Louisville Metro
Public Works & Assets
UTILITY POLICY

Mayor
Greg Fischer

LOUISVILLE METRO
DEPARTMENT OF PUBLIC WORKS
UTILITY POLICY

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LOUISVILLE METRO
DEPARTMENT OF PUBLIC WORKS
UTILITY POLICY

Purpose

This policy is established to describe the means and methods by which work may be permitted in the public right-of-way of Louisville Metro.

Background

Work may be permitted in the right-of-way at the discretion of Louisville Metro Public Works. The Director of Public Works is charged with the responsibility for insuring that all work within the right-of-way complies with Louisville Metro Code of Ordinances (LMCO) Section 97.076(A)(1), which states, "No person shall place, construct, or maintain within the right-of-way of any public way of Metro Government any permanent or immovable object, structure, sidewalk, entrance way, driveway or other installation, except as otherwise permitted by resolution or ordinance of Louisville Metro." LMCO 97.076(B)(1) provides that".. The Director of Public Works shall establish reasonable rules and regulations governing the erection and maintenance of such objects, structures, and installations in such right-of-way".

It is recognized that there is a need to accommodate work in the right-of-way; however, Louisville Metro must insure that the primary purpose of the roadway, passage of vehicular traffic, is maintained to the greatest extent possible. The use of the roadway corridors by utility companies and others is secondary to the movement of traffic. This policy strikes a balance between the public need for efficient, safe transportation routes and work within these routes.

Policy Objectives

This policy has five primary objectives.

- To ensure that public safety is maintained and that public inconvenience is minimized by establishing time constraints for utility work, response time for utility repairs to the pavement and standards for work zone safety and other required work.

- To protect Louisville Metro's infrastructure investment and public convenience by establishing repair standards for the pavement when utility cuts are made, and by specifying the inspection requirements for street repairs.

- To facilitate utility work and other work within the right-of-way through the standardization of utility placements and the maintenance of an efficient permit process.

- To coordinate the timing of utility installations between various utility companies and any other required work so as to eliminate/minimize the utility work after the street pavement has been completed.

- To meet all requirements of law, including but not limited to, the Americans with Disabilities Act (ADA), the Kentucky Department of Transportation Standard Designs, the Manual on Uniform Traffic Control Devices, Louisville ordinances, MSD Standards, Roadside Design Guide, Parks policies, AASTHO, Public Works' Standard Utility Placement.

To guide the staff and the utility companies and others in achieving the above stated objectives, the following policy has been prepared. The policy is intended to provide general guidance only. Specific requirements will be developed based on site-specific conditions. Also, as with any other policy, exception may be granted as deemed necessary in writing by the Director of Public Works or designee. Louisville Metro will conduct periodic reviews of the policy and invites utility companies' input in order to make this document an effective tool for the conduct of our mutual responsibilities to serve our respective "customers".

For the purpose of this document, Louisville Metro, including all of Louisville/Jefferson County, Metro Government will be known as Metro.

Entities other than utility companies performing work in the right-of-way will be expected to perform work in the same manner as described herein. For the purpose of this Policy, all users of the right-of-way will be referred to as "Utility Company."

SECTION I: UTILITY WORK

I. ENSURING PUBLIC SAFETY/MINIMIZING PUBLIC INCONVENIENCE

The Department of Public Works is charged with managing and coordinating all construction in Louisville Metro right-of-way and easements. A major objective is to maximize the public's safety and to minimize inconvenience during the course of construction activities within Louisville Metro. Accordingly, the constraints specified below vary according to the classification of the work area.

ALL PERMIT APPLICATIONS SUBMITTED SHOULD DEFINE THE EXACT WORKING TAKING PLACE WITHIN THE RIGHT OF WAY. IF PLANS HAVE BEEN CREATED FOR THE JOB, METRO WOULD REQUEST A COPY OF PLANS TO REVIEW RESTORATION STANDARDS FOR ALL WORK WITHIN THE RIGHT OF WAY.

A. Work Within the Pavement:

1. Arterial/Collector Streets:

Arterials are those streets in Louisville Metro designated as major thoroughfares**.** ***(See pages 47-54 for a list of Metro Thru Roads)*** Collector streets are all the streets that connect residential streets to arterials, 60'-80' rights-of-way with two lanes of alternating traffic with parking on both sides or four lanes of alternating traffic. Main subdivision collectors are especially critical. Being essential to the safe movement of the majority of citizens, these streets require stricter regulation to maintain the orderly and safe flow of traffic. Therefore, no work will be performed on arterial streets during the peak traffic hours of 6-9am and 3-6pm, with the exception of emergency repairs. Peak hour limits are designated by the Louisville Metro Traffic Engineer based upon the volume of traffic in a particular direction. Kentucky DOT restoration standard specifications will apply on state streets within Louisville Metro. Louisville Metro will control traffic matters on all other streets within its corporate limits.

Because of higher traffic volumes, no new major work will be started on Friday (unless work will be continued during the weekend). Lane closures will be restricted to the working lane only and two-way traffic will be maintained at all times.

Arterials & Collectors shall be opened to traffic each night with all openings covered by a road plate or an asphalt patch. The permanent asphalt patch shall be placed within two weeks after completion of the backfilling operation. When notified by Louisville Metro of an unsafe opening, the responsible Utility Company shall respond immediately to make the situation safe and begin repairs within four (4) hours.

*** Note:** Any Roadway/Right-of-way under State jurisdiction will require a State Encroachment Permit. ***(See pages 55-74 for a list of State Roads)***

2. Residential Streets:

These are those streets and cul-de-sacs which provide direct access to adjacent property or individual homes (normally two alternating lanes in a 50' right-of-way with parking on both sides). Construction hours shall be limited to the hours of 7am to 10pm to be sensitive to the noise impact on surrounding properties (emergency work excluded). At least a single lane shall be provided for two-way traffic with a flagger for control. Excavations in residential streets shall be protected each night; this may be achieved by stone backfill to grade or lighted barricades and fencing. The permanent asphalt repair shall be made as soon as possible but not later than two weeks after work completion. When notified by Louisville Metro of an unsafe opening, the responsible Utility Company shall respond immediately to make the situation safe and repair said patch within seventy-two (72) hours.

B. Work Outside the Pavement:

All work areas outside the pavement shall be restored to their original condition after work completion. All pits/trenches remaining open overnight shall be barricaded or fenced on all sides to insure pedestrian and motorist safety.

Where work is interrupted, temporary repairs (i.e. stone backfill to grade) shall be made or the work resumed within seventy-two (72) hours. In no case shall any work area outside of the pavement be in a disturbed state longer than thirty (30) days. When notified of a failure in the work area (i.e. cave-in), the responsible Utility Company shall respond immediately to make the situation safe and begin repairs of said work within one (1) week.

C. Work Areas - General:

Disturbed areas shall be limited to no more than 300 linear feet of open trench before temporary repairs are initiated. In compliance with the ADA, Louisville Metro has made the following provisions. Any trenches that are cut through intersections will be required to pave through the intersection as well. Any area damage or directly effected by utility work or encroachment will be required to replace with ADA compliant facilities.

No work will be permitted (except for emergencies) on certain streets during special Louisville Metro events, such as Derby, Thunder Over Louisville, etc., or others so designated in writing by the Director of Public Works or designee.

Parked vehicles and equipment shall not restrict private property access nor hinder sight distances for traffic. No vehicles shall be permitted to block any portion of the right-of-way other than that covered in their permit. Any damage occurring to the right-of-way, landscaping or sidewalk shall be repaired at the expense of the responsible Utility Company.

Meter Bagging & Park

For parking meter bagging requests, a permit from Public Works is required. When permit has been obtained, contact PARC at 574-3817 with Meter and permit number as well as location(s). If work vehicles will be parking on site the permit must be in the window and visible at all times. Bagging must be done 24hrs in advance of any work.

Salvage Requirements for work in Preservation Districts

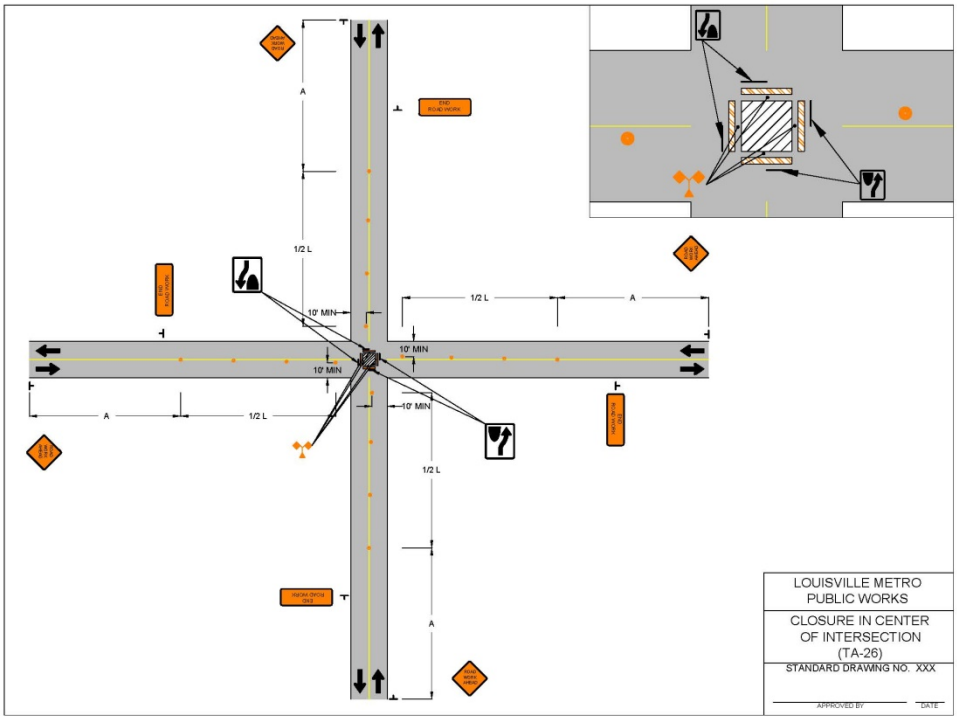
In preservation districts Contractor/Utility Company must be aware of type of road & sidewalk to determine type of repair or restoration needed. All areas within the designated historic preservation areas must be repaired using like materials and restored to its original condition. For information on historic preservation areas you can go to the following link:
http://www.louisvilleky.gov/PlanningDesign/Historic+Landmarks+and+Preservation+Districts+Commission.htm

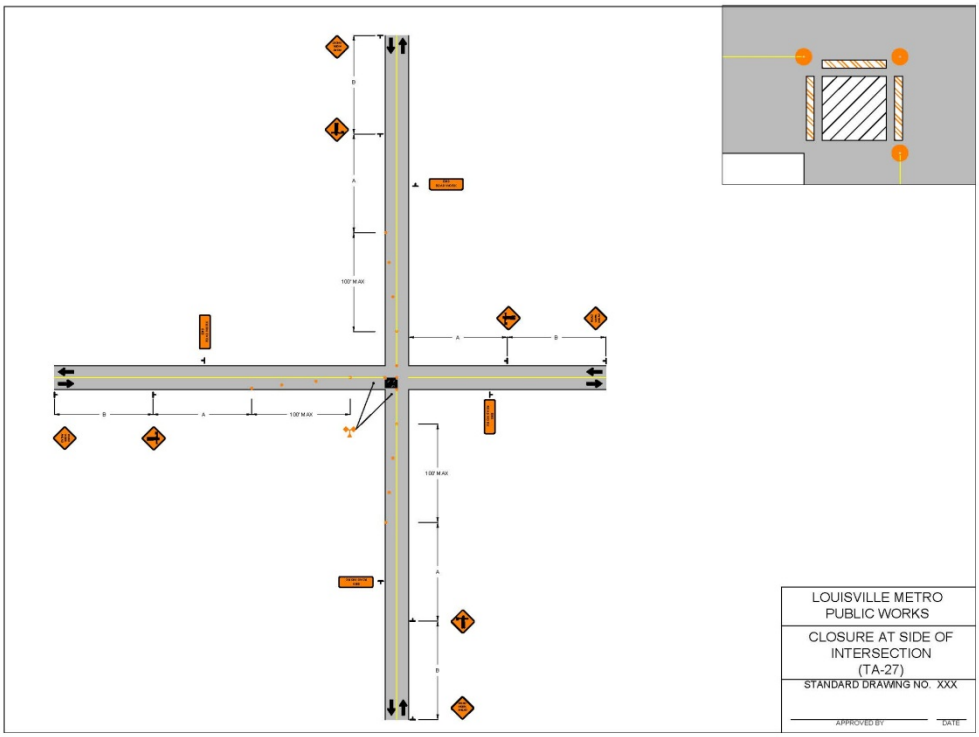
SECTION II: MAINTENANCE OF TRAFFIC

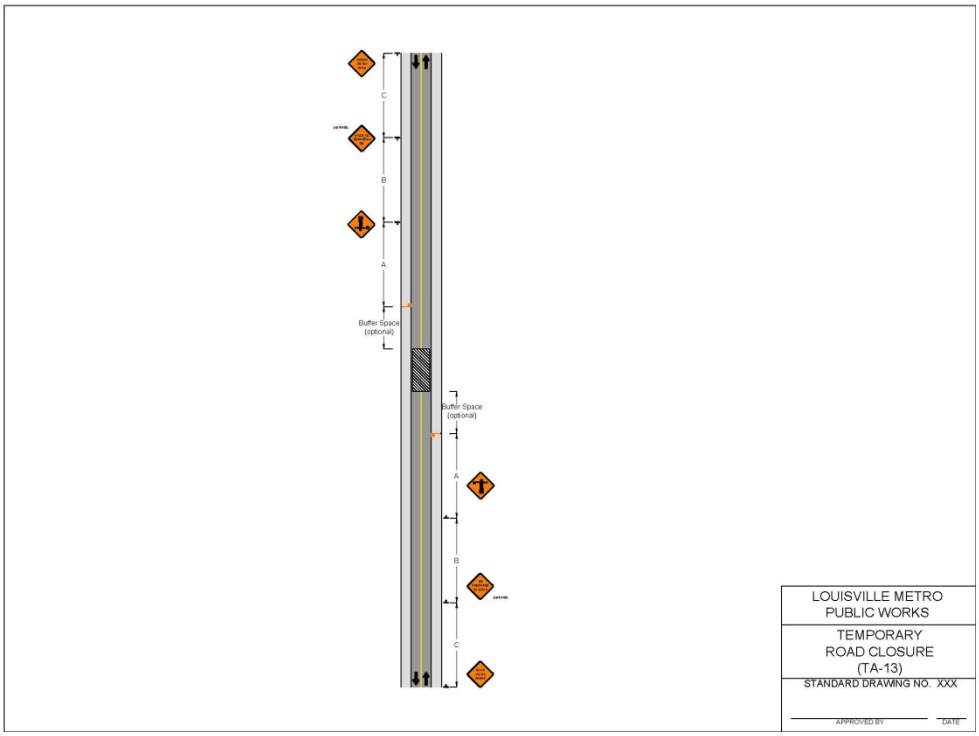
All traffic control around construction sites shall be in accordance with the Manual on Uniform Traffic Control Devices (MUTCD), subject to modification in writing for specific locations by the Department of Public Works. Traffic cones are not acceptable as the sole means of traffic control; Type II barricades and barrels with lights are required by the MUTCD. Advance notification of sidewalk closures shall be provided by the Utility Company. If pedestrian movement is affected, adequate pedestrian access and walkways shall be provided. The Utility Company is responsible for the maintenance and condition of all signs and their appurtenances, 24 hours a day, seven days a week. All signs are to be removed from the work site immediately after work is completed.

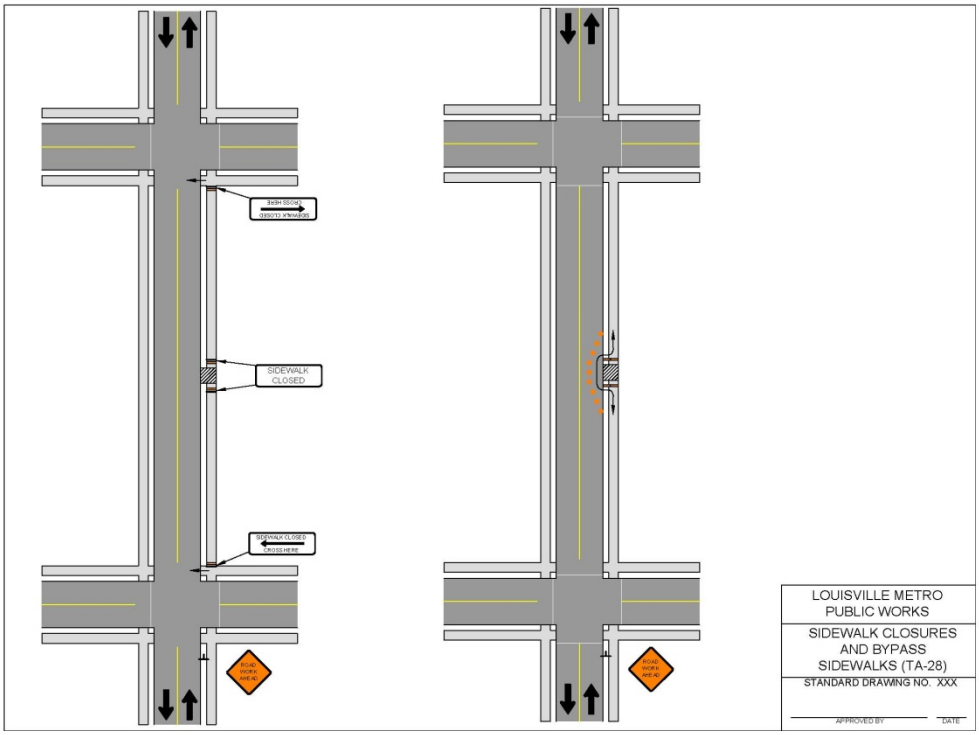
Submittals for maintenance of traffic plans should include an aerial or plan view of work zone, depicting work zone, and required MOT signage, cones, barricades, etc. with dimensions as required by MUTCD, dates of proposed work, full closures will require advanced signage informing residence of pursuing closure (included dates of closure) with fully marked detour

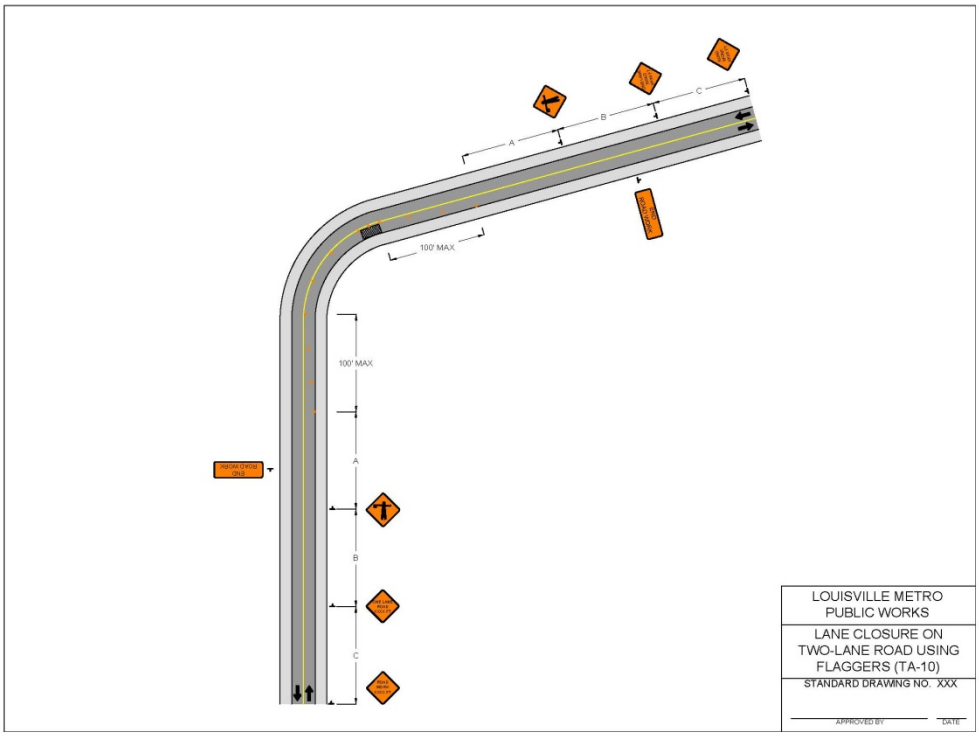
The following schematics provide examples of the required placement of traffic control signs around construction sites in accordance with the MUTCD.

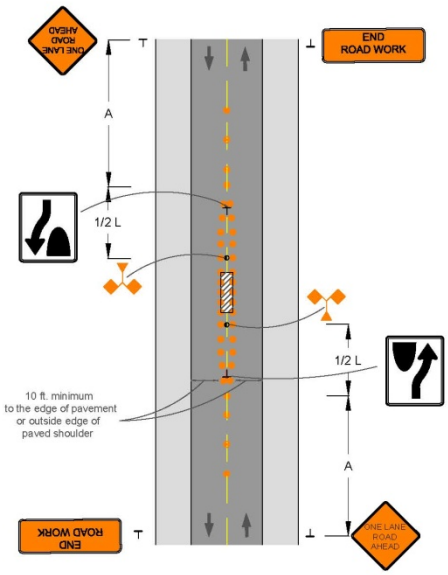



LOUISVILLE METRO
PUBLIC WORKS
CLOSURE AT SIDE OF
INTERSECTION
(TA-27)
STANDARD DRAWING NO. XXX
APPROVED BY
DATE


Buffer Space
(optional)
Buffer Space
(optional)
LOUISVILLE METRO
PUBLIC WORKS
TEMPORARY
ROAD CLOSURE
(TA-13)
STANDARD DRAWING NO. XXX
APPROVED BY
DATE


SIDEWALK CLOSED
SIDEWALK CLOSED
CROSS HERE
ROAD WORK AHEAD
ROAD WORK AHEAD
LOUISVILLE METRO
PUBLIC WORKS
SIDEWALK CLOSURES
AND BYPASS
SIDEWALKS (TA-28)
STANDARD DRAWING NO. XXX
APPROVED BY
DATE


A
B
C
100' MAX
100' MAX
A
B
C
LOUISVILLE METRO
PUBLIC WORKS
LANE CLOSURE ON
TWO-LANE ROAD USING
FLAGGERS (TA-10)
STANDARD DRAWING NO. XXX
APPROVED BY
DATE

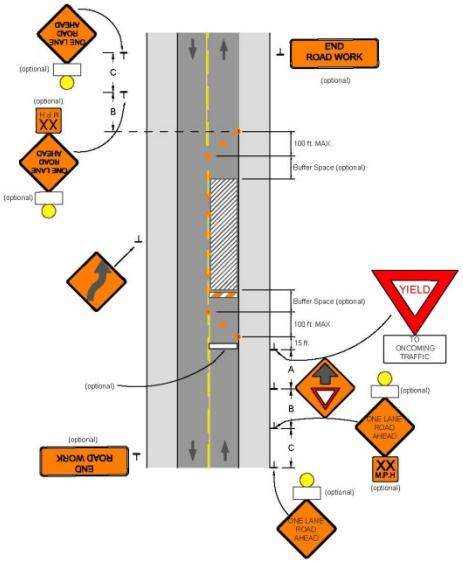


LOUISVILLE METRO
PUBLIC WORKS

Work in Center of
Low - Volume Road
(TA-15)

STANDARD DRAWING NO. XXX

APPROVED BY DATE



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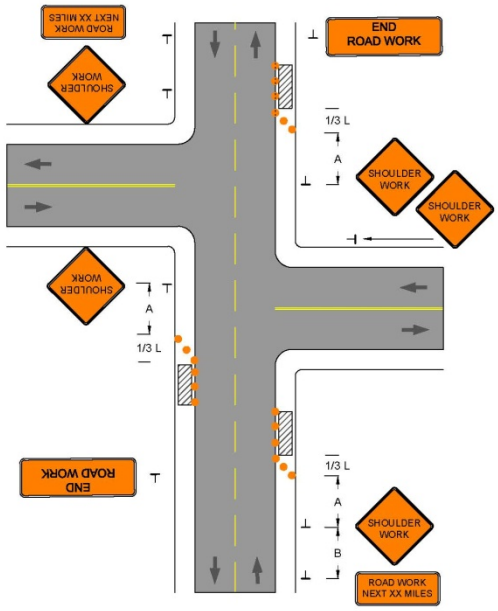
PUBLIC WORKS

Lane Closure on Low-Volume
Two-Lane Road
(TA-11)

STANDARD DRAWING NO. XXX

APPROVED BY DATE

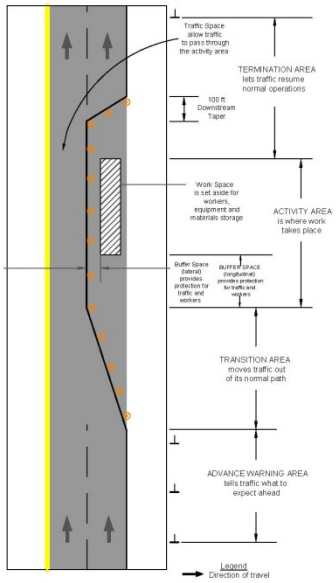


LOUISVILLE METRO
PUBLIC WORKS

Work on Shoulder
(TA-3)

STANDARD DRAWING NO. XXX

APPROVED BY DATE

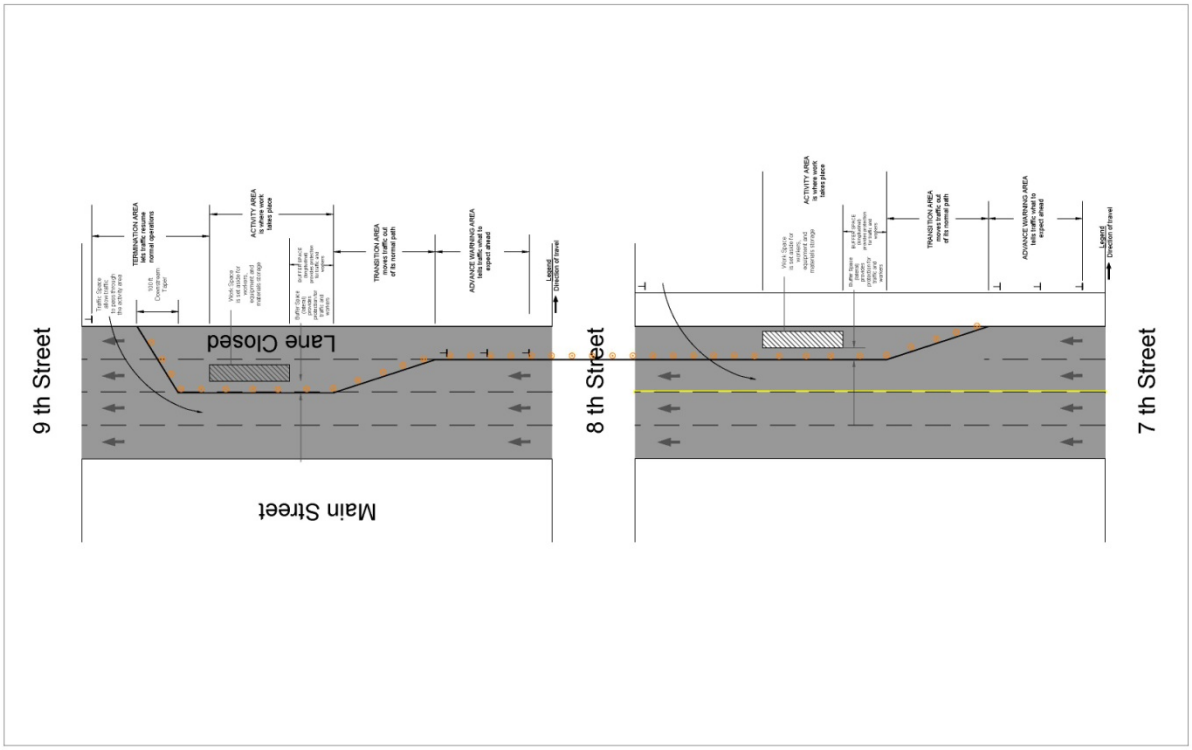


LOUISVILLE METRO
PUBLIC WORKS

Component Parts
of a Temporary
Traffic Control Zone

STANDARD DRAWING NO. XXX

APPROVED BY DATE



Erosion and Sediment Control around work sites shall be in accordance with Metropolitan Sewer District Standards, (these can be found at www.msdlouky.org) Inlet protection should be provided at curb inlets and yard drains. Excess material/sediment shall be allowed to dry and then removed by vacuum sweeper or shoveling and hauled away. Street washing shall be allowed only after sediment is removed in this manner. Effluent from dewatering operations shall be filtered or passed through an approved sediment trapping device, or both, and discharged in a manner that does not adversely affect adjacent property.

Interim Design Standard 12-01
Accessibility Standards for Pedestrian Facilities

DATE: July 5, 2012

Pedestrian Access Routes

1. Pedestrian access routes must be provided within sidewalks and other pedestrian circulation paths located in the public right-of-way.
2. A pedestrian access route is a continuous and unobstructed path of travel provided for pedestrians with disabilities within or coinciding with a pedestrian circulation path in the public right-of-way.

   Requirements:

   - Width: Continuous clear width of pedestrian access routes of 4 feet minimum.
   - Cross Slope: A maximum cross slope of 2 percent is specified for pedestrian access routes, including across driveways.
   - Grade: The grade of the pedestrian access route is permitted to equal the general grade established for the adjacent street. Pedestrian access routes not contained within a street right-of-way, a maximum grade of 5 percent is required.
   - Surface: The surfaces of pedestrian access routes must be firm, stable, and slip resistant.
   - Vertical Discontinuities: Vertical surface discontinuities (i.e., vertical difference in level between two adjacent surfaces must be ½ inch maximum. Vertical surface discontinuities between ¼ inch and ½ inch must be beveled with a slope not steeper than 1:2.
   - Passing spaces: Where the clear width of pedestrian access routes is less than 5 feet, passing spaces must be provided at intervals of 200 feet maximum. If 4 foot sidewalks, passing spaces 5 feet in width with a maximum cross slope of 2 percent shall be provided at residential driveways.

Curb Ramps

1. Newly constructed or altered streets, roads, and highways must contain curb ramps or other sloped areas at any intersection having curbs or other barriers to entry from a street level pedestrian walkway (28 CFR Part 35, Section 35.151).
2. Newly constructed or altered street level pedestrian walkways must contain curb ramps or other sloped areas at intersections to streets, roads or highways (28 CFR Part 35, Section 35.151).

   Requirements:

   - Width: Clear width of curb ramp runs and turning spaces must be 4 feet minimum.
   - Slope: Running slope of 5 - 8.3 percent, limited to 15 feet in length
   - Cross Slope: Maximum cross slope of 2 percent.
   - Landing: A turning space 4 feet by 4 feet with a maximum running slope of 2 percent

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must be provided at the top of perpendicular curb ramps and at the bottom of parallel ramps.

- Grade breaks: Grade breaks at the top and bottom of curb ramp runs must be perpendicular to the direction of the ramp run. Surface slopes that meet at grade breaks must be flush.

Detectable warning surfaces

1. Curb ramps at intersections of streets, roads, and highways require detectable warnings.
2. Commercial driveways with traffic control devices require detectable warnings.

Requirements:

- Profile: Detectable warnings consist of truncated domes aligned in a square or radial grid pattern (KYTC Standard Drawing No. RGX-040-02).
- Visual Contrast: Must contrast visually with adjacent gutter, street, or pedestrian access route surface, either light-on-dark or dark-on-light.
- Dimensions: Must extend 2 feet minimum in the direction of pedestrian travel and the full width of the ramp.

APPROVED BY: Dirk L Gowin DIRK L. GOWIN, ADA COORDINATOR LOUISVILLE METRO PUBLIC WORKS AND ASSETS	DATE: 07 / 05 / 12

For further clarification of these requirements:	Dirk Gowin Public Right-of-Way ADA Coordinator (502)574-5925
For inspection of construction forms prior to installation of ramps and walks:	John Akridge (502)301-0250

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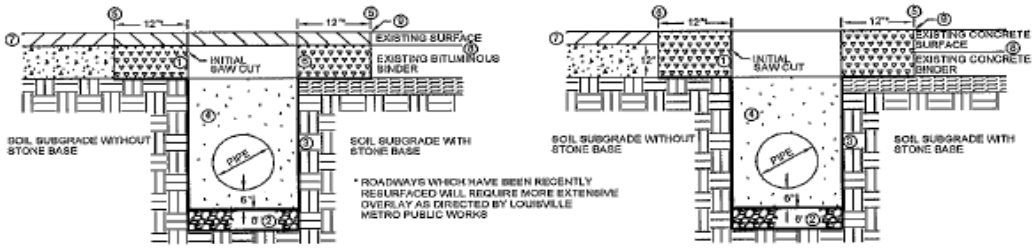
SECTION IV: WORK STANDARDS AND INSPECTION

The inspection process is the primary instrument by which Louisville Metro seeks to protect the public investment in its infrastructure. Through a uniform and responsive inspection process, we can be assured that work has been completed in accordance with current standards for reconstruction and site restoration. The objective of Louisville Metro's inspection effort is to insure that Metro infrastructure attains its maximum useful life and utility restoration callbacks are minimized.

200 STREET PAVING AND APPURTENANCES — STANDARD PLAN NO **201**

REV DATE: APRIL 2012



PAVEMENT RESTORATION

(1) TRENCHES SHALL BE EXCAVATED TO A WIDTH NOT TO EXCEED 12 INCHES ON EACH SIDE OF THE PIPE FOR PIPE DIAMETERS OF 24 INCHES OR LESS AND NOT TO EXCEED 15 INCHES ON EACH SIDE OF THE PIPE FOR PIPE DIAMETERS GREATER THAN 24 INCHES. TRENCH WALLS SHALL BE AS NEARLY VERTICAL AS POSSIBLE.

(2) WHERE ORGANIC SOILS OR ELASTIC SILT/CLAYS BELOW THE WATER TABLE ARE ENCOUNTERED IN THE BOTTOM OF THE TRENCH, EXCAVATE A MINIMUM DEPTH OF 12 INCHES BELOW THE PIPE. INSTALL 6 INCH COURSE OF KYTC NO. 3 STONE AND 6 INCH COURSE OF SELECT GRANULAR BACKFILL.

(3) TRENCH FILTER FABRIC SHALL BE INSTALLED BETWEEN THE BEDDING AND BACKFILL MATERIAL WHENEVER GRANULAR BACKFILL IS USED AS BEDDING.

(4) SELECT GRANULAR BACKFILL PER LWC SPECIFICATION 7.4 AND MSD SPECIFICATION 3.3.4, SHALL BE PLACED IN MAXIMUM 6 INCH LOOSE LIFTS AND MECHANICALLY COMPACTED. THE SAND BACKFILL SHALL BE FLUSHED AND JETTED. IN ROADWAY EMBANKMENT SITUATIONS WHEN SAND BACKFILL IS UTILIZED, COMPACTED EARTH SHALL BE PLACED IN THIS ZONE WITHIN 5 FEET (HORIZONTAL DISTANCE) OF THE EMBANKMENT SLOPE.

(5) THE FINAL SAW CUT SHALL BE MADE A DISTANCE OF 12 INCHES BEYOND THE TRENCH, AFTER THE TRENCH EXCAVATION AND BACKFILL ARE COMPLETE, AND IMMEDIATELY PRIOR TO PLACING CONCRETE.

(6) CONCRETE CAP TO BE 8 INCHES. IF THE EXISTING PAVEMENT SECTION IS LESS THAN 10 INCHES THICK, EXCAVATION OF UNDERLYING STONE BASE OR SOIL SUBGRADE WILL BE REQUIRED TO PROVIDE THE SPECIFIED THICKNESS. CONCRETE CAP MUST BE PLATED UNTIL CONCRETE REACHES STRENGTH REQUIREMENTS (3500 PSI).

CONCRETE RESTORATION

(7) MILL AND RESURFACE EXISTING ROADWAY TO A MINIMUM DEPTH OF 2 INCHES TO A FULL LANE WIDTH OR AS DIRECTED BY THE PUBLIC WORKS DEPARTMENT PRIOR TO PLACING SURFACE COAT.

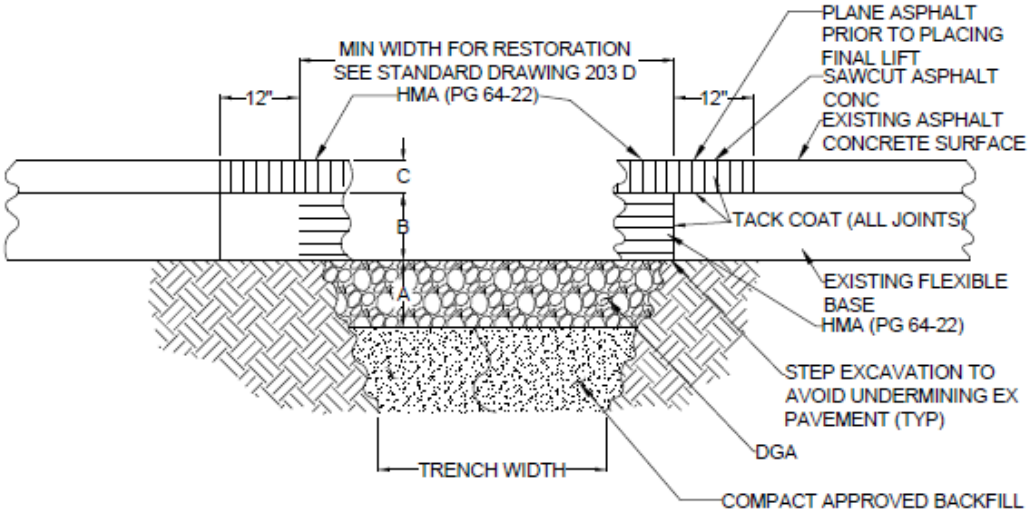
(8) TACK MATERIAL CONSISTING OF EMULSIFIED ASPHALT SS-1H SHALL BE PLACED ON THE SURFACE OF THE CONCRETE CAP AND MILLED ROADWAY SURFACE AT THE RATE OF 0.1 GALLONS PER SQUARE YARD, AND ALLOWED TO "BREAK" PRIOR TO PLACEMENT OF THE BITUMINOUS CONCRETE SURFACE.

(9) PAVEMENT JOINTS SHALL BE SEALED WITH AN APPROVED JOINT SEALANT AFTER PLACEMENT OF THE BITUMINOUS CONCRETE SURFACE.

LOUISVILLE METRO PUBLIC WORKS	NOT TO SCALE	TRENCH REPAIR DETAIL

2011 Edition LOUISVILLE METRO PUBLIC WORKS STANDARD DRAWINGS

REV DATE: MAY 2012



FLEXIBLE PAVEMENT SECTION

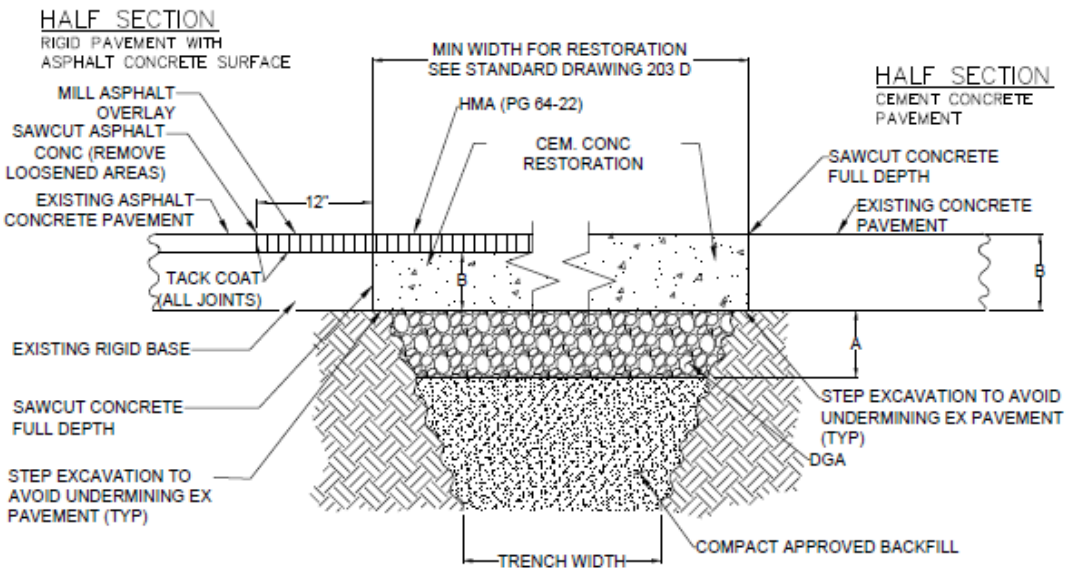
	(A) AGGREGATE BASE	(B) BINDER COURSE	(C) SURFACE COURSE
LOCAL STREET	8"	2.5"	1.5"
COLLECTOR STREET	10"	3.5"	1.5"
ARTERIAL STREET	12"	4.5"	1.5"
INDUSTRIAL/ COMMERCIAL	14"	5.5"	1.5"

IF EXISTING DEPTH OF AGGREGATE BASE AND/OR ASPHALT PAVEMENT COURSE EXCEED THESE DEPTHS, MATCH EXISTING DEPTH OF BASE AGGREGATE BASE AND/OR BINDER COURSE. WIDTH OF RESTORATION SHALL MEET REQUIREMENTS OF STANDARD PLAN 203C.

LOUISVILLE METRO PUBLIC WORKS	NOT TO SCALE	FLEXIBLE PAVEMENT PATCHING

2012 Edition LOUISVILLE METRO PUBLIC WORKS STANDARD DRAWINGS

REV DATE: MAY 2012



TYPICAL PATCH FOR RIGID PAVEMENT

CONCRETE PAVEMENT SECTION

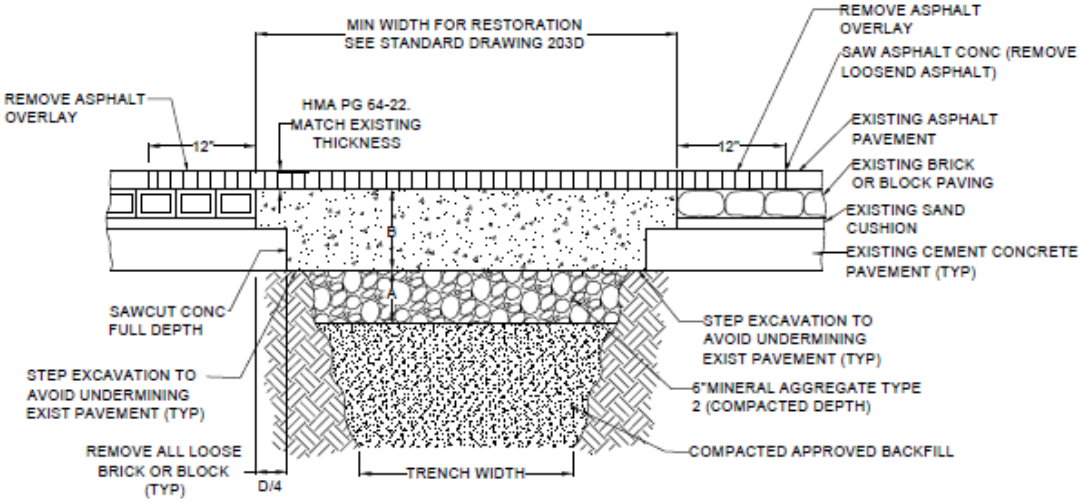
	(A) AGGREGATE BASE	(B) CONCRETE
LOCAL STREET	4"	5"
COLLECTOR STREET	4"	6"
ARTERIAL STREET	4"	8"
INDUSTRIAL/ COMMERCIAL	4"	9"

IF EXISTING DEPTH OF AGGREGATE BASE AND/OR CONCRETE PAVEMENTS EXCEED THESE DEPTHS, MATCH EXISTING DEPTH OF AGGREGATE BASE AND/OR CONCRETE PAVEMENT. CLASS "A" CONCRETE (3,500 PSI) REINFORCED WITH POLYPROPYLENE FIBERS (2 LBS. PER CY) WITH A SLUMP BETWEEN 2 AND 4 INCHES SHALL BE USED.

LOUISVILLE METRO PUBLIC WORKS	NOT TO SCALE	RIGID PAVEMENT PATCHING

2012 Edition LOUISVILLE METRO PUBLIC WORKS STANDARD DRAWINGS

REV DATE: MAY 2012



ASPHALT OVER RIGID BASE OF BRICK OR STONE BLOCK PAVEMENT HALF SECTION

CONCRETE PAVEMENT SECTION

	(A) AGGREGATE BASE	(B) CONCRETE
LOCAL STREET	4"	5"
COLLECTOR STREET	4"	6"
ARTERIAL STREET	4"	8"
INDUSTRIAL/ COMMERCIAL	4"	9"

IF EXISTING DEPTH OF AGGREGATE BASE AND/OR CONCRETE PAVEMENTS EXCEED THESE DEPTHS, MATCH EXISTING DEPTH OF AGGREGATE BASE AND/OR CONCRETE PAVEMENT.

LOUISVILLE METRO PUBLIC WORKS	NOT TO SCALE	ASPHALT OVER RIGID PAVEMENT PATCHING

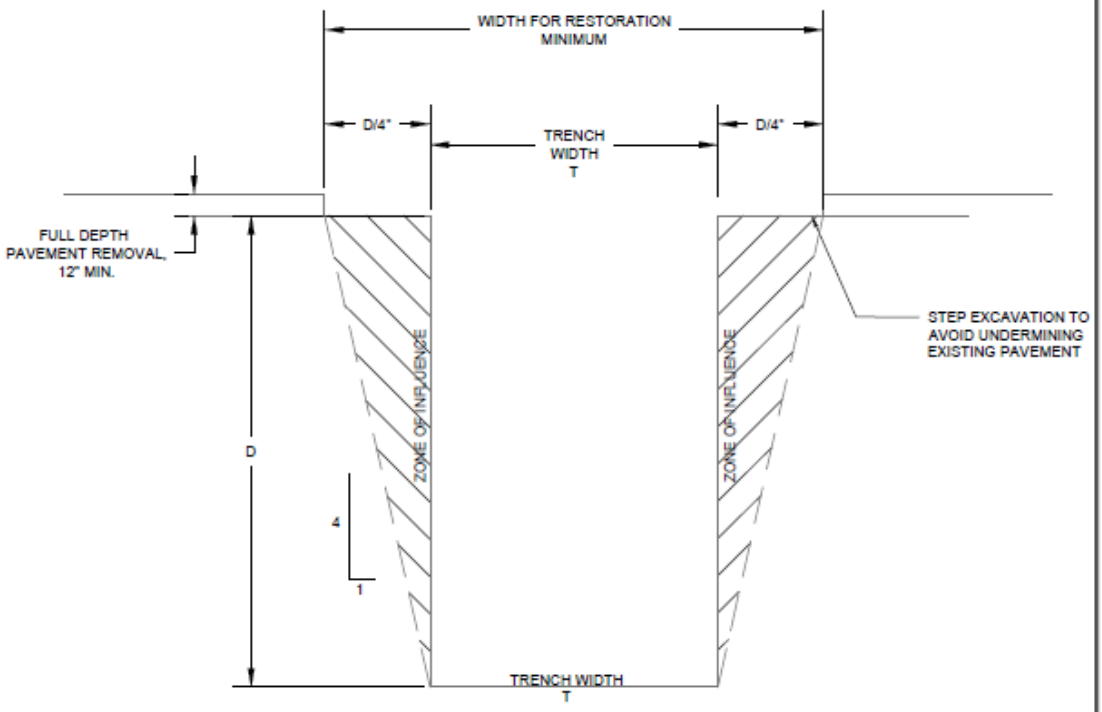
2011 Edition LOUISVILLE METRO PUBLIC WORKS STANDARD DRAWINGS

REV DATE: MAY 2012

NOTE:

FOR 8' DEEP OR LESS: THE ZONE OF INFLUENCE IS DEPENDENT ON SOIL TYPE AND CONDITION METHOD. THE AMOUNT OF PAVEMENT REMOVAL THAT MAY BE REQUIRED TO ALLOW FOR ADEQUATE RE-COMPACTION OF THE SOIL ADJOINING THE EXCAVATION IS BASED ON THE ESTIMATE OF SOIL MOVEMENT RESULTING FROM THE INSTALLATION OF THE UTILITY.

MINIMUM PAVEMENT REMOVAL= D/2 + T
(PAVEMENT & STONE BASE, 12" MIN.)



* ZONE OF INFLUENCE IS DEPENDENT ON THE TYPE AND CONDITION OF THE ADJACENT SOILS.

LOUISVILLE METRO PUBLIC WORKS	NOT TO SCALE	PAVEMENT OPENING ZONE OF INFLUENCE

2011 Edition LOUISVILLE METRO PUBLIC WORKS STANDARD DRAWINGS

A. Quality Assurance/Quality Control/Inspection

Louisville Metro's Quality Assurance effort complements the Utility Companies' Quality Control efforts. Quality Assurance is provided through Louisville Metro Inspectors, who are responsible for the inspection of all right-of-way work. The Inspectors advise of construction standards, on the extent of restoration, and coordinate activities between Louisville Metro and other utility companies.

Quality Control is the responsibility of the Utility Companies. The Utility Companies are expected to be familiar with the applicable standards referenced herein and to employ qualified subcontractors who utilize these standards in the restoration of the right-of-way. Utility Companies and their subcontractors who fail to comply with these standards risk exclusion from performing future right-of-way work.

All Utility Companies shall notify the Public Works Inspector forty-eight (48) hours before beginning the work.

It is the Utility Companies responsibility to notify the Louisville Metro Inspector of work start, backfill start and job completion dates and to sign off on same and return the permit to the Department of Public Works. Failure to do so could result in material being removed to ensure that proper installation methods have been utilized.

The Inspectors' concern shall be focused on work zone safety and restoration of the right-of-way and may address traffic control, backfilling, compaction, hazard protection, concrete bridging and repaving. Some inspections will be ongoing throughout the course of a job whereas other inspections will be made only after completion of the work. Considerations which would dictate the need for ongoing inspection are: location of work, duration of work and size of the area being disturbed.

B. Backfill of Trench Excavations

Backfilling of trenches and tunnel shaft excavations shall be accomplished as soon as possible after the pipe is placed or the tunnel is completed. The Utility Company shall have the option of using flushed and jetted or compacted backfill materials. The Utility Company shall notify Louisville Metro 48 hours in advance of all flushing and jetting and/or mechanical compaction operations.

Compaction around structures will be performed by mechanical compactor when flushing and jetting of sand and earth material is not possible or practical, or when required by the plans.

Within Limits of Existing or Proposed Paved Surfaces. At the Utility Company's option, with prior written approval by Louisville Metro (based on the availability of good sandy soil), backfill within the limits of existing or proposed paved surfaces shall consist of: Type1-A Backfill – sand, flushed and jetted, Type 1-B Backfill – sand, combination flushed and jetted and mechanically compacted, or Type III Backfill - selected excavated material and/or approved borrow material – mechanically compacted. In special cases and with the written approval of Louisville Metro, the Utility Company may utilize Type 1-A sand backfill – flushed and jetted in the lower portion of the excavation and selected excavated materials – mechanically compacted in the upper portion of the excavation.

(A) <u>Sand – Flushed and Jetted (TYPE 1-A).</u> After the trench has been completely backfilled with sand, the backfill shall be densified by thoroughly flushing and jetting with water, beginning at the downstream end of the trench and proceeding upstream. Water to be used for flushing and jetting shall be supplied through hoses and pipes having a minimum diameter of 2 inches. The jet pipe shall have a minimum diameter of 1-1/2 inches. Jet pipes used to penetrate the backfill material shall be equipped with a shut off valve and be of sufficient length to completely penetrate the sand backfill. The jet pipe shall be inserted into the sand backfill at a maximum spacing along the trench of 6 feet and the spacing shall be staggered along the trench area. The jet pipe shall penetrate the sand backfill to within 12 inches of the crushed stone encasement. When the depth of the trench exceeds the length of the pipe the flushing and

jetting shall be completed in lifts. The pipe shall remain in place until water is observed rising above the backfill throughout the full width of the trench and over a length of the trench equal to one-half the distance between adjacent jet installations. If this condition is not observed within a reasonable period, the Utility Company shall increase the water flow or provide additional jet pipes. If the Utility Company fails to flush and jet the sand backfill in accordance with the Specifications, the sand backfill shall be excavated and replaced with properly flushed and jetted sand backfill or material compacted in accordance with Section IV.B-C, at no additional cost to Louisville Metro. The Utility Company shall provide all piping, fittings, etc., necessary to deliver the water along the site of the work and shall arrange with the Louisville Water Co., if applicable, for making the necessary taps and metering. All expenses incurred for installing the pipe and hose, together with the cost of the water, shall be borne by the Utility Company.

Following flushing and jetting and prior to pavement construction, the surface of the sand sub grade shall be thoroughly compacted following the procedures described in Section 10.1 (B).

(B) Sand Combination Flushed and Jetted, and Mechanically Compacted (Type 1-B). The trench shall be completely backfilled with sand, and the backfill shall be densified by thoroughly flushing and jetting with water. Flushing and jetting procedures shall be in accordance with Section **IV. B-A** above. Next, the sand backfill shall be removed to a depth of 3 feet below the pavement surface and stockpiled for later mechanical compaction. The exposed surface shall then be thoroughly compacted. The remainder of the trench shall be backfilled in two lifts of sand (approximately 12-inches thick) up to the pavement sub grade level with each lift being thoroughly compacted. For compaction, the Utility Company shall supply a vibratory plate compactor or smooth drum vibratory roller capable of compacting sands to a minimum effective depth of 16-inches. The Utility Company shall submit the manufacturer's equipment specifications for proof of this required effective compaction depth. The required number of passes of the roller or place shall be established at the beginning of compaction operations for the Project by taking nuclear density tests to monitor the density increase with increased passes of the roller or plate. The required number of passes shall be set when no further increase in sand backfill density is measured.

(C) Earth Materials - Compacted (Type III-A). Selected excavated materials such as good sandy materials approved by Louisville Metro, or approved borrow materials containing no rock or rock fragments larger than No. 2 size stone shall be carefully deposited in uniform, horizontal layers, not exceeding 6 inches in compacted depth, in a zone located 2 feet above the exterior top of the pipe. Prior to compaction, each layer shall be level and evenly distributed on both sides of the pipe so as to not disturb, displace or damage the pipe. Each layer shall be thoroughly compacted to a minimum of 95 percent of the standard proctor density, at a moisture content between plus 2 percent and minus 4 percent of the optimum moisture content, as determined by ASTM D 698, utilizing mechanical compaction. Each layer shall be properly compacted before the next succeeding layer is placed. Any lift of fill which pumps under the weight of the compaction equipment shall be rejected, regardless of the field density test results.

The remainder of the trench from the horizontal plane located 2 feet above the pipe up to the ground surface or top of the existing sub grade shall be backfilled with selected excavated materials such as good sandy materials approved by Louisville Metro, or approved borrow materials. The backfill shall be placed in uniform horizontal layers not exceeding 12 inches in compacted depth. Each layer shall be thoroughly compacted to a minimum of 90 percent of the standard Proctor density and a moisture content between plus 2 percent and minus 4 percent of the optimum moisture content, as determined by ASTM D 698, utilizing mechanical compaction methods. Each layer shall be properly compacted before the next succeeding layer is placed. Any lift of fill which pumps under the weight of the compaction equipment shall be rejected, regardless of the field density test results. Follow guidelines set forth in specifications at no additional cost to Louisville Metro.

(D) Combination Sand (Type 1-A) and Earth Backfill (Type III-A). In trench situations where the lower trench dimensions limit the use of mechanical compaction equipment, the existing site conditions limit the effectiveness of the mechanical compaction methods, or where additional backfill material is required to replace unsuitable excavated materials, the Utility Company may utilize flushed and jetted sand backfill in the lower portion of the trench and mechanically compacted earth material in the upper portion of the

trench with prior approval by Louisville Metro. The sand backfill operations shall extend from the top of the cradle or encasement up to a point where mechanical compaction can be properly accomplished in accordance with Section IV.B-C. The mechanical compaction operations shall extend from the top of the sand backfill up to the ground surface or top of the existing sub grade.

(E) Flowable Fill (Controlled Low Strength Cementitious Material)
The mix design must be approved prior to the placement of the material by Public Works. The 28-day compressive strength of said fill shall not exceed 150 psi, and the minimum strength shall be 50 psi. The mix shall include Fly ash, sand, cement with water not included as part of the volume mix. Fly ash shall have a ph value of no less than 7.0 and no greater than 12.5.

(F) Dense Graded Aggregate (DGA) or Lime Dust
DGA shall meet the requirements of section 805 Coarse Aggregates of the current edition of the Kentucky Department of Highways "Standard Specifications for Road and Bridge Construction". The backfill shall be placed in uniform horizontal layers not exceeding 6 inches in compacted depth. A vibrator compactor should be used to ensure adequate consolidation of material.

Outlined Limits of Existing or Proposed Paved Surfaces. At the Utility Company's option, **except as otherwise specified**, trench backfill outside the limits of existing or proposed paved surfaces shall consist of earth materials (selected excavated or approved borrow materials) which are flushed and jetted or compacted. The upper one foot of the earth backfill shall be essentially free from rock, gravel or other hard, durable fragments.

(A) Earth Materials – Flushed and Jetted (Type II Backfill). The lower portion of the trench backfill extending from the top of the cradle or encasement to a horizontal plane located 2 feet above the exterior top of the pipe shall contain no rock or rock fragments larger than No. 57 size stone. The remainder of the trench shall be backfilled with selected excavated materials or approved borrow materials. After the trench has been completely backfilled wit selected excavated material or approved borrow material, the backfill shall be densified by thoroughly flushing and jetting with water, beginning at the downstream end of the trench and proceeding upstream. The backfill shall be thoroughly and uniformly sluiced and flooded by introducing water at the top of the trench and by inserting the jet pipe into the backfill at intervals as specified in section IV.B-A along the trench. This process shall be continued until the backfill is completely saturated and no further settlement is observed. Hoses, jet pipes and the maximum depth of insertion shall be as specified in Section IV.B-A. After the backfill in the trench has substantially dried and completed any additional settlement, any settlement below the finish grade shall be refilled with additional earth, and compacted in accordance with (B), below.

(B)Mechanical compaction of Earth Materials (Type III-B). Selected excavated materials or approved borrow materials, containing no rock or rock fragments larger than No. 2 size stone, shall be carefully deposited in uniform, horizontal layers, not exceeding 6 inches in compacted depth, in a zone located from the top of the cradle or encasement up to a horizontal plane located 2 feet above the exterior top of the pipe. Prior to compaction, each layer shall be leveled and evenly distributed on both sides of the pipe so as not to disturb, displace or damage the pipe. Each layer shall be thoroughly compacted to a minimum of 85 percent of the Standard Proctor density before the next succeeding layer is placed. Any lift of fill which pumps under the weight of the compaction equipment shall be rejected, regardless of the field density test results. Follow guidelines set forth in Louisville Metro specification. The remainder of the trench from the horizontal plane located 2 feet above the top of the pipe up to the ground surface shall be backfilled with selected excavated materials or approved borrow material. The material shall be placed in uniform horizontal layers not exceeding 12 inches in compacted depth. Each layer shall be compacted with a dozer or other heavy, earth-moving equipment traveling back and forth over the material until no further settlement is observed.

Laboratory Tests. Selected excavated materials or approved borrow materials shall be sampled and tested for standard Proctor density, optimum moisture content and classification by the Agency approved by Louisville Metro. These tests will be required whenever such materials are proposed for use in

compacted backfill or embankment and a specified degree of compaction is required. A minimum of one week should be allowed for the Agency to obtain samples and complete the tests.

Field Density Tests. Field density tests shall be performed on compacted backfill or embankment materials. Scheduling of field density tests with an approved agency shall be performed 24 hours in advance of the backfill operations. Scheduling of field density tests on projects involving Louisville Metro funds shall be performed by Louisville Metro 24 hours in advance of the backfill operations. Acceptable methods of performing field density tests include the following:

(A) *Nuclear Density Test* – ASTM D 2922, Standard Specification for Test Methods for Density of soul and Soil-Aggregate In-Place by Nuclear Methods (Shallow Depth).

(B) *Sand Cone Test* – ASTM D 1556, Standard Specification for Test Method for Density of Soil In-Place by the Sand Cone Method.

(C) *Rubber Balloon Test*- ASTM D 2167, Standard Specification for test Method for Density and Unit Weight of soil In-Place by the Rubber Balloon Method.

(D) *Drive-Cylinder Method* – ASTM D 2937, Standard Specification for Test Method for Density of Soil In-Place by the Universal Cylinder Method.

The frequency that field density tests shall be performed will be in accordance to the following minimum schedule. Additional testing shall be performed when directed by the Inspector or by Louisville Metro.

(A) A minimum of 1 test per 100 cubic yards of material placed and compacted in trenches or 500 cubic yards of material in embankments.

(B) A minimum of 1 test per lift per 200 feet of material placed and compacted in trenches.

(C) A minimum of 1 test per lift of material placed and compacted in embankments .

(D) A minimum of 1 test per shift (day) of compaction operations.

(E) A minimum of 1 test whenever there is a suspicion of a change in material, moisture content, or degree of compaction control.

When instructed by Louisville Metro, the Utility Company shall excavate previously untested backfill or embankment material to a particular grade for testing. Backfilled areas which do not pass this test shall be excavated and recompacted until they meet the compaction specifications. Areas excavated for testing shall be recompacted in accordance with the Project specifications. The cost of this Work shall be at the Utility Company's expense.

Payment for Inspection and Testing. When the Contract requires mechanical compaction on Louisville Metro Projects, earthwork inspection and testing shall be performed as specified at Louisville Metro's expense. When the Utility Company has the option of backfilling by flushing and jetting or by mechanical compaction, and he selects to backfill using mechanical compaction, earthwork inspection and testing shall be performed at the Utility Company's expense for any Project. The mechanical compaction option shall be approved by Louisville Metro prior to placement of backfill and the Testing Agent must be designated in writing.

SECTION V: Reconstruction/Restoration Standards

All restoration shall result in a work site condition equal to or better than that which existed prior to construction. The following provisions will serve as guidelines for work in Louisville Metro.

Pavement: Utility Company shall refer to asphalt pavement restoration detail for instructions not shown under this heading. Concrete roads being disturbed will result in requiring full lane replacement from joint to joint. Any trenching will result in full lane replacement for the entire length of the trench. See KYTC standards and specifications for complete restoration details.

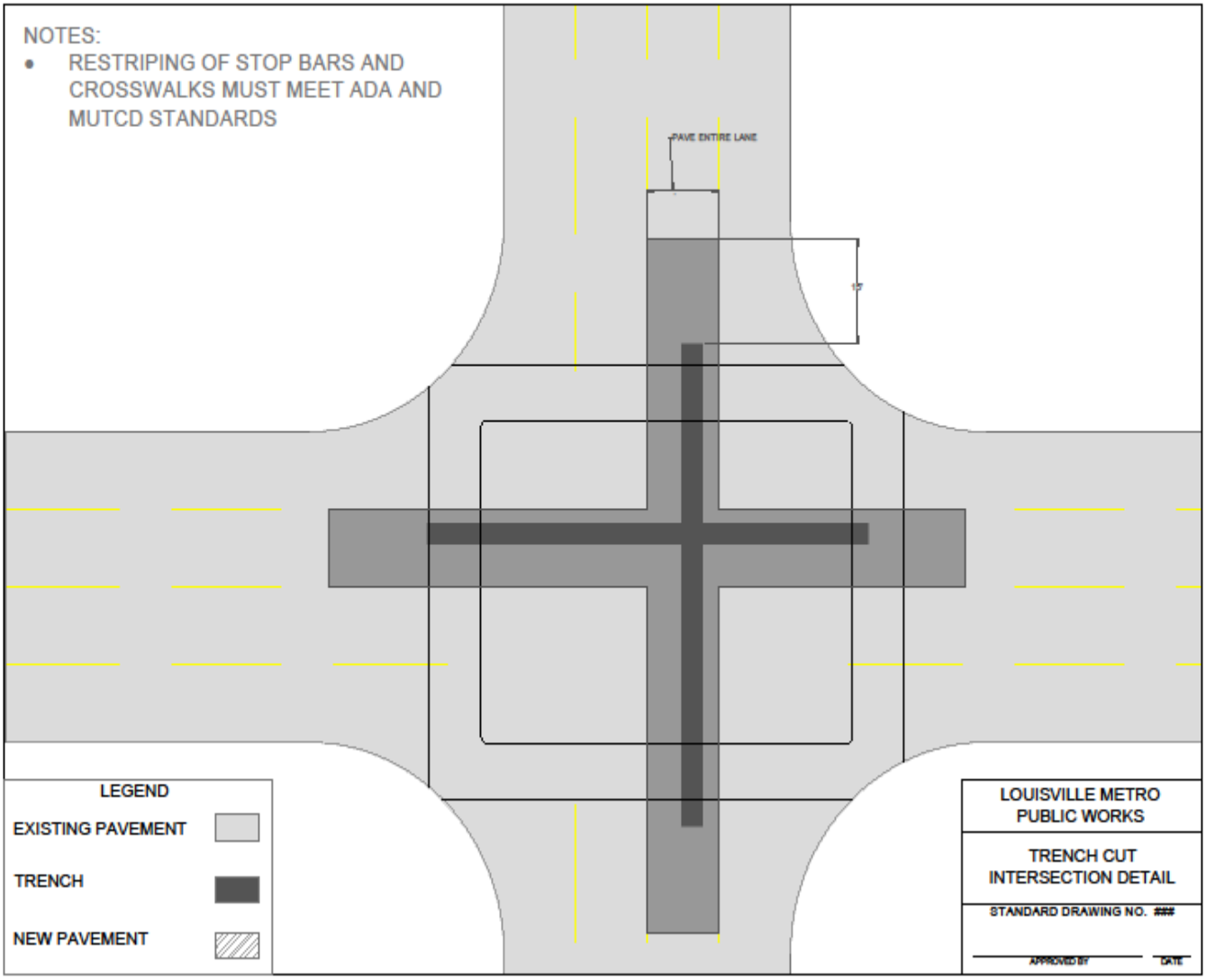
Pavement cuts shall be filled with compacted select material. Concrete base and asphalt surface shall be placed in accordance with Standard Drawings (attached).

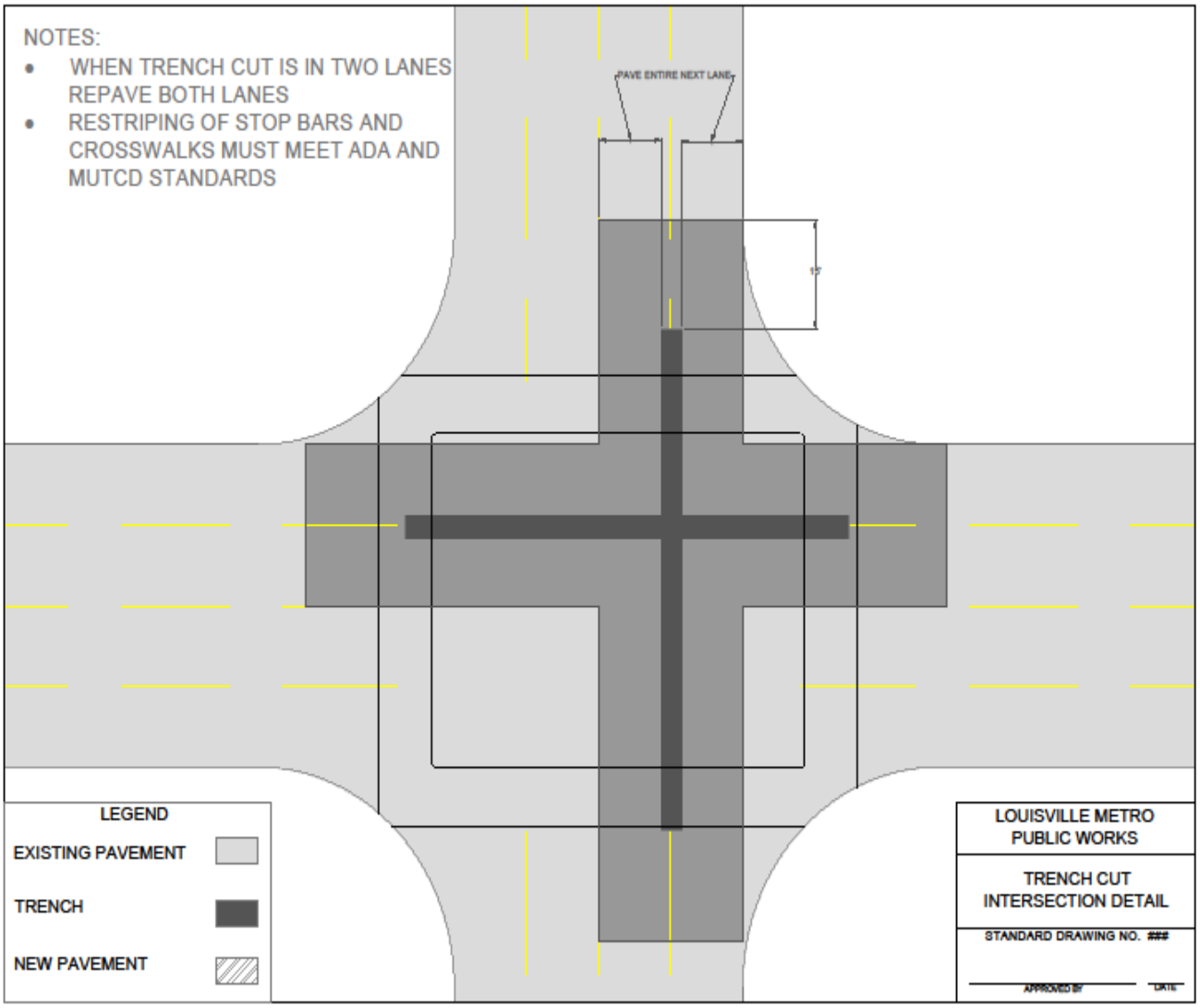
Patches will be approved based on their general appearance as well as their "ride ability". Ride ability is defined as a leveling tolerance to within one-quarter inch (1/4") at any point across the patch as it relates to the surrounding asphalt street surface. This includes the adjustment of manholes, vaults, meter lids, and/or coordination with other utility companies to ensure all manholes, vaults, and meter lids are adjusted to grade. All Striping, stop bars and cross walks must be reinstalled to meet current MUTCD standards.

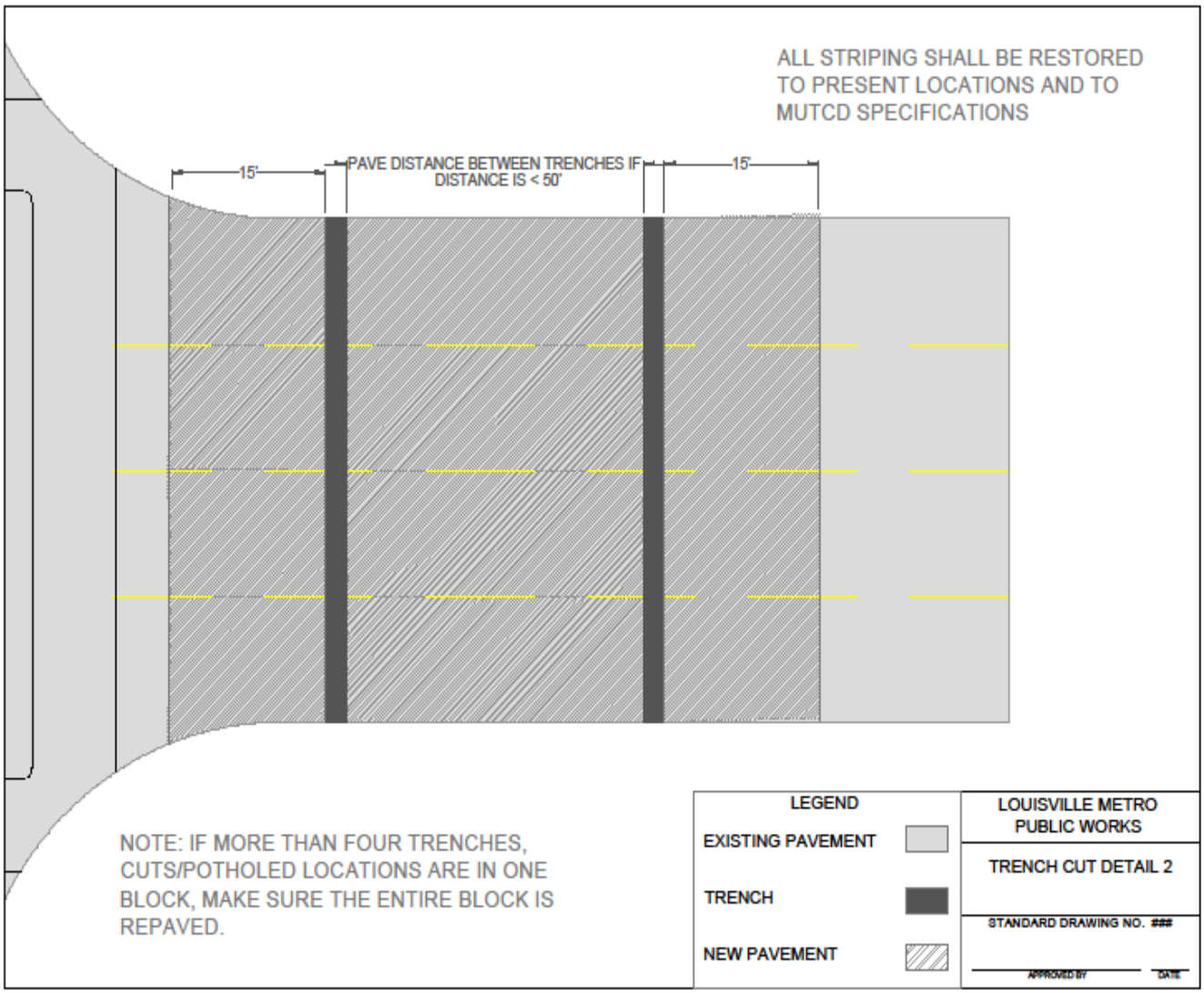
In cases where utility work causes the disturbance of more than 30% in width of a traffic lane, street or intersection, Louisville Metro may cause the Utility Company to overlay an area larger than their work area to insure a smooth, ride able surface. In all cases site cleanup is necessary and required.

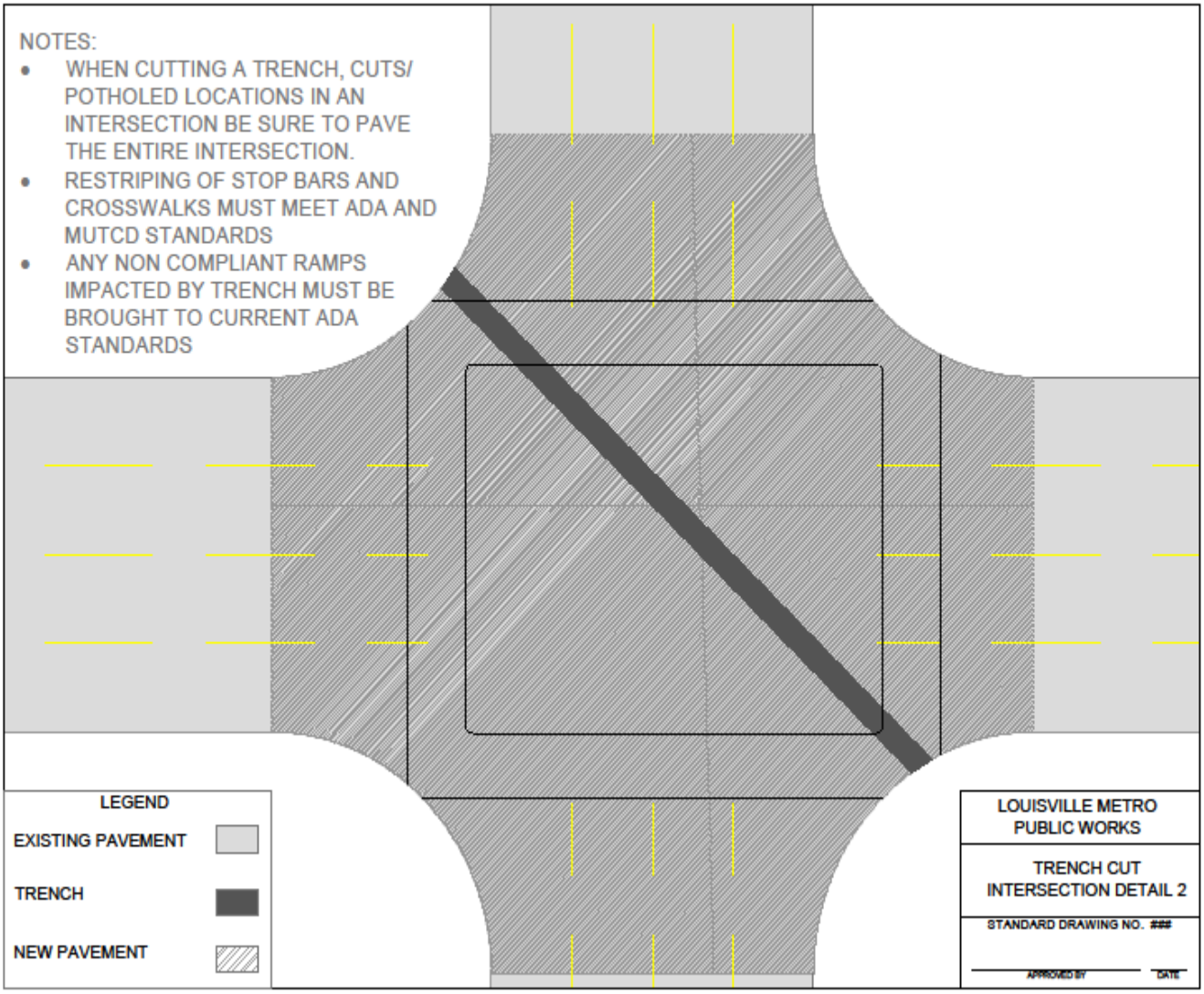
Drop offs from the edge of pavement to the shoulder shall not exceed 2". The contractor/utility company will be responsible for ensuring that proper signage is in place promptly and that a proper shoulder is re-established. See KYTC Standard Specification.

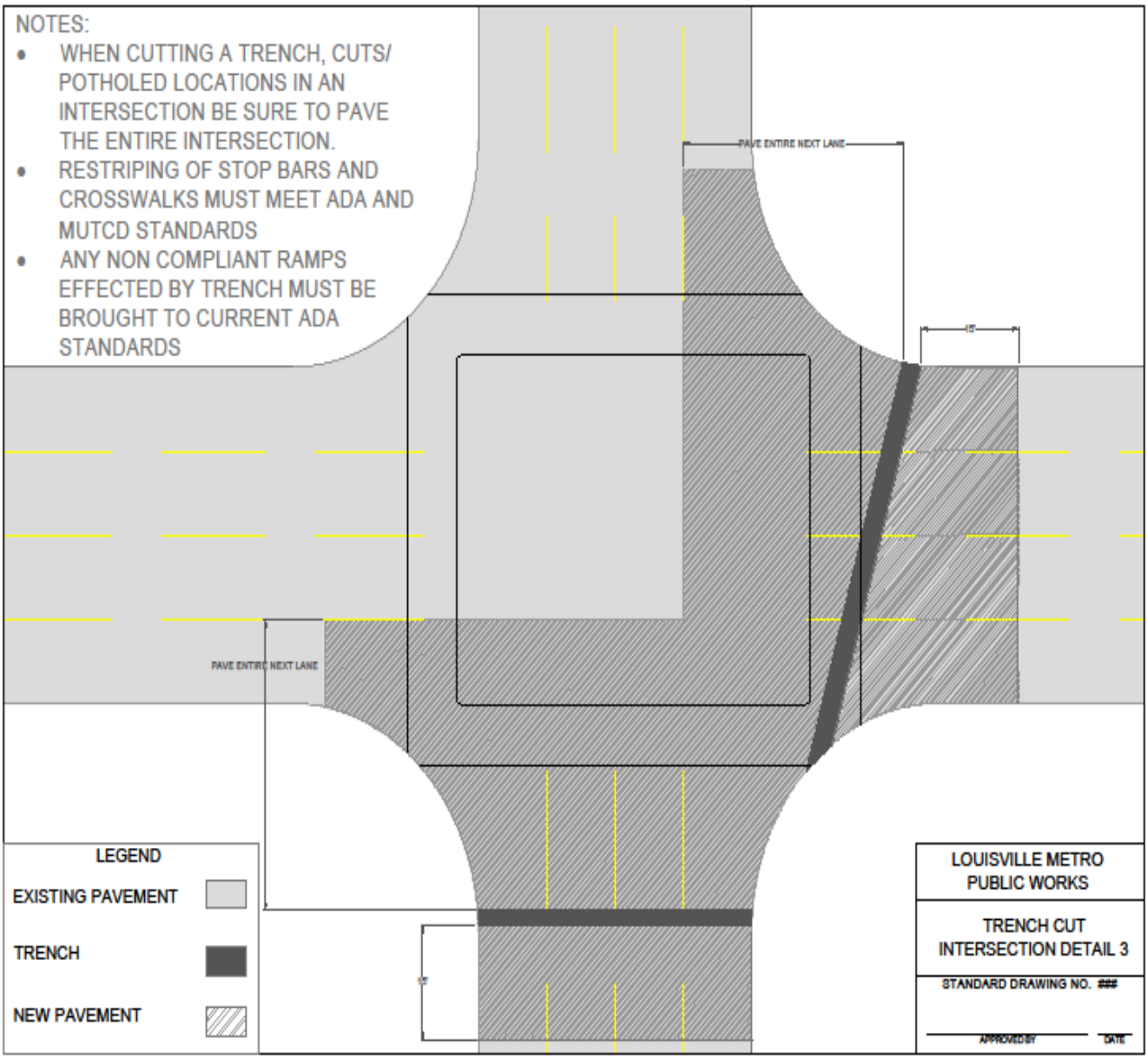
<u>All pavement restorations will negate the degradation charges if installed as depicted in this policy</u>. Also, sidewalk ramps are to be replaced if directly impacted by the utility trench. At which time they will be brought into ADA compliance. Any roadway listed on Metro's 5 year projected paving plan will exempt of full paving restoration, however the degradation charges will be asserted and the trench will have to be repair in accordance with the standard trench repair detail.


NOTES:
• RESTRIPING OF STOP BARS AND CROSSWALKS MUST MEET ADA AND MUTCD STANDARDS
PAVE ENTIRE LANE
15'
LEGEND
EXISTING PAVEMENT
TRENCH
NEW PAVEMENT
LOUISVILLE METRO PUBLIC WORKS
TRENCH CUT INTERSECTION DETAIL
STANDARD DRAWING NO. ###
APPROVED BY
DATE


NOTES:
• WHEN TRENCH CUT IS IN TWO LANES REPAVE BOTH LANES
• RESTRIPING OF STOP BARS AND CROSSWALKS MUST MEET ADA AND MUTCD STANDARDS
PAVE ENTIRE NEXT LANE
15'
LEGEND
EXISTING PAVEMENT
TRENCH
NEW PAVEMENT
LOUISVILLE METRO PUBLIC WORKS
TRENCH CUT INTERSECTION DETAIL
STANDARD DRAWING NO. ###
APPROVED BY
DATE


ALL STRIPING SHALL BE RESTORED TO PRESENT LOCATIONS AND TO MUTCD SPECIFICATIONS
15'
PAVE DISTANCE BETWEEN TRENCHES IF DISTANCE IS < 50'
15'
NOTE: IF MORE THAN FOUR TRENCHES, CUTS/POTHOLED LOCATIONS ARE IN ONE BLOCK, MAKE SURE THE ENTIRE BLOCK IS REPAVED.
LEGEND
EXISTING PAVEMENT
TRENCH
NEW PAVEMENT
LOUISVILLE METRO PUBLIC WORKS
TRENCH CUT DETAIL 2
STANDARD DRAWING NO. ###
APPROVED BY
DATE


NOTES:
• WHEN CUTTING A TRENCH, CUTS/ POTHOLED LOCATIONS IN AN INTERSECTION BE SURE TO PAVE THE ENTIRE INTERSECTION.
• RESTRIPING OF STOP BARS AND CROSSWALKS MUST MEET ADA AND MUTCD STANDARDS
• ANY NON COMPLIANT RAMPS IMPACTED BY TRENCH MUST BE BROUGHT TO CURRENT ADA STANDARDS
LEGEND
EXISTING PAVEMENT
TRENCH
NEW PAVEMENT
LOUISVILLE METRO PUBLIC WORKS
TRENCH CUT INTERSECTION DETAIL 2
STANDARD DRAWING NO. ###
APPROVED BY
DATE


NOTES:
• WHEN CUTTING A TRENCH, CUTS/ POTHOLED LOCATIONS IN AN INTERSECTION BE SURE TO PAVE THE ENTIRE INTERSECTION.
• RESTRIPING OF STOP BARS AND CROSSWALKS MUST MEET ADA AND MUTCD STANDARDS
• ANY NON COMPLIANT RAMPS EFFECTED BY TRENCH MUST BE BROUGHT TO CURRENT ADA STANDARDS
PAVE ENTIRE NEXT LANE
PAVE ENTIRE NEXT LANE
LEGEND
EXISTING PAVEMENT
TRENCH
NEW PAVEMENT
LOUISVILLE METRO PUBLIC WORKS
TRENCH CUT INTERSECTION DETAIL 3
STANDARD DRAWING NO. ###
APPROVED BY
DATE

Covering Excavations: It is Louisville Metro's objective to provide optimal drivability on all streets throughout the year. Avoiding damage to snow removal equipment is a seasonal issue. While Louisville Metro recognizes and encourages placing plates over roadway excavation sites to enable traffic to pass over the site when work is not proceeding, it also desires that the plates be minimally disruptive and meet all safety standards.

Requirements for Collector and Arterial Streets:
November 15 to March 31: Recessed plates at all sites where the project lasts longer than two (2) working days. No flat plates allowed.

April 1 to November 14: Recessed plates, beveled plates pinned to the road surface or flat plates pinned to the road surface with asphalt border mounds.

Beveled plates should be phased in to replace flat plates over a five-year period beginning January 1, 1995.

Requirements for Residential Streets:
November 15 to March 31: Recessed or pinned beveled plates where project lasts five (5) days or longer. No flat plates allowed.

April 1 to November 14: Recessed, beveled or flat plates allowed where construction lasts five days or longer.

Signalized Intersections: In no case shall a Utility Company or their contractor cut into the pavement of a signalized intersection without having contacted the Public Works Electrical Maintenance Division forty-eight (48) hours prior. Electrical Maintenance will locate buried loop detection devices so as to protect them from damage. Anyone damaging a loop detector will be charged for the repair or reinstallation of the device.

Pavement Marking: Lane striping or other painted and affixed delineators which may be removed by Utility Companies, or others, shall be replaced by the Utility Company before restoration will be considered complete. The Utility Company will be responsible for matching the existing product (traffic paint, thermoplastic, raised pavement markers, lane tape) and applications and should consult with Louisville Metro Roads Division concerning the same. For large areas of disturbance a drawing depicting existing striping layout will be approved by Louisville Metro prior to construction beginning.

Sidewalks: The Utility Company shall refer to the Metro Standard Drawing and KYTC specifications on sidewalks for instructions not shown under this heading. (See page 44 for Historic Sidewalk Mix Design)

Sidewalk damaged by Utility Companies shall be removed and replaced in full sections. A section's size will be determined by the adjacent sections or Metro Inspector. Restorations shall meet ADA requirements.

All edges of concrete to be removed shall be saw cut and then formed from construction (or dummy) joint to joint. Any sections of sidewalk, which have been undermined as work progressed, will also be cut out and replaced with suitable backfill, compacted prior to replacement.

Neither the Utility Company nor its subcontractors shall park any vehicles and/or equipment on Metro sidewalks. Any allowed variation from this policy shall require a permit.

Should damage be observed after the work has been completed, the Utility Company shall be notified in writing to perform the repairs. Where sidewalk sections are removed at street corners, the sidewalk and adjacent curb shall be restored as a curb cut handicapped ramp. Construction of the ramp shall be in accordance with Louisville Metro standards and /ADA standards.

Aprons: Utility Company shall refer to Standard Drawing and KYTC specifications on aprons for instructions not shown under this heading.

Driveway aprons will not be "patched" following utility work. The Utility Company will notify the Inspector when a concrete apron is to be disturbed; they will agree on the extent and method of restoration. In any event, all edges of concrete restoration shall be saw cut and the property owner's access to his property shall not be unreasonably denied. In the event of a repair being necessary, an apron will be repaired with the same material from which it was made (i.e. exposed aggregate aprons will be repaired with exposed aggregate concrete).

Curb and Gutter: Utility Company shall refer to Standard Drawing and KYTC specifications on curb and gutter details for instructions not shown under this heading.

When curb and gutter is replaced, it will be restored to the next controlled joint. Existing curb elevations will be matched to ensure constant grade and positive drainage. Curb and gutter is to be installed over 4" crushed stone base, matching adjacent curb sections materials, i.e. concrete, exposed aggregate. Expansion material will be used at joints. Should the work include removal of a section which was finished with a dummy joint, the Utility Company will saw cut the joint prior to forming and pouring the new section.

Street/Road Crossings: When conditions are suitable, the preferred method of crossing a street in Louisville Metro will be by jacking or boring the new pipe, service line or system extension under the street crossed. In some cases, it may be determined that a street can be crossed with an open cut to the pavement. However, in these cases, specific restoration standards and time constraints may be imposed.

These standards may include the use of road plating a controlled density fill material to insure uniform compaction, as well as the ability to re-open the street to traffic at the earliest possible time. At no time should it be assumed that Louisville Metro will permit an open pavement cut; these may be permitted but only as considered on a case-by-case basis.

Utility Companies must supply detailed specification for boring/tunneling operations. In some cases the contractor may be required to hire a third party inspector to oversee the operation. **(*See pages 76-89 for further info.)***

Bridge Attachments: Any proposed attachments require the submittal of detailed plans and specifications with the permit application for approval on a case-by-case basis.

Utility Marking: The over-large paint marks left after utility marking is a source of concern to Louisville Metro. Marks made on curbs as well as beyond the pavement that will not be removed during construction have a tendency to remain in place for an indefinite time. Therefore, Louisville Metro's policy will be that marks shall be large enough and frequent enough so as to be seen by the Utility Company but not so as to become a visual nuisance. Marking of valve boxes and service locations shall be made neatly and be less than 4" square. As the use of concrete or brick pavers increases, the Utility Companies are specifically cautioned to be discreet with marks on these surfaces, whether on Metro-owned or private property.

Grass Areas and Trees: All areas covered with grass prior to construction shall be reseeded or sodded after construction. No permit shall be released until grass is showing at least 75% re-growth.

Special care shall be taken to ensure suitable topsoil is used as the final cover over an excavation either by stockpiling existing topsoil separately during excavation or by using sifted topsoil brought to the site.

Utility Companies will minimize any equipment parking on turf areas. In the event this is unavoidable and results in rutting of the turf and soil, restoration will not be considered complete until any ruts have been leveled out and grass seed is showing at least 75% re-growth.

Utility Companies will plant grass seed to match that existing at the site, fescue with fescue, Bermuda with Bermuda, etc., (no more than 10% annual rye is allowed in any case).

Trees will not be removed or heavily pruned in the course of programmed utility work without prior written approval from Louisville Metro. Maintenance trimming requires prior approval from the Metro Arborist.

In the event tree roots are damaged during excavation the Metro Arborist should be consulted. All damaged material must be cut back cleanly to undamaged material. All cuts shall be cleanly made with either chain saw, knife or lopping shears as size dictates. Applications of tree wound paint are not allowed.

Landscaped Areas - General: Louisville Metro has done extensive landscaping in areas of Louisville Metro, principally in medians of arterial streets. When work is planned in one of these planted areas, it is the Utility Company's responsibility to contact the Operations and Maintenance/Arborist two (2) days prior to the start of work for consultation and possible removal/replacement of plantings. The Department of Public Works will determine procedures to be followed for maintenance of the plants and their policies will govern.

In cases where above ground work needs to be screened or where existing plant materials must be replaced, the Utility Company will install landscaping materials in accordance with a landscape plan provided by Louisville Metro. The attached "Standard Landscaping Screening Materials for Use in the Public Right-of-Way" and "General Landscaping Notes" outlines in general acceptable materials and practices.

In cases where trees are affected, it is the Utility Company's responsibility to contact the Louisville Metro Arborist of the Department of Public Works at 574-5810 at least two (2) days prior to the start of work for consultation on care and possible removal/replacement of trees.

Special Construction: Areas such as Historic Preservation Districts, Historic Registries, Fourth Street, West Main Street, historical alleys consisting of exposed aggregate sidewalk, brick paving, granite curbs, cobblestones and "bomanite" type concrete are extremely difficult to match and may require replacement of entire slabs versus patching. Extreme care is required when working in these areas. All work under the pavements in these areas will require prior coordination with the Public Works Department.

STANDARD LANDSCAPING SCREENING MATERIALS FOR USE IN THE PUBLIC RIGHT-OF-WAY

	BOTANICAL	COMMON
EVERGREEN		
	Pinus strobus	White Pine
	Pinus taeda	Loblolly Pine
	Pinus virginiana	Virginia Pine
	Taxodium distichum	Bald Cypress
	Juniperis virginiana	Eastern Red Cedar
	Juniperis species - Thuga occidentalis	Eastern Arborvitae
SHRUBS		
	Aesculus parviflora	Bottlebrush Buckeye
	Aralia spinosa	Devil's Walkingstick
	Corylus americana	American Hazel Nut
	Ilex decidua	Possumhaw
	Ilex glabra	Inkberry
	Myrica pennsylvanica	Bayberry
	Cornus sericea	Red Twig Dogwood
	Forsythia x intermedia	Border Forsythia
	Rhus aromatica	Fragrant Sumac
	Rhus typhina	Staghorn Sumac
	Rhus copallina	Shining Sumac
	Viburnum dentatum	Arrowwood
	Sambucus pubins	Red Elder
	Sambucus canadensis	American Elder
	Spirea	
	Weigelia	
	Philadelphus coronarius	Mockorange
	Rhamnus cathartica	Buckthorn (Tall Hedge)
	Viburnum prunifolium	Blackhaw
	Viburnum trilobum	American Cranberrybush
PERENNIAL GRASS		
	Miscanthus sinensis	Chinese Silver Grass
	Erianthus ravennae	Pampas Grass
	M. Strictus	Porcupine Grass
	M. Zebrinus	Zebra Grass
BAMBOO		
	Phyllostackys spp.	Chinese Hardy Bamboo

GENERAL LANDSCAPING NOTES

1. The type of plant material to be used will be specified on the permit by Louisville Metro.

2. On Standard Landscaping Plans, utility equipment access doors will generally be oriented to face away from the street.

3. The clearance on non-door sides shall be three (3) feet, ten (10) feet clearance on the door access side.

4. Indigenous plants should be specified whenever possible.

5. Plant selection and placement are both site-specific components of the screening process

** NOTE: all fire hydrants shall be kept clear of weeds, rubbish, and all other obstructions, by the abutting property owner. Landscaping or decorations shall not be used to obstruct or hide the fire hydrant from clear view, nor prohibit access to the hydrant for use or maintenance. Hydrants shall not be permitted to supply irrigation systems. Damage caused to landscaping within a 15-foot radius of the hydrant due to periodic maintenance, use, or testing of a fire hydrant, shall be the responsibility of the owner of the landscaping. (Ord. 29-1980 Code: 94.82)

SECTION VI: UTILITY ELEMENTS

Standards For Various Utility Elements

The following information provides location and configuration standards for utilities for new subdivisions and site plans, existing streets, easements and on Metro Capital projects. The goal is to standardize and document Metro requirements regarding the placement of utility systems in accordance with applicable Metro standards, Codes and Comprehensive Plans.

Meters: Where practical, water meters are to be located within two feet of the back of the curb or at the property line where there is no curb and gutter. When possible, avoid placing within sidewalks or driveway aprons. Where new driveway aprons are to be built over existing water meters, Louisville Metro shall notify the Louisville Water Company and advise the homeowner of conflict consequences.

Poles: With all new street side pole installations consideration should be given to clear zones as designated by the Roadside Design Guide. Downguys shall be minimized and provided with yellow covers. Unused or abandoned guy anchors shall be removed (not cut flush) 6" below grade and sidewalk section replaced, or surface backfilled and restored to original contours.

In specific areas (e.g. Central Business District) and in any new development (i.e. capital projects and subdivisions) Louisville Metro reserves the right to require underground services. Any proposed overhead facilities shall be subject to review by the Director of Public Works or designee. The Director or designee shall also review any proposed changes to existing overhead utilities in existing developed areas. Changes would include but not be limited to: routing change, installation of different materials or type of facilities than currently in use or pole pattern re-locations.

Sewer cleanouts: Sewer cleanouts will be provided per MSD specifications and located at the right-of-way line

Valves: All valves are to be installed with valve boxes set flush (1/4" ± tolerance) with adjacent surfaces and located out of the pavement if possible. Gas valves for private services shall be located at or near the property line, outside of concrete sidewalks. When possible, avoid placing within sidewalks or driveway aprons. When notified by Louisville Metro of the settlement of a valve box, the Utility Company shall raise the box within one week.

Vaults: Locations of all vaults (telephone and electric) shall be coordinated with Louisville Metro on a case-by-case basis. Access to vaults shall be through standard manhole castings. For any vault to be repaired, replaced, or installed, the lids must meet ADA criteria longitudinally and horizontally.

Waterlines: underground facilities, 6" clearance at utility crossings and that installing facilities directly over and parallel to water mains shall be avoided**.**

Ground Level Elements: Panel boxes, Distribution boxes, Transformers, Public Telephone Kiosks, Pedestals, Switches, Cabinets, Video-Ready Access Devices ("VRADs"), etc., Including Poles Installed for the Sole Purpose of Supporting VRADs: Ground level elements shall be painted green, black or brown (unless aluminum or stainless), and/or screened from view by plantings. Such plantings shall be reviewed and approved by Louisville Metro Arborist prior to installation. When installed in easements alongside open drainage ditches such ground level elements shall be placed 10' from the edge of the ditch to allow for access by slope mowing equipment. Any exceptions will need specific written approval from the Department of Public Works.

Utilities and companies engaged in the installation and maintenance of communications equipment such as VRADs (collectively, "Applicants") are encouraged to obtain a private easement for ground level elements which exceed four (4) cubic feet in volume and/or eighteen (18) inches in height ("Large GLEs").

Subject to satisfaction of the other placement criteria set forth herein, and as applicable, the terms of any franchise or municipal facilities agreement approved by Louisville Metro Government, sites for Large GLEs on the public right-of-way will be permitted based on the following sequential preference provided that all landscaping or camouflage required by the Department of Public Works can be provided at that location.

1. Right-of-way or utility easement abutting industrial sites;
2. Right-of-way or utility easement abutting office or commercial sites;
3. Right-of-way or utility easement abutting government centers, public or private schools, churches or other public buildings;
4. Right-of-way or utility easement abutting parking lots that accommodate multi-family residential uses;
5. Right-of-way or utility easement abutting undeveloped sites;
6. Right-of-way or utility easement abutting the rear yard of a single family residential property at an interface with a made alley;
7. Right-of-way or utility easement abutting the side yard of a corner single family residential property;
8. Right-of-way or utility easement abutting the back yard of a single family or multi-family residential property which is not at an interface with a made alley;
9. Right-of-way or utility easement abutting the front yard of a residential property.

For example, assuming a proposed location meets all other placement criteria, a Large GLE will only be permitted to be placed in a right-of-way or utility easement abutting the front yard of a residential property if the Applicant demonstrates to the Department of Public Works' satisfaction that it cannot reasonably be placed in any location described in Category 1 through 8 above.

The foregoing notwithstanding, new or replacement Large GLEs must be placed in accordance with AASTHO (American Association of State Transportation and Highway Officials) Roadway Design Guidelines. Furthermore, Large GLEs cannot create a sight distance obstruction and should not be placed at mid-block locations.

Screening Required. VRADs and, at the discretion of Public Works, other Large GLEs mounted at ground level shall be required to locate in an existing decorative newspaper corral where one exists in the public right-of-way. Where such corral does not exist, the Applicant shall install such decorative corral, the design of which shall be approved by Public Works in consultation with Develop Louisville's Planning and Design Services and Advanced Planning staff, to screen the installation. Where a VRAD or other Large GLE is located in a decorative corral, the Applicant shall maintain full responsibility for upkeep and maintenance of the corral. At the sole discretion of Public Works in consultation with Develop Louisville's Planning and Design Services and Advanced Planning staff, where a VRAD or Large GLE is located in a residential area, appropriate landscaping may be substituted for the corral. If a VRAD is located on a pole, Public Works shall determine to what extent screening is required for the pole, and any ground-mounted equipment installed to serve it shall be located as described in this paragraph.

Unless waived by Louisville Metro Government, Large GLEs shall be required to be metered to the extent they require an independent power supply, and the responsible Applicant shall pay any service charges, meter fees, and other expenses associated with connecting to the municipal power provider.

Before final approval for the location of any Large GLE, the Applicant shall, at their own expense, provide written notification (by certified mail, return receipt requested) to the adjoining property owners of the Utility Company's intent to install such ground level equipment. The Applicant shall provide Public Works with proof of such written notifications.

The letter shall include:

1. An explanation of the purpose of the ground level equipment;
2. A description of the proposed location of the ground level element, including the base, with dimensions and general appearance;
3. Contact information for the responsible utility and a statement advising the property owner that he or she may contact the utility within ten (10) days after receipt of the letter to discuss any questions or concerns.

Due to the potential for ground level elements in the right of way to constitute visual nuisances, Louisville Metro shall require placement and/or replacement of landscaping or other camouflage with Louisville Metro deems it necessary as a condition for approval of the site.

The utility will immediately remove ground level elements that become redundant, unnecessary or otherwise unused, or if the Applicant discontinues service in Louisville, fails to receive a renewal of any expired franchise or municipal facilities agreement from Louisville Metro Government or is able to provide the service that required the installation of the Large GLE using technology that does not require above ground installation. At the sole discretion of Louisville Metro Government, a bond shall be posted to cover the costs of future removal of Large GLEs. Such bond shall be set in an amount to cover removal as well as reconstruction costs, and shall be administered by the Department of Public Works.

Underground Cables and Pipelines: In new developments, Louisville Metro reserves the right to review the location of all underground facilities prior to their construction. Facilities to be upgraded or replaced shall be installed in locations within the right-of-way as shown on the attached sheets, entitled “Standard Utility Placements”. These placements maximize utility separation and remove “active” utilities from the major travel portion of the roadways.

Hydrants: The fire hydrant shall be set to established grade, with the center of the barrel two feet (2’) back of the face of the curb line eighteen inches (18”) behind the back edge of the curb for rolled curbs. In the absence of a curb approximately five feet (5’) to fifteen (15’) from the edge of the pavement. No more than fifteen feet (15’) from a hard traveled surface.

SECTION VII: Right-of-way Permits

Louisville Metro monitors utility work through the utility permitting process and inspections. This process allows Louisville Metro to coordinate activities between Metro forces and other utilities, to maintain a record of street cuts and patches and to identify specific Metro requirements.

Each permit application will be approved or denied based on its own merits. Approval of any particular permit application shall not be construed as approval or a guarantee of approval of any other permit application submitted by an applicant.

Any work within the right-of-way that disturbs the pavement, curb and gutter, driveway entrances, sidewalk, landscaping or grassed areas, and any work that blocks a normal traffic lane, requires a permit.

This work may include, but is not limited to, utility main and/or lateral replacement and repair; valve replacement and repair; installation of new underground mains or laterals, structures or accessories; splices, buried drops (under pavement or sidewalks); pole changes for height, accident, etc.; cathodic protection; boxes and vault installations and jacking or boring under the right-of-way where disturbance within the right-of-way may occur. Any utility work that does not disturb the right-of-way is exempt from

the permitting requirement except to the extent that traffic detours or lane closures must be approved and permitted by Louisville Metro Public Works.

Obtaining a Permit: Before work within the right-of-way is started, the necessary permit shall be obtained from Louisville Metro Public Works. Unless otherwise agreed, emergency work requires that a permit be obtained as soon as possible but not later than twenty-four (24) hours after the onset of work. Beyond normal work hours, utilities must notify Metro Emergency Management and MetroCall 311 of emergency work. During regular working hours, utilities report emergency work to Public Works' Permit Division.

Submittals can be emailed to: MRWP@louisvilleky.gov

Responsibility: The Utility Company receiving the permit is held responsible for the work performed and Louisville Metro will contact the specific Utility Company for required adjustments or corrections regardless of whether the Utility Company performed the work itself or subcontracted and assigned the work. The permit is issued to the Utility Company and it is solely responsible for the work performed. The permit must be on site and clearly displayed at all times.

Utility Companies shall be responsible for the condition of any right-of-way repairs. Pavement repairs shall be warranted until such time as Louisville Metro shall overlay or reconstruct the pavement. Should the condition of the patch become such that additional pavement is in jeopardy of failure, then the Utility may be held responsible for an area larger than the original repair. Other repairs (sidewalk, curb and gutter, trenches, etc.) shall be warranted for the reasonable life of such structures. All warranties should be for at least 1 year in regards to workmanship and materials.

General Requirements

Requirements to obtain a permit to work in the public right-of-way

- The identity of the applicant (the person or entity to whom the permit is issued), including any affiliates who own or operate any facilities in the Public Rights-of-Way.
- The name, address and telephone number of the officer, agent or employee responsible for the accuracy of the information contained in the permit.
- A sketch or drawing of the project, including location map, north arrow and nearest cross street.
- Dates of the construction activity, the proposed start and stop times and any proposal to temporarily reopen any roadway for any "peak hour" period.
- The applicant is required to submit maintenance of traffic plan. The maintenance of traffic plan must comply with the **Manual on Uniform Traffic Control Devices (MUTCD)**.
- In the event of a Full Road Closure the Utility Company must post closure signage 7+ days in advance unless it is an emergency repair.
- In the event of a Full Road Closure, the Utility Company will be required to provide advanced notice of closure to effected residents & businesses 7 days prior to closure and must provide Public Works verification of this notification whether it be email, letter, door hanger etc.
- A Detour Plan (vehicular and pedestrian) must be submitted and approved prior to posting of closure.
- A list of the applicant's emergency providers, including name of company, local contact person, mailing and e-mail address, 24-hour emergency phone number and pager or fax number. This information shall be kept current by written notice to the Public Works Director.
- Name(s) and contact numbers of the Utility Company performing work, as well as the name(s) and contact number for the Foreman on site.
- Scope of work, which should include permanent structures being placed in the right of way. Large structures such as headwalls, drainage basins, retaining walls, man-holes, etc. should provide standard drawing and should be noted on sketch as to placement object.

For Major Projects, the following will be required:

- Detailed engineering plans. The plans shall show the location and area of the proposed project, the locations of all existing and proposed equipment and facilities, the height and/or depth of the

proposed equipment and existing facilities, and the spatial relationship with any adjacent infrastructure, rights-of-way line, easement, utility and /or other physical features. The plans shall be prepared under the direction of and signed by a registered professional engineer, and shall meet the size and scale as set forth in the Department of Public Works' Standard Criteria. http://www.louisvilleky.gov/PublicWorks/IWantTo/The+LouisvilleJefferson+County+Metro+Government+Standard+Drawings.htm

- A copy of the engineering plans in an electronic format acceptable to the Public Works Director or his designee; and
- The applicant shall meet with the Public Works Director or his designee for a pre-work conference prior to issuance of any permits.
- 30 day advanced notice to review and approve plans.

Permit Denial

A permit application may be denied for the following reasons if deemed in the public's interest;

- Past due fees from prior permits.
- Failure to return the right-of-way to its previous condition under previous permits.
- Undue disruption to existing utilities, transportation or Metro use.
- Area is environmentally or historically sensitive as defined by federal, state or local laws and regulations.
- Failure to provide required information.
- The applicant is in violation of the provisions of this policy.

Work Zone Requirements

- The Utility Company must properly mark the area according to the MUTCD.
- Utility Companies must obey ALL peak traffic hour restrictions.
- **Utility Companies may not use the public right-of-way for staging equipment or deliveries. All staging must take place on the site. Utility Companies may not block the public right-of-way at anytime without approval from Louisville Metro Public Works. Remaining travel lanes must remain open to traffic at all times.**
- The Department of Public Works does not grant workers or delivery personnel special privileges to park at existing parking meters without appropriate fees. All workers, deliveries and construction equipment must obey the existing parking regulations and posted on-street restrictions.
- The Utility Company is responsible for maintaining public streets and sidewalks within the area of the site. They are also responsible for ensuring that public roadways and sidewalks remain clear of mud and dirt and are responsible for damages to roadways and sidewalks.
- The Utility Company is responsible for public safety at all times.
- Complete road closures will not be permitted unless specific approval has been obtained from Public Works.

Future Development

Louisville Metro reserves the right to require service extensions to vacant parcels of property for future development to preclude future disruption to the right-of-way.

PERMIT FEES

The fees for permits are charged based on the following:

1) **Permit: Lane Closure, Sidewalk, Parking on meters, or any work in the right of way, etc- $25/week (7-days)**
2) **Excavation Fee: $100- one time fee for any excavation activity per permit in Pavement, Sidewalk or Dirt.**
3) **Degradation: This charge is based on the Area W X L/2 ($0.50/sq ft) for any cuts that are made into the pavement. When milling and paving are required for restoration this fee is waived**.
4) **Utility Cabinets and other Ground Level Elements: $1,000 for placement of each cabinet or GLE within right of way, plus fees as described in Kentucky Revised Statutes Chapter 136 and Louisville Metro Code of Ordinances Chapter 116.**
5) **Temporary No Parking Any Time Signage**

12" x 18"	**14"x20"**
Per first 200 $5.28 each	first 200 $6.75 each
200-400 = $4.27 each	200-400 = $6.07 each
400-800 = $3.84	400 – 800 = $5.46 each
800-1200 = $3.11	800 – 1200 = $4.92
1200-2400 = $2.80	1200 – 2400 = $4.42
2400 up = $2.50	2400 – up = $4.00

6) **Permit fees are waived only at the discretion of management.**

****NOTE if utility is paving, then degradation fees will be waived.**

HANDLING OF FEES

1) **There are several companies that are billed monthly the permits that were obtained in that month.**
2) **A report is made out by the Permit Clerk and sent to Metro Finance who then sends an invoice to the company.**
3) **This report will include a list of the permits issued for the corresponding month with the amount per permit and the total. A memo will be attached to Metro Finance and will give the name and assigned number of the Utility Company being billed. It will list the Total Permit Price, Total Degradation Charge and the Total Excavation Charges. (See Example)**
4) **The company sends a check to Metro Public Works via Permit Clerk, who confirms the payment is correct and forwards them to Finance.**
5) **All other permits require payment of the fees upon issuance. This can only be paid by cash or check (Made out to Louisville Metro Finance)**
6) **A receipt is issued to the permit applicant**

MRWP@louisvilleky.gov

SECTION VIII: UTILITY POLICY FOR PARKS AND PARKWAYS

Louisville Metro Parks is committed to the preservation, protection and enhancement of Louisville Metro parks and parkways and the following policy is intended to provide general guidelines for work in those parks and parkways.

Specific requirements will be developed based on site-specific conditions and standards and criteria will continue to be refined as this process is implemented. Standards for the Olmstead parks and parkways are being developed in a Master Plan.

Requirements for work on the parks and parkways include:

A. Initial Notification

Prior to the development of detailed design, the Parks Director is to be notified in writing of any project being considered in the parks or parkways. Notification should include a description of the work to be done, the location, the date when construction will begin and the estimated duration of the construction period. If Metro Parks determines that a design review will not be necessary, permit notification will follow (see Section C).

B. Design Review

Depending on the proposed scope of work, size of project, location and environmental conditions, the Parks Director may assign staff to participate in the detailed design process. Metro Parks will set project construction standards specific to the site which will include but may not be limited to:

- Trenching and pruning requirements to protect trees and shrubs.
- Worksite boundaries, fencing, access roads and staging areas.
- Erosion control, aeration and fertilization.
- Restoration of turf and grading for proper drainage and appearance including specifications for seed mixture.
- Designating employee and equipment parking and materials storage boundaries.
- Issues of traffic and public safety.
- Screening of permanent structures with plant materials and/or fencing.

C. Permit Notification

The applicant must submit a permit application, including any exhibits, to the Parks Director allowing two (2) weeks for review and approval.

D. Inspection

Parks staff will inspect all work during and after construction to ensure compliance with agreed upon standards.

E. Special Conditions

Scheduling: At the time of permit notification, Metro Parks will identify potential scheduling conflicts resulting from major mark/community events in the immediate vicinity.

Safety: Metro Parks expects utilities to use special precautions to insure the safety of all park and parkway users. Park roads may be congested with bicyclists, pedestrians, joggers and horseback riders and sight distances are often significantly shorter than typical Louisville Metro streets.

Environmental and Historical: Erosion control measures in excess of those required by MSD may need to be implemented. Historic elements and materials, i.e., limestone curbs, cobblestone paths, etc., should be preserved or salvaged. Replacement materials and details should match the original in quality, appearance and durability.

F. Tree Replacement Policy

Care must be taken to preserve and protect specimen trees and shrubs. Any tree within a construction zone that dies within three (3) years must be replaced according to an established ratio based on value of the tree lost, as calculated by a certified Arborist or landscape architect, unless death by other causes can be proven.

G. Emergency Work

The Parks Director must be notified within 12 hours of the start of any emergency work required in the parks and parkways.

CONCRETE SIDEWALKS (HISTORIC MIX)

All historic mix must be washed surfaced, No brooming will be accepted.

Sand-Grout Concrete Mix Design

Mix ID:6-1/2 bag grout – 4,000 psi.
Weights per Cubic Yard (Saturated, Surface-Dry)

		Yield, Cu. Ft.
Type 1 Portland Cements	640	3.21
Class F Fly Ash (lbs.)	110	0.70
Class A Sand (lbs.)	2,729	17.02
Water (lbs.) (Gai.-US)	295 (35.3 lbs./Cu.Yd.)	4.73
Total Air (%)	5.0 +/- 1.0	1.35
	Total	27.00 cu. Ft.

Add Mixture
Russ Tech. Finishease NC, (oz.) 29.60

Air Entrain
Russ Tech, RSA-10 (ox.-US) 5.9

Water/Cement Ratio (lbs.) 0.40
Slump (in.) 4.00
Concrete Unit Weight (lbs./cu.ft.) 139.4

Compensation for free and negative moisture will be made at the time of batching

Construction Type: General
Placement: hands on

The Key to the final product is the light spray wash (water) undertaken at the proper time – a field decision. (no retardant)

Please follow the link below to view Louisville Historical Areas Maps.

http://authoring.louisvilleky.gov/NR/rdonlyres/6574AF7E-BEAD-4652-80F4-594E727C3F02/0/Historic_Mapbook8x11.pdf

LOUISVILLE METRO THRU ROADS LIST

EXHIBIT A: LOUISVILLE METRO THROUGH ROADS (Amended By Substitution)

DIST	DIRECTION	ROAD NAME	MILEAGE	FROM	TO	SPEED *
4	S	12TH ST	1.38	W Broadway	W Hill St	35
4		12TH STREET CONNECTOR	0.23	W Broadway	W Chestnut St	35
4	S	13TH	0.54	W Main St	W Chestnut St	35
4	N	15TH ST	0.24	W Main St	Portland Ave	35
4	S	15TH ST	2.34	W Main St	S 16th St	35
4	N	16TH ST	0.16	W Main St	Bank St	35
4	S	16TH ST	1.18	W Main St	Maple St	35
4	S	18TH ST	0.74	W Main St	W Broadway	35
4	N	1ST ST	0.11	W Main St	W Witherspoon St	35
4	S	1ST ST	2.34	W Main St	W Lee St	35
4	N	26TH ST	0.75	W Main St	Portland Ave	35
4	S	26TH ST	1.86	W Main St	Wilson Ave	35
4	S	28TH ST	1.63	W Market St	Dumesnil St	35
4	N	2ND ST	0.17	W Main St	W River Rd	35
4	N	34TH ST	0.46	W Main St	Parker Ave	35
4	S	34TH ST	2.39	W Main St	Dr William G Weathers Dr	35
4	N	35TH ST	0.42	Parker Ave	Northwestern Pky	35
4	S	35TH ST	0.13	Dr William G Weathers Dr	Algonquin Pky	35
4	S	38TH ST	0.18	Dumesnil St	Hale Ave	35
4	N	3RD ST	0.14	W Main St	W River Rd	35
4	S	3RD ST	1.51	Southern Pky	Kenwood Way	35
4	S	3RD ST	1.15	Tenny Ave	Kenwood Dr	35
4	N	41ST ST	0.52	W Main St	Bank St	35
4	S	41ST ST	1.03	W Main St	W Broadway	35
4	N	4TH ST	0.14	W Main St	W River Rd	35
4	S	4TH ST	3.50	W Main St	Oakdale Ave	35
4	S	5TH ST	1.34	W Main St	W St Catherine St	35
4	N	6TH ST	0.13	W Main St	W River Rd	35
4	S	6TH ST	2.12	W Main St	W Hill St	35
4	N	7TH ST	0.11	W Main St	W River Rd	35
4	S	7TH ST	2.79	W Main St	Algonquin Pky	35
4	N	8TH ST	0.05	W Main St	W River Rd	35
4	S	8TH ST	1.52	W Main St	W Oak St	35
4	S	9TH ST	0.45	W Broadway	S 7th St	35
1		AIKEN RD	0.61	Shelbyville Rd	N English Station Rd	35
1		AIKEN RD	4.02	N English Station Rd	Johnson Rd	35
4		ALGONQUIN PKY	1.05	S 40th St	Southwestern Pky	35
4		ALLMOND AVE	0.58	Strawberry Ln	E Woodlawn Ave	35
2		APPLEGATE LN	1.67	Shepherdsville Rd	Vaughn Mill Rd	35
4		ARCADE AVE	0.60	7th Street Rd	Taylor Blvd	35
3		ARNOLDTOWN RD	2.31	St Andrews Church Rd	3rd Street Rd	35
3		ASHBY LN	1.46	Greenbelt Hwy	Dixie Hwy	35
4	W	ASHLAND AVE	0.89	Taylor Blvd	Southern Pky	35
1		AVOCA RD	1.32	Anchorage City Limits	Aiken Rd	30
2		BACK RUN RD	1.47	Broad Run Rd	Dawson Hill Rd	35
4		BANK ST	0.47	Northwestern Pky	N 38th St	35

		EXHIBIT A: LOUISVILLE METRO THROUGH ROADS (Amended By Substitution)				
DIST	DIRECTION	ROAD NAME	MILEAGE	FROM	TO	SPEED *
4		BARRET AVE	1.31	Castlewood Ave	Lexington Rd	35
2		BASHFORD MANOR LN	0.96	Bardstown Rd	Newburg Rd	35
2		BATES RD	0.88	Cooper Chapel Rd	Pennsylvania Run Rd	35
3		BEARCAMP RD	3.36	Blevins Gap Rd	Bullitt County Line	30
1	N	BECKLEY STATION RD	2.66	Aiken Rd	Shelbyville Rd	30
1	S	BECKLEY STATION RD	1.76	Shelbyville Rd	Wibble Hill Rd	35
1		BELLEWOOD RD	0.29	Cox Ave	Cedardale Rd	25
4		BERNHEIM LN	0.98	S 22nd St	7th Street Rd	35
3		BETHANY LN	1.21	Dixie Hwy	Greenbelt Hwy	35
2		BISHOP LN	1.47	Poplar Level Rd	Newburg Rd	35
4		BISHOP LN	0.25	Leith Ln	Newburg Rd	35
1		BLANKENBAKER LN	2.42	River Rd	Brownsboro Rd	35
1		BLANKENBAKER RD	1.38	Blankenbaker Pky	Decimal Dr	35
3		BLANTON LN	0.99	Dixie Hwy	St. Andrews Church Rd	35
3		BLEVINS GAP RD	6.25	Dixie Hwy	Penile Rd	35
1		BLOSSOM LN	0.32	Goose Creek Rd	Hurstbourne Pky	35
4		BLUEGRASS AVE	0.86	Taylor Blvd	Manslick Rd	35
1		BOWLING BLVD	1.01	Browns Ln	Shelbyville Rd	35
2		BRADBE RD	2.08	Routt Rd	Taylorsville Lake Rd	45
2		BRADFORD DR	0.61	Bardstown Rd	Klondike Ln	25
4	E	BRANDEIS AVE	0.25	S Brook St	Arthur St	35
4	E	BRECKINRIDGE ST	1.31	S 1st St	Barrett Ave	35
4	W	BRECKINRIDGE ST	0.75	S 9th St	S 1st St	35
2		BRENTLINGER LN	1.89	Bardstown Rd	Seatonville Rd	35
2		BRISCOE LN	1.96	Shepherdsville Rd	Vaughn Mill Rd	35
2		BROAD RUN RD	4.57	Seatonville Rd	Bullitt County Line	35
4	W	BROADWAY	2.28	S 22nd St	Southwestern Pky	35
4	S	BROOK ST	2.52	E Main St	E Brandeis Ave	35
1		BROWNS LN	3.02	Shelbyville Rd	Taylorsville Rd	35
		BROWNSBORO RD	0.96	US 42	Seminary Dr	35
		BUECHEL BANK RD	1.57	Shepardsville Rd	Bardstown Rd	35
4	E	BURNETT AVE	1.20	S Preston St	Clarks Ln	35
1		BUSH FARM RD	0.41	Aiken Rd	Old Henry Rd	35
4	S	CAMPBELL ST	0.60	E Main St	E Gray St	35
4	E	CARDINAL BLVD	0.07	S 1st St	S Brook St	35
4	W	CARDINAL BLVD	0.27	S 1st St	S 4th St	35
4		CASTLEWOOD AVE	0.42	Barret Ave	Baxter Ave	35
4		CECIL AVE	0.89	W Broadway	D/E S of Fordson Way	35
2		CEDAR CREEK RD	3.92	Bardstown Rd	Cooper Chapel Rd	35
4		CENTRAL AVE	0.35	S Floyd St	Crittenden Dr	35
4		CENTRAL AVE	1.37	7th Street Rd	S 3rd St	35
1	N	CHADWICK RD	0.59	Shelbyville Rd	Whipps Mill Rd	25
1		CHAMBERLAIN LN	4.00	Brownsboro Rd	Westport Rd	35
1		CHAMBERLAIN LN	2.07	Westport Rd	La Grange Rd	45
1		CHENOWETH RUN RD	0.86	Taylorsville Rd	Blankenbaker Pky	35
2		CHENOWETH RUN RD	3.44	Taylorsville Rd	Old Heady Rd	35
4		CHEROKEE PKY	0.28	Bardstown Rd	Willow Ave	35
4		CHEROKEE RD	0.99	Baxter Ave	Cherokee Pky	35

		EXHIBIT A: LOUISVILLE METRO THROUGH ROADS (Amended By Substitution)				
DIST	DIRECTION	ROAD NAME	MILEAGE	FROM	TO	SPEED *
1		CLARK STATION RD	3.46	Shelbyville Rd	Shelby County Line	30
4		CLARKS LN	0.84	Preston Hwy	Poplar Level Rd	25
4	N	CLAY ST	0.21	E Witherspoon St	E Main St	35
4	S	CLAY ST	1.50	E Main St	E Oak St	35
4	S	CLIFTON AVE	0.08	Payne St	Frankfort Ave	35
1		COLLINS LN	1.26	Westport Rd	Old La Grange Rd	35
2		COOPER CHAPEL RD	3.59	Preston Hwy	Beulah Church Rd	35
4		CRITTENDEN DR	5.00	Atwood St	Grade Ln	35
3	S	CRUMS LN	0.80	Mae Ave	Cane Run Rd	35
4		CYPRESS ST	0.98	Algonquin Pky	Virginia Ave	35
2		DAHL RD	0.59	Poplar Level Rd	Vim Dr	35
2		DAWSON HILL RD	3.20	Brush Run Rd	Bullitt County Line	35
3		DEERING HEIGHTS DR	0.10	Deering Rd	Woodridge Dr	35
3		DEERING RD	0.33	Flowervale Ln	Deering Heights Dr	35
3		DEERING RD	1.01	Woodridge Dr	Valley Station Rd	35
4		DENNY CRUM OVERPASS	0.39	S Floyd St	S 3rd St	35
3		DISTRIBUTION DR	0.52	Cane Run Rd	Greenbelt Hwy	35
4		DIXIE HWY	2.01	W Broadway	Oregon Ave	35
1		DORSEY LN	1.97	La Grange Rd	Shelbyville Rd	35
4		DOUGLASS BLVD	0.56	Bardstown Rd	Norris Pl	35
3		DOVER RD	2.01	Rockford Ln	S Crums Ln	35
4		DR WILLIAM G WEATHERS DR	0.16	S 34th St	S 35th St	35
2		DRY RIDGE RD	2.59	Routt Rd	Old Heady Rd	35
4		DUMESNIL ST	1.52	S 38th St	S 22nd St	35
4		DUMESNIL ST	0.42	Dr W J Hodge St	S 16th St	35
2		DURRETT LN	0.63	Preston Hwy	I-264	35
1		DUTCHMANS LN	0.55	Breckenridge Ln	Browns Ln	35
4		DUTCHMANS LN	0.47	Regal Springs Dr	Cannons Ln	35
1		DUTCHMANS PKY	0.34	Regal Springs Dr	Breckenridge Ln	35
4		EASTERN PKY	0.35	Willow Ave	Scenic Loop	35
2		EASUM RD	2.33	Billtown Rd	Old Heady Rd	35
1		ECHO TRL	1.66	S English Station Rd	Gilliland Rd	35
2		ECHO TRL	2.28	Seatonville Rd	Thurman Rd	35
1		ELECTRON DR	0.25	Blankenbaker Rd	Blankenbaker Pky	35
1		ELLINGSWORTH LN	0.61	Blankenbaker Pky	Tucker Station Rd	35
1	N	ENGLISH STATION RD	0.89	La Grange Rd	Old Henry Rd	35
1	N	ENGLISH STATION RD	1.22	Old Henry Rd	Shelbyville Rd	35
1	S	ENGLISH STATION RD	4.51	Shelbyville Rd	Old Taylorsville Rd	35
1		EVERGREEN RD	0.55	Old Shelbyville Rd	Cedardale Rd	35
1		EVERGREEN RD	0.11	Evergreen Wynd	Freys Hill Rd	25
1		FACTORY LN	1.52	La Grange Rd	Old Henry Rd	35
3		FAIRDALE RD	1.46	Mount Holly Rd	South Park Rd	35
2		FAIRGROUND RD	1.97	Bardstown Rd	Billtown Rd	35
2		FAIRMOUNT RD	2.53	Cedar Creek Rd	Old Bardstown Rd	35
2		FEGENBUSH LN	1.77	Bardstown Rd	Hurstbourne Pky	45
2		FERN CREEK RD	1.91	Beulah Church Rd	Lovers Ln	35
2		FERNDALE RD	1.36	S Watterson Trl	Bardstown Rd	35
1		FLAT ROCK RD	3.84	Shelbyville Rd	Aiken Rd	35

		EXHIBIT A: LOUISVILLE METRO THROUGH ROADS (Amended By Substitution)				
DIST	DIRECTION	ROAD NAME	MILEAGE	FROM	TO	SPEED *
4	S	FLOYD ST	1.89	E Hill St	Lennox Ave	35
4		FRANKFORT AVE	0.48	River Rd	Story Ave	25
1		FREYS HILL RD	1.42	Evergreen Rd	Westport Rd	35
4		GAGEL AVE	1.19	Atterberry Ct	Manslick Rd	35
2		GARDINER LN	1.47	Poplar Level Rd	Newburg Rd	35
4		GARDINER LN	1.21	Bardstown Rd	Newburg Rd	35
2		GELLHAUS LN	0.88	Billtown Rd	Chenoweth Run Rd	35
2		GENTRY LN	0.45	Cedar Creek Rd	Fairmount Rd	35
1		GILLILAND RD	1.10	Eastwood Cut Off Rd	Echo Trl	35
2		GILMORE LN	0.98	Preston Hwy	Poplar Level Rd	35
2		GLASER LN	1.59	Fegenbush Ln	Beulah Church Rd	35
3		GLOBAL DR	0.53	Cane Run Rd	Greenbelt Hwy	35
2		GOLDSMITH LN	0.73	Hikes Ln	Del Rio Pl	30
4		GOLDSMITH LN	1.82	Newburg Rd	Del Rio Pl	35
1		GOOSE CREEK RD	1.35	Brownsboro Rd	Westport Rd	35
3		GRADE LN	4.07	Preston Hwy	Outer Loop	35
3		GRASTON AVE	0.54	Upper Hunters Trce	Rockford Ln	30
3		GREYLING DR	1.13	Blevins Gap Rd	W Manslick Rd	35
4		GRINSTEAD DR	0.13	Winter Ave	Bardstown Rd	35
4		GRINSTEAD DR	1.16	Lexington Rd	Stilz Ave	35
4		HALE AVE	0.28	S 38th St	Cecil Ave	25
4		HESS LN	0.97	Preston Hwy	Poplar Level Rd	35
2		HIKES LN	0.80	Petersburg Rd	Leghorn Dr	35
2		HIKES LN	2.43	Buechel Byp	Taylorsville Rd	35
4	E	HILL ST	0.35	S 1st St	S Preston St	35
4	W	HILL ST	2.55	S 1st St	Wilson Ave	35
4		HILLCREST AVE	0.61	Riedling Dr	Frankfort Ave	35
1		HITT RD	0.83	Ballardsville Rd	Oldham County Line	35
3		HOLSCLAW HILL RD	2.00	Mitchell Hill Rd	Bullitt County Line	35
2		HOPEWELL RD	1.37	Old Heady Rd	New Hopewell Rd	35
1	N	HUBBARDS LN	1.60	Brownsboro Rd	Shelbyville Rd	30
1	S	HUBBARDS LN	0.78	Shelbyville Rd	Bowling Ave	30
2		HUDSON LN	1.13	Bardstown Rd	Fairground Rd	25
2		HUNSINGER LN	1.76	Hikes Ln	Six Mile Ln	35
2		INDEPENDENCE SCHOOL RD	2.20	Cedar Creek Rd	Thixton Ln	35
2	E	INDIAN TRL	2.94	Preston Hwy	Shepherdsville Rd	35
4		INDUSTRY RD	0.82	S 4th St	S 7th St	35
3		INTERMODAL DR	0.55	Greenbelt Hwy	Cane Run Rd	35
2		JEANINE DR	0.89	E Indian Trl	Fern Valley Rd	25
2		JEFFERSON BLVD	1.81	Outer Loop	Poplar Level Rd	35
3		JEFFERSON HILL RD	2.33	Top Hill Rd	Keys Ferry Rd	35
4	E	JEFFERSON ST	1.04	S 1st St	Baxter Ave	35
4	W	JEFFERSON ST	2.47	S 1st St	S 28th St	35
2		JENNINGS LN	1.12	E Indian Trl	Bishop Ln	35
2		JOHNSON SCHOOL RD	1.41	Cedar Creek Rd	Beulah Church Rd	35
3		JOHNSONTOWN RD	2.34	Lower River Rd	Dixie Hwy	35
3		KATHERINE STATION RD	0.49	Dixie Hwy	Bullitt County Line	25
4	E	KENTUCKY ST	1.48	S 1st St	Barret Ave	35

		EXHIBIT A: LOUISVILLE METRO THROUGH ROADS (Amended By Substitution)				
DIST	DIRECTION	ROAD NAME	MILEAGE	FROM	TO	SPEED *
2		KLONDIKE LN	0.22	Six Mile Ln	Pulliam Dr	25
3		KNOB CREEK RD	0.29	Mitchell Hill Rd	Bullitt County Line	35
3		KRAMERS LN	0.85	Camp Ground Rd	Cane Run Rd	35
1		KRESGE WAY	0.50	Browns Ln	Breckenridge Ln	25
1		LA GRANGE RD	1.68	Lyndon Ln	Whipps Mill Rd	35
1		LAKELAND RD	0.86	La Grange Rd	Freys Hill Rd	25
2		CHAMPIONS TRACE LN	0.89	Hikes Ln	Newburg Rd	35
4		LEITH LN	0.09	Goldsmith Ln	Bishop Ln	35
4		LEXINGTON RD	1.92	Barrett Ave	Grinstead Dr	35
4	E	LIBERTY ST	1.28	S 1st St	Lexington Rd	35
4	W	LIBERTY ST	0.71	S 1st St	S 9th St	35
1		LIME KILN LN	2.59	River Rd	Brownsboro Rd	35
3		LOGISTICS DR	0.83	Greenbelt Hwy	Cane Run Rd	35
1		LONG RUN RD	2.74	Shelbyville Rd	Shelby County Line	45
4		LONGFIELD AVE	0.78	Taylor Blvd	S 5th St	35
4		LOUISVILLE AVE	0.46	Ottawa Ave	E Woodlawn Ave	25
1		LOWE RD	0.90	Browns Ln	Taylorsville Rd	35
3		LOWER HUNTERS TRCE	3.07	Cane Run Rd	Dixie Hwy	35
1		LYNDON LN	0.80	New La Grange Rd	Shelbyville Rd	35
1		LYNDON LN	0.47	Herr Ln	Westport Rd	35
1	N	MADISON AVE	0.46	Main St	Cedardale Rd	25
1	S	MADISON AVE	0.25	Main St	Tucker Station Rd	25
3		MAE AVE	0.12	S Crums Ln	Crums Ln	35
4	E	MAGNOLIA AVE	0.21	S 1st St	S Floyd St	25
4	W	MAGNOLIA AVE	0.61	S 1st St	S 7th St	25
4	W	MAIN ST	0.40	S 22nd St	S 26th St	35
2		MANNER DALE DR	0.41	Breckenridge Ln	Six Mile Ln	25
3		MANSLICK RD	1.53	St Anthonys Church Rd	Palatka Rd	35
4	W	MARKET ST	2.19	S 22nd St	Southwestern Pky	35
2		MARKWELL LN	0.19	Broad Run Rd	Bullitt County Line	35
4		MARY ST	0.42	E Oak St	S Shelby St	35
2		MCCAWLEY RD	0.85	Preston Hwy	Jefferson Blvd	35
1		MCMAHAN BLVD	0.24	Taylorsville Rd	Browns Ln	35
3		MCNAIR RD	0.26	Manslick Rd	3rd Street Rd	35
3		MEDORA RD	0.98	Pendleton Rd	Blevins Gap Rd	35
3		MEMORY LN	0.13	Sylvania Rd	Terry Rd	35
2		MILES LN	0.75	Preston Hwy	Shepherdsville Rd	35
1		MILL BROOK RD	0.27	Whipps Mill Rd	Ormsby Station Rd	35
3		MILLERS LN	1.21	Dixie Hwy	Cane Run Rd	35
3		MINOR LN	1.38	Outer Loop	Preston Hwy	35
3		MINOR LN	1.66	Outer Loop	South Park Rd	35
3		MITCHELL HILL RD	2.99	W Manslick Rd	Knob Creek Rd	35
1		MOCKINGBIRD VALLEY RD	1.69	River Rd	Brownsboro Rd	35
1		MOSER RD	1.74	Shelbyville Rd	Watterson Trl	30
3		MUD LN	2.05	Blue Lick Rd	Preston Hwy	35
4	E	MUHAMMAD ALI BLVD	1.03	S 1st St	E Chestnut St	35
4	W	MUHAMMAD ALI BLVD	3.92	S 1st St	Southwestern Pky	35
1		MURPHY LN	1.18	Ballardsville Rd	Westport Rd	35

		EXHIBIT A: LOUISVILLE METRO THROUGH ROADS (Amended By Substitution)				
DIST	DIRECTION	ROAD NAME	MILEAGE	FROM	TO	SPEED *
4		NEVADA AVE	0.14	E Woodlawn Ave	Crittenden Dr	35
2		NEW HOPEWELL RD	0.68	Hopewell Rd	Taylorsville Rd	35
4		NORRIS PL	0.85	Eastern Pky	Douglass Blvd	35
4		NORTHWESTERN PKY	1.05	Southwestern Pky	N 38th St	35
4		NORTHWESTERN PKY	0.31	N 33rd St	N 30th St	35
4		NORTHWESTERN PKY	0.79	N 22nd St	N 29th St	35
2		OAK GROVE RD	0.73	Thixton Ln	Independence School Rd	30
4	E	OAK ST	1.56	S 1st ST	Barret Ave	35
4	W	OAK ST	2.23	S 1st St	S 26th St	35
4		OAKDALE AVE	0.27	S 3rd St	S 4th St	35
2		OLD BARDSTOWN RD	2.17	Bardstown Rd	Thixton Ln	45
1		OLD BROWNSBORO RD	0.50	Brownsboro Rd	Brownsboro Rd	35
1		OLD CLARK STATION RD	1.63	Highway 148	Shelby County Line	30
1		OLD HARRODS CREEK RD	0.21	La Grange Rd	Anchorage City Limit	30
		OLD HARRODS CREEK RD	0.93	Beech Rd	Shelbyville Rd	30
2		OLD HEADY RD	2.44	Taylorsville Rd	Hopewell Rd	35
2		OLD HEADY RD	4.45	Thurman Rd	Spencer County Line	35
1		OLD HENRY RD	3.65	Evergreen Rd	Factory Ln	35
1		OLD HENRY RD	0.70	Factory Ln	Oldham County Line	30
1		OLD LA GRANGE RD	1.51	Lucas Ln	Westport Rd	35
3		OLD MILLERS LN	0.34	Millers Ln	Cane Run Rd	35
3		OLD NEW CUT RD	0.57	W Manslick Rd	New Cut Rd	35
3	E	ORELL RD	1.59	Pendleton Rd	Dixie Hwy	35
3	W	ORELL RD	1.00	Lower River Rd	Dixie Hwy	35
1		ORMSBY LN	0.87	Westport Rd	La Grange Rd	35
1		ORMSBY STATION RD	0.79	N Hurstbourne Pky	N Hurstbourne Pky	35
4		OTTAWA AVE	0.33	Crittenden Dr	Louisville Ave	35
3	E	PAGES LN	1.30	3rd St Rd	Dixie Hwy	35
3	W	PAGES LN	1.44	Dixie Hwy	Terry Rd	35
4		PARK BLVD	0.63	Lennox Ave	Crittenden Dr	35
3		PAULEYS GAP RD	0.63	Pendleton Rd	Bullitt County Line	35
3		PENDLETON RD	1.93	Dixie Hwy	Bullitt County Line	35
3		PENILE RD	1.47	Blevins Gap Rd	W Manslick Rd	35
2		PENNSYLVANIA RUN RD	1.22	Cooper Chapel Rd	Vaughn Mill Rd	35
4		PHILLIPS LN	1.27	Crittenden Dr	Preston Hwy	35
1		POPE DALE RD	0.58	Flat Rock Rd	Long Run Rd	30
1	N	POPE LICK RD	0.44	Tucker Station Rd	Urton Ln	35
1	S	POPE LICK RD	3.78	Tucker Station Rd	Old Taylorsville Rd	35
1		POPLAR LN	1.12	S English Station Rd	S Pope Lick Rd	30
4		PORTLAND AVE	0.63	N 15th St	N 22nd St	35
4	N	PRESTON ST	0.16	E Witherspoon St	E Main St	35
4	S	PRESTON ST	0.11	E Main St	E Burnett Ave	35
2		PRODUCE RD	1.30	Poplar Level Rd	Petersburg Rd	35
2		PROGRESS BLVD	0.94	Buechel Bank Rd	Buechel Byp	45
3		RALPH AVE	2.38	Camp Ground Rd	Dixie Hwy	35
2		RANGELAND RD	1.24	Poplar Level Rd	Shepherdsville Rd	35
1		REAMERS RD	1.69	La Grange Rd	Old Henry Rd	35
1		REHL RD	2.26	Blankenbaker Pky	S Pope Lick Rd	35
1		REHL RD	0.36	S Pope Lick Rd	S English Station Rd	35

		EXHIBIT A: LOUISVILLE METRO THROUGH ROADS (Amended By Substitution)				
DIST	DIRECTION	ROAD NAME	MILEAGE	FROM	TO	SPEED *
1		RIVER RD	3.69	Mockingbird Valley Rd	Lime Kiln Ln	45
1		RIVER RD	3.08	Lime Kiln Ln	U S 42	35
3		RIVERPORT DR	0.73	Greenbelt Hwy	Cane Run Rd	35
2		ROBARDS LN	0.70	Gardiner Ln	Bishop Ln	35
2		ROBBS LN	0.43	Outer Loop	Shepherdsville Rd	35
1		ROLLINGTON RD	0.58	Westport Rd	Oldham County Line	25
4		ROY WILKINS AVE	0.73	W Main St	W Broadway	35
1		RUDY LN	1.58	Brownsboro Rd	N Hubbards Ln	35
3		RUTLEDGE RD	1.01	Greenwood Rd	Sylvania No 6 Rd	25
3		SCOTTS GAP RD	1.41	Blevins Gap Rd	Bullitt County Line	35
2		SEATONVILLE RD	2.55	Lovers Ln	Billtown Rd	45
2		SHAFFER LN	0.76	Seatonville Rd	Billtown Rd	35
4	S	SHELBY ST	0.41	E Main St	E Muhammad Ali Blvd	35
4	S	SHELBY ST	0.07	E Chestnut St	E Gray St	35
4	S	SHELBY ST	0.90	Goss Ave	Keswick Blvd	35
2		SHEPHERDSVILLE RD	1.52	E Manslick Rd	Outer Loop	35
2		SIX MILE LN	4.39	Bardstown Rd	Taylorsville Rd	35
3		SKY BLUE AVE	1.02	Lower Hunters Trce	Greenwood Rd	25
2		SMYRNA PKY	1.91	Cooper Chapel Rd	Outer Loop	35
2		SMYRNA RD	0.43	Outer Loop	Briscoe Ln	35
3		SOUTH PARK RD	3.47	Preston Hwy	Fairdale Rd	35
3		SOUTH PARK RD	1.80	Fairdale Rd	National Tpke	35
4		SOUTHERN PKY	1.11	W Kenwood Way	Taylor Blvd	35
4		SOUTHSIDE DR	2.57	W Kenwood Way	E Tenny Ave	25
4		SOUTHWESTERN PKY	2.27	Northwestern Pky	Algonquin Pky	35
4	N	SPRING ST	0.44	Locust St	Story Ave	35
4	S	SPRING ST	0.18	Locust St	Lexington Rd	35
1		SPRINGDALE RD	2.69	Wolf Pen Branch Rd	Brownsboro Rd	35
1		SPRINGHURST BLVD	1.65	N Hurstbourne Pky	Westport Rd	35
3		ST ANTHONY CHURCH RD	2.22	St Andrews Church Rd	Manslick Rd	35
4	E	ST CATHERINE ST	0.83	S 1st St	S Shelby St	35
4	W	ST CATHERINE ST	0.63	S 1st St	S 8th St	35
1		STANLEY GAULT PKY	0.94	La Grange Rd	Old Henry Rd	35
4		STILZ AVE	0.49	Frankfort Ave	Lexington Rd	35
3		STONESTREET RD	3.03	Dixie Hwy	Blevins Gap Rd	35
2		STONY BROOK DR	2.15	S Hurstbourne Pky	Six Mile Ln	35
4		STRAWBERRY LN	1.97	E Woodlawn Ave	Southside Dr	35
3		SYLVANIA RD	0.36	Rutledge Rd	Memory Ln	35
2		TAYLORSVILLE RD	2.65	Highway 148	Taylorsville Lake Rd	35
3		THOMPSON LN	0.63	W Pages Ln	Johnstown Rd	25
2		THURMAN RD	1.81	Old Heady Rd	Routt Rd	35
3		TOP HILL RD	1.88	Jefferson Hill Rd	Mitchell Hill Rd	35
3		TRADE PORT DR	1.01	Lower River Rd	Johnstown Rd	35
4		TREVILIAN WAY	1.31	Bardstown Rd	Newburg Rd	30
4		TREVILIAN WAY	0.83	Newburg Rd	Poplar Level Rd	35
1		TUCKER STATION RD	4.54	S Madison Ave	Taylorsville Rd	35
3		UPPER HUNTERS TRCE	1.44	Lower Hunters Trce	Dixie Hwy	35
1		UPS DR	0.23	La Grange Rd	Ormsby Station Rd	35
1		URTON LN	1.78	N Pope Lick Rd	Shelbyville Rd	35

		EXHIBIT A: LOUISVILLE METRO THROUGH ROADS (Amended By Substitution)				
DIST	DIRECTION	ROAD NAME	MILEAGE	FROM	TO	SPEED *
2		VAUGHN MILL RD	0.69	Pennsylvania Run Rd	Outer Loop	35
2		VIM DR	0.65	Preston Hwy	Dahl Rd	35
4		VIRGINIA AVE	1.16	S 26th St	S 38th St	35
1		WARD AVE	0.59	Dorsey Ln	Old Harrods Creek Rd	35
4		WARNOCK ST	0.34	S Brook St	Crittenden Dr	35
1		WASHBURN AVE	1.00	Westport Rd	La Grange Rd	25
3		WATSON LN	0.94	Lower River Rd	Dixie Hwy	30
2	S	WATTERSON TRL	3.27	Outer Loop	Bardstown Rd	35
2		WATTERSON TRL	3.31	Bardstown Rd	Billtown Rd	35
4	S	WENZEL ST	0.20	E Main St	E Jefferson St	35
1		WHIPPS MILL RD	0.42	La Grange Rd	N Hurstbourne Pky	35
1		WHIPPS MILL RD	1.93	Shelbyville Rd	Millbrook Rd	35
1		WIBBLE HILL RD	0.47	S English Station Rd	S Beckley Station Rd	30
4		WILSON AVE	0.92	S 22nd St	Beech St	35
		WILSON AVE	0.43	Beech St	Algonquin Pky	25
3		WINSTEAD DR	0.46	Cane Run Rd	Greenbelt Hwy	35
4		WINTER AVE	0.30	Barrett Ave	Grinstead Dr	35
4	E	WITHERSPOON ST	0.97	N 1st St	River Rd	35
4	W	WITHERSPOON ST	0.09	N 1st St	N 2nd St	35
1		WOLF PEN BRANCH RD	4.27	Chamberlain Ln	River Rd	35
4		WOODBINE ST	0.24	S Brook St	S Preston St	35
4	E	WOODLAWN AVE	0.58	Almond Ave	Nevada Ave	35
4	W	WOODLAWN AVE	0.30	Almond Ave	Southern Pky	25
3		WOODRIDGE DR	0.29	Deering Rd	Deering Heights Dr	35
4		ZORN AVE	1.19	Reidling Dr	River Rd	35

*** These speed limits are as determined by the Director of Metro Public Works**

483.92

STATE ROADS IN THE LOUISVILLE METRO AREA

Please follow the link below for the most updated list of State Roads in the Louisville Metro Area.

http://transportation.ky.gov/Planning/State%20Primary%20Road%20System%20Lists/Jefferson.pdf

DEFINITIONS

Controlled joint- intentionally inserted grooves in concrete surfaces to control unwanted cracking. These joints are inserted before curing and any stress the concrete is subject to will not produce cracks that cause the concrete to fail

Dummy joint- slot cut into a concrete slab to prevent serious fracture.
The Roadside Design Guide is a guide that presents a synthesis of current information and operating practices related to roadside safety and is developed and maintained by AASHTO.

Reasonable life- life expectancy, an estimated time that the structure will remain safe and stable.

Standard Criteria- includes standard drawings and standard specifications

BOREING & JACKING

1.0. INSTALLATION OF THE GAS PIPELINES (DIRECTIONALLY DRILLED)

1.1. Directional Drilling Requirements.

1.1.1. The Contractor shall provide for a remote navigation system capable of accurately tracking the position of the drill, reamer, and pipe during the drilling and pullback operation in both the vertical and horizontal planes. A walk over system is acceptable.

1.1.2. The Contractor shall arrange, and shall be responsible for providing the fresh water supply for mixing the drilling mud. River/creek water shall not be used. The Contractor shall use an inert substance such as bentonite for the drilling slurry. The Contractor is to supply information on the type of slurry material to be used.

1.2. Entry and Exit Angles and Required Depth.

1.2.1. The Contractor shall state the entry and exit angles of the directional drill and the carrier pipe for LG&E's review. The Contractor shall be required to maintain the depth defined on the project drawings.

1.2.2. The Contractor shall install the gas main with a standard depth of cover of 36-inches minimum, 42-inches maximum and a clearance of 24 inches from all substructure facilities. The Contractor shall notify the LG&E Field Representative of any proposed deviations from these requirements. The LG&E Field Representative must review and approve such deviations.

1.3. Mechanical Damage

1.3.1. Any dent, gouge, groove, scratch, tear, arc-burn or similar irregularity must be brought to the attention of the LG&E Field Representative as soon as it is detected.

1.4. Pipe String and Pullback.

1.4.1. The pipe shall be set on rollers to prevent damage to the pipe during pullback. The rollers shall be spaced such that the point loading on the pipe is distributed over enough rollers to prevent damage to the pipe.

1.5. Slurry Pits.

1.5.1. Since normal drilling operations require slurry pits to be excavated for containment and collection, the following shall be adhered to by the Contractor:

1.5.1.1. All slurry shall be collected in the excavation slurry pits. Slurry pits shall be excavated only in the launching and receiving areas.

1.5.1.2. The Contractor shall be required to excavate the pits for the collection of the slurry.

1.5.1.3. Hay bales and silt curtains shall be installed two feet away and around the slurry pits to collect any run-off.

1.5.1.4. Once work has been completed and prior to backfilling the slurry pits, any remaining water must be pumped from the slurry pits into a tank truck for disposal by the Contractor. The bentonite, which has accumulated in the pit, shall be removed and disposed of by the Contractor.

1.5.2. The Contractor is to develop contingency plans for the collection of any slurry that might rise through the ground during drilling operations and outside the containment area of the slurry pits. If this happens, the Contractor shall immediately stop drilling operations and take containment and mitigation measures. Such measures shall include, but not be limited to, excavating collection pools, setting up barriers of hay bales and silt curtains to prevent the mud from spreading, and cleaning up any spills on the job site.

1.5.3. Silt fencing shall be placed at all construction activity at the launching and receiving areas. The silt fencing shall be placed around the pits so that no runoff can enter the existing roadside ditches. The Contractor shall maintain extra quantities silt fencing to be used as required during the directional drilling operations.

1.6. Removal of Slurry. During drilling operations at the launching and receiving slurry pits, the Contractor shall make all necessary arrangement for the safe and clean collection and removal of all slurry. Prior to the slurry reaching two feet to the top of grade, the Contractor shall take all necessary steps to empty the slurry pit and remove the slurry from the construction area. This slurry is to be properly transported and disposed of in accordance with all state and/or federal requirements.

Technical Note (December 30, 2004)
Directional Drilling Damage Prevention Guidelines for the Natural Gas Industry

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See Notice and Disclaimer on final page.

DIRECTIONAL DRILLING DAMAGE PREVENTION GUIDELINES FOR THE NATURAL GAS INDUSTRY

PURPOSE

The purpose of this paper is to provide general guidelines for natural gas operators to use in the enhancement of their company's damage prevention programs for directional drilling operations. This paper provides parameters for protecting existing natural gas facilities from damage during directional drilling activities, as well as includes general guidance on underground damage prevention procedures when installing new natural gas facilities by directional drilling.

Each natural gas operator is responsible for developing their own damage prevention program with guidelines, policies and procedures that are specific to the application of directional drilling within the region of their facilities. The information in this document is not intended to replace local, state, federal or private company rules or regulations. These guidelines are a suggested guide only, and the use of these guidelines or any variation thereof, shall be at the sole discretion and risk of the user parties.

BACKGROUND

The background of the need for the development of these safety guidelines is based on suggestions from two governmental agencies associated with the natural gas pipeline industry and a request from a natural gas industry association:

- National Transportations Safety Board (NTSB) Safety Recommendation P-99-1, dated April 28, 1999, which directed that the Research & Special Programs Administration (RSPA) ensure that the natural gas operators' damage prevention programs include actions to protect their facilities when directional drilling operations are conducted in proximity to those facilities.
- In follow-up to this advisory, RSPA issued a Pipeline Safety Advisory Bulletin ADB-99-04, dated August 23, 1999 to all owners and operators of hazardous liquid and natural gas pipeline facilities. This advisory urged these operators to review, and amend if necessary, their written damage prevention program to minimize the risks associated with directional drilling and other trenchless technology operations near buried pipelines. Its purpose was to ensure that pipeline operators take actions to recognize the dangers associated with directional drilling and other trenchless technology operations, and to ensure that underground pipeline facilities are adequately located and protected from inadvertent damage.

- The American Gas Association (AGA) Operating Section Managing Committee requested that general safety guidelines for directional drilling operations in the proximity of natural gas facilities be developed.

RESOURCES

There are numerous articles, guidelines and instructions on the practice of directional drilling from various trade associations and manufacturers of equipment. Those documents are excellent resources for understanding the full extent of safe directional drilling practices. Though this paper will incorporate many of the already documented practices for safe directional drilling, its main purpose is to highlight the appropriate safety practices for natural gas operators to ensure that their underground facilities are adequately located and protected from damage.

The sources used for this paper include excerpts from materials prepared by the directional drilling trade associations, along with suggested practices that are in-development and in-place by member companies of the AGA.

DESCRIPTION OF PROCESS

Directional drilling is a trenchless method of installing underground facilities that can reduce the expense and difficulties that are experienced in open trench construction practices. The usage of directional drilling will be determined by the operator based on many factors. Some of these factors may include the site conditions, size of job, soil conditions, environmental considerations, subsurface interference, traffic disruption, and disruption to the public. It is typically used on river or stream crossings, railroad crossings, highway crossings, well-developed areas and environmentally sensitive areas.

The typical technique for installing pipe by directional drilling uses a surface mounted drill rig that launches drill rods creating a string of rods (called the drill string) below the ground guided by a drill head that is directionally controlled by the drill operator. The direction of the drill is along a pre-determined path (called the drill path) based upon the above ground and below ground, pre-construction investigations of the site. A locating device is used during the drill to track the location of the drill head so that the operator may make adjustments as necessary. A small diameter pilot hole is drilled from the entrance point (typically in a sending pit) to the desired exit point (receiving pit). It is necessary to use a drilling fluid during drilling to lubricate and protect the pipe, and to maintain the size of the hole being opened. Following the exit of the pilot drill bit, the hole is then enlarged by the use of a backreamer attached to the end of the drill string which is pulled back through the pilot hole. As the backreaming takes place, the pipe being installed is also pulled into the hole. Directional drilling may require the use of a casing pipe to protect the carrier pipe where required and/or dictated by an outside agency.

DIRECTIONAL DRILLING GUIDELINES

General

The listed guidelines are general in nature and contain some suggested procedures. Precautions recommended by manufacturers of trenchless technology equipment should be reviewed prior to construction. Applicable state and local requirements for damage prevention should be followed.

Employee Safety

- Directional drilling, whether by the operator in installing new natural gas pipelines or by a third party installing facilities in the proximity of natural gas pipelines, should follow normal construction safety practices that are in accordance with local and federal safety guidelines.
- In addition, all recommended safety practices by directional drilling equipment manufacturers should be adhered to.
- The primary safety issue for field personnel is striking underground utilities. Proper planning and adequate protective measures will provide a safe work environment for the crews and minimize utility damage.
- Employees involved in any aspect of a directional drilling project should wear the appropriate protective equipment based on the conditions they are operating in and required by federal, state, local and company regulations. Appropriate personal protective equipment for directional drilling operations may include, but is not limited to, the following items: hard hat, gloves, safety glasses, hearing protection, flagger/traffic vests, dust masks, and electrical-protection gloves and boots.
- All drill machines should be equipped with an electrical strike detector in the event that the drill rods strike an energized underground utility. Field personnel should make sure that the strike detector is fully operational prior to the start of any directional drilling activities. The strike detector shall be entered into the ground prior to setting the anchor stakes into the ground.
- The drilling machine shall be properly grounded to assure operator protection in the event that the drill rod hits an electric line. Should the alarm go off, the operator should remain on the grounded machine until the drill rod is disconnected from the electrical line or the electric line is shut down.

- Only employees who have been trained and qualified should be permitted to operate the drilling equipment. Personnel should familiarize themselves with any safety concerns addressed in the operator's manual.

Planning

- If directional drilling must be used in streets with parallel runs of gas transmission mains, electric transmission lines, hazardous liquid pipelines, fiber optic lines and other similar facilities, it is advised that a minimum separation between the various underground facilities be established that ensures the safety of the facilities.
- The separation between the gas pipeline and other facilities must be sufficient to allow for maintenance activities on both utilities. Be sure to check local regulations for the minimum separation distances between the gas pipeline and the other facilities.
- Design and installation of metallic structures should be done in such a manner to minimize and mitigate damage from stray current and to prevent interference with existing cathodic protection current distribution on adjacent or crossed facilities.
- Drill paths that are parallel to within 3 feet of any utility, including gas lines, should be avoided. However, when deemed necessary to drill within 3 feet of a utility, the drill head should be physically located at regular intervals dependent on soil type and surrounding conditions.
- Drilling contractor should have a plan in place in the event of a utility strike. This plan should also include the notification of the utility owner.

Site Investigation

- Establish a proposed drill path and visually inspect the potential site for suitability for directional drilling by walking the area.
- Be alert to any obstructions and indications of the presence of other underground facilities or structures such as catch basins, sewers, water boxes, manhole covers, valve box covers, meter pits, telephone and cable television boxes, electrical transformers, conduit or drop lines from utility poles, pavement patches, previous locate marks, ditch line depressions, out buildings that may have unmarked utilities serving them, underground shutoffs, etc.
- Consider talking with local residents who may have knowledge of subsurface activities in the area.
- Review available underground facility maps.

- Depending on the scope of the project, most directionally drilled natural gas main installations should be straight, with a 3 feet minimum cover, and not vary by more than 2 feet horizontally. However, each utility will need to determine the appropriate minimum cover based on their company's operating specifications as well as the actual physical operating conditions where the pipe is installed.
- Establish a site where there is sufficient room for entrance and exit tie-in pits, drill equipment, and safe operation.
- After determining the proposed drill path and delineating the work area with white paint, contact the appropriate utility One-Call provider to ensure that all underground facilities are located and marked accordingly by their owners. Request through the One-Call provider the location of other underground utilities. If possible, identify the presence of utilities not located through One-Call and attempt to determine their location by contacting the owner(s) of those facilities or employing other means to identify the path in which they are running. Note: not all One-Call Centers will send mark-out requests for design purposes.
- In locating facilities, it should be noted that One-Call providers will only help to notify owners of active utility services. Since there may be abandoned and private services that are not located, it is worthwhile to check with utility companies or local residents to determine if their knowledge will reveal any helpful information for critical situations.
- In finalizing the drill path, determine the depth and location of all underground facilities along that path to the extent practicable. Test holing should be considered.
- Establish locations of all entrance and exit pits to ensure that there are not any aboveground or subsurface structures that would interfere with the drilling equipment's operation. Ensure that there is adequate clearance of overhead electric, telephone or cable lines for these locations.
- Establish by test holes or from experience the suitability of soil conditions for directional drilling along the proposed drill path. Directional drilling may not be suitable if the subsoil is composed of large grain material (e.g., gravel and cobble fragments, rock, buried debris, abandoned foundations).

Pre-construction

- Call the local One-Call provider with sufficient advance notice to ensure that all underground facilities are marked, or verified that they are not in the location of the proposed work.

- Notification to all underground utilities through the local One-Call provider must be typically made 48 to 72 hours prior to the start of any directional drilling, depending on the requirements in the state where work is taking place.
- Notify residential and business neighbors, along with privately owned services (e.g., gas, water, and electric) in the area of impending work.
- Proper jobsite setup and layout are essential to ensure safe directional drilling operations. The following should be considered when preparing the jobsite: work area protection, flagger requirements, barricades or other methods to safeguard the public and employees, applicable safety and excavation requirements, marking and locating hazards, verifying One-Call markings, checking location and depth of underground facilities, checking for signs of venting associated with underground tanks, etc.
- There should be a briefing for all employees on the jobsite prior to beginning operations and periodically during the project. The briefing should include:
    - Overview of project plans and identification of field supervision
    - Location and access to local emergency facilities
    - Location and type of buried services and overhead obstructions
    - Jobsite safety: warnings, barriers, emergency procedures, personal protective equipment
- Review the selected locations for the boring machine and the entrance/exit pits to ensure that there are no subsurface or aboveground interferences.
- A visual inspection should be made for the proposed drill path just prior to the drilling operation to ensure that all utilities are marked and that there are no subsurface interferences.
- Expose all underground utilities that are perpendicular or parallel to the bore path, and verify the depth of the facilities. Efforts to locate the existing facility may utilize such techniques as electronic location devices, hand digging, pot holing when practical, vacuum excavation methods, use of pressurized air or water, pneumatic hand tools or other noninvasive methods. Note: some HDD methods use slurry, and digging void in the drill path causes the drill slurry to rise to the surface.
- Existing underground facilities should be exposed with sufficient space around the facility so that the drilling operation can be visually checked to ensure that it will not impact the facility.
- If in the course of excavation the location of the existing facility is found to be incorrect, the facility owner should be contacted so they can correct their records.

- The crew leader should visually inspect the planned drill path, just prior to proceeding with the drilling operation, to ensure that all utility services and underground structures have been identified and test holes made as required.
- Avoid sinking anchor stakes for the boring machine within 24 inches of any utility. If this requirement is impossible to meet, then test holes should be made at a depth equal to 12 inches deeper than the length of the anchor stakes to ensure no strike will occur when anchoring the machine.

Construction

- Parallel installations: Test holes should be excavated at intervals along the existing underground facility closest to the drill path to positively locate and inspect this facility throughout drilling operations to assure no direct or incidental contact. Test holes should be a minimum of 12" deeper than the desired depth of the facility that is to be installed. The minimum intervals for these test holes are dependent on the proximity of the existing facility to the drill path, as well as the type of facility being paralleled. The drilling path should be continuously monitored and it is suggested that the location of the drill head is marked at least every 10 feet.
- Paralleling gas installations: For existing gas facilities, a typical suggestion is to excavate a test hole every 50 feet if the drill path is within 5 feet of a distribution gas pipeline. If an existing gas pipeline that is being paralleled crosses under pavement, the pipeline should be exposed at each curb for monitoring. The intervals for the test holes will be dependent on the proximity of the existing pipeline to the drill path, as well as the type of gas pipeline in operation.
- Crossing installations: Consider excavating test holes at all crossing locations to the extent practicable. The existing facility should be completely exposed with sufficient visual area so that it can be assured that the drilling operations do not impact the facility. A typical practice is to excavate at least 12 inches below the existing facility and 24 inches on either side of the located position of the facility to be crossed. The 24 inches on either side is in addition to the facility width marked by the line locator.
- The test holes can be used to observe the drill head as it passes exposed substructures. Test holes are also used to ensure adequate clearance for the back-reamer (pull-back head). Note that the backreaming process will be a larger hole size and should be taken into consideration when specifying minimum separation distances from existing facilities.
- Establish, check and maintain proper radio communication between the operator and locator at all times before and during directional drilling operations. Communication between the drill operator, locator and operating personnel is

critical. Adequate communications should be established between the operator of the drill rig and the crew member that is tracking the location of the drill string during these operations. Appropriate hand signals should be agreed upon in case the electronic communication fails.

- Appropriate locate and guidance equipment for steering and maintaining accurate location of the drilling head should be used during all drilling operations. Using electronic locating equipment, the location of the drill head during the drilling operation should be continuously monitored to ensure that the drill path follows the design profile. Locations should be marked or staked as required. The drill head should be inspected at test holes previously made at substructure locations to ensure adequate clearance.
- If possible, maintain a minimum separation of 12" when crossing gas facilities; however, if facilities are fully exposed, then a separation of less than 12” may be considered where regulations allow.
- The aboveground drill path should be sufficiently accessible to allow the locator to be able to monitor the progress of the drill head. Overhead structures or wire lines may present potential problems in the accuracy of the electronic locator along the drill path. Steel-reinforced concrete (e.g., sidewalks, driveways, roads, etc.), invisible dog fences, underground power cables and fiber optic cable can also present problems and may interfere in use of the locator. Walking the drill path with the locator prior to the drill string being started can reveal interference problems.
- The horizontal and vertical position of the drill head should be closely monitored as the drilling progresses. The location of the reaming tool should also be closely monitored during the backreaming process to ensure that the reaming tool follows the path of the pilot hole.
- Directional drilling crews should perform periodic sweeps of the area during the project to further ensure that all possible attempts to avoid damage to marked and unmarked facilities have been made.
- Cease drilling operations if an unidentifiable, abnormal or unanticipated resistance or sudden movement of the drill string is encountered. Also, cease operations if other conditions develop (lightning, etc.) that could affect the safe operation of the equipment and personnel. Proceed only after the source of the disturbance has been identified and/or eliminated. Particular care should be taken to ensure that existing substructures are not penetrated. If any underground facility is known to be damaged during the project, notify the appropriate operator and/or emergency response personnel immediately, as appropriate.

- If determined to be needed following the completion of a directional drill near an existing gas pipeline, perform a leak survey of the pipeline to ensure that it was not impacted by the new installation.

Directional Drilling in Proximity of Sewer Facilities

- Sewer systems are especially vulnerable to damage from directional drilling operations for the following reasons:
  - Lines are often non-metallic, making them difficult to locate.
  - Clean-outs or other indications of laterals may be hidden or non-existent.
  - Damage may not be readily apparent when a sewer, particularly a gravity flow system, is pierced by a drilling machine.
- Additional efforts should be considered in determining whether sewer lines and laterals are within the proposed construction area of a directional drilling project. Some of these efforts may include the following:
  - Contact the city, building owners, local plumbers, and other persons that can provide assistance with identifying the existence and location of sewer lines.
  - Obtain maps and drawings of the sewer system from the city or other entity. Maps can provide the depth of the sewer lines and other valuable information that can assist in determining the location of the sewer lines within the proposed drill path.
  - Visually check the job site for sewer cleanouts, manhole covers, and any markings on curbs or gutters that may exist for sewer facilities.
  - Use internal camera systems, if available, that travel down the main sewer line and allow the laterals to be located visually.
  - Use electronic technology, if available, to track a locating transmitter inserted into a sewer and/or lateral to determine its path and depth.
  - Use ground penetrating radar, if available, to assist in locating sewer lines and laterals.
- In determining the depth of the sewer and laterals, the following guidelines should be considered:
  - If a sewer line is located, check the direction of the flow of the water and the direction of the pipe. The flow direction will tell the grade of the sewer. It will help judge whether the sewer will be shallower or deeper where the drill is being made.
  - Access manhole covers and measure the depth of the main sewer line.
  - Access outside clean-outs and measure the depth of the sewer line lateral. Caution should be taken because a sewer lateral may not have a consistent grade from the building entrance to the sewer line.
  - Obtain access to buildings that do not have an outside clean-out and visually identify where the sewer exits the structure. Visually determine the depth of the sewer lateral by identifying where the lateral exits the building versus the depth of the sewer main at the street.

- If known sewer facilities cannot be positively located, then consider the following alternatives:
    - Do not use directional drilling or other trenchless equipment for installing the gas main or service.
    - Use the directional drilling equipment and perform a post-construction camera inspection of possibly affected sewer lines.
    - Use directional drilling equipment only in those areas where the location and depth of sewer lines have been determined to be safely outside the drill path and use open trench equipment for areas where the sewer line conflicts have not been ruled out.
    - Use a sewer listening device where sewer lines are not physically exposed. It is important that a person monitoring the sewer for penetration be alert to any unusual noise and immediately communicates the information to the equipment operator. It is possible that the drill penetration will coincide with a resistance felt by the operator.

NOTE: These ”Directional Drilling Damage Prevention Guidelines for the Natural Gas Industry” are a suggested guide only, and the use of these Guidelines or any variation thereof, shall be at the sole discretion and risk of the user parties. **See Notice and Disclaimer on final page.**

SOURCES

- National Transportations Safety Board (NTSB) Safety Recommendation P-99-1, dated April 28, 1999
- RSPA Pipeline Safety Advisory Bulletin ADB-99-04, dated August 23, 1999
- GPTC Guide for Gas Transmission and Distribution Piping Systems: 2003 Edition - Guide Material Appendix G-192-6 - “Subsurface Damage Prevention Guidelines for Directional Drilling and Other Trenchless Technologies”
- “Common Ground: Study of One-Call Systems and Damage Prevention Best Practices”, August 1999
- HDD Consortium, “Horizontal Directional Drilling - Good Practice Guidelines”, May 2001
- Directional Crossing Contractors Association, “Horizontal Drilling Safe Operations Guidelines”, 2000
- Various member companies of the American Gas Association - specifications, operations guidelines, procedures manuals, etc.

Notices and Disclaimer

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