

# THE JOHNS HOPKINS UNIVERSITY

## APPLIED PHYSICS LABORATORY

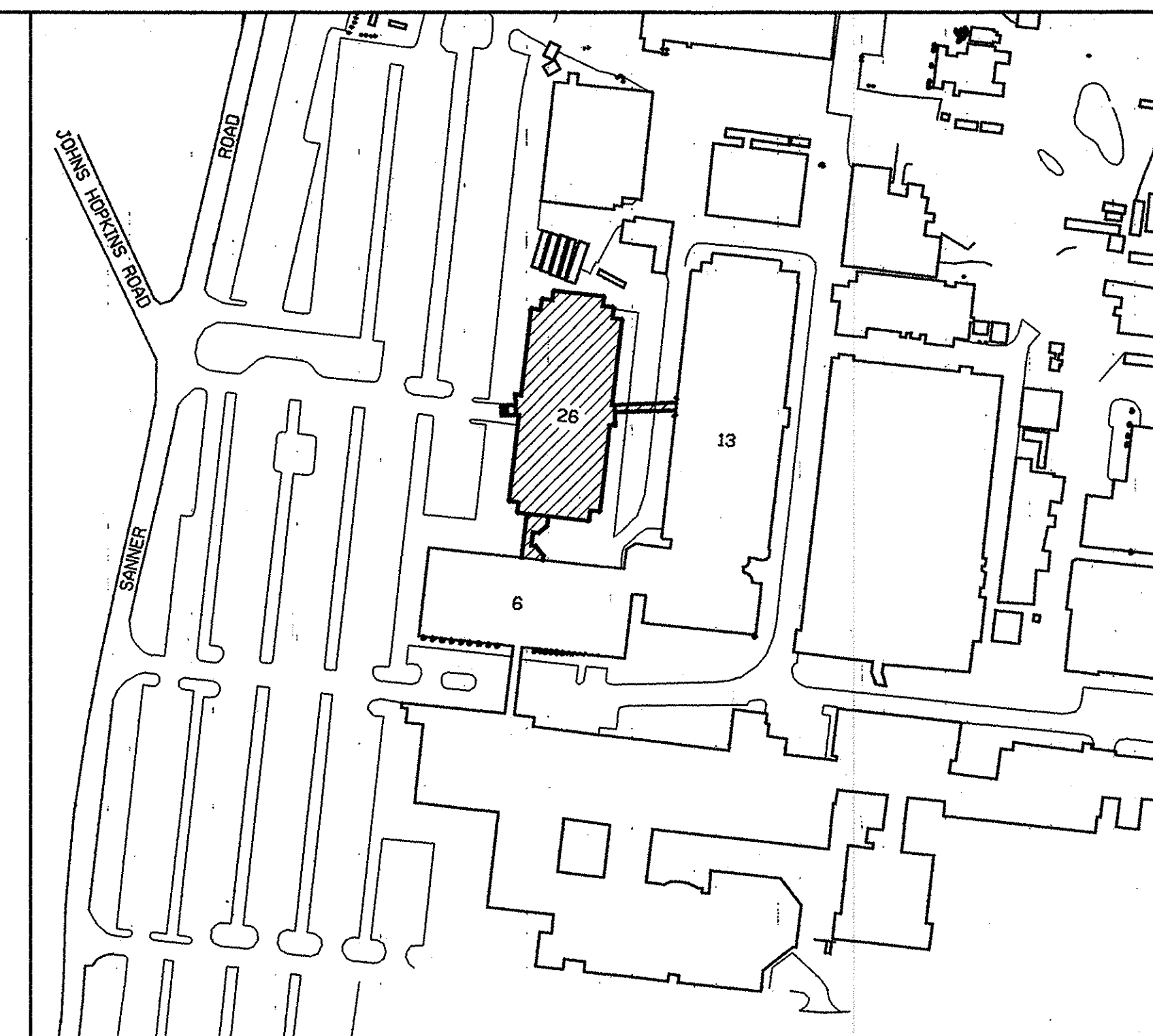
### PROPOSED BUILDING 26

#### GENERAL NOTES

- ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE HOWARD COUNTY SPECIFICATIONS AND DETAILS FOR CONSTRUCTION.
- ELEVATIONS SHOWN ARE BASED ON THE JOHNS HOPKINS UNIVERSITY APPLIED PHYSICS LABORATORY DATUM. JHU-APL-DATUM - 0.94' = HOWARD COUNTY DATUM.
- THE CONTRACTOR SHALL CALL MISS UTILITY 1-800-257-7777, FIVE DAYS PRIOR TO THE START OF CONSTRUCTION.
- APPROXIMATE LOCATION OF EXISTING UTILITIES ARE SHOWN. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PROTECT THE EXISTING UTILITIES AND TO MAINTAIN AN UNINTERRUPTED SERVICE. ANY DAMAGE BY THE CONTRACTOR'S OPERATIONS SHALL BE REPAIRED IMMEDIATELY AT THE CONTRACTOR'S EXPENSE.
- ACCESS TO THE CONSTRUCTION AREA THROUGH THE SECURE AREA OF THE APPLIED PHYSICS LABORATORY (WITHIN THE FENCED ENCLOSURE) MUST BE ARRANGED IN ADVANCE BY CONTACTING THE LABORATORY SECURITY OFFICE (301) 953-7100.
- SECURITY MUST BE MAINTAINED WITHIN THE EXISTING FENCED AREA. ALL REQUIRED FENCE CONSTRUCTION AND RELOCATION SHALL BE BY THE JOHNS HOPKINS UNIVERSITY APPLIED PHYSICS LABORATORY. HOWEVER, THE CONTRACTOR SHALL BE RESPONSIBLE TO COORDINATE WITH JHU-APL AS TO WHEN SUCH WORK IS REQUIRED.
- LANDSCAPING SHALL BE BY JHU-APL.
- THE CONTRACTOR SHALL CONTACT MR. JIM LOESCH, PLANT ENGINEER, (410) 792-5134 AT LEAST 5 WORKING DAYS PRIOR TO COMMENCING ANY WORK OR SHUTTING DOWN ANY UTILITIES.
- THE CONTRACTOR SHALL SHUTDOWN AND TIE-IN TO THE EXISTING WATER SYSTEM ONLY AFTER NORMAL WORKING HOURS AT JHU-APL. WORK SHALL BE SCHEDULED ACCORDINGLY. NORMAL WORKING HOURS ARE 8:30 AM TO 5:00 PM, MONDAY THROUGH FRIDAY.
- ALL PIPE ELEVATIONS SHOWN ARE INVERT ELEVATIONS.
- ALL WATER MAINS SHALL BE DUCTILE IRON PIPE CLASS 52.
- ALL SEWER MAINS SHALL BE P.V.C. UNLESS OTHERWISE NOTED (HOWARD COUNTY SCHEDULE 35 PVC)
- THE CONTRACTOR OR DEVELOPER SHALL CONTACT THE CONSTRUCTION INSPECTION/SURVEY DIVISION 24 HOURS IN ADVANCE OF COMMENCEMENT OF WORK. AT 313-2417 OR 2418.
- TOP OF ALL WATER MAINS SHALL HAVE A MINIMUM OF 3 1/2 FEET OF COVER UNLESS OTHERWISE NOTED.
- FIRE HYDRANTS SHALL BE SET TO THE BURY LINE ELEVATIONS SHOWN ON THE DRAWINGS. ALL FIRE HYDRANTS SHALL BE STRAPPED AND BUTTRESSED WITH CONCRETE IN ACCORDANCE WITH STANDARD DETAILS. SOIL AROUND THE FIRE HYDRANT SHALL BE COMPACTED IN ACCORDANCE WITH SECTION 1003 THE STANDARD SPECIFICATIONS.
- CLEAR ALL UTILITIES BY A MINIMUM OF 1 FOOT. CLEAR ALL POLES BY 2'-0" MINIMUM OR TUNNEL AS REQUIRED.
- THE CONTRACTOR SHALL NOT OPERATE ANY WATER MAIN VALVES ON THE EXISTING WATER SYSTEM.
- THE CONTRACTOR SHALL PROVIDE A JOINT IN ALL SEWER MAINS WITHIN 2'-0" OF EXTERIOR MANHOLE WALL.
- THE CONTRACTOR SHALL STABILIZE AND HOLD IMMOBILE THE AERIAL CONDUIT AND UNDERGROUND UTILITIES DURING ALL CONSTRUCTION ACTIVITIES.

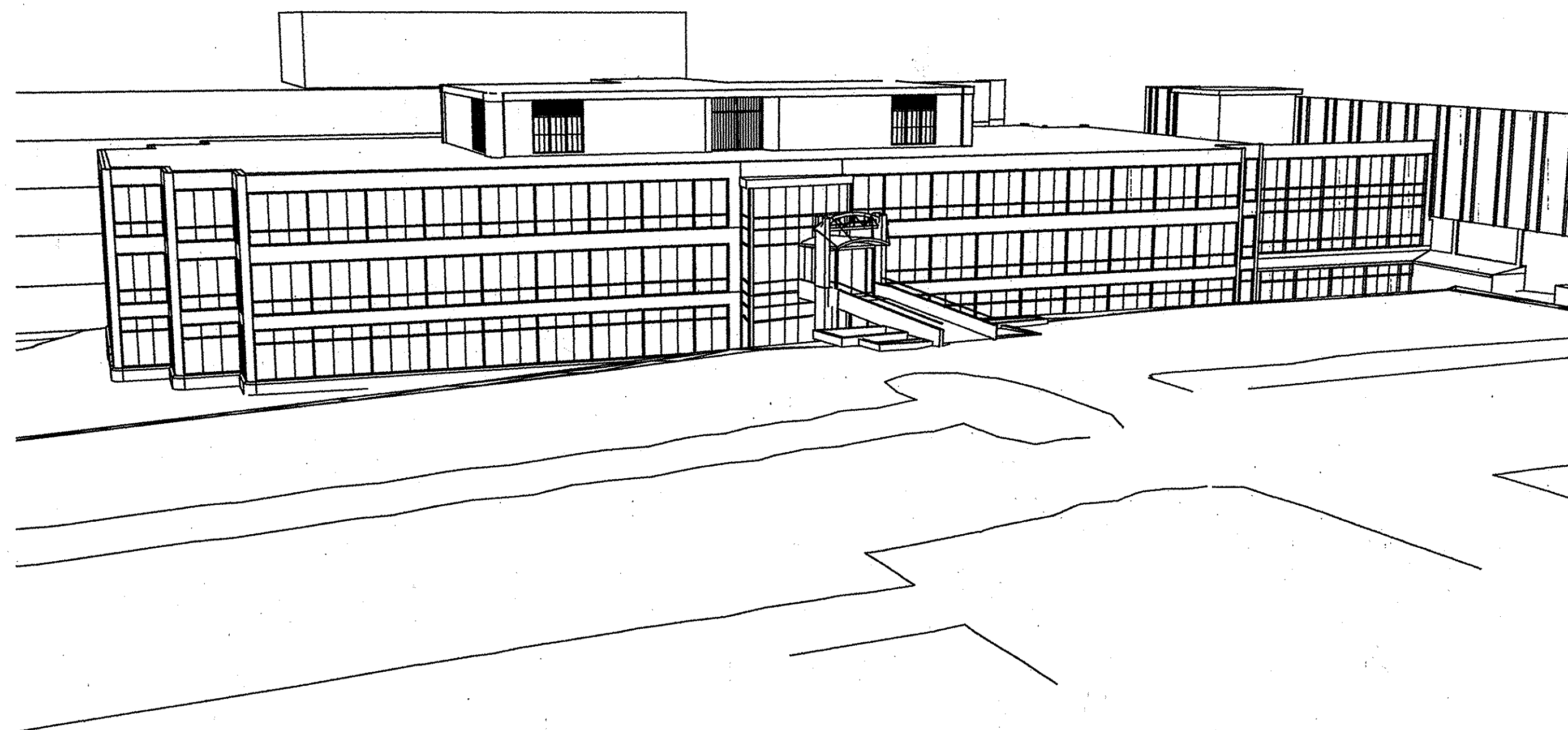
#### SITE DATA

TOTAL PROJECT AREA	366 ACRES
AREA OF PLAN SUBMISSION	1.5 ACRES
LIMIT OF DISTURBED AREA	1.5 ACRES
PRESENT ZONING	PEC
PROPOSED USES FOR STRUCTURE	OFFICE
FLOOR SPACE ON EACH LEVEL	3@23,900SF
BUILDING HEIGHT	51.5 FEET
NUMBER OF PARKING SPACES REQUIRED BY ZONING	2450
NUMBER OF PARKING SPACES PROVIDED ON SITE (INCLUDING UNIVERSAL PARKING SPACES)	3202 + 27 UNIVERSAL SPACES
MAXIMUM NUMBER OF EMPLOYEES ON SITE	3500
OPEN SPACE ON SITE, ACRES	300
OPEN SPACE ON SITE, PERCENT OF GROSS AREA	GREATER THAN 25%
BUILDING COVERAGE OF SITE, ACRES	15.7
BUILDING COVERAGE OF SITE, PERCENT OF GROSS AREA	5%
APPLICABLE DPZ FILE REFERENCES	SDP 85-100



#### VICINITY MAP

SCALE: 1" = 600'



BUILDING 26

#### SHEET INDEX

- COVER SHEET
- LOCATION PLAN
- SITE DEMOLITION PLAN
- SITE DEVELOPMENT PLAN
- DRAINAGE AREA MAP
- STORM DRAIN PROFILE AND DETAILS
- PAVEMENT AND STRUCTURAL DETAILS
- GRAVITY RETAINING WALL PLAN, PROFILE, SECTIONS, AND SCHEDULE
- GRAVITY WALL SPECIFICATIONS
- EROSION AND SEDIMENT CONTROL PLAN
- EROSION AND SEDIMENT CONTROL DETAILS AND NOTES
- SEEDING SPECIFICATIONS

#### ADDRESS CHART

PARCEL	STREET ADDRESS
P. 123	11100 JOHNS HOPKINS ROAD

SUBDIVISION NAME	J. H. U. APPLIED PHYSICS LAB	SECT. AREA	N/A	LOT/PARCEL	50 & 123
PLAT # or LIBER/FOLO	234/304	BLOCK #	16	ZONING	R
TAX MAP NO.	41	ELECT. DIST.	5th	CENSUS TRACT	6051
WATER CODE		SEWER CODE			

APPROVED:	HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING
<i>[Signature]</i>	12/24/97
DIRECTOR	DATE
<i>[Signature]</i>	12/22/97
CHIEF, DEVELOPMENT ENGINEERING DIVISION	DATE
<i>[Signature]</i>	12/21/97
CHIEF, DIVISION OF LAND DEVELOPMENT	DATE

REVISIONS	

APPROVALS	
REQUESTER	
PLANT FACILITIES CHIEF ENGINEER	
CODE COMPLIANCE REVIEW	
TSC GROUP	
TSF GROUP	
SAFETY OFFICER	
DIRECTORS OFFICE	
COORDINATOR	
SENIOR LEADER	

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**APPLIED PHYSICS LABORATORY**  
 JOHNS HOPKINS ROAD  
 LAUREL MARYLAND 20723-6099



**BUILDING 26**

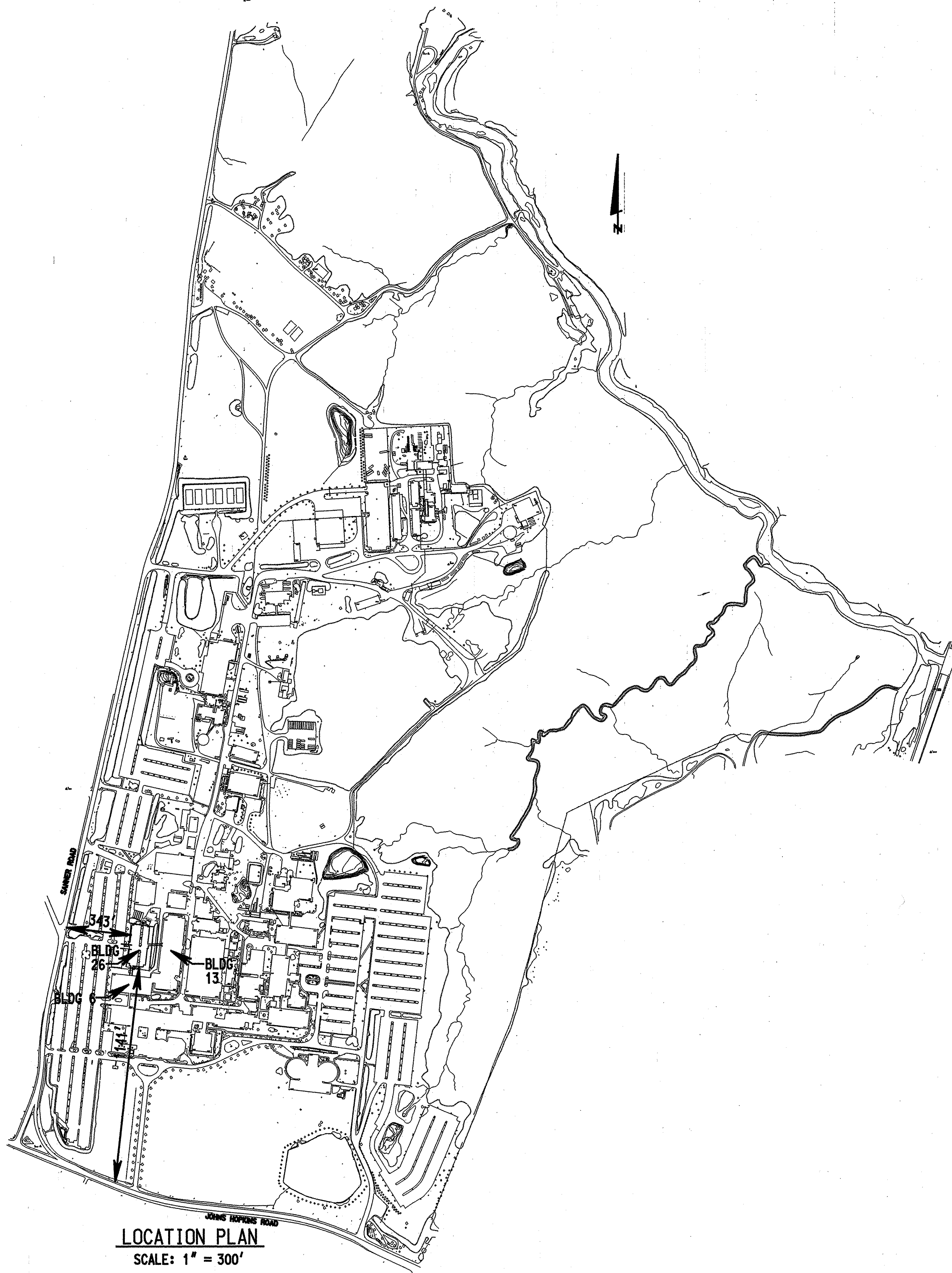
GRAPHIC SCALES



**WHITMAN, REQUARDT AND ASSOCIATES**  
 2315 SAINT PAUL STREET  
 BALTIMORE, MARYLAND  
 410 - 235 - 3450

**COVER SHEET**

	DRAWING NO.	C1.0
	SHEET	1 OF 12
SCALE:		NO SCALE
DES: R.M.	CHECK: R.M.	DATE: 11/25/97



REVISIONS	

APPROVALS	
REQUESTER	
PLANT FACILITIES CHIEF ENGINEER	
CODE COMPLIANCE REVIEW	
TSC GROUP	
TSP GROUP	
SAFETY OFFICER	
DIRECTORS OFFICE	
COORDINATOR	
SENIOR LEADER	

THE JOHNS  
HOPKINS UNIVERSITY  
**APPLIED PHYSICS  
LABORATORY**  
JOHNS HOPKINS ROAD  
LAUREL MARYLAND 20723-6099



**BUILDING  
26**

GRAPHIC SCALES

**WR&A**  
WHITMAN, REQUARDT AND ASSOCIATES  
2315 SAINT PAUL STREET  
BALTIMORE, MARYLAND  
410 - 235 - 3450

LOCATION PLAN	
	DRAWING NO.
	<b>C2.0</b>
SHEET 2 OF 12	
SCALE: 1" = 300'	DATE: 11/25/97
DES: R.M.	CHECK: R.M.

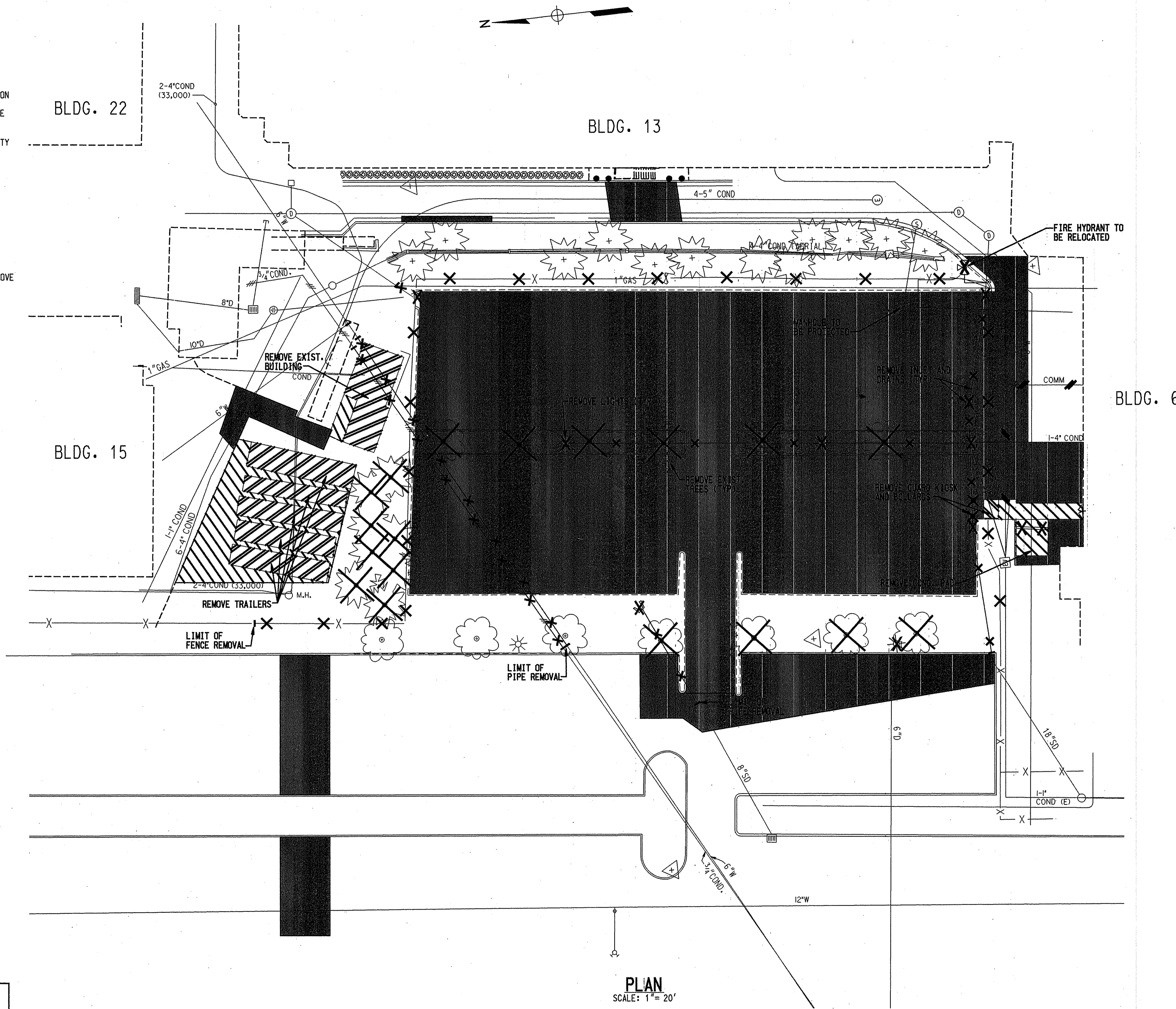
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

<i>James S. Rutter</i>	12/24/97
DIRECTOR	DATE
<i>Mike Dammann</i>	12/22/97
CHIEF, DEVELOPMENT ENGINEERING DIVISION	DATE
<i>Candy Hamilton</i>	12/04/97
CHIEF, DIVISION OF LAND DEVELOPMENT	DATE

**LOCATION PLAN**  
SCALE: 1" = 300'

**DEMOLITION LEGEND**

- //---//--- EXISTING UTILITY - ABANDON
- x-x- EXISTING UTILITY - REMOVE LENGTH/SIZE/TYPE
- //---//--- EXISTING ABANDONED UTILITY
- XXXXX EXISTING FENCE - REMOVE
- x-x- EXISTING UTILITY STRUCTURE - REMOVE
- █ LIMITS OF EXISTING SLAB AND/OR PAVEMENT - REMOVE
- ▨ EXISTING STRUCTURE - REMOVE
- ▨ AGGREGATE - REMOVE
- ☼ TREE - REMOVE



**PLAN**  
SCALE: 1" = 20'

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

*[Signature]* 12/24/97  
 DIRECTOR DATE  
*[Signature]* 12/27/97  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE  
*[Signature]* 12/29/97  
 CHIEF, DIVISION OF LAND DEVELOPMENT DATE

REVISIONS	

APPROVALS	
REQUESTER	
PLANT FACILITIES	
CHIEF ENGINEER	
CODE COMPLIANCE	
REVIEW	
TSC GROUP	
TSP GROUP	
SAFETY OFFICER	
DIRECTOR'S OFFICE	
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**BUILDING 26**

GRAPHIC SCALES

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 BALTIMORE, MARYLAND  
 410 - 235 - 3450

**SITE DEMOLITION PLAN**

DRAWING NO. **C310**

SHEET 3 OF 12

SCALE: 1" = 20'

DES: R.M. CHECK: R.M. DATE: 11/25/97

STATE OF MARYLAND  
 HOWARD COUNTY  
 REGISTERED PROFESSIONAL ENGINEER  
*[Signature]*

REVISIONS

NO.	DESCRIPTION

APPROVALS

REQUESTER	DATE
PLANT FACILITIES CHIEF ENGINEER	
CODE COMPLIANCE REVIEW	
TSC GROUP	
TSP GROUP	
SAFETY OFFICER	
DIRECTORS OFFICE	
COORDINATOR	
SENIOR LEADER	

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**BUILDING 26**

GRAPHIC SCALES



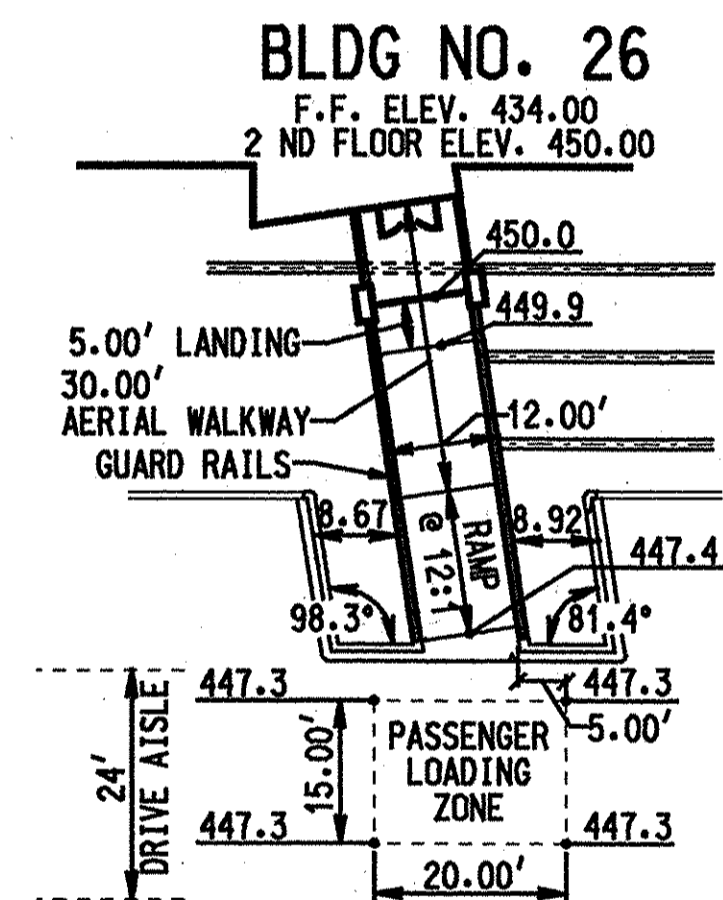
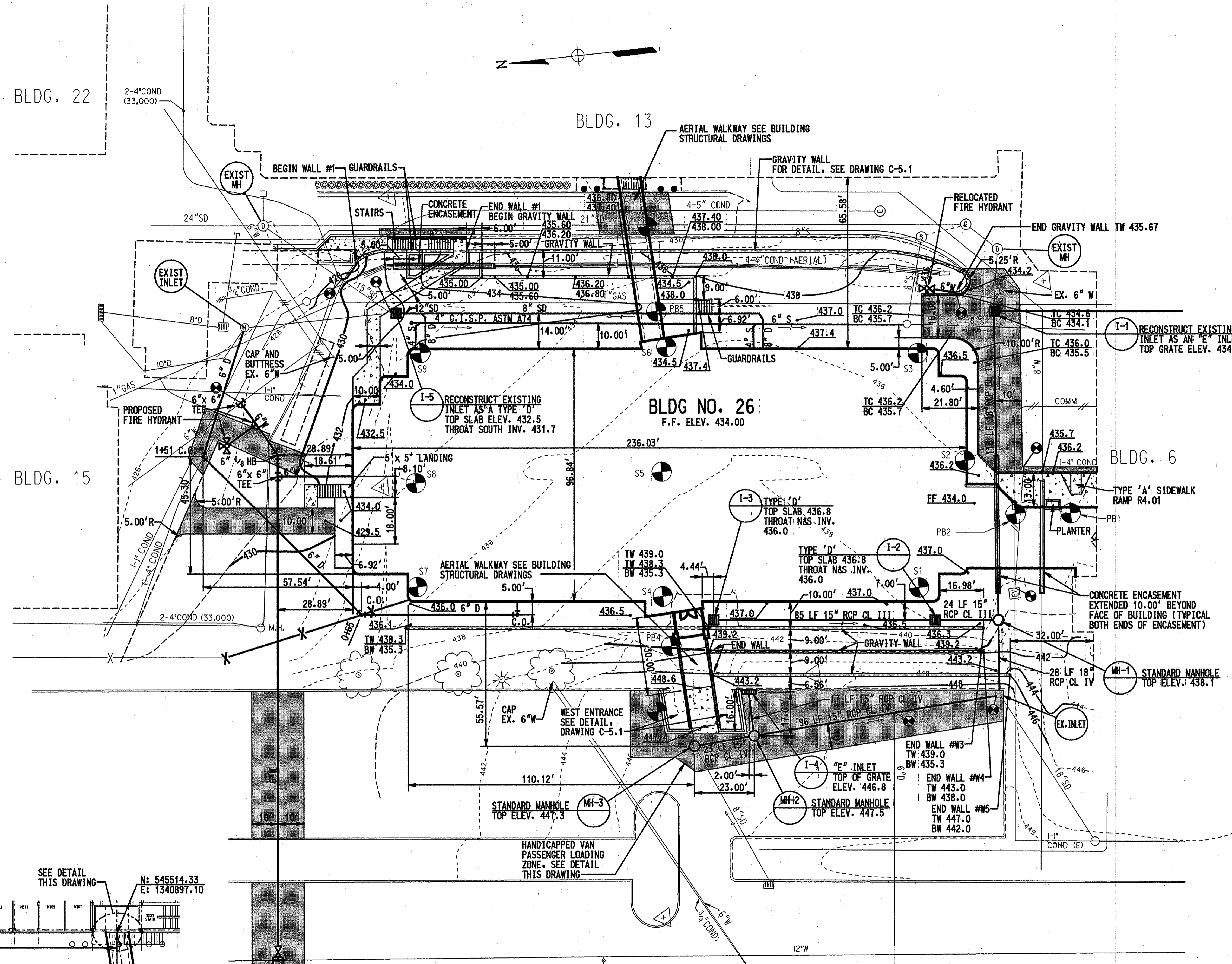
**WHITMAN, BRUQUARDT AND ASSOCIATES**  
 2315 SAINT PAUL STREET  
 BALTIMORE, MARYLAND  
 410 - 235 - 3450

**SITE DEVELOPMENT PLAN**

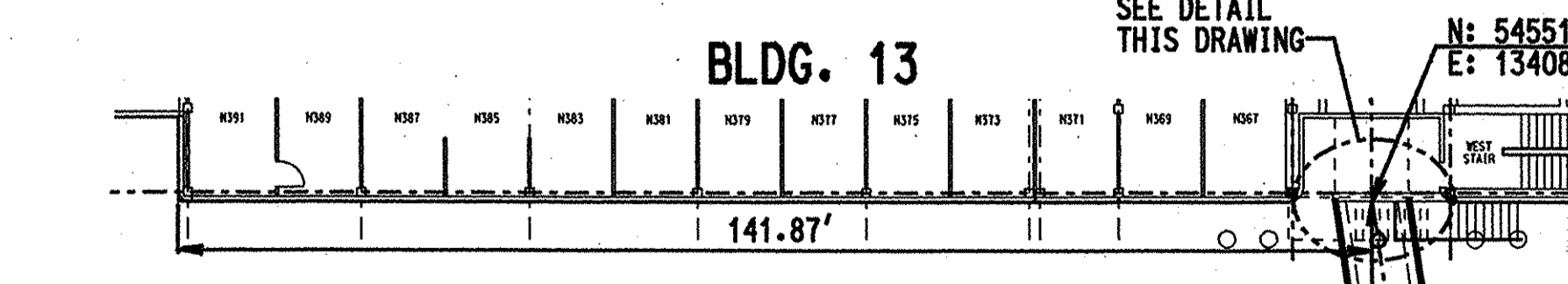
	DRAWING NO.	<b>C4.0</b>	
	SHEET 4 OF 12		
SCALE: 1" = 20'	DES: R.M.	CHECK: R.M.	DATE: 11/25/97

**LEGEND**

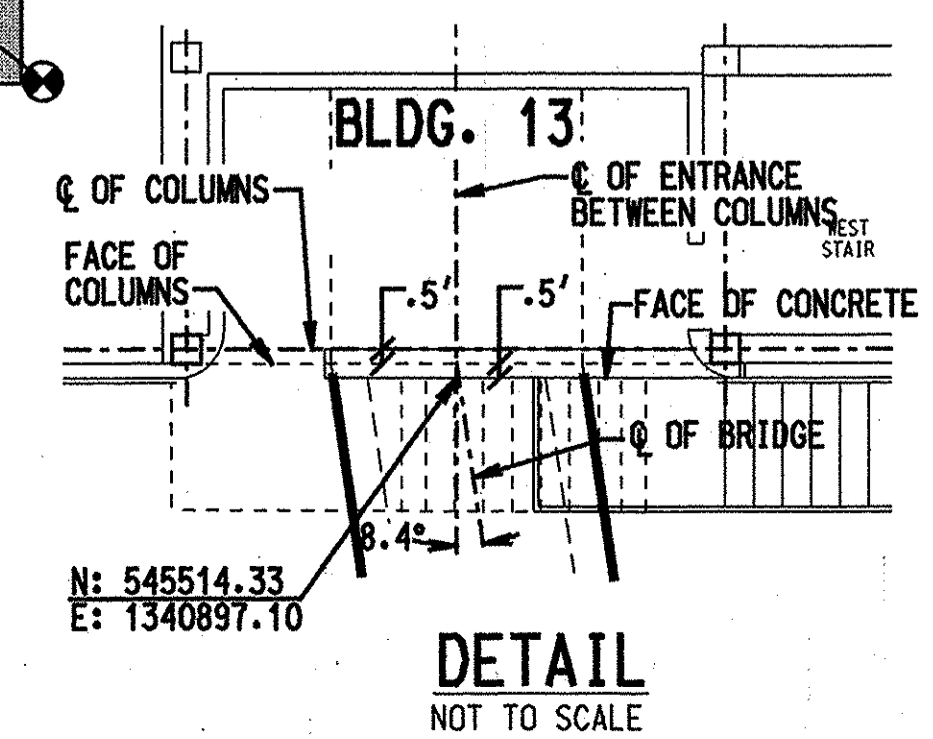
EXISTING	NEW	DESCRIPTION
		BITUMINOUS PAVING
		CONTOURS
		VALVE
		FIRE HYDRANT
		INLET/MANHOLE
		WATER
		12" SD
		18" S
		SANITARY SEWER
		UNDERGROUND ELECTRIC
		GAS
		FENCE
		CONNECT TO EXISTING
		BUILDINGS/STRUCTURES
		LIGHTS
		SPOT ELEVATION
		CURB AND GUTTER
		SIDEWALK
		SIGN
		CLEANOUT
		BORING
		TREE
		WALL



**WEST ENTRANCE LAYOUT DETAIL,  
 CONCRETE PAVEMENT AND  
 HANDICAPPED VAN  
 PASSENGER LOADING ZONE**  
 SCALE: 1" = 20'



**LOCATION DETAIL - TIE FROM BUILDING 13  
 TO BUILDING 26 COLUMN LINE**  
 SCALE: 1" = 20'



**PLAN**  
SCALE: 1" = 20'

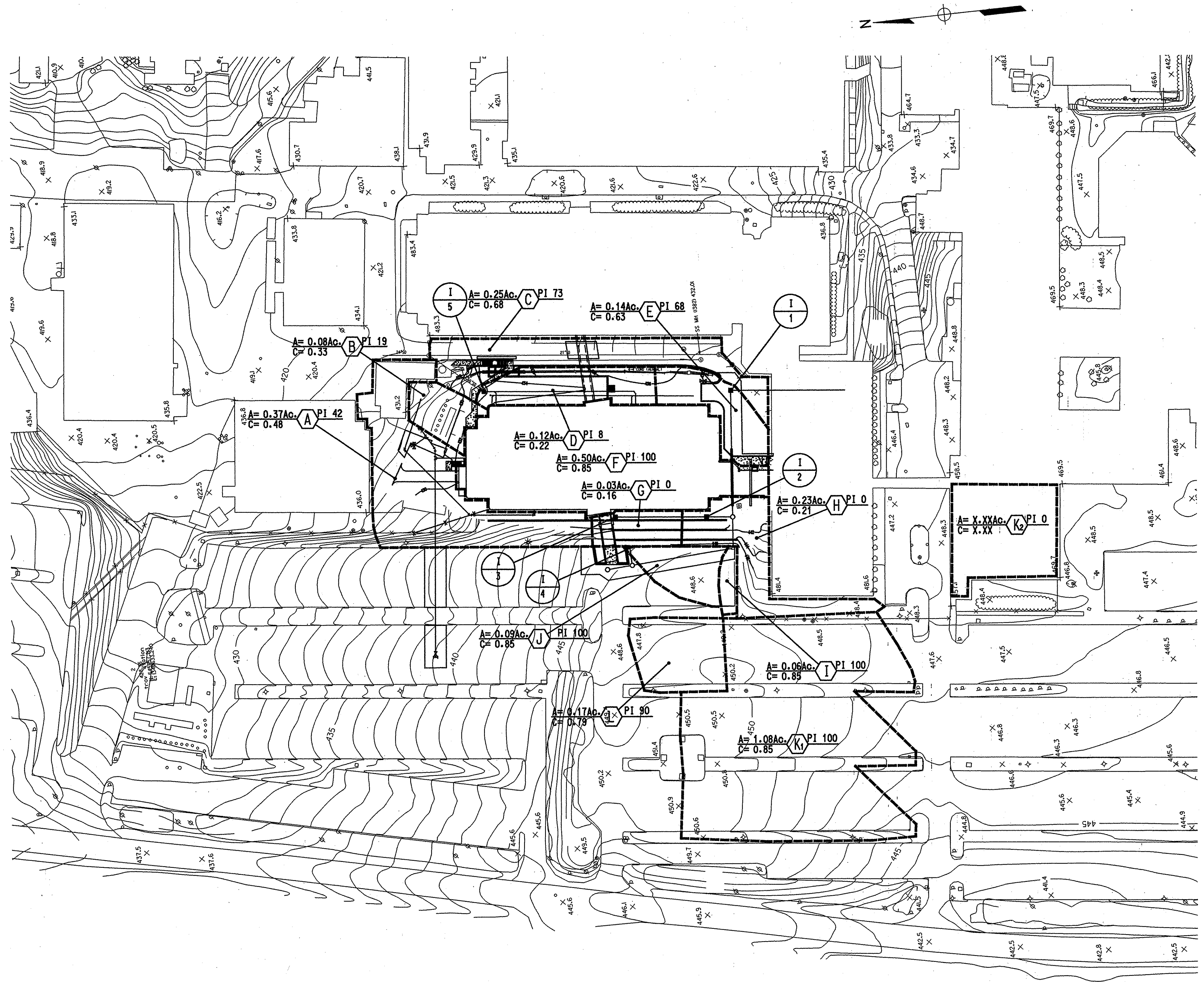
NOTE:  
 CLOSE 6" WATER VALVE IN VALVE VAULT  
 AT WATER TOWER. PLACE A BLIND FLANGE  
 ON WATER VALVE TO ISOLATE 6" WATER LINE.

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING

*[Signature]* 12/24/97  
 DIRECTOR DATE

*[Signature]* 12/22/97  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION MK DATE

*[Signature]* 12/24/97  
 CHIEF, DIVISION OF LAND DEVELOPMENT DATE



PLAN  
SCALE: 1" = 50'

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 DIRECTOR: *[Signature]* DATE: 12/24/97  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION MK DATE: 12/24/97  
 CHIEF, DIVISION OF LAND DEVELOPMENT *[Signature]* DATE: 12/24/97

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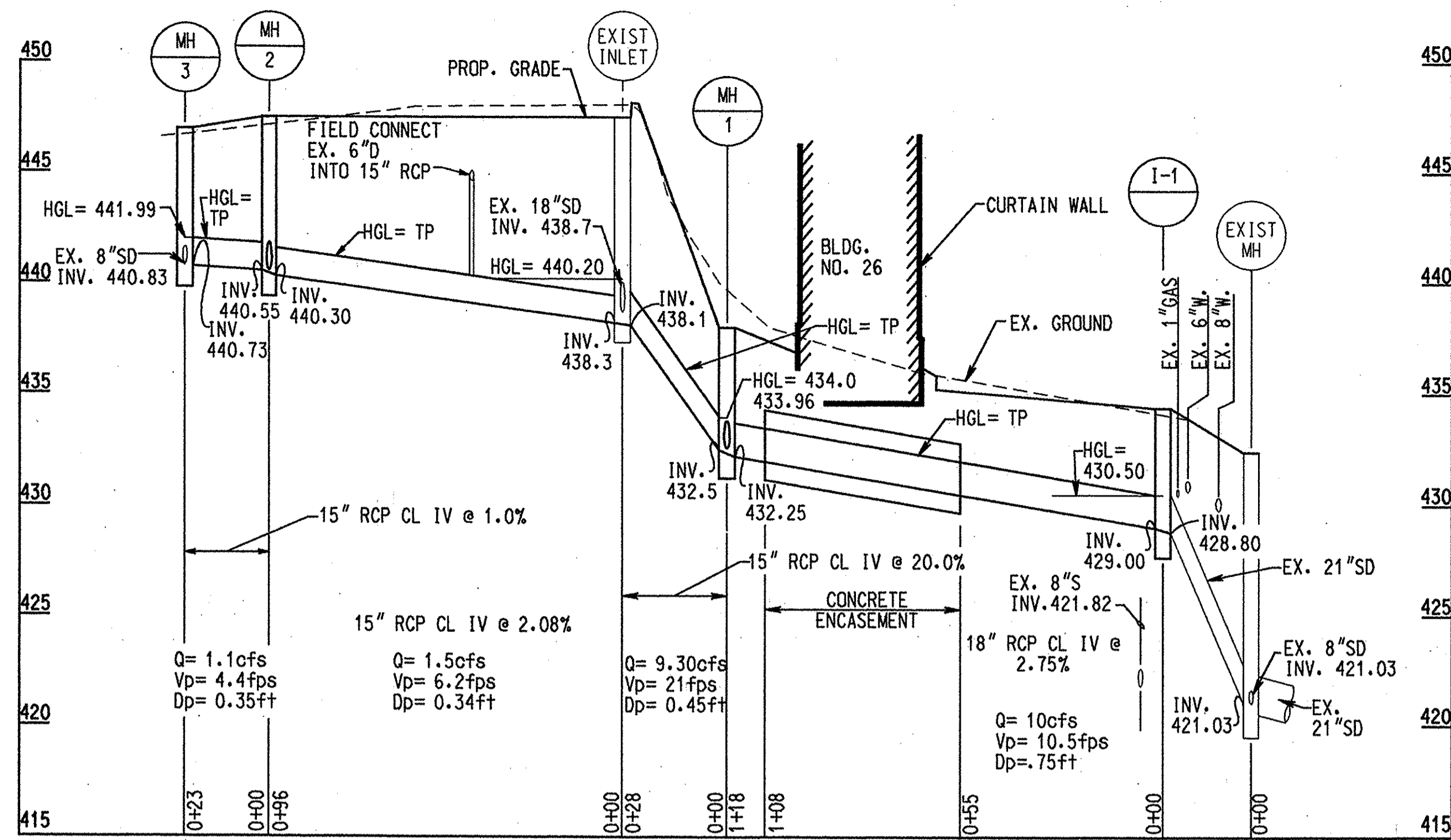
**BUILDING 26**

GRAPHIC SCALES

**WR&A**  
 WHITMAN, REQUARDY AND ASSOCIATES  
 2915 SAINT PAUL STREET  
 BALTIMORE, MARYLAND  
 410 - 235 - 3450

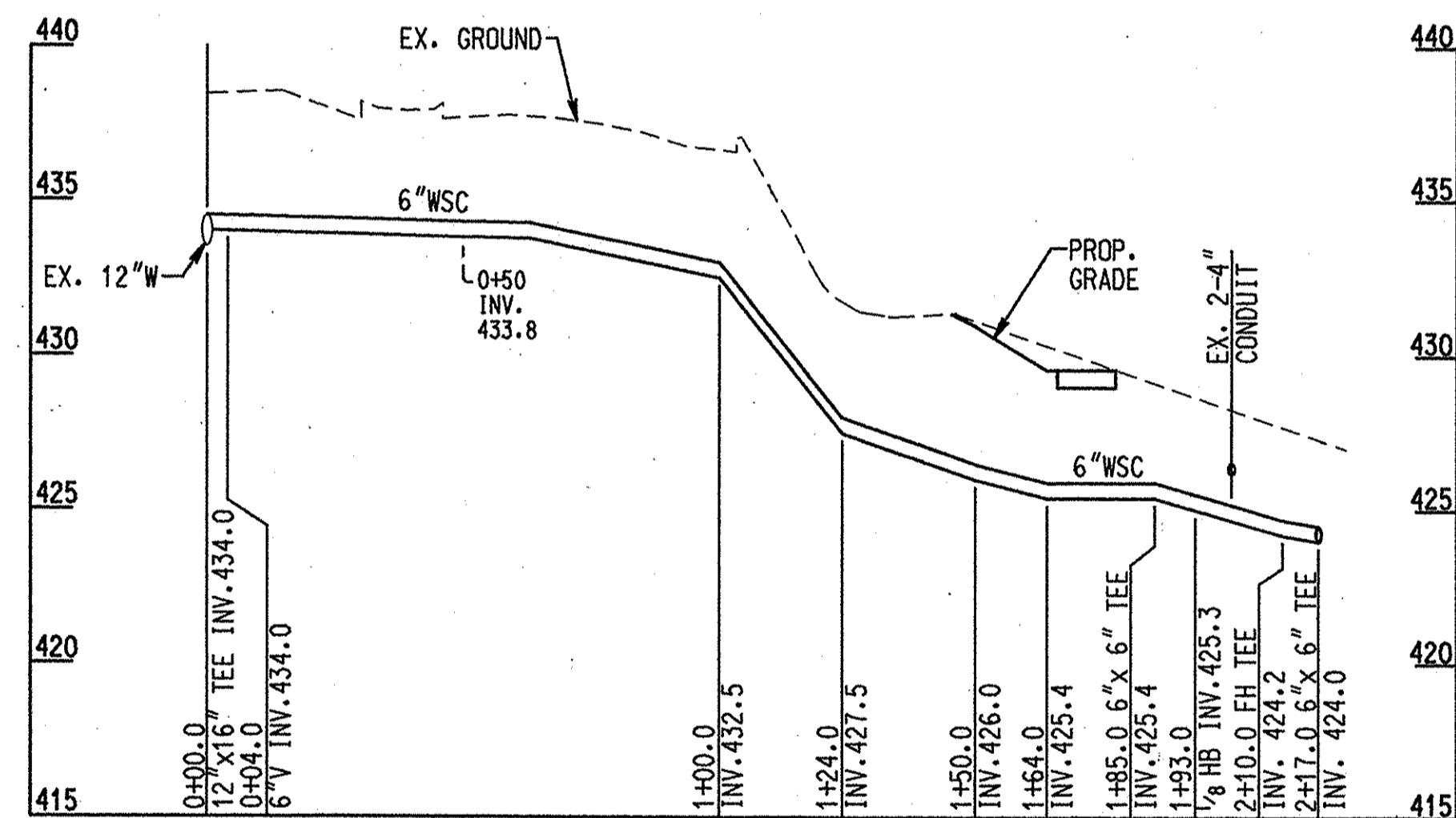
**DRAINAGE AREA MAP**

	DRAWING NO.
	<b>C2.1</b>
SHEET 5 OF 12	
SCALE: 1" = 50'	
DES: R.M.	CHECK: R.M. DATE: 11/25/97



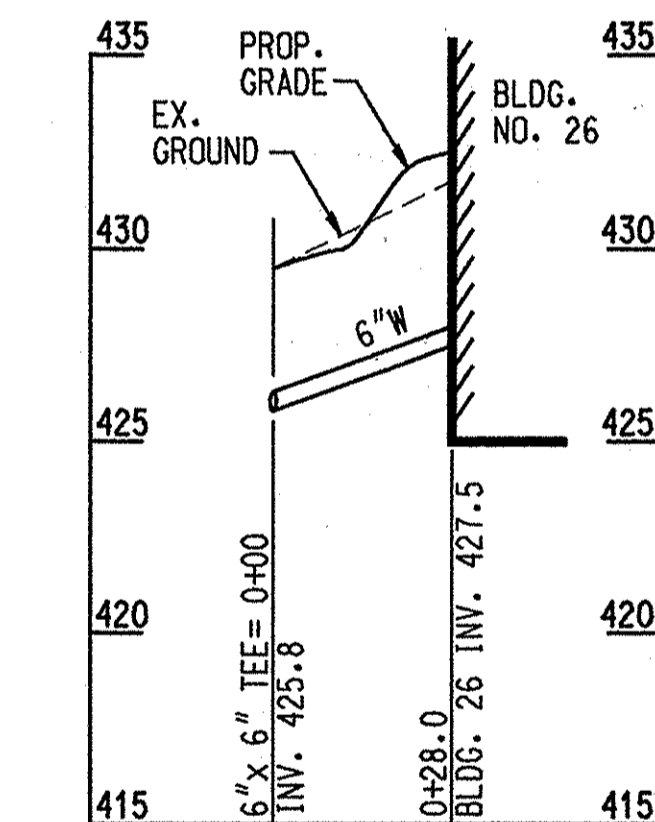
**STORM DRAIN PROFILE**

SCALE: 1" = 30' HORIZ.  
1" = 5' VERT.



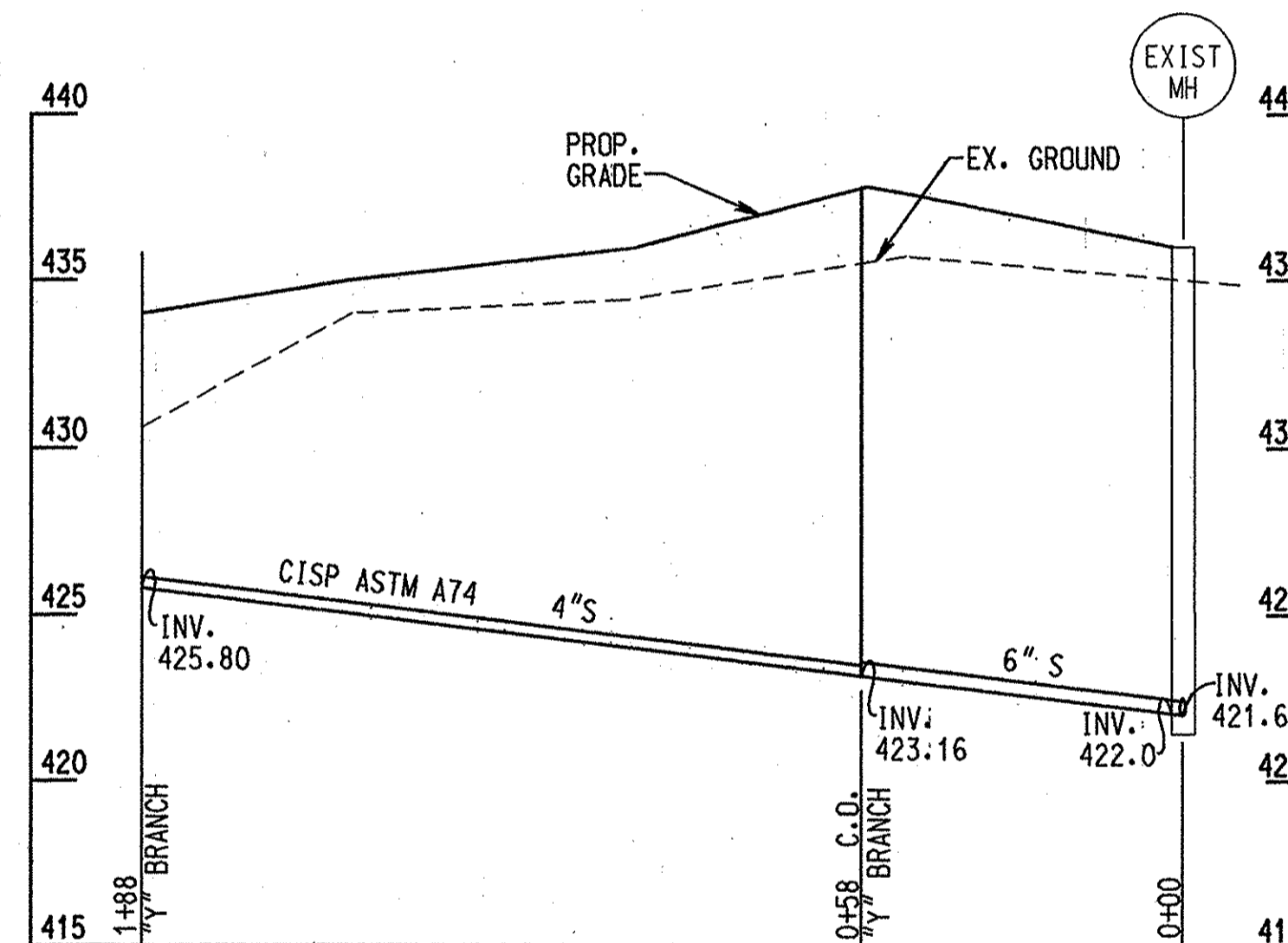
**6" WATER SERVICE CONNECTION**

SCALE: 1" = 30' HORIZ.  
1" = 5' VERT.



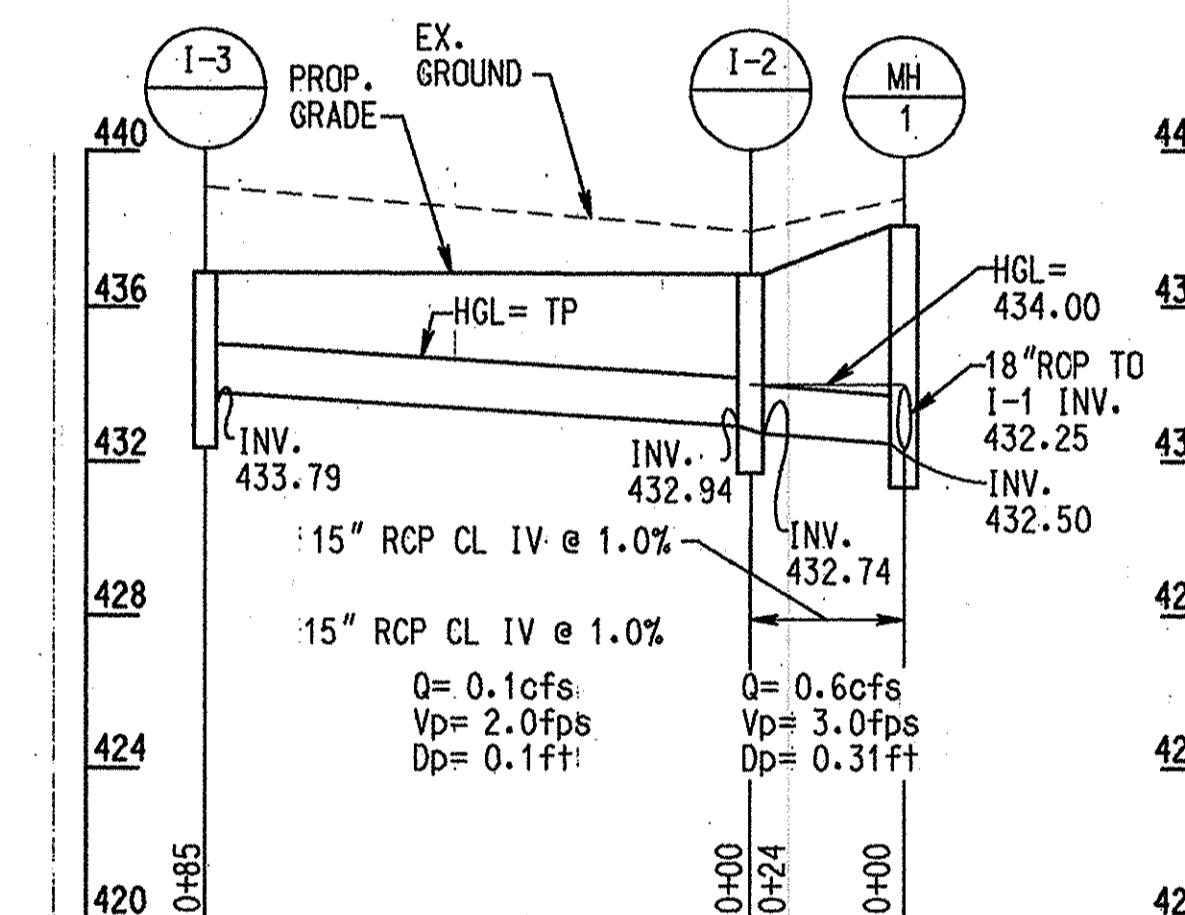
**6" WATER SERVICE CONNECTION**

SCALE: 1" = 30' HORIZ.  
1" = 5' VERT.



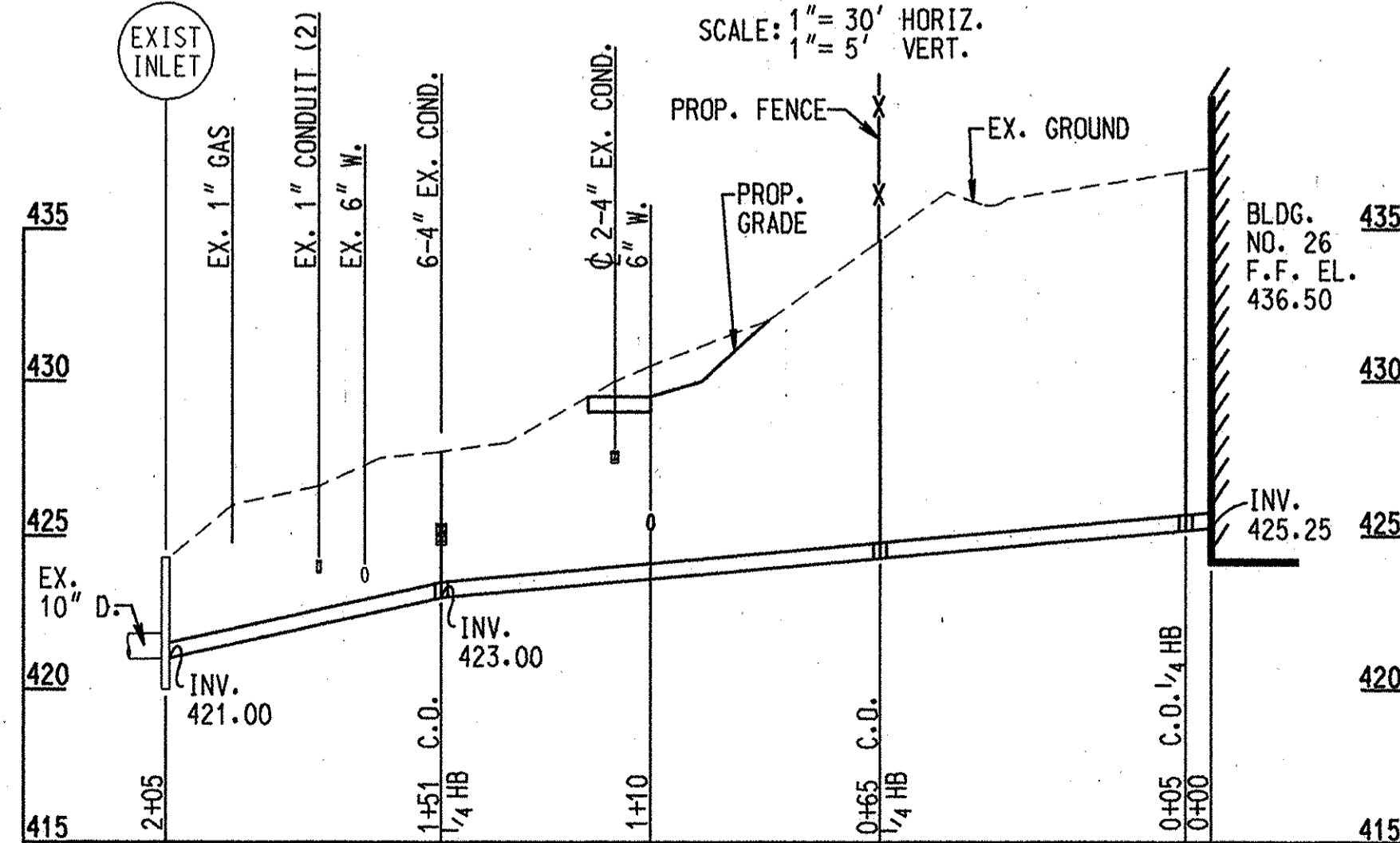
**SEWER SERVICE CONNECTION**

SCALE: 1" = 30' HORIZ.  
1" = 5' VERT.



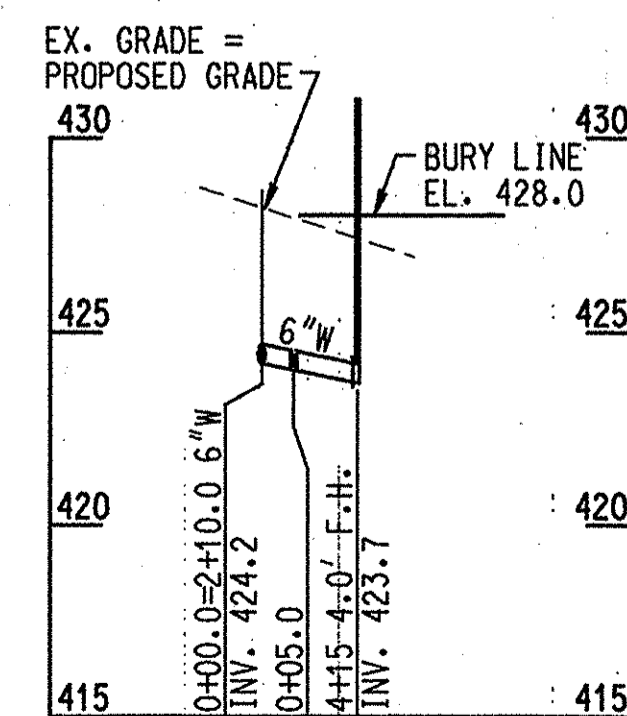
**STORM DRAIN PROFILE**

SCALE: 1" = 30' HORIZ.  
1" = 5' VERT.



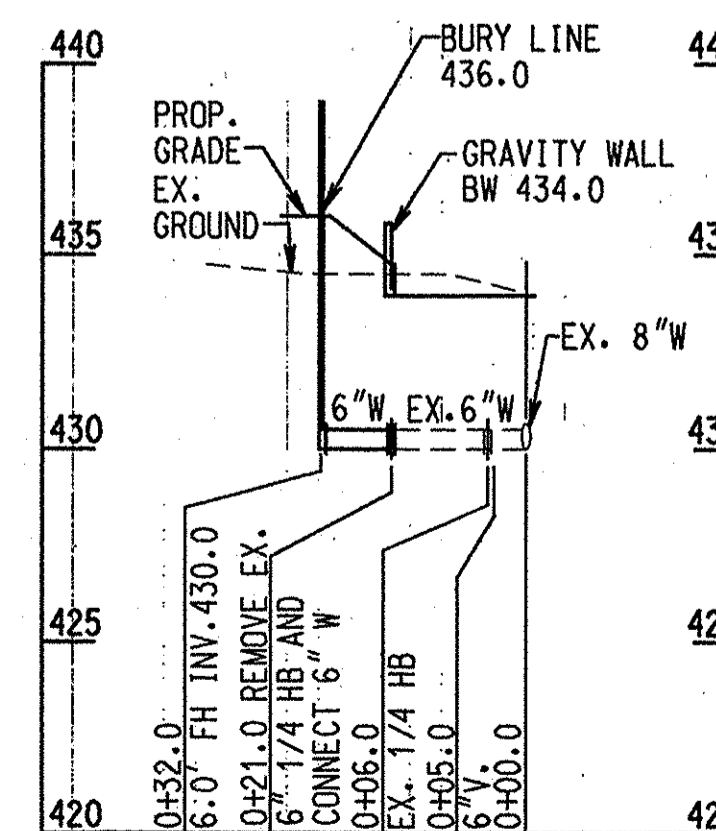
**6" FLOOR DRAIN PROFILE**

SCALE: 1" = 30' HORIZ.  
1" = 5' VERT.



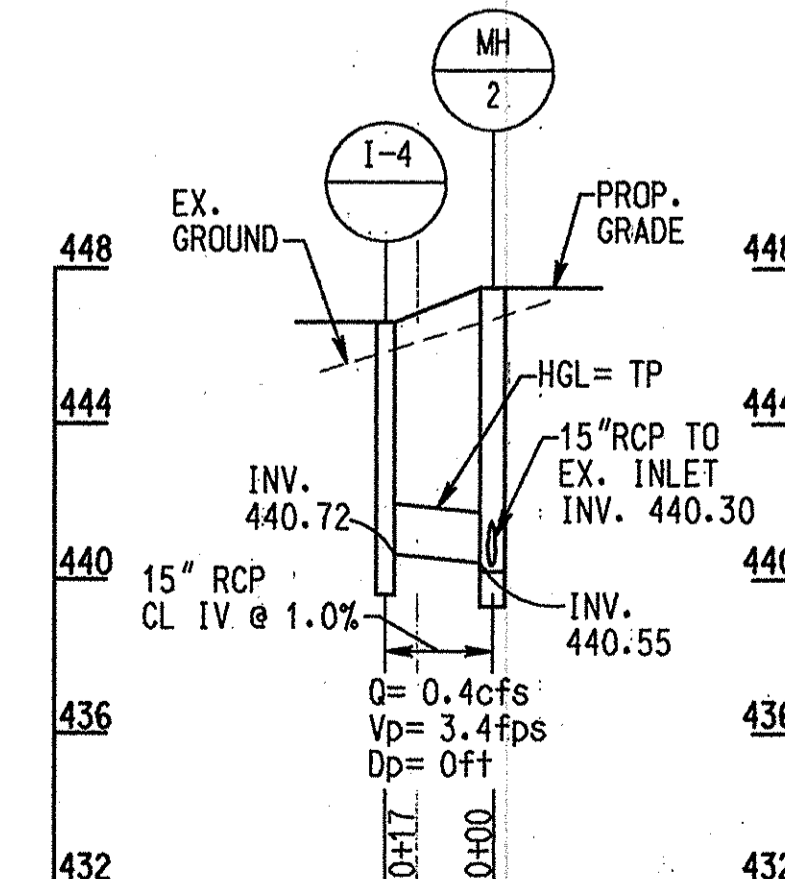
**NEW FIRE HYDRANT**

SCALE: 1" = 30' HORIZ.  
1" = 5' VERT.



**PROFILE AT FIRE HYDRANT RELOCATION**

SCALE: 1" = 30' HORIZ.  
1" = 5' VERT.



**STORM DRAIN PROFILE - WEST**

SCALE: 1" = 30' HORIZ.  
1" = 4' VERT.

**STRUCTURE SCHEDULE**

STRUCTURE NO.	TYPE	INVERT		TOP ELEVATION	HOWARD COUNTY STANDARD DETAIL	NOTES
		IN	OUT			
I-1	E	429.00	428.80	434.5	SD - 4.21	RECONSTRUCT INLET TOP TO PROPOSED ELEVATION AND ADD "E" FRAME AND GRATE
MH-1	STANDARD	432.5(N) 432.5(W)	432.25	438.1	G 5.12	
MH-2	STANDARD	440.55(N) 440.55(E)	440.30	447.5	G 5.12	
MH-3	STANDARD	440.83	440.73	447.3	G 5.12	
F.C.1					SD - 2.01	CONNECT 6" C.I. OVERFLOW DRAIN FROM WATER TANK INTO 15" DRAIN
I-2	D	432.94	432.74	436.8	SD - 4.11	THROAT & S INV. 436.0
I-3	D		433.79	436.8	SD - 4.11	THROAT & S INV. 436.0
I-4	E		440.72	446.8	SD - 4.21	
I-5	D		428.50	432.5	SD - 4.11	RECONSTRUCT INLET THROAT SOUTH INV. 431.7

REVISIONS


APPROVALS

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**APPLIED PHYSICS LABORATORY**  
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LAUREL MARYLAND 20723-6099



**BUILDING 26**

GRAPHIC SCALES

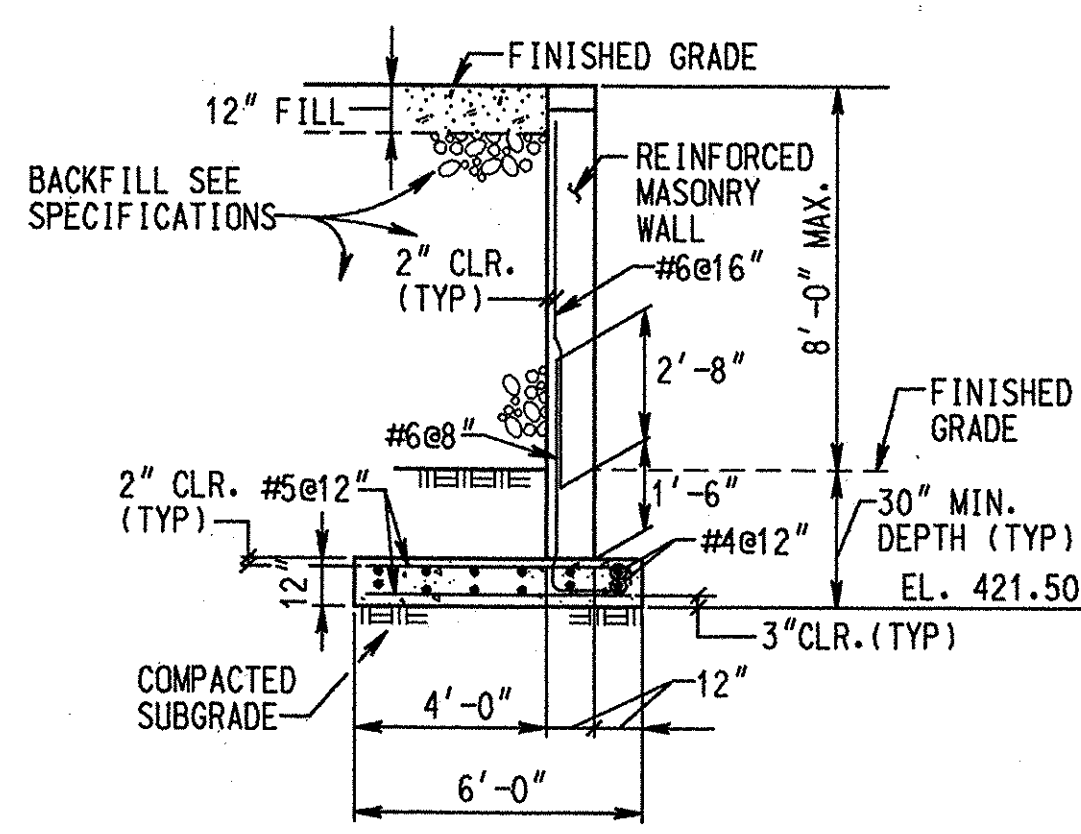


**WHITMAN, REARDON & ASSOCIATES**  
2315 SAINT PAUL STREET  
BALTIMORE, MARYLAND  
410 - 295 - 3450

**STORM DRAIN PROFILES AND DETAILS**  
**STRUCTURE SCHEDULE**

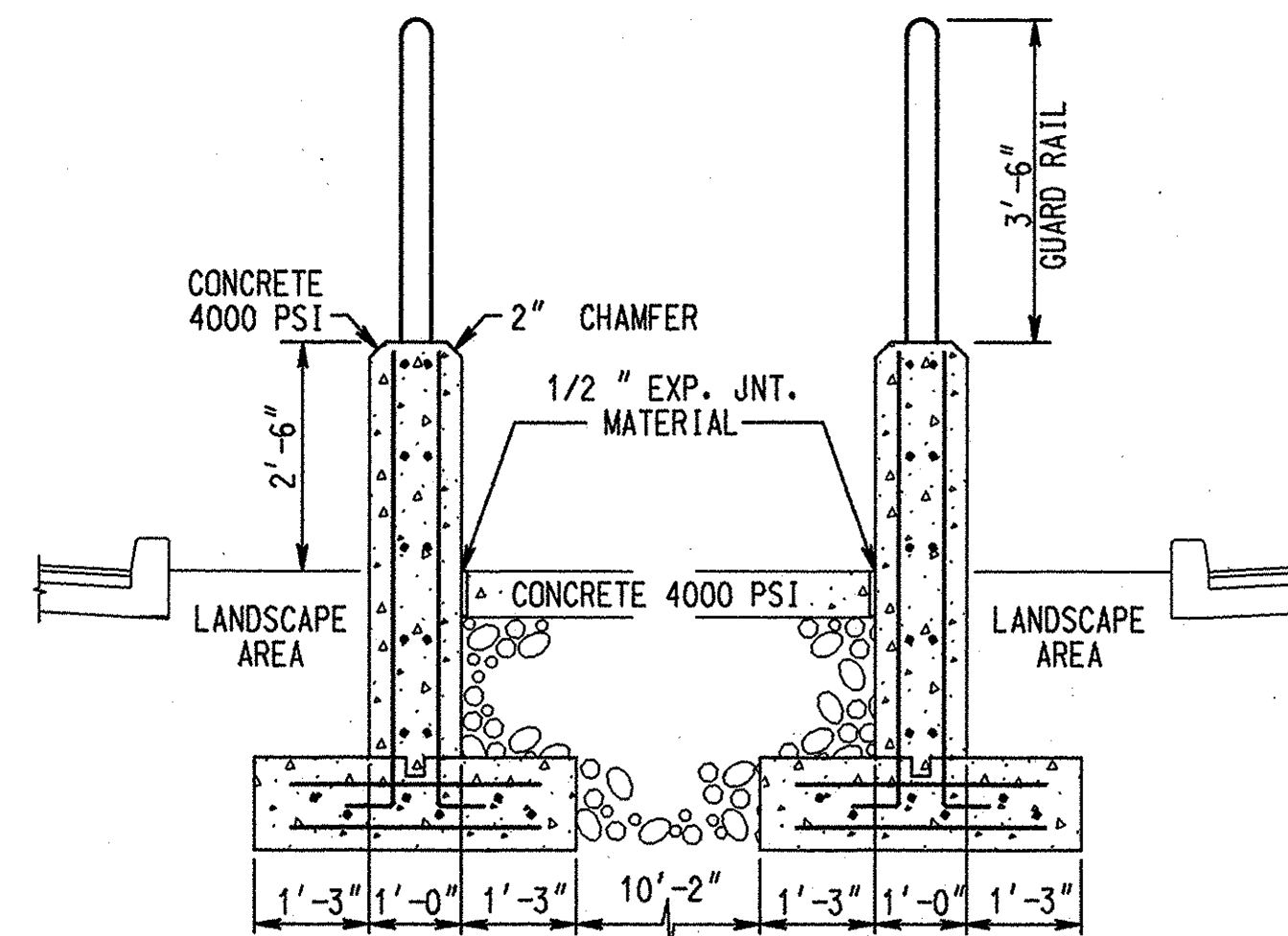
DRAWING NO. **C5.0**  
SHEET 6 OF 12  
SCALE: AS SHOWN  
DES: R.M. CHECK: R.M. DATE: 11/25/97

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
DIRECTOR: *[Signature]* DATE: 12/24/97  
CHIEF, DEVELOPMENT ENGINEERING DIVISION: *[Signature]* DATE: 12/24/97  
CHIEF, DIVISION OF LAND DEVELOPMENT: *[Signature]* DATE: 12/24/97



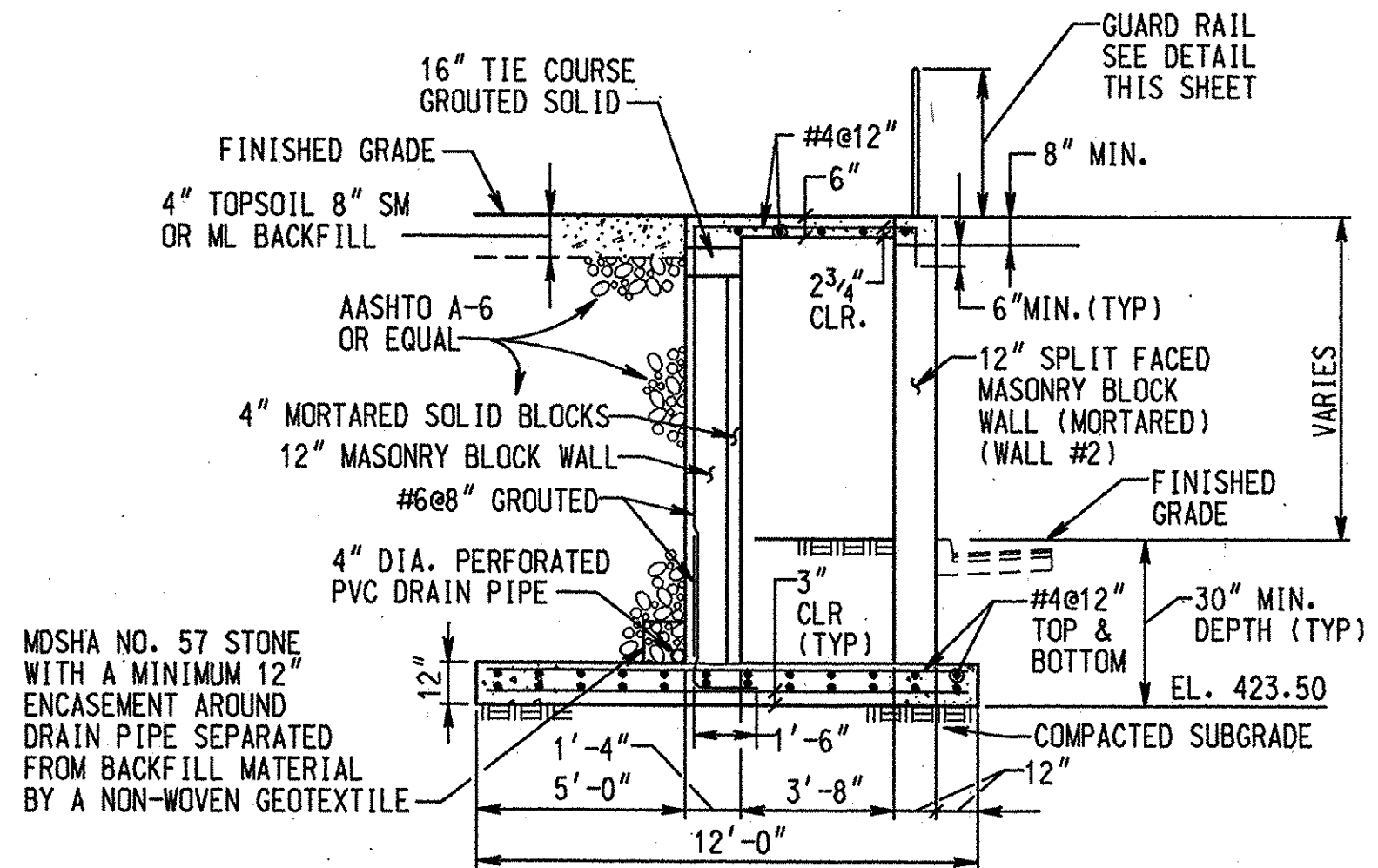
SECTION A-A

TYPICAL SECTION FOR WALL #1  
STATIONS 0+00 - 0+13  
SCALE: 1/4" = 1'-0"



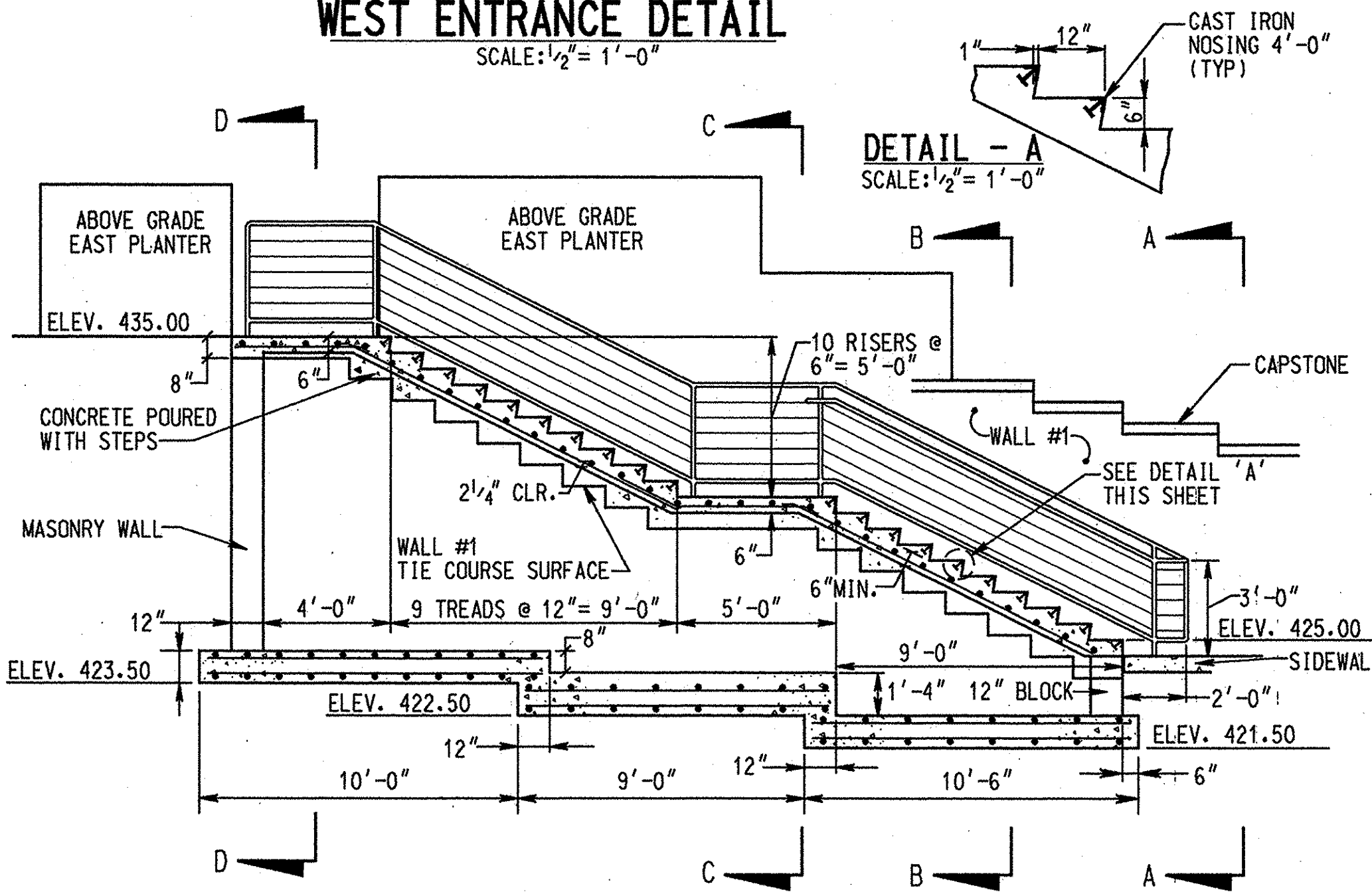
SECTION A-A

WEST ENTRANCE DETAIL  
SCALE: 1/2" = 1'-0"

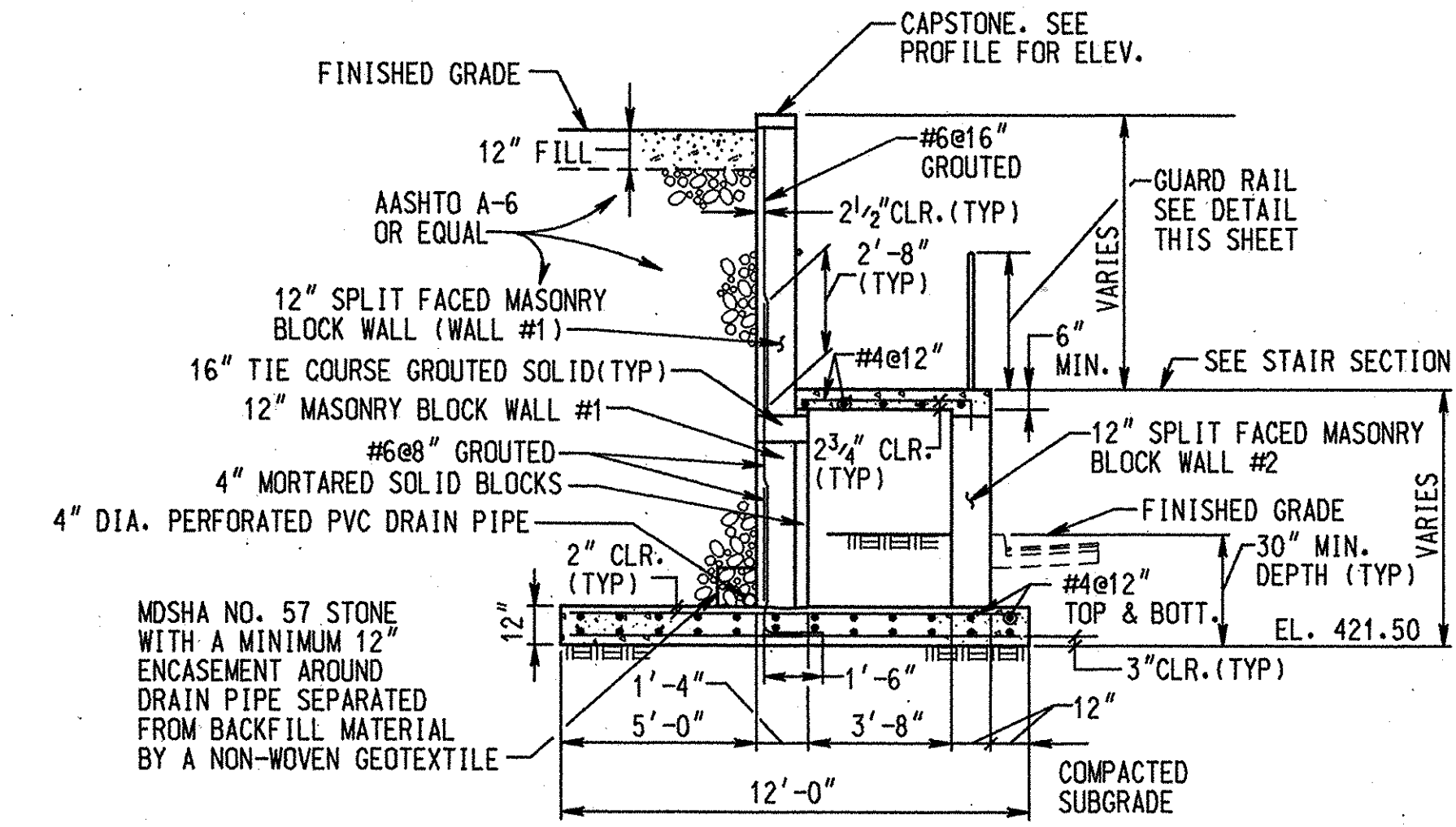


SECTION D-D

TYPICAL SECTION FOR WALLS #1 & #2  
STATIONS 0+32 - 0+43.57  
SCALE: 1/4" = 1'-0"

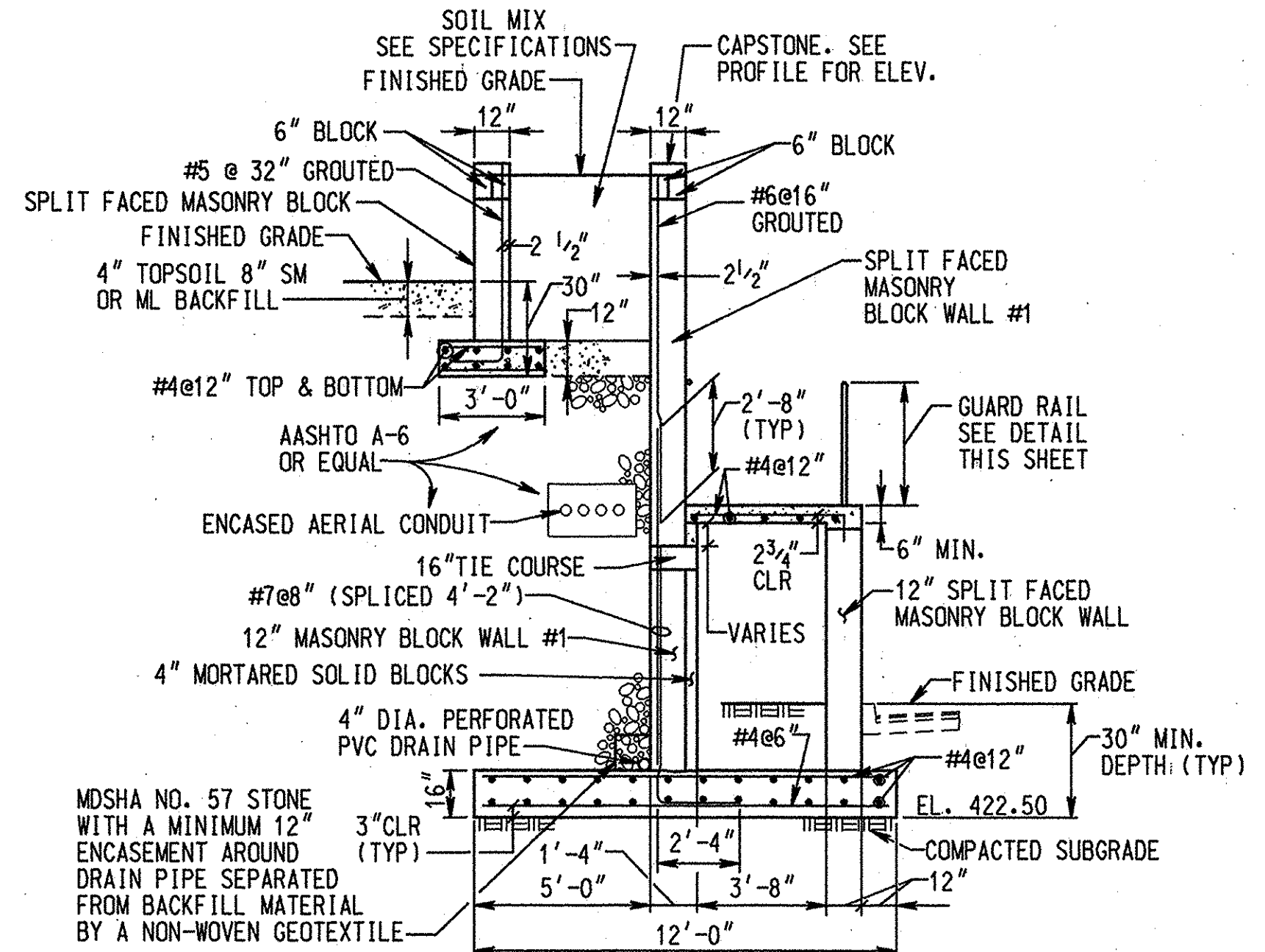


ELEVATION - VERTICAL REINFORCED BLOCK WALL #1  
GUARDRAIL, STEPS AND WALL #2  
SCALE: 1/4" = 1'-0"



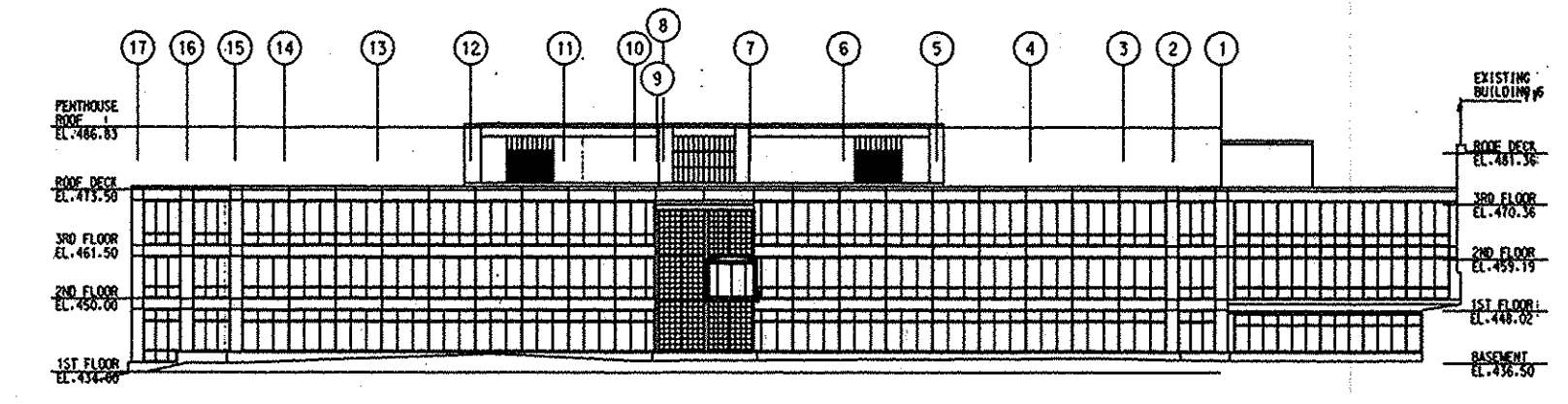
SECTION B-B

TYPICAL SECTION FOR WALLS #1 & #2  
STATIONS 0+13-0+22  
SCALE: 1/4" = 1'-0"

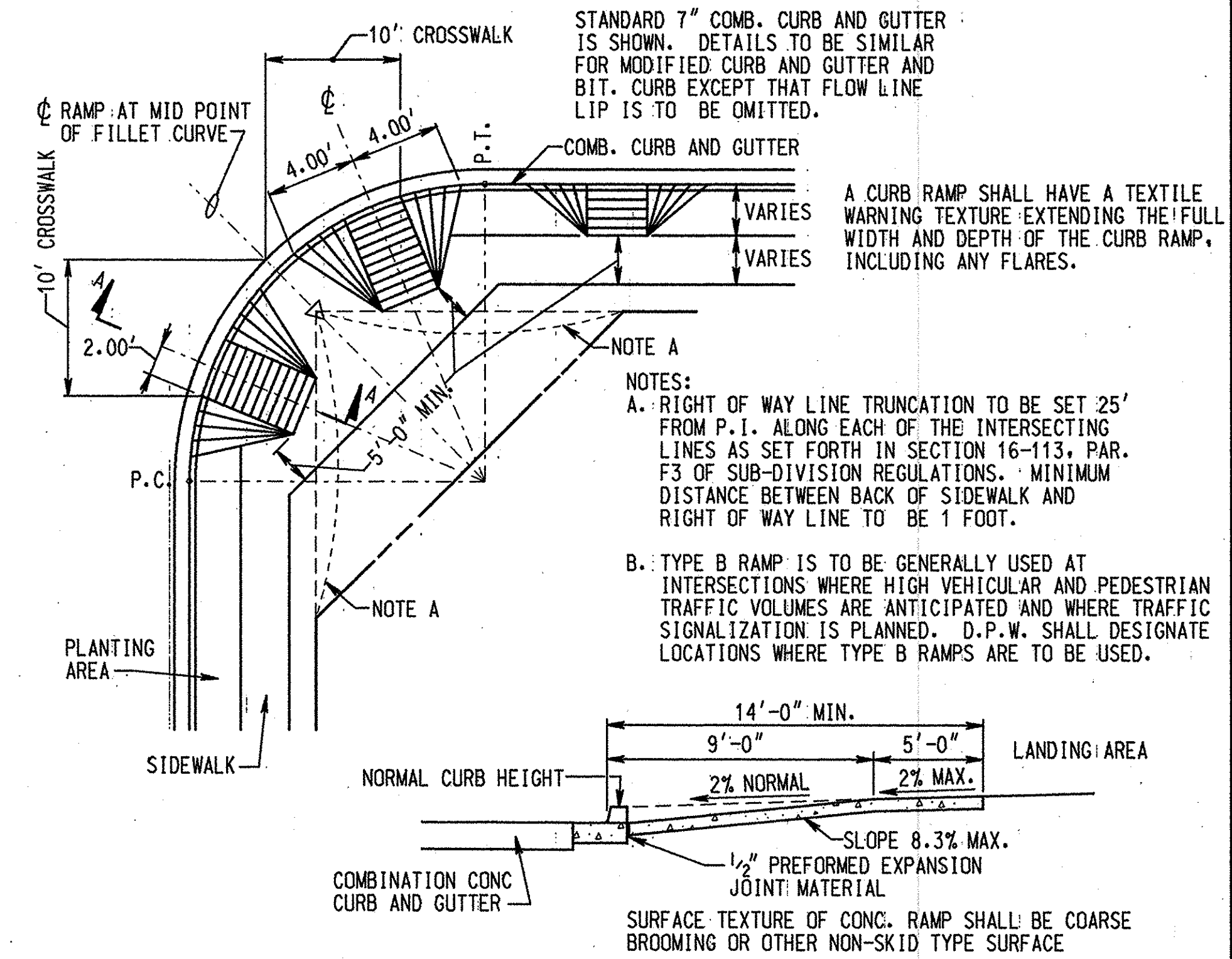


SECTION C-C

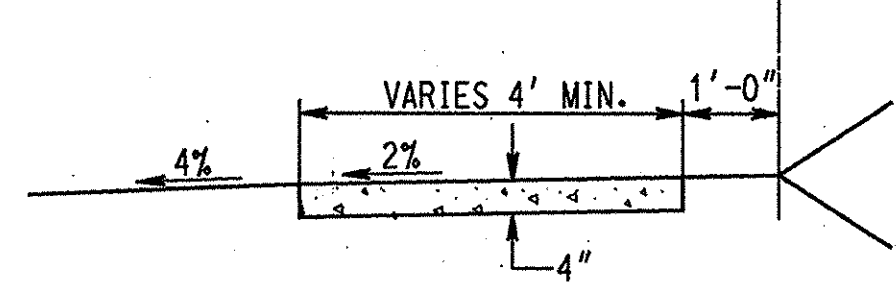
TYPICAL SECTION FOR WALLS #1 & #2  
STATIONS 0+22-0+32  
SCALE: 1/4" = 1'-0"



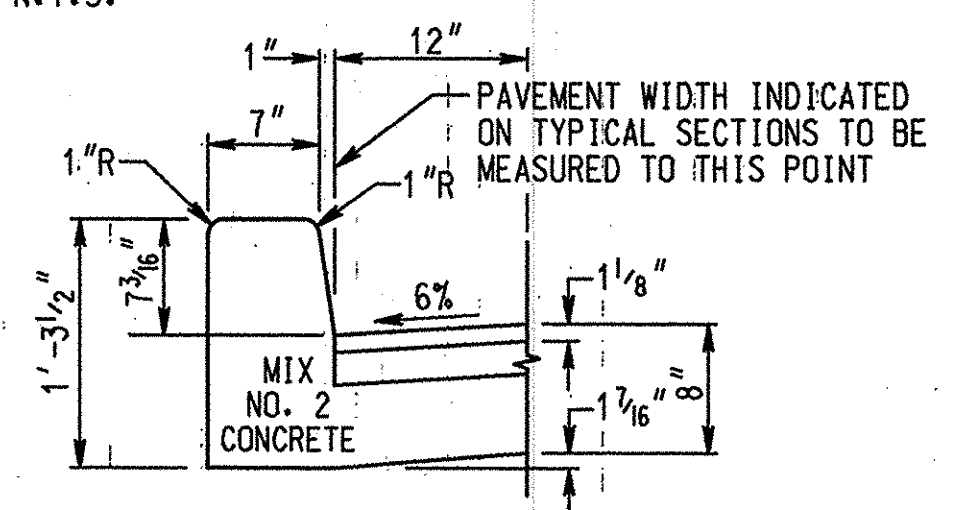
WEST ELEVATION



HOWARD COUNTY  
STANDARD DETAIL R-4.01  
TYPE A SIDEWALK RAMP  
N.T.S.

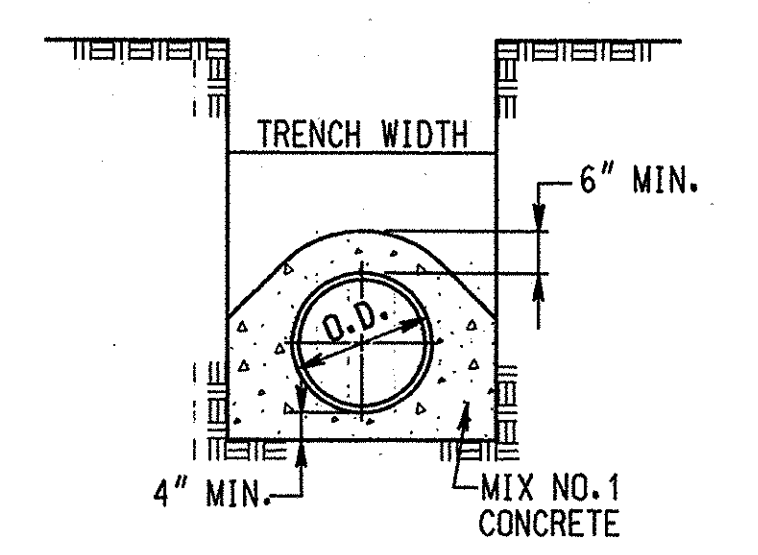


HOWARD COUNTY  
STANDARD DETAIL R-3.05  
CONCRETE SIDEWALK  
SCALE: 1/2" = 1'-0"

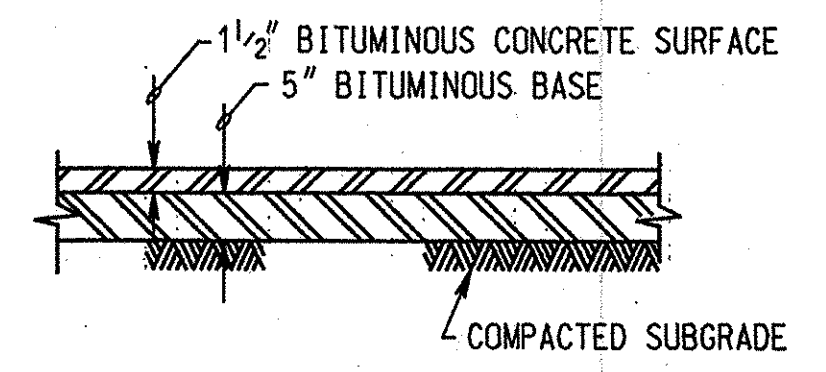


HOWARD COUNTY  
STANDARD DETAIL R-3.01

COMBINATION  
CURB AND GUTTER  
SCALE: 1" = 1'-0"



HOWARD COUNTY  
STANDARD DETAIL G-2.02  
CONCRETE ENCASUREMENT  
SCALE: N.T.S.



HOWARD COUNTY  
STANDARD DETAIL R-2.01  
P-2 PAVEMENT SECTION  
SCALE: N.T.S.

REVISIONS	

APPROVALS	
REQUESTER	
PLANT FACILITIES	
CRUIP ENGINEER	
CODE COMPLIANCE	
ENGINEER	
TSC GROUP	
TSP GROUP	
SAFETY OFFICER	
DIRECTOR'S OFFICE	
COORDINATOR	
SENIOR LEADER	

THE JOHNS HOPKINS UNIVERSITY  
**APPLIED PHYSICS LABORATORY**  
JOHNS HOPKINS ROAD  
LAUREL MARYLAND 20723-6099



**BUILDING 26**

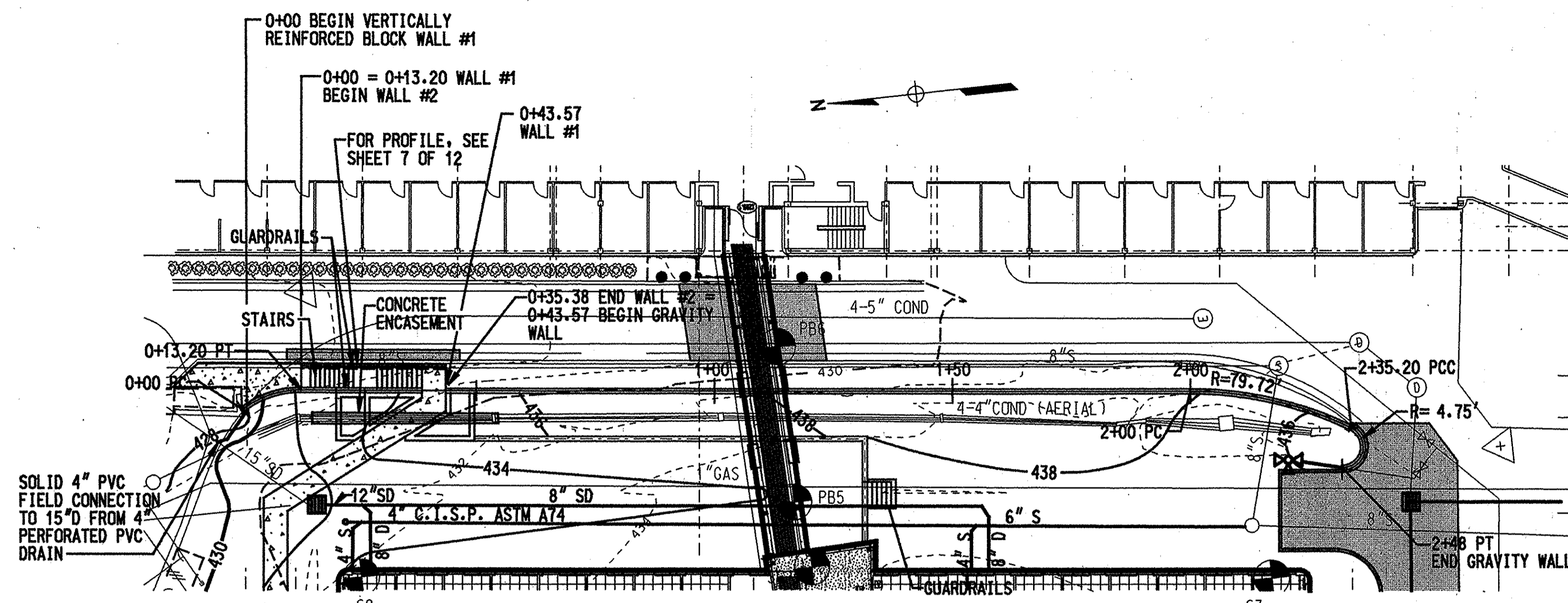
GRAPHIC SCALES

**WR&A**  
WHITMAN, REQUARDT AND ASSOCIATES  
2315 SAINT PAUL STREET  
BALTIMORE, MARYLAND  
410 - 255 - 3450

PAVEMENT & STRUCTURAL  
DETAILS

	DRAWING NO.
	<b>C5.1</b>
SCALE: AS SHOWN	SHEET 7 OF 12
DES: R.M.	CHECK: R.M. DATE: 11/25/97

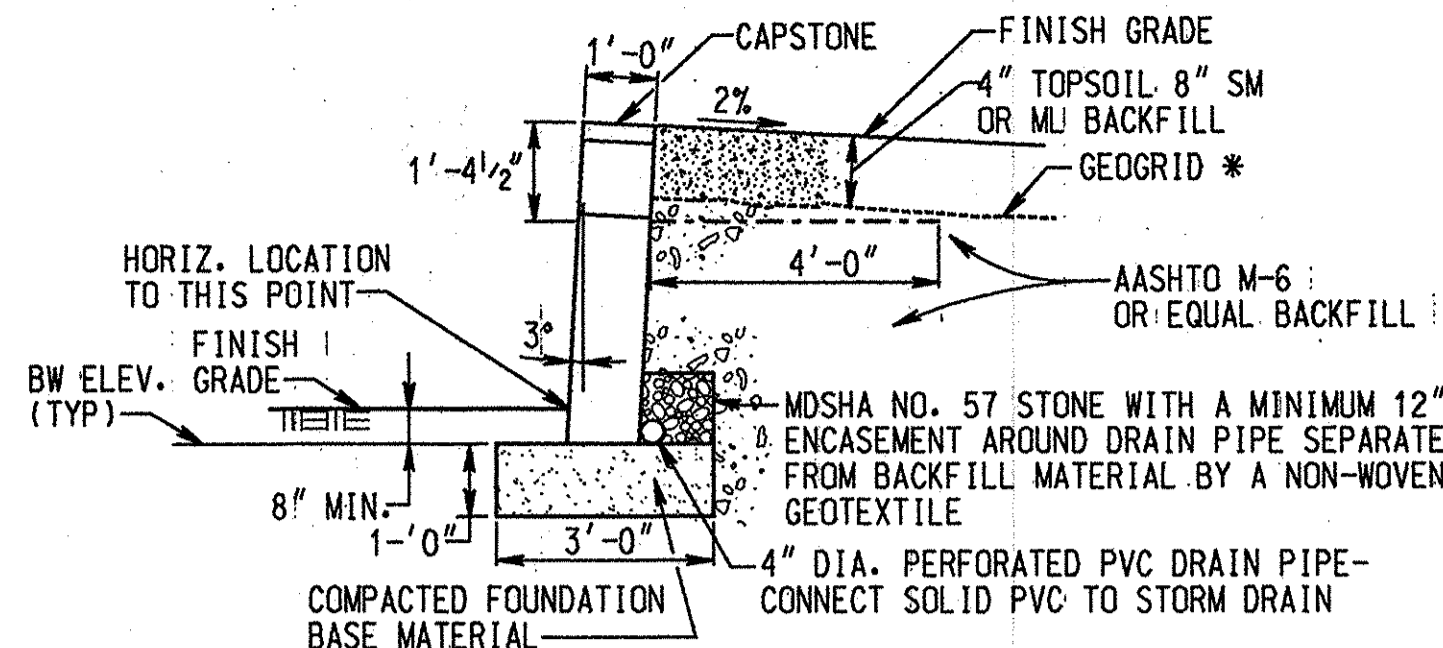
APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 DIRECTOR: *[Signature]* DATE: 12/24/97  
 CHIEF, DEVELOPMENT ENGINEERING DIVISION MK: *[Signature]* DATE: 12/22/97  
 CHIEF, DIVISION OF LAND DEVELOPMENT: *[Signature]* DATE: 12/24/97



**WALL PLAN & STATIONING**  
SCALE: 1" = 20'

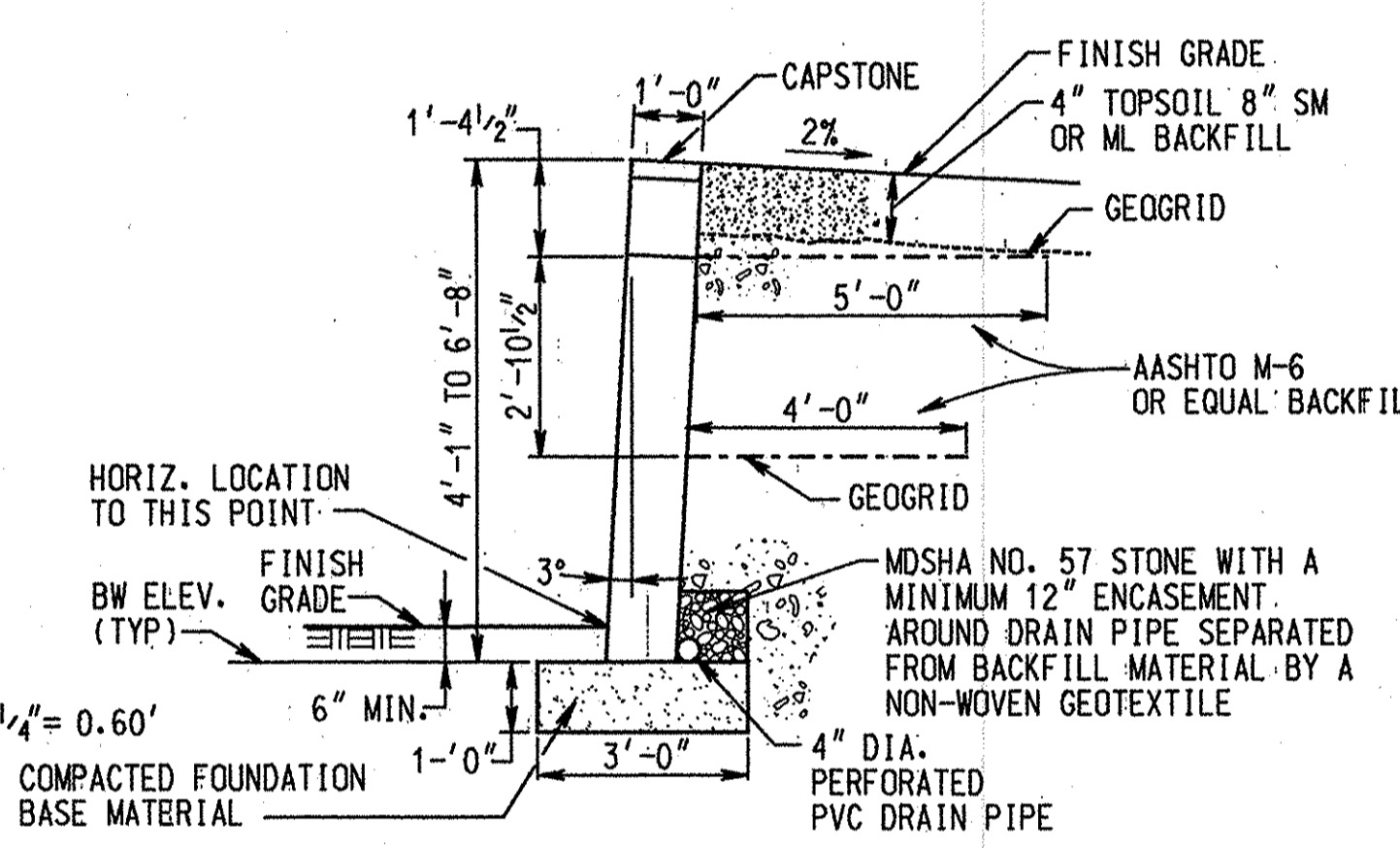
WALL STATION	BEGIN B.W. ELEV.	BEGIN T.W. ELEV.	BEGIN EAST PLANTER WALL ELEV.
0+00.00	421.50	428.33	
0+01.50		428.00	
0+03.00		429.67	
0+04.50		430.33	
0+06.00		431.00	
0+09.00		431.67	
0+12.00		432.33	
0+18.00		433.00	
0+20.57			436.33
0+22.00	422.83		
0+26.57			438.33
0+32.00	423.50		
0+38.00			438.33 CORNER
0+43.00	425.67	434.65	438.33 BEGIN
0+49.00	426.27	435.25	
0+56.00	426.88	435.85	
0+62.00	427.50		
0+68.00		436.45	
0+74.00	428.10		
0+80.00		437.06	
0+92.00		437.67	
1+04.00		438.27	
1+16.00		438.88	
1+38.00	428.70		
1+50.00	429.31		
1+59.00	430.00		
1+74.00	430.50		
1+88.00	431.10	438.27	
2+00.00		437.67	
2+12.00		437.06	
2+24.00	431.70	436.45	
2+36.00		435.85	

\*1 - COURSE OF BLOCK EFFECTIVE HEIGHT = 8" (0.67)  
 \*\*1 - COURSE OF GRAVITY BLOCK WALL EFFECTIVE HEIGHT = 7 1/4" = 0.60'

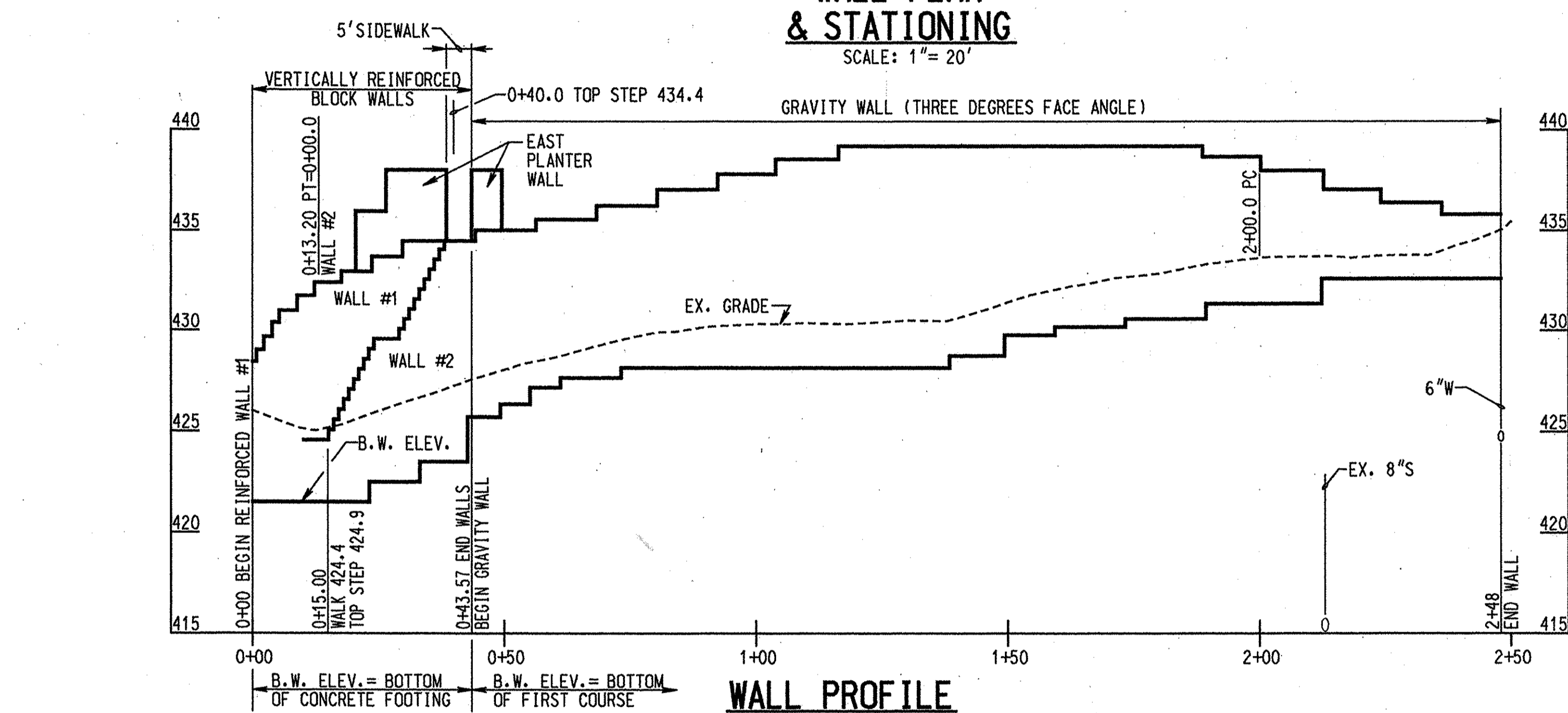


**TYPICAL SECTION - TYPE 1 GRAVITY WALL**  
HEIGHT = 0'-0" TO 4'-0" MAX.  
SCALE: 3/8" = 1'-0"

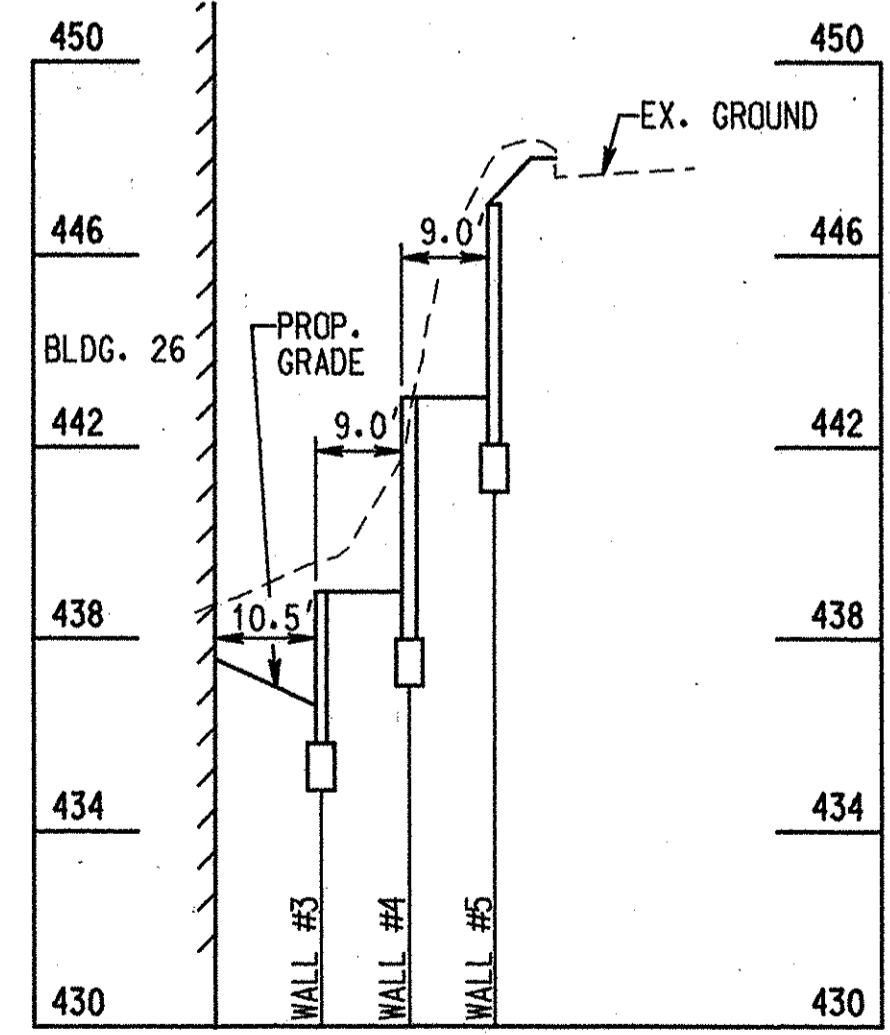
\* GEOGRID MAY BE OMITTED WHEN T.W. IS LESS THAN 4'-0" ABOVE B.W.



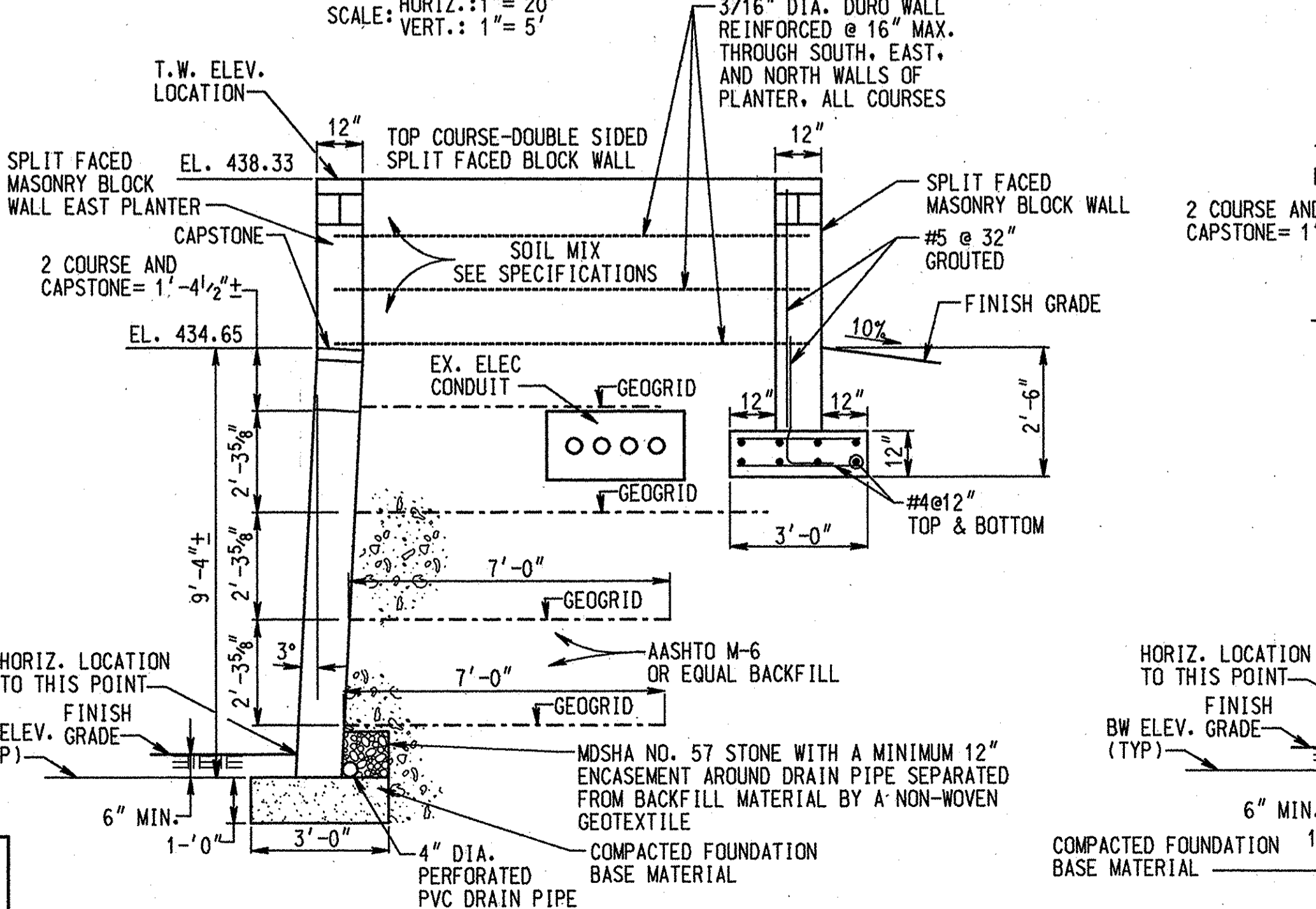
**TYPICAL SECTION - TYPE 2 GRAVITY WALL**  
HEIGHT = 4'-1" TO 6'-8" MAX.  
SCALE: 3/8" = 1'-0"



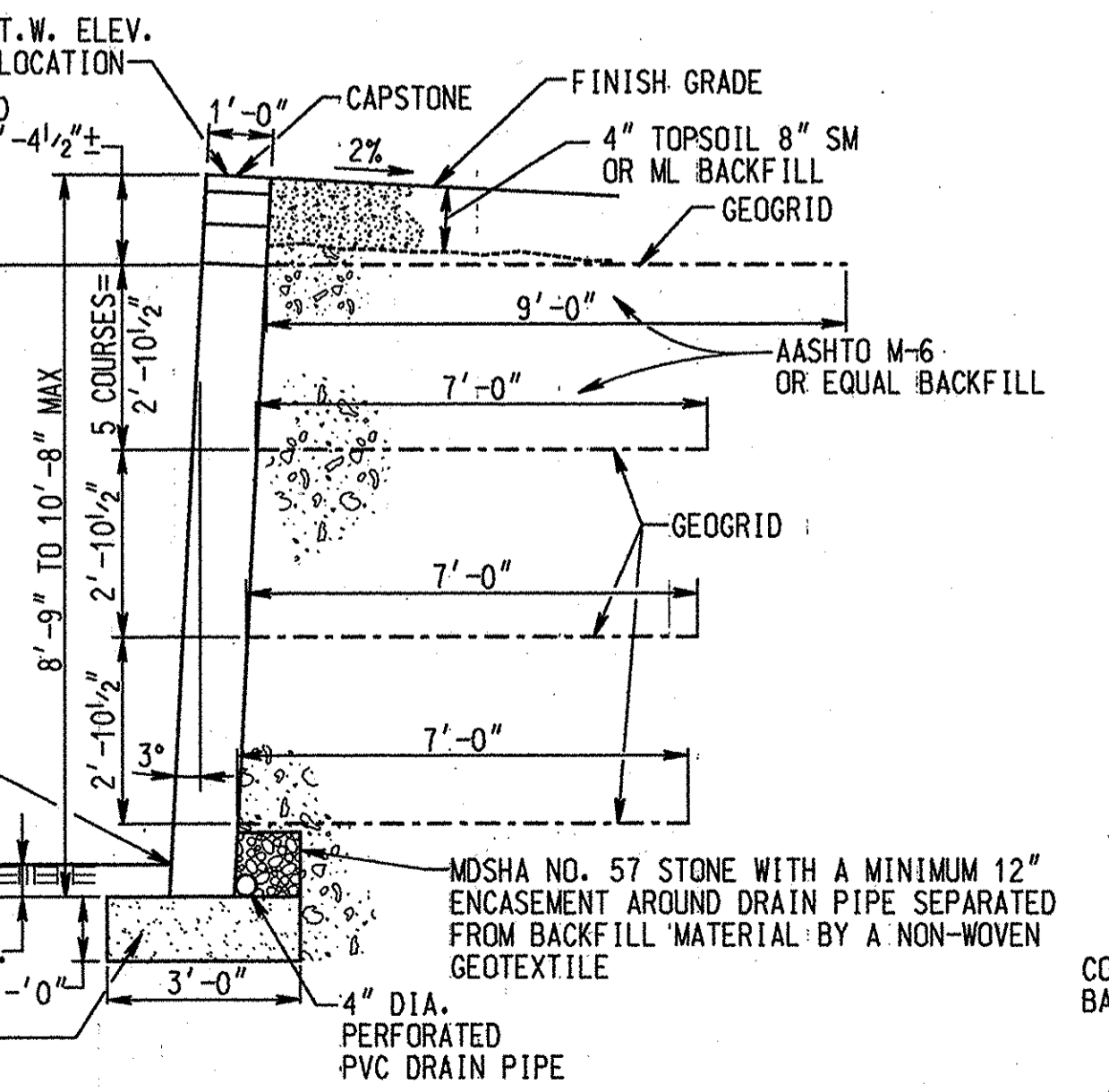
**WALL PROFILE**  
SCALE: HORIZ.: 1" = 20'  
VERT.: 1" = 5'



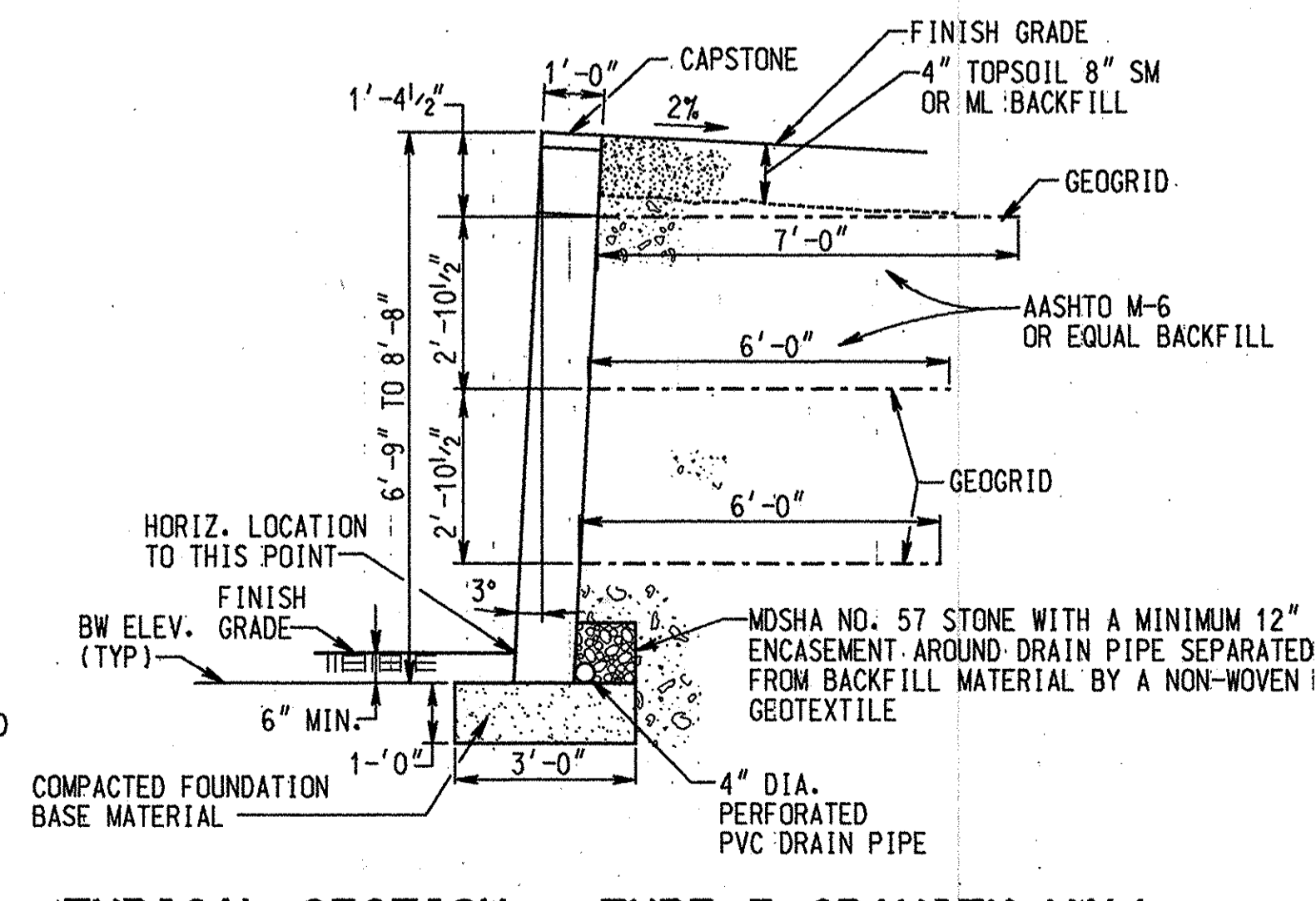
**SECTION THROUGH WALLS NO. 3, 4, AND 5**  
SCALE: HORIZ.: 1" = 20'  
VERT.: 1" = 4'



**TYPICAL SECTION THROUGH EAST PLANTER ABOVE GRAVITY WALL**  
SCALE: 3/8" = 1'-0"



**TYPICAL SECTION - TYPE 4 GRAVITY WALL**  
HEIGHT = 8'-9" TO 10'-8" MAX.  
SCALE: 3/8" = 1'-0"



**TYPICAL SECTION - TYPE 3 GRAVITY WALL**  
HEIGHT = 6'-9" TO 8'-8" MAX.  
SCALE: 3/8" = 1'-0"

REVISIONS	

APPROVALS	
REQUISITER	
PLANT FACILITIES CHIEF ENGINEER	
CODE COMPLIANCE REVIEW	
TSC GROUP	
TSP GROUP	
SAFETY OFFICER	
DIRECTORS OFFICE	
COORDINATOR	
SENIOR LEADER	

THE JOHNS HOPKINS UNIVERSITY  
**APPLIED PHYSICS LABORATORY**  
 JOHNS HOPKINS ROAD  
 LAUREL MARYLAND 20723-6099



**BUILDING 26**

GRAPHIC SCALES

**WR&A**  
 WHITMAN, BRYANT AND ASSOCIATES  
 2315 SAINT PAUL STREET  
 BALTIMORE, MARYLAND  
 410 - 235 - 3450

**GRAVITY RETAINING WALL PLAN, PROFILE, SECTIONS, AND SCHEDULE**

DRAWING NO. **C5.2**  
 SHEET 8 OF 12  
 SCALE: AS SHOWN  
 DES: R.M. CHECK: R.M. DATE: 11/25/97

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 Director: *[Signature]* 12/24/97  
 Chief, Development Engineering Division: *[Signature]* 12/24/97  
 Chief, Division of Land Development: *[Signature]* 12/24/97



SPECIFICATION  
GRAVITY WALL

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. Preparing site and foundation subgrade.
- B. Constructing foundation base material for facing units.
- C. Furnishing and installing modular concrete facing units as shown on the construction drawings.
- D. Furnishing and installing geogrid reinforcement, porous fill, and backfill to the lines and grades designated on the construction drawings.
- E. Furnishing and installing all appurtenant materials required for construction of the retaining wall as shown on the construction drawings.

1.02 RELATED WORK

Earthwork - Section 02200.

1.03 APPLICABLE STANDARDS OR SPECIFICATIONS

American Society for Testing and Materials

ASTM:C-90-93 Hollow Load-Bearing Masonry Units  
ASTM:C-140-91 Sampling and Testing Concrete Masonry Units

Geosynthetic Research Institute

GG1-87 Standard Test Method for Geogrid Rib Tensile Strength  
GG2-87 Standard Test Method for Geogrid Junction Strength  
GG3-90 Standard Test Method for Tension Creep Testing of Geogrids  
GG-4-90 Standard Practice for Determination of the Long Term Design Strength of Geogrids

\*1.04 DELIVERY, STORAGE AND HANDLING

- A. Geogrid:
  - 1. Contractor shall check the geogrid upon delivery to ensure that the proper material has been received.
  - 2. Geogrids shall be stored above -20°F (-29°C).
  - 3. Contractor shall prevent mud, wet cement, epoxy, and like materials from coming in contact with, and affixing to, the geogrid material.
  - 4. Rolled geogrid material may be laid flat or stood on end for storage.
- B. Facing Units:
  - 1. Contractor shall check the materials upon delivery to ensure that proper materials have been received.
  - 2. Contractor shall prevent mud, wet cement, epoxy, and like materials from coming in contact with and affixing to the units.
  - 3. Contractor shall protect the units from damage (i.e. cracks, chips, spalls). Damaged units shall not be incorporated into the wall and shall be replaced by the Contractor at his expense.

PART 2 - MATERIALS

2.01 DEFINITIONS

- A. Gravity Wall - Geogrid reinforced soil retaining wall with modular concrete block facing units.
- B. Geogrid - a geosynthetic formed by a regular network of integrally connected tensile elements with apertures of sufficient size to allow interlocking with surrounding soil, rock, or earth and function primarily as reinforcement.
- C. Facing units - modular concrete block units.
- D. Reinforced Soil Mass - The backfill that stabilizes the facing units. It is a minimum 48" behind the wall to within 1 foot of final grade. All the geogrid is in the reinforced soil mass.
- E. Porous Fill - Granular fill which is within the toe of the reinforced soil mass and covering the perforated PVC pipe.
- F. Backfill - The fill which is the reinforced soil mass. Also, the levelling course of soil and topsoil above the reinforced soil mass.
- G. Foundation Base Material - compacted granular soil or concrete beneath the entire wall.

2.02 GEOGRIDS

The geogrids shall be TENSAR UX1400.

2.03 MODULAR CONCRETE FACING UNITS

- A. Concrete wall units shall have a minimum 28 day compressive strength of 3000 psi in accordance with ASTM C-90. The concrete shall have adequate freeze/thaw protection with a maximum moisture absorption rate of 6%.
- B. Exterior dimensions shall be uniform and consistent. Maximum dimensional deviations shall be 0.125 inch.
- C. Retaining wall units shall provide a minimum of 130 pounds total weight per square foot of wall face area.
- D. Exterior face shall be textured and/or colored as specified by the Owner.

2.04 ACCEPTABLE PRODUCT MANUFACTURERS

- A. MODULAR CONCRETE BLOCK FACING UNITS
  - 1. The Allan Block Corporation or any of their authorized licensees or distributors.
  - 2. A manufacturer of equivalent products, pre-approved by the engineer prior to bid opening.
- B. GEOGRID REINFORCEMENT
  - 1. The TENSAR corporation, Morrow, Georgia. (800) 845-4453.
  - 2. A manufacturer of equivalent products, pre-approved by the Engineer prior to bid opening.

\*PART 3 - FILL AND FOUNDATION MATERIALS

3.01 FOUNDATION BASE MATERIAL

- A. Material for footing shall consist of compacted sands, gravel and/or concrete. A minimum of 12-inches of compacted foundation base material is required.
- B. Contractor shall submit shop drawings indicating material supplier, gradation curves, Modified Proctor (AASHTO T-180), Natural Moisture content (AASHTO T265) and Atterberg Limits (AASHTO T89 and T90)

3.02 BACKFILL

- A. Backfill within the reinforced soil mass shall consist of free-draining, granular fill. Gradation shall meet the requirements for AASHTO M-6.
- B. Backfill outside the reinforced soil mass shall be ML or SM.
- C. Contractor shall submit shop drawings indicating material supplier, gradation curves, Modified Proctor (AASHTO T180), Natural Moisture Content (AASHTO T265) and ATTERBERG LIMITS (AASHTO T89 and T90).

3.03 POROUS FILL

- A. Porous Fill shall consist of free-draining porous fill. Gradation shall meet the requirements for Md. SHA No. 57 stone.
- B. Contractor shall submit shop drawings indicating material supplier, gradation curves, Modified Proctor (AASHTO T-180), Natural Moisture Content (AASHTO T265) and Atterberg Limits (AASHTO T89 and T90).

PART 4 - CONSTRUCTION

4.01 CONSTRUCTION

Contractor shall excavate to the lines and grades shown on the construction drawings. Over-excavation shall not be paid for and replacement with compacted fill and/or wall system components will be required at the contractors expense. Contractor shall be careful not to disturb base beyond the lines shown.

4.02 FOUNDATION SUBGRADE PREPARATION

- A. Foundation subgrade shall be excavated as required for foundation base material dimensions shown on the construction drawings, or as directed by the Geotechnical Engineer.
- B. Foundation subgrade shall be examined by the Geotechnical Engineer to insure that the foundation subgrade is suitable. The subgrade shall be proofrolled and densified with a minimum of 10 passes of a vibratory roller capable of exerting a dynamic force of at least 5 tons. Soft areas shall be removed under direction of the Geotechnical Engineer and replaced with suitable material.
- C. Over-excavated areas shall be filled with approved material.

4.03 UNIT INSTALLATION

- A. The first course of wall units shall be placed on the prepared foundation base material with the raised lip facing out and the front edges tight together. The units shall be checked for level and alignment as they are placed.
- B. Insure that units are in full contact with base. Proper care shall be taken to develop straight lines and smooth curves on base course as per wall layout.
- C. All cavities in and around the base row shall be filled with base materials and compacted. Backfill front and back of entire base row to firmly lock in place. Check again for level and alignment. All excess material shall be swept from top of units.
- D. Install next course of wall units on top of base row. Position blocks to be offset from seams of blocks below. Perfect "running bond" is not essential, but a 3-inch minimum offset shall be maintained. Check each block for proper alignment and level. Fill all cavities in and around wall units with backfill material. Spread backfill in uniform lifts not exceeding 8-inches in thickness measured before compaction. Employ methods using lightweight compaction equipment that will not disrupt the stability or batter of the wall. Only light hand-operated compaction equipment shall be used and within 3 feet of the wall face. Compact all in backfill to at least 95% of the maximum dry density as determined by the Standard Proctor, ASTM D-698.
- E. Install each subsequent course in like manner. Repeat procedure to the extent of wall height.
- F. Allowable construction tolerance of the wall face is 2 degrees vertically and 1-inch in 10 feet horizontally.

4.04 GEOGRID INSTALLATION

- A. Geogrid shall be oriented with axis of long-term design load perpendicular to the wall alignment.
- B. Geogrid reinforcement shall be placed at the elevation(s) and to the extent(s) shown on the construction drawings or as directed by the Engineer.
- C. The geogrid soil reinforcement shall be laid horizontally on compacted wall backfill, secured between the stacked facing units, and pulled taut before backfill is placed on the geogrid.
- D. Slack in the attachment shall be removed in a manner and to such a degree as approved by the Engineer.
- E. Geogrid reinforcements shall be continuous throughout their embedment length(s). Spliced connections between shorter pieces of geogrid shall not be allowed.

4.05 BACKFILL PLACEMENT

- A. Backfill shall be placed in uniform 8-inch lifts and compacted as specified under Section 4.03.
- B. Backfill shall be placed, spread, and compacted in such a manner that minimizes the development of slack in the geogrid.
- C. Only light weight hand-operated compaction equipment shall be allowed within 3 feet of the wall face.
- D. Tracked construction equipment shall not be operated directly upon the geogrid. A minimum fill thickness of 6-inches is required prior to operation of tracked vehicles over the geogrid. Tracked vehicle turning shall be minimized to prevent tracks from displacing the fill and damaging the geogrid.
- E. Rubber tired equipment may pass over geogrid reinforcement only at slow speeds, less than 10 MPH. Sudden braking and sharp turning shall be prohibited.

REVISIONS	

APPROVALS	
REQUESTER	
PLANT FACILITIES CHIEF ENGINEER	
CODE COMPLIANCE REVIEW	
TSC GROUP	
TSF GROUP	
SUPPLY OFFICER	
DIRECTORS OFFICE	
COORDINATOR	
SENIOR LEADER	

THE JOHNS HOPKINS UNIVERSITY  
**APPLIED PHYSICS LABORATORY**  
JOHNS HOPKINS ROAD  
LAUREL MARYLAND 20723-6099



**BUILDING 26**

GRAPHIC SCALES

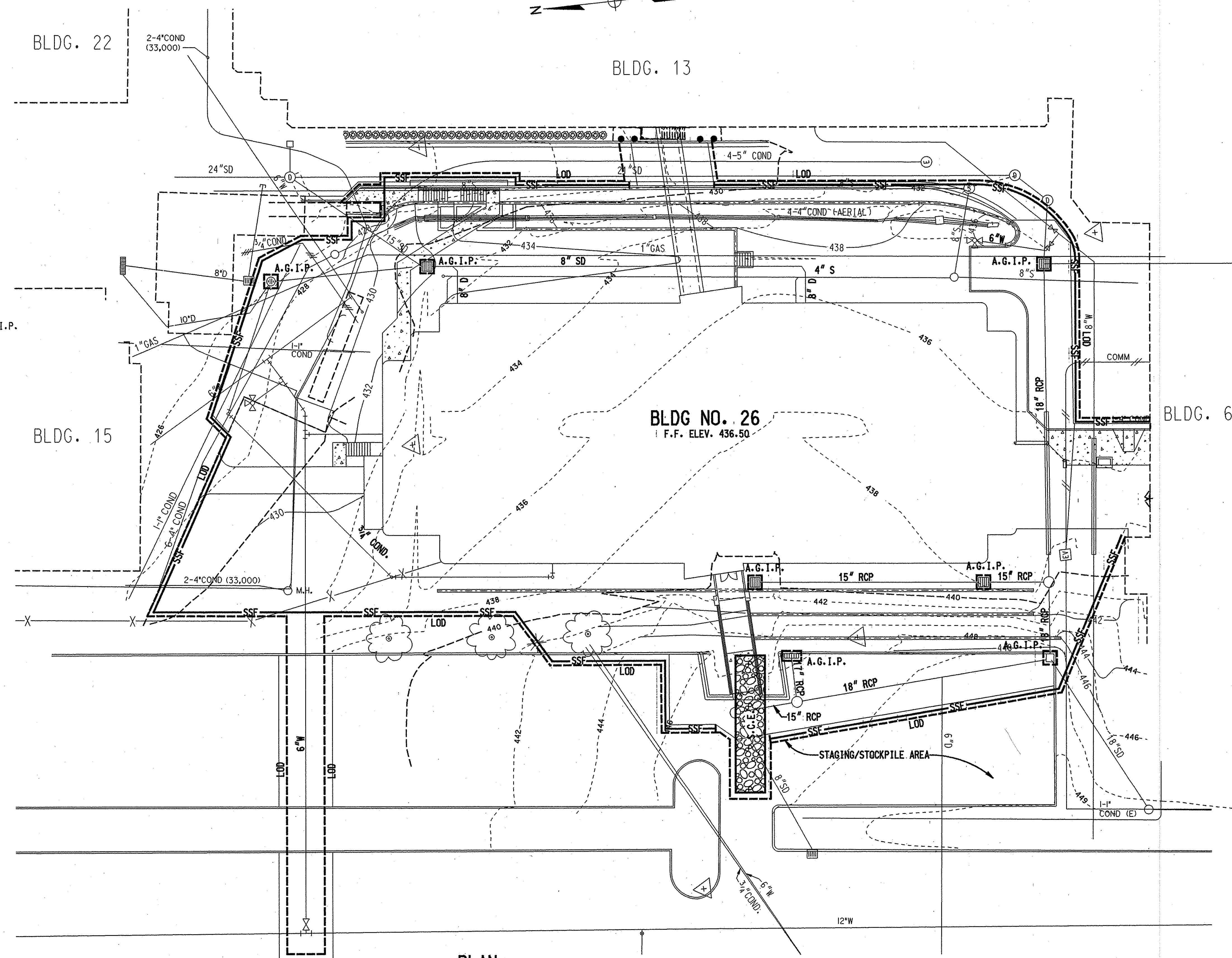
**WR&A**  
WHITMAN, BEQUARDT AND ASSOCIATES  
2315 SAINT PAUL STREET  
BALTIMORE, MARYLAND  
410 - 235 - 3450

SPECIFICATIONS	
	DRAWING NO. <b>05.3</b>
SCALE: NO SCALE	SHEET 9 OF 12
DES: R.M.	CHECK: R.M. DATE: 11/25/97

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING	
<i>[Signature]</i> 12/24/97	DATE
<i>[Signature]</i> 12/24/97	DATE
<i>[Signature]</i> 12/24/97	DATE

**EROSION AND SEDIMENT CONTROL LEGEND**

- LOD LIMITS OF DISTURBANCE
- SSF SUPER SILT FENCE
- A.G.I.P. AT GRADE INLET PROTECTION
- S.C.E. STONE CONSTRUCTION ENTRANCE



**PLAN**  
SCALE: 1" = 20'

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

*Richard C. Lortz*  
RICHARD C. LORTZ 12/10/97  
DATE

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

*James E. Loesch P.E.*  
JAMES E. LOESCH 11/19/97  
DATE

REVIEWED FOR HOWARD S.C.D. AND MEETS THE TECHNICAL REQUIREMENTS.

*Clayton Simmons* 12/17/97  
USDA-Natural Resources Conservation Service  
DATE

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

*John P. Robertson* 12/17/97  
HOWARD S.C.D. DATE

REVISIONS	

APPROVALS	
REQUESTER	
PLANT FACILITIES CHIEF ENGINEER	
CODE COMPLIANCE REVIEW	
TSC GROUP	
TSP GROUP	
SAFETY OFFICER	
DIRECTORS OFFICE	
COORDINATOR	
SENIOR LEADER	

THE JOHNS HOPKINS UNIVERSITY  
**APPLIED PHYSICS LABORATORY**  
JOHNS HOPKINS ROAD  
LAUREL MARYLAND 20723-6099



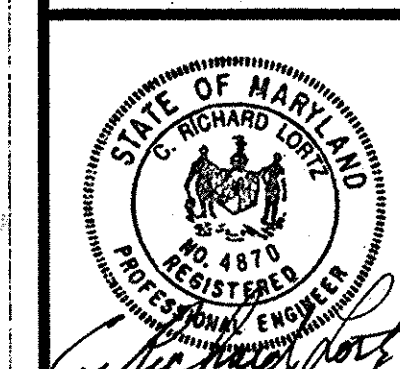
**BUILDING 26**

GRAPHIC SCALES



WHITMAN, REARDON AND ASSOCIATES  
2315 SAINT PAUL STREET  
BALTIMORE, MARYLAND  
410 - 235 - 3450

**EROSION AND SEDIMENT CONTROL PLAN**



DRAWING NO.  
**C610**  
SHEET 10 OF 12

SCALE: 1" = 20'  
DES: R.M. CHECK: R.M. DATE: 11/25/97

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
*Andrew Hamilton* 12/24/97  
DIRECTOR DATE  
*Allen Dammann* 12/22/97  
CHIEF, DEVELOPMENT ENGINEERING DIVISION MK DATE  
*Andy Hamilton* 12/24/97  
CHIEF, DIVISION OF LAND DEVELOPMENT DATE R

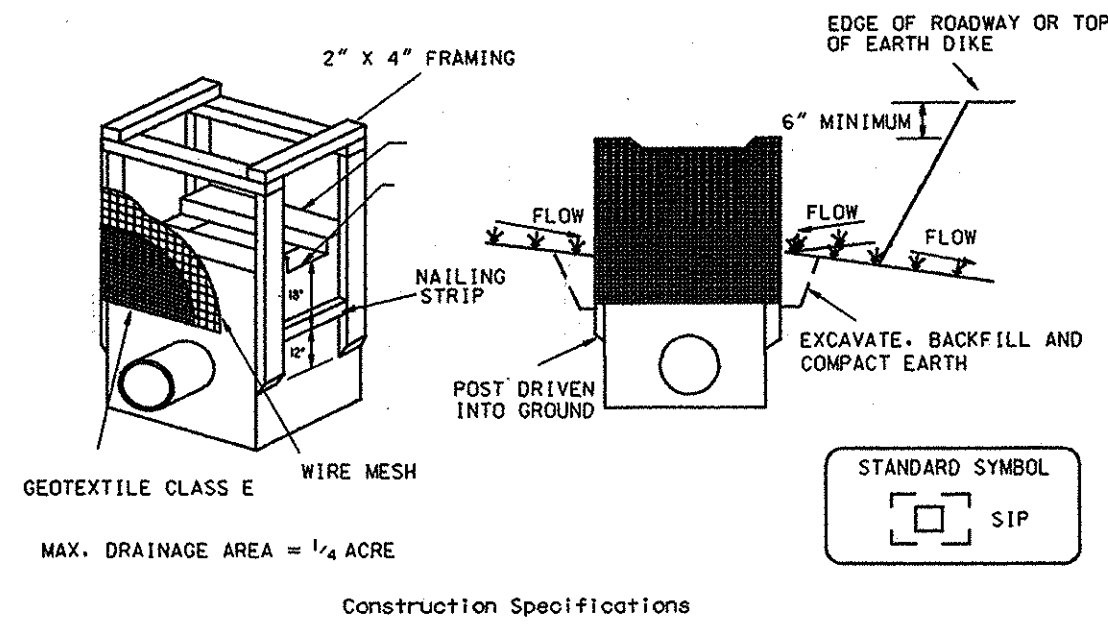
**SEDIMENT CONTROL NOTES**

- 1) A MINIMUM OF 24 HOURS NOTICE MUST BE GIVEN TO THE HOWARD COUNTY OFFICE OF INSPECTION AND PERMITS PRIOR TO THE START OF ANY CONSTRUCTION. (410-313-2437)
- 2) ALL VEGETATIVE AND STRUCTURAL PRACTICES ARE TO BE INSTALLED ACCORDING TO THE PROVISIONS OF THIS PLAN AND ARE TO BE IN CONFORMANCE WITH THE 1994 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL.
- 3) FOLLOWING INITIAL SOIL DISTURBANCE OR REDISTURBANCE, PERMANENT OR TEMPORARY STABILIZATION SHALL BE COMPLETED WITHIN: a) 7 CALENDAR DAYS FOR ALL PERIMETER SEDIMENT CONTROL STRUCTURES, DIKES, PERIMETER SLOPES GREATER THAN 3:1, b) 14 DAYS AS TO ALL OTHER DISTURBED OR GRADED AREAS ON THE PROJECT SITE.
- 4) 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.
- 5) **SITE ANALYSIS:**

TOTAL AREA OF SITE	ACRES	1.5
AREA DISTURBED	ACRES	1.5
AREA TO BE ROOFED OR PAVED	ACRES	1.0
AREA TO BE VEGETATIVELY STABILIZED	ACRES	0.5
TOTAL CUT	CU. YDS.	1,200
TOTAL FILL	CU. YDS.	2,400
OFFSITE WASTE/BORROW AREA LOCATION		1,200 CU. YDS.
- 6) ANY SEDIMENT CONTROL PRACTICE WHICH IS DISTURBED BY GRADING ACTIVITY FOR PLACEMENT OF UTILITIES MUST BE REPAIRED ON THE SAME DAY OF DISTURBANCE.
- 7) ADDITIONAL SEDIMENT CONTROLS MUST BE PROVIDED, IF DEEMED NECESSARY BY HOWARD COUNTY DPW SEDIMENT CONTROL INSPECTOR.
- 8) ON ALL SITES WITH DISTURBED AREAS IN EXCESS OF 2 ACRES, APPROVAL OF THE INSPECTION AGENCY SHALL BE REQUESTED UPON COMPLETION OF INSTALLATION OF PERIMETER EROSION AND SEDIMENT CONTROLS, BUT BEFORE PROCEEDING WITH ANY OTHER EARTH DISTURBANCE OR GRADING. OTHER BUILDING OR GRADING INSPECTION APPROVALS MAY NOT BE AUTHORIZED UNTIL THIS INITIAL APPROVAL BY THE INSPECTION AGENCY IS MADE.

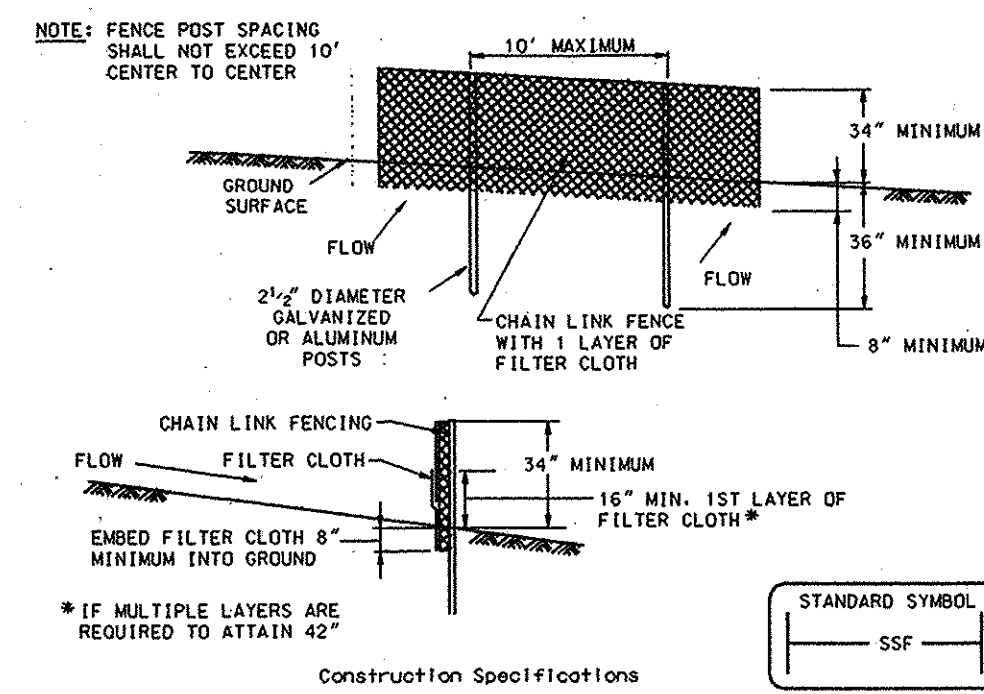
**SEQUENCE OF CONSTRUCTION**

- 1) APPLY FOR GRADING PERMIT.
- 2) NOTIFY THE SEDIMENT CONTROL INSPECTION OFFICE 24 HOURS PRIOR TO CONSTRUCTION.
- 3) CLEAR AND GRUB THE SITE.
- 4) PROTECT EXISTING INLETS UNTIL REMOVAL. PROTECT NEW INLETS UPON CONSTRUCTION.
- 5) INSTALL UTILITIES.
- 6) CONSTRUCT BUILDING 26 AND SITE STRUCTURES.
- 7) COMPLETE SITE GRADING
- 8) CONSTRUCT CURB AND GUTTER AND PAVING.
- 9) STABILIZE SITE.
- 10) REMOVE SEDIMENT CONTROL DEVICES UPON APPROVAL OF THE INSPECTOR.



- Construction Specifications**
1. Excavate completely around the inlet to a depth of 18" below the notch elevation.
  2. Drive the 2" x 4" construction grade lumber posts 1' into the ground at each corner of the inlet. Place nail strips between the posts on the ends of the inlet. Assemble the top portion of the 2" x 4" frame using the overlap joint shown on Detail 23A. The top of the frame (wire) must be 6" below adjacent roadways where flooding and safety issues may arise.
  3. Stretch the 1/2" x 1/2" wire mesh tightly around the frame and fasten securely. The ends must meet and overlap at a post.
  4. Stretch the Geotextile Class E tightly over the wire mesh with the geotextile extending from the top of the frame to 18" below the inlet notch elevation. Fasten the geotextile firmly to the frame. The ends of the geotextile must meet at a post, be overlapped and folded, then fastened down.
  5. Backfill around the inlet in compacted 6" layers until the layer of earth is level with the notch elevation on the ends and top elevation on the sides.
  6. If the inlet is not in a sump, construct a compacted earth dike across the ditch line directly below it. The top of the earth dike should be at least 6" higher than the top of the frame.
  7. The structure must be inspected periodically and after each rain and the geotextile replaced when it becomes clogged.

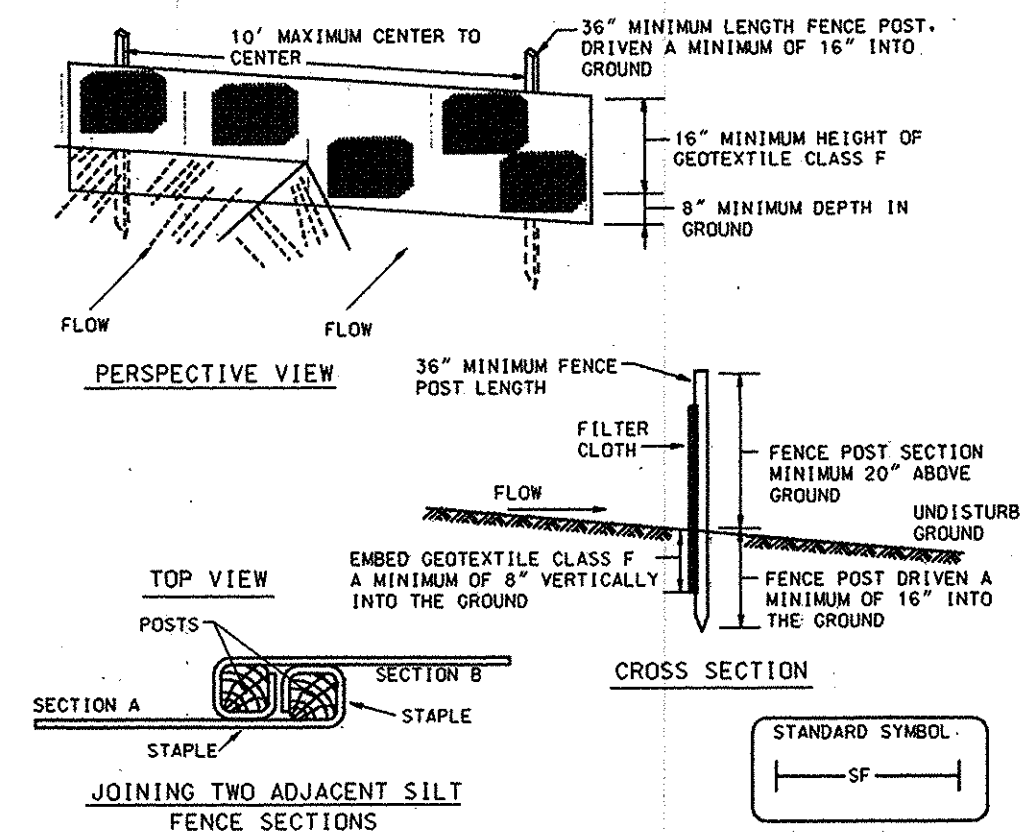
**DETAIL 23A - STANDARD INLET PROTECTION**  
E-16-5



- Construction Specifications**
1. Fencing shall be 42" in height and constructed in accordance with the latest Maryland State Highway Details for Chain Link Fencing. The specification for a 6' fence shall be used, substituting 42" fabric and 6' length posts.
  2. Chain link fence shall be fastened securely to the fence posts with wire ties. The lower tension wire, brack and truss rods, drive anchors and post caps are not required except on the ends of the fence.
  3. Filter cloth shall be fastened securely to the chain link fence with ties spaced every 24" at the top and mid section.
  4. Filter cloth shall be embedded a minimum of 8" into the ground.
  5. When two sections of filter cloth adjoin each other, they shall be overlapped by 6" and stapled.
  6. Maintenance shall be performed as needed and silt bulldozes removed when "bulges" develop in the silt fence, or when silt reaches 50% of fence height.
  7. Filter cloth shall be fastened securely to each fence post with wire ties or staples at top and mid section and shall meet the following requirements for Geotextile Class F:
 

Tensile Strength	50 lbs/in (min.)	Test: MSMT 509
Tensile Modulus	20 lbs/in (min.)	Test: MSMT 509
Flow Rate	0.3 gal/ft <sup>2</sup> /minute (max.)	Test: MSMT 322
Filtering Efficiency	75% (min.)	Test: MSMT 322

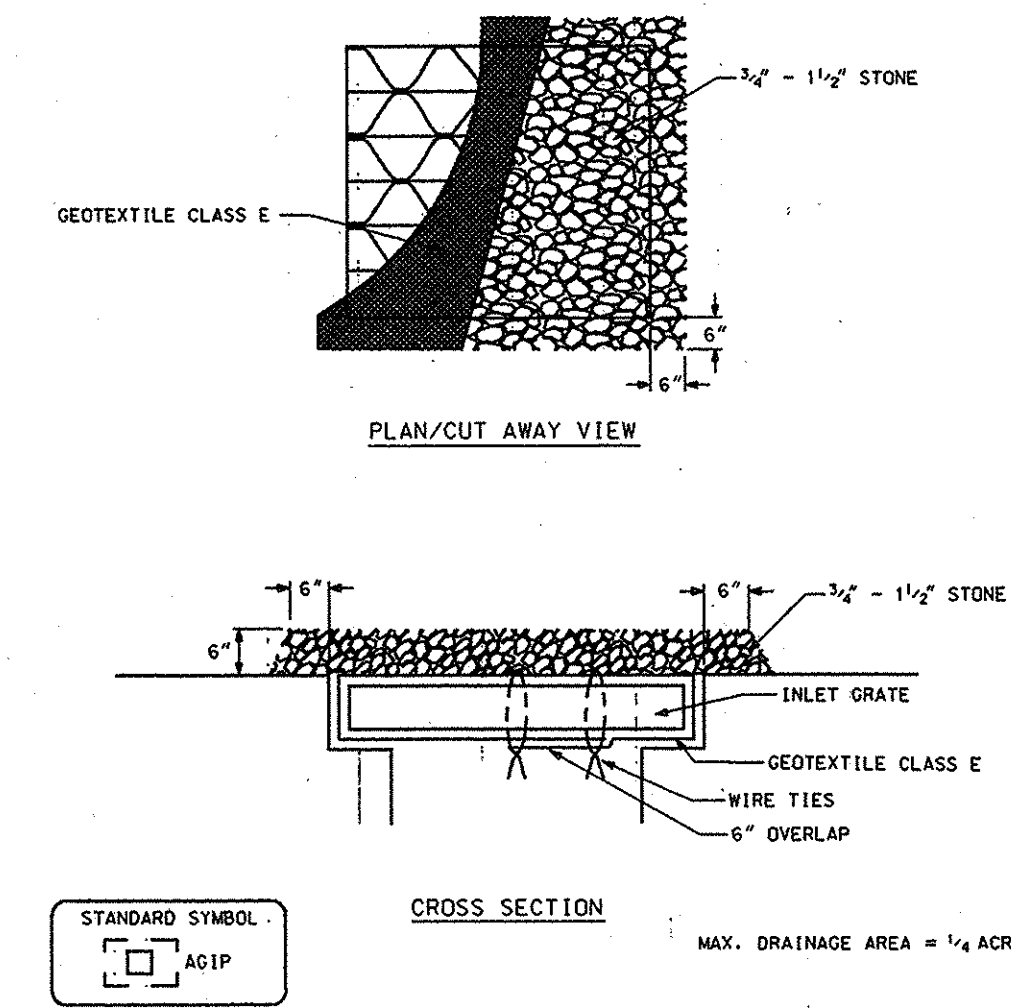
**DETAIL 33 - SUPER SILT FENCE**  
H-26-3



- Construction Specifications**
1. Fence posts shall be a minimum of 36" long driven 16" minimum into the ground. Wood posts shall be 1 1/2" x 1 1/2" square (minimum) cut, or 1 3/4" diameter (minimum) round and shall be of sound quality hardwood. Steel posts will be standard T or U section weighing not less than 1.00 pound per linear foot.
  2. Geotextile shall be fastened securely to each fence post with wire ties or staples at top and mid-section and shall meet the following requirements for Geotextile Class F:
 

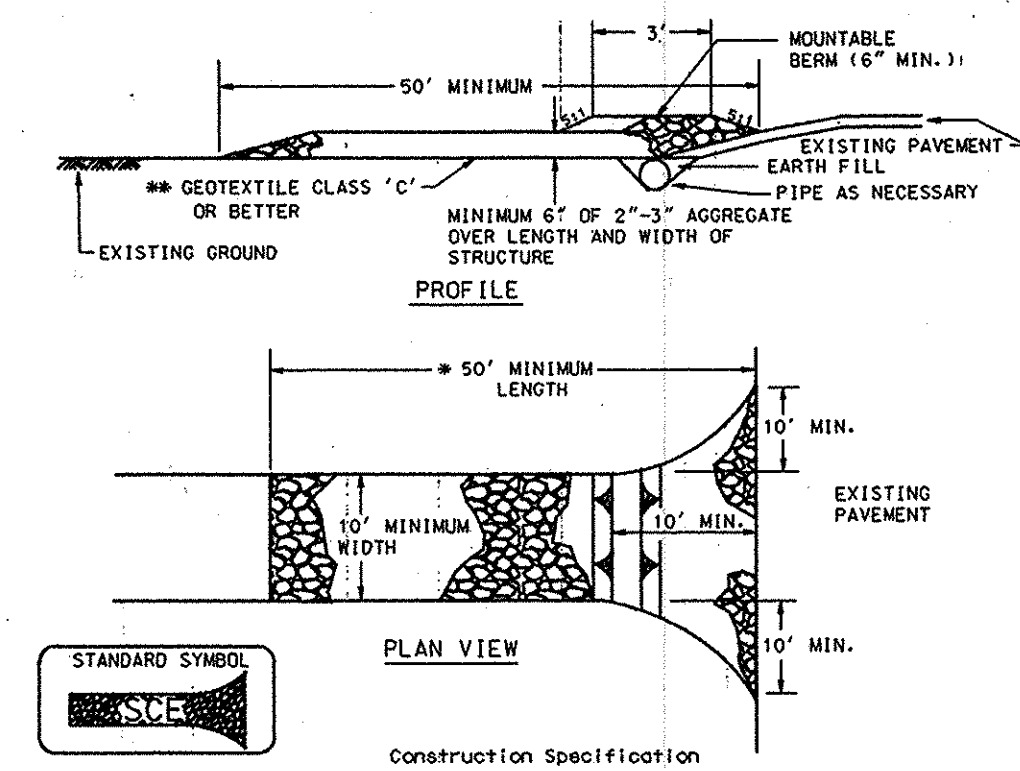
Tensile Strength	50 lbs/in (min.)	Test: MSMT 509
Tensile Modulus	20 lbs/in (min.)	Test: MSMT 509
Flow Rate	0.3 gal/ft <sup>2</sup> /minute (max.)	Test: MSMT 322
Filtering Efficiency	75% (min.)	Test: MSMT 322
  3. Where ends of geotextile fabric come together, they shall be overlapped, folded and stapled to prevent sediment bypass.
  4. Silt fence shall be inspected after each rainfall event and maintained when bulges occur or when sediment accumulation reaches 50% of the fabric height.

**DETAIL 22 - SILT FENCE**  
E-15-3



- Construction Specifications**
1. Lift grate and wrap with Geotextile Class E to completely cover all openings, then set grate back in place.
  2. Place 3/4" to 1 1/2" stone, 4"-6" thick on the grate to secure the fabric and provide additional filtration.

**DETAIL 23B - AT GRADE INLET PROTECTION**  
E-16-5A



- Construction Specifications**
1. Length - minimum of 50' (30' for single residence lot).
  2. Width - 10' minimum, should be flared at the existing road to provide a turning radius.
  3. Geotextile fabric (filter cloth) shall be placed over the existing ground prior to placing stones. The plan approval authority may not require single family residences to use geotextile.
  4. Stone - crushed aggregate (2" to 3") or reclaimed or recycled concrete equivalent shall be placed at least 6" deep over the length and width of the entrance.
  5. Surface Water - all surface water flowing to or diverted toward construction entrances shall be piped through the entrance, maintaining positive drainage. Pipe installed through the stabilized construction entrance shall be protected with a mountable berm with 5:1 slope and a minimum of 6" of stone over the pipe. Pipe has to be sized according to the drainage. When the SCE is located at a high spot and has no drainage to convey a pipe will not be necessary. Pipe should be sized according to the amount of runoff to be conveyed. A 6" minimum will be required.
  6. Location - A stabilized construction entrance shall be located at every point where construction traffic enters or leaves a construction site. Vehicles leaving the site must travel over the entire length of the stabilized construction entrance.

**DETAIL 24 - STABILIZED CONSTRUCTION ENTRANCE**  
F-17-3

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING  
 Director: *[Signature]* 12/24/97  
 Chief, Development Engineering Division: *[Signature]* 12/22/97  
 Chief, Division of Land Development: *[Signature]* 12/21/97

BY THE ENGINEER:  
 "I CERTIFY THAT THIS PLAN FOR EROSION AND SEDIMENT CONTROL REPRESENTS A PRACTICAL AND WORKABLE PLAN BASED ON MY PERSONAL KNOWLEDGE OF THE SITE CONDITIONS AND THAT IT WAS PREPARED IN ACCORDANCE WITH THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT."  
 Richard C. Lortz 12/10/97

BY THE DEVELOPER:  
 "I WE CERTIFY THAT ALL DEVELOPMENT AND CONSTRUCTION WILL BE DONE ACCORDING TO THIS PLAN, AND THAT ANY RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF ATTENDANCE AT A DEPARTMENT OF ENVIRONMENT APPROVED TRAINING PROGRAM FOR THE CONTROL OF SEDIMENT AND EROSION BEFORE BEGINNING THE PROJECT. I ALSO AUTHORIZE PERIODIC ON-SITE INSPECTION BY THE HOWARD SOIL CONSERVATION DISTRICT."  
 James E. Loesch, PE 11/19/97

REVIEWED FOR HOWARD S.C.D. AND MEETS THE TECHNICAL REQUIREMENTS.  
 Cheryl Simmons 12/17/97  
 USDA-Natural Resources Conservation Service  
 THIS DEVELOPMENT PLAN IS APPROVED FOR SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT.  
 John R. Robertson 12/17/97  
 HOWARD S.C.D.

**REVISIONS**


**APPROVALS**

REQUESTER	
PLANT FACILITIES CHIEF ENGINEER	
CODE COMPLIANCE DIVISION	
TSC GROUP	
TSP GROUP	
SAFETY OFFICER	
DIRECTORS OFFICE	
COORDINATOR	
SENIOR LEADER	

THE JOHNS HOPKINS UNIVERSITY  
**APPLIED PHYSICS LABORATORY**  
 JOHNS HOPKINS ROAD  
 LAUREL MARYLAND 20723-6099



**BUILDING 26**

GRAPHIC SCALES

**WR&A**  
 WHITMAN, BEQUARD AND ASSOCIATES  
 2315 SAINT PAUL STREET  
 BALTIMORE, MARYLAND  
 410 - 235 - 3450

**EROSION AND SEDIMENT CONTROL DETAILS AND NOTES**

DRAWING NO. C6.1  
 SHEET 11 OF 12  
 SCALE: NO SCALE  
 DES: R.M. CHECK: R.M. DATE: 11/25/97

20.0 STANDARDS AND SPECIFICATIONS

VEGETATIVE STABILIZATION

Definition

Using vegetation to cover for barren soil to protect it from forces that cause erosion.

PURPOSE

Vegetative Stabilization specifications are used to promote the establishment of vegetation on exposed soil. Bare soil is stabilized with vegetation, the soil is less likely to erode and more likely to allow infiltration of rainfall, thereby reducing sediment loads and runoff to downstream areas, and improving wildlife habitat and visual resources.

Conditions Where Practice Applies

This practice shall be used on denuded areas as specified on the plans and may be used on highly erodible or artificially graded areas. This specification is temporary seeding, to quickly establish vegetative cover for short duration (up to one year), and Permanent Seeding, for long term vegetation cover. Examples of applicable areas for Temporary Seeding are temporary soil stockpiles, cleared areas being left idle between construction phases, earth ditches, etc. and for Permanent Seeding are lawns, dunes, cut and fill slopes and other areas of final grade, former stockpiles and staging areas, etc.

Effects on Water Quality and Quantity

Planting vegetation in disturbed areas will have an effect on the water budget, especially on volume and rate of runoff. Infiltration, evaporation, transpiration, capillary action and groundwater recharge. Vegetation, over time, will increase organic matter content and improve the water holding capacity of the soil and subsequent plant growth.

Vegetation will help reduce the movement of sediment, nutrients, and other chemicals carried by runoff to receiving waters. Plants will also help protect groundwater supplies by assimilating those substances present within the root zone.

Sediment control devices must remain in place during grading, seeded preparation, seeding, mulching and vegetative establishment to prevent large quantities of sediment and associated chemicals and nutrients from washing into water ways.

Section I - Vegetative Stabilization Methods and Materials

A. Site Preparation

- 1. Install erosion and sediment control structures (either temporary or permanent) such as diversions, grade stabilization structures, berms, waterways, or sediment control basins.
2. Perform all grading operations at right angles to the slope. Final grading and shaping is not usually necessary for temporary seeding.
3. Schedule required soil tests to determine soil amendment composition and application rates for sites having disturbed areas over 5 acres.
B. Soil Amendments (Fertilizer and Lime Specifications)
1. Soil tests must be performed to determine the exact ratios and application rates for both lime and fertilizer on sites having disturbed areas over 5 acres.
2. Fertilizers shall be uniform in composition, free flowing and suitable for accurate application by approved equipment.
3. Lime materials shall be ground limestone (hydrated or burnt) lime may be substituted which contains a minimum of 85% total calcium (total calcium oxide) and a maximum of 10% water.
4. Incorporate lime and fertilizer into the top 3-5" of soil by diking or other suitable means.

C. Seeded Preparation

- 1. Temporary Seeding
a. Seeded preparation shall consist of loosening soil to a depth of 3" to 5" by means of suitable agricultural or construction equipment.
b. Apply fertilizer and lime as prescribed on the plans.
c. Incorporate lime and fertilizer into the top 3-5" of soil by diking or other suitable means.

II. Permanent Seeding

- a. Minimum soil conditions required for permanent vegetative establishment:
1. Soil pH shall be between 6.0 and 7.0.
2. Soluble salts shall be less than 500 parts per million (ppm).
3. The soil shall contain less than 40% clay but enough fine grained material (6-30% silt plus clay) to provide the capacity to hold a moderate amount of moisture.
b. Areas previously graded in conformance with the drawings shall be maintained in a true and even grade.
c. Apply soil amendments as per soil test or as included on the plans.
d. Mix soil amendments into the top 3-5" of topsoil by diking or other suitable means.

D. Seed Specifications

- 1. All seed must meet the requirements of the Maryland State Seed Law. All seed shall be subject to re-testing by a recognized seed laboratory.
2. Minimum seed tags shall be made available to the inspector to verify type and rate of seed used.

E. Methods of Seeding

- 1. Hydroseeding: Apply seed uniformly with hydroseeder (slurry includes seed and fertilizer), broadcast or drop seeder, or a cut/packer seeder.
a. If fertilizer is being applied at the time of seeding, the application rates amounts will not exceed the following: nitrogen maximum of 100 lbs. per acre total of available nitrogen P205 (phosphorus): 200 lbs/acre K2O (potassium): 200 lbs/acre.
b. Lime - use only ground agricultural limestone.
c. Seed and fertilizer shall be mixed on site and seeding shall be done immediately and without interruption.
2. Dry Seeding: This includes use of conventional drop or broadcast spreaders.
a. Seed spread dry shall be incorporated into the subsoil at the rates prescribed on the temporary or permanent Seeding Summary or Tables 25 or 26.
b. Where practical, seed should be applied in two directions perpendicular to each other.
3. Cut/packer Seeding: Mechanized seeders that apply and cover seed with soil.
a. Cut/packer seeders are required to bury the seed in such a fashion as to provide at least 1/4 inch of soil covering.
b. Where practical, seed should be applied in two directions perpendicular to each other.
4. Mulch Specifications (In order of preference)
1. Straw shall consist of thoroughly threshed wheat, rye or oat straw, reasonably bright in color, and shall not be matted, matted, decayed, or excessively dusty and shall be free of noxious weed seeds as specified in the Maryland Seed Law.

III. Wood Cellulose Fiber Mulch (WCFA)

- a. WCFA shall consist of specially prepared wood cellulose processed into a uniform fibrous physical state.
b. WCFA shall be dyed green or contain a green dye in the package that will provide an appropriate color to facilitate visual inspection of the uniformly spread slurry.
c. WCFA, including dye, shall contain no germination or growth inhibiting factors.
d. WCFA materials shall be manufactured and processed in such a manner that the wood cellulose fiber mulch will remain in uniform suspension in water under agitation and will blend with seed, fertilizer and other additives to form a homogeneous slurry.
e. WCFA material shall contain no elements or compounds at concentration levels that will be phytotoxic.
f. WCFA must conform to the following physical requirements: fiber length to approximately 10 mm., diameter approximately 1 mm., pH range of 4.0 to 6.5, ash content of 1.65 maximum and water holding capacity of 50% minimum.

Note: Only sterile straw mulch should be used in areas where no species of grass is desired.

- G. Mulching Seeded Areas - Mulch shall be applied to all seeded areas immediately after seeding.
1. If grading is completed outside of the seeding season, mulch shall be applied as prescribed in this section and maintained until the seeding season returns and seeding can be performed in accordance with these specifications.
2. When straw mulch is used, it shall be spread over all seeded areas at the rate of 2 tons/acre.
3. Wood cellulose fiber used as a mulch shall be applied at a net dry weight of 1,500 lbs. per acre.
4. Seeding Straw Mulch (Mulch Anchoring): Mulch anchoring shall be performed immediately following mulch application to minimize loss by wind or water.
5. A mulch anchoring tool is a tractor drawn implement designed to punch and anchor mulch into the soil surface a minimum of 2 inches.
6. Wood cellulose fiber may be used for anchoring straw.
7. Application of liquid binders should be heavier at the edges where wind catches mulch.
8. Lighthight plastic netting may be stapled over the mulch according to manufacturer's recommendations.

IV. Incremental Stabilization - Cut Slopes

- 1. All cut slopes shall be dressed, prepared, seeded and mulched as the work progresses.
2. Construction sequence (Refer to Figure 4 below):
a. Excavate and stabilize all temporary embankments, side ditches, or berms that will be used to convey runoff from the excavation.
b. Perform phase 1 excavation, dress, and stabilize.
c. Perform phase 2 excavation, dress, and stabilize.
d. Perform final phase excavation, dress, and stabilize.
3. Once excavation has begun the operation should be continuous from grubbing through the completion of grading and placement of topsoil (if required) and permanent seed and mulch.

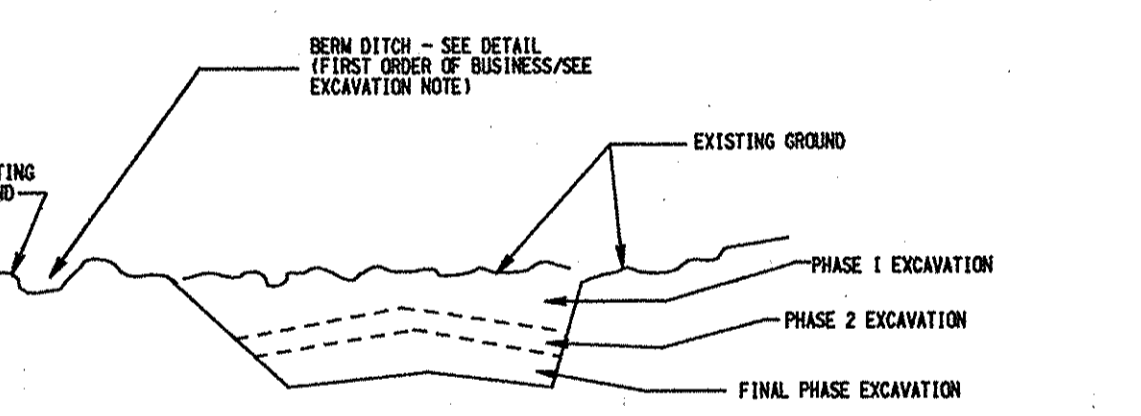


Figure 4 Incremental Stabilization - Cut

V. Incremental Stabilization of Embankments - Fill Slopes

- 1. Embankments shall be constructed in lifts as prescribed on the plans.
2. Slopes shall be stabilized immediately when the vertical height of the multiple lifts reaches 15', or when the grading operation ceases as prescribed in the plans.
3. At the end of each day, temporary berms and pipe slope drains should be constructed along the top edge of the embankment to intercept surface runoff and convey it down the slope in a non-erodible manner to a sediment trapping device.
4. Construction sequence: Refer to Figure 5 (below).
a. Excavate and stabilize all temporary embankments, side ditches, or berms that will be used to divert runoff around the fill.
b. Place phase 1 embankment, dress and stabilize.
c. Place phase 2 embankment, dress and stabilize.
d. Place final phase embankment, dress and stabilize.
5. Once the placement of fill has begun the operation should be continuous from grubbing through the completion of grading and placement of topsoil (if required) and permanent seed and mulch.

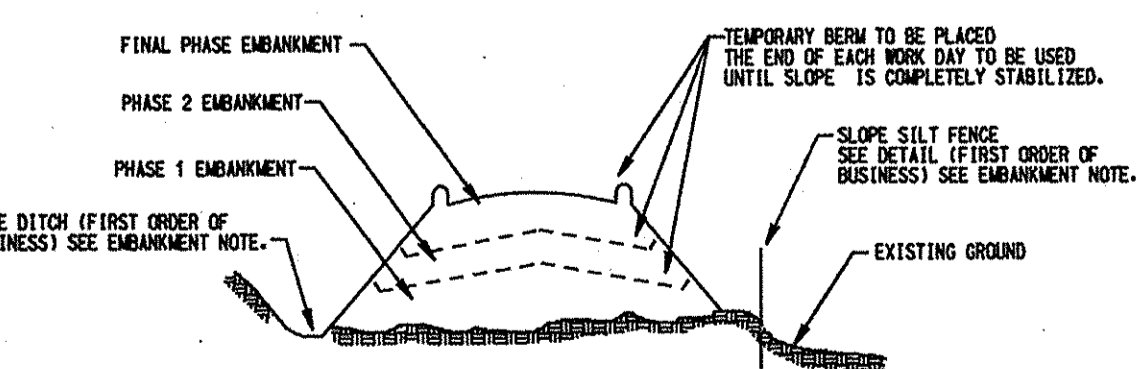


Figure 5 Incremental Stabilization - Fill

Section II - Temporary Seeding

Vegetation - annual grass or grain used to provide cover on disturbed areas for up to 12 months. For longer duration of vegetative cover, Permanent Seeding is required.

A. Seed Mixtures - Temporary Seeding

- 1. Select one or more of the species or mixtures listed in Table 26 for the appropriate Plant Hardiness Zone (from Figure 5) and enter them in the Temporary Seeding Summary below, along with application rates, seeding dates and seeding depths.
2. For sites having soil tests performed, the rates shown on this table shall be deleted and the rates recommended by the testing agency shall be written in.
3. Soil tests are not required for Temporary Seeding.

TEMPORARY SEEDING SUMMARY

Table with columns: SEED MIXTURE HARDNESS ZONE FROM TABLE 26, APPLICATION RATE (lb/acre), SEEDING DATES, SEEDING DEPTHS, FERTILIZER RATE (lb/1000 SF), and LIME RATE (lb/1000 SF). It lists two seed mixtures: 1. ANNUAL RYEGRASS and 2. WMA TEMP SEED MIX.

Section III: Permanent Seeding

Seeding grass and legumes to establish ground cover for a minimum period of one year on disturbed areas generally receiving low maintenance.

A. Seed Mixtures - Permanent Seeding

- 1. Select one or more of the species or mixtures listed in Table 25 for the appropriate Plant Hardiness Zone (from Figure 5) and enter them in the Permanent Seeding Summary below, along with application rates and seeding dates.
2. Additional planting specifications for exceptional sites such as shrub areas, streambanks, or areas for special purposes such as wildlife or aquatic habitat may be found in the MDC-SCS Technical Field Office Guide, Section 342 - Critical Area Planting.
3. Soil tests are not required for Permanent Seeding.

PERMANENT SEEDING SUMMARY

Table with columns: NO., SPECIES, APPLICATION RATE (lb/acre), SEEDING DATES, SEEDING DEPTHS, FERTILIZER RATE (lb/1000 SF), and LIME RATE. It lists three seed mixtures: 1. TALL FESCUE 70% CANADA BLUEGRASS 10% KENTUCKY BLUEGRASS 10% RED TOP 5%, 2. TALL FESCUE 85% PERENNIAL RYEGRASS 10% KENTUCKY BLUEGRASS 5%, and 3. KEEPING LOVEGRASS 17% SEREGIA LESPEDEZA 83%.

Table 24 Maintenance fertilization for Permanent Seeding

Table with columns: Seeding Mixture, Type, lb/acre, lb/1000 sf, Time, and Mowing. It lists four seed mixtures: Tall fescue mixes up to 70% or more of cover, Bromewitch Sericea Lespedeza Crotalaria Trefoil, Fairly uniform stand of tall fescue and sericea lespedeza or brodiaea trefoil, and Red & chewing fescue, Kentucky bluegrass, hard fescue mixtures.

Section IV - Sod: To provide soil cover on a disturbed area (2:1 grade or flatter).

A. General Specifications

- 1. Class of turfgrass sod shall be Maryland or Virginia State Certified or Approved. Sod labels shall be made available to the job foreman and inspector.
2. Sod shall be machine cut of a uniform thickness of 3/4" plus or minus 1/8", at the time of cutting.
3. Standard size sections of sod shall be strong enough to support their own weight and retain their size and shape when suspended vertically with a firm grip on the upper 10 percent of the section.
4. Sod shall not be harvested or transplanted when moisture content (excessively dry or wet) may adversely affect its survival.
5. Sod shall be harvested, delivered, and installed within a period of 36 hours.
6. Sod installation:
1. During periods of excessively high temperature or in areas having dry subsoil, the subsoil shall be lightly irrigated immediately prior to laying the sod.
2. The first row of sod shall be laid in a straight line with subsequent rows placed parallel to and tightly wedged against each other.
3. Sod shall be watered immediately following rolling or tamping until the underside of the new sod pad and soil surface below the sod are completely saturated.
4. Sod shall be watered immediately following rolling or tamping until the underside of the new sod pad and soil surface below the sod are completely saturated.
5. In the absence of adequate rainfall, watering shall be performed daily or as often as necessary during the first week and in sufficient quantities to maintain moist soil to a depth of 4".
6. After the first week, sod watering is required as necessary to maintain adequate moisture content.
7. The first mowing of sod should not be attempted until the sod is firmly rooted.
8. The first mowing of sod should not be attempted until the sod is firmly rooted.
9. The first mowing of sod should not be attempted until the sod is firmly rooted.

SECTION IV - TURFGRASS ESTABLISHMENT

Areas where turfgrass may be desired include lawns, parks, playgrounds, and commercial sites which will receive a medium level of maintenance. Areas to be seeded shall be prepared by diking or other approved methods to a depth of 2 to 4 inches, leveled and rolled to prepare a proper seedbed.

A. Turfgrass Mixtures

- 1. Kentucky Bluegrass - Full sun mixture - For use in areas that receive intensive management.
2. Kentucky Bluegrass/Perennial Ryegrass - Full sun mixture - For use in full sun areas where rapid establishment is necessary.
3. Tall Fescue/Kentucky Bluegrass - Full sun mixture - For use in areas with shade in bluegrass lawns.
4. Kentucky Bluegrass/Fine Fescue - Shade Mixture - For use in areas with shade in bluegrass lawns.

B. Ideal times of seeding

- Western MD: March 15 - June 1, August 1 - October 1 (Hardiness Zone - 8b, 6a)
Central MD: March 1 - May 15 - October 15 (Hardiness Zone - 6a)
Southern MD, Eastern Shore: March 1 - May 15, August 15 - October 15 (Hardiness Zone - 7a, 7b)

C. Irrigation

If soil moisture is deficient, supply new seedlings with adequate water for plant growth (1/2" - 1" every 3 to 4 days depending on soil texture) until they are firmly established. This is especially true when seedlings are made late in the planting season, in generally dry or hot seasons, or on adverse sites.

D. Repair and Maintenance

- 1. Inspect all seeded areas for failures and make necessary repairs, replacements, and reseedings within the planting season.
2. Once the vegetation is established, the site shall have 95% groundcover to be considered adequately stabilized.
3. If the stand provides less than 40% ground coverage, reestablish following original time, fertilizer, seedbed preparation and seeding recommendations.
4. Maintenance fertilizer rates for permanent seedings are shown in Table 24. For lawns and other medium to high maintenance turfgrass areas, refer to the University of Maryland publication "Lawn Care in Maryland" Bulletin No. 171.

REVISIONS table with columns for revision number, description, and date. Below it is the APPROVALS section with fields for REQUESTER, PLANT FACILITIES CHIEF ENGINEER, CODE COMPLIANCE REVIEW, TSC GROUP, TSP GROUP, SAFETY OFFICERS, DIRECTORS OFFICE, COORDINATOR, and SENIOR LEADER.

THE JOHNS HOPKINS UNIVERSITY APPLIED PHYSICS LABORATORY JOHNS HOPKINS ROAD LAUREL MARYLAND 20723-6099

BUILDING 26 logo and address information.

GRAPHIC SCALES section with various scale markings.

WR&A logo and address: WHITMAN, REQUARD AND ASSOCIATES 2315 SAINT PAUL STREET BALTIMORE, MARYLAND 410 - 235 - 3450

SEEDING SPECIFICATIONS section including DRAWING NO. C6.2, SHEET 12 OF 12, and DES: R.M. CHECK: R.M. DATE: 11/25/97.

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING AND ZONING. Includes signatures and dates for Director, Chief Development Engineering Division, and Chief Division of Land Development.

BY THE ENGINEER: I CERTIFY THAT THIS PLAN FOR EROSION AND SEDIMENT CONTROL REPRESENTS A PRACTICAL AND WORKABLE PLAN BASED ON MY PERSONAL KNOWLEDGE OF THE SITE CONDITIONS AND THAT IT WAS PREPARED IN ACCORDANCE WITH THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT. Includes signature of Richard C. Lortz and date 12/10/97.

BY THE DEVELOPER: I/WE CERTIFY THAT ALL DEVELOPMENT AND CONSTRUCTION WILL BE DONE ACCORDING TO THIS PLAN, AND THAT ANY RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF ATTENDANCE AT A DEPARTMENT OF ENVIRONMENT APPROVED TRAINING PROGRAM FOR THE CONTROL OF SEDIMENT AND EROSION BEFORE BEGINNING THE PROJECT. Includes signature of James E. Loesch PE and date 11/19/97.

REVIEWED FOR HOWARD S.C.D. AND MEETS THE TECHNICAL REQUIREMENTS. Includes signature of Cheryl Simmonds and date 12/17/97, and signature of John R. Robertson and date 12/17/97.