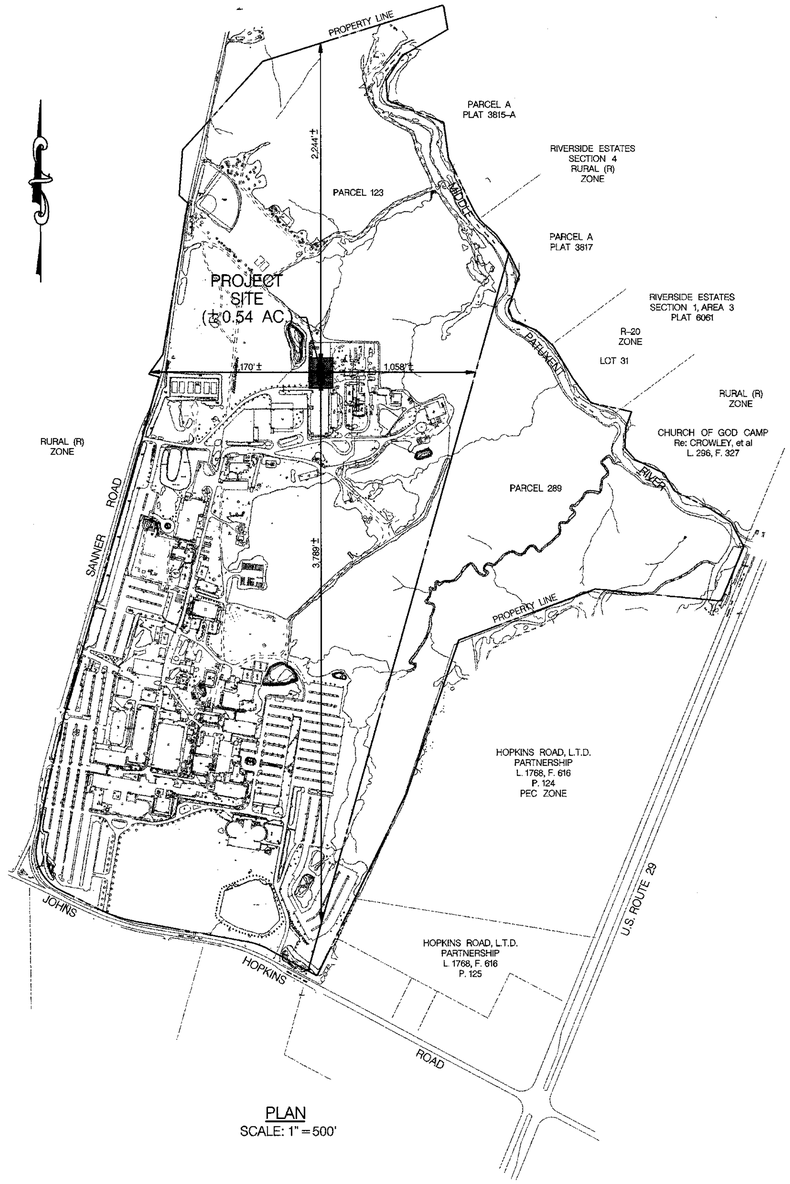
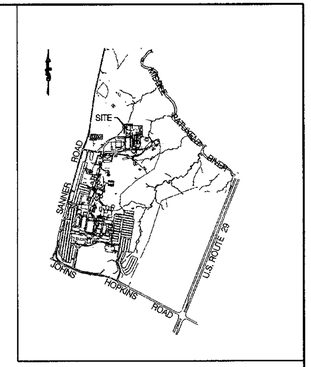
GENERAL NOTES:

1. THE TOPOGRAPHIC AND UTILITY INFORMATION SHOWN IN THIS DEVELOPMENT PLAN, WAS OBTAINED FROM FIELD SURVEYS PERFORMED BY PROGRESSIVE ENGINEERING CONSULTANTS IN NOVEMBER 1998 AND FROM RECORDS PROVIDED BY JOHNS HOPKINS UNIVERSITY APPLIED PHYSICS LAB (APL) AND MAY NOT REFLECT CURRENT CONDITIONS. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY CURRENT TOPOGRAPHIC AND UTILITY INFORMATION TO HIS OWN SATISFACTION.
2. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE HOWARD COUNTY SPECIFICATIONS AND DETAILS FOR CONSTRUCTION, UNLESS OTHERWISE NOTED.
3. ELEVATIONS SHOWN ARE BASED ON AN ASSUMED DATUM PROVIDED BY PROGRESSIVE ENGINEERING CONSULTANTS.
4. APPROXIMATE LOCATIONS OF EXISTING UTILITIES ARE SHOWN. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PROTECT THE EXISTING UTILITIES AND TO MAINTAIN UNINTERRUPTED SERVICE. ANY DAMAGE CAUSED BY THE CONTRACTOR'S OPERATIONS SHALL BE REPAIRED IMMEDIATELY BY THE CONTRACTOR AT NO COST TO THE OWNER.
5. 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 PLANT ENGINEERING OFFICE (443) 778-5134.
6. SECURITY MUST BE MAINTAINED WITHIN THE EXISTING FENCED AREA. ALL REQUIRED FENCE CONSTRUCTION AND RELOCATION SHALL BE BY THE CONTRACTOR WHO SHALL BE RESPONSIBLE TO COORDINATE WITH JHU-APL AS TO WHEN SUCH WORK IS REQUIRED.
7. THE CONTRACTOR SHALL CONTACT MR. JIM LOESCH PLANT ENGINEER (443) 778-5134 AT LEAST FIVE DAYS BEFORE STARTING WORK OR NEEDING TO SHUT DOWN ANY UTILITIES.
8. THE CONTRACTOR SHALL TIE-IN TO THE EXISTING UTILITIES ONLY AFTER NORMAL WORKING HOURS AT JHU-APL. WORK MUST BE SCHEDULED ACCORDINGLY THRU JHU-APL. NORMAL WORKING HOURS ARE 8:30 A.M. TO 5:00 P.M., MONDAY THROUGH FRIDAY.
9. ALL WATER MAINS SHALL BE DUCTILE IRON CLASS 52, UNLESS OTHERWISE NOTED.
10. THE CONTRACTOR OR DEVELOPER SHALL CONTACT THE HOWARD COUNTY CONSTRUCTION INSPECTION DIVISION, 24 HOURS IN ADVANCE OF COMMENCEMENT OF WORK, AT (410) 313-1880.
11. THE TOP OF ALL WATER MAINS SHALL HAVE A MINIMUM OF 4' OF COVER, UNLESS OTHERWISE NOTED.
12. ALL FITTINGS SHALL BE BUTTRESSED OR ANCHORED WITH CONCRETE IN ACCORDANCE WITH THE HOWARD COUNTY STANDARD DETAILS, UNLESS OTHERWISE PROVIDED FOR ON THE DRAWING.
13. CLEAR ALL UTILITIES BY A MINIMUM OF 6". CLEAR ALL POLES AND FOUNDATIONS BY 2'-0" MINIMUM, OR TUNNEL AS REQUIRED.
14. THE CONTRACTOR SHALL NOT OPERATE ANY WATER MAIN VALVES ON THE EXISTING WATER SYSTEMS. COORDINATE WITH THE OWNER FOR OPERATING WATERMAIN VALVES.
15. THE CONTRACTOR SHALL PROVIDE A JOINT IN ALL SANITARY & STORM DRAINS WITHIN 2'-0" OF EXTERIOR MANHOLE WALL.
16. THE CONTRACTOR SHALL PERMANENTLY SEED AND STABILIZE ALL DISTURBED AREAS THAT ARE NOT TO BE PAVED.
17. THE BUILDING PROPOSED IS FOR RESEARCH AND STORAGE.
18. THERE ARE NO WETLANDS WITHIN THE LIMIT OF DISTURBANCE SHOWN. THEREFORE, SECTION 404 AND SECTION 401 DO NOT APPLY AND PERMITS ARE NOT REQUIRED.
19. ALL DRIVEWAYS ARE PRIVATELY OWNED AND MAINTAINED.
20. THE AREA SHOWN IS LOCATED ON TAX MAP #41.
21. THE CONTRACTOR SHALL NOTIFY MISS UTILITY 1-800-257-7777, FIVE DAYS PRIOR TO START OF CONSTRUCTION.
22. THE INFORMATION CONCERNING UNDERGROUND UTILITIES WAS OBTAINED FROM AVAILABLE RECORDS, BUT THE CONTRACTOR MUST DETERMINE THE EXACT LOCATION BY DIGGING TEST PITS, BY HAND, AT ALL CROSSINGS WELL IN ADVANCE OF CONSTRUCTION.
23. ALL SITE UTILITIES ARE THE PROPERTY OF APL. APL WILL HORIZONTALLY LOCATE ALL ACTIVE UTILITIES FOR THE CONTRACTOR.
24. EXISTING PAVEMENTS, (ROADWAY, SIDEWALKS, ETC.) REMOVED TO INSTALL PROPOSED UTILITIES, SHALL BE REPLACED "IN-KIND". TRAFFIC SHALL BE MAINTAINED BY THE CONTRACTOR ALONG EXISTING ROADWAYS DURING PROPOSED WORK, AT ALL TIMES.
25. ALL EXTERIOR LIGHTING SHALL CONFORM TO SECTION 134, ZONING REGULATIONS.

INDEX OF DRAWINGS



PLAN
SCALE: 1" = 500'



VICINITY MAP
SCALE: 1" = 2000'

SITE ANALYSIS:

PRESENT ZONING	PEC
AREA OF PROPERTY	366 Ac.
AREA OF SUBMISSION	0.54 Ac.
BUILDING FLOOR SPACE	
EXISTING	1,471,767 S.F.
PROPOSED (RESEARCH)	5,000 S.F.
TOTAL	1,476,767 S.F.
MAXIMUM NUMBER OF EMPLOYEES	3,500
NUMBER OF PARKING SPACES	
EXISTING	3,431
REQUIRED	2,450
PROVIDED	3,431
GREEN AREA	
EXISTING	297.00 Ac.
PROPOSED	297.19 Ac.
BUILDING COVERAGE	
EXISTING	15.7 Ac.
PROPOSED (5,000 SF ADDED)	15.8 Ac.

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING & ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION	DATE 8/2/99
CHIEF, DIVISION OF LAND DEVELOPMENT	DATE 8/4/99
DIRECTOR	DATE 8/6/99

APPLIED PHYSICS LABORATORY
THE JOHNS HOPKINS UNIVERSITY

Johns Hopkins Road Howard County, Maryland

Approved For The University By: James E. Lovern
Date: 7/22/99 Title: Chief Engineer

STATE OF MARYLAND — No. 10903 — REGISTERED PROFESSIONAL ENGINEER

ADDRESS CHART

PARCEL NUMBER P. 123 / 129			STREET ADDRESS 11100 JOHNS HOPKINS ROAD		
SUBDIVISION NAME J.H.U. APPLIED PHYSICS LAB			SECT. / AREA		LOTS P. 123 / 129
PLAT NO. 234 / 304 400 / 625	BLOCK NO. 16	ZONE PEC	TAX MAP NO. 41	ELEC. DIST. 5TH	CENSUS TR. 6051
WATER CODE E-21			SEWER CODE 6480000		

RK&K
RUMMEL, KLEPPER & KAHL, LLP
CONSULTING ENGINEERS
81 MOSHER STREET BALTIMORE, MARYLAND 21217 (410) 728-2900

DESIGNED	DWW
DRAWN	DWW
CHECKED	JAD
DATE	7-12-99
SCALE	AS NOTED
DRAWING	1 OF 9
JOB NO.	—
FILE NO.	—

COVER SHEET
SITE DEVELOPMENT PLAN
RESEARCH BUILDING #52

JOHNS HOPKINS UNIVERSITY
APPLIED PHYSICS LABORATORY

TAX MAP #41 PARCEL 123 / 129
5TH ELECTION DISTRICT
HOWARD COUNTY, MARYLAND

FOR: JOHNS HOPKINS UNIVERSITY APPLIED PHYSICS LAB
11100 JOHNS HOPKINS ROAD
LAUREL, MARYLAND 20723-6099

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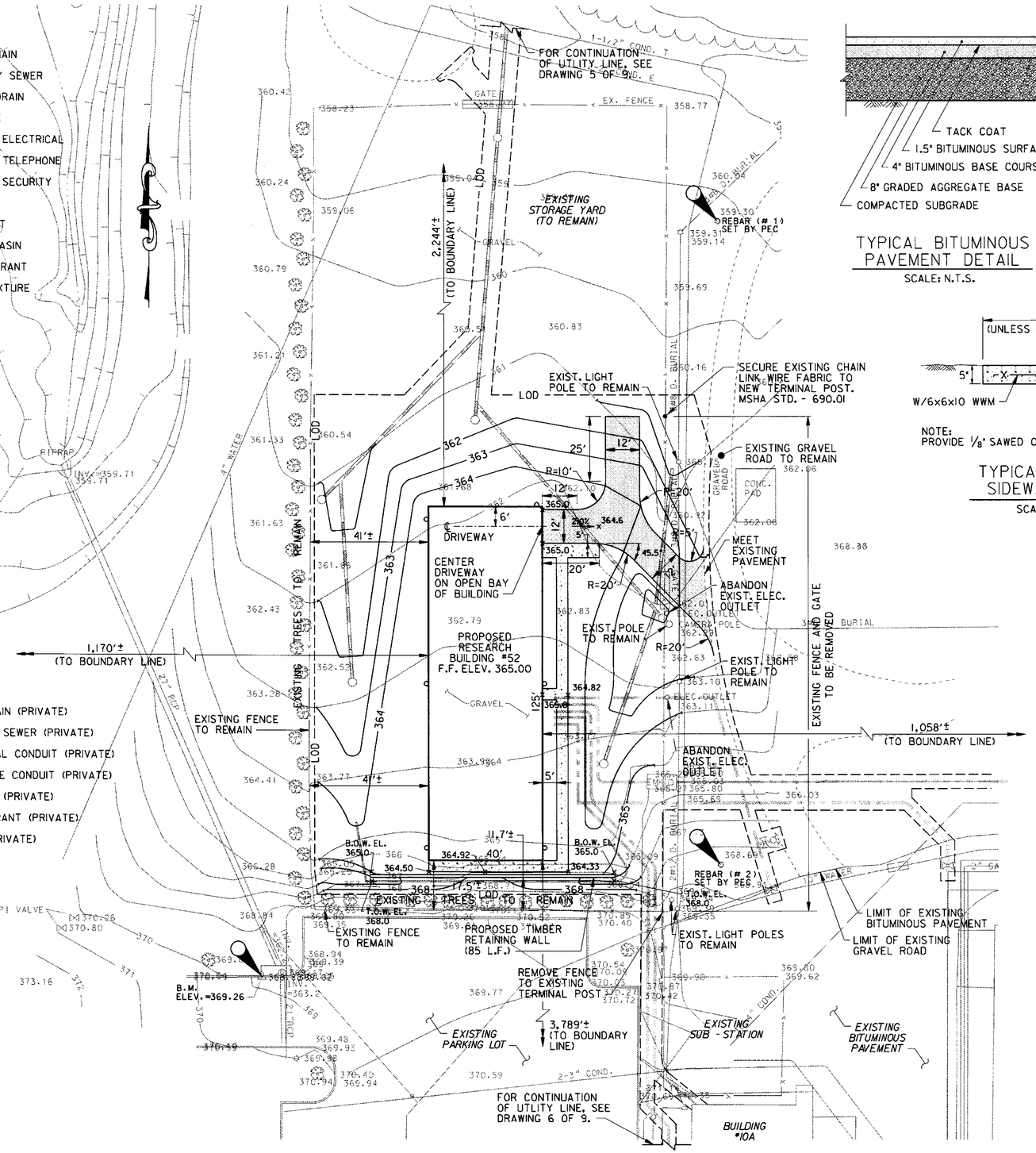
EXISTING UTILITY LEGEND

- 8" WATER — EXIST. WATER MAIN
- 8" SAN. — EXIST. SANITARY SEWER
- 12" STORM — EXIST. STORM DRAIN
- 6" GAS — EXIST. GAS LINE
- 2-4" COND. E — EXIST. CONDUIT ELECTRICAL
- 1-4" COND. T — EXIST. CONDUIT TELEPHONE
- 2-4" COND. S — EXIST. CONDUIT SECURITY
- EXIST. MANHOLE
- EXIST. CLEANOUT
- EXIST. CATCH BASIN
- EXIST. FIRE HYDRANT
- EXIST. LIGHT FIXTURE

PROPOSED UTILITY LEGEND

- PROP. WATER MAIN (PRIVATE)
- PROP. SANITARY SEWER (PRIVATE)
- PROP. ELECTRICAL CONDUIT (PRIVATE)
- PROP. TELEPHONE CONDUIT (PRIVATE)
- PROP. GAS MAIN (PRIVATE)
- PROP. FIRE HYDRANT (PRIVATE)
- PROP. VALVE (PRIVATE)

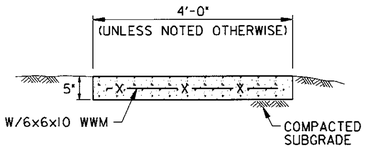


TYPICAL BITUMINOUS PAVEMENT DETAIL

SCALE: N.T.S.

TYPICAL CONCRETE SIDEWALK DETAIL

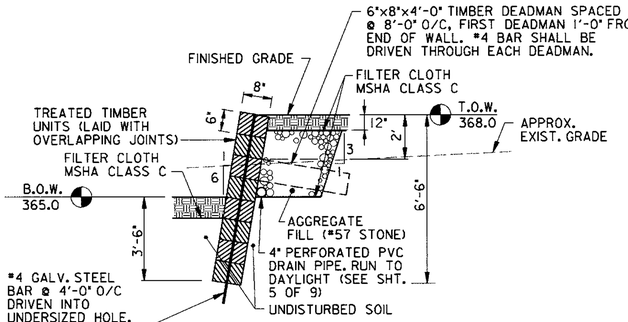
SCALE: N.T.S.



NOTE:
PROVIDE 1/8" SAWED CONTROL JOINTS AT 5' O/C.

NOTES:

1. THE TOPOGRAPHIC AND UTILITY INFORMATION SHOWN HEREON, WAS OBTAINED FROM FIELD SURVEYS PERFORMED BY PROGRESSIVE ENGINEERING CONSULTANTS (P.E.C.) IN NOVEMBER 1998 AND FROM RECORDS OBTAINED FROM JOHNS HOPKINS APPLIED PHYSICS LABORATORY, AND MAY NOT REFLECT CURRENT CONDITIONS. IT IS THE RESPONIBILITY OF THE CONTRACTOR TO VERIFY CURRENT TOPOGRAPHIC AND UTILITY INFORMATION TO HIS OWN SATISFACTION.
2. THIS BASE SHEET IS BASED ON ASSUMED COORDINATES, P.E.C. HAS SET TWO REBARS ON THE EAST SIDE OF THE PROPOSED BUILDING FOR FUTURE REFERENCES.
3. A BENCH MARK HAS BEEN ESTABLISHED ON THE LEFT CORNER OF THE STORM DRAINAGE STRUCTURE LOCATED AT THE NORTH SIDE OF THE CURB. BENCH MARK ELEV. = 369.26 PER AS BUILT DRAWING OBTAINED FROM JOHNS HOPKINS UNIVERSITY APPLIED PHYSICS LABORATORY.
4. ALL BITUMINOUS PAVEMENTS AND CONCRETE SIDEWALKS SHALL BE IN ACCORDANCE WITH "MSHA STANDARD SPECIFICATIONS FOR CONSTRUCTION AND MATERIALS".
5. SEE EROSION AND SEDIMENT CONTROL PLAN FOR EXISTING TREE PRESERVATION.
6. ALL EXISTING UTILITIES TO REMAIN IN SERVICE UNLESS OTHERWISE NOTED.
7. ALL ITEMS INDICATED TO BE REMOVED SHALL BE DISPOSED OF BY THE CONTRACTOR OFF-SITE.
8. CLEAR EXISTING GRAVEL PAVEMENT WITHIN THE LIMIT OF DISTURBANCE AND DISPOSE OFF-SITE.
9. PROPOSED BUILDING TO HAVE EMERGENCY SPRINKLER SYSTEM INSTALLED (N.I.C.).
10. WITHIN THE LIMIT OF DISTURBANCE, ALL AREAS NOT INDICATED TO RECEIVE CONCRETE OR BITUMINOUS SURFACE TREATMENT SHALL BE STABILIZED WITH PERMANENT SEED AND MULCH. SEE EROSION AND SEDIMENT CONTROL GENERAL NOTES.
11. SEE UTILITY COMPOSITE PLAN FOR PROPOSED UTILITY WORK.
12. SEE STORMWATER MANAGEMENT PLAN FOR PROPOSED STORMWATER MANAGEMENT STRUCTURES.
13. ALL EXTERIOR LIGHTING SHALL CONFORM TO SECTION 134, ZONING REGULATIONS.



NOTE:
STEEL BAR SHALL CONFORM TO ASTM A-615, GRADE 60.
IT SHALL BE GALVANIZED ACCORDING TO ASTM A-153 & A-123.

TIMBER RETAINING WALL DETAIL

SCALE: N.T.S.

CONTROL COORDINATE TABLE (SEE NOTE 2)		
POINT NO.	NORTH	EAST
REBAR (# 1)	5269.0660	5047.1470
REBAR (# 2)	5041.4950	5048.0310
BENCH MARK	5001.9970	4886.8460

LEGEND

- CONCRETE SIDEWALK
- PROPOSED BITUMINOUS PAVEMENT
- PROPOSED CHAIN LINK FENCE
- 362 — PROPOSED CONTOUR (1 FOOT INTERVAL)
- 362 — EXISTING CONTOUR (1 FOOT INTERVAL)
- × 362.83 SPOT ELEVATION
- LOD — LIMIT OF DISTURBANCE

REVIEWED FOR HOWARD CO. AND MEETS TECHNICAL REQUIREMENTS
SIGNATURE 7/28/99 DATE
U.S. SOIL CONSERVATION SERVICE

THIS DEVELOPMENT PLAN IS APPROVED FOR SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT.
7/28/99
APPROVED

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING & ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION	8/2/99 DATE
CHIEF, DIVISION OF LAND DEVELOPMENT	8/4/99 DATE
DIRECTOR	8/6/99 DATE

APPLIED PHYSICS LABORATORY
THE JOHNS HOPKINS UNIVERSITY
Johns Hopkins Road Howard County, Maryland
Approved For The University By: James E. Toesch
Date: 7/22/99 Title: Chief Engineer

RUMMEL, KLEPPER & KAHL, LLP
CONSULTING ENGINEERS
81 MOSHER STREET BALTIMORE, MARYLAND 21217 (410) 728-2900

DESIGNED CDK	SITE DEVELOPMENT PLAN RESEARCH BUILDING #52	SCALE 1"=20'
DRAWN DVW	JOHNS HOPKINS UNIVERSITY APPLIED PHYSICS LABORATORY	DRAWING 2 OF 9
CHECKED JAD	TAX MAP #41 PARCEL 123 / 129 5TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND	JOB NO.
DATE 7-12-99	FOR: JOHNS HOPKINS UNIVERSITY APPLIED PHYSICS LAB 11100 JOHNS HOPKINS ROAD LAUREL, MARYLAND 20723-6099	FILE NO.

STATE OF MARYLAND — DAVID W. KLEPPER — NO. 10803 — REGISTERED PROFESSIONAL ENGINEER

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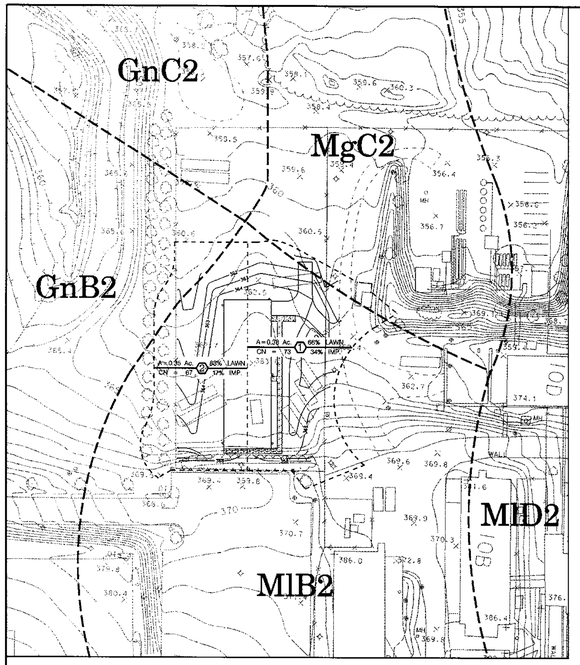
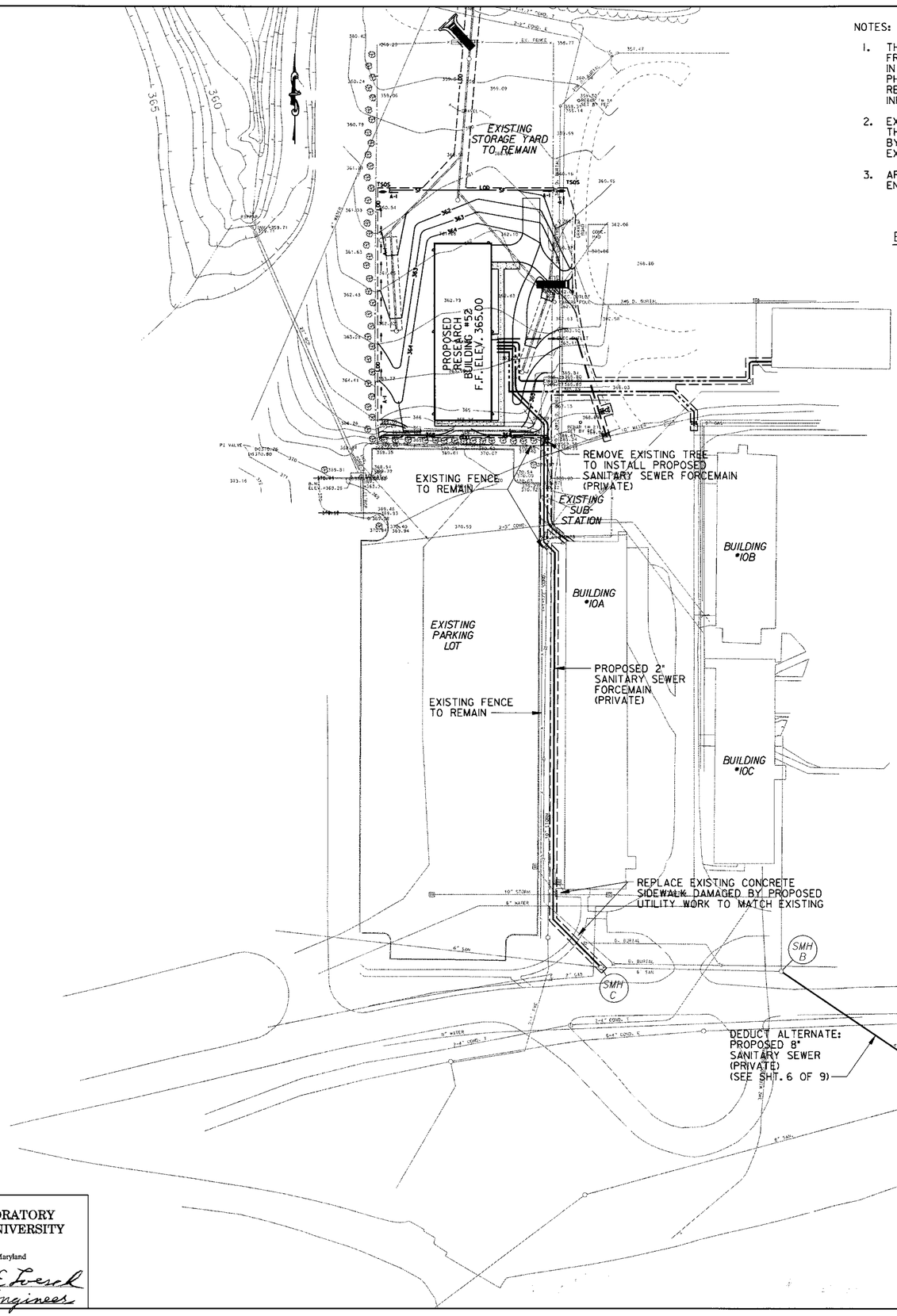


SOILS MAP &
DRAINAGE AREA MAP
SCALE: 1" = 60'

SOILS LEGEND			
SYMBOL	SOILS NAME	SLOPES	EROSION CLASS
GnB2	GLENVILLE SILT LOAM	3-8%	MODERATE
GnC2	GLENVILLE SILT LOAM	8-15%	MODERATE
MgC2	MANOR GRAVELLY LOAM	8-15%	MODERATE
MlB2	MANOR LOAM	3-8%	MODERATE
MlD2	MANOR LOAM	15-25%	MODERATE

NOTE: SEE HOWARD COUNTY SOILS MAP #29.

1. SLOPES: EXISTING SLOPES AVERAGE 5-6%. NO STEEP SLOPES EXIST WITHIN PROJECT AREA.
2. 100 YEAR FLOODPLAIN: DOES NOT EXIST ON SITE.
3. WETLANDS: NO WETLANDS ARE KNOWN TO EXIST ON SITE.
4. VEGETATION: EXISTING TREES ARE LOCATED ALONG THE WESTERN AND SOUTHERN PERIMETER OF THE SITE. TREES TO BE REMOVED ARE INDICATED ON THE EROSION AND SEDIMENT CONTROL PLAN.
5. SOILS LEGEND: HOWARD COUNTY SOILS MAP #29.



NOTES:

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2. EXISTING UTILITY STRUCTURES AND APPURTENANCES ARE SHOWN IN ACCORDANCE WITH THE BEST AVAILABLE INFORMATION. THE CONTRACTOR SHALL VERIFY TO HIS OWN SATISFACTION BY TEST PITS OR OTHER MEANS THE ACTUAL VERTICAL AND HORIZONTAL LOCATIONS OF EXISTING UTILITIES AND APPURTENANCES WELL IN ADVANCE OF CONSTRUCTION IN THEIR VICINITY.
3. AREAS DISTURBED FOR PROPOSED UTILITY WORK SHALL BE TEMPORARILY STABILIZED AT THE END OF EACH DAY.

EXISTING UTILITY LEGEND

8" WATER	EXIST. WATER MAIN
8" SAN.	EXIST. SANITARY SEWER
12" STORM	EXIST. STORM DRAIN
6" GAS	EXIST. GAS LINE
2-4" COND. E	EXIST. CONDUIT ELECTRICAL
2-4" COND. T	EXIST. CONDUIT TELEPHONE
2-4" COND. S	EXIST. CONDUIT SECURITY
○	EXIST. MANHOLE
○	EXIST. CLEANOUT
▥	EXIST. CATCH BASIN
	EXIST. FIRE HYDRANT
	EXIST. LIGHT FIXTURE

PROPOSED UTILITY LEGEND

	PROP. WATER MAIN (PRIVATE)
	PROP. SANITARY SEWER (PRIVATE)
	PROP. ELECTRICAL CONDUIT (PRIVATE)
	PROP. TELEPHONE CONDUIT (PRIVATE)
	PROP. GAS MAIN (PRIVATE)
	PROP. UNDERDRAIN (PRIVATE)

EROSION AND SEDIMENT CONTROL LEGEND

A-1	EARTH DIKE
SF	SILT FENCE
TSOS	TEMPORARY STONE OUTLET STRUCTURE
	STABILIZED CONSTRUCTION ENTRANCE
	TREE PROTECTION FENCING (TEMPORARY)
	TREE TO BE REMOVED (TOTAL = 1)
LOD	LIMIT OF DISTURBANCE

ENGINEER'S CERTIFICATE

"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."

SIGNATURE OF ENGINEER — DATE: July 22, 1999

DEVELOPER'S / BUILDER'S CERTIFICATE

"I/WE CERTIFY THAT ALL DEVELOPMENT AND CONSTRUCTION WILL BE DONE ACCORDING TO THIS PLAN OF DEVELOPMENT AND PLAN FOR EROSION AND SEDIMENT CONTROL AND THAT ALL RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF ATTENDANCE AT A DEPT. OF NATURAL RESOURCES 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 OR THEIR AUTHORIZED AGENTS, AS ARE DEEMED NECESSARY."

SIGNATURE OF DEVELOPER/BUILDER — DATE: 7/22/99

REVIEWED FOR HOWARD CO. AND MEETS TECHNICAL REQUIREMENTS
SIGNATURE — DATE 7/28/99
U.S. SOIL CONSERVATION SERVICE

THIS DEVELOPMENT PLAN IS APPROVED FOR SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT.
APPROVED — 7/28/99

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING & ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION	DATE 8/2/99
CHIEF, DIVISION OF LAND DEVELOPMENT	DATE 8/4/99
DIRECTOR	DATE 8/6/99

APPLIED PHYSICS LABORATORY
THE JOHNS HOPKINS UNIVERSITY
Johns Hopkins Road Howard County, Maryland
Approved For The University By: Jaynes E Loesch
Date: 7/22/99 Title: Chief Engineer

STATE OF MARYLAND — DONALD V. RUMMEL — NO. 10803 — REGISTERED PROFESSIONAL ENGINEER

RUMMEL, KLEPPER & KAHL, LLP
CONSULTING ENGINEERS
81 MOSHER STREET BALTIMORE, MARYLAND 21217 (410) 728-2900

DESIGNED CDK	SOILS MAP AND EROSION AND SEDIMENT CONTROL PLAN RESEARCH BUILDING #52	SCALE 1" = 40'
DRAWN DVW	JOHNS HOPKINS UNIVERSITY APPLIED PHYSICS LABORATORY	DRAWING 3 OF 9
CHECKED JAD	TAX MAP #41 PARCEL 123 /129 5TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND	JOB NO.
DATE 7-12-99	FOR: JOHNS HOPKINS UNIVERSITY APPLIED PHYSICS LAB 11100 JOHNS HOPKINS ROAD LAUREL, MARYLAND 20723-6099	FILE NO.

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PERMANENT SEEDING NOTES

1. Apply to graded or cleared areas not subject to immediate further disturbance where a permanent long-lived vegetative cover is needed.
2. Seedbed Preparation: Loosen upper three inches of soil by raking, discing or other acceptable means before seeding, if not previously loosened.
3. Soil Amendments: In lieu of soil test recommendations, use one of the following schedules
   A. Preferred - Apply 2 tons per acre dolomitic limestone (92 lbs/1000 square 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 time of seeding, apply 400 lbs per acre 30-0-0 ureaform fertilizer (9 lbs/1000 sq ft).
   B. Acceptable - Apply 2 tons per acre dolomitic limestone (92 lbs/1000 sq ft) and 1000 lbs per acre 10-10-10 fertilizer (23 lbs/1000 sq ft) before seeding. Harrow or disc into upper three inches of soil.
4. Seeding: For 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: Option (1) 2 tons per acre of well anchored straw mulch and seed as soon as possible in the spring. Option (2) use sod. Option (3) Seed with 60 lbs/acre Kentucky 31 Tall Fescue and mulch with 2 tons/acre well anchored straw.
5. Mulching: Apply 1½ 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.
6. Maintenance: Inspect all seeded areas and make needed repairs, replacements and reseedings.

TEMPORARY SEEDING NOTES

1. Apply to graded or cleared areas likely to be redisturbed where a short-term vegetative cover is needed.
2. Seedbed Preparation: Loosen upper three inches of soil by raking, discing or other acceptable means before seeding, if not previously loosened.
3. Soil Amendments: Apply 600 lbs per acre 10-10-10 fertilizer (14 lbs/1000 sq ft).
4. Seeding: For periods March 1 thru April 30 and from August 15 thru November 15, seed with 2½ bushel per acre of annual rye (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 16 thru February 28, protect site by applying 2 tons per acre of well anchored straw mulch and seed as soon as possible in the spring, or use sod.
5. Mulching: Apply 1½ 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 gal per acre (5 gal/1000 sq ft) of emulsified asphalt on flat areas. On slopes, 8 ft or higher, use 348 gal per acre (8 gal/1000 sq ft) for anchoring.
6. Refer to the 1994 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL for rate and methods not covered.

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. (410-992-2437)
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 and all slopes greater than 3:1, b) 14 days as to all other disturbed or graded areas on the project site.
4. 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 seedings, temporary seeding and mulching. Temporary stabilization with mulch alone can only be done when recommended seeding dates to not allow for proper germination and establishment of grasses, and with the owner's permission.
5. 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.
6. Site Analysis:

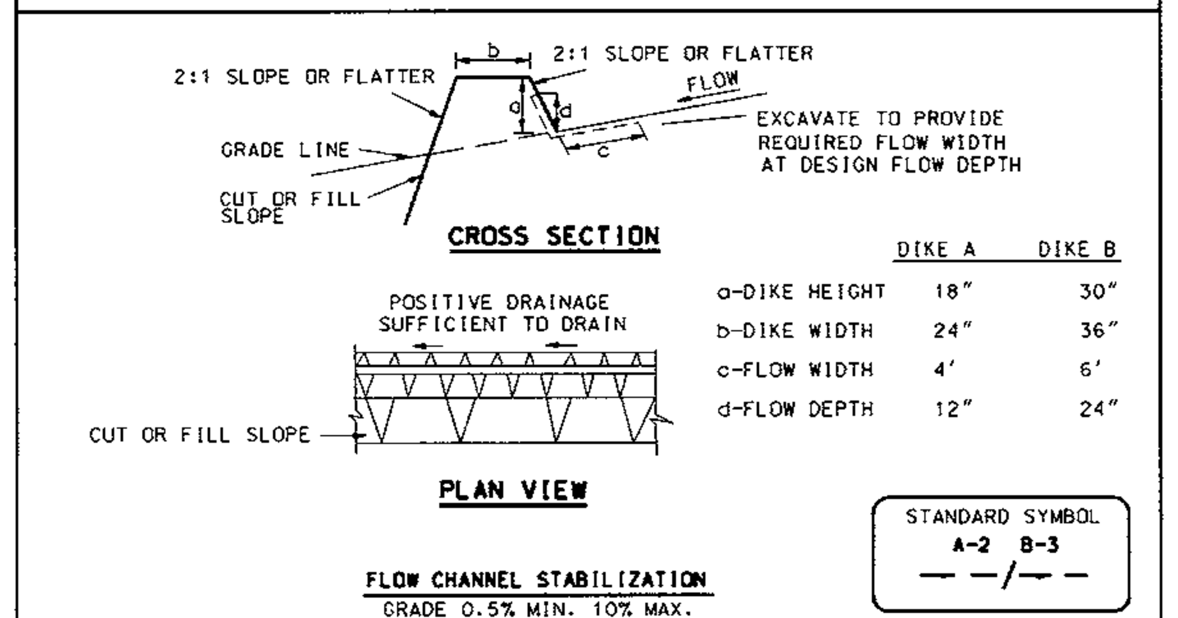
Total Area of Site	0.54 Acres
Area Disturbed	0.54 Acres
Area to be roofed or paved	0.17 Acres
Area to be vegetatively stabilized	0.37 Acres
Total Cut	167 Cu. yds
Total Fill	443 Cu. yds
Offsite waste/borrow area location	undetermined

7. Any sediment control practice which is disturbed by grading activity for placement of utilities must be repaired on the same day of disturbance.
8. Additional sediment control must be provided, if deemed necessary by the Howard County DPW sediment control inspector.
9. 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.
10. The total amount of silt fence equals 120 L.F.

CONSTRUCTION SEQUENCE

1. Obtain Grading Permit.	7 Days
2. Install SCE, Silt Fence, Earth Dike and TSOS.	2 Days
3. Clear and Rough Grade Site. Install Timber Retaining Wall.	5 Days
4. Construct Utilities.	21 Days
5. Fine Grade and Construct Paving.	5 Days
6. Stabilize All Remaining Disturbed Areas in Accordance With Standards and Specifications.	2 Days
7. Upon Approval of the Sediment Control Inspector, Remove Sediment and Erosion Control Devices.	2 Days

DETAIL 1 - EARTH DIKE



	DIKE A	DIKE B
a-DIKE HEIGHT	18"	30"
b-DIKE WIDTH	24"	36"
c-FLOW WIDTH	4'	6'
d-FLOW DEPTH	12"	24"

STANDARD SYMBOL A-2 B-3 — —/— —

FLOW CHANNEL STABILIZATION
GRADE 0.5% MIN. 10% MAX.

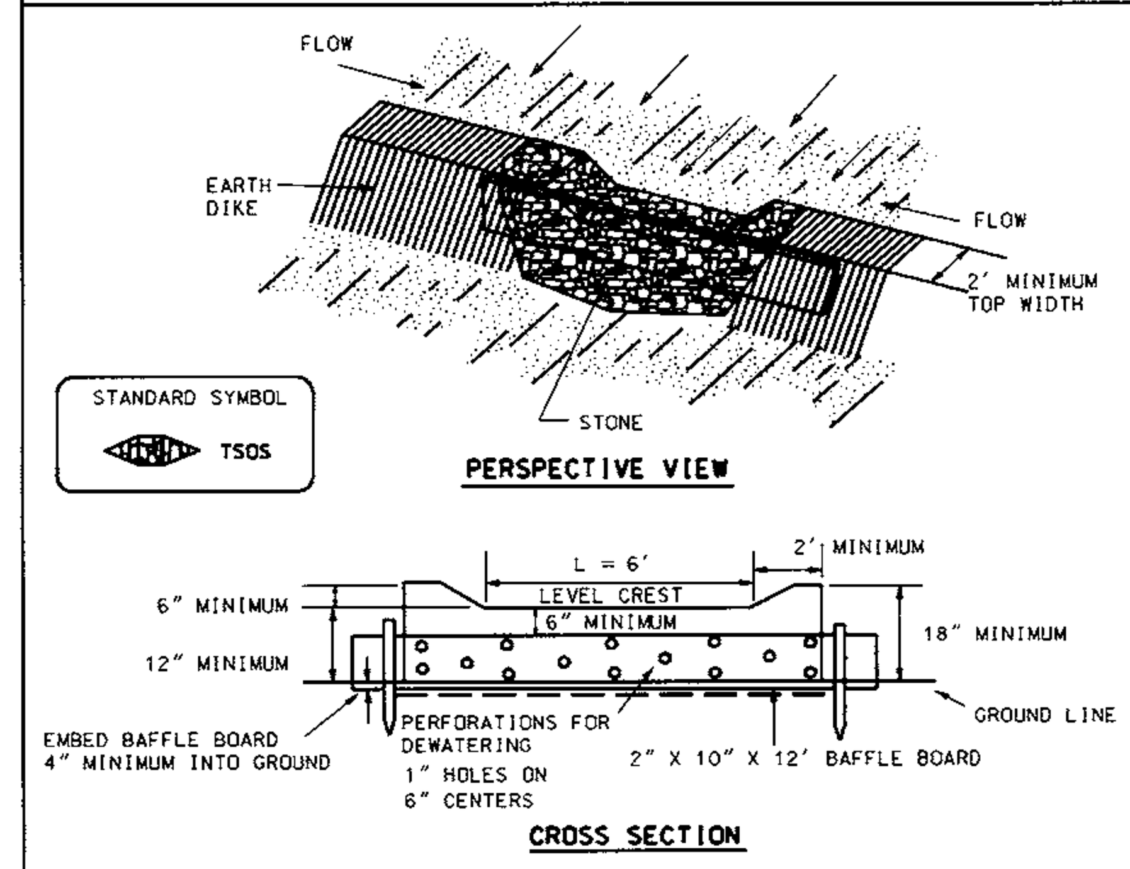
1. Seed and cover with straw mulch.
2. Seed and cover with Erosion Control Matting or line with sod.
3. 4" - 7" stone or recycled concrete equivalent pressed into the soil 7" minimum

Construction Specifications

1. All temporary earth dikes shall have uninterrupted positive grade to an outlet. Spot elevations may be necessary for grades less than 1%.
2. Runoff diverted from a disturbed area shall be conveyed to a sediment trapping device.
3. Runoff diverted from an undisturbed area shall outlet directly into an undisturbed, stabilized area at a non-erosive velocity.
4. All trees, brush, stumps, obstructions, and other objectional material shall be removed and disposed of so as not to interfere with the proper functioning of the dike.
5. The dike shall be excavated or shaped to line, grade and cross section as required to meet the criteria specified herein and be free of bank projections or other irregularities which will impede normal flow.
6. Fill shall be compacted by earth moving equipment.
7. All earth removed and not needed for construction shall be placed so that it will not interfere with the functioning of the dike.
8. Inspection and maintenance must be provided periodically and after each rain event.

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	PAGE A - 1 - 6	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

DETAIL 19 - STONE OUTLET STRUCTURE

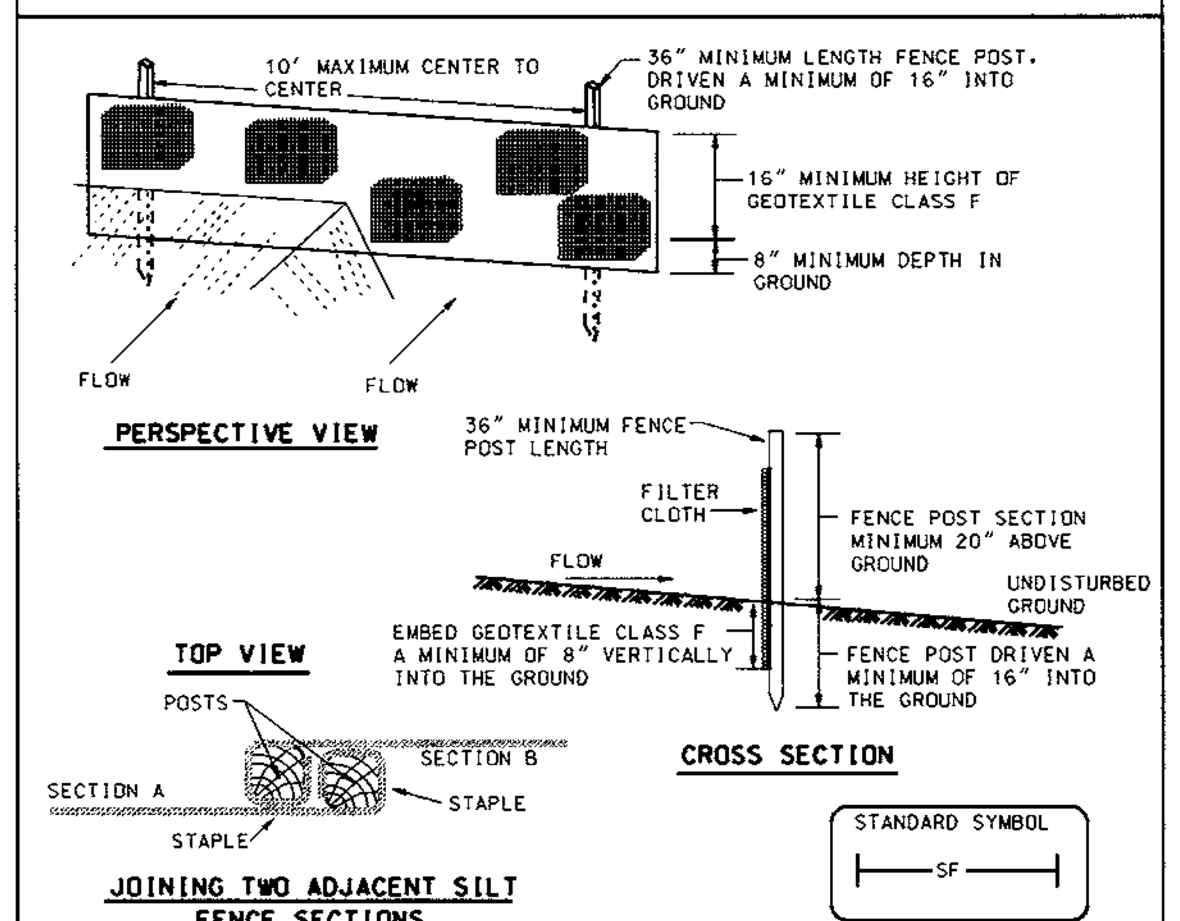


Construction Specifications

1. Crushed stone shall be used. Gravel may be used if crushed stone is not available. The stone shall be 2"-3" in size.
2. The crest of the stone dike shall be at least 6" lower than the lowest elevation of the top of the earth dike and shall be level.
3. The stone outlet structure shall be embedded into the soil a minimum of 4".
4. The minimum length of the crest of the stone outlet structure shall be 6'.
5. The stone outlet structure shall be inspected after each rain. Stone shall be replaced when the structure ceases to function and ponding results.
6. The baffle board shall be extended one foot into the dike, staked and embedded 4" into the existing ground.
7. The drainage area to this structure shall be less than ½ acre.

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	PAGE C - 11 - 2	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

DETAIL 22 - SILT FENCE



Construction Specifications

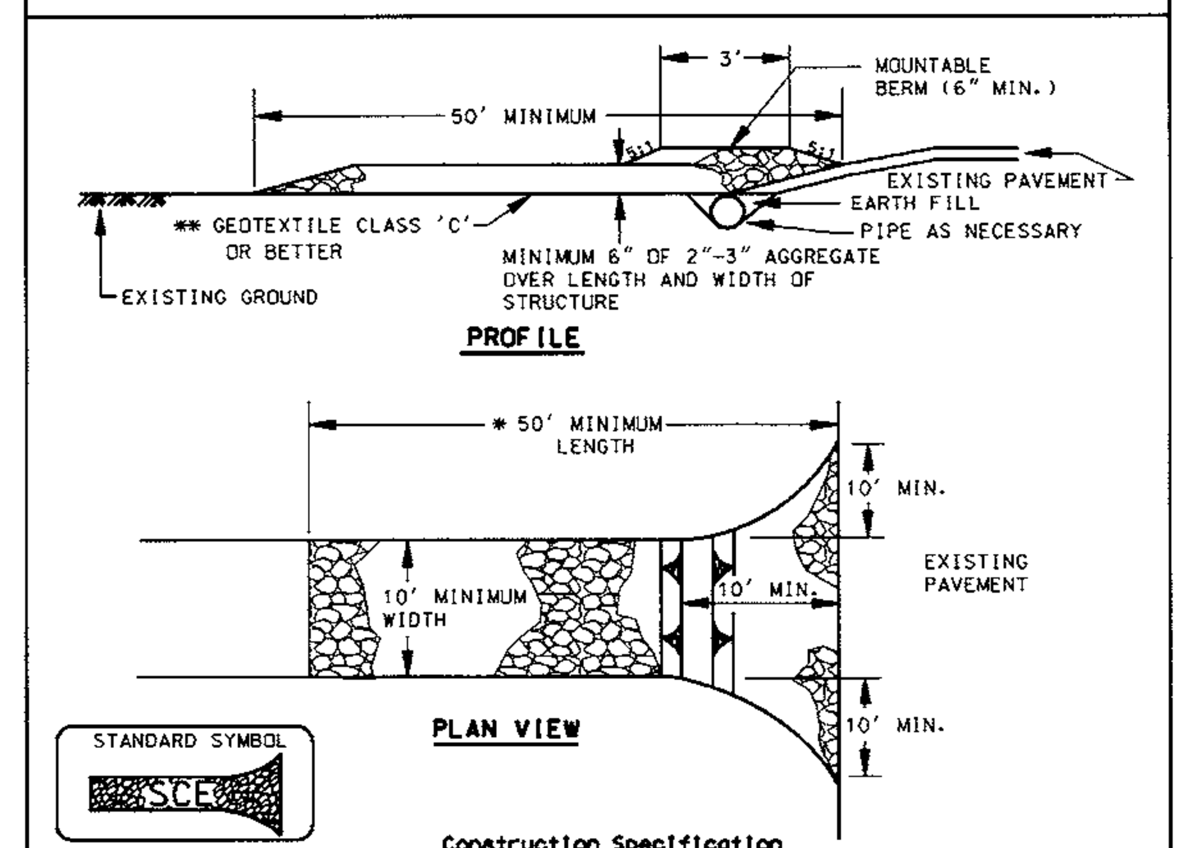
1. Fence posts shall be a minimum of 36" long driven 16" minimum into the ground. Wood posts shall be 1½" x 1½" square (minimum) cut, or 1¾" diameter (minimum) round and shall be of sound quality hardwood. Steel posts will be standard T or U section weighting not less than 1.00 pond per linear foot.
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 ft²/ minute (max.)	Test: MSMT 322
Filtering Efficiency	75% (min.)	Test: MSMT 322

3. Where ends of geotextile fabric come together, they shall be overlapped, folded and stapled to prevent sediment bypass.
4. Silt Fence shall be inspected after each rainfall event and maintained when bulges occur or when sediment accumulation reached 50% of the fabric height.

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	PAGE E - 15 - 3	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

DETAIL 24 - STABILIZED CONSTRUCTION ENTRANCE



Construction Specification

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

U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE	PAGE F - 17 - 3	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

REVIEWED FOR HOWARD CO. AND MEETS TECHNICAL REQUIREMENTS
[signature] 7/28/99
SIGNATURE DATE
U.S. SOIL CONSERVATION SERVICE

THIS DEVELOPMENT PLAN IS APPROVED FOR SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT.
[signature] 7/28/99
APPROVED

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING & ZONING
[signature] 8/2/99
CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE
Cindy Hamilton 8/4/99
CHIEF, DIVISION OF LAND DEVELOPMENT DATE
[signature] 8/6/99
DIRECTOR DATE

APPLIED PHYSICS LABORATORY
THE JOHNS HOPKINS UNIVERSITY
Johns Hopkins Road Howard County, Maryland
Approved For The University By: James E Loesch
Date: 7/22/99 Title: Chief Engineer

DEVELOPER'S / BUILDER'S CERTIFICATE

"I/WE CERTIFY THAT ALL DEVELOPMENT AND CONSTRUCTION WILL BE DONE ACCORDING TO THIS PLAN OF DEVELOPMENT AND PLAN FOR EROSION AND SEDIMENT CONTROL AND THAT ALL RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF ATTENDANCE AT A DEPT. OF NATURAL RESOURCES 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 OR THEIR AUTHORIZED AGENTS, AS ARE DEEMED NECESSARY."

James E Loesch 7/22/99
SIGNATURE OF DEVELOPER/BUILDER DATE

ENGINEER'S CERTIFICATE

"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."

D. W. Wallace July 22, 1999
SIGNATURE OF ENGINEER DATE

RUMMEL, KLEPPER & KAHL, LLP
CONSULTING ENGINEERS
81 MOSHER STREET BALTIMORE, MARYLAND 21217 (410) 728-2900

DESIGNED CDK	EROSION AND SEDIMENT CONTROL NOTES AND DETAILS RESEARCH BUILDING #52	SCALE NONE
DRAWN DVW	JOHNS HOPKINS UNIVERSITY APPLIED PHYSICS LABORATORY	DRAWING 4 OF 9
CHECKED JAD	TAX MAP #41 PARCEL 123 /129 5TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND	JOB NO.
DATE 7-12-99	FOR: JOHNS HOPKINS UNIVERSITY APPLIED PHYSICS LAB 11100 JOHNS HOPKINS ROAD LAUREL, MARYLAND 20723-6099	FILE NO.

7/10/99 09:02:9 k:\projects\98-84\dgn\4of9spl.dgn (4OF9APL.PRF)

"SDP-99-63"

STORMWATER MANAGEMENT: DRY SWALE

1. PERMEABLE SOIL SPECIFICATIONS

   A. The dry swale permeable soil shall consist of a sandy loam or a loamy sand. Loamy soils may be utilized for the soil but must consist of 35% sand. In addition, the furnished soil shall be of uniform composition, free of stones, stumps, roots or similar objects larger than one inch, brush, or any other material or substance which may be harmful to plant growth, or a hindrance to planting or maintenance operations.

   B. The soil shall be free of plants or plant parts of Bermuda grass, Quack grass, Johnson grass, Mugwort, Nutsedge, Poison Ivy, Canadian Thistle or others as specified.

   C. It shall not contain toxic substances harmful to plant growth.

   D. The soil shall be tested and meet the following criteria.:

      pH range 5.5- 6.5
      Organic Matter 1.5 - 3.0%
      Magnesium - Mg 35 lbs./acre
      Phosphorus - P 0 100 lbs./acre
      Potassium - K 0 85 lbs./acre
      Soluble salts not to exceed 500 ppm

   E. The following test frequencies shall apply to the above soil constituents:

      1. pH, Organic Matter: 1 test per 90 cubic yards, but no more than 1 test per Dry Swale

      2. Magnesium, Phosphorus, Potassium, Soluble Salts:
         1 test per 500 cubic yards, but not less than 1 test per borrow source

   F. One grain size analysis shall be performed per 90 cubic yards of soil, but no less than 1 test per Dry Swale.

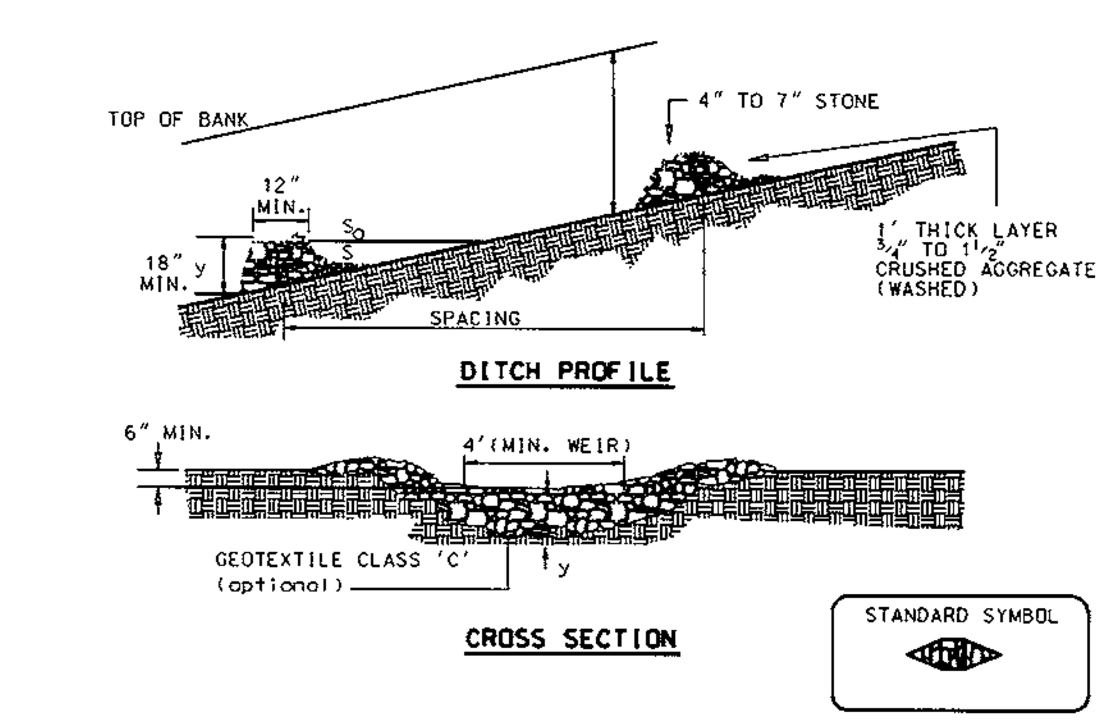
   G. All test data shall be delivered to the owner's representative prior to field installation.

2. GRAVEL SPECIFICATIONS
   The gravel shall be MSHA *57 STONE.

3. COMPACTION
   Soil shall be placed in lifts less than 18 inches and lightly compacted (minimal compactive effort) by tamping with a bucket from a dozer or backhoe.

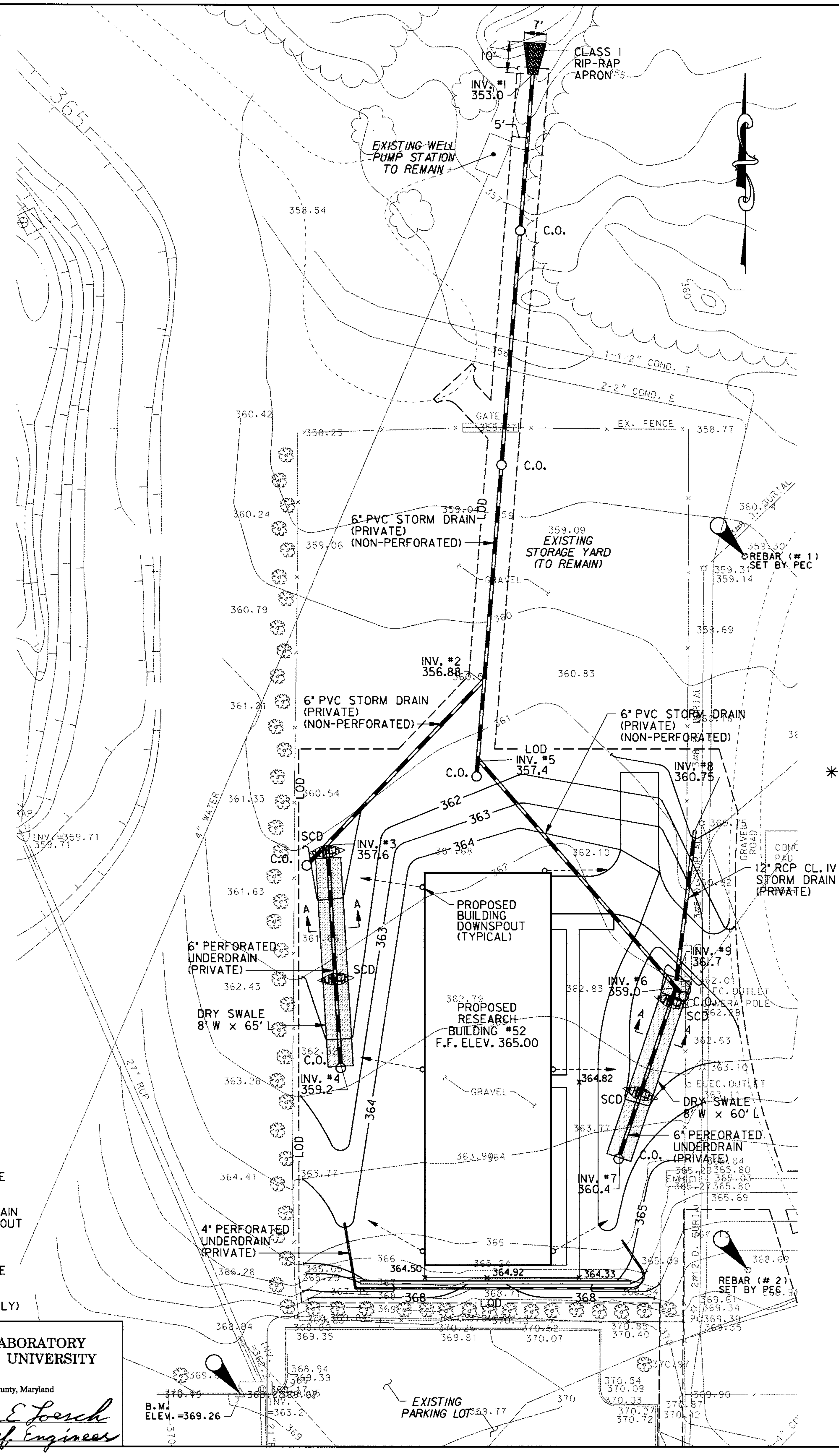
4. PVC UNDERDRAINS AND STORM PIPING
   PVC pipe shall be in accordance with MSHA Spec. 905.

DETAIL 7 - STONE CHECK DAM
(SEE NOTE 5 BELOW FOR ALTERNATE)



Construction Specifications

1. The check dam shall be constructed of 4"-7" stone. The stone shall be placed so that it completely covers the width of the channel and keyed into the channel banks.
2. The top of the check dam shall be constructed so the the center is approximately 6" lower than the outer edges, forming a weir that water can flow across.
3. The maximum height of the check dam at the center shall not exced 2'.
4. The upstream sideof the check dam shall be lined with approximately 1' of 3/4" to 1 1/2" crushed aggregate.
5. ALTERNATE: Install an earth berm permanently stabilized with seed and mulch of dimensions and locations similar to the stone check dam. The owner will make final determination of which device shall be used.

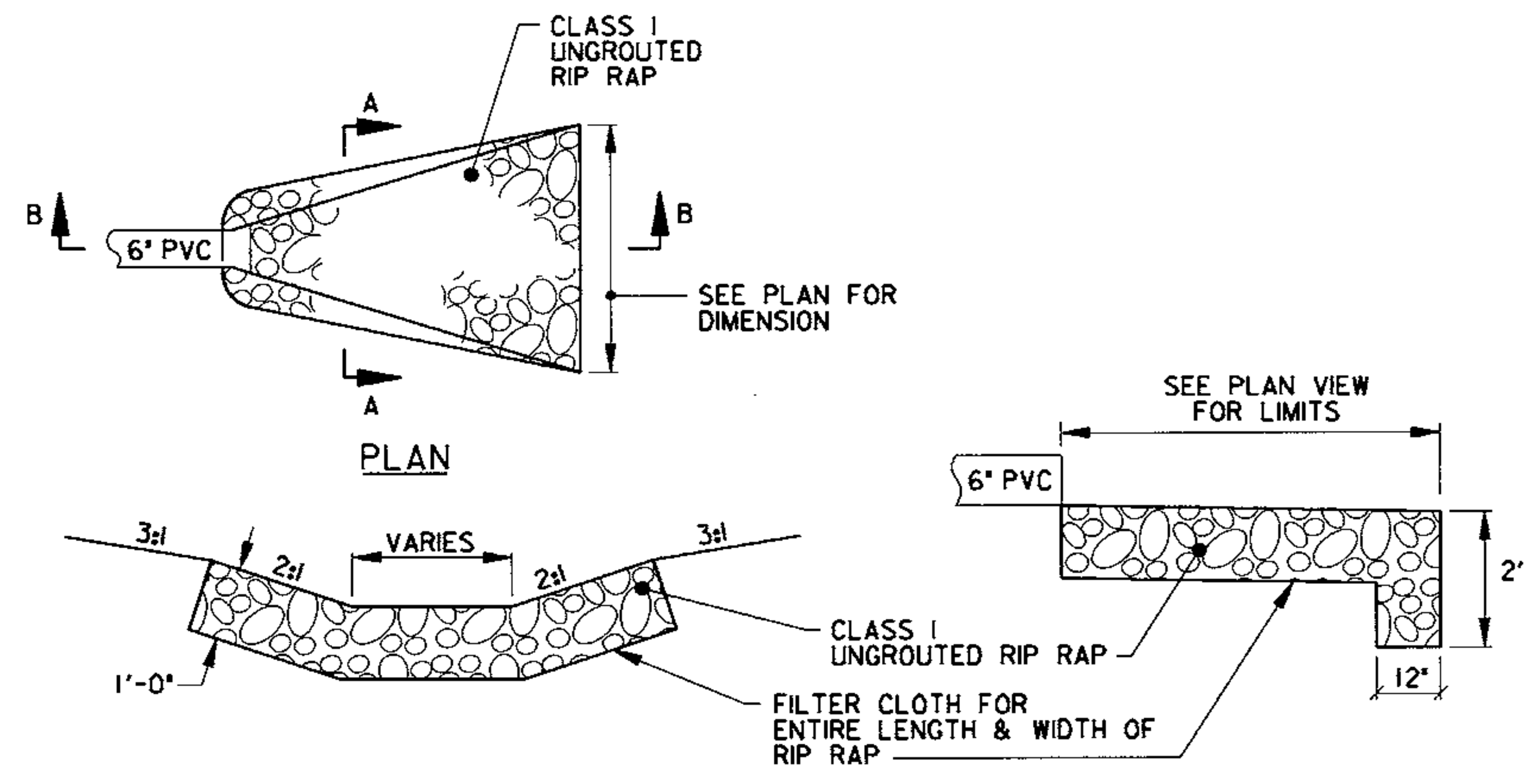


✱ STORM DRAIN COORDINATE LAYOUT		
INVERT NO.	NORTH	EAST
INV. #1	5423.0540	4980.0040
INV. #2	5229.0800	4963.8480
INV. #3	5176.7770	4914.7690
INV. #4	5107.4470	4918.6570
INV. #5	5203.6260	4962.7960
INV. #6	5131.3980	5024.5680
INV. #7	5078.4900	5007.3880
INV. #8	5181.4660	5031.1670
INV. #9	5133.8220	5025.3320

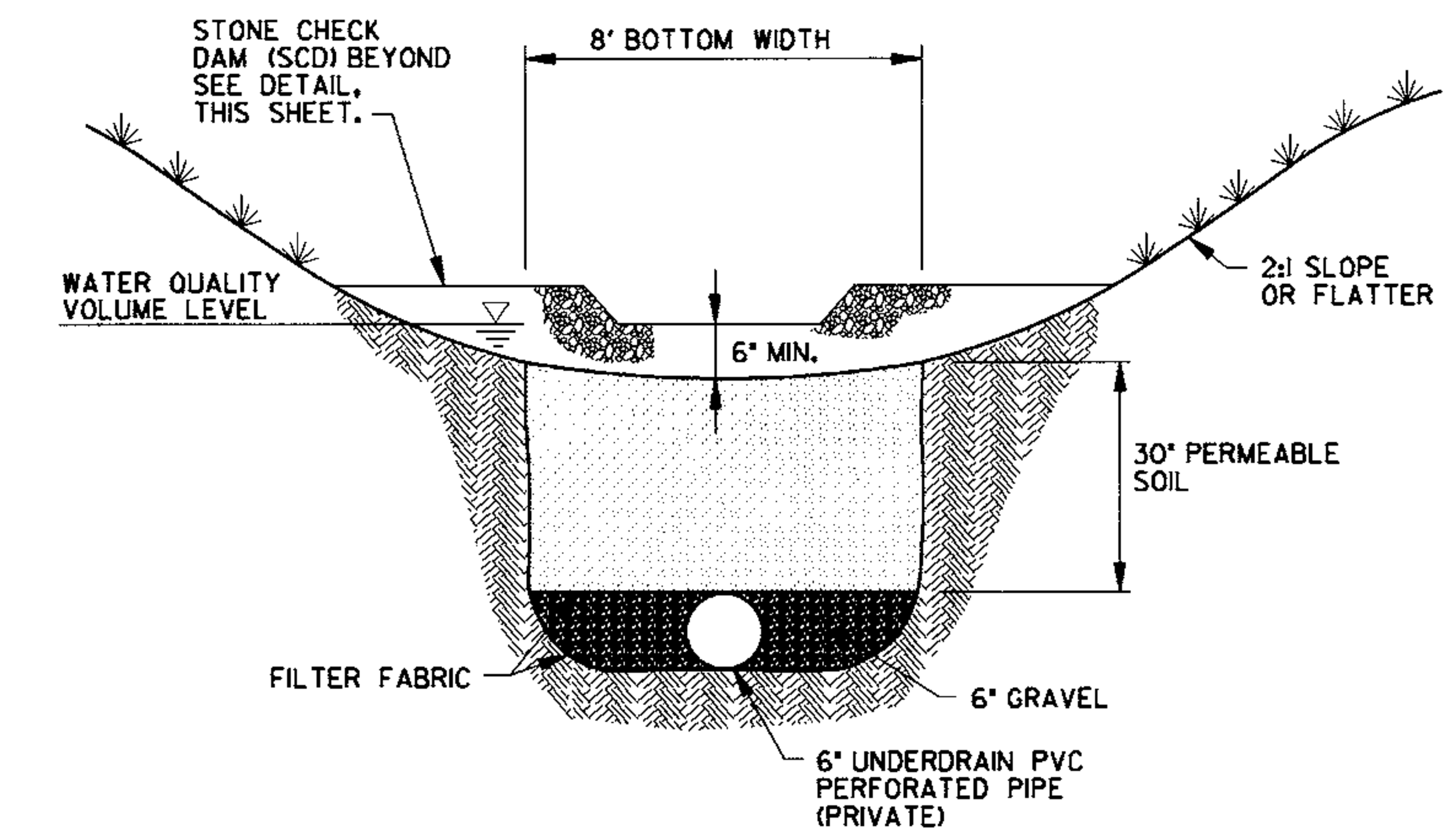
✱ NOTE:
ALL COORDINATE LOCATIONS ARE APPROXIMATE. THE CONTRACTOR SHALL STAKEOUT PROPOSED UTILITIES AND OBTAIN OWNER APPROVAL PRIOR TO INSTALLATION.

NOTES:

1. THE TOPOGRAPHIC AND UTILITY INFORMATION SHOWN HEREON, WAS OBTAINED FROM FIELD SURVEYS PERFORMED BY PROGRESSIVE ENGINEERING CONSULTANTS (P.E.C.) IN NOVEMBER 1998 AND FROM RECORDS OBTAINED FROM JOHNS HOPKINS APPLIED PHYSICS LABORATORY, AND MAY NOT REFLECT CURRENT CONDITIONS. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY CURRENT TOPOGRAPHIC AND UTILITY INFORMATION TO HIS OWN SATISFACTION.
2. THIS BASE SHEET IS BASED ON ASSUMED COORDINATES, P.E.C. HAS SET TWO REBARS ON THE EAST SIDE OF THE PROPOSED BUILDING FOR FUTURE REFERENCES. (SEE SHT. 2 OF 9 FOR COORDINATE TABLE)



UNGROUTED RIP-RAP APRON DETAIL
N.T.S.



TYPICAL DRY SWALE
SECTION A-A
N.T.S.

MAINTENANCE SCHEDULE DRY SWALE STORMWATER MANAGEMENT FACILITY (PRIVATE)	
OPERATIONS	FREQUENCY
I SUPPORT DATA: The owner shall maintain a complete up-to-date as-built plan and design specifications for the facility. Written records of maintenance and observations shall be kept.	Continuous
II INSPECTIONS: The owner will make a visual inspection of the facility, as indicated.	Every 12 months and after extreme rainfall events
MAINTENANCE	
I VEGETATION: Proper vegetation is required within the limits of the swale and its side slopes. See drawing 4 of 9 for approved permanent seed and mulch mixtures.	Continuous
II MOWING AND BRUSH REMOVAL: Mowing is necessary to control the establishment of woody growth and to maintain the vegetative cover. Maintain grass heights in the 4 to 6 inch range.	Growing season- as necessary to maintain proper grass height
III EROSION AND SLOPE PROTECTION: Inspect vegetation and repair any bare or eroded areas, as indicated. Clear and remove deposited sediment from the bottom of the swale and at check dams. Prompt repair of eroded areas is required.	Inspect in the early spring and late summer
IV UNDERDRAINS AND OUTLET: Inspect outfall pipe and dry swale underdrains for blockages, as indicated.	Every 12 months and after extreme rainfall events

LEGEND

- PROPOSED DRY SWALE
- C.O. — PROPOSED STORM DRAIN (PRIVATE) WITH CLEANOUT
- SCD — STONE CHECK DAM
- — — LOD — — LIMIT OF DISTURBANCE
- DOWNSPOUT FLOW (FOR INFORMATION ONLY)

REVIEWED FOR HOWARD CO. AND MEETS TECHNICAL REQUIREMENTS
Cheryl Simmons 7/28/99
SIGNATURE DATE
U.S. SOIL CONSERVATION SERVICE

THIS DEVELOPMENT PLAN IS APPROVED FOR SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT.
John R Robertson 7/28/99
APPROVED

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING & ZONING
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 8/2/99
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 8/4/99
DIRECTOR — DATE 8/6/99

APPLIED PHYSICS LABORATORY
THE JOHNS HOPKINS UNIVERSITY
Johns Hopkins Road Howard County, Maryland
Approved For The University By: James E. Loesch
Date: 7/22/99 Title: Chief Engineer

7/14/99 15:02:51
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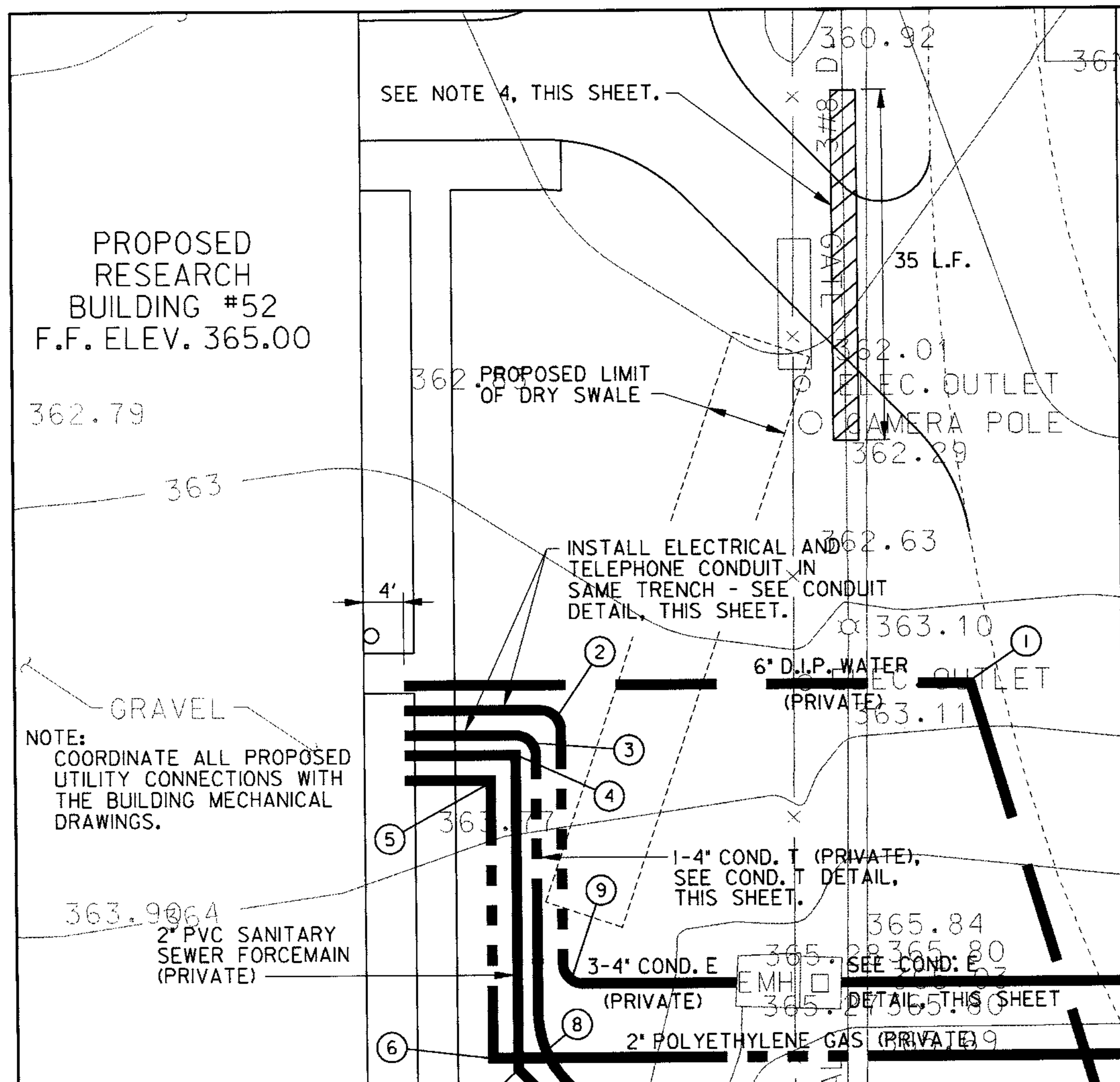
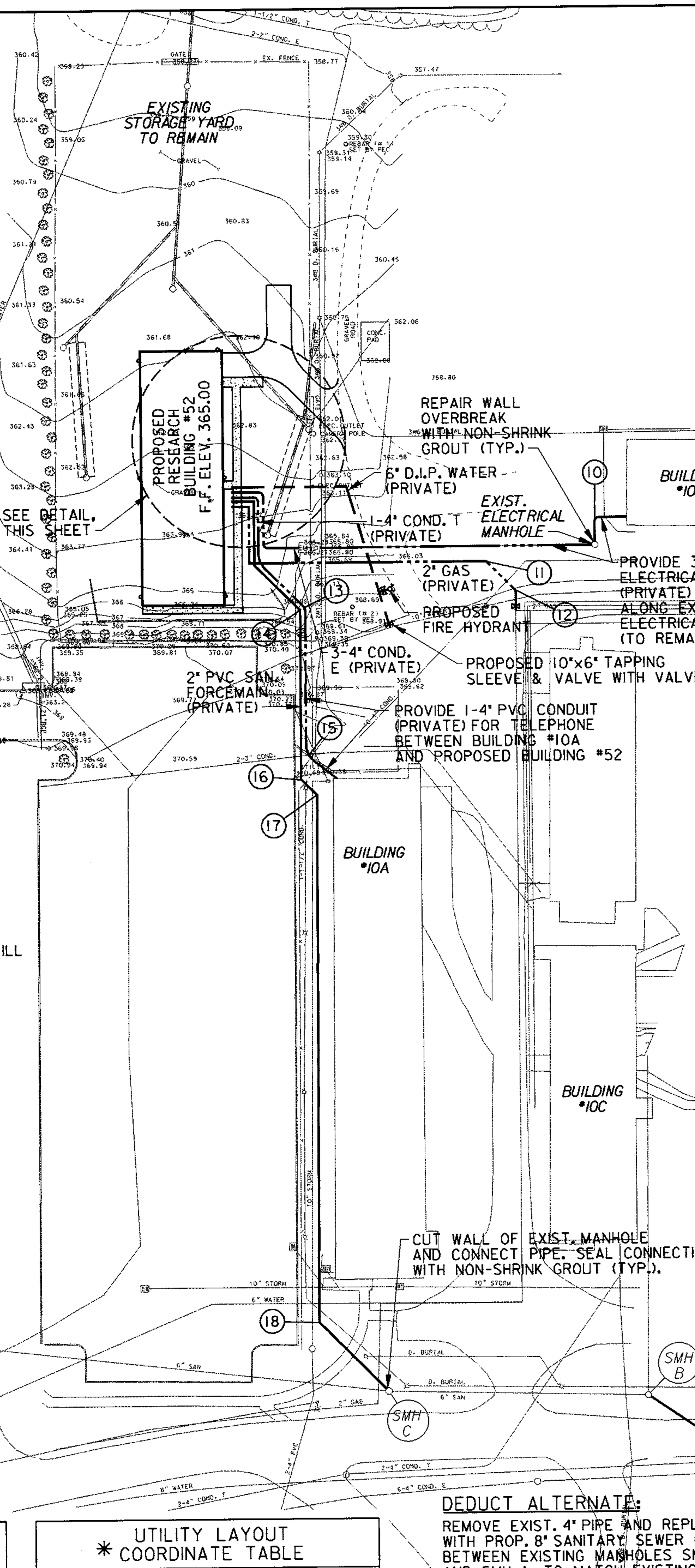
RUMMEL, KLEPPER & KAHL, LLP
CONSULTING ENGINEERS
81 MOSHER STREET BALTIMORE, MARYLAND 21217 (410) 728-2900

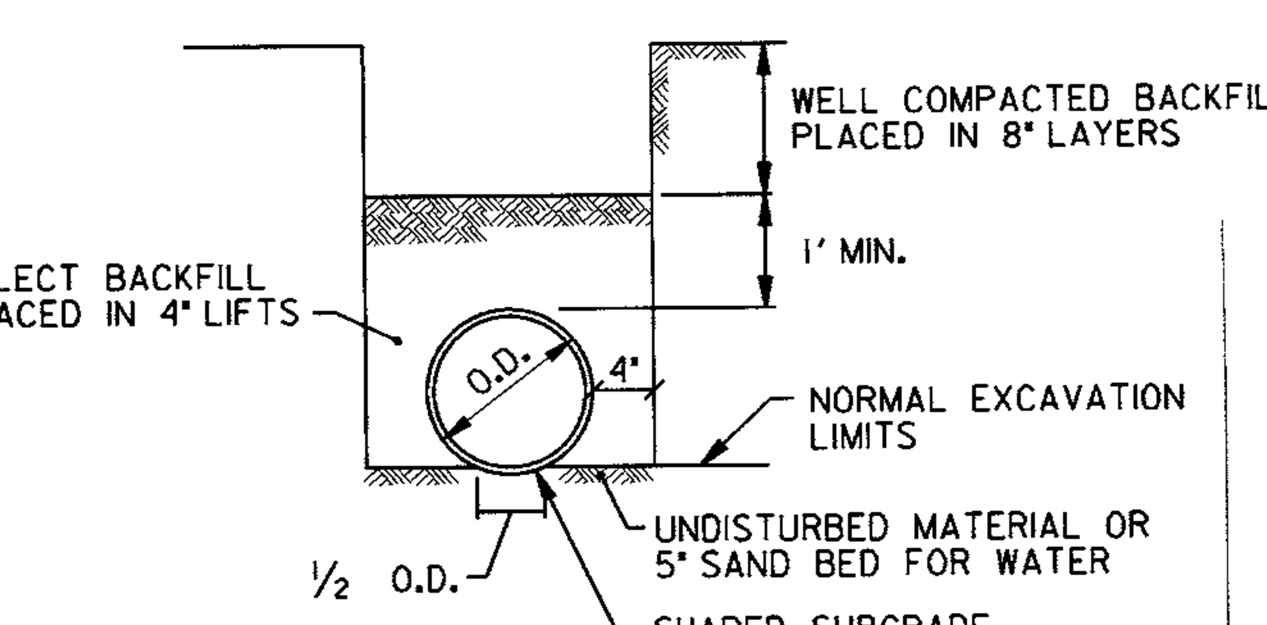
DESIGNED CDK	STORMWATER MANAGEMENT PLAN RESEARCH BUILDING #52	SCALE 1"=20'
DRAWN DVW	JOHNS HOPKINS UNIVERSITY APPLIED PHYSICS LABORATORY	DRAWING 5 OF 9
CHECKED JAD	TAX MAP #41 PARCEL 123 / 129 5TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND	JOB NO.
DATE 7-12-99	FOR: JOHNS HOPKINS UNIVERSITY APPLIED PHYSICS LAB 11100 JOHNS HOPKINS ROAD LAUREL, MARYLAND 20723-6099	FILE NO.

"SDP-99-63"



UTILITY SERVICE CONNECTION PART PLAN
SCALE: 1"= 10'

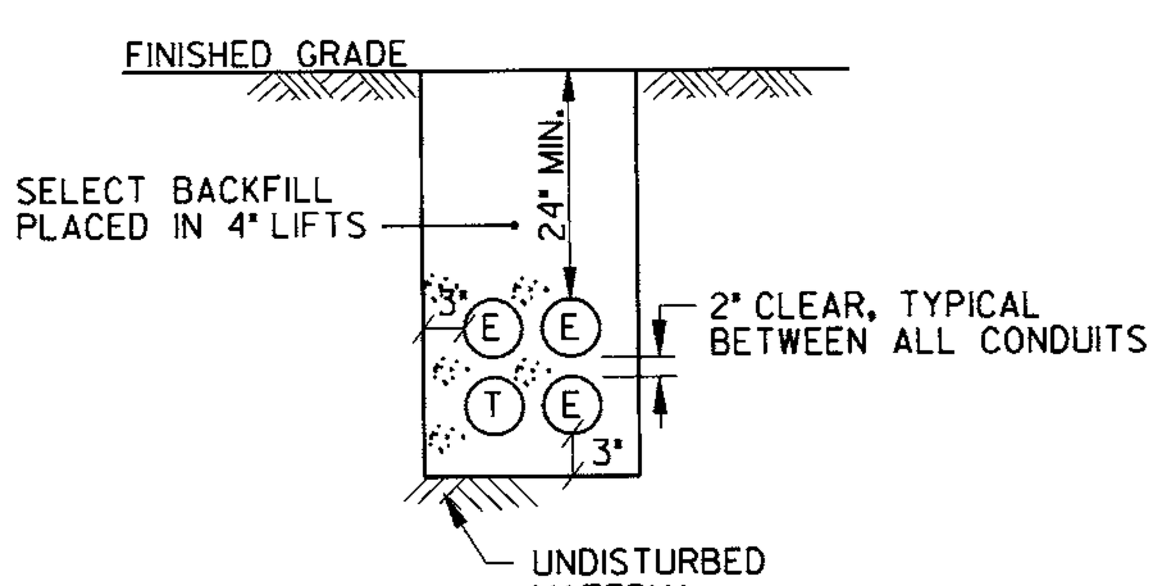




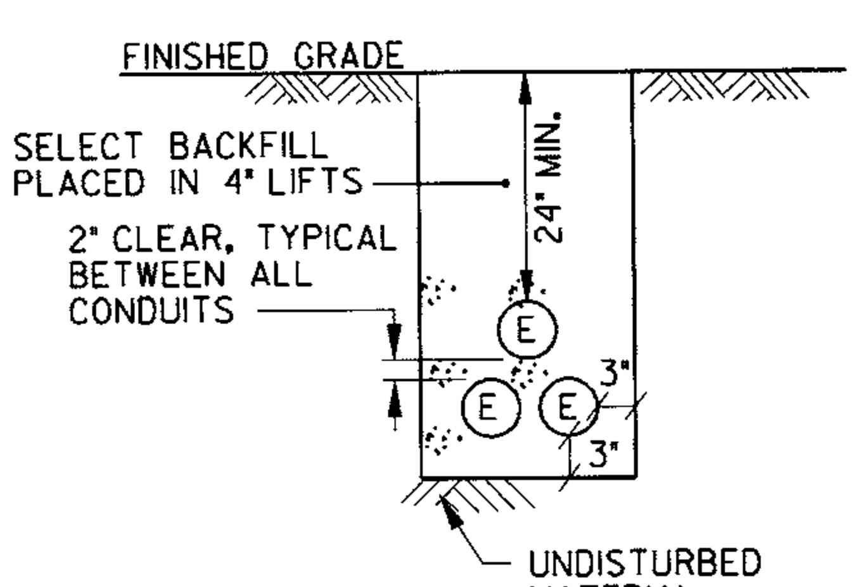
TRENCH DETAIL
(SANITARY - STORM - GAS - WATER)
NOT TO SCALE

NOTES:

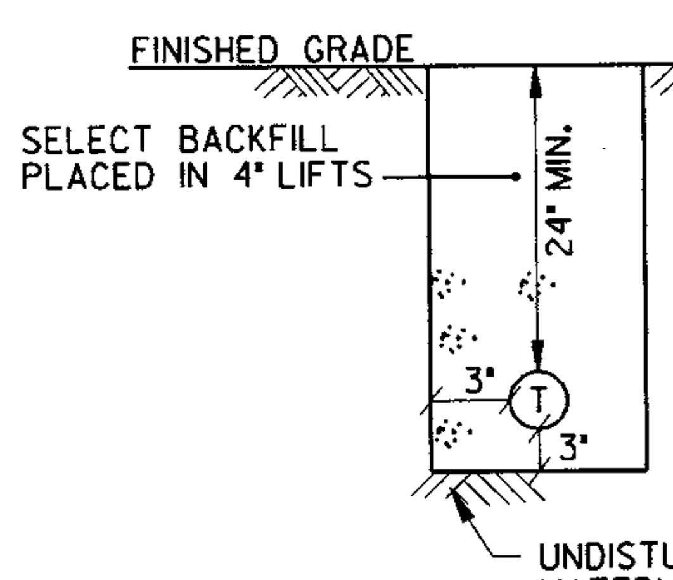
1. WITHIN PAVED AREAS, TRENCH COMPACTION DENSITY SHALL BE 95% AS DETERMINED A.A.S.H.T.O. T-180-A.
2. WITHIN LAWN AREAS, TRENCH COMPACTION DENSITY SHALL BE 80% AS DETERMINED A.A.S.H.T.O. T-180-A.



CONDUIT DETAIL
NOT TO SCALE



COND. E DETAIL
NOT TO SCALE



COND. T DETAIL
NOT TO SCALE

NOTES:

1. THE TOPOGRAPHIC AND UTILITY INFORMATION SHOWN HEREON, WAS OBTAINED FROM FIELD SURVEYS PERFORMED BY PROGRESSIVE ENGINEERING CONSULTANTS (P.E.C.) IN NOVEMBER 1998 AND FROM RECORDS OBTAINED FROM JOHNS HOPKINS APPLIED PHYSICS LABORATORY, AND MAY NOT REFLECT CURRENT CONDITIONS. IT IS THE RESPONIBILITY OF THE CONTRACTOR TO VERIFY CURRENT TOPOGRAPHIC AND UTILITY INFORMATION TO HIS OWN SATISFACTION.
2. ALL WATER MAIN CONSTRUCTION SHALL CONFORM TO THE REQUIREMENTS CONTAINED IN THE CURRENT ISSUE OF THE "HOWARD COUNTY DESIGN MANUAL, VOLUME IV, STANDARD SPECIFICATIONS AND DETAILS FOR CONSTRUCTION", ARTICLE 10, EXCEPT AS MODIFIED HEREIN:

   WATER SERVICE

   WATER MAIN SHALL BE HAVE A MINIMUM COVER OF 48 INCHES AND SHALL BE INSTALLED IN A 5" SAND BED.

   CURB BOX AND VALVES: CURB BOX SHALL BE CAST IRON, TWO PIECE FOR VALVES LESS THAN 6" AND THREE PIECES FOR LARGER VALVES.

   HYDRANTS SHALL CONFORM TO BALTIMORE CITY STANDARDS AND AS SHOWN IN DETAIL ON SHT. 7 OF 9 "UTILITY PROFILES AND DETAILS".

   GAS SERVICE

   CONTRACTOR SHALL COMPLY WITH THE REQUIREMENTS OF THE BALTIMORE GAS & ELECTRIC COMPANY AND OWNER.

   PIPE AND FITTINGS - POLYETHYLENE (SDR-11) AND AS DETERMINED BY INSTALLER TO COMPLY WITH INSTALLATION REQUIREMENTS.

   INSTALL PIPE WITH A MINIMUM COVER OF 36 INCHES.

   SANITARY SEWER

   SEE SANITARY GRINDER PUMP AND FORCEMAIN DRAWINGS (DWG'S 8 AND 9).

   STORM DRAIN

   PIPE: POLYVINYL CHLORIDE PIPE, SDR 40

3. ALL WATER AND SEWER LINES SHOWN ON THESE PLANS ARE JOHNS HOPKINS UNIVERSITY APPLIED PHYSICS LABORATORY PRIVATE SYSTEMS.
4. CONTRACTOR SHALL LOCATE EXISTING DIRECT-BURIED CABLE AND INSTALL 35 L.F. CENTERED ON BUILDING DRIVEWAY, OF 4" DIAMETER SPLIT DUCT CONDUIT SLEEVE AROUND CABLE. INSTALL PLASTIC STRAPS AT 12" O/C AND PROVIDE BULKHEADS AT EACH END OF THE SPLIT DUCT.

EXISTING UTILITY LEGEND

Symbol	Description
8" WATER	EXIST. WATER MAIN
8" SAN.	EXIST. SANITARY SEWER
12" STORM	EXIST. STORM DRAIN
6" GAS	EXIST. GAS LINE
2-4" COND. E	EXIST. CONDUIT ELECTRICAL
2-4" COND. T	EXIST. CONDUIT TELEPHONE
2-4" COND. S	EXIST. CONDUIT SECURITY
○	EXIST. MANHOLE
○	EXIST. CLEANOUT
	EXIST. CATCH BASIN
	EXIST. FIRE HYDRANT
	EXIST. LIGHT FIXTURE

PROPOSED UTILITY LEGEND

- PROP. WATER MAIN (PRIVATE)
- PROP. SANITARY SEWER (PRIVATE)
- PROP. ELECTRICAL CONDUIT (COND. E PRIVATE)
- PROP. TELEPHONE CONDUIT (COND. T PRIVATE)
- PROP. GAS MAIN (PRIVATE)
- PROP. UNDERDRAIN (PRIVATE)
- PROP. FIRE HYDRANT (PRIVATE)
- PROP. VALVE (PRIVATE)

DEDUCT ALTERNATE:

REMOVE EXIST. 4" PIPE AND REPLACE WITH PROP. 8" SANITARY SEWER (PRIVATE) BETWEEN EXISTING MANHOLES SMH-B AND SMH-A, TO MATCH EXISTING INVERT ELEVATIONS. REPLACE EXISTING BITUMINOUS PAVEMENT DAMAGED DURING THIS WORK, (SEE DETAIL SHT. 2 OF 9 FOR BITUMINOUS PAVEMENT DETAIL) BACKFILL TRENCH PER TRENCH DETAIL. STABILIZE DISTURBED AREAS WITH PERMANENT SEED AND MULCH.

* UTILITY LAYOUT COORDINATE TABLE

POINT NO.	NORTH	EAST
1	5100.5230	5045.6020
2	5004.3282	5097.4372
3	5094.9372	5001.8282
4	5093.5230	5000.4140
5	5091.0230	4997.9140
6	5063.3510	4997.9140
7	5062.2360	5000.4140
8	5064.0825	5003.1802
9	5071.3038	5005.4998

* UTILITY LAYOUT COORDINATE TABLE

POINT NO.	NORTH	EAST
10	5083.8390	5167.3405
11	5063.3510	5113.4800
12	5049.0130	5127.7840
13	5041.0320	5024.6091
14	5040.1600	5022.4900
15	4969.5012	5025.6328
16	4956.7920	5022.0860
17	4949.1760	5029.7020
18	4690.2390	5028.2990

* NOTE:
ALL COORDINATE LOCATIONS ARE APPROXIMATE. THE CONTRACTOR SHALL STAKEOUT PROPOSED UTILITIES AND OBTAIN OWNER APPROVAL PRIOR TO INSTALLATION.

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING & ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION	DATE 8/4/99
CHIEF, DIVISION OF LAND DEVELOPMENT	DATE 8/4/99
DIRECTOR	DATE 8/6/99

APPLIED PHYSICS LABORATORY
THE JOHNS HOPKINS UNIVERSITY
Johns Hopkins Road Howard County, Maryland
Approved For The University By: James E. Loesch
Date: 7/22/99 Title: Chief Engineer

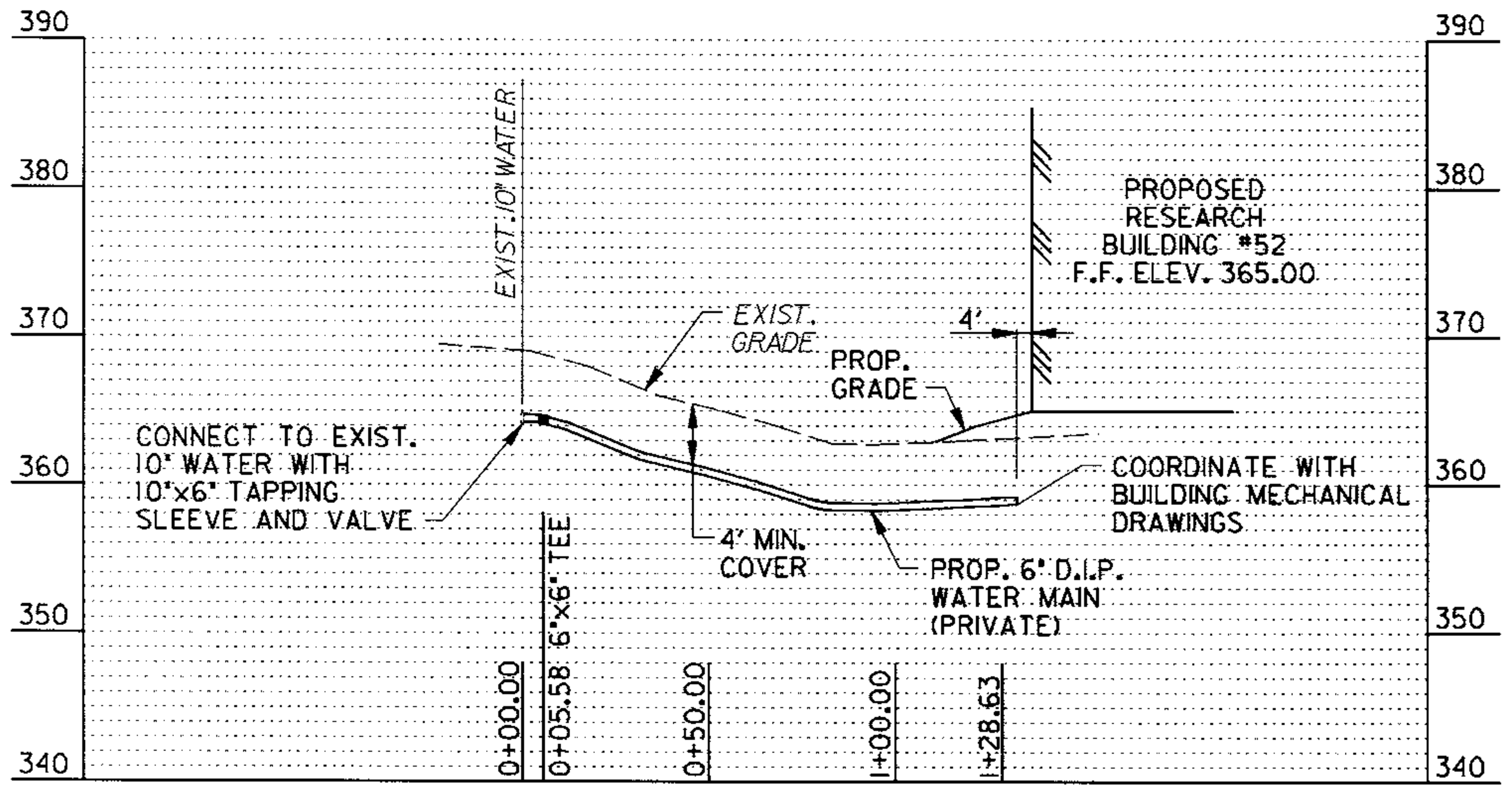
REVIEWED FOR HOWARD CO. AND MEETS TECHNICAL REQUIREMENTS
SIGNATURE DATE
U.S. SOIL CONSERVATION SERVICE

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

RK&K
RUMMEL, KLEPPER & KAHL, LLP
CONSULTING ENGINEERS
81 MOSHER STREET BALTIMORE, MARYLAND 21217 (410) 728-2900

DESIGNED CDK	UTILITY COMPOSITE PLAN RESEARCH BUILDING #52	SCALE 1"=40'
DRAWN DVW	JOHNS HOPKINS UNIVERSITY APPLIED PHYSICS LABORATORY	DRAWING 6 OF 9
CHECKED JAD	TAX MAP #41 PARCEL 123 /129 5TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND	JOB NO.
DATE 7-12-99	FOR: JOHNS HOPKINS UNIVERSITY APPLIED PHYSICS LAB 11100 JOHNS HOPKINS ROAD LAUREL, MARYLAND 20723-6099	FILE NO.

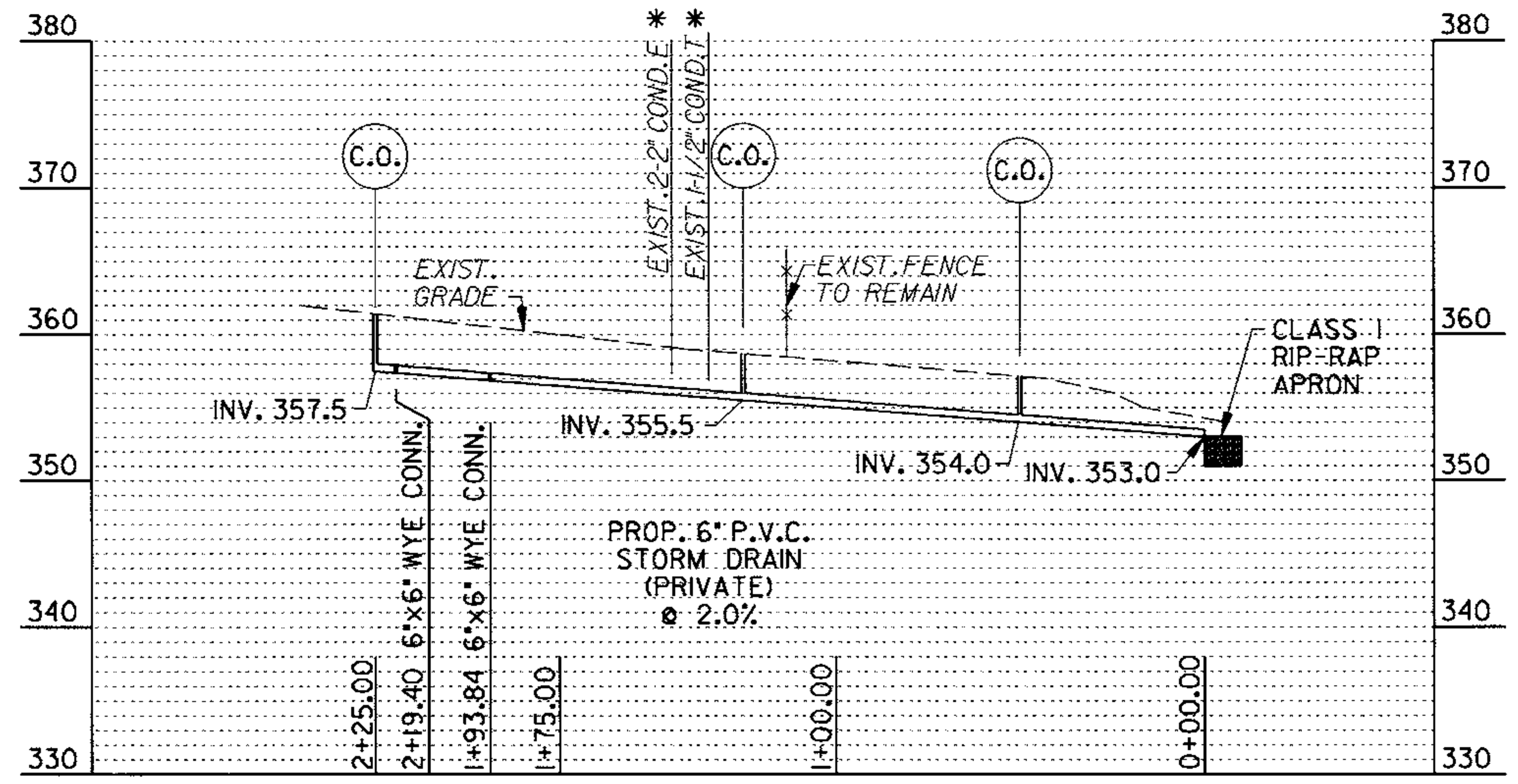
"SDP-99-63"



PROFILE: 6" D.I.P. WATER MAIN (PRIVATE)

HORZ.: 1"=40' 20 0 20 40

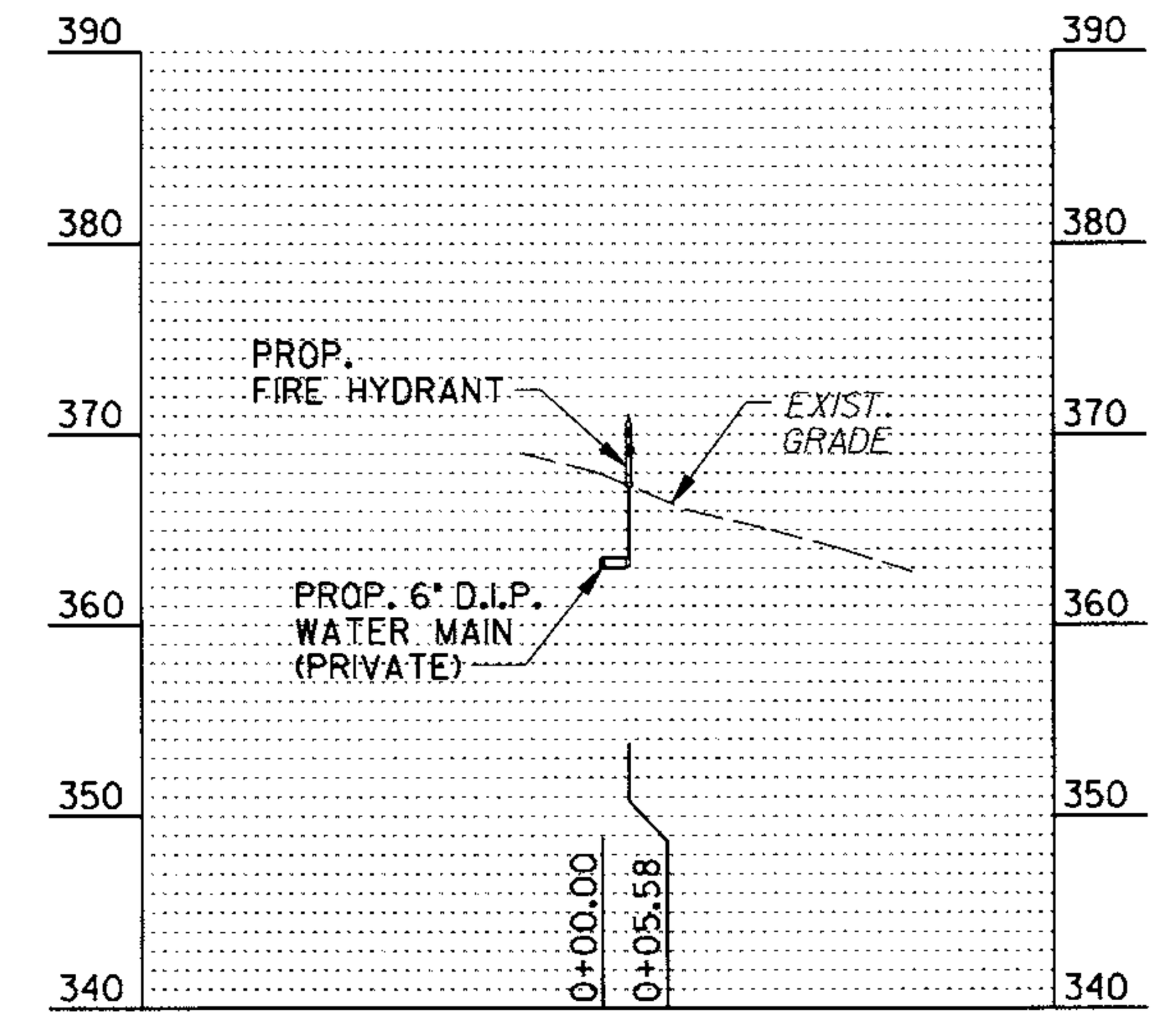
VERT.: 1"=10' 5 0 5 10



PROFILE: 6" P.V.C. STORM DRAIN (PRIVATE)

HORZ.: 1"=40' 20 0 20 40

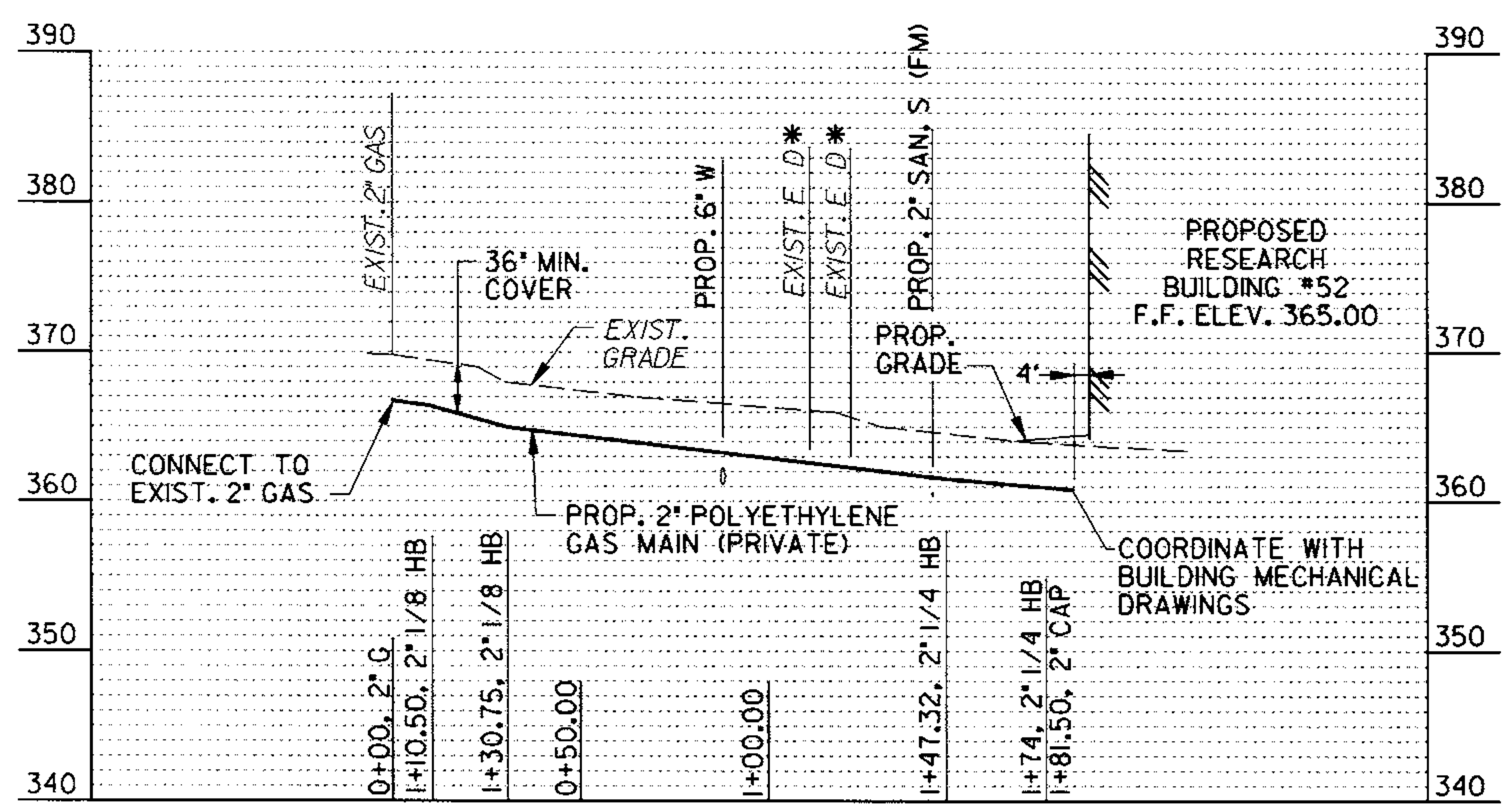
VERT.: 1"=10' 5 0 5 10



PROFILE: 6" D.I.P. WATER MAIN (PRIVATE)

HORZ.: 1"=40' 20 0 20 40

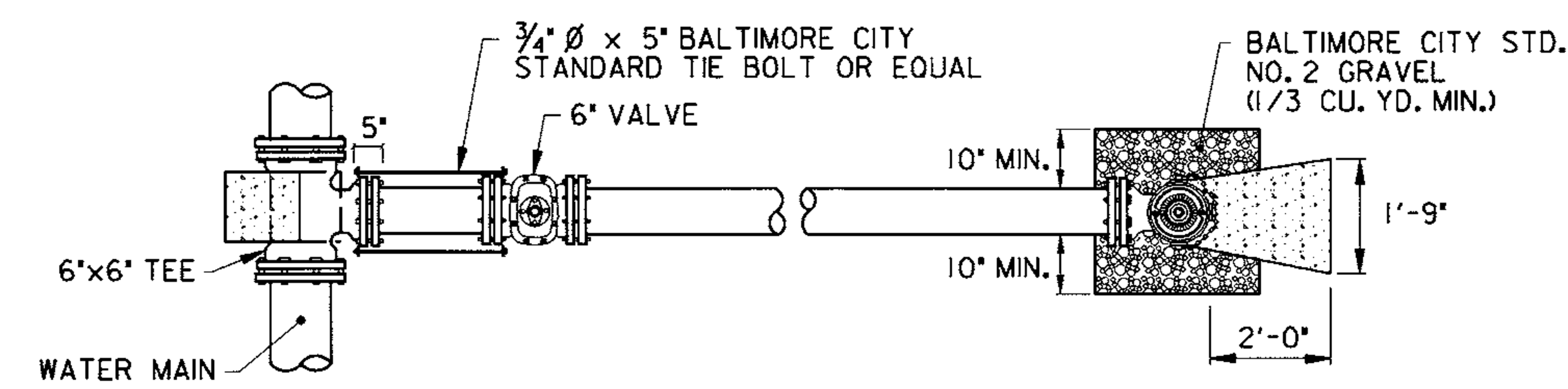
VERT.: 1"=10' 5 0 5 10



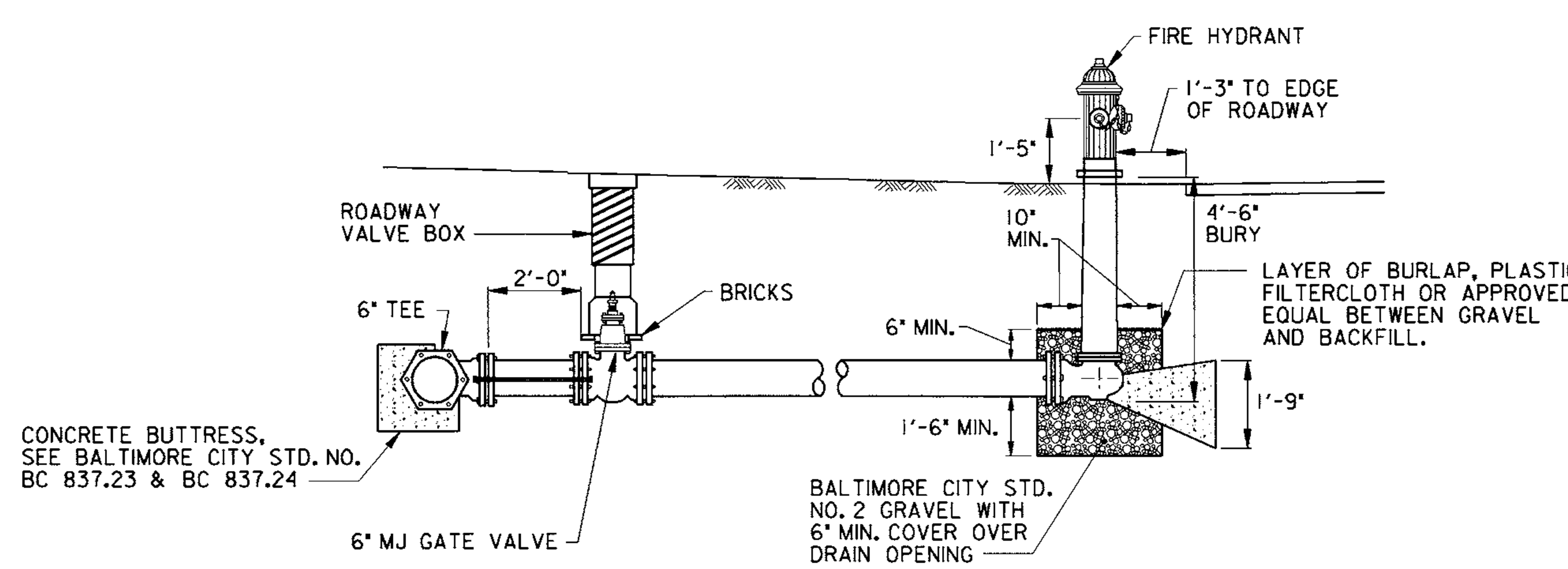
PROFILE: 2" POLYETHYLENE GAS MAIN (PRIVATE)

HORZ.: 1"=40' 20 0 20 40

VERT.: 1"=10' 5 0 5 10



PLAN



ELEVATION

FIRE HYDRANT INSTALLATION

NOT TO SCALE

NOTES:
1. CONCRETE SHALL BE BALTIMORE CITY STD MIX NO. 3.
2. BALTIMORE STANDARD FIRE HYDRANT HAS A 4'-6" BURY, ANY VERTICAL ADJUSTMENT SHALL BE MADE USING BALTIMORE STANDARD FIRE HYDRANT EXTENSION PIECES.

* CONTRACTOR TO LOCATE EXISTING UTILITIES AT CROSSINGS.

REVIEWED FOR HOWARD CO. AND MEETS TECHNICAL REQUIREMENTS
Cheryl Simmons 7/28/99
SIGNATURE DATE
U.S. SOIL CONSERVATION SERVICE

THIS DEVELOPMENT PLAN IS APPROVED FOR SOIL EROSION AND SEDIMENT CONTROL BY THE HOWARD SOIL CONSERVATION DISTRICT.
John R. Robertson 7/28/99
APPROVED

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING & ZONING
CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 8/4/99
CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 8/4/99
DIRECTOR — DATE 8/6/99

APPLIED PHYSICS LABORATORY
THE JOHNS HOPKINS UNIVERSITY
Johns Hopkins Road Howard County, Maryland
Approved For The University By: James E. Lusch
Date: 7/22/99 Title: Chief Engineer

RUMMEL, KLEPPER & KAHL, LLP
CONSULTING ENGINEERS
81 MOSHER STREET BALTIMORE, MARYLAND 21217 (410) 728-2900

DESIGNED CDK	UTILITY PROFILES AND DETAILS RESEARCH BUILDING #52	SCALE AS NOTED
DRAWN DWW	JOHNS HOPKINS UNIVERSITY APPLIED PHYSICS LABORATORY	DRAWING 7 OF 9
CHECKED JAD	TAX MAP #41 PARCEL 123 / 129 5TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND	JOB NO.
DATE 7-12-99	FOR: JOHNS HOPKINS UNIVERSITY APPLIED PHYSICS LAB 11100 JOHNS HOPKINS ROAD LAUREL, MARYLAND 20723-6099	FILE NO.

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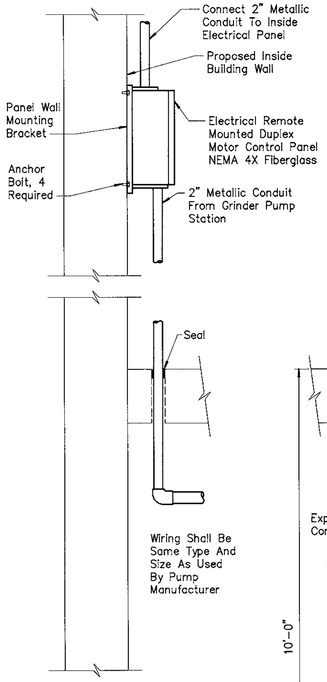
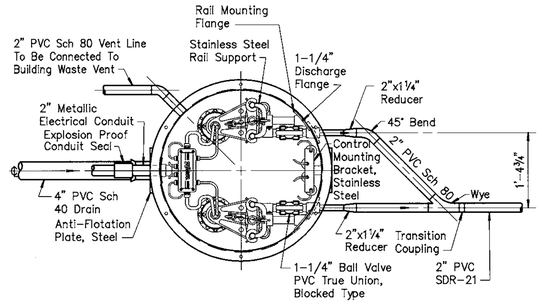
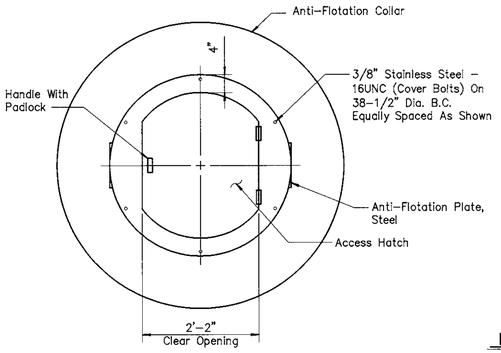




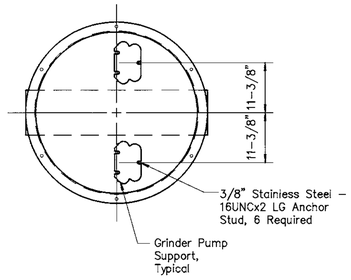
DUPLEX GRINDER PUMP STATION
PLAN – TOP HATCH REMOVED

Scale: ¾" = 1'-0"



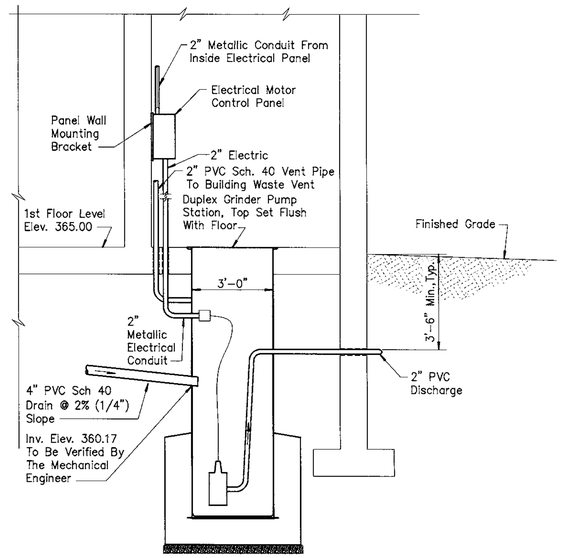
DUPLEX GRINDER PUMP BASIN – PLAN

Scale: ¾" = 1'-0"



DUPLEX GRINDER PUMP BASIN
PLAN – BOTTOM RAILING ANCHOR LAYOUT

Scale: ¾" = 1'-0"

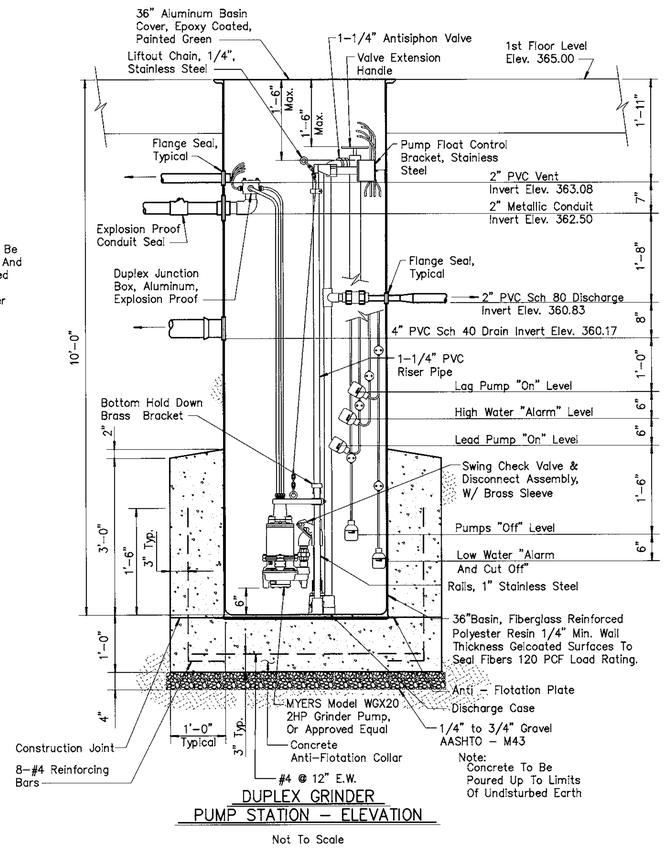


GRINDER PUMP INSTALLATION – ELEVATION

Not To Scale

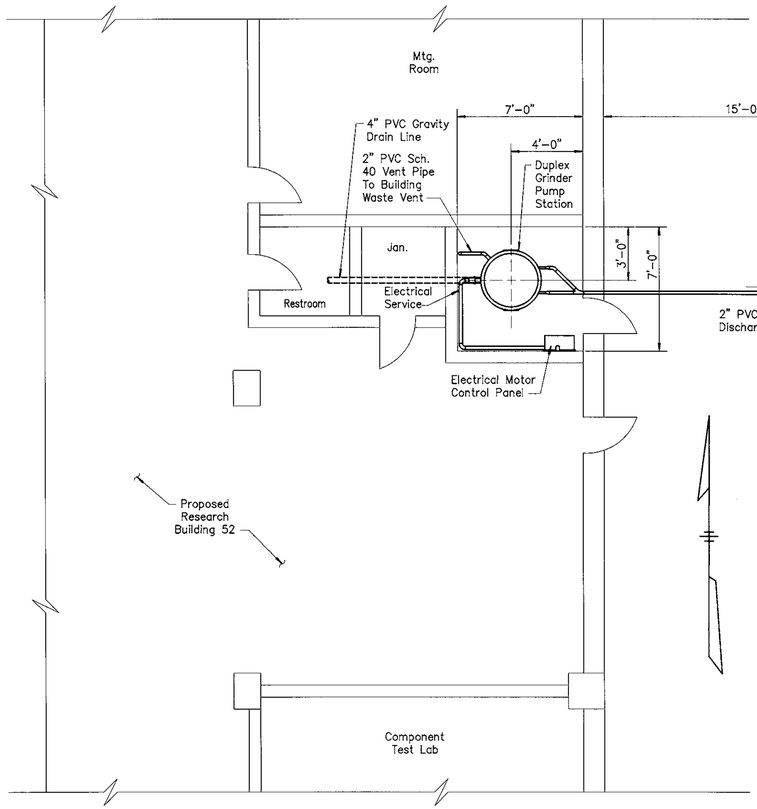
GENERAL NOTES

1. Contractor Shall Verify All Dimensions Before Proceeding With The Work.
2. The Contractor Shall Install The Motor Control Panel In The Proposed Research Building 52 Including The 2 Inch Metallic Conduit And The Wiring From The Grinder Pump Station As Shown.
3. The Contractor Shall Verify The 4-Inch Drain Invert Elevation Before Ordering Or installation Of The Grinder Pump Station.



DUPLEX GRINDER
PUMP STATION – ELEVATION

Not To Scale



GRINDER PUMP INSTALLATION – PLAN

Scale: ¼" = 1'-0"

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING & ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION — DATE 8/2/99

CHIEF, DIVISION OF LAND DEVELOPMENT — DATE 7/14/99

DIRECTOR — DATE 8/6/99

APPLIED PHYSICS LABORATORY
THE JOHNS HOPKINS UNIVERSITY

Johns Hopkins Road Howard County, Maryland

Approved For The University By: James E. Lesch
Date: 7/22/99 Title: Chief Engineer

RUMMEL, KLEPPER & KAHL, LLP
CONSULTING ENGINEERS
81 MOSHER STREET BALTIMORE, MARYLAND 21217 (410) 728-2900

DESIGNED CDR	SANITARY SEWER GENERAL PLAN RESEARCH BUILDING #52	SCALE As Shown
DRAWN DCJ	JOHNS HOPKINS UNIVERSITY APPLIED PHYSICS LABORATORY	DRAWING 8 Of 9
CHECKED MWM	TAX MAP #41 PARCEL 123 / 129 5TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND	JOB NO. X
DATE 7-12-99	FOR: JOHNS HOPKINS UNIVERSITY APPLIED PHYSICS LAB 11100 JOHNS HOPKINS ROAD LAUREL, MARYLAND 20723-6099	FILE NO. X

STATE OF MARYLAND — DAVID W. WATKINS — No. 10803 — REGISTERED PROFESSIONAL ENGINEER

"SDP-99-63"

TECHNICAL SPECIFICATIONS
SPECIAL PROVISIONS

I INTRODUCTION

Unless Otherwise Noted, All Work Required By The Contract Documents Shall Be In Accordance With One Of The Following:

Howard County Standard Specifications And Details For Construction, Latest Publication Of Volume IV.

Maryland Department Of Transportation State Highway Administration's "Book Of Standards For Highway And Incidental Structures" And Standard Specifications For Construction And Materials" Dated October, 1993, And Companion Manual, "General Provisions For Construction Contracts", Revisions Thereof And Additions Thereto, Hereinafter Referred To As The "MDSHA Specifications".

II EROSION AND SEDIMENT CONTROL

All Erosion And Sediment Control Practices Shall Be In Accordance With The Requirements Of The Maryland Department Of The Environment, Water Management Administration, 1994 Maryland Standards And Specifications And The Contract Drawings.

III REGULATORY REQUIREMENTS

A. As Per Article 1, Section 107.06 Of Howard County Standard.

B. As Per Occupational Safety And Health Administration (OSHA) 29 CFR 1910.

C. As Per COMAR 09.12.35 Of The Code Of Maryland Regulations – Maryland Occupational Safety And Health Standard For Confined Spaces.

IV PUMP STATION

General – Furnish And Install A Fully Assembled, 2 Horsepower Duplex Explosion–Proof Grinder Pump 36 Inch Basin Package Consisting Of Two (2) Grinder Pumps And Motors, Basin Assembly, Internal Discharge Piping, Check Valves, Shut–Off Valves, Quick Disconnect Slide Rail Systems, Lift Chains, Five (5) Level Controls, Stainless Steel Level Control Bracket, Junction Box, Inlet Fitting, Remote Control Panel And Any Incident Components Not Specifically Named Herein To Provide A Complete Assembly And Remote Control Panel. All Equipment Shall Be Factory Installed Except For Grinder Pumps, Inlet Fitting, And Externally Mounted Control Panel, As Manufactured By – F.E. Myers Pump, Model WGX20, Or Approved Equal.

Basin – The Basin Shall Be 36" Diameter With 10 Foot Depth As Shown In The Plans. The Basin Shall Be Molded Of Fiberglass Reinforced Polyester Resin. The Basin Shall Have A Minimum Wall Thickness Of 1/4 Inch. A Steel Anti–Flotation Plate Shall Be Molded Into The Bottom Of The Basin.

Basin Cover – One–Piece, Solid Basin Covers Shall Be Provided With A Hinged Access Opening Properly Sized For Pump Installation And Removal As Shown On The Plans. The Access Opening Shall Have A Minimum Of Two (2) Hinges And A Lock Hasp. Covers Shall Be Constructed Of Non–Skid, Aluminum Plate With A Minimum Thickness Of 1/4 Inch, Reinforced To Withstand 300 P.S.F Live Load And Shall Be Bolted To The Basin With Stainless Steel Cap Screws. Stainless Steel Nuts Shall Be Embedded In The Upper Flange Of The Fiberglass Basin For Corrosion Resistance And To Prevent Turning. The Cover Shall Have A Non–Corroding Padlock With Three (3) Keys.

Rail Assemblies – The Lift–Out Stainless Steel Rail System Assemblies Shall Permit Easy Removal And Installation Of The Pumps And Lower Check Valves Without The Necessity Of Personnel Entering The Wetwell. Bronze Guide Brackets With Guide Yokes Of Sufficient Bearing Strength To Prevent Binding Shall Bolt To The Pump. The Yokes Shall Mate Over Guide Rails Of A Minimum Of 1 Inch Stainless Steel Pipe Running Between An Upper Rail Support And The Discharge Case. A Lower Discharge Nozzle, Downstream From The Check Valve , Shall Be Guided Into A Chamfered Cavity In The Discharge Case. A Shoulder On The Nozzle Shall Bottom On The Discharge Case To Insure Alignment For A Leak Tight Seal. Dual "O" Rings Shall Effect A Hydraulic Seal Around The Nozzle When It Is In Its Operating Position. A Brace, Easily Removable From The Top Of The Wetwell, Shall Be Provided To Lock The Parts Together And To Prevent Line Surges From Breaking The Seal And Allowing Leakage. The Discharge Case Shall Have A Discharge Opening For Installation Of Discharge Piping.

The Discharge Cases Shall Be Securely Bolted To The Floor Of The Wetwell So That Slight Deflection Caused By The Discharge Piping Will Not Cause The Quick–Connect Pump Flange To Leak. All Bolts Shall Be Stainless Steel. All Guides, Brackets And Hold Downs Shall Be Non–Sparking Bronze Construction. The Lift–Out Rail System Shall Be Listed For Explosion–Proof Service.

Check Valves – A Heavy Duty Spring Loaded All Rubber Flapper Type Check Valve With Cast Iron Body Shall Be An Integral Part Of The Discharge Seal Assemblies And Lift Out With The Pump Assemblies. The Valve Shall Be Designed To Allow For Operation When Negative Heads Up To 5 Feet Are Encountered. The Valves Shall Be Designed To Operate At All Pressures Created By The Grinder Pumps.

A Flat Stainless Steel Spring, Internally Mounted In The BUNA N Rubber Flapper, Shall Be Furnished In Order To Prevent Collection Of Debris In The Check Valve. All Fasteners Shall Be Stainless Steel.

Discharge Piping – Schedule 80 PVC Discharge Piping Shall Connect To The Stationary Discharge Base Lift Assemblies And Terminate At A 1–1/4" Discharge Flange Mounted On The Basin At The Height Shown In The Plans. The Discharge Flange Shall Have A 2" PVC Solvent Weld Socket Type Hub For Attaching External Discharge Piping.

Shut Off Valves – PVC True Union Ball Type Shut Off Valves With Teflon Seats Shall Be Furnished As An Integral Part Of The Internal Pipe Assembly. The Valves Shall Have Surface Extension Handles To Extend To Within 1 Foot Of The Basin Cover.

Inlet Fitting – A One–Piece Inlet Fitting For 4" Schedule 40 PVC Shall Be Shipped Loose For Field Installation As Required By The Installation.

Junction Box – The Junction Box Shall Be Constructed Of Thermoplastic ABS With An "O" Ring Sealed Cover To Provide A Water Tight Seal. An Adequate Number Of Sealing–Type Cord Grips Shall Be Supplied For Incoming Pump And Level Controls Cords. The Cord Grips Shall Be Nylon Waterlight With Strain Relief Connectors Around The Wire Jacket. The Cord Grips Shall Be Threaded Directly Into Tapped Mating Holes In The Junction Box Body To Provide An Effective Seal.

The Junction Box Shall Have A Cast–In Conduit Of Adequate Size To Accommodate The Number Of Wires Required For Pump And Level Control Operation. A Method For Sealing The Incoming Wires Shall Be Supplied So That Condensation From The Conduit Or Groundwater Will Not Enter The Junction Box Enclosure. The Sealing Method Shall Be Offered As A Kit Containing All Necessary Material Required For An Effective In Field Seal. The Interior Of The Enclosure Shall Be Of Adequate Size To Accommodate The Wires And Connections For Pump And Level Control Operation.

The Wires Running Between The Control Panel And The Junction Box In 2" Metallic Conduit Shall Be Color–Coded And Fastened To The Pump And Level Controls By Means Of Adequately Sized And Insulated Twist Lock Or Crimp Connectors. The Conduit Shall Have A Explosion Proof Conduit Seal To Prevent Gasses From The Grinder Pump Basin Entering The Control Panel. Provide Metallic Conduit.

The Junction Box Assembly Shall Be Listed By UL For Class 1, Group D Explosion–Proof Service.

Level Controls – Pump On, Off And Alarm Levels Shall Be Controlled By Five (5) Mercury Tube Float Switches. Switches Shall Consist Of A Mercury Tube Switch Sealed In A Corrosion–Resistant Polypropylene Housing With A Minimum Of 18 Gauge, 2–Wire, SJOW/A Jacketed Cable. The Cable Shall Be A Sufficient Length To Reach The Junction Box With No Splices. The Level Controls Shall Be Suspended From A Stainless Steel Bracket So That Adjustment Or Replacement May Be Done Without The Use Of Any Tools. Level Controls Shall Be UL/CSA Listed. The Fifth Level Control Shall Be Supplied For Redundant Off/Low Water Alarm.

THREE–PHASE (3 PH) DUPLEX CONTROL PANEL

A NEMA 4X Fiberglass Control Panel Shall Be Furnished With Each Pumping Unit To Be Installed, As Shown On The Plans. Three–Phase 4 Wire 480 Voltage.

The Control Panel Enclosure Shall Be Molded Of Glass Reinforced Polyester Resins Which Are Chemically Resistant To Corrosive Atmospheres. The Resin System Shall Be Pigmented To Impart A Gray Color To The Enclosure And Be Resistant To Ultraviolet Light.

The Resin System Also Shall Include A Flame Retardant To Obtain A Flammability Rating Which Meets U.L. 94V–0. Heat Distortion Temperature Shall Be 350 Degrees Fahrenheit.

The Enclosure Shall Be Of One Piece, Weatherproof Construction With Smooth, Rounded Corners And Shall Be Constructed To Have A Smooth Exterior And Interior. The Enclosure Shall Be Fitted With A Closed Cell Neoprene Gasketed Cover. The Enclosure Shall Be Provided With Back Panel Mounting Provisions.

The Cover Shall Be Hinged With A Heavy Duty Corrosion Resistant Stainless Steel Piano Hinge. The Cover Shall Be Lockable By Means Of Two (2) High Quality Combination Stainless Steel Latches And Padlock Hasps With Three (3) Keys.

The Back Panel Shall Be A Minimum Of .080" Aluminum And Helped In Place By Four (4) #10 Stainless Steel Screws, Which Will Mate To Four (4) Threaded Standoffs, Which Are Molded Into The Enclosure.

The Panel Shall Include Pump Circuit Breakers, Alarm Circuit Fuse, Alarm Silence Switch, Control Circuit Fuse, I.E.C. Rated Motor Starters With 3–Pole Ambient Compensated Bimetal Overload Relays, Pump Hand–Off Auto Switches (Momentary In The Hand Position), Pump Run Lights, Seal Leak Lights, Control Transformer With Primary Fusing, Alternator Relay (Solid State), Override Relay, Terminal Blocks, Two (2) Ground Lugs, 1–Alarm Horn, Elapsed Time Meter, Cycle Counter, Condensation Heater, Convenience Outlet (E1), And All Necessary Wiring And Brackets.

The Alarm Shall Sound For The High Water Or Lead Pump Start Up Failure And Low Water Conditions. The Alarm Horn Will Be Silenced When The High Water Level Drops Or Low Water Has Risen.

All Internal Wiring Shall Be Neat And Color Coded. Each Wire Shall Be A Different Color Stripe (Except For Ground), And All Incoming Wires Shall Terminate Into A Box Clamp Type Terminal Block (Except Incoming Power). All Wires Shall Be 14Ga. Type TEW Rated For 105 Degrees Celsius.

A Schematic Diagram (Showing Wire Color) Shall Be Permanently Fastened To The Inside Of The Enclosure. An Installation, Operation And Service Manual Shall Be Also Included With Each Control Panel.

The Control Panel Shall Be U.L. Listed As An Assembly.

EXPLOSION PROOF GRINDER PUMPS

Pump Model – Pump Shall Be Of The Centrifugal Type Myers Model WGX20 2 Horsepower Or Approved Equal With An Integrally Built In Grinder Unit And Submersible Type Motor. The Grinder Unit Shall Be Capable Of Macerating All Material In Normal Domestic And Commercial Sewage Including Reasonable Amounts Of Foreign Objects Such As Small Wood, Sticks, Plastic, Thin Rubber, Sanitary Napkins, Disposable Diapers And The Like To A Fine Slurry That Will Pass Freely Through The Pump And 1–1/4" Discharge Pipe. Pump And Motor Assembly Shall Be UL Listed For Class 1, Group D Explosion–Proof Service.

Operating Conditions – Each Pump Shall Have A Capacity Of 35 GPM At A Total Head Of 25 Feet And Shall Use A 2Hp Motor Operating At 3450 RPM.

Motor – Each Pump Motor Shall Be Of The Submersible Type Rated 2 Horsepower At 3450 RPM. Motor Shall Be For 4 Wire, Three Phase, 480 Volt Motors Shall Be NEMA B Type.

Stator Winding Shall Be Of The Open Type With Class B Insulation Good For 130 Degrees C (266 Degrees F) Maximum Operating Temperature. Winding Housing Shall Be Filled With A Clean High Dielectric Oil That Lubricates Bearings And Seals And Transfers Heat From Windings And Rotor To Outer Shell. Air–Filled Motors Which Shall Not Be Considered Equal.

Motor Shall Have Two Heavy Duty Ball Bearings To Support Pump Shaft And Take Radial And Thrust Loads And A Sleeve Guide Bushing Directly Above The Lower Seal To Take Radial Load And Act As Flame Path For Seal Chamber. Ball Bearings Shall Be Designed For 50,000 Hours B–10 Life. Stator Shall Be Heat Shrunk Into Motor Housing.

Two Heat Sensor Thermostat Shall Be Attached To Top End Of Motor Winding And Shall Be Connected In Series With The Magnetic Contractor Coil In Control Box To Stop Motor If Motor Winding Temperature Reaches 221 Degrees F. Thermostat To Reset Automatically When Motor Cools.

The Common Motor Pump And Grinder Shaft Shall Be Of #416 Stainless Steel Threaded To Take Pump Impeller And Grinder Impeller.

Seals – Motor Shall Be Protected By Two Mechanical Seals Mounted In Tandem With A Seal Chamber Between The Seals. Seal Chamber Shall Be Oil Filled To Lubricate Seal Face And To Transmit Heat From Shaft To Outer Shell.

Seal Face Shall Be Carbon And Ceramic And Lapped To A Flatness Of One Light Band.

A Double Electrode Shall Be Mounted in The Seal Chamber To Detect Any Water Entering The Chamber Through The Lower Seal. Water In The Chamber Shall Cause A Red Light To Turn On At The Control Box. This Signal Shall Not Stop Motor But Shall Act As A Warning Only, Indicating Service Is Required.

Pump Impeller – The Pump 3¾" Impeller Shall Be Of The Recessed Myers Type Or Approved Equal To Provide An Open Unobstructed Passage Through The Volute For The Ground Solids. Impeller Shall Be Of 85–5–5–5 Bronze And Shall Be Threaded Onto A Stainless Steel Shaft.

Grinder Construction – Grinder Assembly Shall Consist Of Grinder Impeller And Shredding Ring And Shall Be Mounted Directly Below The Volute Passage. Grinder Impeller To Be Threaded Onto A Stainless Steel Shaft And Shall Be Locked With Screw And Washer. The Shredding Ring Shall Be Pressed Into Iron Holding Flange For Easy Removal. Flange Shall Be Provided With Tapped Back–Off Holes So That Screws Can Be Used To Push The Shredding Ring From Housing. All Grinding Of Solids Shall Be From Action Of The Impeller Against The Shredding Ring.

Both 3¾" Grinder Impellers And Shredding Ring Shall Be Of 440C Stainless Steel Hardened To 58–60 Rockwell C.

Corrosion Protection – All Iron Castings Shall Be Pre–Treated With Phosphate And Chromic Rinse And To Be Painted Before Machining And All Machined Surfaces Exposed To The Sewage To Be Re–Painted. All Fasteners To Be 302 Stainless Steel.

Bearing End Cap – Upper Motor Bearing Cap Shall Be A Separate Casting For Easy Mounting And Replacement.

Power Cables – Power Cord And Control Cord Shall Be Double Sealed. The Power And Control Conductor Shall Be Single Strand Sealed With Epoxy Potting Compound And Then Clamped In Place With Rubber Seal Bushing To Seal Outer Jacket Against Leakage And To Provide For Strain Pull. Cords Shall Withstand A Pull Of 300 Pounds To Meet U.L. Requirements.

Insulation Of Power And Control Cords Shall Be Type SOW/SOW–A. Both Control And Power Cords Shall Have A Green Carrier Ground Conductor That Attaches To Motor Frame.

V SANITARY SEWER PIPING

General Requirements

Sanitary Sewer System Shall Be As Shown On The Contract Plans And Shall Be Constructed In Accordance With Article 2, Section 1000 Howard County Specifications, Except As Modified Herein.

Regulatory Requirements

As Per Article 1, Section 107.06, Of The Howard County Standard.

Definitions

A. Trench Bedding: Using ¼" To ¾" Gravel AASHTO–M43 Aggregate As Per Howard County Standard Details G 2.01, And Per 6" Diameter Requirements.

B. Undercutting: When Unsuitable Foundation Material Is Encountered It Shall Be Removed And Replaced With 1/4" To 3/4" Gravel AASHTO–M43 Aggregate To A Depth Of 1' Below The Invert Of The Pipe For The Full Width Of The Trench As Per Contract Drawings

C. Backfill And Select Granular Fill: Shall Comply With Article 2, Section 1008.03 Howard County Standard Specifications, Except As Modified Herein.

Products

A. Polyvinyl Chloride (PVC) Pipe: (Discharge Piping):
   1. Pipe And Fittings: PVC Class Schedule 80, ASTM D–2467
   2. Joint: Solvent Cement For PVC Plastic Pipe And Fitting, ASTM D–2564

B. Polyvinyl Chloride (PVC) Pipe (Vent Piping And Gravity Drain Piping):
   1. Pipe And Fitting: PVC Class Schedule 40, ASTM D–2466
   2. Joint: Solvent Cement For PVC Plastic Pipe And Fitting ASTM D–2564

Execution

A. Excavation
   1. Perform Sheeting, Shoring And Bracing For Trench Excavation For Utility Facilities And Other Purposes In Accordance With Specified Safety Requirements.
   2. Provide Sheeting, Shoring And Bracing For Trench Excavation In Subgrade Of Excavation To Prevent Movement Of Main Excavation Support System.
   3. Comply With Article 1, Section 1000.03.03 Trench Excavation Of The Howard County Specifications, Except As Modified Herein.

B. Backfill
   1. Select Granular Fill Shall Meet The Following:
      A. Maximum Dry Density, Greater Than 105 Pounds Per Cubic Foot As Determined By AASHTO, Designation T–180, Method C.

C. Construction Methods
   1. Select Granular Fill Shall Be Placed In 6–Inch Loose–Depth Layers And Compacted In Accordance With Article 2, Section 206.03.06 Of The Howard County Standard Specifications.
      a. After Stabilizing The Trench Subgrade As Required And Placement Of The Utility Refill Trench Using Properly Compacted Select Granular Fill To A Point Six (6) Inches Above The Crown Or Top Of The Utility.
      b. From A Point Six (6) Inches Above The Top Or Crown Of The Utility And Extending To The Ground Surface Or Finished Grade, Trench Refill Should Consist Of Properly Compacted Materials Conforming To The Requirements Of Article 2, Section 206.03.06 Of The Howard County Standard Specifications For Embankment.
      c. Proper Moisture And Compaction Control Is Imperative In The Trench Backfill Operations To Preclude The Formation Of A Settlement Trough Along The Refilled Trench.

VI CAST–IN–PLACE CONCRETE

General Description

This Item Covers All Concrete For The Grinder Pump Station In Accordance With These Specifications And As Per Article 2, Section 608 Of The Howard County Standard Specifications. Included In This Item Are Proportioning, Mixing, Placing, Finishing And Curing Of The Concrete. Construction Shall Be Or Portland Cement Concrete With The Classes As Designated Or Modified.

Products

A. Materials
   1. Supplement Article 2, Section 403, Of The Howard County Standard Specifications With The Following:
   2. The Mix Number For Concrete Encasement Shall Be Mix No. 1.

Execution

A. Concrete Collar Shall Be Placed In Accordance With Article 2, Section 610 Of The Howard County Standard Specifications.
   1. Reinforcing Bars Shall Be Placed In Accordance With Howard County Standard Specifications.

VII SUBMITTALS

Submit Six (6) Copies Of Shop Drawings To Demonstrate Full Compliance With The Technical Specifications As Indicated On These Drawings. Shop Drawings Shall Be Submitted To The Owner/Engineer For Approval Prior To Construction Of The Pump Station, Grinder Pumps, Motors And Piping. Owner/Engineer Will Provide Approval/Disapproval In Writing Within 14 Days Of Receipt Of The Shop Drawings.

In Addition To Submitting Shop Drawings For The Aforementioned Equipment, Submit To The Owner/Engineer Certification From The Grinder Pump System Manufacturer That The Grinder Pump System As Specified Meets The Requirements Of The Technical Specifications. This Certification Shall Be Provided By The Equipment Warranty And Certification Provided As Follows. No Changes To The Language, Meaning Or Intent Of The Form Shall Be Allowed.

Equipment Warranty And Certification Form

The Undersigned Hereby Attests That He Has Examined All The Referenced Project Drawings And Specifications And Hereby Warrants And Certifies That The Grinder Pump System That He Proposes To Furnish And Deliver Meets Or Exceeds The Contract Specifications, Is Suitable For The Intended Purpose And Installation, And Will Provide Satisfactory Performance At The Design Criteria Specified. This Warranty Shall Be In Addition To And Not In Lieu Of All Other Warranties, Express Or Implied.

Equipment: Grinder Pump System

Manufacturer: ______________________________

Address: ____________________

____

____

By: ______________________________

(Typed Name And Title)

__________________/s/__________________

(Signature) (Date)

Equipment Warranty And Certification Must Be Signed By A Principal Person (President, Vice–President, Etc.) Of The Equipment Manufacturer. In The Event The Manufacturer Is Not The Supplier Then A Principal Person Of The The Supplier Must Also Sign This Form.

Supplier: ______________________________

Address: ____________________

____

____

By: ______________________________

(Typed Name And Title)

__________________/s/__________________

(Signature) (Date)

VIII GUARANTEE

A. The Contractor Hereby Guarantees All Of The Work Performed Under This Contract Including The The Pump Station Unit, Duplex Control Panel, Grinder Pumps And Motors Against All Faulty Or Imperfect Materials For A Period Of Twelve (12) Months Form The Date Of Substantial Completing In Agreement With The Owner.

B. The Contractor Shall Guarantee The Entire Work Will Be Watertight And Leakproof.

C. The Grinder Pump Manufacturer's Representative Shall Provide Supervision For The Installation, Startup And Testing Of The Equipment.

APPROVED: HOWARD COUNTY DEPARTMENT OF PLANNING & ZONING

[signature] CHIEF, DEVELOPMENT ENGINEERING DIVISION	8/2/99 DATE
[signature] CHIEF, DIVISION OF LAND DEVELOPMENT	7/4/99 DATE
[signature] DIRECTOR	8/6/99 DATE

APPLIED PHYSICS LABORATORY
THE JOHNS HOPKINS UNIVERSITY

Johns Hopkins Road Howard County, Maryland

Approved For The University By: James E. Losch

Date: 7/22/99 Title: Chief Engineer

RUMMEL, KLEPPER & KAHL, LLP
CONSULTING ENGINEERS
81 MOSHER STREET BALTIMORE, MARYLAND 21217 (410) 728–2900

DESIGNED CDR	SANITARY SEWER GENERAL NOTES RESEARCH BUILDING #52	SCALE As Shown
DRAWN DCJ	JOHNS HOPKINS UNIVERSITY APPLIED PHYSICS LABORATORY	DRAWING 9 OF 9
CHECKED MWM	TAX MAP #41 PARCEL 123 / 129 5TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND	JOB NO. X
DATE 7–12–99	FOR: JOHNS HOPKINS UNIVERSITY APPLIED PHYSICS LAB 11100 JOHNS HOPKINS ROAD LAUREL, MARYLAND 20723–6099	FILE NO. X

"SDP–99–63"

RKK2\DATA1:COMMONS\98–84 SHEET2.DWG 07/13/1999 12: PENSETUP: SHEET1 PLOTSCALE: 1=1