

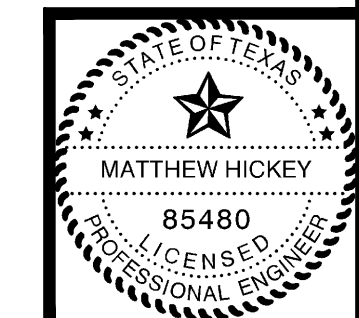
PROPOSED STORM SEWER CALCULATIONS

| Storm Sewer/ Lateral Number | Runoff Collection Point | | Distance Between Collection Points | Area No. | Incremental Drainage Area | | | | Time of Concentration (MIN.) | | | Design Storm Freq. (Yrs.) | Intensity (I) (In./Hr.) | Runoff (Q) (c.f.s.) | Actual Q from Inlet (c.f.s.) | Slope of Hydraulic Gradient (Ft./Ft.) | No of Pipes/ Boxes | Selected Storm Sewer Pipe Size | Velocity Between Points (f.p.s.) | Upstream Minor Losses | | | Flow Time Distance/ (Vel*60) (Min.) | Time at Downstream Station (Min.) | Remarks |
|--------------------------------|-------------------------|-----------------------|---------------------------------------------|------------------------------|---------------------------|-------------------------|--------------------------|--------------------------|------------------------------|-------------------------------|-----------------------------|------------------------------------|-------------------------------|---------------------------|---------------------------------------|------------------------------------------------|-----------------------------|-----------------------------------------|-------------------------------------------|-----------------------|----------------------------|---------------------------------|----------------------------------------------|--------------------------------------------|----------------------------------|
| | Upstream Station | Downstream Station | | | Drainage Area (Ac.) | Runoff Coeff. "C" | Increm- ental "CA" | Accum- ulated "CA" | Inlet Time (MIN.) | Along Sewer Line (MIN.) | Used in Design (MIN.) | | | | | | | | | Point of Turbulence | Head Loss Coeff. "K" | Velocity Head Loss (Feet) | | | |
| Lateral B-1 | 17.85 | 0.00 | 17.85 | B1 | 0.43 | 0.90 | 0.39 | 0.39 | 10.00 | 0.00 | 10.00 | 100 | 9.80 | 3.79 | | 0.0013 | 1 | 18.0 | 2.15 | | | 0.14 | 10.14 | Into Storm Sewer B-1 | |
| Lateral B-2 | 18.37 | 0.00 | 18.37 | B2 | 0.41 | 0.90 | 0.37 | 0.37 | 10.00 | 0.00 | 10.00 | 100 | 9.80 | 3.62 | | 0.0012 | 1 | 18.0 | 2.05 | | | 0.15 | 10.15 | Into Storm Sewer B-1 | |
| Lateral B-3 | 19.11 | 0.00 | 19.11 | B2 | 0.83 | 0.90 | 0.75 | 0.75 | 10.00 | 0.00 | 10.00 | 100 | 9.80 | 7.32 | | 0.0049 | 1 | 18.0 | 4.14 | | | 0.08 | 10.08 | Into Storm Sewer B-1 | |
| Lateral B-4 | 9.00 | 0.00 | 9.00 | B4 | 1.67 | 0.67 | 1.12 | 1.12 | 10.00 | 0.00 | 10.00 | 100 | 9.80 | 10.97 | | 0.0109 | 1 | 18.0 | 6.21 | | | 0.02 | 10.02 | Into Storm Sewer B-2 | |
| Lateral B-5 | 29.45 | 0.00 | 29.45 | B5 | 0.09 | 0.90 | 0.08 | 0.08 | 10.00 | 0.00 | 10.00 | 100 | 9.80 | 0.79 | | 0.0001 | 1 | 18.0 | 0.45 | | | 1.09 | 11.09 | Into Storm Sewer B-2 | |
| Lateral B-6 | 18.80 | 0.00 | 18.80 | B6A, B6B + Carryover from B4 | 0.97 | 0.54 | 0.52 | 0.52 | 10.00 | 0.00 | 10.00 | 100 | 9.80 | 5.13 | 6.52 | 0.0039 | 1 | 18.0 | 3.69 | | | 0.08 | 10.08 | Into Storm Sewer B-1 | |
| Lateral B-7 | 10.22 | 0.00 | 10.22 | B7A, B7B | 0.52 | 0.90 | 0.47 | 0.47 | 10.00 | 0.00 | 10.00 | 100 | 9.80 | 4.59 | | 0.0019 | 1 | 18.0 | 2.60 | | | 0.07 | 10.07 | Into Storm Sewer B-1 | |
| Storm Sewer B-1 | 480.21 | 476.01 | 4.20 | B7 | 0.52 | 0.90 | 0.47 | 0.47 | 10.00 | 0.00 | 10.00 | 100 | 9.80 | 4.59 | | 0.0019 | 1 | 18.0 | 2.60 | | | | | | |
| | 476.01 | 430.03 | 45.98 | B6 + Carryover from B4 | 0.97 | 0.54 | 0.52 | 0.99 | 10.00 | 0.03 | 10.03 | 100 | 9.80 | 9.72 | 11.11 | 0.0112 | 1 | 18.0 | 6.29 | 60 Degree Wye | 0.60 | 0.10 | 0.03 | 10.03 | |
| | 430.03 | 389.30 | 40.73 | B4 & B5 | 1.76 | 0.68 | 1.20 | 2.19 | 10.03 | 0.12 | 10.15 | 100 | 9.78 | 21.40 | | 0.0090 | 1 | 24.0 | 6.81 | 60 Degree Wye | 0.60 | 0.55 | 0.12 | 10.15 | Manhole B - From Storm Sewer B-2 |
| | 389.30 | 385.30 | 4.00 | | | | | 2.19 | 10.15 | 0.10 | 10.25 | 100 | 9.78 | 21.40 | | 0.0027 | 1 | 30.0 | 4.36 | Manhole | | 0.62 | 0.10 | 10.25 | |
| | 385.30 | 248.42 | 136.88 | B3 | 0.41 | 0.90 | 0.37 | 2.56 | 10.15 | 0.02 | 10.16 | 100 | 9.75 | 24.94 | | 0.0037 | 1 | 30.0 | 5.08 | Pipe Expansion | | 0.09 | 0.02 | 10.26 | |
| | 248.42 | 244.42 | 4.00 | | | | | 2.56 | 10.16 | 0.45 | 10.61 | 100 | 9.75 | 24.94 | | 0.0014 | 1 | 36.0 | 3.53 | 60 Degree Wye | 0.60 | 0.22 | 0.45 | 10.61 | |
| | 244.42 | 144.68 | 99.74 | B2 | 0.83 | 0.90 | 0.75 | 3.30 | 10.61 | 0.02 | 10.63 | 100 | 9.72 | 32.12 | | 0.0023 | 1 | 36.0 | 4.54 | Pipe Expansion | | 0.04 | 0.02 | 10.63 | |
| | 144.68 | 0.00 | 144.68 | B1 | 0.43 | 0.90 | 0.39 | 3.69 | 10.63 | 0.37 | 11.00 | 100 | 9.70 | 35.81 | | 0.0029 | 1 | 36.0 | 5.07 | 60 Degree Wye | 3.60 | 0.00 | 0.37 | 11.00 | |
| Storm Sewer B-2 | 44.23 | 33.84 | 10.39 | B4 | 1.67 | 0.67 | 1.12 | 1.12 | 0.00 | 0.00 | 0.00 | 100 | 9.80 | 10.97 | | 0.0023 | 1 | 24.0 | 3.49 | 60 Degree Wye | 0.60 | 0.19 | 0.05 | 0.05 | |
| | 33.84 | 0.00 | 33.84 | B5 | 0.09 | 0.90 | 0.08 | 1.20 | 0.00 | 0.05 | 0.05 | 100 | 9.78 | 11.74 | | 0.0027 | 1 | 24.0 | 3.74 | 60 Degree Wye | 0.60 | 0.10 | 0.15 | 0.20 | |
| Lateral C-1 | 17.57 | 0.00 | 17.57 | C1A, C1B | 1.07 | 0.60 | 0.64 | 0.64 | 10.00 | 0.00 | 10.00 | 100 | 9.80 | 6.29 | | 0.0036 | 1 | 18.0 | 3.56 | | | 0.08 | 10.08 | Into Storm Sewer C-1 | |
| Lateral C-2 | 17.20 | 0.00 | 17.20 | C2A, C2B | 0.32 | 0.90 | 0.29 | 0.29 | 10.00 | 0.00 | 10.00 | 100 | 9.80 | 2.82 | | 0.0007 | 1 | 18.0 | 1.60 | | | 0.18 | 10.18 | Into Storm Sewer C-1 | |
| Lateral C-3 | 24.89 | 0.00 | 24.89 | C3 | 2.48 | 0.50 | 1.24 | 1.24 | 10.00 | 0.00 | 10.00 | 100 | 9.80 | 12.15 | | 0.0134 | 1 | 18.0 | 6.88 | | | 0.06 | 10.06 | Into Storm Sewer C-1 | |
| Storm Sewer C | 474.17 | 470.14 | 4.03 | Lateral C-1 | 1.07 | 0.60 | 0.64 | 0.64 | 10.00 | 0.00 | 10.00 | 100 | 9.80 | 6.29 | | 0.0036 | 1 | 18.0 | 3.56 | 60 Degree Wye | 0.60 | 0.20 | 0.02 | 10.02 | |
| | 470.14 | 423.24 | 46.90 | Lateral C-2 | 0.32 | 0.90 | 0.29 | 0.93 | 10.00 | 0.02 | 10.02 | 100 | 9.80 | 9.11 | | 0.0075 | 1 | 18.0 | 5.16 | 60 Degree Wye | 0.60 | 0.29 | 0.15 | 10.17 | |
| | 423.24 | 401.49 | 21.75 | | | | 0.00 | 0.93 | 10.02 | 0.15 | 10.17 | 100 | 9.78 | 9.10 | | 0.0075 | 1 | 18.0 | 5.15 | 45 Degree Bend | 0.50 | 0.21 | 0.07 | 10.24 | |
| | 401.49 | 106.58 | 294.91 | | | | 0.00 | 0.93 | 10.17 | 0.07 | 10.24 | 100 | 9.78 | 9.10 | | 0.0075 | 1 | 18.0 | 5.15 | 45 Degree Bend | 0.50 | 0.21 | 0.95 | 11.20 | |
| | 106.58 | 96.58 | 10.00 | Lateral C-3 | 2.48 | 0.50 | 1.24 | 2.17 | 10.24 | 0.95 | 11.20 | 100 | 9.70 | 21.05 | | 0.0087 | 1 | 24.0 | 6.70 | 60 Degree Wye | 0.60 | 0.45 | 0.02 | 11.22 | |
| | 96.58 | 63.56 | 33.02 | | | | 0.00 | 2.17 | 11.20 | 0.02 | 11.22 | 100 | 9.70 | 21.05 | | 0.0087 | 1 | 24.0 | 6.70 | 45 Degree Bend | 0.50 | 0.35 | 0.08 | 11.30 | |
| | 63.56 | 50.00 | 13.56 | | | | 0.00 | 2.17 | 11.22 | 0.08 | 11.30 | 100 | 9.70 | 21.05 | | 0.0087 | 1 | 24.0 | 6.70 | 45 Degree Bend | 0.50 | 0.35 | 0.03 | 11.34 | |
| Lateral D-1 | 21.68 | 0.00 | 21.68 | D1 | 0.41 | 0.90 | 0.37 | 0.37 | 10.00 | 0.00 | 10.00 | 100 | 9.80 | 3.62 | | 0.0012 | 1 | 18.0 | 2.05 | | | 0.18 | 10.18 | | |
| Lateral D-3 | 89.36 | 73.68 | 15.68 | D3 | 0.44 | 0.90 | 0.40 | 0.40 | 10.00 | 0.00 | 10.00 | 100 | 9.80 | 3.88 | | 0.0014 | 1 | 18.0 | 2.20 | | | 0.12 | 10.12 | | |
| | 73.68 | 49.35 | 24.33 | | | | 0.00 | 0.40 | 10.00 | 0.12 | 10.12 | 100 | 9.80 | 3.88 | | 0.0014 | 1 | 18.0 | 2.20 | 45 Degree Bend | 0.50 | 0.04 | 0.18 | 10.30 | |
| | 49.35 | 38.33 | 11.02 | D4 | 0.05 | 0.90 | 0.05 | 0.44 | 10.12 | 0.18 | 10.30 | 100 | 9.75 | 4.30 | | 0.0017 | 1 | 18.0 | 2.43 | 60 Degree Wye | 0.60 | 0.05 | 0.08 | 10.38 | |
| | 38.33 | 0.00 | 38.33 | | | | 0.00 | 0.44 | 10.30 | 0.08 | 10.38 | 100 | 9.75 | 4.30 | | 0.0017 | 1 | 18.0 | 2.43 | 45 Degree Bend | 0.50 | 0.05 | 0.26 | 10.64 | |
| Lateral D-4 | 18.80 | 0.00 | 18.80 | D4 | 0.05 | 0.90 | 0.05 | 0.05 | 10.00 | 0.00 | 10.00 | 100 | 9.80 | 0.44 | | 0.0000 | 1 | 18.0 | 0.25 | | | 1.26 | 11.26 | | |
| Storm Sewer D | 242.10 | 230.93 | 11.17 | D2 | 1.66 | 0.90 | 1.49 | 1.49 | 10.00 | 0.00 | 10.20 | 100 | 9.80 | 14.64 | | 0.0042 | 1 | 24.0 | 4.66 | | | 0.04 | 10.24 | | |
| | 230.93 | 225.61 | 5.32 | Lateral D-1 | 0.35 | 0.90 | 0.32 | 1.81 | 10.20 | 0.04 | 10.24 | 100 | 9.80 | 17.73 | | 0.0061 | 1 | 24.0 | 5.64 | 45 Degree Bend | 0.50 | 0.25 | 0.02 | 10.26 | |
| | 225.61 | 165.35 | 60.26 | Lateral D-3 | | | 0.44 | 2.25 | 10.24 | 0.02 | 10.55 | 100 | 9.75 | 21.93 | | 0.0094 | 1 | 24.0 | 6.98 | 60 Degree Wye | 0.60 | 0.46 | 0.14 | 10.69 | |
| | 165.35 | 29.09 | 136.26 | | | | 0.00 | 2.25 | 10.55 | 0.14 | 10.69 | 100 | 9.75 | 21.93 | | 0.0094 | 1 | 24.0 | 6.98 | 60 Degree Wye | 0.60 | 0.30 | 0.33 | 11.62 | |
| | 29.09 | 15.58 | 13.51 | | | | 0.00 | 2.25 | 10.69 | 0.33 | 11.02 | 100 | 9.75 | 21.93 | | 0.0094 | 1 | 24.0 | 6.98 | 45 Degree Bend | 0.50 | 0.38 | 0.03 | 11.05 | |
| | 15.58 | 0.00 | 15.58 | | | | 0.00 | 2.25 | 11.02 | 0.03 | 11.05 | 100 | 9.75 | 21.93 | | 0.0094 | 1 | 24.0 | 6.98 | 45 Degree Bend | 0.50 | 0.38 | 0.04 | 11.09 | |

PROP. STORM SEW. LINE "D"
ST. SEW. & INLETS REMOVED FROM
PROJECT TO SPEED UP CONSTRUCTION
(AS PER CITY OF ROCKWALL)

This record drawing is a compilation of the sealed engineering drawing for this project; modified by addenda, change orders and information furnished by the contractor. The information shown on the record drawings that was provided by the contractor or others not associated with the design engineer cannot be verified for accuracy or completeness. This original sealed drawings are on file at the offices of Birkhoff, Hendricks & Conway, L.L.P.

THESE DOCUMENTS ARE FOR
BIDDING, CONSTRUCTION,
AND PERMIT PURPOSES.
DATE: 4/25/09



CITY OF ROCKWALL, TEXAS

FANNIN STREET
PROPOSED STORM SEWER
CALCULATIONS

BIRKHOFF, HENDRICKS & CONWAY, L.L.P.
CONSULTING ENGINEERS
Dallas, Texas

DESIGNED BY: M.H. PROJECT: 2005-111 SHEET NO. 45
DRAWN BY: J.M. DATE: APRIL, 2006

PLOTTED BY: GDAVIS ON 4/30/2009
 PLOT STYLE: ----
 PLOT SCALE: 1:25849
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 REVISED: 4/24/09 - GDAVIS