

DRAINAGE REPORT

Bureau of Reclamation & Social Security Administration
Building Located at 555 Broadway NE

April 11, 2002

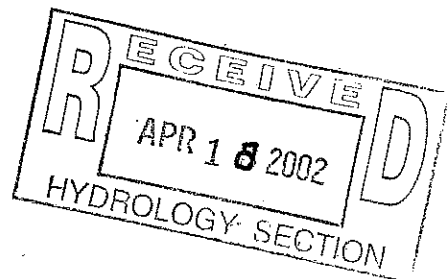
Prepared For:

AARDEX Corporation
12340 West Alameda Parkway, Suite 220
Lakewood, Colorado 80228-2841



Prepared By:

Oden - Miller & Associates



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DRAINAGE AND TRANSPORTATION INFORMATION SHEET

(REV. 1/11/2002)

J-14/D143

Bureau of Reclamation & Social Security Administration Building
 PROJECT TITLE: located at 555 Broadway N.E. ZONE MAP/DRG. FILE #: J-14-Z
 DRB #: _____ EPC#: _____ WORK ORDER#: _____

LEGAL DESCRIPTION: Parcel 1 - Marquette Subdivision
 CITY ADDRESS: 555 Broadway Blvd. N.E.

ENGINEERING FIRM: Oden-Miller & Associates
 ADDRESS: P.O. Box 1976
 CITY, STATE: Moriarty, NM 87035

CONTACT: Verlyn Miller
 PHONE: 832-1425
 ZIP CODE: 87035

OWNER: Aardex Corporation
 ADDRESS: 12340 West Alameda Parkway, Suite 220
 CITY, STATE: Lakewood, CO

CONTACT: Ben Weeks
 PHONE: 303-987-9000
 ZIP CODE: 80228-2841

ARCHITECT: _____
 ADDRESS: _____
 CITY, STATE: _____

CONTACT: _____
 PHONE: _____
 ZIP CODE: _____

SURVEYOR: Clint Sherrill & Associates
 ADDRESS: 730 San Mateo S.E.
 CITY, STATE: Albuquerque, NM

CONTACT: Clint Sherrill
 PHONE: 505-256-7364
 ZIP CODE: 87108

CONTRACTOR: _____
 ADDRESS: _____
 CITY, STATE: _____

CONTACT: _____
 PHONE: _____
 ZIP CODE: _____

CHECK TYPE OF SUBMITTAL:

- ☒ DRAINAGE REPORT
- ☒ DRAINAGE PLAN
- ☐ CONCEPTUAL GRADING & DRAINAGE PLAN
- ☒ GRADING PLAN
- ☐ EROSION CONTROL PLAN
- ☐ ENGINEER'S CERTIFICATION (HYDROLOGY)
- ☐ CLOMR/LOMR
- ☐ TRAFFIC CIRCULATION LAYOUT (TCL)
- ☐ ENGINEERS CERTIFICATION (TCL)
- ☐ ENGINEERS CERTIFICATION (DRB APPR. SITE PLAN)
- ☐ OTHER

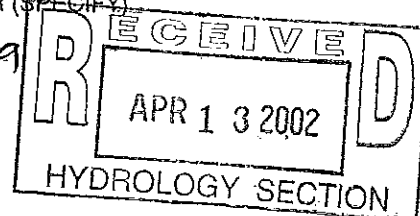
CHECK TYPE OF APPROVAL SOUGHT:

- ☐ SIA / FINANCIAL GUARANTEE RELEASE
- ☐ PRELIMINARY PLAT APPROVAL
- ☐ S. DEV. PLAN FOR SUB'D. APPROVAL
- ☐ S. DEV. PLAN FOR BLDG. PERMIT APPROVAL
- ☐ SECTOR PLAN APPROVAL
- ☐ FINAL PLAT APPROVAL
- ☐ FOUNDATION PERMIT APPROVAL
- ☒ BUILDING PERMIT APPROVAL
- ☐ CERTIFICATE OF OCCUPANCY (PERM.)
- ☐ CERTIFICATE OF OCCUPANCY (TEMP.)
- ☒ GRADING PERMIT APPROVAL
- ☐ PAVING PERMIT APPROVAL
- ☐ WORK ORDER APPROVAL
- ☒ OTHER (SPECIFY) _____

WAS A PRE-DESIGN CONFERENCE ATTENDED:

- ☒ YES
- ☐ NO
- ☐ COPY PROVIDED

DATE SUBMITTED: April 16, 2002 BY: U L N



Requests for approvals of Site Development Plans and/or Subdivision Plats shall be accompanied by a drainage submittal. The particular nature, location and scope of the proposed development defines the degree of drainage detail. One or more of the following levels of submittal may be required based on the following:

1. **Conceptual Grading and Drainage Plan:** Required for approval of Site Development Plans greater than five
2. **Drainage Plans:** Required for building permits, grading permits, paving permits and site plans less than five (5)
3. **Drainage Report:** Required for subdivisions containing more than ten (10) lots or constituting five (5) acres or

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1.0 PURPOSE & SCOPE

The purpose of this report is to provide a hydrologic analysis of existing and post-developed conditions, demonstrate existing and post-developed drainage patterns, and to develop a grading & drainage plan for the management of post-developed flows.

2.0 EXISTING CONDITIONS

The subject site is located at 555 Broadway NE at the corner of Broadway and Marquette (see Figure 2-1). The proposed site currently consists of 3.27 acres of undeveloped land. The site was previously occupied by the Coca-Cola Bottling Company Facility. The site is currently surrounded on all four sides by curb & guttered streets with an old perimeter sidewalk. Off-site drainage does not appear to adversely impact the site due to the presence of curb and guttered streets and sloping topography adjacent to the site.

The ground cover on-site consists of bare ground with little or no vegetation. Under existing conditions, the site may be classified under Land Treatment C as per the City of Albuquerque DPM, Section 22.2.

3.0 PROPOSED CONDITIONS

The proposed development will consist of a two story commercial building with over 50,000 sf of space. The building will be used by the Bureau of Reclamation and the Social Security Administration. The site also consists of asphalt paved parking areas, sidewalks and numerous landscaped areas.

As per previous meetings with the City of Albuquerque Hydrology Section, it was determined that no on-site retention or detention ponding would be required by this project. It was determined that the "free release" of storm water runoff would be allowed based on the following conditions:

- 1) Post-developed flows would be dispersed to both Roma Avenue (north) and Marquette Avenue (south) so that the numerous curb inlets in the area could collect the runoff. The entire site would not discharge to one point on the property.
- 2) Verify that the storm sewer system in Commercial and John Street connected to the 72-inch main in Lomas Boulevard.

In order to satisfy the first requirement, the site was divided into five on-site drainage basins, A – D (see Figure 3-1), in order to disperse the flows to various locations. To further ensure that the capacities of drop inlets in Marquette, Commercial and Roma were not exceeded, the drainage plan includes two on-site drop inlets, which will collect runoff from Basins C & D. ~~Runoff from Basins C & D will be~~ collected by two Type D Drainage Inlets on-site and discharged directly into the storm sewer system in Commercial Street via a 12-inch RCP storm drain pipe.

To satisfy the second condition, as-built plans were obtained from the Records Department and the City to verify that the existing storm sewer system in Commercial and John Streets does in fact connect to the 72-inch main storm sewer line in Lomas Boulevard. A full size print of the as-built plan and profile sheet has been included as an attachment to the grading and drainage plan for the City's reference.

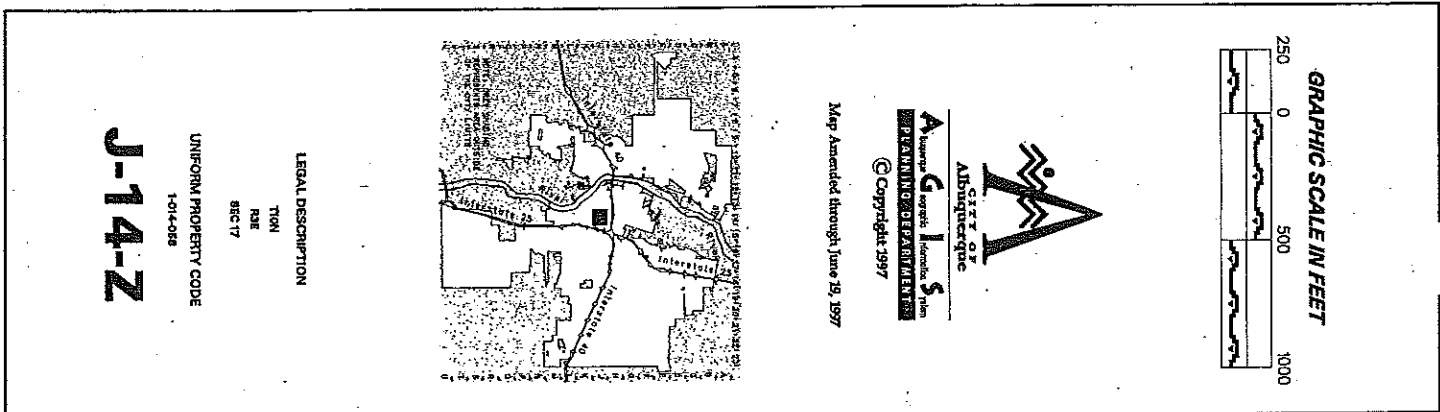


FIGURE 2-2 (VICINITY MAP)

BROADWAY BLVD.

ROMA AVENUE

MARQUETTE AVENUE

COMMERCIAL STREET

BASIN A
1.00 ACRES

BASIN B
0.45 ACRES

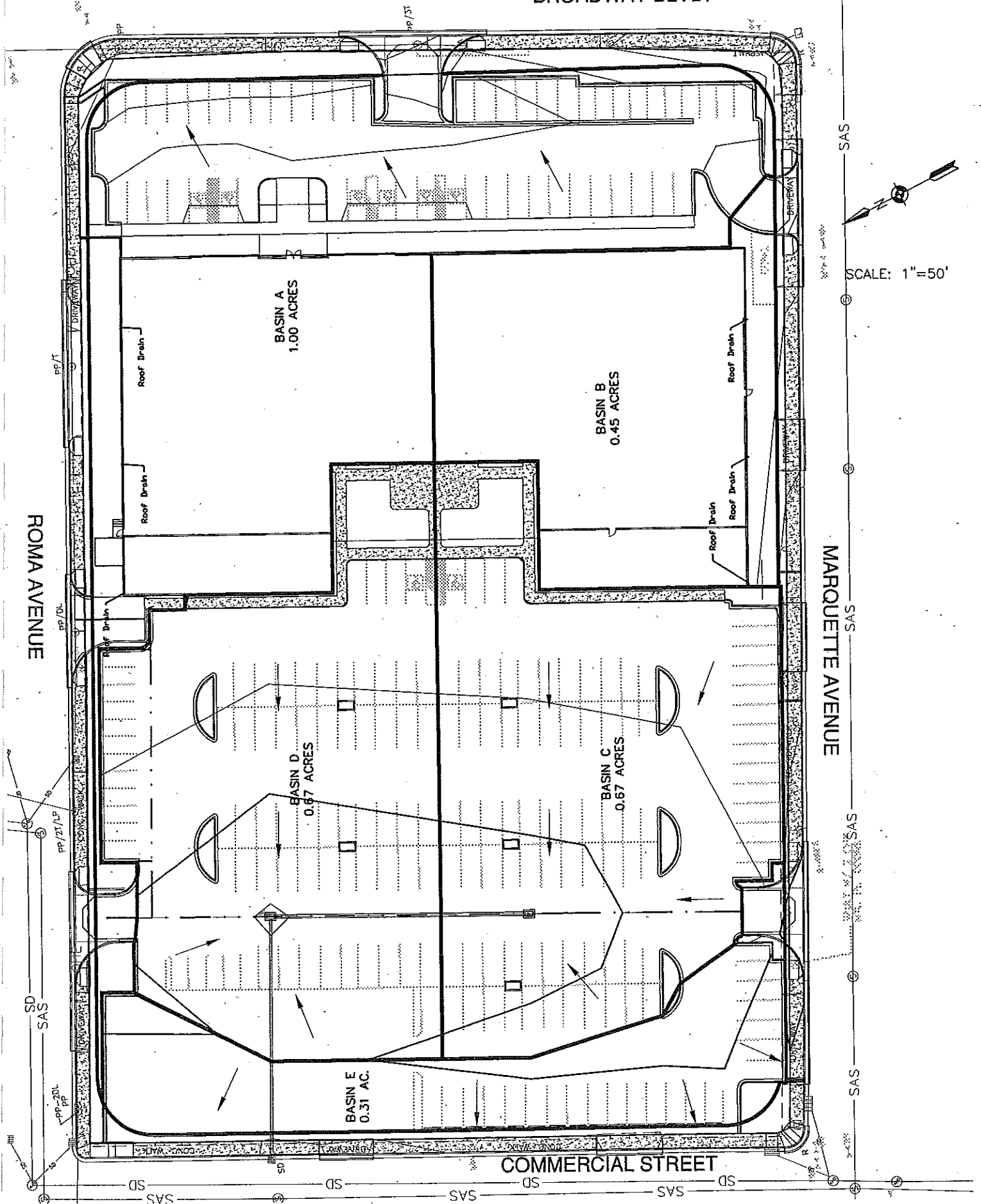
BASIN D
0.67 ACRES

BASIN C
0.67 ACRES

BASIN E
0.31 AC.

SCALE: 1"=50'

FIGURE 3-1 (BASIN MAP)



Other proposed drainage improvements on-site include splash blocks at roof drains to dissipate the energy in the runoff before discharge and to minimize potential erosion to landscaped areas. A minimum water block height of 6-inches has been provided at all driveway entrances in order to maintain curb height and prevent runoff from entering the site. In order to ensure proper parking lot drainage, care has been taken to maintain a 1.5% slope or better in all paved parking lot areas. Concrete valley gutter is specified in areas where longitudinal slopes are 1% or less.

4.0 HYDROLOGY

The hydrologic calculations in this section will quantify the storm water runoff from the site basins for the 10-year, 24-hour and 100-year, 24-hour storm events. The methodology used is per "Section 22.2, Part A, Development Process Manual, Volume 2" dated January 1993. The subject site lies within Precipitation Zone 2 as per Table A-1. The 10-year and 100-year rainfall depths are outlined in Table 4-1.

TABLE 4-1
Rainfall Depths

10-Year Event			100-Year Event		
1-Hour	6-Hour	24-Hour	1-Hour	6-Hour	24-Hour
1.34 in	1.57 in	1.83 in	2.01 in	2.35 in	2.75 in

The time of concentration for all basins in this analysis are considered to be a minimum value of 12 minutes. As such, Tables A-8 and A-9 in the DPM are used to compute volumetric runoff and peak discharge values for the 10-year and 100-year events. A detailed hydrology spreadsheet is included in Appendix A, which indicates the total area of each basin, the total acreage for each land treatment category per basin and the computed discharge values. A spreadsheet is provided for both the 10-year and 100-year events. A summary of the results of this analysis is provided in Table 4-2.

TABLE 4-2
Hydrologic Summary of Results

Basin #	Basin Area (acres)	V _{10yr-24hr} (acre-feet)	Q _{10-yr} (cfs)	V _{100yr-24hr} (acre-feet)	Q _{100-yr} (cfs)
EXISTING CONDITIONS					
Site	3.10	0.134	5.3	0.292	9.7
PROPOSED CONDITIONS					
A	1.00	0.120	2.9	0.193	4.4
B	0.45	0.055	1.3	0.087	2.0
C	0.67	0.085	2.0	0.135	3.1
D	0.67	0.086	2.0	0.136	3.1
E	0.31	0.040	1.0	0.064	1.4

5.0 HYDRAULICS

Hydraulic calculations are provided in Appendix B for all proposed hydraulic structures on-site including drainage inlets and storm sewer pipes. The DPM hydraulic charts are used to determine the drainage inlet capacities and a computer program will be used to verify the capacity of proposed storm sewer pipes.

6.0 CONCLUSION

The requirements as set forth by the City's Hydrology Section in the pre-design meeting for this project have been satisfied. When this site is developed and the grading and drainage improvement are implemented as shown on the grading and drainage plan, the impacts to downstream facilities should be minimal. When this site is fully developed, approximately 14 cfs will be generated during the 100-year event. Approximately 6.2 cfs (44%) of this runoff will be collected on-site and will not surface discharge to adjacent roadways. As a result, 7.78 cfs will discharge from the site during the 100-year event, which is less than the 9.7 cfs that is currently discharged under existing conditions.

APPENDIX A

Hydrology Spreadsheets

HYDROLOGY - 100-YEAR EVENT

Precipitation Zone 2

$P(100-6) = 2.35"$

$P(100-24) = 2.75"$

Basin	Basin Area (Ac)	Land Treatment Factors				Ew (in)	V ₍₁₀₀₋₆₎ (af)	V ₍₁₀₀₋₂₄₎ (af)	Q ₍₁₀₀₎ (cfs)
		A	B	C	D				
Existing Conditions									
Site	3.10	0.00	0.00	3.10	0.00	1.13	0.292	0.292	9.7
Proposed Conditions									
A	1.00	0.00	0.12	0.00	0.88	1.96	0.163	0.193	4.4
B	0.45	0.00	0.05	0.00	0.40	1.97	0.074	0.087	2.0
C	0.67	0.00	0.04	0.00	0.63	2.04	0.114	0.135	3.1
D	0.67	0.00	0.03	0.00	0.64	2.06	0.115	0.136	3.1
E	0.31	0.00	0.01	0.00	0.30	2.08	0.054	0.064	1.4

HYDROLOGY - 10-YEAR EVENT

Precipitation Zone 2

$P_{(10-6)} = 1.57"$ $P_{(10-24)} = 1.83"$

Basin	Basin Area (Ac)	Land Treatment Factors				E _w (in)	V ₍₁₀₀₋₆₎ (af)	V ₍₁₀₀₋₂₄₎ (af)	Q ₍₁₀₀₎ (cfs)
		A	B (Acres)	C	D				
Existing Conditions									
Site	3.10	0.00	0.00	3.10	0.00	0.52	0.134	0.134	5.3
Proposed Conditions									
A	1.00	0.00	0.12	0.00	0.88	1.21	0.101	0.120	2.9
B	0.45	0.00	0.05	0.00	0.40	1.22	0.046	0.055	1.3
C	0.67	0.00	0.04	0.00	0.63	1.28	0.071	0.085	2.0
D	0.67	0.00	0.03	0.00	0.64	1.29	0.072	0.086	2.0
E	0.31	0.00	0.01	0.00	0.30	1.31	0.034	0.040	1.0

APPENDIX B

Hydraulic Calculations



INLETS: $Q_{100} = 3.1 \text{ cfs}$ (BOTH BASIN C & D)

GRATE ELEV. (BASIN C) = 54.42 } AHW = 0.5 ft (MIN.)
HIGH POINT ELEV. = 54.96 }

FROM PLATE 22.3 D-5 $\rightarrow Q_{CAP} = 4 \text{ cfs} > Q_{100} \therefore \text{O.K.}$

ANALYSIS IS CONSERVATIVE \rightarrow ASSUMED
LONGITUDINAL SLOPE OF 0.002 ft/ft
AT GRATE. GRATE IS ACTUALLY IN
SUMP CONDITION. NO NEED TO RUN
HEC-12 ANALYSIS.

PIPES:

I. BETWEEN INLETS C & D

BASIN C $\rightarrow Q_{100} = 3.1 \text{ cfs}$

$S_o = 0.005 \text{ ft/ft}$, $n = 0.01$ (PLASTIC)

D = 12" \rightarrow SEE FLOWMASTER OUTPUT

$Q_{CAP} = 3.52 \text{ cfs} > 3.1 \text{ cfs}$, $\therefore \text{O.K.}$

II. BETWEEN INLETS D & EXIST. DI

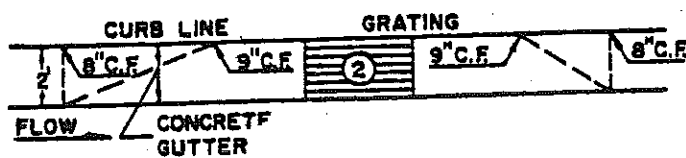
BASIN C & D $\Rightarrow Q_{100} = 3.1 (2) = 6.2 \text{ cfs}$

$S_o = 0.005 \text{ ft/ft}$, $n = 0.01$ (PLASTIC)

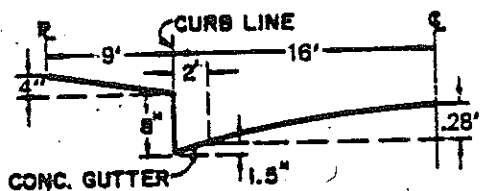
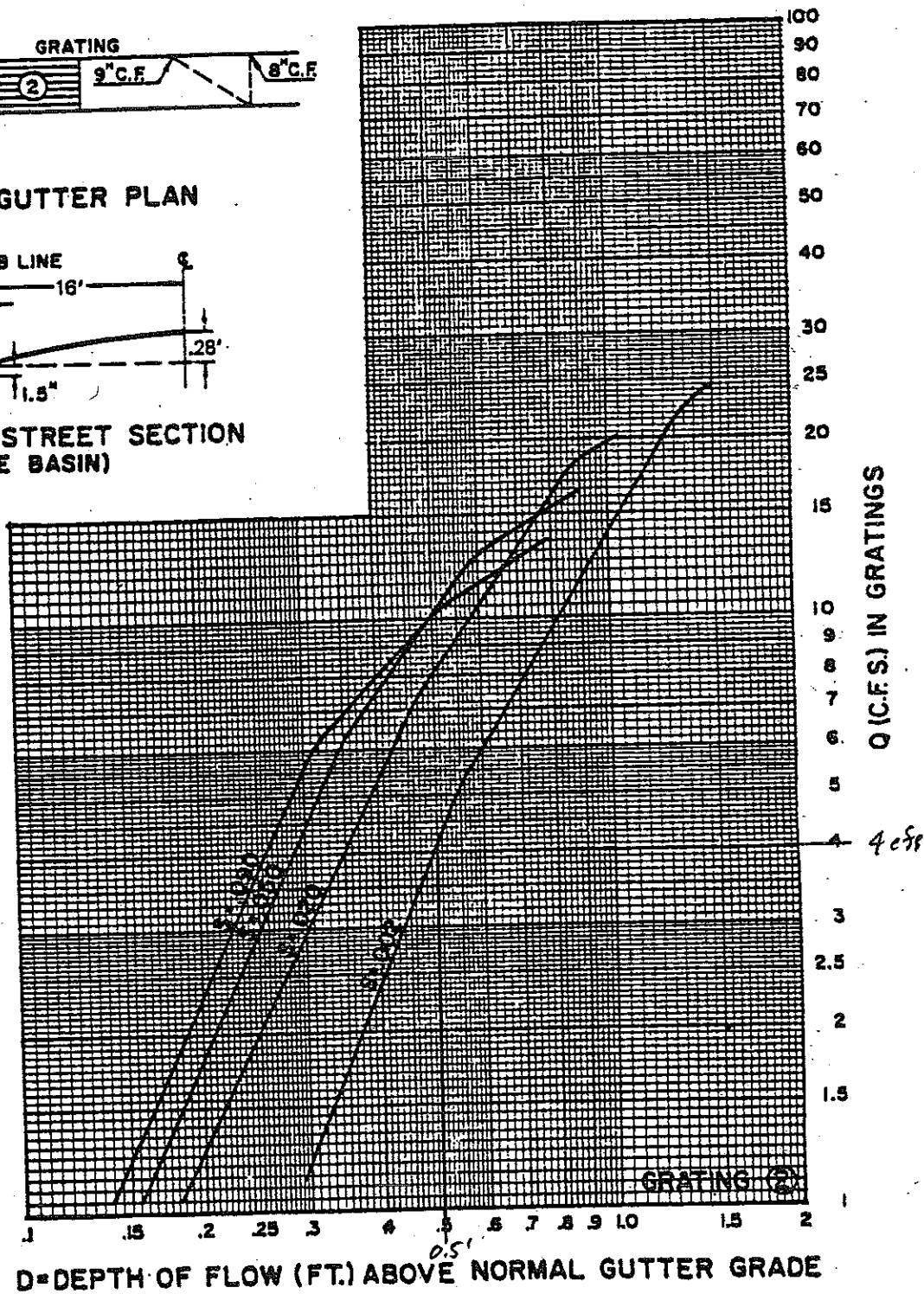
D = 16" \rightarrow SEE FLOWMASTER OUTPUT

$Q_{CAP} = 7.59 \text{ cfs} > 6.2 \text{ cfs}$, $\therefore \text{O.K.}$

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



GRATING & GUTTER PLAN

TYPICAL HALF STREET SECTION
(ABOVE BASIN)

Worksheet

Worksheet for Circular Channel

Project Description	
Project File	c:\haestad\fmw\laardex.fm2
Worksheet	Basin C Drop Inlet
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Discharge

Input Data		
Mannings Coefficient	0.010	
Channel Slope	0.005000	ft/ft
Depth	1.00	ft
Diameter	12.00	in

Results		
Discharge	3.27	cfs
Flow Area	0.79	ft ²
Wetted Perimeter	3.14	ft
Top Width	0.3e-7	ft
Critical Depth	0.77	ft
Percent Full	100.00	
Critical Slope	0.005589	ft/ft
Velocity	4.17	ft/s
Velocity Head	0.27	ft
Specific Energy	1.27	ft
Froude Number	0.14e-3	
Maximum Discharge	3.52	cfs
Full Flow Capacity	3.27	cfs
Full Flow Slope	0.005000	ft/ft
Flow is subcritical.		

Worksheet Worksheet for Circular Channel

Project Description	
Project File	c:\haestad\fmw\laardex.fm2
Worksheet	Basin D Drop Inlet
Flow Element	Circular Channel
Method	Manning's Formula
Solve For	Discharge

Input Data		
Mannings Coefficient	0.010	
Channel Slope	0.005000	ft/ft
Depth	1.33	ft
Diameter	16.00	in

Results		
Discharge	7.20	cfs
Flow Area	1.40	ft ²
Wetted Perimeter	4.06	ft
Top Width	0.13	ft
Critical Depth	1.07	ft
Percent Full	99.75	
Critical Slope	0.005455	ft/ft
Velocity	5.16	ft/s
Velocity Head	0.41	ft
Specific Energy	1.74	ft
Froude Number	0.28	
Maximum Discharge	7.59	cfs
Full Flow Capacity	7.05	cfs
Full Flow Slope	0.005217	ft/ft
Flow is subcritical.		