Iowa Department of Transportation

MINUTES
OF
IOWA DOT SPECIFICATION COMMITTEE MEETING

September 13, 2007

Members Present:	Tom Reis, Chair	Specifications Section
	Daniel Harness, Secretary	Specifications Section
	Gary Novey	Office of Bridges & Structuress
	Larry Jesse	Office of Local System
	Doug McDonald	District 1-Marshalltown RCE
	Keith Norris	District 2-District Materials
	Bruce Kuehl	District 6-District Construction
	Roger Bierbaum	Office of Contracts
Members Not Present:	John Adam	Statewide Operations Bureau
	Jim Berger	Office of Materials
	John Smythe	Office of Construction
	Troy Jerman	Office of Traffic & Safety
	Mike Kennerly	Office of Design
Advisory Members Present:	Brian Jorgensen	FHWA
Others Present:	Deanna Maifield	Office of Design
	Kevin Jones	Office of Materials
	Vanessa Goetz	Office of Materials
	Cindy Spencer	Snyder & Associates
	Steve Klocke	Snyder & Associates

Tom Reis, Specifications Engineer, opened the meeting. The following items were discussed in accordance with the September 6, 2007 agenda:

1. Article 2301.31, Time for Opening Pavement for Use.

The Office of Materials requested a change to allow the use of Type IP and IS cements in Class M mixtures without fly ash substitution.

2. Article 2528.13, A, 2, Temporary Barrier Rail.

The Office of Construction requested a change to clarify how the contractor should be paid for maintenance and repair of temporary barrier rail that is displaced or damaged by vehicle impact.

3. Section 2546, Gabions and Mattresses.

The Office of Materials requested a change to update current specification and match the requirements in the Federal Specifications for Gabions and Revet Mattresses.

4. DS-01057, Trenchless Construction.

The Office of Construction requested changes to clarify welding requirements and the Specifications Section requested changes to bring continuity with the SUDAS specifications.

5. SUDAS Specifications to be Included in the Standard Specifications.

The Specifications Section has been working with CTRE to revise the SUDAS specifications Division 3 (Trench, Backfill, and Trenchless), Division 4 (Sewers and Drains), Division 5 (Water Mains and Appurtenances), and Division 6 (Structures for Sanitary and Storm Sewers) to prepare them for placement into the Department's Standard Specifications.

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Jim Berger	**Office:** Materials	**Item 1**
Submittal Date: July 16, 2007	**Proposed Effective Date:** April 2008	
Article No.: 2301.31 **Title:** Time for Opening Pavement for Use (PCC Pavement)	**Other:**	

Specification Committee Action: Approved as is.

Deferred:	**Not Approved:**	**Approved Date:** 9/13/07	**Effective Date:** 4/15/08

Specification Committee Approved Text: See Specification Section Recommended Text.

Comments: None

Specification Section Recommended Text:

2301.31, Time for Opening Pavement for Use.

Replace the seventh paragraph with:

~~In addition, Class F fly ash and Type IP and Type I(PM) cements shall not be used in Class M concrete mixtures.~~ At the Contractor's option, when Type I/II cements are used, Class C fly ash may be substituted for up to 10%, by weight (mass), of the cement in Class M concrete mixtures. Type IP and Type IS cements may be used in Class M concrete mixtures without fly ash substitution.

Comments:

Member's Requested Change (Redline/Strikeout):

2301.31 TIME FOR OPENING PAVEMENT FOR USE.

Last paragraph

~~In addition, Class F fly ash and Type IP and Type I(PM) cements shall not be used in Class M concrete mixtures.~~ At the Contractor's option, when Type I/II cements are used Class C fly ash may be substituted for up to 10%, by weight (mass), of the cement in Class M concrete mixtures. Type IP and Type IS cements may be used in Class M concrete mixtures without fly ash substitution.

Reason for Revision:

County or City Input Needed (X one)	**Yes**	**No**
Comments:		
Industry Input Needed (X one)	**Yes**	**No**

Industry Notified:	**Yes** X	**No**	**Industry Concurrence:**	**Yes** X	**No**
Comments: On large paving projects, Type IP and IS cements are most commonly used. Not allowing the blended cements may require the contractor to place headers and use ready mix concrete. This affects smoothness and increases costs. Also, the local ready mix may also only have blended cement. This change is needed to accommodate the materials being used on the project. Both strength and time are still required for opening.					

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: John Smythe / Wayne Sunday	**Office:** Construction	**Item 2**
Submittal Date: July 26, 2007	**Proposed Effective Date:** April 15, 2008	
Article No.: 2528.13, A, 2 **Title:** Temporary Barrier Rail (Basis of Payment)	**Other:**	

Specification Committee Action: Approved as is

Deferred:	**Not Approved:**	**Approved Date:** 9/13/07	**Effective Date:** 4/15/08

Specification Committee Approved Text: See Specification Section Recommended Text.

Comments: The Office of Construction noted this has been the practice for quite a while. The proposed change formalizes this practice.

District 1 Construction asked if this change would still apply if TBR is already in place from a previous project. The Office of Construction noted that more than likely there will still be an item for TBR, so the proposed change should cover that situation.

The Office of Design asked how this change would apply if sections of TBR needed to be replaced as a result of a crash. The Office of Contracts explained the Contractor has the option of filing a claim against the insurance company of the person causing the damage.

Specification Section Recommended Text:

2528.13, A, 2, Temporary Barrier Rail.

Add as the second paragraph:

Maintenance and repair of temporary barrier rail shall be incidental to Temporary Barrier Rail.

Comments:

Member's Requested Change: **(DO NOT USE "Track Changes," or "Mark-Up". Use ~~Strikeout~~/Highlight)**

2528.13 BASIS OF PAYMENT.

A. When the following items are required for traffic control, there will be items included in the contract documents with payment as follows:

1. Traffic Control.
When there is a contract item for Traffic Control, the Contractor will be paid the lump sum contract price. This payment shall be full compensation for erecting, maintaining, moving, and removing all traffic control devices required by the contract documents, including warning lights, and for furnishing all materials, labor, and equipment. This payment shall also be full compensation for traffic quality control.

2. Temporary Barrier Rail.
For the number of linear feet (meters) of temporary barrier rail measured, the Contractor will be paid the contract unit price per linear foot (meter).

All maintenance and repair of temporary barrier rail is incidental to Temporary Barrier Rail.

3. Temporary Crash Cushions.
Article 2509.05, A, shall apply.

4. Temporary Traffic Signals.
The Contractor will be paid the contract unit price for each group installation operated by a common control unit, normally four signal heads at the same traffic control area. This payment shall be full compensation for the controller, signal heads, traffic detection system, and signal operator.

5. Temporary Floodlighting.
The Contractor will be paid the contract unit price for each Temporary Floodlighting Luminaire installed. This payment shall be full compensation for furnishing, installing, maintaining and servicing the temporary floodlighting units, all costs for electrical energy, and the cost of removing all lighting materials from the construction site.

6. Pilot Cars.
For the number of days each pilot car was operated, the Contractor will be paid the predetermined contract unit price per day.

7. Flaggers
For the number of days each flagger was used, the Contractor will be paid the predetermined contract unit price per day. This payment will be full compensation for providing trained flaggers in accordance with Article 2528.10.

8. Monitoring With Incident Response.
For the number of calendar days that Monitoring With Incident Response is used, the Contractor will be paid the contract unit price per calendar day. This payment shall be full compensation for furnishing the necessary vehicle (including operation, maintenance, and supplies); furnishing the operator; documentation of any events that restrict the normal flow of traffic including responses to an emergency situation; re-erecting, repairing, or replacing traffic control devices; providing assistance to persons with vehicle problems; moving stalled vehicles; and summoning further assistance when needed.

For the number of calendar days that additional personnel, such as for CMS operation, required by the Engineer are used, the Contractor will be paid the contract unit price per calendar day. This payment shall be full compensation for furnishing the required personnel and necessary support vehicles.

B. When traffic control and traffic quality control are incidental to other items on the project, and the following items are required, they will be included in the contract documents with payment as follows:

1. Traffic Control.
No separate payment will be made.

2. Temporary Barrier Rail.
Article 2528.13, A, 2, shall apply.

3. Temporary Crash Cushions.
Article 2509.05, A, shall apply.

4. Temporary Traffic Signals.
Article 2528.13, A, 4, shall apply.

5. Temporary Floodlighting.
Article 2528.13, A, 5, shall apply.

6. Pilot Cars.
Article 2528.13, A, 6, shall apply.

7. Flaggers.
Article 2528.13, A, 7, shall apply.

When the Engineer requires recleaning of reflectorized surfaces of traffic control devices, payment will be made as extra work in accordance with Article 1109.03, B.

All traffic control devices furnished by the Contractor shall remain the Contractor's property at the completion of the work and shall be removed from the site when no longer needed.

Reason for Revision: The current specifications do not clearly address whether the contractor should be paid for maintenance and repair of temporary barrier rail that is displaced/damaged by vehicle impact. It is felt the maintenance of these temporary devices should be handled like traffic control items, and not paid for separately.

County or City Input Needed (X one)			**Yes**	**No** X	
Comments:					
Industry Input Needed (X one)			**Yes** X	**No**	
Industry Notified:	**Yes** X	**No**	**Industry Concurrence:**	**Yes**	**No**

Comments: Three contractors were contacted regarding this issue. They noted that they typically had not been paid for maintaining these devices. If there is a significant impact, there is usually a accident report, and they have gone after the insurance company of the driver.

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Jim Berger	**Office:** Materials	**Item 3**
Submittal Date: August 22, 2007	**Proposed Effective Date:** April, 2008	
Section No.: 2546 **Title:** Gabions and Mattresses	**Other:**	

Specification Committee Action: Approved with changes as noted.

Deferred:	**Not Approved:**	**Approved Date:** 9/13/07	**Effective Date:** 4/15/08

Specification Committee Approved Text:

2546, Gabions and Mattresses.

Replace the title of the section:

Gabions and Revet Mattresses.

2546.01, Description.

Replace the first paragraph with:

~~This work shall involve furnishing and placing compartmented, rectangular baskets made of woven wire, and filling the baskets with revetment stone.~~ This specification covers materials and construction of baskets for Gabions and Revet Mattresses. The baskets shall be rectangular, variable in size, and manufactured either from:

a. Welded wire fabric meeting the requirements of ASTM A 974, Style 2, fabricated using uncoated steel wire conforming to ASTM A 853, with the fabric subsequently zinc-coated by the hot-dip process.

b. Double twisted hexagonal wire mesh meeting the requirements of ASTM A 975, Style 1 or Style 3, fabricated using soft temper galvanized steel wire, Class 3 coating, in accordance with ASTM A 641.

Gabions are intended for high strength installations in both horizontal and vertical structures. Revet Mattresses are intended for lower strength, horizontal or nearly horizontal structures. The work shall be done as shown in the contract documents and as specified herein. When specified, concrete grout shall be furnished, transported, and placed within the voids to the full width of the gabion basket ~~without over consolidation~~.

2546.02, A, Baskets.

Replace the first and second sentences of the first paragraph:

Baskets shall be made by twisting or welding a mesh from ~~of~~ galvanized steel wire ~~fabricated into hexagonal triple double twist mesh units so bound as to prevent unraveling~~. For gabions, the mesh opening shall not exceed 4 1/2 inches (115 mm), and its area shall not exceed ~~8~~ 10 square inches (~~5200~~ 6450 mm^2).

Add as the second paragraph:

Twisted wire mesh for gabion baskets and revet mattresses shall be formed in a uniform

hexagonal pattern with double twists so bound as to prevent unraveling. Welded wire mesh for gabion baskets shall have each connection welded to obtain a minimum average shear strength of 585 pounds (2600 N), with a minimum shear strength of 450 pounds (2000N). For revet mattresses, the minimum average shear strength of welded connections shall be 292 pounds (1300 N) with minimum shear strength of 225 pounds (1000 N).

2546.01, A, 1, Wire.

Replace the second paragraph:

Wire for twisted wire mesh gabion baskets shall have a tensile strength of 60,000 psi to ~~8~~75,000 psi (413.7 MPa to ~~586~~517.1 MPa). Wire for twisted wire mesh revet mattresses shall have a tensile strength of 60,000 psi to 70,000 psi (413.7 MPa to 482.7 MPa). Wire for welded wire baskets and mattresses shall have a minimum tensile strength of 80,000 psi (550 MPa). Galvanizing shall be according to ASTM A ~~764~~641, Class ~~III~~3~~, Type B Coating, except that all wire shall be coated with 0.80 ounce (244 g) of zinc per foot (square meter)~~. Edge and selvage wire shall be made from the same material used for the wire mesh.

2546.01, A, 3, Basket Fabrication.

Replace the table after the first paragraph:

GABIONS				
Dimensions, ft. (m)*			**Number of Cells or Compartments**	**Capacity yd^3 (m^3)**
Length	**Width**	**Height**		
~~4.5 (1.4)~~	~~3 (0.9)~~	~~3 (0.9)~~	~~1~~	~~1.5 (1.1)~~
6 (1.8)	3 (0.9)	3 (0.9)	2	2.0 (1.5)
9 (2.7)	3 (0.9)	3 (0.9)	3	3.0 (2.3)
12 (3.6)	3 (0.9)	3 (0.9)	4	4.0 (3.1)
6 (1.8)	3 (0.9)	1.5 (0.5)	2	1.0 (0.8)
9 (2.7)	3 (0.9)	1.5 (0.5)	3	1.5 (1.1)
12 (3.6)	3 (0.9)	1.5 (0.5)	4	2.0 (1.5)
6 (1.8)	3 (0.9)	1 (0.3)	2	0.66 (0.5)
9 (2.7)	3 (0.9)	1 (0.3)	3	1.0 (0.8)
12 (3.6)	3 (0.9)	1 (0.3)	4	1.33 (1.0)
REVET MATTRESSES				
Dimensions, ft. (m)*			**Number of Cells or Compartments**	**Capacity yd^2 (m^2)**
Length	**Width**	**Height**		
9 (2.7)	6 (1.8)	0.50 (0.1~~5~~7)	3	~~1.00 (0.73)~~ 6 (5.2)
12 (3.6)	6 (1.8)	0.50 (0.1~~5~~7)	4	~~1.33 (0.97)~~ 8 (6.69)
9 (2.7)	6 (1.8)	0.75 (0.23)	3	6 (5.2)

	12 (3.6)	6 (1.8)	0.75 (0.23)	4	8 (6.69)
	9 (2.7)	6 (1.8)	1.0 (0.3)	3	6 (5.2)
	12 (3.6)	6 (1.8)	1.0 (0.3)	4	8 (6.69)
	Dimensions are subject to a tolerance of ±5%.				

Comments: The Office of Materials distributed additional modifications at the meeting that have been incorporated into these changes. They explained there are different wire strength and coating requirements for twisted and welded wire baskets. Also, there are additional sizes allowed for revet mattresses. The Office of Materials noted the SUDAS reference for wire mesh is out of date.

Specification Section Recommended Text:

2546, Gabions and Mattresses.

Replace the title of the section:

Gabions and Revet Mattresses.

2546.01, Description.

Replace the first paragraph with:

~~This work shall involve furnishing and placing compartmented, rectangular baskets made of woven wire, and filling the baskets with revetment stone.~~ This specification covers materials and construction of baskets for Gabions and Revet Mattresses. The baskets shall be rectangular, variable in size, and manufactured from one of the following:

a. Welded wire fabric meeting the requirements of ASTM A 974, Style 2, fabricated using uncoated steel wire conforming to ASTM A 853, with the fabric subsequently zinc-coated by the hot-dip process.

b. Double twisted hexagonal wire mesh meeting the requirements of ASTM A 975, Style 1, fabricated using soft temper galvanized steel wire, Class III coating, in accordance with ASTM A 641.

Gabions are intended for high strength installations in both horizontal and vertical structures. Mattresses are intended for lower strength, horizontal or nearly horizontal structures. The work shall be done as shown in the contract documents and as specified herein. When specified, concrete grout shall be furnished, transported, and placed within the voids to the full width of the gabion basket ~~without over consolidation~~.

2546.02, A, Baskets.

Replace the first and second sentences:

Baskets shall be made of galvanized steel wire fabricated into hexagonal ~~triple~~ double twist mesh units so bound as to prevent unraveling. For gabions, the mesh opening shall not exceed 4 1/2 inches (115 mm), and its area shall not exceed ~~8~~ 10 square inches (~~5200~~ 6450 mm^2).

Comments:

Member's Requested Change: (Do not use **'Track Changes'**, or **'Mark-Up'**.Use ~~**Strikeout**~~ and **Highlight**.

Section 2546. Gabions and Revet Mattresses.

2546.01 DESCRIPTION.
~~This work shall involve furnishing and placing compartmented, rectangular baskets made of woven wire, and filling the baskets with revetment stone.~~ This specification covers the material and the construction of baskets for gabions and Revet Mattresses. The baskets are rectangular, variable in size and manufactured either from:

a. Welded wire fabric meeting the requirements of ASTM A974, Style 2, manufactured from uncoated steel wire conforming to ASTM A853, and the fabric subsequently zinc-coated by the hot-dip process.

b. Double twisted hexagonal wire mesh meeting the requirements of ASTM A975, Style 1, manufactured from soft temper galvanized steel wire, Class III coating, in accordance with ASTM A641.

Gabions are intended for high strength installations in both horizontal and vertical structures. Mattresses are intended for lower strength, horizontal or nearly horizontal structures. The work shall be done as shown in the contract documents and as specified herein. When specified, concrete grout shall be furnished, transported, and placed within the voids to the full width of the gabion basket. ~~without over consolidation~~.

2546.02 MATERIAL.
Materials used in construction of gabions and mattresses shall meet the following requirements. Baskets shall be fabricated as required for gabions, unless mattresses are specifically designated in the contract documents. At the Contractor's option, for lid fastening at edges and diaphragms, either the "Lacing Wire" or the "Steel Ring Fastener System" may be used.

A. Baskets.
Baskets shall be made of galvanized steel wire fabricated into hexagonal ~~triple~~ double twist mesh units so bound as to prevent unraveling. For gabions, the mesh opening shall not exceed 4 1/2 inches (115 mm), and its area shall not exceed ~~8~~ 10 square inches (~~5200~~ 6450 mm^2). mm).

Reason for Revision: To update current specification and match the requirements in the Federal Specifications for Gabions and Revet Mattresses.

County or City Input Needed (X one)			**Yes**	**No**	
Comments:					
Industry Input Needed (X one)			**Yes**	**No**	
Industry Notified:	**Yes**	**No**	**Industry Concurrence:**	**Yes**	**No**
Comments:					

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: John Smythe / Kyle Frame	**Office:** Construction	**Item 4**
Submittal Date: 06/12/07	**Proposed Effective Date:**	
Article No.: DS-01057 **Title:** Developmental Specifications for Trenchless Construction	**Other:**	

Specification Committee Action: Approved changes proposed by the Office of Construction.

Deferred: X	**Not Approved:**	**Approved Date:**	**Effective Date:**

Specification Committee Approved Text: See attached Draft DS-01XXX.

Comments: The Office of Contracts asked if this DS could be incorporated into the GS. They expressed concern with having two approved methods for the same specification, and having the same number. They noted that if the DS was not included in the contract, the default would be to use Section 2418 of the Standard Specifications, which is out of date. Additional concern was expressed that the wrong bid items might be used.

The Specifications Section suggested deferring this item until the next meeting to allow additional time to review bid items. The SUDAS group is proposing to make trenchless construction incidental to the underground utility pipe being installed. This is different from DS-01057, which includes payment for the length of pipe installed by trenchless construction. This issue needs to be resolved before including the SUDAS specification in the Department's Standard Specifications.

Specification Section Recommended Text: See attached Draft DS-01XXX.

Comments: The Specifications Section is including additional changes to bring this DS in line with the SUDAS specifications for trenchless construction.

Member's Requested Change: **(Do not use 'Track Changes', or 'Mark-Up'. Use ~~Strikeout~~ and Highlight.**

2418.02, B, Steel Pipe (Materials)
Replace the second paragraph:

Joints and welding shall comply with American Welding Society Code D1.1M / D1.1. Fully weld all joints with full penetrating weld, including joints of casing pipes laid in open pipe trenches. Welders shall be qualified according to IM 560. Welds shall be in accordance with IM 558.

Reason for Revision: Clarify welding requirements

County or City Input Needed (X one)			**Yes**	**No** x	
Comments:					
Industry Input Needed (X one)			**Yes**	**No** x	
Industry Notified:	**Yes** x	**No**	**Industry Concurrence:**	**Yes**	**No**
Comments:					

Draft DS-01XXX
(Replaces DS-01057)

Iowa Department of Transportation

DEVELOPMENTAL SPECIFICATIONS
FOR
TRENCHLESS CONSTRUCTION

Effective Date
October 16, 2007

THE STANDARD SPECIFICATIONS, SERIES 2001, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE DEVELOPMENTAL SPECIFICATIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

Replace Section 2418 of the Standard Specifications with the following:

Section 2418. Trenchless Construction.

2418.01 DESCRIPTION
This work involves the installation of pipe that is forced through existing embankment from side to side by application of force. Installation of pipe may be by one of the following methods unless otherwise indicated in the contract documents:

A. Auger Boring: A boring method that utilizes a rotating cutting head to form the bore and a series of rotating augers inside a casing pipe to remove the spoil.

B. Compaction Method: Boring methods that displace soil radially rather than removing spoil. Bore hole may be formed with a push rod or impact mole.

C. Directional Drilling: A boring method for installing pipe from a surface launched drilling rig. A pilot bore is formed and then enlarged by back reaming. The pipe is then pulled in.

D. Pipe Ramming: A boring method that involves driving a steel casing pipe with a percussive hammer. The front end of the casing pipe may be open ended or closed. If open, spoil must be removed from the pipe.

E. Slurry Boring: A boring method which first forms a pilot bore by forcing a drill tube through the embankment. The pilot hole is then enlarged by reaming. As the hole is enlarged with the reamer, drilling fluid (slurry) is pumped into the hole to hold the soil cuttings in suspension. After reaming, the pipe is pulled into place.

F. Microtunneling: A boring method that consists of a remotely controlled pipe jacking operation utilizing a tunnel boring machine. Personnel entry is not required.

G. Pipe Jacking: A jacking method in which pipe is pushed into the ground with hydraulic rams while soil is simultaneously excavated. Excavation is normally completed with a tunnel boring machine. This method requires personnel to enter the tunnel during the excavation process.

H. Utility Tunneling: A method of forming large diameter tunnels. As excavation takes place at the front of the tunnel, a liner is constructed to temporarily support the tunnel. Upon completion of the tunnel the pipe is pushed in place.

I. Other methods not described here may be allowed upon approval of the Engineer.

2418.02 MATERIALS.

A. Concrete Pipe: Concrete pipe for culverts or casing to be installed by trenchless methods shall meet requirements of Section 4145 of the Standard Specifications for the type specified and the following requirements:

Pipe may be furnished as a single unit or sectional. If sectional, it shall have joints of a type that will assure positive engagement of the sections during and after placement. Square end pipe without proper connecting devices will not be permitted. Pipe having projections on exterior surfaces that requires an excavation larger than the body of the pipe will not be permitted.

B. Steel Pipe: Steel pipe for culverts or casing shall be new and meet the requirements of ASTM A 139, Grade B; ASTM A 252, Grade 2; or ASTM A 53, Grade B. Hydrostatic test should be waived for non-pressure applications and can be designated as (no hydro).

Joints and welding shall comply with American Welding Society Code D1.1M/D1.1. Fully weld all joints with full penetrating weld, including joints of casing pipes laid in open pipe trenches. Welders shall be qualified according to Materials I.M. 560. Welds shall be in accordance with Materials I.M. 558.

Upon approval of the Engineer, connecting adjacent pieces of steel pipe during installation may be achieved by a CNC machined integral press fit connection such as Permalok, or approved equal, as long as loading and installation design criteria are met. The press fit connection of the pipe shall be installed in accordance with the pipe manufacturer's recommendation.

Casing Pipe Minimum Wall Thickness:

NOMINAL DIAMETER INCHES (mm)	WALL THICKNESS, MINIMUM INCHES (mm)	
	UNDER HIGHWAY	UNDER RAILROAD
6 thru 14 (150 thru	0.188 (4.78)	0.25000 (6.35)
16 (465)	0.188 (4.78)	0.28125 (7.14)
18 (450)	0.25 (6.35)	0.31250 (7.94)
20 (510)	0.25 (6.35)	0.34375 (8.73)
22 (560)	0.25 (6.35)	0.34375 (8.73)
24 (600)	0.281 (7.14)	0.37500 (9.53)
26 (660)	0.281 (7.14)	0.40625 (10.32)
28 (710)	0.312 (7.92)	0.43750 (11.11)
30 (750)	0.312 (7.92)	0.46875 (11.91)
32 (815)	0.312 (7.92)	0.50000 (12.70)
34 (865)	0.312 (7.92)	0.53125 (13.49)
36 (900)	0.344 (8.74)	0.53125 (13.49)
38 (965)	0.344 (8.74)	0.56250 (14.29)
40 (1015)	0.344 (8.74)	0.59375 (15.08)
42 (1050)	0.344 (8.74)	0.62500 (15.88)

44 (1120)	0.344 (8.74)	0.65625 (16.67)
46 (1170)	0.344 (8.74)	0.65625 (16.67)
48 (1200)	0.344 (8.74)	0.68750 (17.46)
50 (1270)	For sizes greater than 48 inch (1200 mm) diameter, consult the Engineer	0.71875 (18.26)
52 (1320)		0.75000 (19.05)
54 (1370)		0.78125 (19.84)
56 (1420)		0.81250 (20.64)
58 (1470)		0.81250 (20.64)
60 (1525)		0.84375 (21.43)
62 (1575)		0.87500 (22.23)
64 (1625)		0.90625 (23.02)
66 (1675)		0.93750 (23.81)
68 (1725)		0.93750 (23.81)
70 (1780)		0.96875 (24.61)
72 (1830)		1.00000 (25.40)

C. Casing Pipe Diameter: Minimum inside diameter as shown in the contract documents. If not shown, casing diameter shall not be less than 4 inches (100 mm) greater than the greatest outside diameter of the carrier pipe, including pipe bells.

D. Casing Pipe Filler

1. The space between the carrier pipe and casing pipe shall not be filled unless required by the contract documents. The space shall not be completely filled to avoid transfer of earth and live loads from the casing to the carrier pipe.

2. Fill material: Fill sand or flowable mortar.

E. ~~Carrier Pipe Guide~~ Casing Spacers

1. Manufactured ~~guide~~ casing spacers to position carried pipe in casing. Wood skids will not be allowed.

2. Material requirements for ~~carrier pipe guide~~ casing spacers shall be in accordance with the following:

~~a. Band/Panel: ASTM A 240, Type 304 stainless steel or ASTM A 36 for carbon steel.~~

~~b. Riser: ASTM A 240, Type 304 stainless steel or ASTM A 36 for carbon steel.~~

~~c. Liner: Elastomeric PVC per ASTM D 149.~~

~~d. Chock Skid/Runner: Abrasion resistant polymer with a low coefficient of friction.~~

~~e. Fasteners: ASTM A 193 Type 304 (18-8) Stainless Steel.~~

a. HDPE Band/Panel and Riser: ASTM D 638.

b. Stainless Steel or Carbon Steel Band/Panel and Riser: Type 304 stainless steel per ASTM A 240 or carbon steel per ASTM A 36.

1) Liner: Elastomeric PVC per ASTM D 149.

2) Spacer Skid/Runner: Abrasion resistant polymer with a low coefficient of friction.

3) Fasteners: Type 304 (18-8) stainless steel per ASTM A 193.

2418.03 CONSTRUCTION.
Before installation begins, the pipe or initial section of pipe shall be aligned on a prolongation of the line and grade shown in the contract documents or staked by the Engineer, and shall be held by braces, guideways, and other devices, to follow these lines and grades as close as possible as it progresses through the embankment.

A. Pipe Installation.

1. Casing Pipe or Un-cased carrier pipe Installation:

a. Install pipe by auger boring, pipe jacking, microtunneling, open-ended pipe ramming, directional drilling (back-reaming required), or utility tunneling.

b. Methods which displace excess soil, rather than removing it, such as impact moling, push rod, or closed end pipe ramming will not be permitted.

c. Water jetting will not be allowed.

d. Use a jacking collar, timbers, and other means as necessary to protect the driven end of the pipe from damage.

e. Fully support borehole at all times to prevent collapse. Insert pipe as ~~earth~~ soil is removed, or support bore with drilling fluid.

f. Fill annular space between the inside of the bore hole and the outside of the pipe if the space is greater than 1 inch (25 mm) using flowable mortar.

2. Carrier Pipe Installation Through Casing:

a. Clean dirt and debris from the casing pipe after installation.

b. ~~Attach pipe guides or casing chocks~~ Install casing spacers to pipe sections as necessary to support pipe barrel in accordance with pipe manufacturer's recommendation. ~~Do not allow pipe to be supported by joint bells.~~

~~1. Pipe guides: At least one per pipe section.~~

~~2. Lubricant for pipe guides: Drilling mud or flax soap. Do not use petroleum-based lubricants or oils.~~

1. Space according to pipe manufacturer's recommendation. As a minimum, place a spacer within 1 foot of each side of the joint and a maximum spacing of 6 feet.

2. Do not allow pipe to be supported by joint bells.

3. Lubricate casing spacers with drilling mud or flax soap. Do not use petroleum-based lubricants or oils.

c. ~~As~~Ensure that thrust loads will not damage carrier pipe joints. Provide thrust collars between joint shoulders of concrete pipe.

d. Provide timbers for sufficient cushioning between the end of the pipe pushed and the jacking equipment to prevent damage to the pipe. Do not allow steel jack face to thrust against unprotected pipe end.

e. Position jacks so that resultant force is applied along the centerline of the pipe, and that force is applied evenly to the entire end of the pipe.

f. Assemble pipe joints in the jacking pit before pushing the carrier pipe into the casing.

g. Close end of casing pipe around the carrier pipe with either:

1) A manufactured synthetic rubber casing end seal with a minimum 1/8 inch (32 mm) thickness and stainless steel bands and fasteners, or

2) An open joint masonry plug (do not use with flexible pipes).

Excavation for a limited distance ahead of the forward end of the pipe will be permitted when the soil is sufficiently stable to stand without danger of caving. In this case, the hole shall be trimmed to the outside diameter of the pipe to reduce resistance to jacking and to maintain contact between embankment material and outside surface of the pipe. In soft or unstable soil, the pipe shall be allowed to cut its way through the soil to avoid danger of caving and subsidence of the overlying embankment and roadway. If the pipe is of metal with a coating of corrosion resisting material, care shall be taken to protect the coating from damage during installation and excavating processes.

A small, high pressure, low volume water jet (4 gallons per minute maximum (15 L per minute maximum)) may be used to cut the soil within a steerable shield at the leading edge of the pipe being installed. The water and the operation shall be controlled so there is no change in the condition of the soil adjacent to the pipe and no flow of water along the outside of the pipe.

Obstructions to the progress of the pipe, such as roots, boulders, or parts of former structures, shall be removed. Deviations from line or grade to pass obstructions shall be avoided if such deviation will result in unsatisfactory fitting joints. The use of explosives for removing obstructions will not be allowed.

Provisions shall be made for keeping the excavation free from surface and seepage water during the jacking operation.

After the excavation is opened, the installation of the pipe shall follow immediately to avoid unnecessarily disturbing the stability of the embankment.

Backfilling shall be done in accordance with Article 2402.09 of the Standard Specifications. Surplus excavated material may be uniformly spread in the immediate vicinity of the work, as directed by the Engineer.

B. Accuracy of Placement.

When the location and grade line of the culvert have been determined by the position or elevation of the available outlet, insertion of the pipe shall be from the outlet end. When the location and grade have been determined by the position of the inlet and the elevation to which water must be lowered at the upstream end, insertion of the pipe shall be from the inlet end.

Install pipe at line and grade according to the following tolerances:

a. Carrier pipe shall be installed at its true starting elevation and grade within a maximum alignment deviation of the pipe centerline as specified in the contract documents.

b. When no deviation tolerances are specified in the contract documents, the following shall apply:

1) Gravity Pipe: horizontal ± 1.0 foot per 100 feet (0.3 m per 30 m) of tunneling and vertical ± 0.2 feet up to 200 feet (0.06 m per 60 m) of tunneling. An additional ± 0.1 foot (0.03 m) between 200 feet and 300 feet (60 m and 90 m) or a total of ± 0.3 feet (0.09 m) deviation between 200 feet and 300 feet (60 m and 90 m).

2) Pressure Pipe: horizontal ± 0.2 feet (0.06 m) and vertical ± 1.0 foot (0.3 m).

c. The Contractor shall provide additional fittings, utility accesses, or appurtenances needed to accommodate any horizontal or vertical misalignment, if allowed by the Engineer, at no additional cost to the Contracting Authority.

d. The Contractor will be allowed to correct errors in grade of a casing pipe in order to achieve design grade of the carrier pipe by pouring an invert in the casing pipe, or by shimming the carrier pipe to a uniform grade, provided adequate clearance remains for proper installation of the carrier pipe.

Deviation from the prescribed line that reverses the fall of the grade line through the culvert shall be cause for rejection.

Openings more than 1/4 inch (5 mm) in width between adjacent sections of concrete pipe shall be filled with 1:2 cement/sand mortar.

Abandoned tunnels shall be filled with either a PCC 3,000 psi (21 MPa) mixture of approximately 4 inch (100 mm) slump or flowable mortar.

2418.04 METHOD OF MEASUREMENT.
The quantity of Pipe Installed by Trenchless Construction, of the size and type specified, in feet (meters), will be the quantity shown on the contract documents, for each pipe to the nearest foot (0.1 m), but not including aprons. The quantity of pipe will be determined along the axis.

Normal excavation for pipe installed by trenchless construction will not be measured for payment, but shall be considered incidental to the pipe installed. Excavation for boulders smaller than one-third the diameter of the pipe being installed, or parts of existing structures identified in the contract documents will not be measured for payment, but shall be considered incidental to the price bid for trenchless construction. Excavation and removal of boulders larger than one-third the diameter of the pipe being installed, or parts of existing structures not identified in the contract documents will be paid for in accordance with Article 1109.03, B of the Standard Specifications.

2418.05 BASIS OF PAYMENT.
The Contractor will be paid the contract unit price for Pipe Installed by Trenchless Construction, of the type and size specified, per linear foot (meter). This payment shall be full compensation for equipment, labor, and materials to complete the work including sheeting, shoring, bracing, dewatering, pipe connections, excavation, and backfill. Installations that consist of both trenchless and conventionally placed pipe will include separate bid items for each portion.

Item 5

SUDAS Specifications to be Included in the Standard Specifications

The Specifications Section has been working with the SUDAS group to revise Division 3 (Trench, Backfill, and Trenchless), Division 4 (Sewers and Drains), Division 5 (Water Mains and Appurtenances), and Division 6 (Structures for Sanitary and Storm Sewers) of their specifications in order to prepare them for incorporation into the Department's Standard Specifications. Revised SUDAS sections being proposed for inclusion into the Department's Standard Specifications are as follows:

- Section 3010, Trench Excavation and Backfill
- Section 3020, Trenchless Excavation (currently DS-01057)
- Section 4010, Sanitary Sewers
- Section 4020, Storm Sewers
- Section 4050, Pipe Rehabilitation
- Section 4060, Cleaning, Testing, and Inspection
- Section 5010, Pipe and Fittings
- Section 5020, Valves, Fire Hydrants, and Appurtenances
- Section 5030, Testing and Disinfection
- Section 6010, Structures for Sanitary and Storm Sewers
- Section 6020, Rehabilitation of Existing Manholes
- Section 6030, Testing and Disinfection

Currently, these SUDAS sections are being used as DS-01096, DS-01097, and DS-01098. The Specifications Section is proposing to include these sections in the new book in the following manner:

- SUDAS **Section 3010** will become **Section 2435** in the Standard Specifications.
- SUDAS **Section 3020** (currently DS-01057) will become **Section 2436** in the Standard Specifications.
- SUDAS **Sections 4010**, **4020**, and **4060** will be combined and will replace **Section 2503** of the Standard Specifications.
- SUDAS **Sections 5010**, **5020**, and **5030** will be combined and will replace **Section 2504** of the Standard Specifications.
- SUDAS **Sections 6010** and **6030** will be combined and become **Section 2437** of the Standard Specifications
- SUDAS **Sections 4050** and **6020** will be combined and become **Section 2549** of the Standard Specifications

These are now on the 'W' drive in the Highway\Specifications\Exchange folder. They are located in a folder called SUDAS Specifications. The SUDAS group requested the Specification Committee review these and provide feedback so that they can hopefully have them approved at their October 19, 2007 Board of Directors meeting.

Discussion.

The Specifications Section explained they are attempting to group the SUDAS sections in a logical fashion in the new book. This is to avoid scattering the SUDAS sections throughout the Standard Specifications. They emphasized that if the proposed organization causes problems, it can be changed.

The Specifications Section asked the Specifications Committee if they are comfortable with placing the above mentioned SUDAS sections into the new Standard Specifications book. The committee had no objections.

The Specifications Section asked if combining storm and sanitary sewer sections would create problems for either the Office of Contracts or the Office of Construction. Neither office felt it would.

The Office of Construction asked the Office of Design if including the SUDAS sections would affect the Road Standards. The Office of Design responded by explaining they will need to change some of the references in the drawings. They also explained that there will be several drawings shared by the Iowa DOT and SUDAS.

The Specifications Section asked the Committee if there were any issues that the Specifications Section needed to take back to SUDAS for them to address at their October Board of Directors meeting. No concerns were raised.

The Office of Contracts asked if the term “manhole” would be used in the new specifications in place of “utility access”. They noted that a utility access can refer to several different types of structures other than manholes. The Specifications Section asked FHWA if that would cause concerns with them. FHWA commented they would look into it. If FHWA doesn’t have problems with “manhole”, the Specifications Section will use that term where appropriate rather than “utility access”. The Office of Contracts noted this will affect bid items; several would need to be changed from utility access to manhole.

The Specification Section requested that if the Specifications Committee finds problems with the proposed text to let them know by the last week of September so they can pass the information along to the SUDAS group.

The Specifications Section asked if there are any concerns or comments with the remainder of the rewrite of the book. The question was brought up regarding how comments should be handled. The Specifications Section commented reviewers could provide comments using one of the following methods:

- Place comments within the text of the electronic versions of the rewritten sections, or
- Pass paper copies around their respective offices to gather comments and pass those along to the Specifications Section.

The Specification Section emphasized the importance of everyone being able to view all comments.