

SUPPLEMENTAL DRAINAGE REPORT
TO FEBRUARY 2009 REPORT

FOR

**NORTH POINTE SENIOR LIVING
WICHITA, KANSAS**

MARCH 2009

Summary

A. Additions and Revisions

The drainage and utility plan has been revised to show that grading will take place in the reserves downstream of the site as needed, Figure 1.1. A ditch has been added along the north property line of the property to convey backyard drainage from homes in Pepperwood Village Addition and this site to the drainage reserve. This ditch was sized using Hydraflow Express, Figure 1.2. The ditch will need a 5' bottom, 4:1 side slopes, and a minimum 1.0% slope. Depths in the ditch will be less than 1' in the 100-year design event. The 3-42" RCP's under Pepperwood Street were also analyzed in Hydraflow Express, Figure 1.3. Based on calculations it appears the RCP's are designed to handle the 63.7 acre developed flow without overtopping. The drainage reserve up to the RCP's needs to be re-graded to eliminate existing ponding and direct runoff to the pipes.

Figure 1.1

Drainage and Utility Plan

NORTH POINTE SENIOR LIVING
NORTH POINTE SENIOR LIVING
WICHITA, KANSAS
DRAINAGE AND UTILITY PLAN

DATE
FEBRUARY 2009

REVISED
MARCH 4, 2009

DESIGN BY
KLA

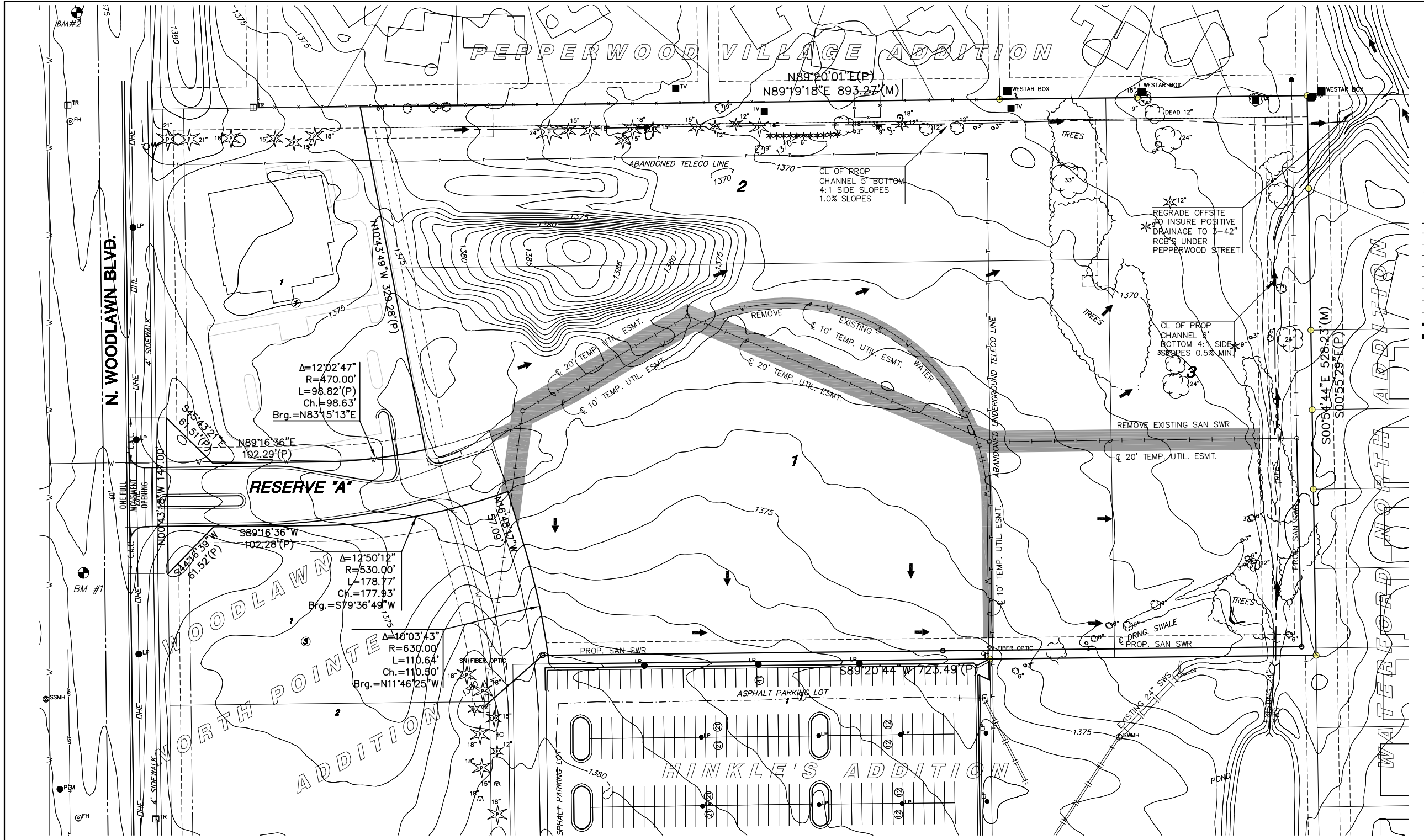
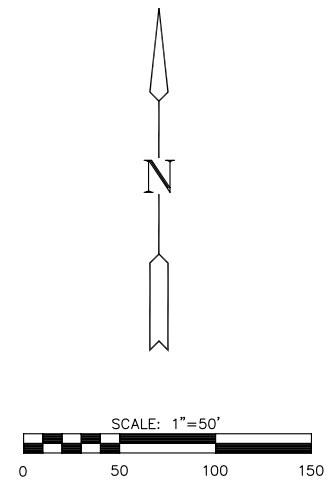
DRAWN BY
CMJ

CHECKED BY
GJA

SHEET NUMBER
1

LEGEND

- ⊗ CONIFEROUS TREE
- ⊙ DECIDUOUS TREE
- ⊙ SIGN
- ⊙ POWER POLE
- ⊙ ELECTRIC BOX
- ⊙ LIGHT POLE
- ⊙ FIRE HYDRANT
- ⊙ WATER VALVE
- ⊙ WATER METER
- ⊙ SECTION CORNER
- ⊙ BENCHMARK
- EASEMENT
- BUILDING SETBACK
- FENCE
- STORM SEWER PIPE
- WATER LINE
- SANITARY SEWER LINE
- GAS LINE
- GAS PIPELINE
- TELEPHONE LINE
- UNDERGROUND ELEC.
- OVERHEAD ELECTRIC
- FIBER OPTIC CABLE
- DRAINAGE SUB BASIN
- DRAINAGE BASIN
- FLOW ARROW
- AREA FOR SWS SIZING



BENCH MARK

- BM** C.O.W. Benchmark Disc 24' North and 95' West of the Southwest corner of Hinkle's Addition
Elev. = 1376.56 (NGVD 29)
1377.06 (NAVD 88)
- BM#1** RR Spike in West face of power pole, 443' South and 81' West of the Northwest Corner of Hinkle's Addition
Elev. = 1378.15 (NGVD 29)
1378.65 (NAVD 88)
- BM#2** RR spike in West Face of power pole, 116' North and 82' West of the Northwest Corner of Hinkle's Addition
Elev. = 1375.89 (NGVD 29)
1376.49 (NAVD 88)

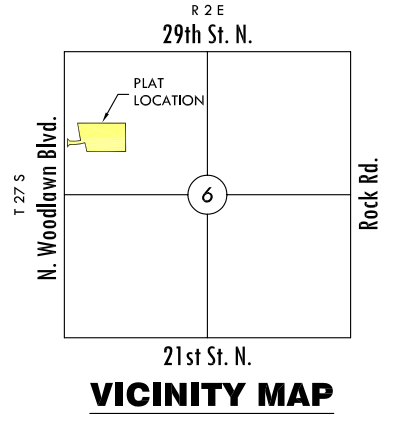


Figure 1.2

North Ditch Analysis

Channel Report

North Pointe Senior Living - North Property Line Channel

Trapezoidal

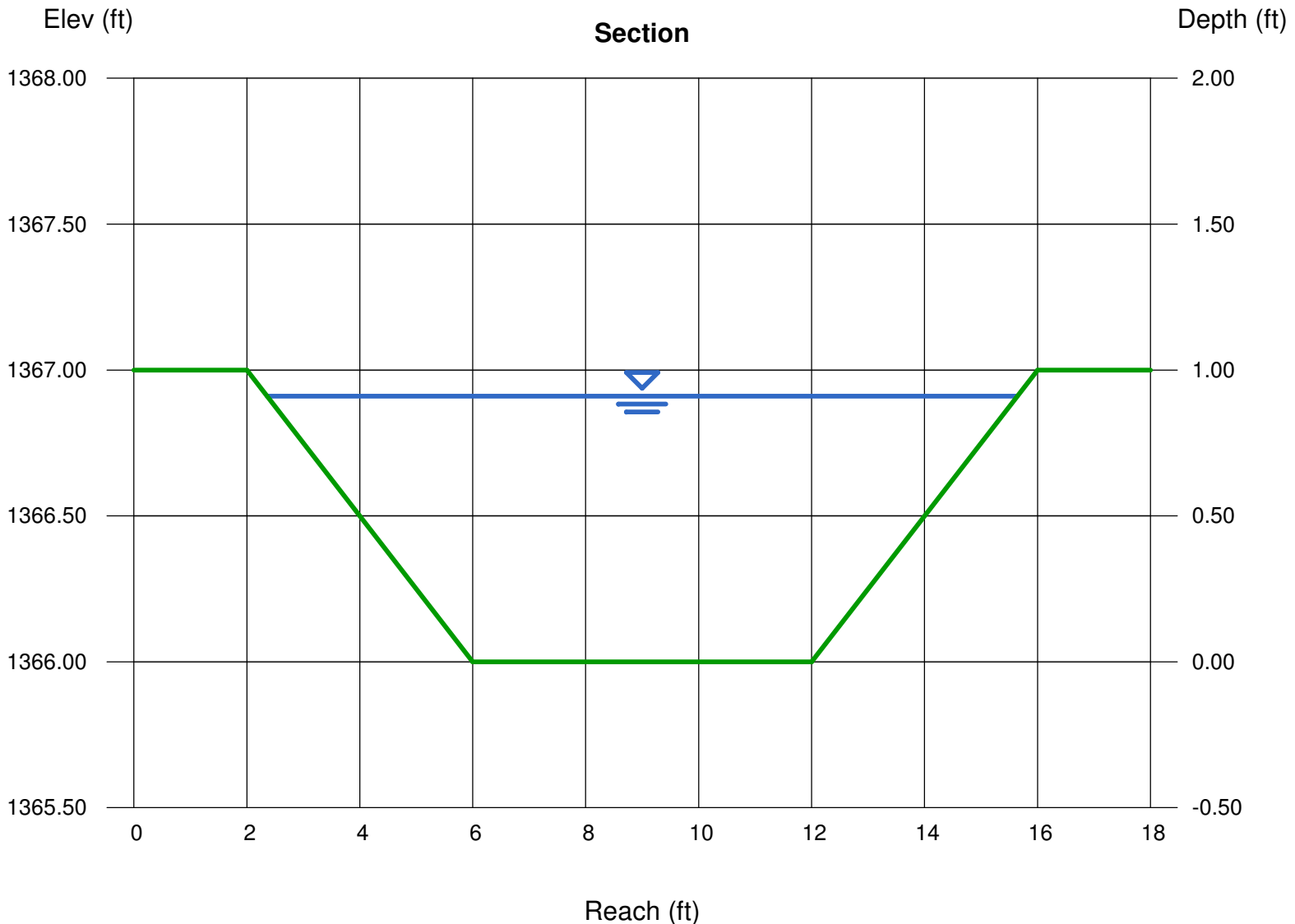
Bottom Width (ft) = 6.00
Side Slopes (z:1) = 4.00, 4.00
Total Depth (ft) = 1.00
Invert Elev (ft) = 1366.00
Slope (%) = 1.00
N-Value = 0.030

Highlighted

Depth (ft) = 0.91
Q (cfs) = 32.11
Area (sqft) = 8.77
Velocity (ft/s) = 3.66
Wetted Perim (ft) = 13.50
Crit Depth, Yc (ft) = 0.80
Top Width (ft) = 13.28
EGL (ft) = 1.12

Calculations

Compute by: Known Q
Known Q (cfs) = 32.11



Hydrology Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc.

Wednesday, Mar 4 2009

North Property Line

Hydrograph type	= Rational	Peak discharge (cfs)	= 32.11
Storm frequency (yrs)	= 100	Time interval (min)	= 1
Drainage area (ac)	= 4.900	Runoff coeff. (C)	= 0.87
Rainfall Inten (in/hr)	= 7.533	Tc by User (min)	= 15
IDF Curve	= ButlerCoKS.IDF	Rec limb factor	= 1.00

Hydrograph Volume = 28,903 (cuft); 0.664 (acft)

Runoff Hydrograph

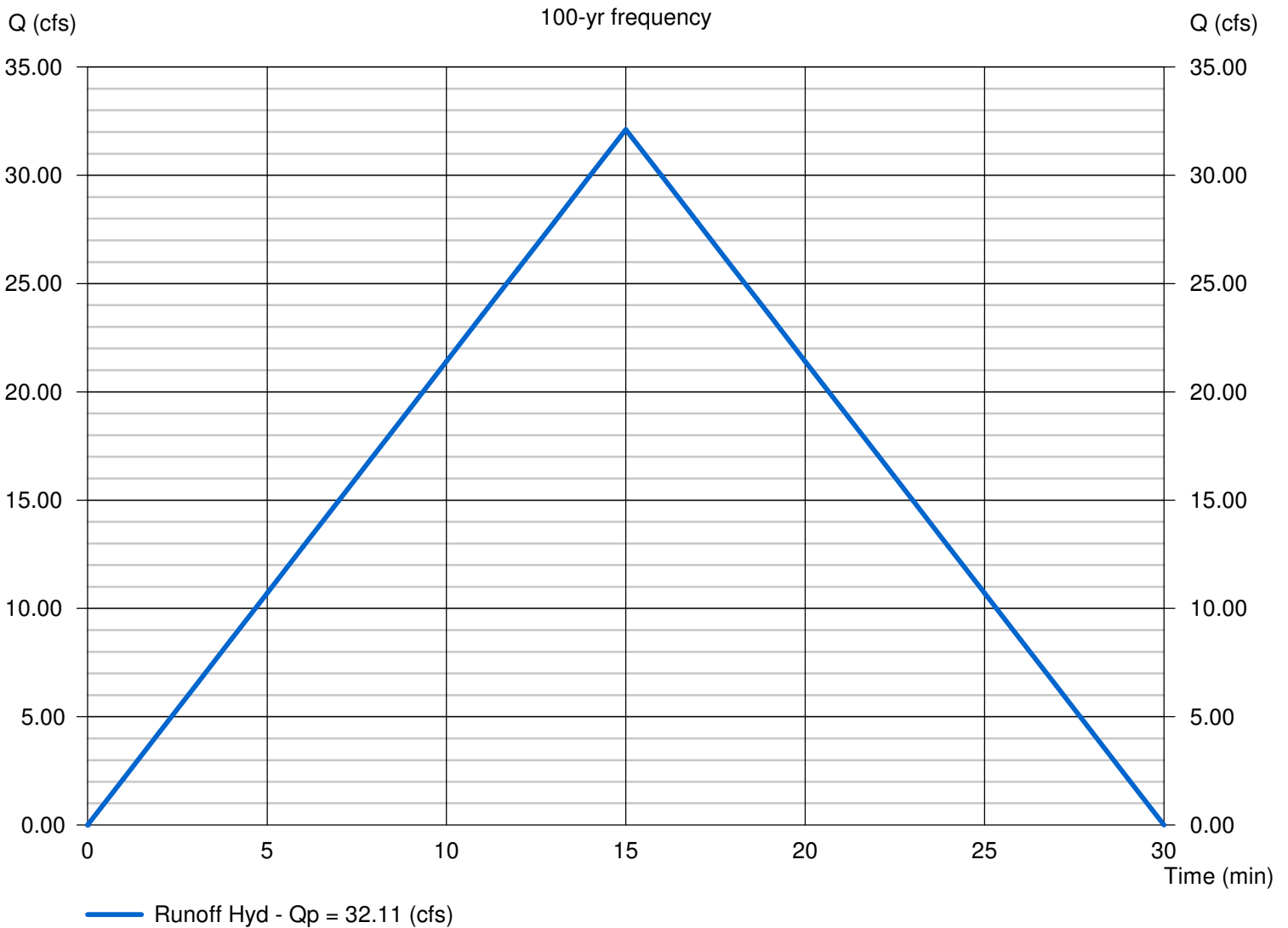


Figure 1.3

Pepperwood RCP Analysis

Culvert Report

Pepperwood Street

Invert Elev Dn (ft) = 100.00
Pipe Length (ft) = 80.00
Slope (%) = 0.09
Invert Elev Up (ft) = 100.07
Rise (in) = 42.0
Shape = Cir
Span (in) = 42.0
No. Barrels = 3
n-Value = 0.013
Inlet Edge = Projecting
Coeff. K,M,c,Y,k = 0.0045, 2, 0.0317, 0.69, 0.5

Embankment

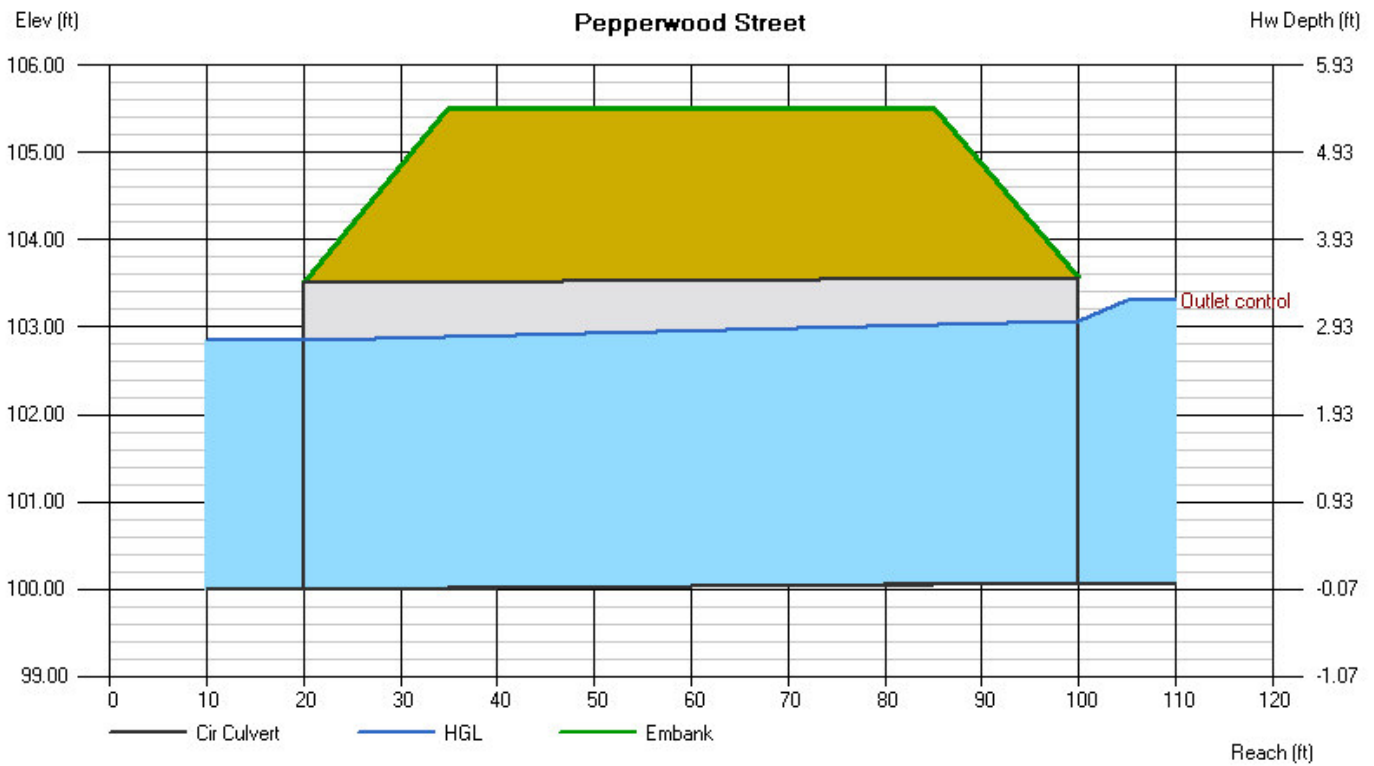
Top Elevation (ft) = 105.50
Top Width (ft) = 50.00
Crest Width (ft) = 100.00

Calculations

Qmin (cfs) = 145.00
Qmax (cfs) = 281.00
Tailwater Elev (ft) = (dc+D)/2

Highlighted

Qtotal (cfs) = 145.00
Qpipe (cfs) = 145.00
Qovertop (cfs) = 0.00
Veloc Dn (ft/s) = 5.78
Veloc Up (ft/s) = 5.51
HGL Dn (ft) = 102.84
HGL Up (ft) = 103.07
Hw Elev (ft) = 103.30
Hw/D (ft) = 0.92
Flow Regime = Outlet Control



Hydrology Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2009 by Autodesk, Inc.

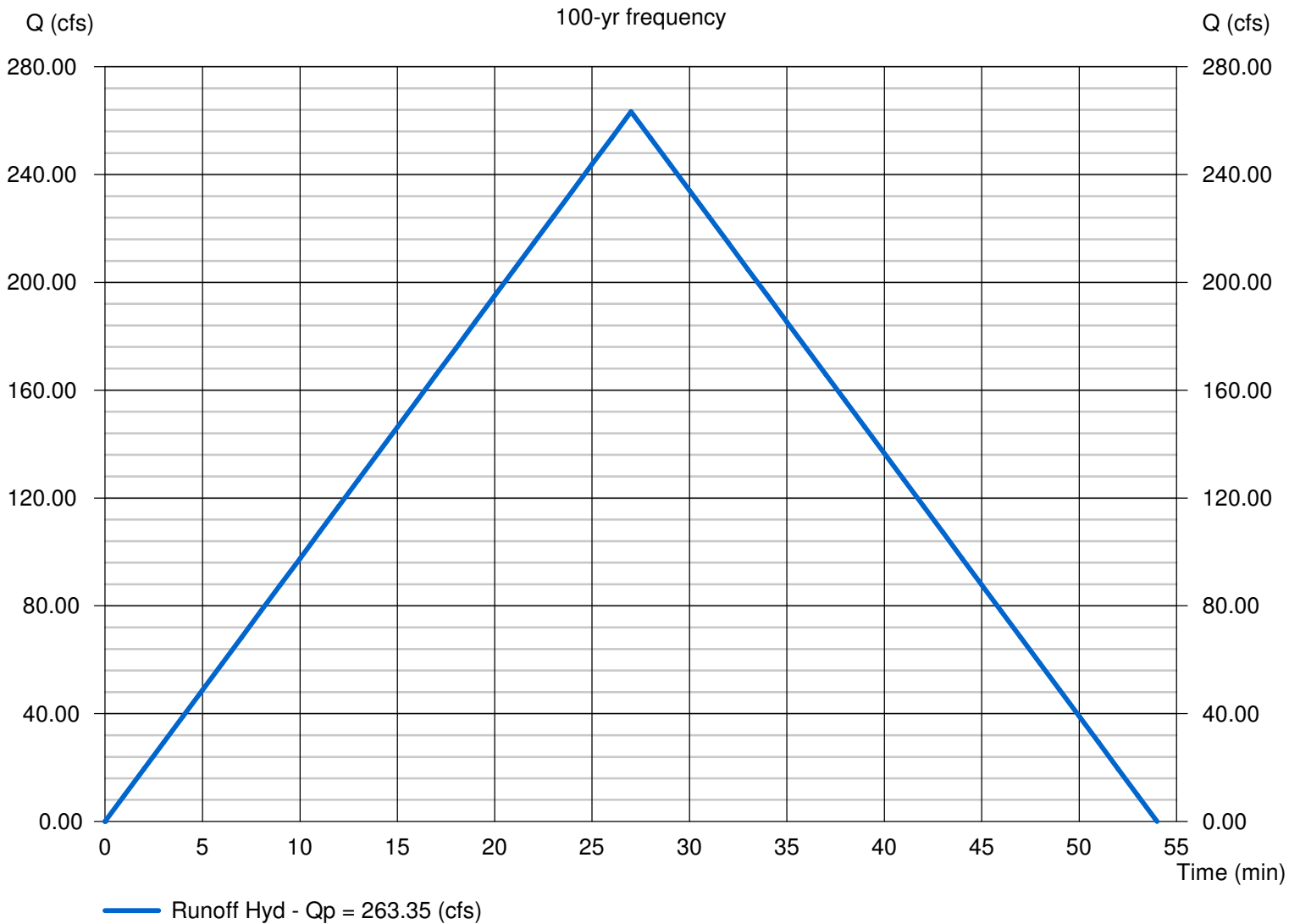
Wednesday, Mar 4 2009

Drainage to Pepperwood

Hydrograph type	= Rational	Peak discharge (cfs)	= 263.35
Storm frequency (yrs)	= 100	Time interval (min)	= 1
Drainage area (ac)	= 63.700	Runoff coeff. (C)	= 0.71
Rainfall Inten (in/hr)	= 5.823	Tc by FAA (min)	= 27
IDF Curve	= ButlerCoKS.IDF	Rec limb factor	= 1.00

Hydrograph Volume = 426,620 (cuft); 9.794 (acft)

Runoff Hydrograph



FAA Formula Tc Worksheet

$$T_c = 1.8(1.1 - C) \times \text{Flow length}^{0.5} / \text{Watercourse slope}^{0.333}$$

Hydraflow Express by Intellisolve

Rational

Drainage to Pepperwood

Description

Flow length (ft) = 1800.00

Watercourse slope (%) = 1.39

Runoff coefficient (C) = 0.71

Time of Conc. (min) = 27