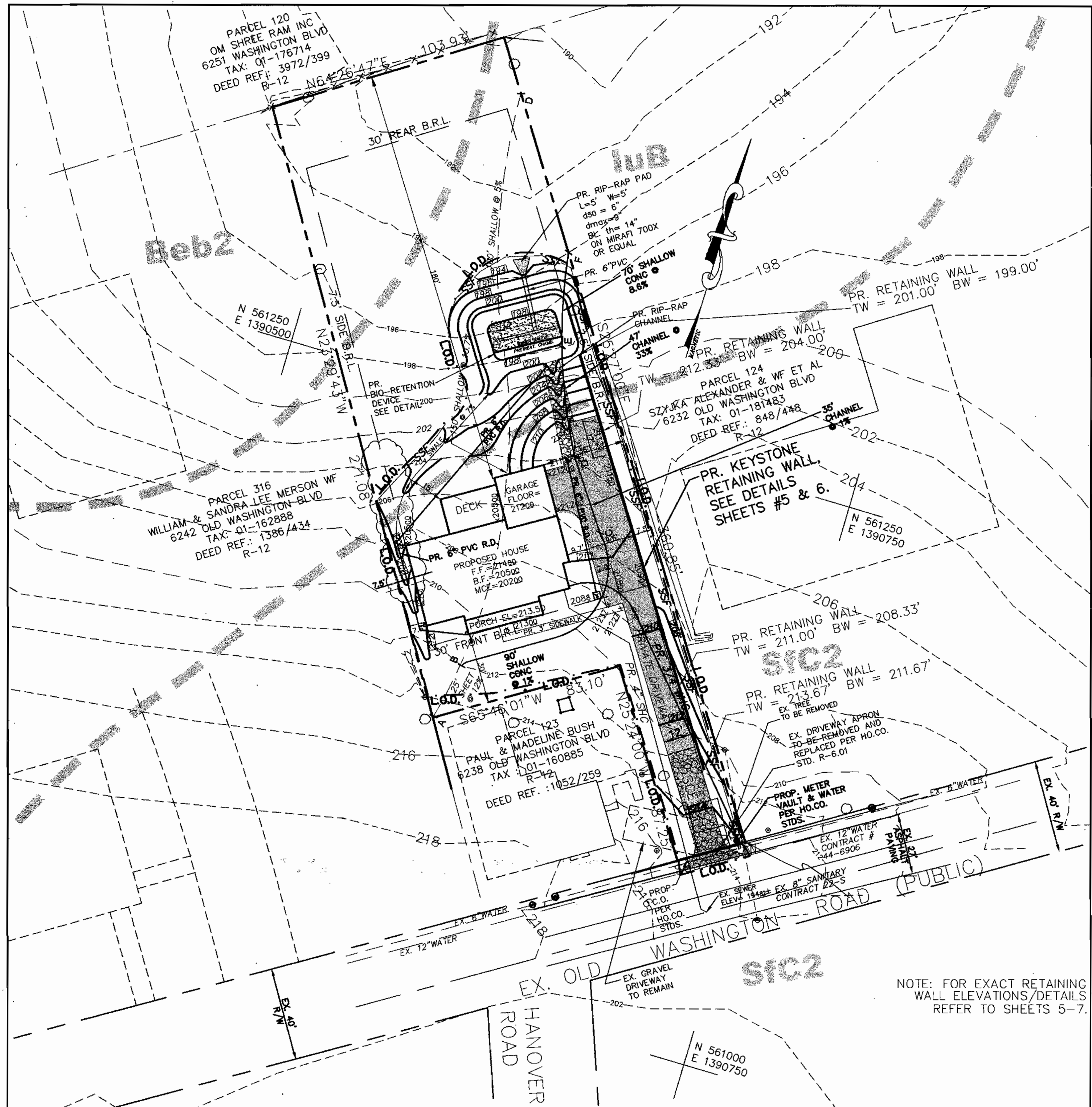


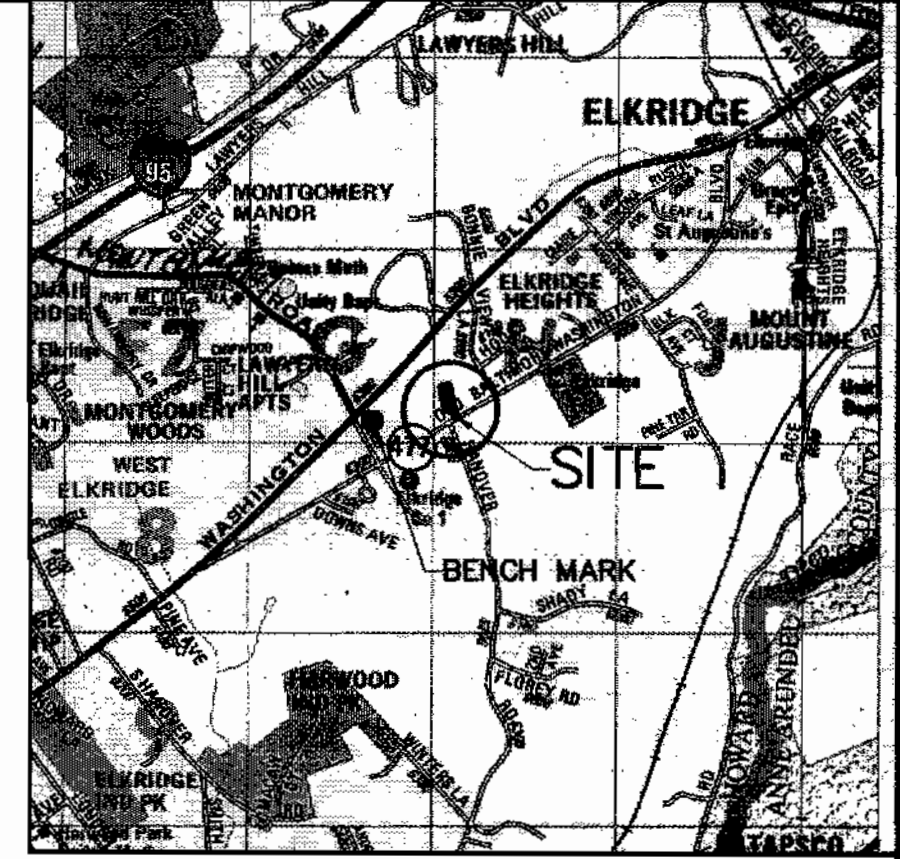
# SITE DEVELOPMENT PLAN FOR BLACK RESIDENCE 1st ELECTION DISTRICT HOWARD COUNTY, MARYLAND

- ### CONSTRUCTION NOTES
- No sediment and erosion control devices may be removed without prior approval from the Howard County inspector.
  - Stabilize any disturbed area as soon as possible by permanent or temporary means.
  - All temporary stock piles and excess material shall be removed to an approved spill site. All borrow material shall be obtained from an approved site.
  - It shall be the responsibility of the contractor or subcontractor to notify the engineer of any deviation to these plans prior to any change being made. Any change in these plans without the written authorization for said change from the engineer shall be the responsibility of the contractor or subcontractor.
  - Utilities shown on these plans are in accordance with the best information available for the contractor. The contractor shall be responsible for locating and protecting all existing services and mains (public or private). The contractor shall obtain the services of a private utility locator to locate all existing private services and mains. The owners and engineer assume no responsibility for accuracy or completeness of the information shown. Existing mains and services shall be carefully protected and any damage to them caused by the work shall be immediately reported to the satisfaction of the engineer by the contractor at the contractor's expense, using materials of the kinds damaged.
  - The contractor shall call "MISS UTILITY", 1-800-257-7777, a minimum of 48 hours in advance of any excavation, boring, and/or digging to determine the location of underground utilities.
  - The contractor shall grade all areas within the area of construction and shall warp paving as necessary to insure positive drainage.
  - The Contractor shall be responsible for coordination of his construction with the construction by other contractors and subcontractors.
  - All soil erosion control measures shall be in accordance with the "1994 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL".
  - Failure to specifically mention items which would normally be required to complete the work and develop this site in accordance with the approved plans, shall not relieve the contractor from performing such work. This work shall be part of the contractors base bid.

- ### GENERAL NOTES
- THE SUBJECT PROPERTY IS ZONED R-12 PER 2/2/04 COMPREHENSIVE ZONING PLAN.
  - COORDINATES BASED ON NAD'83, THE MARYLAND COORDINATE SYSTEM AS PROJECTED BY HOWARD COUNTY GEODETIC CONTROL STATION NO. 38AA.
  - B.R.L. DENOTES BUILDING RESTRICTION LINE.
  - DEED REFERENCE: LIBER 474 FOLIO 419.
  - FOR FLAG OR PIPESTEM LOTS, REFUSE COLLECTION, SNOW REMOVAL AND ROAD MAINTENANCE ARE PROVIDED TO THE JUNCTION OF THE FLAG OR PIPESTEM AND THE RIGHT-OF-WAY LINE AND NOT TO THE PIPESTEM LOT DRIVEWAY.
  - DRIVEWAYS SHALL BE PROVIDED PRIOR TO ISSUANCE OF A USE AND OCCUPANCY PERMIT FOR ANY NEW DWELLINGS TO INSURE SAFE ACCESS FOR FIRE AND EMERGENCY VEHICLES PER THE FOLLOWING MINIMUM REQUIREMENTS:
    - WIDTH: 12 FT. (14 FT. SERVING MORE THAN ONE RESIDENCE).
    - SURFACE: 6 IN. OF COMPACT CRUSHER RUN BASE WITH TAR AND CHIP COATING.
    - GEOMETRY: MAXIMUM 15% GRADE, MAXIMUM 10% GRADE CHANGE AND MINIMUM 45 FT. TURNING RADIUS.
    - STRUCTURES: (CULVERTS AND BRIDGES) CAPABLE OF SUPPORTING 25 GROSS TONS-H2S LOADING.
    - DRAINAGE ELEMENTS: CAPABLE OF SAFELY PASSING A 100 YEAR FLOOD-WITH NO MORE THAN ONE FT. DEPTH OVER DRIVEWAY SURFACE.
    - MAINTENANCE: SUFFICIENT TO INSURE ALL WEATHER USE.
  - THIS PLAN IS BASED ON A FIELD-RUN MONUMENTED BOUNDARY SURVEY PERFORMED ON OR ABOUT MARCH 2004 BY DESIGN TECH ASSOCIATES, INC.
  - THE AREAS SHOWN ON THIS PLAN ARE INDICATED (±) MORE OR LESS.
  - WATER AND SEWER SERVICE TO THIS LOT WILL BE GRANTED UNDER PROVISIONS OF SECTION 16.122 B OF THE HOWARD COUNTY CODE. PUBLIC WATER AND SEWAGE ALLOCATION WILL BE GRANTED AT THE TIME OF ISSUANCE OF THE BUILDING PERMIT IF CAPACITY IS AVAILABLE AT THAT TIME.
  - PUBLIC WATER SERVICE WILL BE PROVIDED TO THIS LOT BY HOUSE CONNECTIONS TO CONTRACT NO. 44-0906. PUBLIC SEWER SERVICE WILL BE PROVIDED TO THIS LOT BY HOUSE CONNECTIONS TO CONTRACT NO. 22-5.
  - WATER AND SEWER CONNECTIONS SHALL BE COMPLETED IN ACCORDANCE WITH THE LAYOUT AS SHOWN HEREON.
  - THERE ARE NO WETLANDS ON SITE AND THE PROPERTY IS NOT LOCATED WITHIN THE 100-YEAR FLOODPLAIN.
  - THIS PROPERTY IS EXEMPT FROM FOREST CONSERVATION PER SECTION 16.1202(b)(1) BECAUSE THIS PARCEL IS LESS THAN 40,000 SQUARE FEET IN AREA.
  - THERE ARE NO ENVIRONMENTALLY SENSITIVE FEATURES OR BUFFERS ON THIS SITE.
  - LANDSCAPING HAS BEEN PROVIDED IN ACCORDANCE WITH SECTION 16.124 OF THE HOWARD COUNTY LANDSCAPE CODE AND THE LANDSCAPE MANUAL. SURETY IN THE AMOUNT OF \$5,130.00 WILL BE POSTED WITH THE GRADING PERMIT APPLICATION FOR 15 SHADE TREES AND 21 EVERGREEN SHRUBS.
  - IN ACCORDANCE WITH SECT. 12B 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 SETBACK, PORCHES OR DECK, OPEN OR ENCLOSED MAY PROJECT NOT MORE THAN 10 FEET INTO THE FRONT OR REAR SETBACKS.
  - THE PURPOSE OF THE RETAINING WALL ALONG THE 7.5' SETBACK LINE IS TO PROVIDE ADEQUATE VEHICULAR ACCESS INTO THE GARAGE. THE RETAINING WALL ALONG THAT LINE COMPLIES WITH THE SIDE SETBACK REQUIREMENTS, SINCE THE WALL WILL NOT EXCEED 3 FEET IN HEIGHT.
  - PARCELS 808 & 123 HAVE A PRIVATE AGREEMENT TO UTILIZE THE DRIVEWAY. THERE IS NO SHARED USE-IN-COMMON ACCESS EASEMENT OR MAINTENANCE EASEMENT BETWEEN THE OWNERS.
  - All construction shall be in accordance with the latest standards and specifications of Howard County, plus MSHA standards and specifications, as applicable.
  - 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 the start of work.
  - The contractor shall notify "MISS UTILITY" at 1-800-257-7777 at least 48 hours prior to any excavation work being done.
  - The existing topography is taken from a field run topographic survey by Design Tech Associates dated March 2004.
  - 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 any work being done in the public road.
  - All plan dimensions are to edge of paving and face of building unless otherwise noted.
  - The coordinates shown hereon are based upon the Howard County Geodetic Control which is based upon the Maryland State Plane Coordinate System. Howard County monument 38AA 31st and 37th.
  - Existing utilities are based on Howard County Record Drawings for contract 44-0906.
  - Storm water management for this project is provided by an on-site system.
  - A noise study is not required for this project.
  - Contractor is solely responsible for construction means, methods, techniques, sequences, procedures, and safety precautions and programs.
  - All pipe elevations shown are invert elevations.
  - All fill areas within roadway and under structures to be compacted to a minimum of 95% compaction of AASHTO T160.



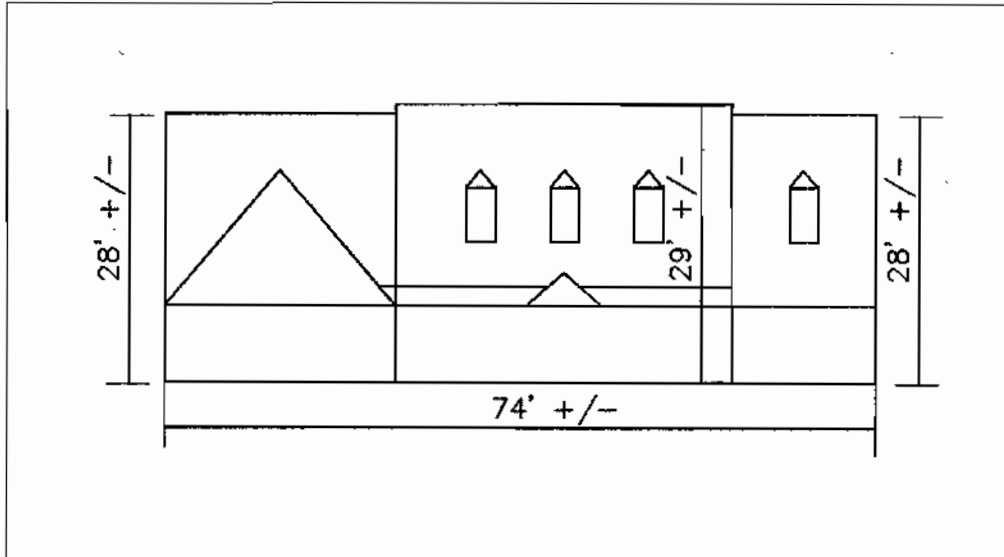
PLAN VIEW  
SCALE: 1" = 30'



VICINITY MAP  
SCALE: 1" = 2000'

### SITE ANALYSIS DATA CHART

TOTAL PROJECT AREA:	32,320 SQ. FT. (0.742 AC)
LIMIT OF DISTURBED AREA:	14,152 SQ. FT. (0.325 AC)
PRESENT ZONING DESIGNATION:	R-12
PROPOSED USE:	SINGLE FAMILY DWELLING
TOTAL NUMBER OF UNITS ALLOWED:	1
TOTAL NUMBER OF UNITS PROPOSED:	1
NUMBER OF PARKING SPACES REQUIRED:	2
NUMBER OF PARKING SPACES PROVIDED:	2
BUILDING COVERAGE OF SITE:	3,373 SQ. FT. (10.5%)



BUILDING ELEVATION  
SCALE: 1" = 20'

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

*Paul D'Angelo* 4/16/04  
DIRECTOR DATE

*W.D. Williams* 3/7/05  
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

*Andy Hanania* 3/15/05  
CHIEF, DIVISION OF LAND DEVELOPMENT DATE

OWNER: CHARLES & BONNIE BLACK  
319 FAIRFIELD DRIVE  
SEVERN, MD. 21144

DEVELOPER: CHARLES & BONNIE BLACK  
319 FAIRFIELD DRIVE  
SEVERN, MD. 21144

PROJECT: BLACK RESIDENCE  
SINGLE FAMILY DETACHED DWELLING

TAX MAP 38, GRID 8, PARCEL 808  
1st ELECTION DISTRICT

WATER CODE 44-6906 SEWER CODE 22-5

TITLE SHEET

MESSICK & ASSOCIATES  
CONSULTING ENGINEERS  
31 OLD SOLOMONS ISLAND RD., SUITE 201  
ANNAPOLIS, MARYLAND 21401  
(410) 266-3212 \* FAX (410) 266-3502

DESIGNED BY: WAN  
DRAWN BY: COP  
PROJECT NO:  
DATE: MARCH, 2004  
SCALE: AS SHOWN  
DRAWING NO.: 1 OF 7

BENCH MARK #1  
HOWARD COUNTY, MD. MONUMENT 38AA  
VERTICAL DATUM: NAVD88  
ELEV. = 220.073  
HORIZONTAL DATUM: NAD83  
N 561,158.8557  
E 1,389,726.3306

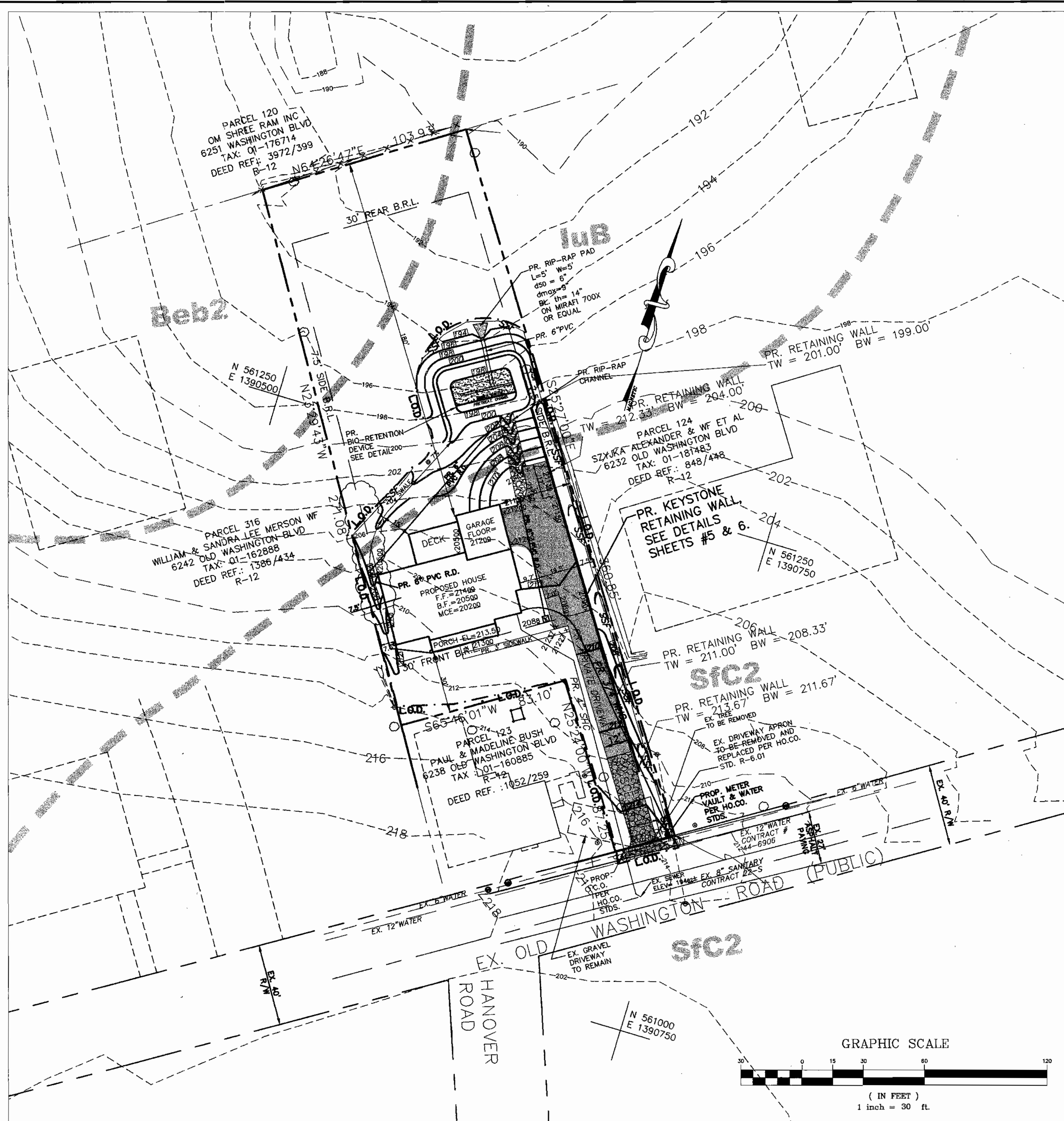
BENCH MARK #2  
HOWARD COUNTY, MD. MONUMENT 371A  
VERTICAL DATUM: NAVD88  
ELEV. = 195.75  
HORIZONTAL DATUM: NAD83  
N 490,906.0  
E 865,758.6  
(INTERSECTION OF MEADOWRIDGE RD & MD. RTE.1)

- ### SHEET INDEX
- TITLE SHEET
  - SITE DEVELOPMENT PLAN
  - NOTES AND DETAILS
  - LANDSCAPE PLAN
  - RETAINING WALL PLAN
  - RETAINING WALL PLAN
  - RETAINING WALL PLAN

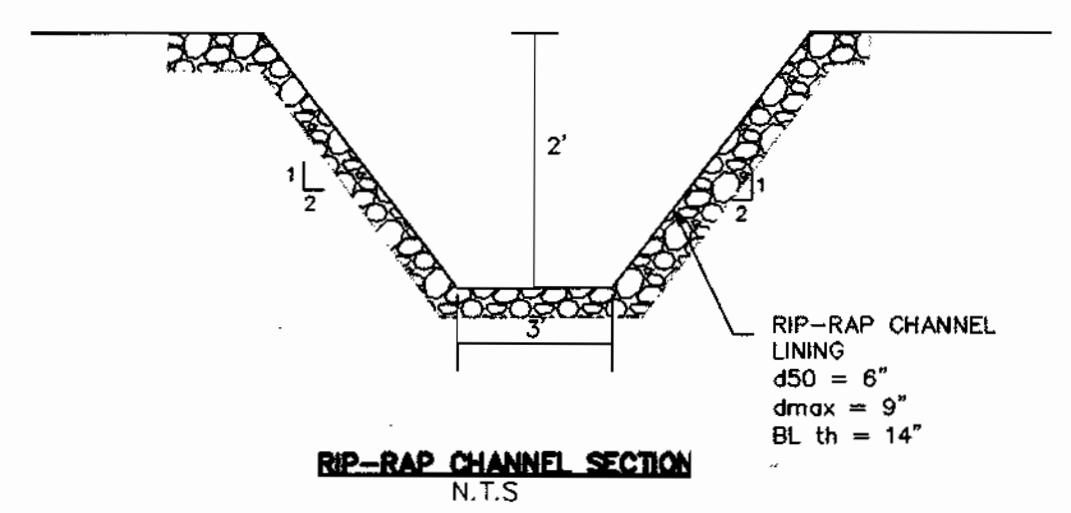
### ADDRESS CHART

PARCEL	STREET ADDRESS
808	6236 OLD WASHINGTON RD ELKRIDGE, MD 21075

SUBDIVISION NAME - N/A	SECT./AREA - N/A	PARCEL - 808
DEED REF - L474 F.419	GRID # - 8	ZONING - R-12
TAX MAP NO. - 38	ELECT. DIST. - 1st	CENSUS TRACT - 601201
WATER CODE - 44-0906	SEWER CODE - 22-5	



TYPE	DESCRIPTION
BeB2	Beltsville Silt loam, 5 to 15 percent slopes, moderately eroded.
luB	luka loam alluvion, 1 to 5 percent slopes.
SIC2	Sassafras Gravelly sandy loam, 5 to 10 percent slopes, moderately eroded.



**Chapter 3. Performance Criteria for Urban BMP Design** *Stormwater Filtration System*

**3.4.6 Filtration Maintenance Criteria**

The sediment chamber outlet device shall be cleaned/inspected when sediment times within the chamber exceed 60 hours. Trash and debris shall be removed as necessary.

Sediment should be cleaned out of the sedimentation chamber when it accumulates to a depth of more than six inches. Vegetation within the sedimentation chamber should be limited to a height of 18 inches.

When the filtering capacity of the filter deteriorates substantially (e.g., when water ponds on the surface of the filter bed for more than 72 hours), the top five inches of filter material shall be removed and shall be replaced with fresh material. The removed sediment should be disposed in an appropriate manner (e.g., landfill). Sediment should be removed from the filter bed when the accumulation exceeds one inch.

Organic filters (P-1) or surface sand filters (P-1) that have a grass cover should be mowed a minimum of 3 times per growing season to maintain maximum grass height less than 12 inches.

A drop of at least six inches shall be provided at the base of bio-retention facilities (P-6) storm drainages. Dead or dormant plant material shall be replaced. Areas devoid of mulch should be re-mulched on an annual basis.

Direct maintenance access shall be provided to the pretreatment area and the filter bed.

Construction of sand filters and bio-retention areas shall conform to the specifications included in Appendix B.1.

**Appendix B.3 Construction Specifications for Sand Filters, Bio-retention and Open Channels**

Areas are excavated using a loader, the contractor should use wide track or similar track equipment, or light equipment with turf type tires. Use of equipment with narrow tracks or narrow tires, rubber tires with large lugs, or high pressure tires will cause excessive compaction resulting in reduced infiltration rates and is not acceptable. Compaction will significantly contribute to design failure.

Compaction can be alleviated at the base of the bio-retention facility by using a primary filling operation such as a child plow, ripper, or subsoiler. These filling operations are to restructure the soil profile through the 12 inch compaction zone. Subsoiler methods must be approved by the engineer. Riprillers typically do not till deep enough to reduce the effects of compaction from heavy equipment.

Recoil 2 to 3 inches of sand into the base of the bio-retention facility before backfilling the required sand layer. Pump any ponded water before preparing (recoiling) base.

When backfilling the bio-retention facility, place soil in lifts 12" to 18". Do not use heavy equipment within the bio-retention basin. Heavy equipment can be used around the perimeter of the basin to supply soils and sand. Grate bio-retention materials with light equipment such as a compact loader or a dozer/loader with marsh tracks.

**4. Plant Material**

Recommended plant material for bio-retention areas can be found in Appendix A, Section A.2.3.

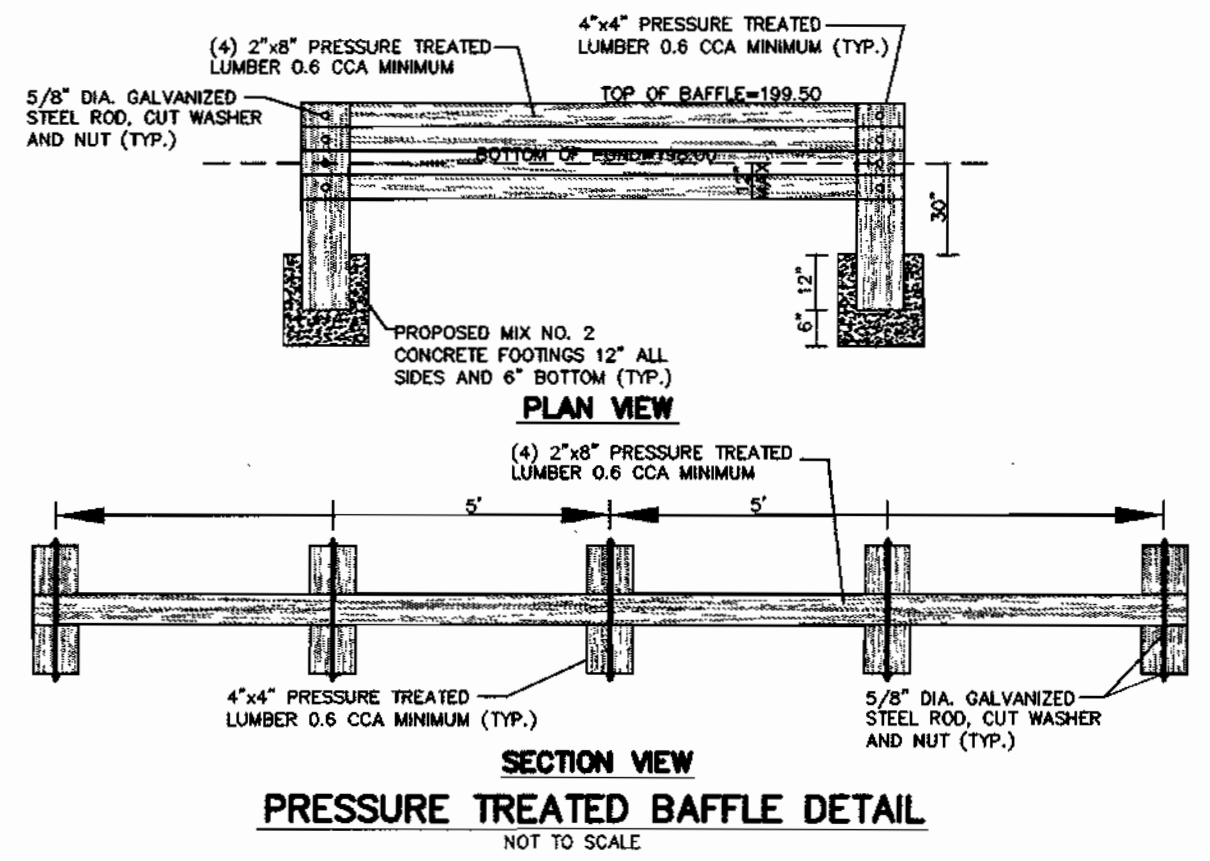
**5. Plant Installation**

Mulch should be placed to a uniform thickness of 2" to 3". Shredded hardwood mulch is the only accepted mulch. Fine mulch and wood chips will float and move to the perimeter of the bio-retention area during a storm event and are not acceptable. Shredded mulch must be well aged (6 to 12 months) for acceptance.

Root stock of the plant material shall be kept moist during transport and on-site storage. The plant root ball should be planted to 1/8" of the soil is above final grade surface. The diameter of the bio-retention area during a storm event and are not acceptable. Shredded mulch must be well aged (6 to 12 months) for acceptance.

Trees shall be braced using 2" by 2" stakes only as necessary and for the first growing season only. Stakes are to be equally spaced on the outside of the tree ball.

Material	Specifications	Size	Notes
Planting soil (2.5' to 4' deep)	sand 35 - 60% silt 30 - 25% clay 10 - 20%	n/a	plantings are site-specific
mulch	shredded hardwood	n/a	page 6, minimum
pre gravel diaphragm and curtain drain	pre gravel ASTM-D-468	pre gravel: No. 6 stone: 2" to 3"	
geotextile	Class "C" - apparent opening size (ASTM-D-4751), grad-able strength (ASTM-D-4032), puncture resistance (ASTM-D-4832)	n/a	for use as necessary beneath underdrains only
underdrain gravel	AASHTO M-43	0.25" to 0.75"	
underdrain piping	2" Type PS 28 or AASHTO M-278	4" to 6" rigid schedule 40 PVC or SDR33	24" perf. @ 6" on center, 4 holes per row; minimum of 2" of gravel over pipe; use necessary underdrain pipe
poured in place concrete (if required)	MSHA Min. No. 3, F <sub>c</sub> = 3500 psi @ 28 days, normal weight, air-entrained, meeting or meet ASTM-616-60	n/a	on-site testing of poured-in-place concrete required; 28 day strength and slump test; all concrete design (cast-in-place or precast) must using previously approved data or local standards requires design drawings sealed and approved by a professional structural engineer licensed in the State of Maryland - design to include meeting ACI Code 350 R/9, vertical loading (HS-10 or HS-20), allowable horizontal loading (based on soil pressure), and analysis of potential cracking.
sand (1' deep)	AASHTO M-6 or ASTM-C-33	0.075" to 0.04"	Sand substitutions such as Dribase and Graystone #10 are not acceptable. No talcum, calcium or dolomite sand substitutions are acceptable. No "rock dust" can be used for sand.



**LEGEND**

- EX. TREES
- EX. TREES
- EX. 2' CONTOUR
- EX. 10' CONTOUR
- EX. 6" WATER
- EX. 8" SANITARY
- PROP. GRADING
- PR. S.H.C. PROP. SEWER HOUSE CONN.
- PR. W.H.C. PROP. WATER HOUSE CONN.
- SOILS DELINEATION LINE

BY THE DEVELOPER:

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

DEVELOPER: *Charles & Bonnie Black* DATE: 2/1/05

BY THE ENGINEER:

I CERTIFY THAT THIS PLAN FOR EROSION AND SEDIMENT 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.

ENGINEER: *Jim Meyer* DATE: 1/16/05

THESE PLANS HAVE BEEN REVIEWED FOR THE HOWARD SOIL CONSERVATION DISTRICT AND MEET THE TECHNICAL REQUIREMENTS FOR SOIL EROSION AND SEDIMENT CONTROL.

NATURAL RESOURCE CONSULTING SERVICE DATE: 2/14/05

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

HOWARD SOIL CONSERVATION DISTRICT DATE: 2/24/05

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

*Mark McLaughlin* DATE: 2/16/05

DIRECTOR

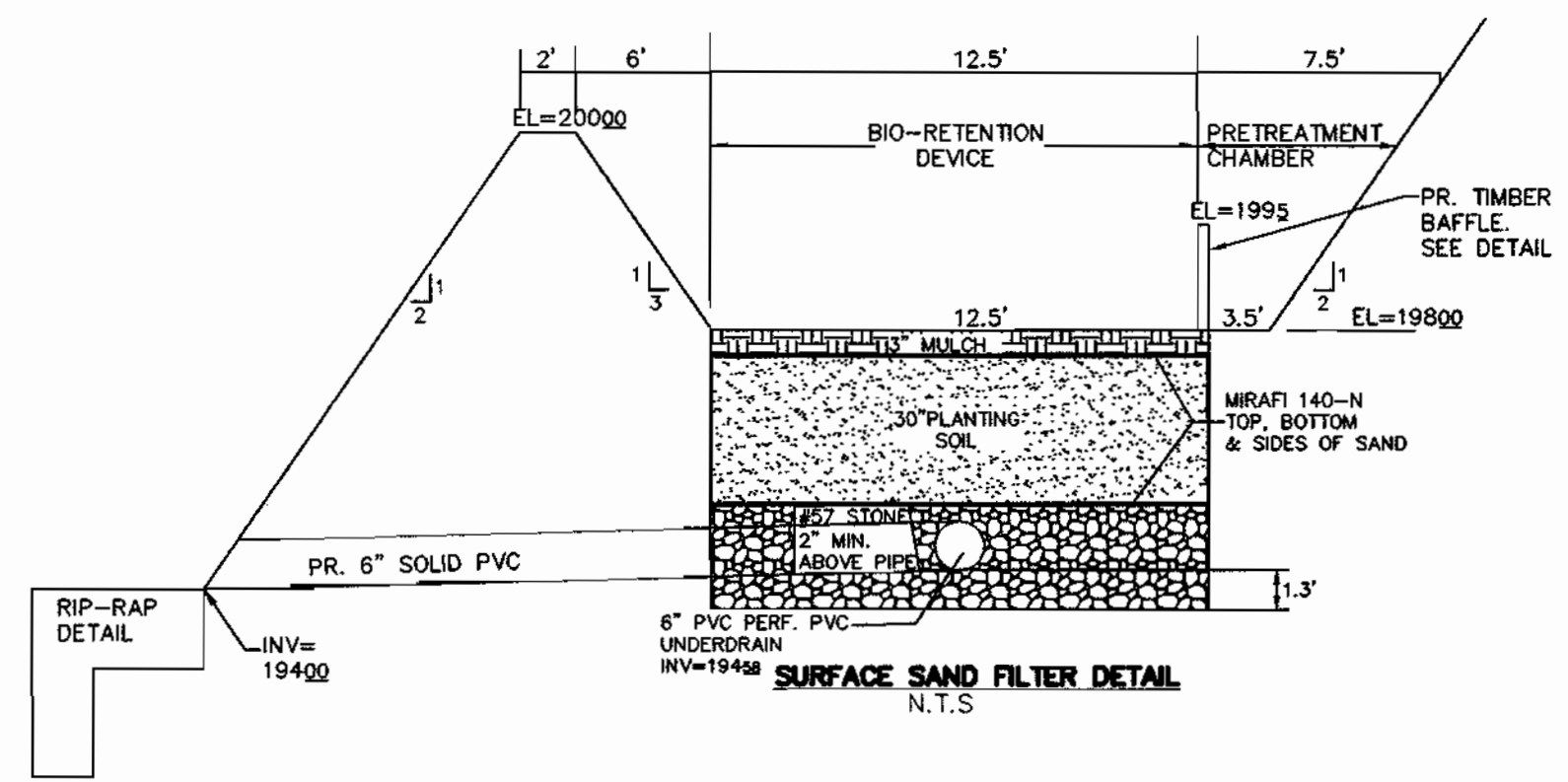
*Mike Deane* DATE: 3/7/05

CHIEF, DEVELOPMENT ENGINEERING DIVISION

*Cindy Starnes* DATE: 3/15/05

CHIEF, DIVISION OF LAND DEVELOPMENT

DATE NO.	REVISION
OWNER:	CHARLES & BONNIE BLACK 319 FAIRFIELD DRIVE SEVERN, MD. 21144
DEVELOPER:	CHARLES & BONNIE BLACK 319 FAIRFIELD DRIVE SEVERN, MD. 21144
PROJECT:	<b>BLACK RESIDENCE</b> SINGLE FAMILY DETACHED DWELLING
TAX MAP 38, GRID B, PARCEL 808	1st ELECTION DISTRICT
WATER CODE 44-6906	SEWER CODE 22-S
TITLE:	<b>SITE DEVELOPMENT /SEDIMENT &amp; EROSION CONTROL PLAN</b>
<b>MESSICK &amp; ASSOCIATES</b> CONSULTING ENGINEERS 31 OLD SOLOMONS ISLAND RD., SUITE 201 ANNAPOLIS, MARYLAND 21401 (410) 266-3212 • FAX (410) 266-3502	
DESIGNED BY:	WAN
DRAWN BY:	COP
PROJECT NO:	
DATE:	MARCH, 2004
SCALE:	AS SHOWN
DRAWING NO.:	2 OF 7



**TEMPORARY SEEDING NOTES**

Apply to graded or cleared areas likely to be redistributed where a short-term vegetative cover is needed.

**Seeded Preparation:** Loosen upper three inches of soil by raking, disking or other acceptable means before seeding, if not previously loosened.

**Soil Amendments:** Apply 600 lbs. per acre 10-10-10 fertilizer (14 lbs. per 1000 sq. ft.)

**Seeding:** For periods March 1 thru April 30 and from August 15 thru November 15, seed with 2-1/2 bushels per acre of annual ryegrass (3.2 lbs. per 1000 sq. ft.). For the period May 1 thru August 14, seed with 3 lbs. per acre of weeping lovegrass (0.07 lbs. per 1000 sq. ft.). For the period November 16 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. per 1000 sq. ft.) of unrattled small grain straw immediately after seeding. Anchor mulch immediately after application using mulch anchoring tool or 218 gal. per acre (5 gal. per 1000 sq.ft.) of emulsified asphalt on flat areas. On slopes, 8 ft. or higher, use 347 gal. per acre (8 gal. per 1000 sq.ft.) for anchoring.

Refer to the 1983 Maryland Standards and Specifications for Soil Erosion and Sediment Control for rate and methods not covered.

**PERMANENT SEEDING NOTES**

Apply to graded or cleared areas not subject to immediate further disturbance where a permanent long-lived vegetative cover is needed.

**Seeded Preparation:** Loosen upper three inches of soil by raking, disking 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. per 1000 sq.ft.) and 600 lbs. per acre 10-10-10 fertilizer (14 lbs. per 1000 sq.ft.) before seeding. Harrow or disc into upper three inches of soil. At time of seeding, apply 400 lbs. per acre 30-0-0 ureaform fertilizer (9 lbs. per 1000 sq.ft.).
- 2) Acceptable - Apply 2 tons per acre dolomitic limestone (92 lbs. per 1000 sq.ft.) and 1000 lbs. per acre 10-10-10 fertilizer (25 lbs. per 1000 sq. ft.) before seeding. Harrow or disc into upper three inches of soil.

**Seeding:** For the period March 1 thru April 30 and from August 1 thru October 15, seed with 60 lbs. per acre (1.4 lbs. per 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 (0.05 lbs. per 1000 sq.ft.) of weeping lovegrass. During the period October 16 thru February 28, protect site by one of the following options:

- 1) 2 tons per acre of well-anchored mulch straw and seed as soon as possible in the spring.
- 2) Use sod.
- 3) Seed with 60 lbs. per acre Kentucky 31 Tall Fescue and mulch with 2 tons per acre well anchored straw.

**Mulching:** Apply 1-1/2 to 2 tons per acre (70 to 90 lbs. per 1000 sq.ft.) of unrattled small grain straw immediately after seeding. Anchor mulch immediately after application using mulch anchoring tool or 218 gal. per acre (5 gal. per 1000 sq.ft.) of emulsified asphalt on flat areas. On slopes, 8 ft. or higher, use 347 gal. per acre (8 gal. per 1000 sq.ft.) for anchoring.

**Maintenance:** Inspect all seeded areas and make needed repairs, replacements and reseedings.

**21.0 Standard and Specifications**

**Topsoil**  
 Definition  
 Placement of topsoil over a prepared subsoil prior to establishment of permanent vegetation.  
 Purpose  
 To provide a suitable soil medium for vegetative 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 Experiment Station.
- II. Topsoil Specifications - Soil to be used as topsoil must meet the following:

- I. 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 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, slogs, coarse fragments, gravel, sticks, roots, trash, or other materials larger than 1-1/2" in diameter.
- II. Topsoil must be free of plants or plant parts such as bermuda grass, quackgrass, johnsongrass, nutedge, poison ivy, thistle, or others as specified.
- III. Where 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.

For sites having disturbed areas under 5 acres:

- I. Place topsoil (if required) and apply soil amendments as specified in 20.0 Vegetative Stabilization - Section I - Vegetative Stabilization Methods and Materials.

For sites having disturbed areas over 5 acres:

- I. On soil meeting topsoil specifications, obtain test results dictating fertilizer and lime amendments required to bring the soil into compliance with the following:
  - a. 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.
  - b. Organic content of topsoil shall be not less than 1.5 percent by weight.
  - c. Topsoil having soluble salt content greater than 500 parts per million shall not be placed.
  - d. No sod or seed shall be used on soil which has been treated with soil sterilants or chemicals for weed control until sufficient time has elapsed (14 days minimum) to permit dissipation of phytotoxic materials.
- II. Place topsoil (if required) and apply soil amendments as specified in 20.0 Vegetative Stabilization - Section I - Vegetative Stabilization Methods and Materials.

**V. Topsoil Application**

- I. 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.
- II. Grades on the areas to be topsoiled, which have been previously established, shall be maintained, albeit 4" - 8" higher in elevation.
- III. 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.
- IV. Topsoil shall not be placed 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 seeded preparation.
- V. Alternative for permanent seeding - instead of applying the full amounts of lime and commercial fertilizer, composted sludge and amendments may be applied as specified below:

- a. Composted sludge material for use as a soil conditioner for sites having disturbed areas over 5 acres shall be tested to prescribe amendments and for site having disturbed areas under 5 acres shall conform to the following requirements:
- b. Composted sludge shall be supplied by, or originate from, a person or persons that are permitted (at the time of acquisition of the compost) by the Maryland Department of the Environment under COMAR 26.04.06.
- c. Composted sludge shall contain at least 1 percent nitrogen, 1.5 percent phosphorus, and 0.2 percent potassium and have a pH of 7.0 to 8.0. If compost does not meet these requirements, the appropriate constituents must be added to meet the requirements prior to use.
- d. Composted sludge shall be applied at a rate of 1 ton/1,000 square feet.
- e. Composted sludge shall be amended with a potassium fertilizer applied at the rate of 4 lb/1,000 square feet, and 1/3 the normal lime application rate.

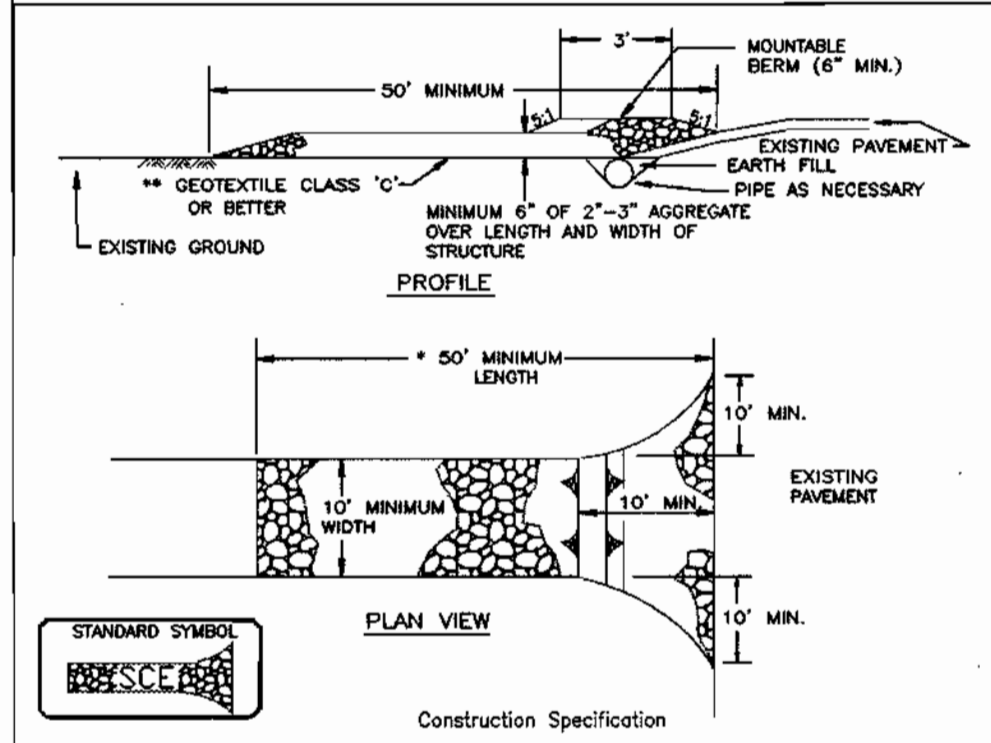
References: Guideline Specifications, Soil Preparation and Sodding, MD-VA, Pub. #1, Cooperative Extension Service, University of Maryland and Virginia Polytechnic Institutes, Revised 1973.

**SEDIMENT CONTROL NOTES**

1. A MINIMUM OF 48 HOURS NOTICE MUST BE GIVEN TO THE HOWARD COUNTY DEPARTMENT OF INSPECTIONS, LICENSES AND PERMITS SEDIMENT CONTROL DIVISION PRIOR TO THE START OF ANY CONSTRUCTION (410) 313-1855.
2. ALL VEGETATIVE AND STRUCTURAL PRACTICES ARE TO BE INSTALLED ACCORDING TO THE PROVISIONS OF THIS PLAN AND ARE TO BE IN CONFORMANCE WITH THE MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL AND EROSION 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 OTHER DISTURBED OR GRADED AREAS ON THE PROJECT SITE.
4. ALL SEDIMENT TRAPS/BASINS SHOWN MUST BE FENCED AND WARNING SIGNS POSTED AROUND THE PERIMETER IN ACCORDANCE WITH VOL. 1, CHAPTER 12, OF THE HOWARD COUNTY DESIGN MANUAL, STORM DRAINAGE.
5. ALL DISTURBED AREAS MUST BE STABILIZED WITHIN THE TIME PERIOD SPECIFIED ABOVE IN ACCORDANCE WITH THE 1984 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL AND EROSION CONTROL FOR PERMANENT SEEDINGS (SEC. 51), SOO (SEC. 54), TEMPORARY SEEDINGS (SEC.50) AND MULCHING (SEC. 52). TEMPORARY STABILIZATION WITH MULCH ALONE CAN ONLY 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

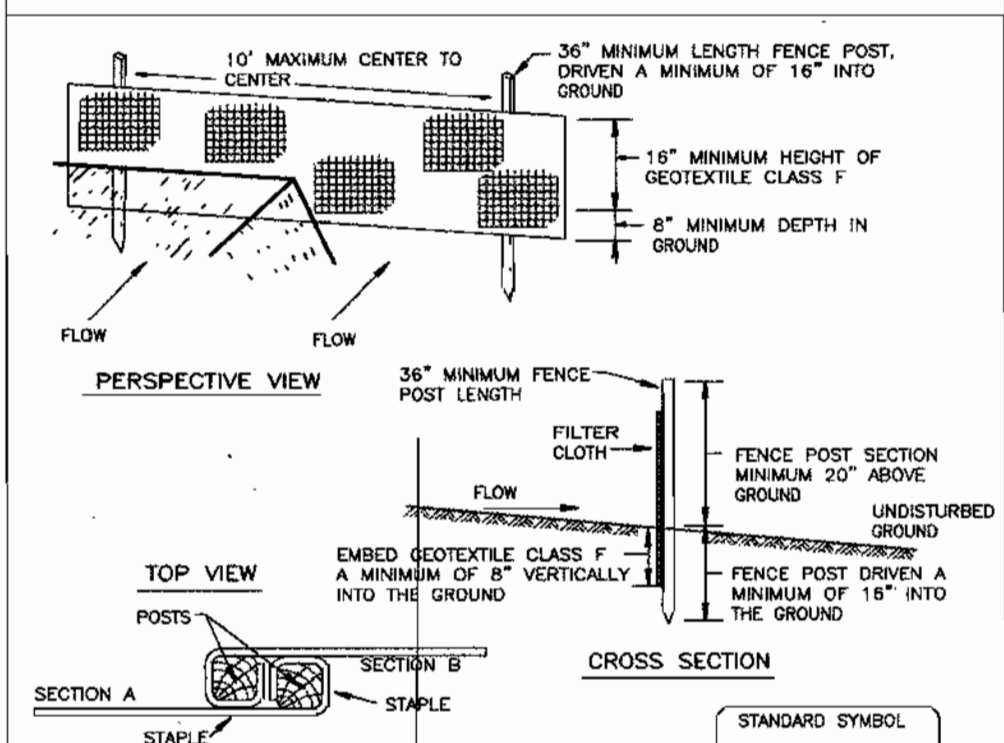
TOTAL SITE AREA	0.49 ACRES
AREA DISTURBED	0.34 ACRES
AREA TO BE ROOFED AND PAVED	0.13 ACRES
AREA TO BE VEGETATIVELY STABILIZED	0.21 ACRES
TOTAL CUT	420± CU. YDS.
TOTAL FILL	100± CU. YDS.

**DETAIL 24 - STABILIZED CONSTRUCTION ENTRANCE**

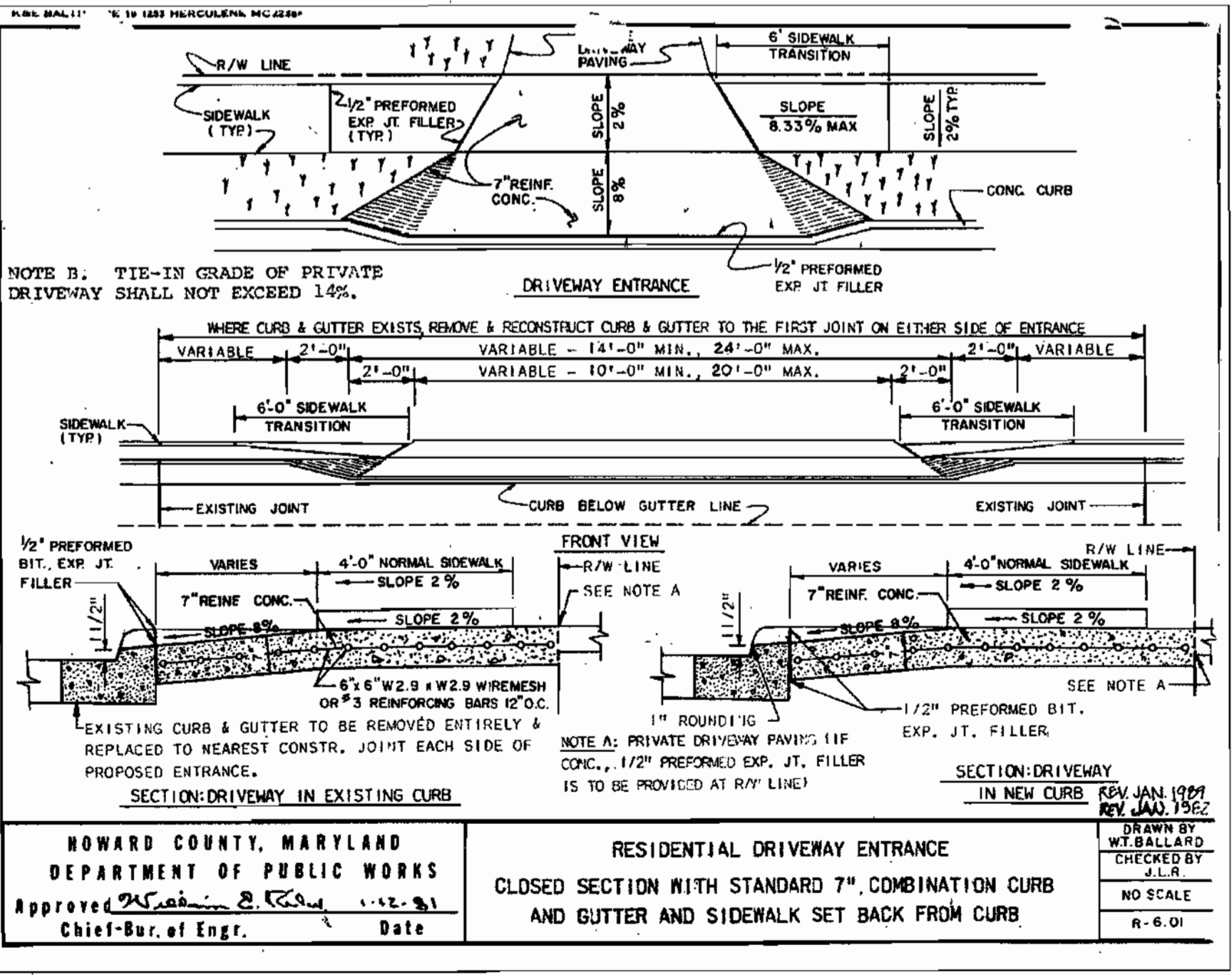


- Construction Specifications**
1. Length - minimum of 50' (\*30' for single residence lot).
  2. Width - 10' minimum, should be flared at the existing road to provide a turning radius.
  3. Geotextile fabric (filter cloth) shall be placed over the existing ground prior to placing stone. \*\*The plan 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 SDC 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 7-12-3 MARYLAND DEPARTMENT OF ENVIRONMENT AND WATER MANAGEMENT ADMINISTRATION

**DETAIL 22 - SILT FENCE**



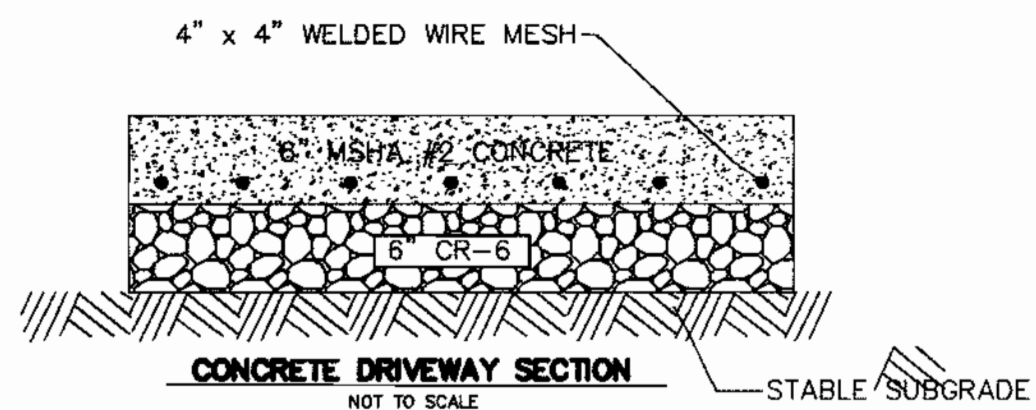
- Construction Specifications**
1. Fence posts shall be a minimum of 36" long driven 16" minimum into the ground. Wood posts shall be 1-1/2" x 1-1/2" square (minimum) cut, or 1-3/4" diameter (minimum) round and shall be of sound quality hardwood. Steel posts will be standard T or U section weighing not less than 1.00 pound per linear foot.
  2. Geotextile 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. ft./minute (max.) | Test: MSMT 322 |
| Filtering Efficiency | 75% (min.)                 | Test: MSMT 322 |
3. Where ends of geotextile fabric come together, they shall be overlapped, folded and stapled to prevent sediment bypass.
  4. Silt Fence shall be inspected after each rainfall event and maintained when bulges occur or when sediment accumulation reached 50% of the fabric height.
- U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE PAGE 8-16-3 MARYLAND DEPARTMENT OF ENVIRONMENT AND WATER MANAGEMENT ADMINISTRATION



**SEQUENCE OF CONSTRUCTION**

1. Obtain all necessary approvals, permits, and easements. The contractor must notify the Howard County Department of Inspection and Permits, and Mass Utility at least 48 prior or to beginning work.
2. The contractor shall schedule a pre-construction meeting with the respective agencies to review the plans and permits. (1 day)
3. Clear only for, grade, and install stabilized construction entrance. (1 day)
4. Clear only for and install perimeter silt fences. (1 day)
5. Clear remaining site area within L.O.D as shown on approved plans. (1 day)
6. Rough grade site per approved plans. (2 weeks)
7. Install water and sanitary sewer connections. (1 week)
8. Excavate for footings and construction building. (3 months)\*
9. Install underground conduits, bio-retention device and paving courses. (2 weeks)\*
10. Fine grade and place 2 inches of topsoil. Stabilize with seed and mulch. (1 week)
11. Once the site is stabilized and with the approval of the Howard County Sediment Control Inspector, remove all sediment control measures. Re-stabilize areas, which were disturbed during removal of the sediment control measures.

\* = Denotes activities that can be done concurrently



BY THE DEVELOPER :

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

DEVELOPER: [Signature] DATE: 2/10/05

BY THE ENGINEER :

I CERTIFY THAT THIS PLAN FOR EROSION AND SEDIMENT 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.

ENGINEER: [Signature] DATE: 1/10/05

THESE PLANS HAVE BEEN REVIEWED FOR THE HOWARD SOIL CONSERVATION DISTRICT AND MEET THE TECHNICAL REQUIREMENTS FOR SOIL EROSION AND SEDIMENT CONTROL.

Jerry Meyer 2/24/05  
 NATURAL RESOURCES CONSERVATION SERVICE DATE

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

John K. Roberts 2/24/05  
 HOWARD SOIL CONSERVATION DISTRICT DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

David A. [Signature] 2/10/05  
 DIRECTOR DATE

Chris [Signature] 2/7/05  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

Wendy [Signature] 2/10/05  
 CHIEF, DIVISION OF LAND DEVELOPMENT DATE

OWNER: CHARLES & BONNIE BLACK  
 319 FAIRFIELD DRIVE  
 SEVERN, MD. 21144

DEVELOPER: CHARLES & BONNIE BLACK  
 319 FAIRFIELD DRIVE  
 SEVERN, MD. 21144

PROJECT: **BLACK RESIDENCE**  
 SINGLE FAMILY DETACHED DWELLING

TAX MAP 38, GRID 8, PARCEL 808  
 -1st ELECTION DISTRICT  
 WATER CODE 44-6906 SEWER CODE 22-S

**NOTES AND DETAILS**

MESSICK & ASSOCIATES  
 CONSULTING ENGINEERS  
 31 OLD SOLOMONS ISLAND RD., SUITE 201  
 ANNAPOLIS, MARYLAND 21401  
 (410) 266-3212 \* FAX (410) 266-3502

DATE: 1/10/05

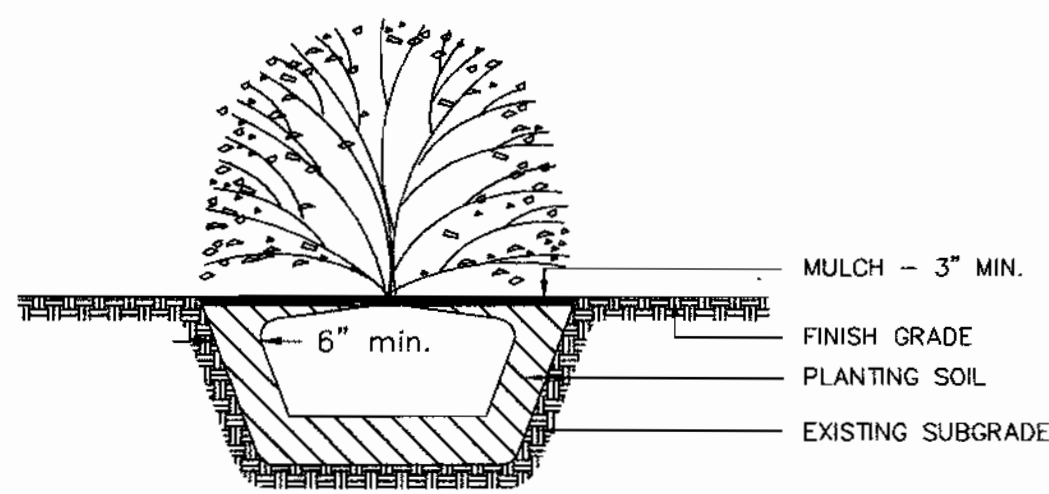
DESIGNED BY: WAN  
 DRAWN BY: COP  
 PROJECT NO:  
 DATE: MARCH, 2004  
 SCALE: AS SHOWN  
 DRAWING NO.: 3 OF 7

SCHEDULE A PERIMETER LANDSCAPE EDGE		
CATEGORY	ADJACENT TO ROADWAYS	ADJACENT TO PERIMETER PROPERTIES
LANDSCAPE TYPE	NONE/B	"A"
LINEAR FEET OF ROADWAY FRONTAGE/PERIMETER	0 L.F.	906 L.F.
CREDIT FOR EXISTING VEGETATION (YES, NO, LINEAR FEET) (DESCRIBE BELOW IF NEEDED)	NO	NO
CREDIT FOR WALL, FENCE OR BERM (YES, NO, LINEAR FEET) (DESCRIBE BELOW IF NEEDED)	NO	NO
NUMBER OF PLANTS REQUIRED	0	906/60=15
SHADE TREES	0	0
EVERGREEN TREES	0	0
SHRUBS	0	0
NUMBER OF PLANTS PROVIDED	0	12
SHADE TREES	0	18*
EVERGREEN TREES	0	0
OTHER TREES (2:1 SUBSTITUTION)	0	0
SHRUBS (2:1 SUBSTITUTION)	0	21**
(DESCRIBE PLANT SUBSTITUTION CREDITS BELOW IF NEEDED)		

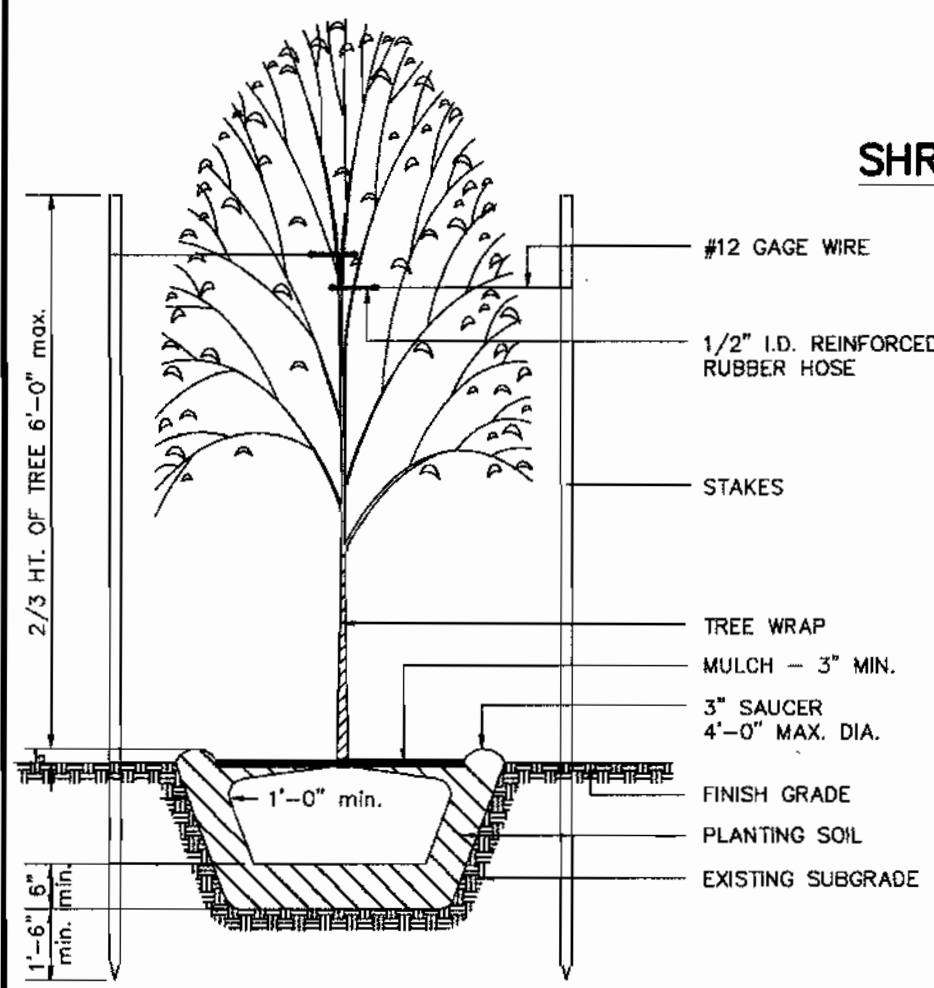
\* = 4 SUBSTITUTED FOR 2 SHADE TREES.  
\*\* = 21 EVERGREEN SHRUBS PROVIDED FOR DRIVEWAY SCREENING PER SECT. 16.120.B(6)(V).

**PLANTING NOTES:**

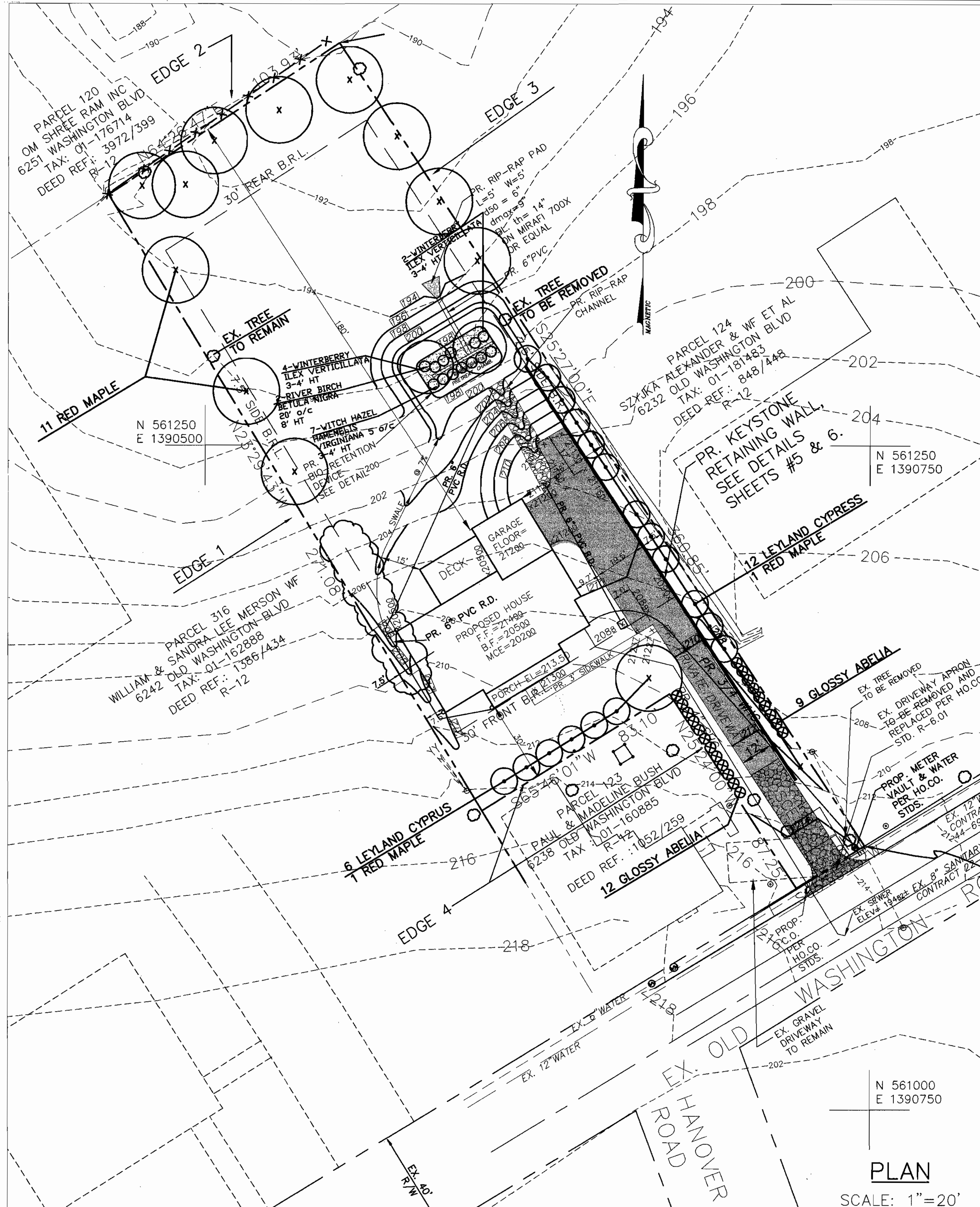
- All plants shall be nursery grown.
- All plants shall conform to the standards of "Landscape Specifications Guidelines" Published by Landscape Contractors Association. They shall be typical of their species or variety and shall have a normal habit of growth. They shall be sound, healthy and vigorous, well-branched and densely foliated when in leaf. They shall be free of disease and insect pests, eggs, or larvae. They shall have healthy, well-developed root systems.
- No substitutions shall be made without the approval of the landscape architect.
- Balled and burlapped plants shall be dug with firm natural balls of earth, of diameter and depth to include most of the fibrous roots. Container grown stock shall have been grown in a container long enough for the root system to be developed sufficiently to hold its soil together firm and whole. No plants shall be loose in the container.
- Root balls of all plants shall be adequately protected at all times from sun and drying winds or frost.
- Owner or his representative shall be notified prior to beginning planting operations.
- All trees shall be wrapped immediately after they are planted. Approved tree wrap shall be installed according to accepted industry practice.
- Each tree and shrub shall be pruned in accordance with the American Association of Nurserymen Standards to preserve the natural character of the plant. All dead wood or suckers and all broken or badly bruised branches shall be removed. Cuts over 1" in diameter shall be painted with an approved tree paint.
- Mulch: immediately after planting operations are completed, all trees and shrub planting pits shall be covered with a 2" layer of Shredded Hardwood Bark Mulch or other material approved by the owner or his representative. The limit of this mulch for trees shall be the area of the pit and for shrubs in beds, the entire area of the shrub bed.
- Trees in leaf when planted shall be treated with anti-desiccant such as Wilt-Proof.
- Conditions detrimental to plants: the contractor shall notify the project representative in writing of all soil or drainage conditions which the contractor considers detrimental to the growth of plants. He shall state the conditions and submit a proposal for correcting the conditions, including any change in cost for review and acceptance by the project representative.
- Minor adjustments to tree location may be necessary due to field conditions and final grading. The contractor shall notify the owner if major adjustments are required.
- A Surety in the amount of \$5130.00 shall be posted with the grading permit application for 15 shade trees (\$4,300.00) and 21 shrubs (\$830.00).
- To obtain surety release, a qualified professional shall submit written certification to the Dept. of Planning & Zoning that healthy plant material was installed in accordance with this plan and that a 1 year guarantee has been executed.
- The developer is responsible for maintenance of the landscaping during construction & is responsible for obtaining a 1 year guarantee that ensures the survival or replacement of all required plant material for 1 year from the date of the landscape certification.
- Maintenance of plant material is the responsibility of the owner. The required plantings shall be maintained in good growing conditions & whenever necessary replaced with new plant material to ensure continued compliance with the landscape regulations.
- To ensure public safety, plant material should not be allowed to encroach on rights of ways & easements & impede motorists vision.



SHRUB PLANTING DETAIL



TREE PLANTING DETAIL - LESS THAN 4" CAL.



**PLAN**

SCALE: 1"=20'

SCHEDULE A					
EDGE NO.	PERIMETER TYPE	PERIMETER LENGTH	PLANTS REQUIRED	CREDIT FOR EX. VEGETATION, ETC.	PLANTS PROVIDED
1	A	271.08 L.F.	4	1 TREE TO REMAIN	5 *
2	A	103.93 L.F.	2	NO	3
3	A	360.85 L.F.	6	NO	10 *
4	A	170.35 L.F.	3	NO	4 *

\* NOTE: 2 EVERGREEN TREES = 1 CANOPY TREE  
EDGE 1 = 1 EX. CANOPY TREE  
4 PR. CANOPY TREE  
EDGE 3 = 4 PR. CANOPY TREES  
12 PR. EVERGREEN TREES  
EDGE 4 = 1 PR. CANOPY TREE  
6 PR. EVERGREEN TREES

PLANT LIST				
SYMBOL	ID	BOTANICAL NAME COMMON NAME	QTY	SIZE CAL.
(*)	T1	ACER RUBRUM/OCTOBER GLORY OCTOBER GLORY RED MAPLE	12	3-1/2" 1"
(*)	E1	CUPRESSOCYPARIS GYLANDII LEYLAND CYPRESS	18	5-8" 1"
(*)	S1	ABELIA GRANDIFLORA GLOSSY ABELIA	21	2-1/2" 3" HT

BY THE DEVELOPER :

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

DEVELOPER: *James Hand* DATE: 2/10/05

BY THE ENGINEER :

I CERTIFY THAT THIS PLAN FOR EROSION AND SEDIMENT 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.

ENGINEER: *[Signature]* DATE: 1/10/05

THESE PLANS HAVE BEEN REVIEWED FOR THE HOWARD SOIL CONSERVATION DISTRICT AND MEET THE TECHNICAL REQUIREMENTS FOR SOIL EROSION AND SEDIMENT CONTROL.

NATURAL RESOURCES CONSULTING SERVICE DATE: *[Signature]*

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

HOWARD SOIL CONSERVATION DISTRICT DATE: *[Signature]*

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

DIRECTOR: *Frank DeLonga* DATE: 2/10/05

CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE: 3/1/05

CHIEF, DIVISION OF LAND DEVELOPMENT DATE: 3/1/05

DATE NO. REVISION

OWNER: CHARLES & BONNIE BLACK  
319 FAIRFIELD DRIVE  
SEVERN, MD. 21144

DEVELOPER: CHARLES & BONNIE BLACK  
319 FAIRFIELD DRIVE  
SEVERN, MD. 21144

PROJECT: **BLACK RESIDENCE**  
SINGLE FAMILY DETACHED DWELLING

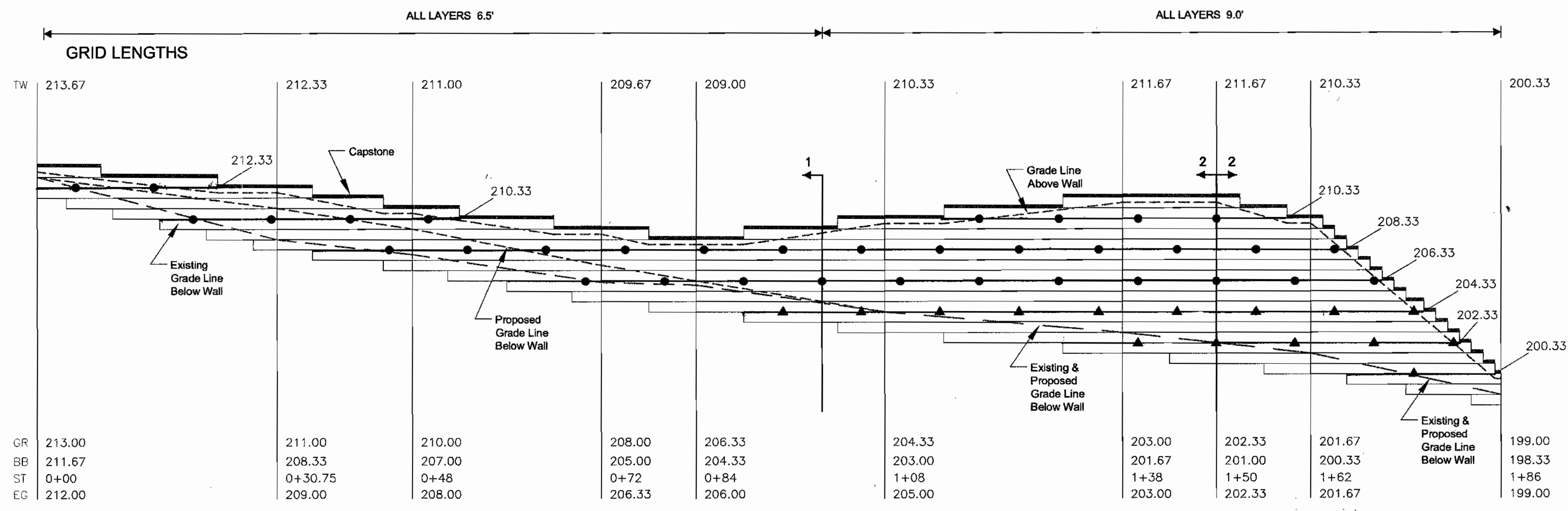
TAX MAP 38, GRID 8, PARCEL 808  
1st ELECTION DISTRICT  
WATER CODE 44-6906 SEWER CODE 22-S

TITLE: **LANDSCAPE PLAN**

MESSICK & ASSOCIATES \*  
CONSULTING ENGINEERS  
31 OLD SOLOMONS ISLAND RD., SUITE 201  
ANNAPOLIS, MARYLAND 21401  
(410) 266-3212 \* FAX (410) 266-3502

DATE: 1/10/05  
DESIGNED BY: WAN  
DRAWN BY: COP  
PROJECT NO:  
DATE: MARCH, 2004  
SCALE: AS SHOWN  
DRAWING NO.: 4 OF 7

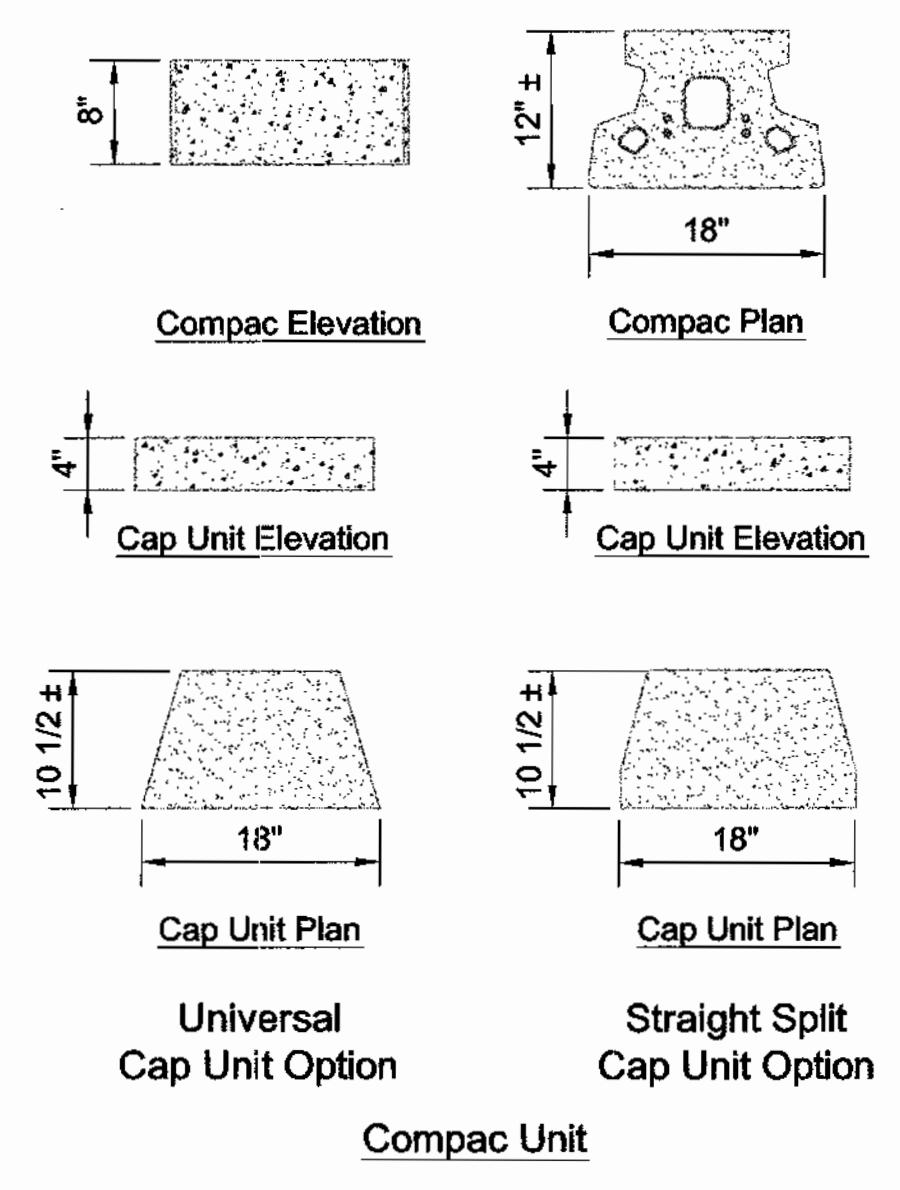
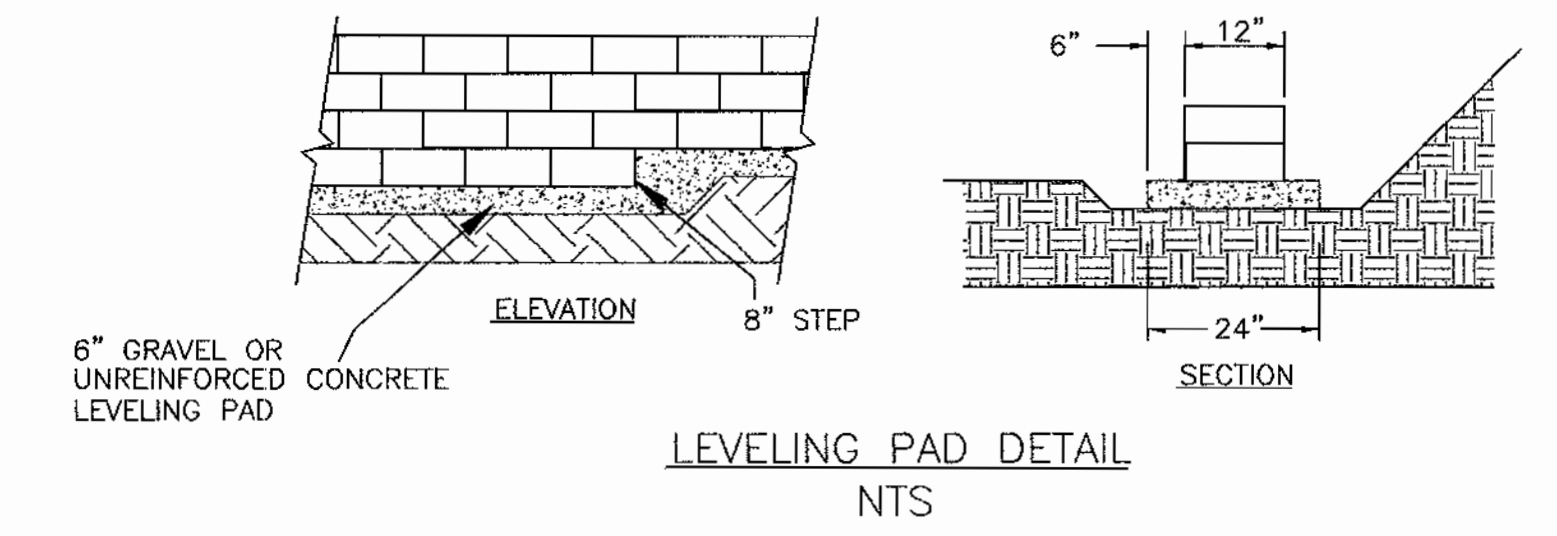
WAYNE A. NEWTON #21591 SDP 04-135



TW = TOP OF WALL (NOT INCLUDING CAP)  
 GR = PROPOSED FINISHED GRADE AT BASE OF WALL  
 BB = BOTTOM OF BLOCK / TOP OF LEVELING PAD  
 ST = WALL STATION  
 EG = EXISTING GRADE

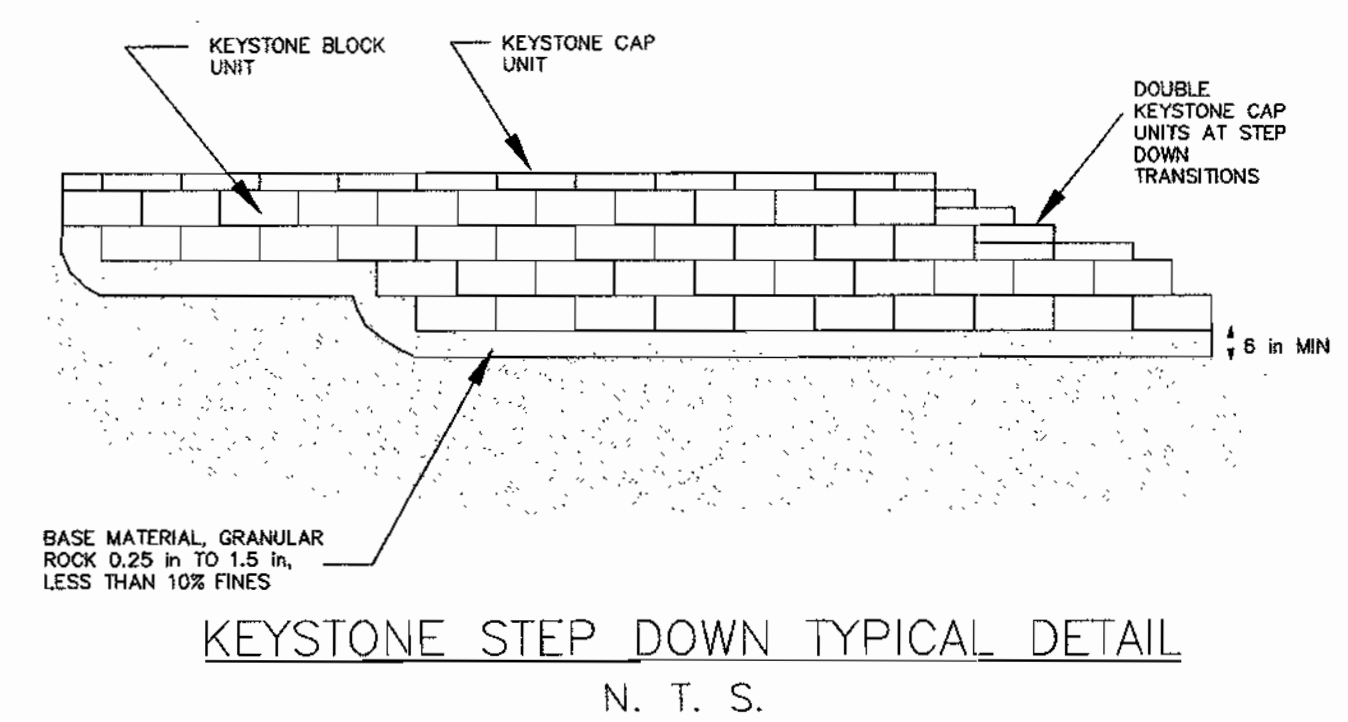
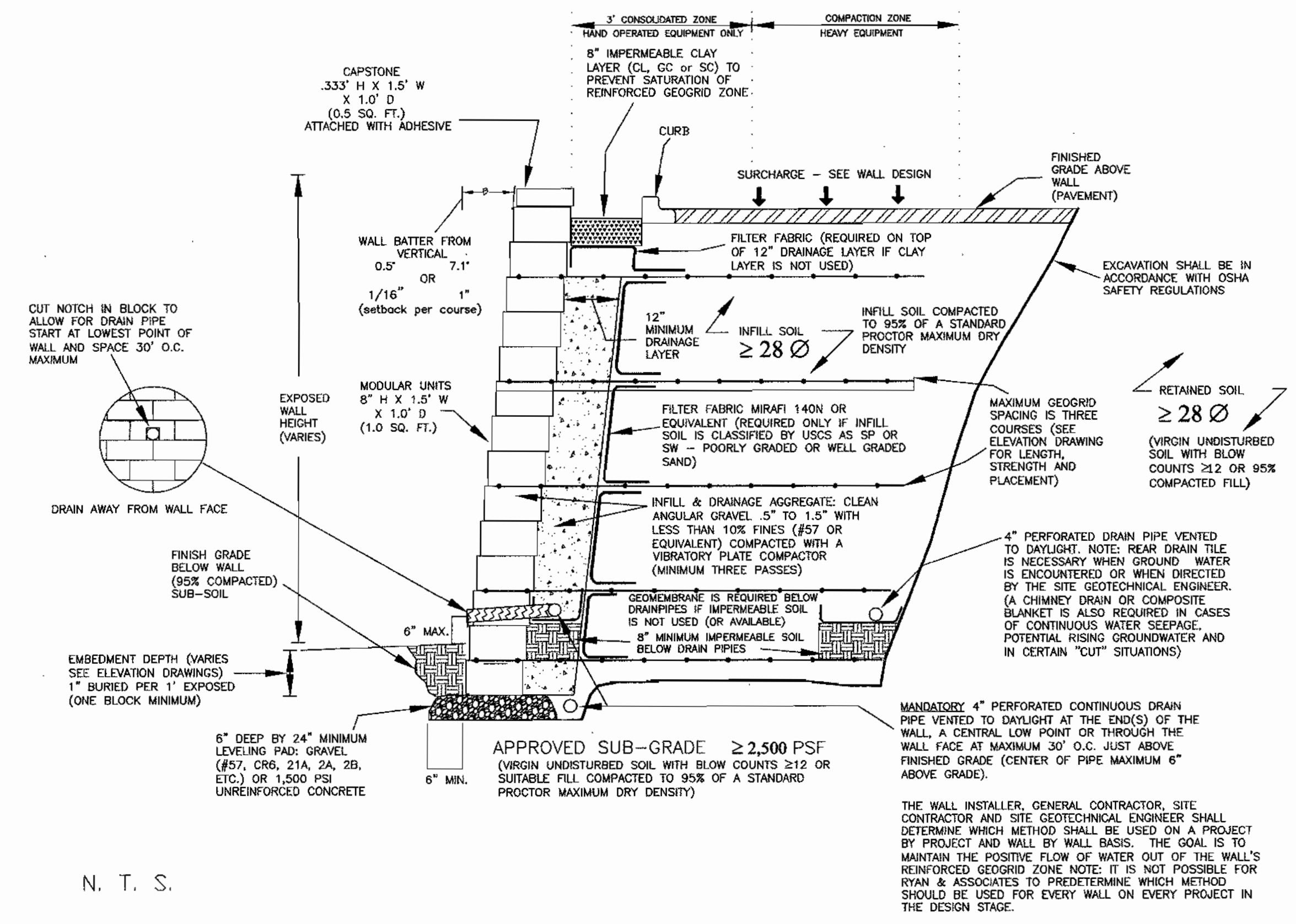
GRID KEY: MIRAFI 3XT  
 MIRAFI 5XT

SCALE: HORIZONTAL SCALE 1" = 10'  
 VERTICAL SCALE 1" = 5'



# KEYSTONE COMPAC

## WALL SECTION WITH SURCHARGE



APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

*Mark Wagner* 3/14/05  
 DIRECTOR DATE

*William K. Ryan* 3/17/05  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

*Cindy Hamilton* 7/15/05  
 CHIEF, DIVISION OF LAND DEVELOPMENT DATE

12-16-04 1 REVISED PER NEW GCM PLANS 12-16-04

DATE	NO.	REVISION

OWNER: CHARLES & BONNIE BLACK  
 319 FAIRFIELD DRIVE  
 SEVERN, MD. 21144

DEVELOPER: CHARLES & BONNIE BLACK  
 319 FAIRFIELD DRIVE  
 SEVERN, MD. 21144

PROJECT: BLACK RESIDENCE  
 SINGLE FAMILY DETACHED DWELLING

TAX MAP 38, GRID 8, PARCEL 808  
 1st ELECTION DISTRICT  
 WATER CODE 44-6906 SEWER CODE 22-S

TITLE: RETAINING WALL  
 PROFILE, SECTION & DETAILS

MESSICK & ASSOCIATES  
 CONSULTING ENGINEERS  
 31 OLD SOLOMONS ISLAND RD., SUITE 201  
 ANNAPOLIS, MARYLAND 21401  
 (410) 266-3212 \* FAX (410) 266-3502

**RYAN & ASSOCIATES**  
 A Division of WKR Consulting, Inc.  
 CONSULTING & DESIGN ENGINEERS  
 29 S. MAIN STREET, SUITE A, CHAMBERSBURG, PA 17201  
 PHONE (717) 262-4242 FAX (717) 262-4245

STATE OF MARYLAND  
 WILLIAM K. RYAN  
 PROFESSIONAL ENGINEER  
 TOP DESIGNATION

*William K. Ryan*  
 WILLIAM K. RYAN  
 P.E. NO. 21586

DATE	DESIGNED BY:
	JWP
DATE	DRAWN BY:
	JWP
DATE	PROJECT NO.:
DATE	DATE:
	JUNE, 2004
SCALE:	SCALE:
	AS SHOWN
DRAWING NO.:	DRAWING NO.:
	5 OF 7

**GENERAL NOTES**

**1. SOIL PARAMETERS:** At the time of this design a geotechnical investigation had not been done for this site. Based on the soil map designation on page 2 of 4 of the civil plans, Ryan & Associates (RA) used an assumed internal angle of friction of 28° for the soils in this design. This is for a worst case ML (sandy silt/silt) soil type and must be verified during wall construction. CH (fat clay), CL (lean clay), MH (elastic silt) and OH/OL/PT (organic) soils are not acceptable for wall construction. If these unsuitable soils are encountered they shall be removed and replaced with soils that meet or exceed the design friction angle of 28°. An assumed unit weight (maximum wet density less 5% for 95% compaction) of 125 PCF was used and fluctuations of 5 PCF higher or lower will not affect this design. However, if the unit weight varies by more than 5 PCF RA must be notified so that the cross sections can be rerun to verify that all factors of safety are still met. The site geotechnical engineer will need to do a proctor test of the proposed backfill soil to determine its actual density and moisture. No cohesion was used in any of the calculations.

**2. SPECIFICATIONS:** Construction and materials must conform to the attached "Ryan & Associates segmental retaining wall specifications and installation guidelines for Keystone".

**3. BEARING CAPACITY:** The sub-grade (the soils under the wall's gravel leveling pad and the soils under the wall's reinforced geogrid zone) must be tested by the site geotechnical engineer prior to wall construction and have a minimum allowable bearing capacity of 2,500 PSF. The actual bearing pressure exerted by each specific wall section is shown on the Cross Section Details and Factors of Safety table so that the site geotechnical engineer may determine specifically how to handle any areas where low bearing capacity soils are encountered on an individual wall section basis. Areas of the sub-grade that do not meet these maximum pressures will require undercutting and/or geogrid reinforcing. The sub-grade must be virgin (natural undisturbed soil with blow counts  $\geq 12$ ) or suitable fill ( $\geq 28$ ) compacted to 95% of a standard proctor maximum dry density.

**4. SLOPES & SURCHARGES:** A 300 PSF live load surcharge was applied for the proposed roadway with vehicles above the wall. There are no proposed slopes above this wall.

**5. FACTORS OF SAFETY:** The following factors of safety have been met in this design: Sliding 1.5, Overturning 2.0, Bearing Capacity 2.0, Geogrid Overstress 1.5, and Geogrid Pullout 1.5 (from the soil and from the block).

**6. GEOGRIDS:** This wall was designed with Mirafi 3XT and 5XT geogrids which have LTDS (Long Term Design Strengths) of 1558 & 2234 respectively. All geogrid substitutions must have prior approval of RA.

**7. CONSTRUCTION OVERSIGHT:** The construction of this wall must be performed under the observation/review of a Maryland Registered Professional Engineer or his authorized representative to ensure that it is constructed in accordance with the RA General Notes and Specifications.

**8. WALL BATTER:** This wall was designed with the Keystone blocks having a 0.5' near vertical batter (1/16" setback per block course: rear pin position). It is important for the wall installer and the civil engineer/surveyor to predetermine the wall's batter during stake out. The base of the wall will need to be moved forward if there are critical dimensions that need to be met on the high side of the wall. The optional 7.1° batter (1" setback per block course: front pin position) may also be used for this wall if desired since it is more conservative (will yield higher factor of safety).

**9. BLOCK SYSTEM:** This design is valid only for the Keystone Compac block system. Each segmental wall system has unique dimensions, connection devices and interacts differently with geogrids; therefore other block types may not be substituted without a partial or total redesign.

**10. EMBEDMENT:** Wall embedment varies from one to two blocks. The exact amount of buried block can be determined by subtracting the "BB" elevation from the "GR" elevation on the RA profile drawing.

**11. WALL PROFILE:** The elevation drawing was done to represent the grade changes necessary on the civil grading plan and was done in even block course increments of .667' (8"). Minor field changes may be necessary by the wall installer. Lineal footage may be added or subtracted as needed if the wall's height is equal to or less than the design height. If the wall needs to be raised in height, RA shall be notified and new structural cross sections must be provided before the installer proceeds. The cap height of .333' (4") is not shown on the profile drawing however its height may have been used in some cases to achieve the desired TW elevations.

**12. CIVIL PLANS:** This design package is based on the "Site Development/Sediment & Erosion Control Plan", sheet 2 of 4, dated March, 2004 prepared by Messick & Associates. A partial copy of these plans has been included in the 8 1/2" X 11" submittal to show the RA wall stationing.

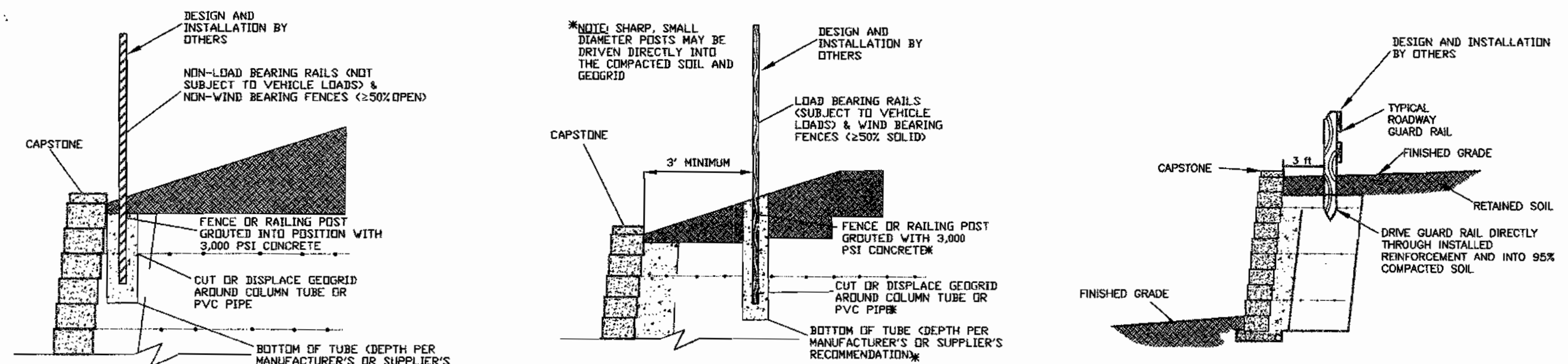
**13. DESIGN SOFTWARE:** Internal and external wall calculations were performed with Keywall design software. A table has been included ("Cross Section Details and Factors of Safety") which has the following information: section location (area of wall referenced), total wall height, loads applied, factors of safety (for sliding, overturning and bearing capacity) and bearing pressure (the weight exerted by the wall structure - block and geogrid zone). Factors of safety of 1.5 were also met for: geogrid pullout (from the soil and from the block), geogrid overstress (geogrid rupture) and connection (block to geogrid).

**14. GUARDRAILS:** If a guardrail is required above this wall it must be kept back a minimum of 3' from the back of the wall since vehicles can impact it. If it is installed closer than 3' from the back of the wall then the wall installer may follow the special instructions on the included detail for "GUARD RAIL WITH IMPACT LOAD". This requires that concrete form tubes be installed in sections and that the geogrid becomes integral with them. The top two layers of geogrid must also be lengthened by 2' beyond the design lengths.

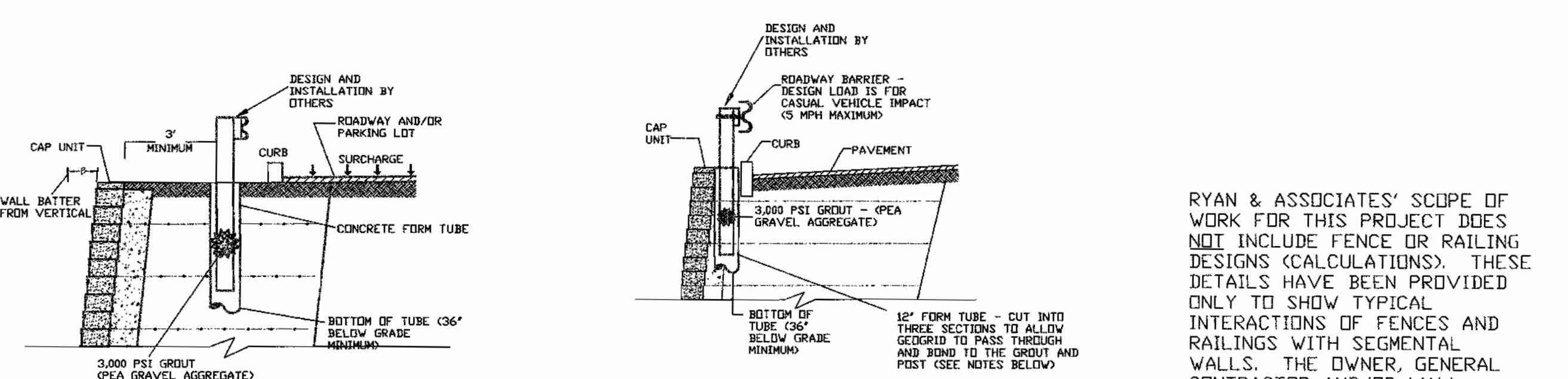
**15. SEPARATE 8 1/2" X 11" SUBMITTAL:** These 24" X 36" sheets were done in conjunction with an 8 1/2" X 11" submittal. The cross section calculations are included in the 8 1/2" X 11" submittal.

**16. SPECIAL HOWARD COUNTY RETAINING WALL SPECIFICATIONS:**

- Retaining walls shall only be constructed under the observation of a Registered Professional Engineer and a (NICET, WACEL, or equivalent) certified soils technician.
- The required bearing pressure beneath the footing of the wall shall be verified in the field by a certified soils technician. Testing documentation shall be provided to the Howard County Inspector prior to the start of construction. The required test procedure shall be the Dynamic Cone Penetrometer Test ASTM STP-399.
- The suitability of the fill material shall be confirmed by the on-site soils technician. Each eight inch lift must be compacted to 95% Standard Proctor Density and the testing report shall be made available to the Howard County Inspector upon completion of the construction.
- For walls over ten feet in height, one soil boring is required every 100 feet along the length of the wall, copies of the boring reports shall be provided to the Howard County Inspector prior to the start of construction.



NON-LOAD BEARING & NON-WIND BEARING (INSTALLED BEHIND WALL) N.T.S.  
LOAD BEARING & NON-WIND BEARING (INSTALLED BEHIND WALL) N.T.S.  
GUARDRAIL DETAIL (DRIVEN THROUGH GEGRID) N.T.S.



GUARDRAIL DETAIL N.T.S.  
GUARDRAIL WITH IMPACT LOAD N.T.S.

RYAN & ASSOCIATES' SCOPE OF WORK FOR THIS PROJECT DOES NOT INCLUDE FENCE OR RAILING DESIGNS (CALCULATIONS). THESE DETAILS HAVE BEEN PROVIDED ONLY TO SHOW TYPICAL INTERACTIONS OF FENCES AND RAILINGS WITH SEGMENTAL WALLS. THE OWNER, GENERAL CONTRACTOR AND/OR WALL INSTALLER WILL NEED TO VERIFY THE SIZE AND TYPE OF FENCE OR RAILING THAT IS NEEDED TO BE IN ACCORDANCE WITH THE MUNICIPALITY'S REQUIREMENTS.

**KEYSTONE RETAINING WALL DESIGN**  
Version 3.3.1.64

Project: BLACK RESIDENCE  
Project No: PA241265  
Case: case 1  
Design Method: Rankine-w/Batter (modified soil interface)

Date: 12/15/2004  
Designer: DKS

Design Parameters	Value	Unit
Reinforced Fill	28	°
Retained Zone	28	°
Foundation Soil	28	°
Reinforced Fill Type	Silt & sands	
Unit Fill	Crushed Stone, 1 inch minus	

Minimum Design Factors of Safety	Value	Unit
sliding	1.50	
overturning	2.00	
bearing	2.00	
pullout	1.50	
shear	1.50	
tension	1.50	

Reinforcing Parameters: Mirafi XT Geogrids	Value	Unit
3XTc	4300	1.67
5XTc	3000	1.67

Analysis: Section #1  
Unit Type: Compacit  
Leveling Pad: Crushed Stone  
Wall Ht: 6.00 ft  
Level Backfill: Offset: 2.00  
Surcharge: LL: 300 psf uniform surcharge  
Load Width: 100.00 ft

Case: case 1  
Wall Batter: 0.50 deg.  
embedment: 1.33 ft  
DL: 0 psf uniform surcharge  
Load Width: 100.00 ft

Results: Factors of Safety	Value
Sliding	1.77
Overturning	4.47
Bearing	8.11
Shear	4.72
Bending	2.23

Layer	Height	Length	Calc. Tension	Reinf. Type	Allow Ten	Pk Conn	Serv Conn	Pullout
3	4.67	6.5	229	3XTc	1037 ok	571 ok	N/A	1.69 ok
2	2.67	6.5	494	3XTc	1637 ok	767 ok	N/A	2.82 ok
1	0.67	6.5	557	5XTc	1486 ok	951 ok	N/A	5.19 ok

Reinforcing Quantities (no waste included):  
3XTc: 0.72 yd  
5XTc: 1.44 yd

NOTE: THESE CALCULATIONS ARE FOR PRELIMINARY DESIGN ONLY AND SHOULD NOT BE USED FOR CONSTRUCTION WITHOUT REVIEW BY A QUALIFIED ENGINEER

**KEYSTONE RETAINING WALL DESIGN**  
Version 3.3.1.64

Project: BLACK RESIDENCE  
Project No: PA241265  
Case: case 1  
Design Method: Rankine-w/Batter (modified soil interface)

Date: 12/15/2004  
Designer: DKS

Design Parameters	Value	Unit
Reinforced Fill	28	°
Retained Zone	28	°
Foundation Soil	28	°
Reinforced Fill Type	Silt & sands	
Unit Fill	Crushed Stone, 1 inch minus	

Minimum Design Factors of Safety	Value	Unit
sliding	1.50	
overturning	2.00	
bearing	2.00	
pullout	1.50	
shear	1.50	
tension	1.50	

Reinforcing Parameters: Mirafi XTc Geogrids	Value	Unit
3XTc	4300	1.67
5XTc	3000	1.67

Analysis: Section #2  
Unit Type: Compacit  
Leveling Pad: Crushed Stone  
Wall Ht: 10.67 ft  
Level Backfill: Offset: 2.00  
Surcharge: LL: 300 psf uniform surcharge  
Load Width: 100.00 ft

Case: case 1  
Wall Batter: 0.50 deg.  
embedment: 1.33 ft  
DL: 0 psf uniform surcharge  
Load Width: 100.00 ft

Results: Factors of Safety	Value
Sliding	1.77
Overturning	3.56
Bearing	5.15
Shear	2.30
Bending	2.25

Layer	Height	Length	Calc. Tension	Reinf. Type	Allow Ten	Pk Conn	Serv Conn	Pullout
3	9.33	9.0	230	3XTc	1037 ok	571 ok	N/A	1.53 ok
4	7.33	9.0	494	3XTc	1037 ok	767 ok	N/A	2.63 ok
5	5.33	9.0	685	3XTc	1037 ok	963 ok	N/A	4.61 ok
2	3.33	9.0	866	5XTc	1486 ok	1109 ok	N/A	5.43 ok
1	1.33	9.0	1240	5XTc	1486 ok	1267 ok	N/A	5.77 ok

Reinforcing Quantities (no waste included):  
3XTc: 2.00 yd  
5XTc: 3.00 yd

NOTE: THESE CALCULATIONS ARE FOR PRELIMINARY DESIGN ONLY AND SHOULD NOT BE USED FOR CONSTRUCTION WITHOUT REVIEW BY A QUALIFIED ENGINEER

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

*Paul J. Agle* 3/16/05  
DIRECTOR DATE

*W. J. Dorman* 3/2/05  
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

*Andy Hanita* 3/15/05  
CHIEF, DIVISION OF LAND DEVELOPMENT DATE

12-16-04 1 REVISED PER NEW CIVIL PLANS 12-16-04

DATE NO. REVISION

OWNER: CHARLES & BONNIE BLACK  
319 FAIRFIELD DRIVE  
SEVERN, MD. 21144

DEVELOPER: CHARLES & BONNIE BLACK  
319 FAIRFIELD DRIVE  
SEVERN, MD. 21144

PROJECT: BLACK RESIDENCE  
SINGLE FAMILY DETACHED DWELLING

TAX MAP 38. GRID 8, PARCEL 808  
1st ELECTION DISTRICT  
WATER CODE 44-6906 SEWER CODE 22-5

TITLE: GENERAL NOTES, DETAILS & CALCULATIONS

MESSICK & ASSOCIATES\*  
CONSULTING ENGINEERS  
31 OLD SOLOMONS ISLAND RD., SUITE 201  
ANNAPOLIS, MARYLAND 21401  
(410) 266-3212 \* FAX (410) 266-3502

DATE

DESIGNED BY: JWP  
DRAWN BY: JWP  
PROJECT NO:  
DATE: JUNE, 2004  
SCALE: AS SHOWN  
DRAWING NO.: 6 OF 7

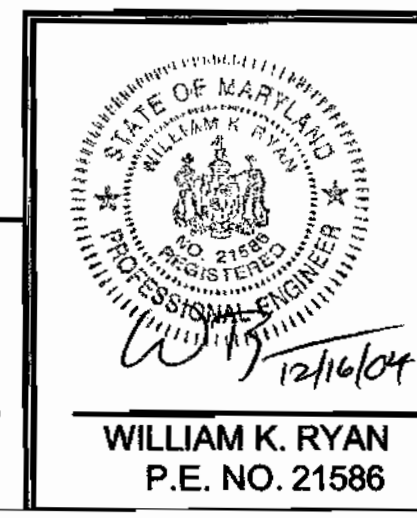
**RYAN & ASSOCIATES**  
A Division of WKR Consulting, Inc.  
CONSULTING & DESIGN ENGINEERS  
29 S. MAIN STREET, SUITE A, CHAMBERSBURG, PA 17201  
PHONE (717) 262-4242 FAX (717) 262-4245

WILLIAM K. RYAN  
P.E. NO. 21586

PROJECT:	Black Residence	LOCATION:	Elkridge, Howard County, MD	DATE:	12/16/04
Block:	Keystone Compac	Grid:	Mirafi		
	(1 S. F.) (5 S. F.) (1 S. F.)	SQ. YDS. LEVELING	SQ. YDS. DRAIN	CU. YDS. PAD	FT. DRAIN
TOTAL SQ. FT.	BLOCK CAPS** CORNERS	3XT GRID PINS	5XT GRID	GRAVEL	PIPE LENGTH
1,228	1,150 156 0	2,052	335 190	73 14	195 186

\* Ryan & Associates is not responsible for extras or shortages based on this take-off. The recipient is responsible for verifying the accuracy of this design by reviewing the site/grading plan for this project or by taking field measurements.

\*\* Cap total includes one extra unit per step down on top of the wall for double capping.



SPECIFICATIONS FOR SEGMENTAL RETAINING WALL SYSTEMS

PART 1: GENERAL

1.01 Description

A. Work includes furnishing and installing segmental retaining wall (SRW) Units to the lines and grades designated on the Final Design prepared by Ryan & Associates (RA). Also included are furnishing and installing appurtenant materials required for construction of the retaining wall as shown on the RA Final Design.

1.02 Reference Standards

- A. ASTM C 140— Sampling and Testing Concrete Masonry Units
- B. ASTM D 4595— Tensile Properties of Geotextiles by the Wide-Width Strip Method.
- C. ASTM D 5262— Test Method for Evaluating the Unconfined Creep Behavior of Geo- Grids
- D. GRI:GG1— Single Rib Geogrid Tensile Strength
- E. GRI:CG5— Geogrid Pullout
- F. ASTM D 698— Moisture Density Relationship for Soils, Standard Method
- G. ASTM D 422— Gradation of Soils
- H. ASTM 4318— Atterberg Limits of Soil
- I. ASTM 3034— Specification for Polyvinyl Chloride (PVC) Plastic Pipe
- J. ASTM D 1248— Specification for Corrugated Plastic Pipe

1.03 Design Standards

A. The following factors of safety must have been met in this design: Sliding 1.5, Overturning 2.0, Bearing Capacity 2.0, Geogrid Overstress 1.5, Geogrid Connection (between the block and the geogrid) and Geogrid Pullout 1.5 (from the block and from the soil).

PART 2: MATERIALS & DESIGN PARAMETERS

2.01 Segmental Retaining Wall Units

A. SRW Units must be machine formed, Portland Cement concrete blocks specifically designed for retaining wall applications. The SRW Unit currently approved for this project is:

Keystone Compac as manufactured by York Building Products or Keystone Compac II as manufactured by Betco Block & Products

NOTE: Where Keystone specifications and reference documents conflict with these specifications, the RA specifications hold precedence.

B. SRW Units shall be sound and free of cracks or other defects that would interfere with the proper placing of the units or significantly impair the strength or permanence of the structure. Cracking or excessive chipping may be grounds for rejection. Units showing cracks longer than 1/2 inch shall not be used within the wall. Units showing chips visible at a distance of 30 feet from the wall shall not be used within the wall.

C. Concrete used to manufacture SRW Units shall have a minimum 28 days compressive strength of 3,000 PSI and a maximum moisture absorption rate, by weight, of 8% as determined in accordance with ASTM C 140. Compressive strength test specimens shall conform to the saw-cut coupon provisions of Section 5.2.4 of ASTM C 140 with the following exception: Coupon shall be taken from the least dimension of the unit of a size and shape representing the geometry of the unit as a whole.

D. SRW Units molded dimensions shall not differ more than + 1/8 inch from that specified, except height which shall be + 1/16 inch as measured in accordance with ASTM C 140.

2.02 Geosynthetic Reinforcement

A. Geosynthetic reinforcement shall consist of geogrids as indicated on the RA Final Design. No geogrid substitutions shall be permitted without the prior approval of RA (a partial redesign may be necessary if geogrids are substituted). NOTE: It is always acceptable to substitute a higher strength geogrid (of the same manufacturer) for a lower strength geogrid.

2.03 Shear Connectors

A. Shear connectors shall be 1/2 inch diameter thermoset isophthalic polyester resin-pultruded fiberglass reinforcement rods or equivalents to provide connection between vertically and horizontally adjacent units. Strength and connectors between vertical adjacent units shall be applicable over a design temperature of 10 degrees F to +100 degrees F. These connectors shall be capable of holding the geogrid in the proper design position during geogrid pre-tensioning and backfilling. The pins have two positions. The rear pin position results in a 1" setback and a 7.1" batter and the front pin position results in a near vertical setback with an approximate positive batter of 0.5". The batter for which RA designed this wall will be stated in the RA Final Design General Notes and on the structural cross sections. It is always acceptable to change from the rear vertical batter to 7.1" since it is more conservative (yields higher factors of safety); however the cross sections will need to be revised (partial redesign is necessary) to change from the 7.1" batter to 0.5".

2.04 Leveling Pad

A. Material for the leveling pad shall consist of compacted gravel or unreinforced concrete. Typical gravels used for this leveling pad are #57, CR# 21A, 2A modified, 2B, RC6, RC57, etc. Lean un-reinforced concrete with a strength of 1,500 PSI may also be used for the leveling pad.

2.05 Drainage Aggregate

A. Drainage aggregate shall be clean angular gravel (#57 or equivalent) with a size of 1/2 inch to 1 1/2 inches and less than 10% fines (passing the #200 sieve). Rounded "pea gravel" type aggregate is not permissible since it does not have the necessary frictional properties. Recycled gravel may be used if it meets the above criterion.

2.06 Drainage Pipe

A. The drainage collection pipe shall be a 4 inch perforated or slotted PVC or corrugated HDPE pipe.

2.07 Infill Soil: within the reinforced geogrid zone

A. The soils used must meet or exceed the friction angle stated in the RA Final Design (in the General Notes, on the typical wall section and on the structural cross sections). The reinforced material shall be free of debris and organic material (i.e. no plants, roots, sod, top soil, trash, wood, etc.). The infill soil shall not consist of CH (elastic silt), MH (elastic silt) or OH/OL/PT (organic) soils. All soils used for wall infill must always meet the following requirements, regardless of the friction angle: maximum liquid limit of 40, maximum optimum moisture of 20%, maximum of 75% passing the #200 sieve (minimum of 25% retained on the #200 sieve) and minimum dry unit weight of 105 PCF. Soil moisture must be within (2% of optimum to obtain proper compaction results (no exceptions).

B. Rocks may be used as infill material as long as they have a maximum size of 6 inches and a mean diameter of 3 inches. Recycled concrete is permissible for infill except with certain polyester geogrids in water applications. In the case of water applications the geogrid manufacturer shall be consulted to see if the alkali in the recycled material will cause corrosive damage to their geogrid.

C. Select gravel (classified by USCS as GP or GW) is normally an acceptable substitution in the event suitable soils (those meeting RA's and the site geotechnical engineer's requirements) are not readily available. However, the unit weights of gravel can vary widely (clean gravel is typically 105 PCF and "crusher run" gravel is typically 135 PCF) so RA must be notified so that revised sections can be run prior to making any substitutions. In some cases clean gravel actually requires longer geogrid because of its extremely light unit weight (typically 105 PCF).

2.08 Retained Soil: the area beyond the infill soil and extending to a distance that is twice the wall's exposed height

A. This soil must meet or exceed the friction angle stated in the RA Final Design (in the General Notes, on the typical wall section and on the structural cross sections). This soil must be virgin (natural undisturbed soil with blow counts (12) or suitable fill (friction angle ( the RA Final Design requirement) compacted to 95% of a standard proctor maximum dry density.

2.09 Foundation Soil: the soil under the wall's gravel leveling pad and the soil under the reinforced geogrid zone

A. The foundation soil must meet or exceed the minimum allowable bearing capacity stated in the RA Final Design (in the General Notes and on the typical wall section). The sub-grade must be virgin (natural undisturbed soil with blow counts (12) or suitable fill (friction angle ( the RA Final Design requirement) compacted to 95% of a standard proctor maximum dry density. If highly plastic soils (CH or MH) or organic soils (OH, OL, or PT) are encountered in the sub-grade they must be removed and replaced with suitable soil or gravel that is placed in controlled lifts and compacted to 95% of a standard proctor maximum dry density. If the organic or plastic soils extend so deep that they cannot be totally removed, they shall be undercut a minimum of 4' and replaced with suitable soils or gravel.

2.10 Soil Investigation

A. RA recommends that every retaining wall design be preceded by an in-situ soil investigation by a licensed geotechnical engineer. However, if the owner and/or wall installer elects not to have an investigation conducted RA may assume soil design parameters based on published data by the Soil Conservation Service (soil maps), a verbal description by the owner and/or wall installer or by RA's previous experience in certain geographic areas. It must be understood that the owner and/or wall installer bears full responsibility to the election not to have a soil investigation performed.

2.11 Site History & Information

A. Many factors other than soil information affect the performance and design of the retaining wall. RA relies on information provided by the owner and/or wall installer when designing a retaining wall. RA bears no responsibility if the owner and/or wall installer omit critical information required to properly design the wall. Information critical to wall design from the site consist of: topographic features (such as slopes), soil types, utilities, storm water management, structures (including buildings, other existing or proposed walls, swimming pools, etc.), site geological phenomenon, groundwater, loads with the wall's zone of influence (such as driveways, patios, roadways, sidewalks, etc.) and any other readily known site factors that could potentially impact the RA Final Design.

PART 3: CONSTRUCTION

3.01 Installation

A. RA considers all retaining walls to be critical structures, meaning most walls require a considerable financial investment by the owner and failure of a wall will negatively impact a property both financially and from a public safety perspective. The owner or owner's representative is responsible for verifying that the wall installer meets all of the requirements of the RA Final Design (as stated in these specifications and the project's General Notes). This includes all submittals for materials and design, qualifications and proper installation of the wall system. All walls with an exposed height of 6 feet or greater must have the construction certified by a licensed geotechnical/ structural engineer registered in the jurisdiction of the project. Additionally, after the wall has been completed it is highly recommended that it be surveyed to establish the wall's current horizontal and vertical alignment.

B. The wall installer's field construction supervisor shall have demonstrated experience and be qualified to direct all work at the site.

C. RA provides construction review on some retaining wall projects. RA verifies general compliance with the RA Final Design; however, it is the wall installer's ultimate responsibility to construct the structure properly in accordance with the RA Final Design. RA's liability is limited to the amount of our fees for the scope of work provided for the wall designs and construction oversight.

3.02 Excavation

A. The wall installer shall excavate to the lines and grades shown on the RA Final Design and the project's civil plans. The wall installer shall take precautions to minimize over-excavation. Over-excavation shall be filled with compacted soil (friction angle (RA design parameters) or gravel as directed by the site geotechnical engineer.

B. The wall installer shall verify the location of existing structures and utilities prior to excavation. The wall installer shall ensure that all surrounding structures are protected from the effects of wall excavation. Excavation support (shoring), if required, is the responsibility of the wall installer. All excavation must be conducted in accordance with OSHA (federal) and state safety regulations. All work to construct the wall must be in accordance with 29CFR1926 sub-part P (OSHA Excavation Safety Requirements).

3.03 Foundation Preparation

A. Following excavation, the foundation soils (under the wall's gravel leveling pad and under the wall's reinforced geogrid zone) shall be examined by the site geotechnical engineer to assure that the actual foundation soil strength meets or exceeds the minimum allowable bearing capacity in the RA Final Design (stated in the General Notes and shown on the typical wall section). Soils that do not meet the required strength shall be removed and replaced with approved select structural fill or gravel and be compacted to 95% of a standard proctor maximum dry density for the full depth.

B. In cases of poor bearing capacity or fill soils, an enlarged geogrid reinforced leveling pad may be required. This typically consists of a 1 foot deep X 4 foot wide leveling pad with geogrid under (on the sub-grade) and within the gravel (6 inches above the sub-grade). The sub-grade must be compacted with a "J-Tamp" or "Jumping Jack" type compactor with a minimum of three passes prior to geogrid placement. These extra measures will increase the soil's bearing capacity by a minimum of 1,000 PSF (RA shall be consulted if the soil's bearing capacity needs to be increased by more than 1,000 PSF).

3.04 Leveling Pad Construction

A. The leveling pad shall be placed so that its top elevation is the same as the bottom of block ("BB") elevation on the RA Final Design profile drawing. It shall have a minimum thickness of 6 inches and a minimum width of 2 feet. The leveling pad should, at a minimum, extend laterally at least a distance of 6 inches from the toe and heel of the lower most SRW Unit.

B. The leveling pad material shall be compacted to 95% of a standard proctor maximum dry density with a vibratory plate compactor to provide a firm level-bearing surface on which to place the first course of SRW Units. A thin layer (not to exceed 1/2 inch) of well-graded sand or stone dust may be used to smooth the top of the leveling pad.

3.05 SRW Unit Installation

A. All SRW Units shall be installed at the proper elevation and orientation as shown on the RA Final Design profile drawing and in conjunction with the project's civil plans. The SRW Units shall be installed in general accordance with the manufacturer's recommendations (RA's Final Design shall govern in any conflict between the two requirements).

B. The first course of SRW Units shall be placed on the leveling pad. The units shall be leveled side-to-side, front-to-rear and with adjacent units, and aligned to ensure intimate contact with the leveling pad. The first course is the most important for accurate and acceptable results. Alignment may be done by means of a string line or an offset from the base line to the backs of the blocks. SRW units shall have a minimum 4 inch overlap of units on each successive course so that the wall is interlocked and continuous. No horizontal gaps greater than 1/4 inch between the faces of adjacent units are permitted.

C. Because the wall has a setback, its batter must be predetermined during the stake out process by the civil engineer/surveyor and wall installer. If there are critical dimensions that must be met on the high side of the wall then the base (at the toe) will need to be moved forward to compensate.

D. Lay out of curves and corners shall be installed in accordance with the civil plans and the RA Final Design. Construction techniques for curves and corners shall be in general accordance with the SRW manufacturer's installation guidelines. In general, all tangent angles shown on the civil drawings should be changed into curves to enhance the wall's strength and appearance. Continuous vertical joints are not recommended. Inside and outside 90° corners may be constructed without compromising the wall's integrity if they are properly interlocked. Inside corners should be constructed so that the SRW Units interlock (according to manufacturer's recommendations) and outside corners should incorporate special corner blocks when possible. If special outside corner blocks are not available from the block manufacturer for this project then the manufacturer's guidelines for building structural outside corners shall be followed. If gluing is necessary only industrial grade adhesives or sealants designed for concrete-to-concrete applications may be used (adhesives designed for plastic or wood applications are not acceptable).

E. Clean all excess debris from the tops of the SRW Units and install the next course.

F. Repeat procedures to extent of wall height.

G. A +2 (tolerance is permitted horizontally for wall batter (block setback). In no case shall a wall go beyond vertical (have a negative batter). Walls shall be built level (not with grade), however a +1.5 inch tolerance over a 10 foot distance is permitted vertically (as checked from left to right along the wall).

H. Embedment shall be a minimum of 1 inch buried for every 1 foot of wall exposed with one block minimum when the front slope is 4:1 or greater (more level). Walls constructed on 3:1 front slopes or less (more steep) require additional buried blocks. See the profile drawing in the RA Final Design for the exact amount of embedment (the amount of buried block can be determined at each wall station by subtracting the "BB" elevations from the "GR" elevations).

3.06 Geogrid Reinforcement Placement

A. All geogrid reinforcement shall be installed at the proper elevation, length and strength as shown on the profile and structural cross sections in the RA Final Design. Partial geogrid coverage is not acceptable: no gaps shall be present between geogrid layers. 100% coverage is required, however it is not necessary to overlap the geogrid pieces. The geogrid shall be laid horizontally on the compacted infill soil and on top of the concrete SRW Units. The geogrid must be embedded into the SRW Units to the face. The wall installer shall verify that the orientation of the geogrid is in accordance with the geogrid manufacturer's recommendations. The highest strength direction of the geogrid must be perpendicular to the wall face (the geogrid must not be laid parallel to the wall— cannot be rolled out with the wall).

B. Geogrid reinforcement layers shall be one continuous piece for their entire embedment length. Overlapping of the geogrid in the design strength direction (perpendicular to the wall face) is not permitted.

C. Tracked construction equipment shall not be operated directly on the geogrid. A minimum of 6 inches of backfill is required prior to operation of tracked vehicles over the geogrid. Turning should be kept to a minimum. Rubber-tired equipment may pass over the geogrid reinforcement at slow speeds (less than 5 MPH).

D. The geogrid shall be in tension and free of wrinkles prior to placement of the infill soil. Nominal tension shall be applied to the geogrid and secured in place with staples, stakes or by hand until it is covered by 6 inches of infill soil.

E. For inside & outside corners and inside & outside curves the geogrid shall be placed according to the manufacturer's instructions to provide total geogrid coverage. On outside corners the geogrid should be shifted up or down one course and alternated so that the geogrid comes into the reinforced geogrid zone from both legs of the 90° angle. Geogrid layers should never be placed on top of one another; there must be a minimum of 3 inches of compacted infill soil between geogrid layers.

3.07 Wall Drainage

A. Drainage aggregate (clean gravel such as #57 or equivalent) shall be installed behind the entire wall face from the first course below grade to one course from the top of the wall. The drainage gravel shall be placed to a minimum thickness of 12 inches behind the SRW Units. Drainage gravel shall also fill all voids between and within (if hollow) the SRW Units. SRW Units must be filled with drainage aggregate in one course lifts (SRW Units may not be stacked in two or three course lifts and then have the gravel dumped in from the top through multiple courses). An impermeable clay layer (CL, GC or SC) shall be placed on top of the 12" drainage layer. If clayey soils are not readily available, a layer of filter fabric (Mirafi 140N or equivalent) shall be placed on top of the gravel (below the topsoil) to prevent the downward migration of fines.

B. Drains are mandatory and shall be vented to daylight at the end(s) of the wall, at a central low point of the wall, or through the wall face at maximum intervals of 30 feet on center (no more than 6 inches above finished grade when vented through the wall face). The pipe(s) must maintain gravity flow of water outside the reinforced geogrid zone. Water must drain to an outlet and have positive flow. If a continuous pipe is run, it shall daylight into a storm sewer manhole or along a slope at an elevation lower than the low point of the pipe within the drainage aggregate. When drains are daylighted at the end(s) of a wall they must be visible and unobstructed. The drains/pipes should be checked by the owner on a regular basis to ensure that they remain open (not blocked, filled in, grown over, pinched).

C. Rear drains/pipes are required in the following situations: when groundwater can rise and approach within 1 foot of the leveling pad sub-grade, in "cut" situations where the potential exists for storm water to enter the interface between the reinforced geogrid zone and the retained zone and when low permeable soils (CL— lean clay & ML— silt) are used for infill soil. Retaining walls with low permeable soils in the reinforced geogrid zone are more susceptible to being negatively impacted by hydrostatic forces. The owner may elect to install a rear drain/pipes to minimize or eliminate potential hydrostatic force buildup leading to potential wall movements. RA recommends a rear drainage system for all walls with these soil types in cut situations, however ultimately it is the owner's decision. This rear drain/pipes shall be surrounded by a minimum of 12 inches of clean gravel (#57 or equivalent) and surrounded with filter fabric to prevent the migration of fines. This rear drain/pipes must vent to daylight or be directed to a storm sewer manhole (see instructions for front drainage in section 3.07B above).

D. Chimney drains (a second 12 inch layer of drainage aggregate within the rear 1 foot of the reinforced geogrid zone or directly behind the reinforced geogrid zone) must be installed when groundwater is present or likely (to an elevation that is a minimum of 1 foot above predicted levels as given by the site geotechnical engineer), when stated in the RA Final Design or when required by the site geotechnical engineer.

E. All drainage zone aggregate shall be compacted to 95% of a standard proctor maximum dry density with a vibratory plate compactor (minimum of three passes).

3.08 Backfill Placement

A. The infill soil shall be placed as shown in the RA Final Design in the maximum compacted lift thickness of 10 inches and shall be compacted to a minimum of 95% of a standard proctor maximum dry density (ASTM D 698) at a moisture content within 2% of optimum. The backfill shall be placed and spread in such a manner as to eliminate wrinkles or movement of the geogrid and the SRW units. Compaction testing shall be done at 25%, 50%, 75% and 100% of the wall height or as specified by the site geotechnical engineer.

B. Only a vibratory plate or small-scale vibratory smooth drum compactor equipment shall be allowed within 3 feet of the front of the wall face. Compaction within the 3 feet behind the wall face shall be achieved by at least three (3) passes of the lightweight mechanical plate compactor or roller. Heavy equipment (such as track hoes, ride on rollers, pons, etc.) must be kept back a minimum of 3 feet from the rear of the wall.

C. At the end of each day's operation, the wall installer shall slope the last level of backfill away from the wall facing to direct water runoff away from the wall face.

D. At completion of wall construction if final grading, paving, landscaping and/or storm drainage installation adjacent to the wall is not placed immediately after wall completion, temporary grading shall be provided to ensure that water runoff is not allowed to collect or pond behind the wall until final construction adjacent to the wall is completed.

E. Filter fabric (Mirafi 140N or equivalent) is required when the infill soil is classified as poorly graded sand (SP) or well graded sand (SW) since these soils are non-cohesive and could potentially slough, clogging the gravel drainage layer. Filter fabric is optional between the 12 inch gravel drainage layer and the compacted infill soil if the backfill soils are clayey (CL or SC), gravely (GC, GM, GP or GW) or silty (ML or SM).

3.09 SRW Caps

A. SRW caps shall be properly aligned and glued (for safety reasons) to the underlying SRW Units with a flexible high-strength concrete adhesive or sealant designed for "concrete to concrete" applications (not for plastic or wood). Rigid adhesive or mortar is not acceptable.

3.10 Water Applications

A. When walls are installed in water applications (such as storm water ponds, streams, bulkheads, areas adjacent to flood plains, etc.) all clean gravel must be used as infill up to 1 foot above the 100 year flood elevation, the high water level or the top of berm/spillway. This gravel must be free draining and have less than 10% fines (#57 or equivalent). Filter fabric (Mirafi 140N or equivalent) must go in front of the buried block, under the leveling pad, behind the reinforced geogrid zone (vertically up to the extent of the gravel infill) and on top of the gravel infill (horizontally). This is required to prevent the migration of fines into the gravel infill. Rip rap is required in front of the bottom three courses on walls installed in tidal waters. Rip rap is also required when indicated on the civil plans and where pipes with active water flow exit through the wall.

3.11 Rails, Fences & Other Structures

A. The scope of RA for this project does not include fence or railing designs. Typical details have been given to provide general guidelines for the installation of fences, guardrails and railings behind walls. RA cannot give specific details because the type, placement and height of fences and rails vary widely and because the requirements are different depending on the municipality and regulatory authority. RA can provide a project specific fence or rail detail and structural design for an additional fee if given exact information (material type and size and manufacturer's specifications and installation guidelines).

B. Open fences and railings not subject to wind loads (minimum of 50% open and maximum of 50% solid) may be placed directly behind the wall or in the wall (can be placed in the blocks only if they are a hollow system and if the cores and web alignment will accept the posts) as long as they are not subject to vehicular impact. Solid or semi-solid fences that are subject to wind loads must be kept back a minimum of 3 feet from the rear of the wall to prevent loading of the wall.

C. Guardrails subject to vehicular impact must be kept back a minimum of 3 feet from the rear of the wall to prevent loading of the wall. Guardrails may be placed closer than this 3 foot minimum only if a barrier (such as curbing, wheel stops, etc.) is in place to prevent vehicular impact (the overhang of vehicles must be considered when determining this).

D. Light post foundations, sign foundations and similar structures subject to wind loads must be kept back a minimum of 3 feet from the rear of the wall to prevent loading of the wall.

E. In cases where these 3 foot minimum distances cannot be met due to restraints on the site, additional analyses will need to be done to determine methods of stabilization. RA can provide these designs for an additional fee.

3.12 Storm Structures & Utilities

A. Reinforced Concrete Pipes (RCP) may pass through the leveling pad or wall structure without additional means of support (it should be verified from the pipe manufacturer that the pipe can withstand a load equal to or greater than that exerted by the wall— as stated in the RA Final Design General Notes under "Bearing Capacity"). The SRW units may be cut to fit around the pipe and the voids filled with non-shrink grout or type "M" mortar. A concrete collar may be cast around the structure if desired for ease of construction and aesthetic considerations. When a collar is cast, the top of the collar must line up with an even block course to maintain proper alignment, neat workmanship and to eliminate horizontal cutting of blocks.

B. The wall may not bear on plastic or steel pipes (such as ADS, CMP, HDPE, SLCPP, etc.) or utilities (such as electric, gas, phone lines, sewer or water lines, etc.). Grade beams or lintels must be used to bridge these non-load bearing structures. If a specific grade beam or lintel is not specified in the RA Final Design, RA shall be consulted to determine the size, strength and reinforcing of the grade beam or lintel. If these non-load bearing pipes or utilities are located at minimum of 42 inches below the wall's leveling pad then a grade beam or lintel is not necessary.

C. Concrete storm structures may be located behind a wall and be within the reinforced geogrid zone as dictated by the project's civil drawings. If the structure(s) cannot be moved out of the reinforced geogrid zone and the geogrid cannot be installed to its full design length the following shall apply. On small structures (such as collection boxes, concrete pipes less than 18 inches, inlets, manholes, etc.) it is acceptable to shorten the geogrid from the design length and meet the structure. The area between the wall and structure where the geogrid has been shortened must be filled with gravel (#57 or equivalent) and not soil. The gravel must be compacted to 95% of a standard proctor maximum dry density with a vibratory plate compactor. On large structures and in cases where pipes parallel the wall for long distances, RA shall be consulted to determine the impact on the wall before allowing this to be done.

D. The wall's integrity may be compromised if pipes or structures burst or develop leaks and allow water or fluids to saturate the reinforced geogrid zone. RA is not responsible for wall failure that results from pipes or structures that burst or leak and allow water or fluids to saturate the reinforced geogrid zone.

3.13 Construction Adjacent to Completed Wall

A. The owner or owner's representative is responsible for ensuring that construction adjacent to the wall by others does not disturb the wall or place temporary construction loads on the wall that exceed design loads, including loads such as water pressure, temporary grades, or equipment loading. Heavy paving or grading equipment shall be kept a minimum of three feet behind the back of the wall face. Equipment with wheel loads in excess of 150 PSF live load shall not be operated with 10 feet of the face of the retaining wall during construction adjacent to the wall. Care should be taken by the general contractor or owner to ensure water runoff is directed away from the wall structure until final grading and surface drainage collection systems are completed.

B. Care must be taken when installing appurtenances (such as generators, transformers, etc.) or utilities within the reinforced geogrid zone of the wall. The compacted infill soil of the reinforced geogrid zone must be maintained, both below and beside (around) the appurtenance or utility. Neglecting to do so may cause hydrostatic pressure and wall failure.

3.14 Storm Water Management & Slopes

A. The segmental retaining wall is not a storm water management structure. The wall can accommodate the rainfall above the reinforced geogrid zone but not the watershed (including the retained zone). Therefore it is absolutely essential that surface water be prevented from entering (and ultimately saturating) the reinforced geogrid zone. This is usually accomplished by the site engineer (owner's civil engineer) grading the surface behind the wall to direct surface water to swales that divert the water around the wall ends, to inlets or over the top of the wall through scuppers. If water is directed to the wall (such as applications with back slopes), the top 8 inches of compacted fill over the reinforced geogrid zone must have impermeable soil (such as CL, GC or SC). If clayey soils are not readily available an underlying geomembrane (geosynthetic liner) may also be used. This geomembrane shall be Mirafi G200N. Straddrain or similar devices shall extend downward vertically a minimum of 3 feet behind the reinforced geogrid zone, be laid horizontally on top of the reinforced geogrid zone with a maximum slope of 10:1 and extend forward into the 12 inch gravel drainage layer.

B. The site geotechnical engineer is responsible for verifying the stability of slopes on the project. RA's scope includes only wall the design, not the evaluation of back slopes (above walls) or front slopes (at the base of walls). RA performs global stability analyses on walls that rest on major front slopes, however only the wall is analyzed, not the actual slopes above or below the wall. It is the responsibility of the site geotechnical engineer to determine if the site soils are able to sustain the proposed grades. If not, they shall determine and specify the additional reinforcement that is necessary to provide the proper slope stability and prevent erosion.

C. The general contractor, owner, site contractor and/or wall installer must provide for proper wall drainage to prevent the buildup of hydrostatic pressures over the service life of the structure. In the event additional water is introduced into the general wall area, either above or below grade, the RA Final Design will be invalid (the exception is "water applications" where clean gravel is used for infill and it is wrapped in filter fabric and the design intent is for the wall to be interacting with water).

3.15 Post Construction Responsibilities

A. Retaining walls are a substantial financial investment. Therefore it is in the owner's best interest that a wall maintenance budget be established within the overall property management budget to monitor and provide preventative maintenance. Retaining wall maintenance, at a minimum, should consist of: checking drainage, inspecting for settling and surveying to verify alignment and batter. This service should be by qualified personnel under the supervision of a licensed geotechnical/structural engineer. RA can provide this service for an additional fee.

B. RA SHOULD BE NOTIFIED AS SOON AS REASONABLY POSSIBLE IF THE RETAINING WALL EXHIBITS CONDITIONS CONTRARY TO THE RA FINAL DESIGN SO THAT RA MAY BE CONSULTED TO PROTECT THE OWNER'S INVESTMENT.

END OF SECTION Revised 03-25-04  
The information contained herein is proprietary and is the sole property of RA. It is only intended for use on this project. Reuse of these drawings, sketches, and design computations in any manner is strictly prohibited without written approval from RA. Any other use is subject to penalty of law. (c)

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

*Michael A. Taylor* 2/14/05  
DIRECTOR DATE  
*Willie R. Williams* 3/7/05  
CHIEF, DEVELOPMENT ENGINEERING DIVISION MRP DATE  
*Lucy Thomas* 3/14/05  
CHIEF, DIVISION OF LAND DEVELOPMENT DATE

12-16-04 1 REVISED PER NEW CIVIL PLANS 12-16-04

DATE NO. REVISION

OWNER: CHARLES & BONNIE BLACK  
319 FAIRFIELD DRIVE  
SEVERN, MD. 21144

DEVELOPER: CHARLES & BONNIE BLACK  
319 FAIRFIELD DRIVE  
SEVERN, MD. 21144

PROJECT: BLACK RESIDENCE  
SINGLE FAMILY DETACHED DWELLING

TAX MAP 38, GRID B, PARCEL 808  
1st ELECTION DISTRICT  
WATER CODE 44-6906 SEWER CODE 22-5

TITLE: SPECIFICATIONS

MESSICK & ASSOCIATES \*  
CONSULTING ENGINEERS  
31 OLD SOLOMONS ISLAND RD., SUITE 201  
ANNAPOLIS, MARYLAND 21401  
(410) 266-3212 \* FAX (410) 266-3502

DATE: DESIGNED BY: JWP  
DRAWN BY: JWP  
PROJECT NO:  
DATE: JUNE, 2004  
SCALE: AS SHOWN  
DRAWING NO.: 7 OF 7

 **RYAN & ASSOCIATES**  
A Division of WKR Consulting, Inc

**CONSTRUCTION NOTES**

- No sediment and erosion control devices may be removed without prior approval from the Howard County Inspector.
- Stabilize any disturbed area as soon as possible by permanent or temporary means.
- All temporary stock piles and excess material shall be removed to an approved spoil site. All borrow material shall be obtained from an approved site.
- It shall be the responsibility of the contractor or subcontractor to notify the engineer of any deviation to these plans prior to any change being made. Any change in these plans without the written authorization for said change from the engineer shall be the responsibility of the contractor or subcontractor.
- Utilities shown on these plans are in accordance with the best information available for the contractor. The contractor shall be responsible for locating and protecting all existing services and mains (public or private). The contractor shall obtain the services of a private utility locator to locate all existing private services and mains. The owners and engineer assume no responsibility for accuracy or completeness of the information shown. Existing mains and services shall be carefully protected and any damage to them caused by the work shall be immediately repaired to the satisfaction of the engineer by the contractor at the contractor's expense, using materials of the kinds damaged.
- The contractor shall call "MISS UTILITY", 1-800-257-7777, a minimum of 48 hours in advance of any excavation, boring, and/or digging to determine the location of underground utilities.
- The contractor shall grade all areas within the area of construction and shall warp paving as necessary to insure positive drainage.
- The Contractor shall be responsible for coordination of his construction with the construction by other contractors and subcontractors.
- All soil erosion control measures shall be in accordance with the 1994 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL.
- Failure to specifically mention items which would normally be required to complete the work and develop this site in accordance with the approved plans, shall not relieve the contractor from performing such work. This work shall be part of the contractor's base bid.

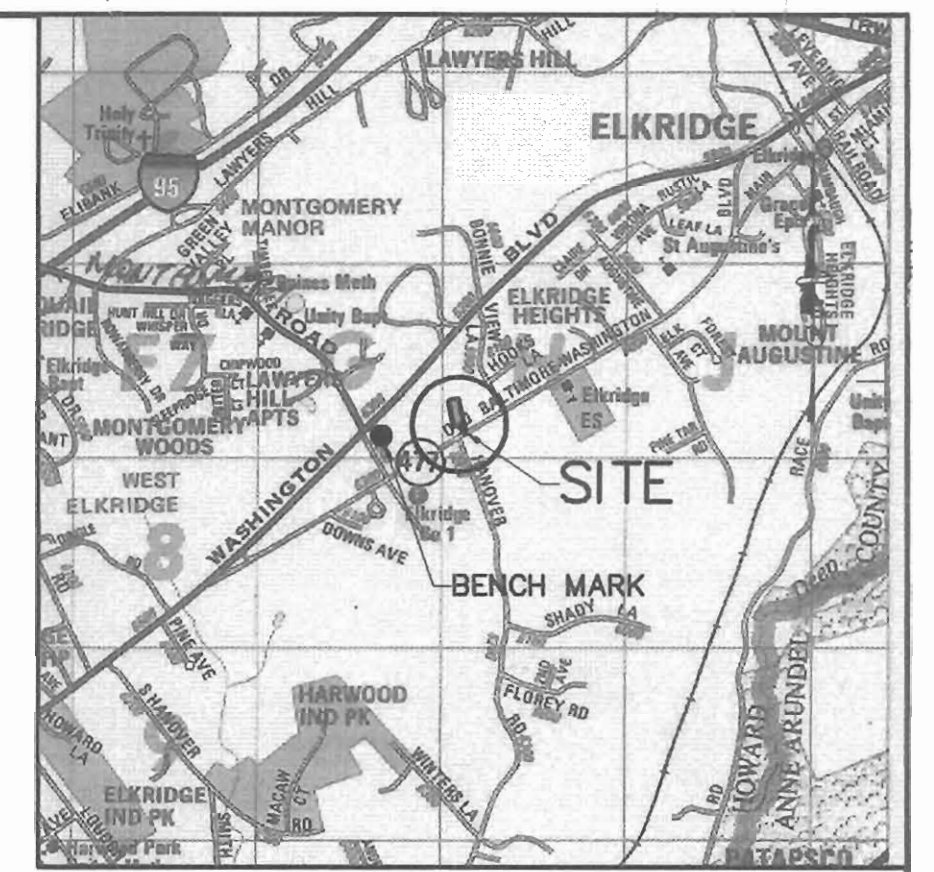
**GENERAL NOTES**

- THE SUBJECT PROPERTY IS ZONED R-12 PER 2/2/04 COMPREHENSIVE ZONING PLAN.
- COORDINATES BASED ON NAD'83, THE MARYLAND COORDINATE SYSTEM AS PROJECTED BY HOWARD COUNTY GEODETIC CONTROL STATION No.38AA.
- B.R.L. DENOTES BUILDING RESTRICTION LINE.
- DEED REFERENCE: LIBER 474 FOLIO 419.
- FOR FLAG OR PIPESTEM LOTS, REFUSE COLLECTION, SNOW REMOVAL AND ROAD MAINTENANCE ARE PROVIDED TO THE JUNCTION OF THE FLAG OR PIPESTEM AND THE RIGHT-OF-WAY LINE AND NOT TO THE PIPESTEM LOT DRIVEWAY.
- DRIVEWAYS SHALL BE PROVIDED PRIOR TO ISSUANCE OF A USE AND OCCUPANCY PERMIT FOR ANY NEW DWELLINGS TO INSURE SAFE ACCESS FOR FIRE AND EMERGENCY VEHICLES PER THE FOLLOWING MINIMUM REQUIREMENTS:
  - WIDTH: 12 FT. (14 FT. SERVING MORE THAN ONE RESIDENCE).
  - SURFACE: 6 IN. OF COMPACT CRUSHER RUN BASE WITH TAR AND CHIP COATING.
  - GEOMETRY: MAXIMUM 15% GRADE, MAXIMUM 10% GRADE CHANGE AND MINIMUM 45 FT. TURNING RADIUS.
  - STRUCTURES: (CULVERTS AND BRIDGES) CAPABLE OF SUPPORTING 25 GROSS TONS-H25 LOADING.
  - DRAINAGE ELEMENTS: CAPABLE OF SAFELY PASSING A 100 YEAR FLOOD-WITH NO MORE THAN ONE FT. DEPTH OVER DRIVEWAY SURFACE.
  - MAINTENANCE: SUFFICIENT TO INSURE ALL WEATHER USE.
- THIS PLAN IS BASED ON A FIELD-RUN MONUMENTED BOUNDARY SURVEY PERFORMED ON OR ABOUT MARCH 2004 BY DESIGN TECH ASSOCIATES, INC.
- THE AREAS SHOWN ON THIS PLAN ARE INDICATED (±) MORE OR LESS.
- WATER AND SEWER SERVICE TO THIS LOT WILL BE GRANTED UNDER PROVISIONS OF SECTION 18.122 B OF THE HOWARD COUNTY CODE. PUBLIC WATER AND SEWER ALLOCATION WILL BE GRANTED AT THE TIME OF ISSUANCE OF THE BUILDING PERMIT IF CAPACITY IS AVAILABLE AT THAT TIME.
- PUBLIC WATER SERVICE WILL BE PROVIDED TO THIS LOT BY HOUSE CONNECTIONS TO CONTRACT No. 44-0906. PUBLIC SEWER SERVICE WILL BE PROVIDED TO THIS LOT BY HOUSE CONNECTIONS TO CONTRACT No. 22-5.
- WATER AND SEWER CONNECTIONS SHALL BE COMPLETED IN ACCORDANCE WITH THE LAYOUT AS SHOWN HEREON.
- THERE ARE NO WETLANDS ON SITE AND THE PROPERTY IS NOT LOCATED WITHIN THE 100-YEAR FLOODPLAIN.
- THIS PROPERTY IS EXEMPT FROM FOREST CONSERVATION PER SECTION 16.1202(b)(1)(i) BECAUSE THIS PARCEL IS LESS THAN 40,000 SQUARE FEET IN AREA.
- THERE ARE NO ENVIRONMENTALLY SENSITIVE FEATURES OR BUFFERS ON THIS SITE.
- LANDSCAPING HAS BEEN PROVIDED IN ACCORDANCE WITH SECTION 16.124 OF THE HOWARD COUNTY LANDSCAPE CODE AND THE LANDSCAPE MANUAL. SURETY IN THE AMOUNT OF \$5,130.00 WILL BE POSTED WITH THE GRADING PERMIT FOR 15 SHADE TREES AND 21 EVERGREEN SHRUBS.
- IN ACCORDANCE WITH SECT. 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 SETBACK, PORCHES OR DECK, OPEN OR ENCLOSED MAY PROJECT NOT MORE THAN 10 FEET INTO THE FRONT OR REAR SETBACKS.
- THE PURPOSE OF THE RETAINING WALL ALONG THE 7.5' SETBACK LINE IS TO PROVIDE ADEQUATE VEHICULAR ACCESS INTO THE GARAGE. THE RETAINING WALL ALONG THAT LINE COMPLIES WITH THE SIDE SETBACK REQUIREMENTS, SINCE THE WALL WILL NOT EXCEED 3 FEET IN HEIGHT.
- PARCELS 808 & 123 HAVE A PRIVATE AGREEMENT TO UTILIZE THE DRIVEWAY. THERE IS NO SHARED USE-IN-COMMON ACCESS EASEMENT OR MAINTENANCE EASEMENT BETWEEN THE OWNERS.
- All construction shall be in accordance with the latest standards and specifications of Howard County, plus MSHA standards and specifications, as applicable.
- 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 the start of work.
- The contractor shall notify "MISS UTILITY" at 1-800-257-7777 at least 48 hours prior to any excavation work being done.
- The existing topography is taken from a field run topographic survey by Design Tech Associates dated March 2004.
- 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 any work being done in the public road.
- All plan dimensions are to edge of paving and face of building unless otherwise noted.
- The coordinates shown hereon are based upon the Howard County Geodetic Control which is based upon the Maryland State Plane Coordinate System. Howard County monument 38AA 31R1 and 37B4.
- Existing utilities are based on Howard County Record Drawings for contract 44-0906.
- Storm water management for this project is provided by an on-site system.
- A noise study is not required for this project.
- Contractor is solely responsible for construction means, methods, techniques, sequences, procedures, and safety precautions and programs.
- All pipe elevations shown are invert elevations.
- All fill areas within roadway and under structures to be compacted to a minimum of 95% compaction of AASHTO T180.

# SITE DEVELOPMENT PLAN FOR BLACK RESIDENCE 1st ELECTION DISTRICT HOWARD COUNTY, MARYLAND

**BENCH MARK #1**  
HOWARD COUNTY, MD. MONUMENT 38AA  
VERTICAL DATUM: NAVD88  
ELEV.= 220.073  
HORIZONTAL DATUM: NAD83  
N 561,158.8557  
E 1,389,728.3306

**BENCH MARK #2**  
HOWARD COUNTY, MD. MONUMENT 371A  
VERTICAL DATUM: NAVD88  
ELEV.= 195.75  
HORIZONTAL DATUM: NAD83  
N 490,906.0  
E 865,758.6  
(INTERSECTION OF MEADOWRIDGE RD & MD. RTE.1)



ADC PERMITTED USE NUMBER 21003176

**VICINITY MAP**  
SCALE: 1"=2000'

**SITE ANALYSIS DATA CHART**

TOTAL PROJECT AREA: 32,320 SQ. FT. (0.742 AC.)  
LIMIT OF DISTURBED AREA: 14,152 SQ. FT. (0.325 AC.)  
PRESENT ZONING DESIGNATION: R-12  
PROPOSED USE: SINGLE FAMILY DWELLING  
TOTAL NUMBER OF UNITS ALLOWED: 1  
TOTAL NUMBER OF UNITS PROPOSED: 1  
NUMBER OF PARKING SPACES REQUIRED: 2  
NUMBER OF PARKING SPACES PROVIDED: 2  
BUILDING COVERAGE OF SITE: 3,373 SQ. FT. (10.5%)



**BUILDING ELEVATION**

SCALE: 1" = 10'

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

*Mark Dingle* 3/16/05  
DIRECTOR DATE

*W.D. Williams* 3/17/05  
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

*Linda Hamilton* 3/15/05  
CHIEF, DIVISION OF LAND DEVELOPMENT DATE

DATE NO. REVISION

OWNFR: CHARLES & BONNIE BLACK  
319 FAIRFIELD DRIVE  
SEVERN, MD. 21144

DEVELOPER: CHARLES & BONNIE BLACK  
319 FAIRFIELD DRIVE  
SEVERN, MD. 21144

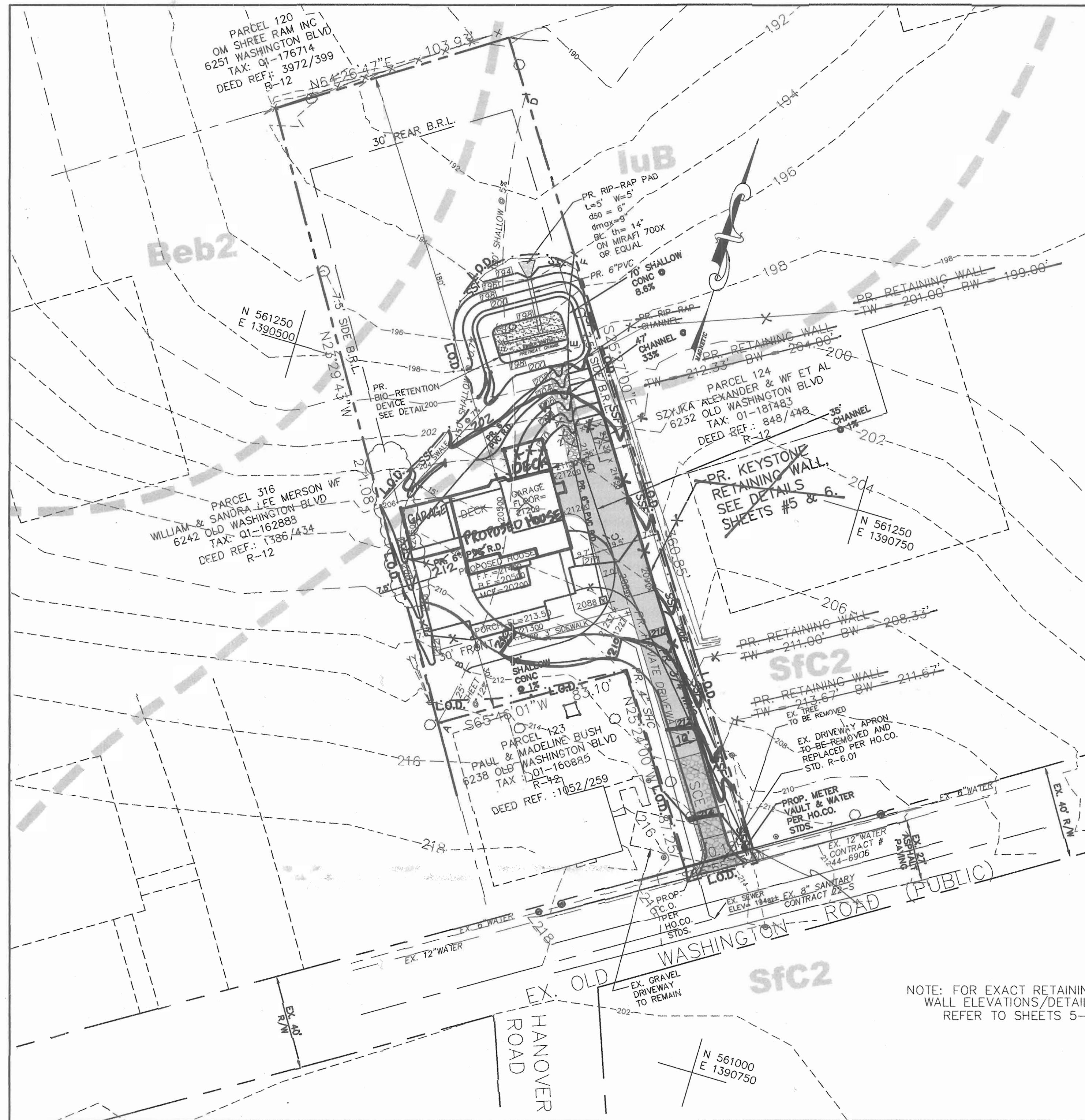
PROJECT: **BLACK RESIDENCE**  
SINGLE FAMILY DETACHED DWELLING

TAX MAP 38, GRID 8, PARCEL 808  
1st ELECTION DISTRICT  
WATER CODE 44-6906 SEWER CODE 22-5

TITLE: **TITLE SHEET**

MESSICK & ASSOCIATES\*  
CONSULTING ENGINEERS  
31 OLD SOLOMONS ISLAND RD., SUITE 201  
ANNAPOLIS, MARYLAND 21401  
(410) 266-3212 \* FAX (410) 266-3502

DESIGNED BY: WAN  
DRAWN BY: COP  
PROJECT NO:  
DATE: MARCH, 2004  
SCALE: AS SHOWN  
DRAWING NO.: 1 OF 7



**PLAN VIEW**

SCALE: 1" = 30'

NOTE: FOR EXACT RETAINING WALL ELEVATIONS/DETAILS REFER TO SHEETS 5-7.

**SHEET INDEX**

- TITLE SHEET
- SITE DEVELOPMENT PLAN
- NOTES AND DETAILS
- LANDSCAPE PLAN
- RETAINING WALL PLAN
- RETAINING WALL PLAN
- RETAINING WALL PLAN

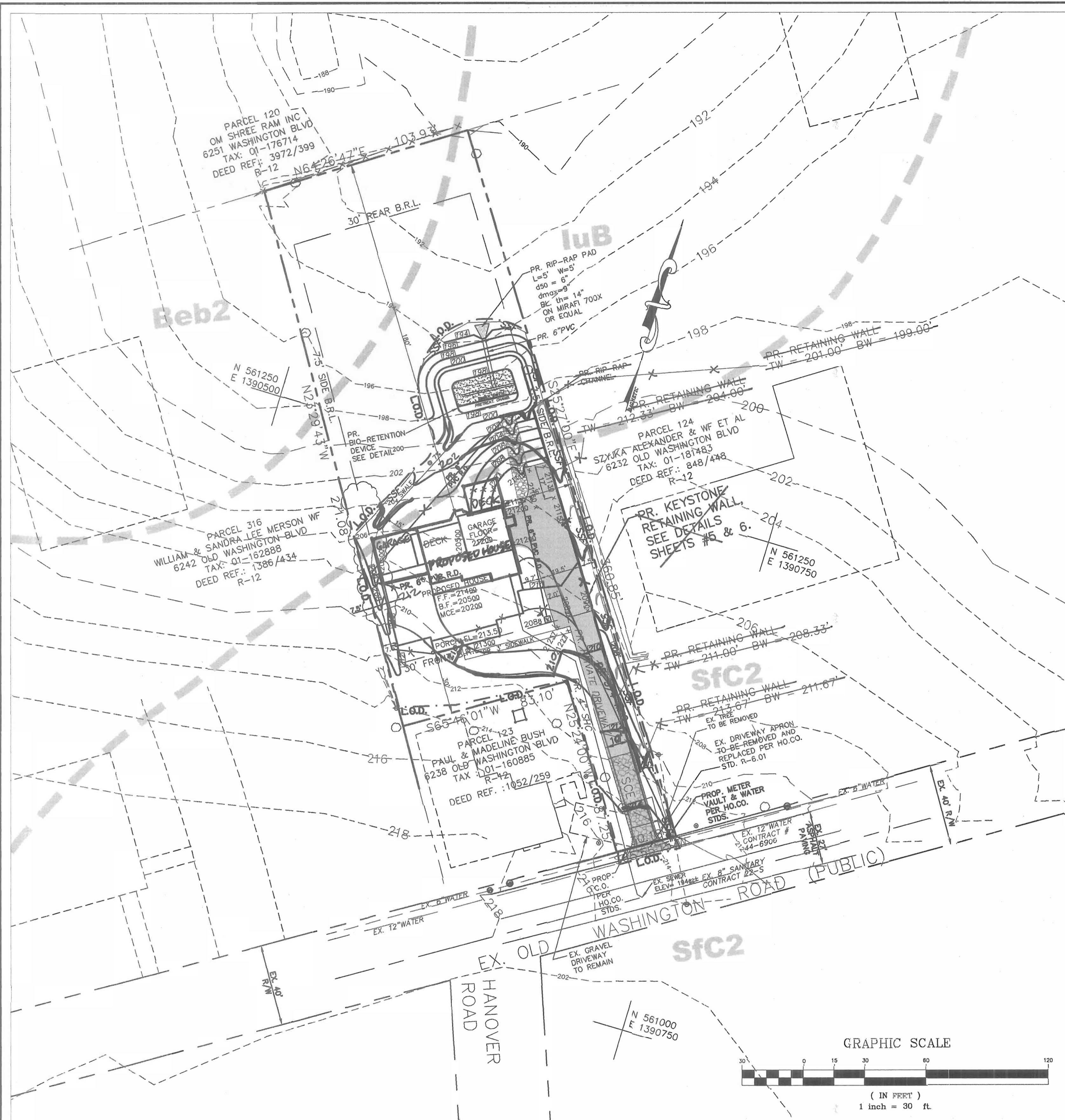
**ADDRESS CHART**

PARCEL	STREET ADDRESS
808	6236 OLD WASHINGTON RD ELKRIDGE, MD 21075

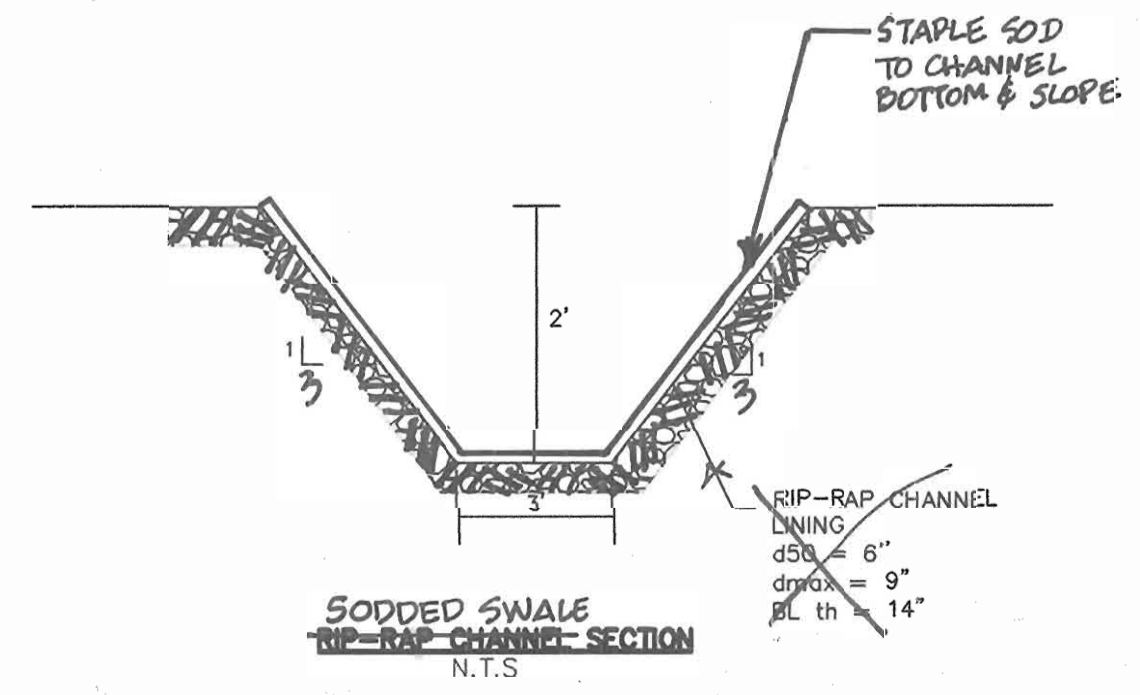
SUBDIVISION NAME - N/A	SECT./AREA - N/A	PARCEL - 808
DEED REF - 474 F.419	GRID # - 8	ZONING - R-12
TAX MAP NO. - 38	ELECT. DIST. - 1st	CENSUS TRACT - 601201
WATER CODE - 44-0906	SEWER CODE - 22-5	

WAYNE A. NEWTON #21591





TYPE	DESCRIPTION
Beb2	Beltville Silt loam, 5 to 15 percent slopes, moderately eroded.
luB	luka loam alluvion, 1 to 5 percent slopes.
SfC2	Sassafras Gravelly sandy loam, 5 to 10 percent slopes, moderately eroded.



**Chapter 3. Performance Criteria for Urban BMP Design - Stormwater Filtration Systems**

**3.4.6 Filtration Maintenance Criteria**

The sediment chamber outlet device shall be cleaned/inspected when sediment rises within the chamber above 30 inches. Trash and debris shall be removed as necessary.

Inspection should be done at the sedimentation chamber when 1 accumulation is a depth of more than six inches. Vegetation within the sedimentation chamber should be limited to a height of 18 inches.

When the filtering capacity of the filter media is exhausted (e.g., when water ponds on the surface of the filter bed for more than 72 hours), the top five inches of discarded material shall be removed and shall be replaced with fresh material. The removed sediment should be disposed in an acceptable manner (e.g., landfill). Sediment should be removed from the filter bed when the accumulation reaches one inch.

Original filter (F-1) or surface sand filter (F-2) that have a grass cover should be mowed a minimum of 3 times per growing season to maintain maximum grass height less than 12 inches.

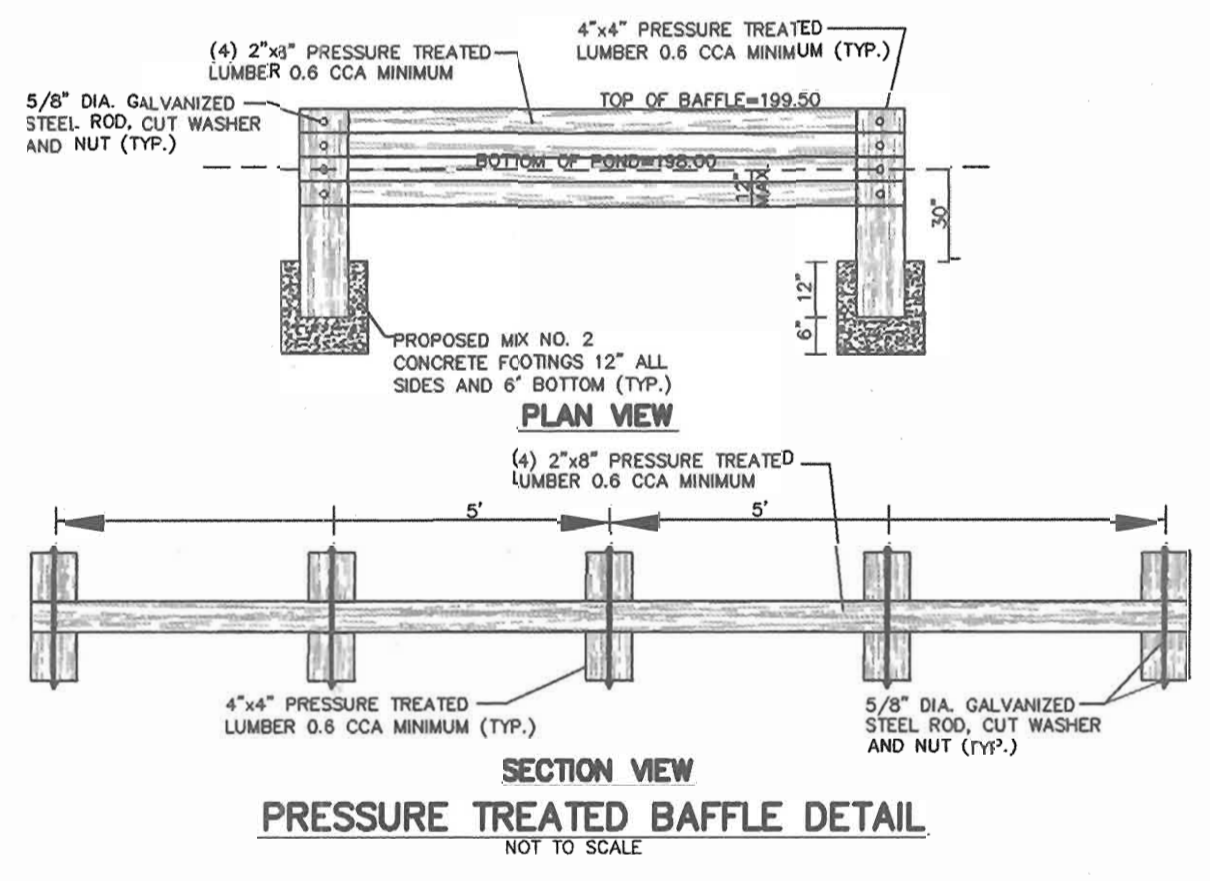
A strip of least six inches shall be provided at the side of bio-retention facilities (F-3) from the driveway. Dead or dormant plant material shall be replaced. Areas devoid of mulch should be re-mulched on an annual basis.

Direct maintenance access shall be provided to the pretreatment area and the filter bed.

Construction of sand filters and bio-retention areas shall conform to the specifications outlined in Appendix B.2.

**Table B.3.2 Materials Specifications for Bio-retention**

Material	Specification	Site	Notes
Planting soil (2.5' to 4' deep)	see Appendix A, Table A.4	n/a	plantings are site-specific
mulch	shredded hardwood	n/a	aged 6 months, minimum
pea gravel diaphragm and curbs drain	pea gravel: ASTM-D-448	pea gravel: No. 6	stone: 2" to 5"
erosion	Class "C" - accurate erosion control (ASTM-D-4753), grad: minimum strength (ASTM-D-4033), permeable resistance (ASTM-D-4833)	n/a	for use as necessary beneath underdrains only
underdrain gravel	AASHTO M-43	0.25" to 0.75"	30" perf. @ 4" on center, 4 holes per row; minimum of 1" of gravel over pipe; not necessary underdrains pipes
underdrain piping	F 784, Type III 20 or AASHTO M-278	4" or 6" rigid schedule 40 PVC or SDR35	on-site setting of poured-in-place concrete required: 28 day strength and slump test; all concrete design (cast-in-place or pre-cast) not using previously approved State or local standards requires design drawings sealed and approved by a professional structural engineer licensed in the State of Maryland - design to include meeting ACI Code 318.1R-99; vertical loading (H-19 or H-20); allowable horizontal loading (based on soil pressure); and analysis of potential cracking.
poured in place concrete (if required)	MSHA Min. No. 3, f'c = 3500 psi @ 28 days, overall weight, air-entrained; reinforcing to meet ASTM-A-616-90	n/a	
sand 11" deep	AASHTO M-6 or ASTM-C-33	0.075" to 0.04"	Sand substitutions such as Diabase and Graystone #10 are not acceptable. No sodium carbonate or dolomitic sand substitutions are acceptable. No "rock dust" can be used for sand.



**LEGEND**

- EX. TREES
- EX. TREES
- EX. 2' CONTOUR
- EX. 10' CONTOUR
- EX. 6" WATER
- EX. 8" SANITARY
- PROP. GRADING
- PR. S.H.C. - PROP. SEWER HOUSE CONN.
- PR. W.H.C. - PROP. WATER HOUSE CONN.
- SOILS DELINEATION LINE

BY THE DEVELOPER :

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

DEVELOPER: *Anna Hans* DATE: 2/1/05

BY THE ENGINEER :

I CERTIFY THAT THIS PLAN FOR EROSION AND SEDIMENT 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.

ENGINEER: *Jim Meyer* DATE: 1/16/05

THESE PLANS HAVE BEEN REVIEWED FOR THE HOWARD SOIL CONSERVATION DISTRICT AND MEET THE TECHNICAL REQUIREMENTS FOR SOIL EROSION AND SEDIMENT CONTROL.

NATURAL RESOURCES CONSERVATION SERVICE DATE: 2/24/05

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

HOWARD SOIL CONSERVATION DISTRICT DATE: 2/24/05

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

*Mark Wright* DATE: 2/16/05

DIRECTOR

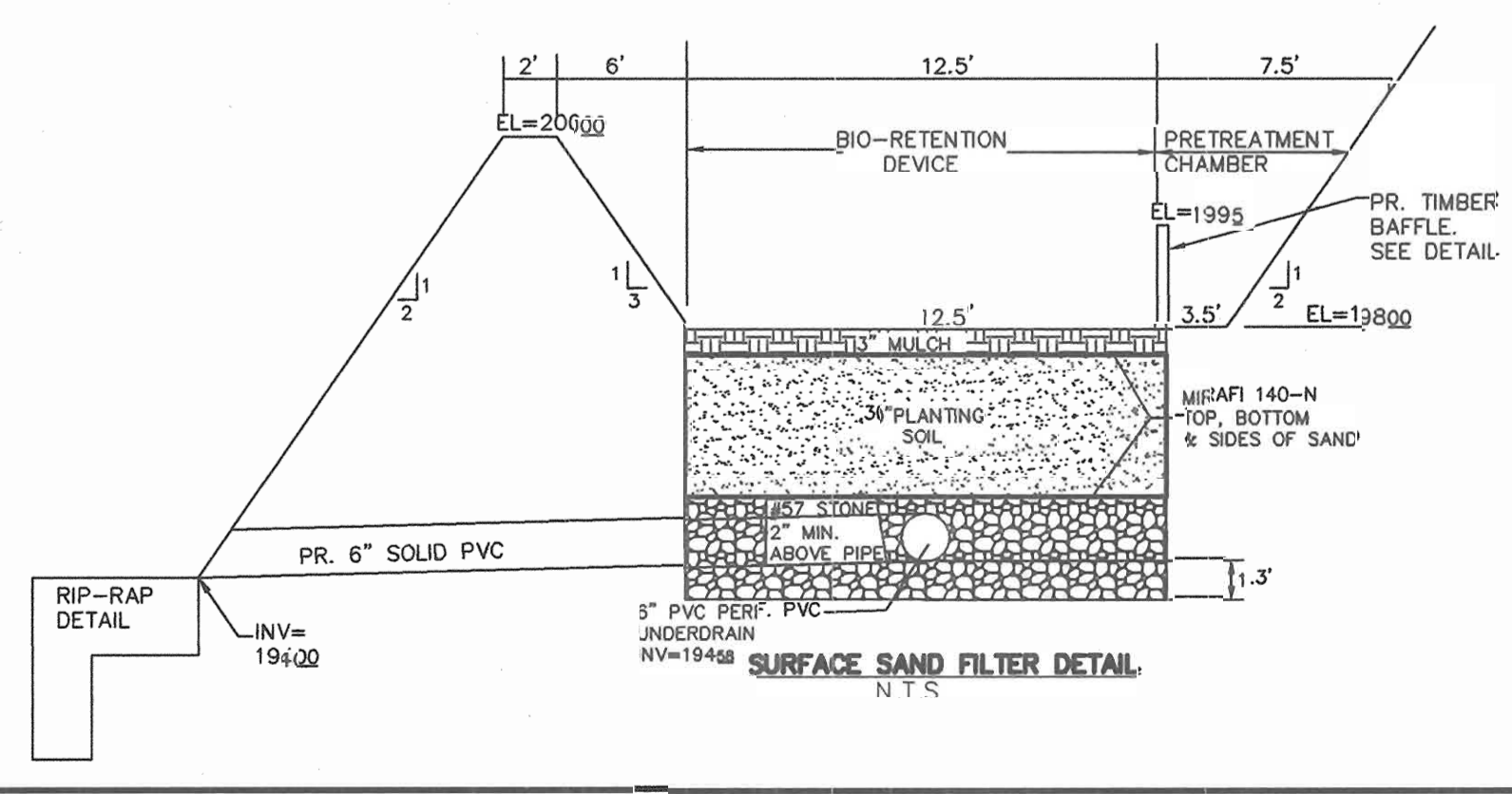
*Mr. Drummond* DATE: 3/7/05

CHIEF, DEVELOPMENT ENGINEERING DIVISION

*Cindy Garcia* DATE: 3/15/05

CHIEF, DIVISION OF LAND DEVELOPMENT

DATE NO.	REVISION
OWNER:	CHARLES & BONNIE BLACK 319 FAIRFIELD DRIVE SEVERN, MD. 21144
DEVELOPER:	CHARLES & BONNIE BLACK 319 FAIRFIELD DRIVE SEVERN, MD. 21144
PROJECT	<b>BLACK RESIDENCE</b> SINGLE FAMILY DETACHED DWELLING
TAX MAP 38, GRID 8, PARCEL 808	1st ELECTION DISTRICT
WATER CODE 44-6906	SEWER CODE 22-S
TITLE	<b>SITE DEVELOPMENT /SEDIMENT &amp; EROSION CONTROL PLAN</b>
<b>MESSICK &amp; ASSOCIATES*</b> CONSULTING ENGINEERS 31 OLD SOLOMONS ISLAND RD., SUITE 201 ANNAPOLIS, MARYLAND 21401 (410) 266-3212 * FAX (410) 266-3502	
DATE: 1/16/05	DESIGNED BY: WAN
DRAWN BY: COP	PROJECT NO:
DATE: MARCH, 2004	SCALE: AS SHOWN
WAYNE A. NEWTON #21591	DRAWING NO.: 2 OF 7



**TEMPORARY SEEDING NOTES**

Apply to graded or cleared areas likely to be reseeded where a short-term 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: Apply 600 lbs. per acre 10-10-10 fertilizer (14 lbs. per 1000 sq. ft.)

Seeding: For periods March 1 thru April 30 and from August 15 thru November 15, seed with 2-1/2 bushels per acre of annual rye (3.2 lbs. per 1000 sq. ft.) For the period May 1 thru August 14, seed with 3 lbs. per acre of weeping lovegrass (0.07 lbs. per 1000 sq. ft.) For the period November 16 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. per 1000 sq. ft.) of unrattled small grain straw immediately after seeding. Anchor mulch immediately after application using mulch anchoring tool or 218 gal. per acre (5 gal. per 1000 sq.ft.) of emulsified asphalt on flat areas. On slopes, 8 ft. or higher, use 347 gal. per acre (9 gal. per 1000 sq.ft.) for anchoring.

Refer to the 1983 Maryland Standards and Specifications for Soil Erosion and Sediment Control for rate and methods not covered.

**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. per 1000 sq.ft.) and 600 lbs. per acre 10-10-10 fertilizer (14 lbs. per 1000 sq.ft.) before seeding. Harrow or disc into upper three inches of soil. At time of seeding, apply 400 lbs. per acre 30-0-0 ureaform fertilizer (9 lbs. per 1000 sq.ft.).
- 2) Acceptable - Apply 2 tons per acre dolomitic limestone (92 lbs. per 1000 sq.ft.) and 1000 lbs. per acre 10-10-10 fertilizer (25 lbs. per 1000 sq. ft.) before seeding. Harrow or disc into upper three inches of soil.

Seeding: for the period March 1 thru April 30 and from August 1 thru October 15, seed with 60 lbs. per acre (1.4 lbs. per 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 (0.05 lbs. per 1000 sq.ft.) of weeping lovegrass. During the period October 16 thru February 28, protect site by one of the following options:

- 1) 2 tons per acre of well-anchored mulch straw and seed as soon as possible in the spring.
- 2) Use sod.
- 3) Seed with 60 lbs. per acre Kentucky 31 Tall Fescue and mulch with 2 tons per acre well anchored straw.

Mulching: Apply 1-1/2 to 2 tons per acre (70 to 90 lbs. per 1000 sq.ft.) of unrattled small grain straw immediately after seeding. Anchor mulch immediately after application using mulch anchoring tool or 218 gal. per acre (5 gal. per 1000 sq.ft.) of emulsified asphalt on flat areas. On slopes, 8 ft. or higher, use 347 gal. per acre (9 gal. per 1000 sq.ft.) for anchoring.

Maintenance: Inspect all seeded areas and make needed repairs, replacements and reseeding.

**21.0 Standard 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 vegetative 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 Experimentation Station.
- II. Topsoil Specifications - Soil to be used as topsoil must meet the following:

I. 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 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 than 1-1/2" in diameter.

II. Topsoil must be free of plants or plant parts such as bermuda grass, quackgrass, Johnsongrass, nutsedge, poison ivy, thistle, or others as specified.

III. Where 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.

For sites having disturbed areas under 5 acres:

- I. Place topsoil (if required) and apply soil amendments as specified in 20.0 Vegetative Stabilization - Section I - Vegetative Stabilization Methods and Materials.

For sites having disturbed areas over 5 acres:

- I. On soil meeting topsoil specifications, obtain test results dictating fertilizer and lime amendments required to bring the soil into compliance with the following:

a. 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.

b. Organic content of topsoil shall be not less than 1.5 percent by weight.

c. Topsoil having soluble salt content greater than 500 parts per million shall not be used.

d. No sod or seed shall be placed on soil which has been treated with soil sterilants or chemicals for weed control until sufficient time has elapsed (14 days minimum) to permit dissipation of phytotoxic materials.

Note: Topsoil substitutes to 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.

- II. Place topsoil (if required) and apply soil amendments as specified in 20.0 Vegetative Stabilization - Section I - Vegetative Stabilization Methods and Materials.

V. Topsoil Application

- I. When topsoiling, maintain needed erosion and sediment control practices such as diversions, Grade Stabilization Structures, Earth Dikes, Slope Silt Fence and Sediment Trap and Basins.

II. Grades on the areas to be topsoiled, which have been previously established, shall be maintained, albeit 4" - 8" higher in elevation.

III. 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.

IV. Topsoil shall not be placed 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 seeded preparation.

V. Alternative for permanent seeding - instead of applying the full amounts of lime and commercial fertilizer, composted sludge and amendments may be applied as specified below:

1. Composted sludge material for use as a soil conditioner for sites having disturbed areas over 5 acres shall be tested to prescribe amendments and for sites having disturbed areas under 5 acres shall conform to the following requirements:

a. Composted sludge shall be supplied by, or originate from, a person or persons that are permitted (at the time of acquisition of the compost) by the Maryland Department of the Environment under COMAR 26.04.06.

b. Composted sludge shall contain at least 1 percent nitrogen, 1.5 percent phosphorus, and 0.2 percent potassium and have a pH of 7.0 to 8.0. If compost does not meet these requirements, the appropriate constituents must be added to meet the requirements prior to use.

c. Composted sludge shall be applied at a rate of 1 ton/1,000 square feet.

d. Composted sludge shall be amended with a potassium fertilizer applied at the rate of 4 lb/1,000 square feet, and 1/3 the normal lime application rate.

References: Guideline Specifications, Soil Preparation and Sodding, MD-VA, Pub. #1, Cooperative Extension Service, University of Maryland and Virginia Polytechnic Institute, Revised 1973.

**SEDIMENT CONTROL NOTES**

1. A MINIMUM OF 48 HOURS NOTICE MUST BE GIVEN TO THE HOWARD COUNTY DEPARTMENT OF INSPECTIONS, LICENSES, AND PERMITS SEDIMENT CONTROL DIVISION PRIOR TO THE START OF ANY CONSTRUCTION (410) 313-1855.
2. ALL VEGETATIVE AND STRUCTURAL PRACTICES ARE TO BE INSTALLED ACCORDING TO THE PROVISIONS OF THIS PLAN AND ARE TO BE IN CONFORMANCE WITH THE MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL AND EROSION 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; BY 14 DAYS AS TO OTHER DISTURBED OR GRADED AREAS ON THE PROJECT SITE.
4. ALL SEDIMENT TRAPS/BASINS SHOWN MUST BE FENCED AND WARNING SIGNS POSTED AROUND THE PERIMETER IN ACCORDANCE WITH VOL. 1, CHAPTER 12, OF THE 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 AND EROSION CONTROL FOR PERMANENT SEEDINGS (SEC. 51), SOD (SEC. 54), TEMPORARY SEEDINGS (SEC.50) AND MULCHING (SEC. 52). TEMPORARY STABILIZATION WITH MULCH ALONE CAN ONLY 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.

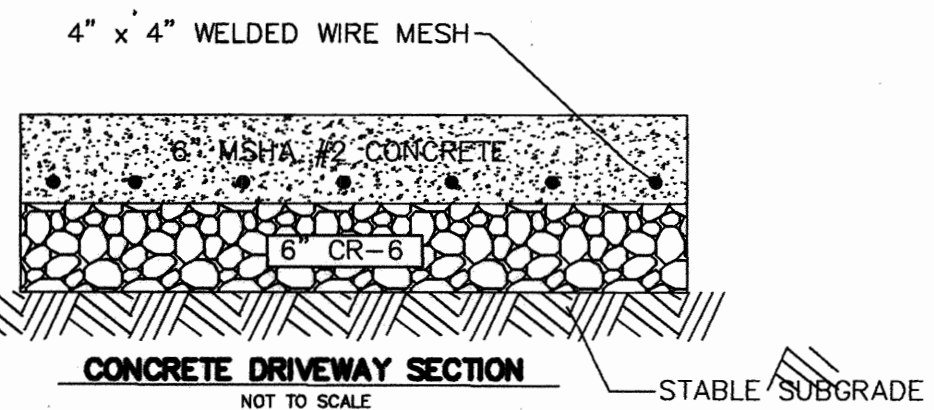
7. SITE ANALYSIS
 

TOTAL SITE AREA	0.49 ACRES
AREA DISTURBED	0.34 ACRES
AREA TO BE ROOFED AND PAVED	0.13 ACRES
AREA TO BE VEGETATIVELY STABILIZED	0.21 ACRES
TOTAL CUT	420± CU. YDS.
TOTAL FILL	100± CU. YDS.
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. SITE GRADING WILL BEGIN ONLY AFTER ALL PERIMETER SEDIMENT CONTROL MEASURES HAVE BEEN INSTALLED AND ARE IN A FUNCTIONING CONDITION.
11. ON ALL SITES WITH DISTURBED AREAS IN EXCESS OF 2 AC., 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.
12. TRENCHES FOR THE CONSTRUCTION OF UTILITIES IS LIMITED TO THREE PIPE LENGTHS OR THAT WHICH CAN BE BACKFILLED AND STABILIZED BY THE END OF EACH WORKING DAY, WHICHEVER IS SHORTER.

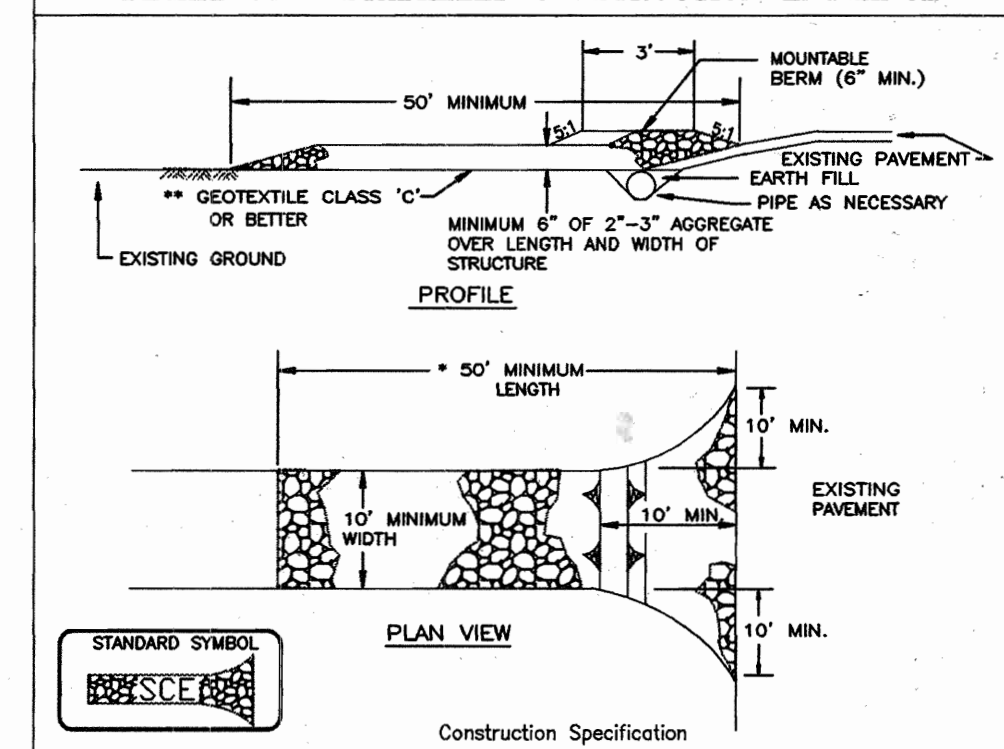
**SEQUENCE OF CONSTRUCTION**

1. Obtain all necessary approvals, permits, and easements. The contractor must notify the Howard County Department of Inspection and Permits, and Miss Utility at least 48 prior to beginning work.
2. The contractor shall schedule a pre-construction meeting with the respective agencies to review the plans and permits. (1 day)
3. Clear only for, grade, and install stabilized construction entrance. (1 day)
4. Clear only for and install perimeter silt fences. (1 day)
5. Clear remaining site area within L.O.D. as shown on approved plans. (1 day)
6. Rough grade site per approved plans. (2 weeks)
7. Install water and sanitary sewer connections. (1 week)\*
8. Excavate for footings and construction building. (3 months)\*
9. Install underground conduits, bio-retention device and paving courses. (2 weeks)\*
10. Fine grade and place 2 inches of topsoil. Stabilize with seed and mulch. (1 week)\*
11. Once the site is stabilized and with the approval of the Howard County Sediment Control Inspector, remove all sediment control measures. Re-stabilize areas, which were disturbed during removal of the sediment control measures.

\* = Denotes activities that can be done concurrently

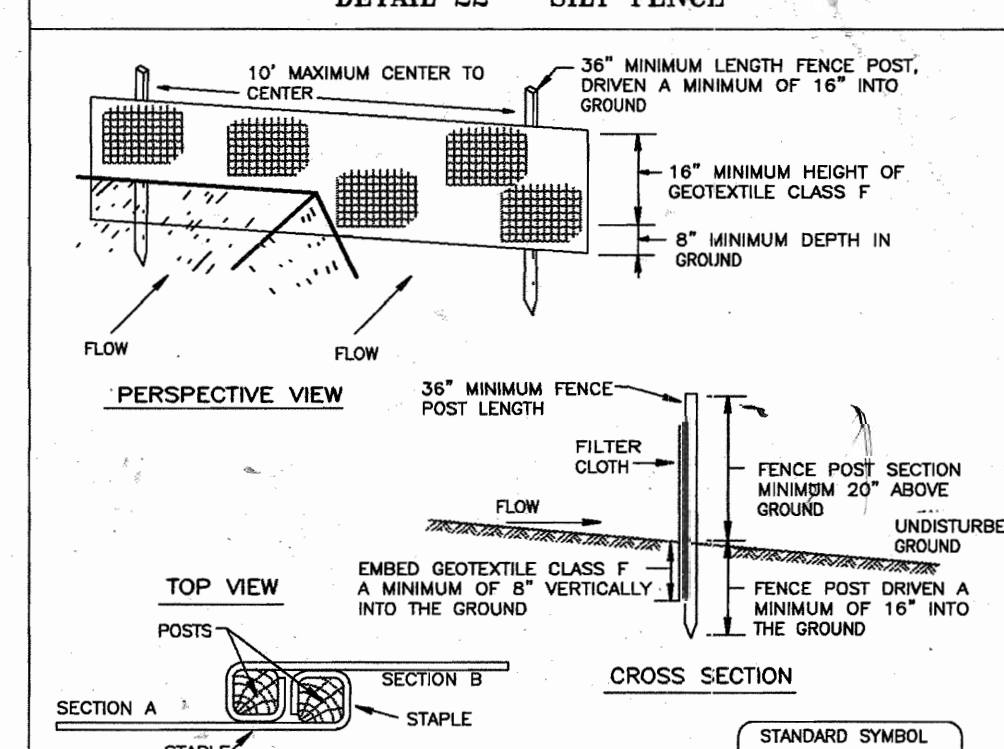


**DETAIL 24 - STABILIZED CONSTRUCTION ENTRANCE**



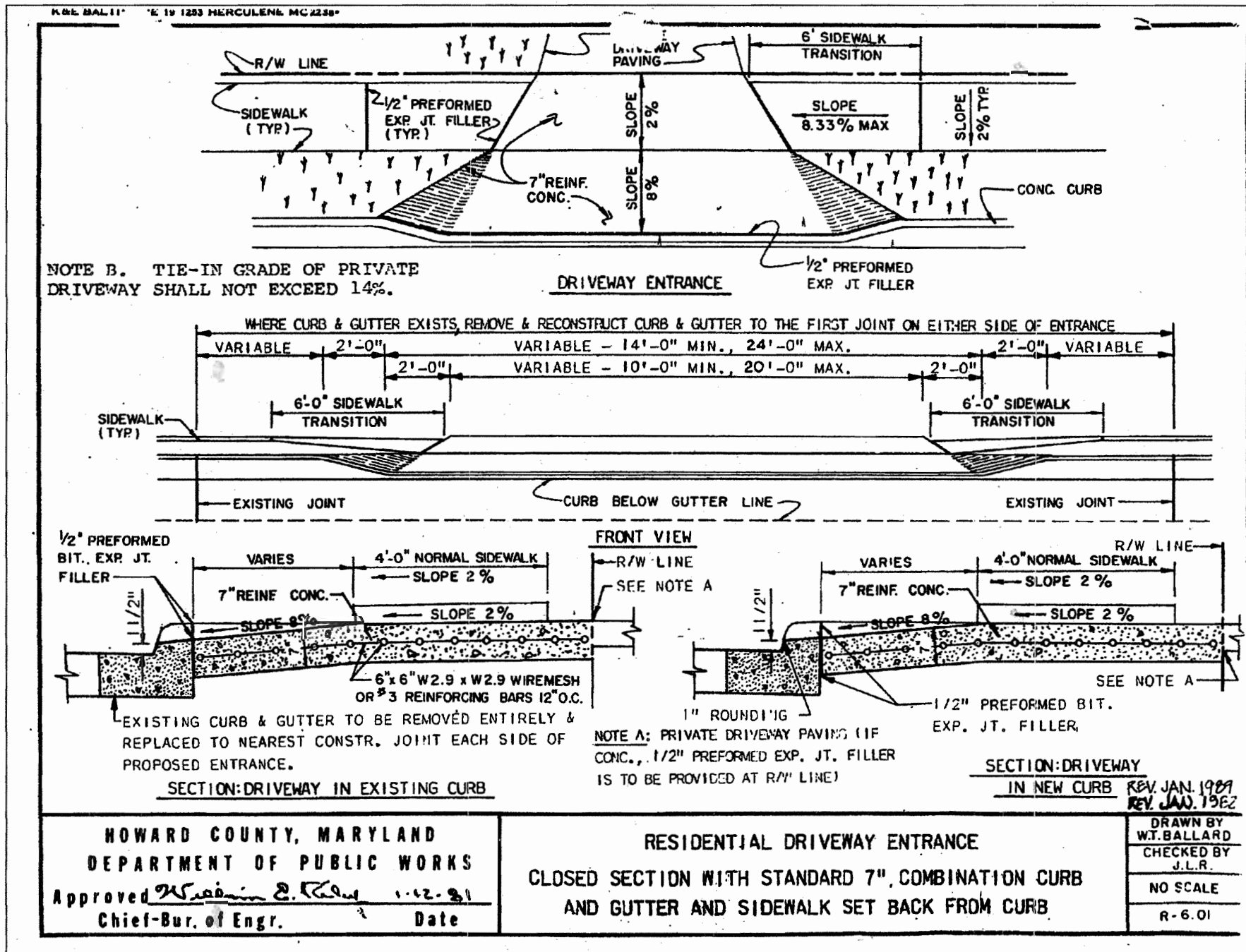
- Construction Specifications
1. Length - minimum of 50' (\*30' for single residence lot).
  2. Width - 10' minimum, should be flared at the existing road to provide a turning radius.
  3. Geotextile fabric (filter cloth) shall be placed over the existing ground prior to placing stone. \*\*The plan approval 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 7 - 17 - 3 MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

**DETAIL 22 - SILT FENCE**



- Construction Specifications
1. Fence posts shall be a minimum of 36" long driven 16" minimum into the ground. Wood posts shall be 1-1/2" x 1-1/2" square (minimum) cut, or 1-3/4" diameter (minimum) round and shall be of sound quality hardwood. Steel posts will be standard T or U section weighting not less than 1.00 pound per linear foot.
  2. Geotextile 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 ft <sup>2</sup> / minute (max)	Test: MSMT 322
Filtering Efficiency	75% (min.)	Test: MSMT 322
  3. Where ends of geotextile fabric come together, they shall be overlapped, folded and stapled to prevent sediment bypass.
  4. Silt Fence shall be inspected after each rainfall event and maintained when bulges occur or when sediment accumulation reached 50% of the fabric height.
- U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE PAGE 8 - 15 - 3 MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION



BY THE DEVELOPER :

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

DEVELOPER: *James H. Black* DATE: 2/10/05

BY THE ENGINEER :

I CERTIFY THAT THIS PLAN FOR EROSION AND SEDIMENT 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.

ENGINEER: *John M. Miller* DATE: 1/10/05

THESE PLANS HAVE BEEN REVIEWED FOR THE HOWARD SOIL CONSERVATION DISTRICT AND MEET THE TECHNICAL REQUIREMENTS FOR SOIL EROSION AND SEDIMENT CONTROL. APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

DIRECTOR: *John M. Miller* DATE: 2/10/05

CHIEF, DEVELOPMENT ENGINEERING DIVISION: *John M. Miller* DATE: 2/10/05

CHIEF, DIVISION OF LAND DEVELOPMENT: *John M. Miller* DATE: 2/10/05

OWNER: CHARLES & BONNIE BLACK  
319 FAIRFIELD DRIVE  
SEVERN, MD. 21144

DEVELOPER: CHARLES & BONNIE BLACK  
319 FAIRFIELD DRIVE  
SEVERN, MD. 21144

PROJECT: **BLACK RESIDENCE**  
SINGLE FAMILY DETACHED DWELLING

TAX MAP 38, GRID 8, PARCEL 808  
-1st ELECTION DISTRICT  
WATER CODE 44-6906 SEWER CODE 22-S

TITLE: **NOTES AND DETAILS**

MESSICK & ASSOCIATES \*  
CONSULTING ENGINEERS  
31 OLD SOLOMONS ISLAND RD., SUITE 201  
ANNAPOLIS, MARYLAND 21401  
(410) 266-3212 \* FAX (410) 266-3502

DATE: 1/10/05

DESIGNED BY: WAN

DRAWN BY: COP

PROJECT NO:

DATE: MARCH, 2004

SCALE: AS SHOWN

DRAWING NO.: 3 OF 7

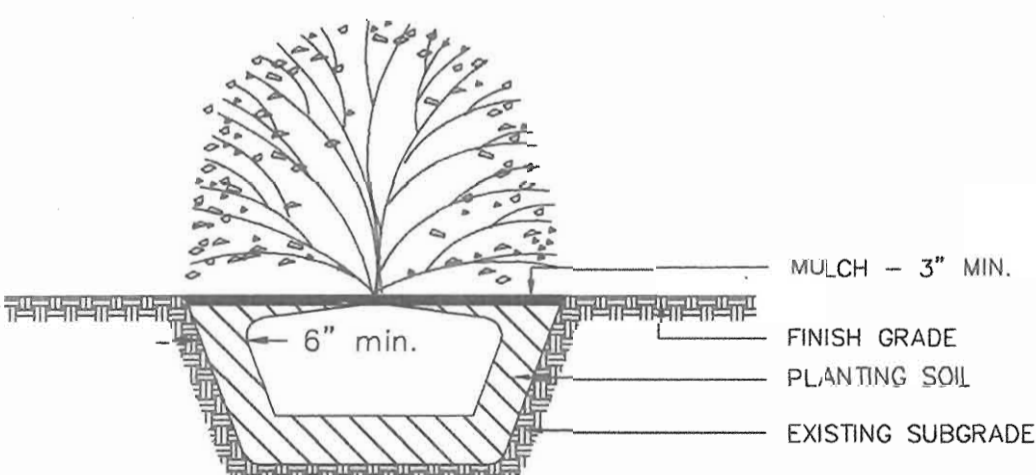
WAYNE A. NEWTON #21591

SCHEDULE A PERIMETER LANDSCAPE EDGE		
CATEGORY	ADJACENT TO ROADWAYS	ADJACENT TO PERIMETER PROPERTIES
LANDSCAPE TYPE	NONE/B	"A"
LINEAR FEET OF ROADWAY FRONTAGE/PERIMETER	0 L.F.	906 L.F.
CREDIT FOR EXISTING VEGETATION (YES, NO, LINEAR FEET) (DESCRIBE BELOW IF NEEDED)	NO	NO
CREDIT FOR WALL, FENCE OR BERM (YES, NO, LINEAR FEET) (DESCRIBE BELOW IF NEEDED)	NO	NO
NUMBER OF PLANTS REQUIRED		
SHADE TREES	0	906/60=15
EVERGREEN TREES	0	0
SHRUBS	0	0
NUMBER OF PLANTS PROVIDED		
SHADE TREES	0	12
EVERGREEN TREES	0	18*
OTHER TREES (2:1 SUBSTITUTION) SHRUBS (2:1 SUBSTITUTION) (DESCRIBE PLANT SUBSTITUTION CREDITS BELOW IF NEEDED)	0	21**

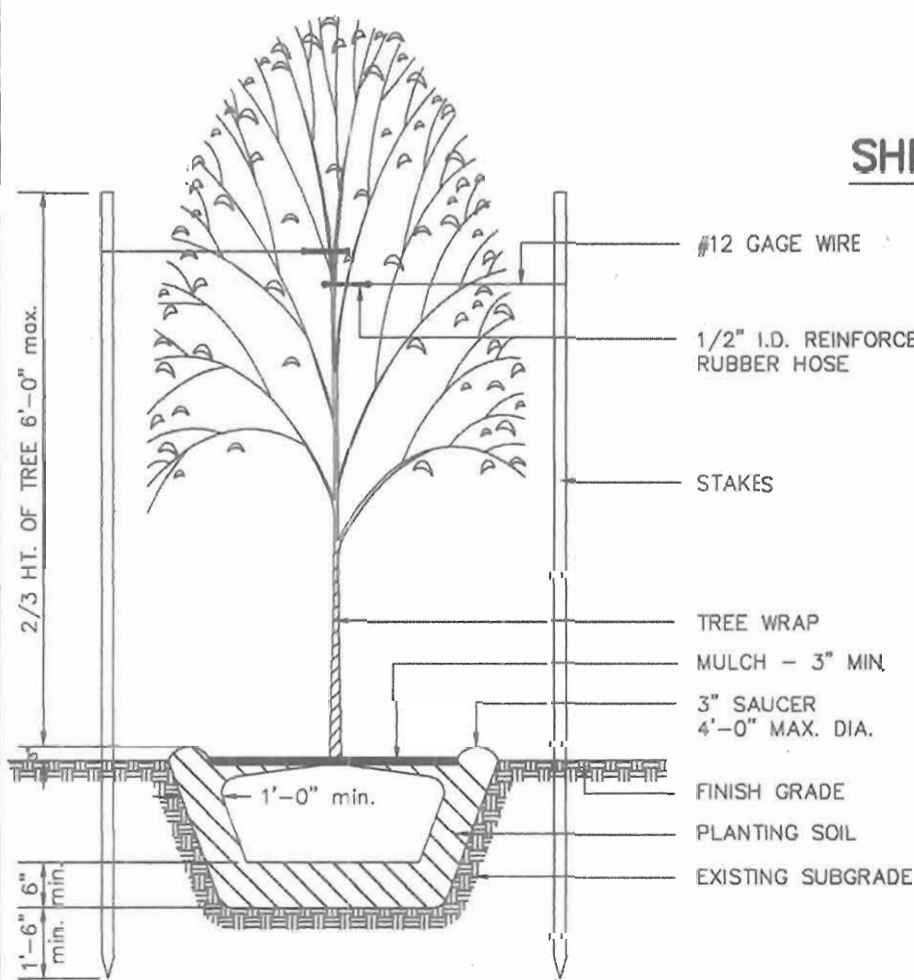
\* = 4 SUBSTITUTED FOR 2 SHADE TREES  
 \*\* = 21 EVERGREEN SHRUBS PROVIDED FOR DRIVEWAY SCREENING PER SECT. 16.120.B(6)(V).

**PLANTING NOTES:**

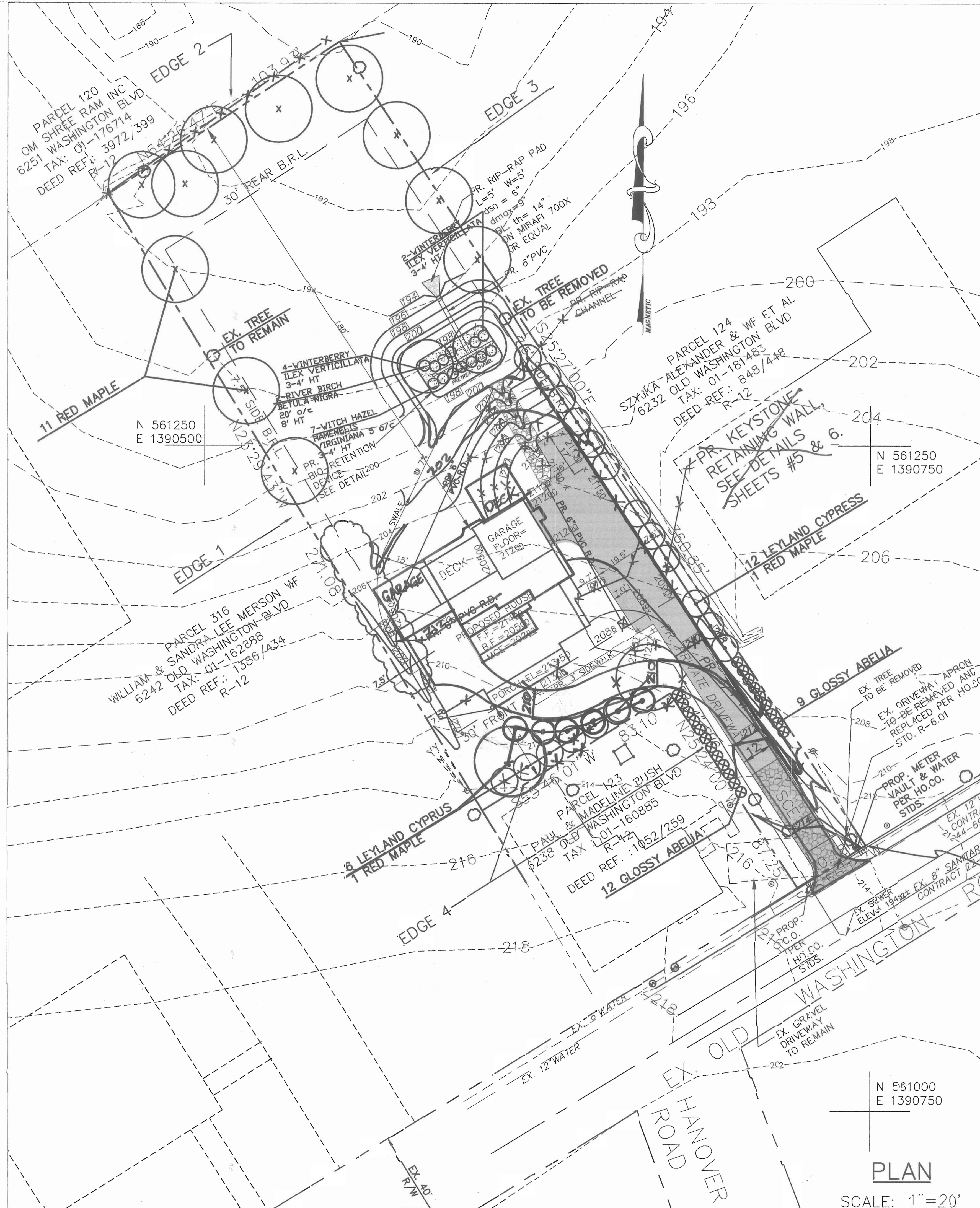
- All plants shall be nursery grown.
- All plants shall conform to the standards of "Landscape Specifications Guidelines" Published by Landscape Contractors Association. They shall be typical of their species or variety and shall have a normal habit of growth. They shall be sound, healthy and vigorous, well-branched and densely foliated when in leaf. They shall be free of disease and insect pests, eggs, or larvae. They shall have healthy, well-developed root systems.
- No substitutions shall be made without the approval of the landscape architect.
- Balled and burlapped plants shall be dug with firm natural balls of earth, of diameter and depth to include most of the fibrous roots. Container grown stock shall have been grown in a container long enough for the root system to be developed sufficiently to hold its soil together firm and whole. No plants shall be loose in the container.
- Root balls of all plants shall be adequately protected at all times from sun and drying winds or frost.
- Owner or his representative shall be notified prior to beginning planting operations.
- All trees shall be wrapped immediately after they are planted. Approved tree wrap shall be installed according to accepted industry practice.
- Each tree and shrub shall be pruned in accordance with the American Association of Nurserymen Standards to preserve the natural character of the plant. All dead wood or suckers and all broken or badly bruised branches shall be removed. Cuts over 1" in diameter shall be painted with an approved tree paint.
- Mulch: immediately after planting operations are completed, all trees and shrub planting pits shall be covered with a 2" layer of Shredded Hardwood Bark Mulch or other material approved by the owner or his representative. The limit of this mulch for trees shall be the area of the pit and for shrubs in beds, the entire area of the shrub bed.
- Trees in leaf when planted shall be treated with anti-desiccant such as Will-Proof.
- Conditions detrimental to plants: the contractor shall notify the project representative in writing of all soil or drainage conditions which the contractor considers detrimental to the growth of plants. He shall state the conditions and submit a proposal for correcting the conditions, including any change in cost for review and acceptance by the project representative.
- Minor adjustments to tree location may be necessary due to field conditions and final grading. The contractor shall notify the owner if major adjustments are required.
- A Surety in the amount of \$5130.00 shall be posted with the grading permit application for 15 shade trees (\$339.00) and 21 shrubs (\$630.00).
- To obtain surety release, a qualified professional shall submit written certification to the Dept. of Planning & Zoning that healthy plant material was installed in accordance with this plan and that a 1 year guarantee has been executed.
- The developer is responsible for maintenance of the landscaping during construction & is responsible for obtaining a 1 year guarantee that ensures the survival or replacement of all required plant material for 1 year from the date of the landscape certification.
- Maintenance of plant material is the responsibility of the owner. The required plantings shall be maintained in good growing conditions & whenever necessary replaced with new plant material to ensure continued compliance with the landscape regulations.
- To ensure public safety, plant material should not be allowed to encroach on rights of ways & easements & impede motorists vision.



SHRUB PLANTING DETAIL



TREE PLANTING DETAIL - LESS THAN 4" CAL.



N 581000  
E 1390750

PLAN  
SCALE: 1"=20'

SCHEDULE A					
EDGE NO.	PERIMETER TYPE	PERIMETER LENGTH	PLANTS REQUIRED	CREDIT FOR EX. VEGETATION, ETC.	PLANTS PROVIDED
1	A	271.08 L.F.	4	TREE TO REMAIN	5 *
2	A	103.93 L.F.	2	NO	3
3	A	360.85 L.F.	6	NO	10 *
4	A	170.35 L.F.	3	NO	4 *

\* NOTE: 2 EVERGREEN TREES = 1 CANOPY TREE  
 EDGE 1 = 1 EX. CANOPY TREE  
 4 PR. CANOPY TREE  
 EDGE 3 = 4 PR. CANOPY TREES  
 12 PR. EVERGREEN TREES  
 EDGE 4 = 1 PR. CANOPY TREE  
 6 PR. EVERGREEN TREES

PLANT LIST					
SYMBOL	ID	BOTANICAL NAME	COMMON NAME	QTY	SIZE CAL.
(*)	T1	ACER RUBRUM	OCTOBER GLORY*	12	2-1/2"
(*)	E1	QUERCUS PRINCEPS	RED MAPLE	18	5-8"
(*)	S1	ABELIA GRANDIFLORA	GLOSSY ABELIA	21	2-1/2"

BY THE DEVELOPER :

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

DEVELOPER: *James H. ...* DATE: 2/10/05

BY THE ENGINEER :

I CERTIFY THAT THIS PLAN FOR EROSION AND SEDIMENT 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.

ENGINEER: *...* DATE: 1/10/05

THESE PLANS HAVE BEEN REVIEWED FOR THE HOWARD SOIL CONSERVATION DISTRICT AND MEET THE TECHNICAL REQUIREMENTS FOR SOIL EROSION AND SEDIMENT CONTROL.

NATURAL RESOURCES CONSERVATION SERVICE DATE: *...*

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

HOWARD SOIL CONSERVATION DISTRICT DATE: *...*

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

DIRECTOR: *...* DATE: 2/10/05

CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE: *...*

CHIEF, DIVISION OF LAND DEVELOPMENT DATE: 2/10/05

OWNER: CHARLES & BONNIE BLACK  
319 FAIRFIELD DRIVE  
SEVERN, MD. 21144

DEVELOPER: CHARLES & BONNIE BLACK  
319 FAIRFIELD DRIVE  
SEVERN, MD. 21144

PROJECT: **BLACK RESIDENCE**  
SINGLE FAMILY DETACHED DWELLING  
TAX MAP 38, GRID 8, PARCEL 808  
1st ELECTION DISTRICT  
WATER CODE 44-6906 SEWER CODE 22-S

TITLE: **LANDSCAPE PLAN**

MESSICK & ASSOCIATES \*  
CONSULTING ENGINEERS  
31 OLD SOLOMONS ISLAND RD., SUITE 201  
ANNAPOLIS, MARYLAND 21401  
(410) 266-3212 \* FAX (410) 266-3502

DATE: 1/10/05

DESIGNED BY: WAN

DRAWN BY: COP

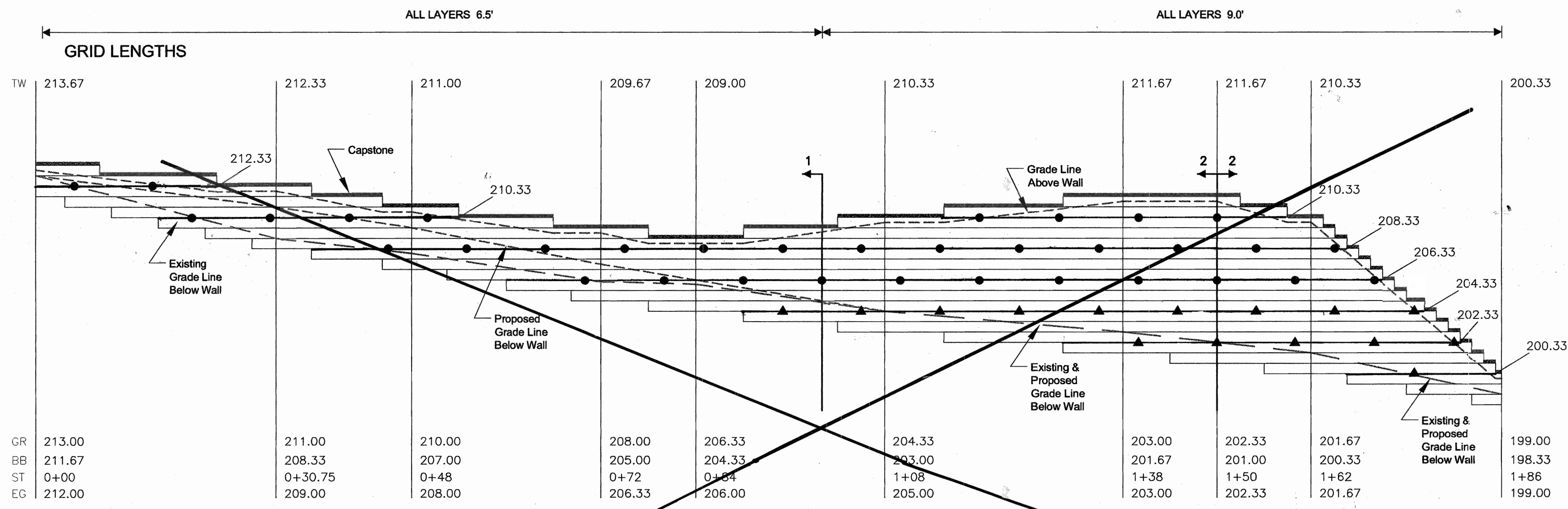
PROJECT NO:

DATE: MARCH, 2004

SCALE: AS SHOWN

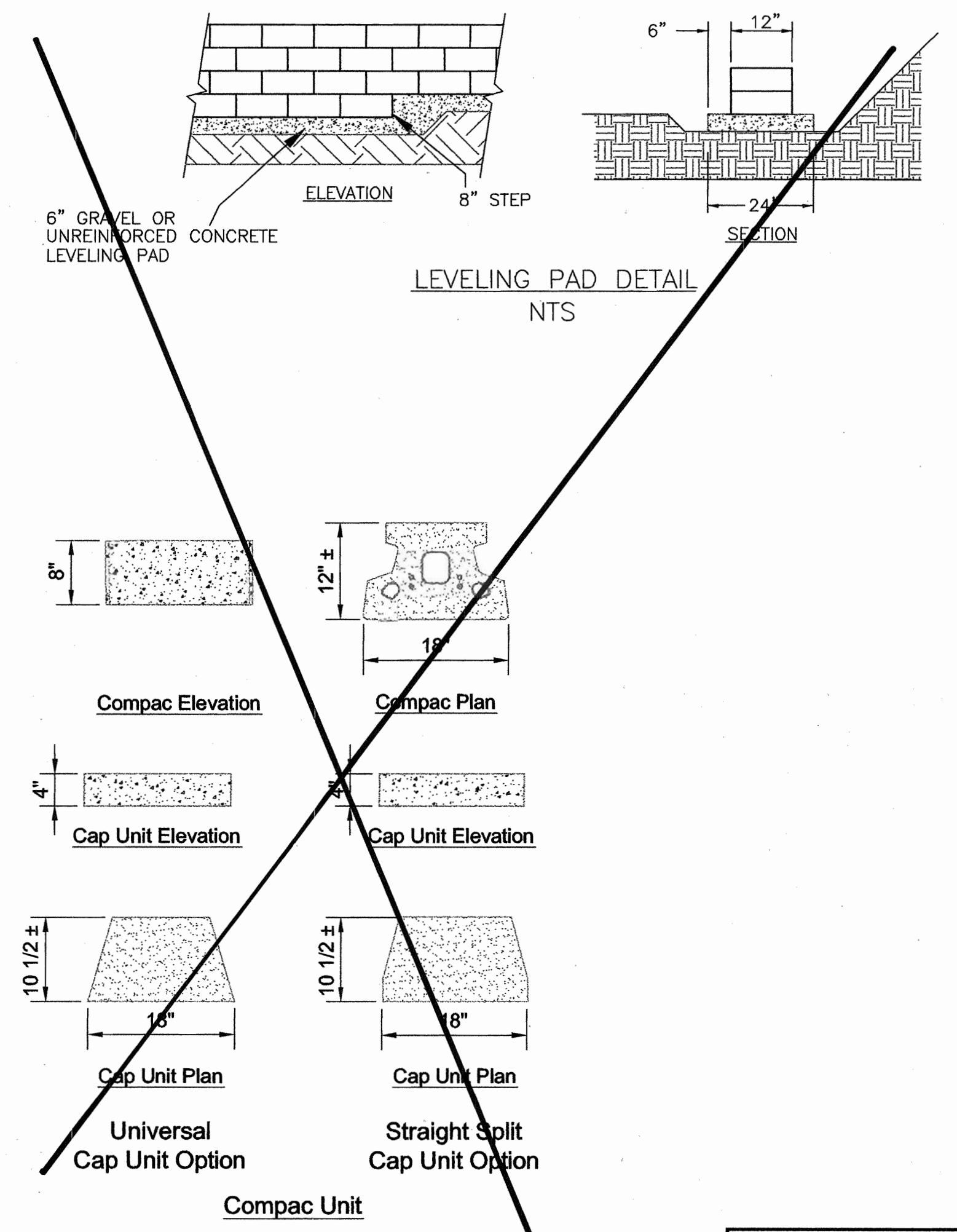
WAYNE A. NEWTON #2159T DATE: 1/10/05

DRAWING NO.: 4 OF 7



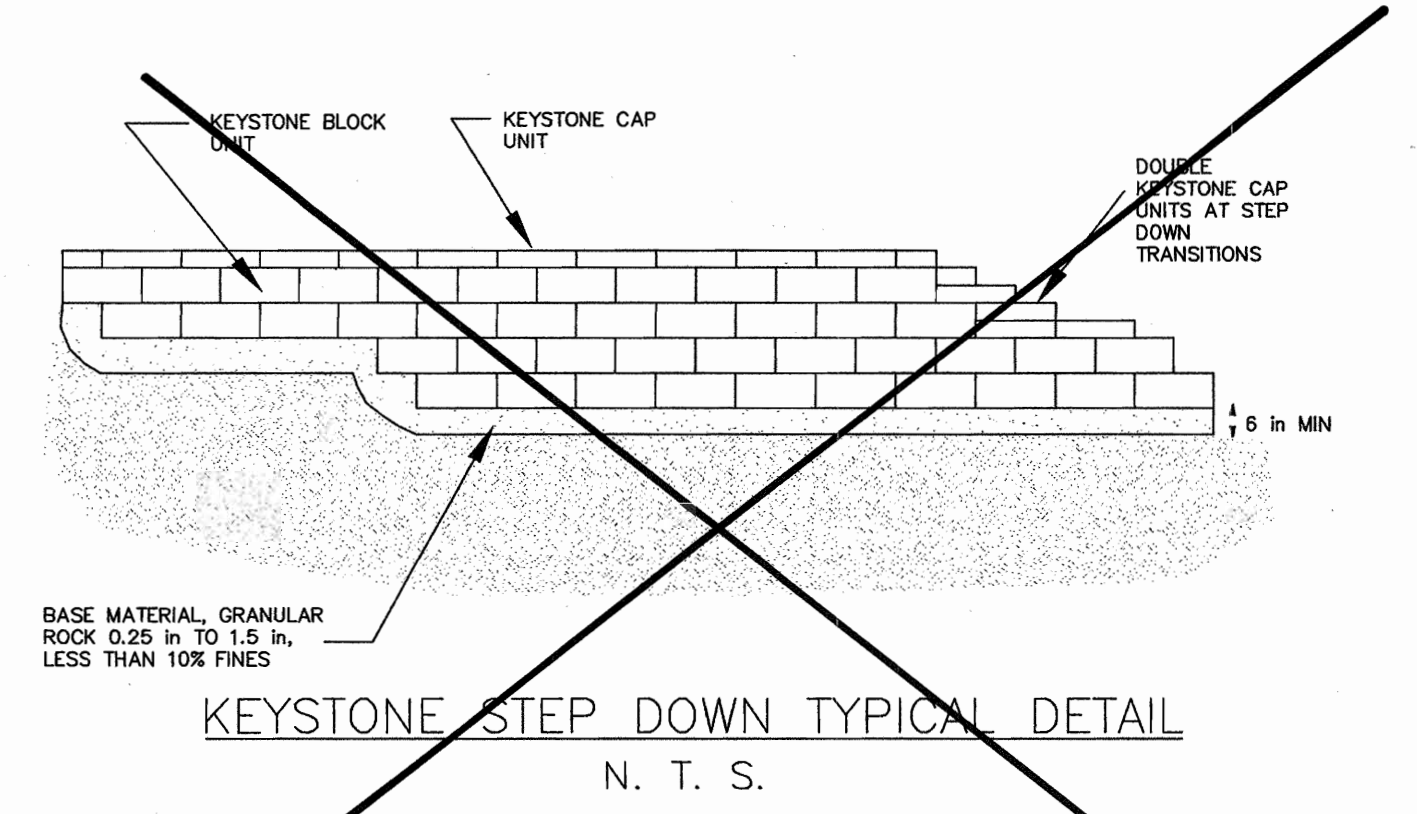
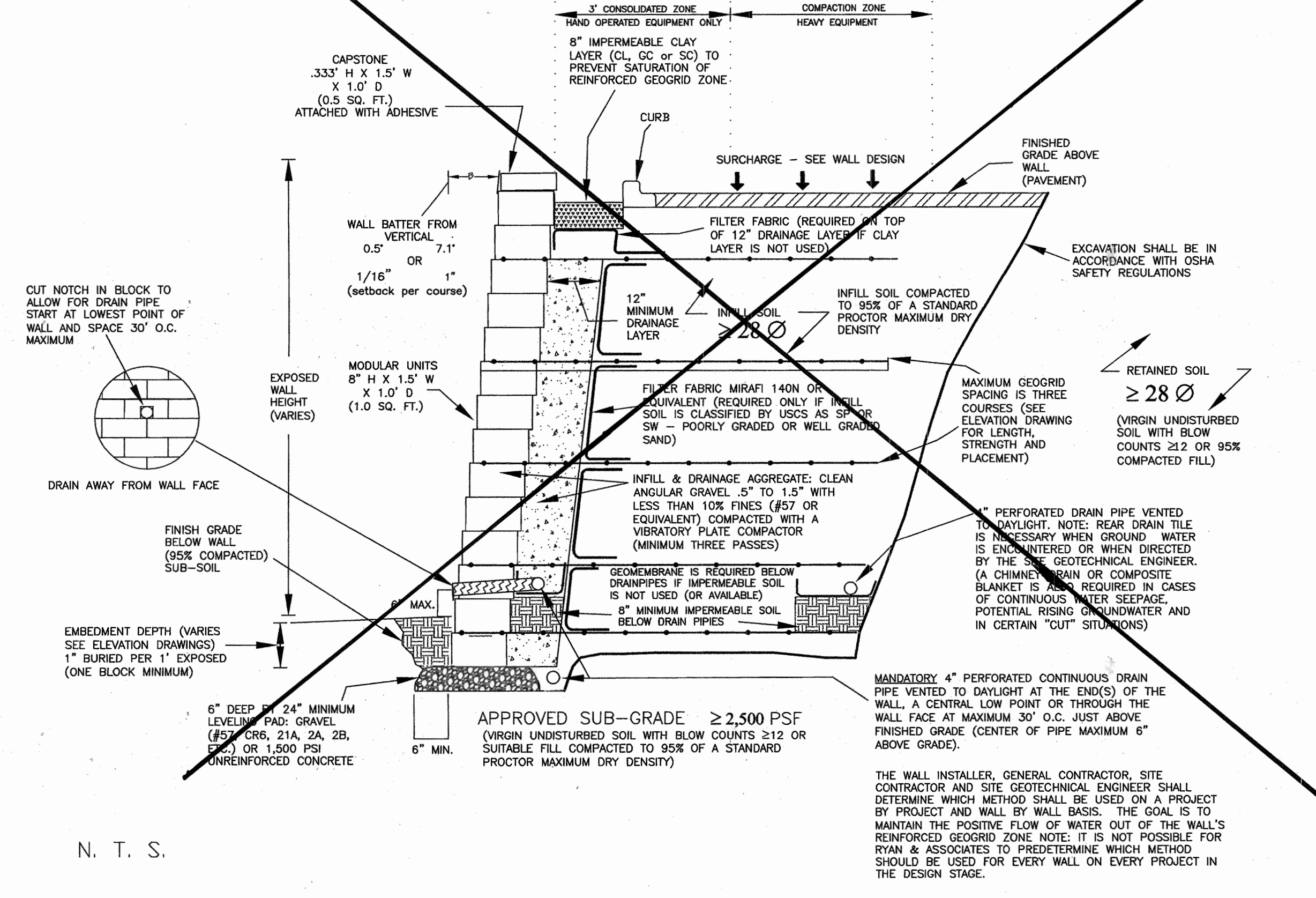
TW = TOP OF WALL (NOT INCLUDING CAP)  
 GR = PROPOSED FINISHED GRADE AT BASE OF WALL  
 BB = BOTTOM OF BLOCK / TOP OF LEVELING PAD  
 ST = WALL STATION  
 EG = EXISTING GRADE

GRID KEY: MIRAFI 3XT ● SCALE: HORIZONTAL SCALE 1" = 10'  
 MIRAFI 5XT ▲ VERTICAL SCALE 1" = 5'



### KEYSTONE COMPAC

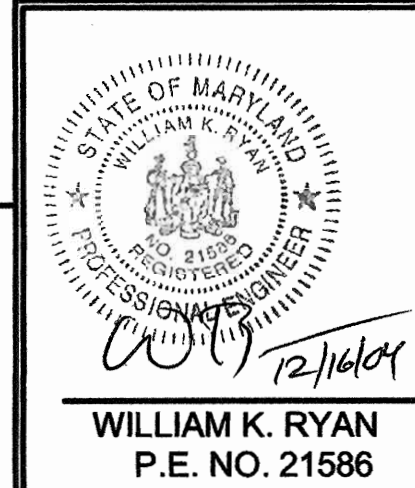
WALL SECTION WITH SURCHARGE



APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 Director: *Mark K. Agler* 3/19/05 DATE  
 Chief, Development Engineering Division: *Michael D. ...* 3/17/05 DATE  
 Chief, Division of Land Development: *Cindy ...* 3/15/05 DATE

12-16-04	1	REVISED PER NEW CIVIL PLANS 12-16-04
DATE	NO.	REVISION
OWNER: CHARLES & BONNIE BLACK 319 FAIRFIELD DRIVE SEVERN, MD. 21144		
DEVELOPER: CHARLES & BONNIE BLACK 319 FAIRFIELD DRIVE SEVERN, MD. 21144		
PROJECT: BLACK RESIDENCE SINGLE FAMILY DETACHED DWELLING		
TAX MAP 38, GRID 8, PARCEL 808 1st ELECTION DISTRICT		
WATER CODE 44-6906 SEWER CODE 22-S		
TITLE: <del>RETAINING WALL</del> PROFILE SECTION & DETAILS		
MESSICK & ASSOCIATES * CONSULTING ENGINEERS 31 OLD SOLOMONS ISLAND RD., SUITE 201 ANNAPOLIS, MARYLAND 21401 (410) 266-3212 * FAX (410) 266-3502		

**RYAN & ASSOCIATES**  
 A Division of WKR Consulting, Inc.  
 CONSULTING & DESIGN ENGINEERS  
 29 S. MAIN STREET, SUITE A, CHAMBERSBURG, PA 17201  
 PHONE (717) 262-4242 FAX (717) 262-4245



DATE	DESIGNED BY: JWP
	DRAWN BY: JWP
	PROJECT NO:
	DATE: JUNE, 2004
	SCALE: AS SHOWN
	DRAWING NO. <del>21597</del>

**GENERAL NOTES**

**1. SOIL PARAMETERS:** At the time of this design a geotechnical investigation had not been done for this site. Based on the soil map designation on page 2 of 4 of the civil plans, Ryan & Associates (RA) used an assumed internal angle of friction of 28° for the soils in this design. This is for a worst case ML (sandy silt/silt) soil type and must be verified during wall construction. CH (fat clay), CL (lean clay), MH (elastic silt) and OH/OL/PT (organic) soils are not acceptable for wall construction. If these unsuitable soils are encountered they shall be removed and replaced with soils that meet or exceed the design friction angle of 28°. An assumed unit weight (maximum wet density less 5% for 95% compaction) of 125 PCF was used and fluctuations of 5 PCF higher or lower will not affect this design. However, if the unit weight varies by more than 5 PCF RA must be notified so that the cross sections can be rerun to verify that all factors of safety are still met. The site geotechnical engineer will need to do a proctor test of the proposed backfill soil to determine its actual density and moisture. No cohesion was used in any of the calculations.

**2. SPECIFICATIONS:** Construction and materials must conform to the attached "Ryan & Associates segmental retaining wall specifications and installation guidelines for Keystone".

**3. BEARING CAPACITY:** The sub-grade (the soils under the wall's gravel leveling pad and the soils under the wall's reinforced geogrid zone) must be tested by the site geotechnical engineer prior to wall construction and have a minimum allowable bearing capacity of 2,500 PSF. The actual bearing pressure exerted by each specific wall section is shown on the Cross Section Details and Factors of Safety table so that the site geotechnical engineer may determine specifically how to handle any areas where low bearing capacity soils are encountered on an individual wall section basis. Areas of the sub-grade that do not meet these maximum pressures will require undercutting and/or geogrid reinforcing. The sub-grade must be virgin (natural undisturbed soil with blow counts  $\geq 12$ ) or suitable fill ( $\geq 28^\circ$ ) compacted to 95% of a standard proctor maximum dry density.

**4. SLOPES & SURCHARGES:** A 300 PSF live load surcharge was applied for the proposed roadway with vehicles above the wall. There are no proposed slopes above this wall.

**5. FACTORS OF SAFETY:** The following factors of safety have been met in this design: Sliding 1.5, Overturning 2.0, Bearing Capacity 2.0, Geogrid Overstress 1.5, and Geogrid Pullout 1.5 (from the soil and from the block).

**6. GEOGRIDS:** This wall was designed with Mirafi 5XT and 5XT geogrids which have LTDS (Long term Design Strengths) of 1558 & 2234 respectively. All geogrid substitutions must have prior approval of RA.

**7. CONSTRUCTION OVERSIGHT:** The construction of this wall must be performed under the observation/review of a Maryland Registered Professional Engineer or his authorized representative to ensure that it is constructed in accordance with the RA General Notes and Specifications.

**8. WALL BATTER:** This wall was designed with the Keystone blocks having a 0.5" near vertical batter (1/16" setback per block course: rear pin position). It is important for the wall installer and the civil engineer/surveyor to predetermine the wall's batter during stake out. The base of the wall will need to be moved forward if there are critical dimensions that need to be met on the high side of the wall. The optional 7.1° batter (1" setback per block course: front pin position) may also be used for this wall if desired since it is more conservative (will yield higher factor of safety).

**9. BLOCK SYSTEM:** This design is valid only for the Keystone Compac block system. Each segmental wall system has unique dimensions, connection devices and interacts differently with geogrids; therefore other block types may not be substituted without a partial or total redesign.

**10. EMBEDMENT:** Wall embedment varies from one to two blocks. The exact amount of buried block can be determined by subtracting the "BB" elevation from the "GR" elevation on the RA profile drawing.

**11. WALL PROFILE:** The elevation drawing was done to represent the grade changes necessary on the civil grading plan and was done in even block course increments of .667' (8"). Minor field changes may be necessary by the wall installer. Lined footage may be added or subtracted as needed if the wall's height is equal to or less than the design height. If the wall needs to be raised in height, RA shall be notified and new structural cross sections must be provided before the installer proceeds. The cap height of .333' (4") is not shown on the profile drawing however its height may have been used in some cases to achieve the desired TW elevations.

**12. CIVIL PLANS:** This design package is based on the "Site Development/Settlement & Erosion Control Plan", sheet 2 of 4, dated March, 2004 prepared by Messick & Associates. A partial copy of these plans has been included in the 8 1/2" X 11" submittal to show the RA wall stationing.

**13. DESIGN SOFTWARE:** Internal and external wall calculations were performed with Keywall design software. A table has been included ("Cross Section Details and Factors of Safety") which has the following information: section location (area of wall referenced), total wall height, loads applied, factors of safety (for sliding, overturning and bearing capacity) and bearing pressure (the weight exerted by the wall structure— block and geogrid zone). Factors of safety of 1.5 were also met for: geogrid pullout (from the soil and from the block), geogrid overstress (geogrid rupture) and connection (block to geogrid).

**14. GUARDRAILS:** If a guardrail is required above this wall it must be kept back a minimum of 3' from the back of the wall since vehicles can impact it. If it is installed closer than 3' from the back of the wall then the wall installer may follow the special instructions on the included detail for "GUARD RAIL WITH IMPACT LOAD". This requires that concrete form tubes be installed in sections and that the geogrid becomes integral with them. The top two layers of geogrid must also be lengthened by 2' beyond the design lengths.

**15. SEPARATE 8 1/2" X 11" SUBMITTAL:** These 24" X 36" sheets were done in conjunction with an 8 1/2" X 11" submittal. The cross section calculations are included in the 8 1/2" X 11" submittal.

**16. SPECIAL HOWARD COUNTY RETAINING WALL SPECIFICATIONS:**

a. Retaining walls shall only be constructed under the observation of a Registered Professional Engineer and a (NICET, WACEL, or equivalent) certified soils technician.

b. The required bearing pressure beneath the footing of the wall shall be verified in the field by a certified soils technician. Testing documentation shall be provided to the Howard County Inspector prior to the start of construction. The required test procedure shall be the Dynamic Cone Penetrometer Test ASTM STP-399.

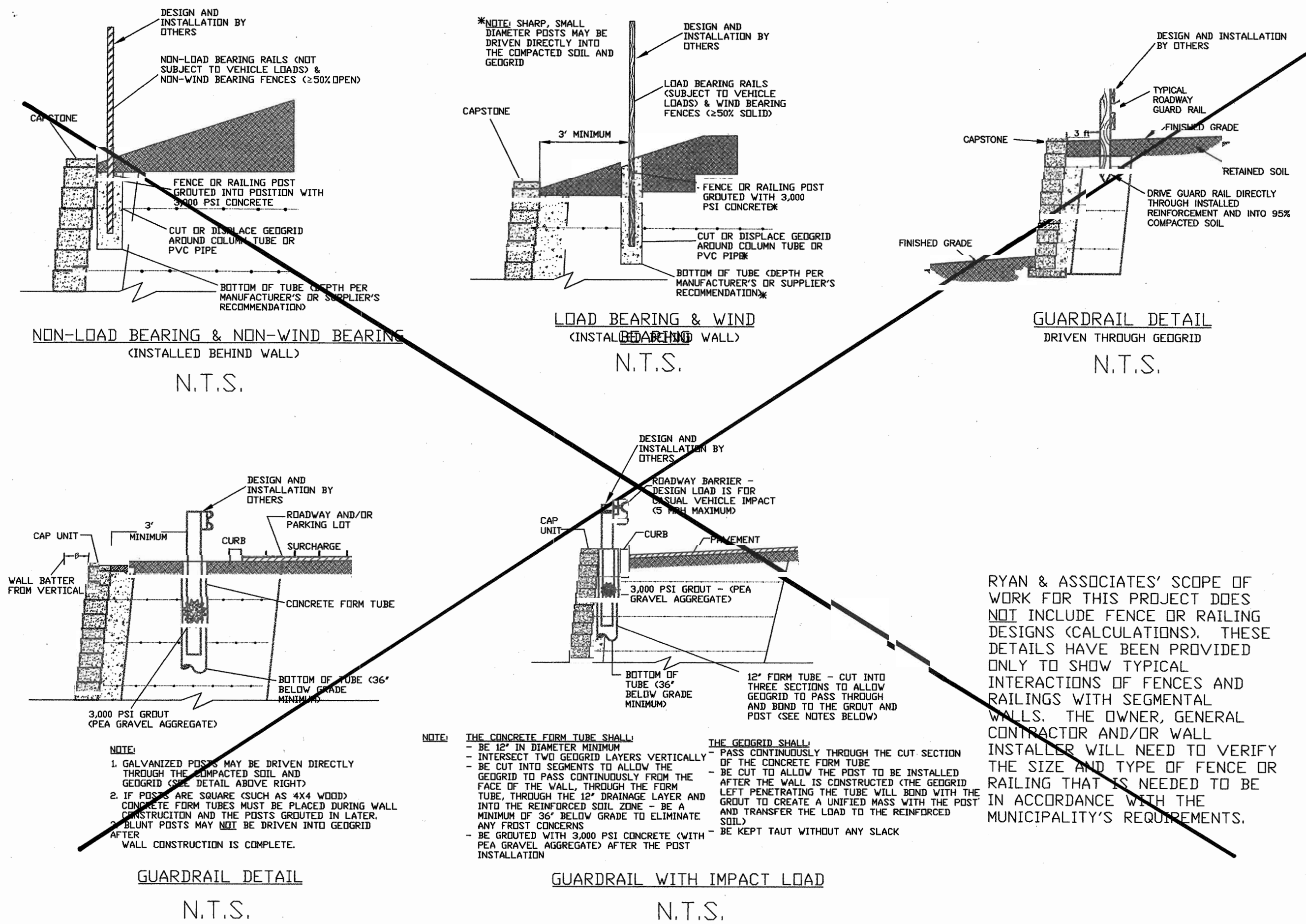
c. The suitability of the fill material shall be confirmed by the on-site soils technician. Each eight inch lift must be compacted to 95% Standard Proctor Density and the testing report shall be made available to the Howard County Inspector upon completion of the construction.

d. For walls over ten feet in height, one soil boring is required every 100 feet along the length of the wall, copies of the boring reports shall be provided to the Howard County Inspector prior to the start of construction.

<b>PROJECT:</b> Black Residence	<b>LOCATION:</b> Elkridge, Howard County, MD	12/16/04
<b>Block:</b> Keystone Compac	<b>Grid:</b> Mirafi	
<b>TOTAL SQ. FT.</b>	<b>SQ. YDS.</b>	<b>FT. WALL LENGTH</b>
1,228	335	186
(1 S.F.)	(5 S.F.)	(1 S.F.)
<b>BLOCK</b>	<b>CAPS*</b>	<b>OUTSIDE CORNERS</b>
1,150	156	0
<b>PINS</b>	<b>GRID</b>	<b>GRID</b>
2,052	335	190
<b>CU. YDS. DRAIN GRAVEL</b>	<b>CU. YDS. LEVELING PAD</b>	<b>FT. DRAIN PIPE</b>
73	14	195

\* Ryan & Associates is not responsible for extras or shortages based on this take-off. The recipient is responsible for verifying the accuracy of this design by reviewing the site/grading plan for this project or by taking field measurements.

\*\* Cap total includes one extra unit per step down on top of the wall for double capping.



RYAN & ASSOCIATES' SCOPE OF WORK FOR THIS PROJECT DOES NOT INCLUDE FENCE OR RAILING DESIGNS (CALCULATIONS). THESE DETAILS HAVE BEEN PROVIDED ONLY TO SHOW TYPICAL INTERACTIONS OF FENCES AND RAILINGS WITH SEGMENTAL WALLS. THE OWNER, GENERAL CONTRACTOR AND/OR WALL INSTALLER WILL NEED TO VERIFY THE SIZE AND TYPE OF FENCE OR RAILING THAT IS NEEDED TO BE IN ACCORDANCE WITH THE MUNICIPALITY'S REQUIREMENTS.

**KEYSTONE RETAINING WALL SYSTEMS**  
Version 3.3.1.64

**Project:** BLACK RESIDENCE  
**Project No.:** PA241265  
**Case:** case 1  
**Design Method:** Rankine-w/Batter (modified soil interface)

**Date:** 12/15/2004  
**Designer:** DKS

Design Parameters	Value	Unit
Reinforced Fill	28	°
Retained Zone	28	°
Foundation Soil	28	°
Reinforced Fill Type:	Silts & sands	
Unit Fill:	Crushed Stone, 1 inch minus	

Minimum Design Factors of Safety	Value
sliding:	1.50
overturning:	2.00
bearing:	2.00
pullout:	1.50
shear:	1.50
bending:	1.50
uncertainties:	1.50
connection:	1.50

Reinforcing Parameters: Mirafi 5XT Geogrids	Value	Unit
Tall	4300	ft
REZ	1.67	ft
RE	1.10	ft
REid	1.05	ft
LTDS	2229	lb/ft
ES	1.50	
Tal	1486	lb/ft
CL	0.80	
Calc	0.80	

**Analysis:** Section #1  
Unit Type: Compact  
Leveling Pad: Crushed Stone  
Wall Ht: 6.00 ft  
Level Backfill Offset: 2.00 ft  
Surcharge: LL 300 pcf uniform surcharge  
Load Width: 100.00 ft

**Results:** Factors of Safety: Sliding 1.77, Overturning 4.47, Bearing 8.11, Shear 4.72, Bending 2.25  
Calculated Bearing Pressure: 1034 pcf  
Eccentricity at base: 0.54 ft  
Reinforcing: (ft & lbs/ft)

Layer	Height	Length	Tension	Reinf. Type	Allow Ten	Pk Cons	Serv Conn	Pullout
5	4.67	6.5	229	3XTc	1037 ok	571 ok	N/A	1.69 ok
2	2.33	6.5	494	3XTc	1037 ok	767 ok	N/A	2.82 ok
1	0.67	6.5	557	3XTc	1486 ok	951 ok	N/A	5.19 ok

**Reinforcing Quantities (no waste included):**  
3XTc: 0.2 yd/ft  
3XTc: .54 yd/ft  
3XTc: .00 yd/ft

**NOTE:** THESE CALCULATIONS ARE FOR PRELIMINARY DESIGN ONLY AND SHOULD NOT BE USED FOR CONSTRUCTION WITHOUT REVIEW BY A QUALIFIED ENGINEER

Date: 12/15/2004 Page: 1

**KEYSTONE RETAINING WALL SYSTEMS**  
Version 3.3.1.64

**Project:** BLACK RESIDENCE  
**Project No.:** PA241265  
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Design Parameters	Value	Unit
Reinforced Fill	28	°
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Reinforced Fill Type:	Silts & sands	
Unit Fill:	Crushed Stone, 1 inch minus	

Minimum Design Factors of Safety	Value
sliding:	1.50
overturning:	2.00
bearing:	2.00
pullout:	1.50
shear:	1.50
bending:	1.50
uncertainties:	1.50
connection:	1.50

Reinforcing Parameters: Mirafi 5XTc Geogrids	Value	Unit
Tall	4300	ft
REZ	1.67	ft
RE	1.10	ft
REid	1.05	ft
LTDS	2229	lb/ft
ES	1.50	
Tal	1486	lb/ft
CL	0.80	
Calc	0.80	

**Analysis:** Section #2  
Unit Type: Compact  
Leveling Pad: Crushed Stone  
Wall Ht: 10.67 ft  
Level Backfill Offset: 2.00 ft  
Surcharge: LL 300 pcf uniform surcharge  
Load Width: 100.00 ft

**Results:** Factors of Safety: Sliding 3.56, Overturning 5.15, Bearing 5.30, Shear 2.30, Bending 2.25  
Calculated Bearing Pressure: 1937 pcf  
Eccentricity at base: 0.90 ft  
Reinforcing: (ft & lbs/ft)

Layer	Height	Length	Tension	Reinf. Type	Allow Ten	Pk Cons	Serv Conn	Pullout
5	9.33	9.0	230	3XTc	1037 ok	571 ok	N/A	1.53 ok
4	7.33	9.0	494	3XTc	1037 ok	767 ok	N/A	2.63 ok
3	5.33	9.0	658	3XTc	1037 ok	951 ok	N/A	4.03 ok
2	3.33	9.0	866	3XTc	1486 ok	1199 ok	N/A	5.43 ok
1	1.33	9.0	1240	3XTc	1486 ok	1267 ok	N/A	5.73 ok

**Reinforcing Quantities (no waste included):**  
3XTc: 2.0 yd/ft  
3XTc: .00 yd/ft

**NOTE:** THESE CALCULATIONS ARE FOR PRELIMINARY DESIGN ONLY AND SHOULD NOT BE USED FOR CONSTRUCTION WITHOUT REVIEW BY A QUALIFIED ENGINEER

Date: 12/15/2004 Page: 1

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING	
DIRECTOR	DATE
CHIEF, DEVELOPMENT ENGINEERING DIVISION	3/1/05
CHIEF, DIVISION OF LAND DEVELOPMENT	DATE

12-16-04	1	REVISED PER NEW CIVIL PLANS 12-16-04
DATE	NO.	REVISION

**OWNER:** CHARLES & BONNIE BLACK  
319 FAIRFIELD DRIVE  
SEVERN, MD. 21144

**DEVELOPER:** CHARLES & BONNIE BLACK  
319 FAIRFIELD DRIVE  
SEVERN, MD. 21144

**PROJECT:** BLACK RESIDENCE  
SINGLE FAMILY DETACHED DWELLING

TAX MAP 38, GRID 8, PARCEL 808  
1st ELECTION DISTRICT  
WATER CODE 44-6906 SEWER CODE 22-S

**TITLE:** GENERAL NOTES, DETAILS & CALCULATIONS

**MESSICK & ASSOCIATES**  
CONSULTING ENGINEERS  
31 OLD SOLC MONS ISLAND RD., SUITE 201  
ANNAPOLIS, MARYLAND 21401  
(410) 266-3212 \* FAX (410) 266-3502

DESIGNED BY: JWP
DRAWN BY: JWP
PROJECT NO:
DATE: JUNE, 2004
SCALE: AS SHOWN
DRAWING NO: <del>XXXX</del>

**RYAN & ASSOCIATES**  
A Division of WKR Consulting, Inc.  
CONSULTING & DESIGN ENGINEERS  
29 S. MAIN STREET, SUITE A, CHAMBERSBURG, PA 17201  
PHONE (717) 262-4242 FAX (717) 262-4245

**WILLIAM K. RYAN**  
P.E. NO. 21586

SPECIFICATIONS FOR SEGMENTAL RETAINING WALL SYSTEMS

PART 1: GENERAL

1.01 Description

A. Work includes furnishing and installing segmental retaining wall (SRW) Units to the lines and grades designated on the Final Design prepared by Ryan & Associates (RA). Also included are furnishing and installing appurtenances/materials required for construction of the retaining wall as shown on the RA Final Design.

1.02 Reference Standards

- A. ASTM C 140- Sampling and Testing Concrete Masonry Units
B. ASTM D 4955- Tensile Properties of Geotextiles by the Wide-Width Strip Method.
C. ASTM D 5232- Test Method for Evaluating the Unconfined Creep Behavior of Geo- Grids
D. GRI:GG1- Single Rib Geogrid Tensile Strength
E. GRI:GG5- Geogrid Pullout
F. ASTM D 698- Moisture Density Relationship for Soils, Standard Method
G. ASTM D 422- Gradation of Soils
H. ASTM 4318- Atterberg Limits of Soil
I. ASTM 3034- Specification for Polyvinyl Chloride (PVC) Plastic Pipe
J. ASTM D 1248- Specification for Corrugated Plastic Pipe

1.03 Design Standards

A. The following factors of safety must have been met in this design: Sliding 1.5, Overturning 2.0, Bearing Capacity 2.0, Geogrid Overstress 1.5, Geogrid Connection (between the block and the geogrid) and Geogrid Pullout 1.5 (from the block and from the soil).

PART 2: MATERIALS & DESIGN PARAMETERS

2.01 Segmental Retaining Wall Units

A. SRW Units shall be machine formed, Portland Cement concrete blocks specifically designed for retaining wall applications. The SRW Unit currently approved for this project is:

Keystone Compac as manufactured by York Building Products or Keystone Compac II as manufactured by Betco Block & Products

NOTE: Where Keystone specifications and reference documents conflict with these specifications, the RA specifications hold precedence.

B. SRW Units shall be sound and free of cracks or other defects that would interfere with the proper placing of the units or significantly impair the strength or permanence of the structure. Cracking or excessive chipping may be grounds for rejection. Units showing cracks longer than 1/2 inch shall not be used within the wall. Units showing chips visible at a distance of 30 feet from the wall shall not be used within the wall.

C. Concrete used to manufacture SRW Units shall have a minimum 28 day compressive strength of 3,000 PSI and a maximum moisture absorption rate, by weight, of 8% as determined in accordance with ASTM C 140. Compressive strength test specimens shall conform to the saw-cut coupon provisions of Section 5.2.4 of ASTM C 140 with the following exception: Coupon shall be taken from the least dimension of the unit of a size and shape representing the geometry of the unit as a whole.

D. SRW Units molded dimensions shall not differ more than + 1/8 inch from that specified, except height which shall be + 1/16 inch as measured in accordance with ASTM C 140.

2.02 Geosynthetic Reinforcement

A. Geosynthetic reinforcement shall consist of geogrids as indicated on the RA Final Design. No geogrid reinforcement shall be permitted without the prior approval of RA. A partial redesign may be necessary if geogrids are substituted. NOTE: It is always acceptable to substitute a higher strength geogrid (of the same manufacturer) for a lower strength geogrid.

2.03 Shear Connectors

A. Shear connectors shall be 1/2 inch diameter thermoset isopthalic polyester resin-pultruded fiberglass reinforcement rods or equivalents to provide connection between vertically and horizontally adjacent units. Strength of shear connectors between vertical adjacent units shall be applicable over a design temperature of 10 degrees F to +100 degrees F. These connectors shall be capable of holding the geogrid in the proper design position during geogrid pre-tensioning and backfilling. The pins have two positions. The rear pin position results in a 1" setback and a 7.1" batter and the front pin position results in a near vertical setback with an approximate positive batter of 0.5". The batter for which RA designed this wall will be stated in the RA Final Design and on the structural cross sections. It is always acceptable to change from the rear vertical batter to 7.1" since it is more conservative (yields higher factors of safety); however the cross sections will need to be revised (partial redesign is necessary) to change from the 7.1" batter to 0.5".

2.04 Leveling Pad

A. Material for the leveling pad shall consist of compacted gravel or unreinforced concrete. Typical gravels used for this leveling pad are #57, CR6, 21A, MA modified, 2A, RC6, RC57, etc. Lean un-reinforced concrete with a strength of 1,500 PSI may also be used for the leveling pad.

2.05 Drainage Aggregate

A. Drainage aggregate shall be clean angular gravel (#57 or equivalent) with a size of 1/2 inch to 1 1/2 inches and less than 10% fines (passing the #200 sieve). Rounded "pea gravel" type aggregate is not permissible since it does not have the necessary frictional properties. Recycled gravel may be used if it meets the above criterion.

2.06 Drainage Pipe

A. The drainage collection pipe shall be a 4 inch perforated or slotted PVC or corrugated HDPE pipe.

2.07 Infill Soil: within the reinforced geogrid zone

A. The soils used must meet or exceed the friction angle stated in the RA Final Design (in the General Notes, on the typical wall section and on the structural cross sections). The reinforced material shall be free of debris and organic material (i.e., no plants, roots, sod, soil, trash, wood, etc.). The infill soil shall not consist of CH (fat clay), MH (elastic silt) or OH/OL/PT (organic) soils. All soils used for wall infill must always meet the following requirements, regardless of the friction angle: maximum liquid limit of 40, maximum optimum moisture of 20%, maximum of 75% passing the #200 sieve (minimum of 25% retained on the #200 sieve) and minimum dry unit weight of 105 PCF. Soil moisture must be within 2% of optimum to obtain proper compaction results (no exceptions).

B. Rocks may be used as infill material as long as they have a maximum size of 6 inches and a mean diameter of 3 inches. Recycled concrete is permissible for infill except with certain polyester geogrids in water applications. In the case of water applications the geogrid manufacturer shall be consulted to see if the alkali in the recycled material will cause corrosive damage to their geogrid.

C. Select gravel (classified by USCS as GP or GW) is normally an acceptable substitution in the event suitable soils (those meeting RA's and the site geotechnical engineer's requirements) are not readily available. However, the unit weights of gravel can vary widely (clean gravel is typically 105 PCF and "crusher run" gravel is typically 135 PCF) so RA must be notified so that revised sections can be run prior to making any substitutions. In some cases clean gravel actually requires longer geogrid because of its extremely light unit weight (typically 105 PCF).

2.08 Retained Soil: the area beyond the infill soil and extending to a distance that is twice the wall's exposed height

A. This soil must meet or exceed the friction angle stated in the RA Final Design (in the General Notes, on the typical wall section) and on the structural cross sections). This soil must be virgin (natural undisturbed soil with blow counts (12) or suitable fill (friction angle ( the RA Final Design requirement) compacted to 95% of a standard proctor maximum dry density.

2.09 Foundation Soil: the soil under the wall's gravel leveling pad and the soil under the reinforced geogrid zone

A. The foundation soil must meet or exceed the minimum allowable bearing capacity stated in the RA Final Design (in the General Notes and on the typical wall section). The sub-grade must be virgin (natural undisturbed soil with blow counts (12) or suitable fill (friction angle ( the RA Final Design requirement) compacted to 95% of a standard proctor maximum dry density. If highly plastic soils (CH or MH) or organic soils (OH, OL, or PT) are encountered in the sub-grade they must be removed and replaced with suitable soil or gravel that is placed in controlled lifts and compacted to 95% of a standard proctor maximum dry density. If the organic plastic soils extend so deep that they cannot be totally removed, they shall be underlain a minimum of 4' and replaced with suitable soils or gravel.

2.10 Soil Investigation

A. RA recommends that every retaining wall design be preceded by an in-situ soil investigation by a licensed geotechnical engineer. However, if the owner and/or wall installer elects not to have an investigation conducted RA may assume soil design parameters based on: published data by the Soil Conservation Service (soil maps), a verbal description by the owner and/or wall installer or by RA's previous experience in certain geographic areas. It must be understood that the owner and/or wall installer bears full responsibility to the election not to have a soil investigation performed.

2.11 Site History & Information

A. Many factors other than soil information affect the performance and design of the retaining wall. RA relies on information provided by the owner and/or wall installer when designing a retaining wall. RA bears no responsibility if the owner and/or wall installer omit critical information required to properly design the wall. Information critical to wall design from the site consist of: topographic features (such as slopes), soil types, utilities, storm water management, structures (including buildings), other existing or proposed walls, swimming pools, etc.), site geological phenomenon, groundwater, loads with the wall's zone of influence (such as driveways, patios, roadways, sidewalks, etc.) and any other readily known site factors that could potentially impact the RA Final Design.

PART 3: CONSTRUCTION

3.01 Inspection

A. RA considers all retaining walls to be critical structures, meaning most walls require a considerable financial investment by the owner and failure of a wall will negatively impact a property both financially and from a public safety perspective. The owner or owner's representative is responsible for verifying that the wall installer meets all of the requirements of the RA Final Design (as stated in these specifications and the project's General Notes). This includes all submittals for materials and design, qualifications and proper installation of the wall system. All walls with an exposed height of 6 feet or greater must have the construction certified by a licensed geotechnical/ structural engineer registered in the jurisdiction of the project. Additionally, after the wall has been completed it is highly recommended that it be surveyed to establish the wall's current horizontal and vertical alignment.

B. The wall installer's field construction supervisor shall have demonstrated experience and be qualified to direct all work at the site.

C. RA provides construction review on some retaining wall projects. RA verifies general compliance with the RA Final Design; however, it is the wall installer's ultimate responsibility to construct the structure properly in accordance with the RA Final Design. RA's liability is limited to the amount of our fees for the scope of work provided for the wall designs and construction oversight.

3.02 Excavation

A. The wall installer shall excavate to the lines and grades shown on the RA Final Design and the project's civil plans. The wall installer shall take precautions to minimize over-excavation. Over-excavation shall be filled with compacted soil (friction angle (RA design parameters) or gravel as directed by the site geotechnical engineer.

B. The wall installer shall verify the location of existing structures and utilities prior to excavation. The wall installer shall ensure that all surrounding structures are protected from the effects of wall excavation. Excavation support (shoring), if required, is the responsibility of the wall installer. All excavation must be conducted in accordance with OSHA (federal) and state safety regulations. All work to construct the wall must be in accordance with 29CFR1926 sub-part P (OSHA Excavation Safety Requirements).

3.03 Foundation Preparation

A. Following excavation, the foundation soils (under the wall's gravel leveling pad and under the wall's reinforced geogrid zone) shall be examined by the site geotechnical engineer to assure that the actual foundation soil strength meets or exceeds the minimum allowable bearing capacity in the RA Final Design (stated in the General Notes and shown on the typical wall section). Soils that do not meet the required strength shall be removed and replaced with compacted structural fill or gravel and be compacted to 95% of a standard proctor maximum dry density for the full depth.

B. In cases of poor bearing capacity or fill soils, an enlarged geogrid reinforced leveling pad may be required. This typically consists of a 1 foot deep X 4 foot wide leveling pad with geogrid under (on the sub-grade) and within the gravel (6 inches above the sub-grade). The sub-grade must be compacted with a "J-Lamp" or "Jumping Jack" type compactor with a minimum of three passes prior to geogrid placement. These extra measures will increase the soil's bearing capacity by a minimum of 1,000 PSF (RA shall be consulted if the soil's bearing capacity needs to be increased by more than 1,000 PSF).

3.04 Leveling Pad Construction

A. The leveling pad shall be placed so that its top elevation is the same as the bottom of block ("BB") elevation on the RA Final Design profile drawing. It shall have a minimum thickness of 6 inches and a minimum width of 2 feet. The leveling pad should extend a minimum, extend laterally at least a distance of 6 inches from the toe and heel of the lower most SRW Unit.

B. The leveling pad material shall be compacted to 95% of a standard proctor maximum dry density with a vibratory plate compactor to provide a firm level-bearing surface on which to place the first course of SRW Units. A thin layer (not to exceed 1/2 inch) of well-graded sand or stone dust may be used to smooth the top of the leveling pad.

3.05 SRW Unit Installation

A. All SRW Units shall be installed at the proper elevation and orientation as shown on the RA Final Design profile drawing in conjunction with the project's civil plans. The SRW Units shall be installed in general accordance with the manufacturer's recommendations (RA's Final Design shall govern in any conflict between the two requirements).

B. The first course of SRW Units shall be placed on the leveling pad. The units shall be leveled side-to-side, front-to-rear and with adjacent units, and aligned to ensure intimate contact with the leveling pad. The first course is the most important for accurate and acceptable results. Alignment may be done by means of a string line or an offset from the base line to the backs of the blocks. SRW units shall have a minimum 4 inch overlap of units on each successive course so that the wall is interlocked and continuous. No horizontal gaps greater than 1/4 inch between the faces of adjacent units are permitted.

C. Because the wall has a setback, its batter must be predetermined during the stake out process by the civil engineer/surveyor and wall installer. If there are critical dimensions that must be met on the high side of the wall then the base (at the toe) will need to be moved forward to compensate.

D. Lay out of curves and corners shall be installed in accordance with the civil plans and the RA Final Design. Construction techniques for curves and corners shall be in general accordance with the SRW manufacturer's installation guidelines. In general, all tangent angles shown on the civil drawings should be changed into curves and the wall strength and appearance. Continuous vertical joints are not recommended. Inside and outside 90° corners may be constructed without compromising the wall's integrity if they are properly interlocked. Inside corners should be constructed so that the SRW Units interlock (according to manufacturer's recommendations) and outside corners should incorporate special corner blocks when possible. If special outside corner blocks are not available from the block manufacturer for this project then the manufacturer's guidelines for building structural outside corners shall be followed. If gluing is necessary only industrial grade adhesives or sealants designed for concrete-to-concrete applications may be used (adhesives designed for plastic or wood applications are not acceptable).

E. Clean all excess debris from the tops of the SRW Units and install the next course.

F. Repeat procedures to extent of wall height.

G. A +2( tolerance is permitted horizontally for wall batter (block setback). In no case shall a wall go beyond vertical (have a negative batter). Walls shall be built level (not with grade), however a +/- 1.5 inch tolerance over a 10 foot distance is permitted vertically (as checked from left to right along the wall).

H. Embedment shall be a minimum of 1 inch buried from every 1 foot of wall exposed with one block minimum when the front slope is 4:1 or greater (more level). Walls constructed on 3:1 front slopes or less (more steep) require additional buried blocks. See the profile drawing in the RA Final Design for the exact amount of embedment (the amount of buried block can be determined at each wall station by subtracting the "BB" elevations from the "GR" elevations).

3.06 Geogrid Reinforcement Placement

A. All geogrid reinforcement shall be installed at the proper elevation, length and strength as shown on the profile and structural cross sections in the RA Final Design. Partial geogrid coverage is not acceptable; no gaps shall be present between geogrid layers. 100% coverage is required, however it is not necessary to overlap the geogrid pieces. The geogrid shall be laid horizontally on the compacted infill soil and on top of the concrete SRW Units. The geogrid must be embedded into the SRW Units to the face. The wall installer shall verify that the orientation of the geogrid is in accordance with the geogrid manufacturer's recommendations. The highest strength direction of the geogrid must be perpendicular to the wall face (the geogrid must not be laid parallel to the wall- cannot be rolled out with the wall).

B. Geogrid reinforcement layers shall be one continuous piece for their entire embedment length. Overlapping of the geogrid in the design strength direction (perpendicular to the wall face) is not permitted.

C. Tracked construction equipment shall not be operated directly on the geogrid. A minimum of 6 inches of backfill is required prior to operating tracked vehicles over the geogrid. Turning should be kept to a minimum. Rubber-tired equipment may pass over the geogrid reinforcement at slow speeds (less than 5 MPH).

D. The geogrid shall be in tension and free of wrinkles prior to placement of the infill soil. Nominal tension shall be applied to the geogrid and secured in place with staples, stakes or by hand until it is covered by 6 inches of infill soil.

E. For inside & outside corners and inside & outside curves the geogrid shall be placed according to the manufacturer's instructions to provide total geogrid coverage. On outside corners the geogrid should be installed up or down one course and alternated so that the geogrid comes into the reinforced geogrid zone from both legs of the 90° angle. Geogrid layers shall never be placed on top of one another; there must be a minimum of 3 inches of compacted infill soil between geogrid layers.

3.07 Wall Drainage

A. Drainage aggregate (clean gravel such as #57 or equivalent) shall be installed behind the entire wall face from the first course below grade to one course from the top of the wall. The drainage gravel shall be placed to a minimum thickness of 12 inches behind the SRW Units. Drainage gravel shall also fill all voids between and within (if hollow) the SRW Units. SRW Units must be filled with drainage aggregate in one course lifts (SRW Units may not be stacked in two or three course lifts and then have the gravel dumped in from the top through multiple courses). An impermeable clay layer (CL, GC or SC) shall be placed on top of the 12" drainage layer. If clayey soils are not readily available, a layer of filter fabric (Mirafi 140N or equivalent) shall be placed on top of the gravel (below the topsoil) to prevent the downward migration of fines.

B. Drainpipes are mandatory and shall be vented to daylight at the end(s) of the wall, at a central low point of the wall, or through the wall face at maximum intervals of 30 feet on center (no more than 6 inches above finished grade when vented through the wall face). The pipe(s) must maintain gravity flow of water outside the reinforced geogrid zone. Water must drain to an outlet and have positive flow. If a continuous pipe is run, it shall daylight into a storm sewer manhole or along a slope at an elevation lower than the lowest point of the pipe within the drainage aggregate. When drainpipes are daylighted at the end(s) of a wall they must be visible and unobstructed. The drainpipes should be checked by the owner on a regular basis to ensure that they remain open (not blocked, filled in, grown over, pinched).

C. Rear drainpipes are required in the following situations: when groundwater can rise and approach within 1 foot of the leveling pad sub-grade, in "cut" situations where the potential exists for storm water to enter the interface between the reinforced geogrid zone and the retained zone and when low permeable soils (CL- lean clay & ML- silt) are used for infill soil. Retaining walls with low permeable soils in the reinforced geogrid zone are more susceptible to being negatively impacted by hydrostatic forces. The owner may elect to install a rear drainpipe to minimize or eliminate potential hydrostatic force buildup leading to potential wall movements. RA recommends a rear drainage system for all walls with these soil types in cut situations, however ultimately it is the owner's decision. This rear drainpipe shall be surrounded by a minimum of 12 inches of clean gravel (#57 or equivalent) and surrounded with filter fabric to prevent the migration of fines. This rear drainpipe must vent to daylight or be directed to a storm sewer manhole (see instructions for front drainpipe in section 3.07B above).

D. Chimney drains (a second 12 inch layer of drainage aggregate within the rear 1 foot of the reinforced geogrid zone or directly behind the reinforced geogrid zone) must be installed when groundwater is present or likely (to an elevation that is a minimum of 1 foot above predicted levels as given by the site geotechnical engineer), when stated in the RA Final Design or when required by the site geotechnical engineer.

E. All drainage zone aggregate shall be compacted to 95% of a standard proctor maximum dry density with a vibratory plate compactor (minimum of three passes).

3.08 Backfill Placement

A. The infill soil shall be placed as shown in the RA Final Design in the maximum compacted lift thickness of 10 inches and shall be compacted to a minimum of 95% of a standard proctor maximum dry density (ASTM D 698) or moist unit weight of optimum. The backfill shall be placed and spread in such a manner as to eliminate wrinkles or movement of the geogrid and the SRW units. Compaction testing shall be done at 25%, 50%, 75% and 100% of the wall height or as specified by the site geotechnical engineer.

B. Only a vibratory plate or small-scale vibratory smooth drum compactor equipment shall be allowed within 3 feet of the front of the wall face. Compaction within the 3 feet behind the wall face shall be achieved by at least three (3) passes of the lightweight mechanical plate compactor or roller. Heavy equipment (such as track hoes, ride on rollers, pans, etc.) must be kept back a minimum of 3 feet from the rear of the wall.

C. At the end of each day's operation, the wall installer shall slope the last level of backfill away from the wall facing to direct water runoff away from the wall face.

D. At completion of wall construction if final grading, paving, landscaping and/or storm drainage installation adjacent to the wall is not placed immediately after wall completion, temporary grading shall be provided to ensure that water runoff is not allowed to collect or pond behind the wall until final construction adjacent to the wall is completed.

E. Filter fabric (Mirafi 140N or equivalent) is required when the infill soil is classified as poorly graded sand (SP) or well graded sand (SW) since these soils are non-cohesive and could potentially slough, clogging the drainage system. Filter fabric is optional between the 12 inch gravel drainage layer and the compacted infill soil if the backfill soils are clayey (CL or SC), gravelly (GC, GM, GP or GW) or silty (ML or SM).

3.09 SRW Caps

A. SRW caps shall be properly aligned and glued (for safety reasons) to the underlying SRW Units with a flexible high-strength concrete adhesive or product designed for "concrete to concrete" applications (not for plastic or wood). Rigid adhesives or mortar is not acceptable.

3.10 Water Applications

A. When walls are installed in water applications (such as storm water ponds, streams, bulkheads, areas adjacent to flood plains, etc.) all clean gravel must be used as infill up to 1 foot above the 100 year flood elevation, the high water level or the top of a berm/spillway. This gravel must be free draining and have less than 10% fines (#57 or equivalent). Filter fabric (Mirafi 140N or equivalent) must go in front of the buried block, under the leveling pad, behind the reinforced geogrid zone (vertically up to the extent of the gravel infill) and on top of the gravel infill (horizontally). This is required to prevent the migration of fines into the gravel infill. Rip rap is required in front of the bottom three courses on walls installed in tidal waters. Rip rap is also required when indicated on the civil plans and where pipes with active water flow exit through the wall.

3.11 Rails, Fences & Other Structures

A. The scope of RA for this project does not include fence or railing designs. Typical details have been given to provide general guidelines for the installation of fences, guardrails and railings behind walls. RA cannot give specific details because the type, placement and height of fences and rails vary widely and because the requirements are different depending on the municipality and regulatory authority. RA can provide a project specific fence or rail detail and structural design for an additional fee if given exact information (material type and size and manufacturer's specifications and installation guidelines).

B. Open fences and railings not subject to wind loads (minimum of 50% open and maximum of 50% solid) may be placed directly behind the wall or in the wall (can be placed in the blocks only if they are a hollow system and if the cores and web alignment will accept the posts) as long as they are not subject to vehicular impact. Solid or semi-solid fences that are subject to wind loads must be kept back a minimum of 3 feet from the rear of the wall to prevent loading of the wall.

C. Guardrails subject to vehicular impact must be kept back a minimum of 3 feet from the rear of the wall to prevent loading of the wall. Guardrails may be placed closer than this 3 foot minimum only if a barrier (such as curbing, wheel stops, etc.) is in place to prevent vehicular impact (the overhang of vehicles must be considered when determining this).

D. Light post foundations, sign foundations and similar structures subject to wind loads must be kept back a minimum of 3 feet from the rear of the wall to prevent loading of the wall.

E. In cases where these 3 foot minimum distances cannot be met due to restraints on the site, additional analysis will need to be done to determine methods of stabilization. RA can provide these designs for an additional fee.

3.12 Storm Structures & Utilities

A. Reinforced Concrete Pipes (RCP) may pass through the leveling pad or wall structure without additional means of support, it should be verified from the pipe manufacturer that the pipe can withstand a load equal to or greater than that exerted by the wall- as stated in the RA Final Design General Notes under "Bearing Capacity". The SRW units may be cut to fit around the pipe and the voids filled with non-shrink grout or type "M" mortar. A concrete collar may be cast around the structure if desired for ease of construction and aesthetic considerations. When a collar is cast, the top of the collar must line up with an even block course to maintain proper alignment, neat workmanship and to eliminate horizontal cutting of blocks.

B. The wall may not bear on plastic or steel pipes (such as ADS, CMP, HDPE, PVC, SLCPP, etc.) or utilities (such as electric, gas, phone lines, sewer or water lines, etc.). Grade beams or lintels must be used to bridge these non-load bearing structures. If a specific grade beam or lintel is not specified in the RA Final Design, RA shall be consulted to determine the size, strength and reinforcing of the grade beam or lintel. If these non-load bearing pipes or utilities are located at minimum of 42 inches below the wall's leveling pad then a grade beam or lintel is not necessary.

C. Concrete storm structures may be located behind a wall and be within the reinforced geogrid zone as dictated by the project's civil drawings. If the structure(s) cannot be moved out of the reinforced geogrid zone and the geogrid cannot be installed to its full design length the following shall apply. On small structures (such as collection boxes, concrete pipes less than 18 inches, inlets, manholes, etc.) it is acceptable to shorten the geogrid from the design length and meet the structure. The area between the wall and structure where the geogrid has been shortened must be filled with gravel (#57 or equivalent) and not soil. The gravel must be compacted to 95% of a standard proctor maximum dry density with a vibratory plate compactor. On large structures and in cases where pipes parallel the wall for long distances, RA shall be consulted to determine the impact on the wall before allowing this to be done.

D. The wall's integrity may be compromised if pipes or structures burst or develop leaks and allow water or fluids to saturate the reinforced geogrid zone. RA is not responsible for wall failure that results from pipes or structures that burst or leak and allow water or fluids to saturate the reinforced geogrid zone.

3.13 Construction Adjacent to Completed Wall

A. The owner or owner's representative is responsible for ensuring that construction adjacent to the wall by others does not disturb the wall or place temporary construction loads on the wall that exceed design loads, including loads such as water pressure, temporary grades, or equipment loading. Heavy paving or grading equipment shall be kept a minimum of three feet behind the back of the wall face. Equipment with wheel loads in excess of 150 PSF (the load shall not be operated with 10 feet of the face of the retaining wall during construction adjacent to the wall. Care should be taken by the general contractor or owner to ensure water runoff is directed away from the wall structure until final grading and surface drainage collection systems are completed.

B. Care must be taken when installing appurtenances (such as generators, transformers, etc.) or utilities within the reinforced geogrid zone of the wall. The compaction integrity of the reinforced geogrid zone must be maintained, both below and beside (around) the appurtenance or utility. Neglecting to do so may cause hydrostatic pressure and wall failure.

3.14 Storm Water Management & Slopes

A. The segmental retaining wall is not a storm water management structure. The wall can accommodate the rainfall above the reinforced geogrid zone but not the watershed (including the retained zone). Therefore it is absolutely essential that surface water be prevented from entering (and ultimately saturating) the reinforced geogrid zone. This is usually accomplished by the site engineer (owner's civil engineer) grading the surface behind the wall to direct surface water to swales that divert the water around the wall ends, to inlets or over the top of the wall through scuppers. If water is directed to the wall (such as applications with back slopes), the top 8 inches of compacted fill over the reinforced geogrid zone must have impermeable soil (such as CL, GC or SC). If clayey soils are not readily available an underlying geomembrane (geosynthetic liner) may also be used. This geomembrane shall be Mirafi G200N, Stratadrain or equivalent. It shall extend downward vertically a minimum of 3 feet behind the reinforced geogrid zone, be laid horizontally on top of the reinforced geogrid zone with a maximum slope of 10:1 and extend forward into the 12 inch gravel drainage layer.

B. The site geotechnical engineer is responsible for verifying the stability of slopes on the project. RA's scope includes only wall design, not the calculation of back slopes (above walls) or front slopes (at the base of walls). RA performs global stability analyses on walls that rest on major front slopes, however only the wall is analyzed, not the actual slopes above or below the wall. It is the responsibility of the site geotechnical engineer to determine if the site soils are able to sustain the proposed grades. If not, they shall determine and specify the additional reinforcement that is necessary to provide the proper slope stability and prevent erosion.

C. The general contractor, owner, site contractor and/or wall installer must provide for proper wall drainage to prevent the buildup of hydrostatic pressures over the service life of the structure. In the event additional water is introduced into the general wall area, either above or below grade, the RA Final Design will be invalid (the exception is "water applications" where clean gravel is used for infill and it is wrapped in filter fabric and the design intent is for the wall to be interacting with water).

3.15 Post Construction Responsibilities

A. Retaining walls are a substantial financial investment. Therefore it is in the owner's best interest that a wall maintenance budget be established within the overall property management budget to monitor and provide preventive maintenance. Retaining wall maintenance, at a minimum, should consist of: checking drainage, inspecting for settling and surveying to verify alignment and batter. This service should be by qualified personnel under the supervision of a licensed geotechnical/structural engineer. RA can provide this service for an additional fee.

B. RA SHOULD BE NOTIFIED AS SOON AS REASONABLY POSSIBLE IF THE RETAINING WALL EXHIBITS CONDITIONS CONTRARY TO THE RA FINAL DESIGN SO THAT RA MAY BE CONSULTED TO PROTECT THE OWNER'S INVESTMENT.

END OF SECTION Revised 03-25-04

The information contained herein is proprietary and is the sole property of RA. It is only intended for use on this project. Reuse of these drawings, sketches, and design computations in any manner is strictly prohibited without written approval from RA. Any other use is subject to penalty of law. (c)

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

Director: [Signature] DATE: 7/14/05
Chief, Development Engineering Division: [Signature] DATE: 3/7/05
Chief, Division of Land Development: [Signature] DATE: 3/14/05

12-16-04 1 REVISED PER NEW CIVIL PLAN(S) 12-16-04

DATE: [ ] REVISION

OWNER: CHARLES & BONNIE BLACK
319 FAIRFIELD DRIVE
SEVERN, MD. 21144

DEVELOPER: CHARLES & BONNIE BLACK
319 FAIRFIELD DRIVE
SEVERN, MD. 21144

PROJECT: BLACK RESIDENCE
SINGLE FAMILY DETACHED DWELLING

TAX MAP 38, GRID B, PARCEL 808
1st ELECTION DISTRICT
WATER CODE 44-8906 SEWER CODE 22-S

TITLE: SPECIFICATIONS

MESSICK & ASSOCIATES \*
CONSULTING ENGINEERS
31 OLD SOLOMONS ISLAND RD., SUITE 201
ANNAPOLIS, MARYLAND 21401
(410) 266-3212 FAX (410) 266-3502

DATE:
DESIGNED BY: JWP
DRAWN BY: JWP
PROJECT NO:
DATE: JUNE, 2004
SCALE: AS SHOWN
DRAWING NO: [ ]

RYAN & ASSOCIATES
A Division of WKR Consulting, Inc.
CONSULTING & DESIGN ENGINEERS
29 S. MAIN STREET, SUITE A, CHAMBERSBURG, PA 17201
PHONE (717) 262-4242 FAX (717) 262-4245

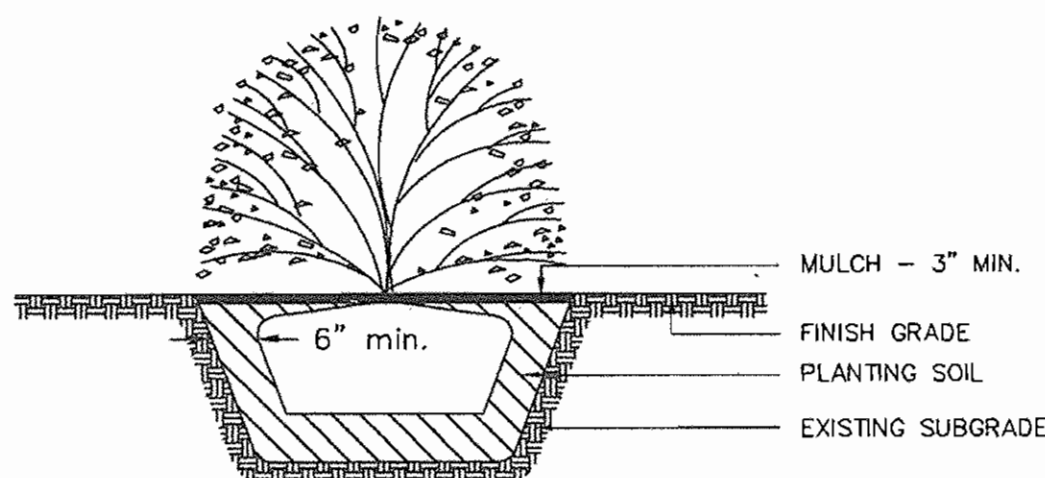
STATE OF MARYLAND
PROFESSIONAL ENGINEER
WILLIAM K. RYAN
P.E. NO. 21586

SCHEDULE A PERIMETER LANDSCAPE EDGE		
CATEGORY	ADJACENT TO ROADWAYS	ADJACENT TO PERIMETER PROPERTIES
LANDSCAPE TYPE	NONE/B	"A"
LINEAR FEET OF ROADWAY FRONTAGE/PERIMETER	0 L.F.	906 L.F.
CREDIT FOR EXISTING VEGETATION (YES, NO, LINEAR FEET) (DESCRIBE BELOW IF NEEDED)	NO	NO
CREDIT FOR WALL, FENCE OR BERM (YES, NO, LINEAR FEET) (DESCRIBE BELOW IF NEEDED)	NO	NO
NUMBER OF PLANTS REQUIRED		906/60=15
SHADE TREES	0	0
EVERGREEN TREES	0	0
SHRUBS	0	0
NUMBER OF PLANTS PROVIDED		12
SHADE TREES	0	12*
EVERGREEN TREES	0	0
OTHER TREES (2:1 SUBSTITUTION)	0	0
SHRUBS (2:1 SUBSTITUTION)	0	21**
(DESCRIBE PLANT SUBSTITUTION CREDITS BELOW IF NEEDED)		

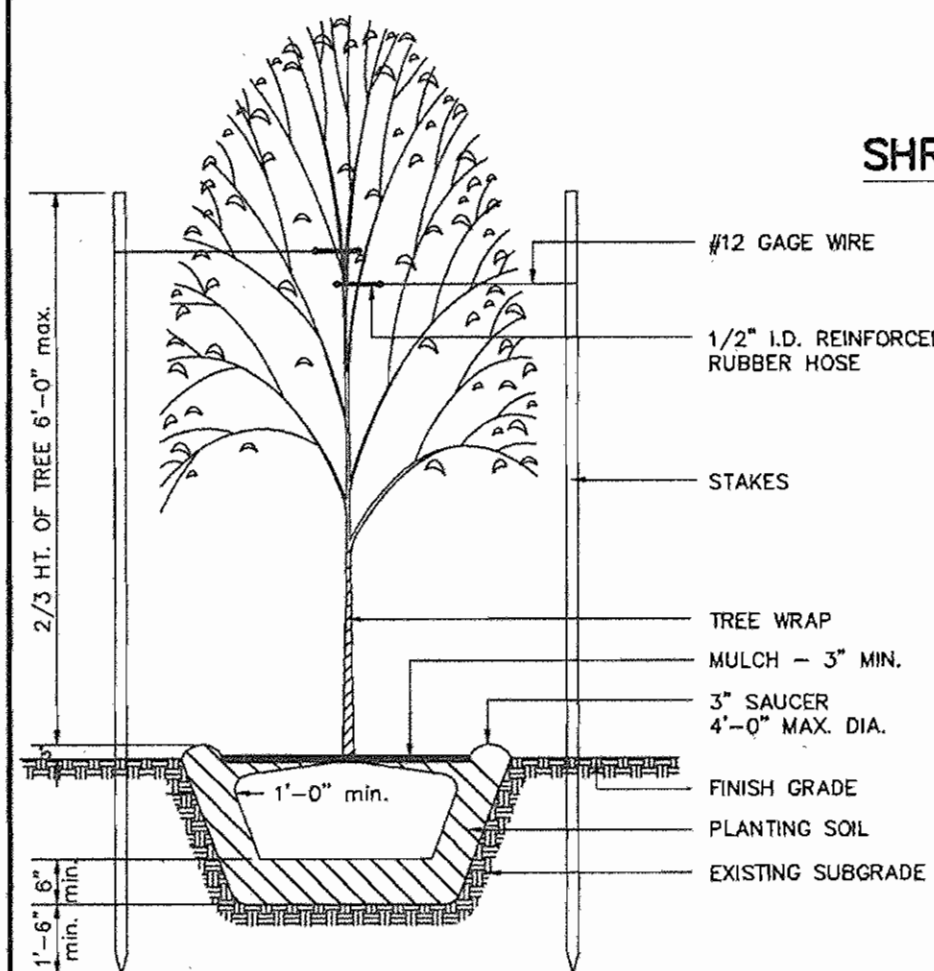
\* = 4 SUBSTITUTED FOR 2 SHADE TREES.  
\*\* = 21 EVERGREEN SHRUBS PROVIDED FOR DRIVEWAY SCREENING PER SECT. 16.120.B(6)(V).

**PLANTING NOTES:**

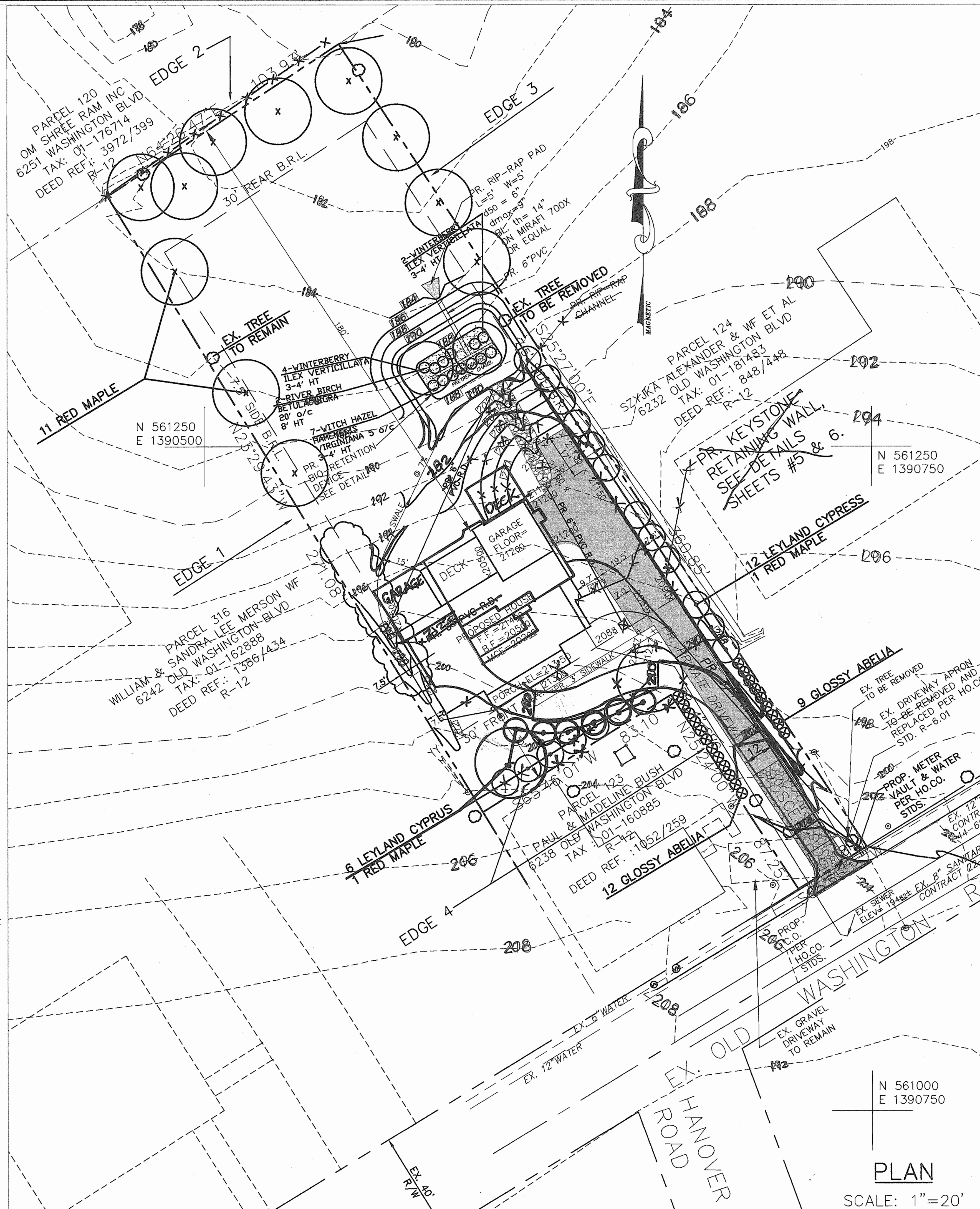
- All plants shall be nursery grown.
- All plants shall conform to the standards of "Landscape Specifications Guidelines" Published by Landscape Contractors Association. They shall be typical of their species or variety and shall have a normal habit of growth. They shall be sound, healthy and vigorous, well-branched and densely foliated when in leaf. They shall be free of disease and insect pests, eggs, or larvae. They shall have healthy, well-developed root systems.
- No substitutions shall be made without the approval of the landscape architect.
- Balled and burlapped plants shall be dug with firm natural balls of earth, of diameter and depth to include most of the fibrous roots. Container grown stock shall have been grown in a container long enough for the root system to be have developed sufficiently to hold its soil together firm and whole. No plants shall be loose in the container.
- Root balls of all plants shall be adequately protected at all times from sun and drying winds or frost.
- Owner or his representative shall be notified prior to beginning planting operations.
- All trees shall be wrapped immediately after they are planted. Approved tree wrap shall be installed according to accepted industry practice.
- Each tree and shrub shall be pruned in accordance with the American Association of Nurserymen Standards to preserve the natural character of the plant. All dead wood or suckers and all broken or badly bruised branches shall be removed. Cuts over 1" in diameter shall be painted with an approved tree paint.
- Mulch: immediately after planting operations are completed all trees and shrub planting pits shall be covered with a 2" layer of Shredded Hardwood Bark Mulch or other material approved by the owner or his representative. The limit of this mulch for trees shall be the area of the pit and for shrubs in beds, the entire area of the shrub bed.
- Trees in leaf when planted shall be treated with anti-desiccant such as Wilt-Proof.
- Conditions detrimental to plants: the contractor shall notify the project representative in writing of all soil or drainage conditions which the contractor considers detrimental to the growth of plants. He shall state the conditions and submit a proposal for correcting the conditions, including any change in cost for review and acceptance by the project representative.
- Minor adjustments to tree location may be necessary due to field conditions and final grading. The contractor shall notify the owner if major adjustments are required.
- A Surety in the amount of \$5,136.00 shall be posted with the grading permit application for 15 shade trees (4,988.00) and 21 shrubs (138.00).
- To obtain surety release, a qualified professional shall submit written certification to the Dept. of Planning & Zoning that healthy plant material was installed in accordance with this plan and that a 1 year guarantee has been executed.
- The developer is responsible for maintenance of the landscaping during construction & is responsible for obtaining a 1 year guarantee that ensures the survival or replacement of all required plant material for 1 year from the date of the landscape certification.
- Maintenance of plant material is the responsibility of the owner. The required plantings shall be maintained in good growing conditions & whenever necessary replaced with new plant material to ensure continued compliance with the landscape regulations.
- To ensure public safety, plant material should not be allowed to encroach on rights of ways & easements & impede motorists vision.



SHRUB PLANTING DETAIL



TREE PLANTING DETAIL - LESS THAN 4" CAL.



N 561000  
E 1390750

PLAN  
SCALE: 1"=20'

SCHEDULE A					
EDGE NO.	PERIMETER TYPE	PERIMETER LENGTH	PLANTS REQUIRED	CREDIT FOR EX. VEGETATION, ETC.	PLANTS PROVIDED
1	A	271.08 L.F.	4	1 TREE TO REMAIN	5 *
2	A	103.93 L.F.	2	NO	3
3	A	360.85 L.F.	6	NO	10 *
4	A	170.35 L.F.	3	NO	4 *

\* NOTE: 2 EVERGREEN TREES = 1 CANOPY TREE  
EDGE 1 = 1 EX. CANOPY TREE  
          4 PR. CANOPY TREE  
EDGE 3 = 4 PR. CANOPY TREES  
          12 PR. EVERGREEN TREES  
EDGE 4 = 1 PR. CANOPY TREE  
          6 PR. EVERGREEN TREES

PLANT LIST					
SYMBOL	ID	BOTANICAL NAME COMMON NAME	QTY	SIZE CAL.	
○	TI	ACER RUBRUM/OCTOBER GLORY OCTOBER GLORY RED MAPLE	12	2-1/2" -3"	
○	ET	CUPRESSOCYPARIS GYLANDII LEYLAND CYPRESS	18	3-4" HT	
○	ST	ABELIA GRANDIFLORA GLOSSY ABELIA	21	2-1/2" 3-4" HT	

BY THE DEVELOPER:  
I/WE CERTIFY THAT ALL DEVELOPMENT AND CONSTRUCTION WILL BE DONE ACCORDING TO THIS PLAN, AND THAT ANY RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF ATTENDANCE AT A DEPARTMENT OF THE ENVIRONMENT APPROVED TRAINING BEFORE BEGINNING THE PROJECT. I ALSO AUTHORIZE PERIODIC ON-SITE INSPECTIONS BY THE HOWARD SOIL CONSERVATION DISTRICT.  
Developer: *Jamie Han* DATE: 2/1/05

BY THE ENGINEER:  
I CERTIFY THAT THIS PLAN FOR EROSION AND SEDIMENT 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.  
Engineer: *[Signature]* DATE: 1/10/05

THESE PLANS HAVE BEEN REVIEWED FOR THE HOWARD SOIL CONSERVATION DISTRICT AND MEET THE TECHNICAL REQUIREMENTS FOR SOIL EROSION AND SEDIMENT CONTROL.  
Natural Resources Conservation Service DATE: *[Signature]*

THIS DEVELOPMENT PLAN IS APPROVED FOR SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT.  
HOWARD SOIL CONSERVATION DISTRICT DATE: *[Signature]*

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
Director: *Wanda K. Layton* DATE: 2/1/05  
Chief, Development Engineering Division: *[Signature]* DATE: 3/7/05  
Chief, Division of Land Development: *[Signature]* DATE: 3/1/05

Revised Topographic Info.

OWNER: CHARLES & BONNIE BLACK  
319 FAIRFIELD DRIVE  
SEVERN, MD. 21144  
DEVELOPER: CHARLES & BONNIE BLACK  
319 FAIRFIELD DRIVE  
SEVERN, MD. 21144

PROJECT: BLACK RESIDENCE  
SINGLE FAMILY DETACHED DWELLING  
TAX MAP 38, GRID 8, PARCEL 808  
1st ELECTION DISTRICT  
WATER CODE 44-6906 SEWER CODE 22-5

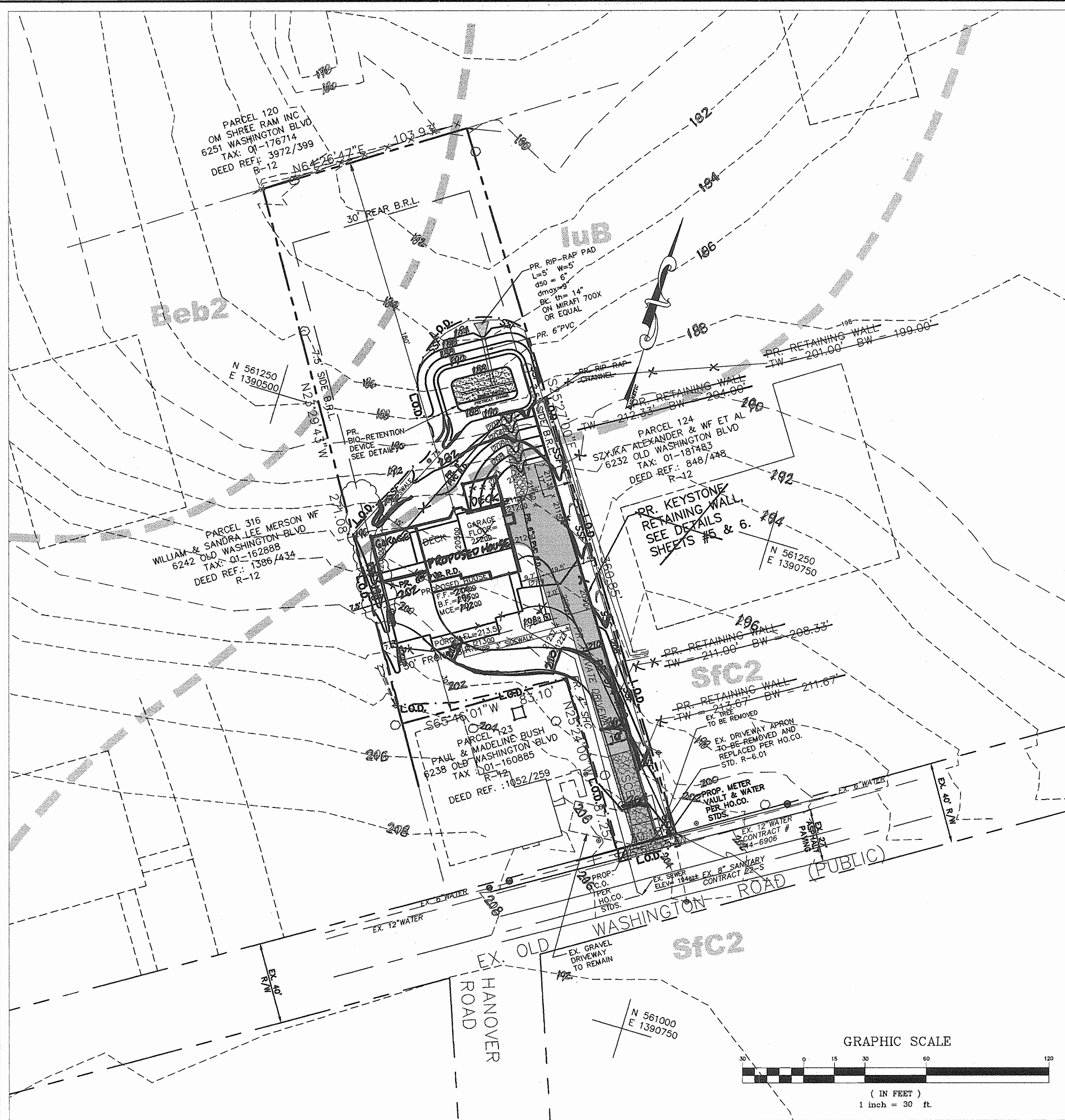
TITLE: LANDSCAPE PLAN

MESSICK & ASSOCIATES  
CONSULTING ENGINEERS  
31 OLD SOLOMONS ISLAND RD., SUITE 201  
ANNAPOLIS, MARYLAND 21401  
(410) 266-3212 \* FAX (410) 266-3502

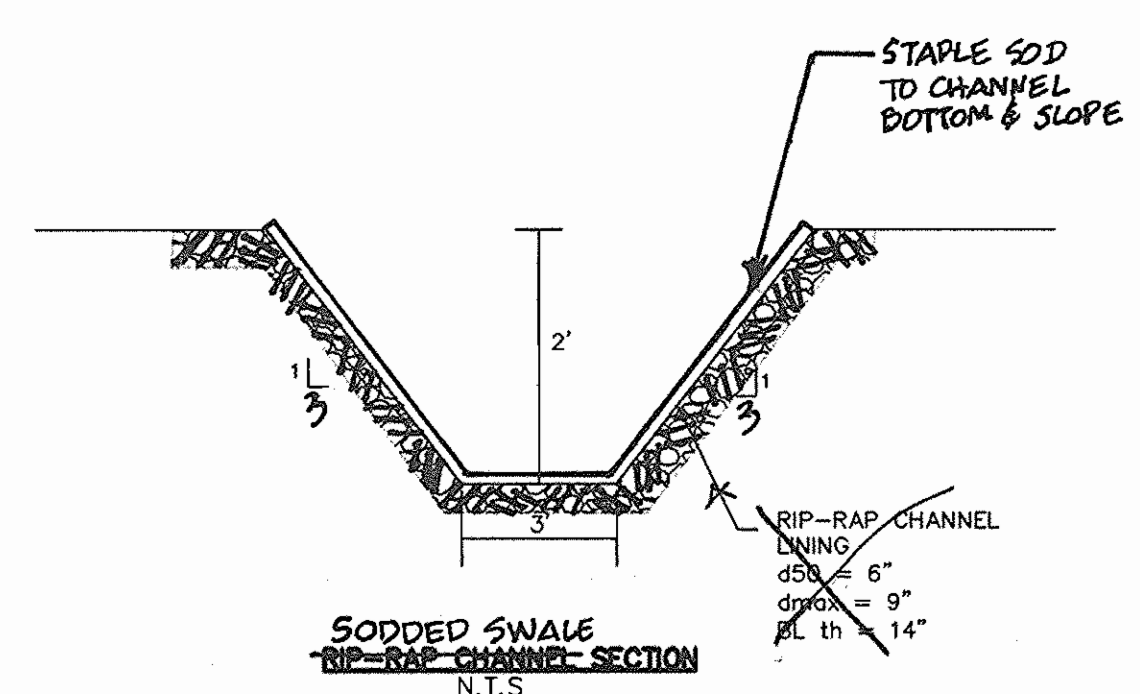
DATE: 1/10/05  
DESIGNED BY: WAN  
DRAWN BY: COP  
PROJECT NO:  
DATE: MARCH, 2004  
SCALE: AS SHOWN  
DRAWING NO.: 4 OF 7







SOILS CHART	
TYPE	DESCRIPTION
BeB2	Beltville Silt loam, 5 to 15 percent slopes, moderately eroded.
IuB	Iuka loam alluvion, 1 to 5 percent slopes.
SIC2	Sassafras Gravelly sandy loam, 5 to 10 percent slopes, moderately eroded.



**Chapter 3. Performance Criteria for Urban BMP Design - Stormwater Filtering Systems**

**3.4.6 Filtering Maintenance Criteria**

The retention chamber under filters shall be cleaned/maintained when drawdowns occur within the drawdown period. Drawdowns shall be removed or replaced as necessary.

Drawdowns shall be cleaned out of the retention chamber when it accumulates to a depth of more than six inches. Vegetation within the retention chamber should be limited to a height of 18 inches.

When the filtering capacity of the filter decreases substantially (i.e., when water ponds on the surface of the filter bed for more than 72 hours), the top few inches of drawdown material shall be removed and shall be replaced with fresh material. The removed material should be disposed in an acceptable manner (i.e., landfilled). Silts/clay should be removed from the filter bed when the accumulation exceeds one inch.

Organic filters (F-4) or surface sand filters (F-1) that have a grass cover should be mowed a minimum of 3 times per growing season to maintain maximum grass heights less than 12 inches.

A depth of at least six inches shall be provided at the base of bio-retention facilities (F-2) (see Appendix B). Dead or dormant plant material shall be replaced. Areas devoid of mulch shall be re-mulched as an annual basis.

Direct maintenance access shall be provided to the pretreatment area and the filter bed.

Construction of sand filters and bio-retention areas shall conform to the specifications outlined in Appendix B.3.

**Appendix B.3. Construction Specifications for Sand Filters, Bio-retention and Open Channels**

Areas are excavated using a loader, the contractor should use wide track or marsh track equipment, or light equipment with soft tire treads. Use of equipment with narrow tracks or narrow tires, rubber tires with large lugs, or high pressure tires will cause excessive compaction resulting in reduced infiltration rates and is not acceptable. Compaction will significantly contribute to design failure.

Compaction can be alleviated at the base of the bio-retention facility by using a primary tilling operation such as a chisel plow, ripper, or subsoiler. These tilling operations are to refracture the soil profile through the 12 inch compaction zone. Subsoiler methods must be approved by the engineer. Subsoilers typically do not till deep enough to reduce the effects of compaction from heavy equipment.

Recontil 2 to 3 inches of sand into the base of the bio-retention facility before backfilling the required sand layer. Pump any ponded water before preparing (recontiling) base.

When backfilling the topsoil over the sand layer, first place 3 to 4 inches of topsoil over the sand, then recontil the sand/topsoil to create a gradation zone. Backfill the remainder of the topsoil to final grade.

When backfilling the bio-retention facility, place soil in lifts 12" to 18". Do not use heavy equipment within the bio-retention basin. Heavy equipment can be used around the perimeter of the basin to supply soil and sand. Grade bio-retention materials with light equipment such as a compact loader or a dozer/loader with marsh tracks.

**4. Plant Material**

Recommended plant material for bio-retention areas can be found in Appendix A, Section A.2.3.

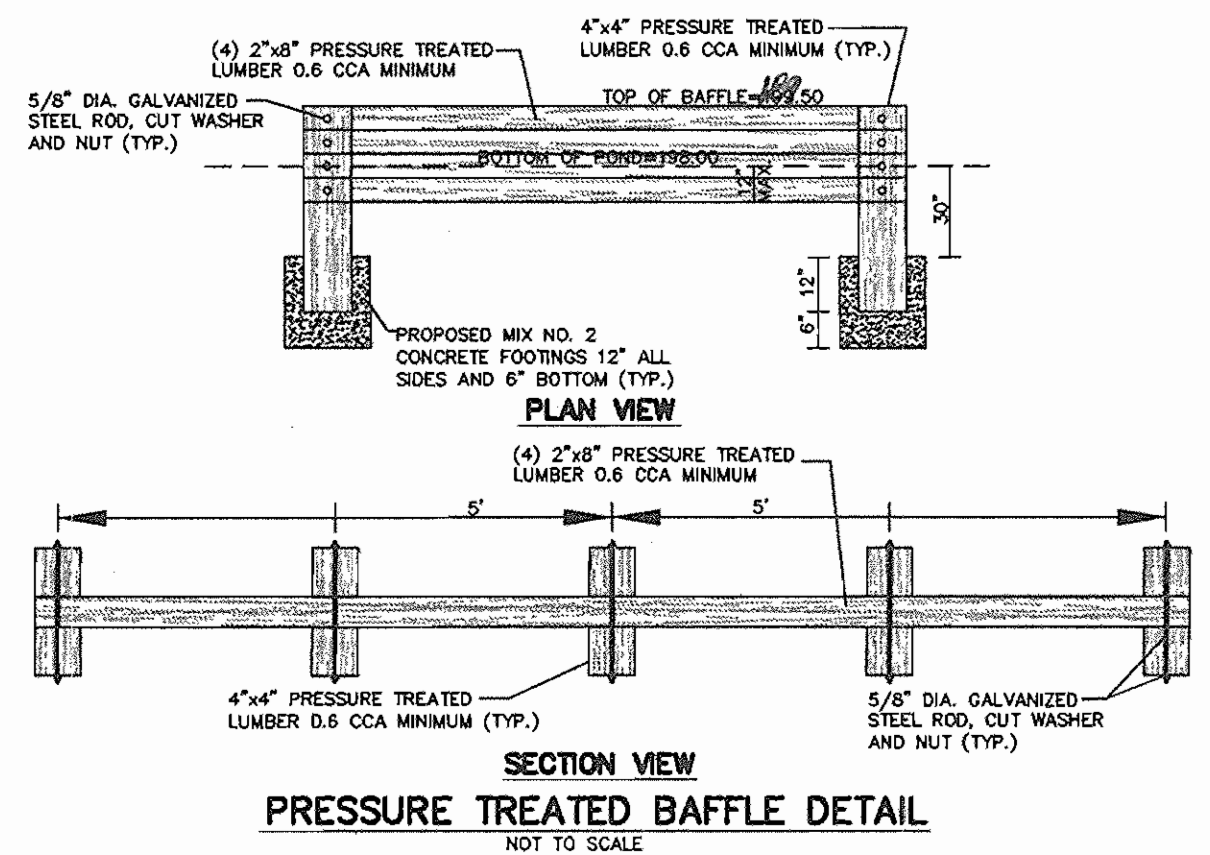
**5. Plant Installation**

Mulch should be placed to a uniform thickness of 2" to 3". Shredded hardwood mulch is the only accepted mulch. Pine mulch and wood chips will float and move to the perimeter of the bio-retention area during a storm event and are not acceptable. Shredded mulch must be well aged (6 to 12 months) for acceptance.

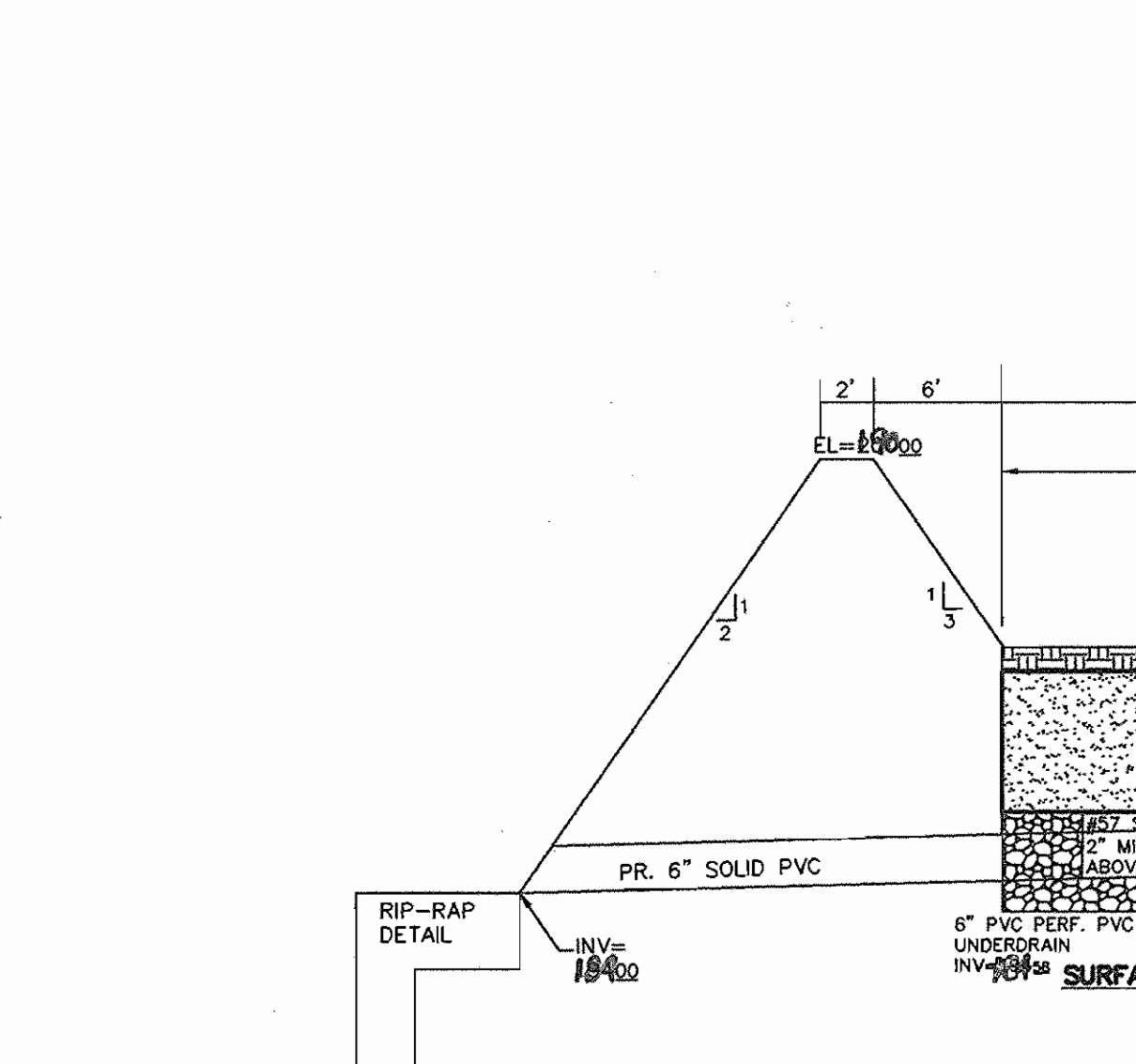
Root ends of the plant material shall be kept moist during transport and on-site storage. The plant root ball should be planted so 1/8" of the ball is above final grade surface. The diameter of the planting pit shall be at least six inches larger than the diameter of the planting ball. Set and maintain the plant straight during the entire planting process. Thoroughly water ground bed cover after installation.

Trees shall be braced using 2" by 2" stakes only as necessary and for the first growing season only. Stakes are to be equally spaced on the outside of the tree ball.

Material	Specification	Site	Notes
Planting soil (2.5' to 4' deep)	sand 35-60% silt 20-55% clay 10-25%	n/a	plantings are site-specific
mulch	shredded hardwood	n/a	aged 6 months, minimum
pea gravel diaphragm and curtain drain	pea gravel: ASTM-D-448 ornamental stone: washed cobble	pea gravel: No. 6 stone: 2" to 5"	
geotextile	Class "C" - against opening size (ASTM-D-4751), grab tensile strength (ASTM-D-4039), puncture resistance (ASTM-D-4833)	n/a	for use as necessary beneath underdrains only
underdrain gravel	ASTM M-43	0.35" to 0.75"	3/8" perf. @ 6" on center, 4 holes per row; minimum of 3" of gravel over pipe; not necessary underdrain pipes
underdrain piping	7.75" Type F5 20 or AASHTO M-278	4" PVC rigid schedule 40 PVC or SDR35	3/8" perf. @ 6" on center, 4 holes per row; minimum of 3" of gravel over pipe; not necessary underdrain pipes
pour in place concrete (if required)	MSHA Mix No. 3, f'c = 3500 psi @ 28 days, normal weight, air-cured, reinforcing to meet ASTM-615-60	n/a	on-site testing of pour-in-place concrete required: 28 day strength and slump test. All concrete design (cast-in-place or pre-cast) not using previously approved State or local standards requires design drawings sealed and approved by a professional structural engineer licensed in the State of Maryland. Design to include meeting ACI Code 309.8.9.9: vertical loading (14.10 or 14.20); allowable horizontal loading (based on soil pressures); and analysis of potential cracking.
sand (1' deep)	AASHTO-M-6 or ASTM-C-33	0.075" to 0.04"	Sand substitutions such as Dolomite and Graystone #10 are not acceptable. No calcium carbonate or dolomitic sand substitutions are acceptable. No "rock dust" can be used for sand.



(Symbol)	EX. TREES
(Symbol)	EX. TREES
(Symbol)	EX. 2' CONTOUR
(Symbol)	EX. 10' CONTOUR
(Symbol)	EX. 6" WATER
(Symbol)	EX. 8" SANITARY
(Symbol)	PROP. GRADING
(Symbol)	PR. S.H.C. - PROP. SEWER HOUSE CONN.
(Symbol)	PR. W.H.C. - PROP. WATER HOUSE CONN.
(Symbol)	SOILS DELINEATION LINE



BY THE DEVELOPER:

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

DEVELOPER: *Charles & Bonnie Black* DATE: 2/1/05

BY THE ENGINEER:

I CERTIFY THAT THIS PLAN FOR EROSION AND SEDIMENT 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.

ENGINEER: *Jim Meyer* DATE: 1/10/05

THESE PLANS HAVE BEEN REVIEWED FOR THE HOWARD SOIL CONSERVATION DISTRICT AND MEET THE TECHNICAL REQUIREMENTS FOR SOIL EROSION AND SEDIMENT CONTROL.

*Jim Meyer* 2/24/05 DATE

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

*John Plater* 2/24/05 DATE

HOWARD SOIL CONSERVATION DISTRICT

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

*Mark DeLong* 2/14/05 DATE

DIRECTOR

*Mr. Dammann* 3/7/05 DATE

CHIEF, DEVELOPMENT ENGINEERING DIVISION

*Andy Arnold* 2/15/05 DATE

CHIEF, DIVISION OF LAND DEVELOPMENT

3/24/05 Revised topographic info.

DATE	NO.	REVISION

OWNER: CHARLES & BONNIE BLACK  
319 FAIRFIELD DRIVE  
SEVERN, MD. 21144

DEVELOPER: CHARLES & BONNIE BLACK  
319 FAIRFIELD DRIVE  
SEVERN, MD. 21144

PROJECT: **BLACK RESIDENCE**  
SINGLE FAMILY DETACHED DWELLING  
TAX MAP 38, GRID 8, PARCEL 808  
1st ELECTION DISTRICT  
WATER CODE 44-6906 SEWER CODE 22-5

TITLE: **SITE DEVELOPMENT / SEDIMENT & EROSION CONTROL PLAN**

MESSICK & ASSOCIATES \*  
CONSULTING ENGINEERS  
31 OLD SUKONONS ISLAND RD., SUITE 201  
ANNEAPOLIS, MARYLAND 21401  
(410) 266-3212 \* FAX (410) 266-3502

DATE: 1/10/05

DESIGNED BY: WAN

DRAWN BY: COP

PROJECT NO:

DATE: MARCH, 2004

SCALE: AS SHOWN

WAYNE A. NEWTON #21591

DRAWING NO.: 2 OF 7

**CONSTRUCTION NOTES**

- No sediment and erosion control devices may be removed without prior approval from the Howard County Inspector.
- Stabilize any disturbed area as soon as possible by permanent or temporary means.
- All temporary stock piles and excess material shall be removed to an approved stock site. All borrow material shall be obtained from an approved site.
- It shall be the responsibility of the contractor or subcontractor to notify the engineer of any deviation to these plans prior to any change being made. Any change in these plans without the written authorization for said change from the engineer shall be the responsibility of the contractor or subcontractor.
- Utilities shown on these plans are in accordance with the best information available for the contractor. The contractor shall be responsible for locating and protecting all existing services and mains (public or private). The contractor shall obtain the services of a private utility locator to locate all existing private services and mains. The owners and engineer assume no responsibility for accuracy or completeness of the information shown. Existing mains and services shall be carefully protected and any damage to them caused by the work shall be immediately repaired to the satisfaction of the engineer by the contractor at the contractor's expense, using materials of the kinds damaged.
- The contractor shall call "MISS UTILITY", 1-800-257-7777, a minimum of 48 hours in advance of any excavation, boring and/or digging to determine the location of underground utilities.
- The contractor shall grade all areas within the area of construction and shall warp paving as necessary to insure positive drainage.
- The Contractor shall be responsible for coordination of his construction with the construction by other contractors and subcontractors.
- All soil erosion control measures shall be in accordance with the 1994 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL.
- Failure to specifically mention items which would normally be required to complete the work and develop this site in accordance with the approved plans, shall not relieve the contractor from performing such work. This work shall be part of the contractors base bid.

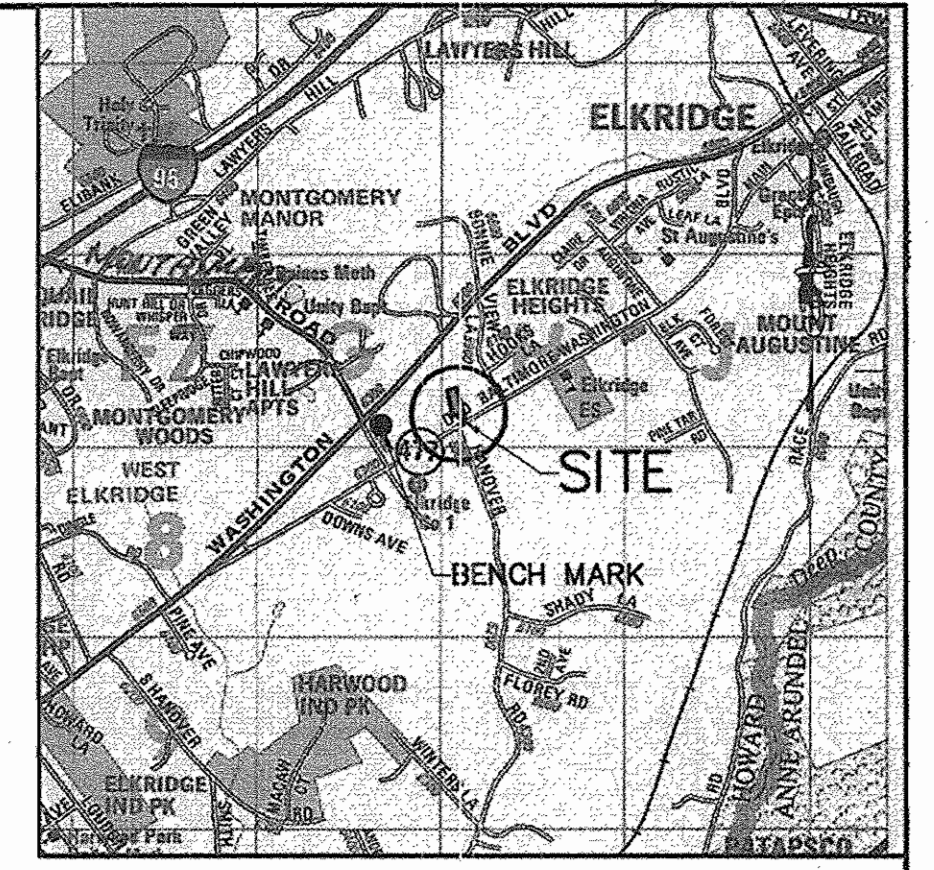
**GENERAL NOTES**

- THE SUBJECT PROPERTY IS ZONED R-12 PER 2/2/04 COMPREHENSIVE ZONING PLAN.
- COORDINATES BASED ON NAD83, THE MARYLAND COORDINATE SYSTEM AS PROJECTED BY HOWARD COUNTY GEODETIC CONTROL STATION No.38AA.
- B.R.L. DENOTES BUILDING RESTRICTION LINE.
- DEED REFERENCE: LIBER 474 FOLIO 419.
- FOR FLAG OR PIPESTEM LOTS, REFUSE COLLECTION, SNOW REMOVAL AND ROAD MAINTENANCE ARE PROVIDED TO THE JUNCTION OF THE FLAG OR PIPESTEM AND THE RIGHT-OF-WAY LINE AND NOT TO THE PIPESTEM LOT DRIVEWAY.
- DRIVEWAYS SHALL BE PROVIDED PRIOR TO ISSUANCE OF A USE AND OCCUPANCY PERMIT FOR ANY NEW DWELLINGS TO INSURE SAFE ACCESS FOR FIRE AND EMERGENCY VEHICLES PER THE FOLLOWING MINIMUM REQUIREMENTS:
  - WIDTH: 12 FT. (14 FT. SERVING MORE THAN ONE RESIDENCE).
  - SURFACE: 6 IN. OF COMPACT CRUSHER RUN BASE WITH TAR AND CHIP COATING.
  - GEOMETRY: MAXIMUM 15% GRADE, MAXIMUM 10% GRADE CHANGE AND MINIMUM 45 FT. TURNING RADIUS.
  - STRUCTURES: (CULVERTS AND BRIDGES) CAPABLE OF SUPPORTING 25 GROSS TONS-H2S LOADING.
  - DRAINAGE ELEMENTS: CAPABLE OF SAFELY PASSING A 100 YEAR FLOOD-WITH NO MORE THAN ONE FT. DEPTH OVER DRIVEWAY SURFACE.
  - MAINTENANCE: SUFFICIENT TO INSURE ALL WEATHER USE.
- THIS PLAN IS BASED ON A FIELD-RUN MONUMENTED BOUNDARY SURVEY PERFORMED ON OR ABOUT MARCH 2004 BY DESIGN TECH ASSOCIATES, INC.
- THE AREAS SHOWN ON THIS PLAN ARE INDICATED (±) MORE OR LESS.
- WATER AND SEWER SERVICE TO THIS LOT WILL BE GRANTED UNDER PROVISIONS OF SECTION 16.122 B OF THE HOWARD COUNTY CODE. PUBLIC WATER AND SEWAGE ALLOCATION WILL BE GRANTED AT THE TIME OF ISSUANCE OF THE BUILDING PERMIT IF CAPACITY IS AVAILABLE AT THAT TIME.
- PUBLIC WATER SERVICE WILL BE PROVIDED TO THIS LOT BY HOUSE CONNECTIONS TO CONTRACT No. 44-0906 PUBLIC SEWER SERVICE WILL BE PROVIDED TO THIS LOT BY HOUSE CONNECTIONS TO CONTRACT No. 22-S.
- WATER AND SEWER CONNECTIONS SHALL BE COMPLETED IN ACCORDANCE WITH THE LAYOUT AS SHOWN HEREON.
- THERE ARE NO WETLANDS ON SITE AND THE PROPERTY IS NOT LOCATED WITHIN THE 100-YEAR FLOODPLAIN.
- THIS PROPERTY IS EXEMPT FROM FOREST CONSERVATION PER SECTION 16.1202(b)(1) BECAUSE THIS PARCEL IS LESS THAN 40,000 SQUARE FEET IN AREA.
- THERE ARE NO ENVIRONMENTALLY SENSITIVE FEATURES OR BUFFERS ON THIS SITE.
- LANDSCAPING HAS BEEN PROVIDED IN ACCORDANCE WITH SECTION 16.124 OF THE HOWARD COUNTY LANDSCAPE CODE AND THE LANDSCAPE MANUAL. SURETY IN THE AMOUNT OF \$5,130.00 WILL BE POSTED WITH THE GRADING PERMIT APPLICATION FOR 15 SHADE TREES AND 21 PERENNIAL SHRUBS.
- IN ACCORDANCE WITH SECT. 12B 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 SETBACK, PORCHES OR DECK, OPEN OR ENCLOSED MAY PROJECT NOT MORE THAN 10 FEET INTO THE FRONT OR REAR SETBACKS.
- THE PURPOSE OF THE RETAINING WALL ALONG THE 7.5' SETBACK LINE IS TO PROVIDE ADEQUATE VEHICULAR ACCESS INTO THE GARAGE. THE RETAINING WALL ALONG THAT LINE COMPLIES WITH THE SIDE SETBACK REQUIREMENTS, SINCE THE WALL WILL NOT EXCEED 3 FEET IN HEIGHT.
- PARCELS 808 & 123 HAVE A PRIVATE AGREEMENT TO UTILIZE THE DRIVEWAY. THERE IS NO SHARED USE-IN-COMMON ACCESS EASEMENT OR MAINTENANCE EASEMENT BETWEEN THE OWNERS.
- All construction shall be in accordance with the latest standards and specifications of Howard County, plus MSHA standards and specifications, as applicable.
- The contractor shall notify the Department of Public Works/Bureau of Engineering/Construction Inspection Division at (410) 313-1280 at least five (5) working days prior to the start of work.
- The contractor shall notify "MISS UTILITY" at 1-800-257-7777 at least 48 hours prior to any excavation work being done.
- The existing topography is taken from a field run topographic survey by Design Tech Associates dated March 2004.
- 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 any work being done in the public road.
- All plan dimensions are to edge of paving and face of building unless otherwise noted.
- The coordinates shown hereon are based upon the Howard County Geodetic Control which is based upon the Maryland State Plane Coordinate System. Howard County monument 38AA 33R1 and 37B4.
- Existing utilities are based on Howard County Record Drawings for contract 44-0906.
- Storm water management for this project is provided by an on-site system.
- A noise study is not required for this project.
- Contractor is solely responsible for construction means, methods, techniques, sequences, procedures, and safety precautions and programs.
- All pipe elevations shown are invert elevations.
- All fill areas within roadway and under structures to be compacted to a minimum of 95% compaction of AASHTO T180.

# SITE DEVELOPMENT PLAN FOR BLACK RESIDENCE 1st ELECTION DISTRICT HOWARD COUNTY, MARYLAND

**BENCH MARK #1**  
HOWARD COUNTY, MD. MONUMENT 38AA  
VERTICAL DATUM: NAVD83  
ELEV.= 220.073  
HORIZONTAL DATUM: NAD83  
N 561,158.8557  
E 1,389,726.3306

**BENCH MARK #2**  
HOWARD COUNTY, MD. MONUMENT 371A  
VERTICAL DATUM: NAVD83  
ELEV.= 195.75  
HORIZONTAL DATUM: NAD83  
N 490,906.0  
E 865,758.6  
(INTERSECTION OF MEADOWRIDGE RD & MD. RTE.1)

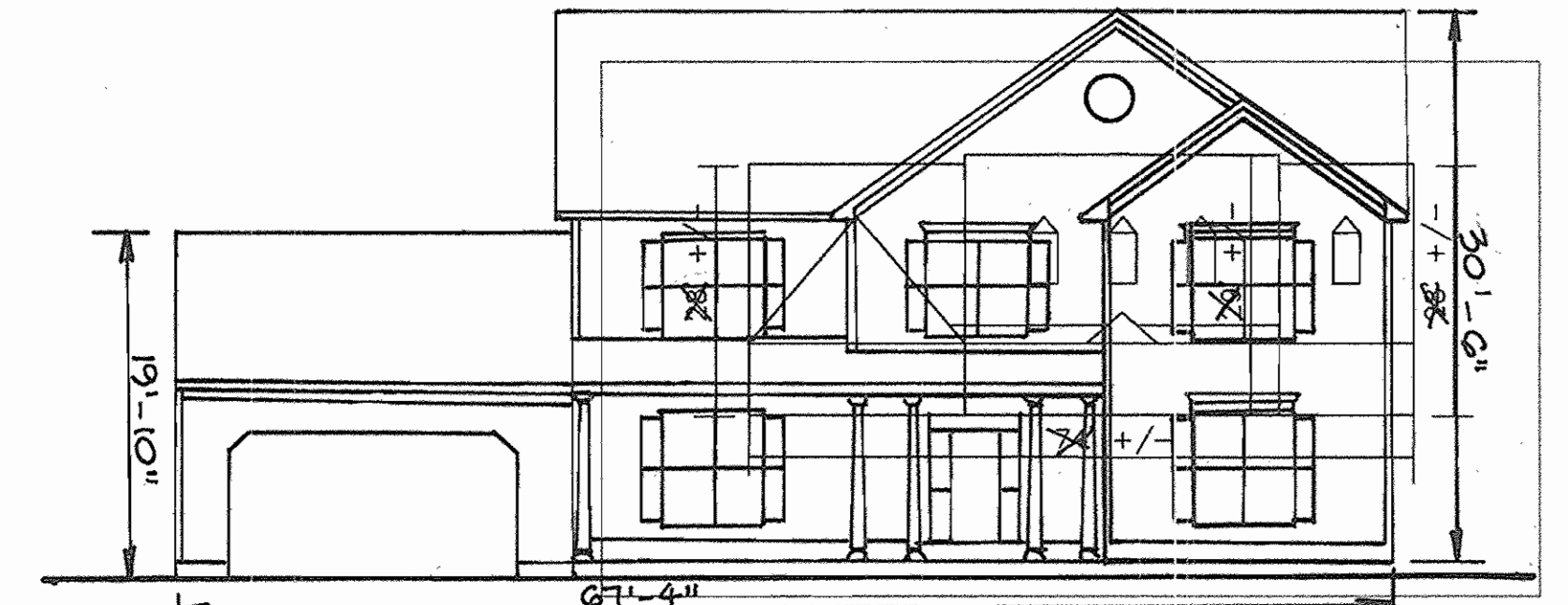


ADC PERMITTED USE NUMBER 21003176

**VICINITY MAP**  
SCALE: 1"=2000'

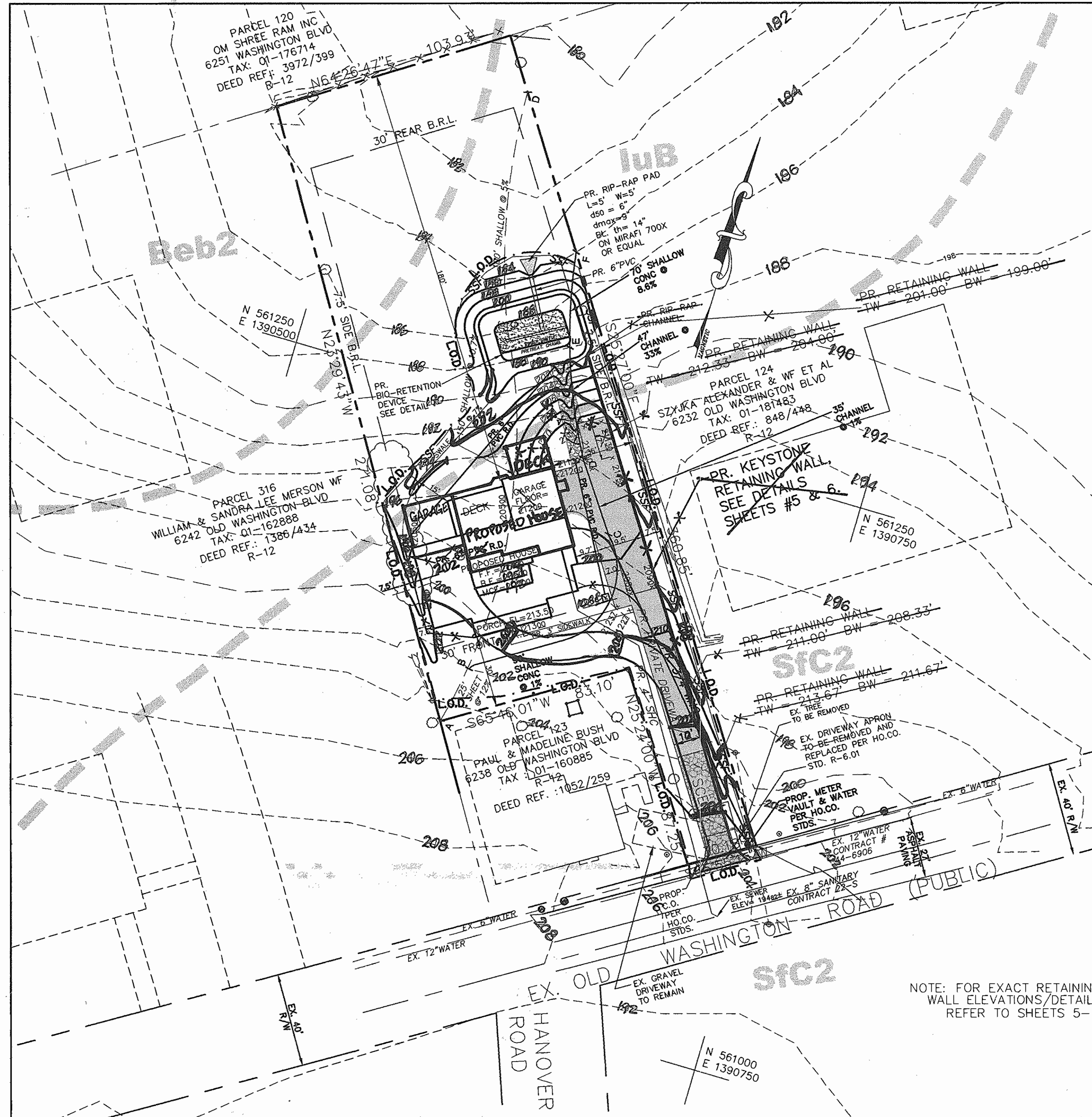
**SITE ANALYSIS DATA CHART**

TOTAL PROJECT AREA: 32,329 SQ. FT. (0.742 AC)  
LIMIT OF DISTURBED AREA: 14,152 SQ. FT. (0.325 AC)  
PRESENT ZONING DESIGNATION: R-12  
PROPOSED USE: SINGLE FAMILY DWELLING  
TOTAL NUMBER OF UNITS ALLOWED: 1  
TOTAL NUMBER OF UNITS PROPOSED: 1  
NUMBER OF PARKING SPACES REQUIRED: 2  
NUMBER OF PARKING SPACES PROVIDED: 2  
BUILDING COVERAGE OF SITE: 3,373 SQ. FT. (10.5%)



**BUILDING ELEVATION**

SCALE: 1" = 10'



**PLAN VIEW**

SCALE: 1" = 30'

NOTE: FOR EXACT RETAINING WALL ELEVATIONS/DETAILS REFER TO SHEETS 5-7.

**SHEET INDEX**

- TITLE SHEET
- SITE DEVELOPMENT PLAN
- NOTES AND DETAILS
- LANDSCAPE PLAN
- RETAINING WALL PLAN
- RETAINING WALL PLAN
- RETAINING WALL PLAN

**ADDRESS CHART**

PARCEL	STREET ADDRESS
808	6236 OLD WASHINGTON RD ELKRIDGE, MD 21075

SUBDIVISION NAME - N/A	SECT./AREA - N/A	PARCEL - 808
DEED REF - L.474 F.419	GRID # - 8	ZONING - R-12
TAX MAP NO. - 38	ELECT. DIST. - 1st	CENSUS TRACT - 601201
WATER CODE - 44-0906	SEWER CODE - 22-S	

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING	
<i>Paul Dingle</i>	3/16/05
DIRECTOR	DATE
<i>W.D. Williams</i>	3/7/05
CHIEF, DEVELOPMENT ENGINEERING DIVISION	DATE
<i>Andy Hamstra</i>	3/15/05
CHIEF, DIVISION OF LAND DEVELOPMENT	DATE

DATE	NO.	REVISION

OWNER: CHARLES & BONNIE BLACK  
319 FAIRFIELD DRIVE  
SEVERN, MD. 21144

DEVELOPER: CHARLES & BONNIE BLACK  
319 FAIRFIELD DRIVE  
SEVERN, MD. 21144

PROJECT: **BLACK RESIDENCE**  
SINGLE FAMILY DETACHED DWELLING

TAX MAP 38, GRID 8, PARCEL 808  
1st ELECTION DISTRICT  
WATER CODE 44-6906 SEWER CODE 22-S

**TITLE SHEET**

MESSICK & ASSOCIATES \*  
CONSULTING ENGINEERS  
31 OLD SOLOMONS ISLAND RD., SUITE 201  
ANNAPOLIS, MARYLAND 21401  
(410) 266-3212 \* FAX (410) 266-3502

DESIGNED BY: WAN
DRAWN BY: COP
PROJECT NO:
DATE: MARCH, 2004
SCALE: AS SHOWN
DRAWING NO.: 1 OF 7

