



March 28, 2019

Renee Brissette, PE CFM
Senior Engineer, Hydrology
600 2nd Street NW
Albuquerque, NM 87103

**RE: Paseo Marketplace Public Work Order #791682
Hydrologic and Hydraulic Analysis of Storm Drain Capacity**

Dear Renee Brissette:

The original approved public work order plan set shows the existing double type "C" and double type "A" inlets located on the north side of Palomas Avenue just east of the intersection with San Pedro Drive to be relocated to the proposed turn lane curb north of the existing location. These new relocated inlets would reconnect to the storm drain where the existing inlets currently discharges. However, there is a 30" concrete cylinder pipe water transmission line that is located directly behind the existing curb on the north side of Palomas Avenue. This transmission line conflicted with reconnecting the new relocated storm inlets with the existing storm drain. The conflict was discovered in the field prior to constructing the turn lane. It was considered to connect the new inlets to the existing storm drain in San Pedro Drive, however, it was determined that there were too many conflicts with underground utility lines near the northeast corner of the San Pedro Drive and Palomas Avenue intersection.

Therefore, this alternative is to modify the existing inlet boxes to double type "D" inlets and leave the existing storm drain in place to avoid any conflicts. The turn lane will be re-designed to drain toward the existing flowline and a valley gutter will be added to replace the existing curb once it is removed. The subsequent exhibits and remainder of this letter analyzes this modification and the effects it has on the existing storm drain system to determine if additional inlets will be necessary.

The attached Exhibit A shows the drainage basins contributing to the San Pedro Drive and Palomas Avenue intersection. Subbasins A, B, and F collect at analysis point #1, which is a single type "A" inlet on the north side of Palomas Drive. Runoff captured by this inlet is routed south in a storm drain that discharges into the South Domingo Baca Channel. Subbasins A, B, and F generate 25.4 cfs. See attached Hydrology Calculations. Using the Grating Capacities for type single inlets chart from the Albuquerque DPM Section 22.3, this inlet has a capacity of 5 cfs. Therefore, 20.4 cfs bypasses this inlet and continues flowing west in Palomas Avenue.

Subbasins C, D, E, and G collect at analysis points #2 and #3. Analysis point #2 is the inlets on the south side of Palomas Avenue while analysis point #3 is the inlets on the north side and the location where the existing inlets will be modified into double type "D" inlets. These subbasins generate 46.8 cfs, therefore, the total flow reaching analysis points #2 and #3 is 67.2 cfs when combined with the bypass from analysis point #1. Using the Grating Capacities for type double inlets chart from the Albuquerque DPM section 22.3, these inlets have a capacity of 6 cfs. This capacity does not include the throat capacities for the storm inlets on

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the south side of Palomas. Therefore, 43.2 cfs bypasses these inlets and continues into San Pedro Drive.

Subbasins H and I collect at analysis point #4, which is a double type "A" inlet in San Pedro Drive at the northeast corner of the intersection with Palomas Avenue. These subbasins generate 15.4 cfs, therefore, the total flow reaching this inlet is 58.6 cfs when combined with the bypass from analysis points #2 and #3. Analysis point #4 is in a sump condition as opposed to the previous analysis points, which were on grade. Using the Orifice & Weir Calculations attached, it is determined that this inlet has a capacity of 29.2 cfs. See attached calculations. The remaining 29.4 cfs overflows to the northwest to a curb opening in the median curb of San Pedro Drive that is also in sump.

The inlets capturing flow at analysis points #2, #3, and #4 are all collected in storm drains that join at a manhole in the intersection and discharge into a 30" storm drain pipe. The 30" pipe discharges into an 84" storm drain located on the west side of San Pedro Drive, which discharges into the South Domingo Baca Channel. This 30" storm drain is essentially a choke point for all the flows reaching this manhole. The current inlet configuration has a total capacity of 53.2 cfs when combining the inlets at analysis points #2, #3, and #4. An analysis of the 30" storm drain shows that it has a capacity of 59.8 cfs. Therefore, the storm drain can only convey an additional flow of 6.6 cfs. If the inlet capacities are increased in excess of 6.6 cfs, it will not be beneficial unless the 30" pipe where the flow is restricted is upsized.

In conclusion, it is proposed that the existing double type "A" and double type "C" inlets on the north side of Palomas Avenue at analysis point #3 will be modified into two double type "D" inlets. Additionally, as a result of this analysis, another double type "D" inlet be added on the north side of Palomas Avenue with the turn lane construction. The addition of this inlet will help capture additional flows reaching this location. This will also maximize the capacity of the existing storm drain system in Palomas Avenue and San Pedro Drive.

If you have any questions or comments concerning any aspect of this analysis, please contact us at your convenience.

Sincerely,

Hugh Floyd, PE
New Mexico Manager, Water & Natural Resources
505.366.4187 cell
Hugh.Floyd@respec.com

NAME: L:\Active Projects\018-15-200 Jim Achen San Pedro Site\3_DWG\OrthoContours\Parcels_Js_BM.dwg PLOT DATE: Mar 26, 2019 4:20pm

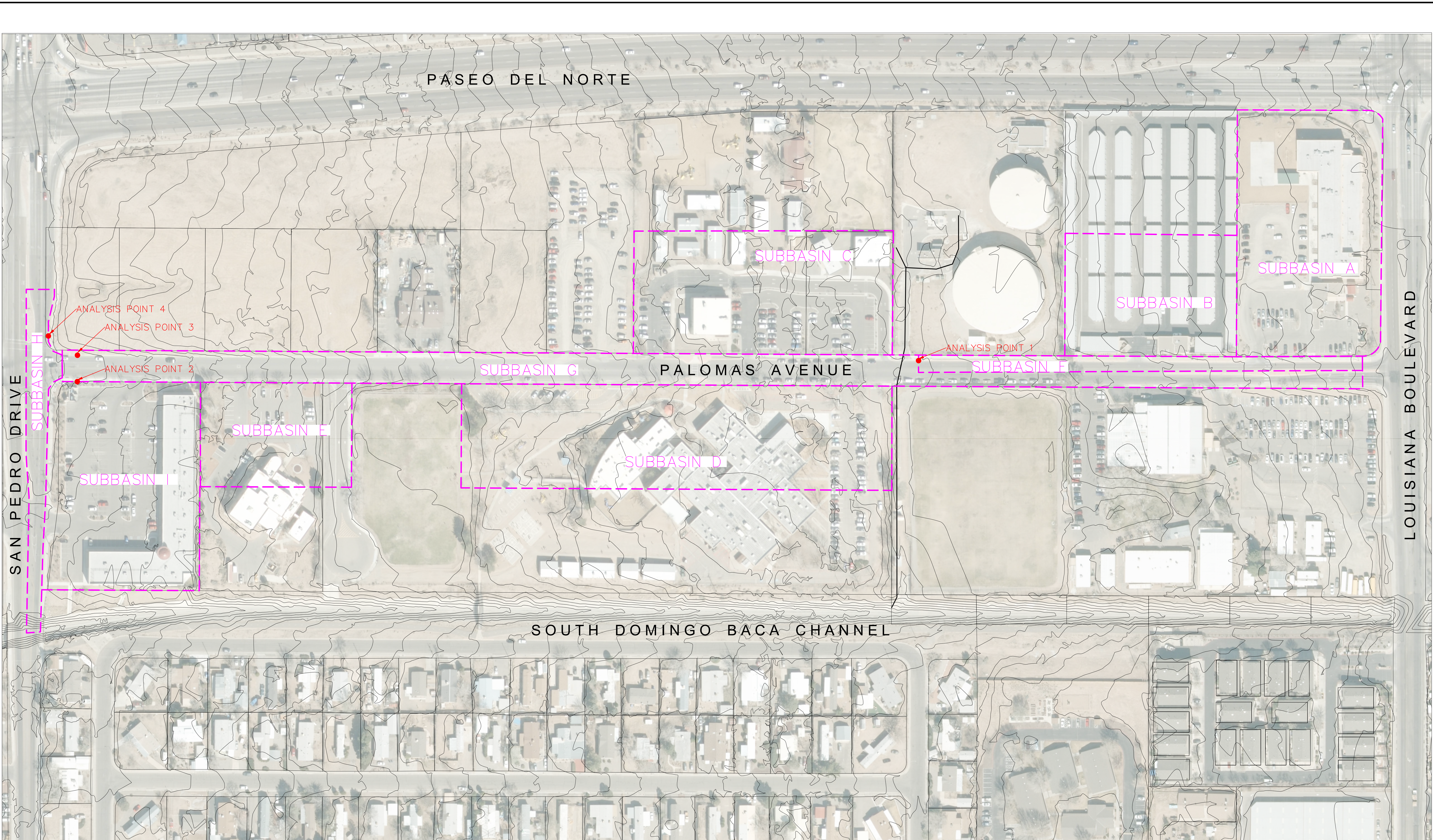
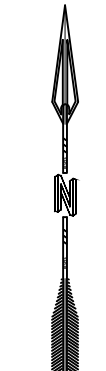


EXHIBIT A



RESPEC

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 WATER & NATURAL RESOURCES
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Hydrology Calculations

The following calculations are based on Albuquerque's Development Process Manual, Section 22.2

Runoff Rate:

Treatment Type Areas

Subbasin	Area _A (ac)	Area _B (ac)	Area _C (ac)	Area _D (ac)	Total (ac)
A	0.00	0.30	0.30	2.38	2.97
B	0.00	0.00	0.00	1.75	1.75
C	0.00	0.27	0.27	2.14	2.67
D	0.00	0.38	0.38	3.00	3.75
E	0.00	0.13	0.13	1.06	1.32
F	0.00	0.00	0.00	0.57	0.57
G	0.00	0.82	0.82	1.20	2.84
H	0.00	0.00	0.00	0.58	0.58
I	0.00	0.27	0.27	2.15	2.69

Peak Discharge values based on Zone 3 from Table A-9

$$Q_A = 1.87 \text{ cfs/ac}$$

$$Q_B = 2.60 \text{ cfs/ac}$$

$$Q_C = 3.45 \text{ cfs/ac}$$

$$Q_D = 5.02 \text{ cfs/ac}$$

Peak Discharge calculation for a 100-yr, 24-hr storm event from equation A-10

Subbasin	Discharge (cfs)
A	13.7
B	8.8
C	12.3
D	17.3
E	6.1
F	2.9
G	11.0
H	2.9
I	12.4

Peak Discharge at each analysis point

Analysis Point	Discharge (cfs)	Subbasins
1	25.4	A, B, F
2/3	46.8	C, D, E, G
4	15.4	H, I

ANALYSIS POINT #1

GRATING CAPACITIES FOR TYPE "A", "C" AND "D"

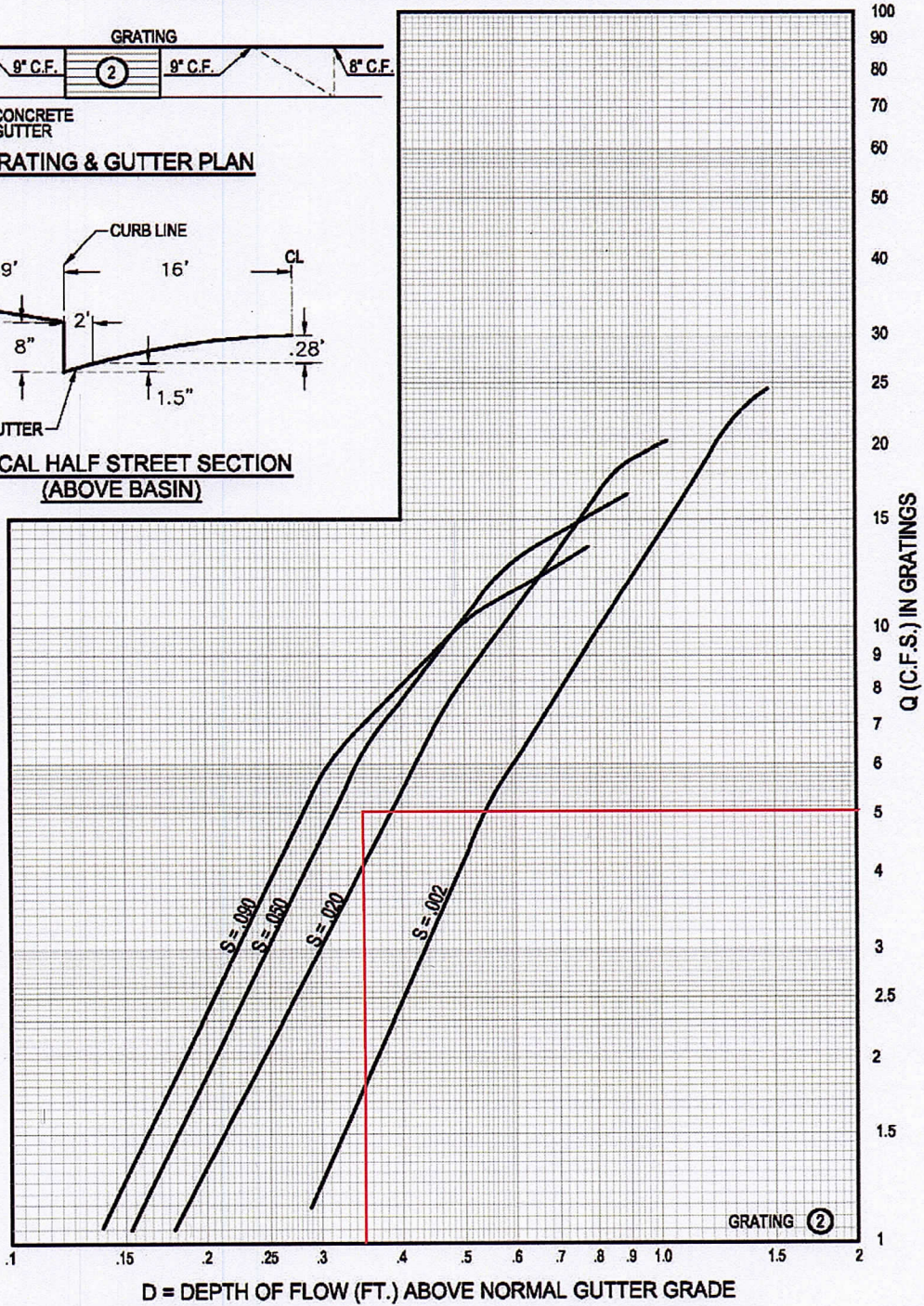
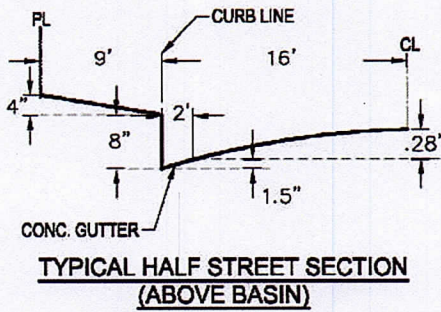
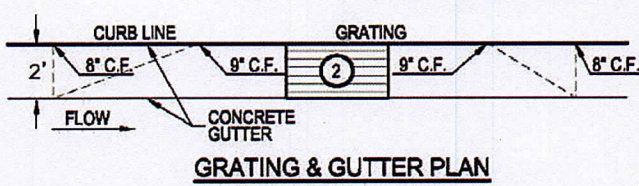


PLATE 22.3 D-5

ANALYSIS POINTS #2/#3

GRATING CAPACITIES FOR TYPE DOUBLE "C" AND "D"

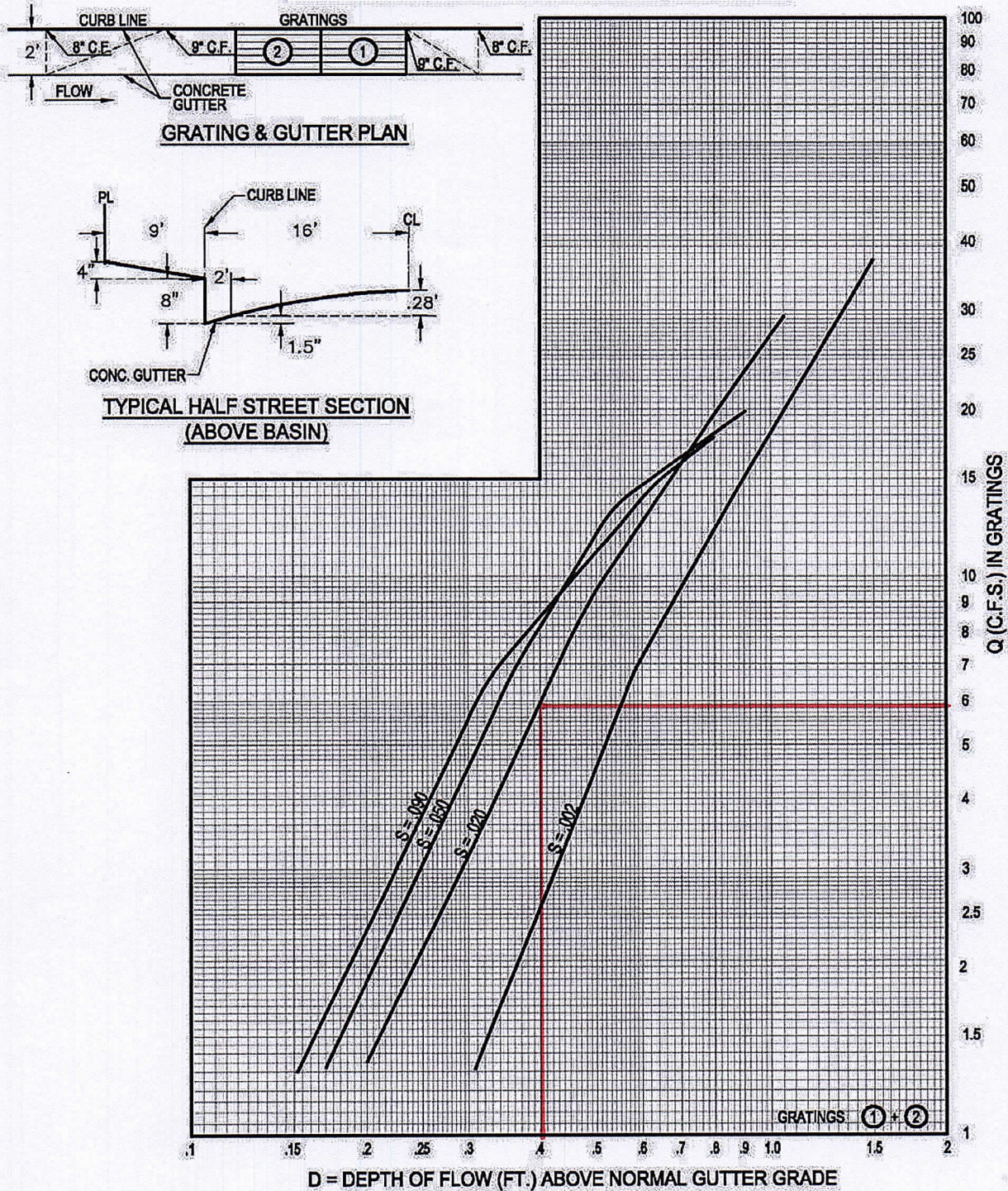


PLATE 22.3 D-6

Orifice & Weir Calculations

Orifice (Unkown Q) for 30" SD

Head Water Depth (h): 6.41 ft

Discharge Coeff. (C_d): 0.6

Open Area (A): 4.9087 ft²

Gravity (g): 32.2 ft/s²

Flow (Q) = $C \cdot A \cdot (2 \cdot g \cdot h)^{0.5}$

Flow (Q) = 59.8 cfs

Orifice (Unkown Q) for San Pedro Double A Inlet Grate

Head Water Depth (h): 0.54 ft

Discharge Coeff. (C_d): 0.6

Open Area (A): 9.1215 ft²

Gravity (g): 32.2 ft/s²

Flow (Q) = $C \cdot A \cdot (2 \cdot g \cdot h)^{0.5}$

Flow (Q) = 32.3 cfs

Weir (Unkown Q) for San Pedro Double A Inlet Grate

Discharge Coeff. (C_w): 3.367

Length (L): 10.83 ft

Flow (Q) = $C_w \cdot L \cdot h^{1.5}$

Flow (Q) = 14.5 cfs

Weir (Unkown Q) for San Pedro Double A Inlet Throat

Discharge Coeff. (C_w): 3.367

Length (L): 11 ft

Flow (Q) = $C_w \cdot L \cdot h^{1.5}$

Flow (Q) = 14.7 cfs