

CITY OF BURLINGTON IOWA

ATTACHMENTS For Excavations

The City of Burlington requires that all construction performed within City right-of-way conform to the Iowa Statewide Urban Design and Specifications (SUDAS) Manual, unless otherwise specified under City of Burlington Supplemental Specifications, separate contract, this attachment or other direction by the Public Works Department.

Eight standard figures from SUDAS are attached for the Contractor's convenience. These eight figures will provide direction for the majority of situations encountered during excavation in the right-of-way. Contractors will be required to perform work in accordance with other requirements of SUDAS as deemed necessary by the Public Works Department for certain locations, situations, or conditions that may not be covered by the attached figures. The following figures are made part of this application: 3010.101 (SW-101), 3010.102 (SW-102), 3010.103 (SW-103), 3010.104 (SW-104), 3010.105 (SW-105), 7040.101, 7040.102, and 7040.103.

The contractor shall remove paved surfaces by full-depth saw-cut. Removal and patching shall be by full panel on PCC streets less than 5 years old, all other cases shall be in accordance with figures 7040.101, 7040.102, and 7040.103. Trench backfill shall conform to figures 3010.101, 3010.102, 3010.103 and/or 3010.104. Rigid pipe embedment shall be Class R-2, flexible pipe embedment shall be Class F-3, pressure pipe embedment shall be Class P-3. Secondary backfill shall be a maximum of 18" over the top of the utility. Alternate pipe embedment methods if requested by utility owners may be considered for approval. Final trench backfill under any traveled roadway or alley shall be made with flowable mortar and 6" of compacted modified subbase beneath the paved surface; final trench backfill under non-roadway areas may be made with existing excavated material compacted in 6" lifts. Flowable mortar used for final trench backfill shall comply with Iowa DOT Section 2506.02.

After utility trench backfilling the pavement restoration batches shall conform to figures 7040.101, 7040.102, and/or 7040.103. Concrete materials for concrete patches shall meet the following specifications:

SUDAS 7040, 2.01, A (Materials), 7010, 2.02 (Materials), and 7010, 2.03 (Mixes)
The concrete mix shall be one of the following: C3WR, C-4, C04WR or M-4. Coarse aggregate in the mix shall be Class 3 Durability aggregate. Air entrainment shall be added to achieve a 7.0%+/- 1.5% air content. The mix shall attain a 4,000 psi compressive strength at 28 days. Depending on traffic volumes, an M-4 mix may be required for pavement restoration.

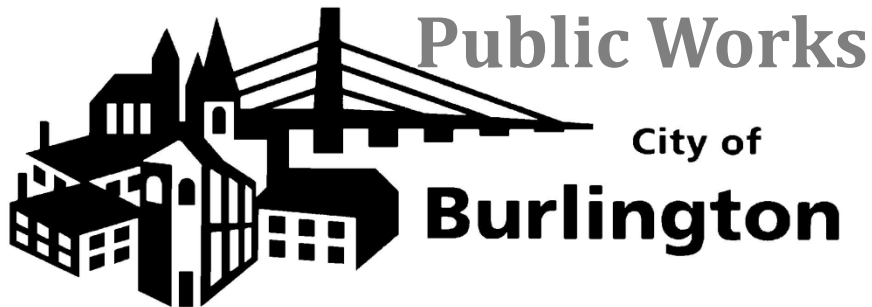
Asphaltic concrete materials for asphalt patches shall meet the following specifications:

SUDAS 7040, 2.01, B (Materials) and 7020, 2.01 (HMA Materials)
The hot mix asphalt (HMA) Binder shall be PG64-22. The HMA mix shall be a 300k, type B, with 3/8" or 1/2 coarse aggregate. Pavement restoration on sealcoat streets shall consist of a minimum 4" thick compacted, crushed stone base, and 2" minimum thick compacted HMA lifts.

For restoration of gravel surfaces a minimum of 8" compacted Class "A" Roadstone is required.

For restoration of grassy areas a minimum of 4" of topsoil shall be placed and seeding shall meet SUDAS specification 9010, 2.02, A Type 1 Permanent Lawn Mixture.

City of Burlington Requirements for Excavations and Street Patching



Jesse Howe, PE

March 2017

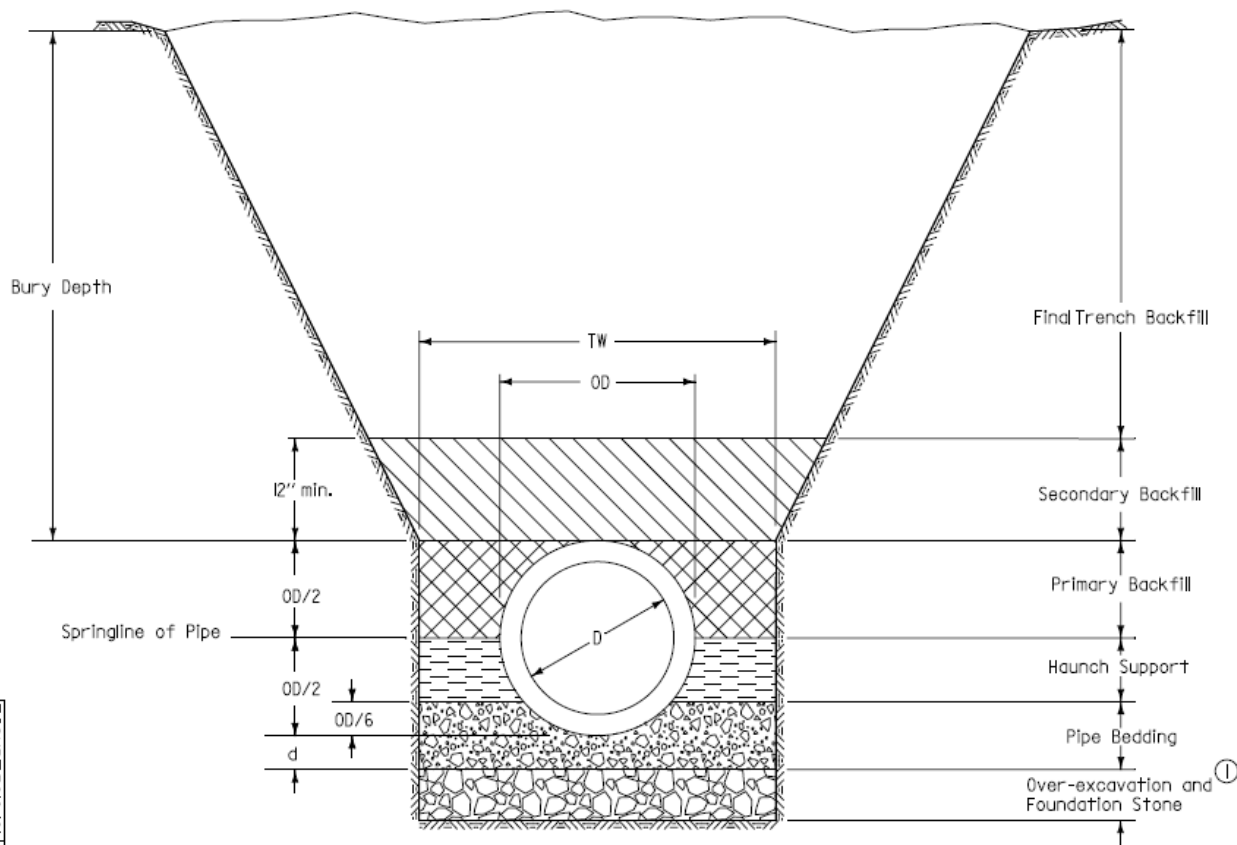
General Excavation Specifications

- SUDAS Bedding Details Used
 - 3010.101 (SW-101): Trench Bedding and Backfill Zones
 - 3010.102 (SW-102): Rigid Gravity Pipe Trench Bedding
 - 3010.103 (SW-103): Flexible Gravity Pipe Trench Bedding
 - 3010.104 (SW-104): Pressure Pipe Trench Bedding
 - 4010.201 (SW-201): Sanitary Sewer Service Stub
- City of Burlington Backfill Detail
- SUDAS Patching Details
 - 7040.101: Full Depth PCC Patches \leq 15' Long
 - 7040.102: Full Depth PCC Patches $>$ 15' Long
 - 7040.103: Full Depth HMA Patches

Pipe Bedding & Backfill

Refer to the contract documents for specific material and placement requirements.

- ① Required only when specified in the contract documents or when directed by the Engineer.



Key

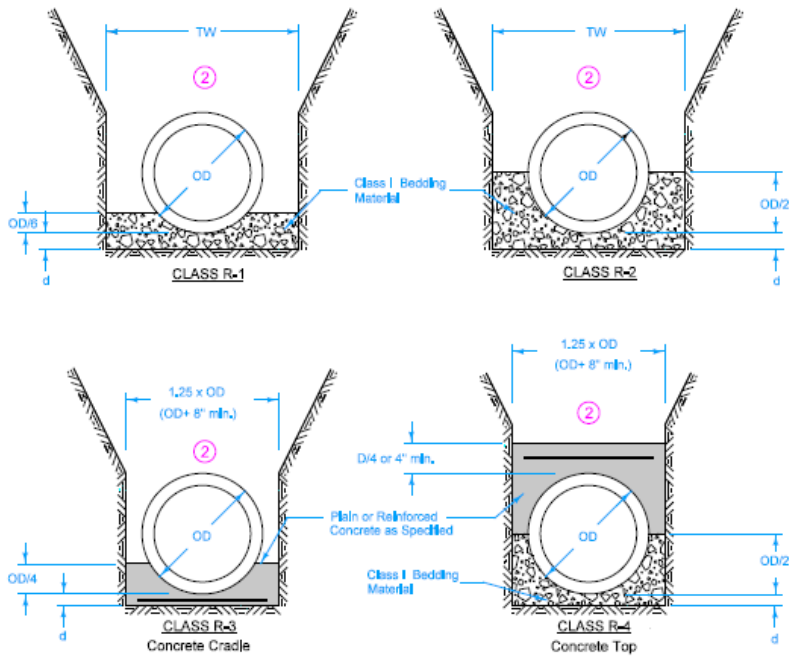
- OD = Outside diameter of pipe
- D = Inside diameter of pipe
- TW = Trench width at top of pipe
- d = Depth of bedding material below pipe

FIGURE 3010.101 SHEET 1 OF 1

		REVISION
		NEW 04-21-09
FIGURE 3010.101	STANDARD ROAD PLAN	SW-101
REVISIONS: New. Replaces SUDAS Figure 3010.1.		SHEET 1 of 1
DAVID J. OWENS SENIOR INSPECTOR		DEANNA MARSHALL SENIOR METRIC ENGINEER
TRENCH BEDDING AND BACKFILL ZONES		

Pipe Bedding - Rigid

RCP AND VCP CIRCULAR PIPE BEDDING ①



Refer to sheet 2 for bury depth restrictions.

- ① Use Bedding Class R-1 or R-2 unless specified otherwise.
- ② Place remainder of bedding and backfill materials as specified in the contract documents.

Key

- OD = Outside diameter of pipe
- OS = Outside span of pipe
- TW = Trench width at top of pipe:
Min. = $OD + 18$ Inches
Max. = $1.25 \times OD + 12$ Inches OR
54 Inches (whichever is greater)
- d = Depth of bedding material below pipe:
 $OD/8$ or $OS/8$, OR 4 Inches
(whichever is greater)

REINFORCED CONCRETE ARCH AND ELLIPTICAL PIPE BEDDING

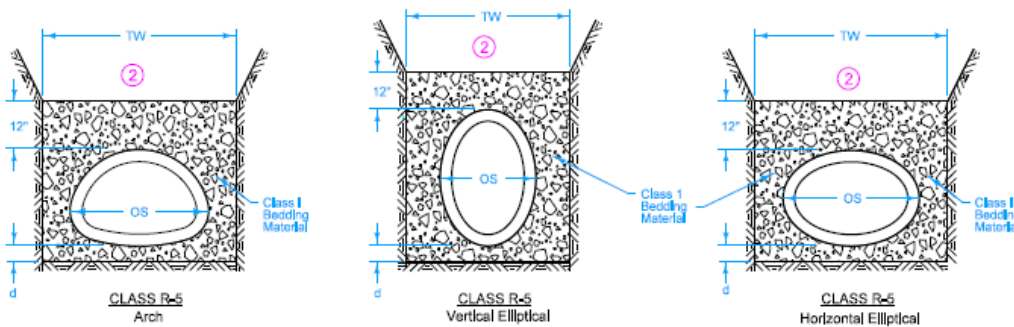
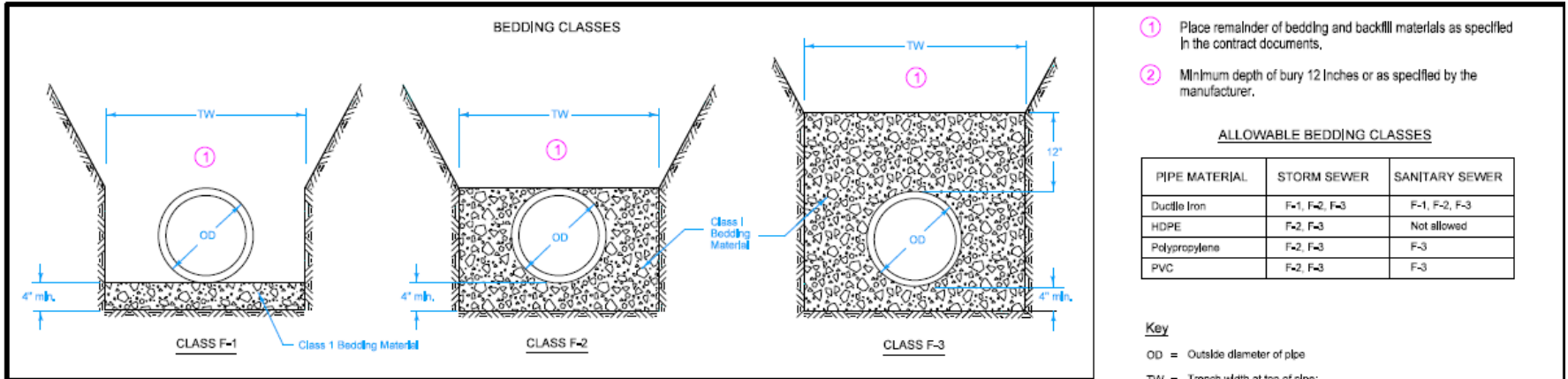


FIGURE 3010.102 SHEET 1 OF 2

		REVISION 2 04-16-17
		SW-102 SHEET 1 of 2
FIGURE 3010.102	STANDARD ROAD PLAN	
REVISIONS: Changed title to RCP AND VCP "CIRCULAR" BEDDING. Changed title on bedding Class R-4 from Concrete Arch to Concrete "Top".		
<i>Brian Smith</i> Brian Smith, Engineer		
RIGID GRAVITY PIPE TRENCH BEDDING		

Pipe Bedding - Flexible



- ① Place remainder of bedding and backfill materials as specified in the contract documents.
- ② Minimum depth of bury 12 Inches or as specified by the manufacturer.

ALLOWABLE BEDDING CLASSES

PIPE MATERIAL	STORM SEWER	SANITARY SEWER
Ductile Iron	F-1, F-2, F-3	F-1, F-2, F-3
HDPE	F-2, F-3	Not allowed
Polypropylene	F-2, F-3	F-3
PVC	F-2, F-3	F-3

Key

OD = Outside diameter of pipe
 TW = Trench width at top of pipe:
 Min. = OD+18 Inches OR 1.25xOD+12 Inches
 (whichever is greater)

PVC PIPE

Pipe Diameter (in)	ASTM D 3034			ASTM F 679	ASTM F 949	ASTM F 1803	ASTM D 2680
	Solid Wall			Solid Wall	Corrug. Exterior	Closed Profile	Composite (Truss Type)
	SDR 23.5	SDR 26	SDR 35	SDR 36			
8	30'	28'	24'	---	24'	---	32'
10	30'	28'	24'	---	24'	---	32'
12	30'	28'	24'	---	24'	---	32'
15	30'	28'	24'	---	24'	---	32'
18	---	---	---	24'	24'	---	---
21	---	---	---	24'	24'	24'	---
24	---	---	---	24'	24'	24'	---
27	---	---	---	24'	---	24'	---
30	---	---	---	24'	24'	24'	---
33	---	---	---	24'	---	---	---
36	---	---	---	24'	24'	24'	---
42	---	---	---	24'	---	24'	---
48	---	---	---	24'	---	24'	---
54	---	---	---	---	---	24'	---
60	---	---	---	---	---	24'	---

DUCTILE IRON, AWWA C151, CLASS 52

Pipe Diameter (in)	Class F-1 Bedding	Class F-2 Bedding	Class F-3 Bedding
4	40'	40'	40'
6	40'	40'	40'
8	40'	40'	40'
10	40'	40'	40'
12	37'	40'	40'
14	31'	40'	40'
16	28'	37'	40'
18	25'	34'	40'
20	23'	32'	40'
24	20'	29'	36'
30	16'	23'	31'
36	18'	22'	30'
42	17'	21'	29'
48	16'	19'	27'
54	16'	19'	27'

HDPE PIPE

Pipe Diameter (in)	AASHTO M 294
12	6'
15	9'
18	9'
24	9'
30	9'
36	9'
42	8'
48	8'
54	8'
60	8'

POLYPROPYLENE PIPE

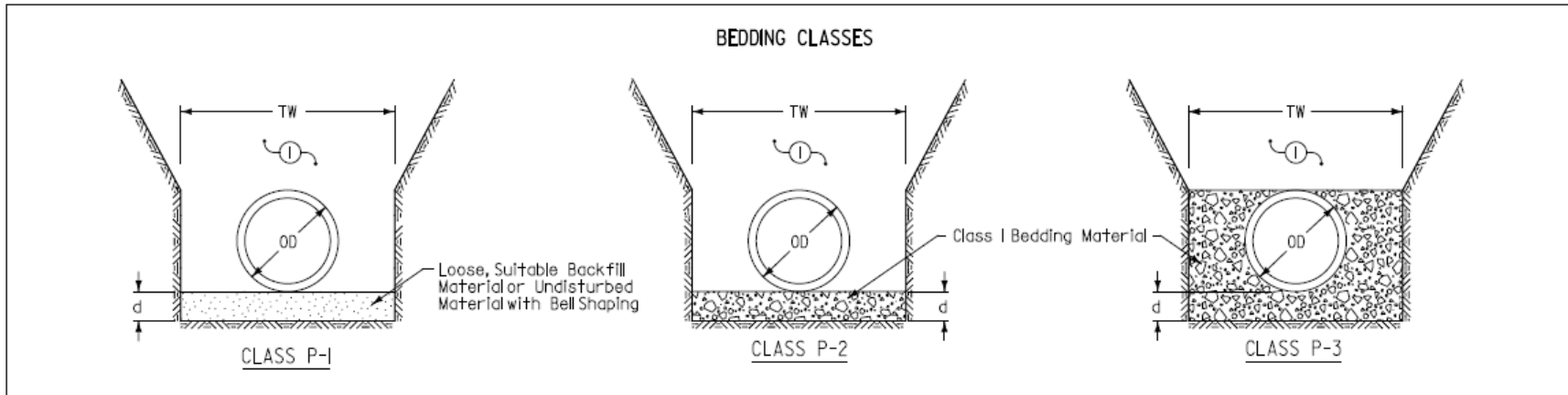
Pipe Diameter (in)	ASTM F 2736	ASTM F 2764
12	24'	---
15	25'	---
18	22'	---
24	20'	---
30	22'	22'
36	---	21'
42	---	22'
48	---	23'
54	---	21'
60	---	21'

*Storm Sewer Only

FIGURE 3010.103 SHEET 1 OF 1

		REVISION 2 10-18-18
		SHEET 1 of 1
FIGURE 3010.103	STANDARD ROAD PLAN	SW-103
REVISIONS: Added polypropylene pipe for storm sewer applications.		
FLEXIBLE GRAVITY PIPE TRENCH BEDDING		

Pipe Bedding - Pressure



ALLOWABLE BURY DEPTH

DUCTILE IRON, AWWA C151, CLASS 52

Pipe Diameter (Inches)	Class P-1 Bedding	Class P-2 Bedding	Class P-3 Bedding
4	40'	40'	40'
6	40'	40'	40'
8	40'	40'	40'
10	36'	40'	40'
12	31'	40'	40'
14	26'	40'	40'
16	23'	37'	40'
18	20'	34'	40'
20	18'	32'	40'
24	16'	29'	38'
30	13'	23'	31'
36	13'	22'	30'
42	13'	21'	29'
48	13'	19'	27'
54	13'	19'	27'

PVC, AWWA C900 & C905, DR18

Pipe Diameter (Inches)	Class P-1 Bedding	Class P-2 Bedding	Class P-3 Bedding
4	19'	23'	40'
6	19'	23'	40'
8	19'	23'	40'
10	19'	23'	40'
12	19'	23'	40'
14	19'	23'	40'
16	19'	23'	40'
18	19'	23'	40'
20	19'	23'	40'
24	19'	23'	40'

① Place remainder of bedding and backfill material as specified in the contract documents.

Key

- OD = Outside diameter of pipe
- TW = Trench width at top of pipe:
Min. = OD+18 inches OR 1.25xOD+12 inches
(whichever is greater)
- d = Depth of bedding material below pipe:
Min. = OD/8 OR 4 inches
(whichever is greater)

FIGURE 3010.104 SHEET 1 OF 1

SUDAS	Iowa Department of Transportation	REVISION: NEW 04-21-09
		SW-104
FIGURE 3010.104	STANDARD ROAD PLAN	SHEET 1 of 1
REVISIONS: New.		
SUDAS PROJECT ENGINEER	Deanna M. Smith REGIONAL PROJECT ENGINEER	
PRESSURE PIPE TRENCH BEDDING		

Laterals – Service Stub

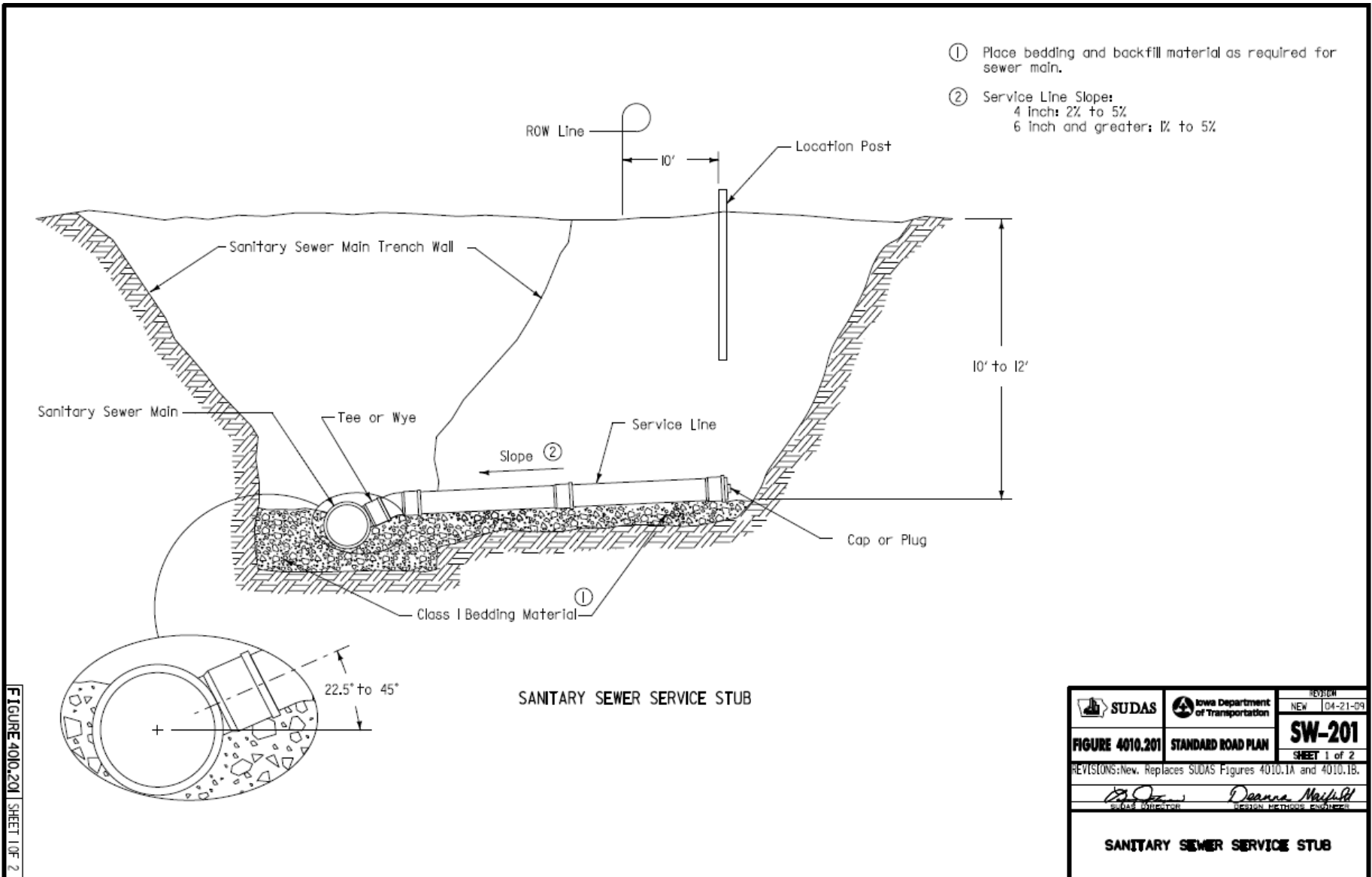


FIGURE 4010.201 SHEET 1 OF 2

SUDAS	Iowa Department of Transportation	REVISION
		NEW 04-21-09
FIGURE 4010.201	STANDARD ROAD PLAN	SW-201
REVISIONS: New. Replaces SUDAS Figures 4010.1A and 4010.1B.		SHEET 1 of 2
<i>[Signature]</i> DESIGN INSPECTOR	<i>[Signature]</i> DESIGN METHODS ENGINEER	
SANITARY SEWER SERVICE STUB		

What We Don't Want to See



Image from: thesinkhole.org



Image from: thesinkhole.org

Backfill

- SUDAS Bedding Around Pipe
- Secondary Backfill not to exceed 18" above pipe
- Final Trench Backfill shall be 1" modified road stone
 - City will have proctor information for local quarries
- Compact to 95% of modified proctor
- Flowable Mortar - subject to City Engineer approval

Surface Restoration/Patching

- Unpaved Surface
 - 4” Topsoil in grassy areas, SUDAS Urban Mix Seeding
 - 8” Class “A” Road stone in gravel surfaces
- Paved Surfaces
 - Full Depth PCC
 - Street < 5 years old: full panel replacement
 - Street > 5 years old: as per SUDAS detail
 - Thickness in all cases shall be street thickness + 2 inches
 - Jointing as per SUDAS detail

Surface Restoration/Patching Continued

- Paved Surfaces Continued
 - Full Depth HMA
 - Thickness shall be street thickness + 2 inches
 - Each lift shall not exceed 3 inches in thickness
 - Compact each lift
 - Composite Surfaces
 - PCC Patch, PCC thickness + 2 inches
 - HMA Surface to match existing HMA overlay
 - Seal Coat Streets
 - Minimum 2, 2 inch lifts of HMA
 - Compact each lift

Failure to Comply

In the event that the construction fails to comply requirements set forth by the City of Burlington, the construction shall be removed and replaced by the Contractor in accordance to all applicable City of Burlington requirements.

Failure to repair and replace the non-compliant work will result in the City exercising its duty to hire a local private contractor to perform the necessary repairs. Costs of the repair will be recovered from the property owner or contractor, in accordance with Chapter 163.04 of the City Code of Burlington, Iowa.

Repeated Failures to Comply

Repeated Failures to Comply may result in the following:

- Temporary removal from the “List of Bonded Contractors”
- Fines in accordance with Section 137.19 and Section 1.14 of the City of Burlington Code of Ordinances
- Permanent removal from the “List of Bonded Contractors”

Questions?

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 - ✓ Ph.: 319-753-8176 ext. 419
- **Chris Clements, Operations Manager**
 - ✓ Ph.: 319-753-8119 ext. 401
- **Nick MacGregor, Public Works Director**
 - ✓ Ph.: 319-753-8171 ext. 412