By ___ Date ___ Page ___ Of ___ BAUGHMAN COMPANY, P.A.

Existing Flow Rates

Auburn Hills 3rd Addition

Area = 9.2 acres C = 0.4 T_c = 15 min

Q_{100} = 27 cfs

Auburn Hills Commercial Addition

Area = 12.6 acres C = 0.4 T_c = 15 min

Q_{100} = 37.1

Net existing from both sites = 64 cfs

Auburn Hills 3rd SWS Allows 20 cfs to be released backyard from Auburn Hills 3rd releases 7 cfs

total from Auburn Hills 3rd = 27 cfs

Allowable Release from Auburn Hills Commercial = 64 − 27 = 37 cfs

Lot 3 Auburn Hills Commercial allows 5 cfs to drain to Maple.

Allowable discharge from detention pond = 32 cfs

24" RCP as outlet allows the release of 26 cfs

Net change in Q_{100} = 6 cfs lower

```
1****************************************
*                                       *
*  FLOOD HYDROGRAPH PACKAGE  (HEC-1)    *
*            MAY   1991                 *
*          VERSION 4.0.1E               *
*   Lahey F77L-EM/32 version 5.01       *
*     Dodson & Associates, Inc.         *
*  RUN DATE  05/22/97  TIME  09:39:30   *
*****************************************

*****************************************
*                                       *
*   U.S. ARMY CORPS OF ENGINEERS        *
*   HYDROLOGIC ENGINEERING CENTER       *
*        609 SECOND STREET              *
*     DAVIS, CALIFORNIA 95616           *
*          (916) 551-1748               *
*                                       *
*****************************************

     X     X  XXXXXXX   XXXXX         X
     X     X  X        X     X       XX
     X     X  X        X              X
     XXXXXXX  XXXX     X      XXXXX   X
     X     X  X        X              X
     X     X  X        X     X        X
     X     X  XXXXXXX   XXXXX        XXX

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL   LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1                                  HEC-1 INPUT                                         PAGE  1

 LINE      ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

   1       ID  AUBURN HILLS COMMERCIAL DETENTION
   2       IT      5 22MAY97    00000      300
   3       IO      3       0
           *

   4       KK  AUBCOM
   5       BA    .018
   6       PH      0       0   0.86  1.8425   3.73     4.6    5.04    5.94    6.96    8.16
   7       UD     .15
   8       LS      0      91
           *

   9       KK   POND
  10       RS      1    ELEV      39
  11       SA     .8     1.0
  12       SE     39    43.0
  13       SL   39.5    3.14     .67      .5
  14       SS   42.5      10    2.86     1.5
           *
  15       ZZ
```

35

```
1****************************************
*                                       *
*  FLOOD HYDROGRAPH PACKAGE  (HEC-1)    *
*            MAY   1991                 *
*          VERSION 4.0.1E               *
*   Lahey F77L-EM/32 version 5.01       *
*     Dodson & Associates, Inc.         *
*  RUN DATE  05/22/97  TIME  09:39:30   *
*****************************************

*****************************************
*                                       *
*   U.S. ARMY CORPS OF ENGINEERS        *
*   HYDROLOGIC ENGINEERING CENTER       *
*        609 SECOND STREET              *
*     DAVIS, CALIFORNIA 95616           *
*          (916) 551-1748               *
*                                       *
*****************************************

                    AUBURN HILLS COMMERCIAL DETENTION

 3 IO        OUTPUT CONTROL VARIABLES
                  IPRNT          3  PRINT CONTROL
                  IPLOT          0  PLOT CONTROL
                  QSCAL         0.  HYDROGRAPH PLOT SCALE

   IT        HYDROGRAPH TIME DATA
                   NMIN          5  MINUTES IN COMPUTATION INTERVAL
                  IDATE    22MAY97  STARTING DATE
                  ITIME       0000  STARTING TIME
                     NQ        300  NUMBER OF HYDROGRAPH ORDINATES
                 NDDATE    23MAY97  ENDING DATE
                 NDTIME       0055  ENDING TIME
                  ICENT         19  CENTURY MARK

              COMPUTATION INTERVAL   0.08 HOURS
                   TOTAL TIME BASE  24.92 HOURS

        ENGLISH UNITS
              DRAINAGE AREA         SQUARE MILES
              PRECIPITATION DEPTH   INCHES
              LENGTH, ELEVATION     FEET
              FLOW                  CUBIC FEET PER SECOND
              STORAGE VOLUME        ACRE-FEET
              SURFACE AREA          ACRES
              TEMPERATURE           DEGREES FAHRENHEIT

*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

              **************
              *            *
   4 KK       *   AUBCOM   *
              *            *
              **************

               SUBBASIN RUNOFF DATA

   5 BA         SUBBASIN CHARACTERISTICS
                     TAREA        0.02  SUBBASIN AREA

                PRECIPITATION DATA

   6 PH                           DEPTHS FOR  0-PERCENT HYPOTHETICAL STORM
                ..... HYDRO-35 ......   ............... TP-40 ...............   ........... TP-49 ...........
                5-MIN  15-MIN  60-MIN   2-HR   3-HR   6-HR  12-HR  24-HR   2-DAY  4-DAY  7-DAY  10-DAY
                 0.86    1.84    3.73   4.60   5.04   5.94   6.96   8.16    0.00   0.00   0.00    0.00

                                           STORM AREA =   0.02

   8 LS         SCS LOSS RATE
                    STRTL        0.20  INITIAL ABSTRACTION
                   CRVNBR       91.00  CURVE NUMBER
                    RTIMP        0.00  PERCENT IMPERVIOUS AREA

   7 UD         SCS DIMENSIONLESS UNITGRAPH
                     TLAG        0.15  LAG

                                          ***

                                        UNIT HYDROGRAPH
                                    11 END-OF-PERIOD ORDINATES
               17.       44.       39.       20.       10.        5.        2.        1.        1.        0.
                0.

     ***           ***           ***           ***           ***

                      HYDROGRAPH AT STATION   AUBCOM

   TOTAL RAINFALL =   8.16, TOTAL LOSS =    1.08, TOTAL EXCESS =    7.08

  PEAK FLOW      TIME                       MAXIMUM AVERAGE FLOW
                                  6-HR        24-HR        72-HR      24.92-HR
+   (CFS)        (HR)
                            (CFS)
+     75.       12.17                 11.          3.           3.           3.
                         (INCHES)   5.561        7.082        7.082        7.082
                          (AC-FT)      5.           7.           7.           7.

                     CUMULATIVE AREA =     0.02 SQ MI

*** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** *** ***

              **************
              *            *
   9 KK       *    POND    *
              *            *
              **************

               HYDROGRAPH ROUTING DATA

  10 RS         STORAGE ROUTING
                    NSTPS          1  NUMBER OF SUBREACHES
                     ITYP       ELEV  TYPE OF INITIAL CONDITION
                   RSVRIC      39.00  INITIAL CONDITION
                        X       0.00  WORKING R AND D COEFFICIENT

  11 SA            AREA          0.8        1.0

  12 SE         ELEVATION      39.00      43.00

  13 SL         LOW-LEVEL OUTLET
                    ELEVL      39.50  ELEVATION AT CENTER OF OUTLET
                    CAREA       3.14  CROSS-SECTIONAL AREA
                     COQL       0.67  COEFFICIENT
                     EXPL       0.50  EXPONENT OF HEAD

  14 SS         SPILLWAY
                     CREL      42.50  SPILLWAY CREST ELEVATION
                    SPWID      10.00  SPILLWAY WIDTH
                     COQW       2.86  WEIR COEFFICIENT
                     EXPW       1.50  EXPONENT OF HEAD

                                          ***

                              COMPUTED STORAGE-ELEVATION DATA

           STORAGE      0.00      3.59
         ELEVATION     39.00     43.00

                              COMPUTED OUTFLOW-ELEVATION DATA

           OUTFLOW      0.00      0.00     16.48     17.57     18.82     20.27     21.95     23.93     26.32     29.22
         ELEVATION     39.00     39.50     40.45     40.58     40.74     40.94     41.19     41.51     41.93     42.50

           OUTFLOW     29.52     29.84     30.34     31.05     32.01     33.24     34.79     36.69     38.97     41.68
         ELEVATION     42.53     42.55     42.59     42.62     42.67     42.72     42.78     42.85     42.92     43.00

                          COMPUTED STORAGE-OUTFLOW-ELEVATION DATA

           STORAGE      0.00      0.41      1.21      1.33      1.47      1.65      1.87      2.16      2.56      3.10
           OUTFLOW      0.00      0.00     16.48     17.57     18.82     20.27     21.95     23.93     26.32     29.22
         ELEVATION     39.00     39.50     40.45     40.58     40.74     40.94     41.19     41.51     41.93     42.50

           STORAGE      3.13      3.15      3.18      3.22      3.26      3.32      3.37      3.44      3.51      3.59
           OUTFLOW     29.52     29.84     30.34     31.05     32.01     33.24     34.79     36.69     38.97     41.68
         ELEVATION     42.53     42.55     42.59     42.62     42.67     42.72     42.78     42.85     42.92     43.00

     ***           ***           ***           ***           ***

                      HYDROGRAPH AT STATION     POND

  PEAK FLOW      TIME                       MAXIMUM AVERAGE FLOW
                                  6-HR        24-HR        72-HR      24.92-HR
+   (CFS)        (HR)
                            (CFS)
+     26.       12.58                 11.          3.           3.           3.
                         (INCHES)   5.519        6.645        6.645        6.645
                          (AC-FT)      5.           6.           6.           6.

 PEAK STORAGE    TIME                      MAXIMUM AVERAGE STORAGE
                                  6-HR        24-HR        72-HR      24.92-HR
+  (AC-FT)       (HR)
       3.       12.58                  1.          0.           0.           0.

  PEAK STAGE     TIME                       MAXIMUM AVERAGE STAGE
                                  6-HR        24-HR        72-HR      24.92-HR
+   (FEET)       (HR)
    41.91       12.58              40.27        39.59        39.57        39.57

                     CUMULATIVE AREA =     0.02 SQ MI

                                   RUNOFF SUMMARY
                             FLOW IN CUBIC FEET PER SECOND
                         TIME IN HOURS,  AREA IN SQUARE MILES

                                PEAK    TIME OF    AVERAGE FLOW FOR MAXIMUM PERIOD      BASIN    MAXIMUM    TIME OF
+    OPERATION      STATION     FLOW     PEAK                                            AREA     STAGE    MAX STAGE
                                                    6-HOUR     24-HOUR     72-HOUR

     HYDROGRAPH AT
+                    AUBCOM      75.     12.17        11.         3.          3.         0.02

     ROUTED TO
+                      POND      26.     12.58        11.         3.          3.         0.02
+                                                                                                 41.91      12.58

*** NORMAL END OF HEC-1 ***
```

DOT Report

Pipe	-Node- Upstream Downstream	Inlet Area (acres)	Inlet CA (acres)	Total CA (acres)	-Ground- Upstream Downstream (ft)	-HGL- Upstream Downstream (ft)	-Slope- Energy Constructed (ft/ft)	-Section- Discharge Capacity (cfs)	-Section- Shape Size	Length (ft)	Average Velocity (ft/s)	Description
P-7	I-6	0.80	0.43	0.43	143.30	143.41	0.000934	3.21	Circular	121.00	1.82	
	I-7				143.30	143.30	0.003306	6.04	18 inch			
P-8	I-7	0.50	0.27	0.70	143.30	143.77	0.002327	5.07	Circular	205.00	2.87	
	I-8				143.30	143.30	0.002927	5.68	18 inch			
P-9	I-8	0.50	0.27	0.97	143.30	143.18	0.004205	6.81	Circular	87.00	3.85	
	I-9				144.00	142.82	0.003448	6.17	18 inch			
P-10	I-9	2.30	1.24	2.21	144.00	142.63	0.004622	15.38	Circular	34.00	4.90	
	I-10				144.00	142.47	0.002941	12.27	24 inch			
P-11	I-10	0.80	0.43	2.65	144.00	142.21	0.006415	18.33	Circular	178.00	5.98	
	I-11				144.60	141.01	0.002247	10.72	24 inch			
P-12	I-11	2.00	1.08	3.73	144.60	140.62	0.011649	25.52	Circular	170.00	6.14	
	Outlet				142.00	139.00	0.022941	62.12	30 inch			

Project Title: LARK 6TH SYSTEM 1
f:\hydro\projects\lark6\system2.stm
05/21/97 11:10:28 AM © Haestad Methods, Inc. 37 Brookside Road Waterbury, CT 06708 USA (203) 755-1666
Baughman Company, P.A.
Project Engineer: Baughman Company, P.A.
StormCAD v1.0
Page 1 of 1

Pipe Report

Pipe	Upstream Node	Downstream Node	Weighted Roughness Coefficient	Section Size	Roughness	Constructed Slope (ft/ft)	Length (ft)	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Upstream Ground Elevation (ft)	Inlet Area (acres)	Total CA (acres)
P-20	I-20	I-19	0.54	18 inch	0.013	0.028070	114.00	140.00	136.80	143.00	1.80	0.97
P-28	I-15	I-16	0.54	18 inch	0.013	0.002747	182.00	140.90	140.40	143.70	0.90	0.49
P-16	I-17	I-16	0.54	18 inch	0.013	0.002941	34.00	140.40	140.30	144.10	2.10	1.13
P-17	I-16	I-14	0.54	24 inch	0.013	0.001976	253.00	140.20	139.70	144.10	2.60	3.02
P-27	I-12	I-13	0.54	18 inch	0.013	0.003082	292.00	140.90	140.00	144.40	0.90	0.49
P-14	I-13	I-14	0.54	24 inch	0.013	0.001176	85.00	139.50	139.40	145.20	0.00	0.49
P-18	I-14	I-18	0.54	36 inch	0.013	0.002778	36.00	139.30	139.20	144.50	2.20	4.70
P-19	I-18	I-19	0.54	36 inch	0.013	0.010185	216.00	139.00	136.80	144.50	1.80	5.67
P-21	I-19	J-2	0.54	36 inch	0.013	0.001538	130.00	136.60	136.40	141.00	0.90	7.13
P-22	J-2	Outlet	N/A	36 inch	0.013	0.016667	60.00	136.00	135.00	141.00	N/A	7.13

Project Title: LARK 6TH SYSTEM 1
f:\hydro\projects\lark6\system3.stm
05/21/97 11:09:07 AM © Haestad Methods, Inc. 37 Brookside Road Waterbury, CT 06708 USA (203) 755-1666
Baughman Company, P.A.
Project Engineer: Baughman Company, P.A.
StormCAD v1.0
Page 1 of 1

Node Report

Node	Inlet Area (acres)	Weighted Roughness Coefficient	Ground Elevation (ft)	Inlet CA (acres)	External CA (acres)	Carryover (cfs)	Total CA (acres)	Additional Flow (cfs)	Inlet TC (min)	Known Flow (cfs)	External TC (min)	Upstream Flow Time (min)	System Flow Time (min)
I-20	1.80	0.54	143.00	0.97	0.00	0.00	0.97	0.00	15.00	0.00	0.00	0.00	15.00
I-15	0.90	0.54	143.70	0.49	0.00	0.00	0.49	0.00	15.00	0.00	0.00	0.00	15.00
I-17	2.10	0.54	144.10	1.13	0.00	0.00	1.13	0.00	15.00	0.00	0.00	0.00	15.00
I-16	2.60	0.54	144.10	1.40	0.00	0.00	3.02	0.00	15.00	0.00	0.00	17.53	17.53
I-12	0.80	0.54	144.40	0.49	0.00	0.00	0.49	0.00	15.00	0.00	0.00	0.00	15.00
I-13	0.00	0.54	145.20	0.00	0.00	0.00	0.49	0.00	15.00	2.00	0.00	17.27	17.27
I-14	2.20	0.54	144.50	1.19	0.00	0.00	4.70	0.00	15.00	2.00	0.00	18.50	18.50
I-18	1.80	0.54	144.50	0.97	0.00	0.00	5.67	0.00	15.00	2.00	0.00	18.63	18.63
I-19	0.90	0.54	141.00	0.49	0.00	0.00	7.13	0.00	15.00	2.00	0.00	19.39	19.39
J-2	N/A	N/A	141.00	N/A	N/A	N/A	7.13	N/A	N/A	N/A	0.00	19.95	19.95
Outlet	N/A	N/A	140.00	N/A	N/A	N/A	7.13	N/A	N/A	N/A	0.00	20.23	20.23

Pipe Report

Pipe	Upstream Node	Downstream Node	Weighted Roughness Coefficient	Section Size	Roughness	Constructed Slope (ft/ft)	Length (ft)	Upstream Invert Elevation (ft)	Downstream Invert Elevation (ft)	Upstream Ground Elevation (ft)	Inlet Area (acres)	Total CA (acres)
P-6	I-5	I-2	0.54	18 inch	0.013	0.002972	286.00	38.90	38.05	41.00	1.60	0.86
P-1	I-1	I-2	0.54	18 inch	0.013	0.002727	165.00	38.50	38.05	43.00	0.80	0.43
P-2	I-2	I-3	0.54	18 inch	0.013	0.003007	143.00	37.93	37.50	41.00	0.80	1.73
P-3	I-3	I-4	0.54	24 inch	0.013	0.004167	36.00	37.40	37.25	43.00	1.00	2.27
P-4	I-4	J-1	0.54	30 inch	0.013	0.002083	144.00	37.15	36.85	43.00	1.10	2.86
P-5	J-1	Outlet	N/A	30 inch	0.013	0.001923	26.00	36.75	36.70	40.00	N/A	2.86

Node Report

Node	Inlet Area (acres)	Weighted Roughness Coefficient	Ground Elevation (ft)	Inlet CA (acres)	External CA (acres)	Carryover (cfs)	Total CA (acres)	Additional Flow (cfs)	Inlet TC (min)	Known Flow (cfs)	External TC (min)	Upstream Flow Time (min)	System Flow Time (min)
I-5	1.60	0.54	41.00	0.86	0.00	0.00	0.86	0.00	15.00	0.00	0.00	0.00	15.00
I-1	0.80	0.54	43.00	0.43	0.00	0.00	0.43	0.00	15.00	0.00	0.00	0.00	15.00
I-2	0.80	0.54	41.00	0.43	0.00	0.00	1.73	0.00	15.00	0.00	0.00	16.51	16.51
I-3	1.00	0.54	43.00	0.54	0.00	0.00	2.27	0.00	15.00	0.00	0.00	16.86	16.86
I-4	1.10	0.54	43.00	0.59	0.00	0.00	2.86	0.00	15.00	0.00	0.00	16.97	16.97
J-1	N/A	N/A	40.00	N/A	N/A	N/A	2.86	N/A	N/A	N/A	0.00	17.43	17.43
Outlet	N/A	N/A	39.00	N/A	N/A	N/A	2.86	N/A	N/A	N/A	0.00	17.51	17.51

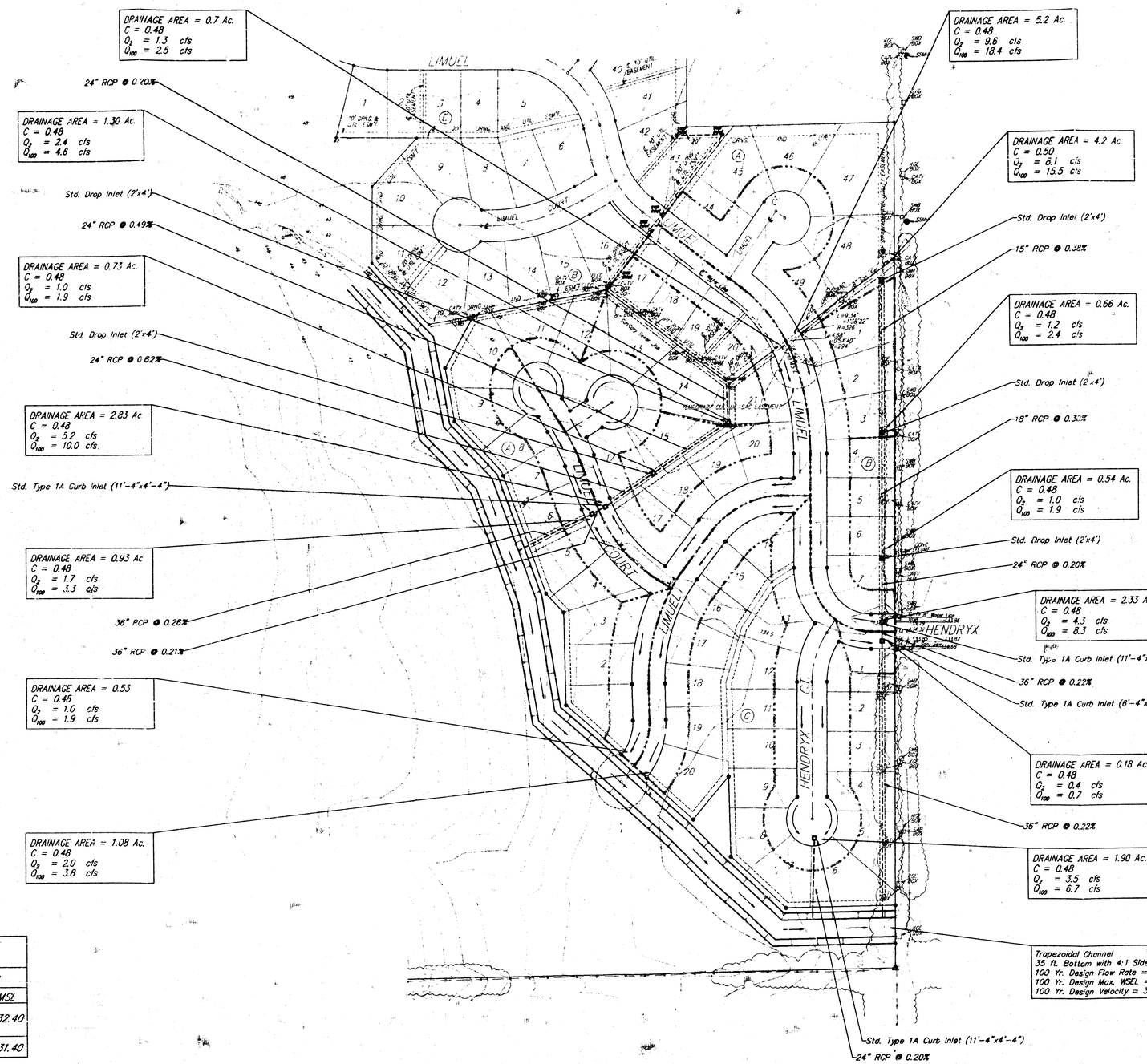
DOT Report

Pipe	-Node- Upstream Downstream	Inlet Area (acres)	Inlet CA (acres)	Total CA (acres)	-Ground- Upstream Downstream (ft)	-HGL- Upstream Downstream (ft)	-Slope- Energy Constructed (ft/ft)	-Section- Discharge Capacity (cfs)	-Section- Shape Size	Length (ft)	Average Velocity (ft/s)	Description
P-6	I-5	1.60	0.86	0.86	41.00	42.07	0.003734	6.42	Circular	286.00	3.63	
	I-2				41.00	41.00	0.002972	5.73	18 inch			
P-1	I-1	0.80	0.43	0.43	43.00	41.15	0.009834	3.21	Circular	165.00	1.82	
	I-2				41.00	41.00	0.002727	5.49	18 inch			
P-2	I-2	0.80	0.43	1.73	41.00	41.42	0.013813	12.35	Circular	143.00	6.99	
	I-3				43.00	39.44	0.003007	5.76	18 inch			
P-3	I-3	1.00	0.54	2.27	43.00	39.36	0.004495	16.06	Circular	36.00	5.14	
	I-4				43.00	39.20	0.004167	14.60	24 inch			
P-4	I-4	1.10	0.59	2.86	43.00	39.12	0.002940	20.21	Circular	144.00	5.20	
	J-1				40.00	38.59	0.002083	18.72	30 inch			
P-5	J-1	N/A	N/A	2.86	40.00	38.50	0.004034	19.99	Circular	26.00	5.93	
	Outlet				39.00	38.22	0.001923	17.99	30 inch			

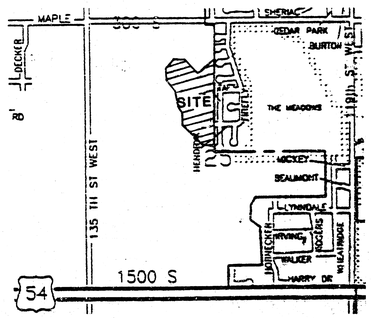
DRAINAGE PLAN

AUBURN HILLS 2nd ADDITION

SEDGWICK COUNTY, KANSAS

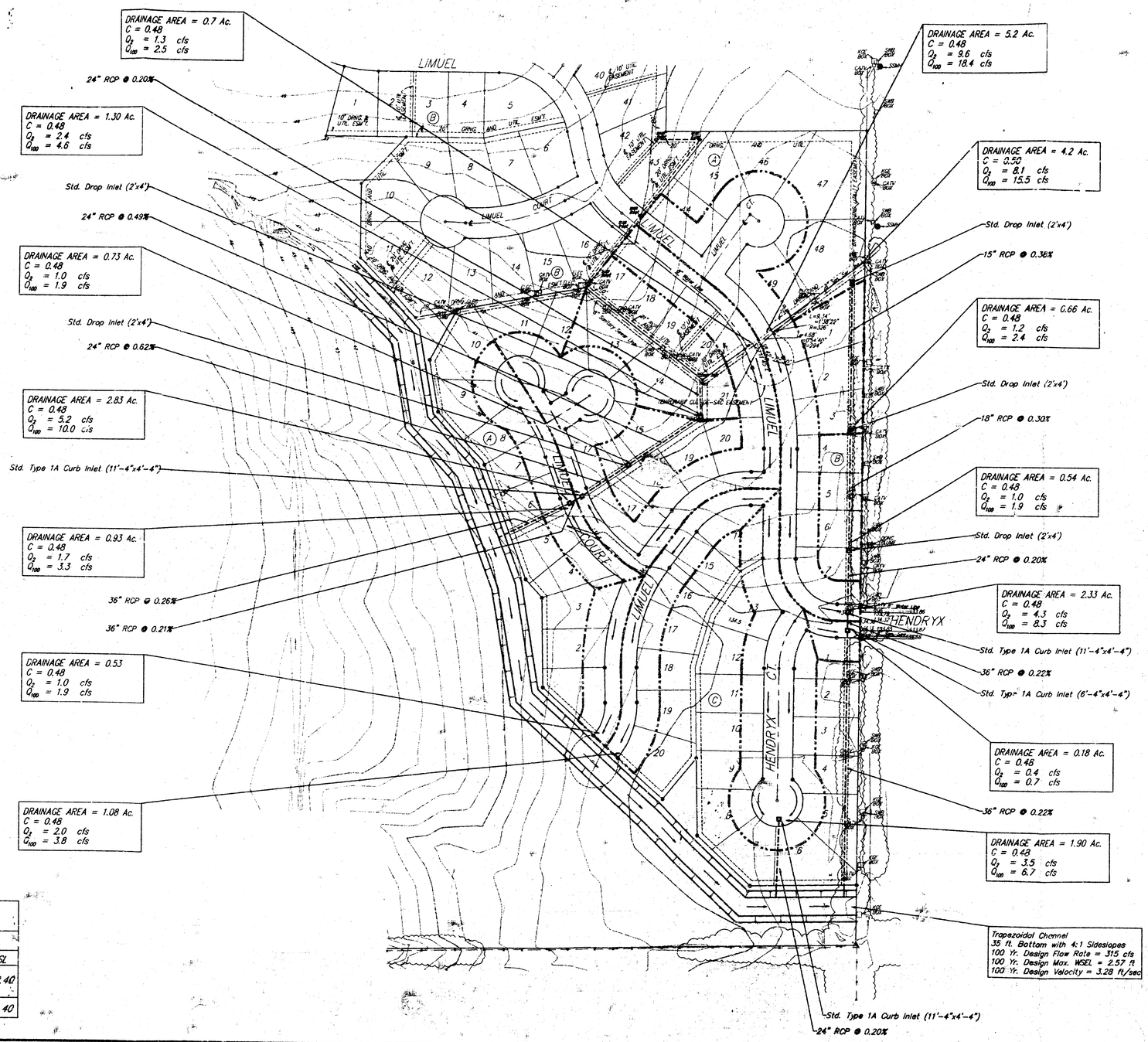


MINIMUM BUILDING PAD ELEV. LOWEST OPENING TO STRUCTURE			
LOT	BLOCK	ELEVATION	
		CITY DATUM	MSL
1, 2, 3, 4, 5, 6, 7, 8, 9, 10	A	145.00	1332.40
6, 7, 8, 9, 20	C	144.00	1331.40

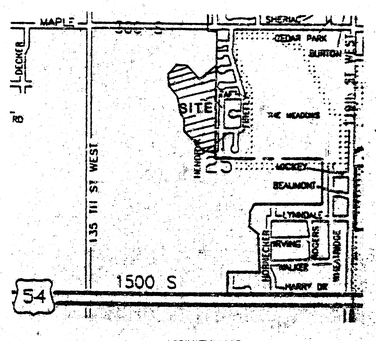


VICINITY MAP

DRAINAGE PLAN
AUBURN HILLS 2nd ADDITION
SEDGWICK COUNTY, KANSAS



MINIMUM BUILDING PAD ELEV. LOWEST OPENING TO STRUCTURE			
LOT	BLOCK	ELEVATION	
		CITY DATUM	MSL
1, 2, 3, 4, 5, 6, 7, 8, 9, 10	A	145.00	1332.40
6, 7, 8, 9, 20	C	144.00	1331.40

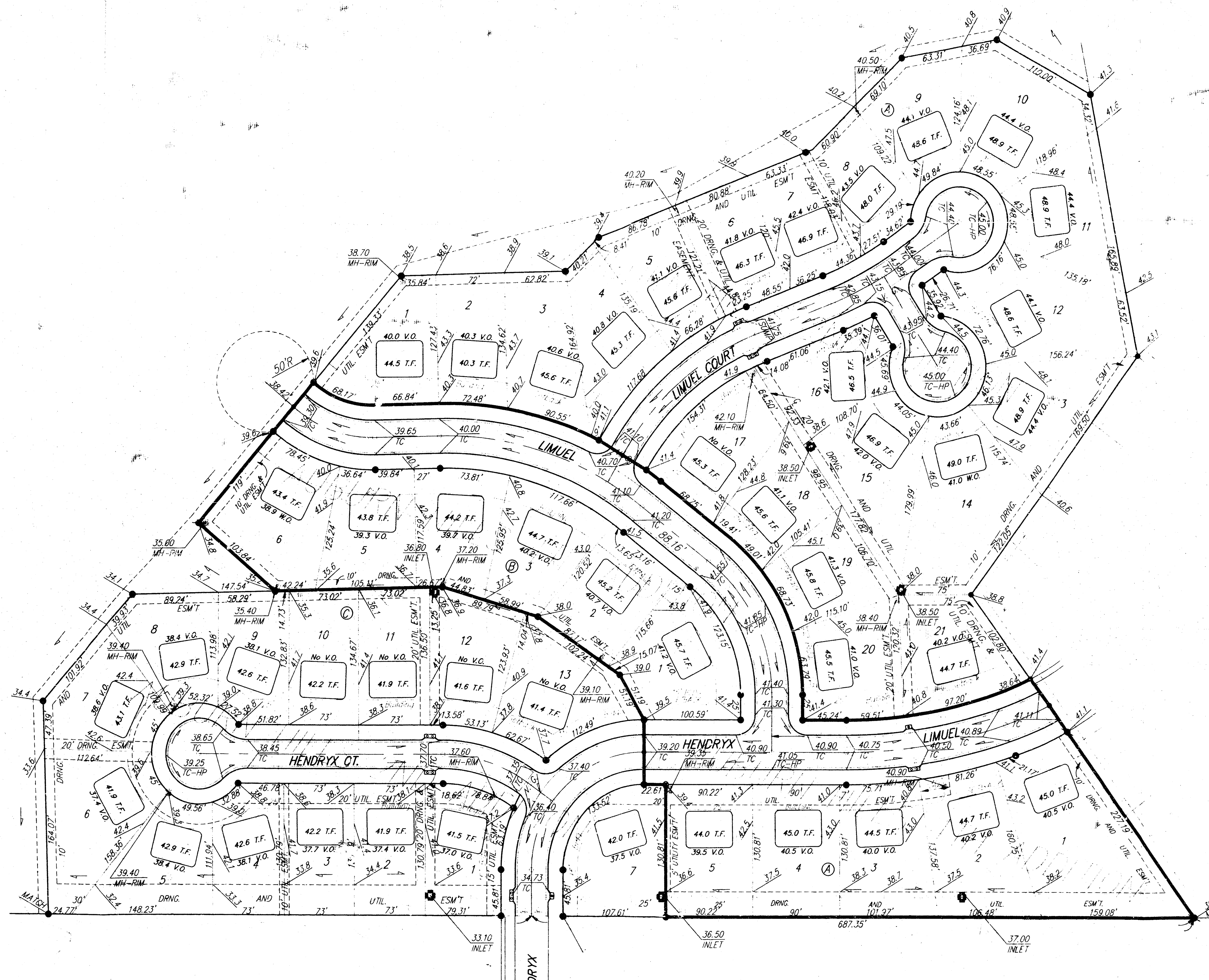


VICINITY MAP

BENCHMARKS:

BM #1 "□" On Top of Curb Located on the South Side of Hendryx 15' West of the East Line of Auburn Hills 2nd Addition. Elev. = 134.32 City Datum

BM #2 "□" On Top of Curb Located at 14.29' North and 38.05' West of the Northeast corner of Lot 13, Block B, Auburn Hills Addition. Elev. = 144.83 City Datum



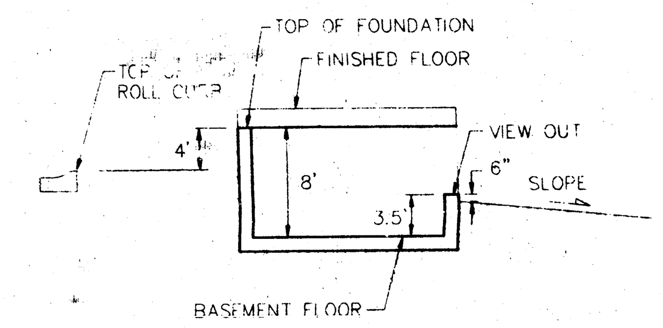
Scale: 1" = 60'
● = Iron

NOTE:

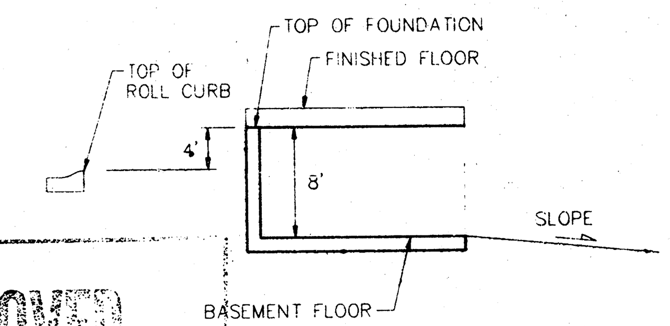
Proposed top of foundation elevations are shown on plans. Contractor to set finish floor elevation.

All street elevations shown on plans are for top of curb (full height).

View-out elevations are denoted as XX.X V.O.
Walk-out elevations are denoted as XX.X W.O.



TYPICAL VIEW OUT
NO SCALE



TYPICAL WALK OUT
NO SCALE

APPROVED DRAINAGE PLAN

Revised 12/31/97 blp

AUBURN HILLS 2ND & 4TH ADDITIONS
LOT GRADING PLAN
WICHITA, KANSAS

BAUGHMAN COMPANY P.A.
ENGINEERING, SURVEYING, & PLANNING

PROJECT NUMBER					SHEET 1 OF 1
DESIGN	DRAWN	APPROVED	DATE	SCALE	