BUCKEYE AREA DRAINAGE MASTER PLAN

FCD 2004CO58

HYDROLOGY COMPARISON OF FDS vs. ADMP MODELS

FINAL MEMORANDUM

Prepared For:

Flood Control District of Maricopa County

red By:

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January 2009

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FINAL MEMORANDUM

I. INTRODUCTION

The purpose of this memorandum is to compare hydrology modeling parameters used in the Flood Delineation Study (FDS) and the Area Drainage Master Plan (ADMP) to assist the District in determining a basis for deciding upon future on-site retention requirements.

Much of the analysis and documentation used for this comparison study had been prepared previously for the Buckeye ADMP hydrology updates. These ADMP reports document the assumptions, methodology and findings for the Existing Conditions and Future Conditions models. This comparison analysis has been prepared as part of the Buckeye ADMP and is intended to supplement the other ADMP hydrology reports. The reader is recommended to review those reports and associated documentation for additional information. A list of referenced reports is included in the References section.

This comparison was prepared to analyze a typical area within the ADMP study area that will include a representative mix of land use types. The area chosen for this analysis was within the "RBE" model area of Area 1 in the ADMP study. The study area is bounded by Miller Road to the west, the Roosevelt Irrigation District (RID) Canal to the north, the Buckeye Water Conservation Drainage District (BWCDD) Canal to the south, and Watson Road to the east. A map of the study area is shown on **Figure 1**. A more detailed vicinity map is shown on **Figure 2**.

II. HYDROLOGY DEVELOPMENT

The 100-yr, 6-hour storm is used for this comparative analysis and utilizes the approved existing conditions model from the ADMP Existing Conditions Update was used as a starting point. The existing conditions model was then modified to match the traditional modeling parameters historically used by the FCDMC (i.e., the FDS parameters). Therefore, an identical model was created with loss rate parameters matching those used during the development of the FDS hydrology model. This will establish a baseline for the point of comparison of two models that are otherwise identical with the exception of the Green & Ampt loss parameters. Only limited land use types were available from the original FDS study. The ADMP model contained a variety of land use codes and new FDS parameters had to be developed for each of the land use types. Therefore, it is important to note that much of the FDS model land use parameters had to be gleaned from the FDS study and the 1995 FCDMC hydrology manual. Next, both models were updated to model the developed land use conditions for the watershed. The Future Conditions model was developed based on land use information provided by the Town of Buckeye which represents the expected Build-Out condition of the study area. The Future Conditions ADMP model is a modified version of the existing conditions model, which includes land use changes and 100-year, 2-hour retention. The approved Future Conditions ADMP model was modified to match the traditional modeling land use parameters, similar to those used in the FDS study.

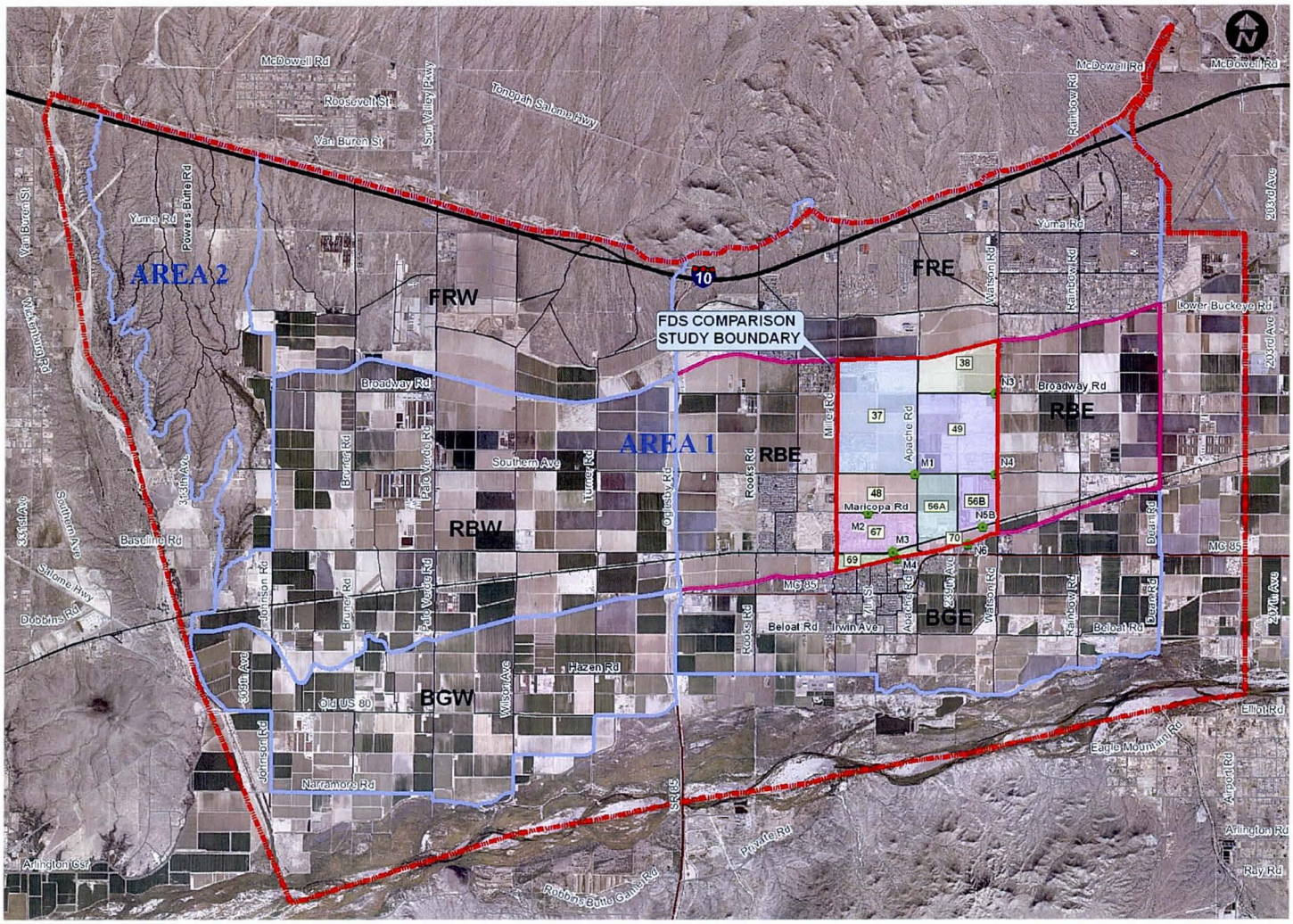

Figure 1 - Study Area

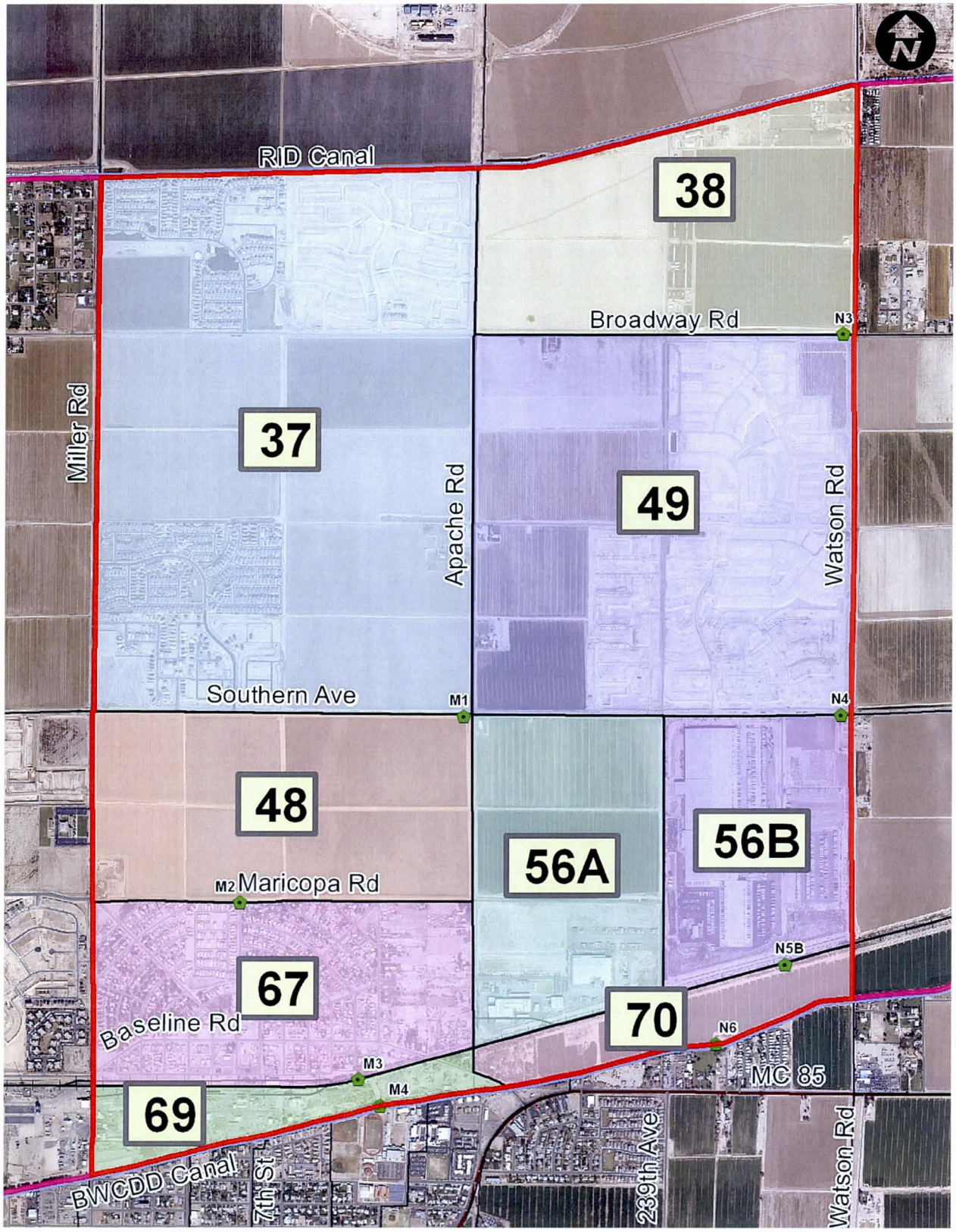

Figure 2 – Project Vicinity

The final modeling step was to prepare a third pair of comparison models that were developed by modifying the two Future Conditions models to provide 100-year, 6-hour retention. Diversions were used within HEC-1 to represent stored volume or retention basins expected for future development. The diversion volume was modified to reflect the 100-year, 2-hour or 6-hour models. In all, six models were prepared based on two land use conditions: existing and future/build-out land use. There are two different future conditions models: one for 2-hour retention and another for 6-hour retention.

Volumes were determined using the FCDMC retention volume equation (V=C(P/12)A. The volume determined using this equation was reduced to be 80% effective to account for grading differences. A table showing the retention volumes used for the future conditions models is included in the **APPENDIX**. The difference between the volumes used for the 2-hour and 6-hour models is based on the precipitation value (P) used, 2.8-inches for the 2-hour retention and 3.3-inches for the 6-hour retention. The future conditions retention volumes were determined using the planned built-out condition land use provided by the Town of Buckeye. Volumes were determined for land that is currently undeveloped based on the runoff coefficient (C) value associated with the proposed land use type. The future retention volumes for each land use type within a sub-basin were added together and included with the estimated retention volumes previously determined for the existing conditions land use.

To expedite modeling of these scenarios, the computer application DDMSW Version 3.5.7 was utilized. DDMSW allows the user to change the land use parameters used to develop the weighted Green & Ampt loss rate parameters in HEC-1. DDMSW was also used to update the 2-hour and 6-hour storage volumes to model the retention.

The HEC-1 Models and DDMSW backup files are provided on a CD with this memo. Tables comparing the sub-basin weighted parameters and runoff values between relevant models are in the **APPENDIX**.

III. RESULTS AND RECOMMENDATIONS

The HEC-1 results were reviewed and compared to each other for sub-basins and combination points within the study area. Since the 100-year, 6-hour precipitation was used for all of the models, the sub-basin runoff for the two future conditions (2-hour and 6-hour retention) models will be the same because the retention is applied after the sub-basin. The ADMP hydrology sub-basin names are typically a two or three digit number, such as "37". The number may be followed by a letter to which signifies that the sub-basin was later broken into smaller areas after the original naming was completed, such as "56A". For this analysis, a diversion was added after the basin to model the affect of onsite storage within the sub-basin. The naming convention for these diversions was the basin name with an "RET" added to the end, such as "37RET". The flow that was not diverted which was allowed to pass downstream was named with a "-O" on the end for "Outlet", such as "37-O". Some of the sub-basins were built-out under existing conditions and therefore had little or no retention added for the future conditions models.

Table 1 and **Table 2** show the storage and peak flows for the sub-basin, retention, and runoff for the ADMP and FDS models, respectively. The tables show that even though the sub-basin runoff volume is reduced in the future conditions, the peak flow may still be higher. To demonstrate this, we prepared a figure (**Figure 3**) showing the hydrographs at sub-basin 37 for existing and future conditions and the ADMP scenario. The figure shows that the hydrograph for the existing

conditions has a slow rising limb, a longer duration at the peak, and a flatter falling limb. For the future conditions, the hydrograph has a very steep rising limb, a much higher peak flow, and a steep falling limb. The "outlet" hydrograph, which is the sub-basin flow after the storage is diverted out, has a near vertical rising limb and a very steep falling limb. For the Future Conditions 2-hour and 6-hour retention models, the hydrograph peaks rise above that of the Existing Conditions peak flow, even though the area under the hydrographs (or volume) will be smaller than the existing conditions. Therefore, based on the results from this analysis, a reduction to the runoff volume through storage basins does not ensure that the peak flow will result in a flow lower than existing conditions. A 6-hour retention will however result in a lower peak runoff than a 2-hour retention in most cases. In general, the change in retention from 2-hour to 6-hour resulted in a reduction in flow ranging from 15% to 60%.

In addition, tables were added to the **APPENDIX** to compare the sub-basin Green & Ampt parameters for the Existing Conditions and Future Conditions (2-hour & 6-hour retention) models. The tables included in the **APPENDIX** indicate that the parameters used for the FDS study result in higher peak flows and runoff volumes than the ADMP models. This is due primarily to the lower default values for vegetation cover, initial abstraction (IA), and hydraulic efficiency (Kn).

Table 1 – ADMP Results Summary

Sub-Basin	HEC-1 Step	Storage			100-Year, 6-Hour Runoff		
		Existing (ac-ft)	Future (2-hr Reten) (ac-ft)	Future (6-hr Reten) (ac-ft)	Existing (cfs)	Future (2-hr Reten) (cfs)	Future (6-hr Reten) (cfs)
37	*Sub-basin*	76.37	136.8	136.8	337	1309	1309
37RET	*Retention*	52	110.0	120.3	337	1309	1309
37-O	*Runoff*	24.37	26.8	16.5	240	392	294
38	*Sub-basin*	29.05	60.4	60.4	134	799	799
38RET	*Retention*	*	36.8	43.3	*	799	799
38-O	*Runoff*	*	23.6	17.1	*	628	484
48	*Sub-basin*	24.46	54.6	54.6	117	810	810
48RET	*Retention*	*	35.1	41.3	*	810	810
48-O	*Runoff*	*	19.5	13.3	*	617	399
49	*Sub-basin*	53.09	101.3	101.3	607	1136	1136
49RET	*Retention*	53.09	85.6	90.6	607	1136	1136
49-O	*Runoff*	0	15.7	10.7	0	400	326
56A	*Sub-basin*	30.56	50.2	50.2	228	875	875
56ARET	*Retention*	*	22.8	26.8	*	773	817
56A-O	*Runoff*	*	27.4	23.4	*	875	831
56B	*Sub-basin*	42.48	43.0	43.0	1089	1111	1111
56BRET	*Retention*	27.1	27.1	27.1	1089	1058	1058
56B-O	*Runoff*	15.38	15.9	15.9	904	991	991
67	*Sub-basin*	47.68	55.6	55.6	942	1050	1050
67RET	*Retention*	*	0.8	1.0	*	15	15
67-O	*Runoff*	*	54.8	54.6	*	1050	1050
69	*Sub-basin*	15.73	6.8	6.8	433	161	161
69RET	*Retention*	*	1.9	2.3	*	45	52
69-O	*Runoff*	*	4.9	4.5	*	161	161
70	*Sub-basin*	10.01	18.5	18.5	100	385	385
70RET	*Retention*	*	9.4	11.1	*	311	385
70-O	*Runoff*	*	9.1	7.4	*	373	299

* Sub-basin currently has no retention under the existing land use.

Table 2 – FDS Results Summary

Sub-Basin	HEC-1 Step	Storage			100-Year, 6-Hour Runoff		
		Existing (ac-ft)	Future (2-hr Reten) (ac-ft)	Future (6-hr Reten) (ac-ft)	Existing (cfs)	Future (2-hr Reten) (cfs)	Future (6-hr Reten) (cfs)
37	*Sub-basin*	89.14	140.1	140.1	425	2327	2327
37RET	*Retention*	52	110.0	120.3	425	2327	2327
37-O	*Runoff*	37.14	30.1	19.8	361	731	491
38	*Sub-basin*	40.19	57.2	57.2	187	1333	1333
38RET	*Retention*	*	36.8	43.3	*	1333	1333
38-O	*Runoff*	*	20.4	13.9	*	1002	595
48	*Sub-basin*	35.26	55.1	55.1	170	1400	1400
48RET	*Retention*	*	35.1	41.3	*	1400	1400
48-O	*Runoff*	*	20.0	13.8	*	981	808
49	*Sub-basin*	70.75	101.6	101.6	830	1892	1892
49RET	*Retention*	57.6	85.6	90.6	830	1892	1892
49-O	*Runoff*	13.15	16.0	11.0	433	658	415
56A	*Sub-basin*	34.52	48.6	48.6	258	1196	1196
56ARET	*Retention*	*	22.8	26.8	*	1041	1042
56A-O	*Runoff*	*	25.8	21.8	*	1178	1036
56B	*Sub-basin*	44.7	45.0	45.0	1145	1146	1146
56BRET	*Retention*	27.1	27.1	27.1	938	917	917
56B-O	*Runoff*	17.6	17.9	17.9	1021	1023	1023
67	*Sub-basin*	50.51	55.6	55.6	1421	1450	1450
67RET	*Retention*	*	0.8	1.0	*	12	12
67-O	*Runoff*	*	54.8	54.6	*	1450	1450
69	*Sub-basin*	16.5	6.2	6.2	295	159	159
69RET	*Retention*	*	1.9	2.3	*	51	71
69-O	*Runoff*	*	4.3	3.9	*	159	159
70	*Sub-basin*	12.33	19.4	19.4	136	400	400
70RET	*Retention*	*	9.4	11.1	*	326	398
70-O	*Runoff*	*	10.0	8.3	*	387	385

* Sub-basin currently has no retention under the existing land use.

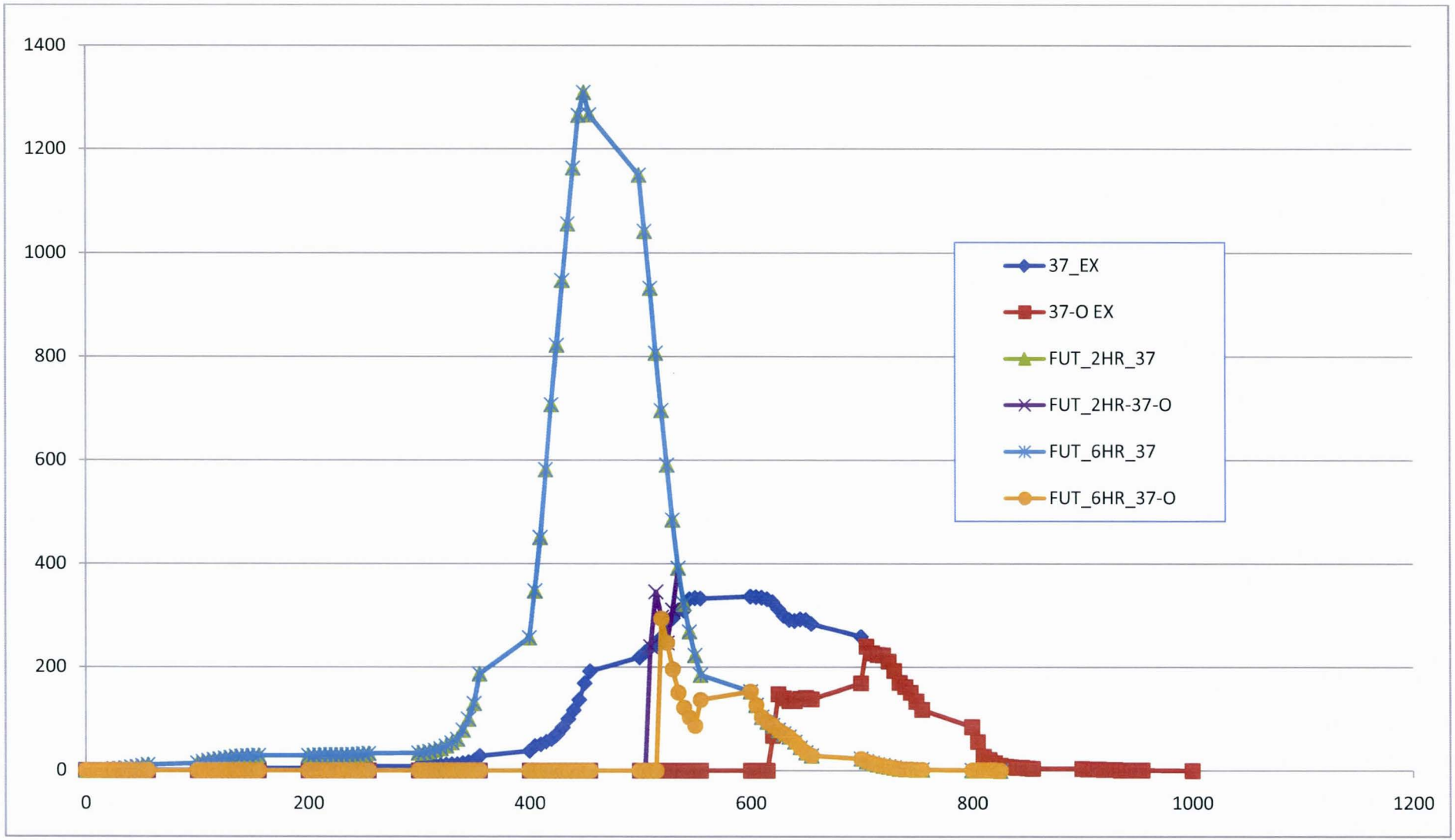

Figure 3 - Hydrograph Comparison

IV. REFERENCES

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Flood Control District of Maricopa County, Engineering Division, *Drainage Design Manual for Maricopa County, Arizona Volume I, Hydrology*, January 1, 1995.

V. APPENDIX

- 2-Hour & 6-Hour Retention Volume Summary and C-value Table (**Tables A-1, A-2, & A-3**)
- Runoff Parameter and Peak Flow Comparison Tables
  - Existing Conditions (**Table A-4**)
  - Future Conditions (2-Hr Retention) (**Table A-5**)
  - Future Conditions (6-Hr Retention) (**Table A-6**)
- Land Use Code Parameters
  - Existing Conditions (**Table A-7**)
  - Future Conditions (**Table A-8**)

Buckeye ADMP
Hydrology Comparison of FDS vs. ADMS

Table A-1 FUTURE CONDITIONS - 2 HOUR RETENTION VOLUME

Sub-Basin	BASIN AREA (Ac)	Precipitation (in)	V_{2hr} (ac-ft)	$V_{80\%}$ (ac-ft)	*EXST VOL* (ac-ft)	TOTAL VOLUME (ac-ft)
37	909.55	2.8	**72.4**	**57.9**	**52.0**	**110.0**
38	346.87	2.8	**45.9**	**36.8**		**36.8**
48	319.85	2.8	**43.9**	**35.1**		**35.1**
49	645.99	2.8	**35.0**	**28.0**	**57.6**	**85.6**
56A	262.77	2.8	**28.4**	**22.8**		**22.8**
56B	213.47	2.8	**Built Out**		**27.1**	**27.1**
67	301.95	2.8	**1.1**	**0.8**		**0.8**
69	87.76	2.8	**2.4**	**1.9**		**1.9**
70	90.00	2.8	**11.8**	**9.4**		**9.4**

Table A-2 FUTURE CONDITIONS - 6 HOUR RETENTION VOLUME

Sub-Basin	BASIN AREA (Ac)	Precipitation (in)	V_{6hr} (ac-ft)	$V_{80\%}$ (ac-ft)	*EXST VOL* (ac-ft)	TOTAL VOLUME (ac-ft)
37	909.55	3.3	**85.4**	**68.3**	**52.0**	**120.3**
38	346.87	3.3	**54.2**	**43.3**		**43.3**
48	319.85	3.3	**51.7**	**41.3**		**41.3**
49	645.99	3.3	**41.2**	**33.0**	**57.6**	**90.6**
56A	262.77	3.3	**33.5**	**26.8**		**26.8**
56B	213.47	3.3	**Built Out**		**27.1**	**27.1**
67	301.95	3.3	**1.2**	**1.0**		**1.0**
69	87.76	3.3	**2.8**	**2.3**		**2.3**
70	90.00	3.3	**13.9**	**11.1**		**11.1**

*C-value varies based on land use type, as shown below

Table A-3 Retention Volume C-values

Land Use Code	Description	C-value
110	Rural Residential (<= 1/5 du per acre)	0.41
120	Estate Residential (1/5 du per acre to 1 du per acre)	0.41
130	Large Lot Residential - Single Family (1-2 du per acre)	0.53
140	Medium Lot Residential - Single Family (2-4 du per acre)	0.53
150	Small Lot Residential - Single Family (4-6 du per acre)	0.6
160	Very Small Lot Residential - Single Family (>6 du per acre)	0.6
180	High Density Residential - Multi Family (10-15 du per acre)	0.82
190	Very High Density Residential - Multi Family (>15 du per ac)	0.82
220	Neighborhood Commercial (50,000 to 100,000 sq. ft.)	0.75
230	Community Commercial (100,000 to 500,000 sq. ft.)	0.9
240	Regional Commercial (500,000 to 1,000,000 sq. ft.)	0.9
300	General Industrial (Industrial where no detail available)	0.75
310	Warehouse/Distribution Centers	0.88
400	Office General (Office where no detail available)	0.69
410	Office Low Rise (1-4 stories)	0.69
520	Educational (Schools and universities)	0.88
530	Institutional (Includes hospitals and churches)	0.88
550	Public Facilities (comm centers, libraries, sub-stations)	0.88
700	General Open Space (Open space where no detail available)	0.38
810	Business Park (enclosed industrial, office or retail)	0.88

BUCKEYE ADMP
FDS vs. ADMP HYDROLOGY COMPARISON
Table A-4
EXISTING CONDITIONS
SUMMARY TABLE
100-Year, 6-Hour Storm

SUB BASIN ADMP / FDS	AREA (sq mi)	SLOPE (ft/mi)	Length (ft)	LCA (ft)	IA (in)	DTHETA	PSIF (in)	XKSAT (in/hr)	RTIMP (%)	S-GRAPH TYPE	Kn	Lag (min)	DISCHARGE (cfs)	% CHANGE DISCHARGE	UNIT DISCHARGE (cfs/sq mi)
37	1.421	30.1	2.36	1.18	0.67	0.25	4.10	0.61	13.00	AGRICULTURE	0.133	148	337	21%	**237**
37	1.421	30.1	2.36	1.18	0.62	0.11	4.10	0.59	6.00	AGRICULTURE	0.12	133.5	425		**299**
38	0.542	20.7	1.40	0.70	0.94	0.25	3.95	0.40	1.00	AGRICULTURE	0.187	150.3	134	28%	**247**
38	0.542	20.7	1.40	0.70	0.93	0.02	3.95	0.40	1.00	AGRICULTURE	0.185	148.7	187		**345**
48	0.500	16.5	1.10	0.55	0.98	0.25	4.35	0.59	1.00	AGRICULTURE	0.196	136.9	117	31%	**234**
48	0.500	16.5	1.10	0.55	0.98	0.01	4.35	0.65	1.00	AGRICULTURE	0.195	136.2	170		**340**
49	1.009	23.5	1.96	0.98	0.46	0.26	3.95	0.40	18.00	VALLEY	0.086	87.1	607	27%	**602**
49	1.009	23.5	1.96	0.98	0.26	0.20	3.95	0.40	9.00	VALLEY	0.068	68.9	830		**823**
56A	0.411	30.3	1.19	0.59	0.69	0.26	3.95	0.40	15.00	AGRICULTURE	0.129	84.9	228	12%	**555**
56A	0.411	30.3	1.19	0.59	0.68	0.11	3.95	0.40	15.00	AGRICULTURE	0.129	84.9	258		**628**
56B	0.334	43.7	0.73	0.37	0.15	0.25	4.00	0.62	54.00	VALLEY	0.021	9	1089	5%	**3260**
56B	0.334	43.7	0.73	0.37	0.15	0.25	4.00	0.39	53.00	VALLEY	0.02	8.5	1145		**3428**
67	0.472	25.7	0.82	0.41	0.25	0.25	4.30	0.47	30.00	VALLEY	0.047	24.1	942	34%	**1996**
67	0.472	25.7	0.82	0.41	0.16	0.25	4.30	0.34	20.00	VALLEY	0.02	10.3	1421		**3011**
69	0.137	17.3	0.11	0.06	0.18	0.27	4.50	0.46	53.00	VALLEY	0.025	3.1	433	-47%	**3161**
69	0.137	17.3	0.11	0.06	0.16	0.27	4.50	0.30	45.00	VALLEY	0.2	24.9	295		**2153**
70	0.141	1.5	0.68	0.34	0.46	0.25	4.45	0.48	24.00	AGRICULTURE	0.09	68.8	100	26%	**709**
70	0.141	1.5	0.68	0.34	0.25	0.18	4.45	0.40	15.00	AGRICULTURE	0.072	55	136		**965**
COMBINE POINTS															
M1	1.420												240	34%	**169**
M1	1.420												361		**254**
M2	1.920												92	46%	**48**
M2	1.920												169		**88**
M3	2.390												614	23%	**257**
M3	2.390												801		**335**
M4	2.530												339	8%	**134**
M4	2.530												370		**146**
N3	0.540												134	28%	**248**
N3	0.540												187		**346**
N4	1.550												118	54%	**76**
N4	1.550												256		**165**
N5B	1.890												318	27%	**168**
N5B	1.890												436		**231**
N6	2.440												313	15%	**128**
N6	2.440												367		**150**

BUCKEYE ADMP
FDS vs. ADMP HYDROLOGY COMPARISON
Table A-5
FUTURE CONDITIONS (2-HOUR RETENTION)
SUMMARY TABLE
100-Year, 6-Hour Storm

SUB BASIN ADMP / FDS	AREA (sq mi)	SLOPE (ft/mi)	Length (ft)	LCA (ft)	IA (in)	DTHETA	PSIF (in)	XKSAT (in/hr)	RTIMP (%)	S-GRAPH TYPE	Kn	Lag (min)	DISCHARGE (cfs)	% CHANGE DISCHARGE	UNIT DISCHARGE (cfs/sq mi)
37	1.421	30.1	2.36	1.18	0.25	0.250	4.1	0.530	30.00	VALLEY	0.05	55.6	1309	44%	**921**
37	1.421	30.1	2.36	1.18	0.2	0.250	4.1	0.380	23.00	VALLEY	0.02	22.3	2327		**1638**
38	0.542	20.7	1.40	0.70	0.25	0.250	3.95	0.400	30.00	VALLEY	0.05	40.2	799	40%	**1474**
38	0.542	20.7	1.40	0.70	0.2	0.250	3.95	0.400	23.00	VALLEY	0.02	16.1	1333		**2459**
48	0.500	16.5	1.10	0.55	0.24	0.250	4.35	0.470	32.00	VALLEY	0.049	34.2	810	42%	**1620**
48	0.500	16.5	1.10	0.55	0.2	0.250	4.35	0.330	24.00	VALLEY	0.02	14	1400		**2800**
49	1.009	23.5	1.96	0.98	0.25	0.250	3.95	0.400	30.00	VALLEY	0.05	50.6	1136	40%	**1126**
49	1.009	23.5	1.96	0.98	0.2	0.250	3.95	0.400	23.00	VALLEY	0.02	20.3	1892		**1875**
56A	0.411	30.3	1.19	0.59	0.21	0.250	3.95	0.400	41.00	VALLEY	0.037	24.4	875	27%	**2129**
56A	0.411	30.3	1.19	0.59	0.18	0.250	3.95	0.400	37.00	VALLEY	0.02	13.2	1196		**2910**
56B	0.334	43.7	0.73	0.37	0.15	0.250	4	0.620	55.00	VALLEY	0.02	8.5	1111	3%	**3326**
56B	0.334	43.7	0.73	0.37	0.15	0.250	4	0.390	54.00	VALLEY	0.02	8.5	1146		**3431**
67	0.472	25.7	0.82	0.41	0.2	0.250	4.3	0.500	45.00	VALLEY	0.041	21.1	1050	28%	**2225**
67	0.472	25.7	0.82	0.41	0.18	0.250	4.3	0.340	33.00	VALLEY	0.02	10.3	1450		**3072**
69	0.137	17.3	0.11	0.06	0.11	0.250	4.5	0.500	76.00	VALLEY	0.021	2.6	161	-1%	**1175**
69	0.137	17.3	0.11	0.06	0.15	0.250	4.5	0.300	54.00	VALLEY	0.02	2.5	159		**1161**
70	0.141	1.5	0.68	0.34	0.15	0.250	4.45	0.500	55.00	VALLEY	0.02	15.3	385	4%	**2730**
70	0.141	1.5	0.68	0.34	0.15	0.250	4.45	0.310	55.00	VALLEY	0.02	15.3	400		**2837**
COMBINE POINTS															
M1	1.420												392	46%	**276**
M1	1.420												731		**515**
M2	1.920												359	24%	**187**
M2	1.920												473		**246**
M3	2.390												680	18%	**285**
M3	2.390												828		**346**
M4	2.530												232	7%	**92**
M4	2.530												250		**99**
N3	0.540												628	37%	**1163**
N3	0.540												1002		**1856**
N4	1.550												297	22%	**192**
N4	1.550												381		**246**
N5B	1.890												373	15%	**197**
N5B	1.890												437		**231**
N6	2.440												472	17%	**193**
N6	2.440												566		**232**

BUCKEYE ADMP
FDS vs. ADMP HYDROLOGY COMPARISON
Table A-6
FUTURE CONDITIONS (6-HOUR RETENTION)
SUMMARY TABLE
100-Year, 6-Hour Storm

SUB BASIN ADMP / FDS	AREA (sq mi)	SLOPE (ft/mi)	Length (ft)	LCA (ft)	IA (in)	DTHETA	PSIF (in)	XKSAT (in/hr)	RTIMP (%)	S-GRAPH TYPE	Kn	Lag (min)	DISCHARGE (cfs)	% CHANGE DISCHARGE	UNIT DISCHARGE (cfs/sq mi)
37	1.421	30.1	2.36	1.18	0.25	0.250	4.1	0.530	30.00	VALLEY	0.05	55.6	1309	44%	**921**
37	1.421	30.1	2.36	1.18	0.2	0.250	4.1	0.380	23.00	VALLEY	0.02	22.3	2327		**1638**
38	0.542	20.7	1.40	0.70	0.25	0.250	3.95	0.400	30.00	VALLEY	0.05	40.2	799	40%	**1474**
38	0.542	20.7	1.40	0.70	0.2	0.250	3.95	0.400	23.00	VALLEY	0.02	16.1	1333		**2459**
48	0.500	16.5	1.10	0.55	0.24	0.250	4.35	0.470	32.00	VALLEY	0.049	34.2	810	42%	**1620**
48	0.500	16.5	1.10	0.55	0.2	0.250	4.35	0.330	24.00	VALLEY	0.02	14	1400		**2800**
49	1.009	23.5	1.96	0.98	0.25	0.250	3.95	0.400	30.00	VALLEY	0.05	50.6	1136	40%	**1126**
49	1.009	23.5	1.96	0.98	0.2	0.250	3.95	0.400	23.00	VALLEY	0.02	20.3	1892		**1875**
56A	0.411	30.3	1.19	0.59	0.21	0.250	3.95	0.400	41.00	VALLEY	0.037	24.4	875	27%	**2129**
56A	0.411	30.3	1.19	0.59	0.18	0.250	3.95	0.400	37.00	VALLEY	0.02	13.2	1196		**2910**
56B	0.334	43.7	0.73	0.37	0.15	0.250	4	0.620	55.00	VALLEY	0.02	8.5	1111	3%	**3326**
56B	0.334	43.7	0.73	0.37	0.15	0.250	4	0.390	54.00	VALLEY	0.02	8.5	1146		**3431**
67	0.472	25.7	0.82	0.41	0.2	0.250	4.3	0.500	45.00	VALLEY	0.041	21.1	1050	28%	**2225**
67	0.472	25.7	0.82	0.41	0.18	0.250	4.3	0.340	33.00	VALLEY	0.02	10.3	1450		**3072**
69	0.137	17.3	0.11	0.06	0.11	0.250	4.5	0.500	76.00	VALLEY	0.021	2.6	161	-1%	**1175**
69	0.137	17.3	0.11	0.06	0.15	0.250	4.5	0.300	54.00	VALLEY	0.02	2.5	159		**1161**
70	0.141	1.5	0.68	0.34	0.15	0.250	4.45	0.500	55.00	VALLEY	0.02	15.3	385	4%	**2730**
70	0.141	1.5	0.68	0.34	0.15	0.250	4.45	0.310	55.00	VALLEY	0.02	15.3	400		**2837**
COMBINE POINTS															
M1	1.420												294	40%	**207**
M1	1.420												491		**346**
M2	1.920												163	28%	**85**
M2	1.920												227		**118**
M3	2.390												680	18%	**285**
M3	2.390												828		**346**
M4	2.530												232	7%	**92**
M4	2.530												250		**99**
N3	0.540												484	19%	**896**
N3	0.540												595		**1102**
N4	1.550												191	20%	**123**
N4	1.550												240		**155**
N5B	1.890												373	15%	**197**
N5B	1.890												437		**231**
N6	2.440												425	18%	**174**
N6	2.440												520		**213**

FDS vs. ADMP HYDROLOGY COMPARISON

Table A-7

EXISTING CONDITIONS

LAND USE DEFAULTS COMPARISON TABLE

Code ADMP *FDS*	Description	Initial Abstraction IA	Percent Impervious RTIMP	Vegetation Cover	Moisture Deficit DTHETA	Hydraulic Efficiency Kn
Agriculture						
750	Agriculture	1.00	0	85	NORMAL	0.20
750	Agriculture	0.50	0	100	WET	0.20
Commercial						
200	General Commercial (Commercial where no detail available)	0.10	80	75	NORMAL	0.02
200	General Commercial (Commercial where no detail available)	0.10	80	0	NORMAL	0.02
210	Specialty Commercial (<=50,000 sq. ft.)	0.10	80	75	NORMAL	0.02
210	Specialty Commercial (<=50,000 sq. ft.)	0.10	80	0	NORMAL	0.02
220	Neighborhood Commercial (50,000 to 100,000 sq. ft.)	0.10	80	75	NORMAL	0.02
220	Neighborhood Commercial (50,000 to 100,000 sq. ft.)	0.10	80	0	NORMAL	0.02
230	Community Commercial (100,000 to 500,000 sq. ft.)	0.10	80	75	NORMAL	0.02
230	Community Commercial (100,000 to 500,000 sq. ft.)	0.10	80	0	NORMAL	0.02
Industrial						
300	General Industrial (Industrial where no detail available)	0.15	55	60	NORMAL	0.02
300	General Industrial (Industrial where no detail available)	0.15	55	0	NORMAL	0.02
310	Warehouse/Distribution Centers	0.15	55	60	NORMAL	0.02
310	Warehouse/Distribution Centers	0.15	55	0	NORMAL	0.02
320	Industrial	0.15	55	60	NORMAL	0.02
320	Industrial	0.15	55	0	NORMAL	0.02
Institutional						
520	Educational (Schools and universities)	0.10	45	80	NORMAL	0.02
520	Educational (Schools and universities) (Industrial)	0.15	55	0	NORMAL	0.02
530	Institutional (Includes hospitals and churches)	0.10	80	75	NORMAL	0.02
530	Institutional (Includes hospitals and churches) (Industrial	0.15	55	0	NORMAL	0.02
550	Public Facilities (comm centers, libraries, sub-stations)	0.10	80	75	NORMAL	0.02
550	Public Facilities (comm centers, libraries, sub-stations) (	0.15	55	0	NORMAL	0.02
Office						
410	Office Low Rise (1-4 stories)	0.10	80	75	NORMAL	0.02
410	Office Low Rise (1-4 stories) (Industrial)	0.15	55	0	NORMAL	0.02
Open Space						
710	Active Open Space (Includes parks)	0.10	5	90	NORMAL	0.02
710	Active Open Space (Includes parks)	0.30	0	0	DRY	0.02
900	Vacant (Existing land use database only)	0.35	0	25	DRY	0.03
900	Vacant (Existing land use database only)	0.30	0	0	DRY	0.03
Other						
560	Special Events (stadiums, sports complexes and fairgrounds)	0.10	80	75	NORMAL	0.02
560	Special Events (stadiums, sports complexes and fairgrounds)	0.15	55	0	NORMAL	0.02
Other Employment						
570	Other Employment - low (Proving grounds and land fills)	0.10	80	75	NORMAL	0.02
570	Other Employment - low (Proving grounds and land fills) (In	0.15	55	0	NORMAL	0.02
Residential						
110	Rural Residential (<= 1/5 du per acre)	0.30	5	30	NORMAL	0.05
110	Rural Residential (VLDR)	0.10	8	5	NORMAL	0.02
120	Estate Residential (1/5 du per acre to 1 du per acre)	0.30	5	30	NORMAL	0.05
120	Estate Residential (VLDR)	0.10	8	5	NORMAL	0.02
130	Large Lot Residential - Single Family (1-2 du per acre)	0.30	15	50	NORMAL	0.05
130	Large Lot Residential - (LDR)	0.15	15	5	NORMAL	0.02
140	Medium Lot Residential - Single Family (2-4 du per acre)	0.25	30	50	NORMAL	0.05
140	Medium Lot Residential - Single Family (LDR)	0.15	15	5	NORMAL	0.02
150	Small Lot Residential - Single Family (4-6 du per acre)	0.25	30	50	NORMAL	0.05
150	Small Lot Residential - Single Family (MDR)	0.20	23	5	NORMAL	0.02
160	Very Small Lot Residential - Single Family (>6 du per acre)	0.25	40	50	NORMAL	0.05
160	Very Small Lot Residential - Single Family (MDR)	0.20	23	5	NORMAL	0.02
161	Mobile Home	0.25	40	50	NORMAL	0.05
161	Mobile Home (MFR)	0.20	23	5	NORMAL	0.02
170	Medium Density Residential - Muli Family (5-10 du per acre)	0.25	45	50	NORMAL	0.05
170	Medium Density Residential - Muli Family (MDR)	0.20	23	5	NORMAL	0.02
190	Very High Density Residential - Multi Family (>15 du per ac)	0.25	45	50	NORMAL	0.05
190	Very High Density Residential - Multi Family (MFR)	0.20	23	5	NORMAL	0.02

BUCKEYE ADMP
FDS vs. ADMP HYDROLOGY COMPARISON
Table A-8
FUTURE CONDITIONS
LAND USE DEFAULTS COMPARISON TABLE

Code ADMP / *FDS*	Description	Initial Abstraction IA	Percent Impervious RTIMP	Vegetation Cover	Moisture Deficit DTHETA	Hydraulic Efficiency Kn
Commercial						
220	Neighborhood Commercial (50,000 to 100,000 sq. ft.)	0.10	80	75	NORMAL	0.02
220	Neighborhood Commercial (50,000 to 100,000 sq. ft.)	0.10	80	0	NORMAL	0.02
230	Community Commercial (100,000 to 500,000 sq. ft.)	0.10	80	75	NORMAL	0.02
230	Community Commercial (100,000 to 500,000 sq. ft.)	0.10	80	0	NORMAL	0.02
240	Regional Commercial (500,000 to 1,000,000 sq. ft.)	0.10	80	65	NORMAL	0.02
240	Regional Commercial	0.10	80	0	NORMAL	0.02
Industrial						
300	General Industrial (Industrial where no detail available)	0.15	55	60	NORMAL	0.02
300	General Industrial (Industrial where no detail available)	0.15	55	0	NORMAL	0.02
310	Warehouse/Distribution Centers	0.15	55	60	NORMAL	0.02
310	Warehouse/Distribution Centers	0.15	55	0	NORMAL	0.02
Institutional						
520	Educational (Schools and universities)	0.10	45	80	NORMAL	0.02
520	Educational (Schools and universities) (Industrial)	0.15	55	0	NORMAL	0.02
530	Institutional (Includes hospitals and churches)	0.10	80	75	NORMAL	0.02
530	Institutional (Includes hospitals and churches) (Industrial	0.15	55	0	NORMAL	0.02
550	Public Facilities (comm centers, libraries, sub-stations)	0.10	80	75	NORMAL	0.02
550	Public Facilities (comm centers, libraries, sub-stations) (	0.15	55	0	NORMAL	0.02
Office						
400	Office General (Office where no detail available)	0.10	80	75	NORMAL	0.02
400	Office Low Rise (1-4 stories) (Industrial)	0.15	55	0	NORMAL	0.02
410	Office Low Rise (1-4 stories)	0.10	80	75	NORMAL	0.02
410	Office	0.15	55	0	NORMAL	0.02
810	Business Park (enclosed industrial, office or retail)	0.10	80	75	NORMAL	0.02
810	Office	0.15	55	0	NORMAL	0.02
Residential						
130	Large Lot Residential - Single Family (1-2 du per acre)	0.30	15	50	NORMAL	0.05
130	Large Lot Residential - (LDR)	0.15	15	5	NORMAL	0.02
150	Small Lot Residential - Single Family (4-6 du per acre)	0.25	30	50	NORMAL	0.05
150	Small Lot Residential - Single Family (MDR)	0.20	23	5	NORMAL	0.02
160	Very Small Lot Residential - Single Family (>6 du per acre)	0.25	40	50	NORMAL	0.05
160	Very Small Lot Residential - Single Family (MDR)	0.20	23	5	NORMAL	0.02
190	Very High Density Residential - Multi Family (>15 du per ac)	0.25	45	50	NORMAL	0.05
190	Very High Density Residential - Multi Family (MFR)	0.20	23	5	NORMAL	0.02

Contents:

BUCKEYE ADMP, FCD 2004C058
FINAL FDS vs. ADMS Report (3.5 MB)
HEC-1 Models (5.20 MB)
DDMSW Backup files (0.46 MB)

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January, 2009

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