20 WEST INDUSTRIAL CENTER
LETTING DATE
RM-2160(618)--9D-31 SEPTEMBER 27, 2023

CITY OF DYERSVILLE - DELAWARE COUNTY

IOWA DNR STORM WATER PERMIT
THIS PROJECT IS COVERED BY THE IOWA DEPARTMENT OF NATURAL RESOURCES NPDES GENERAL PERMIT NO. 2. THE CONTRACTOR SHALL CARRY OUT THE TERMS AND CONDITIONS OF GENERAL PERMIT NO. 2 AND THE STORM WATER POLLUTION PREVENTION PLAN WHICH IS PART OF THESE CONTRACT DOCUMENTS. REFER TO SECTION 2602 OF THE IDOT STANDARD SPECIFICATIONS FOR ADDITIONAL INFORMATION.

NPDES PERMIT DISCHARGE AUTHORIZATION NUMBER 41617-41242
ISSUED FOR 20 WEST INDUSTRIAL CENTER – SEVENTH ADDITION CONSTRUCTION
WEST END OF INDUSTRIAL PARKWAY SW IN THE CITY OF DYERSVILLE, DELAWARE COUNTY
LOCATED AT NE 1/4 SEC 2 T88N R3W.
COVERAGE PROVIDED THROUGH 8/1/2025

CITY OF DYERSVILLE - DELAWARE COUNTY

RM-2160(618)--9D-31

20 WEST INDUSTRIAL CENTER
PHASE 3
CONTRACT C - CULVERT

THE 2015 EDITION OF THE IOWA DEPARTMENT OF TRANPORTATION STANDARD SPECIFICATIONS FOR HIGHWAY AND BRIDGE CONSTRUCTION, GENERAL SUPPLEMENTAL SPECIFICATIONS AND APPLICABLE SUPPLEMENTAL SPECIFICATIONS, DEVELOPMENTAL SPECIFICATIONS AND SPECIAL PROVISIONS SHALL APPLY UNLESS OTHERWISE SUPERCEDED BY THE CONTRACT DOCUMENTS AND TECHNICAL SPECIFICATIONS.

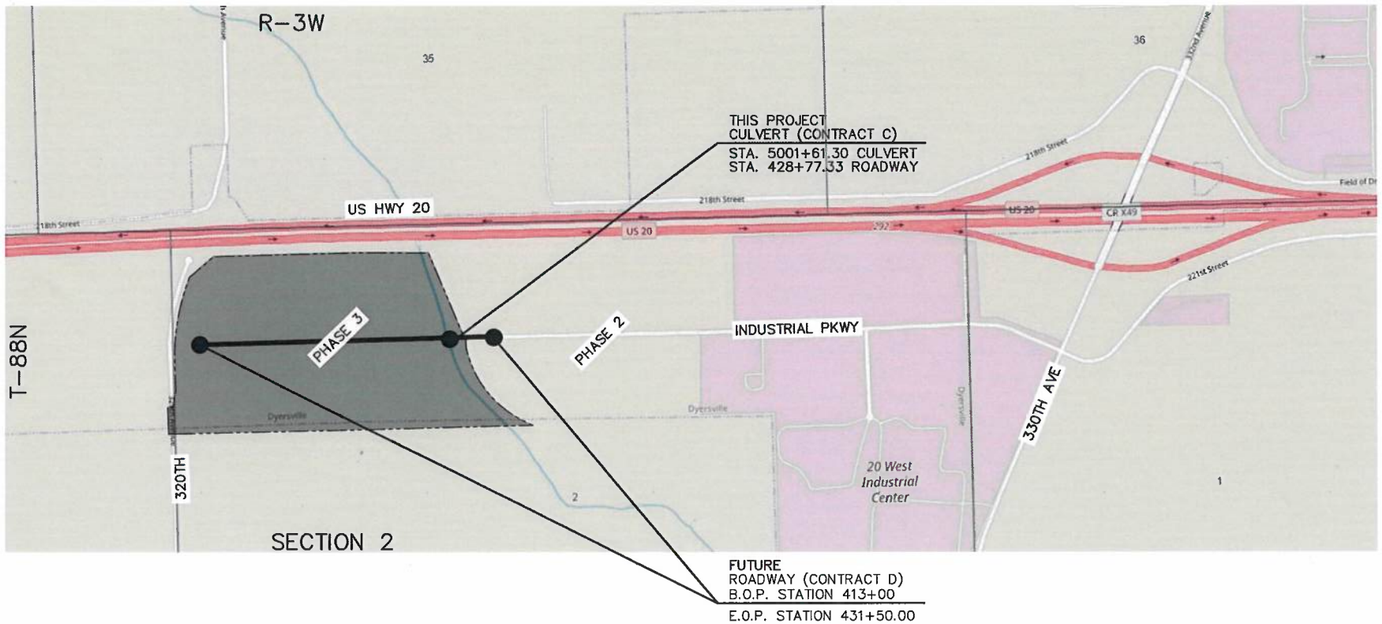
SEE SHEET C.3 FOR STANDARD ROAD PLAN TABULATION AND STANDARD BRIDGE PLAN TABULATION.

TOTAL SHEETS
9

PROJECT NUMBER
RM-2160(618)--9D-31

INDEX OF SHEETS

105-3
10-18-05



APPROX. SCALE:
0 500 1000
SCALE IN FEET

MILEAGE SUMMARY

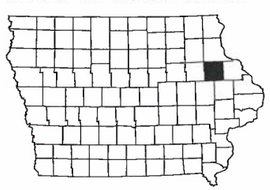
105-1
09-27-94

DIV.	LOCATION	LIN. FT.	MILES
1	CULVERT STA 428+77.33	134	0.025
	TOTAL	134	0.025

WATER & SEWER:	CITY OF DYERSVILLE wandsnider@cityofdyersville.com (563) 875-7724
GAS:	BLACK HILLS ENERGY BRIAN.MCWILLIAM@BLACKHILLSCORP.COM (563) 927-1017
ELECTRICAL POWER:	ALLIANT ENERGY CHAD MEYER (563) 587-4510
COMMUNICATION:	WINDSTREAM COMMUNICATIONS (800) 289-1901
COMMUNICATION:	CENTURY LINK (918) 547-0147
COMMUNICATION:	IOWA COMMUNICATIONS NETWORK (800) 572-3940
ONE CALL	IOWA ONE CALL 1 (800) 292-8989

origin design®
WORKING ON TOMORROW.
800 556-4491
origindesign.com

LOCATION MAP



WORKING DRAWINGS/SUBMITTALS/SHOP
DRAWINGS WILL BE CHECKED BY ORIGIN DESIGN
137 MAIN STREET, DUBUQUE, IA 52001
563-556-2464 (PHONE); 563-556-7811 (FAX)
JON LUTZ
jon.lutz@origindesign.com

IOWA 811 ONE CALL SM
1 (800) 292 - 8989

LICENSED PROFESSIONAL ENGINEER
JONATHAN H. LUTZ
13164
IOWA

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

FOR ORIGIN DESIGN CO.

JONATHAN H. LUTZ — DATE 8/30/2023
PE 13164 — 12/31/2024
LICENSE — RENEWAL DATE

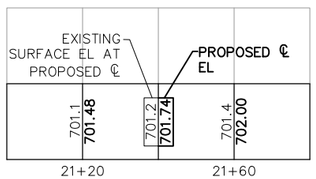
PAGES OR SHEETS COVERED BY THIS CERTIFICATION:
ALL SHEETS SHOWN IN INDEX

P:\21249\DRAWINGS\CIVIL\21249C ZZ 00 G.DWG 8/30/2023 8:42:06 AM LYNN NEAL

RM-2160(618)--9D-31

ABBREVIATIONS

Δ	CENTRAL ANGLE
A/C	AIR CONDITIONING(ER)
AC	ACRES
A.F.F.	ABOVE FINISHED FLOOR
AGG	AGGREGATE
AOH	ARROW ON HYDRANT
ARCH	ARCHITECTURAL
ASPH	ASPHALT
AVG	AVERAGE
B-B	B/C - B/C
B/C, BOC	BACK OF CURB
B/DITCH	BOTTOM OF DITCH
BFP	BACKFLOW PREVENTOR
B/L	BASE LINE
B/S	BOTTOM OF SLOPE
BLDG	BUILDING
B.M.	BENCH MARK
BOP	BEGINNING OF PROJECT
BOT	BOTTOM
BSMT	BASEMENT
BV	BUTTERFLY VALVE
C&G	CURB AND GUTTER
CATV	CABLE TELEVISION
CB	CATCH BASIN
C-C	CENTER TO CENTER
CF	CUBIC FEET
CH	CHORD
CH BRG	CHORD BEARING
CIP	CAST IRON PIPE
C-I-P	CAST-IN-PLACE
CISP	CAST IRON SOIL PIPE
CJ	CONTROL JOINT
℄ OR CL	CENTERLINE
CLR	CLEAR
CMP	CORRUGATED METAL PIPE
CMU	CONCRETE MASONRY UNIT
CO	CLEAN OUT
COL	COLUMN
COMP	COMPACTED
CONC	CONCRETE
CONN	CONNECTION
CONST	CONSTRUCTION
CONT	CONTINUOUS
COR	CORNER
CP	CONTROL POINT
CPE	CORRUGATED POLYETHYLENE PIPE
CRST	CRUSHED STONE
CSP	CORRUGATED STEEL PIPE
CTRD	CENTERED
CTR	CENTER
CULT	CULTIVATED
CV	CHECK VALVE
CY	CUBIC YARD
D	DEGREE OF CURVE
DIA (ø)	DIAMETER
DIP	DUCTILE IRON PIPE
DN	DOWN
DRWY	DRIVEWAY
DS	DOWNSPOUT
DWG(S)	DRAWING(S)
DWL(S)	DOWEL(S)
E	EAST
E'LY	EASTERLY
EA	EACH
EJ	EXPANSION JOINT
EL	ELEVATION
ELEC	ELECTRICAL
ELEV	ELEVATOR
EMBED	EMBEDMENT
ENGR	ENGINEER
ENTR	ENTRANCE
EOP	END OF PROJECT
EOR	END OF RADIUS
E/P	EDGE OF PAVEMENT
EQ	EQUAL
E/S	EDGE OF SHOULDER
ESMT	EASEMENT
EST	ESTIMATE
EX	EXISTING
EXC	EXCAVATE/EXCAVATION
EXP	EXPANSION
EXT	EXTERIOR
EXTD	EXTEND
EW	EACH WAY
FD	FLOOR DRAIN
FDN	FOUNDATION
F.E.	FIELD ENTRANCE
FES	FLARED END SECTION
F-F	FACE TO FACE
FFE	FINISH FLOOR ELEVATION
FG	FORM GRADE
FIN GR	FINISHED GRADE
FL	FLOWLINE
FLG	FLANGE
FLR	FLOOR
FM	FORCE MAIN
FND	FOUND
FT	FOOT/FEET
FTG	FOOTING
FUT	FUTURE
FV	FIELD VERIFY
G	GUTTER
GC	GENERAL CONTRACTOR
GALV	GALVANIZED
GND	GROUND
GRAN	GRANULAR
GRD	GRADE
GV	GATE VALVE
HMA	HOT MIX ASPHALT
HORIZ	HORIZONTAL
HPT	HIGH POINT
HSD	HEADLIGHT STOPPING DISTANCE
HYD	HYDRANT
ID	INSIDE DIA/INSIDE DIM
IE	INVERT ELEVATION
IMP	IMPROVEMENTS
IN	INCHES
INV	INVERT
IP	IRON PIPE
JB	JUNCTION BOX
JT	JOINT/JOINT LENGTH
K	RATE OF VERT CURVATURE
L	LENGTH OF CURVE
LAT	LATERAL
LF	LINEAL FOOT
LONG	LONGITUDINAL
LP	LIGHT POLE
LPT	LOW POINT
LT	LEFT
MAX	MAXIMUM
ME	MATCH EXISTING
MH	MANHOLE
MIN	MINIMUM
MISC	MISCELLANEOUS
MON	MONUMENT
MP	MILE POST
N	NORTH
N/A	NOT APPLICABLE
NE'LY	NORTHEASTERLY
N'LY	NORTHERLY
NO/#	NUMBER
NIC	NOT IN CONTRACT
NTS	NOT TO SCALE
NW'LY	NORTHWESTERLY
OC	ON CENTER
OD	OUTSIDE DIAMETER
PC	POINT OF CURVE
PERF	PERFORATED
PI	POINT OF INTERSECTION
P/L	PROPERTY LINE
PM	PRINCIPAL MERIDIAN
POB	POINT OF BEGINNING
POC	POINT OF CURVE
POT	POINT OF TANGENT
PRC	POINT OF REVERSE CURVE
PRELIM	PRELIMINARY
PROP	PROPOSED
PRV	PRESSURE REDUCING VALVE
PT	POINT OF TANGENCY
PVC	POLYVINYL CHLORIDE
PVMT	PAVEMENT
QTY	QUANTITY
R	RADIUS
R&R	REMOVE & REPLACE
R&S	REMOVE & SALVAGE
RCB	REINFORCED CONCRETE BOX
RCAP	REINFORCED CONCRETE ARCH PIPE
RCP	REINFORCED CONCRETE PIPE
RD	ROAD
REBAR	REINFORCING BAR
REF	REFERENCE
REINF	REINFORCING/REINFORCED
REV	REVISION
RIM	RIM ELEVATION
ROW	RIGHT OF WAY
RP	RADIUS POINT
RS	RESILIENT SEAT
RT	RIGHT
S	SOUTH
S=	SUPERELEVATION
SAN	SANITARY
SANS	SANITARY SEWER
SB	SOIL BORING
SCH	SCHEDULE
SD	SUB DRAIN
SEC	SECTION
SE'LY	SOUTHEASTERLY
SF	SQUARE FOOT
S.F.D.	STEP FOOTING DOWN
SHT	SHEET
SIG.	SIGNAL
SIM.	SIMILAR
S'LY	SOUTHERLY
SOG	SLAB ON GRADE
SPEC	SPECIFICATION
SS	STAINLESS STEEL
SSD	STOPPING SIGHT DISTANCE
ST	STREET
STA	STATION
STD	STANDARD
STL	STEEL
STM	STORM
STMS	STORM SEWER
SW'LY	SOUTHWESTERLY
SY	SQUARE YARD
T	TANGENT LENGTH
T/B	TOP OF BANK
T/DITCH	TOP OF DITCH
T/C, TC	TOP OF CURB
T/GRAV	TOP OF GRAVEL
T/WALL	TOP OF WALL
T/P, TP	TOP OF PAVEMENT
T/S	TOP OF SLOPE
T/SUB	TOP OF SUBGRADE
T/W, TW	TOP OF WALK
T/WM	TOP OF WATER MAIN
T & B	TOP AND BOTTOM
T.O.B.	TOP OF BEAM
T.O.B.L.	TOP OF BRICK LEDGE
T.O.C.	TOP OF CONCRETE
T.O.E.F.	TOP OF EXISTING FOOTING
T.O.F.	TOP OF FOOTING
T.O.M.	TOP OF MASONRY
T.O.P.	TOP OF PIER
T.O.S.	TOP OF STEEL
TCE	TEMP CONSTRUCTION EASEMENT
TEL	TELEPHONE
TEMP	TEMPORARY
THK	THICK / THICKNESS
TWP	TOWNSHIP
TYP	TYPICAL
U	UTILITY
UAC	USE AS CONSTRUCTED
UE	UTILITY EASEMENT
UL	UNDERWRITERS LABORATORIES, INC.
ULFM	UNDERWRITERS LABORATORIES FACTORY MUTUAL
UNO	UNLESS NOTED OTHERWISE
VAR	VARIES
VC	VERTICAL CURVE
VCP	VITRIFIED CLAY PIPE
VER	VERIFY
VERT	VERTICAL
VOL	VOLUME
VPC	VERT POINT OF CURVE
VPI	VERT POINT OF INTERSECTION
VPT	VERT POINT OF TANGENCY
W	WEST
W/	WITH
W'LY	WESTERLY
WM	WATER MAIN
W/O	WITHOUT
W.P.	WORKING POINT
WD	WOOD
WSO	WATER SHUT OFF
WV	WATER VALVE
WWF	WELDED WIRE FABRIC
YD	YARD



PROFILE LEGEND

LEGEND

EXISTING		PROPOSED
	PROPERTY LINE	
	EASEMENT	
	SECTION LINE	
	QUARTER SECTION LINE	
	QUARTER QUARTER SECTION LINE	
	CENTERLINE	
D	STORM SEWER	D
SD	SUB DRAIN	SD
S	SANITARY SEWER	S
FM	FORCE MAIN	FM
W	WATER LINE	W
G	GAS LINE	G
OHE	OVERHEAD ELECTRIC	OHE
E	UNDERGROUND ELECTRIC	E
OHT	OVERHEAD TELEPHONE	OHT
T	UNDERGROUND TELEPHONE	T
OHTV	OVERHEAD TELEVISION	OHTV
TV	UNDERGROUND TELEVISION	TV
FIB	FIBER OPTIC	FIB
X	WIRE FENCE	X
O	CHAINLINK FENCE	O
□	WOOD FENCE	□
000	CONTOUR LINE	000
	RAILROAD TRACKS	
	GUARD RAIL	
+ 0.00	SPOT ELEVATION	+ 0.00
	DIRECTION OF FLOW	
	TREE LINE	

EXISTING		PROPOSED
	CATCH BASIN	
	AREA INTAKE	
D	STORM MANHOLE	
S	SANITARY MANHOLE	
U	UTILITY MANHOLE	
V	WATER VALVE MANHOLE	
	FIRE HYDRANT	
	WATER SHUT OFF	
WV	WATER VALVE	
YH	YARD HYDRANT	
GV	GAS VALVE	GV
	SIGN	
	UTILITY POLE	
	UTILITY POLE WITH LIGHT	
	TRAFFIC SIGNAL POLE	
	GUY ANCHOR	
	LIGHT POLE	
	UTILITY PEDESTAL	
W	WELL	W
	MAILBOX	
	WATER LEVEL	
	BOLLARD	
	SOIL BORING	
PIV	POST INDICATOR VALVE	PIV
	DECIDUOUS TREE W/ TRUNK DIA.	
	CONIFEROUS TREE W/ TRUNK DIA.	
	SHRUB OR BUSH	

EROSION CONTROL LEGEND

TEMPORARY	
SF / SW	PERIMETER CONTROL (STRAW WATTLES, FILTER SOCKS & SILT FENCE ARE GENERALLY INTERCHANGEABLE)
CW	CONCRETE WASHOUT
CE	CONSTRUCTION ENTRANCE
TM	MULCHING
TS	SEEDING
CB	COMPOST BLANKET
DC / RD	DITCH CHECK (ROCK DAM)
SI	SEDIMENT TRAP
IP	INLET PROTECTION
DC	DUST CONTROL

TEMPORARY	
	ROLLED EROSION CONTROL PRODUCT (RECP) PER PLAN
T	STREAM CROSSING
CRS	CONSTRUCTION ROAD STABILIZATION
TD	TEMPORARY DIVERSION
	LEVEL SPREADER

PERMANENT	
PS	SEEDING
S	SODDING
SFM	SEED, FERTILIZER & MULCH
OP	OUTLET PROTECTION
RS	REVETMENT SLOPE PROTECTION
	SOD DROP INLET PROTECTION
CD	CHECK DAM
SC	STONE CHECK
SB	SEDIMENT BASIN
	SURFACE ROUGHENING
	TURF REINFORCEMENT MAT (TRM)
SD	SLOPE DRAIN
PD	PERMANENT DIVERSION
	LEVEL SPREADER

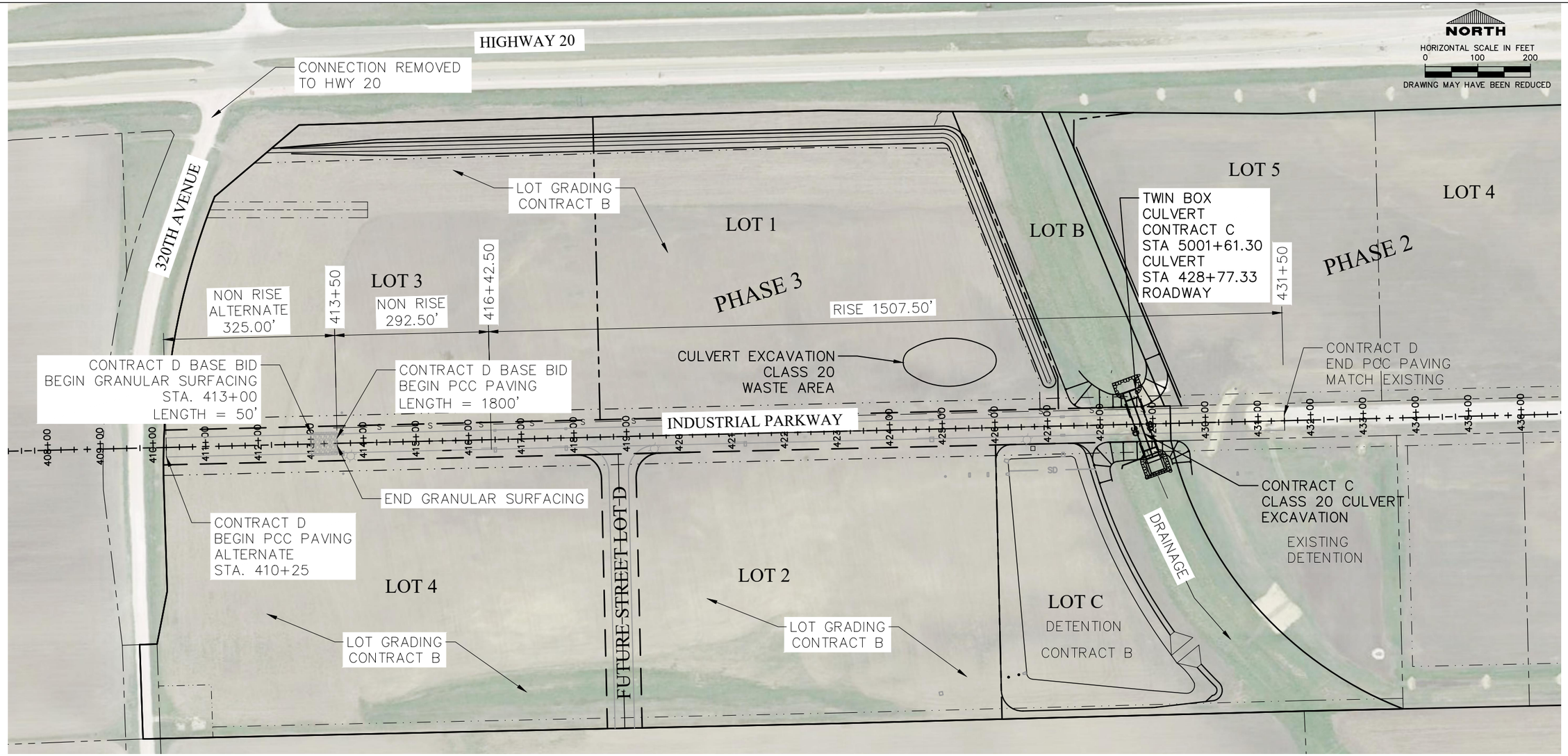
PERMANENT	
V	VEGETATIVE STREAMBANK STABILIZATION
S	STRUCTURAL STREAMBANK STABILIZATION
RR	RIP RAP LINED CHANNEL
GL	GRASS LINED CHANNEL (_____) MATERIAL REQUIRED

SURVEY

■	FOUND REBAR
●	FOUND IRON PIPE
O	SET REBAR

P:\21\249\DRAWINGS\CIVIL\21249C ZZ 00 G.DWG 8/28/2023 4:04:17 PM LYNN NEAL

PROJECT NUMBER	RM-2160(618)--9D-31	20 WEST INDUSTRIAL-PHASE 3- CONTRACT C-CULVERT	origin design 800 556-4491	CITY OF DYERSVILLE - DELAWARE COUNTY	LEGENDS AND ABBREVIATIONS	08-28-2023	A.2



20 WEST INDUSTRIAL CENTER
OVERALL PLAN

PREVIOUS WORK
- CONTRACT A – SANITARY SEWER & WATER MAIN

ONGOING WORK
- CONTRACT B – LOT GRADING & STORM SEWER

THIS CONTRACT
- **CONTRACT C – CULVERT (THIS PROJECT)**

FUTURE WORK
- CONTRACT D – PAVING, STORM SEWER & LIGHTING

PROJECT NUMBER	RM-2160(618)--9D-31	20 WEST INDUSTRIAL-PHASE 3- CONTRACT C-CULVERT	origin design 800 556-4491	CITY OF DYERSVILLE - DELAWARE COUNTY	OVERALL PLAN	08-28-2023	A.3

P:\21\249\DRAWINGS\CIVIL\21249C ZZ 01 P.DWG 8/28/2023 4:04:26 PM LYNN NEAL

ESTIMATED PROJECT QUANTITIES - CAST-IN-PLACE OPTION 1				
20 West Industrial Center Phase 3 - Contract C RM-2160(618)--9D-31				
REF. NO.	ITEM CODE	BID ITEM DESCRIPTION	UNITS	TOTAL RISE QUANTITIES
1A	2402-2720000	EXCAVATION CLASS 20	CY	1389
2A	2402-2725005	FOUNDATION TREATMENT MATERIAL	TON	303
3A	2402-3825025	GRANULAR MATERIAL FOR BLANKET	CY	87
4A	2403-0100020	STRUCTURAL CONCRETE (RCB CULVERT)	CY	267.1
5A	2404-7775000	STEEL REINFORCING	LB	43583
6A	2502-8212304	SUBDRAIN STD PERFORATED 4 IN, AS PER PLAN	LF	40
7A	2502-8213106	SUBDRAIN PVC 6 IN STD NON-PERFORATED	LF	50
8A	2507-6800061	REVETMENT, CLASS E	TON	518
9A	2533-4980005	MOBILIZATION	LS	1
10A	2599-9999010	CONCRETE WASHOUT	LS	1
11A	2599-9999014	('SQUARE FEET' ITEM) POLYSTYRENE BOARD (2 INCHES THICK)	SF	432

GENERAL NOTES:

1. ALL UNSALVAGEABLE MATERIAL AND RUBBLE GENERATED DURING THIS PROJECT SHALL BE DISPOSED OF OFF THE ROADWAY RIGHT-OF-WAY IN A WASTE AREA PROVIDED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER. THE WASTED MATERIAL MUST NOT CREATE AN UNSIGHTLY CONDITION WHEN VIEWED FROM PUBLIC HIGHWAYS. REMOVALS AND DISPOSALS SHALL BE IN ACCORDANCE WITH SECTION 2401 OF THE STANDARD SPECIFICATIONS. ALSO, ALL EXCESSIVE EXCAVATED MATERIAL AND UNSUITABLE MATERIAL FOR BACKFILL WILL BECOME THE PROPERTY OF THE CONTRACTOR AND WILL BE DISPOSED OF OFF SITE. ALL BORROW MATERIAL SHALL BE SUPPLIED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER.
2. NO EXTRA PAYMENT IS ALLOWED FOR COLD WEATHER PROTECTION DURING CONSTRUCTION. WORKING DAYS WILL BE CHARGED OVER THE WINTER.
3. CITY OF DYERSVILLE WILL PROVIDE THE CONSTRUCTION STAKING FOR USE BY THE CONTRACTOR.
4. ROAD CONTRACTOR IS TO USE DUE CAUTION IN WORKING OVER AND AROUND ALL TILE LINES. BREAKS IN THE TILE LINE DUE TO THE CONTRACTOR'S CARELESSNESS ARE TO BE REPLACED AT THE CONTRACTOR'S EXPENSE WITHOUT COST TO CITY OF DYERSVILLE. ANY TILE LINES BROKEN OR DISTURBED BY DESIGNATED CUT LINES WILL BE REPLACED AS DIRECTED BY THE ENGINEER AND PAID PER LINEAR FOOT OF SUBDRAIN ITEM.
5. TOPSOIL STRIPPING SALVAGE AND REPLACEMENT IS BY OTHERS UNDER CONTRACT B.
6. CLASS 20 EXCAVATION SHALL BE PLACED APPROXIMATELY 400 FEET TO THE NORTHWEST ON LOT 1 AS SHOWN ON SHEET A3.
7. CONTRACTOR IS TO USE DUE CAUTION IN WORKING OVER AND AROUND EXISTING WATER MAIN AND SANITARY SEWER. ANY DAMAGE TO THESE UTILITIES DUE TO THE CONTRACTORS CARELESSNESS SHALL BE REMEDIED AT THE CONTRACTORS EXPENSE WITHOUT COSTS TO THE CITY OF DYERSVILLE.
8. FLOODABLE BACKFILL AND EMBANKMENT FILL AND TOPSOIL IS BY OTHERS UNDER CONTRACT B.
9. EROSION CONTROL, SEEDING INSPECTIONS AND DOCUMENTATION IS BY OTHERS UNDER CONTRACT B. THE SITE IS COVERED UNDER AN EXISTING NPDES TYPE 2 PERMIT. CULVERT CONTRACTOR SHALL SIGN THE SWPPP AS A CO-PERMITTEE ON SITE.

10-18-11

STANDARD ROAD PLANS

The following Standard Road Plans apply to construction work on this project.

Number	Date	Title
DR-211	04-17-18	Box Culvert (Backfill)

ESTIMATE REFERENCE INFORMATION - CAST-IN-PLACE OPTION 1 20 West Industrial Center Phase 3 - Contract C RM-2160(618)--9D-31 DATA BELOW IS FOR INFORMATION ONLY AND DOES NOT CONSTITUTE A BASIS FOR EXTRA WORK ORDER REQUESTS	
REF. NO.	DESCRIPTION
1A	FOR EXCAVATION FOR THE BOX CULVERT IN ACCORDANCE WITH DR-111. INCLUDES EXCAVATION FOR CURTAIN WALLS, FONDATION MATERIAL AND GRANULAR BLANKET (BELOW BOX CULVERT). EXCAVATED MATERIAL NOT USED FOR CONSTRUCTION OF THE PROJECT SHALL BE REMOVED FROM THE CULVERT SITE AND WASTED ON SITE AT THE LOCATION SHOWN ON SHEET A.3.
2A	FOUNDATION TREATMENT FOR CONSTRUCTION OF RCB CULVERT. SEE SHEET V.2 AND V.3 FOR INSTALLATION DETAILS. USE CRUSHED STONE MEETING GRADATION NO. 13A (MACADM ST. BASE) IN TABLE 4109.02-1 (AGGREGATE GRADATION TABLE).
3A	FOR CREATING A WORKING BLANKET OVER FOUNDATION TREATMENT MATERIAL. SEE SHEET V.2, V.3 AND V.4 FOR INSTALLATION DETAILS. USE CRUSHED STONE MEETING GRADATION NO. 30 (SPECIAL BACKFILL) IN TABLE 4109.02-1 (AGGREGATE GRADATION TABLE).
4A	FOR TWIN 12X5 RCP BOX CULVERT AT STA. 428+77.33. SEE A AND V SHEETS FOR LOCATION AND DETAILS. CONTRACTOR SHALL SUPPLY CERTIFIED PLANT INSPECTION.
5A	SEE REINFORCING QUANTITIES ON SHEET V.1.
6A	SEE V.2 FOR LOCATIONS. INCLUDES FITTINGS NEECESSARY TO MAKE CONNECTION TO EXISTING 4" VCP DRAIN TILE.
7A	SEE V.2 SHEET FOR LOCATIONS. INCLUDES FITTINGS NEECESSARY TO MAKE CONNECTION TO EXISTING VCP DRAIN TILE.
8A	TO BE USED AT EACH END OF TWIN RCB CULVERT AS SHOWN ON V.2. ENGINEERING FABRIC SHALL BE PLACED UNDER ALL REVETMENT AND SHALL BE INCIDENTAL TO THIS ITEM AND NOT PAID SEPARATELY.
9A	
10A	FOR FURNISHING PERIODIC CLEANING AND MAINTENANCE OF THE WASHOUT AREA AS DIRECTED BY THE ENGINEER. CONCRETE WASHOUTS SHALL BE MAINTAINED THROUGH THE DURATION OF THE PROJECT. CONCRETE WASHOUT LOCATION SHALL BE NOTED IN THE SWPPP. METHOD OF MEASUREMENT AND BASIS OF PAYMENT SHALL BE LUMP SUM. INCLUDES INSTALLATION, MAINTAINING WASHOUT AND SHALL BE FULL COMPENSATION FOR ALL LABOR, EQUIPMENT AND MATERIALS REQUIRED TO INSTALL AND MAINTAIN THE CONCRETE WASHOUT.
11A	TO BE INSTALLED ABOVE SANITARY SEWER LINE AS SHOWN ON SHEET V.2 WITH POLYSTYRENE BOARD INSULATION WITH MINIMUM R VALUE OF 5 PER 1 INCH OF THICKNESS, TO BE INSTALLED IN 6 INCH MINIMUM THICKNESS FOR A MINIMUM WIDTH OF 4 FEET CENTERED ON SEWER MAIN LINE. LAP POLYSTYRENE BOARD JOINTS SUFFICIENTLY TO PREVENT DIFFERENTIAL MOVEMENT OF INSULATION AFTER INSTALLATION. METHOD OF MEASUREMENT: CONTRACTOR SHALL BE PAID BY THE SF OF 2 INCH POLYSTYRENE BOARD SATISFACTORILY INSTALLED. BASIS OF PAYMENT: CONTRACT UNIT PRICE PER SF. PAYMENT IS FULL COMPENSATION FOR ALL EQUIPMENT, MATERIALS, TOOLS AND LABOR NECESSARY TO PROPERLY INSTALL THE POLYSTYRENE BOARD IN ACCORDANCE WTIH CONTRACT DOCUMENTS, INCLUDING ANY EXCAVATION NECESSARY TO ALLOW INSTALLATION OF BOARD.

ESTIMATED PROJECT QUANTITIES - PRECAST OPTION 2

20 West Industrial Center Phase 3 - Contract C RM-2160(618)–9D-31

REF. NO.	ITEM CODE	BID ITEM DESCRIPTION	UNITS	TOTAL RISE QUANTITIES
1B	2402-2720000	EXCAVATION CLASS 20	CY	1490
2B	2402-2725005	FOUNDATION TREATMENT MATERIAL	TON	330
3B	2402-3825025	GRANULAR MATERIAL FOR BLANKET	CY	94
4B	2415-2111205	PRECAST CONCRETE BOX CULVERT, 12 FT. X 5 FT. - TWIN	LF	134
5B	2502-8212304	SUBDRAIN STD PERFORATED 4 IN, AS PER PLAN	LF	40
6B	2502-8213106	SUBDRAIN PVC 6 IN STD NON-PERFORATED	LF	50
7B	2507-6800061	REVETMENT, CLASS E	TON	518
8B	2533-4980005	MOBILIZATION	LS	1
9B	2599-9999014	('SQUARE FEET' ITEM) POLYSTYRENE BOARD (2 INCHES THICK)	SF	480

ESTIMATE REFERENCE INFORMATION - PRECAST OPTION 2

20 West Industrial Center Phase 3 - Contract C RM-2160(618)--9D-31

DATA BELOW IS FOR INFORMATION ONLY AND DOES NOT CONSTITUTE A BASIS FOR EXTRA WORK ORDER REQUESTS

REF. NO.	DESCRIPTION
1B	FOR EXCAVATION FOR THE BOX CULVERT IN ACCORDANCE WITH DR-111. INCLUDES EXCAVATION FOR CURTAIN WALLS, FONDATION MATERIAL AND GRANULAR BLANKET (BELOW BOX CULVERT). EXCAVATED MATERIAL NOT USED FOR CONSTRUCTION OF THE PROJECT SHALL BE REMOVED FROM THE CULVERT SITE AND WASTED ON SITE AT THE LOCATION SHOWN ON SHEET A.3.
2B	FOUNDATION TREATMENT FOR CONSTRUCTION OF RCB CULVERT. SEE SHEET V.2 AND V.3 FOR INSTALLATION DETAILS. USE CRUSHED STONE MEETING GRADATION NO. 13A (MACADM ST. BASE) IN TABLE 4109.02-1 (AGGREGATE GRADATION TABLE).
3B	FOR CREATING A WORKING BLANKET OVER FOUNDATION TREATMENT MATERIAL. SEE SHEET V.2 AND V.3 FOR INSTALLATION DETAILS. USE CRUSHED STONE MEETING GRADATION NO. 30 (SPECIAL BACKFILL) IN TABLE 4109.02-1 (AGGREGATE GRADATION TABLE).
4B	FOR TWIN 12X5 RCP BOX CULVERT AT STA. 428+77.33. SEE D.2 FOR LOCATION.
5B	SEE V.1 FOR LOCATIONS. INCLUDES FITTINGS NEECESSARY TO MAKE CONNECTION TO EXISTING 4" VCP DRAIN TILE.
6B	SEE V.2 SHEET FOR LOCATIONS. INCLUDES FITTINGS NEECESSARY TO MAKE CONNECTION TO EXISTING VCP DRAIN TILE
7B	TO BE USED AT EACH END OF TWIN RCB CULVERT AS SHOWN ON V.2. ENGINEERING FABRIC SHALL BE PLACED UNDER ALL REVETMENT AND SHALL BE INCIDENTAL TO THIS ITEM AND NOT PAID SEPARATELY.
8B	
9B	TO BE INSTALLED ABOVE SANITARY SEWER LINE AS SHOWN ON SHEET V.2 WITH POLYSTYRENE BOARD INSULATION WITH MINIMUM R VALUE OF 5 PER 1 INCH OF THICKNESS, TO BE INSTALLED IN 6 INCH MINIMUM THICKNESS FOR A MINIMUM WIDTH OF 4 FEET CENTERED ON SEWER MAIN LINE. LAP POLYSTYRENE BOARD JOINTS SUFFICIENTLY TO PREVENT DIFFERENTIAL MOVEMENT OF INSULATION AFTER INSTALLATION. METHOD OF MEASUREMENT: CONTRACTOR SHALL BE PAID BY THE SF OF 2 INCH POLYSTYRENE BOARD SATISFACTORILY INSTALLED. BASIS OF PAYMENT: CONTRACT UNIT PRICE PER SF. PAYMENT IS FULL COMPENSATION FOR ALL EQUIPMENT, MATERIALS, TOOLS AND LABOR NECESSARY TO PROPERLY INSTALL THE POLYSTYRENE BOARD IN ACCORDANCE WTIH CONTRACT DOCUMENTS, INCLUDING ANY EXCAVATION NECESSARY TO ALLOW INSTALLATION OF BOARD.

GENERAL CULVERT NOTES:

IT IS THE INTENT OF THIS DESIGN TO CONSTRUCT A TWIN 12'x5'x100' REINFORCED CONCRETE BOX CULVERT SKEWED 19° 50" AT ROADWAY STATION 428+77.33.

THE RCB CULVERT SECTIONS ARE DESIGNED FOR HL-93 LIVE LOAD AND EARTH FILLS OF 3 FEET.

PRECAST CULVERT OPTION NOTES:

THE CULVERT CONTRACTOR MAY SUBSTITUTE PRECAST CONCRETE BOX SECTIONS AND PRECAST CONCRETE HEADWALLS IN PLACE OF THE CONCRETE CAST IN PLACE SECTIONS AND HEADWALLS SHOWN ON THE PLANS. IF THE CONTRACTOR CHOOSES TO SUBSTITUTE PRECAST SECTIONS THEN SECTION 2415 OF THE STANDARD SPECIFICATION SHALL APPLY ALONG WITH THIS SECTION OF NOTES. REFER TO THE SITUATION PLAN AND TABLE ON SHEET V.2 FOR REQUIRED PRECAST DIMENSION INFORMATION AS THEY VARY FROM THE CAST-IN-PLACE DIMENSIONS.

SPECIFICATIONS

DESIGN: AASHTO LRFD 8TH EDITION, SERIES OF 2017.

CONSTRUCTION: THE IOWA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR HIGHWAY AND BRIDGE CONSTRUCTION, SERIES 2015, PLUS GENERAL SUPPLEMENTAL SPECIFICATIONS; AND APPLICABLE SUPPLEMENTAL SPECIFICATIONS, DEVELOPMENTAL SPECIFICATIONS, AND SPECIAL PROVISIONS, SHALL APPLY TO THE CONSTRUCTION ON THIS PROJECT.

DESIGN STRESSES

DESIGN STRESSES FOR THE FOLLOWING MATERIALS ARE IN ACCORDANCE WITH THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, 8TH EDITION, SERIES 2017:

BAR REINFORCEMENT IN ACCORDANCE WITH AASHTO LRFD SECTION 5, GRADE 60.

WELDED WIRE REINFORCEMENT IN ACCORDANCE WITH AASHTO LRFD SECTION 5.

CONCRETE IN ACCORDANCE WITH LRFD AASHTO SECTION 5, F'C FOR BARREL SECTIONS AS NOTED ON CULVERT BARREL DETAIL STANDARDS, FOR END SECTION DESIGN F'C=5,000 PSI.

GENERAL NOTES

THE PRECAST R.C.B. CULVERT SECTIONS ARE DESIGNED FOR HL-93 LIVE LOAD AND EARTH FILLS OF 3 FEET (DESIGN FILL HEIGHT OF 3 FEET). THE CULVERT SECTIONS ARE DESIGNED FOR CLASS 2 EXPOSURE. THE PRECAST R.C.B. BARREL AND END SECTIONS SHALL CONFORM TO IOWA D.O.T. SINGLE PRECAST R.C.B. CULVERT STANDARDS. AT THE CONTRACTOR'S OPTION, PRECAST BARREL SECTIONS MAY CONFORM TO ASTM C1577.

FOR CONSTRUCTION OF THE PRECAST OPTION THE CONTRACTOR WILL BE PAID ACCORDING TO THE QUANTITIES AND PRICES BID FOR OPTION 2.

THE CURTAIN WALL AND THE TYPE 3 LINTEL BEAM OR TYPE 1 PARAPET SHALL BE PRECAST.

THE CONTRACTOR SHALL FURNISH AND INSTALL CULVERT TIES FOR ALL JOINTS. THE MAIN SECTION JOINTS WILL HAVE ONE TIE ON EACH SIDE OF THE BARREL AND THE LAST BARREL SECTION WILL BE ATTACHED TO THE END SECTION WITH TWO TIES PER SIDE. THE END SECTION JOINTS WILL HAVE TWO TIES PER SIDE.

CULVERT TIES SHALL BE INCLUDED IN THE COST FOR PRECAST CONCRETE BOX CULVERT. TIE RODS WILL BE IN ONE INCH DIAMETER STEEL AND SHALL MEET REQUIREMENTS OF ASTM A 709 GRADE 36 OR EQUAL.

CULVERT TIE ASSEMBLIES SHALL BE GALVANIZED AFTER FABRICATION.

THE LIMITS FOR EXCAVATION FOR THE PRECAST CONCRETE BOX CULVERT SHALL BE AS SHOWN ON THE "BEDDING AND GAP BACKFILL DETAILS", SHEET V.3. A MINIMUM OF 6" OF GRANULAR MATERIAL WITH A MAXIMUM AGGREGATE SIZE OF 3/8 INCH SHALL BE USED AS BEDDING FOR THE PRECAST CONCRETE BOX CULVERT. THE BEDDING SHALL BE SHAPED TO A FLAT BASE USING A TEMPLATE. THE 6 INCH GRANULAR BEDDING SHALL BE INCLUDED IN THE COST FOR "SPECIAL BACKFILL"

THE PRECAST BOX CULVERT SHALL BE BUILT TO THE DIMENSIONS AND SPECIFICATIONS SHOWN IN THESE PLANS.

THE CONTRACTOR SHALL SUBMIT DETAILS FOR THE PROPOSED PRECAST CONCRETE BOX SECTIONS FOR THIS PROJECT TO THE ENGINEER FOR APPROVAL. THE DETAILS SHALL INCLUDE THE FOLLOWING.

A. A SITUATION PLAN DRAWING SHOWING THE BACK-TO-BACK PARAPET DIMENSION FOR THE LINE OF THE CULVERT SECTIONS.
B. DIMENSION THE NUMBER OF PRECAST SECTIONS AND SECTION LENGTHS.
C. A DETAIL OF THE PRECAST CULVERT BARREL SECTIONS SHOWING A CROSS SECTION VIEW OF THE SECTION, STEEL LOCATIONS, DIMENSIONS, ETC.,
D. A DETAIL OF THE PRECAST CULVERT END SECTION SHOWING A CROSS SECTION VIEW OF THE SECTIONS, STEEL LOCATIONS, DIMENSIONS, ETC., SIMILAR TO THE END SECTION DETAILS SHOWN IN THE I.D.O.T. STANDARDS.

THE CONTRACTOR SHALL PROVIDE ALL INFORMATION SHOWN ON THE SUBMITTAL SHOP DRAWING SHEET. THE SUBMITTAL SHOP DRAWING SHEET IS AVAILABLE AT THE IOWA D.O.T. BRIDGE WEBSITE AT:
http://www.iowadot.gov/bridge/bridge-and-culvert-standards/lrfd-precast-culvert-standards
ANY DETAILS AND/OR STRUCTURAL DESIGN/RATING THAT DEVIATES FROM IOWA D.O.T. SINGLE PRECAST R.C.B. STANDARDS OR ASTM C1577 SHALL BE CERTIFIED BY AN ENGINEER LICENSED IN THE STATE OF IOWA.

THE CONTRACTOR SHALL ALLOW 14 DAYS FOR THE ENGINEER'S REVIEW OF SUBMITTALS.

INSTALLATION NOTES

PRECAST CONCRETE BOX CULVERT SECTIONS SHALL BE LAID WITH THE GROOVE END OF EACH SECTION UP-GRADE AND THE SECTIONS SHALL BE TIGHTLY JOINED. CONCRETE TIES TO BE USED ONLY TO HOLD BOX SECTIONS TOGETHER, NOT FOR PULLING SECTIONS TIGHT. JOINT OPENINGS BETWEEN SECTIONS SHOULD BE AS TIGHT AS PRACTICABLE AND LIMITED TO A MAXIMUM OF 3/4 INCH OPENINGS. THE JOINT ON THE BOTTOM OF THE CULVERT SHALL BE SEALED WITH A FLEXIBLE WATER TIGHT ONE INCH BUTYL ROPE GASKET AS PER MATERIALS I.M.491.09.

BUTYL ROPE GASKET SHALL BE INSTALLED IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE MANUFACTURER AND SHALL EXTEND VERTICALLY SIX INCHES ABOVE THE BOTTOM FILLET. ALL JOINTS SHALL BE TRIMMED CLEAN ON THE INSIDE AFTER SEALING.

THE CONTRACTOR SHALL PLACE A TWO FOOT WIDE PIECE OF ENGINEERING FABRIC AROUND THE TOP AND SIDES OF EACH PRECAST JOINT. THE FABRIC SHALL BE CENTERED WITH ONE FOOT ON EACH SIDE OF THE JOINT, THE FABRIC SHALL BE ATTACHED TO THE WALLS AND TOP OF EACH SECTION TO PREVENT THE FABRIC FROM SLIPPING OFF THE JOINT DURING BACKFILLING OPERATIONS. ATTACHMENT METHODS SHALL BE APPROVED BY THE ENGINEER.

ALL COSTS INCLUDING MATERIAL AND LABOR ASSOCIATED WITH PROVIDING THE ENGINEERING FABRIC AND INSTALLING IT AS REQUIRED SHALL BE INCIDENTAL TO PRECAST CONCRETE BOX CULVERT.

THE ENGINEERING FABRIC SHALL BE IN ACCORDANCE WITH ARTICLE 4196.01, B, 3, OF THE STANDARD SPECIFICATIONS.

DURING BACKFILLING THE COMPACTION ADJACENT TO THE BOTTOM CORNER RADII OR CHAMFER SHALL BE ACCOMPLISHED WITH A MECHANICAL HAND COMPACTOR.

THE CONTRACTOR SHALL FURNISH AND INSTALL LIFTING HOLE PLUGS FOR EACH SECTION. LIFTING HOLES SHALL BE PLUGGED WITH A PRECAST CONCRETE PLUG, OR PLASTIC PLUG APPROVED BY THE ENGINEER, SEALED AND COVERED WITH A 2'-0"x2'-0" PIECE OF ENGINEERING FABRIC CENTERED OVER THE HOLE AND ATTACHED TO THE SECTION TO PREVENT THE FABRIC FROM SLIPPING.

ALL REINFORCING BARS AND BARS NOTED AS DOWELS SUPPLIED FOR THIS STRUCTURE SHALL BE DEFORMED REINFORCEMENT UNLESS OTHERWISE NOTED OR SHOWN.

STANDARD CULVERT PLANS-CAST IN PLACE

Standard	Issued Date	Revision Date	Description
TWRCB G2-20	Jul-20		GENERAL NOTES
TWRCB G3-20	Jul-20		TYPICAL CULVERT BARREL DETAIL
TWRCB 12-5-20	Jul-20		CULVERT BARREL DETAILS
TWPWH 0-1-20	Jul-20		DIMENSION TABLE
TWPWH 0-2-20	Jul-20		CROSS SECTION DETAILS
TWPWH 0-3-20	Jul-20		WINGWALL ELEVATIONS
TWPWH 0-4-20	Jul-20		BOTTOM APRON REINFORCING
TWPWH 0-5-20	Jul-20		PARAPET AND TOP APRON
TWPWH 0-6-20	Jul-20		QUANTITY TABULATION

STANDARD CULVERT PLANS - PRECAST

Standard	Issued Date	Revision Date	Description
PRCB G1-20	Dec-20		INDEX AND GENERAL NOTES
PRCB G2-20	Dec-20		TYPICAL CULVERT BARREL DETAIL
PRCB 12-20	Dec-20		CULVERT BARREL DETAILS, 12' SPANS
PES 1-20-T1	Dec-20		TYPE 1 END SECTION DETAILS, 0° TO 7.5° SKEWS
PES 2-20-T1	Dec-20		TYPE 1 END SECTION DETAILS, 0° TO 7.5° SKEWS
PES 9-20-T3	Dec-20		TYPE 3 LINTEL BEAM DETAIL, 0° TO 45° SKEWS
PES 11-20	Dec-20		ALTERNATE CURTAIN WALL DETAILS
PEP 12-20	Dec-20		EMBANKMENT PROTECTION DETAILS, 0° TO 45° SKEWS

CULVERT PLACEMENT QUANTITIES-DESIGN FILL = 3'

LOCATION	HEADWALLS	BARREL	TOTALS
SLAB & PARAPET	5.0	78.6	83.6
WALLS	9.4	38.2	47.6
FLOOR	47.4	88.5	135.9
CONCRETE TOTALS, CU. YD.	61.8	205.3	267.1
REINFORCING STEEL, LBS.	8,212	35,371	43,583

REINFORCING BAR LIST - ADDITIONAL REINFORCING FOR ONE JOINT SHEETS TWRCB G3-20 AND TWRCB 12-5-20

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
				ft. '- in.	lb
5 k1	SLAB, TRANV. BOTT.	———	2	25 '- 11	55
6 k4	SLAB, TRANV. TOP CORNER	⌝	4	7 '- 2	44
7 k9	SLAB, TRANV. TOP	———	4	25 '- 11	212
5 m1	FLOOR, TRANV. TOP	———	2	26 '- 5	56
6 m4	FLOOR, TRANV. BOTT. CORNER	⌟	4	8 '- 7	52
7 m9	FLOOR, TRANV. BOTT.	———	4	26 '- 5	216
5 r1	SLAB, LONGIT. TOP, JOINT	———	26	3 '- 6	95
	TOTAL ADDITIONAL REINFORCING STEEL (INCLUDED WITH CULVERT TOTAL)				730

RM-2160(618)--9D-31

4" VCP TILE ACTIVE. DO NOT DISTURB

VCP TILE CAPPED END

4" VCP

EX PROP LINE

ROW 33.00'

INDUSTRIAL PARKWAY

TWIN 12'x 5' RCB

NORTH

HORIZONTAL SCALE IN FEET
0 10 20
DRAWING MAY HAVE BEEN REDUCED

END OF CURTAIN WALL

BACK OF PARAPET

16.00'

50.00'

429+00

16.00 LF 12X5 RCB PARALLEL WING HEADWALLS 0° SKEW

STA 5000+70.30

STA 5000+94.30

26.75'

5000+50

5001+00

5001+50

STA 428+77.34
19°50" SKEW

INTERSECTION
STA 5001+61.30 CULVERT
= STA 428+77.33 ROADWAY

5002+00

SUBDRAIN
PVC 6" NON
PERFORATED

STA 5002+28.30

SUBDRAIN STD
PERFORATED 4" PLASTIC
PIPE, AS PER PLAN

PROPOSED
CENTERLINE CULVERT

STA 5002+63.30

5002+50

5003+00

CONNECT
TO EX VCP
DRAIN TILE
(INCIDENTAL)

EX 4" VCP DRAIN TILE
(TO REMAIN)

4" VCP TILE ACTIVE.
DO NOT DISTURB

EXISTING 4" HDPE
SUBDRAIN. DO NOT
DISTURB

4" VCP TILE
CAPPED END

EX 4" VCP DRAIN TILE
(TO BE ABANDONED UNDER
CULVERT)

5.00'

4" SUB-DRAIN EACH
SIDE (INCIDENTAL TO
SPECIAL BACKFILL)

PROPOSED TWIN
12' x 5' RCB
DESIGN FILL=3'

4' WIDEx6"
THICKNESS RIGID
INSULATION OVER
SANITARY SEWER

18.50'

935

984

EX 4" VCP DRAIN TILE
(TO BE ABANDONED UNDER
CULVERT)

CLASS E REVETMENT 2' THICKNESS
OVER NON WOVEN GEOTEXTILE
OPPOSITE SIDE SAME
ENGINEERING FABRIC INCIDENTAL
TO CLASS E REVETMENT.

SUBDRAIN PVC, 6", NON-PERFORATED
50'

PRECAST OPTION DIMENSIONS TABLE
BACK TO BACK OF PARAPETS=109.0'
BOX RISE R=5'
BOX WIDTH S=12'
APRON LENGTH L=13'
END TO END OF CURTAIN WALLS=134'
FILL HEIGHT = 3.0'

SEE DR-111 FOR BOX CULVERT
BACKFILL AND SUBDRAIN

990
985
980
975
972

STA: 5001+11.30
EL: 985.20

1.00' PARAPET

R.O.W.

PROP GRADE

10.00'

2.99

INDUSTRIAL PWKY ℄

EL: 987.41

3.29'

100.00 LF TWIN
12X5 RCB
DESIGN FILL=3'

SPECIAL
BACKFILL
CONTRACT B

FLOODABLE
FILL LIMITS

STA: 5002+11.30
EL: 985.05

16.00 LF 12X5 RCB PARALLEL
WING HEADWALLS 0° SKEW

CONSTRUCTION JOINT

EX GRADE

31.00'

38.00'

16.00'

50.00'

PROPOSED FL
STA: 5000+94.31
EL: 978.13

STA: 5001+10.30
EL: 978.11

EL: 978.08

0.15%

STA: 5001+61.31
EL: 978.03

STA: 5002+12.30
EL: 977.96

STA: 5002+28.31
EL: 977.94

7.50'

20.00'

4.00'

3.00'

GRADE TO DRAIN

EL: 976.20

EXISTING SUBDRAIN PVC,
4", NON-PERFORATED

5.00'

3.00'
FROM BOC

INSULATION

EL: 977.24

6" PVC

END SECTION FOOTING

EXISTING
10" Ductile Iron Pipe
TOP/PIPE 976.80
FL 975.90

EX ELEV ℄
PROP ELEV ℄

EXISTING 4" VCP DRAIN TILE
(TO BE ABANDONED UNDER CULVERT)

SPECIAL BACKFILL 6" THICKNESS
MODIFIED MACADAM 12" THICKNESS

END SECTION FOOTING

EXISTING 12" PVC WATER MAIN

CONNECT
TO EX VCP
DRAIN TILE
(INCIDENTAL)

EXISTING 4" VCP DRAIN TILE
(TO REMAIN)

INSTALL 4"SUBDRAIN W/
SOCK & ¾ WASHED
LIMESTONE CHIPS UNDER
GEOTEXTILE. PAID AS
SUBDRAIN PERFORATED
PLASTIC PIPE, 4".

979.1 979.06	979.0 978.53	978.8 979.46	978.8 986.49	981.7 987.19	982.2 987.16	978.9 986.20	978.9 978.99	978.9 977.93	978.8	978.7

5000+50 5001+00 5001+50 5002+00 5002+50 5003+00

P:\21\249\DRAWINGS\CIVIL\21249C ZZ 06 P CULVERT.DWG 8/28/2023 4:04:46 PM LYNN NEAL

PROJECT NUMBER	RM-2160(618)--9D-31	20 WEST INDUSTRIAL-PHASE 3- CONTRACT C-CULVERT	origin design 800 556-4491	CITY OF DYERSVILLE - DELAWARE COUNTY	CULVERT PLAN AND PROFILE	08-28-2023	V.2

RM-2160(618)--9D-31

NORTH

HORIZONTAL SCALE IN FEET
0 10 20
DRAWING MAY HAVE BEEN REDUCED

SEE V.1 & V.2 PROFILES FOR BACKFILL REQUIREMENTS

ROW

SKEW 19°50"

TWIN 12'x 5' RCB

5001+50

428+00

429+00

18.50'

18.50'

INTERSECTION
STA 5001+61.30 CULVERT
= STA 428+77.33 ROADWAY

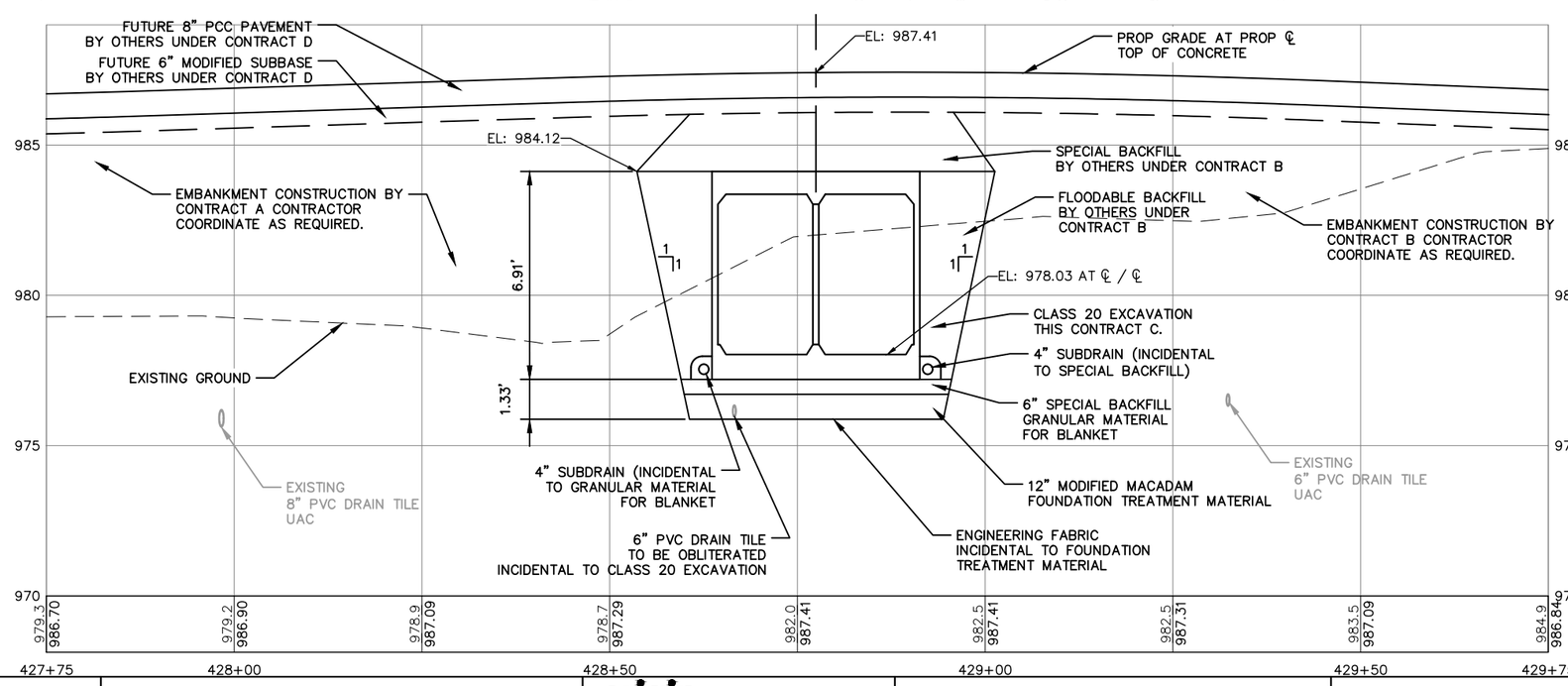
INDUSTRIAL PARKWAY

ROW 33.00'

ROW 33.00'

ROW

5002+00

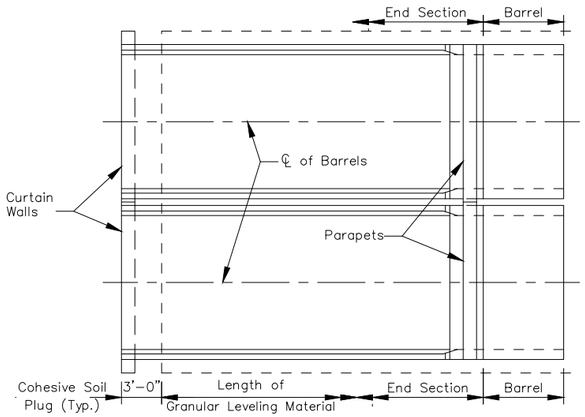


VERTICAL SCALE IN FEET
5
2.5
0
DRAWING MAY HAVE BEEN REDUCED

NOTE
SEE DR-111 FOR ADDITIONAL BOX CULVERT BACKFILL REQUIREMENTS

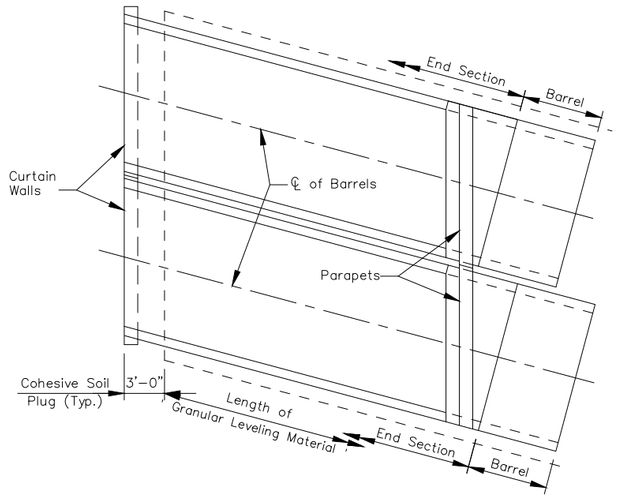
P:\21\249\DRAWINGS\CIVIL\21249C ZZ 06 P CULVERT.DWG 8/28/2023 4:04:48 PM LYNN NEAL

PROJECT NUMBER	RM-2160(618)--9D-31	20 WEST INDUSTRIAL-PHASE 3- CONTRACT C-CULVERT	origin design 800 556-4491	CITY OF DYERSVILLE - DELAWARE COUNTY	CULVERT SECTION VIEW	08-28-2023	V.3



Typical Plan View - 0° Skew Example

Granular Leveling Material shall terminate 3'–0" short of the precast curtain wall.



Typical Plan View - Skewed Example

Granular Leveling Material shall terminate 3'–0" short of the precast curtain wall.

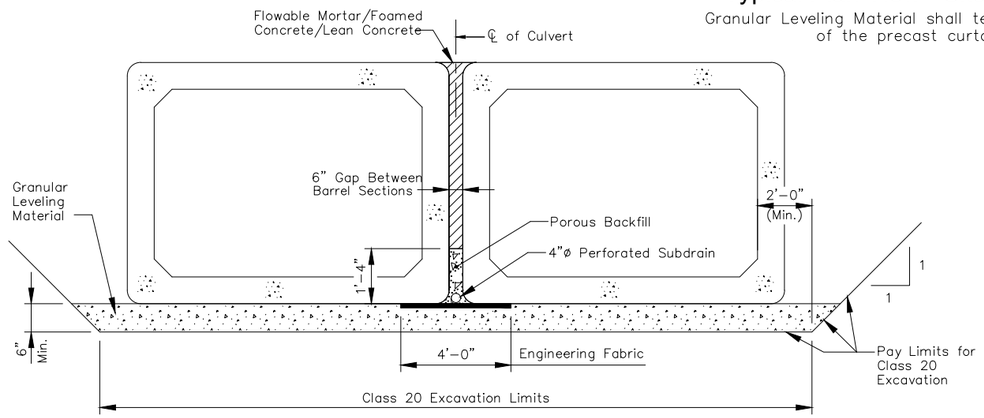
Side-by-Side Precast Culvert Notes:

1. Double welded pipe or double eye bolt type ties are required for the barrel wall adjacent to the first precast culvert structure placed at the site to allow the ties to be tightened from the inside of the barrel wall.
2. Burr threads of Concrete Box Ties without damaging galvanizing to prevent nut rotation after tightening is complete.
3. The Type 1 parapets length shall be increased so the adjoining ends will abut against each other at the centerline of culvert for side–by–side precast culvert structures.
4. The Type 3 lintel beams and parapets length shall be increased so the adjoining ends will abut against each other at the centerline of culvert for side–by–side precast culvert structures.
5. The curtain walls length shall be shortened so the adjoining ends will abut against each other at the centerline of culvert for side–by–side precast culvert structures.
6. Engineering fabric shall be in accordance with Article 4196.01, B, 3, of the Standard Specifications. A 4'–0" wide strip of engineering fabric shall be placed on top of the granular leveling material and the cohesive soil. Engineering fabric shall be placed the full length of the precast culvert. The engineering fabric shall be centered over the centerline of culvert and pinned or otherwise secured in place before the precast culverts are placed. All costs including material and labor associated with providing the engineering fabric and installing it as required shall be included in the bid items "Precast Concrete Box Culvert" and "Precast Concrete Box Culvert Straight End Section".
7. The 4 inch diameter perforated subdrain shall terminate and be capped at the upstream end 3'–0" short of the end of the apron of the end section. The subdrain shall outlet downstream at the end of the apron of the end section. The subdrain shall be surrounded by porous backfill in accordance with Section 4131 of the Standard Specifications. No compaction of the porous backfill is required. All costs including material and labor associated with providing the 4 inch diameter perforated subdrain and installing it as required shall be included in the bid items "Precast Concrete Box Culvert" and "Precast Concrete Box Culvert Straight End Section".

Flowable Mortar/Foamed Concrete/Lean Concrete Option Notes:

At the Contractor's option, the porous backfill and concrete cap may be replaced with flowable mortar backfill as shown in the flowable mortar option details. Only the options and materials designated on this sheet are allowed. All other options and materials are prohibited.

The flowable mortar including material and labor is included in the bid items "Precast Concrete Box Culvert" and "Precast Concrete Box Culvert Straight End Section".

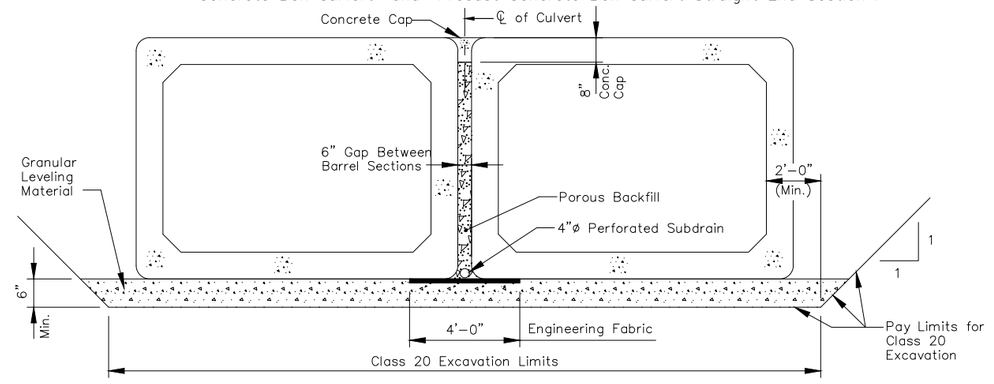


Granular Leveling Material Details / Flowable Mortar Option

Barrel section displayed. End section details not shown.

The porous backfill shall be placed between the precast barrel walls as shown on the Granular Leveling Material Detail. Porous backfill shall also be placed between the end sections up to 1'–4" from the bottom of the end sections and 3'–0" short of the end of the apron of the end section. The porous backfill shall be in accordance with Section 4131 of the Standard Specifications.

Flowable mortar shall be placed on top of the porous backfill between the precast culverts to the top of the barrel slabs, the top of the end section walls, and to a 3'–0" depth at the ends of the apron end sections.

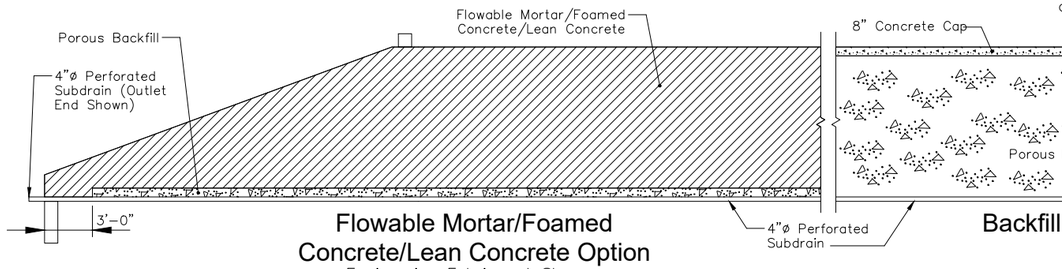


Granular Leveling Material Details / Concrete Cap Option

Barrel section displayed. End section details not shown.

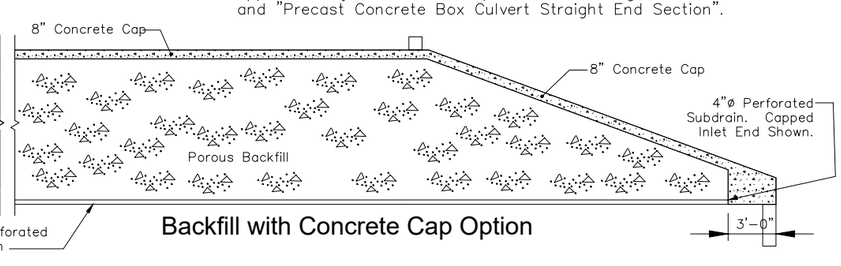
Porous backfill shall be placed between the precast barrel walls up to 8 inches from the top of the barrel slabs. Porous backfill shall also be placed between the end sections up to 8 inches from the top of the walls and 3'–0" short of the end of the apron of the end section. The porous backfill shall be in accordance with Section 4131 of the Standard Specifications.

A concrete cap shall be placed on top of the porous backfill between the precast culverts for a depth of 8 inches from the top of the barrel slabs, the top of the end section walls, and to a 3'–0" depth at the ends of the apron of the end sections. The concrete shall be Class C concrete in accordance with Section 2403 of the Standard Specifications. The concrete cap, approximately 0.03 Cu. Yds. per foot, including material and labor is included in the bid items "Precast Concrete Box Culvert" and "Precast Concrete Box Culvert Straight End Section".



Flowable Mortar/Foamed Concrete/Lean Concrete Option

Engineering Fabric not Shown



Backfill with Concrete Cap Option

Bedding and Gap Backfill Details

PROJECT NUMBER	RM-2160(618)--9D-31	20 WEST INDUSTRIAL-PHASE 3- CONTRACT C-CULVERT	origin design 800 556-4491	CITY OF DYERSVILLE - DELAWARE COUNTY	BEDDING AND GAP BACKFILL DETAILS	08-28-2023	V.4

P:\21\249\DRAWINGS\CIVIL\21249C ZZ 00 G.DWG 8/28/2023 4:04:51 PM LYNN NEAL