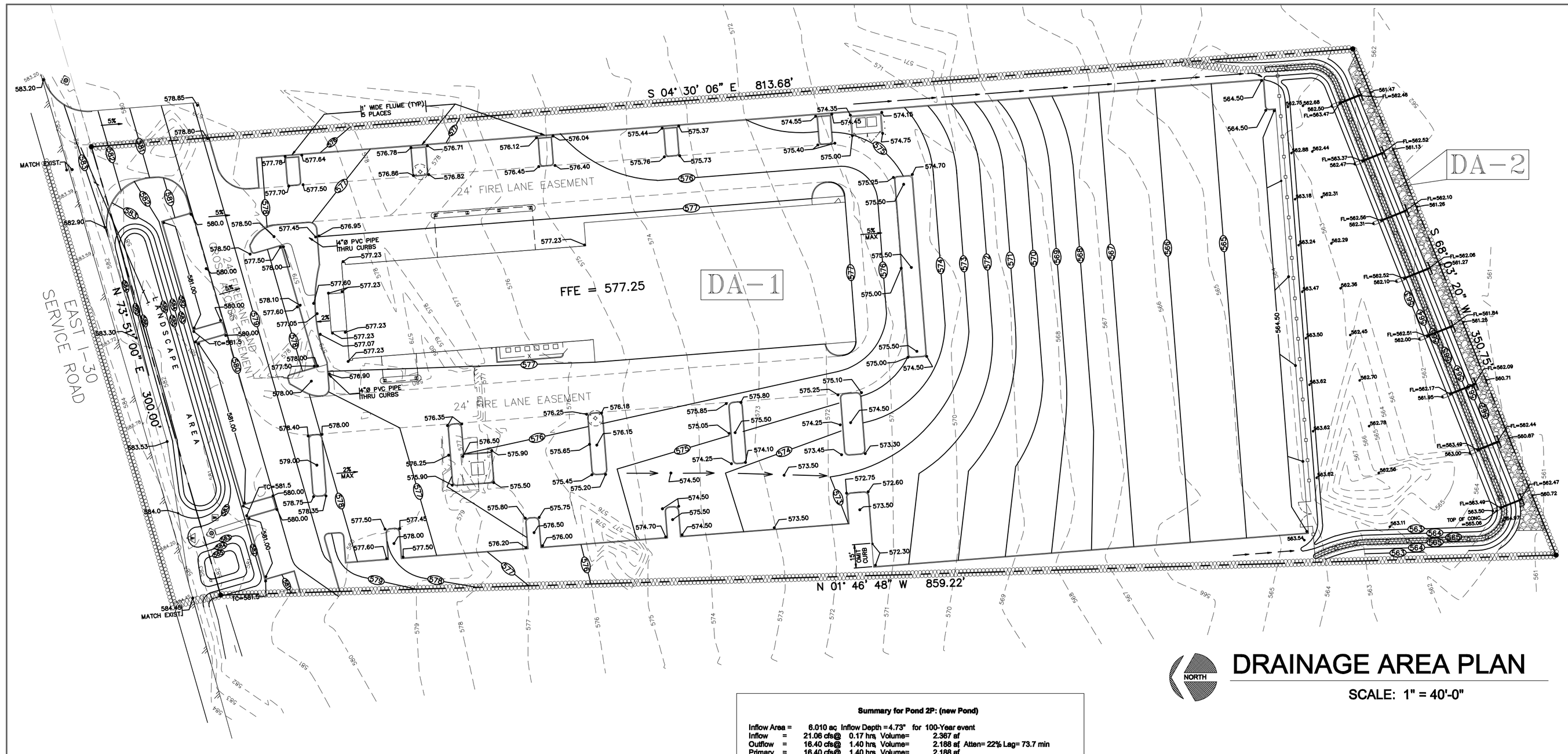


DRAINAGE AREA PLAN

SCALE: 1" = 40'-0"

Summary for Pond 2P: (new Pond)

Inflow Area = 6.010 ac Inflow Depth = 4.73" for 100-Year event
Inflow = 21.06 cfs@ 0.17 hrs Volume= 2.367 af
Outflow = 16.40 cfs@ 1.40 hrs Volume= 2.188 af Atten= 22% Lag= 73.7 min
Primary = 16.40 cfs@ 1.40 hrs Volume= 2.188 af

Routing by Stor-Ind method, Time Span= 0.00-3.00 hrs, dt= 0.01 hrs / 3
Peak Elev= 564.88@ 1.40 hrs Surf.Area= 0.557 acStorage= 1.128 af

Plug-Flow detention time=41.5 min calculated for 2.180 af (92% of inflow)
Center-of-Mass det. time=38.5 min (84.4 - 45.9)

Volume	Invert	Avail.Storage	Storage Description
#1	562.50'	1.201 af	Custom Stage Data (Prismatic)Listed below

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
562.50	0.254	0.000	0.000
563.00	0.460	0.179	0.179
564.00	0.510	0.485	0.664
565.00	0.565	0.538	1.201

Device	Routing	Invert	Outlet Devices
#1	Primary	562.50'	**8.0" x 20.0' long Culvert X 4.00** RCP,sq.cut end projecting, Ke= 0.500 Outlet Invert= 562.00' S= 0.0250 '/' Cc= 0.900 n= 0.011 PVC,smooth interior
#2	Primary	563.50'	**8.0" x 20.0' long Culvert X 4.00** RCP,sq.cut end projecting, Ke= 0.500 Outlet Invert= 562.50' S= 0.0500 '/' Cc= 0.900 n= 0.011 PVC,smooth interior

Primary OutFlow Max=16.40 cfs @ 1.40 hrs HW=564.88' (Free Discharge)
└1=Culvert (Inlet Controls 9.58 cfs @ 6.86 fps)
└2=Culvert (Inlet Controls 6.82 cfs @ 4.89 fps)

2 ~ 50 YR RECURRENCE INTVERVAL STORM RESULTS

PREDEVELOPED CONDITION: Tc=20 min c=0.35 A=6.2 ac

RECURRENCE INTERVAL	2YR	5YR	10YR	25YR	50YR
I (in/hr)	4.00	5.00	5.77	6.64	7.37
Q (cfs)	8.68	10.85	12.52	14.40	16.00

DEVELOPED CONDITION: Tc=10 min c=0.90

RECURRENCE INTERVAL	2YR	5YR	10YR	25YR	50YR
I (in/hr)	5.19	6.19	7.29	8.30	9.00
Q (cfs) INTO POND	28.0	33.43	39.37	44.82	48.60
Q (cfs) FROM POND	4.71	5.27	6.01	7.06	7.95

PEAK DISCHARGE FROM POND IS LESS THAN PREDEVELOPED PEAK DISCHARGES FOR 2YR, 5YR, 10YR, 25YR, AND 50YR RECURRENCE INTERVAL STORMS.

DETENTION POND VOLUME

CALC. CONTOUR	AREA	
562.5	11,083 SF	(0.254 AC)
563.0	20,391 SF	(0.468 AC)
564.0	22,234 SF	(0.514 AC)
565.0	24,610 SF	(0.565 AC)

CHANNEL CAPACITY

V = 1.49/n * (R)^(⅔) * S^(½)
S = 0.25' / 73' = 0.34%
n = 0.04 (RIP-RAP)
R = AREA/WETTED PERIMETER
AREA = (W*z + 3z^(2)) (3:1 SIDESLOPE)
WETTED PERIMETER = W + 6z
z = DEPTH OF NORMAL FLOW

z	A	P	R	V	Q
0.5	2.25	6.16	0.37	0.81	1.83
0.6	2.88	6.79	0.42	1.23	3.53
0.7	3.57	7.43	0.48	1.33	4.76
0.8	4.32	8.06	0.54	1.13	6.19
0.9	5.13	8.69	0.59	1.53	7.84

DEVELOPED DRAINAGE AREA CALCULATION TABLE

#	AREA (Ac)	C	I (in/hr)	Q_{100} (cfs)	DESCRIPTION
DA-1	6.01	0.9	SEE TABLE		DRAINS THROUGH DETENTION POND, LEAVES SOUTH PROPERTY LINE
DA-2	0.19	0.9	9.8	1.67	BYPASS POND DRAINS TO SOUTH PROPERTY LINE

ALLOWABLE PEAK DISCHARGE FROM POND = 18.01 - 1.67 = 16.34

DRAINAGE AREA BOUNDARY

MODIFIED RATIONAL METHOD

UNDEVELOPED PEAK DISCHARGE Q_1

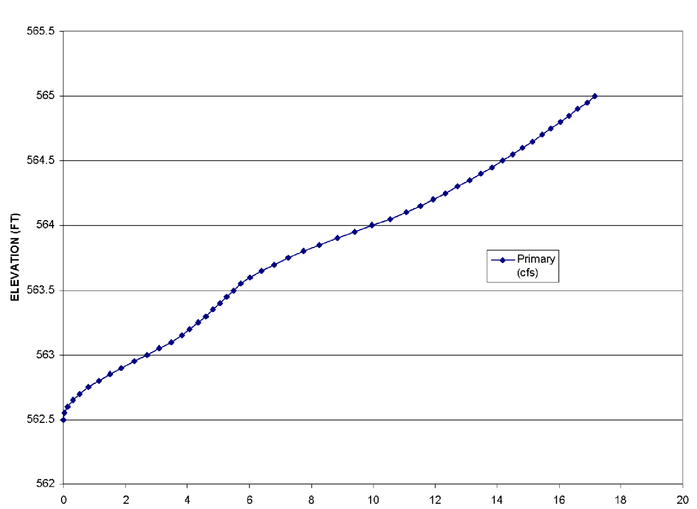
DRAINAGE AREA DA-1 + DA-2 = 6.2 Ac

c= 0.35
Tc= 20 min
I_{100}= 8.3 in/hr
Q_1= 0.35x8.3x6.2= 18.01 cfs

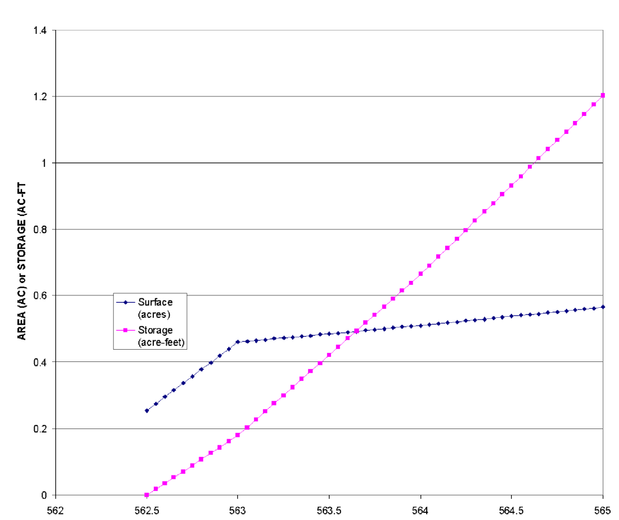
DEVELOPED PEAK DISCHARGE Q_2 = 16.34 cfs

Tc	I (in/hr)	Q_2 (cfs)	V_{in} (ft^3)	V_{out} (ft^3)	$V_{storage}$ (ft^3)
10	9.8	52.9	31,805	9,805	22,000
20	8.3	44.8	53,874	14,707	39,167
30	6.9	37.3	67,180	19,609	47,571
40	5.8	31.32	75,293	24,512	50,782
50	5.0	27.0	81,135	29,414	51,721
60	4.5	24.3	87,626	34,316	53,310
70	4.1	22.14	93,143	39,218	53,925
80	3.9	21.06	101,256	44,121	57,136
90	3.6	19.44	105,161	49,023	56,128

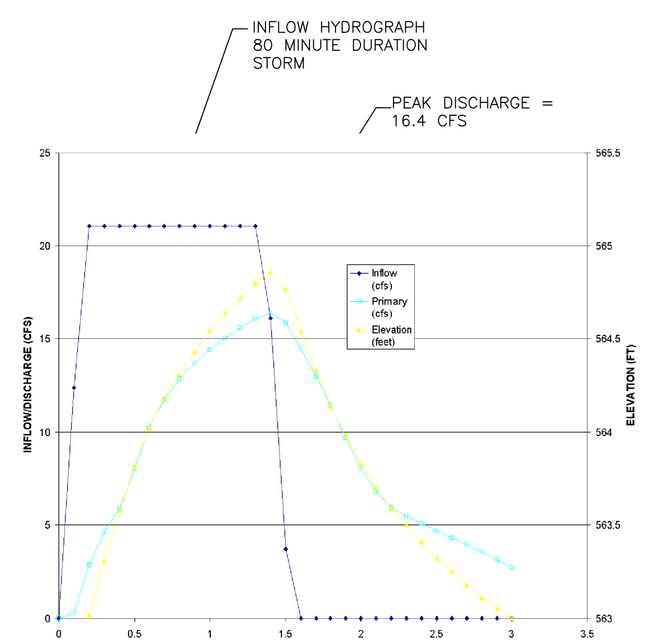
DESIGN DETENTION FACILITIES FOR 80min DURATION STORM WITH PEAK INFLOW INTO POND OF 21.06cfs, PEAK DISCHARGE OUT OF 16.34 cfs OR LESS.



STAGE-DISCHARGE CURVE



STAGE-AREA-STORAGE CURVE



HYDROGRAPH & POND DISCHARGE

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