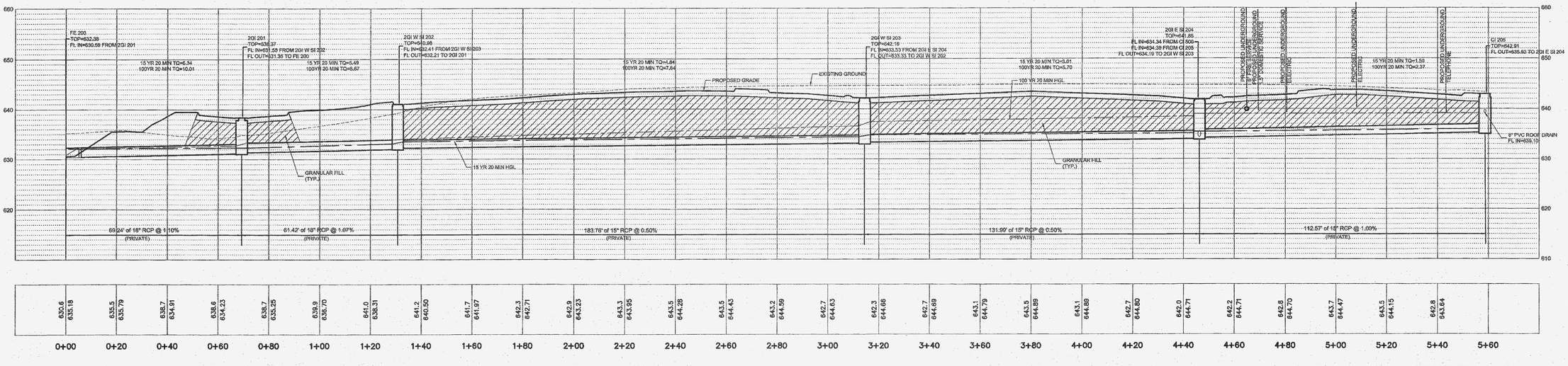
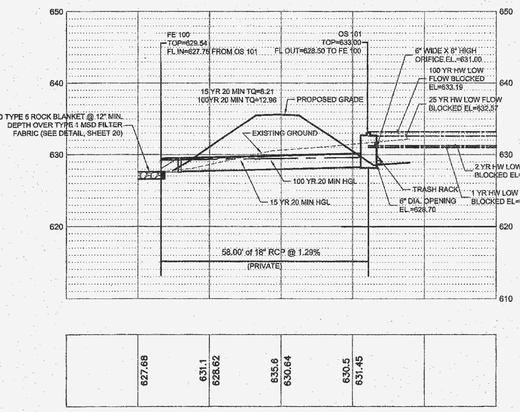
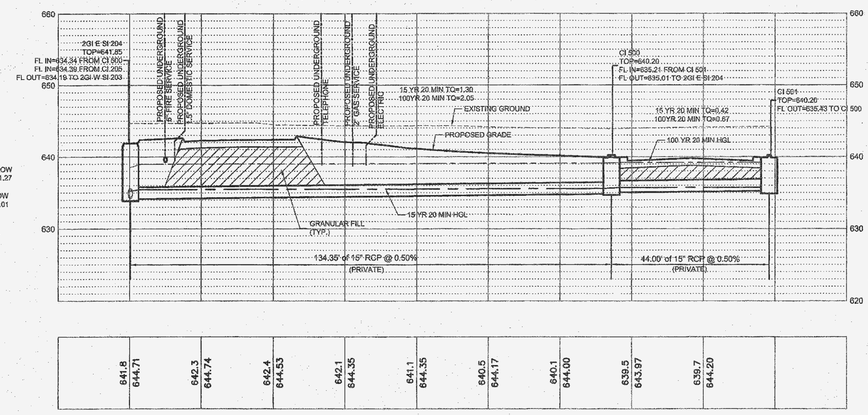



HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 10'




HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 10'




HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 10'

100 Year 20 Minute Storms

| Line No. | Line ID | Inlet ID | Line Length (ft) | Line Size (in) | Invert Up (ft) | Invert Dn (ft) | Δ Rim Elev (ft) | Depth Up (ft) | HGL Up (ft) | HGL Dn (ft) | Rim +w (ft) | Runoff Coeff (C) | Vel Dn (ft/s) | Vel Hd Dn (ft) | J-Loss Coeff | Energy Loss (ft) | Minor Loss (ft) | Cross Slope, Sx (ft/ft) | Capacity Full (cfs) | Drainage Area (ac) | Known Q (cfs) | Flow Rate (cfs) | Q Captured (cfs) | Inlet Eff (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 200-201 | 2GI 201 | 76.648 | 18 | 631.35 | 630.59 | 638.48 | 1.33 | 632.68 | 633.09 | 5.07 | 0 | 5.67 | 0.5 | 1.29 | 0.658 | 0.73 | 0.02 | 10.47 | 0 | 1.34 | 10.01 | 0.63 | 47 |
| 2 | 201-202 | 2GI W SI 202 | 65.94 | 18 | 632.21 | 631.55 | 640.98 | 1.5 | 633.86 | 633.41 | 6.93 | 0 | 4.91 | 0.37 | 0.5 | 0.45 | 0.19 | 0.02 | 10.51 | 0 | 1.03 | 8.67 | 0.87 | 85 |
| 3 | 202-203 | 2GI W SI 203 | 181.763 | 15 | 633.33 | 632.41 | 642.16 | 1.25 | 636.62 | 634.05 | 4.88 | 0 | 6.23 | 0.6 | 1.43 | 2.573 | 0.86 | 0.02 | 4.57 | 0 | 1.94 | 7.64 | 0.55 | 29 |
| 4 | 203-204 | 2GI E SI 204 | 131.985 | 15 | 634.19 | 633.53 | 641.85 | 1.25 | 638.51 | 637.46 | 2.86 | 0 | 4.65 | 0.34 | 1.42 | 1.029 | 0.48 | 0.02 | 4.57 | 0 | 1.28 | 5.7 | 1.03 | 81 |
| 5 | 205-205 | CI 205 | 112.568 | 15 | 635.52 | 634.39 | 642.91 | 1.25 | 639.14 | 638.99 | 3.71 | 0 | 3.93 | 0.06 | 1 | 0.152 | 0.06 | 0.02 | 6.47 | 0 | 2.37 | 2.37 | 0.61 | 26 |
| 6 | 204-500 | CI 500 | 134.35 | 15 | 635.01 | 634.39 | 640.04 | 1.25 | 639.12 | 638.99 | 0.85 | 0 | 1.67 | 0.04 | 1.5 | 0.135 | 0.07 | 0.02 | 4.39 | 0 | 1.38 | 2.05 | 0.47 | 34 |
| 7 | 500-501 | CI 501 | 42.934 | 15 | 635.42 | 635.21 | 640.15 | 1.25 | 639.19 | 639.19 | 0.95 | 0 | 0.55 | 0 | 1 | 0.005 | 0 | 0.02 | 4.52 | 0 | 0.67 | 0.67 | 0.32 | 48 |
| 8 | 300-301 | OS 101 | 57.995 | 18 | 628.5 | 627.75 | 631.71 | 1.5 | 630.13 | 629.25 | 0.74 | 0 | 7.34 | 0.84 | 1 | 0.884 | 0.84 | 0.02 | 11.94 | 0 | 11.96 | 12.96 | 2.56 | 20 |

15 Year 20 Minute Storm

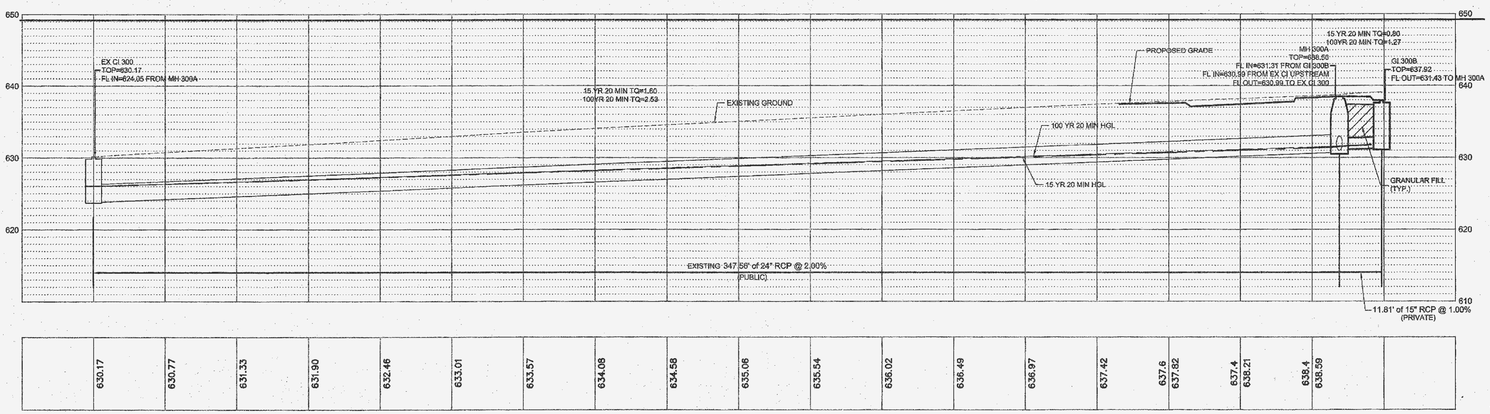
| Line No. | Line ID | Inlet ID | Line Length (ft) | Line Size (in) | Invert Up (ft) | Invert Dn (ft) | Δ Rim Elev (ft) | Depth Up (ft) | HGL Up (ft) | HGL Dn (ft) | Rim +w (ft) | Runoff Coeff (C) | Vel Dn (ft/s) | Vel Hd Dn (ft) | J-Loss Coeff | Energy Loss (ft) | Minor Loss (ft) | Cross Slope, Sx (ft/ft) | Capacity Full (cfs) | Drainage Area (ac) | Known Q (cfs) | Flow Rate (cfs) | Q Captured (cfs) | Inlet Eff (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 200-201 | 2GI 201 | 76.648 | 18 | 631.35 | 630.59 | 638.48 | 0.97** | 632.32 | 632.00 | 6.16 | 0 | 3.59 | 0.2 | 1.29 | 0.385 | n/a | 0.02 | 10.47 | 0 | 0.85 | 6.34 | 0.76 | 89 |
| 2 | 201-202 | 2GI W SI 202 | 65.94 | 18 | 632.21 | 631.55 | 640.98 | 0.90** | 633.11 | 632.82 | 7.68 | 0 | 5.99 | 0.38 | 0.5 | 0 | n/a | 0.02 | 10.51 | 0 | 0.65 | 5.49 | 0.61 | 94 |
| 3 | 202-203 | 2GI W SI 203 | 181.763 | 15 | 633.33 | 632.41 | 642.16 | 1.11 | 634.44 | 633.52 | 7.33 | 0 | 4.2 | 0.27 | 1.43 | 0.92 | 0.38 | 0.02 | 4.57 | 0 | 1.23 | 4.84 | 0.45 | 36 |
| 4 | 203-204 | 2GI E SI 204 | 131.985 | 15 | 634.19 | 633.53 | 641.85 | 1.01 | 635.2 | 634.83 | 6.39 | 0 | 2.94 | 0.13 | 1.42 | 0.416 | 0.25 | 0.02 | 4.57 | 0 | 0.81 | 3.61 | 0.72 | 89 |
| 5 | 205-205 | CI 205 | 112.568 | 15 | 635.52 | 634.39 | 642.91 | 0.40** | 636.00 | 635.46 | 6.91 | 0 | 1.34 | 0.18 | 1 | 0 | n/a | 0.02 | 6.47 | 0 | 1.5 | 1.5 | 0.49 | 33 |
| 6 | 204-500 | CI 500 | 134.35 | 15 | 635.01 | 634.39 | 640.04 | 0.56 | 635.57 | 635.46 | 4.33 | 0 | 1.16 | 0.02 | 1.5 | 0.185 | 0.14 | 0.02 | 4.39 | 0 | 0.88 | 0.88 | 0.37 | 42 |
| 7 | 500-501 | CI 501 | 43 | 15 | 635.42 | 635.21 | 640.15 | 0.31 | 635.73 | 635.71 | 4.37 | 0 | 0.92 | 0.01 | 1 | 0.057 | 0.05 | 0.02 | 4.51 | 0 | 0.42 | 0.42 | 0.24 | 58 |
| 8 | 300-301 | OS 101 | 57.995 | 18 | 628.5 | 627.75 | 631.71 | 1.11** | 629.61 | 629.25 | 2.1 | 0 | 4.65 | 0.34 | 1 | 0.398 | n/a | 0.02 | 11.94 | 0 | 8.21 | 8.21 | 1.95 | 24 |

MH 300A - GI 300B (TIE-IN TO EXISTING STORM) 15 Year 20 Minute Storm

| Line No. | Line ID | Inlet ID | Line Length (ft) | Line Size (in) | Invert Up (ft) | Invert Dn (ft) | Δ Rim Elev (ft) | Depth Up (ft) | HGL Up (ft) | HGL Dn (ft) | Rim +w (ft) | Runoff Coeff (C) | Vel Dn (ft/s) | Vel Hd Dn (ft) | J-Loss Coeff | Energy Loss (ft) | Minor Loss (ft) | Cross Slope, Sx (ft/ft) | Capacity Full (cfs) | Drainage Area (ac) | Known Q (cfs) | Flow Rate (cfs) | Q Captured (cfs) | Inlet Eff (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 300A-EX CI | MH 300A | 347.564 | 24 | 630.99 | 624.05 | 638.5 | 0.44** | 631.43 | 625.3 | 7.07 | 0 | 0.77 | 0.15 | 0.81 | 0 | n/a | .... | 31.96 | 0 | 0.8 | 1.6 | .... | .... |
| 2 | 300A-300B | 300B | 11.814 | 15 | 631.43 | 631.31 | 637.92 | 0.35** | 631.78 | 631.61 | 6.14 | 0 | 3.6 | 0.13 | 1 | 0 | 0.13 | 0.02 | 6.51 | 0 | 0.8 | 0.8 | 0.72 | 91 |

MH 300A - GI 300B (TIE-IN TO EXISTING STORM) 100 Year 20 Minute Storm

| Line No. | Line ID | Inlet ID | Line Length (ft) | Line Size (in) | Invert Up (ft) | Invert Dn (ft) | Δ Rim Elev (ft) | Depth Up (ft) | HGL Up (ft) | HGL Dn (ft) | Rim +w (ft) | Runoff Coeff (C) | Vel Dn (ft/s) | Vel Hd Dn (ft) | J-Loss Coeff | Energy Loss (ft) | Minor Loss (ft) | Cross Slope, Sx (ft/ft) | Capacity Full (cfs) | Drainage Area (ac) | Known Q (cfs) | Flow Rate (cfs) | Q Captured (cfs) | Inlet Eff (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 300A-EX CI | MH 300A | 347.564 | 24 | 630.99 | 624.05 | 638.5 | 0.55** | 631.54 | 625.3 | 6.96 | 0 | 1.22 | 0.2 | 0.81 | 0 | n/a | .... | 31.96 | 0 | 1.26 | 2.53 | .... | .... |
| 2 | 300A-300B | 300B | 11.814 | 15 | 631.43 | 631.31 | 637.92 | 0.44** | 631.87 | 631.66 | 6.05 | 0 | 4.31 | 0.16 | 1 | 0 | 0.16 | 0.02 | 6.51 | 0 | 1.27 | 1.27 | 1.02 | 80 |




HORIZONTAL SCALE: 1" = 20'
VERTICAL SCALE: 1" = 10'

NOTES:
1. ALL NEW STORM SEWERS ARE PRIVATE.
2. WATER TIGHT A-LOCK JOINTS SHALL BE PROVIDED ON ALL STORM SEWERS.
3. THE CONTRACTOR SHALL VISIT THE SITE PRIOR TO SUBMITTAL OF HIS/HER BIDS TO CONFIRM THAT THE SITE CONDITIONS ARE AS SHOWN ON THESE PLANS. ANY CONDITION THAT IS DIFFERENT THAN WHAT IS SHOWN ON THESE PLANS SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER PRIOR TO SUBMITTAL OF BIDS.

STORM SEWER PROFILE NOTES

1. MH.....DENOTES MANHOLE
   GI.....DENOTES GRATE INLET
   EP.....DENOTES END OF PIPE
   FE.....DENOTES FLARED END SECTION
   SD.....DENOTES SLOTTED DRAIN
   OS.....DENOTES OUTFALL STRUCTURE
   TQ.....TOTAL Q TO PIPE
   **.....DENOTES SURCHARGED HGL
   J.....DENOTES HYDRAULIC JUMP IN INLET OR LINE
2. ALL DIMENSIONS ARE TO THE CENTERLINE OF STRUCTURE, TO THE END OF FLARED END SECTION OR TO THE END OF PIPE AT EP'S.
3. BACK FILL REQUIREMENTS FOR ADS N-12 IS CLASS 3 @ 95% STANDARD PROCTOR DRY DENSITY. DEEPER THAN 10 FEET BELOW FINISHED GRADE, AT LEAST 98% OF THE MATERIAL'S MAXIMUM STANDARD PROCTOR DRY DENSITY.

THE CONTRACTOR SHALL VISIT THE SITE PRIOR TO SUBMITTAL OF HIS/HER BIDS TO CONFIRM THAT THE SITE CONDITIONS ARE AS SHOWN ON THESE PLANS. ANY CONDITION THAT IS DIFFERENT THAN WHAT IS SHOWN ON THESE PLANS SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER PRIOR TO SUBMITTAL OF BIDS.

"Little MO" says CALL BEFORE YOU DIG! 1-800-DIG-RITE

NOTE:
Underground utilities and structures have been plotted from available information and therefore, their location must be considered approximate only. It is the responsibility of the individual contractors to notify the utility companies before actual construction.

CVS pharmacy®

PROJECT TITLE
NORTHERN 13,225-RIGHT CHAMFER DRIVE-THRU
STORE NUMBER: 10546
NEC FEISE ROAD AND BRYAN ROAD
O'FALLON, MO
PROJECT TYPE: NEW CONSTRUCTION
DEAL TYPE: Fee for Service
CS PROJECT NUMBER: 69591

NORR
ARCHITECTS ENGINEERS PLANNERS
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Suite 1000
Detroit, MI 48226
(313) 324-3113

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308 TCW Court
Lake Saint Louis, MO 63367
Phone: (314) 925-7444 Fax: (314) 925-7457
Missouri Certificate of Authority # E-2011000031
Missouri Certificate of Authority # LS-2012007849

ENGINEERS AUTHENTICATION
The responsibility for professional engineering liability on this project is hereby limited to the set of plans authenticated by the seal, signature, and date hereunder attached. Responsibility is disclaimed for all other engineering plans involved in this project and specifically excludes revisions after this date unless resubmitted.

STATE OF MISSOURI
STEVE MARION
NUMBER
PE2008007195
PROFESSIONAL ENGINEER
STEVE MARION P.E.
ENGINEER
PE2008007195

Developer / Owner Information
T.M. CROWLEY & ASSOCIATES

Storm Sewer Profiles

P+Z No. 01-15 & 01.15.01
APPROVED 1-15-15
City No.

Sheet Number:
13

PCE PROJECT NO. 136101

\\Vault-pcivault\CIVIL 3D PROJECTS\2013\136101 NEC FEISE AND BRYAN\CONSTRUCTION DOCUMENTS\STORM SEWER PROFILES.dwg