

**Project No. 16175.08
Work Authorization No. 7**

**EVALUATION OF TWIN LAKES FOR USE AS
REGIONAL DETENTION FACILITY
Diamondhead Drive West
DIAMONDHEAD, MISSISSIPPI**



**Prepared for
*City of Diamondhead, Mississippi***

December 9, 2020

Table of Contents

1.0	Executive Summary	1
2.0	Introduction	3
3.0	Topographic Data	5
4.0	Hydrologic Analysis	7
4.1	Drainage Basin.....	7
4.2	Existing and Future Land Use	7
4.3	Hydrologic Soil Types.....	10
4.4	Rainfall	12
4.5	Hydrographs.....	14
5.0	Conclusions	17
5.1	Existing and Future with On-Site Detention (Existing Storm Water Ordinance Remains).....	17
5.2	Future Conditions with No On-Site Detention and No Improvements (Existing Storm Water Ordinance Modified)	17
5.3	Future Conditions with No On-Site Detention and Berm South of Diamondhead Drive West (Existing Storm Water Ordinance Modified)	18
6.0	Recommendations	19

Tables

Table 1 – Drainage Areas of Sub-Basins in Acres
Table 2 – Acreage and Percent of Existing and Future Land Use (with on-site detention)
Table 3 – Acreage and Percent of Future Land Use (with no on-site detention)
Table 4 – Acreage and Percent of Hydrologic Soil Groups
Table 5 – Composite Runoff Curve Number per Sub-Basin
Table 6 – Diamondhead Rainfall Frequency Chart
Table 7 – Existing Conditions Peak Flows and Peak Water-Surface Elevations
Table 8 – Future Conditions (No Improvements) Peak Flows and Peak Water-Surface Elevations
Table 9 – Future Conditions (With Berm) Peak Flows and Peak Water-Surface Elevations

Figures

Figure 1 – Location Map
Figure 2 – Topo Survey
Figure 3 – Drainage Areas and Sub-Drainage Areas
Figure 4 – Existing Land Use
Figure 5 – Future Land Use
Figure 6 – Hydrologic Soil Types in Sub-Basins
Figure 7 – Community Flood Hazard Area Base Flood Elevation (South Lake)

Appendix

Detailed Composite Curve Number Calculations

Hydrograph Output:

Existing Conditions

Future (No Action) Conditions

Proposed Conditions

1.0 Executive Summary

Covington Civil & Environmental, LLC (Covington) was engaged by the City of Diamondhead to evaluate the feasibility of designating Twin Lakes as a regional detention facility and, if so, how the Diamondhead's Storm Water Ordinance should be modified to allow Twin Lakes to be used as a regional detention facility.

The evaluation looked at three scenarios:

1. Determining the detention capacity and water surface elevations of the Twin Lakes for existing storm water flows (Note: This will also represent the detention capacity and water surface elevations for future development within the drainage basin of the Twin Lakes assuming that the existing City of Diamondhead Storm Water Ordinance requiring on-site detention of all future developments remains in effect),
2. Determining the detention capacity and water surface elevations of the Twin Lakes for storm water flows from future developments within the drainage basin, assuming the City of Diamondhead Storm Water Ordinance is modified to not require on-site detention for future developments and no modifications are made to the Twin Lakes and its drainage structures.
3. Determining the detention capacity and water surface elevations of the Twin Lakes for storm water flows from future developments within the drainage basin, assuming the City of Diamondhead Storm Water Ordinance is modified to not require on-site detention for future developments and a berm is constructed on the south side of Diamondhead Drive West to prevent flooding of Diamondhead Drive West.

The evaluation resulted in the following recommendations:

1. If Twin Lakes is not used as a Regional Detention Facility, the existing Storm Water Ordinance should remain in effect for this area and, if desired, the City of Diamondhead may want to investigate how to lower the 100-year storm elevation in the upper lake to prevent flooding of Diamondhead Drive West (10-inches) during a 100-year storm.
2. If Twin Lakes is to be used as a Regional Detention Facility (Existing Storm Water Ordinance modified to not require on-site detention within the Twin Lakes Drainage Basin), further evaluation is needed to determine the effect the increased flow from the lower lake (Table 7) will have on drainage under Kapalama Drive, costs for any necessary improvements to drainage under Kapalama Drive or construction of a berm south of Diamondhead Drive West and possibly the staging of any improvements based on future growth within the Twin Lakes Drainage Basin.

3. Under the City's Flood Damage Prevention Ordinance, a Community Flood Hazard Area could be designated for the area around the upper lake (south lake) which will be inundated during the 100-year flood. If the existing Stormwater Management Ordinance remains in effect, the Community Flood Hazard Area Base Flood Elevation should be set at 40.5-ft (1-ft above the 100-year flood elevation). If Twin Lakes is used as Regional Detention Facility but no improvements are undertaken, the Community Flood Hazard Area Base Flood Elevation should be set at 40.6-ft (1-ft above 100-year flood elevation). The Base Flood Elevation should be set at 41.2 if the berm is constructed south of Diamondhead Drive West.

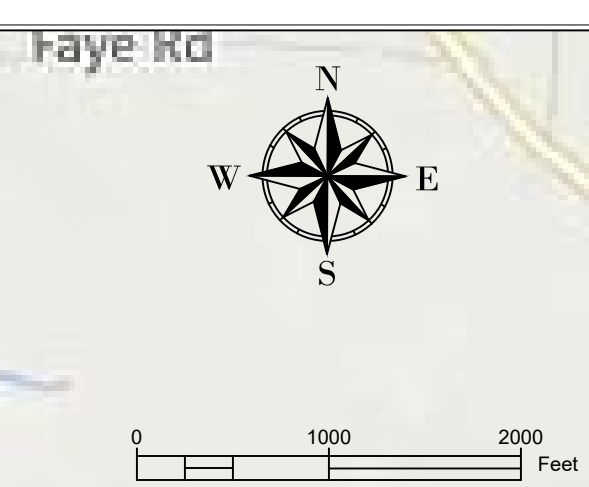
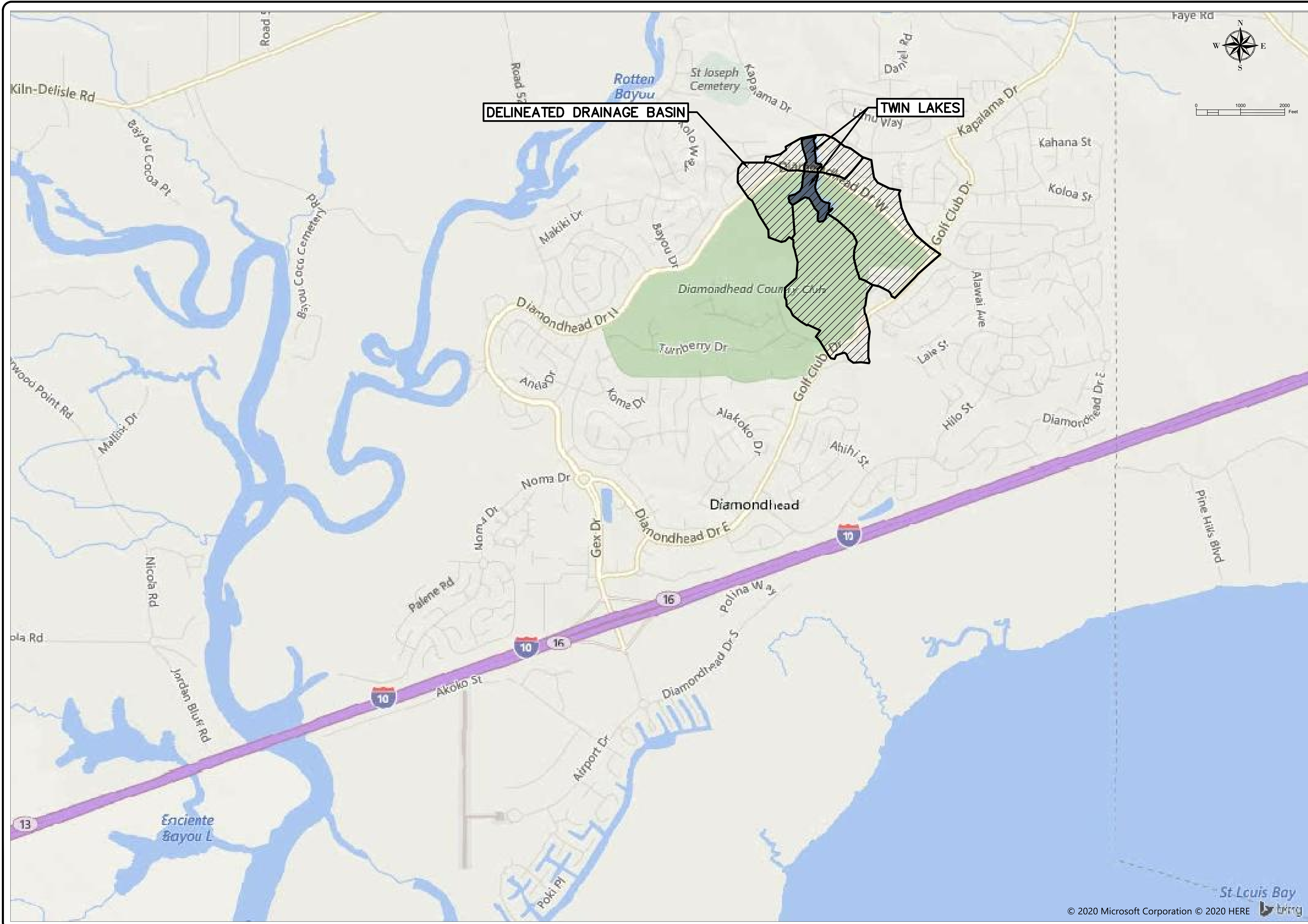
2.0 Introduction

The Twin Lakes of Diamondhead are located in the northeastern section of the City of Diamondhead (Figure 1). The City wishes to evaluate the feasibility of using these existing recreational lakes as a regional detention facility to capture the additional storm water runoff from future development within the drainage basin of the Twin Lakes. The evaluation included:

- Determining the detention capacity and water surface elevations of the Twin Lakes for existing storm water flows (Note: This will also represent the detention capacity and water surface elevations for future development within the drainage basin of the Twin Lakes assuming that the existing City of Diamondhead Storm Water Ordinance requiring on-site detention of all future developments remains in effect),
- Determining the detention capacity and water surface elevations of the Twin Lakes for storm water flows from future developments within the drainage basin, assuming the City of Diamondhead Storm Water Ordinance is modified to not require on-site detention for future developments and no modifications are made to the Twin Lakes and its drainage structures.
- Determining the detention capacity and water surface elevations of the Twin Lakes for storm water flows from future developments within the drainage basin, assuming the City of Diamondhead Storm Water Ordinance is modified to not require on-site detention for future developments and a berm is constructed on the south side of Diamondhead Drive West to prevent flooding of Diamondhead Drive West.

The evaluation included collecting topographic information of the existing drainage structures, controlling elevations around the Twin Lakes (profiles along Diamondhead Drive West, profile along northern levee of Lower Twin Lake (north lake), top of bulkhead elevations and finished floor elevations of residence adjacent to Twin Lakes. Multiple recurrence interval rainfall data for Diamondhead (1-year, 2-year, 5-year, 10-year, 25-year, 50-year, and 100-year) were used in the evaluation, along with the present and future land use information within the drainage basin as provided by the City of Diamondhead.

This report presents the findings, conclusions, and recommendations for using Twin Lakes as a regional detention facility.



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NO.	DATE	REVISION/ISSUE

**EVALUATION OF TWIN LAKES
REGIONAL DETENTION FACILITY**

**CITY OF DIAMONDHEAD
DIAMONDHEAD, MISSISSIPPI**

LOCATION MAP

DATE 09-22-2020	SHEET NUMBER
SCALE 1"=1000'	
DRAWN BY TMK	CHECKED BY JFS
PROJECT NO. 16175.08	

FIG 1

3.0 Topographic Data

Field surveys for the project were provided by Patrick Martino & Associates. This field data was supplemented by 2015 LIDAR information obtained from the Mississippi Automated Resource Information System (MARIS). This topographic survey (Figure 2) provided several critical controlling elevations:

- The minimum elevation of Diamondhead Drive West, which runs along the top of the levee separating the Upper Lake from the Lower Lake and is about 38.7-ft located on the northeastern corner of the Upper Lake.
- The minimum elevation around the sewer lift pump station is about 42.5-ft.
- The elevation of the top of the wooden bulkhead along the east side of the Lower Lake is approximately 32.0-ft.
- The finished floor elevation of the existing residence on the eastern shore of the Lower Lake is about 34.5-ft.
- The minimum elevation of the Lower Lake levee is about 32.0-ft and is on the northwest end of the levee.
- The outlet structure for the Lower Lake consists of four 30-inch pipe culverts. The average of the downstream flowline elevations is 26.6-ft., and the average of the upstream flowline elevations is 29.8-ft.
- The outlet structure for the Upper Lake consists of three 36-inch by 60-inch arch pipes, with a weir box on the upstream end. The downstream flowline elevation of the pipes is 26.9-ft., and their upstream flowline elevation is 32.7-ft. The crest of the weir box is at elevation 35.4-ft.

BEARING REFERENCE:
GEODETIC NORTH BY
GPS OBSERVATION
(NAD 83; COGS 96)



A TOPOGRAPHIC SURVEY OF A
PORTION OF THE TWIN LAKES
REGIONAL DETENTION FACILITY,
DIAMONDHEAD DRIVE WEST,
CITY OF DIAMONDHEAD,
HANCOCK COUNTY, MISSISSIPPI

LINE LEGEND:
FENCE LINE
OVERHEAD UTILITY LINE
OVERHEAD POWER LINE

UTILITY NOTE:
ABOVE-GROUND, APPARENT, AND REASONABLY
ACCESSIBLE LOCATIONS ON EXISTING UTILITIES AND
INFRASTRUCTURE WERE OBSERVED AND RECORDED
ON THIS SURVEY. HOWEVER, NO UNDERGROUND TRACINGS
OF SUCH UTILITIES AND DRAINAGE FEATURES WERE
OBTAINED. THEREFORE, THE LOCATION OF ANY
LOCATIONS BY UTILITY COMPANIES WILL BE
NECESSARY PRIOR TO ANY CONSTRUCTION.

BASIS OF ELEVATION:
ELEVATIONS AS SHOWN HEREON BASED
ON OBSERVATIONS OBTAINED ON CONTROL
POINTS USING USM RTK NETWORK.

UTILITY
LEGEND:
--- WATER VALVE
--- WATER METER
--- FIRE HYDRANT
--- SEWER MANHOLE
--- SEWER CLEANOUT
--- GAS METER
--- POWER POLE
--- LIGHT POLE
--- ELECTRIC BOX

ABBREVIATION
LEGEND:
DEED = DEED DIMENSION
CONV = CONVERSION
PS = PRIOR SURVEY
NOI = NOTICE OF
P.O.C. = POINT OF COMMENCEMENT
P.O.B. = POINT OF BEGINNING
ACTUAL FIELD MEASUREMENT
FIDN = TAX PARCEL NUMBER

NOTES:
THIS SURVEY WAS PREPARED FROM INFORMATION PROVIDED BY CLIENT. WITHOUT
THE BENEFIT OF A CURRENT TITLE REPORT OR AN ENVIRONMENTAL STUDY.
NO FLOOD DETERMINATION WAS PERFORMED AS A PART OF THIS SURVEY. AN
ELEVATION DETERMINATION CAN BE MADE BY ORDERING A FEMA ELEVATION
CERTIFICATION.
BEARINGS SHOWN HEREON ARE DERIVED BY:
GEODETIC NORTH BY GPS OBSERVATION
S-T-R OR SUBD: DIAMONDHEAD

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DIAMONDHEAD, MS

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EVALUATION OF TWIN LAKES
REGIONAL DETENTION FACILITY

CITY OF DIAMONDHEAD
DIAMONDHEAD, MISSISSIPPI

TOPOGRAPHIC
SURVEY

DATE
09-22-2020
SCALE
1"=50'
DRAWN
BY TMK
CHECKED
BY JFS
PROJECT
NO. 16175.08

FIG 2

4.0 Hydrologic Analysis

4.1 Drainage Basin

LIDAR data was used to delineate drainage sub-basin areas and compute peak flows from each drainage sub-basin area for multiple recurrence intervals. The overall watershed was divided into five drainage sub-basins as shown in Figure 3. The area in acres of each Sub-Basin, as well as the total drainage basin area, is shown in Table 1.

Area A (acres)	Area B (acres)	Area C (acres)	Area D (acres)	Area E (acres)	Total Drainage Basin (acres)
8.64	16.12	38.40	94.69	106.20	264.05

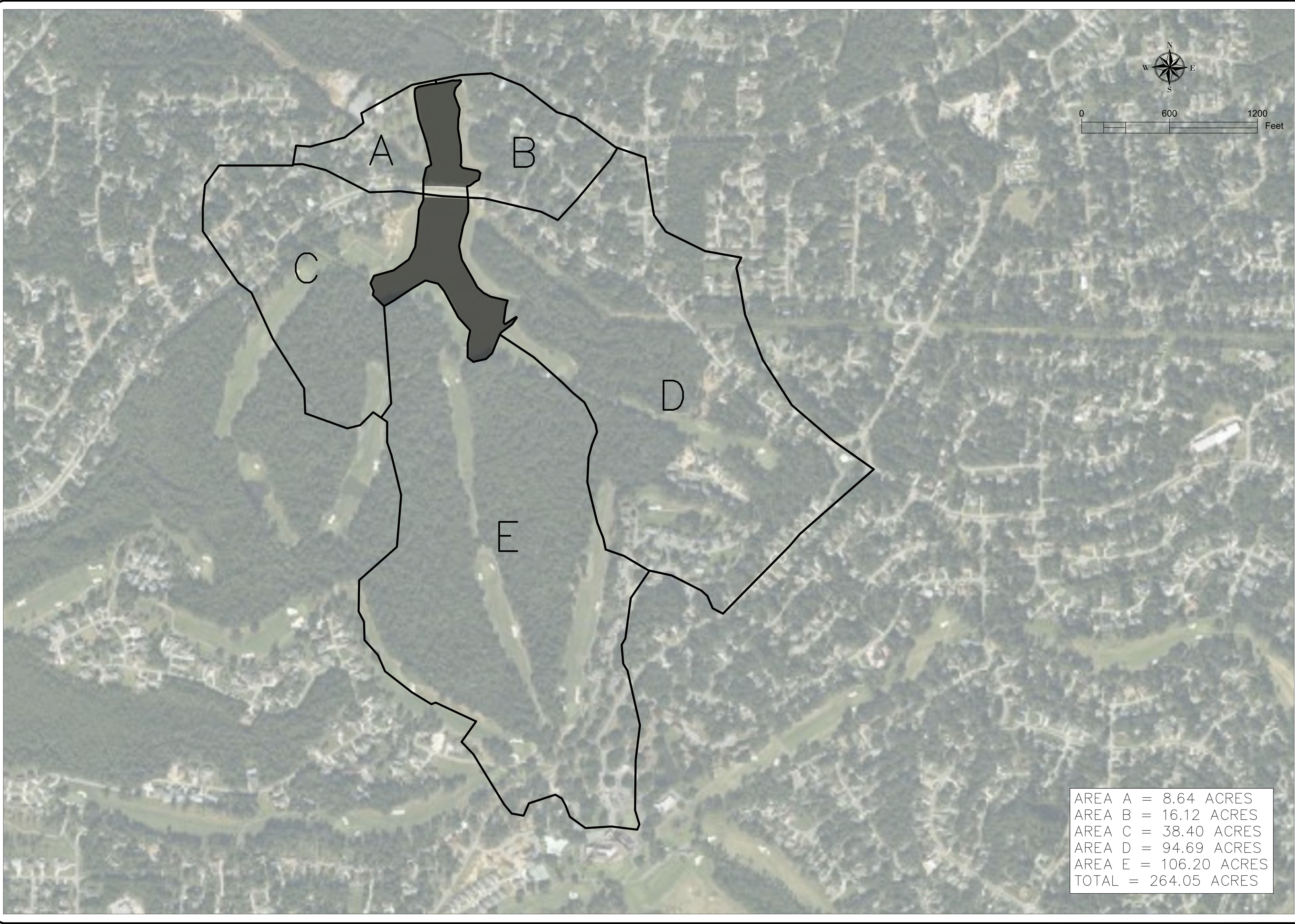
Table 1 – Drainage Areas of Sub-Basins in Acres

4.2 Existing and Future Land Use

City of Diamondhead Zoning map was used to obtain existing land use in each sub-basin (Figure 4). Presently undeveloped areas (vacant) were assumed to be wooded. In this evaluation, existing land use also represented future land use with on-site detention being provided to capture increased flow from future development, so there was no increased storm water runoff to Twin Lakes due to future development, since on-site detention, per existing Storm Water Ordinance, will contain any increased runoff from future development. Table 2 summarizes the existing land use in each sub-basin and the total drainage basin.

Land Use	Area A Acres (%)	Area B Acres (%)	Area C Acres (%)	Area D Acres (%)	Area E Acres (%)	Total Acres (%)
Public/Semi-Public (PSP)	4.09 (47%)	0.27 (2%)	10.87 (28%)	14.46 (15%)	30.22 (28%)	59.91 (23%)
Vacant Land	0.94 (11%)	4.86 (30%)	15.53 (40%)	34.64 (37%)	70.24 (66%)	126.21 (48%)
Road	1.13 (13%)	2.49 (15%)	4.00 (10%)	7.74 (8%)	-	15.36 (6%)
Single Family	2.48 (29%)	8.06 (50%)	8.00 (21%)	20.87 (22%)	0.52 (0.5%)	39.93 (15%)
Manufactured Housing	-	0.44 (3%)	-	0.35 (0.4%)	-	0.79 (0.3%)
Multifamily	-	-	-	11.70 (12%)	5.22 (5%)	16.92 (6%)
Utility	-	-	-	4.93 (5%)	-	4.93 (2%)
TOTAL	8.64 (100%)	16.12 (100%)	38.40 (100%)	94.69 (100%)	106.20 (100%)	264.05 (100%)

Table 2 – Acreage and Percent of Existing and Future Land Use (with on-site detention)

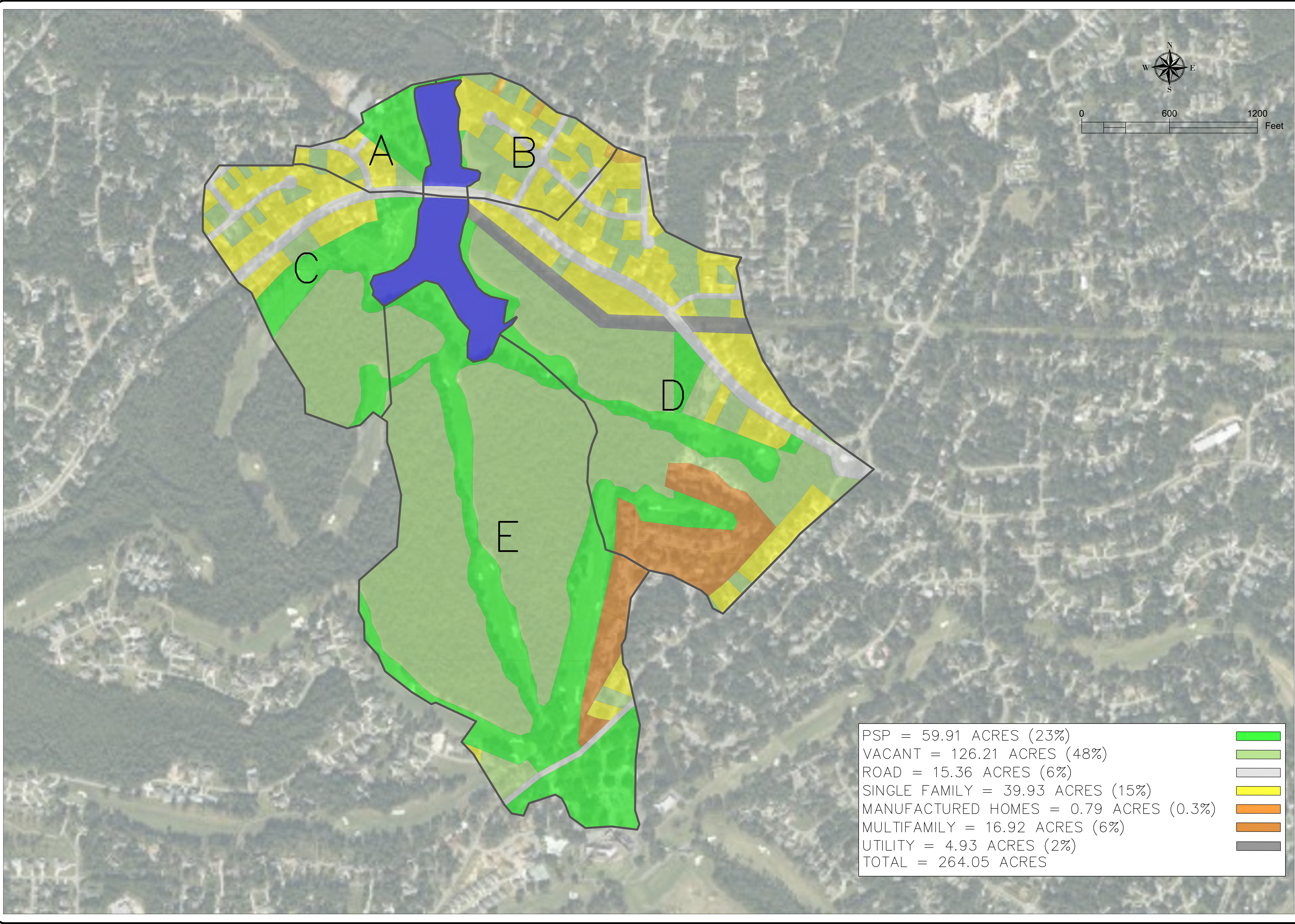


AREA A = 8.64 ACRES
AREA B = 16.12 ACRES
AREA C = 38.40 ACRES
AREA D = 94.69 ACRES
AREA E = 106.20 ACRES
TOTAL = 264.05 ACRES

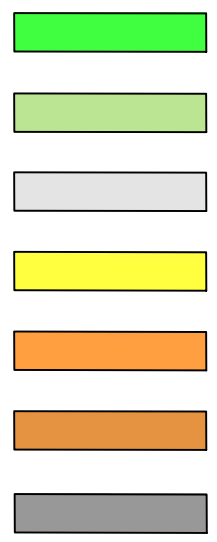
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EVALUATION OF TWIN LAKES
REGIONAL DETENTION FACILITY

CITY OF DIAMONDHEAD
DIAMONDHEAD, MISSISSIPPI



PSP = 59.91 ACRES (23%)
VACANT = 126.21 ACRES (48%)
ROAD = 15.36 ACRES (6%)
SINGLE FAMILY = 39.93 ACRES (15%)
MANUFACTURED HOMES = 0.79 ACRES (0.3%)
MULTIFAMILY = 16.92 ACRES (6%)
UTILITY = 4.93 ACRES (2%)
TOTAL = 264.05 ACRES



NO.	DATE	REVISION/ISSUE

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To evaluate the increased runoff to Twin Lakes due to future development with no on-site detention (existing Storm Water Ordinance modified to reflect no on-site detention), it was assumed that all zoned land was totally built out based on its zoning and maximum building site coverage (Figure 5). Table 3 summarizes the future land use in each sub-basin and the total drainage basin.

Land Use	Area A Acres (%)	Area B Acres (%)	Area C Acres (%)	Area D Acres (%)	Area E Acres (%)	Total
Public Facilities & Recreation (PFR)/Utilities	4.08 (47%)	0.27 (2%)	10.85 (28%)	18.38 (19%)	30.04 (28%)	63.62 (24%)
Road	1.13 (13%)	2.49 (15%)	3.99 (10%)	7.68 (8%)	-	15.29 (6%)
Low Density	-	-	-	25.76 (27%)	34.30 (32%)	60.06 (23%)
Medium Density	3.43 (40%)	10.70 (66%)	23.56 (61%)	24.92 (26%)	27.61 (26%)	90.22 (34%)
High Density	-	-	-	17.61 (19%)	14.25 (13%)	31.86 (12%)
Manuf. Home	-	2.65 (16%)	-	0.35 (0.4%)	-	3.00 (1%)
Total	8.64 (100%)	16.11 (100%)	38.40 (100%)	94.70 (100%)	106.20 (100%)	264.05 (100%)

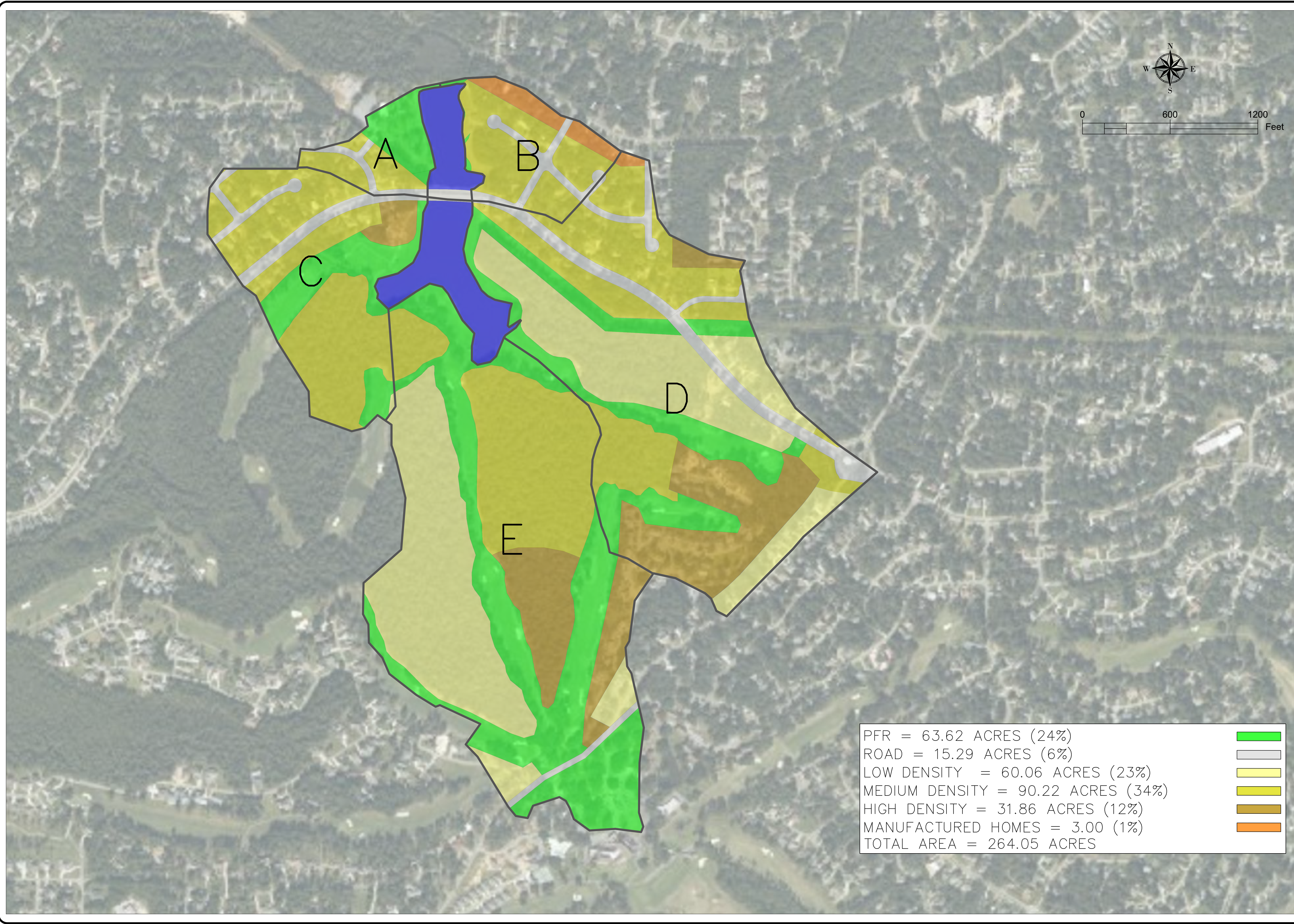
Table 3 – Acreage and Percent of Future Land Use (with no on-site detention)

4.3 Hydrologic Soil Types

The NRCS Web Soil Survey for Hancock County was used to generate a report of soil types present in each sub-basin. Hydrologic soil groups are based on estimates of runoff potential. Soils in the Twin Lakes watershed are either Hydrologic Group B or Hydrologic Group C.

Group B soils are characterized as having a moderate infiltration rate when thoroughly wet. These soils consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C soils are characterized as having a slow infiltration rate when thoroughly wet. These soils consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.



NO.	DATE	REVISION/ISSUE

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Figure 6 and Table 4 shows the acreage and percent of each hydrologic soil group type in each sub-basin.

Soil Group	Area A Acres (%)	Area B Acres (%)	Area C Acres (%)	Area D Acres (%)	Area E Acres (%)	Total Acres (%)
Type B	4.31 (50%)	9.31 (58)	20.47 (53)	47.24 (50)	41.35 (39)	122.68 (46%)
Type C	4.33 (50%)	6.81 (42)	17.93 (47)	47.46 (50)	64.85 (61)	141.38 (54%)
Total	8.64 (100%)	16.12 (100%)	38.40 (100%)	94.70 (100%)	106.20 (100%)	264.06 (100%)

Table 4 – Acreage and Percent of Hydrologic Soil Groups

The land use and hydrologic soil group percentages were then used along with SCS Runoff Curve Number Method to compute a composite curve number for each of the 5 basins. Table 5 shows the composite Curve Number for each of the subareas for Existing and Future conditions. Detailed computations can be found in the Appendix.

Condition	Area A	Area B	Area C	Area D	Area E
Existing	85.6	81.3	81.5	80.3	78.2
Future	86.5	84.4	84.8	85.4	84.8

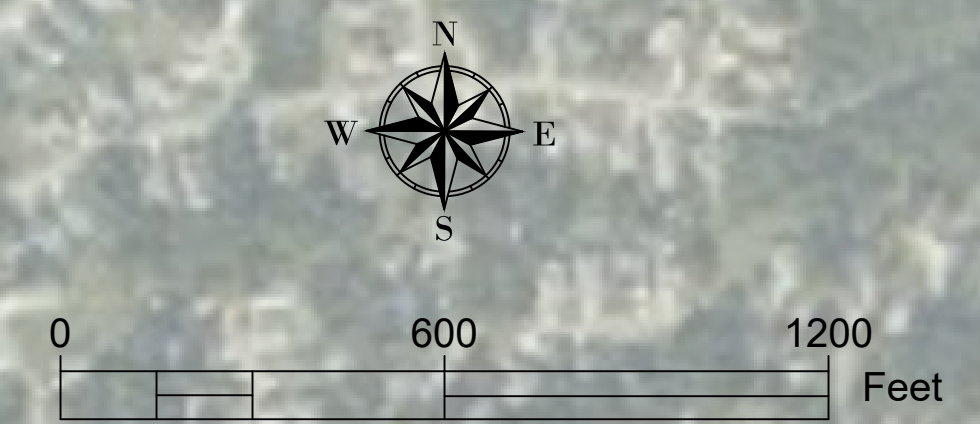
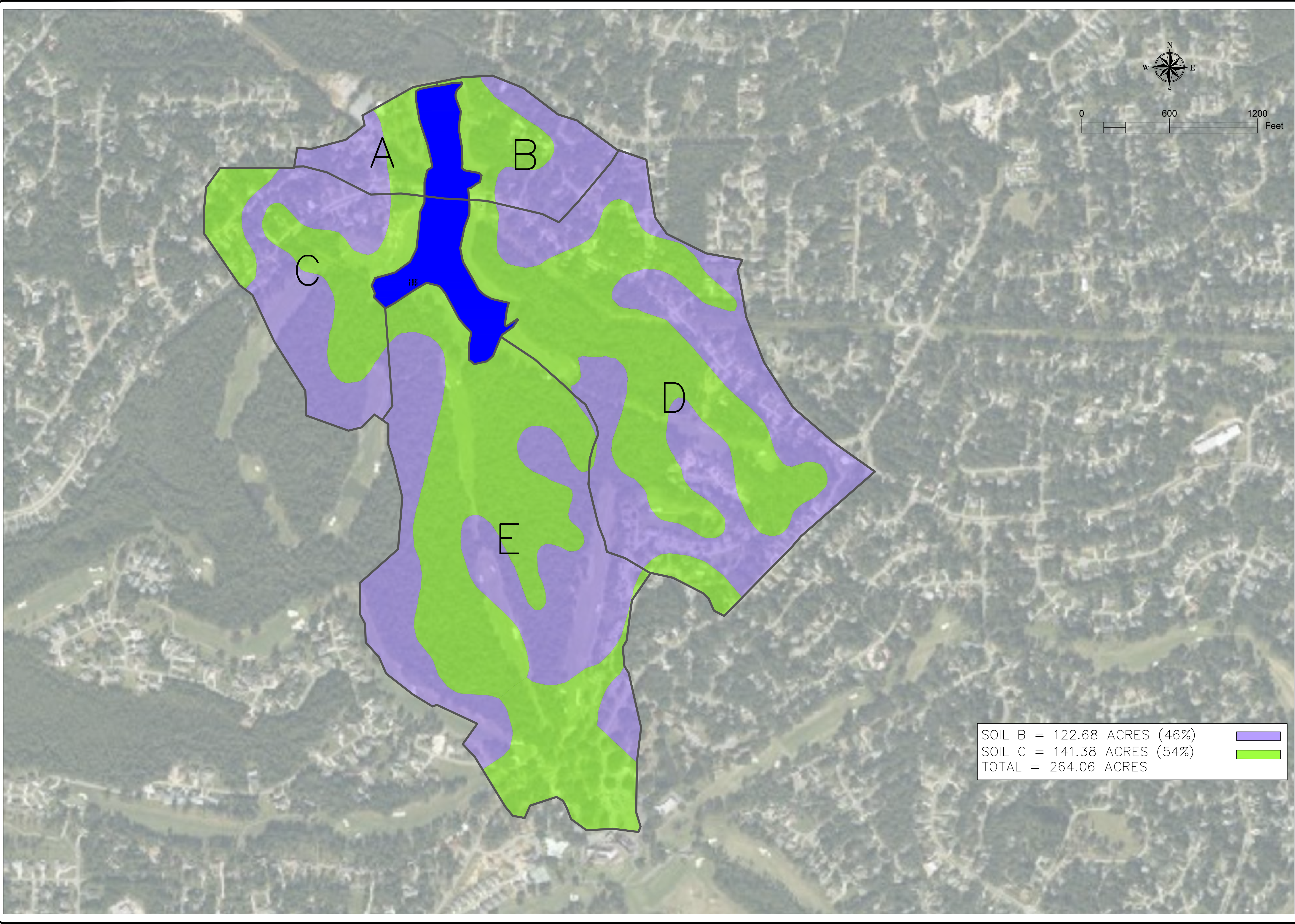
Table 5 – Composite Runoff Curve Number per Sub-Basin

4.4 Rainfall

Rainfall data for Diamondhead, Mississippi was obtained from the NOAA Precipitation Data Frequency Server for use in the analysis. Table 6 lists the point rainfall amounts for the City of Diamondhead.

Point Rainfall Amounts (inches)						
1-yr	2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
4.4	5.0	7.0	8.2	9.4	10.5	11.7

Table 6 - Diamondhead Rainfall Frequency Chart



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DIAMONDHEAD, MISSISSIPPI

4.5 Hydrographs

Peak flows were computed for each sub-basin. This was accomplished using the computer program Hydraflow Hydrographs by Intelisolve, using the XX method, rainfall data for Diamondhead, a 5-minute hydrograph interval and a Type III rainfall distribution. Peak flows entering the upper lake (south lake) from Sub-basins C, D, and E were combined and then routed through the upper lake outlet structure. The resulting outflow hydrograph from the upper lake (south lake) was then combined with peak flows from Sub-basins A and B entering the lower lake (north lake), and this combined hydrograph was routed through the lower lake outlet structure. The results of the hydrograph routing analysis are shown in Tables 7 through 9. Detailed results for all Sub-Basins can be found in the Appendix.

Existing	1 yr.	2 yr.	5 yr.	10 yr.	25 yr.	50 yr.	100 yr.
Upper lake inflow, cfs	304	371	599	738	877	1004	1143
High water elevation, ft.	36.9	37.2	38.1	38.6	39.0	39.3	39.5
Upper lake outflow, cfs	138	179	276	310	412	568	744

Lower lake inflow, cfs	146	189	291	327	432	595	777
High water elevation, ft.	30.7	30.8	31.1	31.1	31.3	31.6	31.9
Lower lake outflow, cfs	143	185	290	326	425	578	753

Table 7 – Existing Conditions Peak Flows and Peak Water-Surface Elevations

Future (No Improvements) 1 yr. 2 yr. 5 yr. 10 yr. 25 yr. 50 yr. 100 yr.

Upper lake inflow, cfs	389	463	709	857	1004	1139	1285
High water elevation, Ft.	37.2	37.5	38.4	38.9	39.2	39.4	39.6
Upper lake outflow, cfs	184	221	297	369	528	699	879

Lower lake inflow, cfs	194	232	313	388	552	729	915
High water elevation, ft.	30.9	30.9	31.1	31.3	31.5	31.8	32.1
Lower lake outflow, cfs	190	229	312	383	536	706	878

Lower Lake Outflow, cfs							
Diff. Proposed vs. Existing Flow	47	44	22	57	111	128	125

Upper Lake Elevation, ft.							
Diff. Proposed vs. Existing Elevation	0.3	0.3	0.3	0.3	0.2	0.1	0.1

Lower Lake Elevation, ft.							
Diff. Proposed vs. Existing Elevation	0.2	0.1	0.0	0.2	0.2	0.2	0.2

Table 8 – Future Conditions (No Improvements) Peak Flows and Peak Water-Surface Elevations

Future (with Berm)	1 yr.	2 yr.	5 yr.	10 yr.	25 yr.	50 yr.	100 yr.
Upper lake inflow, cfs	389	463	709	857	1004	1139	1285
High water elevation, ft.	36.7	37.1	38.1	38.7	39.2	39.7	40.2
Upper lake outflow, cfs	151	175	280	316	346	370	391
Lower lake inflow, cfs	160	185	296	335	367	398	459
High water elevation, ft.	30.8	30.8	31.1	31.2	31.2	31.3	31.3
Lower lake outflow, cfs	158	183	294	333	366	392	433
Lower Lake Outflow, cfs Diff. Proposed vs. Existing	15	-2	4	7	-59	-186	-320
Upper Lake Elevation, ft. Diff. Proposed vs. Existing	-0.2	-0.1	0	0.1	0.2	0.4	0.7
Lower Lake Elevation, ft. Diff. Proposed vs. Existing	0.1	0.0	0.0	0.1	-0.1	-0.3	-0.6

Table 9 – Future Conditions (With Berm) Peak Flows and Peak Water-Surface Elevations

5.0 Conclusions

5.1 Existing and Future with On-Site Detention (Existing Storm Water Ordinance Remains)

For a 100-year recurrence interval storm under Existing Conditions and Future Conditions with on-site detention per existing Storm Water Ordinance, the Upper Lake inflow from Sub-basins C, D, and E is expected to have a peak inflow of 1,143 cfs. The outflow is predicted to be 744 cfs, with a maximum water-surface elevation of 39.5-ft. Note that this would result in overtopping Diamondhead Drive West by about 10-inches during a 100-year storm near the northeast corner of the Upper Lake.

For a 100-year recurrence interval storm under Existing conditions and Future Conditions with on-site detention per existing Storm Water Ordinance, the Lower Lake inflow is expected to have a peak outflow of 777 cfs from the upper lake and Sub-Basins A and B. The outflow is predicted to be 753 cfs, with a maximum water-surface elevation of 31.9-ft. Note that this elevation is near the top of the wooden bulkhead but would not encroach on the house adjacent to the lower lake or overtop the dam at the north end of the lower lake.

5.2 Future Conditions with No On-Site Detention and No Improvements (Existing Storm Water Ordinance Modified)

For a 100-year recurrence interval storm under Future conditions without on-site detention (Existing Storm Water Ordinance is modified) and no improvements, the Upper Lake inflow is expected to have a peak inflow of 1,285 cfs. The outflow is predicted to be 879 cfs, with a maximum water-surface elevation of 39.6-ft. Note that this would result in overtopping of Diamondhead Drive by about 11-inches near the northeast corner of the Upper Lake.

For a 100-year recurrence interval storm under Future conditions without on-site detention (Existing Storm Water Ordinance is modified) and no improvements, the Lower Lake inflow is expected to have a peak inflow of 915 cfs. The outflow is predicted to be 878 cfs, with a maximum water-surface elevation of 32.1-ft. Note that this elevation is near the top of the wooden bulkhead but would not encroach on the house adjacent to the lower lake or overtop the dam at the north end of the lower lake. The increased outflow, however, may impact drainage under Kapalama Drive. The potential impact on Kapalama Drive was not investigated under this study but should be investigated before the City of Diamondhead decides whether to use Twin Lakes as a Regional Detention Facility and allow no on-site detention (Modify existing Storm Water Ordinance).

5.3 Future Conditions with No On-Site Detention and Berm South of Diamondhead Drive West (Existing Storm Water Ordinance Modified)

Attenuation of the Future condition peak flows into the Upper Lake with no on-site detention could be achieved by constructing a berm on the upstream side of the Upper Lake dam (south of Diamondhead Drive West), with a crest of about elevation 41-ft. The berm would tie into high ground at the end of the levee/road and may have to encroach into the water in order to maintain a safe distance from the traffic on Diamondhead Drive West. The weir 'box' of the outlet structure may also need to be modified or replaced.

For a 100-year recurrence interval storm under Future conditions with no on-site detention and a berm, the Upper Lake inflow is expected to have a peak of 1,285 cfs. The outflow is predicted to be 391 cfs, with a maximum water-surface elevation of 40.2-ft. Note that this would result in an increase of about 0.7-ft in the water surface elevation of the Upper Lake over that of Existing conditions and Future conditions with on-site detention being required, but no flooding of Diamondhead Drive West, due to the berm being in place.

For a 100-year recurrence interval storm under Future conditions with no on-site detention and a berm, the Lower Lake inflow is expected to have a peak of 459 cfs. The outflow is predicted to be 433 cfs, with a maximum water-surface elevation of 31.3-ft. This elevation is about 0.6-ft lower than that of the Existing conditions and Future conditions with on-site detention.

6.0 Recommendations

If Twin Lakes is not used as Regional Detention Facility, the existing Storm Water Ordinance should remain in effect for this area and, if desired, the City of Diamondhead may want to investigate how to lower the 100-year storm elevation in the upper lake to prevent flooding of Diamondhead Drive West (10-inches) during a 100-year storm.

If Twin Lakes is to be used as a Regional Detention Facility (Existing Storm Water Ordinance modified to not require on-site detention within the Twin Lakes Drainage Basin), further evaluation is needed to determine the effect the increased flow from the lower lake (Table 7) will have on drainage under Kapalama Drive, costs for any necessary improvements to drainage under Kapalama Drive or construction of a berm south of Diamondhead Drive West and possibly the staging of any improvements based on future growth within the Twin Lakes Drainage Basin.

Under the City's Flood Damage Prevention Ordinance, a Community Flood Hazard Area could be designated for the area around the Upper Lake (South Lake) which will be inundated during the 100-year flood. If the existing Stormwater Management Ordinance remains in effect, the Community Flood Hazard Area Base Flood Elevation should be set at 40.5-ft (1-ft above the 100-year flood elevation). Figure 7 shows the area around the Upper Lake (South Lake) below 40.5'ft (Community Flood Hazard Area Base Flood Elevation). If Twin Lakes is used as a Regional Detention Facility but no improvements are undertaken, the Community Flood Hazard Area Base Flood Elevation should be set at 40.6-ft (1-ft above 100-year flood elevation). The Base Flood Elevation should be set at 41.2 if the berm is constructed south of Diamondhead Drive West.



NO.	DATE	REVISION / ISSUE				

EVALUATION OF TWIN LAKES
REGIONAL DETENTION FACILITY

CITY OF DIAMONDHEAD
DIAMONDHEAD, MISSISSIPPI

TWIN LAKES
REGIONAL DETENTION ANALYSIS

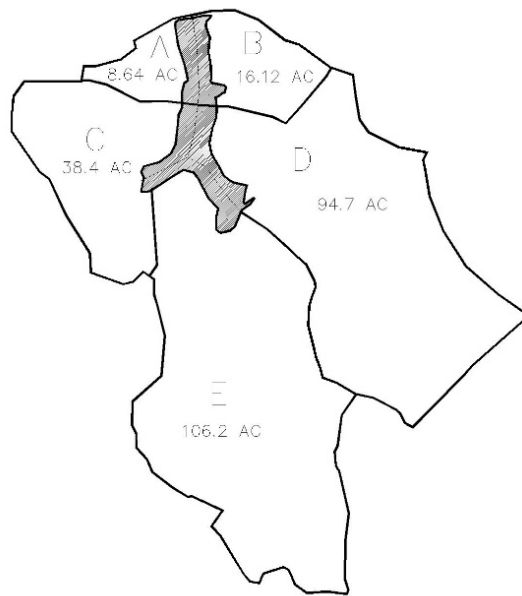
APPENDIX

DETAILED COMPOSITE CURVE NUMBER CALCULATIONS

HYDROGRAPH OUTPUT:

EXISTING CONDITIONS
FUTURE NO ACTION CONDITIONS
PROPOSED CONDITIONS

DETAILED COMPOSITE CURVE NUMBER CALCULATIONS



SUMMARY	Valley Slope	Length	D.A.
Area A	4.6	907	8.6
Area B	4.6	1145	16.1
Area C	5.7	1364	38.4
Area D	6.6	3313	94.7
Area E	5.2	3712	106.2

Curve numbers for land use types – from NRCS guidance		
	Type B	Type C
PSP/PFR	86	89
VACANT LAND	70	77
ROAD	98	98
SINGLE FAMILY	78	85
MANUF HOME	83	88
MULTIFAMILY	80	86
UTILITY	61	74
LOW DEN	78	85
MED DEN	78	85
HI DEN	87	91

EXISTING LAND USE	Percent	Acres
Area A		
PSP	47	4.09
VACANT LAND	11	0.94
ROAD	13	1.13
SINGLE FAMILY	29	2.48
Area B		
PSP	2	0.27
VACANT LAND	30	4.86
ROAD	15	2.49
SINGLE FAMILY	50	8.06
MANUF HOME	3	0.44
Area C		
PSP	28	10.87
VACANT LAND	40	15.53
ROAD	10	4.00
SINGLE FAMILY	21	8.00
Area D		
PSP	15	14.46
VACANT LAND	37	34.64
ROAD	8	7.74
SINGLE FAMILY	22	20.87
MANUF HOME	0.4	0.35
MULTIFAMILY	12	11.70
UTILITY	5	4.93
Area E		
SINGLE FAMILY	0.5	0.52
PSP	28	30.22
VACANT LAND	66	70.24
MULTIFAMILY	5	5.22

FUTURE LAND USE	Percent	Acres
Area A		
PFR	47	4.08
ROAD	13	1.13
MEDIUM DENSITY	40	3.43
Area B		
PFR	2	0.27
ROAD	15	2.49
MEDIUM DENSITY	66	10.70
MANUF HOME	16	2.65
Area C		
PFR	28	10.85
ROAD	10	3.99
MEDIUM DENSITY	61	23.56
Area D		
PFR	19	18.38
ROAD	8	7.68
MANUF HOME	0.4	0.35
LOW DENSITY	27	25.76
MEDIUM DENSITY	26	24.92
HIGH DENSITY	19	17.61
Area E		
PFR	28	30.04
LOW DENSITY	32	34.30
MEDIUM DENSITY	26	27.61
HIGH DENSITY	13	14.25

EXISTING CONDITIONS COMPOSTE CN % of land use x CN x % of soil group							Composite CN
Area A							
		% Type B			% Type C		
PSP	47% x 86 x 50%'	0.5	20.35	47% x 89 x 50%'	0.5	21.06	
VACANT LAND	11% x70 x 50%'	0.5	3.79	11% x77 x 50%'	0.5	4.17	
ROAD	13% x 98 x 50%'	0.5	6.41	13% x 98 x 50%'	0.5	6.41	
SINGLE FAMILY	29% x78 x 50%'	0.5	11.22	29% x85 x 50%'	0.5	12.22	85.6
			41.77			43.86	
Area B							
PSP	2% x 86 x 58%'	0.58	0.84	2% x 86 x 42%'	0.42	0.63	
VACANT LAND	30% x70 x 58%'	0.58	12.24	30% x70 x 42%'	0.42	9.75	
ROAD	15% x 98 x 58%'	0.58	8.78	15% x 98 x 42%'	0.42	6.36	
SINGLE FAMILY	50% x78 x 58%'	0.58	22.61	50% x78 x 42%'	0.42	17.84	
MANUF HOME	3% x 83 x 58%'	0.58	1.24	3% x 88 x 42%'	0.42	0.98	81.3
			45.71			35.56	
Area C							
PSP	28% x 86 x 53%'	0.53	12.90	28% x 89 x 47%'	0.47	11.84	
VACANT LAND	40% x70 x 53%'	0.53	15.01	40% x77 x 47%'	0.47	14.64	
ROAD	10% x 98 x 53%'	0.53	5.41	10% x 98 x 47%'	0.47	4.79	
SINGLE FAMILY	21% x78 x 53%'	0.53	8.62	21% x85 x 47%'	0.47	8.33	81.5
			41.93			39.60	

EXISTING CONDITIONS COMPOSTE CN % of land use x CN x % of soil group							Composite CN
Area D							
PSP	15% x 86 x 50%'	0.5	6.57	15% x 89 x 50%'	0.5	6.80	
VACANT LAND	37% x 70 x 50%'	0.5	12.80	37% x 77 x 50%'	0.5	14.08	
ROAD	8% x 98 x 50%'	0.5	4.00	8% x 98 x 50%'	0.5	4.00	
SINGLE FAMILY	22% x 78 x 50%'	0.5	8.60	22% x 85 x 50%'	0.5	9.37	
MANUF HOME	.4% x 83 x 50%'	0.5	0.15	.4% x 88 x 50%'	0.5	0.16	
MULTIFAMILY	12% x 80 x 50%'	0.5	4.94	13% x 86 x 50%'	0.5	5.31	
UTILITY	5% x 61 x 50%'	0.5	1.59	5% x 74 x 50%'	0.5	1.93	80.3
			38.66			41.65	
Area E							
SINGLE FAMILY	0.5% x 78 x 39%'	0.39	0.15	0.5% x 85 x 61%'	0.61	0.26	
PSP	28% x 86 x 39%'	0.39	9.54	28% x 89 x 61%'	0.61	15.45	
VACANT LAND	66% x 70 x 39%'	0.39	18.06	66% x 77 x 61%'	0.61	31.06	78.2
MULTIFAMILY	5% x 80 x 39%'	0.39	1.53	5% x 86 x 61%'	0.61	2.58	
			29.13			49.09	

FUTURE CONDITIONS COMPOSTE CN % of land use x CN x % of soil group							Composite CN
Area A							
		% Type B			% Type C		
PFR	47% x 86 x 50%'	0.5	20.3	47% x 89 x 50%'	0.5	21.	
ROAD	13% x 98 x 50%'	0.5	6.4	13% x 98 x 50%'	0.5	6.4	
MED DENSITY	40% x 78 x 50%'	0.5	15.5	29% x 85 x 50%'	0.5	16.9	86.5
			42.2			44.3	
Area B							
PFR	2% x 86 x 58%'	0.58	0.8	2% x 89 x 42%'	0.42	0.6	
ROAD	15% x 98 x 58%'	0.58	8.8	15% x 98 x 42%'	0.42	6.4	
MED DENSITY	66% x 78 x 58%'	0.58	30.0	66% x 85 x 42%'	0.42	23.7	
MANUF HOME	16% x 83 x 58%'	0.58	7.9	16% x 88 x 42%'	0.42	6.1	84.4
			47.6			36.8	
Area C							
PFR	28% x 86 x 53%'	0.53	12.9	28% x 89 x 47%'	0.47	11.8	
ROAD	10% x 98 x 53%'	0.53	5.4	10% x 98 x 47%'	0.47	4.8	
MED DENSITY	61% x 78 x 53%'	0.53	25.4	61% x 85 x 47%'	0.47	24.5	84.8
			43.6			41.1	

FUTURE CONDITIONS COMPOSTE CN % of land use x CN x % of soil group							Composite CN
Area D							
PFR	19% x 86 x 50%'	0.5	8.3	19% x 89 x 50%'	0.5	8.6	
ROAD	8% x 98 x 50%'	0.5	4.0	8% x 98 x 50%'	0.5	4.0	
MANUF HOME	.4% x 83 x 50%'	0.5	0.2	.4% x 88 x 50%'	0.5	0.2	
LOW DENSITY	27% x 78 x 50%'	0.5	10.6	27% x 85 x 50%'	0.5	11.6	
MED DENSITY	26% x 78 x 50%'	0.5	10.3	26% x 85 x 50%'	0.5	11.2	
HIGH DENSITY	19% x 87 x 50%'	0.5	8.1	19% x 91 x 50%'	0.5	8.5	85.4
			41.4			44.0	
Area E							
PFR	28% x 86 x 39%'	0.39	9.5	28% x 89 x 61%'	0.61	15.4	
LOW DENSITY	32% x 78 x 39%'	0.39	9.8	32% x 85 x 61%'	0.61	16.7	
MEDIUM DENSITY	26% x 78 x 39%'	0.39	7.9	26% x 85 x 61%'	0.61	13.5	
HIGH DENSITY	13% x 87 x 39%'	0.39	4.6	13% x 91 x 61%'	0.61	7.4	84.8
			31.8			53.0	

HYDROGRAPH OUTPUT:

EXISTING CONDITIONS

Reservoir Report

EXISTING CONDITIONS

Page 1

Reservoir No. 2 - Upper lake w culverts

Hydraflow Hydrographs by Intelisolve

Pond Data

Pond storage is based on known contour areas. Average end area method used.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	32.70	10	0	0
1.30	34.00	11	14	14
3.30	36.00	388,745	388,756	388,770
5.30	38.00	683,712	1,072,457	1,461,227
7.30	40.00	966,954	1,650,666	3,111,893

Culvert / Orifice Structures

	[A]	[B]	[C]	[D]
Rise in	= 36.0	0.0	0.0	0.0
Span in	= 45.6	0.0	0.0	0.0
No. Barrels	= 3	0	0	0
Invert El. ft	= 32.70	0.00	0.00	0.00
Length ft	= 90.0	0.0	0.0	0.0
Slope %	= 6.40	0.00	0.00	0.00
N-Value	= .013	.000	.000	.000
Orif. Coeff.	= 0.60	0.00	0.00	0.00
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len ft	= 0.00	23.00	100.00	200.00
Crest El. ft	= 0.00	35.40	38.60	39.00
Weir Coeff.	= 3.33	3.33	2.60	2.60
Weir Type	= ---	Riser	Broad	Broad
Multi-Stage	= No	Yes	No	No

Exfiltration Rate = 0.00 in/hr/sqft Tailwater Elev. = 0.00 ft

Note: All outflows have been analyzed under inlet and outlet control.

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Total cfs
0.00	0	32.70	0.00	---	---	---	---	0.00	0.00	0.00	---	0.00
1.30	14	34.00	0.00	---	---	---	---	0.00	0.00	0.00	---	0.00
3.30	388,770	36.00	35.60	---	---	---	---	35.60	0.00	0.00	---	35.60
5.30	1,461,227	38.00	265.14	---	---	---	---	265.13	0.00	0.00	---	265.13
7.30	3,111,893	40.00	378.27	---	---	---	---	378.24	430.69	520.00	---	1328.93

Reservoir Report

EXISTING CONDITIONS

Page 1

Reservoir No. 3 - Lower lake

Hydraflow Hydrographs by Intelisolve

Pond Data

Pond storage is based on known contour areas. Average end area method used.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	30.00	189,715	0	0
2.00	32.00	237,343	427,058	427,058
4.00	34.00	305,306	542,649	969,707
6.00	36.00	377,121	682,427	1,652,134

Culvert / Orifice Structures

	[A]	[B]	[C]	[D]
Rise in	= 30.0	0.0	0.0	0.0
Span in	= 30.0	0.0	0.0	0.0
No. Barrels	= 41	0	0	0
Invert El. ft	= 30.00	0.00	0.00	0.00
Length ft	= 50.0	0.0	0.0	0.0
Slope %	= 6.60	0.00	0.00	0.00
N-Value	= .013	.000	.000	.000
Orif. Coeff.	= 0.60	0.00	0.00	0.00
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len ft	= 12.00	250.00	0.00	0.00
Crest El. ft	= 31.60	33.00	0.00	0.00
Weir Coeff.	= 3.33	2.60	0.00	0.00
Weir Type	= Cipiti	Broad	---	---
Multi-Stage	= No	No	No	No

Exfiltration Rate = 0.00 in/hr/sqft Tailwater Elev. = 0.00 ft

Note: All outflows have been analyzed under inlet and outlet control.

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Total cfs
0.00	0	30.00	0.00	---	---	---	0.00	0.00	---	---	---	0.00
2.00	427,058	32.00	831.29	---	---	---	10.11	0.00	---	---	---	841.40
4.00	969,707	34.00	1606.79	---	---	---	148.57	650.00	---	---	---	2405.37
6.00	1,652,134	36.00	2111.74	---	---	---	368.81	3377.50	---	---	---	5858.05

Hyd. No. 1

Area A Existing

Hydrograph type	=	SCS Runoff	Peak discharge	=	21.06 cfs
Storm frequency	=	1 yrs	Time interval	=	5 min
Drainage area	=	8.64 ac	Curve number	=	85.6
Basin Slope	=	4.6 %	Hydraulic length	=	907 ft
Tc method	=	LAG	Time of conc. (Tc)	=	11.3 min
Total precip.	=	4.40 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 84,499 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.17 21.06 <<

...End

Hyd. No. 2

Area B Existing

Hydrograph type	=	SCS Runoff	Peak discharge	=	34.34 cfs
Storm frequency	=	1 yrs	Time interval	=	5 min
Drainage area	=	16.12 ac	Curve number	=	81.3
Basin Slope	=	4.6 %	Hydraulic length	=	1145 ft
Tc method	=	LAG	Time of conc. (Tc)	=	15.8 min
Total precip.	=	4.40 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 136,470 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.17 34.34 <<

...End

Hyd. No. 3

Area C Existing

Hydrograph type	=	SCS Runoff	Peak discharge	=	72.82 cfs
Storm frequency	=	1 yrs	Time interval	=	5 min
Drainage area	=	38.40 ac	Curve number	=	81.5
Basin Slope	=	5.7 %	Hydraulic length	=	2270 ft
Tc method	=	LAG	Time of conc. (Tc)	=	24.5 min
Total precip.	=	4.40 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 349,178 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.25 72.82 <<

...End

Hyd. No. 4

Area D Existing

Hydrograph type	=	SCS Runoff	Peak discharge	=	133.37 cfs
Storm frequency	=	1 yrs	Time interval	=	5 min
Drainage area	=	94.70 ac	Curve number	=	80.3
Basin Slope	=	6.6 %	Hydraulic length	=	4382 ft
Tc method	=	LAG	Time of conc. (Tc)	=	40 min
Total precip.	=	4.40 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 805,065 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.42 133.37 <<

...End

Hyd. No. 5

Area E Existing

Hydrograph type	=	SCS Runoff	Peak discharge	=	115.68 cfs
Storm frequency	=	1 yrs	Time interval	=	5 min
Drainage area	=	106.20 ac	Curve number	=	78.2
Basin Slope	=	5.2 %	Hydraulic length	=	4901 ft
Tc method	=	LAG	Time of conc. (Tc)	=	52.6 min
Total precip.	=	4.40 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 873,797 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.67 115.68 <<

...End

Hyd. No. 6

Upper lake area

Hydrograph type	=	SCS Runoff	Peak discharge	=	28.49 cfs
Storm frequency	=	1 yrs	Time interval	=	5 min
Drainage area	=	9.10 ac	Curve number	=	99
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	8 min
Total precip.	=	4.40 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 132,578 cuft

Hydrograph Discharge Table

Time -- Outflow
(hrs cfs)

12.17 28.49 <<

...End

Hyd. No. 7

Lower lake area

Hydrograph type = SCS Runoff
Storm frequency = 1 yrs
Drainage area = 4.90 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 4.40 in
Storm duration = 24 hrs

Peak discharge = 15.34 cfs
Time interval = 5 min
Curve number = 99
Hydraulic length = 0 ft
Time of conc. (Tc) = 8 min
Distribution = Type III
Shape factor = 484

Hydrograph Volume = 71,388 cuft

Hydrograph Discharge Table

Time -- Outflow
(hrs cfs)

12.17 15.34 <<

...End

Hyd. No. 8

Upper Lake Inflow

Hydrograph type = Combine

Storm frequency = 1 yrs

Inflow hyds. = 3, 4, 5, 6

Peak discharge = 304.41 cfs

Time interval = 5 min

Hydrograph Volume = 2,160,617 cuft

Hydrograph Discharge Table

Time (hrs)	Hyd. 3 + (cfs)	Hyd. 4 + (cfs)	Hyd. 5 + (cfs)	Hyd. 6 + (cfs)	Outflow (cfs)
12.42	61.36	133.37 <<	97.28	12.41	304.41 <<
...End					

Hyd. No. 9

Route thru Upper Lake

Hydrograph type	= Reservoir	Peak discharge	= 137.53 cfs
Storm frequency	= 1 yrs	Time interval	= 5 min
Inflow hyd. No.	= 8	Reservoir name	= Upper lake w culv
Max. Elevation	= 36.88 ft	Max. Storage	= 858,382 cuft

Storage Indication method used.

Outflow hydrograph volume = 1,888,468 cuft

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
13.08	145.24	36.88 <<	137.54	-----	-----	-----	-----	137.53	-----	-----	-----	137.53 <<

...End

Hyd. No. 10

Inflow to lower

Hydrograph type = Combine

Storm frequency = 1 yrs

Inflow hyds. = 1, 2, 7, 9

Peak discharge = 145.93 cfs

Time interval = 5 min

Hydrograph Volume = 2,180,827 cuft

Hydrograph Discharge Table

Time (hrs)	Hyd. 1 + (cfs)	Hyd. 2 + (cfs)	Hyd. 7 + (cfs)	Hyd. 9 = (cfs)	Outflow (cfs)
13.08	2.49	4.28	1.63	137.53 <<	145.93 <<
...End					

Hyd. No. 11

Routed thru Lower Lake

Hydrograph type	= Reservoir	Peak discharge	= 142.83 cfs
Storm frequency	= 1 yrs	Time interval	= 5 min
Inflow hyd. No.	= 10	Reservoir name	= Lower lake
Max. Elevation	= 30.73 ft	Max. Storage	= 154,965 cuft

Storage Indication method used. Outflow hydrograph volume = 2,180,823 cuft

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
13.25	143.72	30.73 <<	142.83	-----	-----	-----	-----	-----	-----	-----	-----	142.83 <<

...End

Hyd. No. 1

Area A Existing

Hydrograph type	= SCS Runoff	Peak discharge	= 24.96 cfs
Storm frequency	= 2 yrs	Time interval	= 5 min
Drainage area	= 8.64 ac	Curve number	= 85.6
Basin Slope	= 4.6 %	Hydraulic length	= 907 ft
Tc method	= LAG	Time of conc. (Tc)	= 11.3 min
Total precip.	= 5.00 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 100,772 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.17 24.96 <<

...End

Hyd. No. 2

Area B Existing

Hydrograph type	=	SCS Runoff	Peak discharge	=	41.48 cfs
Storm frequency	=	2 yrs	Time interval	=	5 min
Drainage area	=	16.12 ac	Curve number	=	81.3
Basin Slope	=	4.6 %	Hydraulic length	=	1145 ft
Tc method	=	LAG	Time of conc. (Tc)	=	15.8 min
Total precip.	=	5.00 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 165,306 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.17 41.48 <<

...End

Hyd. No. 3

Area C Existing

Hydrograph type	=	SCS Runoff	Peak discharge	=	88.05 cfs
Storm frequency	=	2 yrs	Time interval	=	5 min
Drainage area	=	38.40 ac	Curve number	=	81.5
Basin Slope	=	5.7 %	Hydraulic length	=	2270 ft
Tc method	=	LAG	Time of conc. (Tc)	=	24.5 min
Total precip.	=	5.00 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 422,642 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.25 88.05 <<

...End

Hyd. No. 4

Area D Existing

Hydrograph type	=	SCS Runoff	Peak discharge	=	162.40 cfs
Storm frequency	=	2 yrs	Time interval	=	5 min
Drainage area	=	94.70 ac	Curve number	=	80.3
Basin Slope	=	6.6 %	Hydraulic length	=	4382 ft
Tc method	=	LAG	Time of conc. (Tc)	=	40 min
Total precip.	=	5.00 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 978,843 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.42 162.40 <<

...End

Hyd. No. 5

Area E Existing

Hydrograph type	=	SCS Runoff	Peak discharge	=	142.17 cfs
Storm frequency	=	2 yrs	Time interval	=	5 min
Drainage area	=	106.20 ac	Curve number	=	78.2
Basin Slope	=	5.2 %	Hydraulic length	=	4901 ft
Tc method	=	LAG	Time of conc. (Tc)	=	52.6 min
Total precip.	=	5.00 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 1,071,063 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.67 142.17 <<

...End

Hyd. No. 6

Upper lake area

Hydrograph type	=	SCS Runoff	Peak discharge	=	32.39 cfs
Storm frequency	=	2 yrs	Time interval	=	5 min
Drainage area	=	9.10 ac	Curve number	=	99
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	8 min
Total precip.	=	5.00 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 151,151 cuft

Hydrograph Discharge Table

Time -- Outflow
(hrs cfs)

12.17 32.39 <<

...End

Hyd. No. 7

Lower lake area

Hydrograph type = SCS Runoff
Storm frequency = 2 yrs
Drainage area = 4.90 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 5.00 in
Storm duration = 24 hrs

Peak discharge = 17.44 cfs
Time interval = 5 min
Curve number = 99
Hydraulic length = 0 ft
Time of conc. (Tc) = 8 min
Distribution = Type III
Shape factor = 484

Hydrograph Volume = 81,389 cuft

Hydrograph Discharge Table

Time -- Outflow
(hrs cfs)

12.17 17.44 <<

...End

Hyd. No. 8

Upper Lake Inflow

Hydrograph type = Combine

Storm frequency = 2 yrs

Inflow hyds. = 3, 4, 5, 6

Peak discharge = 370.93 cfs

Time interval = 5 min

Hydrograph Volume = 2,623,699 cuft

Hydrograph Discharge Table

Time (hrs)	Hyd. 3 + (cfs)	Hyd. 4 + (cfs)	Hyd. 5 + (cfs)	Hyd. 6 + (cfs)	Outflow (cfs)
12.42	73.58	162.40 <<	120.85	14.11	370.93 <<
...End					

Hyd. No. 9

Route thru Upper Lake

Hydrograph type	= Reservoir	Peak discharge	= 178.66 cfs
Storm frequency	= 2 yrs	Time interval	= 5 min
Inflow hyd. No.	= 8	Reservoir name	= Upper lake w culv
Max. Elevation	= 37.16 ft	Max. Storage	= 1,013,277 cuft

Storage Indication method used.

Outflow hydrograph volume = 2,351,552 cuft

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
13.08	174.67	37.16 <<	178.67	-----	-----	-----	-----	178.66	-----	-----	-----	178.66 <<

...End

Hyd. No. 10

Inflow to lower

Hydrograph type = Combine
Storm frequency = 2 yrs
Inflow hyds. = 1, 2, 7, 9

Peak discharge = 188.59 cfs
Time interval = 5 min

Hydrograph Volume = 2,699,017 cuft

Hydrograph Discharge Table

Time (hrs)	Hyd. 1 + (cfs)	Hyd. 2 + (cfs)	Hyd. 7 + (cfs)	Hyd. 9 = (cfs)	Outflow (cfs)
13.00	3.16	5.48	2.01	177.93	188.59 <<
...End					

Hyd. No. 11

Routed thru Lower Lake

Hydrograph type	= Reservoir	Peak discharge	= 185.47 cfs
Storm frequency	= 2 yrs	Time interval	= 5 min
Inflow hyd. No.	= 10	Reservoir name	= Lower lake
Max. Elevation	= 30.84 ft	Max. Storage	= 178,778 cuft

Storage Indication method used.

Outflow hydrograph volume = 2,699,015 cuft

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
13.17	186.72	30.84	185.48	-----	-----	-----	-----	-----	-----	-----	-----	185.47 <<

...End

Hyd. No. 1

Area A Existing

Hydrograph type	=	SCS Runoff	Peak discharge	=	37.97 cfs
Storm frequency	=	5 yrs	Time interval	=	5 min
Drainage area	=	8.64 ac	Curve number	=	85.6
Basin Slope	=	4.6 %	Hydraulic length	=	907 ft
Tc method	=	LAG	Time of conc. (Tc)	=	11.3 min
Total precip.	=	7.00 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 156,436 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.17 37.97 <<

...End

Hyd. No. 2

Area B Existing

Hydrograph type	=	SCS Runoff	Peak discharge	=	65.66 cfs
Storm frequency	=	5 yrs	Time interval	=	5 min
Drainage area	=	16.12 ac	Curve number	=	81.3
Basin Slope	=	4.6 %	Hydraulic length	=	1145 ft
Tc method	=	LAG	Time of conc. (Tc)	=	15.8 min
Total precip.	=	7.00 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 265,423 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.17 65.66 <<

...End

Hyd. No. 3

Area C Existing

Hydrograph type	=	SCS Runoff	Peak discharge	=	139.70 cfs
Storm frequency	=	5 yrs	Time interval	=	5 min
Drainage area	=	38.40 ac	Curve number	=	81.5
Basin Slope	=	5.7 %	Hydraulic length	=	2270 ft
Tc method	=	LAG	Time of conc. (Tc)	=	24.5 min
Total precip.	=	7.00 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 677,520 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.25 139.70 <<

...End

Hyd. No. 4

Area D Existing

Hydrograph type	=	SCS Runoff	Peak discharge	=	261.52 cfs
Storm frequency	=	5 yrs	Time interval	=	5 min
Drainage area	=	94.70 ac	Curve number	=	80.3
Basin Slope	=	6.6 %	Hydraulic length	=	4382 ft
Tc method	=	LAG	Time of conc. (Tc)	=	40 min
Total precip.	=	7.00 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 1,584,525 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.42 261.52 <<

...End

Hyd. No. 5

Area E Existing

Hydrograph type	=	SCS Runoff	Peak discharge	=	234.51 cfs
Storm frequency	=	5 yrs	Time interval	=	5 min
Drainage area	=	106.20 ac	Curve number	=	78.2
Basin Slope	=	5.2 %	Hydraulic length	=	4901 ft
Tc method	=	LAG	Time of conc. (Tc)	=	52.6 min
Total precip.	=	7.00 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 1,764,455 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.58 234.51 <<

...End

Hyd. No. 6

Upper lake area

Hydrograph type	=	SCS Runoff	Peak discharge	=	45.38 cfs
Storm frequency	=	5 yrs	Time interval	=	5 min
Drainage area	=	9.10 ac	Curve number	=	99
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	8 min
Total precip.	=	7.00 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 213,070 cuft

Hydrograph Discharge Table

Time -- Outflow
(hrs cfs)

12.17 45.38 <<

...End

Hyd. No. 7

Lower lake area

Hydrograph type	=	SCS Runoff	Peak discharge	=	24.44 cfs
Storm frequency	=	5 yrs	Time interval	=	5 min
Drainage area	=	4.90 ac	Curve number	=	99
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	8 min
Total precip.	=	7.00 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 114,730 cuft

Hydrograph Discharge Table

Time -- Outflow
(hrs cfs)

12.17 24.44 <<

...End

Hyd. No. 8

Upper Lake Inflow

Hydrograph type = Combine

Storm frequency = 5 yrs

Inflow hyds. = 3, 4, 5, 6

Peak discharge = 598.91 cfs

Time interval = 5 min

Hydrograph Volume = 4,239,571 cuft

Hydrograph Discharge Table

Time (hrs)	Hyd. 3 + (cfs)	Hyd. 4 + (cfs)	Hyd. 5 + (cfs)	Hyd. 6 + (cfs)	Outflow (cfs)
12.42	114.71	261.52 <<	202.92	19.76	598.91 <<
...End					

Hyd. No. 9

Route thru Upper Lake

Hydrograph type	= Reservoir	Peak discharge	= 275.69 cfs
Storm frequency	= 5 yrs	Time interval	= 5 min
Inflow hyd. No.	= 8	Reservoir name	= Upper lake w culv
Max. Elevation	= 38.14 ft	Max. Storage	= 1,575,254 cuft

Storage Indication method used.

Outflow hydrograph volume = 3,967,422 cuft

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
13.08	274.21	38.14 <<	275.69	-----	-----	-----	-----	275.69	-----	-----	-----	275.69 <<

...End

Hyd. No. 10

Inflow to lower

Hydrograph type = Combine
Storm frequency = 5 yrs
Inflow hyds. = 1, 2, 7, 9

Peak discharge = 290.90 cfs
Time interval = 5 min

Hydrograph Volume = 4,504,012 cuft

Hydrograph Discharge Table

Time (hrs)	Hyd. 1 + (cfs)	Hyd. 2 + (cfs)	Hyd. 7 + (cfs)	Hyd. 9 = (cfs)	Outflow (cfs)
13.00	4.64	8.28	2.82	275.16	290.90 <<
...End					

Hyd. No. 11

Routed thru Lower Lake

Hydrograph type	= Reservoir	Peak discharge	= 289.50 cfs
Storm frequency	= 5 yrs	Time interval	= 5 min
Inflow hyd. No.	= 10	Reservoir name	= Lower lake
Max. Elevation	= 31.07 ft	Max. Storage	= 227,735 cuft

Storage Indication method used. Outflow hydrograph volume = 4,504,005 cuft

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
13.08	290.17	31.07	289.50	-----	-----	-----	-----	-----	-----	-----	-----	289.50 <<

...End

Hyd. No. 1

Area A Existing

Hydrograph type	=	SCS Runoff	Peak discharge	=	45.73 cfs
Storm frequency	=	10 yrs	Time interval	=	5 min
Drainage area	=	8.64 ac	Curve number	=	85.6
Basin Slope	=	4.6 %	Hydraulic length	=	907 ft
Tc method	=	LAG	Time of conc. (Tc)	=	11.3 min
Total precip.	=	8.20 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 190,466 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.17 45.73 <<

...End

Hyd. No. 2

Area B Existing

Hydrograph type	=	SCS Runoff	Peak discharge	=	80.23 cfs
Storm frequency	=	10 yrs	Time interval	=	5 min
Drainage area	=	16.12 ac	Curve number	=	81.3
Basin Slope	=	4.6 %	Hydraulic length	=	1145 ft
Tc method	=	LAG	Time of conc. (Tc)	=	15.8 min
Total precip.	=	8.20 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 327,329 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.17 80.23 <<

...End

Hyd. No. 3

Area C Existing

Hydrograph type	=	SCS Runoff	Peak discharge	=	170.86 cfs
Storm frequency	=	10 yrs	Time interval	=	5 min
Drainage area	=	38.40 ac	Curve number	=	81.5
Basin Slope	=	5.7 %	Hydraulic length	=	2270 ft
Tc method	=	LAG	Time of conc. (Tc)	=	24.5 min
Total precip.	=	8.20 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 835,030 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.25 170.86 <<

...End

Hyd. No. 4

Area D Existing

Hydrograph type	=	SCS Runoff	Peak discharge	=	321.64 cfs
Storm frequency	=	10 yrs	Time interval	=	5 min
Drainage area	=	94.70 ac	Curve number	=	80.3
Basin Slope	=	6.6 %	Hydraulic length	=	4382 ft
Tc method	=	LAG	Time of conc. (Tc)	=	40 min
Total precip.	=	8.20 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 1,960,149 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.42 321.64 <<

...End

Hyd. No. 5

Area E Existing

Hydrograph type	=	SCS Runoff	Peak discharge	=	291.17 cfs
Storm frequency	=	10 yrs	Time interval	=	5 min
Drainage area	=	106.20 ac	Curve number	=	78.2
Basin Slope	=	5.2 %	Hydraulic length	=	4901 ft
Tc method	=	LAG	Time of conc. (Tc)	=	52.6 min
Total precip.	=	8.20 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 2,197,314 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.58 291.17 <<

...End

Hyd. No. 6

Upper lake area

Hydrograph type	=	SCS Runoff	Peak discharge	=	53.17 cfs
Storm frequency	=	10 yrs	Time interval	=	5 min
Drainage area	=	9.10 ac	Curve number	=	99
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	8 min
Total precip.	=	8.20 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 250,226 cuft

Hydrograph Discharge Table

Time -- Outflow
(hrs cfs)

12.17 53.17 <<

...End

Hyd. No. 7

Lower lake area

Hydrograph type	=	SCS Runoff	Peak discharge	=	28.63 cfs
Storm frequency	=	10 yrs	Time interval	=	5 min
Drainage area	=	4.90 ac	Curve number	=	99
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	8 min
Total precip.	=	8.20 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 134,737 cuft

Hydrograph Discharge Table

Time -- Outflow
(hrs cfs)

12.17 28.63 <<

...End

Hyd. No. 8

Upper Lake Inflow

Hydrograph type = Combine

Storm frequency = 10 yrs

Inflow hyds. = 3, 4, 5, 6

Peak discharge = 737.66 cfs

Time interval = 5 min

Hydrograph Volume = 5,242,718 cuft

Hydrograph Discharge Table

Time (hrs)	Hyd. 3 + (cfs)	Hyd. 4 + (cfs)	Hyd. 5 + (cfs)	Hyd. 6 + (cfs)	Outflow (cfs)
12.42	139.41	321.64 <<	253.47	23.15	737.66 <<
...End					

Hyd. No. 9

Route thru Upper Lake

Hydrograph type	= Reservoir	Peak discharge	= 310.32 cfs
Storm frequency	= 10 yrs	Time interval	= 5 min
Inflow hyd. No.	= 8	Reservoir name	= Upper lake w culv
Max. Elevation	= 38.62 ft	Max. Storage	= 1,970,453 cuft

Storage Indication method used.

Outflow hydrograph volume = 4,970,572 cuft

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
13.17	293.40	38.62	308.34	-----	-----	-----	-----	308.34	1.98	-----	-----	310.32 <<

...End

Hyd. No. 10

Inflow to lower

Hydrograph type = Combine
Storm frequency = 10 yrs
Inflow hyds. = 1, 2, 7, 9

Peak discharge = 327.36 cfs
Time interval = 5 min

Hydrograph Volume = 5,623,101 cuft

Hydrograph Discharge Table

Time (hrs)	Hyd. 1 + (cfs)	Hyd. 2 + (cfs)	Hyd. 7 + (cfs)	Hyd. 9 = (cfs)	Outflow (cfs)
13.08	5.08	9.15	3.04	310.09	327.36 <<
...End					

Hyd. No. 11

Routed thru Lower Lake

Hydrograph type	= Reservoir	Peak discharge	= 326.08 cfs
Storm frequency	= 10 yrs	Time interval	= 5 min
Inflow hyd. No.	= 10	Reservoir name	= Lower lake
Max. Elevation	= 31.14 ft	Max. Storage	= 243,282 cuft

Storage Indication method used. Outflow hydrograph volume = 5,623,093 cuft

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
13.17	326.43	31.14	326.08	-----	-----	-----	-----	-----	-----	-----	-----	326.08 <<

...End

Hyd. No. 1

Area A Existing

Hydrograph type	=	SCS Runoff	Peak discharge	=	53.45 cfs
Storm frequency	=	25 yrs	Time interval	=	5 min
Drainage area	=	8.64 ac	Curve number	=	85.6
Basin Slope	=	4.6 %	Hydraulic length	=	907 ft
Tc method	=	LAG	Time of conc. (Tc)	=	11.3 min
Total precip.	=	9.40 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 224,776 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.17 53.45 <<

...End

Hyd. No. 2

Area B Existing

Hydrograph type	=	SCS Runoff	Peak discharge	=	94.78 cfs
Storm frequency	=	25 yrs	Time interval	=	5 min
Drainage area	=	16.12 ac	Curve number	=	81.3
Basin Slope	=	4.6 %	Hydraulic length	=	1145 ft
Tc method	=	LAG	Time of conc. (Tc)	=	15.8 min
Total precip.	=	9.40 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 390,073 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.17 94.78 <<

...End

Hyd. No. 3

Area C Existing

Hydrograph type	=	SCS Runoff	Peak discharge	=	201.99 cfs
Storm frequency	=	25 yrs	Time interval	=	5 min
Drainage area	=	38.40 ac	Curve number	=	81.5
Basin Slope	=	5.7 %	Hydraulic length	=	2270 ft
Tc method	=	LAG	Time of conc. (Tc)	=	24.5 min
Total precip.	=	9.40 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 994,629 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.25 201.99 <<

...End

Hyd. No. 4

Area D Existing

Hydrograph type	=	SCS Runoff	Peak discharge	=	381.82 cfs
Storm frequency	=	25 yrs	Time interval	=	5 min
Drainage area	=	94.70 ac	Curve number	=	80.3
Basin Slope	=	6.6 %	Hydraulic length	=	4382 ft
Tc method	=	LAG	Time of conc. (Tc)	=	40 min
Total precip.	=	9.40 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 2,341,387 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.42 381.82 <<

...End

Hyd. No. 5

Area E Existing

Hydrograph type	=	SCS Runoff	Peak discharge	=	348.11 cfs
Storm frequency	=	25 yrs	Time interval	=	5 min
Drainage area	=	106.20 ac	Curve number	=	78.2
Basin Slope	=	5.2 %	Hydraulic length	=	4901 ft
Tc method	=	LAG	Time of conc. (Tc)	=	52.6 min
Total precip.	=	9.40 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 2,638,014 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.58 348.11 <<

...End

Hyd. No. 6

Upper lake area

Hydrograph type	=	SCS Runoff	Peak discharge	=	60.96 cfs
Storm frequency	=	25 yrs	Time interval	=	5 min
Drainage area	=	9.10 ac	Curve number	=	99
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	8 min
Total precip.	=	9.40 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 287,383 cuft

Hydrograph Discharge Table

Time -- Outflow
(hrs cfs)

12.17 60.96 <<

...End

Hyd. No. 7

Lower lake area

Hydrograph type	=	SCS Runoff	Peak discharge	=	32.83 cfs
Storm frequency	=	25 yrs	Time interval	=	5 min
Drainage area	=	4.90 ac	Curve number	=	99
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	8 min
Total precip.	=	9.40 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 154,745 cuft

Hydrograph Discharge Table

Time -- Outflow
(hrs cfs)

12.17 32.83 <<

...End

Hyd. No. 8

Upper Lake Inflow

Hydrograph type = Combine

Storm frequency = 25 yrs

Inflow hyds. = 3, 4, 5, 6

Peak discharge = 876.77 cfs

Time interval = 5 min

Hydrograph Volume = 6,261,411 cuft

Hydrograph Discharge Table

Time (hrs)	Hyd. 3 + (cfs)	Hyd. 4 + (cfs)	Hyd. 5 + (cfs)	Hyd. 6 + (cfs)	Outflow (cfs)
12.42	164.02	381.82 <<	304.40	26.54	876.77 <<
...End					

Hyd. No. 9

Route thru Upper Lake

Hydrograph type	= Reservoir	Peak discharge	= 411.60 cfs
Storm frequency	= 25 yrs	Time interval	= 5 min
Inflow hyd. No.	= 8	Reservoir name	= Upper lake w culv
Max. Elevation	= 39.03 ft	Max. Storage	= 2,309,072 cuft

Storage Indication method used.

Outflow hydrograph volume = 5,989,266 cuft

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
13.08	394.10	39.03	331.97	-----	-----	-----	-----	331.97	73.29	6.34	-----	411.60 <<

...End

Hyd. No. 10

Inflow to lower

Hydrograph type = Combine
Storm frequency = 25 yrs
Inflow hyds. = 1, 2, 7, 9

Peak discharge = 431.64 cfs
Time interval = 5 min

Hydrograph Volume = 6,758,856 cuft

Hydrograph Discharge Table

Time (hrs)	Hyd. 1 + (cfs)	Hyd. 2 + (cfs)	Hyd. 7 + (cfs)	Hyd. 9 = (cfs)	Outflow (cfs)
13.08	5.89	10.68	3.48	411.60 <<	431.64 <<
...End					

Hyd. No. 11

Routed thru Lower Lake

Hydrograph type	= Reservoir	Peak discharge	= 425.10 cfs
Storm frequency	= 25 yrs	Time interval	= 5 min
Inflow hyd. No.	= 10	Reservoir name	= Lower lake
Max. Elevation	= 31.32 ft	Max. Storage	= 282,616 cuft

Storage Indication method used.

Outflow hydrograph volume = 6,758,856 cuft

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
13.17	422.58	31.32	425.10	-----	-----	-----	-----	-----	-----	-----	-----	425.10 <<

...End

Hyd. No. 1

Area A Existing

Hydrograph type	=	SCS Runoff	Peak discharge	=	60.50 cfs
Storm frequency	=	50 yrs	Time interval	=	5 min
Drainage area	=	8.64 ac	Curve number	=	85.6
Basin Slope	=	4.6 %	Hydraulic length	=	907 ft
Tc method	=	LAG	Time of conc. (Tc)	=	11.3 min
Total precip.	=	10.50 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 256,400 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.17 60.50 <<

...End

Hyd. No. 2

Area B Existing

Hydrograph type	=	SCS Runoff	Peak discharge	=	108.08 cfs
Storm frequency	=	50 yrs	Time interval	=	5 min
Drainage area	=	16.12 ac	Curve number	=	81.3
Basin Slope	=	4.6 %	Hydraulic length	=	1145 ft
Tc method	=	LAG	Time of conc. (Tc)	=	15.8 min
Total precip.	=	10.50 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 448,115 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.17 108.08 <<

...End

Hyd. No. 3

Area C Existing

Hydrograph type	=	SCS Runoff	Peak discharge	=	230.44 cfs
Storm frequency	=	50 yrs	Time interval	=	5 min
Drainage area	=	38.40 ac	Curve number	=	81.5
Basin Slope	=	5.7 %	Hydraulic length	=	2270 ft
Tc method	=	LAG	Time of conc. (Tc)	=	24.5 min
Total precip.	=	10.50 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 1,142,240 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.25 230.44 <<

...End

Hyd. No. 4

Area D Existing

Hydrograph type	=	SCS Runoff	Peak discharge	=	436.91 cfs
Storm frequency	=	50 yrs	Time interval	=	5 min
Drainage area	=	94.70 ac	Curve number	=	80.3
Basin Slope	=	6.6 %	Hydraulic length	=	4382 ft
Tc method	=	LAG	Time of conc. (Tc)	=	40 min
Total precip.	=	10.50 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 2,694,400 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.42 436.91 <<

...End

Hyd. No. 5

Area E Existing

Hydrograph type	=	SCS Runoff	Peak discharge	=	400.38 cfs
Storm frequency	=	50 yrs	Time interval	=	5 min
Drainage area	=	106.20 ac	Curve number	=	78.2
Basin Slope	=	5.2 %	Hydraulic length	=	4901 ft
Tc method	=	LAG	Time of conc. (Tc)	=	52.6 min
Total precip.	=	10.50 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 3,046,989 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.58 400.38 <<

...End

Hyd. No. 6

Upper lake area

Hydrograph type = SCS Runoff
Storm frequency = 50 yrs
Drainage area = 9.10 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 10.50 in
Storm duration = 24 hrs

Peak discharge = 68.10 cfs
Time interval = 5 min
Curve number = 99
Hydraulic length = 0 ft
Time of conc. (Tc) = 8 min
Distribution = Type III
Shape factor = 484

Hydrograph Volume = 321,445 cuft

Hydrograph Discharge Table

Time -- Outflow
(hrs cfs)

12.17 68.10 <<

...End

Hyd. No. 7

Lower lake area

Hydrograph type = SCS Runoff
Storm frequency = 50 yrs
Drainage area = 4.90 ac
Basin Slope = 0.0 %
Tc method = USER
Total precip. = 10.50 in
Storm duration = 24 hrs

Peak discharge = 36.67 cfs
Time interval = 5 min
Curve number = 99
Hydraulic length = 0 ft
Time of conc. (Tc) = 8 min
Distribution = Type III
Shape factor = 484

Hydrograph Volume = 173,086 cuft

Hydrograph Discharge Table

Time -- Outflow
(hrs cfs)

12.17 36.67 <<

...End

Hyd. No. 8

Upper Lake Inflow

Hydrograph type = Combine

Storm frequency = 50 yrs

Inflow hyds. = 3, 4, 5, 6

Peak discharge = 1004.28 cfs

Time interval = 5 min

Hydrograph Volume = 7,205,077 cuft

Hydrograph Discharge Table

Time (hrs)	Hyd. 3 + (cfs)	Hyd. 4 + (cfs)	Hyd. 5 + (cfs)	Hyd. 6 + (cfs)	Outflow (cfs)
12.42	186.50	436.91 <<	351.22	29.64	1004.28 <<
...End					

Hyd. No. 9

Route thru Upper Lake

Hydrograph type	= Reservoir	Peak discharge	= 568.23 cfs
Storm frequency	= 50 yrs	Time interval	= 5 min
Inflow hyd. No.	= 8	Reservoir name	= Upper lake w culv
Max. Elevation	= 39.27 ft	Max. Storage	= 2,513,247 cuft

Storage Indication method used.

Outflow hydrograph volume = 6,932,929 cuft

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
12.92	597.96	39.27	344.81	-----	-----	-----	-----	344.79	145.18	78.26	-----	568.23 <<

...End

Hyd. No. 10

Inflow to lower

Hydrograph type = Combine

Storm frequency = 50 yrs

Inflow hyds. = 1, 2, 7, 9

Peak discharge = 594.94 cfs

Time interval = 5 min

Hydrograph Volume = 7,810,531 cuft

Hydrograph Discharge Table

Time (hrs)	Hyd. 1 + (cfs)	Hyd. 2 + (cfs)	Hyd. 7 + (cfs)	Hyd. 9 = (cfs)	Outflow (cfs)
12.92	7.84	14.27	4.61	568.23 <<	594.94 <<
...End					

Hyd. No. 11

Routed thru Lower Lake

Hydrograph type	= Reservoir	Peak discharge	= 577.77 cfs
Storm frequency	= 50 yrs	Time interval	= 5 min
Inflow hyd. No.	= 10	Reservoir name	= Lower lake
Max. Elevation	= 31.59 ft	Max. Storage	= 338,646 cuft

Storage Indication method used.

Outflow hydrograph volume = 7,810,527 cuft

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
13.08	567.18	31.59 <<	577.77	-----	-----	-----	0.00	-----	-----	-----	-----	577.77 <<

...End

Hyd. No. 1

Area A Existing

Hydrograph type	=	SCS Runoff	Peak discharge	=	68.16 cfs
Storm frequency	=	100 yrs	Time interval	=	5 min
Drainage area	=	8.64 ac	Curve number	=	85.6
Basin Slope	=	4.6 %	Hydraulic length	=	907 ft
Tc method	=	LAG	Time of conc. (Tc)	=	11.3 min
Total precip.	=	11.70 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 291,038 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.17 68.16 <<

...End

Hyd. No. 2

Area B Existing

Hydrograph type	=	SCS Runoff	Peak discharge	=	122.53 cfs
Storm frequency	=	100 yrs	Time interval	=	5 min
Drainage area	=	16.12 ac	Curve number	=	81.3
Basin Slope	=	4.6 %	Hydraulic length	=	1145 ft
Tc method	=	LAG	Time of conc. (Tc)	=	15.8 min
Total precip.	=	11.70 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 511,861 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.17 122.53 <<

...End

Hyd. No. 3

Area C Existing

Hydrograph type	=	SCS Runoff	Peak discharge	=	261.38 cfs
Storm frequency	=	100 yrs	Time interval	=	5 min
Drainage area	=	38.40 ac	Curve number	=	81.5
Basin Slope	=	5.7 %	Hydraulic length	=	2270 ft
Tc method	=	LAG	Time of conc. (Tc)	=	24.5 min
Total precip.	=	11.70 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 1,304,333 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.25 261.38 <<

...End

Hyd. No. 4

Area D Existing

Hydrograph type	=	SCS Runoff	Peak discharge	=	496.86 cfs
Storm frequency	=	100 yrs	Time interval	=	5 min
Drainage area	=	94.70 ac	Curve number	=	80.3
Basin Slope	=	6.6 %	Hydraulic length	=	4382 ft
Tc method	=	LAG	Time of conc. (Tc)	=	40 min
Total precip.	=	11.70 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 3,082,381 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.42 496.86 <<

...End

Hyd. No. 5

Area E Existing

Hydrograph type	=	SCS Runoff	Peak discharge	=	457.36 cfs
Storm frequency	=	100 yrs	Time interval	=	5 min
Drainage area	=	106.20 ac	Curve number	=	78.2
Basin Slope	=	5.2 %	Hydraulic length	=	4901 ft
Tc method	=	LAG	Time of conc. (Tc)	=	52.6 min
Total precip.	=	11.70 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 3,497,221 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.58 457.36 <<

...End

Hyd. No. 6

Upper lake area

Hydrograph type	=	SCS Runoff	Peak discharge	=	75.89 cfs
Storm frequency	=	100 yrs	Time interval	=	5 min
Drainage area	=	9.10 ac	Curve number	=	99
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	8 min
Total precip.	=	11.70 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 358,604 cuft

Hydrograph Discharge Table

Time -- Outflow
(hrs cfs)

12.17 75.89 <<

...End

Hyd. No. 7

Lower lake area

Hydrograph type	=	SCS Runoff	Peak discharge	=	40.86 cfs
Storm frequency	=	100 yrs	Time interval	=	5 min
Drainage area	=	4.90 ac	Curve number	=	99
Basin Slope	=	0.0 %	Hydraulic length	=	0 ft
Tc method	=	USER	Time of conc. (Tc)	=	8 min
Total precip.	=	11.70 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 193,094 cuft

Hydrograph Discharge Table

Time -- Outflow
(hrs cfs)

12.17 40.86 <<

...End

Hyd. No. 8

Upper Lake Inflow

Hydrograph type = Combine

Storm frequency = 100 yrs

Inflow hyds. = 3, 4, 5, 6

Peak discharge = 1143.16 cfs

Time interval = 5 min

Hydrograph Volume = 8,242,540 cuft

Hydrograph Discharge Table

Time (hrs)	Hyd. 3 + (cfs)	Hyd. 4 + (cfs)	Hyd. 5 + (cfs)	Hyd. 6 + (cfs)	Outflow (cfs)
12.42	210.93	496.86 <<	402.34	33.03	1143.16 <<
...End					

Hyd. No. 9

Route thru Upper Lake

Hydrograph type	= Reservoir	Peak discharge	= 744.43 cfs
Storm frequency	= 100 yrs	Time interval	= 5 min
Inflow hyd. No.	= 8	Reservoir name	= Upper lake w culv
Max. Elevation	= 39.48 ft	Max. Storage	= 2,681,319 cuft

Storage Indication method used.

Outflow hydrograph volume = 7,970,396 cuft

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
12.83	774.04	39.48	354.77	-----	-----	-----	-----	354.76	215.00	174.67	-----	744.43 <<

...End

Hyd. No. 10

Inflow to lower

Hydrograph type = Combine

Storm frequency = 100 yrs

Inflow hyds. = 1, 2, 7, 9

Peak discharge = 776.81 cfs

Time interval = 5 min

Hydrograph Volume = 8,966,383 cuft

Hydrograph Discharge Table

Time (hrs)	Hyd. 1 + (cfs)	Hyd. 2 + (cfs)	Hyd. 7 + (cfs)	Hyd. 9 = (cfs)	Outflow (cfs)
12.83	9.49	17.34	5.55	744.43 <<	776.81 <<
...End					

Hyd. No. 11

Routed thru Lower Lake

Hydrograph type	= Reservoir	Peak discharge	= 753.16 cfs
Storm frequency	= 100 yrs	Time interval	= 5 min
Inflow hyd. No.	= 10	Reservoir name	= Lower lake
Max. Elevation	= 31.86 ft	Max. Storage	= 397,735 cuft

Storage Indication method used. Outflow hydrograph volume = 8,966,381 cuft

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
12.92	768.92	31.86	747.54	-----	-----	-----	5.62	-----	-----	-----	-----	753.16 <<

...End

HYDROGRAPH OUTPUT:
FUTURE (NO ACTION) CONDITIONS

Reservoir Report

FUTURE CONDITIONS NO ACTION

Page 1

Reservoir No. 3 - Lower lake

Hydraflow Hydrographs by Intelisolve

Pond Data

Pond storage is based on known contour areas. Average end area method used.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	30.00	189,715	0	0
2.00	32.00	237,343	427,058	427,058
4.00	34.00	305,306	542,649	969,707
6.00	36.00	377,121	682,427	1,652,134

Culvert / Orifice Structures

	[A]	[B]	[C]	[D]
Rise in	= 30.0	0.0	0.0	0.0
Span in	= 30.0	0.0	0.0	0.0
No. Barrels	= 41	0	0	0
Invert El. ft	= 30.00	0.00	0.00	0.00
Length ft	= 50.0	0.0	0.0	0.0
Slope %	= 6.60	0.00	0.00	0.00
N-Value	= .013	.000	.000	.000
Orif. Coeff.	= 0.60	0.00	0.00	0.00
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len ft	= 12.00	250.00	0.00	0.00
Crest El. ft	= 31.60	33.00	0.00	0.00
Weir Coeff.	= 3.33	2.60	0.00	0.00
Weir Type	= Cipiti	Broad	---	---
Multi-Stage	= No	No	No	No

Exfiltration Rate = 0.00 in/hr/sqft Tailwater Elev. = 0.00 ft

Note: All outflows have been analyzed under inlet and outlet control.

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Total cfs
0.00	0	30.00	0.00	---	---	---	0.00	0.00	---	---	---	0.00
2.00	427,058	32.00	831.29	---	---	---	10.11	0.00	---	---	---	841.40
4.00	969,707	34.00	1606.79	---	---	---	148.57	650.00	---	---	---	2405.37
6.00	1,652,134	36.00	2111.74	---	---	---	368.81	3377.50	---	---	---	5858.05

Reservoir Report

FUTURE CONDITIONS NO ACTION

Page 1

Reservoir No. 4 - PropUpper lake w culverts

Hydraflow Hydrographs by Intelisolve

Pond Data

Pond storage is based on known contour areas. Average end area method used.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	32.70	10	0	0
1.30	34.00	11	14	14
3.30	36.00	388,745	388,756	388,770
5.30	38.00	683,712	1,072,457	1,461,227
7.30	40.00	966,954	1,650,666	3,111,893
9.30	42.00	1,244,763	2,211,717	5,323,610

Culvert / Orifice Structures

	[A]	[B]	[C]	[D]
Rise in	= 36.0	0.0	0.0	0.0
Span in	= 45.6	0.0	0.0	0.0
No. Barrels	= 3	0	0	0
Invert El. ft	= 32.70	0.00	0.00	0.00
Length ft	= 90.0	0.0	0.0	0.0
Slope %	= 6.40	0.00	0.00	0.00
N-Value	= .013	.000	.000	.000
Orif. Coeff.	= 0.60	0.00	0.00	0.00
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len ft	= 1.50	23.00	200.00	5.60
Crest El. ft	= 32.70	37.00	41.00	32.70
Weir Coeff.	= 3.33	3.33	2.60	3.33
Weir Type	= Rect	Riser	Broad	Rect
Multi-Stage	= Yes	Yes	No	Yes

Exfiltration Rate = 0.00 in/hr/sqft Tailwater Elev. = 32.80 ft

Stage / Storage / Discharge Table

Note: All outflows have been analyzed under inlet and outlet control.

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Total cfs
0.00	0	32.70	0.00	---	---	---	0.00	0.00	0.00	0.00	---	0.00
1.30	14	34.00	27.34	---	---	---	5.78	0.00	0.00	21.56	---	27.34
3.30	388,770	36.00	110.58	---	---	---	23.36	0.00	0.00	87.21	---	110.58
5.30	1,461,227	38.00	264.09	---	---	---	39.61	76.59	0.00	147.89	---	264.09
7.30	3,111,893	40.00	383.18	---	---	---	36.92	208.41	0.00	137.83	---	383.16
9.30	5,323,610	42.00	454.39	---	---	---	36.65	280.84	520.00	136.82	---	974.31

Hyd. No. 12

Area A Future

Hydrograph type	=	SCS Runoff	Peak discharge	=	21.60 cfs
Storm frequency	=	1 yrs	Time interval	=	5 min
Drainage area	=	8.64 ac	Curve number	=	86.5
Basin Slope	=	4.6 %	Hydraulic length	=	907 ft
Tc method	=	LAG	Time of conc. (Tc)	=	11 min
Total precip.	=	4.40 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 86,985 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.17 21.60 <<

...End

Hyd. No. 13

Area B Future

Hydrograph type	=	SCS Runoff	Peak discharge	=	37.92 cfs
Storm frequency	=	1 yrs	Time interval	=	5 min
Drainage area	=	16.12 ac	Curve number	=	84.4
Basin Slope	=	4.6 %	Hydraulic length	=	1145 ft
Tc method	=	LAG	Time of conc. (Tc)	=	14.3 min
Total precip.	=	4.40 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 151,581 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.17 37.92 <<

...End

Hyd. No. 14

Area C Future

Hydrograph type	=	SCS Runoff	Peak discharge	=	81.12 cfs
Storm frequency	=	1 yrs	Time interval	=	5 min
Drainage area	=	38.40 ac	Curve number	=	84.8
Basin Slope	=	5.7 %	Hydraulic length	=	2270 ft
Tc method	=	LAG	Time of conc. (Tc)	=	21.9 min
Total precip.	=	4.40 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 390,267 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.25 81.12 <<

...End

Hyd. No. 15

Area D Future

Hydrograph type	=	SCS Runoff	Peak discharge	=	158.38 cfs
Storm frequency	=	1 yrs	Time interval	=	5 min
Drainage area	=	94.70 ac	Curve number	=	85.4
Basin Slope	=	6.6 %	Hydraulic length	=	4382 ft
Tc method	=	LAG	Time of conc. (Tc)	=	33.7 min
Total precip.	=	4.40 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 956,976 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.42 158.38 <<

...End

Hyd. No. 16

Area E Future

Hydrograph type	=	SCS Runoff	Peak discharge	=	159.10 cfs
Storm frequency	=	1 yrs	Time interval	=	5 min
Drainage area	=	106.20 ac	Curve number	=	84.8
Basin Slope	=	5.2 %	Hydraulic length	=	4901 ft
Tc method	=	LAG	Time of conc. (Tc)	=	42.5 min
Total precip.	=	4.40 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 1,079,331 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.50 159.10 <<

...End

Hyd. No. 17

Upper Lake Inflow Future

Hydrograph type = Combine

Storm frequency = 1 yrs

Inflow hyds. = 6, 14, 15, 16

Peak discharge = 389.14 cfs

Time interval = 5 min

Hydrograph Volume = 2,559,151 cuft

Hydrograph Discharge Table

Time (hrs)	Hyd. 6 + (cfs)	Hyd. 14 + (cfs)	Hyd. 15 + (cfs)	Hyd. 16 = (cfs)	Outflow (cfs)
12.42	12.41	67.37	158.38 <<	150.98	389.14 <<
...End					

Hyd. No. 21

Future No Action Upper

Hydrograph type	= Reservoir	Peak discharge	= 184.29 cfs
Storm frequency	= 1 yrs	Time interval	= 5 min
Inflow hyd. No.	= 17	Reservoir name	= Upper lake w culv
Max. Elevation	= 37.20 ft	Max. Storage	= 1,034,618 cuft

Storage Indication method used. Outflow hydrograph volume = 2,287,005 cuft

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
13.00	178.90	37.20	184.30	-----	-----	-----	-----	184.29	-----	-----	-----	184.29 <<

...End

Hyd. No. 22

Future No Action inflow to lower

Hydrograph type = Combine

Storm frequency = 1 yrs

Inflow hyds. = 7, 12, 13, 21

Peak discharge = 193.76 cfs

Time interval = 5 min

Hydrograph Volume = 2,596,960 cuft

Hydrograph Discharge Table

Time (hrs)	Hyd. 7 + (cfs)	Hyd. 12 + (cfs)	Hyd. 13 + (cfs)	Hyd. 21 = (cfs)	Outflow (cfs)
13.00	1.77	2.75	4.94	184.29 <<	193.76 <<
...End					

Hyd. No. 23

Future No Action Lower

Hydrograph type	= Reservoir	Peak discharge	= 190.08 cfs
Storm frequency	= 1 yrs	Time interval	= 5 min
Inflow hyd. No.	= 22	Reservoir name	= Lower lake
Max. Elevation	= 30.85 ft	Max. Storage	= 181,047 cuft

Storage Indication method used. Outflow hydrograph volume = 2,596,956 cuft

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
13.08	191.55	30.85 <<	190.08	-----	-----	-----	-----	-----	-----	-----	-----	190.08 <<

...End

Hyd. No. 12

Area A Future

Hydrograph type	=	SCS Runoff	Peak discharge	=	25.51 cfs
Storm frequency	=	2 yrs	Time interval	=	5 min
Drainage area	=	8.64 ac	Curve number	=	86.5
Basin Slope	=	4.6 %	Hydraulic length	=	907 ft
Tc method	=	LAG	Time of conc. (Tc)	=	11 min
Total precip.	=	5.00 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 103,410 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.17 25.51 <<

...End

Hyd. No. 13

Area B Future

Hydrograph type	=	SCS Runoff	Peak discharge	=	45.18 cfs
Storm frequency	=	2 yrs	Time interval	=	5 min
Drainage area	=	16.12 ac	Curve number	=	84.4
Basin Slope	=	4.6 %	Hydraulic length	=	1145 ft
Tc method	=	LAG	Time of conc. (Tc)	=	14.3 min
Total precip.	=	5.00 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 181,544 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.17 45.18 <<

...End

Hyd. No. 14

Area C Future

Hydrograph type	=	SCS Runoff	Peak discharge	=	96.63 cfs
Storm frequency	=	2 yrs	Time interval	=	5 min
Drainage area	=	38.40 ac	Curve number	=	84.8
Basin Slope	=	5.7 %	Hydraulic length	=	2270 ft
Tc method	=	LAG	Time of conc. (Tc)	=	21.9 min
Total precip.	=	5.00 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 466,743 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.25 96.63 <<

...End

Hyd. No. 15

Area D Future

Hydrograph type	=	SCS Runoff	Peak discharge	=	188.34 cfs
Storm frequency	=	2 yrs	Time interval	=	5 min
Drainage area	=	94.70 ac	Curve number	=	85.4
Basin Slope	=	6.6 %	Hydraulic length	=	4382 ft
Tc method	=	LAG	Time of conc. (Tc)	=	33.7 min
Total precip.	=	5.00 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 1,142,073 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.42 188.34 <<

...End

Hyd. No. 16

Area E Future

Hydrograph type	=	SCS Runoff	Peak discharge	=	189.81 cfs
Storm frequency	=	2 yrs	Time interval	=	5 min
Drainage area	=	106.20 ac	Curve number	=	84.8
Basin Slope	=	5.2 %	Hydraulic length	=	4901 ft
Tc method	=	LAG	Time of conc. (Tc)	=	42.5 min
Total precip.	=	5.00 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 1,290,836 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.50 189.81 <<

...End

Hyd. No. 17

Upper Lake Inflow Future

Hydrograph type = Combine

Storm frequency = 2 yrs

Inflow hyds. = 6, 14, 15, 16

Peak discharge = 462.76 cfs

Time interval = 5 min

Hydrograph Volume = 3,050,803 cuft

Hydrograph Discharge Table

Time (hrs)	Hyd. 6 + (cfs)	Hyd. 14 + (cfs)	Hyd. 15 + (cfs)	Hyd. 16 = (cfs)	Outflow (cfs)
12.42	14.11	79.71	188.34 <<	180.60	462.76 <<
...End					

Hyd. No. 21

Future No Action Upper

Hydrograph type	= Reservoir	Peak discharge	= 220.90 cfs
Storm frequency	= 2 yrs	Time interval	= 5 min
Inflow hyd. No.	= 17	Reservoir name	= Upper lake w culv
Max. Elevation	= 37.52 ft	Max. Storage	= 1,201,811 cuft

Storage Indication method used. Outflow hydrograph volume = 2,778,654 cuft

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
13.00	210.28	37.52 <<	220.91	-----	-----	-----	-----	220.90	-----	-----	-----	220.90 <<

...End

Hyd. No. 22

Future No Action inflow to lower

Hydrograph type = Combine

Storm frequency = 2 yrs

Inflow hyds. = 7, 12, 13, 21

Peak discharge = 232.27 cfs

Time interval = 5 min

Hydrograph Volume = 3,144,996 cuft

Hydrograph Discharge Table

Time (hrs)	Hyd. 7 + (cfs)	Hyd. 12 + (cfs)	Hyd. 13 + (cfs)	Hyd. 21 = (cfs)	Outflow (cfs)
12.92	2.19	3.47	6.28	220.32	232.27 <<
...End					

Hyd. No. 23

Future No Action Lower

Hydrograph type	= Reservoir	Peak discharge	= 229.23 cfs
Storm frequency	= 2 yrs	Time interval	= 5 min
Inflow hyd. No.	= 22	Reservoir name	= Lower lake
Max. Elevation	= 30.94 ft	Max. Storage	= 200,314 cuft

Storage Indication method used. Outflow hydrograph volume = 3,144,993 cuft

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
13.08	229.44	30.94	229.23	-----	-----	-----	-----	-----	-----	-----	-----	229.23 <<

...End

Hyd. No. 12

Area A Future

Hydrograph type	=	SCS Runoff	Peak discharge	=	38.50 cfs
Storm frequency	=	5 yrs	Time interval	=	5 min
Drainage area	=	8.64 ac	Curve number	=	86.5
Basin Slope	=	4.6 %	Hydraulic length	=	907 ft
Tc method	=	LAG	Time of conc. (Tc)	=	11 min
Total precip.	=	7.00 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 159,437 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.17 38.50 <<

...End

Hyd. No. 13

Area B Future

Hydrograph type	=	SCS Runoff	Peak discharge	=	69.46 cfs
Storm frequency	=	5 yrs	Time interval	=	5 min
Drainage area	=	16.12 ac	Curve number	=	84.4
Basin Slope	=	4.6 %	Hydraulic length	=	1145 ft
Tc method	=	LAG	Time of conc. (Tc)	=	14.3 min
Total precip.	=	7.00 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 284,437 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.17 69.46 <<

...End

Hyd. No. 14

Area C Future

Hydrograph type	=	SCS Runoff	Peak discharge	=	148.54 cfs
Storm frequency	=	5 yrs	Time interval	=	5 min
Drainage area	=	38.40 ac	Curve number	=	84.8
Basin Slope	=	5.7 %	Hydraulic length	=	2270 ft
Tc method	=	LAG	Time of conc. (Tc)	=	21.9 min
Total precip.	=	7.00 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 729,020 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.25 148.54 <<

...End

Hyd. No. 15

Area D Future

Hydrograph type	=	SCS Runoff	Peak discharge	=	288.60 cfs
Storm frequency	=	5 yrs	Time interval	=	5 min
Drainage area	=	94.70 ac	Curve number	=	85.4
Basin Slope	=	6.6 %	Hydraulic length	=	4382 ft
Tc method	=	LAG	Time of conc. (Tc)	=	33.7 min
Total precip.	=	7.00 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 1,775,636 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.42 288.60 <<

...End

Hyd. No. 16

Area E Future

Hydrograph type	=	SCS Runoff	Peak discharge	=	292.85 cfs
Storm frequency	=	5 yrs	Time interval	=	5 min
Drainage area	=	106.20 ac	Curve number	=	84.8
Basin Slope	=	5.2 %	Hydraulic length	=	4901 ft
Tc method	=	LAG	Time of conc. (Tc)	=	42.5 min
Total precip.	=	7.00 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 2,016,198 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.50 292.85 <<

...End

Hyd. No. 17

Upper Lake Inflow Future

Hydrograph type = Combine

Storm frequency = 5 yrs

Inflow hyds. = 6, 14, 15, 16

Peak discharge = 709.40 cfs

Time interval = 5 min

Hydrograph Volume = 4,733,927 cuft

Hydrograph Discharge Table

Time (hrs)	Hyd. 6 + (cfs)	Hyd. 14 + (cfs)	Hyd. 15 + (cfs)	Hyd. 16 = (cfs)	Outflow (cfs)
12.42	19.76	120.86	288.60 <<	280.19	709.40 <<
...End					

Hyd. No. 21

Future No Action Upper

Hydrograph type	= Reservoir	Peak discharge	= 296.79 cfs
Storm frequency	= 5 yrs	Time interval	= 5 min
Inflow hyd. No.	= 17	Reservoir name	= Upper lake w culv
Max. Elevation	= 38.44 ft	Max. Storage	= 1,821,761 cuft

Storage Indication method used. Outflow hydrograph volume = 4,461,778 cuft

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
13.00	314.52	38.44	296.79	-----	-----	-----	-----	296.79	0.00	-----	-----	296.79 <<

...End

Hyd. No. 22

Future No Action inflow to lower

Hydrograph type = Combine

Storm frequency = 5 yrs

Inflow hyds. = 7, 12, 13, 21

Peak discharge = 313.10 cfs

Time interval = 5 min

Hydrograph Volume = 5,020,378 cuft

Hydrograph Discharge Table

Time (hrs)	Hyd. 7 + (cfs)	Hyd. 12 + (cfs)	Hyd. 13 + (cfs)	Hyd. 21 = (cfs)	Outflow (cfs)
12.92	3.07	5.09	9.31	295.63	313.10 <<
...End					

Hyd. No. 23

Future No Action Lower

Hydrograph type	= Reservoir	Peak discharge	= 311.93 cfs
Storm frequency	= 5 yrs	Time interval	= 5 min
Inflow hyd. No.	= 22	Reservoir name	= Lower lake
Max. Elevation	= 31.11 ft	Max. Storage	= 237,268 cuft

Storage Indication method used. Outflow hydrograph volume = 5,020,375 cuft

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
13.08	311.37	31.11	311.93	-----	-----	-----	-----	-----	-----	-----	-----	311.93 <<

...End

Hyd. No. 12

Area A Future

Hydrograph type	=	SCS Runoff	Peak discharge	=	46.24 cfs
Storm frequency	=	10 yrs	Time interval	=	5 min
Drainage area	=	8.64 ac	Curve number	=	86.5
Basin Slope	=	4.6 %	Hydraulic length	=	907 ft
Tc method	=	LAG	Time of conc. (Tc)	=	11 min
Total precip.	=	8.20 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 193,618 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.17 46.24 <<

...End

Hyd. No. 13

Area B Future

Hydrograph type	=	SCS Runoff	Peak discharge	=	83.98 cfs
Storm frequency	=	10 yrs	Time interval	=	5 min
Drainage area	=	16.12 ac	Curve number	=	84.4
Basin Slope	=	4.6 %	Hydraulic length	=	1145 ft
Tc method	=	LAG	Time of conc. (Tc)	=	14.3 min
Total precip.	=	8.20 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 347,526 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.17 83.98 <<

...End

Hyd. No. 14

Area C Future

Hydrograph type	=	SCS Runoff	Peak discharge	=	179.61 cfs
Storm frequency	=	10 yrs	Time interval	=	5 min
Drainage area	=	38.40 ac	Curve number	=	84.8
Basin Slope	=	5.7 %	Hydraulic length	=	2270 ft
Tc method	=	LAG	Time of conc. (Tc)	=	21.9 min
Total precip.	=	8.20 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 889,677 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.25 179.61 <<

...End

Hyd. No. 15

Area D Future

Hydrograph type	=	SCS Runoff	Peak discharge	=	348.58 cfs
Storm frequency	=	10 yrs	Time interval	=	5 min
Drainage area	=	94.70 ac	Curve number	=	85.4
Basin Slope	=	6.6 %	Hydraulic length	=	4382 ft
Tc method	=	LAG	Time of conc. (Tc)	=	33.7 min
Total precip.	=	8.20 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 2,163,154 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.42 348.58 <<

...End

Hyd. No. 16

Area E Future

Hydrograph type	=	SCS Runoff	Peak discharge	=	354.61 cfs
Storm frequency	=	10 yrs	Time interval	=	5 min
Drainage area	=	106.20 ac	Curve number	=	84.8
Basin Slope	=	5.2 %	Hydraulic length	=	4901 ft
Tc method	=	LAG	Time of conc. (Tc)	=	42.5 min
Total precip.	=	8.20 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 2,460,514 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.50 354.61 <<

...End

Hyd. No. 17

Upper Lake Inflow Future

Hydrograph type = Combine

Storm frequency = 10 yrs

Inflow hyds. = 6, 14, 15, 16

Peak discharge = 857.10 cfs

Time interval = 5 min

Hydrograph Volume = 5,763,568 cuft

Hydrograph Discharge Table

Time (hrs)	Hyd. 6 + (cfs)	Hyd. 14 + (cfs)	Hyd. 15 + (cfs)	Hyd. 16 = (cfs)	Outflow (cfs)
12.42	23.15	145.41	348.58 <<	339.97	857.10 <<
...End					

Hyd. No. 21

Future No Action Upper

Hydrograph type	= Reservoir	Peak discharge	= 369.00 cfs
Storm frequency	= 10 yrs	Time interval	= 5 min
Inflow hyd. No.	= 17	Reservoir name	= Upper lake w culv
Max. Elevation	= 38.90 ft	Max. Storage	= 2,202,678 cuft

Storage Indication method used. Outflow hydrograph volume = 5,491,418 cuft

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
13.00	376.62	38.90	324.83	-----	-----	-----	-----	324.83	44.17	0.00	-----	369.00 <<

...End

Hyd. No. 22

Future No Action inflow to lower

Hydrograph type = Combine

Storm frequency = 10 yrs

Inflow hyds. = 7, 12, 13, 21

Peak discharge = 388.09 cfs

Time interval = 5 min

Hydrograph Volume = 6,167,302 cuft

Hydrograph Discharge Table

Time (hrs)	Hyd. 7 + (cfs)	Hyd. 12 + (cfs)	Hyd. 13 + (cfs)	Hyd. 21 = (cfs)	Outflow (cfs)
13.00	3.31	5.56	10.22	369.00 <<	388.09 <<
...End					

Hyd. No. 23

Future No Action Lower

Hydrograph type	= Reservoir	Peak discharge	= 383.08 cfs
Storm frequency	= 10 yrs	Time interval	= 5 min
Inflow hyd. No.	= 22	Reservoir name	= Lower lake
Max. Elevation	= 31.25 ft	Max. Storage	= 266,444 cuft

Storage Indication method used. Outflow hydrograph volume = 6,167,295 cuft

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
13.08	384.33	31.25	383.08	-----	-----	-----	-----	-----	-----	-----	-----	383.08 <<

...End

Hyd. No. 12

Area A Future

Hydrograph type	=	SCS Runoff	Peak discharge	=	53.95 cfs
Storm frequency	=	25 yrs	Time interval	=	5 min
Drainage area	=	8.64 ac	Curve number	=	86.5
Basin Slope	=	4.6 %	Hydraulic length	=	907 ft
Tc method	=	LAG	Time of conc. (Tc)	=	11 min
Total precip.	=	9.40 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 228,047 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.17 53.95 <<

...End

Hyd. No. 13

Area B Future

Hydrograph type	=	SCS Runoff	Peak discharge	=	98.44 cfs
Storm frequency	=	25 yrs	Time interval	=	5 min
Drainage area	=	16.12 ac	Curve number	=	84.4
Basin Slope	=	4.6 %	Hydraulic length	=	1145 ft
Tc method	=	LAG	Time of conc. (Tc)	=	14.3 min
Total precip.	=	9.40 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 411,220 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.17 98.44 <<

...End

Hyd. No. 14

Area C Future

Hydrograph type	=	SCS Runoff	Peak discharge	=	210.54 cfs
Storm frequency	=	25 yrs	Time interval	=	5 min
Drainage area	=	38.40 ac	Curve number	=	84.8
Basin Slope	=	5.7 %	Hydraulic length	=	2270 ft
Tc method	=	LAG	Time of conc. (Tc)	=	21.9 min
Total precip.	=	9.40 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 1,051,798 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.25 210.54 <<

...End

Hyd. No. 15

Area D Future

Hydrograph type	=	SCS Runoff	Peak discharge	=	408.30 cfs
Storm frequency	=	25 yrs	Time interval	=	5 min
Drainage area	=	94.70 ac	Curve number	=	85.4
Basin Slope	=	6.6 %	Hydraulic length	=	4382 ft
Tc method	=	LAG	Time of conc. (Tc)	=	33.7 min
Total precip.	=	9.40 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 2,553,944 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.42 408.30 <<

...End

Hyd. No. 16

Area E Future

Hydrograph type	=	SCS Runoff	Peak discharge	=	416.14 cfs
Storm frequency	=	25 yrs	Time interval	=	5 min
Drainage area	=	106.20 ac	Curve number	=	84.8
Basin Slope	=	5.2 %	Hydraulic length	=	4901 ft
Tc method	=	LAG	Time of conc. (Tc)	=	42.5 min
Total precip.	=	9.40 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 2,908,880 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.50 416.14 <<

...End

Hyd. No. 17

Upper Lake Inflow Future

Hydrograph type = Combine

Storm frequency = 25 yrs

Inflow hyds. = 6, 14, 15, 16

Peak discharge = 1004.24 cfs

Time interval = 5 min

Hydrograph Volume = 6,802,004 cuft

Hydrograph Discharge Table

Time (hrs)	Hyd. 6 + (cfs)	Hyd. 14 + (cfs)	Hyd. 15 + (cfs)	Hyd. 16 = (cfs)	Outflow (cfs)
12.42	26.54	169.84	408.30 <<	399.56	1004.24 <<
...End					

Hyd. No. 21

Future No Action Upper

Hydrograph type	= Reservoir	Peak discharge	= 528.30 cfs
Storm frequency	= 25 yrs	Time interval	= 5 min
Inflow hyd. No.	= 17	Reservoir name	= Upper lake w culv
Max. Elevation	= 39.22 ft	Max. Storage	= 2,472,108 cuft

Storage Indication method used. Outflow hydrograph volume = 6,529,854 cuft

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
12.92	525.73	39.22 <<	342.32	-----	-----	-----	-----	342.31	128.93	57.06	-----	528.30 <<
...End												

Hyd. No. 22

Future No Action inflow to lower

Hydrograph type = Combine
Storm frequency = 25 yrs
Inflow hyds. = 7, 12, 13, 21

Peak discharge = 552.33 cfs
Time interval = 5 min

Hydrograph Volume = 7,323,864 cuft

Hydrograph Discharge Table

Time (hrs)	Hyd. 7 + (cfs)	Hyd. 12 + (cfs)	Hyd. 13 + (cfs)	Hyd. 21 = (cfs)	Outflow (cfs)
12.92	4.12	7.00	12.90	528.30 <<	552.33 <<
...End					

Hyd. No. 23

Future No Action Lower

Hydrograph type	= Reservoir	Peak discharge	= 536.25 cfs
Storm frequency	= 25 yrs	Time interval	= 5 min
Inflow hyd. No.	= 22	Reservoir name	= Lower lake
Max. Elevation	= 31.52 ft	Max. Storage	= 323,696 cuft

Storage Indication method used. Outflow hydrograph volume = 7,323,868 cuft

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
13.00	538.64	31.52	536.25	-----	-----	-----	0.00	-----	-----	-----	-----	536.25 <<

...End

Hyd. No. 12

Area A Future

Hydrograph type	=	SCS Runoff	Peak discharge	=	60.97 cfs
Storm frequency	=	50 yrs	Time interval	=	5 min
Drainage area	=	8.64 ac	Curve number	=	86.5
Basin Slope	=	4.6 %	Hydraulic length	=	907 ft
Tc method	=	LAG	Time of conc. (Tc)	=	11 min
Total precip.	=	10.50 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 259,761 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.17 60.97 <<

...End

Hyd. No. 13

Area B Future

Hydrograph type	=	SCS Runoff	Peak discharge	=	111.64 cfs
Storm frequency	=	50 yrs	Time interval	=	5 min
Drainage area	=	16.12 ac	Curve number	=	84.4
Basin Slope	=	4.6 %	Hydraulic length	=	1145 ft
Tc method	=	LAG	Time of conc. (Tc)	=	14.3 min
Total precip.	=	10.50 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 469,982 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.17 111.64 <<

...End

Hyd. No. 14

Area C Future

Hydrograph type	=	SCS Runoff	Peak discharge	=	238.78 cfs
Storm frequency	=	50 yrs	Time interval	=	5 min
Drainage area	=	38.40 ac	Curve number	=	84.8
Basin Slope	=	5.7 %	Hydraulic length	=	2270 ft
Tc method	=	LAG	Time of conc. (Tc)	=	21.9 min
Total precip.	=	10.50 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 1,201,319 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.25 238.78 <<

...End

Hyd. No. 15

Area D Future

Hydrograph type	=	SCS Runoff	Peak discharge	=	462.83 cfs
Storm frequency	=	50 yrs	Time interval	=	5 min
Drainage area	=	94.70 ac	Curve number	=	85.4
Basin Slope	=	6.6 %	Hydraulic length	=	4382 ft
Tc method	=	LAG	Time of conc. (Tc)	=	33.7 min
Total precip.	=	10.50 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 2,914,194 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.42 462.83 <<

...End

Hyd. No. 16

Area E Future

Hydrograph type	=	SCS Runoff	Peak discharge	=	472.34 cfs
Storm frequency	=	50 yrs	Time interval	=	5 min
Drainage area	=	106.20 ac	Curve number	=	84.8
Basin Slope	=	5.2 %	Hydraulic length	=	4901 ft
Tc method	=	LAG	Time of conc. (Tc)	=	42.5 min
Total precip.	=	10.50 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 3,322,396 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.50 472.34 <<

...End

Hyd. No. 17

Upper Lake Inflow Future

Hydrograph type = Combine

Storm frequency = 50 yrs

Inflow hyds. = 6, 14, 15, 16

Peak discharge = 1138.58 cfs

Time interval = 5 min

Hydrograph Volume = 7,759,357 cuft

Hydrograph Discharge Table

Time (hrs)	Hyd. 6 + (cfs)	Hyd. 14 + (cfs)	Hyd. 15 + (cfs)	Hyd. 16 = (cfs)	Outflow (cfs)
12.42	29.64	192.13	462.83 <<	453.99	1138.58 <<
...End					

Hyd. No. 21

Future No Action Upper

Hydrograph type	= Reservoir	Peak discharge	= 699.39 cfs
Storm frequency	= 50 yrs	Time interval	= 5 min
Inflow hyd. No.	= 17	Reservoir name	= Upper lake w culv
Max. Elevation	= 39.43 ft	Max. Storage	= 2,642,908 cuft

Storage Indication method used. Outflow hydrograph volume = 7,487,211 cuft

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
12.83	699.43	39.43 <<	352.56	-----	-----	-----	-----	352.55	197.79	149.04	-----	699.39 <<

...End

Hyd. No. 22

Future No Action inflow to lower

Hydrograph type = Combine

Storm frequency = 50 yrs

Inflow hyds. = 7, 12, 13, 21

Peak discharge = 728.57 cfs

Time interval = 5 min

Hydrograph Volume = 8,390,037 cuft

Hydrograph Discharge Table

Time (hrs)	Hyd. 7 + (cfs)	Hyd. 12 + (cfs)	Hyd. 13 + (cfs)	Hyd. 21 = (cfs)	Outflow (cfs)
12.83	4.98	8.51	15.70	699.39 <<	728.57 <<
...End					

Hyd. No. 23

Future No Action Lower

Hydrograph type	= Reservoir	Peak discharge	= 705.92 cfs
Storm frequency	= 50 yrs	Time interval	= 5 min
Inflow hyd. No.	= 22	Reservoir name	= Lower lake
Max. Elevation	= 31.79 ft	Max. Storage	= 382,004 cuft

Storage Indication method used. Outflow hydrograph volume = 8,390,036 cuft

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
12.92	710.61	31.79	702.54	-----	-----	-----	3.38	-----	-----	-----	-----	705.92 <<

...End

Hyd. No. 12

Area A Future

Hydrograph type	=	SCS Runoff	Peak discharge	=	68.61 cfs
Storm frequency	=	100 yrs	Time interval	=	5 min
Drainage area	=	8.64 ac	Curve number	=	86.5
Basin Slope	=	4.6 %	Hydraulic length	=	907 ft
Tc method	=	LAG	Time of conc. (Tc)	=	11 min
Total precip.	=	11.70 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 294,479 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.17 68.61 <<

...End

Hyd. No. 13

Area B Future

Hydrograph type	=	SCS Runoff	Peak discharge	=	125.97 cfs
Storm frequency	=	100 yrs	Time interval	=	5 min
Drainage area	=	16.12 ac	Curve number	=	84.4
Basin Slope	=	4.6 %	Hydraulic length	=	1145 ft
Tc method	=	LAG	Time of conc. (Tc)	=	14.3 min
Total precip.	=	11.70 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 534,388 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.17 125.97 <<

...End

Hyd. No. 14

Area C Future

Hydrograph type	=	SCS Runoff	Peak discharge	=	269.46 cfs
Storm frequency	=	100 yrs	Time interval	=	5 min
Drainage area	=	38.40 ac	Curve number	=	84.8
Basin Slope	=	5.7 %	Hydraulic length	=	2270 ft
Tc method	=	LAG	Time of conc. (Tc)	=	21.9 min
Total precip.	=	11.70 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 1,365,161 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.25 269.46 <<

...End

Hyd. No. 15

Area D Future

Hydrograph type	=	SCS Runoff	Peak discharge	=	522.07 cfs
Storm frequency	=	100 yrs	Time interval	=	5 min
Drainage area	=	94.70 ac	Curve number	=	85.4
Basin Slope	=	6.6 %	Hydraulic length	=	4382 ft
Tc method	=	LAG	Time of conc. (Tc)	=	33.7 min
Total precip.	=	11.70 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 3,308,816 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.42 522.07 <<

...End

Hyd. No. 16

Area E Future

Hydrograph type	=	SCS Runoff	Peak discharge	=	533.41 cfs
Storm frequency	=	100 yrs	Time interval	=	5 min
Drainage area	=	106.20 ac	Curve number	=	84.8
Basin Slope	=	5.2 %	Hydraulic length	=	4901 ft
Tc method	=	LAG	Time of conc. (Tc)	=	42.5 min
Total precip.	=	11.70 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 3,775,523 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.50 533.41 <<

...End

Hyd. No. 17

Upper Lake Inflow Future

Hydrograph type = Combine

Storm frequency = 100 yrs

Inflow hyds. = 6, 14, 15, 16

Peak discharge = 1284.60 cfs

Time interval = 5 min

Hydrograph Volume = 8,808,103 cuft

Hydrograph Discharge Table

Time (hrs)	Hyd. 6 + (cfs)	Hyd. 14 + (cfs)	Hyd. 15 + (cfs)	Hyd. 16 = (cfs)	Outflow (cfs)
12.42	33.03	216.34	522.07 <<	513.15	1284.60 <<
...End					

Hyd. No. 21

Future No Action Upper

Hydrograph type	= Reservoir	Peak discharge	= 878.53 cfs
Storm frequency	= 100 yrs	Time interval	= 5 min
Inflow hyd. No.	= 17	Reservoir name	= Upper lake w culv
Max. Elevation	= 39.61 ft	Max. Storage	= 2,793,936 cuft

Storage Indication method used. Outflow hydrograph volume = 8,535,952 cuft

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
12.75	908.37	39.61	361.21	-----	-----	-----	-----	361.20	266.04	251.30	-----	878.53 <<

...End

Hyd. No. 22

Future No Action inflow to lower

Hydrograph type = Combine

Storm frequency = 100 yrs

Inflow hyds. = 7, 12, 13, 21

Peak discharge = 915.05 cfs

Time interval = 5 min

Hydrograph Volume = 9,557,910 cuft

Hydrograph Discharge Table

Time (hrs)	Hyd. 7 + (cfs)	Hyd. 12 + (cfs)	Hyd. 13 + (cfs)	Hyd. 21 = (cfs)	Outflow (cfs)
12.75	6.20	10.64	19.68	878.53 <<	915.05 <<
...End					

Hyd. No. 23

Future No Action Lower

Hydrograph type	= Reservoir	Peak discharge	= 878.21 cfs
Storm frequency	= 100 yrs	Time interval	= 5 min
Inflow hyd. No.	= 22	Reservoir name	= Lower lake
Max. Elevation	= 32.06 ft	Max. Storage	= 443,088 cuft

Storage Indication method used. Outflow hydrograph volume = 9,557,907 cuft

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
12.92	855.67	32.06 <<	865.60	-----	-----	-----	12.61	-----	-----	-----	-----	878.21 <<

...End

HYDROGRAPH OUTPUT:
PROPOSED CONDITIONS

Reservoir Report

PROPOSED CONDITIONS

Page 1

Reservoir No. 3 - Lower lake

Hydraflow Hydrographs by Intelisolve

Pond Data

Pond storage is based on known contour areas. Average end area method used.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	30.00	189,715	0	0
2.00	32.00	237,343	427,058	427,058
4.00	34.00	305,306	542,649	969,707
6.00	36.00	377,121	682,427	1,652,134

Culvert / Orifice Structures

	[A]	[B]	[C]	[D]
Rise in	= 30.0	0.0	0.0	0.0
Span in	= 30.0	0.0	0.0	0.0
No. Barrels	= 41	0	0	0
Invert El. ft	= 30.00	0.00	0.00	0.00
Length ft	= 50.0	0.0	0.0	0.0
Slope %	= 6.60	0.00	0.00	0.00
N-Value	= .013	.000	.000	.000
Orif. Coeff.	= 0.60	0.00	0.00	0.00
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len ft	= 12.00	250.00	0.00	0.00
Crest El. ft	= 31.60	33.00	0.00	0.00
Weir Coeff.	= 3.33	2.60	0.00	0.00
Weir Type	= Cipiti	Broad	---	---
Multi-Stage	= No	No	No	No

Exfiltration Rate = 0.00 in/hr/sqft Tailwater Elev. = 0.00 ft

Note: All outflows have been analyzed under inlet and outlet control.

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Total cfs
0.00	0	30.00	0.00	---	---	---	0.00	0.00	---	---	---	0.00
2.00	427,058	32.00	831.29	---	---	---	10.11	0.00	---	---	---	841.40
4.00	969,707	34.00	1606.79	---	---	---	148.57	650.00	---	---	---	2405.37
6.00	1,652,134	36.00	2111.74	---	---	---	368.81	3377.50	---	---	---	5858.05

Reservoir Report

PROPOSED CONDITIONS

Page 1

Reservoir No. 4 - PropUpper lake w culverts

Hydraflow Hydrographs by Intelisolve

Pond Data

Pond storage is based on known contour areas. Average end area method used.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	32.70	10	0	0
1.30	34.00	11	14	14
3.30	36.00	388,745	388,756	388,770
5.30	38.00	683,712	1,072,457	1,461,227
7.30	40.00	966,954	1,650,666	3,111,893
9.30	42.00	1,244,763	2,211,717	5,323,610

Culvert / Orifice Structures

	[A]	[B]	[C]	[D]
Rise in	= 36.0	0.0	0.0	0.0
Span in	= 45.6	0.0	0.0	0.0
No. Barrels	= 3	0	0	0
Invert El. ft	= 32.70	0.00	0.00	0.00
Length ft	= 90.0	0.0	0.0	0.0
Slope %	= 6.40	0.00	0.00	0.00
N-Value	= .013	.000	.000	.000
Orif. Coeff.	= 0.60	0.00	0.00	0.00
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len ft	= 1.50	23.00	200.00	5.60
Crest El. ft	= 32.70	37.00	41.00	32.70
Weir Coeff.	= 3.33	3.33	2.60	3.33
Weir Type	= Rect	Riser	Broad	Rect
Multi-Stage	= Yes	Yes	No	Yes

Exfiltration Rate = 0.00 in/hr/sqft Tailwater Elev. = 32.80 ft

Stage / Storage / Discharge Table

Note: All outflows have been analyzed under inlet and outlet control.

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Total cfs
0.00	0	32.70	0.00	---	---	---	0.00	0.00	0.00	0.00	---	0.00
1.30	14	34.00	27.34	---	---	---	5.78	0.00	0.00	21.56	---	27.34
3.30	388,770	36.00	110.58	---	---	---	23.36	0.00	0.00	87.21	---	110.58
5.30	1,461,227	38.00	264.09	---	---	---	39.61	76.59	0.00	147.89	---	264.09
7.30	3,111,893	40.00	383.18	---	---	---	36.92	208.41	0.00	137.83	---	383.16
9.30	5,323,610	42.00	454.39	---	---	---	36.65	280.84	520.00	136.82	---	974.31

Hyd. No. 12

Area A Future

Hydrograph type	= SCS Runoff	Peak discharge	= 21.60 cfs
Storm frequency	= 1 yrs	Time interval	= 5 min
Drainage area	= 8.64 ac	Curve number	= 86.5
Basin Slope	= 4.6 %	Hydraulic length	= 907 ft
Tc method	= LAG	Time of conc. (Tc)	= 11 min
Total precip.	= 4.40 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 86,985 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.17 21.60 <<

...End

Hyd. No. 13

Area B Future

Hydrograph type	=	SCS Runoff	Peak discharge	=	37.92 cfs
Storm frequency	=	1 yrs	Time interval	=	5 min
Drainage area	=	16.12 ac	Curve number	=	84.4
Basin Slope	=	4.6 %	Hydraulic length	=	1145 ft
Tc method	=	LAG	Time of conc. (Tc)	=	14.3 min
Total precip.	=	4.40 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 151,581 cuft

Hydrograph Discharge Table

Time -- Outflow
(hrs cfs)

12.17 37.92 <<

...End

Hyd. No. 14

Area C Future

Hydrograph type	=	SCS Runoff	Peak discharge	=	81.12 cfs
Storm frequency	=	1 yrs	Time interval	=	5 min
Drainage area	=	38.40 ac	Curve number	=	84.8
Basin Slope	=	5.7 %	Hydraulic length	=	2270 ft
Tc method	=	LAG	Time of conc. (Tc)	=	21.9 min
Total precip.	=	4.40 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 390,267 cuft

Hydrograph Discharge Table

Time -- Outflow
(hrs cfs)

12.25 81.12 <<

...End

Hyd. No. 15

Area D Future

Hydrograph type = SCS Runoff
Storm frequency = 1 yrs
Drainage area = 94.70 ac
Basin Slope = 6.6 %
Tc method = LAG
Total precip. = 4.40 in
Storm duration = 24 hrs

Peak discharge = 158.38 cfs
Time interval = 5 min
Curve number = 85.4
Hydraulic length = 4382 ft
Time of conc. (Tc) = 33.7 min
Distribution = Type III
Shape factor = 484

Hydrograph Volume = 956,976 cuft

Hydrograph Discharge Table

Time -- Outflow
(hrs cfs)

12.42 158.38 <<

...End

Hyd. No. 16

Area E Future

Hydrograph type	=	SCS Runoff	Peak discharge	=	159.10 cfs
Storm frequency	=	1 yrs	Time interval	=	5 min
Drainage area	=	106.20 ac	Curve number	=	84.8
Basin Slope	=	5.2 %	Hydraulic length	=	4901 ft
Tc method	=	LAG	Time of conc. (Tc)	=	42.5 min
Total precip.	=	4.40 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 1,079,331 cuft

Hydrograph Discharge Table

Time -- Outflow
(hrs cfs)

12.50 159.10 <<

...End

Hyd. No. 17

Upper Lake Inflow Future

Hydrograph type = Combine

Storm frequency = 1 yrs

Inflow hyds. = 6, 14, 15, 16

Peak discharge = 389.14 cfs

Time interval = 5 min

Hydrograph Volume = 2,559,151 cuft

Hydrograph Discharge Table

Time (hrs)	Hyd. 6 + (cfs)	Hyd. 14 + (cfs)	Hyd. 15 + (cfs)	Hyd. 16 = (cfs)	Outflow (cfs)
12.42	12.41	67.37	158.38 <<	150.98	389.14 <<
...End					

Hyd. No. 18

Future thru Upper Lake

Hydrograph type	= Reservoir	Peak discharge	= 150.77 cfs
Storm frequency	= 1 yrs	Time interval	= 5 min
Inflow hyd. No.	= 17	Reservoir name	= PropUpper lake w
Max. Elevation	= 36.76 ft	Max. Storage	= 794,869 cuft

Storage Indication method used. Outflow hydrograph volume = 2,559,853 cuft

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
13.08	150.08	36.76	150.77	-----	-----	-----	31.85	-----	-----	118.92	-----	150.77 <<

...End

Hyd. No. 19

Future Inflow to Lower

Hydrograph type = Combine

Storm frequency = 1 yrs

Inflow hyds. = 7, 12, 13, 18

Peak discharge = 159.80 cfs

Time interval = 5 min

Hydrograph Volume = 2,869,808 cuft

Hydrograph Discharge Table

Time (hrs)	Hyd. 7 + (cfs)	Hyd. 12 + (cfs)	Hyd. 13 + (cfs)	Hyd. 18 = (cfs)	Outflow (cfs)
13.00	1.77	2.75	4.94	150.34	159.80 <<
...End					

Hyd. No. 20

Future thru Lower Lake

Hydrograph type	= Reservoir	Peak discharge	= 158.40 cfs
Storm frequency	= 1 yrs	Time interval	= 5 min
Inflow hyd. No.	= 19	Reservoir name	= Lower lake
Max. Elevation	= 30.77 ft	Max. Storage	= 164,286 cuft

Storage Indication method used. Outflow hydrograph volume = 2,869,803 cuft

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
13.17	158.53	30.77	158.40	-----	-----	-----	-----	-----	-----	-----	-----	158.40 <<

...End

Hyd. No. 12

Area A Future

Hydrograph type	=	SCS Runoff	Peak discharge	=	25.51 cfs
Storm frequency	=	2 yrs	Time interval	=	5 min
Drainage area	=	8.64 ac	Curve number	=	86.5
Basin Slope	=	4.6 %	Hydraulic length	=	907 ft
Tc method	=	LAG	Time of conc. (Tc)	=	11 min
Total precip.	=	5.00 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 103,410 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.17 25.51 <<

...End

Hyd. No. 13

Area B Future

Hydrograph type	=	SCS Runoff	Peak discharge	=	45.18 cfs
Storm frequency	=	2 yrs	Time interval	=	5 min
Drainage area	=	16.12 ac	Curve number	=	84.4
Basin Slope	=	4.6 %	Hydraulic length	=	1145 ft
Tc method	=	LAG	Time of conc. (Tc)	=	14.3 min
Total precip.	=	5.00 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 181,544 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.17 45.18 <<

...End

Hyd. No. 14

Area C Future

Hydrograph type	=	SCS Runoff	Peak discharge	=	96.63 cfs
Storm frequency	=	2 yrs	Time interval	=	5 min
Drainage area	=	38.40 ac	Curve number	=	84.8
Basin Slope	=	5.7 %	Hydraulic length	=	2270 ft
Tc method	=	LAG	Time of conc. (Tc)	=	21.9 min
Total precip.	=	5.00 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 466,743 cuft

Hydrograph Discharge Table

Time -- Outflow
(hrs cfs)

12.25 96.63 <<

...End

Hyd. No. 15

Area D Future

Hydrograph type = SCS Runoff
Storm frequency = 2 yrs
Drainage area = 94.70 ac
Basin Slope = 6.6 %
Tc method = LAG
Total precip. = 5.00 in
Storm duration = 24 hrs

Peak discharge = 188.34 cfs
Time interval = 5 min
Curve number = 85.4
Hydraulic length = 4382 ft
Time of conc. (Tc) = 33.7 min
Distribution = Type III
Shape factor = 484

Hydrograph Volume = 1,142,073 cuft

Hydrograph Discharge Table

Time -- Outflow
(hrs cfs)

12.42 188.34 <<

...End

Hyd. No. 16

Area E Future

Hydrograph type	=	SCS Runoff	Peak discharge	=	189.81 cfs
Storm frequency	=	2 yrs	Time interval	=	5 min
Drainage area	=	106.20 ac	Curve number	=	84.8
Basin Slope	=	5.2 %	Hydraulic length	=	4901 ft
Tc method	=	LAG	Time of conc. (Tc)	=	42.5 min
Total precip.	=	5.00 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 1,290,836 cuft

Hydrograph Discharge Table

Time -- Outflow
(hrs cfs)

12.50 189.81 <<

...End

Hyd. No. 17

Upper Lake Inflow Future

Hydrograph type = Combine

Storm frequency = 2 yrs

Inflow hyds. = 6, 14, 15, 16

Peak discharge = 462.76 cfs

Time interval = 5 min

Hydrograph Volume = 3,050,803 cuft

Hydrograph Discharge Table

Time (hrs)	Hyd. 6 + (cfs)	Hyd. 14 + (cfs)	Hyd. 15 + (cfs)	Hyd. 16 = (cfs)	Outflow (cfs)
12.42	14.11	79.71	188.34 <<	180.60	462.76 <<
...End					

Hyd. No. 18

Future thru Upper Lake

Hydrograph type	= Reservoir	Peak discharge	= 174.68 cfs
Storm frequency	= 2 yrs	Time interval	= 5 min
Inflow hyd. No.	= 17	Reservoir name	= PropUpper lake w
Max. Elevation	= 37.12 ft	Max. Storage	= 990,677 cuft

Storage Indication method used. Outflow hydrograph volume = 3,051,276 cuft

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
13.08	176.11	37.12	174.69	-----	-----	-----	36.02	4.20	-----	134.47	-----	174.68 <<

...End

Hyd. No. 19

Future Inflow to Lower

Hydrograph type = Combine

Storm frequency = 2 yrs

Inflow hyds. = 7, 12, 13, 18

Peak discharge = 184.80 cfs

Time interval = 5 min

Hydrograph Volume = 3,417,618 cuft

Hydrograph Discharge Table

Time (hrs)	Hyd. 7 + (cfs)	Hyd. 12 + (cfs)	Hyd. 13 + (cfs)	Hyd. 18 = (cfs)	Outflow (cfs)
13.08	1.85	2.94	5.32	174.68 <<	184.80 <<
...End					

Hyd. No. 20

Future thru Lower Lake

Hydrograph type	= Reservoir	Peak discharge	= 183.25 cfs
Storm frequency	= 2 yrs	Time interval	= 5 min
Inflow hyd. No.	= 19	Reservoir name	= Lower lake
Max. Elevation	= 30.83 ft	Max. Storage	= 177,681 cuft

Storage Indication method used.

Outflow hydrograph volume = 3,417,614 cuft

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
13.17	183.57	30.83	183.25	-----	-----	-----	-----	-----	-----	-----	-----	183.25 <<

...End

Hyd. No. 12

Area A Future

Hydrograph type	=	SCS Runoff	Peak discharge	=	38.50 cfs
Storm frequency	=	5 yrs	Time interval	=	5 min
Drainage area	=	8.64 ac	Curve number	=	86.5
Basin Slope	=	4.6 %	Hydraulic length	=	907 ft
Tc method	=	LAG	Time of conc. (Tc)	=	11 min
Total precip.	=	7.00 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 159,437 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.17 38.50 <<

...End

Hyd. No. 13

Area B Future

Hydrograph type	=	SCS Runoff	Peak discharge	=	69.46 cfs
Storm frequency	=	5 yrs	Time interval	=	5 min
Drainage area	=	16.12 ac	Curve number	=	84.4
Basin Slope	=	4.6 %	Hydraulic length	=	1145 ft
Tc method	=	LAG	Time of conc. (Tc)	=	14.3 min
Total precip.	=	7.00 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 284,437 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.17 69.46 <<

...End

Hyd. No. 14

Area C Future

Hydrograph type = SCS Runoff
Storm frequency = 5 yrs
Drainage area = 38.40 ac
Basin Slope = 5.7 %
Tc method = LAG
Total precip. = 7.00 in
Storm duration = 24 hrs

Peak discharge = 148.54 cfs
Time interval = 5 min
Curve number = 84.8
Hydraulic length = 2270 ft
Time of conc. (Tc) = 21.9 min
Distribution = Type III
Shape factor = 484

Hydrograph Volume = 729,020 cuft

Hydrograph Discharge Table

Time -- Outflow
(hrs cfs)

12.25 148.54 <<

...End

Hyd. No. 15

Area D Future

Hydrograph type	=	SCS Runoff	Peak discharge	=	288.60 cfs
Storm frequency	=	5 yrs	Time interval	=	5 min
Drainage area	=	94.70 ac	Curve number	=	85.4
Basin Slope	=	6.6 %	Hydraulic length	=	4382 ft
Tc method	=	LAG	Time of conc. (Tc)	=	33.7 min
Total precip.	=	7.00 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 1,775,636 cuft

Hydrograph Discharge Table

Time -- Outflow
(hrs cfs)

12.42 288.60 <<

...End

Hyd. No. 16

Area E Future

Hydrograph type	=	SCS Runoff	Peak discharge	=	292.85 cfs
Storm frequency	=	5 yrs	Time interval	=	5 min
Drainage area	=	106.20 ac	Curve number	=	84.8
Basin Slope	=	5.2 %	Hydraulic length	=	4901 ft
Tc method	=	LAG	Time of conc. (Tc)	=	42.5 min
Total precip.	=	7.00 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 2,016,198 cuft

Hydrograph Discharge Table

Time -- Outflow
(hrs cfs)

12.50 292.85 <<

...End

Hyd. No. 17

Upper Lake Inflow Future

Hydrograph type = Combine

Storm frequency = 5 yrs

Inflow hyds. = 6, 14, 15, 16

Peak discharge = 709.40 cfs

Time interval = 5 min

Hydrograph Volume = 4,733,927 cuft

Hydrograph Discharge Table

Time (hrs)	Hyd. 6 + (cfs)	Hyd. 14 + (cfs)	Hyd. 15 + (cfs)	Hyd. 16 = (cfs)	Outflow (cfs)
12.42	19.76	120.86	288.60 <<	280.19	709.40 <<
...End					

Hyd. No. 18

Future thru Upper Lake

Hydrograph type	= Reservoir	Peak discharge	= 280.33 cfs
Storm frequency	= 5 yrs	Time interval	= 5 min
Inflow hyd. No.	= 17	Reservoir name	= PropUpper lake w
Max. Elevation	= 38.17 ft	Max. Storage	= 1,601,808 cuft

Storage Indication method used. Outflow hydrograph volume = 4,734,717 cuft

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
13.08	262.49	38.17	280.34	-----	-----	-----	39.04	95.52	-----	145.77	-----	280.33 <<
...End												

Hyd. No. 19

Future Inflow to Lower

Hydrograph type = Combine

Storm frequency = 5 yrs

Inflow hyds. = 7, 12, 13, 18

Peak discharge = 296.11 cfs

Time interval = 5 min

Hydrograph Volume = 5,293,321 cuft

Hydrograph Discharge Table

Time (hrs)	Hyd. 7 + (cfs)	Hyd. 12 + (cfs)	Hyd. 13 + (cfs)	Hyd. 18 = (cfs)	Outflow (cfs)
13.00	2.82	4.68	8.57	280.04	296.11 <<
...End					

Hyd. No. 20

Future thru Lower Lake

Hydrograph type	= Reservoir	Peak discharge	= 293.84 cfs
Storm frequency	= 5 yrs	Time interval	= 5 min
Inflow hyd. No.	= 19	Reservoir name	= Lower lake
Max. Elevation	= 31.08 ft	Max. Storage	= 229,579 cuft

Storage Indication method used.

Outflow hydrograph volume = 5,293,317 cuft

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
13.17	292.80	31.08	293.84	-----	-----	-----	-----	-----	-----	-----	-----	293.84 <<

...End

Hyd. No. 12

Area A Future

Hydrograph type	=	SCS Runoff	Peak discharge	=	46.24 cfs
Storm frequency	=	10 yrs	Time interval	=	5 min
Drainage area	=	8.64 ac	Curve number	=	86.5
Basin Slope	=	4.6 %	Hydraulic length	=	907 ft
Tc method	=	LAG	Time of conc. (Tc)	=	11 min
Total precip.	=	8.20 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 193,618 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.17 46.24 <<

...End

Hyd. No. 13

Area B Future

Hydrograph type	=	SCS Runoff	Peak discharge	=	83.98 cfs
Storm frequency	=	10 yrs	Time interval	=	5 min
Drainage area	=	16.12 ac	Curve number	=	84.4
Basin Slope	=	4.6 %	Hydraulic length	=	1145 ft
Tc method	=	LAG	Time of conc. (Tc)	=	14.3 min
Total precip.	=	8.20 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 347,526 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.17 83.98 <<

...End

Hyd. No. 14

Area C Future

Hydrograph type	=	SCS Runoff	Peak discharge	=	179.61 cfs
Storm frequency	=	10 yrs	Time interval	=	5 min
Drainage area	=	38.40 ac	Curve number	=	84.8
Basin Slope	=	5.7 %	Hydraulic length	=	2270 ft
Tc method	=	LAG	Time of conc. (Tc)	=	21.9 min
Total precip.	=	8.20 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 889,677 cuft

Hydrograph Discharge Table

Time -- Outflow
(hrs cfs)

12.25 179.61 <<

...End

Hyd. No. 15

Area D Future

Hydrograph type	=	SCS Runoff	Peak discharge	=	348.58 cfs
Storm frequency	=	10 yrs	Time interval	=	5 min
Drainage area	=	94.70 ac	Curve number	=	85.4
Basin Slope	=	6.6 %	Hydraulic length	=	4382 ft
Tc method	=	LAG	Time of conc. (Tc)	=	33.7 min
Total precip.	=	8.20 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 2,163,154 cuft

Hydrograph Discharge Table

Time -- Outflow
(hrs cfs)

12.42 348.58 <<

...End

Hyd. No. 16

Area E Future

Hydrograph type	=	SCS Runoff	Peak discharge	=	354.61 cfs
Storm frequency	=	10 yrs	Time interval	=	5 min
Drainage area	=	106.20 ac	Curve number	=	84.8
Basin Slope	=	5.2 %	Hydraulic length	=	4901 ft
Tc method	=	LAG	Time of conc. (Tc)	=	42.5 min
Total precip.	=	8.20 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 2,460,514 cuft

Hydrograph Discharge Table

Time -- Outflow
(hrs cfs)

12.50 354.61 <<

...End

Hyd. No. 17

Upper Lake Inflow Future

Hydrograph type = Combine

Storm frequency = 10 yrs

Inflow hyds. = 6, 14, 15, 16

Peak discharge = 857.10 cfs

Time interval = 5 min

Hydrograph Volume = 5,763,568 cuft

Hydrograph Discharge Table

Time (hrs)	Hyd. 6 + (cfs)	Hyd. 14 + (cfs)	Hyd. 15 + (cfs)	Hyd. 16 = (cfs)	Outflow (cfs)
12.42	23.15	145.41	348.58 <<	339.97	857.10 <<
...End					

Hyd. No. 18

Future thru Upper Lake

Hydrograph type	= Reservoir	Peak discharge	= 316.18 cfs
Storm frequency	= 10 yrs	Time interval	= 5 min
Inflow hyd. No.	= 17	Reservoir name	= PropUpper lake w
Max. Elevation	= 38.66 ft	Max. Storage	= 2,007,584 cuft

Storage Indication method used.

Outflow hydrograph volume = 5,764,051 cuft

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
13.08	313.92	38.66	316.20	-----	-----	-----	38.20	135.38	-----	142.61	-----	316.18 <<

...End

Hyd. No. 19

Future Inflow to Lower

Hydrograph type = Combine

Storm frequency = 10 yrs

Inflow hyds. = 7, 12, 13, 18

Peak discharge = 334.61 cfs

Time interval = 5 min

Hydrograph Volume = 6,439,930 cuft

Hydrograph Discharge Table

Time (hrs)	Hyd. 7 + (cfs)	Hyd. 12 + (cfs)	Hyd. 13 + (cfs)	Hyd. 18 = (cfs)	Outflow (cfs)
13.00	3.31	5.56	10.22	315.52	334.61 <<
...End					

Hyd. No. 20

Future thru Lower Lake

Hydrograph type	= Reservoir	Peak discharge	= 333.03 cfs
Storm frequency	= 10 yrs	Time interval	= 5 min
Inflow hyd. No.	= 19	Reservoir name	= Lower lake
Max. Elevation	= 31.15 ft	Max. Storage	= 246,235 cuft

Storage Indication method used.

Outflow hydrograph volume = 6,439,928 cuft

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
13.08	333.73	31.15	333.03	-----	-----	-----	-----	-----	-----	-----	-----	333.03 <<

...End

Hyd. No. 12

Area A Future

Hydrograph type	= SCS Runoff	Peak discharge	= 53.95 cfs
Storm frequency	= 25 yrs	Time interval	= 5 min
Drainage area	= 8.64 ac	Curve number	= 86.5
Basin Slope	= 4.6 %	Hydraulic length	= 907 ft
Tc method	= LAG	Time of conc. (Tc)	= 11 min
Total precip.	= 9.40 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 228,047 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.17 53.95 <<

...End

Hyd. No. 13

Area B Future

Hydrograph type	=	SCS Runoff	Peak discharge	=	98.44 cfs
Storm frequency	=	25 yrs	Time interval	=	5 min
Drainage area	=	16.12 ac	Curve number	=	84.4
Basin Slope	=	4.6 %	Hydraulic length	=	1145 ft
Tc method	=	LAG	Time of conc. (Tc)	=	14.3 min
Total precip.	=	9.40 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 411,220 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.17 98.44 <<

...End

Hyd. No. 14

Area C Future

Hydrograph type	=	SCS Runoff	Peak discharge	=	210.54 cfs
Storm frequency	=	25 yrs	Time interval	=	5 min
Drainage area	=	38.40 ac	Curve number	=	84.8
Basin Slope	=	5.7 %	Hydraulic length	=	2270 ft
Tc method	=	LAG	Time of conc. (Tc)	=	21.9 min
Total precip.	=	9.40 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 1,051,798 cuft

Hydrograph Discharge Table

Time -- Outflow
(hrs cfs)

12.25 210.54 <<

...End

Hyd. No. 15

Area D Future

Hydrograph type	=	SCS Runoff	Peak discharge	=	408.30 cfs
Storm frequency	=	25 yrs	Time interval	=	5 min
Drainage area	=	94.70 ac	Curve number	=	85.4
Basin Slope	=	6.6 %	Hydraulic length	=	4382 ft
Tc method	=	LAG	Time of conc. (Tc)	=	33.7 min
Total precip.	=	9.40 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 2,553,944 cuft

Hydrograph Discharge Table

Time -- Outflow
(hrs cfs)

12.42 408.30 <<

...End

Hyd. No. 16

Area E Future

Hydrograph type	=	SCS Runoff	Peak discharge	=	416.14 cfs
Storm frequency	=	25 yrs	Time interval	=	5 min
Drainage area	=	106.20 ac	Curve number	=	84.8
Basin Slope	=	5.2 %	Hydraulic length	=	4901 ft
Tc method	=	LAG	Time of conc. (Tc)	=	42.5 min
Total precip.	=	9.40 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 2,908,880 cuft

Hydrograph Discharge Table

Time -- Outflow
(hrs cfs)

12.50 416.14 <<

...End

Hyd. No. 17

Upper Lake Inflow Future

Hydrograph type = Combine

Storm frequency = 25 yrs

Inflow hyds. = 6, 14, 15, 16

Peak discharge = 1004.24 cfs

Time interval = 5 min

Hydrograph Volume = 6,802,004 cuft

Hydrograph Discharge Table

Time (hrs)	Hyd. 6 + (cfs)	Hyd. 14 + (cfs)	Hyd. 15 + (cfs)	Hyd. 16 = (cfs)	Outflow (cfs)
12.42	26.54	169.84	408.30 <<	399.56	1004.24 <<
...End					

Hyd. No. 18

Future thru Upper Lake

Hydrograph type	= Reservoir	Peak discharge	= 345.78 cfs
Storm frequency	= 25 yrs	Time interval	= 5 min
Inflow hyd. No.	= 17	Reservoir name	= PropUpper lake w
Max. Elevation	= 39.18 ft	Max. Storage	= 2,438,214 cuft

Storage Indication method used.

Outflow hydrograph volume = 6,802,120 cuft

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
13.08	365.08	39.18 <<	345.79	-----	-----	-----	37.57	167.97	-----	140.25	-----	345.78 <<
...End												

Hyd. No. 19

Future Inflow to Lower

Hydrograph type = Combine

Storm frequency = 25 yrs

Inflow hyds. = 7, 12, 13, 18

Peak discharge = 366.80 cfs

Time interval = 5 min

Hydrograph Volume = 7,596,130 cuft

Hydrograph Discharge Table

Time (hrs)	Hyd. 7 + (cfs)	Hyd. 12 + (cfs)	Hyd. 13 + (cfs)	Hyd. 18 = (cfs)	Outflow (cfs)
13.00	3.79	6.44	11.87	344.70	366.80 <<
...End					

Hyd. No. 20

Future thru Lower Lake

Hydrograph type	= Reservoir	Peak discharge	= 365.67 cfs
Storm frequency	= 25 yrs	Time interval	= 5 min
Inflow hyd. No.	= 19	Reservoir name	= Lower lake
Max. Elevation	= 31.22 ft	Max. Storage	= 259,743 cuft

Storage Indication method used. Outflow hydrograph volume = 7,596,129 cuft

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
13.08	366.09	31.22	365.67	-----	-----	-----	-----	-----	-----	-----	-----	365.67 <<

...End

Hyd. No. 12

Area A Future

Hydrograph type	=	SCS Runoff	Peak discharge	=	60.97 cfs
Storm frequency	=	50 yrs	Time interval	=	5 min
Drainage area	=	8.64 ac	Curve number	=	86.5
Basin Slope	=	4.6 %	Hydraulic length	=	907 ft
Tc method	=	LAG	Time of conc. (Tc)	=	11 min
Total precip.	=	10.50 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 259,761 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.17 60.97 <<

...End

Hyd. No. 13

Area B Future

Hydrograph type	=	SCS Runoff	Peak discharge	=	111.64 cfs
Storm frequency	=	50 yrs	Time interval	=	5 min
Drainage area	=	16.12 ac	Curve number	=	84.4
Basin Slope	=	4.6 %	Hydraulic length	=	1145 ft
Tc method	=	LAG	Time of conc. (Tc)	=	14.3 min
Total precip.	=	10.50 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 469,982 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.17 111.64 <<

...End

Hyd. No. 14

Area C Future

Hydrograph type	=	SCS Runoff	Peak discharge	=	238.78 cfs
Storm frequency	=	50 yrs	Time interval	=	5 min
Drainage area	=	38.40 ac	Curve number	=	84.8
Basin Slope	=	5.7 %	Hydraulic length	=	2270 ft
Tc method	=	LAG	Time of conc. (Tc)	=	21.9 min
Total precip.	=	10.50 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 1,201,319 cuft

Hydrograph Discharge Table

Time -- Outflow
(hrs cfs)

12.25 238.78 <<

...End

Hyd. No. 15

Area D Future

Hydrograph type	=	SCS Runoff	Peak discharge	=	462.83 cfs
Storm frequency	=	50 yrs	Time interval	=	5 min
Drainage area	=	94.70 ac	Curve number	=	85.4
Basin Slope	=	6.6 %	Hydraulic length	=	4382 ft
Tc method	=	LAG	Time of conc. (Tc)	=	33.7 min
Total precip.	=	10.50 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 2,914,194 cuft

Hydrograph Discharge Table

Time -- Outflow
(hrs cfs)

12.42 462.83 <<

...End

Hyd. No. 16

Area E Future

Hydrograph type	=	SCS Runoff	Peak discharge	=	472.34 cfs
Storm frequency	=	50 yrs	Time interval	=	5 min
Drainage area	=	106.20 ac	Curve number	=	84.8
Basin Slope	=	5.2 %	Hydraulic length	=	4901 ft
Tc method	=	LAG	Time of conc. (Tc)	=	42.5 min
Total precip.	=	10.50 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 3,322,396 cuft

Hydrograph Discharge Table

Time -- Outflow
(hrs cfs)

12.50 472.34 <<

...End

Hyd. No. 17

Upper Lake Inflow Future

Hydrograph type = Combine

Storm frequency = 50 yrs

Inflow hyds. = 6, 14, 15, 16

Peak discharge = 1138.58 cfs

Time interval = 5 min

Hydrograph Volume = 7,759,357 cuft

Hydrograph Discharge Table

Time (hrs)	Hyd. 6 + (cfs)	Hyd. 14 + (cfs)	Hyd. 15 + (cfs)	Hyd. 16 = (cfs)	Outflow (cfs)
12.42	29.64	192.13	462.83 <<	453.99	1138.58 <<
...End					

Hyd. No. 18

Future thru Upper Lake

Hydrograph type	= Reservoir	Peak discharge	= 369.54 cfs
Storm frequency	= 50 yrs	Time interval	= 5 min
Inflow hyd. No.	= 17	Reservoir name	= PropUpper lake w
Max. Elevation	= 39.68 ft	Max. Storage	= 2,850,635 cuft

Storage Indication method used.

Outflow hydrograph volume = 7,760,226 cuft

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
13.17	345.49	39.68 <<	369.55	-----	-----	-----	37.12	193.82	-----	138.60	-----	369.54 <<

...End

Hyd. No. 19

Future Inflow to Lower

Hydrograph type = Combine

Storm frequency = 50 yrs

Inflow hyds. = 7, 12, 13, 18

Peak discharge = 398.40 cfs

Time interval = 5 min

Hydrograph Volume = 8,663,055 cuft

Hydrograph Discharge Table

Time (hrs)	Hyd. 7 + (cfs)	Hyd. 12 + (cfs)	Hyd. 13 + (cfs)	Hyd. 18 = (cfs)	Outflow (cfs)
12.25	30.13	50.47	92.60	225.18	398.40 <<
...End					

Hyd. No. 20

Future thru Lower Lake

Hydrograph type	= Reservoir	Peak discharge	= 391.85 cfs
Storm frequency	= 50 yrs	Time interval	= 5 min
Inflow hyd. No.	= 19	Reservoir name	= Lower lake
Max. Elevation	= 31.26 ft	Max. Storage	= 269,820 cuft

Storage Indication method used.

Outflow hydrograph volume = 8,663,043 cuft

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
13.08	392.22	31.26	391.85	-----	-----	-----	-----	-----	-----	-----	-----	391.85 <<

...End

Reservoir Report

PROPOSED CONDITIONS

Page 1

Reservoir No. 3 - Lower lake

Hydraflow Hydrographs by Intelisolve

Pond Data

Pond storage is based on known contour areas. Average end area method used.

Stage / Storage Table

Stage (ft)	Elevation (ft)	Contour area (sqft)	Incr. Storage (cuft)	Total storage (cuft)
0.00	30.00	189,715	0	0
2.00	32.00	237,343	427,058	427,058
4.00	34.00	305,306	542,649	969,707
6.00	36.00	377,121	682,427	1,652,134

Culvert / Orifice Structures

	[A]	[B]	[C]	[D]
Rise in	= 30.0	0.0	0.0	0.0
Span in	= 30.0	0.0	0.0	0.0
No. Barrels	= 41	0	0	0
Invert El. ft	= 30.00	0.00	0.00	0.00
Length ft	= 50.0	0.0	0.0	0.0
Slope %	= 6.60	0.00	0.00	0.00
N-Value	= .013	.000	.000	.000
Orif. Coeff.	= 0.60	0.00	0.00	0.00
Multi-Stage	= n/a	No	No	No

Weir Structures

	[A]	[B]	[C]	[D]
Crest Len ft	= 12.00	250.00	0.00	0.00
Crest El. ft	= 31.60	33.00	0.00	0.00
Weir Coeff.	= 3.33	2.60	0.00	0.00
Weir Type	= Cipiti	Broad	---	---
Multi-Stage	= No	No	No	No

Exfiltration Rate = 0.00 in/hr/sqft Tailwater Elev. = 0.00 ft

Note: All outflows have been analyzed under inlet and outlet control.

Stage / Storage / Discharge Table

Stage ft	Storage cuft	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Total cfs
0.00	0	30.00	0.00	---	---	---	0.00	0.00	---	---	---	0.00
2.00	427,058	32.00	831.29	---	---	---	10.11	0.00	---	---	---	841.40
4.00	969,707	34.00	1606.79	---	---	---	148.57	650.00	---	---	---	2405.37
6.00	1,652,134	36.00	2111.74	---	---	---	368.81	3377.50	---	---	---	5858.05

Hyd. No. 12

Area A Future

Hydrograph type	=	SCS Runoff	Peak discharge	=	68.61 cfs
Storm frequency	=	100 yrs	Time interval	=	5 min
Drainage area	=	8.64 ac	Curve number	=	86.5
Basin Slope	=	4.6 %	Hydraulic length	=	907 ft
Tc method	=	LAG	Time of conc. (Tc)	=	11 min
Total precip.	=	11.70 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 294,479 cuft

Hydrograph Discharge Table

Time -- Outflow (hrs cfs)

12.17 68.61 <<

...End

Hyd. No. 13

Area B Future

Hydrograph type	=	SCS Runoff	Peak discharge	=	125.97 cfs
Storm frequency	=	100 yrs	Time interval	=	5 min
Drainage area	=	16.12 ac	Curve number	=	84.4
Basin Slope	=	4.6 %	Hydraulic length	=	1145 ft
Tc method	=	LAG	Time of conc. (Tc)	=	14.3 min
Total precip.	=	11.70 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 534,388 cuft

Hydrograph Discharge Table

Time -- Outflow
(hrs cfs)

12.17 125.97 <<

...End

Hyd. No. 14

Area C Future

Hydrograph type	=	SCS Runoff	Peak discharge	=	269.46 cfs
Storm frequency	=	100 yrs	Time interval	=	5 min
Drainage area	=	38.40 ac	Curve number	=	84.8
Basin Slope	=	5.7 %	Hydraulic length	=	2270 ft
Tc method	=	LAG	Time of conc. (Tc)	=	21.9 min
Total precip.	=	11.70 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 1,365,161 cuft

Hydrograph Discharge Table

Time -- Outflow
(hrs cfs)

12.25 269.46 <<

...End

Hyd. No. 15

Area D Future

Hydrograph type	= SCS Runoff	Peak discharge	= 522.07 cfs
Storm frequency	= 100 yrs	Time interval	= 5 min
Drainage area	= 94.70 ac	Curve number	= 85.4
Basin Slope	= 6.6 %	Hydraulic length	= 4382 ft
Tc method	= LAG	Time of conc. (Tc)	= 33.7 min
Total precip.	= 11.70 in	Distribution	= Type III
Storm duration	= 24 hrs	Shape factor	= 484

Hydrograph Volume = 3,308,816 cuft

Hydrograph Discharge Table

Time -- Outflow
(hrs cfs)

12.42 522.07 <<

...End

Hyd. No. 16

Area E Future

Hydrograph type	=	SCS Runoff	Peak discharge	=	533.41 cfs
Storm frequency	=	100 yrs	Time interval	=	5 min
Drainage area	=	106.20 ac	Curve number	=	84.8
Basin Slope	=	5.2 %	Hydraulic length	=	4901 ft
Tc method	=	LAG	Time of conc. (Tc)	=	42.5 min
Total precip.	=	11.70 in	Distribution	=	Type III
Storm duration	=	24 hrs	Shape factor	=	484

Hydrograph Volume = 3,775,523 cuft

Hydrograph Discharge Table

Time -- Outflow
(hrs cfs)

12.50 533.41 <<

...End

Hyd. No. 17

Upper Lake Inflow Future

Hydrograph type = Combine

Storm frequency = 100 yrs

Inflow hyds. = 6, 14, 15, 16

Peak discharge = 1284.60 cfs

Time interval = 5 min

Hydrograph Volume = 8,808,103 cuft

Hydrograph Discharge Table

Time (hrs)	Hyd. 6 + (cfs)	Hyd. 14 + (cfs)	Hyd. 15 + (cfs)	Hyd. 16 = (cfs)	Outflow (cfs)
12.42	33.03	216.34	522.07 <<	513.15	1284.60 <<
...End					

Hyd. No. 18

Future thru Upper Lake

Hydrograph type	= Reservoir	Peak discharge	= 390.80 cfs
Storm frequency	= 100 yrs	Time interval	= 5 min
Inflow hyd. No.	= 17	Reservoir name	= PropUpper lake w
Max. Elevation	= 40.19 ft	Max. Storage	= 3,319,645 cuft

Storage Indication method used.

Outflow hydrograph volume = 8,808,775 cuft

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
13.17	387.86	40.19	390.81	-----	-----	-----	36.83	216.49	-----	137.48	-----	390.80 <<

...End

Hyd. No. 19

Future Inflow to Lower

Hydrograph type = Combine

Storm frequency = 100 yrs

Inflow hyds. = 7, 12, 13, 18

Peak discharge = 458.96 cfs

Time interval = 5 min

Hydrograph Volume = 9,830,738 cuft

Hydrograph Discharge Table

Time (hrs)	Hyd. 7 + (cfs)	Hyd. 12 + (cfs)	Hyd. 13 + (cfs)	Hyd. 18 = (cfs)	Outflow (cfs)
12.25	33.58	56.73	104.35	264.30	458.96 <<
...End					

Hyd. No. 20

Future thru Lower Lake

Hydrograph type	= Reservoir	Peak discharge	= 432.96 cfs
Storm frequency	= 100 yrs	Time interval	= 5 min
Inflow hyd. No.	= 19	Reservoir name	= Lower lake
Max. Elevation	= 31.34 ft	Max. Storage	= 285,641 cuft

Storage Indication method used.

Outflow hydrograph volume = 9,830,729 cuft

Hydrograph Discharge Table

Time (hrs)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
12.33	437.57	31.34 <<	432.96	-----	-----	-----	-----	-----	-----	-----	-----	432.96 <<

...End