




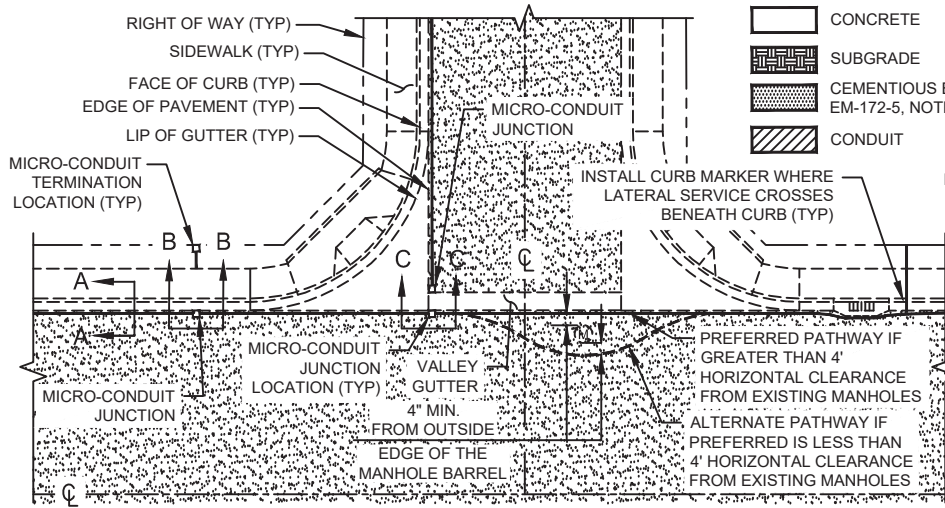


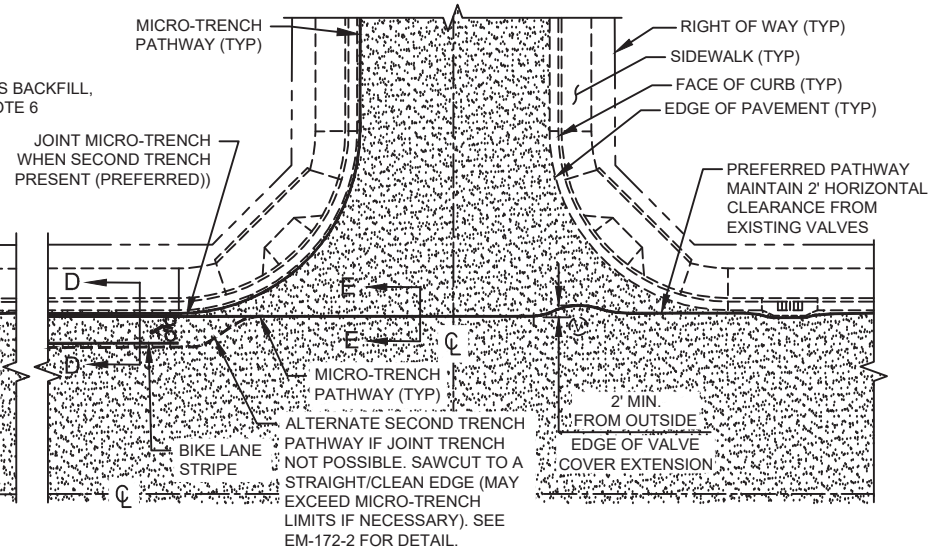
LEGEND

-  ASPHALT
-  CONCRETE
-  SUBGRADE
-  CEMENTIOUS BACKFILL, EM-172-5, NOTE 6
-  CONDUIT



ROADWAY WITH VALLEY GUTTER & APRON @ CURB RETURN

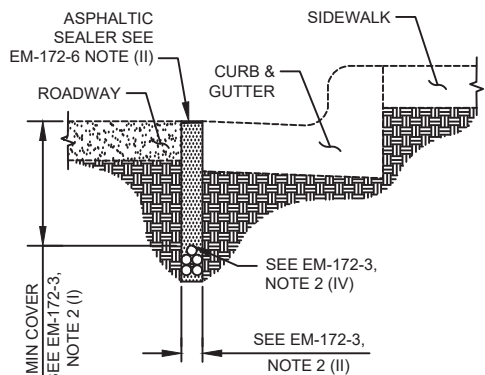
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ROADWAY WITH CURB AND GUTTER @ CURB RETURN

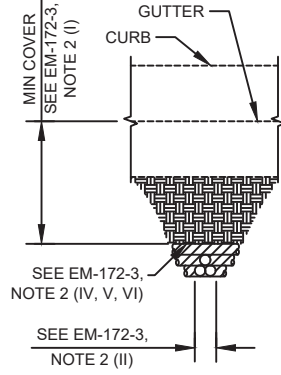
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NOTE: REFER TO MICRO-TRENCHING GENERAL NOTES ON EM-172-3 TO EM-172-5 AND MICRO-TRENCHING SURFACE RESTORATION NOTES ON EM-172-6 TO EM-172-8



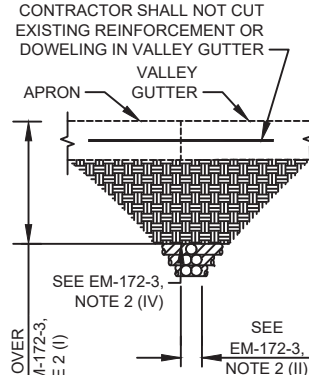
SECTION A-A

NTS



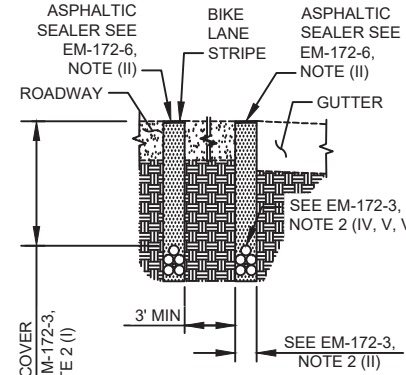
SECTION B-B

EM-172-3, NOTE 1
EM-172-5, NOTE 5
NTS



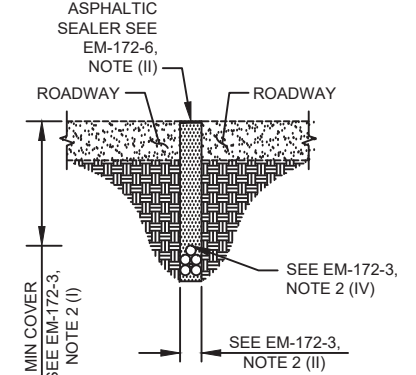
SECTION C-C

EM-172-3, NOTE 1
EM-172-5, NOTE 5
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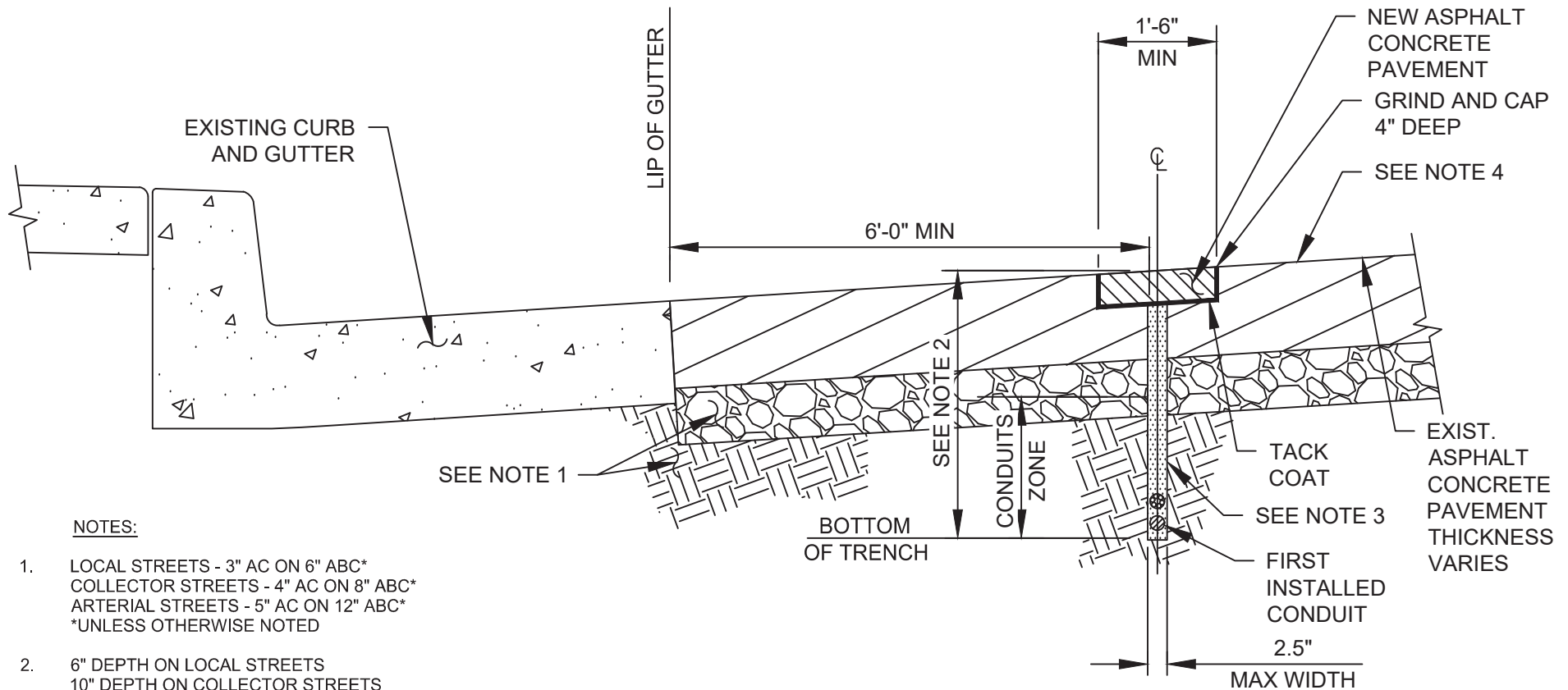
SECTION D-D

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SECTION E-E

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NOTES:

1. LOCAL STREETS - 3" AC ON 6" ABC*
 COLLECTOR STREETS - 4" AC ON 8" ABC*
 ARTERIAL STREETS - 5" AC ON 12" ABC*
 *UNLESS OTHERWISE NOTED
2. 6" DEPTH ON LOCAL STREETS
 10" DEPTH ON COLLECTOR STREETS
 10" DEPTH FOR ARTERIAL CROSSINGS
3. BACKFILL PER DETAIL EM-172-3 TO EM-172-5 REQUIREMENTS.
4. PER DETAIL EM-172-3 TO EM-172-5 REQUIREMENTS FOR THIRD MICRO-TRENCHES, APPLY MICRO-SEAL OR SLURRY SEAL PER CITY STANDARDS FROM LIP OF GUTTER TO 50' BEYOND THE PAVEMENT CUT. ALL STRIPING SHALL BE REPLACED PER CITY STANDARDS.

NOTES:

THE FOLLOWING STANDARDS APPLY TO MICRO-TRENCHING:

1. MICRO-TRENCHING IS NOT PERMITTED IN THE FOLLOWING AREAS:

- I) CONCRETE STREETS, DRIVEWAYS, SIDEWALKS, CURB AND GUTTER, APRONS, BOX CULVERTS, BRIDGES, OR OTHER CONCRETE STRUCTURES.
- II) SPECIAL PAVEMENTS SUCH AS, DECORATIVE PAVING, BRICKS, CONCRETE PAVERS, EXPOSED AGGREGATE CONCRETE, STAMPED ASPHALT, OR OTHER UNIQUE NON-CONCRETE OR NON-ASPHALT MATERIALS.
- III) AREAS RESTRICTED PER EL MIRAGE CITY CODE AND THE PAVEMENT CUT POLICY.
- IV) CROWN OF THE STREET.
- V) THE APPLICANT MUST COORDINATE ATTACHMENTS TO ANY BOX CULVERT OR BRIDGE WITH THE ENGINEERING DIVISION.

2. MICRO-TRENCHING MUST:

- I) ONLY BE ALLOWED FOR PERPENDICULAR CROSSINGS ON ARTERIAL STREETS AND HAVE SUFFICIENT DEPTH FOR THE CONDUITS TO BE INSTALLED WITH A MINIMUM COVER OF 10" IN AN ARTERIAL OR COLLECTOR STREET AND 6" IN LOCAL STREETS;
- II) HAVE MAXIMUM 2.5" WIDE TRENCH:
- III) BE RESTORED WITH PRE-APPROVED CEMENTITIOUS BACKFILL. SEE EM-172-5, NOTE 6 FOR ADDITIONAL INFORMATION;
- IV) CONDUITS MUST BE TRACEABLE WITH TRACER WIRE PER THE CITY'S APPROVED MATERIAL LIST AND MUST MEET ASTM B1010 REQUIREMENTS;
- V) CONFORM TO SEPARATION REQUIREMENTS (HORIZONTAL AND VERTICAL) FROM EXISTING UTILITIES AS SHOWN ON CITY DETAIL EM-402.
- VI) BE INSTALLED WITHOUT CUTTING EXISTING CONCRETE IMPROVEMENTS. MICRO-TRENCH SHALL BE INSTALLED BENEATH CONCRETE WHERE REQUIRED.

3. LOCATION OF TRENCHES:

- I) MICRO-TRENCHING IS APPROVED FOR PERPENDICULAR CROSSINGS ON ARTERIAL STREETS AND FOR USE ON COLLECTOR AND LOCAL STREET CLASSIFICATIONS.
- II) MICRO-TRENCHING ON PRIVATE STREETS SHALL BE APPROVED AND PERMITTED BY THE HOMEOWNERS ASSOCIATION OR EQUIVALENT GOVERNING BODY.
- III) THE UTILITY/CONTRACTOR IS RESPONSIBLE TO VERIFY CITY HAS A UTILITY EASEMENT OVER THE PRIVATE STREET. THE UTILITY/CONTRACTOR SHALL OBTAIN A PERMIT FROM THE CITY TO WORK WITHIN THE UTILITY EASEMENT.



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3. LOCATION OF TRENCHES (CONT.):

- IV) MICRO-TRENCHING MUST BE LOCATED AT THE LIP OF GUTTER ON EITHER SIDE OF A STREET UNLESS SPECIFIED OTHERWISE WITHIN THE CITY STANDARD DETAILS.
- V) A SECOND MICRO-TRENCH MAY BE PLACED 6 FEET AWAY FROM THE FIRST MICRO-TRENCH. IF A BIKE LANE EXISTS, MICRO-TRENCH SHALL BE COMPLETELY OUTSIDE OF THE BIKE LANE AND BE ADJACENT TO THE BIKE LANE STRIPE. CONTRACTOR SHALL APPLY A SURFACE TREATMENT, I.E. MICRO-SEAL, SLURRY SEAL OR OTHER SEALANT MATERIAL APPROVED BY THE CITY ENGINEER FROM 1' BEYOND THE SECOND TRENCH AND THE LIP OF GUTTER AND RESTRIPE THE BIKE LANE LINES AND SYMBOLS;
- VI) WHERE ANGULAR CROSSING OR ANY LENGTH-WISE CUTS OF A BIKE LANE OCCUR BY MICRO-TRENCHING, THE CAPPING LIMITS SHALL EXTEND THE FULL WIDTH OF THE BIKE LANE. PERPENDICULAR CROSSINGS MAY RECEIVE A CAPPING WIDTH A DISTANCE OF 50' FROM EDGE OF PAVEMENT CUT. PAVEMENT MARKINGS SHALL BE RESTORED IN KIND. WHERE NO BIKE LANE MARKINGS EXIST, CONTRACTOR SHALL CONSULT WITH CITY TO DETERMINE LOCATION OF ANY PLANNED BIKE LANES SO THAT IMPACT OF PAVEMENT SURFACE MAY BE AVOIDED.
- VII) MICRO-TRENCHING SHALL BE CONSTRUCTED AND PHASED TO MINIMIZE INTERFERENCE WITH VEHICULAR TRAFFIC.
- VIII) MICRO-TRENCHING MAY EXTEND THROUGH AN INTERSECTION AND CONTINUE ADJACENT TO THE CURB ON THE OTHER SIDE OF THE INTERSECTION.
- IX) PRIOR TO MICRO-TRENCHING OPERATION, THE CITY INSPECTOR AND CONTRACTOR SHALL "WALK" THE MICRO-TRENCH PATH AFTER AZ811 LOCATE MARKERS HAVE BEEN COMPLETED. THE PURPOSE OF THE "WALK" IS TO IDENTIFY ANY AREAS OF POTENTIAL CONFLICT AND/OR INTERFERENCE AND RECORD THE RESULTS OF THE "WALK". ADDITIONALLY, THE CONTRACTOR SHOULD VERIFY THAT ALL UTILITIES HAVE BEEN LOCATED. THE CONTRACTOR SHALL CROSS CHECK THE RECORD DRAWINGS AND PLANS WITH FIELD LOCATE MARKS TO DETERMINE DISCREPANCIES.
- X) THE CITY REQUIRES EACH LICENSEE TO REFER TO THE ARIZONA UTILITY COORDINATING COMMITTEE (AUCC) - PUBLIC IMPROVEMENT PROJECT GUIDE (PIPG) JOINT USE TRENCH MODEL. EACH LICENSEE INTENDING TO INSTALL CONDUIT USING THE MICRO-TRENCH METHOD SHALL NOTIFY OTHER LICENSEES AND OFFER JOINT TRENCH USE TO POTENTIAL PARTICIPANTS.

4. VAULTS AND SERVICE CONNECTIONS

- I) CONNECTION TO SERVICE LATERALS, JUNCTION BOXES, ETC., SHALL BE DONE SUCH THAT CURB AND GUTTER IS NOT DISTURBED, SETTLED OR DAMAGED. REMOVAL LIMITS OF SIDEWALK SHALL FOLLOW APPLICABLE STANDARDS AND REQUIREMENTS AS APPROVED BY THE ENGINEERING DIVISION.
- II) THE USE OF HYDRO-JETTING IS NOT PERMITTED. TRENCHLESS METHODS SHALL NOT CREATE A VOID TWO TIMES GREATER THAN CONDUIT. VOID SHALL BE COMPACTED AND BACKFILLED.
- III) VAULTS, JUCTION BOXES, HANDHOLES, ETC. THAT ARE INSTALLED WITHIN PAVEMENT OR VEHICULAR PATHWAYS MUST MEET TRAFFIC RATING CRITERIA DESCRIBED WITHIN AASHTO M306. PRODUCT DATA, DETAILS, AND/OR SPECIFICATIONS SHOWING THAT PRODUCT(S) MEET TRAFFIC RATING REQUIREMENTS SHALL BE SUBMITTED TO THE CITY FOR REVIEW AND APPROVAL.



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5. PAVEMENT CUTS

- I) SAWCUTS SHALL BE STRAIGHT AND CLEAN.
- II) THE VERTICAL FACES OF THE TRENCH MUST BE CLEAN, OIL FREE, WITH NO LOOSE MATERIAL.
- III) CONTRACTOR SHALL JACK OR PUSH CONDUITS DIRECTLY UNDER THE CURB AND GUTTER, SIDEWALK AND/OR VALLEY GUTTER.
- IV) COMPLY WITH THE CITY OF EL MIRAGE PAVEMENT CUT POLICY.

6. BACKFILL PROCEDURES

THE BACKFILL MATERIAL MUST BE 1200 - 2000 PSI CONTROLLED LOW STRENGTH MATERIAL (CLSM) WITH SAND OR AN EQUIVALENT FLOWABLE TYPE BACKFILL AS SPECIFIED IN MAG SPECIFICATION 604, 701.3, AND 728. MICRO-TRENCHING AND CORES SHALL BE BACKFILLED BY THE END OF THE DAY FOLLOWING THE INSTALLATION OF THE NEW FACILITY. THIS BACKFILL PROCESS MUST ADHERE TO THE FOLLOWING:

- I) TRENCH BACKFILL SHALL BE PLACED IN A TRENCH THAT IS FREE OF STANDING WATER.
- II) BEFORE PLACING ANY BACKFILL, REMOVE ALL LOOSE CONCRETE OR ROCKS, ROOTS, TRASH, AND OTHER DEBRIS FROM THE EXCAVATION.
- III) SAND BEDDING IS NOT ALLOWED.
- IV) THE BACKFILL MUST BE PLACED USING AN ON-BOARD VIBRATOR THAT MATCHES THE MICRO-TRENCH WIDTH.
- V) THE BACKFILL MATERIAL MUST ADHERE TO MAG SPECIFICATION 604.1 MODIFIED TO REPLACE COURSE AGGREGATE WITH FINE AGGREGATE (SAND), AS SPECIFIED IN MAG SPECIFICATION 701.3.

THE MATERIAL MUST ALSO:

- 1) FLOW FREELY TO THE MICRO-TRENCH BOTTOM.
- 2) REMAIN STABLE UNDER TRAFFIC LOADS.
- 3) BE SUITABLE FOR THE ROAD ENVIRONMENT.
- 4) MEET PERFORMANCE TESTING PER MAG SPECIFICATION 604.4.
- 5) MEET ACCEPTANCE PER MAG SPECIFICATION 604.5.
- VI) THE BACKFILL MATERIAL MUST BE 100% CURED BEFORE APPLYING THE ASPHALTIC SEALANT.
- VII) IF TESTS OR INSPECTONS REVEALS THAT THE BACKFILL FAILS TO MEET THE REQUIREMENTS MENTIONED ABOVE, THE BACKFILL WILL BE CONSIDERED UNACCEPTABLE AND MUST BE REMOVED AND REPLACED. ALL COSTS RELATED TO CORRECTIONS AND SUBSEQUENT TESTING WILL BE THE RESPONSIBILITY OF THE CONTRACTOR IF THE BACKFILL IS DEEMED UNACCEPTABLE AND/OR IF THE TRENCH IS BACKFILLED WITHOUT BEING INSPECTED BY THE CITY INSPECTOR.
- VIII) THE ASPHALTIC SEALANT SHALL BE COMPLETED IN NO MORE THAN 7 CALENDAR DAYS AFTER PLACEMENT OF THE CLSM.



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ASPHALTIC SEALER/OVERBAND

THE ASPHALTIC SEALING MATERIAL, ALSO KNOWN AS AN OVERBAND, PLACED OVER THE TOP OF A MICRO-TRENCH SHALL CONFORM TO MAG STANDARD 337 AND BE APPLIED ACCORDING TO THE MANUFACTURER'S RECOMMENDATIONS OR THE REQUIREMENTS OF THIS STANDARD WHICHEVER IS MORE STRINGENT.

- I) THE SEALANT SHALL OVERLAY THE GROOVE LEAVING A MAXIMUM OVERBAND APPEARANCE OF 3-INCH WIDE (6-INCH WIDTH TOTAL) ON EACH SIDE OF THE EXCAVATION CENTERLINE.
- II) WHERE THE TRENCH IS ADJACENT TO CURB AND GUTTER OR OTHER CONCRETE SURFACE, THE SEALANT SHALL OVERLAY THE GROOVE LEAVING A MAXIMUM 3-INCH WIDE OVERBAND ON THE ASPHALT SURFACE.
- III) THE HEIGHT OF THE SEALANT ABOVE THE PAVEMENT SURFACE SHALL NOT EXCEED 1/8-INCH.
- IV) PAVEMENT PATCHES SHALL BE "SQUARED UP" AND NOT IRREGULAR IN SHAPE.
- V) THE UTILITY POTHOLE-KEYHOLE METHOD, ALSO KNOWN AS CORE RESTORATION, SHALL CONFORM TO MAG DETAIL 212, TYPE B PAVEMENT REPAIR MODIFIED FOR A MAXIMUM DIAMETER CORE OF 10-INCHES.
 - (A) IF THE PAVEMENT CORE IS FOUND FRACTURED OR DEFECTIVE UPON REMOVAL, OR IF IT BECOMES DAMAGED AFTER REMOVAL AND BEFORE REINSTATEMENT, THE DEFECTIVE OR DAMAGED CORE SHALL NOT BE USED TO RESTORE PAVEMENT.
 - (B) CLSM SHALL CONFORM TO MAG SPECIFICATIONS SECTION 355.3.1 AND SECTION 728, AND BE PLACED TO TOP OF TRENCH, ALLOWING SPACE FOR ASPHALT SEALER.
 - (C) CONVENTIONAL POTHOLE RESTORATION SHALL CONFORM TO MAG DETAIL 212, TYPE A OR B PAVEMENT REPAIR, MODIFIED TO INCLUDE CRACK SEAL.
- VI) THE RESTORED SURFACE SHALL BE THOROUGHLY COMPACTED, SMOOTH AND TRUE TO GRADE AND CROSS-SECTION, AND FREE FROM RUTS, HUMPS, DEPRESSIONS, OR IRREGULARITIES PER MAG 336.2.4.1.
- VII) RESTORATION OF ANY DAMAGED TRAFFIC CONTROL DEVICES MUST BE COMPLETED, INCLUDING BUT NOT LIMITED TO, EMBEDDED LOOP DETECTORS AND PAVEMENT MARKINGS.

SITE RESTORATION

- I) A CONTRACTOR PERFORMING CONSTRUCTION IN PUBLIC RIGHT-OF-WAY (ROW) MUST RESTORE THE ROW TO A CONDITION EQUAL TO OR BETTER THAN THAT SPECIFIED IN THIS DETAIL OR OTHER APPLICABLE CITY DESIGN AND CONSTRUCTION STANDARDS.
- II) CONCRETE DAMAGE, POTHOLE EXCAVATIONS OR OTHER DAMAGE IN CONCRETE FACILITIES, SHALL BE SAW CUT AND REMOVED TO THE NEAREST JOINT. IF SIDEWALK PANELS ARE DAMAGED OR POTHOLED THEY MUST BE ENTIRELY REPLACED.
- III) TURF REPLACEMENT AND SOD MATCHING EXISTING TURF SHOULD BE USED AND CONFORM TO MAG STANDARD SPECIFICATION 430. RUTS SHOULD BE ELIMINATED, AND TOPSOIL MUST BE PREPARED TO CREATE A SMOOTH SURFACE DEVOID OF ROCKS AND GRAVEL.
- IV) ANY IRRIGATION SYSTEMS SHALL BE RESTORED PER MAG SPECIFICATION SECTION 440. ALL IRRIGATION SYSTEMS (I.E., SPRINKLER HEADS, BUBBLERS, EMITTERS, CONTROLS, ETC.) SERVING AN AREA AFFECTED BY THIS PROJECT SHALL BE RESTORED AS REQUIRED TO FACILITATE THE CONTINUED OPERATION FOR THEIR INTENDED USE. NEW SPRINKLER HEADS SHALL HAVE THE SAME PRECIPITATION OUTPUT AS THE EXISTING LAWN HEADS. ALL PIPING, PIPE FITTINGS, COUPLINGS, SPRINKLERS, EMITTERS, CONDUIT, SLEEVEING, LOW VOLTAGE CONDUCTORS, SERVICE LINE CONDUCTORS, DRIP LINE, FIXTURES, ETC. USED IN THE REPAIR AND RESTORATION OF EXISTING SPRINKLER AND EMITTER SYSTEMS SHALL BE NEW, IN PERFECT CONDITION, AND SHALL COMPLY WITH MAG SPECIFICATION SECTION 757.
- V) FOR SYNTHETIC TURF, FOLLOW THE MANUFACTURER'S RECOMMENDATIONS FOR RESTORATION, ADHERING TO THESE ABBREVIATED STEPS:
 - (A) CLEAN THE SURFACE: BEGIN BY THOROUGHLY CLEANING THE SYNTHETIC TURF SURFACE. REMOVE DEBRIS, LEAVES, DIRT, AND DUST USING A LEAF BLOWER, BROOM, OR A GENTLE SPRAY OF WATER.
 - (B) APPLY INFILL: IF YOUR SYNTHETIC TURF HAS INFILL MATERIAL (LIKE SAND), CHECK IF IT NEEDS REPLENISHING. ADD THE APPROPRIATE AMOUNT OF INFILL TO MAINTAIN WEIGHT AND SUPPORT FOR THE TURF.
 - (C) REPAIR DAMAGES: INSPECT FOR DAMAGE SUCH AS TEARS, RIPS, OR LOOSE SEAMS. REPAIR DAMAGED AREAS AS PER THE MANUFACTURER'S GUIDELINES. SECURE SEAMS PROPERLY.
 - (D) DIRECTION OF GAUGES OR TUFTED FIBER: DETERMINE THE DIRECTION OF THE GAUGES OR TUFTED FIBER IN THE LAWN. ADD NEW SECTIONS IN THE CORRECT DIRECTION FOR A SEAMLESS APPEARANCE. ENSURE THAT BLADES AND STITCH PATTERNS FACE THE SAME DIRECTION.
 - (E) REMOVE STAINS: USE A MILD DETERGENT MIXED WITH WATER TO GENTLY SCRUB STAINED AREAS. RINSE THOROUGHLY WITH WATER TO REMOVE SOAP RESIDUE.
 - (F) RINSE AND DRAIN: RINSE THE ENTIRE TURF WITH WATER TO REMOVE CLEANING AGENTS OR DIRT. ENSURE PROPER DRAINAGE FROM THE SURFACE.
 - (G) GROOM THE TURF: USE THE BRUSH OR POWER BROOM TO GROOM THE TURF IN THE NATURAL DIRECTION OF THE BLADES. THIS HELPS FIBERS STAND UPRIGHT AND GIVES A REALISTIC APPEARANCE.



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FOR GEOTEXTILE FABRIC, FOLLOW THE MANUFACTURER'S RECOMMENDATIONS FOR RESTORATION. HERE ARE THE ABBREVIATED STEPS:

- (A) GEOTEXTILE OR WEED BARRIER FABRIC, IS A SPECIALIZED MATERIAL DESIGNED FOR WEED CONTROL, EROSION PREVENTION, AND ENHANCED LANDSCAPING STABILITY. ENSURE THAT THE NEW GEOTEXTILE FABRIC MATCHES OR EXCEEDS THE QUALITY OF THE EXISTING FABRIC BEING REPLACED. THE WEIGHT PER SQUARE YARD SHOULD EXCEED THAT OF THE EXISTING GEOTEXTILE FABRIC.
- (B) BACKFILL AND COMPACT TRENCHES TO A MINIMUM OF 90% OF MAXIMUM DENSITY.
- (C) MAINTAIN A 6 TO 12-INCH OVERLAP BETWEEN EACH PIECE OF GEOTEXTILE FABRIC. FAILING TO OVERLAP THE MATERIAL COULD ALLOW WEEDS TO GROW BETWEEN THE GAPS.
- (D) SECURE THE LANDSCAPE FABRIC IN PLACE.
- (E) REMOVE WEEDS & DEBRIS.
- (F) LEVEL THE SOIL SURFACE.
- (G) THE CONTRACTOR SHOULD MATCH THE EXISTING LANDSCAPE ROCK AND ROCK PATTERN, COVERING THE ENTIRE AREA WITH ROCK AND ENSURING NO GAPS WHERE THE GEOTEXTILE FABRIC IS EXPOSED.
- (H) UNLESS DIRECTED OTHERWISE BY THE CITY INSPECTOR, THE CONTRACTOR MUST COMPLETE ALL REPAIRS AND RESTORATION WORK ON DAMAGED OR DISTURBED LANDSCAPE IRRIGATION SYSTEMS, ELECTRICAL LINES, AND LIGHTING WITHIN 24 HOURS OF SUCH DAMAGE OR DISRUPTION.

RESTORATION WORK SHOULD BE CARRIED OUT PROMPTLY. UNSATISFACTORY RESTORATION OR DELAYED COMPLETION WILL LEAD TO A HALT IN ALL CONTRACTOR WORK ON THE OVERALL PROJECT. NO ADDITIONAL PERMITS WILL BE ISSUED UNTIL SATISFACTORY RESTORATION IS COMPLETE, INCLUDING PREVIOUSLY PERMITTED BUT UNFINISHED WORK.



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