

**CITY OF SHEBOYGAN FALLS  
DEPARTMENT OF PUBLIC WORKS**

**Technical Standards for Right of Way Excavation**

Any person or utility having first obtained a street opening permit shall be fully responsible for restoring streets and their appurtenances (e.g. under-drain, geo-textile fabric, geo-grids, sewer and drainage structures, etc.) in complete compliance with this Technical Standard, which references the State of Wisconsin Department of Transportation, Standard Specifications for Highway and Structure Construction, hereinafter referred to as WisDOT Specifications; the Standard Specifications for Sewer & Water Construction in Wisconsin, hereinafter referred to as State Specifications; and the Wisconsin Construction Site Best Management Practice Handbook, hereinafter referred to as BMP Handbook;

Excavation

All work must be conducted in strict accordance with the latest regulations of OSHA for excavations.

- a. All excavations shall be performed in accordance with the Department of Public Works specifications or in a manner as prescribed by the Director of Public Works for circumstances not covered by the specifications.
- b. All material excavated from trenches and piled adjacent to the trench or in any street shall be removed from the site as soon as practical and by the completion of the project. The city shall have the authority to require that the Permittee haul the excavated material offsite immediately upon removal of said material if the stockpiled material poses a potential hazard to vehicular and or pedestrian traffic.
- c. All excavations must be protected from erosion and meet the standards as prescribed in the BMP Handbook.
- d. Breaking Pavements
  1. The permittee shall make every effort to keep the amount of pavement damage to a minimum. Cut in a rectangular shape to ensure a proper repair. Any pavement damage created by permittee's excavation shall be repaired by the permittee.
  2. Saw cut paved street surfaces to the full depth of existing pavement in a neat straight line.
  3. Heavy-duty pavement breakers may be prohibited by the City when the use endangers existing substructures or other property.
  4. Removal limits must be perpendicular or parallel to the trench line. No irregular shapes will typically be allowed.
  5. Trim pavement edges to a vertical face and neatly aligned with the centerline of the trench.
  6. Remove unstable pavement over cave-outs and over-breaks and treat the exposed sub-grade the same as the main trench.
  7. The permittee shall not be required to repair pavement damage outside of the requirements of the "Restoration of Streets" section, existing prior to the excavation unless their cut results in

small floating sections that may be unstable, in which case, the permittee shall remove the unstable portion and the area shall be treated as part of the excavation.

8. When two or more street openings are made under the same permit in sequence six feet or less (edge to edge) between each adjacent opening, the permittee shall neatly cut and remove the area of pavement between these adjacent openings and shall repair the entire area as one trench.
9. Where additional excavations are made for the same client or utility which are six feet or less (edge to edge) from the first excavation or from a previous excavations still under a guarantee period, the permittee shall neatly cut and remove the area of pavement between these adjacent openings and shall repair the area between openings and the most recent opening as one trench.

### Backfill

- a. Conduct all work in strict accordance with the latest regulations of OSHA for excavations.
- b. Protect all work from freezing.
- c. Use temporary or permanent sheeting to support the sidewalls where necessary to prevent undermining of the pavement and/or maintenance of traffic and or safety of personnel.
- d. Whenever water is found standing in the excavation area, the water shall be removed by pump or other means before backfilling operations can commence. Dewatering shall conform to the standards as prescribed in the BMP Handbook.
- e. Backfilling of excavations shall be performed by the permittee as soon as practicable so that the least possible subsequent settling will occur.
- f. **Aggregate Slurry Backfill is required** in all excavations for lateral repairs, manhole repairs, utility spot repairs, and utility valves and curb stops. During night-time emergency repairs when the contractor is not able to leave the excavation exposed overnight due to weather conditions, the contractor may use granular backfill.
- g. All excavated material shall be removed from the job site and disposed of, as the permittee's responsibility, in such a manner that will minimize interference with pedestrian and vehicular traffic. No material shall be left within the right-of-way once the repair and/or installation is complete.
- h. Pavement base:
  1. The pavement base shall be replaced with dense graded base aggregate, spread and compacted to no less than 95% of the maximum dry density of the material. The base thickness under asphalt pavements shall be 12-inches.
- i. The maximum dry density of the material to be used as pavement base shall be filed at the time of application to obtain the permit. The City reserves the right to verify maximum density and field density at any time.
  1. In lieu of dense graded base aggregate, aggregate slurry backfill – used as required trench backfill – may be utilized as the pavement base.

- j. The requirements of this section are intended to maximize compaction and therefore minimize settling.

#### Street Restoration

- a. Concrete pavement streets less than 40 years old require full panel replacement.
- b. Concrete pavement streets older than 40 years old can be restored by partial panel replacement except that when the remaining area is less than six feet, the additional area to the nearest joint shall be included in the repair.
- c. Concrete pavement thickness shall be a minimum of 7 inches or match the thickness of the existing concrete whichever is greater.
- d. Asphalt pavement streets shall be replaced with 4-inch hot mix asphalt pavement over 12-inch base aggregate dense 1 ¼-inch. Place the hot mix asphalt pavement with a 2-inch lower layer and a 2-inch upper layer.
- e. Asphalt overlaid concrete pavement streets shall be replaced with one of the following as directed by the Director of Public Works:
  - 1. A two layer hot mix asphalt pavement matching the thickness of the existing asphalt over 7 inches of concrete pavement. If the existing asphalt thickness is less than 3 inches, the replacement asphalt may be placed in one layer.
  - 2. Hot mix asphalt pavement over base aggregate dense 1 ¼-inch as described in paragraph d. above.
- f. If excavation or pavement damage occurs at or within 24 inches of the edge of pavement, the permittee shall be responsible for repair to the edge of pavement.
- g. Where two or more street openings are made under the same permit in sequence six feet or less (edge to edge) between each adjacent opening, the permittee shall be responsible for repairing the entire area between openings measured from the first opening through the last opening.
- h. Where additional excavations made for the same client or utility are within 6 feet or less (edge to edge) of previous excavations still subject to a guarantee, the permittee shall be responsible for repairing the area between openings.
- i. Upon the completion of proper backfilling, the permittee must notify the Department, allowing hours for the Department to arrive for inspection. All paving must first be approved by the Department as to depth and materials.
- j. Should the circumstances of the pavement replacement require City personnel to be on-site after 4:00 PM, or on holidays, the permittee shall be required to make special arrangements with the Department of Public Works in advance of such scheduled work.

1. Notification of the anticipated timing of all paving activity must be acknowledged by the Department of Public Works; any notification delivered by facsimile machine or email must be preceded or followed up by a telephone conversation to assure its proper and timely receipt.
  2. Permittee shall endeavor to make notification by 9:00 AM of each workday that paving is anticipated. In the event of schedule changes or emergencies, the permittee is required to provide a minimum of one-hour notification to assure inspection availability.
  3. If a City Inspector is not able to be on-site within 30 minutes of the acknowledged anticipated start time of paving activity, the permittee shall be allowed to commence paving in accordance with this section.
  4. Placement of any materials within or upon any subgrade without prior approval from the City Inspector shall be removed by the contractor at the request of the Inspector.
- k. Use a paver for hot-mixed asphalt paving of trenches greater than 100 feet in length unless otherwise authorized by the Director of Public Works.
- l. The permittee shall be responsible for the proper placement and maintenance of the temporary pavement and shall keep pavement level with the surface of the surrounding existing pavement and in proper repair and condition.
- m. Structures:
1. Wherever existing structures, such as manhole frames, storm inlets, catch basins, water valve boxes, etc. are not to the correct elevation, the permittee shall adjust such structures to the new grade and remove/replace all adjusting rings and casting.
  2. The use of cast iron manhole adjusting rings (Paver Rings) is not permitted unless authorized by the Director of Public Works.
  3. Low profile castings may be required to bring structures to grade.
  4. The permittee shall furnish all castings for the project.
  5. Manhole castings damaged or broken by the permittee during construction will be replaced with a new casting at no cost to the City.
  6. When in the opinion of the City Inspector, a sewer manhole casting is in such a condition that it should be replaced and the permittee has not damaged or broken the casting during the construction, the permittee is shall remove the old casting and replace it with a new casting which will be provided by the City.
  7. The maximum amount of manhole adjusting rings shall be 6".
- n. Sidewalks and Pedestrian Ramps
1. If during the construction or repair it is necessary to remove a sidewalk corner, State Statutes require a new sidewalk pedestrian ramp to be constructed in compliance with ADA (Americans with Disabilities Act) requirements.
  2. Construct all pedestrian ramps in compliance with WisDOT Specification section 602.
  3. Cast iron detectable warning plates are required as shown in the WisDOT Standard Detail Drawing 8D5 Curb Ramps. The warning plates shall be 2 feet long measured parallel to the length of the sidewalk and shall extend across the entire width of the sidewalk. The minimum size for the detectable warning plate is 2' x 4'.

- o. Any work that requires excavation within the "Drip Line" of a tree that is located within the city right of way, must receive approval from the Department of Public Works @ 920-467-7901 ext. 301 prior to cutting roots, trimming branches, stump removal and or tree removal.
  - 1. All approved work will be the responsibility of the Permittee.
  - 2. The Contractor will excavate and remove buried roots found existing below the surface of the pavement or sidewalk beginning from the bottom of the sidewalk grade extending 12" below grade. This excavated area shall be filled with granular material and compacted.
  - 3. Stumps shall be removed to a depth of eighteen (18") inches below the bottom of the subgrade elevation.
  
- p. Any pavement markings disturbed by the permittee shall be promptly replaced and or repaired by the permittee.
  
- q. It shall be the responsibility of the permittee to perform the necessary restoration beyond the limits of the pavement, which shall include but not be limited to restoration of lawns, esplanades, shrubs, gardens, curbing, sidewalks, under-drains, separations, fabrics, fences, walls, etc. Upon completion of the permanent repairs outside the limits of the pavement, the permittee shall notify the City Inspector in writing that the permanent repairs or replacement has been completed, setting forth the date of completion. The permittee shall warranty the replacement area outside of the pavement for a period of 12 months after completion.
  
- r. Permanent Pavement Restoration:
  - 1. Permanent restoration of streets shall be made by a qualified contractor prior to the expiration date of the permit.
  - 2. Permanent restoration shall be warranted for a period of 18 months from the documented completion of the restoration.

Material Specifications

- a. Aggregate
  - 1. All aggregates shall conform to WisDOT Specifications Section 301.
  - 2. Pavement base material shall be 1 ¼" gradation, conforming to WisDOT Specifications Section 305.
  - 3. Aggregate slurry backfill shall consist of the following materials as specified in section 501 of the WisDOT Specifications (quantities per nominal cubic yard):
    - 1320 lb. Fine Aggregate
    - 700 lb. Coarse Aggregate No.1
    - 1280 lb. Coarse Aggregate No. 2
    - 25 gal to 30 gal water
    - NO CEMENT IS ALLOWED**

The slump shall be approximately 3-inches.
  
- b. Concrete Pavements
  - 1. All concrete shall conform to the State of Wisconsin Department of Transportation (WisDOT) Standard Specifications Section 501.

2. Concrete pavement placed as part of repair or restoration of the right of way shall consist of Air-entrained concrete containing 6.0 % (+ or – 1%) with a minimum compressive strength of not less than 3500 psi when cylinders are prepared, cured and tested in accordance with ASTM Specifications.
  3. No concrete additives, other than an approved air-entraining admixture, shall be allowed without written consent of the Director of Public Works.
  4. Concrete pavements with integral curb and gutter and placed with a slip form type paver shall be Grade A2.
  5. Concrete pavements not placed with a slip form type paver shall be Grade A or A-FA mix.
- c. Asphaltic Pavements
1. Permanent asphaltic pavements shall conform to WisDOT Specifications Section 460, Hot Mix Asphalt Pavements and Section 450, 455, General Requirements for Asphaltic Pavements and Asphaltic Materials.
    - (i) Pavement lower layer: HMA pavement E-0.3 with asphaltic material PG 58-28 and 12.5mm aggregate.
    - (ii) Pavement upper layer: HMA pavement E-0.3 with asphaltic material PG 58-28 and 9.5mm aggregate.
  2. Temporary asphalt pavements shall conform to WisDOT Specifications section 465, Asphaltic Surface.
  3. Modified Winter Patching Material: Cold patch material conforming to Chapter 8.46.0 of the State Specifications.
- d. Mortar shall conform to WisDOT Specifications Section 519.2.3.
- e. Underdrains shall conform to WisDOT Specifications Section 612.
- f. Filter Fabric for underdrain shall meet the specification for Geotextile Fabric in the WisDOT Specifications Section 612.2.8.
- g. Topsoil shall conform to WisDOT Specification Section 625 Topsoil and Salvage Topsoil. Topsoil shall have a minimum finished depth of four inches.
- h. Mulch with tackifier added shall be placed on slopes exceeding 3:1.
- i. Seeding shall be WisDOT Seed Mixture No. 40 conforming to the requirements of WisDOT Specification 630. Permittees shall be required to seed and maintain areas of topsoil and seed until a satisfactory growth of grass with less than 20 % bare spots by area is established.

## Winter Excavation

- a. If work is conducted in the winter season (November 15 – April 1), the following specifications shall apply:
  1. The temporary pavement repair shall be hot-mixed asphalt as specified unless hot-mix material is documented to not be available within a 75 mile radius of the city. As an alternate the permittee may use:
    - (i) Modified Winter Patching Material (cold patch) placed in one lift of three inches compacted thickness. This material must then be removed and replaced with hot mix asphalt by the following June 15<sup>th</sup> as defined in “Methods of Construction.” The applicable guarantee period will begin when the hot-mixed asphalt repair or finished concrete pavement is completed.
    - (ii) Temporary Concrete Patch to be placed at a thickness of 4”. This material must then be removed and replaced with hot mix asphalt by the following June 15<sup>th</sup> as defined in “Methods of Construction.” The applicable guarantee period will begin when the hot-mixed asphalt repair or finished concrete pavement is completed.
  2. In all cases of Modified Winter Patching Material (cold patch or concrete) use, the permittee shall take all reasonable measures to maintain a drivable and safe surface for motorists and pedestrians as determined by the Department.
  3. If the trench area is saturated, the following backfill method shall apply:
    - (i) Filter fabric meeting “Material Specifications” subsection i., shall be placed to form a lining to wrap the crushed stone backfill, leaving extra material to completely cover the stone when placed.
    - (ii) Crushed stone meeting the State Specifications, must be placed to the height of saturation and completely wrapped in filter fabric.
    - (iii) Backfill requirements shall be dependent on vertical trench area absent of saturation. A minimum of 24 inches of base aggregate dense 1 ¼-inch shall be spread in layers not exceeding eight inches in loose depth and compacted to no less than 95% of the maximum dry density of the material, up to the base of temporary pavement. Should a vertical zone exist between the saturation zone and the sub base zone, the backfill methods outlined in the Backfill section may be utilized within this zone.

## Special Conditions

- a. Geo-textile Material
  1. If an excavation cuts through an area that has been constructed with geo-textiles, the following restoration procedures shall apply:
    - (i) Use a replacement fabric with similar properties as that of the cut fabric. The most important property is the maximum apparent opening size tested in accordance with ASTM D4751.

- (ii) Overcut the trench walls above the geo-textile fabric by a minimum of four inches in the area of the fabric replacement being careful not to disturb the exposed existing fabric. Place a minimum of a four inch overlap of new fabric. Do not allow soil migration in the seam area. Increase the seam width if the subgrade is very soft. If the sub-grade is soft and if the trench lies directly beneath a wheel path, increase the seam width to 12 inches.
- (iii) Sew or staple the seams in accordance with manufacturer's recommendation. If sewn, use colored thread, do not sew near the edge, double sew at 10-15 stitches per inch, and use thread material that closely matches fabric properties. If stapled or pinned, pin on 2-foot (0.6m) centers; using 6-inch x1-inch wide staples which can be applied by foot activated guns.
- (iv) Exercise caution when placing and compacting the first 12 inches of backfill material so as not to puncture the fabric.

b. Geo-grid Material

1. If an excavation cuts through an area that has been constructed with geo-grids, the following restoration procedures shall be strictly adhered to:
  - (i) Use a bi-axial replacement geo-grid with similar properties as that of the cut geo-grid. Overcut the trench walls above the geo-grid by a minimum of 24 inches in the area of the geo-grid replacement being careful not to disturb the exposed existing geo-grid. Place a minimum of a 24-inch overlap of new geo-grid.
  - (ii) Exercise caution when placing and compacting the first 12 inches of backfill material so as not to puncture the geo-grid.

c. Underdrain

1. If an excavation cuts through an existing underdrain system, it shall be repaired by the permittee in accordance with section 612 of the WisDOT specifications.
2. The Director of Public Works has the right to require a permittee to install underdrain within any major excavation zone if conditions warrant.

Methods of Construction

a. Workmanship

1. The permittee is required to furnish all materials and will be responsible for the job in an orderly, timely, quality controlled manner. Utilize quality workmanship and construction techniques conducted in accordance with industry standards for the successful completion of the utility work, backfilling, appurtenant restorations, and pavement repair.
2. The permittee shall keep a competent foreman and sufficient competent employees to carry on the work with all proper speed, in accordance with the requirements of law and to reasonable satisfaction of the Director of Public Works.

3. The permittee shall conduct the work in such a manner as not to unreasonably interfere with other work being done by the City, by contract or otherwise. If deemed necessary by the Director of Public Works, the work done under these specifications shall conform to the progress of the city work. The permittee shall cooperate with the contractors or employees who may be doing work for the City, and with other utilities affected by the work in arranging for storage places, temporary support for structures, repairs, etc.
  4. All temporary repairs must be maintained by the permittee until the end of the guarantee period or until permanent repair has been made, whichever first occurs.
- b. Length of Trench Opening
1. The maximum length of open trench in an excavation permissible at any time shall be 200 feet, inclusive of pavement removal excavation, construction, backfilling, repairing or any other operation. Do not exceed the maximum length without the express written permission of the Director of Public Works.
- c. Placement of Aggregate Slurry Backfill
1. Aggregate Slurry backfill shall be placed by mechanical means and placed so that all voids are completely filled. If a curb stop is present when using aggregate slurry backfill, the curb stop shall be separated from these materials to allow for future adjustments.
- d. Placement of Backfill Material
1. Place and compact aggregate backfill in layers not exceeding 12 inches loose depth.
- e. Placement of Base Aggregate Dense
1. Spread and compacted base aggregate dense in layers not exceeding 8 inches in loose depth. Compacted to not less than 95% of the maximum dry density of the material.
  2. The maximum dry density of the material to be used as base aggregate dense along with the corresponding moisture contents, in accordance with WDOT Specifications, must be filed at the time of application to obtain the permit. Single source documentation will be acceptable for multiple permits in a season, provided that every stockpile utilized is accounted for.
- f. Temporary Asphalt Pavement
1. Placement and workmanship shall be in accordance with the applicable provisions of WisDOT Specifications section 465.
  2. Compact to the requirements for ordinary compaction as specified in WisDOT Specifications section 450.3.2.6.2.

3. 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.
4. The placing temperature of the hot-mixed asphalt mixture shall be between 325°F and 255°F. All compaction rolling shall be completed before the mixture cools below 185°F.

g. Permanent Pavement Restoration

1. All materials, placement, compaction and workmanship shall be in accordance with the applicable provisions of the WisDOT Specifications.
2. Temporary paving material shall be saw cut and neatly removed, or milled, as needed to comply with all provisions of this subsection.
3. Check the pavement base for compliance with the 95% compaction requirement when temporary paving material is removed. If compaction is found to be less than 95%, re-compact the trench to meet specifications before paving will be allowed.
4. The permanent pavement materials and depths shall conform to the specifications found in this Technical Standard or match the existing depths, whichever is greater. The requirement to match existing depths may be waived by the Director of Public Works.
5. 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.
6. The placing temperature of the hot-mixed asphalt mixture shall be between 325°F and 255°F. All compaction rolling shall be completed before the mixture cools below 185°F.

h. Tack Coat

1. All vertical surfaces of the existing hot-mixed asphalt pavement shall be tack coated with an approved asphalt emulsion by thoroughly swabbing or brushing the vertical edges to fully cover with the liquid material prior to pavement installation.

i. Depth of Structures

1. The permittee shall not, without written permission from the city, install any structure, except manholes, valve boxes, culverts, and catch basins at a depth less than:
2. Twenty-four inches below the established flow line of the nearest gutter. If the flow line is not established, the depth shall be at a minimum of 24 inches below the surface of the nearest outermost edge of the traveled portion of the street.
3. The minimum depth of any structure shall be 24 inches below the established sidewalk.

4. The minimum depth of any structure on any other public place shall be 24 inches below the surface; provided, however, that the city may permit a lesser depth in special cases.
5. Nothing in this section shall impose a duty upon the permittee to maintain the specifications as required herein upon subsequent changes of grade in the surface unless the grade in the structure interferes with the maintenance of or travel on a public street.

#### Guarantee Period

- a. All street excavation repairs shall be guaranteed to conform to these Technical Standards for a minimum of 18 months.
- b. All street excavation repair guarantee periods shall begin upon the approved placement of hot-mixed asphalt or concrete in accordance with these Technical Standards.
- c. Guarantee periods shall end if the street is rehabilitated by the City before the expiration of the guarantee period.
- d. Maintenance of restored items other than pavement and trench material (such as driveways, esplanade, and sidewalks) shall be the responsibility of the permittee for a period of 12 months from approved completion of work.

#### Definition of Guaranteed Pavement Repair Condition

- a. Pavement repairs guaranteed by each permittee shall meet all of the following conditions in order to remain in conformance with these Technical Standards:
  1. The entire area shall be free from delamination of the approved surface material.
  2. No distortion of one-half inch (1/2) or greater shall exist over more than five percent of the total surface area of the repair.
  3. No cracks 1/4 - inch or greater shall exist in the surface or edges of the repair totaling more than five percent of the repair perimeter.
  4. The hot-mixed asphalt within the trench shall not be flushed or bleeding.
- b. Non-conformance with any of the above conditions shall constitute a breach of guarantee and subject the Permittee to remedial actions.
- c. Severe (over one inch) distortion conditions shall be considered Tort liability and such street defect conditions shall necessitate that full repairs be completed within twenty-four hours of notification by the Director of Public Works.