

GENERAL NOTES

- All construction shall be in accordance with the latest standards and specifications of Howard County plus MSHA standards and specifications, if applicable.
- The contractor shall notify "Miss Utility" at 1-800-257-7777 at least 48 hours prior to any excavation work.
- The contractor is to notify the following utilities or agencies at least five days before starting work on these drawings:
 Miss Utility 1-800-257-7777
 Verizon Telephone Company 1-410-954-6281
 Howard County Bureau of Utilities 313-2366
 A/E/C Cable Location Division 393-3553
 B.G.&E. Co. Contractor Services 850-4620
 B.G.&E. Co. Underground Damage Control 787-4620
 State Highway Administration 531-5533

GENERAL NOTES CONT:

- 39. WP-15-108 APPROVED 2/27/15 TO WAIVE SECTION 16.15(c)(1) AND REACTIVATE SDP APPROVAL. APPROVAL IS SUBJECT TO THE FOLLOWING CONDITIONS:**
- THE PETITIONER SHALL COMPLY WITH ALL OUTSTANDING DEPARTMENT OF INSPECTIONS, LICENSING & PERMITS CHECKS AND THE BUILDING PERMIT STAGE.
 - APPROVAL OF THIS WAIVER IS ONLY FOR WHAT IS BEING PROPOSED ON SITE. THE FINAL SDP.
 - THE PETITIONER SHALL COMPLY WITH ALL APPLICABLE R-20 ZONING REGULATIONS INCLUDING SETBACKS AND BUILDING HEIGHT.
 - THE PETITIONER SHALL COMPLY WITH THE PREVIOUS CONDITIONAL USE ALLOWED PERMITS BA-02-36C.
 - THE SDP PLAN IS REACTIVATED FOR A ONE YEAR FROM THE DATE OF THE WAIVER APPROVAL LETTER (ON OR BEFORE FEBRUARY 26, 2016) TO APPLY FOR THE SHEEP BUILDING PERMIT.

GLEN MAR UNITED METHODIST CHURCH

PHASE I & III

SITE DEVELOPMENT PLAN

PARCEL 10, LOTS 1-5

GENERAL NOTES
 39. Any future additional parking or impervious areas beyond what is proposed on the Phase Map shown on this sheet will require additional storm water quality and quantity management.

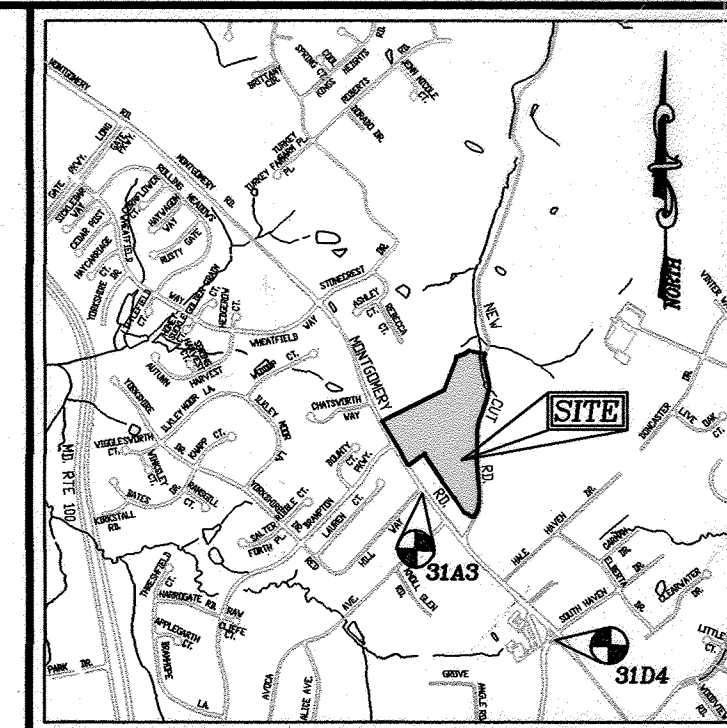
- PHASE I: NEW CUT ROAD (PARTIAL) PARKING (20 SPACES)**
 MAIN BUILDING (822 SEATS)
 MULTI-PURPOSE FIELD BUILDING AREA: 42,125 SF
- PHASE II: CHAPEL (1052 SEATS) PARKING (20 SPACES)**
 BUILDING AREA: 3,248 SF
- PHASE III: EDUCATIONAL WING PARKING (310 SPACES)**
 COURTYARD SECOND ACCESS TO NEW CUT ROAD BUILDING AREA: 16,330 SF
- PHASE IV: MAIN SANCTUARY (1154 SEATS) PARKING (476 SPACES)**
 COURTYARD SECOND ACCESS TO NEW CUT ROAD BUILDING AREA: 16,330 SF
- PHASE V: CLASSROOM ADDITION PARKING (476 SPACES)**
 BUILDING AREA: 9,600 SF
- ** TOTAL: CHAPEL-MAIN SANCTUARY**

LEGEND

- Existing Contour
- Proposed Contour
- Existing Spot Elevation
- Proposed Spot Elevation
- Direction of Flow
- Existing Trees to Remain
- Light Pole
- Concrete

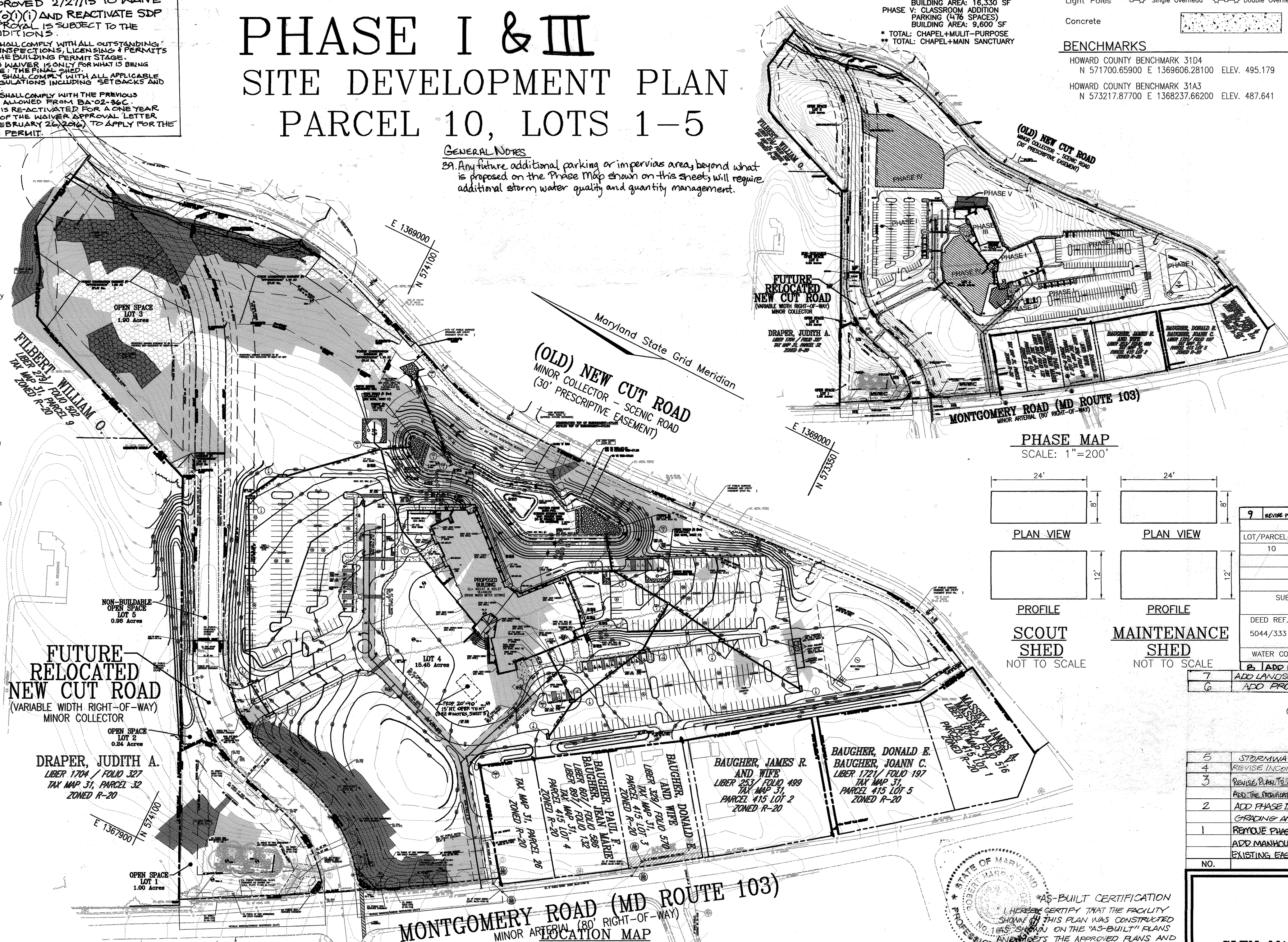
BENCHMARKS

- HOWARD COUNTY BENCHMARK 3104 N 571700.65900 E 1369606.28100 ELEV. 495.179
- HOWARD COUNTY BENCHMARK 3143 N 573217.87700 E 1368237.66200 ELEV. 487.641



SHEET INDEX

| DESCRIPTION | SHEET NO. |
|---|-----------|
| COVER SHEET | 1 of 30 |
| SITE PLAN | 2 of 30 |
| SITE PLAN | 3 of 30 |
| SITE PLAN | 4 of 30 |
| SITE PLAN | 5 of 30 |
| SITE PLAN | 6 of 30 |
| SITE PLAN | 7 of 30 |
| SITE NOTES AND DETAILS SHEET | 7 of 30 |
| SEDIMENT AND EROSION CONTROL PLAN | 8 of 30 |
| SEDIMENT AND EROSION CONTROL PLAN | 9 of 30 |
| SEDIMENT AND EROSION CONTROL PLAN | 10 of 30 |
| SEDIMENT AND EROSION CONTROL PLAN | 11 of 30 |
| SEDIMENT AND EROSION CONTROL PLAN | 12 of 30 |
| SEDIMENT CONTROL NOTES AND DETAILS | 13 of 30 |
| STORM DRAIN DRAINAGE AREA MAP | 14 of 30 |
| STORM DRAIN PROFILES | 15 of 30 |
| STORMWATER MANAGEMENT NOTES AND DETAILS | 16 of 30 |
| STORMWATER MANAGEMENT NOTES AND DETAILS | 17 of 30 |
| LANDSCAPE PLAN | 18 of 30 |
| LANDSCAPE PLAN | 19 of 30 |
| LANDSCAPE PLAN | 20 of 30 |
| LANDSCAPE PLAN | 21 of 30 |
| LANDSCAPE PLAN | 22 of 30 |
| FOREST CONSERVATION PLAN | 23 of 30 |
| FOREST CONSERVATION PLAN | 24 of 30 |
| FOREST CONSERVATION PLAN | 25 of 30 |
| FOREST CONSERVATION PLAN | 26 of 30 |
| FOREST CONSERVATION PLAN | 27 of 30 |
| WALL DETAILS | 28 of 30 |
| WALL DETAILS | 29 of 30 |
| WALL DETAILS | 30 of 30 |



PHASE MAP
 SCALE: 1"=200'

PLAN VIEW
 24' x 24'

PROFILE
 12' x 12'

SCOUT SHED
 NOT TO SCALE

MAINTENANCE SHED
 NOT TO SCALE

9. REVISE PLAN TO ADD AN OFFICE OUTLINE THAT TO BE UTILIZED BY CHURCH MEMBERS 10-6-22

ADDRESS CHART

| LOT/PARCEL# | STREET ADDRESS |
|-------------|----------------------|
| 10 | 4701 MONTGOMERY ROAD |

PERMIT INFORMATION CHART

| SUBDIVISION NAME | SECTION/AREA | PARCEL NUMBER |
|------------------|--------------|---------------|
| N/A | N/A | 10 |

DEED REF. BLOCK NO. ZONE TAX/ZONE ELEC. DIST. CENSUS TR.

| | | | | | |
|----------|-------|------|----|-----|---------|
| 5044/333 | 1 & 8 | R-20 | 31 | 5th | 6051.02 |
|----------|-------|------|----|-----|---------|

WATER CODE: F16 & F05 SEWER CODE: 5706701

6. ADD REFERENCE INFORMATION FOR WP-15-108 4/1/15

7. ADD LANDSCAPING, SHEDS AND A PAVILION 10/31/11

8. ADD PROPERTY SIGN 11/20/11

OWNER/DEVELOPER
 GLENMAR UNITED METHODIST CHURCH
 8430 GLENMAR RD
 ELLICOTT CITY, MD 21043
 AL HAMMER
 (410) 465-4395

5. STORMWATER MANAGEMENT AS-BUILT 11-11-09

4. REVISE INCOMING WATER SERVICES TO THE EDUCATION WING 10/19/09

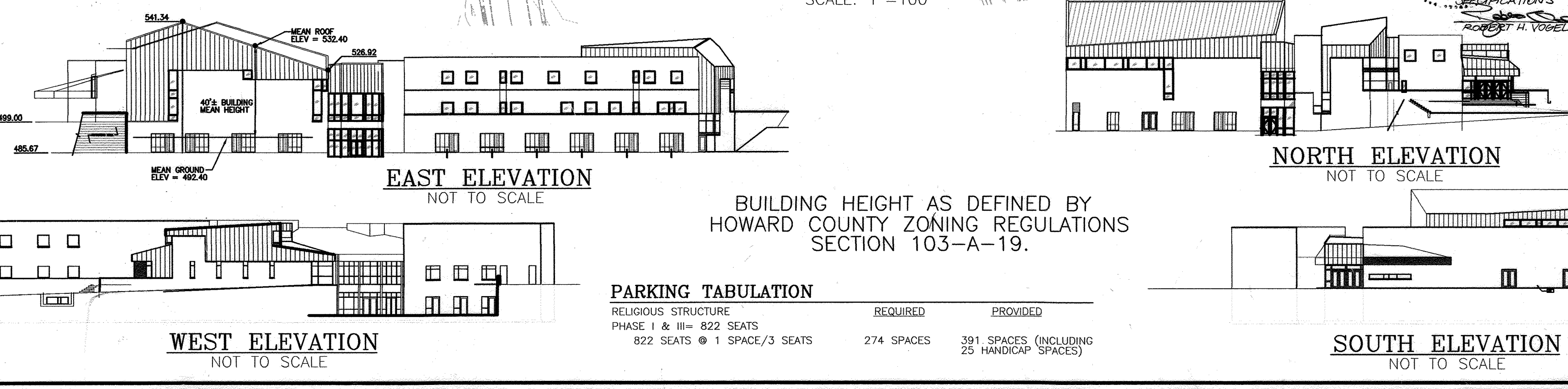
3. REVISE PLAN TO ADDRESS SIDE OF PLAYFIELD, PAVILION, SCOUTS, ASSOCIATED CHANGING 07-01-09

2. ADD THE INFORMATION TO ADD EXISTING LOTS IN THE EDUCATIONAL BUILDING

1. ADD PHASE III'S ADDITION OF EDUCATIONAL WING ASSOCIATED CHANGING AND STORM DRAIN 12/17/08

1. REMOVE PHASE III FROM PLANS. REMOVE ASSOCIATED ROAD DRAINS & 28-06

ADD MANHOLE 1A. ADD PLUT RECORDING REFERENCES TO EXISTING EASEMENTS. REMOVE GENERAL NOTES 40 & 41.



APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION
 DATE: 11/17/04

CHIEF, DIVISION OF LAND DEVELOPMENT
 DATE: 12/2/04

DIRECTOR
 DATE: 12/2/04

SITE DEVELOPMENT PLAN
COVER SHEET

GLEN MAR UNITED METHODIST CHURCH
 PHASE I & III

TAX MAP 31 BLOCK 1 & 8 PARCEL '10', LOTS 1-5
 5TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND

ROBERT H. VOGEL ENGINEERING, INC.
 ENGINEERS • SURVEYORS • PLANNERS

8407 MAIN STREET
 ELLICOTT CITY, MARYLAND 21043
 TEL: 410.461.7666 FAX: 410.461.8961

DESIGN BY: RHV
 DRAWN BY: DJZ
 CHECKED BY: RHV
 DATE: OCTOBER 2004
 SCALE: AS SHOWN
 W.O. NO.: 04-64

1 SHEET OF 30

AS-BUILT 11-11-09

LEGEND:

- EXISTING CONTOUR
- PROPOSED CONTOUR
- PROPOSED SPOT ELEVATION
- EXISTING SPOT ELEVATION
- EXISTING CURB AND GUTTER
- PROPOSED CURB AND GUTTER
- EXISTING UTILITY POLE
- PROPOSED UTILITY POLE
- EXISTING LIGHT POLE
- EXISTING MAILBOX
- EXISTING SIGN
- EXISTING SANITARY MANHOLE
- EXISTING SANITARY LINE
- EXISTING CLEANOUT
- EXISTING FIRE HYDRANT
- EXISTING WATER LINE
- PROPOSED STORM DRAIN
- PROPOSED STORM DRAIN INLET
- EXISTING TREES (FIELD LOCATED)
- EXISTING TREELINE (FIELD LOCATED)
- EXISTING VEGETATION (APPROXIMATE LOCATION)
- EXISTING STREET TREES (F-04-...)
- EXISTING FENCE
- PROPERTY LINE
- RIGHT-OF-WAY LINE
- SOILS BOUNDARY
- PROPOSED SIDEWALK
- PROPOSED LIGHTPOLE
- MODERATE SLOPES (1:5 - 4:59%)
- STEEP SLOPE (>25%)

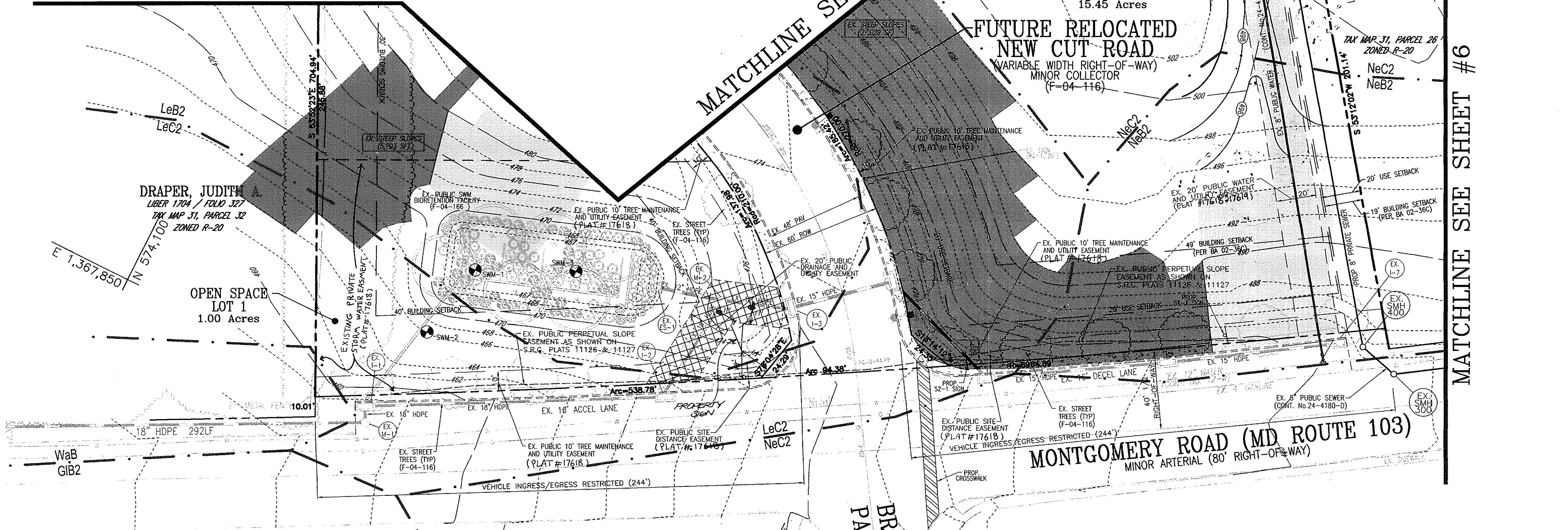
MATCHLINE SEE SHEET #3

MATCHLINE SEE SHEET #3

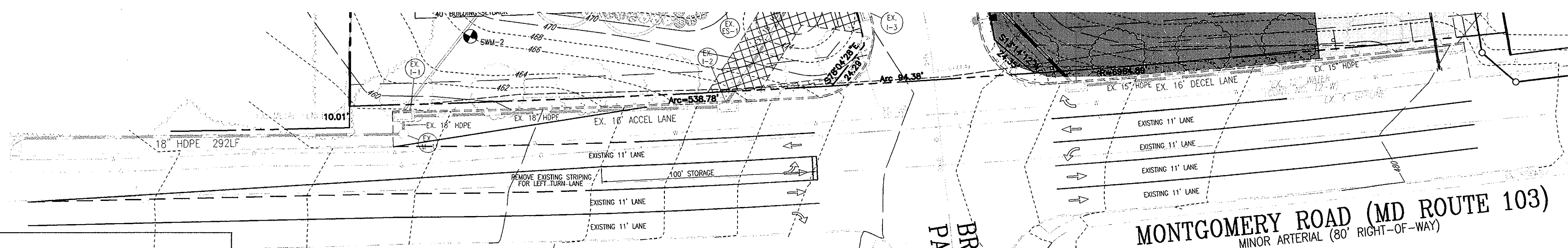
MATCHLINE SEE SHEET #5

MATCHLINE SEE SHEET #6

MATCHLINE SEE SHEET #6



PLAN VIEW
SCALE: 1"=30'



LANE CONFIGURATION PLAN
SCALE: 1"=30'

NOTE:
LANE CONFIGURATIONS ARE FOR CONCEPT PURPOSES ONLY.
LANE STRIPING AND SPECIFICATIONS TO BE INCLUDED AS
ON THE FINAL ROAD CONSTRUCTION PLANS.

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING
 CHIEF, DEVELOPMENT ENGINEERING DIVISION *11/17/04*
 CHIEF, DIVISION OF LAND DEVELOPMENT *12/2/04*
 DIRECTOR *12/2/04*

OWNER/DEVELOPER
 GLEN MAR UNITED METHODIST CHURCH
 8430 GLENMAR ROAD
 ELLICOTT CITY, MD 21043
 AL HAMMER
 (410) 465-4995

| | | |
|-----|--|---------|
| 6 | ADD PROPERTY SIGN | 1/20/10 |
| 1 | REMOVE PHASE III FROM PLANS; REMOVE ASSOCIATED ROOF DRAINS (6-28-04) | |
| | ADD MANHOLE 1A ADD PLAT RECORDING REFERENCES TO EXISTING EASEMENTS. REMOVE GENERAL NOTES 40 & 41 | |
| NO. | REVISION | DATE |

SITE DEVELOPMENT PLAN
SITE LAYOUT
GLEN MAR UNITED METHODIST CHURCH
 PHASE I & III
 TAX MAP 31 BLOCK 1 & 8 PARCEL '10', LOTS 1-5
 5TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND

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

ROBERT H. VOGEL, PE No. 16193

DESIGN BY: RHV
 DRAWN BY: DZ
 CHECKED BY: RHV
 DATE: OCTOBER 2004
 SCALE: 1"=30'
 W.O. NO.: 04-64

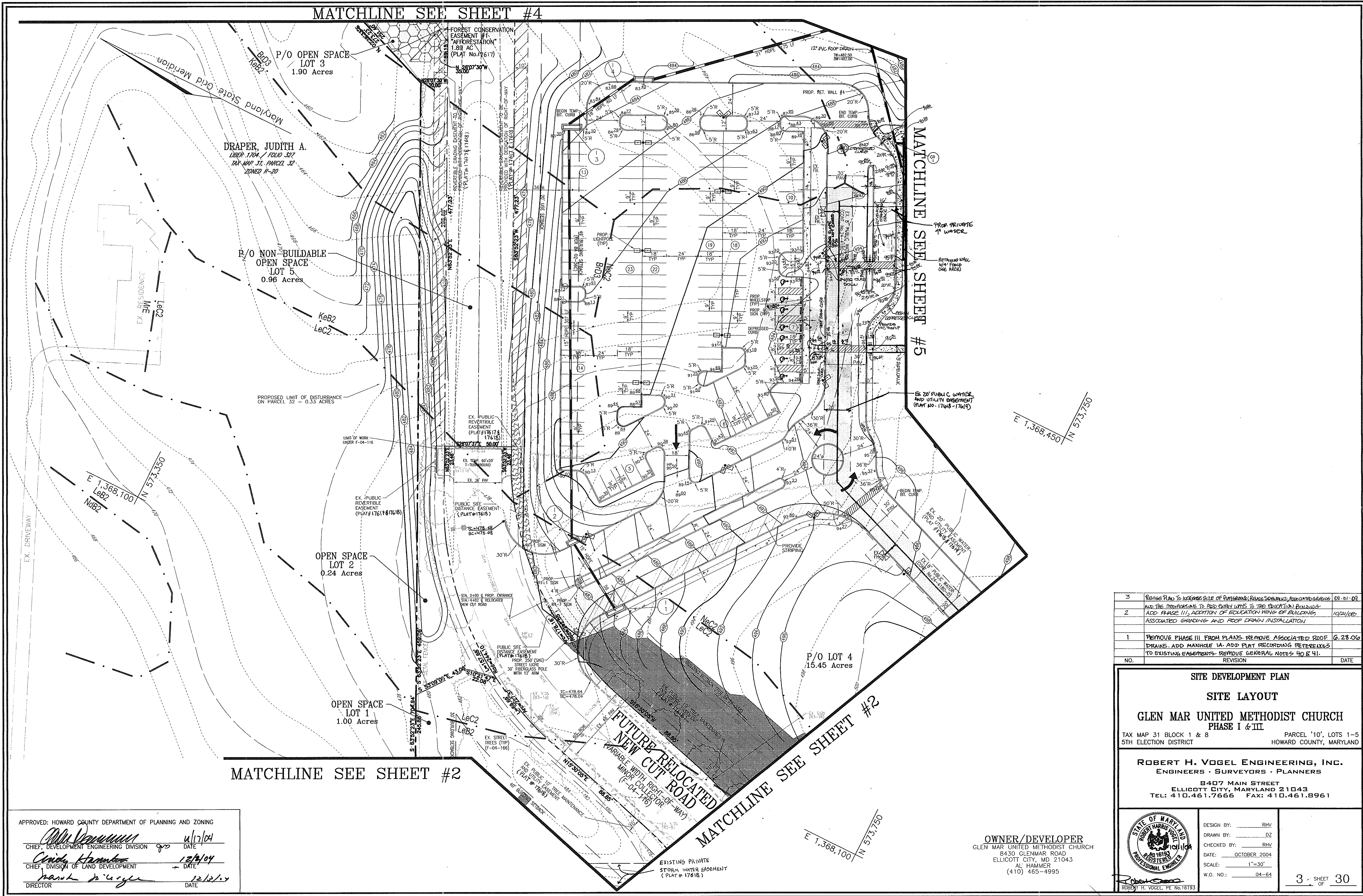
2 SHEET OF 30

MATCHLINE SEE SHEET #4

MATCHLINE SEE SHEET #5

MATCHLINE SEE SHEET #2

MATCHLINE SEE SHEET #2



| 3 | REVISION PLAN TO INCREASE SIZE OF PUMPED; REVISIONS TO ASSOCIATED GRADING; 09-01-09 | |
|-----|--|------|
| 2 | ADD THE MODIFICATIONS TO ADD EXISTING LOTS TO THE EXISTING BUILDING; ADD PHASE III; ADDITION OF EDUCATION WING OF BUILDING; ASSOCIATED GRADING AND ROOF DRAIN INSTALLATION; 10/21/08 | |
| 1 | REMOVE PHASE III FROM PLANS; REMOVE ASSOCIATED ROOF DRAINS; ADD MATCHLINE IN ADD PLAT RECORDING REFERENCES TO EXISTING EASEMENTS; REMOVE GENERAL NOTES 40 & 41; 06-23-06 | |
| NO. | REVISION | DATE |

SITE DEVELOPMENT PLAN
SITE LAYOUT
GLEN MAR UNITED METHODIST CHURCH
PHASE I & III

TAX MAP 31 BLOCK 1 & 8 PARCEL '10', LOTS 1-5
5TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND

ROBERT H. VOGEL ENGINEERING, INC.
ENGINEERS - SURVEYORS - PLANNERS

8407 MAIN STREET
ELLCOTT CITY, MARYLAND 21043
TEL: 410.461.7666 FAX: 410.461.8961

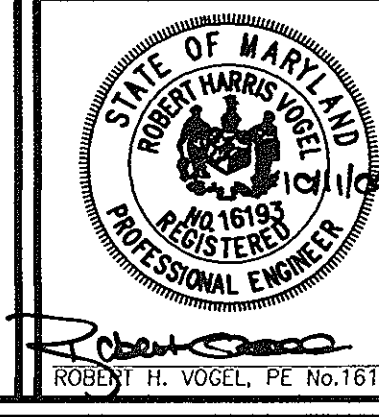
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

Michael J. ... 11/7/04
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

Cindy Hammer 12/1/04
CHIEF, DIVISION OF LAND DEVELOPMENT DATE

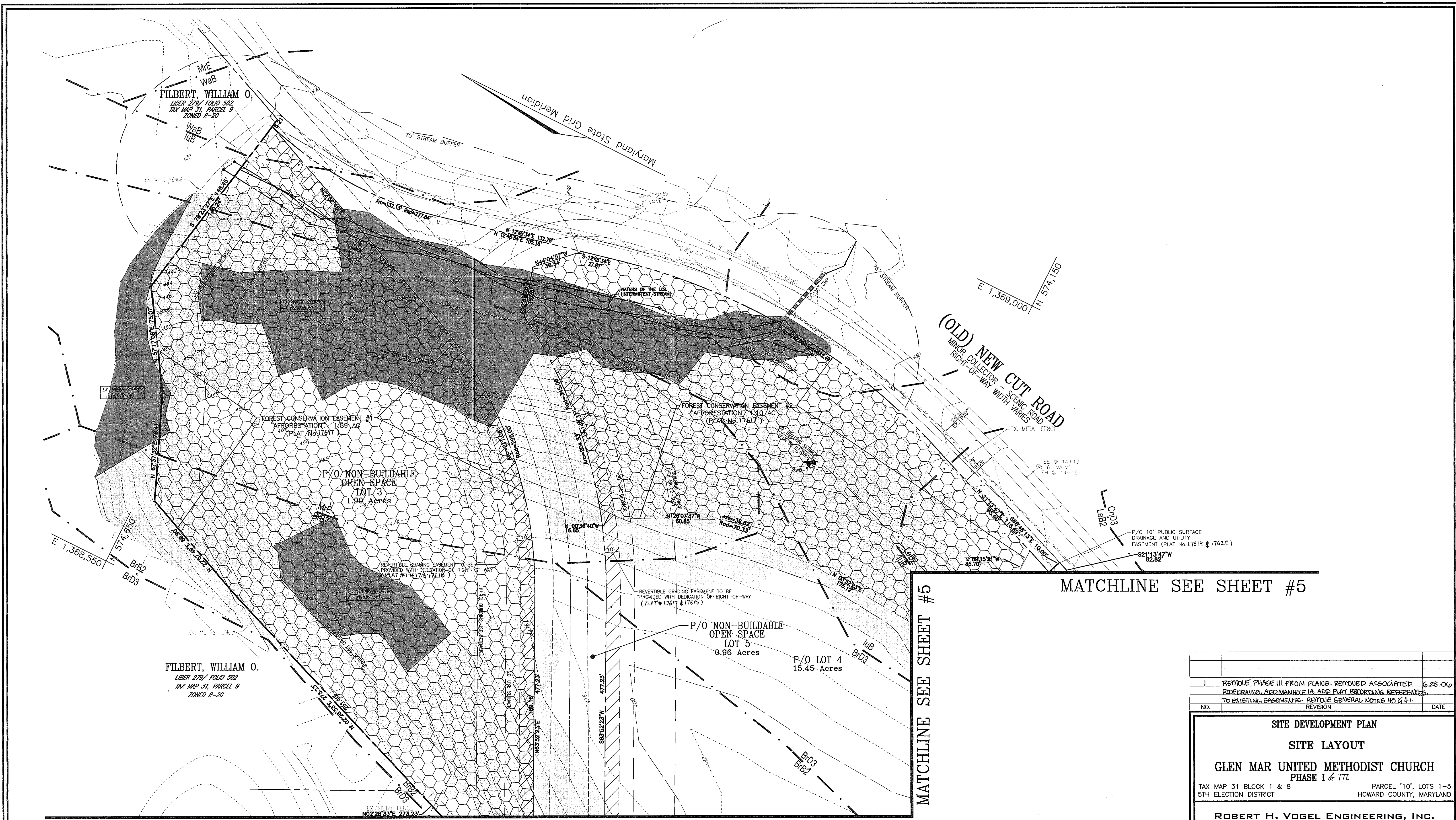
Mark ... 12/1/04
DIRECTOR DATE

OWNER/DEVELOPER
GLEN MAR UNITED METHODIST CHURCH
8430 GLENMAR ROAD
ELLCOTT CITY, MD 21043
AL HAMMER
(410) 465-4995



DESIGN BY: _____ RHV
DRAWN BY: _____ DZ
CHECKED BY: _____ RHV
DATE: _____ OCTOBER, 2004
SCALE: _____ 1"=30'
W.O. NO.: _____ 04-64

3 SHEET OF 30



FILBERT, WILLIAM O.
LIBER 278 / FOLD 502
TAX MAP 31, PARCEL 9
ZONED R-20




FILBERT, WILLIAM O.
LIBER 279 / FOLD 502
TAX MAP 31, PARCEL 9
ZONED R-20

(OLD) NEW CUT ROAD
MINOR COLLECTOR - SCENIC ROAD
RIGHT-OF-WAY WIDTH VARIES

MATCHLINE SEE SHEET #3

MATCHLINE SEE SHEET #5

MATCHLINE SEE SHEET #5

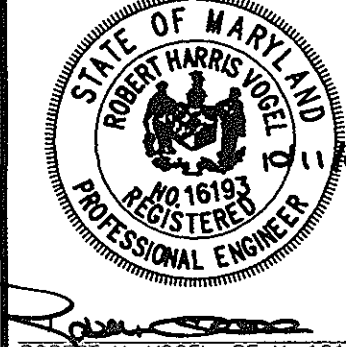
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING
 11/17/04
 CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE
 12/02/04
 CHIEF, DIVISION OF LAND DEVELOPMENT DATE
 12/02/04
 DIRECTOR DATE

OWNER/DEVELOPER
 GLEN MAR UNITED METHODIST CHURCH
 8430 GLENMAR ROAD
 ELLICOTT CITY, MD 21043
 AL HAMMER
 (410) 465-4995

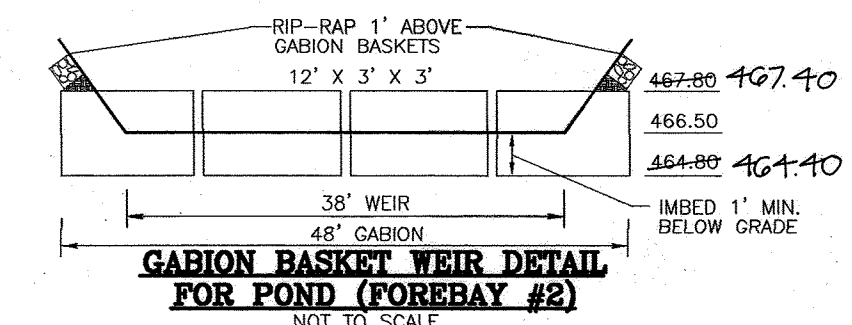
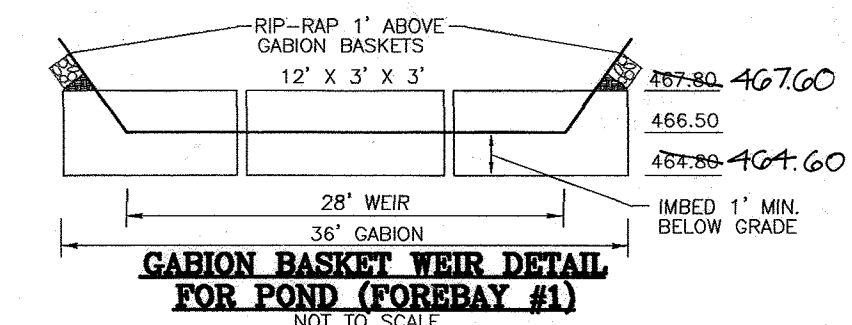
| NO. | REVISION | DATE |
|-----|---|---------|
| 1 | REMOVE PHASE III FROM PLANS. REMOVED ASSOCIATED ROOFDRAINS. ADD MANHOLE VA. ADD PLAT RECORDING REFERENCE TO EXISTING EASEMENTS. REMOVE GENERAL NOTES 40 & 41. | 6.28.04 |

SITE DEVELOPMENT PLAN
SITE LAYOUT
GLEN MAR UNITED METHODIST CHURCH
 PHASE I & III
 TAX MAP 31 BLOCK 1 & 8 PARCEL '10', LOTS 1-5
 5TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND

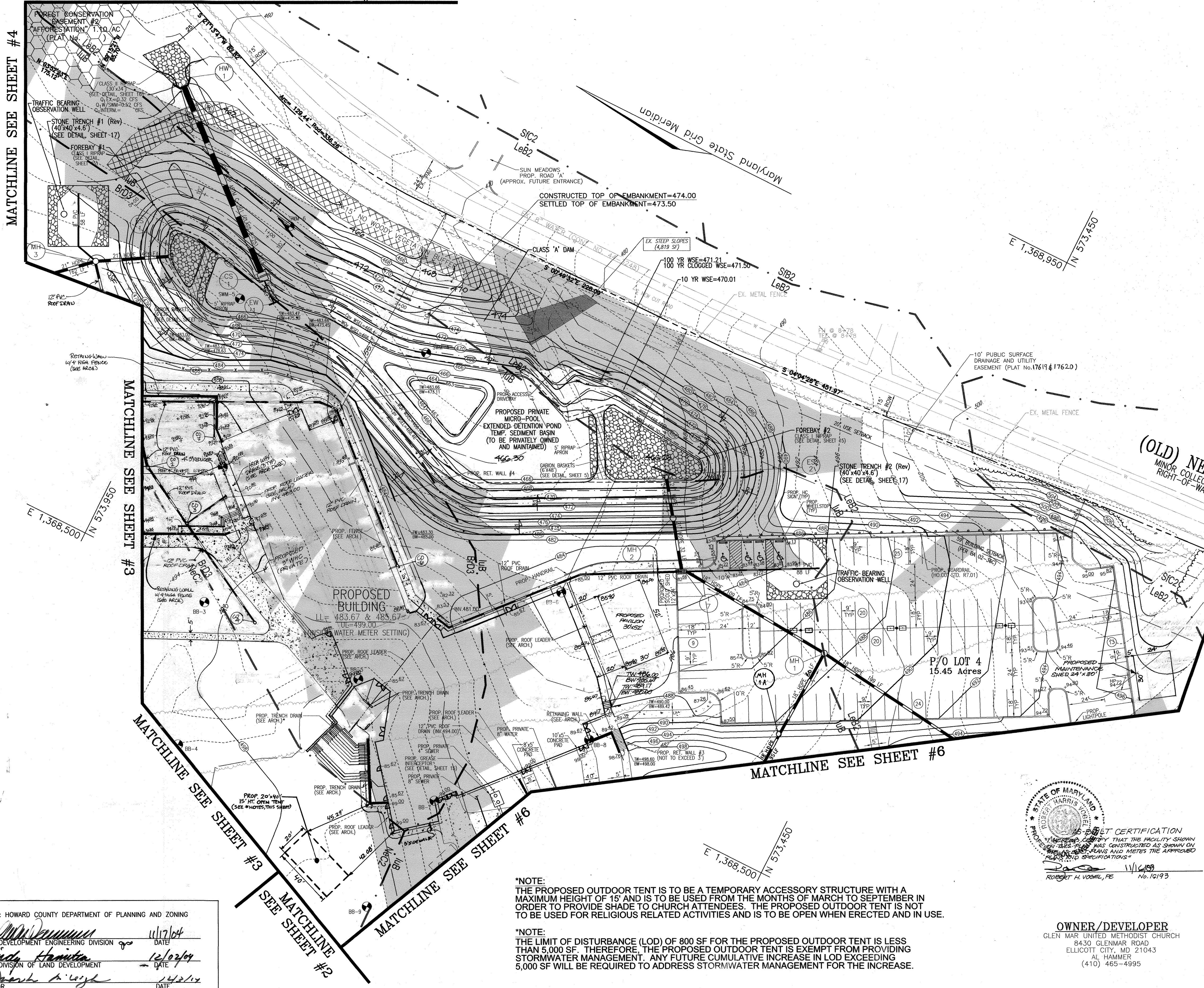
ROBERT H. VOGEL ENGINEERING, INC.
 ENGINEERS • SURVEYORS • PLANNERS
 8407 MAIN STREET
 ELLICOTT CITY, MARYLAND 21043
 TEL: 410.461.7666 FAX: 410.461.8961

| | | |
|---|--------------------------|---------------|
|  | DESIGN BY: _____ RHV | 4 SHEET OF 30 |
| | DRAWN BY: _____ DZ | |
| | CHECKED BY: _____ RHV | |
| | DATE: _____ OCTOBER 2004 | |
| | SCALE: _____ 1"=30' | |
| W.O. NO.: _____ 04-64 | | |

MATCHLINE SEE SHEET #4



- NOTES:
1. ALL WIRE USED IN GABION CONSTRUCTION SHALL BE GALVANIZED AND PLASTIC COATED.
 2. FILTER CLOTH SHALL BE PLACED WHEREVER GABIONS COME INTO CONTACT WITH SOIL.
 3. STONE FILL SHALL CONSIST OF HARD, DURABLE, CLEAN STONE 4" - 8" IN DIAMETER.
 4. CONSTRUCTION MATERIALS AND METHODS SHALL BE IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS.



MATCHLINE SEE SHEET #5

| NO. | REVISION | DATE |
|-----|---|----------|
| 9 | REVISE PLAN TO ADD AN OPEN OUTDOOR TENT TO BE UTILIZED BY CHURCH MEMBERS | 10-6-22 |
| 7 | ADD LANDSCAPING, SHEDS AND A PAVILION | 10-31-21 |
| 5 | STORMWATER MANAGEMENT AS-BUILT | 11-11-09 |
| 4 | REVISE INCOMING WATER SERVICE TO THE EDUCATION WING | 10/15/09 |
| 3 | REVISE PLAN TO INCLUDE SLOPE OF PLAYGROUND, REUSE SIDEWALKS ASSOCIATED CHURCH AND THE PROVISIONS TO ADD EXTERIOR LIGHTS TO THE EDUCATION BUILDING | 08-01-09 |
| 2 | ADD PHASE III'S ADDITION OF EDUCATION WING, ASSOCIATED GRADING & STORM DRAIN | 12/17/08 |
| 1 | REMOVE PHASE II FROM PLAN'S REMOVE ASSOCIATED ROOF DRAINS. ADD MH 1A. 06-28-06 | 06-28-06 |
| | ADD PLAT RECORDS REFERENCED TO EXISTING RECORDS. REMOVE GENERAL NOTES TO #4. | |

SITE DEVELOPMENT PLAN
SITE LAYOUT
GLEN MAR UNITED METHODIST CHURCH
PHASE I & III
TAX MAP 31 BLOCK 1 & 8 PARCEL '10', LOTS 1-5
5TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND

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

OWNER/DEVELOPER
GLEN MAR UNITED METHODIST CHURCH
8430 GLENMAR ROAD
ELLCOTT CITY, MD 21043
AL HAMMER
(410) 465-4995

DESIGN BY: RHV
DRAWN BY: DJZ
CHECKED BY: RHV
DATE: OCTOBER 2004
SCALE: 1"=30'
W.O. NO.: 04-64

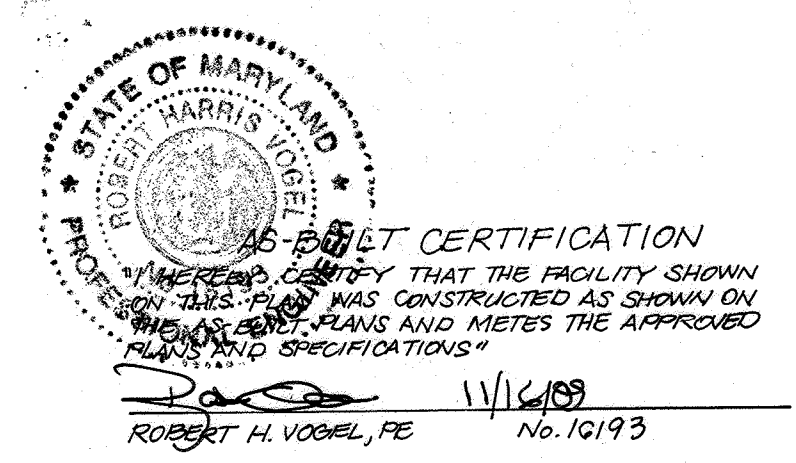
5 SHEET OF 30

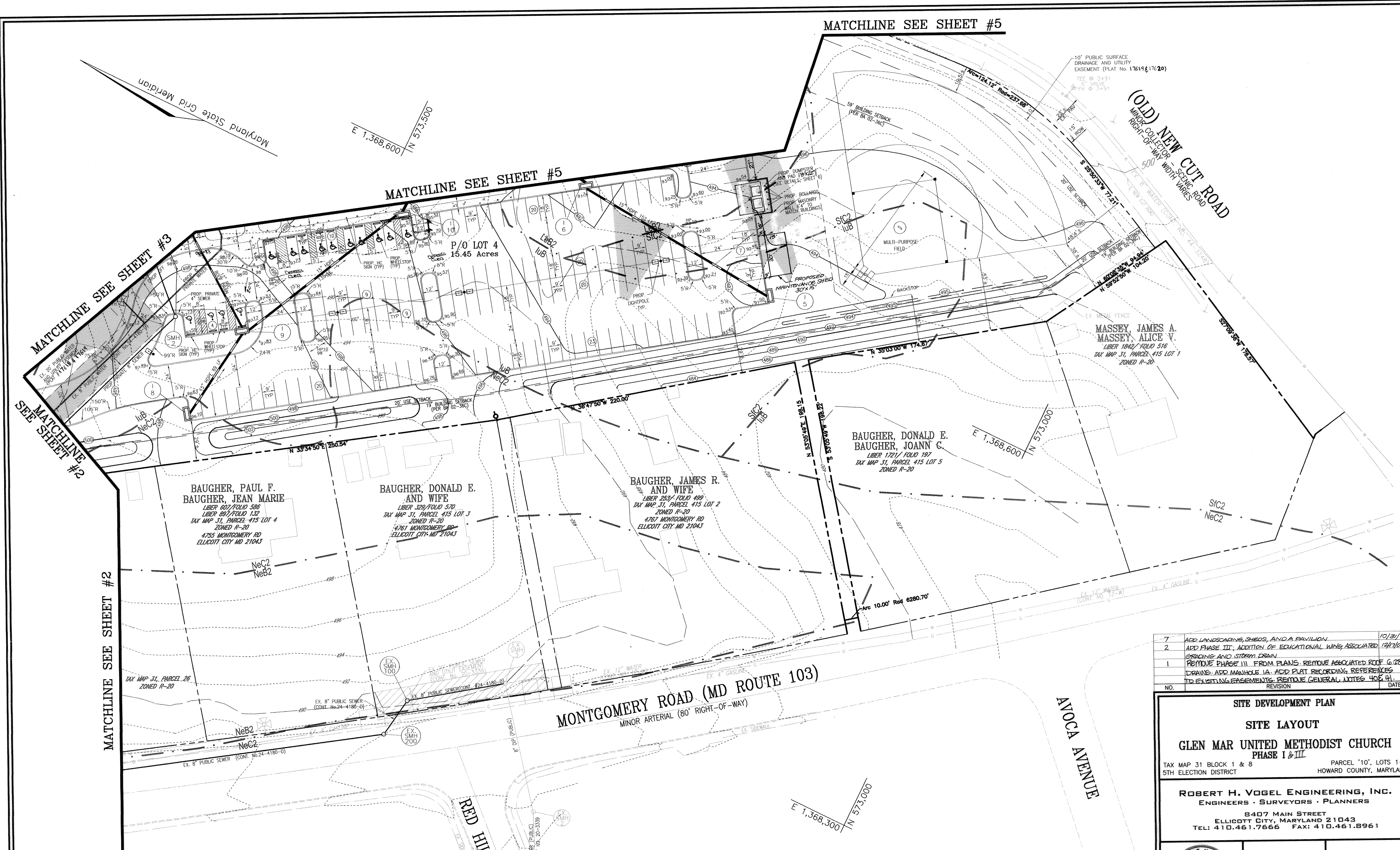
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION: *[Signature]* 11/17/04
CHIEF, DIVISION OF LAND DEVELOPMENT: *[Signature]* 12/02/04
DIRECTOR: *[Signature]* 12/21/04

*NOTE:
THE PROPOSED OUTDOOR TENT IS TO BE A TEMPORARY ACCESSORY STRUCTURE WITH A MAXIMUM HEIGHT OF 15' AND IS TO BE USED FROM THE MONTHS OF MARCH TO SEPTEMBER IN ORDER TO PROVIDE SHADE TO CHURCH ATTENDEES. THE PROPOSED OUTDOOR TENT IS NOT TO BE USED FOR RELIGIOUS RELATED ACTIVITIES AND IS TO BE OPEN WHEN ERECTED AND IN USE.

*NOTE:
THE LIMIT OF DISTURBANCE (LOD) OF 800 SF FOR THE PROPOSED OUTDOOR TENT IS LESS THAN 5,000 SF. THEREFORE, THE PROPOSED OUTDOOR TENT IS EXEMPT FROM PROVIDING STORMWATER MANAGEMENT. ANY FUTURE CUMULATIVE INCREASE IN LOD EXCEEDING 5,000 SF WILL BE REQUIRED TO ADDRESS STORMWATER MANAGEMENT FOR THE INCREASE.





| | | |
|-----|--|----------|
| 7 | ADD LANDSCAPING, SHEDS, AND A PAVILION | 10/31/11 |
| 2 | ADD PHASE III, ADDITION OF EDUCATIONAL WING ASSOCIATED GRADING AND STORM DRAIN | 12/1/09 |
| 1 | REMOVE PHASE III FROM PLANS. REMOVE ASSOCIATED ROOF G. 28.00 | |
| | DRAINS: ADD MANHOLE 1A. ADD PLAT RECORDING REFERENCES TO EXISTING EASEMENTS. REMOVE GENERAL NOTES 40E-H. | |
| NO. | REVISION | DATE |

SITE DEVELOPMENT PLAN
SITE LAYOUT
GLEN MAR UNITED METHODIST CHURCH
PHASE I & II

TAX MAP 31 BLOCK 1 & 8 PARCEL 10', LOTS 1-5
 5TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND

ROBERT H. VOGEL ENGINEERING, INC.
 ENGINEERS • SURVEYORS • PLANNERS

8407 MAIN STREET
 ELLICOTT CITY, MARYLAND 21043
 TEL: 410.461.7666 FAX: 410.461.8961

| | | |
|-----------------|--------------------|---------------|
| | DESIGN BY: RHV | 6 SHEET OF 30 |
| | DRAWN BY: DZ | |
| | CHECKED BY: RHV | |
| | DATE: OCTOBER 2004 | |
| | SCALE: 1"=30' | |
| W.O. NO.: 04-64 | | |

OWNER/DEVELOPER
 GLEN MAR UNITED METHODIST CHURCH
 8430 GLENMAR ROAD
 ELLICOTT CITY, MD 21043
 AL HAMMER
 (410) 465-4995

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

Al Hammer 11/7/04
 CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

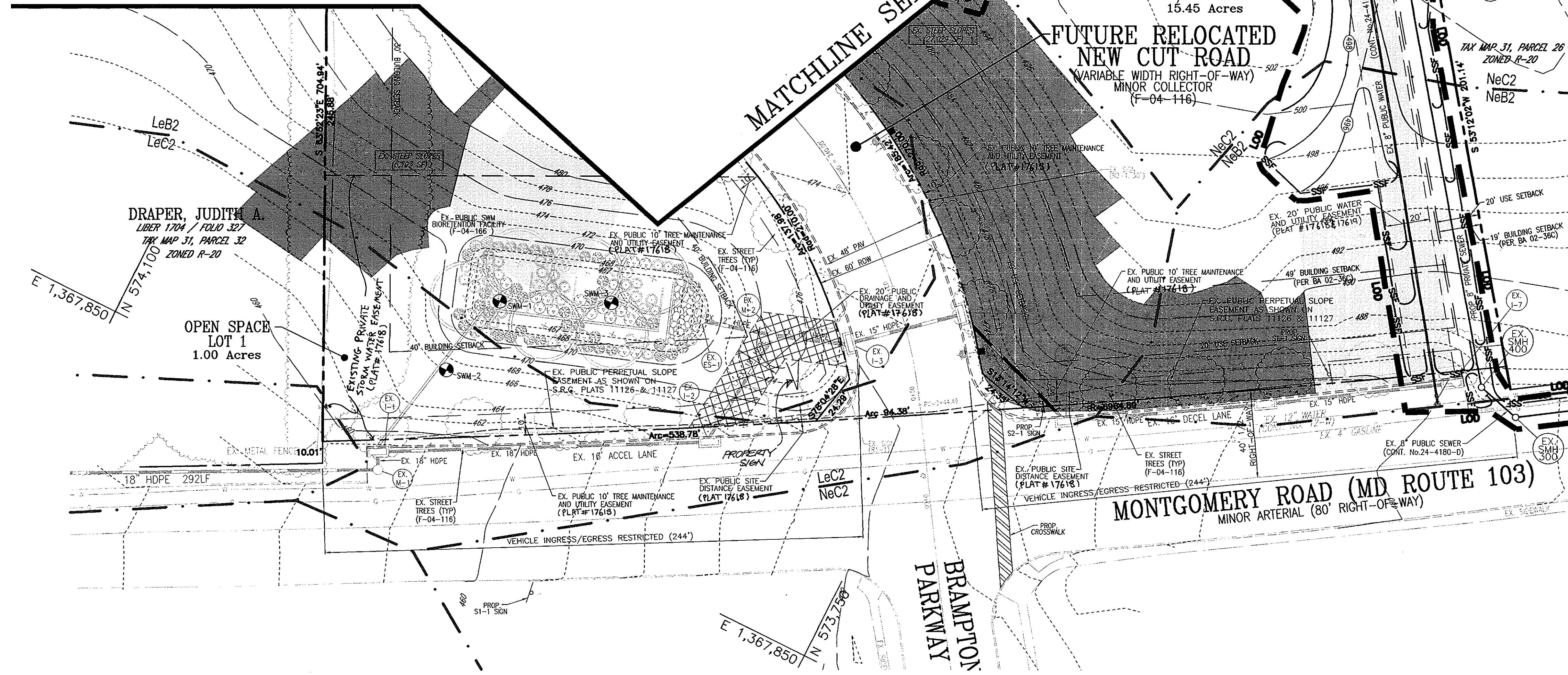
Cathy Hamilton 12/09/04
 CHIEF, DIVISION OF LAND DEVELOPMENT DATE

Mark A. Layton 12/2/04
 DIRECTOR DATE

LEGEND:

| | |
|--|--|
| | EXISTING CONTOUR |
| | PROPOSED CONTOUR |
| | PROPOSED SPOT ELEVATION |
| | EXISTING SPOT ELEVATION |
| | EXISTING CURB AND GUTTER |
| | PROPOSED CURB AND GUTTER |
| | EXISTING UTILITY POLE |
| | EXISTING LIGHT POLE |
| | EXISTING MAILBOX |
| | EXISTING SIGN |
| | EXISTING SANITARY MANHOLE |
| | EXISTING SANITARY LINE |
| | EXISTING CLEANOUT |
| | EXISTING FIRE HYDRANT |
| | EXISTING WATER LINE |
| | PROPOSED STORM DRAIN |
| | PROPOSED STORM DRAIN INLET |
| | EXISTING TREES (FIELD LOCATED) |
| | EXISTING TREE LINE (FIELD LOCATED) |
| | EXISTING VEGETATION (APPROXIMATE LOCATION) |
| | EXISTING STREET TREES (F-04-...) |
| | EXISTING FENCE |
| | PROPERTY LINE |
| | RIGHT-OF-WAY LINE |
| | SOILS BOUNDARY |
| | SILT FENCE |
| | SUPER SILT FENCE |
| | LIMIT OF DISTURBANCE |
| | PROPOSED LIGHTPOLE |
| | CURB INLET PROTECTION |
| | AT GRADE INLET PROTECTION |
| | PROPOSED SIDEWALK |
| | STABILIZED CONSTRUCTION ENTRANCE |

MATCHLINE SEE SHEET #9



MATCHLINE SEE SHEET #12

| | | |
|-----|---|----------|
| 6 | ADD PROPERTY SIGN | 11/20/10 |
| 1 | REMOVE PHASE III FROM PLANS. REMOVE ASSOCIATED ROOF DRAINS. ADD MANHOLE VA. ADD PLAT RECORDING REFERENCES TO EXISTING EASEMENTS. REMOVE GENERAL NOTES 402 & 41. | 6-23-06 |
| NO. | REVISION | DATE |

**SITE DEVELOPMENT PLAN
SEDIMENT AND EROSION CONTROL**

**GLEN MAR UNITED METHODIST CHURCH
PHASE I & III**

TAX MAP 31 BLOCK 1 & 8 PARCEL '10', LOTS 1-5
5TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND

ROBERT H. VOGEL ENGINEERING, INC.
ENGINEERS • SURVEYORS • PLANNERS

8407 MAIN STREET
ELLCOTT CITY, MARYLAND 21043
TEL: 410.461.7666 FAX: 410.461.8961

Note:
Turned-up section of SF/SSF to be extended to full 2' (one contour interval) in elevation throughout the site.

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

[Signature] 11/17/04
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

[Signature] 12/01/04
CHIEF, DIVISION OF LAND DEVELOPMENT DATE

[Signature] 12/01/04
DIRECTOR DATE

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

[Signature] 10/21/04
USDA-NATURAL RESOURCES CONSERVATION SERVICE DATE

THESE PLANS FOR SMALL POND CONSTRUCTION, SOIL EROSION AND SEDIMENT CONTROL MEET THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT.

[Signature] 10/21/04
HOWARD S.C.D. DATE

BY THE DEVELOPER:

"I/WE CERTIFY THAT ALL DEVELOPMENT AND/OR CONSTRUCTION WILL BE DONE IN ACCORDANCE TO THESE PLANS, AND THAT ANY RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF ATTENDANCE AT A DEPARTMENT OF THE ENVIRONMENT APPROVED TRAINING PROGRAM FOR THE CONTROL OF SEDIMENT AND EROSION BEFORE BEGINNING THE PROJECT. I SHALL ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION."

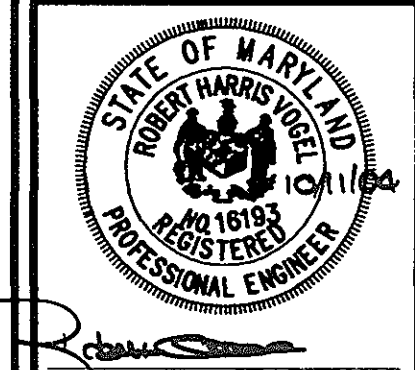
[Signature] 11/01/04
SIGNATURE OF DEVELOPER DATE

BY THE ENGINEER:

"I HEREBY CERTIFY THAT THIS PLAN FOR POND CONSTRUCTION, EROSION AND SEDIMENT CONTROL REPRESENTS A PRACTICAL AND WORKABLE PLAN BASED ON MY PERSONAL KNOWLEDGE OF THE SITE CONDITIONS. THIS PLAN WAS PREPARED IN ACCORDANCE WITH THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT. I HAVE NOTIFIED THE DEVELOPER THAT HE/SHE MUST ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION."

[Signature] 10/11/04
SIGNATURE OF ENGINEER
ROBERT H. VOGEL, P.E. DATE

OWNER/DEVELOPER
GLEN MAR UNITED METHODIST CHURCH
8430 GLENMAR ROAD
ELLCOTT CITY, MD 21043
AL HAMMER
(410) 465-4995



DESIGN BY: RHV
DRAWN BY: DZ
CHECKED BY: RHV
DATE: OCTOBER 2004
SCALE: 1"=30'
W.O. NO.: 04-64

8 SHEET OF 30

MATCHLINE SEE SHEET #10

SEDIMENT TRAP
 TYPE: SUPER SILT FENCE TRAP
 DEVELOPED DRAINAGE AREA: 0.5 AC
 TOTAL STORAGE REQUIRED: 1800 CF
 WET STORAGE (EXCAVATED): 900 CF
 DRY STORAGE (TOP OF SSF): 900 CF
 BOTTOM ELEVATION: 458.00
 WET STORAGE ELEVATION: 460.00
 DRY STORAGE ELEVATION: 462.75
 WET STORAGE PROVIDED: 1370-CF
 DRY STORAGE PROVIDED: 3809 CG

P/O OPEN SPACE
 LOT 3
 1.90 Acres

DRAPER, JUDITH A.
 LIBER 1704 / FOLD 327
 TAX MAP 31, PARCEL 32
 ZONED R-20

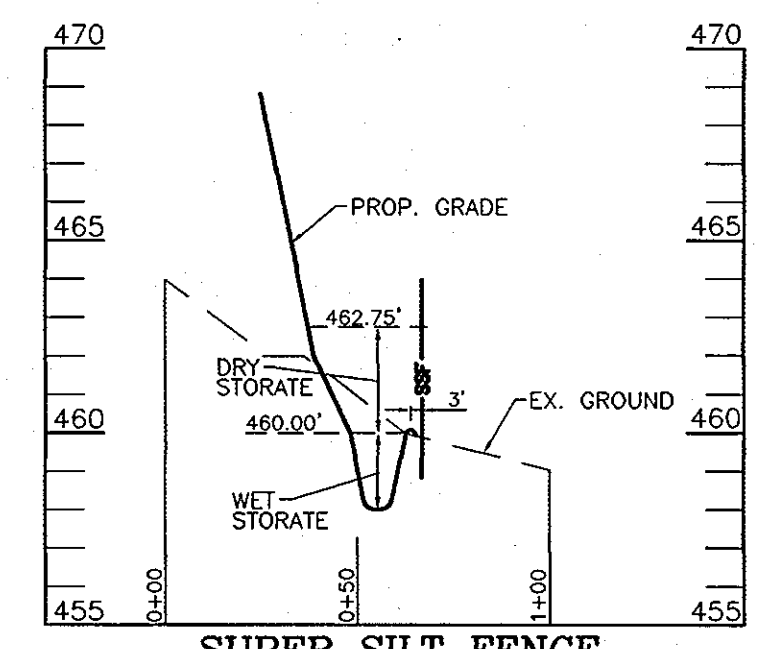
R/O NON-BUILDABLE
 OPEN SPACE
 LOT 5
 0.96 Acres

OPEN SPACE
 LOT 2
 0.24 Acres

OPEN SPACE
 LOT 1
 1.00 Acres

P/O LOT 4
 15.45 Acres

**FUTURE RELOCATED
 NEW CUT ROAD**
 (VARIABLE WIDTH RIGHT-OF-WAY)
 MINOR COLLECTOR (F-04-176)



OWNER/DEVELOPER
 GLEN MAR UNITED METHODIST CHURCH
 8430 GLENMAR ROAD
 ELLICOTT CITY, MD 21043
 AL HAMMER
 (410) 465-4995

| 3 | REVISE PLAN TO INCREASE SIZE OF PLAYGROUND; REVERSE SIDEWALKS; ASSOCIATED GRADING | 09-01-09 |
|-----|--|----------|
| 2 | ADD PHASE III, ADDITION OF EDUCATION WING; ASSOCIATED 18" 1100P STORM DRAIN AND GRADING | 12/11/08 |
| 1 | REMOVE PHASE III FROM PLANS. REMOVE ASSOCIATED ROOF DRAINS | 6-28-06 |
| | ADD MANHOLE 1A. ADD PLAT RECORDING REFERENCES TO EXISTING EASEMENTS. REMOVE GENERAL NOTES 40 & 41. | |
| NO. | REVISION | DATE |

SITE DEVELOPMENT PLAN
SEDIMENT AND EROSION CONTROL
GLEN MAR UNITED METHODIST CHURCH
PHASE I & III
 TAX MAP 31, BLOCK 1 & 8 PARCEL '10', LOTS 1-5
 5TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND

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

| | |
|-------------------|--------------|
| DESIGN BY: _____ | REV |
| DRAWN BY: _____ | DZ |
| CHECKED BY: _____ | RMV |
| DATE: _____ | OCTOBER 2004 |
| SCALE: _____ | 1"=30' |
| W.O. NO.: _____ | 04-64 |

9 SHEET OF 30

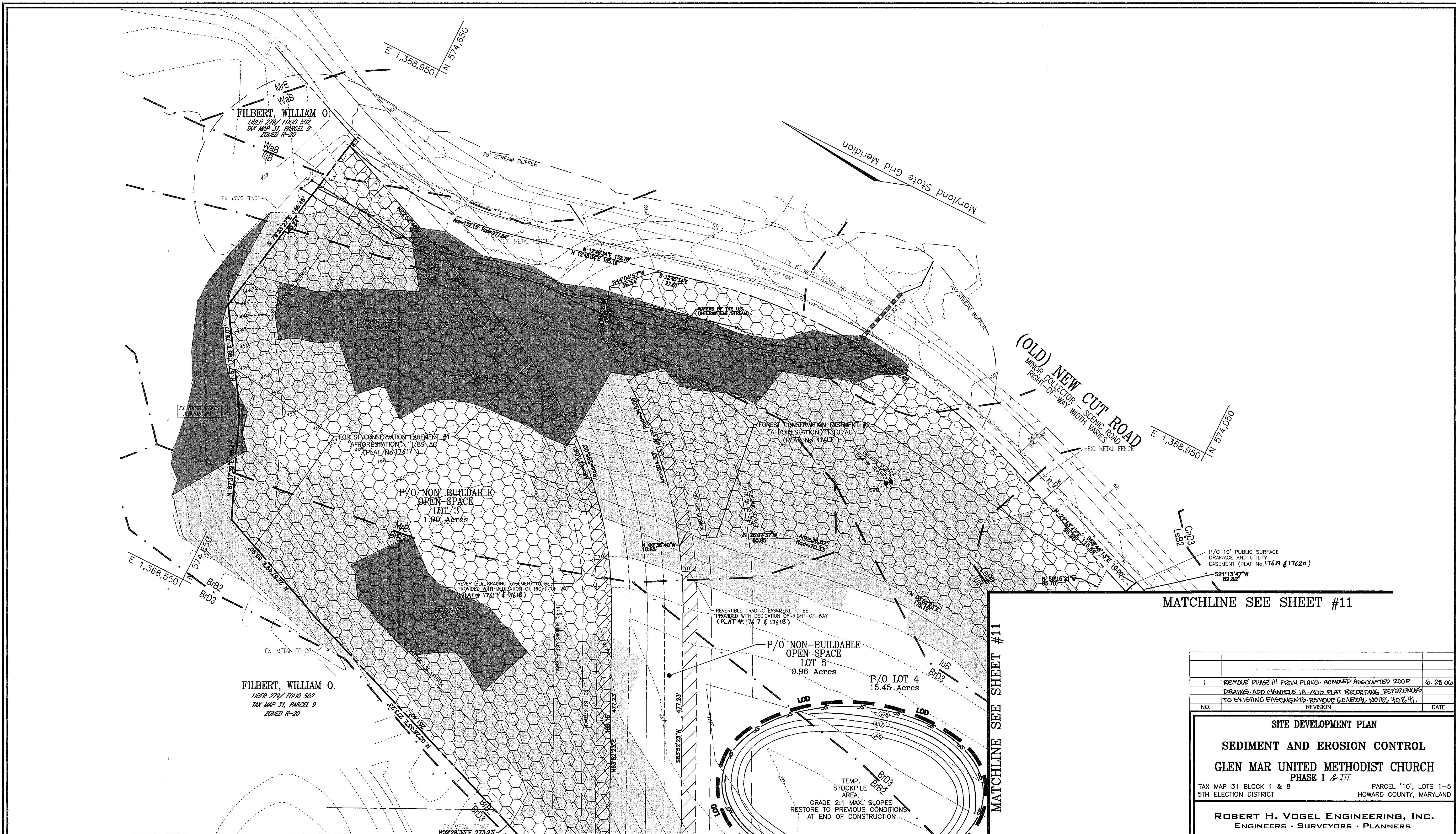
THESE PLANS HAVE BEEN REVIEWED FOR HOWARD SOIL CONSERVATION DISTRICT AND MEET THE TECHNICAL REQUIREMENTS FOR SMALL POND CONSTRUCTION, SOIL EROSION AND SEDIMENT CONTROL.
 JIM MAYER/CSA 10/21/04
 USDA-NATURAL RESOURCES CONSERVATION SERVICE
 THESE PLANS FOR SMALL POND CONSTRUCTION, SOIL EROSION AND SEDIMENT CONTROL MEET THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT.
 DAVID C. EDEY 10/21/04
 HOWARD S.C.D.

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING
 CHIEF, DEVELOPMENT ENGINEERING DIVISION gms 11/17/04
 CHIEF, DIVISION OF LAND DEVELOPMENT 10/21/04
 DIRECTOR mark h. wright 10/21/04

BY THE DEVELOPER:
 I HEREBY CERTIFY THAT ALL DEVELOPMENT AND/OR CONSTRUCTION WILL BE DONE IN ACCORDANCE TO THESE PLANS, AND THAT ANY RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF ATTENDANCE AT A DEPARTMENT OF THE ENVIRONMENT APPROVED TRAINING PROGRAM FOR THE CONTROL OF SEDIMENT AND EROSION BEFORE BEGINNING THE PROJECT. I SHALL ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION.
 David C. Edey 11/01/04
 SIGNATURE OF DEVELOPER DATE

BY THE ENGINEER:
 I HEREBY CERTIFY THAT THIS PLAN FOR POND CONSTRUCTION, EROSION AND SEDIMENT CONTROL REPRESENTS A PRACTICAL AND WORKABLE PLAN BASED ON MY PERSONAL KNOWLEDGE OF THE SITE CONDITIONS. THIS PLAN WAS PREPARED IN ACCORDANCE WITH THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT. I HAVE NOTIFIED THE DEVELOPER THAT HE/SHE MUST ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION.
 Robert H. Vogel, P.E. 10/11/04
 SIGNATURE OF ENGINEER DATE

Note:
 Turned-up section of SF/SSF to be extended to full 2' (one contour interval) in elevation throughout the site.



Note:
Turned-up section of SF/SSF to be extended to full 2' (one contour interval) in elevation throughout the site.

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

Michael D. Coyle 11/17/04
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

Cindy Hamster 12/6/04
CHIEF, DIVISION OF LAND DEVELOPMENT DATE

David A. Coyle 12/15/04
DIRECTOR DATE

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

Jim Mays 10/21/04
USDA-NATURAL RESOURCES CONSERVATION SERVICE DATE

THESE PLANS FOR SMALL POND CONSTRUCTION, SOIL EROSION AND SEDIMENT CONTROL MEET THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT.

David C. Eddy 10/21/04
HOWARD S.C.D. DATE

BY THE DEVELOPER:

I HEREBY CERTIFY THAT ALL DEVELOPMENT AND/OR CONSTRUCTION WILL BE DONE IN ACCORDANCE TO THESE PLANS, AND THAT ANY RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF ATTENDANCE AT A DEPARTMENT OF THE ENVIRONMENT APPROVED TRAINING PROGRAM FOR THE CONTROL OF SEDIMENT AND EROSION BEFORE BEGINNING THE PROJECT. I SHALL ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION.

David C. Eddy 10/21/04
SIGNATURE OF DEVELOPER DATE

BY THE ENGINEER:

I HEREBY CERTIFY THAT THIS PLAN FOR POND CONSTRUCTION, EROSION AND SEDIMENT CONTROL REPRESENTS A PRACTICAL AND WORKABLE PLAN BASED ON MY PERSONAL KNOWLEDGE OF THE SITE CONDITIONS. THIS PLAN WAS PREPARED IN ACCORDANCE WITH THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT. I HAVE NOTIFIED THE DEVELOPER THAT HE/SHE MUST ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION.

Robert H. Vogel 10/11/04
SIGNATURE OF ENGINEER DATE
ROBERT H. VOGEL, P.E.

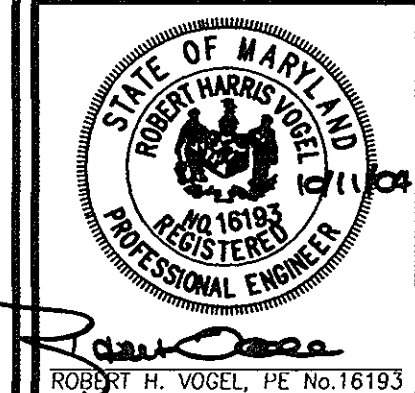
MATCHLINE SEE SHEET #11

MATCHLINE SEE SHEET #11

| NO. | REVISION | DATE |
|-----|--|---------|
| 1 | REMOVE PHASE III FROM PLANS- REMOVE ASSOCIATED ROOF DRAINS- ADD MANHOLE 1A- ADD PLAT RECORDING REFERENCES TO EXISTING EASEMENTS- REMOVE GENERAL NOTES 40 & 41. | 6.28.06 |

SITE DEVELOPMENT PLAN
SEDIMENT AND EROSION CONTROL
GLEN MAR UNITED METHODIST CHURCH
PHASE I & III
TAX MAP 31 BLOCK 1 & 8 PARCEL '10', LOTS 1-5
5TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND

ROBERT H. VOGEL ENGINEERING, INC.
ENGINEERS - SURVEYORS - PLANNERS
8407 MAIN STREET
ELLCOTT CITY, MARYLAND 21043
TEL: 410.461.7666 FAX: 410.461.8961



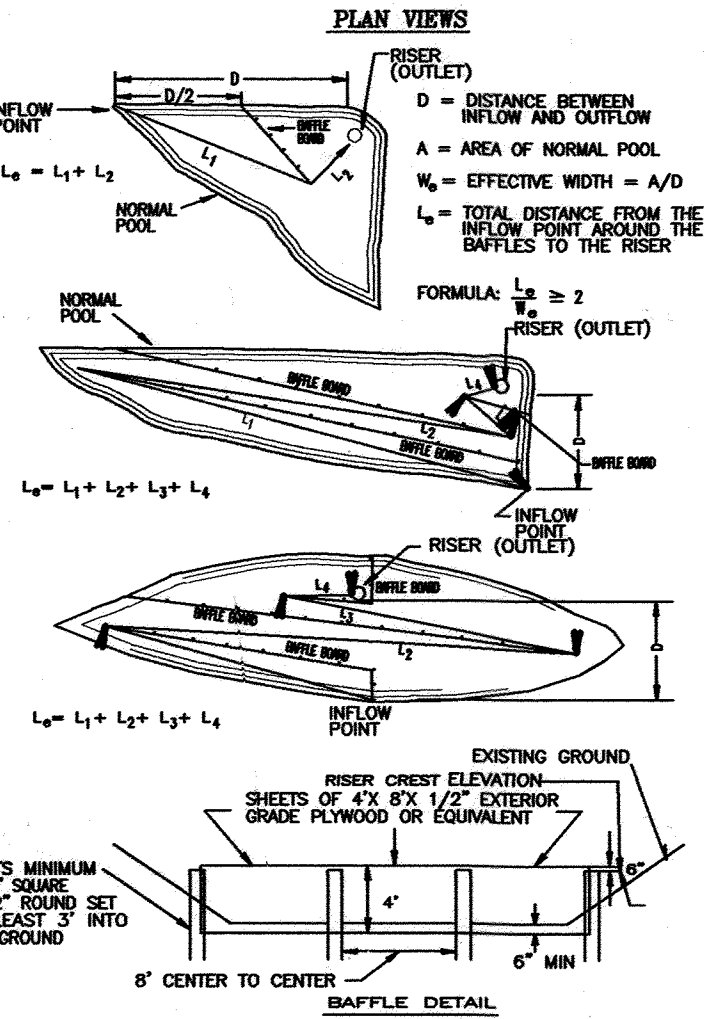
DESIGN BY: RHV
DRAWN BY: DZ
CHECKED BY: RHV
DATE: OCTOBER 2004
SCALE: 1"=30'
W.O. NO.: 04-64

10 SHEET OF 30

MATCHLINE SEE SHEET #10

SEDIMENT BASIN
 EX. D.A. = 8.00 AC
 PROP. D.A. = 12.35 AC
 REQ. VOL. = 44,460 CF
 DRY VOL. = 22,230 CF
 WET VOL. = 22,230 CF
 TOP OF EMBANKMENT = 474.00
 WEIR CREST EL. = 469.20
 WET EL. STORAGE EL. = 469.20
 DRY STORAGE EL. = 469.20
 SIDE SLOPE = 3:1
 BOTTOM OF TRAP = 466.00
 CLEANOUT EL. = 467.50
 WEIR WIDTH = 1.80' FRONT
 Q₁ EX = 0.48 CFS
 Q₁ GRADED = 0.70 CFS
 Q₁ ULTIMATE = 0.32 CFS

DETAIL 18 - SEDIMENT BASIN BAFFLES



D = 284'
 A = 12,796SF
 LC = 449'
 LC/WC = 9.97

MATCHLINE SEE SHEET #10

MATCHLINE SEE SHEET #9

MATCHLINE SEE SHEET #9

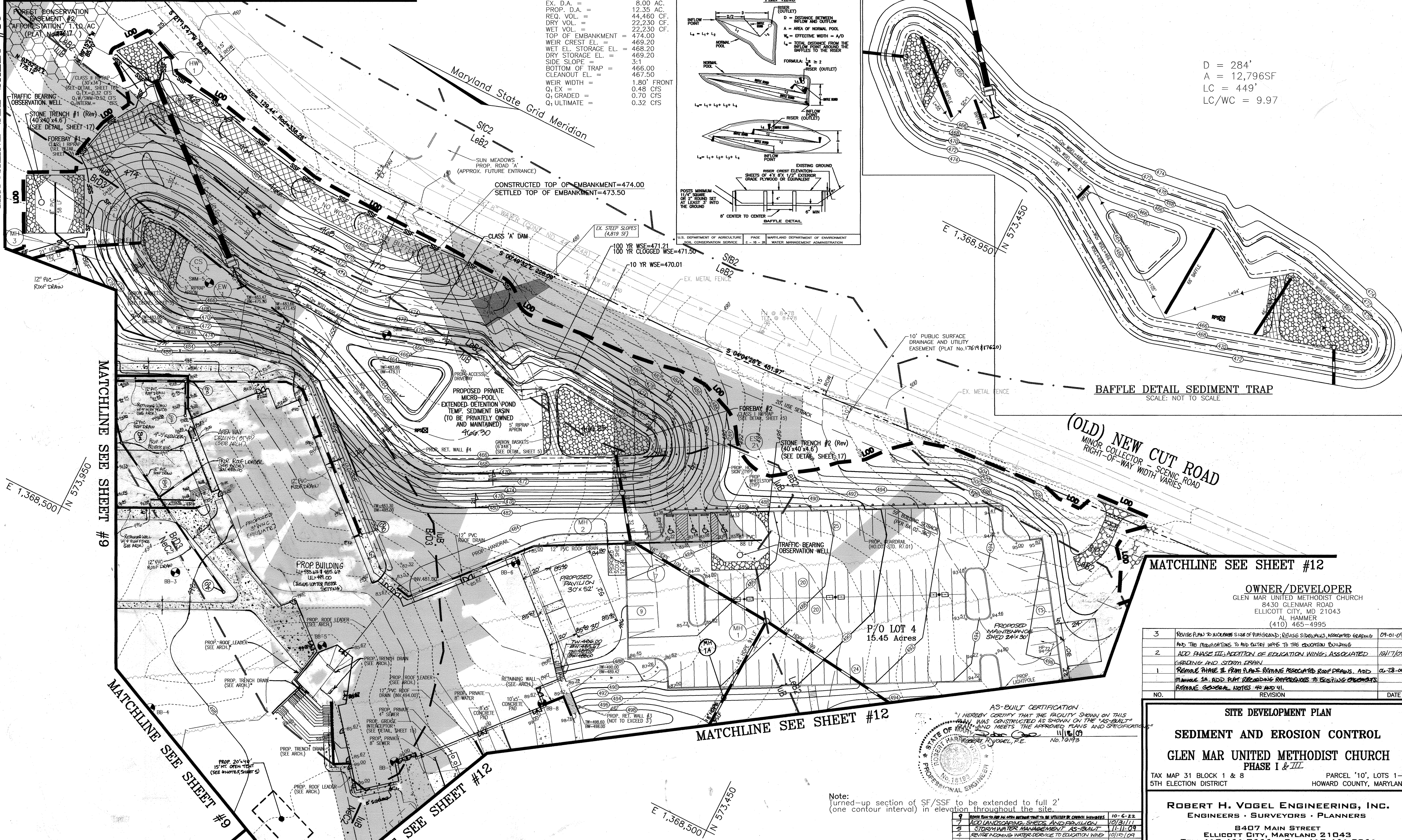
MATCHLINE SEE SHEET #9

MATCHLINE SEE SHEET #8

MATCHLINE SEE SHEET #12

MATCHLINE SEE SHEET #12

MATCHLINE SEE SHEET #12



OWNER/DEVELOPER
 GLEN MAR UNITED METHODIST CHURCH
 8430 GLENMAR ROAD
 ELLICOTT CITY, MD 21043
 AL HAMMER
 (410) 465-4995

| NO. | REVISION | DATE |
|-----|---|----------|
| 3 | REVISE PLAN TO INCLUDE SIZE OF PARKING; REVISE SIDEWALKS ASSOCIATED GRADING AND THE MODIFICATIONS TO ADD ENTRY WAYS TO THE EDUCATION BUILDING | 09-01-09 |
| 2 | ADD PHASE III ADDITION OF EDUCATION WING; ASSOCIATED GRADING AND SIDEWALK | 10/17/08 |
| 1 | REMOVE PHASE II PLAN PLANS REMOVE ASSOCIATED ROOF DRAWS. ADD MINIMUM 3A. ADD PUMP RELEVANCE REFERENCES TO EXISTING OPERATIONS REMOVE GENERAL NOTES 40 AND 41. | 06-28-06 |

AS-BUILT CERTIFICATION
 I HEREBY CERTIFY THAT THE FACILITY SHOWN ON THIS PLAN WAS CONSTRUCTED AS SHOWN ON THE "AS-BUILT" MEETS THE APPROVED PLANS AND SPECIFICATIONS.
 ROBERT H. VOGEL, P.E.
 No. 10193

Note:
 Turned-up section of SF/SSF to be extended to full 2' (one contour interval) in elevation throughout the site.

| NO. | REVISION | DATE |
|-----|---|----------|
| 1 | REVISE PLAN TO INCLUDE SIZE OF PARKING; REVISE SIDEWALKS ASSOCIATED GRADING AND THE MODIFICATIONS TO ADD ENTRY WAYS TO THE EDUCATION BUILDING | 10-6-22 |
| 2 | ADD LANDSCAPING, SHADES AND PAVILION | 10/31/11 |
| 3 | STORMWATER MANAGEMENT AS-BUILT | 11-11-09 |
| 4 | REVISE INCLUDING WATER SERVICE TO EDUCATION WING | 10/12/09 |

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING
 CHIEF, DEVELOPMENT ENGINEERING DIVISION
 DATE 11/17/04
 CHIEF, DIVISION OF LAND DEVELOPMENT
 DATE 12/12/04
 DIRECTOR
 DATE 12/16/04

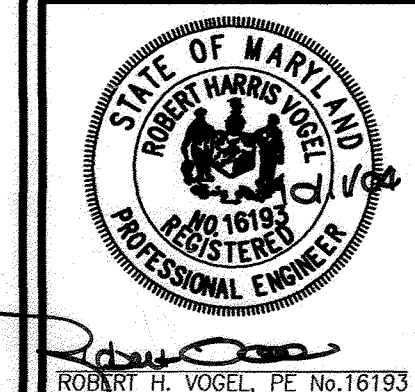
THESE PLANS HAVE BEEN REVIEWED FOR HOWARD SOIL CONSERVATION DISTRICT AND MEET THE TECHNICAL REQUIREMENTS FOR SMALL POND CONSTRUCTION, SOIL EROSION AND SEDIMENT CONTROL.
 USDA-NATURAL RESOURCES CONSERVATION SERVICE
 THESE PLANS FOR SMALL POND CONSTRUCTION, SOIL EROSION AND SEDIMENT CONTROL MEET THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT.
 HOWARD S.C.D.

BY THE DEVELOPER:
 I/WE CERTIFY THAT ALL DEVELOPMENT AND/OR CONSTRUCTION WILL BE DONE IN ACCORDANCE TO THESE PLANS, AND THAT ANY RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF ATTENDANCE AT A DEPARTMENT OF THE ENVIRONMENT APPROVED TRAINING PROGRAM FOR THE CONTROL OF SEDIMENT AND EROSION BEFORE BEGINNING THE PROJECT. I SHALL ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION.
 SIGNATURE OF DEVELOPER
 DATE 11/02/2004

BY THE ENGINEER:
 I HEREBY CERTIFY THAT THIS PLAN FOR POND CONSTRUCTION, EROSION AND SEDIMENT CONTROL REPRESENTS A PRACTICAL AND WORKABLE PLAN BASED ON MY PERSONAL KNOWLEDGE OF THE SITE CONDITIONS. THIS PLAN WAS PREPARED IN ACCORDANCE WITH THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT. I HAVE NOTIFIED THE DEVELOPER THAT HE/SHE MUST ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION.
 SIGNATURE OF ENGINEER
 DATE 10/11/06

SITE DEVELOPMENT PLAN
SEDIMENT AND EROSION CONTROL
GLEN MAR UNITED METHODIST CHURCH
PHASE I & III
 TAX MAP 31 BLOCK 1 & 8 PARCEL '10', LOTS 1-5
 5TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND

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

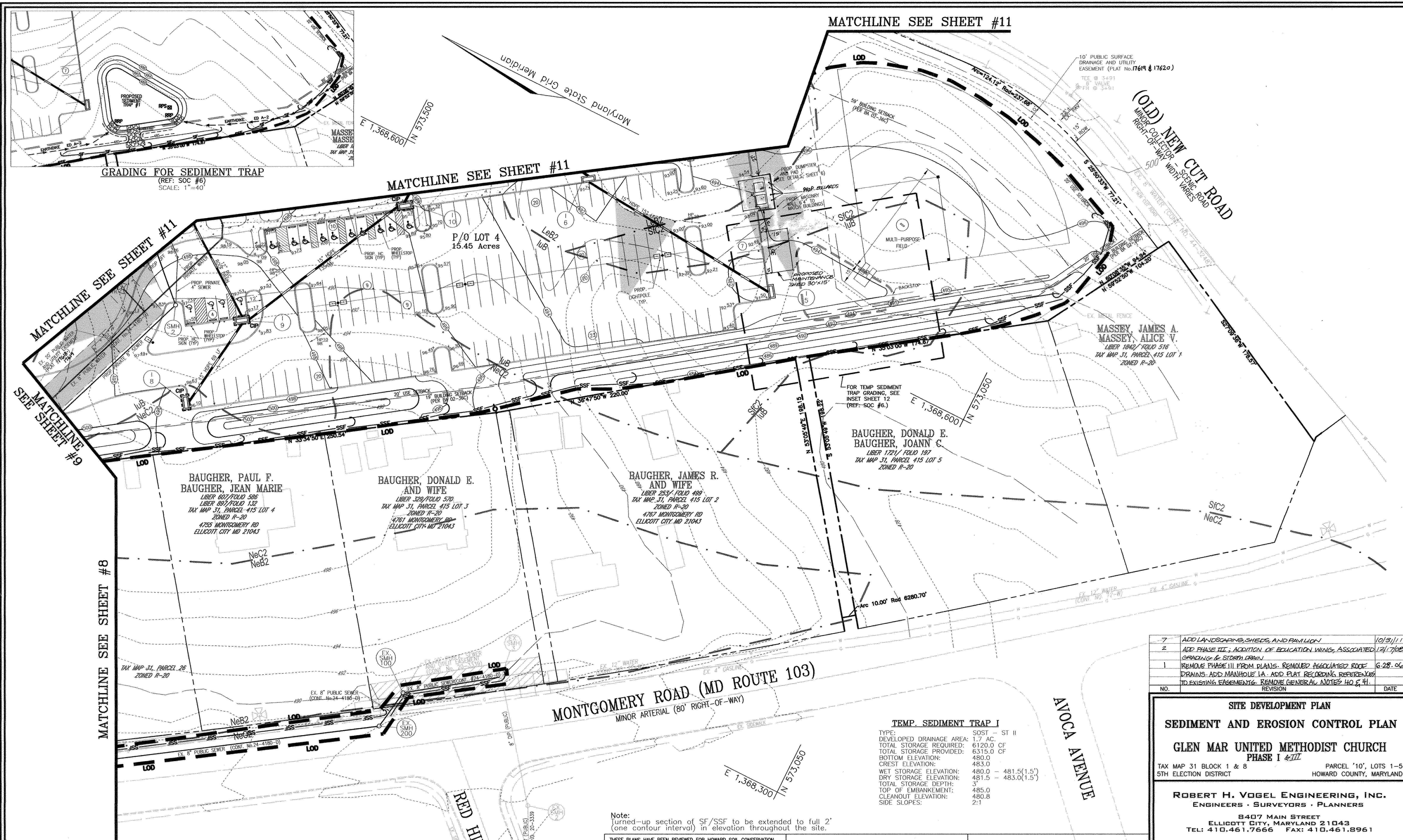


DESIGN BY: RHV
 DRAWN BY: DZ
 CHECKED BY: RHV
 DATE: OCTOBER 2004
 SCALE: 1"=30'
 W.O. NO.: 04-64

11 SHEET OF 30

AS-BUILT 11-11-09

SDP-04-42



APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING
 [Signature] 11/17/04
 CHIEF, DEVELOPMENT ENGINEERING DIVISION
 [Signature] 12/28/04
 CHIEF, DIVISION OF LAND DEVELOPMENT
 [Signature] 12/28/04
 DIRECTOR

OWNER/DEVELOPER
 GLEN MAR UNITED METHODIST CHURCH
 8430 GLENMAR ROAD
 ELLICOTT CITY, MD 21043
 AL HAMMER
 410-465-4995

Note:
 Turned-up section of SF/SSF to be extended to full 2' (one contour interval) in elevation throughout the site.

THESE PLANS HAVE BEEN REVIEWED FOR HOWARD SOIL CONSERVATION DISTRICT AND MEET THE TECHNICAL REQUIREMENTS FOR SMALL POND CONSTRUCTION, SOIL EROSION AND SEDIMENT CONTROL.
 [Signature] 10/21/04
 USDA - NATURAL RESOURCES CONSERVATION SERVICE
 THESE PLANS FOR SMALL POND CONSTRUCTION, SOIL EROSION AND SEDIMENT CONTROL MEET THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT.
 [Signature] 10/21/04
 HOWARD S.C.D.

BY THE DEVELOPER:
 I/WE CERTIFY THAT ALL DEVELOPMENT AND/OR CONSTRUCTION WILL BE DONE IN ACCORDANCE TO THESE PLANS, AND THAT ANY RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF ATTENDANCE AT A DEPARTMENT OF THE ENVIRONMENT APPROVED TRAINING PROGRAM FOR THE CONTROL OF SEDIMENT AND EROSION BEFORE BEGINNING THE PROJECT. I SHALL ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION.
 [Signature] 11/01/04
 SIGNATURE OF DEVELOPER

BY THE ENGINEER:
 I HEREBY CERTIFY THAT THIS PLAN FOR POND CONSTRUCTION, EROSION AND SEDIMENT CONTROL REPRESENTS A PRACTICAL AND WORKABLE PLAN BASED ON MY PERSONAL KNOWLEDGE OF THE SITE CONDITIONS. THIS PLAN WAS PREPARED IN ACCORDANCE WITH THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT. I HAVE NOTIFIED THE DEVELOPER THAT HE/SHE MUST ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION.
 [Signature] 10/11/04
 SIGNATURE OF ENGINEER
 ROBERT H. VOGEL, P.E.

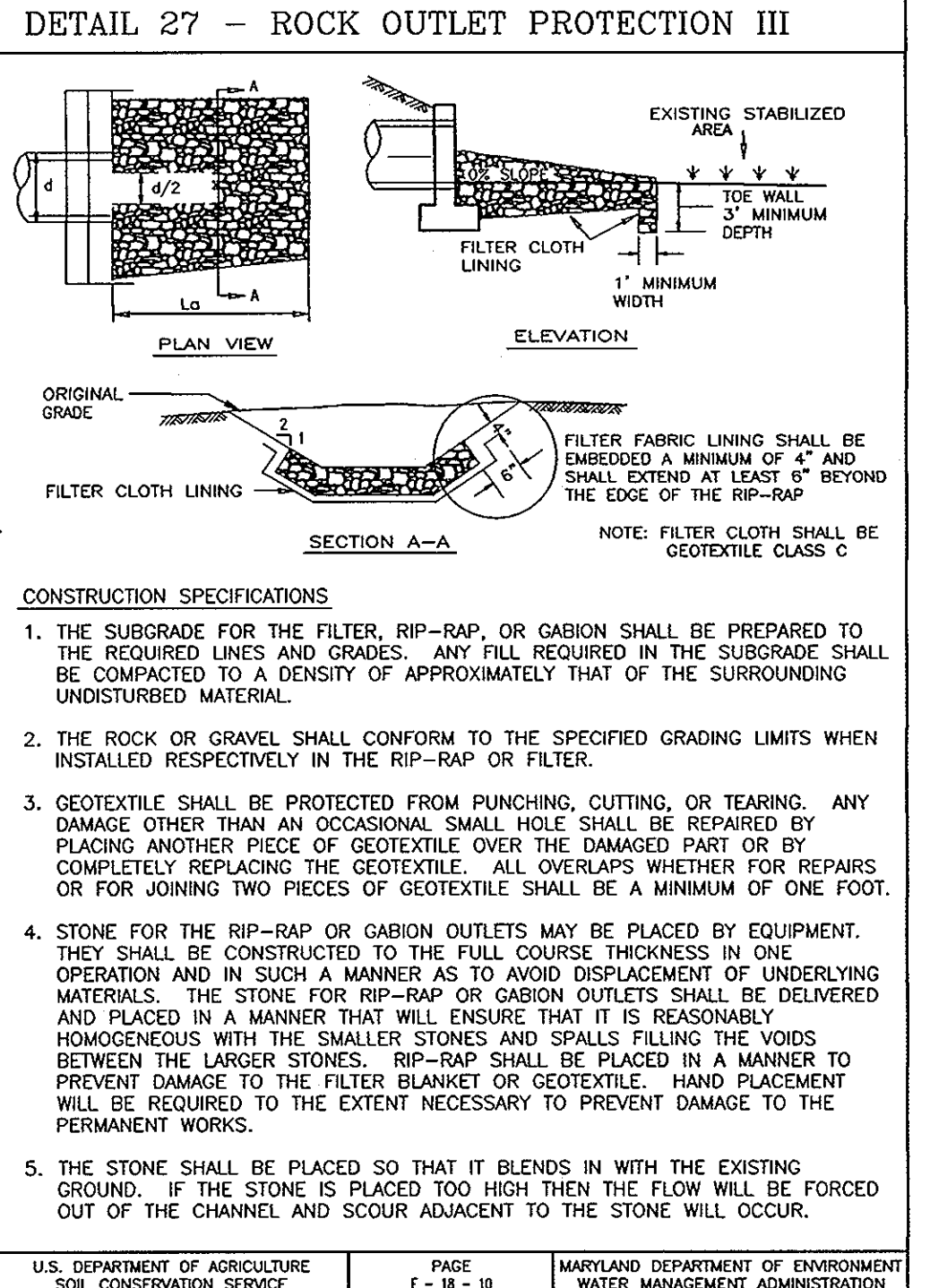
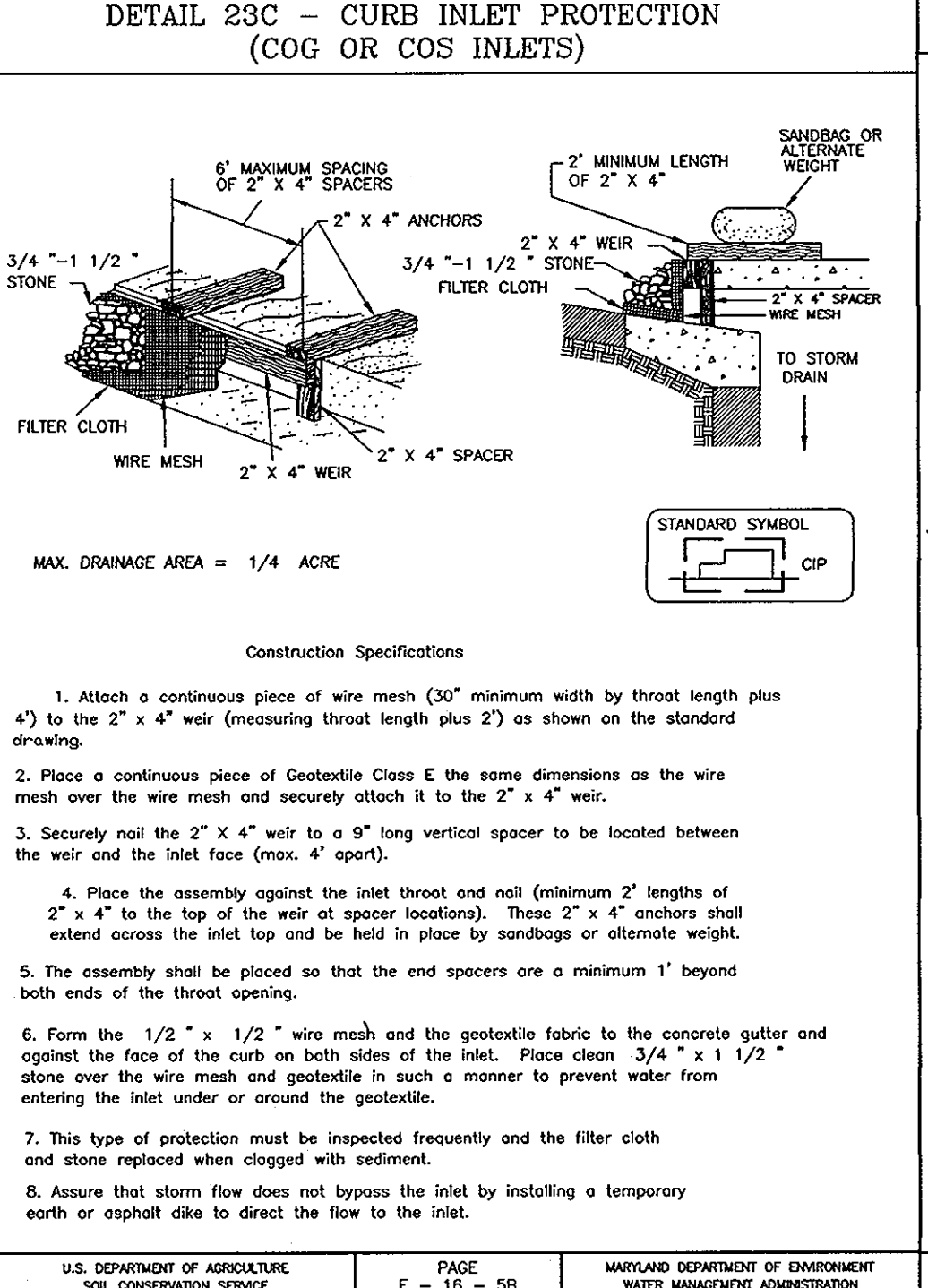
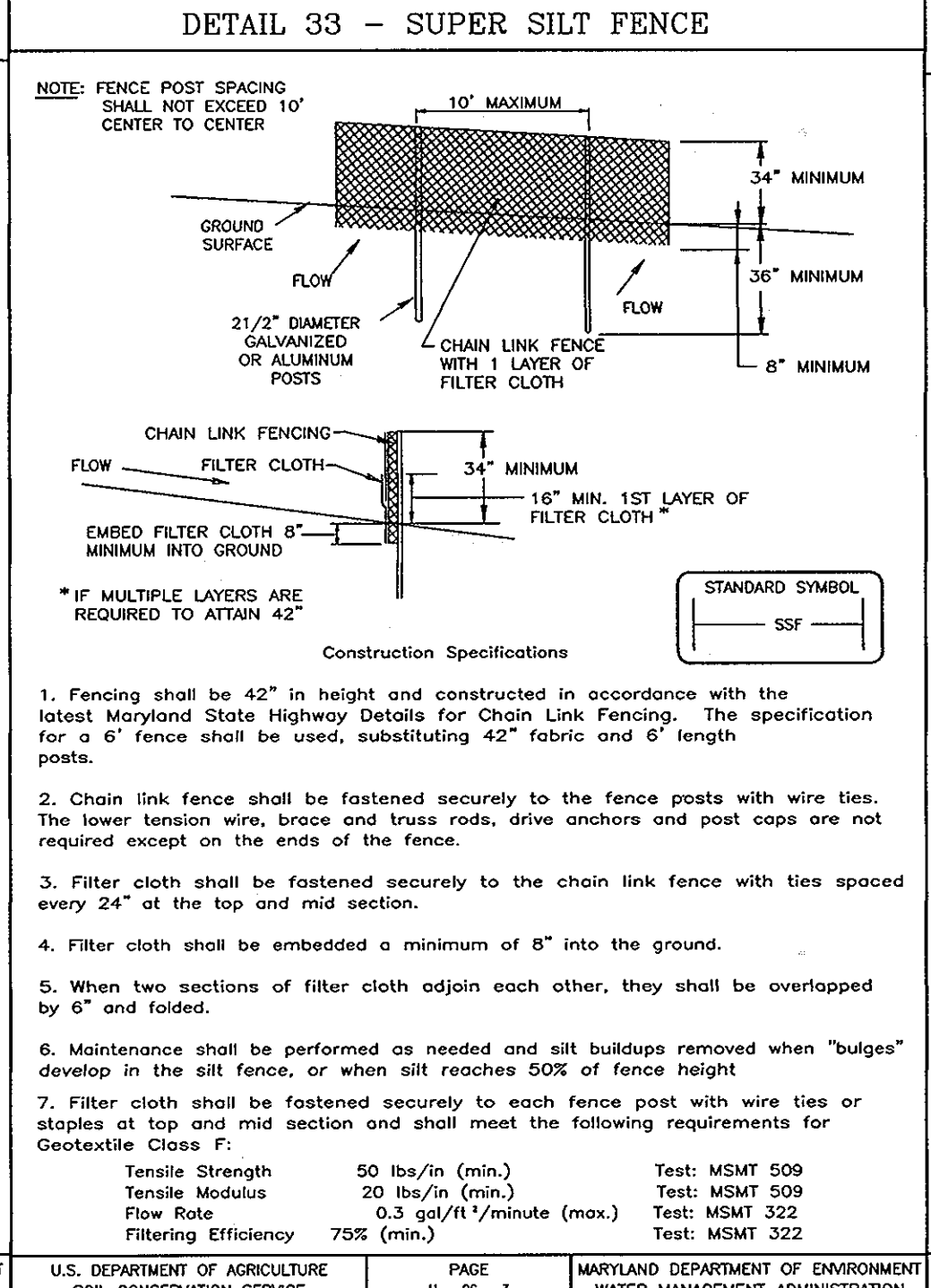
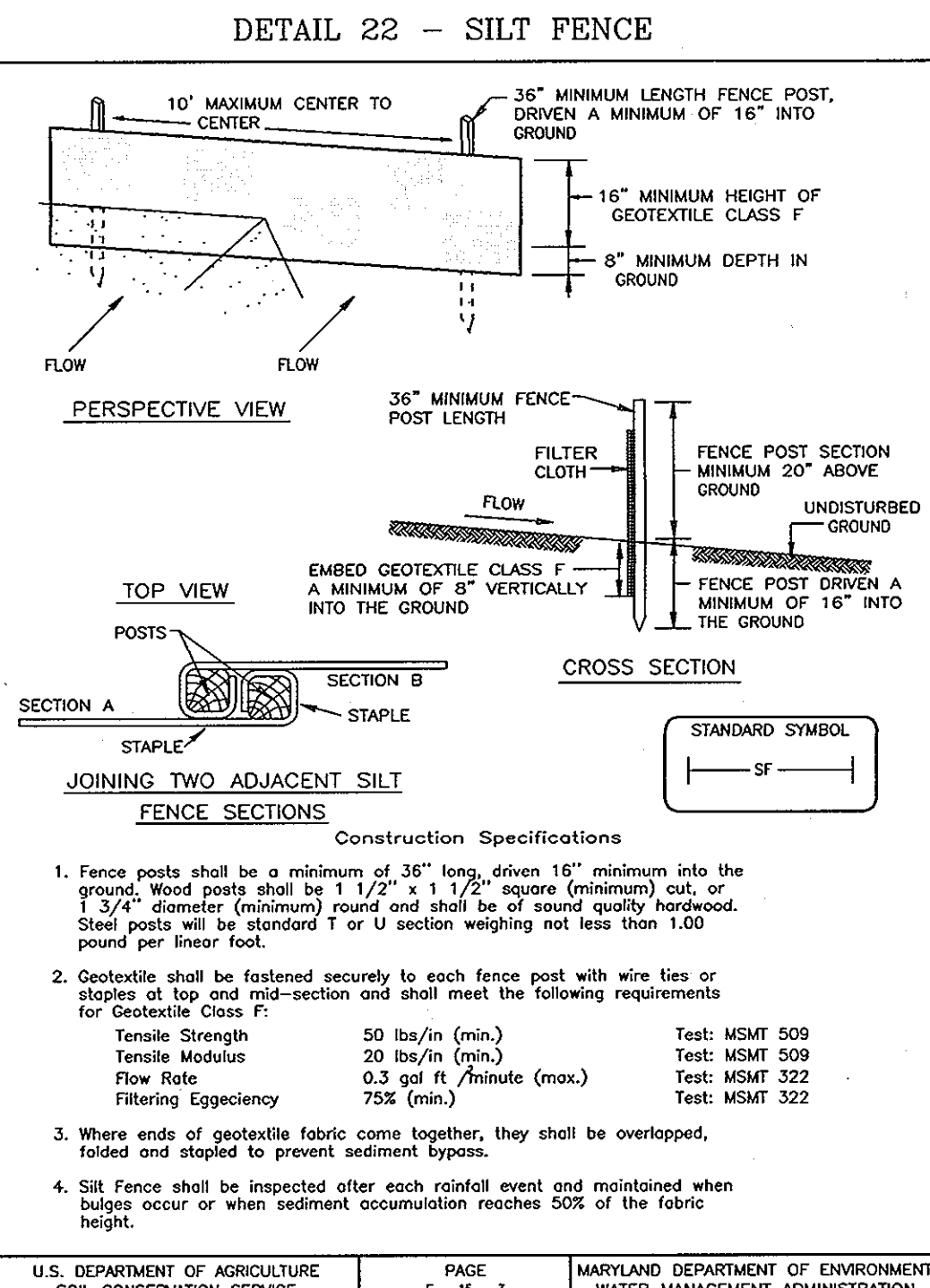
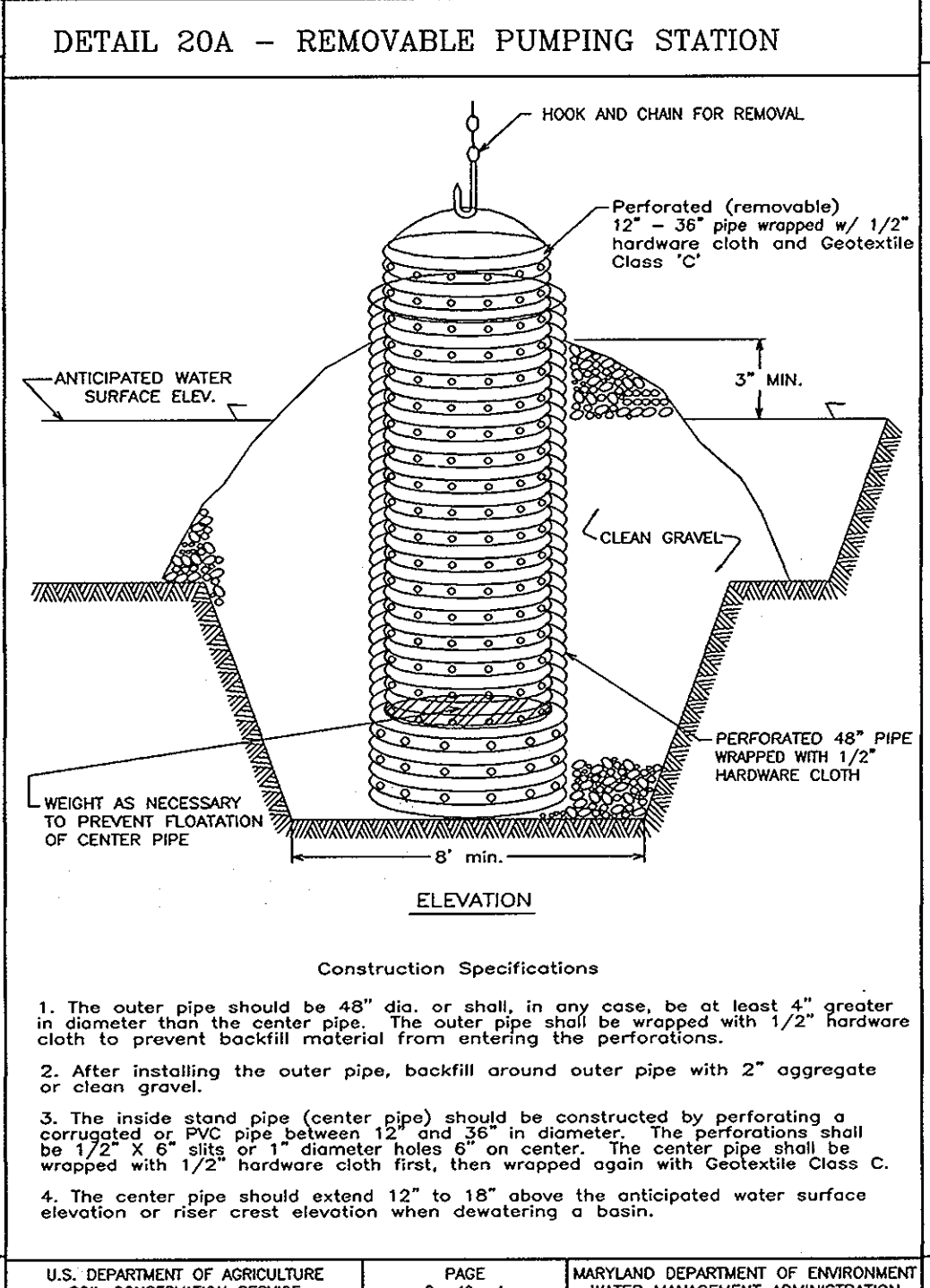
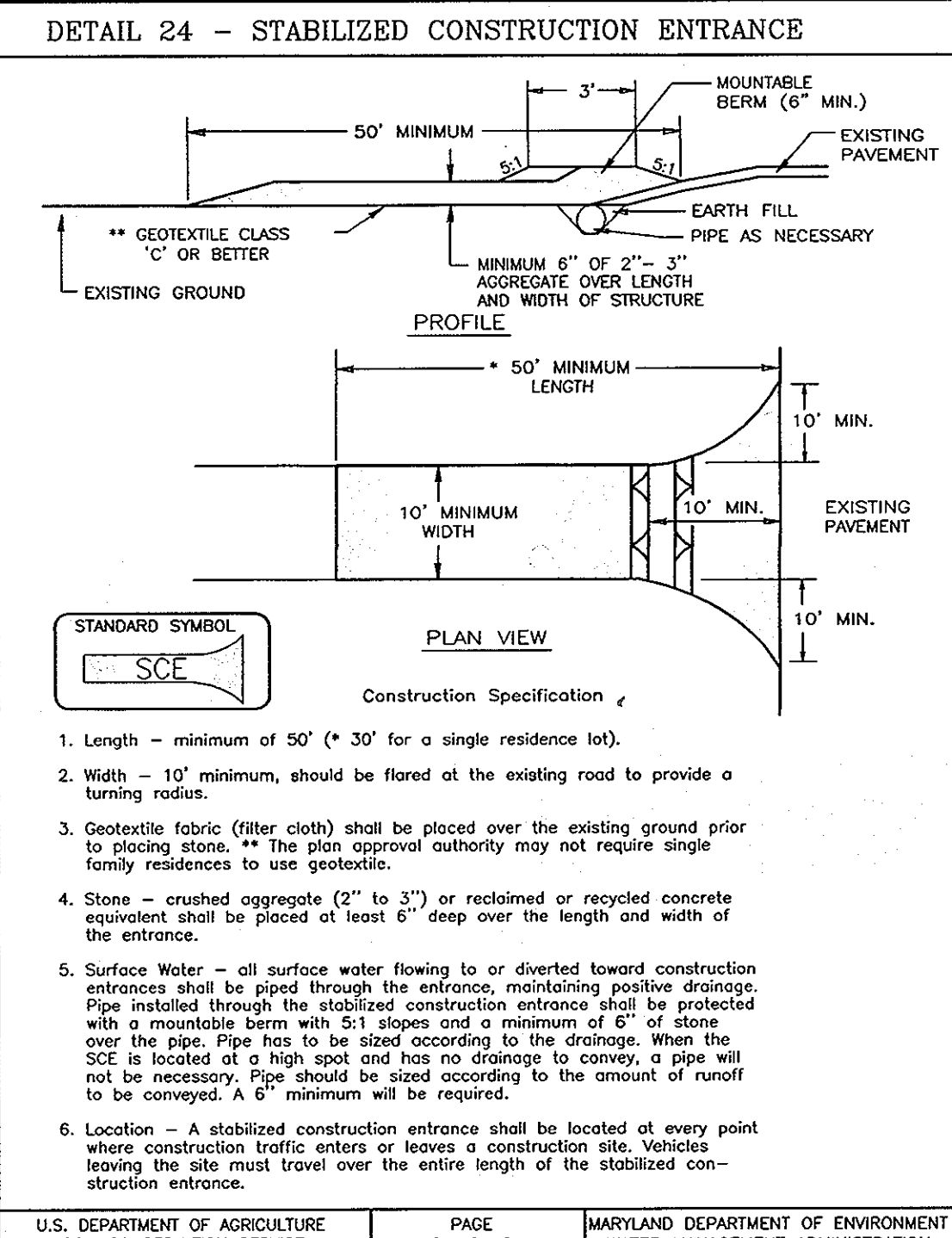
TEMP. SEDIMENT TRAP I

| | |
|--------------------------|---------------------|
| TYPE: | SOST - ST II |
| DEVELOPED DRAINAGE AREA: | 1.7 AC. |
| TOTAL STORAGE REQUIRED: | 6120.0 CF |
| TOTAL STORAGE PROVIDED: | 6315.0 CF |
| BOTTOM ELEVATION: | 480.0 |
| CREST ELEVATION: | 483.0 |
| WET STORAGE ELEVATION: | 480.0 - 481.5(1.5') |
| DRY STORAGE ELEVATION: | 481.5 - 483.0(1.5') |
| TOTAL STORAGE DEPTH: | 3' |
| TOP OF EMBANKMENT: | 485.0 |
| CLEANOUT ELEVATION: | 480.8 |
| SIDE SLOPES: | 2:1 |

| NO. | REVISION | DATE |
|-----|--|----------|
| 7 | ADD LANDSCAPING, SHEDS, AND PAVILION | 10/31/11 |
| 2 | ADD PHASE III; ADDITION OF EDUCATION WING, ASSOCIATED GRADING & STORM DRAIN | 12/17/02 |
| 1 | REMOVE PHASE III FROM PLANS; REMOVE ASSOCIATED ROOF DRAINS; ADD MANHOLE 1A; ADD PLAT RECORDING REFERENCES TO EXISTING EASEMENTS; REMOVE GENERAL NOTES 40 & 41. | 6-28-06 |

**SITE DEVELOPMENT PLAN
 SEDIMENT AND EROSION CONTROL PLAN**
GLEN MAR UNITED METHODIST CHURCH
 PHASE I & III
 TAX MAP 31 BLOCK 1 & 8 PARCEL '10', LOTS 1-5
 5TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND
ROBERT H. VOGEL ENGINEERING, INC.
 ENGINEERS · SURVEYORS · PLANNERS
 8407 MAIN STREET
 ELLICOTT CITY, MARYLAND 21043
 TEL: 410.461.7666 FAX: 410.461.9661

DESIGN BY: RHV
 DRAWN BY: OZ
 CHECKED BY: RHV
 DATE: OCTOBER 2004
 SCALE: 1"=30'
 W.O. NO.: 04-64
 12 SHEET OF 30



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, 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:

- Preferred—Apply 2 tons per acre dolomitic limestone (92 lbs./1000 sq.ft.) and 600 lbs per acre 10-10-10 fertilizer (14 lbs./1000 sq.ft.) before seeding. Harrow or disc into upper three inches of soil. At the time of seeding, apply 400 lbs. per acre 30-0-0 ureaform fertilizer (9 lbs./1000 sq.ft.).
- Acceptable—Apply 2 tons per acre dolomitic limestone (92 lbs./1000 sq.ft.) and apply 1000 lbs per acre 10-10-10 fertilizer (23 lbs./1000 sq.ft.) before seeding. Harrow or disc into upper three inches of soil.

SEEDING: For the periods March 1 thru April 30, and August 1 thru October 15, seed with 60 lbs. per acre (1.4 lbs./1000 sq.ft.) of Kentucky 31 Tall Fescue. For the period May 1 thru July 31, seed with 60 lbs. Kentucky 31 Tall Fescue per acre and 2 lbs. per acre (.05 lbs./1000 sq.ft.) of weeping lovegrass. During the period of October 16 thru February 28, protect site by applying 2 tons per acre well anchored straw mulch and seed as soon as possible in the spring, or use sod.

MULCHING: Apply 1 1/2 to 2 tons per acre (70 to 90 lbs./1000 sq.ft.) of unrotted small grain straw immediately after seeding. Anchor mulch immediately after application using mulch anchoring tool or 218 gallons per acre (5 gal./1000 sq.ft.) of emulsified asphalt on flat areas. On slopes 8 feet or higher, use 348 gallons per acre (8 gal./1000 sq.ft.) for anchoring.

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

21.0 STANDARDS AND SPECIFICATIONS FOR TOPSOIL

Definition
Placement of topsoil over a prepared subsoil prior to establishment of permanent vegetation.

Purpose
To provide a suitable soil medium for vegetable growth. Soils of concern have low moisture content, low nutrient levels, low pH, materials toxic to plants, and/or unacceptable soil gradation.

Conditions Where Practice Applies

- This practice is limited to areas having 2:1 or flatter slopes where:
 - The texture of the exposed subsoil/parent material is not adequate to produce vegetative growth.
 - 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.
 - The original soil to be vegetated contains material toxic to plant growth.
 - The soil is so acidic that treatment with limestone is not feasible.
- 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.

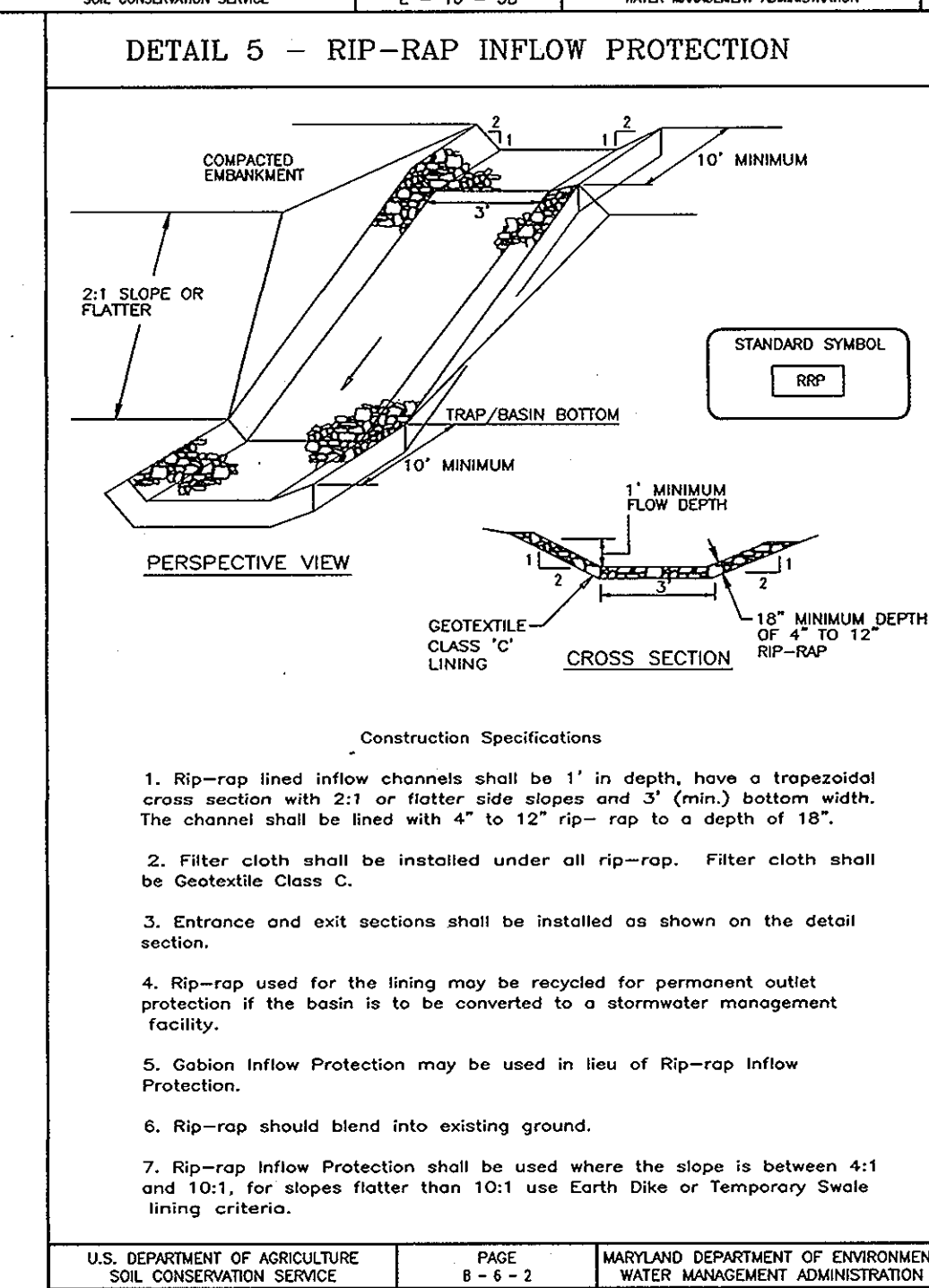
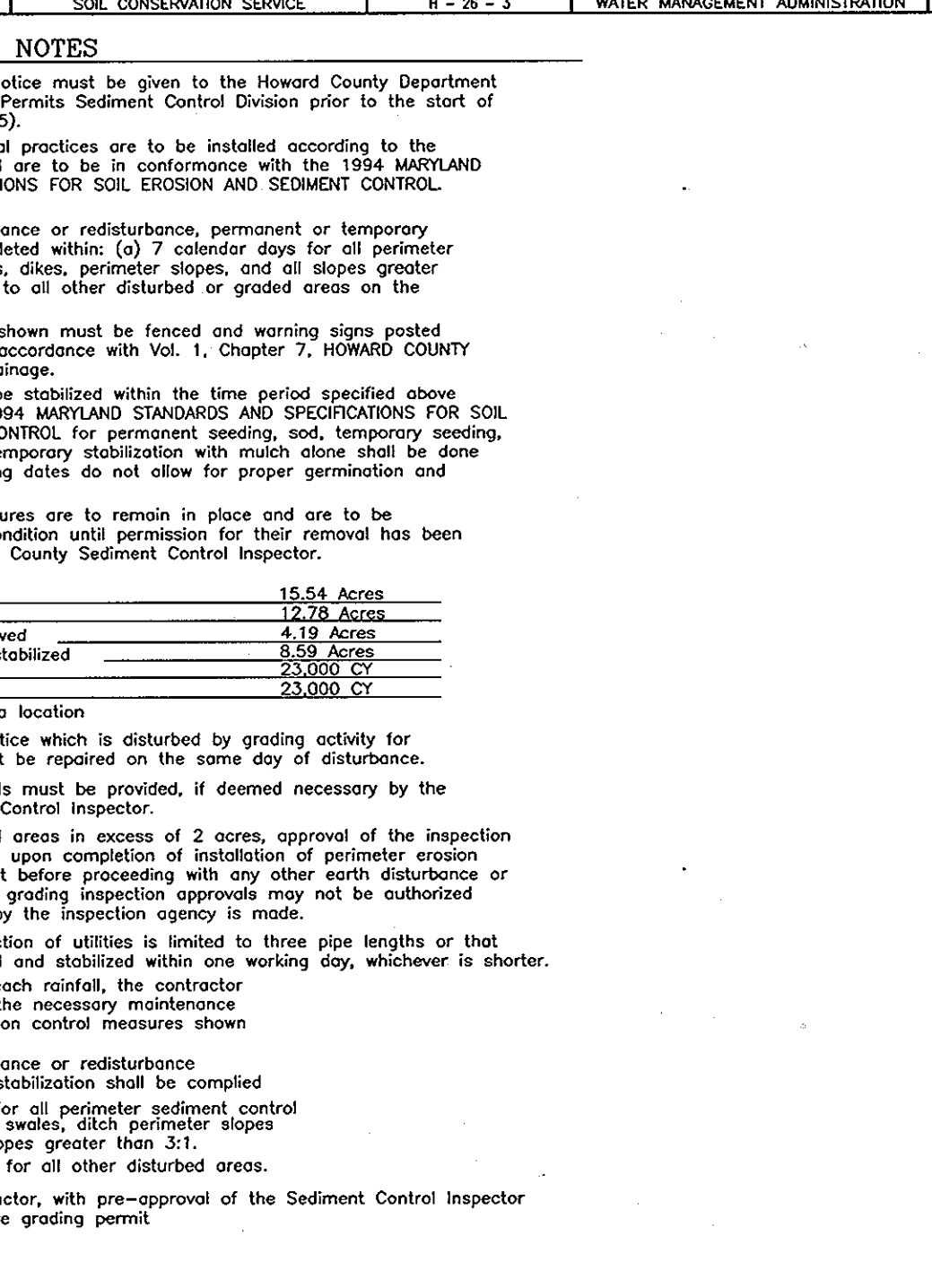
Construction and Material Specifications

- Topsoil salvaged from the existing site may be used provided that it meets the standards 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 shown in the Soil Survey published by USDA-SCS in cooperation with Maryland Agricultural Experiment Station.
- Topsoil Specifications - Soil to be used as topsoil must meet the following:
 - 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 and 1/2" in diameter.
 - Topsoil must be free of plants or plant parts such as Bermuda grass, quackgrass, Johnsongrass, nutsedge, poison ivy, thistle, or others as specified in this plan.
 - Where the subsoil is either highly acidic or composed of heavy clays, ground limestone shall be spread at the rate of 4-8 tons/acre (200-400 pounds per 1,000 square feet) prior to the placement of topsoil. Lime shall be distributed uniformly over designated areas and worked into the soil in conjunction with tillage operations as described in the following procedures.
- For sites having disturbed areas under 5 acres:
 - Place topsoil (if required) and apply soil amendments as specified in 20.0 Vegetative Stabilization - Section I Vegetative Stabilization Methods and Materials.

SEDIMENT CONTROL NOTES

- A minimum of 48 hours notice must be given to the Howard County Department of Inspection, License and Permits Sediment Control Division prior to the start of any construction (313-1805).
- All vegetation and structural practices are to be installed according to the provisions of this plan and are to be in conformance with the 1994 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL, and revisions thereto.
- Following initial soil disturbance or redistribution, permanent or temporary stabilization shall be completed within (a) 7 calendar days for all perimeter sediment control structures, dikes, perimeter slopes, and all slopes greater than 3:1, (b) 14 days as to all other disturbed or graded areas on the project site.
- All sediment traps/basins must be fenced and warning signs posted around their perimeter in accordance with Vol. 1, Chapter 7, HOWARD COUNTY DESIGN MANUAL, Storm Drainage.
- All disturbed areas must be stabilized within the time period specified above in accordance with the 1994 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL for permanent seeding, sod, temporary seeding, and mulching (Sec. G). Temporary stabilization with mulch alone shall be done when recommended seeding dates do not allow for proper germination and establishment of grasses.
- 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.
- Site Analysis:

| | |
|----------------------------|-------------|
| Total Area | 15.54 Acres |
| Area Disturbed | 17.72 Acres |
| Area to be roofed or paved | 4.19 Acres |
| Total Cut | 5.99 Acres |
| Total Fill | 24,000 CY |
- Off-site waste/borrow area location
- Any sediment control practice which is disturbed by grading activity for placement of utilities must be repaired on the same day of disturbance.
- Additional sediment controls must be provided, if deemed necessary by the Howard County Sediment Control Inspector.
- On all sites with disturbed areas in excess of 2 acres, approval of the inspection agency shall be requested upon completion 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.
- Trenches for the construction of utilities is limited to three pipe lengths or that which shall be back-filled and stabilized within one working day, whichever is shorter.
- During grading and after each rainfall, the contractor shall inspect and provide the necessary maintenance on the sediment and erosion control measures shown hereon.
- Following initial soil disturbance or redistribution permanent or temporary stabilization shall be completed with:
 - A 7 calendar days for all perimeter sediment control structures, dikes, swales, ditch perimeter slopes and all slopes greater than 3:1.
 - 14 calendar days for all other disturbed areas.
- To be determined by contractor, with pre-approval of the Sediment Control Inspector with an approved and active grading permit.



TEMPORARY SEEDING NOTES

SEEDBED 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./1000 sq.ft.)

SEEDING: For periods March 1 thru April 30 and from August 15 thru November 15, seed with 2 1/2 bushel per acre of annual ryegrass (3.2 lbs./1000 sq.ft.) For the period May 1 thru August 14, seed with 3 lbs. per acre of weeping lovegrass (.07 lbs./1000 sq.ft.). For the period November 1 thru February 28, protect site by applying 2 tons per acre of well anchored straw mulch and seed as soon as possible in the spring, or use sod.

MULCHING: Apply 1 1/2 to 2 tons per acre (70 to 90 lbs./1000 sq.ft.) of unrotted small grain straw immediately after seeding. Anchor mulch immediately after application using mulch anchoring tool or 218 gallons per acre (5 gal./1000 sq.ft.) of emulsified asphalt on flat areas. On slopes 8 feet or higher, use 348 gallons per acre (8 gal./1000 sq.ft.) for anchoring.

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

EROSION AND SEDIMENT CONTROL

Construction operations will be carried out in such a manner that erosion will be controlled and water and air pollution minimized. State and local laws concerning pollution abatement will be followed. Construction plans shall detail erosion and sediment control measures to be employed during the construction process.

OWNER/DEVELOPER

GLEN MAR UNITED METHODIST CHURCH
8430 GLENMAR ROAD
ELLCOTT CITY, MD 21043
AL HAMMER
410-465-4995

CARE OF WATER DURING CONSTRUCTION

All work on permanent structures shall be carried out in areas free from water. The Contractor shall construct and maintain all temporary dikes, levees, cofferdams, drainage channels, and stream diversions necessary to protect the areas to be occupied by the permanent works. The contractor shall also furnish, install, operate, and maintain all necessary pumping and other equipment required for removal of water from the various parts of the work and for maintaining the excavations, foundation, and other parts of the work free from water as required or directed by the engineer for constructing each part of the work. After having served their purpose, all temporary protective works shall be removed or leveled and graded to the extent required or prevent obstruction in any degree whatsoever of the flow of water to the spillway or outlet works and so as not to interfere in any way with the operation or maintenance of the structure. Stream diversions shall be maintained until the full flow can be passed through the permanent works. The removal of water from the required excavation and the foundation shall be accomplished in a manner and to the extent that will maintain stability of the excavated slopes and bottom of required excavations and will allow satisfactory performance of all construction operations. During the placing and compacting of material in required excavations, the level of the locations being raised shall be maintained below the bottom of the excavation at such locations which may require draining the water to pumps from which the water shall be pumped.

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

BY THE DEVELOPER:
I HEREBY CERTIFY THAT ALL DEVELOPMENT AND/OR CONSTRUCTION WILL BE DONE IN ACCORDANCE WITH THESE PLANS, AND THAT ANY RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A WORKABLE PLAN BASED ON MY PERSONAL KNOWLEDGE OF THE SITE CONDITIONS. THIS PLAN WAS PREPARED IN ACCORDANCE WITH THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT. I HAVE NOTIFIED THE DEVELOPER THAT I AM A REGISTERED PROFESSIONAL ENGINEER AND I SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION.

BY THE ENGINEER:
I HEREBY CERTIFY THAT THIS PLAN FOR POND CONSTRUCTION, EROSION AND SEDIMENT CONTROL REPRESENTS A PRACTICAL AND WORKABLE PLAN BASED ON MY PERSONAL KNOWLEDGE OF THE SITE CONDITIONS. THIS PLAN WAS PREPARED IN ACCORDANCE WITH THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT. I HAVE NOTIFIED THE DEVELOPER THAT I AM A REGISTERED PROFESSIONAL ENGINEER AND I SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION.

SEQUENCE OF CONSTRUCTION

| NO. | DESCRIPTION | DURATION |
|-----|---|----------|
| 1. | Obtain grading permit. | 1 DAY |
| 2. | Notify Howard County Bureau of Inspections and Permits (313-1805) of least 24 hours before starting any work. This plan shall not be permitted until the F-04-166 plan is completed. | 3 DAYS |
| 3. | Contract Stabilization Structures, Clear and grub remaining sediment control devices. | 1 WEEK |
| 4. | Install all inlet and outlet structures. Clear and grub remaining sediment control devices. | 2 WEEKS |
| 5. | Contractor to first grade area to establish positive flow to basins and traps by installing drainage dikes. As grading continues, the contractor is to maintain positive flow to the basins at all times. Empty dust control measures as needed. | 2 WEEKS |
| 6. | With inspector's approval, clear and grub remainder of site to 100. | 1 WEEK |
| 7. | Install stormwater system with inlet protection devices. | 3 WEEKS |
| 8. | Direct outlet into Sediment Basin and remove trap #1. | 6 MONTHS |
| 9. | Begin constructing building. | 2 WEEKS |
| 10. | Begin utility construction. | 2 WEEKS |
| 11. | With curb and gutter in place, pave road and install sidewalks as shown on the plans. | 2 WEEKS |
| 12. | Complete paving, sidewalks, and retaining stabilization. | 2 DAYS |
| 13. | With inspector's approval (with road paving complete and contributing drainage areas stabilized) convert sediment basin to final stormwater management by excavating bottom of basin to design bottom. Remove dewatering devices from pond and install pond sediment management to be performed as shown on approved SWM plans. | 2 WEEKS |
| 14. | Install site landscaping. | 2 WEEKS |
| 15. | With inspector's approval, remove all remaining sediment control devices off-site. | 2 DAYS |

SOILS LEGEND

| SYMBOL | NAME / DESCRIPTION | HYDRIC | DEPTH TO WATER TABLE |
|--------|--|--------|----------------------|
| B-B2 | BRANDYWINE LOAM, 3 TO 8 PERCENT SLOPES, MODERATELY ERODED | - | 30" |
| B-03 | BRANDYWINE LOAM, 15 TO 25 PERCENT SLOPES, SEVERELY ERODED | - | 30" |
| luB | LUKA LOAM, LOCAL ALLUVIUM, 1-5 PERCENT SLOPES | - | 1.5'-3' |
| KeB2 | KELLY SILT LOAM, 3 TO 8 PERCENT SLOPES, MODERATELY ERODED | I | 1'-3' |
| LeB2 | LEGORE SILT LOAM, 3 TO 8 PERCENT SLOPES, MODERATELY ERODED | - | 20" |
| LeC2 | LEGORE SILT LOAM, 8 TO 15 PERCENT SLOPES, MODERATELY ERODED | - | 20" |
| MrE | MONTALTO AND RELAY SOILS, 15 TO 45 PERCENT SLOPES | - | 20" |
| NeB2 | NESHAMINY SILT LOAM, 3 TO 8 PERCENT SLOPES, MODERATELY ERODED | - | 20" |
| NcC2 | NESHAMINY SILT LOAM, 8 TO 15 PERCENT SLOPES, MODERATELY ERODED | - | 20" |
| SiC2 | SASSAFRAS GRAVELLY SANDY LOAM, 5-10% SLOPES, MODERATELY ERODED | - | 5" |
| WbB | WATCHUNG SILT LOAM, 3 TO 8 PERCENT SLOPES | X | 0'-1" |

X=HYDRIC SOIL
I=INCLUSIONAL SOIL

30.0 DUST CONTROL

Definition
To prevent blowing and movement of dust from exposed soil surfaces, reduce on and off-site damage, health hazards, and improve traffic safety.

Purpose
This practice is applicable to areas subject to dust blowing and movements where on and off-site damage is likely without treatment.

Conditions Where Practice Applies

Temporary Methods:

- Mulches - See standards for vegetative stabilization with mulches only. Mulch should be crimped or tacked to prevent blowing.
- Vegetative Cover - See standards for temporary vegetative cover.
- Tillage - To roughen surface and bring clods to the surface. This is an emergency measure which should be used before soil blowing starts. Begin plowing on windward side of site. Chisel-type plows spaced about 12" apart, spring-toothed harrows, and similar plows are examples of equipment which may produce the desired effect.
- Irrigation - This is generally done as an emergency treatment. Site is sprinkled with water until the surface is moist. Repeat as needed. At no time should the site be irrigated to the point that runoff begins to flow.
- Barriers - Solid board fences, silt fences, snow fences, burlap fences, straw bales, and similar material can be used to control air currents and soil blowing. Barriers placed at right angles to prevailing currents at intervals of about 10 times their height are effective in controlling soil blowing.
- Calcium Chloride - Apply at rates that will keep surface moist. May need retreatment.

Permanent Methods

- Permanent Vegetation - See standards for permanent vegetative cover, and permanent stabilization with sod. Existing trees or large shrubs may afford valuable protection if left in place.
- Topsoiling - Covering with less erosive soil materials. See standards for topsoiling.
- Stone - Cover surface with crushed stone or coarse gravel.

SITE DEVELOPMENT PLAN

SEDIMENT AND EROSION CONTROL NOTES AND DETAILS

GLEN MAR UNITED METHODIST CHURCH PHASE I AND III

TAX MAP 31 BLOCK 1 & 8 PARCEL '10', LOTS 1-5
5TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND

ROBERT H. VOGEL ENGINEERING, INC.

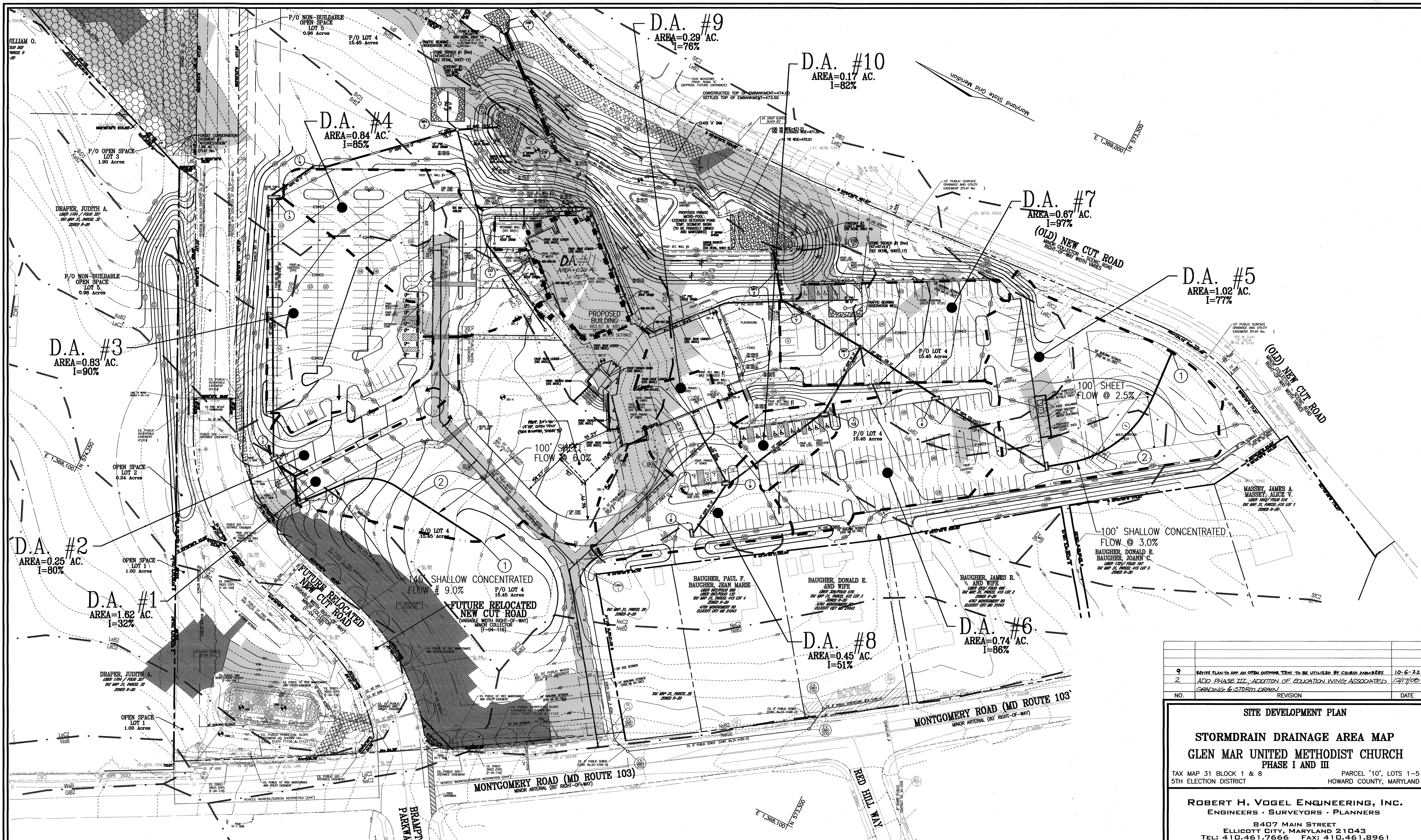
ENGINEERS - SURVEYORS - PLANNERS

8407 MAIN STREET
ELLCOTT CITY, MARYLAND 21043
TEL: 410.461.7666 FAX: 410.461.8961

DESIGN BY: RHW
DRAWN BY: DZ
CHECKED BY: RHW
DATE: OCTOBER 2004
SCALE: AS SHOWN
W.O. NO.: 04-64

13 SHEET OF 30

11-1-09 AS-BUILT SDP-04-42



APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

Michael J. ... 11/17/04
 CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

Conita Kanata 12/10/04
 CHIEF, DIVISION OF LAND DEVELOPMENT DATE

David L. ... 12/11/04
 DIRECTOR DATE

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

USDA-NATURAL RESOURCES CONSERVATION SERVICE DATE

THESE PLANS FOR SMALL POND CONSTRUCTION, SOIL EROSION AND SEDIMENT CONTROL MEET THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT.

HOWARD S.C.D. DATE

BY THE DEVELOPER:

I/WE CERTIFY THAT ALL DEVELOPMENT AND/OR CONSTRUCTION WILL BE DONE IN ACCORDANCE TO THESE PLANS, AND THAT ANY RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF ATTENDANCE AT A DEPARTMENT OF THE ENVIRONMENT APPROVED TRAINING PROGRAM FOR THE CONTROL OF SEDIMENT AND EROSION BEFORE BEGINNING THE PROJECT. I SHALL ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION.

David L. ... 11 OCT 2004
 SIGNATURE OF DEVELOPER DATE

BY THE ENGINEER:

I HEREBY CERTIFY THAT THIS PLAN FOR POND CONSTRUCTION, EROSION AND SEDIMENT CONTROL REPRESENTS A PRACTICAL AND WORKABLE PLAN BASED ON MY PERSONAL KNOWLEDGE OF THE SITE CONDITIONS. THIS PLAN WAS PREPARED IN ACCORDANCE WITH THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT. I HAVE NOTIFIED THE DEVELOPER THAT HE/SHE MUST ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION.

Robert H. Vogel 12/11/04
 SIGNATURE OF ENGINEER DATE

OWNER/DEVELOPER
 GLEN MAR UNITED METHODIST CHURCH
 8430 GLENMAR ROAD
 ELLICOTT CITY, MD 21043
 AL HAMMER
 410-465-7125

| NO. | REVISION | DATE |
|-----|---|---------|
| 9 | REVISE PLAN TO ADD AN OPEN OUTDOOR TENT TO BE UTILIZED BY CHURCH MEMBERS | 10-6-22 |
| 2 | ADD PHASE III, ADDITION OF EDUCATION WING, ASSOCIATED GRADING & STORM DRAIN | 12/1/04 |

SITE DEVELOPMENT PLAN

STORMDRAIN DRAINAGE AREA MAP

GLEN MAR UNITED METHODIST CHURCH

PHASE I AND III

TAX MAP 31, BLOCK 1 & 8 PARCEL '10', LOTS 1-5
 5TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND

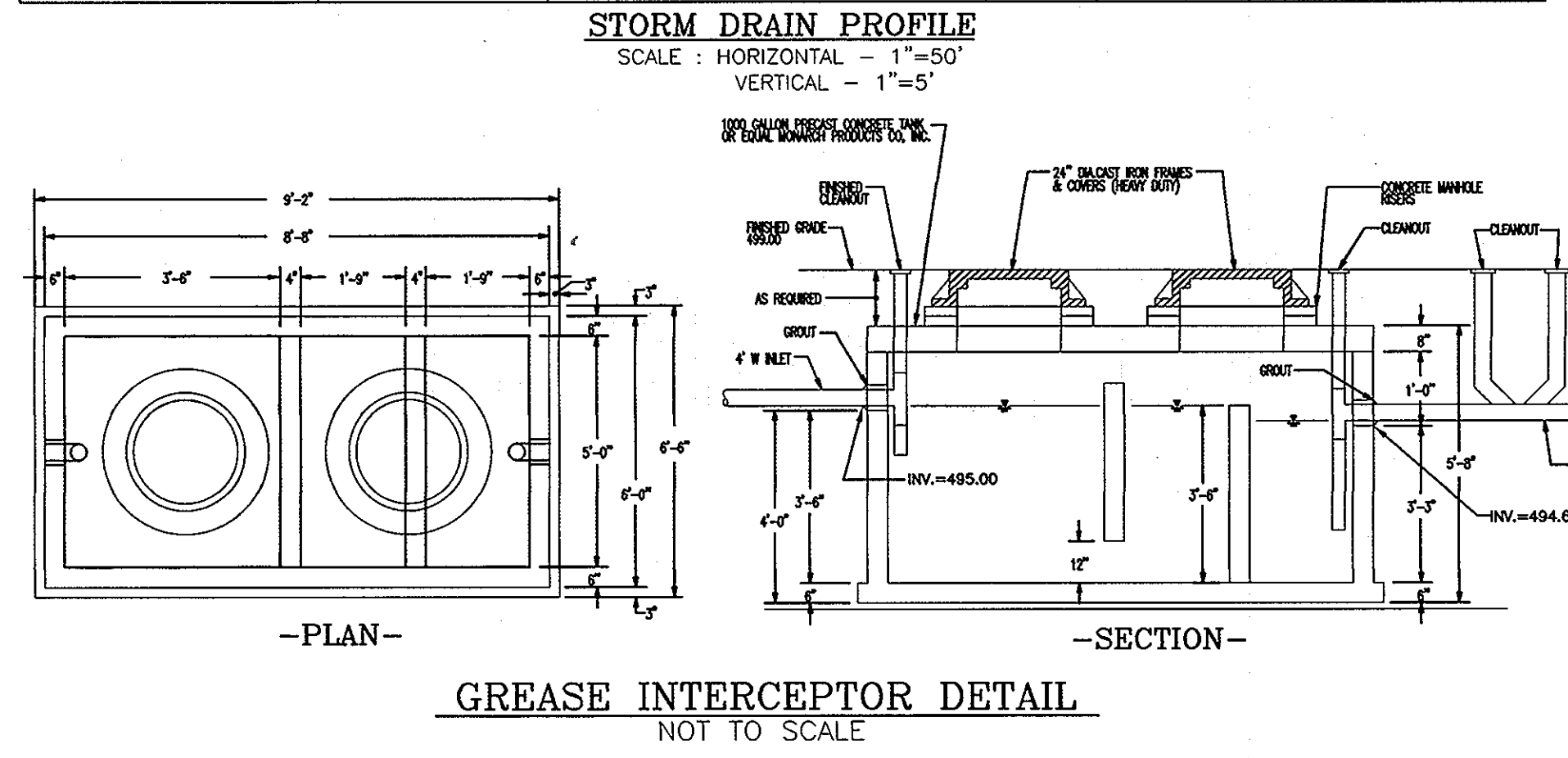
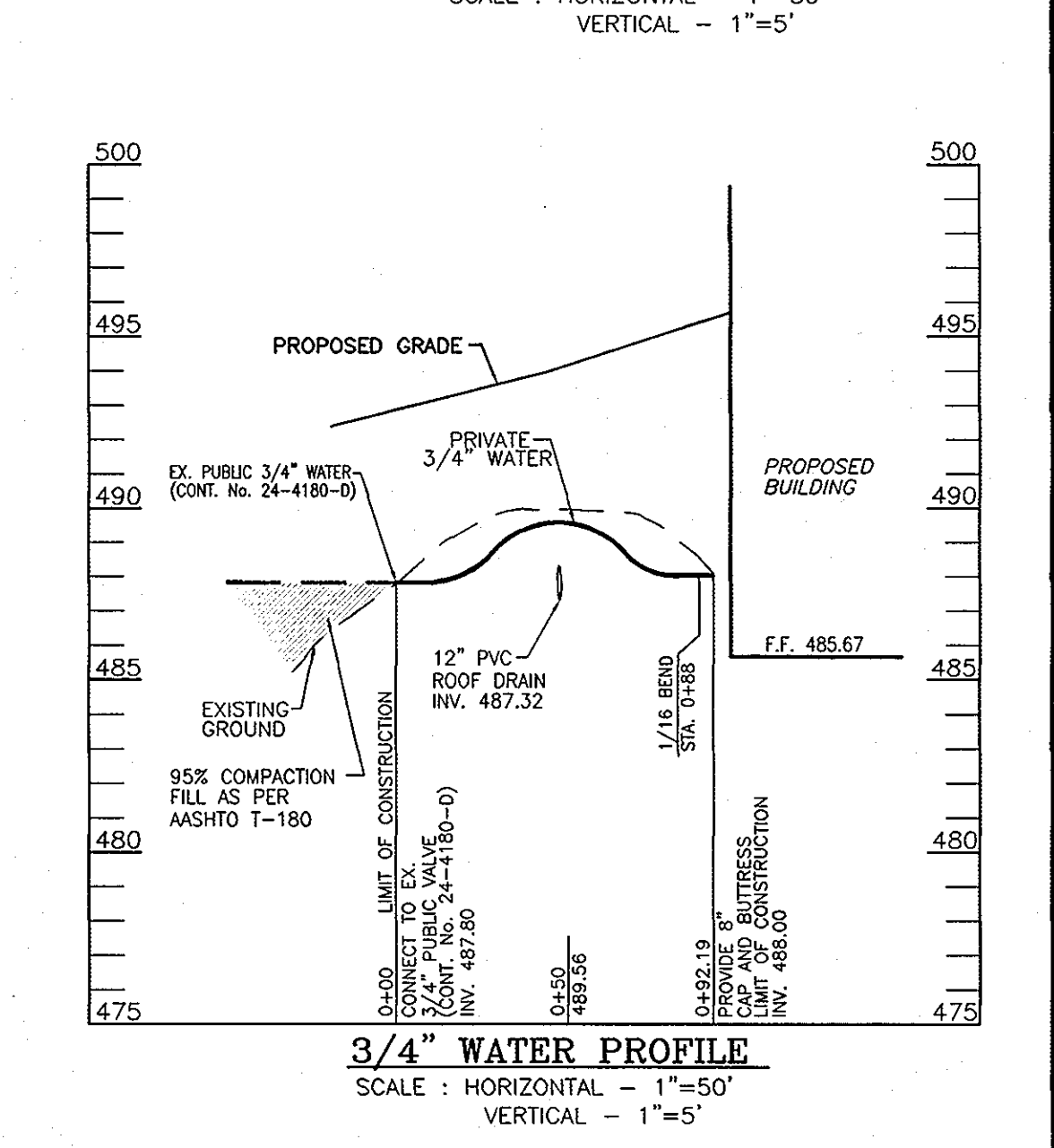
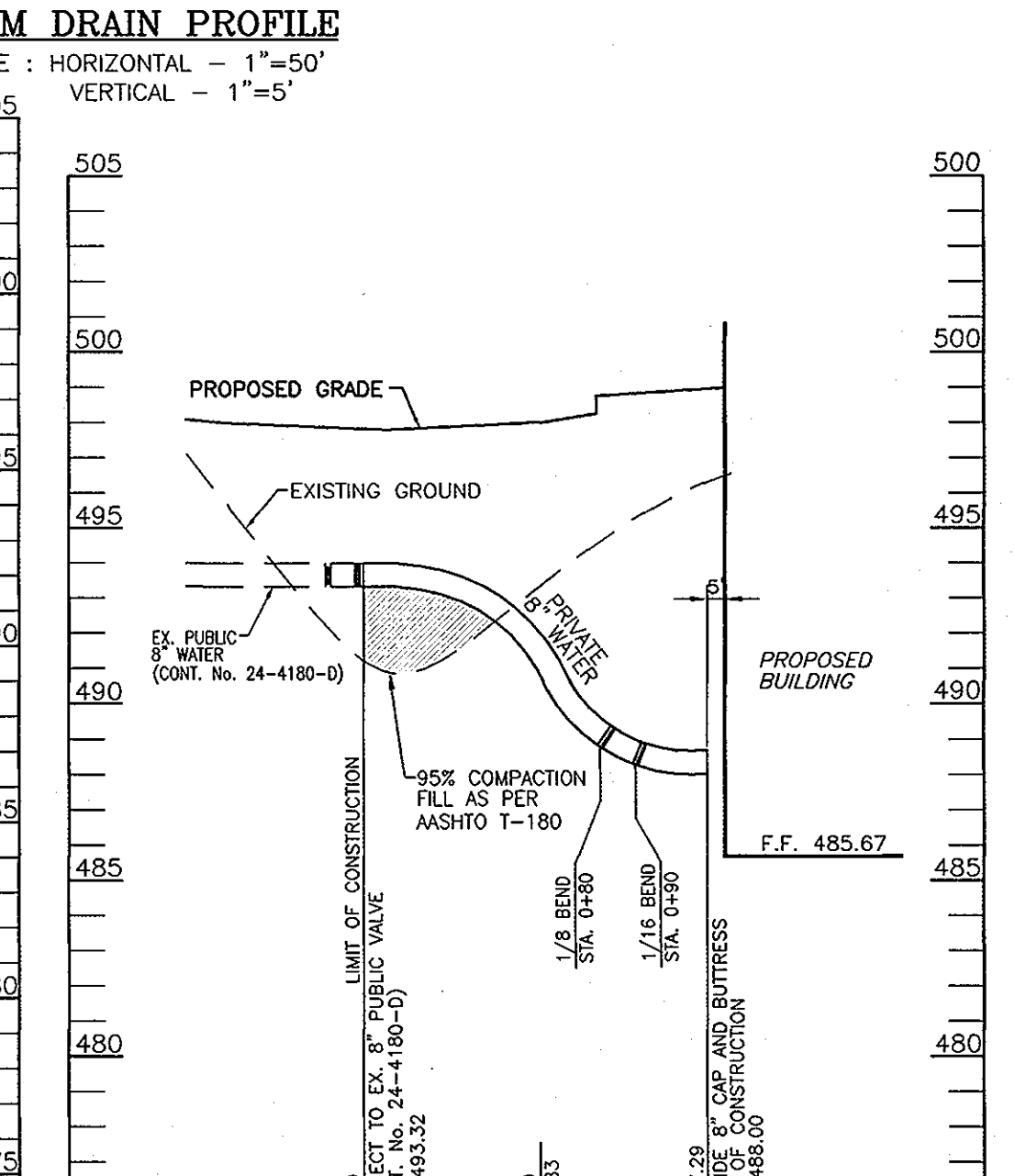
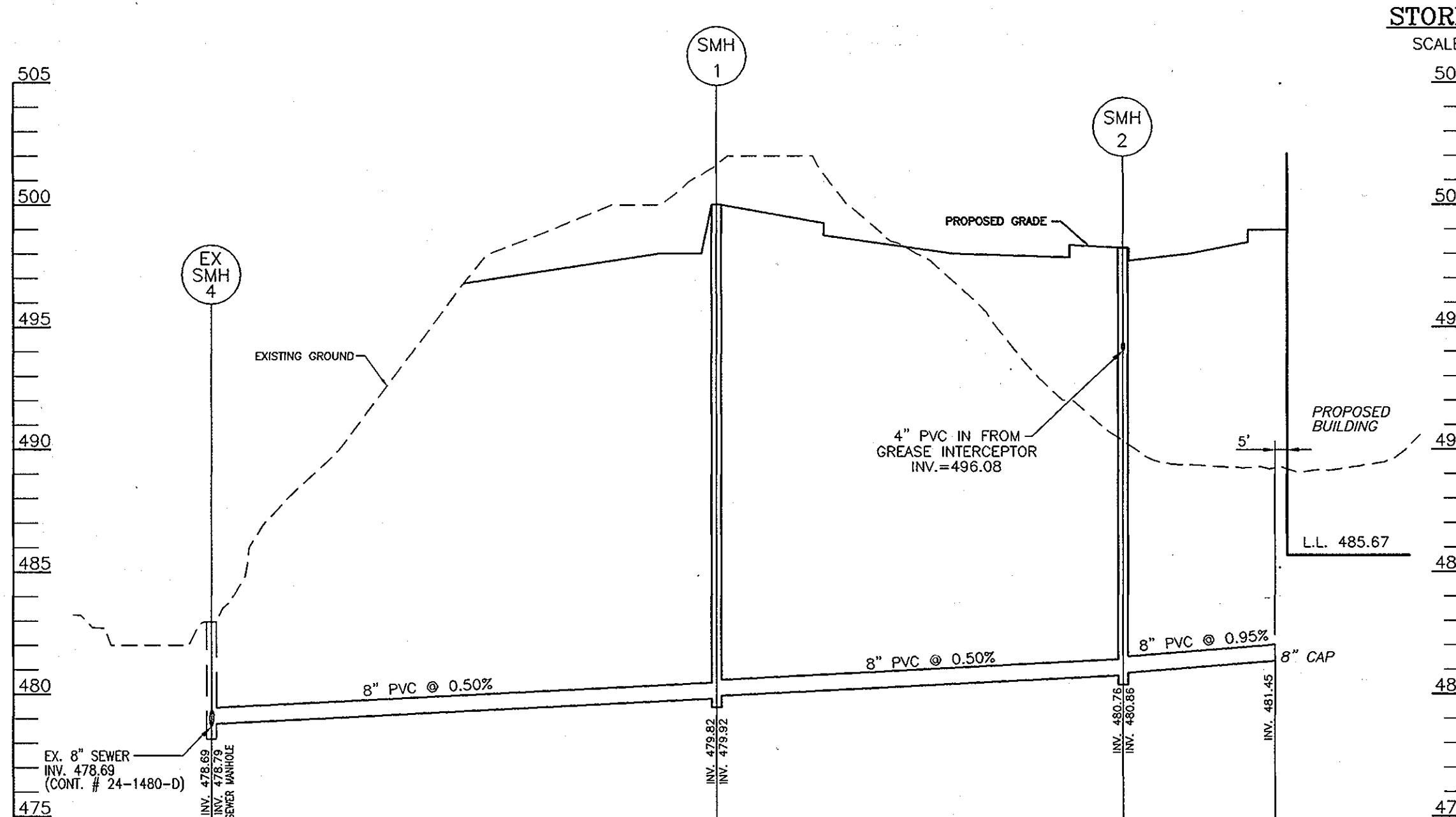
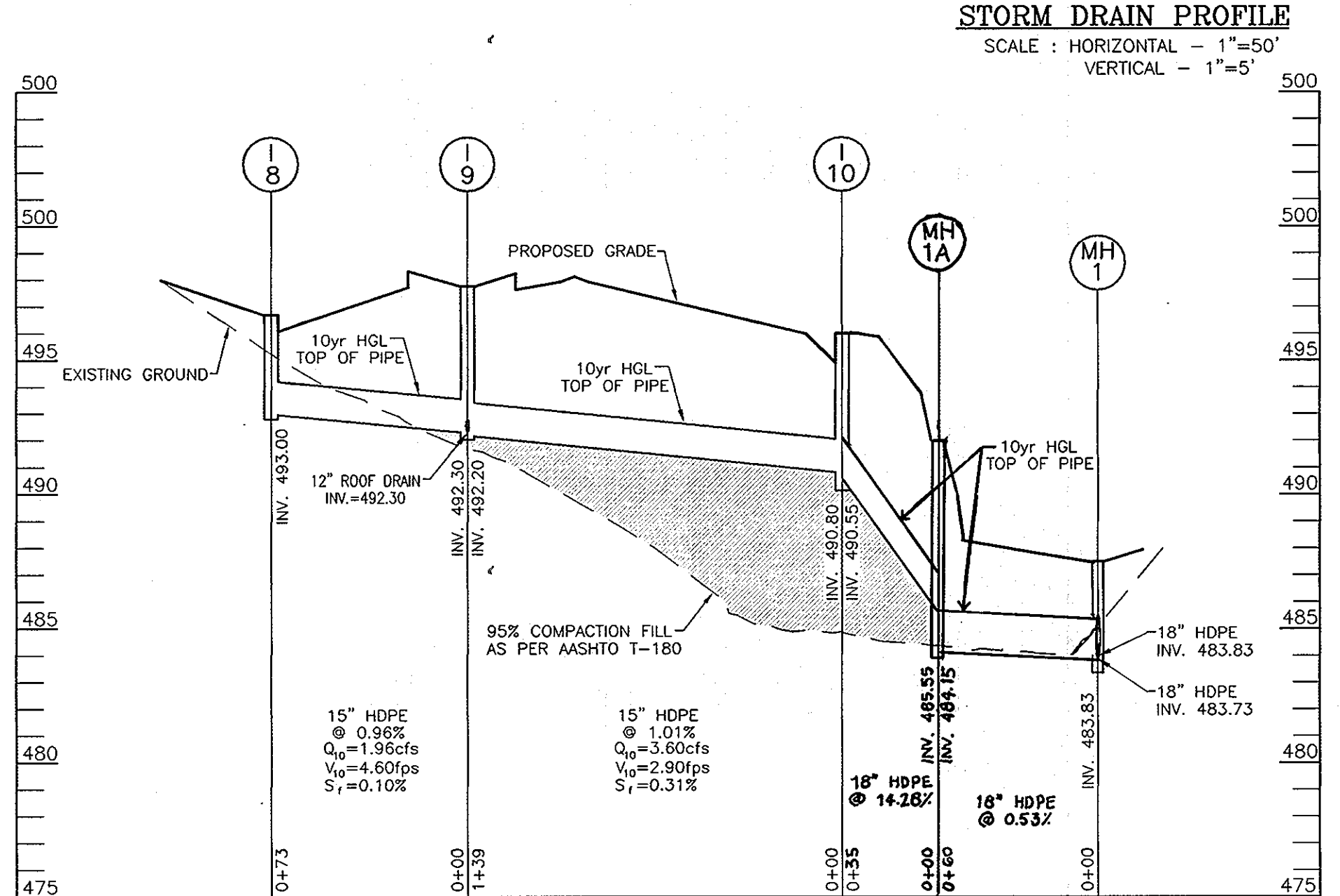
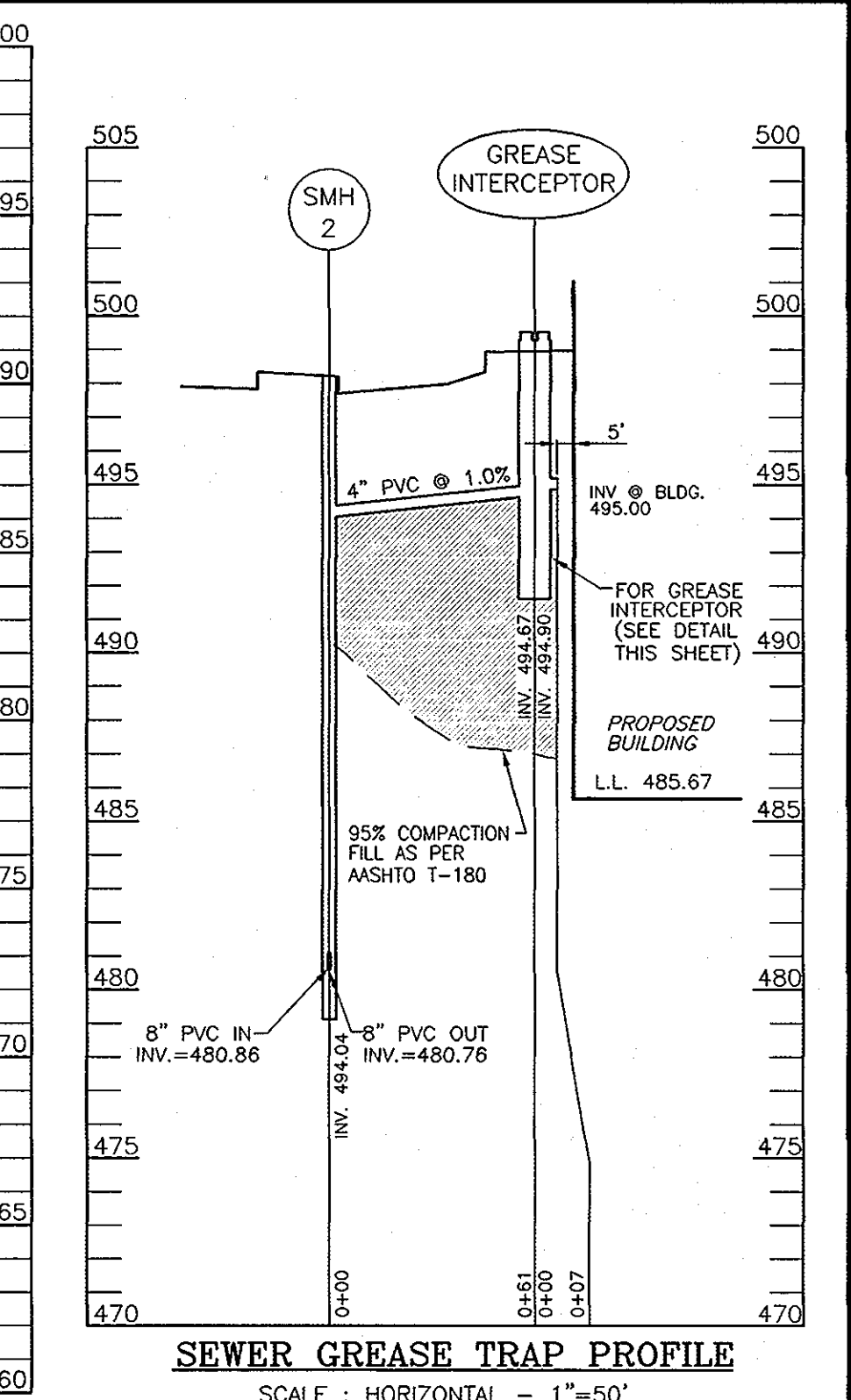
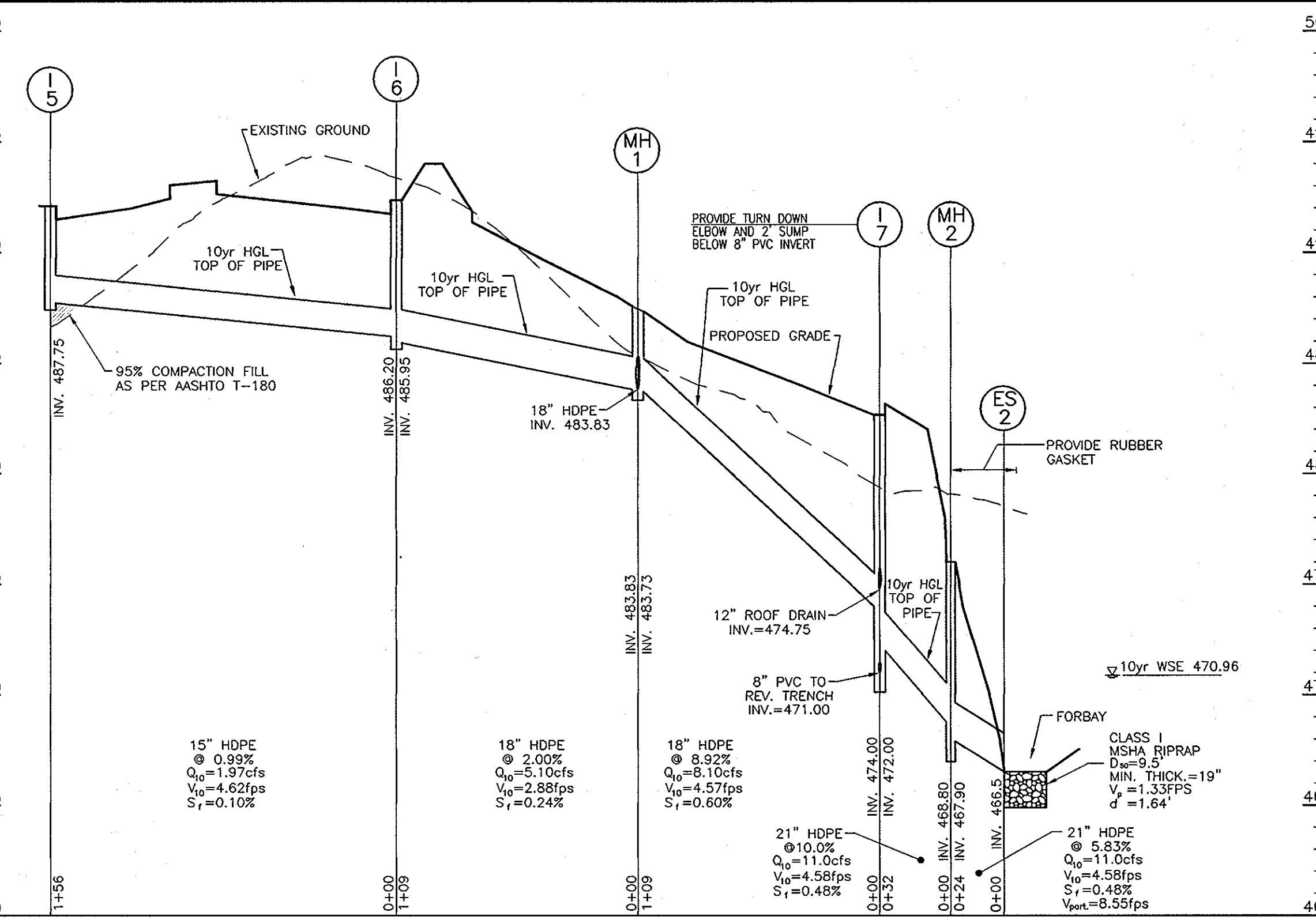
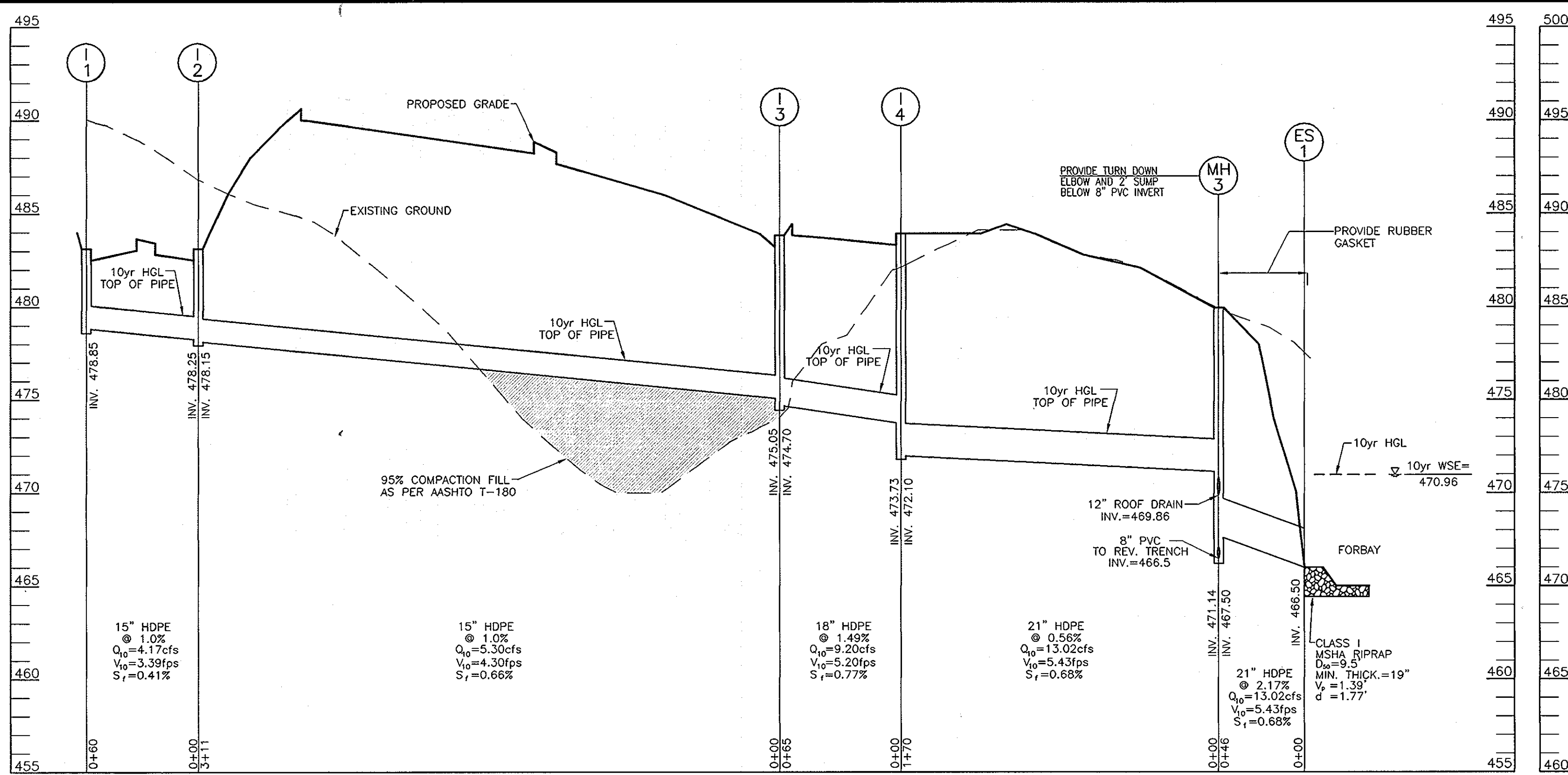
ROBERT H. VOGEL ENGINEERING, INC.
 ENGINEERS • SURVEYORS • PLANNERS

8407 MAIN STREET
 ELLICOTT CITY, MARYLAND 21043
 TEL: 410.461.7666 FAX: 410.461.8961

DESIGN BY: RHV
 DRAWN BY: DZ
 CHECKED BY: RHV
 DATE: OCTOBER, 2004
 SCALE: 1"=50'
 W.O. NO.: 04-64

14 SHEET OF 30

STATE OF MARYLAND
 ROBERT H. VOGEL, P.E. No. 16193



| SIZE | TYPE | LENGTH |
|------|------------------------------|--------|
| 15" | HDPE | 739 LF |
| 18" | HDPE | 378 LF |
| 21" | HDPE | 272 LF |
| 12" | PVC | 762 LF |
| 42" | RCPP, ASTM C-361, CLASS B-25 | 132 LF |
| 6" | PVC | 15 LF |
| 8" | PVC | 68 LF |
| 8" | PERFORATED PVC | 70 LF |

OWNER/DEVELOPER
GLENMAR UNITED METHODIST CHURCH
8430 GLENMAR RD
ELLCOTT CITY, MD 21043
AL HAMMER
(410) 465-4995

| NO. | TYPE | LOCATION | TOP ELEV. | INV. IN | INV. OUT | COMMENTS |
|-------|--------------------------|--------------------|------------|------------|------------|----------------------|
| I-1 | STANDARD 15" COG INLET | N 573992 E 1368183 | 483.20 | 478.85 | 478.85 | MD-374.51 |
| I-2 | TYPE 'A'-10" INLET | N 574043 E 1368215 | 483.20 | 478.25 | 478.15 | HO. CO. STD. R-4.02 |
| I-3 | STANDARD 15" COG INLET | N 574185 E 1368492 | 483.84 | 475.05 | 474.70 | MD-374.51 |
| I-4 | STANDARD 15" COG INLET | N 574151 E 1368549 | 483.94 | 473.73 | 472.10 | MD-374.51 |
| I-5 | TYPE 'A'-10" INLET | N 573217 E 1368619 | 492.10 | 487.75 | 487.75 | HO. CO. STD. R-4.02 |
| I-6 | TYPE 'A'-10" INLET | N 573369 E 1368632 | 492.35 | 486.20 | 485.95 | HO. CO. STD. R-4.02 |
| I-7 | DOUBLE S COMBINATION | N 573586 E 1368653 | 482.66 | 474.06 | 473.98 | HO. CO. STD. R-4.33 |
| I-8 | TYPE 'A'-10" INLET | N 573556 E 1368360 | 496.70 | 493.00 | 493.00 | HO. CO. STD. R-4.02 |
| I-9 | TYPE 'A'-10" INLET | N 573550 E 1368432 | 496.70 | 492.30 | 492.20 | HO. CO. STD. R-4.02 |
| I-10 | TYPE 'A'-10" INLET | N 573479 E 1368555 | 495.57 | 490.80 | 490.55 | HO. CO. STD. R-4.02 |
| MH-1 | STANDARD PRECAST MANHOLE | N 573477 E 1368647 | 487.50 | 483.83 | 483.73 | HO. CO. STD. G-5.12 |
| MH-2 | STANDARD PRECAST MANHOLE | N 573607 E 1368683 | 475.00 | 468.80 | 467.90 | HO. CO. STD. G-5.12 |
| MH-3 | STANDARD PRECAST MANHOLE | N 574024 E 1368663 | 479.70 | 469.88 | 469.50 | HO. CO. STD. G-5.12 |
| ES-1 | CONCRETE END SECTION | N 573980 E 1368689 | 466.50 | 466.50 | 466.50 | HO. CO. STD. SD-5.52 |
| ES-2 | CONCRETE END SECTION | N 573624 E 1368706 | 466.50 | 466.50 | 466.50 | HO. CO. STD. SD-5.52 |
| EW-1 | TYPE 'A' END WALL | N 573907 E 1368692 | SEE DETAIL | SEE DETAIL | SEE DETAIL | SEE DETAIL, SHEET 17 |
| HW-1 | TYPE 'A' HEADWALL | N 574023 E 1368792 | 464.00 | 459.00 | 459.00 | HO. CO. STD. SD-5.11 |
| CS-1 | CONTROL STRUCTURE | N 573921 E 1368704 | SEE DETAIL | SEE DETAIL | SEE DETAIL | SEE DETAIL, SHEET 16 |
| MH-1A | STANDARD PRECAST MANHOLE | N 573480 E 1368588 | 492.04 | 485.55 | 484.15 | HO. CO. STD. G-5.12 |

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING
 CHIEF, DEVELOPMENT ENGINEERING DIVISION
 CHIEF, DIVISION OF LAND DEVELOPMENT
 DIRECTOR

THESE PLANS HAVE BEEN REVIEWED FOR HOWARD SOIL CONSERVATION DISTRICT AND MEET THE TECHNICAL REQUIREMENTS FOR SMALL POND CONSTRUCTION, SOIL EROSION AND SEDIMENT CONTROL.
 USDA-NATURAL RESOURCES CONSERVATION SERVICE
 THESE PLANS FOR SMALL POND CONSTRUCTION, SOIL EROSION AND SEDIMENT CONTROL MEET THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT.

BY THE DEVELOPER:
 I HEREBY CERTIFY THAT ALL DEVELOPMENT AND/OR CONSTRUCTION WILL BE DONE IN ACCORDANCE TO THESE PLANS, AND THAT ANY RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF ATTENDANCE AT A DEPARTMENT OF THE ENVIRONMENT APPROVED TRAINING PROGRAM FOR THE CONTROL OF SEDIMENT AND EROSION BEFORE BEGINNING THE PROJECT. I SHALL ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION.
 David C. Eddy
 SIGNATURE OF DEVELOPER
 11 OCT 2004
 DATE

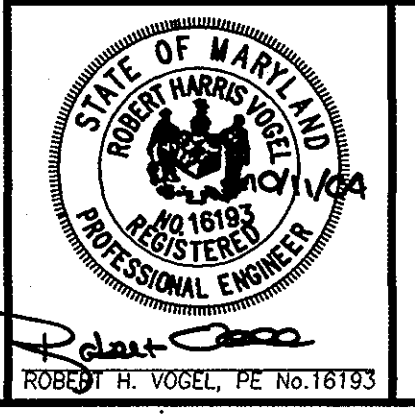
BY THE ENGINEER:
 I HEREBY CERTIFY THAT THIS PLAN FOR POND CONSTRUCTION, EROSION AND SEDIMENT CONTROL REPRESENTS A PRACTICAL AND WORKABLE PLAN BASED ON MY PERSONAL KNOWLEDGE OF THE SITE CONDITIONS. THIS PLAN WAS PREPARED IN ACCORDANCE WITH THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT. I HAVE NOTIFIED THE DEVELOPER THAT HE/SHE MUST ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION.
 Robert H. Vogel
 SIGNATURE OF ENGINEER
 10/11/04
 DATE

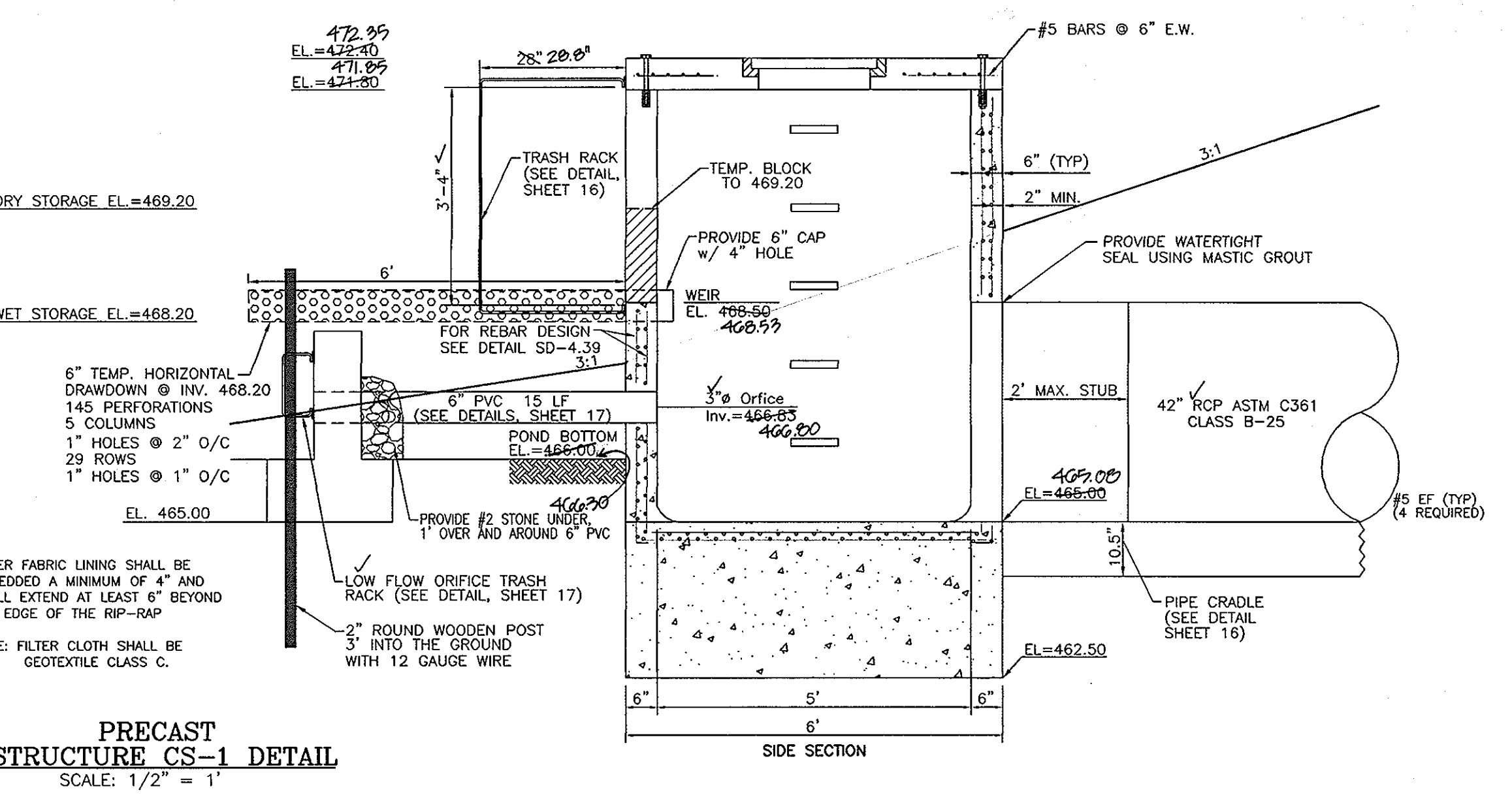
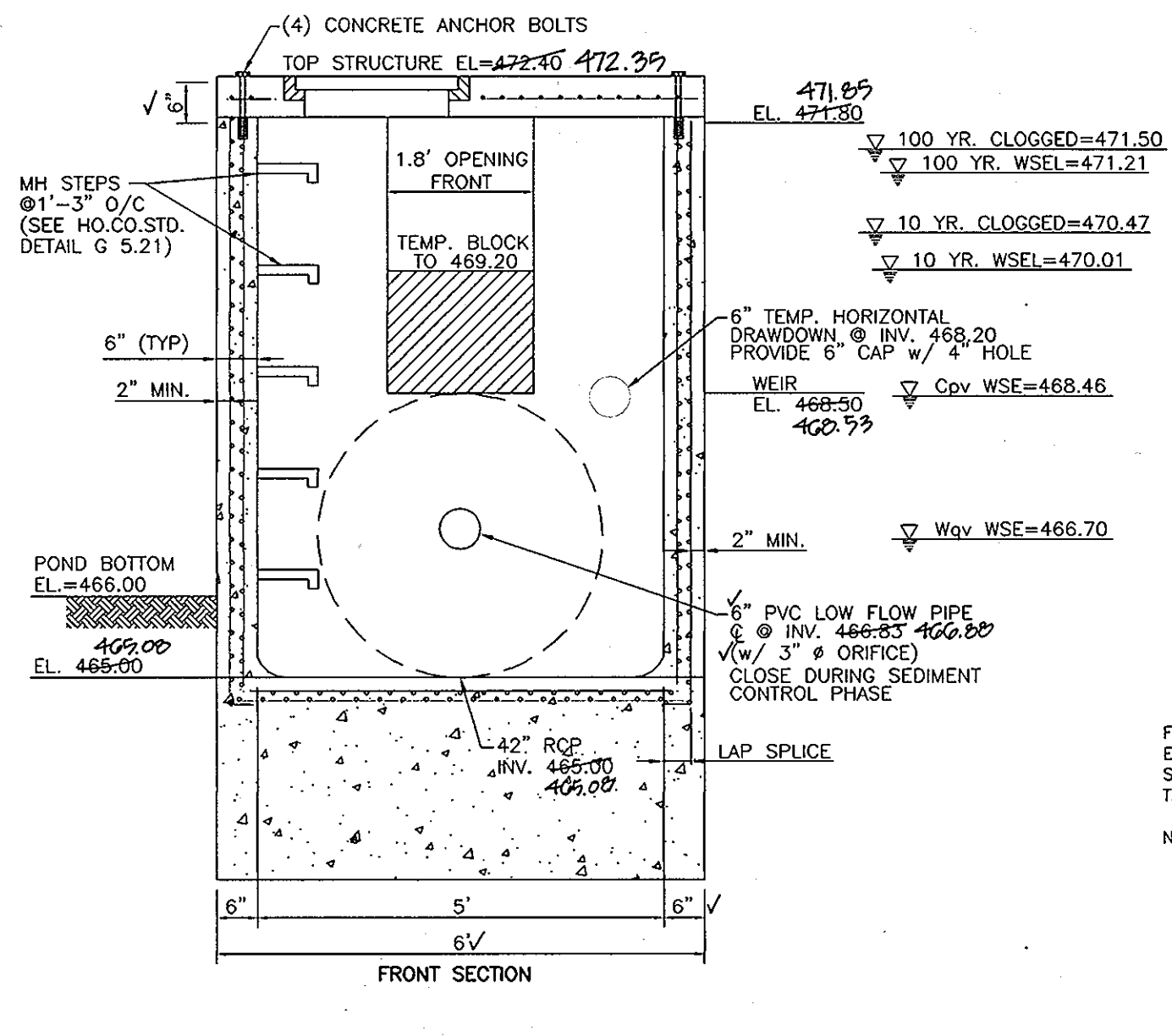
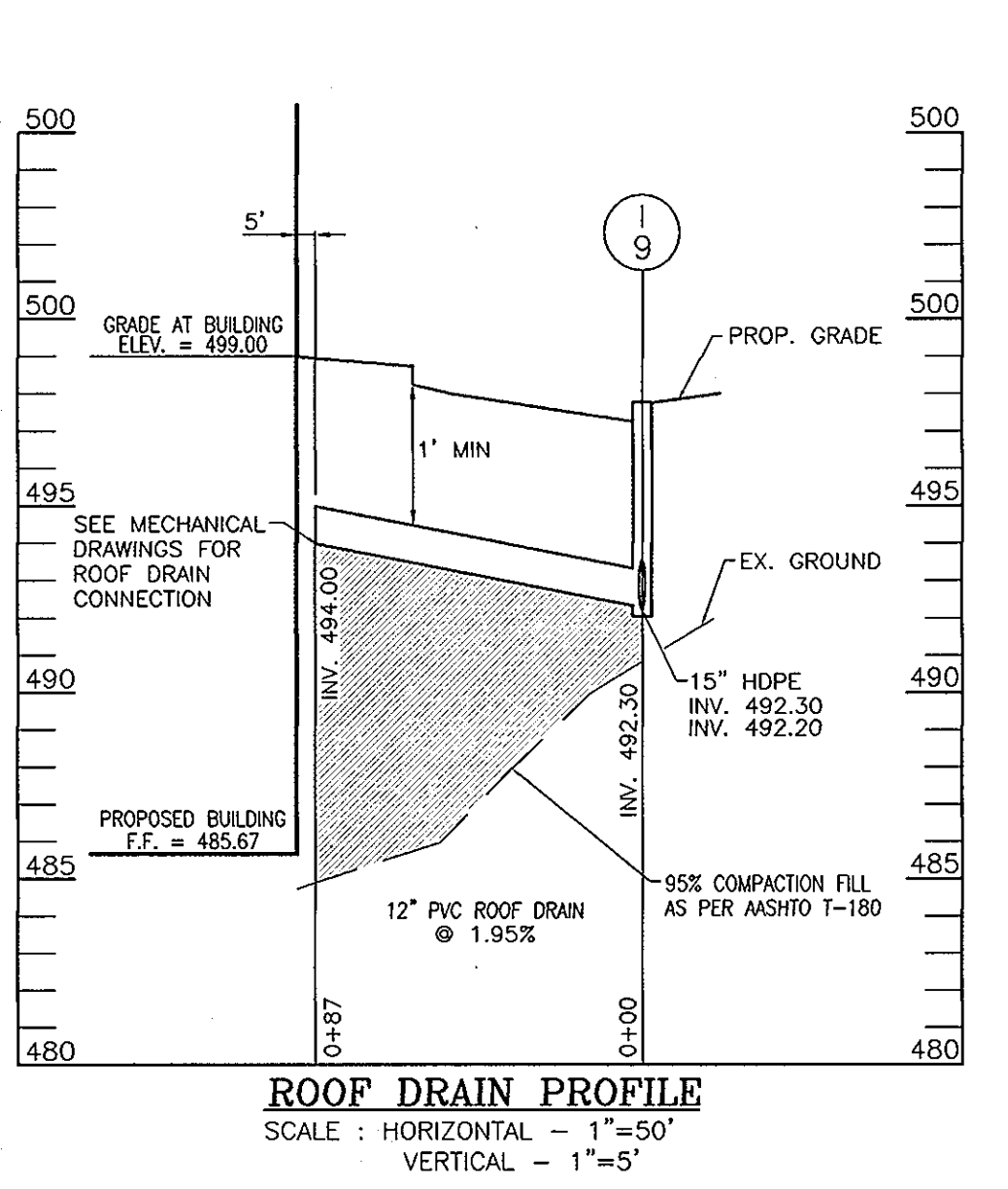
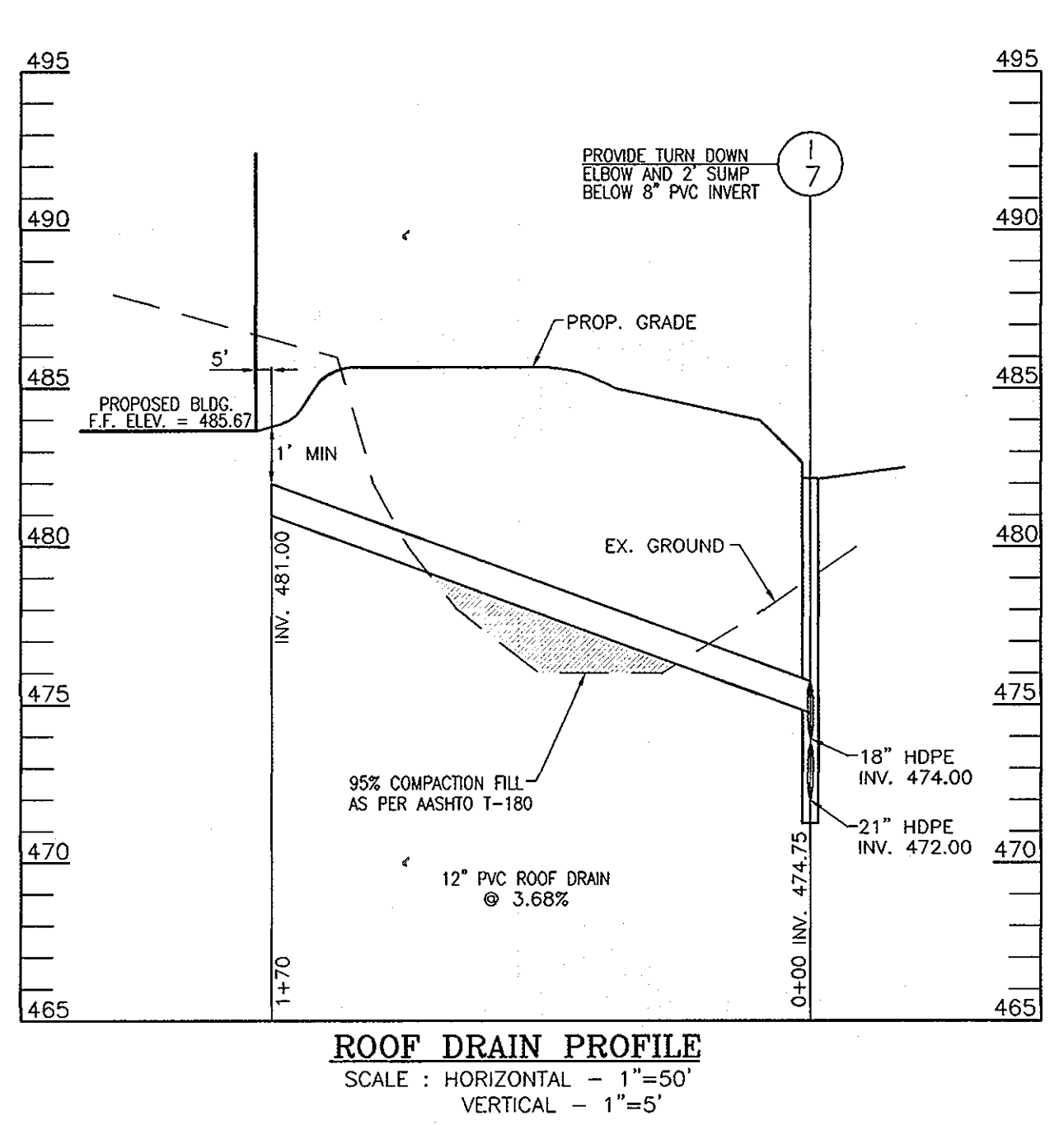
NOTE: 1. Top elevations are to the center of the structure at top of curb for Double Type 'S' Comb. Inlets, center top of grate for Double Type 'S' Inlet and top of Manhole cover for Precast Manholes.
 2. For top slab slopes see grading plan.
 3. See Architectural plans for roof drain details.

| NO. | REVISION | DATE |
|-----|--|---------|
| 1 | REMOVE PHASE III FROM PLANS. REMOVE ASSOCIATED ROOF DRAINS. ADD MANHOLE 1A. ADD PLAT RECORDING REFERENCES TO EXISTING EASEMENTS. REMOVE GENERAL NOTES 4D & 4I. | 6-28-04 |

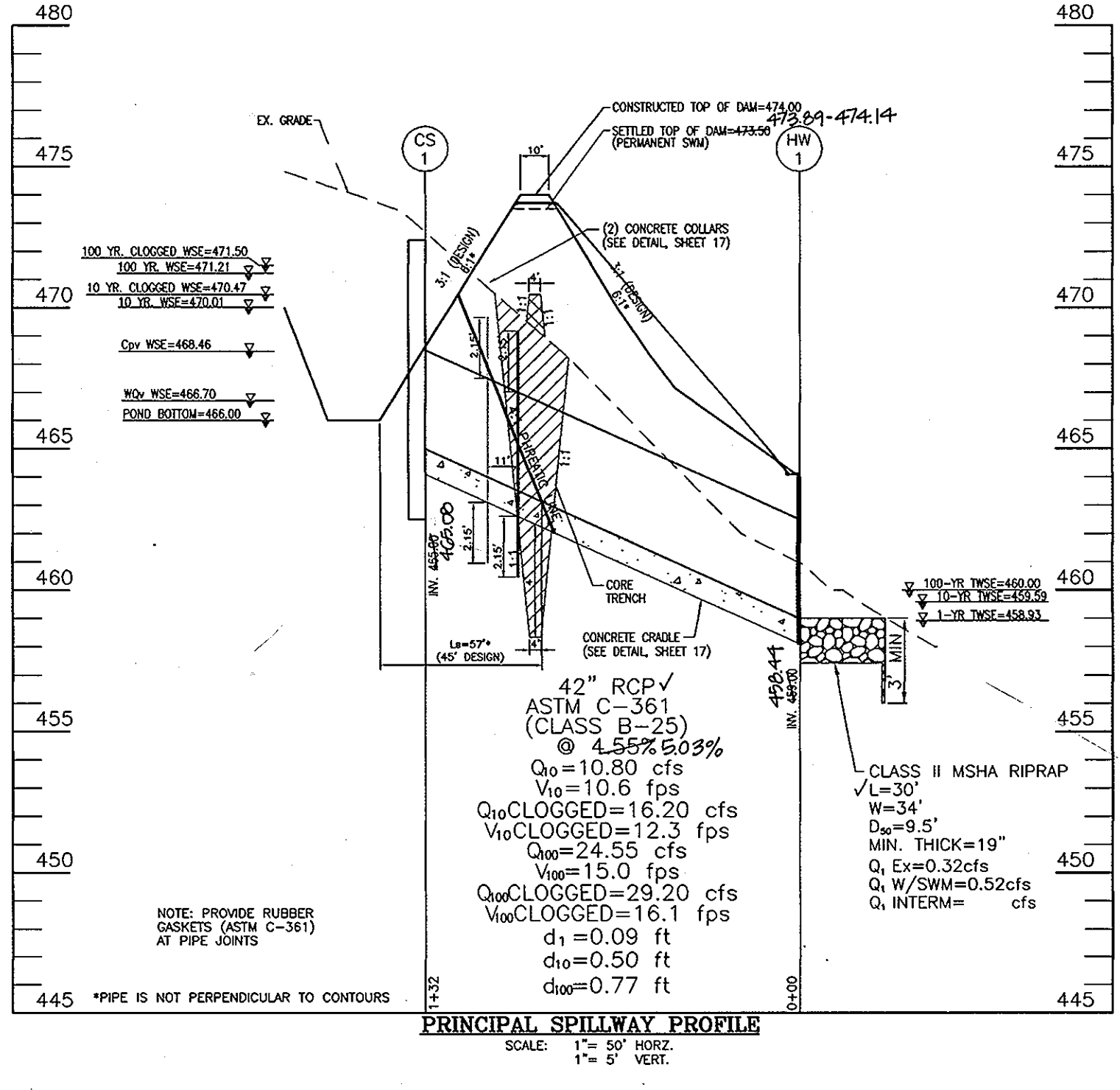
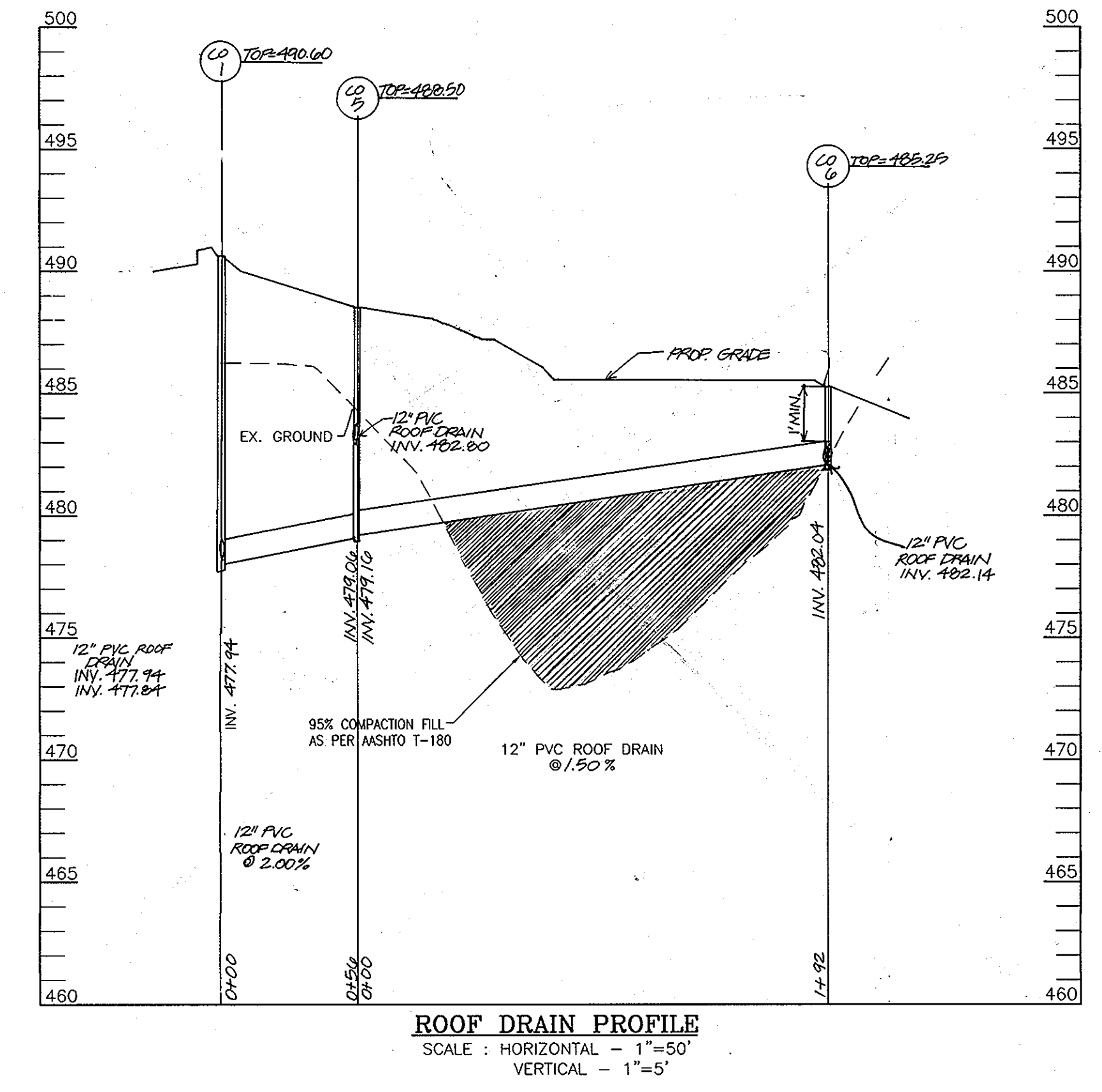
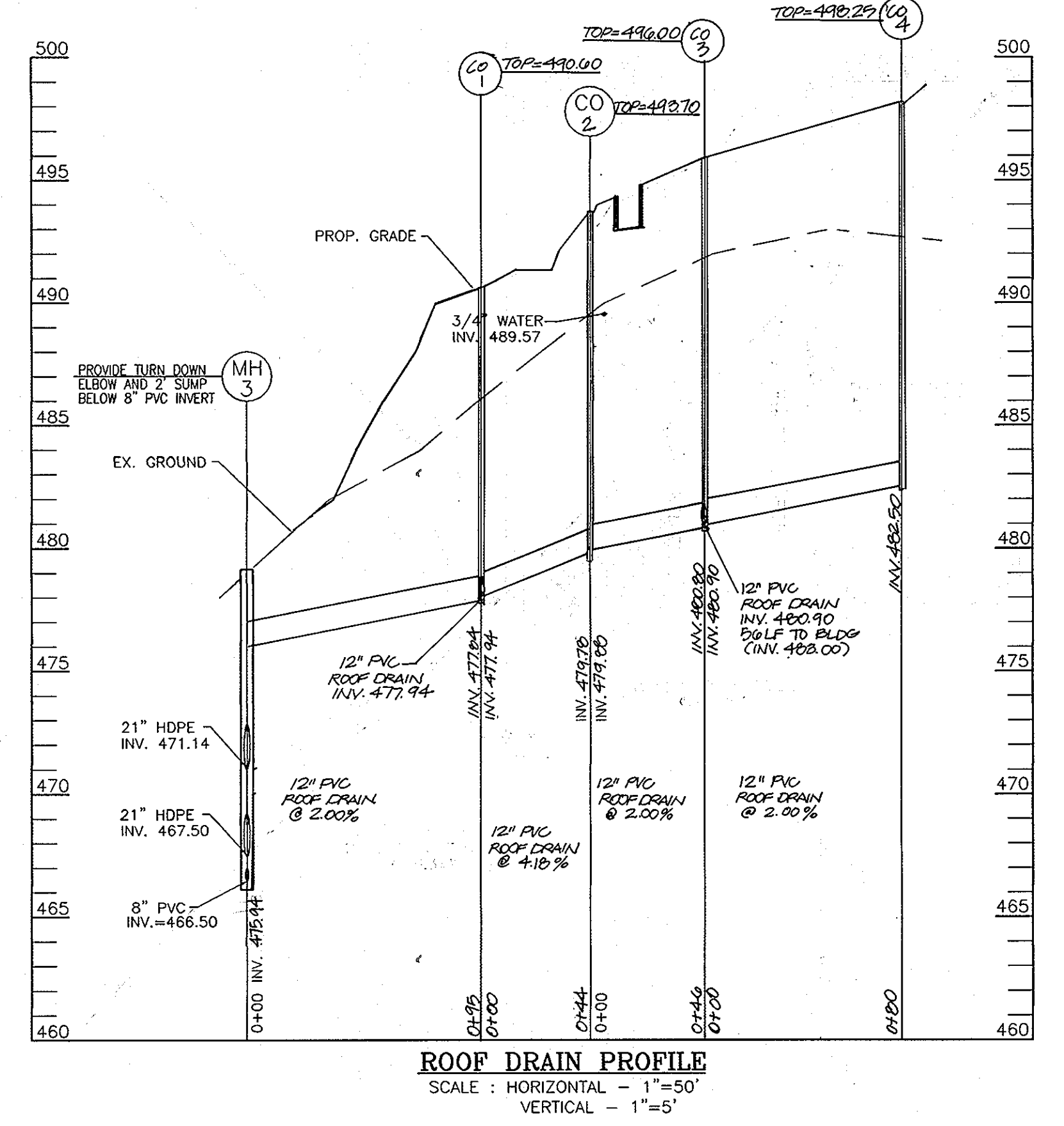
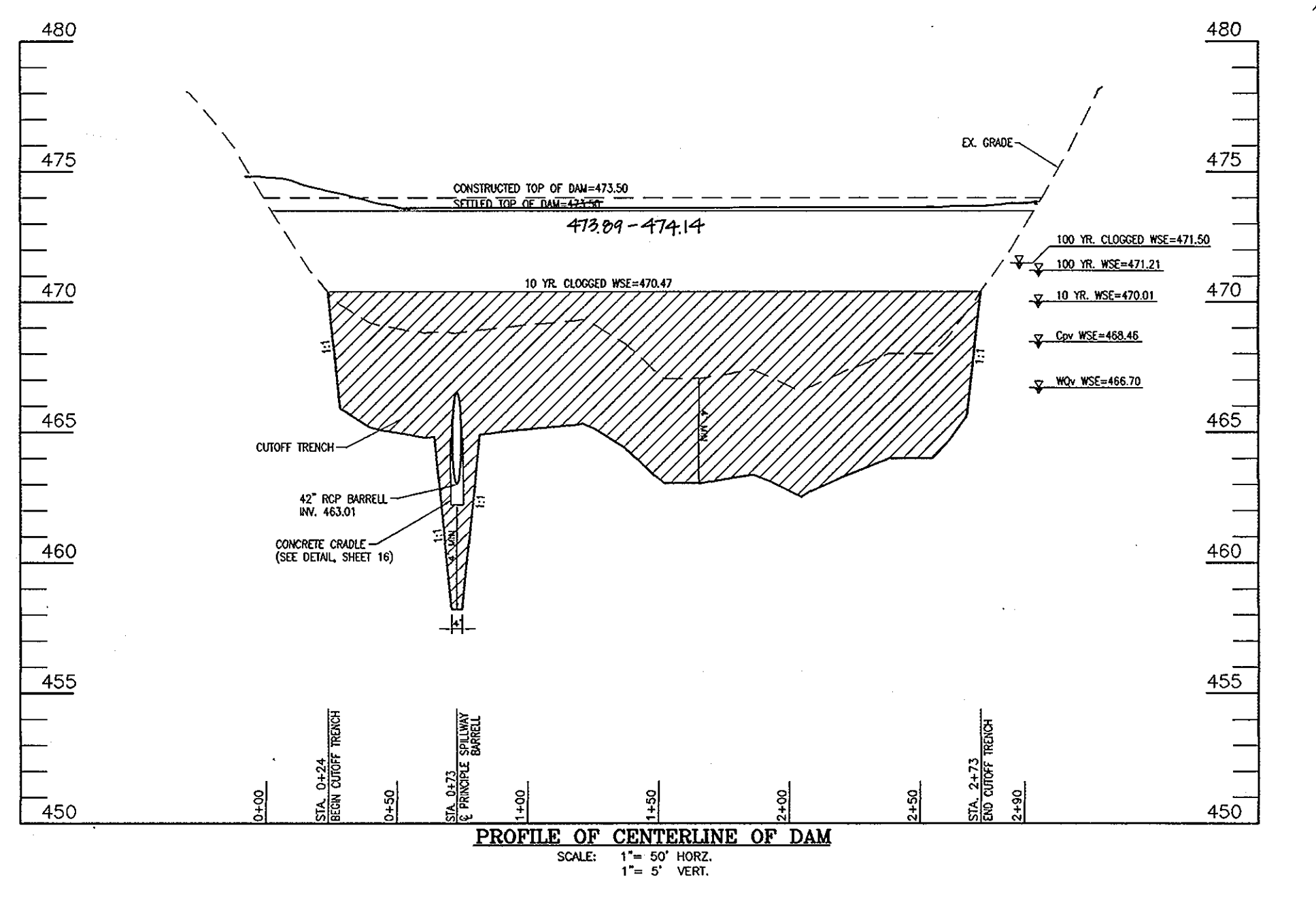
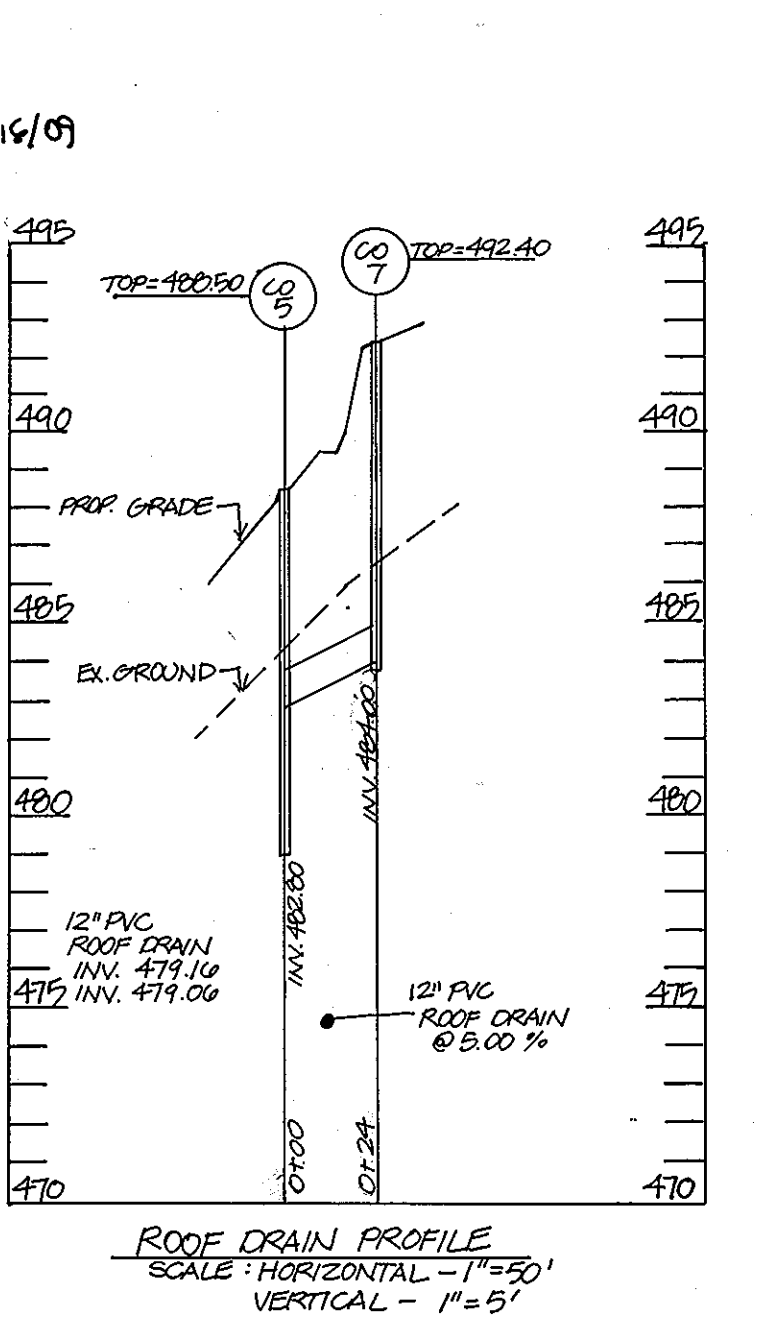
SITE DEVELOPMENT PLAN
UTILITY PROFILES
GLEN MAR UNITED METHODIST CHURCH
 PHASE I & II
 TAX MAP 31 BLOCK 1 & 8
 5TH ELECTION DISTRICT
 PARCEL '10', LOTS 1-5
 HOWARD COUNTY, MARYLAND
ROBERT H. VOGEL ENGINEERING, INC.
 ENGINEERS • SURVEYORS • PLANNERS
 8407 MAIN STREET
 ELLICOTT CITY, MARYLAND 21043
 TEL: 410.461.7666 FAX: 410.461.8961

DESIGN BY: RHV
 DRAWN BY: DZ
 CHECKED BY: RHV
 DATE: OCTOBER 2004
 SCALE: AS SHOWN
 W.O. NO.: 04-64
 15 SHEET OF 30





AS-BUILT CERTIFICATION
I HEREBY CERTIFY THAT THE FACILITY SHOWN ON THESE PLANS WAS CONSTRUCTED AS SHOWN ON THE AS-BUILT PLANS AND MEETS THE APPROVED PLANS AND SPECIFICATIONS.
ROBERT H. VOGEL, P.E. NO. 16193



OWNER/DEVELOPER
GLENMAR UNITED METHODIST CHURCH
8430 GLENMAR RD
ELLICOTT CITY, MD 21043
ALL HAMMER
(410) 465-4995

| NO. | REVISION | DATE |
|-----|---|----------|
| 5 | STORMWATER MANAGEMENT AS-BUILT | 11-11-09 |
| 2 | ADD PHASE III, ADDITION OF EDUCATION WING OF BUILDING, ASSOCIATED GRADING AND ROOF DRAIN INSTALLATION | 10/21/09 |
| 1 | REMOVE PHASE III FROM PLANS. REMOVE ASSOCIATED ROOF GRADING, PRAIRIES, ADD MANHOLE 1A. ADD PLAT RECORDING REFERENCES TO EXISTING EASEMENTS. REMOVE GENERAL NOTES 40 & 41. | 06-28-06 |

SITE DEVELOPMENT PLAN
STORMWATER MANAGEMENT
NOTES AND DETAILS
GLEN MAR UNITED METHODIST CHURCH
PHASE I & III
TAX MAP 31 BLOCK 1 & 8 PARCEL '10', LOTS 1-5
5TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND

ROBERT H. VOGEL ENGINEERS - PLANNERS
8407 MAIN STREET
ELLICOTT CITY, MARYLAND 21043
TEL: 410.461.7666 FAX: 410.461.8961

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

Cheryl Dammann 11/17/04
CHIEF, DEVELOPMENT ENGINEERING DIVISION 90 DATE

Cindy Hammett 12/2/04
CHIEF, DIVISION OF LAND DEVELOPMENT DATE

Paul H. Meyer 12/15/04
DIRECTOR DATE

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

Jim Harpelle 10/21/04
USA-NATURAL RESOURCES CONSERVATION SERVICE DATE

THESE PLANS FOR SMALL POND CONSTRUCTION, SOIL EROSION AND SEDIMENT CONTROL MEET THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT.

David G. Eddy 10/21/04
HOWARD S.C.D. DATE

BY THE DEVELOPER:

I HEREBY CERTIFY THAT ALL DEVELOPMENT AND/OR CONSTRUCTION WILL BE DONE IN ACCORDANCE TO THESE PLANS, AND THAT ANY RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF ATTENDANCE AT A DEPARTMENT OF THE ENVIRONMENT APPROVED TRAINING PROGRAM FOR THE CONTROL OF SEDIMENT AND EROSION BEFORE BEGINNING THE PROJECT. I SHALL ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION.

David G. Eddy 11 OCT 2004
SIGNATURE OF DEVELOPER DATE

BY THE ENGINEER:

I HEREBY CERTIFY THAT THIS PLAN FOR POND CONSTRUCTION, EROSION AND SEDIMENT CONTROL REPRESENTS A PRACTICAL AND WORKABLE PLAN BASED ON MY PERSONAL KNOWLEDGE OF THE SITE CONDITIONS. THIS PLAN WAS PREPARED IN ACCORDANCE WITH THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT. I HAVE NOTIFIED THE DEVELOPER THAT HE/SHE MUST ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION.

Robert H. Vogel 10/11/04
SIGNATURE OF ENGINEER ROBERT H. VOGEL, P.E. DATE

DESIGN BY: RHV
DRAWN BY: DZ
CHECKED BY: RHV
DATE: OCTOBER 2004
SCALE: AS SHOWN
W.O. NO.: 04-64

16 SHEET OF 30

MARYLAND 378
STORMWATER MANAGEMENT POND CONSTRUCTION SPECIFICATIONS

CONSTRUCTION SPECIFICATIONS

These specifications are appropriate to all ponds within the scope of the Standard for practice MD-378. All references to ASIM and AASHTO specifications apply to the most recent version.

Site Preparation

Areas designated for borrow areas, embankment, and structural works shall be cleared, grubbed and stripped of topsoil. All trees, vegetation, roots and other objectionable material shall be removed. Channel banks and sharp breaks shall be sloped to no steeper than 1:1. All trees shall be cleared and grubbed within 15 feet of the toe of the embankment.

Areas to be covered by the reservoir will be cleared of all trees, brush, logs, fences, rubbish and other objectionable material unless otherwise designated on the plans. Trees, brush, and stumps shall be cut approximately level with the ground surface. For dry stormwater management ponds, a minimum of a 25-foot radius around the inlet structure shall be cleared.

All cleared and grubbed material shall be disposed of outside and below the limits of the dam and reservoir as directed by the owner or his representative. When specified, a sufficient quantity of topsoil will be stockpiled in a suitable location for use on the embankment and other designated areas.

Earth Fill

Material - The fill material shall be taken from approved designated borrow areas. It shall be free of roots, stumps, wood, rubbish, stones greater than 6", frozen or other objectionable materials. Fill material for the center of the embankment, and cut off trench shall conform to Unified Soil Classification CC, SC, CH, or CL and must have at least 30% passing the #20 sieve. Consideration may be given to the use of other materials in the embankment if designed by a geotechnical engineer. Such special designs must have construction supervised by a geotechnical engineer. Materials used in the outer shell of the embankment must have the capability to support vegetation of the quality required to prevent erosion of the embankment.

Placement - Areas on which fill is to be placed shall be scarified prior to placement of fill. Fill materials shall be placed in maximum 8 inch thick (before compaction) layers which are to be continuous over the entire length of the fill. The most permeable borrow material shall be placed in the downstream portions of the embankment. The principal spillway must be installed concurrently with fill placement and not excavated into the embankment.

Compaction - The movement of the hauling and spreading equipment over the fill shall be controlled so that the entire surface of each fill shall be traversed by not less than one track of heavy equipment or compaction shall be achieved by a minimum of four complete passes of a sheepsfoot, rubber tired or vibratory roller. Fill material shall contain sufficient moisture such that the required degree of compaction will be obtained with the equipment used. The fill material shall contain sufficient moisture so that if formed into a ball it will not crumble, yet not be so wet that water can be squeezed out.

When required by the reviewing agency the minimum required density shall not be less than 95% of maximum dry density with a moisture content within +/-2% of the optimum. Each layer of fill shall be compacted as necessary to obtain that density, and is to be certified by the Engineer at the time of construction. All compaction is to be determined by AASHTO Method T-99 (Standard Proctor).

Cut Off Trench - The cutoff trench shall be excavated into impervious material along or parallel to the centerline of the embankment as shown on the plans. The bottom width of the trench shall be covered by the equipment used for excavation, with the minimum width being four feet. The depth shall be at least four feet below existing grade or as shown on the plans. The side slopes of the trench shall be 1 to 1 or flatter. The backfill shall be compacted with construction equipment, rollers, or hand tampers to assure maximum density and minimum permeability.

Embankment Core - The core shall be parallel to the centerline of the embankment as shown on the plans. The top width of the core shall be a minimum of four feet. The height shall extend up to at least 10 year water elevation or as shown on the plans. The side slopes shall be 1 to 1 or flatter. The core shall be compacted with construction equipment, rollers, or hand tampers to assure maximum density and minimum permeability. In addition, the core shall be placed concurrently with the outer shell of the embankment.

Structure Backfill

Backfill adjacent to pipes or structures shall be of the type and quality conforming to that specified for the adjoining fill material. The fill shall be placed in horizontal layers not to exceed four inches in thickness and compacted by hand tampers or other manually directed compaction equipment. The material needs to fill completely all spaces under and adjacent to the pipe. At no time during the backfilling operation shall driven equipment be allowed to operated closer than four feet, measured horizontally, to any part of a structure. Under no circumstances shall equipment be driven over any part of a concrete structure or pipe, unless there is a compacted fill of 24" or greater over the structure or pipe.

Structure backfill may be flowable fill meeting the requirements of Maryland Department of Transportation, State Highway Administration Standard Specifications for Construction and Materials, Section 313 as modified. The mixture shall have a 100-200 psi, 28 day unconfined compressive strength. The flowable fill shall have a minimum pH of 4.0 and a minimum resistivity of 2,000 ohm-cm. Material shall be placed such that minimum of 6" (measured perpendicular to the outside of the pipe) of flowable fill shall be under (bedding), over and, on the sides of the pipe. If only needs to extend up to the spring line for rigid conduits. Average slump of the fill shall be 7" to ensure flowability of the material. Adequate measures shall be taken (sand bags, etc.) to prevent flooding the pipe. When using flowable fill, all metal pipe shall be bituminous coated. Any adjoining soil fill shall be placed in horizontal layers not to exceed four inches in thickness and compacted by hand tampers or other manually directed compaction equipment. The material shall completely fill all voids adjacent to the flowable fill zone. At no time during the backfilling operation shall driven equipment be allowed to operate closer than four feet, measured horizontally, to any part of the structure. Under no circumstances shall equipment be driven over any part of a structure or pipe unless there is a compacted fill of 24" or greater over the structure or pipe. Backfill (flowable fill) zone shall be of the type and quality conforming to that specified for the core of the embankment or other embankment materials.

Pipe Conduits

All pipes shall be circular in cross section.

Corrugated Metal Pipe - All of the following criteria shall apply for corrugated metal pipe:

- Materials - (Polymer Coated steel pipe) - Steel pipes with polymeric coating shall have a minimum coating thickness of 0.01 inch (10 mil) on both sides of the pipe. This pipe and its appurtenances shall conform to the requirements of AASHTO Specifications M-245 & M-245 with watertight coupling bands or flanges.

Materials - (Aluminum Coated Steel Pipe) - This pipe and its appurtenances shall conform to the requirements of AASHTO Specification M-274 with watertight coupling bands or flanges. Aluminum Coated Steel Pipe, when used with flowable fill or when soil and/or water conditions warrant the need for increased durability, shall be fully bituminous coated per requirements of AASHTO Specification M-190 Type A. Any aluminum coating damaged or otherwise removed shall be replaced with cold applied bituminous coating compound. Aluminum surfaces that are to be in contact with concrete shall be painted with one coat of zinc chromate primer or two coats of asphalt.

OPERATION AND MAINTENANCE SCHEDULE FOR STORMWATER MANAGEMENT EXTENDED DETENTION FACILITY

STORMWATER MANAGEMENT FACILITY

ROUTINE MAINTENANCE

- FACILITY WILL BE INSPECTED ANNUALLY AND AFTER MAJOR STORMS.
- INSPECTIONS SHOULD BE PERFORMED DURING WET WEATHER TO DETERMINE IS FUNCTIONING PROPERLY.
- TOP AND SIDE SLOPES OF THE EMBANKMENT SHALL BE MOWED A MINIMUM OF TWO (2) TIMES A YEAR, ONCE IN JUNE AND ONCE IN SEPTEMBER.
- OTHER SIDE SLOPES AND MAINTENANCE ACCESS SHOULD BE MOWED AS NEEDED.
- DEBRIS AND LITTER NEXT TO THE OUTLET STRUCTURE SHALL BE REMOVED DURING REGULAR MOWING OPERATIONS AND AS NEEDED.
- VISIBLE SIGNS OF EROSION IN THE POND AS WELL AS RIPRAP OUTLET AREAS SHALL BE REPAIRED AS SOON AS IT IS NOTICED.

NON-ROUTINE MAINTENANCE

- STRUCTURAL COMPONENTS OF THE POND SUCH AS THE DAM, RISER, AND THE PIPES SHALL BE REPAIRED UPON DETECTION OF ANY DAMAGE. THE COMPONENTS SHOULD BE INSPECTED DURING MAINTENANCE OPERATIONS.
- SEDIMENT SHOULD BE REMOVED WHEN ITS ACCUMULATION SIGNIFICANTLY REDUCES THE DESIGN STORAGE, INTERFERES WITH THE FUNCTION OF THE RISER, WHEN DEEMED NECESSARY FOR AESTHETIC REASONS, OR WHEN DEEMED NECESSARY BY THE HOWARD COUNTY DEPARTMENT OF PUBLIC WORKS.

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

Cheryl Damann 11/17/09
CHIEF, DEVELOPMENT ENGINEERING DIVISION
Cindy Horvath 12/02/09
CHIEF, DIVISION OF LAND DEVELOPMENT
Denise L. Campbell 12/02/09
DIRECTOR

POND BOTTOM SOIL CONDITIONS

If broken rock fragments are encountered at finished pond bottom, under cut a minimum of 12" below basin grade and to a horizontal distance of at least 18" beyond each edge of the broken rock and backfill with fine-grained ML or CL soils compacted to a firm condition. This procedure should be performed under the supervision of the project Geotechnical Engineer.

OPERATION, MAINTENANCE AND INSPECTION

INSPECTION OF THE POND(S) SHOWN HEREON SHALL BE PERFORMED AT LEAST ANNUALLY, IN ACCORDANCE WITH THE CHECKLIST AND REQUIREMENTS CONTAINED WITHIN USDA, SCS "STANDARDS AND SPECIFICATIONS FOR PONDS" (MD-378). THE POND OWNER(S) AND ANY HEIRS, SUCCESSORS, OR ASSIGNS SHALL BE RESPONSIBLE FOR THE SAFETY OF THE POND AND THE CONTINUED OPERATION, SURVEILLANCE, INSPECTION, AND MAINTENANCE THEREOF. THE POND OWNER(S) SHALL PROMPTLY NOTIFY THE SOIL CONSERVATION DISTRICT OF ANY UNUSUAL OBSERVATIONS THAT MAY BE INDICATIONS OF DISTRESS SUCH AS EXCESSIVE SEEPAGE, TURBID SEEPAGE, SLIDING OR SLUMPING.

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

Jim Mays 10/21/09
USDA-NATURAL RESOURCES CONSERVATION SERVICE
THESE PLANS FOR SMALL POND CONSTRUCTION, SOIL EROSION AND SEDIMENT CONTROL MEET THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT.
Paula Selby 10/21/09
HOWARD S.C.D.

BY THE DEVELOPER:
David C. Elder 11 OCT 2009
SIGNATURE OF DEVELOPER DATE

BY THE ENGINEER:
Robert H. Vogel 10/11/09
SIGNATURE OF ENGINEER DATE

SUMMARY TABLE-ENTIRE SITE

| REQUIREMENT | VOLUME REQUIREMENT | VOLUME PROVIDED |
|---------------------------------|--------------------|-----------------|
| WATER QUALITY (WQV) | 22,651 c.f. | 22,651 c.f. |
| RECHARGE VOLUME (REV) | 5,924 c.f. | 5,924 c.f. |
| CHANNEL PROTECTION VOLUME (CPV) | 27,878 c.f. | 27,878 c.f. |
| Q10 | N/A | - |
| Q100 | N/A | - |

Materials - (Aluminum Pipe) - This pipe and its appurtenances shall conform to the requirements of AASHTO Specification M-196 or M-211 with watertight coupling bands or flanges. Aluminum Pipe, when used with flowable fill or when soil and/or water conditions warrant for increased durability, shall be fully bituminous coated per requirements of AASHTO Specification M-190 Type A. Aluminum surfaces that are to be in contact with concrete shall be painted with one coat of zinc chromate primer or two coats of asphalt. Hot dip galvanized bolts may be used for connections. The pH of the surrounding soils shall be between 4 and 9.

- Coupling bands, anti-seep collars, and sections, etc., must be composed of the same material and coatings as the pipe. Metals must be insulated from dissimilar materials with use of rubber or plastic insulating materials at least 24 mils in thickness.
- Connections - All connections with pipes must be completely watertight. The drain pipe or barrel connection to the riser shall be welded all around when the pipe and riser are metal. Anti-seep collars shall be connected to the pipe in such a manner as to be completely watertight. Dimple bands are not considered to be watertight.

All connections shall use a rubber or neoprene gasket when joining pipe sections. The end of each pipe shall be re-rolled on adequate number of corrugations to accommodate the bandwidth. The following type connections are acceptable for pipes less than 24 inches diameter: flanges on both ends of the pipe with a circular 3/8 inch thick closer cell circular neoprene gasket; and a 12-inch wide hugger type band with o-ring gaskets having a minimum diameter of 1/2 inch greater than the corrugation depth. Pipes 24 inches in diameter and larger shall be connected by a 24 inch long annular corrugated band using a minimum of 4(four) rods and lugs, 2 on each connecting pipe end. A 24-inch wide by 3/8-inch thick closed cell circular neoprene gasket will be installed with 12 inches on the end of each pipe. Flanged joints with 3/8 inch closer cell gaskets the full width of the flange is also acceptable.

Helically corrugated pipe shall have either continuously welded seams or have lock seams with internal caulking or a neoprene bead.

- Bedding - The pipe shall be firmly and uniformly bedded throughout its entire length. Where rock or soft, spongy or other unstable soil is encountered, all such material shall be removed and replaced with suitable earth compacted to provide adequate support.
- Backfilling shall conform to "Structure Backfill".
- Other details (anti-seep collars, valves, etc.) shall be as shown on the drawings.

Reinforced Concrete Pipe - All of the following criteria shall apply for reinforced concrete pipe:

- Materials - Reinforced concrete pipe shall have bell and spigot joints with rubber gaskets and shall equal or exceed ASTM C-361.
- Bedding - Reinforced concrete pipe conduits shall be laid in a concrete bedding/cradle for their entire length. This bedding/cradle shall consist of high slump concrete placed under the pipe and up the sides of the pipe at least 50% of its outside diameter with a minimum thickness of 6 inches. Where a concrete cradle is not needed for structural reasons, flowable fill may be used as described in the "Structure Backfill" section of this standard. Gravel bedding is not permitted.
- Laying pipe - Bell and spigot pipe shall be placed with the bell end upstream. Joints shall be made in accordance with recommendations of the manufacturer of the material. After the joints are sealed for the entire line, the bedding shall be placed so that all spaces under the pipe are filled. Care shall be exercised to prevent any deviation from the original line and grade of the pipe. The first joint must be located within 4 feet from the riser.
- Backfilling shall conform to "Structure Backfill".
- Other details (anti-seep collars, valves, etc.) shall be shown on the drawings.

Plastic Pipe - The following criteria shall apply for plastic pipe:

- Materials - PVC pipe shall be PVC-1120 or PVC-1220 conforming to ASTM D-1785 or ASTM D-2241. Corrugated High Density Polyethylene (HDPE) pipe, couplings and fittings shall conform to the following: 4" - 10" inch pipe shall meet the requirements of AASHTO M252 Type S, and 12" through 24" inch shall meet the requirements of AASHTO M294 Type S.
- Joints and connections to anti-seep collars shall be completely watertight.
- Bedding - The pipe shall be firmly and uniformly bedded throughout its entire length. Where rock or soft, spongy or other unstable soil is encountered, all such material shall be removed and replaced with suitable earth compacted to provide adequate support.
- Backfilling shall conform to "Structure Backfill".
- Other details (anti-seep collars, valves, etc.) shall be shown on the drawings.

Drainage Diaphragms - When a drainage diaphragm is used, a registered professional engineer will supervise the design and construction inspection.

Concrete - Concrete shall meet the requirements of Maryland Department of Transportation, State Highway Administration Standard Specifications for Construction and Materials, Section 414, Mix No. 3.

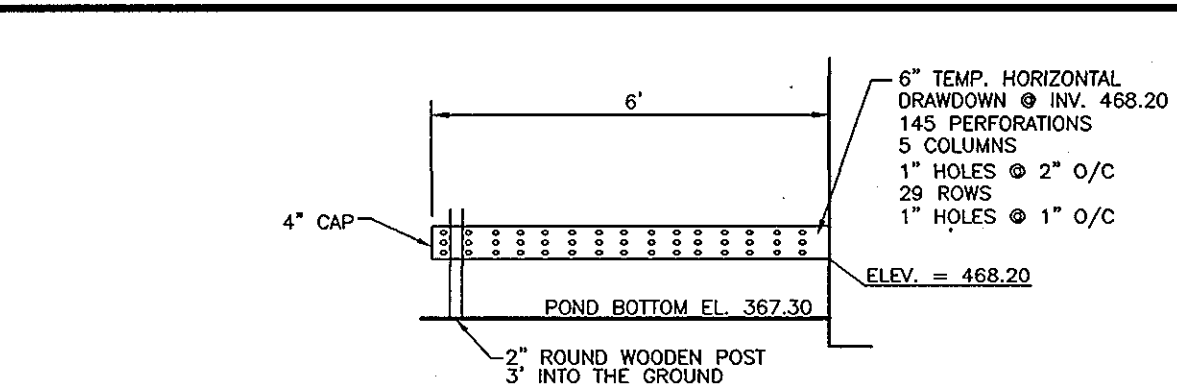
Rock Riprap - Rock riprap shall meet the requirements of Maryland Department of Transportation, State Highway Administration Standard Specifications for Construction Materials, Section 311.

Geotextile shall be placed under all riprap and shall meet requirements of Maryland Department of Transportation, State Highway Administration Standard Specifications for Construction and Materials, Section 921.09, Class C.

Care of Water during Construction - All on permanent structures shall be carried out in areas free from water. The contractor shall construct and maintain all temporary dikes, levees, cofferdams, drainage channels, and stream diversions necessary to protect to be occupied by the permanent works. The contractor shall also furnish, install, operate, and maintain all necessary pumping and other equipment required for removal of water from various parts of the work and for maintaining the excavations, foundation, and other parts of the work free from water as required or directed by the engineer for constructing each part of the work. After having served their purpose, all temporary protective works shall be removed or leveled and graded to the extent required to prevent obstruction in any degree whatsoever of the flow of water to the spillway or outlet works and so as not to interfere in any way with the operation or maintenance of the structure. Stream diversions shall be maintained until the full flow can be passed through the permanent works. The removal of water from the required excavation and the foundation shall be accomplished in a manner and to the extent that will maintain stability of the excavated slopes and bottom required excavations and will allow satisfactory performance of all construction operations. During the placing and compacting of material in required excavations, the water level at the locations being refilled shall be maintained below the bottom of the excavation at such locations which may require draining the water pumps from which the water shall be pumped.

Stabilization - All borrow areas shall be graded to provide proper drainage and left in a slightly condition. All exposed surfaces of the embankment, spillway, spigot and borrow areas, and berms shall be stabilized by seeding, liming, fertilizing and mulching in accordance with the Natural Resources Conservation Service Standards and Specifications for Critical Area Planting (MD-342) or as shown on the accompanying drawings.

Erosion and Sediment Control - Construction operations will be carried out in such a manner that erosion will be controlled and water and air pollution minimized. State and local laws concerning pollution abatement will be followed. Construction plans shall detail erosion and sediment control measures.

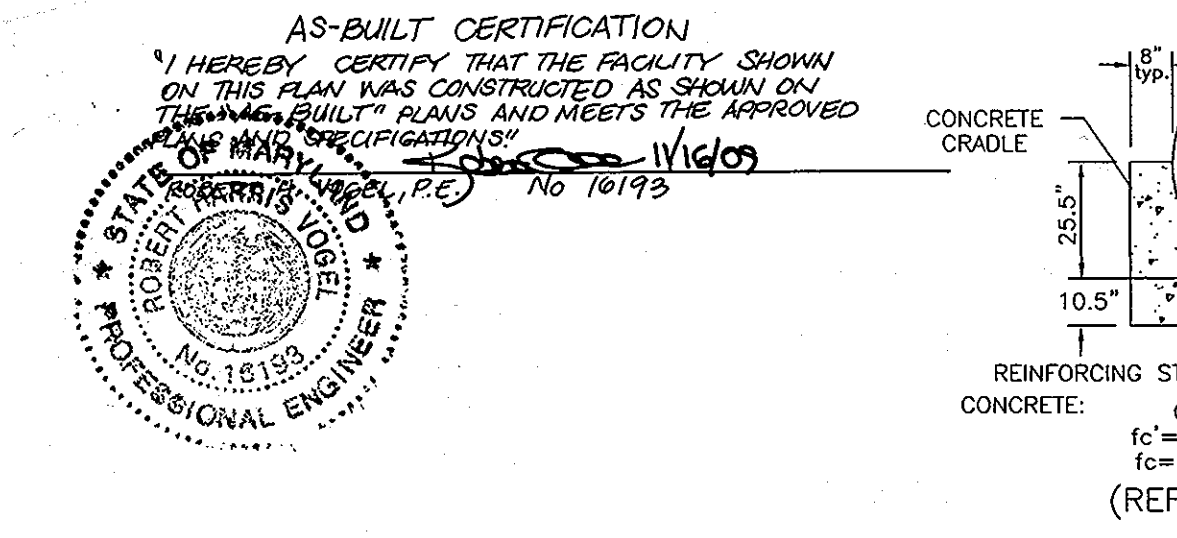


TEMP. SEDIMENT BASIN HORIZONTAL DRAW-DOWN DEVICE

REF: 1994 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL PAGE C-10-29

CONSTRUCTION SPECIFICATIONS

- THE TOTAL AREA OF THE PERFORATIONS MUST BE GREATER THEN 2 TIMES THE AREA OF THE INTERNAL ORIFICE.
- THE PERFORATED PORTION OF THE DRAW-DOWN DEVICE SHALL BE WRAPPED WITH 1/2" HARDWARE CLOTH AND GEOTEXTILE FABRIC. THE GEOTEXTILE FABRIC SHALL MEET THE SPECIFICATIONS FOR GEOTEXTILE CLASS E.
- PROVIDE SUPPORT OF DRAW-DOWN DEVICE TO PREVENT SAGGING AND FLOATION. AN ACCEPTABLE PREVENTATIVE MEASURE IS TO STAKE BOTH SIDES OF DRAW-DOWN DEVICE WITH 1" STEEL ANGLE, OR 1" x 4" SQUARE WOODEN POSTS SET 3" MINIMUM INTO THE GROUND THEN JOINING THEM TO THE DEVICE BY WRAPPING WITH 12 GAUGE MINIMUM WIRE.



PIPE CRADLE DETAIL

NOT TO SCALE

DEWATERING STRATEGY

Dewatering refers to the act of removing and discharging water from excavated areas on construction sites or from sediment traps or basins on construction sites. Standards and specifications for dewatering practices follow:

- These standards apply to removal and discharge of water from any excavated area or sediment trap or basin at any construction site. Given the unique conditions of any particular construction site, any or all of the practices may apply. Regardless of the applicability of the practices listed herein, operators are required to use acceptable procedures for maintenance and dewatering. In all cases, every effort shall be made to eliminate sediment pollution associated with dewatering.
- Designers shall specify the preferred procedures for dewatering on plans. In particular, designers should identify procedures for dewatering sediment traps and basins to elimination of the last sediment control facility on the site or prior to conversion of sediment control facilities to stormwater management facilities. Recommended procedures shall be consistent with these standards. Atypical site conditions may require innovative dewatering designs. Dewatering measures not referenced in this standard may be used with the consent of the approval authority.

Dewatering of Excavated Areas

- Designers shall specify on plans, and in sequences of construction included on plans, practices for dewatering of excavated areas. Plan reviewers shall check to see that procedures for dewatering are included on plans.
- In all cases, water removed from excavated areas shall be discharged such that it shall pass through a sediment control device prior to entering receiving waters. Sediment control devices include sediment traps and basins, in addition to the practices in this section.

Approved Practices for Dewatering of Excavated Areas

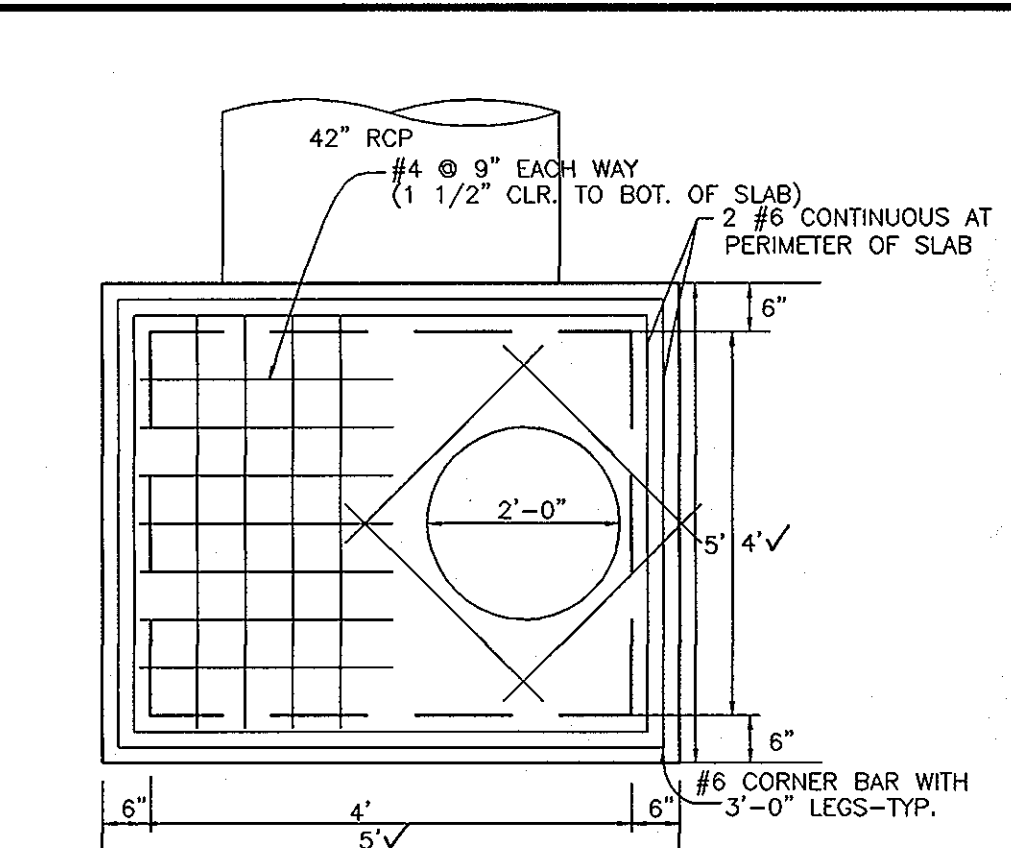
- Pumping of water to an existing sediment basin or trap to which the entire volume of water from the area to be dewatered can be contained without discharge to receiving waters.
- Pumping of water to an existing sediment basin or trap such that the entire volume of water from the area to be dewatered can be managed without exceeding the design outflow from the sediment control structure.
- Removable Pumping Station? Standards and specifications for Removable Pumping Station are on Detail 208.
- Use of a Sump Pit? Standards and specifications for a sump pit are on Detail 208.
- Sediment Tank? Standards and specifications for a sump pit are on Detail 208.

Dewatering of Sediment Traps and Basins

Designers shall specify on plans, and in sequences of construction included on plans, the practices for dewatering of traps and basins. Plan reviewers shall check to see that procedures for dewatering to be used are included on plans. In all cases, water removed from traps and basins shall be discharged so that it passes through a sediment control device prior to entering receiving waters.

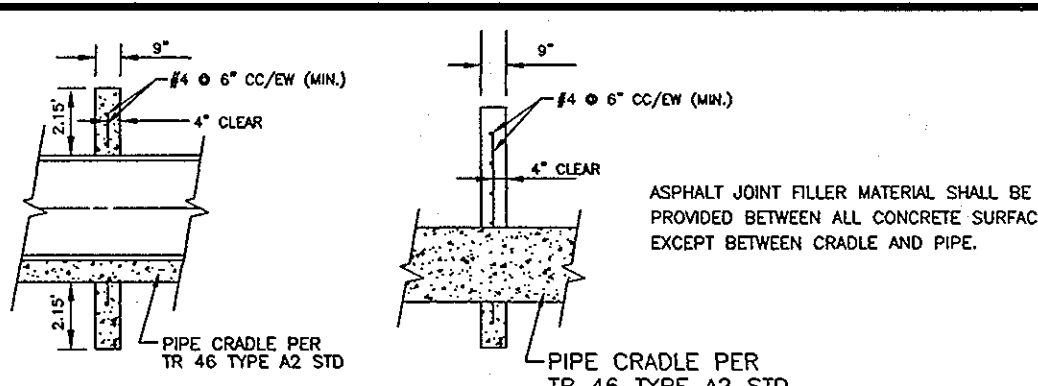
Approved Practices for Dewatering of Traps and Basins

- Removable pumping station.
- Use of a Sump Pit.
- Use of a floating suction hose to pump the cleaner water from the top of the pond. As the cleaner water is pumped the suction hose will lower and eventually encounter sediment below water. When this happens the pumping operation will cease. Provisions shall be made to filter water.



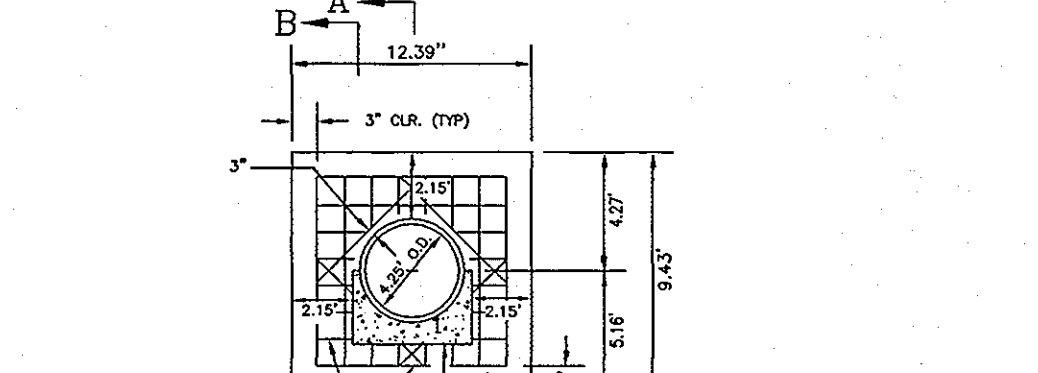
6" TOP SLAB

NOT TO SCALE



SECTION A-A

NOT TO SCALE

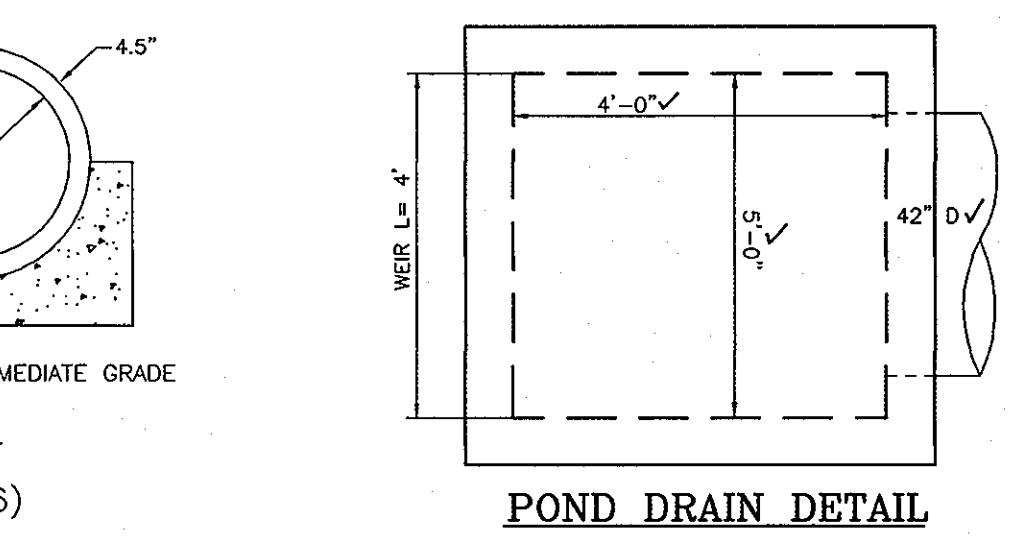


CONCRETE ANTI-SEEP COLLAR DETAIL

NOT TO SCALE

NOTES:

- ANTI-SEEP COLLARS SHOULD BE PLACED WITHIN THE SATURATION ZONE.
- ALL ANTI-SEEP COLLARS AND THEIR CONNECTIONS TO THE CONDUIT SHALL BE WATER TIGHT AND MADE OF COMPATIBLE WITH THE CONDUIT.
- COLLAR DIMENSIONS SHALL EXTEND A MIN. OF 2' IN ALL DIRECTIONS AROUND THE PIPE.
- ANTI-SEEP COLLAR SHALL BE PLACED A MIN. OF 2' FROM PIPE JOINTS EXCEPT WHERE FLANGED JOINTS ARE USED.



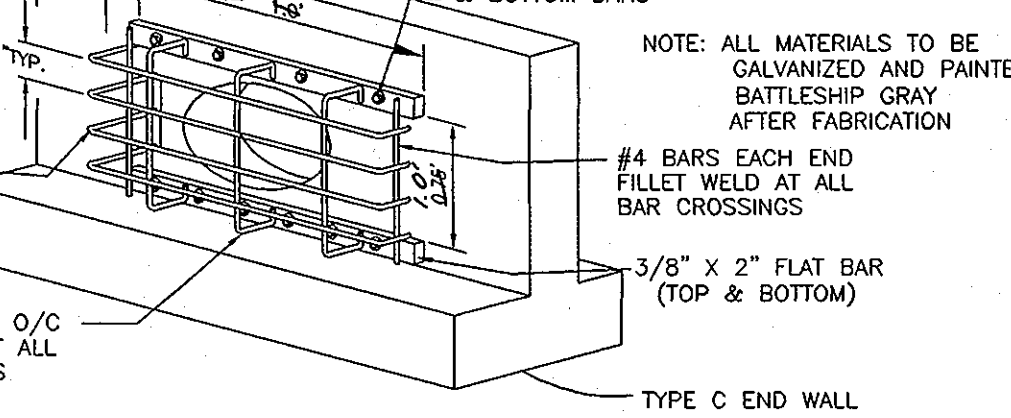
POND DRAIN DETAIL

NOT TO SCALE



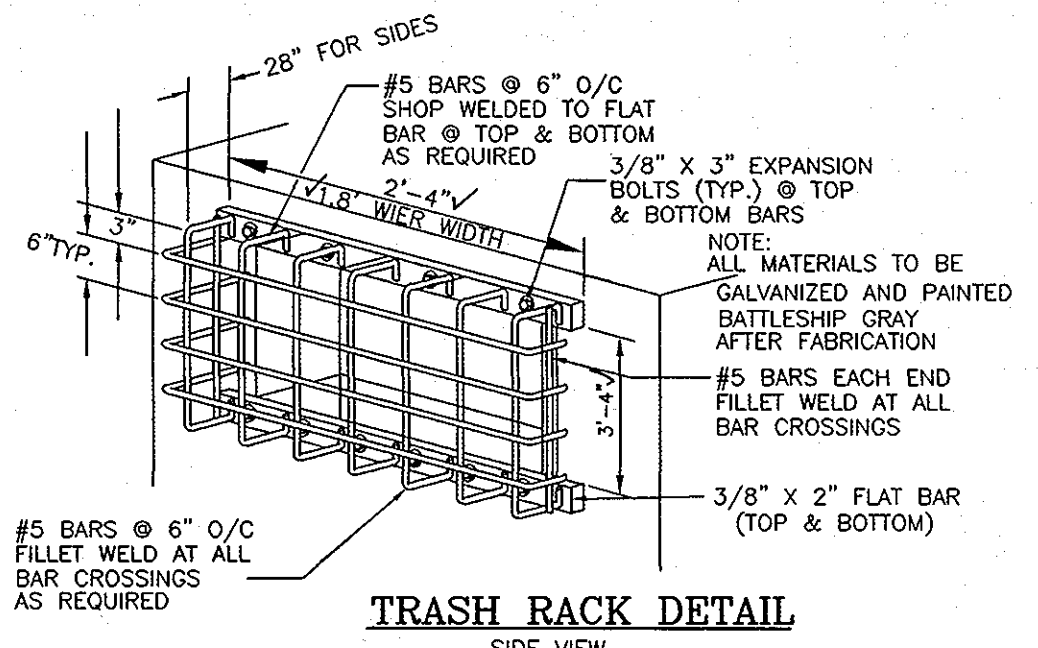
TRASH RACK DETAIL

NOT TO SCALE



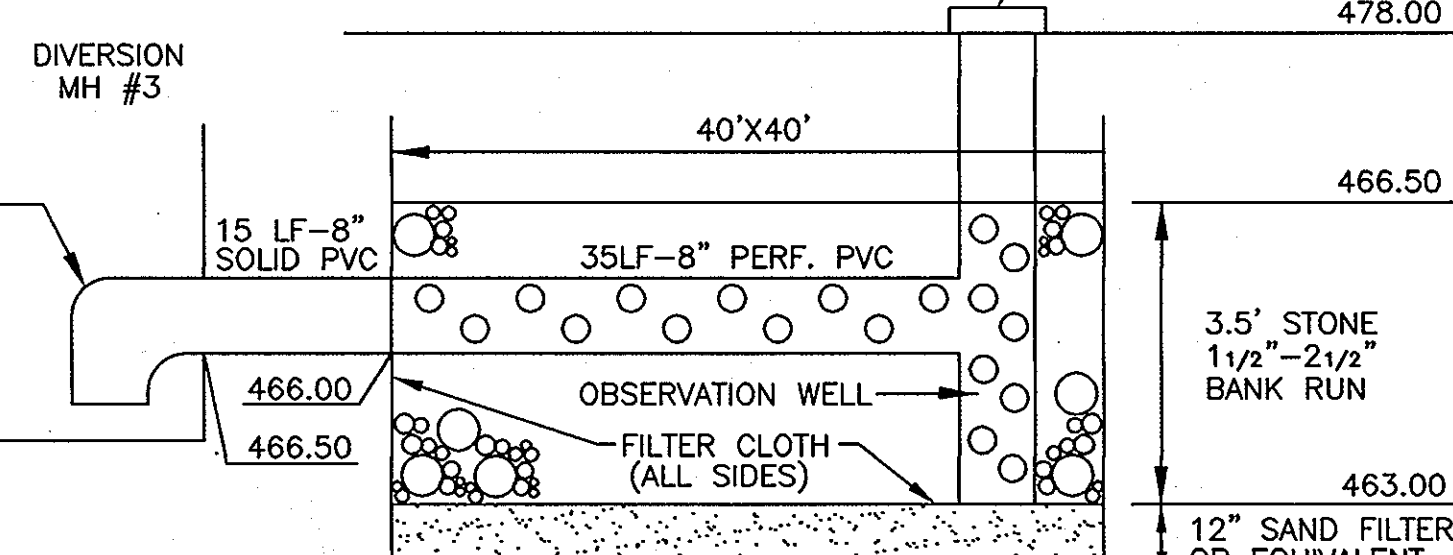
LOW FLOW ORIFICE TRASH RACK DETAIL

NOT TO SCALE



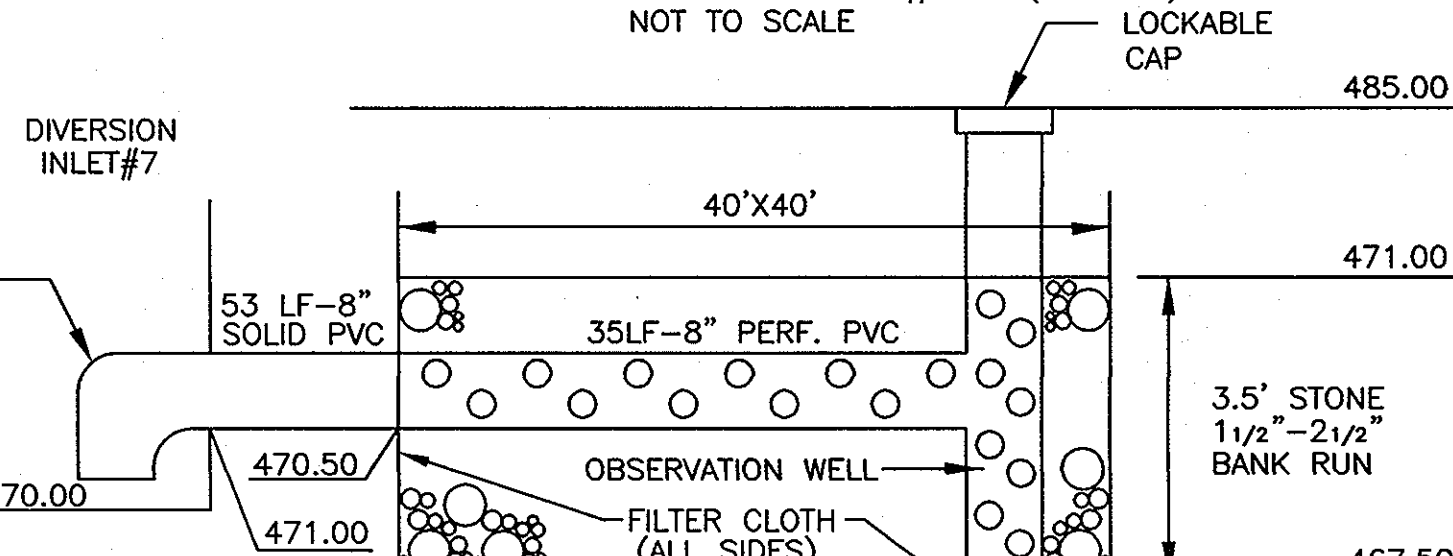
PERMANENT ORIFICE DETAIL IN CONTROL STRUCTURE

NOT TO SCALE



GRAVEL TRENCH #1 (REV)

NOT TO SCALE



GRAVEL TRENCH #2 (REV)

NOT TO SCALE

OWNER/DEVELOPER

8430 GLENMAR RD
ELLCOTT CITY, MD 21043
GLENMAR UNITED METHODIST CHURCH
AL HAMMER
(410) 465-4995

| NO. | REVISION | DATE |
|-----|--------------------------------|----------|
| 5 | STORMWATER MANAGEMENT AS-BUILT | 11/11/09 |

SITE DEVELOPMENT PLAN

STORMWATER MANAGEMENT NOTES AND DETAILS

GLEN MAR UNITED METHODIST CHURCH

PHASE I AND III

TAX MAP 31 BLOCK 1 & 8 PARCEL '10', LOTS 1-5
5TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND

ROBERT H. VOGEL ENGINEERS, INC.
ENGINEERS • SURVEYORS • PLANNERS

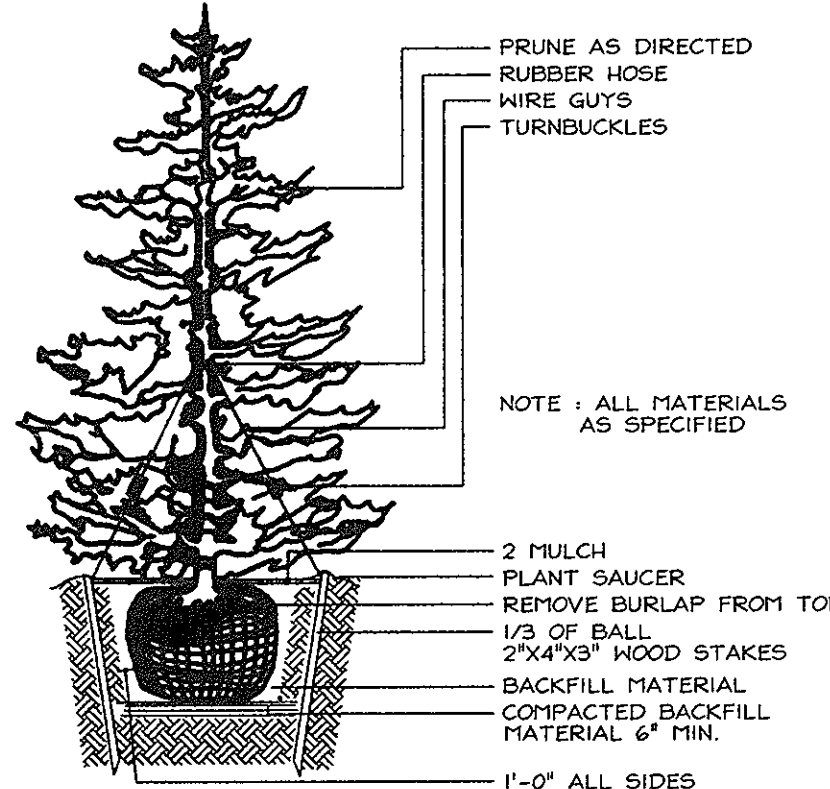
8407 MAIN STREET
ELLCOTT CITY, MARYLAND 21043
TEL: 410.461.7666 FAX: 410.461.8961

DESIGN BY: RHV
DRAWN BY: DZ
CHECKED BY: RHV
DATE: OCTOBER 2004
SCALE: 1"=30'
W.O. NO.: 04-64

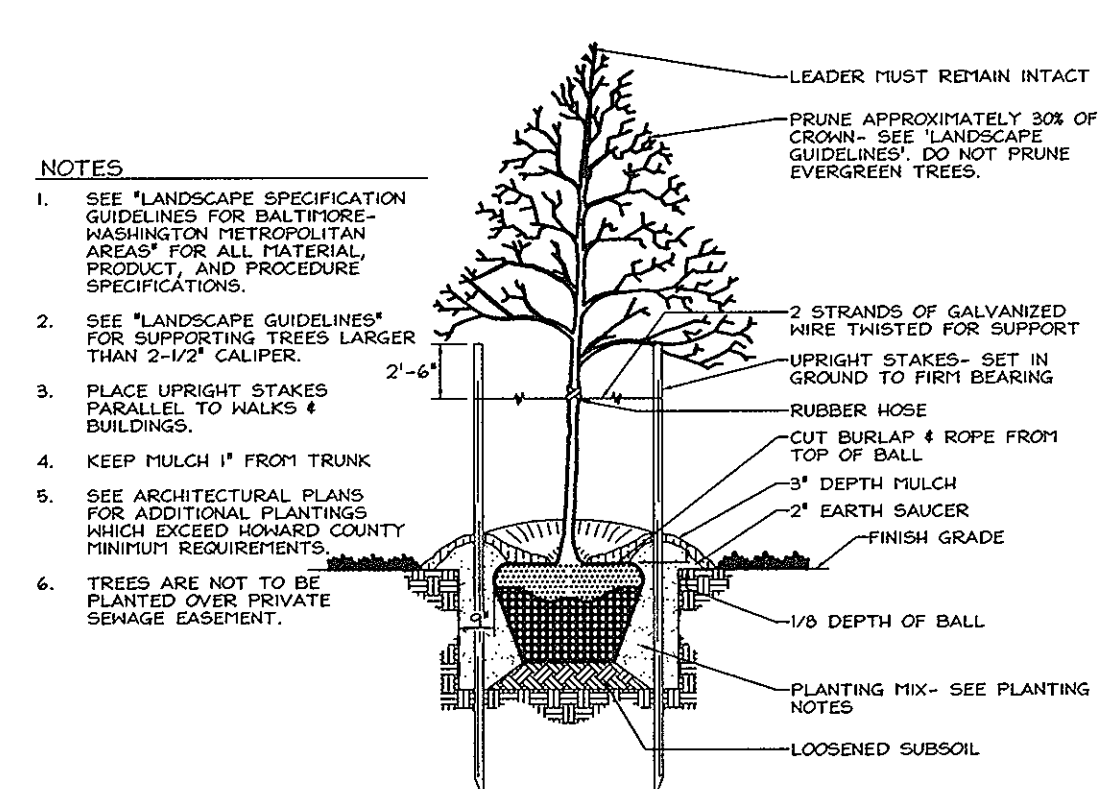
17 SHEET OF 30

AS-BUILT 11-11-09

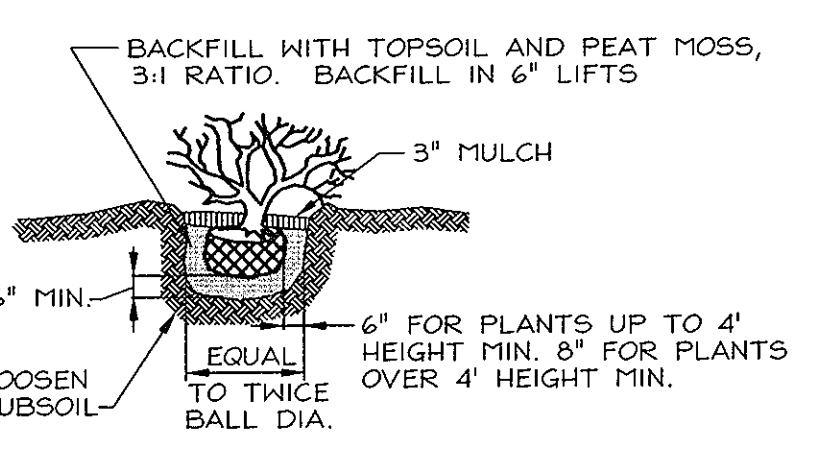
SDP-04-42



TYPICAL EVERGREEN TREE PLANTING DETAIL
NOT TO SCALE



TREE PLANTING AND STAKING
DECIDUOUS TREES UP TO 2-1/2\"/>



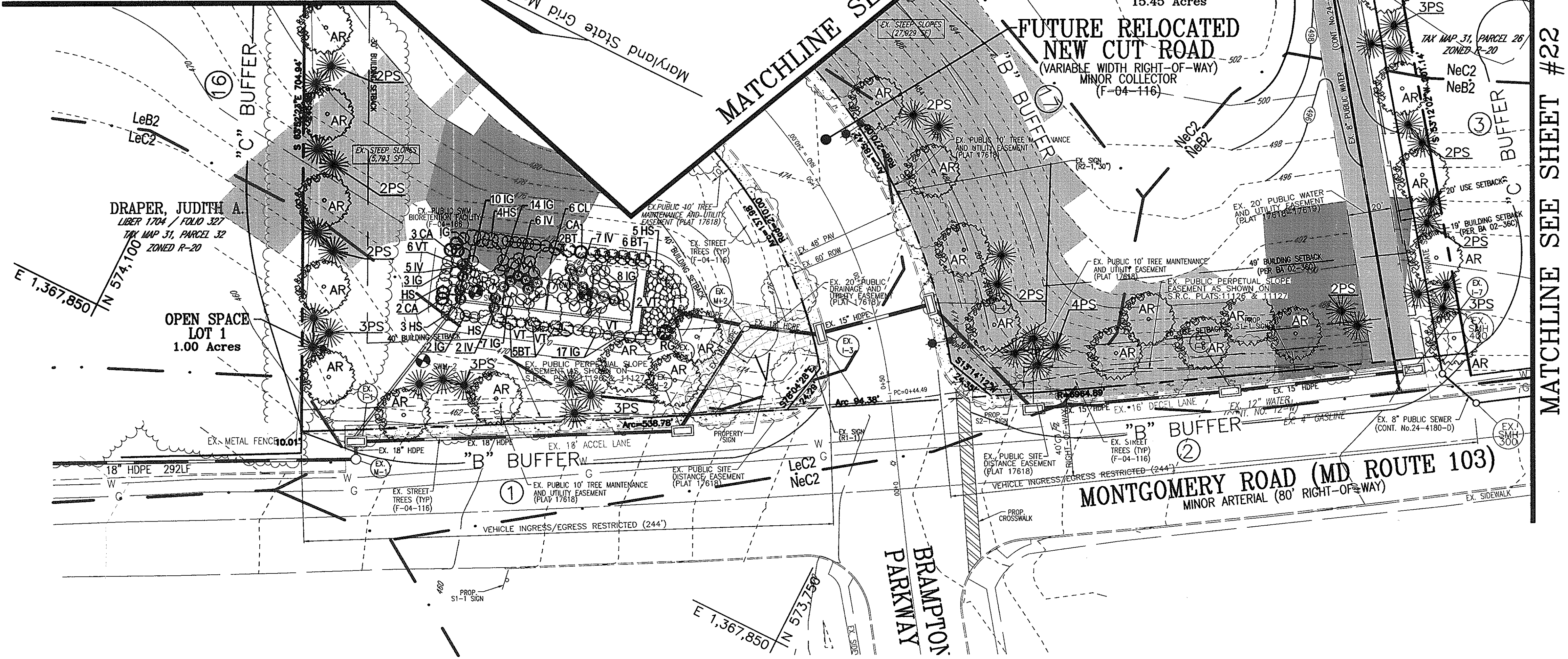
SHRUB PLANTING DETAIL
NOT TO SCALE

| LANDSCAPE SCHEDULE- BIORETENTION AREA | | | | |
|---------------------------------------|--------------------------------------|---------------------------------|-------------------|-------|
| IG 55 | ILEX GLABRA 'SHAMROCK' | SHAMROCK COMPACT INKBERRY HOLLY | 3 GALLON | CONT. |
| IV 20 | ILEX VIRGINICA 'HENRY'S GRANITE' | HENRY'S GARNET SWEETSPICE | 3 GALLON | CONT. |
| BT 13 | BERBERIS THUNBERGII 'CRIMSON PYGMY' | CRIMSON PYGMY BARBERRY | 3 GALLON | CONT. |
| CL 6 | CLADRASTIS LUTEA 'SWEETSHADE' | SWEETSHADE YELLOWWOOD | 1.5-2\"/> | |
| HS 14 | HIBISCUS SYRIACUS 'LAVENDER CHIFFON' | LAVENDER CHIFFON ROSE OF SHARON | 3 GALLON | CONT. |
| VI 11 | VIBURNUM TRILOBUM | AMERICAN Highbush Viburnum | 3 GALLON | CONT. |
| RG 1 | RHOODODENDRON HYB. 'GLACIER' | GLACIER AZALEA | 3 GALLON | CONT. |
| CA 6 | CLETHRA ALNIFOLIA | SUMMERSWEET | 3 GALLON | CONT. |
| GROUND COVER | 1417 | LIRIOPE MUSCARI 'BIG BLUE' | BIG BLUE LILYTURF | 2\"/> |

LEGEND:

- 500 --- EXISTING CONTOUR
- 405 --- PROPOSED CONTOUR
- + 402.58 EXISTING SPOT ELEVATION
- 402.58 --- PROPOSED SPOT ELEVATION
- EXISTING CURB AND GUTTER
- PROPOSED CURB AND GUTTER
- EXISTING UTILITY POLE
- EXISTING LIGHT POLE
- EXISTING MAILBOX
- EXISTING SIGN
- EXISTING SANITARY MANHOLE
- EXISTING SANITARY LINE
- EXISTING CLEANOUT
- EXISTING FIRE HYDRANT
- EXISTING WATER LINE
- PROPERTY LINE
- RIGHT-OF-WAY LINE
- SOILS BOUNDARY
- MIB2 --- PROPOSED STORM DRAIN
- MIB3 --- PROPOSED STORM DRAIN INLET
- PROPOSED SIDEWALK
- PROPOSED LIGHT POLE
- EXISTING STREET TREES (F-04-166)
- PROPOSED SHADE TREE
- PROPOSED EVERGREEN TREE
- PROPOSED SHRUB
- LANDSCAPE PERIMETER

MATCHLINE SEE SHEET #19



| LANDSCAPE SCHEDULE | | | | |
|--------------------|-------|--|------------------|-----------|
| KEY | QUAN. | BOTANICAL NAME | SIZE | REM. |
| AR | 130 | Acer rubrum 'October Glory' / October Glory Red Maple | 2 1/2" - 3" Cal. | B & B |
| PS | 223 | Pinus strobus / Eastern White Pine | 6' - 8' Ht. | B & B |
| CF | 22 | Cornus Florida 'rubra' / Red Flowering Dogwood | 8' - 10' Ht. | B & B |
| LC | 18 | Leyland Cypress | 5' - 6' Ht. | B & B |
| IG | 140 | Ilex glabra 'Compacta' / Compact Inkberry | 2 1/2" - 3" Ht. | B & B |
| QP | 13 | Quercus Phellos / Willow Oak | 2 1/2" - 3" Cal. | B & B |
| BT | 9 | BERBERIS THUNBERGII 'CRIMSON PYGMY' / CRIMSON PYGMY BARBERRY | 3 GALLON | CONTAINER |
| HS | 14 | HIBISCUS SYRIACUS 'LAVENDER CHIFFON' / LAVENDER CHIFFON ROSE OF SHARON | 3 GALLON | CONTAINER |
| IO | 15 | ILLEC OPACA / AMERICAN HOLLY | 6-8' HEIGHT | B & B |
| AC | 26 | ABIES CONCOLOR / WHITE FIR | 6-8' HEIGHT | B & B |

GENERAL NOTES:

- THIS PLAN HAS BEEN PREPARED IN ACCORDANCE WITH THE PROVISIONS OF SECTION 16.124 OF THE HOWARD COUNTY CODE AND THE LANDSCAPE MANUAL. THE REQUIRED PARKING AND PERIMETER LANDSCAPING WILL BE BONDED PER THIS SUBMISSION.
- FINANCIAL SURETY FOR THE REQUIRED LANDSCAPING HAS BEEN POSTED AS PART OF THE DEVELOPER'S AGREEMENT IN THE AMOUNT OF \$78,840.00 FOR THE REQUIRED 149 SHADE TREES, 195 EVERGREEN TREES, AND 163 SHRUBS.

DEVELOPER'S/BUILDER'S CERTIFICATE

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

Barbara Julia Minister for Operations 11/10/11
SIGNATURE OF DEVELOPER DATE

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING
[Signature] 11/10/11
 CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

[Signature] 11/17/11
 CHIEF, DIVISION OF LAND DEVELOPMENT DATE

[Signature] 11/22/11
 DIRECTOR DATE

| CATEGORY | SCHEDULE A PERIMETER LANDSCAPE EDGE | | | | | | | | | | | | | | | | | |
|--|---|--------|---------|---------|---------|--------|--------|---------|--------|---------|--------|--------|---------|---------|---------|--------|--------|--|
| | ADJACENT TO ROADWAYS AND PERIMETER PROPERTIES | | | | | | | | | | | | | | | | | |
| Perimeter/Frontage Designation | B | B | C | C | C | C | C | E | B | C | C | C | C | C | C | B | E | |
| Linear Feet of Roadway Frontage/Perimeter | 240 | 240 | 292 | 251 | 220 | 175 | 95 | 260 | 340 | 580 | 148 | 75 | 76 | 363 | 459 | 245 | 310 | |
| Credit for Existing Vegetation (Yes, No, Linear Feet Describe below if needed) | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | |
| Credit for Wall, Fence or Berm (Yes, No, Linear Feet Describe below if needed) | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | No | |
| Number of Plants Required | Shade Trees: 1:50 5 | 1:50 5 | 1:40 7 | 1:40 6 | 1:40 6 | 1:40 4 | 1:40 2 | 1:40 7 | 1:40 9 | 1:50 12 | 1:40 4 | 1:40 2 | 1:40 2 | 1:40 9 | 1:40 11 | 1:40 6 | 1:50 7 | |
| Evergreen Trees | 1:40 6 | 1:40 6 | 1:20 15 | 1:20 13 | 1:20 11 | 1:20 9 | 1:20 5 | 1:20 13 | 1:4 85 | 1:40 15 | 1:20 8 | 1:20 4 | 1:20 18 | 1:20 23 | 1:20 12 | 1:40 9 | 1:40 6 | |
| Shrubs | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | 1:4 60 | |
| Number of Plants Provided | Shade Trees: 5 | 5 | 7 | 6 | 6 | 7 | 2 | 9 | 13 | 12 | 4 | 2 | 2 | 9 | 6 | 6 | 7 | |
| Evergreen Trees | 6 | 6 | 15 | 13 | 11 | 11 | 5 | 16 | --- | 21 | 7 | 4 | 4 | 28 | 82* | 16 | 9 | |
| Other Trees (2:1 Substitution) | --- | --- | --- | --- | --- | --- | --- | --- | 85 | --- | --- | --- | --- | --- | --- | --- | 78 | |
| Shrubs (10:1 Substitution) | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |
| Describe Plant Substitution Credits Below if needed) | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | |

* 22 EVERGREE SUBSTITUTED FOR THE 11 SHADE TREES REQUIRED (36 ADDITIONAL EVERGREENS HAVE ALSO BEEN PROVIDED).

| SCHEDULE B PARKING LOT INTERNAL LANDSCAPING | |
|---|-----|
| Number of parking spaces | 390 |
| Number of trees and islands required | 20 |
| Number of trees and islands provided | 22 |
| Shade Trees | 0 |
| Other Trees (2:1 Substitution) | 22 |

OWNER/DEVELOPER
 GLEN MAR UNITED METHODIST CHURCH
 8430 GLENMAR ROAD
 ELLICOTT CITY, MD 21043
 AL HAMMER
 (410) 465-4995

| NO. | REVISION | DATE |
|-----|--|---------|
| 7 | REVISE PLAN TO ADD LANDSCAPING, SHEDS, AND A PAVILION. | 11-4-11 |
| 6 | ADD PROPERTY SIGN | 1/20/10 |
| 1 | REMOVE PHASE III. REMOVE ASSOCIATED ROOF DRAINS. ADD MANHOLE 1A. 6-28-06 | 6-28-06 |
| | ADD PLAT RECORDING REFERENCES TO EXISTING EASEMENTS. REMOVE GENERAL NOTES 40 & 41. | |

REVISED SITE DEVELOPMENT PLAN
LANDSCAPE PLAN
GLEN MAR UNITED METHODIST CHURCH
 PHASE I & III
 TAX MAP 31 BLOCK 1 & 8 PARCEL '10', LOTS 1-5
 5TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND

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

PROFESSIONAL CERTIFICATE
 DESIGN BY: RHV
 DRAWN BY: DZ/KS
 CHECKED BY: RHV
 DATE: OCTOBER 2011
 SCALE: 1"=30'
 W.O. NO.: 04-84

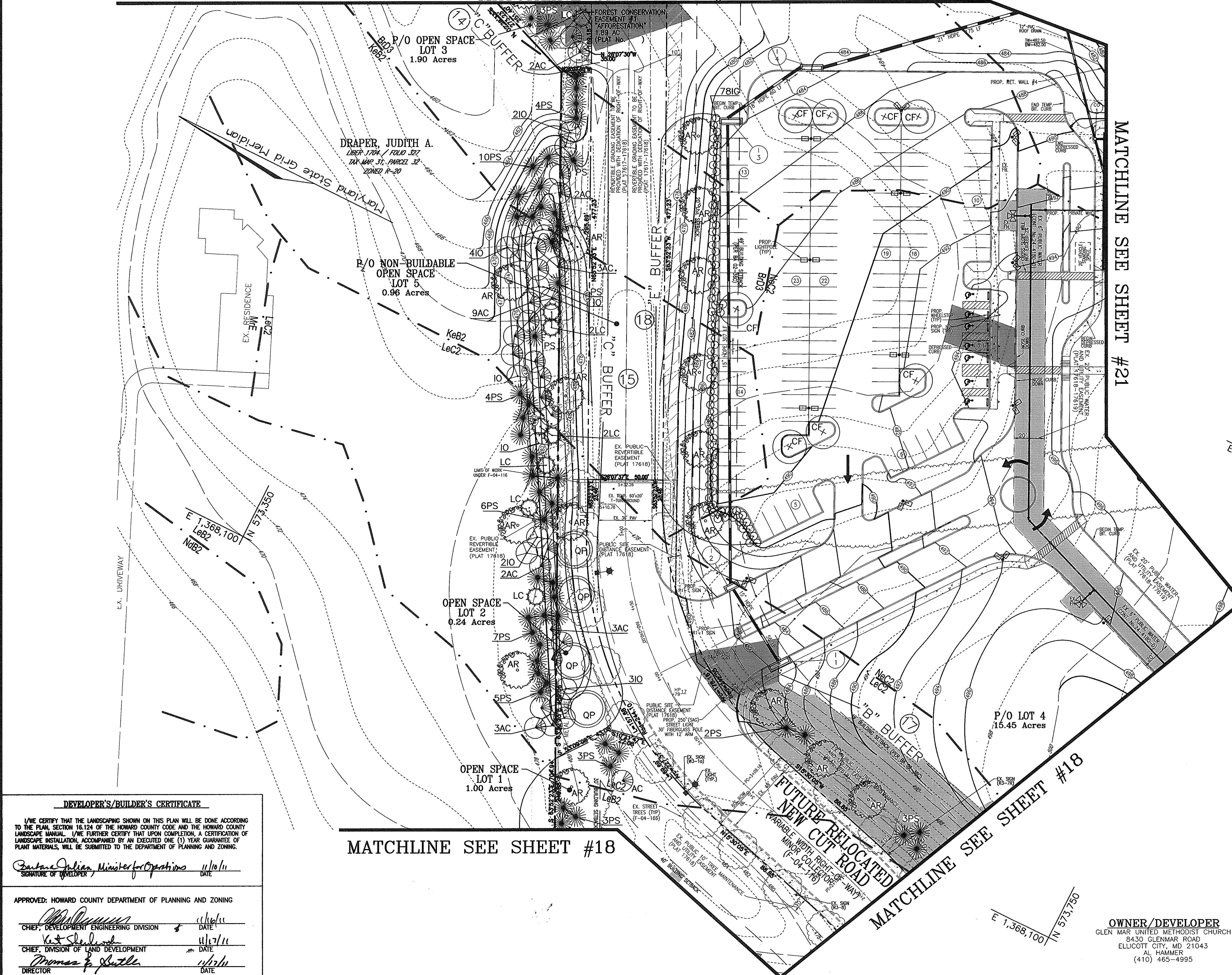
18 SHEET OF 30

MATCHLINE SEE SHEET #20

MATCHLINE SEE SHEET #21

MATCHLINE SEE SHEET #18

MATCHLINE SEE SHEET #18



| NO. | REVISION | DATE |
|-----|---|----------|
| 7 | REVISE PLAN TO ADD LANDSCAPING, SHEDS, AND A PAVILION. | 11-4-11 |
| 3 | REVISE PLAN TO INCREASE SIZE OF PLAYGROUND; REVISE SIGNAGE, ASSOCIATED GRADING AND THE MODIFICATIONS TO ADD ENTRY WAYS TO THE EDUCATION BUILDING. | 09-01-09 |
| 2 | ADD PHASE III; ADDITION OF EDUCATIONS WING, ASSOCIATED GRADING & STORM DRAIN | 12-17-08 |
| 1 | REMOVE PHASE III. REMOVE ASSOCIATED ROOF DRAINS. ADD MANHOLE 1A. ADD PLAT RECORDING REFERENCES TO EXISTING EASEMENTS. REMOVE GENERAL NOTES 40 & 41. | 6-28-08 |

REVISED SITE DEVELOPMENT PLAN
LANDSCAPE PLAN
GLEN MAR UNITED METHODIST CHURCH
 PHASE I & III
 TAX MAP 31 BLOCK 1 & 8 PARCEL '10', LOTS 1-5
 5TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND

ROBERT H. VOGEL ENGINEERING, INC.
 ENGINEERS • SURVEYORS • PLANNERS
 8407 MAIN STREET TEL: 410.461.7866
 ELLICOTT CITY, MD 21043 FAX: 410.461.8961

PROFESSIONAL CERTIFICATE
 I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. EXPIRATION DATE 06-27-2012

DESIGN BY: RHY
 DRAWN BY: DZ/KG
 CHECKED BY: RHY
 DATE: OCTOBER 2011
 SCALE: 1"=30'
 W.O. NO.: 04-64

19 SHEET OF 30

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

Barbara Julia, Minister for Operations 11/16/11
 SIGNATURE OF DEVELOPER DATE

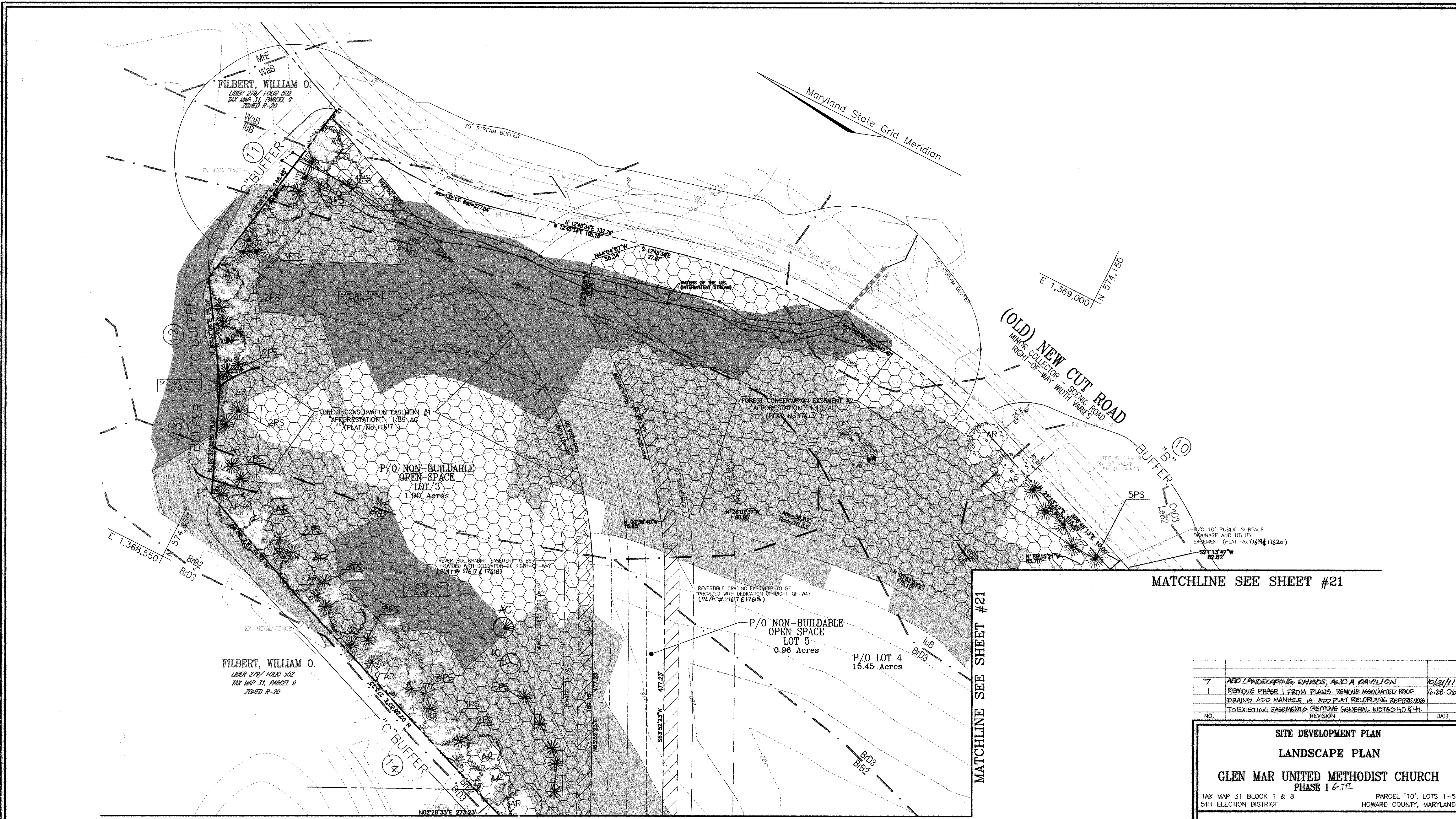
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

[Signature] 11/16/11
 CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

[Signature] 11/17/11
 CHIEF, DIVISION OF LAND DEVELOPMENT DATE

[Signature] 11/16/11
 DIRECTOR DATE

OWNER/DEVELOPER
 GLEN MAR UNITED METHODIST CHURCH
 8430 GLENMAR ROAD
 ELLICOTT CITY, MD 21043
 AL HAMMER
 (410) 465-4995



FILBERT, WILLIAM O.
LIBER 278/ FOLIO 502
TAX MAP 31, PARCEL 9
ZONED R-20

FILBERT, WILLIAM O.
LIBER 278/ FOLIO 502
TAX MAP 31, PARCEL 9
ZONED R-20

P/O NON-BUILDABLE
OPEN SPACE
LOT 3
1.90 Acres

P/O NON-BUILDABLE
OPEN SPACE
LOT 5
0.96 Acres

P/O LOT 4
15.45 Acres

MATCHLINE SEE SHEET #21

MATCHLINE SEE SHEET #21

MATCHLINE SEE SHEET #19

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

 CHIEF, DEVELOPMENT ENGINEERING DIVISION
 DATE: 11/17/04

 CHIEF, DIVISION OF LAND DEVELOPMENT
 DATE: 12/10/04

 DIRECTOR
 DATE: 12/10/04

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

 SIGNATURE OF DEVELOPER
 DATE: 11 OCT 2004

OWNER/DEVELOPER
 GLEN MAR UNITED METHODIST CHURCH
 8430 GLENMAR ROAD
 ELLICOTT CITY, MD 21043
 AL HAMMER
 (410) 465-4995

| NO. | REVISION | DATE |
|-----|--|----------|
| 7 | ADD LANDSCAPING, SHEDS, AND A PAVILION | 10/31/11 |
| 1 | REMOVE PHASE I FROM PLANS. REMOVE ASSOCIATED ROOF DRAINS. ADD MANHOLE 1A. ADD PLAT RECORDING REFERENCES TO EXISTING EASEMENTS. REMOVE GENERAL NOTES 40 & 41. | 6.28.02 |

SITE DEVELOPMENT PLAN
LANDSCAPE PLAN
GLEN MAR UNITED METHODIST CHURCH
 PHASE I & III
 TAX MAP 31 BLOCK 1 & 8 PARCEL '10', LOTS 1-5
 5TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND

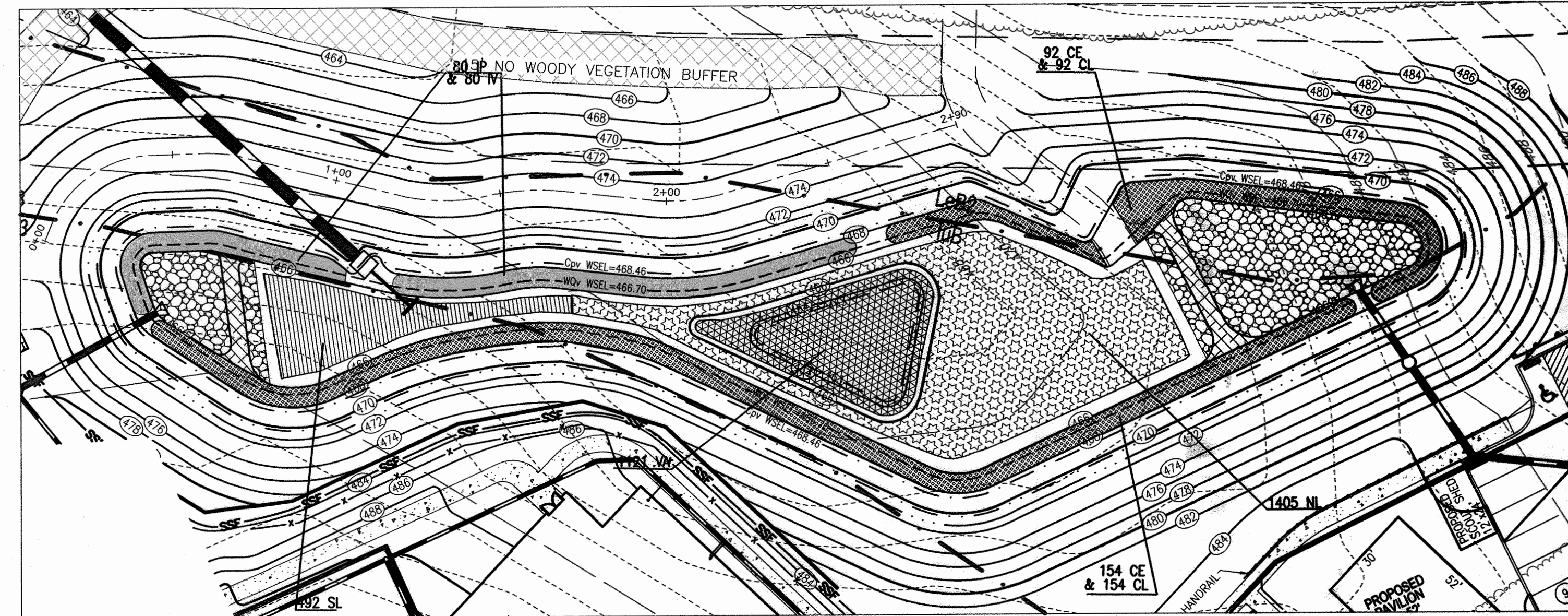
ROBERT H. VOGEL ENGINEERING, INC.
 ENGINEERS · SURVEYORS · PLANNERS
 8407 MAIN STREET
 ELLICOTT CITY, MARYLAND 21043
 TEL: 410.461.7666 FAX: 410.461.8961

ROBERT H. VOGEL, P.E. No. 16193

DESIGN BY: RHV
 DRAWN BY: DJ
 CHECKED BY: RHV
 DATE: OCTOBER 2004
 SCALE: 1"=30'
 W.O. NO.: 04-64

20 SHEET OF 30

MATCHLINE SEE SHEET #20



2' DEEP STORMWATER POND HERBACEOUS LANDSCAPE SCHEDULE

| KEY | QUAN. | BOTANICAL NAME | SIZE | REMARKS |
|-----|-------|---|--------------|---------------|
| IP | 80 | Iris pseudocaris Yellow Water Iris | plug 1.5' oc | |
| IV | 80 | Iris versicolor Blue Flag | plug 1.5' oc | (wear gloves) |
| CE | 246 | Cyperus esculentus Yellow Nut Sedge | plug 2' oc | |
| CL | 246 | Carex lacustris Lakes Sedge | plug 2' oc | |
| SL | 492 | Sagittaria latifolia Duck Potato (do not plant tubers) | plug 4' oc | |
| VA | 1121 | Vallisneria spiralis Wild Celery | plug 2' oc | |
| NL | 1405 | Nuphar luteum Spatterdock | plug 1.5' oc | |

MATCHLINE SEE SHEET #20

MATCHLINE SEE SHEET #19

MATCHLINE SEE SHEET #22

MATCHLINE SEE SHEET #22

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

_____ 11/16/11
 CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE
 _____ 11/17/11
 CHIEF, DIVISION OF LAND DEVELOPMENT DATE
 _____ 11/16/11
 DIRECTOR DATE

DEVELOPER'S/BUILDER'S CERTIFICATE

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

_____ 11/10/11
 SIGNATURE OF DEVELOPER DATE

**SCHEDULE D
STORMWATER MANAGEMENT AREA LANDSCAPING**

| | |
|--|--------|
| PERIMETER TYPE | B |
| LINEAR FEET OF PERIMETER | 935 LF |
| CREDIT FOR EX VEGETATION (NO, YES AND LINEAR FEET) | NO |
| CREDIT FOR OTHER LANDSCAPING (NO, YES AND %) | NO |
| NUMBER OF TREES REQUIRED | |
| SHADE TREES | 19 |
| EVERGREEN TREES | 24 |
| NUMBER OF TREES PROVIDED | |
| SHADE TREES | 13 |
| EVERGREEN TREES | 18 |
| OTHER TREES (2:1 SUB.) | - |

OWNER/DEVELOPER
 GLEN MAR UNITED METHODIST CHURCH
 8430 GLENMAR ROAD
 ELLICOTT CITY, MD 21043
 AL HAMMER
 (410) 465-4995

| | | |
|-----|--|----------|
| 9 | REVISE PLAN TO ADD AN OPEN OUTDOOR TENT TO BE UTILIZED BY CHURCH MEMBERS | 10-6-22 |
| 7 | REVISE PLAN TO ADD LANDSCAPING, SHEDS, AND A PAVILION | 11-4-11 |
| 3 | REVISE PLAN TO INCREASE SIZE OF PLAYGROUND; REVISE SIDEWALKS, ASSOCIATED GRADING AND THE MODIFICATIONS TO ADD ENTRY WAYS TO THE EDUCATION BUILDING | 09-01-09 |
| 2 | ADD PHASE III; ADDITION OF EDUCATING WING, ASSOCIATED GRADING & STORM DRAIN | 12-17-08 |
| 1 | REMOVE PHASE III. REMOVE ASSOCIATED ROOF DRAINS. ADD MANHOLE 1A. | 6-28-06 |
| | ADD PLAT RECORDING REFERENCES TO EXISTING EASEMENTS. REMOVE GENERAL NOTES 40 & 41. | |
| NO. | REVISION | DATE |

**REVISED SITE DEVELOPMENT PLAN
LANDSCAPE PLAN**

**GLEN MAR UNITED METHODIST CHURCH
PHASE I & III**

TAX MAP 31 BLOCK 1 & 8 PARCEL '10', LOTS 1-5
5TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND

ROBERT H. VOGEL ENGINEERING, INC.
 ENGINEERS • SURVEYORS • PLANNERS
 8407 MAIN STREET TEL: 410.461.7666
 ELLICOTT CITY, MD 21043 FAX: 410.461.6961

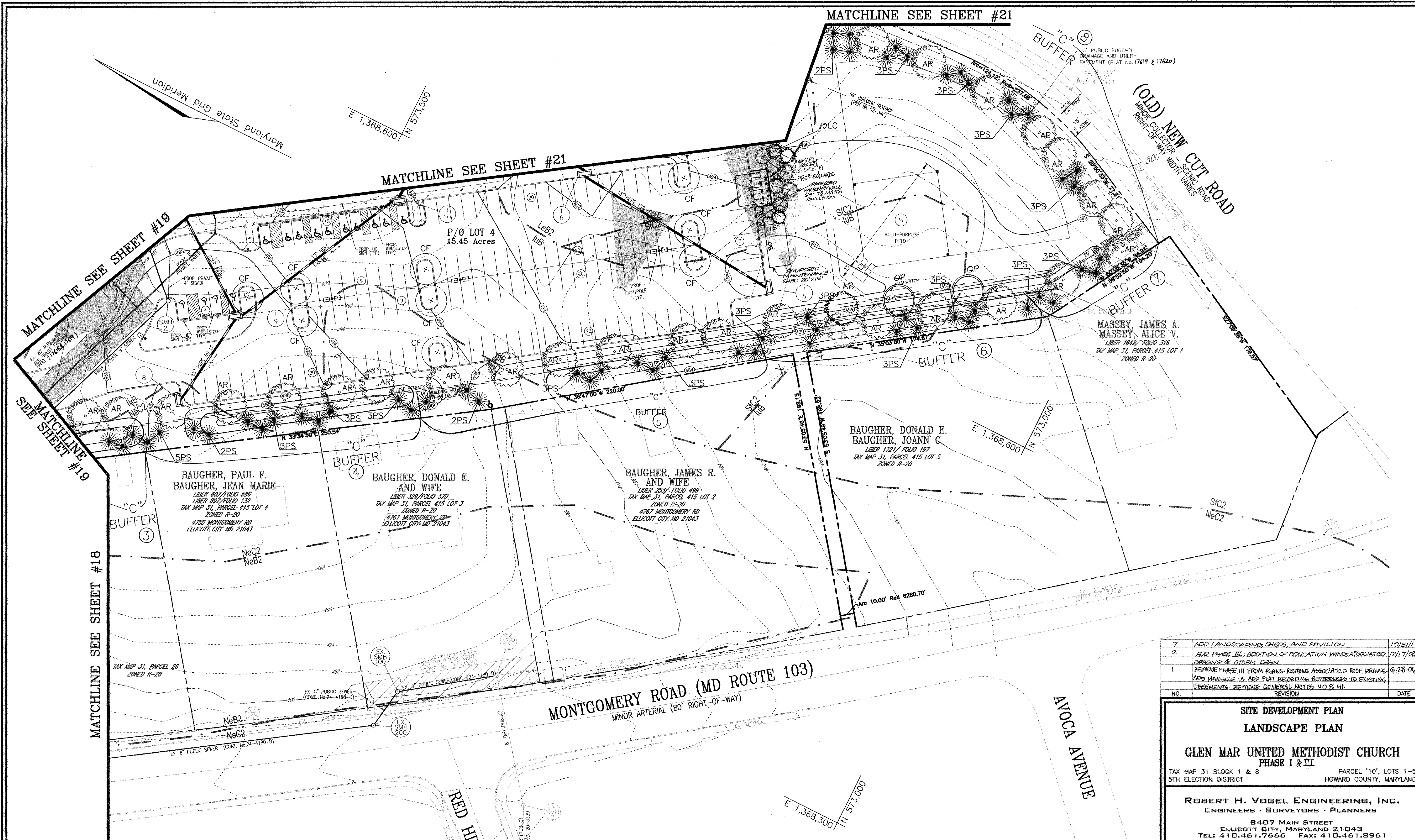
PROFESSIONAL CERTIFICATE

DESIGN BY: RHW
 DRAWN BY: DZ/KG
 CHECKED BY: RHW
 DATE: OCTOBER 2011
 SCALE: 1"=30'
 W.O. NO.: 04-64

I HEREBY CERTIFY THAT THESE ENGINEERING AND SURVEYING SERVICES WERE PREPARED OR SUPERVISED BY ME, THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER OR SURVEYOR IN THE STATE OF MARYLAND, AND THAT THE DATE OF EXPIRATION DATE IS 06-27-2012.

 ROBERT H. VOGEL, PE No. 16193

21 SHEET OF 30



APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

[Signature] 11/17/04
 CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

[Signature] 12/2/04
 CHIEF, DIVISION OF LAND DEVELOPMENT DATE

[Signature] 12/2/04
 DIRECTOR DATE

DEVELOPER'S/BUILDER'S CERTIFICATE

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

[Signature] 11/02/04
 SIGNATURE OF DEVELOPER DATE

OWNER/DEVELOPER
 GLEN MAR UNITED METHODIST CHURCH
 8430 GLENMAR ROAD
 ELLICOTT CITY, MD 21043
 AL HAMMER
 (410) 465-4995

| | | |
|-----|--|----------|
| 7 | ADD LANDSCAPING, SHEDS, AND PAVILION | 10/31/11 |
| 2 | ADD PHASE III; ADDITION OF EDUCATION WING, ASSOCIATED GRADING & STORM DRAIN | 12/1/02 |
| 1 | REMOVE PHASE III FROM PLANS. REMOVE ASSOCIATED ROOF DRAINS. ADD MANHOLE 1A. ADD PLAT RECORDING REFERENCES TO EXISTING EASEMENTS. REMOVE GENERAL NOTES 40 & 41. | 6-28-06 |
| NO. | REVISION | DATE |

**SITE DEVELOPMENT PLAN
 LANDSCAPE PLAN**

**GLEN MAR UNITED METHODIST CHURCH
 PHASE I & III**

TAX MAP 31 BLOCK 1 & 8 PARCEL "10", LOTS 1-5
 5TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND

ROBERT H. VOGEL ENGINEERING, INC.
 ENGINEERS • SURVEYORS • PLANNERS

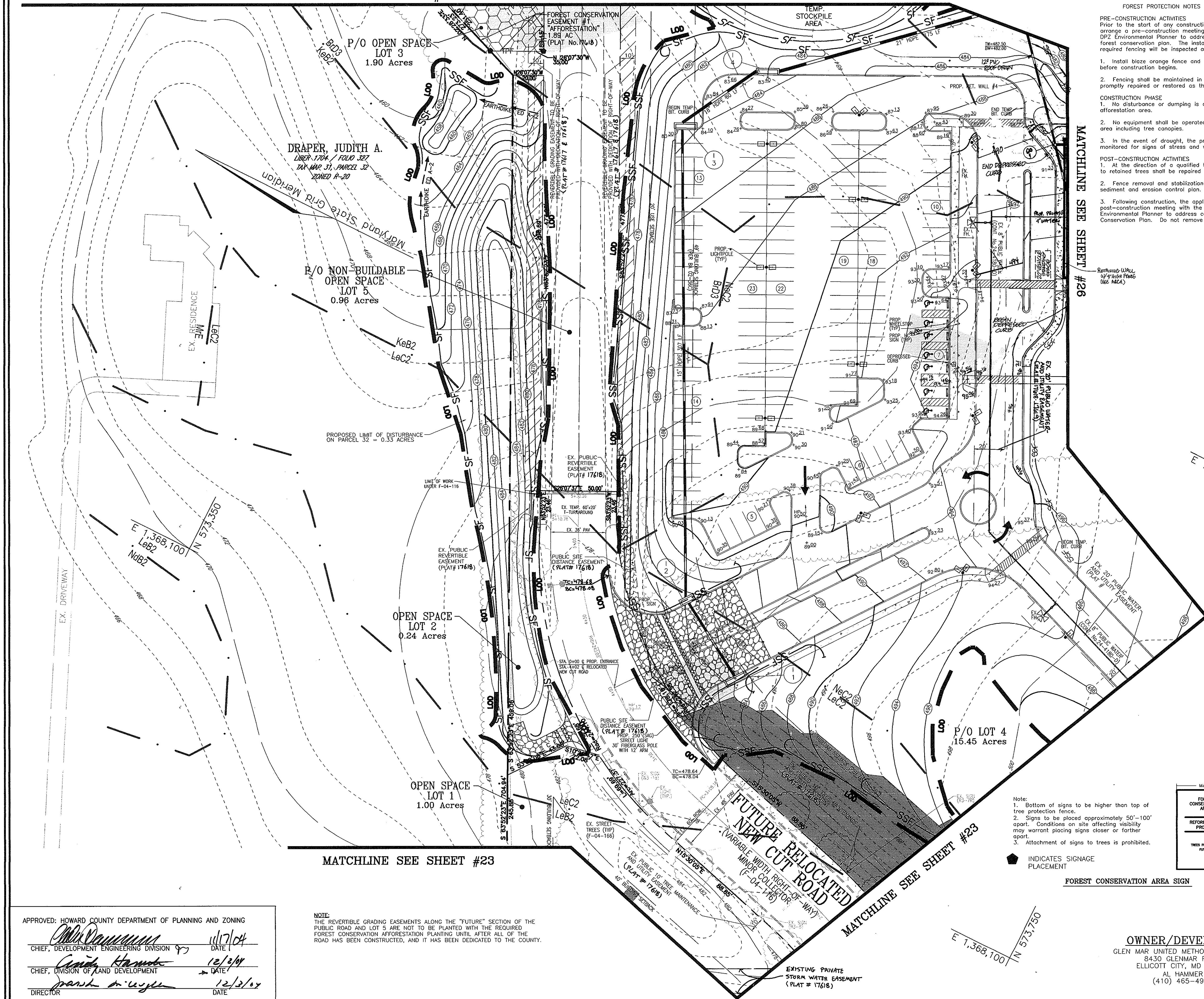
8407 MAIN STREET
 ELLICOTT CITY, MARYLAND 21043
 TEL: 410.461.7666 FAX: 410.461.8961

DESIGN BY: RHV
 DRAWN BY: DZ
 CHECKED BY: RHV
 DATE: OCTOBER 2004
 SCALE: 1"=30'
 W.G. NO.: 04-64

STATE OF MARYLAND
ROBERT H. VOGEL
REGISTERED PROFESSIONAL ENGINEER

22 SHEET OF 30

MATCHLINE SEE SHEET #25



FOREST PROTECTION NOTES

PRE-CONSTRUCTION ACTIVITIES
Prior to the start of any construction, the applicant shall arrange a pre-construction meeting with the Howard County DPZ Environmental Planner to address implementation of the forest conservation plan. The installation of signage, and any required fencing will be inspected at that meeting.

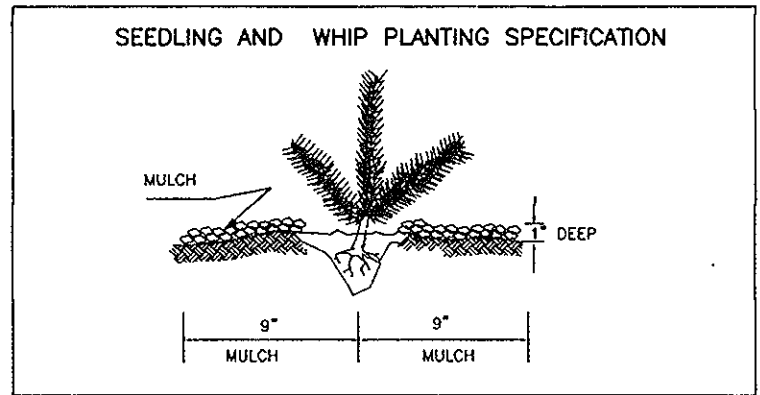
1. Install blaze orange fence and forest conservation signs before construction begins.
2. Fencing shall be maintained in good condition and promptly repaired or restored as the situation warrants.

CONSTRUCTION PHASE
1. No disturbance or dumping is allowed inside the afforestation area.

2. No equipment shall be operated inside the afforestation area including tree canopies.
3. In the event of drought, the protected trees shall be monitored for signs of stress and watered as needed.

POST-CONSTRUCTION ACTIVITIES
1. At the direction of a qualified tree care expert, damages to retained trees shall be repaired by the contractor.

2. Fence removal and stabilization shall be as per the sediment and erosion control plan.
3. Following construction, the applicant shall arrange a post-construction meeting with the Howard County DPZ Environmental Planner to address compliance with the Forest Conservation Plan. Do not remove signs.



AFFORESTATION PLANT SCHEDULE FOREST CONSERVATION EASEMENT #1 1.89 ACRES
PLANTING DENSITY: 1.89 AC. OF WHIPS/SEEDLINGS WITH TREE SHELTERS @ 350 PER ACRE

| QTY. | BOTANICAL NAME | SIZE | SPACING |
|------|---|------|-----------|
| 133 | ACER RUBRUM RED MAPLE | 3-4" | 11' x 11' |
| 133 | PLATANUS x ACERIFOLIA 'BLOODGOOD' BLOODGOOD LONDON PLANE | 3-4" | 11' x 11' |
| 132 | CIRCIS CANADENSIS RED BUD | 3-4" | 11' x 11' |
| 132 | POPULUS GRANDIDENTATA TOOTHED ASPEN | 3-4" | 11' x 11' |
| 132 | QUERCUS RUBRA RED OAK | 3-4" | 11' x 11' |

AFFORESTATION PLANT SCHEDULE FOREST CONSERVATION EASEMENT #2 1.10 ACRES
PLANTING DENSITY: 1.10 AC. OF WHIPS/SEEDLINGS WITH TREE SHELTERS @ 350 PER ACRE

| QTY. | BOTANICAL NAME | SIZE | SPACING |
|------|---|------|-----------|
| 77 | ACER RUBRUM RED MAPLE | 3-4" | 11' x 11' |
| 77 | PLATANUS x ACERIFOLIA 'BLOODGOOD' BLOODGOOD LONDON PLANE | 3-4" | 11' x 11' |
| 77 | CIRCIS CANADENSIS RED BUD | 3-4" | 11' x 11' |
| 77 | POPULUS GRANDIDENTATA TOOTHED ASPEN | 3-4" | 11' x 11' |
| 77 | QUERCUS RUBRA RED OAK | 3-4" | 11' x 11' |

- AFFORESTATION NOTES**
1. AT COMPLETION OF BUILDING CONSTRUCTION, ANY DISTURBED AREAS WITHIN THE CONSERVATION EASEMENT WILL BE VEGETATIVELY STABILIZED WITH ANNUAL RYE AND BIRDSFOOT TREFLOIL.
 2. ANY EXISTING TALL GRASSES WITHIN THE CONSERVATION EASEMENT SHALL BE MOWED TO A HEIGHT OF 3 INCHES.
 3. RANDOMLY SPACE SEEDLINGS/WHIPS SO THAT NO MORE THAN 5 OF ANY PARTICULAR SPECIES ARE PLANTED IN SUCCESSION.
 4. ALL PROPOSED PLANT MATERIAL TO BE NATIVE PLANT SPECIES. NO ORNAMENTAL CULTIVARS TO BE USED. USE LOCAL GENETIC STOCK UP TO A 100-MILE RADIUS.
 5. AFFORESTATION MANAGEMENT RECORDS SHOULD BE KEPT FOR HOWARD COUNTY REVIEW.
 6. YEAR 1: INSPECT TREES FOR HEALTH AND VIGOR AT: A. BEGINNING OF GROWING SEASON, B. MIDSUMMER AND C. FALL. ADJUST WATERING, PEST CONTROL, WEEDING AND FEEDING AS NEEDED. AFTER ONE YEAR, REPLACE ANY 1" CAL. OF 6" HT. TREES THAT DID NOT SURVIVE DURING THE NEXT PLANTING SEASON.
 7. YEAR 2: INSPECT TREES FOR HEALTH AND VIGOR IN APRIL AND OCTOBER. ADJUST WATERING, PEST CONTROL, WEEDING, AND FEEDING AS NEEDED. REPLACE ANY 1" CAL./6" HT. TREES THAT DID NOT SURVIVE YEAR 2 DURING THE NEXT PLANTING SEASON. SEEDLINGS SHALL BE REPLACED UP TO 50 PERCENT DURING THE NEXT PLANTING SEASON.
 8. CONTRACTOR TO FOLLOW ALL STATE AND COUNTY GUIDELINES FOR AFFORESTATION.
 9. IN ORDER TO INSURE SURVIVABILITY, THE PERSON RESPONSIBLE FOR INSTALLATION SHALL INSPECT AND AMEND THE SOILS PRIOR TO PLANTING. PROVIDE WATER DURING DROUGHT PERIODS, AND REMOVE ANY PESTS OR WEEDS DURING THE 2-YEAR MAINTENANCE PERIOD.

| NO. | REVISION | DATE |
|-----|--|----------|
| 3 | REMOVE PLANS TO INCREASE SIZE OF PLAYGROUND; REMOVE SEEDLINGS, ASSOCIATED GRASSING AND THE MEASUREMENTS TO ADD ENTRY WINGS TO THE EDUCATION BUILDING | 09-01-09 |
| 2 | ADD PHASE III 1/2 ADDITION OF EDUCATION WING, ASSOCIATED GRASSING AND STORM DRAIN | 12/17/08 |
| 1 | REMOVE PHASE III FROM PLANS; REMOVE ASSOCIATED ROOF DRAWS AND MANHOLE 1A. ADD PLAT RECORDING REFERENCES TO EXISTING EASEMENTS; REMOVE GENERAL NOTES 40 AND 41. | 6-28-06 |

SITE DEVELOPMENT PLAN
FOREST CONSERVATION PLAN
GLEN MAR UNITED METHODIST CHURCH
PHASE I & III

TAX MAP 31 BLOCK 1 & 8 PARCEL '10', LOTS 1-5
5TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND

ROBERT H. VOGEL ENGINEERING, INC.
ENGINEERS • SURVEYORS • PLANNERS

8407 MAIN STREET
ELlicott CITY, MARYLAND 21043
TEL: 410.461.7666 FAX: 410.461.8961

| | |
|-----------------------|--------------|
| DESIGN BY: _____ ACS | 10/1/04 |
| DRAWN BY: _____ DZ | |
| CHECKED BY: _____ ACS | |
| DATE: _____ | OCTOBER 2004 |
| SCALE: _____ | 1"=30' |
| W.O. NO.: _____ | 04-64 |

24 SHEET OF 30

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

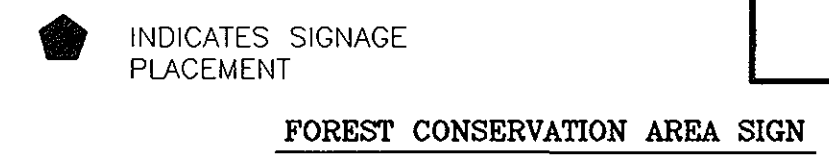
Michael... 11/7/04
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

Cynthia... 12/3/04
CHIEF, DIVISION OF LAND DEVELOPMENT DATE

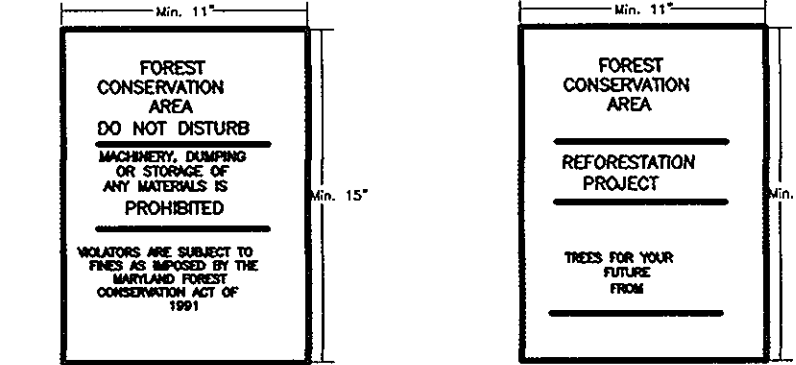
Mark... 12/3/04
DIRECTOR DATE

NOTE:
THE REVERSIBLE GRADING EASEMENTS ALONG THE "FUTURE" SECTION OF THE PUBLIC ROAD AND LOT 5 ARE NOT TO BE PLANTED WITH THE REQUIRED FOREST CONSERVATION AFFORESTATION PLANTING UNTIL AFTER ALL OF THE ROAD HAS BEEN CONSTRUCTED, AND IT HAS BEEN DEDICATED TO THE COUNTY.

- Note:
1. Bottom of signs to be higher than top of tree protection fence.
 2. Signs to be placed approximately 50'-100' apart. Conditions on site affecting visibility may warrant placing signs closer or farther apart.
 3. Attachment of signs to trees is prohibited.



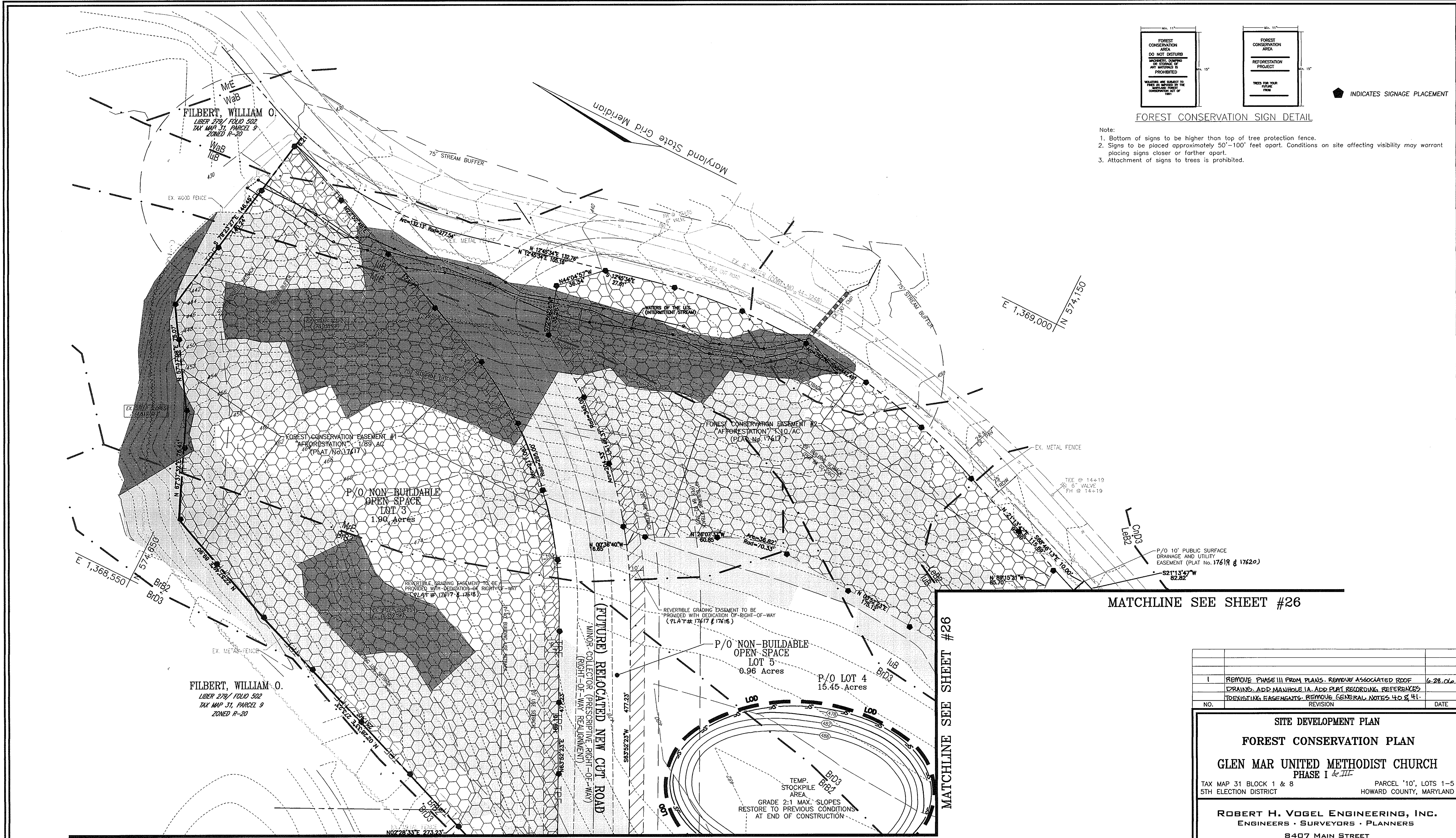
OWNER/DEVELOPER
GLEN MAR UNITED METHODIST CHURCH
8430 GLENMAR ROAD
ELlicott CITY, MD 21043
AL HAMMER
(410) 465-4995



FOREST CONSERVATION SIGN DETAIL

- Note:
1. Bottom of signs to be higher than top of tree protection fence.
 2. Signs to be placed approximately 50'-100' feet apart. Conditions on site affecting visibility may warrant placing signs closer or farther apart.
 3. Attachment of signs to trees is prohibited.

INDICATES SIGNAGE PLACEMENT



MATCHLINE SEE SHEET #26

MATCHLINE SEE SHEET #24

MATCHLINE SEE SHEET #26

| NO. | REVISION | DATE |
|-----|--|---------|
| 1 | REMOVE PHASE III FROM PLANS. REMOVE ASSOCIATED ROOF DRAINS. ADD MANHOLE 1A. ADD PLAT RECORDING REFERENCES TO EXISTING EASEMENTS. REMOVE GENERAL NOTES 4.0 & 4.1. | 6.28.04 |

SITE DEVELOPMENT PLAN
FOREST CONSERVATION PLAN
GLEN MAR UNITED METHODIST CHURCH
 PHASE I & III

TAX MAP 31 BLOCK 1 & 8 PARCEL '10', LOTS 1-5
 5TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND

ROBERT H. VOGEL ENGINEERING, INC.
 ENGINEERS · SURVEYORS · PLANNERS

8407 MAIN STREET
 ELLICOTT CITY, MARYLAND 21043
 TEL: 410.461.7666 FAX: 410.461.8961

OWNER/DEVELOPER
 GLEN MAR UNITED METHODIST CHURCH
 8430 GLENMAR ROAD
 ELLICOTT CITY, MD 21043
 AL HAMMER
 (410) 465-4995

| | | |
|--------------------------|--|----------------|
| DESIGN BY: _____ ACS | | 25 SHEET OF 30 |
| DRAWN BY: _____ DZ | | |
| CHECKED BY: _____ ACS | | |
| DATE: _____ OCTOBER 2004 | | |
| SCALE: _____ 1"=30' | | |
| W.O. NO.: _____ 04-64 | | |

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

Chris Danvers 11/17/04
 CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

Cindy Hanata 12/2/04
 CHIEF, DIVISION OF LAND DEVELOPMENT DATE

Markus J. Loyell 12/2/04
 DIRECTOR DATE

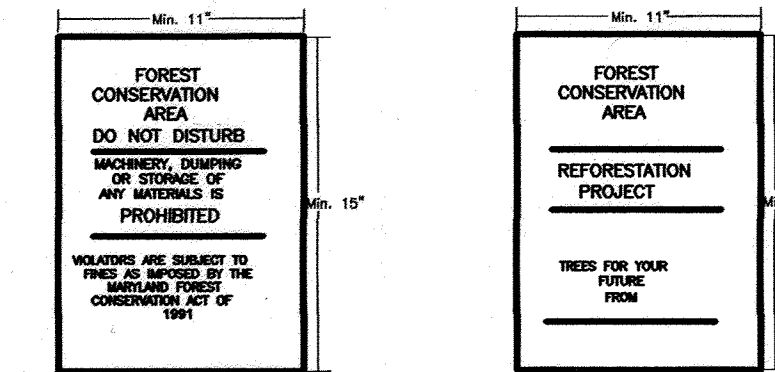
NOTE:
 THE REVERTIBLE GRADING EASEMENTS ALONG THE "FUTURE" SECTION OF THE PUBLIC ROAD AND LOT 5 ARE NOT TO BE PLANTED WITH THE REQUIRED FOREST CONSERVATION AFFORESTATION PLANTING UNTIL AFTER ALL OF THE ROAD HAS BEEN CONSTRUCTED, AND IT HAS BEEN DEDICATED TO THE COUNTY.

MATCHLINE SEE SHEET #25

IGLER, FRANK A
IGLER, FRANK R.
LIBER 184/ FOLIO 417
TAX MAP 31, PARCEL 11
ZONED R-20

KUPCHOCK, SALLY M.
LIBER 2231/ FOLIO 659
TAX MAP 31, PARCEL 605
ZONED R-20

BAUGHER, RUSSEL H.
BAUGHER, JAMES R.
BAUGHER, MILDRED J.
LIBER 2033/ FOLIO 23
TAX MAP 31, PARCEL 800
ZONED R-20



FOREST CONSERVATION SIGN DETAIL

- Note:
1. Bottom of signs to be higher than top of tree protection fence.
 2. Signs to be placed approximately 50'-100' feet apart. Conditions on site affecting visibility may warrant placing signs closer or farther apart.
 3. Attachment of signs to trees is prohibited.

MATCHLINE SEE SHEET #25

MATCHLINE SEE SHEET #24

MATCHLINE SEE SHEET #27

MATCHLINE SEE SHEET #27

SPECIMEN TREE CHART

| NO. | COMMON NAME | DBH (INCHES) | RETAIN/REMOVE |
|-----|--------------|--------------|---------------|
| 1 | CHESTNUT OAK | >45" | |
| 2 | TULIP POPLAR | >30" | |

| NO. | REVISION | DATE |
|-----|--|----------|
| 9 | REVISE PLAN TO ADD AN OPEN OUTDOOR TENT TO BE UTILIZED BY CHURCH MEMBERS | 10-6-22 |
| 3 | REVISE PLAN TO INCREASE SIZE OF PLAYGROUND, REUSE SIDEWALKS, PROTECTIVE CURBS | 09-01-09 |
| | ADD THE MEMORIALS TO ADD BENCHES TO THE EXISTING BUILDING | |
| 2 | ADD PHASE III, ADDITION OF EDUCATION WING ASSOCIATED GRADING AND STORM DRAIN | 12/17/08 |
| 1 | REMOVE PHASE III FROM PLANS. REMOVE ASSOCIATED ROOF DRAINS | 6-28-06 |
| | ADD MANHOLE 1A. ADD PLAT RECORDING REFERENCES TO EXISTING EASEMENTS. REMOVE GENERAL NOTES 40 AND 41. | |

SITE DEVELOPMENT PLAN
FOREST CONSERVATION PLAN
GLEN MAR UNITED METHODIST CHURCH
PHASE I & III
TAX MAP 31 BLOCK 1 & 8 PARCEL '10', LOTS 1-5
5TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND

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

DESIGN BY: _____ ACS
DRAWN BY: _____ DZ
CHECKED BY: _____ ACS
DATE: _____ OCTOBER 2004
SCALE: 1"=30'
W.O. NO.: _____ 04-64

26 SHEET OF **30**

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

[Signature] 11/17/04
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

[Signature] 12/2/04
CHIEF, DIVISION OF LAND DEVELOPMENT DATE

[Signature] 12/2/04
DIRECTOR DATE

OWNER/DEVELOPER
GLEN MAR UNITED METHODIST CHURCH
8430 GLENMAR ROAD
ELLCOTT CITY, MD 21043
AL HAMMER
(410) 465-4995

MATCHLINE SEE SHEET #26

10' PUBLIC SURFACE DRAINAGE AND UTILITY EASEMENT (PLAT No. 17619 & 17620) TEE @ 3+91 6" VALVE @ 3+91

(OLD) NEW CUT ROAD
MINOR RIGHT-OF-WAY WIDTH Varies
500'

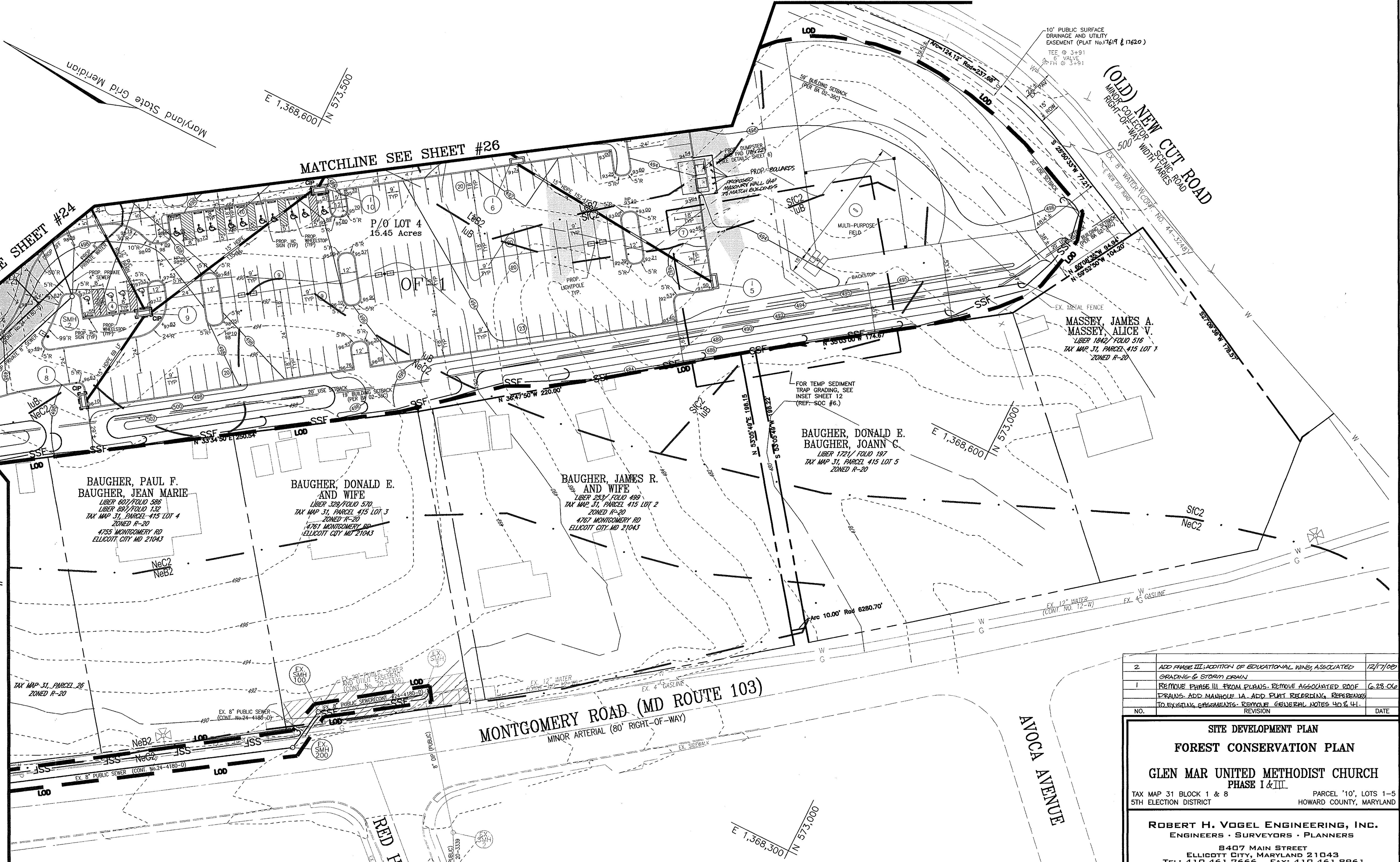
Maryland State Grid Meridian

E 1,368,600
N 573,500

MATCHLINE SEE SHEET #26

MATCHLINE SEE SHEET #24

MATCHLINE SEE SHEET #23



BAUGHER, PAUL F.
BAUGHER, JEAN MARIE
LIBER 602/FOLD 586
LIBER 602/FOLD 132
TAX MAP 31, PARCEL 415 LOT 4
ZONED R-20
4755 MONTGOMERY RD
ELLCOTT CITY MD 21043

BAUGHER, DONALD E.
AND WIFE
LIBER 329/FOLD 570
TAX MAP 31, PARCEL 415 LOT 3
ZONED R-20
4761 MONTGOMERY RD
ELLCOTT CITY MD 21043

BAUGHER, JAMES R.
AND WIFE
LIBER 283/FOLD 499
TAX MAP 31, PARCEL 415 LOT 2
ZONED R-20
4767 MONTGOMERY RD
ELLCOTT CITY MD 21043

BAUGHER, DONALD E.
BAUGHER, JOANN C.
LIBER 1721/FOLD 197
TAX MAP 31, PARCEL 415 LOT 5
ZONED R-20

MASSEY, JAMES A.
MASSEY, ALICE V.
LIBER 1842/FOLD 516
TAX MAP 31, PARCEL 415 LOT 1
ZONED R-20

MONTGOMERY ROAD (MD ROUTE 103)
MINOR ARTERIAL (80' RIGHT-OF-WAY)

ANOCA AVENUE

RED HILL WAY

| | | |
|-----|--|----------|
| 2 | ADD PHASE III; ADDITION OF EDUCATIONAL WING, ASSOCIATED GRADING & STORM DRAIN | 12/17/09 |
| 1 | REMOVE PHASE III FROM PLANS; REMOVE ASSOCIATED ROOF DRAINS; ADD MANHOLE 1A; ADD ELEV RECORDING; REPERMITS TO EXISTING EASEMENTS; REMOVE GENERAL NOTES 40 & 41. | 6.28.06 |
| NO. | REVISION | DATE |

SITE DEVELOPMENT PLAN
FOREST CONSERVATION PLAN
GLEN MAR UNITED METHODIST CHURCH
PHASE I & III
 TAX MAP 31 BLOCK 1 & 8 PARCEL '10', LOTS 1-5
 5TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND

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

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

Chris Dammann 11/17/04
 CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE

Cinda Hamilton 12/2/04
 CHIEF, DIVISION OF LAND DEVELOPMENT DATE

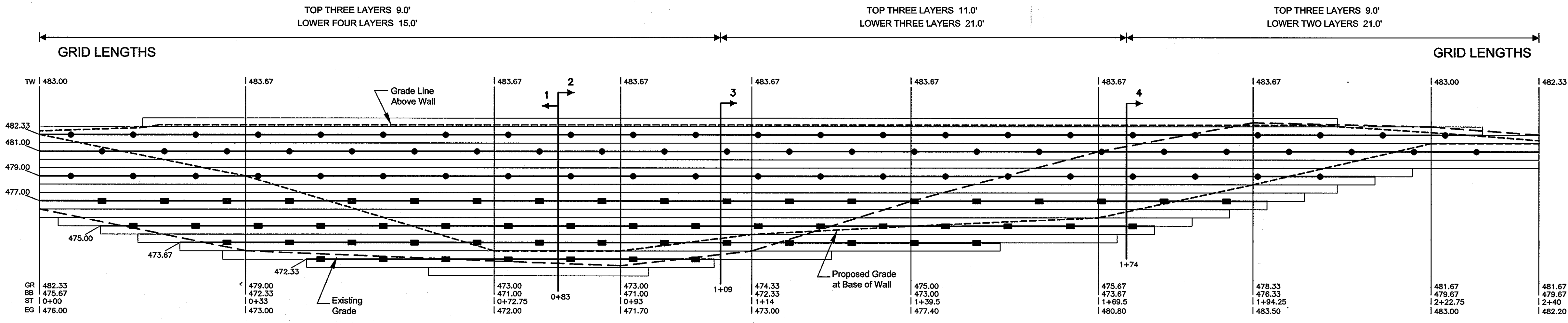
Marsha DeLayton 12/18/04
 DIRECTOR DATE

OWNER/DEVELOPER
 GLEN MAR UNITED METHODIST CHURCH
 8430 GLENMAR ROAD
 ELLCOTT CITY, MD 21043
 AL HAMMER
 (410) 465-4995

DESIGN BY: ACS
 DRAWN BY: DZ
 CHECKED BY: ACS
 DATE: OCTOBER 2004
 SCALE: 1"=30'
 W.O. NO.: 04-34

10/14/04
James J. Thompson
 CARRY J. THOMPSON
 DNR QUALIFIED PROFESSIONAL

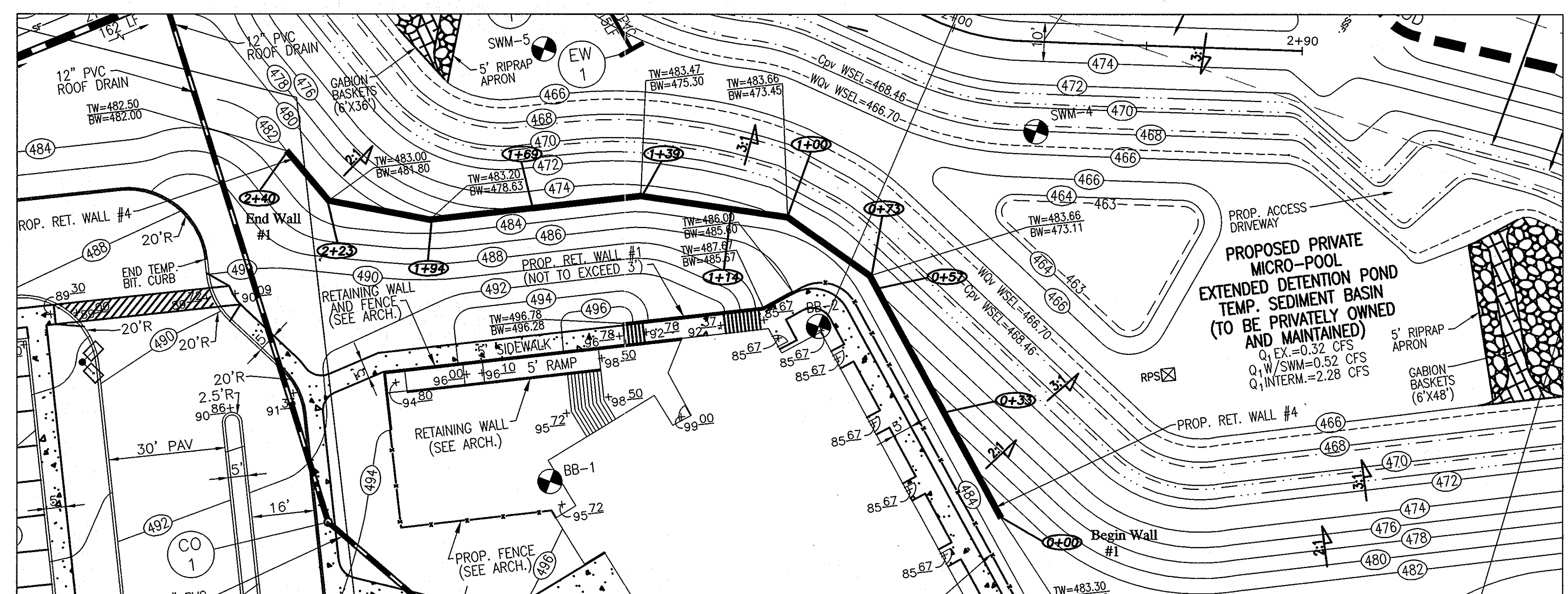
27 SHEET OF 30



GRID KEY: MIRAFI 3XT
 MIRAFI 8XT

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

SCALE:
 Horizontal Scale 1"=10'
 Vertical Scale 1"=5'



SCALE: 1"=20'

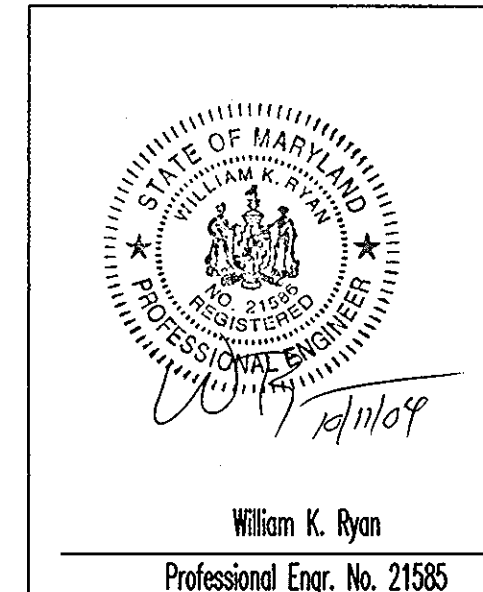
DEVELOPER'S/BUILDER'S CERTIFICATE
 I/WE CERTIFY THAT THE LANDSCAPING SHOWN ON THIS PLAN WILL BE DONE ACCORDING TO THE PLAN, SECTION 16.124 OF THE HOWARD COUNTY CODE AND THE HOWARD COUNTY LANDSCAPE MANUAL. I/WE FURTHER CERTIFY THAT UPON COMPLETION, A CERTIFICATION OF LANDSCAPE INSTALLATION, ACCOMPANIED BY A GUARANTEED ONE (1) YEAR GUARANTEE OF PLANT MATERIALS, WILL BE SUBMITTED TO THE DEPARTMENT OF PLANNING AND ZONING.
 SIGNATURE OF DEVELOPER: _____ DATE: _____
 APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING
 CHIEF, DEVELOPMENT ENGINEERING DIVISION: *John J. Williams* DATE: 11/17/04
 CHIEF, DIVISION OF LAND DEVELOPMENT: *Candy Hamilton* DATE: 12/2/04
 DIRECTOR: *John M. Vogel* DATE: 12/2/04

THESE PLANS HAVE BEEN REVIEWED FOR HOWARD SOIL CONSERVATION DISTRICT AND MEET THE TECHNICAL REQUIREMENTS FOR SMALL POND CONSTRUCTION, SOIL EROSION AND SEDIMENT CONTROL.
 USDA - NATURAL RESOURCES CONSERVATION SERVICE
 THESE PLANS FOR SMALL POND CONSTRUCTION, SOIL EROSION AND SEDIMENT CONTROL MEET THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT.
 HOWARD S.C.D. _____ DATE: _____

BY THE DEVELOPER:
 I/WE CERTIFY THAT ALL DEVELOPMENT AND/OR CONSTRUCTION WILL BE DONE IN ACCORDANCE TO THESE PLANS, AND THAT ANY RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF ATTENDANCE AT A DEPARTMENT OF THE ENVIRONMENT APPROVED TRAINING PROGRAM FOR THE COURSE OF SEDIMENT AND EROSION BEFORE BEGINNING THE PROJECT. I SHALL ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION.
 SIGNATURE OF DEVELOPER: *William David III* DATE: _____

BY THE ENGINEER:
 I HEREBY CERTIFY THAT THIS PLAN FOR POND CONSTRUCTION, EROSION AND SEDIMENT CONTROL REPRESENTS A PRACTICE AND WORKABLE PLAN BASED ON MY PERSONAL KNOWLEDGE OF THE SITE CONDITIONS. THIS PLAN WAS PREPARED IN ACCORDANCE WITH THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT. I HAVE NOTICED THE DEVELOPER THAT HE/SHE MUST ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION.
 SIGNATURE OF ENGINEER: *Robert H. Vogel, P.E.* DATE: _____

RYAN & ASSOCIATES
 A Division of WKR Consulting, Inc.
RETAINING WALL DIVISION
 717-477-8400 fax 717-477-8410
 68 West King Street
 Shippensburg, PA 17257-0006



| | | |
|-----|---|----------|
| NO. | REVISION | DATE |
| 1 | REMOVE PHASE II FROM PLANS. REMOVE ASSOCIATED ROOF DRAWS. ADD PHASE I. ADD PLAT REVISIONS REFERENCES TO EXISTING DISCREPANCIES. REMOVE GENERAL NOTES 4p & 4i. | 06-28-04 |

SITE DEVELOPMENT PLAN
RETAINING WALL DESIGN
 WALL PLAN AND PROFILE
 GLEN MAR UNITED METHODIST CHURCH
 PHASE I & III
 TAX MAP 31 BLOCK 1 & 8 PARCEL '10', LOTS 1-5
 5TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND

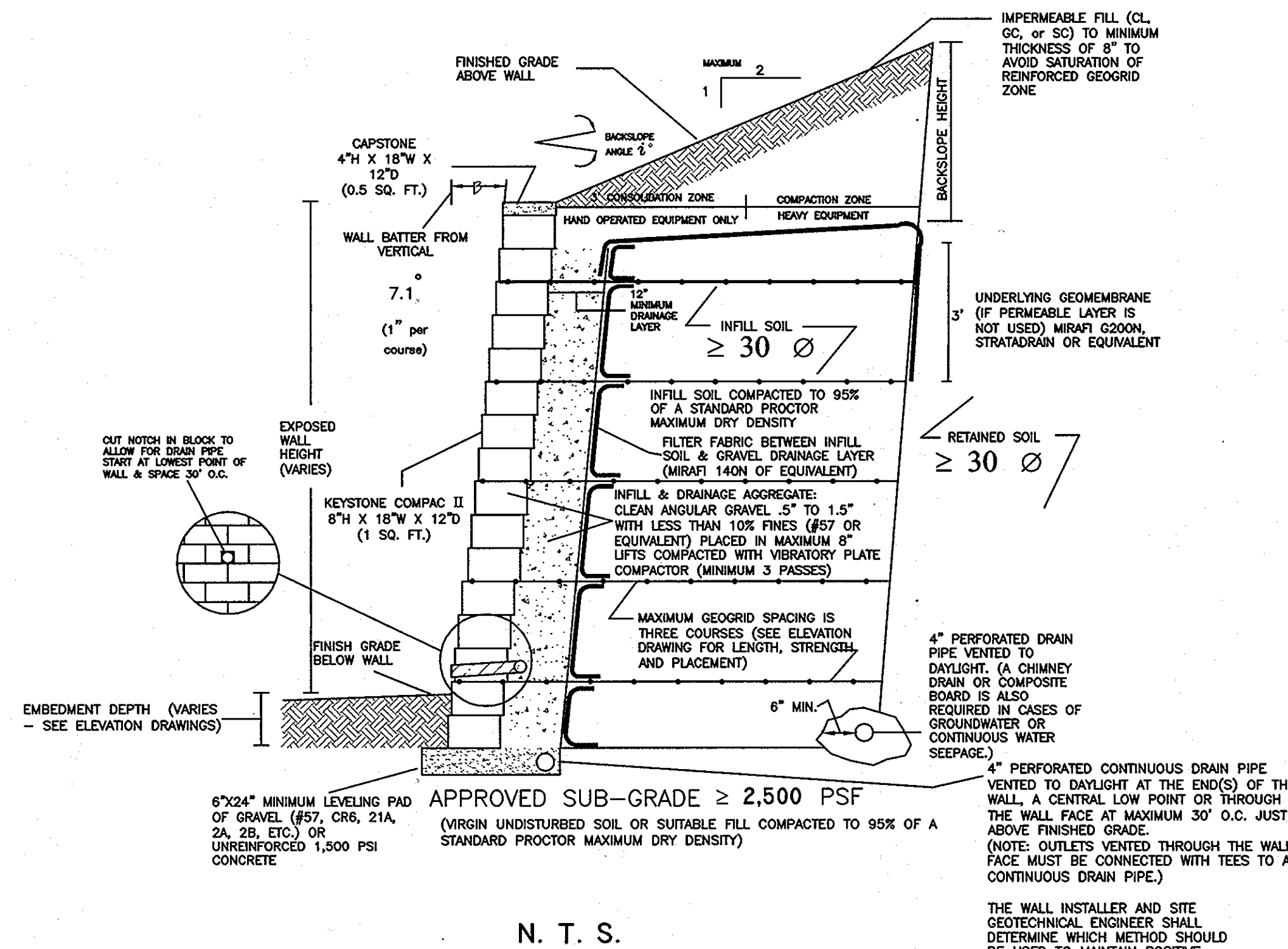
ROBERT H. VOGEL ENGINEERING, INC.
 ENGINEERS • SURVEYORS • PLANNERS
 8407 MAIN STREET
 ELLICOTT CITY, MARYLAND 21043
 TEL: 410.461.7666 FAX: 410.461.8961

DESIGN BY: _____ RHW
 DRAWN BY: _____ DZ
 CHECKED BY: _____ RHW
 DATE: _____ OCTOBER 2004
 SCALE: _____ AS SHOWN
 W.O. NO.: _____ 04-84

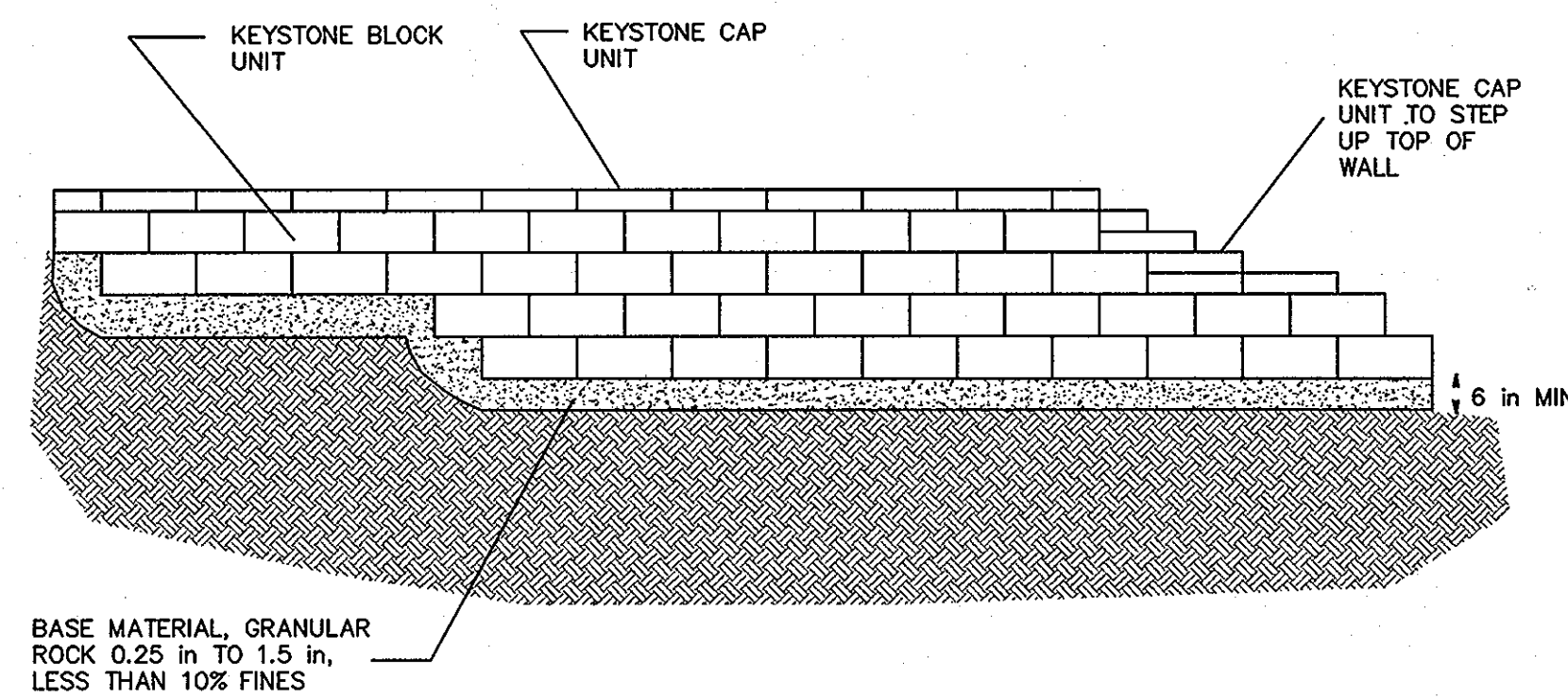
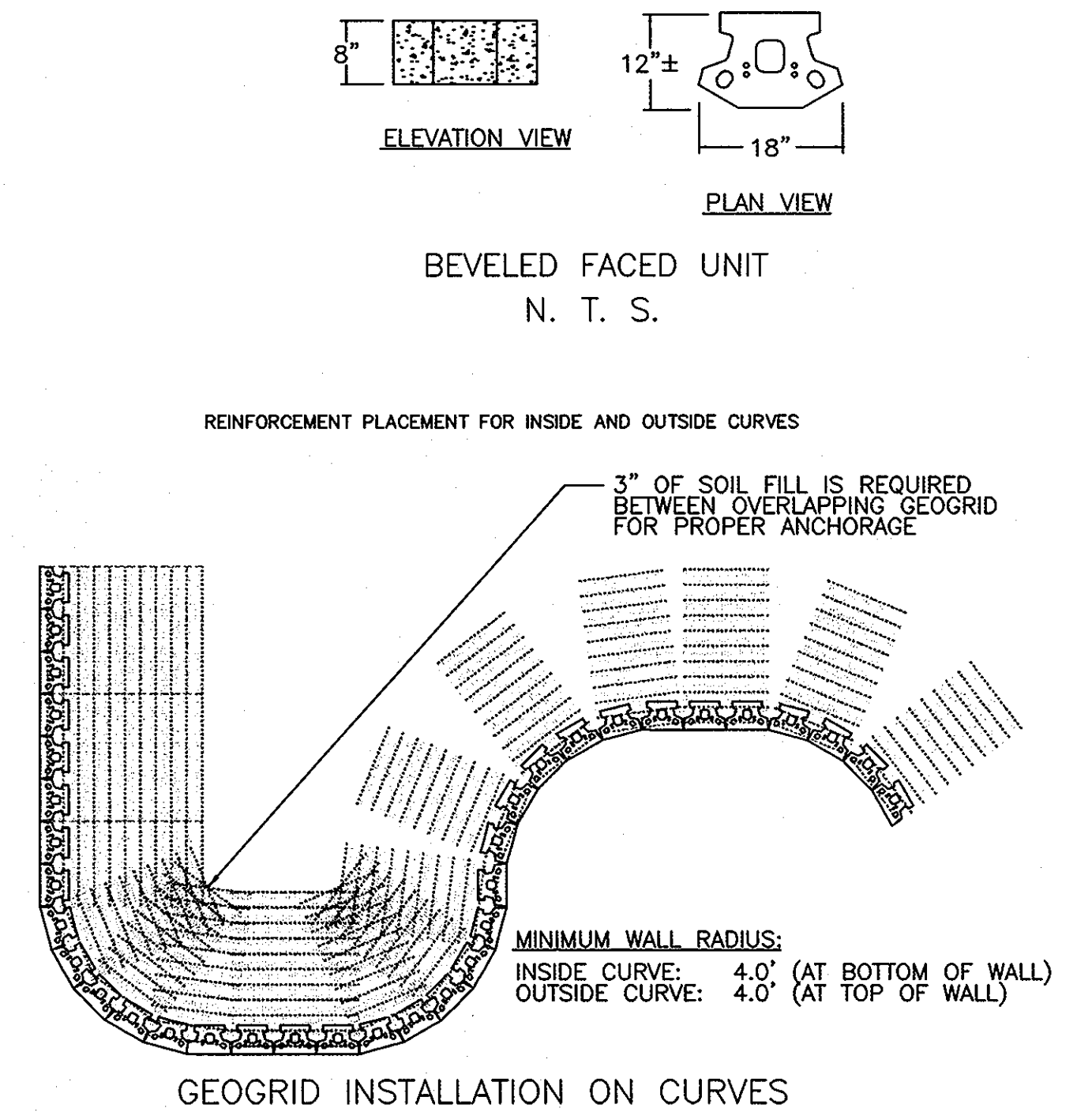
GENERAL NOTES

- SOIL PARAMETERS:** Based on review of the "Report of Subsurface Exploration and Geotechnical Engineering Analysis" dated 05/15/2003 for this site prepared by ECS, Ltd., the following soil parameters were used for the wall design. An internal angle of friction of 32° was used for the foundation soil (the wall's sub-grade) since the borings indicate that the material at this elevation of the wall is most likely dense SM (silty sand) or WR (weathered rock). An internal angle of friction of 30° was used for the infill soil (within the wall's reinforced geogrid zone) and retained soil (behind the wall's reinforced geogrid zone and extending to a distance that is twice the wall's exposure height). This is in accordance with the ECS report which states that only SM or more coarsely graded materials shall be used for wall construction. Therefore both the infill and retained soils must be classified by USCS as gravel (GC, GM, GP or GW) or sand (SC, SM SP or SW), CH (fat clay), CL (lean clay), MH (elastic silt), ML (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 30°. The on site geotechnical engineer shall monitor this closely during the construction process. The moisture level of the soils must be ±2% of optimum to obtain proper compaction results. Since proctors were not available for the sandy soils, assumed unit weights (maximum wet densities less 5% for 95% compaction) of 135 PCF for the 32° soils and 130 PCF for the 30° foundation and retained soils were used. The site geotechnical engineer shall run standard proctor tests of the proposed infill and retained soils (prior to wall construction) to verify the actual soil density. Fluctuations of 5 PCF higher or lower will not affect this design, however if the unit weights vary by more than 5 PCF Ryan & Associates (RA) must be notified so that the cross sections can be rerun to verify that all factors of safety are still met. No cohesion was used in any of the calculations.
- CONSTRUCTION OVERSIGHT:** The construction of this wall must be performed under the observation of a Maryland Registered Professional Engineer to ensure that it is built in accordance with the RA General Notes and Specifications.
- GLOBAL STABILITY:** Two global stability analyses were done on G-Slope design software (GA1 at wall station 0+73 & GA2 at wall station 1+39). The geogrid layers were lengthened and strengthened (8XT was required at the bottom) until factors of safety of 1.3 for a dry pond condition and 1.1 for rapid draw down situation (with a piezometric surface at the 100 year flood elevation) were met. Copies of the global stability analyses have been included in the 8 1/2" X 11" calculations submittal.
- BEARING CAPACITY:** The wall's 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 sub-grade must be virgin (natural undisturbed soil with blow counts ≥12) or suitable fill (≥32") compacted to 95% of a standard proctor maximum dry density. Any areas of the sub-grade that do not meet this bearing pressure will require undercutting and/or geogrid reinforcing.
- DESIGN SOFTWARE:** Internal and external wall calculations were performed with Keywall 2001 design software (version 3.3.1.64). 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, bearing capacity and global stability) and bearing pressure (the load exerted by the wall on the sub-grade). 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).
- GEORGRIDS:** Mirafi 3XT & 8XT geogrids, which have LTDS (Long Term Design Strengths) of 1558 & 3636 respectively, were used in this design. All geogrid substitutions must have prior approval of RA.
- WALL PROFILE:** The elevation drawing was done to represent the grade changes necessary on the civil drawings 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 heights. If the wall needs to be raised in height, RA shall be notified and new structural cross sections must be provided before the wall 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.
- 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, Geogrid Pullout 1.5 (from the block and from the soil) and Global Stability 1.3.
- EMBEDMENT:** The wall embedment varies from three to ten blocks. The exact amount of buried blocks may be determined by subtracting the "BB" elevations from the "GR" elevations on the RA profile drawing. Additional blocks were buried in some areas to ensure that the wall is built on virgin soil and not fill soils.
- REAR DRAIN TILES:** A rear drainpipe is required at the back of the wall's reinforced geogrid zone. This is in addition to the mandatory 4" drainpipe at the front of the wall (within the gravel leveling pad or behind the at grade course— depending which drainpipe position is exercised). The rear drainpipe shall be surrounded by a minimum of 6" of clean gravel (#57 or equivalent) and shall be vented to daylight, connected to an underground storm system or have perpendicular solid pipes that run forward and vent it through the wall face at maximum 30' O.C. (it may be connected to the front drainpipe with crosses or tees).
- BLOCK SYSTEM:** This design is valid only for the Keystone Compac II block system. Each segmental wall system has unique dimensions, connection devices and interacts differently with geogrids; therefore other block types may not be substituted.
- FILTER FABRIC:** Filter fabric (Mirafi 140N or equivalent) is required between the 12" gravel drainage layer and the compacted infill soil (as shown on the wall section) since the infill soils will be sandy (non-cohesive soils can slough into and clog the drainage layer).
- SEPARATE 8 1/2" X 11" SUBMITTAL:** A separate 8 1/2" X 11" booklet has also been provided and includes: cover letter, General Notes, Keywall cross section calculations, G-Slope global stability calculations and RA Specifications.
- WALL BATTER:** The 7.1" batter (1" setback per block course: rear pin position) was used for the Keystone blocks in this design. The 0.5" near vertical batter (1/16" setback per block course: front pin position) may not be used for this wall. NOTE: it is important for the wall installer and the civil engineer/surveyor to predetermine the wall's batter during stake out. The wall will need to be moved forward at its base if there are critical dimensions that must be met on the high sides of the wall.
- BACK SLOPE:** Water management is especially critical since there is a back slope above this wall. Since water is being directed to the wall, the top 8" of compacted fill over the reinforced geogrid zone must have impermeable soil (clay— such as CL, GC or SC) or an underlying geomembrane on top of the reinforced geogrid zone (see RA Specifications for details). The slope may continue to the top of the wall and the water may be directed over it (sheet flow) or a swale may be constructed (clay, concrete or asphalt: see attached swale detail) behind the wall to divert the water around the end(s) of the wall. This swale should have a minimum depth of 8" and a minimum 1-2% slope laterally from the high point to the end(s) of the wall. In no case should the surface water be allowed to pond and saturate the wall's reinforced geogrid zone or be introduced into the 12" drainage layer. NOTE: the soils in the back slope and retained zone (within the wall's zone of influence: behind the reinforced geogrid zone and extending to a distance that is twice the wall's exposed height) must be virgin (natural undisturbed soil with blow counts ≥12) or suitable fill (≥30") compacted to 95% of a standard proctor maximum dry density. This must be verified by the site geotechnical engineer.
- INTERACTION WITH BUILDING:** The lengths of the geogrid layers are not so long that they meet the building structure, however they are within the building's zone of influence. Therefore, it will be necessary to build the wall prior to or in conjunction with the building pad. A dead load surcharge was applied to model the weight of the building in all calculations (global, internal and external).
- 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.
- TANGENT ANGLES:** The angle points as drawn on the civil plans at wall stations 0+73, 1+001+39, 1+94 & 2+23 shall be built as radii (inside & outside curves) to prevent vertical joints.
- SPECIFICATIONS:** Construction and materials must conform to the attached "Specifications for Retaining Wall Systems".

KEYSTONE COMPAC II WALL SECTION



KEYSTONE COMPAC DIMENSIONS



KEYSTONE STEP DOWN TYPICAL DETAIL

MATERIAL ESTIMATE

| TOTAL SQ. FT. | (1 S.F.) | | (5 S.F.) | | SQ. YDS. 3XT GRID | SQ. YDS. 5XT GRID | CU. YDS. DRAIN GRAVEL | CU. YDS. LEVELING PAD GRAVEL | FT. WALL LENGTH |
|---------------|----------|-------|----------|------|-------------------|-------------------|-----------------------|------------------------------|-----------------|
| | BLOCK | CAPS* | PINS | GRID | | | | | |
| 2,454 | 2,370 | 168 | 4,420 | 835 | 1,235 | 145 | 19 | 240 | |

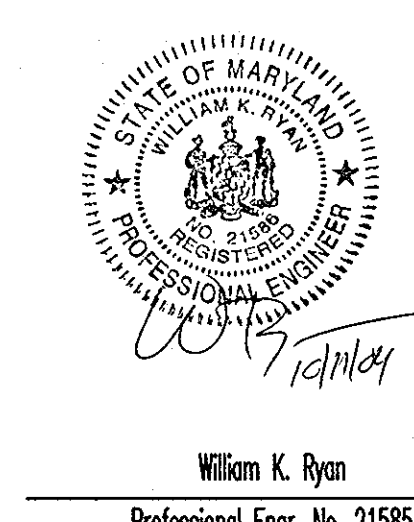
NOTE: Quantities have been increased by the following percentages: block & caps 3%, geogrid 15% & gravel 5%. *Cap quantity is based on one unit for each step down transition on the top of the wall.

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.

CROSS SECTION DETAILS & FACTORS OF SAFETY:

| SECTION | STATION | TOTAL WALL HEIGHT | LOAD APPLIED | SLIDING | OVERTURNING | BEARING CAPACITY | BEARING PRESSURE | GLOBAL STABILITY (dry pond) | GLOBAL STABILITY (wet pond) |
|---------|--------------|-------------------|-------------------------|--------------|--------------|------------------|------------------|-----------------------------|-----------------------------|
| | | | | minimum 1.50 | minimum 2.00 | minimum 2.50 | PSF | minimum 1.30 | minimum 1.30 |
| 1 | 0+00 TO 0+83 | 12.67' | 120 PSF LL & 300 PSF CL | 3.35 | 10.54 | 21.30 | 1.730 | 1.69 | 1.11 |
| 2 | 0+83 TO 1+09 | 12.67' | 120 PSF LL & 3.1 SLOPE | 2.40 | 6.93 | 19.33 | 1.906 | 1.69 | 1.11 |
| 3 | 1+09 TO 1+74 | 11.33' | 2:1 SLOPE | 2.51 | 9.82 | 22.78 | 2.155 | 1.53 | 1.11 |
| 4 | 1+74 TO 2+40 | 9.33' | 2:1 SLOPE | 2.47 | 11.42 | 24.82 | 1.893 | 1.53 | 1.11 |

RYAN & ASSOCIATES
A Division of WKR Consulting, Inc.
RETAINING WALL DIVISION
717-477-8400 fax 717-477-8410
68 West King Street
Shippensburg, PA 17257-0006



DEVELOPER'S/BUILDER'S CERTIFICATE
I/WE CERTIFY THAT THE LANDSCAPING SHOWN ON THIS PLAN WILL BE DONE ACCORDING TO THE PLAN, SECTION 16.124 OF THE HOWARD COUNTY CODE AND THE HOWARD COUNTY LANDSCAPE MANUAL. I/WE FURTHER CERTIFY UPON COMPLETION, A CERTIFICATION OF LANDSCAPE INSTALLATION, ACCOMPANIED BY AN EXHIBIT ONE (1) YEAR GUARANTEE OF PLANT MATERIALS, WILL BE SUBMITTED TO THE DEPARTMENT OF PLANNING AND ZONING.
SIGNATURE OF DEVELOPER _____ DATE _____
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING
M. Danmum 11/17/04
CHIEF, DEVELOPMENT ENGINEERING DIVISION
G. Krumm 12/1/04
CHIEF, DIVISION OF LAND DEVELOPMENT
D. Lopez 12/3/04
DIRECTOR

THESE PLANS HAVE BEEN REVIEWED FOR HOWARD SOIL CONSERVATION DISTRICT AND MEET THE TECHNICAL REQUIREMENTS FOR SMALL POND CONSTRUCTION AND SOIL EROSION AND SEDIMENT CONTROL.
USDA-NATURAL RESOURCES CONSERVATION SERVICE
DATE _____
THESE PLANS FOR SMALL POND CONSTRUCTION SOIL EROSION AND SEDIMENT CONTROL MEET THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT.
HOWARD S.C.D. DATE _____

BY THE DEVELOPER:
I/WE CERTIFY THAT ALL DEVELOPMENT AND/OR CONSTRUCTION WILL BE DONE IN ACCORDANCE TO THESE PLANS, AND WE ARE RESPONSIBLE FOR PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF ATTENDANCE FROM A DEPARTMENT OF THE ENVIRONMENT APPROVED TRAINING PROGRAM FOR THE CONTROL OF SEDIMENT AND EROSION BEFORE BEGINNING THE PROJECT. I SHALL ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE THE POND CONSTRUCTION AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION.
SIGNATURE OF DEVELOPER WILLIAM DAVID III DATE _____

BY THE ENGINEER:
I HEREBY CERTIFY THAT THIS PLAN FOR POND CONSTRUCTION, EROSION AND SEDIMENT CONTROL REPRESENTS A PROFESSIONAL AND WORKMANLIKE JUDGMENT ON MY PERSONAL KNOWLEDGE OF THE SITE CONDITIONS. THIS PLAN WAS PREPARED IN ACCORDANCE WITH THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT. I HAVE NOTIFIED THE DEVELOPER THAT HE/SHE MUST ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION.
SIGNATURE OF ENGINEER ROBERT H. VOGEL, P.E. DATE _____

SITE DEVELOPMENT PLAN
RETAINING WALL GENERAL NOTES, DETAILS,
MATERIAL ESTIMATE AND LOAD TABLE
GLEN MAR UNITED METHODIST CHURCH
PHASE I & III
TAX MAP 31 BLOCK 1 & 8 PARCEL '10', LOTS 1-5
5TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND

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

DESIGN BY: RHV
DRAWN BY: DZ
CHECKED BY: RHV
DATE: OCTOBER 2004
SCALE: AS SHOWN
W.O. NO.: 04-64

29 SHEET OF 30

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 459— Tensile Properties of Geotextiles by the 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-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 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 .08 as determined in accordance with ASTM C 140. Compressive strength test specimens shall conform to the size and shape 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 6 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 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 pre-tensioning and backfilling. The pins have several positions. The rear pin position results in a 1" setback and a 9.5° batter and the center pin position results in a near vertical setback with an approximate positive batter of 1.0°. 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 near vertical batter to 9.5° 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 9.5° batter to 1.0°.

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, 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 (fat clay), MH (elastic silt) or OH/OL/PT (organic) soils.

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 polystyrene 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 weight 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).

2.10 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.

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.

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 verified 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 selected 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 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 "OR" 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 clay 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/pipes 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 notify the storm sewer manhole or along the slope at an elevation lower than the lowest point of the drainage aggregate. When drains/pipes 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. A rear drainpipe is required at the back of the wall's reinforced geogrid zone. This rear drainpipe shall be surrounded by a minimum of 6 inches of clean gravel (#57 or equivalent) and surrounded with filter fabric to prevent the migration of fines. The rear drainpipe must vent to daylight, be directed to a storm sewer manhole (see instructions for front drainpipe in section 3.07B above) or be vented through the wall face at maximum 30' on center. If it is vented through the wall face then the perpendicular pipes must be solid. They may or may not be connected to the front drainpipe with tees or crosses.

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 placed in loose lifts not to exceed 8 inches and compacted 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, pavers, 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), 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 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 tide 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, PVC, SLOPP, 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 does not 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 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 6 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 G200M, 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 1:1 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 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.

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 01-21-04

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)

DEVELOPER'S/BUILDER'S CERTIFICATE

I/WE CERTIFY THAT THE LANDSCAPING SHOWN ON THIS PLAN WAS BE DONE ACCORDING TO THE PLAN, SECTION 107.01 OF THE HOWARD COUNTY CODE AND THE HOWARD COUNTY LANDSCAPE MANUAL. I/WE FURTHER CERTIFY THAT UPON COMPLETION, A CERTIFICATION OF LANDSCAPE INSTALLATION, ACCOMPANIED BY A WRITTEN ONE (1) YEAR GUARANTEE OF PLANT MATERIALS, WILL BE SUBMITTED TO THE DEPARTMENT OF PLANNING AND ZONING.

SIGNATURE OF DEVELOPER DATE
 APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING
 CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE
 CHIEF, DIVISION OF LAND DEVELOPMENT DATE
 DIRECTOR DATE

THESE PLANS HAVE BEEN REVIEWED FOR HOWARD SOIL CONSERVATION DISTRICT AND MEET THE TECHNICAL REQUIREMENTS FOR SMALL POND CONSTRUCTION, SOIL EROSION AND SEDIMENT CONTROL.
 USDA-NATURAL RESOURCES CONSERVATION SERVICE
 THESE PLANS FOR SMALL POND CONSTRUCTION, SOIL EROSION AND SEDIMENT CONTROL MEET THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT.
 HOWARD S.C.D. DATE

I/WE CERTIFY THAT ALL DEVELOPMENT AND/OR CONSTRUCTION WILL BE DONE IN ACCORDANCE WITH THESE PLANS AND THAT I/WE ARE RESPONSIBLE FOR PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT. I HAVE A CERTIFICATE OF ATTENDANCE AT A DEPARTMENT OF THE ENVIRONMENT APPROVED TRAINING PROGRAM FOR THE CONTROL OF SEDIMENT AND EROSION BEFORE BEGINNING CONSTRUCTION. I SHALL ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION.
 SIGNATURE OF DEVELOPER WILLIAM DAVID II DATE

I HEREBY CERTIFY THAT THIS PLAN FOR POND CONSTRUCTION, EROSION PREVENTION CONTROL REPRESENTS A FINISHED AND WORKABLE PLAN. I HAVE BASED ON MY PERSONAL KNOWLEDGE OF THE SITE CONDITIONS, THIS PLAN WAS PREPARED IN ACCORDANCE WITH THE REQUIREMENTS OF THE HOWARD COUNTY CODE AND THE HOWARD COUNTY DISTRICT. I HAVE NOTIFIED THE DEVELOPER THAT HE/SHE MUST ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION.
 SIGNATURE OF ENGINEER ROBERT H. VOGEL, P.E. DATE

RYAN & ASSOCIATES
 A Division of WKR Consulting, Inc.
 RETAINING WALL DIVISION
 717-477-8400 fax 717-477-8410
 68 West King Street
 Shippensburg, PA 17257-0006

Professional Eng. No. 21585
 William K. Ryan

| | | |
|-----|--|----------|
| NO. | REVISION | DATE |
| 1 | REMOVE PHASE II FROM PLANS. REMOVE ASSOCIATED AIR DETAILS. ADD INLET AND ADD PUMP REQUIREMENTS TO EXISTING EQUIPMENTS. | 06-28-09 |
| | REMOVE GENERAL NOTES 40 & 41 | |