6 Trenches and Street Openings

6.1 General

A. Any contractor, corporation, public utility or person desiring to open a public way must comply with the City's Street Opening Permit (SOP) policy and the associated standard operating procedures. For further information, please refer to City of Framingham Web site link as follows: https://www.framinghamma.gov/207/Street-Opening-Obstruction-Trench-Permit.

E. All trench repair work must be guaranteed and bonded as required in the City's Street Opening Permit (SOP) policy. All trenches, whether on public or private property, that are at least 3 feet in depth and less than 15 feet in width, regardless of the length, shall be permitted throughout the City of Framingham as required by Massachusetts law, 520 CMR 14.00. All work shall be conducted in strict accordance with the latest OSHA regulations.

F. Work within public roadways is not permitted between November 15 and April 1, unless special approval is granted by the DPW.

E. No excavation shall remain open after working hours (7:00 a.m. to 5:00 p.m. or as specified in specific City requirements). All excavations shall be backfilled and paved, or covered with steel plates as approved by DPW at the end of work each day.

F. Workmanship:

1. The Contractor shall furnish all materials and conduct the job in an orderly, timely, quality controlled manner. Materials shall conform to the specifications in Section 5 Roadway of the City's Construction Standard.
2. The Contractor shall keep a competent foreman and sufficient competent employees to carry on the work with proper speed and in accordance with the requirements of law and other public authorities and to the reasonable satisfaction of the DPW.
3. The Contractor shall conduct the work in a manner that will not unreasonably interfere with other work being done by the City, by contract or otherwise. If deemed necessary by the DPW, the work done under these standards shall conform to the progress of said other work. The Contractor shall cooperate with the contractors or employees who may be doing work for the City, and with public service corporations affected by the work in arranging for storage places, temporary support for structures, repairs, etc.
4. All temporary repairs shall be properly maintained by the Contractor to assure good rideability conditions until the end of the guarantee period or until permanent restoration has been made, whichever first occurs.
5. Permanent pavement restoration accomplished by utility companies shall be properly maintained to assure good rideability conditions until acceptance by the DPW.
6. All existing roadway monumentation shall be inventoried and protected. Any and all impacts shall be brought to the attention of the Engineering Division immediately.

G. Disposal of removed pavement, concrete, soil, or other material shall comply with the DPW's Waste Management and Soil Management specifications. The disposal location and management plan shall be pre-approved by the DPW, prior to the start of any work.

H. All traffic devices, signs, pavement markings or traffic loops disturbed, damaged, altered or removed by the Contractor shall be promptly replaced by the Contractor, unless otherwise directed by the DPW, in accordance with City and State of Massachusetts rules and regulations at the

expense of the Contractor. The Contractor shall promptly repair all other damage caused by the work or activities. Street markings (centerlines, crosswalks, stop bars, lane markings, etc.) and traffic loops shall be replaced no later than thirty (30) days after completion of work or as may be directed by the City Engineer. If work disturbs centerlines or lane markings on primary streets, the Contractor shall place temporary reflective markers immediately after the pavement is placed. Traffic markings must be restored by end of day, either after removal or paving. Temporary markings are allowed.

I. A complete Street Opening Permit shall be submitted to and approved by the DPW prior to commencing work. The DPW requires that a traffic management plan be prepared and submitted for review and approval with the Street Opening Permit application.

6.2 Excavation

A. DIG SAFE shall be contacted to determine the location of all existing underground utilities prior to any excavation. Framingham Fire Department shall be contacted to mark out their lines.

B. The maximum length of open trench permissible at any time shall be two hundred (200 feet) feet, and no greater length shall be opened for pavement removal, excavation, construction, backfilling, repairing, or any other operation without the express written permission of the City.

C. Sections of sidewalks and curbs shall be removed to the nearest real joint or scored line.

D. Tunneling, boring or other methods may be required by the DPW to avoid or minimize pavement removal.

E. Removal of asphalt pavement:

1. All initial excavations into paved street surfaces shall be precut in a neat line with pavement breakers or saws. The initial cutting of the pavement shall be restricted to the area directly over the sidewalls of the proposed trench to be excavated, or as directed by the DPW.
2. Heavy duty pavement breakers may be prohibited by the City when the use endangers existing substructures or other property.
3. No irregular shapes will be allowed. No shape will be allowed that would prevent compaction equipment from adequately compacting all of the area. The shape of pavement cutouts shall be rectangular, or a combination of rectangular and square shapes unless otherwise agreed to by the City and Contractor.
4. Pavement edges shall be trimmed to a neat vertical face free of loose materials and neatly aligned with the centerline of the trench.
5. Unstable pavement shall be removed over cave outs and overbreaks and the subgrade shall be treated as the main trench.
6. The Contractor shall make every effort to avoid damage to existing pavement to remain. Any damage shall be promptly repaired by the Contractor.

F. Removal of concrete pavement:

1. Saw cutting of reinforced Portland cement concrete is required with the depth of the cut being the full depth of the pavement unless otherwise directed by the DPW to retain reinforcement. Sawcutting may be required by the DPW outside of the limits of the excavation over cave-outs, overbreaks and small floating sections.
2. Reinforced concrete pavement, to the extent possible, shall be removed without cutting the reinforcement. The bars or mesh, when cut, shall be severed as close to the center of the

trench as practicable and bent back to permit accomplishment of the work. When the pavement is ready to be permanently replaced, the reinforcement shall be bent back into position and reinforced with other bars or mesh which shall overlap the ends of existing reinforcement not less than twelve (12) inches and be securely wired together. Contact faces between new and existing concrete pavement shall be bonded using an approved epoxy binding agent installed and applied in accordance with the manufacturer's instructions, unless otherwise directed by the DPW.

G. All material excavated from trenches and piled adjacent to the trench or in any street shall be piled and maintained in a manner that will not endanger those working in the trench, pedestrians or users of the streets, and so that as little inconvenience and obstruction as possible is caused to those using streets and adjoining property. The excavated material shall be hauled away from the site by the end of each working day.

H. The Contractor shall secure the necessary permission and make all necessary arrangements for all required storage and disposal sites.

I. When excavated material is laid along the side of the trench, it shall be kept trimmed. Whenever necessary in order to expedite the flow of traffic or to abate the dirt or dust nuisance, toe boards or bins may be required by the DPW to prevent the spreading of dirt into traffic lanes. If any portion of the excavated material is allowed to be used as backfill, it shall be stockpiled separately from all other materials.

6.3 Steel Plates in Roadways

A. Steel plates shall not be used without DPW approval.

B. Steel plates shall not be used between November 15 and April 1 without DPW approval, or at any time when snow or freezing rain is forecasted.

A. Plates and supporting members shall be steel, either new or used.

1. All materials shall be sound and free of damage or deterioration that would adversely affect functions.
2. Load and deflection calculations shall be used on ASTM A36 / A36M steel unless Contractor provides evidence that all steel used for the plate systems will be a higher strength grade.

C. Steel plates in vehicular and pedestrian traffic areas shall be coated with an approved skid-resistant coating, if required by the DPW. Preparation of the surface and application of the coating shall be in accordance with all of the manufacturer's guidelines. Coatings shall be maintained on 100 percent of the surface of plates carrying vehicular and pedestrian traffic. Repairs shall be made to worn or deficient areas.

D. Design Requirements:

1. The Contractor shall select and design the temporary steel plate and supporting system. The design calculations and Drawings shall be prepared, signed, and stamped by a Professional Engineer registered in the Commonwealth of Massachusetts experienced in design of temporary traffic decking.
2. Design shall be in accordance with Loads and Design Criteria standard to the industry for this type of work, and with the following requirements:
    a. For vehicular ramps, limit maximum grade to 5 percent.
    b. For pedestrian ramps, limit maximum grade to 8 percent.
    c. Conform with Americans with Disabilities Act Accessibility Guidelines (ADAAG) at all pedestrian traffic locations.

d. Design of support members shall allow clearances for existing and relocated utilities.

e. Provide access to utilities, fire hydrants, and other facilities requiring unique access. Requirements at each site shall be obtained from the respective agencies affected.

E. Construction Methods:

1. Not more than two (2) steel plates shall be used at any time.
2. Steel plates shall be secured with pins and asphalt to prevent movement.
3. Plates shall overlap the trench width by at least 2 feet on each side.

F. Maintenance:

1. Inspect the condition of temporary steel plates at least once a day. Continuously maintain plates to conform to design requirements and construction requirements. Immediately repair defects such as broken, bent, or loose plate members, and protruding fasteners. Patch adjacent paving as potholes develop, and immediately re-secure and bed loose transition members, plates, and ramps to the existing pavement.
2. Maintain steel plates free of accumulations of snow, ice, water, mud, and debris.
3. Perform maintenance, repair, or replacement whenever there is noticeable deterioration of any material or component from its original conditions.

6.4 Backfill

A. In unpaved areas, excavations shall be backfilled as directed by the DPW with approved material conforming to MassDOT Spec M1.02.0.

1. Special borrow for fill shall conform to MassDOT Standard Spec. M1.02.0.
2. Processed gravel for subbase shall conform to MassDOT Standard Spec. M1.03.1.
3. Gravel borrow shall conform to MassDOT Standard Spec. M1.03.0, Type b.
4. Washed crushed stone for subbase shall range in size from ¾ inch to 1½ inch, conforming to MassDOT Standard Spec. M2.01.4 to M2.01.2 and shall be hard, durable and reasonably free from flat or laminated particles to furnish free draining material.

A. Special Borrow shall be thoroughly compacted in layers not to exceed twelve inches (12 inches) in thickness until flush with the surrounding ground surface. All backfill shall be rough graded and compacted to not less than 95 percent of the maximum dry density of the material as determined by the Standard AASHTO Test Designation T 99, Compaction Test Method C at optimum moisture content. If the backfilled material settles, additional approved materials shall be installed by the Contractor, as required, to keep the surface even. After settlement is completed, the excavated area shall be left by the Contractor in as good a condition as before the work was started.

B. Temporary sheeting and bracing used to support the side walls shall be removed, unless otherwise directed by the DPW, as backfilling progresses. When backfilling has reached the bottom of a brace, the latter and its horizontal ranger shall be removed, and this procedure shall be repeated throughout the backfilling operation. The sheeting shall be pulled in short increments, care being taken to avoid significant lateral movements of the sides of the trench. During and after pulling the sheeting, the backfill in the space formerly occupied by the sheeting shall be compacted.

C. Whenever water is found standing in the excavation area, the water shall be removed by pump or other means before backfilling operations may commence.

D. Backfilling shall be performed as soon as practicable so that the least possible subsequent settling will occur. In most cases backfilling shall occur on the same day as the excavation was begun. If this is not feasible due to the complex nature of work, emergency, or unpreventable conditions, the Contractor shall notify the DPW that same day, if not sooner, and take appropriate measures to protect public safety and infrastructure until work commences again the following day.

E. Backfill in paved areas shall be granular gravel borrow, processed gravel, sand or crushed stone material. At the City's discretion, in-situ material conforming to MassDOT Spec M1.02.0, Special Borrow may be used for trench backfill above the pipe bedding material and below the roadway foundation materials. The backfill shall be spread in layers not exceeding eight inches (8 inches) in loose depth and thoroughly compacted, up to the pavement subgrade surface. All backfill shall be rough graded and compacted to not less than 95 percent of the maximum dry density of the material as determined by the Standard AASHTO Test Designation T 99, Compaction Test Method C at optimum moisture content.

F. Broken pavement, large stones, roots and other debris shall not be used in backfill. Unused excavated material shall be removed from the jobsite and disposed of in a manner that will minimize interference and obstruction with pedestrian and vehicular traffic. No material shall be left within the right-of-way once the repair and/or installation is complete.

G. The City will allow, and may in some cases require under certain conditions, as an alternate, Controlled Density Fill (CDF) under the following conditions:

1. Only Type IE, Excavatable, Fill will be allowed.
2. This material shall not be used for bedding material or in situations that will cause floating of the utility lines, or in the presence of cast iron or steel pipes.
3. CDF placement in trenches shall be fully barricaded or police protected for a minimum of three (3) hours after the pour or until a set is reached that will prevent a hazard to animals or humans.
4. CDF shall be placed up to the pavement subgrade surface.
5. CDF shall be separated from gas lines with a minimum of six (6) inches of sand cover over the lines.
6. CDF shall be allowed to set up in accordance with manufacturer's recodmmendation before backfilling or paving.

6.5 Temporary Pavement

B. Temporary pavement shall be hot-mixed asphalt MassDOT Type I top course material conforming to MassDOT M3.01.0 and M3.11.07.

A. Upon the completion of proper backfilling, the Contractor shall install temporary pavement. The Contractor shall take all reasonable measures to complete temporary pavement on the same day excavation work was begun. If same day paving is not achievable due to complexity of work, emergency, or unpreventable conditions, the Contractor must notify the DPW as soon as practicable that same day and take appropriate measures to protect the public safety and infrastructure until work commences again the following day. The most stringent measures will be required on primary streets. Same day paving will typically be required if work is not expected to be continued the next day, regardless of location.

B. The Contractor shall notify the DPW 48 hours prior to beginning paving operations for inspection. All hot mixed asphalt paving must first be approved by the DPW or designee as to depth and materials; this *applies to both temporary and permanent paving activities*.

1. Receipt of notification of the anticipated timing of all paving activity must be acknowledged by the DPW.
2. Contractors shall endeavor to make a follow-up notification by 7:00 AM of each workday that paving is still anticipated. In the event of schedule changes or emergencies, the Contractor shall provide a minimum of one-hour notification to assure inspection availability.
3. If a City inspector is not able to be on site within 24 hours of the acknowledged anticipated start time of paving activity, the Contractor may be allowed to commence paving. Inspector may sample in-place material for specification compliance.
4. Contractors who do not provide proper notification of paving activities may be subject to required removal and replacement of pavement for the purpose of inspection.

C. The total thickness of the gravel base material and temporary pavement shall be of an adequate thickness to allow for the proper permanent roadway cross section. Extra gravel base may need to be installed.

D. All temporary pavement shall be hot mixed asphalt, conforming to MassDOT Standard Section 460, placed in two (2) inch compacted courses to a total depth of four (4) inches. If existing pavement depth is greater than eight (8) inches, temporary pavement shall be placed in two (2) inch compacted courses to a total depth of six (6) inches. If a layer of concrete, cobblestone, granite pavers, or other supporting material also exists, the Contractor shall install concrete to match that depth prior to installing temporary pavement.

E. If excavation (or pavement damage) occurs at or within twenty four (24) inches of the edge of trench, the Contractor shall place temporary pavement to the edge of existing sound pavement.

F. Hot mixed asphalt paving of trenches deemed by the DPW to be major excavation shall be paver applied, unless otherwise authorized by the DPW.

G. A pavement marker shall be installed. The markers will display the year the work was completed and identify the owner by color-coding. Color coding is as follows:

1. Water – BLUE
2. Sewer – GREEN
3. Highway/Drainage – WHITE
4. DPW capital project – PURPLE
5. Street Opening Permit – ORANGE (Temporary pavement remaining minimum 120 days) RED (Permanent pavement)

H. The Contractor shall maintain the temporary pavement and shall keep the temporary pavement in acceptable condition until the end of the guarantee period, or until permanent pavement is installed.

I. Refilling of bar holes made in the street or sidewalk shall immediately, upon completion of the work, be filled with compacted, granular material up to three (3) inches below the paved surface and the remaining three (3) inches filled with an approved asphalt plug.

J. All traffic control signs approved by the DPW for removal, relocation, or replacement shall be immediately replaced by the Contractor, unless otherwise directed by the City Engineer. No such traffic control sign shall be removed, relocated or replaced without the express approval of the DPW.

6.6 Permanent Pavement

A. Permanent pavement materials shall conform to the same MassDOT Standard Specifications as required for temporary pavement. Pavement markings shall conform to MassDOT Standard Section 860.

B. The existing pavement shall be saw cut a minimum of six (6) inches beyond the initial excavation limits to expose a six (6) inch width of undisturbed soil.

C. The temporary pavement, backfill and undisturbed soil shall be removed to the depth of the proposed pavement and disposed of offsite.

D. The permanent pavement shall be:

1. Local Streets: 1.5 inches of Top Course material placed on 2.5 inches of Binder Course material founded on 4 inches of Dense Graded Crushed Stone on 8 inches of Processed Gravel or Dense Graded Crushed Stone. This pavement structure shall be placed on the backfill.
2. Collector Streets: 2 inches of Top Course material placed on 4 inches of Binder Course material placed in two equal courses founded on 4 inches of Dense Graded Crushed Stone on 8 inches of Processed Gravel or Dense Graded Crushed Stone.
3. Arterial Streets: 3 inches Modified Top Course material placed in two courses on 5-inches of Binder Course material placed in two equal courses founded on 4 inches of Dense Graded Crushed Stone on 8 inches of Processed Gravel or Dense Graded Crushed Stone.

E. Trench backfill and roadway foundation materials shall be checked for compliance with 95 percent compaction requirement. If compaction is found to be less than 95 percent, trench shall be re-compacted before paving will be allowed.

F. In cases where the existing pavement adjoining a proposed excavation is in need of rehabilitation, the City and Contractor may enter into a mutual agreement such that the Contractor undertakes the pavement rehabilitation as part of their pavement restoration.

G. The Contractor will not be required to repair or replace damaged pavement existing prior to commencement of the work unless excavation operations result in small, unstable sections. These shall be removed and replaced as part of the work.

H. Mechanical compactors will be permitted for repairs less than 10 square yards. Repairs exceeding 10 square yards shall be rolled with an appropriately sized, power-driven, steel-wheeled roller to obtain specification density.

I. Hot-mixed asphalt materials shall be laid upon an approved clean, dry, compacted surface, spread and struck off to the established grade and elevation, giving regard to the loss in depth between loose and compacted mixtures. Immediately after the hot mix asphalt mixture has been spread, struck off, and surface irregularities adjusted, it shall be thoroughly and uniformly compacted.

J. Each course of hot-mixed asphalt shall be compacted separately, meeting the requirement of 92 percent minimum compaction of standard laboratory maximum theoretical density for the specific material.

K. Permanent pavement restorations shall not be allowed to commence until at least one hundred twenty (120) days have passed since the installation of approved temporary hot-mixed asphalt pavement.

L. All saw cut vertical faces of existing pavement shall be neat, free of loose materials, and tack coated with an approved asphalt emulsion by applying the emulsion material in conformance with

MassDOT Standard Specifications Section 460.62, to fully cover the surfaces prior to pavement installation.

M. A tack coat shall be applied to the sub-base surface, or previous course surface.

N. If two or more excavations are made for the same utility or Contractor in the same construction season and are within six (6) feet of each other, edge to edge, they shall be permanently restored as one trench, including the pavement between excavations.

O. Same requirement shall apply, if in a future season, an excavation for the same utility or Contractor occurs within six (6) feet and the first has not yet been permanently restored.

P. If an excavation for the same utility or Contractor falls within six (6) feet of another excavation already permanently restored, the permanent pavement of the second excavation shall include all surface pavement between both excavations.

K. A pavement marker shall be installed. The markers will display the year the work was completed and identify the owner by color-coding. Color coding is as follows:

1. Water – BLUE
2. Sewer – GREEN
3. Highway/Drainage – WHITE
4. DPW capital project – PURPLE
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Q. The Contractor shall perform the necessary restoration beyond the limits of the street pavement, including lawns, esplanades, shrubs, gardens, curbing, sidewalks, underdrains, separations fabrics, fences, walls, etc. Upon completion of the permanent repairs outside the limits of the street pavement, the Contractor shall notify the DPW in writing that the permanent repairs and/or replacements have been completed, setting forth the date of completion. The Contractor shall maintain the repaired area outside of the pavement for a period of three (3) years after completion, with the exception that once proper horticultural growth has been established, no further horticultural maintenance will be required.