
4720 Hardin rd
Legend
4720 Hardin Rd
Drainage
Mainline
Sump
Tanks and pipe from sump
4720 Hardin Rd
Google Earth
500 ft

EDWARDS ENGINEERING

PROJECT: EAKLE- HARDIN RD HYDROLOGY

DATE: 2-21-21
JOB NO.: EKLHAR-R
COMP. BY: BAE
CHKD. BY:
SHEET 1 OF 1

PER ATTACHED NOAA ISOPLUVIAL - $P_{100} = 8.0''$

T_c = 0.1 HR - MINIMUM PER NRCS TR-55

AREA OF WATERSHED = 2.64 ACRES

C_N = 98 - IMPERVIOUS AREAS - NRCS TR55

STORM DISTRIBUTION - TYPE 1A - NRCS TR55

Q_{100} = 5.26 cfs - SEE ATTACHED REPORT

REGISTERED PROFESSIONAL ENGINEER
BRENT A. EDWARDS
C 051461
Exp. 6/24
CIVIL
STATE OF CALIFORNIA

Hydrology Report

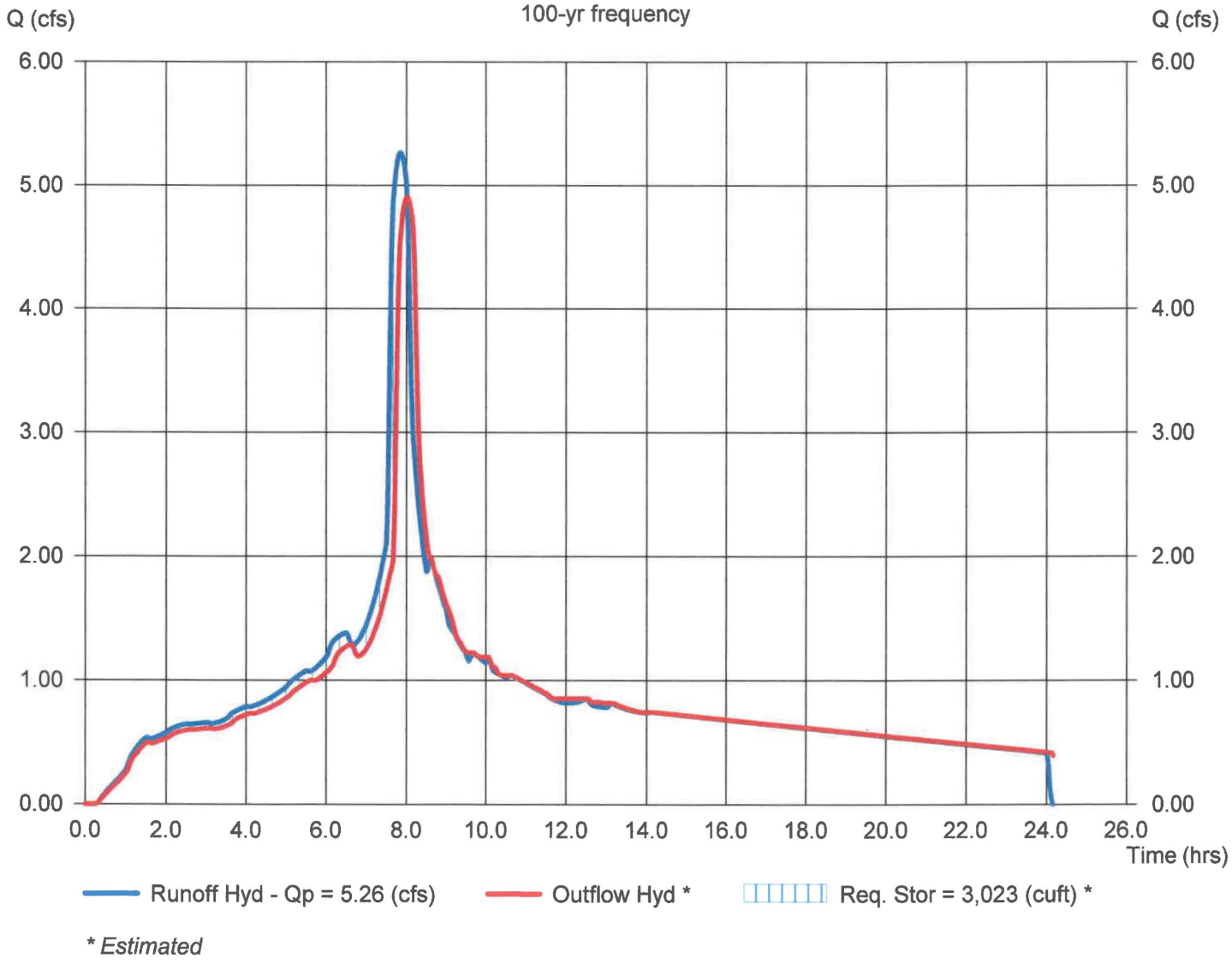
Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Sunday, Feb 21 2021

Eakle - Hardin Road

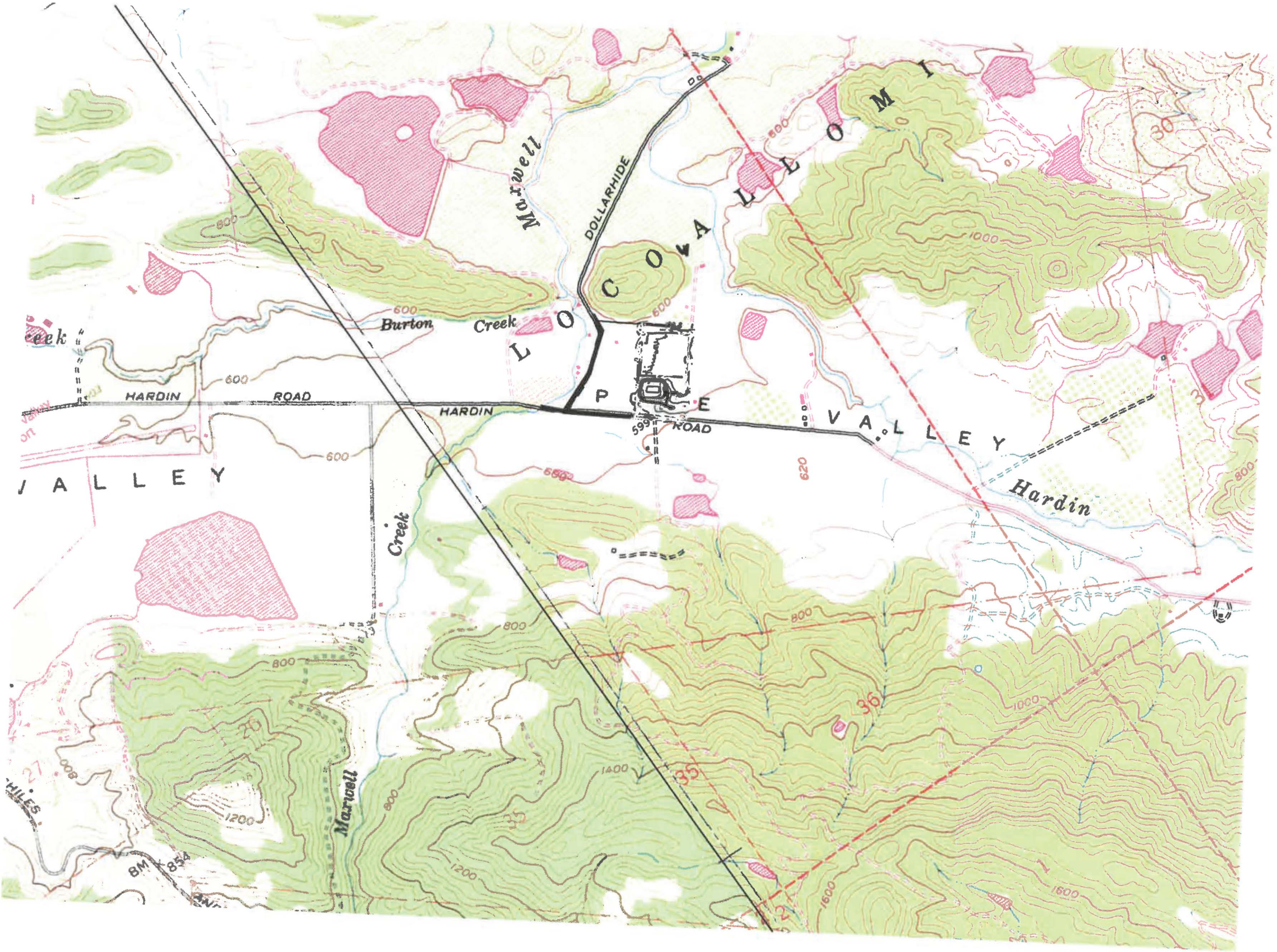
Hydrograph type	= SCS	Peak discharge (cfs)	= 5.262
Storm frequency (yrs)	= 100	Time interval (min)	= 1
Drainage area (ac)	= 2.640	Curve number (CN)	= 98
Basin Slope (%)	= n/a	Hydraulic length (ft)	= n/a
Tc method	= User	Time of conc. (min)	= 6
Total precip. (in)	= 8.00	Storm Distribution	= Type IA
Storm duration (hrs)	= 24	Shape factor	= 484

Hydrograph Volume = 76,692 (cuft); 1.761 (acft)

Runoff Hydrograph



** Estimated*



Maxwell
DOLLARHIDE
Burton
Creek
HARDIN
ROAD
HARDIN
ROAD
599
V A L L E Y
V A L L E Y
Hardin
Creek
Maxwell
620
600
800
1000
1200
1400
1600
35
36

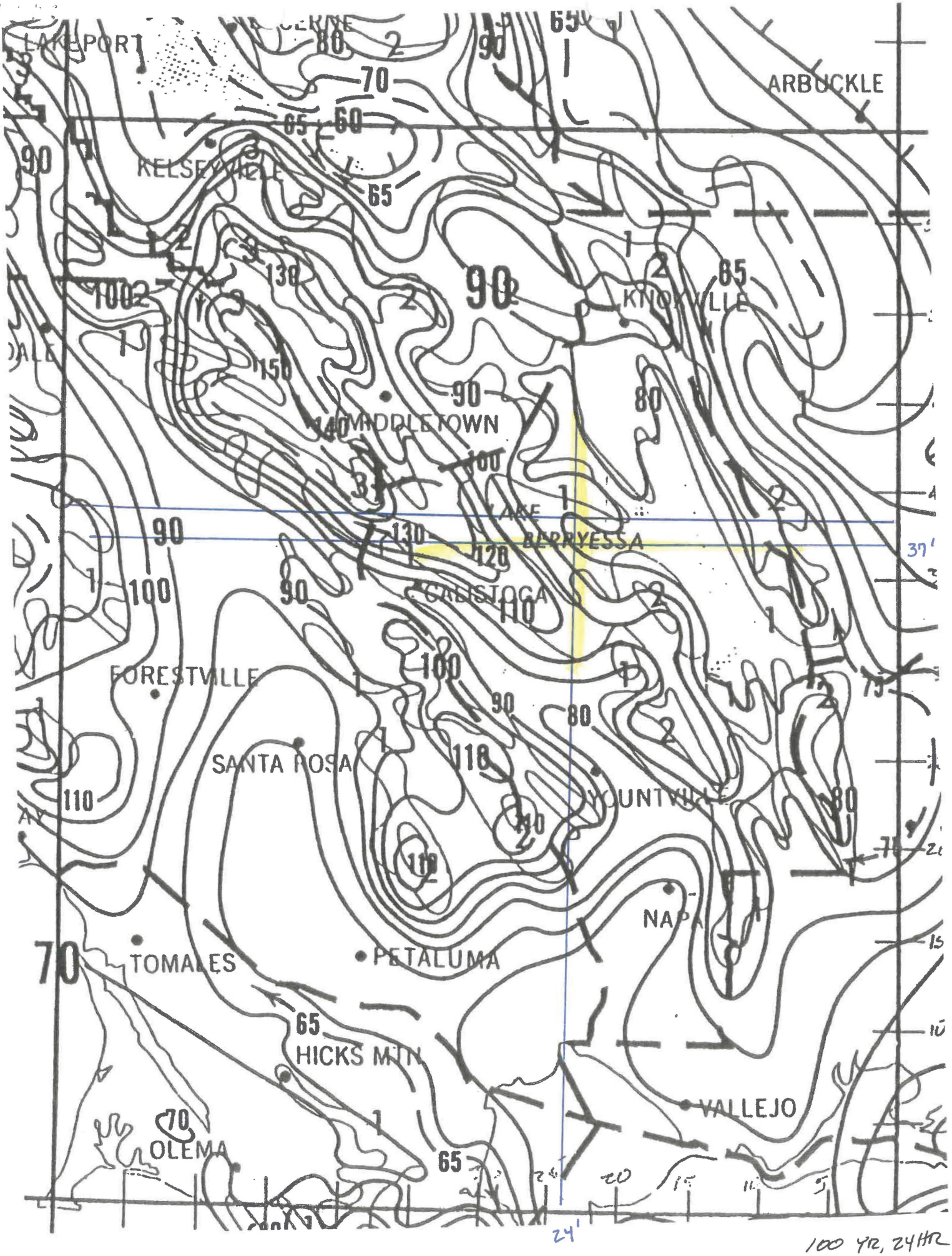
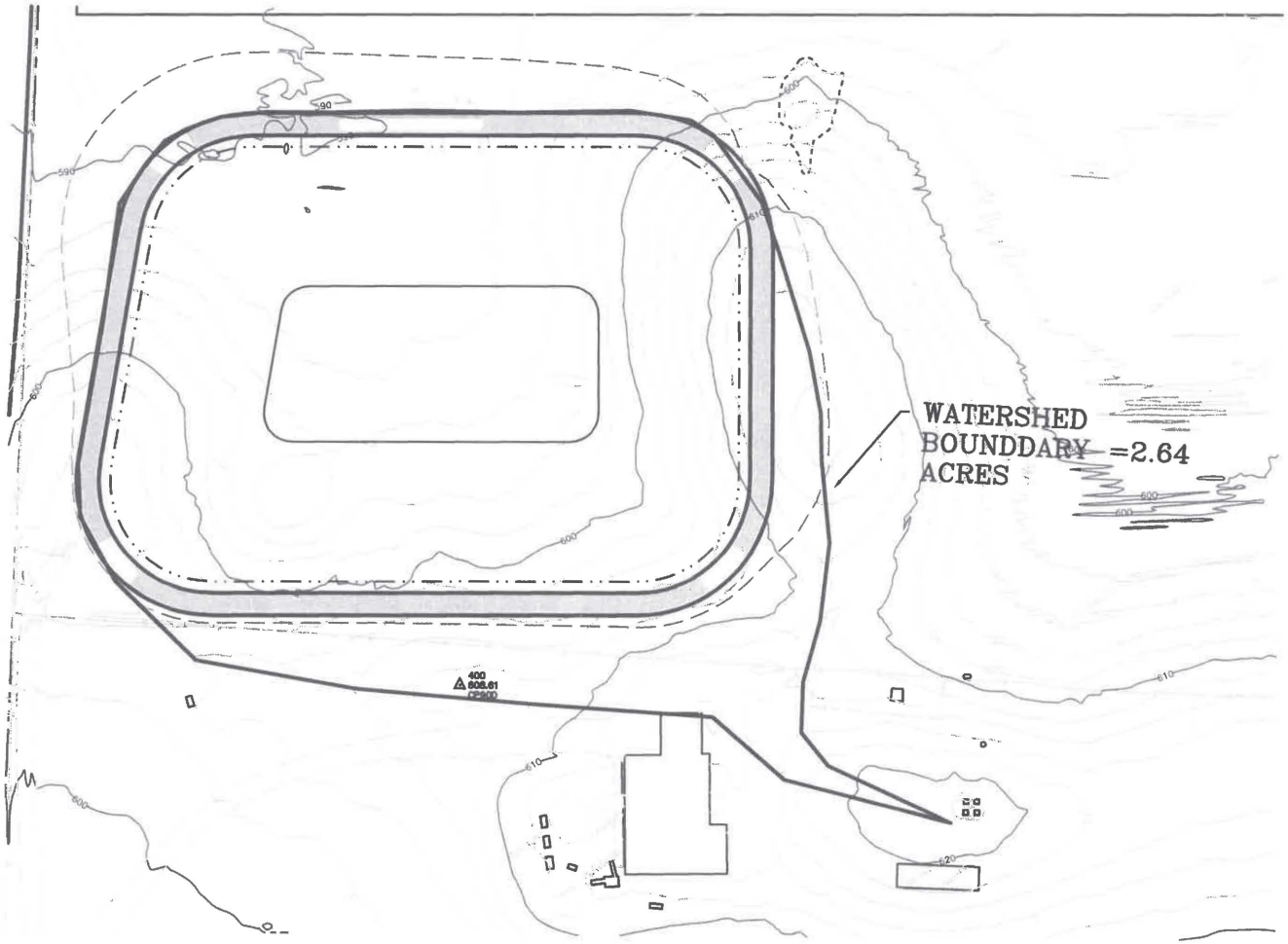

LAKEPORT
ARBUCKLE
KELSEYVILLE
KNOXVILLE
MIDDLETOWN
LAKE BERRYESSA
CALISTOGA
FORESTVILLE
SANTA ROSA
NAPA
TOMALES
PETALUMA
HICKS MTN
VALLEJO
OLEMA
24'
37'
100 YR, 24 HR

Table 2-2a.—Runoff curve numbers for urban areas[1]

Cover description		Curve numbers for hydrologic soil group—			
Cover type and hydrologic condition	Average percent impervious area[2]	A	B	C	D
Fully developed urban areas (vegetation established)					
Open space (lawns, parks, golf courses, cemeteries, etc.)[3]:					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only)[4]		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
1/8 acre or less (town houses)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82
Developing urban areas					
Newly graded areas (pervious areas only, no vegetation)[5]		77	86	91	94
Idle lands (CN's are determined using cover types similar to those in table 2-2c).					

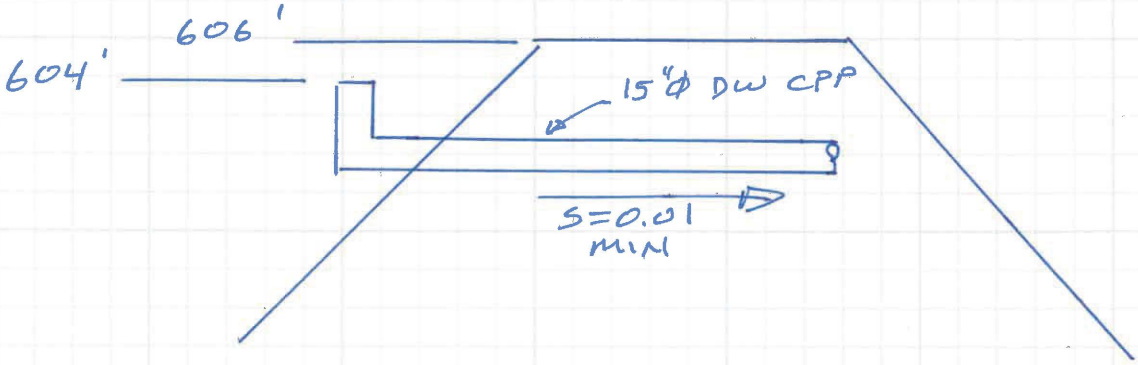
[1]Average runoff condition, and $I_a = 0.2S$.
[2]The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using figure 2-3 or 2-4.
[3]CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.
[4]Composite CN's for natural desert landscaping should be computed using figures 2-3 or 2-4 based on the impervious area percentage (CN = 98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.
[5]Composite CN's to use for the design of temporary measures during grading and construction should be computed using figure 2-3 or 2-4, based on the degree of development (impervious area percentage) and the CN's for the newly graded pervious areas.


WATERSHED
BOUNDDARY
ACRES
=2.64

EDWARDS ENGINEERING

PROJECT: EAKLE - HARDIN RD
OVERFLOW PIPE

DATE: 2-21-21
JOB NO.: EKL HAR-1
COMP. BY: BAE
CHKD. BY:
SHEET 1 OF 1



Q_{100} = 5.26 cfs

PER NRCS NOMOGRAPH, H_{HDS} FOR 5.26cfs = 0.8'
WHICH LEAVES 1.2-FT RESIDUAL FREEBOARD

AT S=0.01 & n=0.012 (DUAL WALL CPP),
d_{100} = 0.72' O.K.

REGISTERED PROFESSIONAL ENGINEER
BRENT A. EDWARDS
C 051464
Exp. 6/24
CIVIL
STATE OF CALIFORNIA

B. Edwards

Channel Report

Hydraflow Express Extension for Autodesk® AutoCAD® Civil 3D® by Autodesk, Inc. Sunday, Feb 21 2021

<Name>

Circular

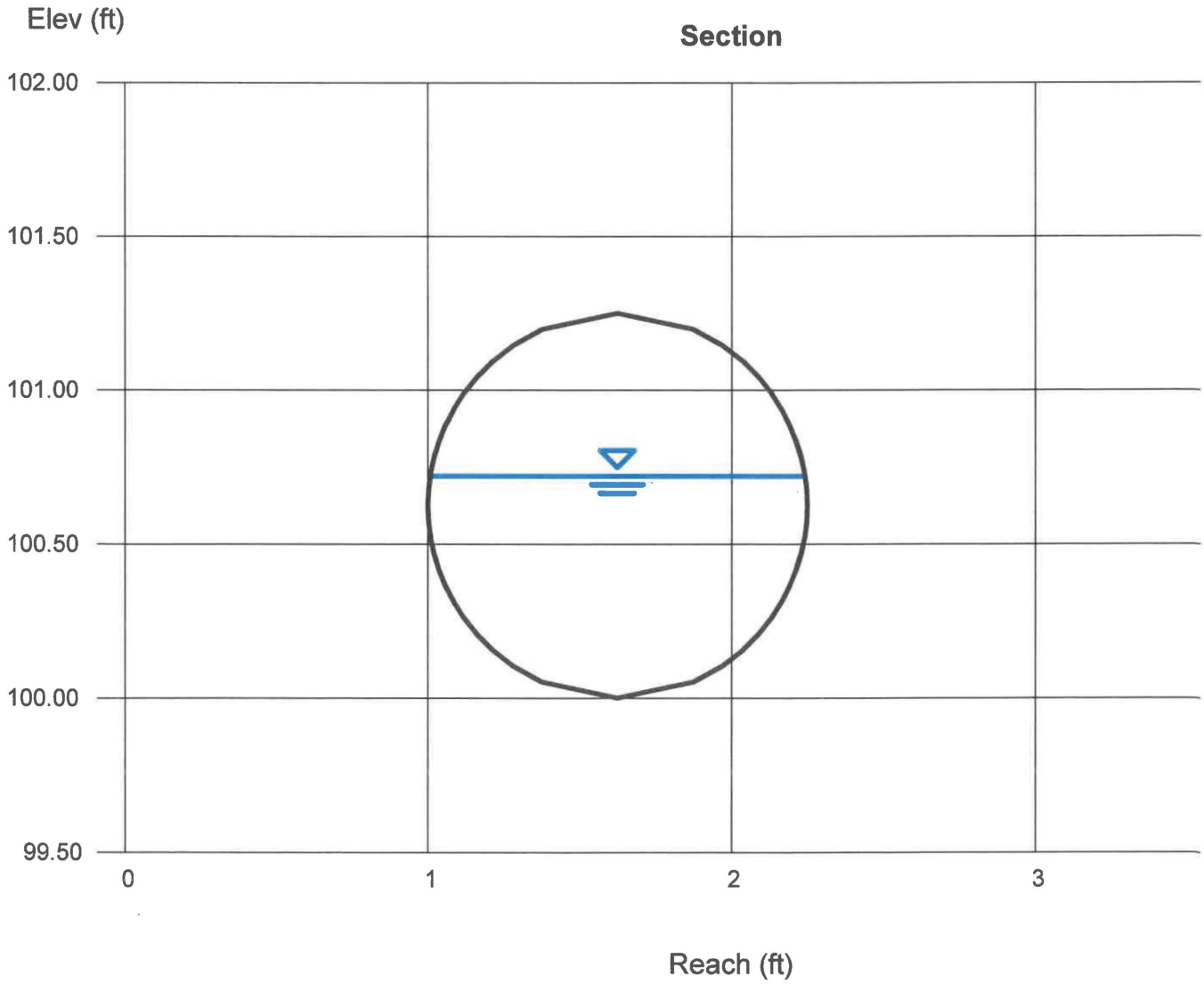
Diameter (ft)	= 1.25
Invert Elev (ft)	= 100.00
Slope (%)	= 0.01
N-Value	= 0.001

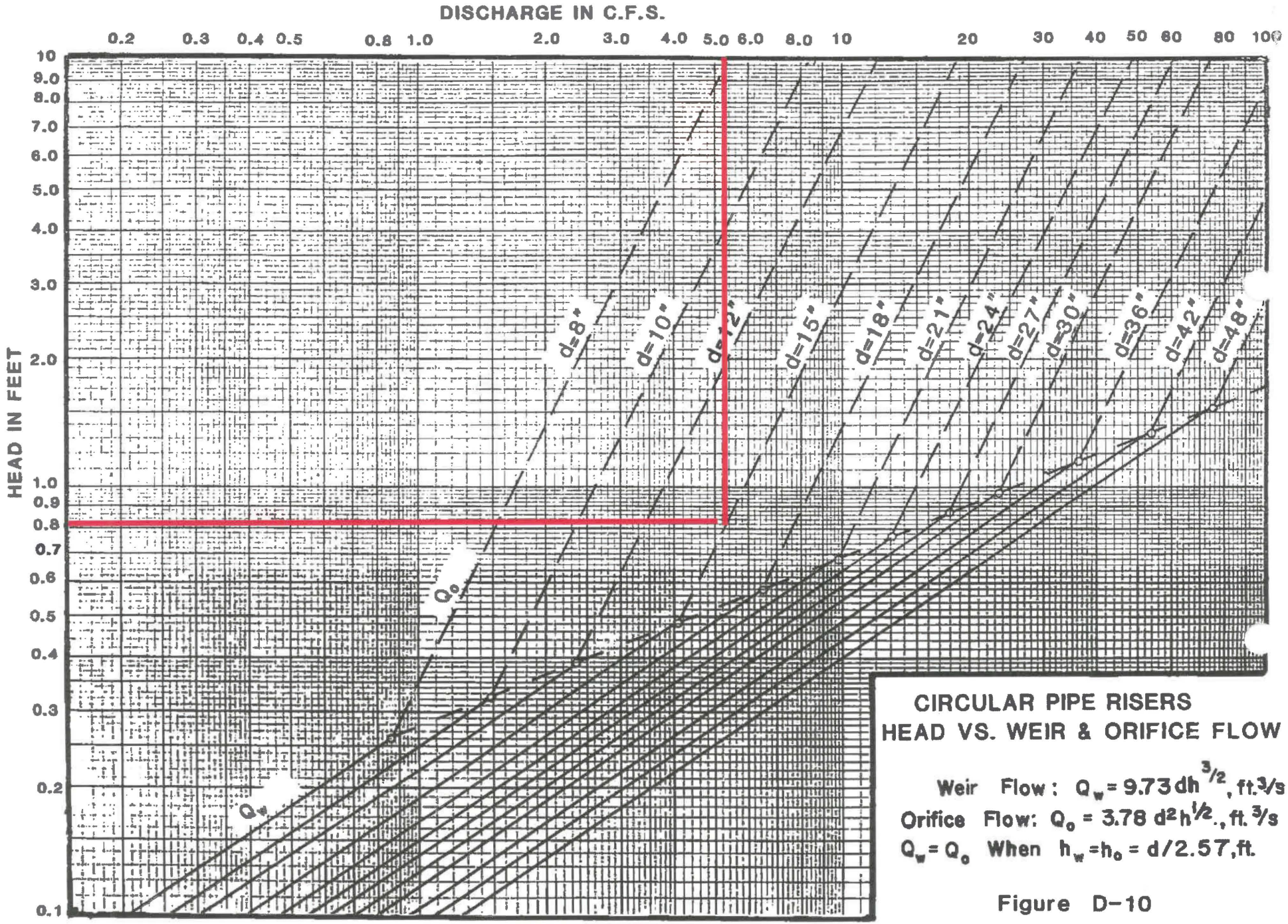
Calculations

Compute by:	Known Q
Known Q (cfs)	= 5.26

Highlighted

Depth (ft)	= 0.72
Q (cfs)	= 5.260
Area (sqft)	= 0.73
Velocity (ft/s)	= 7.17
Wetted Perim (ft)	= 2.16
Crit Depth, Yc (ft)	= 0.93
Top Width (ft)	= 1.24
EGL (ft)	= 1.52





CIRCULAR PIPE RISERS
HEAD VS. WEIR & ORIFICE FLOW

Weir Flow: $Q_w = 9.73 dh^{3/2}$, ft.³/s

Orifice Flow: $Q_o = 3.78 d^2 h^{1/2}$., ft.³/s

$Q_w = Q_o$ When $h_w = h_o = d/2.57$, ft.

Figure D-10

PJC & Associates, Inc.
Consulting Engineers & Geologists

June 1, 2022 Job No. S2007.01

Edwards Engineering, Inc.
Attention: Brent Edwards
1305 E Street
Napa, CA 94559

Subject: **Toe Drain**
Proposed Eakle Reservoir
4720 Hardin Road
Saint Helena, California

References: Report titled, "Geotechnical Investigation, Proposed Eakle Reservoir, 4720 Hardin Road, Saint Helena, California" prepared by PJC & Associates, Inc., dated December 1, 2020.

Civil Plans, Sheets 1 through 3, prepared by Edwards Engineering, dated March 18, 2021.

PJC & Associates, Inc. (PJC) is pleased to submit this letter presenting the addressing the proposed toe drain. PJC previously performed a geotechnical investigation for the project and presented the results in a written report dated December 1, 2020.

It is our understanding that it is proposed to substitute the keyway subdrain recommended in geotechnical report with a toe drain as shown on the above referenced plans. Based on our review, we judge that the substitution should not significantly impact the embankment stability and should likely prevent seepage through the face of the embankment.

We trust that this is the information that you require at this time. If you have any questions concerning the content of this letter please call.

Sincerely,

PJC & Associates, Inc.

Anthony J. DeMartini
Geotechnical Engineer
GE 2750, California