



**CONSTRUCTION OBSERVATION GUIDE
 FOR
 VILLAGE OF BELLEVILLE
 2007 DEVELOPMENT**

INTRODUCTION: This guide is intended to be a supplement to the Village of Belleville Standard Specifications for Public Works Improvements (SSPWD), May 2007, MSA Construction Observation Reference Manual, April 17, 2006 and Standard Specification for Sewer and Water Construction in Wisconsin, Sixth Edition, December 22, 2003. Each resident project representative (RPR) must have a copy of the above documents and become thoroughly familiar with the sections pertaining to current construction activities before observing the construction activities.

DUTIES, RESPONSIBILITIES AND LIMITATIONS OF AUTHORITY OF RESIDENT PROJECT

REPRESENTATIVE: The resident project representative shall have a copy of EXHIBIT C, consisting of three pages, of the EJCDC document titled "Duties, Responsibilities and Limitations of Authority of Resident Project Representative." Specifically, the RPR:

1. Shall not agree to or authorize any deviation from the contract documents or of materials or equipment. If the RPR is approached by the Contractor regarding any of the above issues the RPR shall refer the contractor to the developer's engineer for a response.
2. Shall not undertake any of the responsibilities of the Contractor, Subcontractor, Suppliers, or Contractor's Superintendent.
3. Shall not advise on, issue directions relative to or assume control over any of the means, methods, techniques, sequences or procedures of construction.
3. Shall not advise on, issue directions regarding or assume control over safety precautions and programs in connection with the work.
3. The RPR and Contractor shall notify all residents, Belleville Police/Fire and Emergency, and Belleville Public Works Department, as appropriate to the situation, at least 48 hours prior to a disruption in service such as:
 - Potable water service
 - Closing of a street for utility, street construction/reconstruction

RESIDENT PROJECT REPRESENTATIVE'S DAILY REQUIREMENTS:

0. The RPR shall shoot elevations on all inverts of sanitary and storm structures as they are installed and record them in their field book. The RPR shall shoot elevations on the top of watermain installed at 100' intervals. The RPR shall measure and record the lengths of all pipes installed. These elevations and measurements shall be transferred to the record drawings on a daily basis. If installed utility elevations do not match the plans the RPR shall notify the contractor immediately followed by a call to Josh Stieve.
0. The RPR shall shoot elevations on the ends of all sanitary, storm, and water laterals as they are installed and record them in their field book. The RPR shall measure, from the downstream manhole, and record the locations of all sanitary, water and storm laterals installed. These elevations and locations shall be transferred to the record drawings on a daily basis. If installed utility elevations do not match the plans the RPR shall notify the contractor immediately followed by a call to Josh Stieve.
0. The RPR shall completely fill out the daily utility report each day prior to leaving the job-site. Lateral cards shall be completed by the end of the week for laterals installed that week. Record drawings shall be updated on a daily basis.

The RPR will maintain **two sets** of plans on the site at all times. One set is to be used for day-to-day reference. The second one is to be used for "Daily" record keeping (record drawings).

If in doubt, contact your supervisor or the main office:

Josh Stieve - Cell Phone 444-2055/ 242-7779 Office
Kevin Lord - Cell Phone 712-2563 / 242-7779 Office

Emergency numbers: Police 608-424-3129
Public Works Department: Office 608-424-3666/Cell 608-575-2151

REQUIREMENTS FOR EROSION CONTROL

0. No construction work will begin until an approved erosion control plan is in hand.
0. The NR 216 permit issued for the work states that erosion control inspections must be completed by the permit holder weekly and within 24 hours after a 0.5-inch or greater rainfall. Those inspections are the responsibility of the owner's representative, who may be the engineer or contractor.
0. Erosion control inspection forms must be turned in to the RPR to file in the project binder.
0. The permit holder is responsible for erosion control maintenance during construction. Refer to the grading plan and erosion control plan notes for the erosion control required on the project.

REQUIREMENTS FOR MATERIALS/SHOP DRAWINGS

0. Inspect materials delivered to the site for conformance with shop drawings and village specs. Verify and record information pertaining to the following:
 - ◆ Proper class, thickness & size
 - ◆ Approval stamp
 - ◆ Conformance with ASTM and other standards
 - ◆ Name brand and all similar products are of the same brand, quality, & class
 - ◆ All new materials

REQUIREMENTS FOR SANITARY SEWER MAIN AND SANITARY LATERALS

0. Before the start of new sewer construction, a sanitary manhole plug shall be installed in the outlet pipe of the downstream manhole. The plug must be installed in the presence of the RPR and may be removed only in the presence of the RPR. Upon installation/removal of a plug contact Josh Stieve. Observe that the plug is in place throughout the duration of the project. This plug must be secured with a tie to the manhole steps. The Contractor may only remove the plug after the binder course of pavement is installed. Water that has accumulated in the downstream manhole must be pumped out prior to removal of the plug.
0. Discrepancies of more than 0.02' from grade sheet elevations shall be corrected by removing and relaying pipe back to the point where the error first occurred.
0. Discrepancies in alignment shall be tolerated when total left to right error does not exceed one sixth (1/10) of the nominal internal pipe diameter. The pipe with discrepancies in excess of this shall be removed to the point where the discrepancy is within the tolerances and re-laid at the contractor's sole expense.
0. Duplex lots require two sewer laterals.
0. The spigot of each piece of pipe must be oriented in the direction of flow.
0. The maximum allowable height for adjusting rings is 7.5". The maximum height is controlled by the size of a standard chimney seal. Manholes with more than 7.5" of adjusting rings will not be accepted unless the contractor receives written approval from the Superintendent of the Wastewater Pollution Control Facility.
0. The contractor must use a pre-compressed butyl gasket between adjusting rings. Cement mortar may only be used between the manhole- casting frame and the upper adjusting ring in order to bring the casting to the proper grade and slope. **Do not** allow mortar (plaster) on the inside of manhole casting and adjusting rings. Over time the mortar breaks off and enters the sewer system.
1. All manhole castings must be Neenah 1550 non-rocking castings with a "T" type gasket seal.
1. In phased construction manholes that are constructed beyond 100' of the end of the pavement shall be constructed as remote manholes.
1. When concrete adjusting rings are used to form a cylindrical "chimney", the vertical face of each ring will line up with the adjacent ring so that when tested with a vertical straight edge, the straight edge will contact each ring in at least the cardinal points.
1. ALL cone and barrel section joints are required to have a butyl gasket on BOTH the inside and outside ring.
1. All cone and barrel section steps shall be in a straight line over the manhole bench, not a pipe.
1. Low Pressure Air Test & Mandrel Testing- See MSA Construction Observation Reference Manual.

1. An infiltration test must be done for all sanitary sewers installed in ground water.
1. An internal rubber seal manufactured by Cretex Specialty Products (chimney seal) shall be installed in ALL sanitary manholes installed in pavement. A chimney seal is not required for remote manholes which have bolt down castings and frames and are set to an elevation a minimum of one foot above the existing or final grade, whichever is greater.

REQUIREMENTS FOR WATER MAIN AND WATER LATERALS

1. Whenever water mains or laterals cross over sewers, the water main shall be laid at such an elevation that the bottom of the water main is at least 6 inches above the top of the sewer. Whenever water mains or laterals cross under sewers, a minimum vertical separation of 18 inches shall be maintained between the top of the water main and the bottom of the sewer. At crossings, one full length of water pipe shall be centered on the sewer so that both joints will be equidistant from the sewer. The Village Engineer may require special structural support for the water and sewer pipes.
2. Watermain shall be laid with a minimum of 6.5' of cover, wherever cover is less than this, it shall be insulated to prevent freezing. Seven feet of cover is a minimum on all cul-de-sacs. The cover material shall be compacted using either a walk behind plate compactor or a jumping jack compactor prior to backfilling.
3. Whenever storm sewer crosses over water mains or water laterals and when the separation distance between the pipe is less than 5 feet at a minimum, the main and lateral will be insulated as follows: Styrofoam insulation shall be installed according to SSPWI Pipe Insulation Detail 5-3, 5-5, and 5-6. Use 2" thick 4' x 8' sheet Styrofoam over water main and 2" thick 2' x 8' over laterals.
4. Hydrostatic Testing; See MSA Construction Seminar Reference Manual
5. Thrust blocking: The village spec. requires poured concrete for blocking. However, the contractor may use concrete blocks if he so chooses. The blocking must be tightly wedged between the pipe and virgin soil. Blocking is required behind all hydrants, tees, caps, plugs, and bends. All hydrants shall be placed on a 4"x8"x16" solid concrete block. All valves shall be placed on a 4" thick by 16" long by a width that is appropriate to fit between the flanges. It may be necessary for the contractor to cut 4"x8"x16" solid concrete blocks to an appropriate size. The use of wood of any type is not allowed.
6. Hydrants: All hydrants must have two flat concrete blocks placed against the hydrant frost case forming a roof over the drain ports on the hydrant elbow (like a teepee). Clear stone must be backfilled first, around the base of the hydrant, to form a drainage area for the hydrant. A sheet of 6-mil polyethylene must be placed around the hydrant on top of the clear stone. The hydrant must be secured to the main by use of megalugs or mechanical restraint, such as rodding.

REQUIREMENTS FOR STORM SEWER

1. All segments of pipe will have a snug seal. An improper seal over time will allow granular material to seep into the pipe causing a sinkhole at the surface above the pipe.
2. Make sure mortar and solid concrete block are used to properly seal around the concrete pipe connecting to manholes.
3. The spigot of each piece of pipe must be oriented in the direction of flow.
4. Storm sewer structures that have an infiltration hole shall also have a one-foot sump and non-woven geotextile fabric. Please see Drawing No. 5-10 of the SSPWI for a detailed drawing.
5. All manhole castings must be Neenah 1550 non-rocking castings with a "T" type gasket seal.
6. Where inlet castings are on a continuous slope, the curb and gutter flow line shall be depressed by 0.2' resulting in a graduated curb face of a maximum depth of 0.7' at the inlet casting. Please see Drawing No. 3-8 of the SSPWI for a detailed drawing.
7. Discrepancies of more than 0.05' from grade sheet elevations shall be corrected by removing and relaying pipe back to the point where the error first occurred.
8. Discrepancies in alignment shall be tolerated when total left to right error does not exceed one tenth (1/10) of the nominal internal pipe diameter. The pipe with discrepancies in excess of this shall be removed to the point where the discrepancy is within the tolerances and re-laid at the contractor's sole expense.

REQUIREMENTS FOR TRENCH BACKFILL

1. Pipe backfill: As recommended by Engineer and Soils Testing Consultant.
2. Excavated topsoil and clay is not allowed in trenches as backfill under street pavement, sidewalks, or bike paths.
3. Structure backfill: As recommended by Engineer and Soils Testing Consultant.

4. Frozen or saturated material is not allowed in trenches as backfill under street pavement, sidewalks, or bike paths.

REQUIREMENTS FOR COMPACTION

1. Pipe bedding: Special care should be taken so the pipe is not damaged from compaction equipment.
2. Compaction around structures such as manholes, valve boxes, hydrants, and curb inlets will be checked by using a rod probe. Adequate compaction around these structures is required. Poor compaction around structures will result in settlement and pavement failure. A hoe pack is the preferred equipment for compaction. Hand guided equipment may be used if the thickness of the lifts are restricted to match the capacity of the equipment. It is unacceptable to postpone compaction until the top few feet of fill is placed. Thorough compaction must be done from the bottom of the excavation to the top.
3. All trench backfill under pavement will be compacted to the following density:
 - 90% from bottom of trench to within 3' of finished grade
 - 95% for the upper 3'
4. Soil testing: The Soils Testing Consultant performs frequent tests to determine soil compaction. RPR should note the methods and amount of effort required to meet the compaction requirements. Pick random spots for the soil tests to check (at varying depths) and if there are areas you are concerned about, have them test there as well. If the contractor encounters different soils than were originally tested, the Soils Testing Consultant should be contacted to verify the specified compaction has been achieved.

REQUIREMENTS FOR ON SITE BORROW PITS

1. Have the developer's surveyor locate the borrow pit. No borrow pits are allowed in street ROW and in areas of proposed buildings and pavements.
2. Accurately locate and sketch borrow pit location, size, and depth for records.
3. A fence completely surrounding the borrow pit is required until the pit is filled to final grade.

REQUIREMENTS FOR EXCAVATION BELOW SUBGRADE (EBS)

1. The following methods shall be used when the contractor commences "street construction." Proof rolling is the method of testing subgrades. Observe a fully loaded dual-axle or tri-axle dump truck, not less than 60,000 lbs gross weight, driving across the area in question (refer to Village of Belleville Specification Section 401.4.1). Any areas that reveal noticeable deflection under the tires will be rejected. If excavation below subgrade is required the RPR shall not instruct the contractor or the engineer how deep to excavate or the type of material to be used to backfill the EBS area. The RPR will sketch location of EBS on the Record Drawings, note how the contractor backfills the EBS area, compute and record the volume. These quantities will be forwarded to the developer's engineer's office
2. Proof roll the subgrade below the curb and gutter, about 8 feet wide, to determine the locations of unsuitable subgrade material to be removed prior to the placement C&G base course.
3. After the EBS areas are backfilled, proof roll the EBS areas to verify that the depth of EBS and method of backfilling was adequate. If the subgrade still deflects, additional EBS and backfilling is required for the deficient areas. If the subgrade does not deflect, the contractor may place the C&G base course only and place the C&G.
4. Proof roll the street subgrade after the C&G cylinders have passed a compression test of at least 3000psi. After the EBS areas are backfilled, proof roll the EBS areas to verify that the depth of EBS and method of backfilling is adequate. If the subgrade still deflects, additional EBS and backfilling will be necessary until a successful proof roll is observed. If the subgrade does not deflect, the contractor may place the base course according to the plans and specifications.
5. The finished base course must pass a proof roll before paving can begin. A "proofed" base is evident by observing "NO DEFLECTION".

REQUIREMENTS FOR CURB & GUTTER AND SIDEWALK

1. A minimum of 4" of crushed aggregate base course shall be placed under the C&G and sidewalk with a minimum of 1ft. either side of the C&G and sidewalk.
2. Under no condition will there be any construction activity in the roadbed or directly behind the C&G until the test cylinders verify a compressive strength of at least 3000psi or seven days have elapsed.

3. When the weather is expected to drop below 35 degrees Fahrenheit, the C&G and sidewalk MUST be completely covered and insulated as soon as possible after placing the concrete. This time period is from Oct. 15 to May 15. See SSPWI section 301.5
4. Note: The insulation must thoroughly cover ALL faces and edges of the C&G. See section 302 in the village spec. book for further information on curb and gutter.
5. Check concrete slips from delivery trucks for proper mix. i.e. all concrete must be air entrained, fly ash may be used in C&G only when specified in the special provisions.
6. Make 1 set (3 cylinders) and take one air test first thing in the morning. Cast another set of cylinders mid morning. Take another air test and cast another set of cylinders after lunch. If the contractor pours all day cast another set of cylinders near the end of the day. No more than 12 cylinders will be taken per day per project. Perform at least 1 air test per pour, or at least two per day when more than 6 cylinders are made.
7. Making and curing concrete specimens in the field
 - Contractor will provide testing cylinders
 - Each concrete test cylinder must be securely covered with a bag immediately after finishing the surface.
 - Cylinders must be placed in a shaded area (out of direct sunlight). If temperatures are 30 - 40 °F or below, place test cylinders in a properly maintained cure box (temperature between 60 - 80 °F).
 - The concrete cylinders will be delivered to CGC within 24 - 48 hours after casting the cylinder.
8. C&G and sidewalk must be reinforced at all utility crossings, i.e., water and sanitary laterals, fire hydrants leads, etc; with 2 15' long #4 rebars for C+G and 3 #4 rebars for sidewalk.
9. Concrete shall be of a minimum a 6 bag mix, air entrained at 6% plus or minus 1.5% for hand pours and 7% plus or minus 1.5% for slip form work, with a maximum of a 1.5" slump for slip form and 4" slump for flat work. The compressive strength shall be at least 4000 psi at 28 days.
10. Contraction joints shall be tooled at 10' max lengths for C+G and the width of the walk for sidewalk.
11. Expansion joints shall be installed at 250 foot max intervals for C+G at points of tangency, points of curvature immovable objects, and 15-feet from inlets. Expansion joints for sidewalk shall be placed at 100-foot max intervals.

REQUIREMENTS FOR CRUSHED AGGREGATE BASE COURSE FOR STREETS

1. The C&G must be adequately cured and the street subgrade must not deflect before base course operations can begin.
2. Village of Belleville Specification Section 401.2 specifies that the base course shall be installed in two layers. The first layer shall be 3" stone, and the top layer shall be 1 1/2" stone.
3. If an area with base course has evidence of "pumping", the finished base course in this area **must** pass a proof roll before paving can begin. An effective base is evident by observing "NO DEFLECTION".
4. Verify that the base course grades are correct by "string lining" between curbs and manholes. Also check that the correct depth for asphalt has been left at the curb flags and structure castings.
5. At temporary street dead ends, the base course must extend beyond the pavement 15'. This is necessary to provide for grading and paver "run out" area. The run out is necessary to maintain proper centerline grade and crown. This run out must pass a proof roll.

REQUIREMENTS FOR ASPHALT PAVING

1. Observe dumping and paver feed operation for segregation of aggregate.
2. Maintain surveillance of paver operation to guard against incorrect line, grade, cross slope or malfunctioning automatic screed control. Do not allow start and stop operations.
3. Tarps on asphalt trucks will be required at all times. The tarps shall not be removed until they are ready to unload at the paver.
4. The preferred asphalt temperature, in the truck, is 270°F-300°F. Any asphalt that is less than 250°F or more than 350°F will be rejected.
5. Observe extrusion of the mat for uniformity of texture, presence of spot segregation and proper thickness. Check for excessive void areas in the surface. Require the contractor to fill areas of depression or inadequate material by hand. Rake the material to an even, smooth and uniform consistency prior to rolling.
6. Verify that longitudinal and transverse mat joints are at the same elevation after rolling.
7. Observe breakdown roller (hot roller) operation for uniformity and continuity of operation with attention to speed, pattern, location of drive wheel and completion before temperature falls below 180°F.
8. Observe cold roller operations: the intent is to remedy mat blemishes and remove marks and bumps.
9. Asphaltic mixture shall be placed only on a prepared, firm and compacted base foundation layer or existing

- pavement that is dry and free of loose and foreign material.
10. Prior to placing the wearing course, all potholes, sags and depressions, or alterations of the existing pavement crown, shall be repaired. All patch jobs or repairs shall be feathered out so they become co-planar with the adjoining areas. All damaged curb and gutter must be removed and replaced, and given adequate time to cure.
 11. The asphaltic mixture shall be uniformly spread and struck-off in order to obtain a smooth, dense texture without tearing or segregation of the material. Raking over machine spread and finished material on surface courses shall be kept to a minimum in order to prevent segregation. Spreading by means of raking from a pile of dumped material will not be permitted.
 12. Any scuffing or displacement occurring as a result of vehicles or equipment shall be corrected immediately.
 13. To prevent adhesion of the mixture to the roller the wheels shall be kept properly moistened.
 14. Any mixture that becomes loose and broken, mixed with dirt, or is in any way defective shall be removed and replaced with fresh hot mixture, which shall be compacted immediately.
 15. Binder courses shall show no variation greater than 1/4 inch from the testing edge of the straightedge between any two contacts with the surface. Binder course will be 1" above manhole castings when the thickness of the surface course is 1 1/4". The valve boxes shall be turned up to 1/4" below the binder course. No vehicular traffic shall be permitted until the following day after paving operations are completed for the bituminous asphalt binder course.
 16. Surface course, after compaction rolling, shall be 1/4" above curb edges, manhole castings and water boxes. It will show no variation greater than 1/8 inch from the testing edge of the straightedge between any two contacts with the surface. Valve boxes shall be turned up to 1/4" below the surface grade at the time of the surface course paving.

TACK COAT

1. Tack coat is required between the binder and finish surface course of asphalt unless the surface course is going to be placed immediately after the binder is placed.
2. **All** surface course joints shall be tacked, longitudinal and transverse, except at asphalt/concrete interface. A generous amount shall be applied.

REQUIREMENTS FOR PROJECT CLOSEOUT

1. Verify the following items:
2. Storm water structures all have grouted channels and smooth entrances to discharge.
3. All structures are free from construction debris.
4. Structure/casting adjusting materials are concrete. The work is complete and forms one smooth surface unit. Mis-joined work will not be accepted.
5. Water main valves have been exercised by the contractor and left in the open position (except for dead ends).
6. C&G and sidewalk have been inspected to identify damaged sections for repair.
7. Record drawing information:
 - ◆ Distance from downstream manhole to the sanitary sewer WYE
 - ◆ Horizontal distance from lot corner to end of sanitary lateral and water lateral
 - ◆ Invert elevation at the end of sanitary lateral
 - ◆ Top of pipe elevation at the end of the water lateral
 - ◆ Length of sanitary lateral
 - ◆ Total length of water lateral including the tail.
8. Laterals, both water and sanitary, are marked by a wood stake in the field.
9. Property corners are in place.
10. Chimney seals are installed in sanitary manholes.
11. Dead end street stubs have a Type III Barricade in accordance with WisDOT specifications.
12. Fire hydrants have a snow flag installed.
13. With the contractor operating the valves, walk the site and verify that the valves required to be opened or closed are in the proper position and ready for service.
14. Owner's engineer and contractor must walk the site with the RPR to view and agree to the final site restoration and erosion control measures.
15. Testing records are obtained. Verify with DPW for "SAFE Water Samples".