# STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION

## CITY OF WEST BEND, WISCONSIN

## SECTION 300

## EARTHWORK, GRADING, AND GRAVELING

## Section Title Number 301 GENERAL 302 MATERIALS SPECIFICATIONS 303 CLEARING AND GRUBBING 304 OPEN GRADED BASE COURSE 305 COMPACTION 306 CRUSHED STONE BASE COURSE 307 OVEREXCAVATION, SUBGRADE PREPARATION, AND SUBGRADE CORRECTIONS

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CITY ENGINEER'S APPROVAL

SECTION 300 - EARTHWORK, GRADING, AND GRAVELING

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## 301 - GENERAL

301.1 <u>Scope Of Work</u> The work under this section shall consist of excavating, grading, graveling, and associated items as required by the Contract Documents.

The Contractor shall furnish all labor, equipment, materials, supervision, tools, supplies and incidentals, as required by the work.

301.2 Associated Sections Of These Standard Specifications The Contractor is advised that associated work is covered in other sections of this document and he shall be familiar with all applicable standards for the work. While not all inclusive the Contractor is especially advised to be familiar with the sections on Erosion and Sediment Control, Landscaping, and Traffic Control.

Except as hereinafter otherwise noted, the following sections of the D.O.T. Specifications Latest Edition are, by reference made a part of these Standard Specifications.

D.O.T.			
Sections	Titled		
Part II	Earthwork		
Part III	Bases and Subbases		

- 301.3 <u>Material Source</u> The source of materials for use on projects shall be subject to the approval of the Engineer.
- 301.4 <u>Haul Route</u> Requirements for Haul Routes shall conform to Section 208 of these Standard Specifications.
- 301.5 Grading Quantities Bidders are hereby notified that the Unclassified Excavation quantities listed in the Bidding Documents are based on the material in the 100% compacted state and not loose cubic yards.

## 301.6 <u>Surplus Material</u> The Owner shall have first rights to surplus excavated material. All surplus excavated material not claimed by the Owner shall be properly disposed of by the Contractor at his expense at a disposal site in accordance with Section 209 of these Standard Specifications.

## 301.7 Proof Rolling of Pavement Foundations

The Contractor shall proof roll all pavement foundations prior to placing the base course and, as directed by the Engineer, shall remove areas of yielding or unstable material and backfill with satisfactory material in accordance with Sections 302.2 and 307. Since all costs associated with the proofrolling, and removal and replacement of unsuitable materials are to be included in the unit price for the class of excavation involved, no additional compensation will be made for such work unless a separate contract unit price has been established specifically for that work.

# 301.8 Proof Rolling of Base Course

The Contractor shall proof roll the base course, using a fullyloaded quad axle dump truck approved by the Engineer, prior to paving operations taking place. The proof roll shall take place in the presence of the Engineer. As directed by the Engineer, the Contractor shall remove any soft areas and replace with materials approved for use in the road base. All costs associated with the proof rolling shall be included in the price bid for furnishing and installing the base course. All costs associated with removal of soft areas and replacement of the removed materials shall be included in the contract unit prices for such base and subbase repair work. If the Contractor does not proof roll the subbase prior to placing the base course, the removal and replacement of soft materials will be at the Contractor's expense.

## 302 - MATERIALS SPECIFICATIONS

## 302.1 General

Materials for earthwork, subgrade, and road bases shall comply with applicable specifications in Parts II and III of the D.O.T. Specifications, except as noted or supplemented herein.

## 302.2 Subgrade

The compacted fill subgrade shall consist of and be underlain by suitable bearing materials, free of all organic, frozen, or other deleterious material and inspected and approved by the Inspector prior to placing the base course. Preparation of the subgrade shall consist of proof rolling, as described in Section 301.7, to detect unstable or yielding areas that must be undercut. All areas identified by the Engineer for undercutting shall be undercut in accordance with Section 307.

The compacted fill materials shall be free of deleterious, organic or frozen matter, and shall have a maximum Liquid Limit (ASTM D-423) and Plasticity Index (ASTM D-424) of 30 and 10 respectively, unless specifically tested and found to have low expansive properties and approved by the Engineer. The top twelve (12) inches of compacted fill should have a maximum three (3) inch particle diameter and all underlying compacted fill a maximum six (6) inch diameter unless specifically approved by the Engineer. All fill material must be tested and approved under the direction and supervision of the Engineer prior to placement.

#### 303 - CLEARING AND GRUBBING

#### 303.1 Scope of Work

Clearing and Grubbing shall consist of cutting and disposing of trees, brush, windfalls, logs, and other vegetation located within the clearing limits, and the removing and disposing of roots, stumps, stubs, grubs, logs, and other timber from within the grubbing limits as hereinafter defined or which interfere with excavation, embankment, marsh or waste disposal, or designated clear vision areas.

Unless otherwise specified, the limits and depths of clearing and grubbing shall be in accordance with Section 201 of the Wisconsin D.O.T. Specifications.

Clearing and grubbing shall be completed before placing of embankment materials.

303.2 Disposal Of Waste Material

All cleared and grubbed materials shall become the property of the Contractor and shall be properly disposed of off-site. See Section 210 of these Standard Specifications regarding proper disposal of waste materials.

#### 303.3 Protection of Vegetation

Unless specifically designated otherwise on the plans, or by the Engineer, all trees, brush, shrubs, or other vegetation occurring within the limits defined above shall be cut off and disposed of as hereinafter provided. All stumps, roots, logs or timber and all brush, matted roots and debris not suitable for the roadway foundation within the grubbing limits shall be removed.

Trees and shrubs located beyond the clearing limits shall not be removed unless their removal is specifically indicated by the contract. Within areas to be cleared, and where grubbing is not required, all shrubs and brush shall be cut within three (3") inches of the ground surface and all trees shall be clean cut as nearly flush with the ground surface as is reasonably possible with tools ordinarily used for such operations.

Should the Contractor cause damage to existing trees and shrubs which are not specified to be removed, the Engineer shall contact the City Forester to determine the best action to be taken to preserve the trees. The Contractor shall follow the directions of the City Forester and take what action is prescribed to ensure the survival of the tree. Any remedial work to damaged trees and shrubs shall be performed by the Contractor at no cost to the City. Should the damage be such as to destroy or decrease the value of the tree or shrub, the Contractor may be liable for all cost of removing the tree or shrub in addition to a forfeiture for the replacement or decreased value as determined by the City Forester.

Should the Contractor determine that a tree or shrub, which is not shown to be removed, encroaches in his work area requiring that it be trimmed or relocated, the Engineer shall contact the City Forester to determine how best to save the tree or shrub. The Contractor shall work with the City Forester to minimize the impact on the tree or shrub.

Where feasible, trees shall be felled toward the center of the area to be cleared. Where trees cannot be felled without danger to traffic or injury to other trees, structures or property, they shall be cut in sections, of a size not to endanger the above, from the top down.

When so designated on the plans or directed by the Engineer, trees or shrubs located within clearing areas which are desirable for shade or road beautification shall be preserved.

When limbs or branches of trees to be left in place overhang the roadbed and do not leave a clearance of at least fourteen (14') feet above the finished grade, such trees shall be carefully and symmetrically trimmed on their lower limbs or branches so as to provide a clearance of not less than fourteen (14') feet above finished grade. Such trimming shall be performed in accordance with directions of the City Forester.

Unless otherwise specifically provided in the contract, all timber salvaged from the required clearing of right-of-way and easement areas shall become the property of the Contractor.

## 303.4 Staking

Project staking for clearing and grubbing shall conform to Section 203 of these Standard Specifications.

# 304 - OPEN GRADED BASE

304.1 General

Open graded base shall consist of crushed stone or crushed concrete conforming to the requirements of Section 310 of the Wisconsin DOT Specifications. Crushed gravel shall not be used for open graded base. INFORMATION ON THIS PAGE DELETED WITH THIS REVISION

REVISION DATE \_\_\_\_\_ December 13, 2004

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# 305 - COMPACTION

305.1 Scope of Work

This work shall consist of the compaction of soil and gravel for trenches, fill areas, subgrade and other areas requiring consolidation of materials.

# 305.2 <u>Standard Proctor</u> The basis for defining required compaction shall be determined by laboratory tests to establish optimum compaction and moisture for the material being utilized on the project. These tests shall be based on the Standard Proctor Method ASTM D698-91 T-99.

## 305.3 Moisture Content

The moisture content of granular soils shall be within three (3) percent of the optimum moisture. The moisture content for cohesive soils shall not vary more than -1 to +3 percent of the optimum moisture. The optimum moisture contents shall be determined by the standard proctor test unless a different tolerance is specified in a soils investigation report recognized by the City Engineer or unless a different tolerance is specifically recommended or approved by the City Engineer.

Should the material be deficient or excessive in moisture content, the Contractor shall adjust the moisture content as required. If, due to weather conditions, the Contractor chooses to place the material with greater than optimum moisture, the material shall be subject to removal and replacement should it not meet compaction and moisture requirements after it has had time to dry. The Engineer shall have the right to direct the Contractor to use suitable material if conditions are such that, in the opinion of the Engineer, the material on site will not reach optimum moisture or is unsuitable for the use. No compensation will be given the Contractor for re-excavation or removal and replacement of unsuitable material.

The Contractor shall have water available to increase moisture content during dry weather should it be required to meet the optimum levels as determined by the Proctor Test.

- 305.4 <u>Fill Placement</u> All fill materials shall be placed in maximum twelve (12") inch (loose depth) lifts prior to compaction.
- 305.5 <u>Method Of Compaction</u> All fill shall be compacted by means of mechanical compaction, suitable for the material and moisture conditions.
- 305.5.1 <u>Trench Section</u> Material shall be placed and compacted as specified above.

Minimum compaction shall be 90% of Standard Proctor for material deeper than two (2') feet below the proposed finished pavement grade. Minimum compaction for material shallower than two (2') feet below the proposed finished pavement grade shall be 95% of Standard Proctor.

When crushed stone chips or similar materials are used for pipe bedding, the Contractor may flood the lowest layer of backfill material so that the void spaces between particles of the bedding material will become partially or completely filled with particles of the backfill material. The flooding shall not be applied until after the trench has been backfilled to a height of between one and two feet above the top of the pipe. All layers of backfill located above the layer that is flooded shall be mechanically compacted. The equipment and method used in the flooding operation shall conform to WSWS 2.6.14a.

## 305.5.2 Embankments

Material shall be placed and compacted as specified above.

Unless specified otherwise in the Contract Documents, the minimum compaction shall be 95% of Standard Proctor.

305.5.3 <u>Subgrades for Pavement</u>

Material shall be placed and compacted as specified above.

The minimum compaction shall be 95% of Standard Proctor with the exception of the top twelve (12) inches of pavement subgrade which shall have a minimum in-situ density of 100 percent of maximum density (or 5 percent higher than the underlying fill materials).

305.5.4 <u>Crushed Stone Base</u> Material shall be placed and compacted as specified above.

The minimum compaction shall be 95% of Standard Proctor.

## 305.6 Testing

At the sole discretion of the Engineer, the City may test the compaction of the materials placed by the Contractor.

If the materials being compacted are placed under a contract with the City for a public works project and if (in the sole opinion of the Engineer) the compaction is not satisfactory, the Engineer may require the Contractor to have the compaction tested by a certified soils testing firm that is approved by the Engineer. If the compaction testing indicates the compaction to be unsatisfactory, the Contractor shall pay for the compaction testing and shall take appropriate action to compact the materials to a satisfactory compaction. If the compaction testing indicates the compaction to be satisfactory, the City will pay for the compaction testing. If the materials being compacted are placed in a private development project requiring acceptance by the City and if (in the sole opinion of the City Engineer) the compaction is not satisfactory, the City Engineer may require the developer to pay for and to have the compaction tested by a certified soils testing firm that is approved by the City Engineer. If the compaction testing indicates the compaction to be unsatisfactory, the Contractor shall take appropriate action to compact the materials to a satisfactory compaction.

305.7 Basis of Payment

The cost of compacting the materials shall be included in the Contract Unit Price bid for the work causing its need, unless specifically stated otherwise in the contract documents, and shall include all labor, supervision, equipment, materials, tools, supplies, and incidentals required to place, spread, compact, moisten, or dry the material in accordance with these Standard Specifications.

#### 306 - CRUSHED STONE BASE COURSE

## 306.1 <u>General</u>

Crushed stone base course shall consist of crushed stone, crushed concrete, or crushed limestone conforming to the materials requirements of Section 301 of the Wisconsin D.O.T. Specifications; to the construction requirements of Section 305.3 of the Wisconsin D.O.T. Specifications; and to the gradations of Table 306-1 below. The crushed stone shall be granular material resulting from the mechanical crushing of rock, boulders, or large cobble stones, of which substantially all faces have been fractured by crushing operations. Crushed gravel shall not be used for base course.

#### Table 306-1

	Percent Passing	by Weight
	Cr. Stone	Cr. Stone
	Gradation	Gradation
<u>Sieve Size</u>	<u>No. 1</u>	<u>No. 2</u>
1 1/2 inch (37.5 mm)	100	
1 1/4 inch (31.5 mm)		
1 inch (25.0 mm)		100
3/4 inch (19.0 mm)		
3/8 inch (9.5 mm)	30-65	40-75
No. 4 (4.75 mm)	25-55	25-60
No. 10 (2.00 mm)	15-40	15-45
No. 40 (425 μm)		
No. 200 (75 μm)	2-12	3-12

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#### 307.1 Overexcavation

Overexcavation may be required as part of the construction of the roads, curb and gutter, driveway approaches, sidewalks, and other areas to be paved.

The Engineer will determine the exact areas and depth of overexcavation during construction based on proofroll results.

Prior to backfilling of the overexcavated area, the Engineer will determine the exact quantity of overexcavated material removed by cross sectioning performed by the City's survey crew or by other methods as agreed to by the Engineer prior to the start of overexcavation. The Engineer will determine the exact quantity of overexcavation for payment.

307.2 <u>Subgrade Preparation and Subgrade Correction</u> Preparation of the subgrade shall be in accordance with Section 211 of the WisDOT Standard Specifications.

When the ground surface has been excavated to rough subgrade, the excavated areas will be visually inspected by the Engineer to detect any unstable areas that must be undercut. The Contractor shall proof roll the subgrade as per Section 301.7, using appropriate equipment, to detect any unstable or yielding areas that must be undercut.

Any areas deemed unsatisfactory by the Engineer shall be undercut, backfilled with stable soil, and compacted in accordance with the requirements of Section 305. The Contractor shall not undercut any areas without specific prior approval of the Engineer.

Backfill materials for the subgrade shall conform to Section 302.

The finished earth subgrade in pavement areas shall be compacted as per Section 305.5.3.

Geotextile fabric and breaker run stone may be needed in some areas to supplement bridging layers, which may be used to reduce subsequent fill placement. This fabric shall be Mirafi 600X, GTF300, Amoco 2006, Ling 275EX, or an approved equal.

Soft areas within ten (10) feet centered on utility trenches that are constructed as part of the contract and that require removal and replacement shall be removed and replaced at no cost to the City per Section 403. Soft areas at utility trenches that are not constructed as part of the contract and that require removal and replacement will be paid for as Overexcavation.

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307.3 Breaker Run and Clear Breaker Run
Breaker run shall be large-sized aggregate resulting from furnishing stone
or concrete processed through a primary crusher set to produce a material
predominantly six (6) inches or less in at least one dimension. The
material shall not be screened or
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REVISION DATE December 15, 2008

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processed beyond the size obtained from the initial crushing. The breaker run shall be well graded and shall conform to the gradation below.

**Clear breaker run** shall be large-sized aggregate resulting from furnishing stone processed through a primary crusher set to produce a material predominantly six (6) inches or less in at least one dimension. The clear breaker run shall be well graded and shall conform to the gradation below.

	Percent (%)	Passing by Weight
Sieve Size	Breaker Run	Clear Breaker Run
6" (150 mm)	90 - 100	90 - 100
3" (75 mm)		5 - 20
1.5" (37.5 mm)	40 - 60	0 - 10

Aggregate mixtures of uncrushed rocks and sand will not be allowed for breaker run or clear breaker run.

The breaker run and clear breaker run shall be subject to approval by the Engineer prior to placing the material. The Engineer may reject material produced from deteriorated concrete or from non-durable rock. Acceptability of the breaker run or clear breaker run will be based primarily upon the Engineer's visual inspection.

The substitutions allowed via Section 311.5 (2) of the WisDOT Standard Specifications will not be allowed.

## 307.4 Measurement and Payment

Payment for Overexcavation will be made per cubic yard of overexcavated material replaced and as measured in accordance with Section 307.1. The contract unit price for Overexcavation shall include all costs associated with removing, hauling, and legally disposing of the overexcavated materials; furnishing, hauling, placing, and compacting backfill materials; and all equipment, materials, labor, tools, supervision, supplies, and other incidentals necessary to complete the work.

Payment for Furnish and Install Soil Reinforcing Fabric will be made per square yard installed. The contract unit price for Furnish and Install Soil Reinforcing Fabric shall include all costs associated with furnishing, installing, and anchoring the soil reinforcing fabric and all equipment, materials, labor, tools, supervision, supplies, and other incidentals necessary to complete the work.

Payment for Furnish and Place Breaker Run will be made per ton placed. The contract unit price for Furnish and Place Breaker Run shall include all costs associated with furnishing, hauling, placing, and compacting the breaker run materials and all equipment, materials, labor, tools, supervision, supplies, and other incidentals necessary to complete the work.

-END OF SECTION 300-

REVISION DATE November 27, 2006

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# DETAILS

Detail Number	Title
301	TYPICAL ROADWAY SECTIONS FOR 66' AND 80' R.O.W.
302	TYPICAL ROADWAY SECTIONS FOR 100' R.O.W. WITH 46' AND 52' PAVEMENT WIDTH
303	TYPICAL RURAL ROADWAY SECTION WITH 24' PAVEMENT WIDTH
304	TYPICAL DRIVEWAY DETAIL FOR RURAL PAVEMENT
305	REFERENCE ELEVATIONS FOR TYPICAL ROADWAY SECTIONS





-A -B -24" ST	ANDARD CURB AND GUT	P ROAD	C	B <sup>-/</sup>			
THE FOLLOWING REFERENCE ELEVATIONS ARE BASED UPON THE USE OF STANDARD 24" CURB AND GUTTER OF DETAIL 501 AND UPON THE DIMENSIONS AND SLOPES OF DETAILS 301 AND 302 REFERENCE ELEVATIONS (ft) BACK-OF-CURB TOP BACK-OF-CURB OF GUTTER FLANGE AT CENTERLINE							
(PT. A TO P	T. A) (PT. A)	(PT. B)	(PT. C)	(PT. D)			
	(WITH RESPECT TO FIN	NISHED GRADE AT (	CENTERLINE OF R	DAD:)			
37 41 47 53	0.0 -0.05' -0.12' -0.20'	-0.50' -0.55' -0.62' -0.70'	-0.41' -0.46' -0.54' -0.61'	0.0 0.0 0.0 0.0			
	(WITH RES	PECT TO THE TOP	OF CURB:)				
37 41 47 53	0.0 0.0 0.0 0.0	-0.50' -0.50' -0.50' -0.50'	-0.41' -0.41' -0.41' -0.41'	0.0 +0.05' +0.12' +0.20'			
1				DRAWN BY: S.J.N DATE: 12/12			
City of REFERENCE ELEVATIONS FOR APPROVED BY: J.A.N. AWest Bend TYPICAL POADWAY SECTIONS					.N.		
				DETAIL NO. 305	sheet 1 OF 1		

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