PLANS OF IMPROVEMENTS FOR

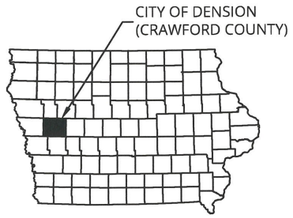
CITY OF DENISON

BEI PROJECT No.: E24042

2024 13TH AVENUE SOUTH STORM SEWER REPLACEMENT

APPROXIMATELY 1000' WEST OF THE INTERSECTION OF 13TH AVENUE SOUTH AND SOUTH MAIN STREET DENSION, IOWA

Unless otherwise specified, the Iowa Statewide Urban Design and Specifications (SUDAS) for Public Improvements, 2024 edition, followed by the Iowa Department of Transportation Standard Specifications for Highway and Bridge Construction, Series 2023, and applicable general supplemental specifications and special provisions shall apply to construction on this project. In case of conflicting requirements, the more stringent shall apply.



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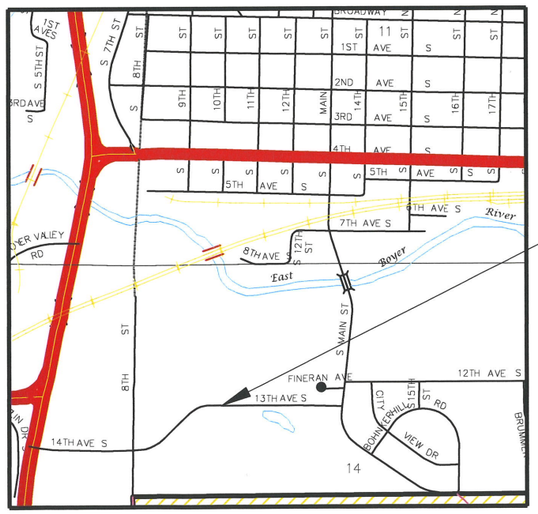

APPROXIMATE PROJECT LOCATION

N

VICINITY MAP (NOT TO SCALE)

IOWA ONE CALL SM
1-800-292-8989
www.iowaonecall.com
811 Know what's below. Call before you dig.

Beck Engineering, Inc.				
110 E Indian Street Cherokee, IA 51012 (712) 225-9025	2480 Berkshire Parkway Suite B Clive, IA 50325 (515) 330-1538	806 Hartford PL SE Orange City, IA 51041 (712) 737-9225	301 10th Street Suite A Sheldon, IA 51201 (712) 631-4014	3301 Zenith Avenue PO Box 238 Spirit Lake, IA 51360 (712) 336-3596

ZACHERY T. ARNESON LICENSED 28332 IOWA PROFESSIONAL ENGINEER

I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.

04/19/24 (date)

ZACHERY T. ARNESON, P.E.
LICENSE NUMBER 28332

My license renewal date is December 31, 2024

Pages or sheets covered by this seal: All

Client: City of Denison, 111 N Main St, Denison, IA 51442

Beck Engineering, Inc. — Cherokee, Iowa | Clive, Iowa | Orange City, Iowa | Sheldon, Iowa | Spirit Lake, Iowa

Beck Engineering, Inc. BEI Civil Engineering Land Surveying Landscape Architecture

2024 City of Denison
13th Avenue South Storm Sewer Replacement
Title Sheet

Drawn	04-18-24 By ZTA	Checked by	BJG
Revised		Project No.	E24042
		Sheet	A.01

QUOTE DATE: May 2, 2024

CITY OF DENISON
2024 CITY OF DENISON
13TH AVENUE SOUTH STORM SEWER REPLACEMENT
PROJECT No.: E24042

Plot Date: 4/19/2024 Last Saved By: zarneson File Name: E24042 - A Sheets

LEGEND

- FOUND BOUNDARY MONUMENT AS NOTED
- BUILDING SETBACK LIMITS
- 1400 EXISTING MAJOR CONTOUR
- 1401 EXISTING MINOR CONTOUR
- 1400 PROPOSED CONTOUR
- C EXISTING CURB STOP
- C PROPOSED CURB STOP
- EXISTING GATE VALVE
- PROPOSED GATE VALVE
- EXISTING FIRE HYDRANT
- PROPOSED FIRE HYDRANT
- EXISTING IOWA HYDRANT
- C EXISTING CISTERN
- W EXISTING WATER METER PIT
- EXISTING SANITARY SEWER CLEANOUT
- M EXISTING SANITARY SEWER MANHOLE
- M PROPOSED SANITARY SEWER MANHOLE
- S EXISTING STORM SEWER MANHOLE
- S PROPOSED STORM SEWER MANHOLE
- C COMMUNICATION PEDESTAL
- CV COMMUNICATION VAULT
- E ELECTRIC PEDESTAL
- EV ELECTRIC VAULT
- E ELECTRIC METER
- G GAS METER
- GAS GATE VALVE
- U UTILITY PEDESTAL
- U UTILITY MANHOLE
- AC AIR CONDITIONER
- S SPRINKLER CONTROL VALVE
- MoB EXISTING MAILBOX
- EXISTING STREET LIGHT
- EXISTING LIGHT POLE
- EXISTING GUY WIRE
- EXISTING UTILITY POLE
- EXISTING TRAFFIC LIGHT
- 911 (ADDRESS) SIGN
- STREET OR INFORMATIONAL SIGN
- DECIDUOUS TREE (DIA. GIVEN)
- CONIFEROUS TREE (DIA. GIVEN)
- STUMP
- BUSH
- BRUSH
- PROPOSED RETAINING WALL
- EXISTING BUILDING FOOTPRINT
- PROPOSED BUILDING FOOTPRINT

- FG 1305.00 PROPOSED FINISH GRADE
- ME 1305.00 MATCH EXISTING GRADE
- TOC 1305.00 PROPOSED TOP OF CURB GRADE
- (UAC) UNDISTURBED AFTER CONSTRUCTION
- GAS EXISTING GAS LINE
- E EXISTING UNDERGROUND ELECTRIC LINE
- OH EXISTING OVERHEAD UTILITY LINE
- CLN EXISTING CENTURY LINK NETWORK LINE
- FO EXISTING FIBER OPTIC LINE
- COM EXISTING COMMUNICATION LINE
- SAN EXISTING SANITARY SEWER LINE
- SAN PROPOSED SANITARY SEWER LINE
- ST EXISTING STORM SEWER LINE
- PROPOSED STORM SEWER LINE
- PROPOSED SUBDRAIN
- W EXISTING WATER MAIN
- W PROPOSED WATER MAIN
- ROW RIGHT OF WAY LINE
- PROJECT BOUNDARY
- SF PROPOSED SILT FENCE
- SC PROPOSED FLOATING SILT CURTAIN
- SL PROPOSED SEDIMENT LOG
- FS PROPOSED FILTER SOCK
- EXISTING CHAIN LINK FENCE
- EXISTING WOOD FENCE
- EXISTING WOOD DECK
- EXISTING PAVERS
- PROPOSED PAVERS
- PROPOSED RIP-RAP
- EXISTING DETECTABLE WARNING
- PROPOSED DETECTABLE WARNING
- PROPOSED SOD
- EXISTING GRAVEL
- PROPOSED GRAVEL
- EXISTING PCC PAVEMENT
- PROPOSED FULL DEPTH PCC PATCH
- PROPOSED 5" PCC SIDEWALK
- EXISTING ASPHALT PAVEMENT
- PROPOSED ASPHALT PAVEMENT

DISTRICT	CONTACT NAME	CONTACT PHONE	CONTACT EMAIL
DENISON MUNICIPAL UTILITIES	JUSTIN GIBBONS	712-263-3046	jgibbons@dmuonline.com
FRONTIER COMMUNICATIONS	URANAN THAO	515-573-1268	frontierlocatemapsia@ftr.com
IOWA COMMUNICATIONS NETWORK	DAVE AUGSPURGER	515-725-4604	icnoutsideplantiowaonecall@iowa.gov
MONARC TECHNOLOGIES	MIKE LUDWIG	712-673-2311	mludwig@westianet.com
BLACK HILLS ENERGY COUNCIL BLUFFS	CHRIS DEWEY	712-580-6028	chris.dewey@blackhillscorp.com
MEDIACOM CABLE	TIM ADREON	515-451-8404	tadreon@mediacomcc.com

WHERE PUBLIC UTILITY LINES AND FIXTURES ARE SHOWN AS EXISTING ON THE PLANS OR ENCOUNTERED WITHIN THE CONSTRUCTION AREA, IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO NOTIFY THE OWNER OF THOSE UTILITIES PRIOR TO BEGINNING ANY CONSTRUCTION ACTIVITIES. THE CONTRACTOR SHALL PROVIDE ACCESS TO THOSE UTILITIES THAT REQUIRE SERVICE. UNDERGROUND UTILITIES AND STRUCTURES ARE SHOWN FROM LOCATES, SURVEYS AND RECORDS, AND SHALL BE CONSIDERED APPROXIMATE ONLY. IT IS POSSIBLE THAT OTHERS MAY EXIST OF WHICH THE LOCATION IS NOT KNOWN. THE CONTRACTOR WILL BE RESPONSIBLE FOR DETERMINING THE EXISTENCE AND EXACT LOCATION OF ALL UTILITIES AND STRUCTURES AND TO AVOID DAMAGE THERETO. NO CLAIMS FOR ADDITIONAL COMPENSATION WILL BE ALLOWED TO THE CONTRACTOR FOR INTERFERENCE OR DELAY CAUSED BY UTILITY COORDINATION OR RELOCATION WORK.

THE CONTRACTOR SHALL CONTACT THE IOWA ONE-CALL SERVICE (1-800-292-8989) AT LEAST 48 HOURS PRIOR TO COMMENCING ANY WORK ON THE CONSTRUCTION SITE.

GENERAL CONSTRUCTION NOTES:

-HEAVY TRUCK TRAFFIC ON THE EXISTING ADJACENT PAVEMENTS SHALL BE KEPT TO THE MINIMUM NECESSARY FOR THE REQUIRED CONSTRUCTION OPERATIONS. ALL BASE AND EXISTING PAVEMENT REPAIRS NECESSARY DUE TO HAULING DURING CONSTRUCTION ACTIVITIES SHALL BE COMPLETED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER. LIGHTER HAUL LOADS MAY BE REQUIRED TO PROTECT THE EXISTING SURFACES AND SHALL BE INCLUDED IN THE BID. NO COMPENSATION WILL BE MADE FOR ADDITIONAL HAULING ACTIVITIES OR PLACEMENT MACHINES/OPERATIONS THAT MAY BE REQUIRED TO PROTECT THE EXISTING SURFACES AND BASE MATERIALS.
-LOCATION OF UTILITIES IS APPROXIMATE. CONTRACTOR SHALL CONTACT IOWA ONE-CALL (1-800-292-8989) AT LEAST 48 HOURS PRIOR TO COMMENCING WORK ON THE PROJECT TO VERIFY LOCATION OF UTILITIES.
-NO CLAIMS FOR ADDITIONAL COMPENSATION WILL BE ALLOWED TO THE CONTRACTOR FOR INTERFERENCE OR DELAY CAUSED BY UTILITY COORDINATION OR RELOCATION WORK.
-ALL EXISTING UTILITY POLES, STREET LIGHTS, PEDESTALS AND TRANSFORMERS, EXCEPT THOSE NOTED IN THE PLANS, SHALL REMAIN UNDISTURBED AND FUNCTIONAL DURING CONSTRUCTION.
-ALL WORK SHALL TAKE PLACE WITHIN THE CURRENT ADJACENT PUBLIC ROAD RIGHT-OF-WAY, EASEMENT AREAS OR PROJECT BOUNDARY AS SHOWN IN THE PLAN SHEETS. NO PAYMENT WILL BE MADE FOR REPLACEMENT OR REPAIR TO ITEMS THAT ARE DAMAGED OUTSIDE OF THIS AREA OR WITHIN SAID WORK ZONE THAT ARE NOT NOTED IN THE PLANS.
-THE CONTRACTOR WILL BE REQUIRED TO PROVIDE CONSTRUCTION ACCESS TO THE SITE. THIS SHALL INCLUDE REMOVING, SALVAGING AND REPLACING ANY REQUIRED ITEMS NECESSARY TO ACCOMMODATE CONSTRUCTION TRAFFIC.
-ACCESS TO THE ADJACENT PROPERTIES SHALL BE MAINTAINED TO THE FULL EXTENT POSSIBLE AT ALL TIMES DURING CONSTRUCTION. THIS SHALL REQUIRE KEEPING THE ADJACENT ROADWAYS AND AREAS CLEAN AND FREE OF EQUIPMENT AND DEBRIS.
-THE PROJECT AREA WILL BE CONTROLLED THROUGH TRAFFIC CONTROL DURING CONSTRUCTION. THE ADJACENT ROADWAYS SHALL REMAIN OPEN TO TRAFFIC DURING CONSTRUCTION.
-IF THE PROJECT IS OPEN TO PROPERTIES ALONG THE PROJECT SITE, THE CONTRACTOR SHALL CONSTRUCT AND MAINTAIN TEMPORARY DRIVEWAY RAMPS AND ACCESSES DURING CONSTRUCTION. RAMPS CAN BE CONSTRUCTED OF MODIFIED SUBBASE TO BE USED FOR LATER GRADING OPERATIONS. NO SEPARATE PAYMENT WILL BE MADE FOR THIS TEMPORARY ACCESS TO LOCAL RESIDENTS.
-THE CONTRACTOR WILL BE REQUIRED TO MAINTAIN SANITARY SEWER AND WATER SERVICES TO ALL ADJACENT PROPERTIES TO THE FULL EXTENT POSSIBLE. A WRITTEN NOTICE SHALL BE PROVIDED TO THE CITY AND ANY INDIVIDUAL PROPERTY OWNERS INFORMING OF AN EXPECTED SERVICE INTERRUPTION. THIS NOTICE SHALL BE GIVEN AT LEAST 24 HOURS PRIOR TO SERVICE INTERRUPTION.
-ALL STRUCTURES AND FIXTURES, INCLUDING, BUT NOT LIMITED TO, MANHOLE COVERS AND STORM SEWER INTAKES, SHALL BE CLEAN AND FREE OF ALL DEBRIS AFTER CONSTRUCTION ACTIVITIES.
-THE CONTRACTOR SHALL APPLY NECESSARY MOISTURE TO THE CONSTRUCTION AREA TO PREVENT THE SPREAD OF DUST. SEE SECTION 1107.07 OF THE IOWA DOT STANDARD SPECIFICATIONS FOR HIGHWAY AND BRIDGE CONSTRUCTION.
-ALL VEGETATION SHALL BE SCARIFIED PRIOR TO GRADING OF THE PROJECT. EXCEPT FOR BACKFILLING, NO VEGETATION SHALL BE PLACED UNDER, OR WITHIN 2 FEET OF ANY PAVING.
-ALL FILL MATERIAL SHALL BE COMPACTED TO 95% OF THE STANDARD PROCTOR DENSITY UNLESS STATED OTHERWISE.
-THE CONTRACTOR SHALL NOT DISTURB DESIRABLE GRASS AREAS AND DESIRABLE TREES OUTSIDE OF THE CONSTRUCTION LIMITS AS SHOWN IN THE CONSTRUCTION DOCUMENTS. THE CONTRACTOR SHALL PROTECT ALL GRASS AREAS, TREES, BUSHES AND LANDSCAPING WITHIN THE WORK ZONE UNLESS NOTED OTHERWISE IN THE PLANS. DAMAGE TO SUCH ITEMS WILL BE AT THE CONTRACTOR'S EXPENSE.
-CONTRACTOR SHALL PROTECT EXISTING TREES AND SUCH THAT ARE NOT NOTED TO BE CLEARED/GRUBBED.
-THE CONTRACTOR WILL NOT BE PERMITTED TO PARK OR SERVICE VEHICLES AND EQUIPMENT OR USE UNDISTURBED AREAS FOR STORAGE OF MATERIALS. STORAGE, PARKING, AND SERVICE AREAS WILL BE SUBJECT TO APPROVAL OF THE ENGINEER.
-ALL TOPSOIL IN THE DISTURBED AREAS SHALL BE FREE OF ROCK AND DEBRIS AND SHALL BE SUITABLE FOR THE ESTABLISHMENT OF VEGETATION, SOD AND SEEDING OPERATIONS, SUBJECT TO APPROVAL OF THE ENGINEER.
-ANY WASTE MATERIALS THAT ARE GENERATED SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE REMOVED FROM THE PROJECT SITE. NO ADDITIONAL PAYMENT WILL BE MADE FOR THIS REMOVAL.
-INSTALLATION OF THE EROSION CONTROL DEVICES MAY REQUIRE MULTIPLE MOBILIZATIONS. THESE ITEMS MUST BE INSTALLED AS SPECIFIED AND NO ADDITIONAL PAYMENT WILL BE MADE FOR MULTIPLE MOBILIZATIONS.
-OWNER WILL PROVIDE CONSTRUCTION SURVEY AND QUALITY CONTROL TESTING.

Client:
City of Denison
111 N Main St.
Denison, IA 51442

Beck Engineering, Inc.
Cherokee, Iowa | Clive, Iowa
Orange City, Iowa | Sheldon, Iowa
Spirit Lake, Iowa

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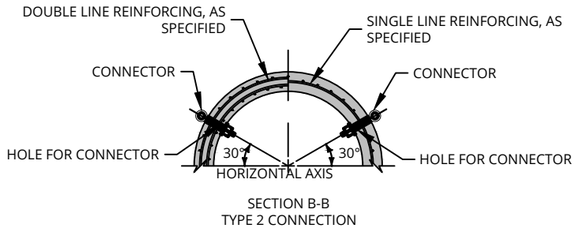
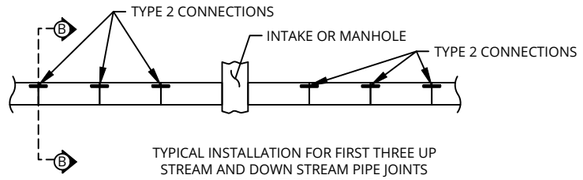
2024 City of Denison
13th Avenue South Storm Sewer Replacement
Legend, General Construction Notes,
Utility Contact Information

Drawn	04-18-24 By ZTA	Checked by	BJG
Revised		Project No.	E24042
Sheet	A.02		

Plot Date: 4/19/2024 Last Saved By: zameson File Name: E24042 - A Sheets

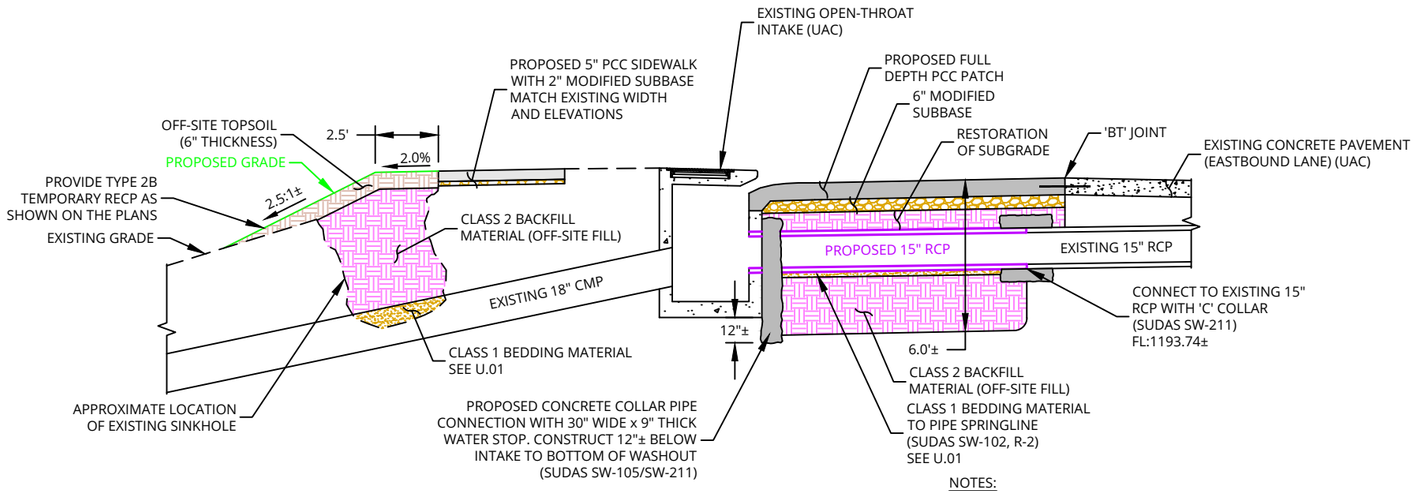


SECTION B-B
TYPE 2 CONNECTION



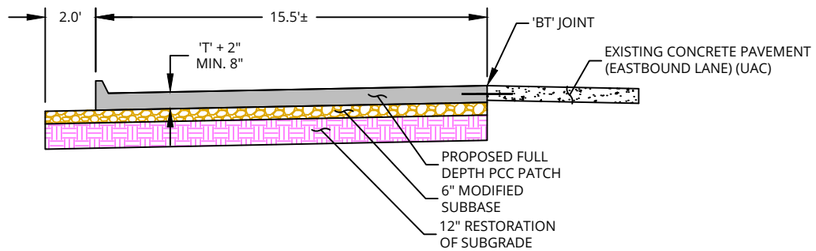
TYPICAL INSTALLATION FOR FIRST THREE UP STREAM AND DOWN STREAM PIPE JOINTS STORM SEWER - TYPE 2 CONNECTION

A / B.01 TIED PIPE JOINTS FOR RCP STORM SEWER
(NOT TO SCALE)



B / B.01 PROPOSED IMPROVEMENTS CROSS SECTION
(NOT TO SCALE)

NOTES:
- EXPANSION JOINTS WILL BE REQUIRED AS SHOWN OR AS DIRECTED WHEN ABUTTING CERTAIN EXISTING PAVEMENTS OR BUILDING FOUNDATIONS.
- TYPICAL 12' JOINT SPACING IS MAX SPACING FOR THE LONGITUDINAL JOINTS. TRANSVERSE JOINTS SHALL BE SPACED AT 15' MAX SPACING OR AS SHOWN IN THE PLAN SHEETS. IRREGULAR SPACING SHALL BE AS SHOW OR AS DIRECTED. INTEGRAL TRANSVERSE JOINTS SHALL BE A 'CD' JOINT AND END OF PAVING TRANSVERSE JOINTS SHALL BE A 'RT' JOINT. DEPENDING ON THE SEQUENCE OR LOCATION, LONGITUDINAL JOINTS SHALL BE A 'C', 'L-1' OR A 'BT-1' OR 'KT-1' JOINT. MATCH EXISTING TRANSVERSE AND LONGITUDINAL JOINTING LAYOUTS.
- THICKNESS SHALL BE EXISTING 'T' + 2" WITH 6" MINIMUM THICKNESS.
- PROPOSED CONCRETE PATCHING SHALL MATCH ADJACENT SURFACES.
- RESTORED SUBGRADE SHALL BE COMPACTED TO A MINIMUM 95% OF THE STANDARD PROCTOR DENSITY.



C / B.01 TYPICAL PCC PATCH
(NOT TO SCALE)

Client: City of Denison, 111 N Main St., Denison, IA 51442

Beck Engineering, Inc.: Cherokee, Iowa | Clive, Iowa | Orange City, Iowa | Sheldon, Iowa | Spirit Lake, Iowa

Beck Engineering, Inc. BET Civil Engineering Land Surveying Landscape Architecture

2024 City of Denison
13th Avenue South Storm Sewer Replacement
Typical Cross Sections and Details

Drawn	04-18-24 By ZTA	Checked by	BJG
Revised		Project No.	E24042
Sheet B.01			

Plot Date: 4/19/2024 Last Saved By: zarneson File Name: E24042 - B Sheets

ESTIMATED PROJECT QUANTITIES - BASE BID

ITEM NO.	ITEM CODE	ITEM DESCRIPTION	UNIT	QUANTITY
1	2010-D-1	TOPSOIL, ON-SITE	CY	25
2	2010-D-3	TOPSOIL, OFF-SITE	CY	10
3	2010-E	EXCAVATION, CLASS 10, BORROW	CY	80
4	2010-J	SUBBASE, MODIFIED, 2"	SY	17
5	2010-J	SUBBASE, MODIFIED, 6"	SY	114
6	4020-A-1	STORM SEWER, TRENCHED, RCP, 15"	LF	11
7	4020-D	REMOVAL OF STORM SEWER, RCP, 15"	LF	11
8	4020-999-A	SPECIAL 'C' COLLAR	EA	2
9	7030-A	REMOVAL OF SIDEWALK	SY	17
10	7030-E	SIDEWALK, PCC, 5"	SY	17
11	7040-A	FULL DEPTH PATCHES	SY	101
12	7040-H	PAVEMENT REMOVAL	SY	101
13	9010-A	CONVENTIONAL SEEDING, SEEDING, FERTILIZING, AND HYDRO-MULCHING	AC	0.03
14	9040-N-1	SILT FENCE OR SILT FENCE DITCH CHECK	LF	92
15	9040-N-2	SILT FENCE OR SILT FENCE DITCH CHECK, REMOVAL OF SEDIMENT	LF	92
16	9040-N-3	SILT FENCE OR SILT FENCE DITCH CHECK, REMOVAL OF DEVICE	LF	92
17	11,020-A	MOBILIZATION	LS	1
18	11,050-A	CONCRETE WASHOUT	LS	1

ESTIMATE REFERENCE INFORMATION - BASE BID

ITEM NO.	ITEM CODE	ITEM DESCRIPTION
1	2010-D-1	TOPSOIL, ON-SITE Bid item is for stripping, salvaging, spreading and shaping on-site topsoil in accordance with Section 2010 of the SUDAS Standard Specifications. Quantity is based on grass areas inside the right-of-way and construction limits that will be disturbed with a 6" uniform thickness. Bid item shall include scarifying all vegetation prior to grading.
2	2010-D-3	TOPSOIL, OFF-SITE Bid item is for furnishing, spreading and shaping off-site topsoil in accordance with Section 2010 of the SUDAS Standard Specifications. Material shall be topsoil free of rock and debris and subject to engineer approval prior to placement. Quantity is based on grass areas inside the right-of-way and sinkhole that are disturbed and require furnished topsoil with a 6" uniform thickness. Bid item shall include scarifying all vegetation prior to grading.
3	2010-E	EXCAVATION, CLASS 10, BORROW Bid item includes 80 c.y. of off-site fill material. Fill quantity is based on a 30% compaction factor. All fill material shall be compacted to a minimum 95% of the Standard Proctor Density. All imported fil shall be suitable clay material approved by the engineer prior to placement.
4-5	2010-J	SUBBASE, MODIFIED, 2", 6" Modified subbase will be required under all portions of the proposed roadway pavement and sidewalks. Roadway quantity is based on material being placed as shown in the typical sections and shall be a minimum of 6" thickness. Sidewalk quantity is based on material being placed the full width of the driveway and sidewalk pavement or as shown in the typical sections and shall be a minimum of 2" thickness. Material shall conform to Section 4123 of the Iowa DOT Standard Specifications for Highway and Bridge Construction.
6	4020-A-1	STORM SEWER, TRENCHED, RCP, 15" Bid item shall include all equipment, labor and material, including all necessary bends and connections, watertight rope gaskets per ASTM C443 and fabric for joints, required for complete installation. All Reinforced Concrete Pipe shall be 2000D. Bid item shall include all excavation, bedding and backfill material. All RCP pipe bedding shall be Class R-2 as shown in Figure 3010.102 (SW-102) of the SUDAS Standard Specifications. Bedding material shall conform to Class I Material (crushed stone) of Section 3010-2.02.A of the SUDAS Standard Specifications. Bid item includes bedding material for existing CMP located at the sinkhole location. Bid item shall include topsoil separation where applicable. All excavation, with topsoil separation, salvage and spread, as well as all backfill shall be included in this bid item. Salvaged topsoil shall be spread on the top 6" of all excavated areas that are not under the proposed pavement and shall be free of rock and debris and shall be suitable for the establishment of vegetation. All backfill material shall be compacted to a minimum 95% of the Standard Proctor Density. Bid item shall include the installation and removal of all temporary tie-ins that may be required. All pipe joints shall include ASTM C443 gaskets and be fabric wrapped. The first three up stream and down stream RCP pipe joints shall be tied with Type 2 connections as per Iowa DOT Standard Road Plan DR-121.
7	4020-D	REMOVAL OF STORM SEWER, RCP, 15" Bid item shall include the complete removal of the existing storm sewer system as shown on the plan sheets. Material shall become the property of the contractor and shall be removed from the project site. Bid item shall include all backfill material. All backfill material shall be compacted to a minimum 95% of the Standard Proctor Density.
8	4020-999-A	SPECIAL 'C' COLLAR Bid item shall include all trench excavation, pipe, bends, bedding and backfill material, engineering fabric, wire mesh, concrete, couplers, connections, equipment, and labor required for the complete installation. Bedding and backfill material shall be in accordance with the Storm Sewer, Trench bid item. Payment will be per each item of special connection 'C' collar installed. Bid item includes connection to existing open-throat intake and poured water stop at connection as shown in the plans.
9	7030-A	REMOVAL OF SIDEWALK Bid item shall include all saw cutting and complete removal of the existing sidewalk as shown in the plan sheets or as directed. No separate payment for the material hauling or disposal will be made. Material is to become the property of the contractor and shall be removed from the project site and disposed of in a timely and legal fashion. The contractor shall exercise care when removing the sidewalks to ensure that adjacent surfaces are not damaged. Damaged portions shall be re-sawed, removed and replaced at the discretion of the engineer at no additional cost to the owner.
10	7030-E	SIDEWALK, PCC, 5" Concrete shall be Iowa DOT C-4 Mix. Coarse aggregate shall be Class 3 Ledge Rock (Limestone or Quartzite). Refer to Sections 7010 and 7030 of the SUDAS Standard Specifications and Sections 2301 and 2511 of the Iowa DOT Standard Specifications for Highway and Bridge Construction. Bid item shall include 'C' joints sawed at a spacing equal to the width, but not to exceed 10' maximum. Connections to existing sidewalk and end of pouring sequence joints shall be 'RT' joints. Bid item shall include epoxy coated reinforcing steel, pavement cure and joint sealant material where required. Contractor shall construct the sidewalks in strict compliance with ADA requirements and Chapter 12 of the SUDAS Design Manual-General Sidewalk Requirements.
11	7040-A	FULL DEPTH PATCHES Concrete shall be Iowa DOT C-4 Mix. Coarse aggregate shall be Class 3 Ledge Rock (Limestone or Quartzite). Bid item shall include integral Curb and Gutter where applicable. Refer to Section 7010 and 7040 of the SUDAS Standard Specifications and Sections 2301 and 2529 of the Iowa DOT Standard Specifications for Highway and Bridge Construction. Thickness shall be existing 'T' + 2", minimum 8". Contractor shall utilize a jointing system as specified in the SUDAS Standard Specifications. Contractor shall utilize a sealed 'E' joint when abutting buildings, structures and other certain pavements. All reinforcing steel shall be epoxy coated. Bid item shall include all saw cuts, dowels, reinforcing steel, cure and joint sealant material required for pavement. Jointing system shall match existing joints or as shown or directed. A mix design shall be submitted to the engineer prior to construction. Bid item shall include all saw cutting, excavation, compaction of disturbed subgrade, and full depth patch.
12	7040-H	PAVEMENT REMOVAL Bid item shall include all saw cutting required for complete removal of the existing pavement. No separate payment for the material hauling or disposal will be made. Material is to become the property of the contractor and shall be disposed of in a timely and legal fashion. The contractor shall exercise care when removing the existing pavement to ensure that adjacent surfaces are not damaged. Damaged portions shall be re-sawed, removed and replaced at the discretion of the engineer at no additional cost to the owner.
13	9010-A	CONVENTIONAL SEEDING, SEEDING, FERTILIZING, AND HYDRO-MULCHING Bid item includes areas that are disturbed during construction. Seed areas with Type 1 Seed Mixture as specified in Section 9010-2.02 of the SUDAS Standard Specifications. Seed and fertilizer shall be placed conventionally with hydro-mulch applied. If seed does not establish to a minimum of 70% coverage within the first growing season, the contractor shall re-seed the project area until 70% coverage is achieved at no additional expense to the owner.
14	9040-N-1	SILT FENCE OR SILT FENCE DITCH CHECK Contractor shall install silt fence at locations indicated in the plan sheets or as directed by the engineer. Installation shall take place prior to construction activities whenever possible. Installation may require multiple mobilizations to the project site. No additional payment will be made for multiple mobilizations.
15	9040-N-2	SILT FENCE OR SILT FENCE DITCH CHECK, REMOVAL OF SEDIMENT Bid item shall include removal of sediment once the silt has reached a height of 50% of the height of the silt fence for the duration of the project. This shall not include dirt that is placed along the silt fence as part of the grading or excavation operations.
16	9040-N-3	SILT FENCE OR SILT FENCE DITCH CHECK, REMOVAL OF DEVICE Bid item shall include the complete removal of the device once vegetation has been established to a minimum coverage of 70% along the entire project site.
17	11,020-A	MOBILIZATION Refer to Section 11,020 of the SUDAS Standard Specifications. Shall include preparatory work and operations of all items under the contract.
18	11,050-A	CONCRETE WASHOUT Bid item shall include all labor and materials required for the installation of a concrete washout. Concrete washout shall conform to Section 11,050 of the SUDAS Standard Specifications.

ESTIMATED PROJECT QUANTITIES - ALTERNATE 1

ITEM NO.	ITEM CODE	ITEM DESCRIPTION	UNIT	QUANTITY
1	2010-B	CLEARING AND GRUBBING	AC	0.05
2	9010-A	CONVENTIONAL SEEDING, SEEDING, FERTILIZING, AND HYDRO-MULCHING	AC	0.05
3	9040-E-0	TEMPORARY RECP, TYPE 2B	SY	175
4	9040-J-0	RIP RAP, CLASS 'E'	TON	105
5	11,020-A	MOBILIZATION	LS	1

ESTIMATE REFERENCE INFORMATION - ALTERNATE 1

ITEM NO.	ITEM CODE	ITEM DESCRIPTION
1	2010-B	CLEARING AND GRUBBING Bid item shall include all combined clearing and grubbing for complete tree and stump removal as shown in the plan sheets and as specified in Section 2010 of the SUDAS Standard Specifications. Trees, stumps and bushes that are to be removed shall be marked by the engineer prior to removal. Material shall become the property of the contractor and shall be promptly and properly removed from the project site.
2	9010-A	CONVENTIONAL SEEDING, SEEDING, FERTILIZING, AND HYDRO-MULCHING Bid item includes areas that are disturbed during construction. Seed areas with Type 1 Seed Mixture as specified in Section 9010-2.02 of the SUDAS Standard Specifications. Seed and fertilizer shall be placed conventionally with hydro-mulch applied. If seed does not establish to a minimum of 70% coverage within the first growing season, the contractor shall re-seed the project area until 70% coverage is achieved at no additional expense to the owner.
3	9040-E-0	TEMPORARY RECP, 2B Bid item includes all equipment, labor and materials to furnish and place Temporary Erosion Control Products as shown in the plans. RECP Shall be a type 2B Netless Rolled Erosion Control Blanket. Refer to Section 9040 of the SUDAS Standard Specifications.
4	9040-J-0	RIP RAP, CLASS 'E' Material shall meet the requirements of Section 4130 of the Iowa DOT Standard Specifications for Highway and Bridge Construction. Bid item shall include material and labor to place stone.
5	11,020-A	MOBILIZATION Refer to Section 11,020 of the SUDAS Standard Specifications. Shall include preparatory work and operations of all items under the contract.

Client:
City of Denison
111 N Main St.
Denison, IA 51442

Beck Engineering, Inc.
Cherokee, Iowa | Clive, Iowa
Orange City, Iowa | Sheldon, Iowa
Spirit Lake, Iowa

Beck Engineering, Inc.
BEI
Civil Engineering Land Surveying
Landscape Architecture

2024 City of Denison
13th Avenue South Storm Sewer Replacement
Estimate of Project Quantities and
Estimate Reference Information

Checked by	BJG
Project No.	E24042
Drawn	04-18-24 By ZTA
Revised	
Sheet	C.01

Plot Date: 4/19/2024 Last Saved By: zarneson File Name: E24042 - C Sheets

GRAPHIC SCALE
0 6 12
(1" = 12')

N

78" RCP APRON FL:1179.41'

18" CMP FL: 1184.15'

CLEAR AND GRUB
(0.05 AC)
ALTERNATE 1

REMOVE CONCRETE
SIDEWALK (17 SY)

OPEN TROAT CURB INTAKE
RIM 1197.50'
15" RCP FL(S): 1193.58'
18" CMP FL(N): 1192.86'

REMOVE CONCRETE
ROADWAY (101 SY)

REMOVED EXISTING
15" RCP (11 LF)

OPEN THROAT CURB INTAKE
RIM: 1197.67'
15" RCP FL(N): 1194.02'

Client:
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111 N Main St.
Denison, IA 51442

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Spirit Lake, Iowa

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Civil Engineering Land Surveying
Landscape Architecture

2024 City of Denison
13th Avenue South Storm Sewer Replacement
Removal Sheet

Drawn	04-18-24 By ZTA	Checked by	BJG
Revised		Project No.	E24042
Sheet CR.01			

Plot Date: 4/19/2024 Last Saved By: zameson File Name: E24042 - CR Sheets

GRAPHIC SCALE
0 6 12
(1" = 12')

N

78" RCP APRON FL:1179.41'

18" CMP FL: 1184.15'

WATERWAY

CLASS 'E' RIP RAP
(95 TONS)
ALTERNATE 1

TEMPORARY TYPE 2B RECP
(175 SY)
ALTERNATE 1

APPROXIMATE LOCATION OF SINKHOLE
CONTRACTOR TO PROVIDE CLASS 1 BEDDING MATERIAL FOR EXISTING CMP (F-2, SUDAS SW-103) AND 30 CY OF CLASS 2 BACKFILL MATERIAL. TERMINATE BACKFILL MATERIAL 6" BELOW FINISHED GRADE. USE 10 CY OFF-SITE TOPSOIL FOR THE FINAL 6"

SF-1 (92 LF)

PROPOSED 5" PCC
SIDEWALK (17 SY)

ME 1197.46
ME 1197.50
ME 1197.46
ME 1197.37
ME 1197.51
ME 1197.55

EXISTING OPEN-THROAT CURB INTAKE
RIM 1197.50'
PROPOSED 15" RCP FL(S): 1193.58'
18" CMP FL(N): 1192.86'

PROPOSED 15"
RCP @ 1.43%
(11 LF)

TOC 1197.64
FG 1197.14
TOC 1197.43
FG 1196.93
TOC 1197.36
FG 1196.86
TOC 1197.56
FG 1197.06

ME/TOC 1197.63
ME/FG 1197.28
ME 1197.42
ME 1197.54
ME 1197.44
ME 1197.35
ME 1197.27
ME 1197.35
ME 1197.30
ME 1197.41
ME/TOC 1197.61
ME/FG 1197.46

13TH AVENUE SOUTH

FULL DEPTCH PCC PATCH
(101 SY)

CONNECT TO EXISTING
15" RCP WITH 'C' COLLAR
FL:1193.74±

OPEN THROAT CURB INTAKE
RIM: 1197.67'
15" RCP FL(N): 1194.02'

GENERAL NOTE:
- 13TH AVENUE SOUTH SHALL BE CLOSED FOR THE DURATION OF DEMOLITION, EXCAVATION, AND PAVING OPERATIONS. CONTRACTOR TO COORDINATE WITH CITY FOR REOPENING AND/OR ONE-WAY TRAFFIC DURING PAVEMENT CURING.

Client:
City of Denison
111 N Main St.
Denison, IA 51442

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Orange City, Iowa | Sheldon, Iowa
Spirit Lake, Iowa

Beck Engineering, Inc.
BECK
Civil Engineering Land Surveying
Landscape Architecture

2024 City of Denison
13th Avenue South Storm Sewer Replacement
Plan Sheet

Checked by: BJG
Project No.: E24042

Drawn 04-18-24 By ZTA
Revised

Sheet D.01

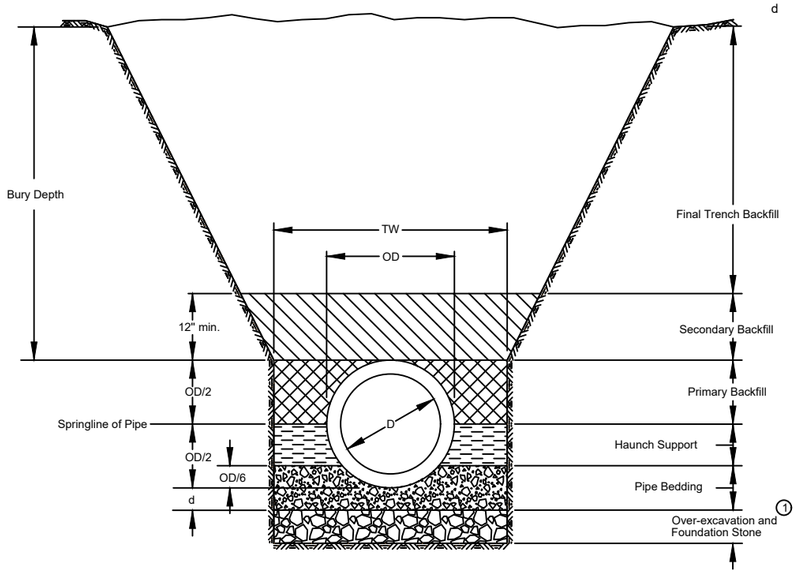
Plot Date: 4/19/2024 Last Saved By: zameson File Name: E24042 - D Sheets

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

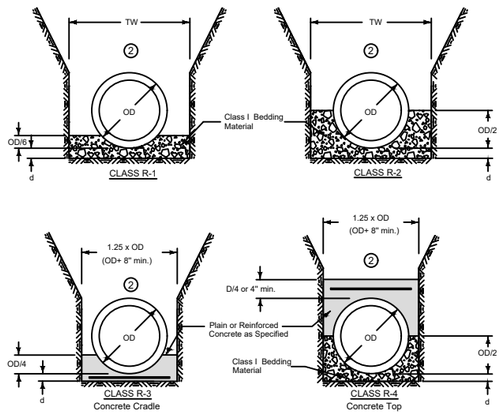


SUDAS | IOWA DOT | REVISION 1 04-17-18
FIGURE 3010.101 | STANDARD ROAD PLAN | SW-101 | SHEET 1 of 1
REVISIONS: Replaced Iowa DOT and SUDAS logos.
SUDAS DIRECTOR | DESIGN METHODS ENGINEER

TRENCH BEDDING AND BACKFILL ZONES

FIGURE 3010.101 | SHEET 1 OF 2

RCP AND VCP CIRCULAR PIPE BEDDING (1)



REINFORCED CONCRETE ARCH AND ELLIPTICAL PIPE BEDDING

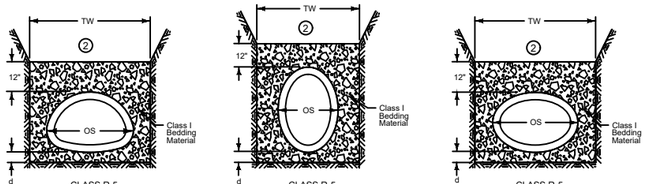


FIGURE 3010.102 | SHEET 1 OF 2

DO NOT USE ON PRIMARY ROADWAYS

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.= 1.25xOD+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)

SUDAS | IOWA DOT | REVISION 4 04-20-21
FIGURE 3010.102 | STANDARD ROAD PLAN | SW-102 | SHEET 1 of 2
REVISIONS: Added note DO NOT USE ON PRIMARY ROADWAYS.
SUDAS DIRECTOR | DESIGN METHODS ENGINEER

RIGID GRAVITY PIPE TRENCH BEDDING

Client: City of Denison, 111 N Main St., Denison, IA 51442

Beck Engineering, Inc. — Cherokee, Iowa | Clive, Iowa | Orange City, Iowa | Sheldon, Iowa | Spirit Lake, Iowa

Beck Engineering, Inc. — Civil Engineering Land Surveying Landscape Architecture

2024 City of Dension
13th Avenue South Storm Sewer Replacement
Details

Checked by: BJG
Project No.: E24042
Drawn: 04-18-24 By ZTA
Revised:
Sheet U.01

ALLOWABLE BURY DEPTH

CLASS III RCP

Pipe Diameter (in)	Class R-1 Bedding	Class R-2 Bedding	Class R-3 & R-4 Bedding		
			No Steel	As=0.4%	As=1.0%
12	7'	10'	15'	19'	27'
15	8'	10'	16'	19'	27'
18	8'	11'	16'	20'	40'
21	8'	11'	18'	26'	40'
24	8'	12'	23'	36'	40'
27	10'	15'	30'	40'	40'
30	11'	15'	29'	40'	40'
33	11'	15'	28'	40'	40'
36	11'	15'	27'	40'	40'
42	11'	15'	26'	38'	40'
48	11'	15'	26'	36'	40'
54	11'	15'	25'	34'	40'
60	11'	15'	25'	33'	40'
66	11'	15'	24'	32'	40'
72	11'	15'	24'	32'	40'

As = Area of Steel Reinforcing

CLASS IV RCP

Pipe Diameter (in)	Class R-1 Bedding	Class R-2 Bedding	Class R-3 & R-4 Bedding		
			No Steel	As=0.4%	As=1.0%
12	12'	15'	23'	28'	40'
15	12'	16'	23'	30'	40'
18	13'	16'	29'	40'	40'
21	13'	18'	40'	40'	40'
24	16'	23'	40'	40'	40'
27	19'	30'	40'	40'	40'
30	19'	29'	40'	40'	40'
33	19'	28'	40'	40'	40'
36	19'	28'	40'	40'	40'
42	18'	27'	40'	40'	40'
48	18'	26'	40'	40'	40'
54	18'	25'	40'	40'	40'
60	18'	25'	40'	40'	40'
66	18'	25'	40'	40'	40'
72	18'	24'	40'	40'	40'

As = Area of Steel Reinforcing

CLASS V RCP

Pipe Diameter (in)	Class R-1 Bedding	Class R-2 Bedding	Class R-3 & R-4 Bedding		
			No Steel	As=0.4%	As=1.0%
12	18'	23'	35'	40'	40'
15	19'	24'	40'	40'	40'
18	19'	30'	40'	40'	40'
21	25'	40'	40'	40'	40'
24	34'	40'	40'	40'	40'
27	40'	40'	40'	40'	40'
30	40'	40'	40'	40'	40'
33	40'	40'	40'	40'	40'
36	40'	40'	40'	40'	40'
42	37'	40'	40'	40'	40'
48	35'	40'	40'	40'	40'
54	33'	40'	40'	40'	40'
60	32'	40'	40'	40'	40'
66	31'	40'	40'	40'	40'
72	31'	40'	40'	40'	40'

As = Area of Steel Reinforcing

EXTRA STRENGTH VCP

Pipe Dia. (in)	Bedding Class				
	R-1	R-2	R-3 & R-4		
			No Steel	As=0.4%	As=1.0%
6	25'	30'	30'	30'	30'
8	20'	26'	30'	30'	30'
10	18'	23'	30'	30'	30'
12	16'	20'	30'	30'	30'
15	15'	19'	28'	30'	30'
18	14'	18'	30'	30'	30'
21	15'	22'	30'	30'	30'
24	18'	28'	30'	30'	30'
27	20'	30'	30'	30'	30'
30	19'	29'	30'	30'	30'
33	20'	30'	30'	30'	30'
36	20'	30'	30'	30'	30'
39	19'	29'	30'	30'	30'
42	18'	26'	30'	30'	30'

As = Area of Steel Reinforcing

CONCRETE ARCH PIPE

Pipe Size (in x in)	Equiv. Dia. (in)	Pipe Class	
		A-III	A-IV
18 x 11	15	6'	11'
22 x 13	18	6'	11'
26 x 15	21	6'	13'
29 x 18	24	7'	15'
36 x 22	30	8'	15'
44 x 27	36	8'	14'
51 x 31	42	8'	15'
58 x 36	48	8'	15'
65 x 40	54	8'	15'
73 x 45	60	8'	14'
88 x 54	72	9'	14'

Based on Class R-5 bedding

HORIZONTAL ELLIPTICAL RCP

Pipe Size (in x in)	Equiv. Dia. (in)	Pipe Class	
		HE-III	HE-IV
14 x 23	18	12'	22'
19 x 30	24	15'	29'
22 x 34	27	15'	28'
24 x 38	30	15'	27'
27 x 42	33	15'	27'
29 x 45	36	15'	26'
32 x 49	39	15'	26'
34 x 54	42	15'	25'
38 x 60	48	15'	25'
43 x 68	54	15'	24'
48 x 76	60	15'	24'
53 x 83	66	15'	24'
58 x 91	72	15'	24'
63 x 98	78	15'	23'
68 x 106	84	15'	23'

Based on Class R-5 bedding

VERTICAL ELLIPTICAL RCP

Pipe Size (in x in)	Equiv. Dia. (in)	Pipe Class			
		VE-III	VE-IV	VE-V	VE-VI
23 x 14	18	10'	15'	22'	33'
30 x 19	24	10'	16'	34'	40'
34 x 22	27	11'	20'	40'	40'
38 x 24	30	12'	23'	40'	40'
42 x 27	33	15'	30'	40'	40'
45 x 29	36	15'	29'	40'	40'
49 x 32	39	15'	29'	40'	40'
54 x 34	42	15'	28'	40'	40'
60 x 38	48	15'	27'	40'	40'
68 x 43	54	15'	27'	40'	40'
76 x 48	60	15'	26'	40'	40'
83 x 53	66	15'	25'	40'	40'
91 x 58	72	15'	25'	40'	40'
98 x 63	78	15'	25'	40'	40'
106 x 68	84	15'	24'	40'	40'

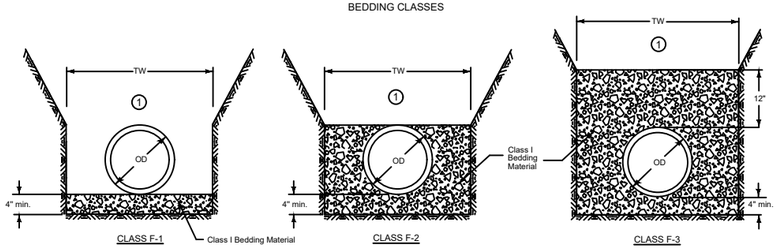
Based on Class R-5 bedding

SUDAS | IOWA DOT | REVISION 4 04-20-21
FIGURE 3010.102 | STANDARD ROAD PLAN | SW-102 | SHEET 2 of 2
REVISIONS: Added note DO NOT USE ON PRIMARY ROADWAYS.
SUDAS DIRECTOR | DESIGN METHODS ENGINEER

RIGID GRAVITY PIPE TRENCH BEDDING

FIGURE 3010.102 | SHEET 2 OF 2

BEDDING CLASSES



DO NOT USE ON PRIMARY ROADWAYS

(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)

ALLOWABLE BURY DEPTH (2)

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 35			
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'	38'
30	18'	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	8'
15	9'
18	9'
24	9'
30	9'
36	9'
42	8'
48	8'
54	8'
60	8'

POLYPROPYLENE PIPE

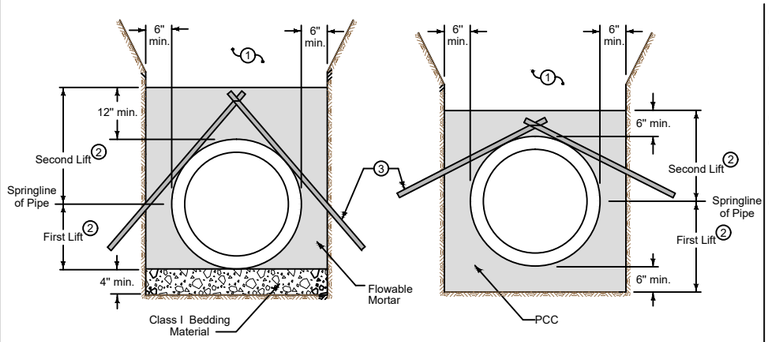
Pipe Diameter (in)	ASTM F 2764
12	24'
15	25'
18	22'
24	20'
30	22'
36	21'
42	22'
48	23'
54	21'
60	21'

SUDAS | IOWA DOT | REVISION 4 04-20-21
FIGURE 3010.103 | STANDARD ROAD PLAN | SW-103 | SHEET 1 of 1
REVISIONS: Added note DO NOT USE ON PRIMARY ROADWAYS.
SUDAS DIRECTOR | DESIGN METHODS ENGINEER

FLEXIBLE GRAVITY PIPE TRENCH BEDDING

FIGURE 3010.103 | SHEET 1 OF 1

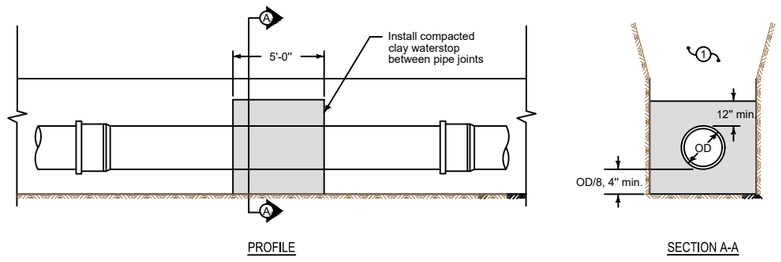
File Name: E24042 - U Sheets
Last Saved By: zarneson
Plot Date: 4/19/2024



FLOWABLE MORTAR ENCASEMENT

PCC ENCASEMENT

1. Place remainder of bedding and backfill material as specified in the contract documents.
2. Place encasement material in two lifts, or as required to prevent pipe flotation. Allow previous lift to reach initial set prior to placing subsequent lifts.
3. Restrain pipe as necessary to prevent flotation.
4. When specified in the contract documents, install waterstops at a nominal spacing of 800 feet or at locations as specified by the Engineer.



WATERSTOP FOR TRENCHES (4)

FIGURE 3010.105 | SHEET 1 OF 1

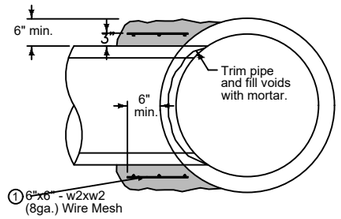
SUDAS	IOWADOT	REVISION 2	04-17-18
FIGURE 3010.105	STANDARD ROAD PLAN	SW-105	SHEET 1 of 1

REVISIONS: Replaced Iowa DOT and SUDAS logos.

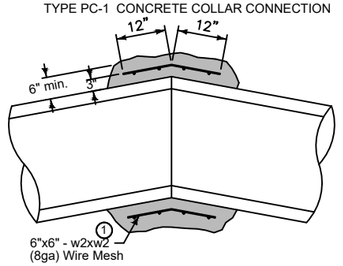
SUDAS DIRECTOR | DESIGN METHODS ENGINEER

MISCELLANEOUS PIPE BEDDING

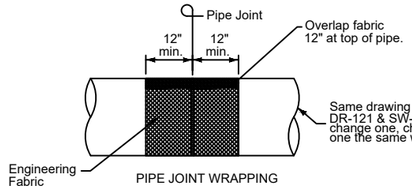
FIGURE 4020.211 | SHEET 1 OF 1



TYPE PC-1 CONCRETE COLLAR CONNECTION



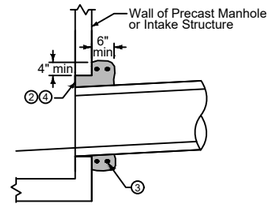
TYPE PC-2 CONCRETE COLLAR CONNECTION



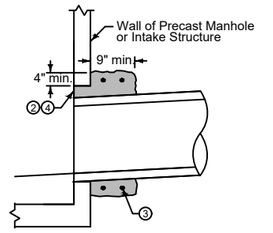
PIPE JOINT WRAPPING

PIPE TO PIPE CONNECTION

1. Lap ends of wire mesh a minimum of 6 inches.
2. Concrete collar is required when annular space between the outside of the pipe and the wall of the structure is 2 inches or greater.
3. Provide two #4 hoop bars in concrete collar. Lap bars a minimum of 6 inches.
4. Trowel concrete flush with inside wall of structure.



CONCRETE COLLAR FOR PIPES 12" AND SMALLER



CONCRETE COLLAR FOR PIPES GREATER THAN 12"

PIPE TO STRUCTURE CONNECTION

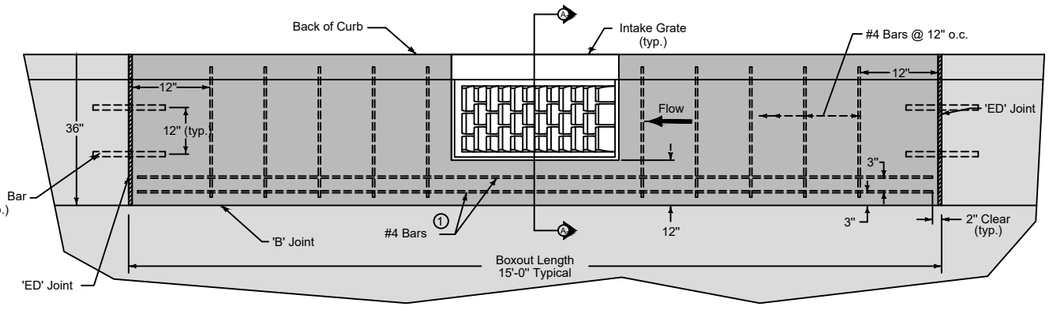
FIGURE 4020.211 | SHEET 1 OF 1

SUDAS	IOWADOT	REVISION 2	04-17-18
FIGURE 4020.211	STANDARD ROAD PLAN	SW-211	SHEET 1 of 1

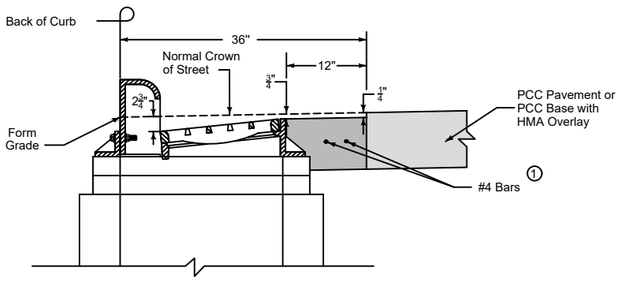
REVISIONS: Removed 'Invert' callout on Pipe to Structure View. Retitled and replaced old Iowa DOT and SUDAS logos with new logos.

SUDAS DIRECTOR | DESIGN METHODS ENGINEER

STORM SEWER PIPE CONNECTIONS



BOXOUT IN PCC PAVEMENT AND PCC BASE WITH HMA OVERLAY



Transverse joint spacing on new concrete pavement is controlled by the intake boxout. Adjust adjacent joint spacing as required to accommodate boxouts.

For retrofit intakes, match existing concrete pavement joints. Stop any transverse pavement joints that do not conform to the minimum spacing requirements at the edge of the boxout.

1. Center bars vertically within slab.

FIGURE 6010.514 | SHEET 1 OF 3

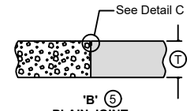
SUDAS	IOWADOT	REVISION 1	04-17-18
FIGURE 6010.514	STANDARDROADPLAN	SW-514	SHEET 1 of 3

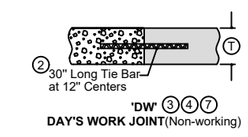
REVISIONS: Added dimension to back of grate. Updated line work and Iowa DOT and SUDAS logo.

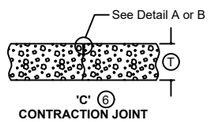
Paul D Wigant (SUDAS DIRECTOR) Brian Smith (DESIGN METHODS ENGINEER)

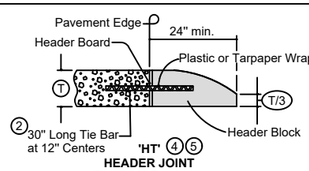
BOXOUT FOR GRATE INTAKES

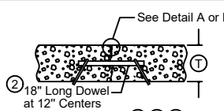
FIGURE 7010.101 | SHEET 1 OF 8

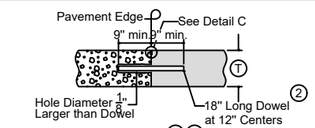


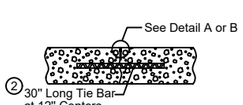


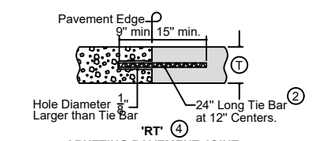






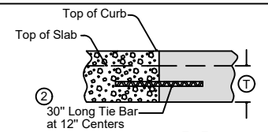


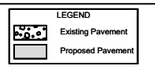




TRANSVERSE CONTRACTION

1. See dowel assemblies for fabrication details.
2. See Bar Size Table for Contraction Joints on Sheet 2.
3. Locate 'DW' joint at a mid-panel location between future 'C' or 'CD' joints. Place no closer than 5 feet to a 'C' or 'CD' joint.
4. Place bars within the limits shown under dowel assemblies.
5. Edge with 1/8 inch tool for length of joint. For HT joint, remove header block and board when second slab is placed.
6. Unless specified otherwise, use 'CD' transverse contraction joints in mainline pavement when (T) is greater or equal to 8 inches. Use 'C' joints when (T) is less than 8 inches.
7. 'RT' joint may be used in lieu of 'DW' joint at the end of the days work. Remove any pavement damaged due to the drilling at no additional cost to the Contracting Authority.





SUDAS	IOWADOT	REVISION 11	04-19-22
FIGURE 7010.101	STANDARDROADPLAN	PV-101	SHEET 1 of 8

REVISIONS: Modified Circle Note 32.

SUDAS DIRECTOR | DESIGN METHODS ENGINEER

JOINTS

Client: City of Denison, 111 N Main St., Denison, IA 51442

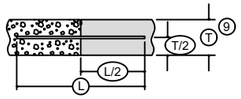
Beck Engineering, Inc. — Cherokee, Iowa | Clive, Iowa | Orange City, Iowa | Sheldon, Iowa | Spirit Lake, Iowa

Beck Engineering, Inc. — Civil Engineering Land Surveying Landscape Architecture

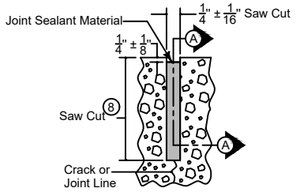
2024 City of Denison
13th Avenue South Storm Sewer Replacement
Details

Checked by: BJG
Drawn: 04-18-24 By ZTA
Revised:
Project No.: E24042
Sheet U.02

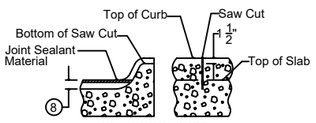
File Name: E24042 - U Sheets
Last Saved By: zarneson
Plot Date: 4/19/2024



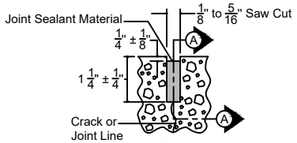
BAR PLACEMENT
(Applies to all joints unless otherwise detailed.)



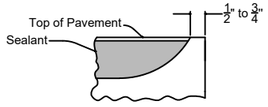
DETAIL A
(Saw cut formed by conventional concrete sawing equipment.)



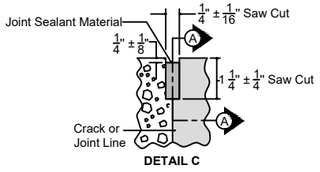
'C' JOINT IN CURB
(Match 'CT', 'CD', or 'C' joint in pavement.)



DETAIL B
(Saw cut formed by approved early concrete sawing equipment.)



SECTION A-A
(Detail at Edge of Pavement)



DETAIL C

TRANSVERSE CONTRACTION

8 Saw 'CD' joint to a depth of T/3 ± 1/4"; saw 'C' joint to a depth of T/4 ± 1/4".

9 When tying into old pavement, (T) represents the depth of sound PCC.

BAR SIZE TABLE FOR CONTRACTION JOINTS			
(T)	Solid Dowel Diameter	Tubular Dowel Diameter	Tie Bar Size
< 8"	3/4"	7/8"	#6
≥ 8" but < 10"	1 1/4"	1 3/8"	#10
≥ 10"	1 1/2"	1 5/8"	#11
Tubular Dowel Bars will not be allowed for RD joints.			

LEGEND
Existing Pavement
Proposed Pavement

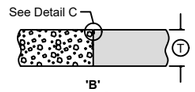
SUDAS	IOWADOT	REVISION 11 04-19-22
FIGURE 7010.101	STANDARDROADPLAN	PV-101 SHEET 2 of 8

REVISIONS: Modified Circle Note 32.

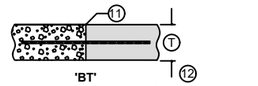
SUDAS DIRECTOR | DESIGN METHODS ENGINEER

JOINTS

FIGURE 7010.101 | SHEET 2 OF 8

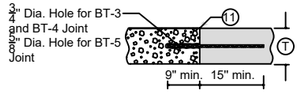


'B'
PLAIN JOINT
(Abutting Pavement Slabs)



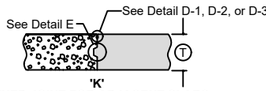
'BT'
ABUTTING PAVEMENT JOINT - RIGID TIE

(T)	Joint	Bars	Bar Length and Spacing
< 8"	'BT-1'	#4	36" Long at 30" Centers
		#5	30" Long at 30" Centers
≥ 8"	'BT-2'	#5	36" Long at 30" Centers

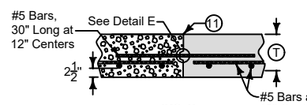


'BT'
ABUTTING PAVEMENT JOINT - RIGID TIE (Drilled)

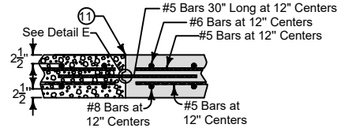
(T)	Joint	Bars	Bar Length and Spacing
< 8"	'BT-5'	#4	24" Long at 30" Centers
≥ 8"	'BT-3'	#5	24" Long at 30" Centers
	'BT-4'		24" Long at 15" Centers



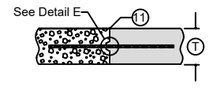
'K'
KEYED JOINT FOR ADJACENT SLABS
(Where T is 8" or more)



'KS-1'
[Single Reinforced Pavement (Bridge Approach)]



'KS-2'
[Double Reinforced Pavement (Bridge Approach)]



'KT' 10 12
ABUTTING PAVEMENT JOINT - KEYWAY TIE

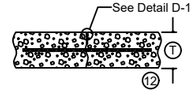
(T)	Joint	Bars	Bar Length and Spacing
< 8"	'KT-1'	#4	30" Long at 30" Centers
≥ 8"	'KT-2'	#5	30" Long at 30" Centers
	'KT-3'		30" Long at 15" Centers

LONGITUDINAL CONTRACTION

10 Bar supports may be necessary for fixed form paving to ensure the bar remains in a horizontal position in the plastic concrete.

11 Sawing or sealing of joint not required.

12 The following joints are interchangeable, subject to the pouring sequence:
'BT-1', 'L-1', and 'KT-1'
'KT-2' and 'L-2'
'KT-3' and 'L-3'



'L'
CONTRACTION JOINT

(T)	Joint	Bars	Bar Length and Spacing
< 8"	'L-1'	#4	36" Long at 30" Centers
≥ 8"	'L-2'	#5	36" Long at 30" Centers
	'L-3'		36" Long at 15" Centers

LEGEND
Existing Pavement
Proposed Pavement

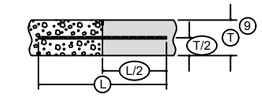
SUDAS	IOWADOT	REVISION 11 04-19-22
FIGURE 7010.101	STANDARDROADPLAN	PV-101 SHEET 3 of 8

REVISIONS: Modified Circle Note 32.

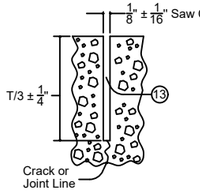
SUDAS DIRECTOR | DESIGN METHODS ENGINEER

JOINTS

FIGURE 7010.101 | SHEET 3 OF 8



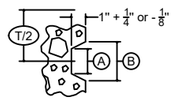
TIE BAR PLACEMENT
(Applies to all joints unless otherwise detailed.)



DETAIL D-1
(Required when specified in the contract documents.)

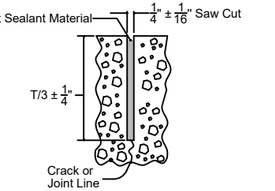
9 When tying into old pavement, (T) represents the depth of sound PCC.

13 Sealant or cleaning not required.

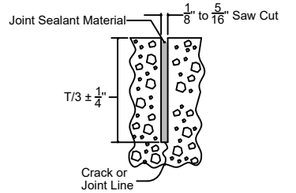


DETAIL E

KEYWAY DIMENSIONS			
Keyway Type	Pavement Thickness (T)	(A)	(B)
Standard	8" or greater	1 3/4"	2 3/4"
Narrow	Less than 8"	1"	2"



DETAIL D-2
(Required when the Department of Transportation is not the Contracting Authority, or when specified in the contract documents)



DETAIL D-3
(Required when the Department of Transportation is the Contracting Authority, or when specified in the contract documents)

LEGEND
Existing Pavement
Proposed Pavement

SUDAS	IOWADOT	REVISION 11 04-19-22
FIGURE 7010.101	STANDARDROADPLAN	PV-101 SHEET 4 of 8

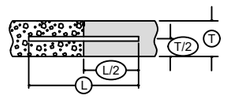
REVISIONS: Modified Circle Note 32.

SUDAS DIRECTOR | DESIGN METHODS ENGINEER

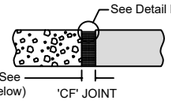
JOINTS

FIGURE 7010.101 | SHEET 4 OF 8

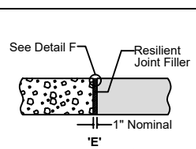
LONGITUDINAL CONTRACTION



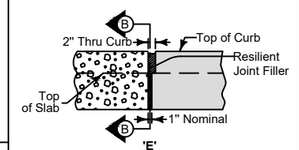
DOWEL PLACEMENT
(Applies to all joints unless otherwise detailed.)



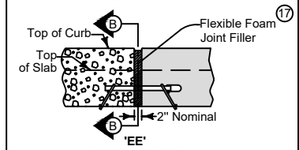
TYPE	WIDTH
CF-1	2"
CF-2	2 1/2"
CF-3	3"
CF-4	3 1/2"



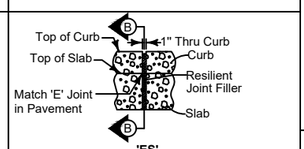
'E'
1" EXPANSION JOINT



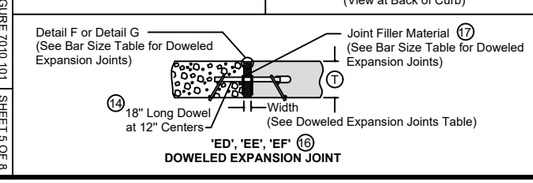
'E'
JOINT IN CURB
(View at Back of Curb)



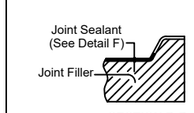
'EE'
JOINT IN CURB
(View at Back of Curb)



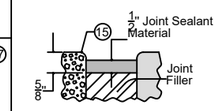
'ES'
JOINT IN CURB
(View at Back of Curb)



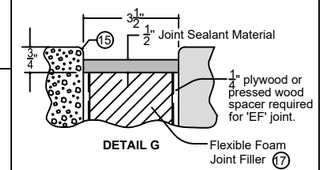
'ED', 'EE', 'EF' 16
DOWELED EXPANSION JOINT



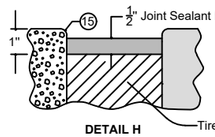
SECTION B-B



DETAIL F



DETAIL G



DETAIL H

EXPANSION

14 See Bar Size Table for Doweled Expansion Joints.

15 Edge with 1/4 inch tool for length of joint indicated if formed; edging not required when cut with diamond blade saw.

16 See Dowel Assemblies for fabrication details and placement limits. Coat the free end of dowel bar to prevent bond with pavement. At intake locations, dowel bars may be cast-in-place.

17 Predrill or preform holes in joint material for appropriate dowel size.

18 Compact tire buffings by spading with a square-nose shovel.

DOWELED EXPANSION JOINTS		
TYPE	WIDTH	FILLER MATERIAL 17
ED	1"	Resilient (Detail F)
EE	2"	Flexible Foam (Detail F)
EF	3 1/2"	Flexible Foam (Detail G)

BAR SIZE TABLE FOR DOWELED EXPANSION JOINTS			
(T)	< 8"	≥ 8" but < 10"	≥ 10"
Dowel Diameter	3/4"	1 1/4"	1 1/2"
Tubular Dowel Bars will not be allowed for expansion joints.			

LEGEND
Existing Pavement
Proposed Pavement

SUDAS	IOWADOT	REVISION 11 04-19-22
FIGURE 7010.101	STANDARDROADPLAN	PV-101 SHEET 5 of 8

REVISIONS: Modified Circle Note 32.

SUDAS DIRECTOR | DESIGN METHODS ENGINEER

JOINTS

FIGURE 7010.101 | SHEET 5 OF 8

Client:
City of Denison
111 N Main St.
Denison, IA 51442

Beck Engineering, Inc.
Cherokee, Iowa | Clive, Iowa
Orange City, Iowa | Sheldon, Iowa
Spirit Lake, Iowa

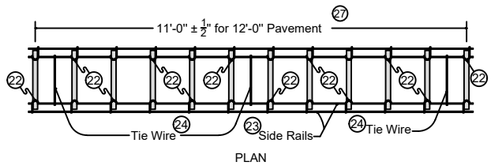
Beck Engineering, Inc.
Civil Engineering Land Surveying
Landscape Architecture

2024 City of Dension
13th Avenue South Storm Sewer Replacement
Details

Checked by	BJG
Project No.	E24042
Drawn	04-18-24 By ZTA
Revised	
Sheet	U.03

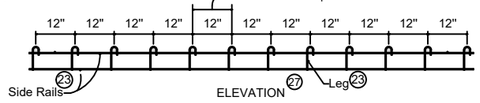
Plot Date: 4/19/2024 Last Saved By: zarneson File Name: E24042 - U Sheets

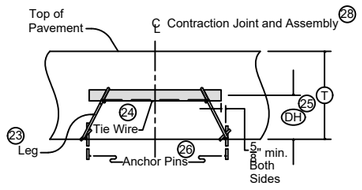
CONTRACTION JOINTS



PLAN

Spaces between dowel bars are nominal dimensions with a $\frac{1}{4}$" allowable tolerance.





LONGITUDINAL SECTION

DOWEL ASSEMBLIES (19)(20)(21)

DOWEL HEIGHT AND DIAMETER FOR DOWELED CONTRACTION JOINTS			
(T)	(DH) 25	Diameter (Solid)	Diameter (Tubular)
7" to 7½"	3½"	¾"	⅞"
8" to 9½"	4¼"	1¼"	1⅜"
10" to 11½"	5¼"	1½"	1⅝"
12" to 13"	6¼"	1½"	1⅝"
Tubular Dowel Bars will not be allowed for RD joints.			

19 Use 18 inch long dowel bars with a tolerance of ± 1/8 inch. Ensure the centerlines of individual dowels are parallel to the other dowels in the assembly within ± 1/8 inch.

20 Use wires with a minimum tensile strength of 50 ksi.

21 Details apply to both transverse contraction and expansion joints.

22 Weld alternately throughout.

23 0.306 inch diameter wire. Wire sizes shown are the minimum required.

24 Maximum 0.177 inch diameter wire, welded or friction fit to upper side rail, both sides.

25 Measured from the centerline of dowel bar to bottom of lower side rail + 1/4 inch.

26 Per lane width, install a minimum of 8 anchor pins evenly spaced (4 per side), to prevent movement of assembly during construction. Anchor assemblies placed on pavement or PCC base with devices approved by the Engineer.

27 If dowel basket assemblies are required for curbed pavements, the assembly length is based on the jointing layout. See PV-101, sheet 8.

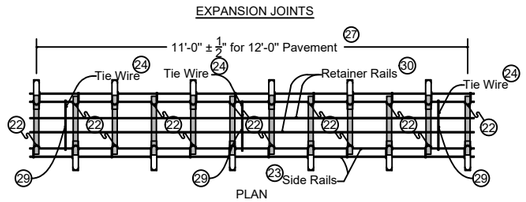
28 Ensure dowel basket assembly centerline is within 2 inches of the intended joint location longitudinally and has no more than 1/4 inch horizontal skew from end of basket to end of basket.

SUDAS	IOWADOT	REVISION 11 04-19-22
FIGURE 7010.101	STANDARDROADPLAN	PV-101 SHEET 6 of 8
REVISIONS: Modified Circle Note 32.		
SUDAS DIRECTOR	DESIGN METHODS ENGINEER	

JOINTS

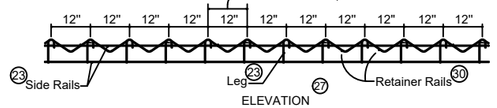
FIGURE 7010.101 | SHEET 6 OF 8

EXPANSION JOINTS

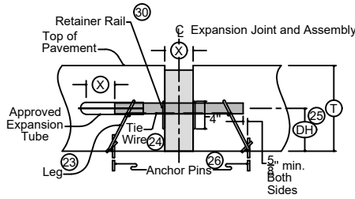


PLAN

Spaces between dowel bars are nominal dimensions with a $\frac{1}{4}$" allowable tolerance.



ELEVATION



SECTION THRU EXPANSION JOINT

JOINT OPENING AND EXPANSION TUBE EXTENSION		
Joint Type	(X)	Minimum Tube Length
"ED"	1"	6"
"EE"	2"	7"
"EF"	3½"	9"

DOWEL HEIGHT AND DIAMETER FOR DOWELED EXPANSION JOINTS		
(T)	(DH) 25	Diameter
7" to 7½"	3½"	¾"
8" to 9½"	4¼"	1¼"
10" to 11½"	5¼"	1½"
12" to 13"	6¼"	1½"
Tubular Dowel Bars will not be allowed for expansion joints.		

DOWEL ASSEMBLIES (19)(20)(21)

19 Use 18 inch long dowel bars with a tolerance of ± 1/8 inch. Ensure the centerlines of individual dowels are parallel to the other dowels in the assembly within ± 1/8 inch.

20 Use wires with a minimum tensile strength of 50 ksi.

21 Details apply to both transverse contraction and expansion joints.

22 Weld alternately throughout.

23 0.306 inch diameter wire. Wire sizes shown are the minimum required.

24 Maximum 0.177 inch diameter wire, welded or friction fit to upper side rail, both sides.

25 Measured from the centerline of dowel bar to bottom of lower side rail + 1/4 inch.

26 Per lane width, install a minimum of 8 anchor pins evenly spaced (4 per side), to prevent movement of assembly during construction. Anchor assemblies placed on pavement or PCC base with devices approved by the Engineer.

27 If dowel basket assemblies are required for curbed pavements, the assembly length is based on the jointing layout. See PV-101, sheet 8.

28 Ensure dowel basket assembly centerline is within 2 inches of the intended joint location longitudinally and has no more than 1/4 inch horizontal skew from end of basket to end of basket.

29 Clip and remove center portion of tie during field assembly.

30 1/4 inch diameter wire.

SUDAS	IOWADOT	REVISION 11 04-19-22
FIGURE 7010.101	STANDARDROADPLAN	PV-101 SHEET 7 of 8
REVISIONS: Modified Circle Note 32.		
SUDAS DIRECTOR	DESIGN METHODS ENGINEER	

JOINTS

FIGURE 7010.101 | SHEET 7 OF 8

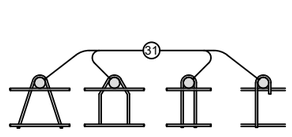
Client: City of Denison, 111 N Main St., Denison, IA 51442

Beck Engineering, Inc.: Cherokee, Iowa | Clive, Iowa | Orange City, Iowa | Sheldon, Iowa | Spirit Lake, Iowa

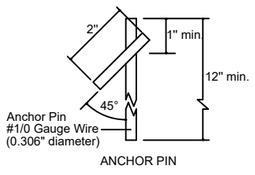
Beck Engineering, Inc. — Civil Engineering Land Surveying Landscape Architecture

2024 City of Dension
13th Avenue South Storm Sewer Replacement
Details

Checked by	BJG
Project No.	E24042
Drawn	04-18-24 By ZTA
Revised	
Sheet	U.04



OPTIONAL LEG SHAPES



ANCHOR PIN

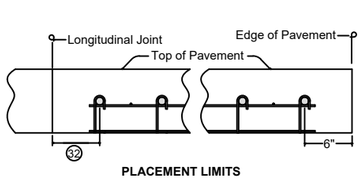
19 Use 18 inch long dowel bars with a tolerance of ± 1/8 inch. Ensure the centerlines of individual dowels are parallel to the other dowels in the assembly within ± 1/8 inch.

20 Use wires with a minimum tensile strength of 50 ksi.

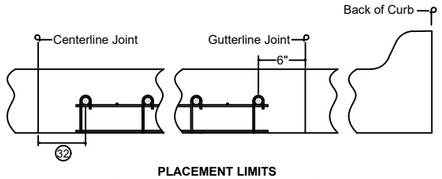
21 Details apply to both transverse contraction and expansion joints.

31 Diameter of bend around dowel is dowel diameter + 1/8 to 3/16 inches.

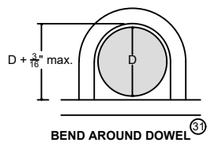
32 For uniform lane widths: 3 to 6 inches. For taper and variable width pavements: 3 to 12 inches.



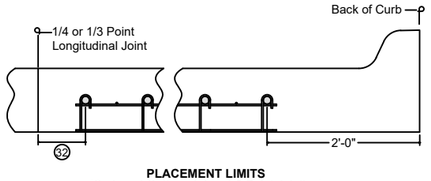
PLACEMENT LIMITS
(Rural Section)



PLACEMENT LIMITS
(Curb and Gutter - Gutterline Jointing)



BEND AROUND DOWEL (31)



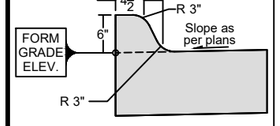
PLACEMENT LIMITS
(Curb and Gutter - 1/4 or 1/3 Point Jointing)

DOWEL ASSEMBLIES (19)(20)(21)

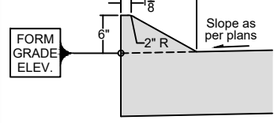
SUDAS	IOWADOT	REVISION 11 04-19-22
FIGURE 7010.101	STANDARDROADPLAN	PV-101 SHEET 8 of 8
REVISIONS: Modified Circle Note 32.		
SUDAS DIRECTOR	DESIGN METHODS ENGINEER	

JOINTS

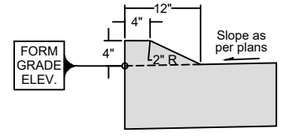
FIGURE 7010.101 | SHEET 8 OF 8



6" STANDARD CURB



6" SLOPED CURB



4" SLOPED CURB

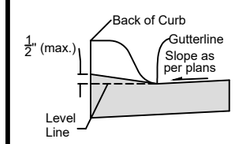
For joint details, see PV-101.

1 6 inch Standard Curb, 6 inch Sloped Curb, or 4 inch Sloped Curb as specified.

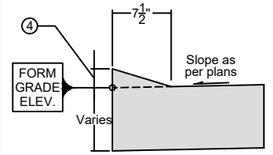
2 ⅛ inch if Proposed Pavement is HMA. No elevation difference if Proposed Pavement is PCC.

3 'BT' , 'KT', or 'L' joint if Proposed Pavement is PCC. 'B' joint if Proposed Pavement is HMA.

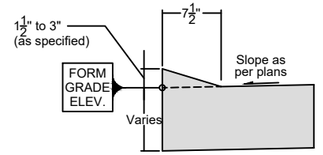
4 0 to 2 inches for residential entrances. 1½ to 3 inches for industrial or commercial entrances.



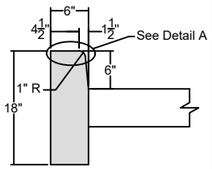
DROP CURB AT SIDEWALK



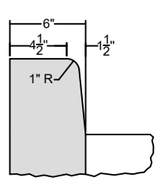
DRIVEWAY DROP CURB
(IowaDepartment of Transportation is not the Contracting Authority)



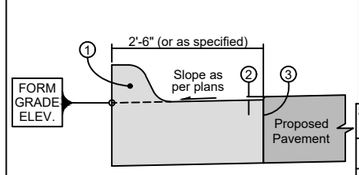
DRIVEWAY DROP CURB
(Iowa Department of Transportation is the Contracting Authority)



BEAM CURB*
*For short replacement sections, match existing curb profile



DETAIL A



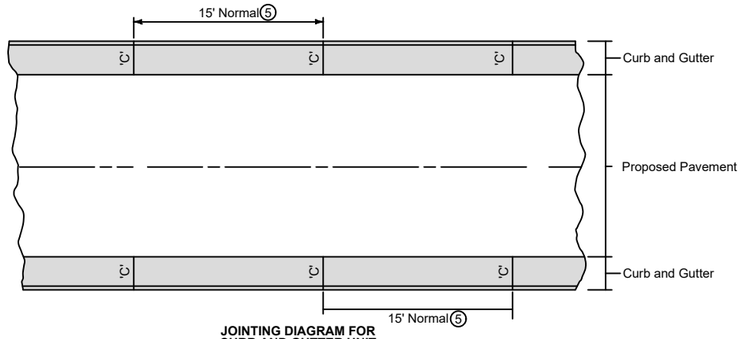
CURB AND GUTTER UNIT

SUDAS	IOWADOT	REVISION 5 04-21-20
FIGURE 7010.102	STANDARD ROAD PLAN	PV-102 SHEET 1 of 2
REVISIONS: Split DRIVEWAY DROP CURB detail into two details. Added new circle note.		
SUDAS DIRECTOR	DESIGN METHODS ENGINEER	

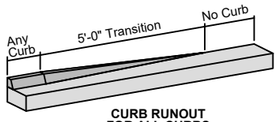
PCC CURB DETAILS

FIGURE 7010.102 | SHEET 1 OF 2

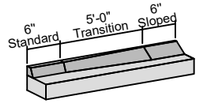
Plot Date: 4/19/2024 Last Saved By: zarneson File Name: E24042 - U Sheets



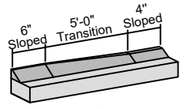
JOINTING DIAGRAM FOR CURB AND GUTTER UNIT



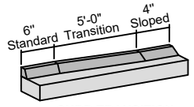
CURB RUNOUT FOR ALL CURBS



CURB TRANSITION FROM 6" STANDARD TO 6" SLOPED



CURB TRANSITION FROM 6" SLOPED TO 4" SLOPED



CURB TRANSITION FROM 6" STANDARD TO 4" SLOPED

(5) If proposed pavement is PCC, match joint spacing for proposed pavement. Place 'E' joints in curb and gutter section where expansion joints are to be placed in proposed pavement.

SUDAS | IOWADOT | REVISION 5 04-21-20

FIGURE 7010.102 | STANDARD ROAD PLAN | PV-102 | SHEET 2 of 2

REVISIONS: Split DRIVEWAY DROP CURB detail into two details. Added new circle note

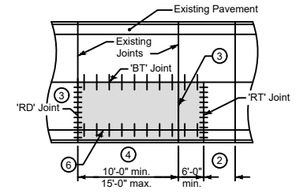
SUDAS DIRECTOR | DESIGN METHODS ENGINEER

PCC CURB DETAILS

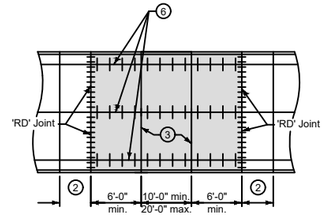
FIGURE 7010.102 | SHEET 2 OF 2

FIGURE 7040.102 | SHEET 1 OF 1

GUTTERLINE JOINTING

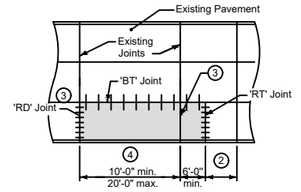


ONE PANEL WIDTH PATCH

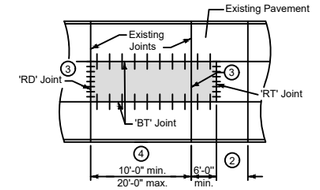


FULL ROADWAY WIDTH PATCH

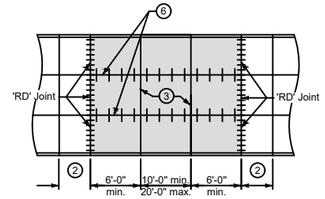
THIRD POINT JOINTING (1)



OUTSIDE PANEL PATCH



CENTER PANEL PATCH



FULL ROADWAY WIDTH PATCH

(1) Patches on roadways with quarter point jointing will be similar to third point jointing details.

(2) Minimum distance between existing joint and patch is 6 feet. If distance is less than 6 feet, extend patch to existing joint.

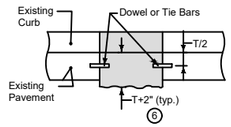
(3) Match existing joint type and locations. If specified, replace existing 'C' joints with 'CD' joints.

(4) If existing joint spacing is greater than 20 feet, add a 'CT' joint at mid-panel.

(5) If subgrade or subbase material is required below patch, bring material to a level 2 inches below bottom of existing pavement.

(6) BT, KT, or L joint depending on pavement thickness and pouring sequence

LONGITUDINAL SECTION THRU PCC PATCH



SUDAS | REVISION 5 2022 Edition

7040.102 | SHEET 1 of 1

SUDAS Standard Specifications

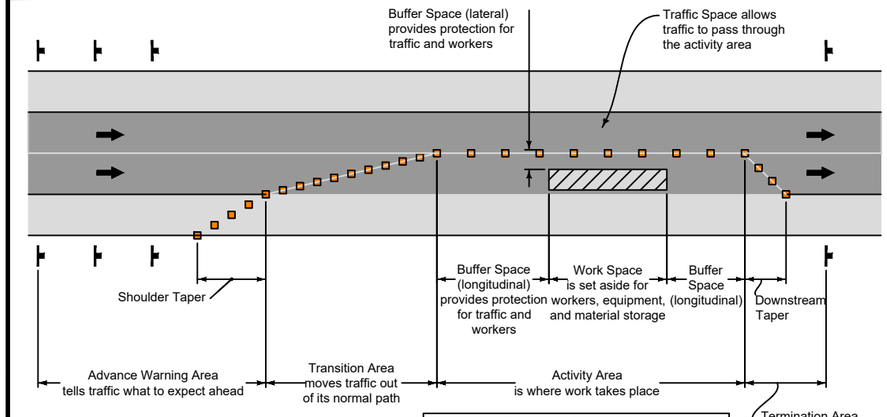
FULL DEPTH PATCHES GREATER THAN 15' LONG

Client: City of Denison, 111 N Main St., Denison, IA 51442

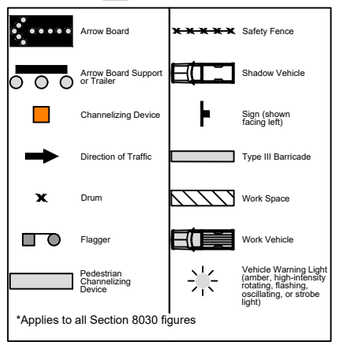
Beck Engineering, Inc. | Cherokee, Iowa | Clive, Iowa | Orange City, Iowa | Sheldon, Iowa | Spirit Lake, Iowa

Beck Engineering, Inc. — Civil Engineering Land Surveying Landscape Architecture

2024 City of Dension
13th Avenue South Storm Sewer Replacement
Details



Key*



*Applies to all Section 8030 figures

Channelizing Device Spacing			
Speed Limit (mph)	Taper (ft)	Buffer (ft)	Work Space (ft)
20	20	40	40
25	25	50	50
30	30	60	60
35	35	70	70
40	40	80	80
45	45	90	90
50	50	100	100
55	55	110	110

Distance Between Signs	
Speed Limit (mph)	A
20-25	100
30-40	250
45-50	350
55	500

Merging Taper Lengths for Lane Closure*		
Speed Limit (mph)	Taper Length (L) (ft)	Number of Devices
20	80	5
25	125	6
30	180	7
35	245	8
40	320	9
45	540	13
50	600	13
55	660	13

*Values shown are for a 12 foot shift. Table does not apply to one-lane, two-way (flagger) tapers

It may be necessary to combine two or more examples to adequately address the traffic control needed.

Utilize vehicle warning lights (amber, high-intensity rotating, flashing, oscillating, or strobe light) on all shadow and work vehicles.

Vehicle hazard lights may be used to supplement warning lights. Do not use hazard lights alone.

Flags may be used to call attention to the advanced warning signs.

If a closure extends overnight, utilize channelizing devices with retroreflective sheeting.

Speed limit refers to the legally established and signed speed limit.

If an arrow board is used on 2-lane roads, operate only in the caution mode.

Adjust the position of warning signs and channelizing devices for available sight distance.

Do not install temporary traffic control devices until work is ready to begin, and remove or cover all signs and devices promptly when they are not needed.

The END WORK (G20-2) signs shown on all figures are optional.

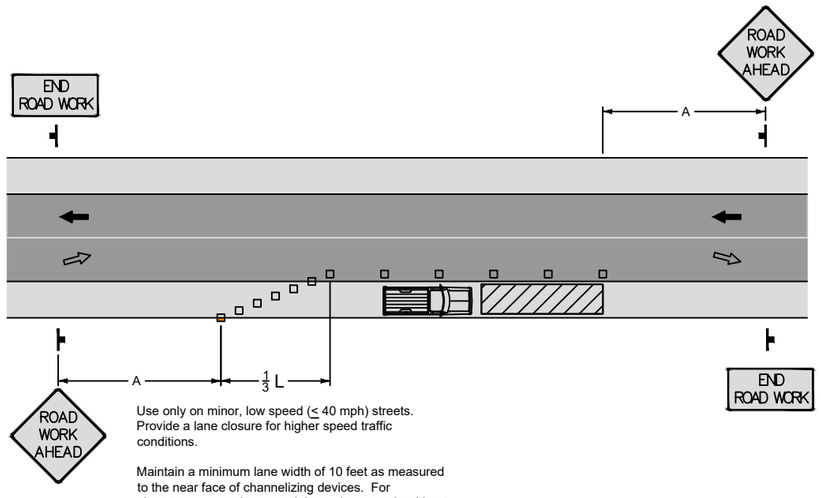
SUDAS | REVISION New 10-17-17

8030.101 | SHEET 1 of 1

SUDAS Standard Specifications

TEMPORARY TRAFFIC CONTROL GENERAL INFORMATION

FIGURE 8030.101 | SHEET 1 OF 1



Use only on minor, low speed (≤ 40 mph) streets. Provide a lane closure for higher speed traffic conditions.

Maintain a minimum lane width of 10 feet as measured to the near face of channelizing devices. For short-term use on low speed, low volume roads without wider heavy commercial vehicles, a minimum lane width of 9 feet may be used.

Where the opposite shoulder is suitable for carrying vehicular traffic, lanes may be shifted by using closely spaced channelizing devices provided the resulting lane widths are at least 10 feet wide.

Additional advanced warning may be appropriate, such as a ROAD NARROWS sign.

For short-term work, the taper and channelizing devices may be omitted if a shadow vehicle with activated vehicle warning lights is used.

Refer to Figure 8030.101 for symbol key and sign spacing.

SUDAS | REVISION New 10-17-17

8030.102 | SHEET 1 of 1

SUDAS Standard Specifications

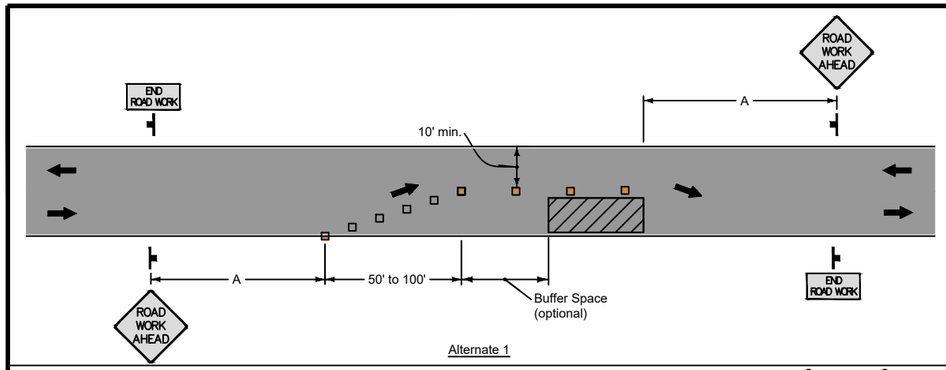
WORK OFF OF PAVEMENT WITH MINOR ENCROACHMENT ONTO TRAVELED WAY

FIGURE 8030.102 | SHEET 1 OF 1

Checked by: BJG | Project No.: E24042

Drawn: 04-18-24 By ZTA | Revised: | Sheet U.05

Plot Date: 4/19/2024 | Last Saved By: zarneson | File Name: E24042 - U Sheets



Alternate 1

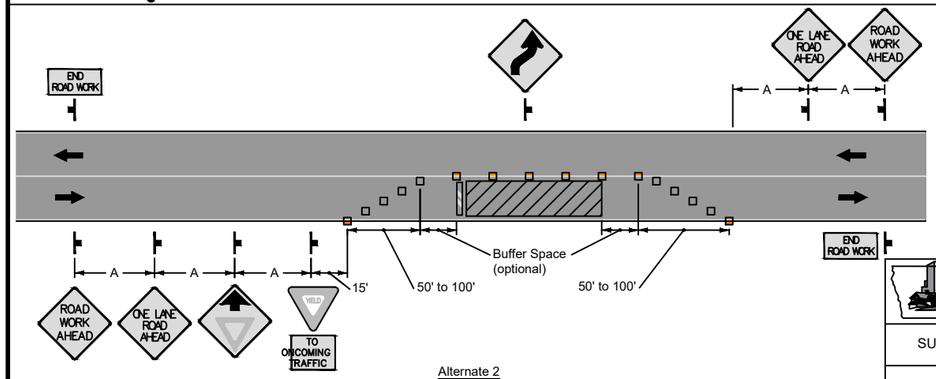
Refer to Figure 8030.101 for symbol key and sign spacing.

Alternate 1

Use of Alternate 1 is restricted to low-speed roadways with good sight distance (paved or unpaved) during daylight hours.

Traffic may be self-regulating when the work space is short and drivers can see the roadway beyond.

Use one or two flaggers when motor vehicle traffic cannot effectively self-regulate.



Alternate 2

Alternate 2

Use of Alternate 2 is restricted to roadways where average daily traffic is fewer than 400 vehicles and good sight distance exists.

Do not use within 2,500 feet of a similar work site.

May be used for overnight closures. During non-working hours remove materials, equipment, or stockpiled waste and fill or cover excavations.

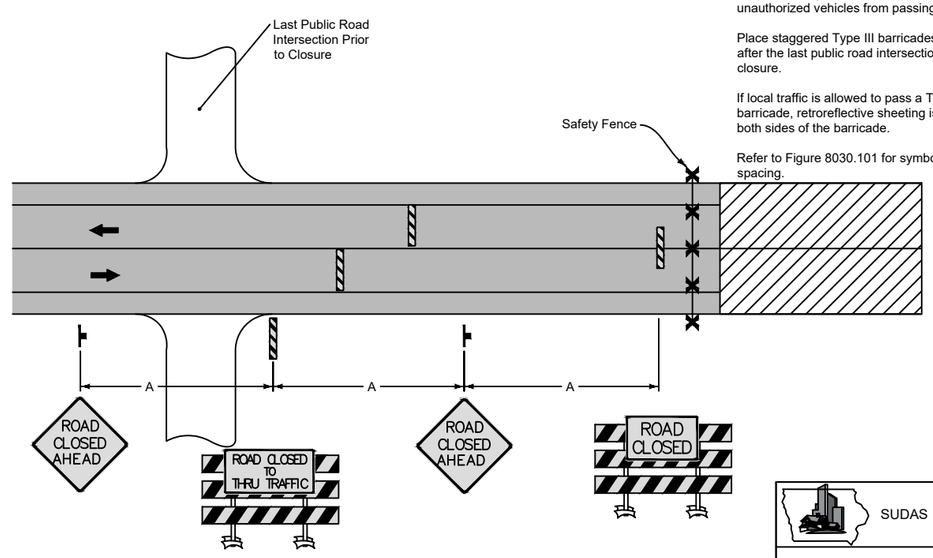
FIGURE 8030.104 | SHEET 1 OF 1

SUDAS | REVISION: New 10-17-17 | 8030.104 | SHEET 1 of 1

SUDAS Standard Specifications

LANE CLOSURE ON LOW VOLUME STREET (SELF-REGULATING)

FIGURE 8030.116 | SHEET 1 OF 1



When distance "A" is less than 500 feet, place the barricade with the ROAD CLOSED TO THRU TRAFFIC sign in the middle of the traffic lane approaching the work area. The barricade may be omitted if the distance to the work area is less than 250 feet.

Maintain safety fence closures to prevent unauthorized vehicles from passing through.

Place staggered Type III barricades in the roadway after the last public road intersection prior to the closure.

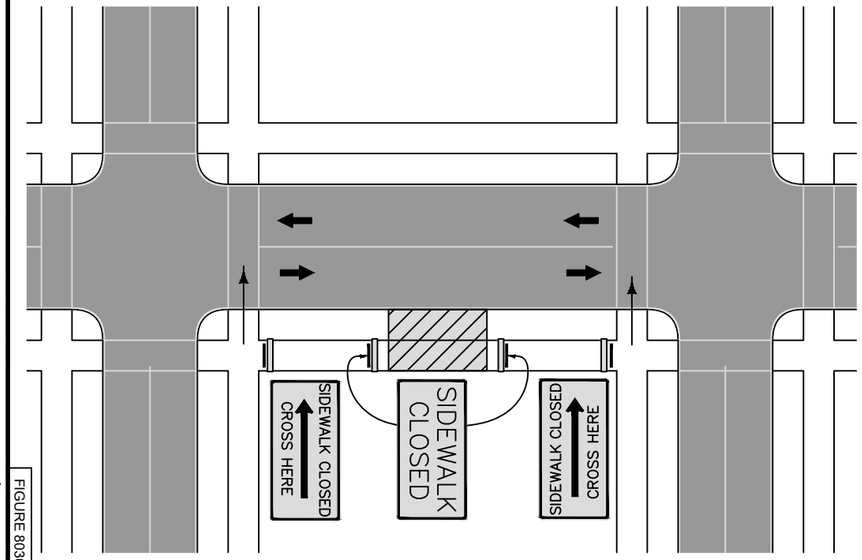
If local traffic is allowed to pass a Type III barricade, retroreflective sheeting is required on both sides of the barricade.

Refer to Figure 8030.101 for symbol key and sign spacing.

SUDAS | REVISION: New 10-17-17 | 8030.116 | SHEET 1 of 1

SUDAS Standard Specifications

STREET OR ROAD CLOSURE



Use when crosswalks, sidewalks, or other pedestrian facilities are closed or relocated. Ensure temporary facilities are detectable and include accessibility features consistent with the features present in the existing pedestrian facility.

Signs such as KEEP RIGHT (LEFT) may be placed to guide or direct pedestrians.

Provide continuous barriers or fencing complying with the requirements of PROWAG to secure work areas from pedestrians.

When required in the contract documents, provide auxiliary lighting or audible information devices to assist pedestrians with visual disabilities.

Only the temporary traffic control devices related to pedestrians are shown. Other devices related to control of vehicular traffic may be necessary.

Refer to Figure 8030.101 for symbol key and sign spacing.

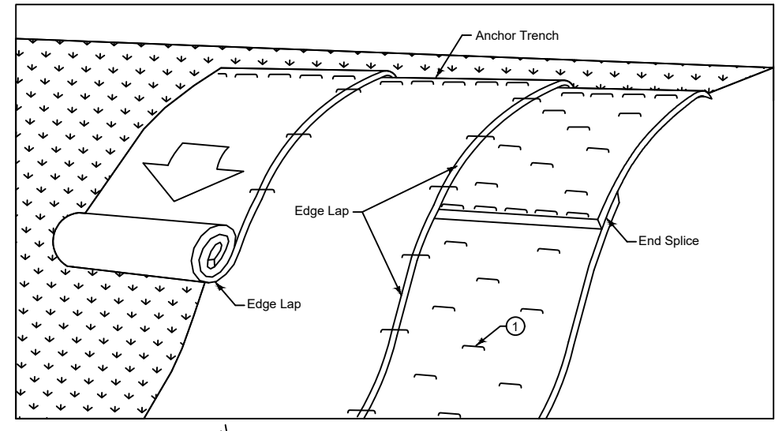
FIGURE 8030.117 | SHEET 1 OF 1

SUDAS | REVISION: New 10-17-17 | 8030.117 | SHEET 1 of 1

SUDAS Standard Specifications

SIDEWALK DETOUR

FIGURE 9040.103 | SHEET 1 OF 1



ANCHOR TRENCH (12" min. anchor spacing)

EDGE LAP (4'-0" min. anchor spacing)

END SPLICE (18" min. anchor spacing)

1 Secure blanket to ground according to manufacturer's recommended anchoring pattern and minimum shown in Table 1.

TABLE 1

Max. slope	Min. anchors
≤ 3:1	1.5/yd²
2:1	2/yd²
1:1	2.5/yd²

SUDAS | REVISION: 2 10-21-14 | 9040.103 | SHEET 1 of 1

SUDAS Standard Specifications

ROLLED EROSION CONTROL PRODUCT (RECP) INSTALLATION ON SLOPES

Client: City of Denison, 111 N Main St., Denison, IA 51442

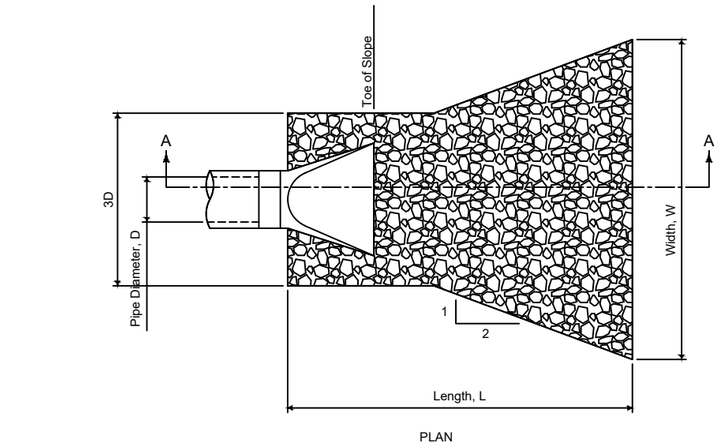
Beck Engineering, Inc. — Cherokee, Iowa | Clive, Iowa | Orange City, Iowa | Sheldon, Iowa | Spirit Lake, Iowa

Beck Engineering, Inc. — Civil Engineering Land Surveying Landscape Architecture

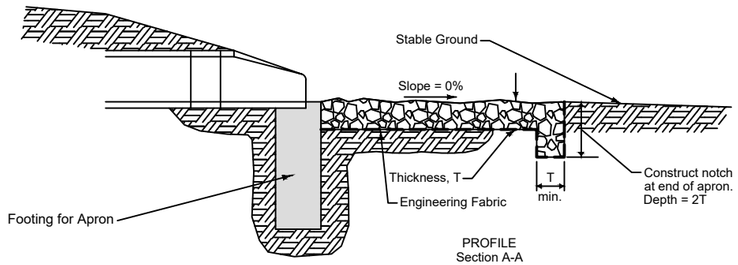
2024 City of Dension
13th Avenue South Storm Sewer Replacement
Details

Checked by: BJG
Project No.: E24042
Drawn: 04-18-24 By ZTA
Revised:
Sheet U.06

Plot Date: 4/19/2024 Last Saved By: zarneson File Name: E24042 - U Sheets



PLAN



PROFILE
Section A-A

SUDAS

REVISION
3 10-21-14

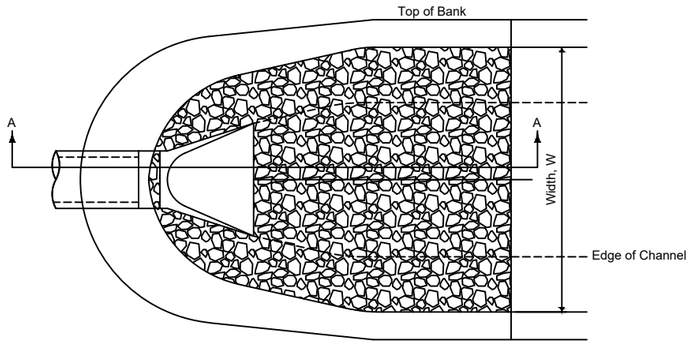
9040.110

SHEET 1 of 1

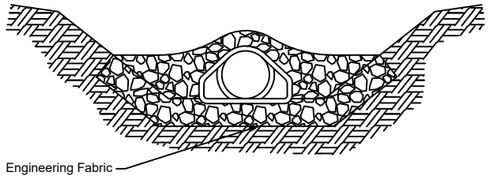
SUDAS Standard Specifications

RIP RAP FOR PIPE OUTLET
ONTO FLAT GROUND

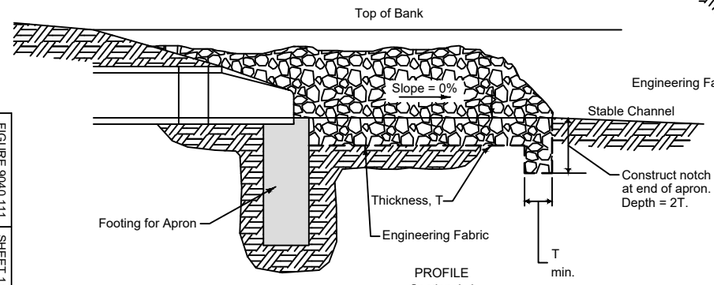
FIGURE 9040.110 | SHEET 1 OF 1



PLAN



CROSS-SECTION



PROFILE
Section A-A

SUDAS

REVISION
3 10-21-14

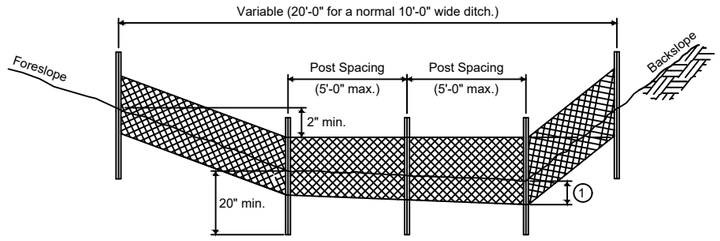
9040.111

SHEET 1 of 1

SUDAS Standard Specifications

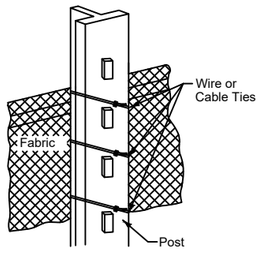
RIP RAP APRON FOR PIPE
OUTLET INTO CHANNEL

FIGURE 9040.111 | SHEET 1 OF 1



TYPICAL SILT FENCE DITCH CHECK

1. Insert 12 inches of fabric a minimum of 6 inches deep (fabric may be folded below the ground line).



ATTACHMENT TO POST

SUDAS

REVISION
2 10-21-14

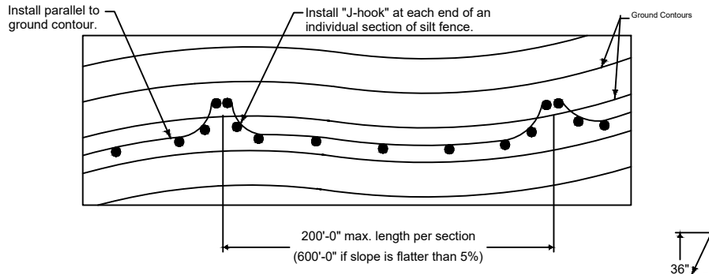
9040.119

SHEET 1 of 2

SUDAS Standard Specifications

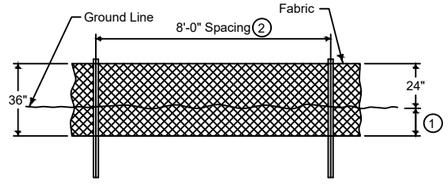
SILT FENCE

FIGURE 9040.119 | SHEET 1 OF 2

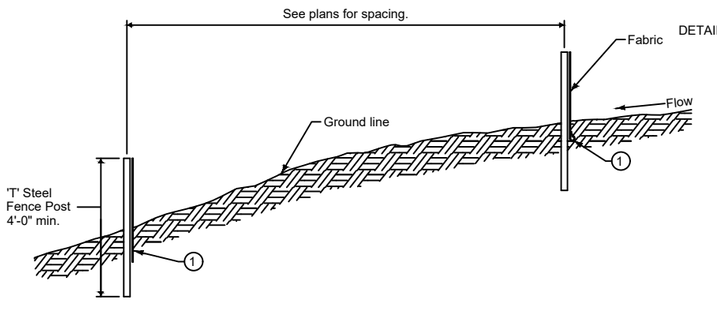


TYPICAL SILT FENCE INSTALLATION ON LONGITUDINAL SLOPES
(Plan View)

1. Insert 12 inches of fabric a minimum of 6 inches deep (fabric may be folded below the ground line).
2. Reduce post spacing to 5'-0" at water concentration areas, or as required to adequately support fence.



DETAILS OF SILT FENCE ON LONGITUDINAL SLOPES



TYPICAL SILT FENCE INSTALLATION ON LONGITUDINAL SLOPES
(Profile View)

SUDAS

REVISION
2 10-21-14

9040.119

SHEET 2 of 2

SUDAS Standard Specifications

SILT FENCE

FIGURE 9040.119 | SHEET 2 OF 2

Client:
City of Denison
111 N Main St.
Denison, IA 51442

Beck Engineering, Inc.
Cherokee, Iowa | Clive, Iowa
Orange City, Iowa | Sheldon, Iowa
Spirit Lake, Iowa

Beck Engineering, Inc.
Civil Engineering Land Surveying
Landscape Architecture

2024 City of Dension
13th Avenue South Storm Sewer Replacement
Details

Checked by: BJG
Project No.: E24042
Drawn: 04-18-24 By ZTA
Revised:
Sheet U.07

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