# AREA DEVELOPMENT

	DRTH PARKING/B	ALL FIELD ENTRAN	CE AREA DEVE
DEVELOPER & ENGINEER CERTIFICATES	TUTT TOUNTS L	IOPKINS UNIVERSITY A	ADDITED DUVCICS
1) BY THE DEVELOPER:	TUE JOUND E	IOLIXIIIO OMIATIVOITI E	ALLTIED LUISICS
"I/We certify that all development and/or construction will be done according to these plans, and that any responsible personnel involved in the construction project will have a certificate of attendance at a Department of the Environment approved training program for the	LABORA	ATORY IN HOWARD CO	UNTY, MD 21. ACCESS TO ALL EXISTING FACILITIES SHALL BE MAINTAINED AT ALL TIMES.
control of sediment and erosion before beginning the project. I shall engage a registered professional engineer to supervise all construction and provide the Howard County Soil Conservation District with an	SITE ANALYSIS TOTAL JHU/APL PROPERTY:	GENERAL NOTES  1. THE TOPOGRAPHIC AND UTILITY INFORMATION SHOWN IN THIS DEVELOPMENT PLAN WERE	22. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO NOTIFY THE JHU ANY DEVIATION FROM THESE PLANS PRIOR TO ANY CHANGE BEING MADE. AN
"As-Built" plans within 30 days of completion.  June 18, 2003  Developer Signature J. E. Lesch Date March 16, 2004	PROPERTY NOTES  1. COURSES AND COORDINATES ARE BASED ON THE MARYLAND STATE COORDINATE SYSTEM (NAD 83) AND ARE DERIVED FROM THE FOLLOWING JOHNS HOPKINS UNIVERSITY CONTROL STATIONS: STATION NORTH EAST	OBTAINED FROM FIELD SURVEYS PERFORMED BY A. MORTON THOMAS AND ASSOCIATES  (TOPOGRAPHY) AND APPLIED PHYSICS LABORATORY (UTILITIES) CONSULTANTS IN NOVEMBER  1998, AND FROM REPORTS PROVIDED BY JOHNS HOPKINS UNIVERSITY APPLIED PHYSICS LAB  (JHU/APL). SINCE NOT ALL INFORMATION SHOWN MAY REFLECT CURRENT CONDITIONS, IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY CURRENT TOPOGRAPHIC AND UTILITY	DEVIATION FROM THESE PLANS WITHOUT WRITTEN AUTHORIZATION BY THE JH JHU/APL, A. MORTON THOMAS & ASSOC., HOWARD COUNTY DPZ, & SCD.  23. SURFACED STREETS AND PARKING AREAS SHALL BE MAINTAINED IN A CLEAN CONDITION, MUD AND DUST FREE AT ALL TIMES. ADEQUATE MEANS SHALL TO CLEAN TRUCKS AND OTHER EQUIPMENT USING EXISTING SURFACED STRE PARKING AREAS.
Printed Name Registration Number  2) BY THE ENGINEER:	HOPKINS 544836.5300 1340825.3542 G12 550256.5002 1342325.2642 G7 548107.0328 1341025.0830 G8 549478.7005 1341170.4345 41 EA 544825.8093 1339217.4439	INFORMATION TO HIS OWN SATISFACTION.  2. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE HOWARD COUNTY AND MSHA SPECIFICATIONS AND DETAILS FOR CONSTRUCTION, UNLESS OTHERWISE NOTED.  3. ALL WORK ON THESE PLANS SHALL BE COORDINATED WITH TRADES CONTRACT, BASIN'S B AND G.  4. APPROXIMATE LOCATIONS OF EXISTING UTILITIES ARE SHOWN. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PROTECT EXISTING UTILITIES AND MAINTAIN UNINTERRUPTED	<ul> <li>24. THE CONTRACTOR SHALL MAKE EVERY ATTEMPT TO MINIMIZE DAMAGE TO EXTREES DURING CONSTRUCTION.</li> <li>25. ALL EROSION AND SEDIMENT CONTROL DEVICES SHALL MEET CURRENT IN DEPARTMENT OF THE ENVIRONMENT STANDARDS AND DIRECTIVES.</li> <li>26. EXISTING SIGNS, GUARDRAILS, AND OTHER MINOR SITE FEATURES IN THE PROPOSED CONSTRUCTION.</li> </ul>
"I certify that the erosion and sediment control plan represents a practical and workable plan based on my personal knowledge of the site conditions. This plan was prepared in accordance with the requirements of the Howard County Soil Conservation District.	A. AREA OF PARCEL/LOT = 361 ACRES  B. PRESENT ZONING = PEC  C. PARKING TABULATION: EXISTING PARKING SPACES = 3,746  PROPOSED PARKING SPACES = 1,194 + 188  TOTAL SPACES PROVIDED = 4,940 + 4,934  D. EXISTING BUILDING COVERAGE = 42.7 ACRES GROSS FLOOR AREA 5.101/9	SERVICE. ANY DAMAGE CAUSED BY THE CONTRACTOR'S OPERATIONS SHALL BE REPAIRED IMMEDIATELY BY THE CONTRACTOR AT NO COST TO THE JHU/APL.  5. SECURITY MUST BE MAINTAINED WITHIN THE CONSTRUCTION AREA. THE CONTRACTOR SHALL COORDINATE ANY REQUIRED FENCE CONSTRUCTION AND RELOCATION WITH JHU/APL WITH NOTIFICATIONS OF ALL SCHEDULES AND REQUIREMENTS.  6. THE CONTRACTOR SHALL CONTACT MR. RUSTY OBER (443) 778-0167 AT LEAST FIVE DAYS	PROPOSED CONSTRUCTION, WHETHER OR NOT SHOWN ON THESE PLANS BE REMOVED AND REPLACED AT NO ADDITIONAL COST TO THE JHU/APL 27. CONTRACTOR SHALL CONTACT JHU/APL PLANT FACILITIES OFFICE (443) AND "MISS UTILITY" AT 1-800-257-7777, 48 HOURS PRIOR START OF EXCAVATION AND MUST NOTIFY ALL PUBLIC UTILITY COMPANIES AND THE OF UNDERGROUND FACILITIES IN THE AREA OF PROPOSED EXCAVATION
Design Engineer Signature  Date  13403	COVERAGE = 19.7 ACRES, 5.5% OF TOTAL LOT AREA  E. PROPOSED BUILDING COVERAGE = 0.02ACRES GROSS FLOOR AREA  COVERAGE = 0.02ACRES, 0.00% OF TOTAL LOT AREA	BEFORE STARTING WORK OR DISRUPTION OF ANY UTILITIES.  7. ALL "TIE—INS" TO EXISTING UTILITIES MAY ONLY BE DONE AFTER NORMAL WORKING HOURS AT JHU—APL. WORK MUST BE SCHEDULED ACCORDINGLY THRU JHU/APL. NORMAL WORKING HOURS	THOSE FACILITIES LOCATED BY THE UTILITY COMPANIES PRIOR TO COMM EXCAVATION.  28. THE SUBJECT PROPERTY IS ZONED PEC PER THE OCTOBER 1993 COMPREHENS
Printed Name Registration Number	F. TOTAL PROPOSED BUILDING COVERAGE = 19.7 ACRES, 5.5% OF TOTAL LOT AREA	ARE 8:00 A.M. TO 5:00 P.M., MONDAY THROUGH FRIDAY. "TIE-INS" TO STORM DRAINAGE MAY BE	29. NO CLEARING, GRADING, OR CONSTRUCTION ARE PERMITTED WITHIN THE RESTR FOREST CONSERVATION, WETLANDS, STREAMS, OR THEIR BUFFERS AS NOT PE
12750 TWINBROOK PARKWAY ROCKVILLE, MARYLAND 20852 301.881.2545	G. PROPOSED BUILDINGS DISTURBED AREA = 16.7 ACRES/PROPUTILITIES EXT.  H. PROPOSED USE = EDUCATION/RESEARCH  I. FLOOR SPACE USE = EDUCATION/RESEARCH  J. MAXIMUM NUMBER OF EMPLOYEES = 3,937  PROPOSE PARKING	8. THE CONTRACTOR OR DEVELOPER SHALL CONTACT THE HOWARD COUNTY CONSTRUCTION INSPECTION DIVISION 24 HOURS IN ADVANCE OF COMMENCING WORK AT (410) 313-1880. 9. ALL UTILITIES SHALL HAVE A MINIMUM CLEARANCE OF 6". ALL POLES AND FOUNDATIONS SHALL	MDE, U.S. ARMY CORPS OF ENGINEERS, AND HOWARD COUNTY.  30. THE FOREST CONSERVATION EASEMENT HAS BEEN ESTABLISHED TO FULFILL THE REQUIREMENTS OF SECTION 16.1200 OF THE HOWARD COUNTY CONSERVATION CLEARING, GRADING, OR CONSTRUCTION ARE PERMITTED WITHIN THE FOREST OF THE PERMITTED WITHIN THE POREST OF THE PERMITTED WITHIN THE PERMITTED WITH
3) CERTIFICATION BY PROFESSIONAL:	K. NO LOT SUBDIVISION IS ANTICIPATED  L. CASE NUMBERS APPLICABLE: IMPROVEMENTS. 4,600 AREA. LOD: 4.89 AC.	10. THE CONTRACTOR SHALL NOT OPERATE ANY WATER MAIN VALVES ON THE EXISTING WATER SYSTEMS. COORDINATE WITH THE OWNER FOR OPERATING WATER MAIN VALVES.	EASEMENT. THE FOREST CONSERVATION OBLIGATION HAS BEEN ADDRESSED \ 40, JHU/APL SWM BASIN A.
There are no wetlands on the site that will be disturbed. Therefore, the requirement of 401 and 404 wetlands permits from the State of	F02-40 FOREST CONSERVATION AND APFO SDP # 90-218 BUILDING #31	11. THE CONTRACTOR SHALL PROVIDE A JOINT IN ALL STORM DRAINS WITHIN 2'-0" OF EXTERIOR MANHOLE WALL.	31. THE EXISTING TOPOGRAPHY IS TAKEN FROM AERIAL SURVEY WITH ONE FOOT CINTERVALS PREPARED AS DESCRIBED IN GENERAL NOTE #1. 32. WATER IS PUBLIC (HOWARD COUNTY)
Maryland and Corps of Engineers are not needed.  2015/04	SDP 99-63 BUILDING #52 SDP F-02-70 - SWM BASIN B SDP 03-174 - POND ENTRANCE ROAD	12. THE CONTRACTOR SHALL PERMANENTLY SEED AND STABILIZE ALL DISTURBED AREAS THAT ARE NOT TO BE PAVED.  13. ALL DRIVEWAYS ARE PRIVATELY OWNED AND MAINTAINED BY JHU/APL.	33. SEWER IS PUBLIC (HOWARD COUNTY) 34. THE FLOODPLAIN LIMITS FOR THIS PROJECT WAS TAKEN FROM HOWARD COUNT 35. DIMENSION TO NEW STRUCTURES ARE PERPENDICULAR TO PROPERTY LINE.
Professional's Signature  Date  Date	M. SANITARY SEWER/WATER SERVICE SEE GENERAL NOTES N. EXISTING OPEN SPACE AREA (LOT AREA MINUS PARKING & BUILDINGS)=300 ACRES, 83.8% OF TOTAL LOT AREA	14. THE AREA SHOWN IS LOCATED ON TAX MAP #41.  15. 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.	36. THE LOD OF THIS PLAN IS NOT IN THE 100 YEAR FLOODPLAIN.  37. SOIL MAP USED SHEET NO. 29, SOIL SURVEY JULY 1968 HOWARD COUNTY, M. USDA.

INDEX OF DRAWINGS

REFER TO SHEET CO. IA FOR

REVISED SHEET INDEX

O. PROPOSED OPEN SPACE AREA = 291 ACRES, 80.6% OF TOTAL LOT

A. DRAINAGE AREAS: B=28.8 ACRES; G=25.8 ACRES

7.5 NEW: B=9.0 ACRES (31%); G=1.8 ACRES (7.0%)

EXISTING: B=4.6 ACRES/(16%); G=6.1 ACRES (23.7%)

TOTAL: B=13.6 ACRES (47%); G=7.9 ACRES (30.6%)
PERMITTED: B=25.7 ACRES (89%); G=19.5 ACRES (76%)

BASIN B: MDE APPROVED "SWM FINAL PLAN BASIN B REPORT (AUGUST 2002)

BASIN G: SDP-90-218 (BUILDING #31) AND SDP-04-35 (BASIN EXPANSION)

B. DESIGN IMPERVIOUS SURFACE: 29%

C. HYDRAULIC CALULATIONS FOUND:

RED-LINE REMAINING SWM AREA

TO BE PAVED

13.6AC

PITS BY HAND AT ALL CROSSINGS WELL IN ADVANCE OF CONSTRUCTION. 16. ALL SITE UTILITIES ARE THE PROPERTY OF JHU/APL WHO WILL HORIZONTALLY LOCATE ALL ACTIVE UTILITIES FOR THE CONTRACTOR. 17. EXISTING PAVEMENT, (ROADWAY SIDEWALKS ETC.) TO BE REMOVED AND REPLACED BY NEW DRAINAGE AREAS B'AND G'BASINS DRAINAGE NOTES PAVEMENT SHALL BE REPLACED "IN-KIND". TRAFFIC SHALL BE MAINTAINED BY THE CONTRACTOR ALONG EXISTING ROADWAYS DURING PROPOSED WORK AT ALL TIMES. 18. SEE DETAIL SHEETS FOR OTHER ITEMS THAT APPLY TO THIS PROJECT. 19. THE CONTRACTOR SHALL TAKE PROPER PRECAUTIONS TO AVOID DAMAGE TO EXISTING ADJACENT FACILITIES AND STRUCTURES. THE CONTRACTOR SHALL RESTORE ALL DISTURBED AREAS TO THEIR ORIGINAL CONDITION OR BETTER UNLESS NOTED OTHERWISE. 20. DUE TO THE PROXIMITY OF LIVE UNDERGROUND UTILITIES, THE JHU/APL AND A.

USED ON OR ADJACENT TO THE SITE.

MORTON THOMAS AND ASSOCIATES, INC. ARE NOT RESPONSIBLE FOR ANY DAMAGE OR

INJURY SUSTAINED DURING CONSTRUCTION BY ANY PERSON, VEHICLES OR EQUIPMENT

NO. BY CK APP

SHEET TITLE

ON OR BEFORE \_\_

9 THE BUILDING PERMIT FOR THE RED-LINE

THE APPROVAL LETTER FROM THE

DEVELOPMENT ENGINEERING DIVISION

TO ADD THE 279 PARKING SPACES MUST

BE APPLIED FOR WITHIN ONE YEAR FROM

SHT. NO.

7/28/09 RED-LINE SUBMISSION

DATE REVISIONS AND RECORD OF ISSUE

A Add Diffraction SHI Fence to Antenna Range.

LE EXISTING FACILITIES SHALL BE MAINTAINED AT ALL TIMES. THE RESPONSIBILITY OF THE CONTRACTOR TO NOTIFY THE JHU/APL OF FROM THESE PLANS PRIOR TO ANY CHANGE BEING MADE. ANY OM THESE PLANS WITHOUT WRITTEN AUTHORIZATION BY THE JHU/APL THE MORTON THOMAS & ASSOC., HOWARD COUNTY DPZ, & SCD.

REETS AND PARKING AREAS SHALL BE MAINTAINED IN A CLEAN UD AND DUST FREE AT ALL TIMES. ADEQUATE MEANS SHALL BE PROVIDED JCKS AND OTHER EQUIPMENT USING EXISTING SURFACED STREETS AND

TOR SHALL MAKE EVERY ATTEMPT TO MINIMIZE DAMAGE TO EXISTING CONSTRUCTION.

AND SEDIMENT CONTROL DEVICES SHALL MEET CURRENT MARYLAND OF THE ENVIRONMENT STANDARDS AND DIRECTIVES.

NS, GUARDRAILS, AND OTHER MINOR SITE FEATURES IN THE WAY OF ONSTRUCTION, WHETHER OR NOT SHOWN ON THESE PLANS, SHALL

AND REPLACED AT NO ADDITIONAL COST TO THE JHU/APL. SHALL CONTACT JHU/APL PLANT FACILITIES OFFICE (443) 778-0167 ITILITY" AT 1-800-257-7777, 48 HOURS PRIOR START OF THE AND MUST NOTIFY ALL PUBLIC UTILITY COMPANIES AND THE OWNER OUND FACILITIES IN THE AREA OF PROPOSED EXCAVATION AND HAVE ITIES LOCATED BY THE UTILITY COMPANIES PRIOR TO COMMENCING

PROPERTY IS ZONED PEC PER THE OCTOBER 1993 COMPREHENSIVE ZONING

GRADING, OR CONSTRUCTION ARE PERMITTED WITHIN THE RESTRICTED FOREST ERVATION, WETLANDS, STREAMS, OR THEIR BUFFERS AS NOT PERMITTED BY

MY CORPS OF ENGINEERS, AND HOWARD COUNTY. CONSERVATION EASEMENT HAS BEEN ESTABLISHED TO FULFILL THE OF SECTION 16,1200 OF THE HOWARD COUNTY CONSERVATION ACT. NO ADING, OR CONSTRUCTION ARE PERMITTED WITHIN THE FOREST CONSERVATION THE FOREST CONSERVATION OBLIGATION HAS BEEN ADDRESSED WITH F-02

TOPOGRAPHY IS TAKEN FROM AERIAL SURVEY WITH ONE FOOT CONTOUR REPARED AS DESCRIBED IN GENERAL NOTE #1. LIC (HOWARD COUNTY)

LIC (HOWARD COUNTY) AIN LIMITS FOR THIS PROJECT WAS TAKEN FROM HOWARD COUNTY STUDY.

NEW STRUCTURES ARE PERPENDICULAR TO PROPERTY LINE. THIS PLAN IS NOT IN THE 100 YEAR FLOODPLAIN.

ED SHEET NO. 29, SOIL SURVEY JULY 1968 HOWARD COUNTY, MARYLAND, 38. JHU/ENVIRONMENTAL CONDITIONS ASSESSMENT REPORT REQUIREMENTS HAVE BEEN

ADDRESSED BY ENVIRONMENTAL REPORTS ISSUED BY JHU/APL AND ACCEPTED BY THE COUNTY UNDER FO2-04 SWM BASIN A. 39. THE EXISTING SECURITY FENCE IS CONSIDERED A STRUCTURE WHICH COMPLIES WITH THE 2

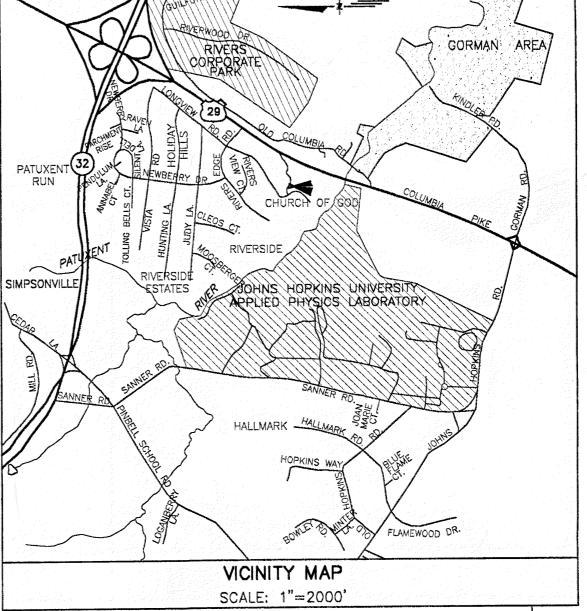
VARIANCE #BA-02-48V (DATED OCTOBER 2, 2002), AND THE VARIANCE APPLIES ONLY TO USES AND STRUCTURES DESCRIBED IN THE PETITION SUBMITTED. THE EXISTING SECURITY FENCE WAS APPROVED UNDER WP-03-23 (OCTOBER 9, 2002) WITH NO CONDITIONS. 40. DPZ HOWARD COUNTY WAIVER, DESIGN MANUAL HAS BEEN GRANTED,12/17/03, FOR

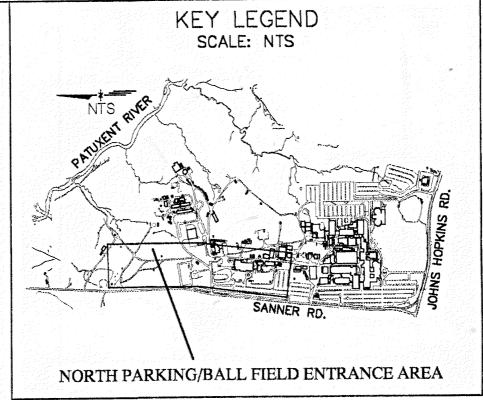
HOWARD COUNTY MANUAL VOLUME IV. PERTAINING TO THE DIMENSIONS AND GEOMETRY OF A COMMERCIAL PARKING LOT. THE WAIVER IS BASED ON EXISTING PARKING GEOMETRY. 41. THE STORMWATER MANAGEMENT POND MUST BE IN PLACE BEFORE THE PARKING LOT

CONSTRUCTION CAN BE STARTED. 42. THE EXCLUSIVE LEFT TURN ON SANNER ROAD WILL BE CONSTRUCTION AS PART OF THE

NORTH BALL ENTRANCE SANNER ROAD ACCELERATION/DECELERATION LANES IMPROVEMENT 3 SDP SUBMISSION TO THE COUNTY.

43. THE UPDATE OF THE F-02-77 APPROVED PERMIT THAT LAPSED DUE TO TIME WAS REINSTITUTED UNDER WAIVER PETITION #WP-04-82 (JANUARY 14, 2004) NEW DEADLINE TO APPLY FOR GRADING PERMIT NOVEMBER 24, 2004.





CONTACT PERSON FOR OWNER: RUSTY OBER TELEPHONE: (443) 778-0167 FAX: (443) 778-6122

## ADDRESS CHART

LOT/PARCEL #1

STREET ADDRESS 11100 JOHNS HOPKINS ROAD LAUREL, MD 20723 CONTACT: MR. RUSTY OBER

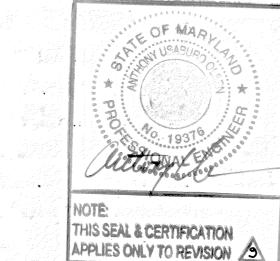
## PERMIT INFORMATION CHART

	IN OTHER TOTAL	
SUBDIVISION NAME JHU APPLIED PHYSICS LAB	SECTION / AREA N/A	PARCEL NO 1
PLAT# OR L/F GRID# ZONING 15429-15433 16 PEC	TAX MAP NO. ELEC. DISTRICT 5	CENSUS TRACT 6051
WATER CODE E-21	SEWER CODE 6480000	

/9\ REFER TO SHEET CO. IA FOR REVISED SHEET INDEX

I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE NO. 19376 EXPIRATION DATE: SEPTEMBER 22, 2021

REVISED SITE DEVELOPMENT PLAN - RETAIN EXISTING ANTENNA RANGE AND PARKING LOT FI



## NORTH PARKING / BALL FIELD ENTRANCE

ROPERTY OWNER: JOHNS HOPKINS UNIVERSITY APPLIED PHYSICS LABORATORY 11100 JOHNS HOPKINS ROAD LAUREL, MD 20723 CONTACT: MR. RUSTY OBER (443) 778-0167

APPLIED PHYSICS LABORATORY THE JOHNS HOPKINS UNIVERSITY

#### **COVER SHEET**

TAX MAP 41 PARCEL 1 ELECTION DISTRICT NO. 5 HOWARD COUNTY, MARYLAND

SHOWN SHEET C0.1 SHEET 1 OF 84

SDP-04-66

SCALE

AS

## 19 REFER TO SHEET CI. 19B FOR REVISED EROSION AND SEDIMENT CONTROL SHEET

(8/17/05)

15AC

STORM DRAINAREA

9.0AC

Review for HOWARD SCD and meets Technical Requirements.

STORMWATER MANAGEMENT DRAINAGE AREA B BASIN

USDA — Natural Resources Conservation Service

"I/WE CERTIFY THAT ALL DEVELOPMENT AND/OR CONSTRUCTION WILL BE DONE ACCORDING TO THESE PLANS, AND THAT ANY RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF ATTENDANCE AT A DEPARTMENT OF THE ENVIRONMENT APPROVED TRAINING PROGRAM FOR THE CONTROL OF SEDIMENT AND EROSION BEFORE BEGINNING THE PROJECT.

A PRACTICAL AND WORKABLE PLAN BASED ON MY PERSONAL KNOWLEDGE OF THE SITE CONDITIONS. THIS PLAN WAS PREPARED IN ACCORDANCE WITH THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION

NCI STORM DRAINAGE

4.6 AC.

ALSO AUTHORIZE PERIODIC ON-SITE INSPECTIONS BY THE HOWARD SOIL CONSERVATION DISTRICT."

"I CERTIFY THAT THIS PLAN FOR EROSION AND SEDIMENT CONTROL REPRESENTS

IONAL IMPERVIOUS AREA EXISTING

Print Name

SEDIMENT CONTROL

PRINT NAME BELOW SIGNATŪR

ROBERT A. WARNER SIGNATURE OF ENGINEER

25.7 Ac.

Howard SCD

This development plan is approved for soil erosion and

sediment control by the HOWARD SOIL CONSERVATION DISTRICT

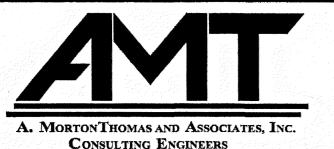
APPROVED: DEPARTMENT OF PUBLIC WORKS

CHIEF, BUREAU OF HIGHWAYS

APPROVED: DEPARTMENT OF PLANNING AND ZONING 3/24/04 CHIEF, DEVELOPMENT ENGINEERING DIVISION MK CHIEF, DIVISION OF LAND DEVELOPMENT 361/04

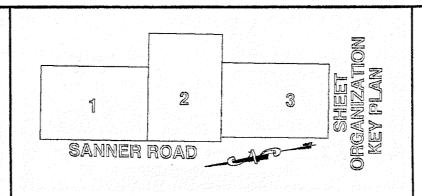
soul solvel.

HU/APL INTERNAL USE PARTY AND SHALL NOT BE DISCLOSED TO A THIRD PARTY AND SHALL NOT BE DUPLICATED, USED, OR DISCLOSED IN WHOLE OR IN PART FOR ANY PURPOSE OTHER THAN TO EVALUATE THIS RFP OR, IN THE CASE OF A CONTRACT AWARD, TO PERFORM THE WORK REQUIRED HEREUNDER, WITHOUT THE EXPRESS WRITTEN CONSENT OF JHU/APL.



2750 TWINBROOK PARKWAY, SUITE 200, ROCKVILLE MD 20852

TEL (301) 881-2545 FAX (301) 881-0814



그 그 보는 경험을 받아 가는 사람들이 되는 그가 없다.				4.5			
A Translation to the second	2/04/20	PARKING LOT IMPROVEMENT-UPDATES TO SHEET LIST/ SITE ANALYSIS	/9\			Company of the Compan	
DEC. III	8/17/05	RED-LINE SUBMISSION	A	17	2.7		
DES: JK	6/25/04	RED-LINE	6	151	/e/_	<b>%</b>	
DRN: RLP	5/17/04	FUTURE LIBRARIES SERVICE	B	1,541		jari 1	
	3/1/04	COUNTY SET A	4/12	e de la companya de La companya de la companya de l	27	29	
CHK: BW	1/26/04	COUNTY SET A	27	1.1		18 <sup>27</sup>	
	12/16/03	COUNTY SET 🛕	j);r		til.	7 e	
DATE: 10/10/03	DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	CK	APP	,

#### CIVIL GENERAL NOTES

- 1. THE CONTRACTOR SHALL NOTIFY FGGM "MISS UTILITY" AT 1-800-257-7777
  AT LEAST (5) FIVE DAYS PRIOR TO COMMENCEMENT OF ANY EXCAVATION OPERATION
  TO ASCERTAIN THE LOCATION OF NEARBY UNDERGROUND UTILITIES.
- 2. THERE IS NOT WARRANTY OR GUARANTEE ON THE COMPLETENESS OR CORRECTNESS OF THE EXISTING CONDITION INFORMATION. ALL EXISTING UTILITIES SHOWN ON THE PLANS ARE BASED ON FIELD OBSERVATIONS AND/OR RECORD DRAWINGS. THE INFORMATION SHOWN IS NOT NECESSARILY COMPLETE AND THE LOCATION OF THE UTILITIES SHOWN ARE APPROXIMATE. THE CONTRACTOR SHALL VERIFY THE LOCATIONS OF ALL EXISTING UTILITIES WELL IN ADVANCE OF CONSTRUCTION OPERATIONS WHICH COULD DAMAGE THESE UTILITIES. IN AREAS WHERE PROPOSED CONSTRUCTION MAY CONFLICT WITH EXISTING UTILITIES, THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO AVOID DAMAGE TO THE EXISTING UTILITIES. IF A UTILITY IS DAMAGED THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE GOVERNMENT AND THE OWNER OF SAID UTILITY. ANY DAMAGE SUSTAINED TO UTILITIES ABOVE OR BELOW GROUND SHALL BE REPAIRED BY OR UNDER THE DIRECTION OF THE UTILITY OWNER AT THE CONTRACTOR'S EXPENSE. UNDER NO CIRCUMSTANCE SHALL THE CONTRACTOR BACKFILL AN EXCAVATION AFFECTING SAID UTILITY WITHOUT FIRST RECEIVING PERMISSION FROM THE UTILITY OWNER.
- 3. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PROTECT AND PRESERVE EXISTING STRUCTURES, UTILITIES AND EQUIPMENT INCLUDING, BUT NOT LIMITED TO; WATER, STORM DRAINS, ELECTRICAL FACILITIES AND LIGHTING, COMMUNICATIONS, SANITARY SEWERS, AND GAS LINES. THE CONTRACTOR SHALL PROVIDE ALL TEMPORARY SUPPORTS, BRACES, SHEETING, AND SHORING AS NECESSARY TO PROTECT AND MAINTAIN ALL STRUCTURES, PIPING, EQUIPMENT AND APPURTENANCES. ANY DAMAGE RESULTING FROM THE ACTIONS, OR LACK THEREOF, BY THE CONTRACTOR, SHALL BE REPAIRED IMMEDIATELY BY THE CONTRACTOR AT HIS EXPENSE AND UNDER DIRECTION OF THE GOVERNMENT.
- 4. THE CONTRACTOR SHALL VERIFY, BY FIELD MEASUREMENT, THE REQUIRED DIMENSIONS OF ALL PIPES, FITTINGS, EQUIPMENT AND STRUCTURES TO ASSURE PROPER CLEARANCE AND SPACING BETWEEN ALL EXISTING AND PROPOSED UTILITIES PRIOR TO FABRICATION OR INSTALLATION.
- 5. WHEN EXCAVATING FOR UTILITIES, ALL SPOIL MATERIAL SHALL BE PLACED ON THE UPHILL SIDE OF THE TRENCH.
- 6. ALL AREAS OF THE SITE OUTSIDE THE LIMIT OF WORK DISTURBED BY THE CONTRACTOR DURING CONSTRUCTION SHALL BE RESTORED TO THEIR ORIGINAL CONDITIONS BY THE CONTRACTOR. THIS INCLUDES, BUT IS NOT LIMITED TO, ASPHALT/CONCRETE PAVEMENT, CURB/CURB AND GUTTER, SIDEWALKS, UTILITIES, GRASS/TURF, LANDSCAPING, STRUCTURES AND BUILDINGS.
- 7. PIPE ELEVATIONS REFER TO INVERTS UNLESS OTHERWISE NOTED.
- 8. CONTRACTOR TO USE EXTREME CAUTION WHEN TRAVERSING EQUIPMENT IN THE VICINITY OF EXISTING UTILITY POLE, OVERHEAD LINES, AND GUY WIRES.
- 9. DESIGN DRAWINGS BASED ON MARYLAND COORDINATE SYSTEM (MCS) DATUM HORIZONTAL NAD 83/91 AND VERTICAL NAVD 88.
- 10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONSTRUCTION STAKEOUT.
- 11. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
- 12. FAILURE TO SPECIFICALLY MENTION ANY WORK, WHICH WOULD NORMALLY BE REQUIRED TO COMPLETE THE PROJECT, SHALL NOT RELIEVE THE CONTRACTOR OF HIS RESPONSIBILITY TO PERFORM SUCH WORK. WORK ITEMS NOT SPECIFIED IN THE CONTRACT DOCUMENTS SHALL BE PERFORMED IN ACCORDANCE WITH THE MARYLAND STATE HIGHWAY ADMINISTRATION STANDARDS AND SPECIFICATIONS OR AT THE DIRECTION OF THE GOVERNMENT AS APPLICABLE.
- 13. THE CONTRACTOR SHALL GRADE FOR POSITIVE DRAINAGE FOR TEMPORARY STORM DRAIN DIVERSIONS IN CONFORMANCE WITH THE EXISTING DRAINAGE PATTERNS AS SHOWN ON THE PLANS AND WHERE APPLICABLE.
- 14. FOLLOWING INITIAL SOIL DISTURBANCE OR REDISTURBANCE, PERMANENT OR TEMPORARY STABILIZATION SHALL BE COMPLETED WITHIN THREE (3) CALENDAR DAYS AS TO THE SURFACE OF ALL PERIMETER CONTROLS, DIKES, SWALES, DITCHES, PERIMETER SLOPES, AND ALL SLOPES GREATER THAN 3 HORIZONTAL TO 1 VERTICAL (3:1), AND SEVEN (7) CALENDAR DAYS AS TO ALL OTHER DISTURBED OR GRADED AREAS ON THE PROJECT SITE NOT UNDER ACTIVE GRADING.
- 15. SEDIMENT AND EROSION CONTROL WILL BE STRICTLY ENFORCED DURING CONSTRUCTION.
- 16. THE GRADING LIMITS SHOWN ON THE PLAN ARE NOT TO BE EXCEEDED. ANY CHANGES IN THE GRADING, EROSION AND SEDIMENT CONTROL PLAN, OR OTHER SEGMENT OF THE WORK MUST BE REVIEWED AND APPROVED BY THE DESIGN ENGINEER.

			NOT FO	OR CONSTRUCTION
	1	02/04/20	NEW SHEET - NEW	SHEET INDEX (Descp. ABOVE)
		PORTE IN		
0 25' 50' 100'				
SCALE: 1" = 50'		BARRAROR.		
	REV	DATE		DESCRIPTION
			DRAWING	SHEET
D SHEET INDEX			CO 1 A	2 OF 84

EXPIRATION DATE: 09/22/2021

I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME. AND THAT I AM

DIRECTOR

5 A DULY LICENSED PROFESSIONAL ENGINEER

UNDER THE LAWS OF THE STATE OF MARYLAND,

PROFESSIONAL CERTIFICATION.

LICENSE NO. 19376



5-29-20

INDEX OF DRAWINGS

JOHNS HOPKINS APPLIED PHYSICS LAB
11100 JOHNS HOPKINS ROAD
LAUREL, MD 20723-6099

COUNTY ENGINEER

OWNER/DEVELOPER

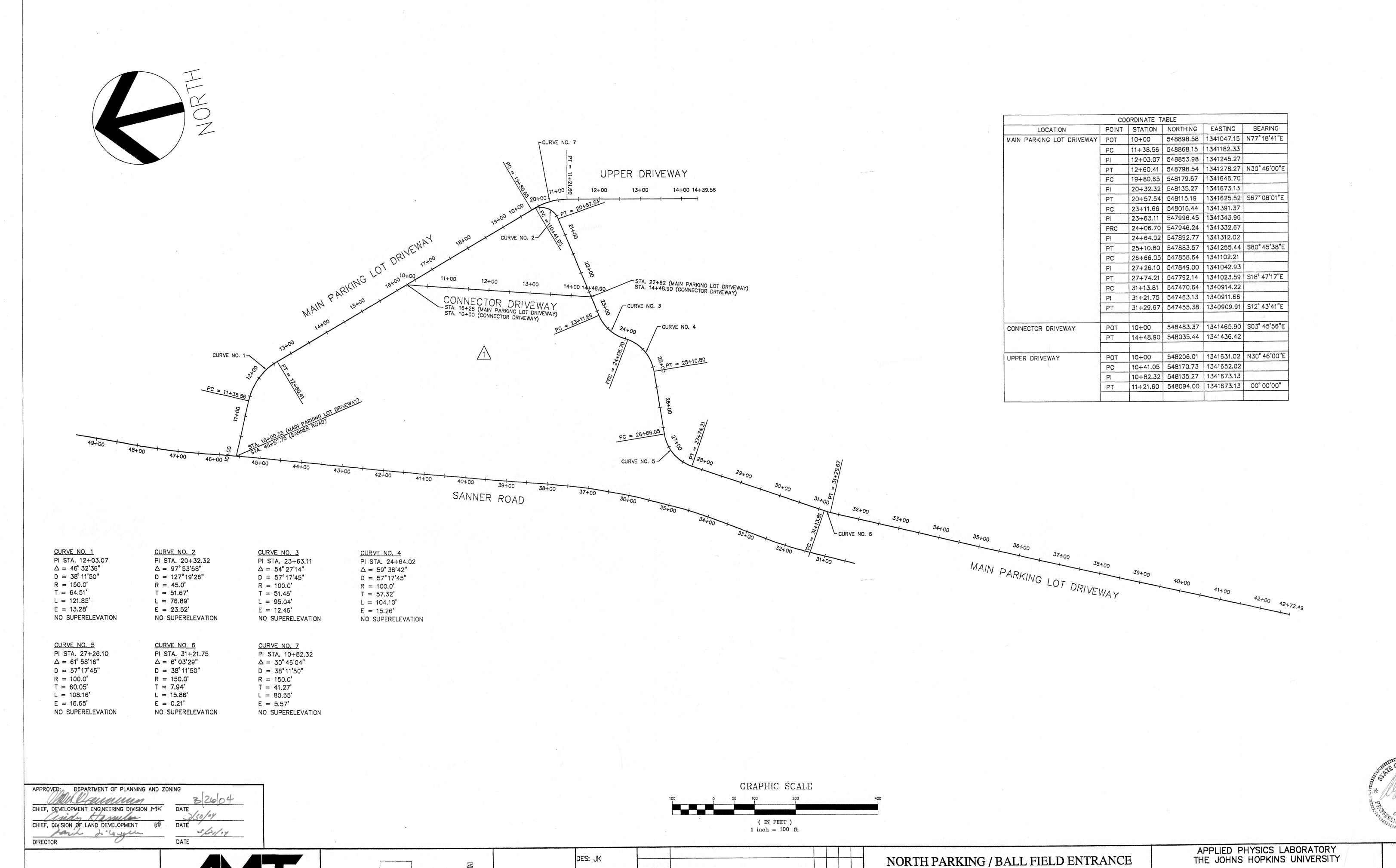
JOHNS HOPKINS APPLIED PHYSICS LAB
CHRISTOPHER GILLIGAN
240-592-0343 christopher.gilligan@jhuapl.com

JOHNS HOPKINS APPLIED PHYSICS LAB NORTH PARKING / BALL FIELD ENTRANCE

REVISED SHEET INDEX AND ADDITIONAL NOTES

C0.1A

SDP-04-66



DRN: PF

CHK: BW

DATE: 10/10/03

11/24/03 ADDENDUM 1

REVISIONS AND RECORD OF ISSUE

NO. BY CK APP

A. MORTON THOMAS AND ASSOCIATES, INC.

CONSULTING ENGINEERS
12750 TWINBROOK PARKWAY, SUITE 200, ROCKVILLE MD 20852
TEL (301) 881-2545 FAX (301) 881-0814
AMT FILE # 102-440

SANNER ROAD

NO AS-BUILT ONTHIS SHEET SDP-04-66

CENTER LINE GEOMETRY

TAX MAP 41 PARCEL 1

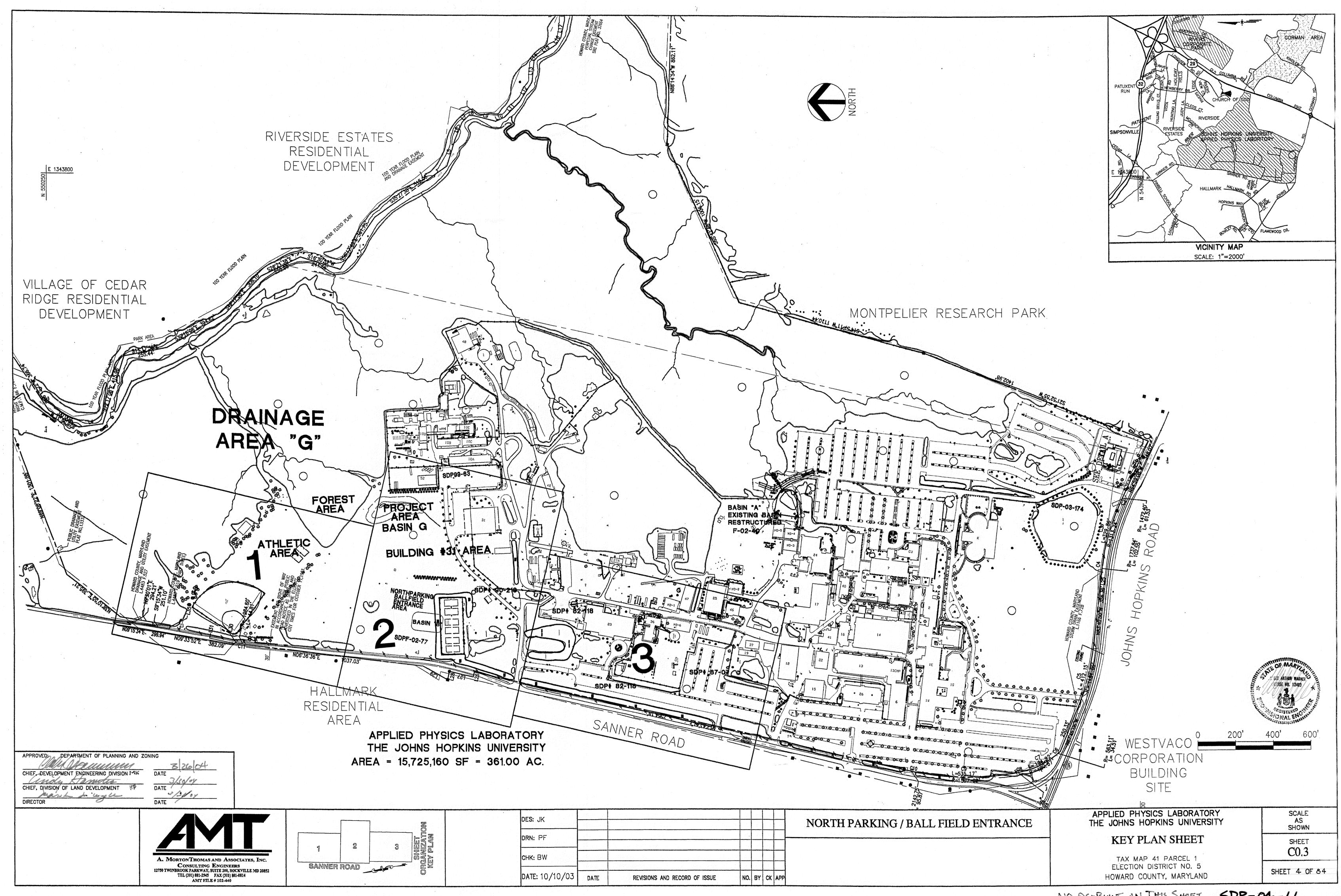
ELECTION DISTRICT NO. 5

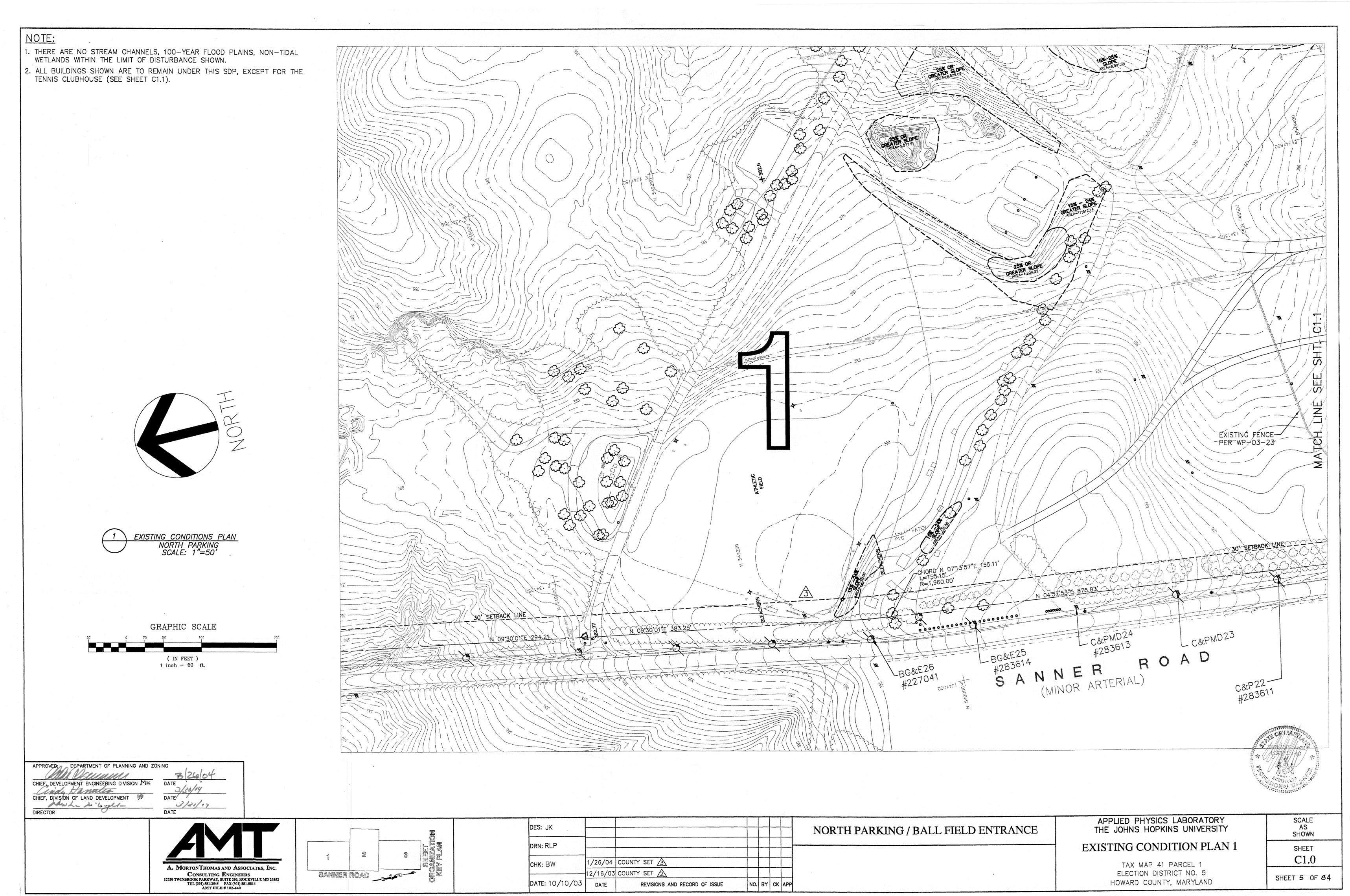
HOWARD COUNTY, MARYLAND

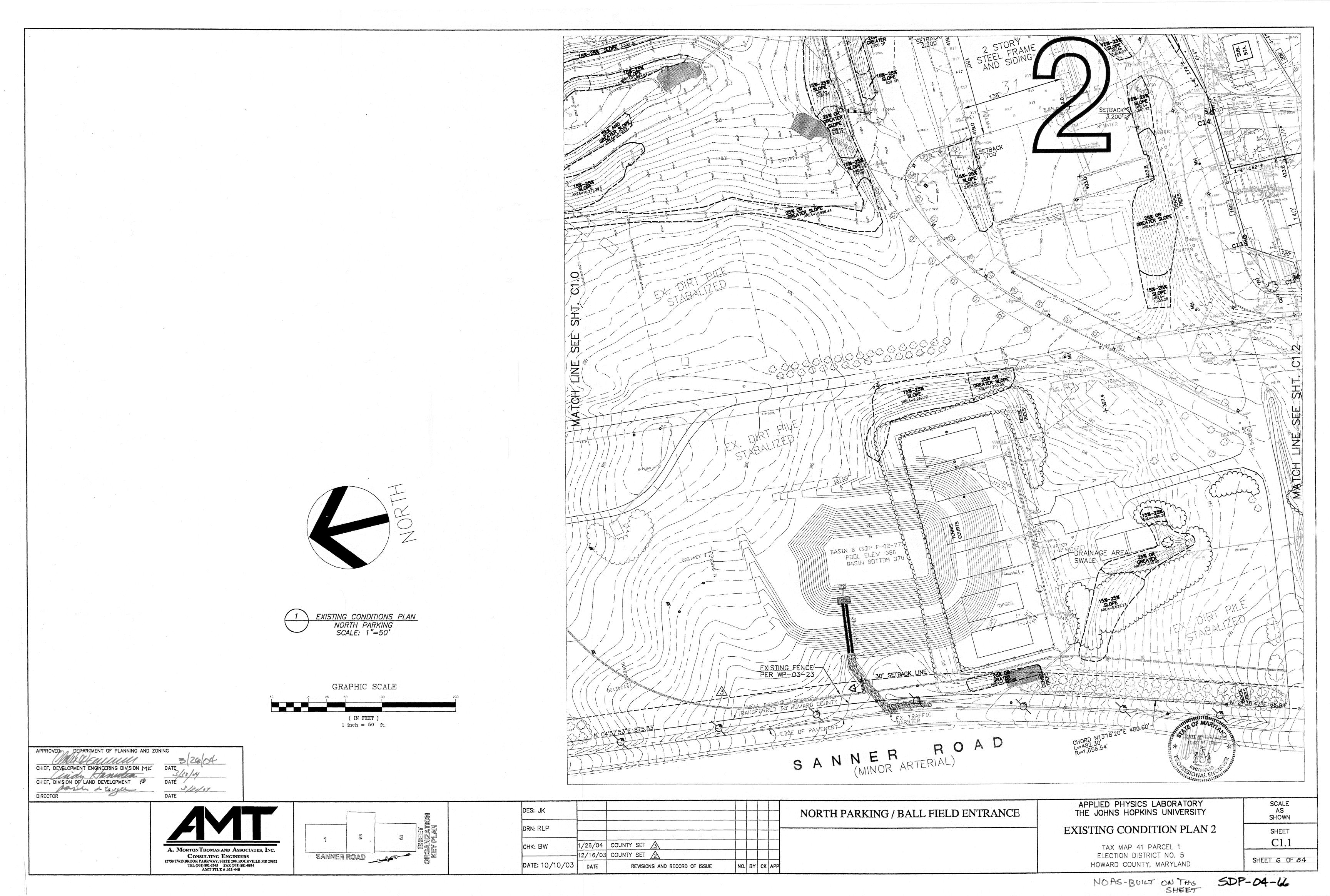
SCALE AS SHOWN

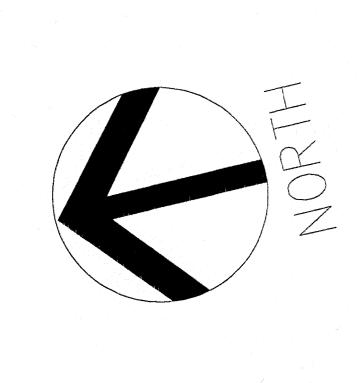
SHEET CO.2

SHEET 3 OF 84

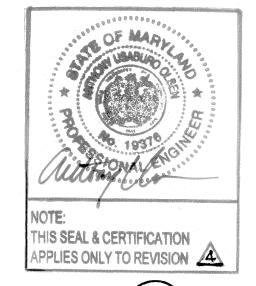








PROFESSIONAL CERTIFICATION.
I HEREBY CERTIFY THAT THESE DOCUMENTS
WERE PREPARED OR APPROVED BY ME, AND
THAT I AM A DULY LICENSED PROFESSIONAL
ENGINEER UNDER THE LAWS OF THE STATE OF
MARYLAND. LICENSE NO. 19376
EXPIRATION DATE: SEPTEMBER 22, 2021

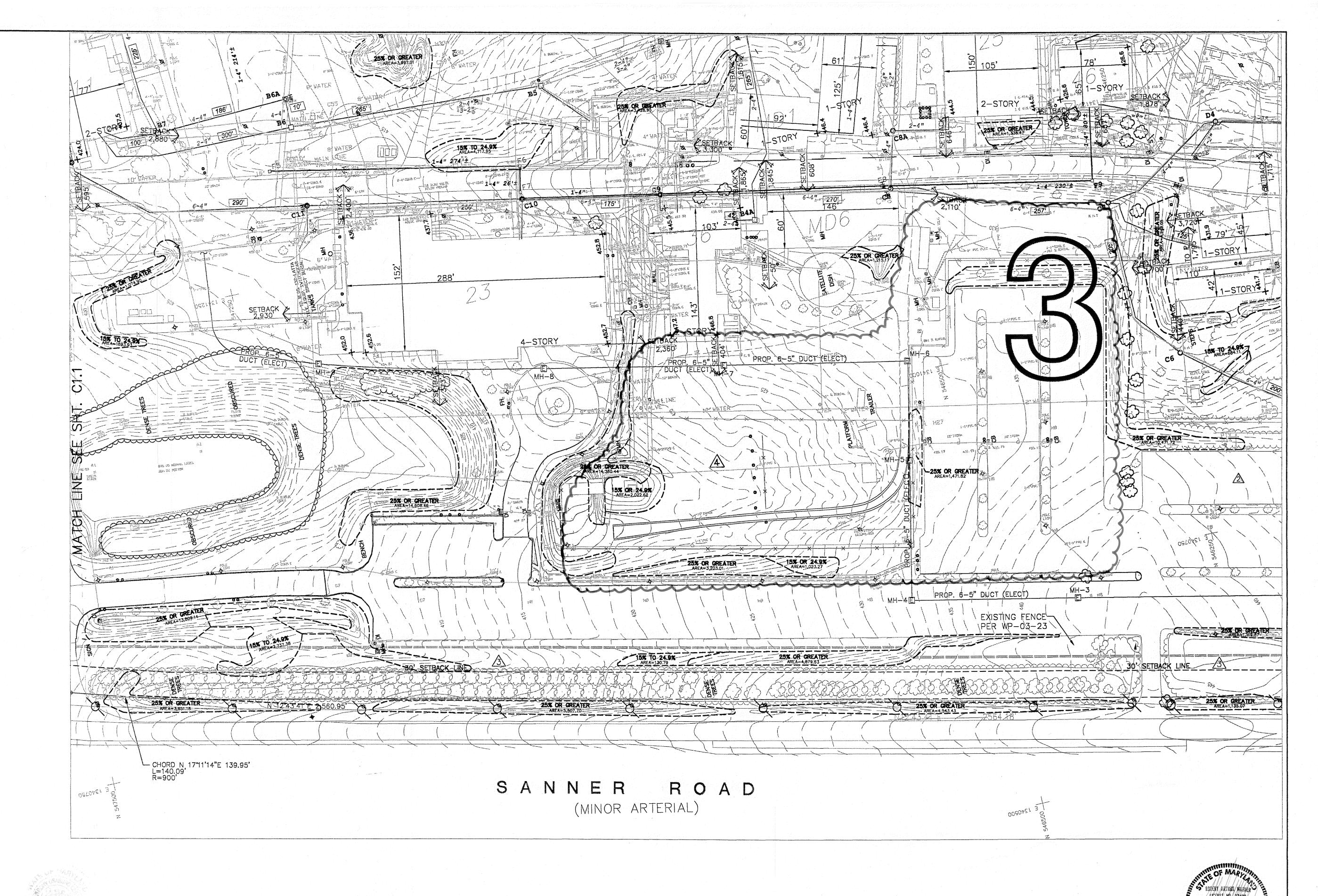


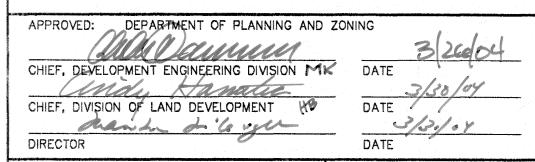
EXISTING CONDITIONS PLAN
NORTH PARKING
SCALE: 1"=50'

GRAPHIC SCALE

50 0 25 50 100 20

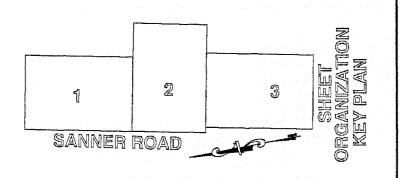
( IN FEET )
1 inch = 50 ft.





A. MORTONTHOMAS AND ASSOCIATES, INC.

CONSULTING ENGINEERS
12750 TWINBROOK PARKWAY, SUITE 200, ROCKVILLE MD 20852
TEL (301) 881-2545 FAX (301) 881-0814
AMT FILE # 102-440



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NORTH PARKING / BALL FIELD ENTRANCE

APPLIED PHYSICS LABORATORY THE JOHNS HOPKINS UNIVERSITY

TAX MAP 41 PARCEL 1

ELECTION DISTRICT NO. 5

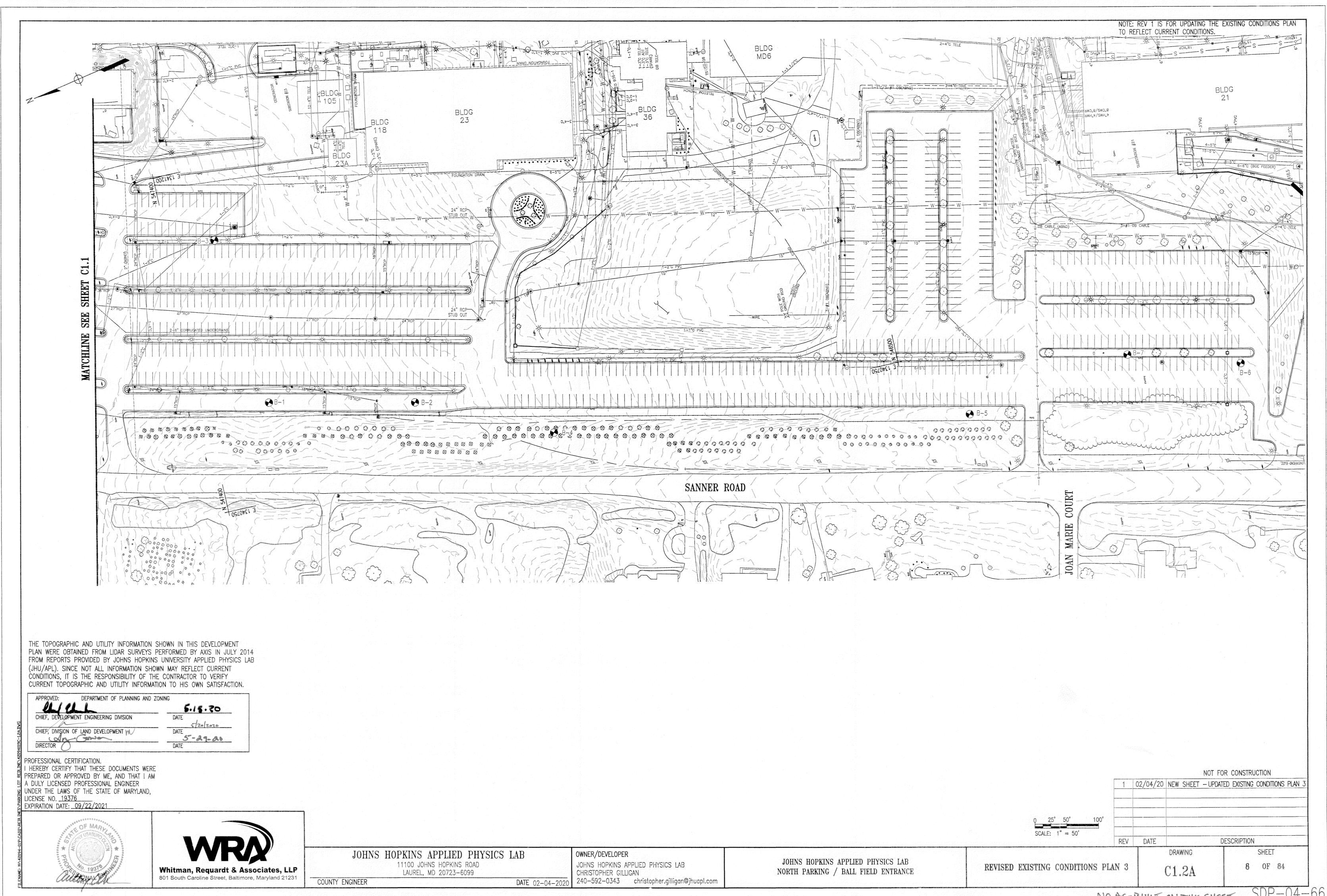
HOWARD COUNTY, MARYLAND

EXISTING CONDITION PLAN 3

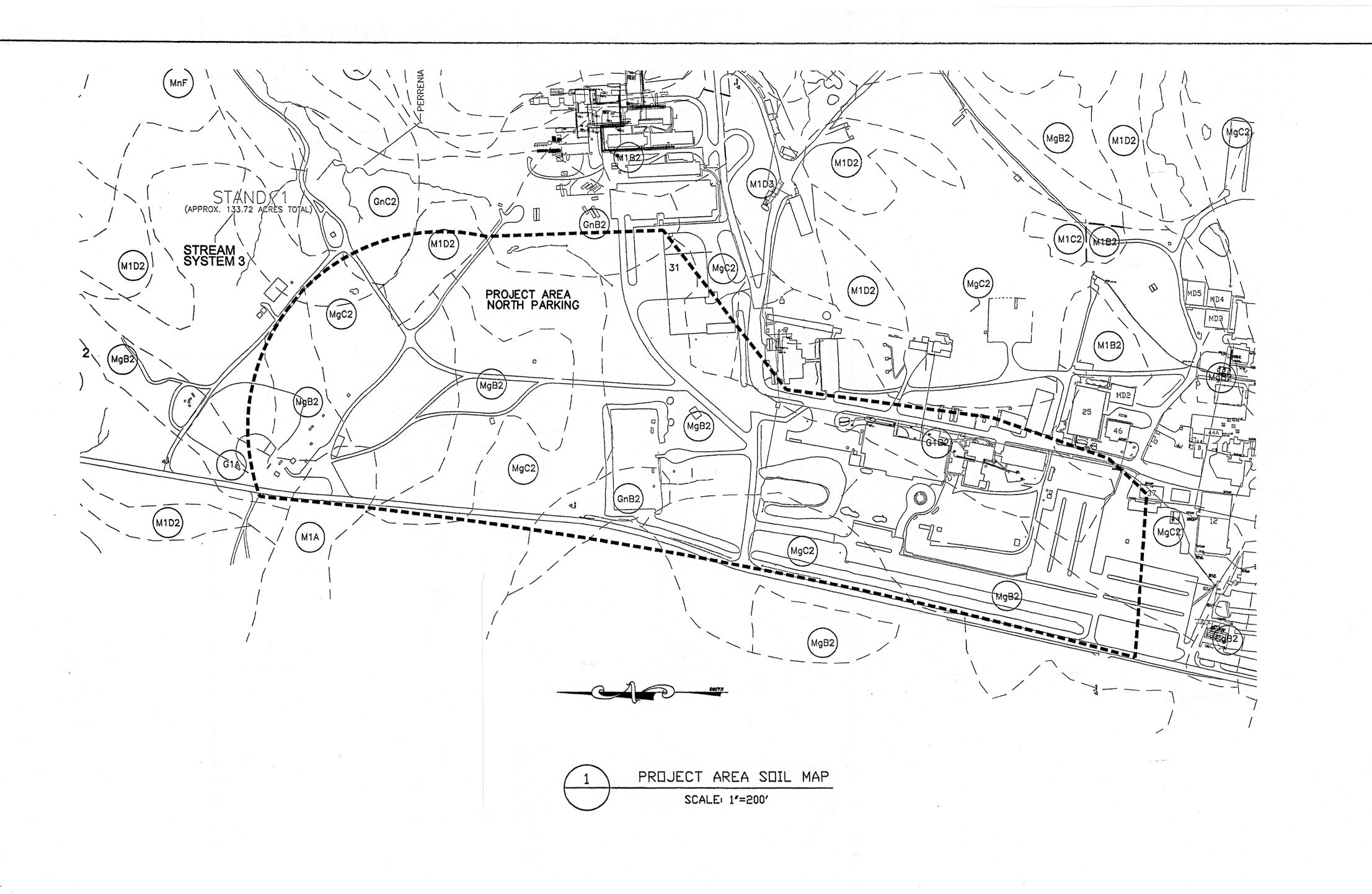
SCALE
AS
SHOWN

SHEET
C1.2

SHEET 7 OF 84



NO AS-BUILT ON THIS SHEET



SOILS MAP LEGEND:

CgB2 CHESTER GRAVELLY SILT LOAM 3-8%

SLOPES MODERATELY ERODED
G1A GLENELG LOAM, 0-3% SLOPES

G1B2 GLENELG LOAM, 3-8% SLOPES

MODERATELY ERODED

GLENVILLE SILT LOAM, 8-15% SLOPES

3nB2 GLENVILLE SILT LOAM, 3-8% SLOPES

MgB2 MANOR GRAVELLY LOAM, 3-8% SLOPES

MgC2 MANOR GRAVELLY LOAM, 8-15% SLOPES, MODERATELY ERODED

MANOR LOAM, 0-3% SLOPE

M1B2 MANOR LOAM, 3-8% SLOPES,

MODERATELY ERODED

M1C2 MANOR LOAM, 8-15% SLOPES, MODERATELY ERODED

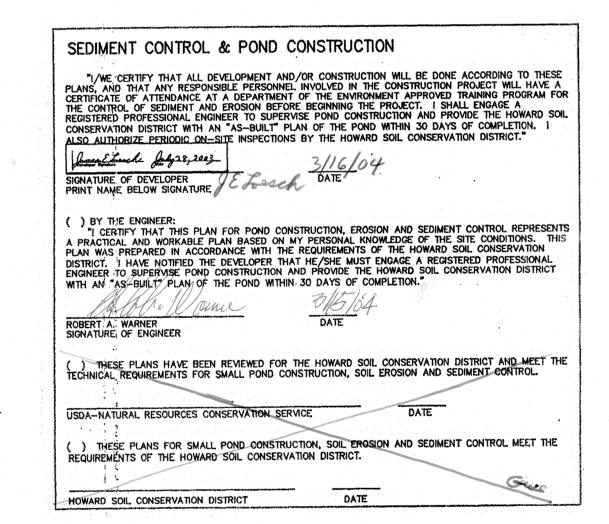
D2 MANOR LOAM, 15-25% SLOPES,

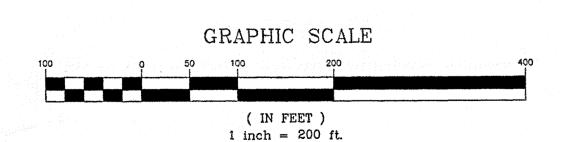
MODERATELY ERODED
M1D3 MANOR LOAM, 15-25% SLOPES,

SEVERELY ERODED

Inf MANOR VERY STONY LOAM,

20-60% SLOPES







CHIEF, DEVELOPMENT ENGINEERING DIVISION DATE OF LAND DEVELOPMENT WAS DATED.

DATE DATE

CONSULTING ENGINEERS

12750 TWINBROOK PARKWAY, SUITE 200, ROCKVILLE MD 20852

TEL (301) 881-2545 FAX (301) \$81-0814 AMT FILE # 102-440

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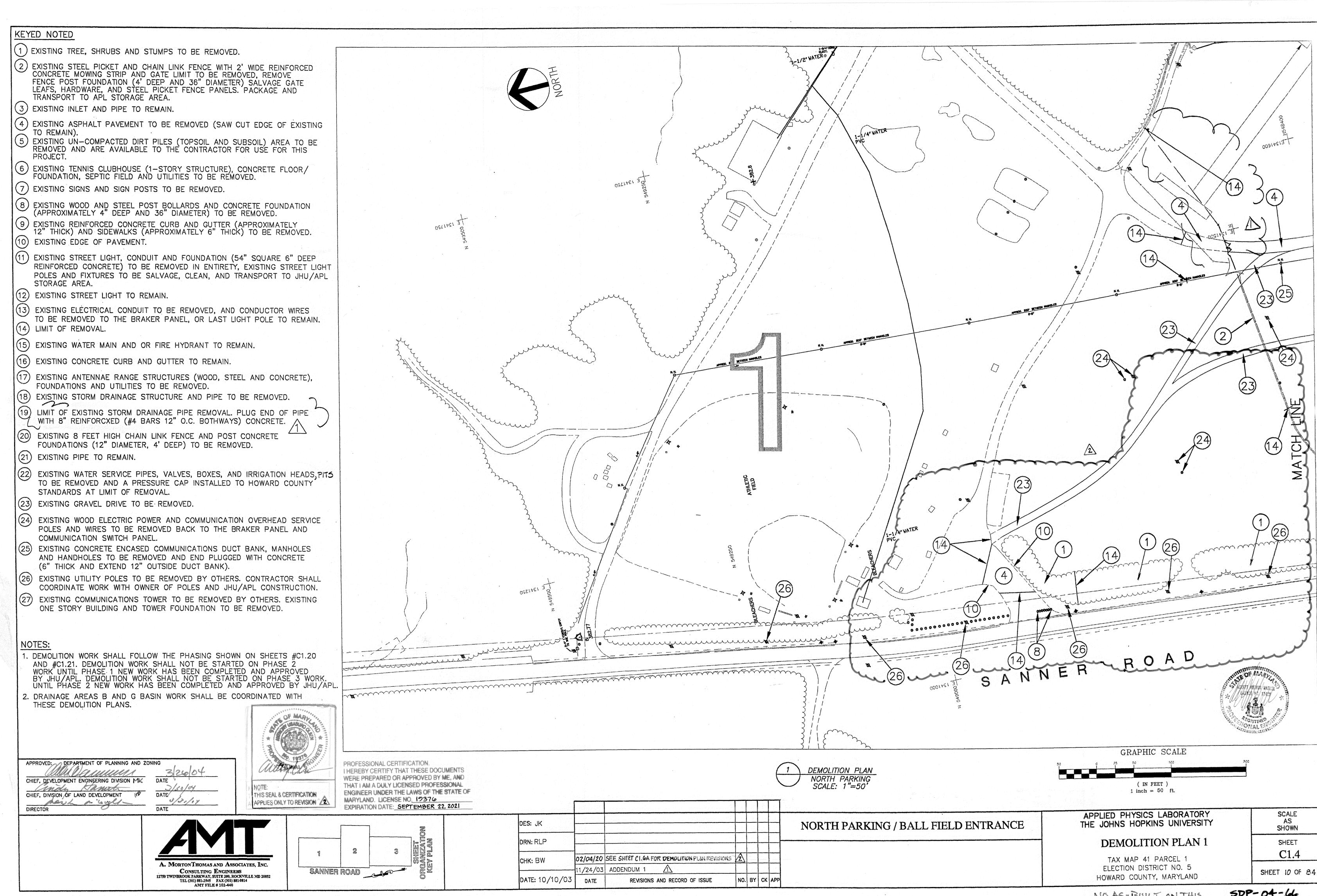
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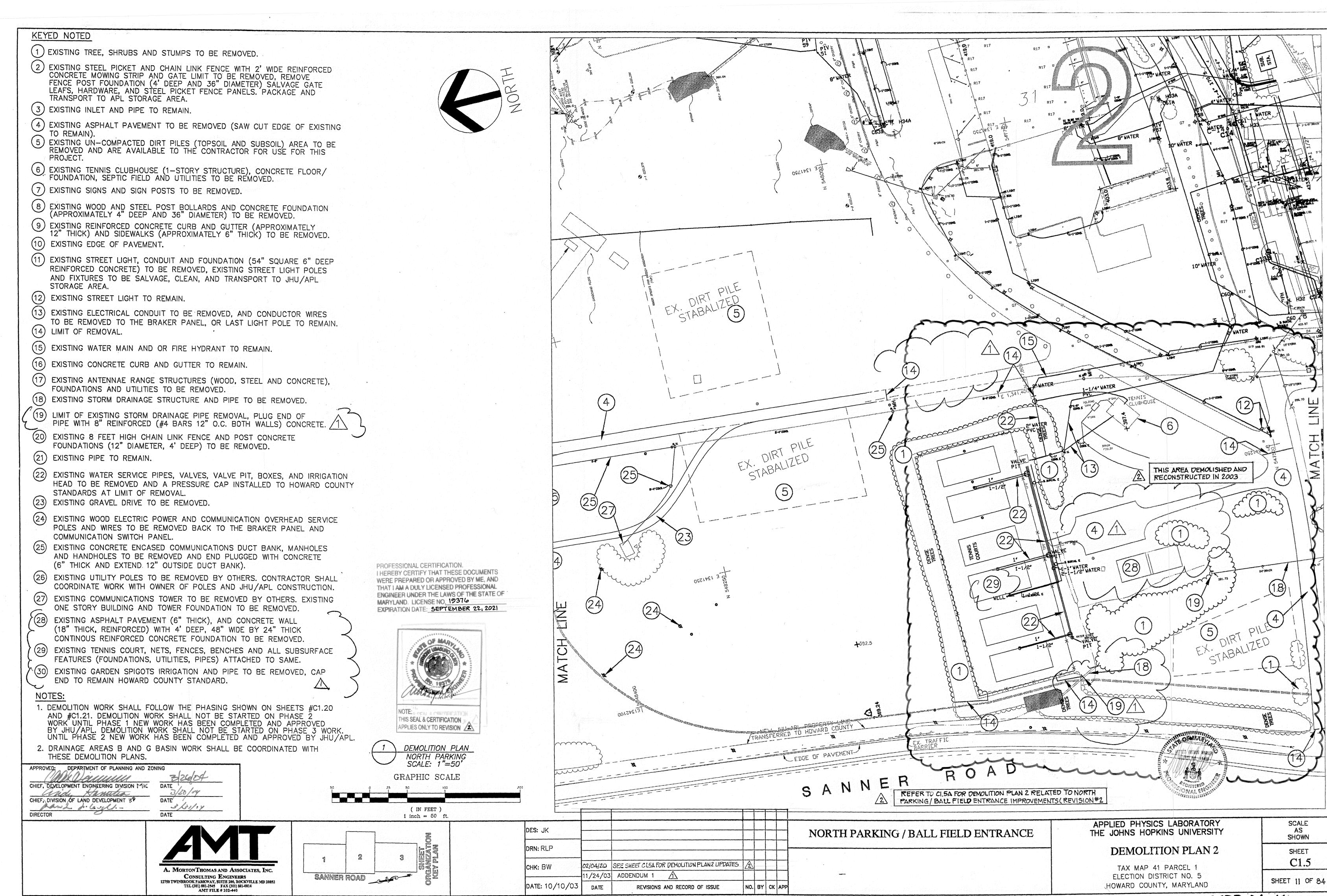
APPLIED PHYSICS LABORATORY
THE JOHNS HOPKINS UNIVERSITY
PROJECT AREA
SOILS MAP
TAX MAP 41 PARCEL 1

ELECTION DISTRICT NO. 5

HOWARD COUNTY, MARYLAND

SCALE
AS
SHOWN
SHEET
C1.3
SHEET 9 OF 84





NO AS-BUILT ON THIS SHEET SDP-04-66

NOTE: REV 1 IS TO SHOW UPDATED DEMOLITION PLAN WITH ADDITIONAL REMOVAL OF PAVEMENT AND TREES DUE TO NEW PARKING FOR THE NORTH PARKING/ BALL FIELD ENTRANCE. SANNER ROAD KEYED NOTES: 1. REMOVE EXISTING TREE, SHRUBS AND STUMPS (TYP.) 2. SAWCUT AND REMOVE EXISTING ASPHALT PAVEMENT 3. SAWCUT AND REMOVE EXISTING CONCRETE CURB AND GUTTER THE TOPOGRAPHIC AND UTILITY INFORMATION SHOWN IN THIS DEVELOPMENT (APPROXIMATELY 12" THICK) PLAN WERE OBTAINED FROM LIDAR SURVEYS PERFORMED BY AXIS IN JULY 2014 FROM REPORTS PROVIDED BY JOHNS HOPKINS UNIVERSITY APPLIED PHYSICS LAB 4. LIMIT OF REMOVAL (JHU/APL). SINCE NOT ALL INFORMATION SHOWN MAY REFLECT CURRENT CONDITIONS, IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY CURRENT TOPOGRAPHIC AND UTILITY INFORMATION TO HIS OWN SATISFACTION. APPROVED: DEPARTMENT OF PLANNING AND ZONING 5.15.20 CHIEF, DEVELOPMENT ENGINEERING DIVISION CHIEF, DIVISION OF LAND DEVELOPMENT DIRECTOR 5-29-20 DATE PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE NOT FOR CONSTRUCTION PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 19376 1 02/04/20 NEW SHEET - UPDATES TO DEMOLITION PLAN 2 EXPIRATION DATE: 09/22/2021 0 25' 50' 100'

OWNER/DEVELOPER

CHRISTOPHER GILLIGAN

DATE 02-04-2020 240-592-0343 christopher.gilligan@jhuapl.com

JOHNS HOPKINS APPLIED PHYSICS LAB

JOHNS HOPKINS APPLIED PHYSICS LAB

NORTH PARKING / BALL FIELD ENTRANCE

JOHNS HOPKINS APPLIED PHYSICS LAB

11100 JOHNS HOPKINS ROAD LAUREL, MD 20723-6099

COUNTY ENGINEER

Whitman, Requardt & Associates, LLP 801 South Caroline Street, Baltimore, Maryland 21231

SDP-04-66

DESCRIPTION

SHEET

12 OF 84

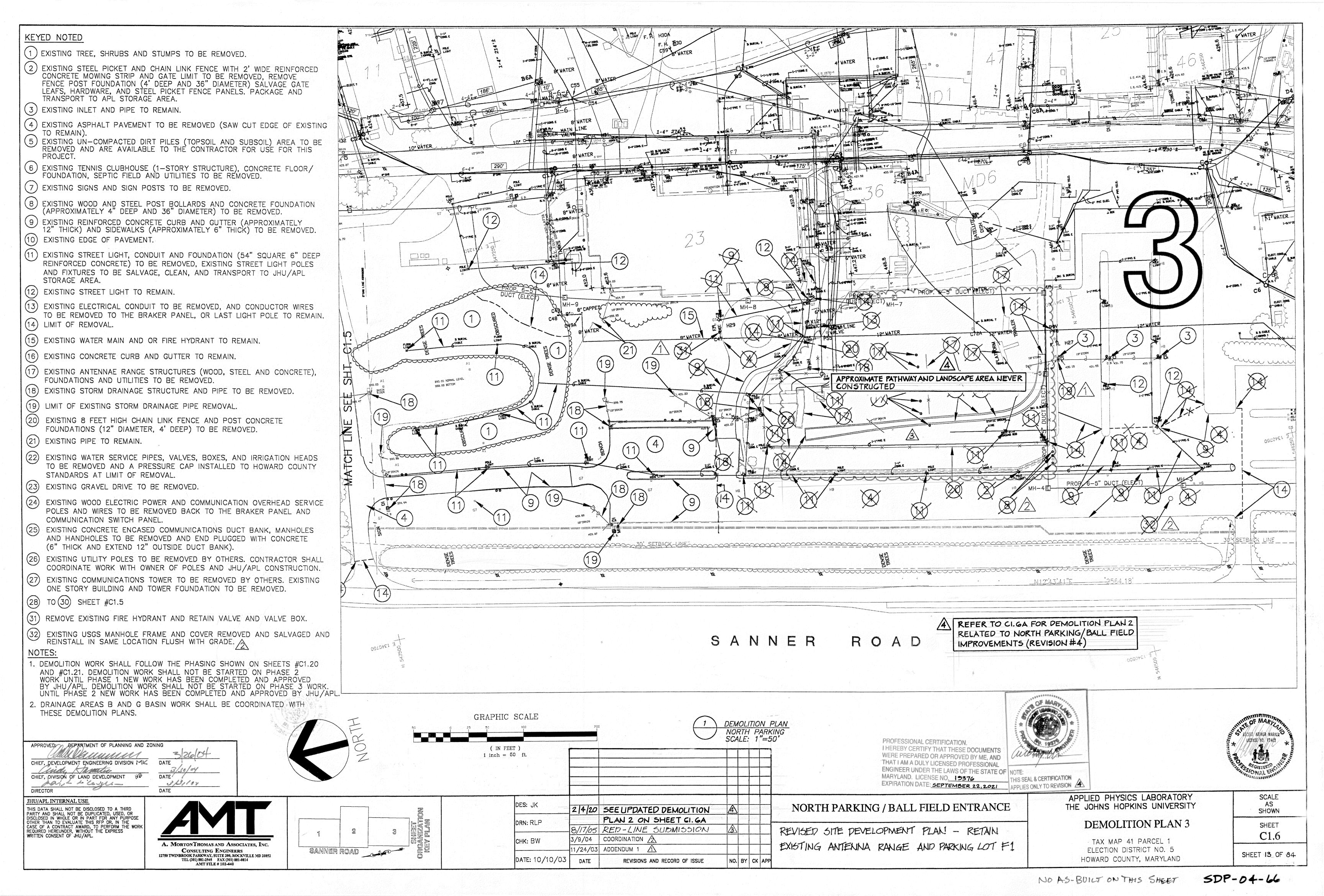
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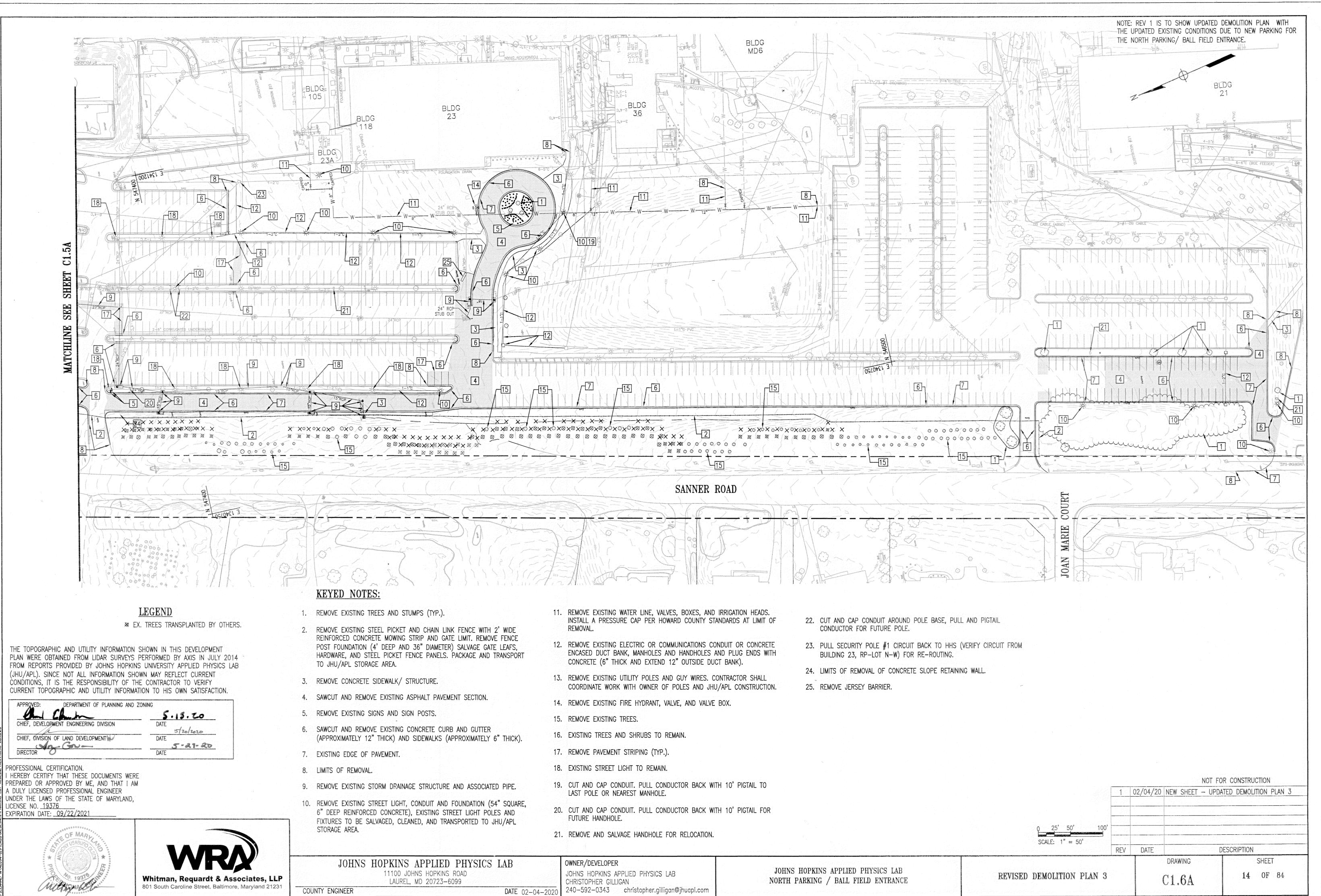
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C1.5A

REV DATE

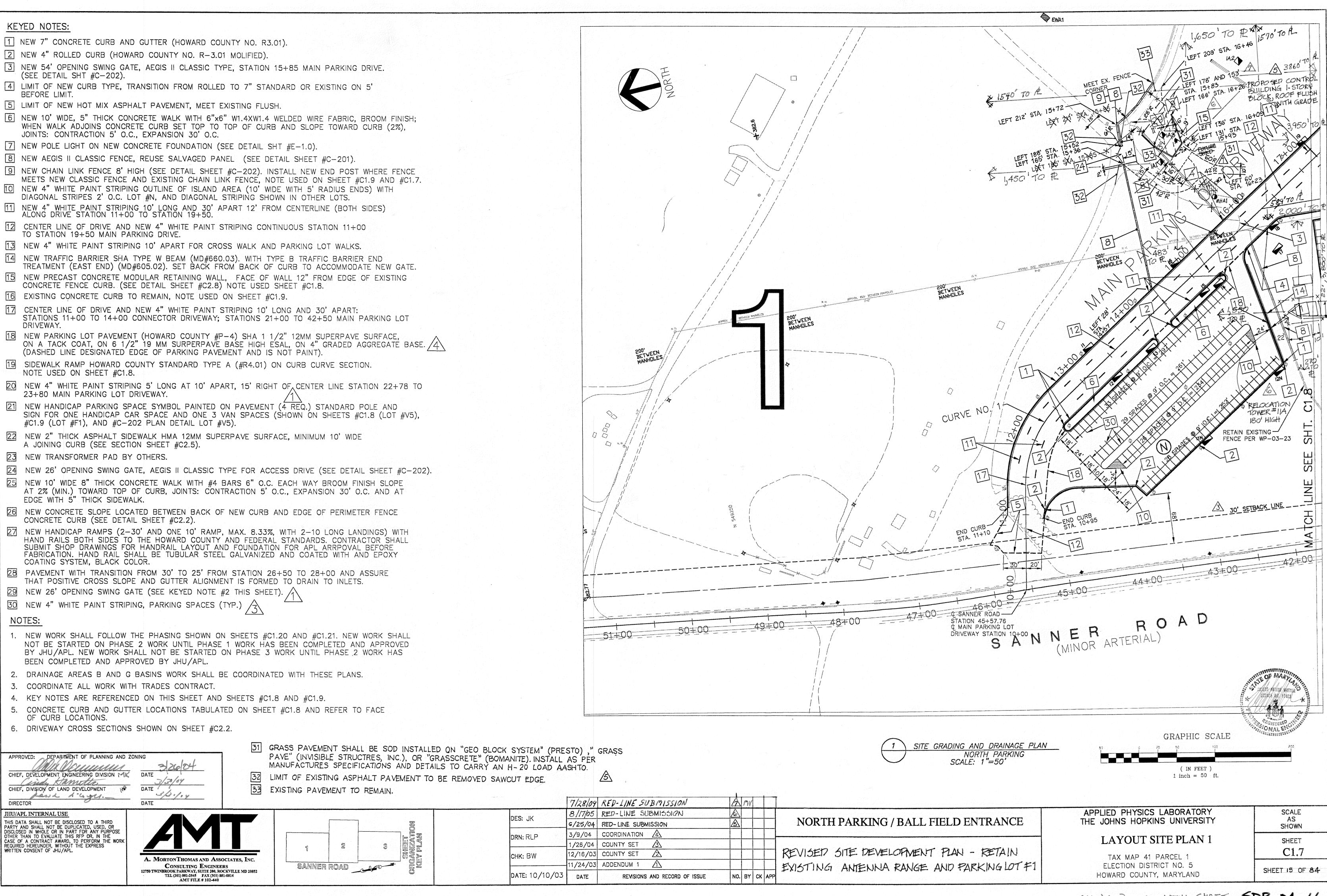
REVISED DEMOLITION PLAN 2

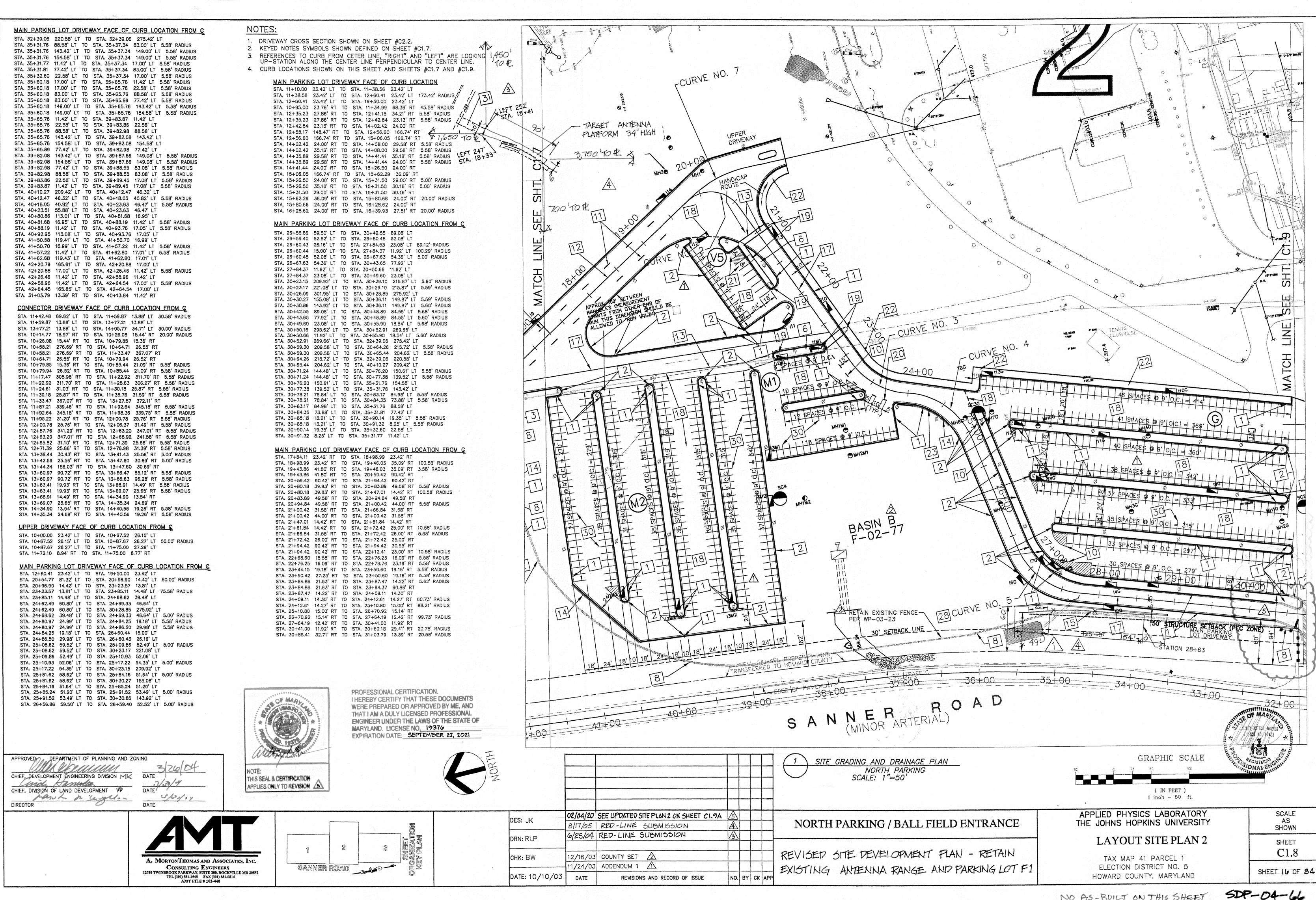


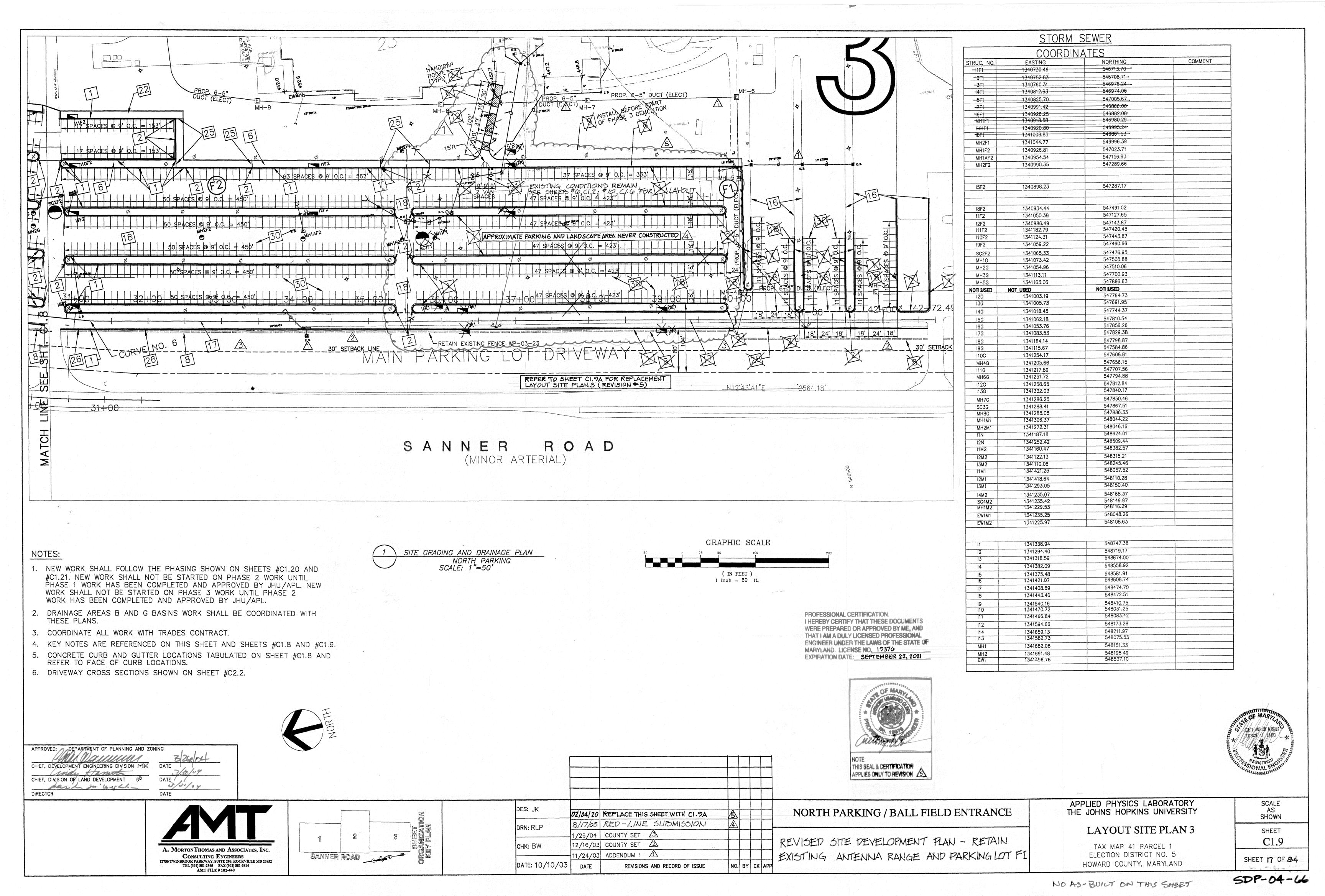


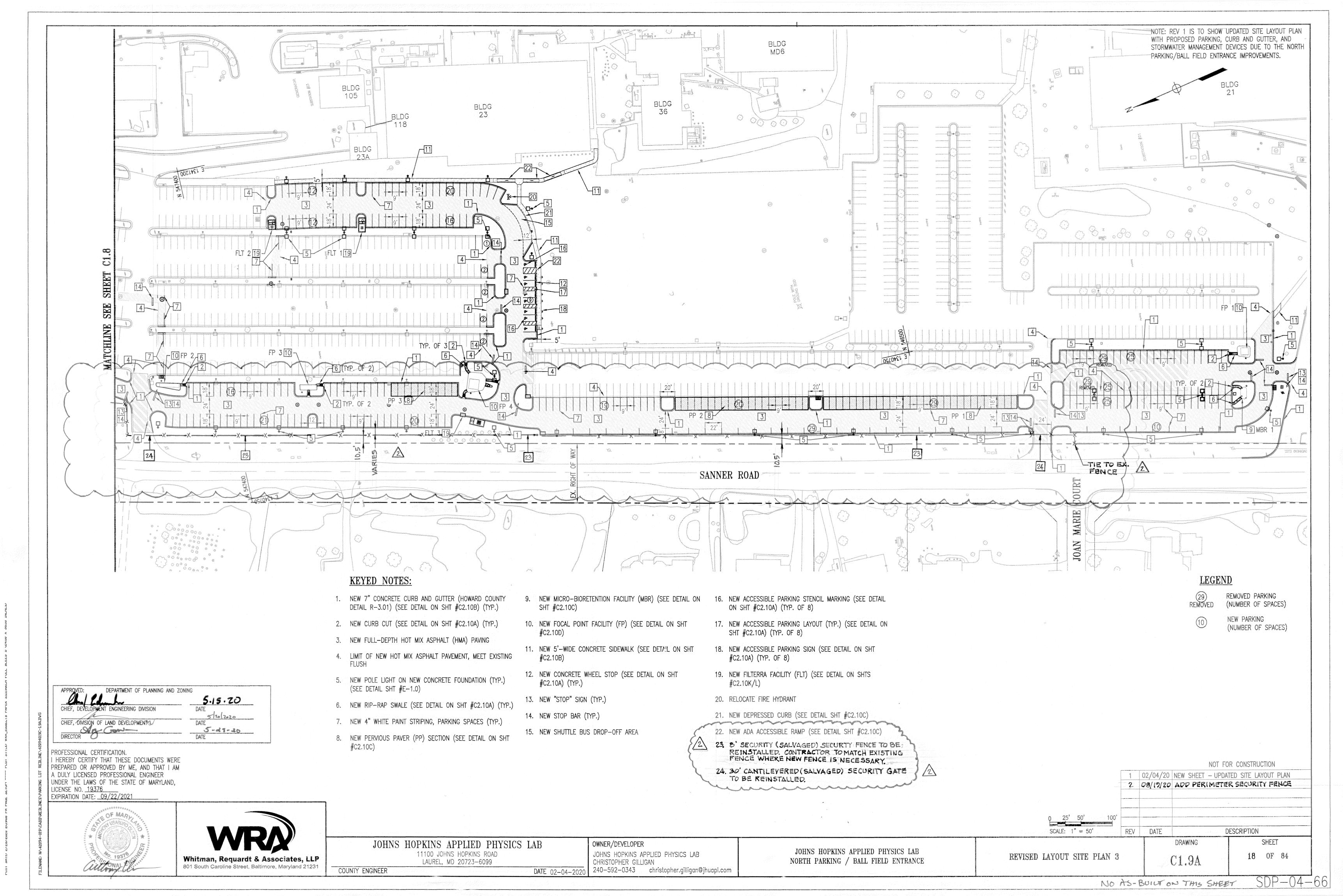
SDP-04-66

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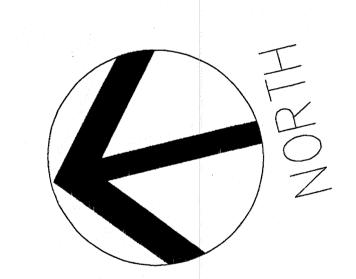


#### KEYED NOTED:

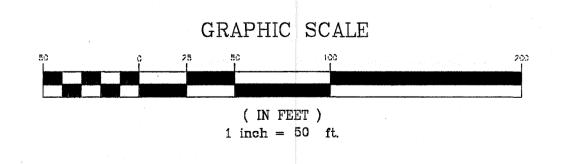
- 1 NEW HIGH VOLTAGE DUCT BANK 5"-6 WAY DUCT BY OTHER COORDINATE WITH OTHER CONTRACTORS
- ② NEW 2-WAY TO 8 WAY DUCT BANKS, SEE SHEET #E1.4 FOR SIZES AND LOCATIONS.
- 3 NEW 1" OR 2" ELECTRICAL CONDUIT FOR PARKING LOT LIGHTING SYSTEM, LOCATE IN PAVEMENT AREA, SEE SHEETS #E-1.1 THROUGH #E-1.3 FOR SIZE AND LOCATION.

#### NOTES:

- 1. DUCT BANKS AND CONDUITS SHOWN ARE SCHEDULED AND LOCATED APPROXIMATELY ON SHEET #E-1.4, NORTH CAMPUS DISTRIBUTION SITE PLAN, AND #E-1.0 THROUGH #E-1.3 AND #E-1.4.
- ELECTRICAL HAND HOLE, DUCT BANKS, CONDUIT, AND MANHOLE LOCATIONS ARE APPROXIMATE AND SHALL BE ADJUSTED TO ACCOMMODATE STORM DRAINAGE STRUCTURES AND PIPES, CURBS AND GUTTERS.
- 3. ALL FRAMES AND COVERS ON ALL MANHOLES AND HANDHOLES SHALL BE HEAVY DUCT (AASHTO #H-20 LOAD BEARING).







APPROVED: DEPARTMENT OF PLANNING AND ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION MIC DATE

CHIEF, DIVISION OF LAND DEVELOPMENT DATE

DIRECTOR

DATE

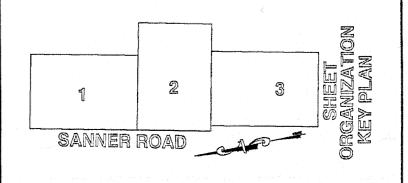
JHU/APL INTERNAL USE

THIS DATA SHALL NOT BE DISCLOSED TO A THIRD PARTY AND SHALL NOT BE DUPLICATED, USED, OR DISCLOSED IN WHOLE OR IN PART FOR ANY PURPOSE OTHER THAN TO EVALUATE THIS RFP OR, IN THE CASE OF A CONTRACT AWARD, TO PERFORM THE WORK REQUIRED HEREUNDER, WITHOUT THE EXPRESS WRITTEN CONSENT OF JHU/APL.

A. MORTONTHOMAS AND ASSOCIATES, INC.

CONSULTING ENGINEERS
12750 TWINBROOK PARKWAY, SUITE 200, ROCKVILLE MD 20852
TEL (301) 881-2545 FAX (301) 881-0814

AMT FILE # 102-440



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	DATE: 10/10/03	DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	СК	APP	

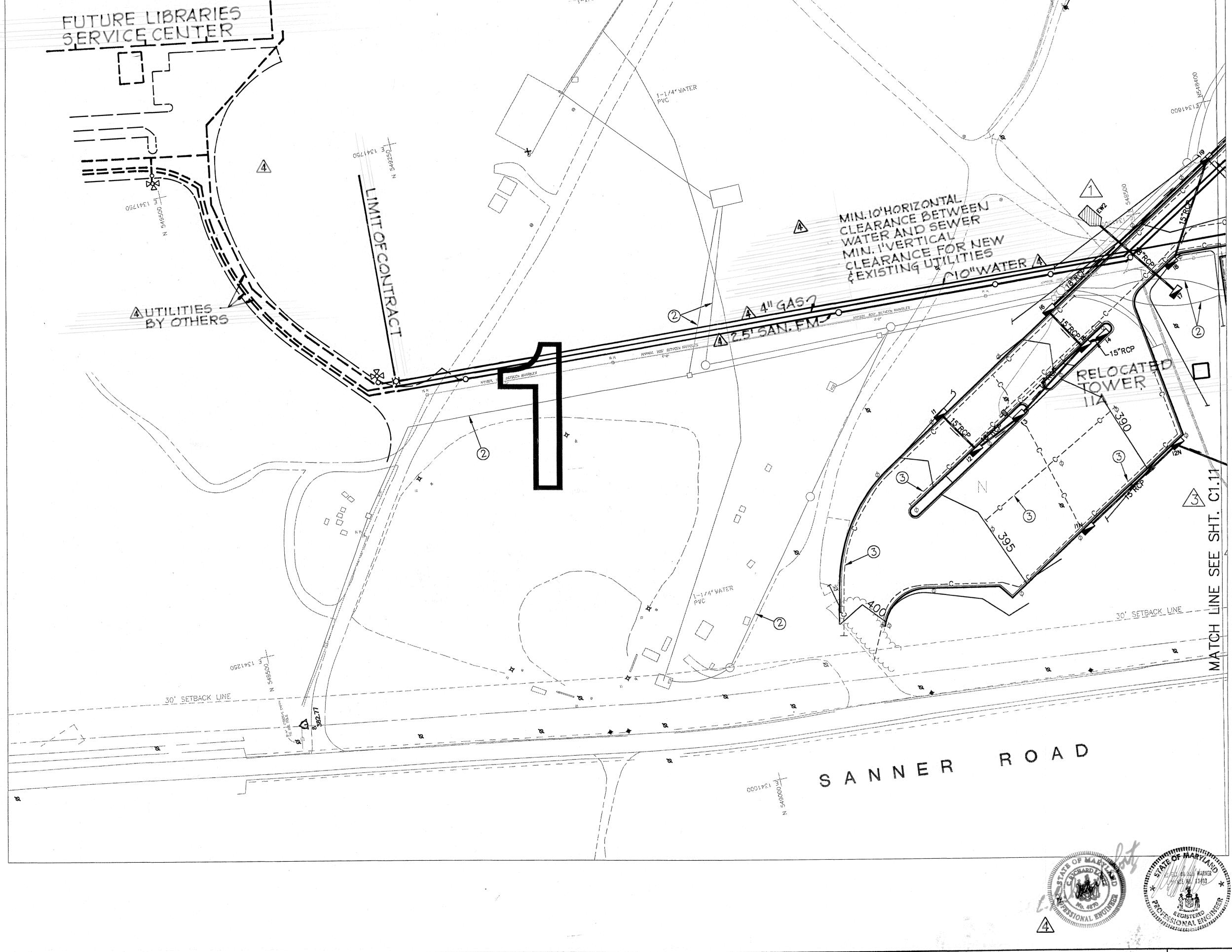
NORTH PARKING / BALL FIELD ENTRANCE

APPLIED PHYSICS LABORATORY THE JOHNS HOPKINS UNIVERSITY

UTILITY PLAN

TAX MAP 41 PARCEL 1
ELECTION DISTRICT NO. 5
HOWARD COUNTY, MARYLAND

SCALE
AS
SHOWN
SHEET
C1.10
SHEET 19 OF 84

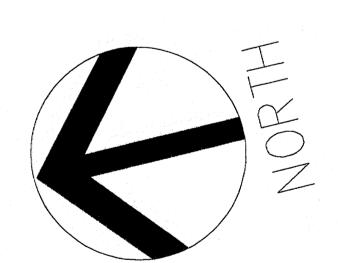


#### KEYED NOTED:

- 1) NEW HIGH VOLTAGE DUCT BANK 5"-6 WAY DUCT BY OTHER COORDINATE WITH OTHER CONTRACTORS
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- 3 NEW 1" OR 2" ELECTRICAL CONDUIT FOR PARKING LOT LIGHTING SYSTEM, LOCATE IN PAVEMENT AREA, SEE SHEETS #E-1.1 THROUGH #E-1.3 FOR SIZE AND LOCATION.

### NOTES:

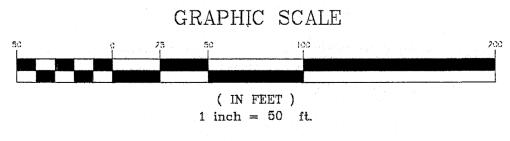
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- 2. ELECTRICAL HAND HOLE, DUCT BANKS, CONDUIT, AND MANHOLE LOCATIONS ARE APPROXIMATE AND SHALL BE ADJUSTED TO ACCOMMODATE STORM DRAINAGE STRUCTURES AND PIPES, CURBS AND GUTTERS.
- 3. ALL FRAMES AND COVERS ON ALL MANHOLES AND HANDHOLES SHALL BE HEAVY DUCT (AASHTO #H-20 LOAD BEARING).



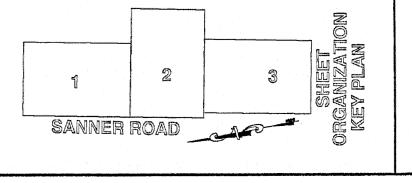


APPROVED: DEPARTMENT OF PLANNING AND ZONING CHIEF, DEVELOPMENT ENGINEERING DIVISION MK

CHIEF, DIVISION OF LAND DEVELOPMENT 3/31/84



A. MORTON THOMAS AND ASSOCIATES, INC. CONSULTING ENGINEERS
12750 TWINBROOK PARKWAY, SUITE 200, ROCKVILLE MD 20852
TEL (301) 881-2545 FAX (301) 881-0814
AMT FILE # 102-440



DES: JK						
DRN: RLP						_
DICIA: IVE	11 741					
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DATE: 10/10/03	DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	СК	API

NORTH PARKING / BALL FIELD ENTRANCE

SANNER

ROAD

APPLIED PHYSICS LABORATORY THE JOHNS HOPKINS UNIVERSITY

#### UTILITY PLAN

TAX MAP 41 PARCEL 1 ELECTION DISTRICT NO. 5 HOWARD COUNTY, MARYLAND

SHEET C1.11 SHEET 20 OF 84

SCALE AS

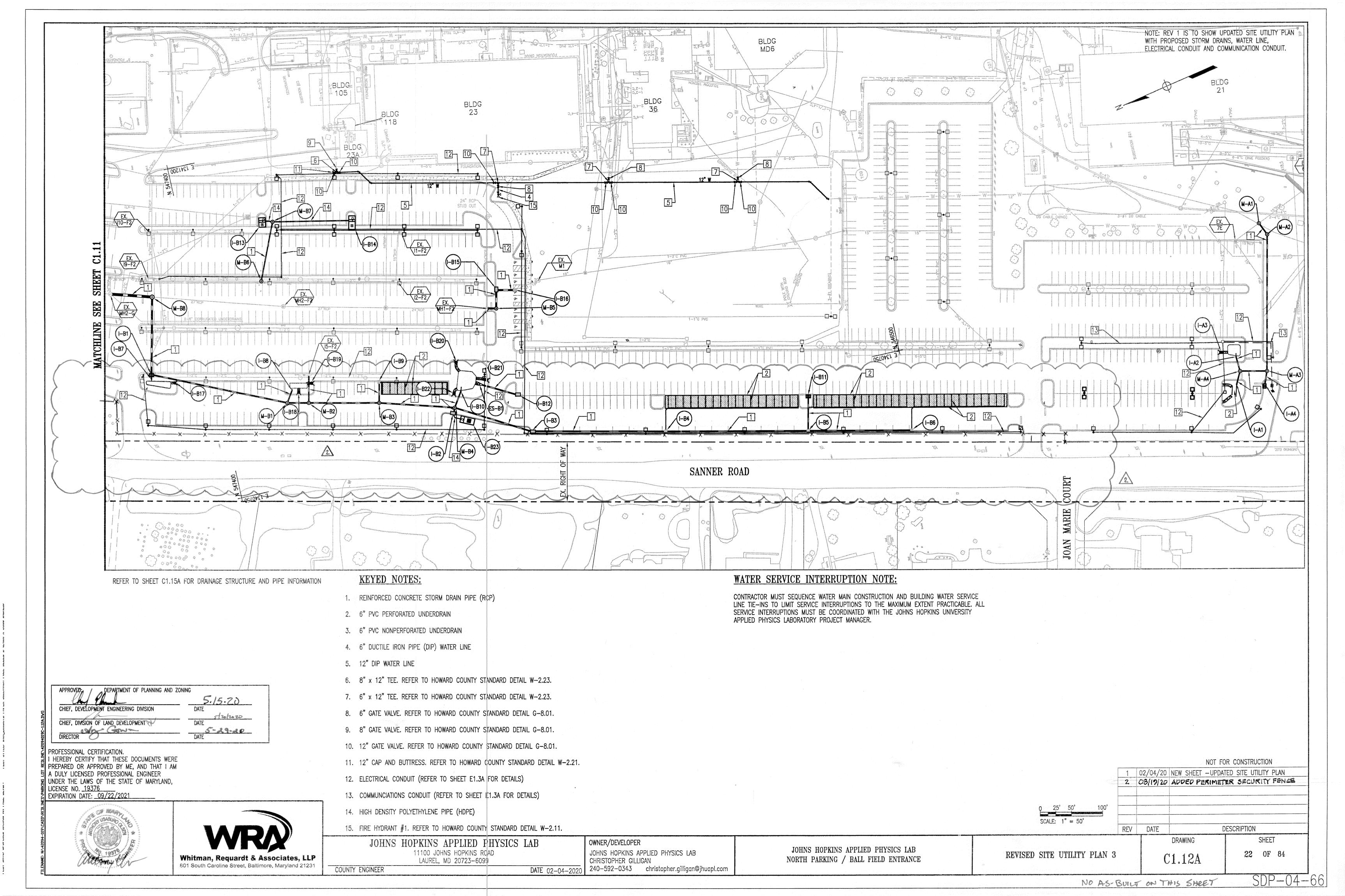
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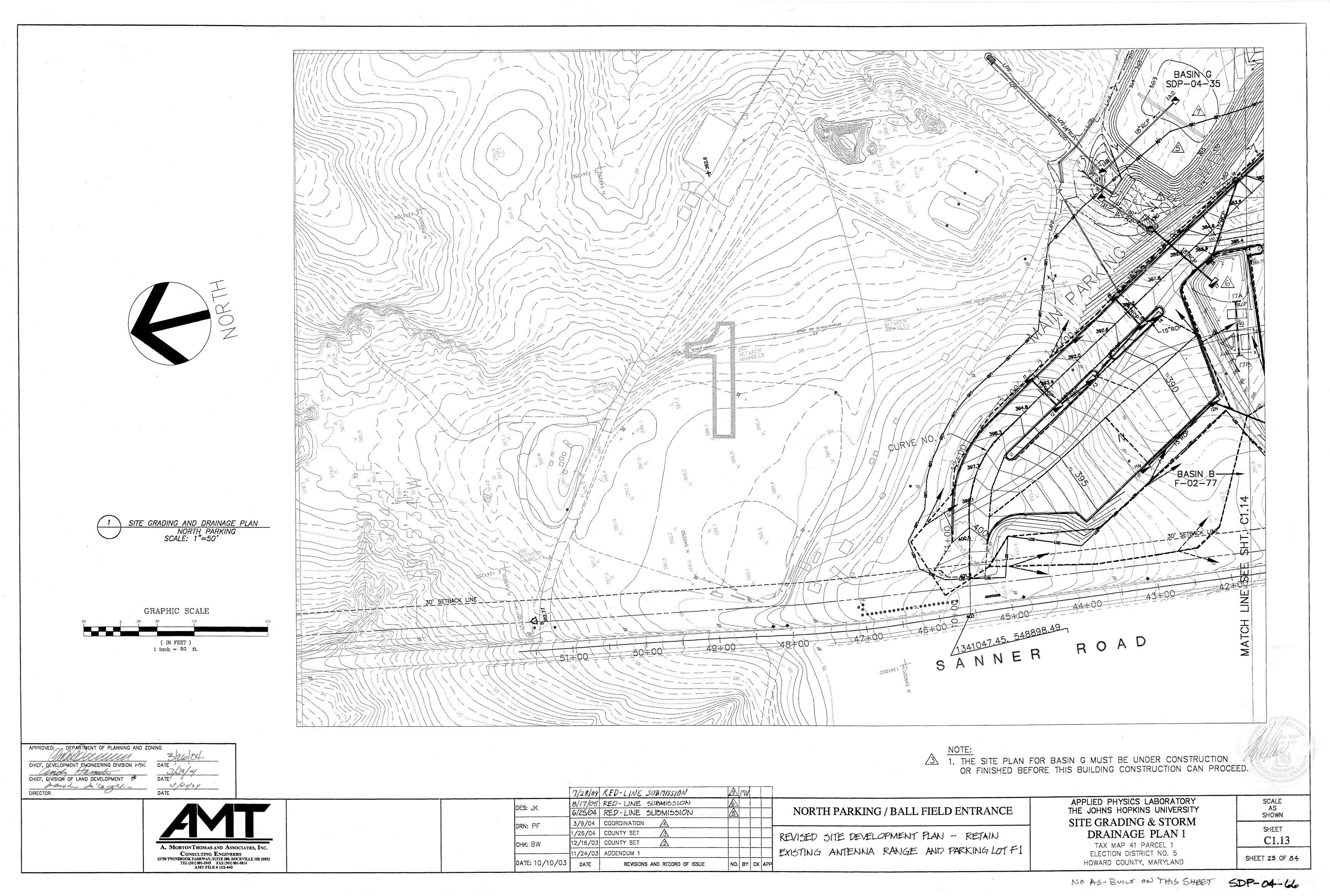
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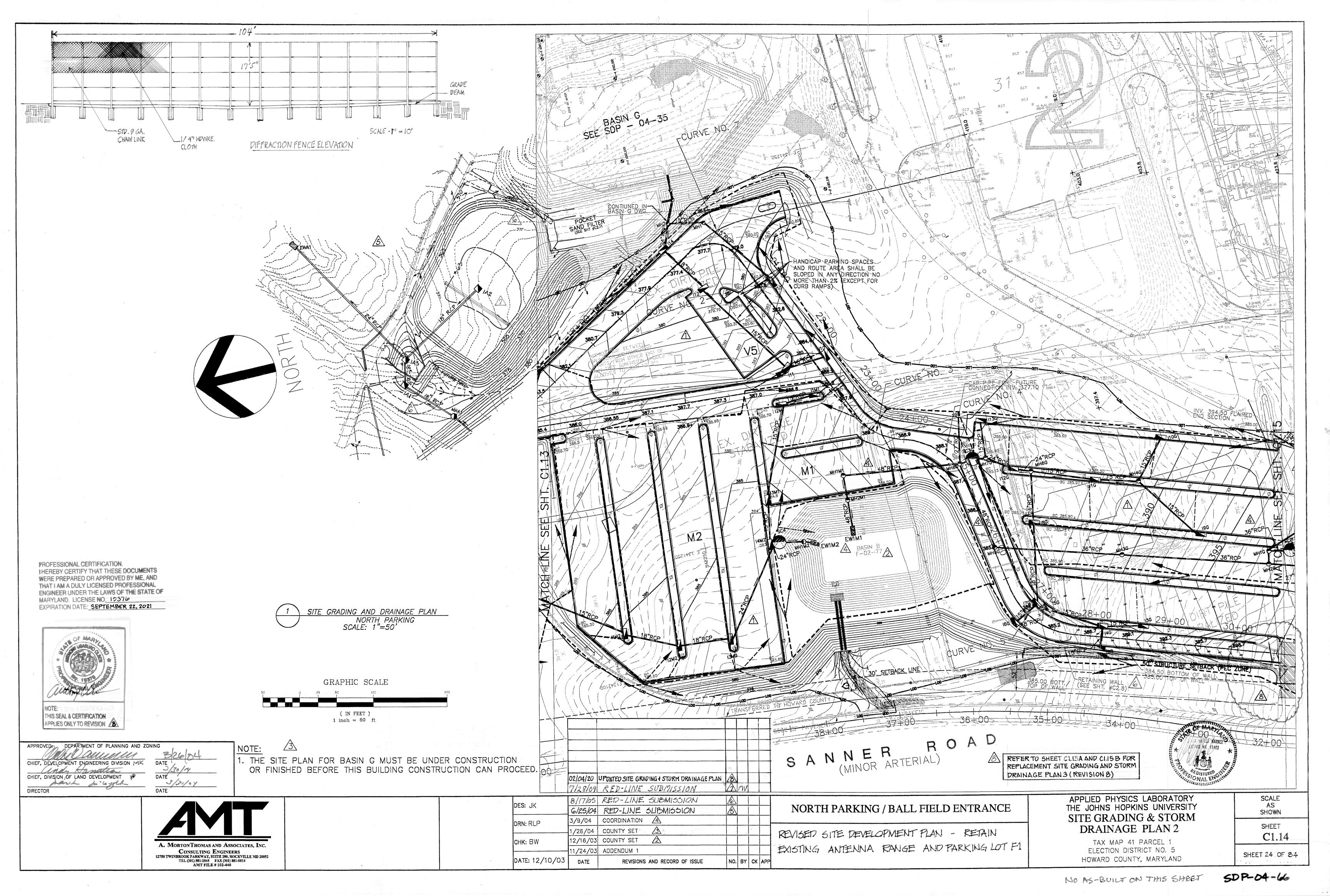
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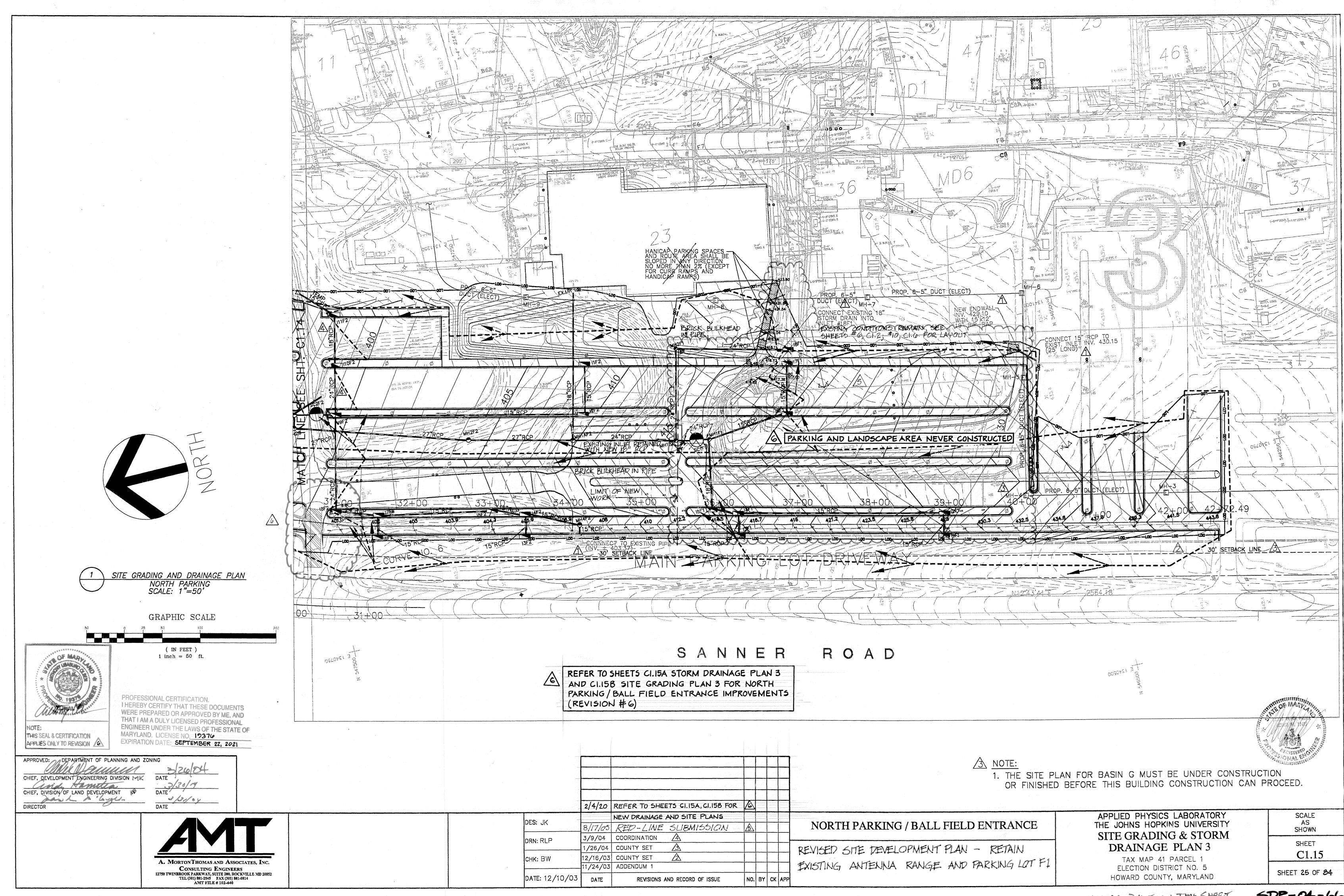


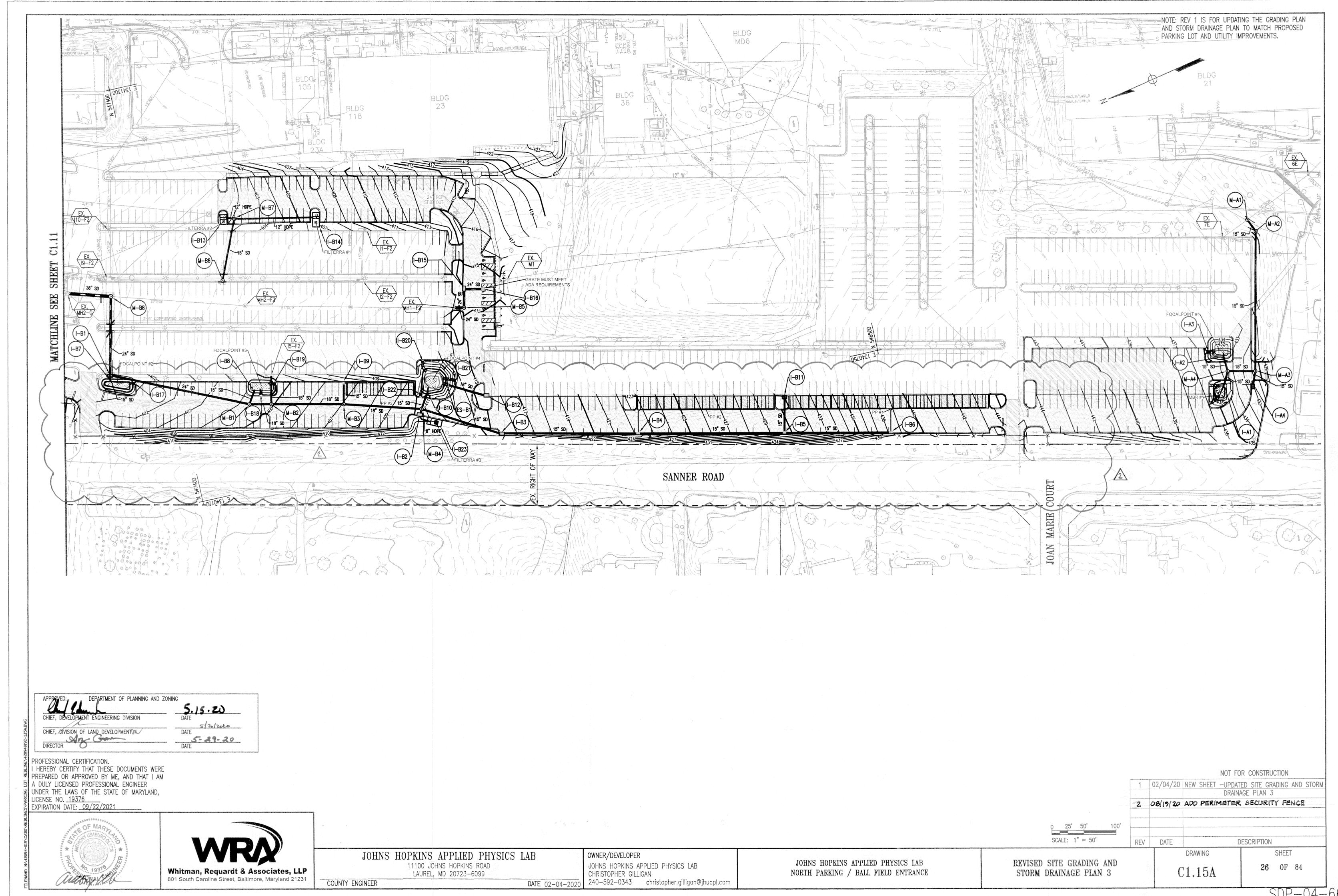
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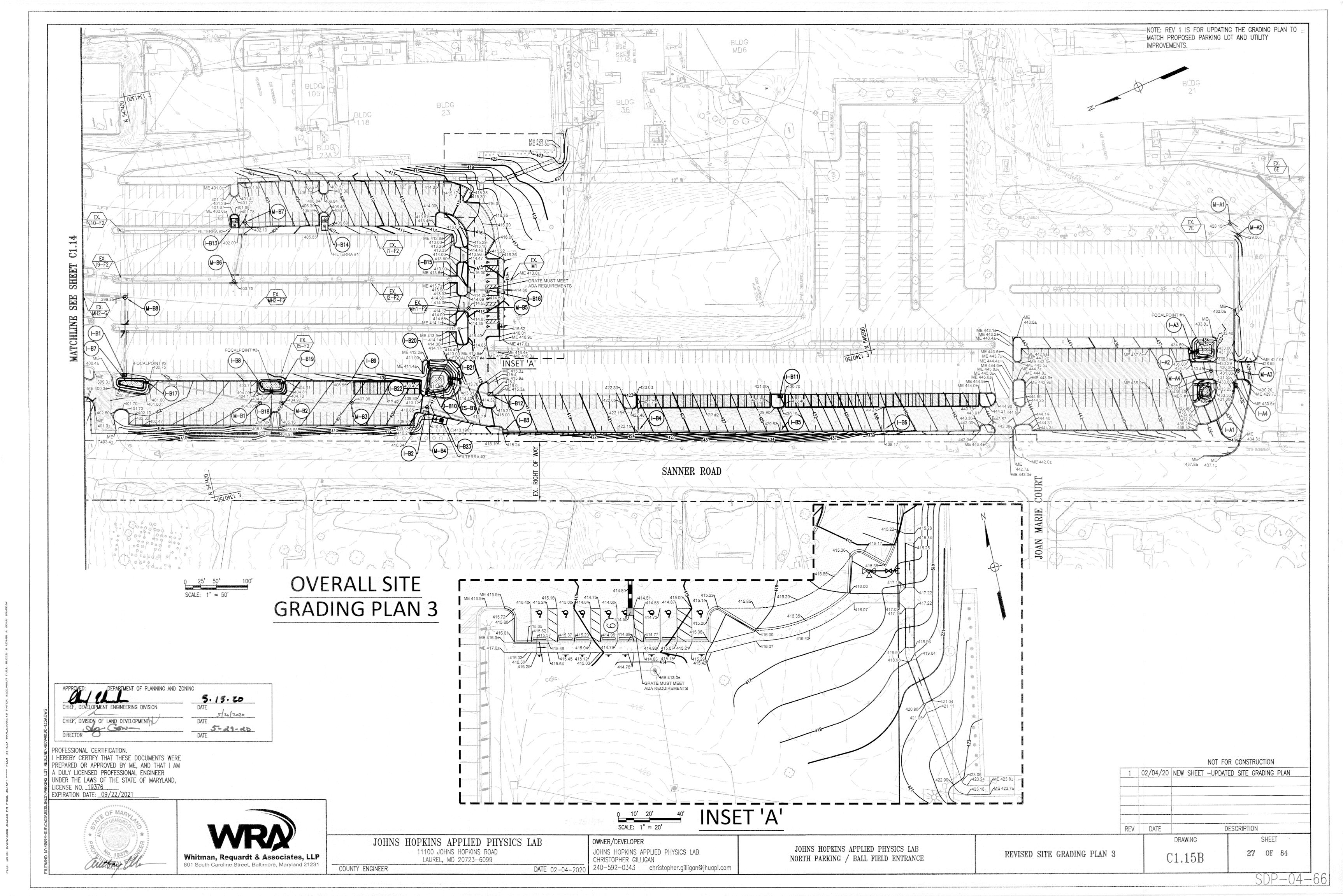


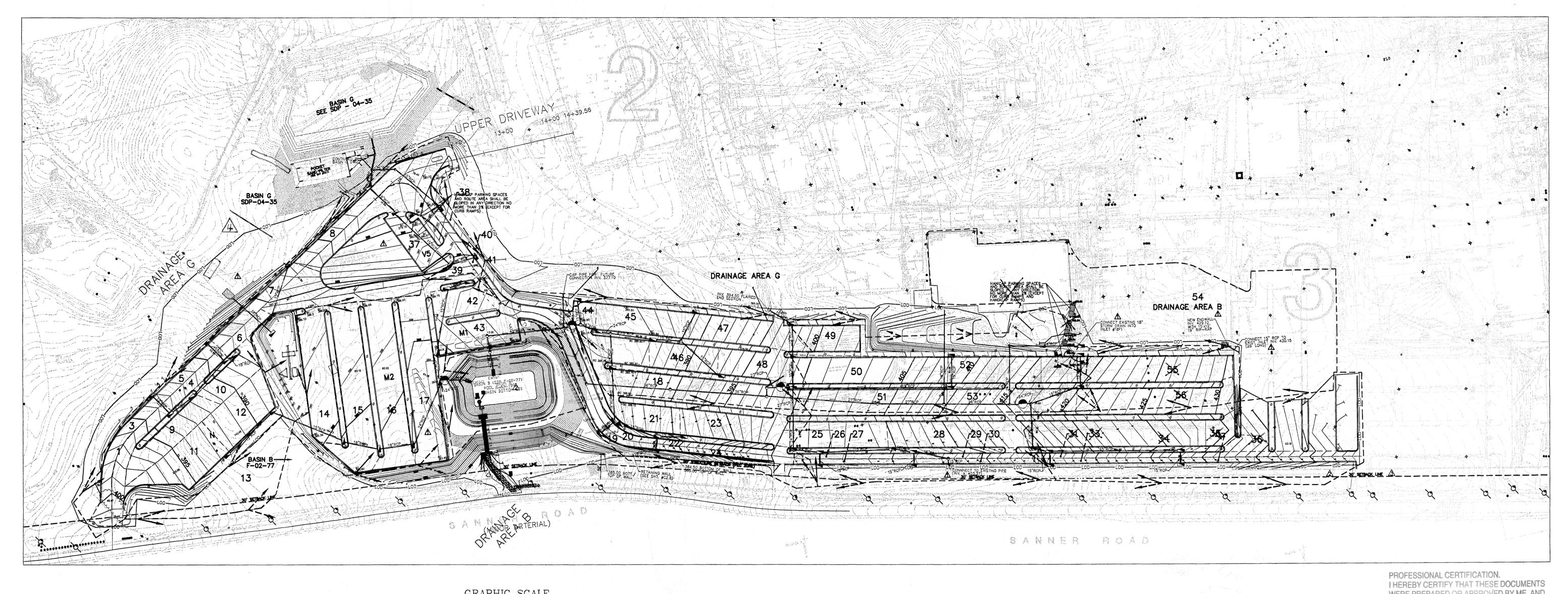


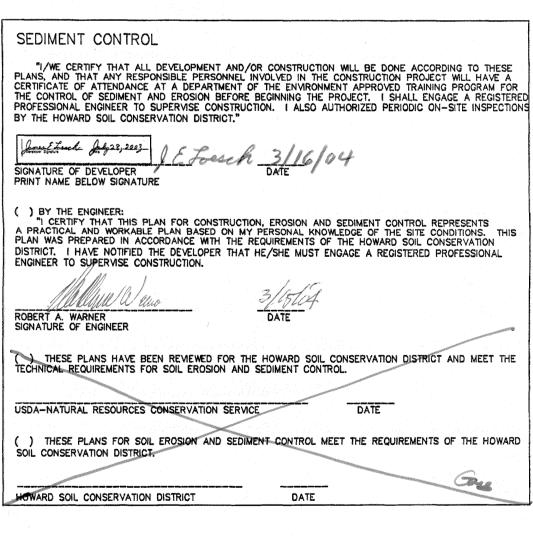




SDP-04-66







DATE #

DATE

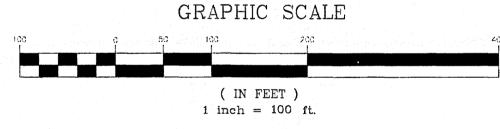
APPROVED: DEPARTMENT OF PLANNING AND ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION

Mul his soll

CHIEF, DIVISION OF LAND DEVELOPMENT

DIRECTOR



SITE GRADING AND DRAINAGE PLAN NORTH PARKING SCALE: 1"=100"

WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE NO. 19376 EXPIRATION DATE: SEPTEMBER 22, 2021

DRAINAGE AREA

1 D.A=0.16 AC c = 0.90% IMPERVIOUS=99% 2 D.A.=0.98 AC c = 0.45% IMPERVIOUS=10% 3 D.A.=0.17 AC

c = 0.9% IMPERVIOUS=99% 4 D.A.=0.09 AC c = 0.9

% IMPERVIOUS=99% 5 D.A.=0.09 AC c = 0.9% IMPERVIOUS=99%

12 D.A.=0.26 AC 6 D.A.=0.10 AC c = 0.9% IMPERVIOUS=99%

c = 0.9% IMPERVIOUS=99% 9 D.A.=0.23 AC c = 0.9% IMPERVIOUS=99%

% IMPERVIOUS=99%

DRAINAGE AREA

7 D.A=0.29 AC

8 D.A.=0.3 AC

c = 0.90

10 D.A.=0.13 AC c = 0.9% IMPERVIOUS=99%

11 D.A.=0.33 AC c = 0.9% IMPERVIOUS=99%

c = 0.9

18 D.A.=0.47 AC c = 0.9% IMPERVIOUS=95% % IMPERVIOUS=99%

c = 0.9

c = 0.9

DRAINAGE AREA DRAINAGE AREA 13 D.A=0.98 AC

19 D.A=0.15 AC c = 0.45c = 0.9% IMPERVIOUS=10% % IMPERVIOUS=99%

14 D.A.=0.32 AC 20 D.A.=0.20 AC c = 0.9c = 0.9% IMPERVIOUS=99% % IMPERVIOUS=99%

15 D.A.=0.44 AC 21 D.A.=0.41 AC c = 0.9c = 0.9% IMPERVIOUS=95% % IMPERVIOUS=95%

16 D.A.=0.45 AC 22 D.A.=0.06 AC c = 0.9% IMPERVIOUS=95% % IMPERVIOUS=99% 17 D.A.=0.46 AC 23 D.A.=0.3 AC c = 0.9

% IMPERVIOUS=95% % IMPERVIOUS=95% 24 D.A.=0.14 AC c = 0.9% IMPERVIOUS=99% DRAINAGE AREA

DRAINAGE AREA 25 D.A=0.43 AC 30 D.A=0,07 AC c = 0.90c=0.90 % IMPERVIOUS=95% % IMPERVIOUS=99%

26 D.A.=0.05 AC c = 0.9% IMPERVIOUS=99% % IMPERVIOUS=99%

35 D.A.≥0.08 AC 3 27 D.A.=0.05 AC c = 0.9% IMPERVIOUS=99% % IMPERVIOUS=99%

28 D.A.=0.38 AC c = 0.9% IMPERVIOUS=95% % IMPERVIOUS=99%

29 D.A.=0.09 AC 35 D.A.≥0,04 AC c = 0.9% IMPERVIOUS=99% 30 D.A.=0.07 AC c = 0.9

% IMPERVIOUS=99% % IMPERVIOUS=95% % IMPERVIOUS=99%

DRAINAGE AREA DRAINAGE AREA

37 D.A=0.92 AC 43 D.A=0.27 AC c = 0.75c = 0.90% IMPERVIOUS=25% % IMPERVIOUS=95%

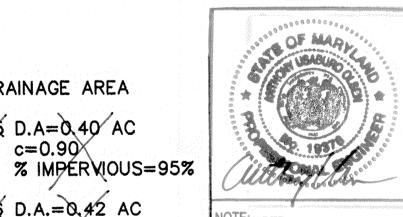
38 D.A.=0.04 AC 44 D.A.=0.06 AC % IMPERVIOUS=95% % IMPERVIOUS=99%

39 D.A.=0.08 AC 45 D.A.=0.25 AC c = 0.9c = 0.9% IMPERVIOUS=99% % IMPERVIOUS=95%

40 D.A.=0.02 AC 46 D.A.=0.19 AC c = 0.9c = 0.9% IMPERVIOUS=95% % IMPERVIOUS=99%

47 D.A.=0.26 AC 41 D.A.=0.06 AC c = 0.9% IMPERVIOUS=95% % IMPERVIOUS=99%

42 D.A.=0.22 AC 48 D.A.=0.21 AC c = 0.9% IMPERVIOUS=95% % IMPERVIOUS=99%



56 D.A.=0.42 AC % IMPERVIOUS=95%

DRAINAGE AREA

55 D.A=0.40 AC

c=0.90×

DRAINAGE AREA

49 D.A=0.19 AC

50 D.A.=0.42 AC

51 D.A.=0.41 AC

52 D.A.=0.34 AC

53 D.A.=0.34 AC

54 D.A.=1.21 AC

c = 0.45

% IMPERVIOUS=95%

% IMPERVIOUS=95%

% IMPERVIOUS=95%

% IMPERVIOUS=95%

% IMPERVIOUS=95%

% IMPERVIOUS=10%

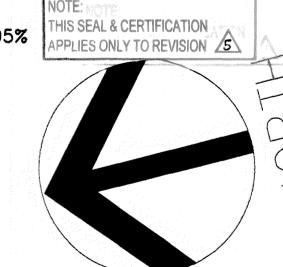
c = 0.90

c = 0.9

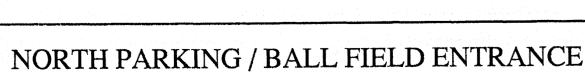
c = 0.9

c = 0.9

c = 0.9



REFER TO SHEET CI.IGA FOR REPLACEMENT DRAINAGE AREA B PLAN (REVISION #5)



REVISED SITE DEVELOPMENT PLAN- RETAIN EXISTING ANTENNA RANGE AND PARKING LOT FI

APPLIED PHYSICS LABORATORY THE JOHNS HOPKINS UNIVERSITY DRAINAGE AREA B

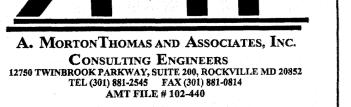
**PLAN** TAX MAP 41 PARCEL 1 ELECTION DISTRICT NO. 5 HOWARD COUNTY, MARYLAND SCALE AS SHOWN SHEET

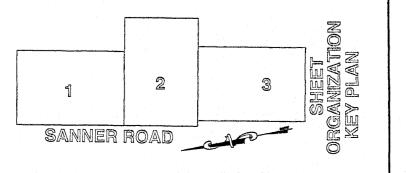
SHEET 28 OF 84

C1.16

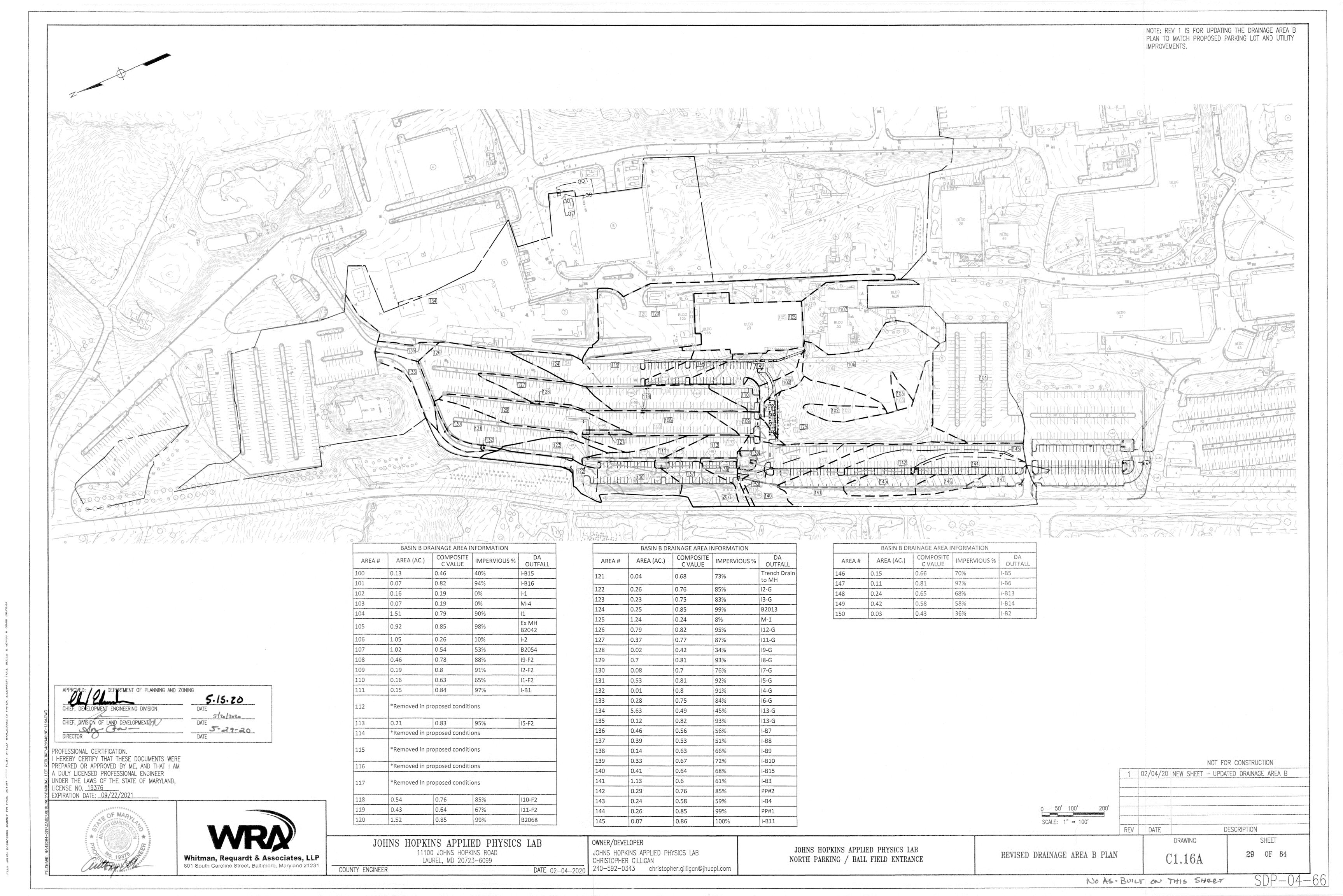
AT AWARDER WARNER

12thst/nn. 13403

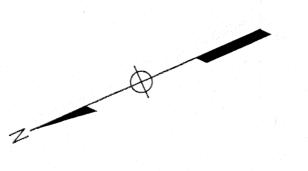




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DES. UK				1,444	.37.		
DRN: PF	2/4/20	SEE SHEET CI.IGA FOR UPDATED DRAINAGE AREAS	B	ement and a distribute of	e nor o pri dell'opperatione res	**************************************	
		RED LINE SUBMISSION	4	MV			
CHK: BW	8/17/05	RED-LINE SUBMISSION	3	17			
	12/16/03	COUNTY SET A					
DATE: 10/10/03	DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	СК	APP	



		and a subserver of the			And the state of t
		BASIN A DRA	INAGE AREA	INFORMATION	1
AREA	#	AREA (AC.)	COMPOSITE C VALUE	IMPERVIOUS %	DA OUTFALL
200		0.32	0.85	99%	7E
201		0.64	0.72	79%	8E
202		0.09	0.86	100%	7E1
203		1.49	0.62	65%	6E2
204		0.02	0.19	0%	A4075
205		2.82	0.29	15%	A4082
206		0.44	0.79	90%	I-A2
207		0.11	0.64	67%	I-A1
208		0.11	0.66	70%	I-A4

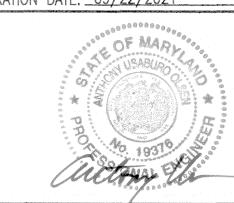


5.15.20 DATE CHIEF, DIVISION OF LAND DEVELOPMENT 5-27-20 DATE

PROFESSIONAL CERTIFICATION.

I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 19376

EXPIRATION DATE: 09/22/2021





er in de generalingstaat te anter geveel. Dit geleer van die bevoor gevelts van dit teveren Vorgenigsberg.	
JOHNS HOPKINS APPLIED PHYSICS LAI	D
AND UNLIND WELLIED LUISIOS THI	D
11100 JOHNS HOPKINS ROAD	
LAUREL, MD 20723-6099	
COUNTY ENGINEER	ATE

OWNER/DEVELOPER JOHNS HOPKINS APPLIED PHYSICS LAB
CHRISTOPHER GILLIGAN
240-592-0343 christopher.gilligan@jhuapl.com

JOHNS HOPKINS APPLIED PHYSICS LAB NORTH PARKING / BALL FIELD ENTRANCE

REVISED DRAINAGE AREA A PLAN

SHEET DRAWING 30 OF 84 C1.16B

1 02/04/20 NEW SHEET - UPDATED DRAINAGE AREA A

NOTE: REV 1 IS FOR UPDATING THE DRAINAGE AREA A PLAN TO MATCH PROPOSED PARKING LOT AND UTILITY IMPROVEMENTS.

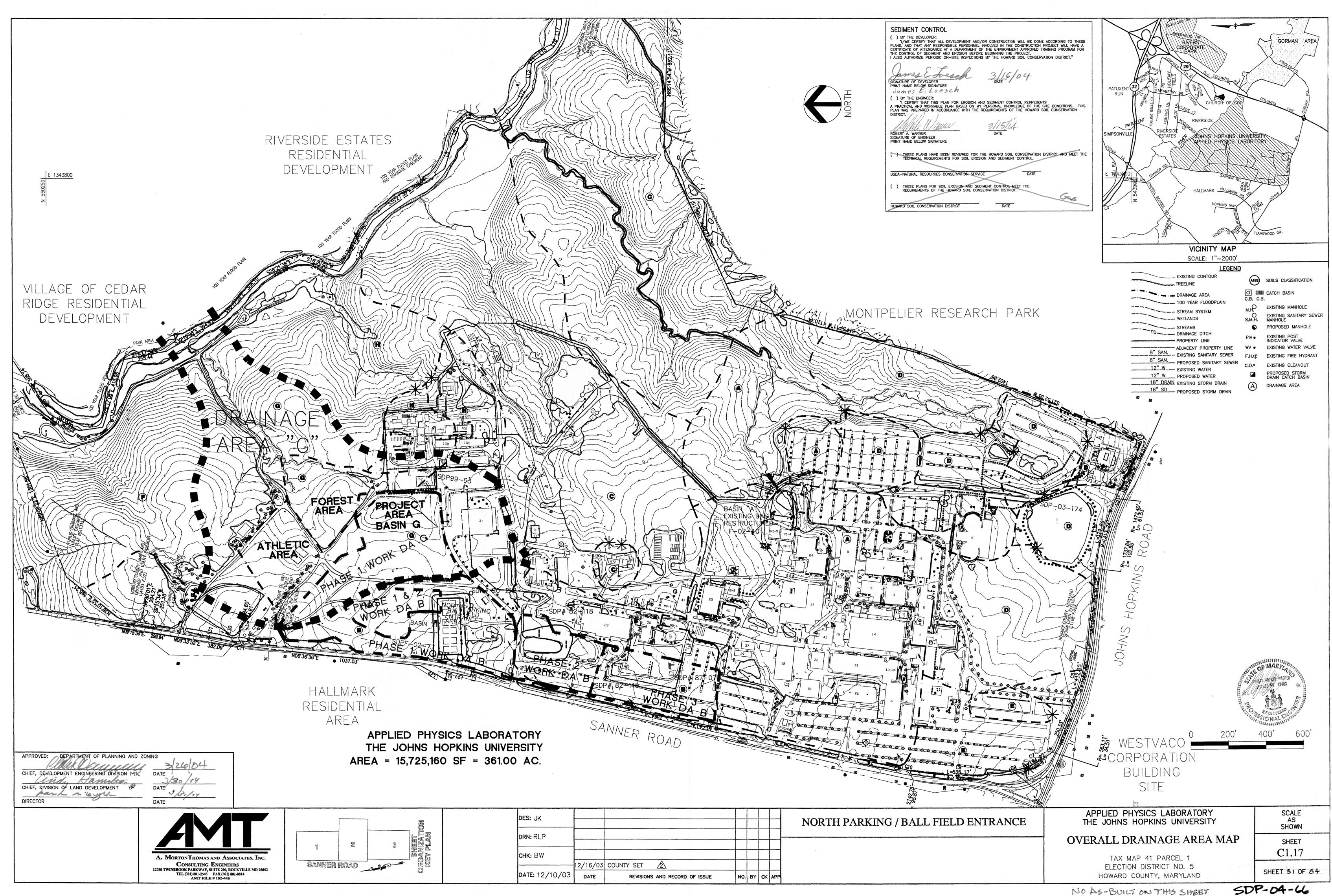
NO AS-BUILT ON THIS SHEET

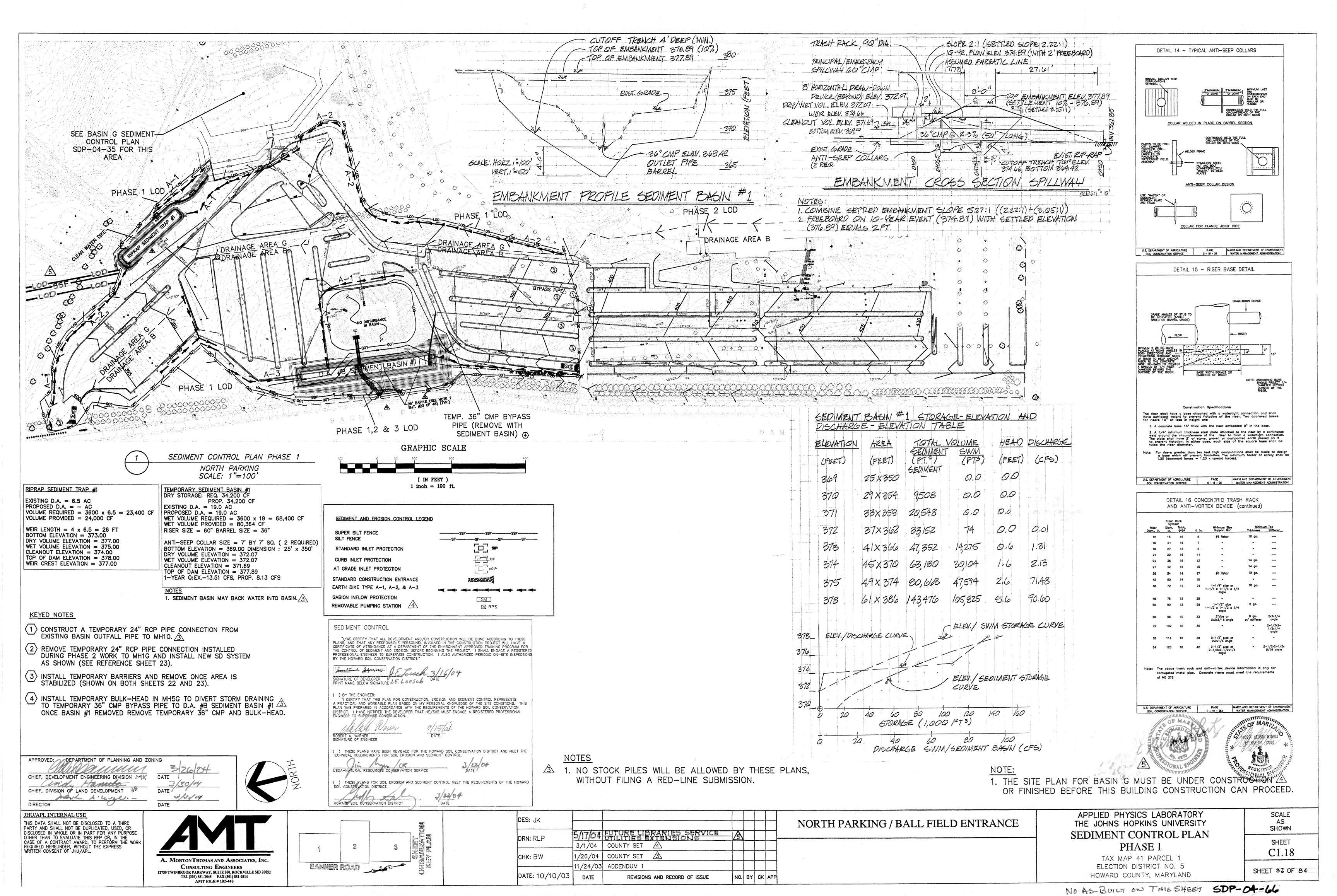
SDP-04-66

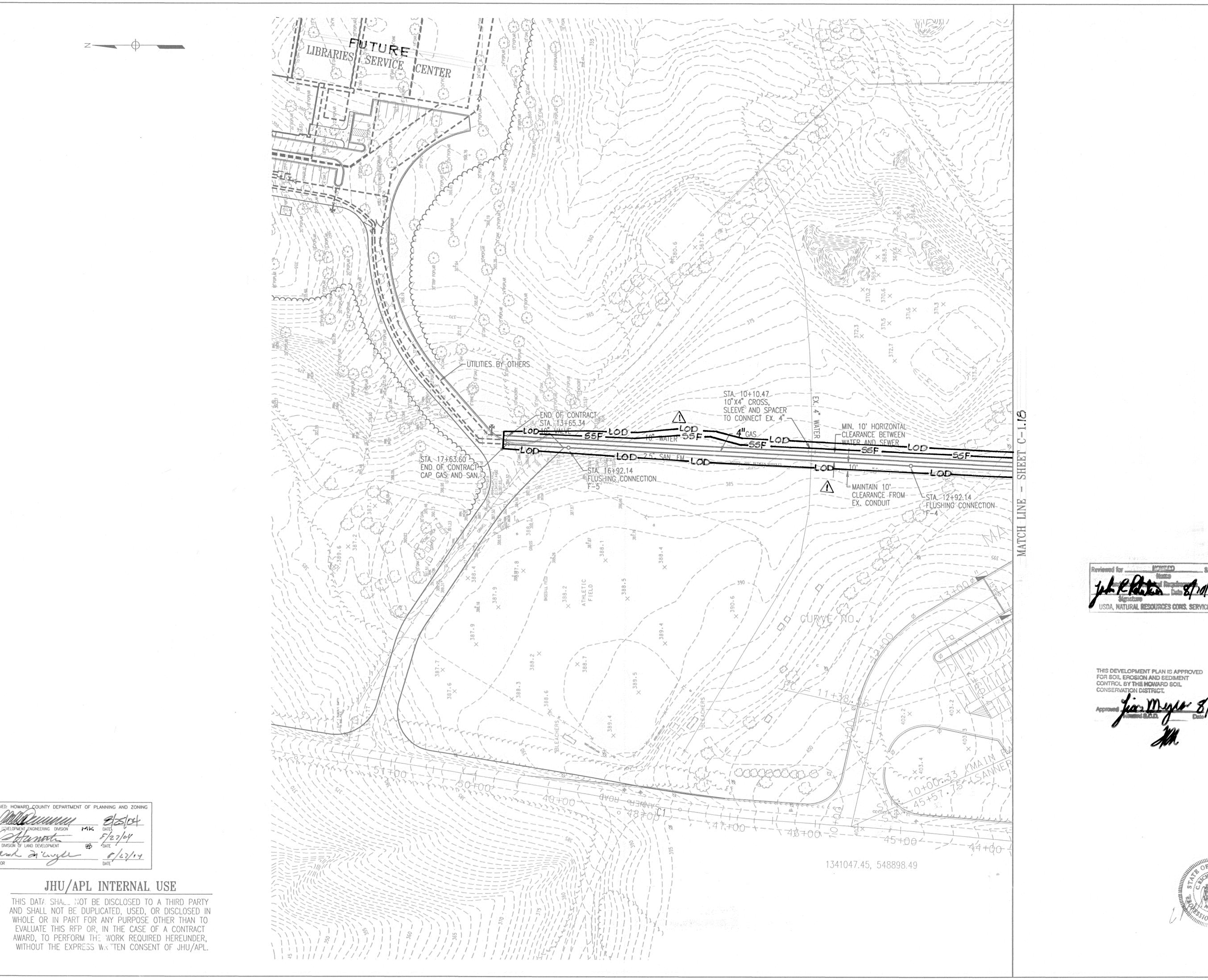
NOT FOR CONSTRUCTION

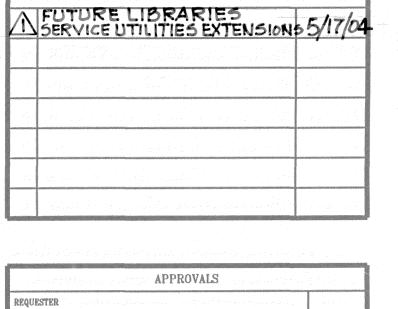
REV DATE

DESCRIPTION









REVISIONS

APPROVALS	
REQUESTER	71111
PLANT FACILITIES CHIEF ENGINEER	
CODE COMPLIANCE REVIEW	
TSC GROUP IN THE COMMENT OF A PROPERTY OF A	12.72.72.0
TSF GROUP	
SAPETY OPPICER	era jan jija
DIRECTORS OFFICE	3 ,24-2-4
COORDINATOR - 200 - 200 / 200	verent vije e
SENIOR LEADER	

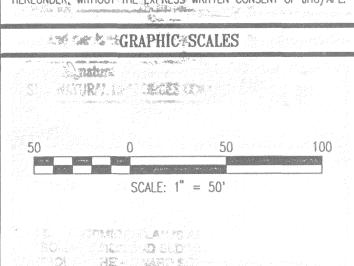
THE JOHNS HOPKINS UNIVERSITY APPLIED PHYSICS LABORATORY JOHNS HOPKINS ROAD LAUREL MARYLAND 20723-6099

THE JOHNS HOPKINS UNIVERSITY

LIBRARIES SERVICE CENTER

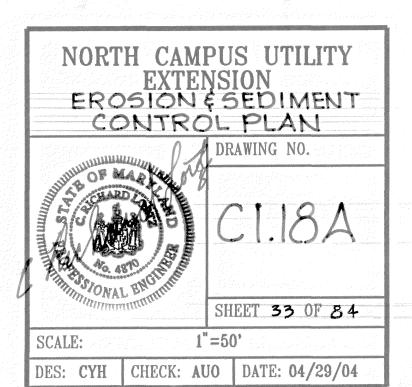
#### JHU/APL INTERNAL USE

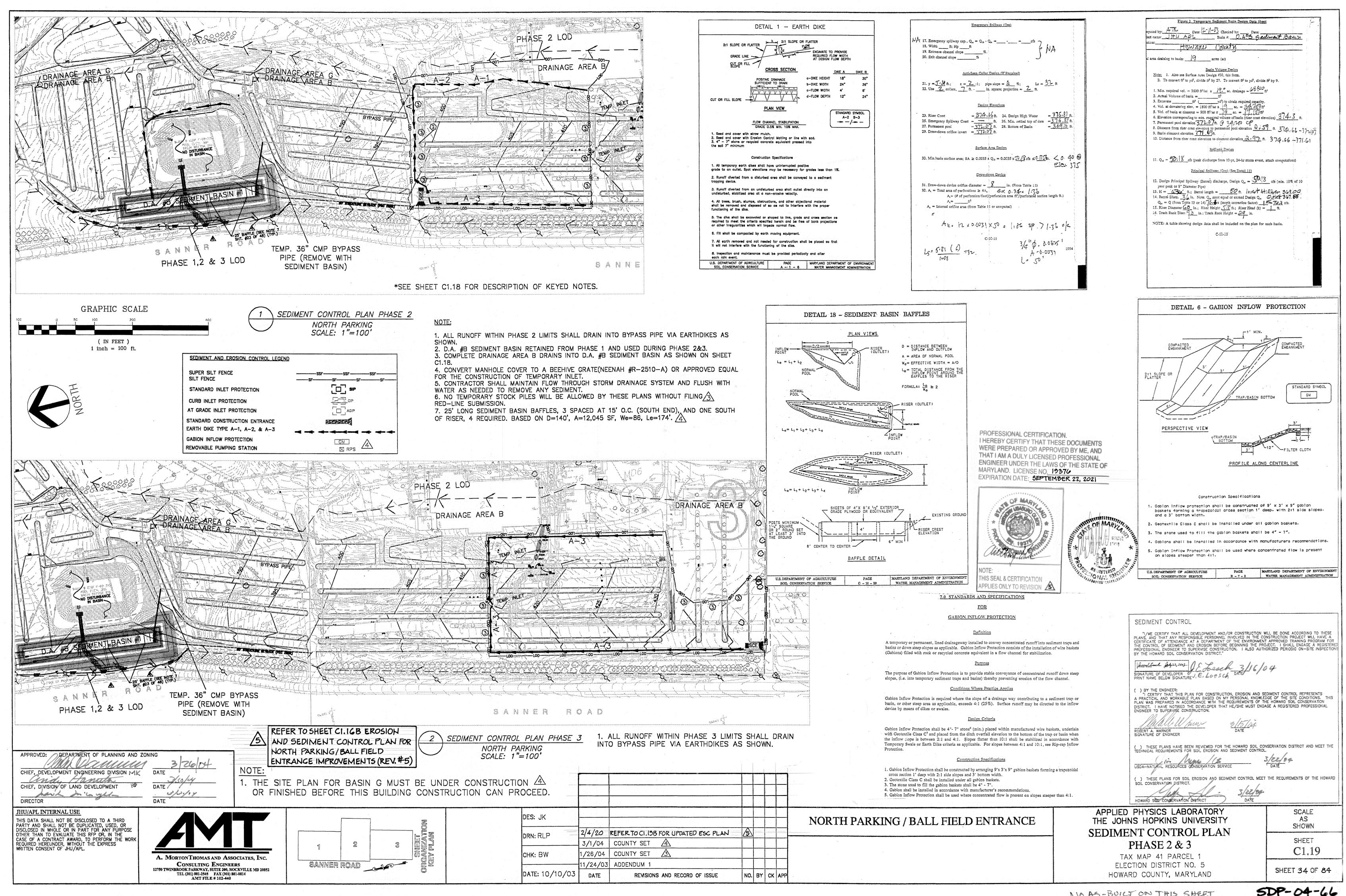
THIS DATA SHALL NOT BE DISCLOSED TO A THIRD PARTY AND SHALL NOT BE DUPLICATED, USED, OR DISCLOSED IN WHOLE OR IN PART FOR ANY PURPOSE OTHER THAN TO EVALUATE THIS RFP OR, IN, THE CASE OF A CONTRACT AWARD, TO PERFORM THE WORK REQUIRED HEREUNDER, WITHOUT THE EXPRESS WRITTEN CONSENT OF JHU/APL.

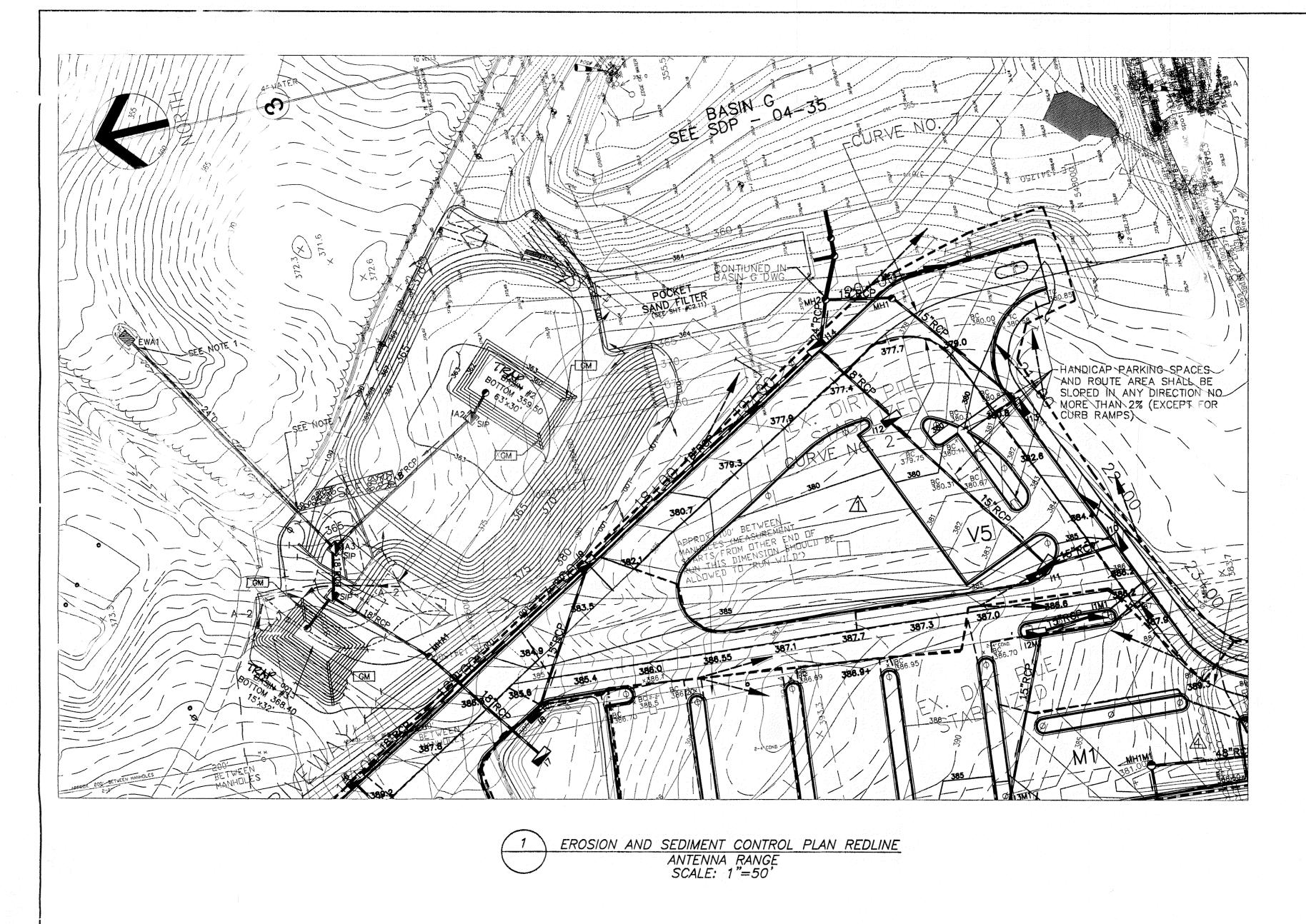




WHITMAN, REQUARDT AND ASSOCIATES, LLP
801 SOUTH CAROLINE STREET
BALTIMORE, MARYLAND 21231
410 - 235 - 3450







#### NOTES:

1. NEW RIP-RAP HEADWALL #EWA1 AND 24" RCP SHALL BE EXCAVATED IN NO MORE THEN 100 LINEAR FEET PER DAY. AT THE COMPLETION OF A DAY'S WORK THE AREA WILL BE BACK FILLED, TOPSOIL INSTALLED, SEEDED AND MULCHED. WORK SHALL START FROM THE HEADWALL AREA AND PROCEED ALONG THE PIPE TO INLET #IA3.

APPROVED; DEPARTMENT OF PLANNING AND ZONING CHIEF, DEVELOPMENT ENGINEERING DIVISION MK 9/21/04 CHIEF, DIVISION OF LAND DEVELOPMENT DATE 7/22/04 De lesse DATE

GRAPHIC SCALE ( IN FEET ) 1 inch = 50 ft.

JHU/APL INTERNALUSE THIS PATA SHALL NOT BE DISCLOSED TO A THIRD PARTY AND SHALL NOT BE DUPLICATED, USED, OR DISCLOSED IN WHOLE OR IN PART FOR ANY PURPOSE OTHER THAN TO EVALUATE THIS REP OR IN THE CASE OF A CONTRACT AWARD, TO PERFORM THE WORK REQUIRED HEREUNDER WITHOUT THE EXPRESS WRITTEN CONSENT OF "JHU/APL.



	DES: JK	र्जन्ति स्ट्री	ak era Maria a Suka era de kalandar era da era er					
	DL3. UK	6/25/04	RED-LINE SUBMISSION					
	DRN: PF	3/9/04	COORDINATION (A)					-
		1/26/04	COUNTY SET A				1	
	<b>снк:</b> ВW	12/16/03	COUNTY SET 🛕		1 2	2.27		
		11/24/03	ADDENDUM 1	12.5		200	- 22	
	DATE: 10/10/03	DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	СК	APP	

SEDIMENT AND EROSION CONTROL LEGEND

SUPER SILT FENCE SILT FENCE

STANDARD INLET PROTECTION

CURB INLET PROTECTION

AT GRADE INLET PROTECTION

STANDARD CONSTRUCTION ENTRANCE EARTH DIKE TYPE A-1, A-2, & A-3

GABION INFLOW PROTECTION REMOVABLE PUMPING STATION GM

RIPRAP SEDIMENT TRAP #2

EXISTING D.A. = 1.3 AC PROPOSED D.A. = 1.3 AC VOLUME REQUIRED =  $3600 \times 1.3 = 4,680$  CF VOLUME PROVIDED = 4.725 CF BOTTOM DIMENSIONS =  $63 \text{ FT. } \times 30 \text{ FT.}$ 

WEIR LENGTH = 18" DIA. = 4.7 FT BOTTOM ELEVATION = 359.50 DRY VOLUME ELEVATION = 362.00WET VOLUME ELEVATION = 360 75 CLEANOUT ELEVATION = 360.12TOP OF DAM ELEVATION = 363.00 (BASIN EDGE) WEIR CREST ELEVATION = 362.00 (RISER)

RIPRAP SEDIMENT TRAP #3

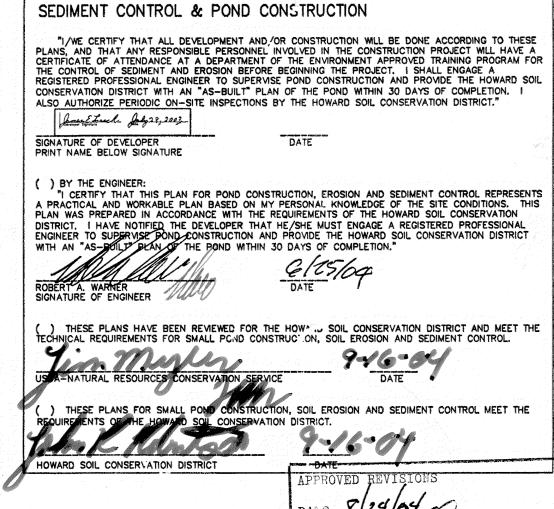
EXISTING D.A. = 0.4 AC PROPOSED D.A. = 0.4 AC VOLUME REQUIRED =  $3600 \times 0.4 = 1,440 \text{ CF}$ VOLUME PROVIDED = 1,440 CF BOTTOM DIMENSIONS = 15 FT x 32 FT

NORTH PARKING / BALL FIELD ENTRANCE

REVISED SITE DEVELOPMENT PLAN GRADING OF AREA TO BE USED FOR AMTERINA

WEIR LENGTH = 15" DIA. = 3.9 FT BOTTOM ELEVATION = 368.40 DRY VOLUME ELEVATION = 371.40 WET VOLUME ELEVATION = 369.90 CLEANOUT ELEVATION = 369.15 TOP OF DAM ELEVATION = 372.40WEIR CREST ELEVATION = 371.40

AS SHOWN

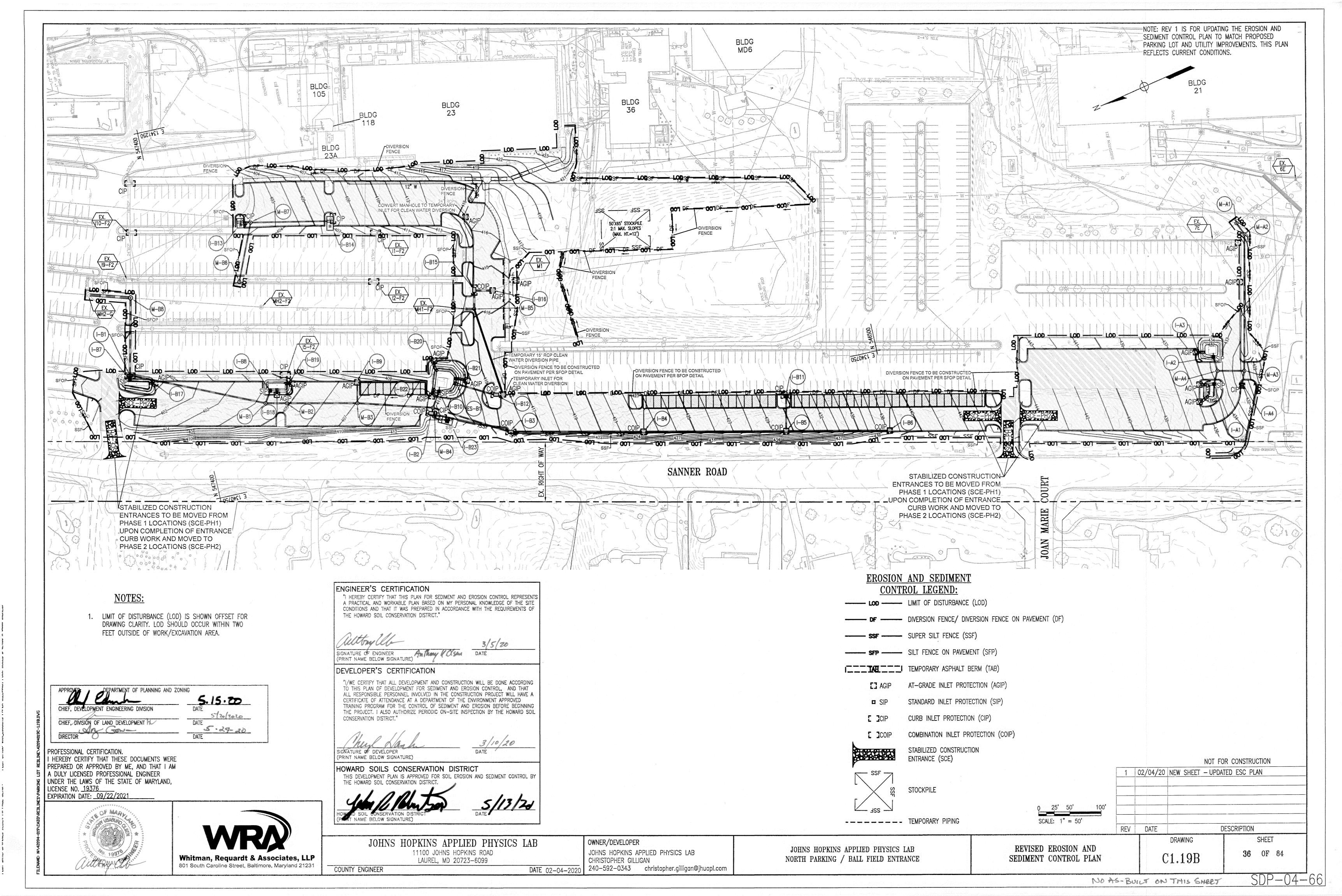


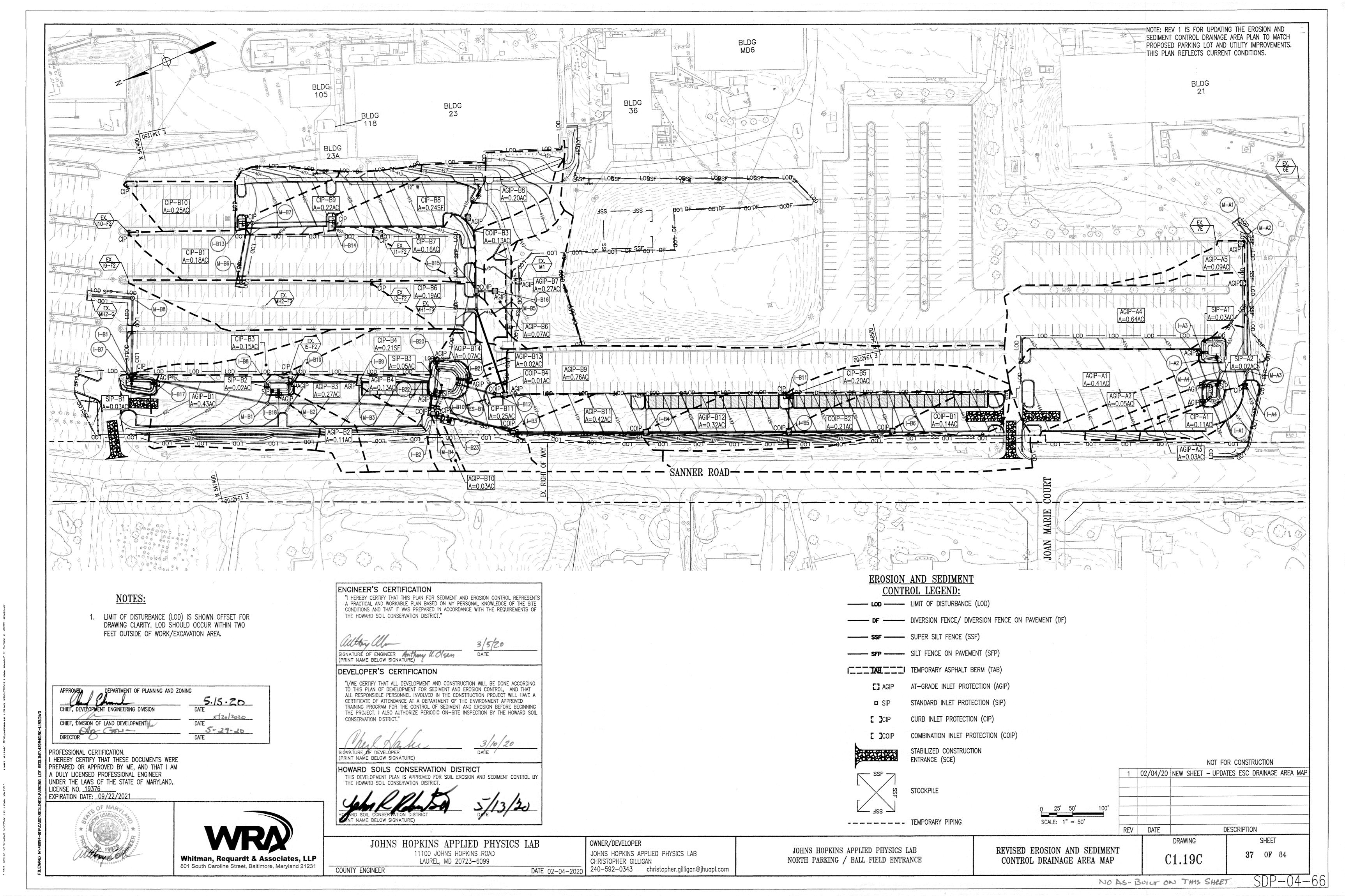
APPLIED PHYSICS LABORATORY

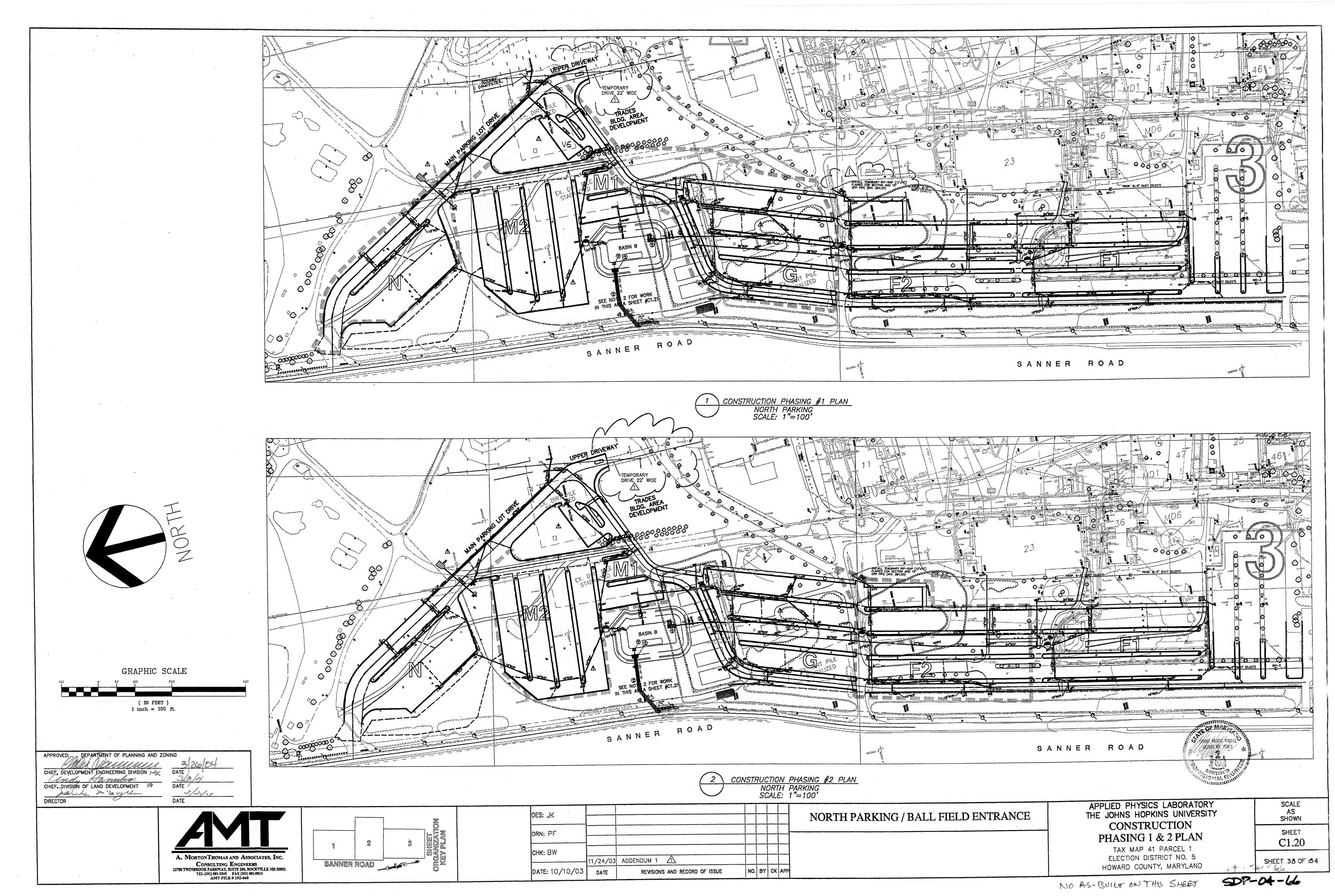
THE JOHNS HOPKINS UNIVERSITY **EROSION AND SEDIMENT CONTROL** 

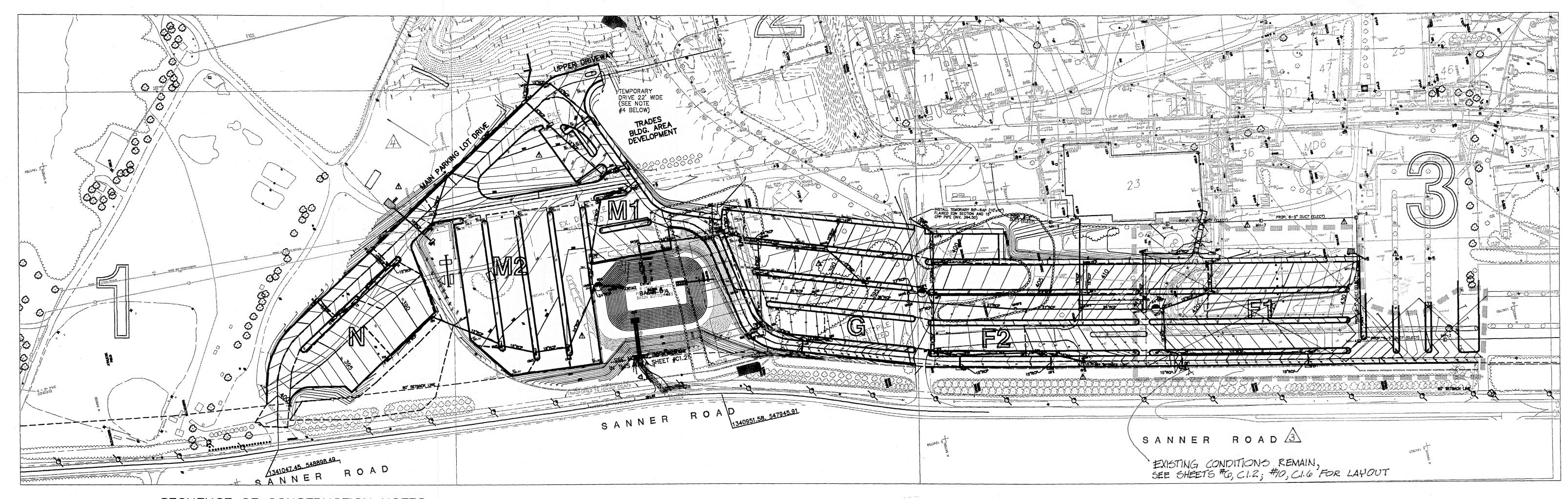
> TAX MAP 41 PARCEL 1 ELECTION DISTRICT NO. 5

SHEET PLAN RED-LINE C1.19A SHEET 35 OF 84 HOWARD COUNTY, MARYLAND











1. ONCE NOTICE TO PROCEED IS OBTAINED, CONTRACTOR SHALL FOLLOW SEQUENCE OF CONSTRUCTION, AS DESCRIBED ON SHEET #C2.13. TRAFFIC FLOW ON THE EXISTING DRIVE SOUTH OF PHASE 1 FROM SANNER ROAD SHALL BE MAINTAINED AT ALL TIMES.

2. PHASE WORK SHALL INCLUDE THE AREA DESIGNATED ON THE PLAN PLUS GRADING AREA AND STORM DRAINAGE AREA IN LOTS #M1 AND #M2, PLUS BASIN B AS FOLLOWS:

PHASE 1 WORK INCLUDES: PARKING LOTS #M1 AND #M2 ROUGH GRADE TO WITHIN 12" OF FINISHED GRADE, TOPSOIL AND PERMANENT SEED" (ESTABLISH TURF).

• PHASE 1 WORK INCLUDES CONSTRUCTION OF BASIN B AS PERMITTED UNDER SDP F-02-70. • PHASE 1 WORK INCLUDES STORM DRAINAGE PIPE SYSTEM FROM MANHOLE #MH8G TO AND INCLUDING RIP-RAP AT END WALL #EW1M1.

3. ALL PHASE 1 WORK SHALL BE COMPLETELY INSPECTED AND APPROVED BY JHU/APL BEFORE THE START OF PHASE 2 WORK, AND PHASE 3 WORK SHALL NOT BE STARTED UNTIL PHASE 2

WORK IS APPROVED. ALLOW FOR A MINIMUM 30 DAYS PERIOD BETWEEN PHASES OF WORK TO COMPLY WITH INSPECTION ACCEPTANCE COMPLIANCE.

4. AFTER RECEIVING NOTICE TO PROCEED FOR PHASE 2 WORK, THE CONTRACTOR SHALL FOLLOW

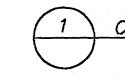
THE SEQUENCE OF CONSTRUCTION AS DESCRIBED ON SHT. # C2.13. TRAFFIC FLOW ON THE MAIN

PARKING LOT DRIVE (BUILT IN PHASE 1) SHALL BE MAINTAINED AT ALL TIMES. A TEMPORARY

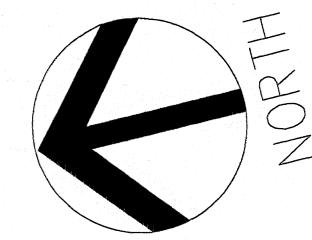
ACCESS DRIVE FROM THE NEW UPPER DRIVEWAY TO BUILDING #31 LOADING AREA SHALL BE MAINTAINED AT ALL TIMES DURING PHASE 2, AND SHALL BE RELOCATED AS REQUIRED BY APL (AT LEAST TWO TIMES). THE TEMPORARY ACCESS DRIVE SHALL BE MAINTAINED AT ALL TIMES FOR 2-WAY TRACK TRAILER TRAFFIC WITH AN ALL WEATHER/DUST FREE SURFACE, MINIMUM 22' WIDE.

5. AFTER RECEIVING NOTICE TO PROCEED FOR PHASE 3 WORK, THE CONTRACTOR SHALL FOLLOW THE SEQUENCE OF CONSTRUCTION AS DESCRIBED ON SHT. #C2.13 BEFORE START OF PHASE 3 WORK. INSTALL A TEMPORARY SECURITY FENCE SOUTH OF BUILDING #23 AND EAST OF THE WORK, SEE SHT. #C1.6 FOR LOCATION.

6. EACH PHASE OF THE WORK SHALL BE COMPLETED AS SHOWN. COMPLY WITH CLOSURE REQUIREMENTS FOR EACH PHASE SPECIFIED IN THE SEQUENCE OF CONSTRUCTION SHT. #C2.13.



CONSTRUCTION PHASING #3 PLAN NORTH PARKING SCALE: 1"=100'



GRAPHIC SCALE ( IN FEET ) 1 inch = 100 ft.

CHIEF, DEVELOPMENT ENGINEERING DIVISION and Hande CHIEF, DIVISION OF LAND DEVELOPMENT

3/2/14

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	DRN: PF	7/28/09	RED-LINE SUBMISSION	4	MV		7
		8/17/05	RED-LINE SUBMISSION	3			11.0
•	снк: BW	12/16/03	COUNTY SET 🛕				
		11/24/03	ADDENDUM 1 🛆				11 1 11 4
	DATE: 10/10/03	DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	СК	APP

NOR	TH PARKING	/BALL FIELD	ENTRANCE

REVISED SITE DEVELOPMENT FLAN - RETAIN EXISTING ANTENINA RANGE AND PARKING LOT FI

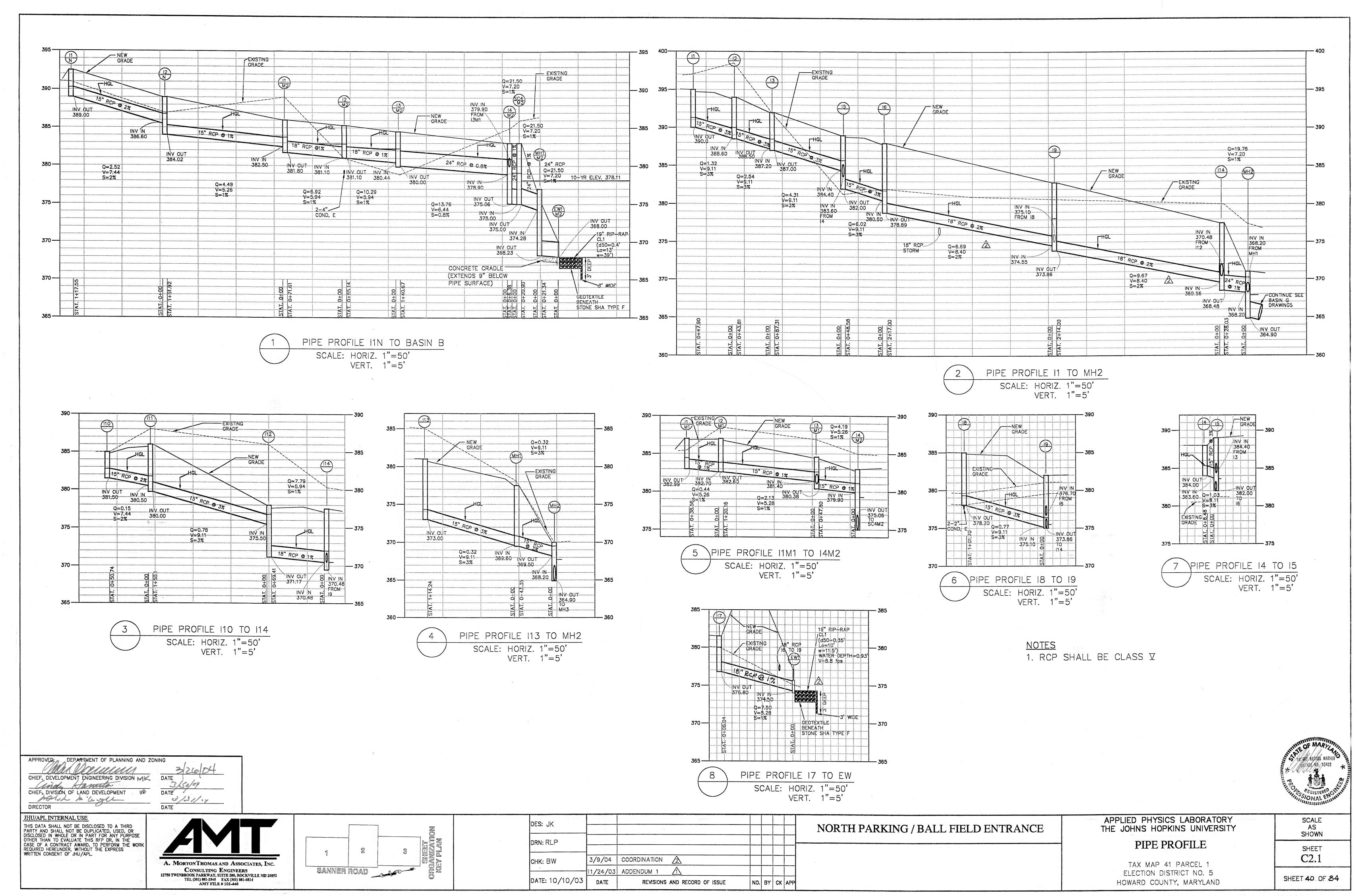
APPLIED PHYSICS LABORATORY THE JOHNS HOPKINS UNIVERSITY CONSTRUCTION PHASING #3 PLAN TAX MAP 41 PARCEL 1

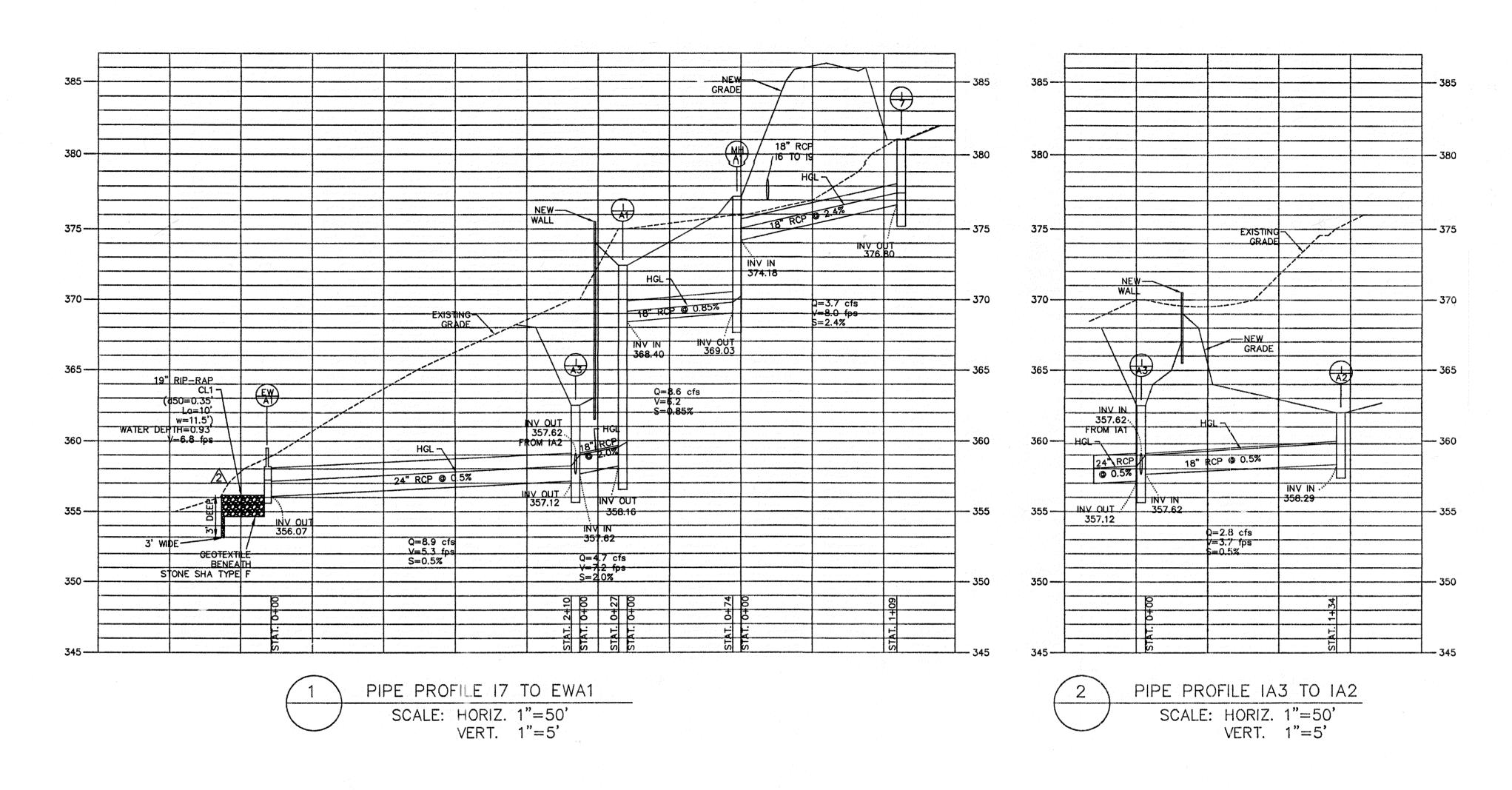
ELECTION DISTRICT NO. 5

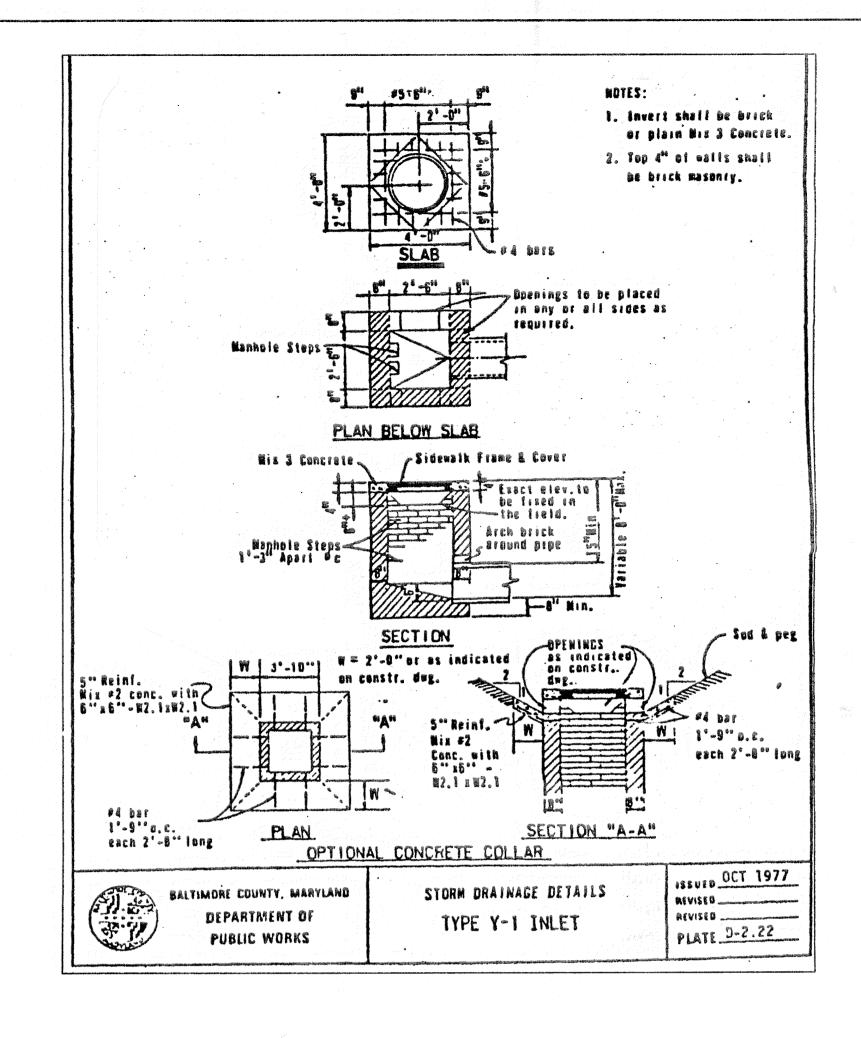
HOWARD COUNTY, MARYLAND

AS SHOWN SHEET C1.21

SHEET 39 OF 84







# DRAIN PIPE SCHEDULE

FROM		TO		SIZE		LENGT	н	SLOPE	Ξ.	FLOW		10-Y	R V	ELOCI	TY	PIPE
				inche	s)	(feet)	) jedi	%		CAP.(cfs	3)	Q (cf	s)	(fps)	tical	type
17		MHA1		18	word S	109	and a	2.4	¥ (	14.4		3.7	1,000,000	8.0		RCP
MHA1		IA1	- Stylene	18		74	t parties de	0.85		8.6		3.7	a seek seek as	6.2		RCP
IA1		IA3	yan.	16	1	27	rookt.	2.0		13.1	17.59	4.7		7.2	e zert eg e	RCP
1A2		IA3	1000	18	- 21 - 2	134		0.5	1111	6.6	e dese	2.8	W. 1. 1. W.	3.7		RCP
IA3		EWA1	J. T	24		210		0.5		14.1	1.7	8.9	77.	5.3		RCP
20 to 10 to			11.1										and the same			4- , J
NOTE:	ALI	RCP	CLA	SS V.						-						

# STORM DRAIN STRUCTURE SCHEDULE

STRUC.	NO.	TYPE	STANDARD NO.	TOP	SIZE (ft)	INV. IN	INV. OUT	COMMENT	and the second
	P. J. J.		A CONTRACTOR OF THE STATE OF TH	ELEV.	and professional		1.0		
IA1	18 million 18 million	INLET	BALTIMORE COUNTY TYPE Y-1 INLET	372.40	2.5X2.5	368.40	358.16	OPEN 4-SIDES, W=1.5	(CONC. APRON)
IA2	day of ways	INLET	BALTIMORE COUNTY TYPE Y-1 INLET	362.00	2.5X2.5	and mar	358.29	OPEN 4-SIDES, W=1.5	(CONC. APRON)
IA3		INLET	BALTIMORE COUNTY TYPE Y-1 INLET	362.50	2.5X2.5	357.62	357.12	OPEN 4-SIDES, W=1.5	(CONC. APRON)
and the second	a e de e		with the control of t		and promise of a second	357.62	· · · · · · · · · · · · · · · · · · ·	e e e a a vermente de la proposición de la companya de la companya de la companya de la companya de la company	
MHA1		MANHOLI	E SHA #MD-384.03	377.00	5.0	374.18	369.03	PRECAST MANHOLE	and the second of the second
EWA1		END WAL	LL SHA #MD-354.01	359.00		356.07	AND THE CONTRACTOR OF THE	PRECAST END WALL	g to a company of the second
	ger Floren.	r graan ge	Brookers College College Statement	200	and the state of the same		and the second second		and the same of the

STORM DRAIN COMPUTATION SHEET

COMPUTED BY: PCF

DATE: <u>06/03</u>

DATE: <u>06/03</u>

PROJECT: APL-JHU BASIN G

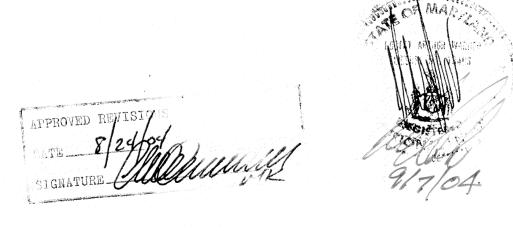
STORM FREQUENCY: 10-YEAR

MANNING'S "N" (RCP) = 0.013MANNING'S "N" (PVC) = 0.011

CHECKED BY: JK

PIF STRUC			NAGE REA	RUNOFF COEFF.	"AREA	"X"C"	TIME OF CONC.	RAINFALL INTENSITY	RUNOFI "Q"	PIPE DIAMETER	PIPE LENGTH	MIN. PIPE	ACTUAL PIPE	VELOCITY	TIME IN PIPE	PIPE "Q" CAPACITY	INLE"
FROM	то	INC (AC)	TOTAL (AC)	"C"	INC (AC)	TOTAL (AC)	SYSTEM (MIN)	"I" (IN/HR)	(CFS)	(IN)	(ft)	SLOPE (1/f)	SLOPE (f/f)	(FPS)	(MIN)	(CFS)	(CFS)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
17	MHA1	0.98	.98	0.45	0.44	0.44	5.00	8.50	3.7	18	109	0.55	2.4	8.0	0.2	14.4	3 7
MHA1	IA1	0.00	.98	0.45	0.44	0.44	5.00	8.50	3.7	18	74	J.55	0.85	6.2	0.2	8.6	0.0
IA1	IA3	0.4	1.38	0.25	0.10	0.55	5.00	8.50	4.7	18	27	ງ.25	2.0	7.2	0.1	13.1	0.8
IA2	IA3	1.3	2.68	0.25	0.32	0.32	5.00	8.50	2.8	18	134	0.09	0.50	3.7	0.5	6.6	2.8
IA3	EWA1	0.7	3.38	0.25	0.18	1.05	5.00	8.50	8.9	24	210	0.19	0.50	5.3	0.7	14.1	1.5
									Mark Jaga	Type SK See St.	grand to the good		arti ra	e setti e e est successione	T 10 10 10 10 10 10 10 10 10 10 10 10 10		

PIPE PROFILES CONTINUED ON THIS SHEET FROM SHEET C2.1 (26 OF 48).
 PIPE AND STRUCTURAL SCHEDULES CONTINUED FROM SHEET C2.4 (29 OF 48)



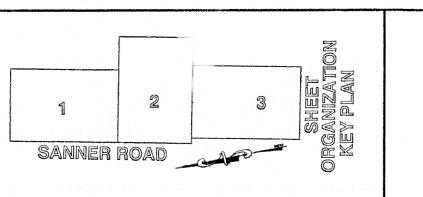
DEPARTMENT OF PLANNING AND ZOWING CHIEF, DEVELOPMENT ENGINEERING DIVISION MK DATE

CHIEF, DIVISION OF LAND DEVELOPMENT DATE

DATE

DATE 9/22/04 DATE HU/APL INTERNAL USE THIS DATA SHALL NOT BE DISCLOSED TO A THIRD PARTY AND SHALL NOT BE DUPLICATED, USED, OR DISCLOSED IN WHOLE OR IN PART F(R ANY PURPOSE OTHER THAN TO EVALUATE THIS REPORT THE WORK REQUIRED HEREUNDER, WITHOUT THE EXPREMENTED CONSENT OF JHU/APL. MORTO THOMAS AND ASSOCIATES, INC. CONSULTING ENGINEERS IWINBROOK PARKWAY, SUITE 200, ROCKVILLE MD 20852

9/21/04



					r			1	r
	DES: JK								
	DE3. 0K								
	DRN: RLP								<u> </u>
	<b>снк:</b> ВW	a a Thigh Landing			2				
		6/25/04	RED-LINE SUBMISSION						
100 m 100 m	DATE: 10/10/03	DATE	REVISIONS AND RECORD OF IS	SSUE	NO.	BY	ск	APP	

NORTH PARKING / BALL FIELD ENTRANCE

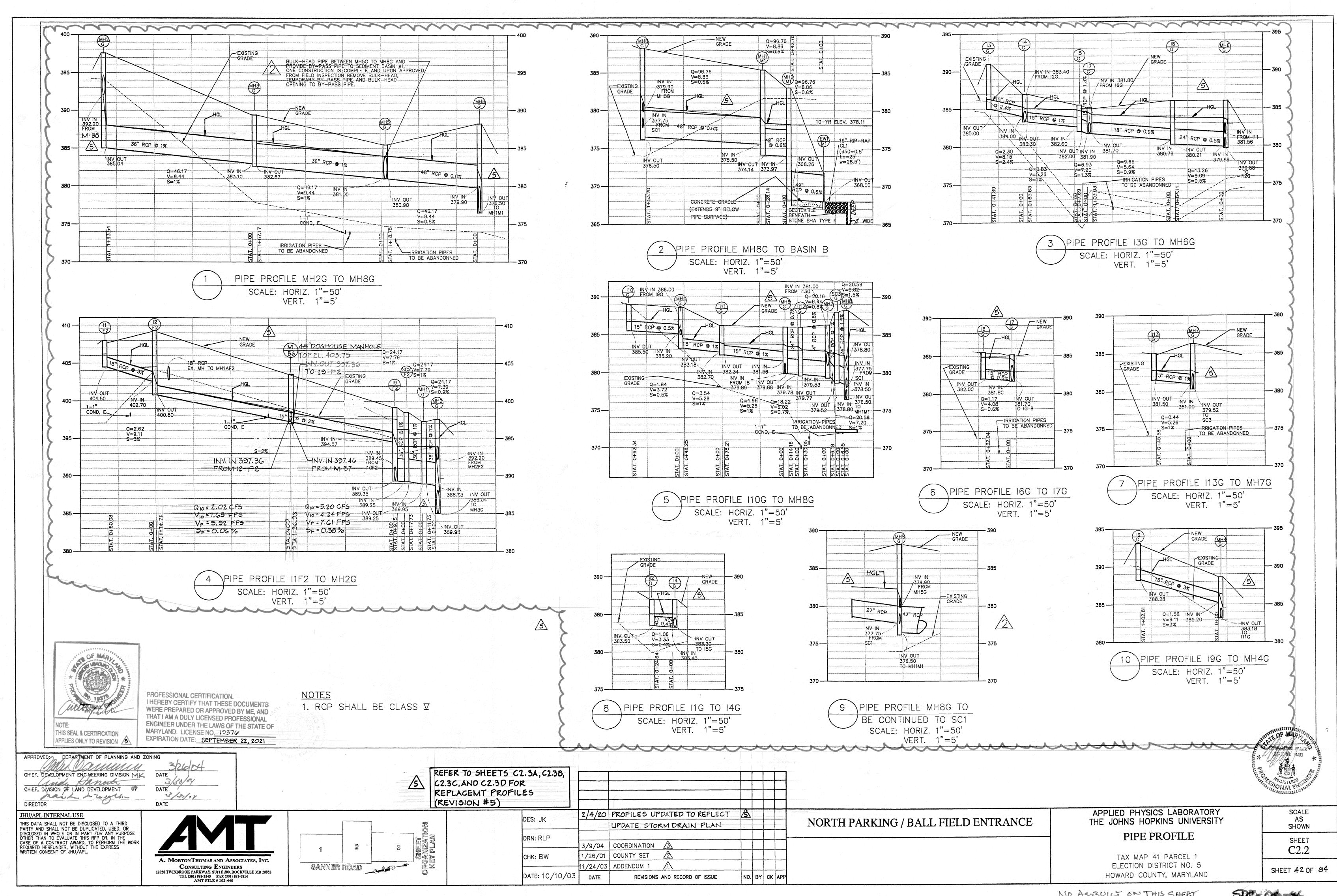
REVISED SITE DEVELOPMENT PLAN GRADING OF AREA TO BE USED FOR ANTENNA RANGE APPLIED PHYSICS LABORATE
THE JOHNS HOPKINS UNIVERS

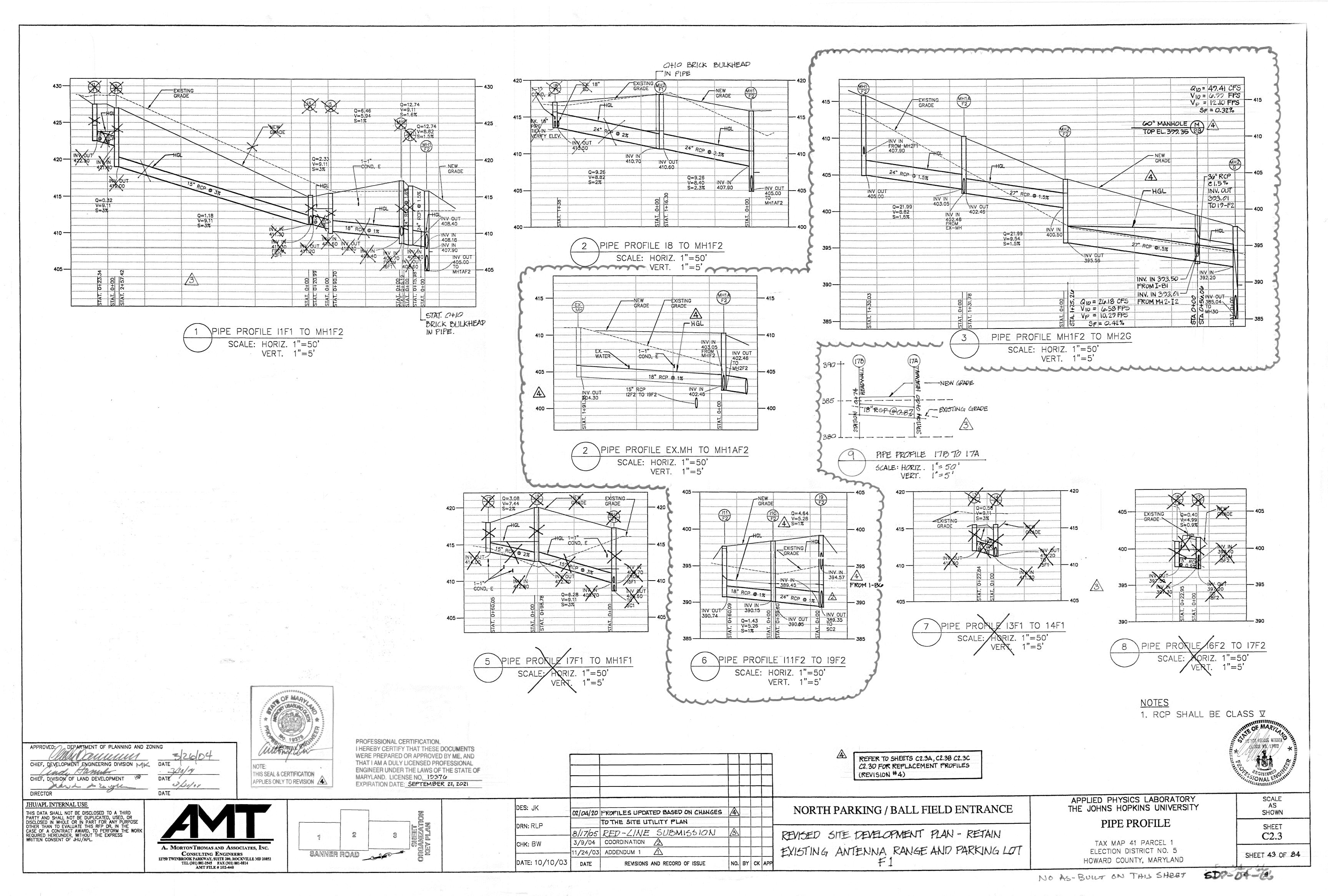
PIPE PROFILE

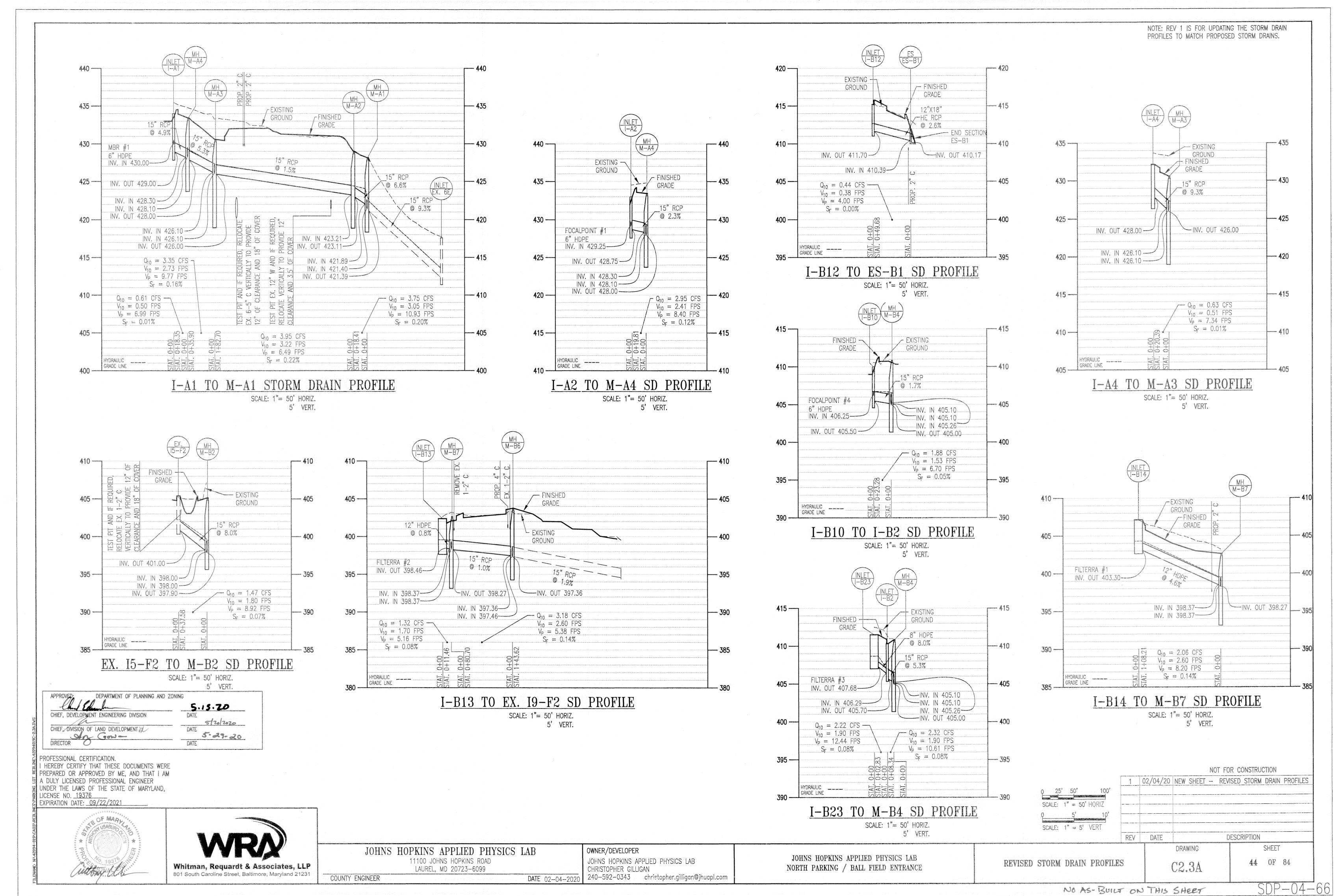
TAX MAP 41 PARCEL 1 ELECTION DISTRICT NO. 5 HOWARD COUNTY, MARYLAND

SCALE AS SHOWN SHEET C2.1A

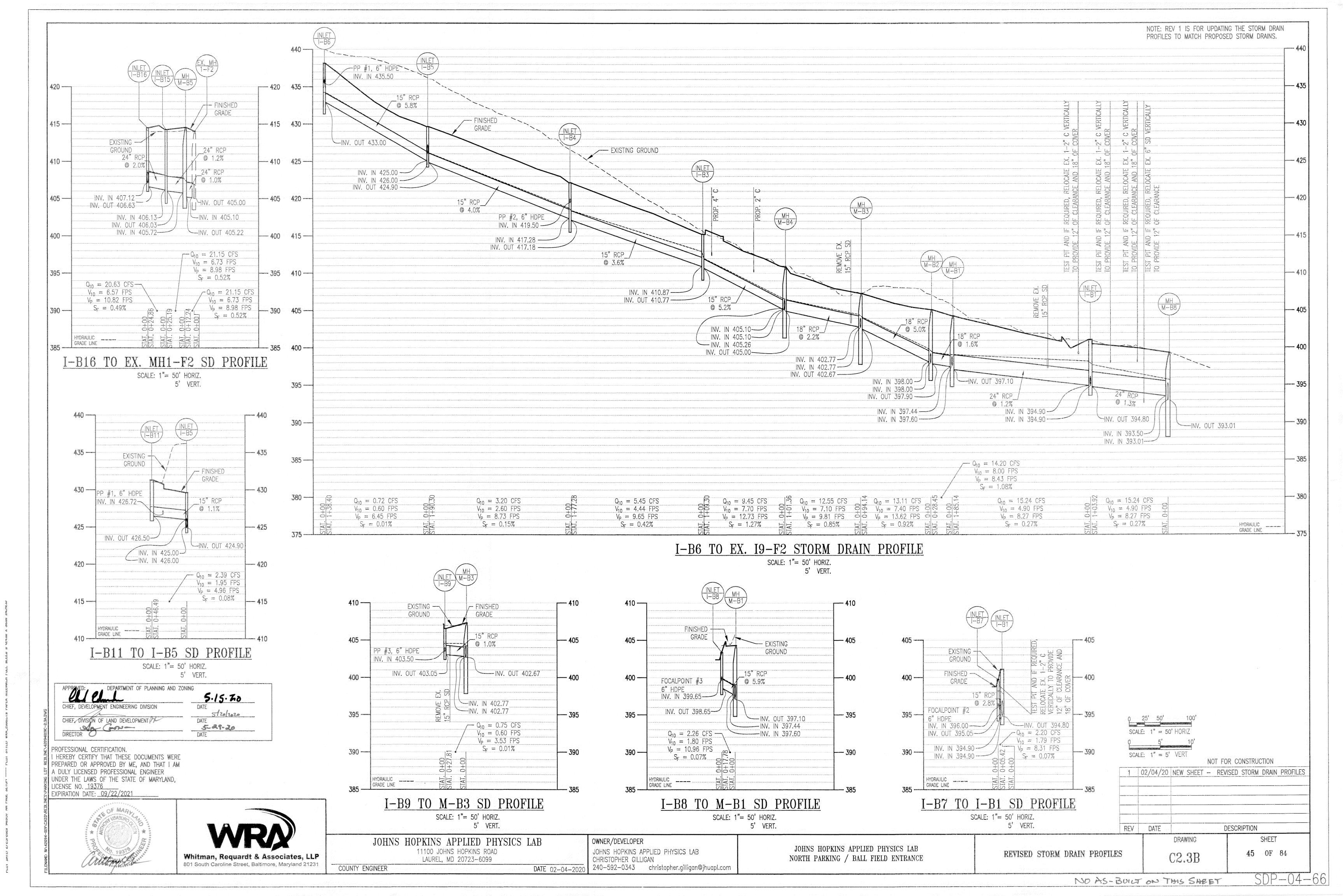
SHEET 41 OF 84







WHIS EZECTORS SHOW



NOTE: REV 1 IS FOR UPDATING THE WATER MAIN PROFILE TO MATCH PROPOSED WATER MAIN.

FUTURE GRADE NOT PART OF THIS CONTRACT) 425 FINISHED GRADE -EXISTING GRADE — 41.60 12" CATE VALVE & - INV. 424.99
45.37 CONNECTION TO EX. 6" WATER WITH
"X6" TEE & - APPROX. INV. 425.2± 6+41.59 45° HB © — INV. 427.79 6+50.00 INV. 428.00 6+74.69 CONNECTION TO EX. 12" WATER WITH 12" 45° HB — APPROX. INV. 428.7± 395 390 3+50.00
INV. 414.40
3+69.19 12" CATE VALVE ©
3+72.88 CONNECTION TO E)
12"X6" TEE © — APPROX. I
3+76.49 12" CATE VALVE © 0+77.65 3° VERT INV. 401.35 1+00.00 INV. 402.42 1+20.16 12" (1+25.33 12"X(14.7) +50.00 NV. 404.82 +00.00 W. 407.22 1+00.00 VV. 411.99 +00.00 VV. 417.02 +50.00 W. 419.84 +50.00 W. 425.34

> 12" WATER LINE (PRIVATE) SCALE: 1"= 50' HORIZ 1" = 5' VERT

APPROVED: DEPARTMENT OF PLANNING AND ZON	ING
	5.15.ZD
CHIEF, DEVELOPMENT ENGINEERING DIVISION	DATE
	5(20/2020
CHIEF, DIVISION OF LAND DEVELOPMENT	DATE
DIRECTOR	DATE 29-20
DIRECTOR	DAIE

PROFESSIONAL CERTIFICATION.

I HEREBY CERTIFY THAT THESE DOCUMENTS WERE
PREPARED OR APPROVED BY ME, AND THAT I AM

BA DULY LICENSED PROFESSIONAL ENGINEER
UNDER THE LAWS OF THE STATE OF MARYLAND,
LICENSE NO. 19376
EXPIRATION DATE: 09/22/2021



JOHNS HOPKINS APPLIED PHYSICS LAB 11100 JOHNS HOPKINS ROAD LAUREL, MD 20723-6099 COUNTY ENGINEER DATE 02-04-2020

OWNER/DEVELOPER JOHNS HOPKINS APPLIED PHYSICS LAB
CHRISTOPHER GILLIGAN
240-592-0343 christopher.gilligan@jhuapl.com

JOHNS HOPKINS APPLIED PHYSICS LAB NORTH PARKING / BALL FIELD ENTRANCE REVISED WATER MAIN PROFILE

0 25' 50' 100' SCALE: 1" = 50' HORIZ

SCALE: 1" = 5' VERT

REV DATE DESCRIPTION DRAWING C2.3C

1 02/04/20 NEW SHEET - REVISED WATER LINE PROFILE

SHEET **46** OF 84

NOT FOR CONSTRUCTION

NO AS-BULT ON THIS SHEET

SDP-04-66

NOTE: REV 1 IS FOR UPDATING THE STORM DRAIN AND WATER MAIN STRUCTURE SCHEDULES TO MATCH PROPOSED STORM DRAIN SYSTEM AND WATER MAIN.

		ST0	RM DRAIN P	IPE S	CHEDUI	E		
FROM STRC.	TO STRC.	DIA.	TYPE	CLASS	LENGTH	SLOPE	START INV.	END INV.
EX. 15-F2	M-B2	15''	RCP	IV	38'	7.98%	401.00	398.00
I-A1	M-A4	15"	SCH. 40 PVC			4.91%	429.00	428.10
I-A2	M-A4	15"	SCH. 40 PVC		20'	2.27%	428.75	428.30
I-A4	M-A3	15"	RCP	IV	20'	9.32%	428.00	426.10
I-B1	M-B8	24''	RCP	IV	104'	1.25%	394.80	393.50
I-B2	M-B4	15"	RCP	IV	8'	5.27%	405.70	405.26
l-B3	M-B4	15"	RCP	IV	109'	5.19%	410.77	405.10
IB4	I-B3	15''	RCP	IV	177'	3.56%	417.18	410.87
I-B5	I-B4	15"	RCP	IV	190'	4.00%	424.90	417.28
I-B6	I-B5	15"	RCP	IV .	/138 <b>'</b>	5.78%	433.00	425.00
I-B7	I-B1	15''	SCH. 40 PVC		5' <u></u>	2.77%	395.05	394.90
I-B8	M-B1	15"	SCH. 40 PVC		18'	5.91%	398.65	397.60
I-B9	M-B3	15"	RCP	IV	28'	1.01%	403.05	402.77
I-B10	M-B4	15"	SCH. 40 PVC		23'	1.72%	405.50	405.10
I-B11	I-B5	15"	RCP	IV	46'	1.08%	426.50	426.00
I-B12	ES-B1	18"	12"x18" HE RCP	IV	50'	2.64%	411.70	410.39
I-B13	M-B7	12"	HDPE		10'	0.90%	398.46	398.37
I-B14	M-B7	12''	HDPE		108'	4.02%	402.72	398.37
I-B15	M-B5	24''	RCP	IV	25'	1.24%	406.03	405.72
I-B16	I-B15	24"	RCP	IV	25'	2.00%	406.63	406.13
I-B23	I-B2	8"	HDPE		17'	8.00%	407.68	406.29
M-A2	M-A1	15"	RCP	IV	18'	6.61%	423.11	421.89
M-A3	M-A2	15"	RCP	IV	183'	1.53%	426.00	423.21
MA4	M-A3	15''	RCP	IV	36'	5.29%	428.00	426.10
M-B1	I-B1	24"	RCP	IV	185'	1.19%	397.10	394.90
M-B2	M-B1	18"	RCP	IV	28'	1.60%	397.90	397.44
M-B3	MB2	18''	RCP	IV	94'	4.96%	402.67	398.00
M-B4	M-B3	18"	RCP	V	[101 <b>'</b> ]	2.20%	405.00	402.77
M-B5	EX. MH1-F2	24"	RCP	IV	12'	1.00%	405.22	405.10
M-B7	M-B6	15''	RCP	IV	81'	1.00%	398.27	397.46
M-B8	EX. MH2-G	36''	RCP	IV	56'	1.45%	393.01	392.20

Alizanda i i i i i i i i i i i i i i i i i i i	STORM DRA	IN STRUCTUR	E SCHED	ULE			
STRC. NO.	STRC. TYPE	STANDARD NO.	TOP ELEV.	INV. IN	INV. OUT	NORTHING	EASTING
ES-B1	HORIZ. ELLIP. END SECTION	MSHA-369.00		410.39	an an an an an	547053.450	1340827.316
EX. I5-F2	EXISTING INLET	ner en	405.40		401.00	547276.804	1340891.055
EX. MH1-F2	EXISTING MANHOLE	1 <u>.</u> 201	414.05	405.10	405.00	547024.602	1340925.281
EX. MH2-G	EXISTING MANHOLE		414.89	392.20 -5.44 388.85		547511.461	1341053.886
I–A1	18" DOMED OVERFLOW INLET	ACF DOMED INLET	434.00	430.00	429.00	546070.403	1340606.325
1–A2	18" DOMED OVERFLOW INLET	ACF DOMED INLET	433.00	<del>429</del> .25	428.75	546063.162	1340642.459
I-A4	TYPE 'A-5' INLET	Ho. Co. D-4.02	432.15		428.00	546034.465	1340595.732
I–B1	TYPE 'A-10' INLET	Ho. Co. D-4.03	401.10	394.90 394.90	394.80	547481.664	1340936.645
I-B2	SINGLE WR INLET	Ho. Co. D-4.31	410.34	406.29	405.70	547100.080	1340798.082
∫ I–B3	DOUBLE WR INLET	Ho. Co. D-4.31	415.24	410.87	410.77	547001.057	1340751.085
å∋ <b>I−B4</b>	SINGLE WR INLET	Ho. Co. D-4.32	422.15	417.28	417.18	546827.918	1340712.990
I-B5	SINGLE WR INLET	Ho. Co. D-4.32	429.63	425.00 426.00	424.90	546642.137	1340671.753
/ I-B6	SINGLE WR INLET	Ho. Co. D-4.32	438.17	14.00 ja 14.	433.00	546507.003	1340641.887
I-B7	18" DOMED OVERFLOW INLET	ACF DOMED INLET	399.75	396.00	395. <del>05</del>	547482.855	1340931.357
I-B8	18" DOMED OVERFLOW INLET	ACF DOMED INLET	403.40	399. <del>6</del> 5	398.65	547303.118	1340875.546
I-B9	SINGLE WR INLET	Ho. Co. D-4.32	406.55		403.05	547187.149	1340860.853
I–B10	18" DOMED OVERFLOW INLET	ACF DOMED INLET	410.00	406.25	405. <del>50</del>	547083.207	1340824.816
I-B11	TYPE 'A-5' INLET	Ho. Co. D-4.02	431.30		426.50	546631.945	1340717.110
I-B12	DOUBLE WR INLET	Ho. Co. D-4.31	415.20		411.70	547009.508	1340804.137
[-B13]	SWM FILTERRA INLET	8'x18' FTSCPD	402.38		398.46 <sub>48</sub>	547290.012	1341104.130
I-B14	SWM FILTERRA INLET	8'x12' FTSCPD	407.14		402.72	547173.091	1341078.821
∫ I−B15	DOUBLE WR INLET	Ho. Co. D-4.31	414.26	406.13	406.03	547007.008	1340947.069
I-B16	SINGLE WR INLET W/ ADA ACCESSIBLE GRATE	Ho. Co. D-4.32	414.50	407.12	406.63	546982.928	1340940.887
I-B23	SWM FILTERRA INLET	8'x18' FTSC	411.51		407.68	547089.488	1340787.857
M-A1	48" DOGHOUSE MANHOLE	Ho. Co. G-5.14	428.15	421.89 421.40	421.39	545993.994	1340809.773
M-A2	48" MANHOLE	Ho. Co. G-5.12	429.00	423.21	423.11	545986.643	1340792.897
M-A3	48" MANHOLE	Ho. Co. G-5.12	430.60	426.10 426.10	426.00	546027.083	1340614.734
M-A4	48" MANHOLE	Ho. Co. G-5.12	433.45	428.30 428.10	428.00	546062.089	1340622.680
M-B1	48" MANHOLE	Ho. Co. G-5.12	404.30	397.44 397.60	397.10	547312.838	1340860.658
M-B2	48" MANHOLE	Ho. Co. G-5.12	404.92	398.00 398.00	397.90	547285.086	1340854.402
M-B3	48" MANHOLE	Ho. Co. G-5.12	407.06	402.77 402.77	402.67	547193.250	1340833.717
M-B4	48" MANHOLE	Ho. Co. G-5.12	410.85	405.10 405.10 405.26	405.00	547095.943	1340805.328
M-B5	48" MANHOLE	Ho. Co. G-5.12	414.55	405.72	405.22	547012.680	1340922.524
M-B6	48" DOGHOUSE MANHOLE	Ho. Co. G-5.14	403.75	397.36 397.46	397.36	547311.157	1341026.731
M-B7	48" MANHOLE	Ho. Co. G-5.12	402.10	398.37 398.37	398.27	547279.056	1341100.770
M-B8	60" MANHOLE	Ho. Co. G-5.12	399.35	393.50 393.01	393.01	547457.766	1341037.776

	STORM DRAIN	STRUCTURE S	CHEDULE		
STRC. NO.	STRC. TYPE	STANDARD NO.	TOP ELEV.	GUTTERLINE ELEV.	OUTFLOW ELEV.
I-A3	RAIN GUARDIAN TURRET	ACF RAIN TURRET	435.18	434.89	433.89
I-B17	RAIN GUARDIAN TURRET	ACF RAIN TURRET	400 - 65 401.04	400.75	399. <del>75</del>
I-B18	RAIN GUARDIAN TURRET	ACF RAIN TURRET	404. <del>69</del>	404.40	403.40
I-B19	RAIN GUARDIAN TURRET	ACF RAIN TURRET	404.90	404.61	403. <del>61</del>
I-B20	RAIN GUARDIAN TURRET	ACF RAIN TURRET	412. <del>49</del>	412.20 411.82	411.20
I-B21	RAIN GUARDIAN TURRET	ACF RAIN TURRET	414.05	413.76	412.76
I-B22	RAIN GUARDIAN TURRET	ACF RAIN TURRET	410.41	410.12	409.12

	FITTING SCHEDULE	
SIZE (INCHES)	TYPE	QUANTITY
6	90° VERTICAL BEND	1
12	45° HORIZONTAL BEND	4
12	CAP	1
NAMES OF THE PARTY	12"X6" TEE	3
	12"X8" TEE	1

WA	TER LINE PIPE S	CHEDULE
SIZE (INCHES)	MATERIAL	LENGTH (LINEAR FEET)
6	DUCTILE IRON CL54	30
8	DUCTILE IRON CL54	3
12	DUCTILE IRON CL54	672

APPURTENAN	NCE SCH	EDULE
SIZE (INCHES)	TYPE	QUANTITY
6	VALVE	3
5-1/4"	HYDRANT	1
8	VALVE	1
12	VALVE	7

FIRE	Н	YDRANT SCI	HEDULE
STRUCTURE	#	BURYLINE ELEV.	LENGTH
FH #1		416.50	7.5'

APPROVED: DEPARTMENT OF PLANNING AND ZONING
CHIEF, DEVELOPMENT ENGINEERING DIVISION DA 5.15.20 DATE

5/20/2020

DATE

5-29-20

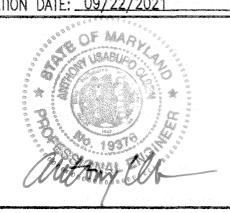
DATE CHIEF, DIVISION OF LAND DEVELOPMENT

ND			C2.3D	47	OF	84
TT			DRAWING		SHEET	
	REV	DATE	essa s jälveikeisse kunger l	DESCRIPTION		
-						
-						.:
	2	12/20/21	SWM AS-BU	ILTS		
	1	02/04/20	NEW SHEET - REV	/ISED STORM	DRAIN	PROFILES
			NOT FO	OR CONSTRUC	CTION	· · · · · · · · · · · · · · · · · · ·

PROFESSIONAL CERTIFICATION.

I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 19376

EXPIRATION DATE: 09/22/2021





JOHNS HOPKINS APPLIED PHYSICS LAB 11100 JOHNS HOPKINS ROAD LAUREL, MD 20723-6099 COUNTY ENGINEER

OWNER/DEVELOPER JOHNS HOPKINS APPLIED PHYSICS LAB
CHRISTOPHER GILLIGAN
240-592-0343 christopher.gilligan@jhuapl.com

JOHNS HOPKINS APPLIED PHYSICS LAB NORTH PARKING / BALL FIELD ENTRANCE REVISED STORM DRAINAGE AND WATER STRUCTURE TABLES

# STORM DRAIN PIPE SCHEDULE

FROM	то	SIZE	LENGTH	SLOPE	FLOW	10-YR	VELOCITY	PIPE
		(inches)	(feet)	%	CAP.(cfs)	Q (cfs)	(fps)	type
-11F1	12F1	15	23.34	0.03	11.19	0.32	9.11	RCP
12F1	14F1	15	257.42	0.03				
-1351	14F1	15	22.84	0.03	11.19	1.18 0.58	9.11	RCP -
-14[1	15F1	15	20.99	0.03	11.19	2.33	9.11	RCP
-15F1	MH1F1	18	90.70	0.01	11.19	6.46	5.94	RCP
-17F1	18F1	15	60.05	0.02	9,13	3.08	7.44	RCP -
16F1	MH1F1	15	98.78	0.03	11.19	6.28	9.11	RCP -
-MH1F1	SC1F1	24	6.19	0.016	28.61	12.74	9.11	RCP -
SC1F1	MH1F2	24	15.98	0.015	27.70	12.74	8.82	RCP
-18F1	MH2F1	-24	138.00	0.02	31.99	9.26	8.82	RCP -
MH2F1	MH1F2	24	116.30	0.023	34.30	9.26	8.40	RCP *
MH1F2	MH1AF2	24	130.03	0.015	27.70	21.99	8.82	RCP
EX-MH	MH1AF2	18	191.33	0.01	10.50	9.26	7.20	RCP
MH1AF2	MH2F2	27	131.78	0.015	37.93	21.99	9.54	RCP
MH2F2	MH2G	_27	224.06	0.015	37.93	21.99	9.54	RCP
13F2 EXI	14F2	15	23.54	0.008	5.78	0.57	4.71	RCP
MH4AF2	MH4AF2 I4F2	15	17.16	0.01		-	_	RCP RCP
		15	61.15	0.01				RCP
14F2	15F2	15	29.64	0.01	6,46	1.22	5.26	RCP
15F2 16F2	17F2 17F2	15	135.45	0.02	9.13	4.14	7.44	RCP
17F2	17F2 18F2	15 18	22.95 42.59	0.009	6.13	0.40	4.99	RCP
18F2	19F2	24		0.009	9.96	7.85	5.64	RCP
11F2	19F2 12F2	15	120.46 60.08	0.01	22.62 11.19	11.16 2.62	7.20 9.11	RCP
12F2	19F2	15	311.65	0.03	9.13	5.23	7.44	RCP
111F2	110F2	18 🔼	60.09	0.02	10.5	29.83	5.94 🖄	RCP
110F2	19F2	24	59.60	0.01	6.46	13.04	7.20	RCP
19F2	SC2F2	36	9.15	0.01	30.97	32.57	9.44	RCP
SC2F2	MH1G	36	17.73	0.01	30.97	32.57	9.44	RCP
MH1G	MH2G	36	11.73	0.009	30.97	32.57	8.95	RCP
MH2G	MH3G	36	193.54	0.01	66.70	61.38	9.44	RCP
MH3G	MH5G	36	167.17	0.01	66.70	61.38	9.44	RCP
MH5G	MH8G	48	118.78	0.008	59.66	61.38	8,44	RCP
NOTI USED	12G	NOT USED	216.39	NOTOUSED	6.46	NOTOUSED	5.26	NOTCUSED
12G	14G	15	24.64	0.004	4.08	1.06	3.33	RCP
13G	14G	15	41.89	0.024	10.00	2.30	8.15	RCP
14G	I5G	15	65.63	0.01	6.46	3.83	5.26	RCP
15G	17G	18	7.69	0.013	11.97	6.93	7.20	RCP
16G	17G	15	32.04	0.006	5.00	1.17	4.08	RCP
17G	18G	18	103,93	0.009	9,96	9,65	5.64	RCP
18G 19G	MH6G	24	64.11	0.005	15.99	13.26	5.09	RCP
110G	MH4G	15 15	102.81	0.03	11.19	1.58	9.11	RCP
MH4G	MH4G I11G	15	62.34	0.005	4.57	1.97	3.72	RCP
111G	MH6G	15	48.25 78.21	0.01	6.46	3.54	5.26	RCP
MH6G	I12G	24	14.16		6.46	4.96	5.26	RCP
112G	MH7G	24	30.05	0.007	18.92	18.22	6.02	RCP
113G	MH7G	15	45.58	0.008	22.62 6.46	20.16 0.44	7.20 5.26	RCP
MH7G	SC3G	24	6.18	0.01	27.70	20.59	7.20	RCP
SC3G	MH8G	24	6.55	0.015	27.70		8.82	RCP
MH8G	MH1M1	48 2	153.20	0.006	111.28	96.70	8.86	RCP
MH1M1	MH2M1	48	28.14	0.006	111.28	96.70	8.86	RCP
MH2M1	l	48	42.78	0.006	111.28	96.70	8,86	RCP
I1N	I2N	15	117.55	0.02	9.13	2.52	7.44	RCP
12N	I1M2	15	151.92	0.01	6.46	4.49	5.26	RCP
I1M2	12M2	18	71.61	0.01	10.50	6.92	5.94	RCP
12M2	13M2	18	65.14	0.01	10.50	10.29	5.94	RCP
13M2	14M2	24	140.67	0.008	20.23	13.76	6.44	RCP
I1M1	12M1	15	38.56	0.01	6.46	0.44	5.26	RCP
12M1	13M1	15	120.16	0.01	6.46	2.13	5.26	RCP
13M1	14M2	15	47.80	0.01	6.46	4.19	5.26	RCP
14M2	SC4M2	24	6.38	0.01	22.62	21.50	7.20	RCP
	MH1M2	24	20.90	0.01	22.62		7.20	RCP
SC4M2		1 0 4	21.34	0.01	22.62		7.20	RCP
SC4M2	EW1M2	1 24	ONIN A	・ハレヒハ	~ ~ ~ ~ III \ [	·II I+R		
SC4M2			OND G	ANEA	SAND	L.   L.   \		
SC4M2 MH1M2	EW1M2	<u> </u>	r					PCD
SC4M2 MH1M2	EW1M2	<u>P</u>	47.90	0.03	11.19	1.32	9.11	RCP
SC4M2 MH1M2	i2 i3	<u>P</u>	47.90 43.81	0.03 0.03	11.19	1.32 2.54	9.11	RCP
SC4M2 MH1M2 I1 I2 I3	I2 I3 I5	<u>P</u> 15 15 15	47.90 43.81 87.31	0.03 0.03 0.03	11.19 11.19 11.19	1.32 2.54 4.31	9.11 9.11	RCP RCP
SC4M2 MH1M2 I1 I2 I3 I4	i2 i3 i5	15 15 15 15	47.90 43.81 87.31 8.48	0.03 0.03 0.03 0.03	11.19 11.19 11.19 11.19	1.32 2.54 4.31 1.03	9.11 9.11 9.11	RCP RCP
SC4M2 MH1M2 I1 I2 I3 I4	I2 I3 I5 I5	P 15 15 15 15 15	47.90 43.81 87.31 8.48 48.58	0.03 0.03 0.03 0.03 0.03	11.19 11.19 11.19 11.19 11.19	1.32 2.54 4.31 1.03 6.02	9.11 9.11 9.11 9.11	RCP RCP RCP
SC4M2 MH1M2 I1 I2 I3 I4 I5	I2 I3 I5 I5 I6	P 15 15 15 15 18 A	47.90 43.81 87.31 8.48 48.58 217.00	0.03 0.03 0.03 0.03 0.03 0.02	11.19 11.19 11.19 11.19 11.19 14.85	1.32 2.54 4.31 1.03 6.02 6.69	9.11 9.11 9.11 9.11 8.40	RCP RCP RCP RCP
SC4M2 MH1M2 I1 I2 I3 I4 I5 I6	I2 I3 I5 I5 I6 I9	P 15 15 15 15 15 15 18 15	47.90 43.81 87.31 8.48 48.58 217.00	0.03 0.03 0.03 0.03 0.03 0.02 0.02	11.19 11.19 11.19 11.19 11.19 14.85 11.19	1.32 2.54 4.31 1.03 6.02 6.69 0.77	9.11 9.11 9.11 9.11 8.40 9.11	RCP RCP RCP RCP RCP
SC4M2 MH1M2 I1 I2 I3 I4 I5 I6 I8	I2 I3 I5 I5 I6 I9 I9	P 15 15 15 15 15 18 15 18	47.90 43.81 87.31 8.48 48.58 217.00 101.70 218.00	0.03 0.03 0.03 0.03 0.03 0.02 0.02	11.19 11.19 11.19 11.19 11.19 14.85 11.19	1.32 2.54 4.31 1.03 6.02 6.69 0.77 9.67	9.11 9.11 9.11 9.11 8.40 9.11 8.40	RCP RCP RCP RCP RCP RCP
SC4M2 MH1M2 I1 I2 I3 I4 I5 I6 I8 I9	I2 I3 I5 I5 I6 I9 I9 I14	P  15  15  15  15  15  15  18  15  18  15  18	47.90 43.81 87.31 8.48 48.58 217.00 101.70 218.00 50.74	0.03 0.03 0.03 0.03 0.03 0.02 0.03 0.02 0.02	11.19 11.19 11.19 11.19 11.19 14.85 11.19 14.85 9.13	1.32 2.54 4.31 1.03 6.02 6.69 0.77 9.67 0.15	9.11 9.11 9.11 9.11 8.40 9.11 8.40 7.44	RCP RCP RCP RCP RCP RCP RCP
SC4M2 MH1M2 I1 I2 I3 I4 I5 I6 I8 I9 I10	I2 I3 I5 I5 I6 I9 I9 I14 I11	P 15 15 15 15 15 15 18 15 18 15 18 15 18	47.90 43.81 87.31 8.48 48.58 217.00 101.70 218.00 50.74 150.10	0.03 0.03 0.03 0.03 0.03 0.02 0.03 0.02 0.02	11.19 11.19 11.19 11.19 14.85 11.19 14.85 9.13	1.32 2.54 4.31 1.03 6.02 6.69 0.77 9.67 0.15 0.76	9.11 9.11 9.11 9.11 8.40 9.11 8.40 7.44 9.11	RCP RCP RCP RCP RCP RCP RCP RCP
SC4M2 MH1M2 I1 I2 I3 I4 I5 I6 I8 I9 I10 I11	I2 I3 I5 I5 I6 I9 I9 I14 I11	P  15  15  15  15  15  18  15  18  15  18  15  18	47.90 43.81 87.31 8.48 48.58 217.00 101.70 218.00 50.74 150.10 69.41	0.03 0.03 0.03 0.03 0.03 0.02 0.03 0.02 0.02	11.19 11.19 11.19 11.19 14.85 11.19 14.85 9.13 11.19	1.32 2.54 4.31 1.03 6.02 6.69 0.77 9.67 0.15 0.76 7.79	9.11 9.11 9.11 9.11 8.40 9.11 8.40 7.44 9.11 5.94	RCP RCP RCP RCP RCP RCP RCP RCP RCP
SC4M2 MH1M2 I1 I2 I3 I4 I5 I6 I8 I9 I10 I11 I12	I2 I3 I5 I5 I6 I9 I9 I14 I11 I12 I14 MH2	P  15  15  15  15  15  18  15  18  15  18  15  18  24	47.90 43.81 87.31 8.48 48.58 217.00 101.70 218.00 50.74 150.10 69.41 28.03	0.03 0.03 0.03 0.03 0.03 0.02 0.03 0.02 0.02 0.03 0.01	11.19 11.19 11.19 11.19 14.85 11.19 14.85 9.13 11.19 10.50	1.32 2.54 4.31 1.03 6.02 6.69 0.77 9.67 0.15 0.76 7.79 19.76	9.11 9.11 9.11 9.11 8.40 9.11 8.40 7.44 9.11 5.94 7.20	RCP RCP RCP RCP RCP RCP RCP RCP RCP RCP
SC4M2 MH1M2 I1 I2 I3 I4 I5 I6 I8 I9 I10 I11 I12 I14 I13	I2 I3 I5 I5 I6 I9 I9 I14 I11 I12 I14 MH2 MH1	P  15  15  15  15  15  18  15  18  15  18  15  18  15  18  15  18  15  18  15  18	47.90 43.81 87.31 8.48 48.58 217.00 101.70 218.00 50.74 150.10 69.41 28.03 114.24	0.03 0.03 0.03 0.03 0.03 0.02 0.02 0.02 0.02 0.03 0.01 0.01 0.03	11.19 11.19 11.19 11.19 14.85 11.19 14.85 9.13 11.19 10.50 22.62	1.32 2.54 4.31 1.03 6.02 6.69 0.77 9.67 0.15 0.76 7.79 19.76 0.32	9.11 9.11 9.11 9.11 8.40 9.11 8.40 7.44 9.11 5.94 7.20 9.11	RCP RCP RCP RCP RCP RCP RCP RCP RCP RCP
SC4M2 MH1M2 I1 I2 I3 I4 I5 I6 I8 I9 I10 I11 I12 I14 I13 MH1	I2 I3 I5 I5 I6 I9 I9 I14 I11 I12 I14 MH2	P  15  15  15  15  15  18  15  18  15  18  15  18  15  18  15  18  24  15  15	47.90 43.81 87.31 8.48 48.58 217.00 101.70 218.00 50.74 150.10 69.41 28.03 114.24 43.35	0.03 0.03 0.03 0.03 0.03 0.02 0.02 0.02 0.02 0.03 0.01 0.01 0.03 0.03	11.19 11.19 11.19 11.19 14.85 11.19 14.85 9.13 11.19 10.50 22.62 11.19	1.32 2.54 4.31 1.03 6.02 6.69 0.77 9.67 0.15 0.76 7.79 19.76 0.32 0.32	9.11 9.11 9.11 9.11 8.40 9.11 8.40 7.44 9.11 5.94 7.20 9.11 9.11	RCP RCP RCP RCP RCP RCP RCP RCP RCP RCP
SC4M2 MH1M2 I1 I2 I3 I4 I5 I6 I8 I9 I10 I11 I12 I14 I13	I2 I3 I5 I5 I6 I9 I9 I14 I11 I12 I14 MH2 MH1 MH2	P  15  15  15  15  15  18  15  18  15  18  15  18  15  18  15  18  15  18  15  18	47.90 43.81 87.31 8.48 48.58 217.00 101.70 218.00 50.74 150.10 69.41 28.03 114.24 43.35 18.79	0.03 0.03 0.03 0.03 0.03 0.02 0.02 0.02 0.02 0.03 0.01 0.01 0.03	11.19 11.19 11.19 11.19 11.19 14.85 11.19 14.85 9.13 11.19 10.50 22.62 11.19 22.62	1.32 2.54 4.31 1.03 6.02 6.69 0.77 9.67 0.15 0.76 7.79 19.76 0.32	9.11 9.11 9.11 9.11 8.40 9.11 8.40 7.44 9.11 5.94 7.20 9.11 9.11 7.20	RCP RCP RCP RCP RCP RCP RCP RCP RCP RCP

STORM	M DRAIN	STRUC	TURE	SCHED	ULE

RUC. NO.	TYPE	STANDARD NO.	TOP	SIZE (ft)	INV. IN	INV. OUT	COMMENT
-11F1	1, 1,2 + 22 + 24 +	HOWARD COUNTY DOW TYPE 'A 5 INLET. SO.4.01	ELEV. 428.36	5.00		422,50	CAST IN PLACE INLET•
1251	INLET	HOWARD COUNTY DPW TYPE 'A-5 INLET, SD.4.01	428.36	5.00	421.80	419.00	CAST IN PLACE INLET
-13F1	INLET	HOWARD COUNTY DOW TYPE 'A 5 INLET. 50.4.01	416.24	5.00		412.00	CAST IN PLACE INLET
MH4AF2	MANHOLE	SHA #MD-384.03		5.00	403.20	403.19	PRECAST MANHOLE .
14F1	INIET	HOWARD COUNTY DPW TYPE 'A-5 INLET. SD.4.01	416.02	5.00	411.30	411.20	CAST IN PLACE INLET
	750	And the gardeness of the gardeness of the con-		.: -	411.30		
-15F1	INLET	HOWARD COUNTY DPW TYPE 'A-10 INLET, SD.4.02	414.60	10.00	410.60	410.30	PRECAST INLET
17F1 18F1	INLE	HOWARD COUNTY DPW TYPE A-10 INLET. SD.4.02	418.60 420.60		412.80	414.00 412.70	PRECAST INLET PRECAST INLET
1011	INLET	TOWARD COURT DIN THE A TO MEET BOTTOE	7 121	10.00	409.40	712.70	garan Tanan a sama ayan sana a
MH1F1	MANITOLE	SHA #MD-384.03	417.20	5.00	409.70	408.60	PRECAST MANHOLE
SC1F1	STORMCEPTO	7	416.50	8.00	408.40	408.40	STORMCEPTOR
-18F1	INLET	SHA DOT TYPE WE INCET 4.37	419.00	10.00		413.50	PRECAST INLET
MH2F1	MANHOLE	SHA #M0-384.03	418.00	5.00	410.70	410.60	PRECAST MANHOLE
MH1F2	MANHOLE	SHA #MD-384.03	415.80	5.00	408.16 403.05	405.00	PRECAST MANHOLE
MH1AF2 MH2F2	MANHOLE	SHA #MD-384.03 SHA #MD-384.03	410.00	5.00 5.00	402,46 400.50	402.46 395.56	PRECAST MANHOLE PRECAST MANHOLE
13F2	MANHOLE	HOWARD COUNTY DPW TYPE 'A-5 INLET. SD.4.01	404.30	5.00	400.50	401.50	CAST IN PLACE INLET
14F2	INLET	HOWARD COUNTY DPW TYPE 'A-5 INLET. SD.4.01	406.26	5.00	401.30	401.20	CAST IN PLACE INLET
15F2	INLET	HOWARD COUNTY DPW TYPE 'A-10 INLET. SD.4.02	405.40	10.00	400.90	400.80	PRECAST INLET
16F2	INLET	HOWARD COUNTY DPW TYPE 'A-5 INLET. SD.4.01	402.36	5.00	_	397.50	CAST IN PLACE INLET
17F2	INLET	HOWARD COUNTY DPW TYPE 'A-5 INLET. SD.4.01	402.30	5.00	398.10	397.20	CAST IN PLACE INLET
	4 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -				397.30		PRECAST INLET
18F2	INLET	HOWARD COUNTY DPW TYPE 'A-10 INLET. SD.4.02	401.10	10.00	396.80	396.70	PRECAST INLET
11F2	INLET	HOWARD COUNTY DPW TYPE 'A-10 INLET. SD.4.02 HOWARD COUNTY DPW TYPE 'A-10 INLET. SD.4.02	408.60	10.00	402.70	404.50	PRECAST INLET
12F2 111F2	INLET	HOWARD COUNTY DPW TYPE 'A-10 INLET. SD.4.02	397.60	10.00	-	390.74	PRECAST INLET
110F2	INLET	HOWARD COUNTY DPW TYPE 'A-10 INLET. SD.4.02	399.00	10.00	390.15	390.05	PRECAST INLET
19F2	INLET	HOWARD COUNTY DPW TYPE 'A-10 INLET. SD.4.02	399.80	10.00	394.57 389.45	À 389.35	PRECAST INLET
101 4	INLE	NUMARD COUNTY DEM TITE A-TO INLET. SD.4.02	333.00		395.50		**************************************
	STORMCEPTO	Removed the second property and second above	398.50	10.00	389.25	389.25	STORMCEPTOR
MH1G	MANHOLE	SHA #MD-384.03	397.30	5.00	388.95	388.85	PRECAST MANHOLE
MH2G	MANHOLE	SHA #MD-384.05	397.60	6.00 6.00	388.75	385.04	PRECAST MANHOLE
MH3G MH5G	MANHOLE	SHA #MD-384.05	389.40 385.50		383.10 381.00	382.67 380.90	PRECAST MANHOLE PRECAST MANHOLE
MH5G	MANHOLE MOT USED	SHA #MD-384.05  NOT USED NOT USED	400.00		NOT USE		NOTICEST INLINOT USED
12G	INLET	HOWARD COUNTY DPW TYPE 'A-10 INLET. SD.4.02	387.70	10.00	-	383.50	PRECAST INLET
13G	INLET	HOWARD COUNTY DPW TYPE 'A-10 INLET. SD.4.02	391.60	10.00	_	385.00	PRECAST INLET
14G	INLET	HOWARD COUNTY DPW TYPE 'A-10 INLET. SD.4.02	387.70	10.00	384.00	383.30	PRECAST INLET
140	IIILLI		007.70		383.40		
15G	INLET	HOWARD COUNTY DPW TYPE 'A-10 INLET. SD.4.02	386.10	10.00	382.60	382.00	PRECAST INLET
16G	INLET	HOWARD COUNTY DPW TYPE 'A-10 INLET. SD.4.02	385.86	10.00	381.90	382.00	PRECAST INLET
17G	INLET	HOWARD COUNTY DPW TYPE 'A-10 INLET. SD.4.02	385.86	10.00	381.80	381.70	PRECAST INLET
IBG	INLET	HOWARD COUNTY DPW TYPE 'A-10 INLET. S0.4.02	386.60	10.00	380.76	380.21	PRECAST INLET
19G	INLET	HOWARD COUNTY DPW TYPE 'A-10 INLET. SD.4.02	393.60	1		388.28	PRECAST INLET
I10G	INLET	HOWARD COUNTY DPW TYPE 'A-10 INLET. SD.4.02	389.60		_	385.50	PRECAST INLET
MH4G	grand the first	SHA #MD-384.03	388.50	5.00	386.00	383.18	PRECAST MANHOLE
MITTE	MANHOLE	STA #MU-304.03	366.30	a de la composición	385.20	303.10	THEONO! WATEROLL
111G	INLET	HOWARD COUNTY DPW TYPE 'A-10 INLET. SD.4.02	386.60	10.00	382.70	382.34	PRECAST INLET
MH6G	MANHOLE	SHA #MD-384.03	386.00	5.00	381.56	379.88	PRECAST MANHOLE
112G	INLET	HOWARD COUNTY DPW TYPE 'A-10 INLET. SD.4.02	385.00	10.00	379.89 379.78	379.77	PRECAST INLET
113G	INLET	HOWARD COUNTY DPW TYPE 'A-10 INLET. SD.4.02	385.60		-	381.50	PRECAST INLET
	100	Janether - Kweek et al. 11 in the control	1 2 2 2	100	379.53	770 50	22201021111111
MH7G	MANHOLE	SHA #MD-384.03	386.30	5.00	381.00	379.52	PRECAST MANHOLE
SC3G	STORMCEPTO	<b>7</b>	388.00	8.00	378.80	378.80	STORMCEPTOR
MH8G	MANHOLE	SHA #MD-384.07	388.20	7.00	379.90	376.50	PRECAST MANHOLE
379	1 1			147.000	380.00	17	
MH1M1	MANHOLE	SHA #MD-384.07	387.70 393.10		375.50	374.14 389.00	PRECAST MANHOLE PRECAST INLET
I2N	INLET	HOWARD COUNTY DPW TYPE 'A-10 INLET. SD.4.02 HOWARD COUNTY DPW TYPE 'A-10 INLET. SD.4.02	389.60	L	386.60	384.02	PRECAST INLET
11M2	INLET	HOWARD COUNTY DPW TYPE 'A-10 INLET. SD.4.02 HOWARD COUNTY DPW TYPE 'A-10 INLET. SD.4.02	385.40		382.50	381.80	PRECAST INLET
12M2	INLET	HOWARD COUNTY DPW TYPE 'A-10 INLET. SD.4.02	384.60	10.00	381.10	381.10	PRECAST INLET
13M2	INLET	HOWARD COUNTY DPW TYPE 'A-10 INLET. SD.4.02	385.10	10.00	380.44	380.00	PRECAST INLET
/ I1M1	INLET	HOWARD COUNTY DPW TYPE 'A-10 INLET. SD.4.02	387.60			382.99	PRECAST INLET
12M1	INLET	HOWARD COUNTY DPW TYPE 'A-10 INLET. SD.4.02	387.60		382.70	382.60	PRECAST INLET
13M1	INLET	HOWARD COUNTY DPW TYPE 'A-10 INLET. SD.4.02	385.20	10.00	381.40	380.38	FREUASI INLE!
14M2	INLET	HOWARD COUNTY DPW TYPE 'A-10 INLET. SD.4.02	383.00	10.00	381.40	375.06	PRECAST INLET
			383.00		379.90 375.00	375.00	STORMCEPTOR
SC4M2 MH1M2	STORMCEPTC MANHOLE		377.00		374.28	368.23	PRECAST MANHOLE
EW1M1	ENDWALL	SHA #MD-354.01	371.70		- 7	368.00	STANDARD TYPE C ENDWA
EW1M2	ENDWALL	SHA #MD-354.01	370.30	5.00	- 2 12	368.00	STANDARD TYPE C ENDWA
EX 1	EX. INLET			107.20	_	403.37	STANDARD TYPE C ENDWA
MH2M1	MANHOLE	SHA #MD-384.03	383.00	5.00	373.97	368.26	PRECAST MANHOLE
		POND G A	REA S	SANDFIL	TER		
11	INII ET		393.92			390.00	DDECAST INI CT
12	INLET	HOWARD COUNTY DPW TYPE 'A-10 INLET. S0.4.02	393.92		388.60	388.50	PRECAST INLET
13	INLET	HOWARD COUNTY DPW TYPE 'A-10 INLET. SD.4.02 HOWARD COUNTY DPW TYPE 'A-10 INLET. SD.4.02	392.00		387.20	387.00	PRECAST INLET PRECAST INLET
14	INLET	HOWARD COUNTY DPW TYPE 'A-10 INLET. SD.4.02	388.00		-	384.00	PRECAST INLET
		The state of the s	389.32		384.40	382.00	PRECAST INLET
15	INLET	HOWARD COUNTY DPW TYPE 'A-10 INLET. SD.4.02			383.60		
16	INLET	HOWARD COUNTY DPW TYPE 'A-10 INLET. SD.4.02	389.32		380.50	378.89	PRECAST INLET
17	INLET	SHA DOT TYPE WR INLET 4.37	381.50		- 11/	2376.80	PRECAST INLET
18	INLET	HOWARD COUNTY DPW TYPE 'A-10 INLET. SD.4.02	385.72	10.00	A 374 55	378.20	PRECAST INLET
19	INLET	HOWARD COUNTY DPW TYPE 'A-10 INLET. SD.4.02	382.85	10.00	374.55	373.86	PRECAST INLET
110	INLET	HOWARD COUNTY DPW TYPE 'A-10 INLET. SD.4.02	385.90	10.00	375.10	381.50	PRECAST INLET
111	INLET	HOWARD COUNTY DPW TYPE 'A-10 INLET. SU.4.02 HOWARD COUNTY DPW TYPE 'A-10 INLET. SD.4.02	386.72		380.50	380.00	PRECAST INLET
112	INLET	SHA DOT TYPE WR INLET 4.37	376.59		375.50	371.17	PRECAST INLET
· · · · · · · · · · · · · · · · · · ·	<b></b>	and the second s			2 369.56		
114	INLET	HOWARD COUNTY DPW TYPE 'A-10 INLET. SD.4.02	377.57		370.48	300.40	PRECAST INLET
	INLET	HOWARD COUNTY DPW TYPE 'A-10 INLET. SD.4.02	381.55	-	7 <b>-</b> 7 2 1 2 4 4	373.00	PRECAST INLET
113			1	5.00	369.60	369.50	PRECAST INLET
	MANHOLE	SHA #MD-384.03	370.00	3.00		303.00	TILOAST INCL
113		CUA MID 204 03	380.00		368.20 368.20	364.90	PRECAST INLET

STORM DRAIN COMPUTATION SHEET

DATE: <u>06/03</u> COMPUTED BY: PCF DATE: 06/03 CHECKED BY: JK

PROJECT: APL-JHU BASIN G STORM FREQUENCY: 10-YEAR

MANNING'S "N" (RCP) = 0.013MANNING'S "N" (PVC) = 0.011

3

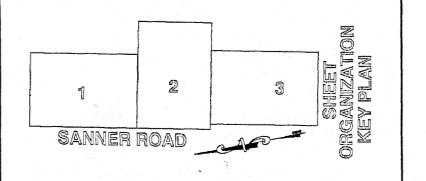
STRUC	TURE	DRAII AR	EA	RUNOFF COEFF.	"AREA"		TIME OF CONC.	INTENSITY	RUNOFF "Q"	PIPE DIAMETER	PIPE LENGTH (ft)	MIN. PIPE SLOPE	ACTUAL PIPE SLOPE	VELOCITY	TIME IN PIPE	PIPE "Q" CAPACITY	"Q"	
ROM	TO	INC (AC)	TOTAL (AC)	"c"	(AC)	TOTAL (AC)	(MIN)	"I" (IN/HR)	(CFS)	(IN)		(f/f)	(f/f)	(FPS)	(MIN)	(CFS)	(CFS)	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13) -0.000	0.030	(15) 9.11	(16) 	(17)	(18) <del>- 0.32 -</del>	
1F1	1251	0.04	0.04	0.9	0.04	0.04	5.00 5.00	8.50 8.50	0.32 1.18	15 15	23.34 257.42	0.000	0.030	9.11	0.47	11.19	0.86	
2F1 3F1	-14F1 -14F1	0.11	0.15	0.9	0.10	0.14	5.00	8.50	0.58	15	-22.84-	0.000	0.030	9.11	0.04	11.19	0.58	
4F1	15F1	0.07	0.30	0.9	0.07	0.27	5.00	8.50	2.33	15	20.99	0.001	0.030	9.11	0.04	11.19	0.57	
5F1	M: (1F1	0.54	0.84	0.9	0.49	0.76	5.00	8.50	6.46	18	90.70	0.004	0.010	5.94	0.25	10.50	4.13	
7Г1	16F1	0.40	0.40	0.9	0.36	0.36	5.00	8.50	3.08	15	60.05	0.002	0.020	7.44	0.13	9.13	3.08	
6F1	MHIFT	0.42	0.82	0.9	0.38	0.74	5.00	8.50	6.28 12.74	15 24	98.78 <b>6.</b> 19	0.009	0.030	9.11	0.18	28.81	0.00	
WH1F1	SC1F1	0.00		0.9	0.00	1.50	5.00	8.50	12.74	24	15.98	0.003	0.015	8.82	0.03	27.70	0.00	
3C1F1 8F1	MH1F2 MH2F1	1.21	1.67	0.9	1.09	1.09	5.00 5.00	8.50 8.50	9.26	18	138.54	0.003	0.020	8.40	0.27	14.85	9.26	
MH2F1	MH1F2	0.00	1.21	0.9	0.00	1.09	5.00	8.50	9.26	18	116.30	0.008	0.023	9.01	0.22	15.93	0.00	
MH1F2	MH1AF2	0.00	2.88	0.9	0.00	2.59	5.00	8.50	21.99	24	130.03	0.009	0.015	8.82	0.25	27.70	0.00	
EX-MH	MH1AF2	0.89	0.89	0.9	0.80	0.80	5.00	8.50	6.81	18	191.33	0.004	0.010	5.94	0.54	10.50	0.00	
H1AF2	MH2F2	0.00		0.9	0.00	3.39	5.00	8.50	28.80	27	131.78	0.009	0.015	9.54	0.23	37.93 37.93	0.00	
MH2F2	MH2G 14F2	0.00		0.9	0.00	0.07	5.00	8.50 8.50	28.80 0.57	15	224.06	0.000	0.008	4.71	0.08	5.78	0.57	
4F2	15F2	0.07	0.16	0.9	0.08	0.14	5.00	8.50	1.22	15	29.64	0.000	0.010	5.26	0.09	6.46	0.66	
5F2	17F2	0.38		0.9	0.34	0.49	5.00	8.50	4.14	15	135.45	0.004	0.020	7.44	0.30	9.13	2.91	
6F2	17F2	0.05	1	0.9	0.05	0.05	5.00	8.50	0.40	15	22.95	0.000	0.009	4.99	0.08	6.13	0.40	-
7F2	18F2	0.43	1	0.9	0.39	0.92	5.00	8.50	7.85	18	42.59	0.006	0.009	5.64	0.13	9.96	3.31	}
18F2	19F2	0.43		0.9	0.39	1.31	5.00	8.50	11.16	24	120,46	0.002	0.010	7.20	0.28	22.62	3.31	1
11F2	12F2	0.34	1		0.31	0.31	5.00	8.50	2.62	15	60.08	0.002	0.030	9.11	0.11	9.13	2.62	
12F2	19F2	0.34			0.31	0.62	5.00 5.00	8.50 8.50	5.23 9.83/2	15	311.65 60.09	0.007 0.009	0.020	7.44 5.94/2	0.70	10.5/2		
111F2 110F2	110F2 19F2	0.19	0.19	0.9	0.17	0.17	5.00	8.50	13.04	24	59.60	0.003	0.010	7.20	0.14	22.62	3.21	_
19F2	F2	0.42	3.16		0.37	1	5.00	8.50	32.57	36	9.15	0.002	0.010	9.44	0.02	66.70	3.14	1
SC2F2	MH1G	0.00			0.00	2.84	5.00	8.50	32.57	36	17.73	0.002	0.010	9.44	0.03	66.70	0.00	-
MH1G	MH2G	0.00	3.16	0.9	0.00	2.84	5.00	8.50	32.57	36	11.73	0.002	0.009	8.95	0.02	63.28	0.00	1
MH2G	MH3G	0.00	-		0.00	6.23	5.00	8.50	61.38	36 36	193.54 167.17	0.006	0.010	9.44	0.34	66.70	0.00	1
MH3G MH5G	MH5G MH8G	0.00	1	<del></del>	0.00	6.23	5.00 5.00	8.50 8.50	61.38 61.38	48	118.78	0.008	0.010	10.23	0.19	128.49	0.00	1
MH3G		0.00					OT SUSED		NO.TO BUSE		<b>SED</b> 6.39			4.71	NOT7 US		NOSE USED	]
12G	14G	0.07	<del> </del>	<u> </u>	0.06	0.12	5.00	8.50	1.06	15	24.64	0.000	0.004	3.33	0.12	4.08	0.50	
13G	14G	0.30			0.27	0.27	5.00	8.50	2.30	- 15	41.89	0.001	0.024	8.15	0.09	10.00	2.30	
14G	15G	0.06	0.50	0.9	0.06	0.45	5.00	8.50	3.83	15	65.63	0.004	0.010	5.26	0.21	6.46	0.48	4
15G	17G	0.41	0.91		0.37	0.82	5.00	8.50	6.93	18	7.69	0.004	0.013	6.78 4.08	0.02	11.97 5.00	3.10 1.17	-
16G	17G	0.15	<del> </del>	<del></del>	0.14	0.14	5.00	8.50	1.17	15	32.04 103.93	0.000	0.006	5.64	0.13	9.96	1.55	-
17G	18G	0.20			0.18	1.14	5.00	8.50 8.50	9.65	18	64.11	0.003	0.005	5.09	0.21	15.99	3.61	1
18G 19G	MH6G MH4G	0.47	0.21		0.43	1.56	5.00	8.50	1.58	15	102.81	0.001	0.030	9.11	0.19	11.19	1.58	
110G	MH4G	0.26	<del></del>		0.23	0.23	5.00	8.50	1.97	15	62.34	0.001	0.005	3.72	0.28	4.57	1.97	
MH4G	111G	0.00			0.00	0.42	5.00	8.50	3.54	15	48.25	0.003	0.010	5.26	0.15	6.46	0.00	
111G	MH6G	0.19	0.65	0.9	0.17	0.58	5.00	8.50	4.96	15	78.21	0.006	0.010	5.26	0.25	6.46	1.42	-
MH6G	112G	0.00	-		0.00	2.14	5.00	8.50	18.22	24	14.16	0.007	0.007	6.02	0.04	18.92 20.23	1.94	1
112G	MH7G	0.25		1	0.23	2,37	5.00	8.50	20.16 0.44	15	30.05 45.58	0.008	0.008	5.26	0.08	6.46	0.44	1
I13G MH7G	MH7G SC3G	0.06			0.05	0.05	5.00	8.50 8.50	20.59	24	6.18	0.008	0.010	7.20	0.02	22.62	0.00	
SC3G	MHBG	0.00			0.00	2.42	5.00	8.50	20.59	24	6.55	0.008	0.015	8.82	0.01	27.70	0.00	
TBC	MH8G	0.00			0.00	0.00	5.00	8.50	30.00	36	0.00	0.002	0.005	6.67	0.00	47.16	0.00	_
MH8G	MH1M1	0.00			0.00	8.66	5.00	8.50	101.97	48	153.20	0.005	0.006	8.86	0.29	111.28	0.00	-
MH1M1	MH2M1	0.00			0.00	8.66	5.00	8.50 /	101.97	<u>/2</u> \48 48	28.14 42.78	0.005	0.006	8.86	0.29	111.28	0.00	-
MH2M1	EW1M1	0.00			0.00	8.66	5.00	8.50 8.50	2.52	15	117.55	0.002	0.020	7.44	0.26	9.13	2.52	1
IIN I2N	12N 11M2	0.33	-		0.30	0.53	5.00	8.50	4.49	15	151.92	0.005	0.010	5.26	0.48	6.46	1.97	
11M2	12M2	0.32			0.29	0.82	5.00	8.50	6.92	18	71.61	0.004	0.001	4.20	0.28	7.43	2.43	-
12M2	13M2	0.44	-	-	0.40	1.21	5.00	8.50	10.29	18	65.14	0.001	0.001	4.20	0.26	10.50	3.37	4
13M2	14M2		1.80		0.41	1.62	5.00	8.50	13.76	24	140.67	0.004	0.005	6.44	0.36	20.23	3.47	-
I1M1 .	12M1	0.06	-1		0.05	0.05	5.00	8.50	0.44	15	38.56	0.000	0.010	5.26	0.12	6.46	1.68	1
12M1	13M1	0.22		-	0.20	0.25		8.50	2.13	15	120.16 47.80	0.001	0.001	9.11	0.22	11.19	2.07	1
13M1 14M2	SCAM2	0.27	0.55		0.24	2.53	1	8.50 8.50	4.19 21.50	24	6.38	0.004	0.010	7.20	0.01	22.62	3.54	]
SC4M2	SC4M2 MH1M2	1	2.81		0.42	2.53		8.50	21.50	24	20.90	0.009	0.010	7.20	0.05	22.62	0.00	]
	EWIM2		2.81		0.00			8.50	21.50	24	21.34	0.009	0.010	7.20	0.05	22.62	0.00	4
								GAR	EA SA	NDFIL	TER							
					<u> </u>						<del></del>		0.070	044	0.00	11 10	1.32	1
11	12	0.17			0.16	0.16	5.00	8.50	1.32	15	47.90	0.000	0.030	9.11	0.09	11.19	1.22	1
12	13		0.3		0.14	0.30	5.00	8.50 8.50	4.31	15	43.81 87.31	0.002	0.030	9.11	0.08	11.19	1.77	1
13	15	0.23	0.56	-	0.21	0.51	5.00	8.50	1.03	15	8.48	0.000	0.030	9.11	0.02	11.19	1.03	]
15	15		0.13	<del></del>	0.12		5.00	8.50	6.02	15	48.58	0.009	0.030	9.11	0.09	11.19	0.68	4
16	19	<del></del>	0.8		0.08	_	<del></del>	8.50	6.69	18	117.33	0.004	0.020	8.40	0.22	14.85	0.67	-
18	19	0.10			0.09		5.00	8.50	0.77	15	101.70	0.000	0.030	9.11	0.19	11.19	0.77	-
19	114	-	1.26		0.26		5.00	8.50	9.67	18	168.90	0.009	0.020	8.40	0.34	14.85	0.15	-
110	111	<del></del>	0.0		0.02			8.50	0.15	15	50.74	0.000	0.020	9.11	0.11	9.13	0.15	1
111	112		0.10		0.07			8.50 8.50	7.79	18	150.10 69.41	0.000	0.030	5.94	0.19	10.50	7.03	1
112	114	0.92	_		0.83	_		8.50	19.76	24	28.03	0.003	0.010	7.20	0.06	22.62	2.30	]
114	MH2 MH1	0.30	2.5		0.27	_		8.50	0.32	15	114.24	0.000	0.030		0.21	11.19	0.32	
MH1	MH2		0.0		0.00		<del></del>	8.50	0.32	15	43.35	0.000			0.08	11.19	0.00	
	EDMH3		T USE				NOT SUSEI		NOT. US	ED NOT	<b>USED</b> ,79	NOT WE		7.20		22.62	NOOTO USED	STATE OF MA
17	EW2	-	0.9					8.50	3.75	18	96.04	0.001	0.010	5.94	0.27	10.50	3.75	In! MILL
NO						-											(No. 1)	SO ROBERT ARTHUR
1 T	OP OF HO	WARD	COUN	TY A-5	AND A-1	O REPI	RESENT T	HE TOP OF	CURB EL	EVATION O	F THE STR	UCTURE /	AND SLOPE	D TO FOLI	OW SLOP	E OF CURE	3	
		TOP	FRON:	T OF THE	INLET S	HALL E	BE AT HE	SAME LON	GITUDINAL	SLOPE AS	THE CUR	B MEET F	RONT EDG	E OF CURE	FLUSH.	A	656 598	WY J
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CHIEF, DEVELOPMENT ENGINEERING DIVISION MK DATE

CHIEF, DIVISION OF LAND DEVELOPMENT DATE

DIRECTOR U/U/19

JHU/APL INTERNAL USE THIS DATA SHALL NOT BE DISCLOSED TO A THIRD PARTY AND SHALL NOT BE DUPLICATED, USED, OR DISCLOSED IN WHOLE OR IN PART FOR ANY PURPOSE OTHER THAN TO EVALUATE THIS RFP OR, IN THE CASE OF A CONTRACT AWARD, TO PERFORM THE WORK REQUIRED HEREUNDER, WITHOUT THE EXPRESS WRITTEN CONSENT OF JHU/APL. A. MORTON THOMAS AND ASSOCIATES, INC. CONSULTING ENGINEERS
12750 TWINBROOK PARKWAY, SUITE 200, ROCKVILLE MD 20852
TEL (301) 881-2545 FAX (301) 881-0814
AMT FILE # 102-440



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DRN: RLP	j.,49480	jana ngakata Malagara				<u>;</u> ;	
	8/17/05	RED-LINE SLIBMISSION	3	j.	: .	9,5	
CHK: BW	3/9/04	COORDINATION 🛕	117		-		
	11/24/03	ADDENDUM 1 🛕					
DATE: 10/10/03	DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	СК	APP	

# NORTH PARKING / BALL FIELD ENTRANCE

REVISED SITE DEVELOPMENT PLAN - RETAIN EXISTING ANTENNA RANGE AND PARKING LOT FI

APPLIED PHYSICS LABORATORY THE JOHNS HOPKINS UNIVERSITY STRUCTURE SCHEDULES

> TAX MAP 41 PARCEL 1 ELECTION DISTRICT NO. 5 HOWARD COUNTY, MARYLAND

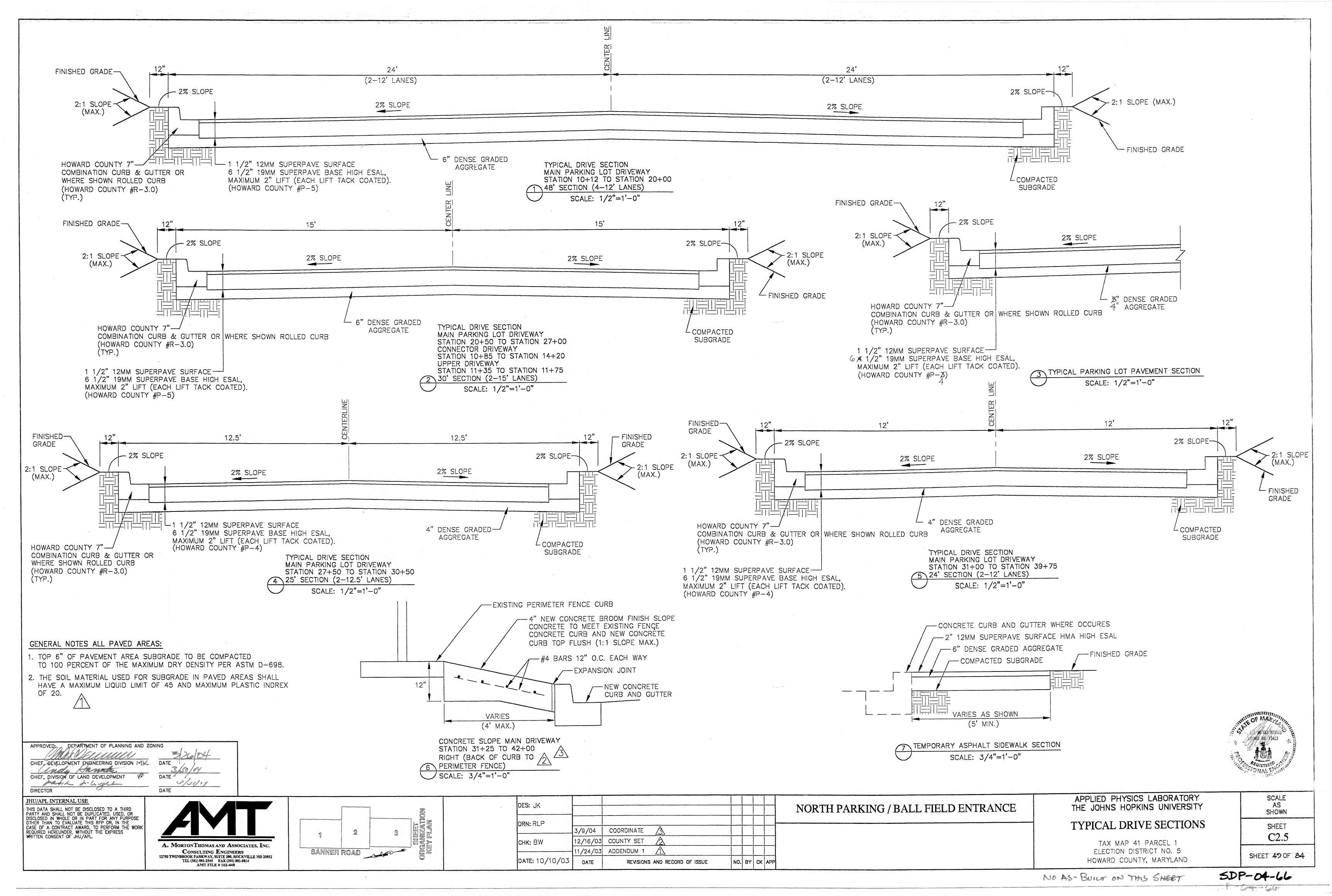
C2.4 SHEET 48 OF 84

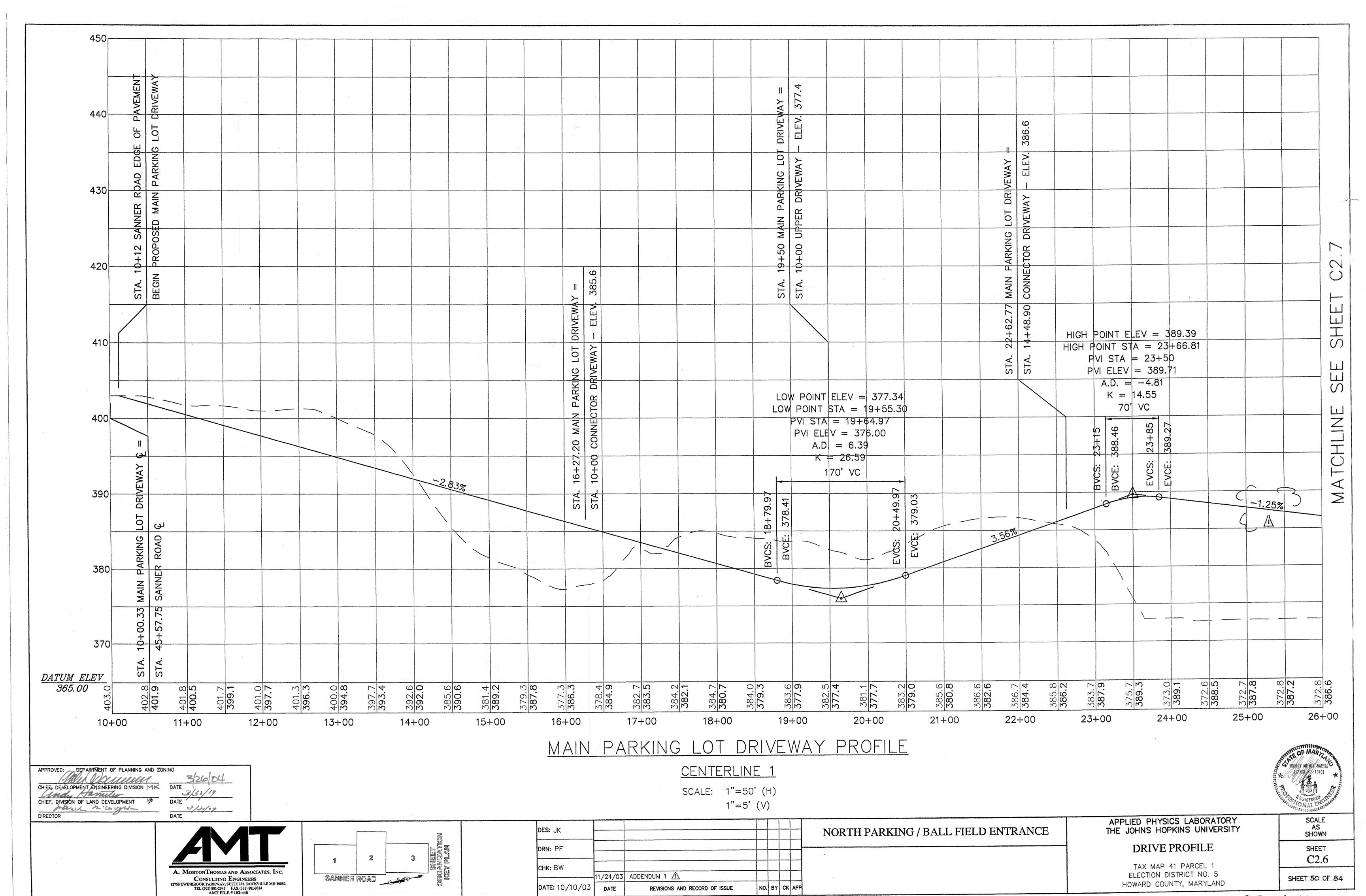
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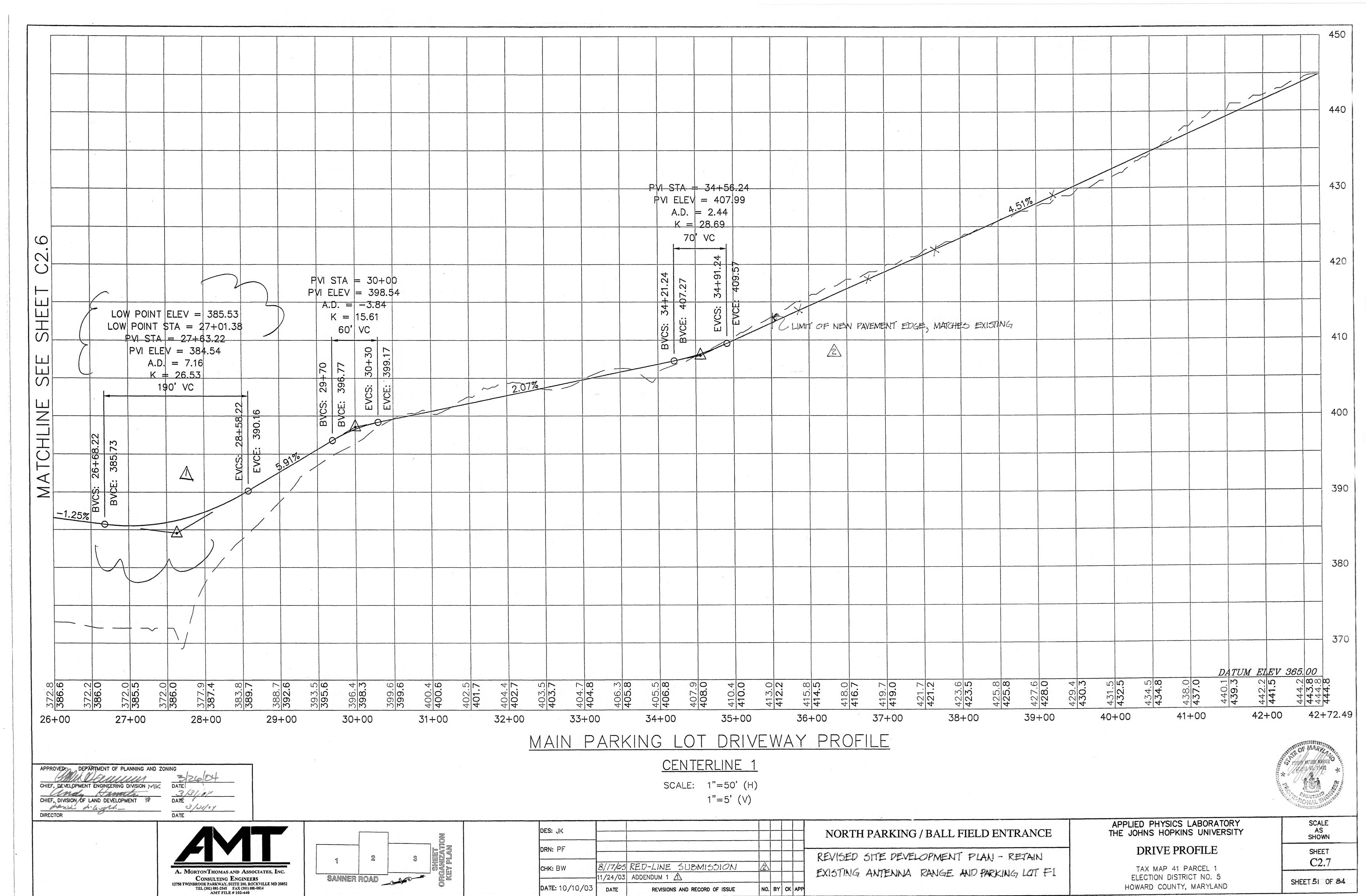


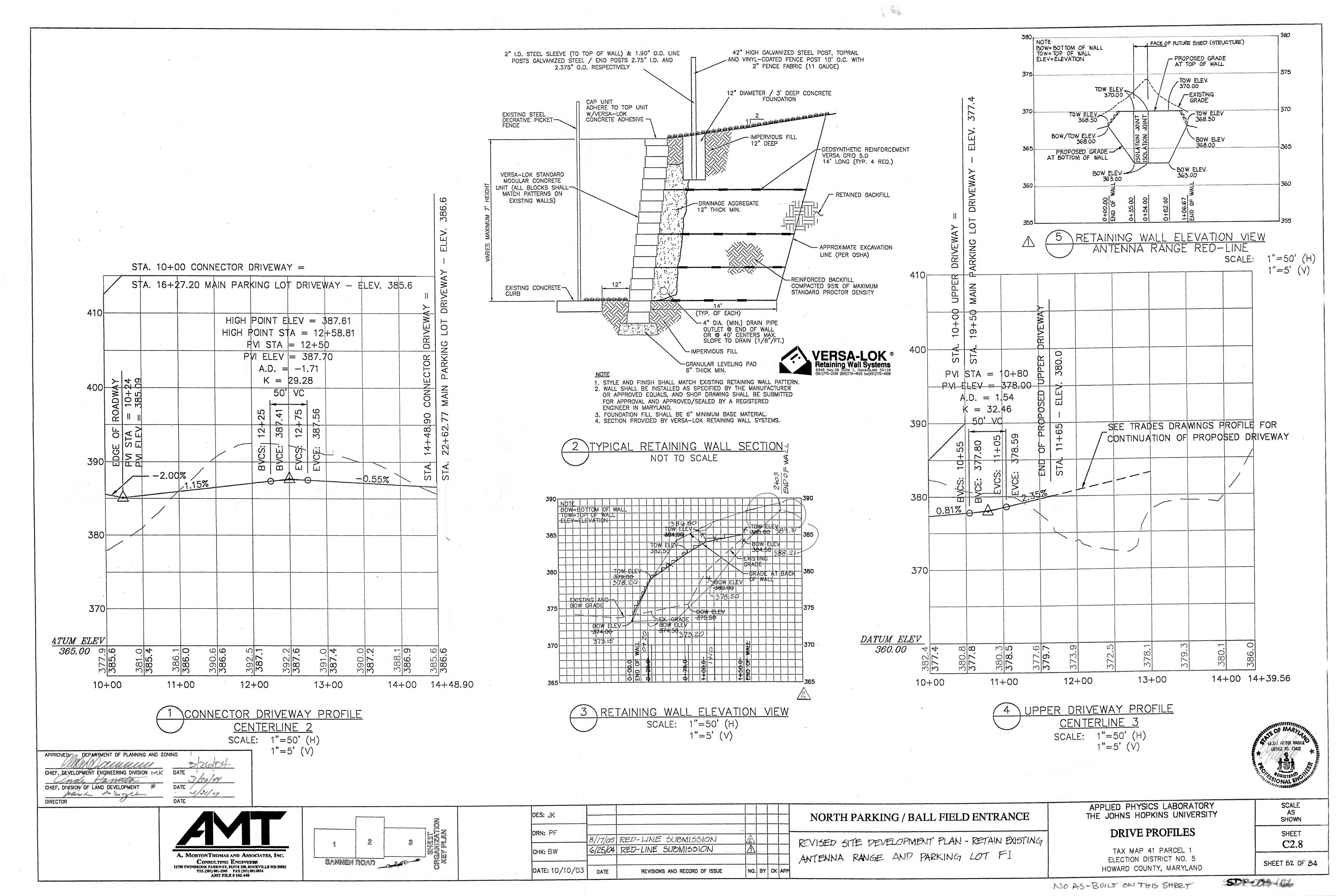
DATE: 10/10/03

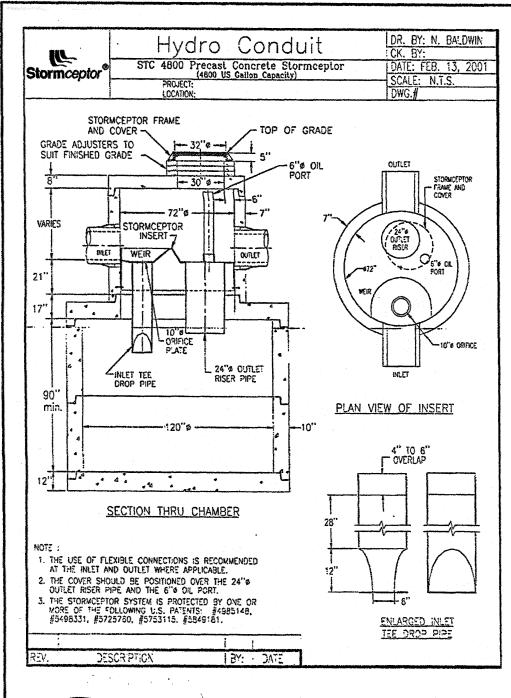
NO. BY CK APP

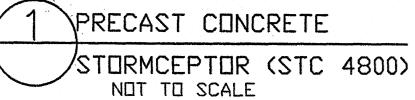
REVISIONS AND RECORD OF ISSUE

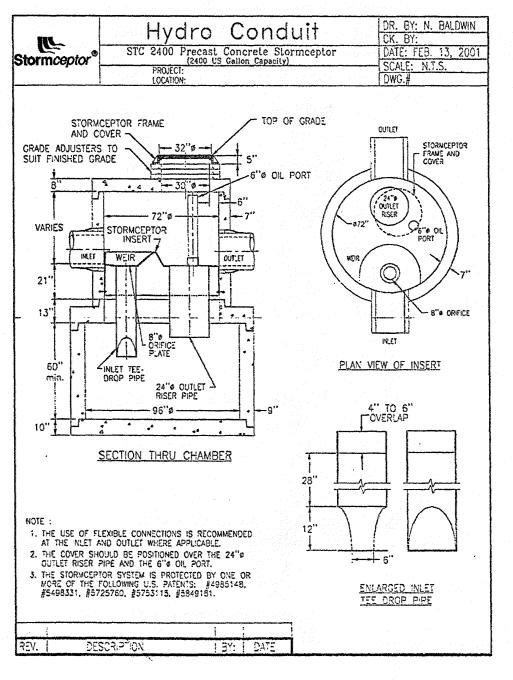
ELECTION DISTRICT NO. 5 SHEET 50 OF 84 HOWARD COUNTY, MARYLAND NO AS-BUILT ON THIS SHEET

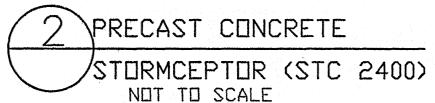






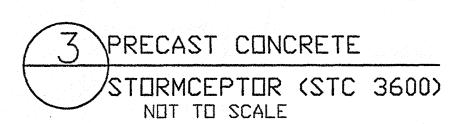






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u Perinteria, Re	Hvdro	Condu	tik	DR. BY: N. BAL	DWIN
E	STC 3600 Precast	Concrete Stor		DATE: FEB. 13,	2001
itormceptor®	PROJECT: (3800 US	Galion Capacity)		SCALE: N.T.S.	
	LOCATION:			DWG.#	
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	the production of the second				
	ICEPTOR FRAME	TOP OF GRAI	DE		
GRADE ADJUSTER		<u> </u>			
SUIT FINISHED G	ADE ADE	5"		OUTLET STORMCE	erne
8"	-30"	6"ø OIL		FRAME AF	ON
1		TL 6"	_	1_11	
	72"0	7"		777	
VARIES	STORMCEPTOR INSERT -7		· // ·	(24°) OUTLET	\
Y-milet	WEIR	1	11	RISER	
1	1777 \ \-P-	OUTET	872	" 6"e OLL\PP	ORT
21''		L	// WER		/
		<b>韦</b> 上,		(C) \//	~7"
13"		1::1			
· • • • • • • • • • • • • • • • • • • •	NORIFICE TO	<b></b>		8"0 ORFF	CE.
	PLATE				
	INLET TEE			MET	
J., L	DROP PIPE	—ქქ			
100"	24"ø CUTLET 4 RISER PIPE		PLAN V	EW OF INSERT	
-	95"¢	——			
		<u>                                     </u>		4" TO 6"	
				OVERLAP	
10"	<u> </u>	4 4			
	SECTION THRU CHAMS	oe o			1
	SECTION THAT CHAM:	<del>5.00</del>	28"		
NOTE :			T T	<b>∜</b> ────────────────────────────────────	1
1. THE USE OF FL	EXIBLE CONNECTIONS IS RECO	MMENDED	1-	$\neg$	
AT THE INLET A	nd outlet where applicable the positioned over th	€.	12"	/ V	$\bigvee$
OUTLET RISER F	THE AND THE 6" OIL PORT.				_
WORE OF THE P	OR SYSTEM IS PROTECTED BY OLLOWING U.S. PATENTS: #4	985148.		5"	
#5498331, #57	25760, #5753115, #5849181.				
				ENLARGED ALET TEE DROP P.PE	



#### Stormceptor Capacities Table Sediment Oil (Gal) Total Volume Diameter Depth (ft) Empty Weight Full Weight STC 450i 45.1 468.9 57 4.0 STC 900 75.4 251.0 951.0 5.2 STC 1200 | 113.1 251.0 1233.7 6.0 22.9 STC 1800 193.2 251.0 1832.0 6.0 9.4 18.8 28.0 STC 2400 | 154.9 840.1 2462.1 8.0 8.7 24.0 33.4 STC 3600 322.6 840.1 3714.3 8.0 12.0 29.3 43.9 STC 4800 464.7 908.8 5058.9 10.0 11.7 39.9 59.9 6135.4 10.0 STC 6000 608.7 908.8 13.5 44.0 68.4 7419.3 | 12.0 STC 7200 725.8 1058.0 12.3 58.0 87.7 STC 11000 : 942.5 2796.3 11193.0 20.0 11.7 79.9 119.7 STC 13000 1230.4 2796.3 13347.3 20.0 13.5 88.0 136.8 STC 16000 | 1470.2 3053.8 15917.7 24.0 12.3 116.0 175.5

Sediment and Oil volumes are maximum capacities
Repth = Depth of tank from the invert of the pipe to the bottom of the structure
Depth = Depth of tank from the invert of the pipe to the bottom of the structure Diameter = Diameter of the lower tank below the invert of the pipe
Empty Weight = Weight of the Concrete Structure
Full Weight = Weight of the Concrete Structure when it is full of water

DATE/

APPROVED: // DEPARTMENT OF PLANNING AND ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION MK Hamole

CHIEF, DIVISION OF LAND DEVELOPMENT

mark house

DIRECTOR

			CONCRET	E STORMCE	PTOR DAT	Α	
	STRUCTURE NUMBER	DRAINAGE AREA (ACRES)	TOP ELEVATION	PIPE SIZE & TYPE	INVERT IN	INVERT OUT	MATERIAL/ MODEL NO.
-	SC1F1	1.67	416.50	24" RCP	408.50	408.40	STC2400
7	sc2F2	<del>3.16</del> 4,51	398,50	27" RCP	392.70	392.60	5TC <del>4888</del>
	SC3G	2.69	388.00	24" RCP	380.20	380.10	STC3600
	SC4M2	2.81	383.00	24" RCP	375.80	375.00	STC3600

SEDIMENT C					
"I/WE CERTIFY PLANS, AND THAT	THAT ALL DEVELOP ANY RESPONSIBLE F TENDANCE AT A DE	PERSONNEL.	INVOLVED IN TH	E CONSTRUCTION OF APPROVE	ONE ACCORDING TO THE ON PROJECT WILL HAVED TRAINING PROGRAM
I ALSO AUTHORIZE					ERVATION DISTRICT."
Carnes	E Leas	e e			
James SIGNATURE OF DEV		ch	3/16/ DATE	54	
PRINT NAME BELOW	SIGNATURE				
( ) BY THE ENGIN			n application an	umai amaza	PLIMA
A PRACTICAL AND	AT THIS PLAN FOR WORKABLE PLAN BA	ASED ON MY	PERSONAL KN	OWLEDGE OF T	ENTS HE SITE CONDITIONS. D SOIL CONSERVATION
MA	1. Wimm		3/15/04		
SIGNATURE OF ENG PRINT NAME BELOW			DAIL		
THEOR OF ANO	C HAVE BEEN BEVIE		שאאמת פטו	CONSERVATION	ON DISTRICT AND MEET
	EQUIREMENTS FOR				
Carlotta Carlotta					Management and Manage
USDA-NATURAL RE	SOURCES CONSERV	ATION SERVI	CE	DATE	<del>-</del>
( ) THESE PLANS REQUIREMEN	s for soil erosion ts of the Howard	n and sedii ) soil cons	MENT CONTROL ERVATION DISTR	MEET THE	
	- ALEXANDER OF THE PARTY OF THE				The second secon

SEDIMENT C	CONTROL			
LANS, AND THAT ERTIFICATE OF A HE CONTROL OF	THAT ALL DEVELOPMENT A ANY RESPONSIBLE PERSON ITENDANCE AT A DEPARTMI SEDIMENT AND EROSION BE	INEL INVOLVED IN THE CO ENT OF THE ENVIRONMENT FORE BEGINNING THE PRO	ILL BE DONE ACCORDING TO TH NSTRUCTION PROJECT WILL HAV APPROVED TRAINING PROGRAM JECT. OIL CONSERVATION DISTRICT."	Æ A
James	A . A	3/16/04	t	
IGNATURE OF DET RINT NAME BELO		DATE /		
PRACTICAL AND	IAT THIS PLAN FOR EROSION WORKABLE PLAN BASED O	ON MY PERSONAL KNOWLE		THIS
IGNATURE OF EN		BATE		
) THESE PLAN TECHNICAL	IS HAVE BEEN REVIEWED FOR REQUIREMENTS FOR SOIL EF	OR THE HOWARD SOIL COI ROSION AND SEDIMENT CO	NIROL.	THE
	ESOURCES CONSERVATION :		DATE	

#### CONTRACTOR INSTALLATION INSTRUCTIONS PRECAST CONCRETE STURMCEPTUR

- STAKE-DUT THE LOCATION OF THE STORMCEPTOR AND EXCAVATE HOLE. EXCAVATE ADEQUATE SPACE TO CONNECT INLET AND DUTLET PIPES TO UNIT. INSTALL A 12' DEEP (OR AS REQUIRED) LAYER OF COMPACTED AGGREGATE SUBBASE AT BOTTOM OF EXCAVATION. INSTALL MULE OR SHORING, AS NEEDED.
- CHECK ELEVATION OF UNIT BY MEASURING ITS SECTIONS FROM BASE OF THE STORAGE CHAMBER (BOTTOM OF UNIT'S SLAB) TO THE INVERT OF STORMCEPTOR BYPASS CHAMBER INLET ELEVATION (FIBERGLASS INSERT). SUBTRACT THIS DISTANCE FROM DESIGN INVERT ELEVATION TO DETERMINE TO PERSON SUBBASE ELEVATION. CHECK ELEVATION OF INSTALLED SUBBASE AND ADJUST AS NEEDED.
- SECURE INSPECTOR APPROVAL OF SUBGRADE AND SUBBASE.
- INSTALL STURAGE CHAMBER. INSTALL SCREW INSERTS INTO BASE OF STURAGE CHAMBER. ATTACH CABLES OR CHAINS TO ALL 3 LIFTING LUGS ON THE BASE SLAB. USING LARGE EQUIPMENT OR CRANE LIFT, PLACE THE BASE SECTION OF THE STURAGE CHAMBER IN THE EXCAVATED HOLE ON THE SUBBASE. MAKE SURE THAT THE BASE IS LEVEL. SPECIFIC ALIGNMENT OF THIS PART IS NOT REQUIRED. INSTALL RUBBER GASKET ON BASE UNIT AND COAT WITH LUBRICATING GREASE (PROVIDED IN SHIPMENT). IF NOT PRELUBRICATED, INSTALL ADDITIONAL STURAGE CHAMBER SECTIONS, AS REQUIRED (PROCEDURE IS SAME AS STEP 6).
- INSTALL REDUCING SLAB (STORMCEPTOR MODELS STC-2400, STC-3600, STC-4800, STC-6000 AND STC-7200) CHECK THAT SECTION IS SET FLUSH, LEVEL, AND IS AT THE PROPER ELEVATION. INSTALL RUBBER GASKET ON THE TRANSITION SLAB SPIGOT AND COAT WITH LUBRICATING GREASE (PROVIDED IN SHIPMENT).
- INSTALL BYPASS CHAMBER OF STORMCEPTOR WITH FACTORY INSTALLED STORMCEPTOR INSERT. LIFT BYPASS SECTION AND INSTALL, WHILE CHECKING ALIGNMENT AND GRADE OF INLET AND OUTLET DRAINAGE PIPES. CHECK TO MAKE SURE THE BYPASS CHAMBER IS SET FLUSH, LEVEL AND IS AT THE PROPER ELEVATION. THE BYPASS CHAMBER MUST BE DRIENTED SUCH THAT THE INLET PIPE DISCHARGES INTO THE V-SHAPED FIBERGLASS WEIRS (INSIDE INSERT). INSTALL RUBBER GASKET ON TOP OF BYPASS SECTION AND COAT WITH LUBRICATING GREASE, IF NOT LUBRICATED.
- INSTALL STORMCEPTOR DROP PIPES ACCORDING TO STC PIPE INSTALLATION PROCEDURE
- INSTALL RISER SECTION. LIFT RISER SECTION AND INSTALL, WHILE CHECKING THAT SECTION IS SET FLUSH AND IS AT PROPER ELEVATION AND THAT UNIT IS LEVEL. SPECIFIC ALIGNMENT OF THIS PART IS REQUIRED IF STEP(S) ARE INCLUDED. ALIGN STEPS ABOVE INLET INSPECTION PORT. NOTE, FOR SHALLOW INSTALLATIONS THIS SECTION MAY NOT BE REQUIRED.
- INSTALL TOP CAP WITH OPENING FOR STORMCEPTOR COVER. IF OPENING IS OFFSET(NOT CENTERED), THE TOP CAP OPENING SHOULD BE ORIENTED ABOVE THE STORMCEPTOR INLET INSPECTION PORT(PLUG).
- BACKFILL STORMCEPTOR WITH APPROVED BACKFILL MATERIAL (NO ORGANIC OR TOPSOIL IS TO BE USED FOR BACKFILL). BACKFILL AND COMPACT IN 8 INCH LIFTS. BACKFILL SHOULD BE COMPACTED TO LOCAL/STATE REQUIREMENTS.
- 11. INSTALL AND SET GRADE ADJUSTING RINGS AS NEEDED
- 12. INSTALL AND SET STURMCEPTUR FRAME AND COVER
- INSTALL INLET AND DUTLET STORM DRAIN PIPES. CONNECT INLET AND DUTLET STORM DRAIN PIPES WITH FLEXIBLE BOOTS (WHEN PROVIDED) AND WITH NON-SHRINK GROUT WHEN NO FLEXIBLE BOOTS ARE PROVIDED, THE INVERT OF THE INLET AND DUTLET PIPE IS TO MATCH WITH THE INVERT OF THE STORMCEPTOR INSERT. FLEXIBLE BOOT INSTALLATION PROCEDURES: CENTER THE PIPE IN THE BOOT OPENING, LUBRICATE THE OUTSIDE OF THE PIPE AND/OR THE INSIDE OF THE BOOT IF THE PIPE DUTSIDE DIAMETER IS THE SAME AS THE INSIDE DIAMETER OF THE BOOT. POSITION THE PIPE CLAMP IN THE GROUVE OF THE BOOT WITH THE SCREW AT THE TOP. TIGHTEN THE PIPE CLAMP SCREW TO 60 INCH POUNDS. IF THE PIPE IS MUCH SMALLER THAN THE BOOT LIFT THE BOOT SUCH THAT IT CONTACTS THE BOTTOM OF THE PIPE WHILE TIGHTENING THE CLAMP TO ENSURE EVEN CONTRACTION OF THE RUBBER. MOVE THE PIPE HORIZONTALLY AND/OR VERTICALLY TO BRING IT TO GRADE.
- 14. THE STORMCEPTOR SHOULD BE PUMPED OUT WHEN THE SEDIMENT CONTROL MEASURES ARE REMOVED (SITE PERMANENTLY STABILIZED).

Order # \_\_\_\_

Date \_\_\_\_ Internal Sale \_\_\_\_

Please draw orientation of inlet and outlet pipes

on diagram along with pipe inside diameter (in.) and invert elevation (ft.) Clearly mark inlets

pipes with an O and outlet pipes with an and provide the inlet/outlet pipe angle in degrees.

Top Elevation (ft)

Inlet Pipe Invert (ft)

Outlet Pipe Invert (ft)

Pipe Inside Diameter (in) [ID]
Pipe Outside Diameter (in) [OD]

15. FINAL INSPECTION

Concrete Stormceptor® Order Request Form

||Insert Size||

Custom \_\_\_\_

Approximate time frame until required delivery (weeks)\_

K

Please fax this sheet back to Hydro Conduit/Virginia Precast at (804) 798-3426 Attn: Dave Brinser / Ed O'Malley (Phone: 1-800-999-2278)

CONTRACTOR SHALL FIELD VERIFY ALIGNMENT AND ELEVATION

For credit information/applications contact Carole Broadus at (804) 798-6068

For Technical Assistance Please Call Stormceptor Corporation

at (301) 762-8361 or toll free at 1 (800) 762-4703

55,

32.

44"

|Contractor Information

Owner Information

4800

6000

7200

TO BE INCLUDED ON SWM PLAN BY DESIGNER

DATA PRIOR TO ORDERING STORMCEPTOR.

Stormcept%Model

STATE

CONTACT .

PHONE

PHONE

1200

1800

2400

Project Name

# FOR TECHNICAL INFORMATION CALL STORMCEPTOR AT 1-800-762-4703

AS MANUFACTURED BY CSR-HYDRO CONDUIT AND STORMCEPTOR CORPORATION. MODEL STC-3600, PRECAST CONCRETE. FOR TECHNICAL INFORMATION CALL STORMCEPTOR AT 301-762-8361 TO ORDER CONTACT CSR-HYDRO CONDUIT, VIRGINIA PRECAST AT 1-800-999-2278 AT LEAST 3 WEEKS PRIOR TO NEEDED DELIVERY.

- 1. THE STORMCEPTOR IS PROTECTED BY U.S. PATENT NO. 4,985,148.
- 2. CAST IRON FRAME & COVER TO BE APPROVED BY STORMCEPTOR
- 3. BEDDING, BACKFILL AND GENERAL INSTALLATION REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE MANUFACTURER AND A PROFESSIONAL ENGINEER BASED ON SITE SPECIFIC SOILS CONDITIONS, SUBJECT TO THE APPROVAL OF THE REGULATORY AGENCIES.

CORPORATION. "STORMCEPTOR" TO BE EMBOSSED ON COVER

- 4. SIZING OF THE STORMCEPTOR SHALL BE IN ACCORDANCE WITH THE GUIDELINES PROVIDED BY STORMCEPTOR CORPORATION, SUBJECT TO THE APPROVAL OF THE REGULATORY AGENCIES.
- 5. THE STORMCEPTOR SHOULD BE MAINTAINED ANNUALLY AND/OR IMMEDIATELY FOLLOWING ANY KNOWN SPILLS.
- 6. THE STORMCEPTOR CONFORMS TO ASTM C 478 DESIGN SPECIFICATIONS / STANDARDS.
- 7. A MINIMUM OF 1 STEP IS TO BE USED IN THE ACCESS WAY.
- 8. COVER TO BE OFFSET 6" FROM ACCESS WALL ADJACENT TO INLET INSPECTION PORT.
- 9. NON-SMOOTH WALL O.D. PIPE TO BE GROUTED IN PLACE
- 10. FURTHER TECHNICAL INFORMATION IS AVAILABLE FROM STORMCEPTOR CORPORATION 1 (800) 762-4703.

#### CONSTRUCTION NOTES

- 1, SILT AND DEBRIS SHALL NOT BE ALLOWED TO ENTER THE STORMCEPTOR UNTIL THE CONTRIBUTING DRAINAGE AREAS HAVE BEEN PERMANENTLY STABILIZED. SILT MAY BE ALLOWED TO ENTER STORMCEPTOR IF IT IS BEING USED AS A FINAL SEDIMENT CONTROL FILTERING DEVICE.
- 2. ALL OPENINGS TO STRUCTURES SHALL BE PROTECTED WITH THE APPROPRIATE SEDIMENT CONTROL MEASURES.
- 3. THE STORMCEPTOR MUST BE PUMPED OUT AND CLEANED AT THE END OF THE CONSTRUCTION OF THE PROJECT.

#### FLOWS AND CAPACITIES\*

MODEL	MAX. TREATED FLOW RATE (gpm)**	SEDIMENT CAPACITY (ft3)	OIL. CAPACITY (US gal)	TOTAL CAPACITY (US gal)

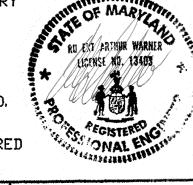
\* APPROXIMATE \*\* WITHOUT BY-PASSING

# INSPECTION NOTES: PRECAST CONCRETE STORMCEPTOR

- 1. PRIOR TO THE START OF INSTALLING THE STORMCEPTOR, THE INSPECTOR MUST BE CALLED 48 HOURS IN ADVANCE (PRE-CONSTRUCTION MEETING).
- 2. THE APL INSPECTOR MUST BE NOTIFIED AT EACH OF THE
  - FULLOWING STAGES
  - A. APPROVAL OF SUBGRADE, PREPARE A COMPACTED GRAVEL BED AT THE BOTTOM OF THE EXCAVATION, ENSURE COMPACTION TO 95% DENSITY.
  - B. PLACE STORMCEPTOR IN EXCAVATION AT CORRECT ELEVATION AND AT CORRECT ALIGNMENT AND GRADE FOR INLET AND DUTLET STORM DRAINS. LEVEL UNIT INSTALL BASE AND LOWER TANK, MIDDLE SECTION WITH STORMCEPTOR INSERT. RISER SECTION, TOP SLAB WITH PERSONWAY, LEVELING RINGS AND MANHOLE FRAME AND COVER,
  - C. BACKFILL STORMCEPTOR WITH SUITABLE NATIVE SOIL (NO ORGANIC OR TOPSOIL IS TO BE USED FOR BACKFILL). BACKFILL AND COMPACT IN 8' LIFTS. BACKFILL SHOULD BE AT 95% OF DENSITY.
  - D. WHEN SITE IS PERMANENTLY STABILIZED AND SEDIMENT CONTROL MEASURES HAVE BEEN REMOVED AND STABILIZED, THEN THE STORMCEPTOR WILL BE PUMPED DUT AND CLEANED AND PLACED IN STORMWATER MANAGEMENT OPERATION.
  - E. FINAL INSPECTION
- 3. ALL GEOTECHNICAL REPORTS, SOIL COMPACTION, BEARING CAPACITY, AND CONCRETE TESTING DATA & RESULTS SHALL BE PROVIDED TO THE INSPECTOR AND COPIED TO THE OWNER.

#### MAINTENANCE NOTES: WATER QUALITY STRUCTURE

- 1. WATER QUALITY STRUCTURES WILL REQUIRE PERIODIC CLEANING. OWNERS OF THESE FACILITIES WILL HAVE TO CLEAN THEM AS NEEDED.
- 2. MAINTENANCE OF THESE FACILITIES WILL CONSIST OF CLEANING OUT THE STORMCEPTOR AND DISPOSAL OF THE WASTE AND REPAIR OF THE FACILITY AS NEEDED. PERIODIC INSPECTIONS OF THESE FACILITIES WILL BE MADE BY THE DWNER.
- 3. THE DISPOSAL OF THE LIQUID AND SOLID MATTER SHALL BE AS FOLLOWS:
- A. ALL LIQUID MATERIAL IN THE STURMCEPTUR SHALL BE PUMPED INTO A SUITABLE TANK TRUCK AND DISPOSED OF AT AN APPROVED SANITARY DISTRICT DISCHARGE MANHOLE OR TO BE TAKEN TO AN APPROVED SEWAGE TREATMENT PLANT FOR DISCHARGE.
- B. THE SOLID MATERIAL SHALL BE LANDFILLED IN AN APPROVED SANITARY LANDFILL.
- 4. THE INLET PIPES AND STRUCTURAL PARTS SHALL BE REPAIRED AS NEEDED.
- 5. STORMCEPTOR INLET AND OUTLET ASSEMBLY SHALL BE PERIODICALLY INSPECTED. BLOCKAGES SHALL BE REMOVED AND DISPOSED OF AS REQUIRED IN 3B ABOVE.



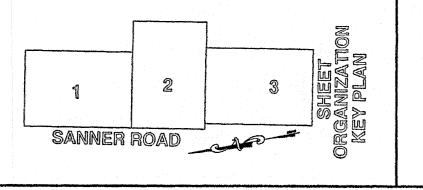
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SHEET

A. MORTON THOMAS AND ASSOCIATES, INC. CONSULTING ENGINEERS 12750 TWINBROOK PARKWAY, SUITE 200, ROCKVILLE MD 20852 TEL (301) 881-2545 FAX (301) 881-0814

**AMT FILE # 102-440** 



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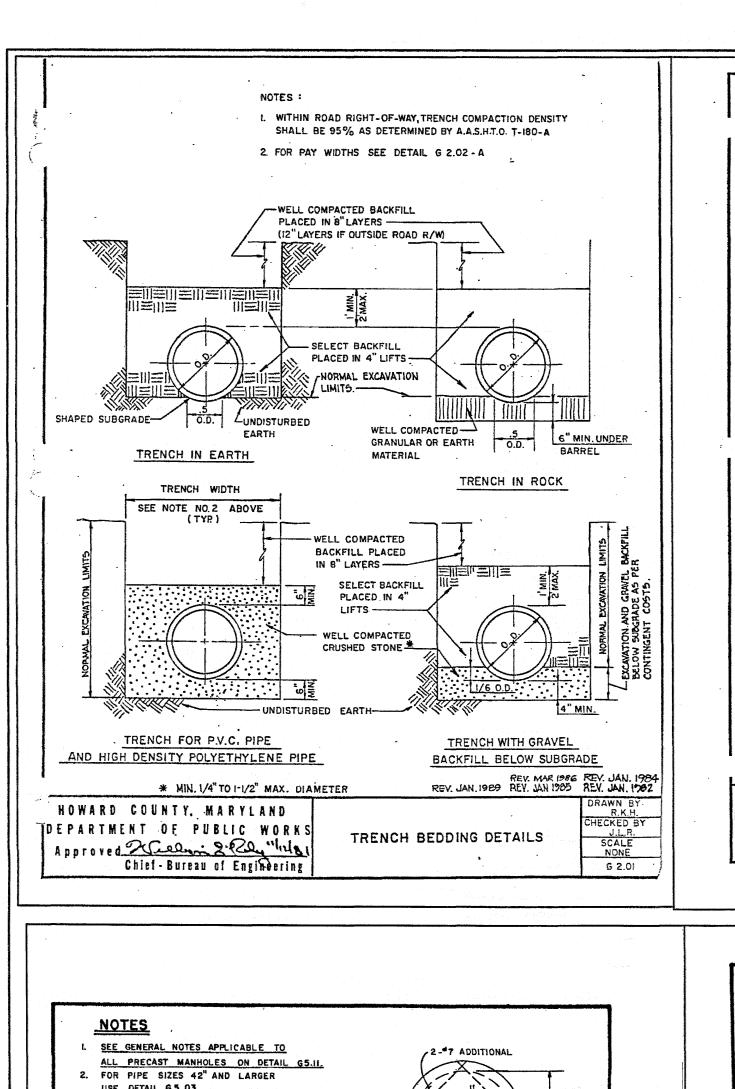
# STORMCEPTOR DETAILS

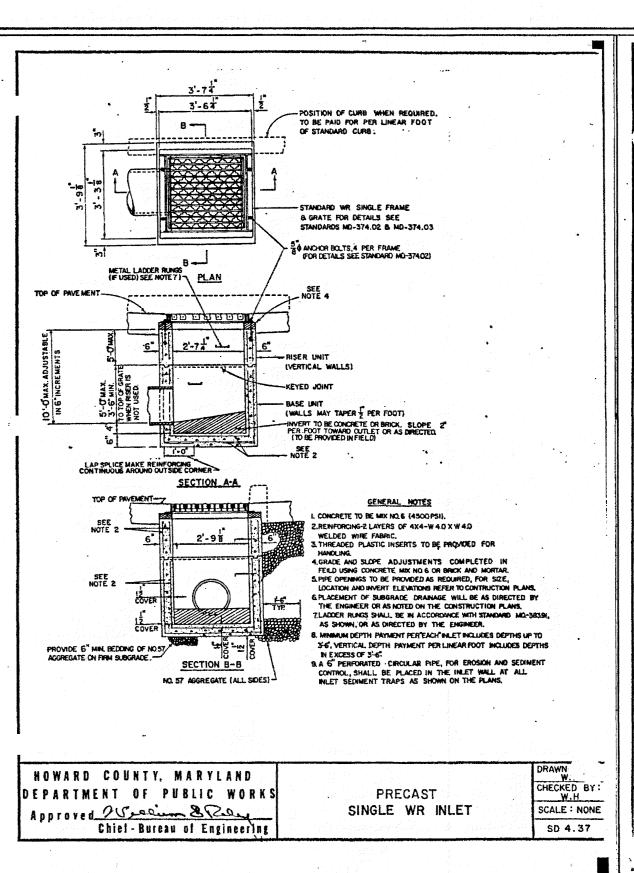
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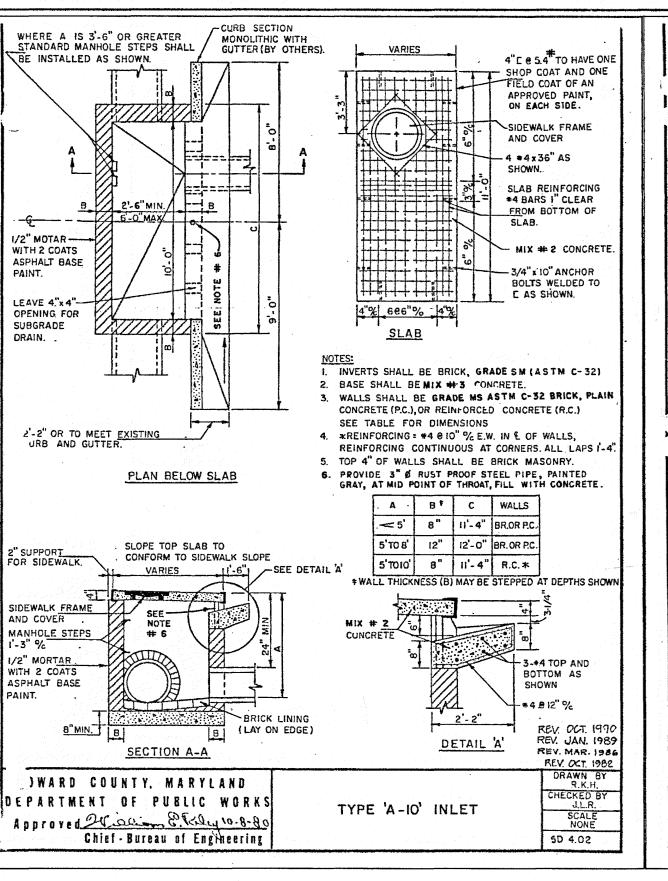
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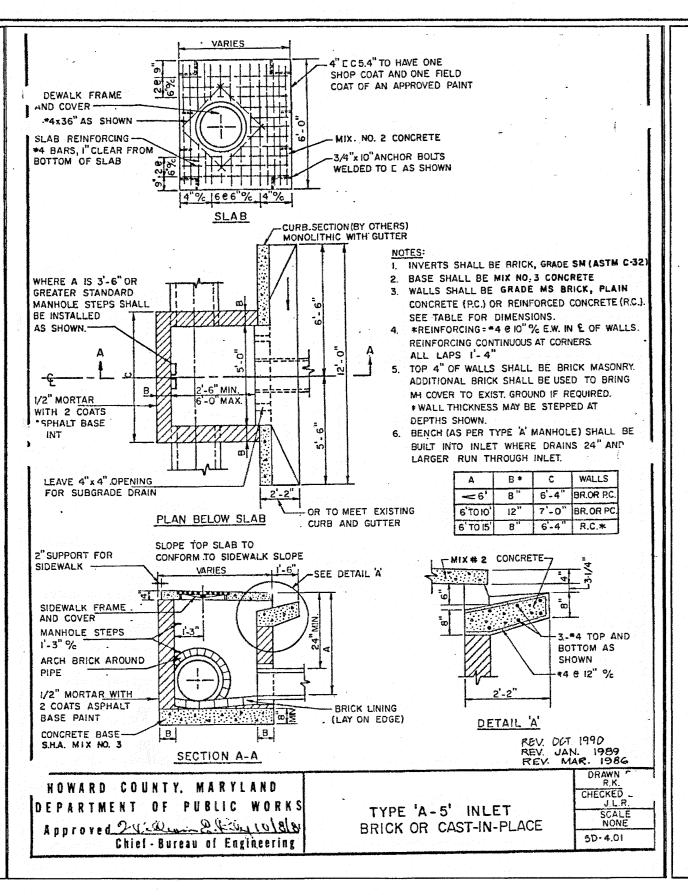
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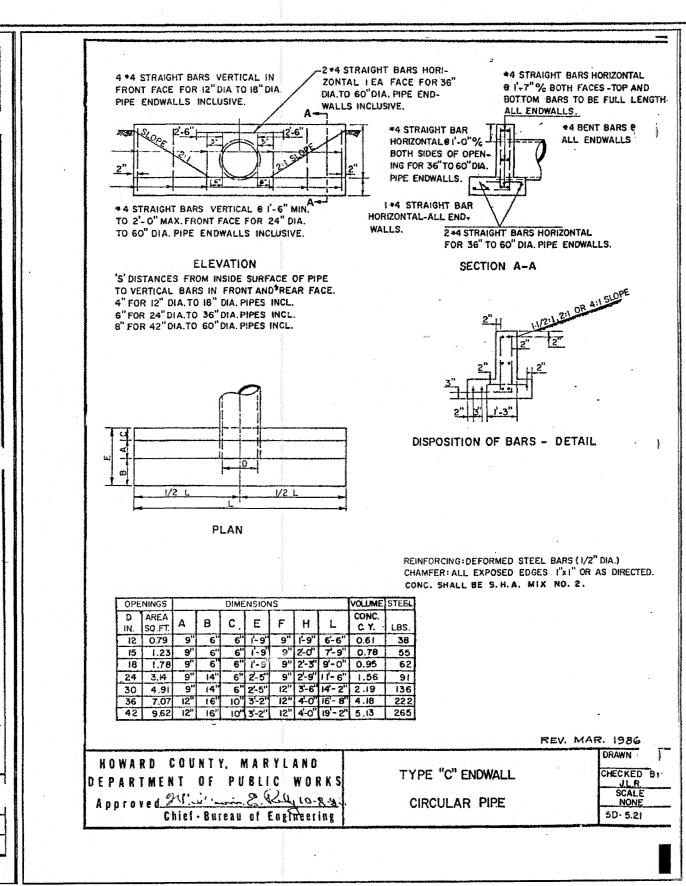
HOWARD COUNTY, MARYLAND

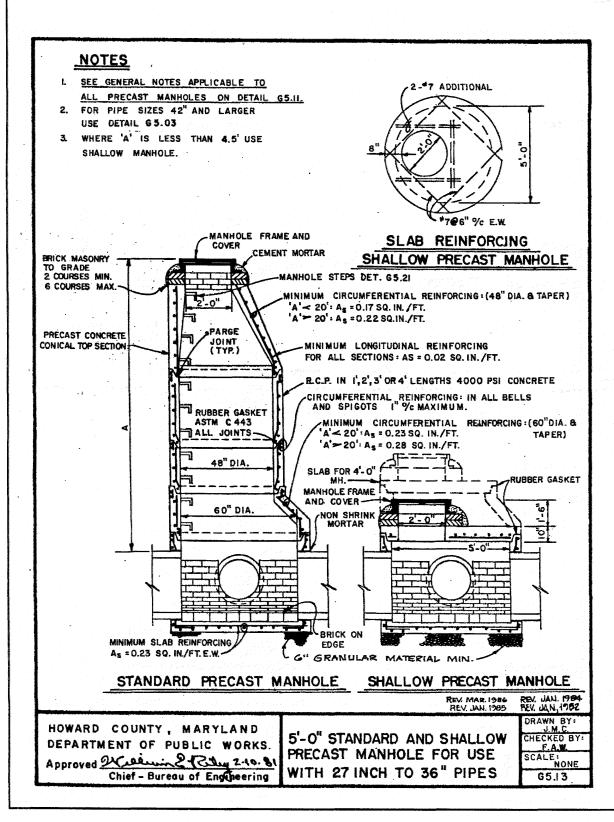


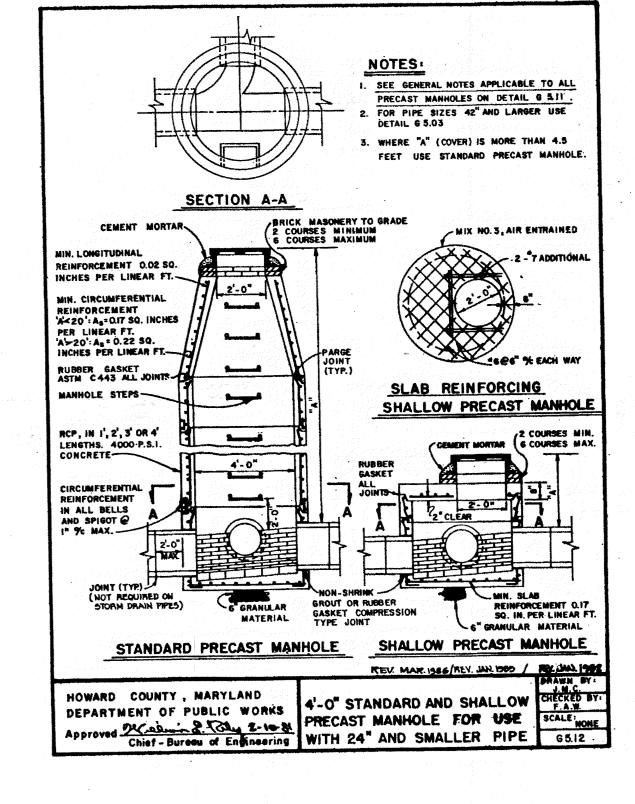


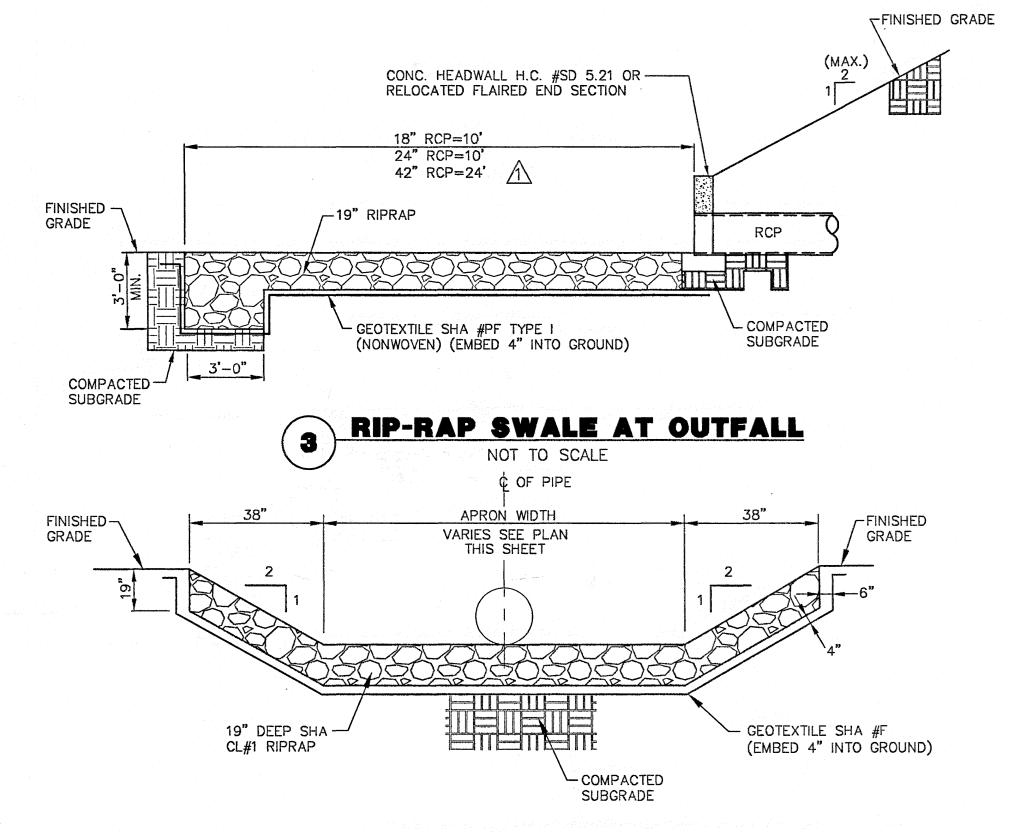


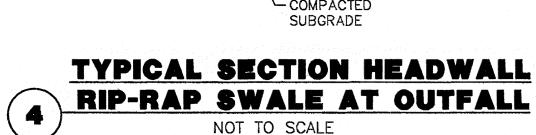


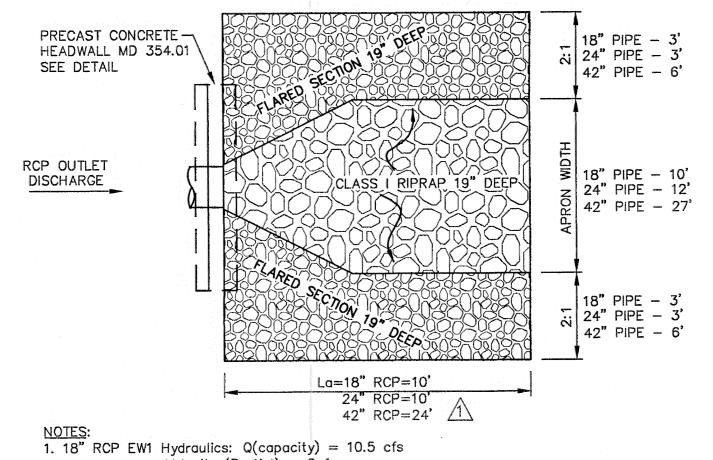












Velocity (Partial) = 2 fpsDepth (partial) = 0.93

2. 24" RCP EW1M2 Hydraulics: Q(capacity) = 21.5 cfs Velocity (Partial) = 10 fps Depth (Partial) = 1.5'

3. 42" RCP EW1M1 Hydraulics: Q(capacity) = 100.6 cfs Velocity (Partial) = 10.6 fps Depth (Partial) = 2.7

#### TYPICAL PLAN VIEW NOT TO SCALE

SEDIMENT CONTROL & POND CONSTRUCTION "I/WE CERTIFY THAT ALL DEVELOPMENT AND/OR CONSTRUCTION WILL BE DONE ACCORDING TO THESE PLANS, AND THAT ANY RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF ATTENDANCE AT A DEPARTMENT OF THE ENVIRONMENT APPROVED TRAINING PROGRAM FOR THE CONTROL OF SEDIMENT AND EROSION BEFORE BEGINNING THE PROJECT. I SHALL ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE POND CONSTRUCTION AND PROVIDE THE HOWARD SOIL CONSERVATION DISTRICT WITH AN "AS-BUILT" PLAN OF THE POND WITHIN 30 DAYS OF COMPLETION. I ALSO AUTHORIZE PERIODIC ON-SITE INSPECTIONS BY THE HOWARD SOIL CONSERVATION DISTRICT." ALSO AUTHORIZE PERIODIC ON-SITE INSPECTIONS BY THE HOWARD SOIL CONSERVATION DISTRICT. SIGNATURE OF DEVELOPER J. E. Lues CONTE PRINT NAME BELOW SIGNATURE J. E. Lues CONTE

( ) BY THE ENGINEER:

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

USDA-NATURAL RESOURCES CONSERVATION SERVICE

HOWARD SOIL CONSERVATION DISTRICT SCALE

APPLIED PHYSICS LABORATORY THE JOHNS HOPKINS UNIVERSITY

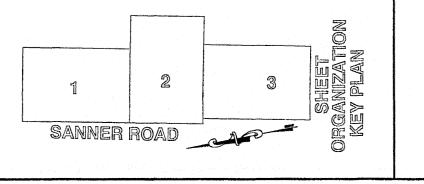
**DETAILS** 

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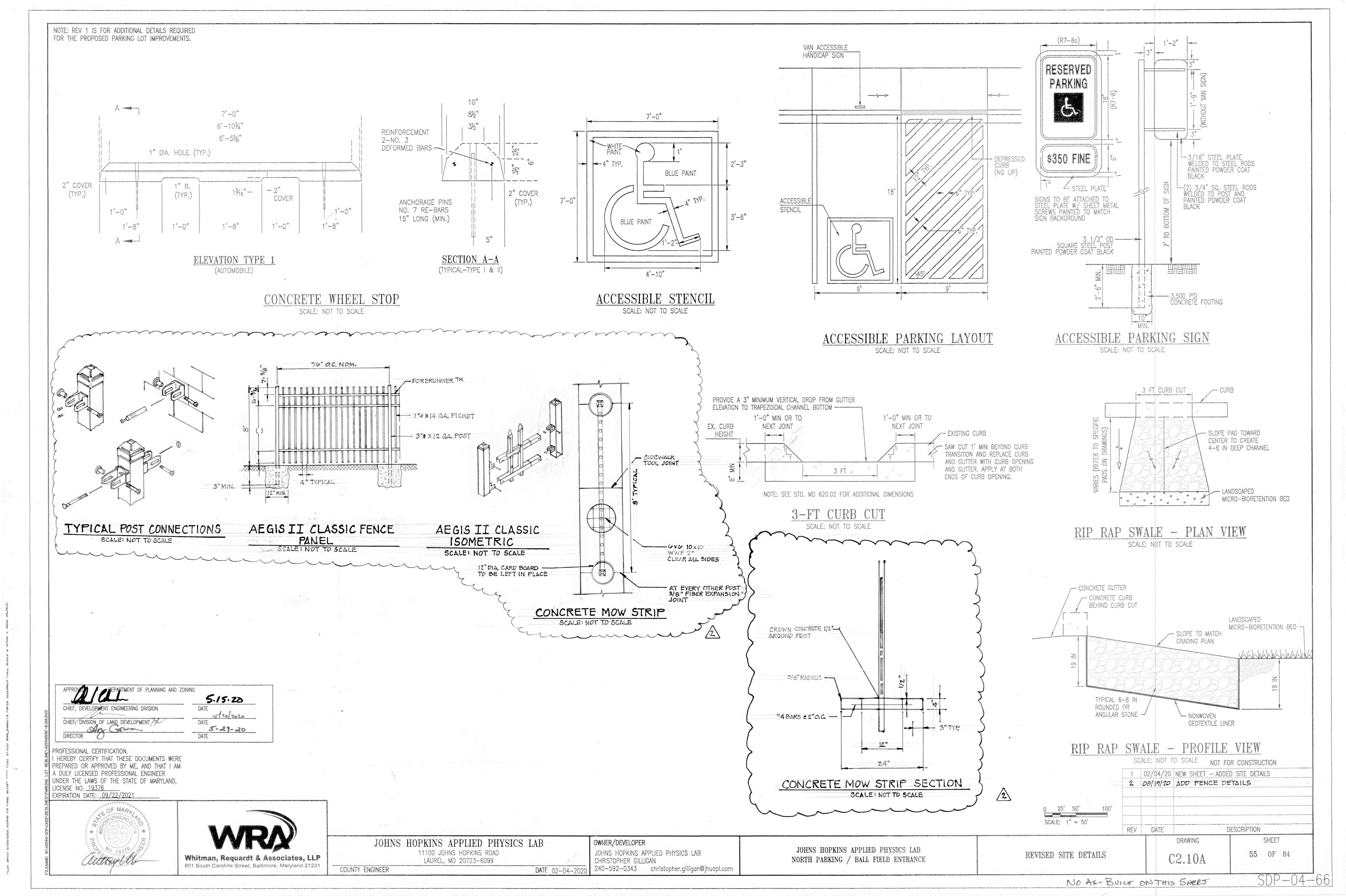
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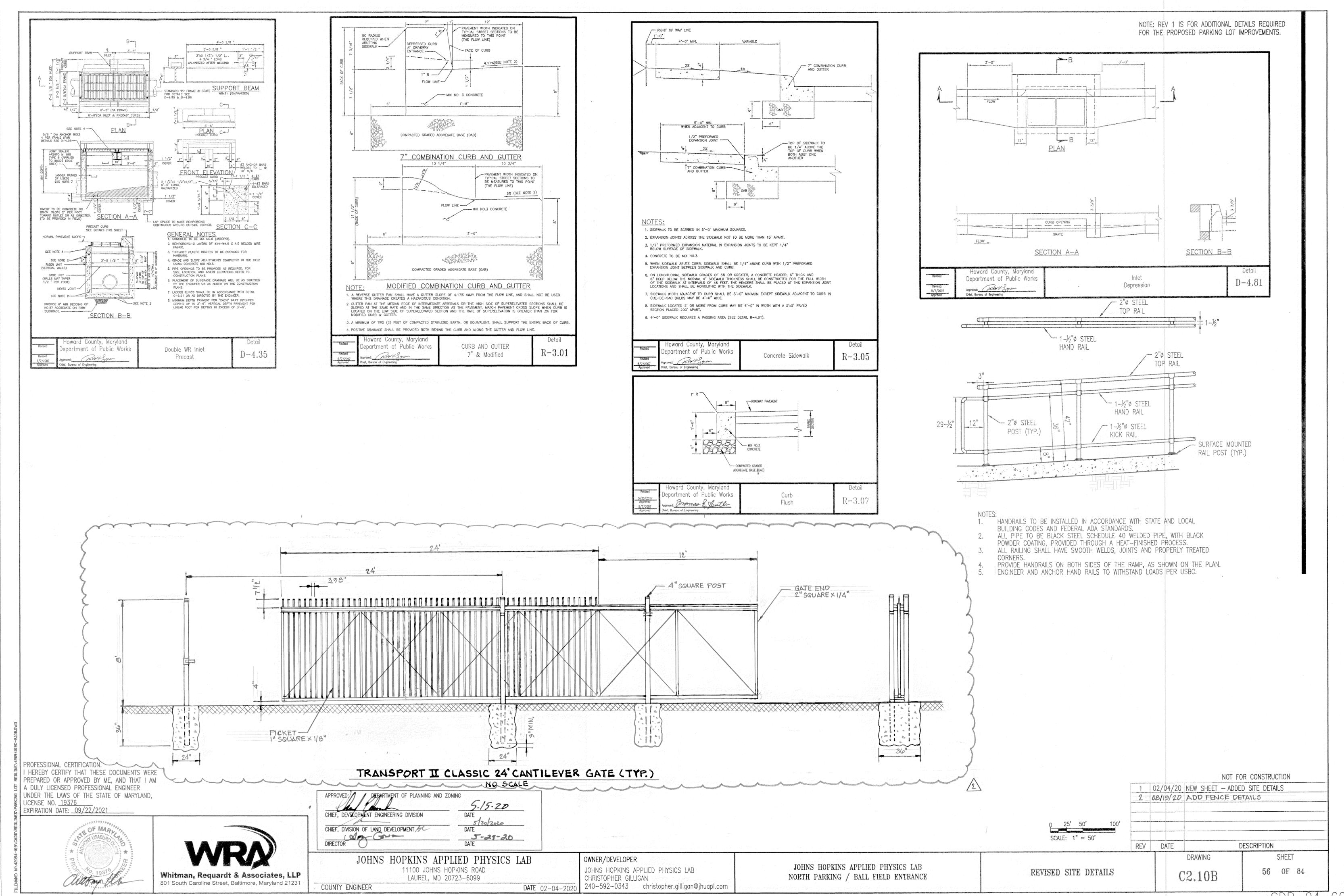
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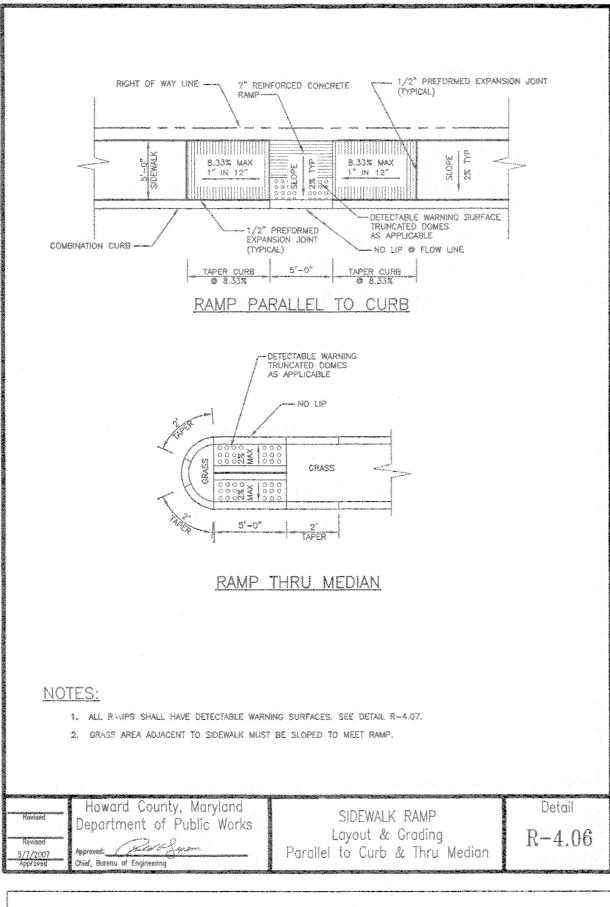
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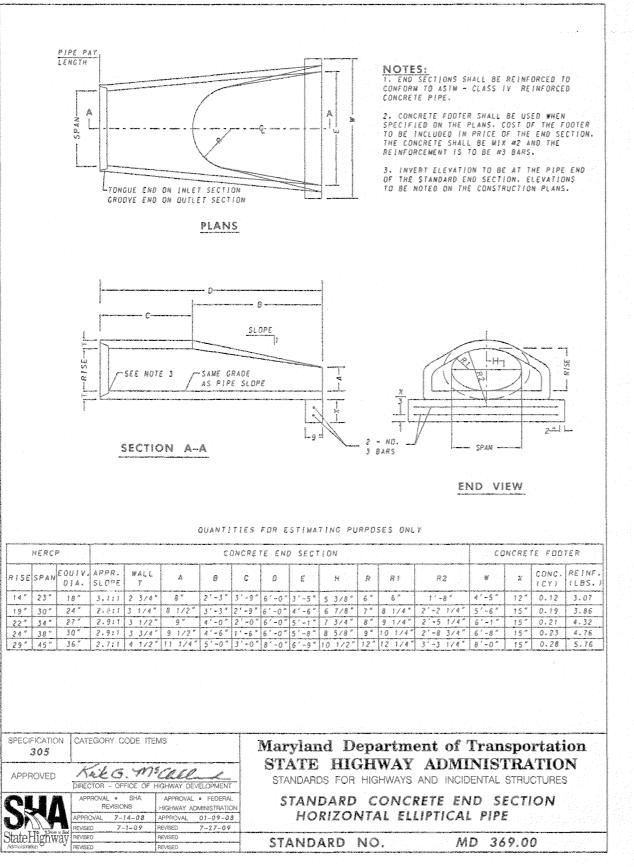


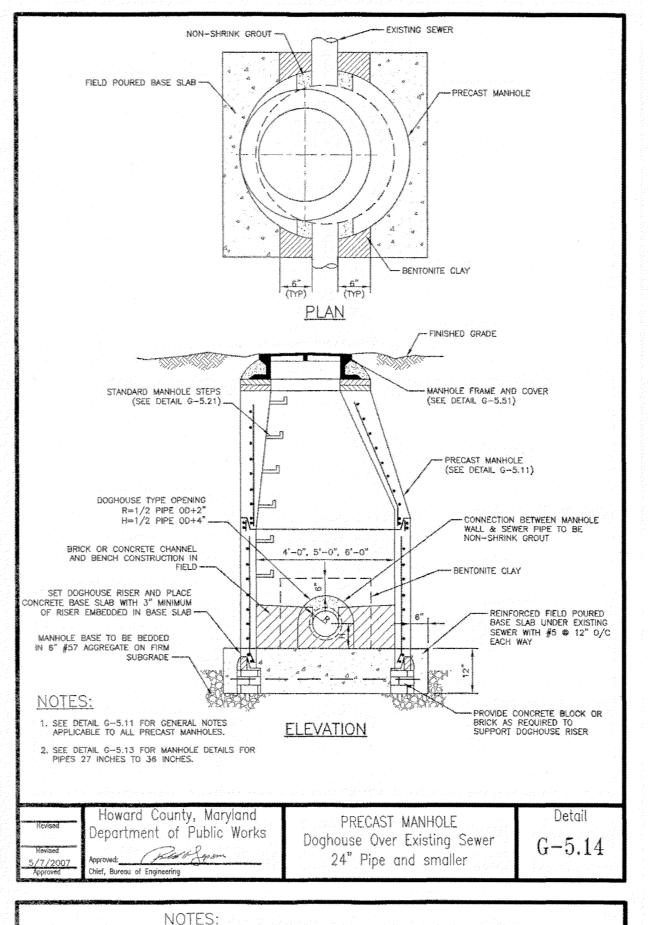


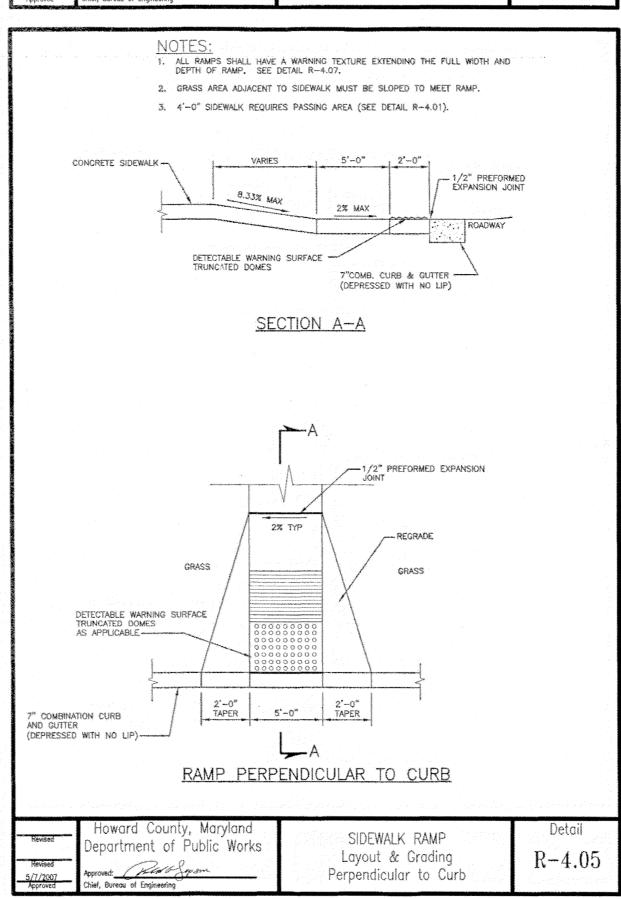
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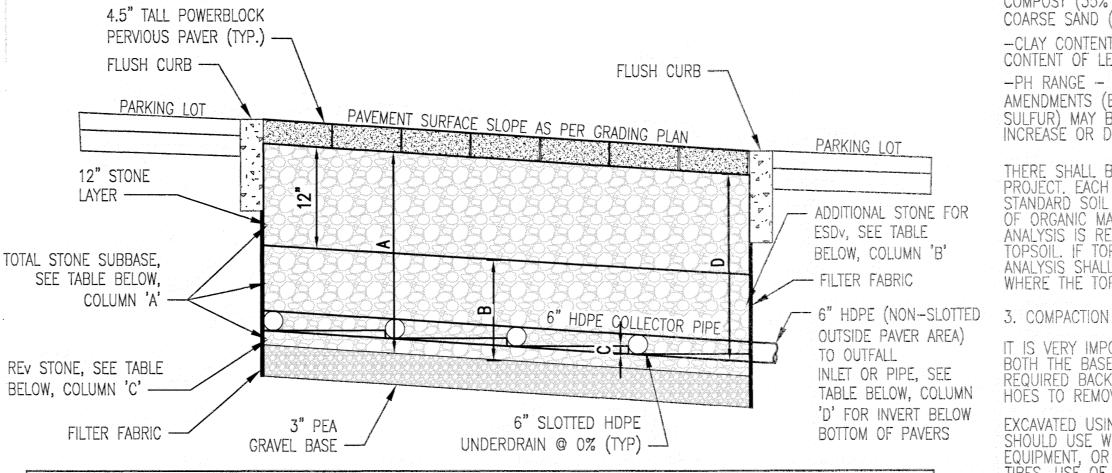






## Table B.4.1 Materials Specifications for M-6 Micro-Bioretention

MATERIAL	SPECIFICATION	SIZE	NOTES
PLANTING SOIL [2' TO 4' DEEP]	LOAMY SAND (60-65%) & COMPOST (35-40%) OR SANDY LOAM (30%), COARSE SAND (30%) & COMPOST (40%).	N/A	SPECIFICATION 920.01.05 (SEE NOTES THIS SHEET).
ORGANIC CONTENT	MIN. 10% BY DRY WEIGHT (ASTM D 2974)		
MULCH	SHREDDED HARDWOOD		AGED 6 MONTHS, MINIMUM; NO PINE OR WOOD CHIPS
PEA GRAVEL	ASTM-D-448	NO. 8 OR NO. 9 (a " oo")	
GEOTEXTILE		N/A	PE TYPE 1 NONWOVEN
GRAVEL (UD's)	AASHTO M-43	NO. 57 OR NO. 6 AGGREGATE	
UNDERDRAIN PIPING	F 758, TYPE PS 28 OR AASHTO M-278	6" RIGID SCHEDULE 40 PVC OR AS SHOWN ON PLAN	SLOTTED PIPE PERF. © 6" ON CENTER, 4 HOLES PER ROW; MINIMUM OF 3" OF GRAVEL OVER PIPES; NOT NECESSARY UNDERNEATH PIPES. PERFORATED PIPE SHALL BE WRAPPED WITH GALVANIZED HARDWARE CLOTH



	PERVIC	DUS PAVER SPECIFI	CATIONS	
	, A * , ,	цилица В придражения	1,4,4,4,4,4,4,C	D
SPEC ESD DEVICE	TOTAL DEPTH OF STONE BELOW PAVERS 3/4" – 1" CLEAN, WASHED ANGULAR STONE	ADDITIONAL STONE BELOW 12" BASE 3/4" — 1" CLEAN, WASHED ANGULAR STONE	RECHARGE STONE LAYER 3/4" - 1" CLEAN, WASHED ANGULAR STONE	INVERT OF DISCHARGE PIPE BELOW BOTTOM OF PAVERS
PP #1	22"	9.00"	1.06"	21.00"
PP #2	28"	14.57"	1.48"	26.57"
PP #3	24"	9.98"	1.16"	21.98"

#### PERVIOUS PAVERS DETAIL SCALE: NOT TO SCALE

NOTES:

- CONTRACTOR SHALL PROVIDE WRITTEN EVIDENCE OF PROJECT EXPERIENCE AND PROFICIENCY IN SUCCESSFULLY
- COMPLETING PERVIOUS PAVER CONSTRUCTION PERVIOUS PAVER MUST BE COVERED WITH PLASTIC FOR A MINIMUM OF 7 DAYS IMMEDIATELY AFTER PLACEMENT.
- 6" PERFORATED PLUG SCHEDULE 40, 3/8" DIAMETER PERFORATIONS AT 4" O.C. LENGTH WIDE AND 90 DEGREES RADIALLY AROUND. INSTALL END CAP ON OPEN END.

# OPERATION AND MAINTENANCE SCHEDULE FOR PERVIOUS PAVERS

- THE OWNER SHALL PERIODICALLY SWEEP (OR VACUUM PERVIOUS CONCRETE PAVEMENT) THE PAVEMENT SURFACES TO REDUCE SEDIMENT ACCUMULATION AND ENSURE CONTINUED SURFACE POROSITY. SWEEPING SHOULD BE PERFORMED AT LEAST TWICE ANNUALLY WITH A COMMERCIAL CLEANING UNIT. WASHING OR COMPRESSED AIR UNITS SHOULD NOT BE
- ISED TO PERFORM SURFACE CLEANING THE OWNER SHALL PERIODICALLY CLEAN DRAINAGE PIPES, INLETS, STONE EDGE DRAINS AND OTHER STRUCTURES WITHIN
- DEICERS SHOULD BE NON-TOXIC AND BE APPLIED EITHER AS CALCIUM MAGNESIUM ACETATE OR AS PRETREATED SALT.
- THE OWNER SHALL ENSURE SNOW PLOWING IS PERFORMED CAREFULLY WITH BLADES SET ONE—INCH ABOVE THE SURFACE. PLOWED SNOW PILES AND SNOWMELT SHOULD NOT BE DIRECTED TO PERVIOUS PAVERS.

#### OPERATION AND MAINTENANCE SCHEDULE FOR M-6 MICRO-BIORETENTIONS

- THE OWNER SHALL MAINTAIN THE PLANT MATERIAL, MULCH LAYER AND SOIL LAYER ANNUALLY. MAINTENANCE OF MULCH AND SOIL IS LIMITED TO CORRECTING AREAS OF EROSION OR WASH OUT. ANY MULCH REPLACEMENT SHALL BE DONE IN THE SPRING. PLANT MATERIAL SHALL BE CHECKED FOR DISEASE AND INSECT INFESTATION AND MAINTENANCE WILL ADDRESS DEAD MATERIAL AND PRUNING. ACCEPTABLE REPLACEMENT PLANT MATERIAL IS LIMITED TO THE FOLLOWING:
- 2000 MARYLAND STORMWATER DESIGN MANUAL VOLUME II, TABLE A.4.1 AND 2 THE OWNER SHALL PERFORM PLANTING IN THE SPRING AND IN THE FALL OF EACH YEAR. DURING THE INSPECTION, THE OWNER SHALL REMOVE DEAD AND DISEASED VEGETATION CONSIDERED BEYOND TREATMENT, REPLACE DEAD PLANT MATERIAL WITH ACCEPTABLE REPLACEMENT PLANT MATERIAL, TREAT DISEASED TREES AND SHRUBS, AND REPLACE ALL DEFICIENT STAKES AND WIRES.
- THE OWNER SHALL INSPECT THE MULCH EACH SPRING. THE MULCH SHALL BE REPLACED EVERY TWO TO THREE YEARS. THE PREVIOUS MULCH LAYER SHALL BE REMOVED BEFORE THE NEW LAYER IS APPLIED.
- THE OWNER SHALL CORRECT SOIL EROSION ON AN AS NEEDED BASIS, WITH A MINIMUM OF ONCE PER MONTH AND AFTER EACH HEAVY STORM.

### B.4.C SPECIFICATIONS FOR M-6 MICRO-BIORETENTION

1. MATERIAL SPECIFICATIONS

THE ALLOWABLE MATERIALS TO BE USED IN THESE PRACTICES ARE DETAILED IN TABLE B.4.1.

2. FILTERING MEDIA OR PLANTING SOIL

THE SOIL SHALL BE A UNIFORM MIX, FREE OF STONES, STUMPS, ROOTS OR OTHER SIMILAR OBJECTS LARGER THAN TWO INCHES. NO OTHER MATERIALS OR SUBSTANCES SHALL BE MIXED OR DUMPED WITHIN THE MICRO-BIORETENTION PRACTICE THAT MAY BE HARMFUL TO PLANT GROWTH, OR PROVE A HINDRANCE PLANTING OR MAINTENANCE OPERATIONS. THE PLANTING SOIL SHALL BE FREE OF BERMUDA GRASS, QUACKGRASS, JOHNSON GRASS, OR OTHER NOXIOUS WEEDS AS SPECIFIED UNDER COMAR 15.08.01.05.

THE PLANTING SOIL SHALL BE TESTED AND SHALL MEET THE FOLLOWING CRITERIA:

-SOIL COMPONENT - LOAMY SAND OR SANDY LOAM (USDA SOIL TEXTURAL CLASSIFICATION) -ORGANIC CONTENT - MINIMUM 10% BY DRY WEIGHT (ASTM D 2974). IN GENERAL, THIS CAN BE MET WITH A MIXTURE OF LOAMY SAND (60%-65%) AND COMPOST (35% TO 40%) OR SANDY LOAM (30%), COARSE SAND (30%), AND COMPOST (40%).

-CLAY CONTENT - MEDIA SHALL HAVE A CLAY CONTENT OF LESS THAN 5%. -PH RANGE - SHOULD BE BETWEEN 5.5 - 7.0. AMENDMENTS (E.G., LIME, IRON SULFATE PLUS SULFUR) MAY BE MIXED INTO THE SOIL TO INCREASE OR DECREASE PH.

OF ORGANIC MATTER, AND SOLUBLE SALTS. A TEXTURANALYSIS IS REQUIRED FROM THE SITE STOCKPILED TOPSOIL. IF TOPSOIL IS IMPORTED, THEN A TEXTURE ANALYSIS SHALL BE PERFORMED FOR EACH LOCATION WHERE THE TOPSOIL WAS EXCAVATED.

VERY IMPORTANT TO MINIMIZE COMPACTION OF BOTH THE BASE OF BIORETENTION PRACTICES AND THE REQUIRED BACKFILL. WHEN POSSIBLE, USE EXCAVATION HOES TO REMOVE ORIGINAL SOIL. IF PRACTICES ARE

EXCAVATED USING A LOADER, THE CONTRACTOR SHOULD USE WIDE TRACK OR MARSH TRACK QUIPMENT, OR LIGHT EQUIPMENT WITH TURF TYPE ES. USE OF EQUIPMENT WITH NARROW TRACKS OR NARROW TIRES, RUBBER TIRES WITH LARGE LUGS, OR HIGH-PRESSURE TIRES WILL CAUSE EXCESSIVE COMPACTION RESULTING IN REDUCED INFILTRATION RATES AND IS NOT ACCEPTABLE, COMPACTION WILL SIGNIFICANTLY CONTRIBUTE TO DESIGN FAILURE.

COMPACTION CAN BE ALLEVIATED AT THE BASE OF THE BIORETENTION FACILITY BY USING A PRIMARY TILLING OPERATION SUCH AS A CHISEL PLOW, RIPPER, OR SUBSOILER, THESE TILLING OPERATIONS ARE TO REFRACTURE THE SOIL PROFILE THROUGH THE 12 INCH APPROVED BY THE ENGINEER. ROTOTILLERS TYPICALLY DO NOT TILL DEEP ENOUGH TO REDUCE THE EFFECTS OF COMPACTION FROM HEAVY EQUIPMENT

2 TO 3 INCHES OF SAND INTO THE BASE OF BIORETENTION FACILITY BEFORE BACKFILLING OPTIONAL SAND LAYER. PUMP ANY PONDED WATER BEFORE PREPARING (ROTOTILLING) BASE.

WHEN BACKFILLING THE TOPSOIL OVER THE SAND LAYER, FIRST PLACE 3 TO 4 INCHES OF TOPSOIL OVER THE SAND, THEN ROTOTILL THE SAND/TOPSOIL TO CREATE A GRADATION ZONE. BACKFILL THE REMAINDER OF THE TOPSOIL TO FINAL GRADE.

WHEN BACKFILLING THE BIORETENTION FACILITY, PLACE SOIL IN LIFTS 12" TO 18". DO NOT USE HEAVY EQUIPMENT WITHIN THE BIORETENTION BASIN. HEAVY QUIPMENT CAN BE USED AROUND THE PERIMETER OF BASIN TO SUPPLY SOILS AND SAND. GRADE BIORETENTION MATERIALS WITH LIGHT EQUIPMENT SUCH AS A COMPACT LOADER OR A DOZER/LOADER WITH MARSH TRACKS.

NOTE: REV 1 IS FOR ADDITIONAL DETAILS REQUIRED

REVISED SITE DETAILS

FOR THE PROPOSED PARKING LOT IMPROVEMENTS.

4. PLANT MATERIAL

SEE LANDSCAPING PLANS.

5. PLANT INSTALLATION COMPOST IS A BETTER ORGANIC MATERIAL SOURCE, IS IS LIKELY TO FLOAT, AND SHOULD BE PLACED IN INVERT AND OTHER LOW AREAS. MULCH SHOUL PLACED IN SURROUNDING TO A UNIFORM THICKNESS SHREDDED OR CHIPPED HARDWOOD MULCH IS THE ONLY ACCEPTED MULCH. PINE MULCH AND WOOD CHIPS WILL FLOAT AND MOVE TO THE PERIMETER OF THE BIORETENTION AREA DURING A

STORM EVENT AND ARE NOT ACCEPTABLE. SHREDDED

MULCH MUST BE WELL AGED (6 TO 12 MONTHS) FOR

DURING TRANSPORT AND ON-SITE STORAGE. THE PLANT ROOT BALL SHOULD BE PLANTED SO 1/8TH OF THE BALL IS ABOVE FINAL GRADE SURFACE. THE DIAMETER OF THE PLANTING PIT SHALL BE AT LEAST SIX INCHES LARGER THAN THE DIAMETER OF THE PLANTING BALL. SET AND MAINTAIN THE PLANT STRAIGHT DURING THE ENTIRE PLANTING PROCESS. THOROUGHLY WATER GROUND BED COVER AFTER

TREES SHALL BE BRACED USING 2" BY 2" STAKES ONLY AS NECESSARY AND FOR THE FIRST GROWING SEASON ONLY. STAKES ARE TO BE EQUALLY SPACED ON THE

TO A DEPTH OF AT LEAST ONE INCH. GRASS AND LEGUME PLUGS SHALL BE PLANTED FOLLOWING THE NON-GRASS GROUND COVER PLANTING SPECIFICATIONS.

THE TOPSOIL SPECIFICATIONS PROVIDE ENOUGH ORGANIC MATERIAL TO ADEQUATELY SUPPLY NUTRIENTS FROM NATURAL CYCLING. THE PRIMARY FUNCTION OF THE BIORETENTION STRUCTURE IS TO IMPROVE WATER QUALITY. ADDING FERTILIZERS DEFEATS, OR AT A MINIMUM, IMPEDES THIS GOAL. ONLY ADD FERTILIZER IF WOOD CHIPS OR MULCH ARE USED TO AMEND THE SOIL. ROTOTILL UREA FERTILIZER AT A RATE OF 2 POUNDS PER 1000 SQUARE FEET.

#### UNDERDRAINS

UNDERDRAINS SHOULD MEET THE FOLLOWING CRITERIA -PIPE- SHOULD BE 4" TO 6" DIAMETER, SLOTTED OR PERFORATED RIGID PLASTIC PIPE (ASTMF 758, TYPE PS 28, OR AASHTO-M-278) IN A GRAVEL LAYER. THE PREFERRED MATERIAL IS SLOTTED, 4" RIGID PIPE (E.G., PVC OR HDPE).

-PERFORATIONS - IF PERFORATED PIPE IS USED, PERFORATIONS SHOULD BE 3/8" DIAMETER LOCATED " ON CENTER WITH A MINIMUM OF FOUR HOLES PER ROW. PIPE SHALL BE WRAPPED WITH A 1/4" (NO. 4 OR 4X4) GALVANIZED HARDWARE CLOTH -GRAVEL - THE GRAVEL LAYER (NO. 57 STONE PREFERRED) SHALL BE AT LEAST 3" THICK ABOVE AND BELOW THE UNDERDRAIN.

-THE MAIN COLLECTOR PIPE SHALL BE AT A MINIMUM 0.5% SLOPE.

-A RIGID, NON-PERFORATED OBSERVATION WELL MUST BE PROVIDED (ONE PER EVERY 1.0000 SQUARE FEET) TO PROVIDE A CLEAN-OUT PORT AND MONITOR PERFORMANCE OF THE FILTER.

-A 4" LAYER OF #7 STONE (1/8" TO 3/8" STONE)
SHALL BE LOCATED BETWEEN THE FILTER MEDIA
AND UNDERDRAIN TO PREVENT MIGRATION OF FINES
INTO THE UNDERDRAIN. THIS LAYER MAY BE
CONSIDERED PART OF THE FILTER BED WHEN BED THICKNESS EXCEEDS 24".

THE MAIN COLLECTOR PIPE FOR UNDERDRAIN SYSTEMS SHALL BE CONSTRUCTED AT A MINIMUM SLOPE OF 0.5%. OBSERVATION WELLS AND/OR CLEAN-OUT PIPES MUST BE PROVIDED (ONE MINIMUM PER EVERY 1000

. MISCELLANEOUS

SQUARE FEET OF SURFACE AREA).

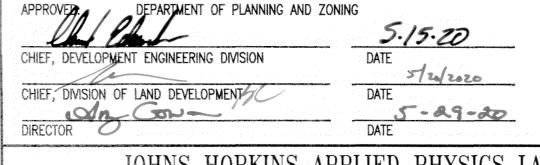
THESE PRACTICES MAY NOT BE CONSTRUCTED UNTIL ALL CONTRIBUTING DRAINAGE AREA HAS BEEN

1 02/04/20 NEW SHEET - ADDED SITE DETAILS AND NOTES REV DATE DESCRIPTION SHEET DRAWING

NOT FOR CONSTRUCTION

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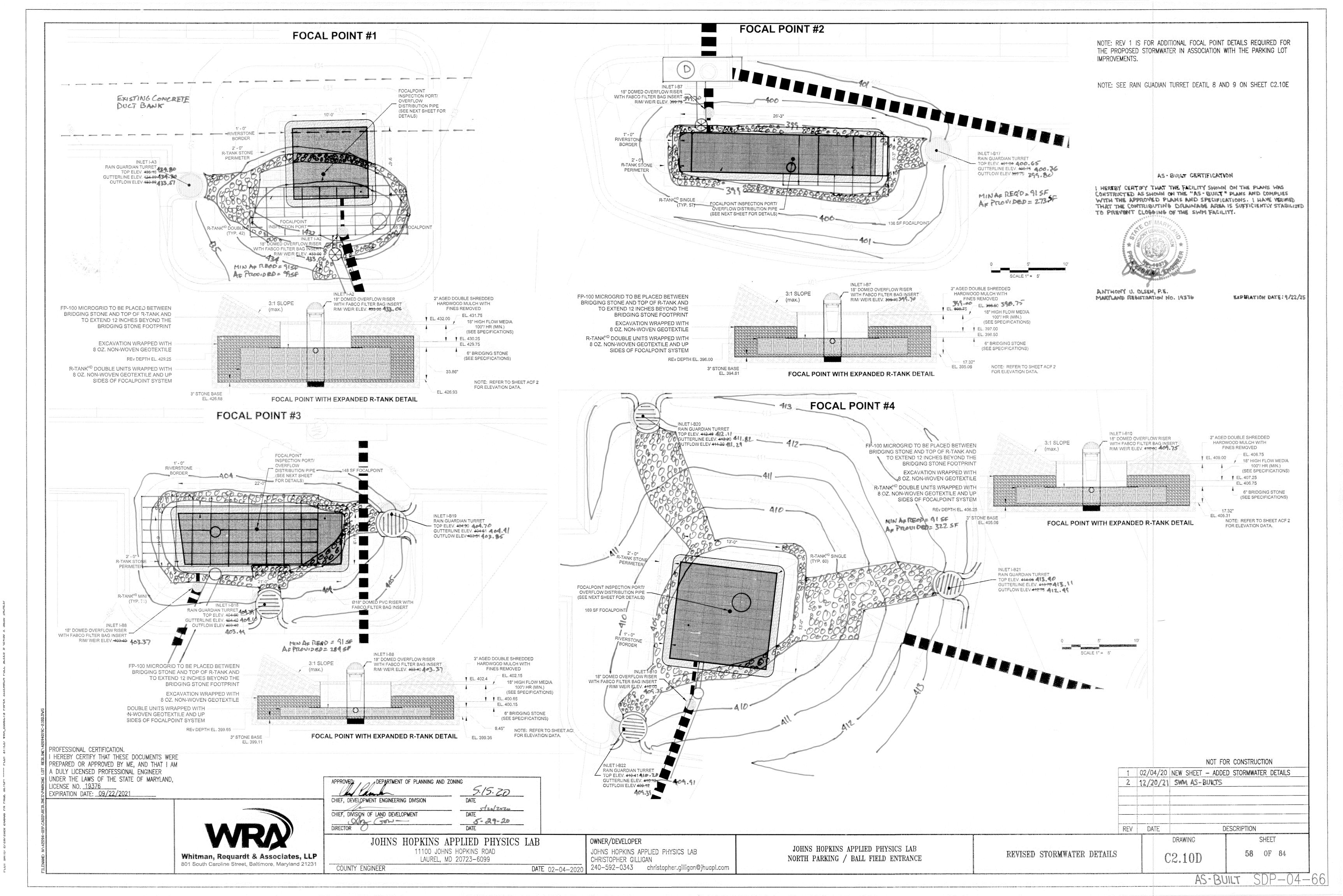
JOHNS HOPKINS APPLIED PHYSICS LAB 11100 JOHNS HOPKINS ROAD LAUREL, MD 20723-6099

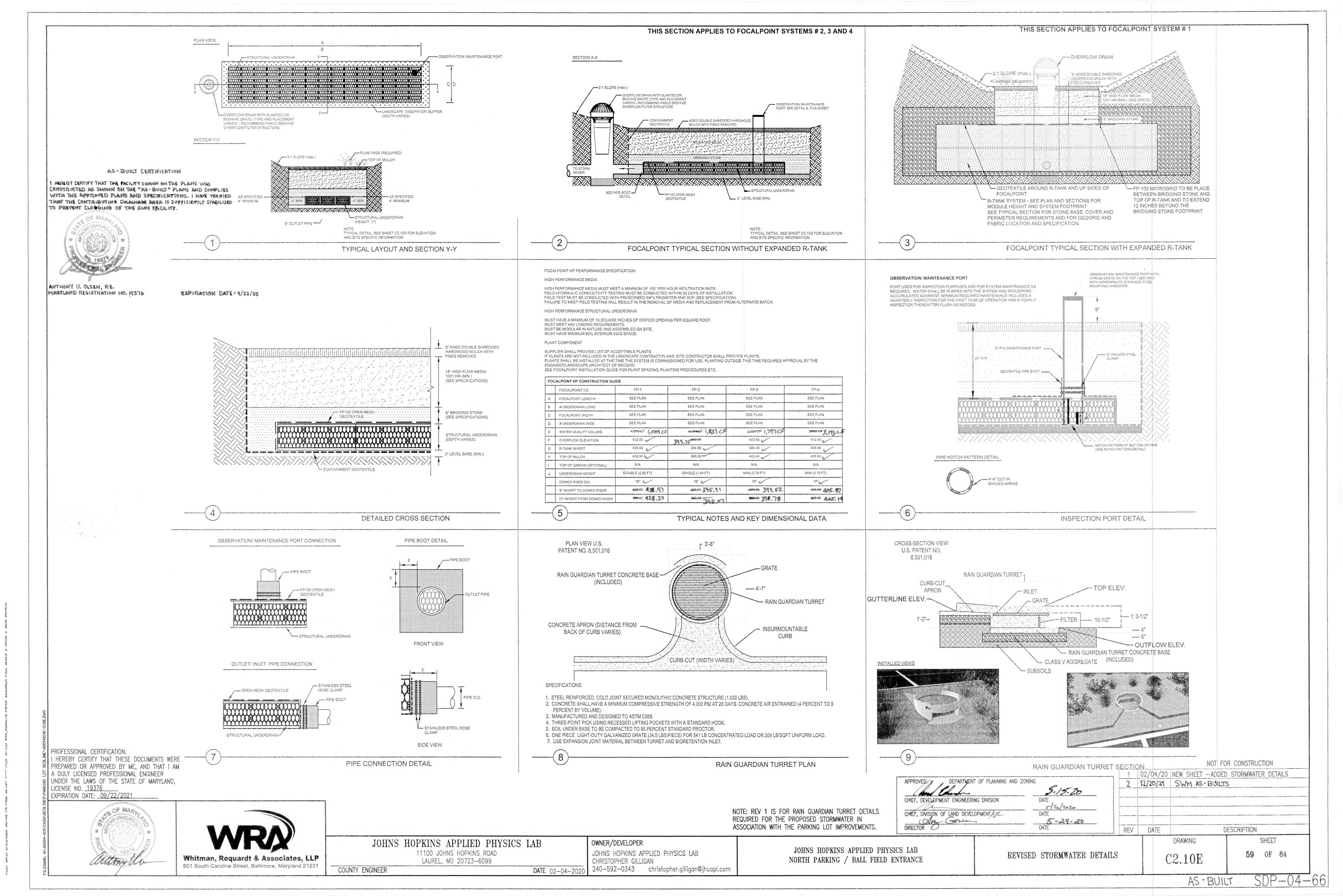
JOHNS HOPKINS APPLIED PHYSICS LAB NORTH PARKING / BALL FIELD ENTRANCE

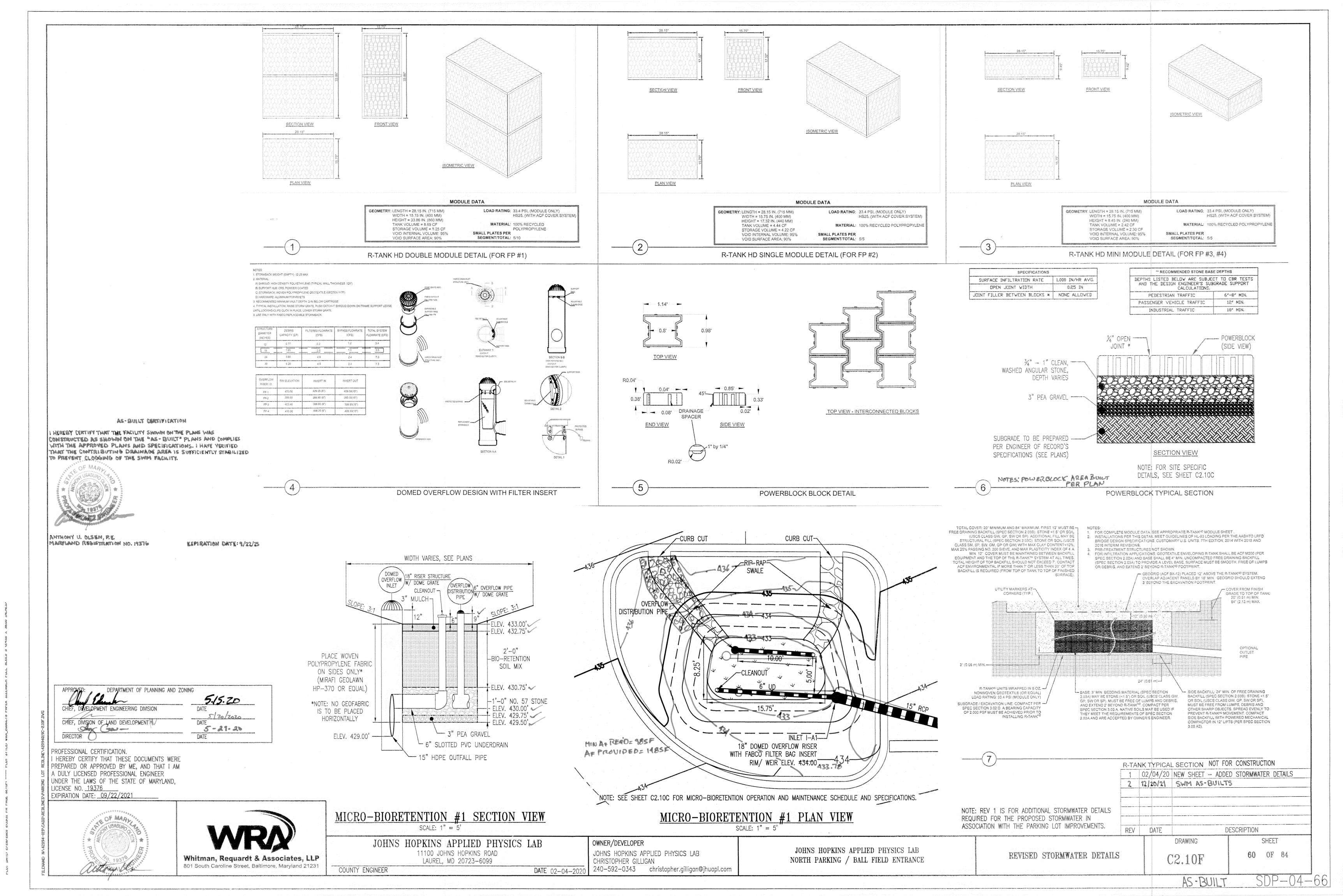
NO AS-BUILT ON THIS SHEET

OWNER/DEVELOPER JOHNS HOPKINS APPLIED PHYSICS LAB Whitman, Requardt & Associates, LLP CHRISTOPHER GILLIGAN 801 South Caroline Street, Baltimore, Maryland 21231 240-592-0343 christopher.gilligan@jhuapl.com COUNTY ENGINEER DATE 02-04-2020

PROFESSIONAL CERTIFICATION. HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 19376 EXPIRATION DATE: 09/22/2021







I. SUMMARY

THE FOLLOWING GENERAL SPECIFICATIONS DESCRIBE THE COMPONENTS AND INSTALLATION REQUIREMENTS FOR A VOLUME BASED HIGH PERFORMANCE MODULAR BIOFILTRATION SYSTEM (HPMBS) THAT UTILIZES PHYSICAL, CHEMICAL AND BIOLOGICAL MECHANISMS OF A SOIL, PLANT AND MICROBE COMPLEX TO REMOVE POLLUTANTS TYPICALLY FOUND IN URBAN STORM WATER RUNOFF. THE MODULAR TREATMENT SYSTEM IN WHICH THE BIOLOGICALLY ACTIVE BIOFILTRATION MEDIA IS USED SHALL BE A COMPLETE, INTEGRATED SYSTEM DESIGNED TO BE PLACED IN SQUARE FOOT OR LINEAR FOOT INCREMENTS PER THE APPROVED DRAWINGS TO TREAT CONTAMINATED RUNOFF FROM IMPERVIOUS SURFACES.

THE HIGH PERFORMANCE MODULAR BIOFILTRATION SYSTEM (HPMBS) IS COMPRISED OF THE FOLLOWING COMPONENTS:

A. PLANT COMPONENT

1. MANUFACTURER SHALL PROVIDE A REGIONALIZED LIST OF ACCEPTABLE PLANTS.

3. PLANTS AND PLANTING ARE TYPICALLY INCLUDED IN LANDSCAPE CONTRACT

2. PLANTS, AS SPECIFIED IN THE APPROVED DRAWINGS/MANUFACTURER'S PLANT LIST, SHALL BE INSTALLED AT THE TIME THE HPMBS IS COMMISSIONED FOR USE.

1. THIS COMPONENT EMPLOYS A HIGH PERFORMANCE CROSS-SECTION IN WHICH EACH ELEMENT IS HIGHLY DEPENDENT ON THE OTHERS TO MEET THE PERFORMANCE SPECIFICATION FOR THE COMPLETE SYSTEM, IT IS IMPORTANT THAT THIS ENTIRE CROSS-SECTION BE PROVIDED AS A COMPLETE SYSTEM, AND INSTALLED AS SUCH.

2. AS INDICATED IN THE APPROVED DRAWINGS, THE ELEMENTS OF THE BIOFILTER INCLUDE:

A. A MULCH PROTECTIVE LAYER (IF SPECIFIED).

B. AN ADVANCED HIGH INFILTRATION RATE BIOFILTRATION PLANTING MEDIA BED WHICH UTILIZES PHYSICAL, CHEMICAL AND BIOLOGICAL MECHANISMS OF THE SOIL, PLANT, AND MICROBE COMPLEX, TO REMOVE POLLUTANTS FOUND IN STORM WATER RUNOFF.

C. A SEPARATION LAYER WHICH UTILIZES THE CONCEPT OF 'BRIDGING' TO SEPARATE THE BIOFILTRATION MEDIA FROM THE UNDERDRAIN WITHOUT THE USE OF GEOTEXTILE FABRICS.

D. A WIDE APERTURE MESH LAYER UTILIZED TO PREVENT BRIDGING STONE FROM ENTERING THE UNDERDRAIN/STORAGE ELEMENT,

E. A MODULAR, HIGH INFILTRATION RATE 'FLAT PIPE' STYLE UNDERDRAIN/STORAGE SYSTEM WHICH IS DESIGNED TO DIRECTLY INFILTRATE OR EXFILTRATE WATER THROUGH ITS SURFACE. THE MODULAR UNDERDRAIN MUST PROVIDE A MINIMUM OF 95% VOID SPACE.

C. ENERGY DISSIPATION COMPONENT

1. AN ENERGY DISSIPATION COMPONENT IS TYPICALLY SPECIFIED TO SLOW AND SPREAD OUT WATER AS IT ENTERS THE SYSTEM. THIS COMPONENT IS DEPENDENT UPON THE DESIGN IN THE APPROVED DRAWINGS, BUT TYPICALLY CONSISTS OF A ROCK GABION, ROCK FILTER DAM OR DENSE VEGETATION ELEMENT, SUCH AS NATIVE GRASSES, EITHER SURROUNDING THE BIOFILTRATION COMPONENT OR LOCATED IMMEDIATELY UPSTREAM OF IT.

D. PRETREATMENT COMPONENT

1. PRETREATMENT, WHEN SPECIFIED, IS TYPICALLY ACCOMPLISHED BY LOCATING THE BIOFILTRATION COMPONENT WITHIN A TRADITIONAL VEGETATED BMP SUCH AS A VEGETATED SWALE, VEGETATED DEPRESSION, TRADITIONAL BIORETENTION SYSTEM, VEGETATED FILTER STRIP, SEDIMENT FOREBAY, ETC. THESE BMPS PROVIDE PRIMARY TSS REMOVAL WHEN DESIRABLE.

E. OBSERVATION AND MAINTENANCE COMPONENT

1. AN OBSERVATION AND MAINTENANCE PORT SHALL BE INSTALLED PER THE APPROVED DRAWINGS TO PROVIDE FOR EASY INSPECTION OF THE UNDERDRAIN/STORAGE ELEMENT, AND CLEANOUT ACCESS IF NEEDED.

F. EXTREME EVENT OVERFLOW (BY OTHERS)

1. AN EXTREME EVENT OVERFLOW SHOULD BE LOCATED EXTERNAL TO, BUT NEAR THE BIOFILTRATION ELEMENT TO PROVIDE BYPASS WHEN NEEDED. THIS MAY BE AN UTILIZED IT SHOULD INCLUDE A REMOVABLE FILTER INSERT TO PROVIDE A MINIMUM OF 50% TSS REMOVAL AND CONTROL OF GROSS POLLUTANTS, TRASH AND

II. QUALITY ASSURANCE AND PERFORMANCE SPECIFICATIONS

THE QUALITY AND COMPOSITION OF ALL SYSTEM COMPONENTS AND ALL OTHER APPURTENANCES AND THEIR ASSEMBLY PROCESS SHALL BE SUBJECT TO INSPECTION UPON DELIVERY OF THE SYSTEM TO THE WORK SITE.

INSTALLATION IS TO BE PERFORMED ONLY BY SKILLED WORK PEOPLE WITH SATISFACTORY RECORD OF PERFORMANCE ON EARTHWORKS, PIPE, CHAMBER, OR POND/LANDFILL CONSTRUCTION PROJECTS OF COMPARABLE SIZE AND QUALITY.

A. PLANTS

1. PLANTS MUST BE COMPATIBLE WITH THE HPMBS MEDIA AND THE ASSOCIATED HIGHLY VARIABLE HYDROLOGIC REGIME. PLANTS ARE TYPICALLY FACULTATIVE WITH

2. MANUFACTURER SHALL PROVIDE A REGIONALIZED LIST OF ACCEPTABLE PLANTS.

FIBROUS ROOTS SYSTEMS SUCH A NATIVE GRASSES AND SHRUBS.

3. ALL PLANT MATERIAL SHALL COMPLY WITH THE TYPE AND SIZE REQUIRED BY THE APPROVED DRAWINGS AND SHALL BE ALIVE AND FREE OF OBVIOUS SIGNS OF

1. MULCH, TYPICALLY DOUBLE SHREDDED HARDWOOD (NON-FLOATABLE), SHALL COMPLY WITH THE TYPE AND SIZE REQUIRED BY THE APPROVED DRAWINGS, AND

B. MULCH

C. BIOFILTRATION MEDIA 1. BIOLOGICALLY ACTIVE BIOFILTRATION MEDIA SHALL BE VISUALLY INSPECTED TO ENSURE APPROPRIATE VOLUME, TEXTURE AND CONSISTENCY WITH THE APPROVED

DRAWINGS. AND MUST BEAR A BATCH NUMBER MARKING FROM THE MANUFACTURER WHICH CERTIFIES PERFORMANCE TESTING OF THE BATCH TO MEET OR EXCEED THE REQUIRED INFILTRATION RATE (100 IN/HR). A THIRD PARTY LABORATORY TEST MUST BE PROVIDED TO CERTIFY THE 100 IN/HR RATE.

2. WITHIN 90 DAYS AFTER PROJECT COMPLETION, THE INFILTRATION RATE SHALL BE CONFIRMED AT THE MANUFACTURER'S EXPENSE, BY A WETTED CONDITION

a. FAILURE TO PASS THIS TEST WILL RESULT IN REMOVAL AND REPLACEMENT OF ALL MEDIA IN THE SYSTEM AT NO COST TO THE PROJECT OWNER/OPERATOR.

b. TEST MUST UTILIZE THE EQUIPMENT AND FOLLOW THE STANDARD OPERATING PROCEDURES FOUND IN THE HARRIS COUNTY TEXAS MANUAL ENTITLED, LOW IMPACT DEVELOPMENT & GREEN INFRASTRUCTURE DESIGN CRITERIA FOR STORM WATER MANAGEMENT (2011).

c. REPLACEMENT MEDIA, IF REQUIRED, MUST BE TAKEN FROM A DIFFERENT BATCH THAN THE ORIGINAL.

3. MANUFACTURER SHALL PROVIDE, AT NO ADDITIONAL COST TO THE PROJECT OWNER/OPERATOR, MAINTENANCE OF THE BIOFILTRATION SYSTEM FOR A PERIOD OF

4. POLLUTANT REMOVAL PERFORMANCE, COMPOSITION AND CHARACTERISTICS OF THE BIOFILTRATION MEDIA MUST MEET OR EXCEED THE FOLLOWING MINIMUM STANDARDS AS DEMONSTRATED BY TESTING ACCEPTABLE TO THE PROJECT ENGINEER:

Pollutant Programme	Removal Efficiency
TSS	91%
Phosphorus 2000 1000	66% 131 4 444 4 4
on the control of the	
Nitrogen	48%
Composition an	d Characteristics
Sand - Fine	<5%
Sand – Medium	10% - 15%
Sand—Coarse	15% - 25%
Sand – Very Coarse	40% - 45%
Gravel Grave	10% - 20%
Infiltration Rate	>100 inches per hour
Peat Moss*	5% - 15% - 15%
*Peat Moss	Specification (1997)
Listed by Organic Mat	erials Review Institute
100% natural peat (no composted, slud	ge, yard or leaf waste) Total Carbon >85%
Carbon to Nitrogen Ratio 15:1 to	o 23:1 Lignin Content 49% to 52%
Humic A	xcid >18%
pH 6.0	0 to 7.0
Moisture Cont	ent 30% to 50%
95% to 100% pas	ssing 2.0mm sieve
>80% passin	g 1.0mm sieve

D. UNDERDRAIN/STORAGE SYSTEM

1. UNDERDRAIN/STORAGE COMPONENTS SHALL BE MANUFACTURED IN AN ISO CERTIFIED FACILITY AND BE MANUFACTURED FROM AT LEAST 90% POST CONSUMER 2. UNDERDRAIN/STORAGE COMPONENTS SHALL MEET OR EXCEED THE FOLLOWING CHARACTERISTICS:

Property - 1 - 1 - 1 - 1 - 1	Value	
Surface Void Area	≥85%	
Unit Weight	3.25 lbs/cf	
Service Temperature	-14° to 167°	
Unconfined Crush Strength	32.48 psi	
180 Day Creep Test		
Load Applied – Initial and Sustained	11.16 psi	
* Creep Sustained – After 180 Days	0.20 inches	
* Creep Sustained – After 180 Days	1.13%	
* Projected Creep – 40 years	1.72%	

E. SEPARATION MESH

SEPARATION MESH SHALL BE COMPOSED OF HIGH-TENACITY MONOFILAMENT POLYPROPYLENE YARNS THAT ARE WOVEN TOGETHER TO PRODUCE AN OPEN MESH GEOTEXTILE WHICH SHALL BE INERT TO BIOLOGICAL DEGRADATION AND RESISTANT TO NATURALLY ENCOUNTERED CHEMICALS, ALKALIS AND ACIDS. THE MESH SHALL MEET OR EXCEED THE FOLLOWING CHARACTERISTICS:

	*	4154	Min Avg Roll Value			
Properties	Test Method	Unit	MD	CD		
Tensile Strength	ASTM D4595	kN/m (lbs/ft)	21 (1440)	25.3 (1733)		
Creep Reduced Strength	ASTM D5262	kN/m (lbs/ft)	6.9 (471)	8.3 (566)		
Long Term Allowable Design Load	GRI GG-4	kN/m (lbs/ft)	5.9 (407)	7.2 (490)		
UV Resistance (at 500 hours)	<u>.</u>	% strength retained				
Aperture Size (machine direction)	•	mm (in)	2 (0.0	)8)		
Aperture Size (cross machine direction)	•	mm (in)	2 (0.8	(8)		
Mass/Unit Area	ASTM D5261	g/m2 (oz/yd2)	197 (	5.8)		

F. BRIDGING STONE

1. BRIDGING STONE SHALL BE 3/8" PEA GRAVEL, OR OTHER DIAMETER SIZED TO PREVENT MIGRATION OF FILTER MEDIA, AS SPECIFIED BY MANUFACTURER. 2. STONE MUST BE WASHED AND FREE FROM SEDIMENT, SOIL AND CONTAMINANTS

DELIVERY, STORAGE AND HANDLING

A, 💚 PROTECT ALL MATERIALS FROM DAMAGE DURING DELIVERY AND STORE UV SENSITIVE MATERIALS UNDER TARP TO PROTECT FROM SUNLIGHT INCLUDING ALL PLASTICS VHEN TIME FROM DELIVERY TO INSTALLATION EXCEEDS ONE WEEK. STORAGE SHOULD OCCUR ON SMOOTH SURFACES, FREE FROM DIRT, MUD AND DEBRIS. B. BIOFILTRATION MEDIA SHALL BE SEGREGATED FROM ANY OTHER AGGREGATE MATERIALS AND SHALL BE PROTECTED AGAINST CONTAMINATION, INCLUDING CONTAMINATION FROM ANY STORMWATER RUNOFF FROM AREAS OF THE SITE WHICH ARE NOT STABILIZED.

SUBMITTALS

1. SUBMIT MANUFACTURER'S PRODUCT DATA AND APPROVED INSTALLATION MANUAL AS WELL AS MANUFACTURER'S OPERATIONS AND MAINTENANCE MANUAL FOR THE SYSTEM. IT WILL BE THE RESPONSIBILITY OF THE SYSTEM OWNER/OPERATOR OR THEIR CONTRACTOR TO ENSURE THE SYSTEM IS OPERATED AND MAINTAINED IN

B. CERTIFICATION

1. MANUFACTURER SHALL SUBMIT A LETTER OF CERTIFICATION THAT THE COMPLETE SYSTEM MEETS OR EXCEEDS ALL TECHNICAL AND PACKAGING REQUIREMENTS BIOFILTRATION MEDIA PACKAGING MUST BEAR A BATCH NUMBER MARKING FROM THE MANUFACTURER WHICH MATCHES A LETTER FROM THE MANUFACTUREF CERTIFYING PERFORMANCE TESTING OF THE BATCH TO MEET OR EXCEED THE REQUIRED INFILTRATION RATE.

1. MANUFACTURER SHALL PROVIDE DIMENSIONAL DRAWINGS INCLUDING DETAILS FOR CONSTRUCTION, MATERIALS, SPECIFICATIONS AND PIPE CONNECTIONS. D. MANUFACTURER'S WARRANTY

1. THE HPMBS MUST BE SIZED USING THE MDE SIZING CRITERIA AND DEMONSTRATE THAT DEPENDING ON WHETHER NEW DEVELOPMENT, REDEVE

AND MAINTAINED IN ACCORDANCE WITH THE MANUAL, IMPROPER OPERATION, MAINTENANCE OR ACCIDENTAL OR ILLEGAL ACTIVITIES (I.E. DUMPING OF POLLUTANTS VANDALISM, ETC.) WILL VOID THE WARRANTY. BIOFILTRATION MEDIA SHALL BE WARRANTED TO PASS THE POST-INSTALLATION INFILTRATION TEST DESCRIBED IN THIS E. DESIGN COMPUTATIONS

RETROFIT THAT ALL APPLICABLE WATER QUALITY (WQ), CHANNEL PROTECTION (CPV) AND RECHARGE (REV) REQUIREMENTS HAVE BEEN MET. IF LOCAL REGULATIONS

I. MANUFACTURER SHALL PROVIDE A WARRANTY FOR ALL COMPONENTS OF THE HPMBS FOR A PERIOD OF ONE YEAR PROVIDED THE UNIT IS INSTALLED, OPERATEI

HAVE THE SYSTEM APPROVED BASED ON AN ALTERNATIVE SIZING CRITERIA THE LARGER OF THE TWO COMPUTED SIZES WILL GOVERN.

1. ANY PROPOSED EQUAL ALTERNATIVE PRODUCT SUBSTITUTION TO THIS SPECIFICATION MUST BE SUBMITTED FOR REVIEW AND APPROVED PRIOR TO BID OPENING REVIEW PACKAGE SHOULD INCLUDE THIRD PARTY REVIEWED PERFORMANCE DATA FOR BOTH FLOW RATE AND POLLUTANT REMOVAL OF BIOFILTRATION MEDIA. POLLUTANT REMOVAL DATA MUST FOLLOW SPECIFIED PROTOCOLS. ALL COMPONENTS MUST MEET OR EXCEED QUALITY ASSURANCE AND PERFORMANCE CRITERIA

PROJECT CONDITIONS

A. REVIEW MANUFACTURER'S RECOMMENDED INSTALLATION PROCEDURES AND COORDINATE INSTALLATION WITH OTHER WORK AFFECTED, SUCH AS GRADING,

CAVATION, UTILITIES, CONSTRUCTION ACCESS AND EROSION CONTROL TO PREVENT ALL NON- INSTALLATION RELATED CONSTRUCTION TRAFFIC OVER THE COMPLETED HPMBS.

B. COLD WEATHER

1. DO NOT USE FROZEN MATERIALS OR MATERIALS MIXED OR COATED WITH ICE OR FROST.

2. DO NOT BUILD ON FROZEN GROUND OR WET, SATURATED OR MUDDY SUBGRADE.

3. CARE MUST BE TAKEN WHEN HANDLING PLASTICS WHEN AIR TEMPERATURE IS AT 40 DEGREES OR BELOW AS PLASTIC BECOMES BRITTLE.

C. PROTECT PARTIALLY COMPLETED INSTALLATION AGAINST DAMAGE FROM OTHER CONSTRUCTION TRAFFIC WHEN WORK IS IN PROGRESS AND FOLLOWING COMPLETION DE BACKFILL BY ESTABLISHING A PERIMETER WITH HIGHLY VISIBLE CONSTRUCTION TAPE, FENCING, OR OTHER MEANS UNTIL CONSTRUCTION IS COMPLETE.

D. SOIL STABILIZATION OF THE SURROUNDING SITE MUST BE COMPLETE BEFORE THE BIOFILTRATION SYSTEM CAN BE BROUGHT ONLINE, SOIL STABILIZATION OCCURS VHEN 90% OF THE SITE HAS BEEN PAVED OR VEGETATED. TEMPORARY EROSION CONTROL AND/OR SEDIMENTATION PREVENTION MEASURES SHALL BE IMPLEMENTED TO REDUCE THE POSSIBILITY OF SEDIMENTS BEING TRANSPORTED INTO THE BIOFILTRATION SYSTEM PRIOR TO FULL STABILIZATION OF THE SITE. SIGNIFICANT SEDIMENT LOADS CAN DAMAGE THE HPBMS AND LEAD TO FAILURE IF NOT PREVENTED OR REMEDIATED PROMPTLY.

PRODUCTS

A. ACCEPTABLE HPBMS

FOCALPOINT HIGH PERFORMANCE BIOFILTRATION SYSTEM

B. ACCEPTABLE BEEHIVE OVERFLOW GRATE STRUCTURE (OPTIONAL)

BEEHIVE OVERFLOW GRATE STRUCTURE WITH REMOVABLE STORMSACK

C. ACCEPTABLE MANUFACTURER

MANUFACTURER:

CONVERGENT WATER TECHNOLOGIES, INC. (800) 711-5428 WWW.CONVERGENTWATER.COM

D. AUTHORIZED VALUE ADDED RESELLER

ACF ENVIRONMENTAL (800) 448 3636 WWW.ACFENVIRONMENTAL.COM II. PACKAGING

A. HPMBS IS ASSEMBLED ON SITE

D. OTHER COMPONENTS ARE DELIVERED IN BULK OR SUPER SACKS

B. MODULAR UNDERDRAIN/STORAGE UNIT IS SHIPPED FLAT AND MODULES ARE ASSEMBLED PRIOR TO INSTALLATION. C. BIOFILTRATION MEDIA IS DELIVERED IN ONE TON SUPER SACKS EACH LABELED WITH MANUFACTURER'S BATCH NUMBER AND/OR IN BULK WITH ACCOMPANYING MANUFACTURER'S CERTIFICATION.

VIII. EXECUTION

A. EXCAVATION AND BACKFILL

1. BASE OF EXCAVATION SHALL BE SMOOTH, LEVEL AND FREE OF LUMPS OR DEBRIS, AND COMPACTED UNLESS INFILTRATION OF STORM WATER INTO SUBGRA DESIRED. A THIN LAYER (3") OF COMPACTED BASE MATERIAL IS RECOMMENDED TO ESTABLISH A LEVEL WORKING PLATFORM (MAY NOT BE NEEDED IN SANDY SOIL THE BASE OF THE EXCAVATION IS PUMPING OR APPEARS EXCESSIVELY SOFT, A GEOTECHNICAL ENGINEER SHOULD BE CONSULTED FOR ADVICE. IN MANY CASE STABILIZATION GEOTEXTILE AND 6" OF COMPACTABLE MATERIAL THAT DRAINS WELL WILL BE SUFFICIENT TO AMEND THE BEARING CAPACITY OF THE SOIL.

2, MOST APPLICATIONS REQUIRE 8 OZ NON-WOVEN GEOTEXTILE OR EQUIVALENT NONWOVEN GEOTEXTILE WITH A NOMINAL WEIGHT OF 8 OZ PER SQUARE YARD TO THE EXCAVATION TO SEPARATE IN SITU SOILS AND THE HPMBS. (APPLICATIONS REQUIRING WATER TO INFILTRATE THE IN SITU SUB-SOILS SHOULD USE A BRIE STONE RATHER THAN GEOTEXTILE TO PROVIDE A SEPARATION LAYER BETWEEN THE HPMBS AND THE IN SITU SOILS). GEOTEXTILE, WHEN UTILIZED, SHOULD BE PI ON THE BOTTOM AND UP THE SIDES OF THE EXCAVATION, ABSOLUTELY NO GEOTEXTILES SHOULD BE USED IN THE WATER COLUMN. IF AN IMPERMEABLE LII SPECIFIED, IT SHALL BE INSTALLED ACCORDING TO MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS.

3. SPECIFIED BACKFILL MATERIAL MUST BE FREE FROM LUMPS, DEBRIS AND ANY SHARP OBJECTS THAT COULD PENETRATE THE GEOTEXTILE. MATERIAL IS USE BACKFILL ALONG THE SIDES OF THE SYSTEM AS INDICATED IN ENGINEERING DETAIL DRAWINGS.

B. INSPECTION

1. EXAMINE PREPARED EXCAVATION FOR SMOOTHNESS, COMPACTION AND LEVEL. CHECK FOR PRESENCE OF HIGH WATER TABLE, WHICH MUST BE KEPT AT I BELOW THE BOTTOM OF THE UNDER DRAIN STRUCTURE AT ALL TIMES. IF THE BASE IS PUMPING OR APPEARS EXCESSIVELY SOFT, A GEOTECHNICAL ENGINEER SE BE CONSULTED FOR ADVICE.

2. INSTALLATION COMMENCEMENT CONSTITUTES ACCEPTANCE OF EXISTING CONDITIONS AND RESPONSIBILITY FOR SATISFACTORY PERFORMANCE. IF EXI CONDITIONS ARE FOUND TO BE UNSATISFACTORY, CONTACT PROJECT MANAGER OR ENGINEER FOR RESOLUTION PRIOR TO INSTALLATION.

CLEANUP AND PROTECTION DURING ONGOING CONSTRUCTION ACTIVITY A. PERFORM CLEANING DURING THE INSTALLATION AND UPON COMPLETION OF THE WORK.

B. REMOVE FROM SITE ALL EXCESS MATERIALS, DEBRIS, AND EQUIPMENT, REPAIR ANY DAMAGE TO ADJACENT MATERIALS AND SURFACES RESULTING FROM

C. IF SURROUNDING DRAINAGE AREA IS NOT FULLY STABILIZED, A PROTECTIVE COVERING OF GEOTEXTILE FABRIC SHOULD BE SECURELY PLACED TO PROTECT THE BIOFILTRATION MEDIA. D. CONSTRUCTION PHASE EROSION AND SEDIMENTATION CONTROLS SHALL BE PLACED TO PROTECT THE INLET(S) TO THE BIOFILTRATION SYSTEM. EXCESSIVE

SEDIMENTATION, PARTICULARLY PRIOR TO ESTABLISHMENT OF PLANTS MAY DAMAGE THE HPMBS. E. STRICTLY FOLLOW MANUFACTURER'S GUIDELINES WITH RESPECT TO PROTECTION OF THE HPMBS BETWEEN INSTALLATION AND COMMISSIONING PHASES.

K. COMMISSIONING

A. COMMISSIONING SHOULD ONLY BE CARRIED OUT ONCE THE CONTRIBUTING DRAINAGE AREA IS FULLY STABILIZED, IF COMMISSIONING MUST BE CARRIED OUT SOC IS IMPERATIVE THAT APPROPRIATE EROSION AND SEDIMENT CONTROLS BE PLACED TO PREVENT THE ENTRY OF EXCESSIVE SEDIMENT/POLLUTANT LOADS INTO THE SYSTI B. COMMISSIONING ENTAILS REMOVING THE PROTECTIVE COVERING FROM THE BIOFILTRATION MEDIA, PLANTING THE PLANT MATERIAL IN ACCORDANCE WITH THE APPROVED DRAWINGS, AND PLACING MULCH IF SPECIFIED.

1. DIG PLANTING HOLES THE DEPTH OF THE ROOT BALL AND TWO TO THREE TIMES AS WIDE AS THE ROOT BALL. WIDE HOLES ENCOURAGE HORIZONTAL ROOT GF

2. WITH TREES, YOU MUST ENSURE YOU ARE NOT PLANTING TOO DEEP. DON'T DIG HOLES DEEPER THAN ROOT BALLS. THE MEDIA SHOULD BE PLACED AT THE COLLAR, NOT ABOVE THE ROOT COLLAR. OTHERWISE THE STEM WILL BE VULNERABLE TO DISEASE.

3. STRICTLY FOLLOW MANUFACTURER'S PLANTING GUIDANCE.

C. OVER THE EXPOSED ROOT BALL TOP WITH MULCH, MULCH SHOULD NOT TOUCH THE PLANT BASE BECAUSE IT CAN HOLD TOO MUCH MOISTURE AND INVITE DISEA AND INSECTS. EVENLY PLACE 3 INCHES OF DOUBLE-SHREDDED HARDWOOD MULCH (IF SPECIFIED) ON THE SURFACE OF THE MEDIA.

D. PLANTINGS SHALL BE WATERED-IN AT INSTALLATION AND TEMPORARY IRRIGATIONS SHALL BE PROVIDED, IF SPECIFIED.

USING THE HPMBS

A MAINTENANCE REQUIREMENTS

1. EACH CORRECTLY INSTALLED HPMBS IS TO BE MAINTAINED BY THE MANUFACTURER FOR A MINIMUM PERIOD OF ONE YEAR. THE COST OF THIS SERVICE IS INCLUDED IN THE MANUFACTURER'S PRICE OF THE SYSTEM.

2. ANNUAL MAINTENANCE CONSISTS OF TWO (2) SCHEDULED VISITS UNLESS OTHERWISE SPECIFIED.

3. EACH MAINTENANCE VISIT CONSISTS OF THE FOLLOWING:

2. REMOVAL OF FOREIGN DEBRIS, SILT, PLANT MATERIAL, TRASH AND MULCH (IF NEEDED)

3. EVALUATION OF BIOFILTRATION MEDIA

4. EVALUATION OF PLANT HEALTH

5. INSPECTION OF UNDERDRAIN/STORAGE SYSTEM VIA OBSERVATION/MAINTENANCE PORT

6. PROPERLY DISPOSE OF ALL MAINTENANCE REFUSE ITEMS (TRASH, MULCH, ETC.)

7. TAKE PHOTOGRAPHS DOCUMENTING PLANT GROWTH AND GENERAL SYSTEM HEALTH

8. UPDATE AND STORE MAINTENANCE RECORDS

PORT TO MAXIMIZE FLUSHING EFFICIENCY.

9. TO ENSURE LONG TERM PERFORMANCE OF THE HPMBS, CONTINUING ANNUAL MAINTENANCE SHOULD BE PERFORMED PER THE MANUFACTURER'S OPERATION 4. IF SEDIMENT ACCUMULATES BEYOND AN ACCEPTABLE LEVEL IN THE UNDERDRAIN/STORAGE SYSTEM, IT WILL BE NECESSARY TO FLUSH THE UNDERDRAIN. T BE DONE BY PUMPING WATER INTO THE OBSERVATION/MAINTENANCE PORT OR ADJACENT OVERFLOW STRUCTURE, ALLOWING THE TURBULENT FLOWS THROUGH

SEDIMENT-LADEN WATER CAN BE PUMPED OUT AND EITHER CAPTURED FOR DISPOSAL OR FILTERED THROUGH A DIRTBAG FILTER BAG, IF PERMITTED BY THE LOCAL

UNDERDRAIN TO RE- SUSPEND THE FINE SEDIMENTS. IF MULTIPLE OBSERVATION/MAINTENANCE PORTS HAVE BEEN INSTALLED, WATER SHOULD BE PUMPED INTO

MEASUREMENT AND PAYMENT

GIVEN THE INTEGRATED NATURE OF THE HPMBS, MEASUREMENT AND PAYMENT WILL BE BASED NOT ON THE INDIVIDUAL COMPONENT PRICES, BUT ON THE SIZE OF BIOFILTRATION MEDIA BED. THE EXTERNAL DIMENSION AS INDICATED IN THE APPROVED PLANS AND EXECUTED IN THE INSTALLATION WILL BE MEASURED IN SQUARE AND PAYMENT WILL BE MADE PER HPMBS SYSTEM.

MEASUREMENT AND PAYMENT OF BEEHIVE OVERFLOW GRATE STRUCTURE WITH REMOVABLE FILTER INSERT WILL BE BASED ON PER UNIT PRICE.

NOT FOR CONSTRUCTION

DESCRIPTION

1 02/04/20 NEW SHEET -ADDED SPECS FOR FOCAL POINT

NOTE: REV 1 IS FOR ADDITIONAL FOCAL POINT SPECIFICATION REQUIRED FOR THE PROPOSED STORMWATER IN ASSOCIATION WITH THE PARKING LOT IMPROVEMENTS.

REV

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SHEET

COUNTY ENGINEER

OWNER/DEVELOPER JOHNS HOPKINS APPLIED PHYSICS LAB CHRISTOPHER GILLIGAN

JOHNS HOPKINS APPLIED PHYSICS LAB NORTH PARKING / BALL FIELD ENTRANCE

REVISED FOCAL POINT SPECIFICATION

DRAWING

NO AS-BUILT ON THIS SHEET

DEVELOPMENT ENGINEERING DIVISION

HEREBY CERTIFY THAT THESE DOCUMENTS WERE

PREPARED OR APPROVED BY ME, AND THAT I AM

UNDER THE LAWS OF THE STATE OF MARYLAND,

A DULY LICENSED PROFESSIONAL ENGINEER

CHIEF, DIVISION OF LAND DEVELOPMENT

PROFESSIONAL CERTIFICATION.

EXPIRATION DATE: 09/22/2021

LICENSE NO. <u>19376</u>

ARTMENT OF PLANNING AND ZONING

Whitman, Requardt & Associates, LLP 801 South Caroline Street, Baltimore, Maryland 21231

JOHNS HOPKINS APPLIED PHYSICS LAB 11100 JOHNS HOPKINS ROAD LAUREL, MD 20723-6099

DATE 02-04-202

240-592-0343 christopher.gilligan@jhuapl.com

# POWERBLOCK SPECIFICATION

#### PART 1 GENERAL

#### 1. Related Documents

A.Drawings, technical specifications, and general provisions of the Contract as modified herein apply to this section.

#### 2. Description of the Work Included

- A. Provide excavation and base preparation per geotechnical engineer's recommendations and/or as shown on the design drawings.
- B. Provide and install PowerBLOCK and all related products including base materials, geotextiles, and geogrids per the manufacturer's installation guidelines provided in this section.
- C. Perform post-installation testing.
- D. Protect PowerBLOCK system from contamination due to construction traffic and construction sedimentation after installation until the site is completely stabilized.

- A.Installation Contractor shall demonstrate the following experience:
- 1. A minimum of three permeable pavement projects completed within the last 2 years of a similar or larger size and complexity.
- 2. A minimum of 25,000 square feet of permeable pavement installed within the last 2 years.
- 3. Installation Contractor experience requirement may be waived if the manufacturer's representative provides on-site training and review during construction.
- B. Installation Personnel: Performed only by skilled workers with a satisfactory record of performance on permeable pavement construction projects of comparable size and complexity. C. Contractor must have the manufacturer's representative available for site review if requested by the Owner.

#### 4. Submittals

- A. Submit proposed PowerBLOCK layout drawings.
- B. Submit manufacturer's product data, including all requirements detailed in this specification.
- C. Submit material specifications for all geotextiles and geogrids. D.Submit material specification for base stone and aggregates.
- E. Any proposed equal alternative product substitution to this specification must be submitted for review and approved prior to the bid opening. The review package should include third party performance data that meets or exceeds the criteria in Table 2.1A.

#### 5. Storage and Handling

- A. Protect concrete pavers during shipment, storage, and installation against staining, chipping, cracking, and other damage.
- B. Coordinate delivery and paving schedule with other construction activities.

#### 6. Preinstallation Conference

- A. Prior to the start of the installation, a preinstallation conference shall occur with Owner representatives, the general contractor, the installation contractor, and the manufacturer's
- B. Coordinate installation for the PowerBLOCK system with other on-site activities to minimize sedimentation and contamination of the permeable pavement during construction. All non-installation related construction traffic, particularly equipment used for earthwork, should be routed around the permeable pavement. Stabilize denuded soils contributing runoff to the permeable pavement prior to commissioning the system.

#### PART 2: PRODUCTS

A. Permeable pavement shall be constructed from pre-manufactured, interlocking concrete blocks that do not require stone or sand filler between the blocks, leaving the joints open to allow rapid infiltration of runoff through the joints. The blocks and completed permeable pavement shall meet the following properties:

#### Table 2.1A

PROPERTY	DESCRIPTION	VALUE
Dimensions	Length x Width x Height	11.75" x 13.70" x 4.5" (+/- 1/8"
Block Weight	Pounds	44 lbs Minimum
Loading Capacity	Traffic Rating	HS-20 / HS-25
Open Joint Width	Inches	0.25" (+/- 0.02")
Joint Filler Between Blocks	Material Used	NONE ALLOWED 1
Post-Installation, Field- Verified Surface Infiltration Rate 3	ASTM C-1701 / C-1701-M09 / ASTM C-1781 / C-140	1'000 inches / hour average (Minimum 3 tests)
Compressive Strength	ASTM D-6684 / C-140	4,000 psi (average) 3,500 psi (minimum)
Freeze / Thaw Resistance 2	ASTM C-67 / C-1645 / C-936	

NOTE 1: No filler material is allowed to be used between the blocks. Use ONLY blocks that do not require stabilizing stone/sand between the units.

NOTE 2: Testing by the National Concrete Masonry Association (NCMA) will be made available for freeze/thaw and abrasion resistance upon request.

NOTE 3: The completed permeable pavement system must be tested in-situ after installation and will only be accepted when required performance value shown in Table 2.1A has been documented by a third party. Final test report must be submitted to the Owner prior to acceptance.

#### A. Visual Inspection

- 1. All blocks shall be sound and free of defects that would interfere with the proper placing of the units or impair the strength or performance of the permeable pavement system.
- 2. Surface cracks incidental to the usual methods of manufacture, or surface chipping resulting from customary methods of handling in shipment and delivery, shall not be deemed grounds for
- 3. Cracks exceeding 0.25 inches in width and/or 1.0 inches in depth or larger shall be deemed grounds for rejection.
- 4. Ensure the PowerBLOCK delivered to the site matches the color requirements on plans.

C. The pervious paver shall be PowerBLOCK<sup>®</sup> or pre-approved equal (as noted in Part 1, Section 4.E), as represented and distributed by:

ACF Environmental

COUNTY ENGINEER

- PH. (800) 448-3636 info@acfenv.com
- acfenvironmental.com
- D. When PowerBLOCK installation may be exposed to de-icing salts or salt air in coastal climates, blocks should be sealed after installation with optional Prossoco Saltguard WB or equivalent. If specified, the coating shall be applied per manufacturer's recommendations.

#### 2. Stone Base

A.Permeable pavements require site specific design based on both structural and hydrologic requirements of the pavement. Depths shown on typical drawings must be evaluated and modified as

B. All aggregate shall be clean and angular on all sides, with no less than 90% fractured faces. Do not use rounded river gravel or fractured river gravel for any application. C. If more than 6" of base stone is required, use AASHTO #2 Stone or simillar for the lower layers. Compact with a roller in 6" to 8" lifts.

#### ASTM No. 2 Subbase Grading Requirements Sieve Size 75 mm (3 in.) 63 mm (2 1/2 in.) 90 to 100 50 mm (2 in.) 35 to 70

37.5 mm (1 1/2 in.) 0 to 15

19 mm (3/4 in.) 0 to 5

2.36 mm (No. 8) 0 to 5

D.AASHTO #57 Stone shall be used as a leveling course for the upper 4" to 6" of the base layer. Compact first with a roller, and finish with a 10,000 psi plate compactor in both the perpendicular and parallel directions. Base shall be a smooth, plane surface, firm and non-yielding before placement of the PowerBLOCK.

#### ASTM No. 57 Base Grading Requirements 37.5 mm (1 1/2 in.) 100 25 mm (1 in.) 95 to 100 12.5 mm (1/2 in.) 25 to 60 4.75 mm (No. 4) 0 to 10

E. INSPECTION: Prior to placement of PowerBLOCK units, the base shall be inspected and approved by either the engineer or other Owner's representative. No blocks shall be placed until approval is obtained.

#### 3. Geotextiles

A.Use a woven monofilament geotextile, such as ACF M200, or as specified in the contract documents.

#### PART 3: FOUNDATION PREPARATION AND BLOCK INSTALLATION

- A.Prepare subgrade as noted on plans. Typically, compaction of underlying subgrade soil should be avoided or minimized in order to encourage infiltration of stormwater. Subgrade should be uniform, level, and free of lumps and debris. All questions about the adequacy of the subgrade should be directed to the owner's engineer, who will approve the subgrade conditions prior to placement of the stone base.
- B. Place a woven monofilament geotextile, such as ACF M200, on the subgrade base and sides of the excavation to prevent contamination of the clean aggregate base or as specified in the contract documents. Overlap seams a minimum of 12" in all directions, or as shown on plans.
- C. Install base materials in layers uniformly spread and compacted as shown on plans and as noted in Part 2, Section 2 of this specification. Compaction is complete when no movement of base
- D.Confirm finished elevations of the base match plan requirements.
- E. Completed base shall be proof rolled and approved by engineer. Reconstruct areas where deflection exceeds acceptable limits as determined by engineer.

- A.Ensure PowerBLOCK<sup>®</sup> units are free of foreign material before installation.
- B.Set PowerBLOCK pavers as shown on plans, within the specified lines and grades shown on plans. Units shall be installed straight and true to the required lines. Ensure joint widths are consistent throughout installation.
- 1. Installation shall proceed by adding blocks adjacent to previously installed units.
- 2. On sloped areas, work from lower areas toward the higher elevations.
- C. Cut PowerBLOCK<sup>®</sup> units as needed to accommodate field conditions and to achieve a consistent pattern.
- D. When a substantial area of PowerBLOCK<sup>®</sup> units has been installed, the pavers shall be static rolled to ensure a consistent top elevation.
- E. Replace pavers that are broken, substantially chipped, or stained during cor F. The joints between the blocks shall not be backfilled with smaller aggregates or sand in order to function properly. The joints shall be left open at all times, including following maintenance
- G. Within 60 days of completion of the installation, the surface infiltration rate of the pavement shall be field verified to confirm the required infiltration rate of the pavement (per Table 2.1A). If
- the system fails to perform as required, it shall be removed and replaced at no cost to the Owner.

#### PART 4: INSPECTION AND MAINTENANCE

#### 1. Inspection

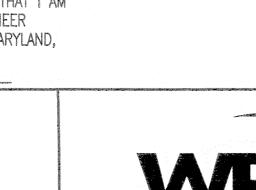
- A.Inspect the permeable pavement, noting areas of standing water or significant accumulation of joint debris.
- B. If joints are excessively filled with debris or sediment, a surface infiltration test may be performed per Table 2.1A to determine the capabilities of the system.

#### 2. Maintenance

- A. Maintenance shall be performed when either:
- 1. The surface infiltration rates of more than 75% of the surface area fall below 10% of the rate required per Table 2.1A.
- 2. Surface ponding remains for 24 hours in an area larger than 10 square feet.
- 3. Other desired maintenance at the Owner's discretion to optomize performance.
- B. Maintenance shall be performed with a vacuum device, not a mechanical sweeper, to remove accumulated debris from joints. This may be accomplished with smaller hand-held devices or with vacuum trucks such as the Elgin Whirlwind. Adjust device settings to avoid movement or lifting of block, or removal of the base stone underneath the blocks at all times.

DEPARTMENT OF PLANNING AND ZONING CHIEF, DEVELOPMENT ENGINEERING DIVISION CHIEF, DIVISION OF LAND DEVELOPMENT 5-27-20

PROFESSIONAL CERTIFICATION. HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 19376 EXPIRATION DATE: 09/22/2021



Whitman, Requardt & Associates, LLP 801 South Caroline Street, Baltimore, Maryland 21231

JOHNS HOPKINS APPLIED PHYSICS LAB 11100 JOHNS HOPKINS ROAD LAUREL, MD 20723-6099

OWNER/DEVELOPER JOHNS HOPKINS APPLIED PHYSICS LAB CHRISTOPHER GILLIGAN 240-592-0343 christopher.gilligan@jhuapl.com DATE 02-04-2020

JOHNS HOPKINS APPLIED PHYSICS LAB NORTH PARKING / BALL FIELD ENTRANCE

REVISED POWERBLOCK SPECIFICATION

NOTE: REV 1 IS FOR ADDITIONAL POWERBLOCK

SPECIFICATION REQUIRED FOR THE PROPOSED STORMWATER IN ASSOCIATION WITH THE PARKING LOT IMPROVEMENTS.

DRAWING C2.10H

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SHEET

NOT FOR CONSTRUCTION

DESCRIPTION

1 02/04/20 NEW SHEET - ADDED SPECS FOR POWERBLOCK

NO AS-BUILT ON THIS SHEET

REV DATE

# R-TANK SPECIFICATION

#### PART 1 - GENERAL

1.01 Related Documents

A. Drawings, technical specification and general provisions of the Contract as modified herein apply to this section.

1.02 Description of Work Included

- A. Provide excavation and base preparation per geotechnical engineer's recommendations and/or as shown on the design drawings, to provide adequate support for project design loads and safety from excavation sidewall collapse. Excavations shall be in accordance with the owner's and OSHA requirements.
- Provide and install R-Tank<sup>LD</sup>, R-Tank<sup>HD</sup>, R-Tank<sup>SD</sup>, or R-Tank<sup>UD</sup> system (hereafter called R-Tank) and all related products including fill materials, geotextiles, geogrids, inlet and outlet pipe with connections per the manufacturer's installation guidelines provided in this section.
- Provide and construct the cover of the R-Tank system including; stone backfill, structural fill cover, and pavement section as specified. D. Protect R-Tank system from construction traffic after installation until completion of all construction activity in the installation area.
- 1.03 Quality Control A. All materials shall be manufactured in ISO certified facilities.
- Installation Contractor shall demonstrate the following experience:
- 1. A minimum of three R-Tank or equivalent projects completed within 2 years; and,
- 2. A minimum of 25,000 cubic feet of storage volume completed within 2 years.
- 3. Contractor experience requirement may be waived if the manufacturer's representative provides on-site training and review during construction.
- C. Installation Personnel: Performed only by skilled workers with satisfactory record of performance on bulk earthworks, pipe, chamber, or pond/landfill construction projects of comparable size and quality.
- Contractor must have manufacturer's representative available for site review if requested by Owner.

#### 1.04 Submittals

- A. Submit proposed R-Tank layout drawings. Drawings shall include typical section details as well as the required base elevation of stone and tanks, minimum cover requirements and tank configuration.
- Submit manufacturer's product data, including compressive strength and unit weight.
- Submit manufacturer's installation instructions.
- Submit R-Tank sample for review. Reviewed and accepted samples will be returned to the Contractor.
- Submit material certificates for geotextile, geogrid, base course and backfill materials. Submit required experience and personnel requirements as specified in Section 1.03.
- Any proposed equal alternative product substitution to this specification must be submitted for review and approved prior to bid opening. Review package should include third party reviewed performance data that meets or exceeds criteria in Table 2.01 B.

1.05 Delivery, Storage, and Handling

- A. Protect R-Tank and other materials from damage during delivery, and store UV sensitive materials under tarp to protect from sunlight when time from delivery to installation exceeds two weeks. Storage of materials should be on smooth surfaces, free from dirt, mud and debris.
- Handling is to be performed with equipment appropriate to the materials and site conditions, and may include hand, handcart, forklifts, extension lifts, etc. Cold weather:
- 1. Care must be taken when handling plastics when air temperature is 40 degrees or below as plastic becomes brittle.
- 2. Do not use frozen materials or materials mixed or coated with ice or frost.
- 3. Do not build on frozen ground or wet, saturated or muddy subgrade.

1.06 Preinstallation Conference.

A. Prior to the start of the installation, a preinstallation conference shall occur with the representatives from the design team, the general contractor, the excavation contractor, the R-Tank installation contractor, and the manufacturer's representative.

1.07 Project Conditions

- Coordinate installation for the R-Tank system with other on-site activities to eliminate all non-installation related construction traffic over the completed R-Tank system. No loads heavier than the design loads shall be allowed over the system, and in no case shall loads higher than a standard AASHTO HS20 (or HS25, depending on design criteria) load be allowed on the system at any time.
- Protect adjacent work from damage during R-Tank system installation.
- All pre-treatment systems to remove debris and heavy sediments must be in place and functional prior to operation of the R-Tank system. Additional pretreatment measures may be needed if unit is operational during construction due to increased sediment loads.
- D. Contractor is responsible for any damage to the system during construction.

#### PART 2 - PRODUCTS

2.01 R-Tank Units

- A. R -Tank Injection molded plastic tank plates assembled to form a 95% void modular structure of predesigned height (custom for each project).
- R-Tank units shall meet the following Physical & Chemical Characteristics:

PROPERTY	DESCRIPTION	R-Tank <sup>LD</sup> VALUE	R-Tank <sup>HD</sup> VALUE	R-Tank <sup>so</sup> VALUE	R-Tank <sup>UD</sup> VALUE
Void Area	Volume available for water storage	95%	95%	95%	95%
Surface Void Area	Percentage of exterior available for infiltration	90%	90%	90%	90%
Compressive Strength	ASTM D 2412 / ASTM F 2418	30.0 psi	33.4 psi	42.9 psi	134.2 psi
HS-20 Minimum Cover	Cover required to support HS-20 loads	N/A	20"	18"	12" (STONE BACKFILL)
HS-25 Minimum Cover	Cover required to support HS-25 loads	N/A	24°	19"	15" (STONE BACKFILL)
Maximum Cover	Maximum allowable cover depth	3 feet	< 7 feet	< 10 feet	5 feet
Unit Weight	Weight of plastic per cubic foot of tank	3.29 lbs / cf	3.62 lbs/cf	3.96 lbs / cf	4.33 lbs / cf
Rib Thickness	Thickness of load-bearing members	0.18 inches	0.18 inches	0.18 inches	N/A
Service Temperature	Safe temperature range for use	-14 – 167° F	-14 - 167° F	-14 167° F	-14 – 167° F

 Supplier: ACF Environmental 2831 Cardwell Road Richmond, VA 23234 (T): 800-448-3636; (F): 804-743-7779 www.acfenvironmental.com

# 2.02 Geosynthetics

A. Geotextile. A geotextile envelope is required to prevent backfill material from entering the R-Tank modules.

1. Standard Application: The standard geotextile shall be an 8 oz per square yard nonwoven geotextile (ACF N080 or equivalent).

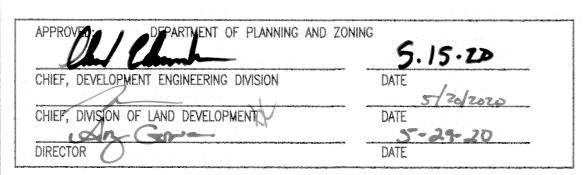
- 2. Infiltration Applications: When water must infiltrate/exfiltrate through the geotextile as a function of the system design, a woven monofilament (ACF M200 or equivalent) shall be
- Geogrid. For installations subject to traffic loads and/or when required by project plans, install geogrid (ACF BX12 or equivalent) to reinforce backfill above the R-Tank system. Geogrid is not always required for R-Tank<sup>UD</sup> installations, and is often not required for non-traffic load applications.

2.03 Backfill & Cover Materials

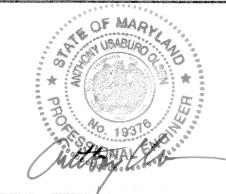
- Bedding Materials: Stone (angular and smaller than 1.5" in diameter) or soil (GW, GP, SW, or SP as classified by the Unified Soil Classification System) shall be used below the R-Tank system (3" minimum). Material must be free from lumps, debris, and any sharp objects that could cut the geotextile. Material shall be within 3 percent of the optimum moisture content as determined by ASTM D698 at the time of installation. For infiltration applications bedding material shall be free draining.
- Side and Top Backfill: Free draining material shall be used adjacent to (24" minimum) and above (for the first 12") the R-Tank system. Material must be free from lumps, debris and any sharp objects that could cut the geotextile. Material shall be within 3 percent of the optimum moisture content as determined by ASTM D698 at the time of installation. 1. For LD, HD, and SD modules, backfill materials shall be free draining stone (angular and smaller than 1.5" in diameter) or soil (GW, GP, SW, or SP as classified by the Unified
- Soil Classification System). 2. For UD modules in traffic loaded (HS-20) applications with less than 14" of top cover, side backfill materials shall be free draining stone (angular and smaller than 1.5" in diameter). The use of soil backfill on the sides of the UD module is not permitted unless the modules are installed outside of traffic areas or with cover depths of > 14". Top backfill
- material may be stone or soil as noted above (Section 2.03 B 1). Additional Cover Materials: Structural Fill shall consist of granular materials meeting the gradational requirements of SM, SP, SW, GM, GP or GW as classified by the Unified Soil Classification System. Structural fill shall have a maximum of 25 percent passing the No. 200 sieve, shall have a maximum clay content of 10 percent and a maximum Plasticity
  - Index of 4. Material shall be within 3 percent of the optimum moisture content as determined by ASTM D698 at the time of installation.

2.04 Other Materials

Utility Marker: Install metallic tape at corners of R-Tank system to mark the area for future utility detection.



PROFESSIONAL CERTIFICATION. HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME. AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE NO. 19376 EXPIRATION DATE: 09/22/2021





# 11100 JOHNS HOPKINS ROAD

OWNER/DEVELOPER JOHNS HOPKINS APPLIED PHYSICS LAB CHRISTOPHER GILLIGAN 240-592-0343 christopher.gilligan@jhuapl.com DATE 02-04-2020

JOHNS HOPKINS APPLIED PHYSICS LAB

A. Assembly of modules shall be performed in accordance with the R-Tank Installation Manual, Section 2.

3.02 Layout and Excavation

3.01 Assembly of R-Tank Units

PART 3 - EXECUTION

A. Installer shall stake out, excavate, and prepare the subgrade area to the required plan grades and dimensions, ensuring that the excavation is at least 2 feet greater than R-Tank dimensions in each direction allowing for installation of geotextile filter fabric, R-Tank modules, and free draining backfill materials. All excavations must be prepared with OSHA approved excavated sides and sufficient working space.

C. Protect partially completed installation against damage from other construction traffic by establishing a perimeter with high visibility construction tape, fencing, barricades, or other means until construction is complete.

D. Base of the excavation shall be uniform, level, and free of lumps or debris and soft or yielding subgrade areas. A minimum 2,000 pounds per square foot bearing capacity is

1. Standard Applications: Compact subgrade to a minimum of 95% of Standard Proctor (ASTM D698) density or as required by the Owner's engineer. 2. Infiltration Applications: Subgrade shall be prepared in accordance with the contract documents. Compaction of subgrade should not be performed in infiltration applications.

E. Unsuitable Soils or Conditions: All questions about the base of the excavation shall be directed to the owner's engineer, who will approve the subgrade conditions prior to placement of stone. The owner's engineer shall determine the required bearing capacity of the R-Tank subgrade; however in no case shall a bearing capacity of less than 2,000 pounds per square foot be provided.

1. If unsuitable soils are encountered at the subgrade, or if the subgrade is pumping or appears excessively soft, repair the area in accordance with contract documents and/or as directed by the owner's engineer.

2. If indications of the water table are observed during excavation, the engineer shall be contacted to provide recommendations

3. Do not start installation of the R-Tank system until unsatisfactory subgrade conditions are corrected and the subgrade conditions are accepted by the owner's engineer.

3.03 Preparation of Base

A. Place a thin layer (3" unless otherwise specified) of bedding material (Section 2.03 A), over the subgrade to establish a level working platform for the R-Tank modules. Level to within ½" (+/- ½") or as shown on the plans. Native subgrade soils or other materials may be used if determined to meet the requirements of 2.03 A and are accepted by the

1. Standard Applications: Static roll or otherwise compact bedding materials until they are firm and unyielding. 2. Infiltration Applications: Bedding materials shall be prepared in accordance with the contract documents.

B. Outline the footprint of the R-Tank system on the excavation floor using spray paint or chalk line to ensure a 2' perimeter is available around the R-Tank system for proper installation and compaction of backfill.

3.04 Installation of the R-Tanks

A. Where a geotextile wrap is specified on the stone base, cut strips to length and install in excavation, removing wrinkles so material lays flat. Overlap geotextile a minimum 12" or

Where an impervious liner (for containment) is specified, install the liner per manufacturer's recommendations and the contract documents. The R-Tank units shall be separated from impervious liner by a non-woven geotextile fabric installed accordance with Section 3.04A.

C. Install R-Tank modules by placing side by side, in accordance with the design drawings. No lateral connections are required. It is advisable to use a string line to form square corners and straight edges along the perimeter of the R-Tank system. The modules are to be oriented as per the design drawing with required depth as shown on plans. 1. For LD, HD, and SD installations, the large side plate of the tank should be placed on the perimeter of the system. This will typically require that the two ends of the tank area will have a row of tanks placed perpendicular to all other tanks. If this is not shown in the construction drawings, it is a simple field adjustment that will have minimal effect on the overall system footprint. Refer to R-Tank Installation Guide for more details

2. For UD installations, there is no perpendicular end row required.

- D. Wrap the R-Tank top and sides in specified geotextile. Cut strips of geotextile so that it will cover the sides and top, encapsulating the entire system to prevent backfill entry into the system. Overlap geotextile 12" or as recommended by manufacturer. Take great care to avoid damage to geotextile (and, if specified, impervious liner) during placement.
- Identify locations of inlet, outlet and any other penetrations of the geotextile (and optional liner). These connections should be installed flush (butted up to the R-Tank) and the geotextile fabric shall be cut to enable hydraulic continuity between the connections and the R-Tank units. These connections shall be secured using pipe boots with stainless steel pipe clamps. Support pipe in trenches during backfill operations to prevent pipe from settling and damaging the geotextile, impervious liner (if specified) or pipe. Connecting pipes at 90 degree angles facilitates construction, unless otherwise specified. Ensure end of pipe is installed snug against R-Tank system.

Install Inspection and Maintenance Ports in locations noted on plans. At a minimum one maintenance port shall be installed within 10' of each inlet & outlet connection, and with a maximum spacing of one maintenance port for every 2,500 square feet. Install all ports as noted in the R-Tank Installation Guide.

G. If required, install ventilation pipes and vents as specified on drawings to provide ventilation for proper hydraulic performance. The number of pipes and vents will depend on the size of the system. Vents are often installed using a 90 degree elbow with PVC pipe into a landscaped area with 'U" bend or venting bollard to inhibit the ingress of debris. A ground level concrete or steel cover can be used.

3.05 Backfilling of the R-Tank Units

A. Backfill and fill with recommended materials as follows:

1. Place freely draining backfill materials (Section 2.03 B) around the perimeter in lifts with a maximum thickness of 12". Each lift shall be placed around the entire perimeter such that each lift is no more than 24" higher than the side backfill along any other location on the perimeter of the R-Tank system. No fill shall be placed over top of tanks until the side backfill has been completed.

2. Each lift shall be compacted at the specified moisture content to a minimum of 95% of the Standard Proctor Density until no further densification is observed (for self-compacting stone materials). The side lifts must be compacted with walk behind compaction equipment. Even when "self-compacting" backfill materials are selected, a walk behind vibratory

3. Take care to ensure that the compaction process does not allow the machinery to come into contact with the modules due to the potential for damage to the geotextile and

R-Tank units. 4. No compaction equipment is permissible to operate directly on the R-Tank modules.

5. Top Backfill:

a. Typical Applications: Install a 12" (or as shown on plans) lift of freely draining material (Section 2.03 B) over the R-Tank Units, maintaining 12" between equipment tracks and

b. Shallow Applications (< 18" total cover): Install top backfill in accordance with plans.

Lightly compacted using a walk-behind trench roller. Alternately, a roller (maximum gross vehicle weight of 6 tons) may be used. Roller must remain in static mode until a minimum of 24" of cover has been placed over the modules. Sheep foot rollers should not be used. 6. If required, install a geogrid as shown on plans. Geogrid shall extend a minimum of 3 feet beyond the limits of the excavation wall.

7. Following placement and compaction of the initial cover, subsequent lifts of structural fill (Section 2.03 C) shall be placed at the specified moisture content and compacted to a minimum of 95% of the Standard Proctor Density and shall cover the entire footprint of the R-Tank system. During placement of fill above the system, unless otherwise specified, a uniform elevation of fill shall be maintained to within 12" across the footprint of the R-Tank system. Do not exceed maximum cover depths listed in Table 2.01 B.

8. Place additional layers of geotextile and/or geogrid at elevations as specified in the design details. Each layer of geosynthetic reinforcement placed above the R-Tank system shall extend a minimum of 3 feet beyond the limits of the excavation wall. B. Only low pressure tire or track vehicles shall be operated over the R-Tank system during construction. No machinery should drive on top of the tank until a minimum of 18" of

backfill and compaction is achieved. Dump Trucks and Pans shall not be operated within the R-Tank system footprint at any time. Where necessary the heavy equipment should unload in an area adjacent to the R-Tank system and the material should be moved over the system with tracked equipment. C. Ensure that all unrelated construction traffic is kept away from the limits of excavation until the project is complete and final surface materials are in place. No non-installation

related loading should be allowed over the R-Tank system until the final design section has been constructed (including pavement). D. Place surfacing materials, such as groundcovers (no large trees), or paving materials over the structure with care to avoid displacement of cover fill and damage to surrounding

E. Backfill depth over R-Tank system must be within the limitations shown in the table in Section 2.01 B. If the total backfill depth does not comply with this table, contact engineer or manufacturer's representative for assistance.

PART 4 - USING THE SYSTEM 4.01 Maintenance Requirements

A. A routine maintenance effort is required to ensure proper performance of the R-Tank system. The Maintenance program should be focused on pretreatment systems. Ensuring these structures are clean and functioning properly will reduce the risk of contamination of the R-Tank system and stormwater released from the site. Pre-treatment systems shall be inspected yearly, or as directed by the regulatory agency and by the manufacturer (for proprietary systems). Maintain as needed using acceptable practices or following manufacturer's guidelines (for proprietary systems).

B. Inspection and/or Maintenance Ports in the R-Tank system will need to be inspected for accumulation of sediments at least quarterly through the first year of operation and at least yearly thereafter. This is done by removing the cap of the port and using a measuring device long enough to reach the bottom of the R-Tank system and stiff enough to push

through the loose sediments, allowing a depth measurement. If sediment has accumulated to the level noted in the R-Tank Maintenance Guide or beyond a level acceptable to the Owner's engineer, the R-Tank system should be flushed. A flushing event consists of pumping water into the Maintenance Port and/or adjacent structure, allowing the turbulent flows through the R-Tank system to re-suspend the fine sediments. If multiple Maintenance Ports have been installed, water should be pumped into each port to maximize flushing efficiency. Sediment-laden water can be filtered through a Dirtbag or approved equivalent if permitted by the locality.

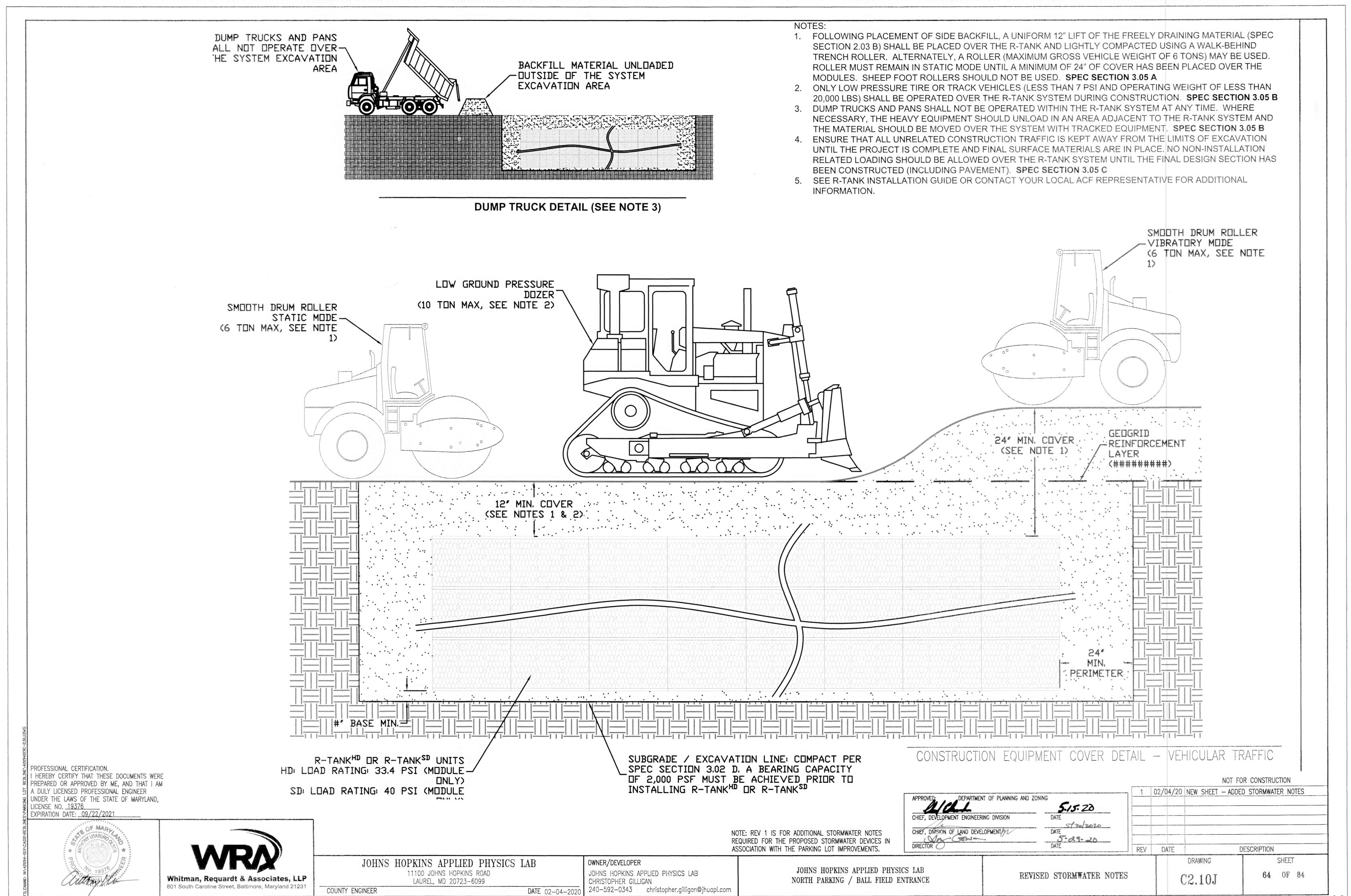
REVISED R-TANK SPECIFICATION

	1	02/04/20	NEW SHEET -ADDED	SPECS FOR R-TANK SY	STEM
NOTE: REV 1 IS FOR ADDITIONAL R-TANK SPECIFICATION					
REQUIRED FOR THE PROPOSED STORMWATER IN					
ASSOCIATION WITH THE PARKING LOT IMPROVEMENTS.	REV	DATE		DESCRIPTION	
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REVISED R-TANK SPECIFICATION	)N		TO LOD	63 OF 84	

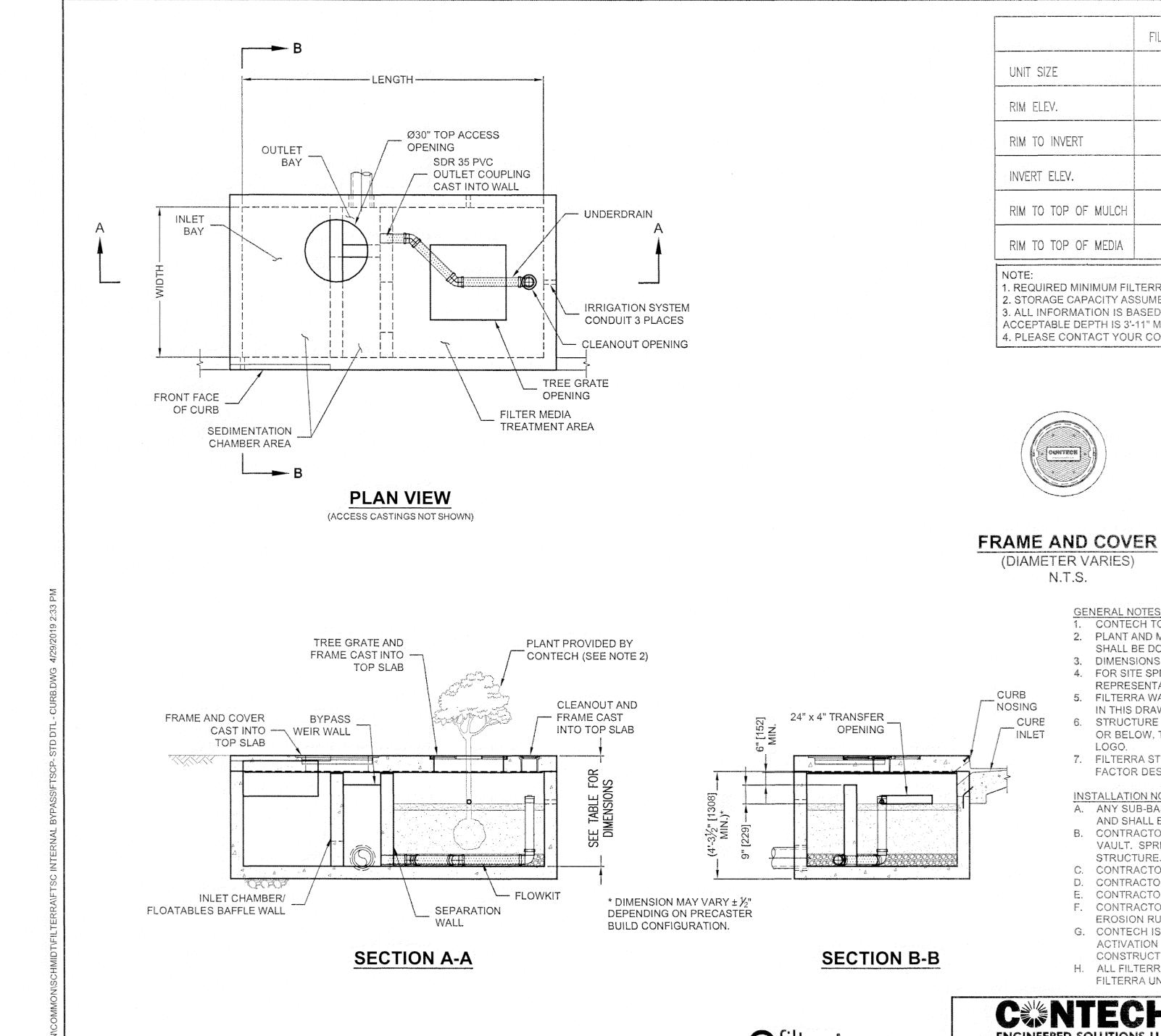
NO AS-BUILT ON THIS SHEET

JOHNS HOPKINS APPLIED PHYSICS LAB LAUREL, MD 20723-6099 COUNTY ENGINEER

NORTH PARKING / BALL FIELD ENTRANCE



NO AS-BULY ON THIS SHEET SDP-04-66



FILTERRA #1 (I-B14) FILTERRA #2 (I-B13) 8' X 18' 8' X 12' 407.14' 407.18 402.38' 402.40 4.42' 3.92 RIM TO INVERT 398.46' 398.48 402.72 402.76 INVERT ELEV. RIM TO TOP OF MULCH 2.00 2.00 RIM TO TOP OF MEDIA 2.50 2.50'

1. REQUIRED MINIMUM FILTERRA TREATMENT SURFACE AREA IS 91 SF/20,000 SF OF TOTAL DRAINAGE AREA PER MDE APPROVAL. 2. STORAGE CAPACITY ASSUMES NO STORAGE IN MULCH, MEDIA OR STONE.

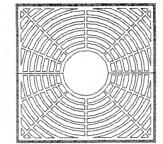
3. ALL INFORMATION IS BASED ON STANDARD 4'-5" RIM TO OUTLET DEPTH. CONTACT CONTECH FOR CUSTOM SIZING IF DEPTH DIFFERS. ACCEPTABLE DEPTH IS 3'-11" MINIMUM TO 5'-0" MAXIMUM RIM TO INVERT OUT.

4. PLEASE CONTACT YOUR CONTECH REPRESENTATIVE FOR CUSTOM SIZING IF THE STANDARD UNITS DO NOT MEET SITE CONSTRAINTS.



Ø7" x 8" [178 x 203] CLEANOUT

(ACTUAL PRODUCT MAY VARY) N.T.S.



36" x 36" [914 x 914] OR 48" X 48" [1219 x 1219] TREE GRATE

(ACTUAL PRODUCT MAY VARY) N.T.S.

CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.

PLANT AND MULCH ARE SUPPLIED BY CONTECH AND DELIVERED AT TIME OF SYSTEM ACTIVATION. PLANT SELECTION SHALL BE DONE BY THE ENGINEER OF RECORD IN ACCORDANCE WITH THE PROJECT PLANS AND SPECIFICATIONS.

. DIMENSIONS MARKED WITH ( ) ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY.

4. FOR SITE SPECIFIC DRAWINGS WITH DETAILED VAULT DIMENSIONS AND WEIGHTS, PLEASE CONTACT YOUR CONTECH REPRESENTATIVE. www.ContechES.com

5. FILTERRA WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED

6. STRUCTURE SHALL MEET PEDESTRIAN LIVE LOAD, ASSUMING EARTH COVER OF 0' AND GROUNDWATER ELEVATION AT OR BELOW, THE OUTLET PIPE INVERT ELEVATION. CASTINGS SHALL MEET AASHTO M306 AND BE CAST WITH THE CONTECH

7. FILTERRA STRUCTURE SHALL BE PRECAST CONCRETE CONFORMING TO ASTM C-857, ASTM C-918, AND ACI-318 LOAD FACTOR DESIGN METHOD.

A. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS

AND SHALL BE SPECIFIED BY ENGINEER OF RECORD. B. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE FILTERRA

VAULT. SPREADER BAR WITH SUFFICIENT CABLE IS REQUIRED FOR SAFETY AND REDUCTION OF DAMAGE TO CONCRETE

C. CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL VAULT SECTIONS AND ASSEMBLE VAULT.

D. CONTRACTOR TO PROVIDE, INSTALL AND GROUT INLET AND OUTLET PIPES.

CONTRACTOR TO SUPPLY AND INSTALL INLET PROTECTION BAR IF REQUIRED BY LOCAL JURISDICTION.

F. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT FILTERRA MEDIA BAY FROM CONSTRUCTION-RELATED **EROSION RUNOFF.** 

G. CONTECH IS RESPONSIBLE FOR ACTIVATION OF THE SYSTEM AND PLANTING OF THE PLANT THAT IS SPECIFIED. ACTIVATION ONLY OCCURS WHEN THE SITE IS FULLY STABILIZED, FINAL PAVEMENT INSTALLED AND SWEPT CLEAN OF CONSTRUCTION SEDIMENT.

H. ALL FILTERRA UNITS MUST BE WATERED BY IRRIGATION LINES OR SPRINKLER SYSTEMS ON A REGULAR BASIS. EACH FILTERRA UNIT INCLUDES IRRIGATION HOLES FOR NEW OR EXISTING IRRIGATION LINES.

**ENGINEERED SOLUTIONS LLC** 

www.ContechES.com 7037 Ridge Road Suite 350, Hanover, MD 21076 866-740-3318 410-740-8490 410-740-8496 FAX FILTERRA SEDIMENTATION CHAMBER PEAK DIVERSION STANDARD DETAIL MODEL: FTSCPDXXXX

#### AS-BUILT CERTIFICATION

I HEREBY CERTIFY THAT THE FACILITY SHOWN ON THE PLANS WAS CONSTRUCTED AS SHOWN ON THE "AS-BURT" PLANS AND COMPLIES WITH THE APPROVED PLANS AND SPECIFICATIONS. I HAVE VERIFIED THAT THE CONTRIBUTING DRAINAGE AREA IS SUFFICIENTLY STABILIZED to prevent closoing of the sum facility.



ANTHONY U. OLSEN, P.E. MARILAND REDISTRATION NO. 19376

EXPIRATION DATE: 9/22/25

NOTE: REV 1 IS FOR ADDITIONAL FILTERRA DETAILS AND

NOTES REQUIRED FOR THE PROPOSED STORMWATER IN ASSOCIATION WITH THE PARKING LOT IMPROVEMENTS.

NOT FOR CONSTRUCTION

1 02/04/20 NEW SHEET - ADDED DETAIL FOR FILTERRA

CHIEF, DEVELOPMENT ENGINEERING DIVISION CHIEF, DIVISION OF LAND DEVELOPMENT

5.15.20 5/20/2020 5-29-20 DATE

2 12/20/21 SWM AS-BUILTS

REV DATE DESCRIPTION DRAWING

BERTINY CHATIFIYHEISHATD ON ESHENDISCUMERNITS WERE

PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFIESSIONALDERGINEERAWS OF

UNDERTATE CIAWARAPATATHE, STATITIS OF NOVARY DAME.

PROFESSIONAL CERTIFICATION.

EXPIRATION DATE: WX/XX/XXXX

EXPERSEIONO DATE 346

Whitman, Requardt & Associates, LLP 801 South Caroline Street, Baltimore, Maryland 21231

JOHNS HOPKINS APPLIED PHYSICS LAB 11100 JOHNS HOPKINS ROAD LAUREL, MD 20723-6099

COUNTY ENGINEER

OWNER/DEVELOPER CHRISTOPHER GILLIGAN

DATE 02-04-2020

JOHNS HOPKINS APPLIED PHYSICS LAB JOHNS HOPKINS APPLIED PHYSICS LAB NORTH PARKING / BALL FIELD ENTRANCE 240-592-0343 christopher.gilligan@jhuapl.com

REVISED FILTERRA DETAIL

65 OF 84

SHEET

# **C**®NTECH

## Filterra® Standard Plan Notes



#### Construction & Installation

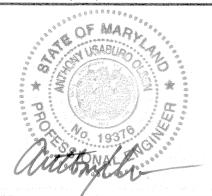
- A. Each unit shall be constructed at the locations and elevations according to the sizes shown on the approved drawings. Any modifications to the elevation or location shall be at the direction of and approved by the Engineer.
- B. If the Filterra® is stored before installation, the top slab must be placed on the box using the 2x4 wood provided, to prevent any contamination from the site. All internal fittings supplied (if any), must be left in place as per the delivery.
- C. The unit shall be placed on a compacted sub-grade with a minimum 6-inch gravel base matching the final grade of the curb line in the area of the unit. The unit is to be placed such that the unit and top slab match the grade of the curb in the area of the unit. Compact undisturbed sub-grade materials to 95% of maximum density at +1-2% of optimum moisture. Unsuitable material below sub-grade shall be replaced to the site engineer's approval.
- D. Outlet connections shall be aligned and sealed to meet the approved drawings with modifications necessary to meet site conditions and local regulations.
- E. Once the unit is set, the internal wooden forms and protective mesh cover must be left intact. Remove only the temporary wooden shipping blocks between the box and top slab. The top lid should be sealed onto the box section before backfilling, using a nonshrink grout, butyl rubber or similar waterproof seal. The boards on top of the lid and boards sealed in the unit's throat must NOT be removed. The Supplier will remove these sections at the time of activation. Backfilling should be performed in a careful manner, bringing the appropriate fill material up in 6" lifts on all sides. Precast sections shall be set in a manner that will result in a watertight joint. In all instances, installation of Filterra® unit shall conform to ASTM specification C891 "Standard Practice for Installation of Underground Precast Utility Structures", unless directed otherwise in contract documents.
- F. Curb and gutter construction (where present) shall ensure that the flow-line of the Filterra® units is at a greater elevation than the flow-line of the bypass structure or relief (drop inlet, curb cut or similar). Failure to comply with this guideline may cause failure and/or damage to the Filterra® environmental device.
- G. Each Filterra® unit must receive adequate irrigation to ensure survival of the living system during periods of drier weather. This may be achieved through a piped system, gutter flow or through the tree grate.

#### OPERATION AND MAINTENANCE SCHEDULE FOR FILTERRA

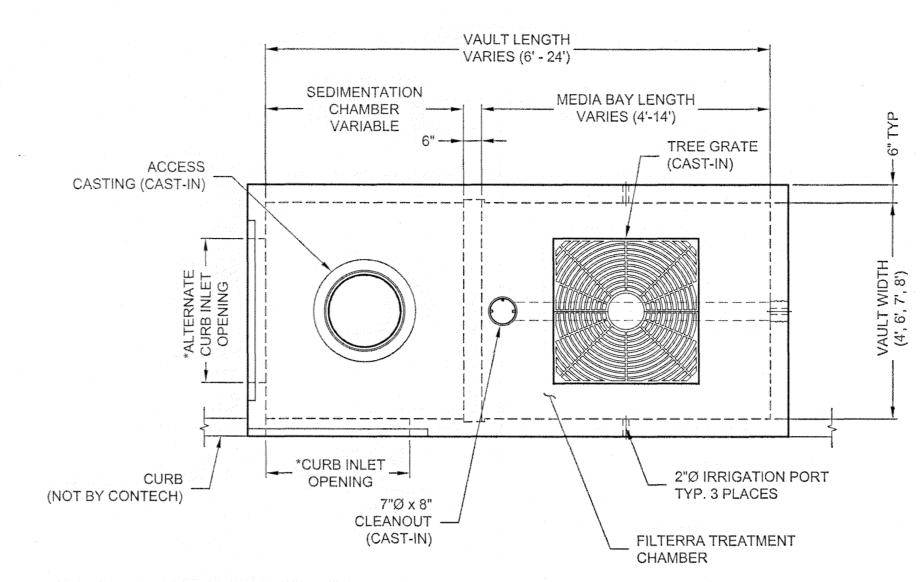
- a) ROUTINE MAINTENANCE SHALL BE DONE BY THE MANUFACTURER FOR THE FIRST YEAR AFTER ACTIVATION, ONCE IN THE SPRING AND ONCE IN THE FALL. THIS INCLUDES TWO (2) VISITS, SCHEDULED BY THE OWNER, TO PERFORM DEBRIS REMOVAL, REPLACEMENT OF MULCH, AND PRUNING. ANY ADDITIONAL MAINTENANCE IN THE FIRST YEAR IS THE RESPONSIBILITY OF THE OWNER. AFTER THE FIRST YEAR, ALL MAINTENANCE SHALL BE DONE BY THE OWNER.
- b) THE OWNER SHALL PERFORM ROUTINE MAINTENANCE AND INSPECTION TWICE PER YEAR, ONCE IN THE SPRING AND ONCE IN THE FALL, AND SHALL CONSIST OF THE FOLLOWING:
  - a. REMOVAL OF DEBRIS AND MULCH LAYER.
  - b. INSPECT THE PLANT'S HEALTH FOR DISEASE AND INSECT INFESTATION AND REPLACE IF NECESSARY, PERFORM PRUNING AS NECESSARY TO ENCOURAGE GROWTH IN THE CORRECT DIRECTIONS AND REMOVE DEAD MATERIAL. ACCEPTABLE REPLACEMENT PLANTS ARE LIMITED TO THOSE SPECIFIED BY THE MANUFACTURER. INSTRUCTIONS CAN BE FOUND AT WWW.CONTECHES.COM.
  - c. IF NECESSARY, ADD ADDITIONAL FILTERRA ENGINEERED MEDIA SOIL USING THE APPROVED CONTRACT DRAWINGS AS REFERENCE FOR REQUIRED MEDIA DEPTH.
  - d. ADD THREE (3) INCHES OF DOUBLE SHREDDED MULCH EVENLY ACROSS THE ENTIRE

	FILTERRA #3 (I-B23)
UNIT SIZE	8' X 18'
RIM ELEV.	411.51' 411.53
RIM TO INVERT	3.83'
INVERT ELEV.	407.68 <sup>2</sup> 407.70
RIM TO TOP OF MULCH	2.00
RIM TO TOP OF MEDIA	2.50

PROFESSIONAL CERTIFICATION. HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 19376 EXPIRATION DATE: 09/22/2021



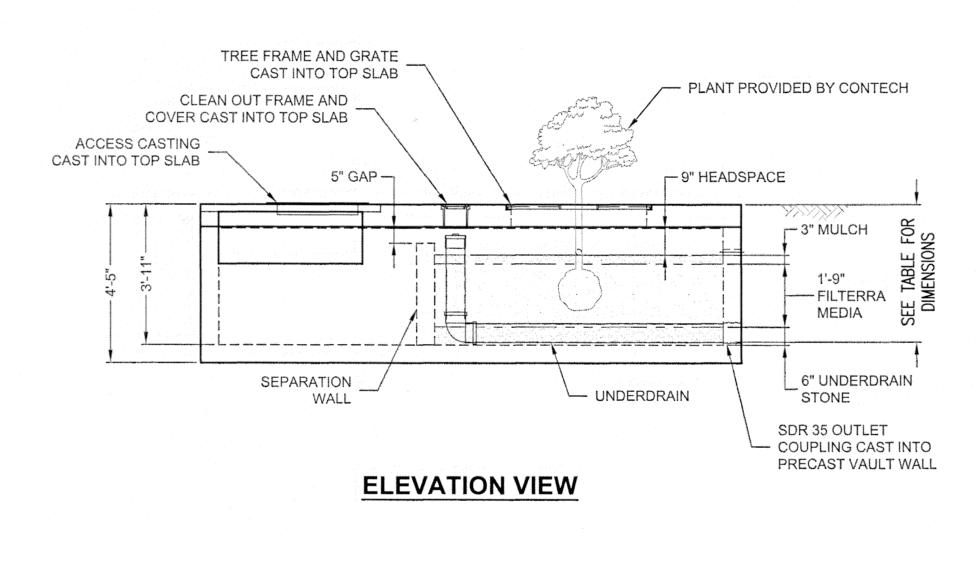




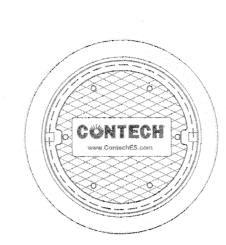
\*CURB INLET OPENING LENGTH BY VAULT WIDTH:

- 4' VAULT WIDTH: 3'-0" CURB OPENING
- 6' VAULT WIDTH: 4'-0" CURB OPENING 7' VAULT WIDTH: 4'-0" CURB OPENING
- 8' VAULT WIDTH: 5'-0" CURB OPENING

**PLAN VIEW** 

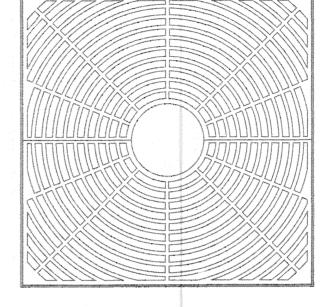




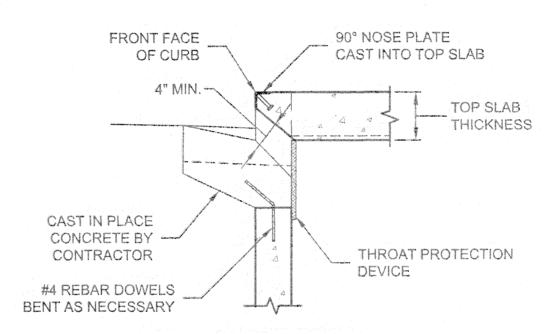


# FRAME AND COVER

(DIAMETER VARIES) NOT TO SCALE



TREE GRATE 36" x 36" [914 x 914] OR 48" x 48" [1219 x 1219] (ACTUAL PRODUCT MAY VARY) NOT TO SCALE



**CURB INLET DETAIL** NOT TO SCALE

- 1. REQUIRED MINIMUM FILTERRA TREATMENT SURFACE AREA IS 91 SF/20,000 SF OF THE TOTAL DRAINAGE AREA PER MDE.
- STORAGE CAPACITY ASSUMES NO STORAGE IN MULCH, MEDIA AND STONE.
- 2. ALL VEGETATION PROVIDED BY CONTECH. 3. ADA COMPLIANT FULL GRATE COVERS WITH SHADE TOLERANT PLANT SPECIES AVAILABLE UPON REQUEST.
- 4. ALL INFORMATION IS BASED ON STANDARD 3.83' RIM TO OUTLET INVERT DEPTH, CONTACT CONTECH FOR CUSTOM SIZING IF DEPTH IS
- NOT 3.83'. ACCEPTABLE DEPTH IS 3.33' MIN. TO 5.00' MAX. RIM TO INVERT OUT.

5. PLEASE CONTACT YOUR CONTECH REPRESENTATIVE FOR SIZING RECOMMENDATIONS. www.conteches.com.

CINTECH\* **ENGINEERED SOLUTIONS LLC** 

www.ContechES.com 7037 Ridge Road, Hanover, MD 21076 866-740-3318 410-796-5505 866-376-8511 FAX FILTERRA SEDIMENTATION CHAMBER (FTSC) CONFIGURATION DETAIL MARYLAND

AS - BUILT CERTIFICATION

HEREGY CERTIFY THAT THE FACILITY SHOWN ON THE PLANS WAS CONSTRUCTED AS SHOWN ON THE "AS - BUILT" PLANS AND COMPLIES WITH THE APPROVED PLANS AND SPECIFICATIONS. I HAVE VERIFIED THAT THE CONTRIBUTING DRAINAGE AREA IS SUFFICIENTLY STABILIZED TO PREVENT CLOGGING OF THE SHIM FACILITY.



ANTHONY U. OLSEN, P.E. MARELAND REGISTRATION NO. 19276

COUNTY ENGINEER

EXPIRATION DATE: 9/22/25

NOTE: REV 1 IS FOR ADDITIONAL FILTERRA DETAILS AND NOTES REQUIRED FOR THE PROPOSED STORMWATER IN ASSOCIATION WITH THE PARKING LOT IMPROVEMENTS.

DEPARTMENT OF PLANNING AND ZONING 5.15.20 CHIEF, DEVELOPMENT ENGINEERING DIVISION 5/20/2020 CHIEF, DIVISION OF LAND DEVELOPMENT 5-29-20 DATE DIRECTOR

NOT FOR CONSTRUCTION 1 02/04/20 NEW SHEET - ADDED FILERRA DETAIL 2 12/20/21 SWM AS-BUILTS

DESCRIPTION REV DATE SHEET

DRAWING

REVISED FILTERRA DETAIL

66 OF 84

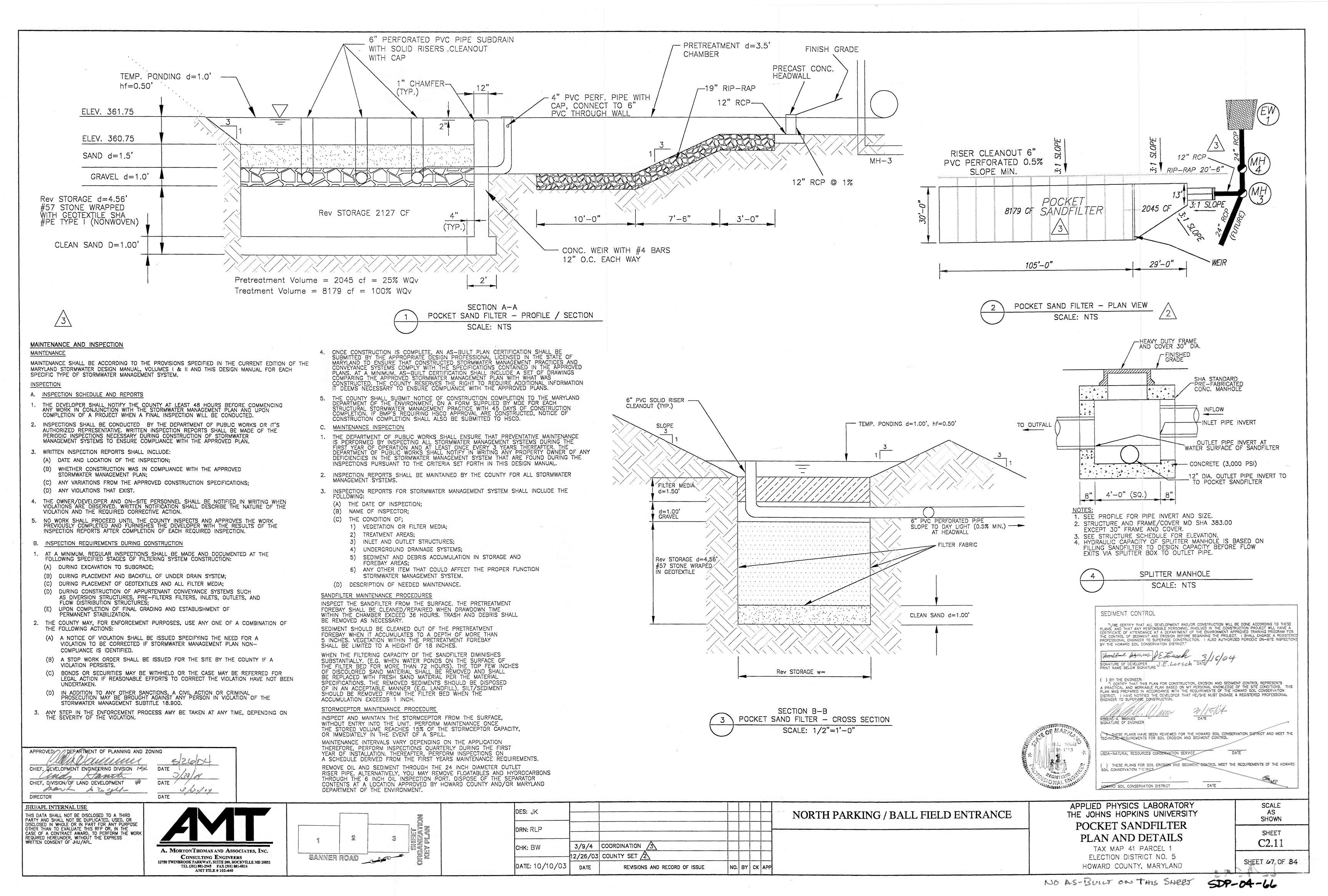
JOHNS HOPKINS APPLIED PHYSICS LAB 11100 JOHNS HOPKINS ROAD

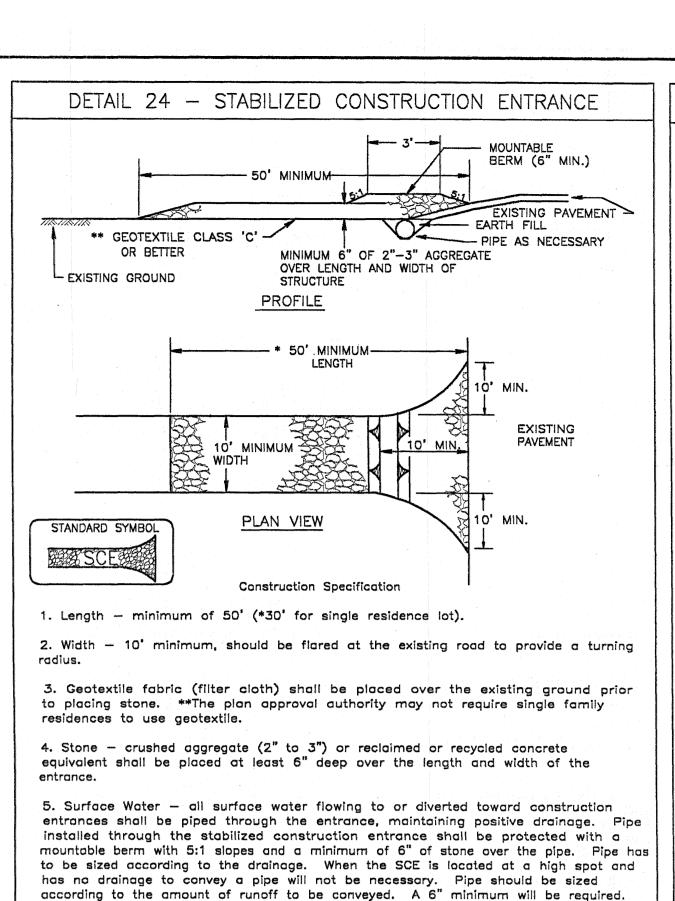
LAUREL, MD 20723-6099

CHRISTOPHER GILLIGAN DATE 02-04-2020

OWNER/DEVELOPER JOHNS HOPKINS APPLIED PHYSICS LAB 240-592-0343 christopher.gilligan@jhuapl.com

JOHNS HOPKINS APPLIED PHYSICS LAB NORTH PARKING / BALL FIELD ENTRANCE





6. Location - A stabilized construction entrance shall be located at every point

U.S. DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE

GROUND

- BOTTOM ELEVATION

APPROVED: \_\_ DEPARTMENT OF PLANNING AND ZONING

CHIEF, DEVELOPMENT ENGINEERING DIVISION MK

manch to condi-

CHIEF, DIVISION OF LAND DEVELOPMENT

JHU/APL INTERNAL USE

Kanuch

U.S. DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE

where construction traffic enters or leaves a construction site. Vehicles leaving

F - 17 - 3

SECTION B-B

the site must travel over the entire length of the stabilized construction entrance.

HEIGHT

PERSPECTIVE VIEW

- SMALL RIP-RAP 4" TO 7

C - 9 - 16

MARYLAND DEPARTMENT OF ENVIRONMENT

WATER MANAGEMENT ADMINISTRATION

2:1 MAX.

OUTLET ELEVATION

APRON (SEE NOTE)

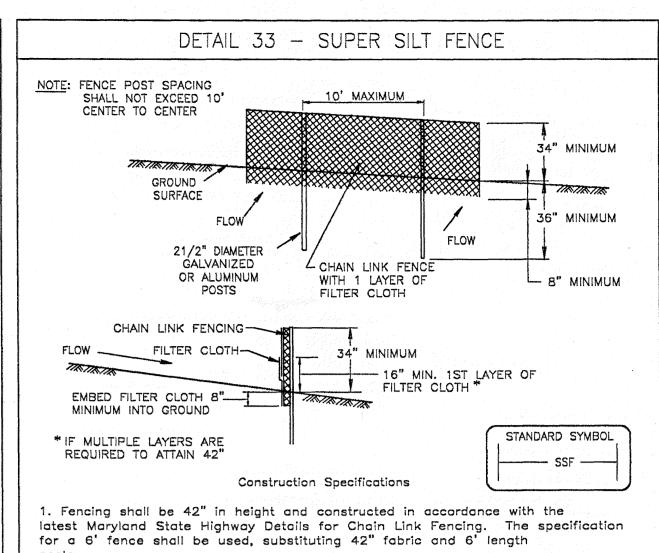
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3/21/14

3/20/04

DATE /

NOTE: 5' MIN LENGTH UP TO 5
ACRES. OVER 5 ACRES USE



2. Chain link fence shall be fastened securely to the fence posts with wire ties. The lower tension wire, brace 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 folded.

6. Maintenance shall be performed as needed and silt buildups 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 Tensile Modulus Flow Rate Filtering Efficiency 75% (min.)

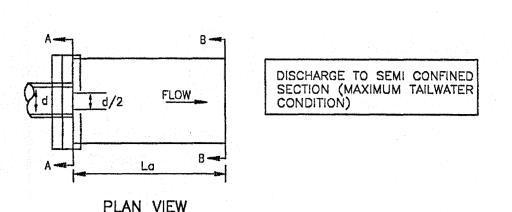
50 lbs/in (min.) 20 lbs/in (min.) 0.3 gal/ft 2/minute (max.)

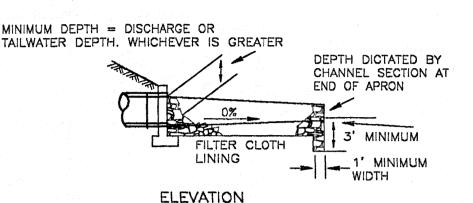
Test: MSMT 509 Test: MSMT 322 Test: MSMT 322

Test: MSMT 509

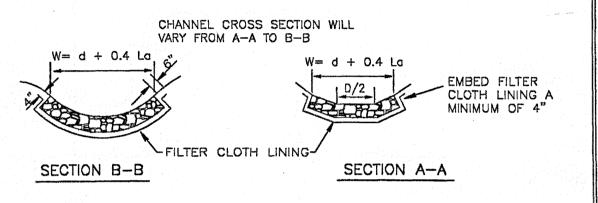
MARYLAND DEPARTMENT OF ENVIRONMENT U.S. DEPARTMENT OF AGRICULTURE PAGE U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE WATER MANAGEMENT ADMINISTRATION

# DETAIL 25 - ROCK OUTLET PROTECTION I





FILTER CLOTH MUST EXTEND A MINIMUM OF 6" BEYOND APRON



NOTE: FILTER CLOTH SHALL BE GEOTEXTILE CLASS C

MARYLAND DEPARTMENT OF ENVIRONMENT

#### ROCK OUTLET PROTECTION

Construction Specifications

#### 1. The subgrade for the filter, rip-rap, or gabion shall be prepared to the required lines and grades. Any fill required in the subgrade shall be compacted to a density of

2. The rock or gravel shall conform to the specified grading limits when installed respectively in the rip-rap or filter.

approximately that of the surrounding undisturbed material.

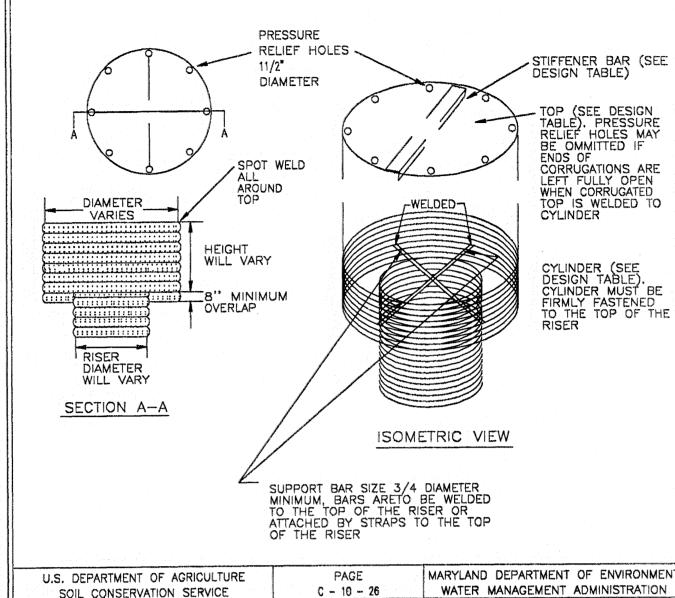
3. Geotextile shall be protected from punching, cutting, or tearing. Any damage other than an occasional small hole shall be repaired by placing another piece of geotextile over the damaged part or by completely replacing the geotextile. All overlaps whether for repairs or for joining two pieces of geotextile shall be a minimum of one foot.

4. Stone for the rip—rap or gabion outlets may be placed by equipment. They shall be constructed to the full course thickness in one operation and in such a manner as to avoid displacement of underlying materials. The stone for rip-rap or gabion outlets shall be delivered and placed in a manner that will ensure that it is reasonably homogeneous with the smaller stones and spalls filling the voids between the larger stones. Rip—rap shall be placed in a manner to prevent damage to the filter blanket or geotextile. Hand placement will be required to the extent necessary to prevent damage to the permanent works.

5. The stone shall be placed so that it blends in with the existing ground. If the stone is placed too high then the flow will be forced out of the channel and scour adjacent to the stone will occur.

F - 18 - 84

DETAIL 16 - CONCENTRIC TRASH RACK AND ANTI-VORTEX DEVICE



WATER MANAGEMENT ADMINISTRATION C - 10 - 26 DETAIL 20A - REMOVABLE PUMPING STATION

## --- HOOK AND CHAIN FOR REMOVAL Perforated (removable) 12" - 36" pipe wrapped w/ STANDARD SYMBOL hardware cloth and Geotextile CLEAN GRAVE! A temporary structure which is used to remove water from excavated areas, sediment traps and basins. The Removable Pumping Station is an easily maintained device that filters sediment laden water at a pump WINT SILVE Removable Pumping Stations are constructed when water collects and must be pumped away during excavation, cofferdam dewatering, maintenance or removal of sediment traps and basins or for other uses as applicable. These are preferred over Sump Pits on projects where a long duration of pumping is expected.

1. The outer pipe should be 48" dia, or shall, in any case, be at least 4" greater in diameter than the center pipe. The outer pipe shall be wrapped with  $\frac{1}{2}$ " hardware cloth to prevent backfill material from entering the perforations.

1. The inner pipe shall be constructed by perforating a 12" to 36" diameter pipe with a watertight U.S. DEPARTMENT OF AGRICULTURE

SEDIMENT CONTROL

BY THE HOWARD SOIL CONSERVATION DISTRICT."

Smithach July 28, 2003 ME, Loesch

cap on the bottom end and wrapping it with 1/2" hardware cloth and Geotextile Class E19. The perforations shall be 1/2" X 6" slits or 1" diameter holes 6" on center. 2. The outer pipe shall be at least 4" larger in diameter than the inside pipe. Both the inner and outer

MARYLAND DEPARTMENT OF ENVIRONMENT

WATER MANAGEMENT ADMINISTRATION

intake, prior to discharging to a suitable area.

outlined on Detail 20A.

pipe to a suitable discharge area.

12.0 DEWATERING SPECIFICATIONS

REMOVABLE PUMPING STATION

Conditions Where Practice Applies

The number of Removable Pumping Stations and their locations shall be determined by the designer and

included on the plans. Contractors may relocate sump pits to optimize use but discharge location changes must

be coordinated with inspectors. A design is not required but construction must conform to the general criteria

A perforated, vertical standpipe wrapped with wire mesh and geotextile is placed inside a larger pipe. The

outside pipe is then enveloped by a cone of washed stone. Water is then pumped from the center of the inside

Water pumped from the standpipe should discharge into a sediment trap, sediment basin or stabilized area.

Construction Specifications

D-12-3

pipes should extend 12" to 18" above the riser crest elevation, or anticipated high water elevation.

ELEVATION (CUT AWAY)

# Construction Specifications

2. After installing the outer pipe, backfill around outer pipe with 2" aggregate or clean gravel. 3. The inside stand pipe (center pipe) should be constructed by perforating a corrugated or PVC pipe between 12" and 36" in diameter. The perforations shall be  $\frac{1}{2}$ " X 6" slits or 1" diameter holes 6" on center. The center pipe shall be "capped with  $\frac{1}{2}$ " hardware cloth first, then wrapped again with Geotextile Class E. 4. The center pipe should extend 12" to 18" above the anticipated water surface elevation or riser crest elevation when dewatering a basin.

PAGE MARYLAND DEPARTMENT OF ENVIRONMEN
D -12 - 5 WATER MANAGEMENT ADMINISTRATION SOIL CONSERVATION SERVICE

( ) BY THE ENGINEER:

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

PLAN WAS PREPARED IN ACCORDANCE WITH THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION

OF THE PROPERSONAL I HAVE NOTIFIED THE DEVELOPER THAT HE/SHE MUST ENGAGE A REGISTERED PROFESSIONAL NGINEER TO SUPERMISE CONSTRUCTION.

SIGNATURE OF ENGINEER THESE PLANS HAVE BEEN REVIEWED FOR THE HOWARD SOIL CONSERVATION DISTRICT AND MEET THE

"I/WE CERTIFY THAT ALL DEVELOPMENT AND/OR CONSTRUCTION WILL BE DONE ACCORDING TO THESE PLANS, AND THAT ANY RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF ATTENDANCE AT A DEPARTMENT OF THE ENVIRONMENT APPROVED TRAINING PROGRAM FOR THE CONTROL OF SEDIMENT AND EROSION BEFORE BEGINNING THE PROJECT. I SHALL ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE CONSTRUCTION. I ALSO AUTHORIZED PERIODIC ON—SITE INSPECTIONS

" of considerable

) THESE PLANS FOR SOIL EROSION AND SEDIMENT CONTROL MEET THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT.

HOWARD SOIL CONSERVATION DISTRICT

THE JOHNS HOPKINS UNIVERSITY **EROSION & SEDIMENT** 

> ELECTION DISTRICT NO. 5 HOWARD COUNTY, MARYLAND

#### STONE RIP-RAP DUTLET SEDIMENT TRAP - ST IV DETAIL 10A - STONE RIP-RAP OUTLET SEDIMENT TRAP - ST IV

#### Constuction Specifications

1. The area under embankment shall be cleared, grubbed and stripped of any vegetation and root mat. The pool area shall be cleared.

The fill material for the embankment shall be free of roots or other wood vegetation as well as over-sized stones, rocks, organic material or other objectionable material. The embankment shall be compacted by traversing with equipment while it is being constructed. Maximum height of embankment shall be 4°, measured at centerline of embankment.

3. All cut and fill slopes shall be 2:1 or flatter.

4. Elevation of the top of any dike directing water into trap must equal or exceed the height of trap embankment.

5. Storage area provided shall be figured by computing the volume measured from top of excavation. (For storage requirements see Table 9).

6. Geotextile Class C shall be placed over the bottom and sides of the outlet channelprior to placement of stone. Section of fabric must overlap at least 1" with section nearest the entrance placed on top. Tabric shall be embedded at least 6" into existing ground at entrance of outlet channel.

7. 4" - 7" stone shall be used to construct the weir and 4" - 12" or Class I rip-rap shall be used to construct the outlet channel.

8. Outlet — An outlet shall include a means of conveying the discharge in an erosion free manner to an existing stable channel. Protection against scour at the discharge point shall be provided as necessary.

9. Outlet channel must have positive drainage from the trap.

10. Sediment shall be removed and trap restored to its original dimensions when the sediment has accumulated to 1/2 of the wet storage depth of the trap (900 cf/ac). Removed sediment shall be deposited in a suitable area and in such a manner that it will not erode.

11. The structure shall be inspected periodically after each rain and repaired as needed.

12. Construction of traps shall be carried out in such a manner that sediment pollution is aboted. Once constructed, the top and outside face of the embankment shall be stabilized with seed and mulch. Points of concentrated inflow shall be protected in accordance with Grade Stabilization Structure criteria. The remainder of the interior slopes should be stabilized (one time) with seed and mulch upon trap completion and monitored and maintained erosion free during the life of the trap.

13. The structure shall be dewatered by approved methods, removed and the area stabilized when the drainage area has been properly stabilized.

MARYLAND DEPARTMENT OF ENVIRONMENT MARYLAND DEPARTMENT OF ENVIRONMENT U.S. DEPARTMENT OF AGRICULTURE WATER MANAGEMENT ADMINISTRATION SOIL CONSERVATION SERVICE

WATER MANAGEMENT ADMINISTRATION C - 9 - 16A

#### SOIL CONSERVATION SERVICE WATER MANAGEMENT ADMINISTRATION Construction Specifications SEDIMENT BAGIN CONSTRUCTION 1. Site Preparation: Perimeter sediment control devices must be installed prior to clearing and

grubbing. Areas where the embankment is to be placed shall be cleared, grubbed, and stripped of topsoil to remove trees, vegetation, roots or other objectionable material. The pool area shall not be cleared until completion of the dam embankment unless the pool area is to be used for borrow. In order to facilitate clean-out and restoration, the pool area (measured at the top of the pipe spillway)

2. Cut-off Trench: A cut-off trench shall be excavated along the centerline of earth fill embankmen The minimum depth shall be four feet. The cut-off trench shall extend up both abutments to the riser crest elevation. The minimum bottom width shall be two feet, but wide enough to permit operation requirements shall be the same as those for the embankment. The trench shall be dewatered during the backfilling-compaction operations. For dewatering see Section D.

3. Embankment: The fill material shall be taken from approved areas shown on the plans. It shall be clean mineral soil free of roots, woody vegetation, oversized stones, rocks, or other objectionable material. Relatively pervious materials such as sand or gravel (Unified Soil Classes GW, GP, SW & SP) or organic materials (Unified Soil Classes OL and OH) shall not be placed in the embankment. Areas on which fill is to be placed shall be scarified prior to placement of fill. The fill material shall contain sufficient moisture so that it can be formed by hand into a ball without crumbling. If water can be squeezed out of the ball, it is too wet for proper compaction. Fill material shall be placed in six-inch to eight-inch thick continuous lifts over the entire length of the fill. Compaction shall be obtained by routing and hauling the construction equipment over the fill so that the entire surface of each layer of the fill is traversed by at least one wheel or tread track of the equipment or by the use of a compactor. The embankment shall be constructed to an elevation 10 percent higher than the design height to allow for settlement.

4. Principal Spillway: Steel risers shall be securely attached to the barrel or barrel stub by welding the full circumference making a watertight structural connection. Concrete risers shall be poured with the principal spillway in place or precast with voids around the principal spillway filled with concrete or shrink proof grout for watertight connection. The barrel stub must be attached to the riser at the same percent (angle) of grade as the outlet conduit. The connection between the riser and the riser base shall be watertight. All connections between barrel sections must be achieved by approved watertight band assemblies. The barrel and riser shall be placed on a firm, smooth foundation of impervious soil as the embankment is constructed. Breaching the embankment to install the barrel is unacceptable. Pervious materials such as sand, gravel, or crushed stone shall not be used as backfill around the pipe or anti-seep collars. The fill material around the pipe spillway shall be placed in four inch lifts and hand compacted under and around the pipe to at least the same density as the adjacent embankment. A depth of 1.5 times the pipe diameter (min.) shall be backfilled over the principal spillway and hand compacted before crossing it with construction equipment.

5. Emergency Spillway: The emergency spillway shall be installed in undisturbed ground. The achievement of planned elevations, grades, design width, entrance and exit channel slopes are critical to the successful operation of the emergency spillway and must be constructed within a tolerance of + 0.2 feet.

C-10-6

6. Vegetative Treatment: Stabilize the embankment in accordance with the appropriate vegetative Standard and Specifications immediately following construction. In no case shall the embankment remain unstabilized for more than seven (7) days. Once constructed, the top and outside face of the embankment shall be stabilized with seed and mulch. The remainder of the interior slopes should be stabilized (one time) with seed and mulch upon basin completion and monitored and maintained erosion free during the life of the basin.

7. Safety: Local requirements concerning fencing and signs shall be met, warning the public of hazards of soft sediment and floodwater.

8. Maintenance: Repair all damage caused by soil crosion and construction equipment at or before the end of each working day. Sediment shall be removed from the basin when it reaches the specified distance below the top of the riser as shown on the riser. This sediment shall be placed in such a manner that it will not erode from the site. The sediment shall not be deposited downstream from the embankment, adjacent to a stream or floodplain. Disposal areas must be stabilized.

9. Final Disposal: When temporary structures have served their intended purpose and the contributing drainage area has been properly stabilized, the embankment and resulting sediment deposits are to be leveled or otherwise disposed of in accordance with the approved sediment control plan. The proposed use of a sediment basin site will often dictate final disposition of the basin and any sediment contained therein. If the site is scheduled for future construction, then the basin material and trapped sediments must be removed and safely disposed of and the basin shall be backfilled with a structural fill. When the basin area is to remain open space, the pond may be pumped dry (using methods in Section D - Dewatering), graded, and back filled.

10. Conversion to Stormwater Management Structure: After permanent stabilization of all disturbed contributory drainage areas, temporary sediment basins, if initially built and certified to meet permanent standards, may be converted to permanent stormwater management structures. To convert the basin from temporary to permanent use, the outlet structure must be modified in accordance with approved stormwater management design plans. Additional grading may also be necessary to provide the required storage volume in the basin. Conversion can only take place after all disturbed areas have been permanently stabilized to the satisfaction of the inspection authority and storm drains have been flushed.

# BASIN DRAWDOWN SCHEMATIC HORIZONTAL DRAW-DOWN DEVICE TOP OF DAM RISER CREST ELEVATION SEE NOTE 3 BELOW - INTERNAL ORIFICE -- PRINCIPAL SPILLWAY FIFVATION RISER BASE TOP OF DAM LIMIT OF DRY STORAGE HORIZONTAL DRAW-DOWN DEVICE LIMIT OF WET STORAGE-PLAN VIEW Construction Specifications . The total area of the perforations must be greater than 2 times the area of

U.S. DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE

2. The perforated portion of the draw-down device shall be wrapped with  $\frac{1}{2}$  hardware cloth and geotextile fabric. The geotextile fabric shall meet the specifications for Geotextile Class E. 3. Provide support of draw-down device to prevent sagging and floatation. An acceptable preventative measure is to stake both sides of draw-down device with 1" steel angle, or 1' by 4" square or 2" round wooden posts set minimum into the ground then joining them to the device by wrapping with 12 gauge minimum wire.

NO. BY CK APP

MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION SOIL CONSERVATION SERVICE C - 10 - 29

LICENSE ND / 134/3

# NORTH PARKING / BALL FIELD ENTRANCE

APPLIED PHYSICS LABORATORY CONTROL DETAILS TAX MAP 41 PARCEL 1

SHEET SHEET 68 OF 84

SCALE AS

SHOWN

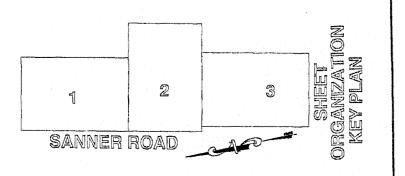
DES: JK DRN: RLP CHK: BW 3/1/04 COUNTY SET 1 DATE: 10/10/03 REVISIONS AND RECORD OF ISSUE

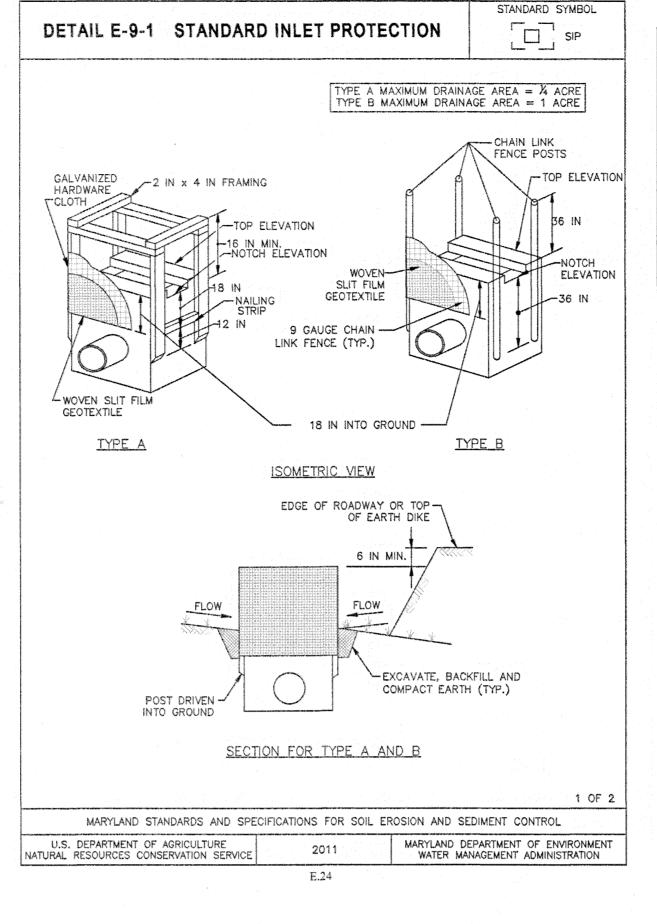
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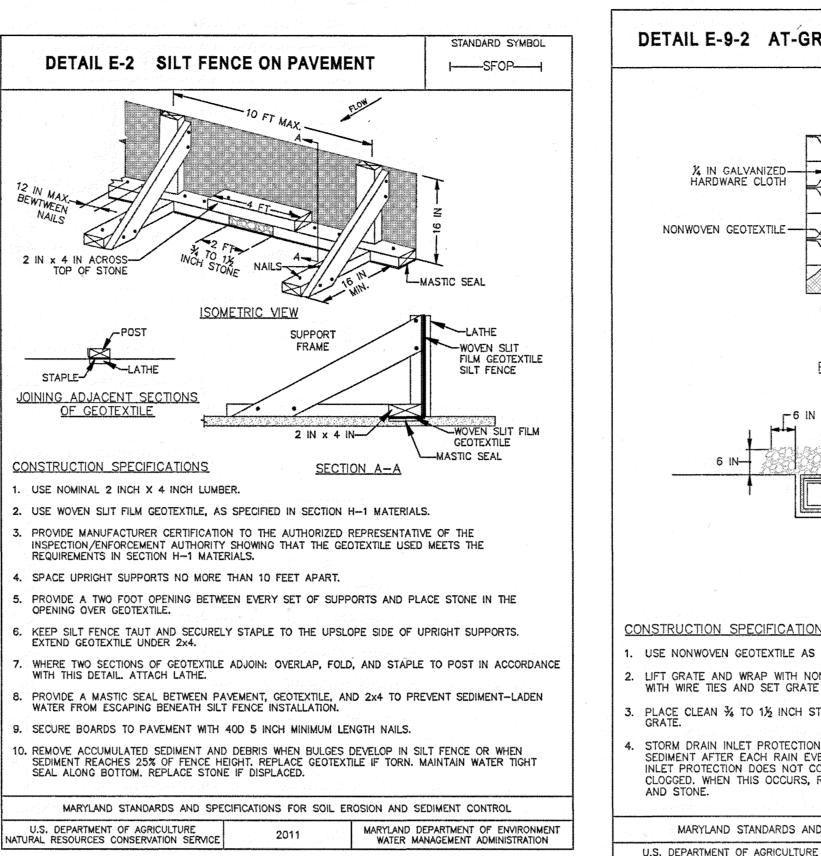
THIS DATA SHALL NOT BE DISCLOSED TO A THIRD PARTY AND SHALL NOT BE DUPLICATED, USED, OR DISCLOSED IN WHOLE OR IN PART FOR ANY PURPOSE OTHER THAN TO EVALUATE THIS REP OR, IN THE CASE OF A CONTRACT AWARD, TO PERFORM THE WORK REQUIRED HEREUNDER, WITHOUT THE EXPRESS WRITTEN CONSENT OF JHU/APL.

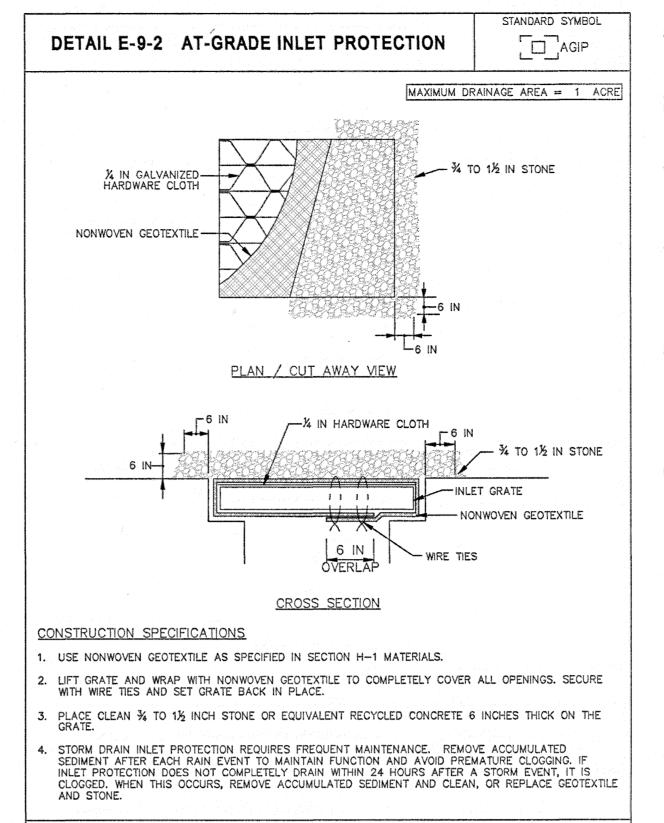
DATE A. MORTON THOMAS AND ASSOCIATES, INC. CONSULTING ENGINEERS 12750 TWINBROOK PARKWAY, SUITE 200, ROCKVILLE MD 20852

TEL (301) 881-2545 FAX (301) 881-0814









MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

NATURAL RESOURCES CONSERVATION SERVICE

MARYLAND DEPARTMENT OF ENVIRONMENT

WATER MANAGEMENT ADMINISTRATION

# SEQUENCE OF CONSTRUCTION

- CONTRACTOR SHALL OBTAIN A GRADING PERMIT FROM APPLIED PHYSICS LAB (APL), THAT IS ISSUED BY HOWARD COUNTY.
- (2 WEEKS) NOTIFY JHU/APL AND COUNTY SEDIMENT CONTROL INSPECTOR, AT LEAST 14 DAYS PRIOR TO BEGINNING WORK TO ARRANGE FOR A PRE-CONSTRUCTION MEETING.
- (1 WEEK) CLEAR AND GRUB ONLY AS NECESSARY TO INSTALL TREE PROTECTION, STABILIZED CONSTRUCTION ENTRANCE, SILT FENCE, SILT FENCE ON PAVEMENT, AND ALL OTHER SEDIMENT CONTROL FACILITIES WITHIN THE PROJECT LIMIT.
- (1 WEEK) ESTABLISH STAGING AREAS FOR CONSTRUCTION. TEMPORARY SITE GRADING SHALL ALLOW FOR ALL RUNOFF TO DRAIN DIRECTLY INTO EXISTING DRAINS. DIVERT SURFACE RUNOFF OUTSIDE THE LOD AWAY FROM THE CONSTRUCTION SITE DURING ENTIRE CONSTRUCTION PERIOD USING DIVERSION FENCE AS SPECIFIED ON SHEET C1.19B.
- 5. (2 WEEKS) PHASE DEMOLITION AND STABILIZED CONSTRUCTION ENTRANCES TO ENSURE ENTRANCES TO THE SITE REMAIN OPEN AND IN USE TO THE MAXIMUM EXTENT PRACTICABLE. SAWCUT AND REMOVE CURB CURB, GUTTER, SIDEWALK, AND FULL DEPTH ASPHALT WITHIN LIMITS SHOWN ON SHEETS C1.5A AND C1.6A. REMOVE UTILITIES AS SHOWN ON SHEETS C1.5A AND C1.6A. REMOVE AND RELOCATE TREES AS SHOWN ON SHEETS L1.1A, L1.2A, AND L1.3A.
- 6. (1 WEEK) EXCAVATE FOR UTILITY DEMOLITION AND PLACEMENT. INSTALL THE TEMPORARY INLET FOR CLEAN WATER DIVERSION AND ASSOCIATED STORM DRAIN PIPE TO NEW STRUCTURE M-B4 AND CONSTRUCT THE PERMANENT STORM DRAIN PIPE FROM NEW STRUCTURE M-B4 TO EXISTING STRUCTURE MH1-F2 AS SHOWN ON SHEET C1.19B.
- 7. (4 WEEKS) CONSTRUCT STORM DRAIN AND ELECTRICAL UTILITIES. CONSTRUCT INLETS AND PLACE SIP. CONSTRUCT FILTERRA UNITS PER INSTRUCTIONS ON SHEET C2.10L
- (4 WEEKS) GRADE SITE. PHASE STABILIZE CONSTRUCTION ENTRANCES TO ENSURE ENTRANCES TO THE SITE REMAIN OPEN AND IN USE TO THE MAXIMUM EXTENT PRACTICABLE. CONSTRUCT MICRO—BIORETENTION AND FOCAL POINT FACILITIES INCLUDING: UNDERDRAINS, CLEAN OUTS, OBSERVATION WELLS, GRAVEL, SAND, AND SOIL. REMOVE TEMPORARY CLEAN WATER INLET AND STORM DRAIN PIPE, CONSTRUCT FULL DEPTH HOT MIX ASPHALT (HMA) PAVING.
- 9. (1 WEEK) INSTALL LIGHT POLES WITH FOUNDATIONS, SIGNAGE, MICRO-BIORETENTION FENCE, PERIMETER SITE FENCE, AND PAVEMENT STRIPING.

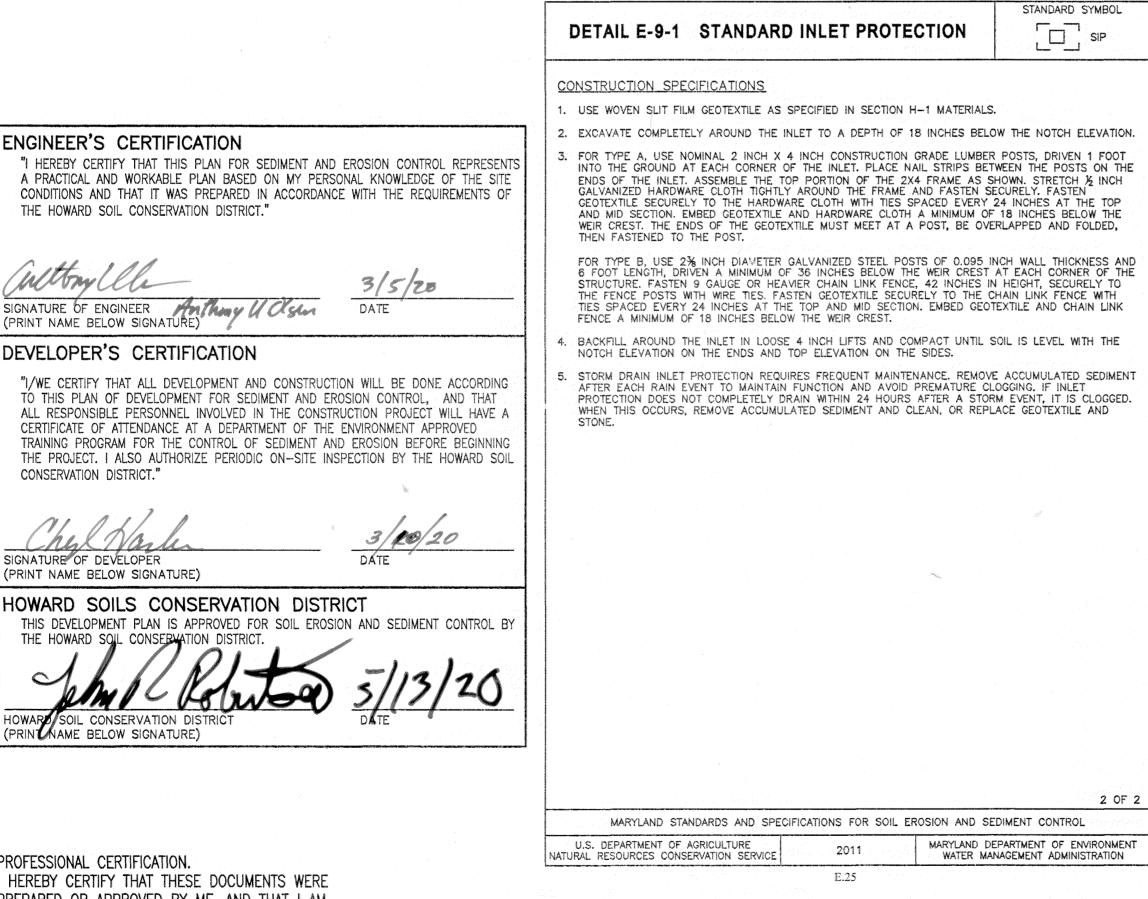
DETAIL E-9-6 COMBINATION INLET

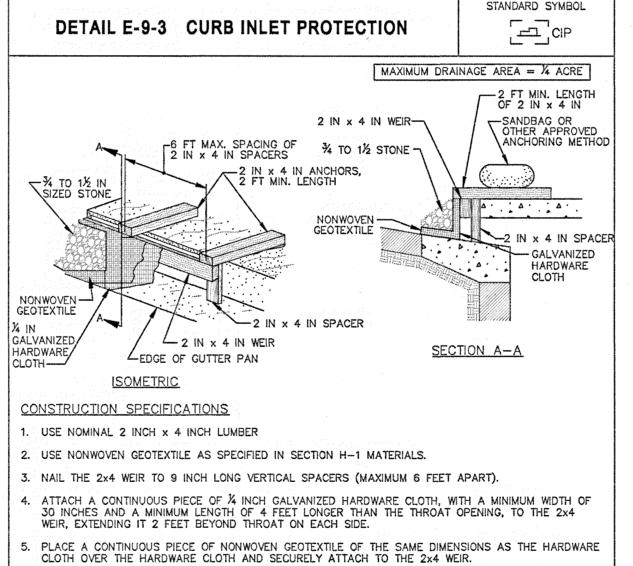
PROTECTION

- 10. (3 WEEKS) PERFORM LANDSCAPING AND PERMANENT STABILIZATION AS SHOWN ON SHEETS L1.1A, L1.2A, L1.3A, AND L1.4A.
- CONTRACTOR SHALL REQUEST FINAL INSPECTION FROM COUNTY SEDIMENT CONTROL INSPECTION TO ALLOW FOR REMOVAL OF SEDIMENT CONTROLS

STANDARD SYMBOL

COIP





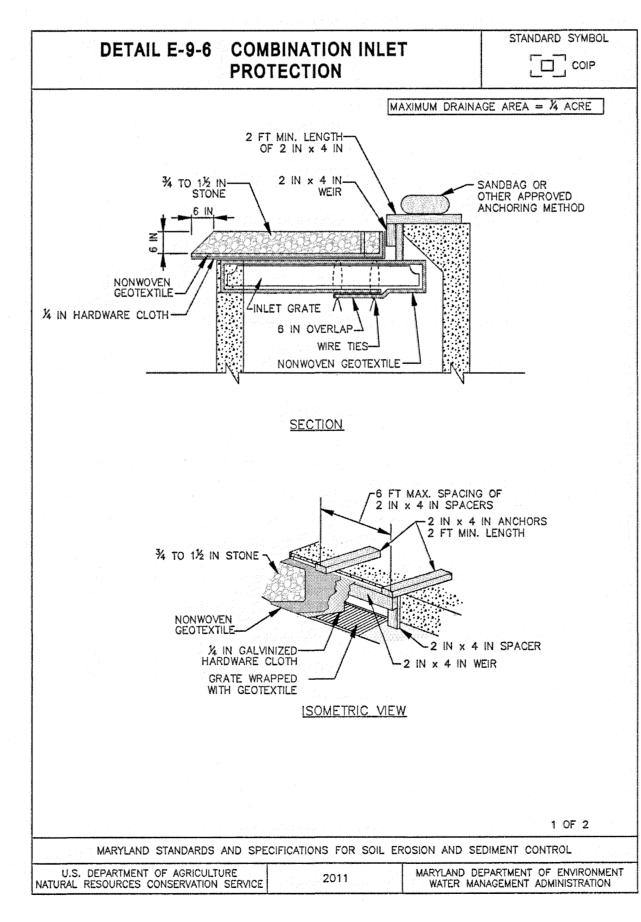
- 6. PLACE THE ASSEMBLY AGAINST THE INLET THROAT AND NAIL TO 2x4 ANCHORS (MINIMUM 2 FEET LENGTH). EXTEND THE ANCHORS ACROSS THE INLET TOP AND HOLD IN PLACE BY SANDBAGS OR OTHER APPROVED ANCHORING METHOD.
- . INSTALL END SPACERS A MINIMUM OF 1 FOOT BEYOND THE ENDS OF THE THROAT OPENING.
- 8. FORM THE HARDWARE CLOTH AND THE GEOTEXTILE TO THE CONCRETE GUTTER AND FACE OF CURB TO SPAN THE INLET OPENING. COVER THE HARDWARE CLOTH AND GEOTEXTILE WITH CLEAN ¾ TO 1½ INCH STONE OR EQUIVALENT RECYCLED CONCRETE.
- AT NON-SUMP LOCATIONS, INSTALL A TEMPORARY SANDBAG OR ASPHALT BERM TO PREVENT INLET BYPASS.

10. STORM DRAIN INLET PROTECTION REQUIRES FREQUENT MAINTENANCE. REMOVE ACCUMULATED SEDIMENT AFTER EACH RAIN EVENT TO MAINTAIN FUNCTION AND AVOID PREMATURE CLOGGING. IF INLET PROTECTION DOES NOT COMPLETELY DRAIN WITHIN 24 HOURS AFTER A STORM EVENT, IT IS

CLOGGED. WHEN THIS OCCURS, REMOVE ACCUMULATED SEDIMENT AND CLEAN OR REPLACE

-	MARYLAND STANDARDS AND SPE	CIFICATIONS FOR SOIL	EROSION AND	SEDIMENT CO	ONTROL
	U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE	2011			OF ENVIRONMENT ADMINISTRATION

E.27



1	USE NOMINAL 2 INCH x 4 INCH LUMBER.
	USE NONWOVEN GEOTEXTILE AS SPECIFIED IN SECTION H-1 MATERIALS.
	LIFT GRATE, AND WRAP WITH NONWOVEN GEOTEXTILE TO COMPLETELY COVER ALL OPENINGS, THEN S
٥.	GRATE BACK IN PLACE.
4.	ATTACH A CONTINUOUS PIECE OF ½ INCH GALVANIZED HARDWARE CLOTH WITH A MINIMUM WIDTH OF 30 INCHES AND A MINIMUM LENGTH OF 4 FEET LONGER THAN THE THROAT OPENING, TO THE 2X4 WEIR, EXTENDING 2 FEET BEYOND THROAT ON EACH SIDE.
5.	PLACE A CONTINUOUS PIECE OF NONWOVEN GEOTEXTILE THE SAME DIMENSIONS AS THE HARDWARE CLOTH OVER THE HARDWARE CLOTH AND SECURELY ATTACH IT TO THE WEIR.
6.	NAIL THE 2X4 WEIR TO THE TOP OF A 9 INCH LONG VERTICAL SPACER TO BE LOCATED BETWEEN TWEIR AND THE INLET FACE (MAXIMUM 4 FEET APART).
7.	PLACE THE ASSEMBLY AGAINST THE INLET THROAT AND NAIL TO 2X4 ANCHORS (MINIMUM 2 FOOT LENGTHS OF 2x4 INCH TO THE TOP OF THE WEIR AT SPACER LOCATIONS). EXTEND 2X4 ANCHORS ACROSS THE INLET TOP AND HOLD IN PLACE BY SANDBAGS OR OTHER APPROVED ANCHORING METHOD.
8.	INSTALL END SPACERS A MINIMUM OF 1 FOOT BEYOND BOTH ENDS OF THE THROAT OPENING.
9.	FORM THE ¼ INCH HARDWARE CLOTH AND THE GEOTEXTILE TO THE CONCRETE GUTTER AND AGAINS THE FACE OF THE CURB ON BOTH SIDES OF THE INLET. PLACE CLEAN ¼ TO 1½ INCH STONE OR EQUIVALENT RECYCLED CONCRETE OVER THE HARDWARE CLOTH AND GEOTEXTILE IN SUCH A MANNET TO PREVENT WATER FROM ENTERING THE INLET UNDER OR AROUND THE GEOTEXTILE.
10.	AT NON-SUMP LOCATIONS, INSTALL A TEMPORARY SANDBAG OR ASPHALT BERM TO PREVENT INLET BYPASS.
11.	STORM DRAIN INLET PROTECTION REQUIRES FREQUENT MAINTENANCE. REMOVE ACCUMULATED SEDIME AFTER EACH RAIN EVENT TO MAINTAIN FUNCTION AND AVOID PREMATURE CLOGGING. IF INLET PROTECTION DOES NOT COMPLETELY DRAIN WITHIN 24 HOURS AFTER A STORM EVENT, IT IS CLOGGE WHEN THIS OCCURS, REMOVE ACCUMULATED SEDIMENT AND CLEAN, OR REPLACE GEOTEXTILE AND STONE.
	2 OF

PROFESSIONAL CERTIFICATION. I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM 5 A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE NO. 19376 EXPIRATION DATE: 09/22/2021





APPROVED DEPARTMENT OF PLANNING	AND ZONING	
Al Columbia		5.15.20
CHIEF, DEVELOPMENT ENGINEERING DIVISION		DATE
CHIEF, DIVISION OF LAND DEVELOPMENT		DATE 5-29-20
DIRECTOR		DATE

COUNTY ENGINEER

JOHNS HOPKINS APPLIED PHYSICS LAB

11100 JOHNS HOPKINS ROAD

LAUREL, MD 20723-6099

OWNER/DEVELOPER JOHNS HOPKINS APPLIED PHYSICS LAB CHRISTOPHER GILLIGAN 240-592-0343 christopher.gilligan@jhuapl.com DATE 02-04-2020

JOHNS HOPKINS APPLIED PHYSICS LAB NORTH PARKING / BALL FIELD ENTRANCE

REVISED EROSION AND SEDIMENT CONTROL DETAILS

NOTE: REV 1 IS FOR ADDITIONAL EROSION AND SEDIMENT CONTROL DETAILS REQUIRED FOR THE

WITH THE PARKING LOT IMPROVEMENTS.

EROSION AND SEDIMENT CONTROL PLAN IN ASSOCIATION

DESCRIPTION REV DATE SHEET DRAWING OF 84

1 02/04/20 NEW SHEET - UPDATED ESC DETAILS AND

NOT FOR CONSTRUCTION

SEQUENCE OF CONSTRUCTION

NO AS-BUILT ON THIS SHEET

# SEDIMENT CONTROL "I/WE CERTIFY THAT ALL DEVELOPMENT AND/OR CONSTRUCTION WILL BE DONE ACCORDING TO THESE PLANS, AND THAT ANY RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF ATTENDANCE AT A DEPARTMENT OF THE ENVIRONMENT APPROVED TRAINING PROGRAM FOR THE CONTROL OF SEDIMENT AND EROSION BEFORE BEGINNING THE PROJECT. I SHALL ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE CONSTRUCTION. I ALSO AUTHORIZED PERIODIC ON—SITE INSPECTIONS BY THE HOWARD SOIL CONSERVATION DISTRICT." c desell June Franch July 28, 2003 Loesch SIGNATURE OF DEVELOPER PRINT NAME BELOW SIGNATURE "I CERTIFY THAT THIS PLAN FOR CONSTRUCTION, EROSION AND SEDIMENT CONTROL REPRESENTS A PRACTICAL AND WORKABLE PLAN BASED ON MY PERSONAL KNOWLEDGE OF THE SITE CONDITIONS. THIS PLAN WAS PREPARED IN ACCORDANCE WITH THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT. I HAVE NOTIFIED THE DEVELOPER THAT HE/SHE MUST ENGAGE A REGISTERED PROFESSIONAL ENGINEER TO SUPERVISE CONSTRUCTION. ROBERT A. WARNER SIGNATURE OF ENGINEER ( ) THESE PLANS HAVE BEEN REVIEWED FOR THE HOWARD SOIL CONSERVATION DISTRICT AND MEET THE TECHNICAL REQUIREMENTS FOR SOIL EROSION AND SEDIMENT CONTROL. USDA-NATURAL RESOURCES CONSERVATION SERVICE THESE PLANS FOR SOIL EROSION AND SEDIMENT CONTROL MEET THE REQUIREMENTS OF THE HOWARD SOIL CONSERVATION DISTRICT. HOWARD SOIL CONSERVATION DISTRICT SEDIMENT CONTROL NOTES 2) ALL VEGETATIVE AND STRUCTURAL PRACTICES AE TO BE INSTALLED ACCORDING TO THE PROVISIONS OF THIS PLAN AND ARE TO BE IN

- 1) A MINIMUM OF 48 HOURS NOTICE MUST BE GIVEN TO THE HOWARD COUNTY DEPARTMENT OF INSPECTIONS, LICENSES AND PERMITS, SEDIMENT CONTROL DIVERSION PRIOR TO THE START OF ANY CONSTRUCTION (313-1855).
- CONFORMANCE WITH THE MOST CURRENT MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL AND REVISIONS THERE TO.
- 3) FOLLOWING INITIAL SOIL DISTURBANCE OR RE-DISTURBANCE, PERMANENT OR TEMPORARY STABILIZATION SHALL BE COMPLETED WITHIN: A) 7 CALENDAR DAYS FOR ALL PERIMETER SEDIMENT CONTROL STRUCTURES. DIKES, PERIMETER SLOPES AND ALL SLOPES STEEPER THAN 3:1. B) 14 DAYS AS TO ALL OTHER DISTURBED OR GRADED AREAS ON THE PROJECT SITE.
- 4) ALL SEDIMENT TRAPS/BASINS SHOWN MUST BE FENCED AND WARNING SIGNS POSTED AROUND THEIR PERIMETER IN ACCORDANCE WITH VOL. 1 CHAPTER 12, OF THE HOWARD COUNTY DESIGN MANUAL, STORM DRAINAGE.
- 5) ALL DISTURBED AREAS MUST BE STABILIZED WITHIN THE TIME PERIOD SPECIFIED ABOVE IN ACCORDANCE WITH THE 1994 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL FOR PERMANENT SEEDING (SEC. 51), SOD (SEC. 54), TEMPORARY SEEDING (SEC. 50) AND MULCHING (SEC. 52), TEMPORARY STABILIZATION WITH MULCH ALONE CAN ONLY BE DONE WHEN RECOMMENDED SEEDING DATES DO NOT ALLOW FOR PROPER GERMINATION AND ESTABLISHMENT OF GRASSES.
- 6) 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
- 7) \*SITE ANALYSIS: TOTAL AREA OF SITE 16.7 17.3 AREA DISTURBED \_\_ACRES 4 5 11.2 14.5 ACRES AREA TO BE ROOFED OR PAVED <u>5.5 6.1</u> AREA TO BE VEGETATIVELY STABILIZED \_ACRES 48,44*O* 39,317 TOTAL CUT (INSITU, IN GROUND) 102.162 TOTAL FILL (COMPACTED) SOURCE UNKNOWN BUT HAS BEEN BUT HAS BEEN REQUIRED TO CU. YDS. HAVE AN ACTIVE PERMIT SEDIMENT CONTROL OFF SITE WASTE/BORROW AREA LOCATION \*NOTE: THESE QUANTITIES ARE A GROSS ESTIMATE BASED INSITU CONDITION (NON BULKING OR COMPACTION) AND SHALL NOT BE USED BY THE CONTRACTOR FOR BIDDING PURPOSES. CONTRACTOR IS RESPONSIBLE FOR ALL QUANTITIES OF CONSTRUCTION AS REPRESENTED
- BY THE GRADING PLAN. ANY SEDIMENT CONTROL PRACTICE WHICH IS DISTURBED BY GRADING ACTIVITY FOR PLACEMENT OF UTILITIES MUST BE REPAIRED ON THE SAME DAY OF DISTURBANCE.
- ADDITIONAL SEDIMENT CONTROLS MUST BE PROVIDED, IF DEEMED NECESSARY BY THE HOWARD COUNTY SEDIMENT CONTROL INSPECTOR.
- 10) ON ALL SITES WITH DISTURBED AREAS IN EXCESS OF 2 ACRES, APPROVAL OF THE INSPECTION AGENCY SHALL BE REQUESTED UPON WERE PREPARED OR APPROVED BY ME, AND APL PROCEDURAL NOTES: COMPLETION OF INSTALLATION OF PERIMETER EROSION AND SEDIMENT THAT I AM A DULY LICENSED PROFESSIONAL CONTROLS, BUT BEFORE PROCEEDING WITH ANY OTHER EARTH DISTURBANCE OR GRADING. OTHER BUILDING OR GRADING INSPECTION MARYLAND. LICENSE NO. 19376 APPROVALS MAY NOT BE AUTHORIZED UNTIL THIS INITIAL APPROVAL BY THE INSPECTION AGENCY IS MADE.
- 11) TRENCHES FOR THE CONSTRUCTION OF UTILITIES IS LIMITED TO THREE PIPE LENGTHS OR THAT WHICH SHALL BE BACK-FILLED AND STABILIZED WITHIN ONE WORKING DAY, WHICHEVER IS SHORTER.
- 12) EXCAVATION AND FILL QUANTITIES SHOWN ARE FOR THE USE OF THE SEDIMENT AND FROSION CONTROL REVIEW ONLY. THE CONTRACTOR SHALL NOT ESTIMATE TIES AS THEY

	ESTIMATE THEIR CONSTRUCTION COSTS BASE ARE APPROXIMATE AND ARE SUBJECT TO UN					
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DATE	REVISIONS AND RECORD OF ISSUE	No.	BY	ĊK	APP	
APPROVED CHIEF, DE	DEPARTMENT OF PLANNING AND ZONING VELOPMENT ENGINEERING DIVISION ME DATE	26	10	4		5450000000000

CHIEF, DIVISION OF LAND DEVELOPMENT

sank buyers

DIRECTOR

OF MARY, LUBABUS: THIS SEAL & CERTIFICATION

APPLIES ONLY TO REVISION 25

REFER TO C 2.12A EROSION AND SEDIMENT

CONTROL DETAILS FOR WEST PARKING LOT

IMPROVEMENTS SEQUENCE OF CONSTRUCTION

PROFESSIONAL CERTIFICATION.

I HEREBY CERTIFY THAT THESE DOCUMENTS

EXPIRATION DATE: SEPTEMBER 22, 2021

(WEEKS)

BY HOWARD COUNTY.

ENGINEER UNDER THE LAWS OF THE STATE OF 1. CONTRACTOR, UPON WRITTEN JHU/APL APPROVAL OF AMOUNT AND LOCATION, WILL BE ALLOWED BY JHU/APL TO DUMP EXCESS SOIL MATERIAL AT THE EXISTING JHU/APL STOCKPILE SITE. CONTRACTOR IS RESPONSIBLE FOR ALL SEDIMENT CONTROLS AND SITE RESTORATION/ STABILIZATION TO HOWARD COUNTY SCD STANDARD AND OBTAIN APPROVAL OF SEDIMENT CONTROLS BY HOWARD COUNTY SCD.

## GENERAL TEMPORARY STORMWATER MANAGEMENT

CONTRACTOR SHALL OBTAIN A GRADING PERMIT FROM APL, THAT IS ISSUED

4. PERFORM CLEARING ONLY AS NECESSARY TO INSTALL TREE PROTECTION, STABILIZED

CONSTRUCTION ENTRANCE, SILT FENCE, AND ALL OTHER SEDIMENT CONTROL FACILITIES WITHIN THE PROJECT LIMIT. INSTALL STABILIZED CONSTRUCTION

SHOWN FOR BASIN G SDP-04-35 AND BASIN B F-02-77 PERMITTED PLANS.

8. PROVIDE AND INSTALL REMAINDER OF CONSTRUCTION AS SHOWN FOR SWM BASIN G

11. PERFORM CLEARING ONLY NECESSARY TO INSTALL TREE PROTECTION, STABALIZED

10. CONTRACTOR SHALL REQUEST FINAL INSPECTION OF SWM BASIN B AND G TO ALLOW FOR

REMOVAL OF STABALIZED CONSTRUCTION ENTRANCE AND PERFORM PER-CONSTRUCTION

CONSTRUCTION ENTRANCE, SILT FENCE, AND ALL OTHER SEDIMENT CONTROL FACILITIES

EXISTING DRAINS. DIVERT SURFACE RUNOFF OUTSIDE THE LOD FROM THE CONSTRUCTION

16. PERFORM FINE GRADING AND PERMANENT STABALIZATION OF THE SITE INCLUDING PAVEMENT

CONTROL INSPECTOR TO ALLOW FOR REMOVAL OF PHASE 1 STABILIZED CONSTRUCTION ENTRANCE

18. PERFORM CLEARING ONLY AS NECESSARY TO INSTALL TREE PROTECTION, STABILIZED CONSTRUCTION

INSTALL PHASE 2 STABILIZED CONSTRUCTION ENTRANCE AT 2 LOCATIONS FOR ACCESS TO PHASE 1 CONSTRUCTED ACCESS DRIVES. (SEE SHEET # C1.19), 3 AND ANTENNA RANGE REDILINE (SEE SHEET # C1.19A).

19. TEMPORARY SITE GRADING SHALL BE PERFORMED AS NOTE #5 OF THIS SEQUENCE SPECIFIES.

23. PERFORM FINE GRADING AND PERMANENT STABILIZATION OF THE SITE INCLUDING PAVEMENT AND

24. CONTRACTOR SHALL REQUEST FINAL INSPECTION OF PHASE 2 FROM COUNTY SEDIMENT CONTROL

26. TEMPORARY SITE GRADING SHALL BE PERFORMED AS NOTE #5 OF THIS SEQUENCE SPECIFIES.

30. PERFORM FINE GRADING AND PERMANENT STABILIZATION OF THE SITE INCLUDING PAVEMENT

32. CONTRACTOR SHALL REQUEST PERMISSION FOR REMOVAL OF SEDIMENT BASIN #1, AND SHALL

31. CONTRACTOR SHALL REQUEST FINAL INSPECTION OF PHASE 3 FROM COUNTY SEDIMENT

NSPECTION TO ALLOW FOR REMOVAL OF PHASE 2 STABILIZED CONSTRUCTION ENTRANCE AND

25. PERFORM CLEARING ONLY AS NECESSARY TO INSTALL TREE PROTECTION, STABALIZED CONSTRUCTION

ENTRANCE, SILT FENCE, AND ALL OTHER SEDIMENT CONTROL FACILITIES WITHIN THE PROJECT. LIMIT.

CONTROL INSPECTOR TO ALLOW FOR REMOVAL OF PHASE 3 STABILIZED CONSTRUCTION ENTRANCE. AND TEMPORARY 36" CMP.

INSTALL SUPER SILT FENCE ALONG THE DISTURBED AREA EAST OF SANNER ROAD (420' MINIMUM).

FOR BASIN B OUTLET CHANNEL CONSTRUCTION WITH A STABILIZED CONSTRUCTION ENTRANCE FROM

INSPECTOR TO ALLOW FOR REMOVAL OF STABILIZED CONSTRUCTION ENTRANCE AND SUPER SILT FENCE.

33. CONSTRUCTOR SHALL REQUEST FINAL INSPECTION OF PROJECT FROM COUNTY SEDIMENT CONTROL

INSTALL PHASE 3 STABILIZED CONSTRUCTION ENTRANCE TO ACCESS EXISTING JHU/APL DRIVE. (SEE

20. ROUGH GRADE AREA OF PHASE 2 WORK (SEE SHEETS #C1.13, #C1.14, #C1.15 AND #C1.21).

22. PROVIDE AND INSTALL REMAINDER OF CONSTRUCTION AS SHOWN FOR PHASE 2.

27. ROUGH GRADE AREA OF PHASE 3 WORK (SEE SHEET #C1.15 AND #C1.20).

29. PROVIDE AND INSTALL REMAINDER OF CONSTRUCTION AS SHOWN FOR PHASE 3

ENTRANCE, SILT FENCE, AND ALL OTHER SEDIMENT CONTROL FACILITIES WITHIN THE PROJECT LIMIT.

17. CONTRACTOR SHALL REQUEST FINAL INSPECTION OF PHASE 1 FROM COUNTY SEDIMENT

12. INSTALL SITE GRADING THAT SHALL ALLOW FOR ALL RUNOFF TO DRAIN DIRECTLY INTO

13. ROUGH GRADE AREA OF PHASE 1 WORK (SEE SHEETS: #C1.13, #C1.4, AND #C1.20).

15. PROVIDE AND INSTALL REMINDER OF CONSTRUCTION AS SHOWN FOR PHASE 1.

5. ESTABLISH STAGING AREA FOR CONSTRUCTION. TEMPORARY SITE GRADING SHALL ALLOW

FOR ALL RUNOFF TO DRAIN DIRECTLY INTO EXISTING DRAINS. DIVERT SURFACE RUNOFF

OUTSIDE THE LOD AWAY FROM THE CONSTRUCTION SITE DURING ENTIRE CONSTRUCTION

ENTRANCES LOCATIONS FOR ACCESS TO EXISTING JHU/APL DRIVERS AS

2. NOTIFY JHU/APL AND COUNTY SEDIMENT CONTROL INSPECTOR, AT

6. ROUGH GRADE SWM BASINS AND SEDIMENT BASIN AREA B.

AND BASIN B, ALONG WITH SEDIMENT BASIN AREA B.

WITHIN THE PROJECT LIMITS FOR PHASE 1 WORK.

SITE DURING ENTIRE CONSTRUCTION PERIOD.

14. INSTALL NEW STORM DRAINAGE SYSTEM PHASE 1.

AND VEGETATIVE STABILIZATION FOR PHASE 1

21. INSTALL NEW STORM DRAINAGE SYSTEM PHASE 2.

28. INSTALL NEW STORM DRAINAGE SYSTEM PHASE 3.

AND VEGETATIVE STABILIZATION FOR PHASE 3.

PERFORM PRE-CONSTRUCTION MEETING FOR PHASE 3.

VEGETATIVE STABILIZATION FOR PHASE 2.

SHEET # C1.18)

SANNER ROAD.

AND PERFORM PRE-CONSTRUCTION MEETING FOR PHASE 2.

MEETING FOR PHASE 1 WORK.

LEAST 14 DAYS PRIOR TO BEGINNING WORK TO ARRANGE FOR A

7. INSTALL OUTLET WORK FOR SWM BASINS AND SEDIMENT BASIN AREA B.

9. PERFORM FINE GRADING AND PERMANENT STABALIZATION OF THE BASINS.

#### SEQUENCE AND NOTES:

- DRAINAGE AREA G AND B BASINS SHALL BE CONSTRUCTED AS PER SDP #04-35, AND F-02-77 RESPECTIVELY BEFORE GROUND DISTURBANCE IS STARTED FOR PARKING.
- 2. BASIN B SEQUENCE OF CONSTRUCTION REQUIRES ROUGH GRADING AND INSTALLATION OF STORM DRAINAGE SYSTEM. AT THE END OF MASS GRADING AND INSTALLATION OF STORM DRAINS THE GROUND WILL BE EXPOSED AND INLETS WILL BE BLOCKED AND SURFACE RUN OFF WILL BE CONTROLED BY THE SEDIMENT BASIN AREA B FOR THE 1-YEAR RUN OFF RATE AND CONVEY THE 10 YEAR FLOW. THIS SEDIMENT BASIN IS SIZE FOR THE TOTAL DRAINAGE AREA AND ALL PHASES OF THE WORK WILL DRAIN INTO THE BASIN. PHASE 2 AND 3 WORK WILL BE DRAINED THROUGH THE STORM DRAINAGE SYSTEM BY-PASSING THE PERMANENT STORMWATER MANAGEMENT BASIN.
- 3. BASIN G WILL PROVIDE STORMWATER MANAGEMENT FOR THE DRAINAGE AREA DOWN STREAM OF THE SEDIMENT TRAP AND IS SIZED AND PERMITTED FOR THE NEW IMPRVIOUS SURFACES.

## SEQUENCE OF CONSTRUCTION: (FOR IMPROVEMENTS PRIOR TO REVISION #5): TEMPORARY SEEDING NOTES:

APPLY TO GRADED OR CLEARED AREAS LIKELY TO BE REDISTURBED WHERE A SHORT-TERM VEGETATIVE COVER IS NEEDED.

#### SEEDED PREPARATION:

LOOSEN UPPER THREE INCHES OF SOIL BY RAKING, DISKING OR OTHER ACCEPTABLE MEANS BEFORE SEEDING, IF NOT PREVIOUSLY LOOSENED.

#### SOIL AMENDMENTS:

APPLY 600 LBS. PER ACRE 10-10-10 FERTILIZER (14 LBS./1000 SQ. FT.)

#### SEEDING:

FOR THE PERIOD MARCH 1 THROUGH APRIL 30, AND FROM AUGUST 15 THROUGH OCTOBER 15, SEED WITH 2-1/2 BUSHEL PER ACRE OF ANNUAL RYE (3.2 LBS/1,000 SQ. FT.) FOR THE PERIOD MAY 1 THROUGH AUGUST 14, SEED WITH 3 LBS/ACRE OF WEEPING LOVEGRASS (0.07 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.

#### MULCHING:

APPLY 1-1/2 TO 2 TONS PER ACRE (70 TO 90 LBS./1,000 SQ.FT) OR UNROTTED WEED FREE, SMALL GRAIN STRAW IMMEDIATELY AFTER SEEDING. ANCHOR MULCH IMMEDIATELY AFTER APPLICATION USING MULCH ANCHORING TOOL OR 218 GALLONS PER AREA (5 GAL/ 1,000 SQ.FT) OF EMULSIFIED ASPHALT ON FLAT AREAS. ON SLOPES 8 FEET OR HIGHER, USE 348 GALLONS PER ACRE (8 GAL/1,000 SQ.FT.) FOR ANCHORING.

REFER TO THE 1988 MARYLAND STANDARDS AND SPECIFICATION FOR SOIL EROSION AND SEDIMENT CONTROL FOR RATE AND METHODS NOT COVERED

## PERMANENT SEEDING NOTES:

APPLY TO GRADED OR CLEARED AREAS NOT SUBJECT TO IMMEDIATE FURTHER DISTURBANCE WHERE A PERMANENT LONG-LIVED VEGETATIVE COVER IS NEEDED.

#### SEEDBED PREPARATION:

LOOSEN UPPER THREE INCHES OF SOIL BY RAKING, DISKING OR OTHER ACCEPTABLE MEANS BEFORE SEEDING, IF NOT PREVIOUSLY LOOSENED

#### SOIL AMENDMENTS:

1. PREFERED - APPLY TWO TONS PER ACRE DOLOMITIC LIMESTONE (92 LBS/1,000 SQ.FT) AND 600 LBS PER ACRE 10-10-10 FERTILIZER (14 LBS/1,000 SQ.FT) BEFORE SEEDING. HARROW OR DISK INTO UPPER THREE INCHES OF SOIL, AT TIME OF SEEDING, APPLY 400 LBS PER ACRE 30-0-0 UREAFORM FERTILIZER (9 LBS/1,000 SQ. FT.)

2. ACCEPTABLE - APPLY 2 TONS PER ACRE DOLOMITIC LIMESTONE (92 LBS/ 1,000 SQ. FT.) AND 1,000 LBS PER ACRE 10-10-10 FERTILIZER (23 LBS/1,000 SQ. FT.) BEFORE SEEDING. HARROW OR DISK INTO UPPER THREE INCHES OF SOIL,

#### **SEEDING:**

FOR THE PERIODS MARCH 1 THROUGH APRIL 30, AND AUGUST 1 THROUGH OCTOBER 15, SEED WITH 60 LBS PER ACRE (1.4 LBS/1,000 SQ.FT.) OF KENTUCKY 31 TALL FESCUE. FOR THE PERIOD MAY 1 THROUGH JULY 31. SEED WITH 60 LBS/ACRE (1.4 LBS/1,000 SQ.FT.) KENTUCKY 31 TALL FESCUE AND 2 LBS PER ACRE (0.05 LBS/1.000 SQ.FT.) OF WEEPING LOVEGRASS. DURING THE PERIOD OF OCTOBER 16 THROUGH FEBRUARY 28 PROTECT SITE BY: OPTION (1) - TWO TONS PER ACRE OF WELL ANCHORED STRAW MULCH AND SEED AS SOON AS POSSIBLE IN THE SPRINGS

OPTION (2) - USE SOD OPTION (3) - SEED WITH 60 LBS/ACRE KENTUCKY 31 TALL FESCUE AND MULCH WITH TWO TONS/ACRE WELL ANCHORED STRAW.

# MULCHING:

APPLY 1-1/2 TO 2 TONS PER ACRE (70 TO 90 LBS/1,000 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/1,000 SQ.FT.) OF EMULSIFIED ASPHALT. ON FLAT ACRES. ON SLOPES 8 FEET OR HIGHER USE 348 GALLONS PER ACRE (8 GAL/1,000 SQ. FT.) FOR ANCHORING.

## SEQUENCE OF CONSTRUCTION

## MAINTENANCE OF TRAFFIC

- ONCE NOTICE TO PROCEED IS OBTAINED, CONTRACTOR SHALL FOLLOW SEQUENCE OF CONSTRUCTION, AS DESCRIBED ON SHEET #C2.13. TRAFFIC FLOW ON THE EXISTING DRIVE SOUTH OF PHASE 1 FROM SANNER ROAD SHALL BE MAINTAINED AT ALL TIMES.
- 2. PHASE #1 WORK SHALL INCLUDE THE AREA DESIGNATED ON THE PLAN PLUS GRADING AREA AND STORM DRAINAGE AREA IN LOTS #M1 AND #M2, PLUS BASIN B AS FOLLOWS: • PHASE #1 WORK INCLUDES: PARKING LOTS #M1 AND #M2 ROUGH GRADE TO WITHIN 12" OF FINISHED GRADE, TOPSOIL AND PERMANENT SEED (ESTABLISH TURF) • PHASE #1 WORK INCLUDES CONSTRUCTION OF BASIN B AS PERMITTED UNDER SDP F-02-70. • PHASE #1 WORK INCLUDES STORM DRAINAGE PIPE SYSTEM FROM MANHOLE #MH8G TO AND INCLUDING RIP-RAP AT END WALL #EW1M1.
- 3. ALL PHASE 1 WORK SHALL BE COMPLETELY INSPECTED AND APPROVED BY JHU/APL BEFORE THE START OF PHASE 2 WORK, AND PHASE 3 WORK SHALL NOT BE STARTED UNTIL PHASE 2 WORK IS APPROVED. ALLOW FOR A MINIMUM 30 DAYS PERIOD BETWEEN PHASES OF WORK TO COMPLY WITH INSPECTION ACCEPTANCE COMPLIANCE.
- 4. AFTER RECEIVING NOTICE TO PROCEED FOR PHASE 2 WORK, THE CONTRACTOR SHALL FOLLOW THE SEQUENCE OF CONSTRUCTION AS DESCRIBED ON SHT. #C2.13. TRAFFIC FLOW ON THE MAIN PARKING LOT DRIVE (BUILT IN PHASE 1) SHALL BE MAINTAINED AT ALL TIMES. PARKING LOTS #M1 AND #M2 SHALL HAVE TOPSOIL STRIPED AND NEW PAVEMENT SECTION INSTALLED AND AND STRIPED ALONG WITH NEW LIGHTING SYSTEM.
- AFTER RECEIVING NOTICE TO PROCEED FOR PHASE 3 WORK, THE CONTRACTOR SHALL FOLLOW THE SEQUENCE OF CONSTRUCTION AS DESCRIBED ON SHT. #C2.13 BEFORE START OF PHASE 3 WORK. INSTALL A TEMPORARY SECURITY FENCE SOUTH "OF BUILDING #23 AND EAST OF THE WORK, SEE SGT, #C1.6 FOR LOCATION.
- 6. EACH PHASE OF THE WORK SHALL BE COMPLETED AS SHOWN. COMPLY WITH CLOSURE REQUIREMENTS FOR EACH PHASE SPECIFIED IN THE SEQUENCE OF CONSTRUCTION SHT. #C2.13.

#### MAINTENANCE:

INSPECT ALL SEEDED AREAS AND MAKE NEEDED REPAIRS, REPLACEMENTS AND RESEEDINGS. FOR PUBLIC PONDS SUBSTITUTE CHEMUNG CROWN VETCH AT 15 LBS/ACRE AND KENTUCKY 31 TALL FESCUE AT 40 LBS/ACRE AS THE SEEDING REQUIREMENT. OPTIMUM SEEDING DATE FOR THIS MOISTURE IS MARCH 1 TO APRIL 30.

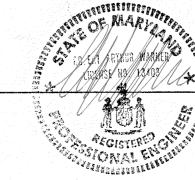
#### TOPSOIL SPECIFICATION

- TOP SOIL SPECIFICATIONS SOIL TO BE USED AS TOP SOIL MUST MEET THE FOLLOWING: S TOPSOIL SHALL BE A LOAM SANDY LOAM, CLAY LOAM, SILT LOAM, SANDY CLAY LOAM, LOAMY SAND. OTHER SOILS MAY BE USED IT RECOMMENDED BY AN AGRONOMIST OR SOIL SCIENTIST AND APPROVED BY THE APPROPRIATE APPROVAL AUTHORITY. REGARDLESS, TOPSOIL SHALL NOT BE A MIXTURE OF CONTRASTING TEXTURE SUBSOIL AND SHALL CONTAIN LESS THAN 5% BY VOLUME OF CINDERS, STONES, SLAG, COARSE FRAGMENTS, GRAVEL, STICKS, ROOTS, TRASH, OR OTHER MATERIALS LARGER THAN 1-1/2" IN DIAMETER.
- TOPSOIL MUST BE FREE OF PLANTS, PLANT PARTS SUCH AS BERMUDA GRASS, QUACK GRASS, JOHNSON GRASS, NUTSEDGE, POISON IVY, THISTLE, OR OTHERS AS SPECIFIED.
- WHERE THE TOPSOIL IS EITHER HIGHLY ACIDIC OR COMPOSED OF HEAVY CLAYS, GROUND LIMESTONE SHALL BE SPREAD AT THE RATE OF 4-8 TONS/ACRE (200-400 POUNDS/1,000 SQ.FT.) PRIOR TO THE PLACEMENT OF TOPSOIL LIME SHALL BE DISTURBED UNIFORMLY OVER DESIGNATED AREAS AND WORKED INTO THE SOIL IN CONJUNCTION WITH TILLAGE OPERATIONS AS DESCRIBED IN THE FOLLOWING PROCEDURES.
- FOR SITE HAVING DISTURBED AREAS UNDER 5 ACRES: PLACE TOPSOIL (IF REQUIRED) AND APPLY SOIL AMENDMENTS AS SPECIFIED IN 20.0 VEGETATIVE STABILIZATION SECTION 1 - VEGETATIVE STABILIZATION METHODS AND MATERIALS.
- ATERATIVE FOR PERMANENT SEEDING INSTEAD OF APPLYING THE FULL AMOUNTS OF LIME AND COMMERCIAL FERTILIZERS, COMPOSED SLUDGE AND AMENDMENTS MAY BE APPLIED AS SPECIFIED BELOW:
- COMPOSTED SLUDGE MATERIAL FOR USE AS A SOIL CONDITIONER FOR SITES HAVING DISTURBED AREAS OVER 5 ACRES SHALL BE TESTED TO PRESCRIBE AMENDMENTS AND FOR SITES HAVING DISTURBED
- AREAS UNDER 5 ACRES SHALL CONFORM TO THE FOLLOWING REQUIREMENTS: A.) COMPOSTED SLUDGE SHALL BE SUPPLIED BY, OR ORIGINATE FROM, A PERSON OR PERSONS THAT ARE PERMITTED (AT THE TIME OF ACQUISITION OF THE COMPOST) BY THE MARYLAND DEPARTMENT OF THE
- ENVIRONMENT UNDER COMAR 26.04.06. B.) COMPOSTED SLUDGE SHALL CONTAIN AT LEAST 1 PERCENT NITROGEN, 1.5 PERCENT PHOSPHORUS, AND 0.2 PERCENT POTASSIUM AND HAVE A PH OF 7.0 TO 8.0. IF COMPOST DOES NOT MEET THESE REQUIREMENTS
- THE APPROPRIATE CONSTITUENTS MUST BE ADDED TO MEET THE REQUIREMENTS PRIOR TO USE. C.) COMPOSTED SLUDGE SHALL BE APPLIED AT A RATE OF 1 TON/1,000 SQ.FT. PERCENT POTASSIUM AND HAVE A PH OF 7.0 TO 8.0. IF COMPOST DOES NOT MEET THESE REQUIREMENTS
- THE APPROPRIATE CONSTITUENTS MUST BE ADDED TO MEET THE REQUIREMENTS PRIOR TO USE. COMPOSTED SLUDGE SHALL BE AMENDED WITH A POTASSIUM FERTILIZER APPLIED AT THE RATE OF 4 LBS/1,000 SQ. FT. AND 1/3 THE NORMAL LIME APPLICATION RATE.

#### 30.0 DUST CONTROL Definition Controlling dust blowing and movement on construction sites and roads Purpose To prevent blowing and movement of dust from exposed soil surfaces, reduce on and off-site damage, health hazards, and improve traffic safety This practice is applicable to areas subject to dust blowing and movement where on and off-site damage is likely without treatment. Temporary Methods 1. Mulches - See standards for vegetative stabilization with mulches only. Mulch should be crimped or tacked to prevent blowing. 2. Vegetative Cover - See standards for temporary vegetative cover. 3. Tillage - To roughen surface and bring clods to the surface. This is an emergency measure which should be used before soil blowing starts. Begin plowing on windward side of site. Chisel-type plows spaced about 12" apart, spring-toothed harrows, and similar plows are examples of equipment which may produce the desired effect. 4. Irrigation - This is generally done as an emergency treatment. Site is sprinkled with water until the surface is moist. Repeat as needed. At no time should the site be irrigated to the point that 5. Barriers - Solid board fences, silt fences, snow fences, burlap fences, straw bales, and similar material can be used to control air currents and soil blowing. Barriers placed at right angles to prevailing currents at intervals of about 10 times their height are effective in controlling soil blowing. 6. Calcium Chloride - Apply at rates that will keep surface moist. May need retreatment. 1. Permanent Vegetation - See standards for permanent vegetative cover, and permanent stabilization with sod. Existing trees or large shrubs may afford valuable protection if left in place. 2. Topsoiling - Covering with less erosive soil materials. See standards for topsoiling. 3. Stone - Cover surface with crushed stone or coarse gravel.

1. Agriculture Handbook 346. Wind Erosion Forces in the United States and Their Use in Predicting

2. Agriculture Information Bulletin 354. How to Control Wind Erosion, USDA-ARS.



NORTH PARKING / BALL FIELD ENTRANCE

APPLIED PHYSICS LABORATORY THE JOHNS HOPKINS UNIVERSITY **EROSION & SEDIMENT** CONTROL NOTES TAX MAP 41 PARCEL 1

ELECTION DISTRICT NO. 5

HOWARD COUNTY, MARYLAND

SHEET C2.13

SHEET 70 OF 84

SCALE

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SHOWN

EROSION AND SEDIMENT CONTROL ONLY

THU/APL INTERNAL USE THIS DATA SHALL NOT BE DISCLOSED TO A THIRD PARTY AND SHALL NOT BE DISCLOSED TO A THIRD PARTY AND SHALL NOT BE DUPLICATED, USED, OR DISCLOSED IN WHOLE OR IN PART FOR ANY PURPOSE OTHER THAN TO EVALUATE THIS RFP OR, IN THE CASE OF A CONTRACT AWARD, TO PERFORM THE WORK REQUIRED HEREUNDER, WITHOUT THE EXPRESS WRITTEN CONSENT OF JHU/APL. A. MORTON THOMAS AND ASSOCIATES, INC.

CONSULTING ENGINEERS

TEL (301) 881-2545 FAX (301) 881-0814

AMT FILE # 102-440

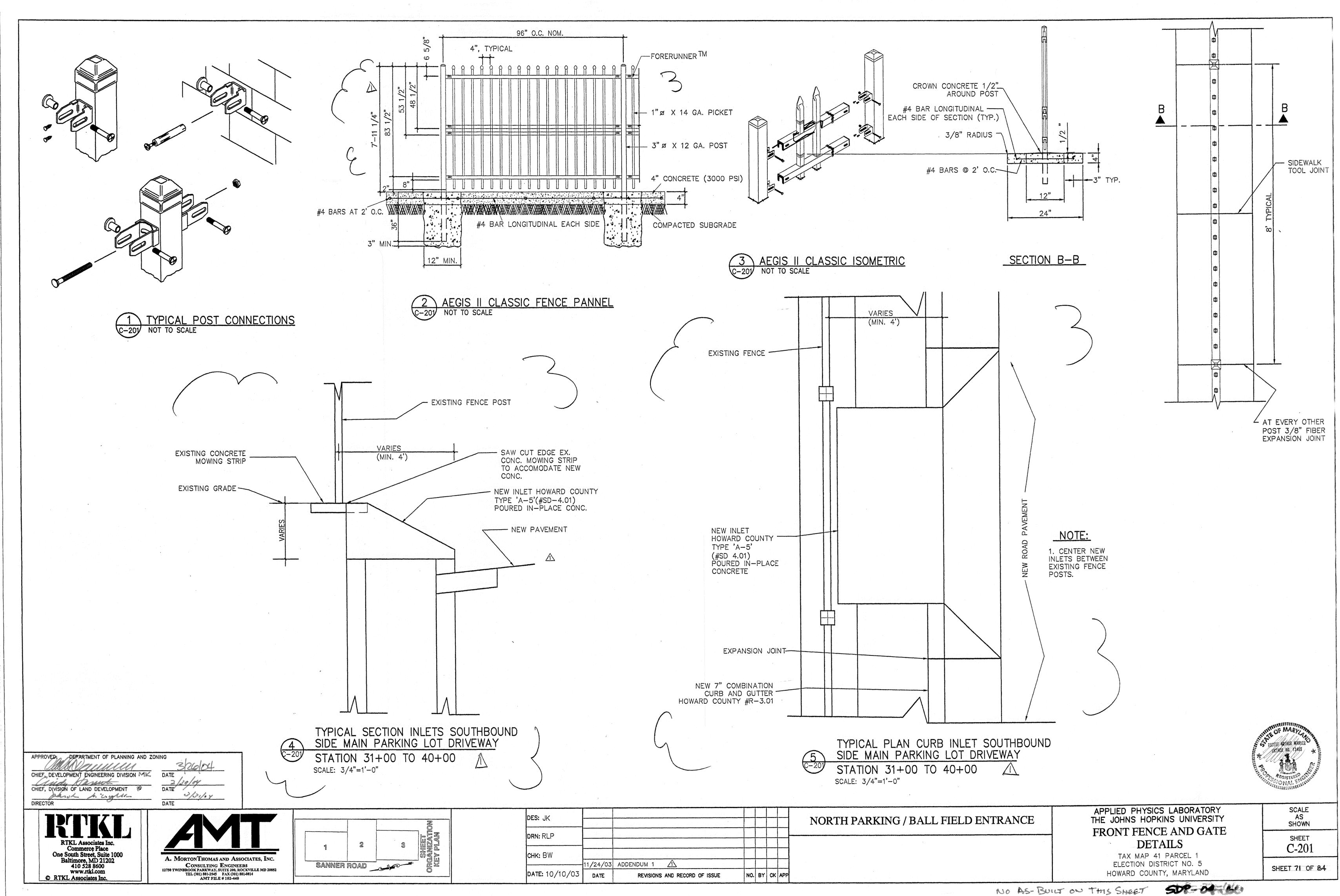
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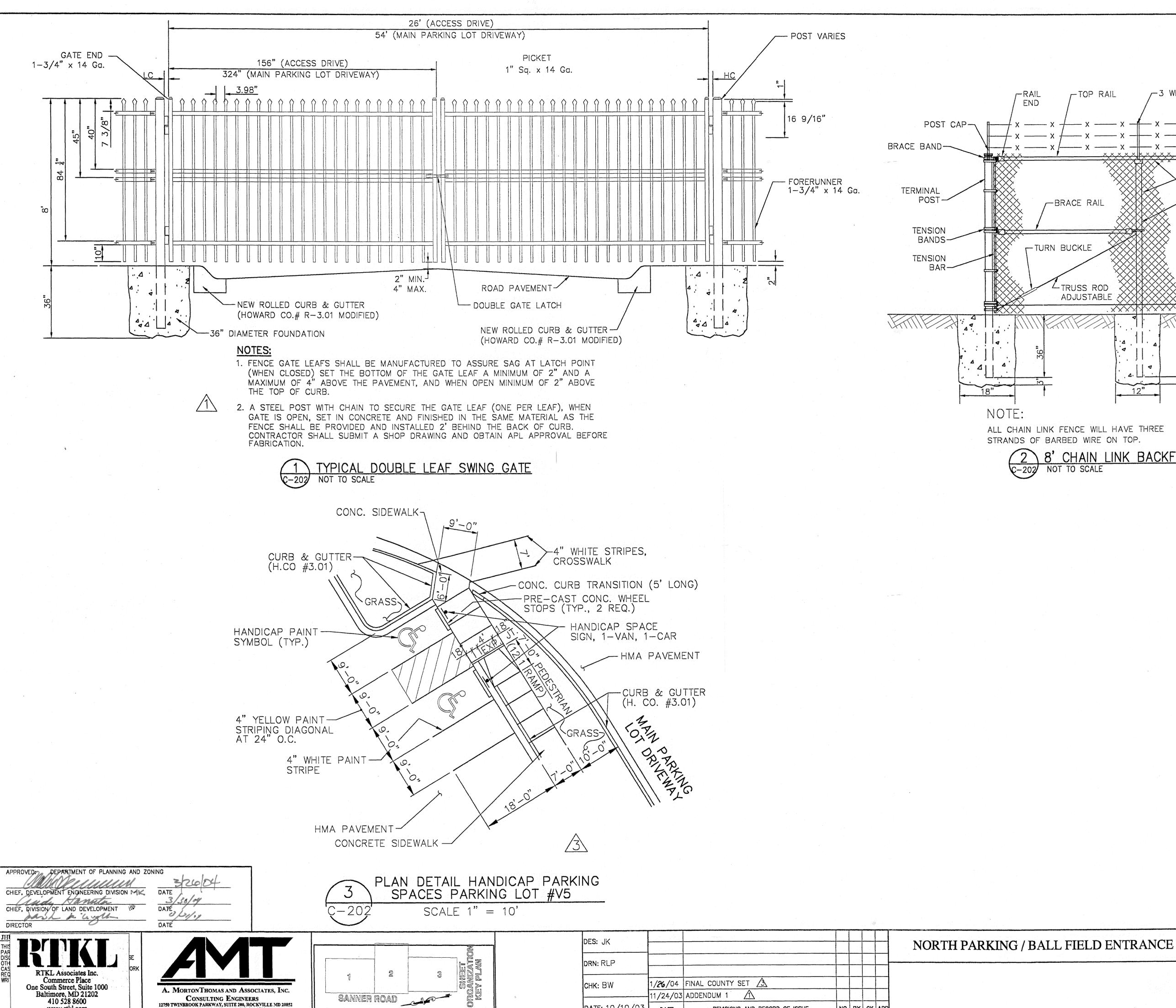
DATE

REVISION #5) 2750 TWINBROOK PARKWAY, SUITE 200, ROCKVILLE MD 20852

SANNER ROAD

DES: JK 2/4/20 REPLACE THIS SHEET WITH CI.IZA DRN: RLP G/25/04 RED-LINE SLIBMISSION 3/1/04 | COUNTY SET 12/16/03 COUNTY SET DATE: 10/10/03 REVISIONS AND RECORD OF ISSUE NO. BY CK AP



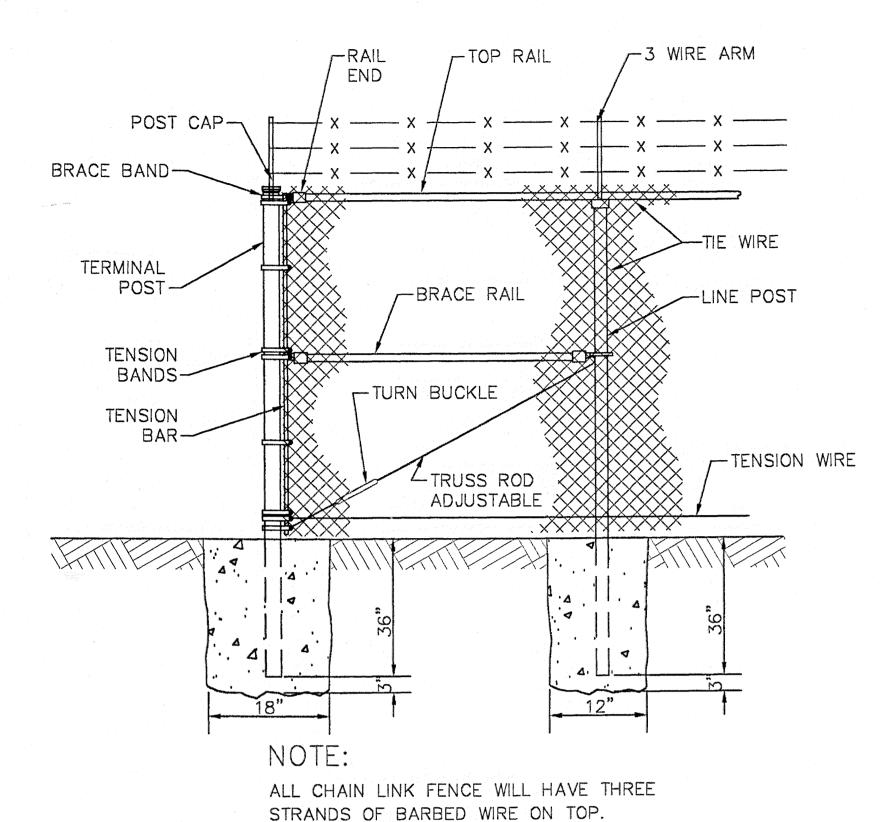


CONSULTING ENGINEERS
12750 TWINBROOK PARKWAY, SUITE 200, ROCKVILLE MD 20852
TEL (301) 881-2545 FAX (301) 881-0814
AMT FILE # 102-440

410 528 8600

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2 8' CHAIN L C-202 NOT TO SCALE

NO. BY CK APP

REVISIONS AND RECORD OF ISSUE

DATE: 10/10/03

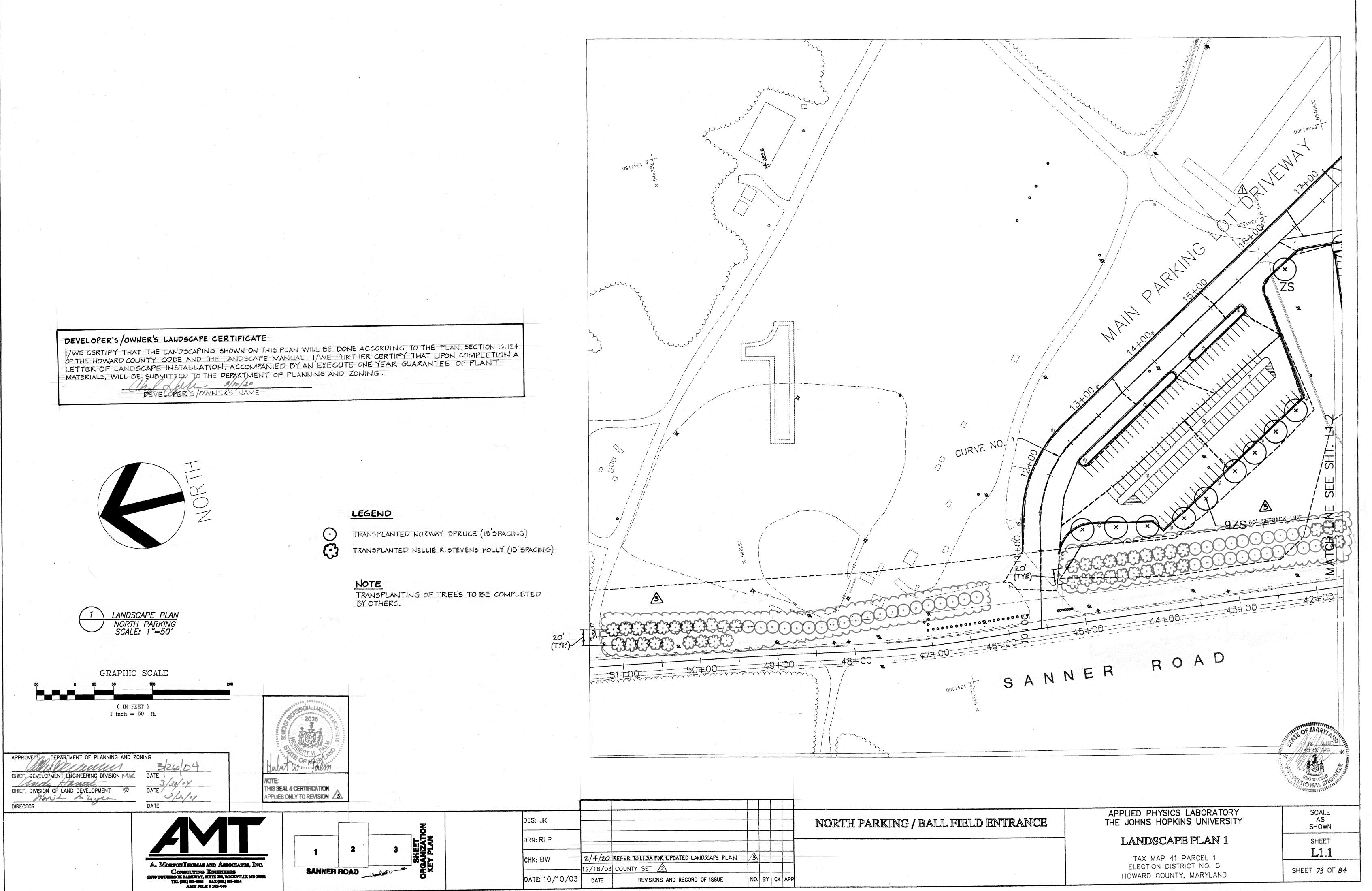
8' CHAIN LINK BACKFENCE

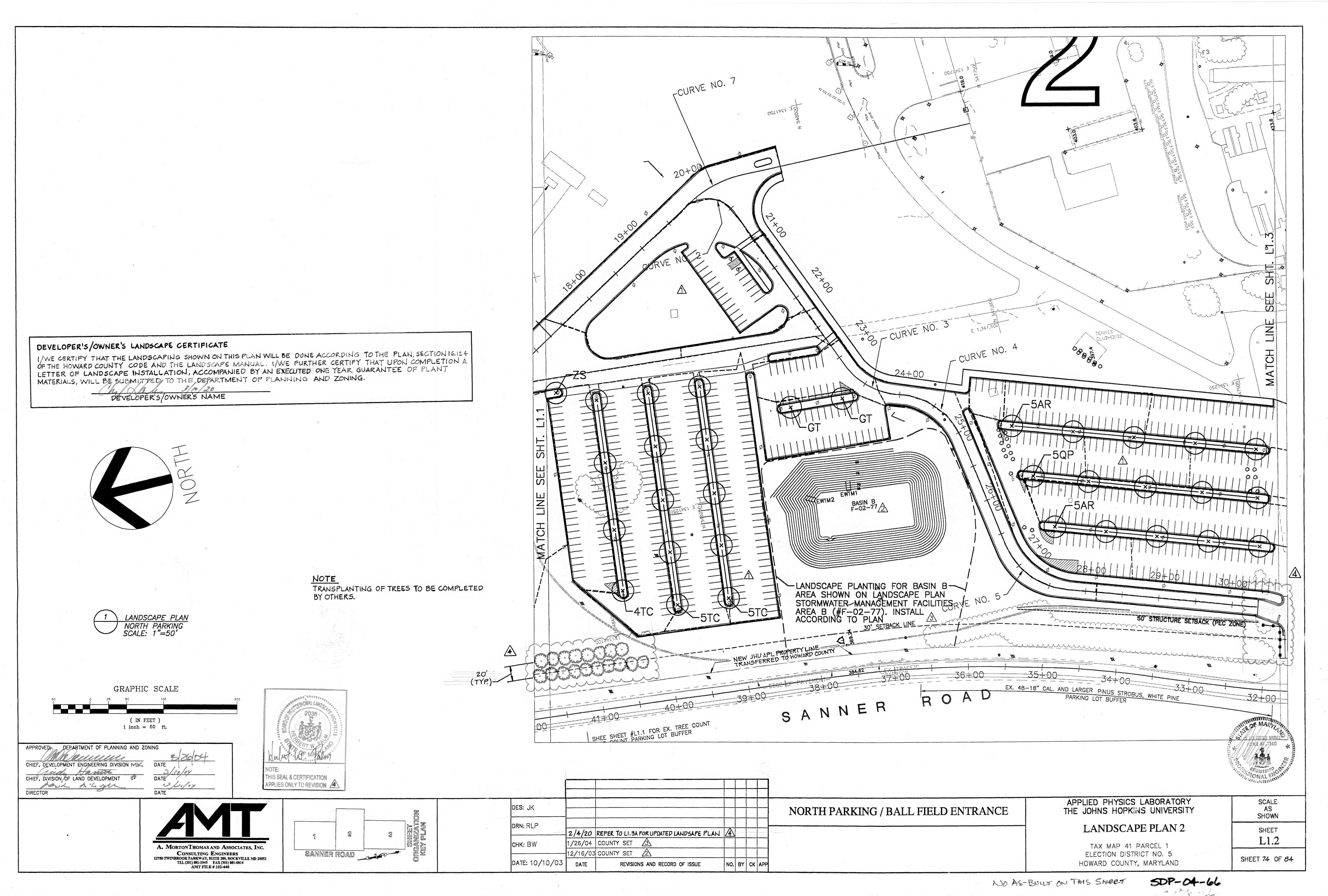
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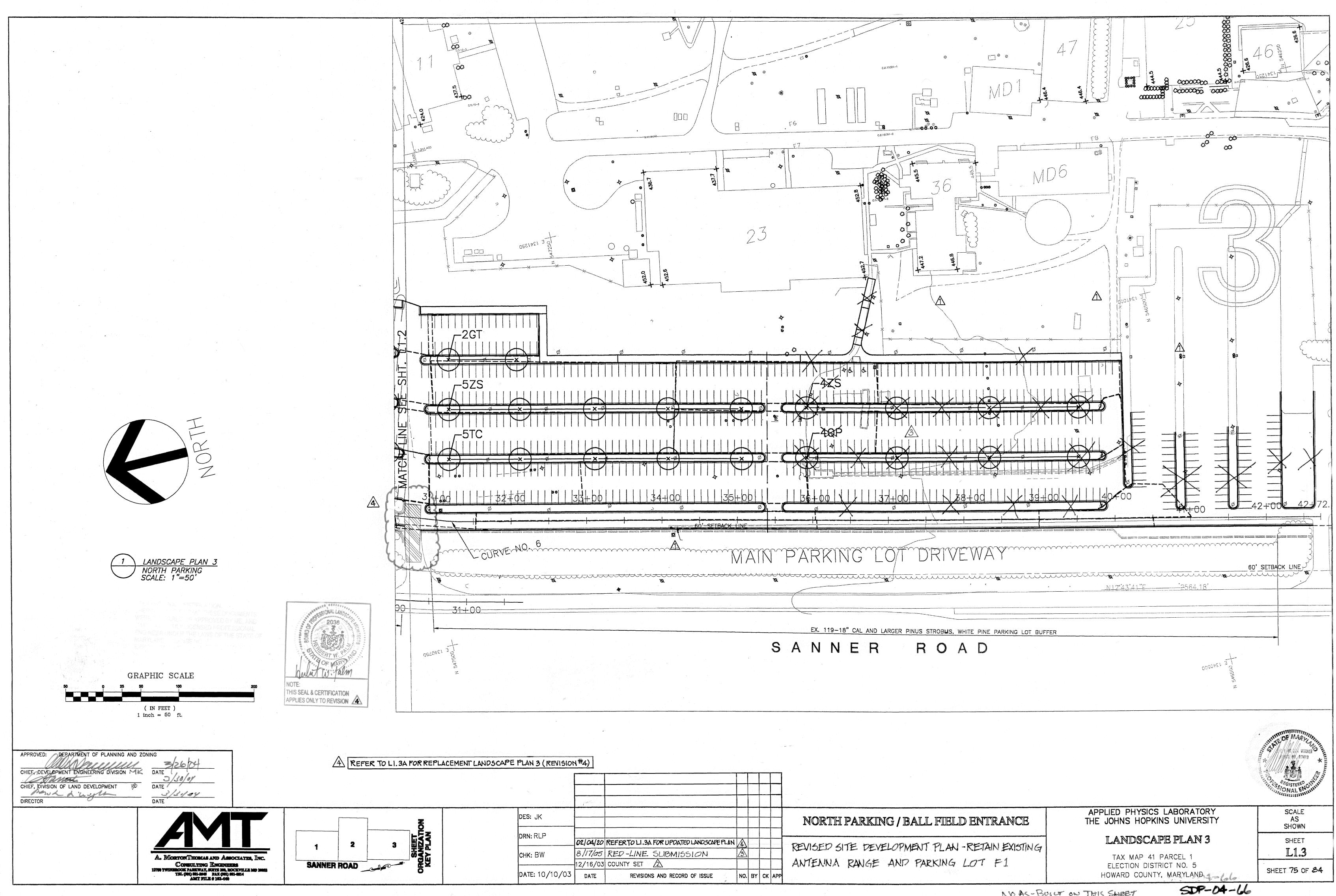
APPLIED PHYSICS LABORATORY THE JOHNS HOPKINS UNIVERSITY BACK FENCE AND GATE **DETAILS** 

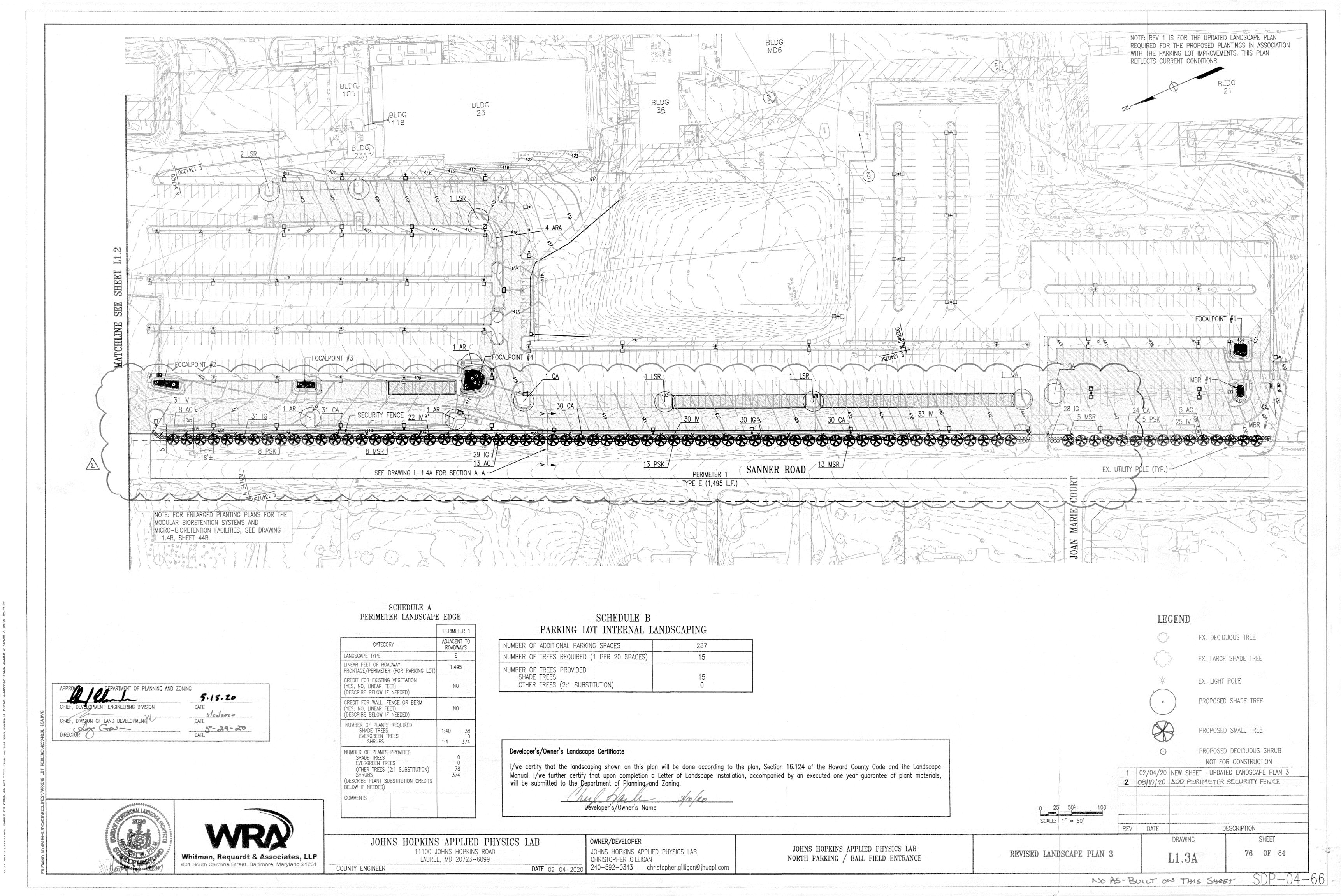
TAX MAP 41 PARCEL 1 ELECTION DISTRICT NO. 5 HOWARD COUNTY, MARYLAND

SHOWN SHEET C-202 SHEET 72 OF 84









## LANDSCAPING NOTES

- 1. This plan is for landscaping measures only.
- 2. All contractors performing work on this site shall notify "Miss Utility" 48 hours prior to any construction or grading by calling 1—800—257—7777 for the location of all utilities.
- 3. The contractors performing work on the site are responsible for protecting existing plantings during construction.
- 4. The landscape contractor shall perform work and the plantings shall conform with the "Landscape Specification Guidelines For The Baltimore-Washington Metropolitan Areas", latest edition.
- 5. The landscape contractor is to verify all plant quantities and availability and notify landscape architect or owner if there are any problems prior to bidding.
- 6. Sod or seed areas as directed by owner for all disturbed areas to be stabilized that are not landscaped or covered.
- 7. For tree pruning and care methods please refer to the National Arborist Standards, latest edition.
- 8. The owner, A. Morton Thomas & Associates, Howard Co. DPZ, and Howard Co. SCD are not responsible for any consequences resulting from any deviations or substitutions to these plans.
- 9. Financial surety for the required landscaping has been posted as part of the DPW developer's agreement in the amount of \$18,000 each for 60 shade trees, 0 evergreen trees, and 0 shrubs.



## SEQUENCE OF CONSTRUCTION FOR LANDSCAPING

THIS SEAL & CERTIFICATION APPLIES ONLY TO REVISION 5

CHIEF, DIVISION OF LAND DEVELOPMENT pash on wyll-

CHIEF DEVELOPMENT, ENGINEERING DIVISION MK DATE

- 1. Flag limits of construction and stake out sediment control measures.
- 2. Arrange pre-construction meeting with the owner, Inspector, and landscape architect at (301)881-2545.
- 3. Call "Miss Utility" at 1-800-257-7777 prior to any work for the location of all utilities.
- 4. Adjust existing sediment control measures for landscape construction as required.
- 5. After site construction has been completed implement site landscaping as shown on plan.
- 6. After site has been stabilized and all construction has been completed, remove sediment control measures upon inspectors approval.

## PROPOSED PLANT MATERIALS

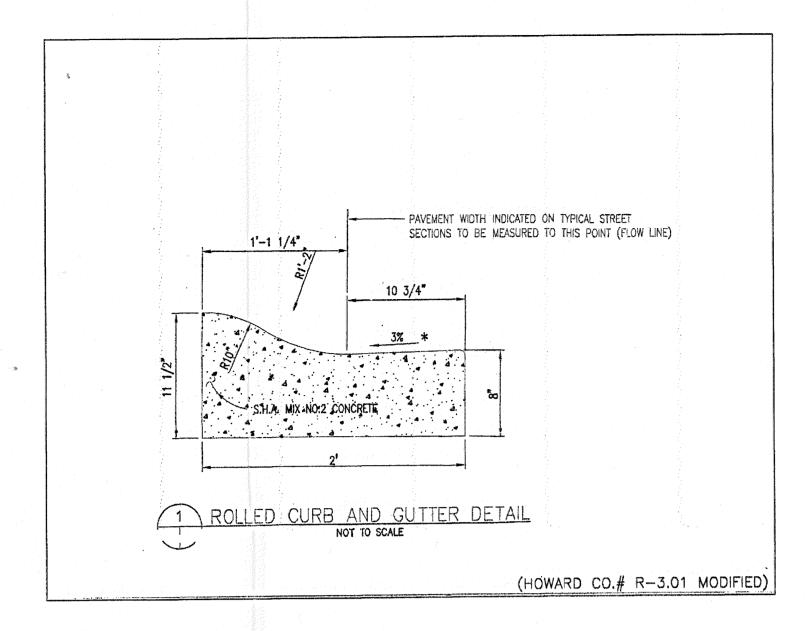
KEY	BOTANICAL NAME	COMMON NAME	SIZE	FORM	SPACING	QUANTITY	
SHAD	E TREES						
AR	ACER RUBRUM	RED MAPLE	2.5"CAL.	В&В	SHOWN	10	
[-1 ]	GLEDITSIA TRICANTHOS INERMIS	IMPERIAL THORNLESS HONEYLOUST	2.5"CAL.	B&B	SHOWN	4	
QP	QUERCUS PHELLOS	WILLOW OAK	2.5"CAL.	В&В	SHOWN	<del>13</del> -9	
TC	TILIA CORDATA	GREENSPIRE LITTLE LEAF LINDEN	2.5"CAL.	B&B	SHOWN	15	
ZS	ZELKOVA SERRATA	VILLAGE GREEN JAPANESE ZELKOVA	2.5"CAL.	В&В	SHOWN	20-16	
EVER	GREEN TREES						
PN	PINUS NIGRA	AUSTRIAN PINE	в' ні <b>с</b> н	CONT.	SHOWN	11	and the second s
STAB	ILIZATION				,	1	en e
SEED	SHA	SEED MIX NO. 1	SEED	100LBS./ ACRE	SHOWN		
VETCH	CORUNILLA VARIA	CROWNVETCH	SEED	75LBS./ ACRE	SHOWN		COMBINE WITH TEMPORARY SEED MIX (SEE SEDIMENT CONTROL NOTES)

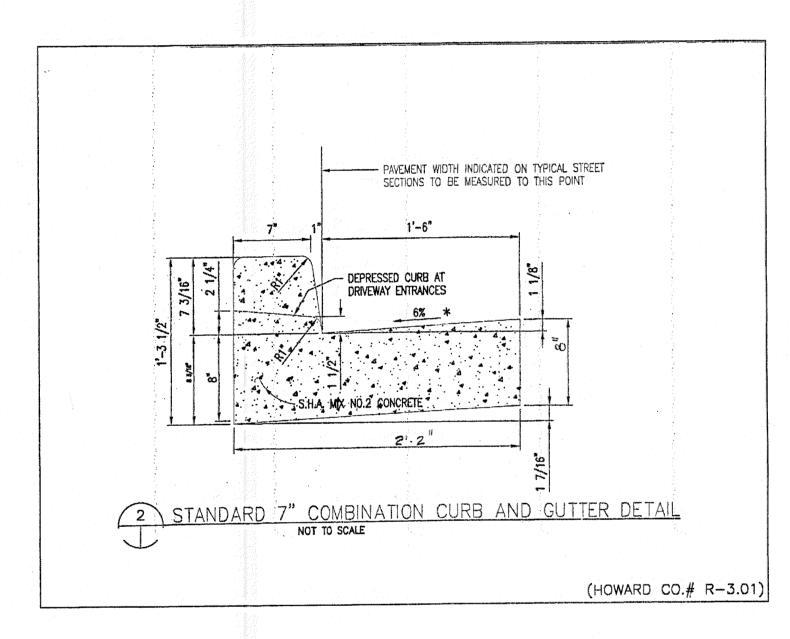
# SCHEDULE B PARKING LOT INTERNAL AND BUFFER LANDSCAPING

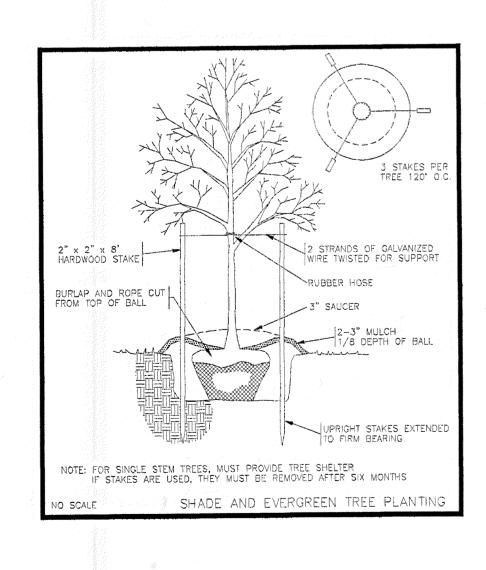
NUMBER OF NON-RESEDENTIAL PARKING SPACES	278 4078 1,194 SPACES
NUMBER OF TREES REQUIRED	15 54-60- 4
NUMBER OF TREES PROVIDED SHADE TREES EVERGREEN TREES OTHER TREES (2:1 SUBSTITUTION)	15 <del>62</del> - <del>54-</del> 0 0

# SCHEDULE A PERIMETER LANDSCAPE EDGE 3

BUFFER and the second of the s	e di la propositionale de la companya del companya del companya de la companya de
LENGTH OF ROAD FRONTAGE	<b>J, 495FT <del>1,700.</del></b> FT.
REQUIRED NUMBER OF SHADE TREES (ST) (1:40) SHRUBS (1:4)	37 <del>43</del> 374 <del>425</del>
NUMBER OF EQUIVALENT EVERGREENS (EG) (2 EG/ST & 1 EG/10 SHRUBS)	86+43=129
NUMBER OF EXISTING EG (18" CALIPER AND LARGER)	225
NUMBER OF ADDITIONAL EG	11
NUMBER OF EG TREES PROVIDED	236



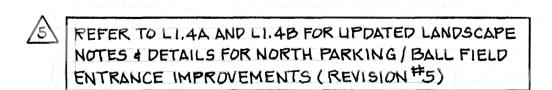


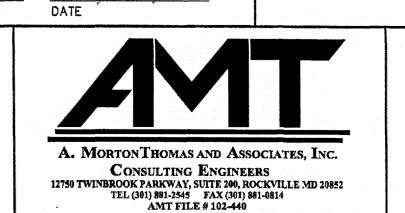


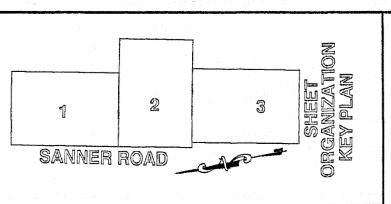


SCALE

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DE2: JK	02/04/20	REFER TO LI.4A AND LI.4B FOR UPDATED			100 m		
DRN: RLP		LANDSCAPE NOTES & DETAILS		-yangaler -		gg./2.	
	8/17/05	RED-LINE SUBMISSION	4	1,24		3 44	F
снк: BW	1/26/04	COUNTY SET 🐧					
	12/16/03	COUNTY SET 🛕					丰
DATE: 10/10/03	DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	СК	APP	1 .41

NORTH PARKING / BALL FIELD ENTRANCE

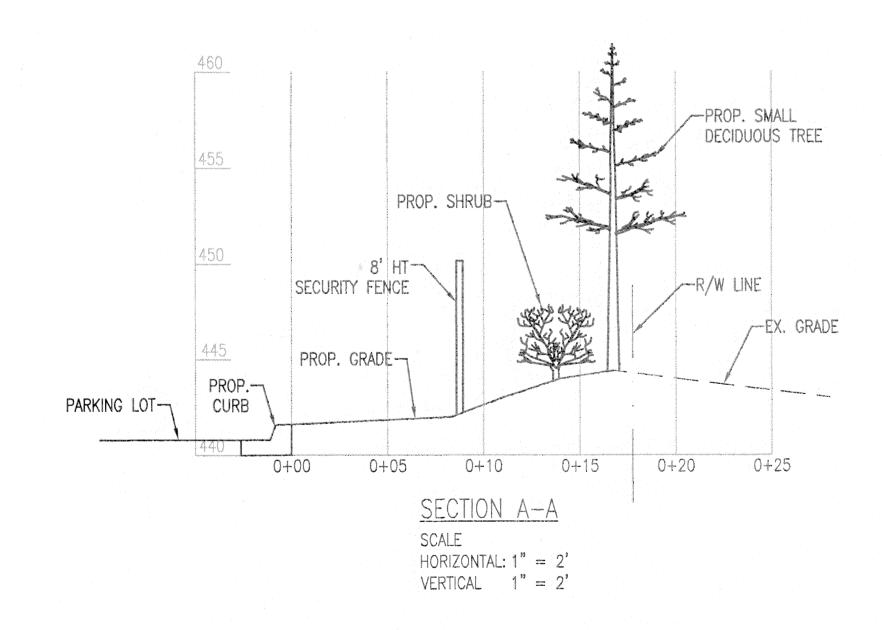
REVISED SITE DEVELOPMENT PLAN - RETAIN EXISTING ANTENNA RANGE AND PARKING LOT FI

APPLIED PHYSICS LABORATORY THE JOHNS HOPKINS UNIVERSITY LANDSCAP & DETAIL TAX MAP 41 ELECTION DIST

_ OOMS TO RING ON VERSIT	SHOWN
LANDSCAPE NOTES & DETAILS PLAN	SHEET
TAX MAP 41 PARCEL 1	L1.4
ELECTION DISTRICT NO. 5 HOWARD COUNTY, MARYLAND	SHEET 77 OF 84

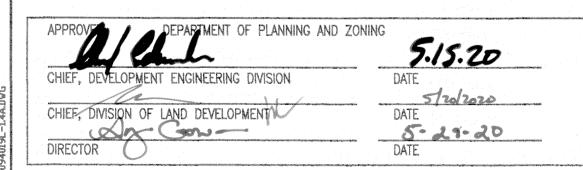
## LANDSCAPE NOTES:

- 1. THE LANDSCAPE CONTRACTOR IS RESPONSIBLE FOR CONTACTING MISS UTILITY PRIOR TO BEGINNING CONSTRUCTION FOR LOCATION OF ALL UTILITY LINES. THE LANDSCAPE CONTRACTOR SHALL BE COGNIZANT OF PROPOSED UTILITY LOCATIONS AS SHOWN ON THE PLANS.
- 2. ALL PLANTS SHALL BE EQUAL TO OR BETTER THAN THE REQUIREMENTS OF THE "AMERICAN STANDARD FOR NURSERY STOCK," LATEST EDITION, AS PUBLISHED BY THE AMERICAN ASSOCIATION OF NURSERYMAN. ALL PLANTS SHALL BE TYPICAL OF THEIR SPECIES AND VARIETY, AND SHALL BE FIRST QUALITY, SOUND, VIGOROUS, WELL BRANCHED, AND WITH HEALTHY, WELL-FURNISHED ROOT SYSTEMS. THEY SHALL BE FREE OF DISEASE, INSECTS, PESTS AND MECHANICAL INJURIES.
- 3. ALL PLANTS SHALL HAVE BEEN NURSERY GROWN AND SHALL HAVE BEEN GROWN UNDER THE SAME CLIMATIC CONDITIONS AS THE LOCATION OF THIS PROJECT FOR AT LEAST TWO YEARS BEFORE PLANTING, NEITHER HEELED IN PLANTS NOR PLANTS FROM COLD STORAGE WILL BE ACCEPTED.
- 4. LANDSCAPE MAINTENANCE OBLIGATIONS SHALL BE IN ACCORDANCE WITH THE HOWARD COUNTY SUBDIVISION AND LAND DEVELOPMENT REGULATIONS MANUAL AND THE HOWARD COUNTY LANDSCAPE MANUAL, ADOPTED JANUARY 4, 1993 AMENDED MARCH 2, 1998.
- 5. THE LANDSCAPE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR ALL WATERING DURING CONSTRUCTION AND DURING THE ONE YEAR MAINTENANCE PERIOD.
- 6. FOR SEEDING REQUIREMENTS, SEE THE EROSION AND SEDIMENT CONTROL DETAIL SHEET.
- 7. ALL PLANT MATERIALS, TOPSOIL, MULCH, FERTILIZERS, SOIL AMENITIES, PLANTING SUPPLIES AND METHODS SHALL BE SUBJECT TO THE ENGINEER'S APPROVAL. REJECTED MATERIAL SHALL BE REMOVED FROM THE SITE WITHOUT DELAY.
- 8. ALL PLANT MATERIALS SHALL BE GUARANTEED FOR ONE FULL YEAR TO BE IN A HEALTHY GROWING CONDITION. PLANT MATERIALS WHICH DO NOT FULFILL THIS GUARANTEE SHALL BE REPLACED AT NO COST TO THE OWNER, REPLACEMENT SHALL BE GUARANTEED THROUGHOUT THE ORIGINAL GUARANTEE PERIOD. PLANTS THAT DIE WITHIN 30-60 DAYS SHALL BE REPLACED IMMEDIATELY.
- 9. THE ONE YEAR GUARANTEE PERIOD SHALL BEGIN UPON THE OWNER'S APPROVAL OF THE PLANTING INSTALLATION. THE LANDSCAPE CONTRACTOR SHALL ALSO PROVIDE LANDSCAPE MAINTENANCE DURING THIS PERIOD.
- 10. ALL SUBSTITUTIONS OF PLANT MATERIAL SHALL BE REQUESTED IN WRITING TO THE LANDSCAPE ARCHITECT AND APPROVED IN WRITING BY THE OWNER. FAILURE TO OBTAIN SUBSTITUTIONS IN WRITING MAY RESULT IN LIABILITY TO THE CONTRACTOR.
- 11. DO NOT PLANT ANY SHRUBS, GRASSES OR PERENNIALS WITHIN 3' OF A CLEANOUT OR OBSERVATION WELL IN THE MICRO-BIORETENTION FACILITIES.
- 12. ALL TREES OVER 6' IN HEIGHT MUST BE STAKED. ALL STAKES AND RELATED MATERIAL MUST BE REMOVED IMMEDIATELY PRIOR TO THE END OF THE ONE YEAR MAINTENANCE PERIOD.
- 13. AT THE TIME OF PLANT INSTALLATION, ALL SHRUBS AND TREES LISTED AND APPROVED ON THE LANDSCAPING PLAN, SHALL COMPLY WITH THE PROPER HEIGHT REQUIREMENTS IN ACCORDANCE WITH THE HOWARD COUNTY LANDSCAPE MANUAL.
- 14. THE OWNER, TENANT AND/OR THEIR AGENTS SHALL BE RESPONSIBLE FOR MAINTENANCE OF THE REQUIRED LANDSCAPING INCLUDING BOTH PLANT MATERIALS AND BERMS, FENCES AND WALLS. ALL PLANT MATERIALS SHALL BE MAINTAINED IN GOOD GROWING CONDITION, AND WHEN NECESSARY, REPLACED WITH NEW MATERIALS TO ENSURE CONTINUED COMPLIANCE WITH APPLICABLE REGULATIONS.
- 15. THIS PLAN HAS BEEN PREPARED IN ACCORDANCE WITH THE PROVISIONS OF SECTION 16.124 OF THE HOWARD COUNTY CODE AND LANDSCAPE MANUAL BY PROVIDING XX SHADE TREES, XX SMALL DECIDUOUS TREES AND XXX SHRUBS. FINANCIAL SURETY FOR THE REQUIRED LANDSCAPING WILL HAVE TO BE POSTED AS PART OF THE DPW DEVELOPER'S AGREEMENT IN THE AMOUNT OF \$xx,xxx FOR THE LANDSCAPING PROVIDED.
- 16. IF THERE IS A DISCREPANCY BETWEEN THE QUANTITY OF PLANTS ON THE LANDSCAPE PLAN AND THE QUANTITY OF PLANTS IN THE LANDSCAPE PLANT SCHEDULE, THE GREATER NUMBER SHALL APPLY.
- 17. ALL PROPOSED AND TRANSPLANTED TREES SHALL HAVE A 6 FOOT DIAMETER MULCH BED. ALL SHRUBS OUTSIDE OF THE SECURITY FENCE ON SANNER ROAD SHALL BE PLACED IN A 4 FOOT WIDE CONTINUOUS MULCH BED.



	P	ARKING LOT A	ND PERIMETER	LANDSCAL	PE PLAN	T SCHEDULE	
QUANTITY	KEY	BOTANICAL NAME	COMMON NAME	SIZE	ROOT	MATURE SIZE	MIN. SPACING
TREES							
4	ARA	ACER RUBRUM 'ARMSTRONG'	ARMSTRONG RED MAPLE	2.5"-3" CAL.	B&B	HEIGHT: 50'-70' SPREAD: 10'-15'	AS SHOWN
3	AR	ACER RUBRUM 'FRANKSRED'	RED SUNSET RED MAPLE	2.5"-3" CAL.	B&B	HEIGHT: 50'-60' SPREAD: 35'-40'	AS SHOWN
26	AC	AMELANCHIER CANADENSIS	SHADBLOW SERVICEBERRY	8'-10' HT.	B&B	HEIGHT: 20'-25' SPREAD: 10'-15'	AS SHOWN
5	LSR	LIQUIDAMBAR STYRACIFLUA 'ROTUNDILOBA'	ROTUNDILOBA SWEETGUM	2.5"-3" CAL.	B&B	HEIGHT: 60'-75' SPREAD: 40'	AS SHOWN
26	MSR	MAGNOLIA STELLATA 'ROYAL STAR'	ROYAL STAR MAGNOLIA	7' - 8' HT.	B&B	HEIGHT: 10'-20' SPREAD: 10'-15'	AS SHOWN
26	PSK	PRUNUS SERRULATA 'KWANZAN'	KWANZAN CHERRY	2.5"-3" CAL.	B&B	HEIGHT: 25'-35' SPREAD: 15'-20'	AS SHOWN
3	QA	QUERCUS ACUTISSIMA	SAWTOOTH OAK	2.5"-3" CAL.	B&B	HEIGHT: 35'-45' SPREAD: 35'-45'	AS SHOWN
SHRUBS							
115	CA	CLETHRA ALNIFOLIA 'SIXTEEN CANDLES'	SIXTEEN CANDLES SUMMERSWEET	30"-36" HT.	B&B	HEIGHT: 3'-4' SPREAD: 3'-4'	4' O.C.
118	IG	ILEX GLABRA 'SHAMROCK'	SHAMROCK INKBERRY	30"-36" HT.	В&В	HEIGHT: 3'-4' SPREAD: 3'-4'	4' O.C.
141	IV	ITEA VIRGINICA 'LITTLE HENRY'	LITTLE HENRY VIRGINIA SWEETSPIRE	30"-36" HT.	B&B	HEIGHT: 2'-3' SPREAD: 3'-4'	4' O.C.

MI	CRO-B	IORETENTION A	ND FOCALPOIN	NT SWM I	ANDSCAP	E PLANT SCI	HEDULE
QUANTITY	KEY	BOTANICAL NAME	COMMON NAME	SIZE	ROOT	MATURE SIZE	MIN. SPACING
SHRUBS							ing thin place from the property of the proper
25	AM	ARONIA MELANOCARPA	BLACK CHOKEBERRY	#5	CONT.	HEIGHT: 3'-6' SPREAD: 5'-6'	3.5' O.C.
26	CA	CLETHRA ALNIFOLIA 'SIXTEEN CANDLES'	SIXTEEN CANDLES SUMMERSWEET	#5	CONT.	HEIGHT: 3'-4' SPREAD: 3'-4'	3.5' O.C.
4	LB	LINDERA BENZOIN	SPICEBUSH	#5	CONT.	HEIGHT: 6'-12' SPREAD: 6'-12'	AS SHOWN
ORNAMENTA	L GRASSE				inne en en eneman genera genera genera genera genera en		
56	CL	CHASMANTHIIUM LATIFOLIUM	NORTHERN SEA OATS	#2	CONT.	HEIGHT: 3'	24" O.C.
57	PV	PANICUM VIRGATUM 'PRAIRIE SKY'	BLUE SWITCHGRASS	#2	CONT.	HEIGHT: 3'-4'	24" O.C.
PERENNIALS							
100	AL	ASTER LAEVIS	SMOOTH ASTER	#1	CONT.	HEIGHT: 2'-4' SPREAD: 1'-2'	18" O.C.
75	BL	BOLTONIA ASTEROIDES	FALSE ASTER	#1	CONT.	HEIGHT: 5'-6' SPREAD: 2'-4'	18" O.C.



## Developer's/Owner's Landscape Certificate

I/we certify that the landscaping shown on this plan will be done according to the plan, Section 16.124 of the Howard County Code and the Landscape Manual. I/we further certify that upon completion a Letter of Landscape Installation, accompanied by an executed one year guarantee of plant materials, will be submitted to the Department of Planning and Zoning.

Developer's/Owner's Name

JOHNS HOPKINS APPLIED PHYSICS LAB 11100 JOHNS HOPKINS ROAD LAUREL, MD 20723-6099

COUNTY ENGINEER

OWNER/DEVELOPER JOHNS HOPKINS APPLIED PHYSICS LAB CHRISTOPHER GILLIGAN 240-592-0343 christopher.gilligan@jhuapl.com DATE 02-04-2020

JOHNS HOPKINS APPLIED PHYSICS LAB NORTH PARKING / BALL FIELD ENTRANCE REVISED LANDSCAPE DETAILS AND NOTES

0 25' 50' SCALE: 1" = 50"

L1.4A

REV DATE

78 OF 84

SHEET

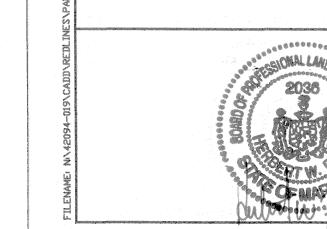
SDP-04-66

NOT FOR CONSTRUCTION

DESCRIPTION

1 02/04/20 NEW SHEET -ADDED LANDSCAPE DETAILS AND NOTES

NO AS-BULLT ON THIS SHEET



Whitman, Requardt & Associates, LLP 801 South Caroline Street, Baltimore, Maryland 21231

DRAWING

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2 CA

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2 CA

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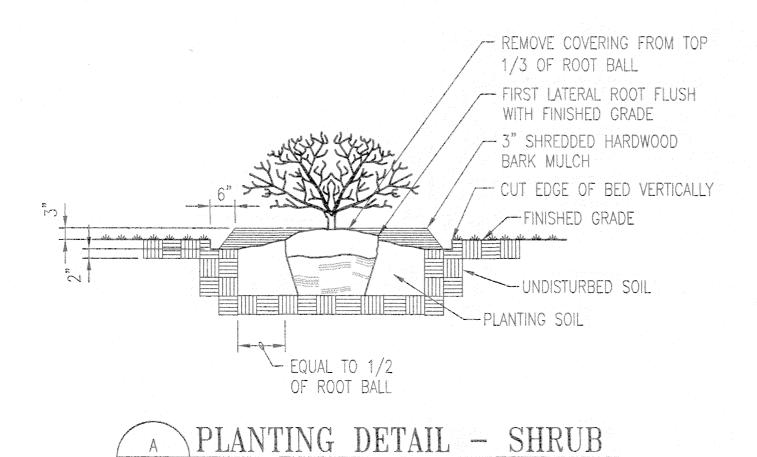
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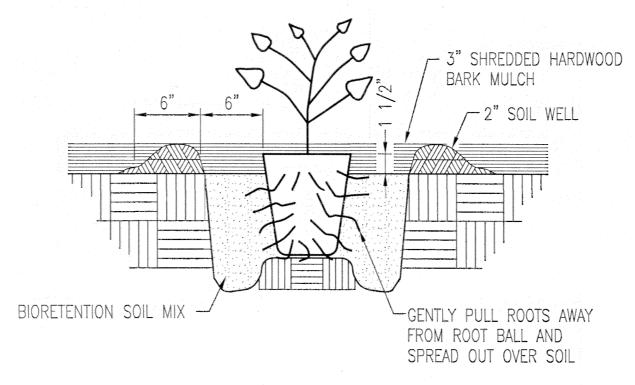
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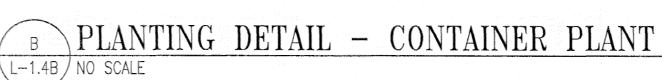
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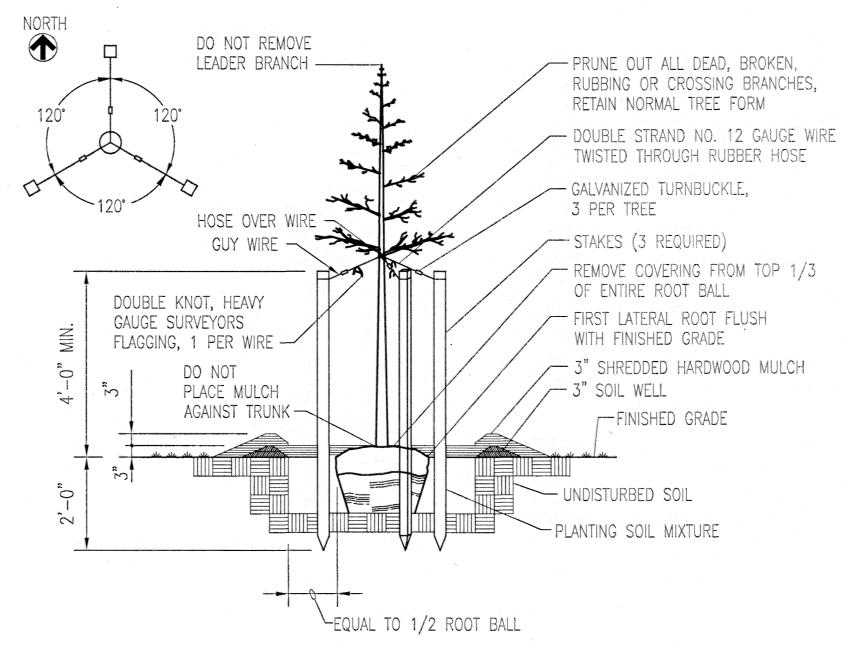
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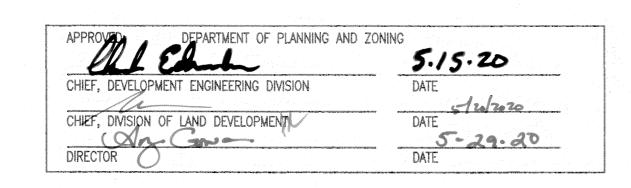






C PLANTING DETAIL - DECIDUOUS TREE

NO SCALE





L-1.4B NO SCALE



#### Developer's/Owner's Landscape Certificate

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Developer's/Owner's Name

JOHNS HOPKINS APPLIED PHYSICS LAB

COUNTY ENGINEER

11100 JOHNS HOPKINS ROAD LAUREL, MD 20723-6099 OWNER/DEVELOPER

JOHNS HOPKINS APPLIED PHYSICS LAB
CHRISTOPHER GILLIGAN
240-592-0343 christopher.gilligan@jhuapl.com

JOHNS HOPKINS APPLIED PHYSICS LAB NORTH PARKING / BALL FIELD ENTRANCE

REVISED LANDSCAPE DETAILS AND NOTES

REV DATE DESCRIPTION

DRAWING SHEET

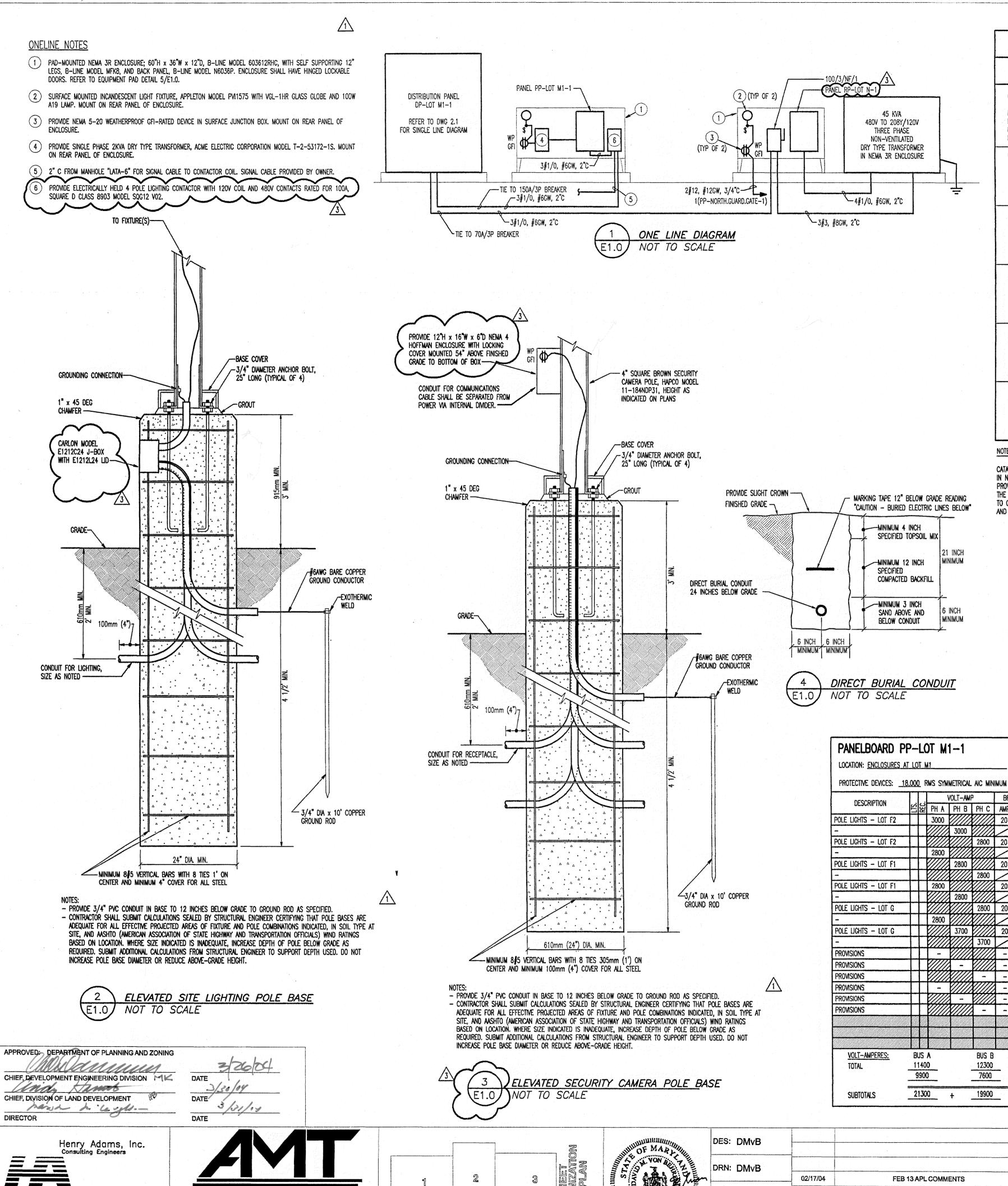
AND NOTES L1.4B 79 OF 84

1 02/04/20 NEW SHEET - ADDITIONAL LANDSCAPE DETAILS

NOT FOR CONSTRUCTION

NO AS-BUILT ON THIS SHEET

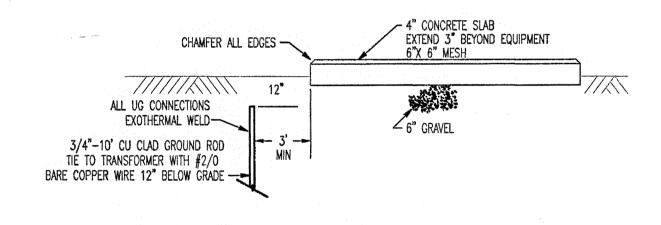
SDP-04-66



	LIGHTING FIXTURE SCHEDULE
TYPE	DESCRIPTION
OA MFGR MODEL LAMPS POLE	ARM MOUNTED, ALUMINUM "SHOEBOX" HID AREA LIGHTING FIXTURE WITH TYPE II DISTRIBUTION AND ONE LAMP WITH SUPPORT ON 15' POLE ON 3' BASE WITH DARK BRONZE FINISH LITHONIA KSF2 R2 480 SP04 LS ONE 400W METAL HALIDE SSS 15 4C
OB MFGR MODEL LAMPS POLE	ARM MOUNTED, ALUMINUM "SHOEBOX" HID AREA LIGHTING FIXTURE WITH TYPE IV SHARP CUTOFF DISTRIBUTION AND ONE LAMP WITH SUPPORT ON 15' POLE ON 3' BASE WITH DARK BRONZE FINISH LITHONIA KSF2 R4SC 480 SP04 LS ONE 400W METAL HALIDE SSS 15 4C
OC MFGR MODEL LAMPS POLE	TWO ARM MOUNTED, ALUMINUM "SHOEBOX" HID AREA LIGHTING FIXTURES AT 180 DEGREE ORIENTATION WITH TYPE II DISTRIBUTION AND ONE LAMP EACH WITH SUPPORT ON 15' POLE ON 3' BASE WITH DARK BRONZE FINISH LITHONIA (TWO) KSF2 R2 480 SP04 LS ONE 400W METAL HALIDE (EACH) SSS 15 4C
OD MFGR MODEL LAMPS POLE	TWO ARM MOUNTED, ALUMINUM "SHOEBOX" HID AREA LIGHTING FIXTURES AT 180 DEGREE ORIENTATION, ONE WITH TYPE II DISTRIBUTION AND ONE WITH TYPE IV SHARP CUTOFF DISTRIBUTION, AND ONE LAMP EACH WITH SUPPORT ON 15' POLE ON 3' BASE WITH DARK BRONZE FINISH LITHONIA (ONE) KSF2 R2 480 SP04 LS & (ONE) KSF2 R4SC 480 SP04 LS ONE 400W METAL HALIDE (EACH) SSS 15 4C
OE MFGR MODEL LAMPS POLE	ARM MOUNTED, ALUMINUM "SHOEBOX" HID AREA LIGHTING FIXTURE WITH TYPE IV SHARP CUTOFF DISTRIBUTION AND ONE LAMP WITH SUPPORT ON 22' POLE ON 3' BASE WITH DARK BRONZE FINISH LITHONIA KSF2 R4SC 480 SP04 LS ONE 400W METAL HALIDE SSS 22 4C
OF MFGR MODEL LAMPS POLE	TWO ARM MOUNTED, ALUMINUM "SHOEBOX" HID AREA LIGHTING FIXTURES AT 180 DEGREE ORIENTATION, ONE WITH TYPE II DISTRIBUTION AND ONE WITH TYPE IV SHARP CUTOFF DISTRIBUTION, AND ONE LAMP EACH WITH SUPPORT ON 22' POLE ON 3' BASE WITH DARK BRONZE FINISH LITHONIA (ONE) KSF2 R2 480 SP04 LS & (ONE) KSF2 R4SC 480 SP04 LS ONE 400W METAL HALIDE (EACH)  SSS 22 4C

NOTES: (APPLICABLE TO LIGHTING FIXTURE SCHEDULE ONLY)

CATALOG NUMBERS FOR LIGHTING FIXTURES INDICATE THE TYPE AND QUALITY OF THE FIXTURE TO BE PROVIDED BY THE CONTRACTOR AND ARE GENERAL IN NATURE. THE CATALOG NUMBERS ARE NOT INTENDED TO INDICATE AN ACTUAL ORDER MODEL NUMBER. IT IS THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE FIXTURES WITH THE TYPE OF LAMP, BALLAST, LENS OR DIFFUSER, AND CONSTRUCTION FEATURES AS INDICATED IN THE SPECIFICATIONS AND IN THE LIGHTING FIXTURE SCHEDULE. UNLESS OTHERWISE NOTED, EQUIVALENT FIXTURES WILL BE ACCEPTED PROVIDED THEY ARE PROVEN TO BE EQUAL TO OR BETTER THAN THE FIXTURE SPECIFIED, IN ALL RESPECTS. THIS SHALL INCLUDE, BUT NOT BE LIMITED TO, CONSTRUCTION FEATURES, APPEARANCE AND PERFORMANCE. WHERE A FIXTURE IS NOTED AS "NO EQUAL," SUBSTITUTIONS WILL NOT BE ACCEPTED.



EQUIPMENT PAD DETAIL

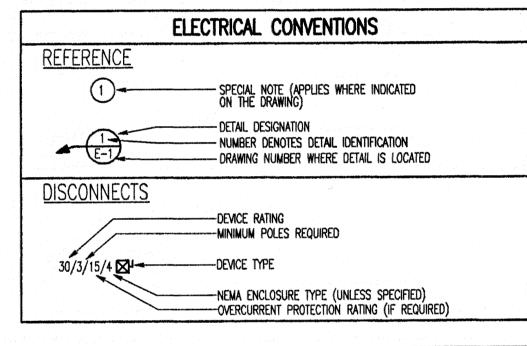
SECTION MAIN: 150			1 OF 1 BUS:	- 		Jnting: <u>\$</u> .ts: <u>480</u>				] ] 	☐ INTEGRAL SPD☐ 200% NEUTRAL☐ GROUND BUS		PANELBOAR LOCATION: ENCLOS	-
FEEDER:	REF	R TO	ONE LINE	DIAGRA	W	**********	PHASE:	3		. [	ISOLATED GROUND BUS		PROTECTIVE DEVICE	:S: _1
CIRC./ POLE			CIRC./ POLE	BRE	aker		/OLT-AM			, ;	DESCRIPTION		DESCRIPTION	
NUMBER	A E	C	NUMBER		POLE	PH A	PH B	PH C	LTS.	REC	MARKET L			landin'
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/3			/4	$\leq$	2		3000		Ц				SECURITY POLE #10	
5/5	<b> </b>		6/6	20				3000	Ш		POLE LIGHTS - LOT M2	_  _	SPARE	
	•	$\dashv$		$\leq$	2	3000			1				SPARE	
9/9	H		10/10	20			1600			$\Box$	POLE LIGHTS - LOT V-5	71	SPARE	
/11	-	-	/12		2			1600			-	<b>〈</b> /₃∖	SPARE	z wiel
13/13	•	$\dashv$	14/14	20		1400			1		POLE LIGHTS - LOT V-5	<b>X</b>	SPACE	
/15	H	H	/16		2		1400		1			4	SPACE	· ·
17/17	-	-	18/18	20				2500	L		POLE LIGHTS — LOT N		SPACE	
/19	<b>•</b> —	$\dashv$	/20		2	2500		<i>X/////</i>	1		-		SPACE	a sesen
21/21	-	$\vdash$	22/22	20			1600		1_		POLE LIGHTS - LOT N		SPACE	4.34
/23	-	-	24/24		2			1600			→   jelo deleta		SPACE	9-10-1
25/25	<b>-</b>	Н	26/26	-	-	-		<i>X////</i>	1		PROVISIONS		VOLT-AMPERES	
27/27		$\vdash$	28/28	-	-		-	<b>V</b> ////	1	Γ	PROMSIONS		TOTAL	
29/29	-		30/30	-	-			-	T	Γ	PROVISIONS			
31/31	<b>_</b>	$\vdash$	32/32	-	T -	-	V////	X////	1	Γ	PROVISIONS			
33/33	-		34/34	-	<b> </b>	/////	-	V////	1	Г	PROVISIONS		SUBTOTALS	
35/35	-	┝	36/36	-	-	/////		-	T	Γ	PROVISIONS			
BUS C									ou.u	Mail de				
12100	•	OD)												
8700	(E	ven)								חרי	MND 18/4 _ 62.0			
8700 20800	_ (E	VEN)	ĹŐF	62.0	KVA	(CONNEC	TFD)	DEMA			MAND KVA = 62.0 PS TOTAL = 74.6			

	ELECTRICAL LEGEND							
SYMBOL	DESCRIPTION	MOUNTING HEIGHT						
<del>о</del> по по по	LUMINAIRE — SEE SCHEDULE FOR TYPE (SINGLE OR DUAL POLE MOUNTED SITE LIGHT — BOX)	-						
↔	Luminaire with forward throw distribution — see schedule for type (single pole mounted site light — box)							
	RECEPTACLE - NEMA CONFIGURATION 5-20R DUPLEX	18"						
	SAFETY SWITCH	46"						
	UNDERGROUND CONDUIT							
	ELECTRICAL HANDHOLE — PROVIDE 36" x 36" x 36"D PRECAST SERVICE BOX WITH OPEN BOTTOM, QUAZITE MODEL PG3636BA36. PROVIDE STANDARD COVER, QUAZITE MODEL PG3636WA0O, WITH "ELECTRICAL" LOGO. INSTALL FLUSH IN GRADE OR SURROUNDING PAVEMENT.	·						
0	COMMUNICATIONS ELECTRICAL HANDHOLE — PROVIDE 36" x 36" x 36"D PRECAST SERVICE BOX WITH OPEN BOTTOM, QUAZITE MODEL PG3636BA36. PROVIDE STANDARD COVER, QUAZITE MODEL PG3636WAOD, WITH "COMMUNICATIONS" LOGO. INSTALL FLUSH IN GRADE OR SURROUNDING PAVEMENT.	-						

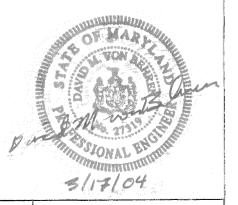
#### NOTES: (APPLICABLE TO ELECTRICAL LEGEND ONLY)

- 1. THE MOUNTING HEIGHTS GIVEN ON THIS SHEET IN THE ELECTRICAL LEGEND ARE GENERAL AND SHALL BE USED ONLY WHEN MOUNTING HEIGHTS CANNOT BE ESTABLISHED BY REFERENCE TO DETAILS, ELEVATIONS, AND NOTES ON THE DRAWINGS.
- 2. ALL MOUNTING HEIGHTS, UNLESS OTHERWISE NOTED, SHALL BE MEASURED FROM THE FINISHED FLOOR TO THE CENTERLINE OF THE OUTLET OR DEVICE.
- 3. HEIGHTS OF ALL ITEMS NOT COVERED BY THE ELECTRICAL LEGEND AND NOT SHOWN ON THE DRAWINGS SHALL BE AS DIRECTED BY THE ENGINEER.
- 4. WHERE PLACING ANY ITEM AT THE HEIGHTS LISTED OR NOTED WILL CAUSE INTERFERENCE WITH THE WORK OF OTHER TRADES, OR IS NOT PHYSICALLY POSSIBLE OR DESIRABLE FOR ONE REASON OR ANOTHER, THE ITEM SHALL BE MOVED TO A LOCATION APPROVED BY THE ENGINEER.

	ELECTRICAL /	ABBREVIA	ATIONS
A	AMPERE.	NTS	NOT TO SCALE
AFF AFG	ABOVE FINISHED FLOOR ABOVE FINISHED GRADE	OCP	OVERCURRENT PROTECTION
AIC ASYM	AMPERE INTERRUPTING CAPACITY ASYMMETRICAL	PH PVC	PHASE POLYMNYL CHLORIDE
C CB CKT	CONDUIT CIRCUIT BREAKER CIRCUIT	RX	REMOVE EXISTING
		SYM	SYMMETRICAL
DWG	DRAWING	TYP	TYPICAL
etr Ex	EXISTING TO REMAIN EXISTING	UG UON	UNDERGROUND UNLESS OTHERWISE NOTED
GFI GW	GROUND FAULT INTERRUPTER GROUND WIRE	V	VOLTS
KCMIL KVA	THOUSAND CIRCULAR MILS KILO-VOLT-AMPERE	W WP	WIRE WEATHER PROOF
MCB	MAIN CIRCUIT BREAKER	XFMR	TRANSFORMER



PANELBOARD (F	NORT	H BALLFI	ELD ENTR		1 121		MAIN: 1	50A MCB	R: <u>1</u> OF BU	S: <u>225A</u>	_ vo	LTS: <u>208</u>		MENNO		☐ INTEGRAL SPD ☐ 200% NEUTRAL ☐ GROUND BUS ☐ ISOLATED GROUND BUS
PROTECTIVE DEVICES:1	0.000	RMS SY	VOLT-AN			AKER		: REFER	TO ONE L		EAKER		PHASE: VOLT-AM		ТТ	T SOLATED GROOMS BOX
DESCRIPTION	5.5	를 PH A		PH C	AMP		CIRC./ POLE NUMBER	ΔR	C NUMB		POLE		PH B		5.5	DESCRIPTION
ECURITY POLE #9	17	500	11111		20	1	1/1	9	7 2/			2500			1	GUARD BOOTH
ECURITY POLE #10	11		500		20	1	3/3	-	1 7		2		2500		1	- Company of the Comp
PARE	77		X////	-	20	1	5/5		6/	60			X/////	2500	$\prod$	GUARD BOOTH
PARE	77	-	V////		20	1	7/7	<del> </del>	1 7	3	2	2500				***
PARE	$\Pi$	V////	-		20	1	9/9	-	10/1	60			2500			GUARD BOOTH
SPARE			X////	-	20	1	11/11		<b>4</b> /1	2	2		X/////	2500	$\prod$	
SPACE	11	-			_	-	13/13	<b> </b>	14/1	60		2500				GUARD BOOTH
SPACE	$\top$		-		_	-	15/15		1 /1	6	2		2500			<b>–</b>
SPACE	ПТ		X////	-	-	-	17/17	+	18/1	60			X////	2500		GUARD BOOTH
SPACE	TT	-		X/////	-	-	19/19	<b> </b>	/2		2	2500		X/////		<ul> <li>Medical services in property</li> </ul>
SPACE	$\top \top$		-		_	T -	21/21	╽┝╼┢╌	22/2	2 60			2500			GUARD BOOTH
SPACE	$\Box$		XIIII	-	-	T -	23/23	L	<b>b</b> /2	4	2		X////	2500		•
VOLT-AMPERES:	BUS	S A		BUS B	^~~		BUS (	;					,			
TOTAL	100	000		500 10000			10000	(000 (EVE	•							CHAND IVIA - 31.0
SUBTOTALS	105	500	+	10500		+	10000	== TO	TAL OF	31.0	KVA	(CONNEC	TEN)	DFM		EMAND KVA = $31.0$ WPS TOTAL = $86.1$



SCALE

A. MORTON THOMAS AND ASSOCIATES, INC. 600 Baltimore Avenue Baltimore, MD 21204-4079 410.296.6500 Fax 410.296.3156 CONSULTING ENGINEERS 12750 TWINBROOK PARKWAY, SUITE 200, ROCKVILLE MD 20852 TEL (301) 881-2545 FAX (301) 881-0814 AMT FILE # 102-440 Sanner Road



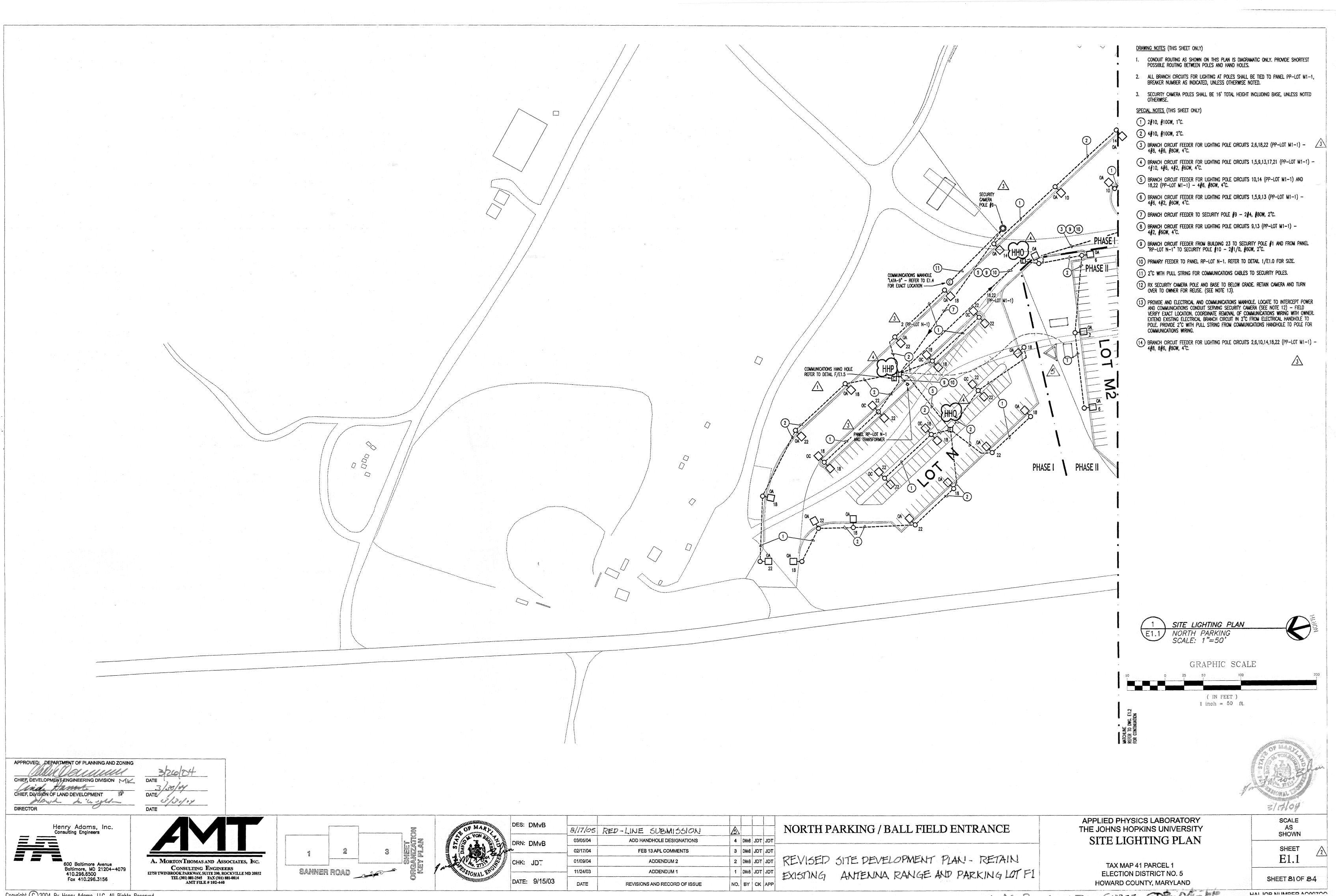
Thin and the state of the state	DES: DMVB						
	DRN: DMvB						
		02/17/04	FEB 13 APL COMMENTS	3	DMvB	JDT	JDT
	CHK: JDT	01/09/04	ADDENDUM 2	2	DMvB	JDT	JDT
		11/24/03	ADDENDUM 1	1	DMvB	JDT	JDT
	DATE: 9/15/03	DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	СК	APP

NORTH PARKING / BALL FIELD ENTRANCE

APPLIED PHYSICS LABORATORY THE JOHNS HOPKINS UNIVERSITY ELECTRICAL NOTES, **DETAILS & SCHEDULES** 

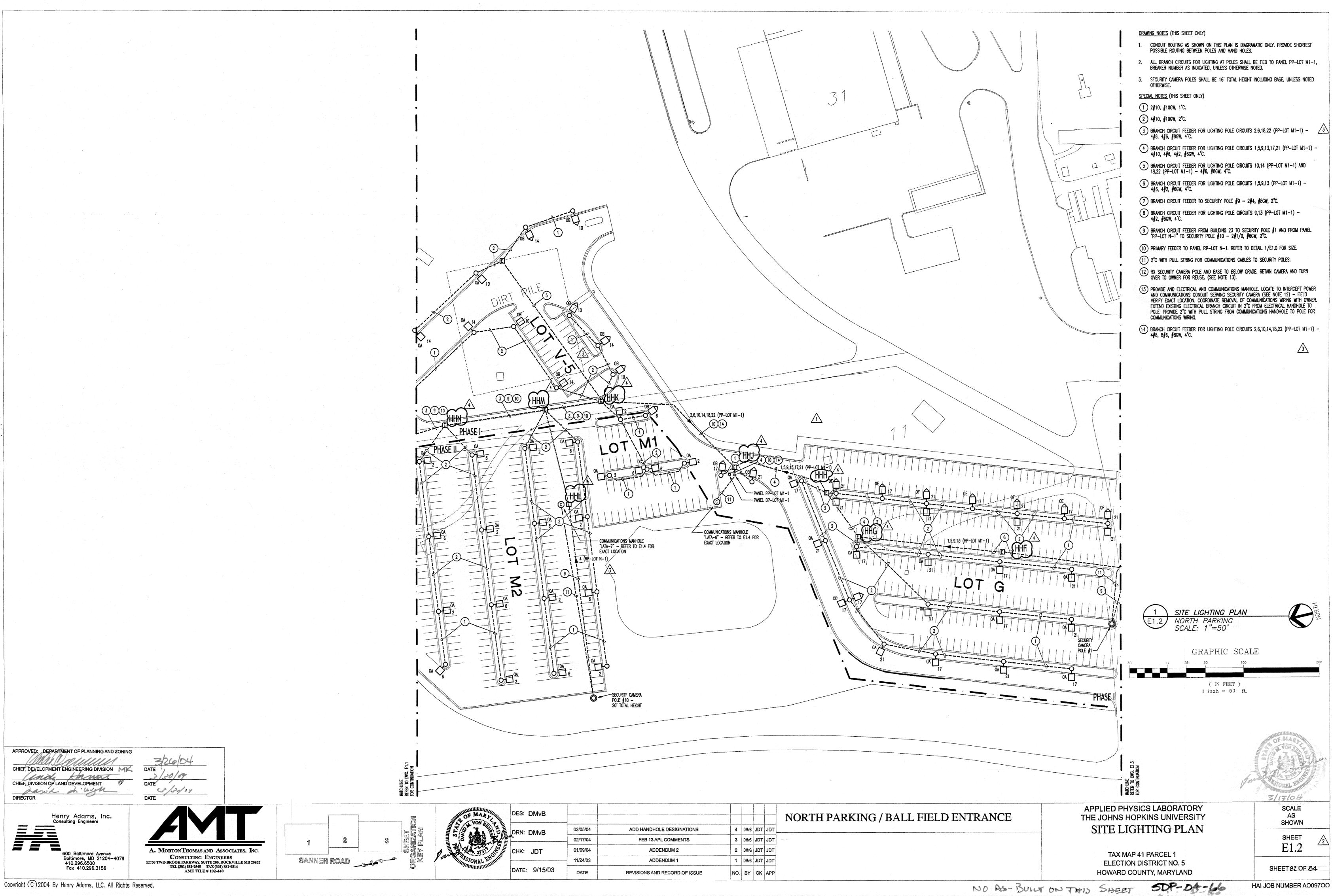
TAX MAP 41 PARCEL 1 **ELECTION DISTRICT NO. 5** HOWARD COUNTY, MARYLAND

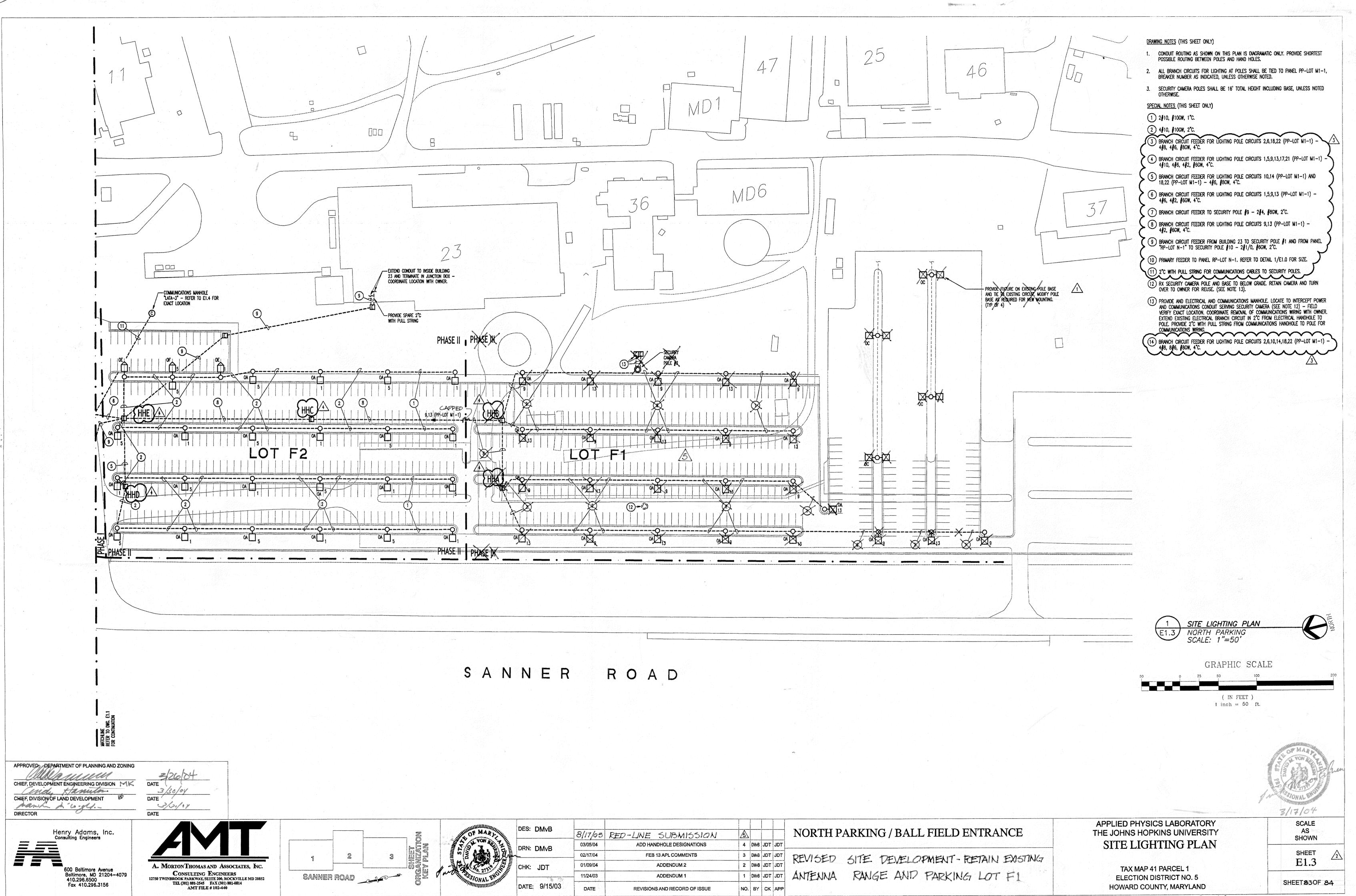
AS SHOWN SHEET SHEET 80 OF 84



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NO AS-BUILT ON THIS SHEET SDP-04-66

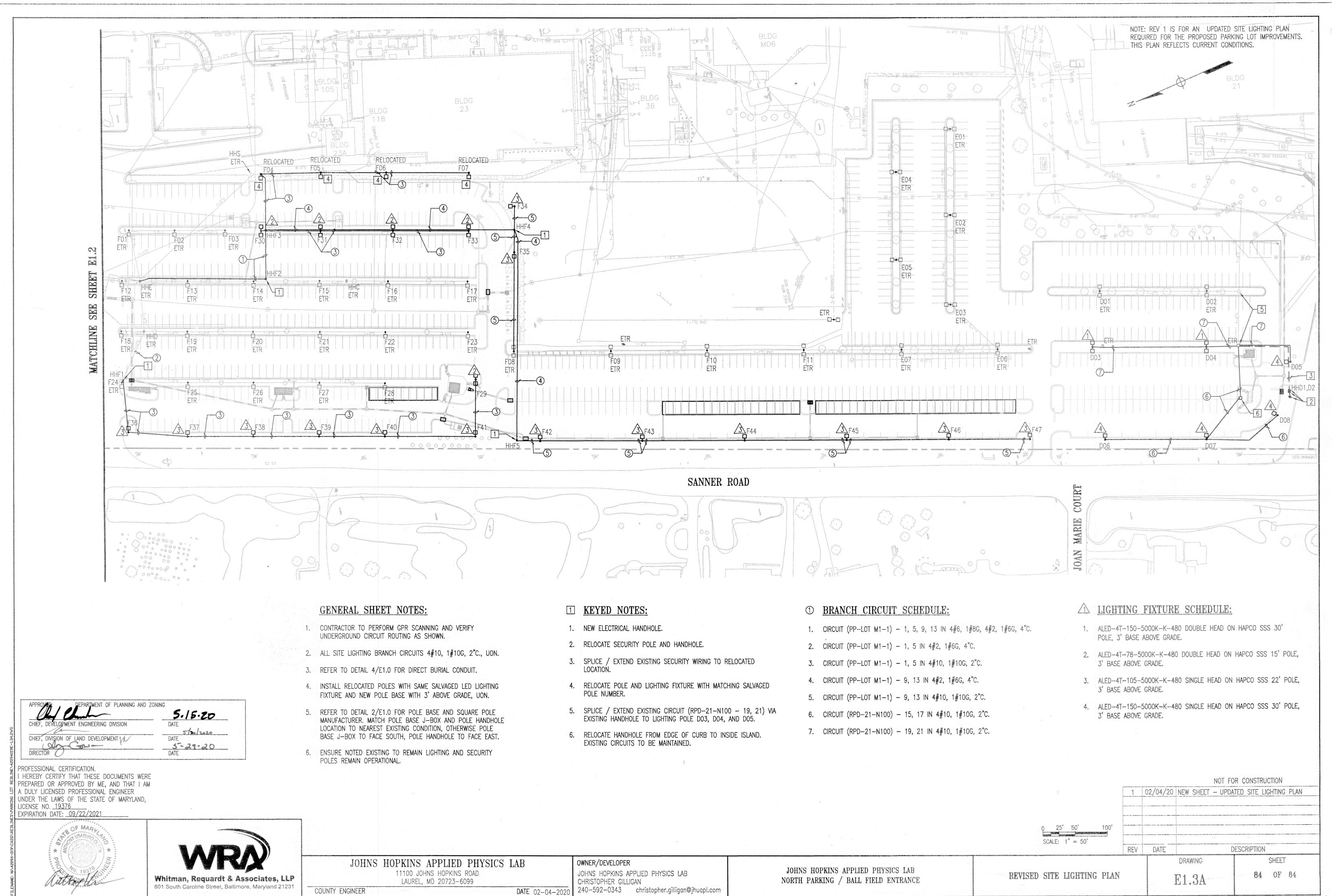




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NO AS-BUILT ON THIS SHEET SDP-04-66

HAI JOB NUMBER A009700



NO AS-BULL ON THIS SHEET SDP-04-66