

LEGEND:

Bc OUTSIDE DIA. OF PIPE
H BACKFILL COVER ABOVE TOP OF PIPE
D NOMINAL PIPE SIZE
A FILL BELOW PIPE (SEE TABLE B1 LOW)

GRANULAR FILL
CONCRETE

TABLE OF FILL BELOW PIPE

D	A MIN.
27" B SMALLER	3"
30" TO 60"	4"
66" B LARGER	6"

NOTES

1. GRANULAR FILL TO BE CRUSHED STONE OR PEA GRAVEL WITH NOT LESS 95% PASSING 1/2" AND NOT LESS THAN 95% TO BE RETAINED ON A #4. TO BE PLACED IN NOT MORE THAN 6" LAYERS AND COMPACTED BY SLIKING WITH A SHOVEL (1/2" B * 4 REFERS TO SIEVE SIZE)

Benchmark: Chiseled square at Southwest corner, of South wingwall, of west abutment of bridge of creek across North outer road: 477.44

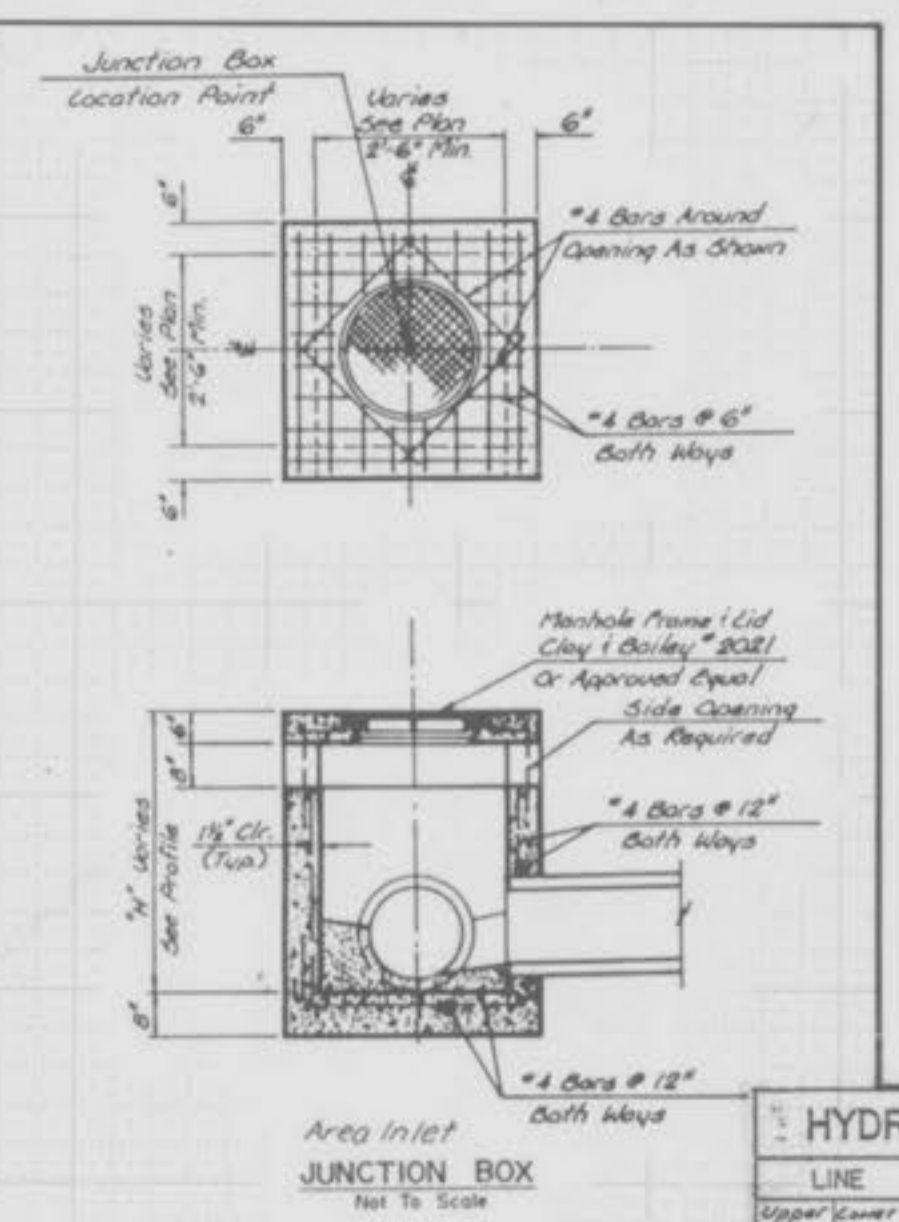
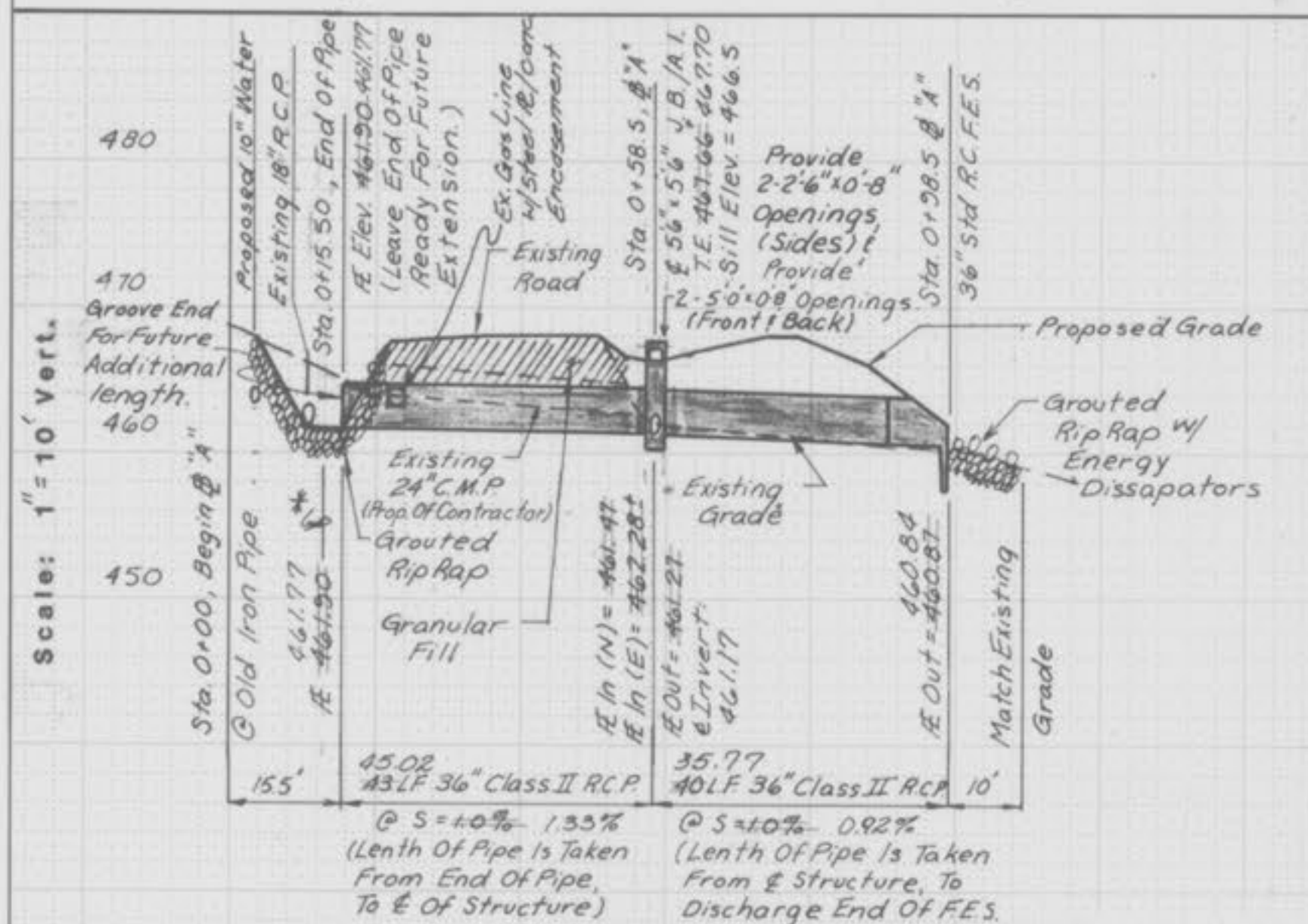
Note: Existing underground (U/G), overhead (O.H.) utilities and drainage structures have been plotted from available information and therefore, their locations must be considered approximate only. It is the responsibility of the individual Contractors to notify the utility companies before actual construction.

Note: Notify the City of O'Fallon 48 hrs. prior to starting construction.

CONCRETE TOEWALL
Not To Scale

Note: All surface and subsurface conditions disturbed during construction shall be restored to equal or better condition by the contractor. This includes but not limited to, pavement, utilities and grass areas.

Note: Cool Springs Road Can NOT Be Closed. Contractor To Maintain At Least One Lane Of Traffic At All Times. Provide, And Maintain Temporary Traffic Control In Work Zone.

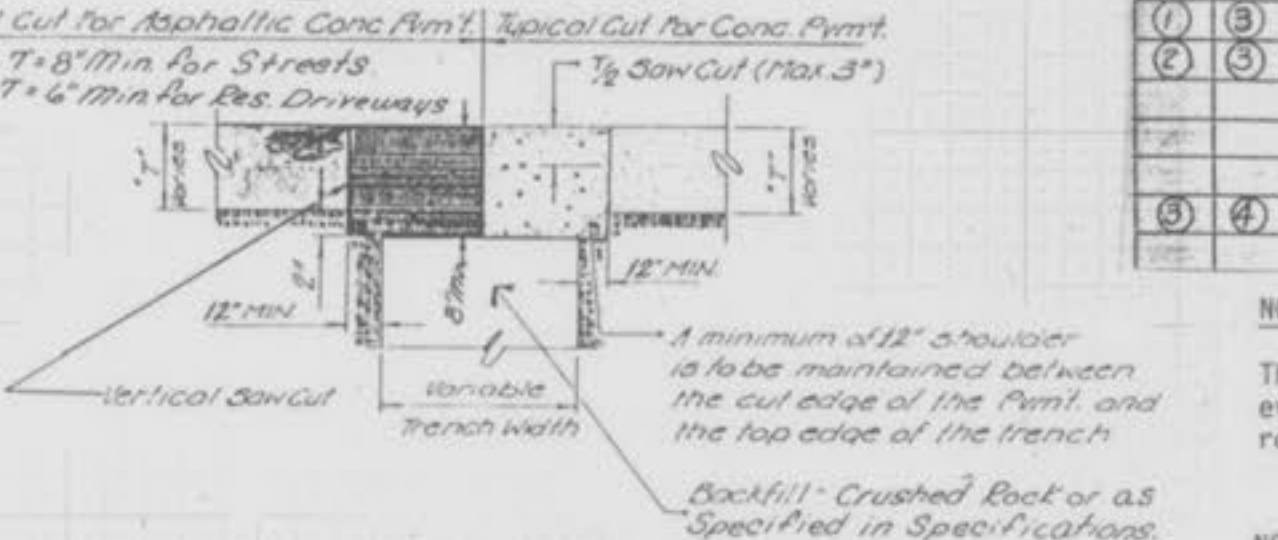
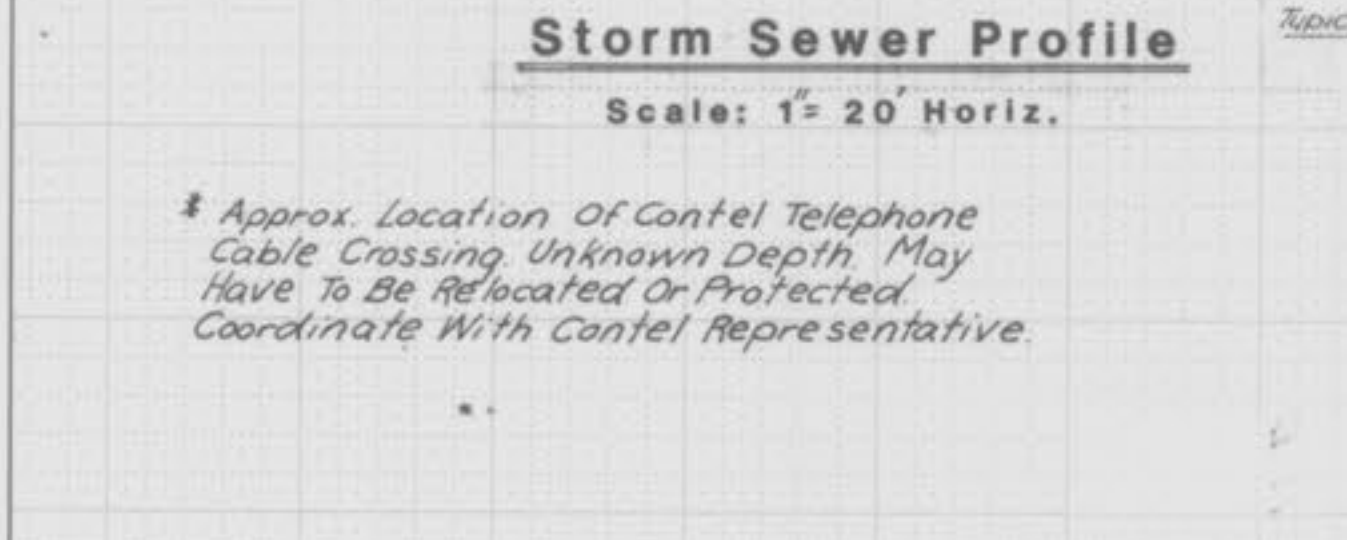


HYDRAULIC DATA PROJECT: Cool Springs Road Culvert SHEET 1 OF 1

LINE	Length	Size	Upper Flow Elev.	Lower Flow Elev.	FL Elev.	Upper Elev.	Lower Elev.	Depth	Upper Elev.	Lower Elev.	Hy. Head	Fric. Coef.	Veloc.	Q	K _t	Turn Loss	Area	RL	Quantity	Area	T.O.	Area	Area
(1) (3)	43.00	36"	461.90	461.47	1.0%	467.90	467.20	2.45	465.40	465.71	3.66	.15	2.51	1.10	-	LR	NA	7.76	521	40.43	40.43	66.92	
(2) (3)	50.00	36"	464.20	462.28	3.94%	467.10	467.84	0.00	467.0	465.71	1.75	.875	2.74	1.37	52	LR	NA	NA	NA	8.5	8.5	12.70	
(3) (4)	40.00	36"	461.27	460.87	1.0%	468.2	NA	2.49	465.17	463.57	5.04	.20	2.60	1.37	-	LR	NA	-	-	48.93	48.93	66.92	

NOTE: The discharge from the 15" C.M.P. side pipe driveway culvert, (2 - 3) was evaluated inlet control, with the water surface elevation up to the edge of road. (i.e.: No freeboard, depth to hydraulic grade line = 0)

NOTE: The area inlet structure has not been designed to accept any specific amount of flow. The dimensions selected are the minimum required for a junction box. The inlet slots are added benefit.



PAVEMENT REPAIR DETAIL

G.J.H. Contracting
Offsite Storm Drainage Improvements
Hydraulic Calculations

Design Discharge
Drainage Basin area tributary to culvert: 7.76 Acres

As per the O'Fallon Subdivision and Land Development Ordinance Culverts at or near low points shall be designed on a storm frequency of 100 years, with entrance control, and two feet of freeboard at the shoulder line.

Assume 70 percent total impervious area at full development.
P.I. = 5.21 cubic feet per second per acre (c.f.s./Ac.)

Design Discharge: *Q* = 7.76 Acres @ 5.21 c.f.s./Ac. = 40.43 c.f.s.

Shoulder Elevation at the edge of the road above the proposed culvert flowline = 467.90 ft.

Maximum allowable water surface elevation, considering inlet control:
467.90 - 2 = 465.90 ft.

Try 36" R.C.P., Q = 40.43 c.f.s., using groove End Pipe, Projecting from embankment.
HW/D = 1.05, HW = 3(1.05) = 3.15

Proposed Flowline = 461.90 A = π(3)²(1/4) = 7.07 s.f.

Headwater Available: 465.90 - 461.90 = 4.0' V = 40.03/7.07 = 5.72 > 3.0 f.p.s. (Flow full, Avg. Velocity) Avg. = 5.72 f.p.s.

1.0 - 2.15 s.f. Use 36" R.C.P., Groove End Projecting from Embankment, with a discharge flowline of 461.90'

With *Q* = 40.43 c.f.s., 36" R.C.P., S = .0037 ft/ft

Install 36" R.C.P. at 1.0 percent as required by the O'Fallon Subdivision and Land Development ordinance.

Since *S* = 1.05 is much greater than S = 0.375 this culvert will operate entrance control unless flooded from downstream.

Provide 0.20 feet of fall through the junction box/area inlet as required. By the O'Fallon Subdivision and Land Development ordinance.

Note: This roadway culvert is located in the Belleau Creek flood plain, with a base flood watersurface elevation of 467.90'. At this elevation the water will be above the shoulder of the road, but not yet over topping. As required, the culvert depth and vertical grade has been established by the City of O'Fallon design criteria for pipe culverts in the flood plain rather than hydraulic calculations predicting and comparing flow performance under conditions of inlet vs outlet control. Hydraulic calculations will be provided using top of pipe for the starting downstream water surface elevation.

Contractor to submit plan and details for temporary "sho-fly" access to the City of O'Fallon Building Department for approval.

Contractor to notify affected residents in writing 72 hours in advance of starting construction.

Surveying Provided By:

LANDMARK SURVEYING, INC.
802 E. MAIN Wentzville, Missouri 63385

GBA GEORGE BUTLER ASSOCIATES, INC.
Engineers / Architects / Landscape Architects / Planners
Suite 202 / 225 S. Main St. / O'Fallon, Missouri 63366

**Cool Springs Road
Storm Drainage Improvements
For
GJH Contracting Co.
O'Fallon, Missouri**

DESIGNED BY: MJH DRAWN BY: MJH CHECKED BY: GRH

JOB NO: 87-5128
DATE: Dec. 24, '87
SCALE: As Noted
SHEET NO: 1 OF 1

As Constructed 10-11-88 S.A.S.