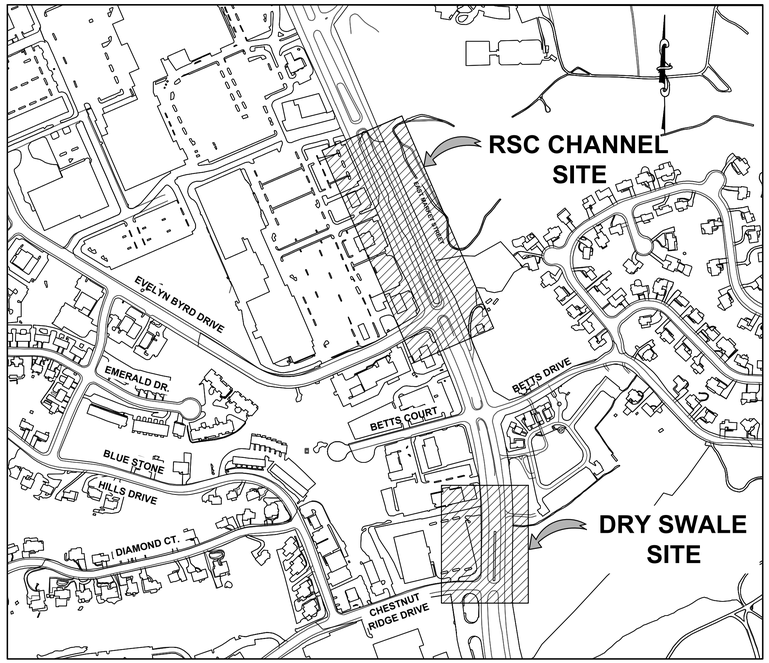
EAST MARKET STREET
STORMWATER IMPROVEMENTS

CITY OF HARRISONBURG, VIRGINIA
APRIL 6, 2016



VICINITY MAP
N.T.S.

SHEET INDEX

811

MISS UTILITY

CALL "MISS UTILITY" AT 811 or 1-800-552-7001, 48 HOURS PRIOR TO THE START OF WORK. THE EXCAVATOR MUST NOTIFY ALL PUBLIC UTILITY COMPANIES WITH UNDER GROUND FACILITIES IN THE AREA OF PROPOSED EXCAVATION AND HAVE THOSE FACILITIES LOCATED BY THE UTILITY COMPANIES PRIOR TO COMMENCING EXCAVATION. THE EXCAVATOR IS RESPONSIBLE FOR COMPLIANCE WITH REQUIREMENTS OF THE CITY OF HARRISONBURG.

A. MORTON THOMAS AND ASSOCIATES, INC.
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CITY OF HARRISONBURG VIRGINIA

REGISTRATION STAMP

COMMONWEALTH OF VIRGINIA
DONALD J. RISSMEYER
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OWNER

CITY OF HARRISONBURG

DEPARTMENT OF PUBLIC WORKS
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PROJECT TITLE

EAST MARKET STREET STORMWATER IMPROVEMENTS
CITY OF HARRISONBURG, VA

REVISIONS

MARK	DATE	DESCRIPTION

AMT FILE NO.	15-0571.001
DATE:	April 6, 2016
SCALE:	NTS
DESIGNED BY:	CC/DEC
DRAWN BY:	LAL
CHECKED BY:	DJR

BID DOCUMENTS

SHEET TITLE

COVER SHEET

SHEET

C0-0

SHEET 1 OF 32

CITY OF HARRISONBURG GENERAL NOTES
(DATED SEPTEMBER 8, 2009)

1. WORK IN THIS PROJECT SHALL CONFORM TO THE LATEST EDITIONS OF THE VIRGINIA DEPARTMENT OF TRANSPORTATION (VDOT) ROAD AND BRIDGE SPECIFICATIONS, THE VDOT ROAD AND BRIDGE STANDARDS, THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK, THE VIRGINIA EROSION AND SEDIMENT CONTROL REGULATIONS, THE VIRGINIA STORMWATER MANAGEMENT HANDBOOK, THE VIRGINIA STORMWATER MANAGEMENT REGULATIONS AND THE CITY OF HARRISONBURG DESIGN AND CONSTRUCTION STANDARDS MANUAL. IN THE EVENT OF CONFLICT BETWEEN ANY OF THESE STANDARDS, SPECIFICATIONS OR PLANS, THE MOST STRINGENT SHALL GOVERN. ALL UTILITIES TO BE DEDICATED TO THE CITY OF HARRISONBURG MUNICIPAL WATER AND/OR SANITARY SEWER SYSTEM SHALL BE CONSTRUCTED AND TESTED TO CONFORM TO COMMONWEALTH OF VIRGINIA/STATE BOARD OF HEALTH WATERWORKS AND/OR SEWERAGE REGULATIONS AND THE CITY OF HARRISONBURG DESIGN AND CONSTRUCTION STANDARDS MANUAL.
2. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE MAINTAINED CONTINUOUSLY RELOCATED WHEN AND AS NECESSARY AND SHALL BE CHECKED AFTER EVERY RAINFALL. SEEDED AREAS SHALL BE CHECKED REGULARLY AND SHALL BE WATERED, FERTILIZED, RESEEDED AND MULCHED AS NECESSARY TO OBTAIN A DENSE STAND OF GRASS.
3. ALL DRAIN INLETS SHALL BE PROTECTED FROM SILTATION. INEFFECTIVE PROTECTION DEVICES SHALL BE IMMEDIATELY REPLACED AND THE INLET CLEANED. FLUSHING IS NOT AN ACCEPTABLE METHOD OF CLEANING.
4. WHEN THE CRUSHED STONE CONSTRUCTION ENTRANCE HAS BEEN COVERED WITH SOIL OR HAS BEEN PUSHED INTO THE SOIL BY CONSTRUCTION TRAFFIC, IT SHALL BE REPLACED WITH A DEPTH OF STONE EQUAL TO THAT OF ORIGINAL APPLICATION.
5. THE LOCATION OF EXISTING UTILITIES AS SHOWN IS APPROXIMATE ONLY. THE CONTRACTOR IS RESPONSIBLE FOR LOCATING ALL PUBLIC OR PRIVATE UTILITIES THAT LIE IN OR ADJACENT TO THE CONSTRUCTION SITE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIRING, AT HIS EXPENSE, ALL EXISTING UTILITIES DAMAGED DURING CONSTRUCTION. FORTY-EIGHT (48) HOURS PRIOR TO ANY EXCAVATION CALL MISS UTILITY 1 (800) 552-7001.
6. ALL MATERIALS USED FOR FILL OR BACK-FILL SHALL BE FREE OF WOOD, ROOTS, ROCKS, BOULDERS OR ANY OTHER NON-COMPACTABLE SOIL TYPE MATERIAL. UNSATISFACTORY MATERIALS ALSO INCLUDE MAN-MADE FILLS AND REFUSE DEBRIS DERIVED FROM ANY SOURCE.
7. SATISFACTORY MATERIAL FOR USE AS FILL FOR PUBLIC STREETS INCLUDE MATERIAL CLASSIFIED IN ASTM D-2487 AS GW, GP, GM, GC, SW, SP, SM, SC, ML, AND CL GROUPS. THE MOISTURE CONTENT SHALL BE CONTROLLED WITHIN PLUS OR MINUS 2 PERCENTAGE POINTS OF OPTIMUM TO FACILITATE COMPACTION. GENERALLY, UNSATISFACTORY MATERIALS INCLUDE MATERIALS CLASSIFIED IN ASTM D-2487 AS PT, CH, MH, OL, OH, AND ANY SOIL TOO WET TO FACILITATE COMPACTION. CH AND MH SOILS MAY BE USED SUBJECT TO APPROVAL OF THE CITY ENGINEER. SOILS SHALL HAVE A MINIMUM DRY DENSITY OF 92 LB/CUBIC FOOT PER ASTM D-698 AND SHALL HAVE A PLASTICITY INDEX LESS THAN 12.
8. MATERIALS USED TO CONSTRUCT EMBANKMENTS FOR ANY PURPOSE, BACK-FILL AROUND DRAINAGE STRUCTURES OR IN UTILITY TRENCHES OR ANY OTHER DEPRESSION REQUIRING FILL OR BACK-FILL SHALL BE COMPACTED TO 95% OF MAXIMUM DENSITY AS DETERMINED BY THE STANDARD PROCTOR TEST AS SET OUT IN ASTM STANDARD D-698. THE CONTRACTOR SHALL, PRIOR TO ANY OPERATIONS INVOLVING FILLING OR BACKFILLING, SUBMIT THE RESULT OF THE PROCTOR TEST TO THE CITY'S ON-SITE INSPECTOR TOGETHER WITH A CERTIFICATION THAT THE SOIL TESTED IN REPRESENTATIVE OF THE MATERIALS TO BE USED ON THE PROJECT. TESTS SHALL BE CONDUCTED BY A CERTIFIED MATERIALS TESTING LABORATORY AND THE CERTIFICATIONS MADE BY A LICENSED PROFESSIONAL ENGINEER REPRESENTING THE LABORATORY.
9. CERTIFICATIONS FOR MATERIALS INCLUDING, BUT NOT LIMITED TO STONE, CONCRETE, PIPES, PRECAST UNITS, HANDRAILS, STABILIZATION MATS, TRAFFIC SIGNAL ITEMS, MUST BE PROVIDED TO THE CITY'S ON-SITE INSPECTOR AND APPROVED BY THE INSPECTOR PRIOR TO INSTALLATION. SEE INSPECTOR FOR MATERIALS CERTIFICATION CHECKLIST.
10. EMBANKMENT FILL AND TRENCH BACK-FILL SHALL BE PLACED IN LIFTS AT A MAXIMUM UNCOMPACTED DEPTH OF 8-INCHES AND 6-INCHES, RESPECTIVELY. DENSITY TESTS SHALL BE CONDUCTED AT THE FOLLOWING MINIMUM FREQUENCIES:

    (A) EMBANKMENT FOR ROADS, STREETS, DAMS, ETC.: ONE TEST PER LIFT PER 10,000 SQUARE FEET OF LIFT.

    (B) BACK-FILL AROUND STRUCTURES AND IN TRENCHES: ONE TEST PER LIFT PER 500 LINEAL FEET OF TRENCH.
11. ALL EXCAVATIONS, INCLUDING TRENCHES, SHALL BE KEPT DRY TO PROTECT THEIR INTEGRITY.
12. TEST RESULTS SHALL BE SUBMITTED TO THE CITY ENGINEER. FAILURE TO CONDUCT DENSITY TESTS AND SUBMIT TEST RESULTS SHALL BE CAUSE FOR NONACCEPTANCE OF THE FACILITY. TESTS SHALL BE CONDUCTED AT THE SOLE COST OF THE DEVELOPER OR HIS AGENT.
13. CITY INSPECTORS HAVE FULL AUTHORITY TO REJECT FILL OR BACKFILL MATERIALS, REQUIRE UNDERCUTTING OR SUB GRADE STABILIZATION, REQUIRE PROVISIONS FOR SUB DRAINAGE, OR REQUIRE OTHER MEASURES WHICH AFFECT THE INTEGRITY OF ROAD AND UTILITY CONSTRUCTION. FAILURE TO COMPLY WITH INSPECTORS' DIRECTIVES SHALL BE CAUSE FOR NON-ACCEPTANCE OF THE FACILITY.
14. TRAFFIC CONTROL ON PUBLIC STREETS SHALL BE IN CONFORMANCE WITH THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES AND AS FURTHER DIRECTED BY CITY INSPECTORS. CITY INSPECTORS MUST BE NOTIFIED 24-HOURS IN ADVANCE OF ANY PLANNED WORK OR ACTIVITY IN CITY RIGHT-OF-WAY THAT REQUIRES FLAGGING, LANE CLOSURE OR STREET CLOSURE. ALL SIGNAGE AND OTHER CONTROL DEVICES SHALL BE IN PLACE BEFORE SUCH ACTIVITIES CAN COMMENCE.
15. ANY DISCREPANCIES FOUND BETWEEN THE DRAWINGS AND SPECIFICATIONS AND SITE CONDITIONS OR ANY INCONSISTENCIES OR AMBIGUITIES IN DRAWINGS OR SPECIFICATIONS SHALL BE IMMEDIATELY REPORTED TO THE ENGINEER, IN WRITING, WHO SHALL PROMPTLY ADDRESS SUCH INCONSISTENCIES OR AMBIGUITIES. WORK DONE BY THE CONTRACTOR AFTER HIS DISCOVERY OF SUCH DISCREPANCIES, INCONSISTENCIES OR AMBIGUITIES SHALL BE DONE AT THE CONTRACTOR'S RISK.
16. A PRECONSTRUCTION CONFERENCE SHALL BE HELD PRIOR TO THE START OF CONSTRUCTION. THE CONTRACTOR SHALL ARRANGE THE MEETING WITH THE CITY ENGINEER. AT THIS TIME, THE CONTRACTOR SHALL PROVIDE A SCHEDULE AND TRAFFIC CONTROL PLAN FOR WORK WITHIN THE CITY RIGHT-OF-WAY.

DEMOLITION NOTES

1. THE CONTRACTOR IS ALERTED TO THE FACT THAT "MISS UTILITY" MUST BE CONTACTED AT 1-800-552-7001 A MINIMUM OF 48 HOURS PRIOR TO EXCAVATION.
2. THE LOCATIONS OF ALL EXISTING FACILITIES SHOWN ON THIS PLAN HAVE BEEN DETERMINED FROM THE BEST INFORMATION AVAILABLE AND ARE GIVEN FOR THE CONVENIENCE OF THE CONTRACTOR. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR THEIR ACCURACY. PRIOR TO THE START OF ANY DEMOLITION ACTIVITY, THE CONTRACTOR SHALL NOTIFY THE UTILITY COMPANIES FOR ON SITE LOCATIONS OF EXISTING UTILITIES.
3. THE CONTRACTOR SHALL FURNISH ALL MATERIALS, LABOR, SUPERVISION AND EQUIPMENT REQUIRED FOR THE ORDERLY DEMOLITION AND REMOVAL OF EXISTING STRUCTURES, PAVEMENT AND UTILITIES SHOWN ON THE DRAWINGS AND DESCRIBED HEREIN.
4. PROVIDE ADEQUATE PROTECTION FOR PERSONS AND PROPERTY AT ALL TIMES. EXECUTE THE WORK IN A MANNER TO AVOID HAZARDS TO PERSONS AND PROPERTY. STREETS AND SIDEWALKS SHALL NOT BE BLOCKED BY DEBRIS AND EQUIPMENT.
5. REMOVE AND LEGALLY DISPOSE OF ALL DEMOLITION DEBRIS. COMPLY WITH ALL APPLICABLE LAWS AND REGULATIONS GOVERNING DISPOSAL OF WASTE AND DEBRIS.
6. IT IS THE CONTRACTOR'S RESPONSIBILITY TO OBTAIN ANY REQUIRED PERMITTING FOR THE WORK SHOWN ON THE PLANS FROM EACH RESPECTIVE REPRESENTATIVE PRIOR TO COMMENCING WORK.
7. IT IS THE CONTRACTOR'S SOLE RESPONSIBILITY TO DETERMINE THE EXTENT OF DEMOLITION REQUIRED IN ORDER TO PERFORM THE CONTRACT WORK FOR THIS PROJECT. THE CONTRACTOR SHALL CONDUCT SITE VISITS AND SHALL EXAMINE ALL OF THE INFORMATION WITHIN THESE DOCUMENTS. ALL DISCREPANCIES AND/OR OMISSIONS SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER IMMEDIATELY.

GENERAL CONSTRUCTION NOTES

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ESTABLISHING AND MAINTAINING ALL LINES AND GRADES REQUIRED FOR CONSTRUCTION.
2. IT SHALL BE THE DUTY OF THE CONTRACTOR TO VERIFY ALL DIMENSIONS AND CONDITIONS GIVEN ON THE DRAWINGS AND REPORT TO THE ENGINEER ANY ERROR OR INCONSISTENCY WITH THE ACTUAL CIRCUMSTANCES IN THE FIELD PRIOR TO COMMENCING WORK.
3. ALL TEMPORARILY OUT OF SERVICE OR PERMANENTLY ABANDONED PIPES, TRENCHES, AND OTHER APPURTENANCES ENCOUNTERED BY THIS PROJECT SHALL BE REMOVED, CAPPED OR BULK HEADED, AS APPROPRIATE.
4. EXCEPT FOR MATERIALS INDICATED TO BE STOCKPILED OR OTHERWISE REMAIN OWNER'S PROPERTY, CLEARED MATERIALS SHALL BECOME CONTRACTOR'S PROPERTY AND SHALL BE REMOVED FROM PROJECT SITE.
5. RESTORE DAMAGED IMPROVEMENTS TO THEIR ORIGINAL CONDITION, AS ACCEPTABLE TO OWNER.

EXCAVATION

1. ALL EXCAVATION FOR UNDERGROUND PIPE INSTALLATION MUST COMPLY WITH OSHA STANDARDS FOR THE CONSTRUCTION INDUSTRY (29 CFR PART 1926).
2. REMOVE SURPLUS SOIL MATERIAL, UNSUITABLE SOIL/TOPSOIL, OBSTRUCTIONS, DEMOLISHED MATERIALS, AND WASTE MATERIALS INCLUDING TRASH AND DEBRIS, AND LEGALLY DISPOSE OF THEM OFF OWNER'S PROPERTY.
3. PROTECT STRUCTURES, UTILITIES, SIDEWALKS, PAVEMENTS, AND OTHER FACILITIES FROM DAMAGE CAUSED BY SETTLEMENT, LATERAL MOVEMENT, UNDERMINING, WASHOUT, AND OTHER HAZARDS CREATED BY EARTH-MOVING OPERATIONS.
4. EXCAVATE TO SUBGRADE ELEVATIONS REGARDLESS OF THE CHARACTER OF SURFACE AND SUBSURFACE CONDITIONS ENCOUNTERED. UNCLASSIFIED EXCAVATED MATERIALS MAY INCLUDE ROCK, SOIL MATERIALS, AND OBSTRUCTIONS. NO CHANGES IN THE CONTRACT SUM OR THE CONTRACT TIME WILL BE AUTHORIZED FOR EXCAVATION OR REMOVAL OF OBSTRUCTIONS.
5. RECONSTRUCT SUBGRADES DAMAGED BY FREEZING TEMPERATURES, FROST, RAIN, ACCUMULATED WATER, OR CONSTRUCTION ACTIVITIES, AS DIRECTED BY ENGINEER, WITHOUT ADDITIONAL COMPENSATION.
6. ALL SLOPES SHALL BE 2:1 OR FLATTER WITH THE EXCEPTION OF RIPRAP FOREBAYS.

FINAL STABILIZATION

1. ALL DISTURBED AREAS ARE TO BE FERTILIZED, SEEDED AND MULCHED, UNLESS OTHERWISE INDICATED.
2. GRASS SEED SHALL BE FRESH, CLEAN, DRY, NEW-CROP SEED COMPLYING WITH AOSA'S "RULES FOR TESTING SEEDS" FOR PURITY AND GERMINATION TOLERANCES.
3. FERTILIZER SHALL BE A COMMERCIAL-GRADE COMPLETE FERTILIZER OF NEUTRAL CHARACTER, CONSISTING OF FAST- AND SLOW-RELEASE NITROGEN, 50 PERCENT DERIVED FROM NATURAL ORGANIC SOURCES OF UREA FORMALDEHYDE, PHOSPHOROUS, AND POTASSIUM IN THE FOLLOWING COMPOSITION: 10 PERCENT NITROGEN, 20 PERCENT PHOSPHOROUS, AND 10 PERCENT POTASSIUM, BY WEIGHT.
4. STRAW MULCH SHALL BE AIR-DRY, CLEAN, MILDEW- AND SEED-FREE, THRESHED STRAW OF WHEAT, RYE, OATS, OR BARLEY.
5. MOISTEN PREPARED AREA BEFORE PLANTING IF SOIL IS DRY. WATER THOROUGHLY AND ALLOW SURFACE TO DRY BEFORE PLANTING. DO NOT CREATE MUDDY SOIL.

SURVEY NOTES

1. THIS TOPOGRAPHIC SURVEY WAS COMPLETED UNDER THE DIRECT AND RESPONSIBLE CHARGE OF, JOHN S. CLAYTOR, L.S. FROM AN ACTUAL GROUND SURVEY MADE UNDER MY DIRECT SUPERVISION; THAT THE ORIGINAL DATA WAS OBTAINED ON NOVEMBER 23, 2015; AND THAT THIS PLAT, MAP, OR DIGITAL GEOSPATIAL DATA INCLUDING METADATA MEETS MINIMUM ACCURACY STANDARDS UNLESS OTHERWISE NOTED.
2. THIS FILE IS REFERENCED TO THE VIRGINIA STATE PLANE COORDINATE SYSTEM, NAD83 DATUM, NORTH ZONE, US SURVEY FEET. CONTROL STATION FILES WERE PROVIDED BY REPRESENTATIVES OF THE CITY OF HARRISONBURG FOR THE PURPOSE OF MEETING THE SAME COORDINATE BASIS AS WAS PREVIOUS SURVEYS COMPLETED BY OTHERS. THE COORDINATE VALUES GIVEN ARE UNDERSTOOD TO BE CORRECTED TO REFLECT SCALED GROUND VALUES.
3. THE ELEVATIONS DEPICTED IN THIS FILE ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM 1988 (NAVD88).
4. THE HORIZONTAL AND VERTICAL COORDINATE SYSTEMS REFERENCED IN THIS FILE WERE CHECKED WITH RTK-GPS SURVEYING TECHNIQUE UTILIZING MULTIPLE AND REDUNDANT OBSERVATIONS VERIFIED TO BE ACCURATE WITHIN A REASONABLE STANDARD.
5. THE BOUNDARY LINES AND RIGHT OF WAY LINES PROVIDED IN THIS FILE ARE DEPICTED AS PREVIOUSLY SURVEYED BY REPRESENTATIVES OF THE CITY OF HARRISONBURG. SOME BOUNDARY MONUMENTS WERE RECOVERED AND CONSIDERED WHEN DETERMINING THE POSITION OF THE PROJECT BOUNDARIES. HOWEVER, THE USER IS HEREBY ADVISED THAT THE BOUNDARY LINES SHOWN ARE NOT THE PRODUCT OF A BOUNDARY SURVEY AS DEFINED BY THE RULES AND STATUTES OF THE COMMONWEALTH OF VIRGINIA AND SHOULD BE CONSIDERED FOR INFORMATIONAL PURPOSES ONLY AND NOT USED FOR LAND CONVEYANCE, LAND ACQUISITION OR THE DESIGN OF PROJECT EASEMENTS.
6. UNDERGROUND UTILITIES AS SHOWN ON THIS SURVEY WERE LOCATED BY MISS UTILITY TICKET # B531400623-00B AND # B531400615-00B, DATED 11/16/15 AND SURVEYED ACCORDING TO THE MARKINGS PLACED BY OTHERS. THIS UTILITY LOCATION DOES NOT MEET THE QUALITY LEVEL A THROUGH D AND DEFINED BY THE FEDERAL HIGHWAY ADMINISTRATION AND THESE POSITIONS ARE FOR INFORMATIONAL PURPOSES ONLY.

ABBREVIATIONS

AOSA	ASSOCIATION OF OFFICIAL SEED ANALYSTS
APPROX.	APPROXIMATE
B.M.	BENCH MARK
BOT.	BOTTOM
CATV	CABLE TELEVISION
CL.	CLASS
CLF	CHAIN LINK FENCE
CMP	CORRUGATED METAL PIPE
C.O.	CLEANOUT
COMM	COMMUNICATION
CONC.	CONCRETE
D.I.	DROP INLET
DIP	DUCTILE IRON PIPE
DIA.	DIAMETER
E	EAST
EA	EACH
ELEC	ELECTRIC
ELEV	ELEVATION
EX or EXIST	EXISTING
FT	FEET
F or FL	FLOWLINE
F.H.	FIRE HYDRANT
G	GAS
G.V.	GAS VALVE
H.B.	HANDBOX
HDPE	HIGH DENSITY POLYETHYLENE
HERCP	HORIZONTAL ELLIPTICAL REINFORCED CONC. PIPE
IN	INCH
INV.	INVERT
J.B.	JUNCTION BOX
LF	LINEAR FEET
L.P.	LIGHT POLE
LT.	LEFT
LOD	LIMITS OF DISTURBANCE
MAX.	MAXIMUM
MOD.	MODIFIED
MIN.	MINIMUM
N	NORTH
O.C.	ON CENTER
OHE	OVERHEAD ELECTRIC
OHT	OVERHEAD TELEPHONE
PC	POINT OF CURVATURE
PI	POINT OF INTERSECTION
PROP	PROPOSED
PRC	POINT OF REVERSE CURVE
PT	POINT OF TANGENCY
PVC	POLYVINYL CHLORIDE
R	RADIUS
RSC	REGENERATIVE STEP-POOL CONVEYANCE
RT	RIGHT
RW OR R/W	RIGHT OF WAY
RCP	REINFORCED CONCRETE PIPE
S	SOUTH
SAN.	SANITARY SEWER
SF	SQUARE FEET
SHT.	SHEET
STD.	STANDARD
STA.	STATION
SY	SQUARE YARDS
SWM	STORMWATER MANAGEMENT
T	TANGENT
TYP.	TYPICAL
U.D.	UNDER DRAIN
UGE	UNDERGROUND ELECTRIC
U.P.	UTILITY POLE
USDA	UNITED STATES DEPT. OF AGRICULTURE
W	WEST
W.M.	WATER METER
W.S.E.L.	WATER SURFACE ELEVATION
W.V.	WATER VALVE

LEGEND

EXISTING	PROPOSED	
		MAIL BOX
		TEST HOLE
		STORM MANHOLE
		GRATE INLET (ROUND)
		GRATE INLET
		SIGN
		TREE
		BUSH
		TELEPHONE PEDESTAL
		TELEPHONE POLE
		POWER POLE
		GUY POLE
		ELECTRIC JUNCTION BOX
		TRAFFIC SIGNAL POLE
		LIGHT POLE
		LAMP POST
		GUY WIRE
563.81		GROUND SHOT
		SANITARY MANHOLE
		CLEAN OUT
		WATER VALVE
		WATER METER
		FIRE HYDRANT
		TRAVERSE
1470	1470	CONTOUR LINE
		CURB
		CURB AND GUTTER
		EDGE OF ROAD
		PROPERTY LINE/RIGHT OF WAY
		PLANTING AREA
		CENTERLINE DITCH
OHT		OVERHEAD TELEPHONE
OHE		OVERHEAD ELECTRIC
UGE		UNDERGROUND ELECTRIC
OHE&T		OVERHEAD ELECTRIC AND TELEPHONE
W		WATER LINE PAINT MARK
G		GAS LINE PAINT MARK
8" SAN		SANITARY SEWER LINE
		GUARDRAIL
X WDF		WOOD FENCE
X SRF		SPLIT RAIL FENCE
15" RCP		STORM DRAINAGE
		THALWEG
		SIDEWALK
		RSC CHANNEL STRUCTURE

UTILITY OWNERS

WATER & SEWER
CITY OF HARRISONBURG
ATTN: MARILYN HARTMAN (FIELD CONTACT)
540-434-9959
EMERGENCY / DAMAGE: 540-434-9959

STORM SEWER
CITY OF HARRISONBURG
ATTN: GLEN BALDWIN (FIELD CONTACT)
540-434-5928
EMERGENCY / DAMAGE: 540-434-5928

ELECTRICITY
HARRISONBURG ELECTRIC
ATTN: BRIAN O'DELL (FIELD CONTACT)
540-434-5361
EMERGENCY / DAMAGE: 540-434-5363

NATURAL GAS
COLUMBIA GAS
ATTN: PAT FAHRNEY
540-290-1821
EMERGENCY / DAMAGE: 800-544-5606

TELEPHONE / CABLE
VERIZON
ATTN: BOB KAVAL
540-434-5361
EMERGENCY / DAMAGE, CALL: 877-562-2253

COMCAST
800-266-2278
ATTN: BOB MACKRELL (FIELD CONTACT)
610-314-5048
EMERGENCY / DAMAGE: 800-441-6917 EXT. 1

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Than.Dang@harrisonburgva.gov

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EAST MARKET STREET STORMWATER IMPROVEMENTS
CITY OF HARRISONBURG, VA

REVISIONS

MARK	DATE	DESCRIPTION

AMT FILE NO.	15-0571.001
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DRAWN BY:	LAL
CHECKED BY:	DJR

BID DOCUMENTS

SHEET TITLE

GENERAL NOTES AND ABBREVIATIONS

SHEET

C0-1

SHEET 2 OF 32

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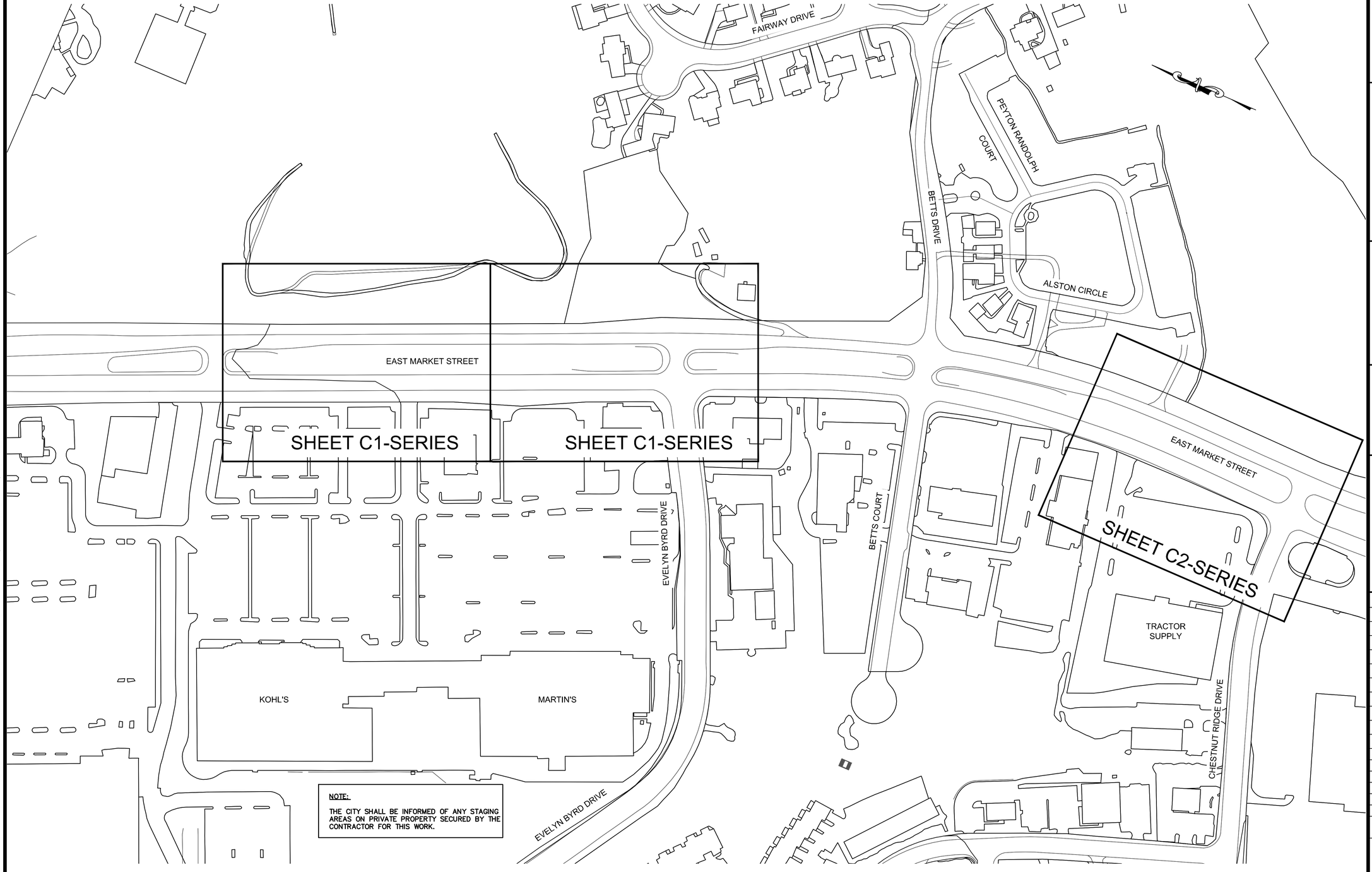

GRAPHIC SCALE

100 0 50 100 200 400

(IN FEET)

1 inch = 100 ft.

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SHEET TITLE

OVERALL SITE LAYOUT PLAN

SHEET

C0-2

SHEET 3 OF 32

X:\RICHMOND\15-0571.001 - EAST MARKET STREET ? RSC\05-CAD\GI\03-15057101-OVERALL SITE LAYOUT PLAN.DWG, 4/5/2016 2:02 PM, LLANGLOIS

EROSION CONTROL NARRATIVE

PROJECT DESCRIPTION
THIS PROJECT CONSISTS OF THE CONSTRUCTION OF THE EAST MARKET STREET REGENERATIVE STORMWATER CONVEYANCE (RSC) PROJECT. IT WILL INCLUDE A DRY SWALE AND A REGENERATIVE (STEP POOL) STORMWATER CONVEYANCE SYSTEM WITHIN THE MEDIAN OF EAST MARKET STREET. THE DRY SWALE WILL BEGIN AT CHESTNUT RIDGE DRIVE AND END APPROXIMATELY 280 FEET NORTH. THE RSC CHANNEL WILL BEGIN AT EVELYN BYRD AVENUE AND END APPROXIMATELY 950 FEET NORTH.

EXISTING CONDITIONS
THE SITE IS AN EXISTING ROADWAY MEDIAN THAT CONSISTS MOSTLY OF RIPRAP DITCH. THE OTHER AREAS ARE GRASSED AREAS WITH A SMALL NUMBER OF SCATTERED TREES. SIDE SLOPES OF THE MEDIAN VARY FROM 2:1 TO 3:1 WITH THE LONGITUDINAL SLOPE AVERAGING 3.6% IN THE RSC CHANNEL AND 5.5% IN THE DRY SWALE.

CRITICAL EROSION AREAS
-CRITICAL EROSION AREAS FOR THE PROJECT WILL BE MAINTAINING AN ADEQUATE DIVERSION AND KEEPING IT SEPARATE FROM THE CONSTRUCTION AREA.

SOILS
-SOILS IN THE DRY SWALE AND RSC CHANNEL AREAS ARE FREDERICK AND LODI SILT LOAMS, CLASSIFIED AS HYDROLOGICAL SOIL GROUP B, MODERATELY WELL DRAINED. IN ADDITION, SOME OF THE SOILS IN THE RSC CHANNEL ARE FAT CLAY, WHICH ARE CLASSIFIED AS HYDROLOGICAL SOIL GROUP D, OR IMPERMEABLE.

ADJACENT AREAS
THE SITE IS BOUND BY THE TRAVEL LANES FOR EAST MARKET STREET.

OFF-SITE AREAS
AT THIS TIME THERE ARE NO KNOWN BORROW OR WASTE OR SURPLUS AREAS ASSOCIATED WITH THIS PROJECT. HOWEVER, ANY BORROW OR WASTE AREAS MUST BE AN APPROVED, PERMITTED SITE.

EROSION AND SEDIMENT CONTROL MEASURES
THE FOLLOWING VESCH CONTROLS ARE TO BE USED
- CONSTRUCTION ENTRANCE PER STD. 3.02
- SILT FENCING PER STD. 3.05
- CULVERT INLET PROTECTION PER STD. 3.08
- DIVERSION PER MODIFIED STD.
- RIPRAP PER STD. 3.19
- SOD PER STD. 3.33
- BLANKETING AND MATTING PER STD. 3.36
- TREE PROTECTION PER STD. 3.38

MANAGEMENT STRATEGIES
SEDIMENT TRAPPING AND DIVERTING MEASURES ARE TO BE INSTALLED AS THE FIRST STEP IN CONSTRUCTION. CONSTRUCTION WILL BE SEQUENCED SO THAT EXISTING COVER WILL NOT BE DISTURBED ANY MORE THAN NECESSARY. CONSTRUCTION WILL BE SEQUENCED SO THAT GRADING OPERATIONS CAN BEGIN AND END AS QUICKLY AS POSSIBLE. TEMPORARY SEEDING OR OTHER STABILIZATION WILL FOLLOW IMMEDIATELY AFTER GRADING. AREAS WHICH ARE DISTURBED WILL BE CLEARLY MARKED WITH FLAGS, SIGNS, ETC. THE JOB SUPERINTENDENT SHALL BE RESPONSIBLE FOR THE INSTALLATION AND MAINTENANCE OF ALL EROSION AND SEDIMENT CONTROL MEASURES. AFTER ACHIEVING ADEQUATE STABILIZATION TO THE SATISFACTION OF THE CITY OF HARRISONBURG E&S ADMINISTRATOR, THE TEMPORARY E&S CONTROLS WILL BE REMOVED.

PERMANENT STABILIZATION
ALL DISTURBED AREAS THAT REQUIRE SEEDING SHALL BE WATERED EVERY DAY BY CONTRACTOR FOR FIRST TWO WEEKS UNTIL GERMINATION AND THEN AS NEEDED THEREAFTER. CONTRACTOR WILL BE REQUIRED TO ESTABLISH AND MAINTAIN A "GOOD" STAND OF GRASS/VEGETATION BEFORE APPROVAL BY THE CITY. AT THE DISCRETION OF THE CITY, EROSION CONTROL BLANKETS MAY BE REQUIRED TO ESTABLISH STABILIZATION.

LIMITS OF DISTURBANCE
RSC CHANNEL AREA = 1.17 ACRES (51,041 S.F.)
DRY SWALE AREA = 0.19 ACRES (8,315 S.F.)

VIRGINIA EROSION CONTROL NOTES (DEQ)

ES-1:

UNLESS OTHERWISE INDICATED, ALL VEGETATIVE AND STRUCTURAL EROSION AND SEDIMENT CONTROL PRACTICES WILL BE CONSTRUCTED AND MAINTAINED ACCORDING TO MINIMUM STANDARDS AND SPECIFICATIONS OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK AND THE VIRGINIA EROSION AND SEDIMENT CONTROL REGULATIONS (9VAC25-840).

ES-2:

THE PLAN APPROVING AUTHORITY (CITY OF HARRISONBURG) MUST BE NOTIFIED ONE WEEK PRIOR TO THE PRE-CONSTRUCTION CONFERENCE, ONE WEEK PRIOR TO THE COMMENCEMENT OF LAND DISTURBING ACTIVITY, AND ONE WEEK PRIOR TO THE FINAL INSPECTION. THE NAME OF THE RESPONSIBLE LAND DISTURBER MUST BE PROVIDED TO THE PLAN-APPROVING AUTHORITY PRIOR TO ACTUAL ENGAGEMENT IN LAND-DISTURBING ACTIVITY SHOWN ON THE APPROVED SITE PLAN. IF THE NAME IS NOT PROVIDED PRIOR TO ENGAGING IN THE LAND-DISTURBING ACTIVITY THE PLAN'S APPROVAL WILL BE REVOKED.

ES-3:

ALL EROSION AND SEDIMENT CONTROL MEASURES ARE TO BE PLACED PRIOR TO OR AS THE FIRST STEP IN CLEARING.

ES-4:

A COPY OF THE APPROVED EROSION AND SEDIMENT CONTROL PLAN AND THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK SHALL BE MAINTAINED ON THE SITE AT ALL TIMES.

ES-5:

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 CONTROL PLAN TO THE OWNER FOR REVIEW AND APPROVAL BY THE PLAN APPROVING AUTHORITY.

ES-6:

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-7:

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, AFTER WHICH, UPON APPROVAL OF THE DCR STORMWATER COMPLIANCE SPECIALIST, THE CONTROLS SHALL BE REMOVED. TRAPPED SEDIMENT AND THE DISTURBED SOIL AREAS RESULTING FROM THE REMOVAL OF TEMPORARY MEASURES SHALL BE PERMANENTLY STABILIZED TO PREVENT FURTHER EROSION AND SEDIMENTATION.

ES-8:

DURING DEWATERING OPERATIONS, WATER SHALL BE PUMPED INTO AN APPROVED FILTERING DEVICE.

ES-9:

THE CONTRACTOR SHALL INSPECT ALL EROSION CONTROL MEASURES AT LEAST EVERY 2 WEEKS AND IMMEDIATELY AFTER EACH RUNOFF-PRODUCING RAINFALL EVENT. ANY NECESSARY REPAIRS OR CLEANUP TO MAINTAIN THE EFFECTIVENESS OF THE EROSION CONTROL DEVICES SHALL BE MADE IMMEDIATELY.

ES-10:

THE CONTRACTOR IS RESPONSIBLE FOR THE DAILY REMOVAL OF SEDIMENT THAT HAS BEEN TRANSPORTED ONTO A PAVED OR PUBLIC ROAD SURFACE.

ES-11:

SODDING OPERATIONS SHALL BE INITIATED WITHIN 7 DAYS AFTER REACHING FINAL GRADE OR UPON SUSPENSION OF GRADING OPERATIONS FOR ANTICIPATED DURATION OF GREATER THAN 14 DAYS OR UPON COMPLETION OF GRADING OPERATIONS FOR A SPECIFIC AREA.

ES-12:

THE CONTRACTOR SHALL BE RESPONSIBLE FOR PREVENTING SURFACE AND AIR MOVEMENT OF DUST FROM EXPOSED SOILS WHICH MAY PRESENT HEALTH HAZARDS, TRAFFIC SAFETY PROBLEMS, OR HARM ANIMAL OR PLANT LIFE.

EROSION CONTROL NOTES

1. THE CITY ENGINEER/PROJECT MANAGER MAY REQUIRE ADDITIONAL DRAINAGE AND EROSION CONTROL, IF MEASURES WARRANT.
2. EROSION AND SEDIMENT CONTROL SHALL BE MAINTAINED SO THAT SEDIMENT CARRYING RUNOFF FROM THE SITE WILL NOT ENTER THE STORM DRAINAGE FACILITIES.
3. EROSION AND SEDIMENT CONTROL SHALL BE MAINTAINED UNTIL THE DISTURBED AREA IS STABILIZED. FINAL REMOVAL OF EROSION AND CONTROL DEVICES SHALL NOT OCCUR UNTIL THE CITY ENGINEER DEEMS THE SITE STABILIZED.
4. IT SHALL BE THE OWNER'S RESPONSIBILITY TO INSPECT EROSION CONTROL DEVICES PERIODICALLY AND AFTER EVERY ERODIBLE RAINFALL. ANY NECESSARY REPAIRS OR CLEAN UP TO MAINTAIN THE EFFECTIVENESS OF THE EROSION CONTROL DEVICES SHALL BE MADE IMMEDIATELY.
5. ALL APPLICABLE FEDERAL, STATE, AND LOCAL REGULATIONS PERTAINING TO WORKING IN OR CROSSING A LIVE WATER COURSE SHALL BE MET.

MINIMUM STANDARD NOTES

MS-1:

UNLESS OTHERWISE SPECIFIED, ALL TREES AND SHRUBS WITHIN THE PROJECT LIMITS SHALL BE CLEARED, GRUBBED, AND DISPOSED OF OFFSITE. VOIDS FROM TREE STUMPS SHALL BE BACKFILLED WITH SELECT MATERIAL OR AS DIRECTED BY THE OWNER OR THEIR REPRESENTATIVE.

MS-2:

ALL SILT FENCING MUST BE INSTALLED OUTSIDE THE CRITICAL ROOT ZONE (CRZ-CROWN SPREAD) TO AVOID ROOT DAMAGE DURING INSTALLATION.

MS-3:

ALL EXCAVATED MATERIAL SHALL BE STORED USING APPROPRIATE EROSION AND SEDIMENT CONTROL MEASURES AND DISPOSED OF IN A LAWFUL MANNER.

MS-4:

IN COMPLIANCE WITHIN MS-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.

MS-5:

IN COMPLIANCE WITHIN MS-2, DURING CONSTRUCTION OF THE PROJECT, SOIL STOCKPILES AND BORROW AREAS SHALL BE STABILIZED OR PROTECTED WITH SEDIMENT TRAPPING MEASURES.

MS-6:

IN COMPLIANCE WITHIN MS-3, A PERMANENT VEGETATIVE COVER SHALL BE ESTABLISHED ON DENUDED AREAS NOT OTHERWISE PERMANENTLY STABILIZED.

MS-7:

IN COMPLIANCE WITHIN MS-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.

MS-8:

IN COMPLIANCE WITHIN MS-5, STABILIZATION MEASURES SHALL BE APPLIED TO EARTHEN STRUCTURES SUCH AS DAMS, DIKES, AND DIVERSIONS IMMEDIATELY AFTER INSTALLATION.

MS-9:

IN COMPLIANCE WITHIN MS-6, SEDIMENT TRAPS AND BASINS SHALL BE DESIGNED AND CONSTRUCTED BASED UPON THE TOTAL DRAINAGE AREA TO BE SERVED BY THE TRAP OR BASIN. SEDIMENT TRAPS SHALL ONLY CONTROL DRAINAGE AREAS LESS THAN THREE ACRES WITH A MINIMUM STORAGE CAPACITY OF 134 CUBIC YARDS PER ACRE OF DRAINAGE AREA. SEDIMENT BASINS SHALL ONLY CONTROL DRAINAGE AREAS GREATER THAN OR EQUAL TO THREE ACRES WITH A MINIMUM STORAGE CAPACITY OF 134 CUBIC YARDS PER ACRE OF DRAINAGE AREA AND THE OUTFALL SYSTEM SHALL, AT A MINIMUM, MAINTAIN THE STRUCTURAL INTEGRITY OF THE BASIN DURING A TWENTY FIVE YEAR STORM OF 24-HOUR DURATION

MS-10:

IN COMPLIANCE WITH MS-7 AND 8 THE CONTRACTOR SHALL CONSTRUCT SLOPES TO MINIMIZE EROSION AND PROVIDE MEASURES TO PREVENT CONCENTRATED RUNOFF. SLOPES FOUND TO BE ERODING SHALL BE REPAIRED WITH PERMANENT STABILIZATION.

MS-11:

IN COMPLIANCE WITH MS-9 ADEQUATE DRAINAGE SHALL BE PROVIDED TO PROTECT WATER SEEPS FROM A SLOPE FACE.

MS-12:

IN COMPLIANCE WITH MS-10 ALL OPERATIONAL STORMWATER INLETS MUST BE PROTECTED.

MS-13:

IN COMPLIANCE WITH MS-11 ADEQUATE OUTLET PROTECTION AND REQUIRED TEMPORARY OR PERMANENT CHANNEL LINING SHALL BE INSTALLED IN BOTH THE CONVEYANCE CHANNEL AND THE RECEIVING CHANNEL BEFORE NEWLY CONSTRUCTED STORM WATER CONVEYANCE CHANNELS OR PIPES ARE MADE OPERATIONAL.

MS-14:

IN COMPLIANCE WITH MS-12, WHEN WORK IN A LIVE WATERCOURSE IS PERFORMED:

A. PRECAUTIONS SHALL BE TAKEN TO MINIMIZE ENCROACHMENT, CONTROL SEDIMENT TRANSPORT, AND STABILIZE THE WORK AREA TO THE GREATEST EXTENT POSSIBLE DURING CONSTRUCTION

B. NONERODIBLE MATERIAL SHALL BE USED FOR THE CONSTRUCTION OF CAUSEWAYS AND COFFERDAMS

C. EARTHEN FILL MAY BE USED FOR THESE STRUCTURES IF ARMORED BY NON ERODIBLE COVER MATERIALS

MS-15:

IN COMPLIANCE WITH MS-13 AND MS-14, A TEMPORARY VEHICULAR STREAM CROSSING CONSTRUCTED OF NON ERODIBLE MATERIAL SHALL BE PROVIDED IF A LIVE WATERCOURSE MUST BE CROSSED BY CONSTRUCTION VEHICLES MORE THAN TWICE IN A SIX-MONTH PERIOD. ALL APPLICABLE FEDERAL, STATE AND LOCAL REGULATIONS MUST BE MET.

MS-16:

IN COMPLIANCE WITH MS-15, WATERCOURSE BEDS AND BANKS SHALL BE STABILIZED IMMEDIATELY AFTER WORK IN THE WATERCOURSE IS COMPLETED.

MS-17:

IN COMPLIANCE WITH MS-16, THE CONTRACTOR SHALL:

A. OPEN NO MORE THAN 500 LF. OF UTILITY TRENCH AT A TIME

B. PLACE EXCAVATED TRENCH MATERIAL ON HIGH SIDE OF TRENCH

C. FILTER SITE EFFLUENT WITH AN APPROVED SEDIMENT TRAPPING DEVICE

D. BACKFILL TRENCHES WITH PROPER COMPACTION TO MINIMIZE EROSION SEED/SOD DISTURBED AREA WITHIN (7) DAYS OF REACHING FINAL GRADE

MS-18:

IN COMPLIANCE WITH MS-17, WHERE CONSTRUCTION VEHICLE ACCESS ROUTES INTERSECT PAVED OR PUBLIC ROADS:

A. MINIMIZE VEHICULAR SEDIMENT TRACKING ONTO THE PAVED SURFACE

B. CLEAN THE ROAD SURF ACE THOROUGHLY AT THE END OF EACH DAY

C. SEDIMENT SHALL BE REMOVED BY SHOVELING OR SWEEPING AND THEN TRANSPORTED TO A SEDIMENT CONTROL DISPOSAL AREA. STREET WASHING SHALL BE ALLOWED ONLY AFTER SEDIMENT IS REMOVED IN THIS MANNER.

MS-19:

IN COMPLIANCE WITH MS-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 PROGRAM 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.

MS-20:

IN COMPLIANCE WITH MS-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. 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.

MS-21:

INLET PROTECTION FOR INLETS SCHEDULED TO BE CAPPED MAY BE REMOVED UPON MODIFICATION OF STRUCTURE.

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PROJECT TITLE

EAST MARKET STREET STORMWATER IMPROVEMENTS
CITY OF HARRISONBURG, VA

REVISIONS

MARK	DATE	DESCRIPTION

AMT FILE NO.	15-0571.001
DATE:	April 6, 2016
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DESIGNED BY:	CC/DEC
DRAWN BY:	LAL
CHECKED BY:	DJR

BID DOCUMENTS

SHEET TITLE

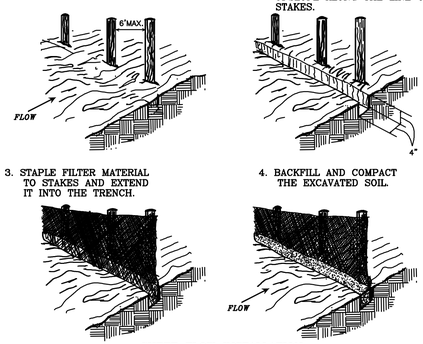
EROSION AND SEDIMENT CONTROL NOTES

SHEET
C0-3
SHEET 4 OF 32

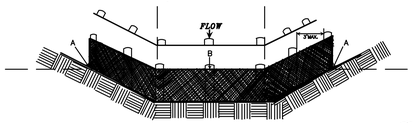
X:\RICHMOND\15-0571.001 - EAST MARKET STREET ? RSC\05-CAD\ES04-150571001-DRY SWALE SEDIMENT CONTROL NOTES.DWG, 4/5/2016 2:02 PM, LLANGLOIS

CONSTRUCTION OF A SILT FENCE (WITHOUT WIRE SUPPORT)

1. SET THE STAKES.
2. EXCAVATE A 4"X 4" TRENCH UPSLOPE ALONG THE LINE OF STAKES.
3. STAPLE FILTER MATERIAL TO STAKES AND EXTEND IT INTO THE TRENCH.
4. BACKFILL AND COMPACT THE EXCAVATED SOIL.



SHEET FLOW INSTALLATION
(PERSPECTIVE VIEW)



POINTS A SHOULD BE HIGHER THAN POINT B.

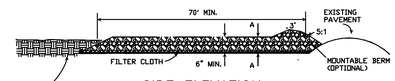
DRAINAGEWAY INSTALLATION
(FRONT ELEVATION)

SF

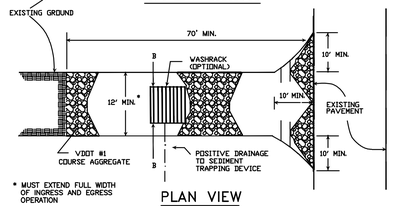
SOURCE: Adapted from Installation of Straw and Fabric Filter Barriers for Sediment Control,VA DSWC Sherwood and Wyant

PLATE. 3.05-2

STONE CONSTRUCTION ENTRANCE

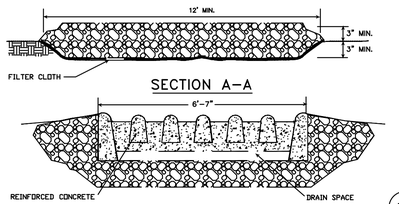


SIDE ELEVATION



* MUST EXTEND FULL WIDTH OF INGRESS AND EGRESS OPERATION

PLAN VIEW



SECTION A-A

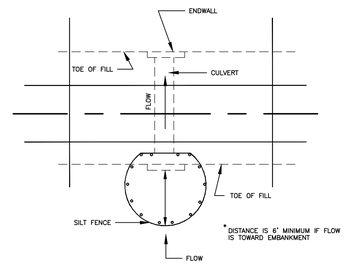
SECTION B-B

CE

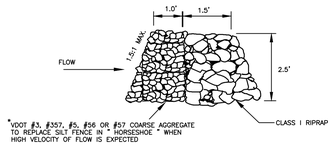
SOURCE: ADAPTED from 1983 Maryland Standards for Soil erosion and Sediment Control, and Va. DSWC

Plate 3.02-1

SILT FENCE CULVERT INLET PROTECTION



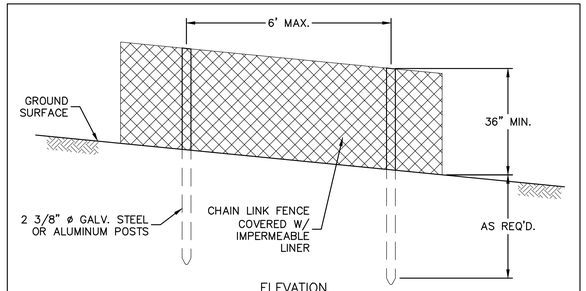
* OPTIONAL STONE COMBINATION



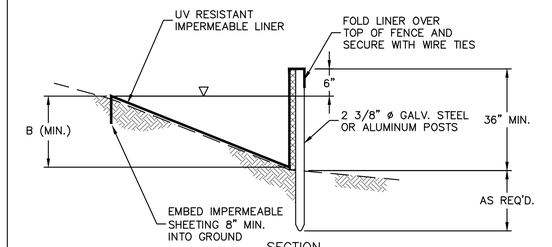
CIP

SOURCE: ADAPTED from VDOT Standard Sheets and Va. DSWC

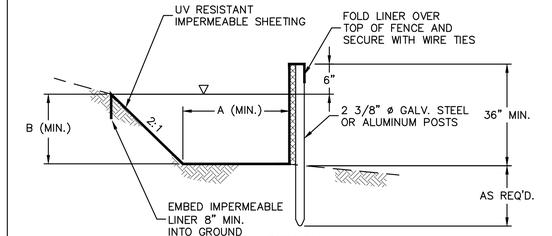
PLATE. 3.08-1



ELEVATION



SECTION
(DRY SWALE)



SECTION
(RSC CHANNEL)

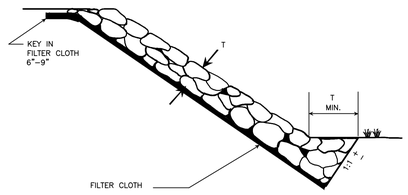
ITEM	START STATION	END STATION	WIDTH 'A'	HEIGHT 'B'
DRY SWALE	10+20	12+75	0'	24"
RSC CHANNEL (UPPER)	0+25	5+75	3'	27"
RSC CHANNEL (LOWER)	5+75	9+25	6'	30"

DIVERSION FENCE
NTS

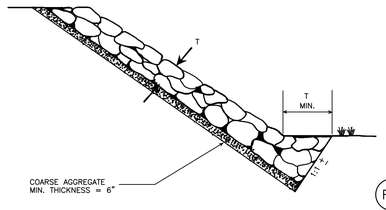
DV

TOE REQUIREMENTS FOR BANK STABILIZATION

FILTER CLOTH UNDERLINER (PREFERRED)



GRANULAR FILTER

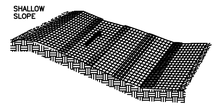


RR

SOURCE: Adapted from VDOT Drainage Manual

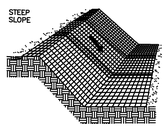
PLATE. 3.19-1

TYPICAL ORIENTATION OF TREATMENT - 1 (SOIL STABILIZATION BLANKET)



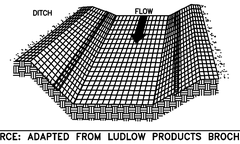
ON SHALLOW SLOPES, STRIPS OF NETTING PROTECTIVE COVERINGS MAY BE APPLIED ACROSS THE SLOPE.

WHERE THERE IS A BERM AT THE TOP OF THE SLOPE, BRING THE MATERIAL OVER THE BERM AND ANCHOR IT BEHIND THE BERM.



ON STEEP SLOPES, APPLY PROTECTIVE COVERING PARALLEL TO THE DIRECTION OF FLOW AND ANCHOR SECURELY.

BRING MATERIAL DOWN TO A LEVEL AREA BEFORE TERMINATING THE INSTALLATION. TURN THE END UNDER 4" AND STAPLE AT 12" INTERVALS.

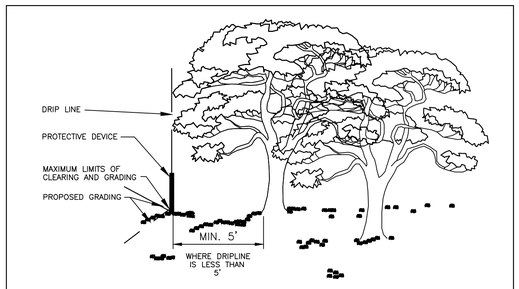


IN DITCHES, APPLY PROTECTIVE COVERING PARALLEL TO THE DIRECTION OF FLOW. USE CHECK SLOTS AS REQUIRED. AVOID JOINING MATERIAL IN THE CENTER OF THE DITCH IF AT ALL POSSIBLE.

B/M

SOURCE: ADAPTED FROM LUDLOW PRODUCTS BROCHURE

PLATE: 3.36-1



CONSTRUCTION OPERATIONS RELATIVE TO THE LOCATION OF PROTECTED TREES

TP

Source: Public Facilities Manual, Vol. III, Fairfax Co., Va., 1976

Plate 3.38-1

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DRAWN BY:	LAL
CHECKED BY:	DJR

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SHEET TITLE

EROSION AND SEDIMENT CONTROL DETAILS

SHEET

C0-4

SHEET 5 OF 32

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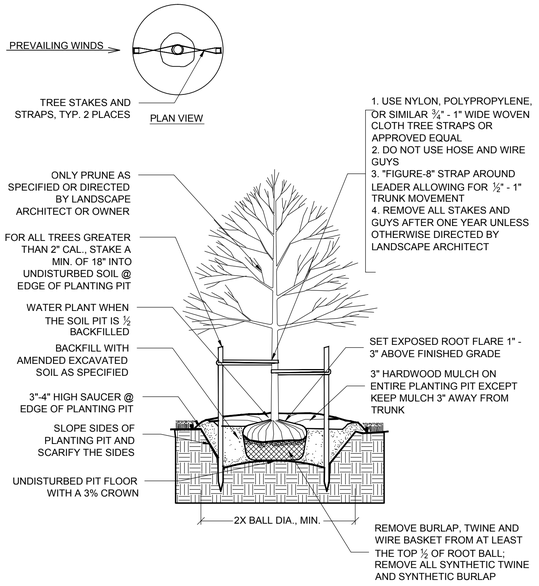
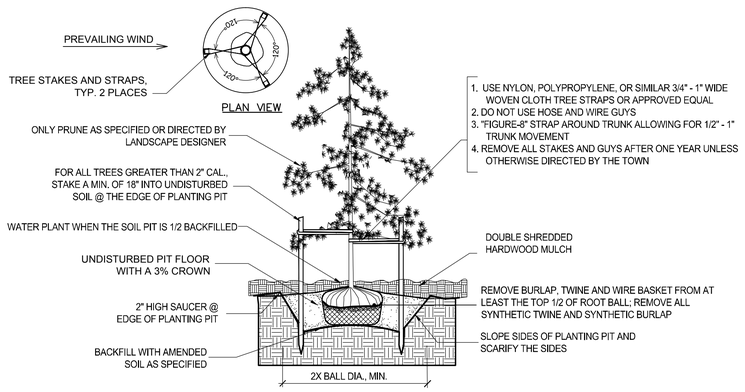


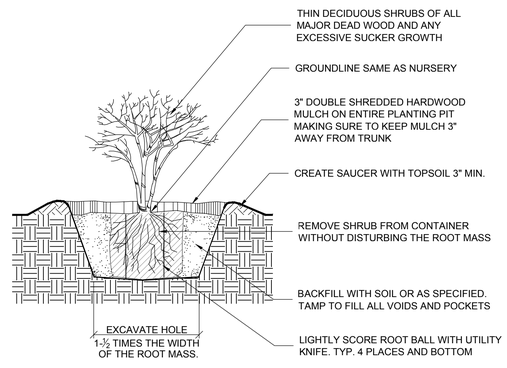
STANDARD DECIDUOUS TREE PLANTING

NTS



STANDARD CONIFEROUS TREE PLANTING

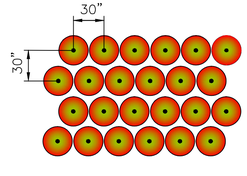
NTS



NOTE:
1. REMOVE ALL NON-ORGANIC ROOT MASS FROM THE SOIL PIT AND HAND TAMP LOOSE SOIL AT BOTTOM OF THE PIT
2. PLANT EVERGREEN AND DECIDUOUS SHRUBS USING THAT SAME METHOD

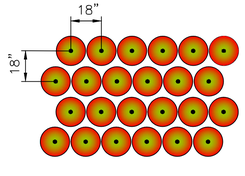
CONTAINERIZED SHRUB PLANTING

NTS



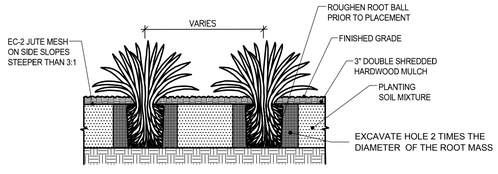
JUNIPER GROUND COVER SPACING

NTS



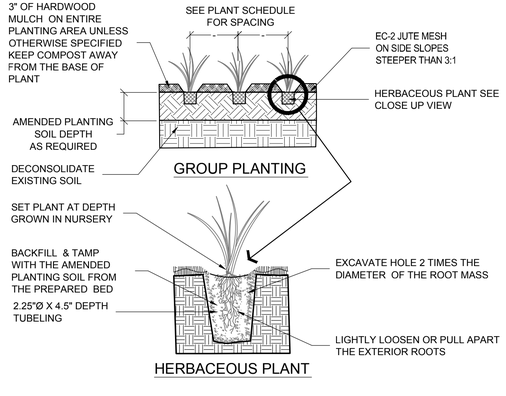
SPURGE GROUND COVER SPACING

NTS



GROUND COVER PLANTING DETAIL

NTS



HERBACEOUS TUBELING/ PLUG PLANTING DETAIL

NTS

LANDSCAPING NOTES:

1. THIS PLAN IS FOR LANDSCAPING PURPOSES, AND ANY OTHER INFORMATION SHOWN IS FOR REFERENCE ONLY. SEE SITE PLAN FOR INFORMATION ABOUT LAYOUT, GRADING AND OTHER SITE IMPROVEMENTS.
2. CALL MISS UTILITY AT 1-800-552-7001 TO MARK UTILITIES AT LEAST 48 HOURS BEFORE DIGGING.
3. ALL MATERIALS AND PLANTING PROCEDURES EXCEPT AS OTHERWISE NOTED SHALL CONFORM TO THE LATEST EDITION OF "LANDSCAPE SPECIFICATION GUIDELINES" BY THE LANDSCAPE CONTRACTORS ASSOCIATION MD-DC-VA.
4. PLANTS SHALL CONFORM TO THE CURRENT EDITION OF THE AMERICAN STANDARD FOR NURSERY STOCK. (ANSI Z60.1)
5. PLANT NAMES SHALL BE THOSE GIVEN IN THE LATEST EDITION OF STANDARD PLANT NAMES, AMERICAN COMMITTEE ON HORTICULTURAL NOMENCLATURE.
6. THE CONTRACTOR SHALL SUBMIT REPRESENTATIVE SOIL SAMPLES FROM BOTH IN-SITU SOILS AND SOILS BROUGHT IN FROM OFF-SITE TO A STATE LICENSED TESTING LABORATORY INCLUDING ANY TOPSOIL OR ENGINEERED SOIL MIX/BIOMEDIA. THE CONTRACTOR SHALL OBTAIN A TEXTURAL ANALYSIS OF EACH SOIL SAMPLE, AND INCORPORATE OR APPLY SOIL AMENDMENTS AND FERTILIZATION BASED UPON RESULTS OF THE SOIL TESTS AND RECOMMENDATIONS BY THE TEST LAB.
7. THE CONTRACTOR SHALL STAKE OUT ALL PLANTING BEDS AND TREE LOCATIONS FOR APPROVAL BY THE CITY BEFORE DIGGING. IT IS THE CONTRACTOR'S RESPONSIBILITY TO LOCATE AND COORDINATE PLANTINGS WITH ALL EXISTING UTILITIES. IF DISCREPANCIES OCCUR BECAUSE OF UTILITY LOCATIONS OR OTHER EXISTING CONDITIONS THE CONTRACTOR SHALL NOTIFY THE CITY IMMEDIATELY TO COORDINATE ANY NECESSARY ADJUSTMENTS.
8. ALL PLANT MATERIAL SHALL BE LABELED BY THE NURSERY AND DELIVERED WITH LABELS IN PLACE FOR INSPECTION. SUBSTITUTIONS IN PLANT SPECIES OR SIZE WILL NOT BE PERMITTED EXCEPT WITH THE APPROVAL OF THE CITY OF HARRISONBURG. DO NOT PRUNE UNTIL PLANT MATERIAL HAS BEEN PLANTED BUT AS SOON THEREAFTER AS IS ADVISABLE UNDER STANDARD HORTICULTURAL PRACTICES. FOR TREE PRUNING AND CARE METHODS PLEASE REFER TO THE NATIONAL ARBORIST STANDARDS, LATEST EDITION.
9. IT IS OF UTMOST IMPORTANCE THAT ALL PLANT MATERIAL BE SET SLIGHTLY HIGHER IN RELATION TO GRADE THAN IT WAS GROWN IN THE NURSERY AND WITH GOOD EARTH TO ROOT CONTACT. ANY MATERIALS OR WORK MAY BE REJECTED BY THE CITY IF IT DOES NOT MEET THIS OR ANY OTHER REQUIREMENT OF THE SPECIFICATIONS. REJECTED MATERIALS SHALL BE REMOVED FROM THE SITE BY THE CONTRACTOR AND REPLACED AT THE CONTRACTOR'S EXPENSE.
10. IN CASE OF DISCREPANCIES BETWEEN QUANTITIES ON THE PLANT LIST AND THE PLAN, THE PLAN SHALL GOVERN.
11. THE CONTRACTOR SHALL WATER ALL PLANTINGS WELL ON THE DAY THEY ARE PLANTED AND EVERY TWO DAYS THEREAFTER (AS WEATHER DICTATES) FOR TWO WEEKS AND THEN TWICE A WEEK FOR ONE MONTH. WATERING OF PLANT MATERIAL IS PREFERABLE IN THE MORNING. ALLOW WATER TO SOAK IN AND NOT CREATE EXCESSIVE RUN-OFF.
12. ALL PLANT MATERIAL SHALL BE WARRANTED TO BE VIGOROUS AND HEALTHY AFTER ONE FULL CALENDAR YEAR FROM THE DATE OF LANDSCAPE ACCEPTANCE. ALL DEAD, DYING, DISFIGURED OR STUNTED PLANT MATERIAL SHALL BE REPLACED AT THE CONTRACTORS EXPENSE, WITHIN THE WARRANTY PERIOD.
13. THE RECOMMENDED PLANTING PERIOD IS FROM SEPTEMBER TO OCTOBER. PLANTING SHALL NOT BE PERFORMED WHILE THE GROUND IS FROZEN.
14. CONTRACTOR SHALL LOCATE PLANTS SO THAT THERE ARE NO CONFLICTS WITH THE IMPERMEABLE LINER OR OTHER WORK.

SOD INSTALLATION

1. WATER TO DAMPEN THE BARE SOIL AND START LAYING SOD IMMEDIATELY AFTER DELIVERY. IN HOT WEATHER, PROTECT UNLAID SOD BY PLACING IN THE SHADE.
2. BEGIN INSTALLING SOD ALONG THE LONGEST STRAIGHT LINE, BUTT AND PUSH EDGES AND ENDS AGAINST EACH OTHER TIGHTLY. STRETCH LIGHTLY. AVOID GAPS OR OVERLAPS. STAGGER THE JOINTS IN EACH ROW IN A BRICK-LIKE FASHION, USING A LARGE SHARP KNIFE TO TRIM CORNERS, ETC.
3. PLACE SOD ACROSS (PERPENDICULAR) TO THE SLOPE, NOT HORIZONTALLY WITH THE SLOPE.
4. AFTER INSTALLING THE TURF, ROLL THE ENTIRE AREA TO IMPROVE SOD/SOIL CONTACT AND TO REMOVE AIR POCKETS.
5. BEGIN WATERING YOUR SOD WITHIN 30 MINUTES OF INSTALLATION. (SOD REQUIRES SOIL CONTACT AND MOISTURE TO SURVIVE.)
6. WATER DAILY, OR MORE OFTEN, KEEPING SOD MOIST UNTIL IT IS FIRMLY ROOTED (ABOUT 2 WEEKS). LIFT A PIECE OF SOD HERE AND THERE TO ASCERTAIN THAT YOU ARE WATERING ENOUGH TO WET THE ORIGINAL SOIL BELOW THE SOD.
7. AFTER THE ROOTING-IN PERIOD (ABOUT 2 WEEKS), LESS FREQUENT AND DEEPER WATERING SHOULD BEGIN. WATER TO SUPPLEMENT RAINFALL SHORTAGES ONLY. SOD BEST PERFORMS WHEN IT RECEIVES APPROXIMATELY 1 INCH OF WATER PER WEEK. IF ONE OR MORE INCHES OF RAINFALL OCCUR IN A WEEK, ADDITIONAL IRRIGATION IS NOT NECESSARY. (EXAMPLE: IF 1/2 INCH OF RAIN OCCURS WITHIN A GROWING WEEK, APPLY 1/2 INCH BY IRRIGATION.) WEATHER CONDITIONS WILL DICTATE THE AMOUNT AND FREQUENCY OF WATERING.
8. BEGIN MOWING AS SOON AS SOD HAS ROOTED TO THE EXTENT THAT MOWING DOES NOT DISPLACE IT. IT IS IMPORTANT THAT MOWING NOT BE DELAYED TOO LONG. CUT HIGH THE FIRST TIME, BUT GRADUALLY AND DELIBERATELY LOWER THE CUT-HEIGHT.
9. CONTRACTOR SHALL MAINTAIN A MINIMUM SEPARATION OF SIX (6) INCHES BETWEEN THE IMPERMEABLE LINER AND THE SEED BED/SOD. REPORT ANY DISCREPANCIES TO THE CITY.

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DONALD J. TISSMEYER
4-6-16
Lic. NO. 26104
PROFESSIONAL ENGINEER

OWNER

CITY OF HARRISONBURG

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THANH DANG - PROJECT MANAGER
Than.Dang@harrisonburgva.gov

PROJECT TITLE

EAST MARKET STREET STORMWATER IMPROVEMENTS
CITY OF HARRISONBURG, VA

REVISIONS

MARK	DATE	DESCRIPTION

AMT FILE NO.	15-0571.001
DATE:	April 6, 2016
SCALE:	N/A
DESIGNED BY:	CC/DEC
DRAWN BY:	LAL
CHECKED BY:	DJR

BID DOCUMENTS

SHEET TITLE

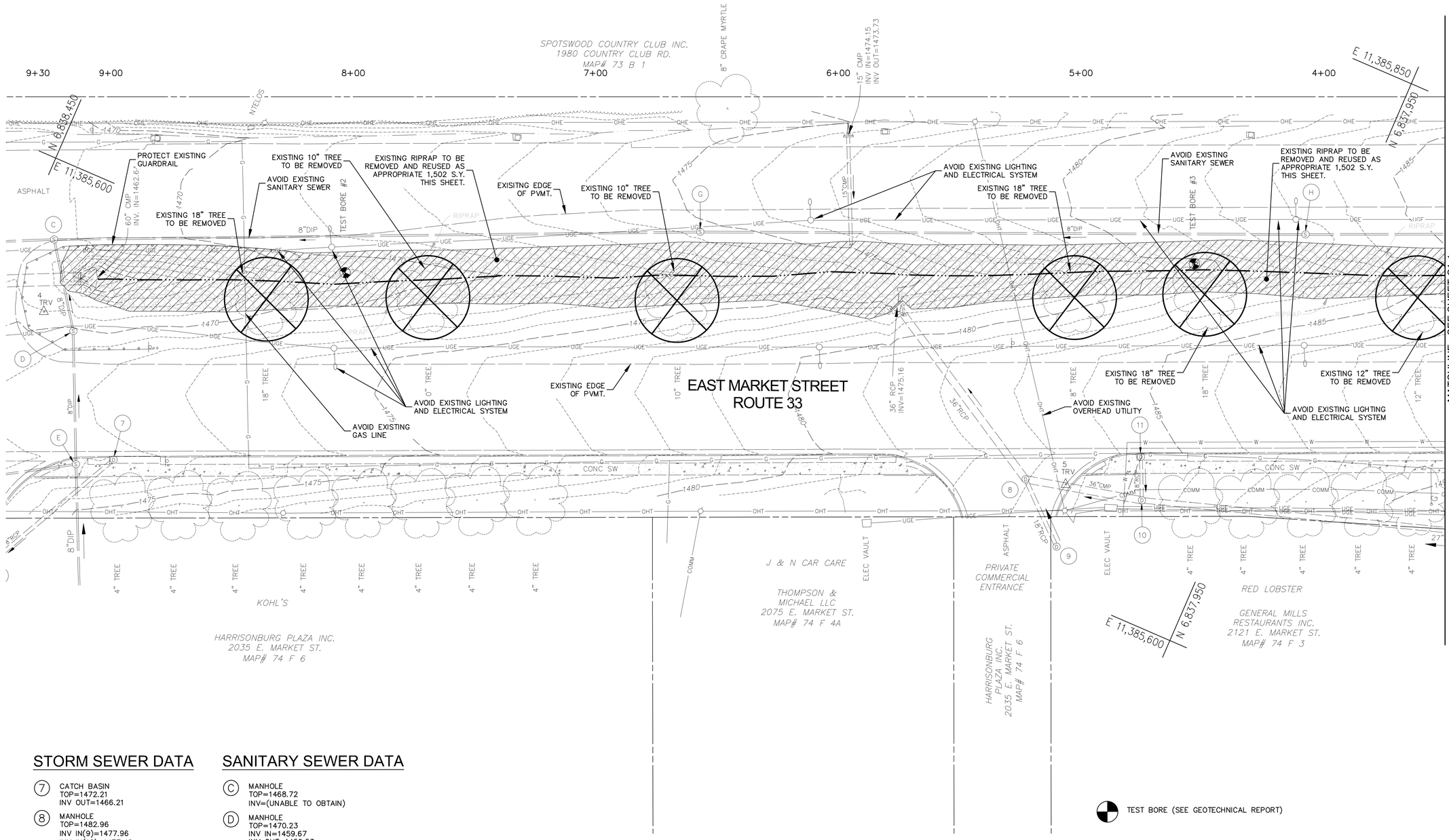
LANDSCAPE DETAILS

SHEET

C0-5

SHEET 6 OF 32

X:\RICHMOND\15-0571.001 - EAST MARKET STREET ? RSC\05-CAD\LP105-150571-001-LANDSCAPE DETAILS.DWG, 4/5/2016 2:02 PM, LLANGLOIS



MATCHLINE - SEE SHEET C1-1

STORM SEWER DATA

(7) CATCH BASIN
TOP=1472.21
INV OUT=1466.21

(8) MANHOLE
TOP=1482.96
INV IN(9)=1477.96
INV IN(10)=1477.46
INV OUT=1477.20

(9) CATCH BASIN
TOP=1484.03
INV OUT=1478.90

(10) MANHOLE
TOP=1485.35
INV IN(11)=1479.93
INV IN(12)=1478.87
INV OUT=1478.81

(11) CATCH BASIN
TOP=1484.99
INV OUT=1480.50

SANITARY SEWER DATA

(C) MANHOLE
TOP=1468.72
INV=(UNABLE TO OBTAIN)

(D) MANHOLE
TOP=1470.23
INV IN=1459.67
INV OUT=1459.53

(E) MANHOLE
TOP=1471.87
INV IN(F)=1466.07
INV IN(WEST)=1464.97
INV OUT=1464.35

(G) MANHOLE
TOP=1474.83
INV IN=1469.08
INV OUT=1468.89

(H) MANHOLE
TOP=1482.84
INV IN=1476.99
INV OUT=1476.65

TEST BORE (SEE GEOTECHNICAL REPORT)

RIPRAP NOTES:

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3. ANY EXCESS RIPRAP DISPOSED OF OFFSITE SHALL REMAIN THE PROPERTY OF THE CITY, CONTRACTOR WILL STOCKPILE THE RIPRAP AT RAMBLEWOOD PARK IN A DESIGNATED LOCATION IN CLOSE COORDINATION WITH THE CITY DURING SHIPPING.

TRAVERSE DATA

NO	NORTHING	EASTING	ELEV	DESCRIPTION
3	6839193.1417	11385207.5840	1460.45	NAIL
4	6838429.2441	11385540.0299	1469.12	NAIL
5	6838014.8986	11385641.9716	1483.31	NAIL
6	6837511.6371	11385837.7669	1508.01	NAIL
7	6836976.6630	11386143.3361	1539.29	NAIL
108	6836202.5919	11386279.5096	1574.80	REBAR & CAP

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

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BID DOCUMENTS

SHEET TITLE

RSC CHANNEL EXISTING CONDITIONS AND DEMOLITION PLAN

SHEET

C1-0

SHEET 7 OF 32

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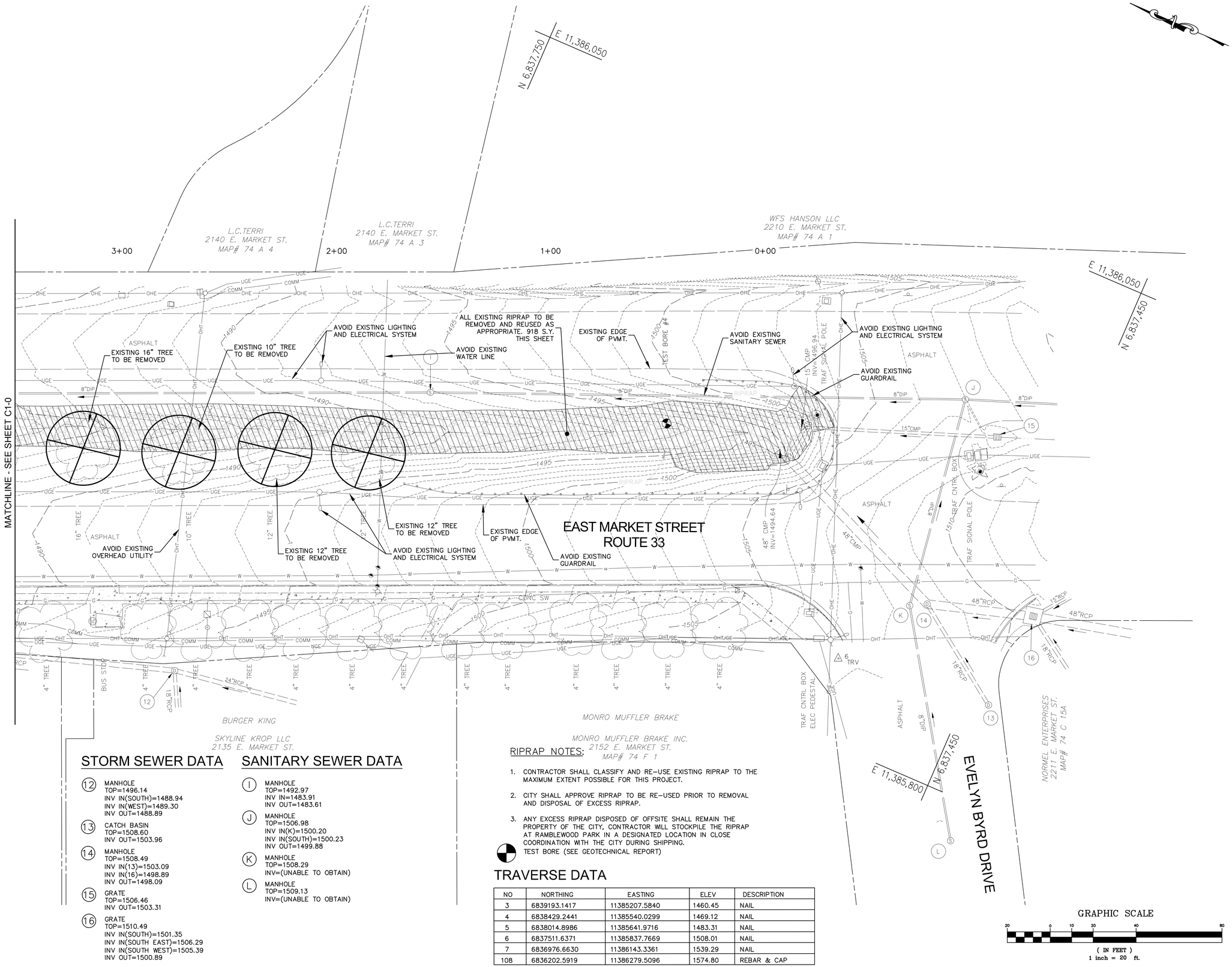

STORM SEWER DATA

(12) MANHOLE
TOP=1496.14
INV IN(SOUTH)=1488.94
INV IN(WEST)=1489.30
INV OUT=1488.89

(13) CATCH BASIN
TOP=1508.60
INV OUT=1503.96

(14) MANHOLE
TOP=1508.49
INV IN(13)=1503.09
INV IN(16)=1498.89
INV OUT=1498.09

(15) GRATE
TOP=1506.46
INV OUT=1503.31

(16) GRATE
TOP=1510.49
INV IN(SOUTH)=1501.35
INV IN(SOUTH EAST)=1506.29
INV IN(SOUTH WEST)=1505.39
INV OUT=1500.89

SANITARY SEWER DATA

(I) MANHOLE
TOP=1492.97
INV IN=1483.91
INV OUT=1483.61

(J) MANHOLE
TOP=1506.98
INV IN(K)=1500.20
INV IN(SOUTH)=1500.23
INV OUT=1499.88

(K) MANHOLE
TOP=1508.29
INV=(UNABLE TO OBTAIN)

(L) MANHOLE
TOP=1509.13
INV=(UNABLE TO OBTAIN)

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4	6838429.2441	11385540.0299	1469.12	NAIL
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20 0 10 20 40 80
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SHEET TITLE

RSC CHANNEL EXISTING CONDITIONS AND DEMOLITION PLAN

SHEET

C1-1

SHEET 8 OF 32

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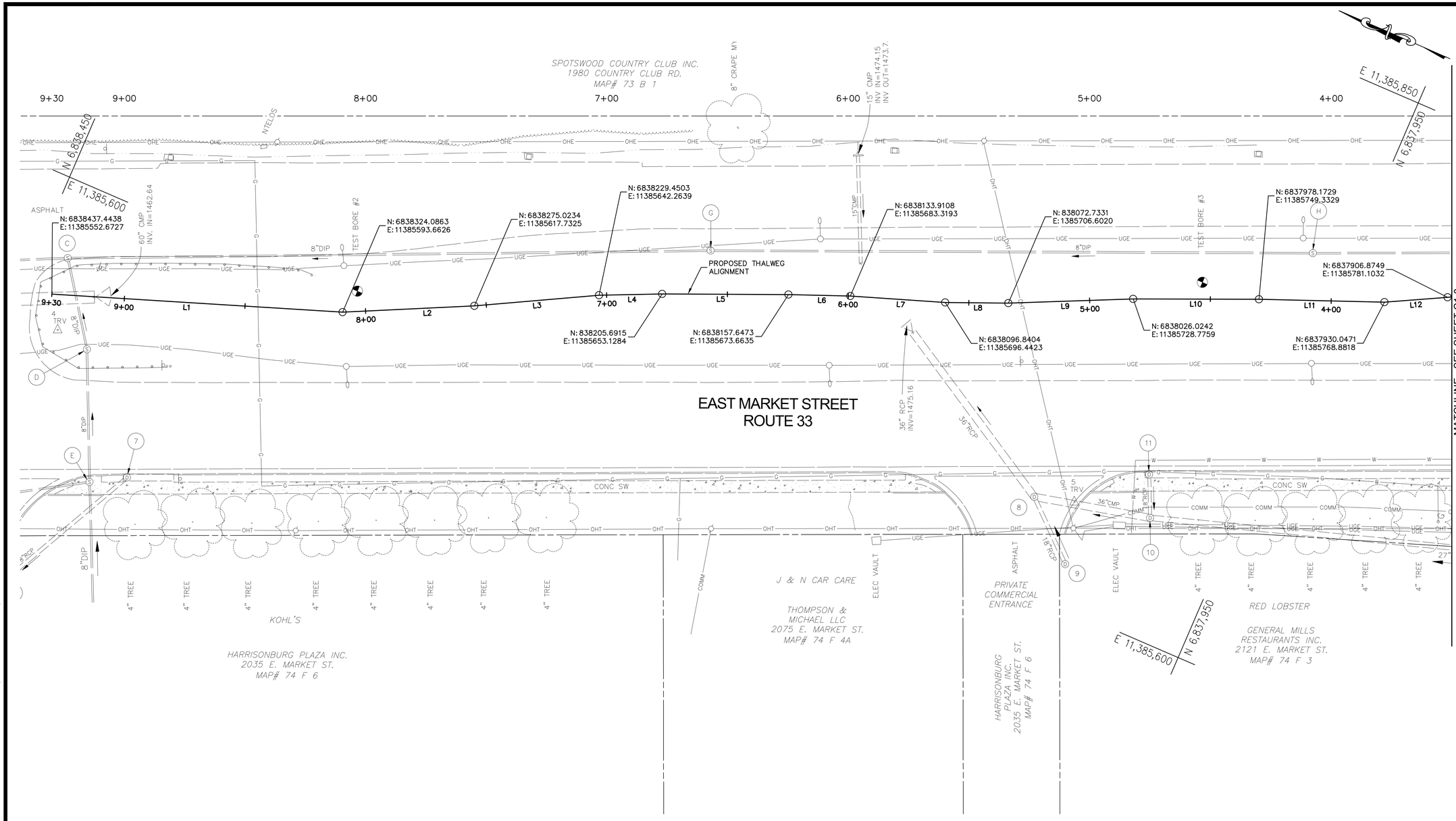

PROPOSED THALWEG ALIGNMENT			
NUMBER	STATION	LENGTH	LINE/CHORD DIRECTION
L1	8+09.53	120.54	N19° 52' 47.70"W
L2	7+54.88	54.65	N26° 07' 55.82"W
L3	7+03.13	51.76	N28° 17' 35.00"W
L4	6+77.00	26.13	N24° 34' 25.58"W
L5	6+24.75	52.25	N23° 08' 34.25"W
L6	5+99.13	25.63	N22° 08' 09.97"W
L7	5+59.80	39.32	N19° 29' 38.57"W
L8	5+33.64	26.16	N22° 51' 09.04"W
L9	4+81.94	51.70	N25° 23' 41.35"W
L10	4+29.86	52.08	N23° 14' 54.59"W
L11	3+77.91	51.94	N22° 06' 25.57"W
L12	3+51.72	26.20	N27° 48' 28.68"W

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

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SHEET TITLE

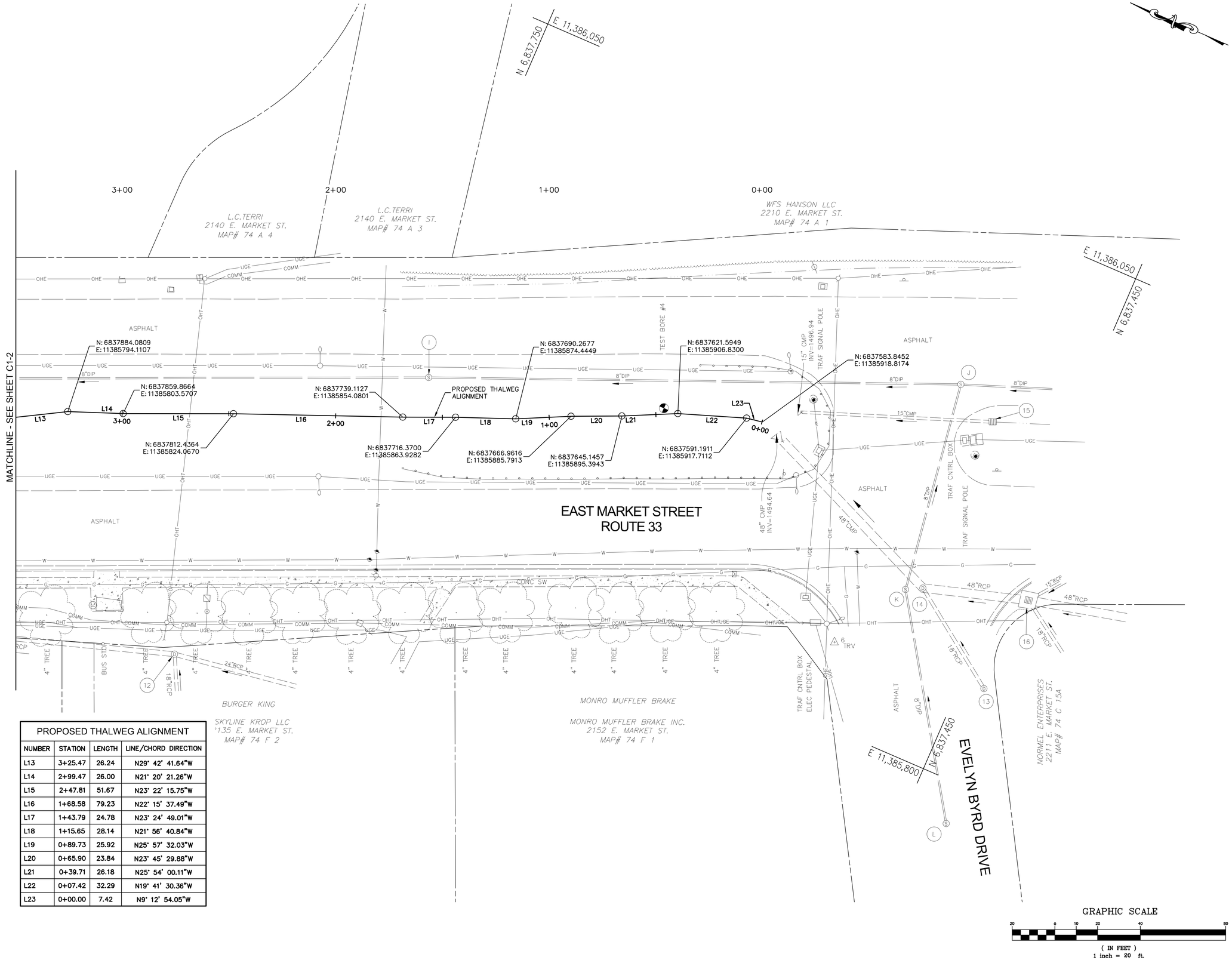
RSC CHANNEL GEOMETRY PLAN

SHEET

C1-2

SHEET 9 OF 32

X:\RICHMOND\15-0571001 - EAST MARKET STREET ? RSC\05-CAD\CL102-150571001-RSC GEOMETRY PLAN.DWG, 4/5/2016 2:03 PM, LLANGLOIS



PROPOSED THALWEG ALIGNMENT			
NUMBER	STATION	LENGTH	LINE/CHORD DIRECTION
L13	3+25.47	26.24	N29° 42' 41.64"W
L14	2+99.47	26.00	N21° 20' 21.26"W
L15	2+47.81	51.67	N23° 22' 15.75"W
L16	1+68.58	79.23	N22° 15' 37.49"W
L17	1+43.79	24.78	N23° 24' 49.01"W
L18	1+15.65	28.14	N21° 56' 40.84"W
L19	0+89.73	25.92	N25° 57' 32.03"W
L20	0+65.90	23.84	N23° 45' 29.88"W
L21	0+39.71	26.18	N25° 54' 00.11"W
L22	0+07.42	32.29	N19° 41' 30.36"W
L23	0+00.00	7.42	N9° 12' 54.05"W

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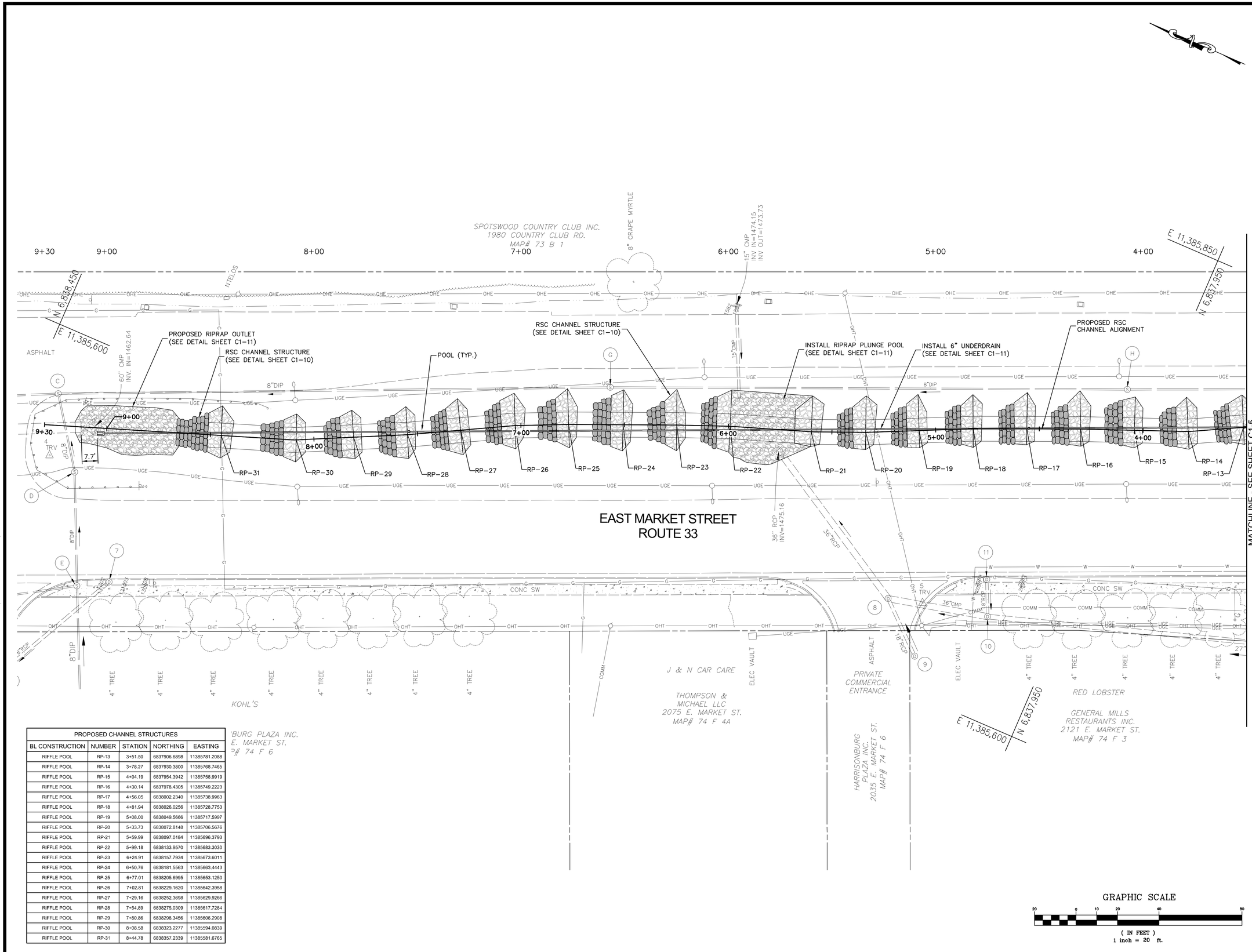
SHEET TITLE

RSC CHANNEL GEOMETRY PLAN

SHEET

C1-3

SHEET 10 OF 32



PROPOSED CHANNEL STRUCTURES				
BL CONSTRUCTION	NUMBER	STATION	NORTHING	EASTING
RIFFLE POOL	RP-13	3+51.50	6837906.6898	11385781.2088
RIFFLE POOL	RP-14	3+78.27	6837930.3800	11385768.7465
RIFFLE POOL	RP-15	4+04.19	6837954.3942	11385758.9919
RIFFLE POOL	RP-16	4+30.14	6837978.4305	11385749.2223
RIFFLE POOL	RP-17	4+56.05	6838002.2340	11385738.9963
RIFFLE POOL	RP-18	4+81.94	6838026.0256	11385728.7753
RIFFLE POOL	RP-19	5+08.00	6838049.5666	11385717.5997
RIFFLE POOL	RP-20	5+33.73	6838072.8148	11385706.5676
RIFFLE POOL	RP-21	5+59.99	6838097.0184	11385696.3793
RIFFLE POOL	RP-22	5+99.18	6838133.9570	11385683.3030
RIFFLE POOL	RP-23	6+24.91	6838157.7934	11385673.6011
RIFFLE POOL	RP-24	6+50.76	6838181.5563	11385663.4443
RIFFLE POOL	RP-25	6+77.01	6838205.6995	11385653.1250
RIFFLE POOL	RP-26	7+02.81	6838229.1620	11385642.3958
RIFFLE POOL	RP-27	7+29.16	6838252.3698	11385629.9266
RIFFLE POOL	RP-28	7+54.89	6838275.0309	11385617.7284
RIFFLE POOL	RP-29	7+80.86	6838298.3456	11385606.2908
RIFFLE POOL	RP-30	8+08.58	6838323.2277	11385594.0839
RIFFLE POOL	RP-31	8+44.78	6838357.2339	11385581.6765

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

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CITY OF HARRISONBURG VIRGINIA

REGISTRATION STAMP

COMMONWEALTH OF VIRGINIA
DONALD J. RISSMEYER
4-6-16
Lic. No. 26104
PROFESSIONAL ENGINEER

OWNER

CITY OF HARRISONBURG

DEPARTMENT OF PUBLIC WORKS
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THANH DANG - PROJECT MANAGER
Than.Dang@harrisonburgva.gov

PROJECT TITLE

EAST MARKET STREET STORMWATER IMPROVEMENTS

CITY OF HARRISONBURG, VA

REVISIONS

MARK	DATE	DESCRIPTION

AMT FILE NO.	15-0571.001
DATE:	April 6, 2016
SCALE:	1" = 20'
DESIGNED BY:	CC/DEC
DRAWN BY:	LAL
CHECKED BY:	DJR

BID DOCUMENTS

SHEET TITLE

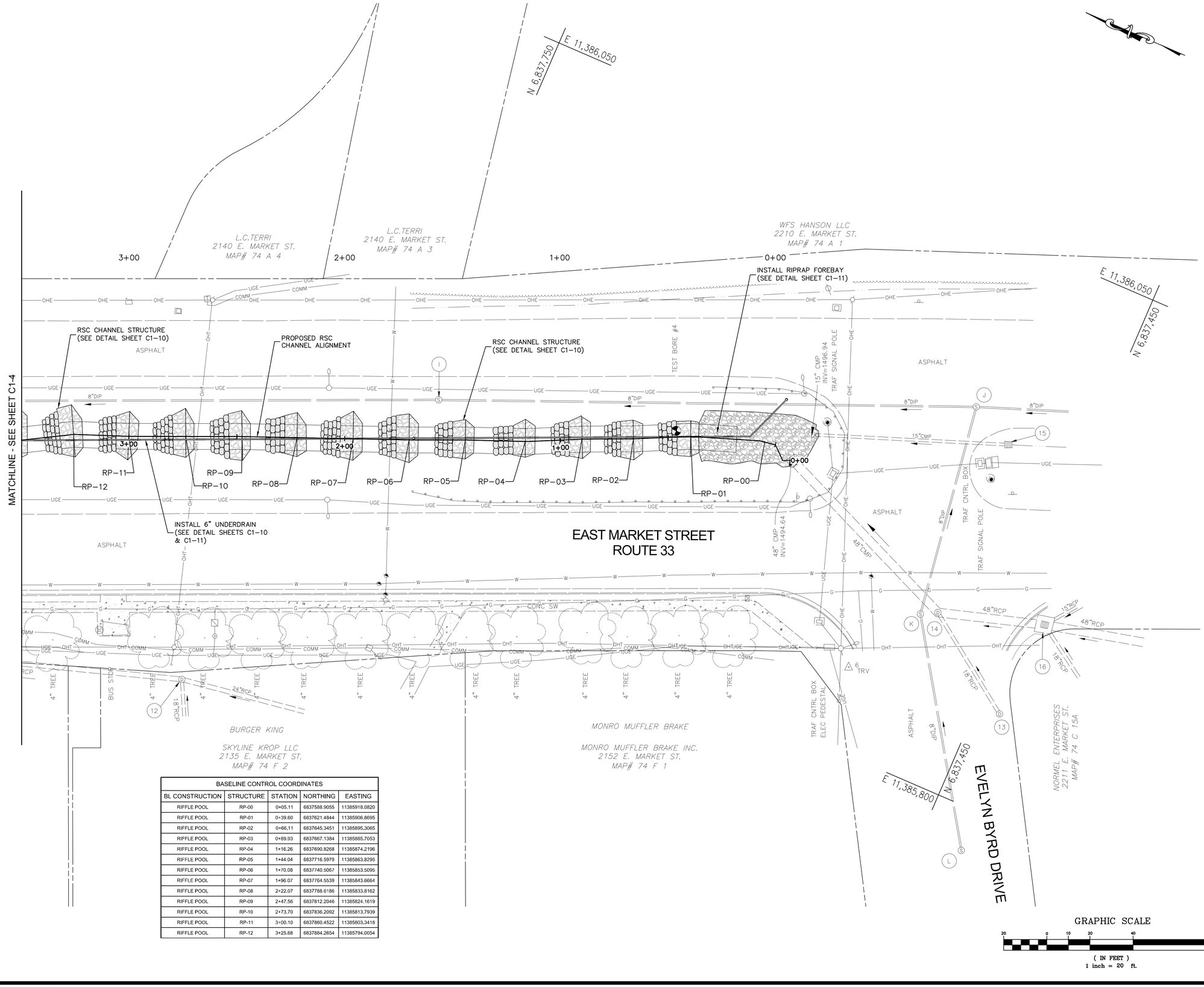
RSC CHANNEL SITE PLAN

SHEET

C1-4

SHEET 11 OF 32

X:\RICHMOND\15-0571.001 - EAST MARKET STREET ? RSC\05-CAD\CS102-150571001-RSC SITE PLAN.DWG, 4/5/2016 2:04 PM, LLANGLOIS



BASELINE CONTROL COORDINATES				
BL CONSTRUCTION	STRUCTURE	STATION	NORTHING	EASTING
RIFFLE POOL	RP-00	0+05.11	6837588.9055	11385918.0820
RIFFLE POOL	RP-01	0+39.60	6837621.4844	11385906.8695
RIFFLE POOL	RP-02	0+66.11	6837645.3451	11385895.3065
RIFFLE POOL	RP-03	0+89.93	6837667.1384	11385885.7053
RIFFLE POOL	RP-04	1+16.26	6837690.8268	11385874.2196
RIFFLE POOL	RP-05	1+44.04	6837716.5979	11385863.8295
RIFFLE POOL	RP-06	1+70.08	6837740.5067	11385853.5095
RIFFLE POOL	RP-07	1+96.07	6837764.5539	11385843.6664
RIFFLE POOL	RP-08	2+22.07	6837788.6186	11385833.8162
RIFFLE POOL	RP-09	2+47.56	6837812.2046	11385824.1619
RIFFLE POOL	RP-10	2+73.70	6837836.2092	11385813.7939
RIFFLE POOL	RP-11	3+00.10	6837860.4522	11385803.3418
RIFFLE POOL	RP-12	3+25.68	6837884.2654	11385794.0054

GRAPHIC SCALE

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(IN FEET)
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SHEET TITLE

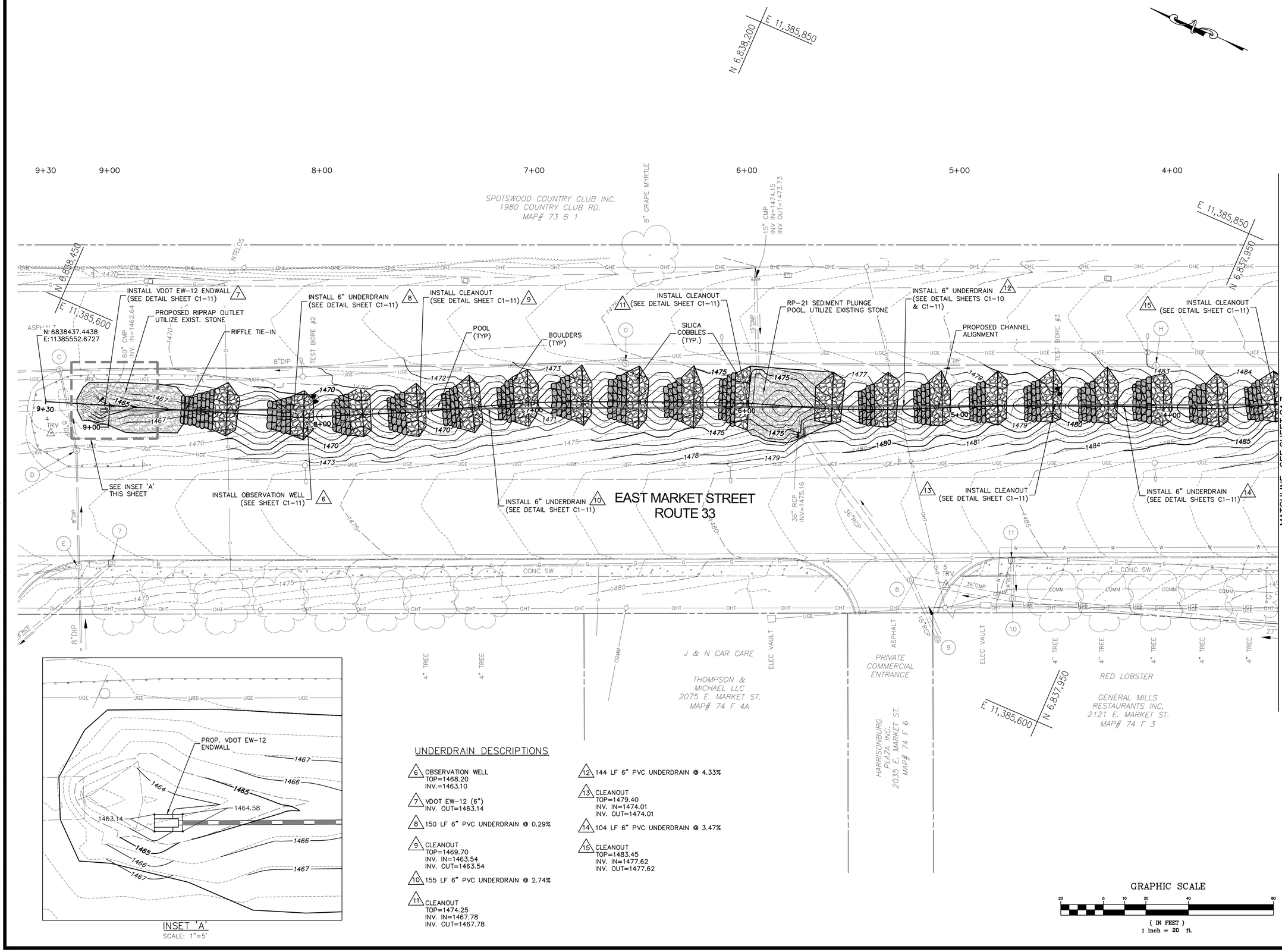
RSC CHANNEL SITE PLAN

SHEET

C1-5

SHEET 12 OF 32

X:\RICHMOND\15-0571.001 - EAST MARKET STREET ? RSC\05-CAD\CS103-150571001-RSC SITE PLAN.DWG, 4/5/2016 2:04 PM, LLANGLOIS



INSET 'A'
SCALE: 1"=5'

UNDERDRAIN DESCRIPTIONS

6 OBSERVATION WELL
TOP=1468.20
INV.=1463.10

7 VDOT EW-12 (6")
INV. OUT=1463.14

8 150 LF 6" PVC UNDERDRAIN @ 0.29%

9 CLEANOUT
TOP=1469.70
INV. IN=1463.54
INV. OUT=1463.54

10 155 LF 6" PVC UNDERDRAIN @ 2.74%

11 CLEANOUT
TOP=1474.25
INV. IN=1467.78
INV. OUT=1467.78

12 144 LF 6" PVC UNDERDRAIN @ 4.33%

13 CLEANOUT
TOP=1479.40
INV. IN=1474.01
INV. OUT=1474.01

14 104 LF 6" PVC UNDERDRAIN @ 3.47%

15 CLEANOUT
TOP=1483.45
INV. IN=1477.62
INV. OUT=1477.62

GRAPHIC SCALE
20 0 10 20 40 80
(IN FEET)
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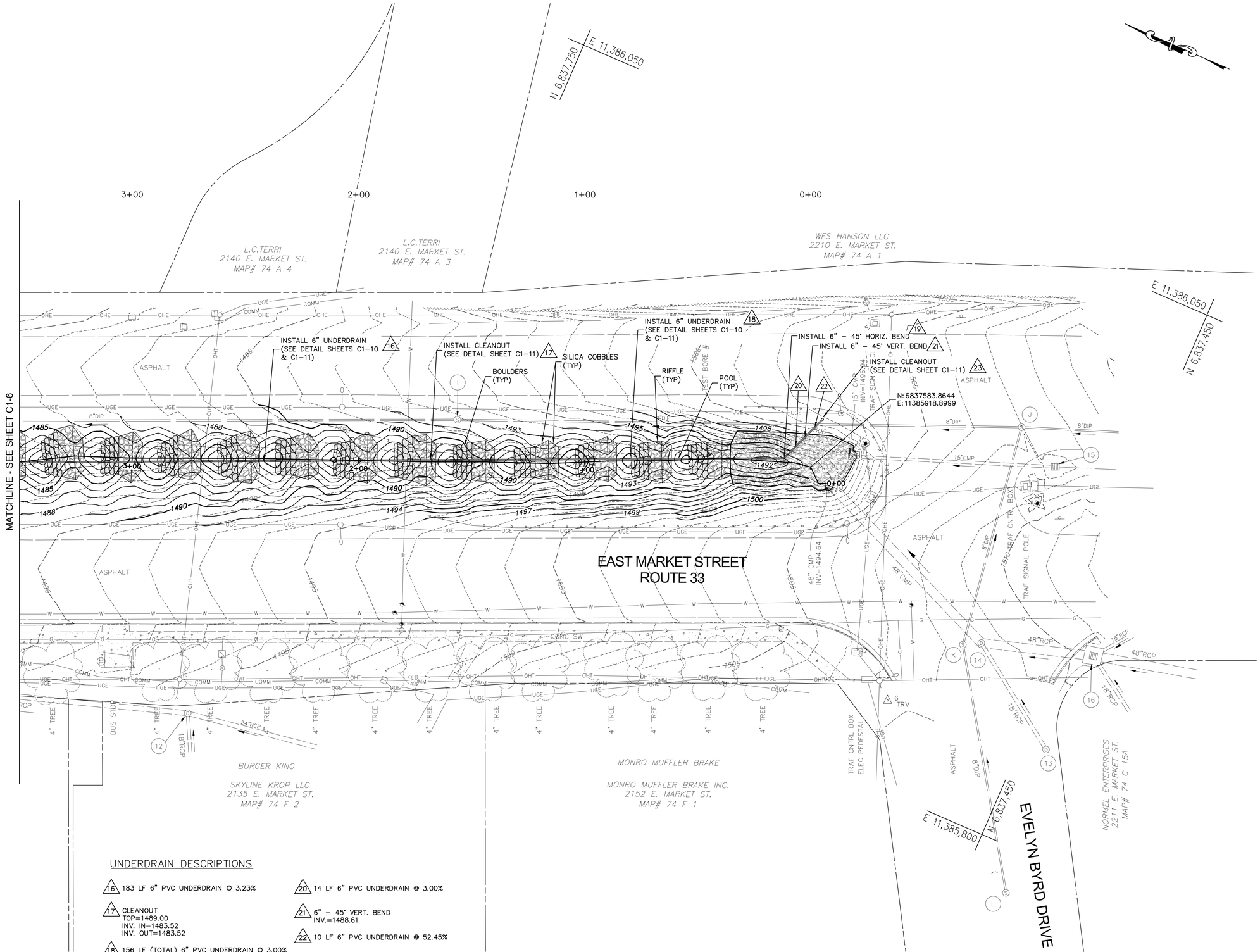
SHEET TITLE

RSC CHANNEL GRADING PLAN

SHEET
C1-6
SHEET 13 OF 32

X:\RICHMOND\15-0571.001 - EAST MARKET STREET ? RSC\05-CAD\CG102-150571001-RSC GRADING PLAN.DWG, 4/5/2016 2:05 PM, LLANGLOIS



UNDERDRAIN DESCRIPTIONS

16 183 LF 6" PVC UNDERDRAIN @ 3.23%

17 CLEANOUT
TOP=1489.00
INV. IN=1483.52
INV. OUT=1483.52

18 156 LF (TOTAL) 6" PVC UNDERDRAIN @ 3.00%

19 6" – 45° HORIZ. BEND
INV.=1488.20

20 14 LF 6" PVC UNDERDRAIN @ 3.00%

21 6" – 45° VERT. BEND
INV.=1488.61

22 10 LF 6" PVC UNDERDRAIN @ 52.45%

23 CLEANOUT
TOP=1502.00
INV. OUT=1499.00

GRAPHIC SCALE

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SHEET TITLE

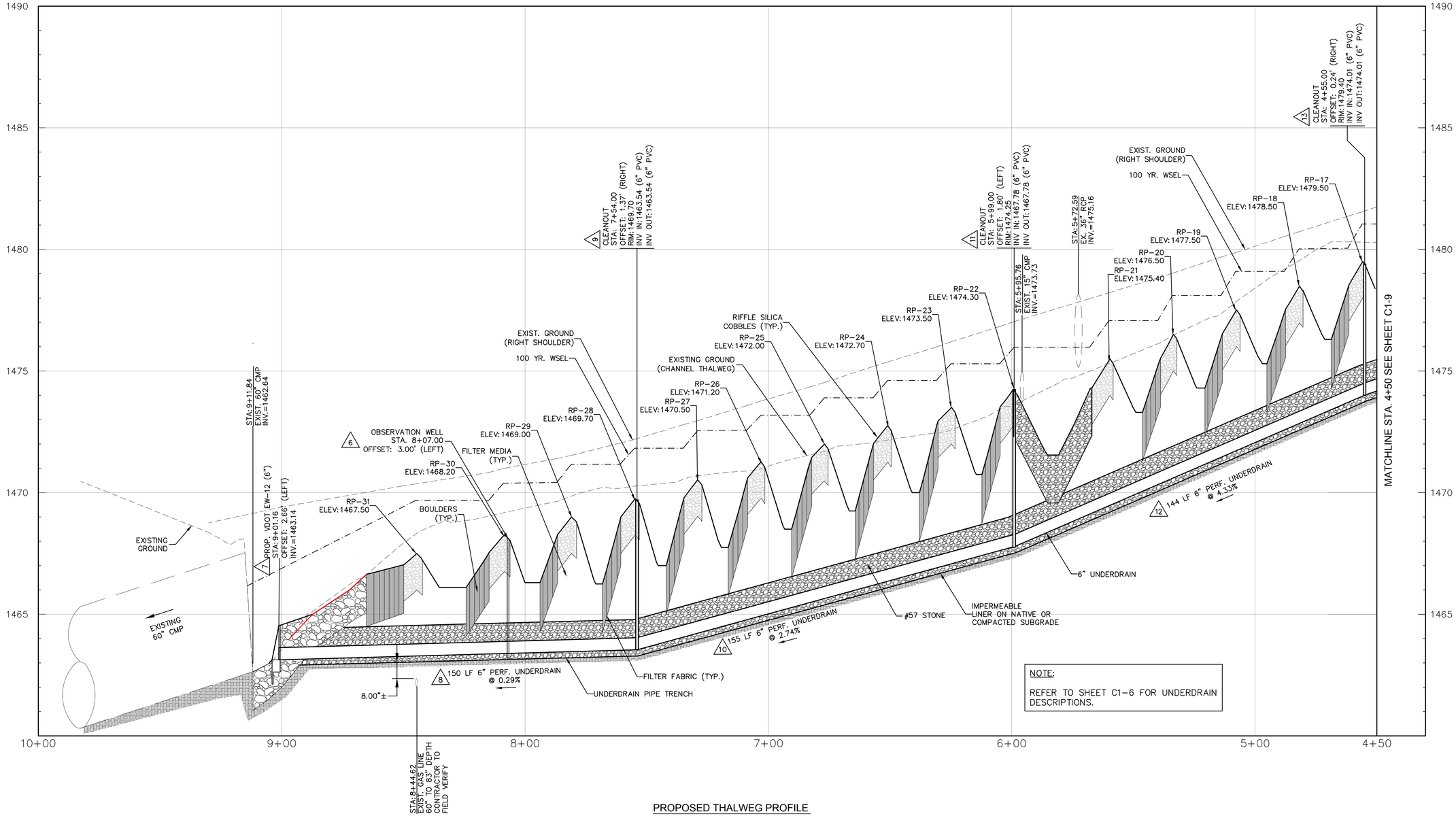
RSC CHANNEL GRADING PLAN

SHEET

C1-7

SHEET 14 OF 32

X:\RICHMOND\15-0571.001 - EAST MARKET STREET ? RSC\05-CAD\CG103-150571001-RSC GRADING PLAN.DWG, 4/5/2016 2:05 PM, LLANGLOIS



NOTE:

REFER TO SHEET C1-6 FOR UNDERDRAIN DESCRIPTIONS.

PROPOSED THALWEG PROFILE

SCALE: HORZ 1" = 20'
VERT. 1" = 2'

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SHEET TITLE

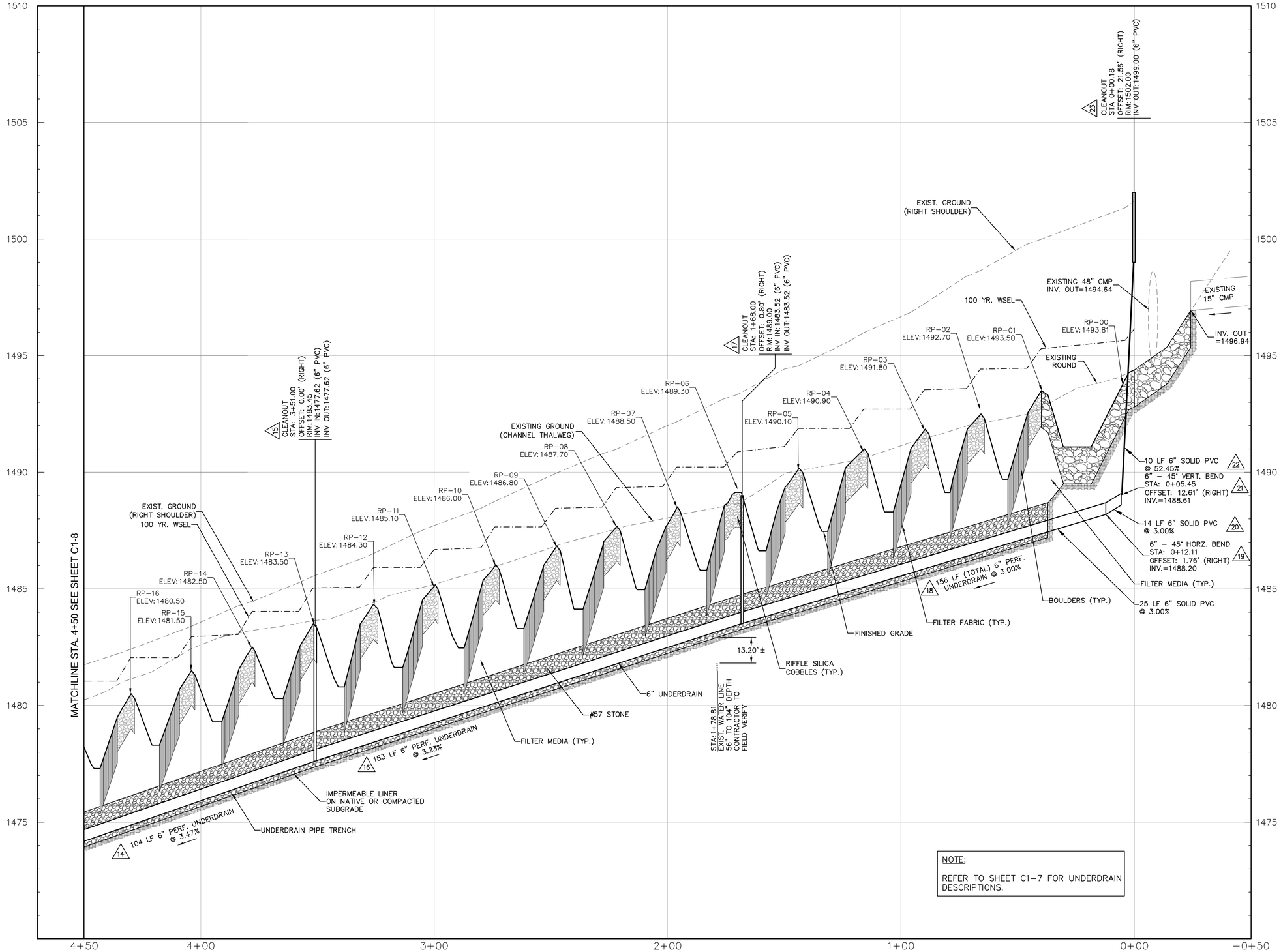
RSC CHANNEL PROFILE

SHEET

C1-8

SHEET 15 OF 32

X:\RICHMOND\15-0571001 - EAST MARKET STREET ? RSC\05-CAD\CS202-150571001-RSC PROFILE.DWG, 4/5/2016 2:06 PM, LLANGLOIS



NOTE:

REFER TO SHEET C1-7 FOR UNDERDRAIN DESCRIPTIONS.

PROPOSED THALWEG PROFILE

SCALE: HORZ 1" = 20'
VERT. 1" = 2'

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CITY OF HARRISONBURG, VA

REVISIONS

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BID DOCUMENTS

SHEET TITLE

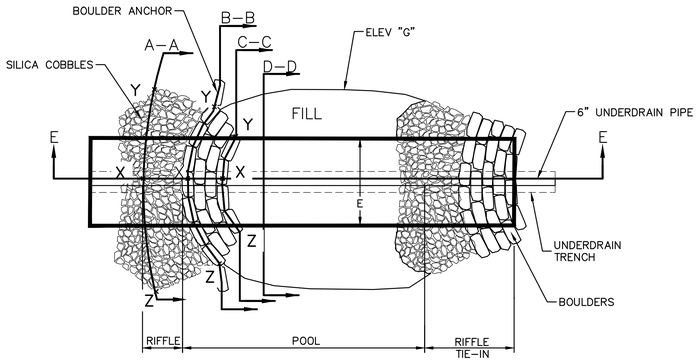
RSC CHANNEL PROFILE

SHEET

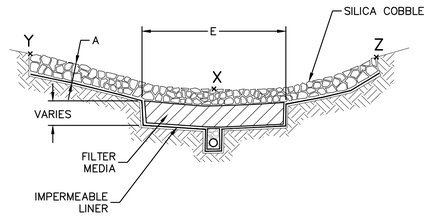
C1-9

SHEET 16 OF 32

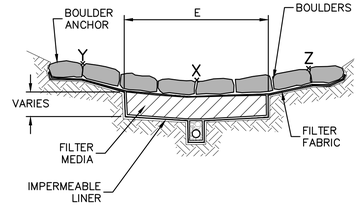
X:\RICHMOND\15-0571.001 - EAST MARKET STREET ? RSC\05-CAD\C3203-150571001-RSC PROFILE.DWG, 4/5/2016 2:06 PM, LLANGLOIS



TOP VIEW



SECTION A-A



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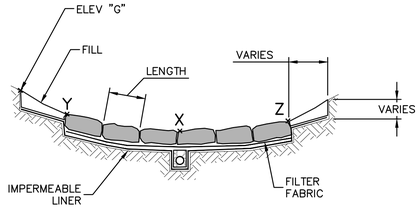

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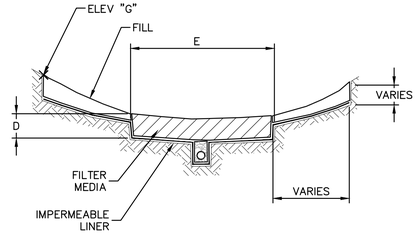

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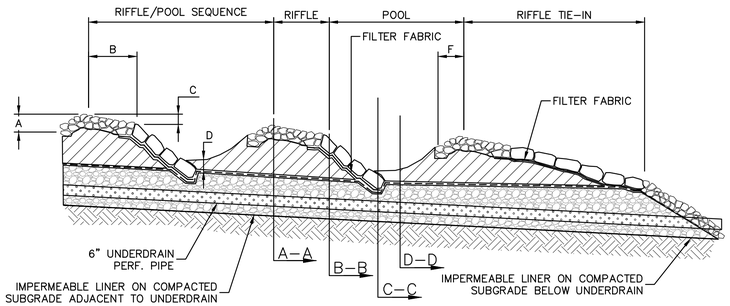
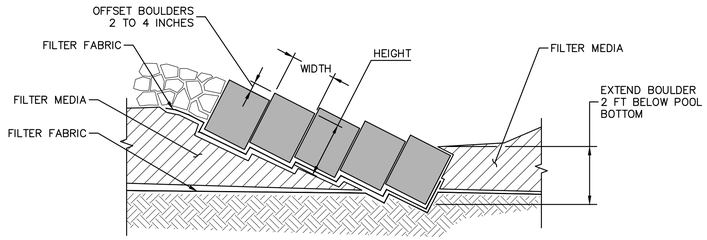


SECTION E-E PROFILE VIEW



POOL BOULDER DETAIL

REGENERATIVE STEP-POOL CONVEYANCE (RSC) CHANNEL DETAIL

NTS

REGENERATIVE STEP-POOL CONVEYANCE (RSC) CHANNEL

STR. #	CROSS-SECTION A-A									CROSS-SECTION B-B									CROSS-SECTION C-C									A	B	C	D	E	F	G	BOULDER ROCK DIMENSIONS		
	X			Y (LEFT)			Z (RIGHT)			X			Y (LEFT)			Z (RIGHT)			X			Y (LEFT)			Z (RIGHT)											
	STA.	OFFSET (FT)	ELEV (MSL)	STA.	OFFSET (FT)	ELEV (MSL)	STA.	OFFSET (FT)	ELEV (MSL)	STA.	OFFSET (FT)	ELEV (MSL)	STA.	OFFSET (FT)	ELEV (MSL)	STA.	OFFSET (FT)	ELEV (MSL)	STA.	OFFSET (FT)	ELEV (MSL)	STA.	OFFSET (FT)	ELEV (MSL)	STA.	OFFSET (FT)	ELEV (MSL)	(FT)	(FT)	(IN)	(FT)	(FT)	(FT)	(MSL)	LENGTH (L)	HEIGHT (H)	WIDTH (W)
RP-00	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	CLASS I RIPRAP		
RP-01	0+40	0.0	1493.5	0+40	9.3	1495.3	0+40	7.2	1495.4	0+46	0.0	1492.5	0+46	8.6	1494.4	0+46	7.2	1494.4	0+54	0.0	1489.7	0+54	6.0	1491.7	0+54	6.0	1491.8	1.5	6	10	1.6	12.0	4.0	1494.4	24"-36"	18"-27"	18"-24"
RP-02	0+66	0.0	1492.7	0+66	9.8	1494.5	0+66	8.7	1494.5	0+72	0.0	1491.7	0+72	8.5	1493.4	0+72	8.1	1493.6	0+79	0.0	1489.2	0+79	6.2	1491.3	0+79	6.0	1491.2	1.5	6	10	1.7	12.0	4.0	1493.6	24"-36"	18"-27"	18"-24"
RP-03	0+90	0.0	1491.8	0+90	9.0	1493.6	0+90	10.8	1493.6	0+96	0.0	1490.9	0+96	7.5	1492.7	0+96	8.5	1492.8	1+04	0.0	1488.3	1+04	6.2	1490.3	1+04	6.0	1490.1	1.5	6	10	1.7	12.0	4.0	1492.8	24"-36"	18"-27"	18"-24"
RP-04	1+16	0.0	1490.9	1+16	7.3	1492.7	1+16	10.3	1492.7	1+22	0.0	1490.4	1+22	6.4	1492.0	1+22	7.3	1492.0	1+31	0.0	1487.5	1+31	6.0	1489.4	1+31	6.0	1489.5	1.5	6	10	1.6	12.0	4.0	1491.9	24"-36"	18"-27"	18"-24"
RP-05	1+44	0.0	1490.1	1+44	8.8	1491.9	1+44	9.4	1491.9	1+50	0.0	1489.3	1+50	8.0	1491.1	1+50	8.5	1491.0	1+58	0.0	1486.6	1+58	6.1	1488.3	1+58	6.1	1488.4	1.5	6	10	1.6	12.0	4.0	1490.9	24"-36"	18"-27"	18"-24"
RP-06	1+70	0.0	1489.3	1+70	10.6	1490.8	1+70	12.1	1490.8	1+76	0.0	1488.4	1+76	8.7	1490.2	1+76	11.3	1490.1	1+84	0.0	1485.8	1+84	5.9	1487.7	1+84	7.0	1487.5	1.5	6	10	1.6	12.0	4.0	1490.2	24"-36"	18"-27"	18"-24"
RP-07	1+96	0.0	1488.5	1+96	10.0	1490.3	1+96	12.8	1490.2	2+02	0.0	1487.3	2+02	8.4	1489.4	2+02	9.8	1489.5	2+10	0.0	1485.0	2+10	6.0	1486.5	2+10	6.0	1486.5	1.5	6	10	1.6	12.0	4.0	1489.3	24"-36"	18"-27"	18"-24"
RP-08	2+22	0.0	1487.7	2+22	8.8	1489.3	2+22	11.6	1489.3	2+28	0.0	1486.8	2+28	7.4	1488.5	2+22	10.1	1488.5	2+36	0.0	1484.1	2+36	6.0	1485.6	2+36	6.6	1485.9	1.5	6	10	1.6	12.0	4.0	1488.5	24"-36"	18"-27"	18"-24"
RP-09	2+48	0.0	1486.8	2+47	11.0	1488.5	2+48	12.0	1488.5	2+54	0.0	1485.8	2+53	10.4	1487.6	2+54	10.4	1487.5	2+62	0.0	1483.3	2+62	6.0	1484.8	2+62	6.0	1485.0	1.5	6	10	1.6	12.0	4.0	1487.7	24"-36"	18"-27"	18"-24"
RP-10	2+74	0.0	1486.0	2+74	9.7	1487.6	2+74	13.0	1487.7	2+80	0.0	1485.1	2+79	8.3	1486.7	2+80	9.7	1486.8	2+88	0.0	1482.5	2+87	6.0	1483.8	2+88	6.0	1484.2	1.5	6	10	1.6	12.0	4.0	1486.7	24"-36"	18"-27"	18"-24"
RP-11	3+00	0.0	1485.1	3+00	11.0	1486.7	3+00	11.5	1486.7	3+06	0.0	1484.2	3+06	7.4	1485.5	3+06	9.3	1485.9	3+14	0.0	1481.6	3+14	6.0	1483.1	3+14	6.0	1483.0	1.5	6	10	1.6	12.0	4.0	1485.9	24"-36"	18"-27"	18"-24"
RP-12	3+26	0.0	1484.3	3+25	10.5	1485.9	3+27	13.8	1485.9	3+32	0.0	1483.4	3+32	8.5	1485.1	3+32	12.7	1485.1	3+39	0.0	1480.8	3+39	6.0	1482.2	3+39	7.0	1482.8	1.5	6	10	1.6	12.0	4.0	1485.0	24"-36"	18"-27"	18"-24"
RP-13	3+52	0.0	1483.5	3+52	8.3	1485.1	3+51	15.6	1485.0	3+58	0.0	1482.5	3+58	6.7	1484.1	3+58	12.0	1484.1	3+65	0.0	1480.3	3+65	6.0	1481.7	3+65	7.3	1481.7	1.5	6	12	2.0	12.0	4.0	1484.0	24"-36"	18"-27"	18"-24"
RP-14	3+78	0.0	1482.5	3+78	8.5	1484.0	3+79	16.5	1484.0	3+84	0.0	1481.5	3+84	7.5	1483.0	3+84	11.5	1483.0	3+92	0.0	1479.3	3+92	6.0	1480.7	3+92	7.5	1480.6	1.5	6	12	1.9	12.0	4.0	1483.0	24"-36"	18"-27"	18"-24"
RP-15	4+04	0.0	1481.5	4.04	8.6	1482.9	4+04	16.1	1482.9	4+10	0.0	1480.5	4+10	7.3	1481.9	4+10	14.4	1482.0	4+18	0.0	1478.3	4+18	6.0	1479.8	4+18	10.8	1480.4	1.5	6	12	1.8	12.0	4.0	1482.1	24"-36"	18"-27"	18"-24"
RP-16	4+30	0.0	1480.5	4+30	8.1	1482.0	4+30	18.4	1482.0	4+36	0.0	1479.4	4+36	7.4	1481.0	4+36	12.5	1481.1	4+43	0.0	1477.3	4+43	6.0	1479.0	4+43	7.4	1478.7	1.5	6	12	1.7	12.0	4.0	1481.0	24"-36"	18"-27"	18"-24"
RP-17	4+56	0.0	1479.5	4+56	7.7	1481.0	4+56	17.5	1481.0	4+62	0.0	1478.4	4+62	7.2	1480.0	4+62	12.6	1480.1	4+69	0.0	1476.3	4+69	6.0	1477.9	4+69	8.1	1478.0	1.5	6	12	1.6	12.0	4.0	1480.0	24"-36"	18"-27"	18"-24"
RP-18	4+82	0.0	1478.5	4+82	9.1	1480.1	4+82	16.4	1480.0	4+88	0.0	1477.4	4+88	7.2	1479.0	4+88	11.2	1479.0	4+95	0.0	1475.3	4+95	6.0	1477.1	4+95	7.9	1476.9	1.5	6	12	1.8	12.0	4.0	1479.1	24"-36"	18"-27"	18"-24"
RP-19	5+08	0.0	1477.5	5+08	8.2	1479.0	5+08	17.4	1479.0	5+14	0.0	1476.4	5+14	8.1	1478.0	5+14	13.0	1478.2	5+21	0.0	1474.3	5+21	6.0	1475.8	5+21	6.0	1475.4	1.5	6	12	1.9	12.0	4.0	1478.1	24"-36"	18"-27"	18"-24"
RP-20	5+34	0.0	1476.5	5+34	8.3	1478.2	5+33	17.6	1478.1	5+40	0.0	1475.2	5+40	7.8	1477.1	5+40	12.2	1477.1	5+47	0.0	1473.3	5+47	6.0	1475.0	5+47	7.9	1474.9	1.5	6	12	2.0	12.0	4.0	1477.1	24"-36"	18"-27"	18"-24"
RP-21	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	CLASS I RIPRAP		
RP-22	5+99	0.0	1474.3	5+99	12.6	1475.9	5+99	17.4	1475.9	6+05	0.0	1473.2	6+05	10.5	1475.2	6+05	14.0	1475.3	6+13	0.0	1470.8	6+13	6.0	1472.4	6+13	7.5	1472.7	1.5	6	9	2.1	12.0	4.0	1475.3	24"-36"	18"-27"	18"-24"
RP-23	6+25	0.0	1473.5	6+25	12.4	1475.1	6+25	17.2	1475.2	6+31	0.0	1472.9	6+31	9.4	1474.3	6+31	11.6	1474.4	6+39	0.0	1470.0	6+39	6.0	1471.6	6+39	6.0	1471.6	1.5	6	9	2.1	12.0	4.0	1474.6	24"-36"	18"-27"	18"-24"
RP-24	6+51	0.0	1472.7	6+51	12.6	1474.6	6+51	16.9	1474.5	6+57	0.0	1472.0	6+57	10.4	1473.9	6+57	14.0	1474.0	6+65	0.0	1469.3	6+65	6.8	1471.4	6+65	9.2	1471.6	1.5	6	9	2.0	12.0	4.0	1473.9	24"-36"	18"-27"	18"-24"
RP-25	6+77	0.0	1472.0	6+77	11.2	1473.8	6+77	17.1	1473.7	6+83	0.0	1471.2	6+83	8.1	1472.8	6+83	12.6	1473.0	6+91	0.0	1468.5	6+91	6.0	1470.4	6+91	7.8	1470.4	1.5	6	9	2.0	12.0	4.0	1473.2	24"-36"	18"-27"	18"-24"
RP-26	7+03	0.0	1471.2	7+03	11.2	1472.9	7+03	15.6	1473.0	7+09	0.0	1470.3	7+09	8.6	1472.2	7+09	12.6	1472.5	7+17	0.0	1467.8	7+17	6.0	1469.7	7+17	6.0	1469.2	1.5	6	9	2.0	12.0	4.0	1472.6	24"-36"	18"-27"	18"-24"
RP-27	7+29	0.0	1470.5	7+29	11.9	1472.5	7+29	15.3	1472.3	7+35	0.0	1469.5	7+35	9.5	1471.4	7+35	11.0	1471.3	7+42	0.0	1467.0	7+42	6.0	1468.7	7+42	6.0	1468.6	1.5	6	9	1.9	12.0	4.0	1471.8	24"-36"	18"-27"	18"-24"
RP-28	7+55	0.0	1469.7	7+55	11.5	1471.7	7+55	13.5	1471.7	7+61	0.0	1469.0	7+61	10.5	1471.2	7+61	9.6	1471.1	7+69	0.0	1466.3	7+69	6.8	1468.2	7+69	6.0	1468.0	1.5	6	9	1.5	12.0	4.0	1471.2	24"-36"	18"-27"	18"-24"
RP-29	7+81	0.0	1469.0	7+81	10.4	1471.1	7+81	13.0	1471.1	7+87	0.0	1468.2	7+87	9.4	1470.4	7+87	10.1	1470.5	7+95	0.0	1466.3	7+95	7.1	1467.6	7+95	6.0	1467.4	1.5	6	9	1.6	12.0	4.0	1470.4	24"-36"	18"-27"	18"-24"
RP-30	8+09	0.0	1468.2	8+09	10.6	1470.5	8+08	12.5	1470.3	8+15	0.0	1467.6	8+15	8.3	1469.7	8+15	9.5	1469.7	8+25	0.0	1466.1	8+25	6.0	1466.3	8+25	6.0	1466.4	1.5	6	9	1.5	12.0	4.0	1469.67	24"-36"	18"-27"	18"-24"
RP-31	8+45	0.0	1467.5	8+45	10.9	1469.7	8+45	14.3	1469.7	8+51	0.0	1467.0	8+51	8.3	1468.8	8+51	10.5	1468.9	8+65	0.0	1466.7	8+65	6.0	1467.8	8+65	6.0	1467.7	1.5	6	6	N/A	12.0	N/A	N/A	24"-36"	18"-27"	18"-24"

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DONALD J. RISSMEYER
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4-6-16
PROFESSIONAL ENGINEER

OWNER

CITY OF HARRISONBURG

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THANH DANG - PROJECT MANAGER
Than.Dang@harrisonburgva.gov

PROJECT TITLE

EAST MARKET STREET STORMWATER IMPROVEMENTS
CITY OF HARRISONBURG, VA

REVISIONS

MARK	DATE	DESCRIPTION

AMT FILE NO.	15-0571.001
DATE:	April 6, 2016
SCALE:	N/A
DESIGNED BY:	CC/DEC
DRAWN BY:	LAL
CHECKED BY:	DJR

BID DOCUMENTS

SHEET TITLE

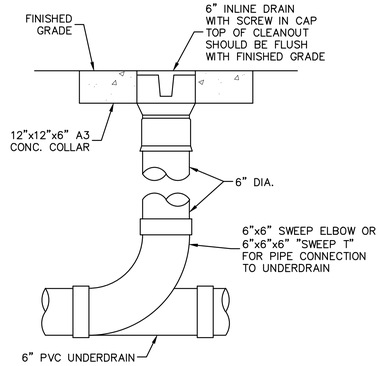
RSC CHANNEL DETAILS

SHEET

C1-10

SHEET 17 OF 32

X:\RICHMOND\15-0571001 - EAST MARKET STREET ? RSC\05-CAD\C5502-150571001-RSC DETAILS.DWG, 4/5/2016 2:06 PM, LLANGLOIS

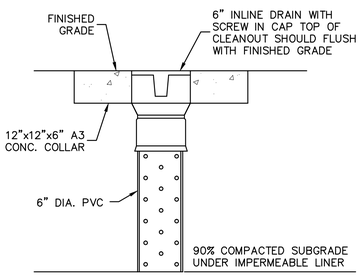


NOTES:

THE CLEANOUT SHALL HAVE THE FOLLOWING:

1. PROVIDE A WHITE TUBE MADE OF PVC OR EQUAL.
2. THE SCREW TOP LID SHALL BE HIGH IMPACT PLASTIC THAT WILL WITHSTAND ULTRA–VIOLET RAYS.

CLEANOUT
NTS

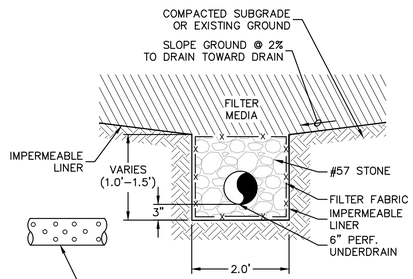


NOTES:

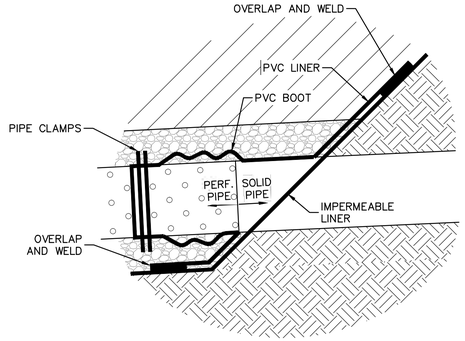
EACH OBSERVATION WELL SHALL INCLUDE THE FOLLOWING:

1. PROVIDE A WHITE TUBE MADE OF NON–CORROSIVE MATERIAL, SCH. 40 PERFORATED PVC OR EQUAL.
2. WRAP TUBE WITH GEOTEXTILE FABRIC.
3. THE SCREW TOP LID SHALL BE HIGH IMPACT PLASTIC THAT WILL WITHSTAND ULTRA–VIOLET RAYS.

OBSERVATION WELL
NTS

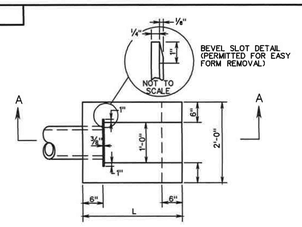


UNDERDRAIN PIPE
NTS

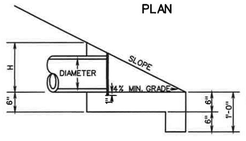


PIPE BOOT DETAIL
NTS

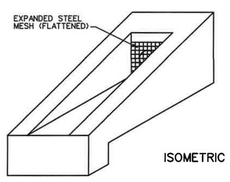
EW-12



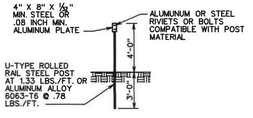
PLAN



SECTION A-A



ISOMETRIC



UNDERDRAIN OUTLET MARKER DETAIL

NOTES:

1. TYPICAL ENDWALL TO BE PLACED AT THE ENDS OF ALL UNDERDRAIN OUTLETS, BARRING LOCATIONS WHERE UNDERDRAIN IS TIED INTO OTHER DRAINAGE STRUCTURES. ENDWALL TO BE INSTALLED PERPENDICULAR TO ROADWAY AND FLUSH WITH THE SLOPE.
2. OUTLET PIPES SHALL BE RIGID NONPERFORATED, SMOOTH-BORE PIPE, MEETING THE REQUIREMENTS OF 70 PSI TESTED ACCORDING TO ASTM 2412.
3. EXPANDED STEEL MESH (FLATTENED) SHALL HAVE OPENINGS OF APPROX. ½" X 1" AND WEIGH APPROX. 0.82 LBS. PER SQ. FT. MESH SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A-123. THE MESH SHALL EXTEND A MINIMUM OF 1" ABOVE THE O.D. OF THE PIPE AND IS A BARRIER FOR RODENTS, ETC. THE SLOT FOR THE STEEL MESH IS TO BE CONSTRUCTED SO THAT THE MESH CAN BE REMOVED FOR CLEANOUT PURPOSES.
4. THIS ITEM MAY BE PRECAST OR CAST IN PLACE.
5. STEEL POSTS AND PLATES TO BE PAINTED OR GALVANIZED IN ACCORDANCE WITH THE ROAD AND BRIDGE SPECIFICATIONS. IF PAINTED THE FINAL COAT SHALL BE NO. 13 ALUMINUM PAINT OR NO. 11 WHITE PAINT.
6. MARKER TO BE PLACED AT ALL EW-12 UNDERDRAIN INSTALLATIONS.
7. MARKER WILL BE PAID FOR IN ACCORDANCE WITH SECTION 501 OF THE ROAD AND BRIDGE SPECIFICATIONS.

PIPE I.D.	SLOPE	DIMENSIONS L	DIMENSIONS H	CLASS A3 CONCRETE CUBIC YARDS
4"	2:1	2'-5½"	1'-2¾"	0.17
4"	4:1	4'-5"	1'-1¾"	0.28
6"	2:1	2'-10½"	1'-3¼"	0.21
6"	4:1	5'-3"	1'-3¾"	0.35

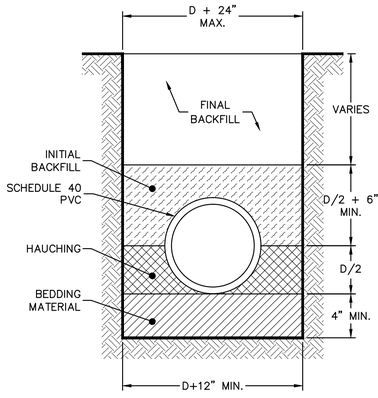
VDOT ROAD AND BRIDGE STANDARDS

SHEET 1 OF 1 | REVISION DATE | 101.32

STANDARD ENDWALL FOR PIPE UNDERDRAIN

VIRGINIA DEPARTMENT OF TRANSPORTATION

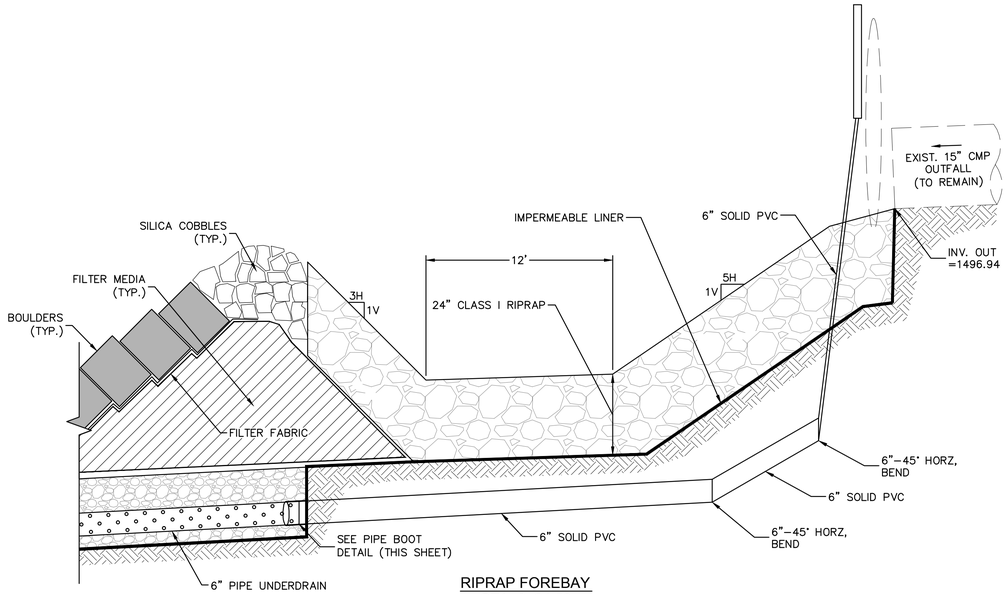
SPECIFICATION REFERENCE
105
233
302
501



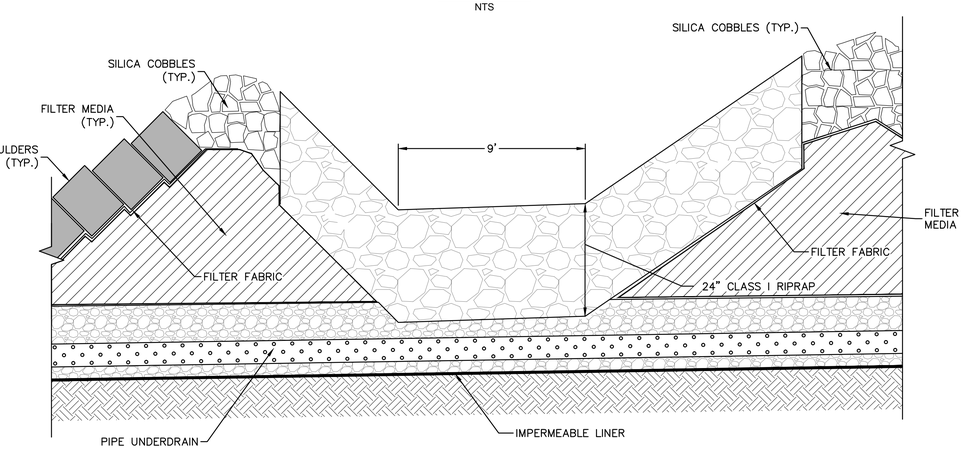
NOTES:

1. BEDDING MATERIAL SHALL BE IN ACCORDANCE WITH SECTION 302 OF THE VDOT ROAD AND BRIDGE SPECIFICIATIONS.
2. HAUCHING AND INITIAL BACKFILL MATERIAL SHALL BE CLASS I IN ACCORDANCE WITH SECTION 302 OF THE VDOT ROAD AND BRIDGE SPECIFICIATIONS.

PIPE BEDDING (SOLID PVC)
NTS



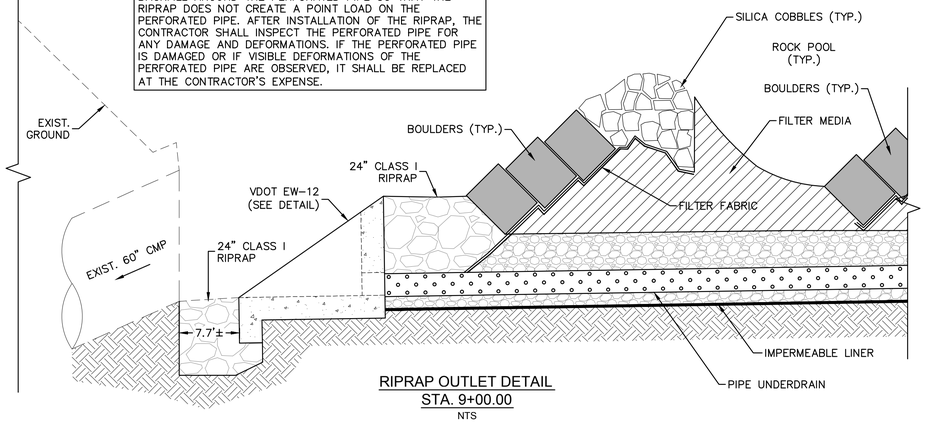
RIPRAP FOREBAY
STA. 0+24.50
NTS



RP-21 SEDIMENT PLUNGE POOL DETAIL
STA. 5+83.00
NTS

NOTE

THE CONTRACTOR SHALL PROVIDE ADEQUATE BEDDING AND BACKFILL AROUND THE PERFORATED PIPE SO THAT THE RIPRAP DOES NOT CREATE A POINT LOAD ON THE PERFORATED PIPE. AFTER INSTALLATION OF THE RIPRAP, THE CONTRACTOR SHALL INSPECT THE PERFORATED PIPE FOR ANY DAMAGE AND DEFORMATIONS. IF THE PERFORATED PIPE IS DAMAGED OR IF VISIBLE DEFORMATIONS OF THE PERFORATED PIPE ARE OBSERVED, IT SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE.



RIPRAP OUTLET DETAIL
STA. 9+00.00
NTS

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THANH DANG - PROJECT MANAGER
Than.Dang@harrisonburgva.gov

PROJECT TITLE

EAST MARKET STREET STORMWATER IMPROVEMENTS
CITY OF HARRISONBURG, VA

REVISIONS		
MARK	DATE	DESCRIPTION

AMT FILE NO.	15-0571.001
DATE:	April 6, 2016
SCALE:	AS NOTED
DESIGNED BY:	CC/DEC
DRAWN BY:	LAL
CHECKED BY:	DJR

BID DOCUMENTS

SHEET TITLE

RSC CHANNEL DETAILS

SHEET

C1-11

SHEET 18 OF 32

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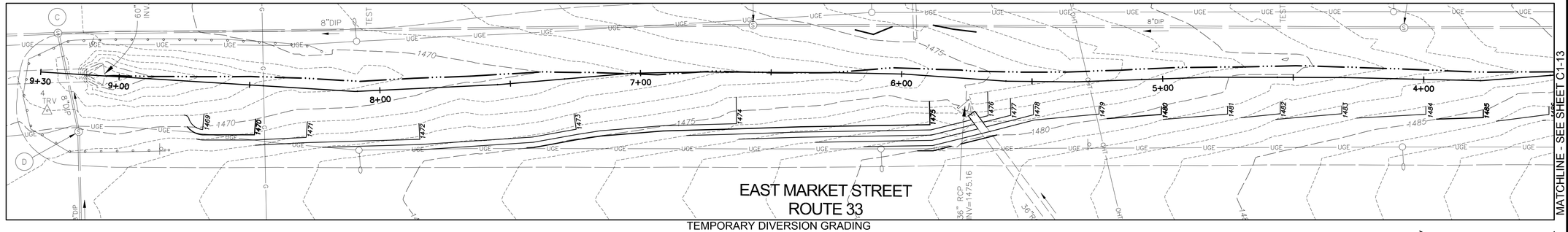

EROSION CONTROL LEGEND

TITLE	KEY	SYMBOL	STD. & SPEC. NUMBER*	QUANTITY
LIMITS OF DISTURBANCE		LOD		51,041 S.F.
CONSTRUCTION ENTRANCE	CE		3.02	AS REQ'D.
SILT FENCE	SF	SF	3.05	1,893 L.F.
DIVERSION FENCE	DV		3.12	915 L.F.
RIPRAP	RR		3.19	AS REQ'D.
SODDING	SO		3.33	4,043 S.Y.
MULCH	MU		3.35	425 S.Y.

*VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK STD.& SPEC.

SEQUENCE OF CONSTRUCTION

1. CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS FROM THE CITY OF HARRISONBURG PRIOR TO COMMENCING WORK.
2. CONTRACTOR SHALL ESTABLISH CLEARING LIMITS AND LOCATION OF CONSTRUCTION ENTRANCES BASED UPON PLANNED SEQUENCE OF WORK AND COORDINATE LOCATIONS WITH THE CITY.
3. CONTRACTOR SHALL INSTALL RIPRAP OUTLET AT STA. 9+00 ON A DRY DAY PRIOR TO INSTALLING TEMPORARY DIVERSION FENCE.
4. CONTRACTOR SHALL INSTALL TEMPORARY DIVERSION FENCE AND PERFORM NECESSARY CLEARING FOR INSTALLATION.
5. CONTRACTOR SHALL INSTALL TEMPORARY SILT FENCE ALONG THE EAST BOUND LANE OF EAST MARKET STREET TO DIRECT ROADWAY RUNOFF AWAY FROM WORK AREA.
6. CONTRACTOR SHALL INSTALL REMAINING RIPRAP, THEN PROCEED WITH OVERALL CLEARING AND REMOVAL OF EXISTING RIPRAP.
7. CONTRACTOR SHALL INSTALL RSC CHANNEL, IMPERMEABLE LINER, UNDERDRAIN, STRUCTURES, FILTER MEDIA AND ASSOCIATED APPURTENANCES AND STABILIZE.
8. CONTRACTOR SHALL INSTALL PERMANENT VEGETATIVE STABILIZATION.
9. CONTRACTOR SHALL REMOVE ALL TEMPORARY EQUIPMENT, DIVERSIONS,CONSTRUCTION MATERIALS AND DEBRIS FROM THE SITE.
10. CONTRACTOR SHALL REMOVE TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES UPON APPROVAL FROM THE CITY OF HARRISONBURG.

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

A. MORTON THOMAS AND ASSOCIATES, INC.
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DONALD J. RISSMEYER
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THANH DANG - PROJECT MANAGER
Than.Dang@harrisonburgva.gov

PROJECT TITLE

EAST MARKET STREET STORMWATER IMPROVEMENTS

CITY OF HARRISONBURG, VA

REVISIONS

MARK	DATE	DESCRIPTION

AMT FILE NO.	15-0571.001
DATE:	April 6, 2016
SCALE:	1" = 20'
DESIGNED BY:	CC/DEC
DRAWN BY:	LAL
CHECKED BY:	DJR

BID DOCUMENTS

SHEET TITLE

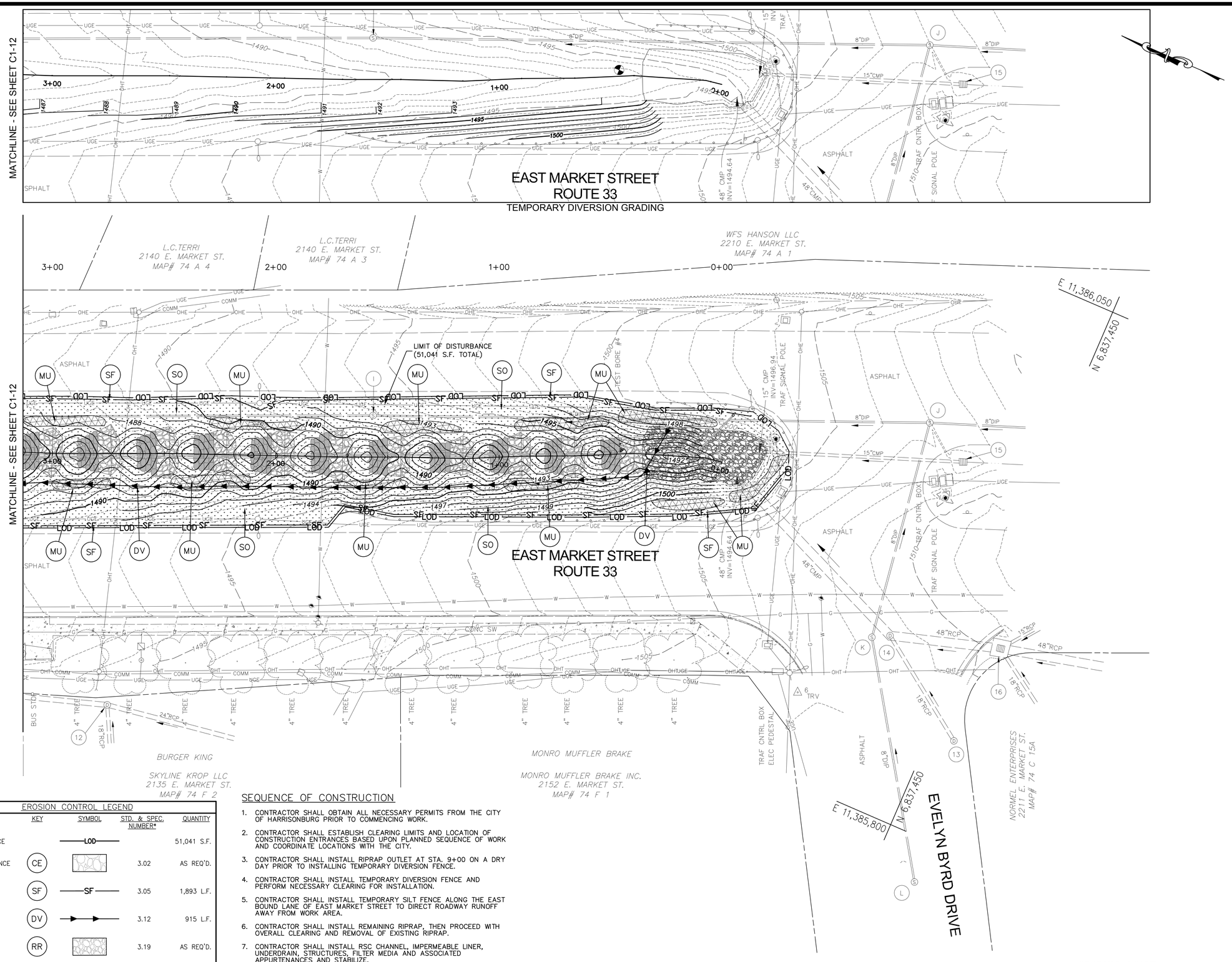
RSC CHANNEL EROSION AND SEDIMENT CONTROL PLAN

SHEET

C1-12

SHEET 19 OF 32

X:\RICHMOND\15-0571.001 - EAST MARKET STREET ? RSC\05-CAD\CE102-150571001-RSC SEDIMENT CONTROL PLAN.DWG, 4/5/2016 2:07 PM, LLANGLOIS



EROSION CONTROL LEGEND

TITLE	KEY	SYMBOL	STD. & SPEC. NUMBER*	QUANTITY
LIMITS OF DISTURBANCE		LOD		51,041 S.F.
CONSTRUCTION ENTRANCE	CE		3.02	AS REQ'D.
SILT FENCE	SF	SF	3.05	1,893 L.F.
DIVERSION FENCE	DV		3.12	915 L.F.
RIPRAP	RR		3.19	AS REQ'D.
SODDING	SO		3.33	4,043 S.Y.
MULCH	MU		3.35	425 S.Y.

*VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK STD.& SPEC.

SEQUENCE OF CONSTRUCTION

1. CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS FROM THE CITY OF HARRISONBURG PRIOR TO COMMENCING WORK.
2. CONTRACTOR SHALL ESTABLISH CLEARING LIMITS AND LOCATION OF CONSTRUCTION ENTRANCES BASED UPON PLANNED SEQUENCE OF WORK AND COORDINATE LOCATIONS WITH THE CITY.
3. CONTRACTOR SHALL INSTALL RIPRAP OUTLET AT STA. 9+00 ON A DRY DAY PRIOR TO INSTALLING TEMPORARY DIVERSION FENCE.
4. CONTRACTOR SHALL INSTALL TEMPORARY DIVERSION FENCE AND PERFORM NECESSARY CLEARING FOR INSTALLATION.
5. CONTRACTOR SHALL INSTALL TEMPORARY SILT FENCE ALONG THE EAST BOUND LANE OF EAST MARKET STREET TO DIRECT ROADWAY RUNOFF AWAY FROM WORK AREA.
6. CONTRACTOR SHALL INSTALL REMAINING RIPRAP, THEN PROCEED WITH OVERALL CLEARING AND REMOVAL OF EXISTING RIPRAP.
7. CONTRACTOR SHALL INSTALL RSC CHANNEL, IMPERMEABLE LINER, UNDERDRAIN, STRUCTURES, FILTER MEDIA AND ASSOCIATED APPURTENANCES AND STABILIZE.
8. CONTRACTOR SHALL INSTALL PERMANENT VEGETATIVE STABILIZATION.
9. CONTRACTOR SHALL REMOVE ALL TEMPORARY EQUIPMENT, DIVERSIONS,CONSTRUCTION MATERIALS AND DEBRIS FROM THE SITE.
10. CONTRACTOR SHALL REMOVE TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES UPON APPROVAL FROM THE CITY OF HARRISONBURG.

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

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RSC CHANNEL EROSION AND SEDIMENT CONTROL PLAN

SHEET

C1-13

SHEET 20 OF 32

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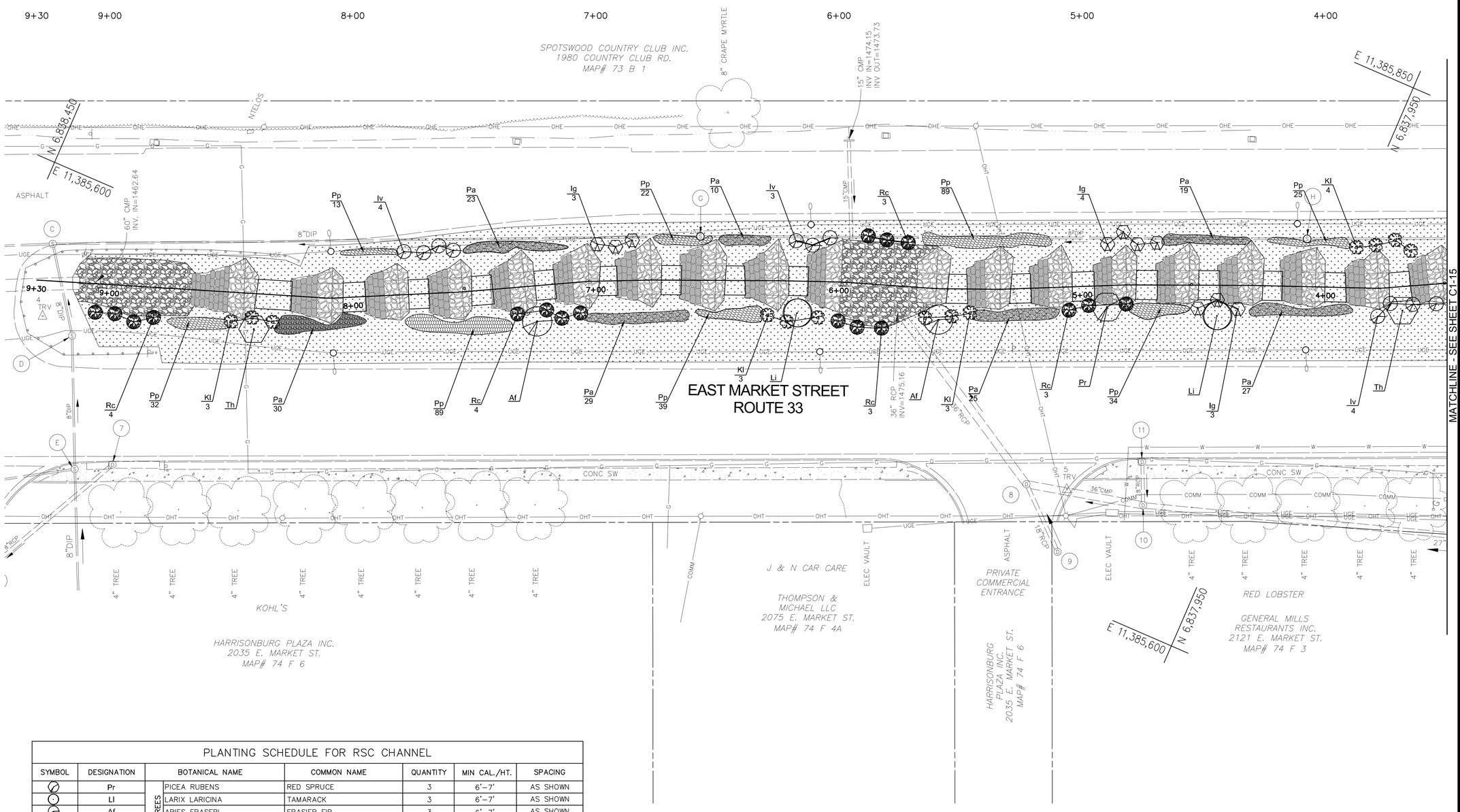

PLANTING SCHEDULE FOR RSC CHANNEL

SYMBOL	DESIGNATION		BOTANICAL NAME	COMMON NAME	QUANTITY	MIN CAL./HT.	SPACING
	Pr	TREES	PICEA RUBENS	RED SPRUCE	3	6'–7'	AS SHOWN
	Ll		LARIX LARICINA	TAMARACK	3	6'–7'	AS SHOWN
	Af		ABIES FRASERI	FRASIER FIR	3	6'–7'	AS SHOWN
	Th		TSUGA HETEROPHYLLA	WESTERN HEMLOCK	3	6'–7'	AS SHOWN
	Rc	SHRUBS	RHODODENDRON CATAWBIENSE	CATAWBA ROSEBAY	25	18"–24" HIGH	AS SHOWN
	Kl		KALMIA LATIFOLIA	MOUNTAIN LAUREL	24	18"–24" HIGH	AS SHOWN
	Ig		ILEX GLABRA	INKBERRY HOLLY	18	18"–24" HIGH	AS SHOWN
	Iv		ILEX VERTICILLATA	WINTERBERRY HOLLY	19	18"–24" HIGH	AS SHOWN
	Pa	GROUND COVER	POLYSTICHUM ACROSTICHOIDES	CHRISTMAS FERN	312	5"H X 8"W	24" O.C.
	Pp		PACHYSANDRA PROCUMBENS	ALLEGHENY SPURGE	475	PLUG	18" O.C.
	SOD		TALL FESCUE WITH MIN. 10% KENTUCKY BLUEGRASS		4,043 SY	N/A	N/A
	MULCH		3" DOUBLE SHREDDED HARDWOOD MULCH		425 SY	N/A	N/A

GRAPHIC SCALE

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SHEET TITLE

RSC CHANNEL LANDSCAPE PLAN

SHEET

C1-14

SHEET 21 OF 32

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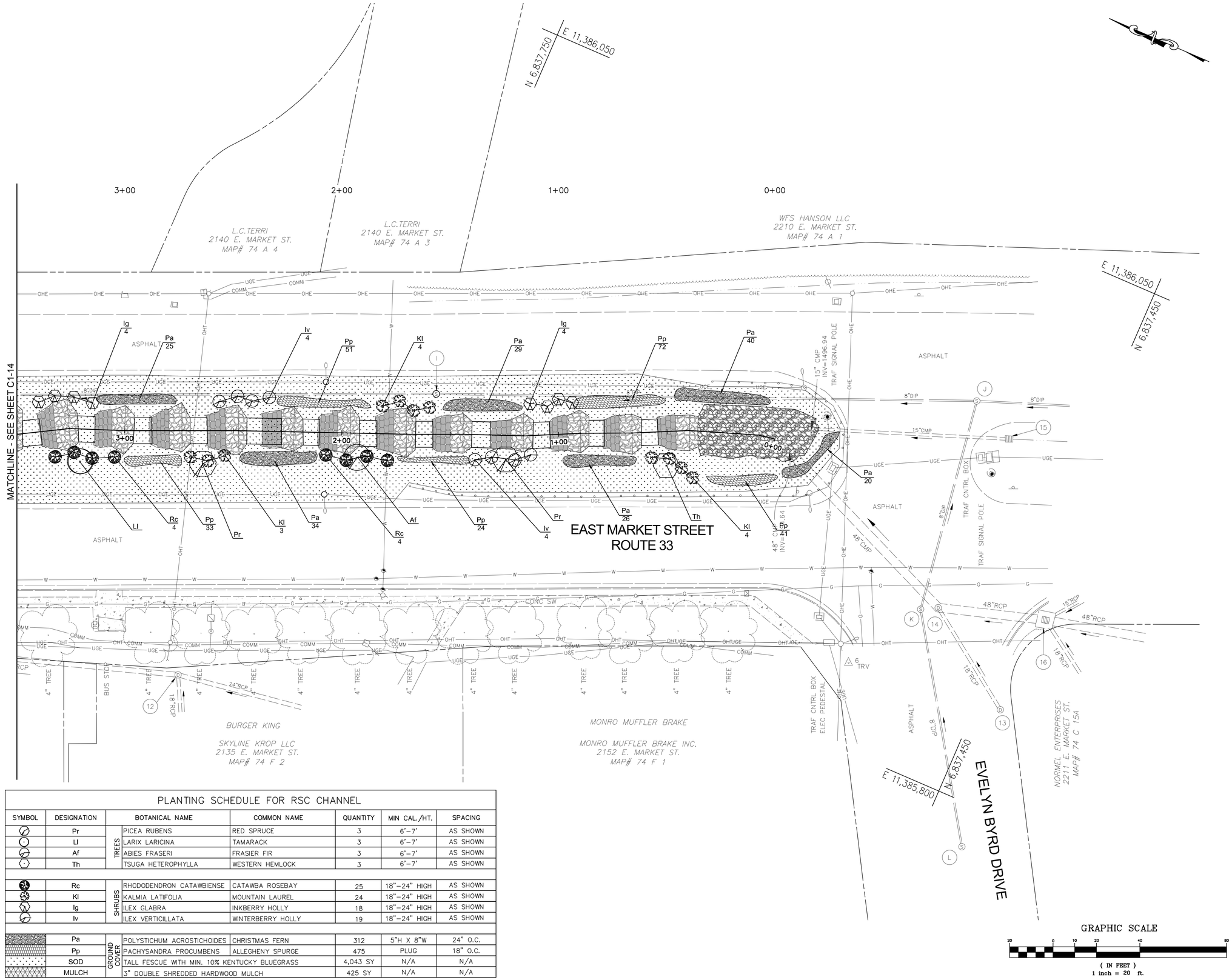

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	Kl		KALMIA LATIFOLIA	MOUNTAIN LAUREL	24	18"–24" HIGH	AS SHOWN
	Ig		ILEX GLABRA	INKBERRY HOLLY	18	18"–24" HIGH	AS SHOWN
	Iv		ILEX VERTICILLATA	WINTERBERRY HOLLY	19	18"–24" HIGH	AS SHOWN
	Pa	GROUND COVER	POLYSTICHUM ACROSTICHOIDES	CHRISTMAS FERN	312	5"H X 8"W	24" O.C.
	Pp		PACHYSANDRA PROCUMBENS	ALLEGHENY SPURGE	475	PLUG	18" O.C.
	SOD		TALL FESCUE WITH MIN. 10% KENTUCKY BLUEGRASS		4,043 SY	N/A	N/A
	MULCH		3" DOUBLE SHREDDED HARDWOOD MULCH		425 SY	N/A	N/A

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CITY OF HARRISONBURG, VA

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SHEET TITLE

RSC CHANNEL LANDSCAPE PLAN

SHEET

C1-15

SHEET 22 OF 32

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Typical Traffic Control
Stationary Operation on a Shoulder
(Figure TTC-4.0)
NOTES

Standard

1. **For long-term stationary work (more than 3 days) on divided highways having a median wider than 8', sign assemblies on both sides of the roadway shall be required as shown (ROAD WORK AHEAD (W20-1), RIGHT SHOULDER CLOSED AHEAD (W21-5bR)), even though only one shoulder is being closed. For operations less than 3 days in duration, sign assemblies will only be required on the side where the shoulder is being closed and a RIGHT SHOULDER CLOSED AHEAD (W21-5bR) sign shall be added to that side.**

Guidance

2. *Sign spacing should be 1300'-1500' for Limited Access highways. For all other roadways, the sign spacing should be 500'-800' where the posted speed limit is greater than 45 mph, and 350'-500' where the posted speed limit is 45 mph or less.*

Option:

3. The SHOULDER WORK (W21-5) sign on an intersecting roadway may be omitted where drivers emerging from that roadway will encounter another advance warning sign prior to this activity area.
4. For short duration operations of 1 hour or less, all signs and channelizing devices may be eliminated if a vehicle with activated high-intensity amber rotating, flashing, oscillating, or strobe lights is used.

Standard:

5. **Vehicle hazard warning signals shall not be used instead of the vehicle's high-intensity amber rotating, flashing, oscillating, or strobe lights. Vehicle hazard warning signals can be used to supplement high-intensity amber rotating, flashing, oscillating, or strobe lights.**
6. **Taper length (L) and channelizing device spacing shall be at the following:**

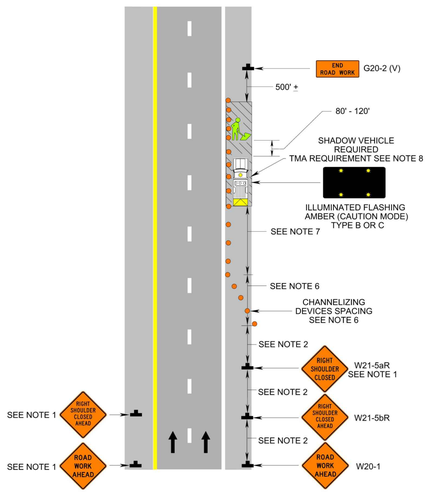
Taper Length (L)				
Speed Limit (mph)	Lane Width (Feet) 9	10	11	12
25	95	105	115	125
30	135	150	165	180
35	185	205	225	245
40	240	270	295	320
45	405	450	495	540
50	450	500	550	600
55	495	550	605	660
60	540	600	660	720
65	585	650	715	780
70	630	700	770	840
Minimum taper lengths for Limited Access highways shall be 1000 feet.				
Shoulder Taper = ½ L Minimum				

Channelizing Device Spacing		
Location	Speed Limit (mph) 0 - 35	36 +
Transition Spacing	20'	40'
Traveway Spacing	40'	80'
Construction Access*	80'	120'
* Spacing may be increased to this distance, but shall not exceed one access per ¼ mile.		

On roadways with paved shoulders having a width of 8 feet or more, channelizing devices shall be used to close the shoulder in advance of the merging taper to direct vehicular traffic to remain within the traveled way.

7. **The buffer space length shall be as shown in Table 6H-3 on Page 6H-5 for the posted speed limit.**
8. **A shadow vehicle shall be used whenever a person is required to operate equipment mounted on or in the work vehicle such as buckets, augers, post drivers, etc. For work operations on the shoulder with a duration greater than 1 hour where workers are present, a shadow vehicle shall be used. A truck-mounted attenuator (TMA) shall be used on the shadow vehicle on Limited Access highways and multi-lane roadways with posted speed limit equal to or greater than 45 mph.**
9. **When a side road intersects the highway within the temporary traffic control zone, additional traffic control devices shall be placed as needed.**

Stationary Operation on a Shoulder
(Figure TTC-4.0)



OPTION 1

Typical Traffic Control
Shoulder Closure with Barrier Operation
(Figure TTC-6.0)
NOTES

Guidance:

1. *Sign spacing should be 1300'-1500' for Limited Access highways. For all other roadways, the sign spacing should be 500'-800' where the posted speed limit is greater than 45 mph, and 350'-500' where the posted speed limit is 45 mph or less.*

Standard:

2. **On divided highways having a median wider than 8', right and left sign assemblies shall be required.**
3. **Group 2 channelizing device spacing shall be at the following:**

Location	Posted Speed Limit (mph) 0 - 35	36 +
Transition Spacing	20'	40'
Traveway Spacing	40'	80'

4. **The minimum length for a shoulder taper should be 320' on Limited Access highways, and ½ L for all other roadways (see Note 7 of TTC-5 for values of L).**
5. **Barrier transition slope ratio shall be as follows:**

Speed Limit (mph)	Slope Ratio	Speed Limit (mph)	Slope Ratio	Speed Limit (mph)	Slope Ratio
70	22:1	55	17:1	40	13:1
65	20:1	50	16:1	35	11:1
60	19:1	45	14:1	≤30	10:1

When the barrier transition slope is on a horizontal alignment, the total offset shall be prorated around the curve in lieu of a straight-line slope.

6. **End treatment of a barrier in order of preference:**
   a. **Where guardrail exists, attach to barrier with appropriate fixed object attachment.**
   b. **Where cut slope exists, bury barrier into cut slope and provide for drainage as needed.**
   c. **Extend end of barrier until it is beyond the established clear zone (see Figure 2 on Page A-4 in Appendix A for clear zone values).**
   d. **When barrier end is inside the established clear zone, attenuator service Type I or Type II shall be used. Contact L&D Standards/Special Design Section for approved attenuators.**
7. **Barrier panels 8 inches in width and 12 inches in height shall be placed on top of the concrete barrier and spaced 80' on centers along the parallel or tangent sections and 40' on centers along the transition or taper sections. Reflectorized surface shall be fluorescent orange prismatic lens sheeting. The light at the beginning of the barrier run and at the breakpoint where the barrier becomes parallel to the roadway shall be a Type B flashing light. Barrier delineators shall be installed along the traffic side of the concrete barriers in-between and at the same spacing as the barrier panels approximately 24 inches up from the roadway surface.**

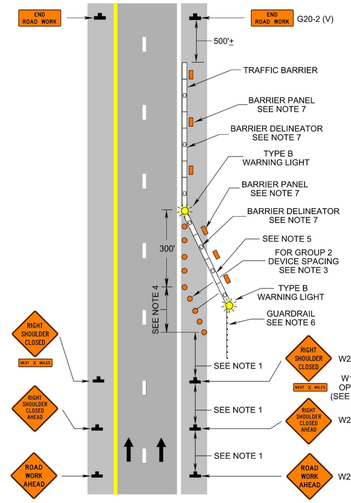
Option:

8. The barrier shown in this typical application is an example of one method that may be used to close a shoulder of a long-term project.
9. The RIGHT SHOULDER CLOSED (W21-5aR) sign may be eliminated from all roadways except Limited Access highways.

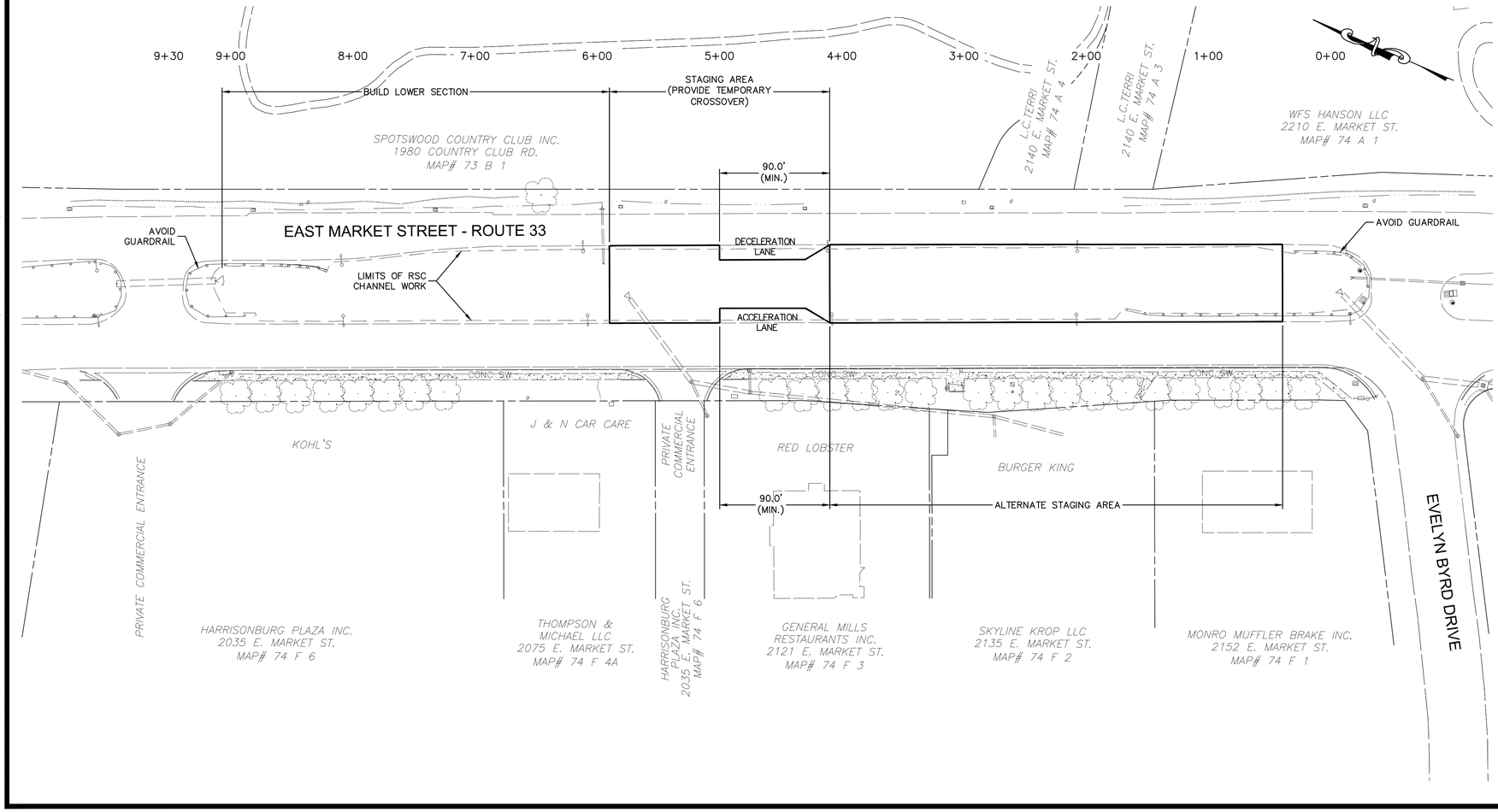
Guidance:

10. *If drivers cannot see a pull-off area beyond the closed shoulder, information regarding the length of the shoulder closure shall be provided in feet or miles, as appropriate.*
11. *An emergency pull-off area should be provided per Section 6G.18 and Temporary Traffic Control Figure TTC-8.*

Shoulder Closure with Barrier Operation
(Figure TTC-6.0)



OPTION 2



TRAFFIC CONTROL NOTES

1. STANDARD DETAILS, SIGNS AND TRAFFIC CONTROL DEVICES SHALL BE USED TO IMPLEMENT A SHOULDER CLOSURE IN THE ROADWAY MEDIAN DURING CONSTRUCTION AS DESCRIBED BELOW.
2. ALL REQUIREMENTS OF THE VIRGINIA WORK AREA PROTECTION MANUAL AND THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) SHALL BE MET.
3. LIMITED ACCESS REQUIREMENTS DO NOT APPLY TO THIS PROJECT.
4. WHERE APPROPRIATE, THE REFERENCES TO "RIGHT" OR "R" SHALL BE REVISED TO INDICATE "LEFT" OR "L" SINCE THE CONSTRUCTION WORK IS IN THE MEDIAN ON THE LEFT SIDE OF TRAFFIC.
5. NO LANE CLOSURES SHALL BE ALLOWED WITHOUT PRIOR WRITTEN APPROVAL OF A REVISED MAINTENANCE OF TRAFFIC PLAN. ALL LANE CLOSURES SHALL BE IN ACCORDANCE WITH TTC–17.0.
6. VEHICLES ENTERING AND EXITING THE CONSTRUCTION WORK ZONE SHALL BE CAREFUL TO MINIMIZE DISRUPTIONS TO TRAFFIC.

TRAFFIC CONTROL SEQUENCE

1. CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS FROM THE CITY OF HARRISONBURG PRIOR TO COMMENCING WORK.
2. CONTRACTOR SHALL INSTALL ALL NECESSARY TRAFFIC CONTROL SIGNAGE IN ACCORDANCE WITH THE VIRGINIA WORK AREA PROTECTION MANUAL AND THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD).
3. IT MAY BE NECESSARY FOR THE CONTRACTOR TO PERFORM A TEMPORARY LANE CLOSURE OF THE INSIDE TRAFFIC LANE OF THE EAST BOUND LANE TO CONSTRUCT THE TEMPORARY DIVERSION FENCE. PRIOR APPROVAL OF A REVISED TRAFFIC CONTROL PLAN WILL BE REQUIRED.
4. UPON COMPLETION OF THE TEMPORARY DIVERSION FENCE SHOULDER CLOSURE AND/OR TEMPORARY LANE CLOSURES SHALL BE RESTRICTED TO THE WEST BOUND LANE FOR CONSTRUCTION OF THE RSC CHANNEL.
5. UPON COMPLETION OF THE RSC CHANNEL A TEMPORARY LANE CLOSURE OF THE EAST BOUND INSIDE LANE MAY BE NECESSARY TO REMOVE THE TEMPORARY DIVERSION FENCE.
6. CONTRACTOR SHALL REMOVE ALL TEMPORARY TRAFFIC CONTROL MEASURES UPON THE COMPLETION OF CONSTRUCTION.

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.

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SHEET TITLE

RSC CHANNEL MAINTENANCE OF TRAFFIC PLAN PHASE 1

SHEET

C1-16

SHEET 23 OF 32

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Minimum taper lengths for Limited Access highways shall be 1000 feet.				
Shoulder Taper = ½ L Minimum				

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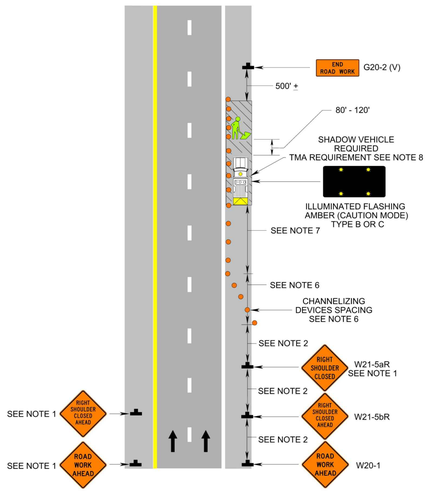
Stationary Operation on a Shoulder
(Figure TTC-4.0)



OPTION 1

Typical Traffic Control
Shoulder Closure with Barrier Operation
(Figure TTC-6.0)
NOTES

Guidance:

1. *Sign spacing should be 1300'-1500' for Limited Access highways. For all other roadways, the sign spacing should be 500'-800' where the posted speed limit is greater than 45 mph, and 350'-500' where the posted speed limit is 45 mph or less.*

Standard:

2. **On divided highways having a median wider than 8', right and left sign assemblies shall be required.**
3. **Group 2 channelizing device spacing shall be at the following:**

Location	Posted Speed Limit (mph) 0 - 35	36 +
Transition Spacing	20'	40'
Traveway Spacing	40'	80'

4. **The minimum length for a shoulder taper should be 320' on Limited Access highways, and ½ L for all other roadways (see Note 7 of TTC-5 for values of L).**
5. **Barrier transition slope ratio shall be as follows:**

Speed Limit (mph)	Slope Ratio	Speed Limit (mph)	Slope Ratio	Speed Limit (mph)	Slope Ratio
70	22:1	55	17:1	40	13:1
65	20:1	50	16:1	35	11:1
60	19:1	45	14:1	≤30	10:1

When the barrier transition slope is on a horizontal alignment, the total offset shall be prorated around the curve in lieu of a straight-line slope.

6. **End treatment of a barrier in order of preference:**
   a. **Where guardrail exists, attach to barrier with appropriate fixed object attachment.**
   b. **Where cut slope exists, bury barrier into cut slope and provide for drainage as needed.**
   c. **Extend end of barrier until it is beyond the established clear zone (see Figure 2 on Page A-4 in Appendix A for clear zone values).**
   d. **When barrier end is inside the established clear zone, attenuator service Type I or Type II shall be used. Contact L&D Standards/Special Design Section for approved attenuators.**
7. **Barrier panels 8 inches in width and 12 inches in height shall be placed on top of the concrete barrier and spaced 80' on centers along the parallel or tangent sections and 40' on centers along the transition or taper sections. Reflectorized surface shall be fluorescent orange prismatic lens sheeting. The light at the beginning of the barrier run and at the breakpoint where the barrier becomes parallel to the roadway shall be a Type B flashing light. Barrier delineators shall be installed along the traffic side of the concrete barriers in-between and at the same spacing as the barrier panels approximately 24 inches up from the roadway surface.**

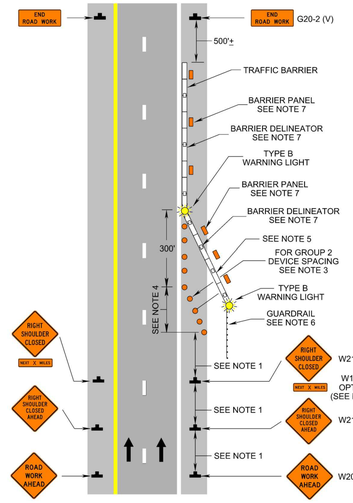
Option:

8. The barrier shown in this typical application is an example of one method that may be used to close a shoulder of a long-term project.
9. The RIGHT SHOULDER CLOSED (W21-5aR) sign may be eliminated from all roadways except Limited Access highways.

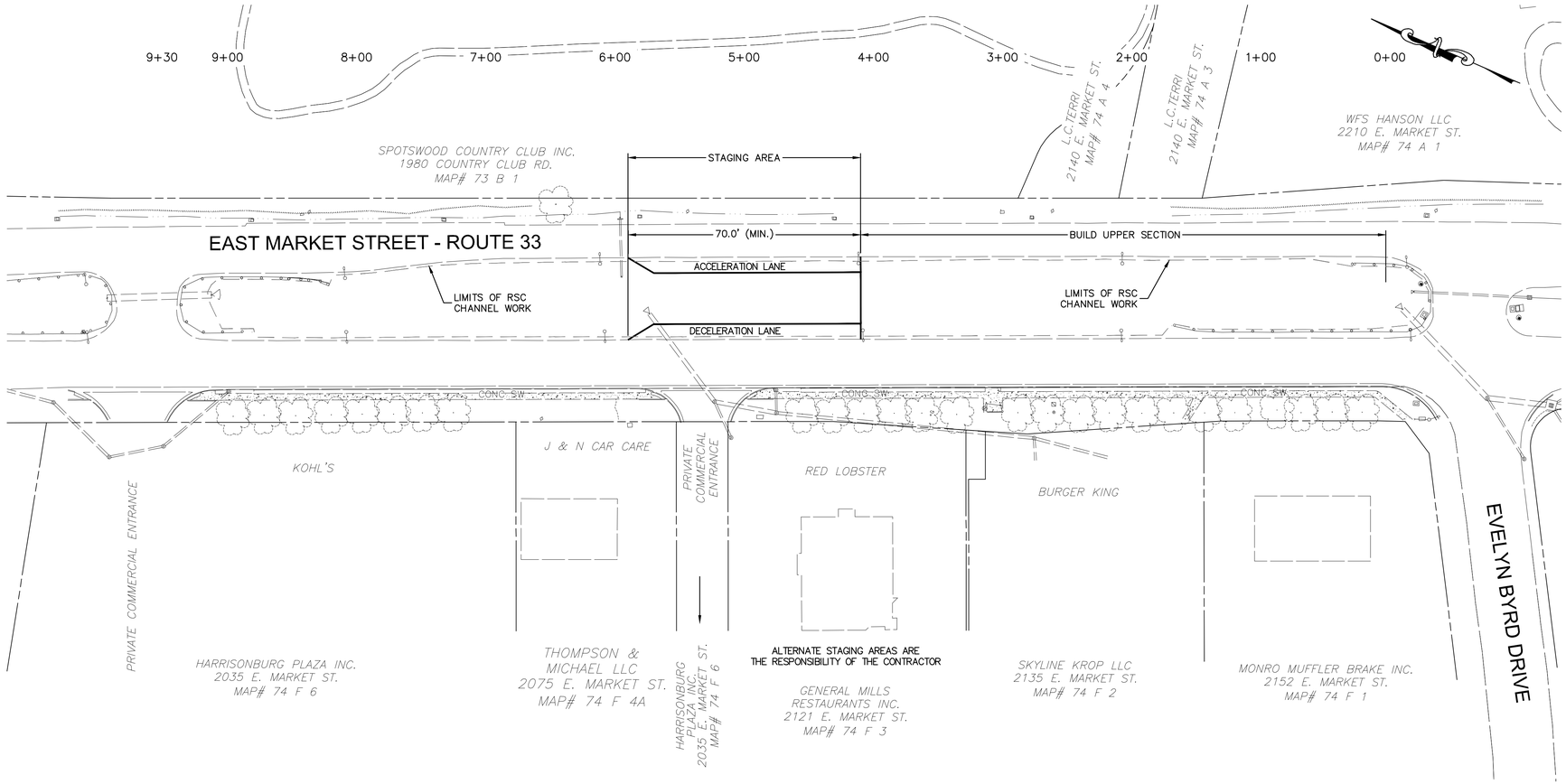
Guidance:

10. *If drivers cannot see a pull-off area beyond the closed shoulder, information regarding the length of the shoulder closure shall be provided in feet or miles, as appropriate.*
11. *An emergency pull-off area should be provided per Section 6G.18 and Temporary Traffic Control Figure TTC-8.*

Shoulder Closure with Barrier Operation
(Figure TTC-6.0)



OPTION 2



TRAFFIC CONTROL NOTES

1. STANDARD DETAILS, SIGNS AND TRAFFIC CONTROL DEVICES SHALL BE USED TO IMPLEMENT A SHOULDER CLOSURE IN THE ROADWAY MEDIAN DURING CONSTRUCTION AS DESCRIBED BELOW.
2. ALL REQUIREMENTS OF THE VIRGINIA WORK AREA PROTECTION MANUAL AND THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) SHALL BE MET.
3. LIMITED ACCESS REQUIREMENTS DO NOT APPLY TO THIS PROJECT.
4. WHERE APPROPRIATE, THE REFERENCES TO "RIGHT" OR "R" SHALL BE REVISED TO INDICATE "LEFT" OR "L" SINCE THE CONSTRUCTION WORK IS IN THE MEDIAN ON THE LEFT SIDE OF TRAFFIC.
5. NO LANE CLOSURES SHALL BE ALLOWED WITHOUT PRIOR WRITTEN APPROVAL OF A REVISED MAINTENANCE OF TRAFFIC PLAN. ALL LANE CLOSURES SHALL BE IN ACCORDANCE WITH TTC-17.0.
6. VEHICLES ENTERING AND EXITING THE CONSTRUCTION WORK ZONE SHALL BE CAREFUL TO MINIMIZE DISRUPTIONS TO TRAFFIC.

TRAFFIC CONTROL SEQUENCE

1. CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS FROM THE CITY OF HARRISONBURG PRIOR TO COMMENCING WORK.
2. CONTRACTOR SHALL INSTALL ALL NECESSARY TRAFFIC CONTROL SIGNAGE IN ACCORDANCE WITH THE VIRGINIA WORK AREA PROTECTION MANUAL AND THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD).
3. IT MAY BE NECESSARY FOR THE CONTRACTOR TO PERFORM A TEMPORARY LANE CLOSURE OF THE INSIDE TRAFFIC LANE OF THE EAST BOUND LANE TO CONSTRUCT THE TEMPORARY DIVERSION FENCE. PRIOR APPROVAL OF A REVISED TRAFFIC CONTROL PLAN WILL BE REQUIRED.
4. UPON COMPLETION OF THE TEMPORARY DIVERSION FENCE SHOULDER CLOSURE AND/OR TEMPORARY LANE CLOSURES SHALL BE RESTRICTED TO THE WEST BOUND LANE FOR CONSTRUCTION OF THE RSC CHANNEL.
5. UPON COMPLETION OF THE RSC CHANNEL A TEMPORARY LANE CLOSURE OF THE EAST BOUND INSIDE LANE MAY BE NECESSARY TO REMOVE THE TEMPORARY DIVERSION FENCE.
6. CONTRACTOR SHALL REMOVE ALL TEMPORARY TRAFFIC CONTROL MEASURES UPON THE COMPLETION OF CONSTRUCTION.

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.

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PROJECT TITLE

EAST MARKET STREET STORMWATER IMPROVEMENTS
CITY OF HARRISONBURG, VA

REVISIONS

MARK	DATE	DESCRIPTION

AMT FILE NO.	15-0571.001
DATE:	April 6, 2016
SCALE:	1" = 50'
DESIGNED BY:	CC/DEC
DRAWN BY:	LAL
CHECKED BY:	DJR

BID DOCUMENTS

SHEET TITLE

RSC CHANNEL MAINTENANCE OF TRAFFIC PLAN PHASE 2

SHEET

C1-17

SHEET 24 OF 32

X:\RICHMOND\15-0571.001 - EAST MARKET STREET ? RSC\05-CAD\CT102-150571001-MOT PLAN.DWG, 4/5/2016 2:09 PM, LLANGLOIS

Typical Traffic Control
Stationary Operation on a Shoulder
(Figure TTC-4.0)
NOTES

Standard

1. **For long-term stationary work (more than 3 days) on divided highways having a median wider than 8', sign assemblies on both sides of the roadway shall be required as shown (ROAD WORK AHEAD (W20-1), RIGHT SHOULDER CLOSED AHEAD (W21-5bR)), even though only one shoulder is being closed. For operations less than 3 days in duration, sign assemblies will only be required on the side where the shoulder is being closed and a RIGHT SHOULDER CLOSED AHEAD (W21-5bR) sign shall be added to that side.**

Guidance

2. *Sign spacing should be 1300'-1500' for Limited Access highways. For all other roadways, the sign spacing should be 500'-800' where the posted speed limit is greater than 45 mph, and 350'-500' where the posted speed limit is 45 mph or less.*

Option:

3. The SHOULDER WORK (W21-5) sign on an intersecting roadway may be omitted where drivers emerging from that roadway will encounter another advance warning sign prior to this activity area.
4. For short duration operations of 1 hour or less, all signs and channelizing devices may be eliminated if a vehicle with activated high-intensity amber rotating, flashing, oscillating, or strobe lights is used.

Standard:

5. **Vehicle hazard warning signals shall not be used instead of the vehicle's high-intensity amber rotating, flashing, oscillating, or strobe lights. Vehicle hazard warning signals can be used to supplement high-intensity amber rotating, flashing, oscillating, or strobe lights.**
6. **Taper length (L) and channelizing device spacing shall be at the following:**

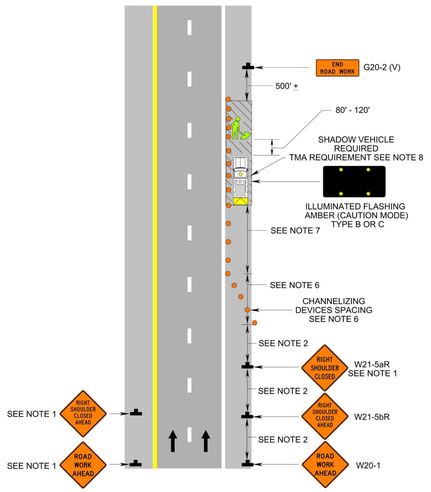
Taper Length (L)				
Speed Limit (mph)	Lane Width (Feet) 9	10	11	12
25	95	105	115	125
30	135	150	165	180
35	185	205	225	245
40	240	270	295	320
45	405	450	495	540
50	450	500	550	600
55	495	550	605	660
60	540	600	660	720
65	585	650	715	780
70	630	700	770	840
Minimum taper lengths for Limited Access highways shall be 1000 feet.				
Shoulder Taper = ½ L Minimum				

Channelizing Device Spacing		
Location	Speed Limit (mph) 0 - 35	36 +
Transition Spacing	20'	40'
Traveway Spacing	40'	80'
Construction Access*	80'	120'
* Spacing may be increased to this distance, but shall not exceed one access per ¼ mile.		

On roadways with paved shoulders having a width of 8 feet or more, channelizing devices shall be used to close the shoulder in advance of the merging taper to direct vehicular traffic to remain within the traveled way.

7. **The buffer space length shall be as shown in Table 6H-3 on Page 6H-5 for the posted speed limit.**
8. **A shadow vehicle shall be used whenever a person is required to operate equipment mounted on or in the work vehicle such as buckets, augers, post drivers, etc. For work operations on the shoulder with a duration greater than 1 hour where workers are present, a shadow vehicle shall be used. A truck-mounted attenuator (TMA) shall be used on the shadow vehicle on Limited Access highways and multi-lane roadways with posted speed limit equal to or greater than 45 mph.**
9. **When a side road intersects the highway within the temporary traffic control zone, additional traffic control devices shall be placed as needed.**

Stationary Operation on a Shoulder
(Figure TTC-4.0)



OPTION 1

Typical Traffic Control
Shoulder Closure with Barrier Operation
(Figure TTC-6.0)
NOTES

Guidance:

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5. **Barrier transition slope ratio shall be as follows:**

Speed Limit (mph)	Slope Ratio	Speed Limit (mph)	Slope Ratio	Speed Limit (mph)	Slope Ratio
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When the barrier transition slope is on a horizontal alignment, the total offset shall be prorated around the curve in lieu of a straight-line slope.

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Option:

8. The barrier shown in this typical application is an example of one method that may be used to close a shoulder of a long-term project.
9. The RIGHT SHOULDER CLOSED (W21-5aR) sign may be eliminated from all roadways except Limited Access highways.

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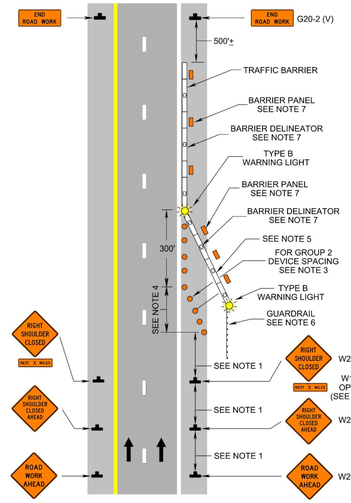
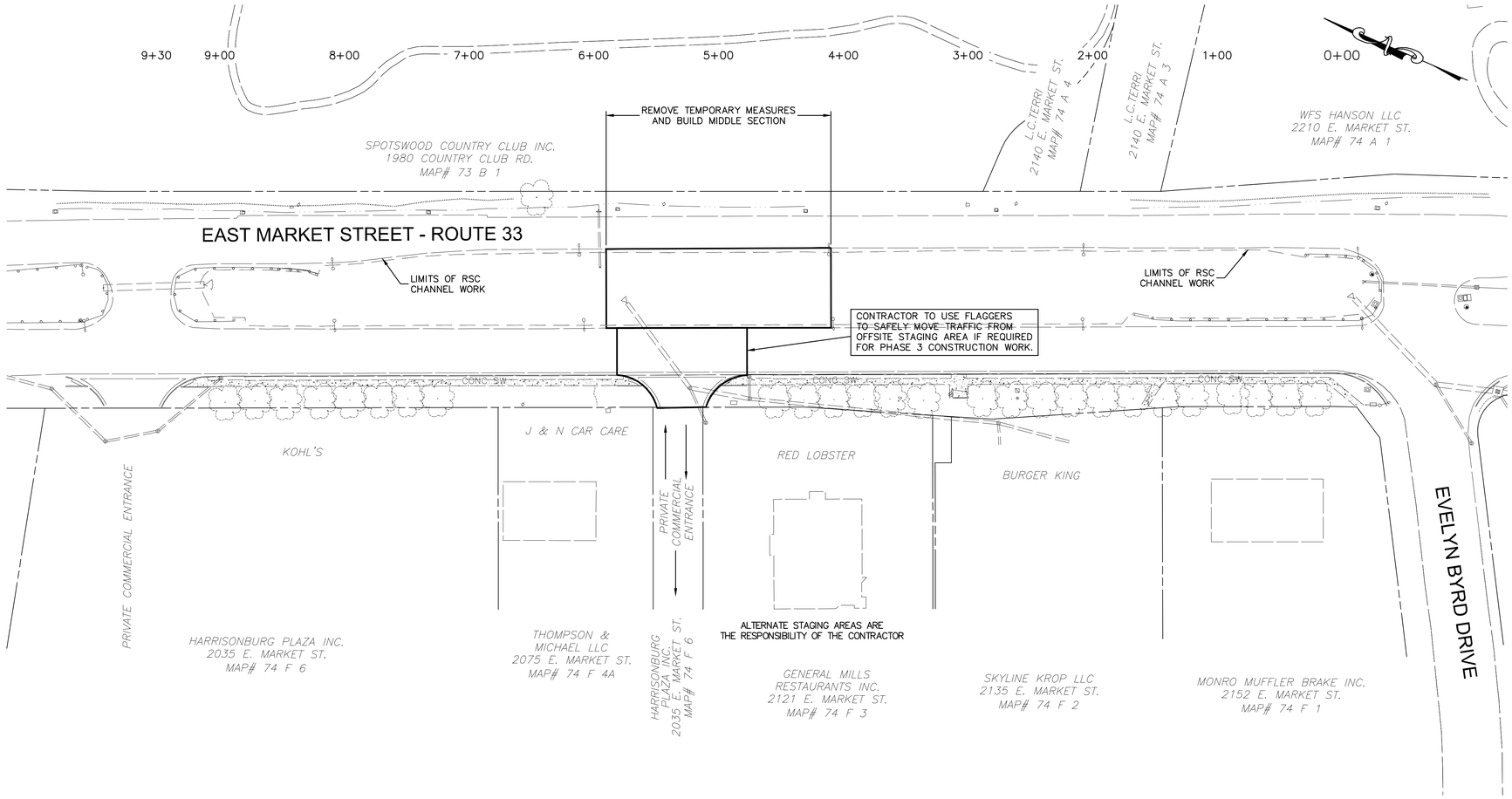
10. *If drivers cannot see a pull-off area beyond the closed shoulder, information regarding the length of the shoulder closure shall be provided in feet or miles, as appropriate.*
11. *An emergency pull-off area should be provided per Section 6G.18 and Temporary Traffic Control Figure TTC-8.*

Shoulder Closure with Barrier Operation
(Figure TTC-6.0)



OPTION 2



TRAFFIC CONTROL NOTES

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GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.

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THANH DANG - PROJECT MANAGER
Than.Dang@harrisonburgva.gov

PROJECT TITLE

EAST MARKET STREET STORMWATER IMPROVEMENTS
CITY OF HARRISONBURG, VA

REVISIONS

MARK	DATE	DESCRIPTION

AMT FILE NO.	15-0571.001
DATE:	April 6, 2016
SCALE:	1" = 50'
DESIGNED BY:	CC/DEC
DRAWN BY:	LAL
CHECKED BY:	DJR

BID DOCUMENTS

SHEET TITLE

RSC CHANNEL MAINTENANCE OF TRAFFIC PLAN PHASE 3

SHEET

C1-18

SHEET 25 OF 32

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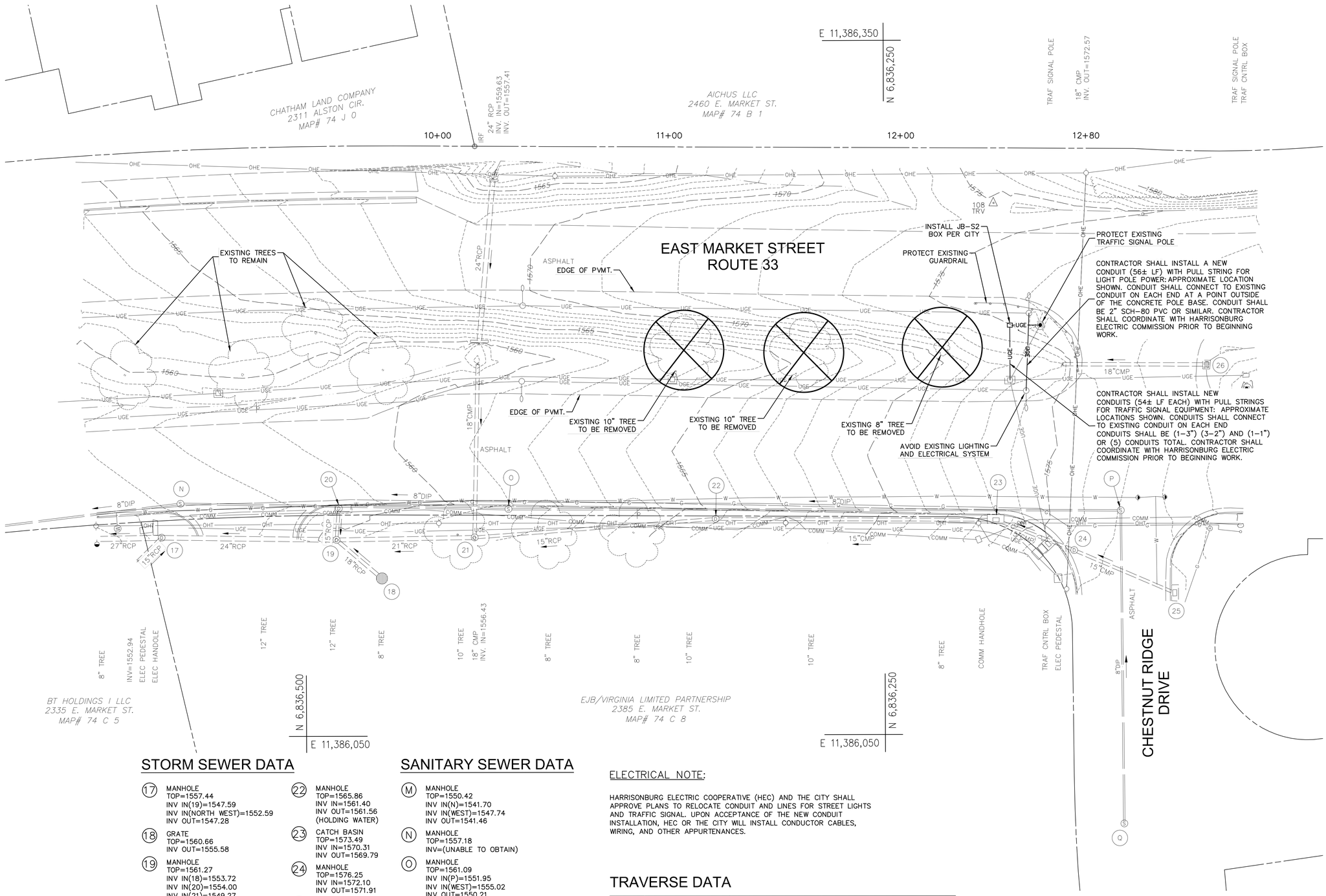

STORM SEWER DATA

(17) MANHOLE
TOP=1557.44
INV IN(19)=1547.59
INV IN(NORTH WEST)=1552.59
INV OUT=1547.28

(18) GRATE
TOP=1560.66
INV OUT=1555.58

(19) MANHOLE
TOP=1561.27
INV IN(18)=1553.72
INV IN(20)=1554.00
INV IN(21)=1549.27
INV OUT=1548.83

(20) CATCH BASIN
TOP=1558.82
INV OUT=1554.85

(21) MANHOLE
TOP=1562.13
INV IN(22)=1550.48
INV IN(EAST)=1551.33
INV OUT=1550.26

(22) MANHOLE
TOP=1565.86
INV IN=1561.40
INV OUT=1561.56
(HOLDING WATER)

(23) CATCH BASIN
TOP=1573.49
INV IN=1570.31
INV OUT=1569.79

(24) MANHOLE
TOP=1576.25
INV IN=1572.10
INV OUT=1571.91

(25) CATCH BASIN
TOP=1577.62
INV OUT=1574.48

(26) GRATE
TOP=1576.96
INV OUT=1575.01

SANITARY SEWER DATA

(M) MANHOLE
TOP=1550.42
INV IN(N)=1541.70
INV IN(WEST)=1547.74
INV OUT=1541.46

(N) MANHOLE
TOP=1557.18
INV=(UNABLE TO OBTAIN)

(O) MANHOLE
TOP=1561.09
INV IN(P)=1551.95
INV IN(WEST)=1555.02
INV OUT=1550.21

(P) MANHOLE
TOP=1577.05
INV IN=1568.57
INV OUT=1568.50

(Q) MANHOLE
TOP=1578.11
INV IN(SOUTH)=1569.83
INV IN(WEST)=1570.48
INV OUT=1569.73

ELECTRICAL NOTE:

HARRISONBURG ELECTRIC COOPERATIVE (HEC) AND THE CITY SHALL APPROVE PLANS TO RELOCATE CONDUIT AND LINES FOR STREET LIGHTS AND TRAFFIC SIGNAL. UPON ACCEPTANCE OF THE NEW CONDUIT INSTALLATION, HEC OR THE CITY WILL INSTALL CONDUCTOR CABLES, WIRING, AND OTHER APPURTENANCES.

TRAVERSE DATA

NO	NORTHING	EASTING	ELEV	DESCRIPTION
3	6839193.1417	11385207.5840	1460.45	NAIL
4	6838429.2441	11385540.0299	1469.12	NAIL
5	6838014.8986	11385641.9716	1483.31	NAIL
6	6837511.6371	11385837.7669	1508.01	NAIL
7	6836976.6630	11386143.3361	1539.29	NAIL
108	6836202.5919	11386279.5096	1574.80	REBAR & CAP

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PROJECT TITLE

EAST MARKET STREET STORMWATER IMPROVEMENTS
CITY OF HARRISONBURG, VA

REVISIONS

MARK	DATE	DESCRIPTION

AMT FILE NO.	15-0571.001
DATE:	April 6, 2016
SCALE:	1" = 20'
DESIGNED BY:	CC/DEC
DRAWN BY:	LAL
CHECKED BY:	DJR

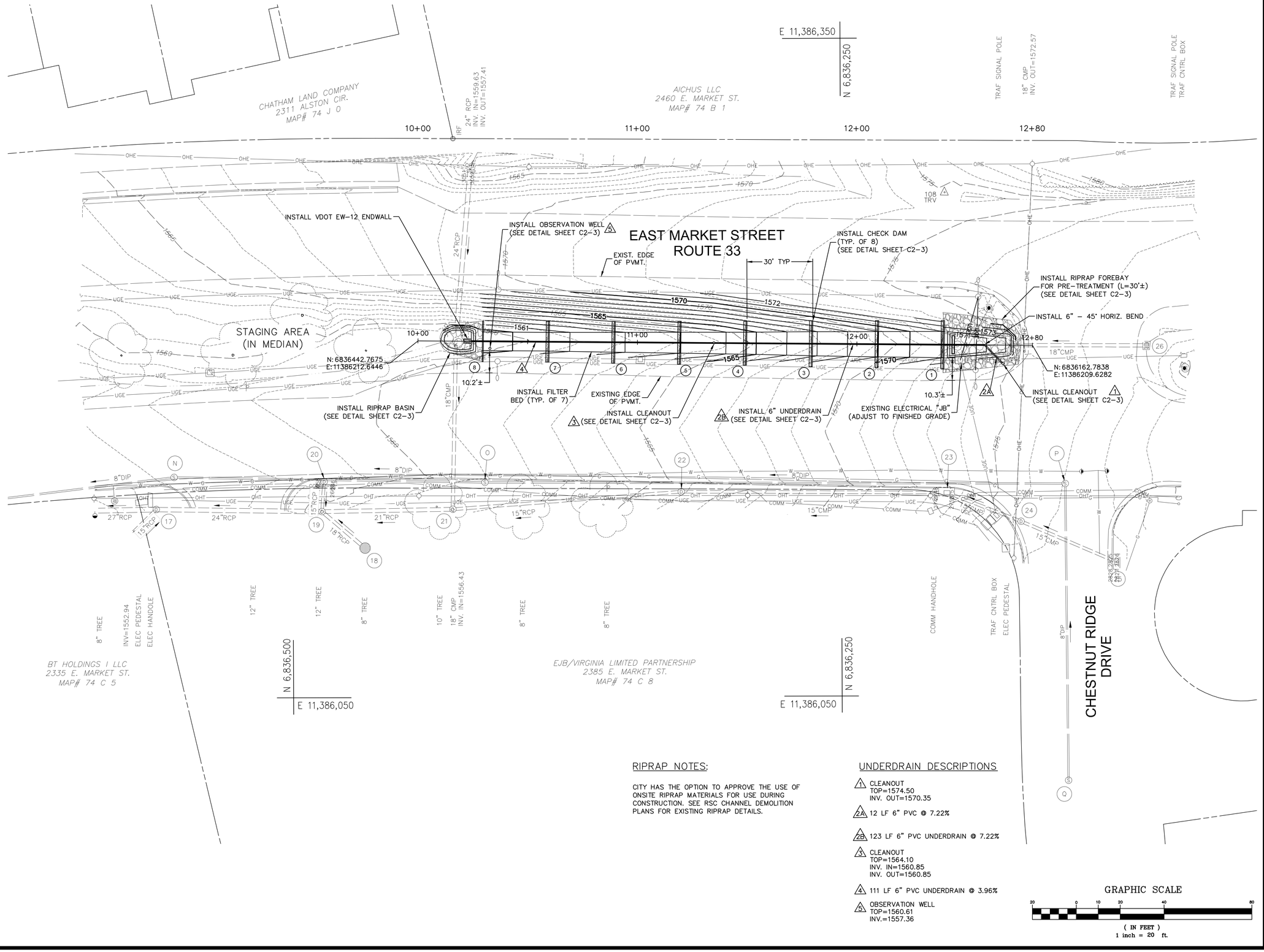
BID DOCUMENTS

SHEET TITLE

DRY SWALE EXISTING CONDITIONS AND DEMOLITION PLAN

SHEET
C2-0
SHEET 26 OF 32

X:\RICHMOND\15-0571.001 - EAST MARKET STREET ? RSC\05-CAD\VF104-150571001-DRY SWALE EXISTING CONDITIONS.DWG, 4/5/2016 2:10 PM, LLANGLOIS



RIPRAP NOTES:

CITY HAS THE OPTION TO APPROVE THE USE OF ONSITE RIPRAP MATERIALS FOR USE DURING CONSTRUCTION. SEE RSC CHANNEL DEMOLITION PLANS FOR EXISTING RIPRAP DETAILS.

UNDERDRAIN DESCRIPTIONS

1. CLEANOUT
   TOP=1574.50
   INV. OUT=1570.35
2A. 12 LF 6" PVC @ 7.22%
2B. 123 LF 6" PVC UNDERDRAIN @ 7.22%
3. CLEANOUT
   TOP=1564.10
   INV. IN=1560.85
   INV. OUT=1560.85
4. 111 LF 6" PVC UNDERDRAIN @ 3.96%
5. OBSERVATION WELL
   TOP=1560.61
   INV.=1557.36

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

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DRAWN BY:	LAL
CHECKED BY:	DJR

BID DOCUMENTS

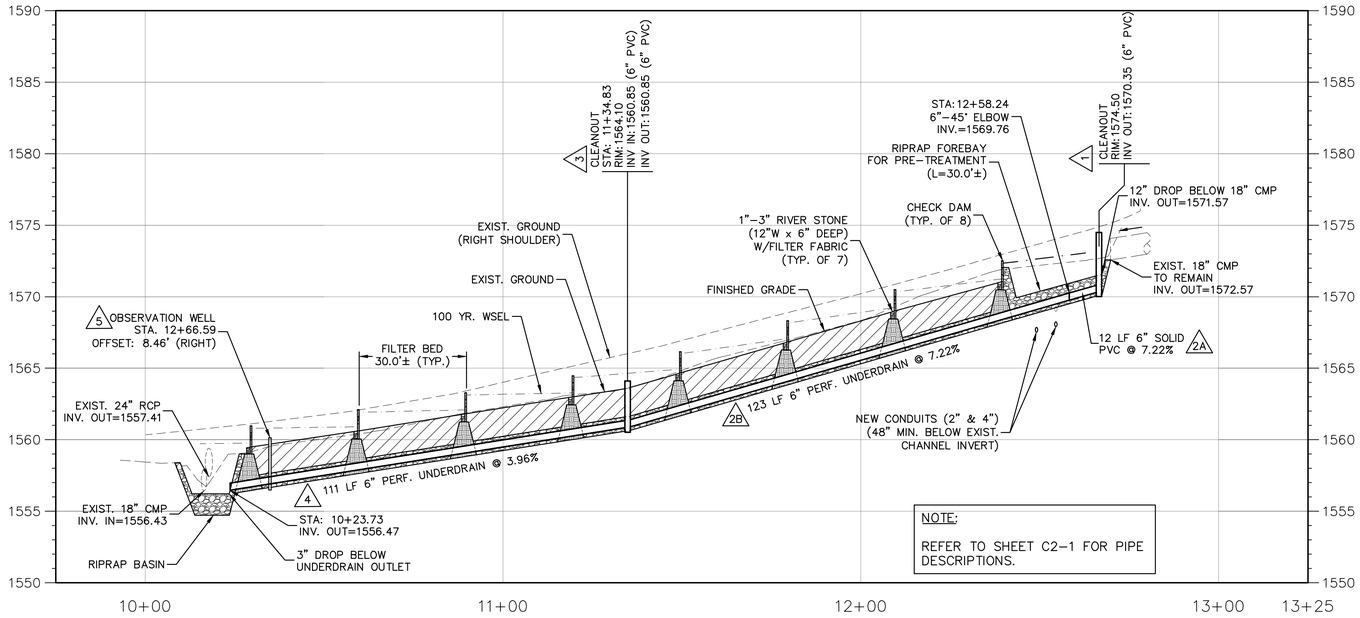
SHEET TITLE

DRY SWALE GEOMETRY, SITE AND GRADING PLAN

SHEET

C2-1

SHEET 27 OF 32



DRY SWALE PROFILE

SCALE: HORZ 1" = 20'
VERT. 1" = 5'

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CITY OF HARRISONBURG, VA

REVISIONS		
MARK	DATE	DESCRIPTION

AMT FILE NO.	15-0571.001
DATE:	April 6, 2016
SCALE:	AS NOTED
DESIGNED BY:	CC/DEC
DRAWN BY:	LAL
CHECKED BY:	DJR

BID DOCUMENTS

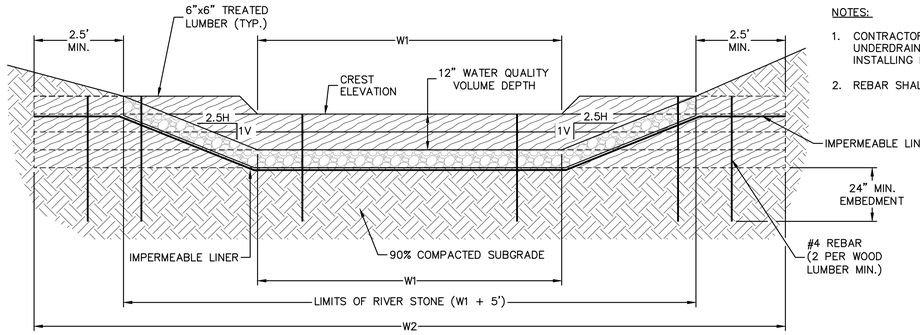
SHEET TITLE

DRY SWALE PROFILE

SHEET

C2-2

SHEET 28 OF 32



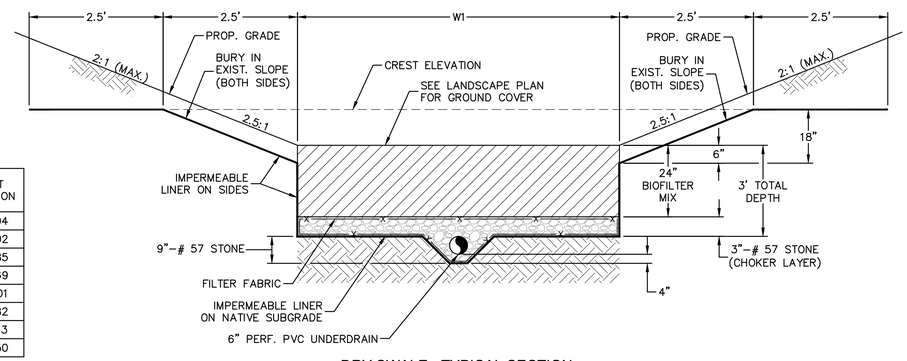
CHECK DAM - TYPICAL SECTION
NTS

NOTES:

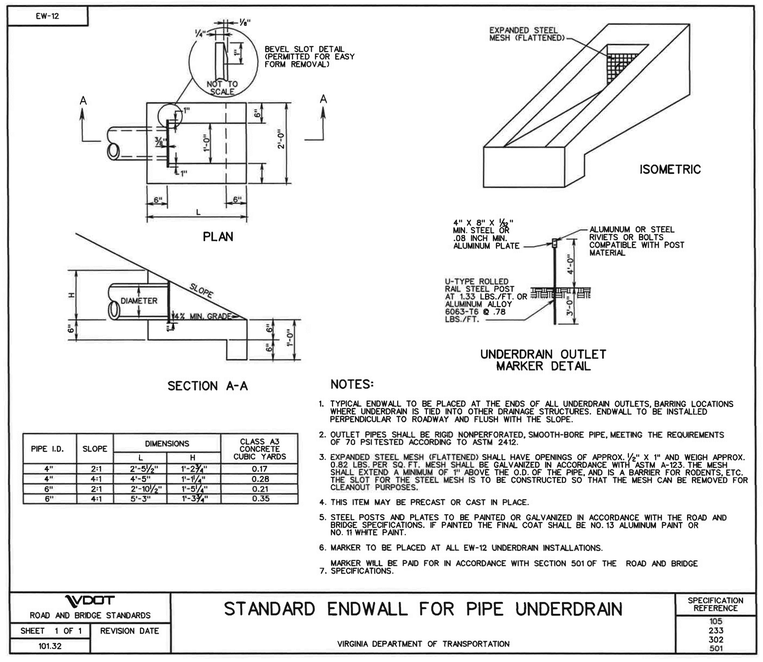
1. CONTRACTOR SHALL VERIFY LOCATION OF UNDERDRAIN AND EXISTING UTILITIES PRIOR TO INSTALLING REBAR TO AVOID CONFLICTS.
2. REBAR SHALL HAVE 36" MAXIMUM SPACING (O.C.).

CHECK DAM NUMBER	FILTER BED WIDTH W1 (FT.)	CHECK DAM WIDTH W2 (FT.)	CREST ELEVATION
1	12.0	22.0	1572.04
2	11.5	21.5	1570.02
3	11.0	21.0	1567.85
4	10.0	20.0	1565.69
5	9.5	19.5	1564.01
6	9.0	19.0	1562.82
7	8.5	18.5	1561.63
8	8.5	18.5	1560.50

CHECK DAM SIZING TABLE



DRY SWALE - TYPICAL SECTION
NTS

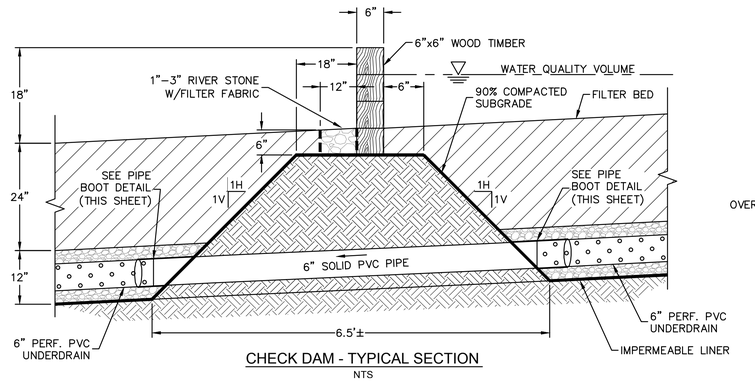


NOTES:

1. TYPICAL ENDWALL TO BE PLACED AT THE ENDS OF ALL UNDERDRAIN OUTLETS, BARRING LOCATIONS WHERE UNDERDRAIN IS TIED INTO OTHER DRAINAGE STRUCTURES. ENDWALL TO BE INSTALLED PERPENDICULAR TO ROADWAY AND FLUSH WITH THE SLOPE.
2. OUTLET PIPES SHALL BE RIGID NONPERFORATED, SMOOTH-BORE PIPE, MEETING THE REQUIREMENTS OF 70 PSI TESTED ACCORDING TO ASTM 2412.
3. EXPANDED STEEL MESH (FLATTENED) SHALL HAVE OPENINGS OF APPROX. ½" X 1" AND WEIGH APPROX. 0.82 LBS. PER SQ. FT. MESH SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A-123. THE MESH SHALL EXTEND A MINIMUM OF 1" ABOVE THE O.D. OF THE PIPE, AND IS A BARRIER FOR RODENTS, ETC. THE SLOT FOR THE STEEL MESH IS TO BE CONSTRUCTED SO THAT THE MESH CAN BE REMOVED FOR CLEANOUT PURPOSES.
4. THIS ITEM MAY BE PRECAST OR CAST IN PLACE.
5. STEEL POSTS AND PLATES TO BE PAINTED OR GALVANIZED IN ACCORDANCE WITH THE ROAD AND BRIDGE SPECIFICATIONS. IF PAINTED THE FINAL COAT SHALL BE NO. 13 ALUMINUM PAINT OR NO. 11 WHITE PAINT.
6. MARKER TO BE PLACED AT ALL EW-12 UNDERDRAIN INSTALLATIONS.
7. MARKER WILL BE PAID FOR IN ACCORDANCE WITH SECTION 501 OF THE ROAD AND BRIDGE SPECIFICATIONS.

PIPE I.D.	SLOPE	DIMENSIONS L	DIMENSIONS H	CLASS A3 CONCRETE CUBIC YARDS
4"	2:1	2'-5½"	1'-2⅞"	0.17
4"	4:1	4'-5"	1'-1¼"	0.28
6"	2:1	2'-10½"	1'-5½"	0.21
6"	4:1	5'-3"	1'-3¾"	0.35

VDOT ROAD AND BRIDGE STANDARDS	STANDARD ENDWALL FOR PIPE UNDERDRAIN	SPECIFICATION REFERENCE
SHEET 1 OF 1	VIRGINIA DEPARTMENT OF TRANSPORTATION	105
REVISION DATE		233
101.32		302
		501



CHECK DAM - TYPICAL SECTION
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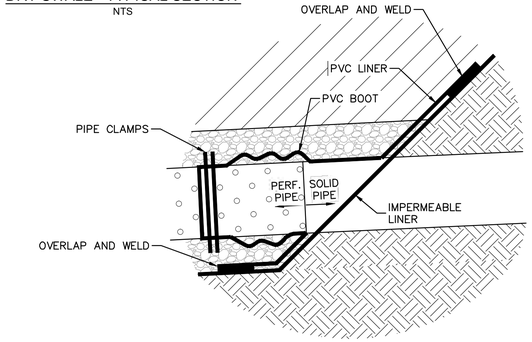
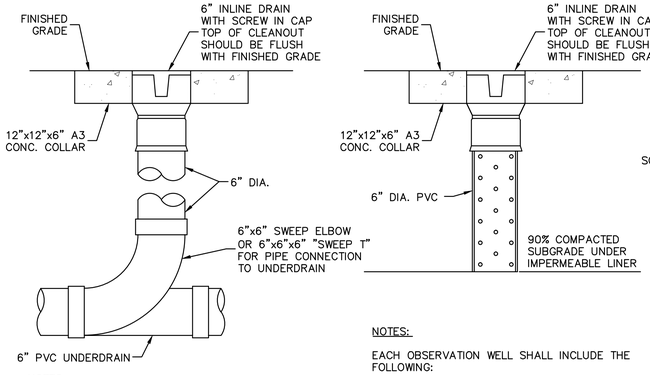


PIPE BOOT DETAIL
NTS



NOTES:

THE CLEANOUT SHALL HAVE THE FOLLOWING:

1. PROVIDE A WHITE TUBE MADE OF PVC OR EQUAL.
2. THE SCREW TOP LID SHALL BE HIGH IMPACT PLASTIC THAT WILL WITHSTAND ULTRA–VIOLET RAYS.

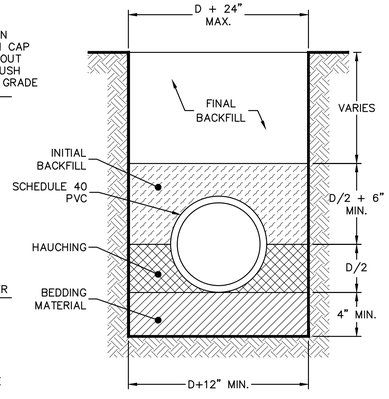
CLEANOUT
NTS

NOTES:

EACH OBSERVATION WELL SHALL INCLUDE THE FOLLOWING:

1. PROVIDE A WHITE TUBE MADE OF NON–CORROSIVE MATERIAL, SCH. 40 PERFORATED PVC OR EQUAL.
2. WRAP TUBE WITH GEOTEXTILE FABRIC.
3. THE SCREW TOP LID SHALL BE HIGH IMPACT PLASTIC THAT WILL WITHSTAND ULTRA–VIOLET RAYS.

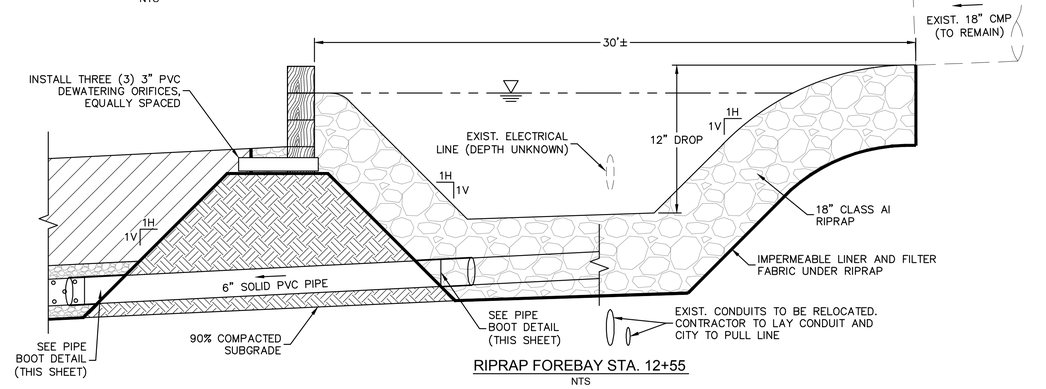
OBSERVATION WELL
NTS



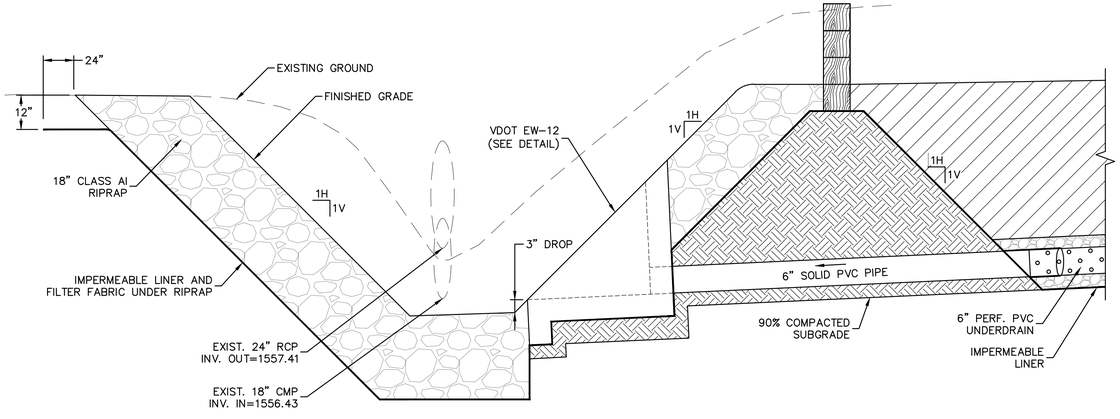
NOTES:

1. BEDDING MATERIAL SHALL BE IN ACCORDANCE WITH SECTION 302 OF THE VDOT ROAD AND BRIDGE SPECIFICIATIONS.
2. HAUCHING AND INITIAL BACKFILL MATERIAL SHALL BE CLASS I IN ACCORDANCE WITH SECTION 302 OF THE VDOT ROAD AND BRIDGE SPECIFICIATIONS.

PIPE BEDDING (SOLID PVC)
NTS



RIPRAP FOREBAY STA. 12+55
NTS



RIPRAP BASIN STA. 10+18
NTS

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THANH DANG - PROJECT MANAGER
Than.Dang@harrisonburgva.gov

PROJECT TITLE

EAST MARKET STREET STORMWATER IMPROVEMENTS
CITY OF HARRISONBURG, VA

REVISIONS

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SHEET TITLE

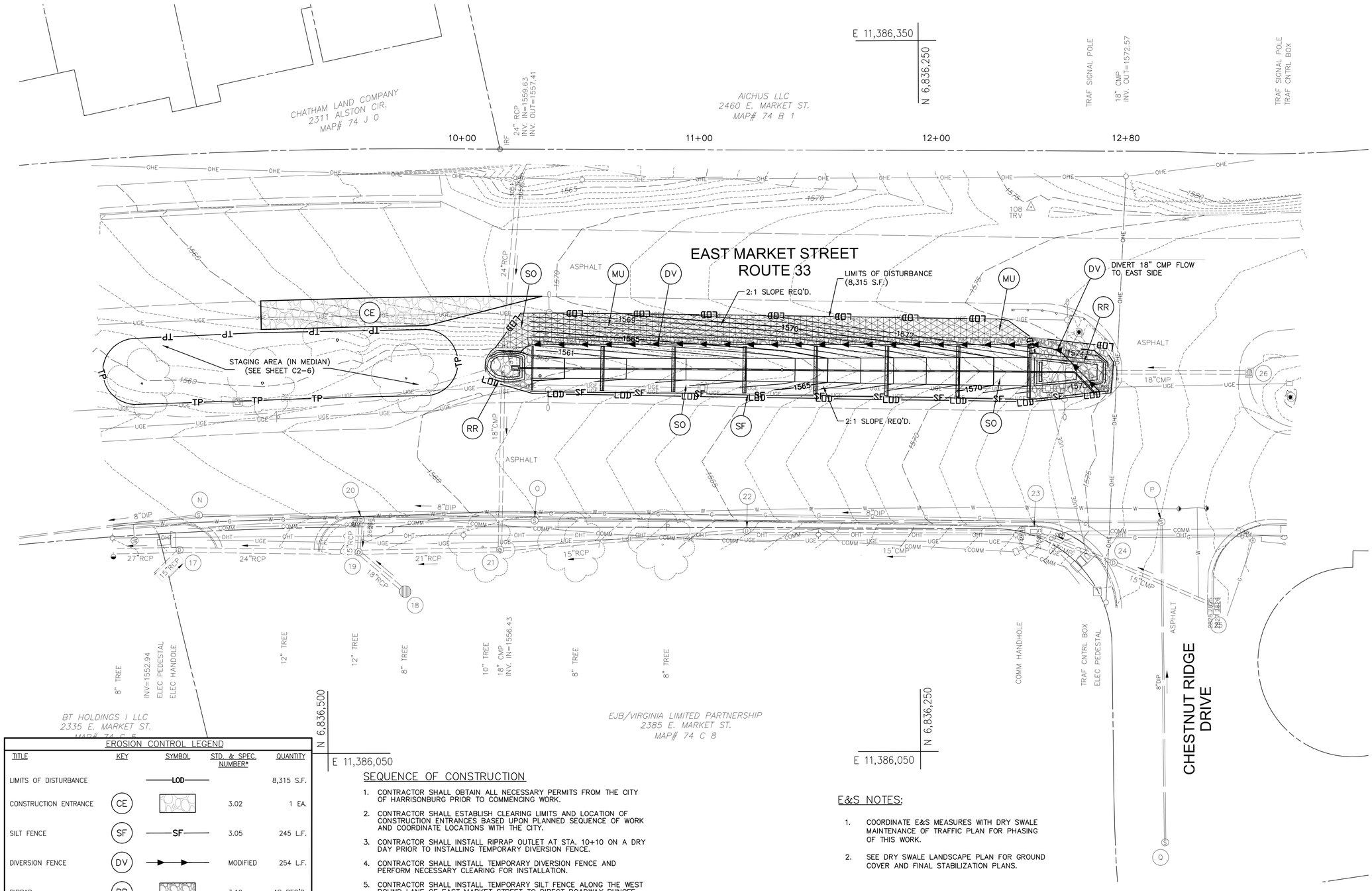
DRY SWALE DETAILS

SHEET

C2-3

SHEET 29 OF 32

X:\RICHMOND\15-0571.001 - EAST MARKET STREET ? RSC\05-CAD\CS504-150571001-DRY SWALE DETAILS.DWG, 4/5/2016 2:11 PM, LLANGLOIS



EROSION CONTROL LEGEND

TITLE	KEY	SYMBOL	STD. & SPEC. NUMBER*	QUANTITY
LIMITS OF DISTURBANCE		LOD		8,315 S.F.
CONSTRUCTION ENTRANCE	CE		3.02	1 EA.
SILT FENCE	SF	SF	3.05	245 L.F.
DIVERSION FENCE	DV		MODIFIED	254 L.F.
RIPRAP	RR		3.19	AS REQ'D.
SODDING	SO		3.33	367 S.Y.
MULCH	MU		3.35	225 S.Y.
TREE PROTECTION	TP	TP	3.38	AS REQ'D.

*VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK STD.& SPEC.

SEQUENCE OF CONSTRUCTION

1. CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS FROM THE CITY OF HARRISONBURG PRIOR TO COMMENCING WORK.
2. CONTRACTOR SHALL ESTABLISH CLEARING LIMITS AND LOCATION OF CONSTRUCTION ENTRANCES BASED UPON PLANNED SEQUENCE OF WORK AND COORDINATE LOCATIONS WITH THE CITY.
3. CONTRACTOR SHALL INSTALL RIPRAP OUTLET AT STA. 10+10 ON A DRY DAY PRIOR TO INSTALLING TEMPORARY DIVERSION FENCE.
4. CONTRACTOR SHALL INSTALL TEMPORARY DIVERSION FENCE AND PERFORM NECESSARY CLEARING FOR INSTALLATION.
5. CONTRACTOR SHALL INSTALL TEMPORARY SILT FENCE ALONG THE WEST BOUND LANE OF EAST MARKET STREET TO DIRECT ROADWAY RUNOFF AWAY FROM WORK AREA.
6. CONTRACTOR SHALL INSTALL REMAINING RIPRAP, THEN PROCEED WITH OVERALL CLEARING AND REMOVAL OF EXISTING RIPRAP.
7. CONTRACTOR SHALL INSTALL DRY SWALE, IMPERMEABLE LINER, UNDERDRAIN, STRUCTURES, FILTER MEDIA AND ASSOCIATED APPURTENANCES AND STABILIZE.
8. CONTRACTOR SHALL INSTALL PERMANENT VEGETATIVE STABILIZATION.
9. CONTRACTOR SHALL REMOVE ALL TEMPORARY EQUIPMENT, DIVERSIONS,CONSTRUCTION MATERIALS AND DEBRIS FROM THE SITE.
10. CONTRACTOR SHALL REMOVE TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES UPON APPROVAL FROM THE CITY OF HARRISONBURG.

E&S NOTES:

1. COORDINATE E&S MEASURES WITH DRY SWALE MAINTENANCE OF TRAFFIC PLAN FOR PHASING OF THIS WORK.
2. SEE DRY SWALE LANDSCAPE PLAN FOR GROUND COVER AND FINAL STABILIZATION PLANS.

GRAPHIC SCALE

20 0 10 20 40 80

(IN FEET)
1 inch = 20 ft.

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SHEET TITLE

DRY SWALE EROSION AND SEDIMENT CONTROL PLAN

SHEET

C2-4

SHEET 30 OF 32

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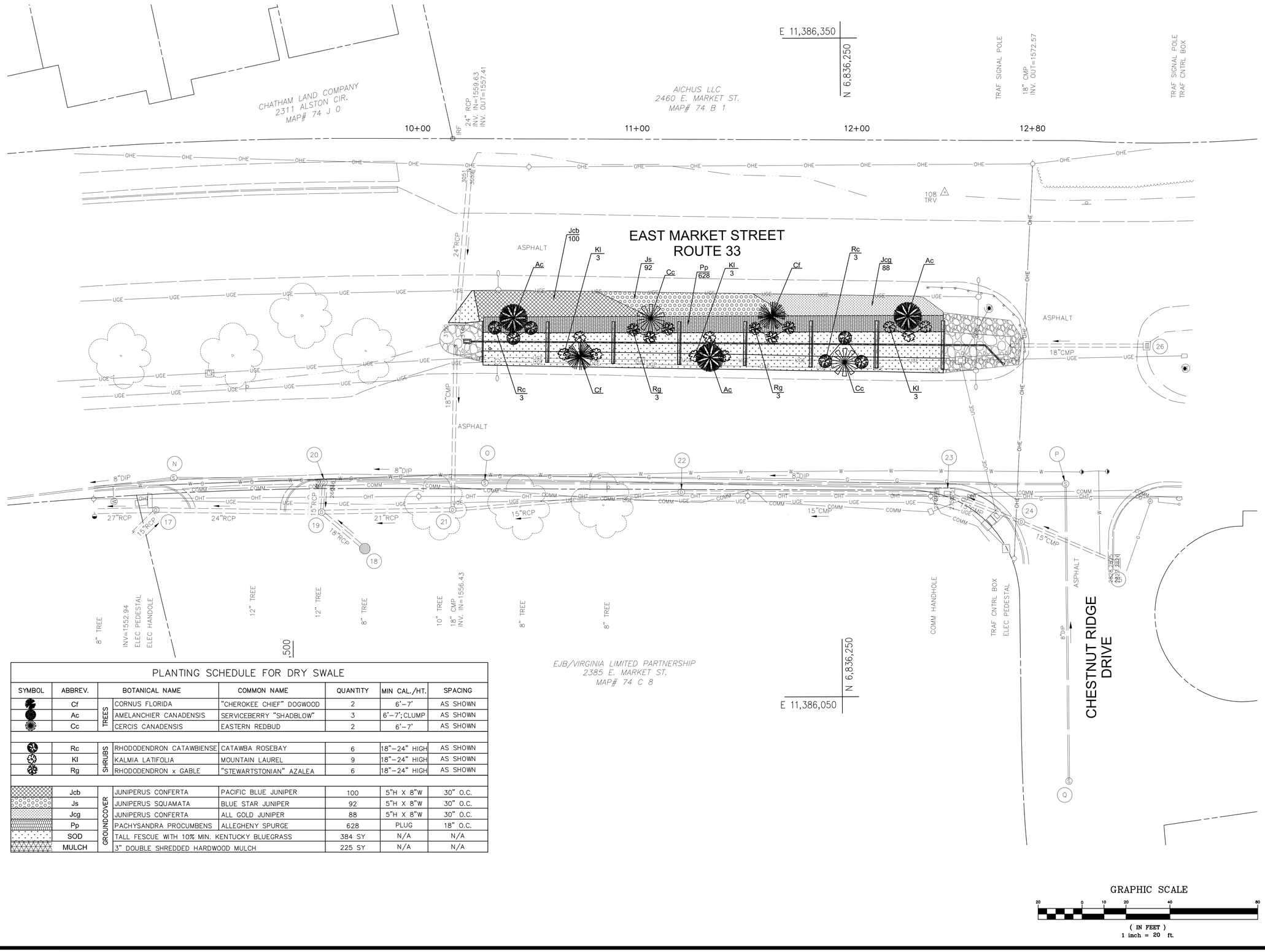

PLANTING SCHEDULE FOR DRY SWALE						
SYMBOL	ABBREV.		BOTANICAL NAME	COMMON NAME	QUANTITY	MIN CAL./HT.	SPACING
	Cf	TREES	CORNUS FLORIDA	"CHEROKEE CHIEF" DOGWOOD	2	6'–7'	AS SHOWN
	Ac		AMELANCHIER CANADENSIS	SERVICEBERRY "SHADBLOW"	3	6'–7';CLUMP	AS SHOWN
	Cc		CERCIS CANADENSIS	EASTERN REDBUD	2	6'–7'	AS SHOWN
	Rc	SHRUBS	RHODODENDRON CATAWBIENSE	CATAWBA ROSEBAY	6	18"–24" HIGH	AS SHOWN
	Kl		KALMIA LATIFOLIA	MOUNTAIN LAUREL	9	18"–24" HIGH	AS SHOWN
	Rg		RHODODENDRON x GABLE	"STEWARTSTONIAN" AZALEA	6	18"–24" HIGH	AS SHOWN
	Jcb	GROUNDCOVER	JUNIPERUS CONFERTA	PACIFIC BLUE JUNIPER	100	5"H X 8"W	30" O.C.
	Js		JUNIPERUS SQUAMATA	BLUE STAR JUNIPER	92	5"H X 8"W	30" O.C.
	Jcg		JUNIPERUS CONFERTA	ALL GOLD JUNIPER	88	5"H X 8"W	30" O.C.
	Pp		PACHYSANDRA PROCUMBENS	ALLEGHENY SPURGE	628	PLUG	18" O.C.
	SOD		TALL FESCUE WITH 10% MIN. KENTUCKY BLUEGRASS		384 SY	N/A	N/A
	MULCH		3" DOUBLE SHREDDED HARDWOOD MULCH		225 SY	N/A	N/A

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SHEET TITLE

DRY SWALE LANDSCAPE PLAN

SHEET

C2-5

SHEET 31 OF 32

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Typical Traffic Control
Stationary Operation on a Shoulder
(Figure TTC-4.0)
NOTES

Standard

1. **For long-term stationary work (more than 3 days) on divided highways having a median wider than 8', sign assemblies on both sides of the roadway shall be required as shown (ROAD WORK AHEAD (W20-1), RIGHT SHOULDER CLOSED AHEAD (W21-5bR)), even though only one shoulder is being closed. For operations less than 3 days in duration, sign assemblies will only be required on the side where the shoulder is being closed and a RIGHT SHOULDER CLOSED AHEAD (W21-5bR) sign shall be added to that side.**

Guidance

2. *Sign spacing should be 1300'-1500' for Limited Access highways. For all other roadways, the sign spacing should be 500'-800' where the posted speed limit is greater than 45 mph, and 350'-500' where the posted speed limit is 45 mph or less.*

Option:

3. The SHOULDER WORK (W21-5) sign on an intersecting roadway may be omitted where drivers emerging from that roadway will encounter another advance warning sign prior to this activity area.
4. For short duration operations of 1 hour or less, all signs and channelizing devices may be eliminated if a vehicle with activated high-intensity amber rotating, flashing, oscillating, or strobe lights is used.

Standard:

5. **Vehicle hazard warning signals shall not be used instead of the vehicle's high-intensity amber rotating, flashing, oscillating, or strobe lights. Vehicle hazard warning signals can be used to supplement high-intensity amber rotating, flashing, oscillating, or strobe lights.**
6. **Taper length (L) and channelizing device spacing shall be at the following:**

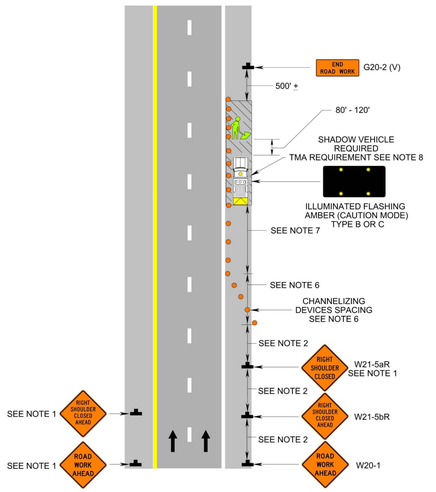
Taper Length (L)				
Speed Limit (mph)	Lane Width (Feet)			
	9	10	11	12
25	95	105	115	125
30	135	150	165	180
35	185	205	225	245
40	240	270	295	320
45	405	450	495	540
50	450	500	550	600
55	495	550	605	660
60	540	600	660	720
65	585	650	715	780
70	630	700	770	840
Minimum taper lengths for Limited Access highways shall be 1000 feet.				
Shoulder Taper = ½ L Minimum				

Channelizing Device Spacing		
Location	Speed Limit (mph)	
	0 - 35	36 +
Transition Spacing	20'	40'
Travelway Spacing	40'	80'
Construction Access*	80'	120'
* Spacing may be increased to this distance, but shall not exceed one access per ¼ mile		

On roadways with paved shoulders having a width of 8 feet or more, channelizing devices shall be used to close the shoulder in advance of the merging taper to direct vehicular traffic to remain within the traveled way.

7. **The buffer space length shall be as shown in Table 6H-3 on Page 6H-5 for the posted speed limit.**
8. **A shadow vehicle shall be used whenever a person is required to operate equipment mounted on or in the work vehicle such as buckets, augers, post drivers, etc. For work operations on the shoulder with a duration greater than 1 hour where workers are present, a shadow vehicle shall be used. A truck-mounted attenuator (TMA) shall be used on the shadow vehicle on Limited Access highways and multi-lane roadways with posted speed limit equal to or greater than 45 mph.**
9. **When a side road intersects the highway within the temporary traffic control zone, additional traffic control devices shall be placed as needed.**

Stationary Operation on a Shoulder
(Figure TTC-4.0)



OPTION 1

Typical Traffic Control
Shoulder Closure with Barrier Operation
(Figure TTC-6.0)
NOTES

Guidance:

1. *Sign spacing should be 1300'-1500' for Limited Access highways. For all other roadways, the sign spacing should be 500'-800' where the posted speed limit is greater than 45 mph, and 350'-500' where the posted speed limit is 45 mph or less.*

Standard:

2. **On divided highways having a median wider than 8', right and left sign assemblies shall be required.**
3. **Group 2 channelizing device spacing shall be at the following:**

Location	Posted Speed Limit (mph)	
	0 - 35	36 +
Transition Spacing	20'	40'
Travelway Spacing	40'	80'

4. **The minimum length for a shoulder taper should be 320' on Limited Access highways, and ½ L for all other roadways (see Note 7 of TTC-5 for values of L).**
5. **Barrier transition slope ratio shall be as follows:**

Speed Limit (mph)	Slope Ratio	Speed Limit (mph)	Slope Ratio	Speed Limit (mph)	Slope Ratio
70	22:1	55	17:1	40	13:1
65	20:1	50	16:1	35	11:1
60	19:1	45	14:1	≤30	10:1

When the barrier transition slope is on a horizontal alignment, the total offset shall be prorated around the curve in lieu of a straight-line slope.

6. **End treatment of a barrier in order of preference:**
   a. **Where guardrail exists, attach to barrier with appropriate fixed object attachment.**
   b. **Where cut slope exists, bury barrier into cut slope and provide for drainage as needed.**
   c. **Extend end of barrier until it is beyond the established clear zone (see Figure 2 on Page A-4 in Appendix A for clear zone values).**
   d. **When barrier end is inside the established clear zone, attenuator service Type I or Type II shall be used. Contact L&D Standards/Special Design Section for approved attenuators.**
7. **Barrier panels 8 inches in width and 12 inches in height shall be placed on top of the concrete barrier and spaced 80' on centers along the parallel or tangent sections and 40' on centers along the transition or taper sections. Reflectorized surface shall be fluorescent orange prismatic lens sheeting. The light at the beginning of the barrier run and at the breakpoint where the barrier becomes parallel to the roadway shall be a Type B flashing light. Barrier delineators shall be installed along the traffic side of the concrete barriers in-between and at the same spacing as the barrier panels approximately 24 inches up from the roadway surface.**

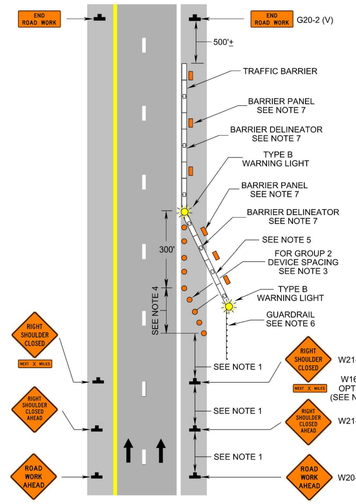
Option:

8. The barrier shown in this typical application is an example of one method that may be used to close a shoulder of a long-term project.
9. The RIGHT SHOULDER CLOSED (W21-5aR) sign may be eliminated from all roadways except Limited Access highways.

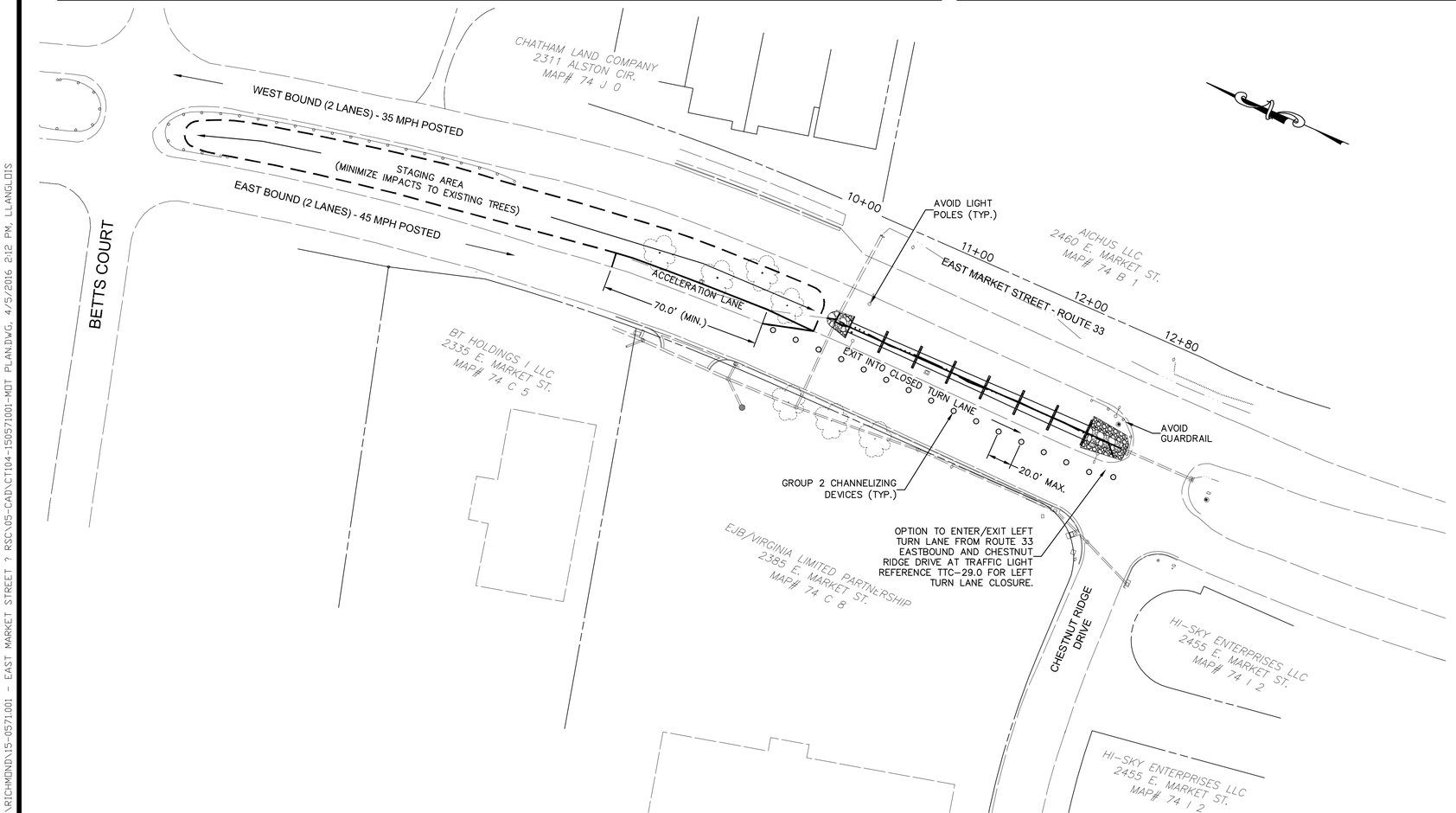
Guidance:

10. *If drivers cannot see a pull-off area beyond the closed shoulder, information regarding the length of the shoulder closure shall be provided in feet or miles, as appropriate.*
11. *An emergency pull-off area should be provided per Section 6G.18 and Temporary Traffic Control Figure TTC-8.*

Shoulder Closure with Barrier Operation
(Figure TTC-6.0)



OPTION 2



TRAFFIC CONTROL NOTES

1. STANDARD DETAILS, SIGNS AND TRAFFIC CONTROL DEVICES SHALL BE USED TO IMPLEMENT A SHOULDER CLOSURE IN THE ROADWAY MEDIAN DURING CONSTRUCTION AS DESCRIBED BELOW.
2. ALL REQUIREMENTS OF THE VIRGINIA WORK AREA PROTECTION MANUAL AND THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD) SHALL BE MET.
3. LIMITED ACCESS REQUIREMENTS DO NOT APPLY TO THIS PROJECT.
4. WHERE APPROPRIATE, THE REFERENCES TO "RIGHT" OR "R" SHALL BE REVISED TO INDICATE "LEFT" OR "L" SINCE THE CONSTRUCTION WORK IS IN THE MEDIAN ON THE LEFT SIDE OF TRAFFIC.
5. NO LANE CLOSURES SHALL BE ALLOWED WITHOUT PRIOR WRITTEN APPROVAL OF A REVISED MAINTENANCE OF TRAFFIC PLAN. ALL LANE CLOSURES SHALL BE IN ACCORDANCE WITH TTC-17.0.
6. VEHICLES ENTERING AND EXITING THE CONSTRUCTION WORK ZONE SHALL BE CAREFUL TO MINIMIZE DISRUPTIONS TO TRAFFIC.

TRAFFIC CONTROL SEQUENCE

1. CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS FROM THE CITY OF HARRISONBURG PRIOR TO COMMENCING WORK.
2. CONTRACTOR SHALL INSTALL ALL NECESSARY TRAFFIC CONTROL SIGNAGE IN ACCORDANCE WITH THE VIRGINIA WORK AREA PROTECTION MANUAL AND THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MUTCD).
3. IT MAY BE NECESSARY FOR THE CONTRACTOR TO PERFORM A TEMPORARY LANE CLOSURE OF THE INSIDE TRAFFIC LANE OF THE WEST BOUND LANE TO CONSTRUCT THE TEMPORARY DIVERSION FENCE. PRIOR APPROVAL OF A REVISED TRAFFIC CONTROL PLAN WILL BE REQUIRED.
4. UPON COMPLETION OF THE TEMPORARY DIVERSION FENCE SHOULDER CLOSURE AND/OR TEMPORARY LANE CLOSURES SHALL BE RESTRICTED TO THE EAST BOUND LANE FOR CONSTRUCTION OF THE DRY SWALE.
5. UPON COMPLETION OF THE DRY SWALE A TEMPORARY LANE CLOSURE OF THE WEST BOUND INSIDE LANE MAY BE NECESSARY TO REMOVE THE TEMPORARY DIVERSION FENCE.
6. CONTRACTOR SHALL REMOVE ALL TEMPORARY TRAFFIC CONTROL MEASURES UPON THE COMPLETION OF CONSTRUCTION.

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET)
1 inch = 50 ft.

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OWNER

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DEPARTMENT OF PUBLIC WORKS
320 EAST MOSBY ROAD
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THANH DANG - PROJECT MANAGER
Than.Dang@harrisonburgva.gov

PROJECT TITLE

EAST MARKET STREET STORMWATER IMPROVEMENTS
CITY OF HARRISONBURG, VA

REVISIONS

MARK	DATE	DESCRIPTION

AMT FILE NO.	15-0571.001
DATE:	April 6, 2016
SCALE:	1" = 50'
DESIGNED BY:	CC/DEC
DRAWN BY:	LAL
CHECKED BY:	DJR

BID DOCUMENTS

SHEET TITLE

DRY SWALE MAINTENANCE OF TRAFFIC PLAN

SHEET

C2-6

SHEET 32 OF 32

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