Project name:	*Centene Data Center Addition*	**Calculated By:**	*J.M.B.*
Project number:	*209-4511.8*	**Checked By:**	*G.M.S.*
Project Location:	*O'Fallon, Missouri*	**Date:**	*11/13/2015*

Bend Coefficients:

$5^0 = 0.06$	$20^0 = 0.24$	$35^0 = 0.4$	$50^0 = 0.50$	$65^0 = 0.57$	$80^0 = 0.65$
$10^0 = 0.11$	$25^0 = 0.30$	$40^0 = 0.43$	$55^0 = 0.52$	$70^0 = 0.60$	$85^0 = 0.67$
$15^0 = 0.18$	$30^0 = 0.35$	$45^0 = 0.47$	$60^0 = 0.55$	$75^0 = 0.62$	$90^0 = 0.70$

Revisions: *December 30, 2015*

Structure Number	LINE Upper structure	LINE Lower structure	FLOW LINE ELEVATIONS Upper structure	FLOW LINE ELEVATIONS Lower Structure	Length (ft)	Flowline Grade ft/ft	Pipe Size (in.)	Full Flow Cap. (cfs)	Total (Q) (cfs)	Mean Full Flow Vel.(V) (ft/s)	Bend Coef.	Curve Coef.	Velocity Head (V_h) (ft)	QV_h (ft^4/s)	Pipe Coef. (n)	HEAD LOSS Hr (ft)	HEAD LOSS Junction (ft)	HEAD LOSS Bend (ft)	HEAD LOSS Curve (ft)	HEAD LOSS Total H_{tot}	Hydraulic Elevations Upper F.I. + Dia.	Hydraulic Elevations Lower H.E. +Hr	Hydraulic Elevations Lower H.E.	Structure Upper H.E. + H_{tot}	TOP Structure Elevation	Free Board	Structure Number
EX 4	EX 4	1	542.59	541.83	76.75	0.0099	18	10.48	6.00	3.40	0.00	0.00	0.18	1.07	0.013	0.25	0.00	0.25	0.00	0.25	544.09	544.25	544.00	544.50	551.25	6.75	EX 4
1	1	EX 3	541.83	540.10	172.26	0.0100	18	10.56	7.91	4.48	0.00	0.00	0.31	2.46	0.013	0.98	0.23	0.44	0.00	0.67	543.33	543.07	542.09	544.00	549.75	5.75	1
EX 3	EX 3	EX 2	539.90	538.87	103.07	0.0100	21	15.88	10.19	4.24	0.00	0.00	0.28	2.84	0.013	0.43	0.05	0.39	0.00	0.44	541.65	541.05	540.62	542.09	548.00	5.91	EX 3
EX 2	EX 2	EX 1	538.67	537.47	120.16	0.0100	21	15.88	10.34	4.30	0.30	0.00	0.29	2.97	0.013	0.51	0.02	0.09	0.00	0.10	540.42	539.90	539.39	540.52	550.17	9.65	EX 2
EX 1	EX 1		537.47																		ASSUME 100 YR POND HGL=			539.39			EX 1
2	2	1	542.50	542.33	27.00	0.0063	12	2.83	1.91	2.43	0.70	0.00	0.09	0.18	0.013	0.08	0.12	0.06	0.00	0.19	543.50	544.08	544.00	544.26	548.42	4.16	2
1	1		541.83																			HGL STRUCTURE #2=		544.00			1
4	4	3	548.50	540.00	285.79	0.0297	10	3.79	1.55	2.84	0.00	0.00	0.13	0.19	0.013	1.43	0.17	0.00	0.00	0.17	549.33	542.26	540.83	549.50	550.00	0.50	4
3	3		540.00																		ASSUME 100 YR POND HGL=			539.39			3

MEAN FULL FLOW VELOC $V = Q_{ACT}/A_{PIPE}$

FRICTION LOSS (H_f): $Hf = 2.87\ n^2\ (LV^2/d^{1.33})$

VELOCITY HEAD: $V_h = V^2/2g$

JUNCTION LOSES (JUNC.) = $[\ Q_{out}Vh_{out}$ - Sum $(Q_{in}V_{in})]x1.33/[Q_{out}]$

BEND LOSES (BEND) = (V^n) * ANGLE COEFFICIENT

CURVE LOSS=V_h*CURVE COEFFICIENT

Note:
1. IF MORE THAN ONE INCOMING LINE, CALC. EACH BEND LOSS AND ADD TOGETHER.
2. NO STRUCTURE LOSES TO BE CALCULATED AT A DROP
3. IF $QV_{h(in)} > QV_{h(out)}$, NO JUNCTION LOSES TO BE CALCULATED.

Note(s):

PIPE HYDRAULICS

POTENTIAL ROCK EXCAVATION MAY OCCUR CONTRACTOR TO FIELD VERIFY PRIOR TO EXCAVATION AND UTILITY INSTALLATION. SHOULD ROCK BE ENCOUNTERED, NOTIFY CLAYCO PRIOR TO COMMENCEMENT OF CONSTRUCTION.

LINETYPE LEGEND

EXISTING GRADE.....
PROPOSED GRADE...
HYDRAULIC GRADE...
PROPOSED PAVEMENT...
GRANULAR BACKFILL.....
COMPACTED FILL.....

STORM SEWER NOTE

ALL DETAILS SHOWN ON THIS SHEET ARE FOR THE CONVENIENCE OF THE CONTRACTOR. THE DETAILS ARE TO BE VERIFIED PER METROPOLITAN ST. LOUIS SEWER DISTRICT STANDARDS FOR FOR STORM SEWERS, & CITY OF OFALLON CONSTRUCTION SPECIFICATIONS. ALL METHODS, MEANS AND MATERIALS SHALL CONFORM TO M.S.D. CURRENT STANDARD CONSTRUCTION SPECIFICATIONS.

SANITARY SEWER NOTE

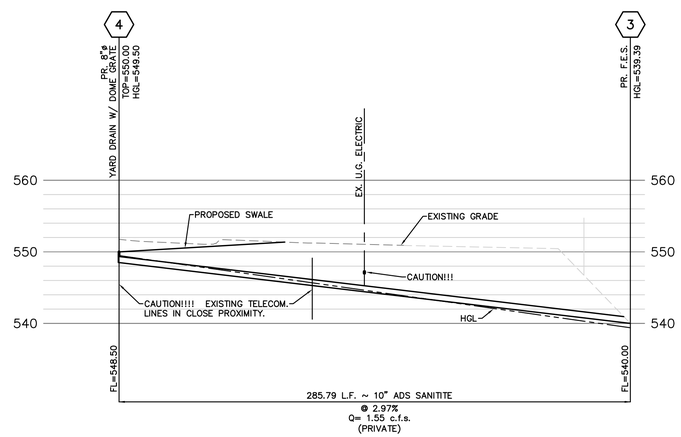
ALL DETAILS SHOWN ON THIS SHEET ARE FOR THE CONVENIENCE OF THE CONTRACTOR. THE DETAILS ARE TO BE VERIFIED PER DUCKETT CREEK SANITARY SEWER DISTRICT STANDARDS FOR SANITARY SEWERS, & CITY OF OFALLON CONSTRUCTION SPECIFICATIONS. ALL METHODS, MEANS AND MATERIALS SHALL CONFORM TO D.C.S.D. CURRENT STANDARD CONSTRUCTION SPECIFICATIONS.

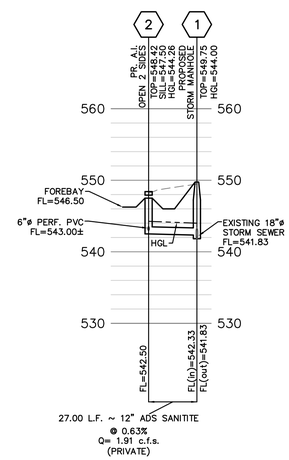
CONSTRUCTION NOTES:

1. ALL R.C.P. SHALL BE CLASS III UNLESS NOTED OTHERWISE.
2. ALL P.V.C. SHALL BE ADS "SANITITE" UNLESS NOTED OTHERWISE.

ALL SEWERS SHOWN ARE PRIVATE, UNLESS OTHERWISE NOTED.

ENGINEER APPROVED SHOP DRAWINGS MUST BE SUBMITTED TO THE CITY OF O'FALLON AND/OR DUCKETT CREEK SANITARY SEWER DISTRICT.





PREPARED BY:
STOCK & ASSOCIATES Consulting Engineers, Inc.
257 Chesterfield Business Parkway
St. Louis, MO 63005 PH. (636) 530-9100 FAX (636) 530-9130
e-mail: general@stockassoc.com
Web: www.stockassoc.com

IMPROVEMENT PLANS FOR:

CENTENE DATA CENTER BUILDING EXPANSION

6430 WELDON SPRING ROAD
O'FALLON, MISSOURI

STATE OF MISSOURI
GEORGE MICHAEL STOCK
NUMBER PE-25116
PROFESSIONAL ENGINEER

12/30/2015

GEORGE M. STOCK E-25116
CIVIL ENGINEER
CERTIFICATE OF AUTHORITY NUMBER: 000996

REVISIONS:

1. 2015-12-07 PROGRESS PRINT
2. 2015-12-09 REVISED PER CITY COMMENTS
3. 2015-12-30 REVISED PER CITY & CLIENT COMMENTS

DRAWN BY: J.M.B.	CHECKED BY: G.M.S.
DATE: 11/10/2015	JOB NO: 209-4511.8
DUCKETT CREEK #: P-	BASE MAP #: --
S.C.C. H&T #: -	H&T S.U.P. #: -
M.D.N.R. #: MO-RA07437	

SHEET TITLE:

SEWER PROFILES & PIPE HYDRAULICS

SHEET NO.:

C7.0