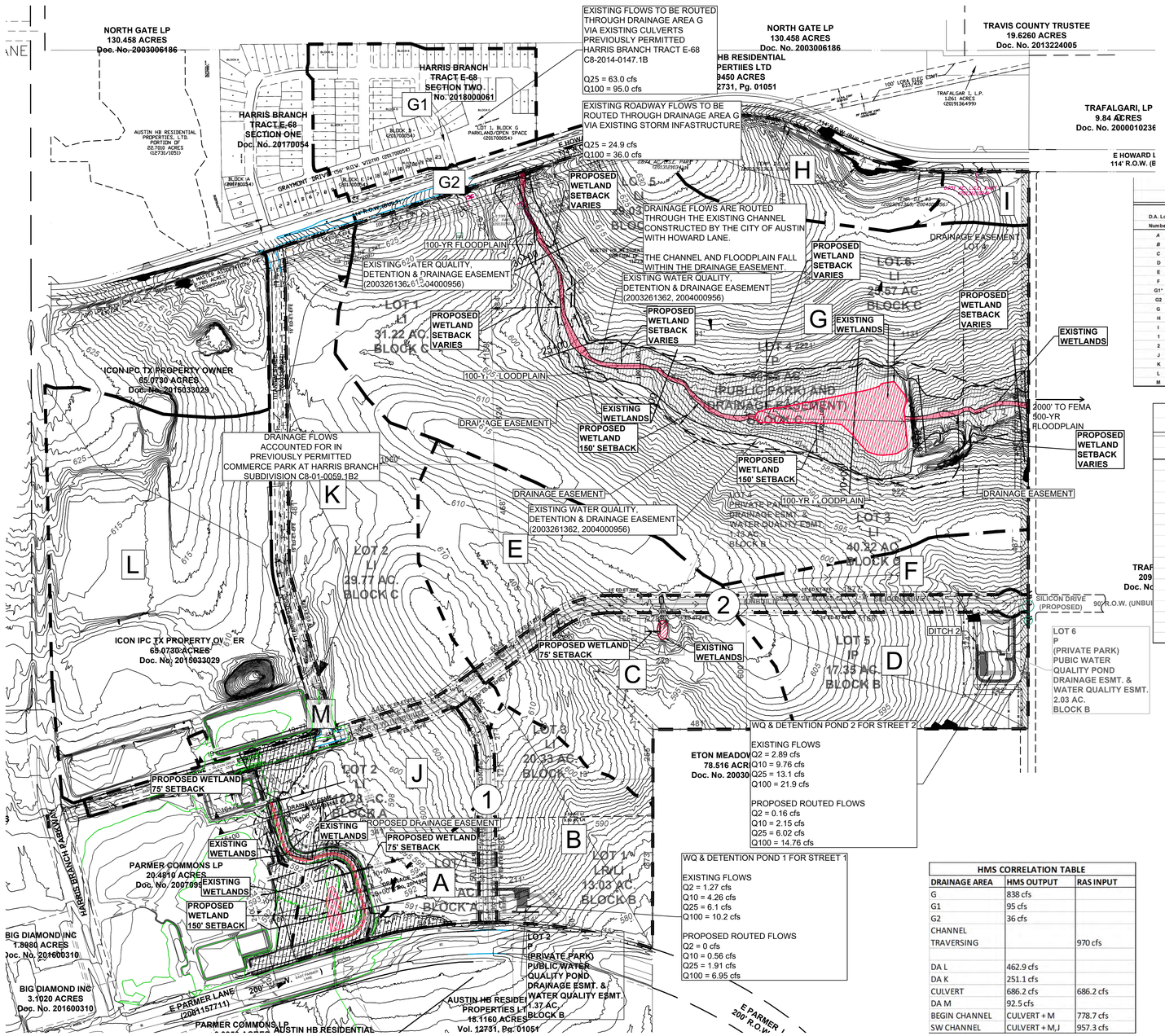

0 300' 600'
SCALE: 1" = 300'

LEGEND

- DRAINAGE BOUNDARY
- A — DRAINAGE AREA IDENTIFIER
- Tc FLOW LINE
- LOCALIZED 100-YR FLOODPLAIN PER AUSTIN CODE (64-ACRES)

HARRIS BRANCH COMMERCE PARK
SCS CN Calculations - Existing (Atlas 14 Basis)

D.A. Lot Number	Drainage Area (SF)	Drainage Area (Ac)	Lot I.C. (SF)	Impervious DA (Ac)	TOTAL I.C. (%)	Comp. SCS CN
A	202,220	4.64	-	0.00	0%	61.00
B	748,930	17.19	-	0.00	0%	61.00
C	869,363	19.96	34,144	0.78	4%	62.45
D	791,335	18.17	-	0.00	0%	61.00
E	888,837	20.40	-	0.00	0%	61.00
F	324,225	7.44	-	0.00	0%	61.00
G1*						
G2	230,448	5.29	144,688	3.32	63%	84.23
G	5,735,783	131.68	164,044	3.77	3%	62.06
H	556,903	12.78	-	0.00	0%	61.00
I	129,523	2.97	-	0.00	0%	61.00
1	104,165	2.39	-	0.00	0%	61.00
2	267,940	6.15	-	0.00	0%	61.00
J	891,997	20.48	-	0.00	0%	61.00
K	1,355,460	31.12	-	0.00	0%	61.00
L	2,119,772	48.66	-	0.00	0%	61.00
M	432,120	9.92	-	0.00	0%	61.00

HARRIS BRANCH COMMERCE PARK
SCS CN Calculations - Developed (Atlas 14 Basis)

D.A. Lot Number	Drainage Area (SF)	Drainage Area (Ac)	Lot I.C. (SF)	Impervious DA (Ac)	TOTAL I.C. (%)	Comp. SCS CN
A	202,220	4.64	161,776	3.71	80%	90.60
B	748,930	17.19	599,144	13.75	80%	90.60
C	869,363	19.96	695,490	15.97	80%	90.60
D	791,335	18.17	633,068	14.53	80%	90.60
E	888,837	20.40	711,070	16.32	80%	90.60
F	324,225	7.44	259,380	5.95	80%	90.60
G1*						
G2	230,448	5.29	144,688	3.32	63%	84.23
G	5,735,783	131.68	4,588,626	105.34	80%	90.60
H	556,903	12.78	445,522	10.23	80%	90.60
I	129,523	2.97	103,618	2.38	80%	90.60
1	104,165	2.39	68,748	1.58	66%	85.42
2	267,940	6.15	179,519	4.12	67%	85.79
J	891,997	20.48	713,597	16.38	80%	90.60
K	1,355,460	31.12	1,084,368	24.89	80%	90.60
L	2,119,772	48.66	1,695,818	38.93	80%	90.60
M	432,120	9.92	292,977	6.73	68%	86.09

HARRIS BRANCH COMMERCE PARK
"Tc" Value Calculations - Existing (Atlas 14 Basis)

D.A. Number	Area (Ac.)	Sheet Flow Length	Slope	n	Tc	Shallow Concentrated Flow (Unpaved) Length	Slope	Velocity	Tc	Channel/Pipe Flow Length	Slope	Velocity	Tc	Total Tc
A	4.64 Ac.	100	2.25%	0.24	13.13 min	815	2.25%	3.0492	4.45 min	0	0.00%	0.0	0.00 min	**17.6 min**
B	17.19 Ac.	100	2.30%	0.24	13.02 min	1389	2.30%	3.0829	7.51 min	0	0.00%	0.0	0.00 min	**20.5 min**
C	19.96 Ac.	100	2.50%	0.24	12.59 min	350	2.50%	3.2142	1.81 min	350	2.50%	3.2	1.81 min	**16.2 min**
D	18.17 Ac.	100	2.50%	0.24	12.59 min	1525	2.50%	3.2142	7.91 min	0	2.50%	3.2	0.00 min	**20.5 min**
E	20.40 Ac.	100	1.40%	0.24	15.87 min	465	1.40%	2.4053	3.22 min	450	1.40%	2.4	3.12 min	**22.2 min**
F	7.44 Ac.	100	2.75%	0.24	12.12 min	610	2.75%	3.3711	3.02 min	540	2.75%	3.4	2.67 min	**17.8 min**
G1*														
G2	5.29 Ac.	125	3.00%	0.24	13.99 min	50	1.50%	2.4897	0.33 min	125	3.00%	3.5	0.59 min	**14.9 min**
G	131.68 Ac.	100	1.50%	0.24	15.44 min	1900	1.50%	2.4897	12.72 min	1200	1.50%	2.5	8.03 min	**36.2 min**
H	12.78 Ac.	100	3.75%	0.24	10.70 min	1098	3.75%	3.9365	4.65 min	0	3.75%	3.9	0.00 min	**15.4 min**
I	2.97 Ac.	100	4.00%	0.24	10.43 min	549	4.00%	4.0656	2.25 min	0	4.00%	4.1	0.00 min	**12.7 min**
1	2.39 Ac.	100	1.75%	0.24	14.52 min	1057	1.75%	2.6892	6.55 min	0	1.50%	2.5	0.00 min	**21.1 min**
2	6.15 Ac.	100	2.00%	0.24	13.76 min	2832	2.00%	2.8748	16.42 min	0	1.75%	2.7	0.00 min	**30.2 min**
J	20.48 Ac.	100	1.50%	0.24	15.44 min	1114	1.75%	2.6892	6.90 min	708	0.48%	1.4	8.38 min	**30.7 min**
K	31.12 Ac.	100	4.00%	0.24	10.43 min	1598	0.75%	1.7605	15.13 min	852	0.70%	1.7	8.35 min	**33.9 min**
L	48.66 Ac.	100	1.33%	0.24	16.20 min	2365	0.89%	1.9178	20.55 min	481	1.30%	2.3	3.31 min	**40.1 min**
M	9.92 Ac.	100	1.00%	0.24	18.16 min	50	1.00%	2.0328	0.41 min	2557	3.00%	3.5	12.10 min	**30.7 min**

EQUATIONS USED:

Sheet Flow
$T_t = [(0.007(nL)^{0.8}] / (P_2)^{0.5}S^{0.4}] * 60$
where: T_t = travel time (Min.)
n = Manning's roughness coefficient
L = sheet flow distance (feet)
P_2 = 2-yr, 24-hr rainfall depth (inches)
= 3.44 inches
S = slope of drainage path (%)

Shallow Concentrated Flow
$V = 16.1345\ S^{0.5}$ (unpaved areas)
$V = 20.3282\ S^{0.5}$ (paved areas)
T_t = [[LV unpaved] + [LV paved]] / 60
where: T_t = travel time (Min.)
V = flow velocity (fps)
L = shallow concentrated flow distance (feet)
S = slope of drainage path (%)

HARRIS BRANCH COMMERCE PARK
"Tc" Value Calculations - Developed (Atlas 14 Basis)

D.A. Number	Area (Ac.)	Sheet Flow Length	Slope	n	Tc	Shallow Concentrated Flow (Unpaved) Length	Slope	Velocity	Tc	Shallow Concentrated Flow (Paved) Length	Slope	Velocity	Tc	Channel/Pipe Flow Length	Slope	Velocity	Tc	Total Tc
A	4.64 Ac.	100	2.25%	0.24	13.13 min	815	2.25%	3.0492	4.45 min					0	0.00%	0.0	0.00 min	**17.6 min**
B	17.19 Ac.	100	2.30%	0.24	13.02 min	1389	2.30%	3.0829	7.51 min					0	0.00%	0.0	0.00 min	**20.5 min**
C	19.96 Ac.	100	2.50%	0.24	12.59 min	350	2.50%	3.2142	1.81 min					350	2.50%	3.2	1.81 min	**16.2 min**
D	18.17 Ac.	100	2.50%	0.24	12.59 min	1525	2.50%	3.2142	7.91 min					0	2.50%	3.2	0.00 min	**20.5 min**
E	20.40 Ac.	100	1.40%	0.24	15.87 min	465	1.40%	2.4053	3.22 min					450	1.40%	2.4	3.12 min	**22.2 min**
F	7.44 Ac.	100	2.75%	0.24	12.12 min	610	2.75%	3.3711	3.02 min					540	2.75%	3.4	2.67 min	**17.8 min**
G1*																		
G2	5.29 Ac.	125	3.00%	0.24	13.99 min	50	1.50%	2.4897	0.33 min	125	3.00%	3.5209	0.59 min					**14.9 min**
G	131.68 Ac.	100	1.50%	0.24	15.44 min	1900	1.50%	2.4897	12.72 min					1200	1.50%	2.5	8.03 min	**36.2 min**
H	12.78 Ac.	100	3.75%	0.24	10.70 min	1098	3.75%	3.9365	4.65 min					0	3.75%	3.9	0.00 min	**15.4 min**
I	2.97 Ac.	100	4.00%	0.24	10.43 min	549	4.00%	4.0656	2.25 min					0	4.00%	4.1	0.00 min	**12.7 min**
1	2.39 Ac.	50	1.58%	0.011	0.20 min					200	1.58%	2.5552	1.30 min	1000	2.00%	2.9	5.80 min	**7.3 min**
2	6.15 Ac.	50	1.50%	0.011	0.21 min					200	1.50%	2.4897	1.34 min	1000	1.75%	2.7	6.20 min	**7.7 min**
J	20.48 Ac.	150	3.00%	0.01	1.27 min	300	3.00%	3.5209	1.42 min					400	1.80%	2.7	2.44 min	**5.1 min**
K	31.12 Ac.	150	0.70%	0.01	2.28 min	300	0.70%	1.7008	2.94 min					1950	1.00%	2.0	15.99 min	**21.2 min**
L	48.66 Ac.	150	1.00%	0.01	1.98 min	300	1.00%	2.0328	2.46 min					800	0.50%	1.4	9.28 min	**13.7 min**
M	9.92 Ac.	150	1.00%	0.01	1.98 min	50	1.00%	2.0328	0.41 min					2557	3.00%	3.5	12.10 min	**14.5 min**

HMS CORRELATION TABLE

DRAINAGE AREA	HMS OUTPUT	RAS INPUT
G	838 cfs	
G1	95 cfs	
G2	36 cfs	
CHANNEL TRAVERSING		970 cfs
DA L	462.9 cfs	
DA K	251.1 cfs	
CULVERT	686.2 cfs	686.2 cfs
DA M	92.5 cfs	
BEGIN CHANNEL	CULVERT + M	778.7 cfs
SW CHANNEL	CULVERT + M,J	957.3 cfs

HARRIS BRANCH COMMERCE PARK
Runoff (Q) Calculations - Existing (Atlas 14 Basis)

D.A. Number	Drainage Area (Ac)	Comp. SCS CN	TOTAL T_c (Min.)	Q_{25} (cfs)	Q_{100} (cfs)
A	4.64	61.00	17.6	13.1	21.8
B	17.19	61.00	20.5	45.3	75.1
C	19.96	62.45	16.2	63.8	102.5
D	18.17	61.00	20.5	47.8	79.2
E	20.40	61.00	22.2	51.1	85.3
F	7.44	61.00	17.8	20.7	34.5
G**	131.68	62.06	36.2	356.1	528.7
H	12.78	61.00	15.4	38.7	63.8
I	2.97	61.00	12.7	9.7	16.1
1	2.39	61.00	21.1	6.1	10.2
2	6.15	61.00	30.2	13.1	21.9
J	20.48	61.00	30.7	58.1	93.2
K	31.12	61.00	33.9	82.2	136.1
L	48.66	61.00	40.1	117.5	194.4
M	9.92	61.00	30.7	27.2	45.1

*Per COA Development Permit C8-2014-0147.2A
**FLOWS INCLUDING UPSTREAM OFFSITE (G1 & G2)

HARRIS BRANCH COMMERCE PARK
Runoff (Q) Calculations - Developed (Atlas 14 Basis)

D.A. Number	Drainage Area (Ac)	Comp. SCS CN	TOTAL T_c (Min.)	Q_{25} (cfs)	Q_{100} (cfs)
A	4.64	90.60	17.6	30.3	39.9
B	17.19	90.60	20.5	107.6	141.5
C	19.96	90.60	16.2	133.3	175.4
D	18.17	90.60	20.5	113.6	149.4
E	20.40	90.60	22.2	122.7	161.6
F	7.44	90.60	17.8	48.1	63.3
G**	131.68	90.60	36.2	722.7	970
H	12.78	90.60	15.4	88.6	116.6
I	2.97	90.60	12.7	22.2	29.2
1	2.39	85.42	7.3	19.3	25.6
2	6.15	85.79	7.7	31.6	42.1
J	20.48	90.60	5.2	196.6	258.7
K	31.12	90.60	21.4	190.8	251.1
L	48.66	90.60	13.9	352.0	462.9
M	9.92	86.09	14.6	70.3	92.5

*Per COA Development Permit C8-2014-0147.2A INCLUDING UPSTREAM OFFSITE (G1 & G2) **FLOWS

HARRIS BRANCH COMMERCE PARK
Street 1 WQP Preliminary Design

Water Quality Pond Drainage Area		104,165 SF
		2.391 acres
Impervious Cover	=	68,748 SF
	=	1.578 acres
% Impervious Cover	=	66.0%
Required Capture Depth	=	0.96 in = 0.5" + (66.%-20%)*.01
Minimum Water Quality Volume	=	**8,333 CF**

OVERFLOW WEIR DESIGN

Provided Overflow Elevation	=	588.00
Top of Box Elevation	=	590.00
Total WQ Pond Volume Provided	=	**20,168 CF @ overflow (weir)**
Using the weir flow equation: Q = C*L*H^(3/2)		
Q = 100 year developed flow into splitter box (cfs)		19.8
C = Weir coefficient		3.0
L = Width of weir (feet)		100.0
H = Depth of flow (feet)		0.16
Max. WSE_{100} in Box	=	588.16

HARRIS BRANCH COMMERCE PARK
Street 2 WQP Preliminary Design

Water Quality Pond Drainage Area		267,940 SF
		6.151 acres
Impervious Cover	=	179,519 SF
	=	4.121 acres
% Impervious Cover	=	67.0%
Required Capture Depth	=	0.97 in = 0.5" + (67.%-20%)*.01
Minimum Water Quality Volume	=	**21,658 CF**

OVERFLOW WEIR DESIGN

Provided Overflow Elevation	=	581.00
Top of Box Elevation	=	583.00
Total WQ Pond Volume Provided	=	**35,431 CF @ overflow (weir)**
Using the weir flow equation: Q = C*L*H^(3/2)		
Q = 100 year developed flow into splitter box (cfs)		51.0
C = Weir coefficient		3.0
L = Width of weir (feet)		110.0
H = Depth of flow (feet)		0.29
Max. WSE_{100} in Box	=	581.29

HARRIS BRANCH COMMERCE PARK
Post Developed Flows (Q) Leaving Pond

	Q_2	Q_{10}	Q_{25}	Q_{100}
POND 1	0	0.56	1.91	6.95
POND 2	0.16	2.15	6.02	14.8

HARRIS BRANCH COMMERCE PARK
Runoff (Q) Calculations (Proposed Conditions)

D.A. Number	Drainage Area (Ac)	Comp. SCS CN	TOTAL T_c (Min.)	Q_{100} (cfs)	avg. slope
DRAINAGE AREA E TO DITCH	20.40	90.60	22.2	**126.910**	1.40%
DRAINAGE AREA F TO DITCH	7.44	90.60	17.8	**50.070**	2.75%

HARRIS BRANCH COMMERCE PARK
Ditch Easement Width Calculation

Ditch Number	Btm. Width (ft)	Slope %	Depth (ft)	Q_{100} (cfs)	Area (sqft)	Veloc. (ft/s)	Wp (ft)	Yc (ft)	Top Width (ft)	Energy (ft)	Min. Ditch Easment (ft)
DITCH 1	25	2.00%	2.84	126.91	87.13	1.46	38.00	0.91	36.36	2.87	41
DITCH 2	25	0.50%	2.50	50.07	75.00	0.68	36.44	0.50	35.00	2.51	41

WETLANDS & CEF NOTE

1) SEE EXHIBIT 'G' FOR EXISTING WETLANDS, AND EXHIBIT 'H' FOR PROPOSED WETLAND SETBACKS AND MITIGATION.

PRELIMINARY SUBDIVISION APPROVAL SHEET ___ OF ___.
FILE NUMBER _____ APPLICATION DATE _____
APPROVED BY LAND USE COMMISSION ON _____
EXPIRATION DATE (LDC 25-4-62) _____
CASE MANAGER:

JUAN ENRIQUEZ for:
Jose Roig, Interim Director, Development Services Department

Final plats must be recorded by the expiration Date. Subsequent Site Pans which do not comply with the Code current at the time of filing, and require Building permits or notice of construction (if a building permit is not required), must also be approved prior to the Project Expiration Date.

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11-18-22
STATE OF TEXAS
CHARLES E. STEINMAN
64410
REGISTERED PROFESSIONAL ENGINEER

HARRIS BRANCH COMMERCE PARK
ONSITE FLOODPLAIN AND DRAINAGE AREA MAP

HARRIS BRANCH
AUSTIN HB RESIDENTIAL PROPERTIES, LTD

Project No.: 10502.02
SHEET
F1