

includes minor losses at drop structure  
check for multiple incoming lines for additional junction losses

| partial flow     |            |             |                    |        |               |               |                |                    |                |            |                   |                       |               |                               | check for multiple incoming lines and |                 |           |      |                      |                |               |                  |                |                 |               |                |          |                      |  |
|------------------|------------|-------------|--------------------|--------|---------------|---------------|----------------|--------------------|----------------|------------|-------------------|-----------------------|---------------|-------------------------------|---------------------------------------|-----------------|-----------|------|----------------------|----------------|---------------|------------------|----------------|-----------------|---------------|----------------|----------|----------------------|--|
| structure number | line upper | reach lower | flowline elevation |        | length (feet) | slope (ft/ft) | pipe size (in) | drainage area (ac) | coeff (cfs/ac) | flow (cfs) | flow vel (ft/sec) | hydraulic radius (in) | vel head (ft) | Q x Vh (ft <sup>4</sup> /sec) | pipe hf                               | friction losses |           |      | hydraulic elevations |                |               | top of structure | freeboard (ft) | roughness coeff | pipe capacity | drop structure |          |                      |  |
|                  |            |             | upper              | lower  |               |               |                |                    |                |            |                   |                       |               |                               |                                       | minor           | structure | bend | total (hmt)          | upper fl + dia | lower HE + hf |                  |                |                 |               |                | lower HE | exiting HGL HE + hmt | entering HGL top of pip in drop struc. |
| 16               | 16         | 15          | 555.80             | 553.19 | 146.82        | 0.0178        | 15             | x                  | x              | 5.79       | 7.53              | 4.17                  | 0.88          | 5.10                          | 2.58                                  | 0.00            | 0.00      | 0.00 | 0.00                 | 557.05         | 557.97        | 555.39           | 557.97         | 550.86          | 560.50        | 2.53           | 0.013    | 8.64                 | 0.20                                   |
| 15               | 15         | 14          | 552.99             | 549.61 | 135.89        | 0.0249        | 15             | x                  | x              | 8.10       | 9.22              | 4.38                  | 1.32          | 10.69                         | 3.36                                  | 0.92            | 0.00      | 0.92 | 0.00                 | 554.24         | 554.47        | 551.11           | 555.39         | 554.44          | 561.35        | 5.96           | 0.013    | 10.22                | 0.20                                   |
| 14               | 14         | EX Cl       | 549.61             | 547.92 | 95.97         | 0.0176        | 18             | x                  | x              | 8.56       | 7.96              | 4.56                  | 0.98          | 8.42                          | 1.68                                  | 0.00            | 0.00      | 0.00 | 0.00                 | 551.11         | 550.80        | 549.12           | 551.11         | 549.42          | 554.80        | 3.69           | 0.013    | 13.98                | 0.00                                   |
| EX Cl            | EX Cl      |             | 547.92             |        |               |               |                |                    |                |            |                   |                       |               |                               |                                       |                 |           |      |                      |                |               |                  |                |                 |               |                |          |                      |  |

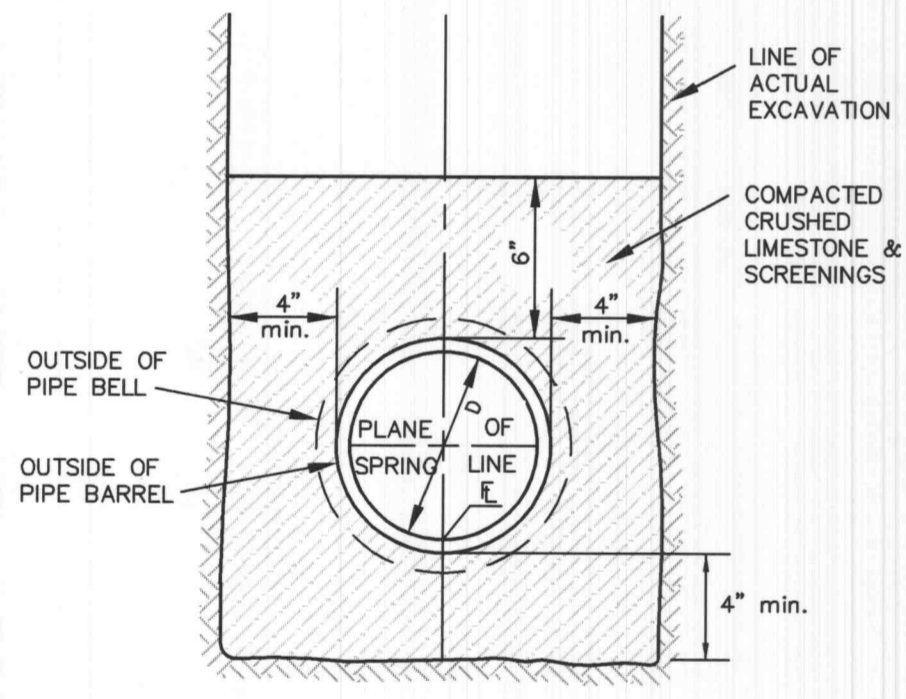
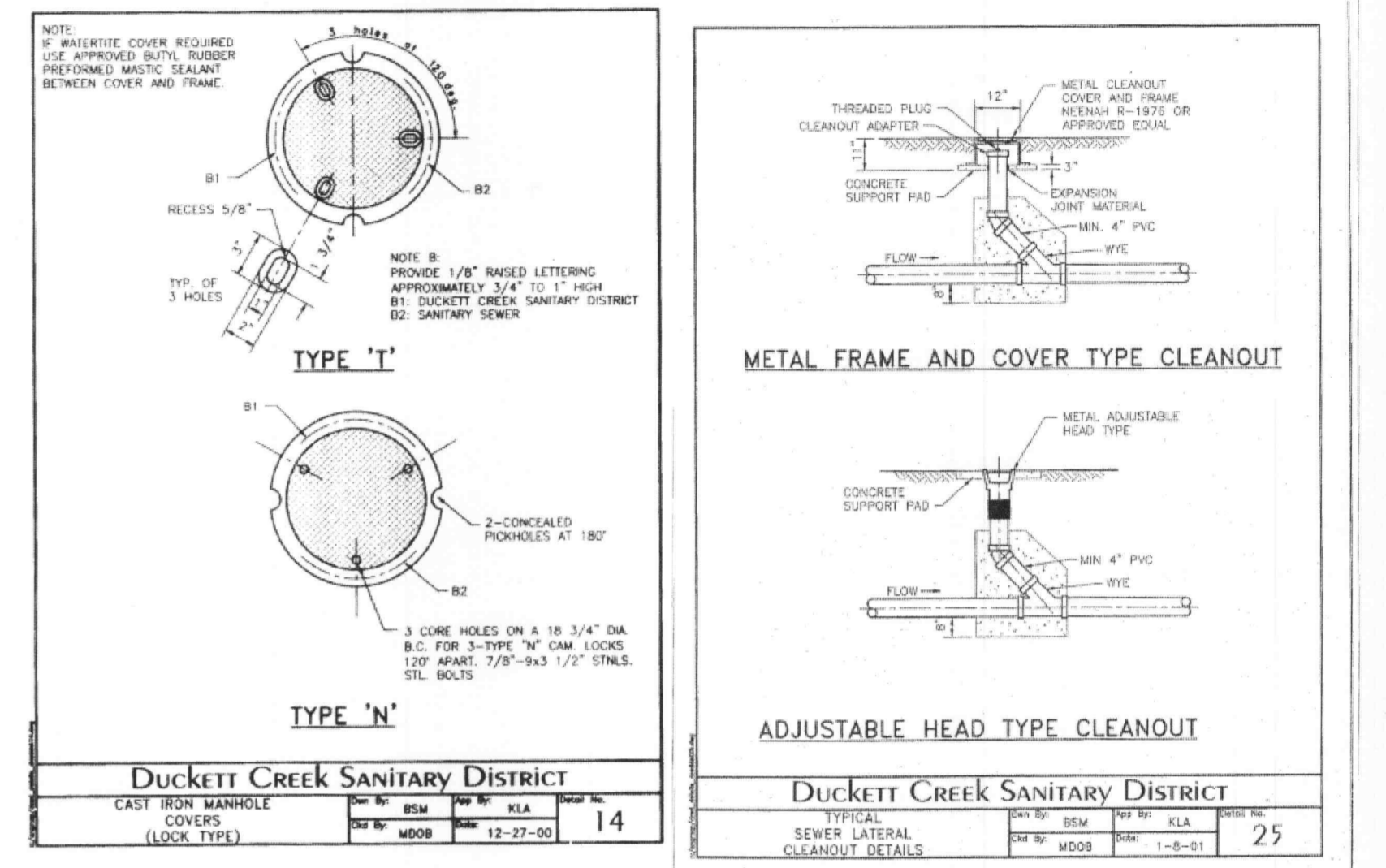
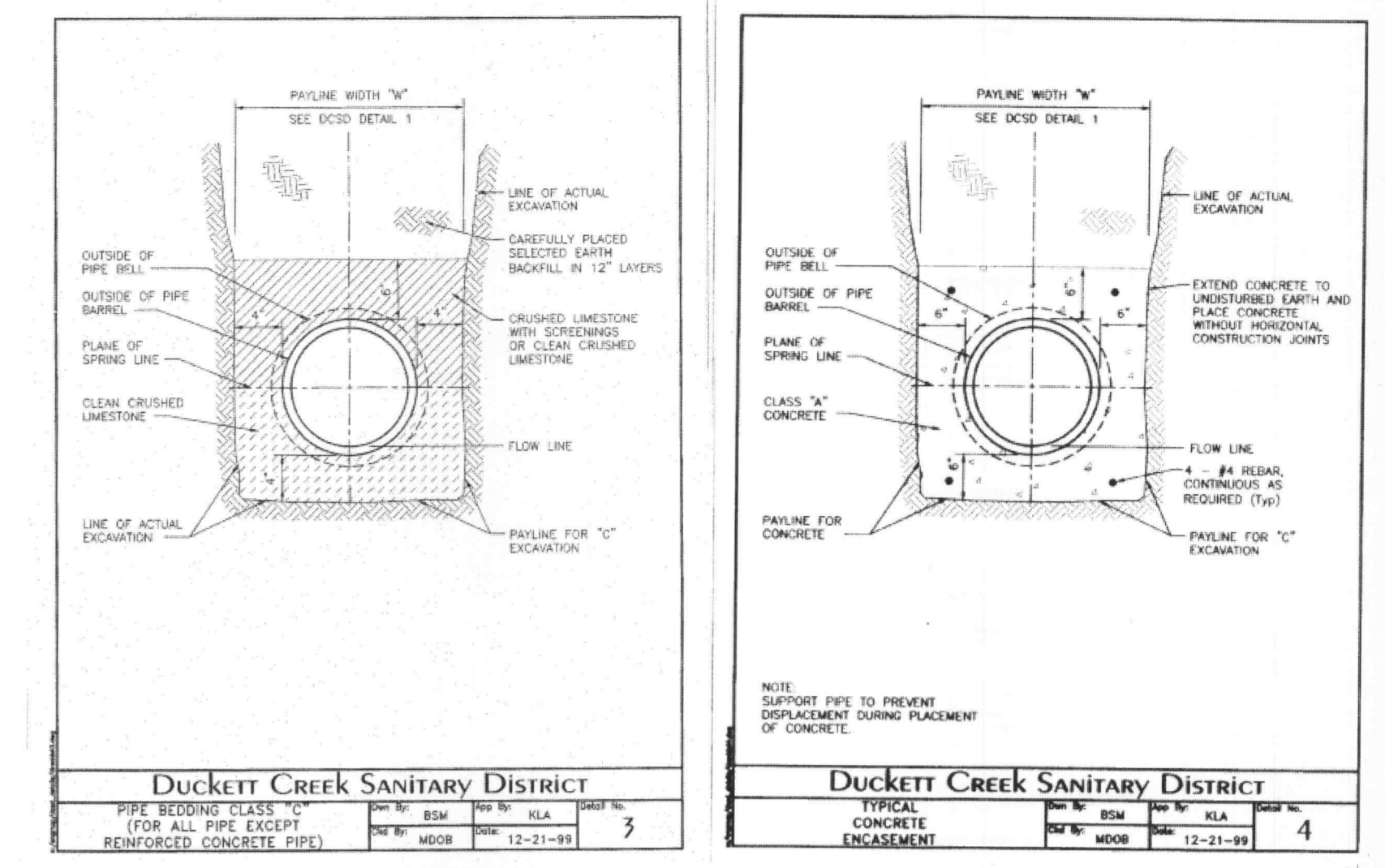
| structure number | line upper | reach lower | flowline elevation |        | length (feet) | slope (ft/ft) | pipe size (in) | drainage area (ac) | coeff (cfs/ac) | flow (cfs) | flow vel (ft/sec) | hydraulic radius (in) | vel head (ft) | Q x Vh (ft <sup>4</sup> /sec) | pipe hf | friction losses |           |      | hydraulic elevations |                |               | top of structure | freeboard (ft) | roughness coeff | pipe capacity | drop structure |          |                      |  |
|------------------|------------|-------------|--------------------|--------|---------------|---------------|----------------|--------------------|----------------|------------|-------------------|-----------------------|---------------|-------------------------------|---------|-----------------|-----------|------|----------------------|----------------|---------------|------------------|----------------|-----------------|---------------|----------------|----------|----------------------|--|
|                  |            |             | upper              | lower  |               |               |                |                    |                |            |                   |                       |               |                               |         | minor           | structure | bend | total (hmt)          | upper fl + dia | lower HE + hf |                  |                |                 |               |                | lower HE | exiting HGL HE + hmt | entering HGL top of pip in drop struc. |
| 13               | 13         | 5           | 557.90             | 557.11 | 39.37         | 0.0201        | 12             | x                  | x              | 0.72       | 4.56              | 1.79                  | 0.32          | 0.23                          | 0.78    | 0.00            | 0.00      | 0.00 | 0.00                 | 558.90         | 0.78          | 0.00             | 558.90         | 553.50          | 562.10        | 3.20           | 0.013    | 5.06                 | 4.61                                   |
| 5                | 5          |             | 552.50             |        |               |               |                |                    |                |            |                   |                       |               |                               |         |                 |           |      |                      |                |               |                  |                |                 |               |                |          |                      |  |

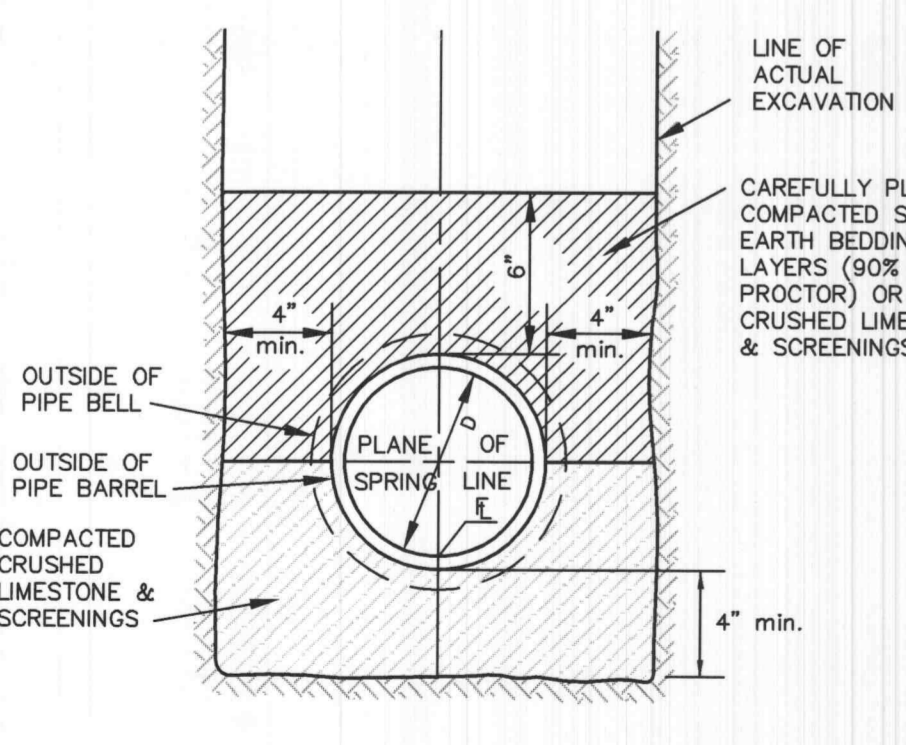
| structure number | line upper | reach lower | flowline elevation |        | length (feet) | slope (ft/ft) | pipe size (in) | drainage area (ac) | coeff (cfs/ac) | flow (cfs) | flow vel (ft/sec) | hydraulic radius (in) | vel head (ft) | Q x Vh (ft <sup>4</sup> /sec) | pipe hf | friction losses |           |      | hydraulic elevations |                |               | top of structure | freeboard (ft) | roughness coeff | pipe capacity | drop structure |          |                      |  |
|------------------|------------|-------------|--------------------|--------|---------------|---------------|----------------|--------------------|----------------|------------|-------------------|-----------------------|---------------|-------------------------------|---------|-----------------|-----------|------|----------------------|----------------|---------------|------------------|----------------|-----------------|---------------|----------------|----------|----------------------|--|
|                  |            |             | upper              | lower  |               |               |                |                    |                |            |                   |                       |               |                               |         | minor           | structure | bend | total (hmt)          | upper fl + dia | lower HE + hf |                  |                |                 |               |                | lower HE | exiting HGL HE + hmt | entering HGL top of pip in drop struc. |
| 4                | 4          | 3           | 543.37             | 542.79 | 75.25         | 0.0077        | 42             | x                  | x              | 62.09      | 9.87              | 11.72                 | 1.51          | 93.92                         | 0.58    | 0.00            | 0.00      | 0.00 | 0.00                 | 546.87         | 546.67        | 546.09           | 546.87         | 546.29          | 565.92        | 19.05          | 0.013    | 88.56                | 0.20                                   |
| 3                | 3          | 2           | 542.59             | 541.26 | 166.00        | 0.0080        | 42             | x                  | x              | 62.09      | 10.02             | 11.65                 | 1.56          | 96.80                         | 1.32    | 0.00            | 0.00      | 0.00 | 0.00                 | 546.09         | 545.88        | 544.56           | 546.09         | 544.76          | 563.40        | 17.31          | 0.013    | 90.30                | 0.20                                   |
| 2                | 2          | 1           | 541.06             | 540.58 | 60.47         | 0.0079        | 42             | x                  | x              | 62.09      | 9.97              | 11.67                 | 1.54          | 95.84                         | 0.47    | 0.00            | 0.00      | 0.00 | 0.00                 | 544.56         | 544.35        | 543.88           | 544.56         | 544.08          | 555.10        | 10.54          | 0.013    | 89.88                | 0.20                                   |
| 1                | 1          |             | 540.38             |        |               |               |                |                    |                |            |                   |                       |               |                               |         |                 |           |      |                      |                |               |                  |                |                 |               |                |          |                      |  |

| structure number | line upper | reach lower | flowline elevation |        | length (feet) | slope (ft/ft) | pipe size (in) | drainage area (ac) | coeff (cfs/ac) | flow (cfs) | flow vel (ft/sec) | hydraulic radius (in) | vel head (ft) | Q x Vh (ft <sup>4</sup> /sec) | pipe hf | friction losses |           |      | hydraulic elevations |                |               | top of structure | freeboard (ft) | roughness coeff | pipe capacity | drop structure |          |                      |  |
|------------------|------------|-------------|--------------------|--------|---------------|---------------|----------------|--------------------|----------------|------------|-------------------|-----------------------|---------------|-------------------------------|---------|-----------------|-----------|------|----------------------|----------------|---------------|------------------|----------------|-----------------|---------------|----------------|----------|----------------------|--|
|                  |            |             | upper              | lower  |               |               |                |                    |                |            |                   |                       |               |                               |         | minor           | structure | bend | total (hmt)          | upper fl + dia | lower HE + hf |                  |                |                 |               |                | lower HE | exiting HGL HE + hmt | entering HGL top of pip in drop struc. |
| 9                | 9          | 8           | 558.05             | 557.67 | 37.56         | 0.0101        | 18             | x                  | x              | 8.78       | 6.68              | 5.32                  | 0.69          | 6.08                          | 0.38    | 0.00            | 0.00      | 0.00 | 0.00                 | 559.55         | 559.56        | 559.19           | 559.56         | 0.00            | 562.05        | 2.49           | 0.013    | 10.59                | 0.00                                   |
| 8                | 8          | 7           | 557.47             | 557.24 | 22.96         | 0.0100        | 18             | x                  | x              | 8.78       | 6.65              | 5.33                  | 0.69          | 6.03                          | 0.23    | 0.00            | 0.00      | 0.00 | 0.00                 | 558.97         | 559.19        | 558.96           | 559.19         | 558.74          | 563.10        | 3.91           | 0.013    | 10.54                | 0.20                                   |
| 7                | 7          | 6           | 557.04             | 555.76 | 128.29        | 0.0100        | 18             | x                  | x              | 9.56       | 6.74              | 5.43                  | 0.71          | 6.74                          | 1.27    | 0.15            | 0.23      | 0.38 | 0.00                 | 558.54         | 558.58        | 557.31           | 558.96         | 557.26          | 561.90        | 2.94           | 0.013    | 10.52                | 0.20                                   |
| 6                | 6          | 5           | 555.56             | 553.39 | 108.45        | 0.0200        | 18             | x                  | x              | 13.23      | 9.50              | 5.41                  | 1.40          | 18.54                         | 2.15    | 0.00            | 0.25      | 0.25 | 0.00                 | 557.06         | 556.84        | 554.69           | 557.31         | 554.89          | 561.90        | 4.59           | 0.013    | 14.90                | 0.20                                   |
| 5                | 5          | EX4         | 553.19             | 552.20 | 49.57         | 0.0200        | 18             | x                  | x              | 13.95      | 9.56              | 5.46                  | 1.42          | 19.80                         | 0.98    | 0.00            | 0.00      | 0.00 | 0.00                 | 554.69         | 543.05        | 542.07           | 554.69         | 553.70          | 563.16        | 8.47           | 0.013    | 14.88                | 8.63                                   |
| EX4              | EX4        |             | 543.57             |        |               |               |                |                    |                |            |                   |                       |               |                               |         |                 |           |      |                      |                |               |                  |                |                 |               |                |          |                      |  |

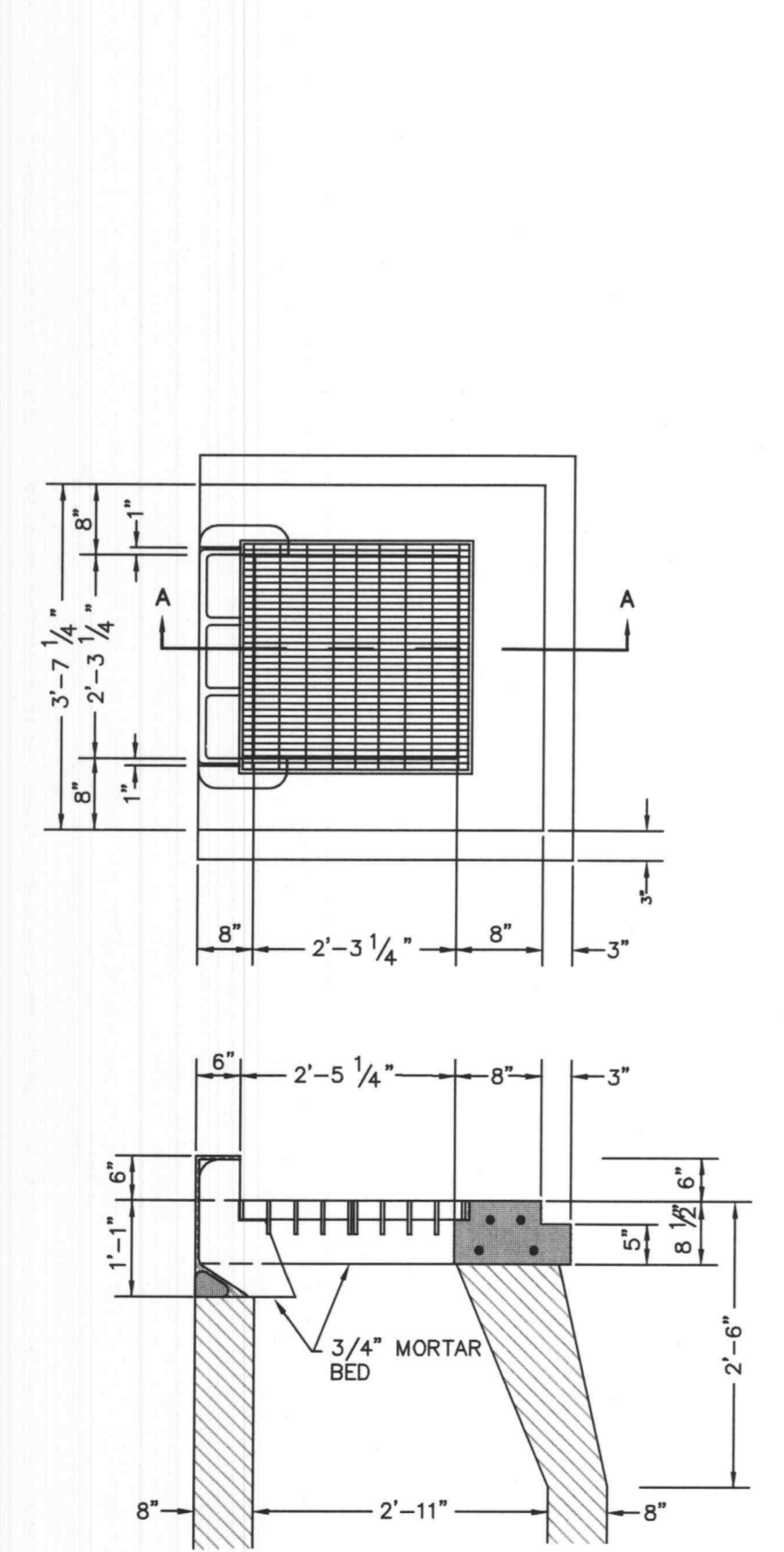


PIPE BEDDING CLASS "C"  
(FOR ALL PIPE EXCEPT REINFORCED CONCRETE PIPE)

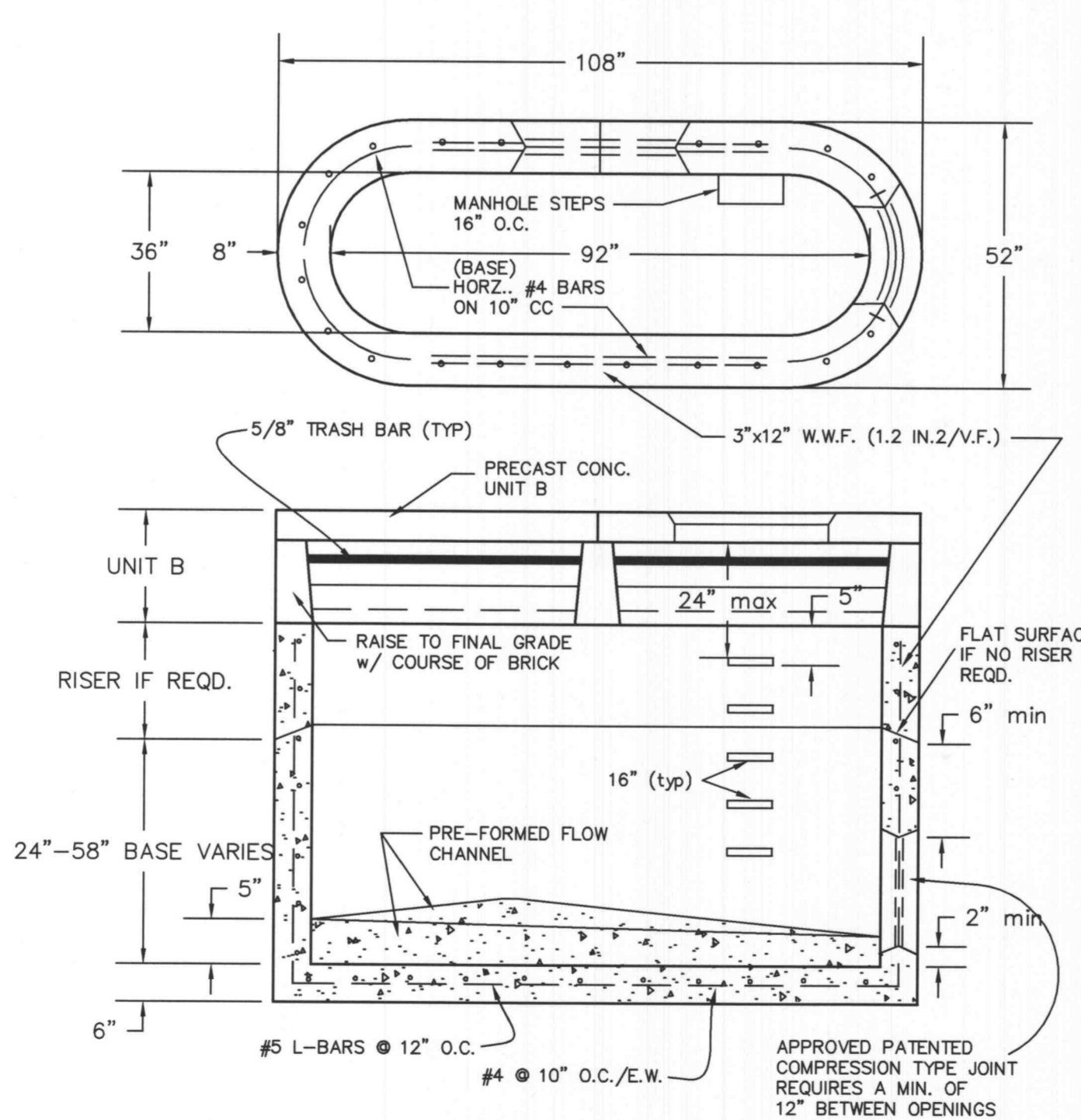


PIPE BEDDING CLASS "C"  
(MODIFIED FOR REINFORCED CONCRETE PIPE)

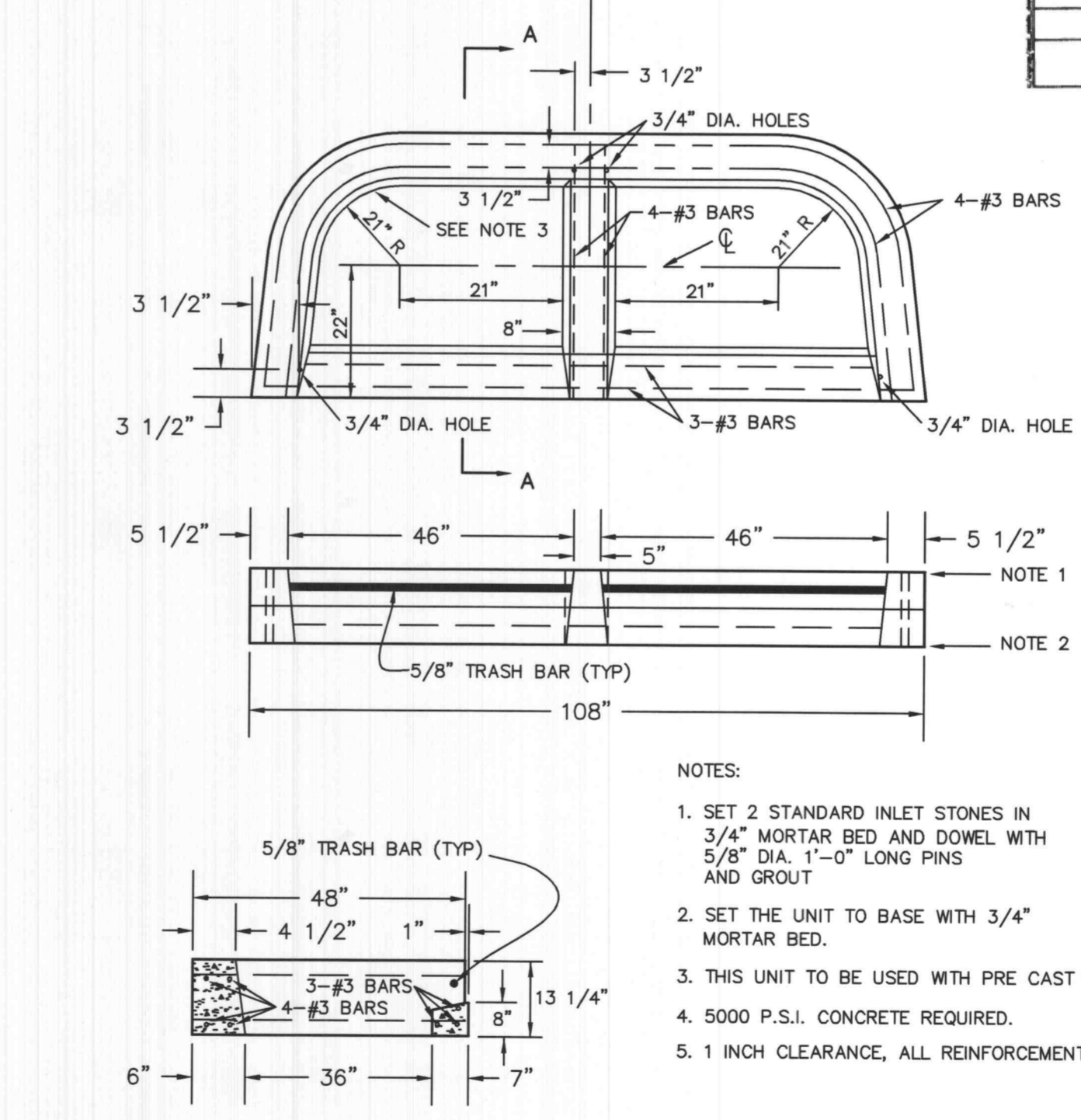
PIPE BEDDING DETAILS



SECTION "A-A"  
PRE-CAST CONCRETE UNIT  
2 GRATE INLET W/SIDE INTAKE  
(n.t.s.)



PRE-CAST CONCRETE UNIT  
DOUBLE UNTRAPPED STREET INLET  
(n.t.s.)



PRE-CAST CONCRETE UNIT  
UNIT B FOR DOUBLE STREET INLET  
(n.t.s.)

- NOTES:
- SET 2 STANDARD INLET STONES IN 3/4" MORTAR BED AND DOWEL WITH 5/8" DIA. 1'-0" LONG PINS AND GROUT
  - SET THE UNIT TO BASE WITH 3/4" MORTAR BED.
  - THIS UNIT TO BE USED WITH PRE CAST BASE.
  - 5000 P.S.I. CONCRETE REQUIRED.
  - 1 INCH CLEARANCE, ALL REINFORCEMENT.

- △ - 06/09/06 REVISED AmeronUE COMMENTS.
- △ - 05/15/06 REVISED PER SEWER DISTRICT COMMENTS. ADDED ABANDONMENT NOTES TO SHEETS C3 and C4, REVISED LATERAL STATIONING, ADDED CONCRETE ENCASMENT.
- △ - 05/03/06 REVISED PER CITY COMMENTS
- △ - 04/25/06 REVISED PER CITY, SEWER DISTRICT AND CLIENT COMMENTS
- △ - 03/22/06 REVISED PER CITY AND CLIENT COMMENTS

APC LAB FACILITY  
SEWER DETAILS AND HYDRAULIC CALCULATIONS

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