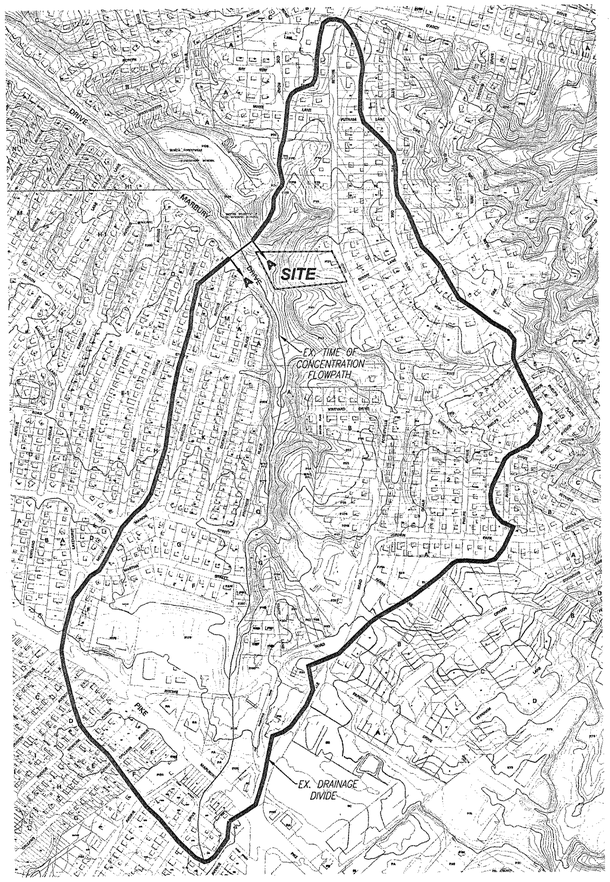
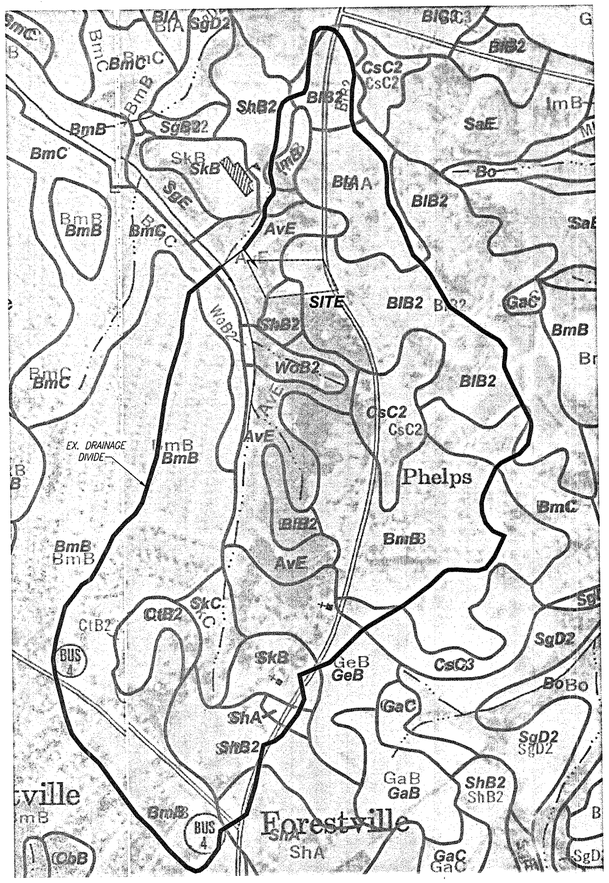


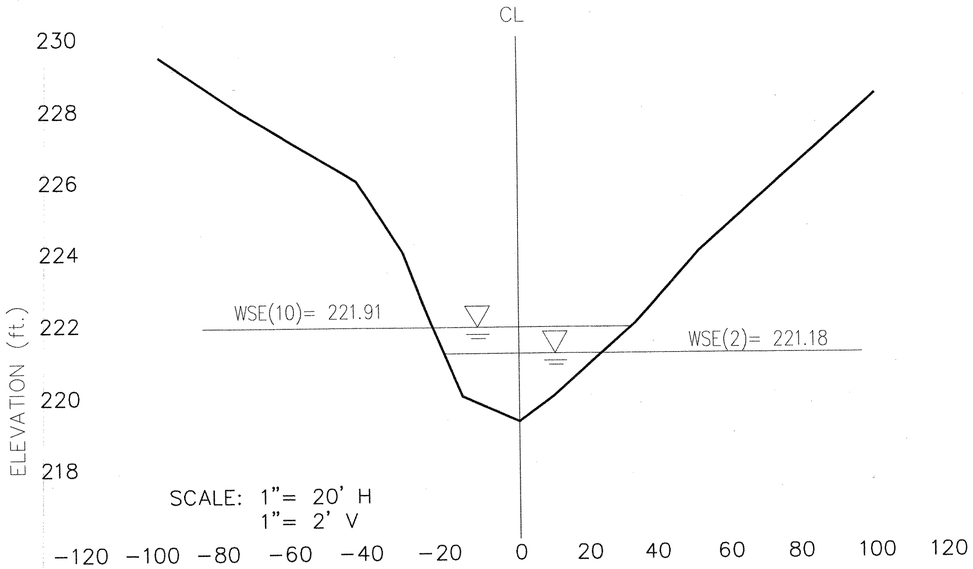
DRAINAGE AREA MAP

SCALE: 1"=500'



SOILS MAP

SCALE: 1"=500'



A= 208.6 ac.
CN= 82
n= 0.03
S= 1.20%
D(2YR)= 3.3in
D(10YR)= 5.3in
Tc= 0.43 HOURS

EXISTING NATURAL OUTFALL CHANNEL SECTION A-A

Q(2YR)= 293 cfs
V(2YR)= 5.88 fps
WSE(2YR)= 221.18
Q(10YR)= 623 cfs
V(10YR)= 7.24 fps
WSE(10YR)= 221.91

INFILTRATION TRENCH SPECIFICATIONS

B.2.A Infiltration Trench General Notes and Specifications

An infiltration trench may not receive run-off until the entire contributing drainage area to the infiltration trench has received final stabilization.

1. Heavy equipment and traffic shall be restricted from traveling over the proposed location of the infiltration trench to minimize compaction of the soil.
2. Excavate the infiltration trench to the design dimensions. Excavated materials shall be placed away from the trench sides to enhance trench wall stability. Large tree roots must be trimmed flush with the trench sides in order to prevent fabric puncturing or tearing of the filter fabric during subsequent installation procedures. The side walls of the trench shall be roughened where sheared and sealed by heavy equipment.
3. A Class "C" geotextile or better (see Section 24.0, Material Specifications, 1994 Standards and Specifications for Soil Erosion and Sediment Control, MDE, 1994) shall interface between the trench side walls and between the stone reservoir and gravel filter layers. A partial list of non-woven filter fabrics that meet the Class "C" criteria follows. Any alternative filter fabric must be approved by the plan approval authority.

Amoco 4552	Carthage FX-80S
GEOLON N70	Mirafi 180-N
WEBTEC N07	

The width of the geotextile must include sufficient material to conform to trench perimeter irregularities and for a 6-inch minimum top overlap. The filter fabric shall be tucked under the sand layer on the bottom of the infiltration trench for a distance of 6 to 12 inches. Stones or other anchoring objects should be placed on the fabric at the edge of the trench to keep the trench open during windy periods. When overlaps are required between rolls, the uphill roll should lap a minimum of 2 feet over the downhill roll in order to provide a shingled effect.

4. If a 6 inch sand filter layer is placed on the bottom of the infiltration trench, the sand for the infiltration trench shall be washed and meet AASHTO-M-43, Size No. 9 or No. 10. Any alternative sand gradation must be approved by the plan approval authority.
5. The stone aggregate should be placed in a maximum loose lift thickness of 12 inches. The gravel (rounded "bank run" gravel is preferred) for the infiltration trench shall be washed and meet one of the following AASHTO-M-43, Size No. 2 or No. 3.
6. Following the stone aggregate placement, the filter fabric shall be folded over the stone aggregate to form a 6-inch minimum longitudinal lap. The desired fill soil or stone aggregate shall be placed over the lap at sufficient intervals to maintain the lap during subsequent backfilling.
7. Care shall be exercised to prevent natural or fill soils from intermixing with the stone aggregate. All contaminated stone aggregate shall be removed and replaced with uncontaminated stone aggregate.
8. Voids may occur between the fabric and the excavation sides shall be avoided. Removing boulders or other obstacles from the trench walls is one source of such voids. Therefore, natural soils should be placed in these voids at the most convenient time during construction to ensure fabric conformity to the excavation sides.
9. Vertically excavated walls may be difficult to maintain in areas where soil moisture is high or where soft cohesive or cohesionless soils are dominant. These conditions may require laying back of the side slopes to maintain stability.
10. PVC distribution pipes shall be Schedule 40 and meet ASTM-D-1785. All fittings shall meet ASTM-D-2729. Perforations shall be 3/8 inch in diameter. A perforated pipe shall be provided only within the infiltration trench and shall terminate 1 foot short of the infiltration trench wall. The end of the PVC pipe shall be capped. **Note:** PVC pipe with a wall thickness classification of SDR-35 meeting ASTM-D-3034 is an acceptable substitute for the Schedule 40 pipe.
11. The observation well is to consist of 6-inch diameter perforated PVC Schedule 40 pipe (M 278 OR F758, Type PS 28) with a cap set 6 inches above ground level and is to be located near the longitudinal center of the infiltration trench. The pipe shall have a plastic collar with slits to prevent rotation when removing the cap. The screw top lid shall be a cleanout with a locking mechanism or special bolt to discourage vandalism. The depth to the invert shall be marked on the lid. The pipe shall be placed vertically within the gravel portion of the infiltration trench and a cap provided at the bottom of the pipe. The bottom of the cap shall rest on the infiltration trench bottom.
12. Corrugated metal distribution pipes shall conform to AASHTO-M-36, and shall be aluminized in accordance with AASHTO-M-274. Aluminized pipe in contact with concrete shall be coated with an inert compound capable of preventing the deleterious effect of the aluminum on the concrete. Perforated distribution pipes shall conform to AASHTO-M-36, Class 2 and shall be provided only within the infiltration trench and shall terminate 1 foot short of the infiltration trench wall. An aluminized metal plate shall be welded to the end of the pipe.
13. If a distribution structure with a wet well is used, a 4-inch drain pipe shall be provided at opposite ends of the infiltration trench distribution structure. Two (2) cubic feet of porous backfill meeting AASHTO-M-43, Size No. 57 shall be provided at each drain.
14. If a distribution structure is used, the manhole cover shall be bolted to the frame.

B.2.B Infiltration Basins Notes and Specifications

An infiltration basin may not receive run-off until the entire contributing drainage area to the basin has received final stabilization.

1. The sequence of various phases of basin construction shall be coordinated with the overall project construction schedule. A program should schedule rough excavation of the basin with the rough grading phase of the project to permit use of the material as fill in earthwork areas. The partially excavated basin, however, cannot serve as a sedimentation basin.

   Specifications for basin construction should state: (1) the earliest point in progress when storm drainage may be directed to the basin, and (2) the means by which this delay in use is to be accomplished. Due to the wide variety of conditions encountered among projects, each should be separately evaluated in order to postpone use as long as is reasonably possible.
2. Initial basin excavation should be carried to within 2 feet of the final elevation of the basin floor. Final excavation to the finished grade should be deferred until all disturbed areas on the watershed have been stabilized or protected. The final phase excavation should remove all accumulated sediment. Relatively light tracked equipment is recommended for this operation to avoid compaction of the basin floor. After the final grading is completed, the basin should provide a well-aerated, highly porous surface texture.
3. Infiltration basins may be lined with a 6- to 12-inch layer of filter material such as coarse sand (AASHTO-M-43, Sizes 9 or 10) to help prevent the buildup of impervious deposits on the soil surface. The filter layer can be replaced or cleaned when it becomes clogged. When a 6-inch layer of coarse organic material is specified for ditching (such as bulls, leaves, stems, etc.) or spading into the basin floor to increase the permeability of the soils, the basin floor should be soaked or inundated for a brief period, then allowed to dry subsequent to this operation. This induces the organic material to decay rapidly, loosening the upper soil layer.
4. Establishing dense vegetation on the basin side slopes and floor is recommended. A dense vegetative stand will not only prevent erosion and sloughing, but will also provide a natural means of maintaining relatively high infiltration rates. Erosion protection of inflow points to the basin shall also be provided.
5. Selection of suitable vegetative materials for the side slope and all other areas to be stabilized with vegetation and application of soil amendments (e.g., lime, fertilizer, etc.) shall be done in accordance with the NRCS Standards and Specifications for Critical Area Planting (MD-342) or the 1994 Maryland Standards and Specifications for Soil Erosion and Sediment Control.
6. Grasses of the fescue family are recommended for seeding primarily due to their adaptability to dry sandy soils, drought resistance, hardiness, and ability to withstand brief inundations. The use of fescues will also permit long intervals between mowings. This is important due to the relatively steep slopes which make mowing difficult. Mowing twice a year, once in June and again in September, is generally satisfactory. Refertilization with 10-6-4 ratio fertilizer at a rate of 500 lb per acre (11 lb per 1000 sq ft) may be required the second year after seeding.

OUTFALL NARRATIVE

THIS PROPERTY IS LOCATED WITHIN THE SOUTHWEST BRANCH WATERSHED, DOWNSTREAM OF APPROXIMATELY 208 ACRES OF PRIMARILY RESIDENTIAL DEVELOPMENT DISCHARGING INTO AN EXISTING NATURAL STREAM ALONG THE WESTERN SIDE OF THE PROPERTY. RUNOFF FROM THE EXISTING PARCEL MAKES UP 3.24 ACRES OF THE 208 ACRE DRAINAGE AREA. THE ENTIRE SITE SHEET FLOWS FROM EAST TO WEST AND INTO THE EXISTING FLOODPLAIN ALONG THE EDGE OF THE PROPERTY.

THE 208 ACRE DRAINAGE AREA IS MOSTLY ZONED R-80 AND R-55 RESIDENTIAL, BUT INCLUDES A SMALL SECTION OF I-1 INDUSTRIAL AREA. FOR HYDROLOGICAL PURPOSES THE RESIDENTIALLY ZONED PORTION OF THE DRAINAGE AREA WAS TREATED AS FULLY DEVELOPED RESIDENTIAL AREA WITH ONE QUARTER ACRE AVERAGE LOT SIZE. LIGHT INDUSTRIAL WAS SELECTED AS THE GROUND TREATMENT IN THE RUNOFF COEFFICIENT COMPUTATIONS FOR THE I-1 ZONED PORTION OF THE DRAINAGE AREA. USING THESE GROUND COVERS ALONG WITH THE EXISTING SOIL TYPES IN THE DRAINAGE AREA, TR55 COMPUTATIONS WERE RUN (SEE COMPS. BOOKLET) RESULTING IN A WEIGHTED CURVE NUMBER OF 82. THE EXISTING TIME OF CONCENTRATION FLOW PATH WAS THEN DETERMINED AND IS SHOWN IN THE DRAINAGE AREA MAP ON THIS SHEET. TIME OF CONCENTRATION COMPUTATIONS WERE THEN RUN, AND FOUND TO BE 0.43 HOURS. USING THIS CURVE NUMBER AND TIME OF CONCENTRATION, THE GRAPHICAL PEAK DISCHARGE METHOD WAS USED TO ESTIMATE THE PEAK DISCHARGE FOR THE WATERSHED. AS DEMONSTRATED BY THE COMPUTATIONS DISCHARGES OF 293 AND 623 CFS WERE FOUND FOR THE 2 AND 10 YEAR DISCHARGES RESPECTIVELY. THESE DISCHARGES WERE THEN ROUTED THROUGH SECTION A-A USING MANNING'S EQUATION, AND THE RESULTS ARE DISPLAYED ON THIS SHEET.

THE PRE AND POST DEVELOPMENT CONDITIONS WERE DETERMINED FOR THE 3.24 ACRE SITE:

SITE AREA= 3.24 AC

	PRE	POST
IMPERVIOUS AREA=	0 AC (0%)	1.06 AC (32.7%)
PERVIOUS AREA=	3.24 AC (100%)	2.18 AC (67.3%)
COMPOSITE 'CN'=	72	75
Q2=	4 CFS	6 CFS
Q10=	9 CFS	14 CFS

THE 'CN' FOR THE SITE POST DEVELOPMENT WAS FOUND TO BE 75, WHICH IS LESS THAN THE COMPUTED COMPOSITE 'CN' OF 82 FOR THE ENTIRE DRAINAGE SHED WHICH WAS USED TO ANALYZE SECTION A-A. THE 5 CFS INCREASE IN THE THE POST DEVELOPMENT CONDITION REPRESENTS A 0.80% INCREASE IN THE OVERALL 10 YEAR STORM DISCHARGE TO THE FLOODPLAIN. BY STORING THE WATER QUALITY VOLUME, RECHARGE VOLUME, AND DETAINING THE CHANNEL PROTECTION VOLUME A PORTION OF THIS DISCHARGE WILL BE MITIGATED. THEREFORE, CONSIDERING THE SIZE OF THE OVERALL DRAINAGE AREA AT THE PROPERTY OUTFALL, THE MINIMAL INCREASE IN DISCHARGE, AND THE ADEQUACY OF THE EXISTING NATURAL FLOODPLAIN TO SAFELY PASS THE DESIGN STORM, IT HAS BEEN DETERMINED THAT THE PROPOSED IMPROVEMENTS TO THE SITE WILL HAVE NO APPRECIABLE EFFECT ON THE EXISTING NATURAL DOWNSTREAM CHANNEL.

CAUTION – NOTICE TO CONTRACTOR

THE CONTRACTOR IS SPECIFICALLY CAUTIONED THAT THE LOCATION AND/OR ELEVATION OF EXISTING UTILITIES AS SHOWN ON THESE PLANS IS BASED ON RECORDS OF THE VARIOUS UTILITY COMPANIES AND, WHERE POSSIBLE, MEASUREMENTS TAKEN IN THE FIELD. THE INFORMATION IS NOT TO BE RELIED ON AS BEING EXACT OR COMPLETE. THE CONTRACTOR MUST CALL THE APPROPRIATE UTILITY COMPANY AT LEAST 48 HOURS BEFORE ANY EXCAVATION TO REQUEST EXACT FIELD LOCATION OF UTILITIES. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO RELOCATE ALL EXISTING UTILITIES WHICH CONFLICT WITH THE PROPOSED IMPROVEMENTS SHOWN ON THE PLANS AND TO VERIFY THE EXACT LOCATION OF ALL EXISTING UTILITIES PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITIES.

REVISIONS:

3/31/07 SHIFT PROP. IMP'S TO EAST, REDUCE to FROM 1.18 TO 1.06 AC. REDUCE DET. PIPE FROM 8' TO 5' DIA.

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WE Inc.
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540-286-3710 and 540-286-0345 Fax
weinc@hughes.net

DATE: MARCH 2007
SCALE: 1"=500'
DRAWING NAME: 19D09-SWM3

ADEQUATE OUTFALL ANALYSIS

PROJECT: BETH SHALOM AME ZION CHURCH
6TH ELECTION DISTRICT
PRINCE GEORGE'S COUNTY, MARYLAND

SHEET 1 OF 1

FILE No. MDPG-19D09-01