LIBERTY UNIVERSITY

LIBERTY MOUNTAIN DRIVE EXTENSION AT THE NORTHERN INTRAMURAL FIELDS
LYNCHBURG, VIRGINIA
RWS PROJECT # 14018-RW

SITE INFORMATION:

TAX MAP#: 267-1-1
INST#: 050006165
OWNER/DEVELOPER: LIBERTY UNIVERSITY
ATTN: MAGGIE COSSMAN, PE
1971 UNIVERSITY CITY BLVD
LYNCHBURG, VA 24502
434-546-0466
mhcossman@liberty.edu
ZONING: R-2C & B-3C
ACRES: 343.495
USE: VACANT COMMERCIAL

GENERAL NOTES:
G1.) THE EXISTING UNDERGROUND UTILITIES SHOWN HEREON ARE BASED UPON AVAILABLE INFORMATION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE EXACT LOCATION OF ALL UTILITIES BEFORE COMMENCING WORK AND FOR ANY DAMAGES THAT OCCUR BY HIS/HER FAILURE TO LOCATE OR PRESERVE THESE UTILITIES. IF, DURING CONSTRUCTION, THE CONTRACTOR SHOULD ENCOUNTER UTILITIES OTHER THAN THOSE SHOWN ON THE PLANS HE/SHE SHOULD NOTIFY THE ENGINEER AND TAKE NECESSARY AND PROPER STEPS TO PROTECT THE FACILITY AND ASSURE THE CONTINUANCE OF SERVICE.
G2.) ANY DISCREPANCIES FOUND BETWEEN THE DRAWINGS AND SITE CONDITIONS OR ANY DISCREPANCIES OR AMBIGUITIES IN THE DRAWINGS SHALL BE IMMEDIATELY REPORTED TO THE ENGINEER. WORK DONE BY THE CONTRACTOR WITHOUT DIRECTION AFTER THE DISCOVERY OF SUCH INCONSISTENCIES SHALL BE DONE AT THE CONTRACTOR'S RISK.
G3.) ALL CONSTRUCTION SHALL CONFORM TO CITY OF LYNCHBURG AND THE VIRGINIA DEPARTMENT OF TRANSPORTATION STANDARDS AND SPECIFICATIONS. CONSTRUCTION OF SANITARY SEWER AND WATER SERVICES SHALL CONFORM TO THE VIRGINIA DEPARTMENT OF HEALTH & CITY OF LYNCHBURG STANDARDS AND SPECIFICATIONS.
G4.) ALL CONSTRUCTION SHALL COMPLY WITH THE AMERICANS WITH DISABILITIES ACT (ADA) REQUIREMENTS & WITH THE 2009 UNIFORM STATEWIDE BUILDING CODE (USBC) AND ICC/ANSI A117.1 2003.
G5.) CONSTRUCTION LIMITS SHALL BE PROPERTY LINES OR AS INDICATED ON THE PLAN.
G6.) ALL FINAL GRADING, SEEDING, SODDING AND/OR PAVING SHALL BE DONE IN SUCH A MANNER TO PRECLUDE PONDING OF WATER ON THE SITE.
G7.) THE CONTRACTOR SHALL BE RESPONSIBLE FOR ACQUIRING ALL NECESSARY PERMITS BEFORE THE START OF CONSTRUCTION.
G8.) THE CONTRACTOR SHALL NOTIFY MISS UTILITY (1-800-552-7001) 48 HOURS PRIOR TO EXCAVATION.
G9.) THE CONTRACTOR SHALL COORDINATE INSTALLATION OF ELECTRICAL, TELEPHONE AND CATV SERVICES.
G10.) DISPOSE OF TREES, STUMPS AND OTHER DEBRIS OFF SITE.
G11.) ALL MATERIALS USED FOR FILL SHALL BE FREE OF UNSUITABLE MATERIALS SUCH AS WOOD, ROOTS, FROZEN MATERIAL, ROCKS OR BOULDERS OF UNACCEPTABLE SIZE OR ANY OTHER NON-COMPACTING SOIL MATERIALS.
G12.) A PERMIT MUST BE SECURED FROM THE CITY OF LYNCHBURG BEFORE ANY WORK IS PERFORMED IN A STATE RIGHT-OF-WAY.
G13.) THE CONTRACTOR SHALL PROVIDE ADEQUATE MEANS OF CLEANING TRUCKS AND/OR OTHER EQUIPMENT OF MUD PRIOR TO TRAVELING ON A PUBLIC RIGHT-OF-WAY. IT IS THE CONTRACTOR'S RESPONSIBILITY TO CLEAN STREETS AND TO ALLAY DUST AND TAKE ALL MEASURES NECESSARY TO ENSURE THAT THE ROAD IS MAINTAINED IN A CLEAN, MUD AND DUST FREE CONDITION AT ALL TIMES DURING CONSTRUCTION.
G14.) DIMENSIONS ARE FROM THE FACE OF CURB UNLESS OTHER OTHERWISE NOTED.
G15.) PAINT HANDICAPPED SYMBOL ON PARKING SPACES WHERE SHOWN ON DRAWINGS. TRAFFIC MARKINGS FOR HANDICAP PARKING SPACES AND ACCESS AISLES SHALL BE BLUE. TRAFFIC MARKINGS SHALL BE IN CONFORMANCE WITH THE LATEST VIRGINIA DEPARTMENT OF TRANSPORTATION AND THE MANUAL FOR UNIFORM TRAFFIC CONTROL DEVICES STANDARDS AND SPECIFICATIONS.
G16.) TRAFFIC CONTROL SIGNS SHALL BE INSTALLED IN ACCORDANCE WITH THE LATEST EDITIONS OF THE VIRGINIA WORK AREA PROTECTION MANUAL AND THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.
G17.) ALL FILLS TO BE COMPACTED IN 8" LOOSE LIFTS TO 95% STD. PROCTOR.
G18.) EXISTING SLOPES GREATER THAN 4:1 SHALL BE BENCHED PRIOR TO PLACEMENT OF FILL.
G19.) CONTRACTOR WILL COMPLETE ALL SITE WORK: FINAL GRADING, LANDSCAPING, SEEDING, PAVING, AND REMOVAL OF DEBRIS.
G20.) THIS PLAN HAS BEEN PREPARED WITHOUT THE BENEFIT OF A TITLE REPORT AND DOES NOT NECESSARILY INDICATE ALL ENCUMBRANCES ON THE PROPERTY.
G21.) ARCHITECTURAL PLANS, SIGNAGE PLANS, AND LIGHTING PLANS SHALL BE SUBMITTED BY OTHERS UNDER SEPARATE COVER. ALL ARCHITECTURAL, SIGNAGE, AND LIGHTING INFORMATION SHOWN ON THIS PLAN IS PROVIDED FOR INFORMATIONAL PURPOSES ONLY.
G22.) BOUNDARY INFORMATION FROM A FIELD SURVEY BY PERKINS & ORRISON.
G23.) TOPOGRAPHIC INFORMATION FROM A FIELD SURVEY BY PERKINS & ORRISON.
G24.) PIPE BEDDING SHALL BE PER APPLICABLE VDOT STANDARDS UNLESS OTHERWISE NOTED.
G25.) HDPE PIPE SHALL BE DOUBLE WALL TYPE "S" WITH SMOOTH INTERIOR AND MEET AASHTO REQUIREMENTS M294. HDPE PIPE BEDDING SHALL BE PER MANUFACTURER'S SPECIFICATION.
G26.) PLASTIC PIPE SHALL CONFORM TO CITY SPECIFICATIONS TO BE POLYPROPYLENE PIPE TO MATCH ASTM F2736-10 AND ASTM F2764

EROSION AND SEDIMENT CONTROL GENERAL NOTES

ES-1) UNLESS OTHERWISE INDICATED, ALL VEGETATIVE AND STRUCTURAL EROSION AND SEDIMENT CONTROL PRACTICES SHALL BE CONSTRUCTED AND MAINTAINED ACCORDING TO MINIMUM STANDARDS AND SPECIFICATIONS OF VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK AND VIRGINIA REGULATIONS 9VAC25-840 EROSION AND SEDIMENT CONTROL REGULATIONS.
ES-2) THE PLAN APPROVING AUTHORITY MUST BE NOTIFIED ONE WEEK PRIOR TO THE PRECONSTRUCTION CONFERENCE, ONE WEEK PRIOR TO THE COMMENCEMENT OF LAND DISTURBING ACTIVITY, AND ONE WEEK PRIOR TO THE FINAL INSPECTION.
ES-3) A LAND DISTURBANCE PERMIT IS REQUIRED PRIOR TO INITIATING ANY SITE WORK.
ES-4) A COPY OF THE APPROVED EROSION AND SEDIMENT CONTROL PLAN SHALL BE MAINTAINED ON THE SITE AT ALL TIMES.
ES-5) THE CONTRACTOR IS RESPONSIBLE FOR INSTALLATION OF ANY ADDITIONAL EROSION CONTROL MEASURES NECESSARY TO PREVENT EROSION AND SEDIMENTATION AS DETERMINED BY THE PLAN APPROVING AUTHORITY.
ES-6) PRIOR TO COMMENCING LAND DISTURBING ACTIVITIES IN AREAS OTHER THAN INDICATED ON THESE PLANS (INCLUDING, BUT NOT LIMITED TO, OFF-SITE BORROW OR WASTE AREAS), THE CONTRACTOR SHALL SUBMIT A SUPPLEMENTARY EROSION AND SEDIMENT CONTROL PLAN TO THE LOCAL PLAN APPROVING AUTHORITY.
ES-7) EROSION AND SEDIMENT CONTROLS SHALL BE CONSTRUCTED AS A FIRST STEP IN ANY LAND DISTURBING ACTIVITY. EARTHEN STRUCTURES SHALL BE SEEDED IMMEDIATELY UPON INSTALLATION.
ES-8) PERMANENT OR TEMPORARY SOIL STABILIZATION SHALL BE APPLIED TO DENUDED AREAS WITHIN 7 DAYS AFTER FINAL GRADE IS REACHED ON ANY PORTION OF THE SITE. TEMPORARY SOIL STABILIZATION SHALL BE APPLIED WITHIN 7 DAYS TO DENUDED AREAS THAT MAY NOT BE AT FINAL GRADE BUT WILL REMAIN DORMANT FOR LONGER THAN 14 DAYS. PERMANENT STABILIZATION SHALL BE APPLIED TO AREAS THAT ARE TO BE LEFT DORMANT FOR MORE THAN ONE YEAR.
ES-9) ALL STOCKPILES SHALL BE STABILIZED OR PROTECTED WITH SEDIMENT TRAPPING MEASURES.
ES-10) A PERMANENT VEGETATIVE COVER SHALL BE ESTABLISHED ON DENUDED AREAS NOT OTHERWISE PERMANENTLY STABILIZED. PERMANENT VEGETATION SHALL NOT BE CONSIDERED ESTABLISHED UNTIL A GROUND COVER IS ACHIEVED THAT IS UNIFORM, MATURE ENOUGH TO SURVIVE AND WILL INHIBIT EROSION.
ES-11) THE ROADWAY SHALL BE STABILIZED BY THE APPLICATION OF STONE BASE UPON REACHING FINAL GRADE. CHECK DAMS SHALL BE INSTALLED IN ALL DITCHES IMMEDIATELY UPON THE GRADING IN OF SAME.
ES-12) CUT AND FILL SLOPES SHALL BE DESIGNED AND CONSTRUCTED IN A MANNER THAT WILL MINIMIZE EROSION. SLOPES THAT ARE FOUND TO BE ERODING EXCESSIVELY WITHIN ONE YEAR OF PERMANENT STABILIZATION SHALL BE PROVIDED WITH ADDITIONAL SLOPE STABILIZING MEASURES UNTIL THE PROBLEM IS CORRECTED.
ES-13) CONCENTRATED RUNOFF SHALL NOT FLOW DOWN CUT OR FILL SLOPES UNLESS CONTAINED WITHIN AN ADEQUATE TEMPORARY OR PERMANENT CHANNEL, FLUME, OR SLOPE DRAIN STRUCTURE.
ES-14) ALL STORM INLETS THAT ARE MADE OPERABLE DURING CONSTRUCTION SHALL BE PROTECTED SO THAT SEDIMENT LADEN WATER CANNOT ENTER THE STORM WATER CONVEYANCE SYSTEM WITHOUT FIRST BEING FILTERED OR OTHERWISE TREATED TO REMOVE SEDIMENT.
ES-15) WHEN INSTALLING UTILITY LINES, NO MORE THAN 500 FEET OF TRENCH MAY BE OPEN AT ONE TIME, AND EXCAVATED MATERIAL SHALL BE PLACED ON THE UPHILL SIDE OF TRENCHES.
ES-16) ALL RIP-RAP SHALL BE INSTALLED OVER FILTER FABRIC.
ES-17) DURING DEWATERING OPERATIONS, WATER WILL BE PUMPED INTO AN APPROVED FILTERING DEVICE.
ES-18) ALL DISTURBED AREAS ARE TO DRAIN TO APPROVED SEDIMENT CONTROL MEASURES AT ALL TIMES DURING LAND DISTURBING ACTIVITIES AND DURING SITE DEVELOPMENT UNTIL FINAL STABILIZATION IS ACHIEVED.
ES-19) SILT FENCE, SILT TRAP AND CHECK DAMS SHALL BE CLEANED OUT WHEN SEDIMENT REACHES ONE HALF THE HEIGHT OF THE BARRIER AND WHENEVER DIRECTED BY THE COUNTY EROSION AND SEDIMENT CONTROL OFFICIAL. SEDIMENT SHALL BE IMMEDIATELY STABILIZED UP GRADIENT OF EROSION AND SEDIMENT CONTROL MEASURES.
ES-20) ALL MEASURES SHALL BE UTILIZED AND CONTINUOUSLY MAINTAINED DURING THE CONSTRUCTION PERIOD UNTIL ALL DISTURBED AND DENUDED AREAS ARE STABILIZED. NO AREA SHALL REMAIN DENUDED FOR MORE THEN THREE CALENDAR DAYS WHEN CONSTRUCTION IS NOT IN PROGRESS.
ES-21) THE CONTRACTOR SHALL INSPECT ALL EROSION CONTROL MEASURES WEEKLY AND AFTER EACH RUNOFF-PRODUCING RAINFALL EVENT. ALL NECESSARY REPAIRS OR CLEANUP TO MAINTAIN THE EFFECTIVENESS OF THE EROSION CONTROL DEVICES SHALL BE MADE IMMEDIATELY.
ES-22) ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES SHALL BE REMOVED WITHIN 30 DAYS AFTER FINAL SITE STABILIZATION, OR AFTER THE MEASURES ARE NO LONGER NEEDED.
ES-23) THE MAXIMUM SPACING BETWEEN THE CHECK DAMS SHOULD BE SUCH THAT THE TOE OF THE UPSTREAM DAM IS AT THE SAME ELEVATIONS THE TOP OF THE DOWNSTREAM DAM. REFERENCE PLATE 3.20-2.

SEEDING
SEEDS SHALL BE SCARIFIED INTO THE TOP 2" OF THE TOP SOIL, IF APPLIED BY HAND. SEEDING BY HYDRO SEEDING SHALL BE IN ACCORDANCE WITH VDOT SPECIFICATIONS.

TEMPORARY SEEDING RATES PER ACRE:
SEPTEMBER 1 TO FEBRUARY 15:
40 LBS. ANNUAL RYE
40 LBS. CEREAL WINTER RYE
FEBRUARY 15 TO APRIL 30:
80 LBS ANNUAL RYE
MAY 1 TO AUGUST 31
50 LBS. GERMAN MILLET

PERMANENT SEEDING RATES PER ACRE:

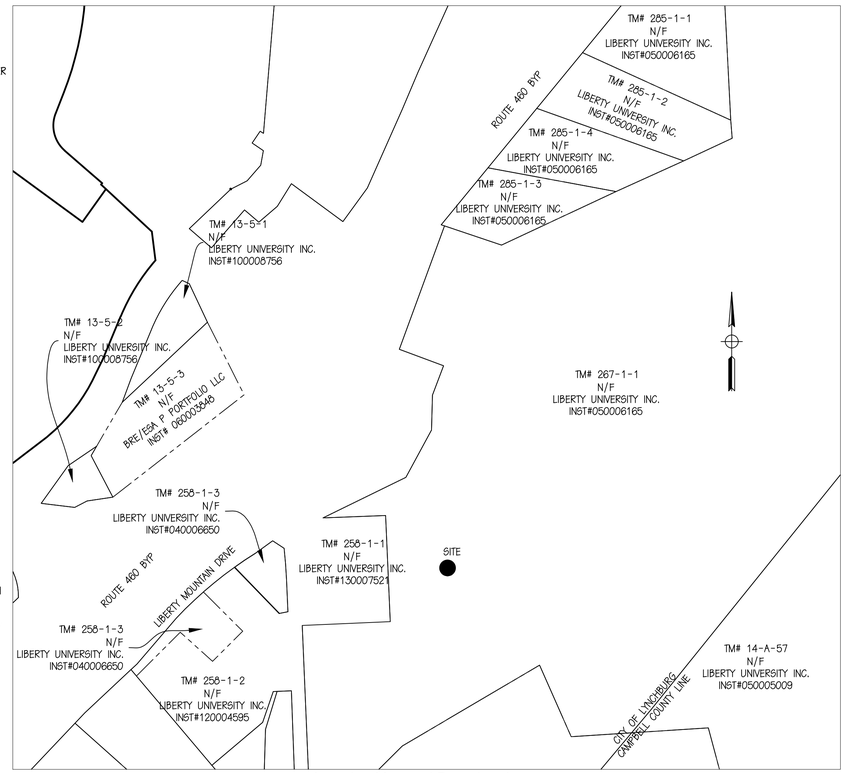
STANDARD SEEDING RATES FOR ALL SEASONS:
(GENERAL SLOPE LESS THAN 3:1)
128 LBS. KENTUCKY 31 FESCUE
20 LBS. OTHER

STANDARD SEEDING RATES FOR ALL SEASONS
(GENERAL SLOPE 3:1 OR GREATER)
108 LBS. KENTUCKY 31 FESCUE
20 LBS. CROWN VETCH
20 LBS. OTHER

OTHER:
MARCH 1 TO MAY 15 — ANNUAL RYE
MAY 16 TO AUGUST 15 — FOXTAIL MILLET
AUGUST 16 TO OCTOBER 31 — ANNUAL RYE
NOVEMBER 1 TO FEBRUARY 28 — WINTER RYE

ALL SEASONS:
FERTILIZER 1000 LBS. 10-20-10
LIME 2 TONS
MULCH 2 TONS THRASHED WHEAT STRAW

EC-2 EROSION BLANKET (VESCH TREATMENT ONE). GENERALLY NOT USED IN DITCHES WITH A VELOCITY OF OVER 4 FPS.
EC-2 SOIL RETENTION MATS SHALL CONSIST OF A MACHINE PRODUCED MAT OF WOOD EXCELSIOR OR MANMADE FIBER THAT SHALL INTERTWINE OR INTERLOCK. MATS SHALL BE OF CONSISTENT THICKNESS WITH FIBER EVENLY DISTRIBUTED OVER ITS ENTIRE AREA AND COVERED ON THE TOP AND BOTTOM SIDE WITH NETTING HAVING A HIGH WEB STRENGTH (NOT GLUED BUT MACHINE SEWN).
EC-3 EROSION BLANKETS (VESCH TREATMENT TWO) CAN BE USED IN DITCHES FROM 4 TO 10 FPS.
EC-3 EROSION BLANKETS MUST BE A THREE DIMENSIONAL GEOMATRIX OF UV STABILIZED NYLON, POLYETHYENE OR POLYPROPHYLENE SEWN WITH UV STABILIZED POLYESTER THREAD TO FORM A MAT. NAG C350 OR P300, MIROMAT HEAVYWEIGHT AND ENKAMAT 7012 ARE SOME OF THE PRODUCTS THAT FIT THIS DESCRIPTION.



Location Map and Boundary Insert
1"=250' 0 250 500

1. CONTACT THE CITY ENVIRONMENTAL REVIEWER, THE CITY CONSTRUCTION COORDINATOR AND MISS UTILITY 48 HOURS IN ADVANCE OF ANY CONSTRUCTION ACTIVITY.
2. ALL CONSTRUCTION SHALL BE PERFORMED IN ACCORDANCE WITH CITY OF LYNCHBURG MANUAL OF SPECIFICATIONS AND STANDARD DETAILS.

DESIGNER:

RUSS ORRISON, PE
PERKINS & ORRISON
17 W. NELSON STREET
LEXINGTON, VA 24450
540-464-9001
rorrison@perkins-orrison.com

SHEET INDEX

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3 OF 17 ROAD PLAN & PROFILE
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6 OF 17 STRIPING PLAN
7 OF 17 ROAD CROSS SECTIONS
8 OF 17 ROAD CROSS SECTIONS
9 OF 17 CANDLERS MOUNTAIN ROAD SIDEWALK ADD ALTERNATE
10 OF 17 RETAINING WALL PLAN & DETAILS
11 OF 17 STREET LIGHTING & LANDSCAPING PLAN
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14 OF 17 EROSION & SEDIMENT CONTROL NOTES & DETAILS
15 OF 17 DETAILS
16 OF 17 DRAINAGE DIVIDES
17 OF 17 DRAINAGE DIVIDES

I HEREBY CERTIFY THAT, TO THE BEST OF MY ABILITY, THIS PLAN HAS BEEN PREPARED IN ACCORDANCE WITH THE LATEST CITY OF LYNCHBURG MANUAL OF SPECIFICATIONS AND STANDARD DETAILS AND CITY CODE.

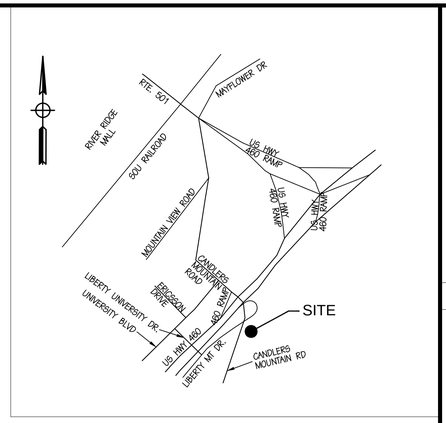
SIGNATURE _____ REGISTRATION NO. _____

PRINTED NAME AND TITLE _____ DATE _____

I/WE HEREBY CERTIFY THAT ALL SITE CONSTRUCTION, DRAINAGE AND GRADING WILL BE DONE PURSUANT TO THIS PLAN AND THAT THE APPLICABLE STORMWATER MANAGEMENT CONDITIONS AND REQUIREMENTS OF THE CITY OF LYNCHBURG, THE COMMONWEALTH OF VIRGINIA AND THE FEDERAL GOVERNMENT AND ITS AGENCIES ARE HEREBY MADE A PART OF THIS PLAN

SIGNATURE _____ TITLE _____

PRINTED NAME _____ DATE _____



VICINITY MAP
NO SCALE

LEGEND

EXISTING	DESCRIPTION	NEW	FUTURE
	BUILDING WALL		
	CONC. WALKS		
1340	CONTOURS	1340	
×1350.6	SPOT ELEVATION	+19 00/TC	
	STORM SEWER		
8"SS	SANITARY SEWER & MANHOLES	8"SS	
W	WATER LINE, VALVE & FIRE HYDRANT	W	
W	WATER METER		
	DUAL WATER METER		
X	FENCE		
UE	UNDERGROUND ELECTRIC LINE	UE	
OE	OVERHEAD ELECTRIC LINE		
G	GAS LINE		
UC	UNDERGROUND COMM LINE	UC	
	EDGE OF PAVEMENT		
	CURB (CG-2)		
	CURB AND GUTTER (CG-6)		
	REVERSE CURB AND GUTTER (CG-6R)		
	TRANSITION CURB		
	PROPERTY LINE		
	TREELINE		
	EXISTING TREES TO BE PROTECTED & PRESERVED		

ABBREVIATIONS

AB	ANCHOR BLOCK	MAX	MAXIMUM
BLDG	BUILDING	MECH	MECHANICAL
BC	BOTTOM FACE OF CURB	MH	MANHOLE
BM	BENCHMARK	MIN	MINIMUM
CL	CENTERLINE	MON	MONUMENT
CL	CLASS	OC	ON CENTER
CMP	CORRUGATED METAL PIPE	PVC	BEGIN VERTICAL CURVE
CO	CLEANOUT	PVC	POLYVINYL CHLORIDE
COMM	COMMUNICATION	PVT	END VERTICAL CURVE
CONC	CONCRETE	RCP	REINFORCED CONCRETE PIPE
DI	DROP INLET	SD	STORM DRAINAGE
DIA	DIAMETER	SHT	SHEET
DIP	DUCTILE IRON PIPE	STR	STRUCTURE
EA	EACH	SW	SIDEWALK
EC	EROSION CONTROL	TAN	TANGENT
ELEC	ELECTRICAL	TB	CONCRETE THRUST BLOCK
ELEV	ELEVATION	TBM	TEMPORARY BENCH MARK
EP	EDGE OF PAVEMENT	TBR	TO BE REMOVED
ES	END SECTION	TBR*	TO BE REMOVED OR RELOCATED
EX	EXISTING	TO	TOP
FB	FACE OF BUILDING	TOC	TOP OF CURB
FF	FINISHED FLOOR ELEVATION	TOW	TOP OF WALL
FH	FIRE HYDRANT	TP	TELEPHONE POLE
GV	GATE VALVE	TR	TOP OF RIM
HB	HORIZONTAL BEND	TYP	TYPICAL
HD	HEAVY DUTY	VB	VERTICAL BEND
HDPE	HIGH DENSITY POLYETHYLENE PIPE	VDOT	VIRGINIA DEPARTMENT OF TRANSPORTATION
HPT	HIGH POINT	WL	WATER LINE
HOR	HORIZONTAL	WM	WATER METER
INV	INVERT	WWF	WELDED WIRE FABRIC
IN	INVERT IN	WWM	WELDED WIRE MESH
IO	INVERT OUT	W/	WITH
LPT	LOW POINT	WV	WATER VALVE

ESC/SWM ADMINISTRATOR: _____ DATE: _____

PERKINS & ORRISON
ENGINEERS ▲ PLANNERS ▲ SURVEYORS

27 GREEN HILL DRIVE, FOREST, VIRGINIA 24551
PHONE: 434-525-5985 FAX: 434-525-5986
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CONSULTANTS

SEAL:

COMMONWEALTH OF VIRGINIA
RUSSELL H. ORRISON
Lic. No. 031849
05/12/2015
PROFESSIONAL ENGINEER

JOB:

LIBERTY UNIVERSITY
LIBERTY MOUNTAIN DRIVE
EXTENSION AT THE NORTHERN
INTRAMURAL FIELDS
LYNCHBURG, VIRGINIA

CLIENT:
LIBERTY UNIVERSITY
ATTN: MAGGIE COSSMAN

MARK	DATE	DESCRIPTION
1	05/12/15	PER CITY/AEP COMMENTS

ISSUE: 10/07/2014
CONTOUR INTERVAL: –
DESIGNED BY: –
DRAWN BY: PWS
CHECKED BY: RHO

SHEET TITLE

COVER SHEET

RWS PROJECT #
14018-RW

JOB NO.: 13331
SHEET NO. 1 OF 17

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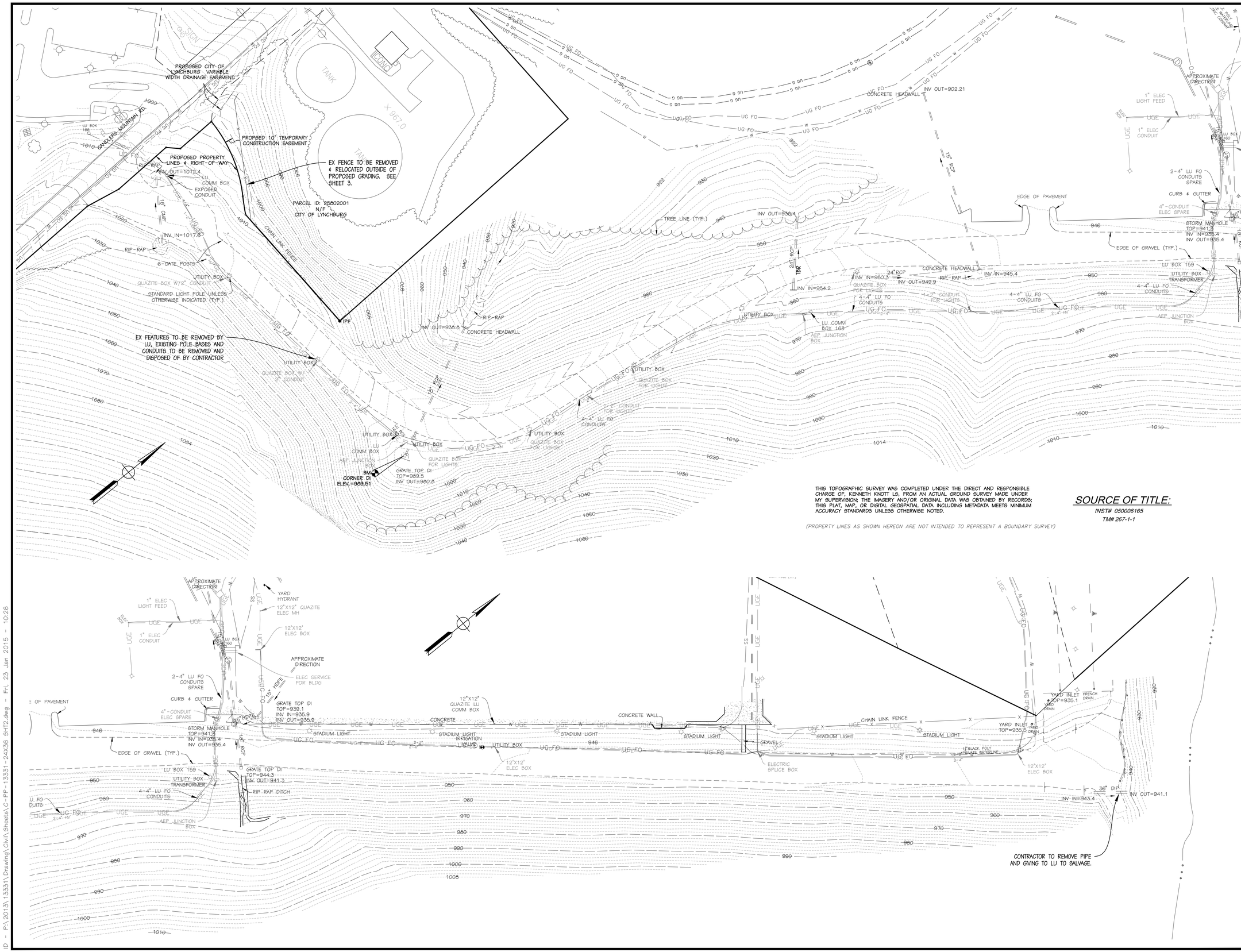

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ATTN: MAGGIE COSSMAN

MARK	DATE	DESCRIPTION
1	05/12/15	PER CITY/AEP COMMENTS

ISSUE:	10/07/2014
CONTOUR INTERVAL:	2'
DESIGNED BY:	RHO/GGW
DRAWN BY:	PWS
CHECKED BY:	RHO

SHEET TITLE

EXISTING CONDITION

GRAPHIC SCALE
0 50 100
1"=50'

RWS PROJECT #

14018-RW

JOB NO.: 13331

SHEET NO. 2 OF 17

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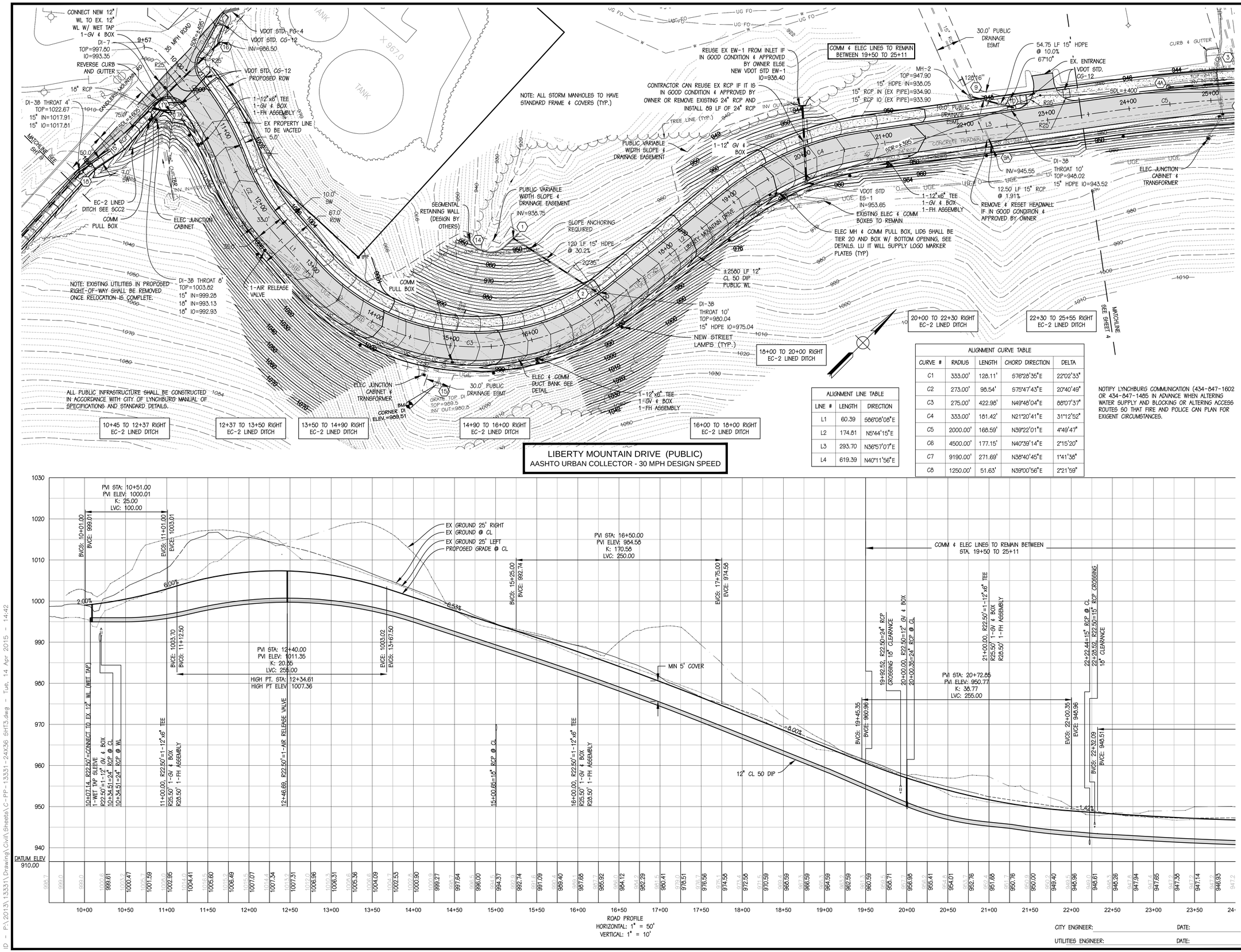

ALIGNMENT LINE TABLE		
LINE #	LENGTH	DIRECTION
L1	60.39	S66°08'08"E
L2	174.81	N5°44'15"E
L3	293.70	N36°57'07"E
L4	619.39	N40°11'56"E

ALIGNMENT CURVE TABLE				
CURVE #	RADIUS	LENGTH	CHORD DIRECTION	DELTA
C1	333.00'	128.11'	S76°28'35"E	22°02'33"
C2	273.00'	98.54'	S75°47'43"E	20°40'49"
C3	275.00'	422.98'	N49°48'04"E	88°07'37"
C4	333.00'	181.42'	N21°20'41"E	31°12'52"
C5	2000.00'	168.59'	N39°22'01"E	4°49'47"
C6	4500.00'	177.15'	N40°39'14"E	2°15'20"
C7	9190.00'	271.69'	N38°40'45"E	1°41'38"
C8	1250.00'	51.63'	N39°00'56"E	2°21'59"

CITY ENGINEER: DATE:

UTILITIES ENGINEER: DATE:

PERKINS & ORRISON
ENGINEERS ▲ PLANNERS ▲ SURVEYORS

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ISSUE: 10/07/2014
CONTOUR INTERVAL: 2'
DESIGNED BY: RHO/GGW
DRAWN BY: PWS
CHECKED BY: RHO

SHEET TITLE

ROAD PLAN & PROFILE

GRAPHIC SCALE 0 50 100 1"=50'

RWS PROJECT #
14018-RW

JOB NO.: 13331
SHEET NO 3 OF 17

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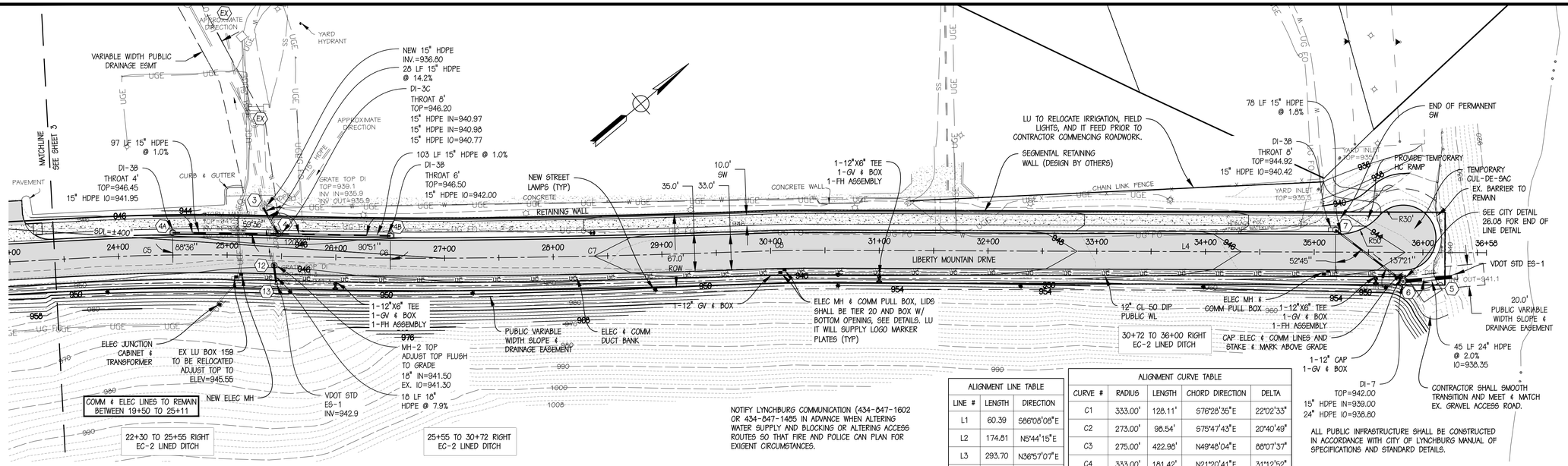

NOTIFY LYNCHBURG COMMUNICATION (434-847-1602 OR 434-847-1485 IN ADVANCE WHEN ALTERING WATER SUPPLY AND BLOCKING OR ALTERING ACCESS ROUTES SO THAT FIRE AND POLICE CAN PLAN FOR EXIGENT CIRCUMSTANCES.

LIBERTY MOUNTAIN DRIVE (PUBLIC)
AASHTO URBAN COLLECTOR - 30 MPH DESIGN SPEED

ALIGNMENT LINE TABLE		
LINE #	LENGTH	DIRECTION
L1	60.39	S86°08'08"E
L2	174.61	N5°44'15"E
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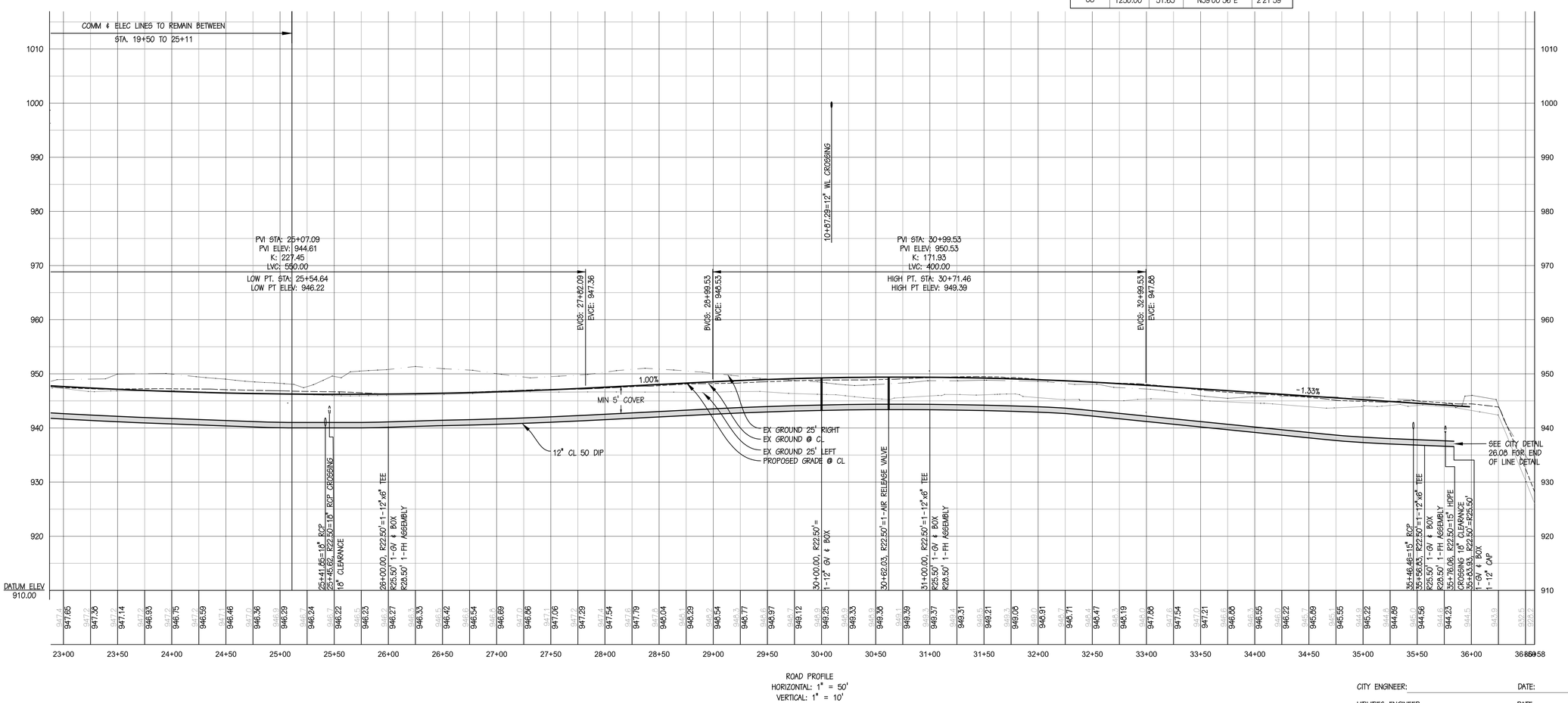
C1	333.00'	128.11'	S76°28'35"E	22°02'33"
C2	273.00'	98.54'	S75°47'43"E	20°40'49"
C3	275.00'	422.98'	N49°48'04"E	88°07'37"
C4	333.00'	181.42'	N21°20'41"E	31°12'52"
C5	2000.00'	168.59'	N39°22'01"E	4°49'47"
C6	4500.00'	177.15'	N40°39'14"E	2°15'20"
C7	9190.00'	271.69'	N38°40'45"E	1°41'38"
C8	1250.00'	51.63'	N39°00'56"E	2°21'59"



ROAD PROFILE
HORIZONTAL: 1" = 50'
VERTICAL: 1" = 10'

CITY ENGINEER: DATE:

UTILITIES ENGINEER: DATE:

PERKINS & ORRISON
ENGINEERS ▲ PLANNERS ▲ SURVEYORS

27 GREEN HILL DRIVE, FOREST, VIRGINIA 24551
PHONE: 434-525-5985 FAX: 434-525-5986
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PHONE: 540-464-9001 FAX: 540-464-5009
EMAIL: pno@perkins-orrison.com

CONSULTANTS

SEAL:

COMMONWEALTH OF VIRGINIA
RUSSELL H. ORRISON
Lic. No. 031849
05/12/2015
PROFESSIONAL ENGINEER

JOB:

LIBERTY UNIVERSITY
LIBERTY MOUNTAIN DRIVE
EXTENSION AT THE NORTHERN
INTRAMURAL FIELDS
LYNCHBURG, VIRGINIA

CLIENT:
LIBERTY UNIVERSITY
ATTN: MAGGIE COSSMAN

MARK	DATE	DESCRIPTION
1	05/12/15	PER CITY/AEP COMMENTS

ISSUE:	10/07/2014
CONTOUR INTERVAL:	2'
DESIGNED BY:	RHO/GGW
DRAWN BY:	PWS
CHECKED BY:	RHO

SHEET TITLE

ROAD PLAN & PROFILE

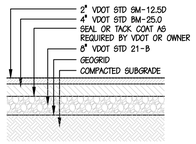
GRAPHIC SCALE
0 50 100
1"=50'

RWS PROJECT #
14018-RW

JOB NO.: 13331
SHEET NO. 4 OF 17

ID - P:\2013\13331\Drawing\Civil\Sheets\C-PP-13331-24X36 SHT4.dwg - Wed, 8 Apr 2015 - 16:11

TYPICAL PAVEMENT SECTIONS

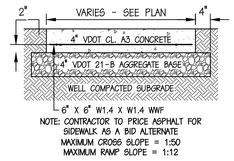


PAVEMENT SECTION*
NO SCALE

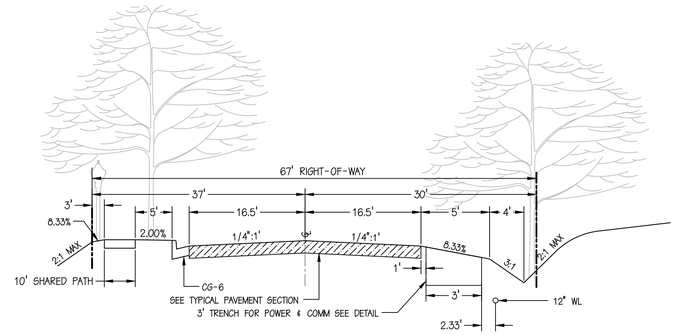
*THE PRELIMINARY PAVEMENT DESIGN(S) IS SHOWN FOR ESTIMATING PURPOSES ONLY. FINAL PAVEMENT DESIGN(S) WILL BE DETERMINED BY ACTUAL CBR TEST RESULTS, WHICH MUST BE SUBMITTED TO AND APPROVED BY VIRGINIA DEPARTMENT OF TRANSPORTATION BEFORE PLACEMENT OF ANY BASE AND SURFACE COURSES. THE CONTRACTOR SHALL COORDINATE CBR TEST(S) WITH THE OWNER/DEVELOPER. THE OWNER/DEVELOPER IS RESPONSIBLE FOR ANY NECESSARY CORRECTIONS DUE TO PLACEMENT PRIOR TO APPROVAL.

TYPICAL SECTION CONCRETE SHARED PATH

(NO SCALE)



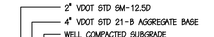
NOTE: CONTRACTOR TO PRICE ASPHALT FOR SIDEWALK AS A BID ALTERNATE
MAXIMUM CROSS SLOPE = 1:50
MAXIMUM RAMP SLOPE = 1:12



TYPICAL ROAD SECTION

NO SCALE

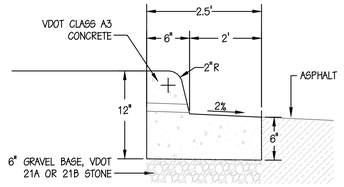
SPECIAL NOTE TO CONTRACTOR:
BACKFILL OF CONDUIT TRENCH MUST BE PLACED IN STRICT ACCORDANCE W/ NOTE G17

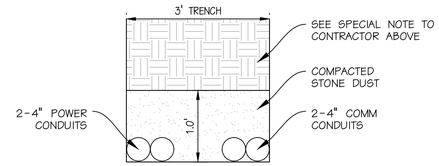


TYPICAL ASPHALT SHARED PATH SECTION
BID ALTERNATE
NO SCALE

REVERSE CURB AND GUTTER SECTION

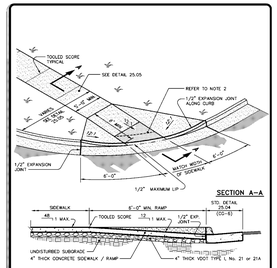
NO SCALE





TRENCH FOR COMM AND POWER

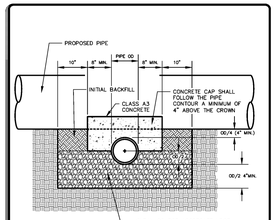
NO SCALE



THE CITY OF LYNCHBURG
TYPE 4 – HANDICAP RAMP for INTERSECTION with GRASS STRIP
NOT TO SCALE | 25.17
REVISED DATE 12-14-2013 | SHEET # 1 of 3
USE WITH THE CITY OF LYNCHBURG STANDARD SPECIFICATIONS ONLY

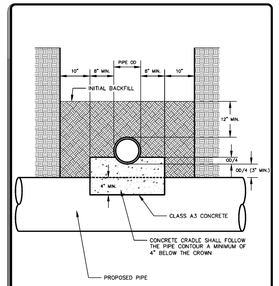
NOTES:
1. CROSS AND SIDE RAMPS SHALL NOT EXCEED A SLOPE OF 12:1.
2. CROSS RAMP SHALL HAVE A TRUNCATED DOME PATTERN MEETING THE CURRENT CROSS RAMP SHALL HAVE A TRUNCATED DOME PATTERN MEETING THE CURRENT AMERICANS WITH DISABILITIES ACT ACCESSIBILITY GUIDELINES (ADAAG). THE TRUNCATED DOME PATTERN SHALL EXTEND THE FULL WIDTH OF THE CROSS RAMP BY 2 FEET IN LENGTH IN THE DIRECTION OF PEDESTRIAN TRAVEL. THE TRUNCATED DOME SURFACE SHALL BE A DIFFERENT COLOR THAN THE SURROUNDING SURFACE. DETECTABLE WARNING SURFACES, INCLUDE THE TRUNCATED DOMES, MEET THE 2004 ADA COMPLIANT DETECTABLE WARNING PAVER BY PAVESTONE COMPANY AND STEP-SAFE BY TRANSPO INDUSTRIES, INC. DETECTABLE WARNING SURFACE SHALL BE INSTALLED WITH THE ELONGATED SIDE PARALLEL TO THE RAMP OPENING. PAVERS/ TILES SHALL BE RECESSED TO MOUNT FLUSH WITH THE SURROUNDING CONCRETE RAMP/SURFACE.
3. CURB RAMPS ARE TO BE LOCATED WHEREVER AN ACCESSIBLE ROUTE WITHIN THE RIGHT-OF-WAY OF A ROADWAY CROSSES AS SHOWN ON PLANS OR AS DIRECTED BY CITY ENGINEER AND SHOULD NOT BE LOCATED BEHIND VEHICLE STOP LINES, EXISTING LIGHT POLES, FIRE HYDRANTS, DROP INLETS, ETC.

THE CITY OF LYNCHBURG
TYPE 4 – HANDICAP RAMP for INTERSECTION with GRASS STRIP
NOT TO SCALE | 25.17
REVISED DATE 12-14-2013 | SHEET # 2 of 3
USE WITH THE CITY OF LYNCHBURG STANDARD SPECIFICATIONS ONLY



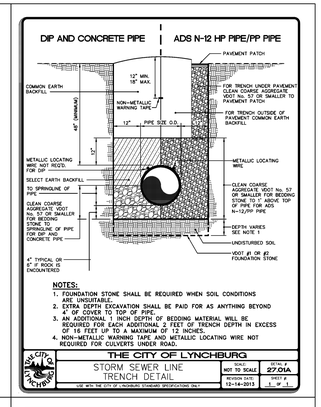
CAP DETAIL

THE CITY OF LYNCHBURG
CONCRETE CAP & CRADLE DETAIL
NOT TO SCALE | 25.26
REVISED DATE 12-14-2013 | SHEET # 1 of 2
USE WITH THE CITY OF LYNCHBURG STANDARD SPECIFICATIONS ONLY



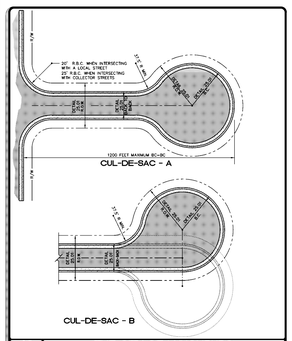
CRADLE DETAIL

THE CITY OF LYNCHBURG
CONCRETE CAP & CRADLE DETAIL
NOT TO SCALE | 25.26
REVISED DATE 12-14-2013 | SHEET # 2 of 2
USE WITH THE CITY OF LYNCHBURG STANDARD SPECIFICATIONS ONLY

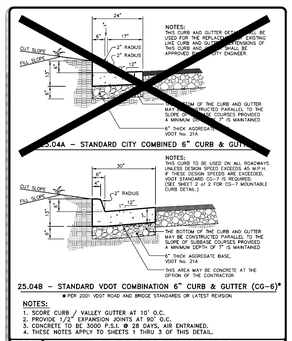


NOTES:
1. FOUNDATION STONE SHALL BE REQUIRED WHEN SOIL CONDITIONS ARE UNSUITABLE.
2. EXTRA DEPTH EXCAVATION SHALL BE PAID FOR AS ANYTHING BEYOND 4' OF COVER TO TOP OF PIPE.
3. AN ADDITIONAL 1 INCH DEPTH OF BEDDING MATERIAL WILL BE REQUIRED FOR EACH ADDITIONAL 2 FEET OF TRENCH DEPTH IN EXCESS OF 18 FEET UP TO A MAXIMUM OF 12 INCHES.
4. NON-METALLIC WARNING TAPE AND METALLIC LOCATING WIRE NOT REQUIRED FOR CULVERTS UNDER ROAD.

THE CITY OF LYNCHBURG
STORM SEWER LINE TRENCH DETAIL
NOT TO SCALE | 27.01A
REVISED DATE 12-14-2013 | SHEET # 1 of 1
USE WITH THE CITY OF LYNCHBURG STANDARD SPECIFICATIONS ONLY



THE CITY OF LYNCHBURG
CUL-DE-SAC DIMENSIONS
NOT TO SCALE | 25.02
REVISED DATE 12-14-2013 | SHEET # 1 of 2
USE WITH THE CITY OF LYNCHBURG STANDARD SPECIFICATIONS ONLY



NOTES:
THIS CURB AND GUTTER SECTION MAY BE USED ON ALL ROADWAYS UNLESS DESIGN SPEED EXCEEDS 40 M.P.H. USE CURB AND GUTTER DESIGNS OF THIS CURB AND GUTTER SHALL BE APPROVED BY CITY ENGINEER.

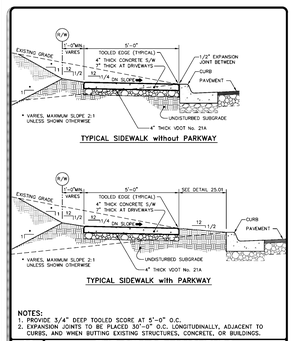
25.04A – STANDARD CITY COMBINED 6" CURB & GUTTER

NOTES:
THIS CURB TO BE USED ON ALL ROADWAYS UNLESS DESIGN SPEED EXCEEDS 40 M.P.H. IF THESE DESIGN SPEEDS ARE EXCEEDED, THE STANDARD CG-7 IS REQUIRED. (SEE SHEET 2 of 2 FOR CG-7 MOUNTABLE CURB DETAIL).

25.04B – STANDARD VDOT COMBINATION 6" CURB & GUTTER (CG-6)*
* PER 2001 VDOT ROAD AND BRIDGE STANDARDS OR LATEST REVISION

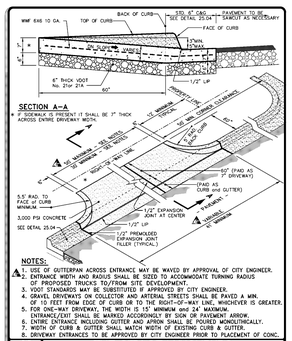
NOTES:
1. SCORE CURB / VALLEY GUTTER AT 10' O.C.
2. PROVIDE 1/2" EXPANSION JOINTS AT 90' O.C.
3. CONCRETE TO BE 3000 P.S.I. @ 28 DAYS, AIR ENTRAINED.
4. THESE NOTES APPLY TO SHEETS 1 THRU 3 OF THIS DETAIL.

THE CITY OF LYNCHBURG
CURB & GUTTER DETAILS
NOT TO SCALE | 25.04
REVISED DATE 12-14-2013 | SHEET # 3 of 3
USE WITH THE CITY OF LYNCHBURG STANDARD SPECIFICATIONS ONLY



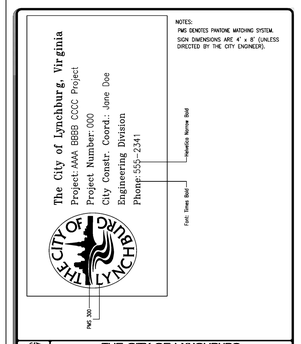
NOTES:
1. PROVIDE 3/4" DEEP TOOLED SCORE AT 5'-0" O.C.
2. EXPANSION JOINTS TO BE PLACED 30'-0" O.C. LONGITUDINALLY, ADJACENT TO CURBS, AND WHEN BUTTING EXISTING STRUCTURES, CONCRETE, OR BUILDINGS.

THE CITY OF LYNCHBURG
STANDARD SIDEWALK DETAIL
NOT TO SCALE | 25.05
REVISED DATE 12-14-2013 | SHEET # 1 of 1
USE WITH THE CITY OF LYNCHBURG STANDARD SPECIFICATIONS ONLY



NOTES:
1. USE OF GUTTERPAN ACROSS ENTRANCE MAY BE WAIVED BY APPROVAL OF CITY ENGINEER.
2. ENTRANCE WIDTH AND RADIUS SHALL BE SIZED TO ACCOMMODATE TURNING RADIUS OF EXPECTED VEHICLES TO TRAVEL THROUGH ENTRANCE.
3. VDOT STANDARDS MAY BE SUBSTITUTED IF APPROVED BY CITY ENGINEER.
4. GRAVEL DRIVEWAYS ON COLLECTOR AND ARTERIAL STREETS SHALL BE PAVED A MIN. OF 10 FEET FROM EDGE OF CURB OR TO THE RIGHT-OF-WAY LINE, WHICHEVER IS GREATER.
5. FOR ONE-WAY DRIVEWAY, THE WIDTH IS 15' MINIMUM and 24' MAXIMUM. ENTRANCE/EXIT SHALL BE MARKED ACCORINGLY BY SIGN OR PAVEMENT ARROW.
6. ENTIRE ENTRANCE INCLUDING GUTTER AND APRON SHALL BE POURED MONOLITHICALLY.
7. WIDTH OF CURB & GUTTER SHALL MATCH WIDTH OF EXISTING CURB & GUTTER.
8. DRIVEWAY ENTRANCES TO BE APPROVED BY CITY ENGINEER PRIOR TO PLACEMENT OF CONC.

THE CITY OF LYNCHBURG
COMMERCIAL DRIVEWAY ENTRANCE
NOT TO SCALE | 25.12
REVISED DATE 12-14-2013 | SHEET # 1 of 1
USE WITH THE CITY OF LYNCHBURG STANDARD SPECIFICATIONS ONLY



NOTES:
PMS DENOTES PANTONE MATCHING SYSTEM.
SIGN DIMENSIONS ARE 4' x 8' (UNLESS DIRECTED BY THE CITY ENGINEER).

THE CITY OF LYNCHBURG
CONSTRUCTION PROJECT SIGN
NOT TO SCALE | 25.25
REVISED DATE 12-14-2013 | SHEET # 1 of 1
USE WITH THE CITY OF LYNCHBURG STANDARD SPECIFICATIONS ONLY

CITY ENGINEER: _____ DATE: _____

PERKINS & ORRISON
ENGINEERS ▲ PLANNERS ▲ SURVEYORS

27 GREEN HILL DRIVE, FOREST, VIRGINIA 24551
PHONE: 434-525-5985 FAX: 434-525-5986
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EMAIL: pno@perkins-orrison.com

CONSULTANTS

SEAL:

COMMONWEALTH OF VIRGINIA
RUSSELL H. ORRISON
Lic. No. 031849
05/12/2015
PROFESSIONAL ENGINEER

JOB:

LIBERTY UNIVERSITY
LIBERTY MOUNTAIN DRIVE EXTENSION AT THE NORTHERN INTRAMURAL FIELDS
LYNCHBURG, VIRGINIA

CLIENT:
LIBERTY UNIVERSITY
ATTN: MAGGIE COSSMAN

MARK	DATE	DESCRIPTION
1	05/12/15	PER CITY/AEP COMMENTS

ISSUE:	10/07/2014
CONTOUR INTERVAL:	–
DESIGNED BY:	RHO/GGW
DRAWN BY:	PWS
CHECKED BY:	RHO

SHEET TITLE

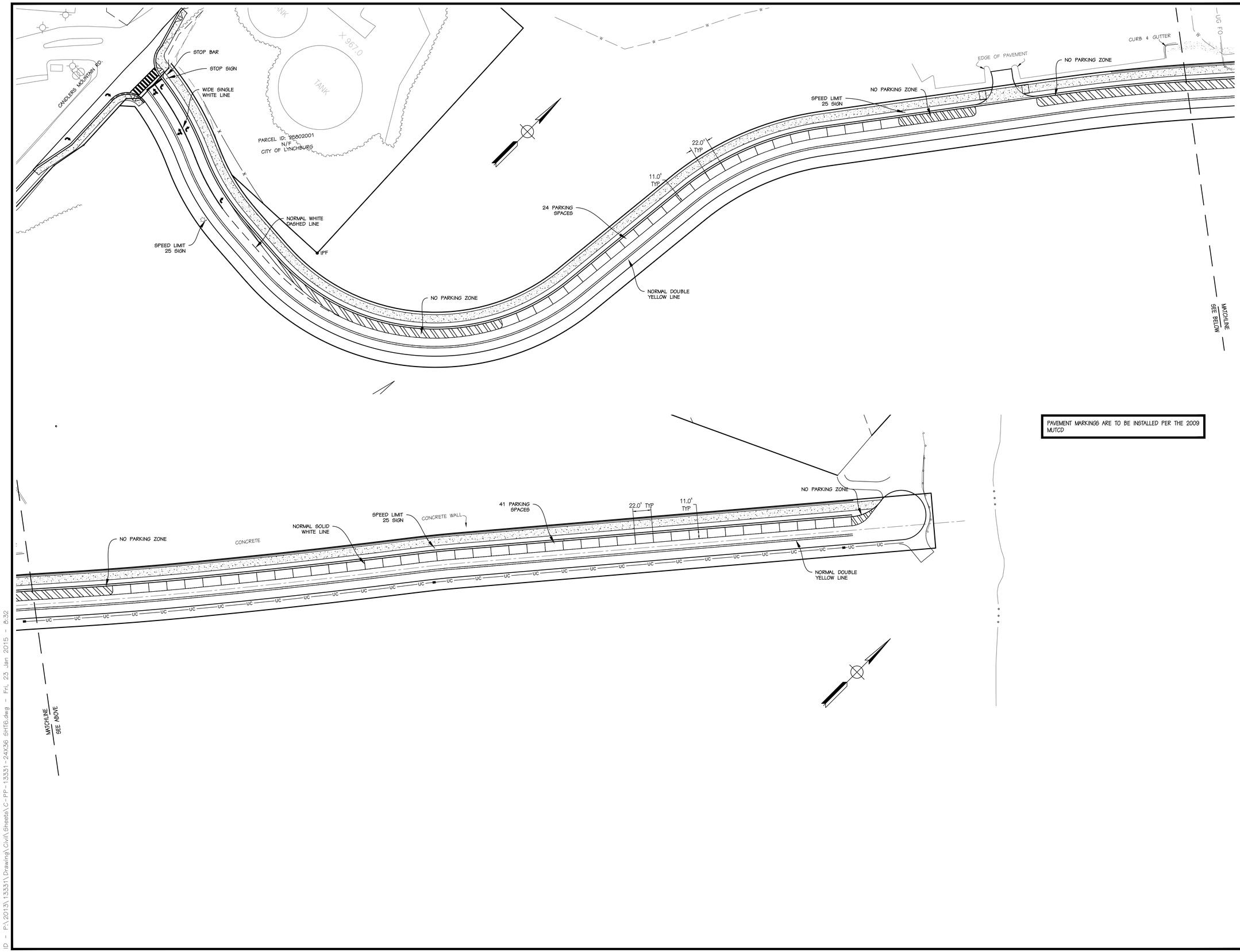
ROAD NOTES & DETAILS

RWS PROJECT #

14018-RW

JOB NO.: 13331 | SHEET NO 5 OF 17

ID – P:\2013\13331\Drawing\Civil\Sheets\C-PP-13331-24X36 SHT5.dwg – Thu, 9 Apr 2015 – 11:35



PERKINS & ORRISON
ENGINEERS ▲ PLANNERS ▲ SURVEYORS

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PO BOX 1567 17 W. NELSON STREET LEXINGTON, VIRGINIA 24450
PHONE: 540-464-9001 FAX: 540-464-5009
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CONSULTANTS

SEAL:

COMMONWEALTH OF VIRGINIA
RUSSELL H. ORRISON
Lic. No. 031849
05/12/2015
PROFESSIONAL ENGINEER

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MARK	DATE	DESCRIPTION
1	05/12/15	PER CITY/AEP COMMENTS

ISSUE:	10/07/2014
CONTOUR INTERVAL:	–
DESIGNED BY:	RHO/GGW
DRAWN BY:	PWS
CHECKED BY:	RHO

SHEET TITLE

STRIPING PLAN

GRAPHIC SCALE
0 50 100
1"=50'

RWS PROJECT #
14018-RW

JOB NO.: 13331
SHEET NO 6 OF 17

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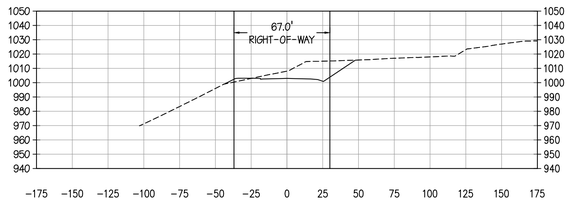

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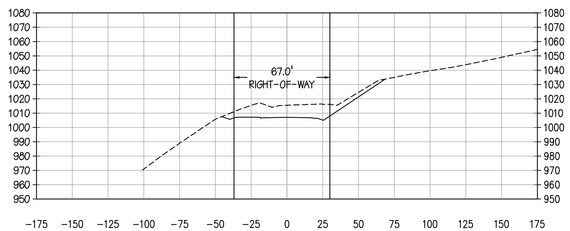

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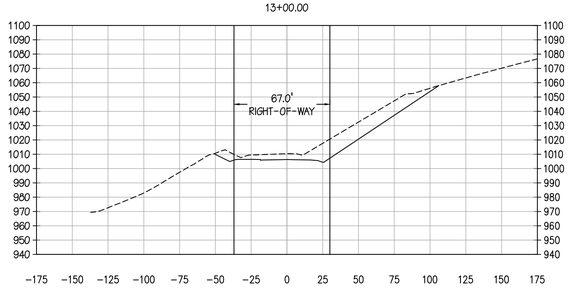

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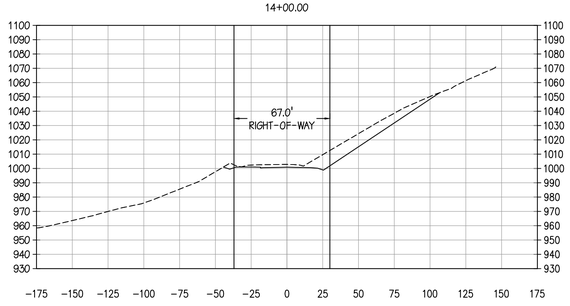

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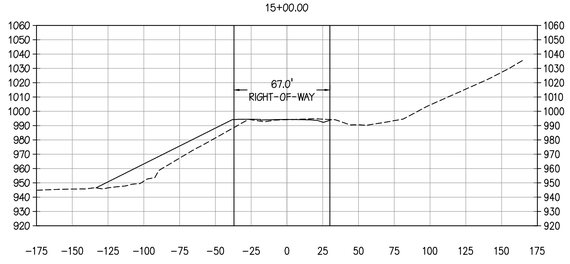

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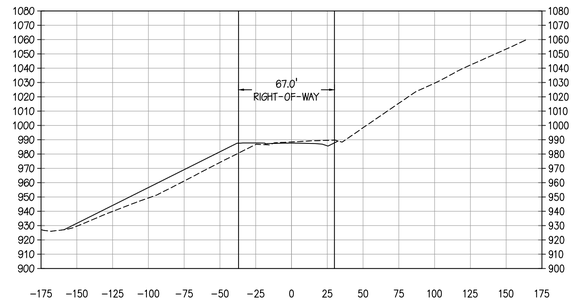

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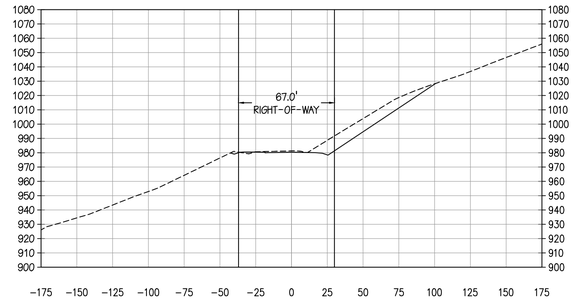

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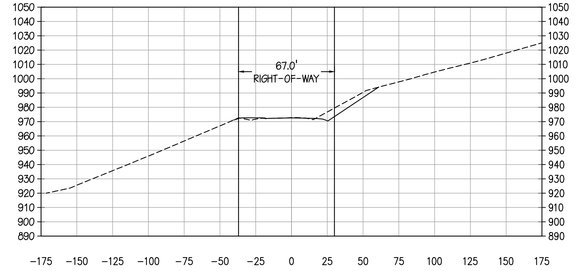

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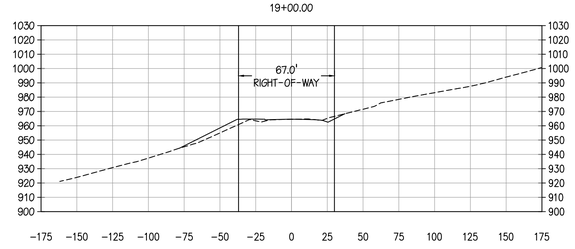

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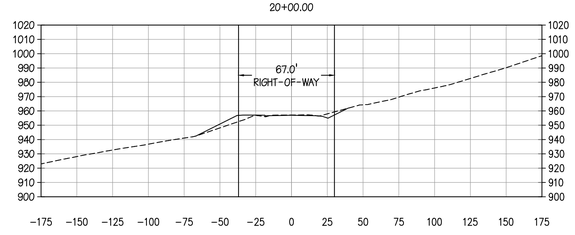

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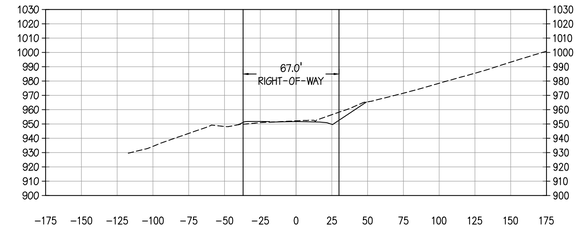

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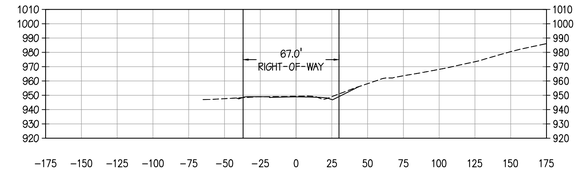

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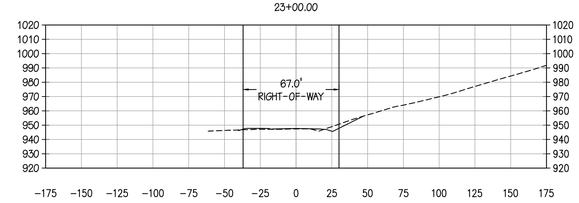

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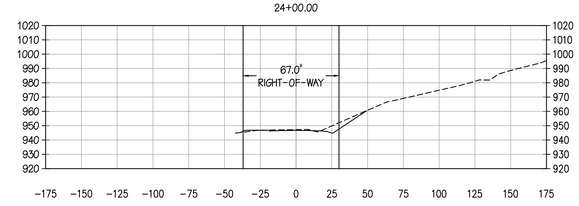

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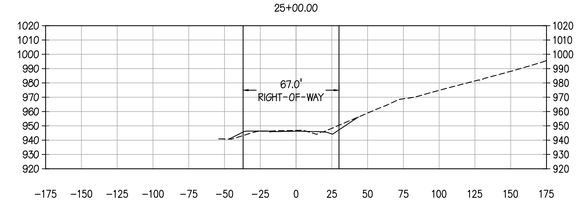

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LYNCHBURG, VIRGINIA

CLIENT:
LIBERTY UNIVERSITY
ATTN: MAGGIE COSSMAN

MARK	DATE	DESCRIPTION
1	05/12/15	PER CITY/AEP COMMENTS

ISSUE:	10/07/2014
CONTOUR INTERVAL:	-
DESIGNED BY:	RHO/GGW
DRAWN BY:	PWS
CHECKED BY:	RHO

SHEET TITLE

ROAD CROSS SECTIONS

RWS PROJECT #

14018-RW

JOB NO.: 13331

SHEET NO. 7 OF 17

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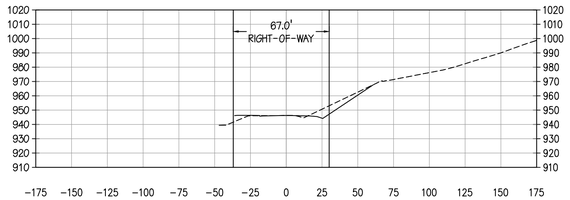

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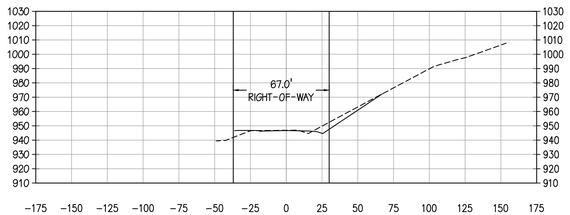

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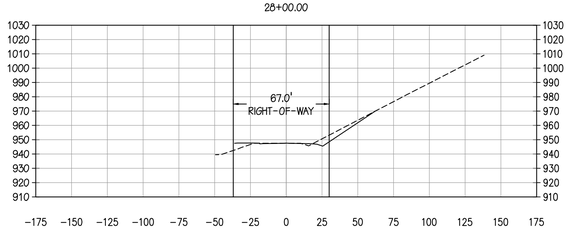

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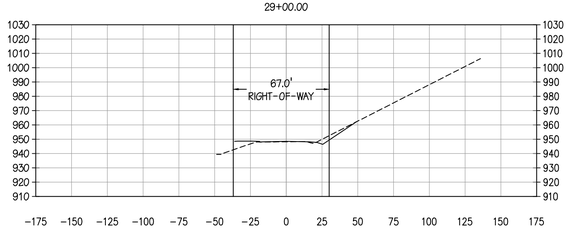

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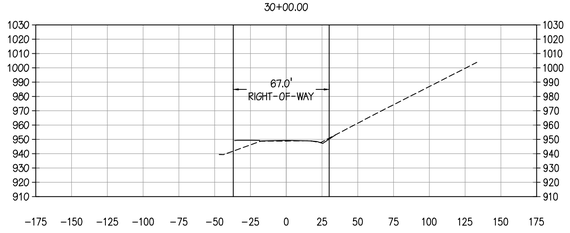

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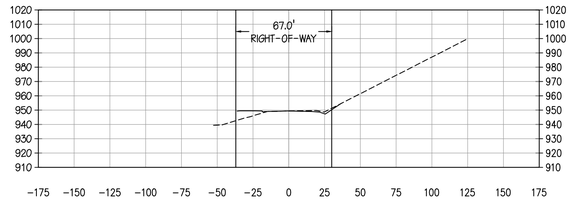

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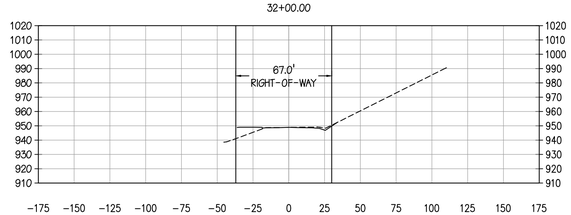

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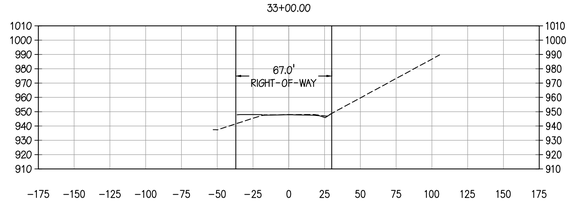

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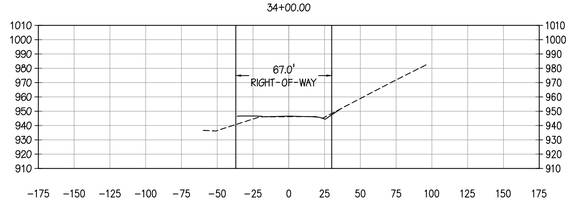

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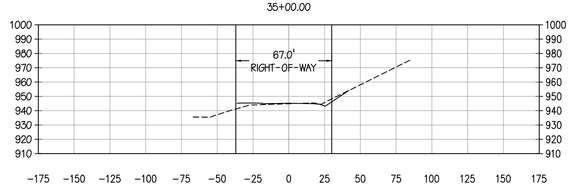

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1	05/12/15	PER CITY/AEP COMMENTS

ISSUE: 10/07/2014
CONTOUR INTERVAL: –
DESIGNED BY: RHO/GGW
DRAWN BY: PWS
CHECKED BY: RHO

SHEET TITLE

ROAD CROSS SECTIONS

RWS PROJECT #
14018-RW

JOB NO.: 13331
SHEET NO 8 OF 17

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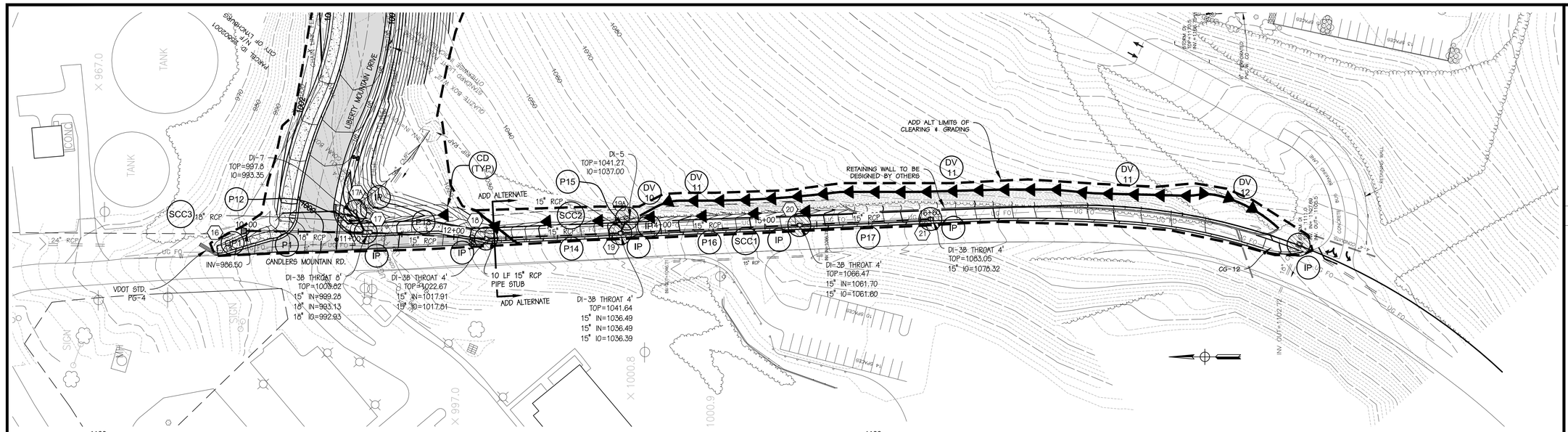
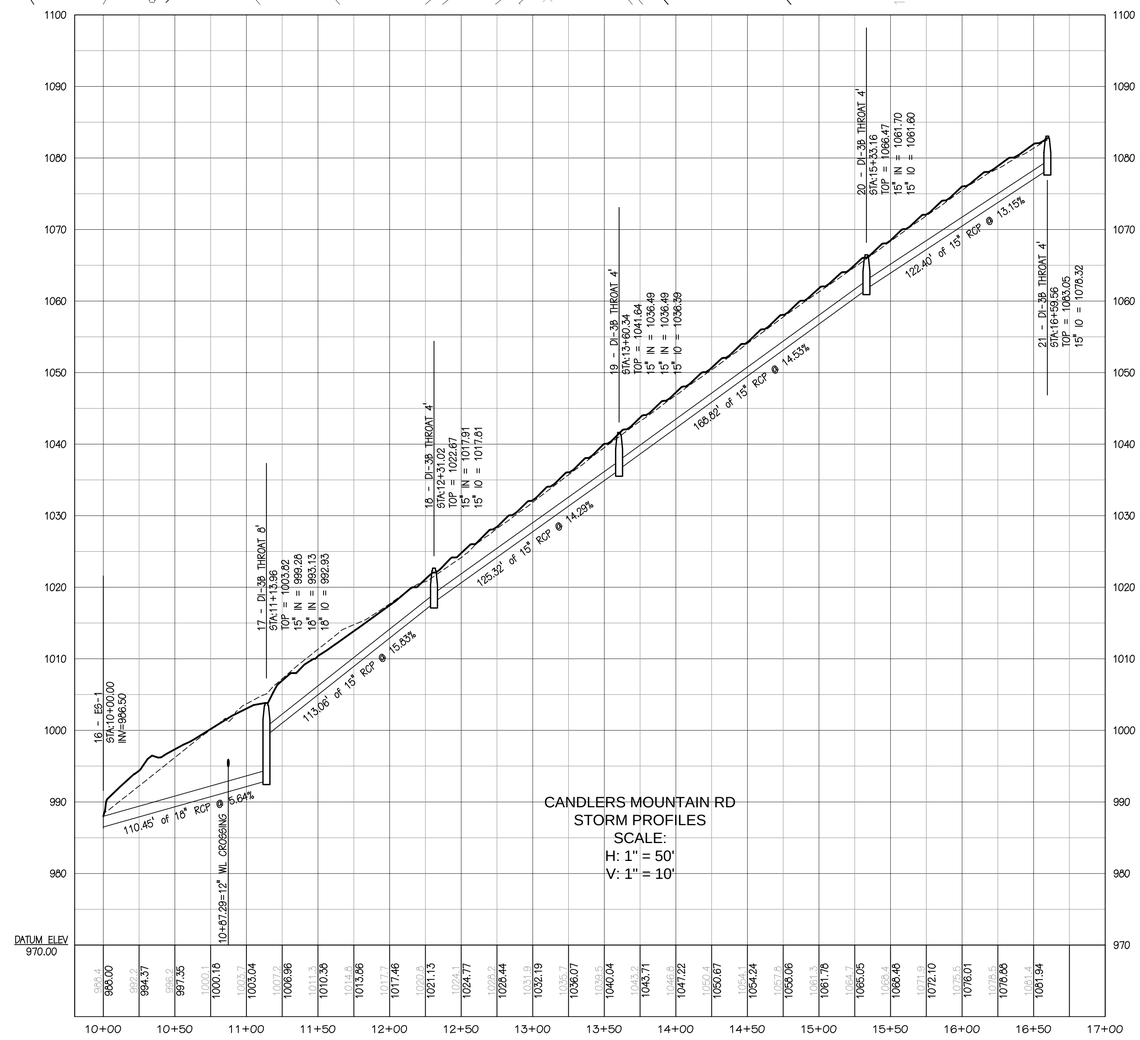
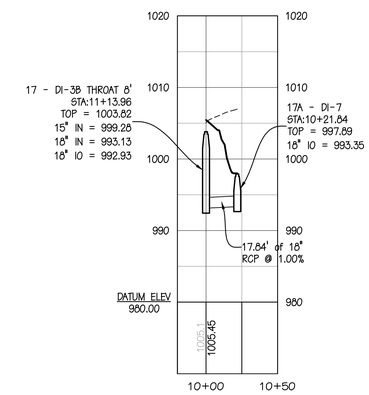
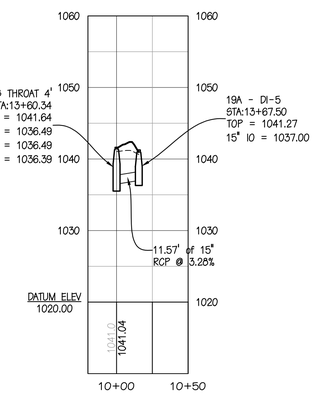


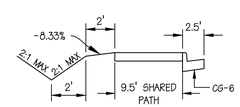




CANDLERS MOUNTAIN RD
STORM PROFILES
SCALE:
H: 1" = 50'
V: 1" = 10'



CANDLERS MOUNTAIN RD
STORM PROFILES
SCALE:
H: 1" = 50'
V: 1" = 10'



TYPICAL SIDEWALK SECTION
NO SCALE

STORMWATER CONVEYANCE CHANNEL (VESCH# 3.17) [ADD ALT]

ID	DV10	DV11	DV12	SCC1	SCC2
2 YR DESIGN FLOW (CFS)	1.1	1.1	0.1	0.3	0.8
10 YR DESIGN FLOW (CFS)	1.5	1.5	0.1	0.4	1.1
BOTTOM WIDTH (FT)	0	0	0	0	0
CHANNEL DEPTH (FT)	1	1	1.5	1	1.5
DESIGN WATER DEPTH (FT)	0.47	0.47	0.17	0.29	0.39
SIDE SLOPES (H:V)	2:1	2:1	2:1	2:1	2:1
CHANNEL SLOPE (FT/FT)	0.1100	0.1100	0.1667	0.1430	0.1630
FLOW VELOCITY (FPS)	3.2	3.2	2.06	2.6	3.4
LINING MATERIAL	CL-I RIP RAP	EC-2	EC-2	EC-2	EC-2
MANNING'S "n"	0.050	0.050	0.50	0.050	0.050

DRAINAGE PIPE (ADD ALT)

ID	P14	P15	P16	P17
DESIGN FLOW (CFS)	1.67	1.85	0.26	0.15
DESIGN VELOCITY (FPS)	11.40	6.98	6.56	5.36
PIPE DIAMETER (IN)	15	15	15	15
PIPE SLOPE (FT/FT)	0.1429	0.0328	0.1453	0.1315
PIPE MATERIAL	RCP	RCP	RCP	RCP
PIPE OWNERSHIP	CITY	CITY	CITY	CITY
UPSTREAM TOP ELEV.	1037.64	1035.25	1062.85	1079.57
UPSTREAM INV. ELEV.	1036.39	1037.00	1061.60	1078.32
DOWNSTREAM TOP ELEV.	1019.16	1037.74	1037.74	1062.95
DOWNSTREAM INV. ELEV.	1017.91	1036.49	1036.49	1061.70
DOWNSTREAM WATER LEVEL (FT)	0.25'	0.35'	0.1'	0.1'

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CLIENT:
LIBERTY UNIVERSITY
ATTN: MAGGIE COSSMAN

MARK	DATE	DESCRIPTION
1	05/12/15	PER CITY/AEP COMMENTS

ISSUE: 10/07/2014
CONTOUR INTERVAL:
DESIGNED BY:
DRAWN BY:
CHECKED BY: RHO

SHEET TITLE

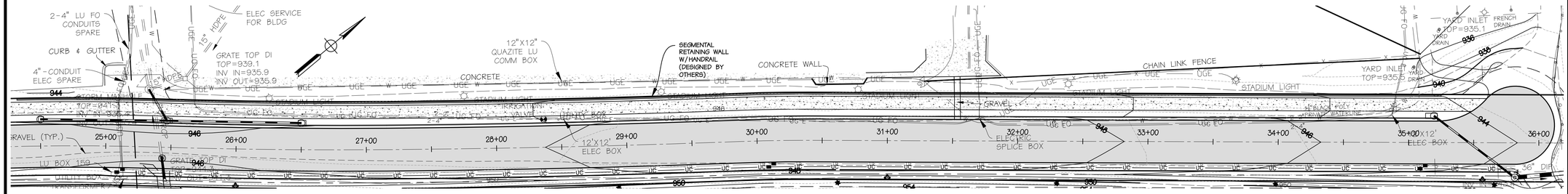
CANDLERS MOUNTAIN ROAD
SIDEWALK ADD ALTERNATE

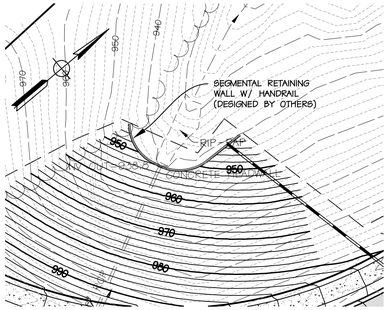
GRAPHIC SCALE
0 50 100
1"=50'

RWS PROJECT #
14018-RW

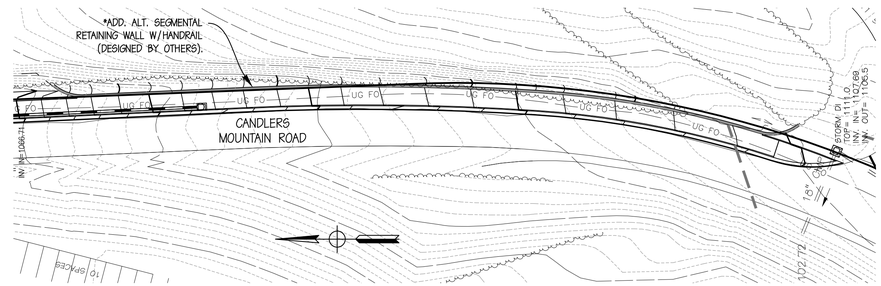
JOB NO.: 13331
SHEET NO 9 OF 17

ID - P:\2013\13331\Drawing\Civil\Sheets\C-PP-13331-24X36 SHT9.dwg - Tue, 12 May 2015 - 14:23

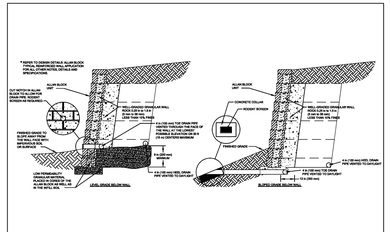




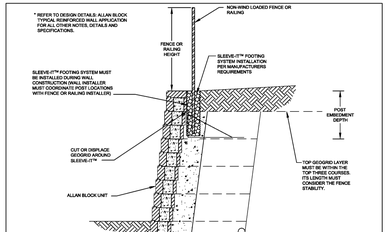
GEOGRID SHALL NOT EXTEND UNDER CURB & GUTTER OR ROADWAY.



DETAILS ARE SHOWN FOR INFORMATION ONLY. SEE WALL DESIGN BY OTHERS.



Designed By: | Checked By: | Scale: NOT TO SCALE | Title: ALTERNATE DRAIN WALL SECTIONS | Date: | Project No: | Drawing No:



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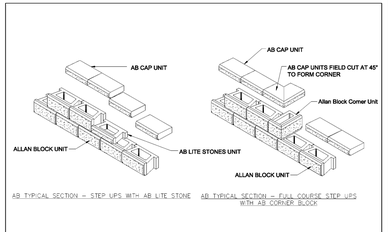
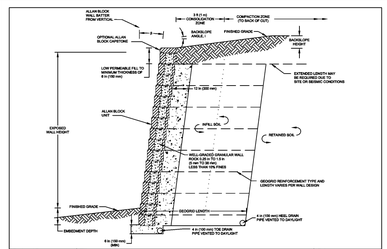


Designed By: | Checked By: | Scale: NOT TO SCALE | Title: AB STEP UP FINISHING DETAILS | Date: | Project No: | Drawing No:



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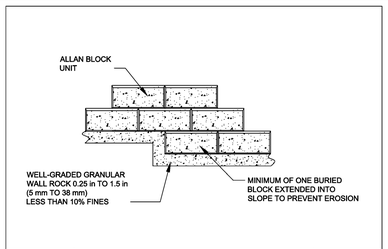
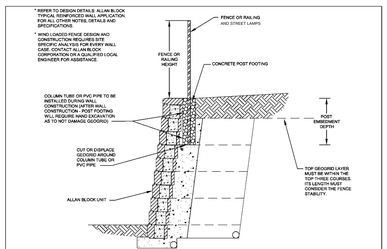


Designed By: | Checked By: | Scale: NOT TO SCALE | Title: STEP UP AT BASE | Date: | Project No: | Drawing No:



Designed By: | Checked By: | Scale: NOT TO SCALE | Title: WIND FENCE WALL SECTION 1 | Date: | Project No: | Drawing No:

The purpose of this drawing is for preliminary design only. This drawing should not be used for final design or construction without the certification of a professional engineer registered in the state in which the wall will be built. The accuracy and use of details contained in this document are the sole responsibility of the user. The user must verify each detail for accuracy as they pertain to their particular project.
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CLIENT:
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ATTN: MAGGIE COSSMAN

MARK	DATE	DESCRIPTION
1	05/12/15	PER CITY/AEP COMMENTS

ISSUE:	10/07/2014
CONTOUR INTERVAL:	2'
DESIGNED BY:	RHO/GGW
DRAWN BY:	PWS
CHECKED BY:	RHO

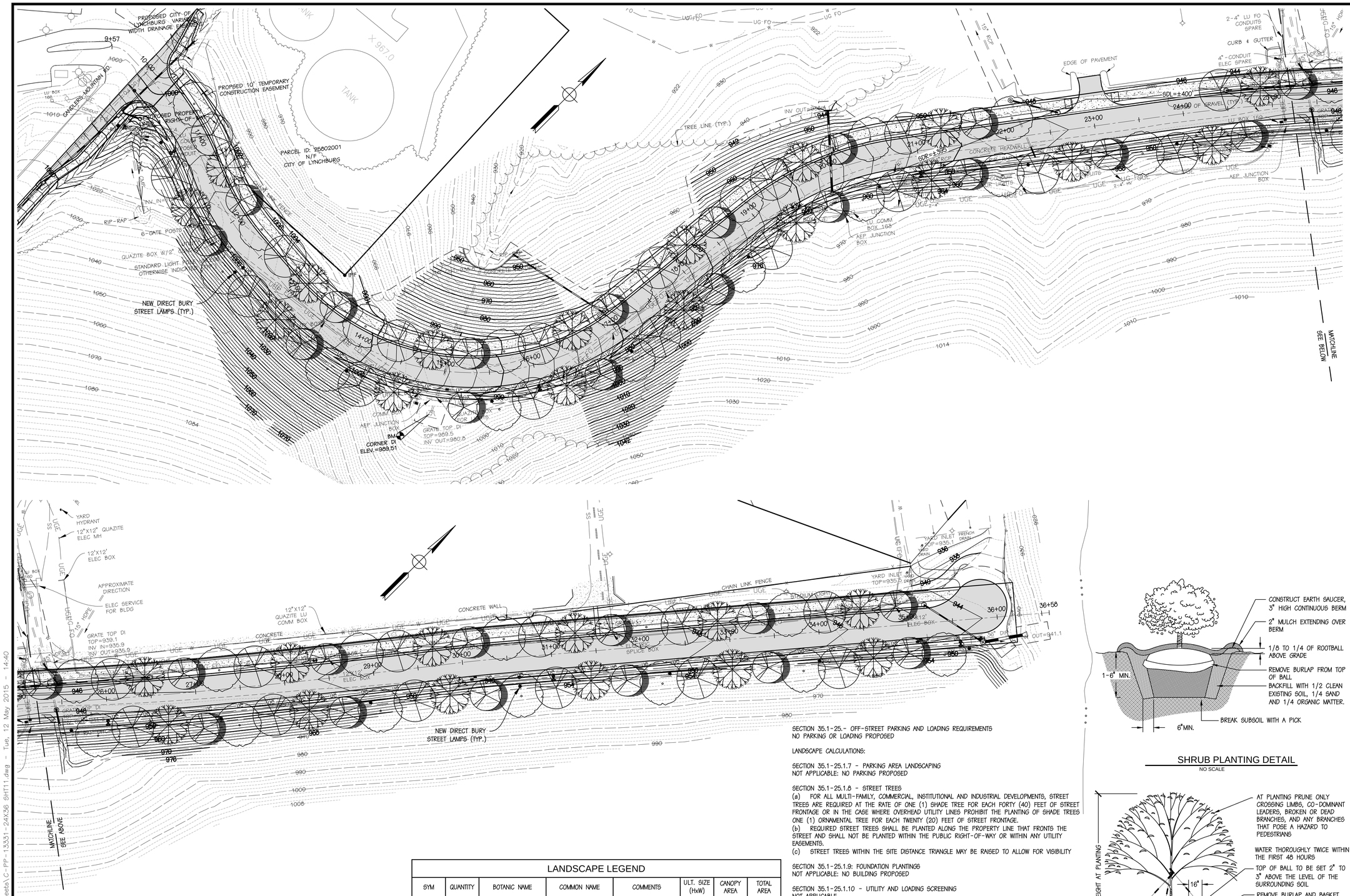
SHEET TITLE

RETAINING WALL PLAN & DETAILS

GRAPHIC SCALE
0 40 80
1"=40'

RWS PROJECT #
14018-RW

JOB NO.: 13331
SHEET NO. 10 OF 17



LANDSCAPE NOTES:

WATERING:

SPRING AND FALL PLANTED TREES AND SHRUBS SHALL BE THOROUGHLY WATERED THE DAY OF PLANTING AND THEN WILL BE WATERED EVERY 7 DAYS THROUGHOUT THE FIRST GROWING YEAR. WHEN SIGNIFICANT RAINFALLS MAINTAIN MOISTURE IN THE SOIL, WATERING FOR THAT PERIOD CAN BE DELAYED UNTIL THE NEXT 7 DAY CYCLE.

FERTILIZING:

INSTALLER TO AMEND SOIL AS REQUIRED BY ON-SITE CONDITIONS AND THE NEEDS OF THE PLANTED TREES AND SHRUBS.

FERTILIZATION SHOULD BE DONE IN EARLY SPRING OR LATE FALL, AND A WATER INSOLUBLE NITROGEN (WIN) IS RECOMMENDED AS THE PLANTS WILL USE IT AS NEEDED AND IT WILL NOT WASH OFF OR LEACH INTO THE GROUND WATER.

THE INSTALLER SHALL HAVE THE SOIL TESTED FOR PH PRIOR TO INSTALLATION AND DETERMINE THE CORRECT FERTILIZERS FOR THE SPECIFIED PLANTS.

LANDSCAPE LEGEND

SYM		QUANTITY	BOTANIC NAME	COMMON NAME	COMMENTS	ULT. SIZE (HxW)	CANOPY AREA	TOTAL AREA
A		30	QUERCUS PHELLOS	WILLOW OAK	3" CALIPER B&B	60'x50'	1963.50	58905
B		29	QUERCUS SHUMARDII	SHUMARD OAK	2"-2 1/2" CALIPER B&B*	50'x40'	1256.6	36441.4
C		29	FRAXINUS AMERICANA	WHITE ASH	2"-2 1/2" CALIPER B&B*	45'x45'	1590.43	46122.5
D		29	GLEDITSIA TRIACANTHOS	HONEY LOCUST	2"-2 1/2" CALIPER B&B*	45'x35'	962.11	27901.2

B&B : BALL AND BURLAP
ALL PLANTINGS TO BE IN SHREDDED PINE BARK MULCHED BEDS.
*HEIGHT OF TREES MEASURED FROM THE TOP OF THE ROOT BALL, REPRESENTING ACTUAL HEIGHT OF TREE WHEN PLANTED (NOT INCLUDING ROOT MASS)
IRRIGATION BY OTHERS
® IS A REGISTERED TRADEMARK OF WAYNESBORO NURSERIES.

SECTION 35.1-25.- OFF-STREET PARKING AND LOADING REQUIREMENTS
NO PARKING OR LOADING PROPOSED

LANDSCAPE CALCULATIONS:

SECTION 35.1-25.1.7 - PARKING AREA LANDSCAPING
NOT APPLICABLE: NO PARKING PROPOSED

SECTION 35.1-25.1.8 - STREET TREES
(a) FOR ALL MULTI-FAMILY, COMMERCIAL, INSTITUTIONAL AND INDUSTRIAL DEVELOPMENTS, STREET TREES ARE REQUIRED AT THE RATE OF ONE (1) SHADE TREE FOR EACH FORTY (40) FEET OF STREET FRONTAGE OR IN THE CASE WHERE OVERHEAD UTILITY LINES PROHIBIT THE PLANTING OF SHADE TREES ONE (1) ORNAMENTAL TREE FOR EACH TWENTY (20) FEET OF STREET FRONTAGE.
(b) REQUIRED STREET TREES SHALL BE PLANTED ALONG THE PROPERTY LINE THAT FRONTS THE STREET AND SHALL NOT BE PLANTED WITHIN THE PUBLIC RIGHT-OF-WAY OR WITHIN ANY UTILITY EASEMENTS.
(c) STREET TREES WITHIN THE SITE DISTANCE TRIANGLE MAY BE RAISED TO ALLOW FOR VISIBILITY

SECTION 35.1-25.1.9: FOUNDATION PLANTINGS
NOT APPLICABLE: NO BUILDING PROPOSED

SECTION 35.1-25.1.10 - UTILITY AND LOADING SCREENING
NOT APPLICABLE

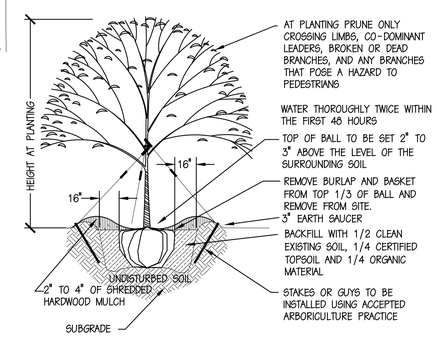
SECTION 35.1-25.1.11 - BUFFERING
A VEGETATIVE BUFFER IS NOT REQUIRED AS THE PROPOSED DEVELOPMENT IS NOT ADJACENT TO A RESIDENTIAL OR A MULTI-FAMILY RESIDENTIAL DISTRICT.

SECTION 35.1-25.1.4 (K) - GENERAL REGULATIONS
ALL DISTURBED AREAS NOT USED FOR OPERATIONS, INCLUDING SLOPES SHALL BE LANDSCAPED AT THE RATE OF 20 TREES PER ACRE.

SECTION 35.1-25.1.12 - TREE CANOPY REQUIREMENTS
10% OF THE ENTIRE DEVELOPMENT SITE (8.0 ACRES) = 0.8 ACRES IN TREE CANOPY REQUIRED/5.5 ACRES PROVIDED IN STREET TREES

SECTION 35.1-25.1.5 - LANDSCAPING PLAN REQUIRED

SHRUB PLANTING DETAIL
NO SCALE



TREE PLANTING DETAIL
NO SCALE

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CLIENT:
LIBERTY UNIVERSITY
ATTN: MAGGIE COSSMAN

MARK	DATE	DESCRIPTION
1	05/12/15	PER CITY/AEP COMMENTS

ISSUE:	10/07/2014
CONTOUR INTERVAL:	2'
DESIGNED BY:	GGW
DRAWN BY:	PWS
CHECKED BY:	RHO

SHEET TITLE

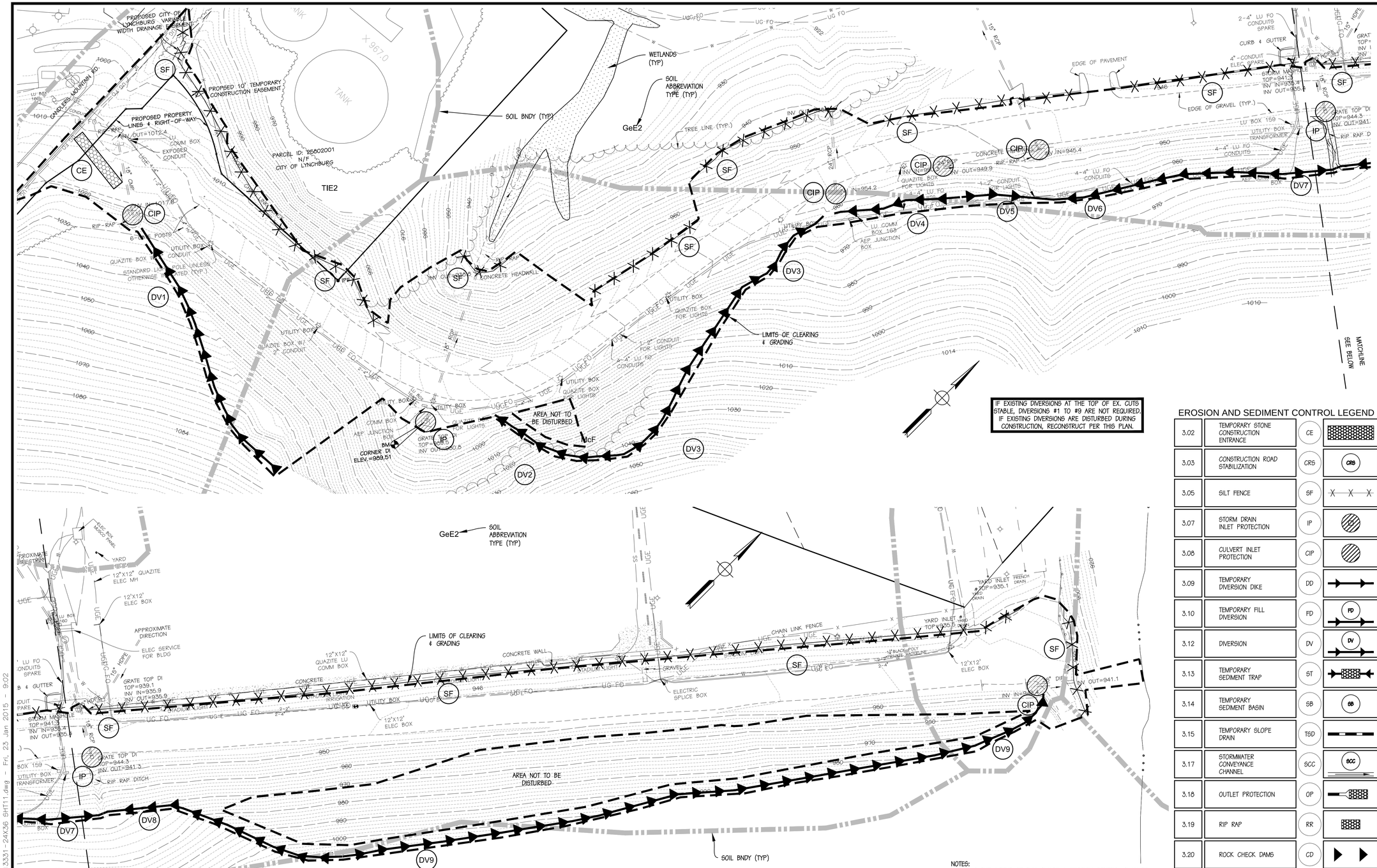
STREET LIGHTING & LANDSCAPING PLAN

GRAPHIC SCALE
0 50 100
1"=50'

RWS PROJECT #
14018-RW

JOB NO.: 13331
SHEET NO 11 OF 17

ID - P:\2013\13331\Drawing\Civil\Sheets\C-PP-13331-24X36 SHT11.dwg - Tue, 12 May 2015 - 14:40



IF EXISTING DIVERSIONS AT THE TOP OF EX. CUTS STABLE, DIVERSIONS #1 TO #9 ARE NOT REQUIRED. IF EXISTING DIVERSIONS ARE DISTURBED DURING CONSTRUCTION, RECONSTRUCT PER THIS PLAN.

STORMWATER CONVEYANCE CHANNEL (VESCH# 3.17)

ID	DV1	DV2	DV3	DV4	DV5	DV6	DV7	DV8	DV9	SCC3
2 YR DESIGN FLOW (CFS)	7.9	0.7	5.06	0.8	5.4	1.9	1.35	3.43	9.8	4.0
10 YR DESIGN FLOW (CFS)	10.8	1.0	6.9	1.1	7.3	2.6	1.84	4.69	13.3	6.8
BOTTOW WIDTH (FT)	0	0	0	0	0	0	0	0	0	0
CHANNEL DEPTH (FT)	1.5	1.0	1.5	1.0	1.5	1.25	1.25	1.25	1.5	1.5
DESIGN WATER DEPTH (FT)	0.9	0.3	0.7	0.5	0.9	0.7	0.6	0.7	1.1	0.80
SIDE SLOPES (H:V)	2:1	2:1	2:1	2:1	2:1	2:1	2:1	2:1	2:1	2:1
CHANNEL SLOPE (FT/FT)	0.2066	0.351	0.2343	0.0285	0.0666	0.0348	0.0631	0.160	0.0770	0.1270
FLOW VELOCITY (FPS)	7.3	5.0	6.7	2.3	4.6	6.0	5.5	5.7	9.0	4.7
LINING MATERIAL	EC-3	EC-3	EC-3	EC-2	EC-3	EC-3	EC-3	EC-3	EC-3	CL-I RIP RAP
MANNING'S "n"	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050	0.050

NOTES:

1. IT IS THE INTENT OF THIS PHASE 1 EROSION CONTROL PLAN TO INDICATE THE EROSION CONTROL MEASURES REQUIRED FOR THE INITIAL CLEARING AND GRADING OF THE PROJECT SITE. ADDITIONAL REVIEW AND APPROVAL BY THE CITY OF LYNCHBURG IS REQUIRED FOR FINAL SITE PLAN APPROVAL PRIOR TO FINAL GRADING, INSTALLATION OF POST-CONSTRUCTION STORMWATER MEASURES, UTILITY INSTALLATIONS, SITE CONSTRUCTION AND/OR BUILDING IMPROVEMENTS. NO LAND DISTURBANCE WORK WILL BE ALLOWED OUTSIDE THE SCOPE OF THIS PHASE 1 PLAN UNTIL FINAL SITE PLAN APPROVAL IS ISSUED FOR THE PROJECT
2. GRADING WILL BE LIMITED TO FIFTEEN (15) TO TWENTY (20) ACRE PHASES WITH CUT AND FILL AREAS BALANCED BETWEEN PHASES, AS INDICATED ON PHASE 1 EROSION CONTROL PLAN. EACH PHASE OF THE PROJECT MUST BE STABILIZED IN ACCORDANCE WITH THE MEASURES IDENTIFIED ON THE SITE PLAN PRIOR TO INITIATING A SUBSEQUENT GRADING PHASE OF PROJECT.

PHASE I EROSION & SEDIMENT CONTROL APPROVAL

TRC: _____ DATE: _____

E&S: _____ DATE: _____

EROSION AND SEDIMENT CONTROL LEGEND

3.02	TEMPORARY STONE CONSTRUCTION ENTRANCE	CE	
3.03	CONSTRUCTION ROAD STABILIZATION	CRS	CRS
3.05	SILT FENCE	SF	X X X
3.07	STORM DRAIN INLET PROTECTION	IP	IP
3.08	CULVERT INLET PROTECTION	CIP	CIP
3.09	TEMPORARY DIVERSION DIKE	DD	
3.10	TEMPORARY FILL DIVERSION	FD	FD
3.12	DIVERSION	DV	DV
3.13	TEMPORARY SEDIMENT TRAP	ST	
3.14	TEMPORARY SEDIMENT BASIN	SB	SB
3.15	TEMPORARY SLOPE DRAIN	TSD	
3.17	STORMWATER CONVEYANCE CHANNEL	SCC	SCC
3.18	OUTLET PROTECTION	OP	
3.19	RIP RAP	RR	
3.20	ROCK CHECK DAMS	CD	
3.29	SURFACE ROUGHENING	SR	SR
3.30	TOPSOILING	TO	TO
3.31	TEMPORARY SEEDING	TS	TS
3.32	PERMANENT SEEDING	PS	PS
3.35	MULCHING	MU	MU
3.36	SOIL STABILIZATION BLANKETS AND MATTING	B/M	B/M

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CONSULTANTS

SEAL:

COMMONWEALTH OF VIRGINIA
RUSSELL H. ORRISON
Lic. No. 031849
05/12/2015
PROFESSIONAL ENGINEER

JOB:

LIBERTY UNIVERSITY
LIBERTY MOUNTAIN DRIVE EXTENSION AT THE NORTHERN INTRAMURAL FIELDS
LYNCHBURG, VIRGINIA

CLIENT:

LIBERTY UNIVERSITY
ATTN: MAGGIE COSSMAN

MARK	DATE	DESCRIPTION
1	05/12/15	PER CITY/AEP COMMENTS

ISSUE: 10/07/2014
CONTOUR INTERVAL: 2'
DESIGNED BY: RHO/GGW
DRAWN BY: PWS
CHECKED BY: RHO

SHEET TITLE

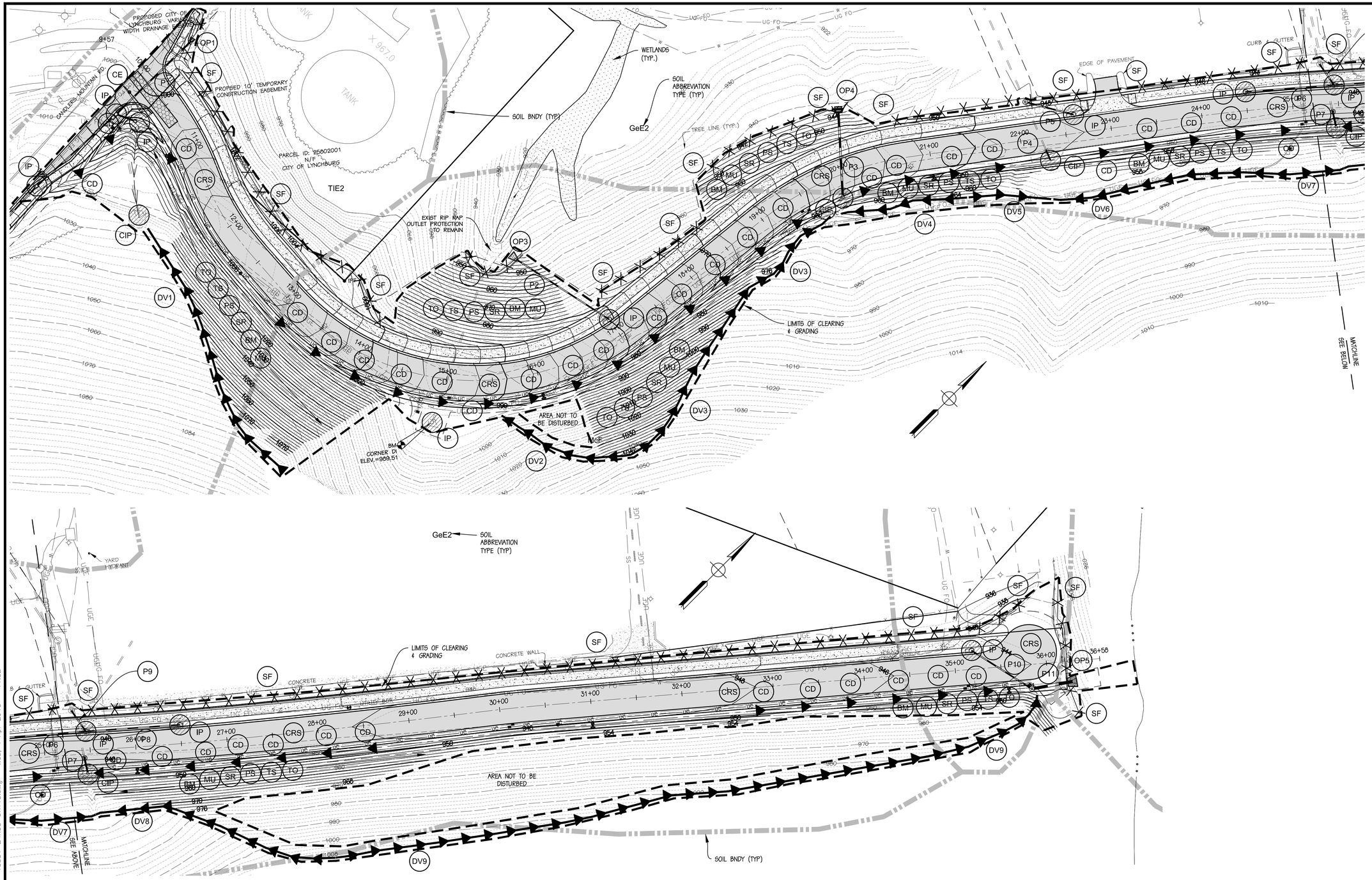
PHASE 1 EROSION & SEDIMENT CONTROL PLAN

GRAPHIC SCALE
0 50 100
1"=50'

RWS PROJECT #
14018-RW

JOB NO.: 13331
SHEET NO 12 OF 17

ID - P:\2013\13331\Drawing\Civil\Sheets\C-PP-13331-24X36 SHT11.dwg - Fri, 23 Jan 2015 - 9:02



OUTLET PROTECTION (VESCH# 3.18)

ID	OP1	OP2	OP3	OP4	OP5
DESIGN EVENT FREQUENCY	10 YR	NOT USED	10 YR	10 YR	10 YR
DESIGN FLOW (CFS)	6.8		1.57	12.4	17.3
TAILWATER DEPTH	<0.5D		<0.5D	<0.5D	<0.5D
DISCHARGE VELOCITY (FPS)	12.04		15.4	20.3	8.5
RIP RAP GRADATION	A1		A1	A1	A1
APRON LENGTH (FT)	10'		8.0'	12.0'	12.0'
APRON WIDTHS (FT)	4.5', 11.5'		3.75', 9.25'	6.0', 18.0'	6.0', 18.0'
SIDE SLOPES (H:V)	2:1		2:1	2:1	2:1
APRON DEPTH (FT)	2.0		2.0	2.0	2.0

DRAINAGE PIPE

ID	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13
DESIGN FLOW (CFS)	6.8	1.57	12.4	10.7	2.02	1.0	10.7	1.8	2.8	1.6	17.3	7.42	1.78
DESIGN VELOCITY (FPS)	12.04	15.4	20.3	21.5	13.4	4.1	15.4	4.8	14.0	5.7	8.5	6.46	12.05
PIPE DIAMETER (IN)	18	15	24	15	15	15	18	15	15	15	24	18	15
PIPE SLOPE (FT/FT)	0.0564	0.302	0.162	0.191	0.163	0.01	0.079	0.01	0.142	0.018	0.01	0.01	0.1583
PIPE MATERIAL	RCP	HDPE	RCP	RCP	HDPE	HDPE	RCP	HDPE	HDPE	HDPE	HDPE	RCP	RCP
PIPE OWNERSHIP	CITY	CITY	CITY	CITY	CITY	CITY	CITY	CITY	CITY	CITY	CITY	CITY	CITY
UPSTREAM TOP ELEV.	994.43	976.29	955.65	946.80	944.77	943.20	944.40	943.25	942.02	941.67	940.80	994.85	1019.06
UPSTREAM INV. ELEV.	992.93	975.04	953.65	945.55	943.52	941.95	942.90	942.00	940.77	940.42	938.80	993.35	1017.81
DOWNSTREAM TOP ELEV.	988.00	940.00	940.40	936.16	935.85	942.23	943.00	942.22	938.05	940.25	940.35	994.63	1000.53
DOWNSTREAM INV. ELEV.	986.50	938.75	938.40	934.91	934.60	940.98	941.50	940.97	936.80	939.00	938.35	993.13	999.28
DOWNSTREAM WATER LEVEL (FT)	0.55'	0.2'	0.5'	0.5'	0.25'	0.3'	0.6'	0.4'	0.3'	0.35'	1.3'	1.0'	0.25'

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EXTENSION AT THE NORTHERN
INTRAMURAL FIELDS
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ISSUE:	10/07/2014
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DESIGNED BY:	RHO/GGW
DRAWN BY:	PWS
CHECKED BY:	RHO

SHEET TITLE

PHASE 2 EROSION & SEDIMENT CONTROL PLAN

GRAPHIC SCALE
0 50 100
1"=50'

RWS PROJECT #
14018-RW

JOB NO.: 13331
SHEET NO 13 OF 17

ID - P:\2013\13331\Drawing\Civil\Sheets\C-PP-13331-24X36-SHT13.dwg - Wed, 1 Apr 2015 - 11:52

ERROSION AND SEDIMENT MINIMUM STANDARDS 9VAC25-840-40.

1. PERMANENT OR TEMPORARY SOIL STABILIZATION SHALL BE APPLIED TO DENUDED AREAS WITHIN SEVEN DAYS AFTER FINAL GRADE IS REACHED ON ANY PORTION OF THE SITE. TEMPORARY SOIL STABILIZATION SHALL BE APPLIED WITHIN SEVEN DAYS TO DENUDED AREAS THAT MAY NOT BE AT FINAL GRADE BUT WILL REMAIN DORMANT FOR LONGER THAN 14 DAYS. PERMANENT STABILIZATION SHALL BE APPLIED TO AREAS THAT ARE TO BE LEFT DORMANT FOR MORE THAN ONE YEAR.
2. DURING CONSTRUCTION OF THE PROJECT, SOIL STOCK PILES AND BORROW AREAS SHALL BE STABILIZED OR PROTECTED WITH SEDIMENT TRAPPING MEASURES. THE APPLICANT IS RESPONSIBLE FOR THE TEMPORARY PROTECTION AND PERMANENT STABILIZATION OF ALL SOIL STOCKPILES ON SITE AS WELL AS BORROW AREAS AND SOIL INTENTIONALLY TRANSPORTED FROM THE PROJECT SITE.
3. A PERMANENT VEGETATIVE COVER SHALL BE ESTABLISHED ON DENUDED AREAS NOT OTHERWISE PERMANENTLY STABILIZED. PERMANENT VEGETATION SHALL NOT BE CONSIDERED ESTABLISHED UNTIL A GROUND COVER IS ACHIEVED THAT IS UNIFORM, MATURE ENOUGH TO SURVIVE AND WILL INHIBIT EROSION.
4. SEDIMENT BASINS AND TRAPS, PERIMETER DIKES, SEDIMENT BARRIERS AND OTHER MEASURES INTENDED TO TRAP SEDIMENT SHALL BE CONSTRUCTED AS A FIRST STEP IN ANY LAND-DISTURBING ACTIVITY AND SHALL BE MADE FUNCTIONAL BEFORE UPSLOPE LAND DISTURBANCE TAKES PLACE.
5. STABILIZATION MEASURES SHALL BE APPLIED TO EARTHEN STRUCTURES SUCH AS DAMS, DIKES AND DIVERSIONS IMMEDIATELY AFTER INSTALLATION.
6. SEDIMENT TRAPS AND SEDIMENT BASINS SHALL BE DESIGNED AND CONSTRUCTED BASED UPON THE TOTAL DRAINAGE AREA TO BE SERVED BY THE TRAP OR BASIN.
A. THE MINIMUM STORAGE CAPACITY OF A SEDIMENT TRAP SHALL BE 134 CUBIC YARDS PER ACRE OF DRAINAGE AREA AND THE TRAP SHALL ONLY CONTROL DRAINAGE AREAS LESS THAN THREE ACRES.
B. SURFACE RUNOFF FROM DISTURBED AREAS THAT IS COMPRISED OF FLOW FROM DRAINAGE AREAS GREATER THAN OR EQUAL TO THREE ACRES SHALL BE CONTROLLED BY A SEDIMENT BASIN. THE MINIMUM STORAGE CAPACITY OF A SEDIMENT BASIN SHALL BE 134 CUBIC YARDS PER ACRE OF DRAINAGE AREA. THE OUTFALL SYSTEM SHALL, AT A MINIMUM, MAINTAIN THE STRUCTURAL INTEGRITY OF THE BASIN DURING A 25-YEAR STORM OF 24-HOUR DURATION. RUNOFF COEFFICIENTS USED IN RUNOFF CALCULATIONS SHALL CORRESPOND TO A BARE EARTH CONDITION OR THOSE CONDITIONS EXPECTED TO EXIST WHILE THE SEDIMENT BASIN IS UTILIZED.
7. CUT AND FILL SLOPES SHALL BE DESIGNED AND CONSTRUCTED IN A MANNER THAT WILL MINIMIZE EROSION. SLOPES THAT ARE FOUND TO BE ERODING EXCESSIVELY WITHIN ONE YEAR OF PERMANENT STABILIZATION SHALL BE PROVIDED WITH ADDITIONAL SLOPE STABILIZING MEASURES UNTIL THE PROBLEM IS CORRECTED.
8. CONCENTRATED RUNOFF SHALL NOT FLOW DOWN CUT OR FILL SLOPES UNLESS CONTAINED WITHIN AN ADEQUATE TEMPORARY OR PERMANENT CHANNEL, FLUME OR SLOPE DRAIN STRUCTURE.
9. WHENEVER WATER SEEPS FROM A SLOPE FACE, ADEQUATE DRAINAGE OR OTHER PROTECTION SHALL BE PROVIDED.
10. ALL STORM SEWER INLETS THAT ARE MADE OPERABLE DURING CONSTRUCTION SHALL BE PROTECTED SO THAT SEDIMENT-LADEN WATER CANNOT ENTER THE CONVEYANCE SYSTEM WITHOUT FIRST BEING FILTERED OR OTHERWISE TREATED TO REMOVE SEDIMENT.
11. BEFORE NEWLY CONSTRUCTED STORMWATER CONVEYANCE CHANNELS OR PIPES ARE MADE OPERATIONAL, ADEQUATE OUTLET PROTECTION AND ANY REQUIRED TEMPORARY OR PERMANENT CHANNEL LINING SHALL BE INSTALLED IN BOTH THE CONVEYANCE CHANNEL AND RECEIVING CHANNEL.
12. WHEN WORK IN A LIVE WATERCOURSE IS PERFORMED, PRECAUTIONS SHALL BE TAKEN TO MINIMIZE ENCROACHMENT, CONTROL SEDIMENT TRANSPORT AND STABILIZE THE WORK AREA TO THE GREATEST EXTENT POSSIBLE DURING CONSTRUCTION. NONERODIBLE MATERIAL SHALL BE USED FOR THE CONSTRUCTION OF CAUSEWAYS AND COFFERDAMS. EARTHEN FILL MAY BE USED FOR THESE STRUCTURES IF ARMORED BY NONERODIBLE COVER MATERIALS.
13. WHEN A LIVE WATERCOURSE MUST BE CROSSED BY CONSTRUCTION VEHICLES MORE THAN TWICE IN ANY SIX-MONTH PERIOD, A TEMPORARY VEHICULAR STREAM CROSSING CONSTRUCTED OF NONERODIBLE MATERIAL SHALL BE PROVIDED.
14. ALL APPLICABLE FEDERAL, STATE AND LOCAL CHAPTERS PERTAINING TO WORKING IN OR CROSSING LIVE WATERCOURSES SHALL BE MET.
15. THE BED AND BANKS OF A WATERCOURSE SHALL BE STABILIZED IMMEDIATELY AFTER WORK IN THE WATERCOURSE IS COMPLETED.
16. UNDERGROUND UTILITY LINES SHALL BE INSTALLED IN ACCORDANCE WITH THE FOLLOWING STANDARDS IN ADDITION TO OTHER APPLICABLE CRITERIA:
A. NO MORE THAN 500 LINEAR FEET OF TRENCH MAY BE OPENED AT ONE TIME.
B. EXCAVATED MATERIAL SHALL BE PLACED ON THE UPHILL SIDE OF TRENCHES.
C. EFFLUENT FROM DEWATERING OPERATIONS SHALL BE FILTERED OR PASSED THROUGH AN APPROVED SEDIMENT TRAPPING DEVICE, OR BOTH, AND DISCHARGED IN A MANNER THAT DOES NOT ADVERSELY AFFECT FLOWING STREAMS OR OFF-SITE PROPERTY.
D. MATERIAL USED FOR BACKFILLING TRENCHES SHALL BE PROPERLY COMPACTED IN ORDER TO MINIMIZE EROSION AND PROMOTE STABILIZATION.
E. RESTABILIZATION SHALL BE ACCOMPLISHED IN ACCORDANCE WITH THIS CHAPTER.
F. APPLICABLE SAFETY CHAPTERS SHALL BE COMPLIED WITH.
17. WHERE CONSTRUCTION VEHICLE ACCESS ROUTES INTERSECT PAVED OR PUBLIC ROADS, PROVISIONS SHALL BE MADE TO MINIMIZE THE TRANSPORT OF SEDIMENT BY VEHICULAR TRACKING ONTO THE PAVED SURFACE. WHERE SEDIMENT IS TRANSPORTED ONTO A PAVED OR PUBLIC ROAD SURFACE, THE ROAD SURFACE SHALL BE CLEANED THOROUGHLY AT THE END OF EACH DAY. SEDIMENT SHALL BE REMOVED FROM THE ROADS BY SHOVELING OR SWEEPING AND TRANSPORTED TO A SEDIMENT CONTROL DISPOSAL AREA. STREET WASHING SHALL BE ALLOWED ONLY AFTER SEDIMENT IS REMOVED IN THIS MANNER. THIS PROVISION SHALL APPLY TO INDIVIDUAL DEVELOPMENT LOTS AS WELL AS TO LARGER LAND-DISTURBING ACTIVITIES.
18. ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES SHALL BE REMOVED WITHIN 30 DAYS AFTER FINAL SITE STABILIZATION OR AFTER THE TEMPORARY MEASURES ARE NO LONGER NEEDED, UNLESS OTHERWISE AUTHORIZED BY THE VESCP AUTHORITY. TRAPPED SEDIMENT AND THE DISTURBED SOIL AREAS RESULTING FROM THE DISPOSITION OF TEMPORARY MEASURES SHALL BE PERMANENTLY STABILIZED TO PREVENT FURTHER EROSION AND SEDIMENTATION.
19. PROPERTIES AND WATERWAYS DOWNSTREAM FROM DEVELOPMENT SITES SHALL BE PROTECTED FROM SEDIMENT DEPOSITION, EROSION AND DAMAGE DUE TO INCREASES IN VOLUME, VELOCITY AND PEAK FLOW RATE OF STORMWATER RUNOFF FOR THE STATED FREQUENCY STORM OF 24-HOUR DURATION IN ACCORDANCE WITH THE FOLLOWING STANDARDS AND CRITERIA. STREAM RESTORATION AND RELOCATION PROJECTS THAT INCORPORATE NATURAL CHANNEL DESIGN CONCEPTS ARE NOT MAN-MADE CHANNELS AND SHALL BE EXEMPT FROM ANY FLOW RATE CAPACITY AND VELOCITY REQUIREMENTS FOR NATURAL OR MAN-MADE CHANNELS:
A. CONCENTRATED STORMWATER RUNOFF LEAVING A DEVELOPMENT SITE SHALL BE DISCHARGED DIRECTLY INTO AN ADEQUATE NATURAL OR MAN-MADE RECEIVING CHANNEL, PIPE OR STORM SEWER SYSTEM. FOR THOSE SITES WHERE RUNOFF IS DISCHARGED INTO A PIPE OR PIPE SYSTEM, DOWNSTREAM STABILITY ANALYSES AT THE OUTFALL OF THE PIPE OR PIPE SYSTEM SHALL BE PERFORMED.
B. ADEQUACY OF ALL CHANNELS AND PIPES SHALL BE VERIFIED IN THE FOLLOWING MANNER:
(1) THE APPLICANT SHALL DEMONSTRATE THAT THE TOTAL DRAINAGE AREA TO THE POINT OF ANALYSIS WITHIN THE CHANNEL IS ONE HUNDRED TIMES GREATER THAN THE CONTRIBUTING DRAINAGE AREA OF THE PROJECT IN QUESTION; OR
(2)(A) NATURAL CHANNELS SHALL BE ANALYZED BY THE USE OF A TWO-YEAR STORM TO VERIFY THAT STORMWATER WILL NOT OVERTOP CHANNEL BANKS NOR CAUSE EROSION OF CHANNEL BED OR BANKS.
(B) ALL PREVIOUSLY CONSTRUCTED MAN-MADE CHANNELS SHALL BE ANALYZED BY THE USE OF A TEN-YEAR STORM TO VERIFY THAT STORMWATER WILL NOT OVERTOP ITS BANKS AND BY THE USE OF A TWO-YEAR STORM TO DEMONSTRATE THAT STORMWATER WILL NOT CAUSE EROSION OF CHANNEL BED OR BANKS; AND
(C) PIPES AND STORM SEWER SYSTEMS SHALL BE ANALYZED BY THE USE OF A TEN-YEAR STORM TO VERIFY THAT STORMWATER WILL BE CONTAINED WITHIN THE PIPE OR SYSTEM.
C. IF EXISTING NATURAL RECEIVING CHANNELS OR PREVIOUSLY CONSTRUCTED MAN-MADE CHANNELS OR PIPES ARE NOT ADEQUATE, THE APPLICANT SHALL:
(1) IMPROVE THE CHANNELS TO A CONDITION WHERE A TEN-YEAR STORM WILL NOT OVERTOP THE BANKS AND A TWO-YEAR STORM WILL NOT CAUSE EROSION TO CHANNEL THE BED OR BANKS; OR
(2) IMPROVE THE PIPE OR PIPE SYSTEM TO A CONDITION WHERE THE TEN-YEAR STORM IS CONTAINED WITHIN THE APPURTENANCES;
(3) DEVELOP A SITE DESIGN THAT WILL NOT CAUSE THE PRE-DEVELOPMENT PEAK RUNOFF RATE FROM A TWO-YEAR STORM TO INCREASE WHEN RUNOFF OUTFALLS INTO A NATURAL CHANNEL OR WILL NOT CAUSE THE PRE-DEVELOPMENT PEAK RUNOFF RATE FROM A TEN-YEAR STORM TO INCREASE WHEN RUNOFF OUTFALLS INTO A MAN-MADE CHANNEL; OR
(4) PROVIDE A COMBINATION OF CHANNEL IMPROVEMENT, STORMWATER DETENTION OR OTHER MEASURES WHICH IS SATISFACTORY TO THE VESCP AUTHORITY TO PREVENT DOWNSTREAM EROSION.
D. THE APPLICANT SHALL PROVIDE EVIDENCE OF PERMISSION TO MAKE THE IMPROVEMENTS.
E. ALL HYDROLOGIC ANALYSES SHALL BE BASED ON THE EXISTING WATERSHED CHARACTERISTICS AND THE ULTIMATE DEVELOPMENT CONDITION OF THE SUBJECT PROJECT.
F. IF THE APPLICANT CHOOSES AN OPTION THAT INCLUDES STORMWATER DETENTION, HE SHALL OBTAIN APPROVAL FROM THE VESCP OF A PLAN FOR MAINTENANCE OF THE DETENTION FACILITIES. THE PLAN SHALL SET FORTH THE MAINTENANCE REQUIREMENTS OF THE FACILITY AND THE PERSON RESPONSIBLE FOR PERFORMING THE MAINTENANCE.
G. OUTFALL FROM A DETENTION FACILITY SHALL BE DISCHARGED TO A RECEIVING CHANNEL, AND ENERGY DISSIPATORS SHALL BE PLACED AT THE OUTFALL OF ALL DETENTION FACILITIES AS NECESSARY TO PROVIDE A STABILIZED TRANSITION FROM THE FACILITY TO THE RECEIVING CHANNEL.
H. ALL ON-SITE CHANNELS MUST BE VERIFIED TO BE ADEQUATE.
I. INCREASED VOLUMES OF SHEET FLOWS THAT MAY CAUSE EROSION OR SEDIMENTATION ON ADJACENT PROPERTY SHALL BE DIVERTED TO A STABLE OUTLET, ADEQUATE CHANNEL, PIPE OR PIPE SYSTEM, OR TO A DETENTION FACILITY.
J. IN APPLYING THESE STORMWATER MANAGEMENT CRITERIA, INDIVIDUAL LOTS OR PARCELS IN A RESIDENTIAL, COMMERCIAL OR INDUSTRIAL DEVELOPMENT SHALL NOT BE CONSIDERED TO BE SEPARATE DEVELOPMENT PROJECTS. INSTEAD, THE DEVELOPMENT, AS A WHOLE, SHALL BE CONSIDERED TO BE A SINGLE DEVELOPMENT PROJECT. HYDROLOGIC PARAMETERS THAT REFLECT THE ULTIMATE DEVELOPMENT CONDITION SHALL BE USED IN ALL ENGINEERING CALCULATIONS.
K. ALL MEASURES USED TO PROTECT PROPERTIES AND WATERWAYS SHALL BE EMPLOYED IN A MANNER WHICH MINIMIZES IMPACTS ON THE PHYSICAL, CHEMICAL AND BIOLOGICAL INTEGRITY OF RIVERS, STREAMS AND OTHER WATERS OF THE STATE.
L. ANY PLAN APPROVED PRIOR TO JULY 1, 2014, THAT PROVIDES FOR STORMWATER MANAGEMENT THAT ADDRESSES ANY FLOW RATE CAPACITY AND VELOCITY REQUIREMENTS FOR NATURAL OR MAN-MADE CHANNELS SHALL SATISFY THE FLOW RATE CAPACITY AND VELOCITY REQUIREMENTS FOR NATURAL OR MAN-MADE CHANNELS IF THE PRACTICES ARE DESIGNED TO (I) DETAIN THE WATER QUALITY VOLUME AND TO RELEASE IT OVER 48 HOURS; (II) DETAIN AND RELEASE OVER A 24-HOUR PERIOD THE EXPECTED RAINFALL RESULTING FROM THE ONE YEAR, 24-HOUR STORM; AND (III) REDUCE THE ALLOWABLE PEAK FLOW RATE RESULTING FROM THE 1.5, 2, AND 10-YEAR, 24-HOUR STORMS TO A LEVEL THAT IS LESS THAN OR EQUAL TO THE PEAK FLOW RATE FROM THE SITE ASSUMING IT WAS IN A GOOD FORESTED CONDITION, ACHIEVED THROUGH MULTIPLICATION OF THE FORESTED PEAK FLOW RATE BY A REDUCTION FACTOR THAT IS EQUAL TO THE RUNOFF VOLUME FROM THE SITE WHEN IT WAS IN A GOOD FORESTED CONDITION DIVIDED BY THE RUNOFF VOLUME FROM THE SITE IN ITS PROPOSED CONDITION, AND SHALL BE EXEMPT FROM ANY FLOW RATE CAPACITY AND VELOCITY REQUIREMENTS FOR NATURAL OR MAN-MADE CHANNELS AS DEFINED IN ANY REGULATIONS PROMULGATED PURSUANT TO § 10.1-562 OR 10.1-570 OF THE ACT.
M. FOR PLANS APPROVED ON AND AFTER JULY 1, 2014, THE FLOW RATE CAPACITY AND VELOCITY REQUIREMENTS OF § 10.1-561 A OF THE ACT AND THIS SUBSECTION SHALL BE SATISFIED BY COMPLIANCE WITH WATER QUANTITY REQUIREMENTS IN THE STORMWATER MANAGEMENT ACT (§ 10.1-603.2 ET SEQ. OF THE CODE OF VIRGINIA) AND ATTENDANT REGULATIONS, UNLESS SUCH LAND-DISTURBING ACTIVITIES ARE IN ACCORDANCE WITH 4VAC50-60-48 OF THE VIRGINIA STORMWATER MANAGEMENT PROGRAM (VSMP) PERMIT REGULATIONS.
N. COMPLIANCE WITH THE WATER QUANTITY MINIMUM STANDARDS SET OUT IN 4VAC50-60-66 OF THE VIRGINIA STORMWATER MANAGEMENT PROGRAM (VSMP) PERMIT REGULATIONS SHALL BE DEEMED TO SATISFY THE REQUIREMENTS OF MINIMUM STANDARD 19.

EROSION AND SEDIMENT CONTROL NARRATIVE
PROJECT DESCRIPTION:
THIS PROJECT PROPOSES THE CONSTRUCTION OF 2,600 LF OF PUBLIC ROAD WITH A 10' SHARED WALKING PATH AND ASSOCIATED UTILITIES. THE PLAN PROPOSES TO CLEAR AND/OR GRADE 8.0 ACRES, AND APPROXIMATELY 0.25 ACRES OF IMPERVIOUS AREA WILL BE ADDED WITH THIS PROJECT. STORMWATER QUANTITY AND QUALITY MANAGEMENT FOR THE ROAD IMPERVIOUS AREAS WERE PROPOSED AND APPROVED UNDER THE LIBERTY UNIVERSITY PHASE 1 LIBERTY MOUNTAIN DRIVE EAST AND INTRAMURAL FIELDS PLANS (SPR00901-0003). THE CONTRACTOR SHALL PROVIDE A SEQUENCE OF MAJOR SOIL DISTURBANCE ACTIVITIES INCLUDING THE PROJECT START DATE, STORM DRAINAGE INSTALLATION, GRADING AND SITE STABILIZATION. PERIMETER EROSION AND SEDIMENT CONTROLS WILL BE INSTALLED AS THE FIRST STEP IN CONSTRUCTION. ADDITIONAL CONTROLS WILL BE INSTALLED AS NEEDED AND WARRANTED.
EXISTING CONDITIONS:
THE EXISTING SITE IS AN EXISTING ROAD BED THAT WAS CONSTRUCTED PREVIOUSLY TO ACCESS THE EXISTING INTRAMURAL FIELDS. THE EXISTING SITE IS MOSTLY CLEARED WITH A GRAVEL ROAD BASE AND STABILIZED SLOPES. MOST OF THE REQUIRED DRAINAGE STRUCTURES HAVE BEEN INSTALLED. SLOPES ON SITE VARY FROM STEEPER THAN 2:1 TO FLAT. RUNOFF FROM THE SITE RUNS TO TWO MAIN CULVERTS UNDER ROUTE 460.
ADJACENT PROPERTY:
THE SITE IS BORDERED TO THE WEST BY UNDEVELOPED LAND BELONGING TO LIBERTY UNIVERSITY AND THE INTRAMURAL FIELDS, TO THE EAST BY UNDEVELOPED LAND BELONGING TO LIBERTY UNIVERSITY, TO THE NORTH BY UNDEVELOPED LAND BELONGING TO LIBERTY UNIVERSITY, AND TO THE SOUTH BY CANDLERS MOUNTAIN ROAD.
OFF-SITE AREAS:
THIS SITE IS CONSIDERED A BALANCED SITE. SHOULD THE NEED FOR A BORROW OR SPOIL SITE ARISE, THE CONTRACTOR SHALL IDENTIFY A PERMITTED SITE OR A PLAN ADDENDUM IS REQUIRED.
SOILS:
SOILS ON THE SITE HAVE BEEN PREVIOUSLY DISTURBED BY GRADING OPERATIONS. HOWEVER, THE NRCS WEB SOIL SURVEY IDENTIFIES 4 SOILS ON THE SITE. THE FIRST IS GEORGEVILLE LOAM, ABBREVIATED GEC2, WITH 6 TO 10 PERCENT SLOPES. THE SECOND IS GEORGEVILLE LOAM, ABBREVIATED GEE1, WITH 15 TO 25 PERCENT SLOPES. THE THIRD IS NASON LOAM, ABBREVIATED NAC, WITH 6 TO 15 PERRCENT SLOPES. THE FOURTH SOIL IS TATUM LOAM, ABBREVIATED TIC2, WITH 6 TO 15 PERCENT SLOPES.
CRITICAL EROSION AREAS:
CRITICAL EROSION AREAS ARE ALL SLOPES STEEPER THAN 3:1. SLOPES SHALL BE SURFACE ROUGHENED AND SEEDED IMMEDIATELY AFTER THE COMPLETION OF GRADING WITH SEEDING AND MULCHING AS INDICATED ON THE PLANS. FAILURE TO STABILIZE THE SITE WILL RESULT IN BLANKET MATTING BEING REQUIRED FOR ALL SLOPES STEEPER THAN 3:1.
EROSION AND SEDIMENT CONTROL MEASURES:
ALL MEASURES SHALL BE INSTALLED AND MAINTAINED PER THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK. THE CONTRACTOR SHALL NAME A RESPONSIBLE LAND DISTURBER (RLD), WHO WILL BE RESPONSIBLE FOR INSTALLING EROSION AND SEDIMENT CONTROLS AS THE FIRST STEP IN CONSTRUCTION, AS THEN SHALL BE RESPONSIBLE FOR ADDITIONAL CONTROL AS NEEDED AND AS SHOWN ON THE PLAN, AND FOR MAINTENANCE OF ALL CONTROLS THROUGH CONSTRUCTION ACTIVITIES. THE RLD SHALL INSTALL ADDITIONAL CONTROLS AS DIRECTED BY THE ENGINEER AND THE CITY, AND AS SITE CONDITIONS WARRANT.
STRUCTURAL PRACTICES:
1. CONSTRUCTION ENTRANCE (VESCH# 3.02):
CONSTRUCTION ENTRANCES ARE PROPOSED TO PREVENT SEDIMENT FROM BEING DEPOSITED ON ANY PUBLIC ROAD BY CONSTRUCTION TRAFFIC. SHOULD THE CONSTRUCTION ENTRANCE BECOME CLOGGED WITH SEDIMENT OR IS NOT EFFECTIVELY PREVENTING SEDIMENT DEPOSITION ON THE PUBLIC STREET, IT SHALL BE CLEANED AND REWORKED OR HAVE A NEW TOP DRESSING OF STONE APPLIED.
2. CONSTRUCTION ROAD STABILIZATION (VESCH# 3.03):
CONSTRUCTION ROAD STABILIZATION IS PROPOSED ON ALL TRAVEL WAYS ON THE SITE. THE BASE STONE SHALL SERVE AS THE CONSTRUCTION ROAD STABILIZATION. ALL BASE STONE SHALL BE VDOT 21-B SHOULD CONSTRUCTION ROAD STABILIZATION BECOME CLOGGED WITH SEDIMENT, IT SHALL HAVE A NEW TOP DRESSING OF STONE APPLIED.
3. SILT FENCE (VESCH# 3.05):
SILT FENCE IS PROPOSED AT THE TOE OF ALL SLOPES WHERE SHEET FLOW IS EXPECTED. SEDIMENT SHALL BE CLEANED OUT WHEN IT REACHES HALFWAY UP THE FENCE. ANY BREACHES OR UNDERCUTTING SHALL BE REPAIRED IMMEDIATELY ONCE DISCOVERED. COMPROMISED OR DETERIORATED SILT FENCE SHALL BE REPLACED
4. INLET PROTECTION (VESCH# 3.07):
INLET PROTECTION IS PROPOSED AT EVERY INLET LOCATED ON THE SITE TO PREVENT SEDIMENT FROM ENTERING STORM INLETS AND PIPES. SHOULD THE INLET PROTECTION STONE BECOME CLOGGED WITH SEDIMENT, IT SHALL BE REPLACED. SEDIMENT ACCUMULATIONS SHALL BE REMOVED WHEN THEY REACH ONE QUARTER OF THE HEIGHT OF THE STONE.
5. CULVERT INLET PROTECTION (VESCH# 3.08):
6. CULVERT INLET PROTECTION IS PROPOSED AT THE ENTRANCE TO THE TEMPORARY SLOPE DRAIN AND PROPOSED/EXISTING CULVERTS IN THE AREA. SEDIMENT SHALL BE CLEANED OUT WHEN IT REACHES HALFWAY UP THE FENCE. ANY BREACHES OR UNDERCUTTING SHALL BE REPAIRED IMMEDIATELY ONCE DISCOVERED. COMPROMISED OR DETERIORATED SILT FENCE SHALL BE REPLACED.
7. PERMANENT DIVERSION (VESCH# 3.12):
PERMANENT DIVERSIONS ARE PROPOSED AT THE TOP OF THE CUT SLOPES TO DIRECT OFFSITE RUNOFF TO STABILIZED CHANNELS AND PREVENT IT FROM RUNNING DOWN THE CUT FACE. THEY ARE SUMMARIZED IN THE STORMWATER CONVEYANCE CHANNEL CHART AND SHOULD BE MAINTAINED TO DIMENSIONS SHOWN IN SAID CHART.
8. OUTLET PROTECTION (VESCH# 3.18):
OUTLET PROTECTION IS PROPOSED AT THE OUTLET OF ALL PIPES ON THE SITE TO SLOW VELOCITIES AND PREVENT SCOUR. IF STONE BECOMES CLOGGED WITH SEDIMENT, IT SHALL BE REMOVED AND REPLACED.
9. ROCK CHECK DAMS (VESCH# 3.20):
ROCK CHECK DAMS ARE PROPOSED IN THE DITCHES TO SLOW VELOCITIES AND TRAP SEDIMENT UNTIL THE SITE IS STABILIZED. SEDIMENT SHOULD BE REMOVED WHEN IT REACHES ONE HALF OF THE ORIGINAL HEIGHT OF THE CHECK DAM.
10. SURFACE ROUGHENING (VESCH# 3.29):
SURFACE ROUGHENING IS PROPOSED ON ALL CUT AND FILL SLOPES ON SITE TO ASSIST WITH SEEDING AND SLOPE STABILIZATION.
11. SOIL STABILIZATION BLANKETS & MATTING (VESCH# 3.36):
SOIL STABILIZATION BLANKETS & MATTING IS PROPOSED ON THE MAJOR FILL SLOPE AND THE STORMWATER MANAGEMENT FACILITY SIDE TO AID IN SLOPE STABILIZATION UNTIL ADEQUATE VEGETATION CAN BE ESTABLISHED. BLANKET MATTING SHALL BE REPAIRED AS NEEDED UNTIL STABILIZATION IS ACHIEVED. BLANKET MATTING SHALL BE EC-2.
VEGETATIVE PRACTICES:
TOPSOILING (VESCH# 3.30)
PRIOR TO PERMANENT SEEDING, A MINIMUM OF 4" OF TOPSOIL SHALL BE PLACED OVER ALL DISTURBED AREAS TO BE SEEDED OR LANDSCAPED. CONTRACTOR SHALL CONFIRM WITH THE OWNER THE FINAL DEPTH OF TOPSOIL.
TEMPORARY SEEDING (VESCH# 3.31):
TEMPORARY SEEDING IS PROPOSED IN AREAS THAT ARE NOT READY FOR PERMANENT STABILIZATION BUT WILL NOT BE DISTURBED FOR A PERIOD OF 14 DAYS OR LONGER. ALL TEMPORARILY SEEDED AREAS SHALL BE INSPECTED PERIODICALLY TO ENSURE A GOOD STAND OF VEGETATION. ANY BARREN AREAS SHALL BE RESEEDED IMMEDIATELY. WATER SEEDED AREAS AS NEEDED. THE TEMPORARY SEEDING MIX AND APPLICATION RATES ARE SHOWN ON THE PLANS.
PERMANENT SEEDING (VESCH# 3.32):
PERMANENT SEEDING IS PROPOSED FOR THE ENTIRE SITE ONCE FINAL GRADE IS REACHED OR FOR AREAS THAT WILL NOT BE DISTURBED FOR A PERIOD LONGER THAN 6 MONTHS. ALL PERMANENTLY SEEDED AREAS SHALL BE INSPECTED PERIODICALLY TO ENSURE A GOOD STAND OF VEGETATION. ANY BARREN AREAS SHALL BE RESEEDED IMMEDIATELY. WATER SEEDED AREAS AS NEEDED. THE PERMANENT SEEDING MIX AND APPLICATION RATES ARE SHOWN ON THE PLANS.
MULCHING (VESCH# 3.35)
MULCHING IS TO BE PLACED OVER ALL DISTURBED AREAS THAT HAVE BEEN SEEDED (TEMPORARY OR PERMANENT) TO PROVIDE PROTECTION FOR THE SEED. STRAW MULCHING MUST BE ANCHORED. MULCHING APPLICATION RATES ARE SHOWN ON THE PLAN
PERMANENT STABILIZATION:
ONCE THE SITE HAS BEEN BROUGHT TO FINAL GRADE AND GRAVEL HAS BEEN PLACED, TOPSOIL SHALL BE SPREAD ON ALL DISTURBED AREAS EVENLY. FERTILIZER, SEED, AND A COVERING SHALL THEN BE INSTALLED IN ACCORDANCE WITH PERMANENT SEEDING (VESCH# 3.32) FOLLOWING APPLICATION RATES SHOWN ON THE PLAN.
STORMWATER MANAGEMENT:
SEE STORMWATER MANAGEMENT NARRATIVE.
MAINTENANCE:
THE RESPONSIBLE LAND DISTURBER SHALL CHECK ALL EROSION AND SEDIMENT CONTROLS DAILY, AND AFTER EACH SIGNIFICANT RAINFALL. DEFICIENCIES SHALL BE REPAIRED IMMEDIATELY. SEE STRUCTURAL PRACTICES FOR SPECIFIC MAINTENANCE ITEMS. ALL SEEDED AREAS WILL BE CHECKED REGULARLY, AND SHALL BE RE-SEEDED AND MULCHED AS NECESSARY.

STORMWATER MANAGEMENT NARRATIVE
PROJECT DESCRIPTION:
THIS PROJECT PROPOSES THE CONSTRUCTION OF 2,600 LF OF PUBLIC ROAD WITH A 10' SHARED WALKING PATH AND ASSOCIATED UTILITIES. THE PLAN PROPOSES TO CLEAR AND/OR GRADE 8.0 ACRES AND APPROXIMATELY 0.25 ACRES OF IMPERVIOUS AREA WILL BE ADDED WITH THIS PROJECT. THIS PROJECT IS BEING DEVELOPED UNDER THE PART IIC CRITERIA AS A RESULT OF THE 2008 CUP. STORMWATER QUANTITY AND QUALITY MANAGEMENT FOR THE ROAD IMPERVIOUS AREAS WERE PROPOSED AND APPROVED UNDER THE LIBERTY UNIVERSITY PHASE 1 LIBERTY MOUNTAIN DRIVE EAST AND INTRAMURAL FIELDS PLANS (SPR00901-0003).
EXISTING CONDITIONS:
THE EXISTING SITE IS AN EXISTING ROAD BED THAT WAS CONSTRUCTED PREVIOUSLY TO ACCESS THE EXISTING INTRAMURAL FIELDS. THE EXISTING SITE IS MOSTLY CLEARED WITH A GRAVEL ROAD BASE AND STABILIZED SLOPES. MOST OF THE REQUIRED DRAINAGE STRUCTURES HAVE BEEN INSTALLED. SLOPES ON SITE VARY FROM STEEPER THAN 2:1 TO FLAT. RUNOFF FROM THE SITE RUNS TO TWO MAIN CULVERTS UNDER ROUTE 460.
SOILS:
SOILS ON THE SITE HAVE BEEN PREVIOUSLY DISTURBED BY GRADING OPERATIONS. HOWEVER, THE NRCS WEB SOIL SURVEY IDENTIFIES 4 SOILS ON THE SITE. THE FIRST IS GEORGEVILLE LOAM, ABBREVIATED GEC2, WITH 6 TO 10 PERCENT SLOPES. THE SECOND IS GEORGEVILLE LOAM, ABBREVIATED GEE1, WITH 15 TO 25 PERCENT SLOPES. THE THIRD IS NASON LOAM, ABBREVIATED NAC, WITH 6 TO 15 PERRCENT SLOPES. THE FOURTH SOIL IS TATUM LOAM, ABBREVIATED TIC2, WITH 6 TO 15 PERCENT SLOPES.
STORMWATER MANAGEMENT:
THIS PROJECT FALLS UNDER THE PART IIC CRITERIA FOR STORMWATER MANAGEMENT. THE PREVIOUSLY APPROVED PLAN, THAT THIS ROAD WAS ORIGINALLY PROPOSED UNDER, PROPOSED 2.7 ACRES OF IMPERVIOUS AREA AND AN APPLICABLE AREA OF 24.5 ACRES. CURRENTLY, THERE IS 3.48 ACRES OF IMPERVIOUS AREA AT THIS SITE. THIS PLAN PROPOSES A 0.25 ACRE INCREASE IN IMPERVIOUS FOR A NEW TOTAL OF 3.73 ACRES IN THE 24.5 ACRE WATERSHED. THIS RESULTS IN A PERCENT IMPERVIOUS OF 15.2% WHICH IS LESS THAN 16%. NO STORMWATER QUALITY IS REQUIRED; HOWEVER, POND 1 WAS ORIGINALLY DESIGNED AS AN EXTENDED DETENTION FACILITY. AS SHOWN IN THE DRAINAGE CALCULATIONS, THE DRAINAGE AREA AND GROUND COVER DRAINING TO THIS FACILITY WILL NOT BE ALTERED BY THIS PLAN. THIS FACILITY REMOVED 1.1 LBS OF PHOSPHOROUS PER YEAR. SEE CALCULATIONS FROM CITY OF LYNCHBURG PROJECT# SPR0901-0003.
THERE ARE TWO EXISTING STORMWATER MANAGEMENT FACILITIES BUILT UNDER SPR0901-0003 THAT WERE DESIGNED TO RECEIVE DRAINAGE FROM THIS ROAD. POND 1 WAS DESIGNED FOR 2.4 ACRES AND A RUNOFF COEFFICIENT OF 0.65. POND 2 WAS DESIGNED FOR 10.3 ACRES AND A RUNOFF COEFFICIENT OF 0.42. BASED ON CURRENT SITE CONDITIONS, POND 1 RECEIVED 2.4 ACRES WITH A RUNOFF COEFFICIENT OF 0.65, AND POND 2 RECEIVES 9.6 ACRES WITH A RUNOFF COEFFICIENT OF 0.41. BOTH OF THESE FACILITIES WERE ROUTED WITH CURRENT CONDITIONS, AND THEY FUNCTION AS DESIGNED, DETAINING THE 2-YEAR AND 10-YEAR FLOWS BACK TO BELOW PRE-DEVELOPED LEVELS.
THERE ARE 3 OUTFALL POINTS OF ANALYSIS FOR THIS PROJECT. THE FIRST IS POA#1. IT RECEIVES 22.32 ACRES WITH A RUNOFF COEFFICIENT OF 0.34. POA#1 IS A 42" RCP THAT EASILY CONVEYS THE 35.5 CFS. THIS OUTFALL IS ADEQUATE.
THE SECOND IS POA#2. IT RECEIVES 78.38 ACRES, INCLUDING POA#1, WITH A RUNOFF COEFFICIENT OF 0.34. POA#2 IS A 60" RCP THAT EASILY CONVEYS THE 84.3 CFS PEAK. THIS OUTFALL IS ADEQUATE. THE THIRD IS POA#3. IT RECEIVES 62.78 ACRES WITH A RUNOFF COEFFICIENT OF 0.33. POA#3 IS A 58"(H)X50"(W) ELLIPTICAL CMP. BASED ON THE NEAREST EQUIVALENT, BUT SMALLER, ELLIPTICAL PIPE, THIS OUTFALL IS ADEQUATE AS WELL. IT IS IMPORTANT TO NOTE THAT POA#2 AND POA#3 CONTAIN POND 1 AND POND 2 RESPECTIVELY, AND A MORE DETAILED ANALYSIS WAS DONE TO DETERMINE THE PEAK FLOW TO USE IN ADEQUACY ANALYSIS. EACH WATERSHED WAS ANALYZED FOR THE WATERSHED
TIME OF CONCENTRATION AND THE POND PEAK OUTFALL TIME. THE OUTFALLS WERE THEN ANALYZED FOR THE LARGER OF THE TWO VALUES.
MAINTENANCE:
SINCE THESE ARE EXISTING STORMWATER MANAGEMENT FACILITIES, THE FOLLOWING MAINTENANCE GUIDELINES ARE RECOMMENDATIONS. SEE THE MAINTENANCE SPECIFICATIONS FROM THE PLAN THESE WERE CONSTRUCTED UNDER FOR ACTUAL MAINTENANCE SPECIFICATIONS. THE STORMWATER MANAGEMENT FACILITIES SHALL HAVE A THICK, HEALTHY STAND OF GRASS COVER, FREE OF TREES AND BRUSH. THE FACILITY SHOULD BE MOWED PERIODICALLY DURING THE GROWING SEASON. THE GRASS SHOULD NOT BE CUT LESS THAN 6" TALL. LIME AND FERTILIZE THE FACILITY AS NECESSARY TO MAINTAIN A THICK, HEALTHY STAND OF GRASS COVER. REPAIR ALL EROSION ISSUES IN A TIMELY FASHION ONCE DISCOVERED. BARE AREAS SHALL BE SEEDED AND MULCHED IN A TIMELY FASHION. ALL ANIMAL BURROWS SHALL BE BACKFILLED AND COMPACTED ONCE THE ANIMAL HAS BEEN REMOVED FROM THE FACILITY. REMOVE ALL TREES, WOODY VEGETATION, AND OTHER DEEP-ROOTED GROWTH IN A TIMELY FASHION ONCE DISCOVERED. ANY MAINTENANCE ISSUES RELATING TO THE PRINCIPAL SPILLWAY SHOULD BE REVIEWED AND APPROVED BY A PROFESSIONAL ENGINEER.

1992 3.08

SILT FENCE CULVERT INLET PROTECTION

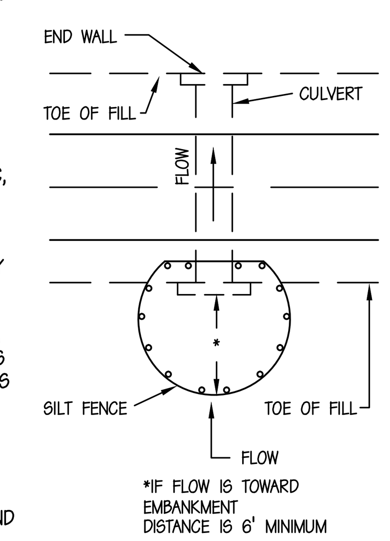
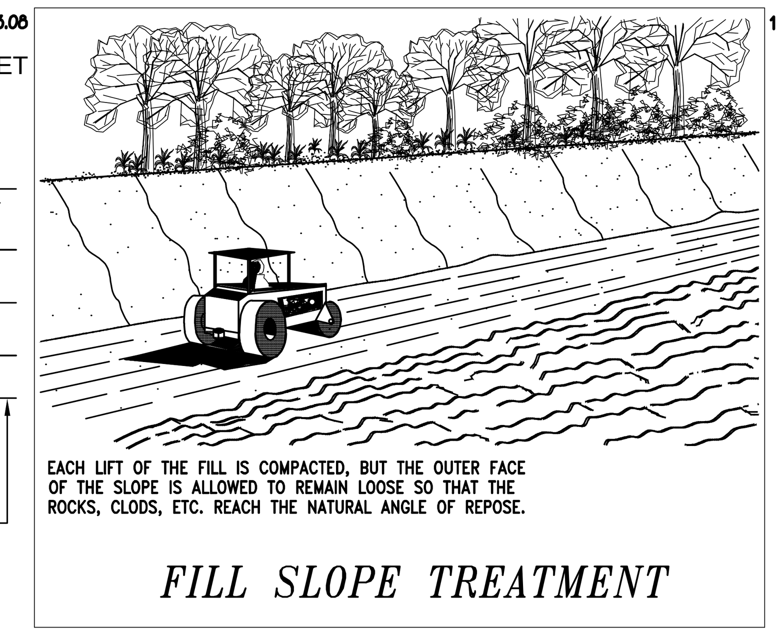
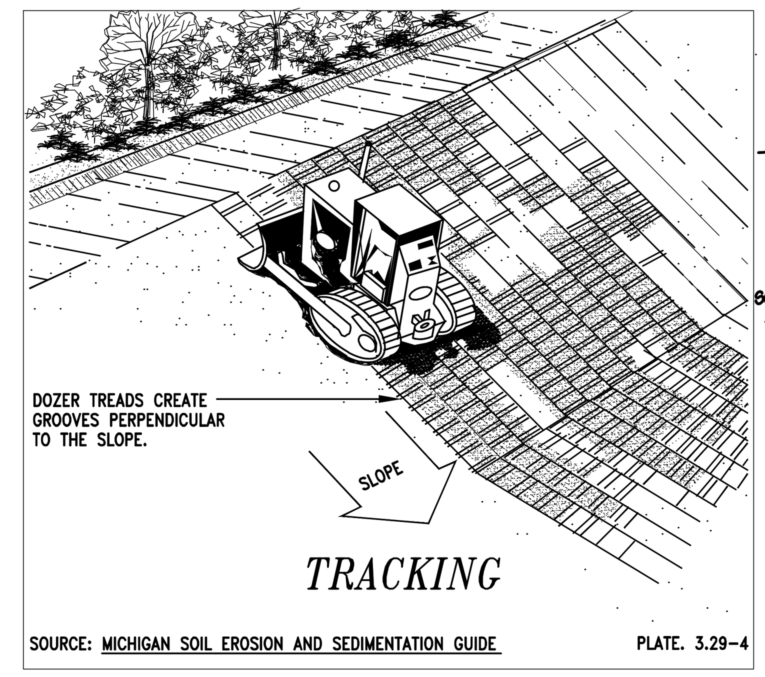


PLATE 3.08-1
SOURCE: ADAPTED FROM VDOT STANDARD SHEETS AND VA. DSWC



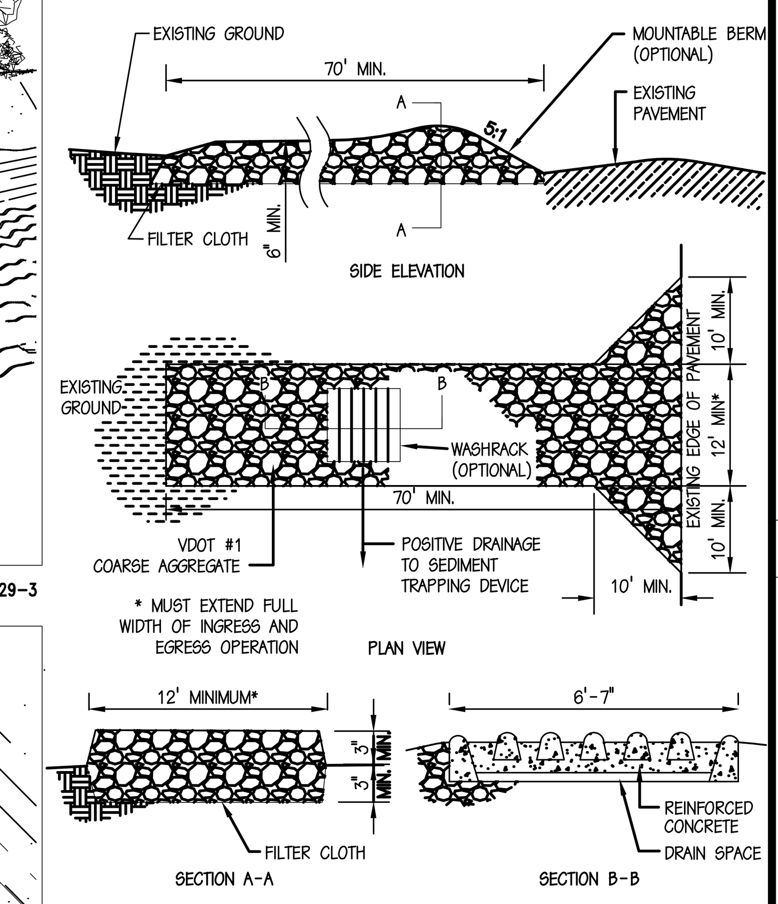
SOURCE: VA. DSWC PLATE. 3.29-3



SOURCE: MICHIGAN SOIL EROSION AND SEDIMENTATION GUIDE PLATE. 3.29-4

1992 3.02

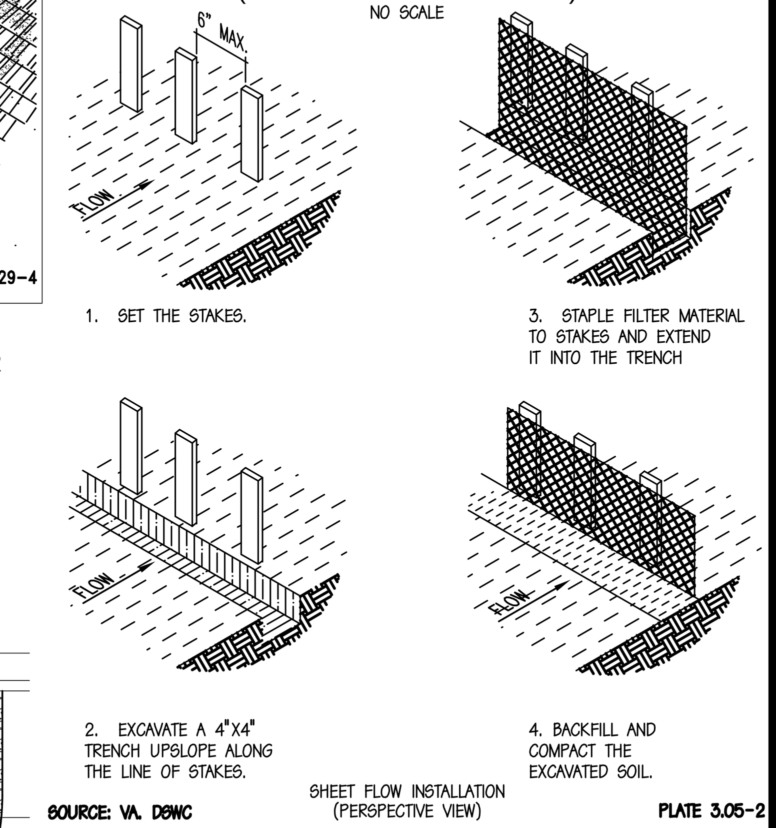
STONE CONSTRUCTION ENTRANCE



SOURCE: VESCH PLATE 3.02-1

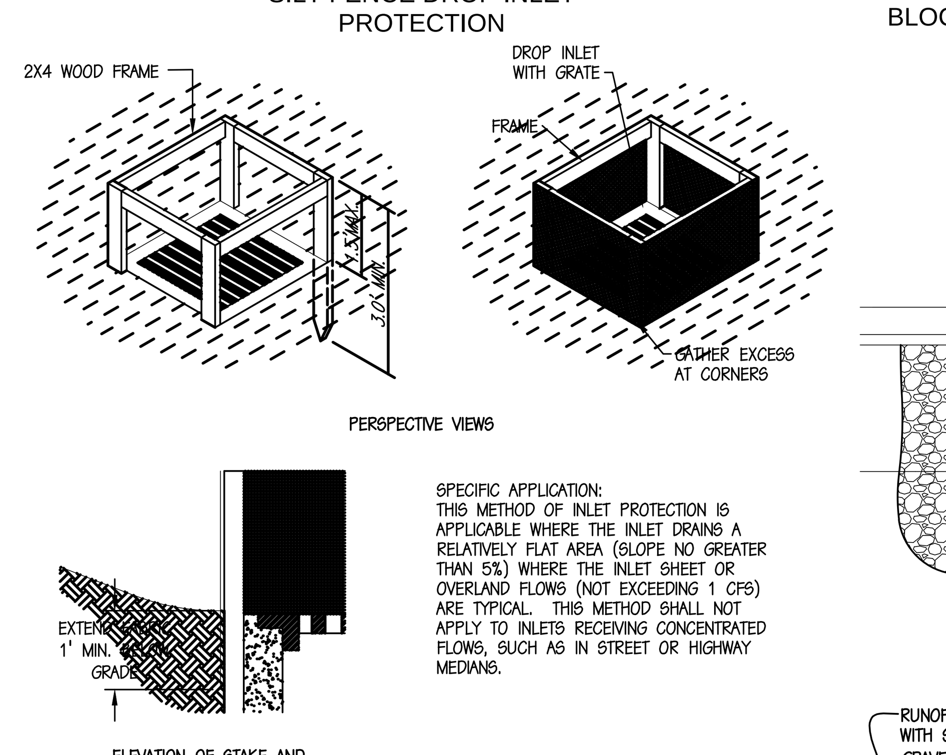
1992 3.05

CONSTRUCTION OF A SILT FENCE (WITHOUT WIRE SUPPORT)
NO SCALE



SOURCE: VA. DSWC PLATE 3.05-2

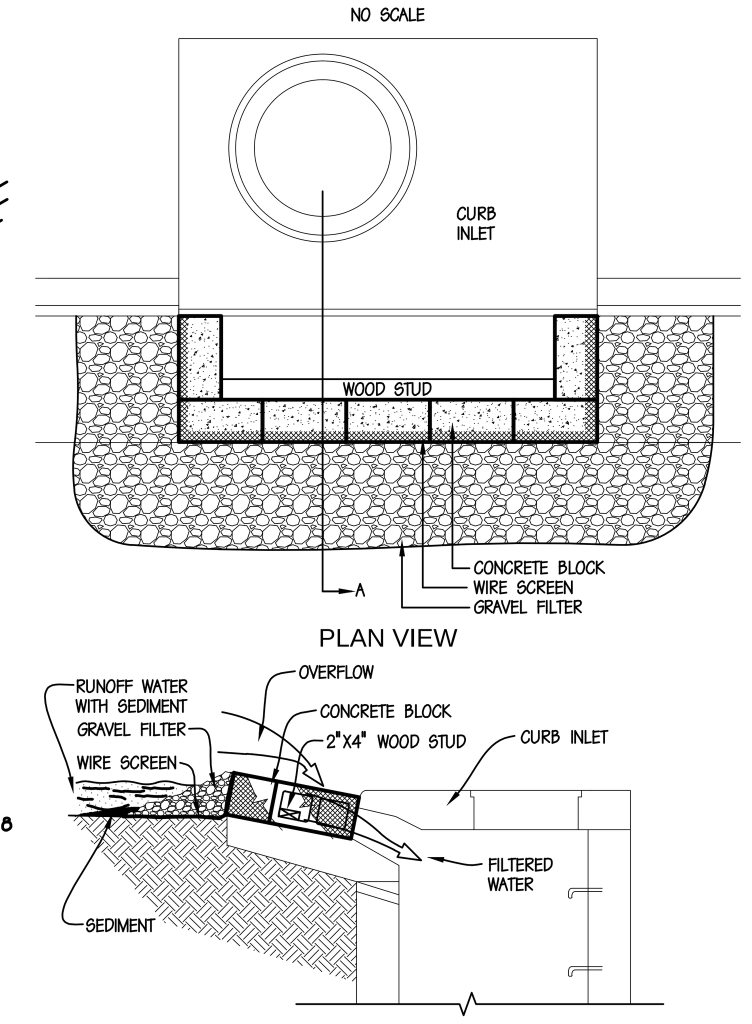
SILT FENCE DROP INLET PROTECTION



SPECIFIC APPLICATION:
THIS METHOD OF INLET PROTECTION IS APPLICABLE WHERE THE INLET DRAINS A RELATIVELY FLAT AREA (SLOPE NO GREATER THAN 5%) WHERE THE INLET SHEET OR OVERLAND FLOWS (NOT EXCEEDING 1 CFS) ARE TYPICAL. THIS METHOD SHALL NOT APPLY TO INLETS RECEIVING CONCENTRATED FLOWS, SUCH AS IN STREET OR HIGHWAY MEDIANS.

3.07

BLOCK AND GRAVEL CURB INLET SEDIMENT FILTER
NO SCALE



SPECIFIC APPLICATION
THIS METHOD OF INLET PROTECTION IS APPLICABLE AT CURB INLETS WHERE AN OVERFLOW CAPABILITY IS NECESSARY TO PREVENT EXCESSIVE PONDING IN FRONT OF THE STRUCTURE.

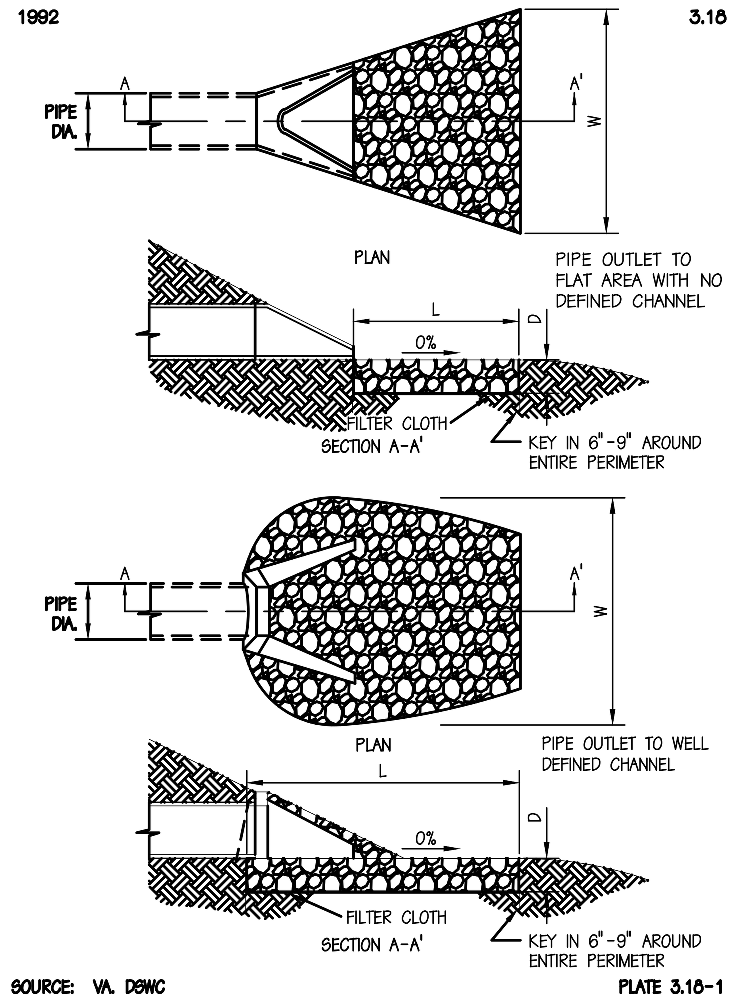
GRAVEL SHALL BE VDOT #3, #357 OR #5 COARSE AGGREGATE.

1992

SOURCE: VA. DSWC PLATE 3.07-8

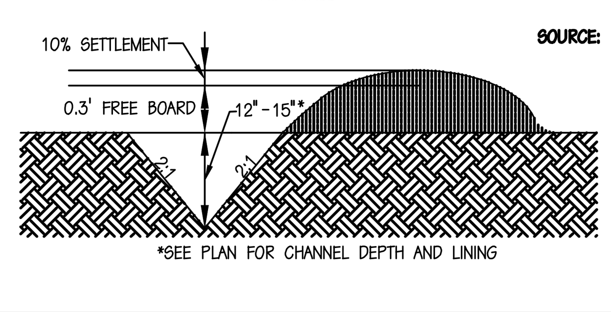
PIPE OUTLET CONDITIONS

1992 3.18

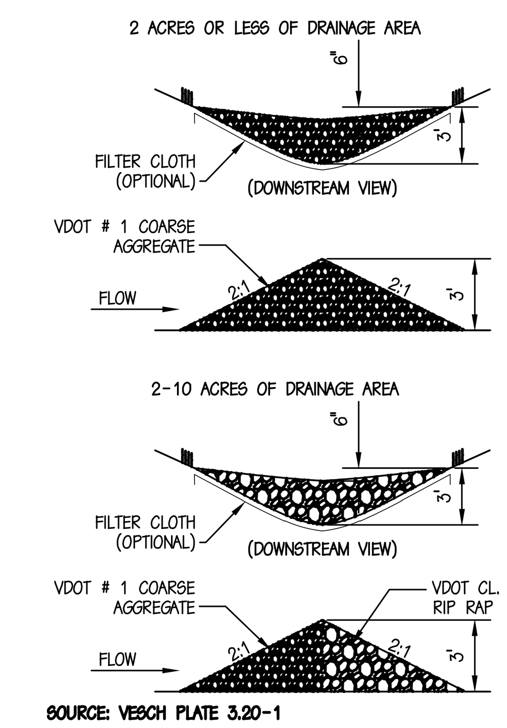


SOURCE: VA. DSWC PLATE 3.18-1

DIVERSION DIKE
NO SCALE

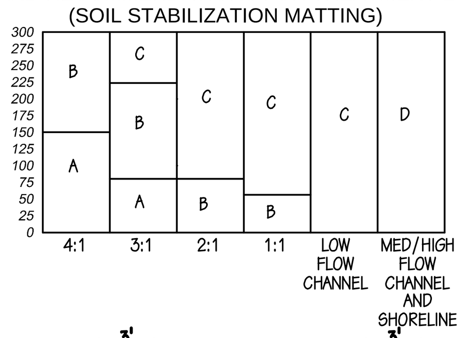


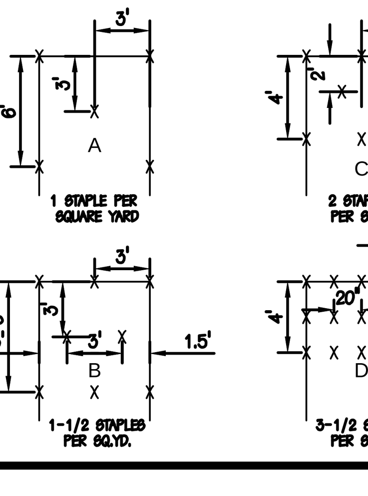
ROCK CHECK DAM



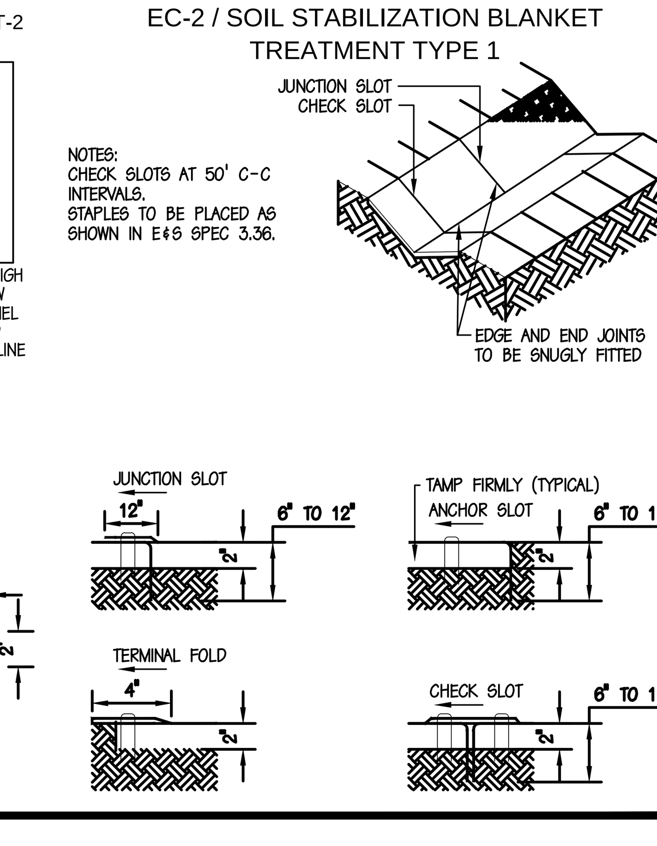
SOURCE: VESCH PLATE 3.20-1

GENERAL STAPLE PATTERN GUIDE AND RECOMMENDATIONS FOR TREATMENT-2 (SOIL STABILIZATION MATTING)





EC-2 / SOIL STABILIZATION BLANKET TREATMENT TYPE 1



NOTES:
CHECK SLOTS AT 50' C-C INTERVALS.
STAPLES TO BE PLACED AS SHOWN IN E&S SPEC 3.36.

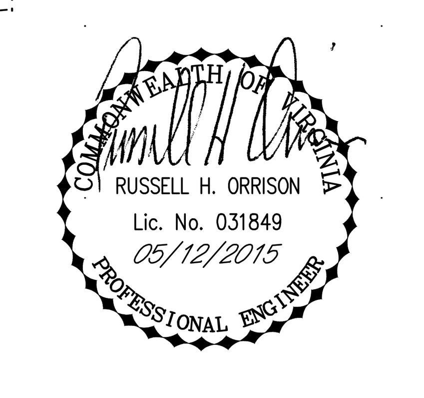
PERKINS & ORRISON
ENGINEERS ▲ PLANNERS ▲ SURVEYORS

27 GREEN HILL DRIVE, FOREST, VIRGINIA 24551
PHONE: 434-525-5985 FAX: 434-525-5986
EMAIL: pno@perkins-orrison.com

PO BOX 1567 17 W. NELSON STREET LEXINGTON, VIRGINIA 24450
PHONE: 540-464-9001 FAX: 540-464-5009
EMAIL: pno@perkins-orrison.com

CONSULTANTS

SEAL:



JOB:

LIBERTY UNIVERSITY
LIBERTY MOUNTAIN DRIVE
EXTENSION AT THE NORTHERN
INTRAMURAL FIELDS
LYNCHBURG, VIRGINIA

CLIENT:
LIBERTY UNIVERSITY
ATTN: MAGGIE COSSMAN

MARK	DATE	DESCRIPTION
1	05/12/15	PER CITY/AEP COMMENTS

ISSUE: 10/07/2014
CONTOUR INTERVAL: -
DESIGNED BY: -
DRAWN BY: PWS
CHECKED BY: RHO

SHEET TITLE

EROSION & SEDIMENT CONTROL NOTES AND DETAILS

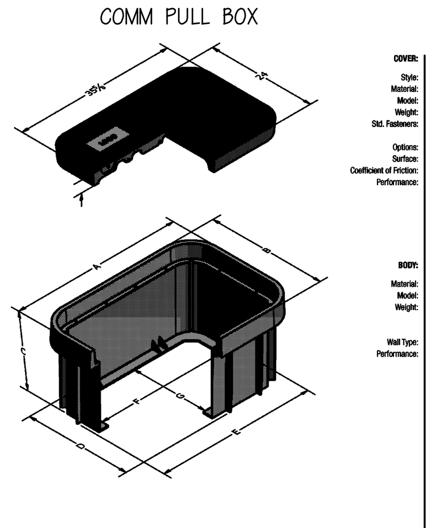
RWS PROJECT # 14018-RW

JOB NO.: 13331 SHEET NO 14 OF 17

COMM PULL BOX

Oldcastle® Enclosure Solutions — Electric & Communications — SYNERTECH Composite

COMM PULL BOX 2436



	A	B	C	D	E	F	G
2436-18	38-1/8	26-1/2	18	23-1/2	35-1/4	29-1/8	17-1/2
2436-24	38-1/8	26-1/2	24	23-1/2	35-1/4	29-1/8	17-1/2
2436-36	38-1/8	26-1/2	36	23-1/2	35-1/4	29-1/8	17-1/2

COVER:
Style: Flush Solid
Material: DuoMold Composite
Model: 24" x 36"
Weight: 126 lbs
Std. Fasteners: 1/2-13 Stainless Steel Hex Head Bolt, Self-Locating Insert
Options: Logos and Special Markings
Surface: Slip Resistant & Marked*
Coefficient of Friction: >0.6 ASTM 1028
Performance: ANSI/SCTE-77 Tier 22, WUC 3.6, ASTM C857 A-16

BODY:
Material: DuoMold Composite
Model: 24" x 36"
Weight: 18" Depth: 82 lbs; 24" Depth: 92 lbs; 36" Depth: 110 lbs
Wall Type: Straight
Performance: ANSI/SCTE-77 Tier 22, WUC 3.6, ASTM C857 A-16
Bodies are stackable to Depths of: 36", 42", 48", 60", 72"

Heavy Duty: Incidental, Non-deliberate Traffic
For use in non-vehicular traffic situations only.
Actual load rating is determined by the box and cover combination. Weights and dimensions may vary slightly

* Cover comes standard with permanent markings for manufacturer, load rating, model size and manufacturing location.

Contact your Oldcastle Enclosure Solutions Distribution Center for specific information and additional options.

oldcastleprecast.com/enclosuresolutions — 800-735-5566

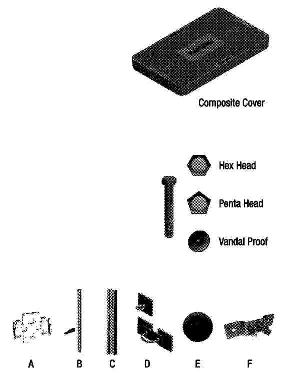
COMM PULL BOX 2436

Options:
Available DuoMold Composite Covers:
Flush Solid (Standard)

Fastener Options for DuoMold Composite Covers:
Hex Head Bolt (Standard)
Penta Head Bolt
Oldcastle Enclosures Vandal Proof Bolt

Add on Options:
Larger Lift Hook Pocket
EMS Marker (E)
Mouseholes/Knockouts
Rack Mount (A)
Cable Racks/Cable Arms (B)
Unistrut (C)
Pulling Eye - 1,000 lb and 3,000 lb (D)
Ground Buss (F)
Dividers
Racking Provision
Lid Gaskets*
Solid Bottom
Bodies are Stackable (with tallest body on bottom)

*Lid Gaskets inhibit water flow into the box, they do not make Enclosure fully waterproof.



Raw Material Specifications:

Standard Test Method	Properties of Raw Material	ASTM Designation	Typical Value
Compressive Strength of Polymer Concretes	Compressive Strength	C 469	> 17,000 psi
Flexural Properties of Plastic Materials	Flexural Strength	D 790	> 14,000 psi
Resistance of Plastics to Chemical Reagents	Chemical Resistance		Retain > 75% of original strength
Impact Resistance by Means of a Falling Weight	Impact Resistance	D 2444	> 70 ft-lb
Static Coefficient of Friction	Friction Coefficient	C 1028	> 0.6

ASTM Specifications shall be the current revision
Test Reports available on request

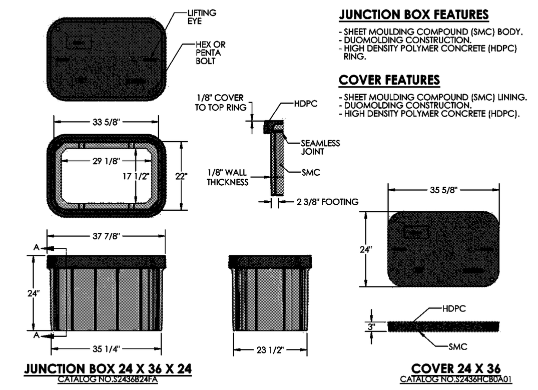
Product Load Rating: Heavy Duty : Incidental, Non-deliberate Traffic. For use in non-vehicular traffic situations only.

Note: Actual load rating is determined by the box and cover combination. Weights and dimensions may vary slightly. All information contained on this sheet is current at the time of printing. Oldcastle Precast, Inc. reserves the right to discontinue or update product information without notice.

oldcastleprecast.com/enclosuresolutions — 800-735-5566

COMM PULL BOX

SYNERTECH — **Junction Box 24 x 36 x 24**



JUNCTION BOX FEATURES
- SHEET MOULDING COMPOUND (SMC) BODY.
- DUOMOLDING CONSTRUCTION.
- HIGH DENSITY POLYMER CONCRETE (HDPC) RING.

COVER FEATURES
- SHEET MOULDING COMPOUND (SMC) LINING.
- DUOMOLDING CONSTRUCTION.
- HIGH DENSITY POLYMER CONCRETE (HDPC).

For all options, please contact Customer Service at 1-888-868-5214.

Catalog No.	Approx Shipping Wt.	Description
S2436HCBOA	131 lbs	Cover Bolt Down/Tier 15 - 20K
S2436B24FA	90 lbs	Box – Open Bottom/24" (610 mm)
S2436C24FA	92 lbs	Box – Closed Bottom/24" (610 mm)

- Stainless Steel Hardware - replaceable
- Penta or Hex Bolts
- Monolithic construction
- Straight walled design for stacking capability and grade adjustments
- Sidewalls can be drilled with a standard hole saw
- Standard or custom logo available
- ISO 9001:2000 quality assurance
- Meets ANSI/SCTE 77-2002 standards

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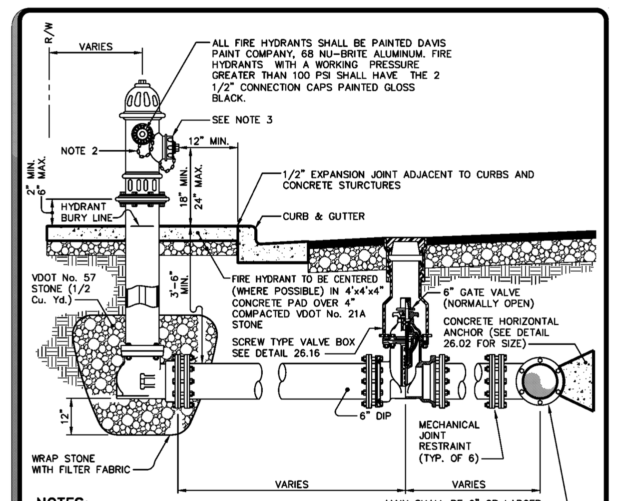
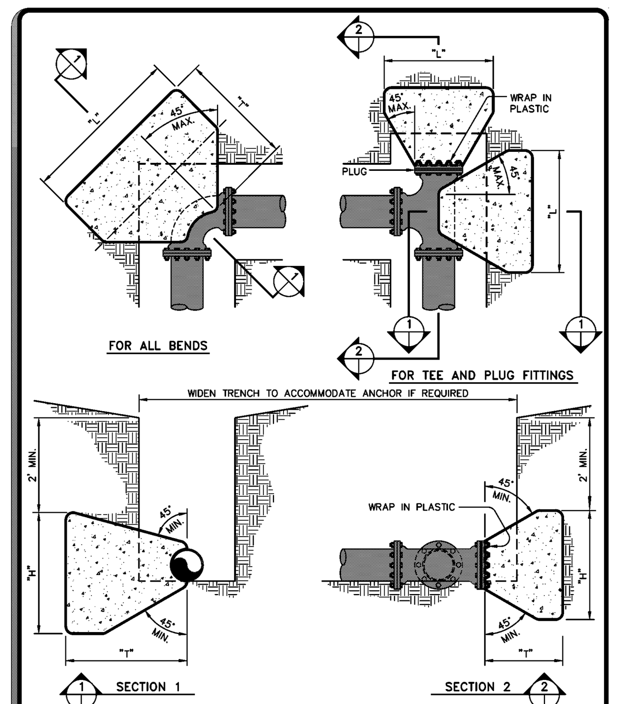
Synertech ~ Products 181



NOTES:
1. TWO MECHANICAL JOINT RESTRAINTS (RESTRAINED JOINT THRUST RINGS) SHALL BE INSTALLED ON THE MAIN LINE ON EACH SIDE OF THE TEE.
2. CHAINS ON FIRE HYDRANTS TO BE REMOVED.
3. HYDRANTS TO BE PLACED WITH PUMPER NOZZLE FACING THE STREET OR AS OTHERWISE DIRECTED.
4. WHEN VALVE BOX IS PLACED OUTSIDE OF PAVEMENT, PROVIDE PRECAST SHOULDER SLAB. (DETAIL 26.18)
5. WHEN FIRE HYDRANTS ARE INSTALLED WHERE ROADWAY HAS A DRAINAGE DITCH AND NO CURB & GUTTER, MINIMUM COVER SHALL BE 24" FROM THE BOTTOM OF DITCH.
6. WHERE HYDRANT IS SET BEHIND GUARDRAIL, CENTERLINE OF PUMPER NOZZLE TO BE A MINIMUM OF 12" AND A MAXIMUM OF 18" ABOVE TOP OF GUARDRAIL.
7. ALL JOINTS BETWEEN THE VALVE AND THE 90° BEND TO THE FIRE HYDRANT SHALL BE RESTRAINED
8. IN AREAS OF HIGH GROUNDWATER, THE WEEP HOLES SHALL BE PLUGGED AS DIRECTED BY THE ENGINEER.

THE CITY OF LYNCHBURG — TYPICAL FIRE HYDRANT CONNECTION DETAIL — SCALE: NOT TO SCALE — DETAIL # 26.09 — REVISION DATE: 12-14-2013 — SHEET # 1 OF 1
USE WITH THE CITY OF LYNCHBURG STANDARD SPECIFICATIONS ONLY

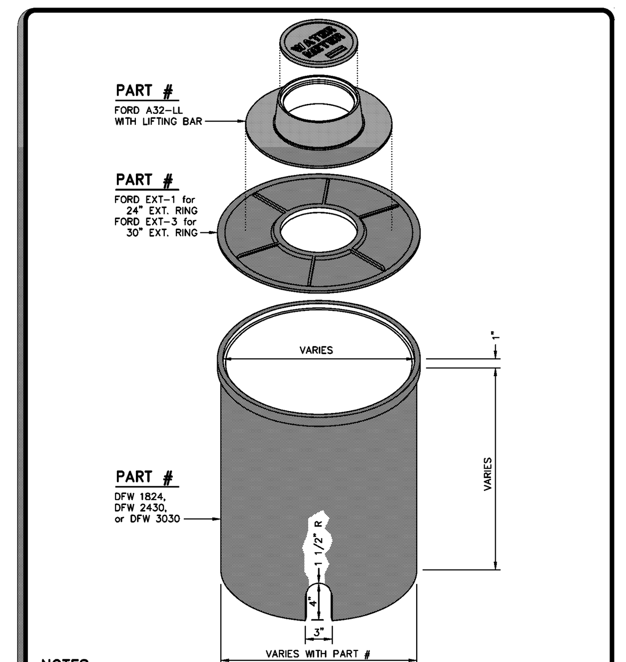


THE CITY OF LYNCHBURG — TYPE "F" HORIZONTAL ANCHOR BLOCKING — SCALE: NOT TO SCALE — DETAIL # 26.02 — REVISION DATE: 12-14-2013 — SHEET # 1 OF 3
USE WITH THE CITY OF LYNCHBURG STANDARD SPECIFICATIONS ONLY

TYPE "F" HORIZONTAL ANCHOR BLOCK DATUM

TYPE FITTING	PIPE SIZE INCHES	DIMENSIONS (Ft.) "L"	"H"	"T"	VOL. CONC. CU. YARDS
TEST PRESSURE = 150 P.S.I. & BELOW					
11 1/4°	6	1.5	2	2.5	0.19
22 1/2°	6	1.5	2	2.52	0.19
45°	6	2	2.25	2.6	0.26
90°	6	2.5	2.5	3.01	0.40
TEE	6	2	2.25	2.5	0.25
PLUG	6	2	2.25	2.5	0.25
11 1/4°	8	1.66	2.16	2.67	0.23
22 1/2°	8	1.66	2.16	2.69	0.23
45°	8	2.66	2.66	2.77	0.41
90°	8	3.66	3.16	3.21	0.75
TEE	8	3.16	2.91	2.66	0.50
PLUG	8	3.16	2.91	2.66	0.50
11 1/4°	12	2	2.5	3	0.33
22 1/2°	12	2.5	2.75	3.02	0.44
45°	12	4	3.5	3.12	0.87
90°	12	5.5	4.25	3.62	1.63
TEE	12	4.5	3.75	3	0.99
PLUG	12	4.5	3.75	3	0.99
TEST PRESSURE = 151 P.S.I. to 200 P.S.I.					
11 1/4°	6	1.5	2	2.5	0.19
22 1/2°	6	1.5	2	2.52	0.19
45°	6	2	2.55	2.6	0.29
90°	6	3	2.75	3.01	0.52
TEE	6	2.5	2.5	2.5	0.34
PLUG	6	2.5	2.5	2.5	0.34
11 1/4°	8	1.66	2.16	2.67	0.23
22 1/2°	8	2.16	2.41	2.69	0.31
45°	8	3.16	2.91	2.77	0.52
90°	8	4.16	3.41	3.21	0.90
TEE	8	3.66	3.16	2.66	0.62
PLUG	8	3.66	3.16	2.66	0.62
11 1/4°	12	2	2.5	3	0.33
22 1/2°	12	3	3	3.02	0.56
45°	12	4.5	3.75	3.12	1.03
90°	12	6.5	4.75	3.62	2.14
TEE	12	5.5	4.25	3	1.35
PLUG	12	5.5	4.25	3	1.35
TEST PRESSURE = 201 P.S.I. to 250 P.S.I.					
11 1/4°	6	1.5	2	2.5	0.19
22 1/2°	6	1.5	2	2.52	0.19
45°	6	2.5	2.5	2.6	0.35
90°	6	3.5	3	3.01	0.64
TEE	6	3	2.75	2.5	0.43
PLUG	6	3	2.75	2.5	0.43
11 1/4°	8	1.66	2.16	2.67	0.23
22 1/2°	8	2.16	2.41	2.69	0.31
45°	8	3.66	3.16	2.77	0.64
90°	8	4.66	3.66	3.21	1.07
TEE	8	4.16	3.41	2.66	0.75
PLUG	8	4.16	3.41	2.66	0.75
11 1/4°	12	2.5	2.75	3	0.44
22 1/2°	12	3.5	3.25	3.02	0.69
45°	12	5.5	4.25	3.12	1.41
90°	12	7.5	5.25	3.62	2.71
TEE	12	6	4.5	3	1.56
PLUG	12	6	4.5	3	1.56

THE CITY OF LYNCHBURG — TYPE "F" HORIZONTAL ANCHOR BLOCKING — SCALE: NOT TO SCALE — DETAIL # 26.02 — REVISION DATE: 12-14-2013 — SHEET # 2 OF 3
USE WITH THE CITY OF LYNCHBURG STANDARD SPECIFICATIONS ONLY



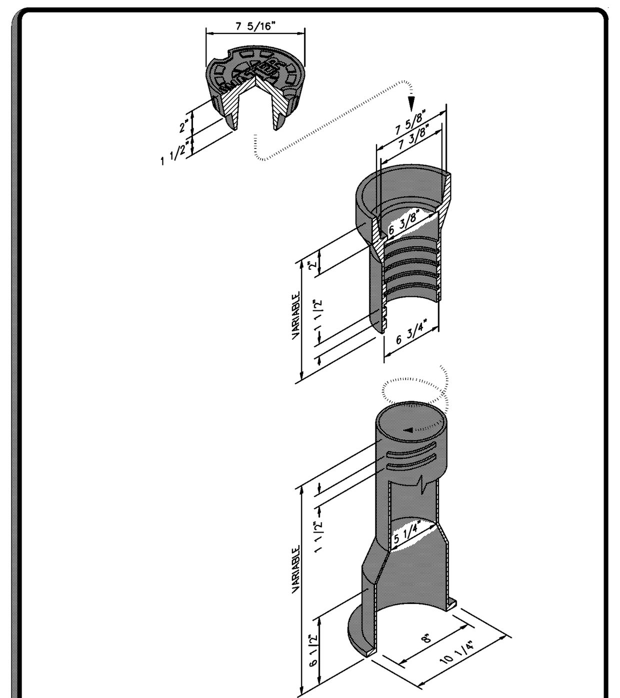
NOTES:
1. THIS BOX AND LID IS NON-TRAFFIC BEARING. WHEN A TRAFFIC BEARING BOX AND LID IS REQUIRED, DETAIL SHALL BE SUBMITTED TO CITY ENGINEER FOR APPROVAL.

THE CITY OF LYNCHBURG — STANDARD 18"x24", 24"x30", or 30"x30" – ROUND METER BOX — SCALE: NOT TO SCALE — DETAIL # 26.15 — REVISION DATE: 12-14-2013 — SHEET # 1 OF 1
USE WITH THE CITY OF LYNCHBURG STANDARD SPECIFICATIONS ONLY

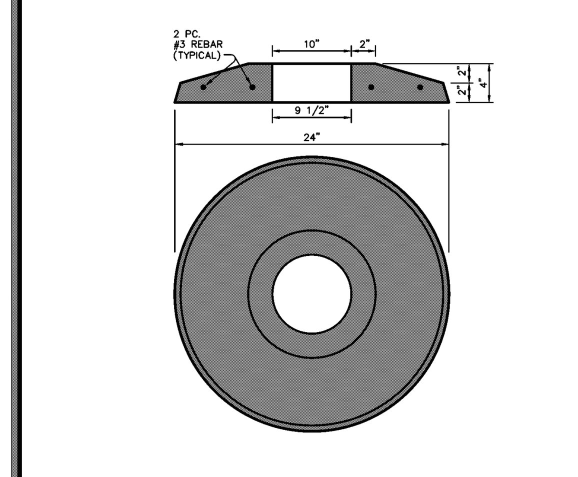
TYPE "F" HORIZONTAL ANCHOR BLOCK DATUM

TYPE FITTING	PIPE SIZE INCHES	DIMENSIONS (Ft.) "L"	"H"	"T"	VOL. CONC. CU. YARDS
TEST PRESSURE = 150 P.S.I. & BELOW					
11 1/4°	16	3	2	3	0.48
22 1/2°	16	4	3	3	0.93
45°	16	6	4	3	1.81
90°	16	8	5.5	3.75	3.92
TEE	16	8	5.5	2.67	3.02
PLUG	16	8	5.5	2.67	3.02
11 1/4°	24	4.5	3	4	1.31
22 1/2°	24	6	4.5	4	2.56
45°	24	8.5	6.25	4	4.97
90°	24	12	8	4.5	9.84
TEE	24	12	8	4	8.94
PLUG	24	12	8	4	8.94
TEST PRESSURE = 151 P.S.I. to 200 P.S.I.					
11 1/4°	16	3	2.67	3	0.63
22 1/2°	16	4.5	3.5	3	1.20
45°	16	7.5	4.25	3	2.40
90°	16	10	5.75	3.75	5.11
TEE	16	10	5.75	5	6.46
PLUG	16	10	5.75	5	6.46
11 1/4°	24	5	3.5	4	1.68
22 1/2°	24	7	5	4	3.30
45°	24	10	7	4	6.54
90°	24	13	10	4.5	13.31
TEE	24	13	10	4.5	13.31
PLUG	24	13	10	4.5	13.31
TEST PRESSURE = 201 P.S.I. to 250 P.S.I.					
11 1/4°	16	3.5	3	3	0.81
22 1/2°	16	5.5	3.67	3	1.53
45°	16	7.5	5.25	3	2.95
90°	16	12	6	3.75	6.38
TEE	16	12	6	4	6.72
PLUG	16	12	6	4	6.72
11 1/4°	24	6	3.75	4	2.14
22 1/2°	24	8	5.5	4	4.13
45°	24	12	7.25	4	8.11
90°	24	14	11.5	4.75	17.21
TEE	24	14	11.5	4.75	17.21
PLUG	24	14	11.5	4.75	17.21

THE CITY OF LYNCHBURG — TYPE "F" HORIZONTAL ANCHOR BLOCKING — SCALE: NOT TO SCALE — DETAIL # 26.02 — REVISION DATE: 12-14-2013 — SHEET # 3 OF 3
USE WITH THE CITY OF LYNCHBURG STANDARD SPECIFICATIONS ONLY

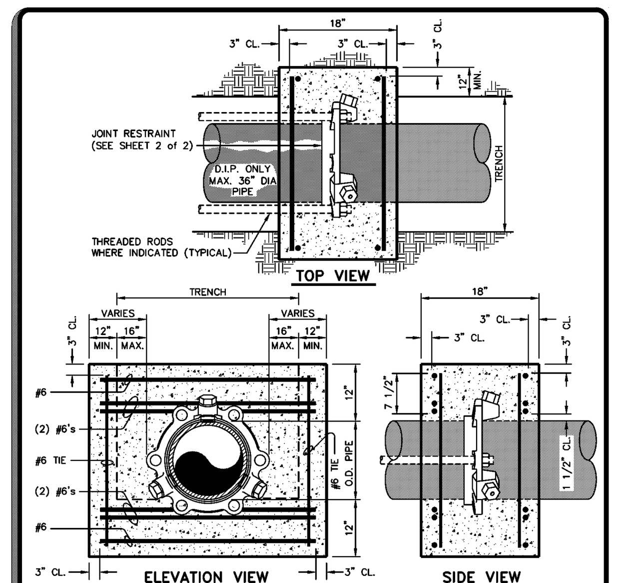


THE CITY OF LYNCHBURG — 2 – PIECE ADJUSTABLE SCREW VALVE BOX DETAIL — SCALE: NOT TO SCALE — DETAIL # 26.16 — REVISION DATE: 12-14-2013 — SHEET # 1 OF 1
USE WITH THE CITY OF LYNCHBURG STANDARD SPECIFICATIONS ONLY



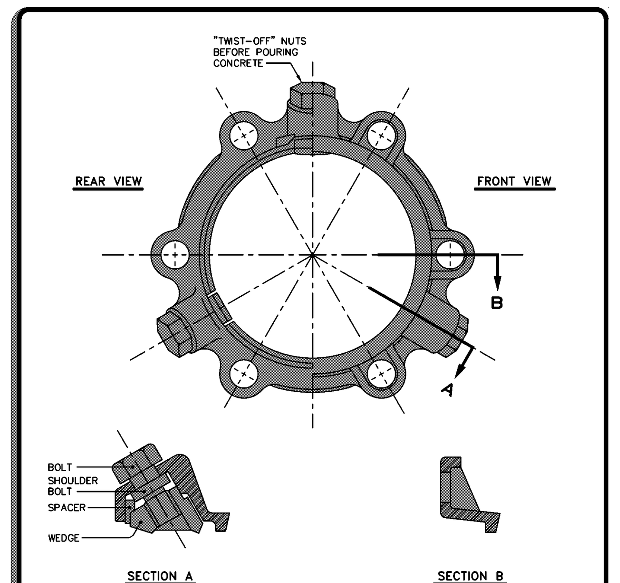
NOTES:
1. VALVE BOX PAD IS TO BE MADE OF CLASS A-3 CONCRETE (3000 PSI @ 28 DAYS).
2. TO BE USED IN UNPAVED AREAS.

THE CITY OF LYNCHBURG — VALVE BOX PRECAST SHOULDER SLAB DETAIL — SCALE: NOT TO SCALE — DETAIL # 26.18 — REVISION DATE: 12-14-2013 — SHEET # 1 OF 1
USE WITH THE CITY OF LYNCHBURG STANDARD SPECIFICATIONS ONLY



NOTES:
1. CONCRETE SHALL BE 3000 P.S.I.
2. REINFORCING BARS SHALL BE DEFORMED, AND TIED TOGETHER.
3. TRENCH BOTTOM WIDTH IN VICINITY OF THRUST BLOCK(S) INSTALLATION SHALL BE THE MINIMUM WIDTH.
4. BACKFILL AND COMPACT IN 6" LAYERS.
5. PLACE THRUST COLLAR ON ONE FULL JOINT OF PIPE.
6. LAST JOINT OF PIPE WITH THRUST COLLAR TO BE MECHANICAL JOINT PIPE.
7. PLACE RESTRAINED JOINT THRUST RING 4' FROM PLUG END OF PIPE.

THE CITY OF LYNCHBURG — THRUST COLLAR & BLOCKING DETAIL — SCALE: NOT TO SCALE — DETAIL # 26.04 — REVISION DATE: 12-14-2013 — SHEET # 1 OF 2
USE WITH THE CITY OF LYNCHBURG STANDARD SPECIFICATIONS ONLY



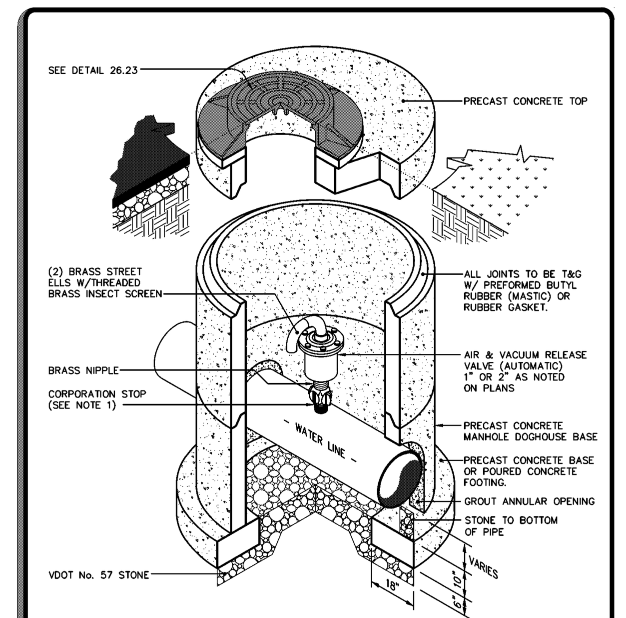
THE CITY OF LYNCHBURG — THRUST RING — SCALE: NOT TO SCALE — DETAIL # 26.04 — REVISION DATE: 12-14-2013 — SHEET # 2 OF 2
USE WITH THE CITY OF LYNCHBURG STANDARD SPECIFICATIONS ONLY

TIE ROD ANCHORS DATUM

PIPE SIZE (INCHES)	ROD DIAMETER (INCHES)	NUMBER OF A307 RODS REQUIRED
TEST PRESSURE = 150 P.S.I. & BELOW		
6	3/4	2
8	3/4	2
10	3/4	2
12	3/4	4
16	3/4	6
20	3/4	8
24	1	8
30	1	10
TEST PRESSURE = 151 P.S.I. to 200 PSI		
6	3/4	2
8	3/4	2
10	3/4	4
12	3/4	6
16	3/4	8
20	3/4	12
24	1	10
30	1	14
TEST PRESSURE = 201 P.S.I. to 250 P.S.I.		
6	3/4	4
8	3/4	4
10	3/4	4
12	3/4	6
16	3/4	12
20	3/4	14
24	1	16
30	1	20

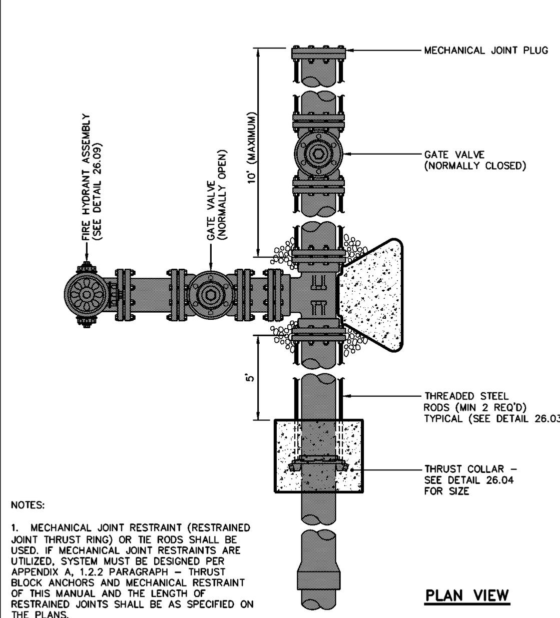
TIE RODS SHALL BE A307 CADMIUM COATED TIE RODS.

THE CITY OF LYNCHBURG — TIE ROD ANCHORS DATUM CHART — SCALE: NOT TO SCALE — DETAIL # 26.03 — REVISION DATE: 12-14-2013 — SHEET # 1 OF 1
USE WITH THE CITY OF LYNCHBURG STANDARD SPECIFICATIONS ONLY



NOTES:
1. DO NOT EXCEED ALLOWABLE DIRECT TAP ALLOWED BY PIPE MANUFACTURER. OTHERWISE, USE DOUBLE STRAP SERVICE SADDLE FOR 2" AIR RELEASE.
2. CONE SECTION MAY BE SUBSTITUTED FOR FLAT TOP ACCORDING TO DEPTH.

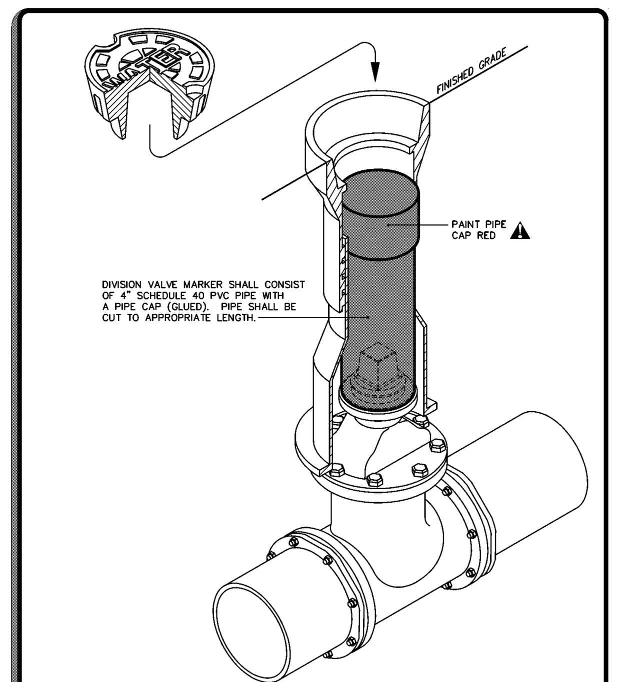
THE CITY OF LYNCHBURG — AIR & VACUUM RELEASE VALVE in PRECAST MANHOLE — SCALE: NOT TO SCALE — DETAIL # 26.11 — REVISION DATE: 12-14-2013 — SHEET # 1 OF 1
USE WITH THE CITY OF LYNCHBURG STANDARD SPECIFICATIONS ONLY



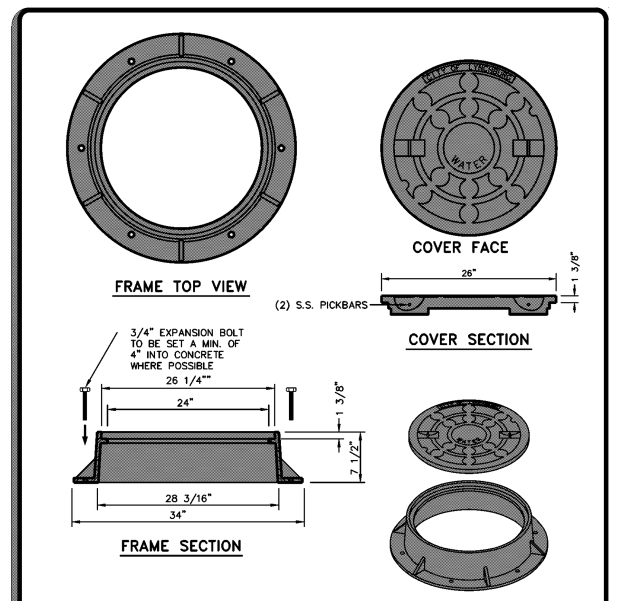
NOTES:

1. MECHANICAL JOINT RESTRAINT (RESTRAINED JOINT THRUST RING) OR TIE RODS SHALL BE USED. IF MECHANICAL JOINT RESTRAINTS ARE UTILIZED, SYSTEM MUST BE DESIGNED PER APPENDIX A, 1.2.2 PARAGRAPH – THRUST BLOCK ANCHORS AND MECHANICAL RESTRAINT OF THIS MANUAL AND THE LENGTH OF RESTRAINED JOINTS SHALL BE AS SPECIFIED ON THE PLANS.

THE CITY OF LYNCHBURG — END of LINE for FUTURE EXPANSION — SCALE: NOT TO SCALE — DETAIL # 26.08 — REVISION DATE: 12-14-2013 — SHEET # 1 OF 1
USE WITH THE CITY OF LYNCHBURG STANDARD SPECIFICATIONS ONLY

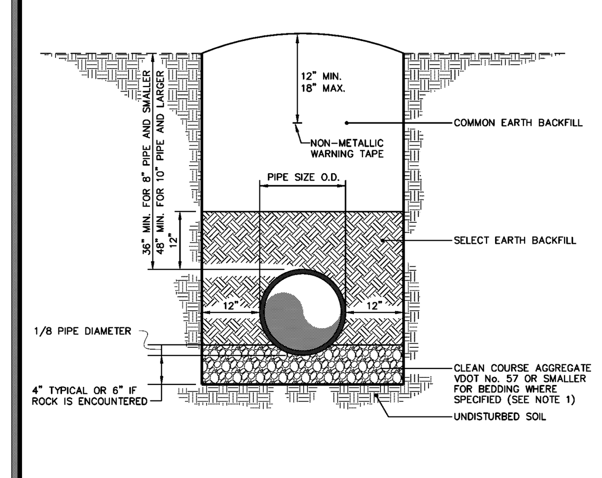


THE CITY OF LYNCHBURG — DIVISION VALVE MARKER DETAIL — SCALE: NOT TO SCALE — DETAIL # 26.17 — REVISION DATE: 12-14-2013 — SHEET # 1 OF 1
USE WITH THE CITY OF LYNCHBURG STANDARD SPECIFICATIONS ONLY



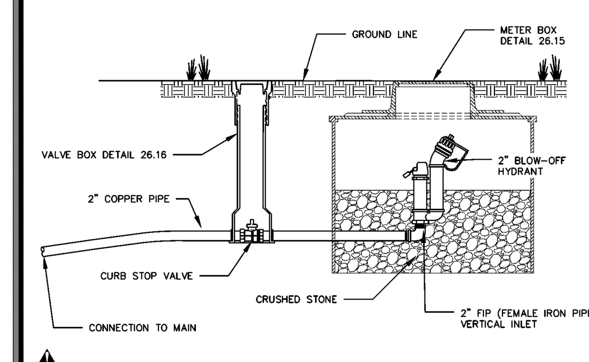
NOTES:
1. PARTS #'s: US FOUNDRY 710 RING AND DP COVER, EAST JORDAN IRON WORKS OR APPROVED EQUAL.
2. MANHOLE FRAMES AND COVERS SHALL BE ROADWAY TYPE WITH DEEP SOCKET COVERS. MACHINE FRAMES AND COVERS TO PREVENT RATTLING. CASTINGS SHALL BE GRAY IRON MEETING REQUIREMENTS OF ASTM A48, CLASS 30.

THE CITY OF LYNCHBURG — STANDARD MANHOLE FRAME and COVER — SCALE: NOT TO SCALE — DETAIL # 26.23 — REVISION DATE: 12-14-2013 — SHEET # 1 OF 1
USE WITH THE CITY OF LYNCHBURG STANDARD SPECIFICATIONS ONLY



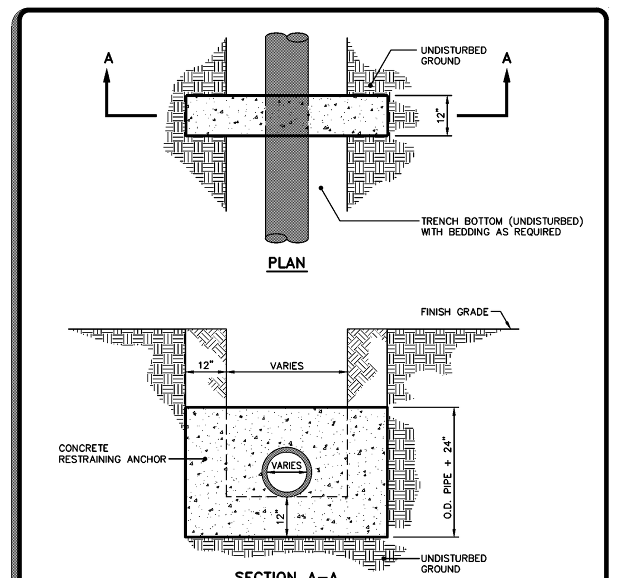
NOTES:
1. BEDDING SHALL BE REQUIRED FOR WATER LINES 16" IN DIAMETER AND LARGER OR IF ROCK IS ENCOUNTERED.
2. EXTRA DEPTH EXCAVATION SHALL BE PAID FOR AS ANYTHING BEYOND 4' OF COVER TO TOP OF PIPE.
3. ANY EXCAVATION BEYOND TRENCH LIMITS SHOWN ON DETAIL SHALL BE AT THE CONTRACTOR'S EXPENSE.

THE CITY OF LYNCHBURG — WATER LINE TRENCH DETAIL — SCALE: NOT TO SCALE — DETAIL # 26.01 — REVISION DATE: 12-14-2013 — SHEET # 1 OF 1
USE WITH THE CITY OF LYNCHBURG STANDARD SPECIFICATIONS ONLY



⚠ USE ONLY WHEN STANDARD FIRE HYDRANT (DETAIL 26.09) IS NOT PRACTICAL. APPROVAL OF CITY UTILITIES ENGINEER IS REQUIRED.

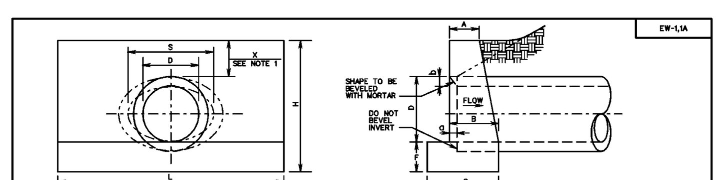
THE CITY OF LYNCHBURG — 2" BLOW-OFF ASSEMBLY DETAIL — SCALE: NOT TO SCALE — DETAIL # 26.10 — REVISION DATE: 12-14-2013 — SHEET # 1 OF 1
USE WITH THE CITY OF LYNCHBURG STANDARD SPECIFICATIONS ONLY



NOTES:
1. SPACING FOR CONCRETE RESTRAINING ANCHORS SHALL BE AS SHOWN ON THE PLANS.
2. THE PORTION OF THE ANCHOR IN UNDISTURBED GROUND SHALL BE POURED UNFORMED.
3. CONCRETE SHALL BE 3000 PSI.
4. CONCRETE ANCHOR TO BE POURED AROUND BELL OF PIPE WHERE APPLICABLE.
5. USE ON SLOPES EQUAL TO OR GREATER THAN 20%.
6. PIPE SHALL BE DUCTILE IRON PIPE.

THE CITY OF LYNCHBURG — CONCRETE RESTRAINING ANCHOR — SCALE: NOT TO SCALE — DETAIL # 27.21 — REVISION DATE: 12-14-2013 — SHEET # 1 OF 1
USE WITH THE CITY OF LYNCHBURG STANDARD SPECIFICATIONS ONLY

EW-1,1A



NOTES:
1. "H" MAY BE REDUCED UNTIL "X" REACHES A MINIMUM OF 4" WHERE ENDWALL WOULD PROTRUDE ABOVE SHOULDER LINE. IN NO CASE SHALL TOP OF ENDWALL PROJECT ABOVE FILL SLOPE, DITCH SLOPE, OR SHOULDER.
2. THIS ITEM MAY BE PRECAST OR CAST IN PLACE.
3. ALL CAST IN PLACE CONCRETE TO BE CLASS A3. FOR PRECAST SEE SHEET 101.02.
4. THIS STANDARD TO BE USED WITH STRAIGHT CROSSINGS AND ALL SKEWS(0° TO 45°).
5. HEADWALL TO BE BEVELED IN ALL AREAS EXCEPT WHERE A CONFLICT WITH INVERT OR WINGWALLS OCCUR
6. BEVEL EDGE IS REQUIRED ON THE HEADWALL AT THE INLET END OF THE CULVERT (WHERE THE FLOW ENTERS THE CULVERT).
7. HEADWALL AT THE OUTLET END OF THE CULVERT MAY BE EITHER SQUARE EDGE OR BEVEL EDGE.
8. ON SHALLOW FILLS, WHERE ENDWALLS ARE 1' OR LESS BELOW SHOULDER LINE, THE TOP OF THE ENDWALL SHALL BE CONSTRUCTED PARALLEL TO THE GRADE OF THE ROAD.
9. ¾" CHAMFER MAY BE PROVIDED ON ALL EDGES AT MANUFACTURER'S OPTION.

EW-1

ENDWALL FOR CIRCULAR PIPE

	DIAMETER OF PIPE CULVERT 12"	15"	18"	21" OR 24"	27" OR 30"	33" OR 36"
A	0'-6"	0'-8"	0'-9"	0'-11"	1'-0"	1'-0"
B	0'-11"	1'-1"	1'-3"	1'-6"	1'-9"	2'-0"
C	1'-4"	1'-7"	1'-9"	2'-2"	2'-6"	2'-9"
D	1'-0"	1'-3"	1'-6"	2'-0"	2'-6"	3'-0"
F	0'-6"	0'-8"	0'-8"	0'-9"	0'-9"	0'-9"
H	2'-3"	2'-11"	3'-2"	3'-9"	4'-3"	4'-9"
L	4'-0"	5'-0"	6'-0"	8'-0"	10'-0"	12'-0"
a	0'-1/4"	0'-1¾"	0'-2"	0'-2½"	0'-3¼"	0'-3¾"
b	0'-1"	0'-1/4"	0'-1/2"	0'-2"	0'-2½"	0'-3"
CUBIC YARDS OF CONCRETE						
CONC. PIPE	0.241	0.492	0.697	1.319	2.067	2.947
C.M. PIPE	0.257	0.521	0.739	1.398	2.198	3.145

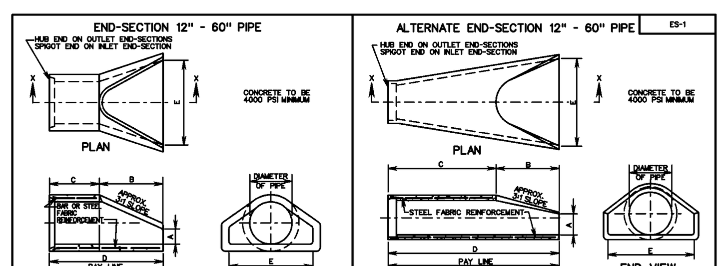
EW-1A

ENDWALL FOR ELLIPTICAL PIPE

	SIZE OF ELLIPTICAL PIPE CULVERT (SPAN x RISE) 23"x14"	30"x19"	34"x22"	38"x24"	42"x27"	45"x29"	49"x32"	53"x34"
A	0'-8"	0'-9"	0'-10"	0'-11"	0'-11"	1'-0"	1'-0"	1'-0"
B	1'-2"	1'-5"	1'-6"	1'-8"	1'-9"	1'-10"	1'-11"	1'-11"
C	1'-8"	1'-11"	2'-1"	2'-4"	2'-5"	2'-7"	2'-8"	2'-9"
D	1'-2"	1'-7"	1'-10"	2'-0"	2'-3"	2'-5"	2'-8"	2'-10"
F	0'-8"	0'-8"	0'-9"	0'-9"	0'-9"	0'-9"	0'-9"	0'-9"
H	2'-10"	3'-3"	3'-7"	3'-9"	4'-0"	4'-2"	4'-5"	4'-7"
L	5'-5"	7'-2"	8'-6"	9'-2"	10'-2"	10'-11"	12'-1"	12'-11"
S	1'-11"	2'-6"	2'-10"	3'-2"	3'-6"	3'-9"	4'-1"	4'-5"
a	0'-2½"	0'-3¼"	0'-3½"	0'-4"	0'-4½"	0'-4¾"	0'-5"	0'-5½"
b	0'-2"	0'-2½"	0'-2¾"	0'-3"	0'-3½"	0'-3¾"	0'-4"	0'-4½"
CUBIC YARDS OF CONCRETE								
CONC.PIPE	0.502	0.855	1.236	1.500	1.811	2.101	2.512	2.801

SPECIFICATION REFERENCE 105 302 — **STANDARD ENDWALL FOR PIPE CULVERTS** — 12" - 36" CIRCULAR AND 23" x 14" - 53" x 34" ELLIPTICAL PIPES — VIRGINIA DEPARTMENT OF TRANSPORTATION — VDOT ROAD AND BRIDGE STANDARDS — REVISION DATE — SHEET 1 OF 1 — 101.01

ES-1

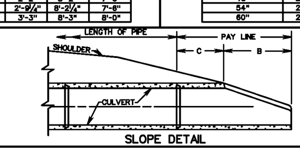


END SECTION DIMENSIONS (END-SECTION 12" - 60" PIPE)

PIPE DIAMETER	A	B	C	D	E
12"	4"	2'-0"	2'-0"	4'-0"	2'-0"
15"	6"	2'-3"	1'-9"	4'-0"	2'-6"
18"	9"	2'-3"	1'-9"	4'-0"	3'-0"
21"	9¼"	2'-11"	2'-1"	5'-0"	3'-6"
24"	9½"	3'-7"	2'-6"	6'-1"	4'-0"
27"	10¾"	4'-0"	2'-1"	6'-1"	4'-6"
30"	1'-0"	4'-6"	1'-7¾"	6'-1¾"	5'-0"
33"	1'-1½"	4'-10½"	2'-3¼"	7'-1¼"	5'-6"
36"	1'-3"	5'-3"	2'-10¾"	8'-1¾"	6'-0"
42"	1'-9"	5'-3"	2'-11"	8'-2"	6'-6"
48"	2'-0"	6'-0"	2'-2"	8'-2"	7'-0"
54"	2'-3"	5'-5"	2'-9¼"	8'-2¼"	7'-6"
60"	2'-11"	5'-0"	3'-3"	8'-3"	8'-0"

END SECTION DIMENSIONS (ALTERNATE END-SECTION 12" - 60" PIPE)

PIPE DIAMETER	A	B	C	D	E
12"	4"	2'-0"	4'-1"	6'-1"	2'-0"
15"	6"	2'-3"	3'-10"	6'-1"	2'-6"
18"	9"	2'-3"	3'-10"	6'-1"	3'-0"
21"	9"	2'-11"	3'-2"	6'-1"	3'-6"
24"	10"	3'-7"	2'-8"	6'-3"	4'-0"
27"	10½"	4'-0"	2'-1½"	6'-1½"	4'-6"
30"	1'-0"	4'-6"	1'-7¾"	6'-1¾"	5'-0"
33"	1'-1½"	4'-10½"	3'-3¼"	8'-1¾"	5'-6"
36"	1'-3"	5'-3"	2'-10¾"	8'-1¾"	6'-0"
42"	1'-9"	5'-3"	2'-11"	8'-2"	6'-6"
48"	2'-0"	6'-0"	2'-2"	8'-2"	7'-0"
54"	2'-3"	5'-5"	2'-11"	8'-4"	7'-6"
60"	2'-6"	5'-0"	3'-3"	8'-3"	8'-0"



NOTES:
PIPE LENGTHS SHOWN ON PLANS ARE BASED ON END-SECTION DESIGN SHOWN ON THE LEFT. IF THE CONTRACTOR ELECTS TO USE THE ALTERNATE DESIGN SHOWN ON THE RIGHT, LENGTHS WILL BE REDUCED BY THE DIFFERENCE IN DIMENSION "D".

SPECIFICATION REFERENCE 302 — **FLARED END SECTION** — 12" - 60" CONCRETE PIPE CULVERTS — VIRGINIA DEPARTMENT OF TRANSPORTATION — VDOT ROAD AND BRIDGE STANDARDS — REVISION DATE — SHEET 1 OF 1 — 102.01

CITY ENGINEER: ______ DATE: ______

UTILITIES ENGINEER: ______ DATE: ______

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COMMONWEALTH OF VIRGINIA — RUSSELL H. ORRISON — Lic. No. 031849 — 05/12/2015 — PROFESSIONAL ENGINEER

JOB:

LIBERTY UNIVERSITY
LIBERTY MOUNTAIN DRIVE
EXTENSION AT THE NORTHERN
INTRAMURAL FIELDS
LYNCHBURG, VIRGINIA

CLIENT:

LIBERTY UNIVERSITY
ATTN: MAGGIE COSSMAN

MARK	DATE	DESCRIPTION
1	05/12/15	PER CITY/AEP COMMENTS

ISSUE: 10/07/2014
CONTOUR INTERVAL: –
DESIGNED BY: RHO/GGW
DRAWN BY: PWS
CHECKED BY: RHO

SHEET TITLE

DETAILS

RWS PROJECT # 14018-RW

JOB NO.: 13331 — SHEET NO 15 OF 17

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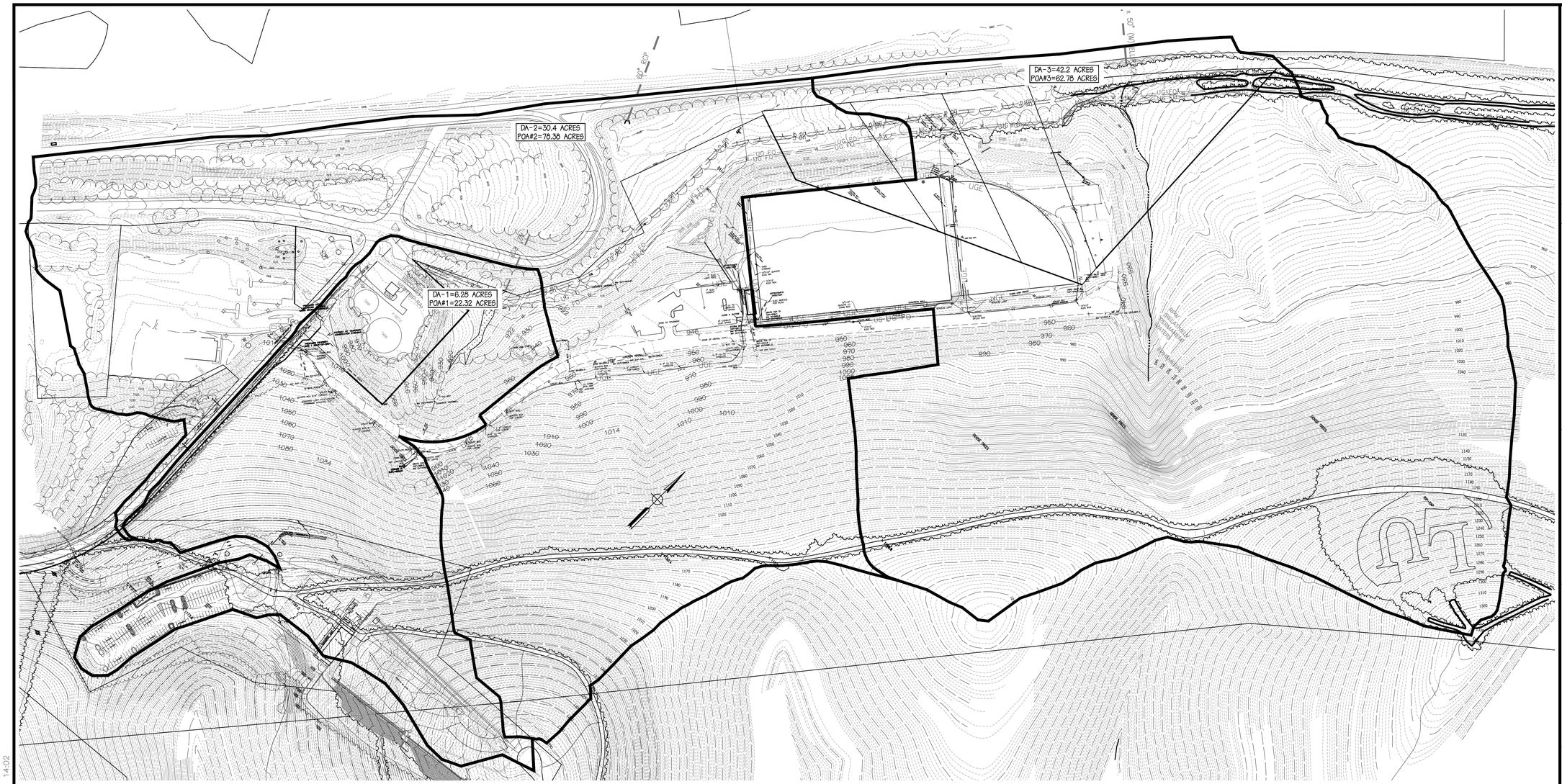

PRE-DEVELOPED
DRAINAGE DIVIDES MAP

FLOW SUMMARY TABLE

ID	DV1	DV2	DV3	DV4	DV5	DV6	DV7	DV8	DV9	DV10	DV11	DV12	SCC1	SCC2	SCC3	OP1	OP2	OP3	OP4	OP5
DESIGN EVENT FREQUENCY (YR)	2 YR, 10 YR	2 YR, 10 YR	2 YR, 10 YR	2 YR, 10 YR	2 YR, 10 YR	2 YR, 10 YR	2 YR, 10 YR	2 YR, 10 YR	2 YR, 10 YR	2 YR, 10 YR	2 YR, 10 YR	2 YR, 10 YR	2 YR, 10 YR	2 YR, 10 YR	2 YR, 10 YR	10 YR	10 YR	10 YR	10 YR	10 YR
RAINFALL INTENSITY (IN/HR)	3.33, 4.54	4.13, 5.61	3.33, 4.54	4.13, 5.61	3.33, 4.54	3.33, 4.54	3.33, 4.54	3.33, 4.54	3.33, 4.54	3.33, 4.54	3.33, 4.54	3.33, 4.54	3.33, 4.54	3.33, 4.54	3.33, 4.54	2.6	4.54	5.61	4.54	4.54
POST DEVELOPMENT																				
DRAINAGE AREA ID(S)	4, 5	6	7	8	9	10	11	12	13	35	35	36	37	14	26	4, 5, 14, 15, 35, 37-42	4, 5	27	6, 7, 8, 19, 20, 21	13, 25, 31
TOTAL DRAINAGE AREA (AC.)	7.94	0.6	5.07	0.67	5.37	1.91	1.35	3.44	9.8	1.83	1.83	0.11	0.27	1.35	0.42	12.28	7.94	0.35	8.54	10.98
TIME OF CONCENTRATION (MIN)	10	5	10	5	10	10	10	10	10	13.7	13.7	14	5	5	5	32.1	10	5	10	10
COMPOSITE RUNOFF FACTOR	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.20	0.20	0.30	0.30	0.21	0.74	0.90	0.30	0.81	0.32	0.32
DESIGN FLOW (CFS)	7.9, 10.8	0.7, 1.0	5.06, 6.9	0.8, 1.1	5.4, 7.3	1.9, 2.6	1.35, 1.84	3.43, 4.69	9.8, 13.5	1.1, 1.5	1.1, 1.5	0.1, 0.1	0.3, 0.4	0.8, 1.1	4.0, 6.8	6.8	10.8	1.57	12.4	17.3
PRE-DEVELOPMENT																				
DRAINAGE AREA ID(S)	-	-	-	-	-	-	-	-	-							-	-	-	-	-
TOTAL DRAINAGE AREA (AC.)	-	-	-	-	-	-	-	-	-							-	-	-	-	-
TIME OF CONCENTRATION (MIN)	-	-	-	-	-	-	-	-	-							-	-	-	-	-
COMPOSITE RUNOFF FACTOR	-	-	-	-	-	-	-	-	-							-	-	-	-	-
DESIGN FLOW (CFS)	-	-	-	-	-	-	-	-	-							-	-	-	-	-

1. FROM APPROVED PLANS TITLED LIBERTY UNIVERSITY PHASE 1 LIBERTY MOUNTAIN DRIVE EAST & INTRAMURAL FIELDS PLANS

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EXTENSION AT THE NORTHERN
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LYNCHBURG, VIRGINIA

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ATTN: MAGGIE COSSMAN

MARK	DATE	DESCRIPTION
1	05/12/15	PER CITY/AEP COMMENTS

ISSUE: 10/07/2014
CONTOUR INTERVAL: 2'
DESIGNED BY: RHO/GGW
DRAWN BY: PWS
CHECKED BY: RHO

SHEET TITLE

DRAINAGE DIVIDES

GRAPHIC SCALE
0 150 300
1"=150'

RWS PROJECT #
14018-RW

JOB NO.: 13331
SHEET NO 16 OF 17

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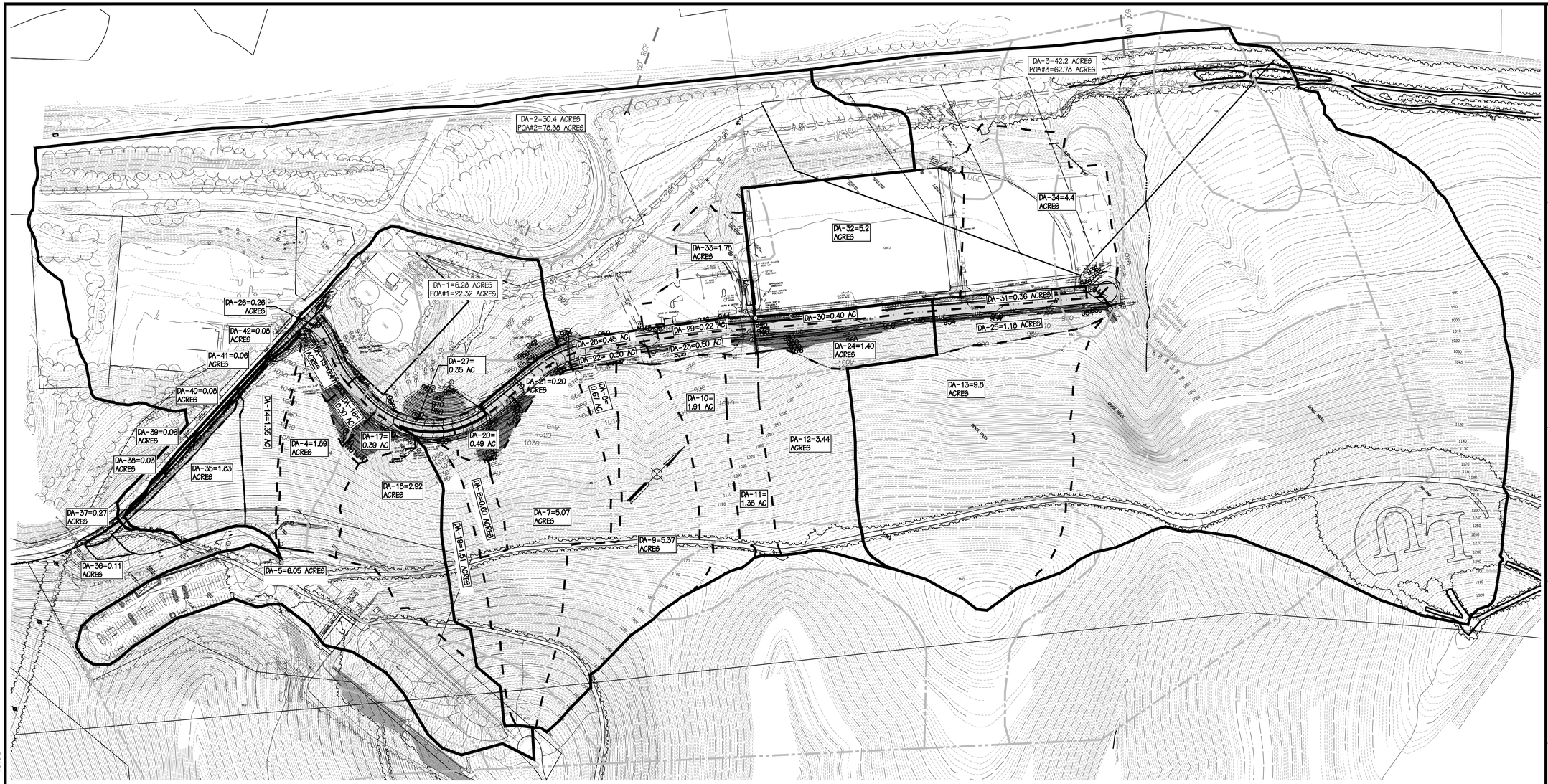

POST-DEVELOPED
DRAINAGE DIVIDES MAP

FLOW SUMMARY TABLE

ID	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	P15	P16	P17	POA#1	POA#2	POA#3	EX POND #1	EX POND #2
DESIGN EVENT FREQUENCY (YR)	10 YR	10 YR	10 YR	10 YR	10 YR	10 YR	10 YR	10 YR	10 YR	10 YR	10 YR	10 YR	10 YR	10 YR	10 YR	10 YR	10 YR	10 YR	10 YR	10 YR	10 YR	10 YR
RAINFALL INTENSITY (IN/HR)	2.6	4.54	4.54	4.54	5.61	5.61	4.54	5.61	5.61	5.61	4.54	3.6	2.7	2.7	4.0	3.2	5.6	4.54	3.36	4.09	3.85	3.85
POST DEVELOPMENT																						
DRAINAGE AREA ID(S)	4, 5, 14, 15, 35, 37-42	27	6, 7, 8, 19, 20, 21	9, 10, 22, 23	28	29	12, 23, 24	30	29, 30	31	13, 25, 31	4, 5, 14, 15	35, 37, 38, 39, 40, 41	35, 37, 38, 39, 40	35, 37	38, 39	38	1, 4, 5, 14, 15, 16, 17, 18, 26, 27, 35-42	POA#1, 2, EX POND#1, 6, 7, 8, 9, 10, 11, 12, 19, 20, 21, 22, 23, 24, 28	3, 13, 25, 31, 32, 34	29, 30, 33	32, 34
TOTAL DRAINAGE AREA (AC.)	12.28	0.35	8.54	7.58	0.45	0.22	7.58	0.4	0.62	0.36	10.98	9.76	2.33	2.27	2.10	0.09	0.03	22.32	78.38	62.78	2.4	9.6
TIME OF CONCENTRATION (MIN)	32.1	5	10	10	50	5	10	5	5	5	10	17.1	31.2	30.1	13.7	22.1	5	10	20	13	15	15
COMPOSITE RUNOFF FACTOR	0.90	0.61	0.32	0.31	.61	0.61	0.31	0.61	0.61	0.61	0.32	0.21	0.90	0.90	0.22	0.90	0.90	0.34	0.33	0.32	0.65	0.41
DESIGN FLOW (CFS)	6.8	1.57	12.4	10.7	2.02	1.0	10.7	1.8	2.8	1.6	17.3	7.42	1.78	1.67	1.65	0.26	0.15	34.5	84.3	69.7	3.3	3.2
PRE-DEVELOPMENT																						
DRAINAGE AREA ID(S)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TOTAL DRAINAGE AREA (AC.)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	84.4[1]	54.86[1]	-	-
TIME OF CONCENTRATION (MIN)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20[1]	13[1]	-	-
COMPOSITE RUNOFF FACTOR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.35[1]	0.31[1]	-	-
DESIGN FLOW (CFS)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	103.08[1]	69.56[1]	-	-

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MARK	DATE	DESCRIPTION
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DRAWN BY: PWS
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SHEET TITLE

DRAINAGE DIVIDES

GRAPHIC SCALE
0 150 300
1"=150'

RWS PROJECT #
14018-RW

JOB NO.: 13331
SHEET NO 17 OF 17

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