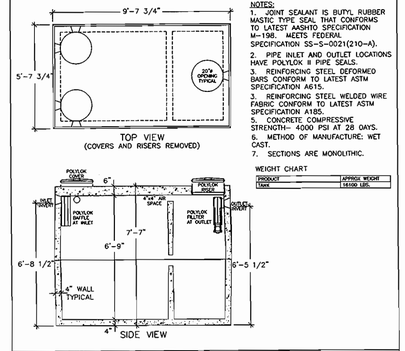
2000 GALLON REGULAR SEPTIC TANK

TANK DESIGN SPECIFICATION CONFORMS TO LATEST: ASTM DESIGNATION C1227

NOTES:
1. JOINT SEALANT IS BUTYL RUBBER MASTIC TYPE SEAL THAT CONFORMS TO LATEST AASHTO SPECIFICATION M-198. MEETS FEDERAL SPECIFICATION SS-S-0021(210-A).
2. PIPE INLET AND OUTLET LOCATIONS HAVE POLYLOK II PIPE SEALS.
3. REINFORCING STEEL DEFORMED BARS CONFORM TO LATEST ASTM SPECIFICATION A615.
3. REINFORCING STEEL WELDED WIRE FABRIC CONFORM TO LATEST ASTM SPECIFICATION A185.
5. CONCRETE COMPRESSIVE STRENGTH– 4000 PSI AT 28 DAYS.
6. METHOD OF MANUFACTURE: WET CAST.
7. SECTIONS ARE MONOLITHIC.

WEIGHT CHART

PRODUCT	APPROX WEIGHT
TANK	18500 LBS.



UNITED CONCRETE PRODUCTS INC.
173 CHURCH STREET YALESVILLE, CT 06492 TEL. 800 234-3119 (203) 269-3119 FAX. (203) 265-4941

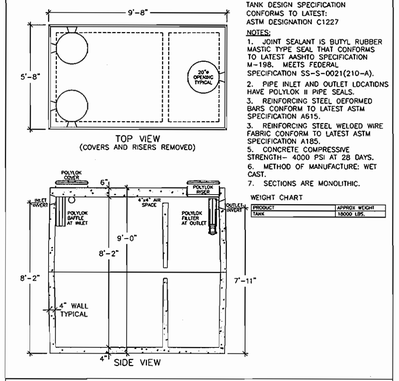
2500 GALLON REGULAR SEPTIC TANK

TANK DESIGN SPECIFICATION CONFORMS TO LATEST: ASTM DESIGNATION C1227

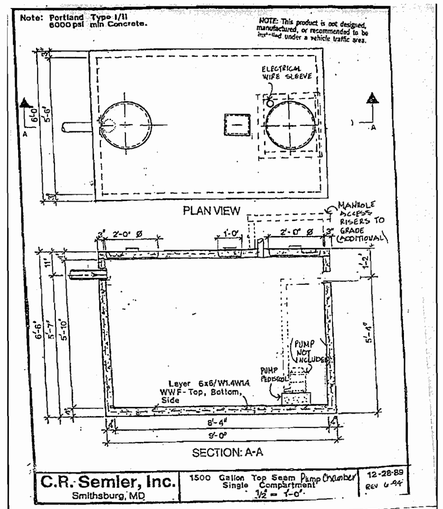
NOTES:
1. JOINT SEALANT IS BUTYL RUBBER MASTIC TYPE SEAL THAT CONFORMS TO LATEST AASHTO SPECIFICATION M-198. MEETS FEDERAL SPECIFICATION SS-S-0021(210-A).
2. PIPE INLET AND OUTLET LOCATIONS HAVE POLYLOK II PIPE SEALS.
3. REINFORCING STEEL DEFORMED BARS CONFORM TO LATEST ASTM SPECIFICATION A615.
3. REINFORCING STEEL WELDED WIRE FABRIC CONFORM TO LATEST ASTM SPECIFICATION A185.
5. CONCRETE COMPRESSIVE STRENGTH– 4000 PSI AT 28 DAYS.
6. METHOD OF MANUFACTURE: WET CAST.
7. SECTIONS ARE MONOLITHIC.

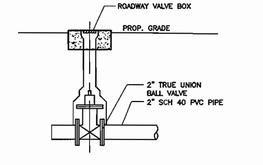
WEIGHT CHART

PRODUCT	APPROX WEIGHT
TANK	19000 LBS.

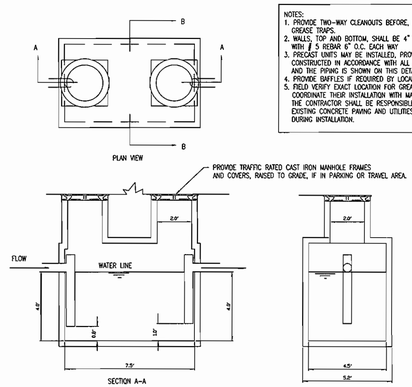


UNITED CONCRETE PRODUCTS INC.
173 CHURCH STREET YALESVILLE, CT 06492 TEL. 800 234-3119 (203) 269-3119 FAX. (203) 265-4941





VALVE BOX DETAIL
NOT TO SCALE



NOTES:
1. PROVIDE TWO-WAY CLEANOUTS BEFORE, BETWEEN AND AFTER GREASE TRAPS.
2. WALLS, TOP AND BOTTOM, SHALL BE 4" THICK CONCRETE WITH ∫ 5 REBAR 6" O.C. EACH WAY
3. PRECAST UNITS MAY BE INSTALLED, PROVIDED THEY ARE CONSTRUCTED IN ACCORDANCE WITH ALL APPLICABLE CODES AND THE PIPING IS SHOWN ON THIS DETAIL.
4. PROVIDE BAFFLES IF REQUIRED BY LOCAL CODES. FIELD VERIFY EXACT LOCATION FOR GREASE TRAPS AND COORDINATE THEIR INSTALLATION WITH WALL REPRESENTATIVES. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIRING ALL EXISTING CONCRETE PAVING AND UTILITIES DAMAGED DURING INSTALLATION.

1500 GALLON GREASE TRAP
NOT TO SCALE

NOTE: ALL DISTRIBUTATION TANKS TO BE TRAFFIC BEARING.
PROVIDE TRAFFIC RATED CAST IRON MANHOLE FRAMES AND COVERS, RAISED TO GRADE, IF IN PARKING OR TRAVEL AREA.

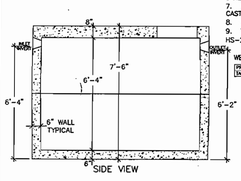
2500 GALLON PUMP CHAMBER

TANK DESIGN SPECIFICATIONS CONFORMS TO LATEST: ASTM DESIGNATION C913

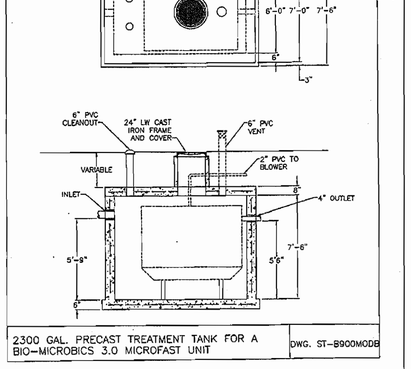
NOTES:
1. JOINT SEALANT IS BUTYL RUBBER MASTIC TYPE SEAL THAT CONFORMS TO LATEST AASHTO SPECIFICATION M-198. MEETS FEDERAL SPECIFICATION SS-S-0021(210-A).
2. PIPE INLET AND OUTLET LOCATIONS HAVE POLYLOK II PIPE SEALS, TYPICAL. CUSTOM KNOCKOUTS CAN BE CAST ON REQUEST.
3. WHEN SPECIFIED THE TANK EXTERIOR IS COATED WITH BAY OIL, "EBONY" OR EQUAL.
4. WHEN SPECIFIED THE TANK INTERIOR IS COATED WITH FLOROK EPOXY OR EQUAL.
5. REINFORCING STEEL DEFORMED BARS CONFORM TO LATEST ASTM SPECIFICATION A615.
6. CONCRETE COMPRESSIVE STRENGTH– 4000 PSI AT 28 DAYS.
7. METHOD OF MANUFACTURE: WET CAST.
8. SECTIONS ARE MONOLITHIC.
9. THE CHAMBER IS DESIGNED FOR HS-20 LOADING w/18" OF SOIL COVER.

WEIGHT CHART

PRODUCT	APPROX WEIGHT
TANK	29200 LBS.

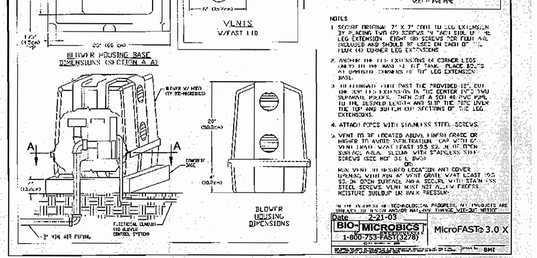


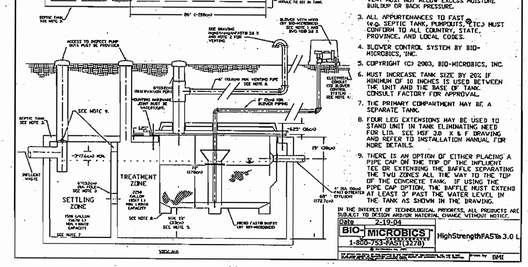
UNITED CONCRETE PRODUCTS INC.
173 CHURCH STREET YALESVILLE, CT 06492 TEL. 800 234-3119 (203) 269-3119 FAX. (203) 265-4941



2300 GAL. PRECAST TREATMENT TANK FOR A BIO-MICROBICS 3.0 MICROFAST UNIT

DWG. ST-B900MODB





Specifications for MicroFAST 3.0 Wastewater Treatment System

1. GENERAL
The contractor can visit, examine and inspect all MicroFAST 3.0 treatment system as hereafter further set forth. The MicroFAST 3.0 treatment system shall be complete with all needed equipment, as shown on the drawings and specified herein.
The principal items of equipment shall include: FAST System Inserts, expert kit for Tee, watertight kit (that option is specified), blower, blower housing, controls, and alarms. The MicroFAST 3.0 unit shall be situated within a 2000 gallon septic compartment in a two compartment tank as shown on the plans, or in a 1500 gallon tank (with a 500 gallon effluent pump) and must conform to local, state, and all other applicable codes. The contractor shall provide ventilation between the FAST system and tank supplier with regard to dimensions of the tank, installation of the FAST unit and delivery to the job site.

2. OPERATING CONDITIONS
The MicroFAST 3.0 treatment system shall be capable of treating the wastewater produced by typical family activities (bath, laundry, kitchen, etc.) ranging from 150 ten to 6421 daily. Daily flow duration time not to exceed 2,000 US gallons per day (7.570 LPD).

3. MEDIA
The FAST media shall be manufactured of rope PVC, polyethylene or polypropylene and shall be supported by polyethylene netting. The media shall be fitted in position and constrained against any wearing parts and shall not corrode. The media shall be designed and installed to ensure that sloughed solids will passively descend through the media to the bottom of the septic tank.

4. BLOWER
The MicroFAST 3.0 unit shall come complete with a regenerative type blower capable of delivering at 39.0 CFM. The blower assembly shall include an inline, felt-in with metal filter element.

5. ELECTRICAL REQUIREMENTS
The blower shall be mounted remote, up to 100 FT (30.5 m) maximum with no more than four elbows to the MicroFAST unit. The blower shall operate at 230 VAC. The blower capacity at 0' water and the elevation must be higher than the normal flood level. A tee-riser,

rectangular housing shall be provided with tamper proof screws. The discharge air line from the blower to the MicroFAST shall be provided and installed by the contractor.

6. ELECTRICAL
All electrical source should be within 100 FT from the blower. Consult local code for longer wiring distances. All wiring must conform to code. The motor power required for the blower is 230 Volts, Single Phase, 60/50 hertz, 10.4 Full Load Amps, motors are size a 1/2 HP. Blower Model Number VLN15 or FMD-730/460 Watts, three Phase 60/50 Hertz 3/60 Full Load Amps, Voltage are 230 to 14 AWG, Electrical Rotor Amps are 30/20ish. All consult with local code officials. Blower shall contain overload protection, the power supply, and the blower shall be furnished and installed by the contractor.

7. ALARMS
The alarm system shall consist of a visual and audible alarm to indicate loss of power to the blower and/or high water level. A manual silence switch is included.

8. INSTALLATION AND OPERATING INSTRUCTIONS
All work must be done in accordance with local codes and regulations. Installation of the MicroFAST 3.0 shall be in accordance with the manufacturer's written instructions provided by the manufacturer. Operation manuals shall be furnished which will include a description of installation, operation, and system maintenance procedures. There shall be a separate manual for the owner which will be left with the owner, located in the T.

9. FLOW & PIPE SIZING
Each FAST module is provided with a 4" (100 mm) inlet and outlet with hub and gaskets. The minimum slope for conventional line flow with a four inch effluent pipe is 10 1/2 Gallons per minute (39.8 l/min, or 42 1/2 GPH (170 LPM) with a 2:0 design safety factor. An optional tee-riser box and

gasket can be utilized on the new construction dimension of up to 9' inches (9 mm) higher. Maximum flow or unrestricted flow with a 4" inlet/outlet pipe is 84 GPM (318 LPM) or 120 GPM (454 LPM) with a 2:0 design safety factor.

Wastewater treatment systems work best when influent flow is delivered as consistently as possible. FAST systems have been successfully designed, tested and certified receiving gravity, pressurized, pumped, or dosed flow when influent flow is introduced either by pump or other means to the FAST system to help with highly variable flow conditions, from multiple flooding events should be used to help assure even flow, optimum performance, and reliability.

10. WARRANTY
In the event a mechanical component fails to perform as specified or is shown defective in material or workmanship within warranty period, the manufacturer shall repair or replace such defective parts. Cost of labor on repair/replacement is not covered under this warranty. Cost of replacement or repair of mechanical components removed in service such as FF filter, etc., shall be considered as part of routine maintenance and upkeep.

It is not intended that the manufacturer assume responsibility for consequential liabilities or consequential expenses of any nature resulting from defects in design, material, workmanship, or errors in delivery, installation, or otherwise.

IN THE INTEREST OF TECHNOLOGICAL ADVANCES, ALL PRODUCTS ARE SUBJECT TO DESIGN MODIFICATION MATERIAL CHANGE WITHOUT NOTICE!
Date 2-21-03
BIO-MICROBICS
1-800-753-FAST(3278)
MicroFAST® 3.0 S

APPROVED: FOR PRIVATE WATER AND PRIVATE SEWERAGE SYSTEMS

COUNTY HEALTH OFFICER, HOWARD COUNTY HEALTH DEPARTMENT — DATE 6/26/06

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 6/19/06
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 7/11/06
DIRECTOR — DATE 7/17/06

NO.	REVISION	DATE

WATER AND SEWER SYSTEMS DETAILS
HIGHLAND CROSSING

TAX MAP 40 BLOCK 5
5TH ELECTION DISTRICT

PARCEL A
HOWARD COUNTY, MARYLAND

ROBERT H. VOGEL ENGINEERING, INC.
ENGINEERS • SURVEYORS • PLANNERS
8407 MAIN STREET ELLICOTT CITY, MD 21043
TEL: 410.461.7666 FAX: 410.461.8961

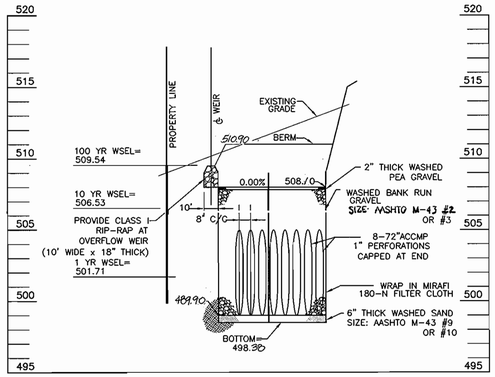
STATE OF MARYLAND — ROBERT HARRISON VOGEL — No. 18193 — PROFESSIONAL ENGINEER
ROBERT H. VOGEL, PE #16193

DESIGN BY:	RHV/JT
DRAWN BY:	LJT
CHECKED BY:	RHV
DATE:	JUNE 1, 2006
SCALE:	
W.O. NO.:	04-12.00

SHEET 6 OF 11

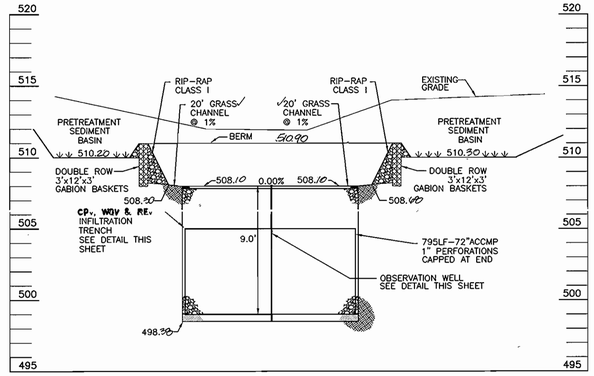
OWNER / DEVELOPER
HIGHLAND CROSSING, L.L.C.
14190 TWISTING LANE
DAYTON, MD 21036

SDP-05-108



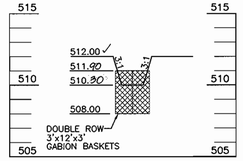
INFILTRATION TRENCH SECTION B-B

SCALE: HORZ.: 1"=50'
VERT.: 1"=5'



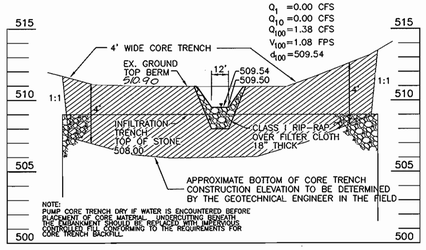
INFILTRATION TRENCH SECTION A-A

SCALE: HORZ.: 1"=50'
VERT.: 1"=5'



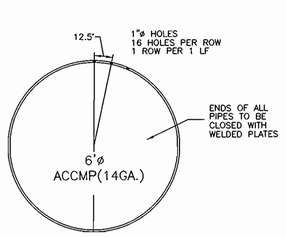
SECTION THROUGH PRETREATMENT SEDIMENT BASIN

SCALE: HORZ.: 1"=50'
VERT.: 1"=5'



SPILLWAY AND CORE TRENCH CROSS SECTION

SCALE: HORZ.: 1"=50'
VERT.: 1"=5'



PERFORATION DETAIL INFILTRATION STORAGE PIPE

SCALE: HORZ.: 1"=50'
VERT.: 1"=5'

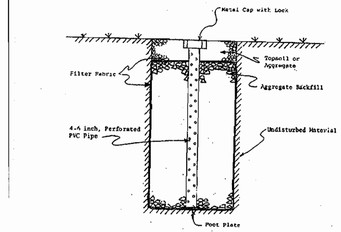


Figure 3-5. Observation Well Detail

3-14

Appendix B.2. Construction Specifications for Infiltration Practices

13. If a distribution structure with a wet well is 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.

14. If a distribution structure is used, the manhole cover shall be bolted to the frame.

MARYLAND 378
STORMWATER MANAGEMENT POND CONSTRUCTION SPECIFICATIONS

CONSTRUCTION SPECIFICATIONS

THESE SPECIFICATIONS ARE APPROPRIATE TO ALL PONDS WITHIN THE SCOPE OF THE STANDARD FOR PRACTICE MD-378. ALL REFERENCES TO ASTM AND AASHTO SPECIFICATIONS APPLY TO THE MOST RECENT VERSION.

SITE PREPARATION

AREAS DESIGNATED FOR BORROW AREAS, EMBANKMENT, AND STRUCTURAL WORKS SHALL BE CLEARED, GRUBBED AND STRIPPED OF TOPSOIL. ALL TREES, VEGETATION, ROOTS AND OTHER OBJECTIONABLE MATERIAL SHALL BE REMOVED. CHANNEL BANKS AND SHARP BREAKS SHALL BE SLOPED TO NO STEEPER THAN 1:1. ALL TREES SHALL BE CLEARED AND GRUBBED WITHIN 15 FEET OF THE TOW OF THE EMBANKMENT.

AREAS TO BE COVERED BY THE RESERVOIR WILL BE CLEARED OF ALL TREES, BRUSH, LOGS, FENCES, RUBBISH AND OTHER OBJECTIONABLE MATERIAL UNLESS OTHERWISE DESIGNATED ON THE PLANS. TREES, BRUSH, AND STUMPS SHALL BE CUT APPROXIMATELY LEVEL WITH THE GROUND SURFACE. FOR DRY STORMWATER MANAGEMENT PONDS, A MINIMUM OF A 25-FOOT RADIUS AROUND THE INLET STRUCTURE SHALL BE CLEARED.

ALL CLEARED AND GRUBBED MATERIAL SHALL BE DISPOSED OF OUTSIDE AND BELOW THE LIMITS OF THE DAM AND RESERVOIR AS DIRECTED BY THE OWNER OR HIS REPRESENTATIVE. WHEN SPECIFIED, A SUFFICIENT QUANTITY OF TOPSOIL WILL BE STOCKPILED IN A SUITABLE LOCATION FOR USE ON THE EMBANKMENT AND OTHER DESIGNATED AREAS.

EARTH FILL

MATERIAL – THE FILL MATERIAL SHALL BE TAKEN FROM APPROVED DESIGNATED BORROW AREAS. IT SHALL BE FREE OF ROOTS, STUMPS, WOOD, RUBBISH, STONES GREATER THAN 6", FROZEN OR OTHER OBJECTIONABLE MATERIALS. FILL MATERIAL FOR THE CENTER OF THE EMBANKMENT, AND CUT OFF TRENCH SHALL CONFORM TO UNIFIED SOIL CLASSIFICATION GC, SC, CH, OR CL AND MUST HAVE AT LEAST 30% PASSING THE #200 SIEVE. CONSIDERATION MAY BE GIVEN TO THE USE OF OTHER MATERIALS IN THE EMBANKMENT IF DESIGNED BY A GEOTECHNICAL ENGINEER. SUCH SPECIAL DESIGNS MUST HAVE CONSTRUCTION SUPERVISED BY A GEOTECHNICAL ENGINEER. MATERIALS USED IN THE OUTER SHELL OF THE EMBANKMENT MUST HAVE THE CAPABILITY TO SUPPORT VEGETATION OF THE QUALITY REQUIRED TO PREVENT EROSION OF THE EMBANKMENT.

PLACEMENT – AREAS ON WHICH FILL IS TO BE PLACED SHALL BE SCARIFIED PRIOR TO PLACEMENT OF FILL. FILL MATERIALS SHALL BE PLACED IN MAXIMUM 8 INCH THICK (BEFORE COMPACTION) LAYERS WHICH ARE TO BE CONTINUOUS OVER THE ENTIRE LENGTH OF THE FILL. THE MOST PERMEABLE BORROW MATERIAL SHALL BE PLACED IN THE DOWNSTREAM PORTIONS OF THE EMBANKMENT. THE PRINCIPAL SPILLWAY MUST BE INSTALLED CONCURRENTLY WITH FILL PLACEMENT AND NOT EXCAVATED INTO THE EMBANKMENT.

COMPACTION – THE MOVEMENT OF THE HAULING AND SPREADING EQUIPMENT OVER THE FILL SHALL BE CONTROLLED SO THAT THE ENTIRE SURFACE OF EACH LIFT SHALL BE TRAVERSED BY NOT LESS THAN ONE TREAD TRACK OF HEAVY EQUIPMENT OR COMPACTION SHALL BE ACHIEVED BY A MINIMUM OF FOUR COMPLETE PASSES OF A SHEEPSFOOT, RUBBER TIRED OR VIBRATORY ROLLER. FILL MATERIAL SHALL CONTAIN SUFFICIENT MOISTURE SUCH THAT THE REQUIRED DEGREE OF COMPACTION WILL BE OBTAINED WITH THE EQUIPMENT USED. THE FILL MATERIAL SHALL CONTAIN SUFFICIENT MOISTURE SO THAT IF FORMED INTO A BALL IT WILL NOT CRUMBLE, YET NOT BE SO WET THAT WATER CAN BE SQUEEZED OUT.

WHEN REQUIRED BY THE REVIEWING AGENCY THE MINIMUM REQUIRED DENSITY SHALL NOT BE LESS THAN 95% OF MAXIMUM DRY DENSITY WITH A MOISTURE CONTENT WITHIN +\-2% OF THE OPTIMUM. EACH LAYER OF FILL SHALL BE COMPACTED AS NECESSARY TO OBTAIN THAT DENSITY, AND IS TO BE CERTIFIED BY THE ENGINEER AT THE TIME OF CONSTRUCTION. ALL COMPACTION IS TO BE DETERMINED BY AASHTO METHOD T-99 (STANDARD PROCTOR).

CUT OFF TRENCH THE CUTOFF TRENCH SHALL BE EXCAVATED INTO IMPERVIOUS MATERIAL ALONG OR PARALLEL TO THE CENTERLINE OF THE EMBANKMENT AS SHOWN ON THE PLANS. THE BOTTOM WIDTH OF THE TRENCH SHALL BE GOVERNED BY THE EQUIPMENT USED FOR EXCAVATION, WITH THE MINIMUM WIDTH BEING FOUR FEET. THE DEPTH SHALL BE AT LEAST FOUR FEET BELOW EXISTING GRADE OR AS SHOWN ON THE PLANS. THE SIDE SLOPES OF THE TRENCH SHALL BE 1 TO 1 OR FLATTER. THE BACKFILL SHALL BE COMPACTED WITH CONSTRUCTION EQUIPMENT, ROLLERS, OR HAND TAMPERS TO ASSURE MAXIMUM DENSITY AND MINIMUM PERMEABILITY.

EMBANKMENT CORE – THE CORE SHALL BE PARALLEL TO THE CENTERLINE OF THE EMBANKMENT AS SHOWN ON THE PLANS. THE TOP WIDTH OF THE CORE SHALL BE A MINIMUM OF FOUR FEET. THE HEIGHT SHALL EXTEND UP TO AT LEAST THE 10 YEAR WATER ELEVATION OR AS SHOWN ON THE PLANS. THE SIDE SLOPES SHALL BE 1 TO 1 OR FLATTER. THE CORE SHALL BE COMPACTED WITH CONSTRUCTION EQUIPMENT, ROLLERS, OR HAND TAMPERS TO ASSURE MAXIMUM DENSITY AND MINIMUM PERMEABILITY. IN ADDITION THE CORE SHALL BE PLACED CURRENTLY WITH THE OUTER SHELL OF THE EMBANKMENT.

STRUCTURE BACKFILL

BACKFILL ADJACENT TO PIPES OR STRUCTURES SHALL BE OF THE TYPE AND QUALITY CONFORMING TO THAT SPECIFIED FOR THE ADJOINING FILL MATERIAL. THE FILL SHALL BE PLACED IN HORIZONTAL LAYERS NOT TO EXCEED FOUR INCHES IN THICKNESS AND COMPACTED BY HAND TAMPERS OR OTHER MANUALLY DIRECTED COMPACTION EQUIPMENT. THE MATERIAL NEEDS TO FILL COMPLETELY ALL SPACES UNDER AND ADJACENT TO THE PIPE. AT NO TIME DURING THE BACKFILLING OPERATION SHALL DRIVEN EQUIPMENT BE ALLOWED TO OPERATED CLOSER THAN FOUR FEET, MEASURED HORIZONTALLY, TO ANY PART OF A STRUCTURE. UNDER NO CIRCUMSTANCES SHALL EQUIPMENT BE DRIVEN OVER ANY PART OF A CONCRETE STRUCTURE OR PIPE, UNLESS THERE IS A COMPACTED FILL OF 24" OR GREATER OVER THE STRUCTURE OR PIPE.

STRUCTURE BACKFILL MAY BE FLOWABLE FILL MEETING THE REQUIREMENTS OF MARYLAND DEPARTMENT OF TRANSPORTATION, STATE HIGHWAY ADMINISTRATION STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MATERIALS, SECTION 313 AS MODIFIED. THE MIXTURE SHALL HAVE A 100-200 PSI; 28 DAY UNCONFINED COMPRESSIVE STRENGTH. THE FLOWABLE FILL SHALL HAVE A MINIMUM PH OF 4.0 AND A MINIMUM RESISTIVITY OF 2,000 OHM-CM. MATERIAL SHALL BE PLACED SUCH THAT MINIMUM OF 6" (MEASURED PERPENDICULAR TO THE OUTSIDE OF THE PIPE) OF FLOWABLE FILL SHALL BE UNDER (BEDDING), OVER AND, ON THE SIDES OF THE PIPE. IT ONLY NEEDS TO EXTEND TO THE SPRING LINE FOR RIGID CONDUITS. AVERAGE SLUMP OF THE FILL SHALL BE 7" TO ASSURE FLOWABILITY OF THE MATERIAL. ADEQUATE MEASURES SHALL BE TAKEN (SAND BAGS, ETC.) TO PREVENT FLOATING THE PIPE. WHEN USING FLOWABLE FILL, ALL METAL PIPE SHALL BE BITUMINOUS COATED. ANY ADJOINING SOIL FILL SHALL BE PLACED IN HORIZONTAL LAYERS NOT TO EXCEED FOUR INCHES IN THICKNESS AND COMPACTED BY HAND TAMPERS OR OTHER MANUALLY DIRECTED COMPACTION EQUIPMENT. THE MATERIAL SHALL COMPLETELY FILL ALL VOIDS ADJACENT TO THE FLOWABLE FILL ZONE. AT NO TIME DURING THE BACKFILLING OPERATION SHALL DRIVEN EQUIPMENT BE ALLOWED TO OPERATE CLOSER THAN FOUR FEET, MEASURED HORIZONTALLY, TO ANY PART OF THE STRUCTURE. UNDER NO CIRCUMSTANCES SHALL EQUIPMENT BE DRIVEN OVER ANY PART OF A STRUCTURE OR PIPE. BACKFILL (FLOWABLE FILL)ZONE SHALL BE OF THE TYPE AND QUALITY CONFORMING TO THAT SPECIFIED FOR THE CORE OF THE EMBANKMENT OR OTHER EMBANKMENT MATERIALS.

CARE OF WATER DURING CONSTRUCTION

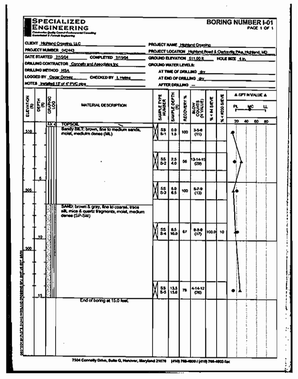
ALL WORK ON PERMANENT STRUCTURES SHALL BE CARRIED OUT IN AREAS FREE FROM WATER. THE CONTRACTOR SHALL CONSTRUCT AND MAINTAIN ALL TEMPORARY DIKES, LEVEES, COFFERDAMS, DRAINAGE CHANNELS, AND STREAM DIVERSIONS NECESSARY TO PROTECT TO BE OCCUPIED BY THE PERMANENT WORKS. THE CONTRACTOR SHALL ALSO FURNISH, INSTALL, OPERATE, AND MAINTAIN ALL NECESSARY PUMPING AND OTHER EQUIPMENT REQUIRED FOR REMOVAL OF WATER FROM VARIOUS PARTS OF THE WORK AND FOR MAINTAINING THE EXCAVATIONS, FOUNDATION, AND OTHER PARTS OF THE WORK FREE FROM WATER AS REQUIRED OR DIRECTED BY THE ENGINEER FOR CONSTRUCTING EACH PART OF THE WORK. AFTER HAVING SERVED THEIR PURPOSE, ALL TEMPORARY PROTECTIVE WORKS SHALL BE REMOVED OR LEVELED AND GRADED TO THE EXTENT REQUIRED TO PREVENT OBSTRUCTION IN ANY DEGREE WHATSOEVER OF THE FLOW OF WATER TO THE SPILLWAY OR OUTLET WORKS AND SO AS NOT TO INTERFERE IN ANY WAY WITH THE OPERATION OR MAINTENANCE OF THE STRUCTURE. STREAM DIVERSIONS SHALL BE MAINTAINED UNTIL THE FULL FLOW CAN BE PASSED THROUGH THE PERMANENT WORKS. THE REMOVAL OF WATER FROM THE REQUIRED EXCAVATION AND THE FOUNDATION SHALL BE ACCOMPLISHED IN A MANNER AND TO THE EXTENT THAT WILL MAINTAIN STABILITY OF THE EXCAVATED SLOPES AND BOTTOM REQUIRED EXCAVATIONS AND WILL ALLOW SATISFACTORY PERFORMANCE OF ALL CONSTRUCTION OPERATIONS. DURING THE PLACING AND COMPACTING OF MATERIAL IN REQUIRED EXCAVATIONS, THE WATER LEVEL AT THE LOCATIONS BEING REFILLED SHALL BE MAINTAINED BELOW THE BOTTOM OF THE EXCAVATION AT SUCH LOCATIONS WHICH MAY REQUIRE DRAINING THE WATER SUMPS FROM WHICH THE WATER SHALL BE PUMPED.

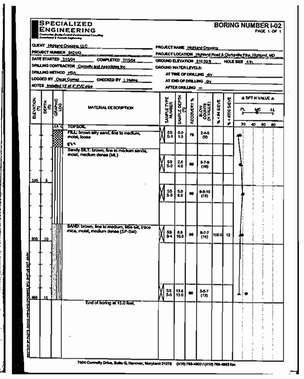
STABILIZATION

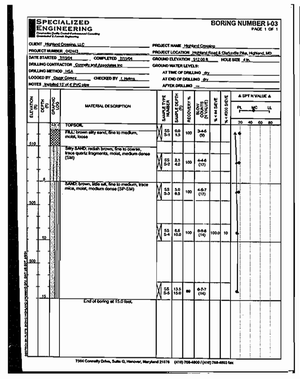
ALL BORROW AREAS SHALL BE GRADED TO PROVIDE PROPER DRAINAGE AND LEFT I A SIGHTLY CONDITION. ALL EXPOSED SURFACES OF THE EMBANKMENT, SPILLWAY, SPOIL AND BORROW AREAS, AND BERMS SHALL BE STABILIZED BY SEEDING, LIMING, FERTILIZING AND MULCHING IN ACCORDANCE WITH THE NATURAL RESOURCES CONSERVATION SERVICE STANDARDS AND SPECIFICATIONS FOR CRITICAL AREA PLANTING (MD-342) OR AS SHOWN ON THE ACCOMPANYING DRAWINGS.

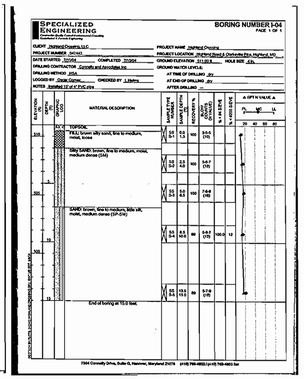
EROSION AND SEDIMENT CONTROL

CONSTRUCTION OPERATIONS WILL BE CARRIED OUT IN SUCH A MANNER THAT EROSION WILL BE CONTROLLED AND WATER AND AIR POLLUTION MINIMIZED. STATE AND LOCAL LAWS CONCERNING POLLUTION ABATEMENT WILL BE FOLLOWED. CONSTRUCTION PLANS SHALL DETAIL EROSION AND SEDIMENT CONTROL MEASURES.









Appendix B.2. Construction Specifications for Infiltration Practices

aggregate to form a 6-inch minimum longitudinal lap. The desired fill soil or stone aggregate shall be placed over the lap at sufficient intervals to maintain the lap during subsequent backfilling.

7. 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.

8. Voids may occur between the fabric and the excavation sides shall be avoided. 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.

9. Vertically excavated walls may 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 slopes to maintain stability.

10. PVC distribution pipes shall be Schedule 40 and meet ASTM-D-1784. 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.

11. The observation well is to consist of 6-inch diameter perforated PVC Schedule 40 pipe (M 218 OR PS8, Type PS 28) with a cap on 6 inches above ground level and is to be located near the longitudinal center of the infiltration trench. The pipe shall have a plastic cellar with nibs to prevent rotation when removing the cap. The screw top lid shall be a cleanout with a locking mechanism or special bolt to discourage vandalism. 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 cap provided at the bottom of the pipe. The bottom of the cap shall rest on the infiltration trench bottom.

12. Corrugated metal distribution pipes shall conform to AASHTO-M-36, and shall be aluminized in accordance with AASHTO-M-274. Aluminized pipe in 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.

B.2.2

HOWARD - NOTES RE

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 has received final stabilization.

1. Heavy equipment and traffic shall be restricted from traveling over the proposed location of the infiltration trench to minimize compaction of the soil.

2. 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 roughened where sheared and sealed by heavy equipment.

3. A Class "C" geotextile or better (see Section 24.0, Material Specifications, 1994 Standards and Specifications for Soil Erosion and Sediment Control, MDE, 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.

Amoco 4552	Carthage FX-80S
GEOLON N70	Mirafi 180-N
WEBTEC 307	

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 sharp-edged objects shall be placed on the fabric at the top of the trench to keep the trench open during windy periods. When overlaps are required between rolls, the uphill roll should lap a minimum of 2 feet over the downhill roll in order to provide a shingled effect.

4. A 6 inch sand filter layer shall be placed on the bottom of the infiltration trench and shall be compacted using plate compactors. 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.

5. 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 one of the following AASHTO-M-43, Size No. 2 or No. 3.

6. Following the stone aggregate placement, the filter fabric shall be folded over the stone

B.2.1

NO.	REVISION	DATE
1	SWM ASBUILTS	6/16/06

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 6/19/06

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 7/11/06

DIRECTOR — DATE 7/17/06

REVIEWED FOR HOWARD SCD AND MEETS TECHNICAL REQUIREMENTS

USDA–NATURAL RESOURCES CONSERVATION SERVICE — DATE

THIS DEVELOPMENT PLAN IS APPROVED FOR SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT

HOWARD SCD — DATE

ENGINEERS CERTIFICATE

"I CERTIFY THAT THIS PLAN FOR SEDIMENT AND EROSION CONTROL REPRESENTS A PRACTICAL AND WORKABLE PLAN BASED ON MY PERSONAL KNOWLEDGE OF THE SITE CONDITIONS AND THAT IT WAS PREPARED IN ACCORDANCE WITH THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT.

ROBERT H. VOGEL, PE #16193 — DATE

DEVELOPER'S CERTIFICATE

"I/WE CERTIFY THAT ALL DEVELOPMENT AND CONSTRUCTION WILL BE DONE ACCORDING TO THIS PLAN FOR SEDIMENT AND EROSION CONTROL, AND THAT ALL RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF ATTENDANCE AT A DEPARTMENT OF THE ENVIRONMENT APPROVED TRAINING PROGRAM FOR THE CONTROL OF SEDIMENT AND EROSION BEFORE BEGINNING THE PROJECT. I ALSO AUTHORIZE PERIODIC ON-SITE INSPECTION BY THE HOWARD SOIL CONSERVATION DISTRICT.

HIGHLAND CROSSING, L.L.C. — DATE 6/14/06

STATE OF MARYLAND ROBERT HARRISON VOGEL NO. 16193 PROFESSIONAL ENGINEER

"STORMWATER MANAGEMENT AS-BUILTS HEREBY CERTIFY THAT THE FACILITY SHOWN ON THIS PLAN WAS CONSTRUCTED AS SHOWN ON THE AS-BUILT PLANS AND MEETS THE APPROVED PLANS AND SPECIFICATIONS."

6/19/06

ROBERT H. VOGEL, PE NO. 16193

OWNER / DEVELOPER

HIGHLAND CROSSING, L.L.C.
14190 TWISTING LANE
DAYTON, MD 21036

STORMWATER MANAGEMENT DETAILS
HIGHLAND CROSSING

TAX MAP 40 BLOCK 5
5TH ELECTION DISTRICT

PARCEL A
HOWARD COUNTY, MARYLAND

ROBERT H. VOGEL ENGINEERING, INC.
ENGINEERS • SURVEYORS • PLANNERS
8407 MAIN STREET
ELLICOTT CITY, MD 21043
TEL: 410.461.7666
FAX: 410.461.8961

STATE OF MARYLAND ROBERT HARRISON VOGEL NO. 16193 PROFESSIONAL ENGINEER

ROBERT H. VOGEL, PE #16193

DESIGN BY:	RHV/LJT
DRAWN BY:	LJT
CHECKED BY:	RHV
DATE:	JUNE 1, 2006
SCALE:	
W.O. NO.:	04-12.00

SHEET 7 OF 11

SDP-05-108

SEDIMENT CONTROL NOTES

1. A MINIMUM OF 48 HOURS NOTICE MUST BE GIVEN TO THE HOWARD COUNTY DEPARTMENT OF INSPECTION, LICENSE AND PERMITS SEDIMENT CONTROL DIVISION PRIOR TO THE START OF ANY CONSTRUCTION (313-1855).
2. ALL VEGETATION AND STRUCTURAL PRACTICES ARE TO BE INSTALLED ACCORDING TO THE PROVISIONS OF THIS PLAN AND ARE TO BE IN CONFORMANCE WITH THE 1994 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL AND REVISIONS THERETO.
3. FOLLOWING INITIAL SOIL DISTURBANCE OR REDISTURBANCE, PERMANENT OR TEMPORARY STABILIZATION SHALL BE COMPLETED WITHIN: (A) 7 CALENDAR DAYS FOR ALL PERIMETER SEDIMENT CONTROL STRUCTURES, DIKES, PERIMETER SLOPES, AND ALL SLOPES GREATER THAN 3:1, (B) 14 DAYS AS TO ALL OTHER DISTURBED OR GRADED AREAS ON THE PROJECT SITE.
4. ALL SEDIMENT TRAPS/BASINS SHOWN MUST BE FENCED AND WARNING SIGNS POSTED AROUND THEIR PERIMETER IN ACCORDANCE WITH VOL. 1, CHAPTER 7, HOWARD COUNTY DESIGN MANUAL, STORM DRAINAGE.
5. ALL DISTURBED AREAS MUST BE STABILIZED WITHIN THE TIME PERIOD SPECIFIED ABOVE IN ACCORDANCE WITH THE 1994 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL FOR PERMANENT SEEDING, SOD, TEMPORARY SEEDING, AND MULCHING (SEC. G). TEMPORARY STABILIZATION WITH MULCH ALONE SHALL BE DONE WHEN RECOMMENDED SEEDING DATES DO NOT ALLOW FOR PROPER GERMINATION AND **ESTABLISHMENT OF GRASSES.**
6. ALL SEDIMENT CONTROL STRUCTURES ARE TO REMAIN IN PLACE AND ARE TO BE MAINTAINED IN OPERATIVE CONDITION UNTIL PERMISSION FOR THEIR REMOVAL HAS BEEN OBTAINED FROM THE HOWARD COUNTY SEDIMENT CONTROL INSPECTOR.
7. SITE ANALYSIS :

	TOTAL
TOTAL AREA	3.85 AC
AREA DISTURBED	4.45 AC
AREA TO BE ROOFED OR PAVED	2.75 AC
AREA TO BE VEGETATIVELY STABILIZED	1.70 AC
TOTAL CUT	10,971 CY
TOTAL FILL	9,918 CY
OFFSITE WASTE/BORROW AREA LOCATION	*

8. ANY SEDIMENT CONTROL PRACTICE WHICH IS DISTURBED BY GRADING ACTIVITY FOR PLACEMENT OF UTILITIES MUST BE REPAIRED ON THE SAME DAY OF DISTURBANCE.
9. ADDITIONAL SEDIMENT CONTROLS MUST BE PROVIDED, IF DEEMED NECESSARY BY THE HOWARD COUNTY SEDIMENT CONTROL INSPECTOR.
10. ON ALL SITES WITH DISTURBED AREAS IN EXCESS OF 2 ACRES, APPROVAL OF THE INSPECTION AGENCY SHALL BE REQUESTED UPON COMPLETION OF INSTALLATION OF PERIMETER EROSION AND SEDIMENT CONTROLS, BUT BEFORE PROCEEDING WITH ANY OTHER EARTH DISTURBANCE OR GRADING. OTHER BUILDING OR GRADING INSPECTION APPROVALS MAY NOT BE AUTHORIZED UNTIL THIS INITIAL APPROVAL BY THE INSPECTION AGENCY IS MADE.
11. TRENCHES FOR THE CONSTRUCTION OF UTILITIES IS LIMITED TO THREE PIPE LENGTHS OR THAT WHICH SHALL BE BACK-FILLED AND STABILIZED WITHIN ONE WORKING DAY, WHICHEVER IS SHORTER.
12. ESTIMATES OF EARTHWORK QUANTITIES ARE PROVIDED SOLELY FOR THE PURPOSE OF CALCULATING FEES.
    * TO BE DETERMINED BY CONTRACTOR, WITH PRE-APPROVAL OF THE SEDIMENT CONTROL INSPECTOR WITH AN APPROVED AND ACTIVE GRADING PERMIT

21.0 STANDARDS AND SPECIFICATIONS FOR TOPSOIL

DEFINITION

PLACEMENT OF TOPSOIL OVER A PREPARED SUBSOIL PRIOR TO ESTABLISHMENT OF PERMANENT VEGETATION.

PURPOSE

TO PROVIDE A SUITABLE SOIL MEDIUM FOR VEGETABLE GROWTH. SOILS OF CONCERN HAVE LOW MOISTURE CONTENT, LOW NUTRIENT LEVELS, LOW PH, MATERIALS TOXIC TO PLANTS, AND/OR UNACCEPTABLE SOIL GRADATION.

CONDITIONS WHERE PRACTICE APPLIES

I. THIS PRACTICE IS LIMITED TO AREAS HAVING 2:1 OR FLATTER SLOPES WHERE:
   A. THE TEXTURE OF THE EXPOSED SUBSOIL/PARENT MATERIAL IS NOT ADEQUATE TO PRODUCE VEGETATIVE GROWTH.
   B. THE SOIL MATERIAL IS SO SHALLOW THAT THE ROOTING ZONE IS NOT DEEP ENOUGH TO SUPPORT PLANTS OR FURNISH CONTINUING SUPPLIES OF MOISTURE AND PLANT NUTRIENTS.
   C. THE ORIGINAL SOIL TO BE VEGETATED CONTAINS **MATERIAL TOXIC TO PLANT GROWTH.**
   D. THE SOIL IS SO ACIDIC THAT TREATMENT WITH LIMESTONE IS NOT FEASIBLE.

II. FOR THE PURPOSE OF THESE STANDARDS AND SPECIFICATIONS, AREAS HAVING SLOPES STEEPER THAN 2:1 REQUIRE SPECIAL CONSIDERATION AND DESIGN FOR ADEQUATE STABILIZATION. AREAS HAVING SLOPES STEEPER THAN 2:1 SHALL HAVE THE APPROPRIATE STABILIZATION SHOWN ON THE PLANS.

CONSTRUCTION AND MATERIAL SPECIFICATIONS

I. TOPSOIL SALVAGED FROM THE EXISTING SITE MAY BE USED PROVIDED THAT IT MEETS THE STANDARDS AS SET FORTH IN THESE SPECIFICATIONS. TYPICALLY, THE DEPTH OF TOPSOIL TO BE SALVAGED FOR A GIVEN SOIL TYPE CAN BE FOUND IN THE REPRESENTATIVE SOIL PROFILE SECTION IN THE SOIL SURVEY PUBLISHED BY USDA-SCS IN COOPERATION WITH MARYLAND AGRICULTURAL EXPERIMENTAL STATION.

II. TOPSOIL SPECIFICATIONS – SOIL TO BE USED AS TOPSOIL MUST MEET THE FOLLOWING:
   A. TOPSOIL SHALL BE A LOAM, SANDY LOAM, CLAY LOAM, SILT LOAM, SANDY CLAY LOAM, LOAMY SAND. OTHER SOILS MAY BE USED IF RECOMMENDED BY AN AGRONOMIST OR A SOIL SCIENTIST AND APPROVED BY THE APPROPRIATE APPROVAL AUTHORITY. REGARDLESS, TOPSOIL SHALL NOT BE A MIXTURE OF CONTRASTING TEXTURED SUBSOILS AND SHALL CONTAIN LESS THAN 5% BY VOLUME OF CINDERS, STONES, SLAG, COARSE FRAGMENTS, GRAVEL, STICKS, ROOTS, TRASH, OR OTHER MATERIALS LARGER THAT 1 AND 1/2" IN DIAMETER.
   B. TOPSOIL MUST BE FREE OF PLANTS OR PLANT PARTS SUCH AS BERMUDA GRASS, QUACKGRASS, JOHNSONGRASS, NUTSEDGE, POISON IVY, THISTLE, OR OTHERS AS SPECIFIED.
   C. WHERE THE SUBSOIL IS EITHER HIGHLY ACIDIC OR COMPOSED OF HEAVY CLAYS, GROUND LIMESTONE SHALL BE SPREAD AT THE RATE OF 4-8 TONS/ACRE (200-400 POUNDS PER 1,000 SQUARE FEET) PRIOR TO THE PLACEMENT OF TOPSOIL. LIME SHALL BE DISTRIBUTED UNIFORMLY OVER DESIGNATED AREAS AND WORKED INTO THE SOIL IN CONJUNCTION WITH TILLAGE OPERATIONS AS DESCRIBED IN THE FOLLOWING PROCEDURES.

III. FOR SITES HAVING DISTURBED AREAS UNDER 5 ACRES:
   A. PLACE TOPSOIL (IF REQUIRED) AND APPLY SOIL AMENDMENTS AS SPECIFIED IN 20.0 VEGETATIVE STABILIZATION – SECTION I – VEGETATIVE STABILIZATION METHODS AND MATERIALS.

IV. FOR SITES HAVING DISTURBED AREAS OVER 5 ACRES:
   A. ON SOIL MEETING TOPSOIL SPECIFICATIONS, OBTAIN TEST RESULTS DICTATING FERTILIZER AND LIME AMENDMENTS REQUIRED TO BRING THE SOIL INTO COMPLIANCE WITH THE FOLLOWING:
   B. PH FOR TOPSOIL SHALL BE BETWEEN 6.0 AND 7.5. IF THE TESTED SOIL DEMONSTRATES A PH OF LESS THAN 6.0, SUFFICIENT LIME SHALL BE PRESCRIBED TO RAISE THE PH TO 6.5 OR HIGHER.
   C. ORGANIC CONTENT OF TOPSOIL SHALL BE NOT LESS THAN 1.5 PERCENT BY WEIGHT.
   D. TOPSOIL HAVING SOLUBLE SALT CONTENT GREATER THAN 500 PARTS PER MILLION SHALL NOT BE USED.
   E. NO SOD OR SEED SHALL BE PLACED ON SOIL SOIL WHICH HAS BEEN TREATED WITH SOIL STERILANTS OR CHEMICALS USED FOR WEED CONTROL UNTIL SUFFICIENT TIME HAS ELAPSED (14 DAYS MIN.) TO PERMIT DISSIPATION OF PHYTO-TOXIC MATERIALS.

NOTE: TOPSOIL SUBSTITUTES OR AMENDMENTS, AS RECOMMENDED BY A QUALIFIED AGRONOMIST OR SOIL SCIENTIST AND APPROVED BY THE APPROPRIATE APPROVAL AUTHORITY, MAY BE USED IN LIEU OF **NATURAL TOPSOIL.**

VI. PLACE TOPSOIL (IF REQUIRED) AND APPLY SOIL AMMENDMENTS SPECIFIED IN 20.0 VEGETATIVE STABILIZATION-SECTION I-VEGETATIVE STABILIZATION METHODS AND MATERIALS.

VII. TOPSOIL APPLICATION
   A. WHEN TOPSOILING, MAINTAIN NEEDED EROSION AND SEDIMENT CONTROL PRACTICES SUCH AS DIVERSIONS, GRADE STABILIZATION STRUCTURES, EARTH DIKES, SLOPE SILT FENCE AND SEDIMENT TRAPS AND BASINS.
   B. GRADES ON THE AREAS TO BE TOPSOILED, WHICH HAVE BEEN PREVIOUSLY ESTABLISHED, SHALL BE MAINTAINED, ALBEIT 4" – 8" HIGHER IN ELEVATION.
   C. TOPSOIL SHALL BE UNIFORMLY DISTRIBUTED IN A 4" – 8" LAYER AND LIGHTLY COMPACTED TO A MINIMUM THICKNESS OF 4". SPREADING SHALL BE PERFORMED IN SUCH A MANNER THAT SODDING OR SEEDING CAN PROCEED WITH A MINIMUM OF ADDITIONAL SOIL PREPARATION AND TILLAGE. ANY IRREGULARITIES IN THE SURFACE RESULTING FROM TOPSOILING OR OTHER OPERATIONS SHALL BE CORRECTED IN ORDER TO PREVENT THE FORMATION OF DEPRESSIONS OR WATER POCKETS.
   D. TOPSOIL SHALL NOT BE PLACE WHILE THE TOPSOIL OR SUBSOIL IS IN A FROZEN OR MUDDY CONDITION, WHEN THE SUBSOIL IS EXCESSIVELY WET OR IN A CONDITION THAT MAY OTHERWISE BE DETRIMENTAL TO PROPER GRADING AND SEEDBED PREPARATION.

PERMANENT SEEDING NOTES

APPLY TO GRADED OR CLEARED AREAS NOT SUBJECT TO IMMEDIATE FURTHER DISTURBANCE WHERE A PERMANENT LONG-LIVED VEGETATIVE COVER IS NEEDED.

SEEDBED PREPARATION: LOOSEN UPPER THREE INCHES OF SOIL BY RAKING, DISCING OR OTHER ACCEPTABLE MEANS BEFORE SEEDING, IF NOT PREVIOUSLY LOOSENED.

SOIL AMENDMENTS: IN LIEU OF SOIL TEST RECOMMENDATIONS, USE ONE OF THE FOLLOWING SCHEDULES:

1) PREFERRED--APPLY 2 TONS PER ACRE DOLOMITIC LIMESTONE (92 LBS./1000 SQ.FT.) AND 600 LBS PER ACRE 10-10-10 FERTILIZER (14 LBS./1000 SQ.FT.) BEFORE SEEDING. HARROW OR DISC INTO UPPER THREE INCHES OF SOIL. AT THE TIME OF SEEDING, APPLY 400 LBS. PER ACRE 30-0-0 UREAFORM FERTILIZER (9 LBS/1000 SQ.FT.)
2) ACCEPTABLE--APPLY 2 TONS PER ACRE DOLOMATIC LIMESTONE (92 LBS/1000 SQ.FT.) AND APPLY 1000 LBS. PER ACRE 10-10-10- FERTILIZER (23 LBS./1000 SQ.FT.) BEFORE SEEDING. HARROW OR DISC INTO UPPER THREE INCHES OF SOIL.

SEEDING: FOR THE PERIODS MARCH 1 THRU APRIL 30, AND AUGUST 1 THRU OCTOBER 15, SEED WITH 60 LBS. PER ACRE (1.4 LBS/1000 SQ.FT.) OF KENTUCKY 31 TALL FESCUE FOR THE PERIOD MAY 1 THRU JULY 31 SEED WITH 60 LBS. KENTUCKY 31 TALL FESCUE PER ACRE AND 2 LBS. PER ACRE (.05 LBS./1000 SQ.FT.) OF WEEPING LOVEGRASS. DURING THE PERIOD OF OCTOBER 16 THRU FEBRUARY 28, PROTECT SITE BY: OPTION (1) 2 TONS PER ACRE WELL ANCHORED STRAW MULCH AND SEED AS SOON AS POSSIBLE IN THE SPRING. OPTION (2) USE SOD. OPTION (3) SEED WITH 60 LBS/ACRE KENTUCKY 31 TALL FESCUE AND MULCH WITH 2 TONS/ACRE WELL ANCHORED STRAW.

MULCHING: APPLY 1 1/2 TO 2 TONS PER ACRE (70 TO 90 LBS./1000 SQ. FT.) OF UNROTTED SMALL GRAIN STRAW IMMEDIATELY AFTER SEEDING. ANCHOR MULCH IMMEDIATELY AFTER APPLICATION USING MULCH ANCHORING TOOL OR 218 GALLONS PER ACRE (5 GAL/1000 SQ.FT.) OF EMULSIFIED ASPHALT ON FLAT AREAS. ON SLOPES 8 FEET OR HIGHER, USE 348 GALLONS PER ACRE (8 GAL/1000 SQ.FT.) FOR ANCHORING.

MAINTENANCE: INSPECT ALL SEEDED AREAS AND MAKE NEEDED REPAIRS, REPLACEMENTS AND RESEEDINGS.

TEMPORARY SEEDING NOTES

SEEDBED PREPARATION: LOOSEN UPPER THREE INCHES OF SOIL BY RAKING, DISCING OR OTHER ACCEPTABLE MEANS BEFORE SEEDING, IF NOT PREVIOUSLY LOOSENED.

SOIL AMENDMENTS: APPLY 600 LBS. PER ACRE 10-10-10 FERTILIZER (14 LBS./1000 SQ.FT).

SEEDING: FOR PERIODS MARCH 1 THRU APRIL 30 AND FROM AUGUST 15 THRU NOVEMBER 15, SEED WITH 2 1/2 BUSHEL PER ACRE OF ANNUAL RYE (3.2 LBS./1000 SQ.FT.) FOR THE PERIOD MAY 1 THRU AUGUST 14, SEED WITH 3 LBS. PER ACRE OF WEEPING LOVEGRASS (.07 LBS./1000 SQ.FT.). FOR THE PERIOD NOVEMBER 1 THRU FEBRUARY 28, PROTECT SITE BY APPLYING 2 TONS PER ACRE OF WELL ANCHORED STRAW MULCH AND SEED AS SOON AS POSSIBLE IN THE SPRING, OR USE SOD.

MULCHING: APPLY 1 1/2 TO 2 TONS PER ACRE (70 TO 90 LBS./1000 SQ.FT.) OF UNROTTED SMALL GRAIN STRAW IMMEDIATELY AFTER SEEDING. ANCHOR MULCH IMMEDIATELY AFTER APPLICATION USING MULCH ANCHORING TOOL OR 218 GALLONS PER ACRE (5 GAL/1000 SQ.FT.) OF EMULSIFIED ASPHALT ON FLAT AREAS. ON SLOPES 8 FEET OR HIGHER, USE 348 GALLONS PER ACRE (8 GAL/1000 SQ.FT.) FOR ANCHORING.

REFER TO THE 1994 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL FOR RATE AND METHODS NOT COVERED.

SEQUENCE OF CONSTRUCTION

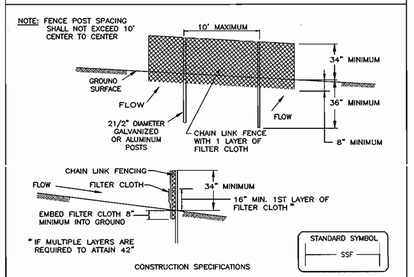
1. OBTAIN GRADING PERMIT.
2. NOTIFY HOWARD COUNTY BUREAU OF INSPECTIONS AND PERMITS (410.313.1880) AT LEAST 24 HOURS BEFORE STARTING ANY WORK.
3. CONSTRUCT STABILIZED CONSTRUCTION ENTRANCE. (1 DAY)
4. INSTALL SUPER SILT FENCE. (2 DAYS)
5. AFTER OBTAINING PERMISSION FROM THE SEDIMENT CONTROL INSPECTOR TO PROCEED, ROUGH GRADE SITE. (4 DAYS)
6. BEGIN CONSTRUCTION OF BUILDINGS. (8 MONTHS)
7. AS BUILDING CONSTRUCTION CONTINUES, INSTALL INITIAL SEPTIC TRENCHES AND WELL LINES TO BUILDINGS. (2 WEEKS)
8. WITH SEPTIC TRENCHES IN PLACE AND WELL LINES COMPLETE INSTALL CURB AND GUTTER AND SIDEWALKS. (2 WEEKS)
9. COMPLETE BUILDING CONSTRUCTION AND FINE GRADE SITE. (3 DAYS)
10. WITH SEDIMENT CONTROL INSPECTORS APPROVAL, STABILIZE DISTURBED AREAS. (2 WEEKS)
11. WITH THE SITE STABILIZED INSTALL PRETREATMENT AND INFILTRATION BASIN. (2 WEEKS)
12. WHEN PIPES AND STONE ARE IN PLACE BACKFILL AS NECESSARY AND STABILIZE AREA. (2 DAYS)
13. INSTALL SITE LANDSCAPING. (4 DAYS)
14. UPON STABILIZATION OF ALL DISTURBED AREAS AND WITH THE APPROVAL OF THE SEDIMENT CONTROL INSPECTOR, REMOVE ALL SEDIMENT CONTROL DEVICES. (3 DAYS)

NOTES
1. DURING GRADING AND AFTER EACH RAINFALL, THE CONTRACTOR SHALL INSPECT AND PROVIDE THE NECESSARY MAINTENANCE ON THE SEDIMENT AND EROSION CONTROL MEASURES SHOWN HEREON.
2. FOLLOWING INITIAL SOIL DISTURBANCE OR REDISTURBANCE PERMANENT OR TEMPORARY STABILIZATION SHALL BE COMPLIED WITH.

OPERATION AND MAINTENANCE SCHEDULE FOR PRIVATELY OWNED AND MAINTAINED SURFACE STORMWATER FILTRATION SYSTEMS (F-1, F-4, AND F-5)

1. THE STORMWATER WETLAND FACILITY SHALL BE INSPECTED ANNUALLY AND AFTER MAJOR STORMS. INSPECTIONS SHALL BE PERFORMED DURING WET WEATHER TO DETERMINE IF THE FACILITY IS FUNCTIONING PROPERLY.
2. THE TOP AND SIDE SLOPES OF THE EMBANKMENT SHALL BE MOWED TO A MINIMUM OF ONCE PER YEAR, WHEN VEGETATION REACHES 18" IN HEIGHT OR AS NEEDED.
3. FILTERS THAT HAVE A GRASS COVER SHALL BE MOWED TO A MINIMUM OF THREE (3) TIMES PER GROWING SEASON TO MAINTAIN A MAXIMUM GRASS HEIGHT OF LESS THAN 12 INCHES.
4. DEBRIS AND LITTER SHALL BE REMOVED DURING REGULAR MOWING OPERATIONS AND AS NEEDED.
5. VISIBLE SIGNS OF EROSION IN THE FACILITY SHALL BE REPAIRED AS SOON AS IT IS NOTICED.
6. REMOVE SILT WHEN IT EXCEEDS FOUR (4) INCHES DEEP IN THE FOREBAY.
7. WHEN WATER PONDS ON THE SURFACE OF THE FILTER BED FOR MORE THAN 72 HOURS, THE TOP FEW INCHES OF DISCOLORED MATERIAL SHALL BE REPLACED WITH FRESH MATERIAL. PROPER CLEANING AND DISPOSAL OF THE REMOVED MATERIALS AND LIQUID MUST BE FOLLOWED BY THE OWNER.
8. A LOGBOOK SHALL BE MAINTAINED TO DETERMINE THE RATE AT WHICH THE FACILITY DRAINS.
9. THE MAINTENANCE LOGBOOK SHALL BE AVAILABLE TO HOWARD COUNTY FOR INSPECTION TO INSURE COMPLIANCE WITH OPERATION AND MAINTENANCE CRITERIA.
10. ONCE THE PERFORMANCE CHARACTERISTICS OF THE INFILTRATION SYSTEM 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.

DETAIL 33 - SUPER SILT FENCE



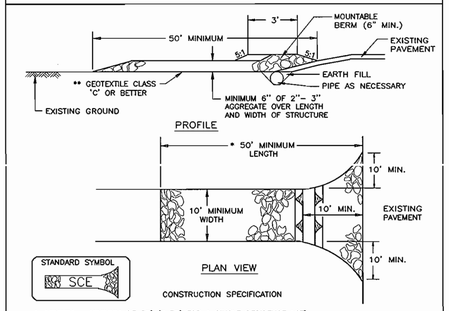
CONSTRUCTION SPECIFICATIONS

1. FENCING SHALL BE 42" IN HEIGHT AND CONSTRUCTED IN ACCORDANCE WITH THE LATEST MARYLAND STATE HIGHWAY DETAILS FOR CHAIN LINK FENCING. THE SPECIFICATION FOR A 6' FENCE SHALL BE USED, SUBSTITUTING 42" FABRIC AND 6' LENGTH POSTS.
2. CHAIN LINK FENCE SHALL BE FASTENED SECURELY TO THE FENCE POSTS WITH WIRE TIES. THE LOWER TENSION WIRE, BRACE AND TRUSS RODS, DRIVE ANCHORS AND POST CAPS ARE NOT REQUIRED EXCEPT ON THE ENDS OF THE FENCE.
3. FILTER CLOTH SHALL BE FASTENED SECURELY TO THE CHAIN LINK FENCE WITH TIES SPACED EVERY 24" AT THE TOP AND MID SECTION.
4. FILTER CLOTH SHALL BE EMBEDDED A MINIMUM OF 8" INTO THE GROUND.
5. WHEN TWO SECTIONS OF FILTER CLOTH ADJOIN EACH OTHER, THEY SHALL BE OVERLAPPED BY 6" AND FOLDED.
6. MAINTENANCE SHALL BE PERFORMED AS NEEDED AND SILT BUILDUPS REMOVED WHEN "BULGES" DEVELOP IN THE SILT FENCE, OR WHEN SILT REACHES 50% OF FENCE HEIGHT
7. FILTER CLOTH SHALL BE FASTENED SECURELY TO EACH FENCE POST WITH WIRE TIES OR STAPLES AT TOP AND MID SECTION AND SHALL MEET THE FOLLOWING REQUIREMENTS FOR GEOTEXTILE CLASS F:

TENSILE STRENGTH	50 LBS/IN (MIN.)	TEST: MSMT 509
TENSILE MODULUS	20 LBS/IN (MIN.)	TEST: MSMT 509
FLOW RATE	0.3 GAL/FT²/MINUTE (MAX.)	TEST: MSMT 322
FILTERING EFFICIENCY	75% (MIN.)	TEST: MSMT 322

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	PAGE H – 25 – 3	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

DETAIL 24 - STABILIZED CONSTRUCTION ENTRANCE



CONSTRUCTION SPECIFICATION

1. LENGTH – MINIMUM OF 50' (* 30' FOR A SINGLE RESIDENCE LOT).
2. WIDTH – 10' MINIMUM, SHOULD BE FLARED AT THE EXISTING ROAD TO PROVIDE A TURNING RADIUS.
3. GEOTEXTILE FABRIC (FILTER CLOTH) SHALL BE PLACED OVER THE EXISTING GROUND PRIOR TO PLACING STONE. ** THE PLAN APPROVAL AUTHORITY MAY NOT REQUIRE SINGLE FAMILY RESIDENCES TO USE GEOTEXTILE.
4. STONE – CRUSHED AGGREGATE (2" TO 3") OR RECLAIMED OR RECYCLED CONCRETE EQUIVALENT SHALL BE PLACED AT LEAST 6" DEEP OVER THE LENGTH AND WIDTH OF THE ENTRANCE.
5. SURFACE WATER – ALL SURFACE WATER FLOWING TO OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED THROUGH THE ENTRANCE, MAINTAINING POSITIVE DRAINAGE. PIPE INSTALLED THROUGH THE STABILIZED CONSTRUCTION ENTRANCE SHALL BE PROTECTED WITH A MOUNTABLE BERM WITH 5:1 SLOPES AND A MINIMUM OF 6" OF STONE OVER THE PIPE. PIPE HAS TO BE SIZED ACCORDING TO THE DRAINAGE. WHEN THE SCE IS LOCATED AT A HIGH SPOT AND HAS NO DRAINAGE TO CONVEY, A PIPE WILL NOT BE NECESSARY. PIPE SHOULD BE SIZED ACCORDING TO THE AMOUNT OF RUNOFF TO BE CONVEYED. A 6" MINIMUM WILL BE REQUIRED.
6. LOCATION – A STABILIZED CONSTRUCTION ENTRANCE SHALL BE LOCATED AT EVERY POINT WHERE CONSTRUCTION TRAFFIC ENTERS OR LEAVES A CONSTRUCTION SITE. VEHICLES LEAVING THE SITE MUST TRAVEL OVER THE ENTIRE LENGTH OF THE STABILIZED CONSTRUCTION ENTRANCE.

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	PAGE F – 17 – 3	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 6/29/06

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 7/11/06

DIRECTOR — DATE 7/14/06

REVIEWED FOR HOWARD SCD AND MEETS TECHNICAL REQUIREMENTS

USDA-NATURAL RESOURCES CONSERVATION SERVICE — DATE 6/15/06

THIS DEVELOPMENT PLAN IS APPROVED FOR SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT

HOWARD SCD — DATE 6/15/06

ENGINEERS CERTIFICATE

"I CERTIFY THAT THIS PLAN FOR SEDIMENT AND EROSION CONTROL REPRESENTS A PRACTICAL AND WORKABLE PLAN BASED ON MY PERSONAL KNOWLEDGE OF THE SITE CONDITIONS AND THAT IT WAS PREPARED IN ACCORDANCE WITH THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT.

ROBERT H. VOGEL, PE #16193 — DATE 6/1/06

DEVELOPER'S CERTIFICATE

"I/WE CERTIFY THAT ALL DEVELOPMENT AND CONSTRUCTION WILL BE DONE ACCORDING TO THIS PLAN FOR SEDIMENT AND EROSION CONTROL, AND THAT ALL RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF ATTENDANCE AT A DEPARTMENT OF THE ENVIRONMENT APPROVED TRAINING PROGRAM FOR THE CONTROL OF SEDIMENT AND EROSION BEFORE BEGINNING THE PROJECT. I ALSO AUTHORIZE PERIODIC ON-SITE INSPECTION BY THE HOWARD SOIL CONSERVATION DISTRICT.

HIGHLAND CROSSING, L.L.C. — DATE 6/1/06

OWNER / DEVELOPER

HIGHLAND CROSSING, L.L.C.
14190 TWISTING LANE
DAYTON, MD 21036

NO.	REVISION	DATE

SEDIMENT AND EROSION CONTROL DETAILS
HIGHLAND CROSSING

TAX MAP 40 BLOCK 5
5TH ELECTION DISTRICT

PARCEL A
HOWARD COUNTY, MARYLAND

ROBERT H. VOGEL ENGINEERING, INC.
ENGINEERS • SURVEYORS • PLANNERS
8407 MAIN STREET
ELLICOTT CITY, MD 21043
TEL: 410.461.7666
FAX: 410.461.8961

STATE OF MARYLAND — ROBERT HARRIS VOGEL — No. 16193 — PROFESSIONAL ENGINEER

ROBERT H. VOGEL, PE #16193

DESIGN BY:	RHV/LJT
DRAWN BY:	LJT
CHECKED BY:	RHV
DATE:	JUNE 1, 2006
SCALE:	
W.O. NO.:	04-12.00

SHEET 8 OF 11

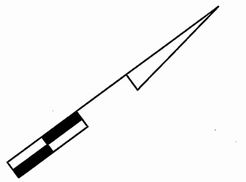
SDP-05-108

DRILL HOLES

BORDER REV: DATE: June 1, 2004

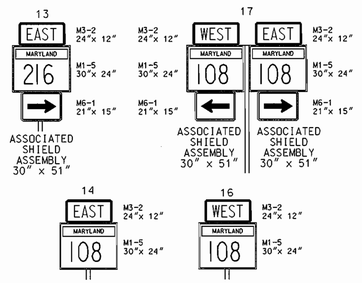
DRILL HOLES

DRILL HOLES

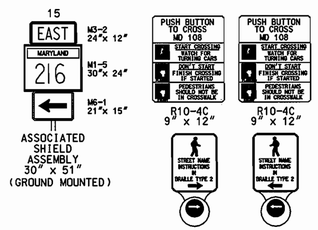


NOTE: MD 108 IS CONSIDERED TO RUN IN AN EAST-WEST DIRECTION.

EXISTING SIGNS

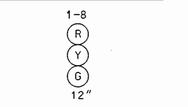


PROPOSED SIGN

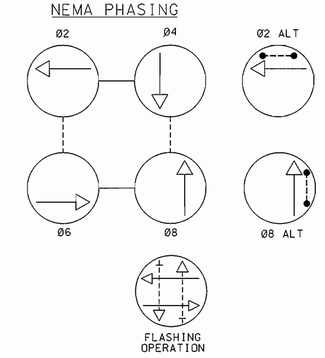


PROPOSED SIGNALS

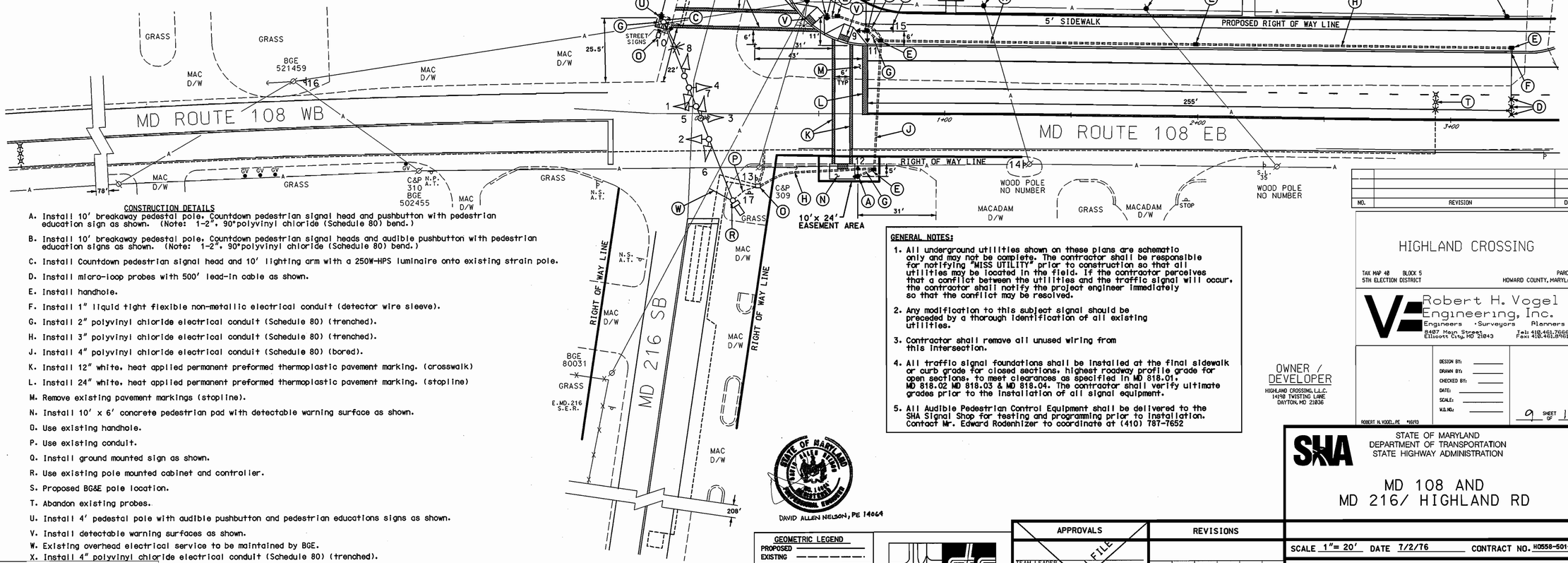
EXISTING SIGNALS



NEMA PHASING



PHASING NOTES:
1.) PHASES ASSOCIATED BY A DASHED LINE WILL OPERATE CONCURRENTLY
2.) PHASES ASSOCIATED BY A SOLID LINE WILL NOT OPERATE CONCURRENTLY



CONSTRUCTION DETAILS

A. Install 10' breakaway pedestal pole. Countdown pedestrian signal head and pushbutton with pedestrian education sign as shown. (Note: 1-2", 90°polyvinyl chloride (Schedule 80) bend.)

B. Install 10' breakaway pedestal pole. Countdown pedestrian signal heads and audible pushbutton with pedestrian education signs as shown. (Note: 1-2", 90°polyvinyl chloride (Schedule 80) bend.)

C. Install Countdown pedestrian signal head and 10' lighting arm with a 250W-HPS luminaire onto existing strain pole.

D. Install micro-loop probes with 500' lead-in cable as shown.

E. Install handhole.

F. Install 1" liquid tight flexible non-metallic electrical conduit (detector wire sleeve).

G. Install 2" polyvinyl chloride electrical conduit (Schedule 80) (trenched).

H. Install 3" polyvinyl chloride electrical conduit (Schedule 80) (trenched).

J. Install 4" polyvinyl chloride electrical conduit (Schedule 80) (bored).

K. Install 12" white, heat applied permanent preformed thermoplastic pavement marking. (crosswalk)

L. Install 24" white, heat applied permanent preformed thermoplastic pavement marking. (stopline)

M. Remove existing pavement markings (stopline).

N. Install 10' x 6' concrete pedestrian pad with detectable warning surface as shown.

O. Use existing handhole.

P. Use existing conduit.

Q. Install ground mounted sign as shown.

R. Use existing pole mounted cabinet and controller.

S. Proposed BG&E pole location.

T. Abandon existing probes.

U. Install 4' pedestal pole with audible pushbutton and pedestrian educations signs as shown.

V. Install detectable warning surfaces as shown.

W. Existing overhead electrical service to be maintained by BGE.

X. Install 4" polyvinyl chloride electrical conduit (Schedule 80) (trenched).

GENERAL NOTES:

1. All underground utilities shown on these plans are schematic only and may not be complete. The contractor shall be responsible for notifying "MISS UTILITY" prior to construction so that all utilities may be located in the field. If the contractor perceives that a conflict between the utilities and the traffic signal will occur, the contractor shall notify the project engineer immediately so that the conflict may be resolved.
2. Any modification to this subject signal should be preceded by a thorough identification of all existing utilities.
3. Contractor shall remove all unused wiring from this intersection.
4. All traffic signal foundations shall be installed at the final sidewalk or curb grade for closed sections, highest roadway profile grade for open sections, to meet clearances as specified in MD 818.01, MD 818.02 MD 818.03 & MD 818.04. The contractor shall verify ultimate grades prior to the installation of all signal equipment.
5. All Audible Pedestrian Control Equipment shall be delivered to the SHA Signal Shop for testing and programming prior to installation. Contact Mr. Edward Rodenhizer to coordinate at (410) 787-7652

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 7/11/06

DIRECTOR — DATE 7/17/06

DAVID ALLEN NELSON, PE 14064

GEOMETRIC LEGEND
PROPOSED
EXISTING

LEGEND OF UNDERGROUND AND OVERHEAD UTILITIES
AERIAL CABLE — A — A —
ELECTRIC — E — E —
TELEPHONE — T — T —
GAS — G — G —
SEWER — S — S —
WATER — W — W —
CABLE TV — TV — TV —

STREET TRAFFIC STUDIES, LTD.
400 Crain Hwy. N.W.
Glen Burnie, MD 21061
Ph (410) 590-5500
Fax (410) 590-6637

4884.dgn

APPROVALS

TEAM LEADER — ORIGINAL ON FILE

ASST. DIV. CHIEF

DIVISION CHIEF

OFFICE DIRECTOR

REVISIONS

NO.	REVISION	DATE
E	12-27-05 ADD PEDS CROSSING EAST & NORTH LEGS S.H.A.NO.: BW996M82	
D	ASBUILT	5-10-96
	S.H.A.NO.: AW-794-501-785	

R.R.Z.
FJH

PLOTTED: @DATETIME@
FILE: @FILE@

HIGHLAND CROSSING

TAX MAP 48 BLOCK 5 PARCEL A
5TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND

Robert H. Vogel Engineering, Inc.
Engineers · Surveyors · Planners
8407 Main Street, Ellicott City, MD 21043
Tel: 410.461.7666 Fax: 410.461.8961

DESIGN BY:
DRAWN BY:
CHECKED BY:
DATE:
SCALE:
W.O. NO.:

ROBERT H. VOGEL, PE #16193

OWNER / DEVELOPER
HIGHLAND CROSSING, L.L.C.
14198 TWISTING LANE
DAYTON, MD 21036

STATE OF MARYLAND
DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION

MD 108 AND MD 216/ HIGHLAND RD

SCALE 1"= 20' DATE 7/2/76 CONTRACT NO. H0558-501-785

DESIGNED BY J GORDON
DRAWN BY J GORDON
CHECKED BY A BUDNICHUCK
F.A.P. NO.

COUNTY HOWARD
LOGMILE 13010801.53
TIMS NO. H222
TOD NO.

TS NO. 1436E | DRAWING NO. 1 OF 3 | SHEET NO. 9 OF 11

SHEET 9 OF 11

SDP-05-108

DRILL HOLES

BORDER REV: DATE: June 1, 2004

DRILL HOLES

DRILL HOLES

PROJECT DESCRIPTION

I. GENERAL

This project involves the modification of an existing Traffic Control Signal with street lighting at the intersection of MD 108 and MD 216 / Highland Rd in Howard County. Countdown pedestrian signal heads with audible pedestrian pushbuttons shall be installed across Highland Rd and the east leg of MD 108. MD 108 is assumed to run an east-west direction.

II. INTERSECTION OPERATION

1. The intersection shall continue to operate in a NEMA four-phase, fully-actuated mode, with the MD 216 approaches running concurrently. A new Countdown pedestrian phase with audible pushbutton actuation shall be provided across the east leg of MD 108. A new Countdown pedestrian phase with audible pushbutton actuation shall be provided across Highland Road. The Highland Road / MD 216 approaches shall also continue to run concurrently.

2. The existing full-traffic-actuated, eight-phase controller with three (3) two channel, loop detector amplifiers,and all necessary equipment housed in a NEMA size "5" pole-mounted cabinet shall be maintained at this intersection. An Audible Pedesrian Control Unit shall be instaled into the cabinet by the SHA.

III. SPECIAL NOTES

1. The Contractor shall be responsible for terminating all signal cables, to the appropriate terminals and shall properly label each cable.

2. All controller cabinet wiring will be performed by the S.H.A. Signal Shop Contact Mr. Ed Rodenhizer at (410) 787-7650 seventy-two hours in advance of intended work.

3. All underground and overhead utilities shown on these plans are schematic only and may not be complete. The Contractor shall be responsible for notifying Miss Utility prior to construction so that all utilities may be located in the field. If the Contractor perceives that a conflict between the utilities and the traffic signal will occur, the Contractor shall notify the Project Engineer immediately so that the conflict may be resolved.

4. SHA signal shop shall install the APS control unit into the controller cabinet.

The contact persons for District #7 are as follows:

Mr. John Concannon
Assistant District Engineer - Traffic
Phone: (310) 624-8141

Mr. Ray Johnson
Assistant District Engineer - Maintenance
Phone: (310) 624-8106

Ms Andrea Abend
District Engineer - Utility
Phone: (301) 624-8110

Mr. Richard L. Daff, Sr.
Chief, Traffic Operations Division
Phone: (410) 787-7630

Mr. Ed Rodenhizer
Signal Shop
410-787-7652

Mr. Sonny Bailey
Sign Shop
410-787-7670

EQUIPMENT LIST

A. EQUIPMENT TO BE FURNISHED BY THE SHA

THERE IS NO EQUIPMENT TO BE SUPPLIED BY THE SHA.

B. EQUIPMENT TO BE FURNISHED AND/OR INSTALLED BY THE CONTRACTOR

SPEC. NUMBER	DESCRIPTION	QUANTITY	
814	16", one-way, LED (DW, W) symbolic pedestrian signal head with adjustable bracket for pole mouting and cutaway visors. (Countdown Display)	4	EA
205	Test pit excavation.	4	C.Y.
206	Remove asphalt curb & gutter.	10	S.F.
	Depressed asphalt curb & gutter.	10	L.F.
610	4" concrete sidewalk.	60	S.F.
801	Furnish and install concrete for signal foundation.	4	C.Y.
813	Ground mounted sheet aluminum signs to consist of:	10.5	S.F.
	GUIDE SIGN (30"x51") M3-2 "EAST"(24"X12") M1-5 "MD 216"(30"X24") M6-1 "left arrow "(21"X15")	1	EA
556	5" white heat applied permanent preformed thermoplastic pavement marking	1140	L.F.
556	5" yellow heat applied permanent preformed thermoplastic pavement marking	45	L.F.
656	12" white heat applied permanent preformed thermoplastic pavement marking	230	L.F.
556	24" white heat applied permanent preformed thermoplastic pavement marking	55	L.F.
815	Saw cut for signal (loop detector).	20	L.F.

EQUIPMENT LIST

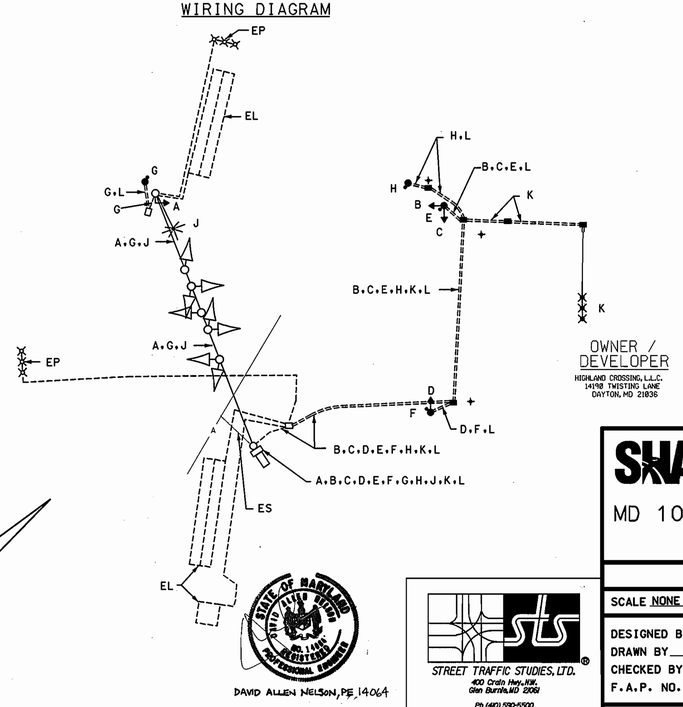
A. EQUIPMENT TO BE FURNISHED AND/OR INSTALLED BY THE CONTRACTOR

SPEC. NUMBER	DESCRIPTION	QUANTITY	
805	1" liquid tight flexible non-metallic conduit for detector sleeve.	10	L.F.
805	Furnish and install 2" schedule 80 rigid polyvinyl chloride - trenched	60	L.F.
805	Furnish and install 3" schedule 80 rigid polyvinyl chloride conduit - trenched	310	L.F.
805	Furnish and install 4" schedule 80 rigid polyvinyl chloride conduit - bored.	55	L.F.
811	Furnish and install electrical handhole.	5	EA
810	Furnish and install 2-conductor electrical cable (No. 14 A.W.G.).	525	L.F.
810	Furnish and install 5-conductor electrical cable (No. 14 A.W.G.).	520	L.F.
810	Furnish and install ground rod -¾" x 10'.	3	EA
810	Furnish and install No. 6 AWG stranded bare copper ground wire.	200	L.F.
810	Furnish and install tray cable - 2 conductor (No. 12 AWG)	125	L.F.
806	Furnish and install 250 watt HPS Luminaire with photocell.	1	EA
808	Furnish and install 10' lighting bracket arm for traffic signal structure.	1	EA
812	Furnish and install wood sign supports (4"x6").	16	L.F.
817	Furnish and install pushbutton and pedestrian education sign R10-4(1). (Note: Sign to read "PUSH BUTTON TO CROSS MD 108).	2	EA
817	Furnish and install pushbutton and pedestrian education sign R10-4(1). (Note: Sign to read "PUSH BUTTON TO CROSS HIGHLAND RD).	2	EA
	Class 2 Excavation	1	CY
	Audible/tactile pedestrian pushbutton.	4	EA
	Furnish and install 10' breakaway pedestal pole with transformer base.	2	EA
	Furnish and install 4' pedestal pole.	2	EA
	Detectable warning system (truncated domes).	24	SF
	2 wire Central Control unit	1	EA
	Furnish and install micro-loop with 500' lead-in.	1	EA
	Remove and dispose of existing signal equipment and material.	LUMP SUM	

PHASE CHART

	1	2	3	4	5	6	7	8	9	10	11	12	
	R Y G	R Y G	R Y G	R Y G	R Y G	R Y G	R Y G	R Y G					
PHASE 2 & 6	G	G	G	G	R	R	R	R	DW	DW	DW	DW	
2 & 6 CHANGE	Y	Y	Y	Y	R	R	R	R	DW	DW	DW	DW	
PHASE 2 & 6 ALT	G	G	G	G	R	R	R	R	WK	WK	DW	DW	
PED CLEAR / COUNTDOWN	G	G	G	G	R	R	R	R	FL/DW	FL/DW	DW	DW	
2 & 6 ALT CHANGE	Y	Y	Y	Y	R	R	R	R	DW	DW	DW	DW	
PHASE 4 & 8	R	R	R	R	G	G	G	G	DW	DW	DW	DW	
4 & 8 CHANGE	R	R	R	R	Y	Y	Y	Y	DW	DW	DW	DW	
PHASE 4 & 8 ALT	R	R	R	R	G	G	G	G	DW	DW	WK	WK	
PED CLEAR / COUNTDOWN	R	R	R	R	G	G	G	G	DW	DW	FL/DW	FL/DW	
4 & 8 ALT CHANGE	R	R	R	R	Y	Y	Y	Y	DW	DW	DW	DW	
FLASHING OPERATION	FL/Y	FL/Y	FL/Y	FL/Y	FL/R	FL/R	FL/R	FL/R	DARK	DARK	DARK	DARK	

WIRING DIAGRAM



WIRING KEY

A, B, C, D, E, F, G, H, J, K, L - 5-CONDUCTOR ELECTRICAL CABLE (NO. 14 A.W.G)

EP - 2-CONDUCTOR ELECTRICAL CABLE (NO. 14 A.W.G)

J - 2-CONDUCTOR TRAY CABLE (NO. 12 A.W.G)

K - MICROLOOP LEAD-IN CABLE (500')

L - STRANDED BARE COPPER GROUND WIRE (NO. 6 A.W.G.)

EP - EXISTING MICROPROBE

EL - EXISTING LOOP

ES - EXISTING OVERHEAD SERVICE TO BE MAINTAINED BY BGE

+ - GROUND ROD

OWNER / DEVELOPER
HIGHLAND CROSSING, L.L.C.
14198 TWISTING LANE
DAYTON, MD 21036

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 6/16/06

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 7/11/06

DIRECTOR — DATE 7/17/06

DAVID ALLEN NELSON, PE 14064

STATE OF MARYLAND — EXPIRES: 07-09-2006 — PROFESSIONAL ENGINEER

STREET TRAFFIC STUDIES, LTD.
400 Crain Hwy.NW.
Glen Burnie,MD 21061
Ph (410) 590-5500
Fax (410) 590-5637

4884.dgn

NO.	REVISION	DATE

HIGHLAND CROSSING

TAX MAP 48 BLOCK 5 — PARCEL: A
5TH ELECTION DISTRICT — HOWARD COUNTY, MARYLAND

Robert H. Vogel Engineering, Inc.
Engineers · Surveyors · Planners
8407 Main Street, Ellicott City, MD 21043
Tel: 410.461.2666 Fax: 410.461.2961

DESIGN BY:
DRAWN BY:
CHECKED BY:
DATE:
SCALE:
W.O. NO.:

ROBERT H. VOGEL, PE #15193

10 SHEET OF 11

STATE OF MARYLAND
DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION

SHA

MD 108 AT MD 216/ HIGHLAND RD

SCALE NONE DATE 12/27/05 CONTRACT NO.

DESIGNED BY R ZACHERL — COUNTY HOWARD
DRAWN BY ROB CICCHINI — LOGMILE 13010801.53
CHECKED BY — TIMS NO. H222
F.A.P. NO. — TOD NO.

TS NO. 1436B | DRAWING NO. 2 OF 3 | SHEET NO. 10 OF 11

PLOTTED: $DATETIME$
FILE: $FILE$

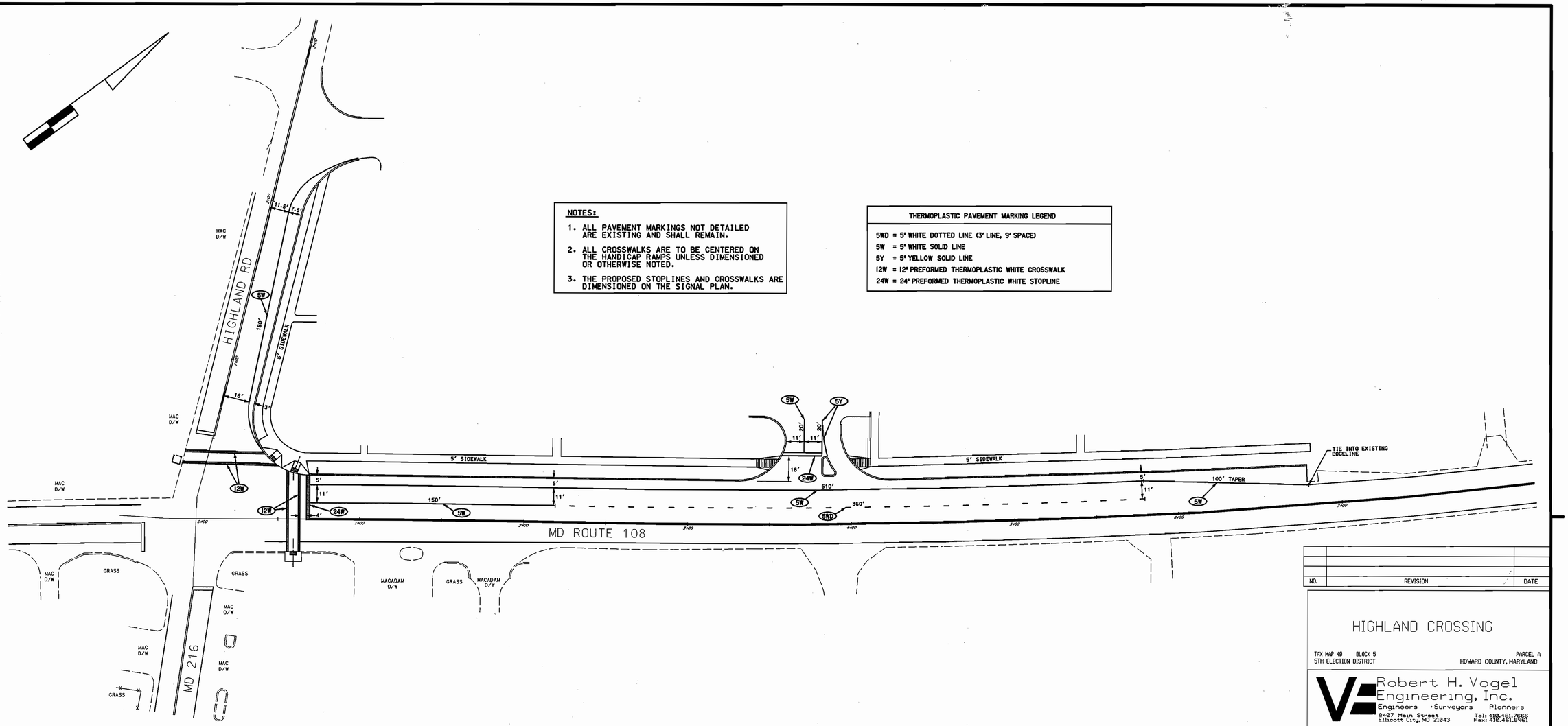
SDP-05-108

DRILL HOLES

BORDER REV: DATE: June 1, 2004

DRILL HOLES

DRILL HOLES



NOTES:

1. ALL PAVEMENT MARKINGS NOT DETAILED ARE EXISTING AND SHALL REMAIN.
2. ALL CROSSWALKS ARE TO BE CENTERED ON THE HANDICAP RAMPS UNLESS DIMENSIONED OR OTHERWISE NOTED.
3. THE PROPOSED STOPLINES AND CROSSWALKS ARE DIMENSIONED ON THE SIGNAL PLAN.

THERMOPLASTIC PAVEMENT MARKING LEGEND

5WD	= 5" WHITE DOTTED LINE (3' LINE, 9' SPACE)
5W	= 5" WHITE SOLID LINE
5Y	= 5" YELLOW SOLID LINE
12W	= 12" PREFORMED THERMOPLASTIC WHITE CROSSWALK
24W	= 24" PREFORMED THERMOPLASTIC WHITE STOPLINE

NO.	REVISION	DATE

HIGHLAND CROSSING

TAX MAP 48 BLOCK 5 PARCEL A
5TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND

Robert H. Vogel Engineering, Inc.
Engineers · Surveyors · Planners
8407 Main Street Tel: 410.461.7666
Ellicott City, MD 21043 Fax: 410.461.8961

DESIGN BY:
DRAWN BY:
CHECKED BY:
DATE:
SCALE:
W.O. NO.:

ROBERT H. VOGEL, PE #16193

SHEET 11 OF 11

OWNER / DEVELOPER

HIGHLAND CROSSING, L.L.C.
14190 TWISTING LANE
DAYTON, MD 21036

STATE OF MARYLAND
DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION

SHA

MD 108 AT MD 216/ HIGHLAND RD

PAVEMENT MARKING PLAN

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 7/14/06

DIRECTOR — DATE 7/14/06

DAVID ALLEN NELSON, PE 14064

GEOMETRIC LEGEND

PROPOSED
EXISTING

LEGEND OF UNDERGROUND AND OVERHEAD UTILITIES

AERIAL CABLE	A — A
ELECTRIC	E — E
TELEPHONE	T — T
GAS	G — G
SEWER	S — S
WATER	W — W
CABLE TV	TV — TV

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Glen Burnie, MD 21061
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Fax (410) 590-5637

APPROVALS	
TEAM LEADER	ORIGINAL ON FILE
ASST. DIV. CHIEF	
DIVISION CHIEF	
OFFICE DIRECTOR	

REVISIONS

PLOTTED: &DATETIME&
FILE: &FILE&

SCALE 1"= 30' DATE 4-4-06 CONTRACT NO. H0558-501-785

DESIGNED BY R R ZACHERL COUNTY HOWARD
DRAWN BY W J NIES LOGMILE 13010801.53
CHECKED BY TIMS NO.
F.A.P. NO. TOD NO.

TS NO. 1436B | DRAWING NO. 3 OF 3 | SHEET NO. 11 OF 11

SDP-05-108