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PLANS OF PROPOSED IMPROVEMENT ON THE  
**PRIMARY ROAD SYSTEM**  
**Dallas COUNTY**  
Storm Sewer/Intakes  
South of N Raccoon River Bridge

SCALES: As Noted

Refer to the Proposal Form for list of applicable specifications.

Value Engineering Saves. Refer to Article 1105.14 of the Specifications.



REVISIONS

Field Exam held  
8-30-2021

TOTAL
17
PROJECT IDENTIFICATION NUMBER
20-25-169-010
PROJECT NUMBER
NHSN-169-4(67)--2R-25
R.O.W. PROJECT NUMBER
NHSN-169-4(68)--2R-25

Attendees:

Design:  
Jason Holst  
Kyle Schrock  
Hunter Finch

Bridge:  
Dave Claman

District 4:  
Wes Mayberry  
Brian Smith

City of Adel:  
Kip Overton

DESIGN DATA RURAL	
20 -- AADT	-- V.P.D.
20 -- AADT	-- V.P.D.
20 -- DHV	-- V.P.H.
TRUCKS	-- %
Total	
Design ESALs	--

INDEX OF SEALS		
SHEET NO.	NAME	TYPE
A.1	X	Primary Signature Block
X	X	X

**PRELIMINARY PLANS**

Subject to change by final design.

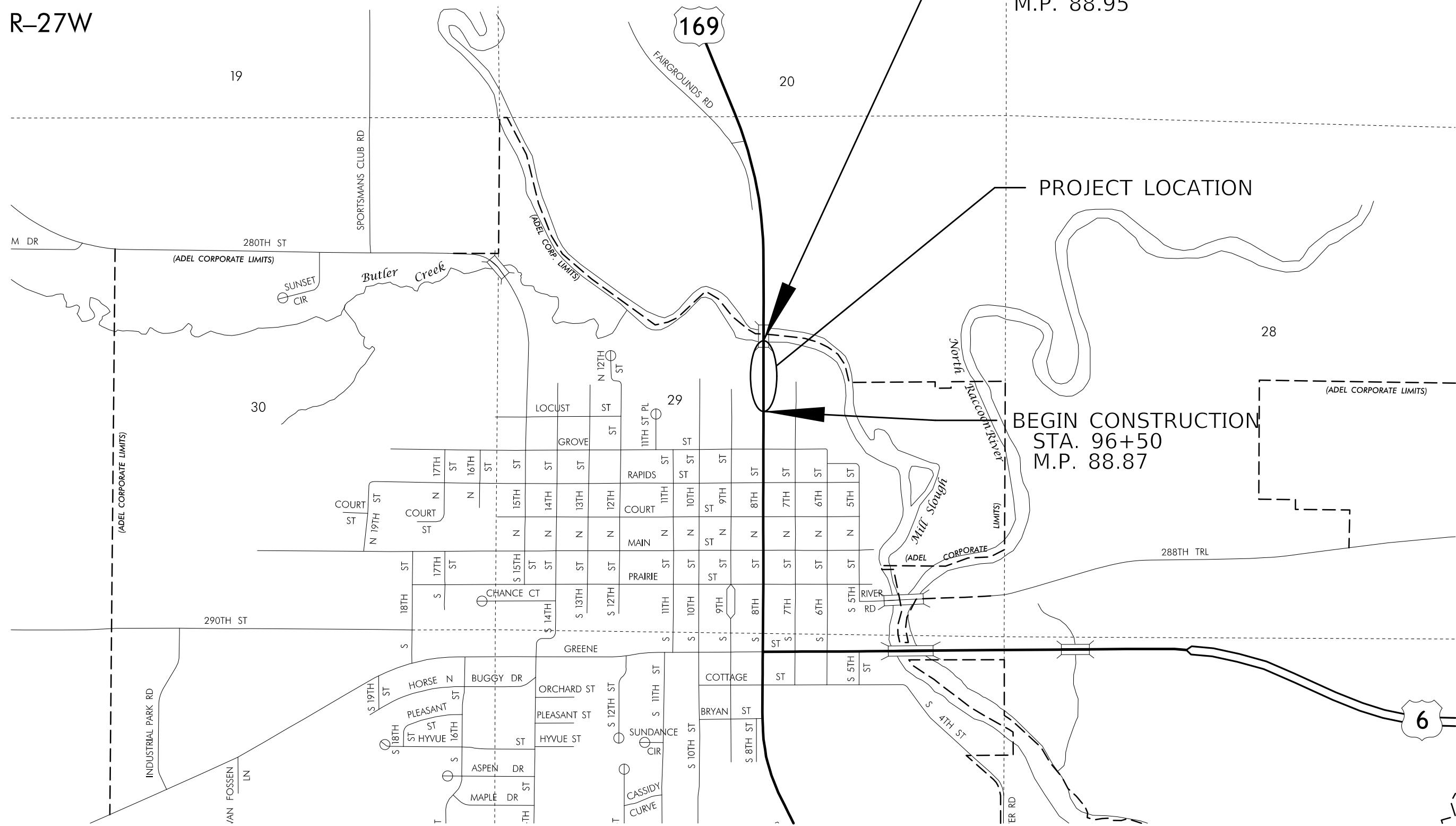
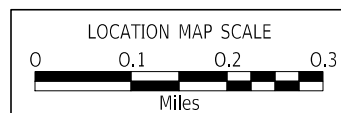
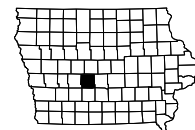
**D2 PLAN - Date: 08-30-2021**

R-27W

END CONSTRUCTION  
STA. 100+00  
M.P. 88.95

PROJECT LOCATION

BEGIN CONSTRUCTION  
STA. 96+50  
M.P. 88.87



PROJECT CONCEPT STATEMENT

Resiliency Improvements for U.S 169 over  
North Raccoon River Mill Race in Adel  
Project NHSN-169-4(67)- -2R-25  
City of Adel  
Dallas County

Highway Division  
Bridges and Structures Bureau

Dave Claman, P.E.  
515-239-1487

December 4, 2020

**Project Description**

U.S. 169 just south of the North Raccoon River Mill Race bridge (2589.1S169) in Adel has experienced many road closures over the past 20 years. The highway location is impacted when the gage at Perry is at a stage around 16.6 which is approximately a 3 year flood. The highway has been impacted at least 13 times over the past 20 years.

There are many instances when the river is high (but not out of bank) when the highway becomes inundated due to seepage and back-flow from a storm sewer. This results in frequent closure of the highway which can last days.

In order to mitigate the number and duration of road closures, the proposed project will include the construction of a manhole adjacent to the storm sewer intake. The manhole will be hydraulically connected on the north side of the intake and will include a sluice gate and access to allow a portable pump to be placed to prevent the Raccoon River flows from backing onto the roadway. The pump will also prevent seepage and local rainfall events from inundating U.S. 169. The storm sewer outlet will also be retrofitted with a flap gate and outlet structure (modified SW-402) to mitigate backup onto the roadway.

**Need for Project**

The highway is lower than the top of bank elevations which causes the highway to close even though flows do not enter upon the flood plain. The highway currently closes for approximately a 3 year flood and has closed several times within the same year. The proposed project would reduce the expected closures of the highway by 50% by increasing the resiliency of the highway to approximately a 7 year flood on the Raccoon River. Once flows get out of bank, the highway will be closed.

The project will improve the resiliency of the highway and prevent a long detour for travelers to get into town. A grade raise was considered but ruled out due to costs and the need for additional ROW.

Dallas County  
U.S. 169 in Adel  
Page 2

**Concept**

**Manhole, Sluice Gate, Storm Sewer Outlet Structure and Flap Gate (See Attachment)**

This concept includes the construction of a manhole that is hydraulically connected to the existing storm sewer intake to allow pumping of seepage and storm water during a flood event. This will allow the highway to remain open until the river flows out of bank. This will double the resiliency of the highway to remain open and will not close the highway until the North Raccoon River reaches a stage of approximately 17.5 at the Perry gage. The project would reduce the duration and closure of the highway from approximately 13 times to 9 times based on historical information over the last 20 years. In addition, the duration of closure for these events will be greatly reduced.

Listed below is the cost estimate to improve resiliency on U.S. 169.

Cost Estimate:

Manhole/Sluice Gate	\$ 20,000
Flap Gate/Outlet Structure	\$ 10,000
Pump/Generator	\$ 2,000
Mobilization/Contintency	\$ 6,400
 Total	 \$ 38,400

**Recommendation**

Develop and implement project as described herein.

**Special Considerations**

The project will require an agreement with the City of Adel outlining agency responsibilities for maintenance and pumping duties.

Raccoon River is not designated as meandered at this location and thus a DNR Sovereign Lands permit will not be required.

The Office of Location and Environment has not reviewed this project but environmental review and clearances may be required.

Extent of existing utilities in the area is unknown but are not anticipated to be in conflict with the proposed work.

Survey is required.

It is anticipated the work for the primary project would be awarded to one prime contractor. The Design Bureau will develop the plan preparation for a December 19, 2023 letting.

### SURVEY SYMBOLS

- Interstate Highway Symbol
- U.S. Highway Symbol
- Iowa Highway Symbol
- County Road Highway Symbol
- Evergreen Tree
- Deciduous Tree
- Fruit Tree
- Shrub (Bushes)
- Timber
- Hedge
- Stump
- Swamp
- Rock Outcrop
- Broken Concrete
- Revetment (Rip Rap)
- Cemetery
- Grave
- Cave
- Sink Hole
- Board Fence
- Chain Link or Security Fence
- Wire Fence
- Terrace
- Earth Dam or Dike (Existing)
- Tile Outlet
- Edge of Water
- Existing Drainage
- Right of Way Rail or Lot Corner
- Concrete Monument
- Well
- Windmill
- Beehive Intake
- Existing Intake
- Existing Utility Access (Manhole)
- Fire Hydrant
- Water Hydrant (Rural)
- Septic Tank
- Cistern
- L.P. Gas Tank (No Footing)
- Underground Storage Tank
- Latrine
- Satellite TV Dish
- Water Hook Up
- Radio Tower
- Tower Anchor
- Guardrail (Beam or Cable)
- Guard Post (one or two)
- Guard Post (over two)
- Filler Pipe
- Gas Valve
- Water Valve
- Speed Limit Sign
- Mile Marker Post
- Sign
- Traffic Signal Control Box
- Rail Road Signal Control Box
- Telephone Switch Box
- Electric Box

### UTILITY LEGEND

- FO1 — FO1D CENTURY LINK - Quality D
- FO2 — FO2D MEDIACOM - Quality D
- G — GL1D Mid American - Quality D
- PPA — PPA Power Pole Mid American

### PLAN VIEW COLOR LEGEND OF PLAN AND PROFILE SHEETS

LINEWORK		Design Color No.	
Green	(2)		Existing Topographic Features and Labels
Blue	(1)		Proposed Alignment, Stationing, Tic Marks, and Alignment Annotation
Magenta	(5)		Existing Utilities
SHADING		Design Color No.	
Lavender	(9)		Temporary Pavement Shading
Gray, Light	(48)		Proposed Pavement Shading
Gray, Med	(80)		Proposed Granular Shading
Gray, Dark	(112)		Proposed Grade and Pave Shading "In conjunction with a paving project"
Brown, Light	(236)		Grading Shading
Tan	(8)		Proposed Sidewalk Shading
Blue, Light	(230)		Proposed Sidewalk Landing Shading
Pink	(11)		Proposed Sidewalk Ramp Shading

### PROFILE VIEW COLOR LEGEND OF PLAN AND PROFILE SHEETS

LINEWORK		Design Color No.	
Green	(2)		Existing Ground Line Profile
Blue	(1)		Proposed Profile and Annotation
Magenta	(5)		Existing Utilities
Blue, Light	(230)		Proposed Ditch Grades, Left
Black	(0)		Proposed Ditch Grades, Median
Rust	(14)		Proposed Ditch Grades, Right

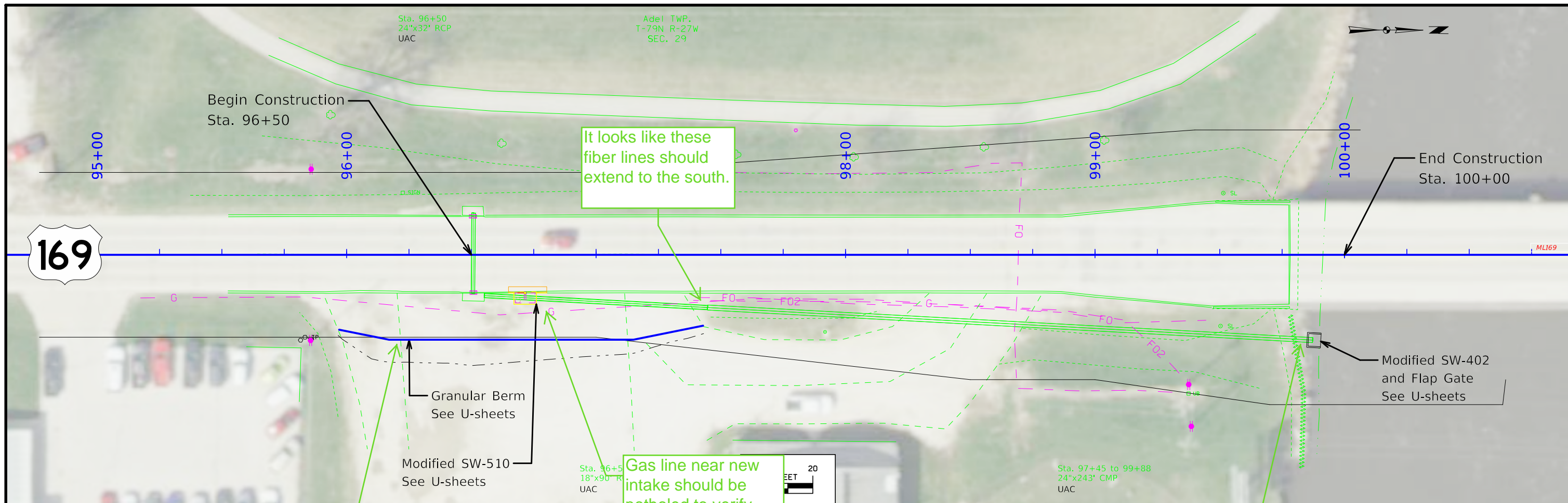
- Reference Point
- Station
- Survey Line
- Section Corner
- Ground Line Intercept
- Saw Cut
- Guardrail
- Trench Drain
- HighTension Cable Guardrail
- Sheet Pile
- Pavement Removal
- Clearing & Grubbing Area

### RIGHT-OF-WAY LEGEND

- Proposed Right-of-Way
- Existing Right of Way
- Existing and Proposed Right-of-Way
- Easement and Existing Right-of-Way
- Easement (Temporary)
- Easement
- Access Control
- Property Line

## PLAN AND PROFILE LEGEND AND SYMBOL INFORMATION SHEET

(COVERS SHEET SERIES D, E, F, & K)



It looks like these fiber lines should extend to the south.

Gas line near new intake should be potholed to verify location w.r.t. intake. District staff will look into this.

Move berm closer to road, so that the top of berm will be on DOT ROW

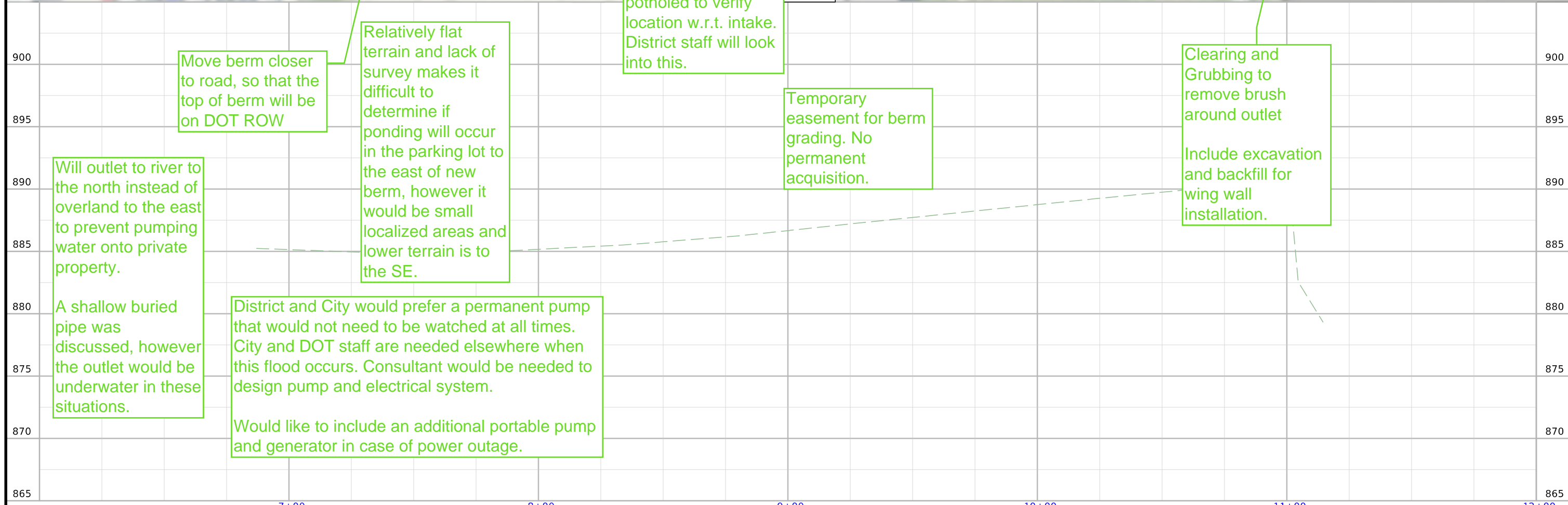
Relatively flat terrain and lack of survey makes it difficult to determine if ponding will occur in the parking lot to the east of new berm, however it would be small localized areas and lower terrain is to the SE.

Temporary easement for berm grading. No permanent acquisition.

Clearing and Grubbing to remove brush around outlet  
Include excavation and backfill for wing wall installation.

Will outlet to river to the north instead of overland to the east to prevent pumping water onto private property.  
A shallow buried pipe was discussed, however the outlet would be underwater in these situations.

District and City would prefer a permanent pump that would not need to be watched at all times. City and DOT staff are needed elsewhere when this flood occurs. Consultant would be needed to design pump and electrical system.  
Would like to include an additional portable pump and generator in case of power outage.



## Survey Information

Dallas County  
NHSN-169-4(67)—2R-25  
Location: Raccoon River Mill Race Bridge 1.4 mi N of US 6  
Type of Work: Storm Sewer/Intakes  
Project Directory: 2516901020  
PIN: 20-25-169-010  
Sap-07191

### Party Personnel

Paul Harry- Party Chief  
Scott Liddell- Party Chief

### Date(s) of Survey

Begin Date 12/7/2020  
End Date 12/22/2020

### General Information

Measurement units for this survey are US survey feet. Project datum and control information is provided by Design Survey Office. This project is a Full DTM without Photo control.

### Vertical Control

The vertical datum is NAVD88. Vertical Control was established on 2 monuments designated as points 25169001, and 25169002. These monuments are expected to hold vertical reasonably well. Datum was transferred from Iowa RTN reference stations to the projects monuments by using concurrent 6-hour static measurements and post processing connecting vectors. Geoid g2012bu3 was used in processing.

This survey observed 2 NGS Control Monuments with published NAVD88 heights and 1 Dallas County Control Monument to compare to local ground control:

NGS First order class 2 monument designated TT4MT has a published Elev. of 913.21  
Survey Elev. = 913.19

NGS First order class 2 monument designated C4 has a published Elev. of 1023.72  
Survey Elev. = 1023.67

Dallas County monument designated G122 has a published Elev. of 967.84  
Survey Elev. = 967.80

### Horizontal Control

The project coordinate system for this survey is Iowa RCS Zone 8 (U.S. Survey Feet). This survey control is relative to laRTN reference stations. laRTN Reference Station coordinate are relative to the National Reference Station network datum NAD83 (2011) for Epoch 2010.00. Coordinates were determined by using concurrent 6-hour static measurements and post processing connecting vectors.

### Alignment Information

The horizontal alignment for this survey is a retrace of Paving Plans No. FN-169-4(17)—21-25. Survey stationing was equated to the plan POT at Sta. 88+76.88 and run ahead without equation throughout the survey.

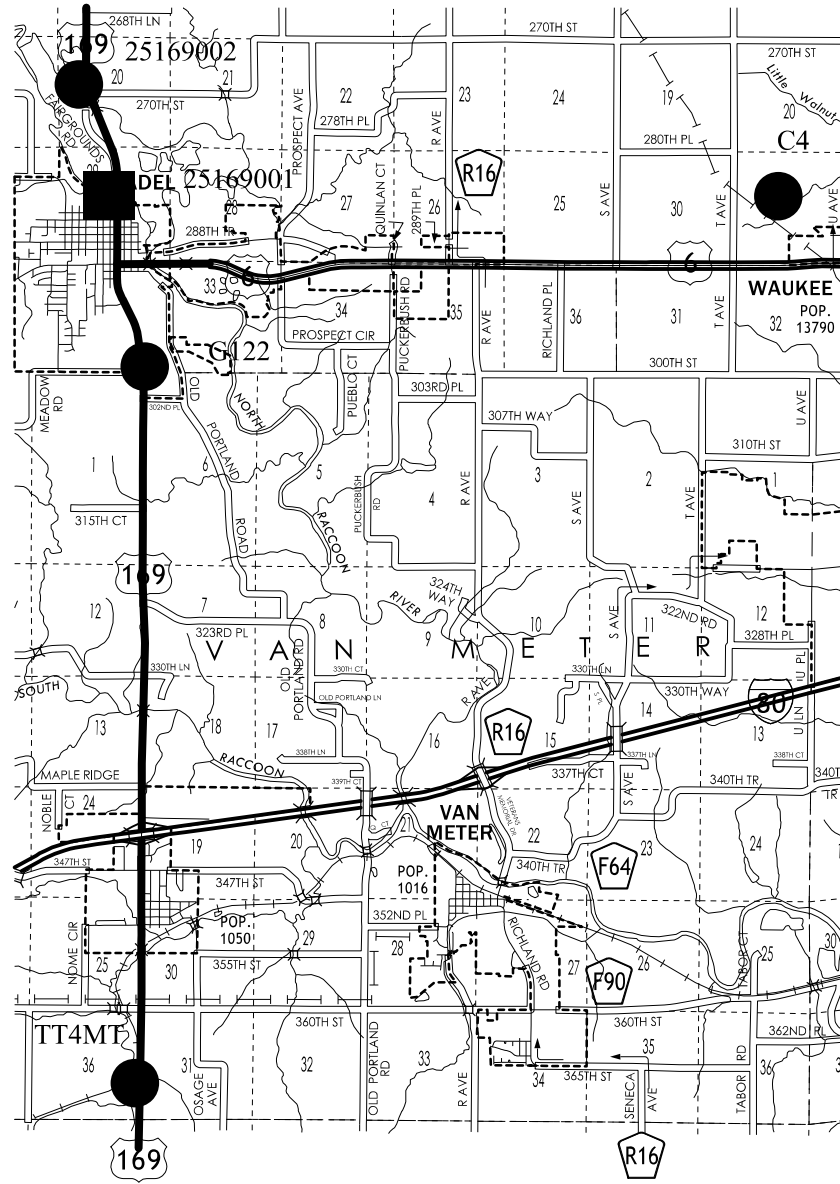
Survey stationing relates to as built plan stationing as follows:

POT Sta. 88+76.88 Paving Plans Project No. FN-169-4(17)—21-25.  
Survey POT Sta. 88+76.88

PI Sta. 101+51.34 Paving Plans Project No. FN-169-4(17)—21-25.  
Survey PI Sta. 101+52.13

## CONTROL POINT VICINITY MAP

This map is a guide to the vicinity of the primary project control points  
 Primary control is for use with RTK base stations and for RTN validation.  
 Future surveys will use primary project control to establish temporary  
 control as needed for construction or other surveying applications.



R-27W

HORIZ. DATUM: NAD83(2011) EPOCH 2010.00

VERT. DATUM: NAVD88

1a. Regional Coordinate System Zone 8

Coordinate listing from next sheet will be used with 1aRTN for monument  
 recovery. No other reference ties are given.

HORIZONTAL AND VERTICAL PROJECT CONTROL COORDINATE LISTING

HORIZ. DATUM: NAD83(2011) EPOCH 2010.00

VERT. DATUM: NAVD88

1a. Regional Coordinate System Zone 8

Project Control Marks are Bench Marks

Point Name	North Coordinate	East Coordinate	Elevation	Feature Code- Monument Description
25169001	7500467.3	18417649.54	886.52	FENO 1100FT NORTH FROM THE INTERSECTION OF HWY 169 AND GROVE ST 86FT W OF CL HWY 169 68FT NW OF SPEED LIMIT SIGN POST AND 18FT NE OF CL HMA TRAIL
25169002	7505705.34	18416190.46	894.2	CP CONCRETE MONUMENT 500FT N OF THE INTERSECTION OF HWY 169 AND 270TH ST 130FT W OF CL HWY 169 32FT S OF POWER POLE AND 2FT E OF WOVEN WIRE FENCE.
G122	7492207.52	18418998.67	967.8	CP COUNTY GPS MONUMENT 72FT E OF CL HWY 169 68FT N OF CL MEADOW RD AND 47FT NE OF STEEL LUM POLE
TT4MT	7458419.63	18418841.55	913.19	CP NGS BRASS DISC IN TOP CONCRETE MONUMENT 0.7 MILES S OF THE INTERSECTION OF HWY 169 AND COUNTY ROAD F90 77FT W OF CL HWY 169 41.5FT NW OF POWER POLE AND 12FT NW OF TOP CL CMP INLET
C4	7500414.79	18449310.58	1023.67	CP NGS BRASS DISC IN HDWL RCB 300FT SE OF INTERSECTION OF NW BENNINGTON DR AND NW GEORGETOWN DR 285FT SW OF THE INTERSECTION OF NW JAMESTOWN LN AND NW GEORGETOWN DR 67FT SW OF CENTER MH TOP 6FT X 6FT CONC AREA INTAKE AND 11FT SW OF CL CONC TRAIL



**ALIGNMENT COORDINATES**

Name	Location	Point on Tangent			Begin Spiral			Begin Curve			Simple Curve PI or Master PI of SCS			End Curve			End Spiral		
		Station	Coordinates		Station	Coordinates		Station	Coordinates		Station	Coordinates		Station	Coordinates		Station	Coordinates	
			Y (Northing)	X (Easting)		Y (Northing)	X (Easting)		Y (Northing)	X (Easting)		Y (Northing)	X (Easting)		Y (Northing)	X (Easting)		Y (Northing)	X (Easting)
1	ML169	88+76.88 R1	7499362.09	18417736.85															
2	ML169	101+52.13 R1	7500637.34	18417735.01															

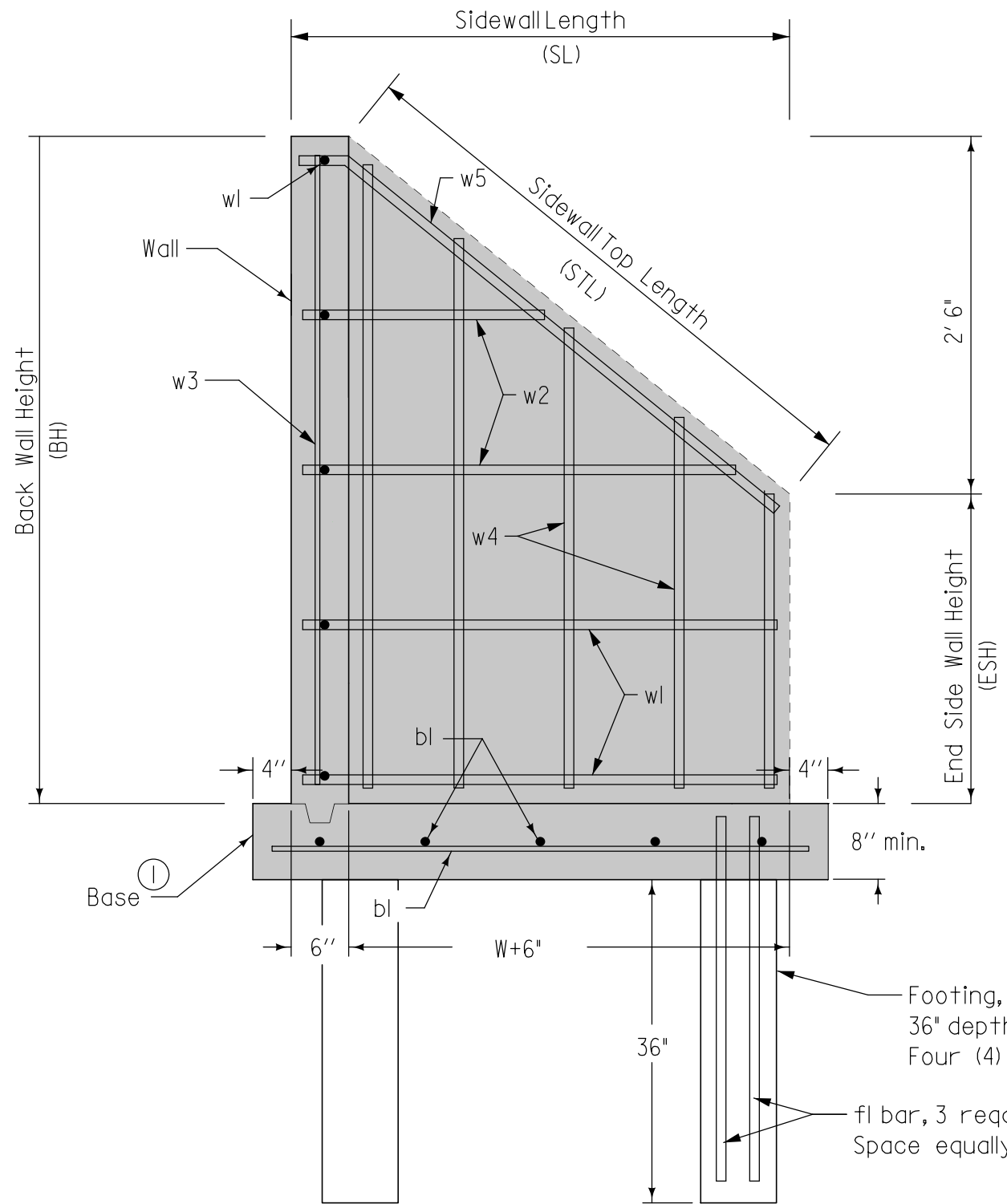
**511 TRAVEL RESTRICTIONS**

Route	Direction	County	Location Description	Feature Crossed	Object Type	Maint. Bridge No., Structure ID, or FHWA No.	Type of Restriction	Existing Measurement	Construction Measurement	Construction Measurement as Signed	Projected As Built Measurement	Remarks
			None Anticipated									

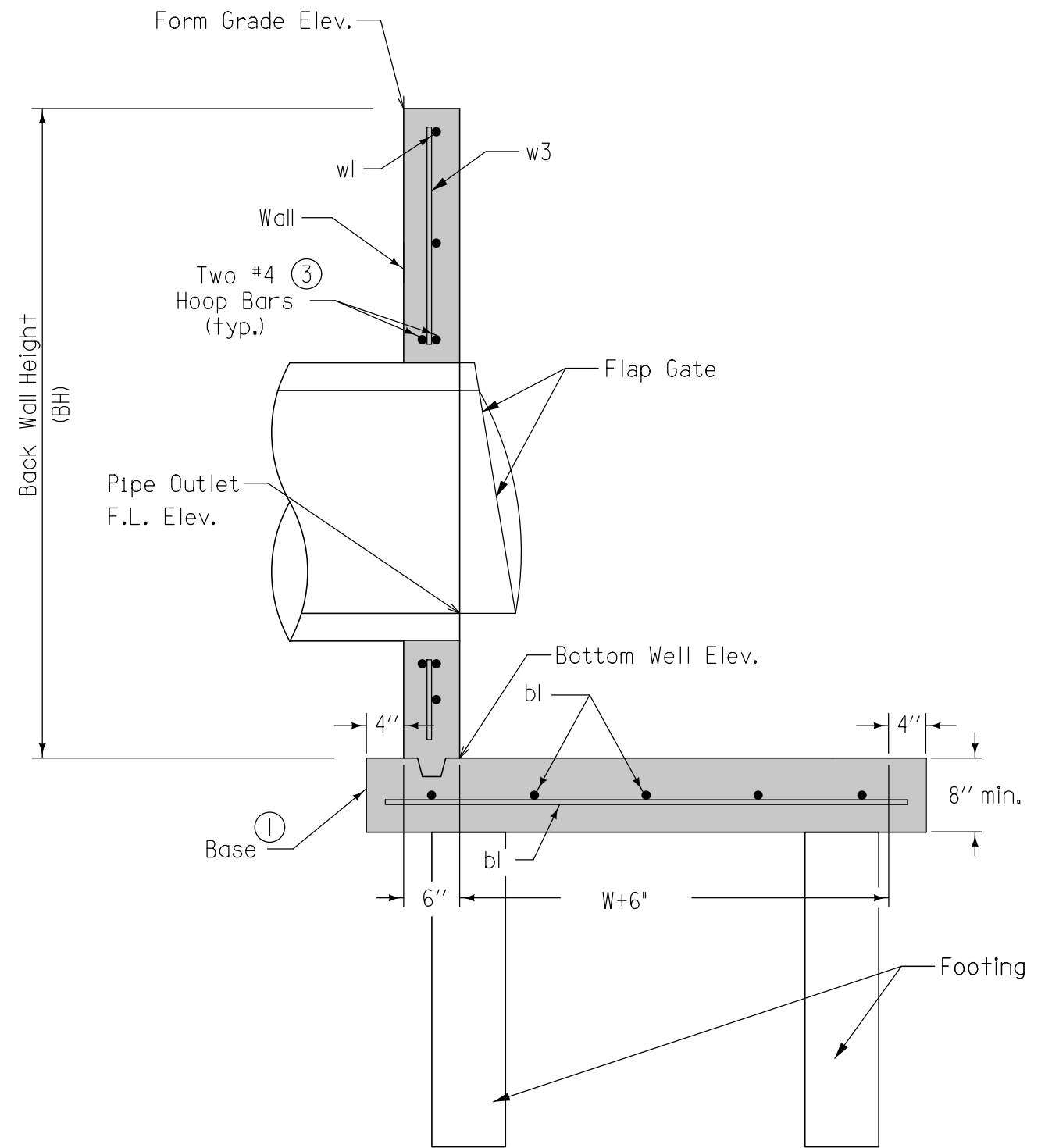
108-23A  
08-01-08

**TRAFFIC CONTROL PLAN**

Construct modified SW-510 utilizing TC-216 (Lane Closure with Signals).



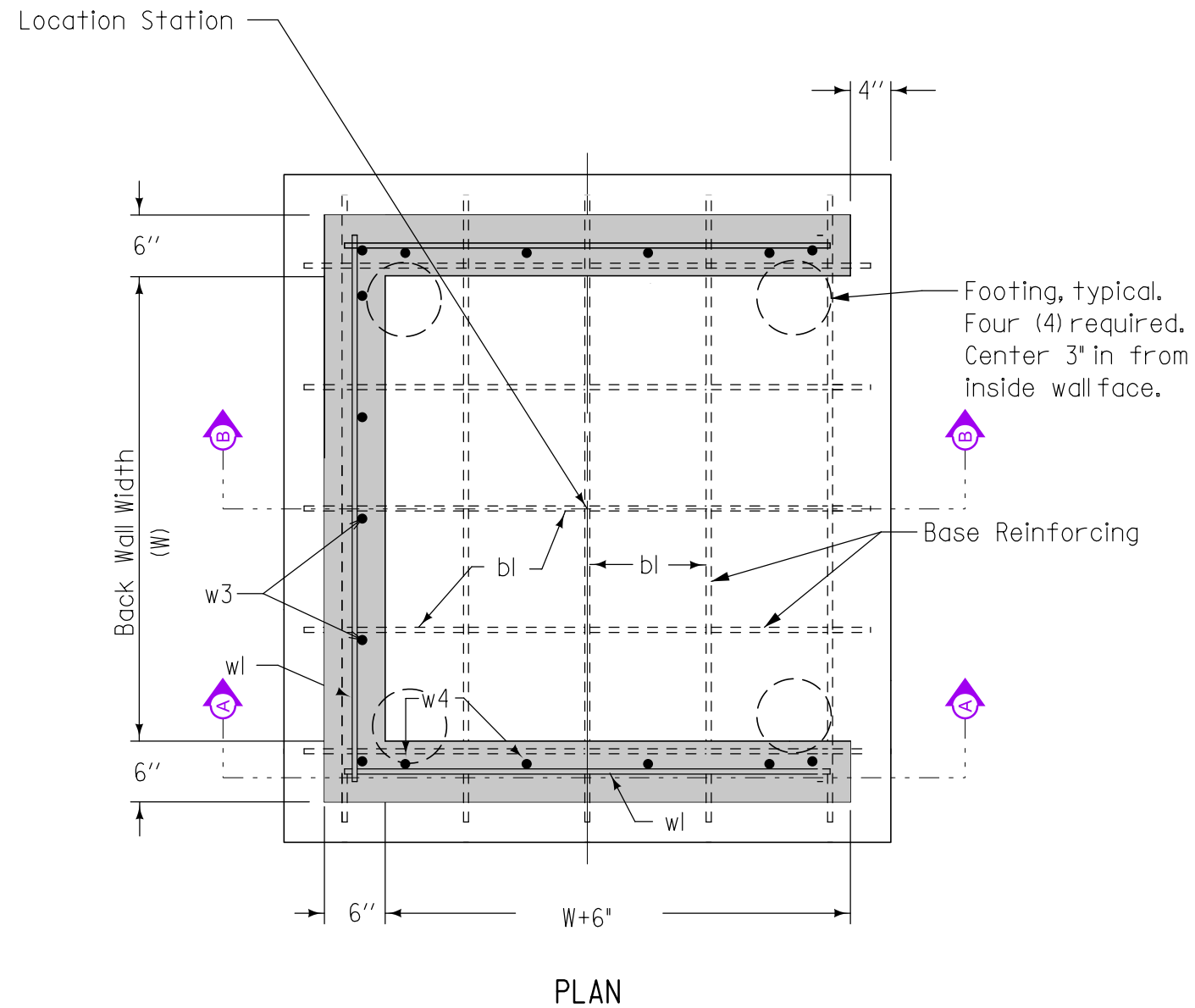
SEC. A-A  
TYPICAL SECTION



SEC. B-B  
TYPICAL SECTION

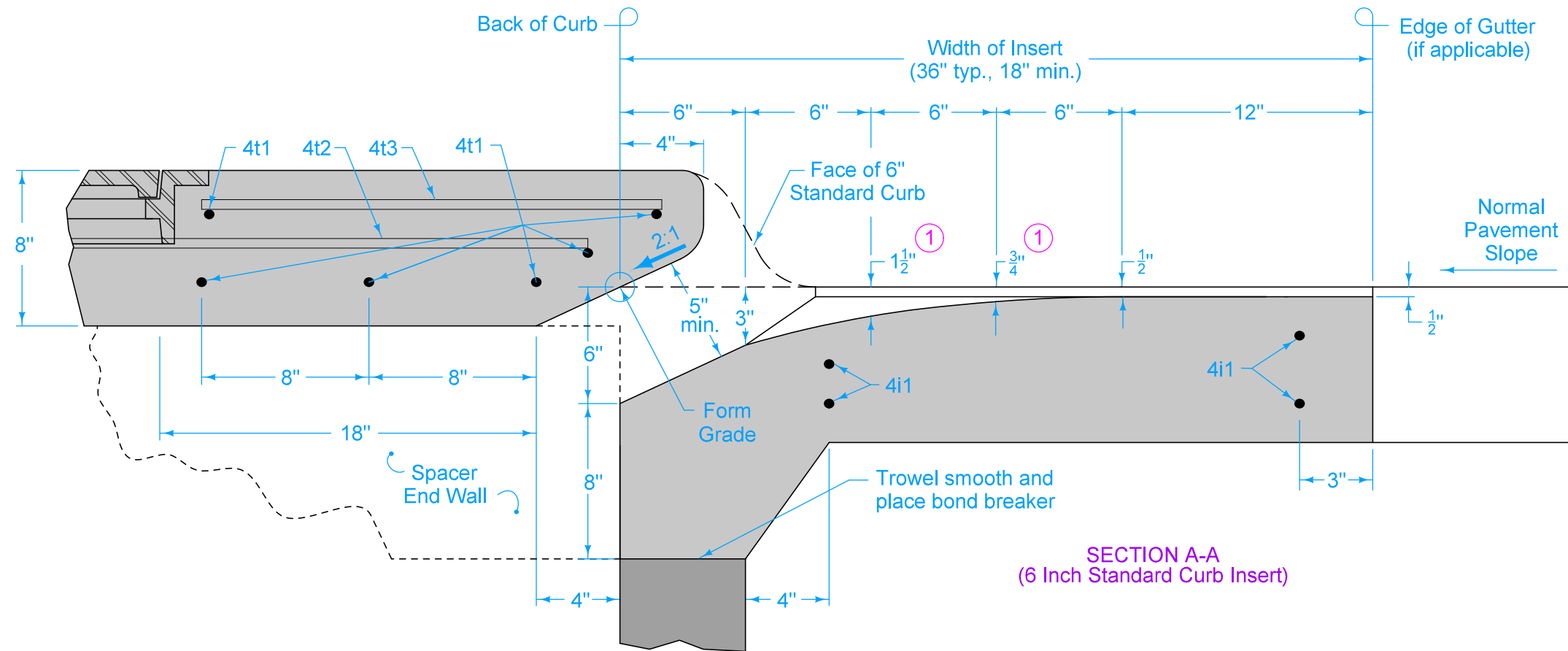
- ① Cast-in-place base shown. If base is precast integral with walls, the footprint of the base is not required to extend beyond the outer edge of the walls.
- ② For precast base, provide 6" dia. blockout in base at footing locations. Extend footing bars into base and fill blockout with concrete.
- ③ Provide two #4 hoop bars at all pipe openings.

**SW-402 MODIFIED  
STORM SEWER MANHOLE  
1/2**



REINFORCING BAR LIST					
Mark	Size	Location	Shape	Length	Spacing
bl	5	Base	—	W plus 14"	12"
w1	5	Walls Hor.	—	W plus 8"	12"
w2	5	Walls Hor.	—	Var. 6" to SL minus 4"	12"
w3	5	Walls Vert.	—	BH minus 4"	12"
w4	5	Walls Vert.	—	Var. ESH to BH minus 4"	12"
w5	5	Wall Top	—	STL plus 2"	NA
fl	4	Footing	—	40"	NA

**SW-402 MODIFIED  
STORM SEWER MANHOLE  
2/2**



① Insert shaping may be modified for insert widths less than 36 inches. For an 18 inch insert, reduce dimensions indicated by 1/4 inch.

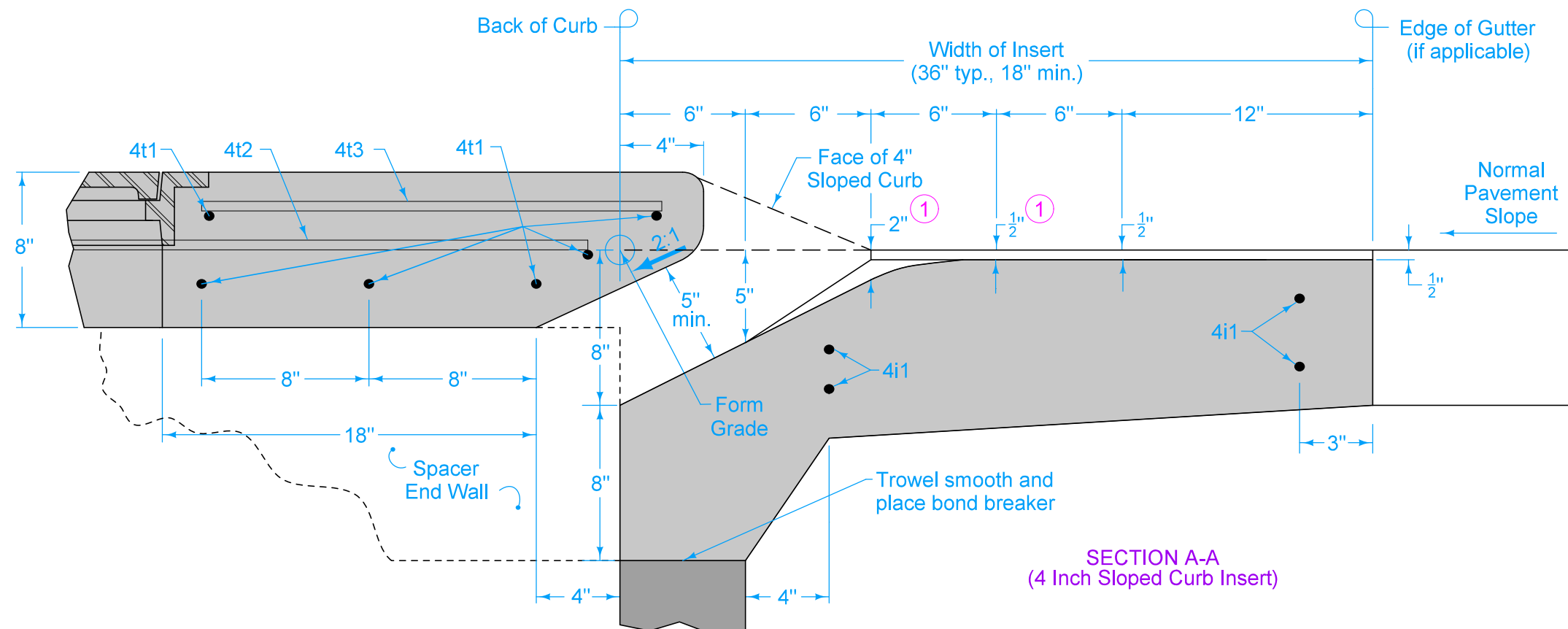
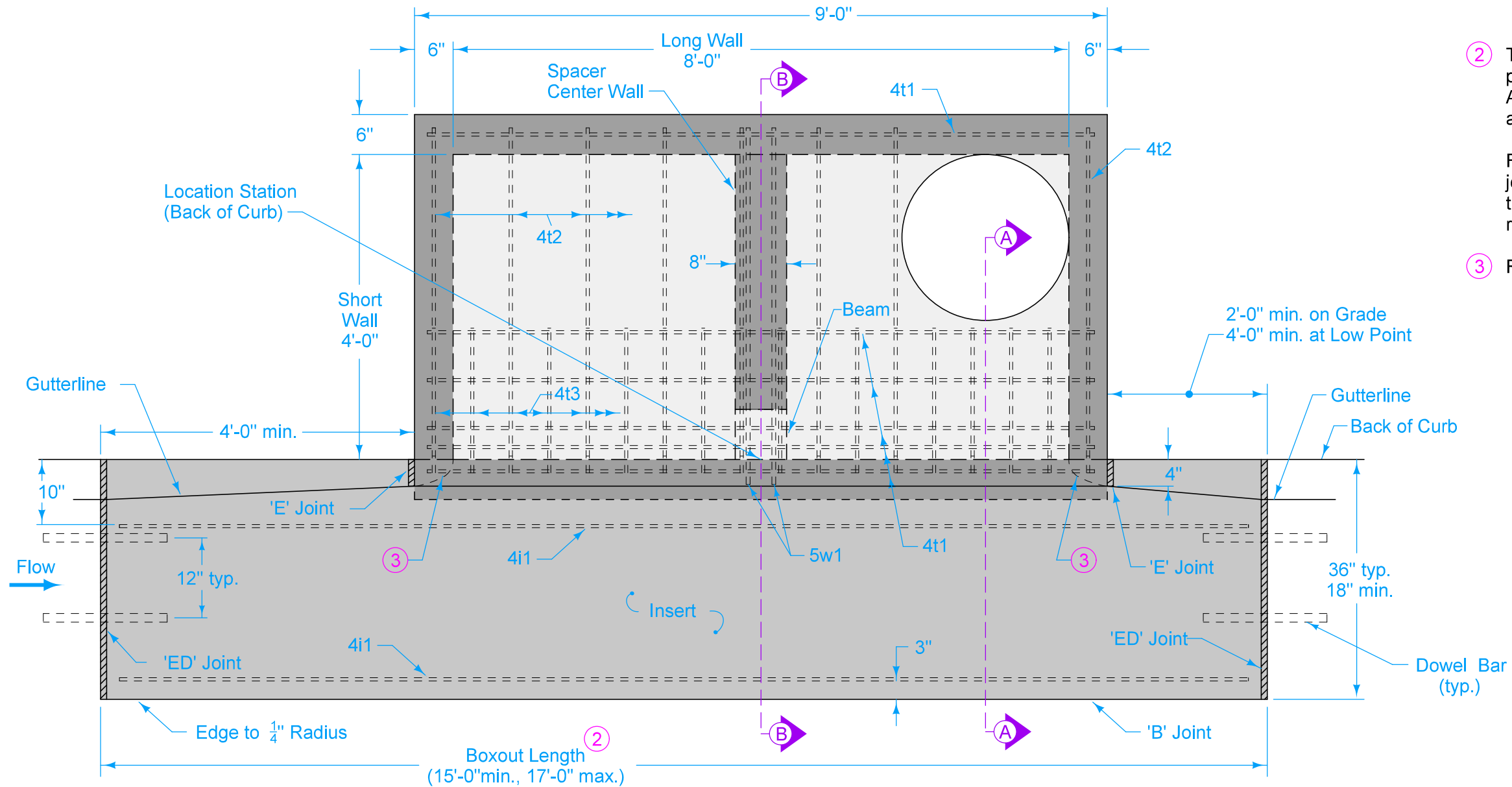


FIGURE 6010.510 SHEET 1 OF 3

		MODIFIED	
		6	04-21-20
FIGURE 6010.510	STANDARD ROAD PLAN	<b>SW-510</b>	
		SHEET 1 of 4	

MODIFICATIONS: Changed

**DOUBLE OPEN-THROAT CURB INTAKE, LARGE BOX**

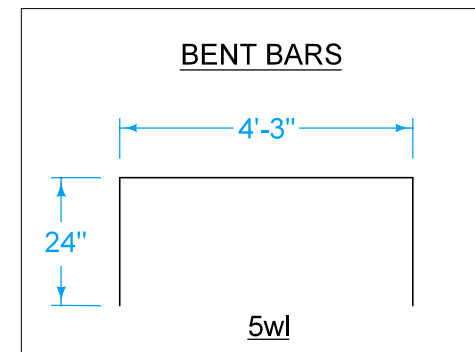


- ② Transverse joint spacing on new concrete pavement is controlled by the intake boxout. Adjust adjacent joint spacing as required to accommodate boxouts.  
  
For retrofit intakes, match existing pavement joints. Stop any transverse pavement joints that do not conform to the minimum spacing requirements at the edge of the insert area.
- ③ Rounded shaping at inlet.

PLAN

REINFORCING BAR LIST

Mark	Size	Location	Shape	Count	Length	Spacing
4b1	4	Base	—	9	4'-6"	12"
4b2	4	Base	—	6	8'-6"	11"
4i1	4	Insert	—	4	Boxout Length minus 8"	See Insert
4t1	4	Top	—	7	8'-6"	See Plan
4t2	4	Top	—	8	4'-4"	12"
4t3	4	Top	—	18	1'-10"	6"
4w1	4	Walls	—	24	Wall Height minus 4"	13"
4w2	4	Long Walls	—	Varies	4'-8"	12"
4w3	4	Short Walls	—	Varies	8'-8"	12"
5w1	5	Beam	┌	2	8'-3"	4"

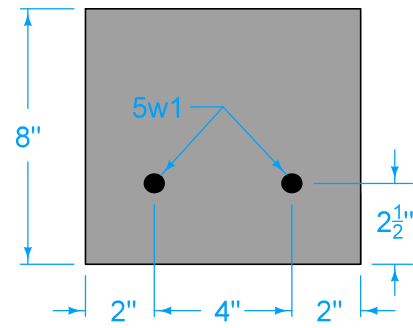


		MODIFIED	
		6	04-21-20
<b>FIGURE 6010.510</b>	<b>STANDARD ROAD PLAN</b>	<b>SW-510</b>	
		SHEET 2 of 4	

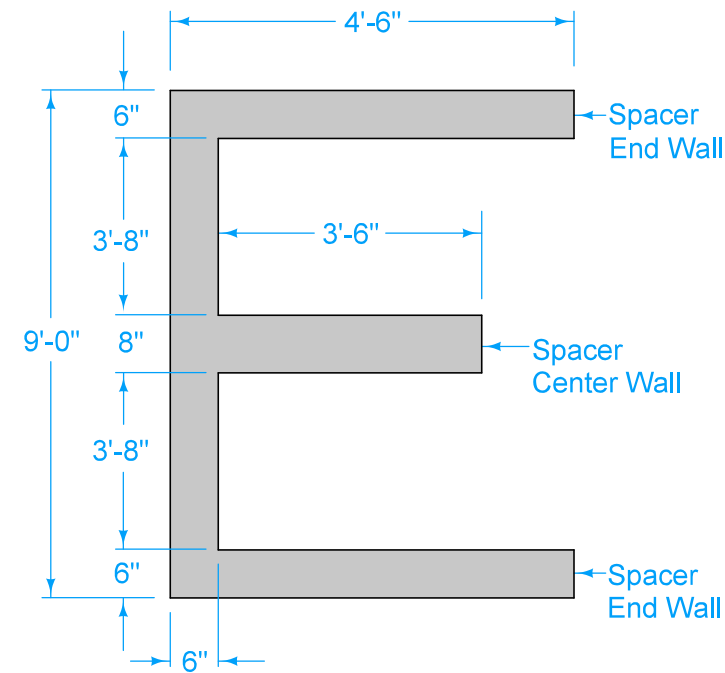
MODIFICATIONS: Changed

**DOUBLE OPEN-THROAT CURB  
INTAKE, LARGE BOX**

FIGURE 6010.510 SHEET 2 OF 3



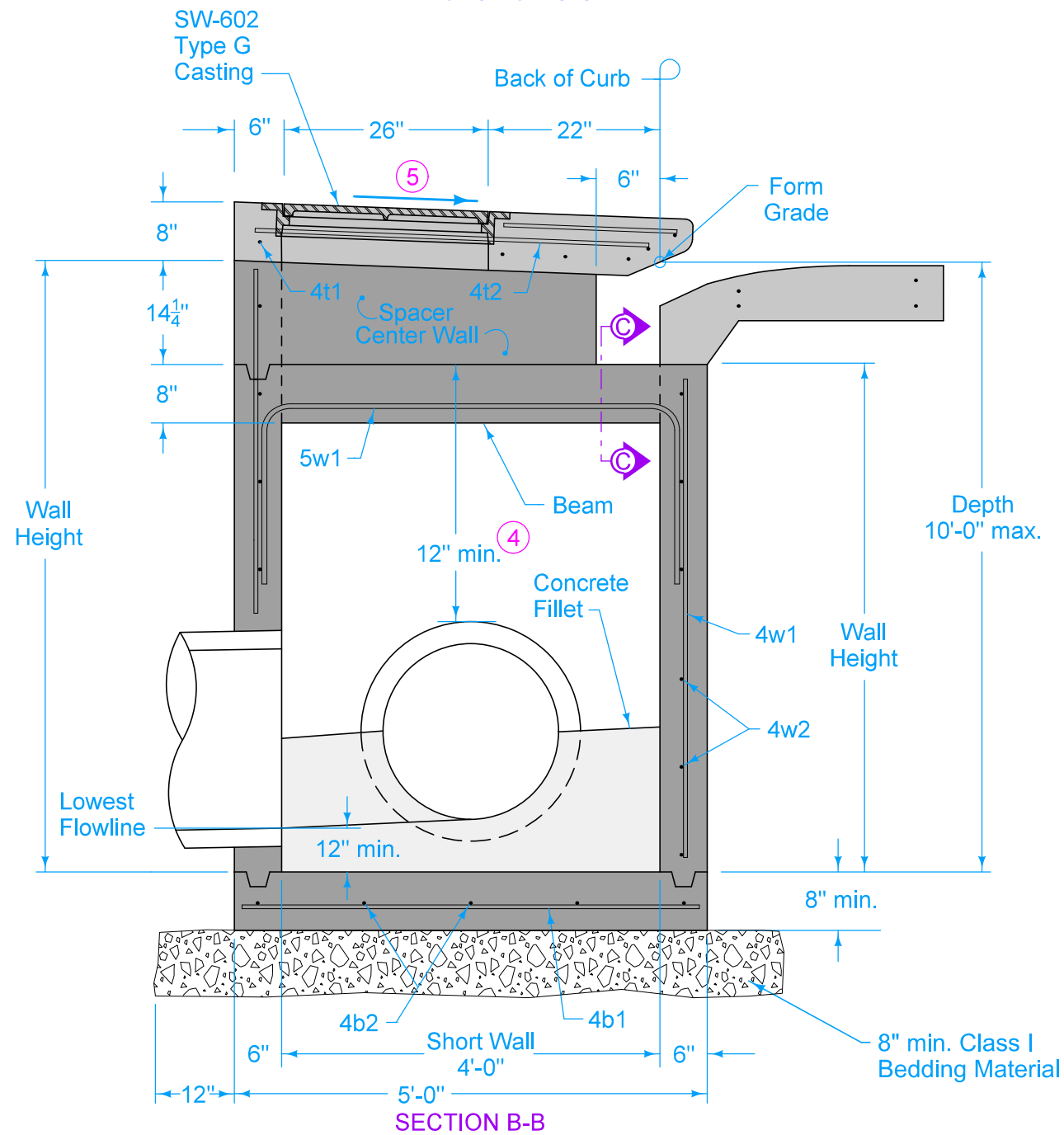
SECTION C-C



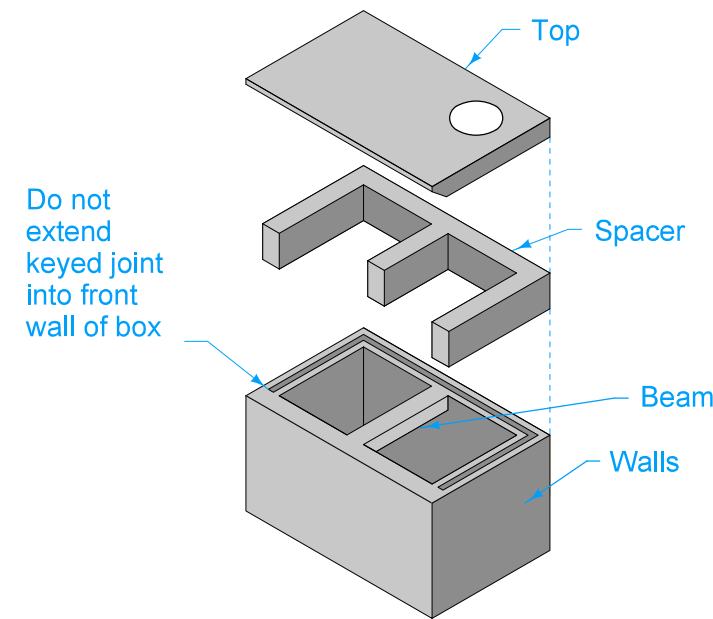
PLAN (SPACER)

- ④ 12 inch minimum wall height above all pipes.
- ⑤ Slope of 1.5% or as specified in the contract documents.

MAXIMUM PIPE DIAMETERS		
Pipe Location	Precast Structure	Cast-in-place Structure
Short Wall	30"	36"
Long Wall	60"	66"



SECTION B-B



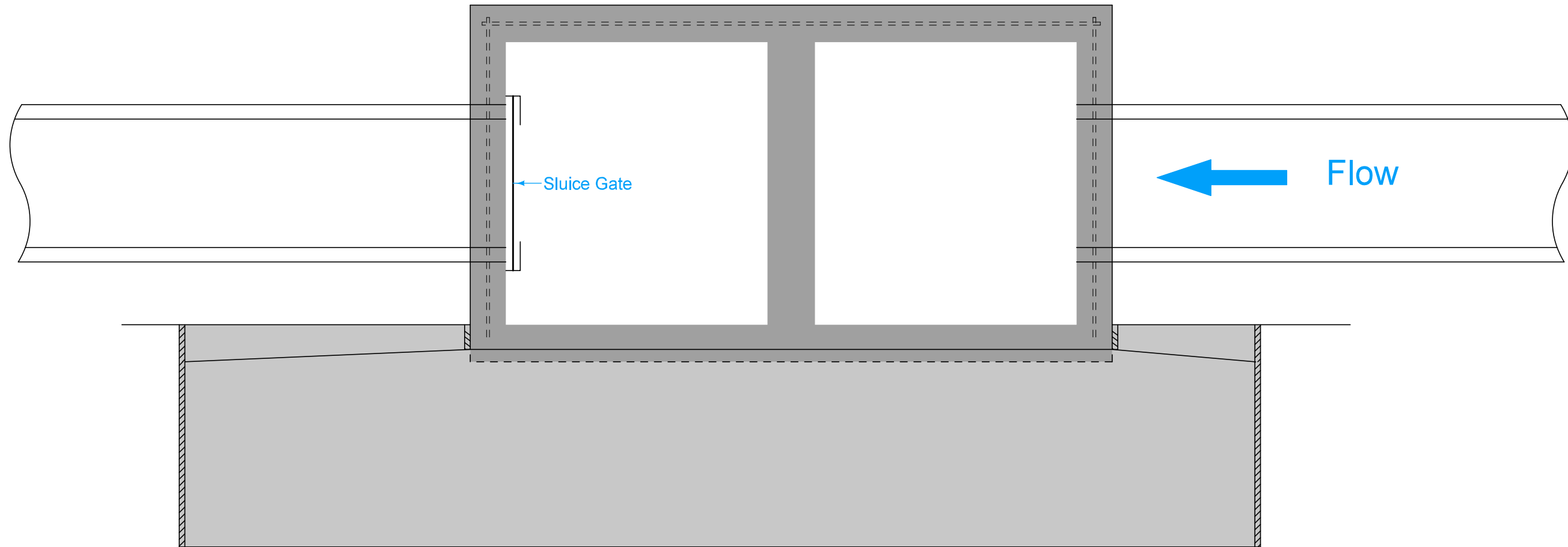
ISOMETRIC  
(Refer to Section B-B  
for alignment of Top  
with Spacer)

FIGURE 6010.510	STANDARD ROAD PLAN	MODIFIED	
		6	04-21-20
		<b>SW-510</b>	
		SHEET 3 of 4	

MODIFICATIONS: Changed

**DOUBLE OPEN-THROAT CURB  
INTAKE, LARGE BOX**

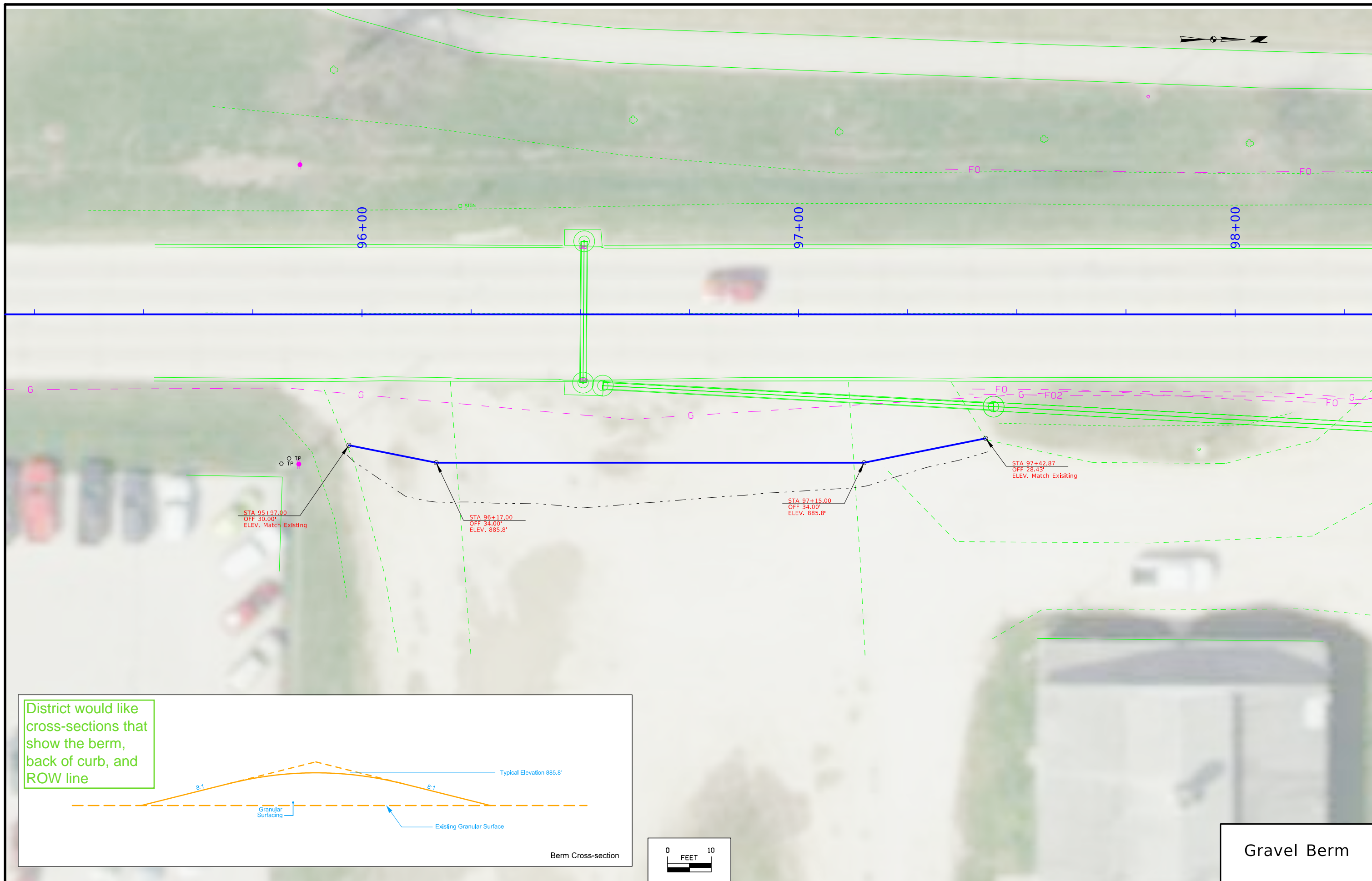
FIGURE 6010.510 SHEET 3 OF 3



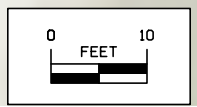
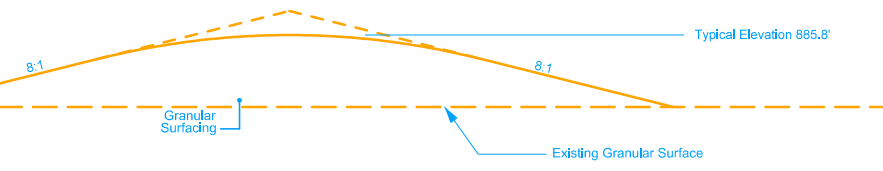
PLAN

		MODIFIED	
		6	04-21-20
<b>FIGURE 6010.510</b>	<b>STANDARD ROAD PLAN</b>	<b>SW-510</b>	
		SHEET 4 of 4	
<small>MODIFIED AS PER CLASS SHEET CHANGE DATE CHANGED MAXIMUM BOX OUT LENGTH TO 17'.</small>			
SUDAS DIRECTOR		DESIGN METHODS ENGINEER	
<b>DOUBLE OPEN-THROAT CURB INTAKE, LARGE BOX</b>			





District would like cross-sections that show the berm, back of curb, and ROW line



Gravel Berm