

DESIGN CALCULATIONS

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4. Jackson E. Barria

a) NE corner

$$t_{c21} = 0.149$$

• Gutter Flow

$$S_{avg} = 6.4\%$$

$$N = 1.2 \text{ FFS (Fig 5)}$$

$$\text{Gutter Length} = 196 + 285 + 28 = 509 \text{ ft}$$

$$t_t = \frac{509}{1.2 (76 \text{ in})} = 0.118 \text{ hr}$$

$$t_c = t_{c21} + t_t = 0.267$$

$$CSM/N = 960$$

• AREA

BLOCK	AREA
20 A	
20	
21	
22	
23	
	0.0308
	0.114
	0.422 sm

• WEIGHTED CN

$$\frac{1}{5} \text{ PASTURE} + \frac{4}{5} \text{ RES}$$

$$CN = 0.2(79) + 0.8(75) = 76$$

$$Q_f \text{ RUNOFF} = 0.011 \text{ in (Fig 7)}$$

$$Q_f = 0.45 (0.0026) (960) = 18.2 \text{ cfs}$$

• CHECK CURB CAPACITY

$$8" @ 6.4\%$$

$$50' \text{ ROAD WIDTH} = 18.5 \text{ cfs} > 18.2 \text{ cfs OK}$$

$$4" @ 6.4\% = 1.8 < 1.82 \text{ PUT IN INLET}$$

• SIZE INLET FOR Q_{100}



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h) CHECK BALBOA STREET

• $Q_p = 5.0$ cfs

• CHECK CURB CAP.

4" ROWWAY @ 11% $\Rightarrow 7.7$ cfs > 5.0 OK

5. JACKSON & CALHOUN

BASED ON Q_p CALCS FOR ABOVE
WILL NEED FOR INTERS DO Q_{100} CALCS.

SUBBASIN B- / Q_{100}

1. LINCOLN & CORONA

a) NORTH SIDE OF A.C. CROSSWALK.

• $Q_{100} = 9.5$ cfs (BLOCK 20)

• CHECK NON-UNIFORM SECTION

CURB CAP = 6.0 < 9.5
@ 0.47%

Q_{100} WILL
FLOOD FRONT
YARD

2. JACKSON & RUTHER

a) CHECK RUTHER

• $Q_{100} = 12.9$ cfs (BLOCK 21)

• ^{EXIST} CURB CAP = 9.1 cfs < 12.9 Q_{100} WILL
FLOOD FRONT
YARD

• NON UNIFORM SECTION

ROWWAY @ 1.6% = 12.0 cfs < 12.9 SAME AS
ABOVE



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b) NE CORNER

$$Q_{100} = 12.9 \text{ cfs}$$

(Alloc 21)

$$\text{CURB CAP} = 7.1 > 12.9 \text{ cfs} \quad \text{NO CURB}$$

3. Jackson & Corona

a) NW corner

$$Q_{100} \text{ RUNOFF} = 1.38 \text{ in}$$

(1676 (N=76))

$$Q_{100} = 1.38 (0.0308) (1100) = 46.75 \text{ cfs} \quad \text{TO HIGH}$$

- PICK UP Q_{100} BEGINNING @ JACKSON & ROYER

$$Q_{100} = 12.9 \text{ cfs}$$

∴ PUT IN 10' DIOR WHICH HANDLES 60% (12.9)

$$Q_{ST} = 12.9$$

$$Q_{IN} = 7.7 \text{ cfs}$$

$$Q_{ST} = 5.2 \text{ cfs} < 7.1 \text{ CURB CAP} \quad \text{OK}$$

- ADD t_L FOR JACKSON & CORONA

$$t_{L20} = 0.170 \text{ hr}$$

• Gutter Flow

$$S_{AUG} = 0.8\%$$

$$N = 1.8 \text{ FI}$$

$$\text{GUTTER LENGTH} = 30' + 930 = 960$$

$$t_L = \frac{960}{1.8 (7600)} = 0.148$$

$$t_L = t_{L20} + t_L = 0.318$$

$$CSM/N = 1000$$

• AREA

BLUZZ	AREA
70	.0069
2.2	.0096
	<u>.0165 sm</u>



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• WEIGHTED CN 100% RPS - SOIL GROUP B

$$CN = 75$$

• $Q_{400} \text{ Runoff} = 1.30 \text{ in}$

$$Q_{100} = 1.30 (0.0165) (1000) = 21.4$$

$$+ Q_{\text{FRACTIONAL \& JACKSON INLET}} \quad \underline{5.2}$$

$$26.6$$

• SIZE 2 INLETS

- NE CORNER INSTALL 20' DIOR @ 0.47

$$Q_{ST} = 26.6 \text{ cfs}$$

$$Q_{IN} = 12.2 \text{ cfs}$$

$$\left. \begin{array}{l} Q_{ST} = 26.6 \text{ cfs} \\ Q_{IN} = 12.2 \text{ cfs} \end{array} \right\} Q_{IT} = 14.4 \text{ cfs}$$

- NW CORNER INSTALL 12' DIOR @ 0.47

$$Q_{ST} = 14.4 \text{ cfs}$$

$$Q_{IN} = 8.6 \text{ cfs}$$

$$\left. \begin{array}{l} Q_{ST} = 14.4 \text{ cfs} \\ Q_{IN} = 8.6 \text{ cfs} \end{array} \right\} Q_{IT} = 5.2 \text{ cfs}$$

• 100 b) CORNER

$$Q_{100} = 9.5 \text{ cfs}$$

• NON-UNIFORM SECTION

$$CURB CAP = 8.5 < 9.5 \quad \approx \text{RECOMMEND NON-UNIFORM SECTION}$$

4. JACKSON & PALBOA

$$Q_{100} (\text{Block 22}) = 16.0 \text{ cfs}$$

$$+ Q_{\text{PMT INLET + JACKSON \& PALBOA}} = 5.8 \text{ cfs}$$

$$\underline{21.8 \text{ cfs}}$$

• INSTALL 2 INLETS



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- NE CORNER 20' DIOR @ 0.4%

$$\left. \begin{array}{l} Q_{ST} = 21.8 \text{ CFS} \\ Q_{IN} = 12.2 \text{ CFS} \end{array} \right\} Q_{ST} = 9.6 \text{ CFS}$$

- NW CORNER 4' DIOR @ 0.4%

$$\left. \begin{array}{l} Q_{ST} = 9.6 \text{ CFS} \\ Q_{IN} = 5.7 \text{ CFS} \end{array} \right\} Q_{ST} = 3.9 \text{ CFS}$$

5. JACKSON & WASHINGTON

a) NE CORNER

$$\begin{aligned} Q_{100} (\text{BLOCK 24}) &= 17.4 \text{ CFS} \\ + \text{FLOW PAST INLET @} &= 3.9 \\ \text{JACKSON \& BALKER} & \\ \hline &21.3 \text{ CFS} \end{aligned}$$

• INSTALL 20' DIOR @ 0.4%

$$\left. \begin{array}{l} Q_{ST} = 21.3 \text{ CFS} \\ Q_{IN} = 12.2 \text{ CFS} \end{array} \right\} Q_{ST} = 9.1 \text{ CFS}$$

b) NW CORNER

$$\begin{aligned} Q_{100} (\text{BLOCK 27}) &= 12.6 \text{ CFS} \\ + \text{FLOW PAST NW CORNER} &= 9.1 \text{ CFS} \\ \text{INLET} & \\ \hline &21.7 \text{ CFS} \end{aligned}$$

• INSTALL 20' DIOR INLET @ S=0.4%

$$\left. \begin{array}{l} Q_{ST} = 21.7 \\ Q_{IN} = 12.2 \end{array} \right\} Q_{ST} = 9.5 \text{ CFS}$$

6. JACKSON & RR ROW

• SIZE INLET SUMP FOR @ PAST INLET @ NW CORNER JACKSON & WASHINGTON

$$\begin{aligned} Q_{ST} &= 9.5 \text{ CFS} \\ \text{INSTALL 6' DIOR} & \\ \text{INLET} & \end{aligned}$$



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DESIGN CALCULATIONS

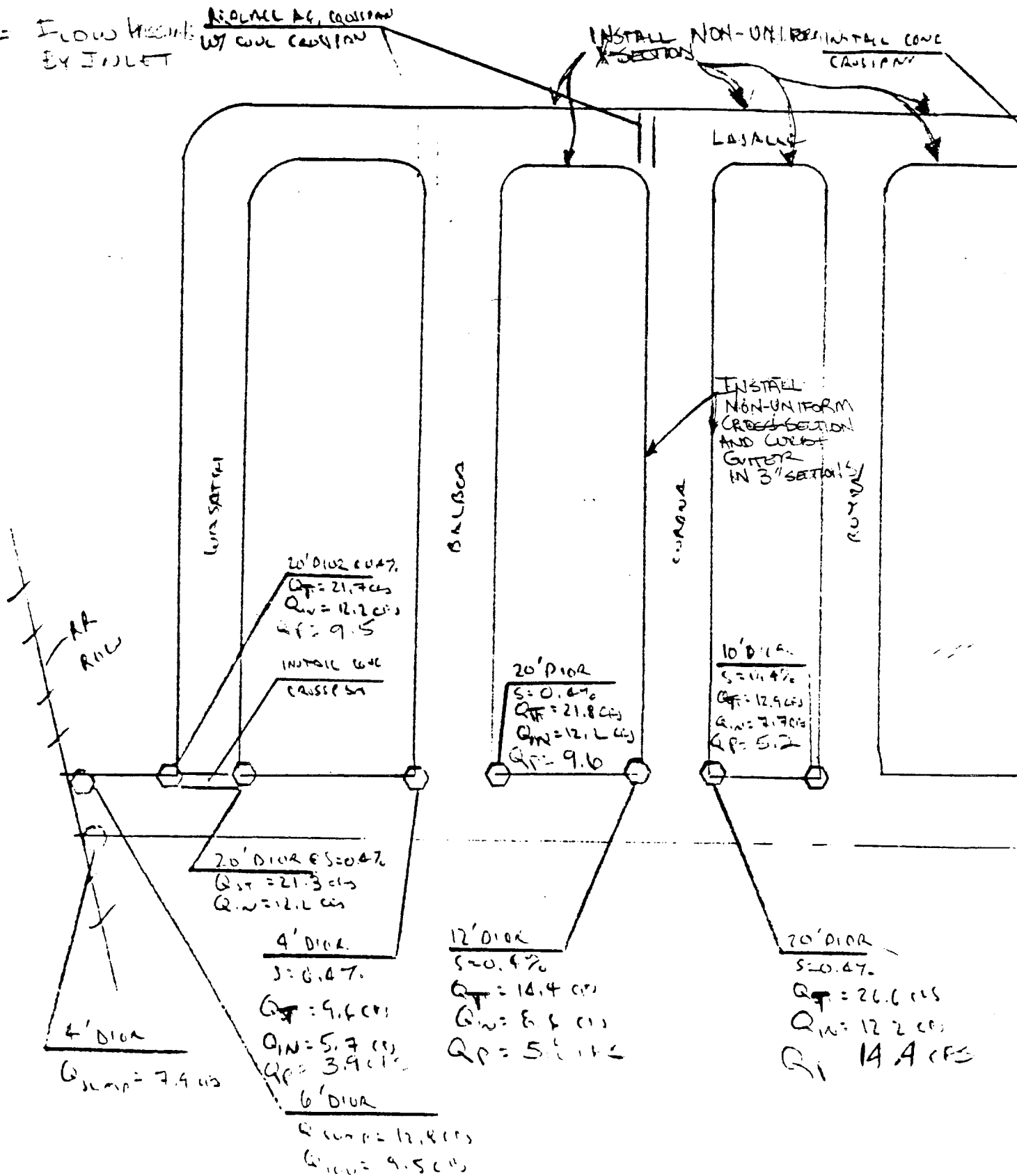
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Q_T = TOTAL FLOW IN STREET
 Q_{IN} = FLOW ENTERING INLET
 Q_P = FLOW LEAVING ^{RISE IN A/C, CROSS SECTION} ~~BY INLET~~ ^{W/ CONE CAUSING}





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SUBBASIN G

a) DRAINAGE IS TO THE SOUTH & WEST TO NORTH SIDE OF ESPAVOLA AT ABANDONED RR CROSSING WHERE SUMP CONDITION OCCURS.

b) BUBBLER LOCATED NORTH OF INTERSECTION OF ESPAVOLA & WAHSATCH SHOULD BE ABANDONED & ALSO BUBBLER @ ABAN. RR ROW.

c) MAJOR INTERSECTIONS

- ESPAVOLA & WAHSATCH
- ESPAVOLA & RR ROW



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Q₅ CALLS / SUB BASIN C

1. INTERSECTION ESPANOLA & WASHATCH

a) NE CORNER BLOCK 50 & 60

• t_c BLOCK 60 = 0.097 HR

• GUTTER FLOW 60 TO 50

$S_{WC} = 1.1\%$

$N = 2.1 \text{ (FP)} \quad (\text{FIG 5})$

GUTTER LENGTH = 410 + 60 = 470 FT

$t_t = \frac{470}{(2.1)(3600)} = 0.062$

• $t_c = 0.062 + 0.097 = 0.159 \text{ HR}$

• $ESM_{IN} = 1150 \quad (\text{FIG 6})$

• AREA

BLOCK	AREA
60	.0045
50	.0081
	<u>.0126 SM</u>

• WEIGHTED CN 100% RES - SEE GROUP A

$CN = 61$

• Q_r RUNOFF = 0.08 IN (FIG 7)

• $Q_r = 0.08 (0.0126) (1150) = 1.2 \text{ CFS}$

• CHECK CURB CAP.

$7" @ 1.1\% \Rightarrow 45.0 \text{ CFS} > 1.2 \text{ OK}$
60' STREET WIDTH

b) MEDIAN (BLOCK 41)

• $Q_r = 0 \text{ CFS RUNOFF}$

c) NW CORNER (BLOCK 34)

• $Q_r = 0.6 \text{ CFS}$



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- CHECK CURB CAPACITY

8" @ 99%

$$\Rightarrow 15.4 \text{ IN} > 0.6$$

30' STREET WIDTH

2. RECOMMEND BASED ON Q_2 CALL TO INSTALL CURB. CROSS BAY & COLLECT ALL FLOW AT ABANDONED ROW IN SUMP W/ET. CHECK Q_{100} PRIOR TO FINALIZING CROSS PAN.

Q_{100} / SUBBASIN C

1. INTERSECTION OF ESPAVOLA & WASHATCH

a) NE CORNER

- Q_{100} RUNOFF = 0.57 (R107 & CN=61)
- $Q_{100} = 0.57(1150)(0.0126) = 8.2$ CFS
- PHEUC CULV CAPACITY $\Rightarrow 45.0$ CFS > 8.2 ✓

b) MEDIAN (BLOCK 41)

$$Q_{100} = 0 \text{ cfs} \quad (\text{SINGLE BLOCK CALC})$$

c) NW CORNER (BLOCK 34)

- $Q_{100} = 2.5$ CFS (SINGLE BLOCK CALC)
- CURV CAP. $\Rightarrow 15.4$ CFS > 2.5 OK

d) Size sump inlet - 4' DIAM @ ABANDONED ROW

$$Q_{\text{sump}} = 7.4$$
$$Q_{100} = 2.5 \quad \underline{\underline{OK}}$$

CHECK USE EXIST BUBBLERS AS ~~GRADES~~ DRAIN INLETS
AND CONNECT TO 4' DIAM @ ROW & ESPAVOLA

$$Q_{DI} = 6.0 \text{ cfs} \quad \text{in } 8" \text{ Vert. Culv. } \left. \begin{array}{l} \text{No} \\ \text{Good} \end{array} \right\}$$
$$Q_{IT} = 8.2 \text{ cfs}$$

∴ INSTALL 6' DIAM INLET @ NE CORNER

$$Q_{IT} = 8.2 \text{ —}$$

$$Q_{\text{sump}} = 12.8 \text{ cfs —}$$

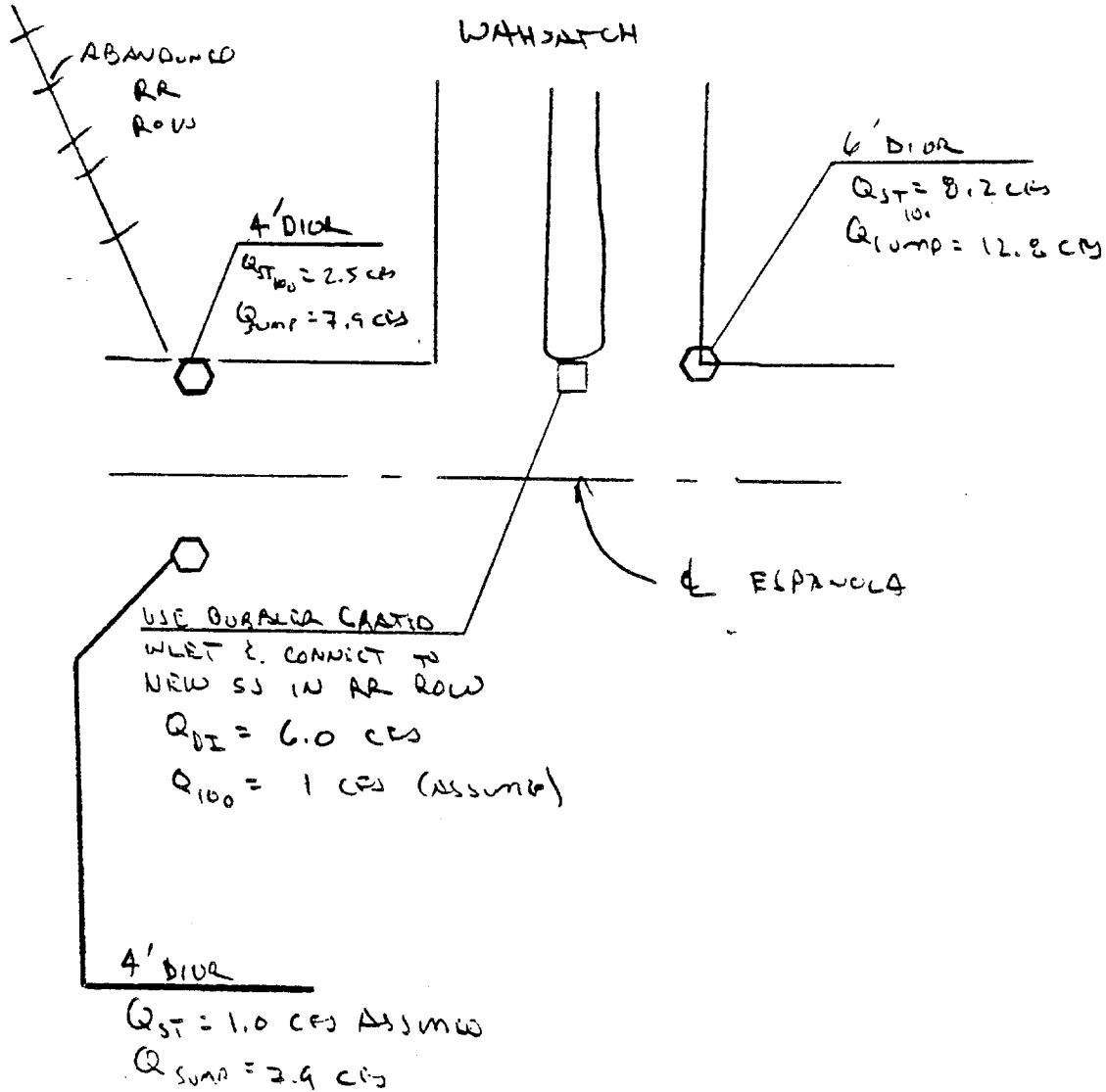


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SUBBASIN D

- a) DRAINAGE IS TO SOUTH E. WEST TO EXISTING INLET @ WAHSATCH & CARAMILLO AND TO A LOW POINT IN GRAVEL ROAD WITH 6" VERT CURB IN BUENA VENTURA. SUMP OCCURS IN BUENA VENTURA. EXIST INLET IN BUENA VENTURA IS A BUBBLER WHICH PASSES WATER ACROSS RR ROW TO EAST GUTTER OF WAHSATCH. ABANDON BUBBLER & RECONNECT EXIST INLET TO STORM SEWER IN RR ROW.
- b) EXIST STORM SEWER (18"Ø) BEGINS @ INTERSECTION OF DEL NORTE & WAHSATCH EXTENDING SOUTH ALONG WAHSATCH WITH ADDITIONAL INLETS AT CARAMILLO & WAHSATCH. THERE IS A BUBBLER LOCATED AT NE & SE CORNER OF DEL NORTE & WAHSATCH. THE BUBBLER IN THE NE CORNER WILL TIE INTO EXISTING SS IN WAHSATCH MEDIAN. THE BUBBLER ON SE CORNER WILL BE ABANDONED
- c) INSTALL CONC. CROSSPANS AT FOLLOWING PLACES
 - REPLACE EXISTING ASPHALT CROSSSPAN WEST AND PARALLEL TO E OF WAHSATCH AT DEL NORTE
 - PARALLEL E. EAST OF CORONA & AT DEL NORTE TO CHANNELIZE SHEET FLOW OVER PAVEMENT
 - PARALLEL E. NORTH OF CARAMILLO & AT CORONA TO CHANNELIZE SHEET FLOW OVER PAVEMENT.
- d) MAJOR INTERSECTIONS
 - CARAMILLO & WAHSATCH
 - SUMP IN BUENA VENTURA



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Q₅ CALCS / SUBBASIN D.

1. INTERSECTION OF DEL NORTE AND WAHSATCH

a) NE CORNER - ONLY CONTRIBUTING BLOCK 51

• $Q_5 = 0.8 \text{ CFS}$ (PER SINGLE BLOCK CALCS)

• CHECK CURB CAPACITY

9" CURB @ 2.070 $\Rightarrow$ 22.9 CFS > 0.8 CFS
30' WIDTH

THE EXISTING GRATED INLET (USED AS A BUBBLER) WILL BE UTILIZED TO INTERCEPT THE 5-YR FLOW AND WILL TIE INTO THE EXISTING 18" STORM SEWER LOCATED IN THE MEDIAN OF WAHSATCH. THE BUBBLE LOCATED AT THE SOUTHEAST CORNER OF THE INTERSECTION WILL BE ABANDONED.

CAPACITY OF GRATED INLET @ 9" VC = 6.34 CFS > 0.8 CFS

ANOTHER ALTERNATIVE WOULD BE TO INSTALL A CROSS DRAIN PARALLEL TO E OF WAHSATCH ON EAST SIDE TO CARRY FLOW TO NEXT INTERSECTION.

b) MEDIAN @ WAHSATCH AND DEL NORTE

$Q_5 = 0 \text{ CFS}$

USING CRITERIA SET FORTH IN SINGLE BLOCK CALCS, THE 5-YR FLOW IS 0 CFS. MOST LIKELY THERE WILL BE A SMALL AMOUNT OF STREET ROBOFF AROUND THE MEDIAN, BUT THE 2'-6" CURB OPENING INLET WILL HANDLE ALL OF THIS FLOW.

2. INTERSECTION OF CARRAMILLO AND WAHSATCH

AREA INCLUDES BLOCKS 52, 62, 61 AND 65



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- $t_{c_{61}}$ BLOCK 61 = .093

- GUTTER FLOW FROM 61 to 62 to 52

$$S_{AVE} = 0.85\%$$

$$V = 1.8 \text{ fps} \quad \text{FIGURE 5}$$

$$\text{GUTTER LENGTH} = 50' + 460' + 60' + 410' = 980'$$

$$t_t = \frac{980'}{(1.8 \text{ FPS} / 3600 \text{ sec/hr})} = 0.151 \text{ HR}$$

$$t_c = t_t + t_{c_{61}} = 0.151 + 0.093 = 0.244$$

- $\text{CSM/IN} = 645 \quad (\text{FIG 6})$

- $\Sigma \text{ AREA}$

BLOCK	AREA
61	.0081
65	.0036
62	.0081
52	.0081
	<u>0.0279 SM</u>

- WEIGHTED CN 100% RES - SOIL GROUP A

$$CN = 61$$

- $Q_5 \text{ RUNOFF} = 0.08 \quad \text{FIG 7}$

- $Q_5 = 0.08 \text{ IN } (0.0279 \text{ SM})(645 \text{ CSM/IN}) = 1.44 \text{ CFS}$

- CHECK CURB CAPACITY

$$10'' \text{ VC @ } 0.5\% \Rightarrow 25.1 \text{ CFS} > 1.4 \text{ CFS} \quad \text{OK}$$

40' STREET WIDTH

- EXIST INLET @ CORNER 2'-7" LONG
CURB OPENING 8" OPENING
15" TO TOP CURB

THIS CORNER IS SUMP DUE TO FLOWS COMING FROM
EUTEL WASHATCH RD. E. CARAMILLO TO THIS POINT

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$$Q_{\text{sump}} = 5.1 \text{ CFS} \quad (\text{PER INLET CAPACITY CALC})$$

$$5.1 \text{ CFS} > 1.4 \quad \text{OK}$$

* INLET WILL TAKE ALL Q_5

b) MEDIAN NORTH SIDE WAKSATCH AND DEL NORTE
AND MEDIAN SOUTH SIDE OF INTERSECTION
 $Q_5 = 0 \text{ CFS}$
▲

USING CRITERIA SET FORTH IN SINGLE BLOCK CALC
THE 5-YR FLOW IS 0 CFS, MOST LIKELY, THERE
WILL BE A SMALL AMOUNT OF STREET RUNOFF ALONG
THE MEDIAN, BUT THE 2'-7" CURB OPENING INLET WILL
HANDLE ALL OF THE FLOW

c) NW CORNER OF WAKSATCH AND CARMILLO

BLOCK 35 ROUTED TO INTERSECTION

$$t_{c_{35}} = 0.077 \text{ HR}$$

• GUTTER FLOW FROM 35 TO INTERSECTION

$$S = 0.6 \%$$

$$V = 1.6 \text{ fps} \quad (\text{FIGURE 5})$$

$$\text{GUTTER LENGTH} = 50' + 440' = 490'$$

$$t_c = \frac{490}{(1.6)(3600)} = 0.085 \text{ HR}$$

$$t_c = t_t + t_{c_{35}} = 0.085 + 0.077 = 0.162$$

$$\bullet \text{ CSM/in} = 1150 \quad (\text{FIGURE 6})$$

• $\Sigma \text{ AREA} =$

BLOCK
35

AREA

.0018

.0018 SM



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- WEIGHTED CN 100% RES SOIL GROUP A

$$CN = 61$$

- Q_5 RUNOFF = 0.08 (FIGURE 7)
- $Q_5 = 0.08 \text{ IN } (.0018)(1150) = 0.2 \text{ CFS}$
- CHECK CURB CAPACITY

$$8" \text{ VC @ } 0.6\% \Rightarrow 12.5 \text{ CFS} > 0.2 \text{ OK}$$

30' STREET WIDTH

- EXISTING INLET ON WABATCH 2'-7" LONG
7" OPENING
11" TO TOP CURB

THIS INLET IN SUMM CONDITION

$$Q_{\text{sump}} = 5.1 \text{ CFS CAPACITY} > 0.2 \text{ OK}$$

3. E. BUENA VENTURA

EXISTING BUBBLER PASSES WATER ACROSS RR ROW
TO EAST GUTTER OF WABATCH

- $Q_5 = 0.5 \text{ CFS}$ - (PER SINGLE BLOCK GULLY)
(53)
- CHECK CURB CAPACITY
 $8" \text{ CURB @ } 1.5\% \Rightarrow 35.89 \text{ CFS} > 0.5 \text{ CFS}$

THE EXISTING CURB INLET (USED AS A BUBBLER)
WILL BE USED TO TIE THE 5-YR FLOW FROM
BUENA VENTURA INTO THE PROPOSED STORM
SEWER LOCATED IN THE RAILROAD RIGHT-OF-WAY.

- CHECK INLET CAPACITY

(2) 3' LONG
8" OPENING
12" TO TOP CURB

$$CAP = 7.0 (2 \text{ INLETS})$$

$$= 14.0 \text{ CFS} > 0.5 \text{ OK}$$



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Q₁₀₀ CALS / SUBBASIN D

1. INTERSECTION OF DEL NORTE AND WANSATCH

a) NE CORNER - ONLY CONTRIBUTING BLOCKS:

- $Q_{100} = 6.0 \text{ CFS}$

- CHECK CURB CAPACITY

$$9" \text{ CURB @ } 2.0\% \Rightarrow 27.9 > 6.0 \quad \underline{\text{OK}}$$

30' WIDTH

USE EXISTING BUBBLER AS INLET TO TIE INTO EXISTING STORM SEWER

$$\text{CAPACITY @ } 9" \text{ VC} = 6.34 > 6.0 \text{ CFS} \quad \underline{\text{OK}}$$

b) MEDIAN

0 CFS FLOW (SEE SHEET 2)

2. INTERSECTION OF CARIAMILLO AND WANSATCH

BLOCKS: 52, 62, 61, AND 65

- $Q_{100} \text{ RUNOFF} = 0.57 \quad (\text{FIG 7 @ } CN=61)$

- $Q_{100} = 0.57 (645 \text{ CSM/IN}) (0.279) = 10.26 \text{ CFS}$

- CHECK CURB CAPACITY

$$= 25.1 > 10.3 \text{ CFS} \quad \underline{\text{OK}}$$

10" VC @ 0.59%
40' WIDTH

- EXIST INLET @ CORNER IN SUMP

$$\text{CAPACITY} = 5.1 \text{ CFS} < 10.3 \quad \text{NOT SUFFICIENT CAPACITY WITH EXIST INLET.}$$

THEREFORE, REMOVE EXIST INLET AND INSTALL A



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NEW - 6 FOOT DIOR INLET. THIS NEW INLET WILL TIE INTO EXISTING STORM SEWER LOCATED IN MEDIAN OF WAHSATCH ONLY IF THE CAPACITY OF THIS STORM SEWER WILL NOT BE EXCEEDED.

OTHERWISE THE INLET WILL DRAIN TO THE PROPOSED STORM SEWER IN THE ABANDONED RAILROAD ROW.

$$6' \text{ DIOR CAPACITY (IN SUMP)} = 12.8 \text{ CFS} > 10.3 \text{ CFS}$$

OK

ALL Q_{100} WILL BE HANDLED BY INLET

b) MEDIAN- NORTH + SOUTH SIDE WAHSATCH

$$Q_{100} = 0$$

SEE SHEET 4

c) NW CORNER OF WAHSATCH AND CARAMILLO

- BLOCK 35 ROUTED TO INTERSECTION
- Q_{100} RUNOFF = 0.57 (FIGURE 7)
- $Q_{100} = 0.57 (0.0018)(1150) = 1.2 \text{ CFS}$
- CHECK CURB CAPACITY

$$8" \text{ VC @ } 0.6\% \Rightarrow 12.5 \text{ CFS} > 1.2 \text{ CFS OK}$$

30' STREET WIDTH

- CAPACITY OF EXISTING INLET = 5.1 CFS > 1.2 OK

3. E BUENA VENTURA

$$Q_{100(s)} = 3.4 \text{ CFS (PER SINGLE BLOCK CURB)}$$



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- CHECK CURB CAPACITY

$$8" \text{ CURB @ } 1.5\% \Rightarrow 35.89 \text{ CFS} > 3.4 \text{ CFS}$$

OK

- CHECK INLET CAPACITY

$$= 14.0 \text{ CFS} > 3.4 \text{ CFS}$$

OK

THE 2 EXISTING CURB OPENING INLETS ON E BUENA VENTURA
WILL BE UTILIZED TO TIE THE 5-YR AND 100-YR FLOW INTO
THE PROPOSED STORM SEWER LOCATED IN THE RAILROAD ROW



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BASIN D

EXIST INLET 2.5'

Q_{100} = NEGLIGIBLE

USE BUBBLER GRATED INLET
AND CONNECT TO STORM SEWER
 Q_{DI} = 6.3 CFS
 Q_{100} = 6.0 CFS

DEL NORTE

EXIST 2'-7"

Q_{SUMP} = 5.1 CFS
 Q_{100} = 1.2 CFS

DIOR 6' = L CONNECT TO EXISTING'S
IF CAPACITY ALLOWED
SUMP = 12.8 CFS OTHERWISE CONNECT
 Q_{100} = 10.3 CFS TO PROPOSED SS

CARAMILLO

NOTE: CROSS PANS
WILL BE INSTALLED
AT INTERSECTION OF
CORONA + CARAMILLO
PARALLEL AND NORTH
OF CARAMILLO &
AND AT THE INTERSECTION
OF DEL NORTE AND
CORONA PARALLEL AND
EAST OF THE & OF
CORONA

EXIST INLET 2'-7"

Q_{100} NEGLIGIBLE

PAVE RD AND INSTALL
8" CURB & GUTTER
EXISTING INLET 3' EA

Q_{SUMP} = 14 CFS
 Q_{100} = 3.4 CFS
CONNECT TO PROPOSED
SS IN RR ROW
INSTALL CROSS PAN
EAST BUENA
VENTURA



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DESIGN CALCULATIONS

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SUBBRAIN E

- a) DRAINAGE IS TO THE SOUTH AND WEST TO THE RR ROW ON CORONA. DRAINAGE ON THE EAST FLOWLINE OF CORONA FLOWS INTO THE RR ROW. DRAINAGE ON THE WEST SIDE ENTERS AN 18" DIAMETER STORM SEWER AND PASSES UNDER THE OLD RR TRACK BED AND CONTINUES DOWN CORONA.
- b) INTERCEPT Q₁₀₀ AT THE RR ROW AND CORONA
- c) MAJOR INTERSECTING
 - CORONA & RR ROW



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SUBBASIN E/Q5

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1. CORONA E. RR ROW

a) NW CORNER (BLOCK 54)

• $t_c = 0.081 \text{ hr}$ (SINGLE BLOCK CASE)

• GUTTER FLOW

$S_{\text{GUG}} = 1.2 \%$

$N = 2.2 \text{ (FP)}$ (FIG. 5)

GUTTER LENGTH = $480 + 50 = 530$

$t_t = \frac{530}{2.2 (3600)} = 0.067$

• $t_c = t_t + t_{c_{54}} = 0.148$

• $\text{CSM}/N = 1080$ (FIG. 6)

• $\text{E AREA} = \text{BLOCK 54} = .0021 \text{ SA}$

• WEIGHTED CN 10-7% RES - SOIL GROUP A

$CN = 41$

• $Q_r \text{ RUNOFF} = 0.08 \text{ IN}$ (FIG. 7)

• $Q_s = 0.08 (1080) (.0021) = 0.2 \text{ CFS}$

• CHECK CURB CAP.

$8" @ 1.2\% = 32.1 \text{ CFS} > 0.2$
60' STREET WIDTH

• INSTALL 4' DIOR

$Q_{\text{SUM}} = 7.9 \text{ CFS} > 0.2 \text{ OK}$



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b) SC CORNER (BLOCKS 63, 64 & 66)

$t_{c,66} = 0.133 \text{ HR}$ (Single Block Cures)

• GUTTER FLOW

$S_{AUG} = 0.6\%$

$N = 1.55 \text{ FS}$ (FIG 5)

GUTTER LENGTH = $50 + 390 + 30 + 100 = 570$

$t_t = \frac{570}{1.55(3600)} = 0.102$

• $t_c = t_t + t_{c,66} = 0.235 \text{ HR}$

• $CN/IN = 100.5$ (FIG 6)

• AREA

BLOCK	AREA
63	.0077
64	.0069
66	.0137
	<u>0.0283</u> SM

• WEIGHTED CN 100% RES - SOIL GROUP A

$CN = 61$

• $Q_s \text{ RUNOFF} = 0.08$ (FIG 7)

• $Q_s = 0.08(100.5)(0.0283) = 2.3 \text{ CFS}$

• CHECK CURB CAP.

$8" @ 0.6\% = 22.6 \text{ CFS} > 2.3$

60' STREET WIDTH

• INSTALL 4' DIAM

$Q_{SUPPLY} = 7.9 \text{ CFS} \geq 2.3 \text{ ok}$



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Q_{100} / SUBRAIN E

1. CORONA & RR ROW

a) NW CORNER

• $Q_{100} = 1.6 \text{ cfs}$ (single blow - cases)

• CURB CAP = 32.1 cfs > 1.6

• install 4' DIOR

$Q_{\text{sump}} = 7.9 > 1.6 \text{ OK}$

b) SE CORNER

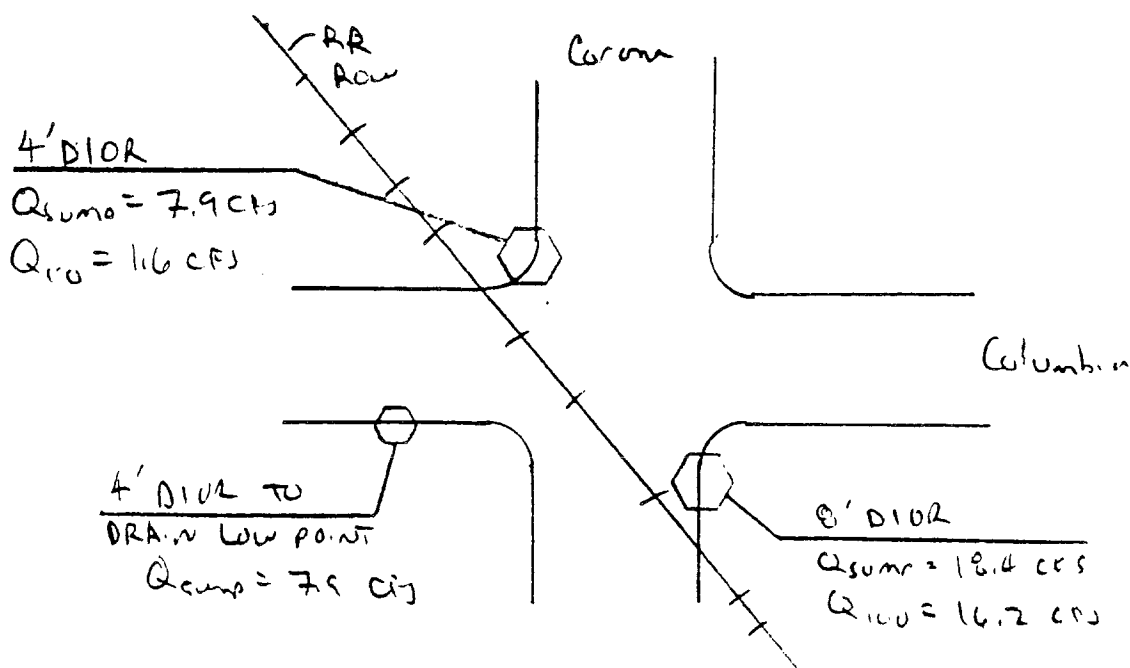
• $Q_{100} = 0.52 \text{ in}$ (FIG 7 e cu = 61)

• $Q_{100} = 0.52 (1005) (0.0283) = 16.2 \text{ cfs}$

• CURB CAP = 22.6 > 16.2 OK

• install 8' DIOR

$Q_{\text{sump}} = 18.4 \text{ cfs} > 16.2$





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SUB BASIN F

a) DRAINAGE IS TO THE SOUTH TO UINTAH AND
 EAST TO SHOOKY RUN, THERE IS EXIST STORM SEWER
 IN UINTAH

b) BUBBLES LOCATED ALONG WEBER

- FONTAINE & WEBER SHOULD BE ABANDONED

- COLUMBIA & WEBER INSTALL CROSSSPAN

- San Miguel & WEBER INSTALL CROSSSPAN

c) BUBBLES LOCATED ALONG WANSATCH

- PARALLEL & BOTH SIDES OF WANSATCH & AT
 COLUMBIA. INTENT IS TO HAVE THESE
 FLOWS COLLECTED IN SWAP INLET @ UINTAH.
 DO NOT BREAK THIS DRAINAGE PATTERN AND
 INSTALL CONC. CROSS PANS

- PARALLEL & EAST OF WANSATCH & AT
 SAN MIGUEL. INTENT IS TO HAVE
 THIS DRAINAGE BE COLLECTED AT INLET
 AT UINTAH. ∴ INSTALL CROSS PAN AS
 ABOVE

d) BUBBLES LOCATED ALONG FRANKLIN

- FRANKLIN @ SAN MIGUEL INSTALL CONC. CROSSSPAN



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e) MAJOR INTERSECTION

- UINTAH & WEBB
- UINTAH & LANCASTER
- UINTAH & CORONA
- UINTAH AND EL PASO
- UINTAH AND FRANKLIN
- UINTAH AND PROSPECT
- UINTAH AND SHOOKS RUN



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SUBBASIN F/Q₅

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1. INTERSECTION UINTAH & WEBER.

AREA INCLUDES BLOCKS 1 → 6 AND 11 → 16. NOTE ALL OF Q FROM BLOCK 10 WILL BE COLLECTED IN INLET @ NE CORNER OF FONTANA & WEBER.

a) NW CORNER UINTAH & WEBER.

$$t_c, \text{ BLOCK 1} = 0.109$$

• GUTTER FLOW FROM 1 TO 6

$$S_{\text{AUG}} = 0.84\%$$

$$N = 1.8 \quad (\text{FIG. 5})$$

$$\text{GUTTER LENGTH} = 440 + 60 + 440 + 55 + 450 + 50 + 920 + 30 + 610 + 50 + 450 = 3555$$

$$t_t = \frac{3555 \text{ ft}}{1.8 \text{ FPS (3600)}} = 0.549 \text{ hr}$$

$$t_c = t_t + t_c = 0.109 + 0.549 = 0.658 \text{ hr}$$

$$c_{sn}/IN = 635 \quad (\text{FIG. 6})$$



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• E AREA

<u>Block</u>	<u>AREA</u>
1	.0042
2	.0083
3	.0083
4	.0156
5	.0105
6	.0081
	<u>.0550 SM</u>

• WEIGHTED CN 100% RES - SOIL GROUP A

$$CN = 61$$

• Q_s RUNOFF = 0.08 IN (FIG 7)

$$Q_s = 0.08 \text{ IN} (1.0550 \text{ SM}) (635 \text{ csm/in}) = 2.8 \text{ CFS}$$

• CHECK CURB CAPACITY

$$10" @ 1.2\% \Rightarrow 65.9 \text{ CFS} > 2.8 \text{ OK.}$$

60' STREET WIDTH

• EXIST INLET @ CORNER 11.5 FT LENGTH
11" IN OPENING
15" TO THE CURB } CURB OPENING INLET

THIS CORNER IS SUMP DUE TO HIGH POINTS
@ CENTERLINE OF BOTH WEBER & VINTAGE

$$Q_{\text{sump}} = 40.3 \text{ CFS (PER INLET CAP. CALC.)} > 2.8 \text{ OK}$$

* INLET WILL TAKE ALL Q_s

b) NE CORNER VINTAGE & WEBER

$$t_{c_{11}} = 0.073 \text{ HRS (PER SINGLE BLOCK CALC.)}$$

• GUTTER FLOW FROM 11 TO 16

$$S_{\text{AUG}} = 0.8\%$$

$$N = 1.8 \text{ (FIG 5)}$$

$$\text{GUTTER LENGTH} = 3555 \text{ FT}$$

$$t_1 = 0.549$$



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$$t_c = t_t + t_{c_{11}} = 0.549 + 0.073 = 0.622$$

$$csm/in = 650$$

Σ AREA	BLOCK	AREA
	11	.0041
	12	.0049
	13	.0066
	14	.0083
	15	.0075
	16	.0058
		<u>.0372</u> c.m

WEIGHTED CN 100% RES. - SOIL GROUP A

$$CN = 61$$

$$Q_s \text{ RUNOFF} = 0.08 \text{ IN (102 FIG 7)}$$

$$Q_s = 0.08 (650) (0.0372) = \underline{1.9} \text{ CFS}$$

CHECK CURB CAPACITY

$$10'' \text{ VC @ } 1.2\% \Rightarrow 65.9 \text{ CFS} > 1.9 \text{ CFS}$$

60' STREET WIDTH

NOTE: THAT @ INLET THIS IS NOT A SUMP CONDITION.
SEE INLET CAP. TABLES, WILL TAKE ALL Q_s

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2. INTERSECTION OF UINTAH & WAHEATCH

c) NW CORNER (BLOCKS 14A → 16A)

$$t_c \text{ BLOCK 14A} = 0.155 \text{ HR}$$

• BUTTER FLOW 14A TO 16A

$$S_{\text{AUG}} = 0.75\%$$

$$N = 1.75 \text{ FPS (FIG 5)}$$

$$\text{GUTTER LENGTH} = 30 + 630 + 50 + 450 = 1160 \text{ FT}$$

$$t_t = \frac{1160}{1.75 (3600)} = 0.184$$

$$t_c = t_t + t_{c_{14A}} = 0.339 \text{ HR}$$

$$CSM_{1/2} = 880 \text{ (FIG 6)}$$

• AREA

BLOCK	AREA
14A	.0075
15A	.0051
16A	.6043
	<u>.0169 SM</u>

• WEIGHTED CN 100% RES - SOIL GROUP A

$$CN = 61$$

$$Q_r \text{ RUNOFF} = 0.08 \text{ IN. (FIG 7)}$$

$$Q_r = 0.08 (880) (.0169) = 1.2 \text{ CFS}$$

NO Q_r FLOW FROM BASIN & SEC BASIN & CALCS

• CHECK CURB CAP.

$$10" @ 0.6\% \Rightarrow 12.5 \text{ CFS} > 1.2 \text{ OK}$$

30' STREET WIDTH

• CHECK INLET CAPACITY. $L = 12'$ & SUMP CONDITION

$$Q_{\text{SUMP}} = 42.1 \text{ CFS} > 1.2 \text{ OK}$$

(PER INLET CAP. CALCS)

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b) MEDIAN

- EAST COLUMBIA & WANSATCH
- SAN MIGUEL & WANSATCH
- UINTAH & WANSATCH

$$Q_5 = 0 \text{ cfs @ ALL INTERSECTIONS}$$

USING CRITERIA SET FORTH IN SINGLE BLOCK
CALCS. THE Q_5 IS 0 CFS. MOST LIKELY THERE
WILL BE SOME MINOR STREET FLOW AROUND
MEDIAN BUT 2'-6" CURB OPENING INLETS AT EACH
MEDIAN. WILL HANDLE ALL FLOW.

c) NE CORNER (BLOCKS 88-90)

- t_c BLOCK 88 = 0.253 HRS
- GUTTER FLOW (SEE NW CORNER CALCS)

$$t_t = 0.184 \text{ HR}$$

$$t_c = t_t + t_{c_{88}} = 0.437 \text{ HR}$$

$$CSM/N = 790 \quad (\text{FIG 6})$$

• AREA

BLOCK	AREA
88	.0030
89	.0056
90	.0023
	<u>.0109 SM</u>

- WEIGHTED CN 100% RES - SOIL GROUP A

$$CN = 61$$

$$Q_5 \text{ RUNOFF} = 0.08 \quad (\text{FIG 7})$$

$$Q_5 = 0.08 (0.0109) (790) = 0.7 \text{ cfs}$$

- CHECK CURB CAP.

$$8' @ 0.6\% \Rightarrow 12.5 \text{ cfs} > 0.7 \text{ OK}$$

- CHECK ^{EXIT} INLET CAPACITY 12' L S = 0.6%

Q_5 SHOULD ALL BE HANDLED BY INLET, SEE

INLET CAPACITY CALC.



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3, INTERSECTION UTAH & CORONA

a) NW CORNER (BLOCKS 89A & 90A)

• t_c BLOCK 89A = 0.147 hr (SINGLE BLOCK CALC)

• GUTTER Flow

$$S_{avg} = 1.2\%$$

$$N = 2.2 \text{ FPS (FIG 5)}$$

$$\text{GUTTER LENGTH} = 50 + 450 = 500 \text{ FT}$$

$$t_t = \frac{500}{(2.2)(3600)} = 0.063$$

$$t_c = t_t + t_{c_{89A}} = 0.210 \text{ hr}$$

$$C_{SM}/IN = 1050$$

• Σ AREA

BLOCK	AREA
89A	.0055
90A	.0051
	<u>.0106 SM</u>

• WEIGHTED CN 100% RES - SOIL GROUP A

$$CN = 61$$

$$Q_{\text{RUNOFF}} = 0.08 \text{ IN (FIG 7)}$$

$$Q_{\text{R}} = 0.08 (0.0106) (1050) = 0.9 \text{ CFS}$$

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- CHECK CURB CAPACITY

$$9' @ 1.2\% = 47.0 \text{ cfs} > 0.9 \text{ cfs} \quad \text{OK}$$

60' STREET WIDTH

- CHECK EXIST INLET SUMP CAPACITY $L = 11'$

$$Q_{\text{sump}} = 34.1 \text{ cfs} > 0.9 \text{ cfs} \quad \text{OK}$$

(PER INLET CAP. CALCS)

b) NE CORNER (BLOCKS 95 & 96)

$$t_c \text{ BLOCK 95} = 0.059 \text{ HR} \quad (\text{SINGLE BLOCK CALCS})$$

- GUTTER FLOW
(SAME AS NW CORNER CALCS)

$$t_t = 0.063 \text{ HR}$$

$$t_c = t_t + t_{c95} = 0.122 \text{ HR}$$

$$C/M_{IN} = 1225 \quad (\text{FIG 6})$$

- AREA

BLOCK	AREA
95	.0023
96	.0085
	<u>.0108 CM</u>

- WEIGHTED CN $100\% \text{ RES} - \text{SOIL GROUP A}$

$$CN = 61$$

$$Q_s \text{ RUNOFF} = 0.08 \text{ IN} \quad (\text{FIG 7})$$

$$Q_s = 0.08 (1225) (.0108) = 1.0 \text{ cfs}$$

- CHECK CURB CAPACITY

$$9' @ 1.2\% = 47.0 \text{ cfs} > 1.0 \quad \text{OK}$$

60' STREET WIDTH

- CHECK EXIST INLET SUMP CAPACITY $L = 12'$

$$Q_{\text{sump}} = 32.6 \text{ cfs} > 1.0 \text{ cfs} \quad \text{OK}$$

(PER INLET CAP. CALCS)

* ALL Q_s HANDLED BY INLET.



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4. INTERSECTION OF UINTAH AND EL PASO

a) NW CORNER (BLOCKS 70, 67, AND 69)

A CHECK MUST BE MADE TO CHECK FOR GREATEST FLOW

• t_{c_1} BASIN 67 = .143

• GUTTER FLOW

$S_{AVE} = 1.45\%$

$V = 2.4 \text{ fps}$ FIG 5

GUTTER LENGTH = $22' + 300' + 50' + 450' = 822'$

$t_t = \frac{822}{2.4(3600)} = 0.095 \text{ HR}$

• $t_c = t_{c_1} + t_t = .143 + 0.095 = 0.238$

• $C_{SM}/in = 1000$ FIG 6

• $\Sigma \text{ AREA} =$

BLOCK	AREA (SM)
67	.0062
69	.0085
70	.0051
	<u>.0198 SM</u>

• WEIGHTED CN $\frac{1}{3}$ COMM $\frac{2}{3}$ RESID SOIL GROUP A

$\frac{1}{3}(89) + \frac{2}{3}(61) = 70$

$Q_5 \text{ RUNOFF} = 0.26$



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$$Q_5 = 0.26 (.0198)(1000) = 5.1 \text{ CFS}$$

COMPARISON OF Q_5 BASED ON TRAVEL TIME OF BLOCK 67 (ABOVE CALCS) AND THE TRAVEL TIME OF BLOCK 69. (BELOW)

$$t_{c_{69}} = .112$$

GUTTER FLOW

$$S_{AVE} = .019$$

$$V = 2.7 \text{ fps}$$

FIG 5

$$\text{GUTTER LENGTH} = 50 + 450 = 500$$

$$t_t = \frac{500}{2.7(3600)} = 0.051$$

$$t_c = t_{c_{69}} + t_t = .112 + 0.051 = .163 \text{ HR}$$

$$\text{CSM}/\text{in} = 1150$$

FIG 6

$$\Sigma \text{ AREA} = .0198 \text{ SM}$$

$$\text{WEIGHTED CN} = 70$$

$$Q_5 \text{ RUNOFF} = 0.26$$

$$Q_5 = 0.26 (.0198)(1150) = 5.9 \text{ CFS} \leftarrow \text{CONTROLS}$$

CHECK CURB CAPACITY

$$8" \text{ VC @ } 1.9\% = 22.2 > 5.9 \text{ OK}$$

CHECK EXISTING INLET IN SUMP CONDITIONS (PER INLET CAPACITY CALCS)

$$= 34.4 > 5.9 \text{ OK}$$

b) NE CORNER (BLOCKS 7 & 2A) = $\frac{1}{2}$ BLOCK

$$Q_5 = \frac{1}{2}(0.6) = 0.3 \text{ CFS} \quad (\text{SINGLE BLOCK CALCS})$$

$$\text{CURB CAPACITY } 6.4\% \text{ 60' WIDE 6" VC} = 7.1 > 0.3 \text{ CFS} \quad \text{OK}$$

INLET CAPACITY SUMP CONDITIONS

$$(\text{INLET CAPACITY CALCS}) = 40.8 \text{ CFS} > 0.3 \text{ OK}$$



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5. INTERSECTION VINTAH - FRANKLIN

a) NW CORNER (BLOCKS 1/2 72, 71, 68 + 74)

• t_c Block 68 = .139

• GUTTER FLOW

$S_{AVE} = 1.0\%$

$V = 2.0 \text{ CFS}$

GUTTER LENGTH = $30' + 700' + 310 + 50 + 450 = 1540$

$t_t = \frac{1540}{2(3600)} = 0.21$

• $t_c = t_{c_{68}} + t_t = .139 + .214 = .353 \text{ HR}$

• $CS_{min} = 870$ (Fig 6)

$\Sigma \text{ AREA}$

BLOCK	AREA
74	.0087
68	.0052
71	.0088
1/2 72	.0030

$.0257 \text{ SM}$

• WEIGHTED CN 100% RESID. SOIL GROUP A
CN = 61

• Q_s RUNOFF 0.08 in FIGURE 7

• $Q_s = 0.08 (.0257)(870) = 1.8 \text{ CFS}$

• CHECK CURB CAPACITY

8" VC @ 1.1%

STREET = 30'

$Cap = 17.0 > 1.8 \text{ OK}$

• CHECK CAPACITY INLET
CONTINUOUS GRADE

ALL FLOW WILL BE PICKED UP

SEE INLET CAP. CALCS



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b) NE CORNER BLOCK 75

$$Q_s = 0.8$$

FROM PREVIOUS CALCS A 13' INLET ON CONTINUOUS GRADE WILL HANDLE ALL OF Q_s

6. INTERSECTION OF UINTAH + N. PROSPECT

a) NW CORNER BLOCKS 75A

$$Q_s = 1.6$$

FROM INLET CALCS A TRIPLE (9') WIDE SUMP CONDITION HAS A CAPACITY = 26.3 CFS > 1.6

b) NE CORNER BLOCKS (1/2) 79

$$Q_s = 1/2(1.9) = 1.0$$

FROM PREVIOUS CALCS, A 13' INLET ON CONTINUOUS GRADE WILL HANDLE ALL OF Q_s .

c) INLET EAST OF INTER. UINTAH + PROSPECT
NORTH SIDE

$$\begin{aligned} \text{Block} &= 1/2(1.9) \\ &= 1/2(1.9) = 1.0 \end{aligned}$$

THERE IS CONTRIBUTING FLOW FROM THE EAST WHICH IS OUT OF THE SCOPE OF THIS PROJECT

THE 1.6" LONG INLET IN SUMP CONDITION HAS A CAPACITY OF 2.3 CFS WHICH IS GREATER THAN 1.0 CFS ENTERING FROM THIS ASPECT OF THE PROJECT.

7. INTERSECTION OF SHOOKS RUN + SAN MIGUEL NORTH SIDE

Block 77

$$Q_s = 6.3 \text{ CFS}$$

CAPACITY OF INLET IN SUMP CONDITION

$$= 7.8 \text{ CFS} > 6.3 \text{ CFS}$$

OK



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Q_{100} / SUBRAIN F

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1. INTERSECTION UNTAX & WATER

a) NW CORNER UNTAX & WATER

• $Q_{100} \text{ RUNOFF} = 0.57 \text{ in} \quad (\text{FIG 7 @ } CN=61)$

• $Q_{100} = 0.57 (635) (0.0550) = 19.9 \text{ cfs}$

• CHECK CURB CAP.

$10" @ 1.2\% \Rightarrow 65.9 \text{ cfs} > 19.9 \text{ OK}$

• EXIST INLET @ CORNER 11.5' LENGTH IN SUMP

$Q_{\text{sump}} = 40.3 \text{ cfs} \quad (\text{PER INLET CAP. CALCS}) > 19.9 \text{ OK}$

* INLET WILL HANDLE ALL Q_{100}

b) NE CORNER

• $Q_{100} \text{ RUNOFF} = 0.57 \text{ in} \quad (\text{FIG 7 @ } CN=61)$

• $Q_{100} = 0.57 \text{ in} (650 \text{ cfs/in}) (0.0372) = 13.8 \text{ cfs}$

• CHECK CURB CAPACITY:

$10" @ 1.2\% \Rightarrow 65.9 \text{ cfs} > 13.8$

• INLET CAPACITY: CURB OPENING = 13'

PER INLET CAP. CALCS

$Q_{ST} = 13.8 \text{ cfs} \quad Q_{in} = 11.3 \text{ cfs}$

$Q_{ST} \text{ TO WASHATCH} = 2.5 \text{ cfs}$



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2. INTERSECTION VINTAGE & VAN SATER

a) NW CORNER (SEE Q₅ CALCS)

- $Q_{100} \text{ RUNOFF} = 0.57 \text{ IN (FIG 7 @ CN=61)}$

- $Q_{100} = 0.57 (880) (0.0169) = 8.5 \text{ CFS}$
 $+ 2.5 \text{ CFS FROM WEAVER INLET} + 2.5 = 11.0$

- CURB CAPACITY = 12.5 CFS > 11.0 OK

- INLET SUMP CAPACITY L=12'

$$Q_{\text{sump}} = 42.1 \text{ CFS} > 11.0 \text{ (PER INLET CAP. CALCS)}$$

* INLET WILL HANDLE ALL Q_{100}

b) MEDIANS

- EACH MEDIAN HAS INLET $Q_{100} = 0 \text{ CFS @ ALL INTERSECTIONS}$

SEE CALCS Q₅ ∴ Q_{100} WILL ALL BE HANDLED
 BY EXIST. INLETS.

c) NE CORNER

- $Q_{100} \text{ RUNOFF} = 0.57 \text{ IN (FIG 7 @ CN=61)}$

- $Q_{100} = 0.57 (0.0109) (790) = 4.9 \text{ CFS}$

- CURB CAPACITY = 12.5 CFS > 4.9 OK

- EXIST INLET CAP 12' LENGTH @ 0.6%

$$Q_{\text{ST}} = 4.9 \text{ CFS } Q_{100} = 4.9 \text{ PER INLET CAP CALCS}$$

* INLET WILL HANDLE ALL Q_{100}



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3. INTERSECTION VINTAGE & CORONA

a) NW CORNER

$$Q_{100} \text{ RUNOFF} = 0.57 \quad (\text{FIG 7 @ } C_u = 61)$$

$$Q_{100} = 0.57 (1050) (.0106) = 6.3 \text{ cfs}$$

$$\text{CURB CAPACITY} = 47.0 \text{ cfs} > 6.3 \text{ OK}$$

$$\text{EXIST WLET SUMP CAPACITY} = 34.1 \text{ cfs} > 6.3 \text{ OK}$$

* ALL Q_{100} TO BE DRAINED BY WLET

b) NE CORNER

$$Q_{100} \text{ RUNOFF} = 0.57 \quad (\text{FIG 7 @ } C_u = 61)$$

$$Q_{100} = 0.57 (1225) (.0108) = 7.5 \text{ cfs}$$

$$\text{CURB CAP} = 47.0 \text{ cfs} > 7.5 \text{ cfs}$$

$$\text{EXIST WLET SUMP CAPACITY} = 32.6 \text{ cfs} > 7.5$$

* ALL Q_{100} TO BE DRAINED BY WLET



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Q_{100} SUB-BASIN F

A. INTERSECTION OF VINTAIL AND EC PASS

a) NW CORNER (70, 67, + 69)

$$t_c = .163 \text{ HR} \quad (Q_5 \text{ CALCS})$$

$$i_{SM}/in = 1150$$

$$z \text{ AREA} = .0198 \text{ SM}$$

$$CN = 70$$

$$Q_{100} \text{ RUNOFF} = 1.03$$

$$Q_{100} = 1.03 (.0198)(1150) = 23.5 \text{ CFS}$$

CHECK EXISTING INLET IN SUMP

$$CAP = 34.4 > 23.5 \quad \underline{\text{OK}}$$

CHECK CURB CAPACITY

$$Cap = 22.2 < 23.5$$

FLOW WILL OVERTOP CURB BUT ALL FLOW WILL BE INTERCEPTED BY INLET. A SMALL AMOUNT OF FLOODING WILL OCCUR AS WATER OVERTOPS CURB. HOWEVER THIS AMOUNT IS NOT ENOUGH TO WARRANT AN INLET AND STORM SEWER PIPE DISTRESS.

b) NE CORNER BLOCK 72A = $\frac{1}{2}$ (BLOCK 72)

$$Q_{100} = \frac{1}{2} (4.3) = 2.2 \text{ CFS}$$

CHECK INLET CAPACITY

$$\text{SUMP } 40.8 > 2.2 \quad \underline{\text{OK}}$$



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5. INTERSECTION OF VINTAH + FRANKLIN

a) NW CORNER BLOCKS (1/2) 72, 71, 68, 74

- $t_c = .353$ HR FROM Q₅ CALCS
CSM = 870
- Σ AREA = .0257 SM
- WEIGHTED CN = 61
- Q_{100} RUNOFF = .57 FIG 7
- $Q_{100} = 0.57 (.0257) (870) = 12.7$ CFS
- CHECK CURB CAPACITY
8" VC @ 1.19% = 17.0 > 12.7 OK
- CHECK CAPACITY OF INLET ON CONTINUOUS GRADE
SEE INLET CAPACITY CALCS.

ALL OF Q_{100} WILL BE INTERCEPTED BY 11" INLET
SEE INLET CAPACITY CALCS

b) NE CORNER BLOCK 75

$$Q_{100} = (3.6) = 3.6 \text{ CFS}$$

FROM PREVIOUS CALCS A 13" INLET ON CONTINUOUS
GRADE WILL HANDLE ALL OF Q_{100}

6. INTERSECTION OF VINTAH + N. PROSPECT

a) NW CORNER BLOCK 75A

$$Q_{100} = 5.1 \text{ CFS}$$

THE CAPACITY OF A TRIPLE (3')(3) INLET
IN GUMP CONDITIONS IS 26.3 CFS > 5.1 OK
SEE INLET CALCS

b) NE CORNER BLOCK 79

$$Q_{100} = 1/2 (6.1) = 3.1 \text{ CFS}$$

FROM PREVIOUS CALCS A 13" INLET ON CONTINUOUS
GRADE WILL HANDLE ALL OF Q_{100}



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c) INLET EAST OF INTERSECTION UINSTAH + PROSPECT
NORTH SIDE

$$\frac{1}{2} \text{ Block 79}$$

$$Q_{100} = \frac{1}{2} (6.1) = 3.1 \text{ CFS}$$

CAPACITY OF INLET IN SUMP CONDITION = 2.3 CFS
INLET MUST BE SIZED TO HANDLE Q_{100}
USE A 4' DIOR IN SUMP CONDITION.
MAX CAPACITY 7.9 CFS

THERE IS FLOW COMING FROM THE EAST WHICH IS NOT IN THIS SCOPE OF WORK. THIS FLOW MUST BE ANALYZED TO PROPERLY SIZE THE DIOR INLET.

7. INTERSECTION OF STROKS RD + SAN MIGUEL NORTH
Block 77

$$Q_{100} = 20.0 \text{ CFS} \quad (\text{PER SINGLE BLOCK (WALK)})$$

$$\text{CAPACITY OF INLET IN SUMP CONDITION} = 9.8 \text{ CFS} < 20.0$$

10' DIOR INLET IN SUMP CONDITION WILL HANDLE 23.0 CFS.

THERE IS FLOW COMING FROM THE EAST WHICH IS NOT IN THIS SCOPE OF WORK BUT WILL BE ENTERING THE INLET AT THIS POINT. IN ORDER TO PROPERLY SIZE THIS INLET, A STUDY OF FLOW ENTERING FROM THE EAST MUST BE CALCULATED.



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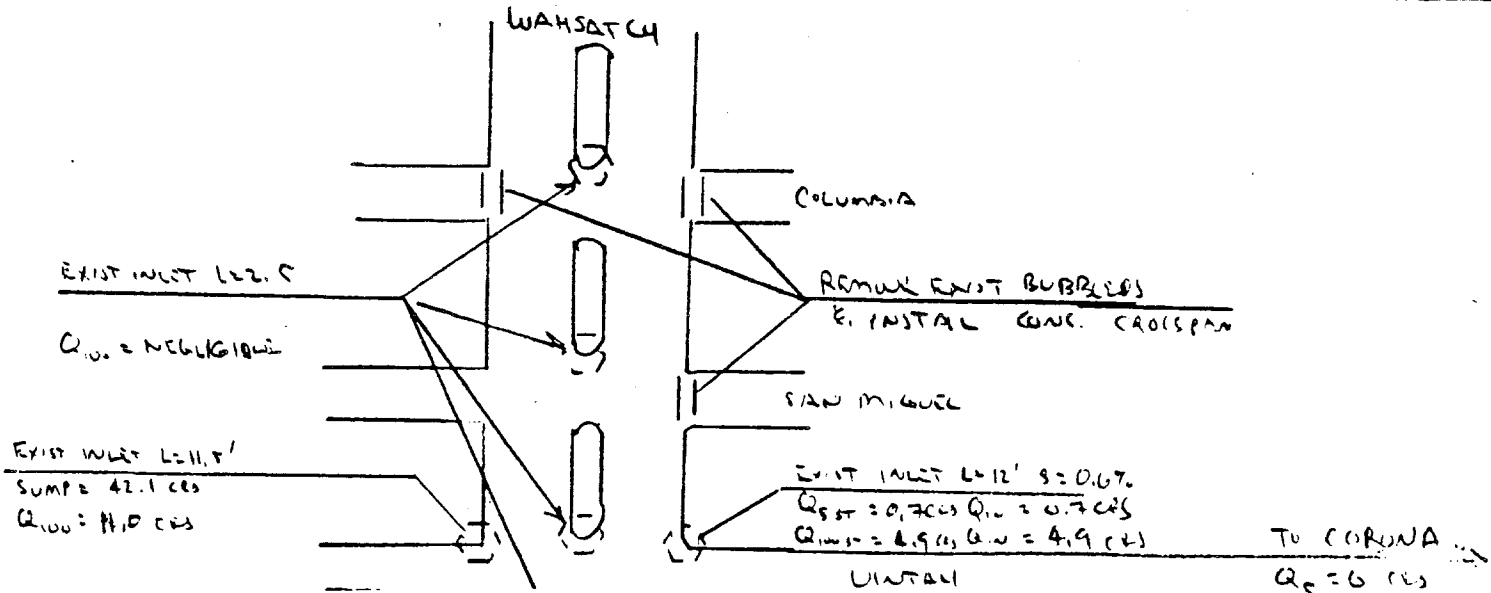
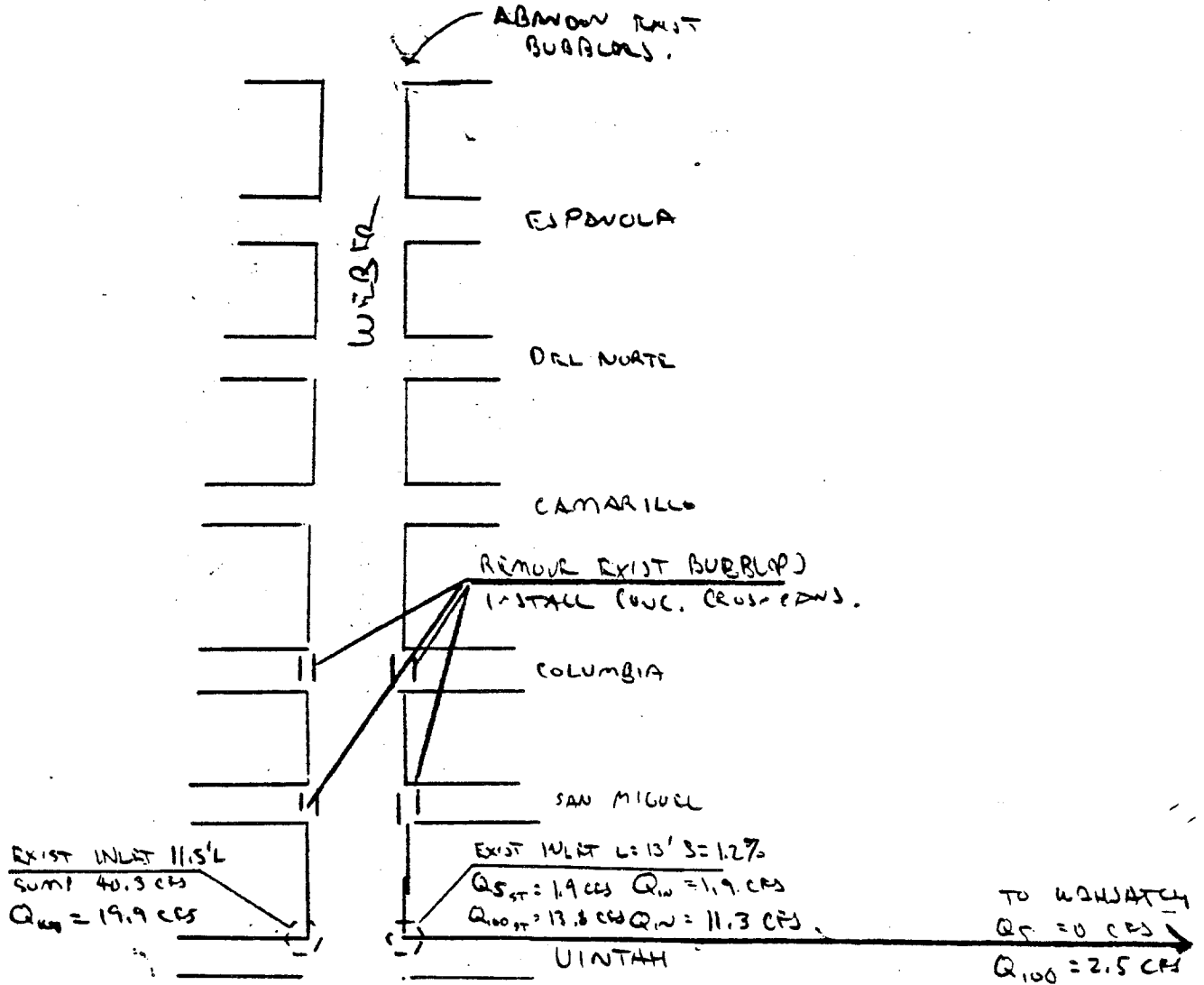
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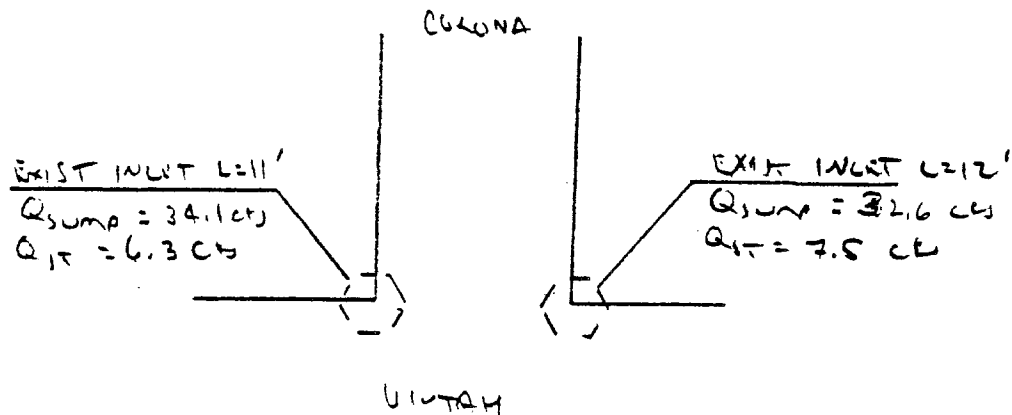
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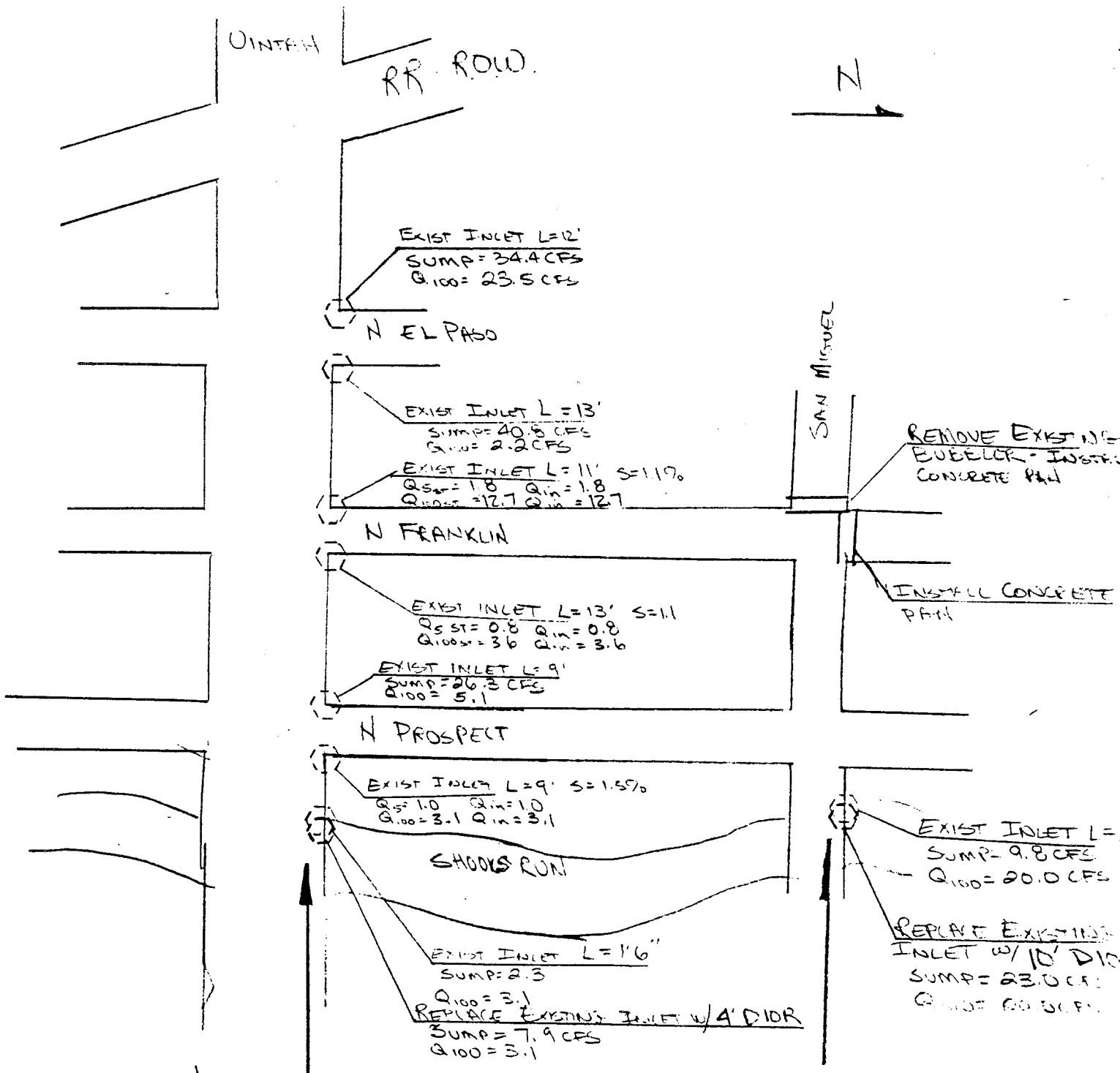


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NOTE: THERE IS A CONTRIBUTING FLOW FROM THE EAST WHICH IS OUT OF THE SCOPE OF THIS PROJECT THIS FLOW MUST BE CALCULATED IN ORDER TO PROPERLY SIZE THE DIOR IN LETS



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SUB BASIN G

- a) ALL DRAINAGE IS TO SOUTH & EAST TO EXIST 18" CULVERT WHICH DISCHARGES TO SHOOKS RUN, THIS IS ONLY DRAINAGE CONTROL POINT,

Q_S / SUB BASIN G

- 1) 18" CULVERT @ SHOOKS RUN (BLOCK 73 & 76)

• t_c (BLOCK 73) = 0.111 (SINGLE BLOCK CASES)

- GUTTER FLOW

$S_{Ave} = 1.07\%$

$N = 1.8 \text{ FPS}$ (FIG 5) GRAVEL ROAD PITCH

GUTTER LENGTH = $30 + 250 = 280 \text{ FT}$

$t_t = \frac{280}{1.8 \text{ (fps)}} = 0.043$

• $t_c = t_t + t_{c_{73}} = 0.154 \text{ HRS}$

• $CSM_{76} = 1070$

- AREA

BLOCK	AREA
73	.0059
76	.0081
	<u>0.0140 SM</u>

- WEIGHTED CN

$\frac{1}{4} \text{ Wm}$
 $\frac{3}{4} \text{ RES}$

$CN = 0.25(12) + (0.75)(75) = 79$

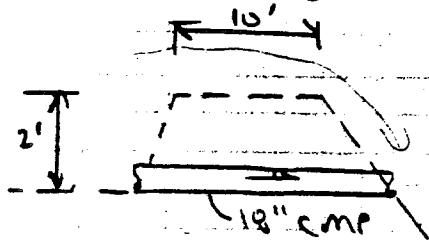
• $Q_5 \text{ RUNOFF} = 0.56 \text{ IN}$ (FIG 7)

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$$Q_p = 0.56 (0.0140) (1070) = 8.4 \text{ cfs}$$

CHECK 18" CULVERT CAPACITY



$$Q_{\text{culvert}} @ 4\% = 1.33 \quad Q = 8.0 \text{ cfs}$$

NO SHOCK RUN

Q_{100} / SUB AREA G

1) 18" CULVERT @ SHOCK RUN

$$Q_{100} \text{ RUNOFF} = 1.55 \text{ in} \quad (\text{FIG 7E } n=79)$$

$$Q_{100} = 1.55 (1070) (0.0140) = 23.2 \text{ cfs}$$

CHECK 18" CULVERT CAPACITY

$$Q_{\text{culvert}} = 8.0 < 23.2 \quad \text{NO PROBLEM}$$

IMPROVEMENTS

- INSTALL 2 - 18" CULVERT
- INSTALL GRAVELLED RIPRAP RUNDOWN.



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SUBBASIN A

a) DRAINAGE IS TO THE SOUTH TO CACHE LA Poudre ALONG WEBER, EXIST STORM SEWER BEGINS @ YAMPA & WEBER (18" Ø). ASSUME 18" SJ FOLLOWS SLOPE OF STREET FOR CAPACITY OR SJ CALCULATION. NO RECORD INFO AVAILABLE.

b) BUBBLES ARE LOCATED @ INTERSECTIONS

• SAN RAFAEL & WEBER } INSTALL CONC CROSSINGS

FOR BUBBLES ON WAHATCH SEE CALC.

c) MAJOR INTERSECTIONS

- YAMPA & WEBER
- CACHE LA Poudre & WEBER
- CACHE LA Poudre & WAHATCH
- YAMPA & WAHATCH
- SAN RAFAEL & WAHATCH



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Q5 / SUBBASIN H

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4. YAMPA & WEIR

- a) NW CORNER YAMPA & WEIR BLOCK 7 & 8 AS
FROM SURF CALC Q₇ CAN BE HANDLED BY
INLET CAP CORNER OF YAMPA & WEIR. NO
OTHER CONTRIBUTING DRAINAGE AREAS.

$$t_{c7} = 0.150 \text{ hrs} \quad (\text{SINGLE BLOCK CALC})$$

- Gutter Flow 7 TO 8

$$S_{avg} = 0.55$$

$$N = 1.5 \text{ FPS} \quad (R165)$$

$$\text{Gutter Length} = 50 + 450 = 500'$$

$$t_t = \frac{500}{1.5 (3600)} = 0.092$$

$$t_c = t_t + t_{c7} = 0.092 + 0.150 = 0.242 \text{ hrs}$$



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• $csm/in = 1040$ (FIG 6)

AREA	BLOCK	AREA
	7	.0081
	8	.0081
		<u>.0162 sm</u>

• WEIGHTED RN 100% RES & SOIL GROUP A

$CN = 61$

• $Q_{runoff} = 0.02 in$ (FIG 2)

• $Q_r = 0.08 (1040) (.0162) = 1.3 cfs$

• CHECK CURB CAPACITY

$B'' \leq 0.4\%$ $\Rightarrow 18.5 cfs > 1.3$
60' STREET WIDTH

• EXIST INLET & CURB 2 INLETS BOTH @ 2.5 FT WIDE

$Q_{sum} = 13.2 cfs$ (PER INLET CAP. TABLE) $> 1.3 cfs$
TOTAL

* INLETS WILL TAKE ALL Q_r

b) NE CORNER YARPA & WEBER. BLOCKS 17 & 18

$t_{c17} = 0.113 hr$

• COUNTER FLOW
SAME AS CALC NW CORNER

$t_c = 0.092$

• $t_c = t_c + t_{c17} = 0.092 + 0.113 = 0.205 hr$

• $csm/in = 1075$

AREA	BLOCK	AREA
	17	.0045
	18	.0045
		<u>.0090 sm</u>

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• WEIGHTED CN 100% AREA - SOIL GROUP A

• Q_T RUNOFF $CN = 61$ (FIG. 2)
 $Q_T = 0.08$ IN

• $Q_T = 0.08 (0.0098) (1075) = 0.8$ CFS

• CHECK CURB CAPACITY 8" @ 0.4% SLOPE WIDTH = 18.5 CFS > 0.8 CFS OK

• INLET IS NOT A SUMP, FIND CAPACITY.
(2 CURB OPENINGS $L = 3.5$ & $S = 0.4\%$)

PER INLET CAP. CALCS Q_T WILL ALL GO INTO 1ST

4. CHECK LA POUDRE & WEBER

a) NW CORNER. BLOCK A ONLY. NO OTHER CONTRIBUTING AREAS FOR Q_5 DUE TO SUMP INLETS AND ADEQUATE CAPACITY.

• $Q_5 = 0.8$ CFS (SINGLE BLOCK CALC)

• CHECK CURB CAPACITY

7" @ 0.5% $\Rightarrow 13.4$ CFS > 0.8 OK
60' STREET WIDTH

• EXIST INLETS @ CORNER 2.5 FT LENGTH INLET
& IS SUMP

$Q_{\text{SUMP}} = 11.2$ CFS (PER INLET CAP. CALCS) > 0.8 CFS

* INLET WILL HANDLE ALL Q_5

b) NE CORNER

• $Q_5 = 0.4$ CFS (SINGLE BLOCK CALC)

• CHECK CURB CAPACITY 9" @ 0.5% $\Rightarrow 30.5$ CFS > 0.4
60' STREET WIDTH

• EXIST INLETS (2 CURB OPENINGS $L = 2.5$ & $S = 0.5\%$)



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2. BUBBLES HAVE BEEN INEFFECTIVE IN TRANSMITTING FLOW DOWNSTREAM. USE BUBBLES AS DROP INLETS & CONNECT TO EXIST. SS. IN WAHSATCH.

(a) CAN RAFFLE & WAHSATCH

a) NW CORNER

• Q_5 BLOCK 17A = 0.4 CFS (SINGLE BLOCK CALC)

• GRATED INLET BUBBLE CAPACITY 8" CURB

$Q_{DI} = 7.4$ CFS (PER GRATED INLET CALC)
0.4 CFS OK

b) MEDIAN (BLOCK 8F)

$Q_5 = 0$ CFS (SINGLE BLOCK CALC)

WHATEVER NUISANCE FLOWS WILL BE
HANDLED BY EXIST CURB OPENING INLET

c) NE CORNER

• Q_5 BLOCK 12 = 0.5 CFS (SINGLE BLOCK CALC)

• GRATED INLET BUBBLE CAPACITY 5" CURB

$Q_{DI} = 5.8$ CFS > 0.5 OK
(PER GRATED INLET CALC)

(b) YAMPA & WAHSATCH

a) NW CORNER

• Q_5 BLOCK 18A = 0.4 CFS (SINGLE BLOCK CALC)

• GRATED INLET CALC 10" CURB

$Q_{DI} = 8.2$ CFS > 0.4 OK
(PER GRATED INLET CALC)



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b) MEDIAN BLOCK 86

SAME RESULTS AS AT SAN RAFAEL MEDIAN

c) BR CORNER

• $Q_B = \text{BLOCK 93} = 0.4 \text{ cfs}$ (SINGLE BLOCK CALC)

• EXIST DUAL CURB OPENING INLET $L = 2.5$ $S = 0.5\%$

Q_3 SHOULD ALL BE HANDLED BY INLET
SEE INLET CAP. CALC

3. CAUSE LA POUORE & LAHATCH

a) NW CORNER (BLOCK 19A)

• $Q_T = 0.4 \text{ cfs}$ (SINGLE BLOCK CALC)

• EXIST CURB OPENING INLET CAPACITY $L = 3'-3"$ E. IS
SUMP EQUATION

$Q_{\text{sump}} = 4.5 \text{ cfs} > 0.4 \text{ OK}$
(SEE INLET CAP. CALC)

b) MEDIAN BLOCK 87

SAME RESULTS AS AT SAN RAFAEL & TAMPA.



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Q_{100} / SUBBASIN 4

1. CORNER YAMPA & WEBER

a) NW CORNER

• $Q_{100} \text{ RUNOFF} = 0.57 \text{ in} \quad (\text{FIG 7 \& } CN=61)$

• $Q_{100} = 0.57 (1040) (0.0162) = 9.6 \text{ cfs}$

• CHECK CURB CAPACITY $\approx 18.5 \text{ cfs} > 9.6 \text{ cfs}$

• INLET CAPACITY (2 INLETS @ $L=2.5'$ SUMP)

$Q_{\text{sump}} = 13.2 > 9.6 \text{ OK}$

* ALL Q_{100} WILL BE HANDLED BY INLETS

b) NE CORNER

• $Q_{100} \text{ RUNOFF} = 0.57 \text{ in} \quad (\text{FIG 7 \& } CN=61)$

• $Q_{100} = 0.57 (1075) (0.0090) = 5.5 \text{ cfs}$

• CHECK CURB CAPACITY $\approx 18.5 \text{ cfs} > 5.5 \text{ cfs}$

• INLETS (DOUBLE CURB GIVING $L=2.5'$ @ $820.47'$)

$Q_{\text{ST}} = 5.5 \text{ cfs}$

$Q_{\text{IN}} = 5.5$

(PRE INLET
CAP. CALCS)

* ALL Q_{100} TO BE HANDLED BY
EXIST INLET



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2. CORNER CATCH LA PONDAL & WEBER

a) NW CORNER

• $Q_{100} = 5.8 \text{ cfs}$ (Block 9 single block catch)

• CHECK CURB CAPACITY $\Rightarrow 13.4 \text{ cfs} > 5.8 \text{ cfs}$ ok

• EXIST INLETS ARE SUFFICIENT

$$Q_{ST} = 5.8 \quad Q_{sum} = 11.2$$

∴ ALL Q_{100} TO BE HANDLED BY INLETS

b) NE CORNER

• $Q_{100} = 2.9 \text{ cfs}$ (Block 19 single block catch)

• CHECK CURB CAPACITY $\Rightarrow 30.5 \text{ cfs} > 2.9 \text{ cfs}$

• EXIST DOUBLE CURB OPENING MEET L-215 $S = 0.5\%$

$$Q_{ST} = 2.9 \quad Q_{in} = 2.9 \quad \left(\text{SEE INLET CAP CHG} \right)$$

ALL Q_{100} TO BE HANDLED BY INLETS



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5. BUBBLES TO BE CONVERTED TO GRATED DROP INLETS & CONNECTED TO EXIST S1 IN WASHATCH

① SAN RAFAEL & WASHATCH

a) NW CORNER

• Q_{100} BLOCK 17A = 2.9 cfs

• GRATED INLET CAPACITY = 7.4 cfs > 2.9 OK

b) NE CORNER

• Q_{100} BLOCK 12 = 3.6 cfs (SINGLE BLOCK CASE)

• GRATED INLET CAP. = 5.8 cfs > 3.6 OK

② YAMPA & WASHATCH

a) NW CORNER

• Q_{100} BLOCK 18A = 2.8 cfs (SINGLE BLOCK CASE)

• GRATED INLET CAP = 8.2 cfs > 2.8 OK

b) NE CORNER

• Q_{100} BLOCK 93 = 2.6 cfs (SINGLE BLOCK CASE)

• DOUBLE INLET L = 2.5 S = 0.570

$Q_{ST} = 2.6$ cfs $Q_{IN} = 2.6$ cfs

ALL Q_{100} TO BE HANDLED BY INLETS.

3. CACHE LA POUDE & WASHATCH

a) NW CORNER

• Q_{100} BLOCK 19A = 2.8 cfs (SINGLE BLOCK CASE)

• EXIST INLET SUM CAP = 6.5 cfs > 2.8

* ALL Q_{100} TO BE HANDLED BY INLET

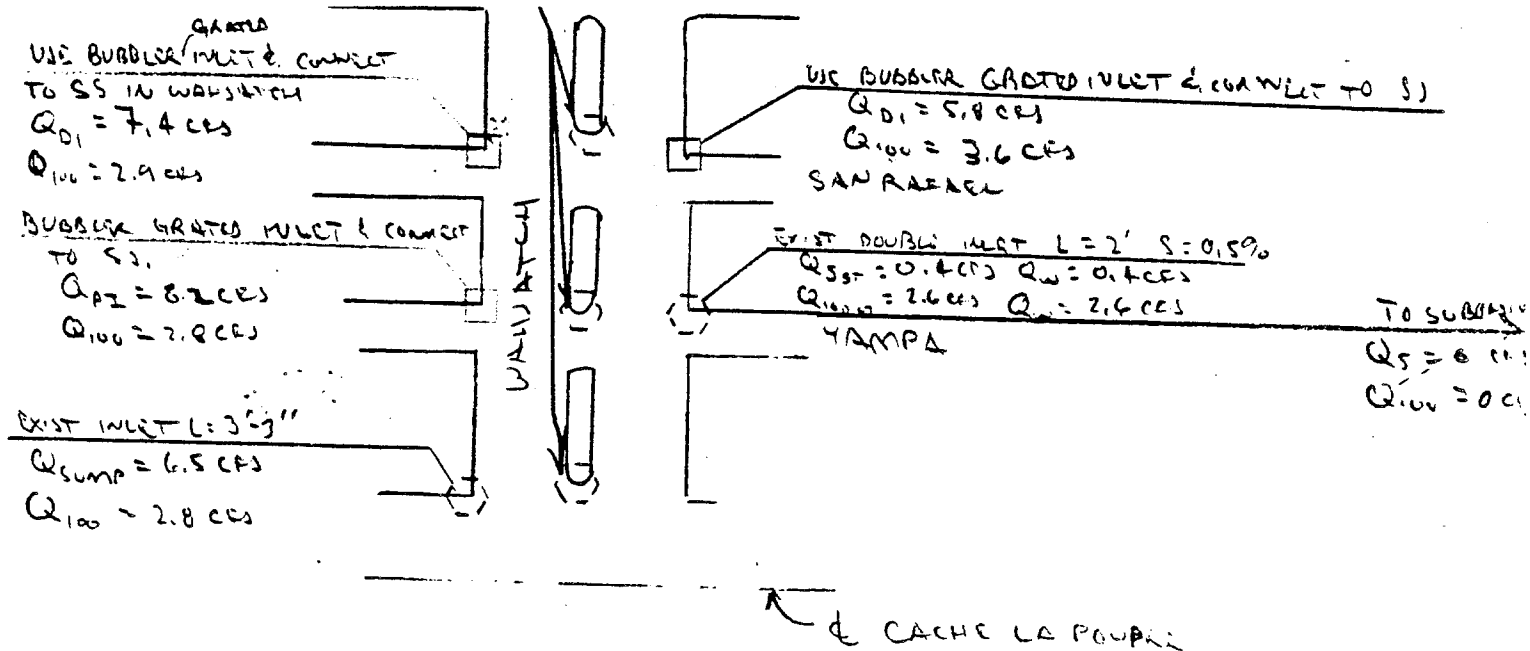
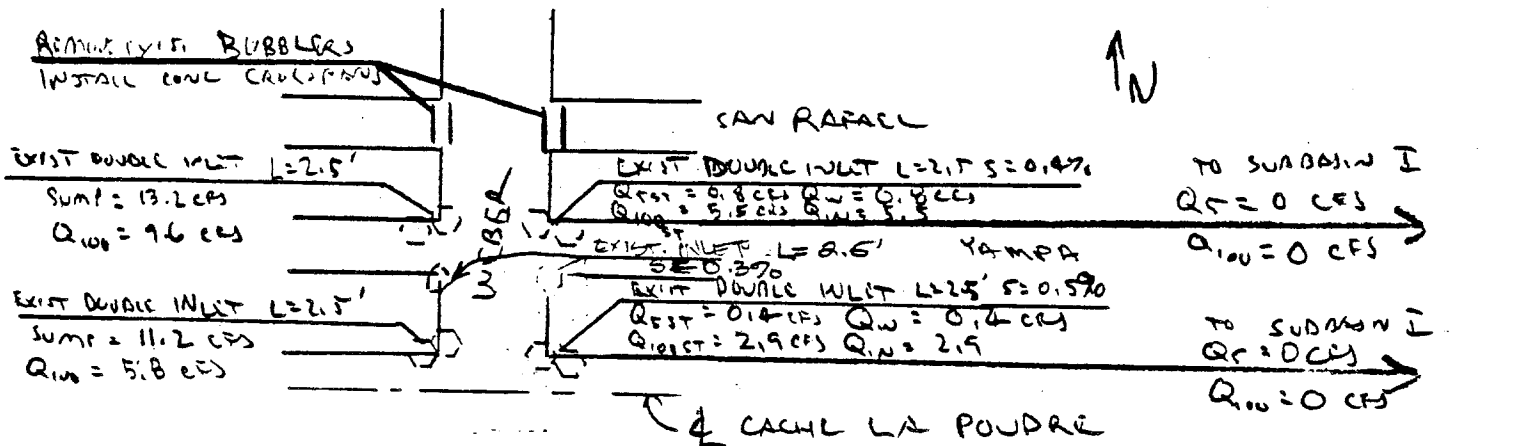


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SUBBASIN I

a) DRAINAGE IS TO SOUTH TO NORTH SIDE OF CACHE LA POUDE TO BUBBLES THAT ROUTE WATER TO THE DROP INLET AT CACHE LA POUDE & SNOOKS RUN.

b) BUBBLES ARE LOCATED @ FOLLOWING INTERSECTIONS

- PARALLEL AND EITHER SIDE OF CORONA & AT SAN RAFAEL STREET, REMOVE BUBBLES & INSTALL CONC. CRUISPAN
- PARALLEL AND EITHER SIDE OF CORONA & AT TAMPA, REMOVE BUBBLES AND INSTALL CONC. CRUISPAN
- @ NE CORNER OF RUTCH & TAMPA "T" INTERSECTION. CONNECT NORTHERN BUBBLE TO 18" SS IN RUTCH. OTHER OPTION IS REMOVE BUBBLES & INSTALL CONC. CRUISPAN

c) MAJOR INTERSECTIONS

- CACHE LA POUDE & CORONA
- CACHE LA POUDE & RUTCH
- CACHE LA POUDE & EL PASO
- CACHE LA POUDE & SNOOKS RUN

d) INSTALL SS TO CONNECT TO SUMPS & DRAIN TO ARCH CULVERT & SNOOKS RUN @ CACHE LA POUDE



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Q₅ / SUB BASIN I

1. INTERSECTION OF CORONA & CARR LA POUVER

a) NW CORNER (BLOCKS 92A, 93A & 94)

• t_c BLOCK 92A = 0.129 HR (same block calc)

• CUTTER FLOW

$$S_{AUG} = 0.85\%$$

$$N = 1.8 \text{ FPS (FIG. 5)}$$

$$\text{CUTTER LENGTH} = 450 + 50 + 450 + 70 + 450 = 1450 \text{ FT}$$

$$t_t = \frac{1450}{1.8 (3600)} = 0.224 \text{ HR}$$

$$t_c = t_t + t_{c_{92A}} = 0.353$$

$$CSM/IN = 860$$

• AREA

BLOCK	AREA
92A	.0061
93A	.0039
94	.0083
	<u>.0203</u> sq

• WEIGHTED CN 100% RES - SOL CLOJO A

$$CN = 61$$

$$Q_r \text{ RUNOFF} = 0.08 \text{ IN (FIG 7)}$$

$$Q_r = 0.08 (0.0203) (860) = 1.4 \text{ CPS}$$

• CHECK CURB CAP

$$10" @ 1.0\%$$

60' STREET WIDTH

$$\Rightarrow 60.1 \text{ CPS} > 1.4 \text{ OK}$$

• CHECK EXIST INLET SUMP CAPACITY (SEE INLET CAP. CALC)

$$Q_{sump} = 8.0 \text{ CPS} > 1.4 \text{ OK}$$

* ALL Q_r TO BE HANDLED BY INLET.

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2. INTERSECTION RIVER & CANYON LA RIVER

a) NW CORNER (BLOCKS 97 → 99)

• t_c Block 97 = 0.095 hrs (since have curbs)

• Gutter Run

$$S_{avg} = 1.10\%$$

$$N = 2.0 \text{ FPI (FIG 5)}$$

$$\text{GUTTER LENGTH} = 1470 + 40 = 1850 \text{ FT}$$

$$t_t = \frac{1850}{(2.0)(3600)} = 0.257$$

$$t_c = t_t + t_{c97} = 0.352$$

• $CSM/W = 860$ (FIG 6)

• $\Sigma AREA$

BLOCK	AREA
97	10039
98	10040
99	10081
	<u>30160 SM</u>

• WEIGHTED CN 100% RES. - SOIL GROUP A
CN = 61

• $Q_{\text{runoff}} = 0.08 \text{ in (FIG 7)}$

• $Q_{\text{r}} = 0.03 (0.0106) (860) = 1.1 \text{ CFS}$

• CHECK CURB CAP

5" @ 1.5%

60' ROAD WIDTH

$$\Rightarrow 7.5 \text{ CFS} > 1.1 \text{ CFS}$$

• CHECK EXIST DOUBLE INLET SUMP CAPACITY $\approx 3'$

$$Q_{\text{sump}} = 14.9 \text{ CFS} > 1.1 \text{ (SEE INLET CAP. CALC.)}$$

* ALL Q_{r} TO BE HANDLED BY INLET.

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b) NE CORNER (along 98A, 98B, 100)

• $t_{c \text{ BLOCK } 98A} = D. 417 \text{ HR}$

• GUTTER ROW

$S_{\text{AVE}} = 1.5\%$

$N = 2.5 \text{ FPS} \quad (\text{FIG 5})$

Gutter Length = $150 + 50' + 450 = 650 \text{ FT}$

$t_t = \frac{650}{2.5(3600)} = 0.072 \text{ HR}$

• $t_c = t_t + t_{c \text{ 98A}} = 0.489 \text{ HR}$

• $CSM_{IN} = 740$

• $\Sigma \text{ AREA}$

BLOCK	AREA
98A	.0072
98B	.0036
99	.0033
	<u>.0141 SM</u>

• WEIGHTED CN

$\frac{1}{3}$ COMM-SCHOOL
 $\frac{1}{3}$ RES
 $\frac{1}{3}$ OPEN SPACE

$CN = 0.33(89) + 0.33(61) + 0.34(41) = 66$

• $Q_s \text{ RUNOFF} = 0.115 \text{ IN} \quad (\text{FIG 7})$

• $Q_T = 0.115(740)(0.0141) = 1.6 \text{ CFS}$

• CHECK CURB CAPACITY

6" CURB @ 1.6% $\Rightarrow 14.3 \text{ CFS} > 1.6 \text{ ON } 30' \text{ ROAD WIDTH}$

• CHECK EXIST DOUBLE INLET CAPACITY $L = 3' \quad S = 1.6\%$

$Q_{ST} = 1.6 \text{ CFS} \quad Q_{IN} = 1.4 \text{ CFS}$

$\therefore 0.2 \text{ CFS DRAINS TO NW CORNER INLET @ EXIST CAPACITY: FIG 8A}$



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3. INTERSECTION OF E-PASE & CACHE LA Poudre

a) NE CORNER (BLOCK 101)

- $Q_T = 0.4 \text{ CFS} + 0.2 = 0.6$ (SMALL BLOCK CALC)
- (0.4 CFS FROM NE CORNER, CACHE LA Poudre & RIVER)
- EXIST INLET CAPACITY: $L = 3'$, $S = 2.2\%$

* WILL INTERCEPT ALL Q_T FLOW

b) NW CORNER 98

- t_c BLOCK 98C = 0.356 (LONGER BLOCKS)

- GUTTER FLOW
 $S_{Ave} = 2.2\%$

$$N = 3.0 \text{ FPS (FIG 5)}$$

$$\text{GUTTER LENGTH} = 50 + 450 = 500$$

$$t_t = \frac{500}{(3.0)(3600)} = 0.046$$

$$t_c = t_t + t_{c,98C} = 0.402 \text{ HR}$$

- $CSM/in = 800$ (FIG 6)

- AREA

Block	AREA
98C	.0093
100A	.0044
	<u>.0139 SM</u>

- WEIGHTED CN $\frac{2}{3}$ OPEN SPACE
 $\frac{1}{3}$ AC

$$CN = 0.33(61) + 0.67(49) = 53$$

$$Q_{\text{RUNOFF}} = 0.02 \text{ IN (FIG 7)}$$

$$Q_T = 0.02(800)(0.0139) = 0.2 \text{ CFS}$$

$$\therefore Q_T = 0.6 \text{ CFS FROM BLOCK 100A SMALL BLOCK CALC}$$

- CHECK CURB CAP.
5' @ 2.0%

$$\Rightarrow 8.6 \text{ CFS} > 0.6 \text{ OK}$$



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* EXIST INLET JUMP CAPACITY $L = 3'$

$$Q_{sum} = 4.9 \text{ CFS} > 0.6 \text{ OK}$$

4. CACHE LA POUDE $\frac{1}{2}$, STICKS RUN

NEGLECTIBLE FLOW FROM SUBSTW K. MOST WATER W FROM EAST OF STUDY AREA

Q_{100} / SUBSTW I

1. INTERSECTION CORONA & CACHE LA POUDE

$$Q_{100} \text{ RUNOFF} = 0.57 \quad (\text{FIG 7 @ } CN=61)$$

$$Q_{100} = 0.57(0.0203)(860) = 10.0 \text{ CFS}$$

$$* \text{ CHECK CURB CAP} = 60.1 \text{ CFS} > 10.0 \text{ OK}$$

$$* \text{ CHECK INLET SUM CAP} = 8.6 < 10.0 \text{ CFS}$$

∴ ASSUME 2.0 CFS WILL FLOW SOUTH OVER CACHE LA

POUDE DOWN & NORTH CORONA ST. CROWN. ELEV

THROUGH CURB CAP IS SUFFICIENT. OR REMOVE EXIST. INLET & INSTALL A 8" DIA. INLET

2. INTERSECTION ROUTE & CACHE LA POUDE

a) NW CORNER

$$Q_{100} \text{ RUNOFF} = 0.57 \text{ IN} \quad (\text{FIG 7 @ } CN=61)$$

$$Q_{100} = 0.57(0.0106)(860) = 5.2 \text{ CFS} + 1.0 \text{ CFS} = 6.2$$

FROM NW CORNER OF
CACHE LA POUDE & CORONA
OVERFLOW

$$* \text{ CHECK CURB CAP} = 7.5 \text{ CFS} > 6.2 \text{ OK}$$

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• CHECK EXIST WLET CAP = 14.9 cfs > 6.2 cfs

* EXIST WLET WILL HANDLE Q_{100}

b) NE CORNER

• $Q_{100} = 0.81$ IN (1016 70 CN=66)

• $Q_{100} = 0.81 (740) (0.0141) = 8.4$ cfs

• CHECK CURB CAP = 14.3 cfs > 8.4 OK

• CHECK EXIST INLET CAP $L=3'$ $S=1.6\%$

$Q_{ST} = 8.4$ $Q_{IN} = 2.0$ cfs ∴ 6.4 cfs WILL DRAW
PAST INLET TO NE
CORNER EL PASO &
CACHE LA Poudre INLET

3. INTERSECTION EL PASO & CACHE LA Poudre

a) NE CORNER

• $Q_{100} = 3.2$ cfs + (BLOCK 101 SINGLE BLOCK CALCS)

• CHECK CURB CAP

10" CURB @ 2.2% ⇒ 24.0 cfs > 3.2 OK
30' ROAD WIDTH

• CHECK ^{EXIST} INLET CAP. $L=3'$ $S=2.2\%$

$Q_{ST} = 3.2$ $Q_{IN} = 0.5$ cfs (SEE INLET CAP
CALCS.)

2.7 cfs WILL FLOW TO
GRATED INLET @ CACHE LA Poudre
& SHOULD RUN.
CHANCE TO SEE IF
ADDITIONAL INLET
DEMANDS WILL TAKE IN
MORE Q

b) NW CORNER

• $Q_{100} = 2.4$ cfs (BLOCK 100A ONLY SEE
Q F CALCS)

+ 6.4 cfs FROM NE CORNER CACHE LA Poudre & RIVER
8.8 cfs



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• CHECK CURB CAP = 8.6 CFS < 8.8 CFS

0.2 CFS WILL
 PASS OVER ROAD
 CROWN. DUE TO
 SLIGHT DIPS
 ASSUME OK

• CHECK INLET SUMP CAP = 4.9 CFS < 8.8

∴ FLOODING WILL OCCUR
 IF WANT TO HANDLE ALL Q_{100}

4, CACHE LA POUARE & SHOOKS RUN
 REMOVE EXIST INLET & INSTALL 6' DIOR

$Q_{100} = 2.7$ FROM Q FLOWING EAST INLET
 Q NE CORNER CACHE LA POUARE & SHOOKS RUN

$Q_{DI} = 36.6$ CFS (PER GRADED INLET CALC) CIS
 ASSUMES NO DEBRIS ON DROP INLET GRATE.

NOTE THAT ADDITIONAL DRAINAGE GOES TO INLET
 FROM AREAS EAST OF STUDY AREA.



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DESIGN CALCULATIONS

Project MADISON / WASHINGTON

Detail SPRINGS OF SAREM SOWER CACHE LA POUQUE

Designer NJH

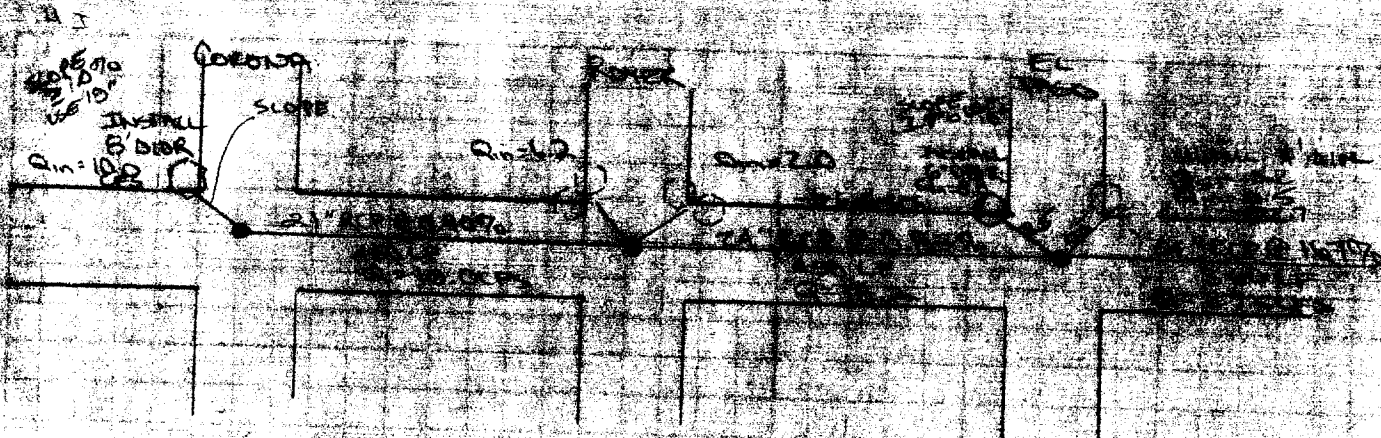
Date 1/31/86

Sheet 01

Checker

Date

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NW CORNER CORONA CACHE LA POUQUE

5' WIDTH

$$CAPACITY = 10.0 \text{ CFS} (.80) = 8.0 \text{ CFS}$$

$$Q_{100} = 10.0 \text{ CFS}$$

$$8.0 < 10.0$$

REMOVE EXIST INLET
INSTALL 8' DIOR

NW CORNER POWER + CACHE LA POUQUE

EXIST DOUBLE 3' INLET SUMA

$$CAP = 14.9 \text{ LPS}$$

$$Q_{100} = 6.2 < 14.9 \text{ OK}$$

NE CORNER POWER + CACHE LA POUQUE

EXIST DOUBLE CONTINUOUS $Q_{100} = 2.0$

$$Q_{100} = 8.4$$

CONVERT EXISTING BURIED
CURB OPENING INLET
TO THE INTO STORM SEWER

$$6.4 \text{ WILL PASS}$$

$$\text{TOTAL IN MH} = 8.2$$