

WALL ELEVATION CHART

STATION	TOP OF WALL ELEVATION	BOT. OF WALL ELEVATION
A	01024	348.10
B	01024	348.22
C	01024	348.43
D	01024	348.76
E	01024	349.50
F	01024	349.82
G	01024	349.82
H	01024	349.82
I	01024	349.82
J	01024	349.82
K	01024	349.82
L	01024	349.82
M	01024	349.82
N	01024	349.82
O	01024	349.82
P	01024	349.82
Q	01024	349.82
R	01024	349.82
S	01024	349.82
T	01024	349.82
U	01024	349.82
V	01024	349.82
W	01024	349.82
X	01024	349.82
Y	01024	349.82
Z	01024	349.82

WALL CHART IS FOR REFERENCE ONLY. SEE SHEET 5 FOR WALL INFORMATION.

"C" FACTOR COMPUTATIONS

STRUCTURE	AREA (AC)	I'	IMPERVIOUS
I-5	0.23	0.16	85%

NOTE: ALL SOILS ON SITE ARE TYPE 'B'

INLET I-5 INFORMATION:

- PRECAST DOUBLE NR (DPM STD. DETAIL D-435)
- 341.69 UPPER TOP ELEVATION AT CURB FLOW LINE
- 341.40 LOWER TOP ELEVATION AT CURB FLOW LINE
- 340.26 INVERT OUT

LEGEND

STORM DRAIN DRAINAGE DRAINAGE

SITE PLAN SCALE: 1" = 20'

STORM DRAIN DRAINAGE AREA MAP SCALE: 1" = 20'

SITE DEVELOPMENT LEGEND

- EXISTING CONTOUR
- PROPOSED CONTOUR
- PROPOSED SPOT ELEVATION
- OVERALL LIMIT OF DISTURBANCE FOR GRADING
- LIMIT OF DISTURBANCE FOR HOUSE CONSTRUCTION
- EXISTING STORM DRAIN
- EXISTING SANITARY SEWER (DASHED LINE)
- SEWER HOUSE CONNECTION (S.H.C. SOLID LINE)
- WATERLINE (PUBLIC)
- MHG (PUBLIC)
- FIRE HYDRANT (PUBLIC)
- EXISTING CURB & GUTTER
- PROPOSED 6" CONCRETE CURB & GUTTER
- DEPRESSED CURB & GUTTER (D.C.G.)
- PROPOSED CONCRETE SIDEWALK
- EASEMENT AREA (SHADED)
- PROPOSED RETAINING WALL
- EXISTING LIGHT FIXTURE & POLE
- PROPOSED HOUSE
- APPROX. MITIGATED 65DBA NOISE LINE
- APPROX. MITIGATED 65DBA NOISE LINE
- SAME BEARING & DISTANCE
- PROPOSED P-2 PAVING (DET. 42) (284 51)
- NUMBER OF GUEST PARKING SPACES

- SITE PLAN NOTES:**
- FOR EACH UNIT ON A PARTICULAR LOT, OPTIONAL FEATURES (SUCH AS DECKS, EXTENSIONS, ETC.) ARE ONLY AVAILABLE IF THEY ARE SHOWN ON THIS SITE DEVELOPMENT PLAN.
 - BRICK POINT ALL BUILDING CONSTRUCTION UNLESS NOTED OTHERWISE.
 - ALL BUILDING WALLS WITHIN 10' OF A BASE TRANSFORMER SHALL BE CONSTRUCTED FOR A MINIMUM FIRE RESISTANCE RATING OF 3 HOURS.
 - MHC TO THE SUBJECT LOTS OF THIS SDP IS 1/2" PER CONTRACT NOS. 14-4513-D AND THE WATER METER VAULTS ARE LOCATED INSIDE THE BUILDINGS.
 - SEE CHART (THIS SHEET) FOR S.H.C. INFORMATION. CONTRACTOR SHALL CHECK & VERIFY THE SEWER HOUSE ELEVATIONS AT THE R/W EASEMENT PRIOR TO CONSTRUCTION.
 - TRASH FOR THE LOTS SHOWN ON THIS SDP SHALL BE COLLECTED BY A PRIVATE REUSE COLLECTION COMPANY.

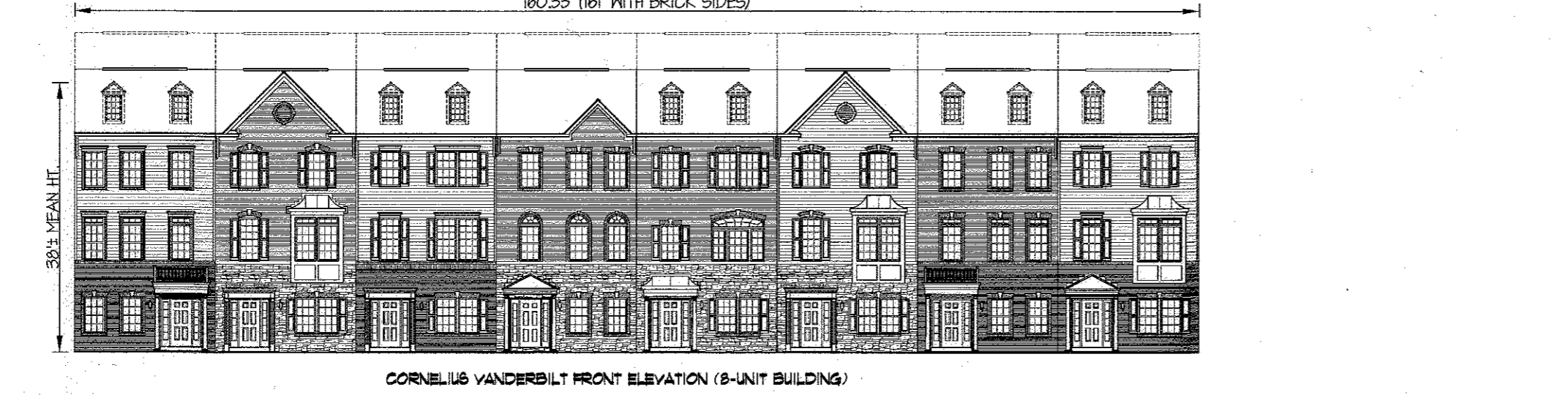
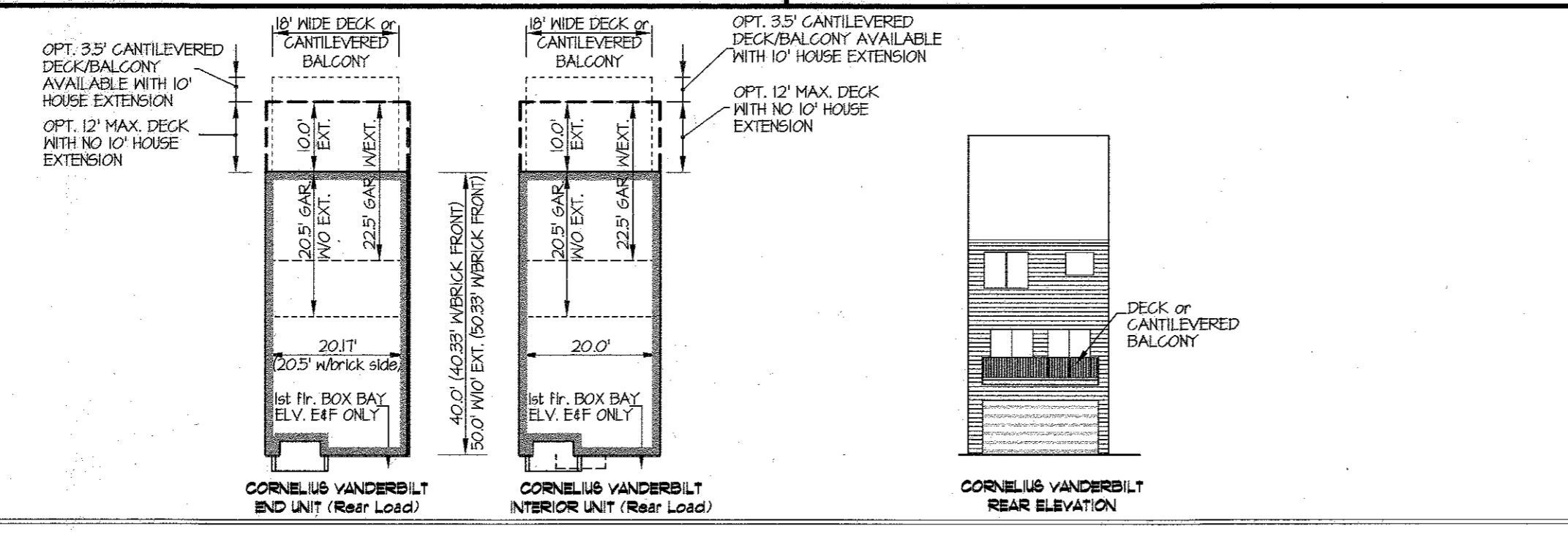
Shipley's Grant Lot Size Chart for this SDP

Lot No.	Lot Size
D-226	1710 s.f.
D-227	1200 s.f.
D-228	1200 s.f.
D-229	1200 s.f.
D-230	1200 s.f.
D-231	1200 s.f.
D-232	1200 s.f.
D-233	1530 s.f.
Common Open Space Lot D-223	5098 s.f.

SEWER HOUSE CONNECTIONS MINIMUM CELLAR ELEVATIONS & INVERT ELEVATION @ P.L.

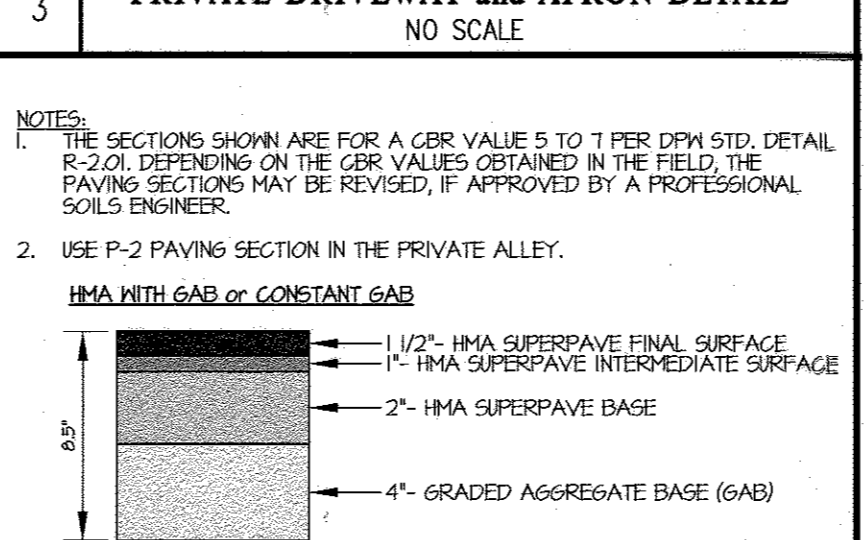
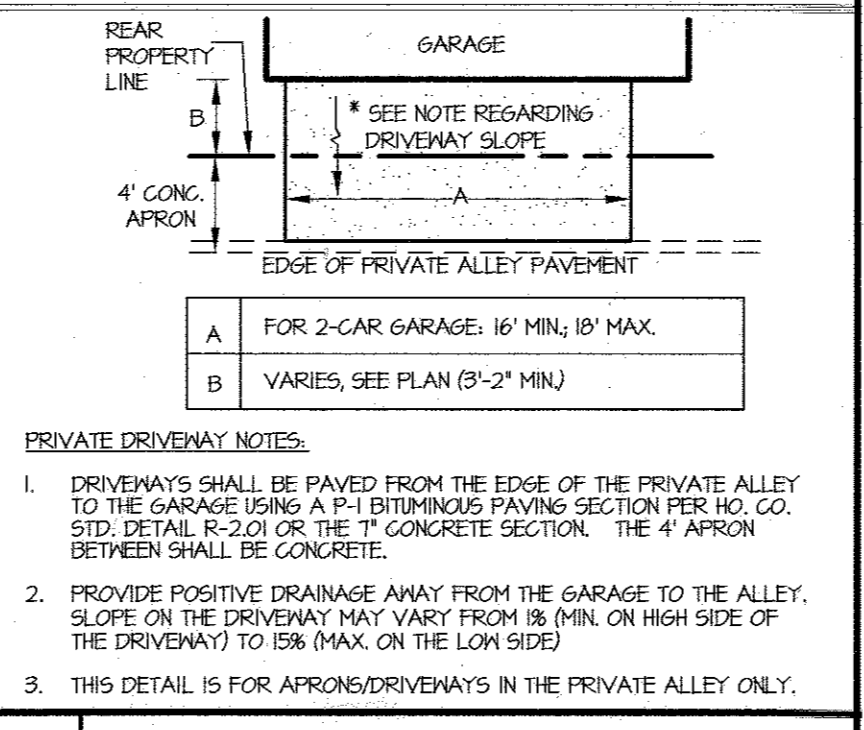
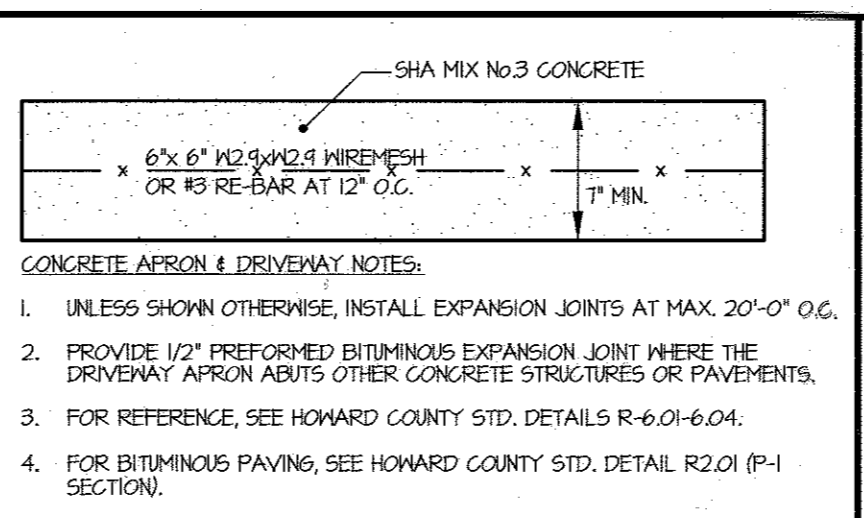
LOT	ELEVATION @ R/W	M.C.E.
D-226	340.41	403.92
D-227	340.55	402.64
D-228	340.13	401.41
D-229	340.11	400.51
D-230	340.34	391.66
D-231	340.41	348.94
D-232	340.62	341.41
D-233	341.60	346.83

NOTE: ALL SEWER HOUSE CONNECTIONS ARE 4".



1 TYPICAL FOOTPRINTS and ELEVATIONS SCALE: 1" = 20'

DATE	REVISION	BY	APPR.



3 PRIVATE DRIVEWAY and APRON DETAIL NO SCALE

NOTES:

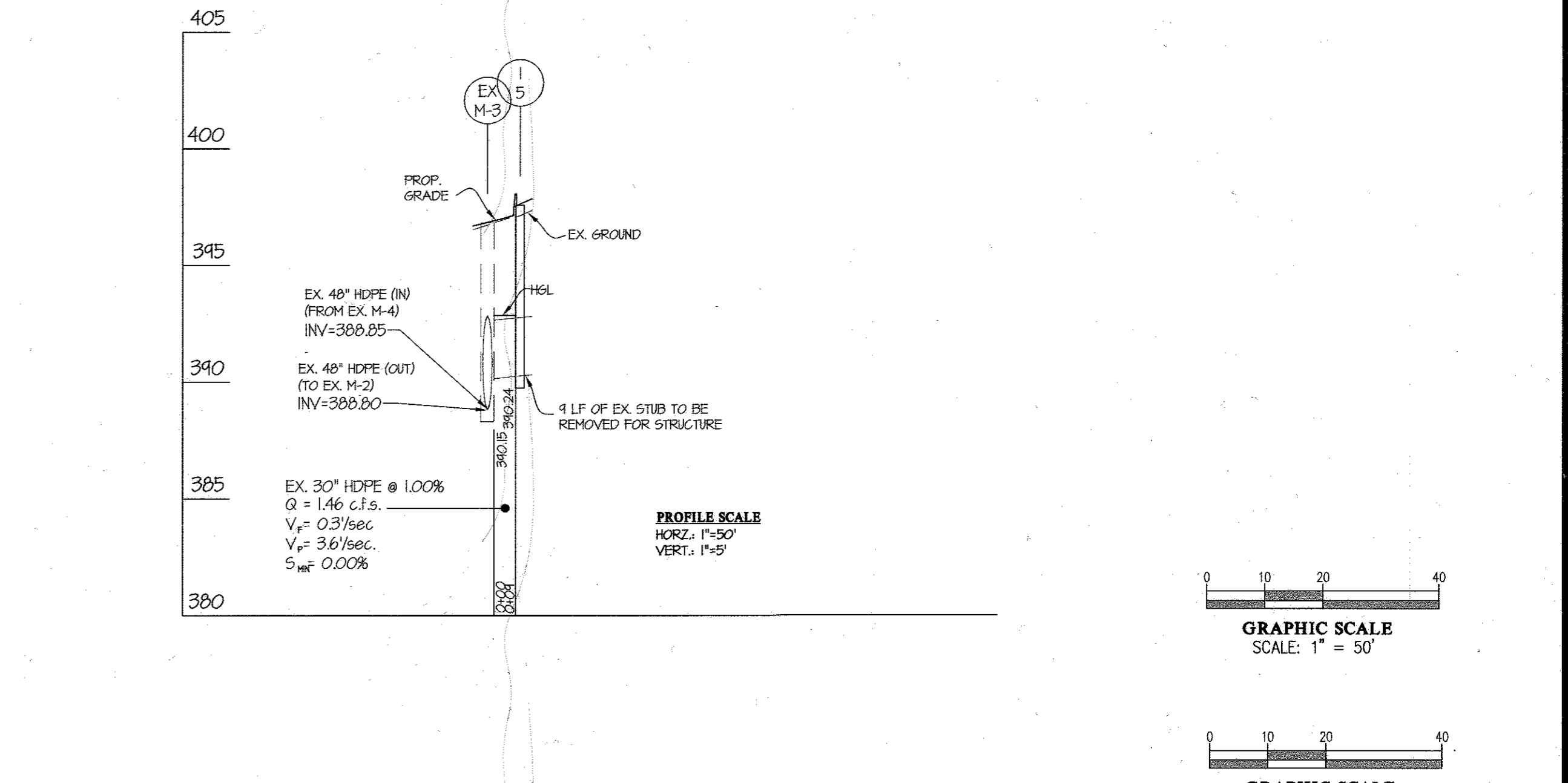
- THE SECTIONS SHOWN ARE FOR A CBR VALUE 5 TO 7 PER DPM STD. DETAIL R-2-2, DEPENDING ON THE CBR VALUES OBTAINED IN THE FIELD. THE PAVING SECTIONS MAY BE REVISED, IF APPROVED BY A PROFESSIONAL SOILS ENGINEER.
- USE P-2 PAVING SECTION IN THE PRIVATE ALLEY.

HMA WITH GAB OR CONSTANT GAB

- 1/2" HMA SUPERPAVE FINAL SURFACE
- 1" HMA SUPERPAVE INTERMEDIATE SURFACE
- 2" HMA SUPERPAVE BASE
- 4" GRADED AGGREGATE BASE (GAB)

STRUCTURE SCHEDULE (STORM DRAIN)

NO	TYPE	WIDTH (INCHES)	TOP ELEVATION		INVERT		STD. DETAIL	LOCATIONS	REMARKS
			UPPER	LOWER	UPPER	LOWER			
I-5	DOUBLE NR	2'-6"	348.18	341.48	340.24	---	HO. CO. D-435		



SITE DEVELOPMENT PLAN and STORM DRAIN DRAINAGE AREA MAP

SHIPLEY'S GRANT
PHASE VI - LOTS D-226 thru D-233 (SFA Residential Use)
and COMMON OPEN SPACE LOT D-223
 PLAT Nos. 24177-24179 and 24269-24274

SCALE: AS SHOWN ZONING: R-A-15 G. L. W. FILE No.: 16021

DATE: DEC. 2017 TAX MAP - GRID: 37 - 1&2 SHEET: 2 of 5

ELECTION DISTRICT No. 1 HOWARD COUNTY, MARYLAND

GLWGUTSCHICK LITTLE & WEBER, P.A.
 CIVIL ENGINEERS, LAND SURVEYORS, LAND PLANNERS, LANDSCAPE ARCHITECTS
 3909 NATIONAL DRIVE - SUITE 250 - BURTSMITH OFFICE PARK
 BURTSMITH, MARYLAND 20866
 TEL: 301-421-4024 FAX: 301-421-4024

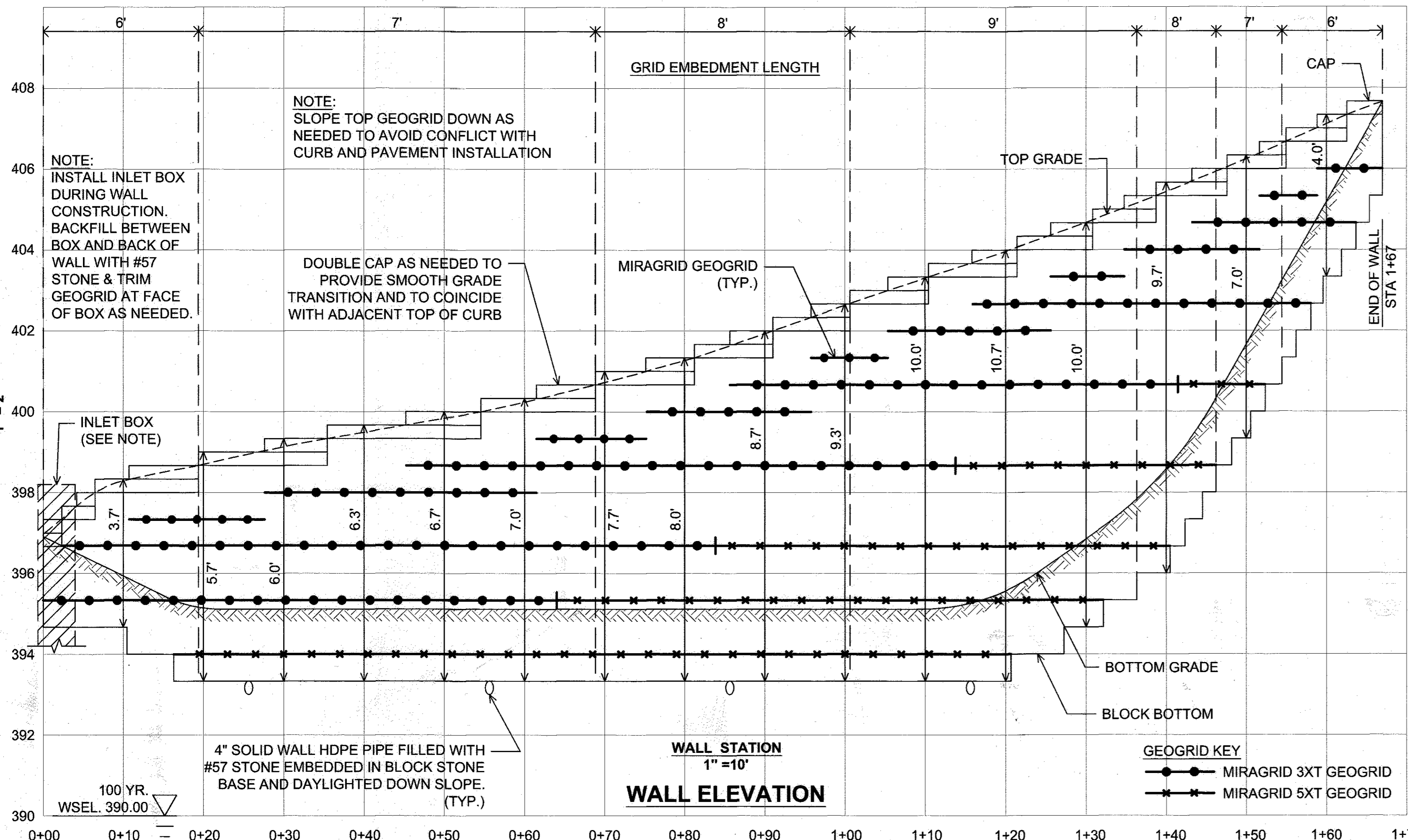
PREPARED FOR:
 OWNER/DEVELOPER
 (C.O.S. LOT D-223):
 BA Waterloo Townhomes, LLC
 c/o Bortz to Homes, Inc.
 6406 by Lane, Suite 700
 Greenbelt, MD 20770
 301-220-0100
 Attn: Chris Block

PREPARED BY:
 BUILDER
 (Lots D-226 thru D-233):
 NWR INC.
 9720 Patuxent Woods Dr.
 Columbia, MD 21046
 Phone: 410-379-5956
 Attn: Robert Grothmann

PROFESSIONAL CERTIFICATION

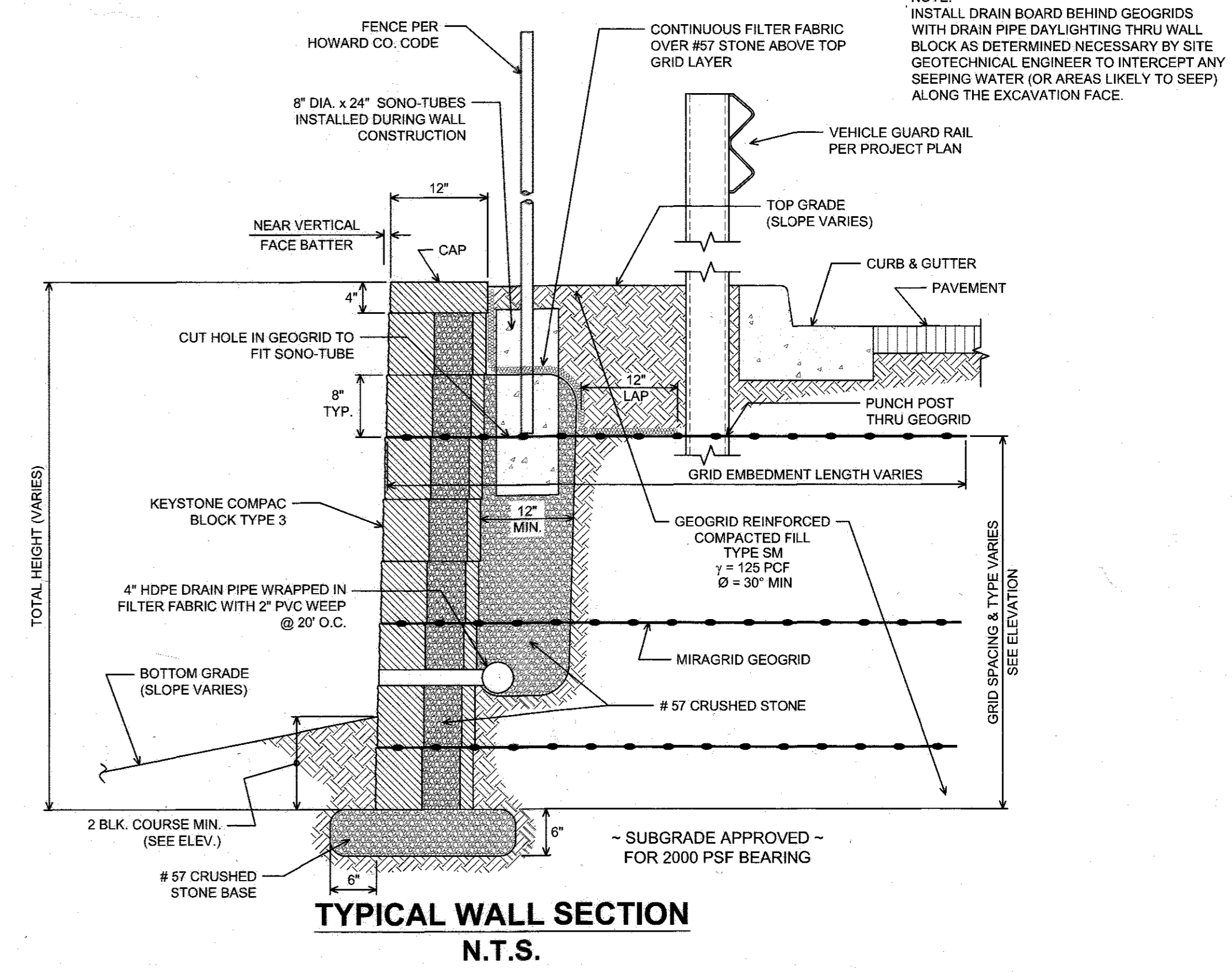
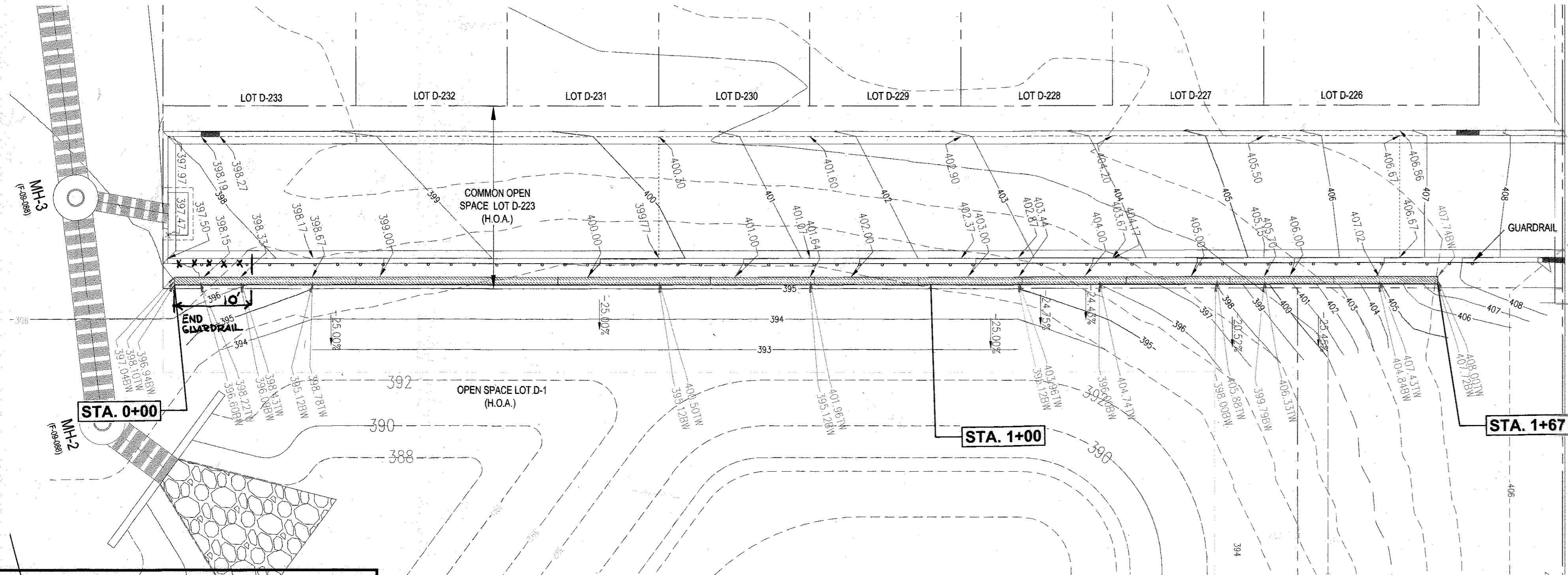
I HEREBY CERTIFY THAT THESE PLANS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 12979, EXPIRATION DATE: MAY 26, 2018.

2/6/18



SPECIFICATIONS MODULAR CONCRETE BLOCK RETAINING WALL

- 1.01 GENERAL**
- A. WORK SHALL CONSIST OF FURNISHING AND CONSTRUCTION OF A MODULAR RETAINING WALL SYSTEM IN ACCORDANCE WITH THESE SPECIFICATIONS AND IN REASONABLE CLOSE CONFORMITY WITH THE LINES, GRADES, DESIGN, AND DIMENSIONS SHOWN ON THE PLANS.**
- B. WORK INCLUDES PREPARING FOUNDATION SOIL, FURNISHING AND INSTALLING LEVELING PAD, UNIT DRAINAGE FILL AND BACKFILL TO THE LINES AND GRADES SHOWN ON THE CONSTRUCTION DRAWINGS.**
- C. WORK INCLUDES FURNISHING AND INSTALLING GEOGRID SOIL REINFORCEMENT OF THE TYPE, SIZE, LOCATION, AND LENGTHS DESIGNATED ON THE CONSTRUCTION DRAWINGS.**
- 1.02 DELIVERY, STORAGE AND HANDLING**
- A. CONTRACTOR SHALL CHECK ALL MATERIALS UPON DELIVERY TO ASSURE THAT THE PROPER TYPE, GRADE, COLOR, AND CERTIFICATION HAS BEEN RECEIVED.**
- B. CONTRACTOR SHALL PROTECT ALL MATERIALS FROM DAMAGE DUE TO JOB SITE CONDITIONS AND IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS. DAMAGED MATERIALS SHALL NOT BE INCORPORATED INTO THE WORK.**
- 2.01 MODULAR CONCRETE RETAINING WALL UNITS**
- A. MODULAR CONCRETE UNITS SHALL CONFORM TO THE FOLLOWING ARCHITECTURAL REQUIREMENTS:**
- FACE COLOR - COLOR MAY BE SPECIFIED BY THE OWNER.
- FACE FINISH - SCULPTURED ROCK FACE IN ANGULAR TRI-PLANE OR FLAT CONFIGURATION. OTHER FACE FINISHES WILL NOT BE ALLOWED WITHOUT WRITTEN APPROVAL OF OWNER.
- BOND CONFIGURATION - RUNNING WITH BONDS NOMINALLY LOCATED AT MIDPOINT VERTICALLY ADJACENT UNITS, IN BOTH STRAIGHT AND CURVED ALIGNMENTS.
- EXPOSED SURFACES OF UNITS SHALL BE FREE OF CHIPS, CRACKS OR OTHER IMPERFECTIONS WHEN VIEWED FROM A DISTANCE OF 10 FEET UNDER DIFFUSED LIGHTING.
- B. MODULAR CONCRETE MATERIALS SHALL CONFORM TO THE REQUIREMENTS OF ASTM C1372 - STANDARD SPECIFICATIONS FOR SEGMENTAL RETAINING WALL UNITS.**
- C. MODULAR CONCRETE UNITS SHALL CONFORM TO THE FOLLOWING STRUCTURAL AND GEOMETRIC REQUIREMENTS MEASURED IN ACCORDANCE WITH APPROPRIATE REFERENCES:**
- COMPRESSIVE STRENGTH - 3000 PSI MINIMUM; ABSORPTION = 8% MAXIMUM (6% IN NORTHERN STATES) FOR STANDARD WEIGHT AGGREGATES;
- DIMENSIONAL TOLERANCES = ±1/8" FROM NOMINAL UNIT DIMENSIONS NOT INCLUDING ROUGH SPLIT FACE, ±1/16"
- UNIT HEIGHT - TOP AND BOTTOM PLANES; UNIT SIZE - 8" (H) x 18" (W) x 12" (D) MINIMUM;
- UNIT WEIGHT - 75 LBS/UNIT MINIMUM FOR STANDARD WEIGHT AGGREGATES;
- INTER-UNIT SHEAR STRENGTH - 1000 PLF MINIMUM AT 2 PSI NORMAL PRESSURE; AT 2 PSI NORMAL FORCE.
- GEOGRID/UNIT PEAK CONNECTION STRENGTH - 1000 PLF MINIMUM
- D. MODULAR CONCRETE UNITS SHALL CONFORM TO THE FOLLOWING CONSTRUCTION REQUIREMENTS (IF APPLICABLE)**
- VERTICAL SETBACK = 1/8" PER COURSE (NEAR VERTICAL) OR 1" PER COURSE PER THE DESIGN; ALIGNMENT AND GRID POSITIONING MECHANISM - FIBERGLASS PINS, TWO PER UNIT MINIMUM;
- MAXIMUM HORIZONTAL GAP BETWEEN ERECTED UNITS SHALL BE - 1/2 INCH.
- 2.02 SHEAR CONNECTORS**
- A. SHEAR CONNECTORS SHALL BE 1/2 INCH DIAMETER THERMOSET ISOPHTHALIC POLYESTER RESIN-PROTRUDED FIBERGLASS REINFORCEMENT RODS OR EQUIVALENT 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. B. SHEAR CONNECTORS SHALL BE CAPABLE OF HOLDING THE GEOGRID IN THE PROPER DESIGN POSITION DURING GRID PRE-TENSIONING AND BACKFILLING.**
- 2.03 BASE LEVELING PAD MATERIAL**
- A. MATERIAL SHALL CONSIST OF A COMPACTED #57 CRUSHED STONE BASE AS SHOWN ON THE CONSTRUCTION DRAWINGS.**
- 2.04 UNIT DRAINAGE FILL**
- A. UNIT DRAINAGE FILL SHALL CONSIST OF #57 CRUSHED STONE**
- 2.05 REINFORCED BACKFILL**
- A. REINFORCED BACKFILL SHALL BE TYPE SM, BE FREE OF DEBRIS AND MEET THE FOLLOWING GRADATION TESTED IN ACCORDANCE WITH ASTM D-422 AND MEET OTHER PROPERTIES SHOWN ON THE PLAN:**
- | SIETVE SIZE | PERCENT PASSING |
|-------------|-----------------|
| 2 INCH | 100-75 |
| 3/4 INCH | 100-75 |
| NO. 40 | 0-60 |
| NO. 200 | 0-35 |
- PLASTICITY INDEX (PI) <10 AND LIQUID LIMIT <35 PER ASTM D-4318.
- B. MATERIAL CAN BE SITE EXCAVATED SOILS WHERE THE ABOVE REQUIREMENTS CAN BE MET. UNSUITABLE SOILS FOR BACKFILL (HIGH PLASTIC CLAYS OR ORGANIC SOILS) SHALL NOT BE USED IN THE REINFORCED SOIL MASS.**
- 2.06 GEOGRID SOIL REINFORCEMENT**
- A. GEOSYNTHETIC REINFORCEMENT SHALL CONSIST OF GEOGRIDS MANUFACTURED SPECIFICALLY FOR SOIL REINFORCEMENT APPLICATIONS AND SHALL BE MANUFACTURED FROM HIGH TENACITY POLYESTER YARN.**
- 2.07 DRAINAGE PIPE**
- A. THE DRAINAGE PIPE SHALL BE PERFORATED CORRUGATED HDPE PIPE MANUFACTURED IN ACCORDANCE WITH ASTM D-1248.**
- PART 3 EXECUTION**
- 3.01 EXCAVATION**
- A. CONTRACTOR SHALL EXCAVATE TO THE LINES AND GRADES SHOWN ON THE CONSTRUCTION DRAWINGS. OWNER'S REPRESENTATIVE SHALL BE RESPONSIBLE FOR INSPECTING AND APPROVING THE EXCAVATION PRIOR TO PLACEMENT OF LEVELING MATERIAL OR FILL SOILS.**
- 3.02 BASE LEVELING PAD**
- A. LEVELING PAD MATERIAL SHALL BE PLACED TO THE LINES AND GRADES SHOWN ON THE CONSTRUCTION DRAWINGS, TO A MINIMUM THICKNESS OF 6 INCHES AND EXTEND LATERALLY A MINIMUM OF 6" IN FRONT AND BEHIND THE MODULAR WALL UNIT.**
- B. LEVELING PAD SHALL BE PREPARED TO INSURE FULL CONTACT TO THE BASE SURFACE OF THE CONCRETE UNITS.**
- 3.03 MODULAR UNIT INSTALLATION**
- A. FIRST COURSE OF UNITS SHALL BE PLACED ON THE LEVELING PAD AT THE APPROPRIATE LINE AND GRADE. ALIGNMENT AND LEVEL SHALL BE CHECKED IN ALL DIRECTIONS AND INSURE THAT ALL UNITS ARE IN FULL CONTACT WITH THE BASE AND PROPERLY SEATED.**
- B. PLACE THE FRONT OF UNITS SIDE-BY-SIDE. DO NOT LEAVE GAPS BETWEEN ADJACENT UNITS. LAYOUT OF CORNERS AND CURVES SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.**
- C. INSTALL SHEAR/CONNECTING DEVICES PER MANUFACTURER'S RECOMMENDATIONS.**



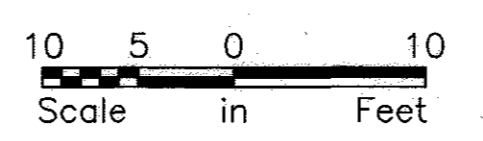
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING & ZONING

Valerie J. Kelly 3-22-18
Director Date

S. Martin 3-22-18
Chief, Division of Land Development Date

Chris Block 3-7-18
Chief, Development Engineering Division Date

WALL LOCATION PLAN
1" = 10'



TYPICAL WALL SECTION
N.T.S.

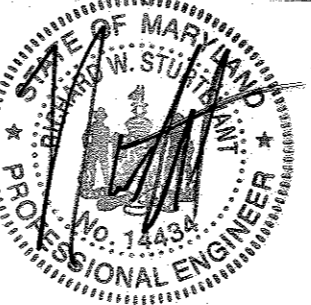
HILLIS-CARNES ENGINEERING ASSOCIATES
10975 Guilford Road, Suite A Annapolis Junction, Maryland
(410) 880-4788 WWW.HCEA.COM Fax: (410) 880-4098

DES. RWS	DRN. AM	CHK. RWS	DATE	REVISION	BY	APPR.

PREPARED FOR:
OWNER/DEVELOPER
(C.O.S. LOT D-223)
BA Waterloo Townhomes, LLC
c/o Bozello Homes, Inc.
6406 Ivy Lane, Suite 700
Greenbelt, MD 20770
301-220-0100
Attn.: Chris Block

WALL BUILDER:
Griffith Brothers, Inc.
3034 Fallston Road
Fallston, MD 21047
Phone: 410-557-8885
Attn.: Becky Schilling

PROFESSIONAL CERTIFICATION
I HEREBY CERTIFY THAT THESE PLANS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 1434
EXPIRATION DATE: 02/27/19



RETAINING WALL DETAILS
PHASE VI - LOTS D-226 thru D-233 (SFA Residential Use)
and COMMON OPEN SPACE LOT D-223
PLAT No. 24177-24179 and 24269-24274
HOWARD COUNTY, MARYLAND

SCALE	ZONING	H.C.E.A. FILE NO.
AS SHOWN	R-A-15	17081Z
DATE	TAX MAP - GRID	SHEET
Dec. 2017	37 - 1&2	5 of 5