Iowa Department of Transportation

MINUTES
OF
IOWA D.O.T. SPECIFICATION COMMITTEE MEETING

February 10, 2011

Members Present:	John Selmer	Statewide Operations Bureau
	Jim Berger	Office of Materials
	Roger Bierbaum	Office of Contracts
	Donna Buchwald	Office of Local Systems
	Eric Johnsen, Secretary	Specifications Section
	Bruce Kuehl	District 6 - Construction
	Doug McDonald	District 1 - Marshalltown RCE
	Gary Novey	Office of Bridges & Structures
	Dan Redmond	District 4 - Materials
	Tom Reis, Chair	Specifications Section
	John Smythe	Office of Construction
	Willie Sorensen	Office of Traffic & Safety
Members Not Present:	Deanna Maifield	Office of Design
Advisory Members Present:	Lisa Rold	FHWA
Others Present:	Daniel Harness	Office of Design

Tom Reis, Specifications Engineer, opened the meeting. The following items were discussed in accordance with the agenda dated February 3, 2011:

1. Article 2435, Sanitary and Storm Sewer Structures.
The Office of Design requested changes to align with SUDAS specifications.

2. Section 2503, Storm Sewers.
The Office of Design requested changes to align with SUDAS specifications.

3. Section 2504, Sanitary Sewers.
The Office of Design requested changes to align with SUDAS specifications.

4. Section 2511, Removal and Construction of Sidewalks and Recreational Trails.
The Office of Design requested changes to add a reference to Section 2516 for construction of sidewalk with retaining wall.

5. Section 2516, Removal and Construction of Retaining Wall and Steps.
The Office of Design requested changes to align with SUDAS specifications.

6. Article 2552.05, A, Trench Excavation and Backfill.
The Office of Design requested changes to move specification language to the most appropriate location.

7. Article 2554.03, A, 7, Water Mains, Valves, Fire Hydrants, and Appurtenances.
The Office of Design requested changes to align with SUDAS specifications.

8. Section 2555, Deliver and Stockpile Salvaged Materials.

The Office of Design requested changes to clean up and clarify the specification language.

9. Section 4130, Revetment Stone, Erosion Stone, and Gabion Stone.

The Office of Materials requested changes to add a new class of revetment stone.

10. Article 4147.01, A, 1, c, Pipe.

The Office of Design requested changes to align with SUDAS specifications.

11. Article 4150.03, C, Butterfly Valves.

The Office of Design requested changes to align with SUDAS specifications.

12. Article 4186.09, A, 4, Washers (Type A Signs).

The Office of Traffic & Safety requested changes to washer specifications for Type A signs.

13. DS-09029, Partial Depth Bridge Deck Patching.

The Office of Bridges and Structures requested revisions to the Developmental Specifications for Partial Depth Bridge Deck Patching.

14. DS-09053, Small Business Development Contracts.

The Office of Contracts requested revisions to the Developmental Specifications for Small Business Development Contracts.

15. Discussion of issuing the next Specification Book.

The Office of Contracts asked when the target is for issuing the next specification book. The target date is October 2012. There currently is a relatively large number of specification books in the warehouse that the warehouse would need to be reimbursed for. Waiting a year and a half should reduce this number to a reasonable amount. The Specifications Section would like to get on a regular schedule for issuing new specification books, i.e. every two or three years. Typically, our printing contract allows a two-year window for reprinting if inventory runs low. This would allow us to order a smaller initial quantity with the opportunity to reorder. The Office of Construction's comment on issuing a new specification book every two years is that the construction offices may be more likely to have to deal with projects utilizing three different specification books at the same time.

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Deanna Maifield	**Office:** Design	**Item 1**
Submittal Date: 2011.01.27	**Proposed Effective Date:** 10/18/2011	
Section No.: 2435 **Title:** Sanitary and Storm Sewer Structures	**Other:**	

Specification Committee Action: Deferred until the March Specification Committee meeting.

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

Specification Committee Approved Text:

Comments: The District 6 office asked if Article 2435.03, E, 1, c was necessary since it seems to say the same things as Article a and d. Articles a and d will be deleted to be consistent with SUDAS.

The Office of Construction asked which class of material in Article 2552.02 was desired for Iowa DOT projects. Without an indication on the plans, any of the classes may be used except Class I material which is unsuitable per Article 2552.02, A, 1, a. The Office of Construction was primarily concerned with the use of Class I material. The Office of Design asked which class would be the Department's preference for backfilling and should this be specified in the specifications for interstate and primary projects?

The District 4 Office asked if the Department is doing the testing of bedding and backfill material. Typically they do not do some of the testing for the properties shown in the appendices. SUDAS personnel indicated that these properties are not routinely tested, but could be tested if there is a question about the quality of the material.

The District 4 Office asked about moisture and density testing for backfill compaction. Typically if it is not indicated as being the contractor's responsibility, it falls back on the Department.

The District 4 Office indicated that aggregate producers had asked that the bedding and backfill material gradations be matched with existing gradation table gradations or added to the gradation table themselves. That way, producers can more easily identify that materials meets the required gradation. The Office of Materials did not indicate an issue with adding these gradations to the gradation table.

Specification Section Recommended Text:

2435.03, A, 12, Placing and Compacting Backfill Material.

Replace the Article and title:

12. ~~Placing and Compacting~~ Backfill and Compaction ~~Material~~ .

a. Place suitable backfill material according to Article 2552.02 after concrete in structure has reached at least 3000 psi (21 MPa) compressive strength or 550 psi (3850 kPa) flexural strength. If concrete strength is not determined, place backfill material at least 14 calendar days after initial concrete placement.

b. Place backfill material simultaneously on all sides of walls and structures so the fill is kept at approximately the same elevation at all times.

c. Compact the 3 feet (1 m) closest to all walls ~~for wing faces~~ using pneumatic or hand tampers only. Ensure proper and uniform compaction of backfill material around structure.

2435.03, E, Connection to Existing Manhole or Intake.

Replace the Article:

1. General.

a. Remove exisiting concrete invert as required to accommodate new pipe.

b. Insert pipe into structure and trim end flush with inside wall of structure.

c. Remove existing invert as necessary to install pipe at required elevation and develop hydraulic channel.

d. Reconstruct structure invert to provide a well defined channel between pipes.

e. Place backfill material according to Section 2552.

~~12~~. Sanitary Sewer.

a. General.

1) ~~Excavate as required.~~ Core new openings in existing manholes unless specified otherwise in the contract documents.

2) Divert flow as necessary. Obtain approval of the diversion plan from the Engineer. Maintain sanitary sewer service at all times unless specified otherwise in the contract documents.

~~**3)** Remove existing invert as necessary to install pipe at required elevation and develop hydraulic channel.~~

b. Cored Opening.

1) Insert flexible watertight connector into new opening.

2) Install and tighten internal expansion sleeve to hold flexible connector in place.

3) Insert pipe through flexible connector and tighten external compression ring.

4) Do not grout opening or pour collar for cored opening with flexible connector.

c. Cut and Chipped Opening (Knockout).

1) Saw opening to approximate dimensions with a masonry saw. Saw to depth sufficient to sever reinforcing steel.

2) Remove concrete and expand opening to a diameter at least 6 inches (150 mm) larger than the outside diameter of the new pipe.

3) Cut off all reinforcing steel protruding from the structure wall.

~~**4)** Remove existing concrete invert as required to accommodate new pipe.~~

~~**5)** Insert pipe into structure and trim end flush with inside wall of structure.~~

~~**6**~~**4)** Install waterstop around new pipe centered within structure wall.

~~**7**~~**5)** Fill opening between structure and pipe with non-shrink grout.

~~**8**~~**6)** Construct concrete collar around pipe and exterior manhole opening.

a) For new pipes 12 inches (300 mm) or smaller, install two No. 3 steel reinforcing hoops on collar around pipe. Pour concrete collar around pipe/structure junction to a minimum thickness and width of 6 inches (150 mm).

b) For new pipes larger than 12 inches (300 mm), install two No. 4 steel reinforcing hoops in collar around pipe. Pour concrete collar around pipe/structure junction to a minimum thickness and width of 9 inches (230 mm).

~~**9**~~**7)** Provide pipe joint, non-shear coupling, or other approved flexible coupling within 2 feet (600 mm) of structure wall to allow for differential settlement between the new sewer and the structure.

~~**10)** Reconstruct structure invert to provide a well defined channel between pipes.~~

~~**2**~~**3. Storm Sewer.**

~~**a.** Excavate as required.~~

~~**b**~~**a.** Cut opening to manhole or intake to 3 to 6 inches (75 to 150 mm) beyond the outside of the pipe. ~~Remove existing invert as necessary to install pipe at required elevation and develop hydraulic channel.~~

~~**c.** Position end of pipe flush with interior wall of manhole.~~

~~**d**~~**b.** Fill opening between manhole or intake wall and outside of pipe with non-shrink grout. Construct a concrete collar around the pipe.

~~**e.** Reconstruct invert according to Article 4149.04, K~~

~~**f.** Place backfill material according to Section 2533.~~

2435.05, A, 2.

Replace the Article:

Payment is full compensation for excavation, placing bedding and backfill material, compaction, base, structural concrete, reinforcing steel, precast units (if used), inverts, chimney seals, castings, and adjustment rings.

2435.05, B, 2.

Replace the Article:

Payment is full compensation for excavation, placing bedding and backfill material, compaction, base, structural concrete, reinforcing steel, precast units (if used), inverts, castings, and adjustment rings~~, and all appurtenances necessary for proper installation~~.

2435.05, G, 2.

Replace the Article:

Payment is full compensation for coring into the existing manhole or intake, pipe ~~connectors~~ connections, grout, and waterstop (when required).

Comments:

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

See attached.

Reason for Revision: To match SUDAS.					
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:					

Section 2435. Sanitary and Storm Sewer Structures

2435.01 DESCRIPTION.
This section was developed in conjunction with Sections 6010 and 6030 of the SUDAS Standard Specifications, with modifications to suit the needs of the Department.

A. Construct sanitary and storm sewer manholes to provide access to sewer systems for maintenance and cleaning purposes.

B. Construct storm sewer intakes for collection of surface water and conveyance to the storm sewer system.

C. Modify existing manholes and intakes as necessitated by other improvements adjacent to the manholes or intakes.

D. Clean and inspect sanitary and storm sewer manholes, intakes, and other utility structures. Test sanitary sewer manholes.

2435.02 MATERIALS.
Apply Article 4149.04.

2435.03 CONSTRUCTION.

A. General Requirements for Installation of Manholes and Intakes.

1. Excavation.
Excavate according to Section 2552.

2. Subgrade Preparation.
- **a. Cut Sections (Undisturbed Soil):** Prepare subgrade to accurate elevation required to place structure base or subbase.
- **b. Fill Sections:** Compact to 95% of maximum Standard Proctor Density and hand grade to accurate elevation required to place structure base or subbase, or install stabilization material as directed by the Engineer.
- **c. Unstable Soil:** Install stabilization material as directed by the Engineer.

3. Subbase.
- **a. Cast-in-place Structures:** No subbase material is required.
- **b. Precast Structures:** If precast structure is provided, install 8 inch (200 mm) thick pad of Class I bedding material a minimum of 12 inches (300 mm) outside the footprint of the structure.

4. Installation of Manhole or Intake Structure.
Adjust wall height and depth of base, when necessary, to provide a minimum of 48 inches (1200 mm) between form grade elevation and top of base.
- **a. Cast-in-place:** Apply Article 2435.03, B.
- **b. Precast:** Apply Article 2435.03, C.

5. Pipes.
Install and bed pipes and connect to manhole or intake. Install pipe flush with inside wall of structure. Place bedding and pipe embedment material according to Section 2552.
- **a. Cast-in-place Structures.**
  - **1) Storm:** Form structure walls around pipe.
  - **2) Sanitary:** Form or core circular opening and install flexible watertight gasket according to Article 4149.04, G. Keep void between pipe and manhole section free of debris and concrete.
- **b. Precast Storm Sewer Manholes or Intakes.**
  Fill space between pipe and structure with non-shrink grout.
- **c. Precast Sanitary Sewer Manholes.**
  Connect to structure with flexible watertight gasket according to Article 4149.04, G. Keep void between pipe and manhole section free of debris and concrete.
- **d. Sanitary Sewer Manholes on Existing Pipe.**
  Install waterstop according to Article 4149.04, G.

6. Joint Sealant.
- **a. Sanitary Sewer Manholes.**
  - **1)** Install rubber O-ring or profile gasket (precast structures).

2) Apply bituminous jointing material or butyl sealant wrap to exterior of all sanitary sewer manhole joints.

b. Storm Sewer Manholes and Intakes.

1) Apply bituminous jointing material or install rubber rope gasket.

2) If indicated in the contract documents, apply engineering fabric wrap to joints.

7. Invert.

a. Construct manhole invert up to one half of pipe diameter to produce a smooth half pipe shape between pipe inverts.

b. Shape invert to provide a smooth transition between pipe inverts.

c. Slope invert top toward pipe 1/2 inch per foot (40 mm per meter) perpendicular to flow line.

d. For sanitary sewer, keep void between pipe and structure wall free of debris and concrete.

e. For precast inverts, remove projections and repair voids to provide a hydraulically smooth channel between ends of pipes.

8. Top Sections.

Install manhole eccentric cone or flat top section or install intake top.

9. Adjustment Ring(s).

Bed each concrete ring with bituminous jointing material in trowelable or rope form. Bed each polyethylene ring with the manufacturer's approved product. Do not install more than a total ring stack height of 12 inches (300 mm). For greater adjustment, modify lower riser section(s).

10. Casting.

Install the type of casting specified in the contract documents and adjust to proper grade. Where a manhole or intake is to be in a paved area, adjust the casting to match the slope of the finished surface. When specified in the contract documents, attach a casting frame to the structure with four anchor bolts.

11. Chimney Seal.

For sanitary sewer manholes, install an internal or external rubber chimney seal.

a. Do not use external chimney seal if seal will be permanently exposed to sunlight.

b. Extend seal 3 inches (75 mm) below the lowest adjustment ring.

c. Extend seal to 2 inches (50 mm) above the flange of the casting for a standard two piece casting, or 2 inches (50 mm) above the top of the base section of the casting for an adjustable three piece casting.

d. Use multiple seals, if necessary.

e. Install compression bands (external chimney seal) or expansion bands (internal chimney seal) to lock the rubber sleeve or extension into place and to provide a positive watertight seal. Once tightened, lock bands into place. Use only manufacturer recommended installation tools and sealants.

12. ~~Placing and Compacting~~ Backfill and Compaction ~~Material~~ .

a. Place suitable backfill material according to Article 2552.02 after concrete in structure has reached at least 3000 psi (21 MPa) compressive strength or 550 psi (3850 kPa) flexural strength. If concrete strength is not determined, place backfill material at least 14 calendar days after initial concrete placement.

b. Place backfill material simultaneously on all sides of walls and structures so the fill is kept at approximately the same elevation at all times.

c. Compact the 3 feet (1 m) closest to all walls ~~for wing faces~~ using pneumatic or hand tampers only. Ensure proper and uniform compaction of backfill material around structure.

B. Additional Requirements for Cast-In-Place Concrete Structures.

1. Forms.

a. Apply Article 2403.03, B, 5.

b. Form all cast-in-place manholes and intakes on both the inside and the outside face above the base. Do not form against excavated earthen surface.

2. Reinforcing Steel.

a. Apply Section 2404.

b. Lap bars a minimum of 36 diameters, unless specified otherwise in the contract documents.

c. Provide a minimum of 3 inches (75 mm) of clearance for structure bases and 2 inches (50 mm) of clearance for walls and tops.

3. Concrete Mixing.
- **a.** Apply Article 2403.02, D.
- **b.** When using ready-mixed concrete, comply with ASTM C 94/C 94M.

4. Concrete Placing.
- **a.** Apply Article 2403.03, C.
- **b.** Do not place concrete when the air temperature is less than 40°F (5º C) without the approval of the Engineer. When placement below 40ºF (5ºC) is allowed, apply Article 2403.03, F.
- **c.** Place concrete continuously in each section until complete. Do not allow more than 30 minutes to elapse between depositing adjacent layers of concrete within each section.
- **d.** Apply Article 2403.03, D, for concrete vibration.
- **e.** Form 1 1/2 by 3 inch (38 mm by 75 mm) keyed construction joints at locations shown in the contract documents.
- **f.** Provide a broom finish on portions of structure that are to become part of exposed pavement.

5. Stripping and Cleaning.
- **a.** Remove forms for manhole and intake walls and tops according to Article 2403.03, M. References to culverts include all sanitary and storm structures. When allowed by the Engineer, compressive strengths at six times the stated flexural strengths may be used in determining concrete strength of structure tops.
- **b.** Finish surfaces according to Article 2403.03, P. Give exposed surfaces a Class 2 finish.

6. Curing.
- **a.** Apply Article 2403.03, E.
- **b.** For surfaces visible to the public, use only curing compounds complying with ASTM C 309, Type 1-D or Type 2.

7. Exterior Loading.
- **a.** Restrict exterior loads on concrete according to Article 2403.03, N.
- **b.** When allowed by the Engineer, compressive strengths at six times the stated flexural strengths may be used.

8. Repairs.
After visual inspection of the completed manhole or intake, repair honeycomb areas, visible leaks, tie holes, or other damage areas. Remove concrete webs or protrusions.

C. Additional Requirements for Precast Concrete Structures.

1. Substitutions.
Precast structures may be substituted for designated cast-in-place structures so long as structure is constructed as specified in the contract documents and according to Article 2435.03, B.

2. Cast-in-place Base.
- **a.** Apply Article 2435.03, B, for placement of concrete.
- **b.** Ensure proper vertical and horizontal alignment of base riser section.

3. Precast Base or Base with Integral Riser Section.
Place base or base with integral riser section and ensure proper vertical and horizontal alignment.

4. Additional Riser Sections.
Install additional riser sections as required.

5. Lift Holes.
Install rubber plug in lift holes. Cover plug and hole with non-shrink grout.

D. Adjustment of Existing Manhole or Intake.

1. Casting Extension Rings.
- **a.** Only install casting extension rings when allowed by the contract documents, and only in conjunction with pavement overlays.
- **b.** Install according to the manufacturer's recommendation and adjust for proper alignment.

2. Minor Adjustment (Adding or Removing Adjustment Rings).
- **a.** Remove casting.
- **b.** Modify adjustment ring stack height by one of the following methods:

1) Add adjustment rings as necessary to adjust existing manhole or intake to finished pavement grade or finished topsoil grade, to a maximum ring stack height of 16 inches (400 mm). Bed each concrete ring with bituminous jointing material. Bed each polyethylene ring with manufacturer's approved product.

2) Remove one or more adjustment rings, as appropriate, to reduce casting elevation.

c. Install new casting on modified adjustment ring stack. Existing casting may be reinstalled when specified in the contract documents.

d. Replace chimney seal for sanitary sewer manhole using only new materials.

3. Major Adjustment (Adding, Removing, or Modifying Riser or Cone Section).
When adjustment is greater than can be accomplished through adding or removing adjustment rings, a major adjustment will be required.

a. Remove casting.

b. Remove top.

c. Remove and replace or modify existing riser section and/or top section, as appropriate.

d. Install new frame and cover or grate. Existing casting may be reinstalled when allowed by the contract documents.

e. Replace chimney seal for sanitary sewer manhole using only new materials.

E. Connection to Existing Manhole or Intake.

1. General.

a. Remove exisiting concrete invert as required to accommodate new pipe.

b. Insert pipe into structure and trim end flush with inside wall of structure.

c. Remove existing invert as necessary to install pipe at required elevation and develop hydraulic channel.

d. Reconstruct structure invert to provide a well defined channel between pipes.

e. Place backfill material according to Section 2552.

~~1~~2. Sanitary Sewer.

a. General.

1) ~~Excavate as required.~~ Core new openings in existing manholes unless specified otherwise in the contract documents.

2) Divert flow as necessary. Obtain approval of the diversion plan from the Engineer. Maintain sanitary sewer service at all times unless specified otherwise in the contract documents.

~~**3)** Remove existing invert as necessary to install pipe at required elevation and develop hydraulic channel.~~

b. Cored Opening**.**

1) Insert flexible watertight connector into new opening.

2) Install and tighten internal expansion sleeve to hold flexible connector in place.

3) Insert pipe through flexible connector and tighten external compression ring.

4) Do not grout opening or pour collar for cored opening with flexible connector.

c. Cut and Chipped Opening (Knockout).

1) Saw opening to approximate dimensions with a masonry saw. Saw to depth sufficient to sever reinforcing steel.

2) Remove concrete and expand opening to a diameter at least 6 inches (150 mm) larger than the outside diameter of the new pipe.

3) Cut off all reinforcing steel protruding from the structure wall.

~~**4)** Remove existing concrete invert as required to accommodate new pipe.~~

~~**5)** Insert pipe into structure and trim end flush with inside wall of structure.~~

~~6~~4) Install waterstop around new pipe centered within structure wall.

~~7~~5) Fill opening between structure and pipe with non-shrink grout.

~~8~~6) Construct concrete collar around pipe and exterior manhole opening.

a) For new pipes 12 inches (300 mm) or smaller, install two No. 3 steel reinforcing hoops on collar around pipe. Pour concrete collar around pipe/structure junction to a minimum thickness and width of 6 inches (150 mm).

b) For new pipes larger than 12 inches, install two No. 4 steel reinforcing hoops in collar around pipe. Pour concrete collar around pipe/structure junction to a minimum thickness and width of 9 inches (230 mm).

~~9~~7) Provide pipe joint, non-shear coupling, or other approved flexible coupling within 2 feet (600 mm) of structure wall to allow for differential settlement between the new sewer and the structure.

~~**10)** Reconstruct structure invert to provide a well defined channel between pipes.~~

~~2~~3. **Storm Sewer.**

~~a. Excavate as required.~~

~~b~~a. Cut opening to manhole or intake to 3 to 6 inches (75 to 150 mm) beyond the outside of the pipe. ~~Remove existing invert as necessary to install pipe at required elevation and develop hydraulic channel.~~

~~c. Position end of pipe flush with interior wall of manhole.~~

~~d~~b. Fill opening between manhole or intake wall and outside of pipe with non-shrink grout. Construct a concrete collar around the pipe.

~~e. Reconstruct invert according to Article 4149.04, K~~

~~f. Place backfill material according to Section 2533.~~

F. Cleaning, Inspection, and Testing of Structures.

1. Cleaning.

a. Clean all manholes, intakes, and structures by removing sheeting, bracing, shoring, forms, soil sediment, concrete waste, and other debris.

b. Do not discharge soil sediment or debris to drainage channels, existing storm sewer, or existing sanitary sewer system.

2. Visual Inspection.

a. Examine structure for:

1) Damage.

2) Slipped forms.

3) Indication of displacement of reinforcement.

4) Porous areas or voids.

5) Proper placement of seals, gaskets, and embedments.

b. Verify that the structure is set to true line, grade, and plumb.

c. Verify structure dimensions and thicknesses.

3. Repair.

Apply Article 2435.03, B, 8.

4. Sanitary Sewer Manhole Testing.

a. **General.**

1) Use vacuum testing for new sanitary sewer manholes unless exfiltration testing is specified in the contract documents.

2) Conduct final test after manhole construction is complete, all repairs and connections have been made, and invert has been installed.

b. **Vacuum Test.**

1) Applicable only for new manholes isolated from connecting sewer lines.

2) Use manufactured vacuum test equipment meeting the Engineer's approval. Follow the equipment manufacturer's recommended procedures throughout.

3) Use extreme care and follow safety precautions during testing operations. Keep personnel clear of manholes during testing.

4) Seal all openings except manhole top access using pneumatic plugs rated for test pressures. Install plugs according to the test equipment manufacturer's recommendations.

5) Brace pipe inverts if backfill material has not been placed around connecting pipes.

6) Install the vacuum tester head assembly on the manhole top access, and inflate the seal.

7) Evacuate the manhole to 5 psi (35 kPa). Close the isolation valve and start the test. Record the starting time.

8) Maintain vacuum in the manhole for the time indicated in Table 2435.03-1 below for the diameter and depth of manhole being tested.

9) Test failure is indicated by vacuum loss greater than 0.5 psi (4 kPa) within the minimum test time indicated in Table 2435.03-1 below for the depth and diameter of the manhole being tested.

Table 2435.03-1: Minimum Vacuum Test Times for Various Manhole Diameters

Depth feet (m)	**Diameter inches (mm)**				
	48 (1200)	**54 (1350)**	**60 (1500)**	**66 (1650)**	**72 (1825)**
	Time, Seconds				
8 (2.45)	20	23	26	29	33

10 (3.28)	25	29	33	36	41
12 (3.66)	30	35	39	43	49
14 (4.27)	35	41	46	51	57
16 (4.88)	40	46	52	58	67
18 (5.49)	45	52	59	65	73
20 (6.10)	50	53	65	72	81
22 (6.71)	55	64	72	79	89
24 (7.32)	59	64	78	87	97
26 (7.93)	64	75	85	94	105
28 (8.54)	69	81	91	101	113
30 (9.15)	74	87	98	108	121

c. **Exfiltration Test.**

1) Applicable to new manholes (when specified in the contract documents) or rehabilitated manholes.
2) Testing may be performed in conjunction with sanitary sewer line testing. Apply Section 2504.
3) Do not test by this method if water may potentially freeze during the test.
4) Plug the manhole inlet and outlet.
5) Fill the manhole with water to 2 feet (600 mm) above the outside top of the connecting pipe. If groundwater is present, fill the manhole to no less than 2 feet (600 mm) nor more than 5 feet (1.5 meters) above the groundwater level. Do not fill above the top of the standard barrel sections.
6) Mark the water level.
7) Allow water to stand in the manhole for 1 hour, then refill to the original water level and begin the test.
8) Determine the allowable drop in water level by using the equation given in Article 2504.03, L, 4, b, 3, c. After 1 hour, measure the drop in water level.
9) Test failure is indicated by water loss greater than maximum allowable calculated exfiltration.

5. Test Failure.

If testing fails, reseal the openings, repair the manhole, and retest. An alternate test method complying with these specifications may be used for a retest if desired.

2435.04 METHOD OF MEASUREMENT.

A. Manhole.
Each type and size of manhole will be counted.

B. Intake.
Each type and size of intake will be counted.

C. Drop Connection.
Each drop connection will be counted.

D. Casting Extension Rings.
Each casting extension ring will be counted.

E. Manhole or Intake Adjustment, Minor.
Each existing manhole or intake adjusted to finished grade by addition or removal of adjustment rings or adjustment of adjustable casting will be counted.

F. Manhole or Intake Adjustment, Major.
Each existing manhole or intake adjusted to grade by addition or removal of riser, cone or flat top sections, or the exchange of existing riser sections with sections having different vertical dimensions will be counted.

G. Connection to Existing Manhole or Intake.
Each connection made to an existing manhole or intake will be counted.

H. Cleaning, Inspection, and Testing.
None.

2435.05 BASIS OF PAYMENT.

A. Manhole.

1. Payment will be at the contract unit price for each type and size of manhole.

2. Payment is full compensation for excavation, placing bedding and backfill material, compaction, base, structural concrete, reinforcing steel, precast units (if used), inverts, chimney seals, castings, and adjustment rings.

B. Intake.

1. Payment will be at the contract unit price for each type and size of intake.

2. Payment is full compensation for excavation, placing bedding and backfill material, compaction, base, structural concrete, reinforcing steel, precast units (if used), inverts, castings, and adjustment rings~~, and all appurtenances necessary for proper installation~~.

C. Drop Connection.

1. Payment will be at the contract unit price for each drop connection.

2. Payment is full compensation for the connection to the manhole and all pipe, fittings, concrete encasement, and bedding and backfill material.

D. Casting Extension Rings.
Payment will be at the unit price for each casting extension ring.

E. Manhole or Intake Adjustment, Minor.

1. Payment will be made at the contract unit price for each minor manhole or intake adjustment.

2. Payment is full compensation for:
- Removing existing casting and existing adjustment rings,
- Furnishing and installing adjustment rings,
- Furnishing and installing new casting, and
- Installing new chimney seal (sanitary sewer manholes only).

F. Manhole or Intake Adjustment, Major.

1. Payment will be at the contract unit price for each major adjustment.

2. Payment is full compensation for:
- Removal of existing casting, adjustment rings, top sections and risers,
- Excavation,
- Concrete and reinforcing steel or precast sections,
- Furnishing and installing new casting
- Installing new chimney seal (sanitary sewer manholes only),
- Placing backfill material, and
- Compaction.

G. Connection to Existing Manhole or Intake.

1. Payment will be made at the contract unit price for each sewer connection.

2. Payment is full compensation for coring into the existing manhole or intake, pipe ~~connectors~~ connections, grout, and waterstop (when required).

H. Cleaning, Inspection, and Testing.
Cleaning, inspection, and testing of structures are incidental to construction of structures and will not be paid for separately.

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Deanna Maifield	**Office:** Design	**Item 2**
Submittal Date: 2011.01.27	**Proposed Effective Date:** 10/18/2011	
Section No.: 2503 **Title:** Storm Sewers	**Other:**	

Specification Committee Action: Approved as recommended.

Deferred:	**Not Approved:**	**Approved Date:** 2/10/2011	**Effective Date:** 10/18/2011

Specification Committee Approved Text: See Specification Section Recommended Text.

Comments: The District 6 Office asked if SUDAS provides guidelines on when to fill and abandon pipes. SUDAS personnel indicated that each jurisdiction has its own policy on plugging versus filling. As a general rule, typically gravity pipes are filled and plugged and pressure pipes are just plugged.

The Office of Traffic & Safety asked about policy on abandoning other utilities in the ROW, such as water lines and gas lines. When these lines are abandoned, they become Iowa DOT property since they are in our ROW. Cost to remove would be a factor.

Specification Section Recommended Text:

2503.03, B, 1, General.

Delete Articles a and b:

~~**a.** Provide proper facilities for lowering the sections into place without damaging the pipe.~~
~~**b.** Inspect pipe for defects before carefully lowering into trench. Do not install damaged or defective pipe.~~

Replace Article g:

Use a saw to ~~C~~cut ends of pipe ~~at~~ flush with inside wall of manholes, intakes, and structures. Do not use hammer ~~cut~~ or other means to break pipe.

2503.03, B, 2, Trenched.

Replace Article a:

Excavate trench and provide bedding and backfill material as specified in Section 2552. If reinforced concrete elliptical pipe is used, provide pipe bedding as specified in the contract documents.

Replace Article c:

Lay pipe to design line and grade~~:~~.

~~**1)** Install pipe to line and grade specified in the contract documents.~~ Set field grades to invert of pipe.

~~**2)** Correct misalignment, displacement, or otherwise defective pipe by removing, relaying, or replacing pipe, at no additional cost to the Contracting Authority~~

2503.03, F, Conflicts.

Delete the Article:

~~**F. Conflicts.**~~

~~**1.** Provide temporary support for existing water, gas, telephone, power, and other utilities or services that cross trench.~~

~~**2.** Compact backfill material under existing utility crossing as specified in Section 2552, or construct utility line supports where specified in the contract documents or as directed by the Engineer.~~

2503.03, G, Storm Sewer Abandonment.

Replace the Article:

1. Plug.

~~**1a.**~~ Prior to placing the sewer plug, the Engineer will verify the sewer line is not in use.

~~**2b.**~~ Construct sewer plug by completely filling the end of the pipe with concrete. Force concrete into the end of the pipe for a distance of 16 inches (400 mm), or one-half the pipe diameter, whichever is greater.

2. Fill.

a. Prior to filling sewer, Engineer will verify sewer line is not in use.

~~**3b**~~. If ~~noted in the plans~~ specified in the contract documents, fill the line to be abandoned with flowable mortar or CLSM, ~~(comply with~~ according to Article ~~Section~~ 2552.02, E,~~)~~ by gravity flow or pumping.

2503.04, METHOD OF MEASUREMENT.

Renumber Article D and **add** new Articles:

D. Connection to Existing Manhole or Intake.

Connections to existing manhole will be measured according to Article 2435.04, G.

E. Sanitary Sewer Abandonment.

1. Plug.

None.

2. Fill and Plug.

Measurement for each size of pipe filled and plugged will be in linear feet (meters) from end of pipe to end of pipe.

~~**D**~~ **F. Cleaning, Inspecting, and Testing.**

2503.05, BASIS OF PAYMENT.

Renumber Article D and **add** new Articles:

D. Connection to Existing Manhole or Intake.

Connections to existing manhole will be paid according to Article 2435.05, G.

E. Sanitary Sewer Abandonment.

1. Plug.

Plugging storm sewers is incidental to other work and will not be paid for separately.

2. Fill and Plug.

Payment will be the contract unit price per linear foot (meter) for each size of pipe filled and plugged.

~~**D**~~ **F. Cleaning, Inspecting, and Testing.**

2503.05, A, 1, b.

Replace the Article:

Payment is full compensation for:

- Trench excavation,

- Dewatering,
- Furnishing bedding material,
- Placing bedding and backfill material,
- Joint wrapping,
- ~~Connectors~~ Wyes and other fittings,
- Pipe joints and pipe connections, and
- Testing~~,~~ and inspection.

Comments:

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

2503.04, D, Cleaning, Inspecting, and Testing.

Renumber as 2503.04, E.

2503.04, D, Connection to Existing Manhole.

Add as a new article:

Connections to existing manhole will be measured according to Article 2435.04, G.

2503.05, D, Cleaning, Inspecting, and Testing.

Renumber as 2503.05, E.

2503.04, D, Connection to Existing Manhole.

Add as a new article:

Connections to existing manhole will paid according to Article 2435.05, G.

Reason for Revision: The Office of Design would also like to add a reference to MOM and BOP for connection to existing manhole to match SUDAS.

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

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

Section 2503. Storm Sewers

2503.01 DESCRIPTION.
This section was developed in conjunction with Section 4020 of the SUDAS Standard Specifications, with modifications to suit the needs of the Department.

A. Construct storm sewers.

B. Abandon storm sewer.

C. Cleaning, inspecting, and testing storm sewers.

D. Cleaning and inspecting pipe culverts.

E. Cleaning, inspecting, and testing rehabilitated pipe.

2503.02 MATERIALS.
Apply Article 4149.03.

2503.03 CONSTRUCTION.

A. Examination.

1. Verify measurements at site. Make necessary field measurements to accurately determine pipe makeup lengths or closures.

2. Examine site conditions to ensure construction operations do not pose hazards to adjacent structures or facilities.

B. Pipe Installation.

1. **General.**
   ~~**a.** Provide proper facilities for lowering the sections into place without damaging the pipe.~~
   ~~**b.** Inspect pipe for defects before carefully lowering into trench. Do not install damaged or defective pipe.~~
   ~~**c**~~**a.** Clean pipe interior and joints prior to lowering into trench. Keep pipe clean during construction.
   ~~**d**~~**b.** Begin at the lowest point in line. Lay groove or bell end pointing upstream unless specifically noted otherwise.
   ~~**e**~~**c.** Place pipe with lifting holes at the top of the pipe and fill lift hole with non-shrink grout or manufactured plugs.
   ~~**f**~~**d.** Assemble joints as specified by the pipe manufacturer. When specified, wrap exterior of storm sewer pipe joints with engineering fabric.
   ~~**g**~~**e.** Use a saw to ~~C~~cut ends of pipe ~~a~~flush with inside wall of manholes, intakes, and structures. Do not use hammer ~~cut~~ or other means to break pipe.
   ~~**h**~~**f.** Provide manholes and intakes as specified in the contract documents.
   ~~**i**~~**g.** Use watertight stopper, plug, or other approved means to protect the exposed upstream ends of the pipe and prevent soil sediment from entering the storm sewer system.

2. **Trenched.**
   a. Excavate trench and provide bedding and backfill material as specified in Section 2552. If reinforced concrete elliptical pipe is used, provide pipe bedding as specified in the contract documents.
   b. Prepare trench bottom to design line and grade so that only minor movement of pipe is necessary after installation.
   c. Lay pipe to design line and grade.~~:~~
      ~~**1)** Install pipe to line and grade specified in the contract documents.~~ Set field grades to invert of pipe.
      ~~**2)** Correct misalignment, displacement, or otherwise defective pipe by removing, relaying, or replacing pipe, at no additional cost to the Contracting Authority~~
   d. Provide uniform bearing for full pipe barrel length. Excavate bell holes as necessary for uniform support of pipe barrel on bedding material.
   e. Do not lay pipe in water or on saturated soil or bedding, or allow water to rise in trench around pipe prior to placing backfill material.

f. Do not disturb installed pipe and bedding when using movable trench boxes and shields. Block or anchor pipe as necessary to prevent joint displacement.

3. Trenchless.
Apply Section 2553.

C. Storm Sewer Pipe Installed within a Casing Pipe.
Apply Article 2553.03, D, for installation of storm sewer pipe within a casing pipe.

D. Pipe Jointing.

1. General.
- **a.** Clean joint surfaces to remove soil or foreign material prior to jointing pipe.
- **b.** Assemble joints according to the pipe manufacturer's recommendations. Use equipment that does not apply damaging forces to pipe joints.

2. Reinforced Concrete Pipe, Reinforced Concrete Arch Pipe, and Reinforced Concrete Elliptical Pipe.
- **a.** Use cold applied bituminous or rubber rope gasket jointing materials unless specified otherwise.
  - **1)** Apply joint material to entire tongue, or to top half of tongue and bottom half of groove, in sufficient quantity to fill the joint. Close the joint between pipes.
  - **2)** Fill remaining voids in the joint, both inside and outside of pipe, with joint material. Smooth the joint material on the inside of pipes 24 inches (600 mm) and larger.
- **b.** If a rubber O-ring or profile gasket is specified for RCP, coat the rubber gasket and joint with soap based lubricant immediately prior to closing the joint.
- **c.** If wrapped pipe joint is specified, comply with the contract documents. Secure engineering fabric in place to prevent displacement while placing backfill material.
- **d.** Place pipe such that joint openings on the outside or inside of the pipe do not exceed 1/8 inch (3 mm) at the bottom and 5/8 inch (15 mm) at the top.

3. Reinforced Concrete Low Head Pressure Pipe, Polyvinyl Chloride Pipe and Corrugated PVC Pipe, and High Density Polyethylene Pipe.
Coat gasket and joint with soap based lubricant immediately prior to closing the joint.

4. Corrugated Metal Pipe and Corrugated Metal Arch Pipe.
Lap coupling bands to form a tightly closed joint upon installation.

5. Connections between Dissimilar Pipes.
- **a.** Use manufactured adapters or couplings approved by the Engineer.
- **b.** Where adapters or couplings are not available, the Engineer may authorize use of concrete collar as shown in the contract documents.

E. Tolerances.
The following tolerances apply to utilities installed by open trench construction. For trenchless construction, apply Section 2553.

1. Ensure horizontal and vertical alignment of gravity sewer lines does not vary from design line and grade at any point along the pipe by more than 1% of the inside diameter of the pipe or 1/4 inch (6 mm), whichever is larger.

2. Tolerance is allowed only if design line and grade is sufficient to prevent backslope when tolerance limits are reached.

3. Reverse slope on pipe is prohibited. Remove and reinstall to proper grade.

~~**F. Conflicts.**~~

~~**1.** Provide temporary support for existing water, gas, telephone, power, and other utilities or services that cross trench.~~
~~**2.** Compact backfill material under existing utility crossing as specified in Section 2552, or construct utility line supports where specified in the contract documents or as directed by the Engineer.~~

~~G~~F. Storm Sewer Abandonment.

1. **Plug.**
   ~~1~~a. Prior to placing the sewer plug, the Engineer will verify the sewer line is not in use.
   ~~2~~b. Construct sewer plug by completely filling the end of the pipe with concrete. Force concrete into the end of the pipe for a distance of 16 inches (400 mm), or one-half the pipe diameter, whichever is greater.

2. **Fill.**
   a. Prior to filling sewer, Engineer will verify sewer line is not in use.
   ~~3~~b. If ~~noted in the plans~~ specified in the contract documents, fill the line to be abandoned with flowable mortar or CLSM, ~~(comply with~~ according to Article ~~Section~~ 2552.02, E,~~)~~ by gravity flow or pumping.

~~H~~G. Connection to Existing Manhole or Intake.
Apply Article 2435.03, E.

~~I~~H. Cleaning, Inspection, and Testing.
Apply Articles 2504.03, L, 1, 2, and 5.

2503.04 METHOD OF MEASUREMENT.

A. Storm Sewer.

1. **Trenched.**
   Measurement for each type and size of pipe installed in a trench will be in linear feet (meters) along the centerline of the pipe from center of intake or manhole to center of intake or manhole. Where the end of the pipe discharges to a ditch or waterway, measurement will be to the end of the pipe, exclusive of aprons. Lengths of elbows and tees will be included in the length of pipe measured.

2. **Trenchless.**
   Measurement for each type and size of pipe installed by trenchless methods will be in linear feet (meters) along the centerline of the pipe.

B. Storm Sewer with Casing Pipe.

1. **Trenched.**
   Measurement for each type and size of pipe installed with a casing pipe in a trench will be in linear feet (meters) along the centerline of the casing pipe from end of casing to end of casing.

2. **Trenchless.**
   Measurement for each type and size of pipe installed by trenchless methods with a casing pipe will be in linear feet (meters) along the centerline of the casing pipe from end of casing to end of casing.

C. Removal of Storm Sewer.
Measurement for each type and size of pipe removed will be in linear feet (meters) from end to end.

D. Cleaning, Inspecting, and Testing.
None.

E. Connection to Existing Manhole or Intake.
Measurement will be according to Article 2534.04, G.

F. Sanitary Sewer Abandonment.

1. **Plug.**
   None.

2. Fill and Plug.
   Measurement for each size of pipe filled and plugged will be in linear feet (meters) from end of pipe to end of pipe.

2503.05 BASIS OF PAYMENT.

A. Storm Sewer.

1. **Trenched.**
   - **a.** Payment will be made at the contract unit price per linear foot (meter) for each type and size of pipe.
   - **b.** Payment is full compensation for:
     - Trench excavation,
     - Dewatering,
     - Furnishing bedding material,
     - Placing bedding and backfill material,
     - Joint wrapping,
     - ~~Connectors~~ wyes and other fittings,
     - Pipe joints and pipe connections, and
     - Testing~~,~~ and inspection.

2. **Trenchless.**
   - **a.** Payment will be made at the contract unit price per linear foot (meter) for each type and size of pipe.
   - **b.** Payment is full compensation for:
     - Furnishing and installing pipe,
     - Trenchless installation materials and equipment,
     - Pit excavation, dewatering, and placing backfill material,
     - Pipe connections, and
     - Testing, and inspection.

B. Storm Sewer with Casing Pipe.

1. **Trenched.**
   - **a.** Payment will be made at the contract unit price per linear foot (meter) for each type and size of pipe.
   - **b.** Payment is full compensation for:
     - Furnishing and installing both carrier pipe and casing pipe,
     - Trench excavation,
     - Dewatering,
     - Furnishing bedding material,
     - Placing bedding and backfill material,
     - Furnishing and installing annular space fill material,
     - Casing spacers,
     - Pipe connections, and
     - Testing and inspection.

2. **Trenchless.**
   - **a.** Payment will be made at the contract unit price per linear foot (meter) for each type and size of carrier pipe.
   - **b.** Payment is full compensation for:
     - Furnishing and installing both storm sewer pipe and casing pipe,
     - Trenchless installation materials and equipment,
     - Pit excavation, dewatering, and placing backfill material,
     - Casing spacers,
     - Furnishing and installing annular space fill material,
     - Pipe connections,
     - Testing, and inspection.

C. Removal of Storm Sewer.

1. Payment will be made at the contract unit price per linear foot (meter) for each type and size of pipe removed.

2. Payment is full compensation for removal, disposal, and capping (if specified) of pipe.

D. Cleaning, Inspecting, and Testing.
Cleaning, inspecting, and testing storm sewers and pipe culverts is incidental to other project costs and will not be paid for separately.

E. Connection to Existing Manhole or Intake.
Payment will be according to Article 2534.05, G.

F. Sanitary Sewer Abandonment.

1. **Plug.**
   Plugging storm sewers is incidental to other work and will not be paid for separately.

2. Fill and Plug.
   Payment will be the contract unit price per linear foot (meter) for each size of pipe filled and plugged.

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Deanna Maifield	**Office:** Design	**Item 3**
Submittal Date: 2011.01.27	**Proposed Effective Date:** 10/18/2011	
Article No.: 2504 **Title:** Sanitary Sewers	**Other:**	

Specification Committee Action: Approved as recommended.

Deferred:	**Not Approved:**	**Approved Date:** 2/10/2011	**Effective Date:** 10/18/2011

Specification Committee Approved Text: See Specification Section Recommended Text.

Comments: The District 6 Office asked if SUDAS provides any guidelines on when to fill and abandon pipes. SUDAS personnel indicated that each jurisdiction has its own policy on plugging versus filling. As a general rule, typically gravity pipes are filled and plugged and pressure pipes are just plugged.

The Office of Traffic & Safety asked about policy on abandoning other utilities in the ROW, such as water lines and gas lines. When these lines are abandoned, they become Iowa DOT property since they are in our ROW. Cost to remove would be a factor.

Specification Section Recommended Text:

2504.03, B, 1, General.

Delete Article b:

~~**b.** Inspect pipe for defects before installation. Do not install damaged or defective pipe.~~

Replace Article f:

f. Use saw to ~~C~~cut ends of pipe ~~at~~ flush with walls of manholes and structures ~~with a saw~~. Do not use hammer ~~cut~~ or other means to break pipe.

2504.03, B, 2, c.

Replace the Article:

Lay pipe to design line and grade~~:~~.

~~**1)** Install pipe to line and grade specified in the contract documents.~~ Set field grades to invert of pipes.

~~**2)** At no additional cost to the Contracting Authority, correct misalignment, displacement, or otherwise defective pipe by removing, relaying, or replacing pipe.~~

2504.03, F, 3, f.

Replace the Article:

For reconnection of new service pipe with existing service pipe and new service pipe, comply with the ~~Engineer's~~ Jurisdiction's plumbing code.

2504.03, H, Sanitary Sewer Abandonment.

Replace the Article:

1. Plug.

~~**1**~~**a.** Prior to placing the sewer plug, the Engineer will verify the sewer line is not in use.

~~**2**~~**b.** Construct sewer plug by completely filling the end of the pipe with concrete. Force concrete into the end of the pipe for a distance of 16 inches (400 mm), or one half the pipe diameter, whichever is greater.

2. Fill.

a. Prior to filling sewer, Engineer will verify sewer line is not in use.

~~**3**~~**b**. If specified in the contract documents, fill the line to be abandoned with flowable mortar or CLSM, according to Article 2552.02, E, by gravity flow or pumping.

2504.03, K, 1, General.

Replace the Article:

~~**a.** Provide temporary support for existing water, sewer, gas, telephone, power, and other utilities or services that cross the trench.~~

~~**b.** Compact backfill material under existing utility crossing as specified in Section 2552, or construct utility line supports where indicated specified in the contract documents or as directed by the Engineer.~~

2504.04, METHOD OF MEASUREMENT.

Renumber Article I and **add** new articles:

I. Sanitary Sewer Cleanout.

Each sanitary sewer cleanout will be counted.

J. Connection to Existing Manhole.

Connections to existing manhole will be measured according to Article 2435.04, G.

K. Sanitary Sewer Abandonment.

1. Plug.

None.

2. Fill and Plug.

Measurement for each size of pipe filled and plugged will be in linear feet (meters) from end of pipe to end of pipe.

~~**I** **L. Cleaning, Inspecting, and Testing.**

2504.05, BASIS OF PAYMENT.

Renumber Article I and **add** new articles:

I. Sanitary Sewer Cleanout.

Payment will be made at the contract unit price for each cleanout. Payment includes the plug at the end of the main, fittings, riser pipe, cap with screw plug, casting, and concrete casting encasement.

J. Connection to Existing Manhole.

Connections to existing manhole will paid according to Article 2435.05, G.

K. Sanitary Sewer Abandonment.

1. Plug.

Plugging sanitary sewers is incidental to other work and will not be paid for separately.

2. Fill and Plug.

Payment will be the contract unit price per linear foot (meter) for each size of pipe filled and plugged.

~~**I** **L. Cleaning, Inspecting, and Testing.**

2504.05, A, 1, b.

Replace the Article:

Payment is full compensation for trench excavation, dewatering, furnishing bedding material, placing bedding and backfill material, wyes and other fittings, pipe joints, pipe connections, testing, and inspection.

Comments:

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

2504.04, I, Cleaning, Inspecting, and Testing.

Renumber as 2504.04, K.

2504.04, I, Sanitary Sewer Cleanout.

Add as a new article:

Each sanitary sewer cleanout will be counted.

2504.04, J, Connection to Existing Manhole.

Add as a new article:

Connections to existing manhole will be measured according to Article 2435.04, G.

2504.05, I, Cleaning, Inspecting, and Testing.

Renumber as 2504.05, K.

2504.04, I, Sanitary Sewer Cleanout.

Add as a new article:

Payment will be made at the contract unit price for each cleanout. Payment includes the plug at the end of the main, fittings, riser pipe, cap with screw plug, casting, and concrete casting encasement.

2504.04, J, Connection to Existing Manhole.

Add as a new article:

Connections to existing manhole will paid according to Article 2435.05, G.

Reason for Revision: Currently, we have no MOM and BOP for sanitary sewer cleanout in the specifications. This is being included as an Estimate Reference Note. The Office of Design would like to include MOM and BOP in the specifications to match SUDAS. The Office of Design would also like to add a reference to MOM and BOP for connection to existing manhole to match SUDAS.

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

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

Section 2504. Sanitary Sewers

2504.01 DESCRIPTION.

This section was developed in conjunction with Sections 4010 and 4060 of the SUDAS Standard Specifications, with modifications to suit the needs of the Department.

A. Construct sanitary sewer gravity and force mains.

B. Construct or relocate building sanitary sewer services, stubs, and connections.

C. Clean, inspect, and test sanitary sewer gravity mains, sanitary sewer force mains, and sanitary sewer service stubs.

D. Clean, inspect, and test rehabilitated pipe.

2504.02 MATERIALS.

A. Sanitary Sewer.
Apply Article 4149.02

B. Testing Equipment for Cleaning, Inspection, and Testing Sewers and Drains.

1. **General.**
   Comply with applicable sections of ASTM and other applicable industry standards and codes.

2. **Video Inspection.**
   - **a.** Video Camera:
     - **1)** High-resolution color with adjustable iris focus.
     - **2)** Pan and tilt capabilities.
     - **3)** Integral lighting suitable to provide proper illumination and a clear video image of the entire periphery of the pipe.
     - **4)** Capable of operating in 100% humidity conditions.
     - **5)** Produce a high quality video image.
   - **b.** Provide closed circuit video inspection equipment capable of displaying on-screen footage of distance measured to within 1% of actual distance.

C. **Inspection Reporting.**
Record the inspection in color in the recording media specified by the Engineer. Forward the recording to the Engineer.

2504.03 CONSTRUCTION.

A. Examination.

1. Verify measurements at site. Make necessary field measurements to accurately determine pipe makeup lengths or closures.

2. Examine site conditions to ensure construction operations do not pose hazards to adjacent structures or facilities.

B. Gravity Sewer Installation.

1. General.
- **a.** Install watertight plug to prevent water from entering the existing sewer system.
- ~~**b.** Inspect pipe for defects before installation. Do not install damaged or defective pipe.~~
- **~~c~~b.** Clean pipe interior and joints prior to installation. Keep pipe clean during construction.
- **~~d~~c.** Begin at the lowest point in the line. Lay groove or bell end pointing upstream unless specifically noted otherwise.
- **~~e~~d.** Assemble joints according to Article 2504.03, D.
- **~~f~~e.** Use a saw to ~~C~~cut ends of pipe ~~at~~ flush with walls of manholes and structures ~~with a saw~~. Do not use hammer ~~cut~~ or other means to break pipe.
- **~~g~~f.** Provide manholes as specified in the contract documents.
- **~~h~~g.** Install cap, plug, or bulkhead at exposed ends of pipe upon completion of construction or whenever pipe installation is not in progress.

2. Trenched.

a. Excavate trench and provide pipe bedding and backfill material as specified in Section 2552.

b. Prepare trench bottom to design line and grade so that only minor movement of the pipe is necessary after installation.

c. Lay pipe to design line and grade.~~:~~

~~**1) Install pipe to line and grade specified in the contract documents.**~~ Set field grades to invert of pipes.

~~**2) At no additional cost to the Contracting Authority, correct misalignment, displacement, or otherwise defective pipe by removing, relaying, or replacing pipe.**~~

d. Provide uniform bearing for full pipe barrel length. Excavate bell holes as necessary for uniform support of pipe barrel on bedding material.

e. Do not lay pipe in water or on saturated soil or bedding, or allow water to rise in trench around pipe prior to placing backfill material.

f. Do not disturb installed pipe and bedding when using movable trench boxes and shields. Block or anchor pipe as necessary to prevent joint displacement.

g. Install preformed wye or tee service fitting at each location as specified in the contract documents.

3. Trenchless.

Apply Section 2553.

C. Carrier Pipe Installed within a Casing Pipe.

Apply Article 2553.03, D, for installation of carrier pipe within casing pipe.

D. Gravity Main Pipe Jointing.

1. General.

a. Clean joint surfaces to remove soil or foreign material prior to jointing pipe.

b. Assemble joints according to the pipe manufacturer's recommendations. Use equipment that does not apply damaging forces to pipe joints.

2. Polyvinyl Chloride Pipe and Polyvinyl Chloride Composite Pipe (truss-type).

a. Coat rubber gasket and joint with soap-based lubricant immediately prior to closing joint.

b. Seal ends of PVC composite and closed profile pipe at manholes with the coating recommended by the manufacturer.

3. Reinforced Concrete Pipe.

Coat rubber gasket and joint with soap-based lubricant immediately prior to closing joint.

4. Ductile Iron Pipe.

a. Push-on Joint: Coat gasket and joint with soap-based lubricant immediately prior to closing joint.

b. Mechanical Joint: Wash plain end, bell socket, and gasket with soap solution. Press gasket into socket, set gland, and tighten bolts uniformly.

5. Connections between Dissimilar Pipes.

a. Use manufactured adapters or couplings approved by the Engineer.

b. Where adapters or couplings are not available, the Engineer may authorize use of a Type PC-2 concrete collar as shown in the contract documents.

E. Force Main Installation.

1. **General.**

Install according to Section 2554.

2. **Tracer Wire.**

a. Required for all force main installations. Apply Section 2554.

b. Install tracer wire station at each end of the force main and at additional locations specified in the contract documents.

c. Bury end of tracer wire station 2 feet (0.6 m) and compact.

F. Sanitary Sewer Service Stubs.

1. Provide sanitary sewer service stubs at locations specified in the contract documents.

2. Install wye or tee for each service connection.
- **a.** Connection of sanitary service to new sewer main, except RCP:
  - **1)** Use only factory wye or tees.
  - **2)** Install according to the manufacturer's requirements and Articles 4149.02, D, and 2504.03, D, for joints.
- **b.** Connection to existing sewer main and new RCP:
  - **1)** Cut sewer main for service tap with hole saw or sewer tap drill.
  - **2)** Use preformed saddle wye or saddle tee for service tap. Use a gasketed saddle with rigid pipe mains, and a solvent-cemented saddle with PVC mains.
  - **3)** Install according to the manufacturer's requirements, but always with at least two stainless steel band clamps.

3. Install service stub from sewer main to a location 10 feet (3 m) beyond the right of way line or as specified in the contract documents.
- **a.** Install according to Article 2504.03, B
- **b.** Install service stub with a slope between 2% and 5% for 4 inch (100 mm) pipes, and between 1% and 5% for 6 inch (150 mm) pipes and greater.
- **c.** Terminate end of service stub 10 to 12 feet (3.0 to 3.6 m) below finished ground elevation or as specified in the contract documents.
- **d.** If the depth of the sewer main causes the service to exceed a depth of 12 feet (3.6 m) or a slope of 5%, install a service riser.
- **e.** For undeveloped properties, place watertight stopper, cap, or plug in end of sanitary sewer service. Mark the end of the service line as required by the Engineer or as specified in the contract documents.
- **f.** For reconnection of new service pipe with existing service pipe and new service pipe, comply with the ~~Engineer's~~ Jurisdiction's plumbing code.

G. Sanitary Sewer Service Relocation.

1. Relocate existing sanitary sewer services that conflict with new storm or sanitary sewer installations. Existing services located within a conflict zone from 6 inches (150 mm) below the bottom of the proposed sewer pipe to 2 inches (50 mm) above the top of the proposed sewer pipe require relocation.

2. When a conflicting service is encountered:
- **a.** Determine grades and elevations of the existing service and proposed main.
- **b.** Determine the extent of service replacement necessary to relocate the service outside of the conflict zone while maintaining a minimum 1% slope on the sewer service.
- **c.** If it is not feasible to maintain a minimum slope of 1% on the relocated service, a special design and additional work may be required. Stop work and contact the Engineer. Do not remove sewer service unless directed by the Engineer.
- **d.** If service relocation with a minimum slope of 1% is feasible, proceed with removal and replacement of the existing sanitary sewer service.
  - **1)** Length of replacement varies. Remove the existing service to the extent necessary to move the service out of the conflict zone.
  - **2)** Use new materials complying with Article 4149.02, D.
  - **3)** Re-install the service according to Article 2504.03, B.
  - **4)** Maintain a minimum 1% grade on relocated service.

H. Sanitary Sewer Abandonment.

1. Plug.
- **~~1~~a.** Prior to placing the sewer plug, the Engineer will verify the sewer line is not in use.
- **~~2~~b.** Construct sewer plug by completely filling the end of the pipe with concrete. Force concrete into the end of the pipe for a distance of 16 inches (400 mm), or one half the pipe diameter, whichever is greater.

2. Fill.
- **a.** Prior to filling the sewer, the Engineer will verify the sewer line is not in use.
- **~~3~~b**. If specified in the contract documents, fill the line to be abandoned with flowable mortar or CLSM, according to Article 2552.02, E, by gravity flow or pumping.

I. Connection to Existing Manhole.
Apply Article 2435.03, E.

J. Tolerances.

Apply the following tolerances to utilities installed by open trench construction. For trenchless construction, comply with Section 2553.

1. Gravity Main.

a. Do not allow horizontal and vertical alignment of trenched gravity sewer lines to vary from design line and grade at any point along the pipe by more than 1% of the inside diameter of the pipe or 1/4 inch (6 mm), whichever is larger.

b. This tolerance is allowed for trenched gravity sewer lines only if design line and grade is sufficient to prevent backslope when tolerance limits are reached.

c. Reverse slope on gravity pipe is prohibited. Remove and reinstall pipe to proper grade.

2. Force Main.

Do not allow horizontal and vertical alignment of trenched force mains to vary from design line and grade by more than 3 inches (75 mm).

K. Conflicts.

~~1. **General.**~~

~~**a.** Provide temporary support for existing water, sewer, gas, telephone, power, and other utilities or services that cross the trench.~~

~~**b.** Compact backfill material under existing utility crossing as specified in Section 2552, or construct utility line supports where indicated specified in the contract documents or as directed by the Engineer.~~

~~2~~1. Horizontal Separation of Gravity Sewers from Water Mains.

a. Separate gravity sewer mains from water mains by a horizontal distance of at least 10 feet (3 m) unless:

- The top of a sewer main is at least 18 inches (450 mm) below the bottom of the water main, and
- The sewer is placed in a separate trench or in the same trench on a bench of undisturbed earth at a minimum horizontal separation of 3 feet (1 m) from the water main.

b. When it is impossible to obtain horizontal clearance of 3 feet (1 m) and vertical clearance of 18 inches (450 mm) between sewers and water mains, the sewers shall be constructed of water main materials meeting the requirements of Article 4149.02, B; however, provide a linear separation of at least 2 feet (600 mm).

~~3~~2. Separation of Sewer Force Mains from Water Mains.

Separate sewer force mains and water mains by a horizontal distance of at least 4 linear feet (1.2 m).

~~4~~3. Separation of Sewer and Water Main Crossovers.

a. Vertical separation of sanitary sewers crossing under any water main should be at least 18 inches (450 mm) when measured from the top of the sewer to the bottom of the water main. If physical conditions prohibit the separation, the sewer may be placed not closer than 6 inches (150 mm) below a water main or 18 inches (450 mm) above a water main. Maintain the maximum feasible separation distance in all cases.

b. Where the sewer crosses over or less than 18 inches (450 mm) below a water main, locate one full length of sewer pipe of water main material so both joints are as far as possible from the water main. The sewer and water pipes shall be adequately supported and have watertight joints. Use a low permeability soil for backfill material within 10 feet (3 m) of the point of crossing.

L. Cleaning, Inspection, and Testing.

Notify the Engineer at least 24 hours prior to performing testing. The Engineer shall be present to review testing procedures and record results.

1. Cleaning.

a. Clean all sanitary sewers and storm sewers by flushing with high pressure water and removing debris by vacuum extraction, and by removing sheeting, bracing, shoring, forms, soil sediment, concrete, or other debris.

b. Do not discharge soil sediment or debris to drainage channels, existing storm sewers, or existing sanitary sewer systems.

2. Visual Inspection.

a. Check each section of sanitary sewer and storm sewer by lamping.

b. Light should be visible through section of pipe lamped.
c. Visually inspect each run of pipe.
d. Repair or replace defective pipe or joints, or remove and relay pipe not meeting alignment tolerances, as directed by the Engineer.

3. Video Inspection.

a. **General.**
1) Conduct video inspection of all new and rehabilitated sanitary sewers after all backfill and compaction operations are completed, but prior to paving.
2) Notify the Engineer the day prior to inspection so the Engineer may be present during the inspection.
3) Low spots holding water in excess of 1 inch (25 mm) or 5% of the pipe diameter, whichever is less, will be considered unacceptable.
4) If unacceptable low spots exist, as indicated by standing water during video inspection, remove and replace sewer as necessary and re-inspect.

b. **Inspection Procedure.**
1) Prior to video inspection, run sufficient water through the pipe to saturate potential low spots so they may be detected during inspection.
2) Inspect each pipe segment between manholes or access points in a single, continuous run. Progress through the entire project in a uniform direction.
3) Inspect all lateral connections and other observations at right angles utilizing the pan and tilt capabilities of the camera.
4) Center the video camera in the pipe during the inspection.
5) Do not exceed 30 feet (10 m) of inspection per minute.

c. **Inspection Reporting.**
1) Provide a copy of the video inspection in the recording media specified by the Engineer. Include on screen continuous footage, pipe diameter, direction of viewing, and manhole and street location references in the recording. Affix labels to the recording media to include the name of the project, the date, and the location of the inspection.
2) Provide a written report of the inspection. In the report, include true to scale drawings of all sewer defects and observation locations. Reference the time stamp on each line item entry on the written report.

4. Sanitary Sewer Leakage Testing.

Perform one or more of the following tests on new sanitary sewer gravity mains and sanitary sewer service stubs. Test sanitary sewer manholes separately as specified in Section 2435.

a. Sanitary Sewer Infiltration Testing.
1) Use only where ground water is more than 2 feet (600 mm) above top of pipe at highest point in section being tested.
2) Provide documented verification of ground water elevations for no less than 24 hours before measurement of infiltration.
3) Measure infiltration in sanitary sewer with a V-notch weir in downstream manhole.
4) The maximum allowable infiltration for new sanitary sewers, including manholes, is 200 gallons per inch of diameter per mile (19 L per mm of diameter per km) of pipe per day.

b. Sanitary Sewer Exfiltration Testing.
1) General.
Use an exfiltration test when ground water level is less than 2 feet (600 mm) above top of pipe at highest point in section being tested. Sectionalize the test section so that the internal pressure in the pipe does not exceed 5 feet (1.5 m) of water.
2) Test Procedures.
a) Install a watertight plug in the inlet of the upstream and downstream manhole of sewer section being tested.
b) Fill the sewer and upstream manhole with potable water until the water elevation in the upstream manhole is 2 feet (600 mm) higher than outside top of pipe in section being tested or 2 feet (600 mm) above existing ground water level, whichever is highest elevation.
c) Allow the water level to stabilize for 30 minutes, then refill the upstream manhole with water to the original level and begin the test.
d) Measure the amount of water lost in the upstream manhole in 1 hour. Use that amount to determine exfiltration in a 24 hour period.
3) Exfiltration Rate.
a) Table 2504.03-1 may be used to determine exfiltration in gallons (liters) per 24 hours by measuring the loss that occurs in 1 hour. The table is applicable only for 48 inch (1200 mm) diameter manholes.

b) The maximum allowable exfiltration for new sanitary sewer, including manholes, is 200 gallons per inch of diameter per mile (19 L per mm of diameter per km) of pipe per day.

Table 2504.03-1: Loss in Gallons (Liters) Per 24 Hours for Drop in Water Level per Hour in 48 inch (1200 mm) Diameter Manhole (table may be interpolated to the nearest 1/4" (6 mm) drop)

Drop	**0"**	**1"**	**2"**	**3"**	**4"**	**5"**	**6"**	**7"**	**8"**	**9"**
	0	188	376	564	752	940	1128	1316	1504	1692
Drop	**0 mm**	**25 mm**	**50 mm**	**75 mm**	**100 mm**	**125 mm**	**150 mm**	**175 mm**	**200 mm**	**225 mm**
	0	712	1423	2135	2845	3558	4267	4982	5693	6405

c) For manholes larger than 48 inch (1200 mm) diameter, use the following formula:

English

$G = 0.0816(H)(D^2)$

Where:

G = loss in gallons
D = diameter of manhole in inches
H = water level drop in manhole in inches

Metric

$L = 353.25(H)(D^2)$

Where:

L = loss in liters
D = diameter of manhole in mm
H = water level drop in manhole in mm

c. Sanitary Sewer Low Pressure Air Testing.

1) General.

a) A low pressure air test may be used in lieu of an exfiltration test except as noted.

b) Air test is not recommended when ground water elevation is 2 feet (600 mm) or greater above the top of the pipe, and cannot be used when ground water is greater than 6 feet (2 m) above the top of the pipe.

c) Use extreme care and follow safety precautions during testing operations. No one is allowed in manholes during testing.

2) Test Procedures.

a) Clean the entire line of all debris. Flush or wet line to produce consistent results.

b) Plug all inlets and outlets to resist the test pressure. Special attention shall be given to stoppers and laterals.

c) Determine the test duration for the section being tested from Table 2504.03-2. This table ignores pipe length and uses the factor 0.472×d (1.20×d), with d being in inches (mm). Pressure holding time is based on average holding pressure of 3.0 psi (21 kPa) or drop from 3.5 psi (24 kPa) to 2.5 psi (18 kPa).

Table 2504.03-2: Test Duration

Size Pipe, inches (mm)	**Test Period Duration (minutes)**
8 (200)	4.0
10 (250)	5.0
12 (300)	6.0
15 (325)	7.0
18 (450)	8.5
21 (525)	10.0
24 (600)	11.5
27 (675)	13.0
30 (750)	14.0
36 (900)	17.0
42 (1050)	20.0
48 (1200)	23.0
54 (1350)	25.5
60 (1500)	28.5

d) Add air to the line segment being tested until the internal air pressure of the sewer line is raised to approximately 4.0 psi (28 kPa) greater than the average back pressure of any ground water that may be over the top of the pipe. Pressure in the sewer should not exceed 5.0 psi (35 kPa). Allow at least 2 minutes for air pressure to stabilize.

e) When pressure has stabilized and is at or above the starting test pressure of 3.5 psi (24 kPa), commence the test. Record the drop in pressure for the test period. The test may be discontinued when the prescribed test time has been completed, even though a 1.0 psi (7 kPa) drop has not occurred.

f) If groundwater level at the time of testing is above the pipe invert, add 0.43 psi air per foot (10 kPa air per meter) of water above the invert to the test air pressure range of 2.5 psi (18 kPa) to 3.5 psi (24 kPa) stated above.

g) If the pressure drop exceeds 1.0 psi (7 kPa) during the test period, the test will be considered to have failed. Repair and retest the line.

d. Sanitary Sewer Vacuum Testing.

1) General.

a) Vacuum testing may be used in lieu of other specified test methods.

b) Use extreme care and follow safety precautions during testing operations. Keep personnel out of and away from manholes during testing.

c) Where practical, clean the pipe prior to testing and wet the pipe surface. Isolate the test segment as necessary, including closing service connections.

2) Test Procedures.

a) Determine the test time for the size of pipe being tested using Table 2504.03-3.

Table 2504.03-3: Minimum Test Time

Nominal Pipe Size, inches (mm)	T (time); Minutes/100 feet (30 m) of pipe
4 (100)	0.3
6 (150)	0.7
8 (200)	1.2
10 (250)	1.5
12 (300)	1.8
15 (375)	2.1
18 (450)	2.4
21 (525)	3.0
24 (600)	3.6
27 (675)	4.2
30 (750)	4.8
33 (825)	5.4
36 (900)	6.0

b) Test time is the time required for vacuum to drop from 3.5 psi (24 kPa) to 2.5 psi (18 kPa).

c) Use a vacuum pump with the capacity to evacuate the sewer test section in time equal or less than that shown in Table 2504.03-3 for the size of pipe being tested.

d) Evacuate air until the internal air pressure of the sewer line is lowered by approximately 4.0 psi (28 kPa). Allow the air pressure to stabilize.

e) When the air pressure is stabilized near the starting test vacuum of 3.5 psi (24 kPa), commence the test by allowing gage pressure to drop to 3.5 psi (24 kPa), then commence time recording. Record the drop in vacuum for the test period.

f) If the drop in vacuum is 1.0 psi (7.0 kPa) or less during the test period, the test will be considered successfully passed.

g) If the drop in vacuum is greater than 1.0 psi (7.0 kPa) during the test period, inspect, evaluate, repair, and retest.

5. Deflection Testing.

a. Perform deflection tests on all PVC sanitary sewer mains. Also perform deflection tests on all HDPE storm sewer or culvert pipe 12 inches in diameter or greater.

b. Perform deflection tests after backfill material has been in place at least 30 calendar days and before paving activity takes place, or as per appropriate sections of these specifications.

c. Pull a 9 arm deflection mandrel complying with applicable ASTM Standards through sewer by hand.
d. Ensure pipe deflection does not exceed 5% of average inside diameter as established by ASTM Standards.
e. Remove and replace pipe exceeding deflection limits.
f. Handle and divert existing flows during deflection testing.

6. Force Main Testing.
a. Provide test pumps, test plugs, pipe, and gages. Make necessary piping connections.
b. Fill the force main with potable water and flush before testing to remove entrapped air. Other water sources may be used if approved by the Engineer.
c. Insert taps as required to remove air. Plug taps after the completion of tests.
d. Use a test pressure of 1.5 times the working pressure at the lowest point along the test section, but no less than 50 psi (350 kPa).
e. Pressurize the test section and allow it to stabilize prior to beginning the leakage test.
f. Maintain pressure to within 5 psi (35 kPa) of the test pressure by pumping in potable water as required.
g. Leakage is the quantity of water that shall be supplied into the test section to maintain pressure within 5 psi (35 kPa) of the specified test pressure during a 2 hour test period.
h. The maximum allowable leakage is determined by the following formula:

English Units

$$L = \frac{(S)(D)(P)^{0.5}}{133{,}200}$$

Where:
L = allowable leakage in gallons per hour
S = length of pipe tested in feet
D = nominal pipe diameter in inches
P = average test pressure in pounds per square inch

Metric Units

$$L = \frac{(S)(D)(P)^{0.5}}{705{,}150}$$

Where:
L = allowable leakage in liters per hour
S = length of pipe tested in meters
D = nominal pipe diameter in mm
P = average test pressure in kPa

Table 2504.03-4 assumes an average test pressure (P) of 50 psi (350 kPa) and length of pipe (S) of 1000 feet (300 m).

Table 2504.03-4: Maximum Allowable Leakage Rate

Nominal Pipe Size inches (mm)	Allowable Leakage gallonshour/1000 feet of pipe (liters/hour/300 m of pipe)
4 (100)	0.21 (0.80)
6 (150)	0.32 (1.19)
8 (200)	0.42 (1.59)
10 (250)	0.53 (1.99)
12 (300)	0.64 (2.39)
14 (350)	0.74 (2.79)
16 (400)	0.85 (3.18)

i. Examine exposed pipe and fittings during testing. Repair all visible leaks.
j. If the test indicates leakage greater than allowed, locate, repair, or replace damaged or defective pipe, and repeat tests until the requirements are met.

2504.04 METHOD OF MEASUREMENT.

A. Sanitary Sewer Gravity Main.

1. **Trenched.**
Measurement for each type and size of pipe installed in a trench will be in linear feet (meters) along the centerline of the pipe from center of manhole to center of manhole.

2. **Trenchless.**
Measurement for each type and size of pipe installed by trenchless methods will be in linear feet (meters) along the centerline of pipe.

B. Sanitary Sewer Gravity Main with Casing Pipe.

1. **Trenched.**
   Measurement for each type and size of pipe installed with casing pipe in a trench will be in linear feet (meters) along the centerline of the casing pipe from end of casing to end of casing.

2. **Trenchless.**
   Measurement for each type and size of pipe installed by trenchless methods with a casing pipe will be in linear feet (meters) along the centerline of the casing pipe from end of casing to end of casing.

C. Sanitary Sewer Force Main.

1. **Trenched.**
   Measurement for each type and size of pipe installed in a trench will be in linear feet (meters) along the centerline of the pipe from the outside wall of the pumping station to the center of manhole, or from center of manhole to center of manhole.

2. **Trenchless.**
   Measurement for each type and size of pipe installed by trenchless methods will be in linear feet (meters) along centerline of pipe.

D. Sanitary Sewer Force Main with Casing Pipe.

1. **Trenched.**
   Measurement for each type and size of pipe installed with casing pipe in a trench will be in linear feet (meters) along the centerline of the casing pipe.

2. **Trenchless.**
   Measurement for each type and size of pipe installed by trenchless methods with a casing pipe will be in linear feet (meters) along the centerline of the casing pipe.

E. Sanitary Sewer Service Stub.

1. A sanitary sewer service stub is the portion of the sanitary sewer service from the main to a point 10 feet (3 m) outside of the right-of-way line or as specified in the contract documents.

2. Measurement for each type and size of pipe will be in linear feet (meters) along the centerline of the pipe from the end of the pipe to the centerline of the sewer main.

F. Sanitary Sewer Service Relocation.

1. A sanitary sewer service relocation is the portion of an existing sanitary sewer service in a zone of conflict.

2. Each completed relocation will be counted.

G. Sewage Air Release Valve and Pit.
Each completed installation, including valve, accessories, and pit, will be counted.

H. Removal of Sanitary Sewer.
Measurement for each type and size of pipe removed will be in linear feet (meters) from end to end.

I. Cleaning, Inspecting, and Testing.
None.

J. Connection to Existing Manhole.
Measurement will be according to Article 2534.05, G.

K. Sanitary Sewer Abandonment.

1. Plug.
None.

2. Fill and Plug.
Measurement for each size of pipe filled and plugged will be in linear feet (meters) from end of pipe to end of pipe.

2504.05 BASIS OF PAYMENT.

A. Sanitary Sewer Gravity Main.

1. **Trenched.**
   a. Payment will be at the contract unit price per linear foot (meter) for each type and size of pipe.
   b. Payment is full compensation for trench excavation, dewatering, furnishing bedding material, placing bedding and backfill material, wyes and other fittings, pipe joints, pipe connections, testing, and inspection.

2. Trenchless.
   a. Payment will be at the contract unit price per linear foot (meter) for each type and size of pipe.
   b. Payment is full compensation for:
   - Furnishing and installing pipe,
   - Trenchless installation materials and equipment,
   - Pit excavation, dewatering, and placing backfill material,
   - Pipe connections, and
   - Testing and inspection.

B. Sanitary Sewer Gravity Main with Casing Pipe.

1. **Trenched.**
   a. Payment will be at the contract unit price per linear foot (meter) for each type and size of sanitary sewer pipe.
   b. Payment is full compensation for:
   - Furnishing and installing both sanitary sewer pipe and casing pipe,
   - Trench excavation, dewatering, furnishing bedding material, placing bedding and backfill material,
   - Furnishing and installing annular space fill material,
   - Casing spacers,
   - Pipe connections, and
   - Testing, and inspection.

2. Trenchless.
   a. Payment will be at the contract unit price per linear foot (meter) for each type and size of sanitary sewer pipe.
   b. Payment is full compensation for:
   - Furnishing and installing both sanitary sewer pipe and casing pipe,
   - Trenchless installation materials and equipment,
   - Pit excavation, dewatering, and placing backfill material,
   - Casing spacers,
   - Furnishing and installing annular space fill material,
   - Pipe connections, and
   - Testing and inspection.

C. Sanitary Sewer Force Main.

1. **Trenched.**
   a. Payment will be at the contract unit price per linear foot (meter) for each type and size of pipe.
   b. Payment is full compensation for trench excavation, dewatering, furnishing bedding material, placing bedding and backfill material, wyes and other fittings, pipe joints, testing, and inspection.

2. **Trenchless.**
   a. Payment will be at the contract unit price per linear foot (meter) for each type and size of pipe.
   b. Payment is full compensation for furnishing and installing pipe, trenchless installation materials and equipment, pit excavation, dewatering, placing backfill material, pipe connections, testing, and inspection.

D. Sanitary Sewer Force Main with Casing Pipe.

1. Trenched.

a. Payment will be at the contract unit price per linear foot (meter) for each type and size of sanitary sewer pipe.

b. Payment is full compensation for furnishing and installing both sanitary sewer pipe and casing pipe, trench excavation, dewatering, placing bedding and backfill material, furnishing and installing annular space fill material, casing spacers, pipe connections, testing, and inspection.

2. Trenchless.

a. Payment will be at the contract unit price per linear foot (meter) for each type and size of sanitary sewer pipe.

b. Payment is full compensation for:

- Furnishing and installing both sanitary sewer pipe and casing pipe,
- Trenchless installation materials and equipment,
- Pit excavation, dewatering, and placing backfill material,
- Casing spacers,
- Furnishing and installing annular space fill material,
- Pipe connections, and
- Testing and inspection.

E. Sanitary Sewer Service Stub.

1. Payment will be made at the contract unit price per linear foot (meter) for each type and size of sanitary sewer service stub.

2. Payment is full compensation for trench excavation, furnishing bedding material, placing bedding and backfill material, tap, fittings, testing, and inspection.

F. Sanitary Sewer Service Relocation.

1. Payment will be made at the contract unit price for each relocation.

2. Payment is full compensation for removal of existing pipe, trench excavation, furnishing new pipe and bedding material, placing bedding and backfill material, connection back to existing service, compaction, testing, and inspection.

G. Sewage Air Release Valve and Pit.

1. Payment will be made at the contract unit price for each sewage air release valve and pit.

2. Payment is full compensation for excavation, furnishing bedding material, placing bedding and backfill material, compaction, and testing.

H. Removal of Sanitary Sewer.

1. Payment will be at the contract unit price per linear foot (meter) for each type and size of pipe.

2. Payment is full compensation for removal, disposal, and capping (if specified) of pipe.

I. Cleaning, Inspecting, and Testing.

Cleaning, inspecting, and testing sanitary sewers, storm sewers, pipe culverts, and rehabilitated pipes (including video inspection) is incidental to other project costs and will not be paid for separately.

J. Connection to Existing Manhole.

Payment will be according to Article 2534.05, G.

K. Sanitary Sewer Abandonment.

1. Plug.

Plugging sanitary sewers is incidental to other work and will not be paid for separately.

2. Fill and Plug.

Payment will be the contract unit price per linear foot (meter) for each size of pipe filled and plugged.

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Deanna Maifield	**Office:** Design	**Item 4**
Submittal Date: 2011.01.27	**Proposed Effective Date:** 10/18/2011	
Section No.: 2511 **Title:** Removal and Construction of Sidewalks and Recreational Trails.	**Other:**	

Specification Committee Action: Approved as recommended.

Deferred:	**Not Approved:**	**Approved Date:** 2/10/2011	**Effective Date:** 10/18/2011

Specification Committee Approved Text: See Specification Section Recommended Text.

Comments: None.

Specification Section Recommended Text:

2511.01, DESCRIPTION.

Add as the second sentence:

For construction of sidewalk with retaining wall, refer to Section 2516.

2511.03, A, 1.

Replace the first sentence:

Remove ~~the~~ areas of sidewalks and recreational trails ~~as~~ shown in the contract documents according to Article 2510.03, A.

2511.03, A, 2.

Replace the last sentence:

~~Remove sidewalks and recreational trails~~ Perform removal according to Article 2510.03, A.

Comments:

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

2511.01, Description.

Add as the second sentence:

For construction of sidewalk with retaining wall, refer to Section 2516.

2511.03, A, 1, Removal of Sidewalks and Recreational Trails.

Replace the first sentence:

Remove the areas of sidewalks and recreational trails ~~as~~ shown in the contract documents according to Article 2510.03, A.

2511.03, A, 2, Removal of Sidewalks and Recreational Trails.

Replace the last sentence:

~~Remove sidewalks and recreational trails~~ Perform removal according to Article 2510.03, A.

Reason for Revision: Add a reference to Section 2516 for construction of sidewalk with retaining wall and clean up existing language.

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

Industry Notified:	**Yes**	**No** X	**Industry Concurrence:**	**Yes**	**No**
Comments:					

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Deanna Maifield	**Office:** Design	**Item 5**
Submittal Date: 2011.01.27	**Proposed Effective Date:** 10/18/2011	
Section No.: 2516 **Title:** Removal and Construction of Retaining Wall and Steps	**Other:**	

Specification Committee Action: Deferred until the March Specification Committee meeting.

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

Specification Committee Approved Text:

Comments: The word "Sidewalk" will be added in the Method of Measurement and Basis of Payment sections.

This change will eliminate the Department's specifications for steps. Due to ADA requirements, steps should not be used except in special circumstances. These special circumstances would require step design in the plans or the use of SUDAS step specifications.

The District 6 Office had concerns about the compaction specified in Article 2516.03, A, 1. Typically the Department specifies moisture and density control, not just density. The Specifications Section will discuss this issue with Construction and Soils personnel prior to the March Specification Committee meeting.

The Office of Local Systems asked about allowing slotted or perforated drain pipe. The referenced Article 4143.01, B does not allow circular perforations. The Specifications Engineer indicated that his recollection was that circular perforations were not allowed because they are more easily clogged than slots. The Office of Local Systems requested that circular perforations be allowed for this use. The Office of Construction asked why this situation should be different than other uses of drain pipe. We should be consistent or have a reason for not being that way. The allowance for circular perforations in Section 2516 will be eliminated and the reference will be to Article 4143.01, B. The Soils Section is reviewing to see if there is a reason to not allow circular perforations. If it is discovered that we do not have a justifiable reason, the elimination of circular perforations will be deleted from Article 4143.01, B.

Specification Section Recommended Text:

2516, Removal and Construction of Retaining Walls and Steps.

Replace title and entire section:

~~**Section 2516. Removal and Construction of Retaining Walls and Steps**~~

~~**2516.01 DESCRIPTION.**~~

~~Remove retaining walls and steps as designated, and construct new PCC retaining walls and steps according to the contract documents and the following provisions.~~

~~**2516.02 MATERIALS.**~~

~~For construction of retaining walls and steps, meet the requirements of Division 41 for the respective materials.~~

~~**2516.03 CONSTRUCTION.**~~

~~**A. Removal of Retaining Walls and Steps.**~~

~~When the contract documents indicate that retaining walls and steps are to be removed, break and remove the walls and steps designated by the Engineer according to Article 2510.03, A.~~

~~**B. Construction of Retaining Walls and Steps.**~~

~~Construct walls and steps to the dimensions shown in the contract documents and according to Section 2403. Unless designated otherwise, use Class C concrete as specified in Section 2403. Give exposed vertical surfaces a Class 2, strip down surface finish.~~

~~**2516.04 METHOD OF MEASUREMENT.**~~

~~Measurement for walls and steps removed and replaced will be as follows:~~

~~**A. Removal of Retaining Walls and Steps.**~~
~~Cubic yards (cubic meters) shown in the contract documents, without remeasurement.~~

~~**B. Construction of Walls and Steps.**~~
~~Cubic yards (cubic meters) shown in the contract documents. When the quantities of concrete have been modified by direction of the Engineer, the Engineer will compute the cubic yards (cubic meters) of concrete involved in the modification and adjust the quantity accordingly.~~

~~**2516.05 BASIS OF PAYMENT.**~~
~~Payment for retaining walls and steps removed and constructed will be the contract unit price as follows:~~

~~**A. Removal of Retaining Walls and Steps.**~~

~~**1.** Per cubic yard (cubic meters).~~

~~**2.** Payment is full compensation for the cost of all labor and equipment necessary to remove and haul the material according to Article 1104.08.~~

~~**B. Construction of Retaining Walls and Steps.**~~

~~**1.** Per cubic yard (cubic meter). Includes modifications ordered by the Engineer.~~

~~**2.** Payment is full compensation for furnishing all materials required, including all steel reinforcement specified, and all equipment and labor necessary to construct the walls and steps as specified.~~

Section 2516. Combined Concrete Sidewalk and Retaining Wall

2516.01 DESCRIPTION.

A. This section was developed in conjunction with Section 9072 of the SUDAS Standard Specifications, with modifications to suit the needs of the Department.

B. Construct combined concrete sidewalk and retaining wall.

2516.02 MATERIALS.
Upon request, submit certification that products supplied comply with identified specifications.

A. Combined Concrete Sidewalk and Retaining Wall.

1. Portland Cement Concrete.
Comply with Article 2511.02, A.

2. Reinforcing Steel.
Comply with Section 4151.

3. Expansion Joint.
Comply with Article 4136.02. Use resilient filler when type is not specified.

B. Subdrain.
Use minimum 4 inch (100 mm) diameter pipe.

1. Polyvinyl Chloride Pipe and Fittings (Solid Wall PVC):
- **a.** Comply with ASTM D 3034, minimum thickness SDR 35, 46 psi (320 kPa) minimum pipe stiffness.
- **b.** Use PVC plastic conforming to ASTM D 1784, Cell Classification 12454.
- **c.** Integral bell and spigot type rubber gasket joint complying with ASTM D 3212 and ASTM F 477.
- **d.** Slot subdrain pipe according to ASTM F 949 or perforate with four rows of 1/4 to 3/8 inch (6 to 9 mm) diameter holes along the bottom of pipe.

2. Corrugated Polyvinyl Chloride Pipe and Fittings (Corrugated PVC):
- **a.** Use corrugated exterior, smooth interior, PVC.
- **b.** Comply with ASTM F 949, minimum pipe stiffness, 46 psi (320 kPa).
- **c.** Use PVC plastic complying with ASTM D 1784, Cell Classification 12454.

d. Integral bell and spigot type rubber gasket joint complying with ASTM D 3212 and ASTM F 477.
e. Slot subdrain pipe according to ASTM F 949.

3. Corrugated Polyethylene Tubing and Fittings (Corrugated PE):
a. Comply with Article 4143.01, B, 1. Slot or perforate according to AASHTO M 252, Type CP or Type SP.
b. Use only fittings supplied or recommended by pipe manufacturer for soil tight service.

C. Porous Backfill Material for Subdrain:

1. Crushed Stone or Processed Gravel.
Comply with Gradation No. 29 of Section 4109.

2. Pea Gravel.
Comply with Gradation No. 20 or 21 of Section 4109.

D. Suitable Backfill Material.
Comply with Article 2102.02, D, 2.

E. Rodent-Proof Hardware Cloth.
Comply with I.M. 443.01.

2516.03 CONSTRUCTION.

A. Excavation and Embankment.

1. At locations where the wall will be constructed against embankment, compact to a minimum of 90% of maximum Standard Proctor Density prior to beginning wall construction.

2. Excavate to the line and grade specified in the contract documents. Minimize over-excavation. Install sheeting, shoring, or other retention systems as required to ensure the stability of the excavation.

B. Installation.

1. Forming the back of the wall is not required. Where the back of the wall is not formed and sloughing occurs, remove loose material, and replace with concrete at no additional cost to the Contracting Authority.

2. Install 3 inch (75 mm) diameter weep holes at 8 foot (2.5 m) intervals. Form weep holes with an approved rustproof device backed with rodent-proof hardware cloth.

3. Install 8 inch (200 mm) wide trench of porous backfill behind the wall. Install subdrain within porous backfill trench when specified in the contract documents. Ensure positive drainage on subdrain. Outlet subdrain to weep holes.

C. Joints.

1. Form ED joints in wall at no more than 60 foot (18 m) spacing. Affix expansion material to retaining wall.

2. Form C joints in the wall at no more than 20 foot (6 m) spacing.

3. Form E joints in sidewalk to coincide with ED joints in wall. Form C joints in sidewalk at spacing equal to sidewalk width.

4. Form longitudinal joint in sidewalk when sidewalk width is greater than 8 feet (2.4 m).

D. Rustication.
Decorative form liners or inserts may be used when forming the face of the wall with the approval of the Engineer. Form rustications as specified in the contract documents.

2516.04 METHOD OF MEASUREMENT.
Measurement for Combined Concrete and Retaining Wall will be cubic yards (cubic meters) shown in the contract documents.

2516.05 BASIS OF PAYMENT.

Payment for Combined Concrete and Retaining Wall will be the contract unit price per cubic yard (cubic meter). Payment is full compensation for:

- Excavation and foundation preparation,
- Furnishing and placing concrete and reinforcing steel,
- Joint material,
- Subdrain,
- Porous backfill material,
- Suitable backfill material,
- Finishing disturbed areas, and
- Shoring as necessary.

Comments:

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

2516, Removal and Construction of Retaining Walls and Steps.

Replace the title and the entire section:

~~**Section 2516. Removal and Construction of Retaining Walls and Steps**~~

~~**2516.01 DESCRIPTION.**~~

~~Remove retaining walls and steps as designated, and construct new PCC retaining walls and steps according to the contract documents and the following provisions.~~

~~**2516.02 MATERIALS.**~~

~~For construction of retaining walls and steps, meet the requirements of Division 41 for the respective materials.~~

~~**2516.03 CONSTRUCTION.**~~

~~**A. Removal of Retaining Walls and Steps.**~~

~~When the contract documents indicate that retaining walls and steps are to be removed, break and remove the walls and steps designated by the Engineer according to Article 2510.03, A.~~

~~**B. Construction of Retaining Walls and Steps.**~~

~~Construct walls and steps to the dimensions shown in the contract documents and according to Section 2403. Unless designated otherwise, use Class C concrete as specified in Section 2403. Give exposed vertical surfaces a Class 2, strip down surface finish.~~

~~**2516.04 METHOD OF MEASUREMENT.**~~

~~Measurement for walls and steps removed and replaced will be as follows:~~

~~**A. Removal of Retaining Walls and Steps.**~~

~~Cubic yards (cubic meters) shown in the contract documents, without remeasurement.~~

~~**B. Construction of Walls and Steps.**~~

~~Cubic yards (cubic meters) shown in the contract documents. When the quantities of concrete have been modified by direction of the Engineer, the Engineer will compute the cubic yards (cubic meters) of concrete involved in the modification and adjust the quantity accordingly.~~

~~**2516.05 BASIS OF PAYMENT.**~~

~~Payment for retaining walls and steps removed and constructed will be the contract unit price as follows:~~

~~**A. Removal of Retaining Walls and Steps.**~~

~~**1.** Per cubic yard (cubic meters).~~

~~**2.** Payment is full compensation for the cost of all labor and equipment necessary to remove and haul the material according to Article 1104.08.~~

~~**B. Construction of Retaining Walls and Steps.**~~

~~**1.** Per cubic yard (cubic meter). Includes modifications ordered by the Engineer.~~

~~**2.** Payment is full compensation for furnishing all materials required, including all steel reinforcement specified, and all equipment and labor necessary to construct the walls and steps as specified.~~

Section 2516. Combined Concrete Sidewalk and Retaining Wall

2516.01 DESCRIPTION.

A. This section was developed in conjunction with Section 9072 of the SUDAS Standard Specifications, with modifications to suit the needs of the Department.

B. Construct combined concrete sidewalk and retaining wall.

2516.02 MATERIALS.

Upon request, submit certification that products supplied comply with identified specifications.

A. Combined Concrete Sidewalk and Retaining Wall.

1. Portland Cement Concrete.
Comply with Article 2511.02, A.

2. Reinforcing Steel.
Comply with Section 4151.

3. Expansion Joint.
Comply with Article 4136.02. Use resilient filler when the type is not specified.

B. Subdrain.
Use minimum 4 inch (100 mm) diameter pipe.

1. Polyvinyl Chloride Pipe and Fittings (Solid Wall PVC):
- **a.** Comply with ASTM D 3034, minimum thickness SDR 35, 46 psi (320 kPa) minimum pipe stiffness.
- **b.** Use PVC plastic conforming to ASTM D 1784, Cell Classification 12454.
- **c.** Integral bell and spigot type rubber gasket joint complying with ASTM D 3212 and ASTM F 477.
- **d.** Slot subdrain pipe according to ASTM F 949 or perforate with four rows of 1/4 to 3/8 inch (6 to 9 mm) diameter holes along the bottom of pipe.

2. Corrugated Polyvinyl Chloride Pipe and Fittings (Corrugated PVC):
- **a.** Use corrugated exterior, smooth interior, PVC.
- **b.** Comply with ASTM F 949, minimum pipe stiffness, 46 psi (320 kPa).
- **c.** Use PVC plastic complying with ASTM D 1784, Cell Classification 12454.
- **d.** Integral bell and spigot type rubber gasket joint complying with ASTM D 3212 and ASTM F 477.
- **e.** Slot subdrain pipe according to ASTM F 949.

3. Corrugated Polyethylene Tubing and Fittings (Corrugated PE):
- **a.** Comply with Article 4143.01, B, 1. Slot or perforate according to AASHTO M 252, Type CP or Type SP.
- **b.** Use only fittings supplied or recommended by pipe manufacturer for soil tight service.

C. Porous Backfill Material for Subdrain:

1. Crushed Stone or Processed Gravel.
Comply with Gradation No. 29 of Section 4109.

2. Pea Gravel.
Comply with Gradation No. 20 or No. 21 of Section 4109.

D. Suitable Backfill Material.
Comply with Article 2102.02, D, 2.

E. Rodent-Proof Hardware Cloth.
Comply with I.M. 443.01.

2516.03 CONSTRUCTION.

A. Excavation and Embankment.

1. At locations where the wall is to be constructed against embankment, compact to a minimum of 90% of maximum Standard Proctor Density prior to beginning wall construction.

2. Excavate to the line and grade specified in the contract documents. Minimize over-excavation. Install sheeting, shoring, or other retention systems as required to ensure the stability of the excavation.

B. Installation.

1. Forming the back of the wall is not required unless otherwise specified in the contract documents. Where the back of the walls is not formed and sloughing occurs, remove the loose material, and replace with concrete at no additional cost to the Contracting Authority.

2. Install 3 inch (75 mm) diameter weep holes at 8 foot (2.5 m) intervals. Form weep holes with an approved rustproof device backed with rodent-proof hardware cloth.

3. Install 8 inch (200 mm) wide trench of porous backfill behind the wall. Install subdrain within porous backfill trench when specified in the contract documents. Ensure positive drainage on subdrain. Outlet subdrain to weep holes.

C. Joints.

1. Form ED joints in wall at no more than 60 foot (18 m) spacing. Affix expansion material to retaining wall.

2. Form C joints in wall at no more than 20 foot (6 m) spacing.

3. Form E joints in sidewalk to coincide with ED joints in wall. Form C joints in sidewalk at spacing equal to sidewalk width.

4. Form longitudinal joint in sidewalk when sidewalk width is greater than 8 feet (2.4 m).

D. Rustication.
Decorative form liners or inserts may be used when forming the face of the wall with the approval of the Engineer. Form rustications as specified in the contract documents.

2516.04 METHOD OF MEASUREMENT.
Measurement for Combined Concrete and Retaining Wall will be cubic yards (cubic meters) shown in the contract documents.

2516.05 BASIS OF PAYMENT.
Payment for Combined Concrete and Retaining Wall will be the contract unit price per cubic yard (cubic meter). Payment is full compensation for:

- Excavation and foundation preparation,
- Furnishing and placing concrete and reinforcing steel,
- Joint material,
- Subdrain,
- Porous backfill material,
- Suitable backfill material,
- Finishing disturbed areas, and
- Shoring as necessary.

Reason for Revision: The Department worked with SUDAS to develop joint standards and specifications for combined sidewalk with retaining wall. SUDAS is proposing to include these specifications in their 2012 manual (to be released in October 2011). The Office of Design would like to include these in our October 2011 GS.

This change will remove construction of steps from the specifications. If it is necessary to construct steps for a private property, designers will include SUDAS specifications as Special Provisions and

would include the SUDAS standard as a detail sheet. The Office of Design will provide instructions to designers.					
County or City Input Needed (X one)			**Yes**	**No** X	
Comments:					
Industry Input Needed (X one)			**Yes**	**No** X	
Industry Notified:	**Yes**	**No** X	**Industry Concurrence:**	**Yes**	**No**
Comments:					

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Deanna Maifield	**Office:** Design	**Item 6**
Submittal Date: 2011.01.27	**Proposed Effective Date:** 10/18/2011	
Article No.: 2552.05, A **Title:** Trench Excavation and Backfill	**Other:**	

Specification Committee Action: Approved as recommended.

Deferred:	**Not Approved:**	**Approved Date:** 2/10/2011	**Effective Date:** 10/18/2011

Specification Committee Approved Text: See Specification Section Recommended Text.

Comments: None.

Specification Section Recommended Text:

2552.05, A, General.

Add new Article:

9. Temporary support for existing water, sewer, gas, telephone, power, and other utilities or services that cross the trench.

Comments:

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

2552.05 BASIS OF PAYMENT.

A. General.

The following items are incidental to the underground utility being installed and will not be paid for separately:

1. Standard trench excavation.

2. Removal and disposal of unsuitable backfill material encountered during standard trench excavation.

3. Removal of abandoned private utilities encountered during trench excavation.

4. Furnishing and placing granular bedding material.

5. Placing and compacting backfill material.

6. Dewatering.

7. Sheeting, shoring, and bracing.

8. Adjusting the moisture content of excavated backfill material to the range specified for placement and compaction.

9. Temporary support for existing water, sewer, gas, telephone, power, and other utilities or services that cross the trench.

Reason for Revision: This was previously in 2503.03, F, 2504.03, K, and 2554.03, 7 but had no pay item. Felt it should be here instead.

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: Deanna Maifield	**Office:** Design	**Item 7**
Submittal Date: 2011.01.27	**Proposed Effective Date:** 10/18/2011	
Article No.: 2554.03, A, 7 **Title:** Water Mains, Valves, Fire Hydrants, and Appurtenances	**Other:**	

Specification Committee Action: Approved with changes.

Deferred:	**Not Approved:**	**Approved Date:** 2/10/2011	**Effective Date:** 10/18/2011

Specification Committee Approved Text:

2554.03, A, 7, a, General.

Delete the Article:

~~**a. General.**~~

~~**1)** Provide temporary support for existing water, sewer gas, telephone, power, and other utilities or services that cross the trench.~~

~~**2)** Compact backfill material under existing utility crossing as specified in Section 2552, or construct utility line supports where specified in the contract documents.~~

Comments: The Specifications Section asked about the note indicating where the separation information is derived from. It was decided that this information isn't necessary in the specifications.

Specification Section Recommended Text:

2554.03, A, 7, a, General.

Delete the Article:

~~**1)** Provide temporary support for existing water, sewer gas, telephone, power, and other utilities or services that cross the trench.~~

~~**2)** Compact backfill material under existing utility crossing as specified in Section 2552, or construct utility line supports where specified in the contract documents.~~

Comments:

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

7. Conflicts

~~**a. General.**~~

~~**1)** Provide temporary support for existing water, sewer gas, telephone, power, and other utilities or services that cross the trench.~~

~~**2)** Compact backfill material under existing utility crossing as specified in Section 2552, or construct utility line supports where specified in the contract documents.~~

The following separation information is derived from Iowa DNR's Iowa Wastewater Facilities Design Standards, Chapter 12, Section 12.5.8.

~~b~~a. Horizontal Separation of Gravity Sewers from Water Mains.

1) Separate gravity sewer mains from water mains by a horizontal distance of at least 10 feet (3 m) unless:

- The top of a sewer main is at least 18 inches (450 mm) below the bottom of the water main, and
- The sewer is placed in a separate trench or in the same trench on a bench of undisturbed earth at a minimum horizontal separation of 3 feet (1 m) from the water main.

2) When it is impossible to obtain horizontal clearance of 3 feet (1 m) and a vertical clearance of 18 inches (450 mm) between sewers and water mains, the sewers shall be constructed of water main materials meeting the requirements of Article 4150.02, A. However, provide a linear separation of at least 2 feet (600 mm).

~~c~~b. Separation of Sewer Force Mains from Water Mains.

Separate sewer force mains and water mains by a horizontal distance of at least 4 linear feet (1.2 m).

~~d~~c. Separation of Sewer and Water Main Crossovers.

1) Vertical separation of sanitary sewers crossing under any water main should be at least 18 inches (450 mm) when measured from the top of the sewer to the bottom of the water main. If physical conditions prohibit the separation, the sewer may be placed not closer than 6

inches (150 mm) below a water main or 18 inches (450 mm) above a water main. Maintain the maximum feasible separation distance in all cases.

2) Where the sewer crosses over or less than 18 inches (450 mm) below a water main, locate one full length of sewer pipe of water main material so both joints are as far as possible from the water main. The sewer and water pipes shall be adequately supported and have watertight joints. Use a low permeability soil for backfill material within 10 feet (3 m) of the point of crossing.

Reason for Revision: General comments were moved to Section 2552. The added comment was added to be consistent with SUDAS.

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: Deanna Maifield	**Office:** Design	**Item 8**
Submittal Date: 2011.01.27	**Proposed Effective Date:** 10/18/11	
Section No.: 2555 **Title:** Deliver and Stockpile Salvaged Materials	**Other:**	

Specification Committee Action: Approved with changes.

Deferred:	**Not Approved:**	**Approved Date:** 2/10/2011	**Effective Date:** 10/18/2011

Specification Committee Approved Text:

2555.01, DESCRIPTION.

Replace the Article:

Deliver and stockpile salvaged materials as tabulated ~~on the plans~~ in the contract documents.

2555.03, CONSTRUCTION.

Replace the Article:

A. ~~Materials to be salvaged, delivered, and stockpiled will be tabulated on the plans. Plans~~ The contract documents will identify the quantity of each item to be salvaged, the delivery location, and stockpiling requirements.

B. Salvage without damage~~e~~ing, disassemble, clean, and match mark (if required) items to be stockpiled~~, and~~. ~~b~~Bundle items in lots normal to the product being salvaged. Replace items damaged from Contractor's operations with new materials (at no additional cost to the Contracting Authority).

C. Deliver salvaged materials, to the location indentified on the contract documents, during normal business hours. Contact the Engineer to schedule delivery and stockpiling of materials at stockpile site.

D. Stockpile salvaged materials in an orderly fashion without intermingling ~~to ensure items are not in contact with soil in an orderly fashion~~. Provide blocking as necessary to ensure items are not in contact with soil.

2555.05, BASIS OF PAYMENT.

Replace the Article:

The lump sum price for Deliver and Stockpile Salvaged Materials will be full payment for salvaging, disassembl~~y~~ing, cleaning, match marking, bundling, deliver~~y~~ing, blocking, and stockpiling.

Comments: The District 4 Office asked what the intent was of stockpiling in an orderly fashion. The committee decided the orderly fashion was to prevent intermingling.

Specification Section Recommended Text:

2555.01, DESCRIPTION.

Replace the Article:

Deliver and stockpile salvaged materials as tabulated ~~on the plans~~ in the contract documents.

2555.03, CONSTRUCTION.

Replace the Article:

A. ~~Materials to be salvaged, delivered, and stockpiled will be tabulated on the plans. Plans~~ The contract documents will identify the quantity of each item to be salvaged, the delivery location, and stockpiling requirements.

B. Salvage without damage~~e~~ing, disassemble, clean, and match mark (if required) items to be stockpiled~~, and~~. ~~b~~Bundle items in lots normal to the product being salvaged. Replace items

damaged from Contractor's operations with new materials (at no additional cost to the Contracting Authority).

C. Deliver salvaged materials, to the location indentified on the contract documents, during normal business hours. Contact the Engineer to schedule delivery and stockpiling of materials at stockpile site.

D. Stockpile salvaged materials, in an orderly fashion, to ensure items are not in contact with soil ~~in an orderly fashion~~. Provide blocking as necessary.

2555.05, BASIS OF PAYMENT.

Replace the Article:

The lump sum price for Deliver and Stockpile Salvaged Materials will be full payment for salvaging, disassembl~~y~~ing, cleaning, match marking, bundling, deliver~~y~~ing, blocking, and stockpiling.

Comments:

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

2555.01, Description.

Replace the sentence:

Deliver and stockpile salvaged materials as tabulated ~~on the plans~~ in the contract documents.

2555.03, Construction.

Replace the article:

A. ~~Materials to be salvaged, delivered, and stockpiled will be tabulated on the plans. Plans~~ The contract documents will identify the quantity of each item to be salvaged, the delivery location, and stockpiling requirements.

B. Salvage without damage~~e~~ing, disassemble, clean, and match mark (if required) items to be stockpiled~~., and b~~Bundle items in lots normal to the product being salvaged. Replace items damaged from Contractor's operations with new materials (at no additional cost to the Contracting Authority).

C. Deliver salvaged materials~~,~~ to the location indentified on the contract documents~~,~~ during normal business hours. Contact the Engineer to schedule delivery and stockpiling of materials at stockpile site.

D. Stockpile salvaged materials in an orderly fashion to ensure items are not in contact with soil ~~in an orderly fashion~~. Provide blocking as necessary.

2555.05, Basis of Payment.

Replace the sentence:

The lump sum price for Deliver and Stockpile Salvaged Materials will be full payment for salvaging, disassembl~~y~~ing, cleaning, match marking, bundling, deliver~~y~~ing, blocking, and stockpiling.

Reason for Revision: Clean up and clarity.

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

Industry Notified:	**Yes**	**No** X	**Industry Concurrence:**	**Yes**	**No**
Comments:					

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Jim Berger	**Office:** Materials	**Item 9**
Submittal Date: 2011.01.24	**Proposed Effective Date:** 10/18/2011	
Section No.: 4130 **Title:** Revetment Stone, Erosion Stone, and Gabion Stone	**Other:**	

Specification Committee Action: Approved as recommended.

Deferred:	**Not Approved:**	**Approved Date:** 2/10/2011	**Effective Date:** 10/18/2011

Specification Committee Approved Text: See Specification Section Recommended Text.

Comments: The Office of Bridges and Structures asked if the recommended gradation contained enough fine material to hold material in place. The Office of Materials commented that the material had been used in the field with no issues.

Specification Section Recommended Text:

4130.01, B.

Replace Table 4130.01-1: Virgin Stone Requrements:

Table 4130.01-1: Virgin Stone Requirements

Revetment Type	Revetment Quality	Test Limits	Test Method
Primary projects: Class A & B revetment All projects: Class C & E revetment	Alumina	0.7	Iowa 222
	A Freeze	10	Iowa 211, Method A
	Secondary Pore Index	25	Iowa 219
Non-Primary projects: Class A & B revetment	C Freeze	5	Iowa 211, Method C
All projects: Class D revetment	C Freeze	10	Iowa 211, Method C
Note: Revetment may pass either Alumina or A Freeze for compliance.			

4130.02, A.

Renumber Article 4 and **add** new Article:

3. Class C Revetment.

- Nominal top size of 450 pounds (205 kg).
- At least 50% of the stones weighing more than 275 pounds (125 kg).
- At least 90% of the stones weighing more than 75 pounds (35 kg).

~~3~~ 4. Class D and Class E Revetment.

Comments:

Member's Requested Change (Redline/Strikeout):

Section 4130. Revetment Stone, Erosion Stone, and Gabion Stone

4130.01 REVETMENT DESCRIPTION.

A. Broken limestone, dolomite, quartzite, or granite from an approved source as described in Materials I.M. 409 and meeting the following requirements.

- A minimum of 50% of the stone is to be composed of beds or slabs more than 5 inches (125 mm) thick.
- A minimum of 10% of the beds or slabs are to be thick enough to produce the required weight (mass) of either the stone or concrete, with the greatest dimension not more than two times the smallest dimension.

B. When the source test plot or service history is not available, meet the requirements of Table 4130.01-1 for virgin stone crushed to 3/4 inch to 1 1/2 inch (19 mm to 37.5 mm) nominal sizes. Abrasion loss for all revetment stone is not to exceed 50% when tested according to AASHTO T 96.

Table 4130.01-1: Virgin Stone Requirements

Revetment Type	Revetment Quality	Test Limits	Test Method
Primary projects: Class A & B revetment All projects: Class C & E revetment	Alumina	0.7	Iowa 222
	A Freeze	10	Iowa 211, Method A
	Secondary Pore Index	25	Iowa 219
Non-Primary projects: Class A & B revetment	C Freeze	5	Iowa 211, Method C
All projects: Class D revetment	C Freeze	10	Iowa 211, Method C
Note: Revetment may pass either Alumina or A Freeze for compliance.			

C. Recycled PCC pavement or broken concrete meeting the requirements of Materials I.M. 210 may be used with the approval of the Engineer.

- All reinforcement material cut flush with the flat surface of the concrete.
- A minimum of 50% of the broken concrete revetment composed of slabs more than 5 inches (125 mm) thick.
- A minimum of 10% of the slabs thick enough to produce the required weight (mass) of the concrete with the greatest dimension not more than 2 times the smallest dimension.
- No petroleum based or HMA material included in revetment.

4130.02 REVETMENT GRADATION.

A. Determine gradation compliance by visual inspection, monitored by the Engineer. After visual inspection and prior to loading, the Engineer may designate material as too fine or too coarse.

1. Class A Revetment.

- Nominal top size of 400 pounds (180 kg).
- At least 75% of the stones weighing more than 75 pounds (35 kg).
- None less than 50 pounds (25 kg).
- Stones with at least one flat face with one dimension at least 15 inches (375 mm).

2. Class B Revetment.

- Nominal top size of 650 pounds (300 kg).
- At least 20% of the stones weighing more than 500 pounds (225 kg).
- At least 50% of the stones weighing more than 275 pounds (125 kg).
- At least 90% of the stones weighing more than 25 pounds (10 kg).

3. Class C Revetment.

- Nominal top size of 450 pounds (205 kg).
- At least 50% of the stones weighing more than 275 pounds (125 kg).
- At least 90% of the stones weighing more than 75 pounds (35 kg).

4. Class D and Class E Revetment.

- Nominal top size of 250 pounds (115 kg).
- At least 50% of the stones weighing more than 90 pounds (40 kg).
- At least 90% of the stones weighing more than 5 pounds (2 kg).
- The Engineer may approve using riprap containing material larger than 250 pounds (115 kg).

Reason for Revision:

This is a new class of revetment, larger than Class E and developed for use on high-velocity streams. It has been successfully tested in western District 2, north of Waukon, Iowa on the Upper Iowa river.

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:					

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Deanna Maifield	**Office:** Design	**Item 10**
Submittal Date: 2011.01.27	**Proposed Effective Date:** 10/18/2011	
Article No.: 4147.01, A, 1, c **Title:** Pipe	**Other:**	

Specification Committee Action: Approved as recommended.

Deferred:	**Not Approved:**	**Approved Date:** 2/10/2011	**Effective Date:** 10/18/2011

Specification Committee Approved Text: See Specification Section Recommended Text.

Comments: It was asked what SDR is an abbreviation for. SDR is short for Standard Dimension Ratio, as noted in the abbreviation section of the specification book. The Specification Section will see if SDR is used anywhere else in the specification book. If it is not, it will be deleted from the abbreviation section of the specification book.

Specification Section Recommended Text:

4147.01, A, 1, c.

Replace the article:

Maximum outside diameter ~~and SDR~~ as specified in the contracts documents.

Comments:

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

4147.01, A, 1, c, Pipe.

Replace the article:

Maximum outside diameter ~~and SDR~~ as specified in the contracts documents.

Reason for Revision: To match SUDAS.

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

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

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Deanna Maifield	**Office:** Design	**Item 11**
Submittal Date: 2011.01.27	**Proposed Effective Date:** 10/18/2011	
Article No.: 4150.03, C **Title:** Butterfly Valves	**Other:**	

Specification Committee Action: Approved as recommended.

Deferred:	**Not Approved:**	**Approved Date:** 2/10/2011	**Effective Date:** 10/18/2011

Specification Committee Approved Text: See Specification Section Recommended Text.

Comments: None.

Specification Section Recommended Text:

4150.03, C, Butterfly Valves.

Replace the article:

1. **Standards:** Comply with AWWA C504 Class 150B (gray iron or ductile iron) and NSF 61.

2. ~~**Disc:** Ductile iron or gray iron with plasma applied nickel chromium edge or stainless steel edge according to ASTM A 240/A 240M, Type 316, and mechanically fixed stainless steel pins.~~

~~3~~2. **Stem:** Stainless steel according to ASTM A 240/A 240M, Type 304, turned, ground, and polished.

3. **For Seat on Body Valves:**
   a. **Disc:** Ductile iron or gray iron with plasma applied nickel-chromium edge or stainless steel edge according to ASTM A 240, Type 316, and mechanically fixed stainless steel pins.
   b. **Seat:** Synthetic rubber compound mechanically retained to the body.

4. **For Seat on Disc Valves:** ~~Synthetic rubber compound bonded or mechanically retained to the body.~~
   a. **Disc:** Ductile iron according to ASTM A 536 with synthetic rubber compound seat mechanically retained to the disc.
   b. **Seat:** Continuous Type 316 stainless steel seat.

5. **External Bolts and Hex Nuts:** Stainless steel according to ASTM A 240/A 240M, Type 304.

Comments:

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

4150.03, C, Butterfly Valves.

Replace the article:

1. **Standards:** Comply with AWWA C504 Class 150B (gray iron or ductile iron) and NSF 61.

2. ~~**Disc:** Ductile iron or gray iron with plasma applied nickel chromium edge or stainless steel edge according to ASTM A 240/A 240M, Type 316, and mechanically fixed stainless steel pins.~~

~~3~~2. **Stem:** Stainless steel according to ASTM A 240/A 240M, Type 304, turned, ground, and polished.

~~4. **Seat:** Synthetic rubber compound bonded or mechanically retained to the body.~~

3. For Seat on Body Valves:

a. Disc: Ductile iron or gray iron with plasma applied nickel-chromium edge or stainless steel edge according to ASTM A 240, Type 316, and mechanically fixed stainless steel pins.

b. Seat: Synthetic rubber compound mechanically retained to the body.

4. For Seat on Disc Valves:

a. Disc: Ductile iron according to ASTM A 536 with synthetic rubber compound seat mechanically retained to the disc.

b. Seat: Continuous Type 316 stainless steel seat.

5. External Bolts and Hex Nuts: Stainless steel according to ASTM A 240/A 240M, Type 304.

Reason for Revision: To match SUDAS.					
County or City Input Needed (X one)			**Yes**	**No** X	
Comments:					
Industry Input Needed (X one)			**Yes**	**No** X	
Industry Notified:	**Yes**	**No** X	**Industry Concurrence:**	**Yes**	**No**
Comments:					

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Willy Sorenson	**Office:** Traffic and Safety	**Item 12**
Submittal Date: 2011.01.31	**Proposed Effective Date:** 10/18/2011	
Article No.: 4186.09, A, 4 **Title:** Washers (Type A Signs)	**Other:**	

Specification Committee Action: Deferred until the March Specification Committee meeting.

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

Specification Committee Approved Text:

Comments: The Office of Local Systems asked if neoprene washers present a problem when used with metal posts. The Office of Traffic and Safety did not know of any problems when used with metal posts.

Subsequent to the Specification Committee meeting, the Office of Materials provided a report showing that aluminum metal will react with the copper in the wood preservative. The Office of Materials would recommend a stainless steel or hot dipped galvanized washer be used to separate the aluminum sign from the treated wood post. This recommendation would apply to both Type A and Type B signs. This issue will be discussed at the next Specification Committee meeting.

Specification Section Recommended Text:

4186.09, A, 4, b.

Replace the Article:

Washers are to be 3/8 inch (9.5 mm) I.D. by ~~1 3/8~~ 1.5 inch (~~35~~ 38mm) O.D. by 0.125 inch (3mm).

Comments:

Member's Requested Change:

4. Washers.
a. Use washers made of a quality of material approved by the Engineer.
b. Washers are to be 3/8 inch (9.5 mm) I.D. by ~~1 3/8~~ 1 ½ inch (~~35~~ 38mm) O.D. by 0.125 inch (3mm).
c. A thickness tolerance of ± 0.006 inch (0.15 mm) is allowed.
d. Neoprene washers are to be 3/8 inch (9.5mm) I.D. by 15/16 inch (24mm) O.D. by 1/8 inch (3 mm) thickness. (~~Neoprene washers are required when treated wood posts are used~~). Durometer hardness is to be 60 to 70, with a tolerance of ± 5.

Reason for Revision:

The 1 ½ in washer seems to be much more readily available than the specified 1 3/8 in.

The neoprene has been drying and shrinking with the resultant lack of snugness leading to problems.

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

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

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Gary Novey / Gordon Port	**Office:** Bridges & Structures	**Item 13**
Submittal Date: January 26, 2011	**Proposed Effective Date:** April 19, 2011	
Article No.: **Title:**	**Other:** DS-09029, Partial Depth Bridge Deck Patching	

Specification Committee Action: Approved with changes.

Deferred:	**Not Approved:**	**Approved Date:** 2/10/2011	**Effective Date:** 4/19/2011

Specification Committee Approved Text: See attached DS for Partial Depth Bridge Deck Patching.

Comments: The Contractor will have the choice of any rapid setting patching material listed in the I.M. It will be up to the Contractor to choose one that is appropriate for bridge decks. If the material doesn't work, the Contractor will need to replace it and will choose more wisely next time.

The Specifications Section requested that the requirement in Article 090XX.03, A, that patching material representative be present on the first day of placement, be deleted since this requirement is also stated in Article 090XX.03, B.

Gary Novey will be the controller of this DS.

Since this DS is replacing an existing DS, the DS will be effective with the April 19th letting.

Specification Section Recommended Text: See attached DS for Partial Depth Bridge Deck Patching.

Comments:

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

Reason for Revision: To incorporate revisions used as an SP into the DS.

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

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

Draft DS-090XX
(Replaces DS-09029)

Iowa Department of Transportation

DEVELOPMENTAL SPECIFICATIONS
FOR
PARTIAL DEPTH BRIDGE DECK PATCHING

Effective Date
April 19, 2011

THE STANDARD SPECIFICATIONS, SERIES 2009, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE DEVELOPMENTAL SPECIFICATIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

090XX.01 DESCRIPTION.
Partial depth bridge deck patching consists of removing deteriorated bridge deck concrete in areas designated by the contract documents. This includes furnishing and placing patching material to provide a new traffic surface. This work is in areas where the size, shape, and depth of patch depends on the extent of deck deterioration and will be determined during the removal operation.

090XX.02 MATERIALS AND EQUIPMENT.

A. Materials.

1. ~~The following concrete mixes have been approved for patching of bridge decks:~~
- ~~Pave Patch 3000 by Conspec Marketing & Manufacturing, Inc.~~
- ~~Euco Speed MP by Euclid Chemical Company~~
- ~~Futura by W.R. Meadows, Inc.~~

Materials listed in Materials I.M. 491.20, Appendix A, are approved for patching bridge decks.

2. Follow manufacturer's recommendations for patching ~~mix~~ material except as modified by this specification. Furnish two copies of manufacturer's product information, mixing procedures, placement procedures and curing procedures to the Engineer at least 14 calendar days prior to Preconstruction Conference.

3. Calcium chloride shall not be added to patching mix.

4. Patching ~~mixes~~ materials may be used with or without coarse aggregate in accordance with manufacturer's recommendations. ~~For repair areas larger than 1 square foot (0.3 square meters) and deeper than 1 inch (25 mm), coarse aggregate shall be used.~~

5. Aggregate for extending grout shall be pea gravel with a minimum durability of Class 2 meeting the following gradation:

Sieve Size	Percent Passing
0.5 inch (12.5 mm)	100
0.375 inch (9.5 mm)	85 - 100
No. 8 (2.36 mm)	0 - 8

6. Manufacturer's recommendations shall be followed for adding aggregates to these mixes.

B. Equipment.

1. Remove existing deck surface material by wet or dry saws, jack hammers, or similar equipment. Hand equipment may be necessary to achieve a vertical edge and designated shape.

2. The following additional equipment will be required:
- Sandblasting equipment for cleaning the prepared patch area before placing the patch.
- Preparation of the patch area shall be completed using equipment no heavier than a 15 pound (7 kg) air chisel. With the approval of the Engineer, a 30 pound (14 kg) air chisel may be used if its use does not result in significant damage to patch area and edges.
- Compressed air for cleaning the prepared area shall be oil and moisture free.
- An on-site mortar or paddle type concrete mixer shall be used for mixing patching material.

090XX.03 CONSTRUCTION.
Tabulations for partial depth bridge deck finish patches shown in the contract documents are for estimating purposes only. The Engineer will designate the location and limits of the patches. The shape and depth may be irregular, thus requiring the use of hand-operated equipment for some or all removal. Existing deck material shall be removed within the designated area to sound concrete as determined by the Engineer. Material removed and not designated for salvage shall become the property of the Contractor and removed in accordance with Article 1104.08 of the Standard Specifications.

Visually survey the bottom of the deck over open roadways or railroads prior to beginning removal operations. Care shall be taken to prevent material from falling onto traffic below. Lane closures below the bridge deck being patched may be required.

A. Preparation of Patch Area.

1. Area to be Patched.
The Engineer will determine areas to be patched by hand sounding. The patching area will normally include 2 to 3 inches (50 mm to 75 mm) of sound concrete around patch edges. Efforts will be made to mark the patching area to accommodate sawing patch edges by using a square, triangle, rectangle, or similar straight edged shape. The minimum depth of patch shall be 1 inch (25 mm).

2. Sawing.
a. Determine the depth of existing reinforcing bars before sawing.
b. Saw at a depth of 0.75 to 1 inch (20 to 25 mm) around the designated area. Care shall be taken to avoid cutting into reinforcing bars.
c. Keep areas where concrete has been removed free of slurry produced from wet sawing.

3. Removal.
a. Remove unsound concrete to a minimum depth of 1 inch (25 mm) and no deeper than 1 inch (25 mm) below the top mat of reinforcing steel. Avoid jack hammering on reinforcing steel to prevent damage to reinforcing bars. Care shall to be taken to avoid breaking through the bridge deck. Keep patch edges as straight and square as possible when removal depth exceeds the initial sawcut.
b. Within 24 hours prior to placing patching material, thoroughly clean all reinforcing bars and newly exposed concrete by sand blasting or shot blasting. Where the bond between

existing concrete and reinforcing steel has been broken, remove the concrete adjacent to the reinforcing bar to a depth that will permit new concrete to bond to the entire periphery of the exposed bar. A minimum of 0.75 inch (20 mm) clearance will be required around the bar. Exercise care to prevent cutting, stretching, or damaging reinforcing steel. Do not sand blast or shot blast epoxy coated reinforcing steel. Clean epoxy coated reinforcing steel with hand tools and compressed air to avoid damaging the epoxy coating. Repair damage to the epoxy coating by a method approved by the Engineer.

c. After sand blasting, remove all loose material with compressed air.

4. Mixing of Patch Material.

a. Mix material in accordance with manufacturer's recommendations and subject to approval of the Engineer.

b. Organize work so all personnel and equipment are in place before mixing.

c. Mix according to patch material manufacturer's recommendations and subject to approval of the Engineer. Mix only the amount of material that can be placed in the time frame designated by manufacturer.

d. Add ingredients to mixer in order of manufacturer's recommendations.

e. Amount of mix water is important. Use a properly graduated measuring device to measure required amount of water. Never exceed maximum recommended water content.

4 5. Patching ~~Mix~~ Material Placement.

a. Place patching mix according to the patching material manufacturer's recommendations and subject to the approval of the Engineer. ~~Furnish two copies of these recommendations to the Engineer at the Preconstruction Conference.~~

b. Thoroughly trowel patching ~~mix~~ material into patch edges to ensure a good bond and seal. Ensure that all saw cuts extending beyond the patch area are filled with patching material to prevent water from getting around or under the patch.

c. Protect and cure patches according to the manufacturer's recommendations.

d. Match profile of patches to the existing deck grade and cross slope. Texture the surface of patches to match the adjacent deck surface.

e. Prior to final acceptance, the patch shall be level with the adjacent pavement and have a smooth riding surface.

B. Limitations of Operations.

1. A representative of the manufacturer of the patch material being used shall be present at the Preconstruction Conference and at the job site on the first day of patch material placement. Contractor is responsible for notifying manufacturer's representative of these dates and ensuring the representative will attend.

~~1~~ 2. Maintain traffic during construction unless the road is closed. Conduct operations with minimum inconvenience to traffic. Lane closures shall be in accordance with the Traffic Control Plan. On two-lane roadways, limit work to one traffic lane at a time except for minor encroachment in the adjacent lane for sawing and patch preparation when traffic is maintained. For multiple lane roadways, the work area may include one lane in each direction.

~~2~~ 3. When approved by the Engineer, patch areas may extend up to 2 feet (0.6 m) into an adjacent lane as allowed by the Traffic Control Plan.

~~3~~ 4. Place patch material within 24 hours of sawing operations.

4 5. If unforeseen conditions result in excavated areas being left open overnight, furnish a sufficient number of flaggers to warn motorists and direct traffic until patches are complete and the roadway is open to normal traffic. The cost of providing these flaggers shall be at no additional cost to the Contracting Authority.

~~5~~ **6.** Place concrete patching material only when the ambient air and pavement temperatures are in accordance with the manufacturer's recommendations.

~~6~~ **7.** Open patched areas to traffic as soon as the manufacturer's recommended patch strength is achieved.

C. Area Restoration.
Keep bridge deck surface and areas immediately adjacent to patch areas clean of slurry and excess patch materials.

090XX.04 METHOD OF MEASUREMENT.

A. The Engineer will calculate the area of each Partial Depth Bridge Deck Finish Patch in square feet (square meters) from surface measurements.

B. The area of each patch less than 1 square foot (0.1 m^2) will be counted as 1 square foot (0.1 m^2) for payment purposes.

090XX.05 BASIS OF PAYMENT.

A. Payment for Partial Depth Bridge Deck Finish Patch will be at the contract unit price per square foot (square meter).

Payment is full compensation for sawing, removal of bridge deck concrete, preparing patch area, furnishing and placing patch material, finishing, curing, and restoration of the area.

SPECIFICATION REVISION SUBMITTAL FORM

Submitted by: Roger Bierbaum	**Office:** Contracts	**Item 14**
Submittal Date: January 5, 2011	**Proposed Effective Date:** April 19, 2011	
Article No.: **Title:**	**Other:** DS-09053, Small Business Development Contracts	

Specification Committee Action: Approved with changes.

Deferred:	**Not Approved:**	**Approved Date:** 2/10/2011	**Effective Date:** 10/18/2011

Specification Committee Approved Text: See attached DS for Small Business Development Contracts.

Comments: The reference to Article 1103.25 was changed to 1103.05.

The Targeted Small Business (TSB) and TSB Bond Waiver sections were switched for clarity.

The Statewide Operations Bureau expressed support since this revision would eliminate a requirement that is more stringent than is typical. This revision would follow the lead of the current state administration's direction.

The Office of Construction expressed reservations in not requiring a performance bond. Some instances were cited where the contractor did not pay a supplier/subcontractor with the disputes ending up in court, requiring time and effort on behalf of the construction employees.

Specification Section Recommended Text: See attached DS for Small Business Development Contracts.

Comments:

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

09053.03 BIDDING FOR CONTRACTS.

Only firms designated as approved Certified Small Business Contractors (CSBCs) by the Department will be allowed to bid on proposals designated for Small Business Contractors. A CSBC wishing to bid on a proposal designated for Small Business Contractors shall submit a written request to bid using the standard Iowa DOT procedures to be approved to bid on a proposal. The Department will give either written approval or denial of each request. Prequalification by the Department is not required, but the Department may require a CSBC to provide references or examples of similar types of work in order to be approved for bidding on individual proposals. If approved to bid, the CSBC shall submit either a Proposal Guaranty (Article 1102.11 of the Standard Specifications) or a TSB Bond Waiver with their bid.

Prior to execution of a contract, the CSBC will be required to provide:

1. A Certificate of Insurance (as required by Article 1103.04 of the Standard Specifications) and
2. For contracts that exceed $25,000 either ~~Either~~ a Performance Bond (as required by Article 1103.25 of the Standard Specifications) or a TSB Bond Waiver.

Reason for Revision: The ability for small business contractors to obtain a performance bond has been identified as a problem for some small contractors. Minority and female contractors are able to obtain a TSB Bond waiver for contracts up to $50,000. The Code of Iowa only requires a Performance Bond for contracts that equals or exceeds $25,000. So we are proposing not to require a Performance Bond for contracts for any Small Business Development Contract under $25,000.

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

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

DS-090XX
(Replaces DS-09053)

Iowa Department of Transportation

DEVELOPMENTAL SPECIFICATIONS
FOR
SMALL BUSINESS DEVELOPMENT CONTRACTS

Effective Date
April 19, 2011

THE STANDARD SPECIFICATIONS, SERIES 2009, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE DEVELOPMENTAL SPECIFICATIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

09053.01 DESCRIPTION.
The intent of this specification is for the Department to comply with Iowa Code 314.14 by providing contracts where only small businesses compete against each other, and not against large established contractors.

09053.02 DEFINITIONS.

Certified Small Business Contractors (CSBC) – A contractor who has been recognized as meeting the requirements of a Small Business contractor by the Iowa DOT's Office of Contracts.

Prequalification – Submittal of a Contractors Financial-Equipment-Experience (FEE) Statement as described in Article 1102.01 of the Standard Specifications

Small Business – A firm which meets the requirement of Iowa Code 314.14 which defines a *"Small business" a*s any enterprise which is operated for profit, under a single management, and which has either fewer than twenty employees or an annual gross income of less than four million dollars computed as the average of the three preceding fiscal years.

Small Business Certification – A document completed by a small business and submitted to the Iowa DOT's Office of Contracts certifying the firm complies with the size requirements of the Iowa Code 314.14 Small Business requirements. The Department may require the small business to provide additional proof of eligibility to verify the requirements of Iowa Code 314.14 are not exceeded.

Targeted Small Business (TSB) – Iowa Code 15.102 paragraph 7a defines a *"Targeted small business"* as a small business which is 51% or more owned, operated, and actively managed by one or more women, minority persons, or persons with a disability.

TSB Bond Waiver – Iowa Code 12.44 requires agencies of state government to waive the requirement of satisfaction, performance, surety, or bid bonds for targeted small businesses which are able to demonstrate the inability of securing such a bond because of a lack of experience, lack of net worth, or lack of capital. This waiver will not apply to businesses with a record of repeated failure of substantial performance or material breach of contract in prior circumstances. The waiver will only be applied to a project or individual transaction amounting to fifty thousand dollars or less, notwithstanding Iowa Code section 573.2. In order to qualify, the TSB shall provide written evidence to the Department of inspections and appeals that the bond would otherwise be denied the business. The granting of the waiver will in no way relieve the business from its contractual obligations and will not preclude the Department from

pursuing any remedies under law upon default or breach of contract. The Department of inspections and appeals will certify TSBs for eligibility and participation in this program and will make this information available to other state agencies.

09053.03 BIDDING FOR CONTRACTS.
Only firms designated as approved Certified Small Business Contractors (CSBCs) by the Department will be allowed to bid on proposals designated for Small Business Contractors. A CSBC wishing to bid on a proposal designated for Small Business Contractors shall submit a written request to bid using the standard Iowa DOT procedures to be approved to bid on a proposal. The Department will give either written approval or denial of each request. Prequalification by the Department is not required, but the Department may require a CSBC to provide references or examples of similar types of work in order to be approved for bidding on individual proposals.

Prior to execution of a contract, the CSBC will be required to provide:

1. A Certificate of Insurance (as required by Article 1103.04 of the Standard Specifications) and
2. For contracts exceeding $25,000, ~~E~~either a Performance Bond (as required by Article ~~1103.25~~ 1103.05 of the Standard Specifications) or a TSB Bond Waiver.

Article 1102.19 of the Standard Specifications does not apply to this contract.

A Traffic Control Technician according to Article 2528.01, C, 1, of the Standard Specifications is not required for this contract.

09053.04 CONSTRUCTION OF THE WORK.
Article 1108.01 of the Standard Specifications allows a contractor to subcontract up to 70% of the contract amount. On contracts designated for CSBCs the Contractor may subcontract 70% of the contract amount, but this work shall only be subcontracted to another CSBC.

While the Department recognizes that a small business may not have all the equipment and resources of larger contractors, all requirements of the contract documents shall apply to the CSBC.

09053.05 PAYMENT FOR WORK.
Payment for work will be according to Article 1109.05 of the Standard Specifications.