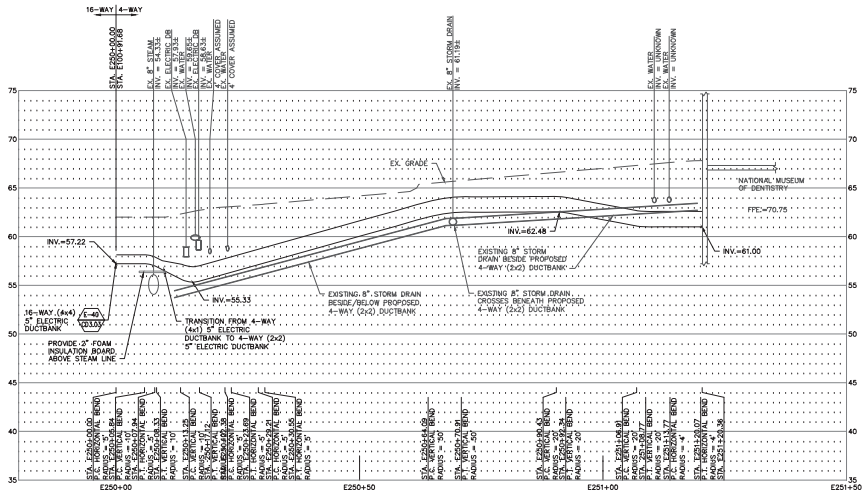
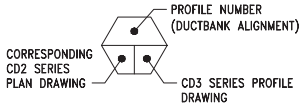




E-78

4-WAY (2x2) 5" ELECTRIC DUCTBANK FROM PR. 16-WAY TO NATIONAL MUSEUM OF DENTISTRY

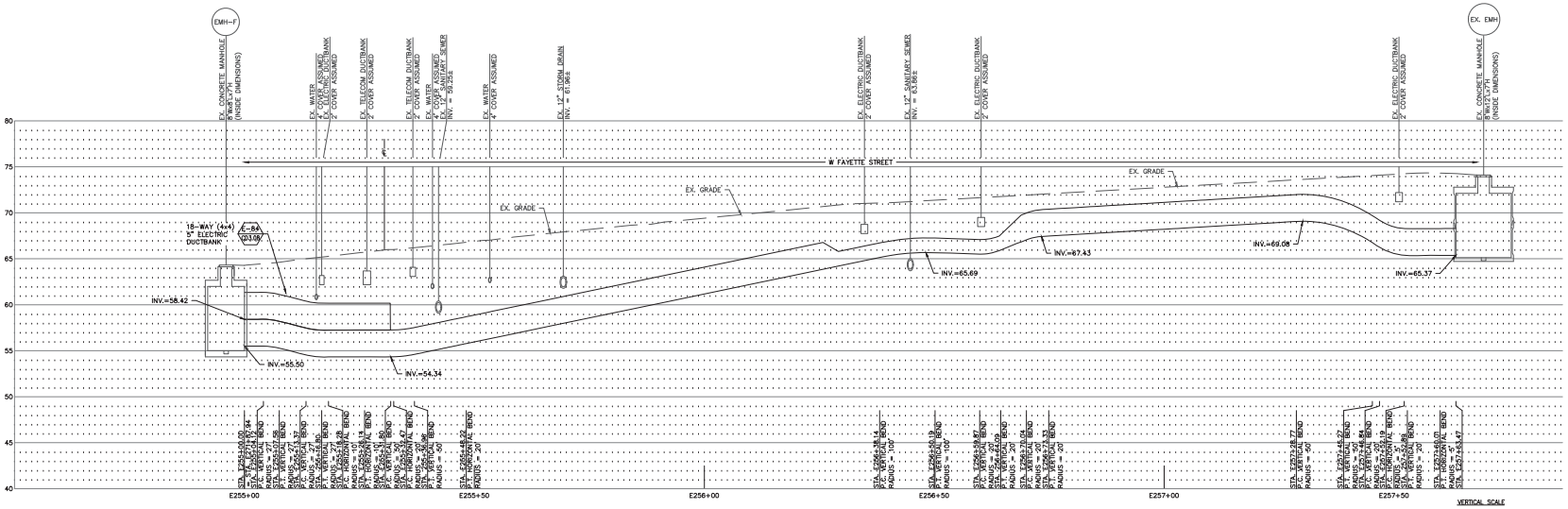
CD2.05
CD3.03

CD3.06

VERTICAL SCALE: 1"=5'-0"
HORIZONTAL SCALE: 1"-10'-0"

NOTES:

1. SEE DRAWINGS CD2.05 FOR ELECTRICAL DISTRIBUTION SITE PLAN.
2. PROFILE IS BASED ON CENTERLINE OF 4-WAY (2X2) 5" ELECTRICAL DUCTBANK. INVERT INFORMATION PROVIDED IS BASED ON THE BOTTOM OF THE DUCTBANK.
3. BACKFILL WITH FLOWABLE FILL WHERE LESS THAN 1' CLEARANCE BETWEEN UTILITIES (MINIMUM SEPARATION BETWEEN UTILITIES SHALL BE 6 INCHES). FLOWABLE FILL CONCRETE CONSISTING OF A MIXTURE OF FLY ASH, CEMENT AND WATER, CERTIFIED BY MANUFACTURERS.



E-79

16-WAY (4x4) 5" ELECTRIC DUCTBANK FROM EX. EMH TO EX. EMH

CD2.03
CD3.08

CD3.06

VERTICAL SCALE: 1"=5'-0"
HORIZONTAL SCALE: 1"-10'-0"

NOTES:

1. SEE DRAWINGS CD2.03 FOR ELECTRICAL DISTRIBUTION SITE PLAN.
2. PROFILE IS BASED ON CENTERLINE OF 16-WAY (4x4) 5" ELECTRICAL DUCTBANK. INVERT INFORMATION PROVIDED IS BASED ON THE BOTTOM OF THE DUCTBANK.
3. BACKFILL WITH FLOWABLE FILL WHERE LESS THAN 1' CLEARANCE BETWEEN UTILITIES (MINIMUM SEPARATION BETWEEN UTILITIES SHALL BE 6 INCHES). FLOWABLE FILL CONCRETE CONSISTING OF A MIXTURE OF FLY ASH, CEMENT AND WATER, CERTIFIED BY MANUFACTURERS.

VERTICAL SCALE
SCALE: 1"=5'
UNIT OF MEASURE: FEET

HORIZONTAL SCALE
SCALE: 1"=10'
UNIT OF MEASURE: FEET

UNIVERSITY of MARYLAND

ADMINISTRATION & FINANCE
OFFICE OF FACILITIES MANAGEMENT
DESIGN AND CONSTRUCTION
220 ARCH STREET, OFFICE LEVEL 3
BALTIMORE, MARYLAND 21201
PHONE NO. (410) 706-7740
FAX NO. (410) 706-8547

KEY PLAN

A/E CONSULTANTS

RMF ENGINEERING, INC.
5520 RESEARCH PARK DR, 3RD FLR
BALTIMORE, MD 21228
P: 410.576-0505 F: 410.385-0327

CARROLL ENGINEERING, INC.

PROFESSIONAL CERTIFICATION: I HERE BY 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. 21970
EXPIRATION DATE: 2024-06-16

REGISTRATION/STAMP

STATE OF MARYLAND
ROBERT D. CARROLL
No. 21970
PROFESSIONAL ENGINEER

PROJECT TITLE :
CAMPUS ELECTRICAL DISTRIBUTION UPGRADES - PHASE 4

100% CD SUBMISSION

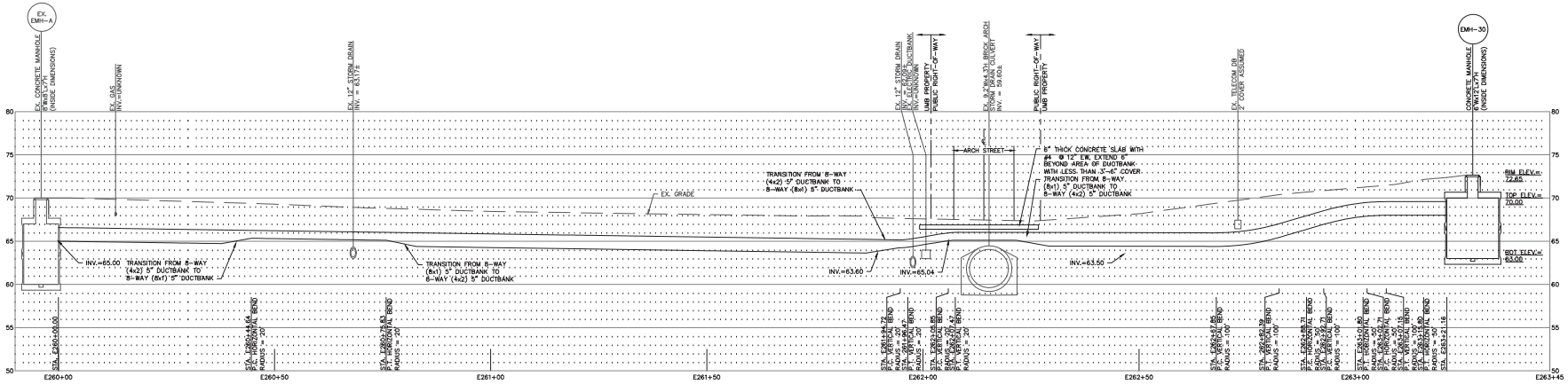
UMB BUILDING NO. :	VARIOUS
UMB Project NO. :	17-317
A/E PROJECT NO. :	117051.A0
CAD FILE NO. :	
DATE :	09/19/2023

SHEET TITLE :
ELECTRIC DUCTBANK PROFILES

REVISIONS

NO	DATE	ITEM

SHEET NO.
CD3.06



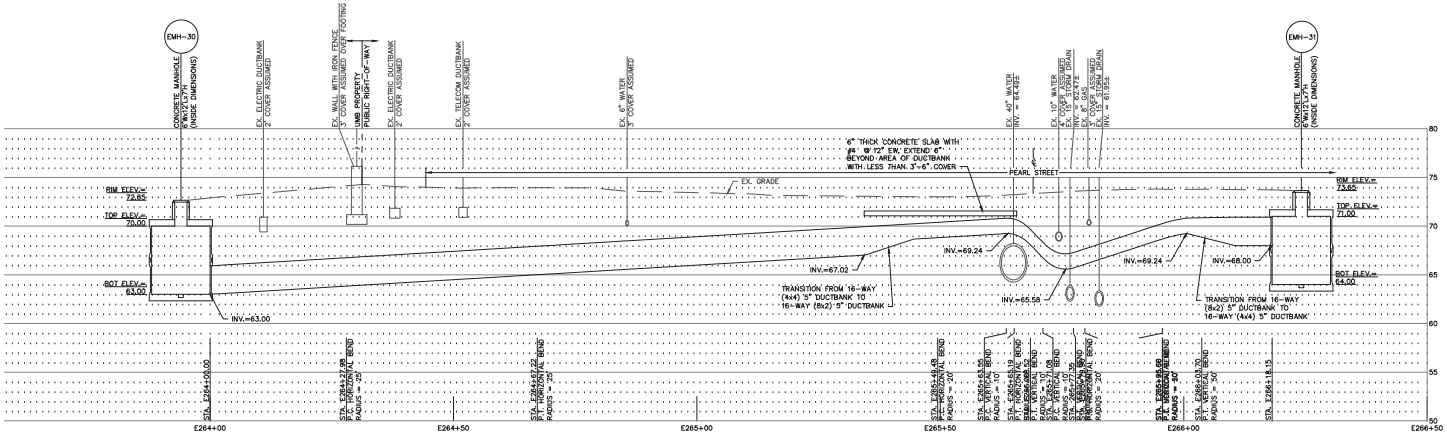
E-81 8-WAY (4x2) 5" ELECTRIC DUCTBANK FROM EX. EMH-A TO EMH-30

CD2.01 — CD3.07

VERTICAL SCALE: 1"=5'-0"
HORIZONTAL SCALE: 1"-10'-0"

NOTES:

1. SEE DRAWING CD2.01 FOR ELECTRICAL DISTRIBUTION SITE PLAN.
2. PROFILE IS BASED ON CENTERLINE OF 8-WAY (4x2) 5" ELECTRICAL DUCTBANK. INVERT INFORMATION PROVIDED IS BASED ON THE BOTTOM OF THE DUCTBANK.
3. BACKFILL WITH FLOWABLE FILL WHERE LESS THAN 1" CLEARANCE BETWEEN UTILITIES (MINIMUM SEPARATION BETWEEN UTILITIES SHALL BE 6 INCHES). FLOWABLE FILL CONCRETE CONSISTING OF A MIXTURE OF FLY ASH, CEMENT AND WATER, CERTIFIED BY MANUFACTURERS.



E-82 16-WAY (4x4) 5" ELECTRIC DUCTBANK FROM EMH-30 TO EMH-31

CD2.01
CD2.02 — CD3.07

VERTICAL SCALE: 1"=5'-0"
HORIZONTAL SCALE: 1"-10'-0"

NOTES:

1. SEE DRAWINGS CD2.01 AND CD2.02 FOR ELECTRICAL DISTRIBUTION SITE PLAN.
2. PROFILE IS BASED ON CENTERLINE OF 16-WAY (4x4) 5" ELECTRICAL DUCTBANK. INVERT INFORMATION PROVIDED IS BASED ON THE BOTTOM OF THE DUCTBANK.
3. BACKFILL WITH FLOWABLE FILL WHERE LESS THAN 1" CLEARANCE BETWEEN UTILITIES (MINIMUM SEPARATION BETWEEN UTILITIES SHALL BE 6 INCHES). FLOWABLE FILL CONCRETE CONSISTING OF A MIXTURE OF FLY ASH, CEMENT AND WATER, CERTIFIED BY MANUFACTURERS.

VERTICAL SCALE
SCALE: 1"=5'
UNIT OF MEASURE: FEET

HORIZONTAL SCALE
SCALE: 1"=10'
UNIT OF MEASURE: FEET

UNIVERSITY of MARYLAND

ADMINISTRATION & FINANCE
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DESIGN AND CONSTRUCTION
220 ARCH STREET, OFFICE LEVEL 3
BALTIMORE, MARYLAND 21201
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FAX NO. (410) 706-8547

KEY PLAN

A/E CONSULTANTS

RMF ENGINEERING, INC.
5520 RESEARCH PARK DR, 3RD FLR
BALTIMORE, MD 21228
P: 410.576-0505 F: 410.385-0327

CARROLL ENGINEERING, INC.

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LICENSE No. 21970
EXPIRATION DATE: 2024-05-16

REGISTRATION/STAMP

STATE OF MARYLAND — ROBERT D. CARROLL — No. 21970 — PROFESSIONAL ENGINEER

PROJECT TITLE:
CAMPUS ELECTRICAL DISTRIBUTION UPGRADES - PHASE 4

100% CD SUBMISSION

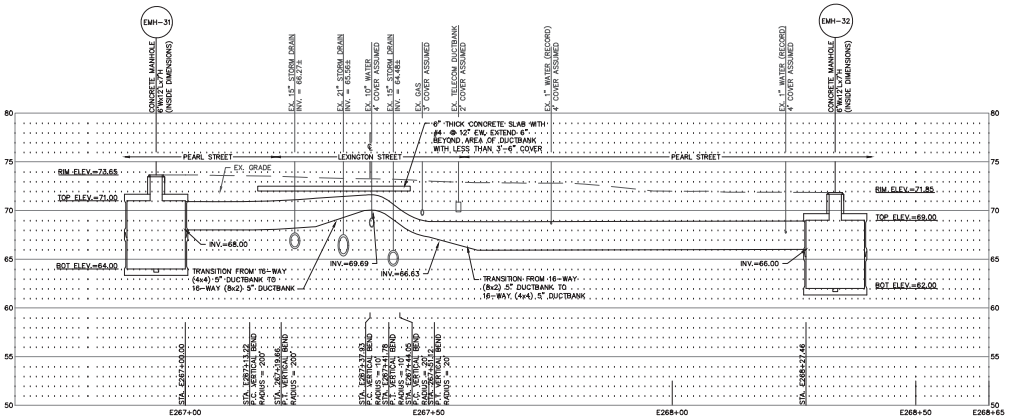
UMB BUILDING NO. : VARIOUS
UMB Project NO. : 17-317
A/E PROJECT NO. : 117051.A0
CAD FILE NO. :
DATE : 09/19/2023

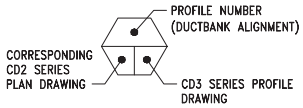
SHEET TITLE:
ELECTRIC DUCTBANK PROFILES

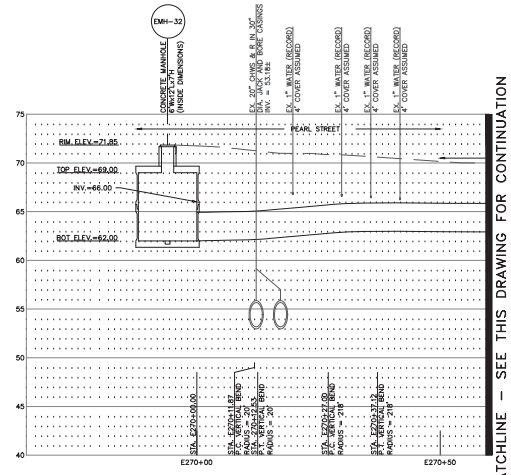
REVISIONS

NO	DATE	ITEM

SHEET NO.
CD3.07







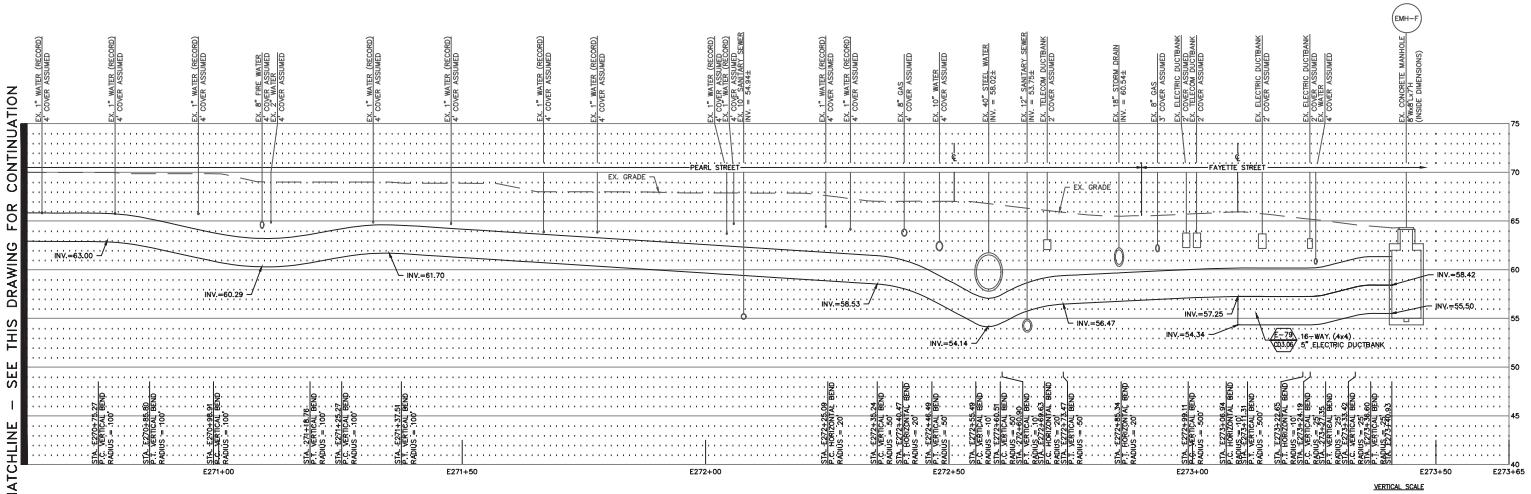
E-83 — CD2.02 — CD3.08

16-WAY (4x4) 5" ELECTRIC DUCTBANK FROM EMH-26 TO EMH-27

VERTICAL SCALE: 1"=5'-0"
HORIZONTAL SCALE: 1"-10'-0"

NOTES:

1. SEE DRAWING CD2.02 FOR ELECTRICAL DISTRIBUTION SITE PLAN.
2. PROFILE IS BASED ON CENTERLINE OF 16-WAY (4x4) 5" ELECTRICAL DUCTBANK. INVERT INFORMATION PROVIDED IS BASED ON THE BOTTOM OF THE DUCTBANK.
3. BACKFILL WITH FLOWABLE FILL WHERE LESS THAN 1' CLEARANCE BETWEEN UTILITIES (MINIMUM SEPARATION BETWEEN UTILITIES SHALL BE 6 INCHES). FLOWABLE FILL CONCRETE CONSISTING OF A MIXTURE OF FLY ASH, CEMENT AND WATER, CERTIFIED BY MANUFACTURERS.



E-84 — CD2.02, CD2.03, CD3.06 — CD3.08

16-WAY (4x4) 5" ELECTRIC DUCTBANK FROM EMH-27 TO EX. EMH-F

VERTICAL SCALE: 1"=5'-0"
HORIZONTAL SCALE: 1"-10'-0"

NOTES:

1. SEE DRAWINGS CD2.02 AND CD2.03 FOR ELECTRICAL DISTRIBUTION SITE PLAN.
2. PROFILE IS BASED ON CENTERLINE OF 16-WAY (4x4) 5" ELECTRICAL DUCTBANK. INVERT INFORMATION PROVIDED IS BASED ON THE BOTTOM OF THE DUCTBANK.
3. BACKFILL WITH FLOWABLE FILL WHERE LESS THAN 1' CLEARANCE BETWEEN UTILITIES (MINIMUM SEPARATION BETWEEN UTILITIES SHALL BE 6 INCHES). FLOWABLE FILL CONCRETE CONSISTING OF A MIXTURE OF FLY ASH, CEMENT AND WATER, CERTIFIED BY MANUFACTURERS.

VERTICAL SCALE
SCALE: 1"=5'
UNIT OF MEASURE: FEET

HORIZONTAL SCALE
SCALE: 1"=10'
UNIT OF MEASURE: FEET

UNIVERSITY of MARYLAND

ADMINISTRATION & FINANCE
OFFICE OF FACILITIES MANAGEMENT
DESIGN AND CONSTRUCTION
220 ARCH STREET, OFFICE LEVEL 3
BALTIMORE, MARYLAND 21201
PHONE NO. (410) 706-7740
FAX NO. (410) 706-8547

KEY PLAN

A/E CONSULTANTS

RMF ENGINEERING, INC.
5520 RESEARCH PARK DR, 3RD FLR
BALTIMORE, MD 21228
P: 410.576-0505 F: 410.385-0327

CARROLL ENGINEERING, INC.

PROFESSIONAL CERTIFICATION: I HERE BY 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. 21970
EXPIRATION DATE: 2024-06-16

REGISTRATION/STAMP

PROJECT TITLE:
CAMPUS ELECTRICAL DISTRIBUTION UPGRADES – PHASE 4

100% CD SUBMISSION

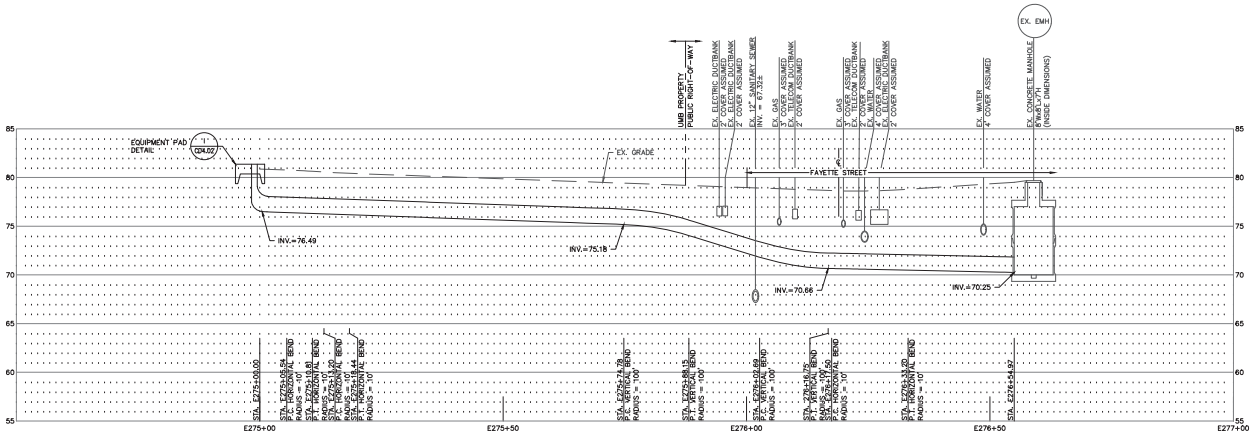
UMB BUILDING NO. : VARIOUS
UMB Project NO. : 17-317
A/E PROJECT NO. : 117061.A0
CAD FILE NO. :
DATE : 09/19/2023

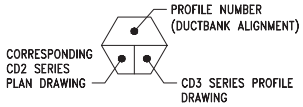
SHEET TITLE:
ELECTRIC DUCTBANK PROFILES

REVISIONS

NO	DATE	ITEM

SHEET NO.
CD3.08





E-85

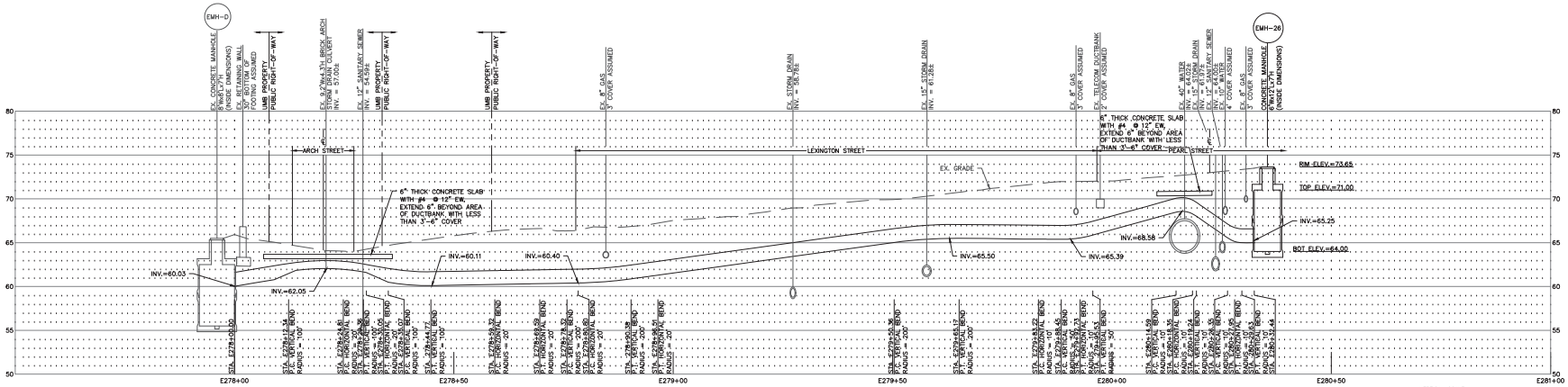
CD2.04 — CD3.09

4-WAY (2x2) 5" ELECTRIC DUCTBANK FROM PAD MOUNT SWITCH TO EX. EMH

VERTICAL SCALE: 1"=5'-0"
HORIZONTAL SCALE: 1"-10'-0"

NOTES:

1. SEE DRAWING CD2.04 FOR ELECTRICAL DISTRIBUTION SITE PLAN.
2. PROFILE IS BASED ON CENTERLINE OF 4-WAY (2x2) 5" ELECTRICAL DUCTBANK. INVERT INFORMATION PROVIDED IS BASED ON THE BOTTOM OF THE DUCTBANK.
3. BACKFILL WITH FLOWABLE FILL WHERE LESS THAN 1' CLEARANCE BETWEEN UTILITIES (MINIMUM SEPARATION BETWEEN UTILITIES SHALL BE 6 INCHES). FLOWABLE FILL CONCRETE CONSISTING OF A MIXTURE OF FLY ASH, CEMENT AND WATER, CERTIFIED BY MANUFACTURERS.



E-86

CD2.02 — CD3.09

8-WAY (4x2) 5" ELECTRIC DUCTBANK FROM EX. EMH-D TO EMH-26

VERTICAL SCALE: 1"=5'-0"
HORIZONTAL SCALE: 1"-10'-0"

NOTES:

1. SEE DRAWING CD2.02 FOR ELECTRICAL DISTRIBUTION SITE PLAN.
2. PROFILE IS BASED ON CENTERLINE OF 8-WAY (4x2) 5" ELECTRICAL DUCTBANK. INVERT INFORMATION PROVIDED IS BASED ON THE BOTTOM OF THE DUCTBANK.
3. BACKFILL WITH FLOWABLE FILL WHERE LESS THAN 1' CLEARANCE BETWEEN UTILITIES (MINIMUM SEPARATION BETWEEN UTILITIES SHALL BE 6 INCHES). FLOWABLE FILL CONCRETE CONSISTING OF A MIXTURE OF FLY ASH, CEMENT AND WATER, CERTIFIED BY MANUFACTURERS.

VERTICAL SCALE
SCALE: 1"=5'
UNIT OF MEASURE: FEET

HORIZONTAL SCALE
SCALE: 1"=10'
UNIT OF MEASURE: FEET

UNIVERSITY of MARYLAND

ADMINISTRATION & FINANCE
OFFICE OF FACILITIES MANAGEMENT
DESIGN AND CONSTRUCTION
220 ARCH STREET, OFFICE LEVEL 3
BALTIMORE, MARYLAND 21201
PHONE NO. (410) 706-7740
FAX NO. (410) 706-8547

KEY PLAN

A/E CONSULTANTS

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BALTIMORE, MD 21228
P: 410.576-0505 F: 410.385-0327

CARROLL ENGINEERING, INC.

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LICENSE No. 21970
EXPIRATION DATE: 2024-05-16

REGISTRATION/STAMP

STATE OF MARYLAND
DAVID A. CARROLL
No. 21970
PROFESSIONAL ENGINEER

PROJECT TITLE :
CAMPUS ELECTRICAL DISTRIBUTION UPGRADES - PHASE 4

100% CD SUBMISSION

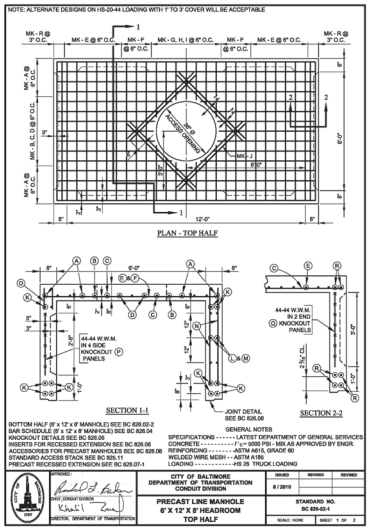
UMB BUILDING NO. : VARIOUS
UMB Project NO. : 17-317
A/E PROJECT NO. : 117051.A0
CAD FILE NO. :
DATE : 09/19/2023

SHEET TITLE :
ELECTRIC DUCTBANK PROFILES

REVISIONS

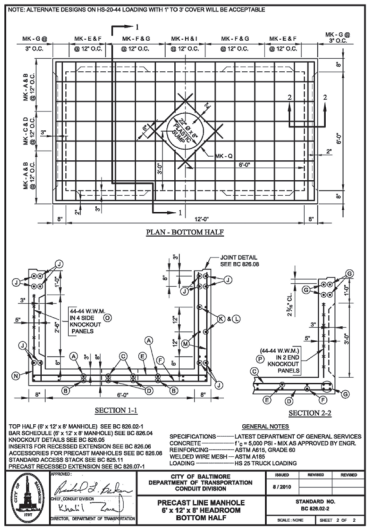
NO	DATE	ITEM

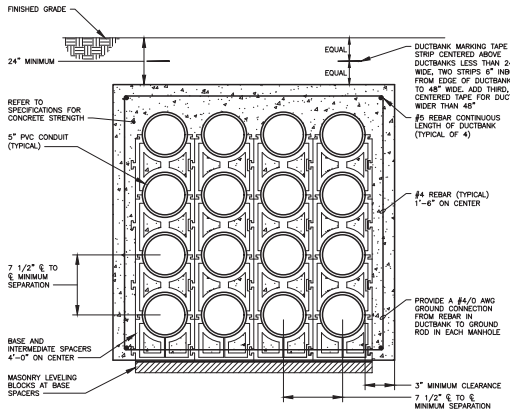
SHEET NO.
CD3.09



A CD4.04 BALTIMORE CITY STANDARD ELECTRIC MANHOLE

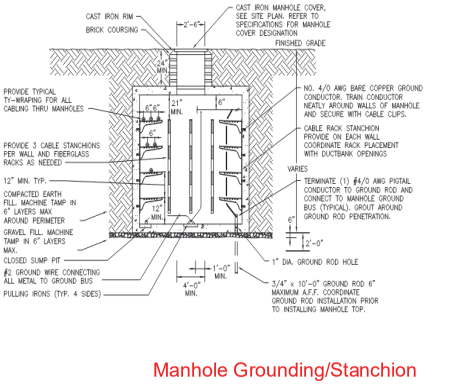
SCALE: NONE





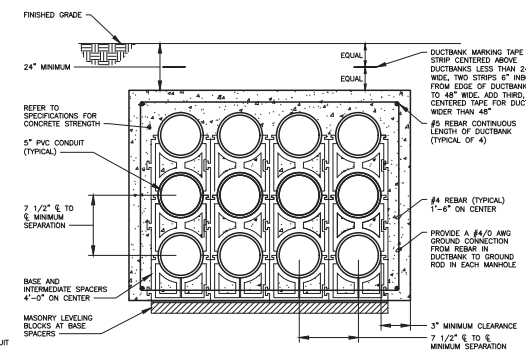
1 CD4.01 16-WAY (4x4) 5" ELECTRIC DUCTBANK

SCALE: NONE



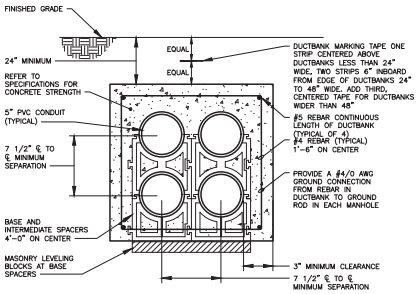
Manhole Grounding/Stanchion Detail

3 CD4.01 SCALE: NONE



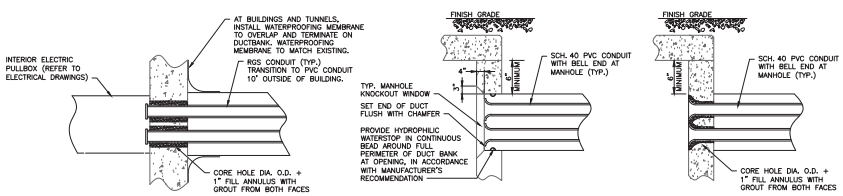
2 CD4.01 12-WAY (4x3) 5" ELECTRIC DUCTBANK

SCALE: NONE



4 CD4.01 4-WAY (2x2) 5" ELECTRIC DUCTBANK

SCALE: NONE



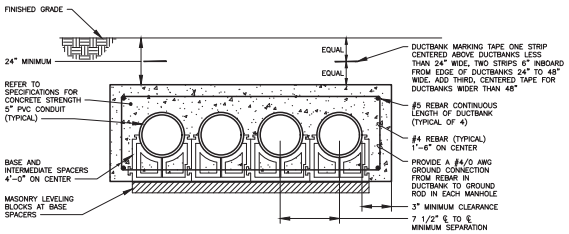
DUCTBANK CONNECTION AT BUILDING WALL PENETRATION

DUCTBANK CONNECTION AT MANHOLE KNOCKOUT WINDOW

DUCTBANK CONNECTION AT MANHOLE WITHOUT KNOCKOUT WINDOW

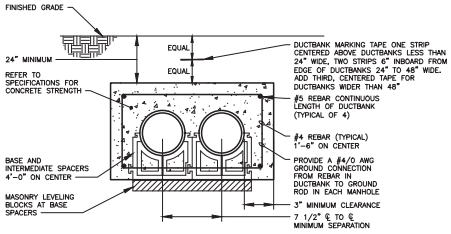
B CD4.01 DUCTBANK CONNECTION DETAILS

SCALE: NONE



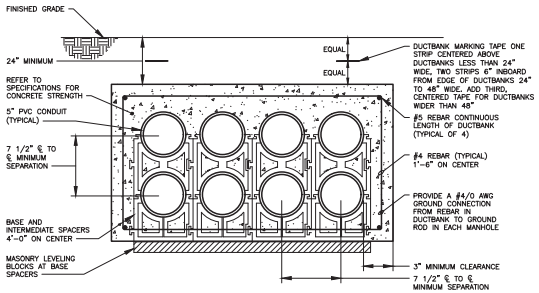
5 CD4.01 4-WAY (4x1) 5" ELECTRIC DUCTBANK

SCALE: NONE



6 CD4.01 2-WAY (2x1) 5" ELECTRIC DUCTBANK

SCALE: NONE



7 CD4.01 8-WAY (4x2) 5" ELECTRIC DUCTBANK

SCALE: NONE

UNIVERSITY of MARYLAND

ADMINISTRATION & FINANCE
OFFICE OF FACILITIES MANAGEMENT
DESIGN AND CONSTRUCTION
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BALTIMORE, MARYLAND 21201
PHONE NO. (410) 706-7740
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KEY PLAN

A/E CONSULTANTS

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BALTIMORE, MD 21228
P: 410.576.0505 F: 410.385.0327

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LICENSE No. 21976
EXPIRATION DATE: 2024-05-16

REGISTRATION/STAMP

PROJECT TITLE :
CAMPUS ELECTRICAL DISTRIBUTION UPGRADES – PHASE 4

100% CD SUBMISSION

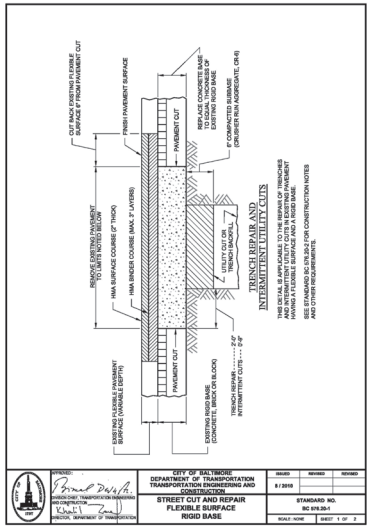
UMB BUILDING NO. :	VARIOUS
UMB Project NO. :	17-317
A/E PROJECT NO. :	117081.A0
CAD FILE NO. :	
DATE :	09/19/2023

SHEET TITLE :
ELECTRIC DETAILS

REVISIONS

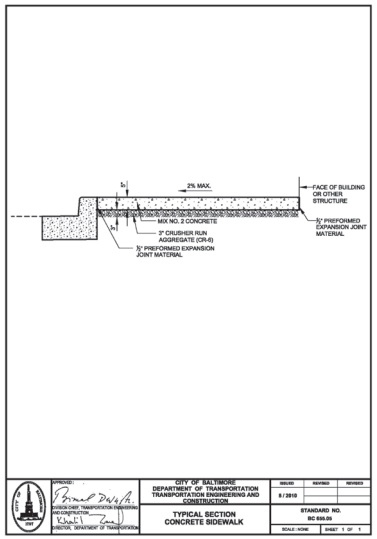
NO	DATE	ITEM

SHEET NO.
CD4.01



C CD4.02 ASPHALT PAVEMENT

SCALE: NONE

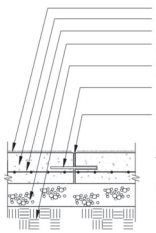


I CD4.02 CONCRETE SIDEWALK

SCALE: NONE

H CD4.02 NOT USED

SCALE: NONE

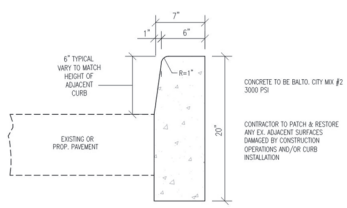


NOTES:

1. PROVIDE EXPANSION JOINTS AS SHOWN ON PLAN AT 40' ON CENTER MAX OR CONTRACTOR TO PROVIDE LAYOUT PRIOR TO CONSTRUCTION.
2. PROVIDE EXPANSION JOINTS WHERE POUR MEETS EXISTING CONCRETE PAVING OR CURB AND GUTTER.
3. PROVIDE CONTRACTION JOINTS (SCORE LINES) AS SHOWN ON PLAN AT 2" DEPTH AND 20' ON CENTER MAX OR CONTRACTOR TO PROVIDE LAYOUT PRIOR TO CONSTRUCTION.

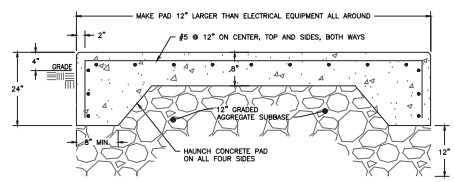
F CD4.02 CONCRETE PAVEMENT

SCALE: NONE



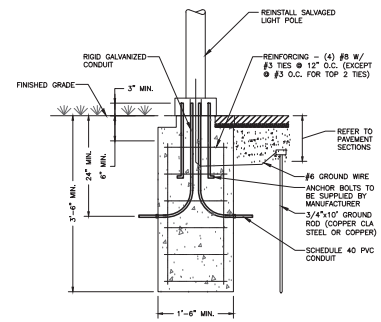
G CD4.02 BALTIMORE CITY TYPE "A" CURB

SCALE: NONE



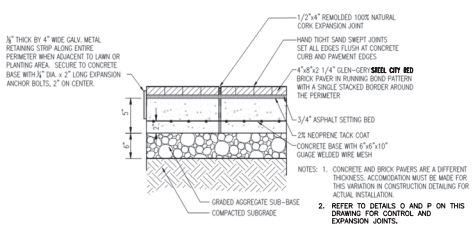
J CD4.02 EQUIPMENT PAD DETAIL

SCALE: NONE



K CD4.02 LIGHT POLE BASE DETAIL

SCALE: NONE

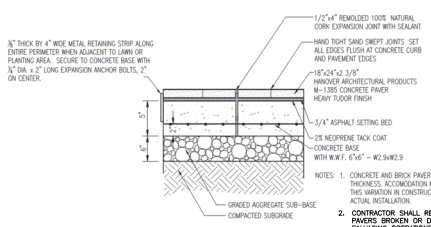


NOTES:

1. CONCRETE AND BRICK PAVERS ARE A DIFFERENT THICKNESS. ACCOMODATION MUST BE MADE FOR THIS VARIATION IN CONSTRUCTION DETAILING FOR ACTUAL INSTALLATION.
2. REFER TO DETAILS O AND P ON THIS DRAWING FOR CONTROL AND EXPANSION JOINTS.
3. CONTRACTOR SHALL REPLACE BRICK PAVERS BROKEN OR DAMAGED DURING SALVAGING OPERATIONS. NEW PAVERS SHALL MATCH EXISTING PAVERS IN SIZE, MATERIAL AND APPEARANCE.

D CD4.02 BRICK PAVER SIDEWALK

SCALE: NONE



NOTES:

1. CONCRETE AND BRICK PAVERS ARE A DIFFERENT THICKNESS. ACCOMODATION MUST BE MADE FOR THIS VARIATION IN CONSTRUCTION DETAILING FOR ACTUAL INSTALLATION.
2. CONTRACTOR SHALL REPLACE CONCRETE PAVERS BROKEN OR DAMAGED DURING SALVAGING OPERATIONS. NEW PAVERS SHALL MATCH EXISTING PAVERS IN SIZE, MATERIAL AND APPEARANCE.

E CD4.02 CONCRETE PAVER SIDEWALK

SCALE: NONE

UNIVERSITY of MARYLAND

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220 ARCH STREET, OFFICE LEVEL 3
BALTIMORE, MARYLAND 21201
PHONE NO. (410) 706-7740
FAX NO. (410) 706-8547

KEY PLAN

A/E CONSULTANTS

RMF ENGINEERING, INC.
5520 RESEARCH PARK DR, 3RD FLR
BALTIMORE, MD 21228
P: 410.576.0505 F: 410.385.0327

PROFESSIONAL CERTIFICATION. I HERE BY 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. 21976
EXPIRATION DATE: 2024-05-16

REGISTRATION/STAMP

PROJECT TITLE :
CAMPUS ELECTRICAL DISTRIBUTION UPGRADES – PHASE 4

100% CD SUBMISSION

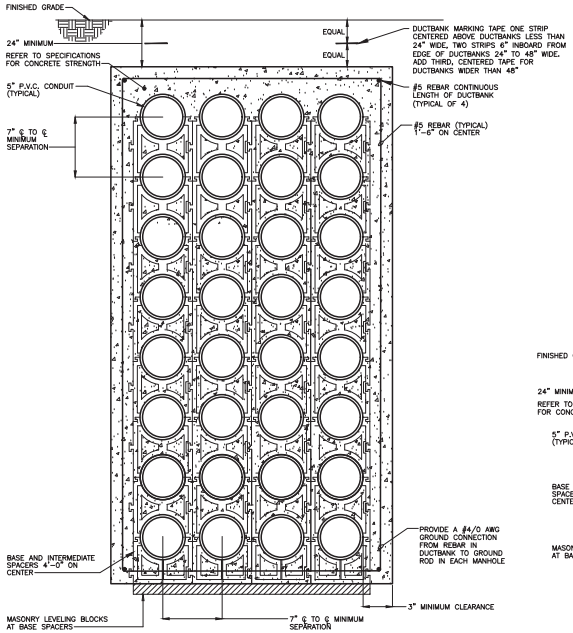
UMB BUILDING NO. : VARIOUS
UMB Project NO. : 17-317
A/E PROJECT NO. : 117081.A0
CAD FILE NO. :
DATE : 09/19/2023

SHEET TITLE :
CITY OF BALTIMORE RESTORATION DETAILS

REVISIONS

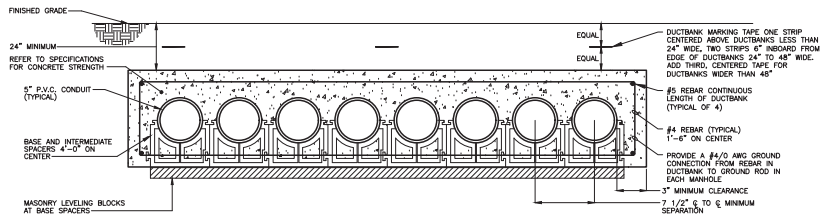
NO	DATE	ITEM

SHEET NO.
CD4.02



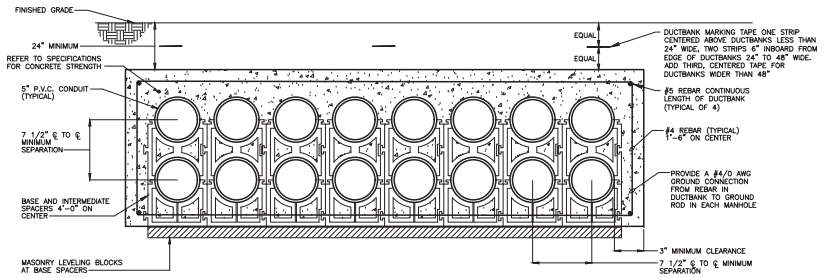
8 CD4.03 24-WAY (4x6) 5" ELECTRIC DUCTBANK

SCALE: NONE



10 CD4.03 8-WAY (8x1) 5" ELECTRIC DUCTBANK

SCALE: NONE



11 CD4.03 16-WAY (8x2) 5" ELECTRIC DUCTBANK

SCALE: NONE

PLANT SCHEDULE

QTY	KEY	BOTANICAL NAME	COMMON NAME	SIZE	CONT.	SPACING	COMMENTS
SHADE TREES							
1	DT-1	Gleditsia triacanthos 'shademaster'	Shademaster Thornless Honeylocust	5" CAL	B&B	AS SHOWN	Limb up 5', Matched specimens
2	DT-2	Platanus acerifolia 'Bloodgood'	London Plane Tree	2"	B&B		
EVERGREEN TREES							
1	ET-1	Magnolia stellata 'centennial'	Star Magnolia	5'			Multi-Stem, 3 Stem Min.
EVERGREEN SHRUBS							
1	E-1	Pyracantha coccinea	Firethorn	3'-4'	B&B	AS SHOWN	
3	E-2	Nandina domestica	Heavenly bamboo	3'-4'	B&B	24" O.C.	
2	E-3	Photinia glabra	Japanese photina	5'-6'	B&B	AS SHOWN	
3	E-4	Euonymus alatus	Burning Bush	2'-3'	B&B	18" O.C.	
SHRUBS							
7	S-1	Juniperus H. plumosa	Andorra Juniper	18-24"	B&B	AS SHOWN	
1	S-2	Lagerstroemia	Crepe Myrtle	18-24"	B&B	AS SHOWN	
6	S-3	Azalea hino crimson	Hino Crimson Azalea	15-18"	6" CANS	AS SHOWN	
GROUND COVER							
43	GC-1	Hedera helix	English Ivy	2YR	3" POTS	18" O.C.	
11	GC-2	Liriope spicata	Creeping Lilyturf		CONT.		
ORNAMENTAL GRASSES							
16	OG-1	Helictotrichon sempervirens 'Sapphire'	Sapphire Blue Oat Grass	#2 can	18" O.C.	Fully rooted container	

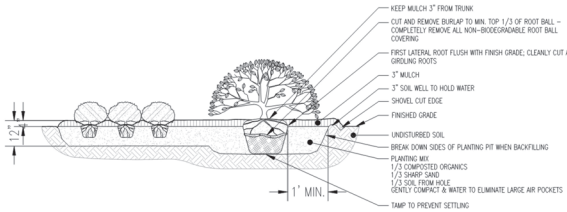
LANDSCAPING NOTES:

1. QUANTITIES SHOWN ON THE PLANT LIST ARE FOR THE CONTRACTOR'S CONVENIENCE ONLY. SYMBOLS ON THE PLAN SHALL TAKE PRECEDENCE. CONTRACTOR SHALL VERIFY ALL PLANT QUANTITIES TO HIS OWN SATISFACTION.
2. PLANT MATERIAL SUBSTITUTIONS ARE SUBJECT TO APPROVAL BY THE OWNER.
3. PLANT MATERIAL SHALL BE TAGGED AT THE SOURCE BY THE OWNER'S REPRESENTATIVE UNLESS THE REQUIREMENT IS SPECIFICALLY WAIVED.
4. LOCATIONS OF ALL PLANT MATERIAL SHALL BE STAKED BY THE CONTRACTOR FOR APPROVAL BY THE OWNER PRIOR TO PLANTING.
5. ALL SHRUB AND GROUND COVER AREAS SHALL BE PLANTED IN CONTINUOUS PREPARED BEDS MULCHED WITH COMPOSTED HARDWOOD MULCH AS DETAILED.
6. PLANTING BEDS SHALL HAVE POSITIVE DRAINAGE WITH A MINIMUM 2% SLOPE.
7. CONTRACTOR SHALL VERIFY ACTUAL SITE CONDITIONS. NO EXTRA PAYMENT SHALL BE MADE FOR WORK ARISING FROM SITE CONDITIONS DIFFERING FROM THOSE INDICATED ON DRAWINGS AND SPECIFICATIONS.
8. THE CONTRACTOR SHALL NOTIFY MISS UTILITY 1-800-257-7777 A MINIMUM OF TWO WORKING DAYS PRIOR TO BEGINNING PLANTING AND CONSTRUCTION.
9. DAMAGE TO EXISTING CONDITIONS AND UTILITIES SHALL BE REPAIRED AND RESTORED AT THE EXPENSE OF THE CONTRACTOR.
10. ALL PLANT MATERIAL SHALL BE NURSERY GROWN AND SHALL CONFORM TO AMERICAN NURSERY AND LANDSCAPE ASSOCIATION'S AMERICAN STANDARD FOR NURSERY STOCK, ANSI Z60.1.
11. INSTALL SHRUBS AND TREES AS SHOWN IN DETAILS U AND X, DRAWING CD4.06.

MINIMUM LANDSCAPE MAINTENANCE REQUIREMENTS:

1. ALL CURBS AND WALKS SHALL BE EDGED AS NEEDED.
2. A SLOW RELEASE NITROGEN BALANCED FERTILIZER WITH A 2-1-1 RATIO SHALL BE APPLIED AT A RATE OF 2 POUNDS OF NITROGEN PER 1000 SQUARE FEET IN SEPTEMBER, OCTOBER, AND FEBRUARY.
3. ALL TRASH, LITTER AND DEBRIS SHALL BE REMOVED FROM LAWN AREAS, PARKING LOTS, AND SHRUB BEDS AS NEEDED.
4. MULCH ALL SHRUB AND GROUNDCOVER BEDS YEARLY WITH 3 INCHES OF SHREDDED HARDWOOD BARK.
5. PERMIT SHRUBS AND TREES TO GROW AND ENLARGE TO THEIR DESIGN SIZE.
6. PRUNE TREES IN ACCORDANCE WITH LANDSCAPE CONTRACTORS ASSOCIATION GUIDELINES.

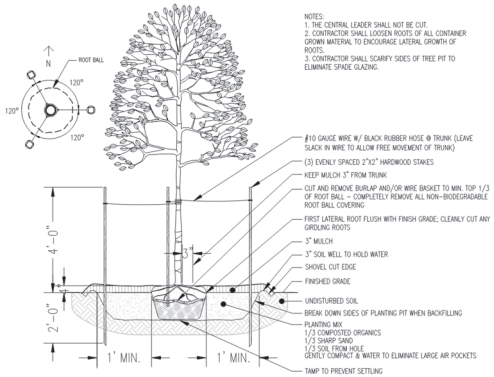
NOTES:
1. CONTRACTOR SHALL LOOSEN ROOTS OF ALL CONTAINER GROWN MATERIAL TO ENCOURAGE LATERAL GROWTH OF ROOTS.
2. CONTRACTOR SHALL SCARIFY SIDES OF SHRUB PIT TO ELIMINATE SPADE GLAZING.
3. PERENNIALS SHALL BE PLANTED IN 12" DEPTH



L CD4.03 SHRUB PLANTING DETAIL

SCALE: NONE

NOTES:
1. THE CENTRAL LEADER SHALL NOT BE CUT.
2. CONTRACTOR SHALL LOOSEN ROOTS OF ALL CONTAINER GROWN MATERIAL TO ENCOURAGE LATERAL GROWTH OF ROOTS.
3. CONTRACTOR SHALL SCARIFY SIDES OF TREE PIT TO ELIMINATE SPADE GLAZING.



M CD4.03 TREE PLANTING DETAIL

SCALE: NONE

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220 ARCH STREET, OFFICE LEVEL 3
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KEY PLAN

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EXPIRATION DATE: 2024-05-16

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CAMPUS ELECTRICAL DISTRIBUTION UPGRADES - PHASE 4

100% CD SUBMISSION

UMB BUILDING NO.	VARIOUS
UMB Project NO. :	17-317
A/E PROJECT NO. :	117081.A0
CAD FILE NO. :	
DATE :	09/19/2023

SHEET TITLE :

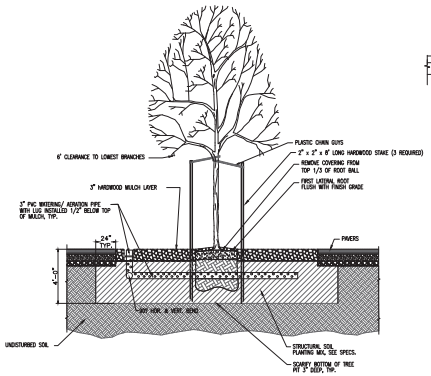
RESTORATION DETAILS

REVISIONS

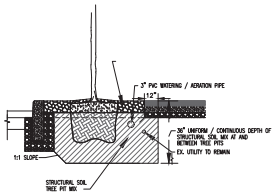
NO	DATE	ITEM

SHEET NO.

CD4.03



SECTION A–A

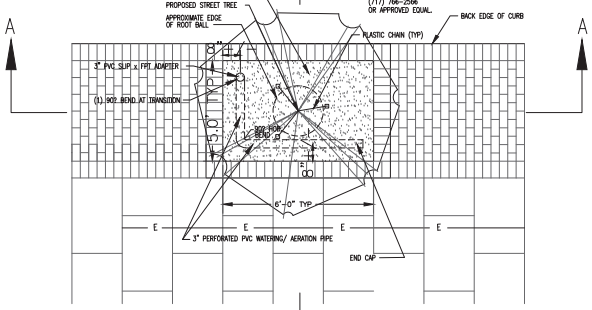


SECTION B–B

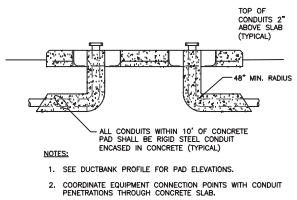
Notes

WATERING/ AERATION PIPE SYSTEM
PERFORATED AND NON-PERFORATED PIPE SHALL BE PVC-DRAIN AND SEWER PIPE (PVC 1120; ASTM D-2729) AND FITTINGS SHALL BE SOLVENT WELD PVC (ASTM D-3034, PSM) AS MANUFACTURED BY:

CRESLINE PLASTIC PIPE CO., INC.
264 SILVER SPRING ROAD
MECHANICSBURG, PA 17050
(717) 766-2566
OR APPROVED EQUAL.



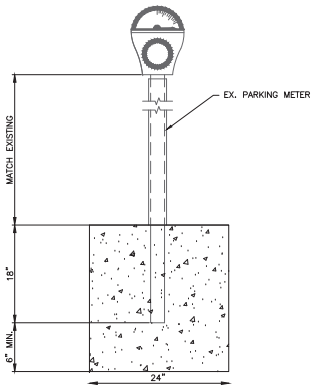
N CD4.04 STREET TREE PLANTING DETAIL
SCALE: NONE



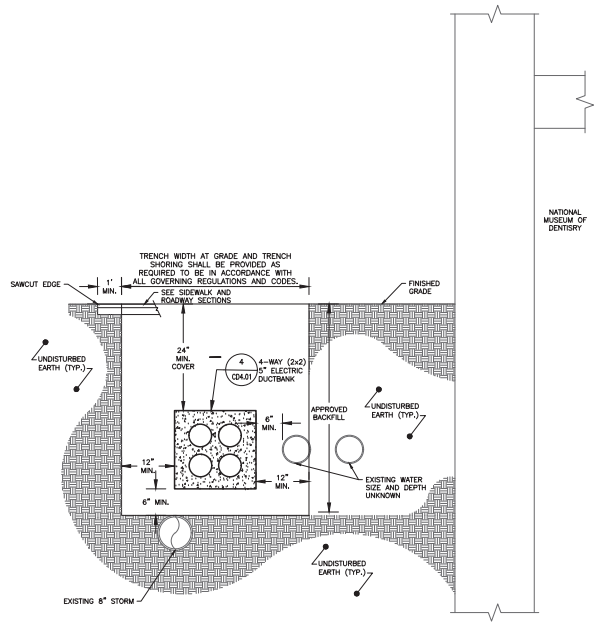
NOTES:

1. SEE DUCTBANK PROFILE FOR PAD ELEVATIONS.
2. COORDINATE EQUIPMENT CONNECTION POINTS WITH CONDUIT PENETRATIONS THROUGH CONCRETE SLAB.

O CD4.04 EQUIPMENT PAD STUB UP DETAIL
SCALE: NONE



P CD4.04 REINSTALL PARKING METER DETAIL
SCALE: NONE



12 CD4.04 4-WAY (2x2) 5" ELEC DUCTBANK SECTION AT MUSEUM OF DENTISTRY
SCALE: NONE

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100% CD SUBMISSION

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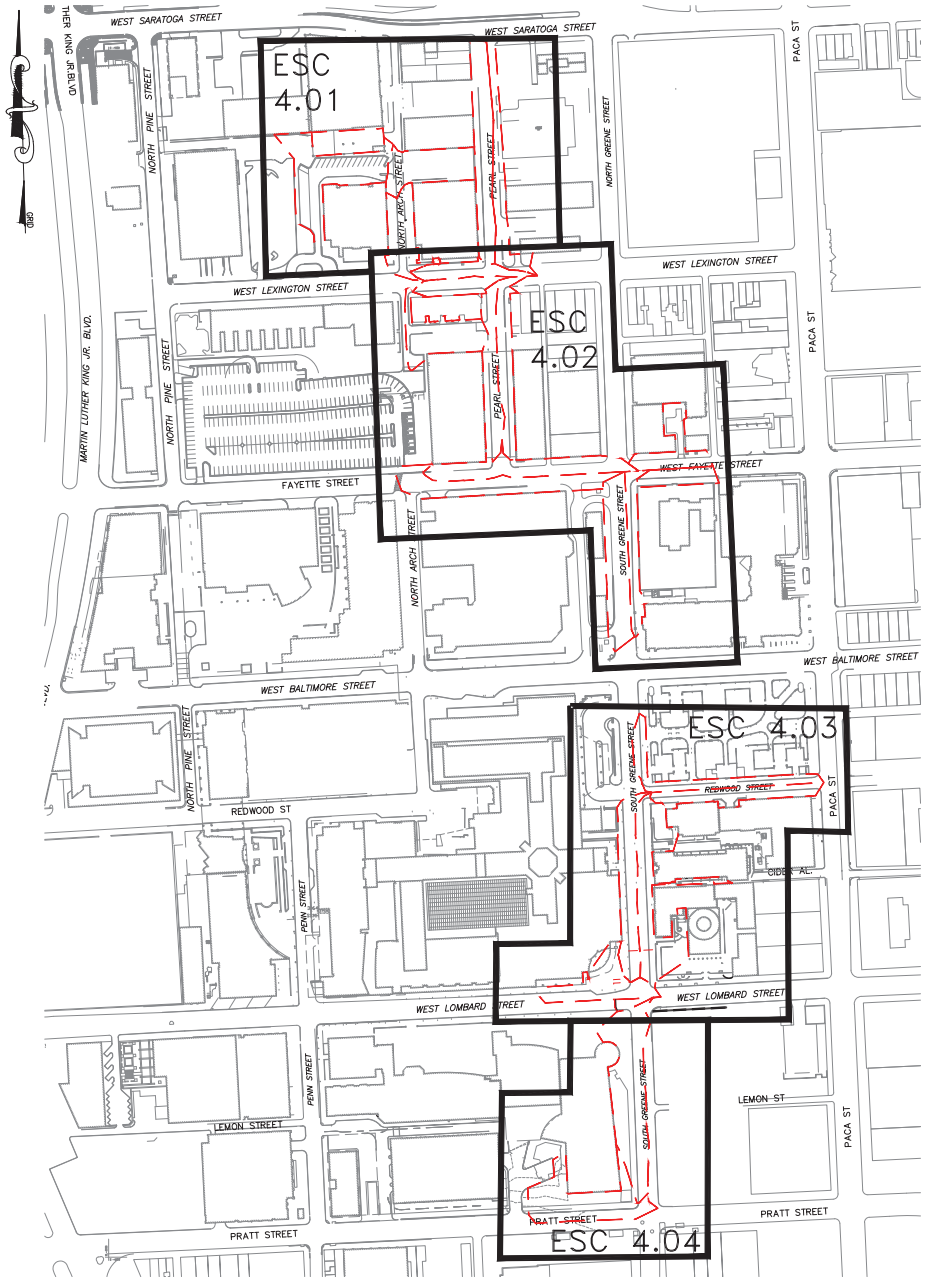
UMB Project NO. : 17-317
A/E PROJECT NO. : 117081.A0
CAD FILE NO. :
DATE : 09/19/2023

SHEET TITLE :
RESTORATION DETAILS

REVISIONS

NO	DATE	ITEM

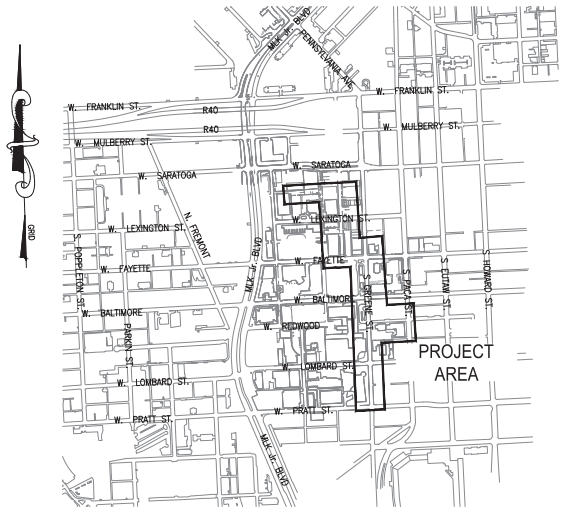
SHEET NO.
CD4.04



ESC KEY PLAN

100' 0 100' 200'

SCALE: 1"=100'



VICINITY MAP

SCALE: 1" = 500'

500' 250' 0 500' 1000'

SCALE: 1"=500'

UNIVERSITY OF MARYLAND
BALTIMORE, MARYLAND

EROSION AND SEDIMENT CONTROL PLANS
MDE NO. 22-SF-0106
PERMIT MODIFICATION #1

INDEX

ESC 4.00 – EROSION AND SEDIMENT CONTROL TITLE SHEET
ESC 4.01 – EROSION AND SEDIMENT CONTROL PLAN
ESC 4.02 – EROSION AND SEDIMENT CONTROL PLAN
ESC 4.03 – EROSION AND SEDIMENT CONTROL PLAN
ESC 4.04 – EROSION AND SEDIMENT CONTROL PLAN
ESC 4.05 – EROSION AND SEDIMENT CONTROL DETAILS
ESC 4.06 – EROSION AND SEDIMENT CONTROL NOTES
ESC 4.07 – EROSION AND SEDIMENT CONTROL NOTES

STANDARD STABILIZATION NOTE:

FOLLOWING INITIAL SOIL DISTURBANCE OR RE-DISTURBANCE, PERMANENT OR TEMPORARY STABILIZATION SHALL BE COMPLETED WITHIN THREE (3) CALENDAR DAYS AS TO THE SURFACE OF ALL PERIMETER DIKES, SWALES, DITCHES, PERIMETER SLOPES, AND ALL SLOPES STEEPER 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.

NOTE TO CONTRACTOR:

"EROSION AND SEDIMENT CONTROL SHALL BE STRICTLY ENFORCED."

Site Information:

A.	Area Disturbed	0.943*	Acres (41,097* SF.)
B.	Total Cut	3,000*±	Cubic Yards
C.	Total Fill	2,800*±	Cubic Yards

*FOR USE IN MDE PERMITTING. NOT FOR CONSTRUCTION ESTIMATION.

AN NPDES PERMIT IS REQUIRED FOR DISTURBANCE OVER 40,000 SF

WHEEL WASHING NOTE

PRIOR TO VEHICLE LEAVING THE SITE, WHEELS SHALL BE CLEANED OR WASHED TO REMOVE SEDIMENT. ALL SEDIMENT SPILLED, DROPPED OR TRACKED ONTO THE ROAD MUST BE REMOVED IMMEDIATELY BY VACUUMING, SCRAPING OR SWEEPING. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE THAT DRAINS TO AN APPROVED SEDIMENT CONTROL DEVICE

MAINTENANCE OF SEDIMENT CONTROL

CONTRACTOR SHALL, WITHOUT EXTRA COST TO THE PROJECT, REPAIR AND MAINTAIN EXISTING SEDIMENT CONTROL DEVICES UNTIL ALL AREAS WITHIN LIMITS OF CONSTRUCTION ARE STABILIZED. ALL SEDIMENT CONTROL MEASURES REFERRED TO ON THESE PLANS SHALL BE IN ACCORDANCE WITH THE PUBLICATION ENTITLED '2011 MARYLAND STANDARDS AND SPECIFICATIONS FOR EROSION AND SEDIMENT CONTROL'.

OWNER/DEVELOPER CERTIFICATION

I / WE HEREBY CERTIFY THAT ALL CLEARING, GRADING, CONSTRUCTION, AND/OR DEVELOPMENT WILL BE DONE PURSUANT TO THIS PLAN AND THAT ANY RESPONSIBLE PERSONNEL INVOLVED IN THE CONSTRUCTION PROJECT WILL HAVE A CERTIFICATE OF ATTENDANCE AT A MARYLAND DEPARTMENT OF THE ENVIRONMENT APPROVED TRAINING PROGRAM FOR THE CONTROL OF EROSION AND SEDIMENT BEFORE BEGINNING THE PROJECT. I/WE HEREBY AUTHORIZE THE RIGHT OF ENTRY FOR PERIODIC ON-SITE EVALUATION BY APPROPRIATE INSPECTION AND ENFORCEMENT AUTHORITY OR THE STATE OF MARYLAND, DEPARTMENT OF THE ENVIRONMENT. I/WE HEREBY CERTIFY THAT STORMWATER MANAGEMENT FACILITIES WILL BE MAINTAINED IN ACCORDANCE WITH APPROVED PLANS.

12/2/2022 — Date

Owner / Developer Signature

RPC014164 — Card No.

Kevin D. Nickel Manager, EHS — Printed Name and Title

DESIGN CERTIFICATION

I HEREBY CERTIFY THAT THIS PLAN HAS BEEN DESIGNED IN ACCORDANCE WITH THE 2011 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL, THE 2000 MARYLAND STORMWATER DESIGN MANUAL, mVOLUMES I & II INCLUDING SUPPLEMENTS, THE ENVIRONMENT ARTICLE SECTIONS 4-101 THROUGH 116 AND SECTIONS 4-201 AND 215, AND THE CODE OF MARYLAND REGULATIONS (COMAR) 26.17.01 AND COMAR 26.17.02 FOR EROSION AND SEDIMENT CONTROL AND STORMWATER MANAGEMENT, RESPECTIVELY.

12/2/2022 — DATE

DESIGNER'S SIGNATURE

MD REGISTRATION NO. 14446 — JUDITH A. CARROLL

(P.E.) R.L.S., RLA, OR R.A. (CIRCLE ONE) — PRINTED NAME

MDE No. 22-SF-0106 MOD #1

UNIVERSITY of MARYLAND

ADMINISTRATION & FINANCE
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BALTIMORE, MD 21228
P: 410.576-0505 F: 410.385-0327

CARROLL ENGINEERING, INC.
215 SCHILLING CIRCLE, SUITE 102
HUNT VALLEY, MD 21031
410-785-7423 PHONE

REGISTRATION/STAMP

PROFESSIONAL CERTIFICATION. I HERE BY 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. 14446
EXPIRATION DATE: 06/25/2023

PROJECT TITLE :
CAMPUS ELECTRICAL DISTRIBUTION UPGRADES – PHASE 4

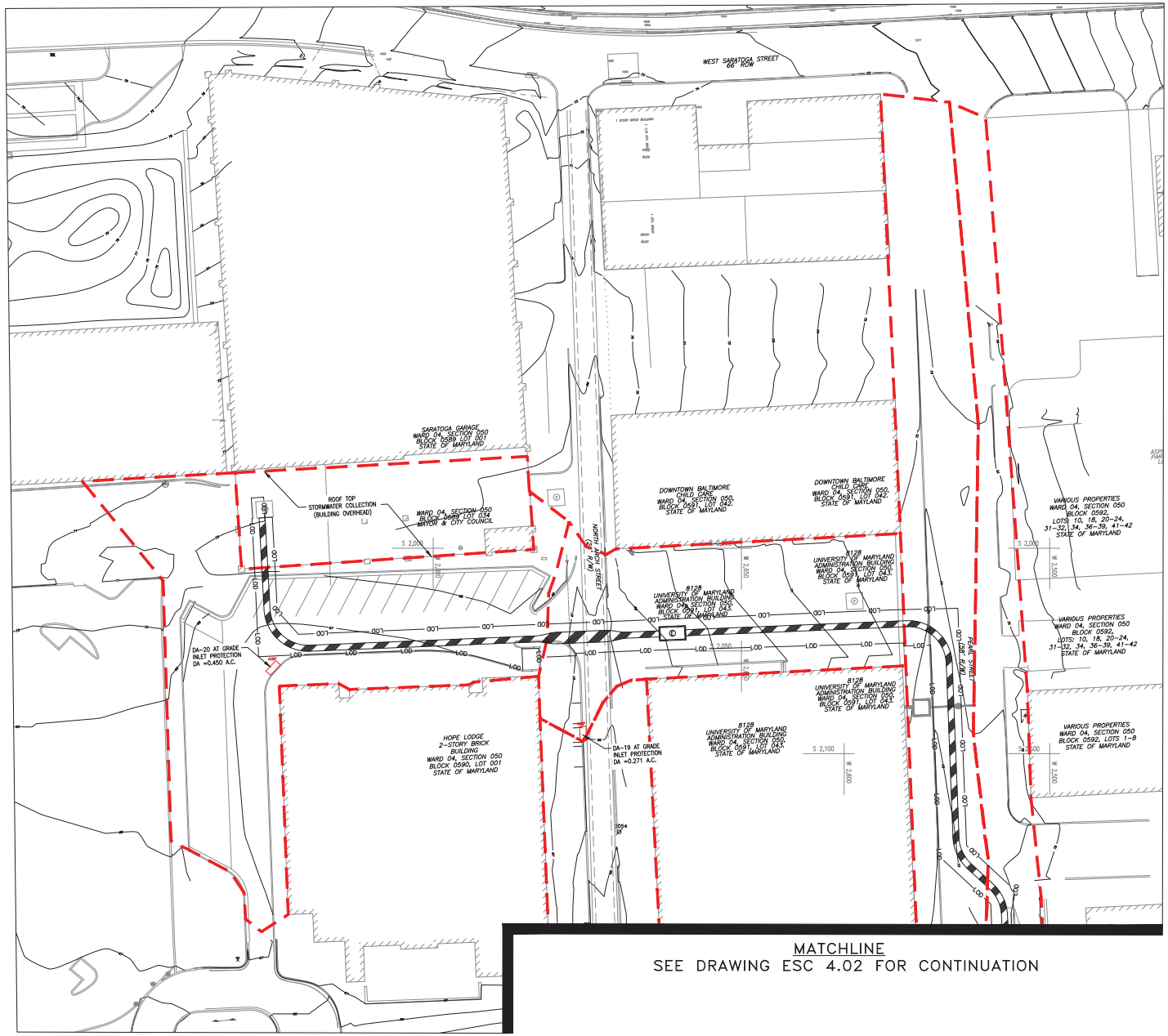
UMB BUILDING NO. : VARIOUS
UMB Project NO. : 17-317
A/E PROJECT NO. : 117081.A0
CAD FILE NO. :
DATE : 12/2/2022

SHEET TITLE :
EROSION AND SEDIMENT CONTROL PLAN

REVISIONS

NO	DATE	ITEM

SHEET NO.
ESC-4.00



MATCHLINE
SEE DRAWING ESC 4.02 FOR CONTINUATION

ESC PLAN

SCALE: 1" = 20'

20 10 0 20 40

SCALE: 1"=20'

ESC LEGEND

- LOD — LIMIT OF DISTURBANCE
- INLET DRAINAGE AREA
- CIP CURB INLET PROTECTION
- AIP AT-GRADE INLET PROTECTION
- CIP COMBINATION INLET PROTECTION

SAME-DAY STABILIZATION NOTE:

FOR UTILITY TRENCHES OUTSIDE THE DRAINAGE AREA LIMITS OF EROSION AND SEDIMENT CONTROL (ESC) DEVICES, THE CONTRACTOR SHALL OPEN ONLY A SECTION OF TRENCH THAT CAN BE BACKFILLED AND STABILIZED AT THE END OF EACH WORKDAY. NO DISTURBED AREA SHALL BE LEFT UNSTABILIZED OVERNIGHT. ANY EXCESS STOCKPILE MATERIAL THAT CANNOT BE STABILIZED WITHIN THE ESC CONTROLS SHALL BE REMOVED FROM THE SITE AT THE END OF EACH WORKDAY.

STANDARD STABILIZATION NOTE:

FOLLOWING INITIAL SOIL DISTURBANCE OR RE-DISTURBANCE, PERMANENT OR TEMPORARY STABILIZATION SHALL BE COMPLETED WITHIN THREE (3) CALENDAR DAYS AS TO THE SURFACE OF ALL PERIMETER DIKES, SWALES, DITCHES, PERIMETER SLOPES, AND ALL SLOPES STEEPER 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.

WHEEL WASHING NOTE

PRIOR TO VEHICLE LEAVING THE SITE, WHEELS SHALL BE CLEANED OR WASHED TO REMOVE SEDIMENT. ALL SEDIMENT SPILLED, DROPPED OR TRACKED ONTO THE ROAD MUST BE REMOVED IMMEDIATELY BY VACUUMING, SCRAPING OR SWEEPING. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE THAT DRAINS TO AN APPROVED SEDIMENT CONTROL DEVICE

MDE No. 22-SF-0106 MOD #1

UNIVERSITY of MARYLAND

ADMINISTRATION & FINANCE
OFFICE OF FACILITIES MANAGEMENT
DESIGN AND CONSTRUCTION
220 ARCH STREET, OFFICE LEVEL 3
BALTIMORE, MARYLAND 21201
PHONE NO. (410) 706-7740
FAX NO. (410) 706-0547

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CAD FILE NO. :	
DATE :	12/2/2022

SHEET TITLE :
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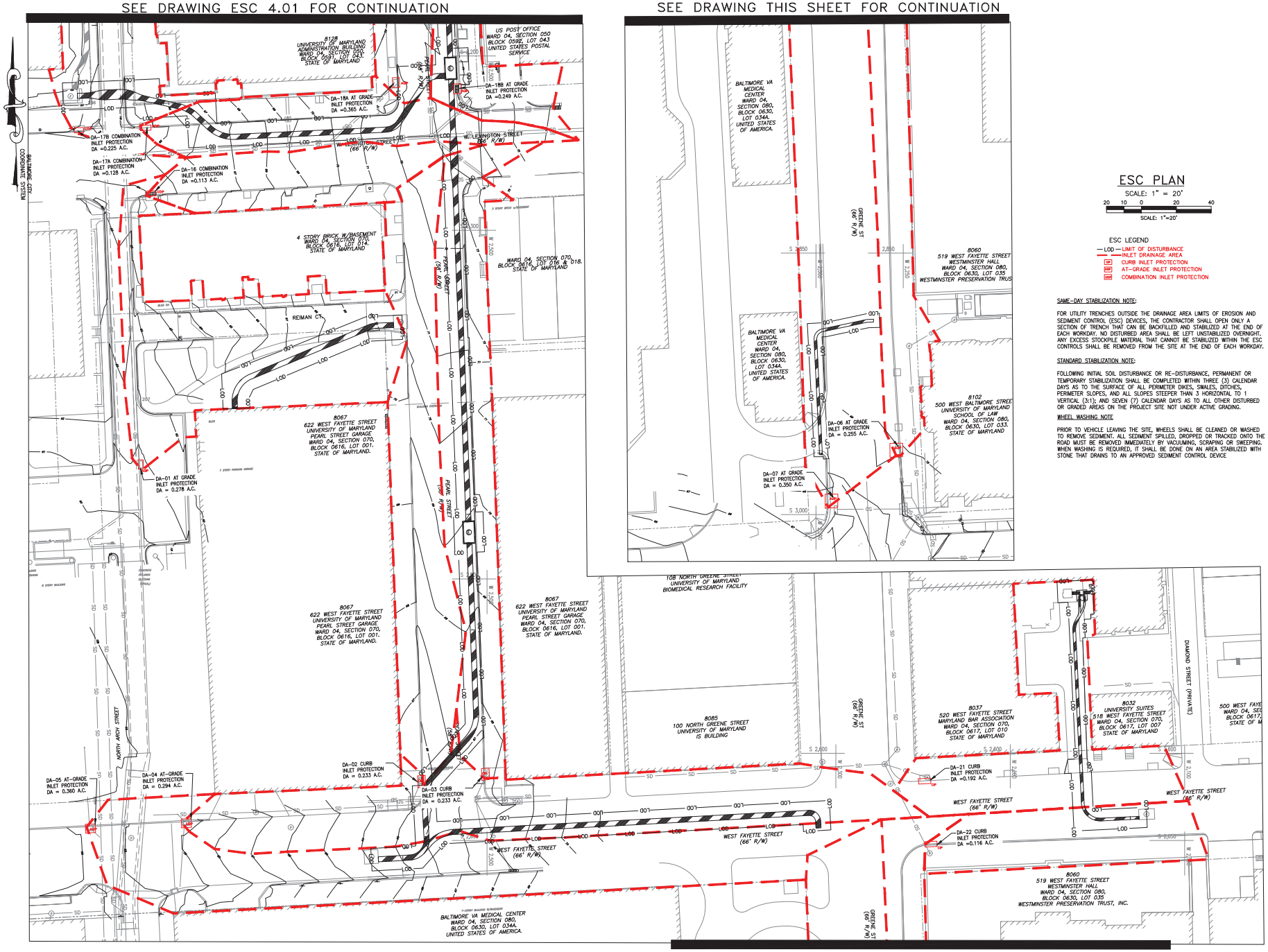
SHEET NO.
ESC-4.01

MATCHLINE
SEE DRAWING ESC 4.01 FOR CONTINUATION

MATCHLINE
SEE DRAWING THIS SHEET FOR CONTINUATION



ESC PLAN

SCALE: 1" = 20'

20 10 0 20 40

SCALE: 1"=20'

ESC LEGEND

- LOD — LIMIT OF DISTURBANCE
- INLET DRAINAGE AREA
- CURB INLET PROTECTION
- AT-GRADE INLET PROTECTION
- COMBINATION INLET PROTECTION

SAME-DAY STABILIZATION NOTE:

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MATCHLINE SEE DRAWING THIS SHEET FOR CONTINUATION

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REVISIONS

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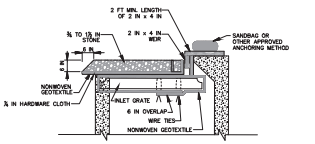
SHEET NO.
ESC-4.02

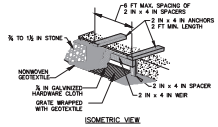
DETAIL E-9-6 COMBINATION INLET PROTECTION

STANDARD SYMBOL: COIP

MAXIMUM DRAINAGE AREA = ¾ ACRE



SECTION



ISOMETRIC VIEW

1 OF 2

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE	2011	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

DETAIL E-9-6 COMBINATION INLET PROTECTION

STANDARD SYMBOL: COIP

CONSTRUCTION SPECIFICATIONS

1. USE NOMINAL 2 INCH x 4 INCH LUMBER.
2. USE NONWOVEN GEOTEXTILE AS SPECIFIED IN SECTION H-1 MATERIALS.
3. LIFT GRATE, AND WRAP WITH NONWOVEN GEOTEXTILE TO COMPLETELY COVER ALL OPENINGS, THEN SET GRATE BACK IN PLACE.
4. ATTACH A CONTINUOUS PIECE OF ¾ 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 THE WEIR AND THE INLET FACE (MAXIMUM 4 FEET APART).
7. PLACE THE ASSEMBLY AGAINST THE INLET THROAT AND NAIL TO 2X4 ANCHORS (MINIMUM 2 FOOT LENGTH) 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 ¾ INCH HARDWARE CLOTH AND THE GEOTEXTILE TO THE CONCRETE GUTTER AND AGAINST THE FACE OF THE CURB ON BOTH SIDES OF THE INLET. (SEAT CLEAN ¾ TO 1½ INCH STONE OR EQUIVALENT RECYCLED CONCRETE OVER THE HARDWARE CLOTH AND GEOTEXTILE IN SUCH A MANNER 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 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 GEOTEXTILE AND STONE.

2 OF 2

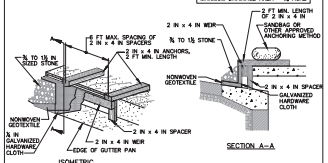
MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE	2011	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

DETAIL E-9-3 CURB INLET PROTECTION

STANDARD SYMBOL: CIP

MAXIMUM DRAINAGE AREA = ¾ ACRE



ISOMETRIC

SECTION A–A

CONSTRUCTION SPECIFICATIONS

1. USE NOMINAL 2 INCH x 4 INCH LUMBER
2. USE NONWOVEN GEOTEXTILE AS SPECIFIED IN SECTION H-1 MATERIALS.
3. NAIL THE 2x4 WEIR TO 9 INCH LONG VERTICAL SPACERS (MAXIMUM 6 FEET APART).
4. ATTACH A CONTINUOUS PIECE OF ¾ 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 IT 2 FEET BEYOND THROAT ON EACH SIDE.
5. PLACE A CONTINUOUS PIECE OF NONWOVEN GEOTEXTILE OF THE SAME DIMENSIONS AS THE HARDWARE CLOTH OVER THE HARDWARE CLOTH AND SECURELY ATTACH TO THE 2x4 WEIR.
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.
7. 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.
9. 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 GEOTEXTILE AND STONE.

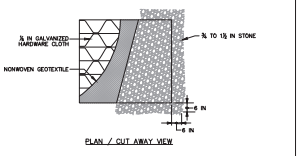
MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE	2011	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

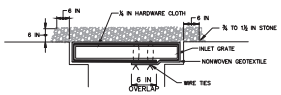
DETAIL E-9-2 AT-GRADE INLET PROTECTION

STANDARD SYMBOL: AGIP

MAXIMUM DRAINAGE AREA = 1 ACRE



PLAN / CUT AWAY VIEW



CROSS SECTION

CONSTRUCTION SPECIFICATIONS

1. USE NONWOVEN GEOTEXTILE AS SPECIFIED IN SECTION H-1 MATERIALS.
2. LIFT GRATE AND WRAP WITH NONWOVEN GEOTEXTILE TO COMPLETELY COVER ALL OPENINGS. SECURE WITH WIRE TIES AND SET GRATE BACK IN PLACE.
3. PLACE CLEAN ¾ TO 1½ INCH STONE OR EQUIVALENT RECYCLED CONCRETE 6 INCHES THICK ON THE GRATE.
4. 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 GEOTEXTILE AND STONE.

MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL

U.S. DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE	2011	MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

SEQUENCE OF CONSTRUCTION

1. PROVIDE ALL PROPER PERMITS PRIOR TO THE START OF CONSTRUCTION.
2. CONTACT THE MARYLAND DEPARTMENT OF THE ENVIRONMENT AT (410) 537-3510 AT LEAST SEVEN (7) DAYS PRIOR TO COMMENCING ANY LAND DISTURBANCE ACTIVITY. PROVIDE THE FOLLOWING:
   A. REQUEST FOR A PRE-CONSTRUCTION MEETING (UNLESS WAIVED BY MDE),
   B. WHEN CONTRACTOR INTENDS TO BEGIN CONSTRUCTION,
   C. SOURCE OF BORROW MATERIAL,
   D. LOCATION OF DISPOSAL AREA WITH AN ACTIVE PERMIT,
   E. CONTRACTOR'S TENTATIVE CLOSING DATE.
3. IMPLEMENT MAINTENANCE OF TRAFFIC AROUND PROPOSED CONSTRUCTION ZONE.
4. WITH THE PERMISSION OF THE SEDIMENT CONTROL INSPECTOR, INSTALL SEDIMENT CONTROL MEASURES WITHIN PROJECT WORK AREA.
5. WITH ESC INSPECTOR'S WRITTEN PERMISSION BEGIN DUCTBANK CONSTRUCTION.
   5.1. ANY EXCAVATED MATERIAL NOT DIRECTLY LIFTED TO TRUCK MUST BE PLACED ON THE HIGH SIDE OF THE TRENCH AND REMOVED PRIOR TO COMPLETION OF THE WORK DAY. SEE MDE GENERAL ESC NOTE 8. SITE MUST BE FULLY STABILIZED AT THE END OF EACH WORKING DAY.
   5.2. CONTRACTOR SHALL WORK WITHIN THE LOD PROGRESSING UP/DOWN ALIGNMENT. PROVIDING FINAL STABILIZATION AS DUCTBANK IS CONSTRUCTED.
6. AFTER THE SITE HAS BEEN STABILIZED AND WITH PERMISSION OF THE MDE SEDIMENT CONTROL INSPECTOR, REMOVE SEDIMENT CONTROLS, AND IMMEDIATELY STABILIZE ANY DISTURBANCE CREATED.
7. REMOVE REMAINING MAINTENANCE OF TRAFFIC AROUND CONSTRUCTION SITE.

Drainage Area	Area (Ac.)	Sediment Control	Location
DA-1	0.278	At-Grade Inlet Protection	Arch St.
DA-2	0.233	Curb Inlet Protection	W. Fayette x Pearl
DA-3	0.233	Curb Inlet Protection	W. Fayette x Pearl
DA-4	0.294	At-Grade Inlet Protection	W. Fayette x N Arch
DA-5	0.360	At-Grade Inlet Protection	W. Fayette x N Arch
DA-6	0.255	At-Grade Inlet Protection	W. Baltimore x S. Greene
DA-7	0.350	At-Grade Inlet Protection	W. Baltimore x S. Greene
DA-8	0.205	Curb Inlet Protection	Redwood x S. Greene
DA-9	0.208	Curb Inlet Protection	Redwood x S. Greene
DA-10	0.472	Curb Inlet Protection	W. Lombard x S. Greene
DA-11	0.301	Curb Inlet Protection	W. Lombard x S. Greene
DA-12	0.271	At-Grade Inlet Protection	W. Lombard x S. Greene
DA-13	0.023	Silt Fence on Pavement	W. Lombard x S. Greene
DA-14	0.488	Curb Inlet Protection	W. Pratt x S. Greene
DA-15	0.398	Combination Inlet Protection	W. Pratt x S. Greene
DA-16	0.113	Combination Inlet Protection	Lexington x N. Arch St.
DA-17A	0.128	Combination Inlet Protection	Lexington x N. Arch St.
DA-17B	0.225	Combination Inlet Protection	Lexington x N. Arch St.
DA-18A	0.365	At-Grade Inlet Protection	Pearl St x Lexington St.
DA-18B	0.269	At-Grade Inlet Protection	Pearl St x Lexington St.
DA-19	0.271	At-Grade Inlet Protection	N. Arch St.
DA-20	0.45	At-Grade Inlet Protection	Hope Lodge Parking Lot

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NO	DATE	ITEM

SHEET NO.
ESC4.05

B-3 STANDARDS AND SPECIFICATIONS FOR LAND GRADING

Definition

Reshaping the existing land surface to provide suitable topography for building facilities and other site improvements.

Purpose

To provide erosion control and vegetative establishment for extreme changes in grade.

Conditions Where Practice Applies

Earth disturbances or extreme grade modifications on steep or long slopes.

Design Criteria

The grading plan should be based on the incorporation of building designs and street layouts that fit and utilize existing topography and desirable natural surroundings to avoid extreme grade modifications. Information submitted must provide sufficient topographic surveys and soil investigations to determine limitations that must be imposed on the grading operation related to slope stability, adjacent properties, drainage patterns, measures for water removal, and vegetative treatment, etc.

Many jurisdictions have regulations and design procedures already established for land grading that must be followed. The plan must show existing and proposed contours for the area(s) to be graded including practices for erosion control, slope stabilization, and safe conveyance of runoff (e.g., waterways, lined channels, reverse benches, grade stabilization structures). The grading/construction plans are to include the phasing of these practices and consideration of the following:

1. Provisions to safely convey surface runoff to storm drains, protected outlets or stable water courses to ensure that surface runoff will not damage slopes or other graded areas.
2. Cut and fill slopes, stabilized with grasses, no steeper than 2:1. (Where the slope is to be mowed, the slope should be no steeper than 3:1, but 4:1 is preferred because of safety factors related to mowing steep slopes.) Slopes steeper than 2:1 require special design and stabilization considerations to be shown on the plans.
3. Benching per Detail B-3-1 whenever the vertical interval (height) of any 2:1 slope exceeds 20 feet; for 3:1 slopes, when it exceeds 30 feet; and for 4:1 slopes, when it exceeds 40 feet. Locate benches to divide the slope face as equally as possible and to convey the water to a stable outlet. Soils, seeps, rock outcrops, etc. are to be taken into consideration when designing benches.
   a. Provide benches with a minimum width of six feet for ease of maintenance.
   b. Design benches with a reverse slope of 6:1 or flatter to the toe of the upper slope and with a minimum of one foot in depth. Grade the longitudinal slope of the bench between 2 percent and 3 percent, unless accompanied by appropriate design and computations.
   c. The maximum allowable flow length within a bench is 800 feet unless accompanied by appropriate design and computations.
4. Diversion of surface water from the face of all cut and fill slopes using earth dikes or swales. Convey surface water down slope using a designed structure, and:
   a. Protect the face of all graded slopes from surface runoff until they are stabilized.
   b. Do not subject the slope's face to any concentrated flow of surface water such as from natural drainage ways, graded swales, downspouts, etc.
   c. Protect the face of the slope by special erosion control materials to include, but not be limited to, approved vegetative stabilization practices, riprap or other approved stabilization methods.
5. Serrated slope as shown in Detail B-3-2. The steepest allowable slope for ripable rock is 1.5:1. For non rock surfaces, the slopes are to be 2:1 or flatter. These steps will weather and act to hold moisture, lime, fertilizer and seed thus producing a much quicker and longer lived vegetative cover and better slope stabilization.
6. Subsurface drainage provisions. Provide subsurface drainage where necessary to intercept seepage that would otherwise adversely affect slope stability or create excessively wet site conditions.
7. Proximity to adjacent property. Slopes must not be created close to property lines without adequate protection against sedimentation, erosion, slippage, settlement, subsidence, or other related damages.
8. Quality of fill material. Fill material must be free of brush, rubbish, logs, stumps, building debris, and other objectionable material. Do not place frozen materials in the fill nor place the fill material on a frozen foundation.
9. Stabilization. Stabilize all disturbed areas structurally or vegetatively in compliance with Section B4 Standards and Specifications for Stabilization Practices.

Maintenance

The line, grade, and cross section of benching and serrated slopes must be maintained. Benches and serrated slopes must continuously meet the requirements for Adequate Vegetative Establishment in accordance with Section B-4 Vegetative Stabilization.

B-4 STANDARDS AND SPECIFICATIONS FOR VEGETATIVE STABILIZATION

Definition

Using vegetation as cover to protect exposed soil from erosion.

Purpose

To promote the establishment of vegetation on exposed soil.

Conditions Where Practice Applies

On all disturbed areas not stabilized by other methods. This specification is divided into sections on incremental stabilization; soil preparation, soil amendments and topsoiling; seeding and mulching; temporary stabilization; and permanent stabilization.

Effects on Water Quality and Quantity

Stabilization practices are used to promote the establishment of vegetation on exposed soil. When soil is stabilized with vegetation, the soil is less likely to erode and more likely to allow infiltration of rainfall, thereby reducing sediment loads and runoff to downstream areas.

Planting vegetation in disturbed areas will have an effect on the water budget, especially on volumes and rates of runoff, infiltration, evaporation, transpiration, percolation, and groundwater recharge. Over time, vegetation will increase organic matter content and improve the water holding capacity of the soil and subsequent plant growth.

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

Sediment control practices must remain in place during grading, seedbed preparation, seeding, mulching, and vegetative establishment.

Adequate Vegetative Establishment

Inspect seeded areas for vegetative establishment and make necessary repairs, replacements, and reseedings within the planting season.

1. Adequate vegetative stabilization requires 95 percent groundcover.
2. If an area has less than 40 percent groundcover, restabilize following the original recommendations for lime, fertilizer, seedbed preparation, and seeding.
3. If an area has between 40 and 94 percent groundcover, over-seed and fertilize using half of the rates originally specified.
4. Maintenance fertilizer rates for permanent seeding are shown in Table B.6.

B-4-1 STANDARDS AND SPECIFICATIONS FOR INCREMENTAL STABILIZATION

Definition

Establishment of vegetative cover on cut and fill slopes.

Purpose

To provide timely vegetative cover on cut and fill slopes as work progresses.

Conditions Where Practice Applies

Any cut or fill slope greater than 15 feet in height. This practice also applies to stockpiles.

Criteria

A. Incremental Stabilization – Cut Slopes
   1. Excavate and stabilize cut slopes in increments not to exceed 15 feet in height. Prepare seedbed and apply seed and mulch on all cut slopes as the work progresses.
   2. Construction sequence example (Refer to Figure B.1):
      a. Construct and stabilize all temporary swales or dikes that will be used to convey runoff around the excavation.
      b. Perform Phase 1 excavation, prepare seedbed, and stabilize.
      c. Perform Phase 2 excavation, prepare seedbed, and stabilize. Overseed Phase 1 areas as necessary.
      d. Perform final phase excavation, prepare seedbed, and stabilize. Overseed previously seeded areas as necessary.

Note: Once excavation has begun the operation should be continuous from grubbing through the completion of grading and placement of topsoil (if required) and permanent seed and mulch. Any interruptions in the operation or completing the operation out of the seeding season will necessitate the application of temporary stabilization.

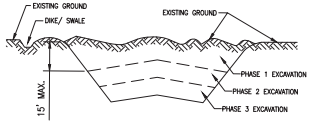

Figure B.1: Incremental Stabilization – Cut

B. Incremental Stabilization – Fill Slopes
   1. Construct and stabilize fill slopes in increments not to exceed 15 feet in height. Prepare seedbed and apply seed and mulch on all slopes as the work progresses.
   2. Stabilize slopes immediately when the vertical height of a lift reaches 15 feet, or when the grading operation ceases as prescribed in the plans.
   3. At the end of each day, install temporary water conveyance practice(s), as necessary, to intercept surface runoff and convey it down the slope in a non-erosive manner.
   4. Construction sequence example (Refer to Figure B.2):
      a. Construct and stabilize all temporary swales or dikes that will be used to divert runoff around the fill. Construct silt fence on low side of fill unless other methods shown on the plans address this area.
      b. At the end of each day, install temporary water conveyance practice(s), as necessary, to intercept surface runoff and convey it down the slope in a non-erosive manner.
      c. Place Phase 1 fill, prepare seedbed, and stabilize.
      d. Place Phase 2 fill, prepare seedbed, and stabilize.
      e. Place final phase fill, prepare seedbed, and stabilize. Overseed previously seeded areas as necessary.

Note: Once the placement of fill has begun the operation should be continuous from grubbing through the completion of grading and placement of topsoil (if required) and permanent seed and mulch. Any interruptions in the operation or completing the operation out of the seeding season will necessitate the application of temporary stabilization.

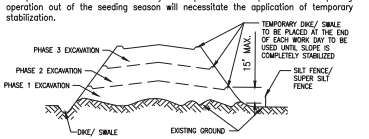

Figure B.2: Incremental Stabilization – Fill

B-4-2 STANDARDS AND SPECIFICATIONS FOR SOIL PREPARATION, TOPSOILING, AND SOIL AMENDMENTS

Definition

The process of preparing the soils to sustain adequate vegetative stabilization.

Purpose

To provide a suitable soil medium for vegetative growth.

Conditions Where Practice Applies

Where vegetative stabilization is to be established.

Criteria

A. Soil Preparation
   1. Temporary Stabilization
      a. Seedbed preparation consists of loosening soil to a depth of 3 to 5 inches by means of suitable agricultural or construction equipment, such as disc harrows or chisel plows or rippers mounted on construction equipment. After the soil is loosened, it must not be rolled or dragged smooth but left in the roughened condition. Slopes 3:1 or flatter are to be tracked with ridges running parallel to the contour of the slope.
      b. Apply fertilizer and lime as prescribed on the plans.
      c. Incorporate lime and fertilizer into the top 3 to 5 inches of soil by disking or other suitable means.
   2. Permanent Stabilization
      a. A soil test is required for any earth disturbance of 5 acres or more. The minimum soil conditions required for permanent vegetative establishment are:
         i. Soil pH between 6.0 and 7.0.
         ii. Soluble salts less than 500 parts per million (ppm).
         iii. Soil contains less than 40 percent clay but enough fine grained material (greater than 30 percent silt plus clay) to provide the capacity to hold a moderate amount of moisture. An exception: if lovegrass will be planted, then a sandy soil (less than 30 percent silt plus clay) would be acceptable.
         iv. Soil contains 1.5 percent minimum organic matter by weight.
         v. Soil contains sufficient pore space to permit adequate root penetration.
      b. Application of amendments or topsoil is required if on-site soils do not meet the above conditions.
      c. Graded areas must be maintained in a true and even grade as specified on the approved plan, then scarified or otherwise loosened to a depth of 3 to 5 inches.
      d. Apply soil amendments as specified on the approved plan or as indicated by the results of a soil test.
      e. Mix soil amendments into the top 3 to 5 inches of soil by disking or other suitable means. Rake lawn areas to smooth the surface, remove large objects like stones and branches, and ready the area for seed application. Loosen surface soil by dragging with a heavy chain or other equipment to roughen the surface where site conditions will not permit normal seedbed preparation. Track slopes 3:1 or flatter with tracked equipment leaving the soil in an irregular condition with ridges running parallel to the contour of the slope. Leave the top 1 to 3 inches of soil loose and friable. Seedbed loosening may be necessary on newly disturbed areas.

B. Topsoiling
   1. Topsoil is placed over prepared subsoil prior to establishment of permanent vegetation. The purpose is to provide a suitable soil medium for vegetative growth. Soils of concern have low moisture content, low nutrient levels, low pH, materials toxic to plants, and/or unacceptable soil gradation.
   2. Topsoil salvaged from an existing site may be used provided it meets the standards as set forth in these specifications. Typically, the depth of topsoil to be salvaged for a given soil type can be found in the representative soil profile section in the Soil Survey published by USDA-NRCS.
   3. Topsoiling is limited to areas having 2:1 or flatter slopes where:
      a. The texture of the exposed subsoil/parent material is not adequate to produce vegetative growth.
      b. The soil material is so shallow that the rooting zone is not deep enough to support plants or furnish continuing supplies of moisture and plant nutrients.
      c. The original soil to be vegetated contains material toxic to plant growth.
      d. The soil is so acidic that treatment with limestone is not feasible.
   4. Areas having slopes steeper than 2:1 require special consideration and design.
   5. Topsoil Specifications: Soil to be used as topsoil must meet the following criteria:
      a. Topsoil must be a loam, sandy loam, clay loam, silt loam, sandy clay loam, or loamy sand. Other soils may be used if recommended by an agronomist or soil scientist and approved by the appropriate approval authority. Topsoil must not be a mixture of contrasting textured subsoils and must contain less than 5 percent by volume of cinders, stones, slag, coarse fragments, gravel, sticks, roots, trash, or other materials larger than 1½ inches in diameter.
      b. Topsoil must be free of noxious plants or plant parts such as Bermuda grass, quack grass, Johnson grass, nut sedge, poison ivy, thistle, or others as specified.
      c. Topsoil substitutes or amendments, as recommended by a qualified agronomist or soil scientist and approved by the appropriate approval authority, may be used in lieu of natural topsoil.
   6. Topsoil Application
      a. Erosion and sediment control practices must be maintained when applying topsoil.
      b. Uniformly distribute topsoil in a 5 to 8 inch layer and lightly compact to a minimum thickness of 4 inches. Spreading is to be performed in such a manner that sodding or seeding can proceed with a minimum of additional soil preparation and tillage. Any irregularities in the surface resulting from topsoiling or other operations must be corrected in order to prevent the formation of depressions or water pockets.
      c. Topsoil must not be placed if the topsoil or subsoil is in a frozen or muddy condition, when the subsoil is excessively wet or in a condition that may otherwise be detrimental to proper grading and seedbed preparation.
C. Soil Amendments (Fertilizer and Lime Specifications)
   1. Soil tests must be performed to determine the exact ratios and application rates for both lime and fertilizer on sites having disturbed areas of 5 acres or more. Soil analysis may be performed by a recognized private or commercial laboratory. Soil samples taken for engineering purposes may also be used for chemical analyses.
   2. Fertilizers must be uniform in composition, free flowing and suitable for accurate application by appropriate equipment. Manure may be substituted for fertilizer with prior approval from the appropriate approval authority. Fertilizers must all be delivered to the site fully labeled according to the applicable laws and must bear the name, trade name or trademark and warranty of the producer.
   3. Lime materials must be ground limestone (hydrated or burnt lime may be substituted except when hydroseeding) which contains at least 50 percent total oxides (calcium oxide plus magnesium oxide). Limestone must be ground to such fineness that at least 50 percent will pass through a #100 mesh sieve and 98 to 100 percent will pass through a #20 mesh sieve.
   4. Lime and fertilizer are to be evenly distributed and incorporated into the top 3 to 5 inches of soil by disking or other suitable means.
   5. Where the subsoil is either highly acidic or composed of heavy clays, spread ground limestone at the rate of 4 to 8 tons/acre (200–400 pounds per 1,000 square feet) prior to the placement of topsoil.

B-4-3 STANDARDS AND SPECIFICATIONS FOR SEEDING AND MULCHING

Definition

The application of seed and mulch to establish vegetative cover.

Purpose

To protect disturbed soils from erosion during and at the end of construction.

Conditions Where Practice Applies

To the surface of all perimeter controls, slopes, and any disturbed area not under active grading.

Criteria

A. Seeding
   1. Specifications
      a. All seed must meet the requirements of the Maryland State Seed Law. All seed must be subject to re-testing by a recognized seed laboratory. All seed used must have been tested within the 6 months immediately preceding the date of sowing such material on any project. Refer to Table B.4 regarding the quality of seed. Seed tags must be available upon request to the inspector to verify type of seed and seeding rate.
      b. Mulch alone may be applied between the fall and spring seeding dates only if the ground is frozen. The appropriate seeding mixture must be applied when the ground thaws.
      c. Inoculants: The inoculant for treating legume seed in the seed mixtures must be a pure culture of nitrogen fixing bacteria prepared specifically for the species. Inoculants must not be used later than the date indicated on the container. Add fresh inoculants as directed on the package. Use four times the recommended rate when hydroseeding. Note: It is very important to keep inoculant as cool as possible until used. Temperatures above 75 to 80 degrees Fahrenheit can weaken bacteria and make the inoculant less effective.
      d. Sod or seed must not be placed on soil which has been treated with soil sterilants or chemicals used for weed control until sufficient time has elapsed (14 days min.) to permit dissipation of phyto-toxic materials.
   2. Application
      a. Dry Seeding: This includes use of conventional drop or broadcast spreaders.
         i. Incorporate seed into the subsoil at the rates prescribed on Temporary Seeding Table B.1, Permanent Seeding Table B.3, or site-specific seeding summaries.
         ii. Apply seed in two directions, perpendicular to each other. Apply half the seeding rate in each direction. Roll the seeded area with a weighted roller to provide good seed to soil contact.
      b. Drill or Cultipacker Seeding: Mechanized seeders that apply and cover seed with soil.
         i. Cultipacking seeders are required to bury the seed in such a fashion as to provide at least 1/4 inch of soil covering. Seedbed must be firm after planting.
         ii. Apply seed in two directions, perpendicular to each other. Apply half the seeding rate in each direction.
      c. Hydroseeding: Apply seed uniformly with hydroseeder (slurry includes seed and fertilizer).
         i. If fertilizer is being applied at the time of seeding, the application rates should not exceed the following: nitrogen, 100 pounds per acre total of soluble nitrogen; P205 (phosphorous), 200 pounds per acre; K20 (potassium), 200 pounds per acre.
         ii. Lime: Use only ground agricultural limestone (up to 3 tons per acre may be applied by hydroseeding). Normally, not more than 2 tons are applied by hydroseeding at any one time. Do not use burnt or hydrated lime when hydroseeding.
         iii. Mix seed and fertilizer on site and seed immediately and without interruption.
         iv. When hydroseeding do not incorporate seed into the soil.

B. Mulching
   1. Mulch Materials (in order of preference)
      a. Straw consisting of thoroughly threshed wheat, rye, oat, or barley and reasonably bright in color. Straw is to be free of noxious weed seeds as specified in the Maryland Seed Law and not musty, moldy, caked, decayed, or excessively dusty. Note: Use only sterile straw mulch in areas where one species of grass is desired.
      b. Wood Cellulose Fiber Mulch (WCFM) consisting of specially prepared wood cellulose processed into a uniform fibrous physical state.
         i. WCFM is to be dyed green or contain a green dye in the package that will provide an appropriate color to facilitate visual inspection of the uniformly spread slurry.
         ii. WCFM, including dye, must contain no germination or growth inhibiting factors.
         iii. WCFM materials are to be manufactured and processed in such a manner that the wood cellulose fiber mulch will remain in uniform suspension in water under agitation and will blend with seed, fertilizer and other additives to form a homogeneous slurry. The mulch material must form a blotter-like ground cover, on application, having moisture absorption and percolation properties and must cover and hold grass seed in contact with the soil without inhibiting the growth of the grass seedlings.
         iv. WCFM material must not contain elements or compounds at concentration levels that will be phyto-toxic.
         v. WCFM must conform to the following physical requirements: fiber length of approximately 10 millimeters, diameter approximately 1 millimeter, pH range of 4.0 to 8.5, ash content of 1.6 percent maximum and water holding capacity of 90 percent minimum.
   2. Application
      a. Apply mulch to all seeded areas immediately after seeding.
      b. When straw mulch is used, spread it over all seeded areas at the rate of 2 tons per acre to a uniform loose depth of 1 to 2 inches. Apply mulch to achieve a uniform distribution and depth so that the soil surface is not exposed. When using a mulch anchoring tool, increase the application rate to 2.5 tons per acre.
      c. Wood cellulose fiber used as mulch must be applied at a net dry weight of 1500 pounds per acre. Mix the wood cellulose fiber with water to attain a mixture with a maximum of 50 pounds of wood cellulose fiber per 100 gallons of water.
   3. Anchoring
      a. Perform mulch anchoring immediately following application of mulch to minimize loss by wind or water. This may be done by one of the following methods (listed by preference), depending upon the size of the area and erosion hazard:
         i. A mulch anchoring tool is a tractor drawn implement designed to punch and anchor mulch into the soil surface a minimum of 2 inches. This practice is most effective on large areas, but is limited to flatter slopes where equipment can operate safely. If used on sloping land, this practice should follow the contour.
         ii. Wood cellulose fiber may be used for anchoring straw. Apply the fiber binder at a net dry weight of 750 pounds per acre. Mix the wood cellulose fiber with water at a maximum of 50 pounds of wood cellulose fiber per 100 gallons of water.
         iii. Synthetic binders such as Acrylic DLR (Agro-Tack), DCA-70, Petroset, Terra Tax II, Terra Tack AR or other approved equal may be used. Follow application rates as specified by the manufacturer. Application of liquid binders needs to be heavier at the edges where wind catches mulch, such as in valleys and on crests of banks. Use of asphalt binders is strictly prohibited.
         iv. Lightweight plastic netting may be stapled over the mulch according to manufacturer recommendations. Netting is usually available in rolls 4 to 15 feet wide and 300 to 3,000 feet long.

B-4-4 STANDARDS AND SPECIFICATIONS FOR TEMPORARY STABILIZATION

Definition

To stabilize disturbed soils with vegetation for up to 6 months.

Purpose

To use fast growing vegetation that provides cover on disturbed soils.

Conditions Where Practice Applies

Exposed soils where ground cover is needed for a period of 6 months or less. For longer duration of time, permanent stabilization practices are required.

Criteria

1. Select one or more of the species or seed mixtures listed in Table B.1 for the appropriate Plant Hardiness Zone (from Figure B.3), and enter them in the Temporary Seeding Summary below along with application rates, seeding dates and seeding depths. If this Summary is not put on the plan and completed, then Table B.1 plus fertilizer and lime rates must be put on the plan.
2. For sites having soil tests performed, use and show the recommended rates by the testing agency. Soil tests are not required for Temporary Seeding.
3. When stabilization is required outside of a seeding season, apply seed and mulch or straw mulch alone as prescribed in Section B-4-3.A.1.b and maintain until the next seeding season.

Temporary Seeding Summary

Hardiness Zone (from Figure B.3): 7A
Seed Mixture (from Table B.1): _____

No.	Species	Application Rate (lb/ac)	Seeding Dates	Seeding Depths	Fertilizer Rate (10-20-20)	Lime Rate
	Annual Ryegrass	40	Mar 1 to May 15; Aug 1 to Oct 15	0.5	436 lb/ac (10 lb/1000sf)	2 tons/ac (90 lb/1000sf)
	Barley	96	Mar 1 to May 15; Aug 1 to Oct 15	1.0		
	Foxtail Millet	30	May 16 to Jul 31	0.5		

H-5 STANDARD AND SPECIFICATIONS FOR 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.

Conditions Where Practice Applies

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

Specifications

Temporary Methods:

1. Mulches: See standards and specifications Section B-4-2, soil Amendments, Seeding, Mulching and topsoiling and Section B-4-3, Temporary Stabilization. Mulch should be crimped or tacked to prevent blowing.
2. Vegetative Cover: See standards and specifications Section B-4-3, Temporary Stabilization.
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 inches 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 runoff begins to flow.
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 and may need retreatment.

Permanent Methods:

1. Permanent Vegetation: See standard and specifications section B-4-4, Permanent Stabilization. Existing trees or large shrubs may afford valuable protection in lift in place.
2. Topsoiling: Covering with less erosive soil materials. See standards and specifications Section B-4-2, soil Amendments, Seeding, Mulching and Topsoiling.
3. Stone: Cover surface with crushed stone or course gravel.

MDE No. 22-SF-0106 MOD #1

UNIVERSITY of MARYLAND

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REGISTRATION/STAMP

PROFESSIONAL CERTIFICATION. I HERE BY 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. 14446
EXPIRATION DATE: 06/25/2023

PROJECT TITLE :
CAMPUS ELECTRICAL DISTRIBUTION UPGRADES – PHASE 4

UMB BUILDING NO. : VARIOUS
UMB Project NO. : 17-317
A/E PROJECT NO. : 117081.A0
CAD FILE NO. :
DATE : 12/2/2022

SHEET TITLE :
EROSION AND SEDIMENT CONTROL PLAN

REVISIONS

NO	DATE	ITEM

SHEET NO.
ESC4.06

B-4-5 STANDARDS AND SPECIFICATIONS FOR PERMANENT STABILIZATION

Definition
To stabilize disturbed soils with permanent vegetation.

Purpose
To use long-lived perennial grasses and legumes to establish permanent ground cover on disturbed soils.

Conditions Where Practice Applies
Exposed soils where ground cover is needed for 6 months or more.

Criteria
A. Seed Mixtures
1. General Use
   a. Select one or more of the species or mixtures listed in Table B.3 for the appropriate Plant Hardiness Zone (from Figure B.3) and based on the site condition or purpose found on Table B.2. Enter selected mixture(s), application rates, and seeding dates in the Permanent Seeding Summary. The Summary is to be placed on the plan.
   b. Additional planting specifications for exceptional sites such as shorelines, stream banks, or dunes or for special purposes such as wildlife or aesthetic treatment may be found in USDA-NRCS Technical Field Office Guide, Section 342 - Critical Area Planting.
   c. For sites having disturbed area over 5 acres, use and show the rates recommended by the soil testing agency.
   d. For areas receiving low maintenance, apply urea form fertilizer (46-0-0) at 3 ½ pounds per 1000 square feet (150 pounds per acre) at the time of seeding in addition to the soil amendments shown in the Permanent Seeding Summary.
2. Turfgrass Mixtures
   a. Areas where turfgrass may be desired include lawns, parks, playgrounds, and commercial sites which will receive a medium to high level of maintenance.
   b. Select one or more of the species or mixtures listed below based on the site conditions or purpose. Enter selected mixture(s), application rates, and seeding dates in the Permanent Seeding Summary. The summary is to be placed on the plan.
      i. Kentucky Bluegrass: Full Sun Mixture: For use in areas that receive intensive management. Irrigation required in the areas of central Maryland and Eastern Shore. Recommended Certified Kentucky Bluegrass Cultivars Seeding Rate: 1.5 to 2.0 pounds per 1000 square feet. Choose a minimum of three Kentucky bluegrass cultivars with each ranging from 10 to 35 percent of the total mixture by weight.
      ii. Kentucky Bluegrass/Perennial Rye: Full Sun Mixture: For use in full sun areas where rapid establishment is necessary and when turf will receive medium to intensive management. Certified Perennial Ryegrass Cultivars/Certified Kentucky Bluegrass Seeding Rate: 2 pounds mixture per 1000 square feet. Choose a minimum of three Kentucky bluegrass cultivars with each ranging from 10 to 35 percent of the total mixture by weight.
      iii. Tall Fescue/Kentucky Bluegrass: Full Sun Mixture: For use in drought prone areas and/or for areas receiving low to medium management in full sun to medium shade. Recommended mixture includes; Certified Tall Fescue Cultivars 95 to 100 percent, Certified Kentucky Bluegrass Cultivars 0 to 5 percent. Seeding Rate: 5 to 8 pounds per 1000 square feet. One or more cultivars may be blended.
      iv. Kentucky Bluegrass/Fine Fescue: Shade Mixture: For use in areas with shade in Bluegrass lawns. For establishment in high quality, intensively managed turf area. Mixture includes; Certified Kentucky Bluegrass Cultivars 30 to 40 percent and Certified Fine Fescue and 60 to 70 percent. Seeding Rate: 1½ to 3 pounds per 1000 square feet.

      Notes:
      Select turfgrass varieties from those listed in the most current University of Maryland Publication, Agronomy Memo #77. "Turfgrass Cultivar Recommendations for Maryland"

      Choose certified material. Certified material is the best guarantee of cultivar purity. The certification program of the Maryland Department of Agriculture, Turf and Seed Section, provides a reliable means of consumer protection and assures a pure genetic line

   c. Ideal Times of Seeding for Turf Grass Mixtures
      Western MD: March 1 to June 1, August 1 to October 1 (Hardiness Zone: 5b, 6a)
      Central MD: March 1 to May 15, August 15 to October 15 (Hardiness Zone: 6b)
      Southern MD, Eastern Shore: March 1 to May 15, August 15 to October 15 (Hardiness Zone: 7a, 7b)
   d. Till areas to receive seed by disking or other approved methods to a depth of 2 to 4 inches, level and rake the areas to prepare a proper seedbed. Remove stones and debris over 1½ inches in diameter. The resulting seedbed must be in such condition that future mowing of grasses will pose no difficulty.
   e. If soil moisture is deficient, supply new seedings with adequate water for plant growth (½ to 1 inch every 3 to 4 days depending on soil texture) until they are firmly established. This is especially true when seedings are made late in the planting season, in abnormally dry or hot seasons, or on adverse sites.

Permanent Seeding Summary

Hardiness Zone (from Figure B.3): 6b Seed Mixture (from Table B.3): #9					Fertilizer Rate (10-20-20)			Lime Rate
No.	Species	Application Rate (lb/ac)	Seeding Dates	Seeding Depths	N	P_2O_5	K_2O	
	Tall Fescue	60	Mar 1 to May 15; Aug 15 to Oct 15	1/4-1/2 inch				
	Kentucky Bluegrass	40	Mar 1 to May 15; Aug 15 to Oct 15	1/4-1/2 inch	45 lb/ac (1.0 lb/ 1000sf)	90 lb/ac (2.0 lb/ 1000sf)	90 lb/ac (2.0 lb/ 1000sf)	2 tons/ac (90 lb/ 1000sf)
	Perennial Ryegrass	20	Mar 1 to May 15; Aug 15 to Oct 15	1/4-1/2 inch				

B. Sod: To provide quick cover on disturbed areas (2:1 grade or flatter).
1. General Specifications
   a. Class of turfgrass sod must be Maryland State Certified. Sod labels must be made available to the job foreman and inspector.
   b. Sod must be machine cut at a uniform soil thickness of ¾ inch, plus or minus ¼ inch, at the time of cutting. Measurement for thickness must exclude top growth and thatch. Broken pads and torn or uneven ends will not be acceptable.
   c. Standard size sections of sod must be strong enough to support their own weight and retain their size and shape when suspended vertically with a firm grasp on the upper 10 percent of the section.
   d. Sod must not be harvested or transplanted when moisture content (excessively dry or wet) may adversely affect its survival.
   e. Sod must be harvested, delivered, and installed within a period of 36 hours. Sod not transplanted within this period must be approved by an agronomist or soil scientist prior to its installation.
2. Sod Installation
   a. During periods of excessively high temperature or in areas having dry subsoil, lightly irrigate the subsoil immediately prior to laying the sod.
   b. Lay the first row of sod in a straight line with subsequent rows placed parallel to it and tightly wedged against each other. Stagger lateral joints to promote more uniform growth and strength. Ensure that sod is not stretched or overlapped and that all joints are butted tight in order to prevent voids which would cause air drying of the roots.
   c. Wherever possible, lay sod with the long edges parallel to the contour and with staggering joints. Roll and tamp, peg or otherwise secure the sod to prevent slippage on slopes. Ensure solid contact exists between sod roots and the underlying soil surface.
   d. Water the sod immediately following rolling and tamping until the underside of the new sod pad and soil surface below the sod are thoroughly wet. Complete the operations of laying, tamping and irrigating for any piece of sod within eight hours.
3. Sod Maintenance
   a. In the absence of adequate rainfall, water daily during the first week or as often and sufficiently as necessary to maintain moist soil to a depth of 4 inches. Water sod during the heat of the day to prevent wilting.
   b. After the first week, sod watering is required as necessary to maintain adequate moisture content.
   c. Do not mow until the sod is firmly rooted. No more than ⅓ of the grass leaf must be removed by the initial cutting or subsequent cuttings. Maintain a grass height of at least 3 inches unless otherwise specified.

B-4-6 STANDARDS AND SPECIFICATIONS FOR SOIL STABILIZATION MATTING

Definition
Material used to temporarily or permanently stabilize channels or steep slopes until groundcover is established.

Purpose
To protect the soils until vegetation is established.

Conditions Where Practice Applies
On newly seeded surfaces to prevent the applied seed from washing out; in channels and on steep slopes where the flow has erosive velocities or conveys clear water; on temporary swales, earth dikes, and perimeter dike swales as required by the respective design standard; and, on stream banks where moving water is likely to wash out new vegetative plantings.

Design Criteria
1. The soil stabilization matting that is used must withstand the flow velocities and shear stresses determined for the area, based on the 2-year, 24-hour frequency storm for temporary applications and the 10-year, 24-hour frequency storm for permanent applications. Designate on the plan the type of soil stabilization matting using the standard symbol and include the calculated shear stress for the respective treatment area.
2. Matting is required on permanent channels where the runoff velocity exceeds two and half feet per second (2.5 fps) or the shear stress exceeds two pounds per square foot (2 lbs/ft2). On temporary channels discharging to a sediment trapping practice, provide matting where the runoff velocity exceeds four feet per second (4 fps).
3. Temporary soil stabilization matting is made with degradable (lasts 6 months minimum), natural, or manmade fibers of uniform thickness and distribution of fibers throughout and is smolder resistant. The maximum permissible velocity for temporary matting is 6 feet per second.
4. Permanent soil stabilization matting is an open weave, synthetic material consisting of nondegradable fibers or elements of uniform thickness and distribution of weave throughout. The maximum permissible velocity for permanent matting is 8.5 feet per second.
5. Calculate channel velocity and shear stress using the following procedure:

   Shear Stress (τ) is a measure of the force of moving water against the substrate and is calculated as:

   $\tau = \gamma x R x Sw$ where:
   τ = shear stress (lb/ft2)
   γ = weight density of water (62.4 lb/ft3)
   R = average water depth (hydraulic radius) (ft)
   Sw = water surface slope (ft/ft)

   Velocity (v) measures the rate of flow through a defined area and is calculated as:

   $$v = \frac{1.486 R^{\frac{2}{3}} s^{\frac{1}{2}}}{n}$$ where: v = velocity (ft/sec)
   n = Manning's roughness coefficient
   R = hydraulic radius (ft)
   s = channel slope (ft/ft)

6. Use Table B.7 to assist in selecting the appropriate soil stabilization matting for slope applications based on the slope, the slope length, and the soil-erodibility K factor.

Table B.7: Soil Stabilization on Slopes

Slope	2:1 Flatter (-5%)			2:1 Flatter (-5%)			2:1 Flatter (-5%)			2:1 Flatter (-5%)			2:1 Flatter (-5%)		
Slope Length (feet)*	0-30	30-60	60-120	0-30	30-60	60-120	0-30	30-60	60-120	0-30	30-60	60-120	0-30	30-60	60-120
Straw Mulch/Wood Cellulose Fiber	for K ≥ (L/33)**														
Temporary Matting with Design Shear Stress ≥ 1.5 lb/sf															
Temporary Matting with Design Shear Stress ≥ 1.75 lb/sf															
Temporary Matting with Design Shear Stress ≥ 2.0 lb/sf															
Temporary Matting with Design Shear Stress ≥ 2.25 lb/sf															

Effective range for all K values unless otherwise specified

* Slope length includes contributing flow length.
** Slopes steeper than 2:1 must be engineered.
*** Soil having a K value less than or equal to 0.35 can be stabilized effectively with straw mulch or wood cellulose fiber when located on slopes steeper than 5%. Soil stabilization matting is required on all slopes steeper than 5% that have soil with a K factor greater than 0.35. K factor ratings are published in the NRCS Soil Survey Http://Websoilsurvey.nrcs.usda.gov/app. During construction or reclamation, the soilerodibility K value should represent the upper 6 inches of the final fill material re-spread as the last lift. Only the effects of rock fragments within the soil profile are considered in the estimation of the K value. Do not adjust K values to account for rocks on the soil surface or increases in soil organic matter related to management activities.

Maintenance
Vegetation must be established and maintained so that the requirements for Adequate Vegetative Establishment are continuously met in accordance with Section B-4 Vegetative Stabilization.

B-4-8 STANDARDS AND SPECIFICATIONS FOR STOCKPILE AREA

Definition
A mound or pile of soil protected by appropriately designed erosion and sediment control measures.

Purpose
To provide a designated location for the temporary storage of soil that controls the potential for erosion, sedimentation, and changes to drainage patterns.

Conditions Where Practice Applies
Stockpile areas are utilized when it is necessary to salvage and store soil for later use.

Criteria
1. The stockpile location and all related sediment control practices must be clearly indicated on the erosion and sediment control plan.
2. The footprint of the stockpile must be sized to accommodate the anticipated volume of material and based on a side slope ratio no steeper than 2:1. Benching must be provided in accordance with Section B-3 Land Grading.
3. Runoff from the stockpile area must drain to a suitable sediment control practice.
4. Access the stockpile area from the upgrade side.
5. Clear water runoff into the stockpile area must be minimized by use of a diversion device such as an earth dike, temporary swale or diversion fence. Provisions must be made for discharging concentrated flow in a non-erosive manner.
6. Where runoff concentrates along the toe of the stockpile fill, an appropriate erosion/sediment control practice must be used to intercept the discharge.
7. Stockpiles must be stabilized in accordance with the 3/7 day stabilization requirement as well as Standard B-4-1 Incremental Stabilization and Standard B-4-4 Temporary Stabilization.
8. If the stockpile is located on an impervious surface, a liner should be provided below the stockpile to facilitate cleanup. Stockpiles containing contaminated material must be covered with impermeable sheeting.

Maintenance
The stockpile area must continuously meet the requirements for Adequate Vegetative Establishment in accordance with Section B-4 Vegetative Stabilization. Side slopes must be maintained at no steeper than a 2:1 ratio. The stockpile area must be kept free of erosion. If the vertical height of a stockpile exceeds 20 feet for 2:1 slopes, 30 feet for 3:1 slopes, or 40 feet for 4:1 slopes, benching must be provided in accordance with Section B-3 Land Grading.

H-1 STANDARDS AND SPECIFICATIONS FOR MATERIALS

Table H.1: Geotextile Fabrics

		WOVEN SLIT FILM GEOTEXTILE		WOVEN MONOFILAMENT GEOTEXTILE		NONWOVEN GEOTEXTILE	
		MINIMUM AVERAGE ROLL VALUE					
PROPERTY	TEST METHOD	MD	CD	MD	CD	MD	CD
GRAB TENSILE STRENGTH	ASTM D-4632	200lb	200lb	370lb	250lb	200lb	200lb
GRAB TENSILE ELONGATION	ASTM D-4632	15%	10%	15%	15%	50%	50%
TRAPEZOIDAL TEAR STRENGTH	ASTM D-4533	75 lb	75 lb	100 lb	60 lb	80 lb	80 lb
PUNCTURE STRENGTH	ASTM D-6241	450 lb		900 lb		450 lb	
APPARENT OPENING SIZE [2]	ASTM D-4751	U.S. Sieve 30 (0.59 mm)		U.S. Sieve 70 (0.21 mm)		U.S. Sieve 70 (0.21 mm)	
PERMITTIVITY	ASTM D-4491	0.05 sec		0.28 sec		1.1 sec	
ULTRAVIOLET RESISTANCE RETAINED AT 500 HOURS	ASTM D-4355	70% strength		70% strength		70% strength	

1 All numeric values except apparent opening size (AOS) represent minimum average roll values (MARV). MARV is calculated as the typical minus two standard deviations. MD is machine direction; CD is cross direction.

2 Values for AOS represent the average maximum opening.

Geotextiles must be evaluated by the National Transportation Product Evaluation Program (NTPEP) and conform to the values in Table H.1.

The geotextile must be inert to commonly encountered chemicals and hydrocarbons and must be rot and mildew resistant. The geotextile must be manufactured from fibers consisting of long chain synthetic polymers and composed of a minimum of 95 percent by weight of polyolefins or polyesters, and formed into a stable network so the filaments or yarns retain their dimensional stability relative to each other, including selvages.

When more than one section of geotextile is necessary, overlap the sections by at least one foot. The geotextile must be pulled taut over the applied surface. Equipment must not run over exposed fabric. When placing riprap on geotextile, do not exceed a one foot drop height.

Table H.2: Stone Size

TYPE	SIZE RANGE	d	d	AASHTO	MIDSIZE WEIGHT [3]
NUMBER 57 [1]	3/8 TO 1 1/2INCH	1 1/2 IN	1 1/2 IN	M-43	N/A
NUMBER 57	2 TO 3 INCH	2 1/2 IN	3 IN	M-43	N/A
RIPRAP [2] (CLASS 0)	4 TO 7 INCH	5 1/2 IN	7 IN	N/A	N/A
CLASS I	N/A	9 1/2 IN	15 IN	N/A	40 lb
CLASS II	N/A	16 IN	24 IN	N/A	200 lb
CLASS III	N/A	23 IN	34 IN	N/A	600 lb

1 This classification is to be used on the upstream face of stone outlets and check dams.

2 This classification is to be used for gabions.

3 Optimum gradation is 50 percent of the stone being above and 50 percent below the midsize.

Stone must be composed of a well graded mixture of stone sized so that fifty (50) percent of the pieces by weight are larger than the size determined by using the charts. A well graded mixture, as used herein, is defined as a mixture composed primarily of larger stone sizes but with a sufficient mixture of other sizes to fill the smaller voids between the stones. The diameter of the largest stone in such a mixture must not exceed the respective d100 selected from Table H.2. The d50 refers to the median diameter of the stone. This is the size for which 50 percent, by weight, will be smaller and 50 percent will be larger.

Note: Recycled concrete equivalent may be substituted for all stone classifications for temporary control measures only. Concrete broken into the sizes meeting the appropriate classification, containing no steel reinforcement, and having a minimum density of 150 pounds per cubic foot may be used as an equivalent.

EROSION AND SEDIMENT CONTROL GENERAL NOTES

The Water Management Administration requires that these notes, in their entirety, be included on the erosion and sediment control plan. It is recognized that every note may not apply to all projects. The requirement of any individual note not applicable to the subject project is not binding upon the applicant or the applicant's contractor.

1. The contractor shall notify MDE at (410) 537-3510 seven (7) days before commencing any land disturbing activity and, unless waived by MDE, shall be required to hold a pre-construction meeting between project representatives and a representative of MDE.
2. The contractor shall notify MDE in writing and by telephone at the following points:
   A. The required pre-construction meeting.
   B. Following installation of sediment control measures.
   C. During the installation of sediment basins (to be converted into permanent stormwater management structures) at the required inspection points (see Inspection Checklist on plan). Notification prior to commencing construction of each step is mandatory.
   D. Prior to removal or modification of any sediment control structure(s).
   E. Prior to removal of all sediment control devices.
   F. Prior to final acceptance.
3. The plan approval letter, approved erosion and sediment control plans, daily log books, and test reports shall be available at the site for inspection by duly authorized officials of MDE and the agency responsible for the project.
4. The contractor shall construct all erosion and sediment control measures per the approved plan and construction sequence and shall have them inspected and approved by the MDE inspector prior to beginning any other land disturbances. Minor sediment control device location adjustments may be made in the field with the approval of the MDE inspector. The contractor shall ensure that all runoff from disturbed areas is directed to the sediment control devices and shall not remove any erosion or sediment control measure without prior permission from MDE inspector. The contractor shall obtain prior agency and MDE approval for modifications to the erosion and sediment control plan and/or sequence of construction.
5. The MDE inspector has the option of requiring additional safety or sediment control measures, if deemed necessary.
6. The contractor shall protect all points of construction ingress and egress to prevent the deposition of materials onto public roads. All materials deposited onto public roads shall be removed immediately.
7. The contractor shall inspect daily and maintain continuously in an effective operating condition all erosion and sediment control measures until such time as they are removed with prior permission from the MDE inspector.
8. Erosion and sediment control for utility construction shall be provided in accordance with approved plans. Utility construction shall only be for areas within the delineated limit of disturbance. Call 'Miss Utility' at 1-800-257-7777 48 hours prior to the start of work. When same day stabilization is approved:
   A. Excavated trench material shall be placed on the high side of the trench.
   B. Trenches for utility installation shall be backfilled, compacted, and stabilized at the end of each working day. No more trench shall be opened than can be completed the same day.
9. All water removed from excavated areas shall be passed through an MDE approved dewatering practice or pumped to a sediment trap or basin prior to discharge to a functional storm drain system or to stable ground surface.
10. Concrete washout structures shall be used when concrete trucks, drums, pumps, chutes, or other equipment is rinsed or cleaned on-site.
11. Construction activities producing dust shall implement control measures to avoid the suspension of dust particles and/or prevent dust from blowing off-site or to areas without treatment.
12. Following initial soil disturbance or re-disturbance, permanent or temporary stabilization shall be completed within:
    A. Three (3) calendar days as to the surface of all perimeter controls, dikes, swales, ditches, perimeter slopes, and all slopes steeper than 3 horizontal to 1 vertical (3:1); and
    B. Seven (7) calendar days as to all other disturbed or graded areas on the project site not under active grading.
13. Vegetative stabilization shall be performed in accordance with the 2011 Maryland Standards and Specifications for Soil Erosion and Sediment Control. Refer to appropriate specifications for temporary seeding, permanent seeding, mulching, sodding, and ground covers.
14. When seeding, all disturbed areas with slopes flatter than 2:1 shall be stabilized with 4 inches of topsoil, seed, and mulch. All disturbed areas with slopes 2:1 or steeper shall be stabilized with matting over 2 inches of topsoil and seed.
15. All sediment basins, trap embankments and slopes, perimeter dikes, swales and all disturbed slopes steeper or equal to 3:1 shall be stabilized with seed and anchored straw mulch, sod, or other approved stabilization measures, as soon as possible but no later than three (3) calendar days after establishment. All areas disturbed outside of the perimeter sediment control system shall be minimized. Maintenance shall be performed as necessary to ensure continued stabilization.
16. Permanent swales or other points of concentrated water flow shall be stabilized with seed and an approved erosion control matting, sod, rip-rap, or other approved stabilization measures.
17. Stock Piles will not be allowed on this project. Material shall be removed from the site daily and the site shall be stabilized at the end of each work day.
18. For finished grading, the contractor shall provide adequate gradients to prevent water from ponding for more than twenty-four (24) hours after the end of a rainfall event. Drainage courses and swale flow areas may take as long as forty-eight (48) hours after the end of a rainfall event to drain. Areas designed to have standing water shall not be required to meet this requirement.
19. Where deemed appropriate by the engineer or inspector, sediment basins and traps may need to be surrounded with an approved safety fence. The fence must conform to local ordinances and regulations. The developer or owner shall check with local building officials on applicable safety requirements. Where safety fence is deemed appropriate and local ordinances do not specify fencing sizes and types, the following shall be used as a minimum standard: The safety fence shall be made of welded wire and at least 42 inches high, have posts spaced no farther apart than 8 feet, have mesh openings no greater than 2 inches in width and 4 inches in height with a minimum of 14 gauge wire. Safety fence shall be maintained and in good condition at all times.
20. All sediment trap depth dimensions are relative to the outlet elevation. All traps shall have a stable outfall. All traps and basins shall have stable inflow points.
21. Sediment shall be removed and the trap or basin restored to its original dimensions when the sediment has accumulated to one quarter of the total depth of the trap or basin. Total depth shall be measured from the trap or basin bottom to the crest of the outlet.
22. Sediment removed from traps (and basins) shall be placed and stabilized in approved areas, but not within a floodplain, wetland or tree-save area. When pumping sediment laden water, the discharge shall be directed to an MDE approved sediment trapping device prior to release from the site. A sump pit may be used if sediment traps themselves are being pumped out.
23. Prior to removal of sediment control measures, the contractor shall stabilize and have established permanent stabilization for all contributory disturbed areas using sod or an approved permanent seed mixture with required soil amendments and an approved anchored mulch. Wood fiber mulch may only be used in seeding season where the slope does not exceed 10% and grading has been done to promote sheet flow drainage. Areas brought to finished grade during the seeding season shall be permanently stabilized as soon as possible, but not later than three (3) calendar days after establishment for slopes steeper than 3 horizontal to 1 vertical (3:1) and seven (7) calendar days for flatter slopes. When property is brought to finished grade during the months of November through February, and permanent stabilization is found to be impractical, temporary seed and anchored straw mulch shall be applied to disturbed areas. The final permanent stabilization of such property shall be applied by March 15 or earlier if ground and weather conditions allow.
24. Temporary sediment control devices shall be removed with permission of the MDE inspector within thirty (30) calendar days following establishment of permanent stabilization in all contributory drainage areas. Upon removal of sediment control devices, the area disturbed by removal shall be stabilized with topsoil, seed, and mulch, or as specified, within 24 hours of said removal. Stormwater management structures used temporarily for sediment control shall be converted to the permanent configuration within this time period as well.
25. Off-site spoil or borrow areas on State or federal property shall have prior approval by MDE and other applicable State, federal, and local agencies; otherwise approval shall be granted by the local authorities. All waste and borrow areas off-site shall be protected by sediment control measures and stabilized.

*NOTES:
1. Cut/ fill totals are for mde review only. contractor is responsible for calculating cut/ fill quantities for estimation purposes. Engineer offers no guarantee to quantities actually encountered during construction.

TABLE 5.1 NATURAL RESOURCES AND THE CORRESPONDING REGULATORY AUTHORITIES:

FEDERAL	STATE	LOCAL
WETLANDS MAJOR WATERWAYS FLOODPLAINS	TIDAL AND NON-TIDAL WETLANDS WETLANDS OF SPECIAL STATE CONCERN WETLAND BUFFERS STREAM BUFFERS PERENNIAL STREAMS FLOODPLAINS FORESTS FOREST BUFFERS CRITICAL AREAS	STEEP SLOPES HIGHLY ERODIBLE SOILS ENHANCED STREAM BUFFERS TOPOGRAPHY/SLOPES SPRINGS SEEPS INTERMITTENT STREAMS VEGETATIVE COVER SOILS BEDROCK/GEOLOGY EXISTING DRAINAGE AREAS

Site Information:
A. Area Disturbed 0.943 Acres (41,097 SF.)
B. Total Cut 3,000± Cubic Yards
C. Total Fill 2,800± Cubic Yards

MDE No. 22-SF-0106 MOD #1

UNIVERSITY of MARYLAND

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LICENSE No. 14446
EXPIRATION DATE: 06/25/2023

PROJECT TITLE :
CAMPUS ELECTRICAL DISTRIBUTION UPGRADES - PHASE 4

UMB BUILDING NO. : VARIOUS
UMB Project NO. : 17-317
A/E PROJECT NO. : 117081.A0
CAD FILE NO. :
DATE : 12/2/2022

SHEET TITLE :
EROSION AND SEDIMENT CONTROL PLAN

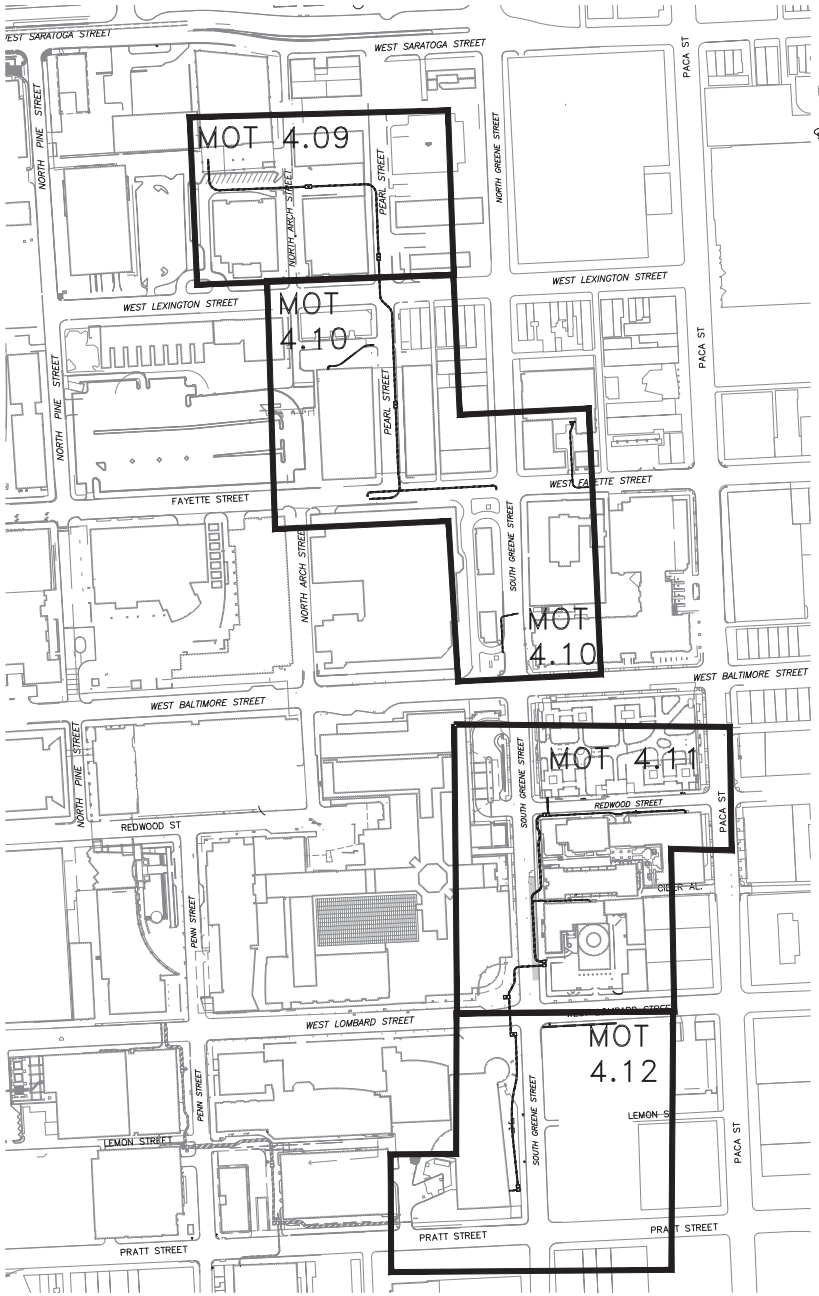
REVISIONS

NO	DATE	ITEM

SHEET NO.
ESC4.07

UNIVERSITY OF MARYLAND
BALTIMORE, MARYLAND

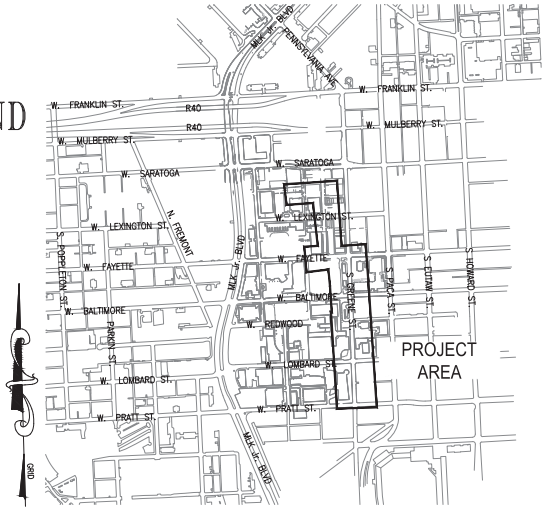
MAINTENANCE OF TRAFFIC PLANS



MOT KEY PLAN

100' 0 100' 200'

SCALE: 1"=100'



VICINITY MAP

SCALE: 1" = 500'

500' 250' 0 500' 1000'

SCALE: 1"=500'

INDEX

MOT 4.08 – MAINTENANCE OF TRAFFIC TITLE
MOT 4.09 – MAINTENANCE OF TRAFFIC PLAN
MOT 4.10 – MAINTENANCE OF TRAFFIC PLAN
MOT 4.11 – MAINTENANCE OF TRAFFIC PLAN
MOT 4.12 – MAINTENANCE OF TRAFFIC PLAN

MAINTENANCE OF TRAFFIC NOTES

- THE CONTRACTOR IS REQUIRED TO REIMBURSE THE CITY FOR LOST REVENUE INCURRED DURING OCCUPATION OF METERED STREET PARKING.
- CROSSWALKS IMPACTED BY OCCUPATION OR CONSTRUCTION SHALL HAVE TEMPORARY CROSSWALK INSTALLED FOR PEDESTRIAN TRAFFIC.
- CONTRACTOR SHALL MAINTAIN ALL PEDESTRIAN AND VEHICULAR EGRESS POINTS AS NOTED ON THE PLANS.
- CONTRACTOR SHALL MAINTAIN A MINIMUM OF ONE LANE OF VEHICULAR TRAVEL. FLAGGERS SHALL BE USED WHERE 2-WAY TRAFFIC IS REDUCED TO A SINGLE LANE.

BALTIMORE CITY TRAFFIC NOTES

1. THE CONTRACTOR SHALL CONTACT THE DEPARTMENT OF TRANSPORTATION, AT 443-984-2153 TWO (2) WEEKS BEFORE CONSTRUCTION BEGINS AND ONE (1) WEEK PRIOR TO ANY CHANGE TO THE MAINTENANCE OF TRAFFIC.
2. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO SUPPLY, INSTALL AND MAINTAIN ALL TEMPORARY TRAFFIC CONTROL EQUIPMENT FOR THE DURATION OF THE CONTACT.
3. ALL TRAFFIC CONTROL SHALL ADHERE TO THE CURRENT EDITIONS OF THE "MARYLAND MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (M.U.T.C.D.), AS AMENDED TO DATE AND "SHA WORK ZONE TRAFFIC CONTROL STANDARDS" AND THE BALTIMORE CITY BOOK OF STANDARDS.
4. FOR WORK WITHIN THE PUBLIC RIGHT-OF-WAY, THE CONTRACTOR SHALL OBTAIN PERMITS FROM THE DEPARTMENT OF TRANSPORTATION PERMITS DIVISION, ABEL WOLMAN MUNICIPAL BUILDING, FIRST FLOOR, 200 NORTH HOLIDAY STREET, BALTIMORE, MARYLAND, PHONE (410)396-6865. DURING THE PERMIT REVIEW THE CONTRACTOR MAY BE BILLED ADDITIONAL TRAFFIC INSPECTION FEES NOT RELATED TO ANY PREVIOUS COSTS.
5 THE CONTRACTOR SHALL MAINTAIN A MINIMUM OF FOUR (4') FOOT PEDESTRIAN FOOTWAY, OR PROVIDE APPROPRIATE PEDESTRIAN DETOUR APPROVED BY DOT-TRAFFIC IN ACCORDANCE WITH ADA GUIDELINES AND APPROPRIATE SHA STANDARDS.
6. THE CONTRACTOR SHALL PROTECT AND MAINTAIN EXISTING SIGNALS, ALL LIGHTING AND CONDUIT FACILITIES DURING CONSTRUCTION.
7. ALL EXCAVATION SHALL BE PLATED AT THE END OF EACH WORK DAY AND "STEEL PLATES AHEAD" WARNING SIGNS, DISPLAYED IN ADVANCE. STEEL PLATES SHALL BE INSTALLED PER STANDARD BC 576.17 AND SHALL BE CLEARLY MARKED SO THAT OWNERSHIP IS EASILY DISCERNABLE.
8. THE CONTRACTOR SHALL MAINTAIN THE FOLLOWING TRAVEL LANES:
   (TO BE DETERMINED BY BALTIMORE CITY)
9. NO LANE CLOSURES OR DISRUPTION OF TRAFFIC BETWEEN THE HOURS OF 6AM TO 9AM AND 3PM TO 6PM WEEKDAYS.
10. THE CONTRACTOR SHALL MAINTAIN AN INGRESS AND EGRESS TO ALL LOCAL BUSINESSES.
11 CONTRACTOR SHALL USE EXTREME CAUTION DUE TO EXISTING UTILITIES IN THIS AREA. THE THE CONTRACTOR SHALL REPAIR ALL DAMAGES TO EXISTING CONDITIONS AND UTILITIES AT NO COST TO THE CITY.
12. NO STREET CLOSURES WILL BE ALLOWED.
13. THE CONTRACTOR IS RESPONSIBLE FOR INSTALLATION OF ANY TEMPORARY "NO STOPPING" PROHIBITION SIGNING THAT WILL BE NECESSARY TO COMPLETE THIS PROJECT. A MINIMUM OF SEVENTY-TWO (72) HOURS' NOTICE IS REQUIRED FOR ANY TEMPORARY PARKING RESTRICTIONS.
14. THE CONTRACTOR IS RESPONSIBLE FOR ANY SIGNING AND PAVEMENT MARKINGS DAMAGED OR DESTROYED DURING CONSTRUCTION, INCLUDING THOSE OUTSIDE PROJECT LIMITS.
15. THE CONTRACTOR IS RESPONSIBLE FOR ALL NEW PAVEMENT MARKINGS TO COMPLETE THIS PROJECT.
16. ANY PROPOSED ROADWAY CLOSURES AND DETOURS SHALL BE IN ACCORDANCE WITH ADJACENT PROPERTY OWNERS AND APPROVED IN ADVANCE BY THE TRAFFIC DIVISION OF THE DEPARTMENT OF TRANSPORTATION.

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STATE OF MARYLAND — NORTH ANDREW MILLER — 16146 — REGISTERED PROFESSIONAL ENGINEER

12/02/2022

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LICENSE No. 16146
EXPIRATION DATE: 06/25/2023

PROJECT TITLE :
CAMPUS ELECTRICAL DISTRIBUTION UPGRADES – PHASE 4

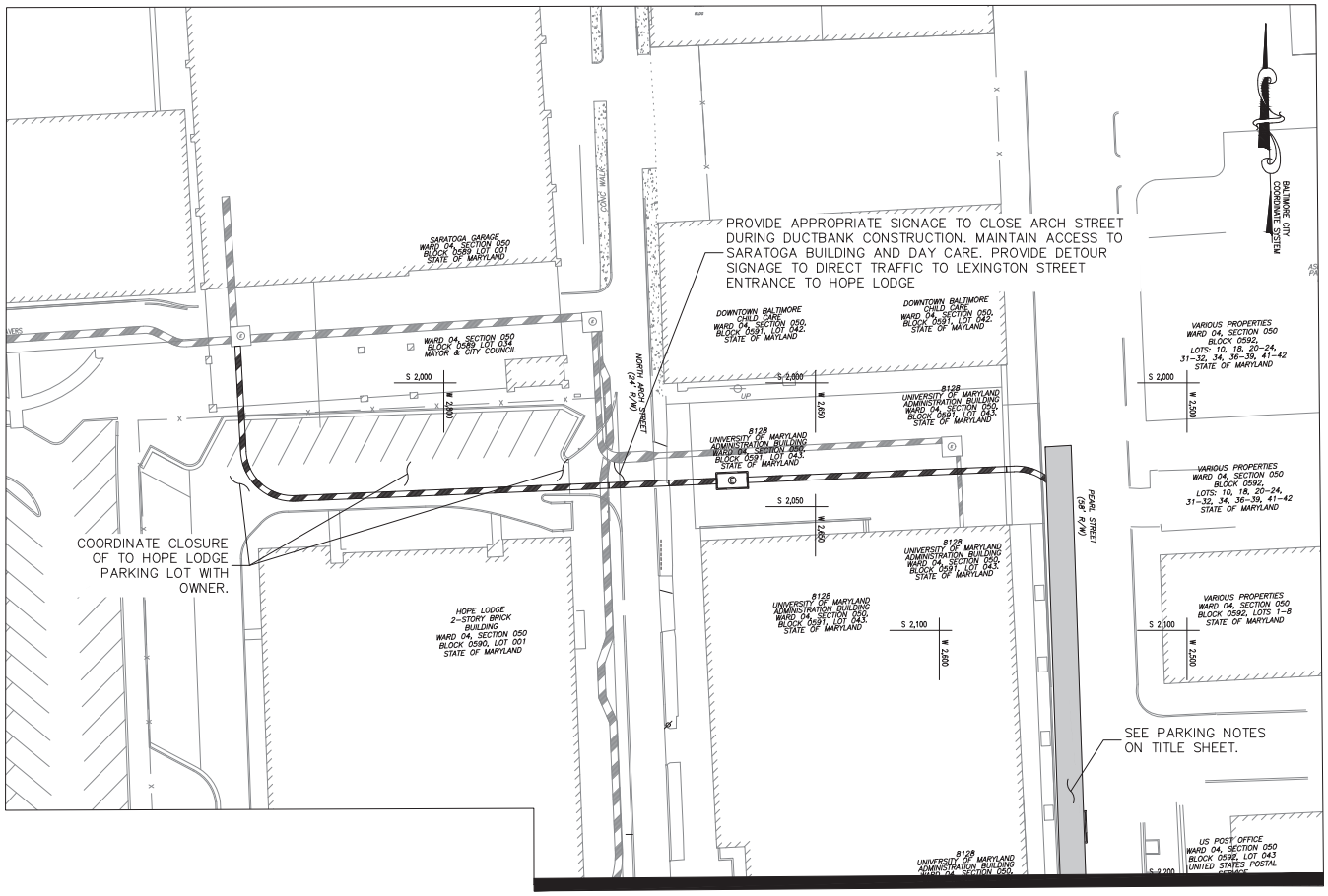
UMB BUILDING NO. : VARIOUS
UMB Project NO. : 17-317
A/E PROJECT NO. : 117081.A0
CAD FILE NO. :
DATE : 12/2/2022

SHEET TITLE :
MAINTENANCE OF TRAFFIC PLAN

REVISIONS

NO	DATE	ITEM

SHEET NO.
MOT-4.08



MATCHLINE

SEE DRAWING MOT 4.10 SHEET FOR CONTINUATION

MOT PLAN

SCALE: 1" = 20'

20 10 0 20 40

SCALE: 1"=20'

DRAWING LEGEND	
SYMBOL	DESCRIPTION
	ELECTRIC DUCTBANK
	PEDESTRIAN AND VEHICULAR ACCOMIDATIONS (SEE NOTE)

UNIVERSITY of MARYLAND

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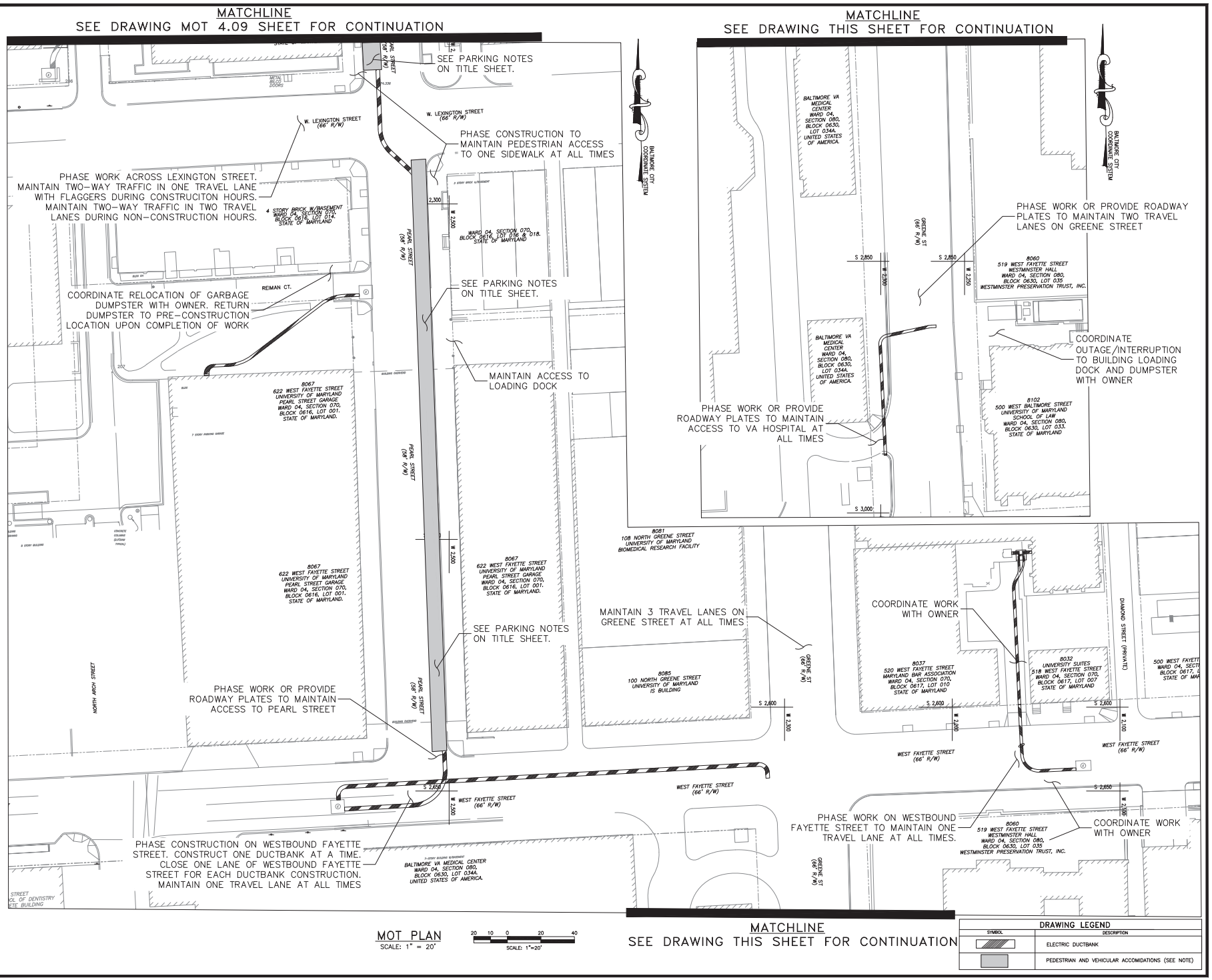
MAINTENANCE OF TRAFFIC PLAN

REVISIONS

NO	DATE	ITEM

SHEET NO.
MOT-4.09



MOT PLAN
SCALE: 1" = 20'

20 10 0 20 40
SCALE: 1"=20'

MATCHLINE
SEE DRAWING THIS SHEET FOR CONTINUATION

DRAWING LEGEND	
SYMBOL	DESCRIPTION
	ELECTRIC DUCTBANK
	PEDESTRIAN AND VEHICULAR ACCOMIDATIONS (SEE NOTE)

UNIVERSITY of MARYLAND

ADMINISTRATION & FINANCE
OFFICE OF FACILITIES MANAGEMENT
DESIGN AND CONSTRUCTION
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CAMPBELL ENGINEERING, INC.
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REGISTRATION/STAMP

STATE OF MARYLAND
NORTH ARCHITECTURE & ENGINEERING
PROFESSIONAL ENGINEER

12/02/2022

PROFESSIONAL CERTIFICATION. I HERE BY 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. 14446
EXPIRATION DATE: 06/25/2023

PROJECT TITLE :
CAMPUS ELECTRICAL DISTRIBUTION UPGRADES - PHASE 4

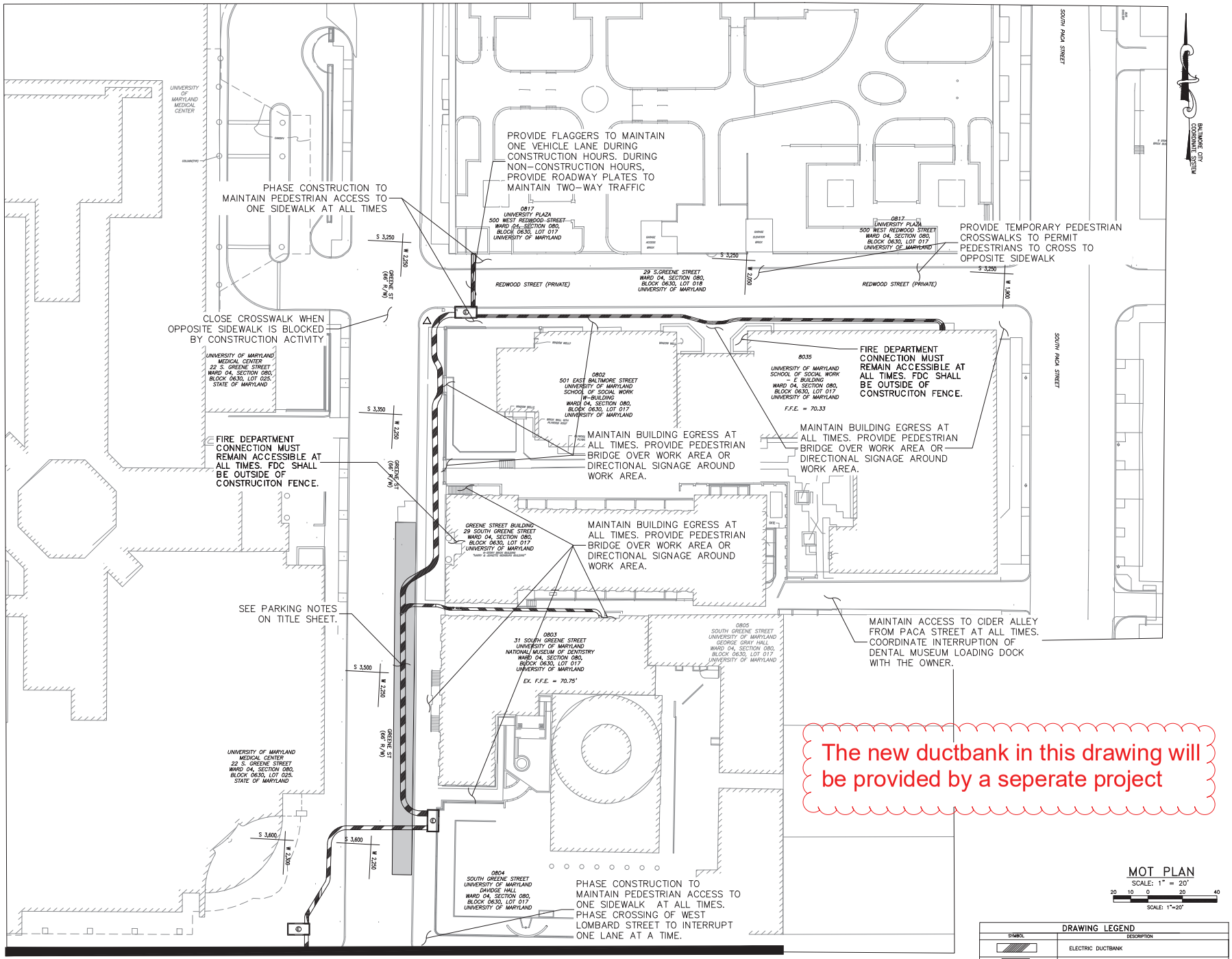
UMB BUILDING NO. : VARIOUS
UMB Project NO. : 17-317
A/E PROJECT NO. : 117081.A0
CAD FILE NO. :
DATE : 12/2/2022

SHEET TITLE :
MAINTENANCE OF TRAFFIC PLAN

REVISIONS

NO	DATE	ITEM

SHEET NO.
MOT-4.10



The new ductbank in this drawing will be provided by a seperate project

MOT PLAN
SCALE: 1" = 20'
20 10 0 20 40
SCALE: 1"=20'

DRAWING LEGEND	
SYMBOL	DESCRIPTION
	ELECTRIC DUCTBANK
	PEDESTRIAN AND VEHICULAR ACCOMIDATIONS (SEE NOTE)

MATCHLINE – SEE DRAWING MOT4.12 FOR CONTINUATION

UNIVERSITY of MARYLAND

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STATE OF MARYLAND
JOHN E. KNOTT
No. 14446
PROFESSIONAL ENGINEER
12/02/2022

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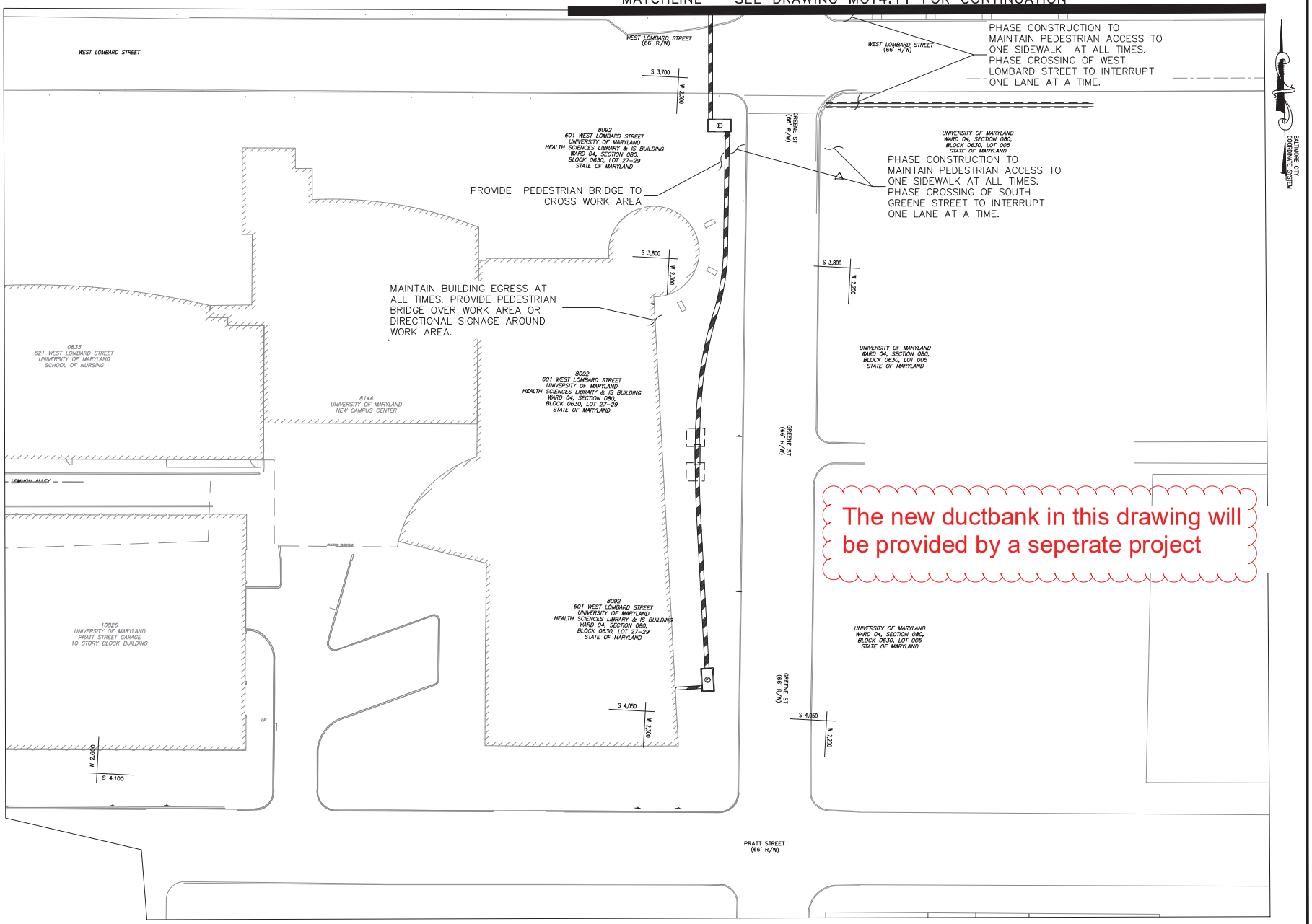
UMB Project NO. :	17-317
A/E PROJECT NO. :	117081.A0
CAD FILE NO. :	
DATE :	12/2/2022

SHEET TITLE :
MAINTENANCE OF TRAFFIC PLAN

REVISIONS

NO	DATE	ITEM

SHEET NO.
MOT 4.11



MOT PLAN

SCALE: 1" = 20'

20 10 0 20 40

SCALE: 1"=20'

DRAWING LEGEND	
SYMBOL	DESCRIPTION
	ELECTRIC DUCTBANK
	PEDESTRIAN AND VEHICULAR ACCOMIDATIONS (SEE NOTE)

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STATE OF MARYLAND — JOHN A. KOMLOS — No. 14446 — PROFESSIONAL ENGINEER

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SHEET NO.
MOT4.12

STANDARD ANSI DEVICE NUMBERS

SYMBOL	DESCRIPTIONS
25	SYNCHRONIZING OR SYNCHRONISM CHECK DEVICE
26	APPARATUS THERMAL DEVICE
27	UNDER-VOLTAGE RELAY
32	DIRECTIONAL POWER RELAY
37	UNDERCURRENT OR UNDER-POWER RELAY
38	BEARING PROTECTIVE DEVICE
39	MECHANICAL CONDITION MONITOR
40	FIELD RELAY
41	FIELD CIRCUIT BREAKER
42	RUNNING CIRCUIT BREAKER
44	UNIT SEQUENCE STARTING RELAY
46	REVERSE-PHASE OR PHASE BALANCE CURRENT RELAY
47	PHASE SEQUENCE VOLTAGE RELAY
48	INCOMPLETE SEQUENCE RELAY
49	MACHINE OR TRANSFORMER THERMAL RELAY
50	INSTANTANEOUS OVER-CURRENT OR RATE-OF-RISE RELAY
51	AC TIME OVER-CURRENT RELAY
51N	RESIDUAL GROUND FAULT RELAY
51G	TRANSFORMER GROUND-TO-NEUTRAL CURRENT SENSING RELAY
51GS	ZERO SEQUENCE (OR CORE BALANCE) GROUND SENSOR GROUND FAULT RELAY
50/51	INSTANTANEOUS/TIME OVERCURRENT RELAY
52	AC CIRCUIT BREAKER
53	EXCITER OR DC GENERATOR RELAY
55	POWER FACTOR RELAY
56	FIELD APPLICATION RELAY
57	SHORT CIRCUITING OR GROUNDING DEVICE
59	OVER-VOLTAGE RELAY
60	NEGATIVE SEQUENCE VOLTAGE RELAY
62	TIME DELAY RELAY
63	LIQUID OR GAS PRESSURE OR VACUUM RELAY
64	GROUND PROTECTIVE RELAY
65	GOVERNOR
67	AC DIRECTIONAL OVER-CURRENT RELAY
69	PERMISSIVE CONTROL DEVICE
74	ALARM RELAY
78	PHASE ANGLE MEASURING OR OUT OF STEP PROTECTIVE RELAY
81	FREQUENCY RELAY
86	LOCKOUT RELAY
87	DIFFERENTIAL PROTECTIVE RELAY
91	VOLTAGE DIRECTIONAL RELAY
92	VOLTAGE AND POWER DIRECTIONAL RELAY
94	TRIPPING OR TRIP FREE RELAY

ELECTRICAL DIAGRAMS

SYMBOL	DESCRIPTIONS
	AUTOMATIC TRANSFER DEVICE
A	METERING DEVICES: A-AMMETER, V-VOLTMETER, PF-POWER FACTOR, HZ-FREQUENCY METER
DM	DIGITAL METER
(50)	FUSE, FUSE SIZE AS INDICATED (50A)
	GROUND CONNECTION
	TRANSFORMER (DELTA - RESISTANCE GROUNDED WYE SHOWN)
	CURRENT TRANSFORMER
	POTENTIAL TRANSFORMER
LA	LIGHTNING ARRESTOR
	MOTOR STARTER CONTACTOR AND THERMAL OVERLOAD
	KIRK KEY INTERLOCK SYSTEM
TRIP FRAME	MOLDED CASE CIRCUIT BREAKER WITH RATINGS AS INDICATED
	SWITCH
	DRAW OUT DEVICE
	DRAW OUT POWER CIRCUIT BREAKER
TB	TEST TERMINAL BLOCK
TB	WIRING TERMINAL BLOCK
	INDICATOR OR PILOT LIGHT: R-RED, B-BLUE, W-WHITE, G-GREEN, A-AMBER
CB	ENCLOSED CIRCUIT BREAKER
FVNR	COMBINATION MAGNETIC MOTOR STARTER, ABBREVIATION INDICATES TYPE: FVNR, FVR, RVAT, 2S1W, 2S2W, SST
VFD	VARIABLE FREQUENCY CONTROLLER W/FUSED DISCONNECT SWITCH
VFC	VARIABLE FREQUENCY CONTROLLER
2S2W	MOTOR - SINGLE WINDING UNLESS OTHERWISE NOTED: 2S2W = 2 SPEED 2 WINDING 2S1W = 2 SPEED 1 WINDING NUMERALS (IF SHOWN) INDICATE HP
	CONDUCTORS NOT CONNECTED
	CONDUCTORS CONNECTED
N.O.	NORMALLY OPEN
N.C.	NORMALLY CLOSED
START	NORMALLY OPEN MOMENTARY CONTACT PUSH BUTTON WITH NAMEPLATE AS INDICATED ON DIAGRAM
STOP	NORMALLY CLOSED MOMENTARY CONTACT PUSH BUTTON WITH NAMEPLATE AS INDICATED ON DIAGRAM
EMERG. STOP	NORMALLY CLOSED MAINTAINED CONTACT PUSH BUTTON WITH MUSHROOM BUTTON
OFF ON	TWO POSITION MAINTAINED CONTACT SELECTOR SWITCH WITH NAMEPLATE AS INDICATED ON DIAGRAMS
LOCAL OFF REMOTE	THREE POSITION MAINTAINED CONTACT SELECTOR SWITCH WITH NAMEPLATE AS INDICATED ON THE CONTROL DIAGRAMS.
XCO	X = CLOSED
OCO	O = OPEN
	NORMALLY CLOSED PRESSURE SWITCH - OPENS ON RISING PRESSURE
	NORMALLY OPEN PRESSURE SWITCH - CLOSES ON RISING PRESSURE
	NORMALLY CLOSED TEMPERATURE SWITCH - OPENS ON RISING TEMPERATURE
	NORMALLY OPEN TEMPERATURE SWITCH - CLOSES ON RISING TEMPERATURE
	NORMALLY CLOSED FLOW SWITCH - OPENS ON RISING FLOW
	NORMALLY OPEN FLOW SWITCH - CLOSES ON RISING FLOW
	NORMALLY CLOSED LEVEL SWITCH - OPENS ON RISING LEVEL
	NORMALLY OPEN LEVEL SWITCH - CLOSES ON RISING LEVEL
	NORMALLY CLOSED LIMIT SWITCH (HELD OPEN)
	NORMALLY CLOSED LIMIT SWITCH
	NORMALLY OPEN LIMIT SWITCH
	NORMALLY OPEN LIMIT SWITCH (HELD CLOSED)
K1	RELAY OR CONTACTOR COIL WITH TAG NUMBER AS SHOWN
	NORMALLY OPEN RELAY CONTACT
	NORMALLY CLOSED RELAY CONTACT
K1 10SD	ON-DELAY OR OFF-DELAY RELAY
	ON-DELAY RELAY NORMALLY CLOSED TIMED OPENING CONTACT
	ON-DELAY RELAY NORMALLY OPEN TIMED CLOSING CONTACT
	OFF-DELAY NORMALLY CLOSED CONTACT (OPENS WHEN ENERGIZED, TIMED CLOSING AFTER DE-ENERGIZING)
	OFF-DELAY NORMALLY OPEN CONTACT (OPENS WHEN ENERGIZED, TIMED OPENING AFTER DE-ENERGIZING)
K1 L U	LATCHING RELAY L = LATCH COIL U = UNLATCH COIL
	FIELD WIRING TERMINAL
	WIRING INSIDE ENCLOSURE
	FIELD WIRING
	FIELD WIRING

POWER SYMBOLS

SYMBOL	DESCRIPTIONS	MH (UON)
	COMBINATION SWITCH AND SIMPLEX RECEPTACLE	48" TOD
	COMBINATION SWITCH AND DUPLEX RECEPTACLE	48" TOD
	SIMPLEX RECEPTACLE	18" CTR
E	DUPLEX RECEPTACLE, "E" (IF SHOWN) INDICATES CONNECTED TO EMERGENCY CIRCUIT.	18" CTR
	DUPLEX RECEPTACLE, FLOOR MOUNTED	
	DUPLEX RECEPTACLE, SPLIT WIRED - TOP HALF SWITCHED	18" CTR
	DUPLEX RECEPTACLE, CEILING MOUNTED	
	PEDESTAL TYPE DUPLEX RECEPTACLE	
A	SPECIAL RECEPTACLE: 20A, 2P, 3W, 208V NEMA 6-20R	18" CTR
B	SPECIAL RECEPTACLE: 30A, 2P, 3W, 208V NEMA 6-30R	18" CTR
C	SPECIAL RECEPTACLE: 20A, 3P, 4W, 208/120V NEMA 14-20	18" CTR
D	SPECIAL RECEPTACLE: 30A, 3P, 4W, 208V NEMA 15-30	18" CTR
A	SPECIAL RECEPTACLE, FLOOR MOUNTED, NEMA 6-20R	
A	PEDESTAL TYPE SPECIAL RECEPTACLE, NEMA 6-20R	
	DOUBLE DUPLEX RECEPTACLE	18" CTR
	RECEPTACLE MOUNTED 6" ABOVE BACK SPLASH OR COUNTER	
GFI	GROUND FAULT INTERRUPTER TYPE RECEPTACLE	18" BOD
H	RECEPTACLE OUTLET MOUNTED HIGH	84" CTR
IG	ISOLATED GROUND RECEPTACLE	18" BOD
	DUPLEX RECEPTACLE AT 54" AFF	54" CTR
P	DUPLEX RECEPTACLE FOR PAY PHONE	54" CTR
C	DUPLEX RECEPTACLE FOR CART RECHARGE	36" CTR
C	SIMPLEX RECEPTACLE FOR CART RECHARGE	36" CTR
	TELEVISION RECEPTACLE	72" CTR
H	TELEVISION RECEPTACLE	18" BFC
	CLOCK HANGER OUTLET	84" CTR
	PROGRAM CLOCK OUTLET - SINGLE FACE, DOUBLE FACE	84" CTR
PS	EMERGENCY POWER OFF SWITCH	48" TOD
J	JUNCTION BOX	
E	EQUIPMENT CONNECTION AS NOTED	
3	HEATER CONNECTION - NUMBER INDICATES KILOWATTS (3KW)	
	HEATER FAN - CEILING MOUNTED	
CB	ENCLOSED CIRCUIT BREAKER	
	NON-FUSED DISCONNECT SWITCH, 30A, 3P (UNLESS OTHERWISE NOTED)	
(40A)	FUSED DISCONNECT SWITCH - FUSE SIZE AS INDICATED (40A)	
MS	MAGNETIC MOTOR STARTER	
FMS	COMBINATION MAGNETIC MOTOR STARTER, ABBREVIATION INDICATES TYPE: FVNR, FVR, RVAT, 2S1W, 2S2W, SST	
VFC	VARIABLE FREQUENCY CONTROLLER W/FUSED DISCONNECT SWITCH	
	MOTOR - NUMERALS (IF SHOWN) INDICATE HP	
	GENERATOR - NUMERALS (IF SHOWN) INDICATE KW	
	MANUAL MOTOR STARTER WITH THERMAL OVERLOADS	
CP	CONTROL PANEL - TYPE AS INDICATED	
PB	MOMENTARY CONTACT START-STOP PUSH BUTTON STATION	
PB	MAINTAINED CONTACT START-STOP PUSHBUTTON STATION	
ES	MAINTAINED CONTACT EMERGENCY STOP PUSHBUTTON STATION	
	PANELBOARD	
	DISTRIBUTION PANELBOARD	
T	TRANSFORMER	
	RACEWAY "UP" OR "TOWARDS"	
	RACEWAY "DOWN" OR "AWAY"	
	CIRCUIT CONCEALED IN WALLS OR CEILING SPACE. CONDUCTORS SHALL BE MINIMUM 2#12 AWG AND 1#12 AWG GROUND IN 3/4" CONDUIT, (UNLESS OTHERWISE NOTED)	
	RACEWAY CONCEALED IN SLAB OR BELOW GRADE.	
	BRANCH CIRCUIT HOMERUN TO PANELBOARD. QUANTITY OF CIRCUITS INDICATED BY ARROWS (). NUMBER OF CONDUCTORS SHALL BE MINIMUM 4#12 AWG AND 1#12 AWG GROUND IN 3/4" CONDUIT, (UNLESS OTHERWISE NOTED)	
	RACEWAY RUN EXPOSED. CONDUCTORS SHALL BE MINIMUM 2#12 AWG AND 1#12 AWG IN 3/4" CONDUIT, (UNLESS OTHERWISE NOTED)	
	BUS DUCT OR CABLE TRAY UP OR TOWARDS	
	BUS DUCT OR CABLE TRAY DOWN OR AWAY	
	BUS DUCT, TYPE & SIZE AS INDICATED	
	TELEPHONE AND POWER POLE ASSEMBLY	
	CONCRETE ENCASED DUCTBANK BELOW GRADE	
W	SURFACE MOUNTED RACEWAY ASSEMBLY WITH REMOVABLE COVER	
	MULTI OUTLET ASSEMBLY - DARK SQUARES INDICATE PREWIRED RECEPTACLE LOCATIONS. SIZE AS INDICATED.	
	MULTI-OUTLET ASSEMBLY WITH RECEPTACLES LOCATED WHERE INDICATED	
	2 CELL MULTI-OUTLET ASSEMBLY WITH COMMUNICATION DEVICES AND RECEPTACLES LOCATED WHERE INDICATED	
	MULTI-OUTLET ASSEMBLY WITH COMMUNICATION OUTLETS LOCATED WHERE INDICATED	
	FLEXIBLE CONDUIT	
	CABLE TRAY	
	GROUND ROD	
X	LIGHTNING PROTECTION AIR TERMINAL	
	GROUND WIRE CONNECTION	
	GROUND WIRE	
	LIGHTNING PROTECTION DOWN LEAD	
	UTILITY POLE	

LIGHTING SYMBOLS

SYMBOL	DESCRIPTIONS	MH (UON)
$	SINGLE POLE TOGGLE SWITCH	48" TOD
$a	SWITCH - SUBLETTER INDICATES FIXTURES CONTROLLED	48" TOD
$2	DOUBLE POLE TOGGLE SWITCH	48" TOD
$3	THREE-WAY TOGGLE SWITCH (SPDT)	48" TOD
$4	FOUR-WAY TOGGLE SWITCH (DPDT)	48" TOD
$K	KEY OPERATED SWITCH	48" TOD
$3wD	THREE WAY DIMMER SWITCH CONTROLLING FIXTURES INDICATED WITH LOWERCASE a.	48" TOD
$M	MANUAL STARTER WITH OVERLOADS	48" TOD
$P	SWITCH WITH PILOT LIGHT	48" TOD
$D	DIMMER SWITCH	48" TOD
$LV	LOW VOLTAGE CONTROL SWITCH	48" TOD
$T	MANUAL TIME SWITCH	48" TOD
$C	MOMENTARY CONTACT SWITCH	48" TOD
OS	OCCUPANCY SENSOR	
T	TIME CLOCK	
R	RELAY	
L	LIGHTING CONTACTOR	
P	PHOTOCELL OR PUSHPLATE SWITCH	
	FLUORESCENT LIGHTING FIXTURE - RECESSED, SURFACE, OR PENDANT MOUNTED, TYPE AS SPECIFIED	
	FLUORESCENT LIGHTING FIXTURE - 2 BALLAST	
	FLUORESCENT INDUSTRIAL LIGHTING FIXTURE	
	FLUORESCENT LIGHTING FIXTURE - WALL MOUNTED, TYPE AS SPECIFIED	
	LIGHTING FIXTURE - RECESSED, SURFACE, OR PENDANT MOUNTED	
	LIGHTING FIXTURE - WALL MOUNTED TYPE AS SPECIFIED	
	WALL WASHER	
	ADJUSTABLE WALL WASHER	
	LIGHTING FIXTURE ON EMERGENCY OR NIGHT LIGHT CIRCUIT	
	EMERGENCY BATTERY PACK WITH NUMBER OF HEADS INDICATED	
	EMERGENCY BATTERY PACK WITH REMOTE HEADS	
	REMOTE EMERGENCY HEAD	
	EMERGENCY BATTERY PACK - SEMI RECESSED, CEILING MOUNT	
	EXIT SIGN - CEILING OR PENDANT MOUNTED (SHADED PORTION INDICATES FACE)	
	EXIT SIGN - WALL MOUNTED - END, BACK	
	EXIT SIGN WITH DIRECTIONAL ARROWS	
	POLE MOUNTED LIGHTING FIXTURE - SINGLE, DOUBLE HEAD	
	POLE MOUNTED LIGHTING FIXTURE- SINGLE, POLE TOP	
	LIGHTING POLE (SPORTS)	

NURSE CALL SYMBOLS

SYMBOL	DESCRIPTIONS	MH (UON)
SU E	NURSE CALL STATION - PATIENT & EMERGENCY	60" CTR
NCA	NURSE CALL ANNUNCIATOR PANEL	48" CTR
NM	NURSE CALL MASTER STATION	60" CTR
S	NURSE CALL STAFF STATION	60" CTR
D	NURSE CALL DUTY STATION	60" CTR
B	NURSE CALL CODE BLUE STATION	60" CTR
CB	CODE BLUE ANNUNCIATOR	60" CTR
N	NURSE CALL DOME LIGHT - CEILING MOUNTED	
N	NURSE CALL DOME LIGHT - WALL MOUNTED	90" CTR
N 2	NURSE CALL ZONE LIGHT - CEILING MOUNTED	
NCE	NURSE CALL EQUIPMENT CABINET	78" TOD
I	INTERCOM STATION	48" TOD

CIRCUIT DESIGNATIONS

LIGHTING

A # a

FIXTURE TYPE
*CIRCUIT DESIGNATION
SWITCH DESIGNATION

POWER

#

*CIRCUIT DESIGNATION

* SEE NOTES FOR PANEL DESIGNATIONS FOR EACH AREA.

SPECIAL SYSTEMS SYMBOLS

SYMBOL	DESCRIPTIONS	MH (UON)
HS	HORN TYPE SPEAKER	GENERAL NOTE 5
FSH	FIRE ALARM FLASHING STROBE LIGHT - WALL MOUNTED	GENERAL NOTE 5
FH	FIRE ALARM HORN	GENERAL NOTE 5
FSH	COMBINATION FIRE ALARM HORN AND FLASHING STROBE LIGHT	GENERAL NOTE 5
H	MAGNETIC DOOR HOLDER	
FAAP	FIRE ALARM ANNUNCIATOR PANEL	
FACP	FIRE ALARM CONTROL PANEL	
RMC	RESCUE ASSISTANCE MASTER CONTROL PANEL	48" TOD
TP	FIRE ALARM TRANSPONDER	
RMS	RESCUE ASSISTANCE REMOTE STATION	48" TOD
DACT	DIGITAL ALARM COMMUNICATOR TRANSMITTER	
DS ES	DOOR SOLENOID, ELECTRIC STRIKE - LOCKING DEVICE CONNECTION POINT	
F	FIRE ALARM PULL STATION	48" TOD
	HEAT DETECTOR	
AB	SMOKE DETECTOR (PHOTOELECTRIC), AB INDICATES AUDIBLE BASE, E INDICATES ELEVATOR CONTROLS	
	SMOKE DETECTOR (IONIZATION)	
	DUCT SMOKE DETECTOR	
ADRC	FIRE ALARM SYSTEM ADDRESSABLE RELAY - CONTROL	
ADRM	FIRE ALARM SYSTEM ADDRESSABLE RELAY - MONITOR	
RVAL	FIRE ALARM SYSTEM REMOTE ALARM LIGHT	
FS	FLOW SWITCH CONNECTION	
TS	TAMPER SWITCH CONNECTION	
TRANSMITTER LBT / RECEIVER LBR	FIRE ALARM LINEAR BEAM SMOKE DETECTOR TRANSMITTER & RECEIVER	
F	FIREMAN'S TELEPHONE JACK	48" TOD
M	MONITOR SYSTEM JB	36" CTR
S	CEILING SPEAKER, F - FIRE ALARM	
A	AMPLIFIER	
K	KEYPAD	48" TOD
CR	CARD READER	48" TOD
DC	DOOR ALARM CONTACT	
T	TELEPHONE OUTLET	18" CTR
T	TELEPHONE OUTLET, WALL MOUNTED	54" CTR
T	TELEPHONE OUTLET, FLOOR MOUNTED	
T	DATA/TELEPHONE OUTLET, UNSHADED AREA = DATA, SHADED AREA = VOICE, NUMERALS INDICATE QUANTITY OF WIRED JACKS	18" CTR
T	DATA/TELEPHONE OUTLET, FLOOR MOUNTED, UNSHADED AREA = DATA, SHADED AREA = VOICE, NUMERALS INDICATE QUANTITY OF WIRED JACKS	
D	DATA OUTLET, FLOOR MOUNTED	
T E	TELEPHONE OUTLET - EMERGENCY	54" TOD
D	DATA OUTLET	
	TELEVISION ANTENNA OUTLET	18" CTR
	TELEVISION SYSTEM SPLITTER - 2 WAY, 4 WAY	
	DATA/TELEPHONE OUTLET, CEILING MOUNTED	
	ROUGH IN JUNCTION BOX FOR CCTV CAMERA	

ELECTRICAL DRAWING PRESENTATION

SYMBOL	DESCRIPTIONS
2	REVISION NUMBER 2
2	DRAWING NOTE NUMBER 2
22A	EQUIPMENT TAG NUMBER - REFER TO EQUIPMENT SCHEDULE
2 DA100	SECTION/ELEVATION IDENTIFICATION
X XX	PART PLAN AND DETAIL IDENTIFICATION
	EXISTING LINE TYPE
	NEW ELECTRICAL WORK LINE TYPE
	FUTURE ELECTRICAL WORK LINE TYPE
	DEMOLITION LINE TYPE ON DEMOLITION DRAWINGS

EQUIPMENT DESIGNATIONS

DESIGNATION	DESCRIPTIONS
SWGR	SWITCHGEAR
SWBD	SWITCHBOARD
PNL	PANELBOARD
MCC	MOTOR CONTROL CENTER
XFMR	TRANSFORMER

GENERAL NOTES:

1. THIS IS A STANDARD SYMBOL LIST, SOME SYMBOLS MAY NOT APPEAR ON THE ACCOMPANYING DRAWINGS.
2. REFER TO SPECIFICATIONS FOR DETAILED REQUIREMENTS.
3. PLAN & SECTION SYMBOLS MAY ALSO BE USED ON RISER DIAGRAMS.
4. ON SINGLE LINE DIAGRAMS FOR 3 PHASE SYSTEMS, DEVICE QUANTITY = 3 UNLESS OTHERWISE NOTED.
5. DEVICE SHALL BE MOUNTED A MINIMUM OF 80" AFF TO BOTTOM OF DEVICE LENS AND BELOW THE FINISHED CEILING OF NOT LESS THAN 6".
6. UNLESS OTHERWISE NOTED ALL INTERIOR CONDUITS AND BOXES SHALL BE CONCEALED.

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KEY PLAN

A/E CONSULTANTS

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LICENSE No. 48184
EXPIRATION DATE: 01-14-2025

REGISTRATION/STAMP

STATE OF MARYLAND
DAVID T. MARCHESE
No. 48184
PROFESSIONAL ENGINEER

PROJECT TITLE :
CAMPUS ELECTRICAL DISTRIBUTION UPGRADES - PHASE 4

100% CD SUBMISSION

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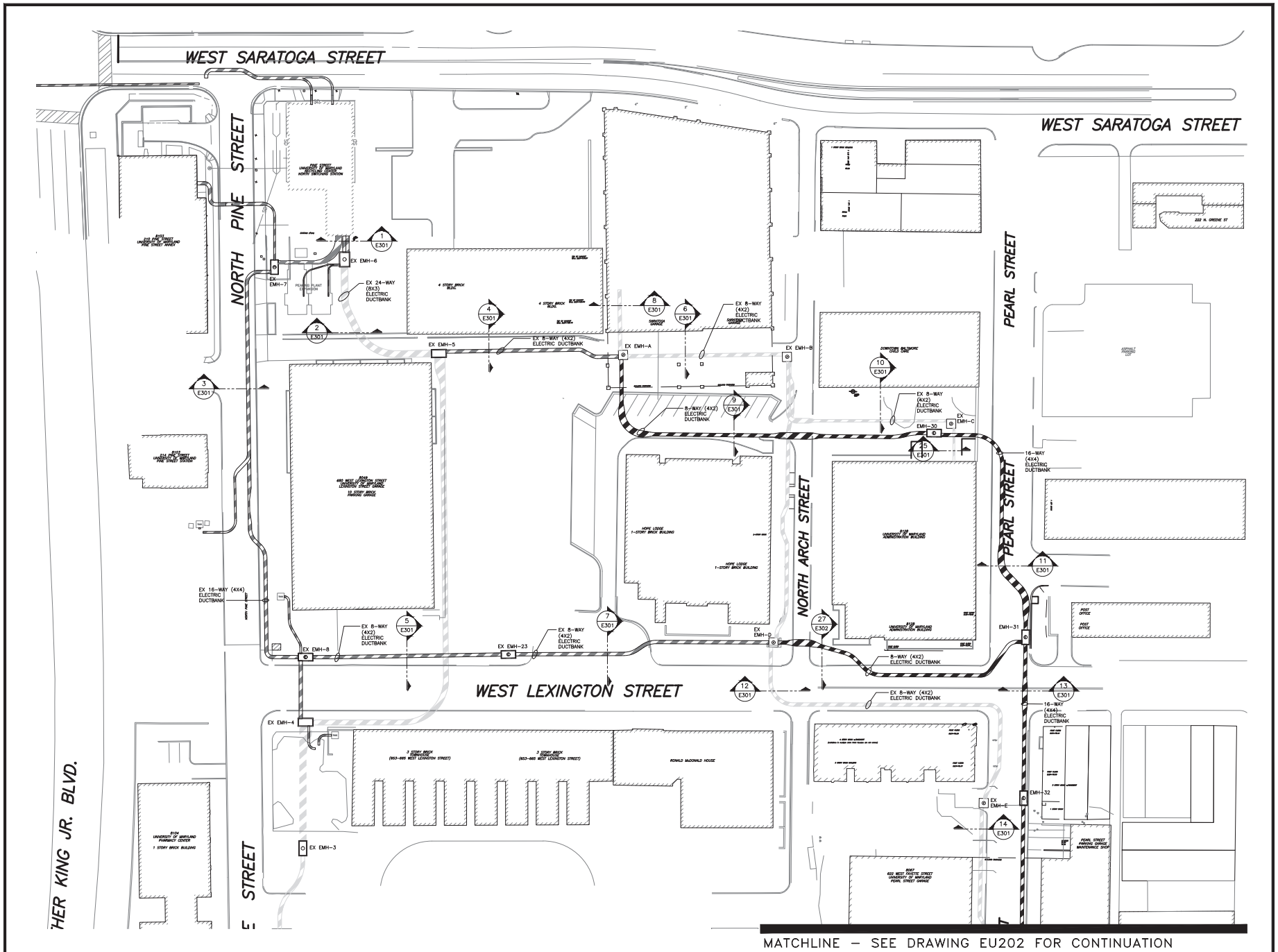
SHEET TITLE :
ELECTRICAL LEGENDS AND ABBREVIATIONS

REVISIONS

NO	DATE	ITEM

SHEET NO.
E001



MATCHLINE – SEE DRAWING EU202 FOR CONTINUATION

PROPOSED ELECTRIC DISTRIBUTION

SCALE: 1" = 30'

GRAPHIC SCALE
30 15 0 30 60
SCALE: 1"=30'
UNIT OF MEASURE: FEET

UNIVERSITY of MARYLAND

ADMINISTRATION & FINANCE
OFFICE OF FACILITIES MANAGEMENT
DESIGN AND CONSTRUCTION
520 ARCH STREET, OFFICE LEVEL 3
BALTIMORE, MARYLAND 21201
PHONE NO. (410) 706-7740
FAX NO. (410) 706-0547

KEY PLAN

A/E CONSULTANTS

RMF ENGINEERING, INC.
5520 RESEARCH PARK DR, 3RD FLR
BALTIMORE, MD 21228
P: 410.576-0505 F: 410.385-0327

PROFESSIONAL CERTIFICATION. I HERE BY 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. 48194
EXPIRATION DATE: 01-14-2026

REGISTRATION/STAMP

STATE OF MARYLAND
ERIC J. MILLER
No. 48194
PROFESSIONAL ENGINEER

PROJECT TITLE :
CAMPUS ELECTRICAL DISTRIBUTION UPGRADES – PHASE 4

100% CD SUBMISSION

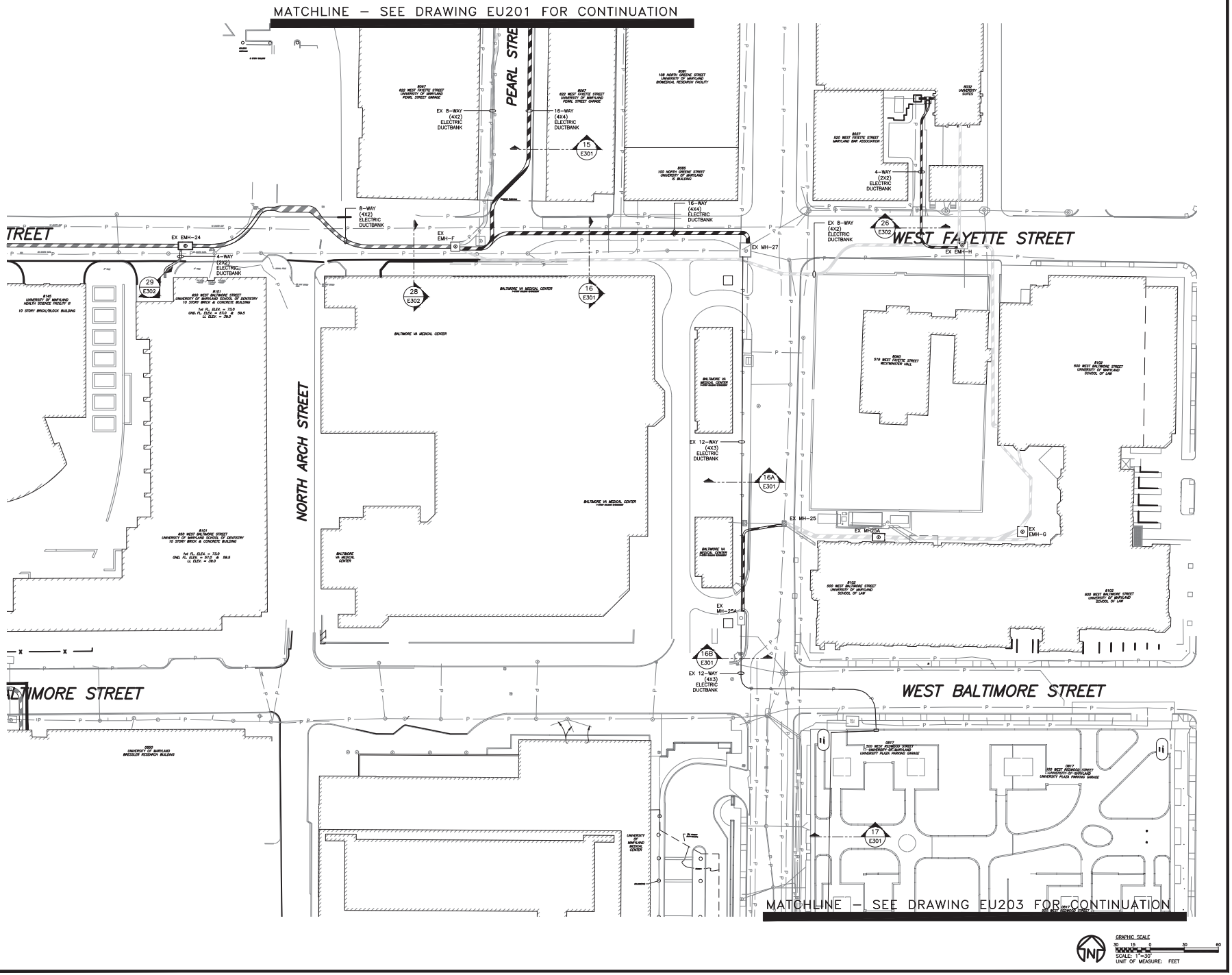
UMB BUILDING NO. :	VARIOUS
UMB Project NO. :	17-317
A/E PROJECT NO. :	117081.A0
CAD FILE NO. :	
DATE :	09/19/2023

SHEET TITLE :
PROPOSED ELECTRIC DISTRIBUTION

REVISIONS

NO	DATE	ITEM

SHEET NO.
EU201



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ADMINISTRATION & FINANCE
OFFICE OF FACILITIES MANAGEMENT
DESIGN AND CONSTRUCTION
220 ARCH STREET, OFFICE LEVEL 3
BALTIMORE, MARYLAND 21201
PHONE NO. (410) 706-7740
FAX NO. (410) 706-8547

KEY PLAN

A/E CONSULTANTS

RMF ENGINEERING, INC.
5520 RESEARCH PARK DR, 3RD FLR
BALTIMORE, MD 21228
P: 410.576-0505 F: 410.385-0327

CARROLL ENGINEERING, INC.

PROFESSIONAL CERTIFICATION. I HERE BY 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. 48184
EXPIRATION DATE: 01-14-2024

REGISTRATION/STAMP

STATE OF MARYLAND
No. 48184
PROFESSIONAL ENGINEER

PROJECT TITLE :
CAMPUS ELECTRICAL DISTRIBUTION UPGRADES – PHASE 4

100% CD SUBMISSION

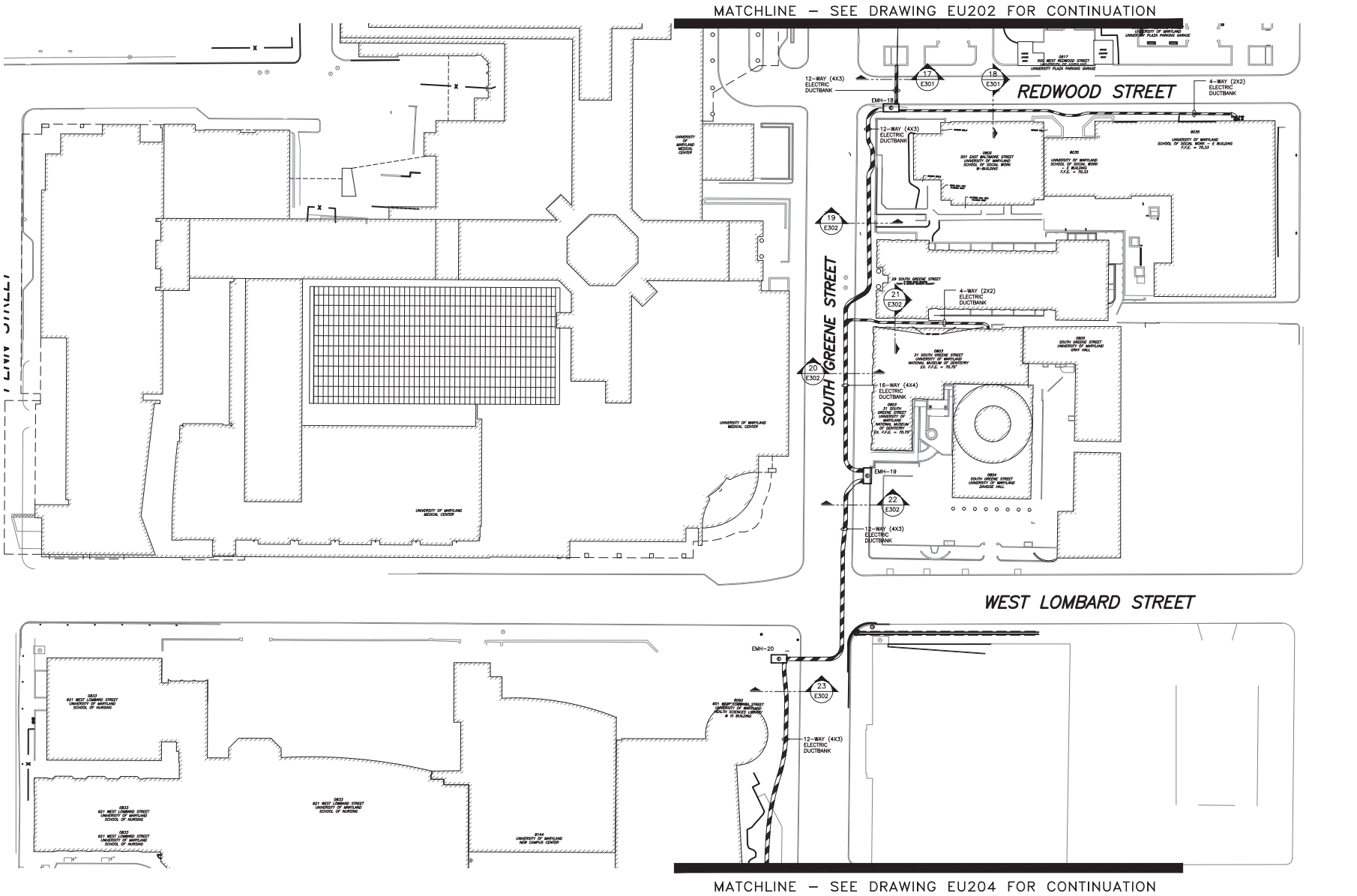
UMB BUILDING NO. : VARIOUS
UMB Project NO. : 17-317
A/E PROJECT NO. : 117081.A0
CAD FILE NO. :
DATE : 09/19/2023

SHEET TITLE :
PROPOSED ELECTRIC DISTRIBUTION

REVISIONS

NO	DATE	ITEM

SHEET NO.
EU202



PROPOSED ELECTRIC DISTRIBUTION

SCALE: 1" = 30'

GRAPHIC SCALE
30 15 0 30 60
SCALE: 1"=30'
UNIT OF MEASURE: FEET

UNIVERSITY of MARYLAND

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KEY PLAN

A/E CONSULTANTS

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P: 410.576-0505 F: 410.385-0327

PROFESSIONAL CERTIFICATION. I HERE BY 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. 48194
EXPIRATION DATE: 01-14-2024

REGISTRATION/STAMP

STATE OF MARYLAND · ALEX T. MILLER · No. 48194 · PROFESSIONAL ENGINEER

PROJECT TITLE :
CAMPUS ELECTRICAL DISTRIBUTION UPGRADES – PHASE 4

100% CD SUBMISSION

UMB BUILDING NO. :	VARIOUS
UMB Project NO. :	17-317
A/E PROJECT NO. :	117081.A0
CAD FILE NO. :	
DATE :	09/19/2023

SHEET TITLE :
PROPOSED ELECTRIC DISTRIBUTION

REVISIONS

NO	DATE	ITEM

SHEET NO.
EU203