SUPPLEMENTAL CALCULATIONS

LOWE'S SUBDIVISION, LOT 3

01.24.12

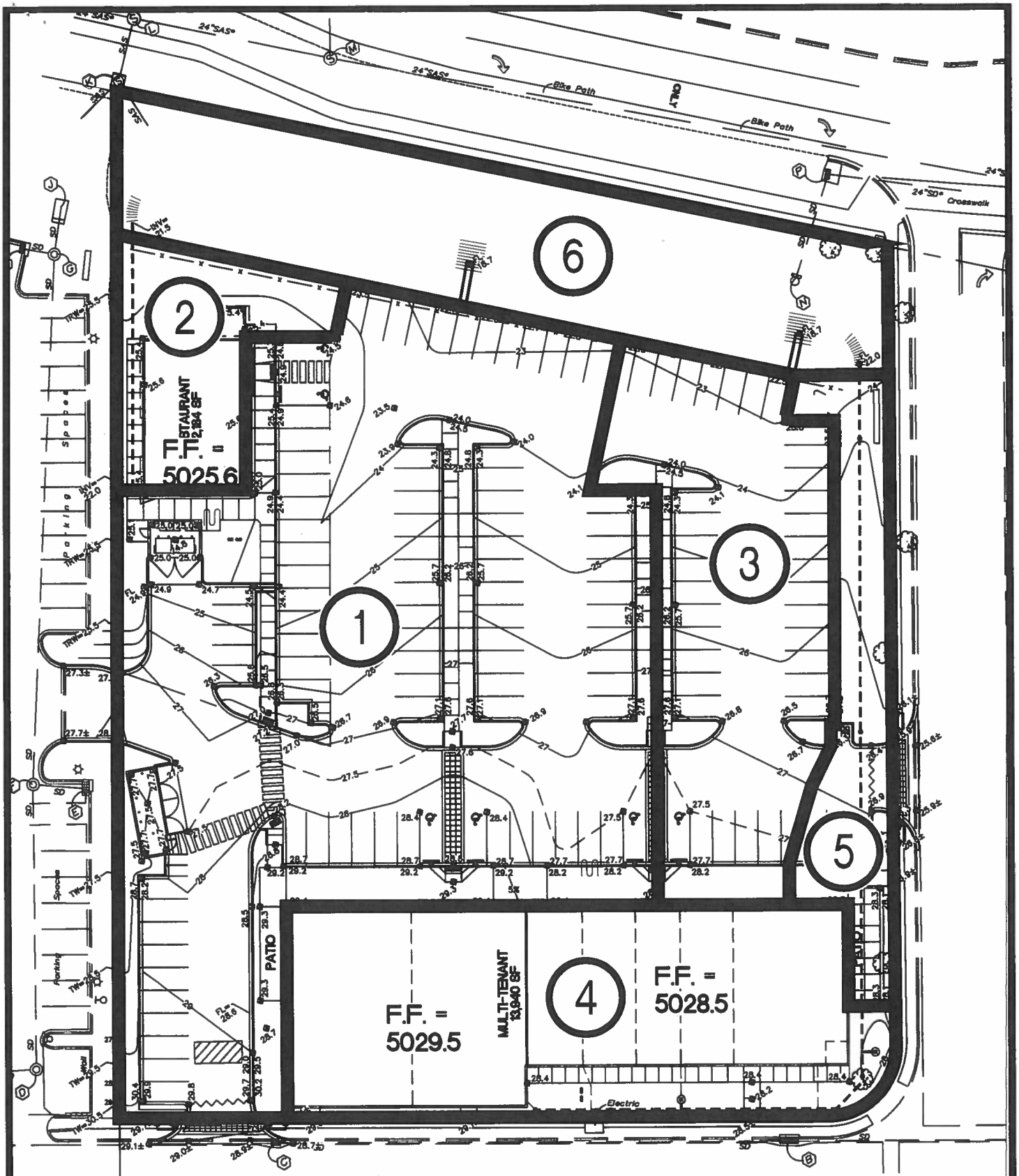
JANUARY 24, 2012

ISAACSON & ARFMAN, P.A.
Consulting Engineering Associates
Albuquerque, New Mexico

1899 CG-101.dwg Jan 24,2012

PROJECT Lowe's Subdivision - Lot 3

JOB NO. 1899 BY BJB DATE 01-24-12



SUB-BASIN EXHIBIT

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North Arrow

AREA OF SITE: 102163 SF = 2.3

100-year, 6-hour

HISTORIC FLOWS:

		Treatment SF	%
Area A	=	20432.6	20%
Area B	=	71514.1	70%
Area C	=	10216.3	10%
Area D	=	0	0%
Total Area	=	102163	100%

DEVELOPED FLOWS:

		Treatment SF	%
Area A	=	0	0%
Area B	=	10216	10%
Area C	=	15324	15%
Area D	=	76622	75%
Total Area	=	102163	100%

EXCESS PRECIP:

Precip. Zone 1

$E_A = 0.44$

$E_B = 0.67$

$E_C = 0.99$

$E_D = 1.97$

On-Site Weighted Excess Precipitation (100-Year, 6-Hour Storm)

$$\text{Weighted } E = \frac{E_A A_A + E_B A_B + E_C A_C + E_D A_D}{A_A + A_B + A_C + A_D}$$

Historic E	=	0.66 in.	Developed E	=	1.69 in.

On-Site Volume of Runoff: V360 = E*A / 12

Historic V_{360}	=	5585 CF	Developed V_{360}	=	14413 CF

On-Site Peak Discharge Rate: $Qp = Q_{pA}A_A + Q_{pB}A_B + Q_{pC}A_C + Q_{pD}A_D / 43{,}560$

For Precipitation Zone 1

Q_{pA}	=	1.29	Q_{pC}	=	2.87
Q_{pB}	=	2.03	Q_{pD}	=	4.37

Historic Q_p	=	4.6 CFS	Developed Q_p	=	9.2 CFS

OVERALL BASIN CALCULATIONS

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BASIN NO. 1	DESCRIPTION	DRAINS TO CENTER RUNDOWN

Area of basin flows = 44900 SF = 1.0 Ac.

The following calculations are based on Treatment areas as shown in table to the right

Sub-basin Weighted Excess Precipitation (see formula above)

Weighted E = 1.89 in.

Sub-basin Volume of Runoff (see formula above)

V_{360} = 7078 CF

Sub-basin Peak Discharge Rate: (see formula above)

Q_P = 4.4 cfs

LAND TREATMENT	
A =	0%
B =	0%
C =	8%
D =	92%

BASIN NO. 2	DESCRIPTION	DRAINS TO PHASE II STORM DRAIN SYSTEM

Area of basin flows = 5254 SF = 0.1 Ac.

The following calculations are based on Treatment areas as shown in table to the right

Sub-basin Weighted Excess Precipitation (see formula above)

Weighted E = 1.69 in.

Sub-basin Volume of Runoff (see formula above)

V_{360} = 741 CF

Sub-basin Peak Discharge Rate: (see formula above)

Q_P = 0.5 cfs

LAND TREATMENT	
A =	0%
B =	10%
C =	15%
D =	75%

BASIN NO. 3	DESCRIPTION	DRAINS TO EAST RUNDOWN

Area of basin flows = 13422 SF = 0.3 Ac.

The following calculations are based on Treatment areas as shown in table to the right

Sub-basin Weighted Excess Precipitation (see formula above)

Weighted E = 1.92 in.

Sub-basin Volume of Runoff (see formula above)

V_{360} = 2149 CF

Sub-basin Peak Discharge Rate: (see formula above)

Q_P = 1.3 cfs

LAND TREATMENT	
A =	0%
B =	0%
C =	5%
D =	95%

BASIN NO. 4	DESCRIPTION	DRAINS TO MAIN STORM DRAIN SYSTEM

Area of basin flows = 17116 SF = 0.4 Ac.

The following calculations are based on Treatment areas as shown in table to the right

Sub-basin Weighted Excess Precipitation (see formula above)

Weighted E = 1.84 in.

Sub-basin Volume of Runoff (see formula above)

V_{360} = 2624 CF

Sub-basin Peak Discharge Rate: (see formula above)

Q_P = 1.6 cfs

LAND TREATMENT	
A =	0%
B =	4%
C =	8%
D =	88%

BASIN NO. 5	DESCRIPTION	DRAINS WITHIN LANDSCAPED AREA TO POND

Area of basin flows = 5888 SF = 0.1 Ac.

The following calculations are based on Treatment areas as shown in table to the right

Sub-basin Weighted Excess Precipitation (see formula above)

Weighted E = 1.48 in.

Sub-basin Volume of Runoff (see formula above)

V_{360} = 727 CF

Sub-basin Peak Discharge Rate: (see formula above)

Q_P = 0.5 cfs

LAND TREATMENT	
A =	0%
B =	15%
C =	30%
D =	55%

BASIN NO. 6	DESCRIPTION	EXISTING POND

Area of basin flows = 15582 SF = 0.4 Ac.

The following calculations are based on Treatment areas as shown in table to the right

Sub-basin Weighted Excess Precipitation (see formula above)

Weighted E = 0.83 in.

Sub-basin Volume of Runoff (see formula above)

V_{360} = 1078 CF

Sub-basin Peak Discharge Rate: (see formula above)

Q_P = 0.9 cfs

LAND TREATMENT	
A =	0%
B =	50%
C =	50%
D =	0%

SUB-BASIN CALCULATIONS

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BASED ON 100-YEAR, 6-HOUR STORM

BASIN 1: 4.4 CFS
Surface drains to proposed 2' bottom width 'U' shaped concrete channel with 1' radius ends. Total opening width = 4.0'. Per Weir Equation ($Q=CLH^{\frac{3}{2}}$) the opening capacity = 4.7 cfs. The depth within the 'U' shaped concrete channel = 0.29' (at 3% slope). See separate channel calculations.

BASIN 2: 0.5 CFS
Approximately 0.4 cfs is discharged to the Phase II storm drain system. At a slope of 0.5%, a 12" storm drain has a full flow capacity of 3± cfs.

BASIN 3: 1.3 CFS
Surface drains to proposed 2' bottom width 'U' shaped concrete channel with 1' radius end (1 side only). Total opening width = 3.0'. Per Weir Equation ($Q=CLH^{\frac{3}{2}}$) the opening capacity = 3.5 cfs. The depth within the 'U' shaped concrete channel = 0.13' (at 3% slope). See separate channel calculations.

BASIN 4: 1.6 CFS
Discharged to the main storm drain system. At a slope of 0.83%, a 12" storm drain has a full flow capacity of 3.8± cfs.

BASIN 5: 0.5 CFS
Surface drains within landscaping to enter pond.

BASIN 6: 0.9 CFS
Captured within existing pond.

SUB-BASIN ANALYSIS

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Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2012 by Autodesk, Inc. Tuesday, Jan 24 2012

<Name> WEST CHANNEL

Rectangular

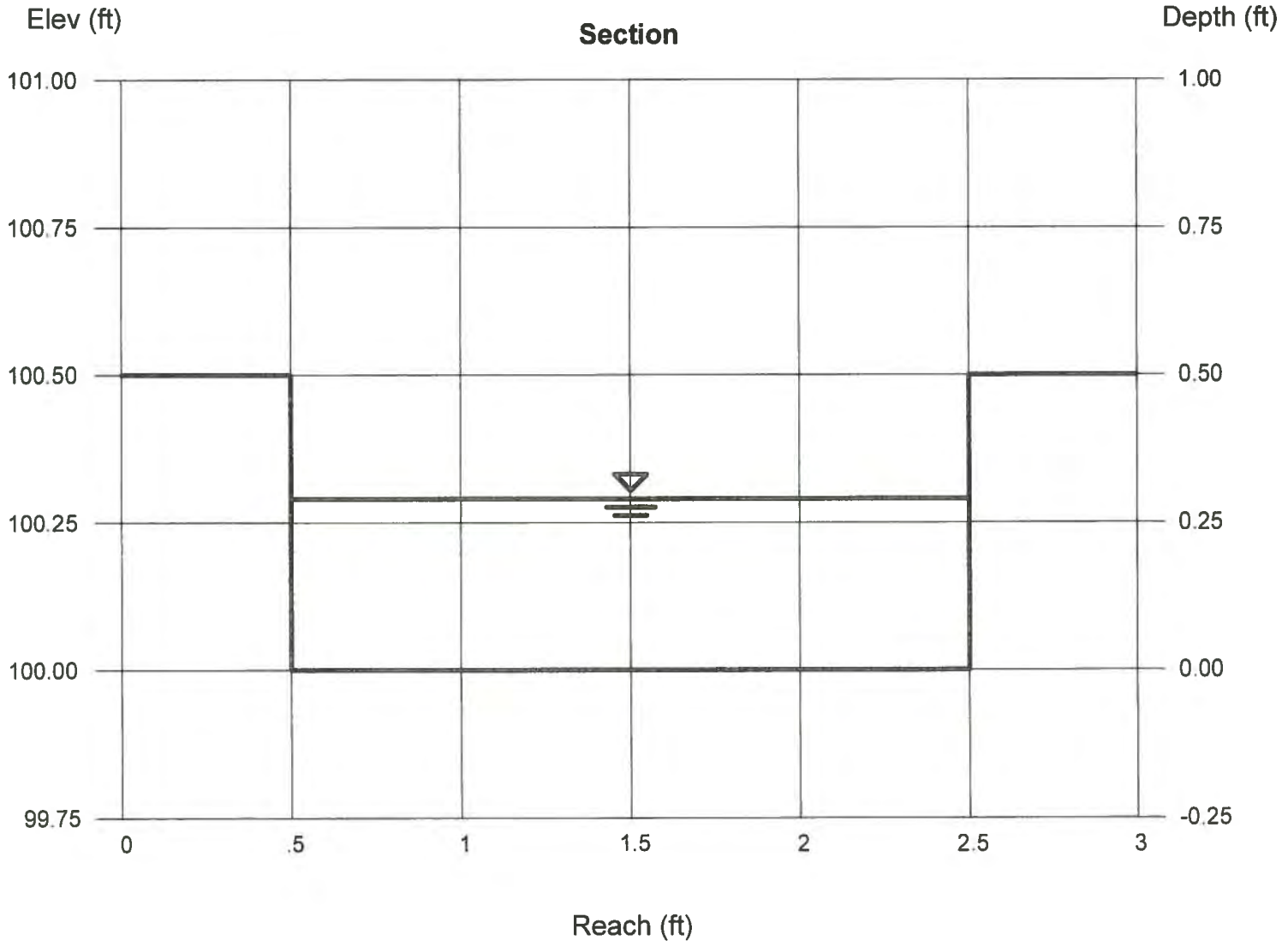
Bottom Width (ft)	= 2.00
Total Depth (ft)	= 0.50
Invert Elev (ft)	= 100.00
Slope (%)	= 3.00
N-Value	= 0.012

Calculations

Compute by:	Known Q
Known Q (cfs)	= 4.40

Highlighted

Depth (ft)	= 0.29
Q (cfs)	= 4.400
Area (sqft)	= 0.58
Velocity (ft/s)	= 7.59
Wetted Perim (ft)	= 2.58
Crit Depth, Yc (ft)	= 0.50
Top Width (ft)	= 2.00
EGL (ft)	= 1.18



Channel Report

Hydraflow Express Extension for AutoCAD® Civil 3D® 2012 by Autodesk, Inc. Tuesday, Jan 24 2012

<Name> EAST CHANNEL

Rectangular

Bottom Width (ft)	= 2.00
Total Depth (ft)	= 0.50
Invert Elev (ft)	= 100.00
Slope (%)	= 3.00
N-Value	= 0.012

Calculations

Compute by:	Known Q
Known Q (cfs)	= 1.30

Highlighted

Depth (ft)	= 0.13
Q (cfs)	= 1.300
Area (sqft)	= 0.26
Velocity (ft/s)	= 5.00
Wetted Perim (ft)	= 2.26
Crit Depth, Yc (ft)	= 0.24
Top Width (ft)	= 2.00
EGL (ft)	= 0.52