

Sunfox Campground Drainage Analysis

15 Kenyon Road, Lisbon, Connecticut

Issued: August 31, 2021

Revised: February 14, 2022

Prepared for:

Sunfox Campground

RECEIVED
@ 12:30pm
APR 25 2022
M. W. Kelly
TOWN CLERKS OFFICE
TOWN OF LISBON



T: 860.885.1055

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33 Wilbur Cross Way, Suite 105, P.O. Box 535, Mansfield, Connecticut 06268

PROJECT OVERVIEW

Sunfox Campground, located in Lisbon Connecticut, proposes to expand their existing campground with 32 new campsites including an associated access road and utilities. Construction is to be split into 2 phases with a total project disturbance of approximately 8.6-acres. The proposed work will be located east and southeast of the pond on the lot. The site is located along Blissville Brook, which has an approximate watershed area of 1.67 sq. mi. at the southwest limits of the campground property.

The proposed design conforms to the required Low Impact Development (LID) regulations with compacted areas flowing to vegetated areas prior to discharging, minimizing impervious areas, and minimizing erosion. The vegetated areas also serve to provide water quality treatment to the runoff produced onsite. The proposed development results in a minor increase in peak flow rates from the developed portion of the site. Given the large drainage area and much higher peak flows associated with Blissville Brook these increases will not impact overall peak flow discharges from the site and will not contribute to increased flooding potential downstream.

Methodology

Existing and proposed peak flow conditions were analyzed using the Rational Method. The Rational Method predicts the peak runoff according to the formula: $Q=CiA$, where C is a runoff coefficient, i is the rainfall intensity, and A is the sub-catchment area. The change in runoff coefficients (C) were determined by aerial imagery, survey data, and design plans. The catchment (A) was considered as the total project disturbance which is 8.6 acres. The rainfall intensities (i) were derived by calculating the time of concentrations using the sheet/shallow/channel flow method and NOAA Atlas 14's rainfall data. The Blissville Brook peak flow information was found using USGS's StreamStats program which uses regression equations to calculate peak flows. A flow comparison table is found below.

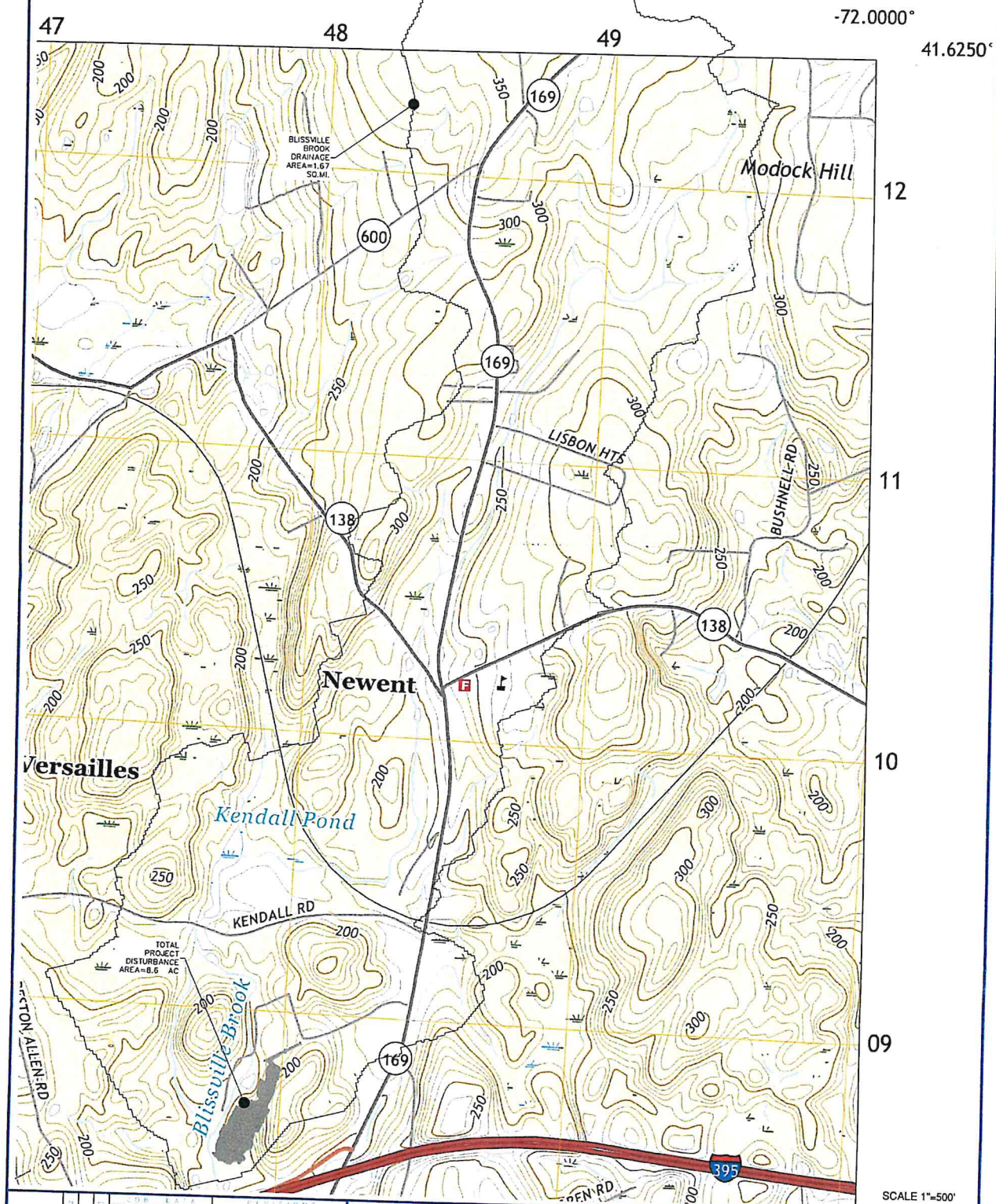
	Existing	Proposed	Blissville Watershed
Runoff Coefficient	0.42	0.57	—
Catchment Area (ac)	8.62	8.62	1070
Q2-year (cfs)	8.8	12.9	91.8
Q10-year (cfs)	13.1	19.3	168
Q25-year (cfs)	15.8	23.3	223
Q50-year (cfs)	17.9	26.3	272
Q100-year (cfs)	20.0	29.4	324

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1000 999 998 997 996 995 994 993 992 991 990 989 988 987 986 985 984 983 982 981 980 979 978 977 976 975 974 973 972 971 970 969 968 967 966 965 964 963 962 961 960 959 958 957 956 955 954 953 952 951 950 949 948 947 946 945 944 943 942 941 940 939 938 937 936 935 934 933 932 931 930 929 928 927 926 925 924 923 922 921 920 919 918 917 916 915 914 913 912 911 910 909 908 907 906 905 904 903 902 901 900 899 898 897 896 895 894 893 892 891 890 889 888 887 886 885 884 883 882 881 880 879 878 877 876 875 874 873 872 871 870 869 868 867 866 865 864 863 862 861 860 859 858 857 856 855 854 853 852 851 850 849 848 847 846 845 844 843 842 841 840 839 838 837 836 835 834 833 832 831 830 829 828 827 826 825 824 823 822 821 820 819 818 817 816 815 814 813 812 811 810 809 808 807 806 805 804 803 802 801 800 799 798 797 796 795 794 793 792 791 790 789 788 787 786 785 784 783 782 781 780 779 778 777 776 775 774 773 772 771 770 769 768 767 766 765 764 763 762 761 760 759 758 757 756 755 754 753 752 751 750 749 748 747 746 745 744 743 742 741 740 739 738 737 736 735 734 733 732 731 730 729 728 727 726 725 724 723 722 721 720 719 718 717 716 715 714 713 712 711 710 709 708 707 706 705 704 703 702 701 700 699 698 697 696 695 694 693 692 691 690 689 688 687 686 685 684 683 682 681 680 679 678 677 676 675 674 673 672 671 670 669 668 667 666 665 664 663 662 661 660 659 658 657 656 655 654 653 652 651 650 649 648 647 646 645 644 643 642 641 640 639 638 637 636 635 634 633 632 631 630 629 628 627 626 625 624 623 622 621 620 619 618 617 616 615 614 613 612 611 610 609 608 607 606 605 604 603 602 601 600 599 598 597 596 595 594 593 592 591 590 589 588 587 586 585 584 583 582 581 580 579 578 577 576 575 574 573 572 571 570 569 568 567 566 565 564 563 562 561 560 559 558 557 556 555 554 553 552 551 550 549 548 547 546 545 544 543 542 541 540 539 538 537 536 535 534 533 532 531 530 529 528 527 526 525 524 523 522 521 520 519 518 517 516 515 514 513 512 511 510 509 508 507 506 505 504 503 502 501 500 499 498 497 496 495 494 493 492 491 490 489 488 487 486 485 484 483 482 481 480 479 478 477 476 475 474 473 472 471 470 469 468 467 466 465 464 463 462 461 460 459 458 457 456 455 454 453 452 451 450 449 448 447 446 445 444 443 442 441 440 439 438 437 436 435 434 433 432 431 430 429 428 427 426 425 424 423 422 421 420 419 418 417 416 415 414 413 412 411 410 409 408 407 406 405 404 403 402 401 400 399 398 397 396 395 394 393 392 391 390 389 388 387 386 385 384 383 382 381 380 379 378 377 376 375 374 373 372 371 370 369 368 367 366 365 364 363 362 361 360 359 358 357 356 355 354 353 352 351 350 349 348 347 346 345 344 343 342 341 340 339 338 337 336 335 334 333 332 331 330 329 328 327 326 325 324 323 322 321 320 319 318 317 316 315 314 313 312 311 310 309 308 307 306 305 304 303 302 301 300 299 298 297 296 295 294 293 292 291 290 289 288 287 286 285 284 283 282 281 280 279 278 277 276 275 274 273 272 271 270 269 268 267 266 265 264 263 262 261 260 259 258 257 256 255 254 253 252 251 250 249 248 247 246 245 244 243 242 241 240 239 238 237 236 235 234 233 232 231 230 229 228 227 226 225 224 223 222 221 220 219 218 217 216 215 214 213 212 211 210 209 208 207 206 205 204 203 202 201 200 199 198 197 196 195 194 193 192 191 190 189 188 187 186 185 184 183 182 181 180 179 178 177 176 175 174 173 172 171 170 169 168 167 166 165 164 163 162 161 160 159 158 157 156 155 154 153 152 151 150 149 148 147 146 145 144 143 142 141 140 139 138 137 136 135 134 133 132 131 130 129 128 127 126 125 124 123 122 121 120 119 118 117 116 115 114 113 112 111 110 109 108 107 106 105 104 103 102 101 100 99 98 97 96 95 94 93 92 91 90 89 88 87 86 85 84 83 82 81 80 79 78 77 76 75 74 73 72 71 70 69 68 67 66 65 64 63 62 61 60 59 58 57 56 55 54 53 52 51 50 49 48 47 46 45 44 43 42 41 40 39 38 37 36 35 34 33 32 31 30 29 28 27 26 25 24 23 22 21 20 19 18 17 16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1

CONNECTICUT - NEW LONDON COUNTY 7.5-MINUTE SERIES



NO.	DATE	BY	DESCRIPTION	STATUS	
PROJECT	2018180				
BOOK NO.	192				
DESIGNED	KLD/PWP	1	02/16/2021	HEALTH COMMENTS	NAC
DRAWN	ZBC/RAC	3	04/02/2021	CT SPW COMMENTS	PAW
CHECKED	KLD	3	08/18/2021	CT SPW COMMENTS	NAC
COORD FILE	2018180 ALL				
FILE					

DESIGNED FOR
DAVID NOWAKOWSKI
PROJECT MANAGER
WATERSHED & PROJECT DISTURBANCE

SCALE 1"=500'

33 Wilbur Cross Way, Mansfield, CT 06268
191 East River Drive, 1st Floor
East Hartford, CT 06108
860-885-1055 | www.ctscampuses.com

CALCULATIONS

PROPOSED						
DESCRIPTION	# units	SURFACE AREA/unit	Total Area (sf)	Area (acres)	RUNOFF COEFF	AC
PROPOSED SITES 1-9	9	3100	27900	0.64	0.7	0.448347107
PROPOSED SITES 9-30	21	2400	50400	1.16	0.7	0.809917355
PROPOSED SITES 30-53	23	2600	59800	1.37	0.7	0.96097337
GRAVEL ROADS	1	62892	62892	1.44	0.7	1.010661157
EXISTING IMPERVIOUS			94019	2.16	0.7	1.510865071
PERVIOUS			81065	1.86	0.3	0.558298382
TOTAL			376075.9	8.63	0.61	5.30

EXISTING						
DESCRIPTION	Total Area (sf)	Area (acres)	RUNOFF COEFF	AC		
EXISTING TRAILS (8' WIDE)	16656	0.38	0.7	0.267658402		
IMPERVIOUS	94019	2.16	0.7	1.510865071		
PERVIOUS	265401	6.09	0.3	1.827830062		
TOTAL	376075.9	8.63	0.42	3.61		

Flow Comparison			
Frequency (years)	Existing	Proposed	StreamStats
2	8.8	12.9	91.8
10	13.1	19.3	168
25	15.8	23.3	223
50	17.9	26.3	272
100	20.0	29.4	324

111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000

TIME of CONCENTRATION (Tc) or TRAVEL TIME (Tt)

NOTES:

Sheet Flow (Applicable to Tc only) Segment ID

1	Surface Description	Grass
2	Manning's Roughness Coeff. n (See table 3-1 TR-55)	0.400
	Max. Flow Elev. (ft)=	238.00
	Min. Flow Elev. (ft)=	235.00
3	Flow length L (total L<=100ft.).....ft.	75.0
	Land Slope (ft/ft)=	0.040
4	Two-yr 24hr Rainfall, P2...in. (Fig. B-3 of TR-55)	3.37
	Tt = 0.007 (nL) ^{0.8}	
6	P2 ^{0.5} * S ^{0.4} Computed Tt....hr.	0.210

0.210 hr.

Shallow Concentrated flow. Typical from sheet flow to well defined flow which is typically a solid blue line on the USGS contour map.

Shallow Concentration Flow Segment ID

7	Surface description (paved or unpaved).....	Unpaved
	Max. Elevation,ft	235.00
	Min. Elevation,ft	140.00
8	Flow length, L.....ft.	1546.0
9	Watercourse slope, s.....ft/ft	0.061
10	Average velocity, V...ft/s (NDOT eq 29-7.7 or 7.8)	4.00
11	Tt = L/(3600 V)..... Computed Tt...hr.	0.107

SUBTOTAL 0.107 hr.

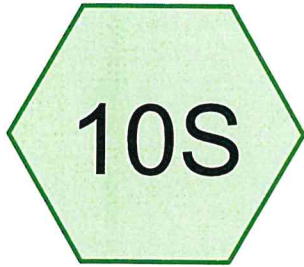
Watershed or Subarea Tc or Tt 0.317 hr.

or **19 min.**

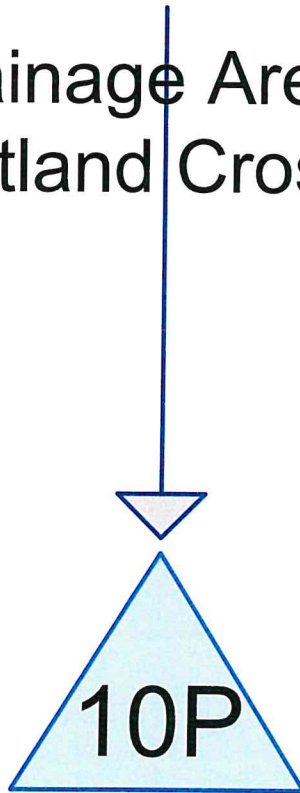
Frequency (years)	Intensity (in/hr) Tc= 19 minutes, interpolated from NOAA
2	2.43
10	3.64
25	4.39
50	4.96
100	5.55

Roughness Coefficients (Manning's n) for Sheet Flow

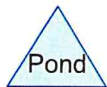
Surface Description	n
Smooth Surfaces (conc., asph., gravel or bare soil)	0.011
Fallow (w/ no residue)	0.05
Cultivated Soils	
Cover <= 20%	0.06
Cover >= 20%	0.17
Grass	
Short grass, prairie	0.15
Dense grass	0.24
Bermudagrass	0.41
Range	0.13
Woods	
Light underbrush	0.4
Dense underbrush	0.8



Drainage Area to
Wetland Crossing



Proposed Wetland
Crossing



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Area Listing (selected nodes)

Area (acres)	CN	Description (subcatchment-numbers)
2.137	65	2 acre lots, 12% imp, HSG B (10S)
0.654	55	Woods, Good, HSG B (10S)
2.792	63	TOTAL AREA

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Proposed Wetland Crossing
CT_Lisbon 24-hr S1 2-yr Rainfall=3.39"

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Time span=0.00-54.00 hrs, dt=0.05 hrs, 1081 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment10S: Drainage Area to Runoff Area=121,600 sf 9.19% Impervious Runoff Depth=0.61"
Tc=10.0 min CN=63 Runoff=1.25 cfs 0.141 af

Pond 10P: Proposed Wetland Crossing Peak Elev=167.57' Storage=224 cf Inflow=1.25 cfs 0.141 af
12.0" Round Culvert x 2.00 n=0.012 L=30.0' S=0.0200 '/' Outflow=1.08 cfs 0.141 af

Total Runoff Area = 2.792 ac Runoff Volume = 0.141 af Average Runoff Depth = 0.61"
90.81% Pervious = 2.535 ac 9.19% Impervious = 0.256 ac

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Proposed Wetland Crossing
 CT_Lisbon 24-hr S1 2-yr Rainfall=3.39"

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Summary for Subcatchment 10S: Drainage Area to Wetland Crossing

Runoff = 1.25 cfs @ 12.11 hrs, Volume= 0.141 af, Depth= 0.61"

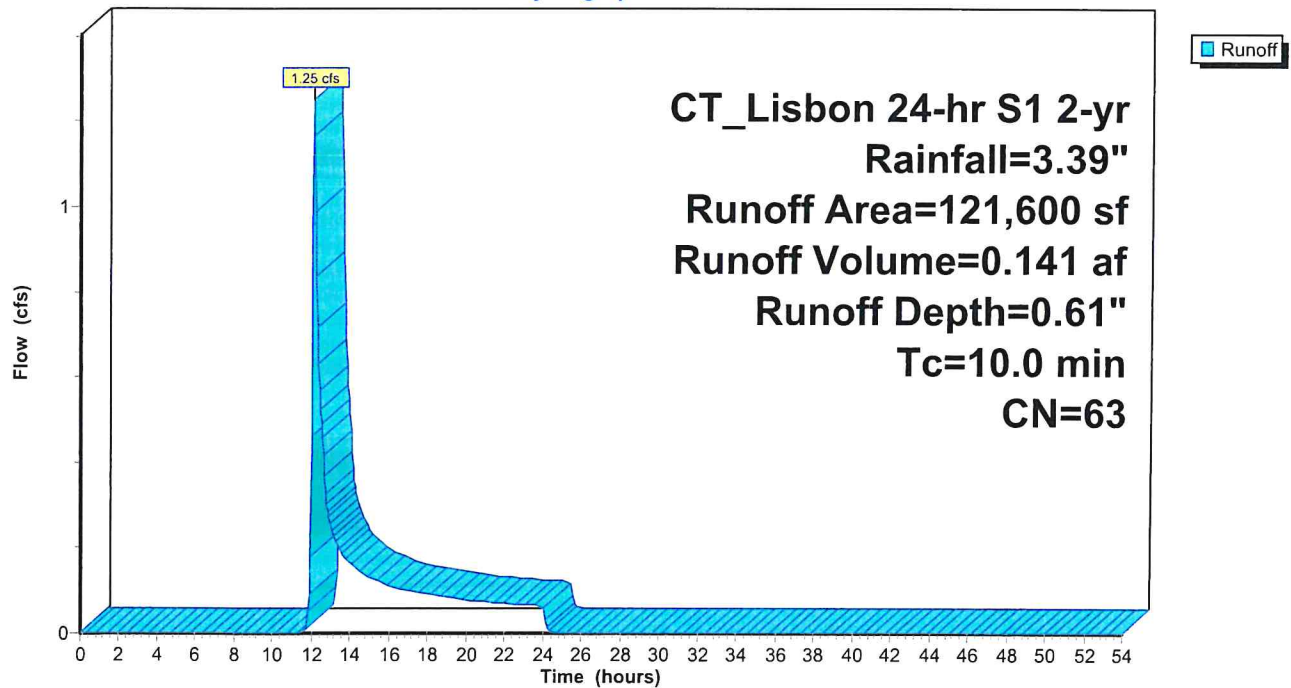
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-54.00 hrs, dt= 0.05 hrs
 CT_Lisbon 24-hr S1 2-yr Rainfall=3.39"

Area (sf)	CN	Description
93,100	65	2 acre lots, 12% imp, HSG B
28,500	55	Woods, Good, HSG B
121,600	63	Weighted Average
110,428		90.81% Pervious Area
11,172		9.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

Subcatchment 10S: Drainage Area to Wetland Crossing

Hydrograph



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Proposed Wetland Crossing
 CT_Lisbon 24-hr S1 2-yr Rainfall=3.39"

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Summary for Pond 10P: Proposed Wetland Crossing

Inflow Area = 2.792 ac, 9.19% Impervious, Inflow Depth = 0.61" for 2-yr event
 Inflow = 1.25 cfs @ 12.11 hrs, Volume= 0.141 af
 Outflow = 1.08 cfs @ 12.18 hrs, Volume= 0.141 af, Atten= 14%, Lag= 3.9 min
 Primary = 1.08 cfs @ 12.18 hrs, Volume= 0.141 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-54.00 hrs, dt= 0.05 hrs
 Peak Elev= 167.57' @ 12.18 hrs Surf.Area= 1,217 sf Storage= 224 cf
 Flood Elev= 169.00' Surf.Area= 4,995 sf Storage= 4,884 cf

Plug-Flow detention time= 3.3 min calculated for 0.141 af (100% of inflow)
 Center-of-Mass det. time= 3.3 min (944.1 - 940.8)

Volume	Invert	Avail.Storage	Storage Description
#1	167.20'	11,052 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

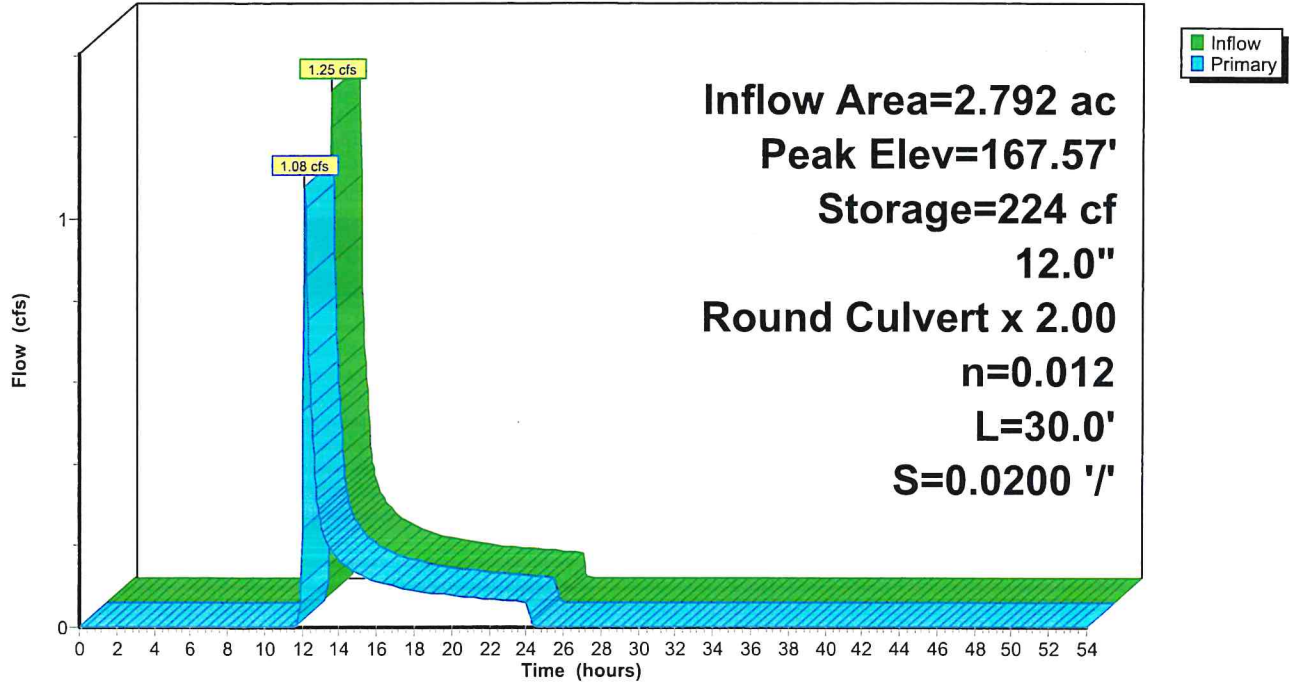
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
167.20	4	0	0
168.00	2,650	1,062	1,062
170.00	7,340	9,990	11,052

Device	Routing	Invert	Outlet Devices
#1	Primary	167.20'	12.0" Round Culvert X 2.00 L= 30.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 167.20' / 166.60' S= 0.0200 '/ Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=1.06 cfs @ 12.18 hrs HW=167.56' (Free Discharge)
 ↑ **1=Culvert** (Inlet Controls 1.06 cfs @ 2.06 fps)

Pond 10P: Proposed Wetland Crossing

Hydrograph



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Proposed Wetland Crossing
CT_Lisbon 24-hr S1 10-yr Rainfall=5.04"

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Time span=0.00-54.00 hrs, dt=0.05 hrs, 1081 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment10S: Drainage Area to Runoff Area=121,600 sf 9.19% Impervious Runoff Depth=1.53"
Tc=10.0 min CN=63 Runoff=4.09 cfs 0.357 af

Pond 10P: Proposed Wetland Crossing Peak Elev=167.91' Storage=828 cf Inflow=4.09 cfs 0.357 af
12.0" Round Culvert x 2.00 n=0.012 L=30.0' S=0.0200 '/ Outflow=3.39 cfs 0.357 af

Total Runoff Area = 2.792 ac Runoff Volume = 0.357 af Average Runoff Depth = 1.53"
90.81% Pervious = 2.535 ac 9.19% Impervious = 0.256 ac

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Proposed Wetland Crossing
 CT_Lisbon 24-hr S1 10-yr Rainfall=5.04"

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Summary for Subcatchment 10S: Drainage Area to Wetland Crossing

Runoff = 4.09 cfs @ 12.10 hrs, Volume= 0.357 af, Depth= 1.53"

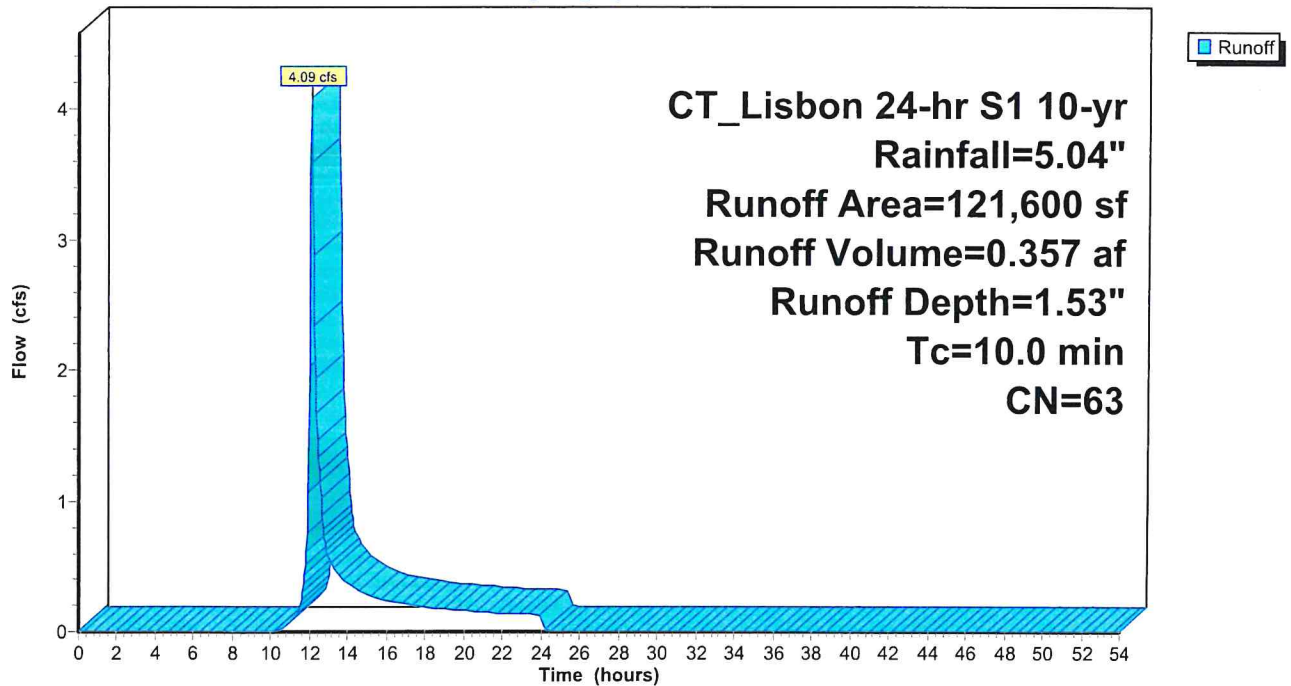
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-54.00 hrs, dt= 0.05 hrs
 CT_Lisbon 24-hr S1 10-yr Rainfall=5.04"

Area (sf)	CN	Description
93,100	65	2 acre lots, 12% imp, HSG B
28,500	55	Woods, Good, HSG B
121,600	63	Weighted Average
110,428		90.81% Pervious Area
11,172		9.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

Subcatchment 10S: Drainage Area to Wetland Crossing

Hydrograph



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Proposed Wetland Crossing
CT_Lisbon 24-hr S1 10-yr Rainfall=5.04"

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Summary for Pond 10P: Proposed Wetland Crossing

Inflow Area = 2.792 ac, 9.19% Impervious, Inflow Depth = 1.53" for 10-yr event
 Inflow = 4.09 cfs @ 12.10 hrs, Volume= 0.357 af
 Outflow = 3.39 cfs @ 12.17 hrs, Volume= 0.357 af, Atten= 17%, Lag= 4.0 min
 Primary = 3.39 cfs @ 12.17 hrs, Volume= 0.357 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-54.00 hrs, dt= 0.05 hrs
 Peak Elev= 167.91' @ 12.17 hrs Surf.Area= 2,340 sf Storage= 828 cf
 Flood Elev= 169.00' Surf.Area= 4,995 sf Storage= 4,884 cf

Plug-Flow detention time= 3.4 min calculated for 0.357 af (100% of inflow)
 Center-of-Mass det. time= 3.4 min (903.8 - 900.3)

Volume	Invert	Avail.Storage	Storage Description
#1	167.20'	11,052 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

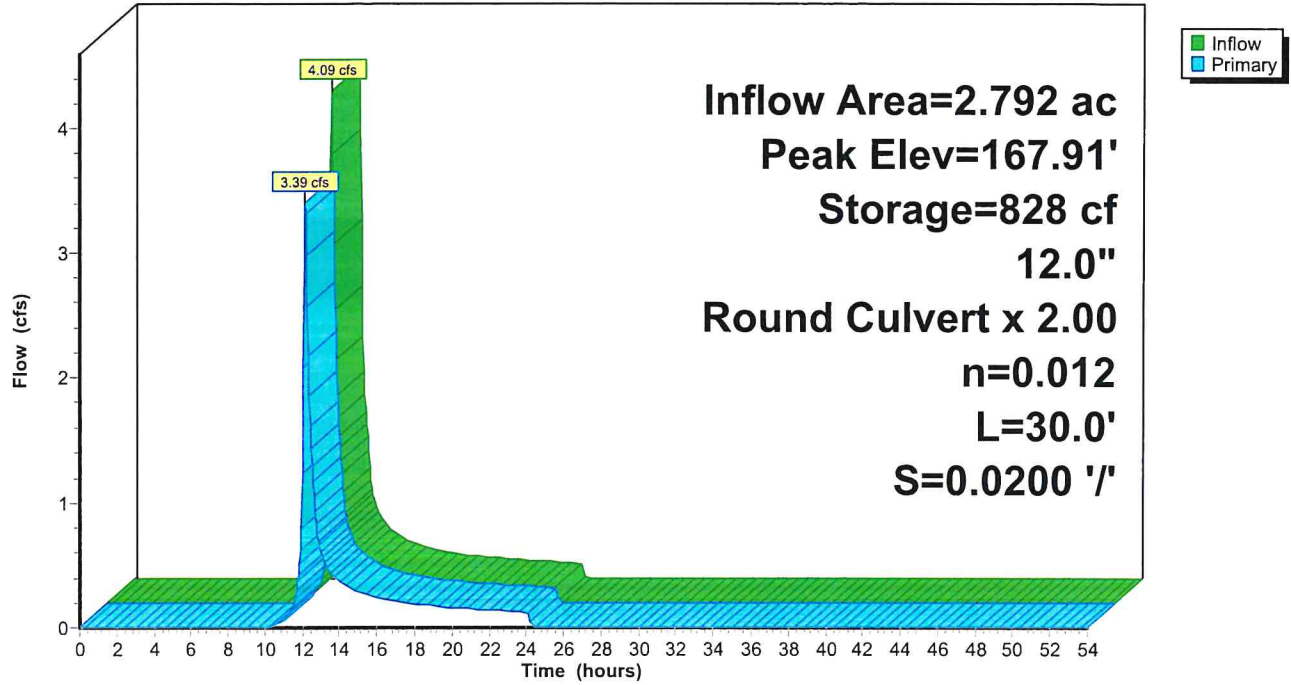
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
167.20	4	0	0
168.00	2,650	1,062	1,062
170.00	7,340	9,990	11,052

Device	Routing	Invert	Outlet Devices
#1	Primary	167.20'	12.0" Round Culvert X 2.00 L= 30.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 167.20' / 166.60' S= 0.0200 '/ Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=3.34 cfs @ 12.17 hrs HW=167.90' (Free Discharge)
 ←**1=Culvert** (Inlet Controls 3.34 cfs @ 2.85 fps)

Pond 10P: Proposed Wetland Crossing

Hydrograph



2019160 Sunfox_Pr

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Proposed Wetland Crossing
CT_Lisbon 24-hr S1 25-yr Rainfall=6.07"

Printed 4/19/2022

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Time span=0.00-54.00 hrs, dt=0.05 hrs, 1081 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment10S: Drainage Area to Runoff Area=121,600 sf 9.19% Impervious Runoff Depth=2.23"
Tc=10.0 min CN=63 Runoff=6.21 cfs 0.518 af

Pond 10P: Proposed Wetland Crossing Peak Elev=168.11' Storage=1,377 cf Inflow=6.21 cfs 0.518 af
12.0" Round Culvert x 2.00 n=0.012 L=30.0' S=0.0200 ' Outflow=4.90 cfs 0.518 af

Total Runoff Area = 2.792 ac Runoff Volume = 0.518 af Average Runoff Depth = 2.23"
90.81% Pervious = 2.535 ac 9.19% Impervious = 0.256 ac

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Proposed Wetland Crossing
 CT_Lisbon 24-hr S1 25-yr Rainfall=6.07"

Printed 4/19/2022

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Summary for Subcatchment 10S: Drainage Area to Wetland Crossing

Runoff = 6.21 cfs @ 12.10 hrs, Volume= 0.518 af, Depth= 2.23"

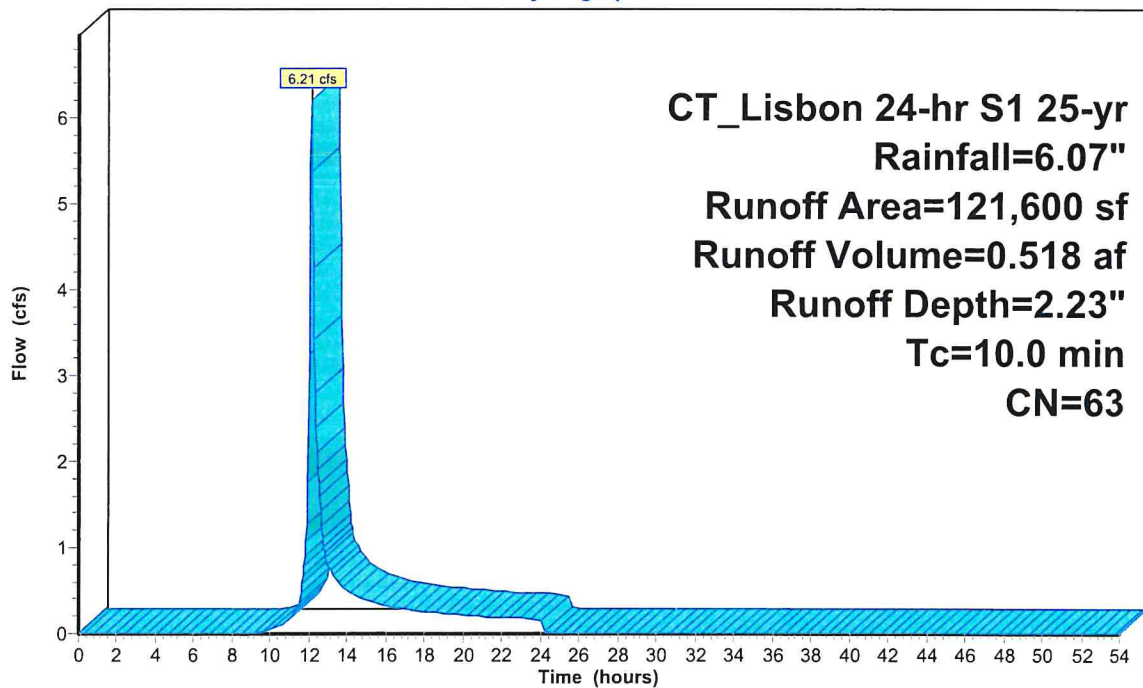
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-54.00 hrs, dt= 0.05 hrs
 CT_Lisbon 24-hr S1 25-yr Rainfall=6.07"

Area (sf)	CN	Description
93,100	65	2 acre lots, 12% imp, HSG B
28,500	55	Woods, Good, HSG B
121,600	63	Weighted Average
110,428		90.81% Pervious Area
11,172		9.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

Subcatchment 10S: Drainage Area to Wetland Crossing

Hydrograph



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Proposed Wetland Crossing
CT_Lisbon 24-hr S1 25-yr Rainfall=6.07"

Printed 4/19/2022

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Summary for Pond 10P: Proposed Wetland Crossing

Inflow Area = 2.792 ac, 9.19% Impervious, Inflow Depth = 2.23" for 25-yr event
Inflow = 6.21 cfs @ 12.10 hrs, Volume= 0.518 af
Outflow = 4.90 cfs @ 12.17 hrs, Volume= 0.518 af, Atten= 21%, Lag= 4.5 min
Primary = 4.90 cfs @ 12.17 hrs, Volume= 0.518 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-54.00 hrs, dt= 0.05 hrs
Peak Elev= 168.11' @ 12.17 hrs Surf.Area= 2,916 sf Storage= 1,377 cf
Flood Elev= 169.00' Surf.Area= 4,995 sf Storage= 4,884 cf

Plug-Flow detention time= 3.6 min calculated for 0.517 af (100% of inflow)
Center-of-Mass det. time= 3.6 min (889.8 - 886.2)

Volume	Invert	Avail.Storage	Storage Description
#1	167.20'	11,052 cf	Custom Stage Data (Prismatic) Listed below (Recalc)

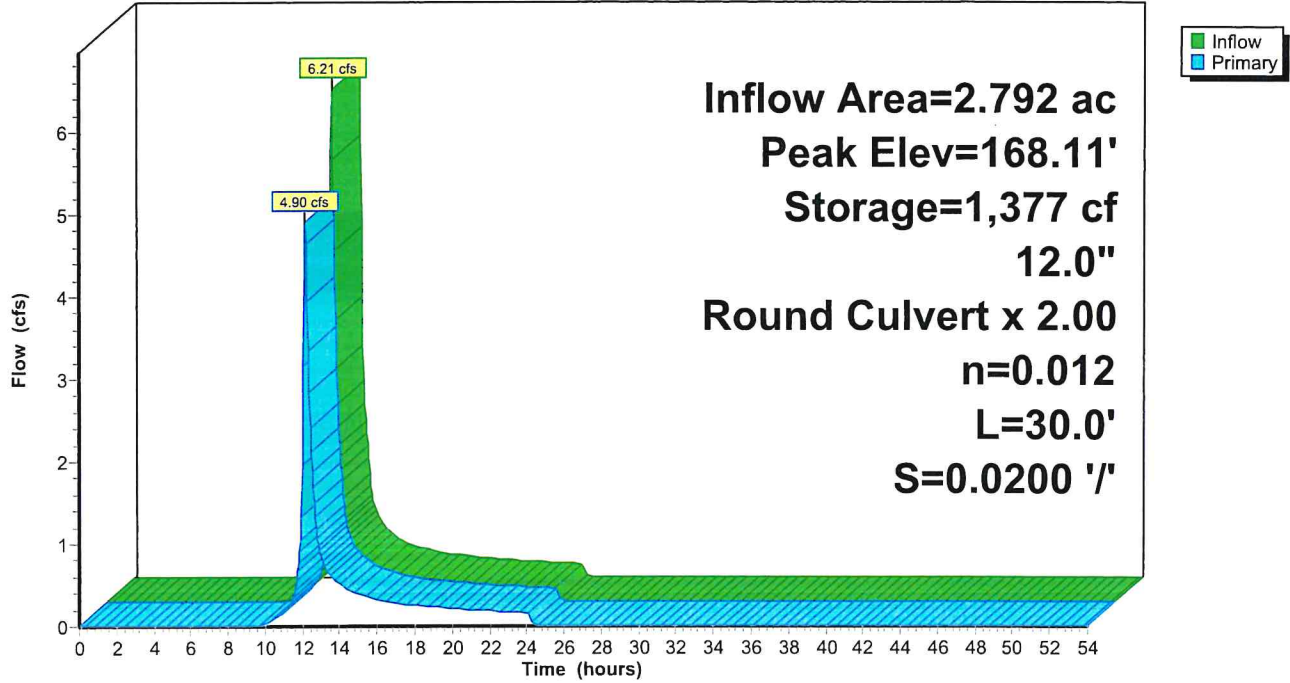
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
167.20	4	0	0
168.00	2,650	1,062	1,062
170.00	7,340	9,990	11,052

Device	Routing	Invert	Outlet Devices
#1	Primary	167.20'	12.0" Round Culvert X 2.00 L= 30.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 167.20' / 166.60' S= 0.0200 '/ Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=4.83 cfs @ 12.17 hrs HW=168.10' (Free Discharge)
↑**1=Culvert** (Inlet Controls 4.83 cfs @ 3.24 fps)

Pond 10P: Proposed Wetland Crossing

Hydrograph



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Proposed Wetland Crossing
CT_Lisbon 24-hr S1 100-yr Rainfall=7.65"

Printed 4/19/2022

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Time span=0.00-54.00 hrs, dt=0.05 hrs, 1081 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment10S: Drainage Area to Runoff Area=121,600 sf 9.19% Impervious Runoff Depth=3.40"
Tc=10.0 min CN=63 Runoff=9.79 cfs 0.790 af

Pond 10P: Proposed Wetland Crossing Peak Elev=168.49' Storage=2,653 cf Inflow=9.79 cfs 0.790 af
12.0" Round Culvert x 2.00 n=0.012 L=30.0' S=0.0200 '/' Outflow=6.74 cfs 0.790 af

Total Runoff Area = 2.792 ac Runoff Volume = 0.790 af Average Runoff Depth = 3.40"
90.81% Pervious = 2.535 ac 9.19% Impervious = 0.256 ac

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Proposed Wetland Crossing
CT_Lisbon 24-hr S1 100-yr Rainfall=7.65"

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Summary for Subcatchment 10S: Drainage Area to Wetland Crossing

Runoff = 9.79 cfs @ 12.10 hrs, Volume= 0.790 af, Depth= 3.40"

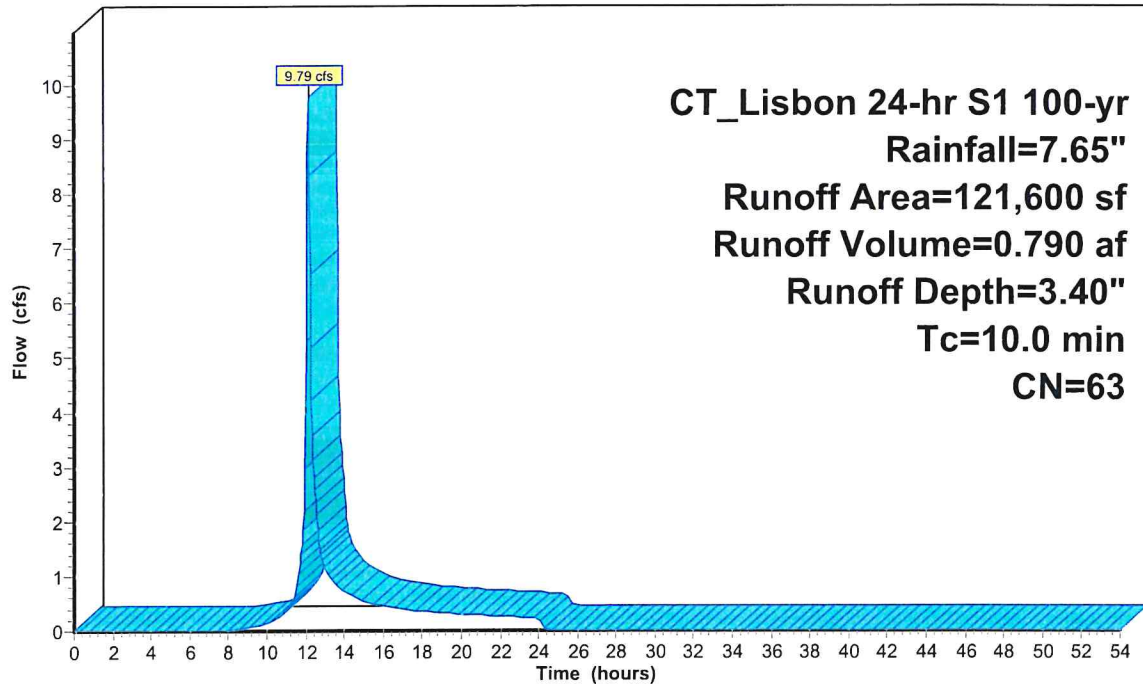
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-54.00 hrs, dt= 0.05 hrs
CT_Lisbon 24-hr S1 100-yr Rainfall=7.65"

Area (sf)	CN	Description
93,100	65	2 acre lots, 12% imp, HSG B
28,500	55	Woods, Good, HSG B
121,600	63	Weighted Average
110,428		90.81% Pervious Area
11,172		9.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry,

Subcatchment 10S: Drainage Area to Wetland Crossing

Hydrograph



CT_Lisbon 24-hr S1 100-yr
Rainfall=7.65"
Runoff Area=121,600 sf
Runoff Volume=0.790 af
Runoff Depth=3.40"
Tc=10.0 min
CN=63

2019160 Sunfox_Pr

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Proposed Wetland Crossing
 CT_Lisbon 24-hr S1 100-yr Rainfall=7.65"

Printed 4/19/2022

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Summary for Pond 10P: Proposed Wetland Crossing

Inflow Area = 2.792 ac, 9.19% Impervious, Inflow Depth = 3.40" for 100-yr event
 Inflow = 9.79 cfs @ 12.10 hrs, Volume= 0.790 af
 Outflow = 6.74 cfs @ 12.20 hrs, Volume= 0.790 af, Atten= 31%, Lag= 6.2 min
 Primary = 6.74 cfs @ 12.20 hrs, Volume= 0.790 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-54.00 hrs, dt= 0.05 hrs
 Peak Elev= 168.49' @ 12.20 hrs Surf.Area= 3,806 sf Storage= 2,653 cf
 Flood Elev= 169.00' Surf.Area= 4,995 sf Storage= 4,884 cf

Plug-Flow detention time= 4.0 min calculated for 0.789 af (100% of inflow)
 Center-of-Mass det. time= 4.0 min (874.3 - 870.3)

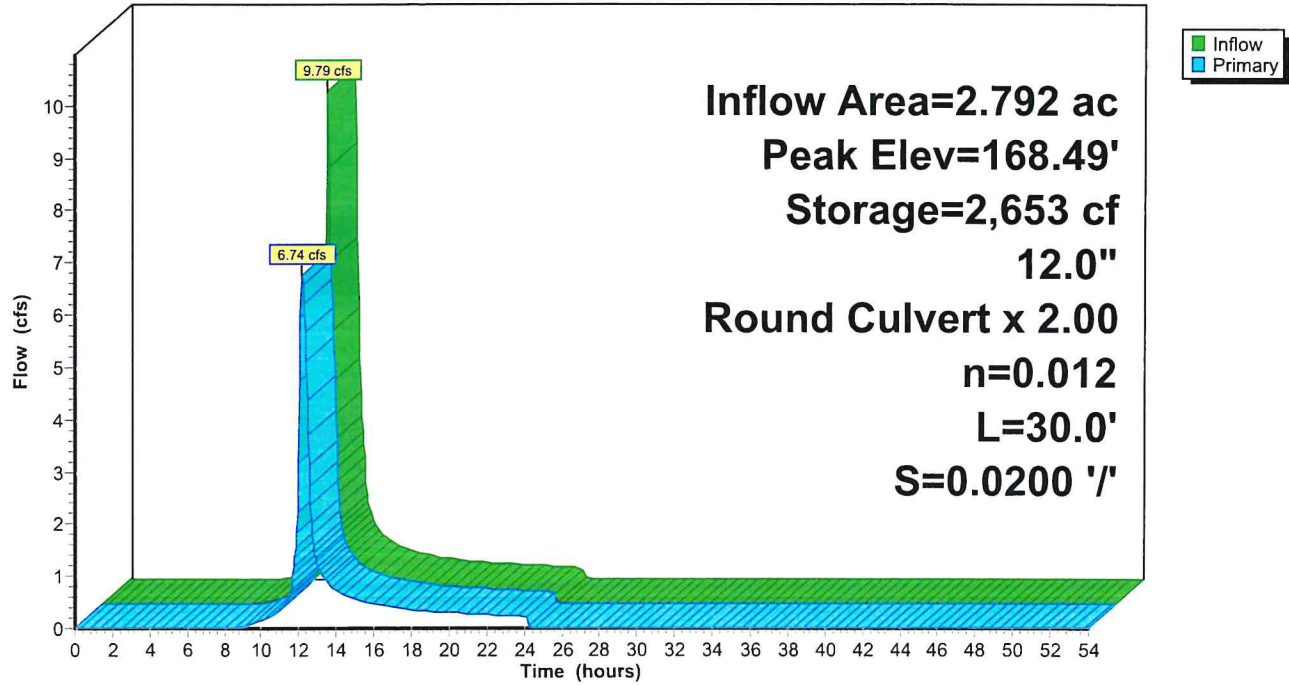
Volume	Invert	Avail.Storage	Storage Description
#1	167.20'	11,052 cf	Custom Stage Data (Prismatic) Listed below (Recalc)
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
167.20	4	0	0
168.00	2,650	1,062	1,062
170.00	7,340	9,990	11,052

Device	Routing	Invert	Outlet Devices
#1	Primary	167.20'	12.0" Round Culvert X 2.00 L= 30.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 167.20' / 166.60' S= 0.0200 '/' Cc= 0.900 n= 0.012, Flow Area= 0.79 sf

Primary OutFlow Max=6.73 cfs @ 12.20 hrs HW=168.49' (Free Discharge)
 ↑ **1=Culvert** (Inlet Controls 6.73 cfs @ 4.29 fps)

Pond 10P: Proposed Wetland Crossing

Hydrograph





NOAA RAINFALL DATA



NOAA Atlas 14, Volume 10, Version 3
Location name: Jewett City, Connecticut, USA*
Latitude: 41.5942°, Longitude: -72.0241°
Elevation: 179.29 ft**
 * source: ESRI Maps
 ** source: USGS



POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sandra Pavlovic, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Orlan Wilhite

NOAA, National Weather Service, Silver Spring, Maryland

[PF_tabular](#) | [PF_graphical](#) | [Maps & aerials](#)

PF tabular

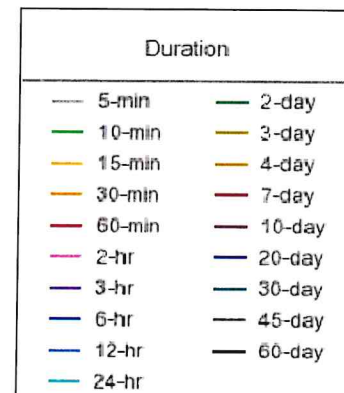
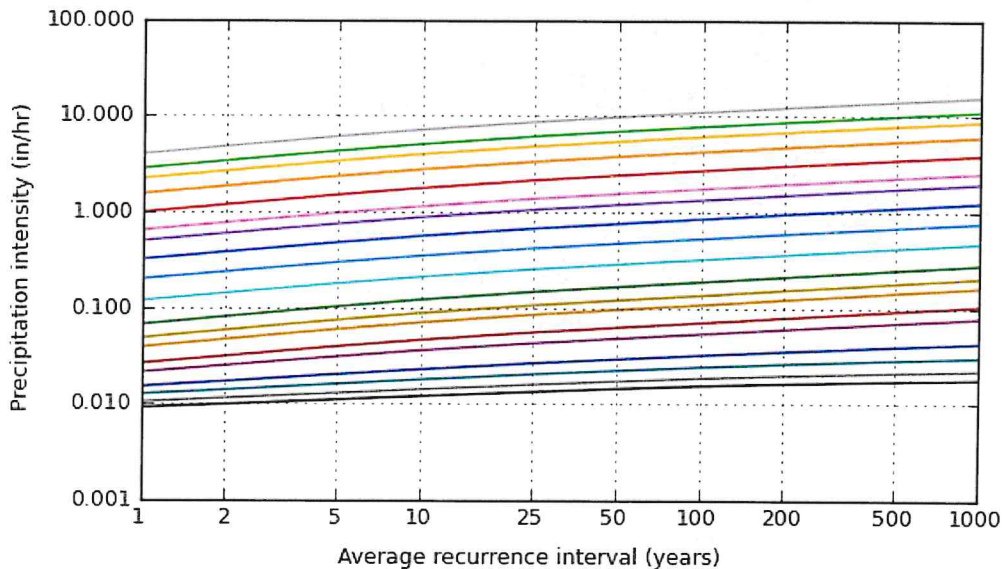
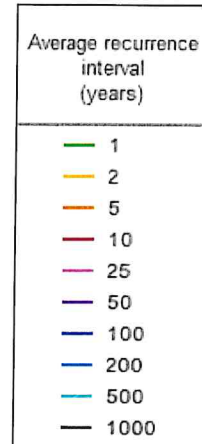
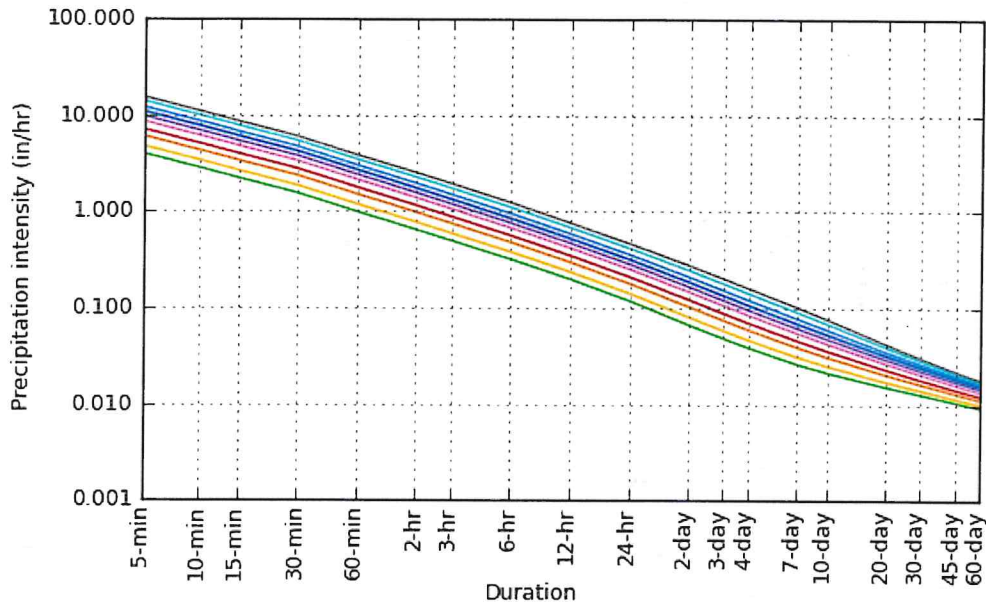
PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches/hour)¹										
Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	3.98 (3.07-5.11)	4.78 (3.68-6.13)	6.06 (4.67-7.81)	7.13 (5.46-9.20)	8.60 (6.38-11.5)	9.72 (7.07-13.2)	10.9 (7.69-15.2)	12.2 (8.18-17.2)	14.0 (9.07-20.3)	15.5 (9.80-22.8)
10-min	2.83 (2.18-3.62)	3.38 (2.61-4.34)	4.30 (3.31-5.53)	5.05 (3.86-6.53)	6.10 (4.52-8.14)	6.89 (5.00-9.33)	7.71 (5.45-10.7)	8.62 (5.80-12.2)	9.92 (6.43-14.4)	11.0 (6.94-16.1)
15-min	2.22 (1.71-2.84)	2.65 (2.05-3.40)	3.37 (2.59-4.34)	3.96 (3.03-5.12)	4.78 (3.55-6.38)	5.40 (3.92-7.32)	6.04 (4.27-8.42)	6.76 (4.54-9.54)	7.78 (5.04-11.3)	8.60 (5.44-12.7)
30-min	1.54 (1.19-1.97)	1.84 (1.42-2.37)	2.34 (1.80-3.01)	2.76 (2.11-3.56)	3.33 (2.47-4.44)	3.76 (2.73-5.09)	4.20 (2.97-5.85)	4.70 (3.16-6.64)	5.41 (3.50-7.84)	5.99 (3.79-8.81)
60-min	0.986 (0.761-1.26)	1.18 (0.911-1.52)	1.50 (1.15-1.93)	1.77 (1.35-2.28)	2.13 (1.58-2.84)	2.41 (1.75-3.26)	2.69 (1.90-3.75)	3.01 (2.02-4.26)	3.47 (2.25-5.02)	3.84 (2.43-5.64)
2-hr	0.642 (0.498-0.817)	0.766 (0.594-0.978)	0.971 (0.750-1.24)	1.14 (0.877-1.46)	1.37 (1.03-1.83)	1.55 (1.13-2.09)	1.74 (1.24-2.41)	1.95 (1.31-2.73)	2.26 (1.47-3.25)	2.52 (1.60-3.68)
3-hr	0.496 (0.386-0.629)	0.591 (0.460-0.752)	0.748 (0.580-0.952)	0.878 (0.677-1.12)	1.06 (0.791-1.40)	1.19 (0.874-1.60)	1.33 (0.953-1.85)	1.50 (1.01-2.09)	1.74 (1.13-2.50)	1.95 (1.24-2.83)
6-hr	0.319 (0.249-0.402)	0.379 (0.296-0.478)	0.478 (0.372-0.604)	0.560 (0.434-0.711)	0.672 (0.506-0.884)	0.756 (0.558-1.01)	0.846 (0.608-1.17)	0.951 (0.645-1.32)	1.11 (0.722-1.58)	1.24 (0.788-1.79)
12-hr	0.199 (0.156-0.249)	0.236 (0.186-0.296)	0.297 (0.233-0.374)	0.348 (0.271-0.439)	0.418 (0.315-0.545)	0.470 (0.348-0.623)	0.525 (0.378-0.718)	0.589 (0.401-0.813)	0.683 (0.448-0.967)	0.761 (0.488-1.09)
24-hr	0.118 (0.094-0.147)	0.141 (0.112-0.176)	0.179 (0.141-0.223)	0.210 (0.164-0.263)	0.253 (0.192-0.328)	0.285 (0.212-0.375)	0.319 (0.231-0.433)	0.358 (0.245-0.491)	0.416 (0.274-0.586)	0.465 (0.299-0.664)
2-day	0.067 (0.053-0.082)	0.080 (0.064-0.099)	0.103 (0.081-0.127)	0.121 (0.095-0.151)	0.146 (0.112-0.189)	0.165 (0.124-0.217)	0.186 (0.136-0.252)	0.210 (0.144-0.286)	0.246 (0.162-0.344)	0.277 (0.178-0.392)
3-day	0.048 (0.038-0.059)	0.058 (0.046-0.071)	0.074 (0.059-0.092)	0.088 (0.069-0.109)	0.106 (0.081-0.136)	0.120 (0.090-0.157)	0.134 (0.098-0.182)	0.152 (0.104-0.206)	0.179 (0.118-0.248)	0.201 (0.130-0.284)
4-day	0.039 (0.031-0.048)	0.047 (0.037-0.057)	0.059 (0.047-0.073)	0.070 (0.055-0.086)	0.084 (0.065-0.108)	0.095 (0.072-0.124)	0.107 (0.078-0.144)	0.121 (0.083-0.164)	0.142 (0.094-0.197)	0.160 (0.104-0.225)
7-day	0.026 (0.021-0.032)	0.031 (0.025-0.038)	0.039 (0.031-0.048)	0.046 (0.037-0.057)	0.055 (0.043-0.070)	0.062 (0.047-0.081)	0.069 (0.051-0.093)	0.078 (0.054-0.105)	0.091 (0.061-0.126)	0.103 (0.067-0.144)
10-day	0.021 (0.017-0.026)	0.025 (0.020-0.030)	0.031 (0.025-0.038)	0.036 (0.029-0.044)	0.043 (0.033-0.054)	0.048 (0.036-0.062)	0.053 (0.039-0.071)	0.059 (0.041-0.080)	0.069 (0.046-0.095)	0.077 (0.050-0.107)
20-day	0.015 (0.012-0.018)	0.017 (0.014-0.021)	0.020 (0.016-0.025)	0.023 (0.018-0.028)	0.027 (0.021-0.033)	0.029 (0.022-0.037)	0.032 (0.023-0.042)	0.035 (0.024-0.047)	0.039 (0.026-0.053)	0.042 (0.028-0.059)
30-day	0.013 (0.010-0.015)	0.014 (0.011-0.017)	0.016 (0.013-0.019)	0.018 (0.014-0.022)	0.020 (0.016-0.025)	0.022 (0.017-0.028)	0.024 (0.018-0.031)	0.026 (0.018-0.035)	0.028 (0.019-0.039)	0.030 (0.020-0.042)
45-day	0.011 (0.009-0.013)	0.011 (0.009-0.014)	0.013 (0.010-0.016)	0.014 (0.011-0.017)	0.016 (0.012-0.020)	0.017 (0.013-0.022)	0.019 (0.014-0.024)	0.020 (0.014-0.026)	0.021 (0.014-0.029)	0.022 (0.014-0.030)
60-day	0.009 (0.007-0.011)	0.010 (0.008-0.012)	0.011 (0.009-0.013)	0.012 (0.010-0.015)	0.013 (0.010-0.016)	0.014 (0.011-0.018)	0.015 (0.011-0.020)	0.016 (0.011-0.021)	0.017 (0.012-0.023)	0.018 (0.012-0.024)

¹ Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).
 Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.
 Please refer to NOAA Atlas 14 document for more information.

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PF graphical

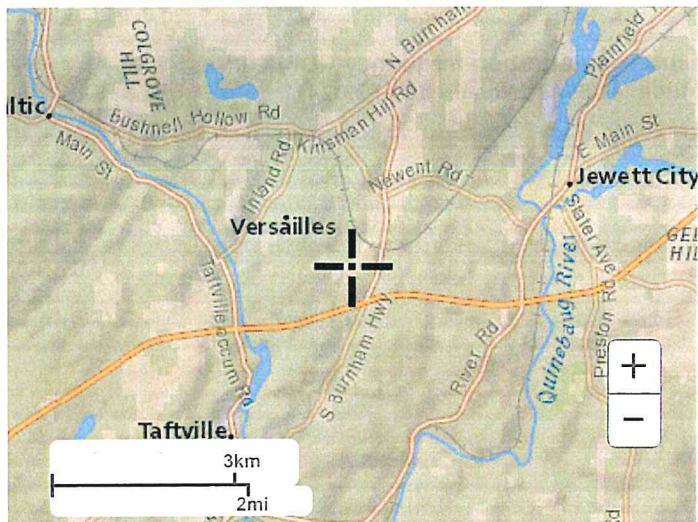
PDS-based intensity-duration-frequency (IDF) curves Latitude: 41.5942°, Longitude: -72.0241°



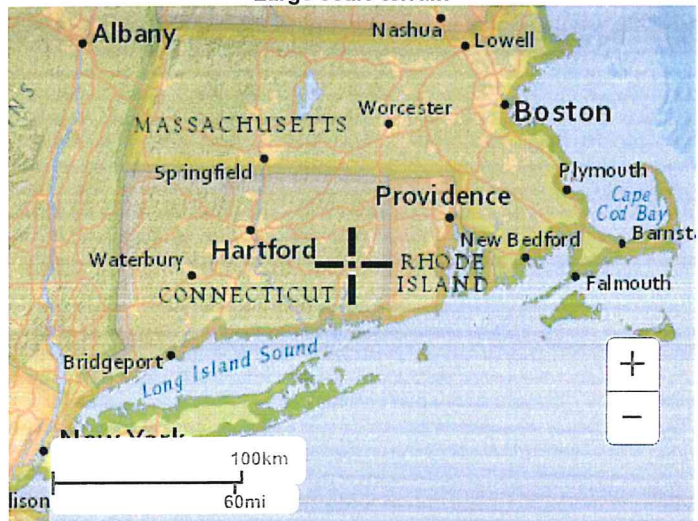
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Maps & aeriels

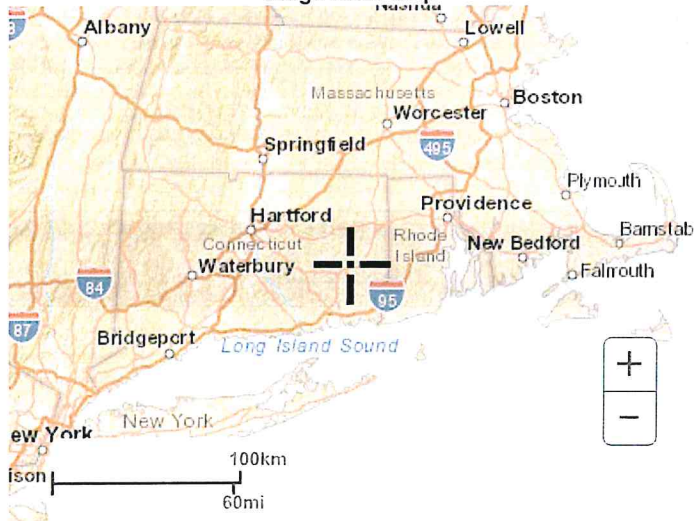
Small scale terrain



Large scale terrain



Large scale map



Large scale aerial

STREAMSTATS REPORT

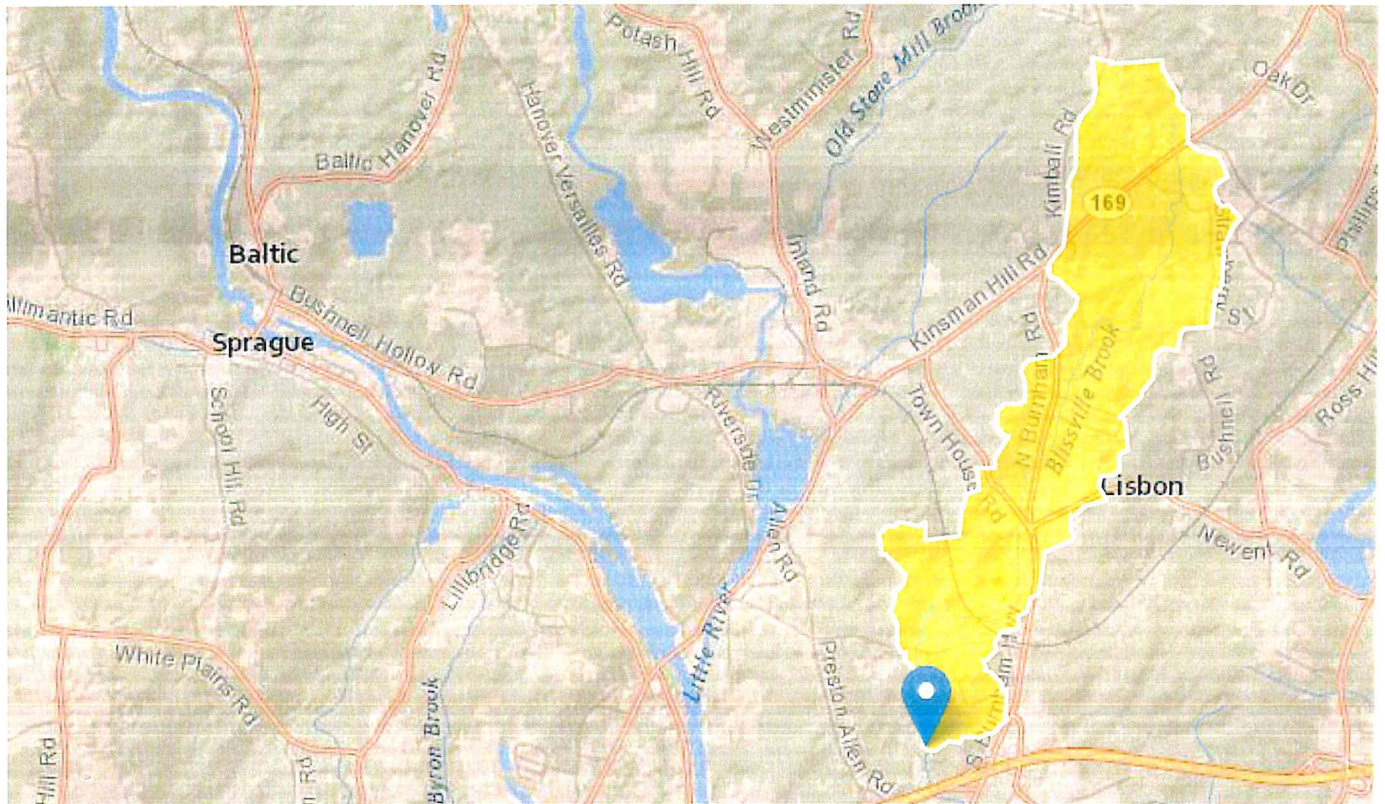
StreamStats Report

Region ID: CT

Workspace ID: CT20210818202359630000

Clicked Point (Latitude, Longitude): 41.59065, -72.02716

Time: 2021-08-18 16:24:18 -0400



Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
CAT1ROADS	Length of interstates lmt'd access highways and ramps for lmt'd access highways, includes cloverleaf interchanges (USGS Ntl Transp Dataset)	0	miles
CAT2ROADS	Length of sec hwy or maj connecting roads; main arteries & hwy's not lmt'd access, usually in the US Hwy or State Hwy systems (USGS Ntl Transp Dataset)	0	miles

Parameter Code	Parameter Description	Value	Unit
CAT3ROADS	Length of local connecting roads; roads that collect traffic from local roads & connect towns, subdivisions & neighborhoods (USGS Nat Transp Dataset)	2.56	miles
CAT4ROADS	Length of local roads; generally paved street, road, or byway that usually have single lane of traffic in each direction (USGS Ntnl Transp Dataset)	4.29	miles
CROSCOUNT1	Number of intersections between streams and roads, where the roads are interstate, limited access highway, or ramp (CAT1ROADS)	0	dimensionless
CROSCOUNT2	Number of intersections between streams and roads, where the roads are secondary highway or major connecting road (CAT2ROADS)	0	dimensionless
CROSCOUNT3	Number of intersections between streams and roads, where roads are local connecting roads (CAT3ROADS)	3	dimensionless
CROSCOUNT4	Number of intersections between streams and roads, where roads are local roads (CAT4ROADS)	6	dimensionless
CRSDFT	Percentage of area of coarse-grained stratified drift	19.1	percent
CSL10_85	Change in elevation divided by length between points 10 and 85 percent of distance along main channel to basin divide - main channel method not known	43	feet per mi
DRNAREA	Area that drains to a point on a stream	1.67	square miles
ELEV	Mean Basin Elevation	284	feet
I24H100Y	Maximum 24-hour precipitation that occurs on average once in 100 years	7.64	inches
I24H10Y	Maximum 24-hour precipitation that occurs on average once in 10 years	4.97	inches
I24H200Y	Maximum 24-hour precipitation that occurs on average once in 200 years	8.7	inches
I24H25Y	Maximum 24-hour precipitation that occurs on average once in 25 years	6.03	inches
I24H2Y	Maximum 24-hour precipitation that occurs on average once in 2 years - Equivalent to precipitation intensity index	3.1	inches

Parameter Code	Parameter Description	Value	Unit
I24H500Y	Maximum 24-hour precipitation that occurs on average once in 500 years	10.1	inches
I24H50Y	Maximum 24-hour precipitation that occurs on average once in 50 years	6.84	inches
I24H5Y	Maximum 24-hour precipitation that occurs on average once in 5 years	4.16	inches
LC11DEV	Percentage of developed (urban) land from NLCD 2011 classes 21-24	11.3	percent
LC11IMP	Average percentage of impervious area determined from NLCD 2011 impervious dataset	2.09	percent
LFPLENGTH	Length of longest flow path	4.73	miles
MAPM	Mean Annual Precip Basin Average	48.819	inches
NOVAVPRE	Mean November Precipitation	4.7	inches
PRCWINTER	Mean annual precipitation for December through February	4.1	inches
SGSL	Total stream length intersecting sand and gravel deposits (in miles)	2.77	miles
SOILPERM	Average Soil Permeability	3.687	inches per hour
SSURGOCCDD	Percentage of area with hydrologic soil types C, D, or C/D from SSURGO	0.5009	percent
STRMTOT	total length of all mapped streams (1:24,000-scale) in the basin	5.69	miles
WETLAND	Percentage of Wetlands	0.34	percent

Peak-Flow Statistics Parameters [Statewide DA only SIR 2020 5054]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	1.67	square miles	0.69	325

Peak-Flow Statistics Parameters [Statewide Multiparameter SIR 2020 5054]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
-----------------------	-----------------------	--------------	--------------	------------------	------------------

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	1.67	square miles	0.69	325
I24H2Y	24 Hour 2 Year Precipitation	3.1	inches	2.77	3.32
SSURGOCCDD	Percent soil type C or D from SSURGO	0.5009	percent	0.118	0.945
I24H5Y	24 Hour 5 Year Precipitation	4.16	inches	4	4.7
I24H10Y	24 Hour 10 Year Precipitation	4.97	inches	4.86	5.79
I24H25Y	24 Hour 25 Year Precipitation	6.03	inches	5.99	7.22
I24H50Y	24 Hour 50 Year Precipitation	6.84	inches	6.81	8.3
I24H100Y	24 Hour 100 Year Precipitation	7.64	inches	7.62	9.38
I24H200Y	24 Hour 200 Year Precipitation	8.7	inches	8.7	11.22
I24H500Y	24 Hour 500 Year Precipitation	10.1	inches	10.1	13.64

Peak-Flow Statistics Flow Report [Statewide DA only SIR 2020 5054]

PII: Prediction Interval-Lower, Plu: Prediction Interval-Upper, ASEp: Average Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	ASEp
Drainage Area Only 50-percent AEP flood	95.6	ft ³ /s	35
Drainage Area Only 20-percent AEP flood	168	ft ³ /s	35
Drainage Area Only 10-percent AEP flood	228	ft ³ /s	36.3
Drainage Area Only 4-percent AEP flood	317	ft ³ /s	37.8
Drainage Area Only 2-percent AEP flood	392	ft ³ /s	39.8
Drainage Area Only 1-percent AEP flood	476	ft ³ /s	42.4
Drainage Area Only 0.5-percent AEP flood	570	ft ³ /s	44.4
Drainage Area Only 0.2-percent AEP flood	710	ft ³ /s	48

Peak-Flow Statistics Flow Report [Statewide Multiparameter SIR 2020 5054]

FLOW USED IN ANALYSIS

PII: Prediction Interval-Lower, Plu: Prediction Interval-Upper, ASEp: Average Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	PII	Plu	ASEp
50-percent AEP flood	91.8	ft ³ /s	22.5	374	26.5
20-percent AEP flood	133	ft ³ /s	29.6	598	26.3

Statistic	Value	Unit	PIl	Plu	ASEp
10-percent AEP flood	168	ft ³ /s	34.4	820	28.4
4-percent AEP flood	223	ft ³ /s	41.1	1210	31.5
2-percent AEP flood	272	ft ³ /s	45.7	1620	34.3
1-percent AEP flood	324	ft ³ /s	49.4	2120	37.1
0.5-percent AEP flood	385	ft ³ /s	65.9	2250	40.6
0.2-percent AEP flood	481	ft ³ /s	87.5	2640	45

Peak-Flow Statistics Flow Report [Area-Averaged]

PIl: Prediction Interval-Lower, Plu: Prediction Interval-Upper, ASEp: Average Standard Error of Prediction, SE: Standard Error (other -- see report)

Statistic	Value	Unit	ASEp		
Drainage Area Only 50-percent AEP flood	95.6	ft ³ /s	35		
Drainage Area Only 20-percent AEP flood	168	ft ³ /s	35		
Drainage Area Only 10-percent AEP flood	228	ft ³ /s	36.3		
Drainage Area Only 4-percent AEP flood	317	ft ³ /s	37.8		
Drainage Area Only 2-percent AEP flood	392	ft ³ /s	39.8		
Drainage Area Only 1-percent AEP flood	476	ft ³ /s	42.4		
Drainage Area Only 0.5-percent AEP flood	570	ft ³ /s	44.4		
Drainage Area Only 0.2-percent AEP flood	710	ft ³ /s	48		
50-percent AEP flood	91.8	ft ³ /s	22.5	374	26.5
20-percent AEP flood	133	ft ³ /s	29.6	598	26.3
10-percent AEP flood	168	ft ³ /s	34.4	820	28.4
4-percent AEP flood	223	ft ³ /s	41.1	1210	31.5
2-percent AEP flood	272	ft ³ /s	45.7	1620	34.3
1-percent AEP flood	324	ft ³ /s	49.4	2120	37.1
0.5-percent AEP flood	385	ft ³ /s	65.9	2250	40.6
0.2-percent AEP flood	481	ft ³ /s	87.5	2640	45

Peak-Flow Statistics Citations

Ahearn, E.A., and Hodgkins, G.A., 2020, Estimating flood magnitude and frequency on streams and rivers in Connecticut, based on data through water year 2015: U.S. Geological

Flow-Duration Statistics Parameters [Duration Flow 2010 5052]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	1.67	square miles	0.92	150
ELEV	Mean Basin Elevation	284	feet	168	1287
CRSDFT	Percent Coarse Stratified Drift	19.1	percent	0.1	55.1

Flow-Duration Statistics Flow Report [Duration Flow 2010 5052]

Statistic	Value	Unit
25 Percent Duration	4.28	ft ³ /s
99 Percent Duration	0.0723	ft ³ /s

Flow-Duration Statistics Citations

Ahearn, E.A., 2010, Regional regression equations to estimate flow-duration statistics in Connecticut: U. S. Geological Survey Scientific Investigations Report 2010-5052, 45 p.
 (<http://pubs.usgs.gov/sir/2010/5052/>)

Seasonal Flow Statistics Parameters [Duration Flow 2010 5052]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	1.67	square miles	0.92	150
PRCWINTER	Mean Annual Winter Precipitation	4.1	inches	3.19	4.4
CRSDFT	Percent Coarse Stratified Drift	19.1	percent	0.1	55.1

Seasonal Flow Statistics Flow Report [Duration Flow 2010 5052]

Statistic	Value	Unit
25 Percent Duration December to February	4.66	ft ³ /s
50 Percent Duration December to February	2.77	ft ³ /s
75 Percent Duration December to February	1.66	ft ³ /s

Statistic	Value	Unit
95 Percent Duration DEC FEB	0.765	ft ³ /s
99 Percent Duration December to February	0.418	ft ³ /s
25 Percent Duration March to April	7.02	ft ³ /s
50 Percent Duration March to April	4.41	ft ³ /s
75 Percent Duration March to April	3.21	ft ³ /s
95 Percent Duration March to April	1.97	ft ³ /s
99 Percent Duration March to April	1.42	ft ³ /s
25 Percent Duration July to October	1.13	ft ³ /s
50 Percent Duration July to October	0.508	ft ³ /s
75 Percent Duration July to October	0.243	ft ³ /s
80 Percent Duration July to October	0.201	ft ³ /s
99 Percent Duration July to October	0.0294	ft ³ /s

Seasonal Flow Statistics Citations

Ahearn, E.A.,2010, Regional regression equations to estimate flow-duration statistics in Connecticut: U. S. Geological Survey Scientific Investigations Report 2010-5052, 45 p. (<http://pubs.usgs.gov/sir/2010/5052/>)

May Flow-Duration Statistics Parameters [Duration Flow 2010 5052]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	1.67	square miles	0.92	150
CRSDFT	Percent Coarse Stratified Drift	19.1	percent	0.1	55.1

May Flow-Duration Statistics Flow Report [Duration Flow 2010 5052]

Statistic	Value	Unit
May 25 Percent Duration	4.79	ft ³ /s
May 50 Percent Duration	3.24	ft ³ /s
May 75 Percent Duration	2.26	ft ³ /s
May 95 Percent Duration	1.29	ft ³ /s
May 99 Percent Duration	0.87	ft ³ /s

May Flow-Duration Statistics Citations

Ahearn, E.A.,2010, Regional regression equations to estimate flow-duration statistics in Connecticut: U. S. Geological Survey Scientific Investigations Report 2010-5052, 45 p. (<http://pubs.usgs.gov/sir/2010/5052/>)

June Flow-Duration Statistics Parameters [Duration Flow 2010 5052]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	1.67	square miles	0.92	150
CRSDFT	Percent Coarse Stratified Drift	19.1	percent	0.1	55.1
WETLAND	Percent Wetlands	0.34	percent	0.3	18.1

June Flow-Duration Statistics Flow Report [Duration Flow 2010 5052]

Statistic	Value	Unit
June 25 Percent Duration	2.46	ft ³ /s
June 50 Percent Duration	1.34	ft ³ /s
June 75 Percent Duration	0.758	ft ³ /s
June 90 Percent Duration	0.569	ft ³ /s
June 99 Percent Duration	0.258	ft ³ /s

June Flow-Duration Statistics Citations

Ahearn, E.A.,2010, Regional regression equations to estimate flow-duration statistics in Connecticut: U. S. Geological Survey Scientific Investigations Report 2010-5052, 45 p. (<http://pubs.usgs.gov/sir/2010/5052/>)

November Flow-Duration Statistics Parameters [Duration Flow 2010 5052]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	1.67	square miles	0.92	150
NOVAVPRE	Mean November Precipitation	4.7	inches	3.48	4.93
CRSDFT	Percent Coarse Stratified Drift	19.1	percent	0.1	55.1

November Flow-Duration Statistics Flow Report [Duration Flow 2010 5052]

Statistic	Value	Unit
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Statistic	Value	Unit
November 25 Percent Duration	3.72	ft ³ /s
November 50 Percent Duration	2.05	ft ³ /s
November 75 Percent Duration	0.965	ft ³ /s
November 90 Percent Duration	0.54	ft ³ /s
November 99 Percent Duration	0.225	ft ³ /s

November Flow-Duration Statistics Citations

Ahearn, E.A.,2010, Regional regression equations to estimate flow-duration statistics in Connecticut: U. S. Geological Survey Scientific Investigations Report 2010-5052, 45 p. (<http://pubs.usgs.gov/sir/2010/5052/>)

Bankfull Statistics Parameters [Appalachian Highlands D Bieger 2015]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	1.67	square miles	0.07722	940.1535

Bankfull Statistics Parameters [New England P Bieger 2015]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	1.67	square miles	3.799224	138.999861

Bankfull Statistics Parameters [USA Bieger 2015]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	1.67	square miles	0.07722	59927.7393

Bankfull Statistics Flow Report [Appalachian Highlands D Bieger 2015]

Statistic	Value	Unit
Bieger_D_channel_width	18.8	ft
Bieger_D_channel_depth	1.3	ft
Bieger_D_channel_cross_sectional_area	24.7	ft ²

Bankfull Statistics Disclaimers [New England P Bieger 2015]

One or more of the parameters is outside the suggested range. Estimates were extrapolated with unknown errors

Bankfull Statistics Flow Report [New England P Bieger 2015]

Statistic	Value	Unit
Bieger_P_channel_width	8.89	ft
Bieger_P_channel_depth	0.469	ft
Bieger_P_channel_cross_sectional_area	45	ft ²

Bankfull Statistics Flow Report [USA Bieger 2015]

Statistic	Value	Unit
Bieger_USA_channel_width	4.52	ft
Bieger_USA_channel_depth	0.41	ft
Bieger_USA_channel_cross_sectional_area	22.5	ft ²

Bankfull Statistics Flow Report [Area-Averaged]

Statistic	Value	Unit
Bieger_D_channel_width	18.8	ft
Bieger_D_channel_depth	1.3	ft
Bieger_D_channel_cross_sectional_area	24.7	ft ²
Bieger_P_channel_width	8.89	ft
Bieger_P_channel_depth	0.469	ft
Bieger_P_channel_cross_sectional_area	45	ft ²
Bieger_USA_channel_width	4.52	ft
Bieger_USA_channel_depth	0.41	ft
Bieger_USA_channel_cross_sectional_area	22.5	ft ²

Bankfull Statistics Citations

Bieger, Katrin; Rathjens, Hendrik; Allen, Peter M.; and Arnold, Jeffrey G., 2015, Development and Evaluation of Bankfull Hydraulic Geometry Relationships for the Physiographic Regions of the United States, Publications from USDA-ARS / UNL Faculty, 17p. (https://digitalcommons.unl.edu/usdaarsfacpub/1515?utm_source=digitalcommons.unl.edu%2Fusdaarsfacpub%2F1515&utm_medium=PDF&utm_can

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Application Version: 4.6.2

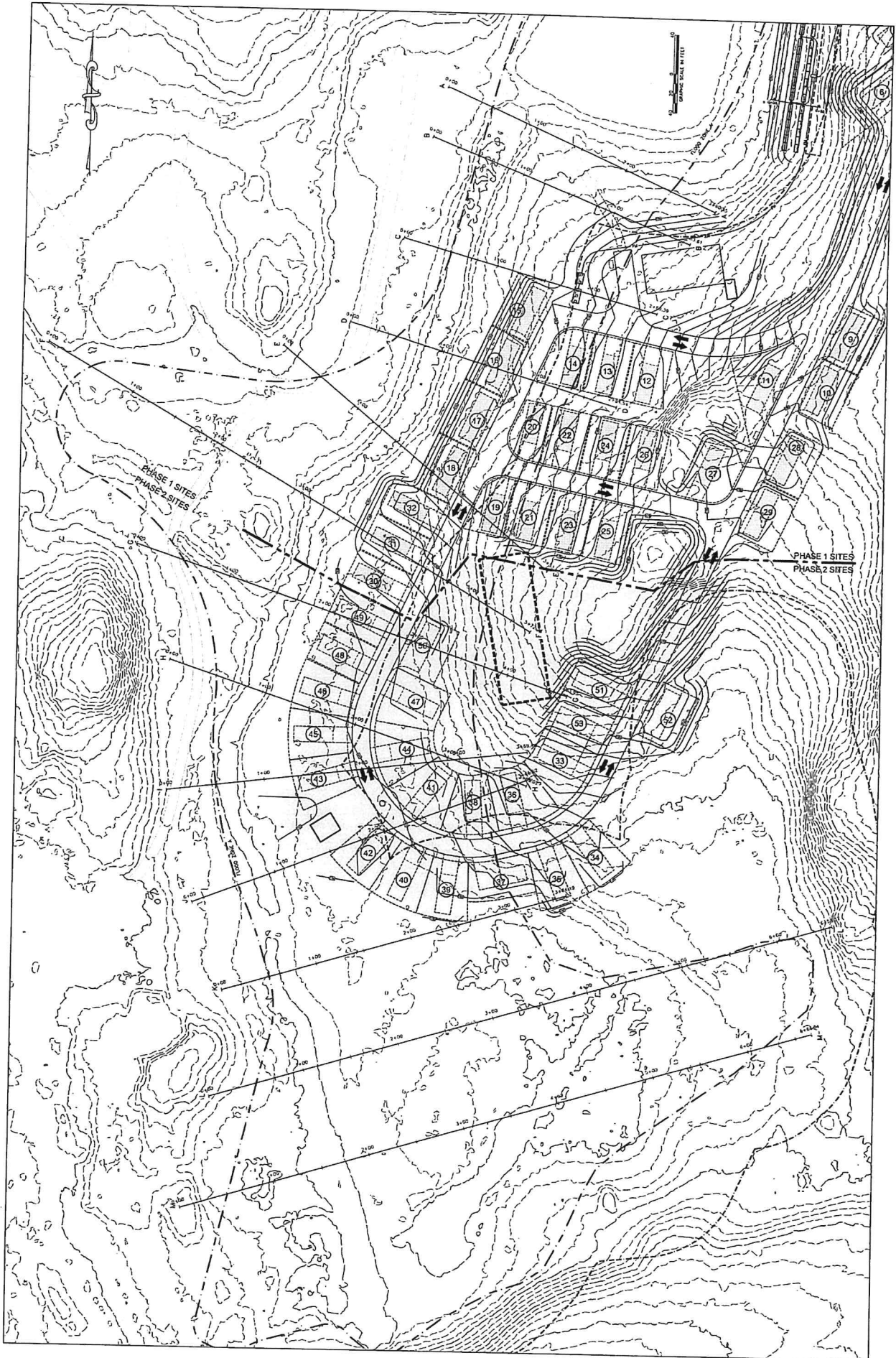
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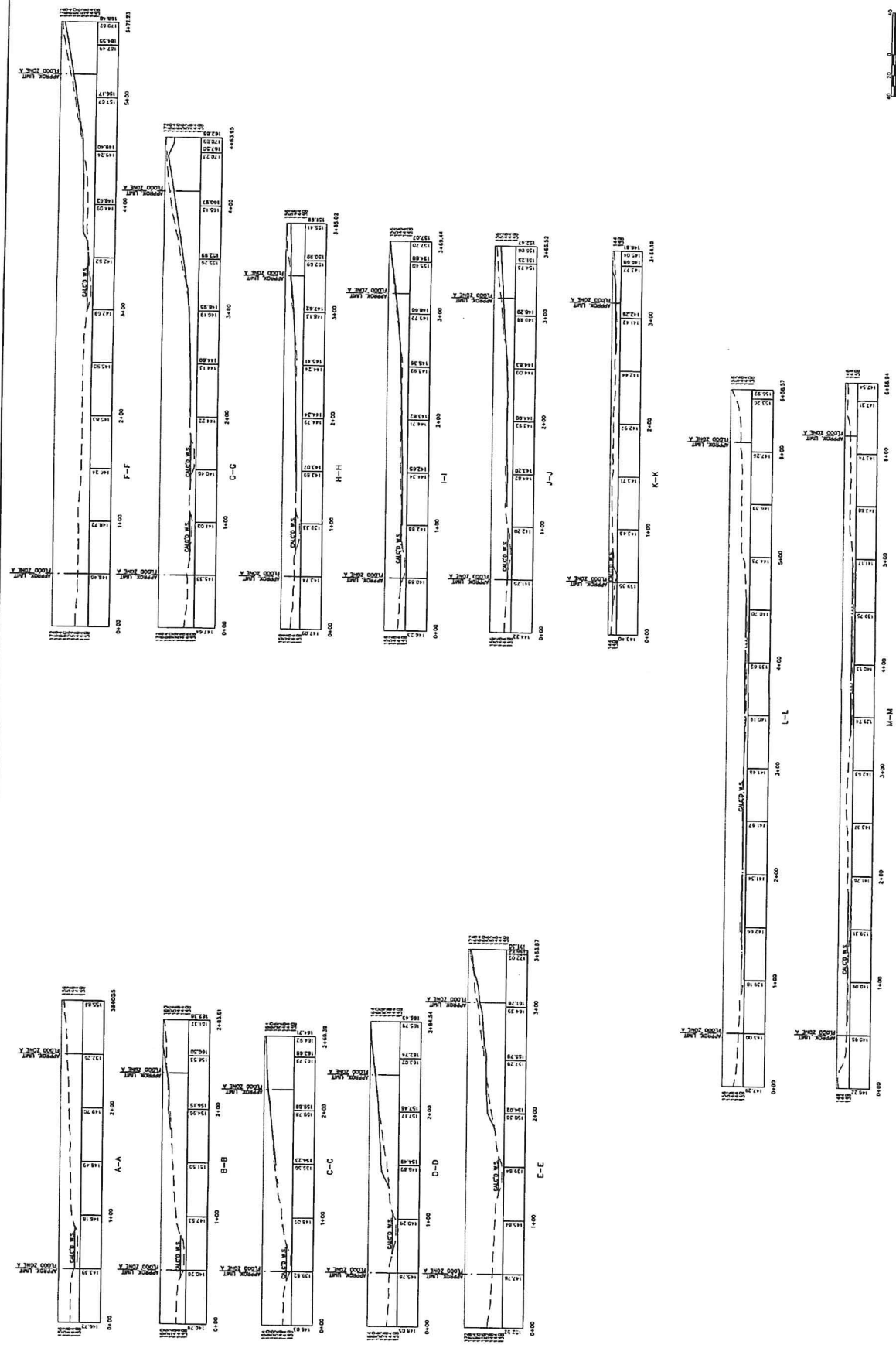
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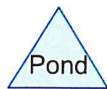
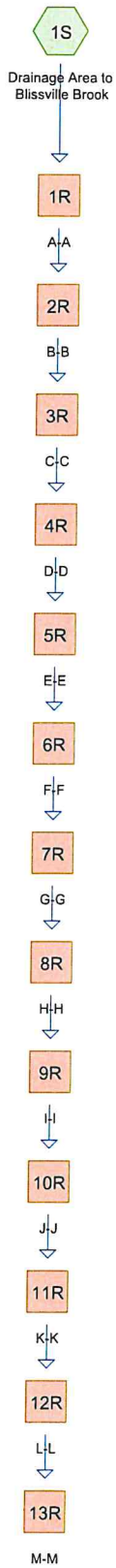


FLOOD DATA

177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000







Routing Diagram for 2019160 Sunfox
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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1,069.000	67	(1S)
1,069.000	67	TOTAL AREA

2019160 Sunfox

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Existing Conditions
CT_Lisbon 24-hr S1 100-yr Rainfall=7.65"

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Time span=0.00-54.00 hrs, dt=0.01 hrs, 5401 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment1S: Drainage Area to	Runoff Area=1,069.000 ac	0.00% Impervious	Runoff Depth>3.83"
	Flow Length=24,974'	Slope=0.0100 '/'	Tc=602.8 min CN=67 Runoff=332.46 cfs 341.407 af
Reach 1R: A-A	Avg. Flow Depth=1.45'	Max Vel=7.73 fps	Inflow=332.46 cfs 341.407 af
	n=0.022 L=50.0'	S=0.0100 '/'	Capacity=3,665.36 cfs Outflow=332.46 cfs 341.406 af
Reach 2R: B-B	Avg. Flow Depth=2.97'	Max Vel=3.70 fps	Inflow=332.46 cfs 341.406 af
	n=0.022 L=100.0'	S=0.0010 '/'	Capacity=1,354.45 cfs Outflow=332.46 cfs 341.405 af
Reach 3R: C-C	Avg. Flow Depth=3.33'	Max Vel=3.77 fps	Inflow=332.46 cfs 341.405 af
	n=0.022 L=100.0'	S=0.0010 '/'	Capacity=905.35 cfs Outflow=332.45 cfs 341.404 af
Reach 4R: D-D	Avg. Flow Depth=3.28'	Max Vel=3.69 fps	Inflow=332.45 cfs 341.404 af
	n=0.022 L=100.0'	S=0.0010 '/'	Capacity=2,297.67 cfs Outflow=332.45 cfs 341.403 af
Reach 5R: E-E	Avg. Flow Depth=3.02'	Max Vel=3.58 fps	Inflow=332.45 cfs 341.403 af
	n=0.022 L=100.0'	S=0.0010 '/'	Capacity=9,968.85 cfs Outflow=332.45 cfs 341.402 af
Reach 6R: F-F	Avg. Flow Depth=3.21'	Max Vel=3.22 fps	Inflow=332.45 cfs 341.402 af
	n=0.022 L=100.0'	S=0.0010 '/'	Capacity=11,356.35 cfs Outflow=332.45 cfs 341.402 af
Reach 7R: G-G	Avg. Flow Depth=3.14'	Max Vel=2.64 fps	Inflow=332.45 cfs 341.402 af
	n=0.022 L=100.0'	S=0.0010 '/'	Capacity=6,147.81 cfs Outflow=332.45 cfs 341.401 af
Reach 8R: H-H	Avg. Flow Depth=3.45'	Max Vel=3.67 fps	Inflow=332.45 cfs 341.401 af
	n=0.022 L=100.0'	S=0.0010 '/'	Capacity=3,947.51 cfs Outflow=332.45 cfs 341.399 af
Reach 9R: I-I	Avg. Flow Depth=3.57'	Max Vel=3.30 fps	Inflow=332.45 cfs 341.399 af
	n=0.022 L=100.0'	S=0.0010 '/'	Capacity=2,897.62 cfs Outflow=332.44 cfs 341.398 af
Reach 10R: J-J	Avg. Flow Depth=3.19'	Max Vel=3.09 fps	Inflow=332.44 cfs 341.398 af
	n=0.022 L=100.0'	S=0.0010 '/'	Capacity=946.99 cfs Outflow=332.44 cfs 341.397 af
Reach 11R: K-K	Avg. Flow Depth=3.58'	Max Vel=2.81 fps	Inflow=332.44 cfs 341.397 af
	n=0.022 L=100.0'	S=0.0010 '/'	Capacity=580.62 cfs Outflow=332.44 cfs 341.396 af
Reach 12R: L-L	Avg. Flow Depth=1.92'	Max Vel=1.97 fps	Inflow=332.44 cfs 341.396 af
	n=0.022 L=100.0'	S=0.0010 '/'	Capacity=5,319.69 cfs Outflow=332.44 cfs 341.394 af
Reach 13R: M-M	Avg. Flow Depth=2.06'	Max Vel=2.34 fps	Inflow=332.44 cfs 341.394 af
	n=0.022 L=100.0'	S=0.0010 '/'	Capacity=3,275.94 cfs Outflow=332.44 cfs 341.393 af

Total Runoff Area = 1,069.000 ac Runoff Volume = 341.407 af Average Runoff Depth = 3.83"
100.00% Pervious = 1,069.000 ac 0.00% Impervious = 0.000 ac

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Existing Conditions
CT_Lisbon 24-hr S1 100-yr Rainfall=7.65"

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Summary for Subcatchment 1S: Drainage Area to Blissville Brook

Runoff = 332.46 cfs @ 20.76 hrs, Volume= 341.407 af, Depth> 3.83"

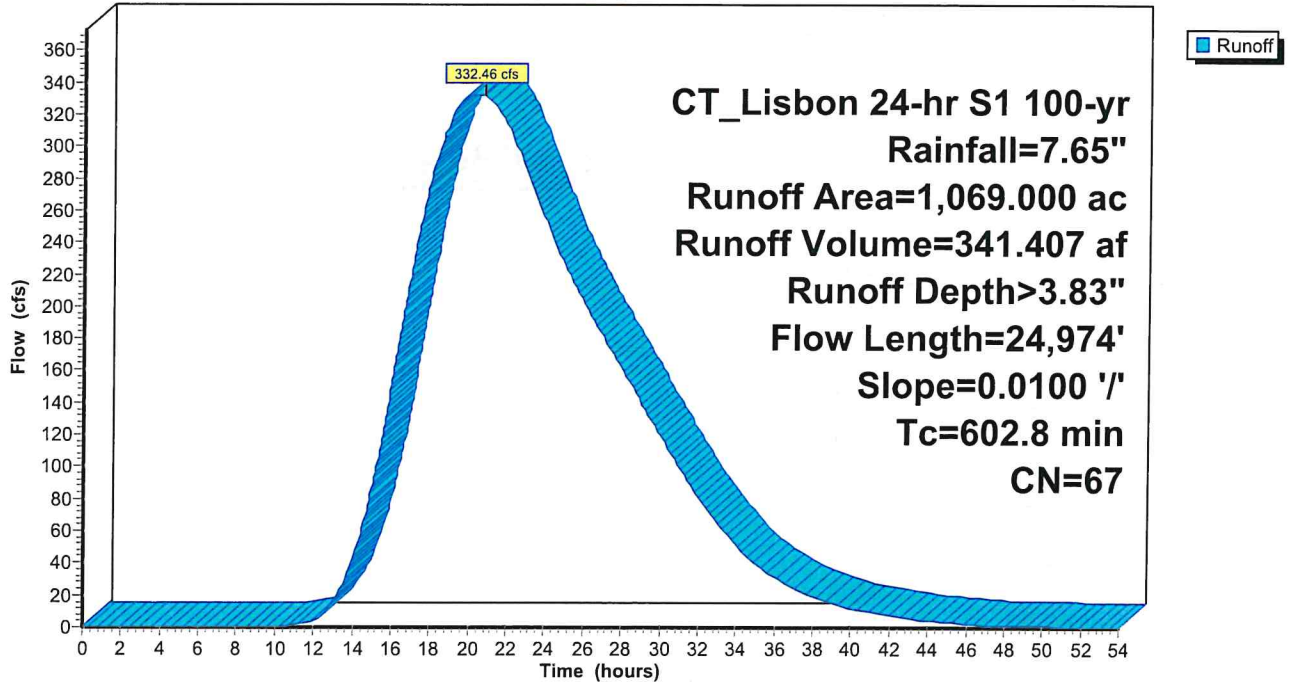
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs
CT_Lisbon 24-hr S1 100-yr Rainfall=7.65"

Area (ac)	CN	Description
* 1,069.000	67	
1,069.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
602.8	24,974	0.0100	0.69		Lag/CN Method,

Subcatchment 1S: Drainage Area to Blissville Brook

Hydrograph



2019160 Sunfox

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Existing Conditions
 CT_Lisbon 24-hr S1 100-yr Rainfall=7.65"

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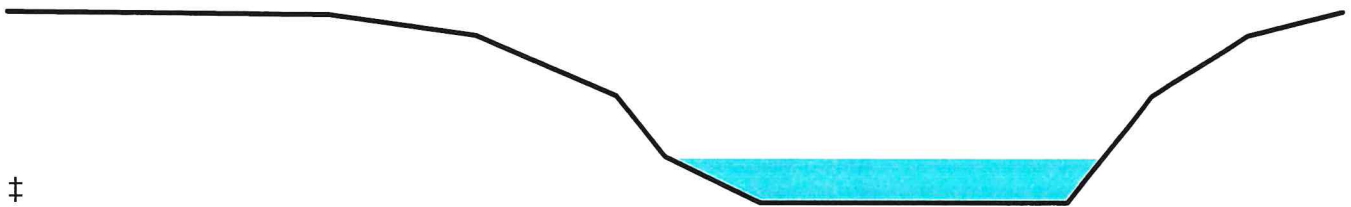
Summary for Reach 1R: A-A

Inflow Area = 1,069.000 ac, 0.00% Impervious, Inflow Depth > 3.83" for 100-yr event
 Inflow = 332.46 cfs @ 20.76 hrs, Volume= 341.407 af
 Outflow = 332.46 cfs @ 20.76 hrs, Volume= 341.406 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs
 Max. Velocity= 7.73 fps, Min. Travel Time= 0.1 min
 Avg. Velocity = 3.74 fps, Avg. Travel Time= 0.2 min

Peak Storage= 2,149 cf @ 20.76 hrs
 Average Depth at Peak Storage= 1.45'
 Bank-Full Depth= 6.30' Flow Area= 285.0 sf, Capacity= 3,665.36 cfs

Custom cross-section, Length= 50.0' Slope= 0.0100 '/' (104 Elevation Intervals)
 Constant n= 0.022 Earth, clean & straight
 Inlet Invert= 140.50', Outlet Invert= 140.00'

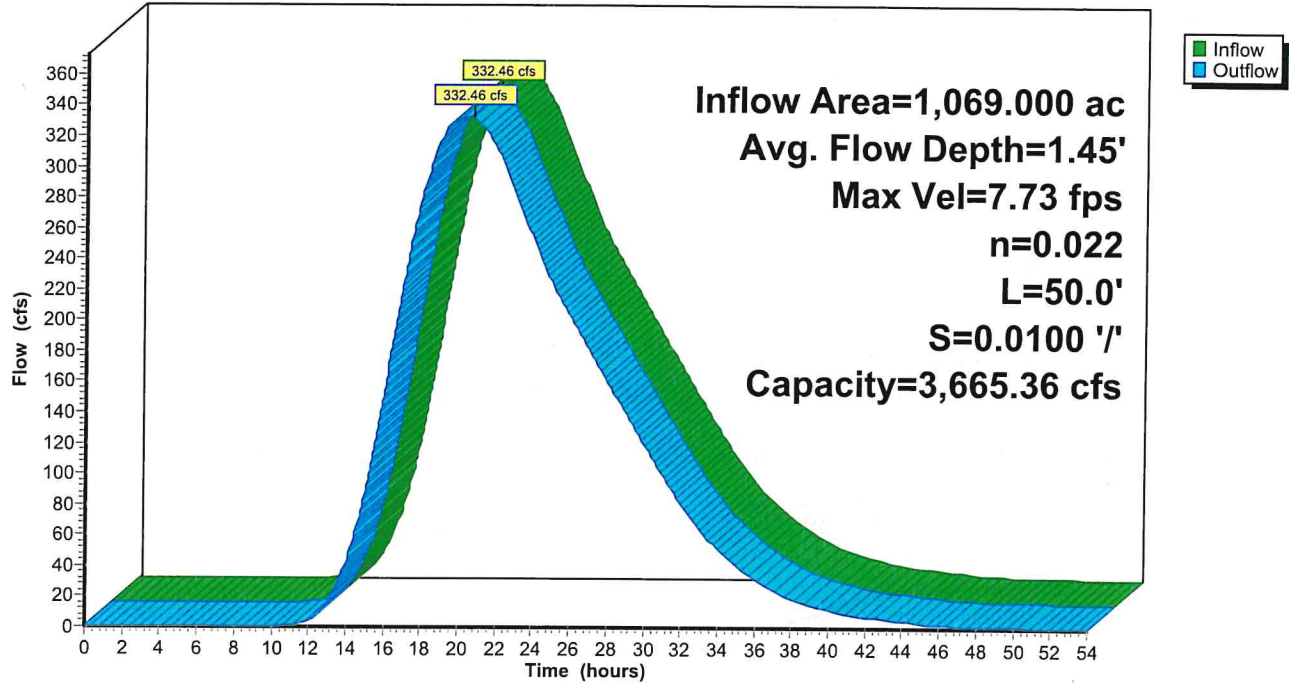


Offset (feet)	Elevation (feet)	Chan.Depth (feet)
0.00	146.80	0.00
25.75	146.70	0.10
37.40	146.00	0.80
48.70	144.00	2.80
52.60	142.00	4.80
60.10	140.50	6.30
84.66	140.50	6.30
87.50	142.00	4.80
91.30	144.00	2.80
98.93	146.00	0.80
106.48	146.80	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	24.6	0	0.00
1.50	44.6	35.4	2,230	351.21
3.50	122.1	44.1	6,105	1,626.11
5.50	226.2	63.5	11,311	3,565.82
6.20	275.7	81.8	13,784	4,186.71
6.30	285.0	108.5	14,250	3,665.36

Reach 1R: A-A

Hydrograph



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Existing Conditions
 CT_Lisbon 24-hr S1 100-yr Rainfall=7.65"

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Summary for Reach 2R: B-B

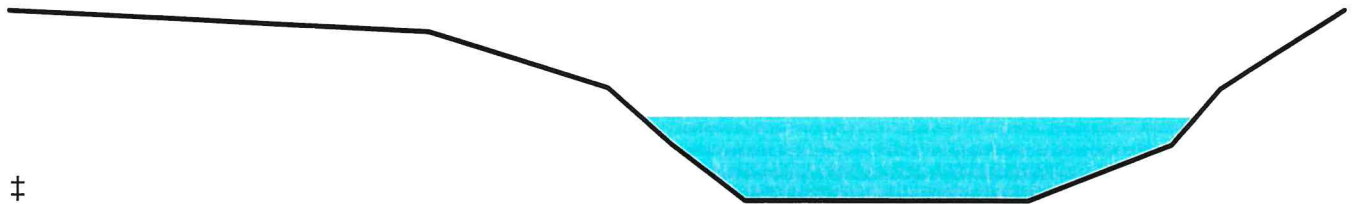
[63] Warning: Exceeded Reach 1R INLET depth by 1.02' @ 20.77 hrs

Inflow Area = 1,069.000 ac, 0.00% Impervious, Inflow Depth > 3.83" for 100-yr event
 Inflow = 332.46 cfs @ 20.76 hrs, Volume= 341.406 af
 Outflow = 332.46 cfs @ 20.76 hrs, Volume= 341.405 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs
 Max. Velocity= 3.70 fps, Min. Travel Time= 0.5 min
 Avg. Velocity = 1.81 fps, Avg. Travel Time= 0.9 min

Peak Storage= 8,993 cf @ 20.76 hrs
 Average Depth at Peak Storage= 2.97'
 Bank-Full Depth= 6.80' Flow Area= 296.5 sf, Capacity= 1,354.45 cfs

Custom cross-section, Length= 100.0' Slope= 0.0010 '/' (103 Elevation Intervals)
 Constant n= 0.022 Earth, clean & straight
 Inlet Invert= 140.00', Outlet Invert= 139.90'



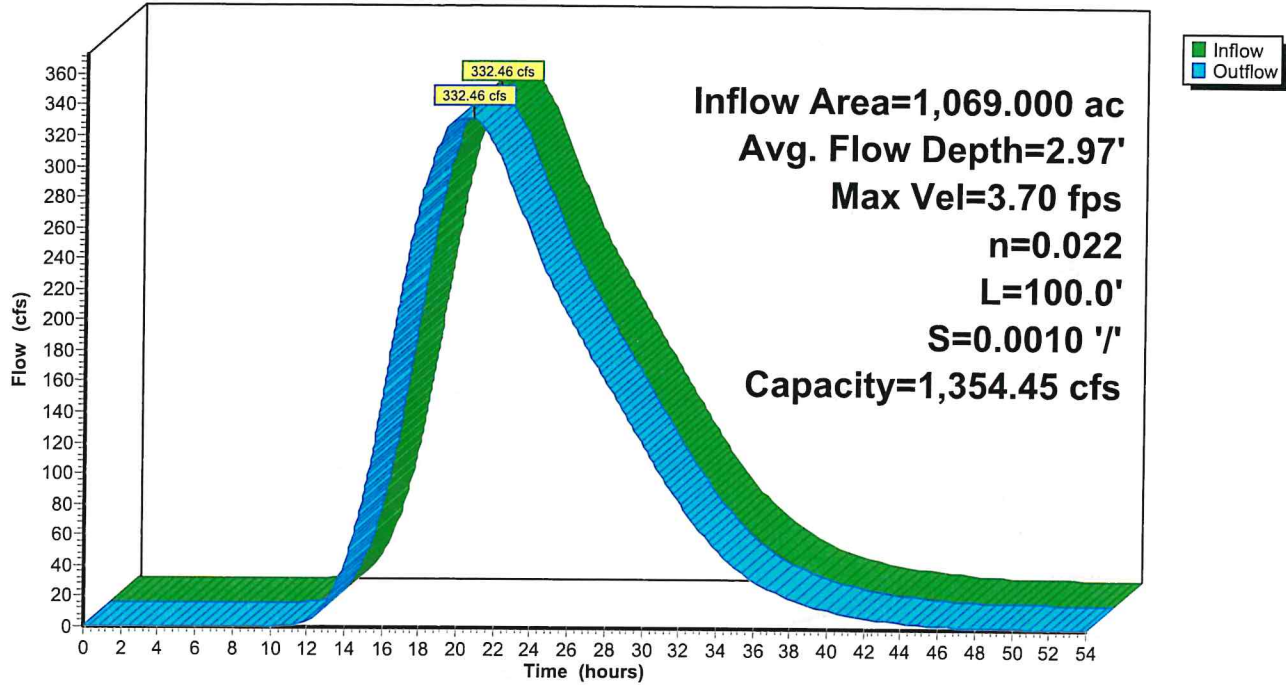
‡

Offset (feet)	Elevation (feet)	Chan.Depth (feet)
0.00	146.80	0.00
29.10	146.00	0.80
41.60	144.00	2.80
46.00	142.00	4.80
51.10	140.00	6.80
70.80	140.00	6.80
80.70	142.00	4.80
84.00	144.00	2.80
90.20	146.00	0.80
92.60	146.80	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	19.7	0	0.00
2.00	54.4	35.3	5,440	155.09
4.00	131.5	44.0	13,150	583.04
6.00	235.0	63.1	23,500	1,205.47
6.80	296.5	94.8	29,648	1,354.45

Reach 2R: B-B

Hydrograph



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Existing Conditions
 CT_Lisbon 24-hr S1 100-yr Rainfall=7.65"

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Summary for Reach 3R: C-C

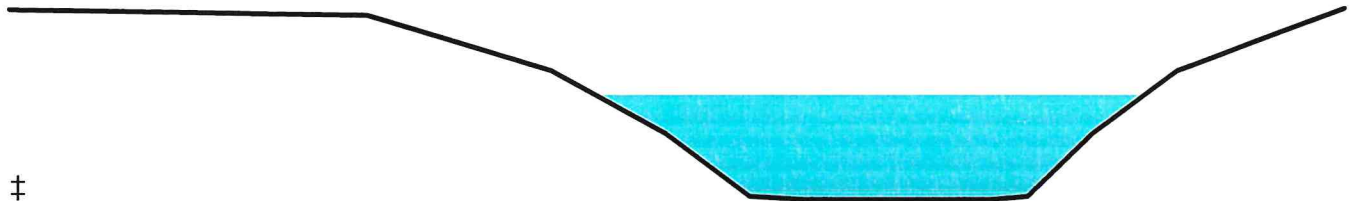
[63] Warning: Exceeded Reach 2R INLET depth by 0.25' @ 20.79 hrs

Inflow Area = 1,069.000 ac, 0.00% Impervious, Inflow Depth > 3.83" for 100-yr event
 Inflow = 332.46 cfs @ 20.76 hrs, Volume= 341.405 af
 Outflow = 332.45 cfs @ 20.76 hrs, Volume= 341.404 af, Atten= 0%, Lag= 0.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs
 Max. Velocity= 3.77 fps, Min. Travel Time= 0.4 min
 Avg. Velocity = 1.89 fps, Avg. Travel Time= 0.9 min

Peak Storage= 8,823 cf @ 20.76 hrs
 Average Depth at Peak Storage= 3.33'
 Bank-Full Depth= 6.10' Flow Area= 228.7 sf, Capacity= 905.35 cfs

Custom cross-section, Length= 100.0' Slope= 0.0010 '/' (104 Elevation Intervals)
 Constant n= 0.022 Earth, clean & straight
 Inlet Invert= 139.90', Outlet Invert= 139.80'



‡

Offset (feet)	Elevation (feet)	Chan.Depth (feet)
0.00	146.00	0.00
23.90	145.80	0.20
36.20	144.00	2.00
43.80	142.00	4.00
49.40	140.00	6.00
53.00	139.90	6.10
65.40	139.90	6.10
67.90	140.00	6.00
72.20	142.00	4.00
77.80	144.00	2.00
88.90	146.00	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	12.4	0	0.00
0.10	1.5	18.5	154	0.63
2.10	48.4	29.2	4,844	145.04
4.10	118.4	43.0	11,844	497.16
5.90	213.4	65.6	21,339	1,000.83
6.10	228.7	90.6	22,866	905.35

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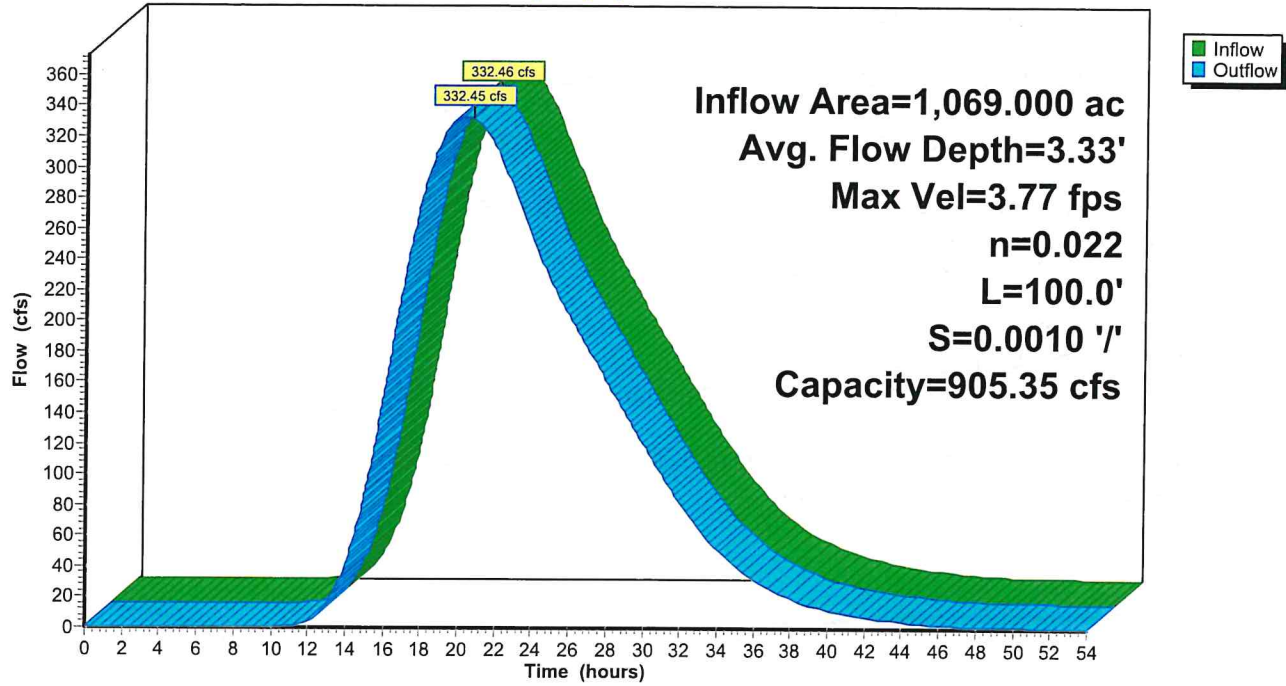
Existing Conditions
CT_Lisbon 24-hr S1 100-yr Rainfall=7.65"

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Reach 3R: C-C

Hydrograph



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Summary for Reach 4R: D-D

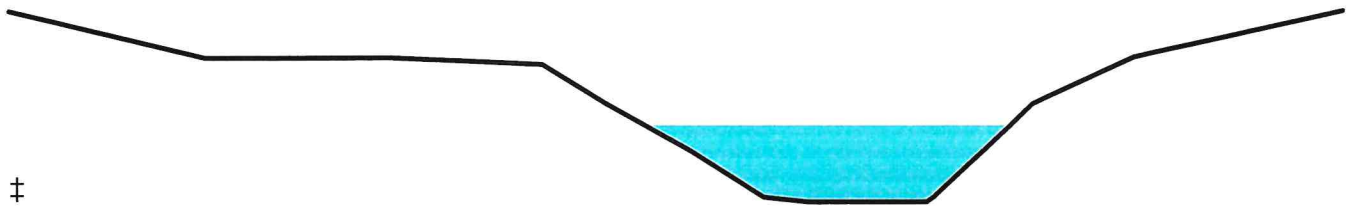
[62] Hint: Exceeded Reach 3R OUTLET depth by 0.03' @ 34.33 hrs

Inflow Area = 1,069.000 ac, 0.00% Impervious, Inflow Depth > 3.83" for 100-yr event
Inflow = 332.45 cfs @ 20.76 hrs, Volume= 341.404 af
Outflow = 332.45 cfs @ 20.76 hrs, Volume= 341.403 af, Atten= 0%, Lag= 0.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.69 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.87 fps, Avg. Travel Time= 0.9 min

Peak Storage= 9,019 cf @ 20.76 hrs
Average Depth at Peak Storage= 3.28'
Bank-Full Depth= 8.20' Flow Area= 480.6 sf, Capacity= 2,297.67 cfs

Custom cross-section, Length= 100.0' Slope= 0.0010 '/' (104 Elevation Intervals)
Constant n= 0.022 Earth, clean & straight
Inlet Invert= 139.80', Outlet Invert= 139.70'



±

Offset (feet)	Elevation (feet)	Chan.Depth (feet)
0.00	148.00	0.00
20.90	146.00	2.00
40.70	146.00	2.00
56.80	145.70	2.30
63.60	144.00	4.00
72.50	142.00	6.00
80.30	140.00	8.00
85.10	139.80	8.20
97.70	139.80	8.20
98.40	140.00	8.00
103.70	142.00	6.00
108.90	144.00	4.00
119.50	146.00	2.00
141.70	148.00	0.00

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Existing Conditions
CT_Lisbon 24-hr S1 100-yr Rainfall=7.65"

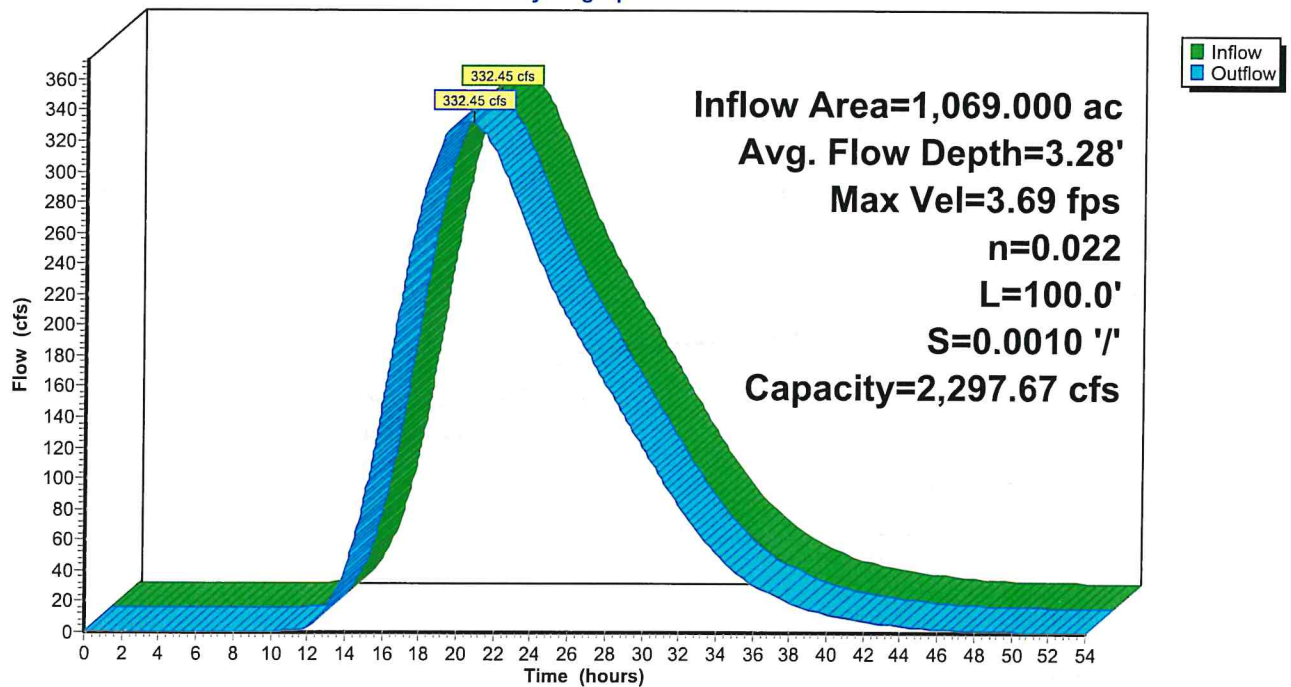
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Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	12.6	0	0.00
0.20	3.1	18.1	307	2.01
2.20	52.4	31.8	5,237	155.84
4.20	128.9	46.5	12,887	542.77
5.90	219.3	62.7	21,932	1,077.09
6.20	240.3	100.2	24,030	919.39
8.20	480.6	143.5	48,060	2,297.67

Reach 4R: D-D

Hydrograph



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CT_Lisbon 24-hr S1 100-yr Rainfall=7.65"

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Summary for Reach 5R: E-E

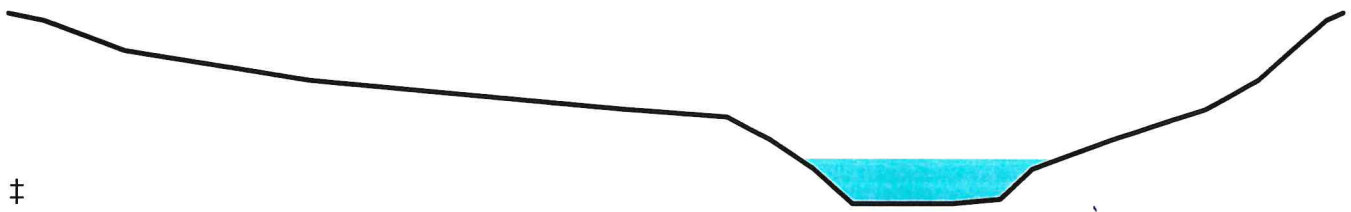
[61] Hint: Exceeded Reach 4R outlet invert by 3.02' @ 20.77 hrs

Inflow Area = 1,069.000 ac, 0.00% Impervious, Inflow Depth > 3.83" for 100-yr event
Inflow = 332.45 cfs @ 20.76 hrs, Volume= 341.403 af
Outflow = 332.45 cfs @ 20.77 hrs, Volume= 341.402 af, Atten= 0%, Lag= 0.3 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.58 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.82 fps, Avg. Travel Time= 0.9 min

Peak Storage= 9,291 cf @ 20.77 hrs
Average Depth at Peak Storage= 3.02'
Bank-Full Depth= 12.80' Flow Area= 1,361.8 sf, Capacity= 9,968.85 cfs

Custom cross-section, Length= 100.0' Slope= 0.0010 '/' (107 Elevation Intervals)
Constant n= 0.022 Earth, clean & straight
Inlet Invert= 139.70', Outlet Invert= 139.60'



±

Offset (feet)	Elevation (feet)	Chan.Depth (feet)
0.00	152.50	0.00
5.60	152.00	0.50
18.30	150.00	2.50
48.10	148.00	4.50
97.80	146.00	6.50
114.10	145.50	7.00
120.90	144.00	8.50
127.90	142.00	10.50
134.10	139.70	12.80
150.00	139.70	12.80
157.70	140.00	12.50
162.70	142.00	10.50
175.40	144.00	8.50
189.90	146.00	6.50
198.40	148.00	4.50
209.20	152.00	0.50
211.80	152.50	0.00

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Existing Conditions
 CT_Lisbon 24-hr S1 100-yr Rainfall=7.65"

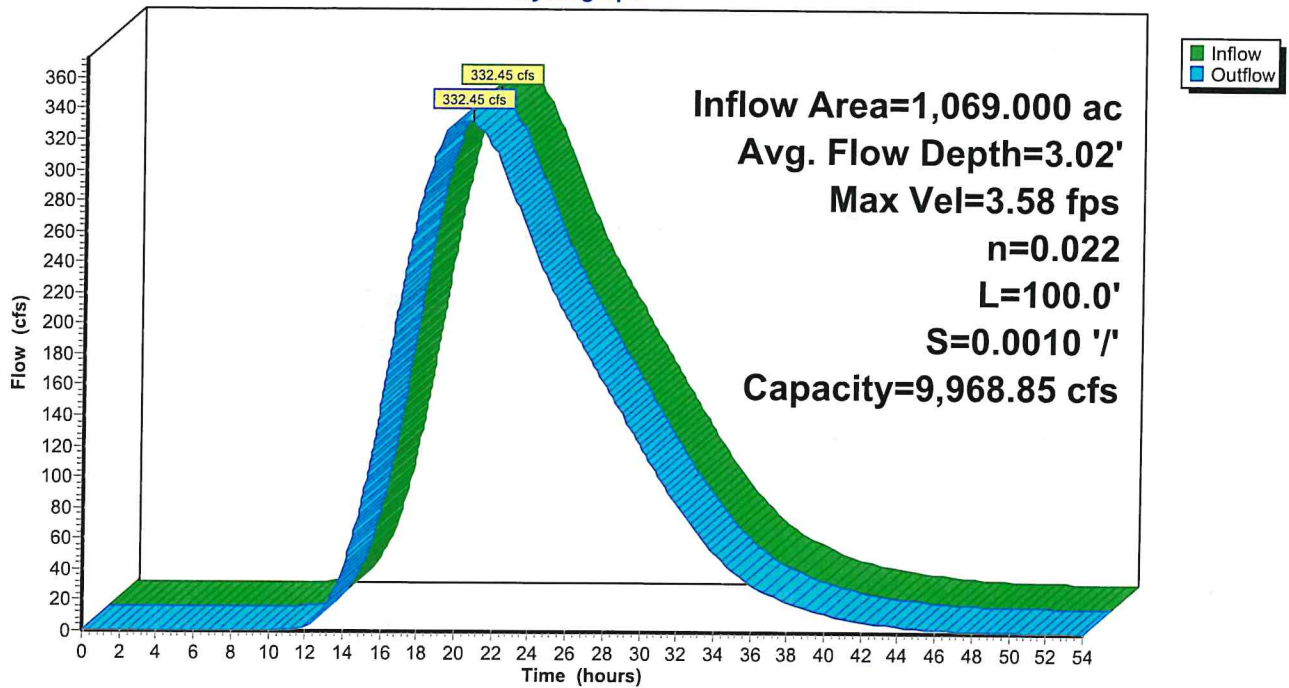
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Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	15.9	0	0.00
0.30	6.0	24.5	605	5.09
2.30	65.3	35.6	6,526	208.69
4.30	154.6	55.7	15,456	651.56
5.80	249.6	73.7	24,956	1,202.22
6.30	290.6	93.6	29,063	1,320.77
8.30	533.0	152.1	53,303	2,626.57
10.30	868.8	187.7	86,883	5,153.54
12.30	1,257.9	206.4	125,793	8,966.11
12.80	1,361.8	214.6	136,178	9,968.85

Reach 5R: E-E

Hydrograph



Summary for Reach 6R: F-F

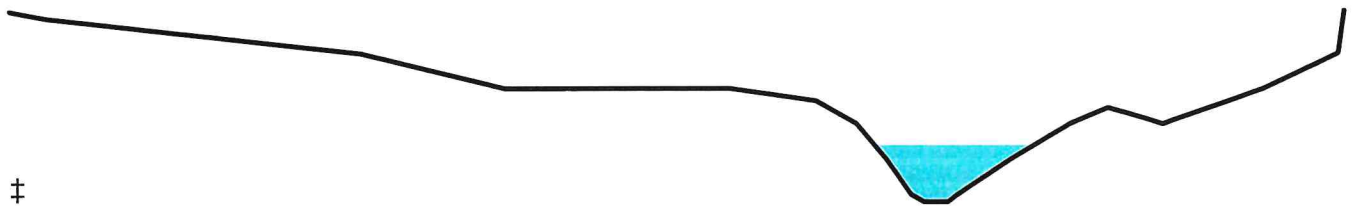
[63] Warning: Exceeded Reach 5R INLET depth by 0.23' @ 30.46 hrs

Inflow Area = 1,069.000 ac, 0.00% Impervious, Inflow Depth > 3.83" for 100-yr event
 Inflow = 332.45 cfs @ 20.77 hrs, Volume= 341.402 af
 Outflow = 332.45 cfs @ 20.77 hrs, Volume= 341.402 af, Atten= 0%, Lag= 0.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs
 Max. Velocity= 3.22 fps, Min. Travel Time= 0.5 min
 Avg. Velocity = 1.75 fps, Avg. Travel Time= 1.0 min

Peak Storage= 10,324 cf @ 20.77 hrs
 Average Depth at Peak Storage= 3.21'
 Bank-Full Depth= 10.80' Flow Area= 1,999.4 sf, Capacity= 11,356.35 cfs

Custom cross-section, Length= 100.0' Slope= 0.0010 '/' (108 Elevation Intervals)
 Constant n= 0.022 Earth, clean & straight
 Inlet Invert= 139.60', Outlet Invert= 139.50'



Offset (feet)	Elevation (feet)	Chan.Depth (feet)
0.00	150.40	0.00
12.60	150.00	0.40
121.20	148.00	2.40
171.00	146.00	4.40
248.10	146.00	4.40
277.70	145.30	5.10
291.70	144.00	6.40
302.10	142.00	8.40
310.80	140.00	10.40
314.90	139.60	10.80
323.40	139.60	10.80
326.60	140.00	10.40
344.90	142.00	8.40
365.30	144.00	6.40
378.30	144.90	5.50
397.20	144.00	6.40
431.60	146.00	4.40
457.00	148.00	2.40
459.00	150.40	0.00

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Existing Conditions
 CT_Lisbon 24-hr S1 100-yr Rainfall=7.65"

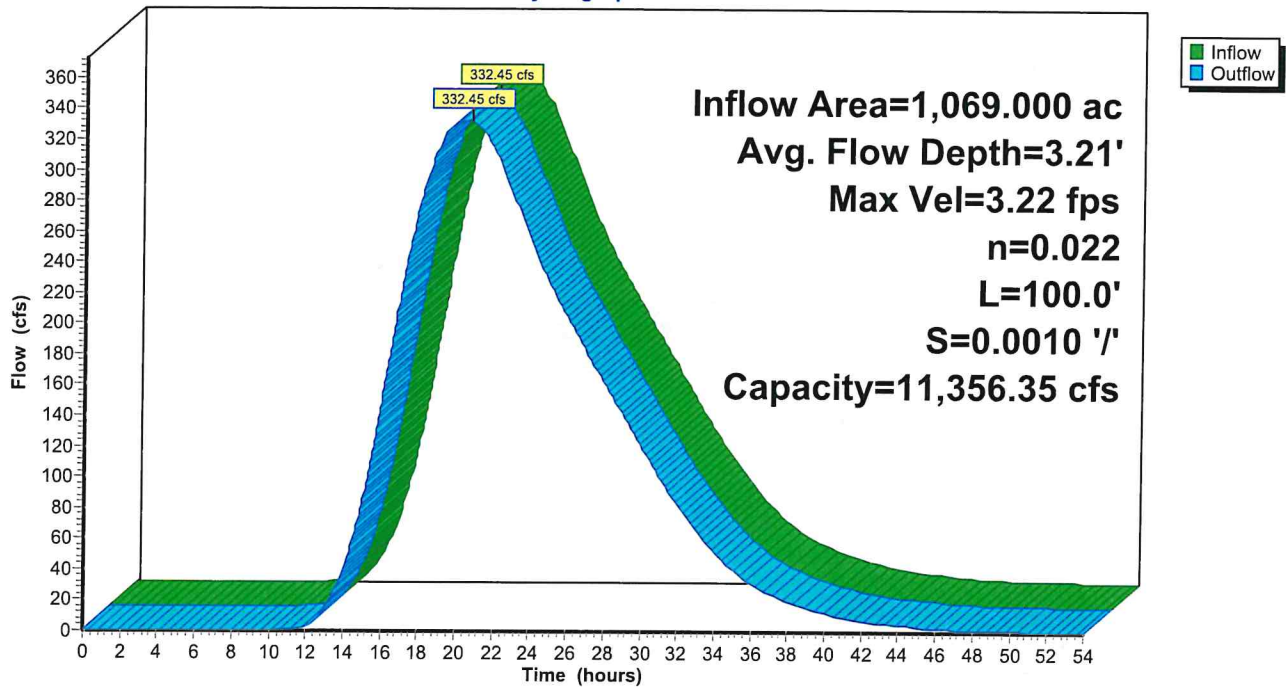
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Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	8.5	0	0.00
0.40	4.9	15.8	486	4.72
2.40	63.5	43.2	6,346	175.22
4.40	179.9	74.3	17,986	692.81
5.30	271.8	131.5	27,178	942.11
5.70	326.3	142.7	32,629	1,209.74
6.40	440.2	261.4	44,016	1,330.55
8.40	1,036.6	336.8	103,656	4,684.94
10.40	1,818.4	448.0	181,843	9,883.56
10.80	1,999.4	461.1	199,945	11,356.35

Reach 6R: F-F

Hydrograph



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Summary for Reach 7R: G-G

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=2)

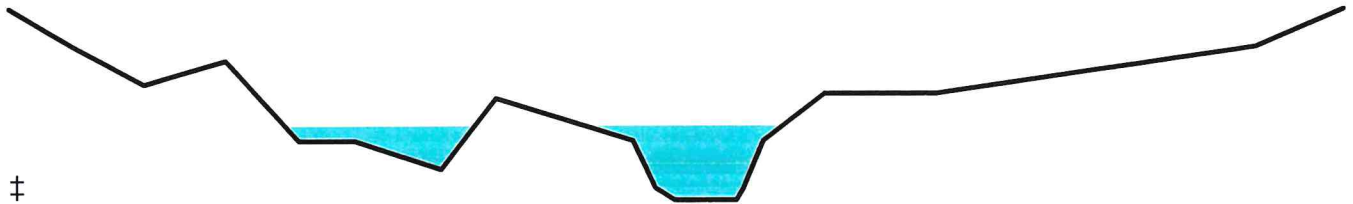
[63] Warning: Exceeded Reach 6R INLET depth by 0.05' @ 27.72 hrs

Inflow Area = 1,069.000 ac, 0.00% Impervious, Inflow Depth > 3.83" for 100-yr event
Inflow = 332.45 cfs @ 20.77 hrs, Volume= 341.402 af
Outflow = 332.45 cfs @ 20.77 hrs, Volume= 341.401 af, Atten= 0%, Lag= 0.3 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs
Max. Velocity= 2.64 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 1.59 fps, Avg. Travel Time= 1.1 min

Peak Storage= 12,609 cf @ 20.77 hrs
Average Depth at Peak Storage= 3.14'
Bank-Full Depth= 8.10' Flow Area= 1,185.2 sf, Capacity= 6,147.81 cfs

Custom cross-section, Length= 100.0' Slope= 0.0010 '/' (107 Elevation Intervals)
Constant n= 0.022 Earth, clean & straight
Inlet Invert= 139.50', Outlet Invert= 139.40'



Offset (feet)	Elevation (feet)	Chan.Depth (feet)
0.00	147.60	0.00
14.80	146.00	1.60
31.60	144.40	3.20
50.80	145.40	2.20
68.00	142.00	5.60
81.00	142.00	5.60
101.30	140.80	6.80
106.40	142.00	5.60
114.00	143.80	3.80
145.90	142.00	5.60
151.20	140.00	7.60
155.60	139.50	8.10
170.00	139.50	8.10
171.70	140.00	7.60
176.20	142.00	5.60
190.50	144.00	3.60
216.50	144.00	3.60
290.90	146.00	1.60
311.10	147.60	0.00

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Existing Conditions
 CT_Lisbon 24-hr S1 100-yr Rainfall=7.65"

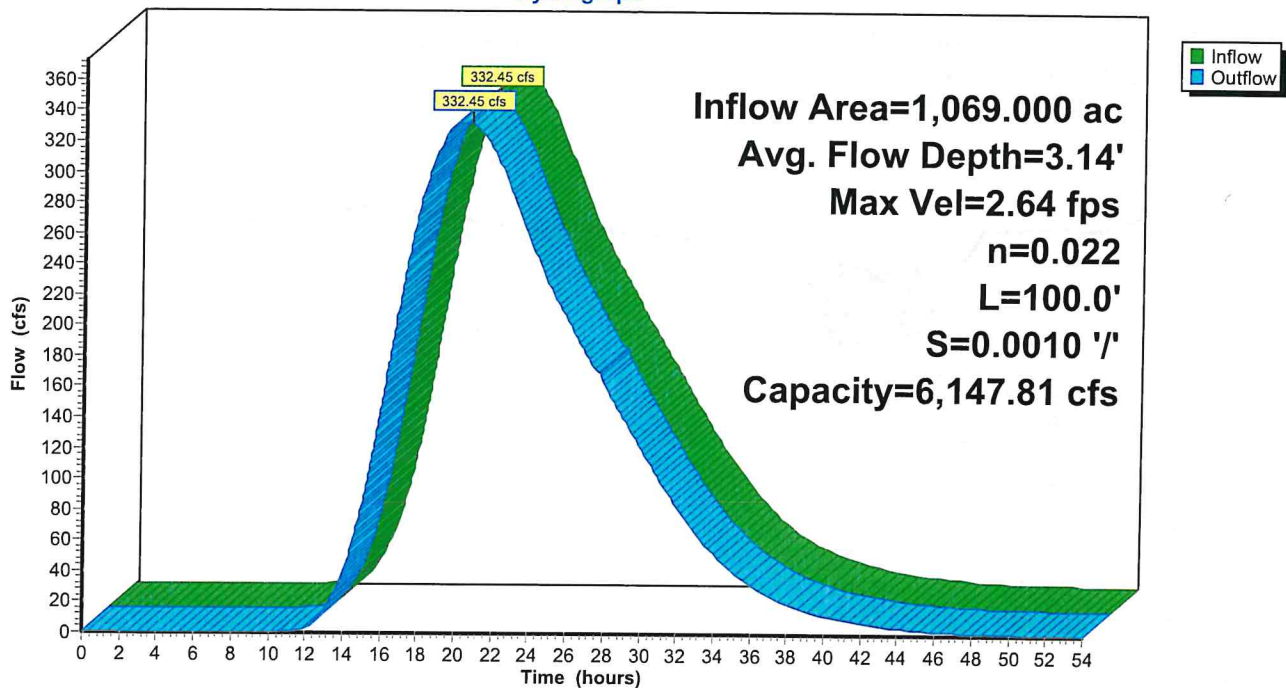
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Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	14.4	0	0.00
0.50	8.7	20.6	873	10.51
1.30	26.7	24.8	2,670	59.71
2.50	74.8	69.8	7,476	167.24
4.30	253.8	131.8	25,375	838.82
4.50	280.0	160.3	28,003	867.68
4.90	346.9	177.2	34,686	1,159.23
5.90	558.4	249.4	55,836	2,041.23
6.50	715.4	278.0	71,543	2,869.61
8.10	1,185.2	313.2	118,519	6,147.81

Reach 7R: G-G

Hydrograph



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Existing Conditions
CT_Lisbon 24-hr S1 100-yr Rainfall=7.65"

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Summary for Reach 8R: H-H

[63] Warning: Exceeded Reach 7R INLET depth by 0.21' @ 20.79 hrs

Inflow Area = 1,069.000 ac, 0.00% Impervious, Inflow Depth > 3.83" for 100-yr event
Inflow = 332.45 cfs @ 20.77 hrs, Volume= 341.401 af
Outflow = 332.45 cfs @ 20.78 hrs, Volume= 341.399 af, Atten= 0%, Lag= 0.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.67 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.90 fps, Avg. Travel Time= 0.9 min

Peak Storage= 9,063 cf @ 20.78 hrs
Average Depth at Peak Storage= 3.45'
Bank-Full Depth= 7.70' Flow Area= 883.7 sf, Capacity= 3,947.51 cfs

Custom cross-section, Length= 100.0' Slope= 0.0010 '/' (106 Elevation Intervals)
Constant n= 0.022 Earth, clean & straight
Inlet Invert= 139.40', Outlet Invert= 139.30'



Offset (feet)	Elevation (feet)	Chan.Depth (feet)
0.00	147.10	0.00
14.60	146.00	1.10
42.90	144.00	3.10
69.00	144.00	3.10
76.80	142.00	5.10
83.20	140.00	7.10
89.20	139.40	7.70
101.60	139.40	7.70
103.50	140.00	7.10
107.60	142.00	5.10
115.40	143.30	3.80
152.80	144.00	3.10
165.80	144.00	3.10
203.00	145.00	2.10
242.00	144.00	3.10
278.40	146.00	1.10
290.70	147.10	0.00

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Existing Conditions
 CT_Lisbon 24-hr S1 100-yr Rainfall=7.65"

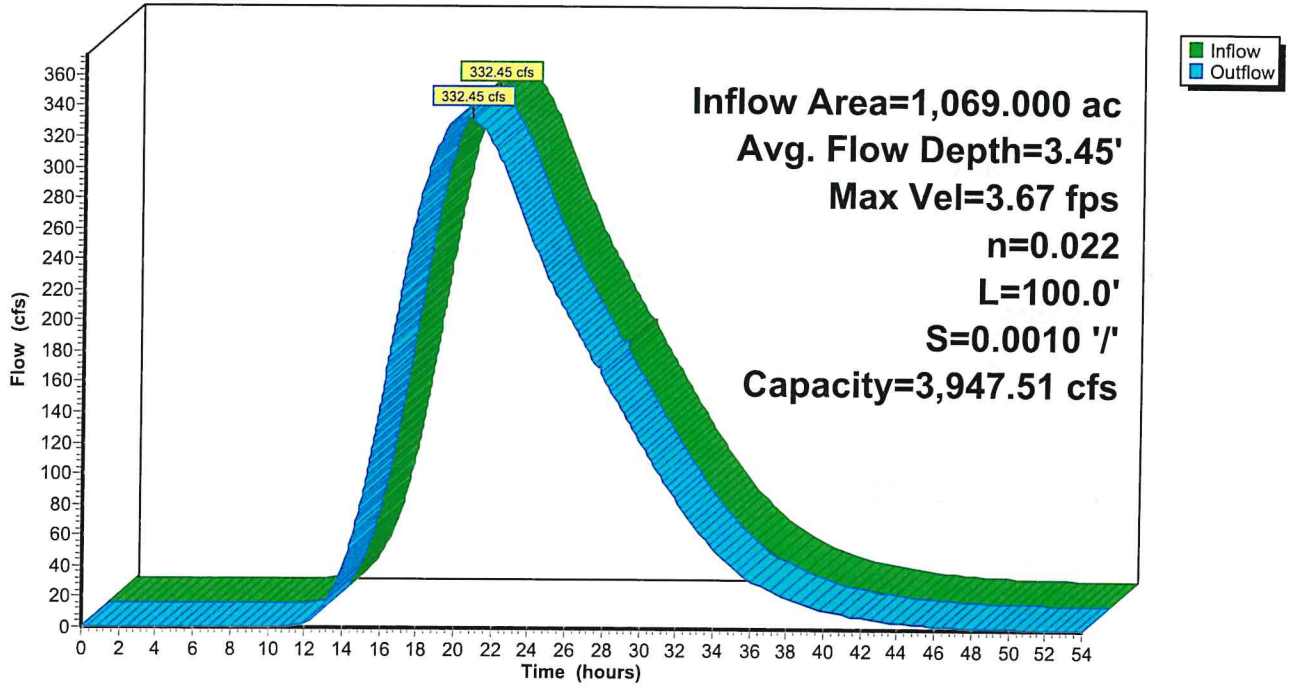
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Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	12.4	0	0.00
0.60	9.8	20.4	981	12.85
2.60	60.9	31.7	6,091	201.13
3.90	109.3	44.8	10,932	423.01
4.60	153.9	124.2	15,393	379.45
5.60	331.1	232.8	33,110	894.45
6.60	578.7	265.2	57,873	2,079.69
7.70	883.7	292.2	88,370	3,947.51

Reach 8R: H-H

Hydrograph



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Summary for Reach 9R: I-I

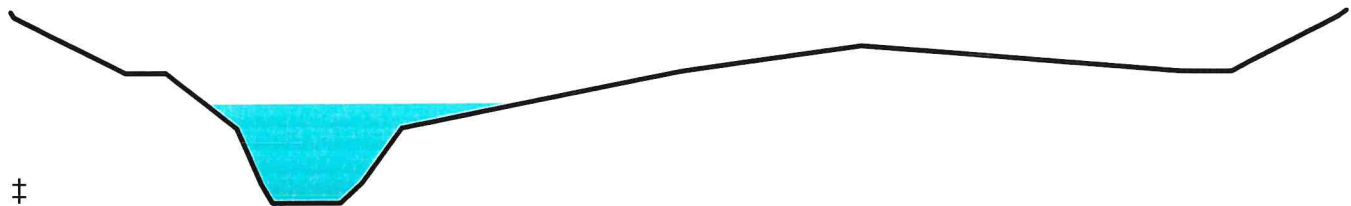
[63] Warning: Exceeded Reach 8R INLET depth by 0.03' @ 23.00 hrs

Inflow Area = 1,069.000 ac, 0.00% Impervious, Inflow Depth > 3.83" for 100-yr event
Inflow = 332.45 cfs @ 20.78 hrs, Volume= 341.399 af
Outflow = 332.44 cfs @ 20.78 hrs, Volume= 341.398 af, Atten= 0%, Lag= 0.3 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs
Max. Velocity= 3.30 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.79 fps, Avg. Travel Time= 0.9 min

Peak Storage= 11,073 cf @ 20.78 hrs
Average Depth at Peak Storage= 3.57'
Bank-Full Depth= 6.90' Flow Area= 718.0 sf, Capacity= 2,897.62 cfs

Custom cross-section, Length= 100.0' Slope= 0.0010 '/' (105 Elevation Intervals)
Constant n= 0.022 Earth, clean & straight
Inlet Invert= 139.30', Outlet Invert= 139.20'



Offset (feet)	Elevation (feet)	Chan.Depth (feet)
0.00	146.20	0.00
0.70	146.00	0.20
23.60	144.00	2.20
32.00	144.00	2.20
46.60	142.00	4.20
51.70	140.00	6.20
54.10	139.30	6.90
68.20	139.30	6.90
72.60	140.00	6.20
80.90	142.00	4.20
138.60	144.00	2.20
175.40	144.90	1.30
241.20	144.00	2.20
251.60	144.00	2.20
273.70	146.00	0.20
275.30	146.20	0.00

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Existing Conditions
 CT_Lisbon 24-hr S1 100-yr Rainfall=7.65"

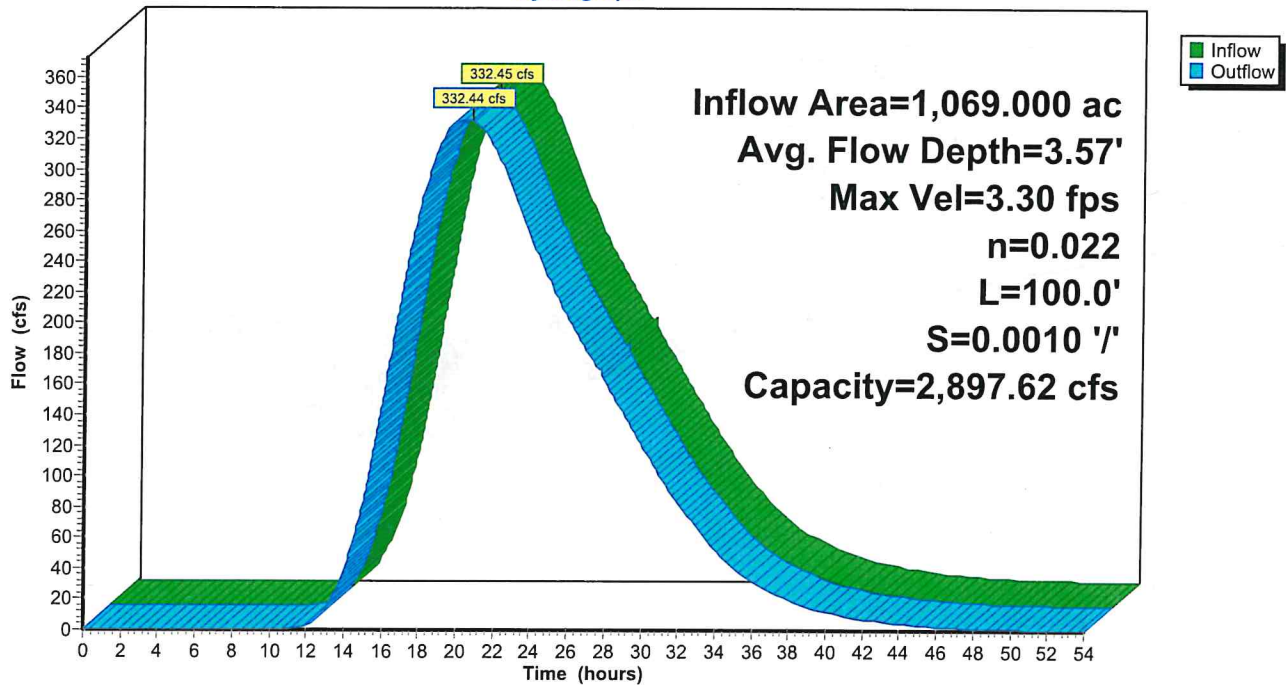
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Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	14.1	0	0.00
0.70	12.2	21.1	1,225	18.24
2.70	67.4	35.1	6,745	222.81
4.70	208.3	126.3	20,835	621.18
5.60	376.5	249.3	37,649	1,058.57
6.70	663.2	274.1	66,318	2,552.72
6.90	718.0	276.5	71,801	2,897.62

Reach 9R: I-I

Hydrograph



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Existing Conditions
 CT_Lisbon 24-hr S1 100-yr Rainfall=7.65"

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Summary for Reach 10R: J-J

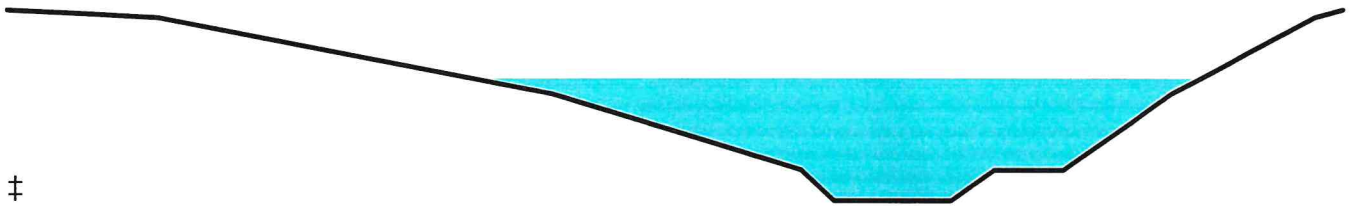
[63] Warning: Exceeded Reach 9R INLET depth by 0.11' @ 39.52 hrs

Inflow Area = 1,069.000 ac, 0.00% Impervious, Inflow Depth > 3.83" for 100-yr event
 Inflow = 332.44 cfs @ 20.78 hrs, Volume= 341.398 af
 Outflow = 332.44 cfs @ 20.79 hrs, Volume= 341.397 af, Atten= 0%, Lag= 0.3 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs
 Max. Velocity= 3.09 fps, Min. Travel Time= 0.5 min
 Avg. Velocity = 1.71 fps, Avg. Travel Time= 1.0 min

Peak Storage= 10,770 cf @ 20.79 hrs
 Average Depth at Peak Storage= 3.19'
 Bank-Full Depth= 5.00' Flow Area= 257.6 sf, Capacity= 946.99 cfs

Custom cross-section, Length= 100.0' Slope= 0.0010 '/'
 Constant n= 0.022 Earth, clean & straight
 Inlet Invert= 139.20', Outlet Invert= 139.10'



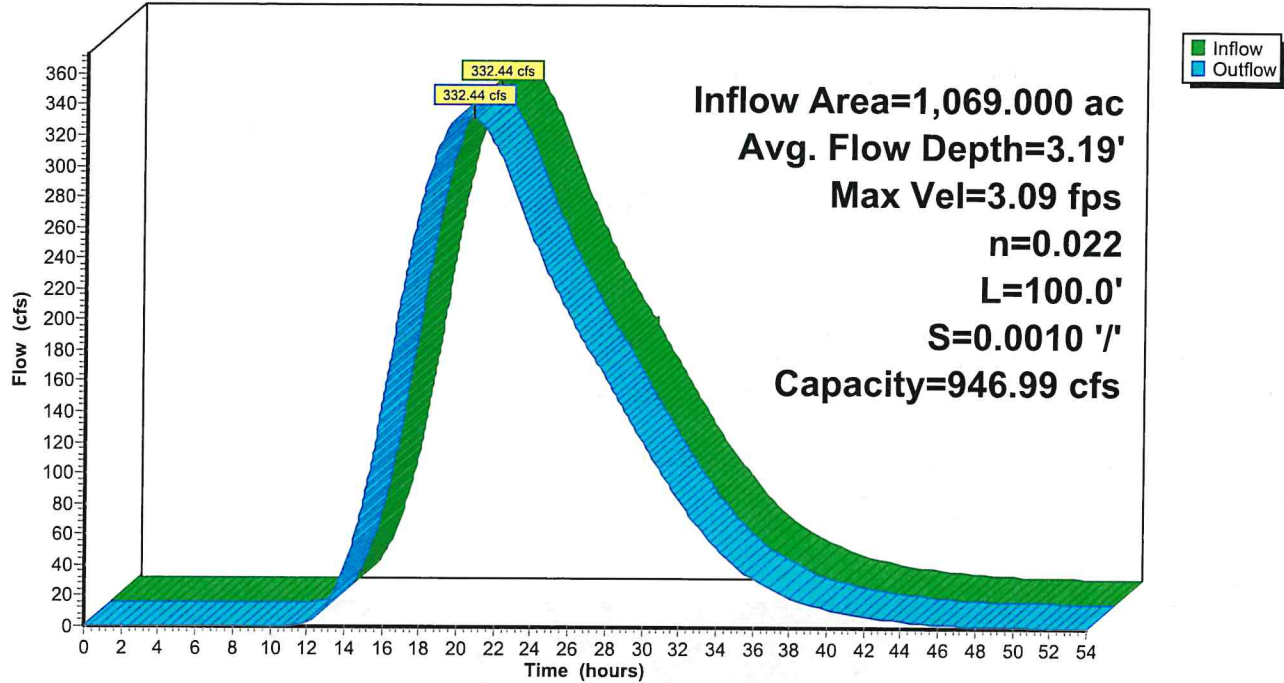
‡

Offset (feet)	Elevation (feet)	Chan.Depth (feet)
0.00	144.20	0.00
12.90	144.00	0.20
46.30	142.00	2.20
67.50	140.00	4.20
70.30	139.20	5.00
80.30	139.20	5.00
84.00	140.00	4.20
89.90	140.00	4.20
99.00	142.00	2.20
111.00	144.00	0.20
113.40	144.20	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	10.0	0	0.00
0.80	10.6	22.6	1,060	13.67
2.80	85.7	53.2	8,570	251.52
4.80	236.5	98.8	23,650	903.74
5.00	257.6	114.1	25,765	946.99

Reach 10R: J-J

Hydrograph



Summary for Reach 11R: K-K

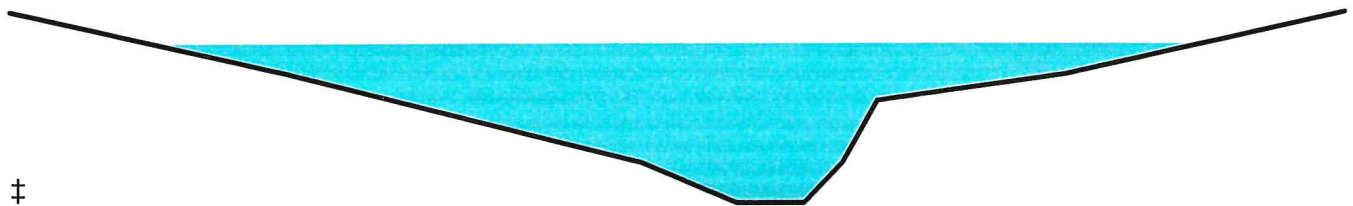
[63] Warning: Exceeded Reach 10R INLET depth by 0.39' @ 16.49 hrs

Inflow Area = 1,069.000 ac, 0.00% Impervious, Inflow Depth > 3.83" for 100-yr event
 Inflow = 332.44 cfs @ 20.79 hrs, Volume= 341.397 af
 Outflow = 332.44 cfs @ 20.79 hrs, Volume= 341.396 af, Atten= 0%, Lag= 0.3 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs
 Max. Velocity= 2.81 fps, Min. Travel Time= 0.6 min
 Avg. Velocity = 1.70 fps, Avg. Travel Time= 1.0 min

Peak Storage= 11,822 cf @ 20.79 hrs
 Average Depth at Peak Storage= 3.58'
 Bank-Full Depth= 4.30' Flow Area= 181.8 sf, Capacity= 580.62 cfs

Custom cross-section, Length= 100.0' Slope= 0.0010 '/' (102 Elevation Intervals)
 Constant n= 0.022 Earth, clean & straight
 Inlet Invert= 139.10', Outlet Invert= 139.00'



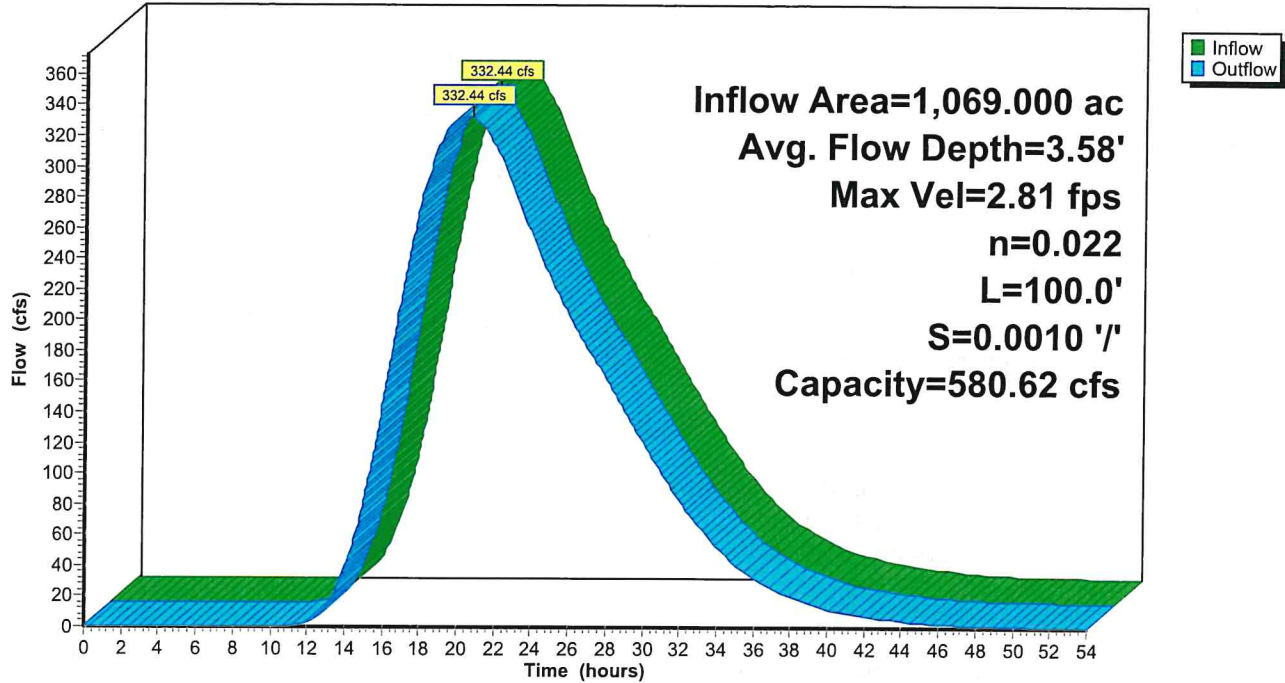
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Offset (feet)	Elevation (feet)	Chan.Depth (feet)
0.00	143.40	0.00
20.60	142.00	1.40
46.80	140.00	3.40
53.80	139.10	4.30
58.80	139.10	4.30
61.60	140.00	3.40
64.20	141.40	2.00
78.30	142.00	1.40
98.70	143.40	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	5.0	0	0.00
0.90	8.9	15.0	891	13.44
2.30	44.3	36.3	4,429	107.92
2.90	72.3	58.3	7,232	178.26
4.30	181.8	99.4	18,180	580.62

Reach 11R: K-K

Hydrograph



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Existing Conditions
CT_Lisbon 24-hr S1 100-yr Rainfall=7.65"

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Summary for Reach 12R: L-L

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=1)

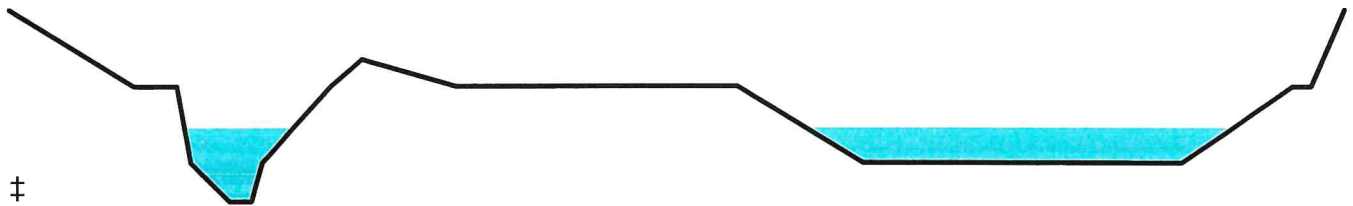
[63] Warning: Exceeded Reach 11R INLET depth by 0.17' @ 41.41 hrs

Inflow Area = 1,069.000 ac, 0.00% Impervious, Inflow Depth > 3.83" for 100-yr event
Inflow = 332.44 cfs @ 20.79 hrs, Volume= 341.396 af
Outflow = 332.44 cfs @ 20.80 hrs, Volume= 341.394 af, Atten= 0%, Lag= 0.4 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs
Max. Velocity= 1.97 fps, Min. Travel Time= 0.8 min
Avg. Velocity = 1.10 fps, Avg. Travel Time= 1.5 min

Peak Storage= 16,903 cf @ 20.80 hrs
Average Depth at Peak Storage= 1.92'
Bank-Full Depth= 5.00' Flow Area= 1,282.8 sf, Capacity= 5,319.69 cfs

Custom cross-section, Length= 100.0' Slope= 0.0010 '/'
Constant n= 0.022 Earth, clean & straight
Inlet Invert= 139.00', Outlet Invert= 138.90'



‡

Offset (feet)	Elevation (feet)	Chan.Depth (feet)
24.90	144.00	0.00
68.90	142.00	2.00
84.30	142.00	2.00
89.20	140.00	4.00
103.10	139.00	5.00
111.10	139.00	5.00
114.90	140.00	4.00
139.30	142.00	2.00
150.30	142.70	1.30
183.50	142.00	2.00
283.20	142.00	2.00
327.70	140.00	4.00
440.80	140.00	4.00
480.00	142.00	2.00
486.50	142.00	2.00
498.10	144.00	0.00

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Existing Conditions
 CT_Lisbon 24-hr S1 100-yr Rainfall=7.65"

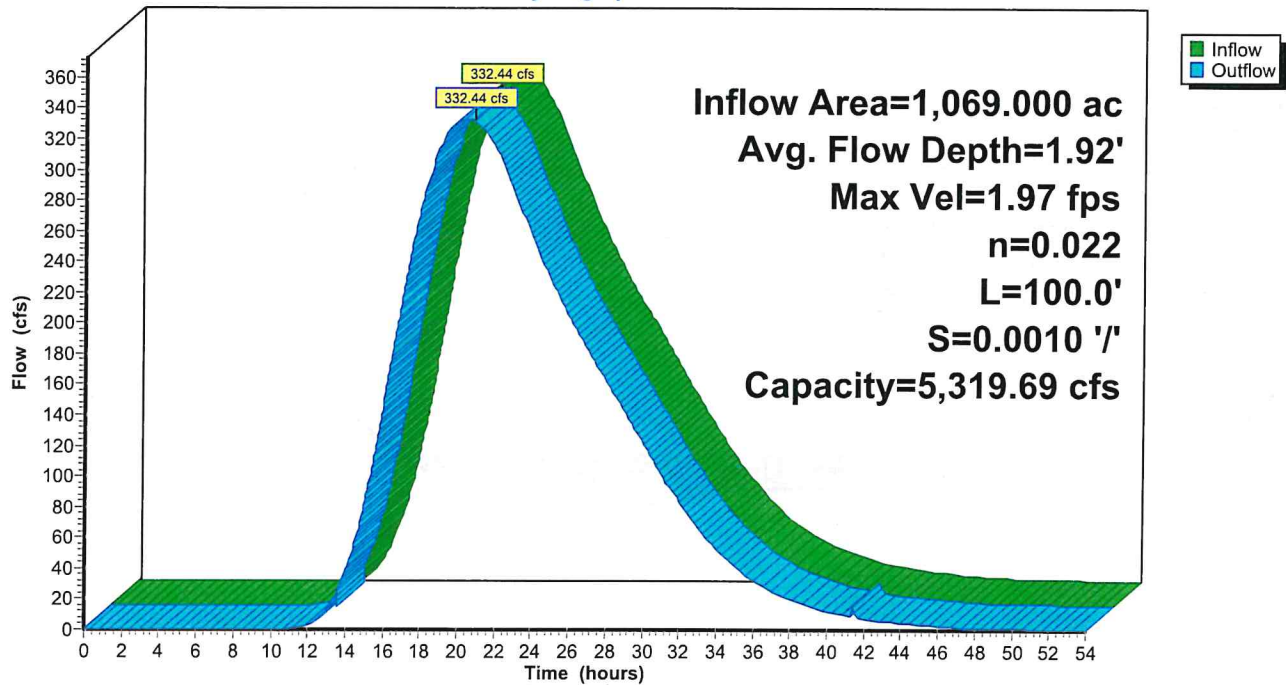
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Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	8.0	0	0.00
1.00	16.9	139.0	1,685	8.82
3.00	407.5	374.1	40,745	921.23
3.70	691.1	437.9	69,111	2,001.05
5.00	1,282.8	474.2	128,278	5,319.69

Reach 12R: L-L

Hydrograph



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Existing Conditions
 CT_Lisbon 24-hr S1 100-yr Rainfall=7.65"

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Summary for Reach 13R: M-M

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=2)

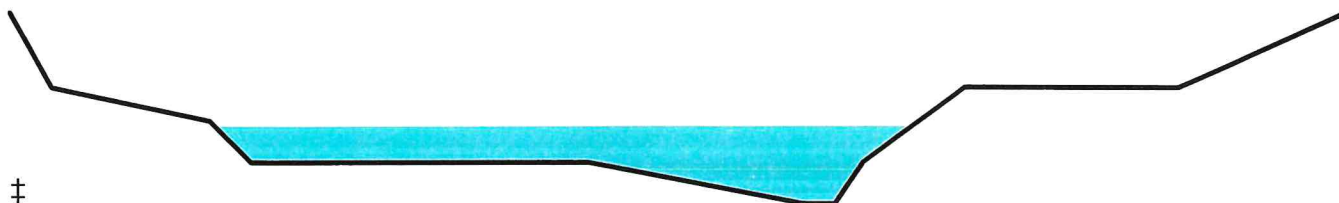
[63] Warning: Exceeded Reach 12R INLET depth by 0.04' @ 20.85 hrs

Inflow Area = 1,069.000 ac, 0.00% Impervious, Inflow Depth > 3.83" for 100-yr event
 Inflow = 332.44 cfs @ 20.80 hrs, Volume= 341.394 af
 Outflow = 332.44 cfs @ 20.81 hrs, Volume= 341.393 af, Atten= 0%, Lag= 0.4 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-54.00 hrs, dt= 0.01 hrs
 Max. Velocity= 2.34 fps, Min. Travel Time= 0.7 min
 Avg. Velocity = 1.26 fps, Avg. Travel Time= 1.3 min

Peak Storage= 14,237 cf @ 20.81 hrs
 Average Depth at Peak Storage= 2.06'
 Bank-Full Depth= 5.10' Flow Area= 728.6 sf, Capacity= 3,275.94 cfs

Custom cross-section, Length= 100.0' Slope= 0.0010 '/' (103 Elevation Intervals)
 Constant n= 0.022 Earth, clean & straight
 Inlet Invert= 138.90', Outlet Invert= 138.80'



Offset (feet)	Elevation (feet)	Chan.Depth (feet)
8.10	144.00	0.00
15.60	142.00	2.00
43.70	141.10	2.90
51.10	140.00	4.00
111.40	140.00	4.00
149.50	138.90	5.10
155.30	138.90	5.10
160.20	140.00	4.00
178.40	142.00	2.00
216.50	142.00	2.00
246.00	144.00	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	5.8	0	0.00
1.10	30.0	109.2	3,003	27.12
2.20	159.6	126.8	15,962	397.50
3.10	289.8	201.2	28,980	789.39
5.10	728.6	238.6	72,860	3,275.94

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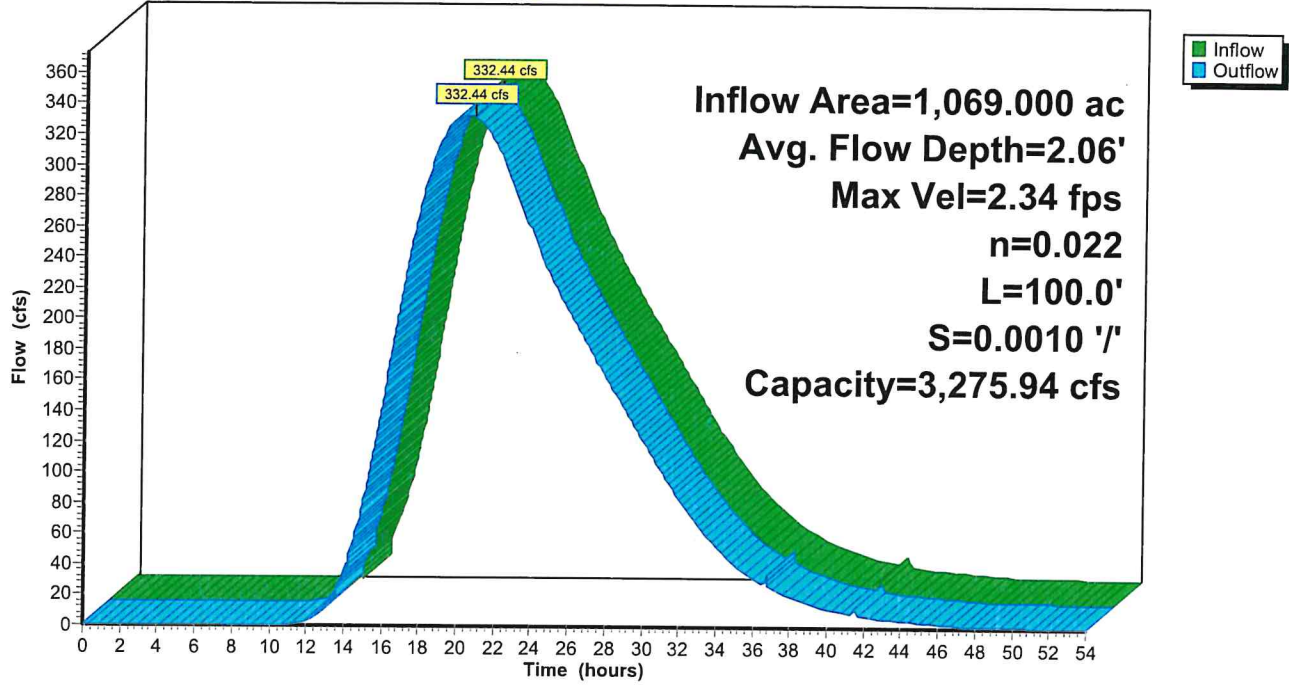
Existing Conditions
CT_Lisbon 24-hr S1 100-yr Rainfall=7.65"

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Reach 13R: M-M

Hydrograph



1S
Drainage Area to
Blissville Brook

1R

A-A

2R

B-B

3R

C-C

4R

D-D

5R

E-E

6R

F-F

7R

G-G

8R

H-H

9R

I-I

10R

J-J

11R

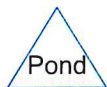
K-K

12R

L-L

13R

M-M



Routing Diagram for 2019160 Sunfox_Pr
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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1,069.000	67	(1S)
1,069.000	67	TOTAL AREA

Time span=0.00-54.00 hrs, dt=0.05 hrs, 1081 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1S: Drainage Area to Runoff Area=1,069.000 ac 0.00% Impervious Runoff Depth>3.83"
Flow Length=24,974' Slope=0.0100 '/' Tc=602.8 min CN=67 Runoff=332.44 cfs 341.407 af

Reach 1R: A-A Avg. Flow Depth=1.45' Max Vel=7.73 fps Inflow=332.44 cfs 341.407 af
n=0.022 L=50.0' S=0.0100 '/' Capacity=3,665.36 cfs Outflow=332.44 cfs 341.407 af

Reach 2R: B-B Avg. Flow Depth=2.97' Max Vel=3.70 fps Inflow=332.44 cfs 341.407 af
n=0.022 L=100.0' S=0.0010 '/' Capacity=1,354.45 cfs Outflow=332.44 cfs 341.406 af

Reach 3R: C-C Avg. Flow Depth=3.33' Max Vel=3.77 fps Inflow=332.44 cfs 341.406 af
n=0.022 L=100.0' S=0.0010 '/' Capacity=905.35 cfs Outflow=332.44 cfs 341.404 af

Reach 4R: D-D Avg. Flow Depth=3.28' Max Vel=3.69 fps Inflow=332.44 cfs 341.404 af
n=0.022 L=100.0' S=0.0010 '/' Capacity=2,325.52 cfs Outflow=332.44 cfs 341.403 af

Reach 5R: E-E Avg. Flow Depth=3.02' Max Vel=3.58 fps Inflow=332.44 cfs 341.403 af
n=0.022 L=100.0' S=0.0010 '/' Capacity=9,667.86 cfs Outflow=332.45 cfs 341.403 af

Reach 6R: F-F Avg. Flow Depth=3.21' Max Vel=3.22 fps Inflow=332.45 cfs 341.403 af
n=0.022 L=100.0' S=0.0010 '/' Capacity=8,997.16 cfs Outflow=332.45 cfs 341.402 af

Reach 7R: G-G Avg. Flow Depth=3.14' Max Vel=2.64 fps Inflow=332.45 cfs 341.402 af
n=0.022 L=100.0' S=0.0010 '/' Capacity=6,147.81 cfs Outflow=332.44 cfs 341.401 af

Reach 8R: H-H Avg. Flow Depth=3.45' Max Vel=3.67 fps Inflow=332.44 cfs 341.401 af
n=0.022 L=100.0' S=0.0010 '/' Capacity=3,947.51 cfs Outflow=332.44 cfs 341.400 af

Reach 9R: I-I Avg. Flow Depth=3.57' Max Vel=3.30 fps Inflow=332.44 cfs 341.400 af
n=0.022 L=100.0' S=0.0010 '/' Capacity=2,897.62 cfs Outflow=332.43 cfs 341.398 af

Reach 10R: J-J Avg. Flow Depth=3.19' Max Vel=3.09 fps Inflow=332.43 cfs 341.398 af
n=0.022 L=100.0' S=0.0010 '/' Capacity=946.99 cfs Outflow=332.43 cfs 341.397 af

Reach 11R: K-K Avg. Flow Depth=3.58' Max Vel=2.81 fps Inflow=332.43 cfs 341.397 af
n=0.022 L=100.0' S=0.0010 '/' Capacity=580.62 cfs Outflow=332.42 cfs 341.396 af

Reach 12R: L-L Avg. Flow Depth=1.92' Max Vel=1.97 fps Inflow=332.42 cfs 341.396 af
n=0.022 L=100.0' S=0.0010 '/' Capacity=5,319.69 cfs Outflow=332.42 cfs 341.395 af

Reach 13R: M-M Avg. Flow Depth=2.06' Max Vel=2.33 fps Inflow=332.42 cfs 341.395 af
n=0.022 L=100.0' S=0.0010 '/' Capacity=3,275.94 cfs Outflow=332.42 cfs 341.393 af

Total Runoff Area = 1,069.000 ac Runoff Volume = 341.407 af Average Runoff Depth = 3.83"
100.00% Pervious = 1,069.000 ac 0.00% Impervious = 0.000 ac

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Proposed Conditions
 CT_Lisbon 24-hr S1 100-yr Rainfall=7.65"

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Summary for Subcatchment 1S: Drainage Area to Blissville Brook

Runoff = 332.44 cfs @ 20.75 hrs, Volume= 341.407 af, Depth> 3.83"

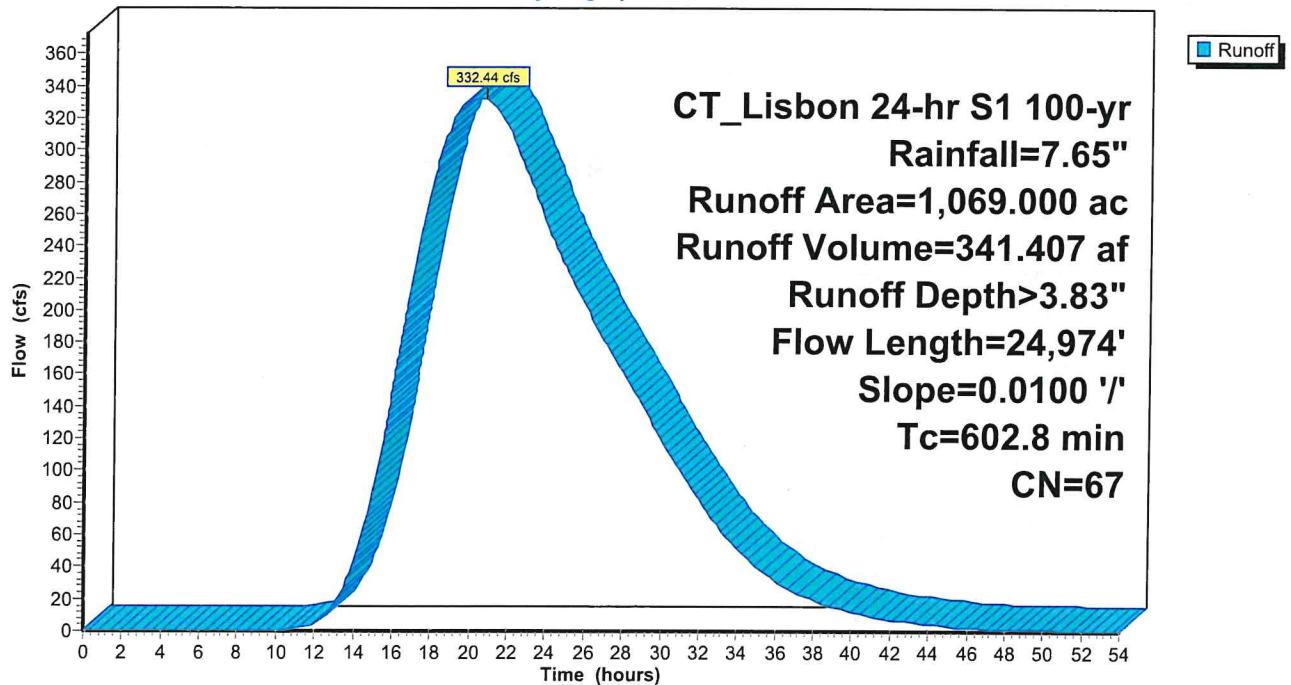
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-54.00 hrs, dt= 0.05 hrs
 CT_Lisbon 24-hr S1 100-yr Rainfall=7.65"

Area (ac)	CN	Description
* 1,069.000	67	
1,069.000		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
602.8	24,974	0.0100	0.69		Lag/CN Method,

Subcatchment 1S: Drainage Area to Blissville Brook

Hydrograph



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Proposed Conditions
 CT_Lisbon 24-hr S1 100-yr Rainfall=7.65"

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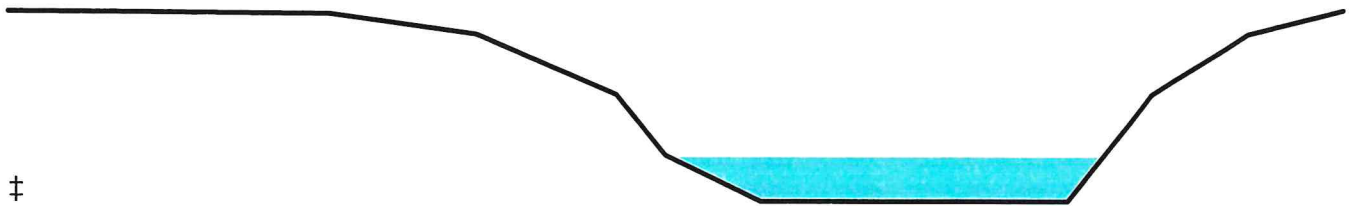
Summary for Reach 1R: A-A

Inflow Area = 1,069.000 ac, 0.00% Impervious, Inflow Depth > 3.83" for 100-yr event
 Inflow = 332.44 cfs @ 20.75 hrs, Volume= 341.407 af
 Outflow = 332.44 cfs @ 20.75 hrs, Volume= 341.407 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-54.00 hrs, dt= 0.05 hrs
 Max. Velocity= 7.73 fps, Min. Travel Time= 0.1 min
 Avg. Velocity = 3.74 fps, Avg. Travel Time= 0.2 min

Peak Storage= 2,149 cf @ 20.75 hrs
 Average Depth at Peak Storage= 1.45'
 Bank-Full Depth= 6.30' Flow Area= 285.0 sf, Capacity= 3,665.36 cfs

Custom cross-section, Length= 50.0' Slope= 0.0100 '/' (104 Elevation Intervals)
 Constant n= 0.022 Earth, clean & straight
 Inlet Invert= 140.50', Outlet Invert= 140.00'

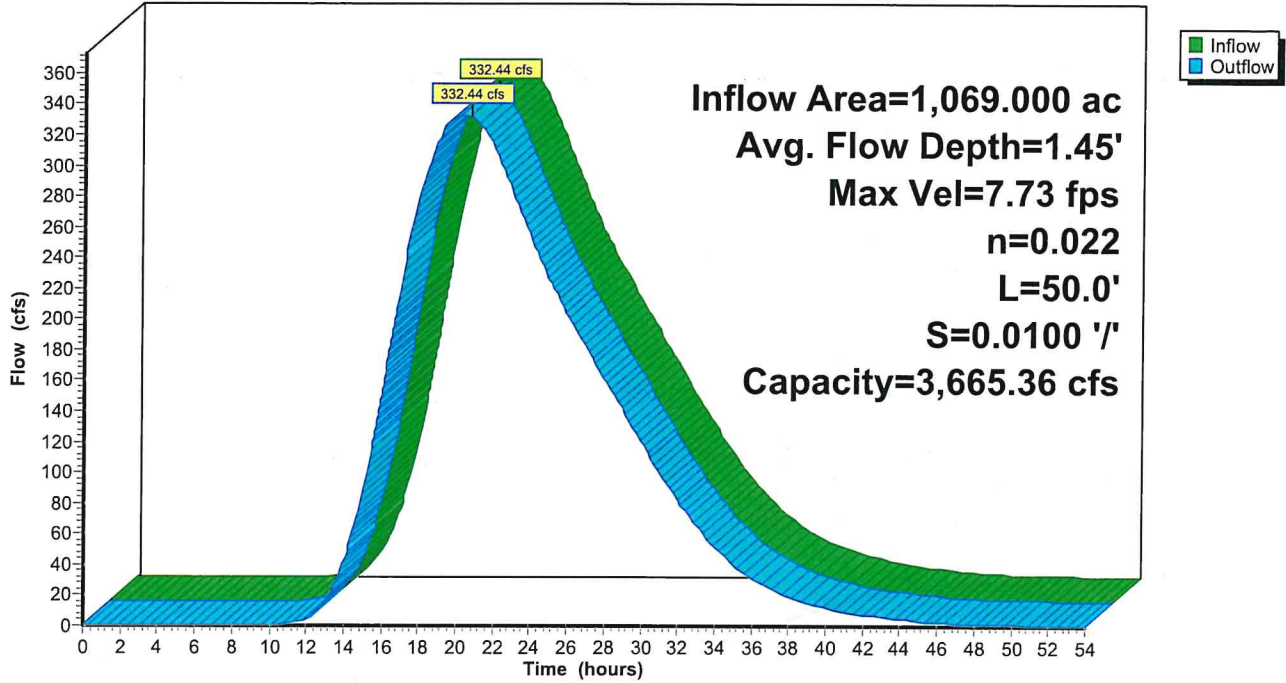


Offset (feet)	Elevation (feet)	Chan.Depth (feet)
0.00	146.80	0.00
25.75	146.70	0.10
37.40	146.00	0.80
48.70	144.00	2.80
52.60	142.00	4.80
60.10	140.50	6.30
84.66	140.50	6.30
87.50	142.00	4.80
91.30	144.00	2.80
98.93	146.00	0.80
106.48	146.80	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	24.6	0	0.00
1.50	44.6	35.4	2,230	351.21
3.50	122.1	44.1	6,105	1,626.11
5.50	226.2	63.5	11,311	3,565.82
6.20	275.7	81.8	13,784	4,186.71
6.30	285.0	108.5	14,250	3,665.36

Reach 1R: A-A

Hydrograph



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Summary for Reach 2R: B-B

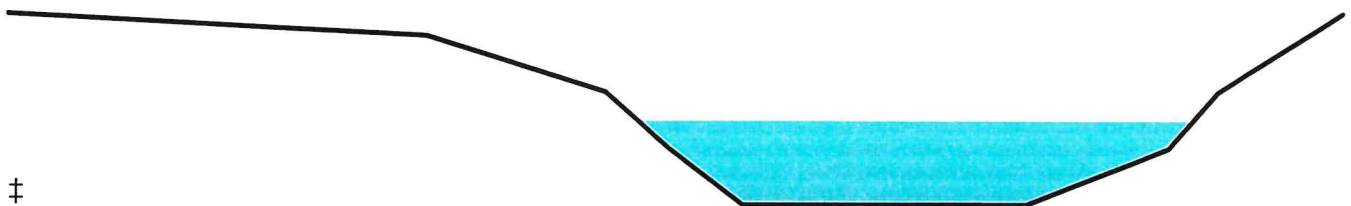
[63] Warning: Exceeded Reach 1R INLET depth by 1.02' @ 20.75 hrs

Inflow Area = 1,069.000 ac, 0.00% Impervious, Inflow Depth > 3.83" for 100-yr event
 Inflow = 332.44 cfs @ 20.75 hrs, Volume= 341.407 af
 Outflow = 332.44 cfs @ 20.75 hrs, Volume= 341.406 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-54.00 hrs, dt= 0.05 hrs
 Max. Velocity= 3.70 fps, Min. Travel Time= 0.5 min
 Avg. Velocity = 1.80 fps, Avg. Travel Time= 0.9 min

Peak Storage= 8,993 cf @ 20.75 hrs
 Average Depth at Peak Storage= 2.97'
 Bank-Full Depth= 6.80' Flow Area= 296.5 sf, Capacity= 1,354.45 cfs

Custom cross-section, Length= 100.0' Slope= 0.0010 '/' (103 Elevation Intervals)
 Constant n= 0.022 Earth, clean & straight
 Inlet Invert= 140.00', Outlet Invert= 139.90'

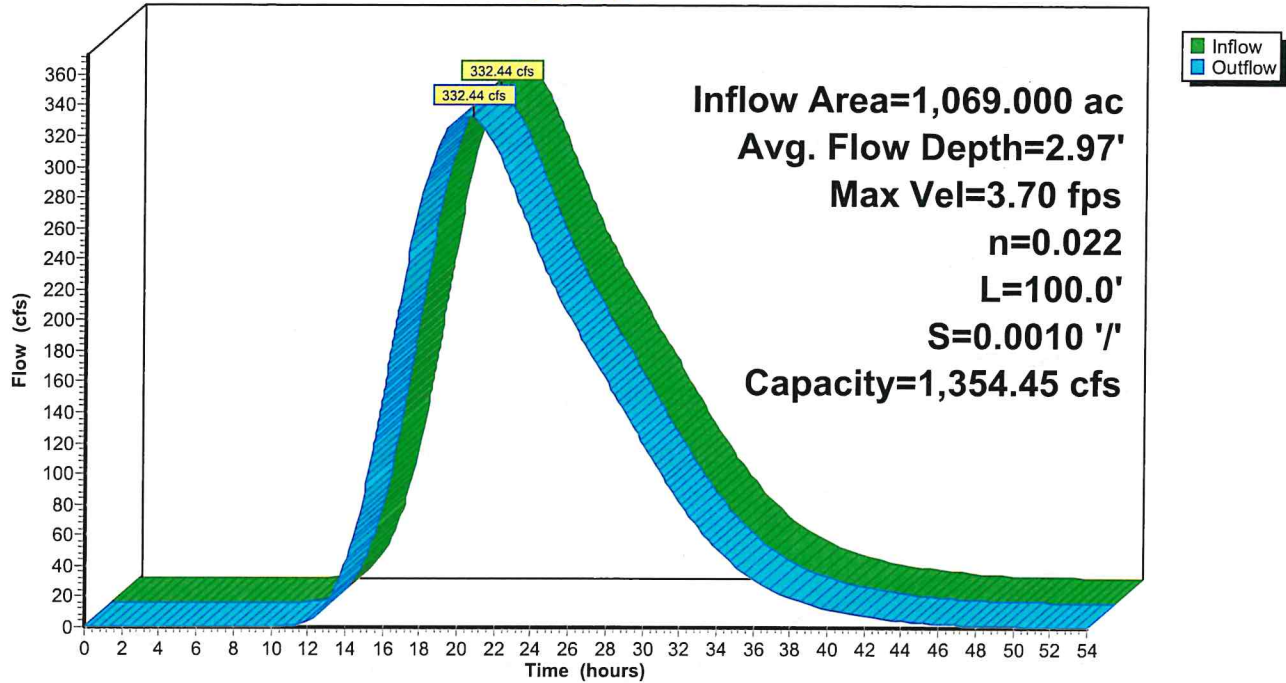


Offset (feet)	Elevation (feet)	Chan.Depth (feet)
0.00	146.80	0.00
29.10	146.00	0.80
41.60	144.00	2.80
46.00	142.00	4.80
51.10	140.00	6.80
70.80	140.00	6.80
80.70	142.00	4.80
84.00	144.00	2.80
90.20	146.00	0.80
92.60	146.80	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	19.7	0	0.00
2.00	54.4	35.3	5,440	155.09
4.00	131.5	44.0	13,150	583.04
6.00	235.0	63.1	23,500	1,205.47
6.80	296.5	94.8	29,648	1,354.45

Reach 2R: B-B

Hydrograph



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Summary for Reach 3R: C-C

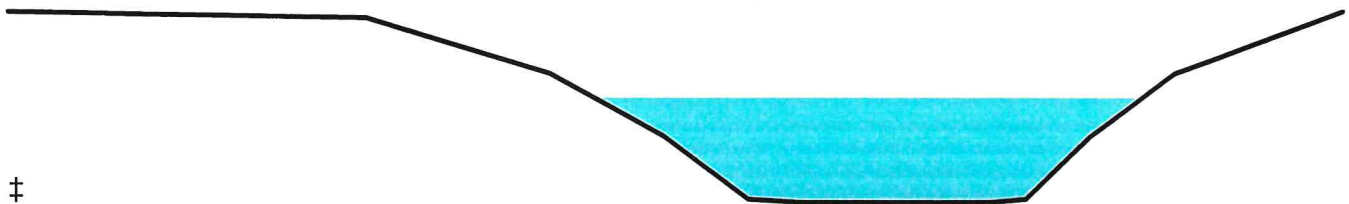
[63] Warning: Exceeded Reach 2R INLET depth by 0.25' @ 20.80 hrs

Inflow Area = 1,069.000 ac, 0.00% Impervious, Inflow Depth > 3.83" for 100-yr event
 Inflow = 332.44 cfs @ 20.75 hrs, Volume= 341.406 af
 Outflow = 332.44 cfs @ 20.75 hrs, Volume= 341.404 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-54.00 hrs, dt= 0.05 hrs
 Max. Velocity= 3.77 fps, Min. Travel Time= 0.4 min
 Avg. Velocity = 1.88 fps, Avg. Travel Time= 0.9 min

Peak Storage= 8,822 cf @ 20.75 hrs
 Average Depth at Peak Storage= 3.33'
 Bank-Full Depth= 6.10' Flow Area= 228.7 sf, Capacity= 905.35 cfs

Custom cross-section, Length= 100.0' Slope= 0.0010 '/' (104 Elevation Intervals)
 Constant n= 0.022 Earth, clean & straight
 Inlet Invert= 139.90', Outlet Invert= 139.80'

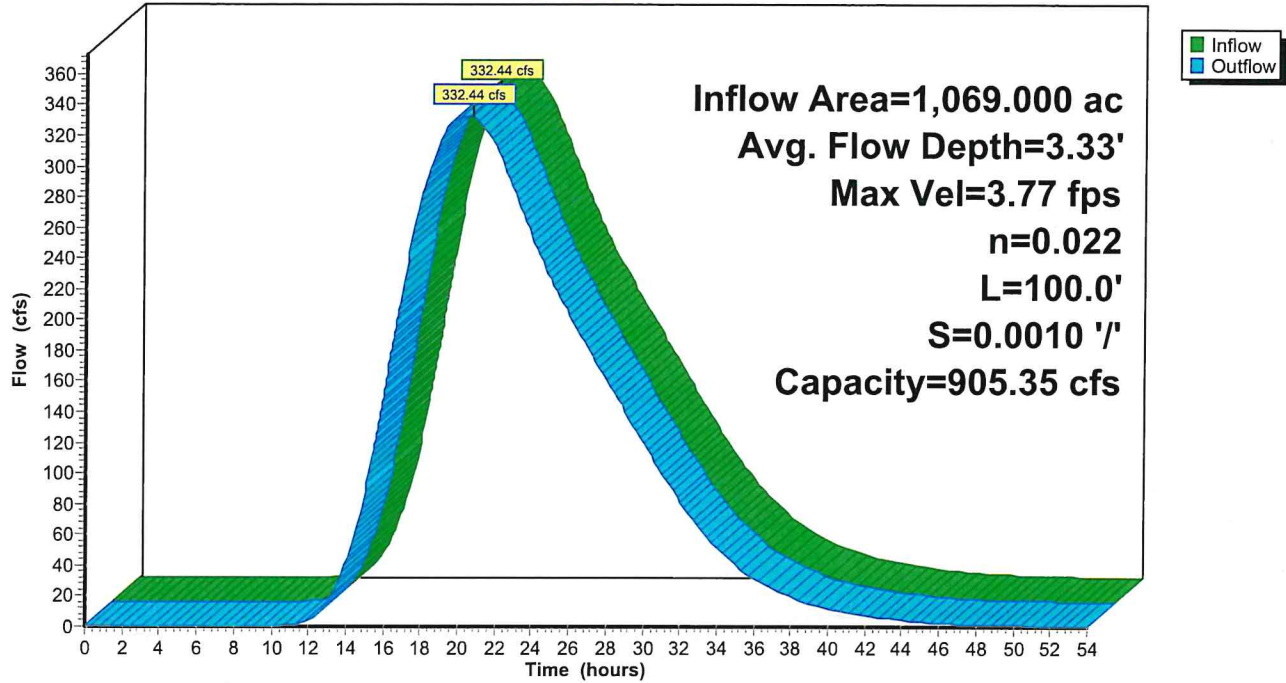


Offset (feet)	Elevation (feet)	Chan.Depth (feet)
0.00	146.00	0.00
23.90	145.80	0.20
36.20	144.00	2.00
43.80	142.00	4.00
49.40	140.00	6.00
53.00	139.90	6.10
65.40	139.90	6.10
67.90	140.00	6.00
72.20	142.00	4.00
77.80	144.00	2.00
88.90	146.00	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	12.4	0	0.00
0.10	1.5	18.5	154	0.63
2.10	48.4	29.2	4,844	145.04
4.10	118.4	43.0	11,844	497.16
5.90	213.4	65.6	21,339	1,000.83
6.10	228.7	90.6	22,866	905.35

Reach 3R: C-C

Hydrograph



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Summary for Reach 4R: D-D

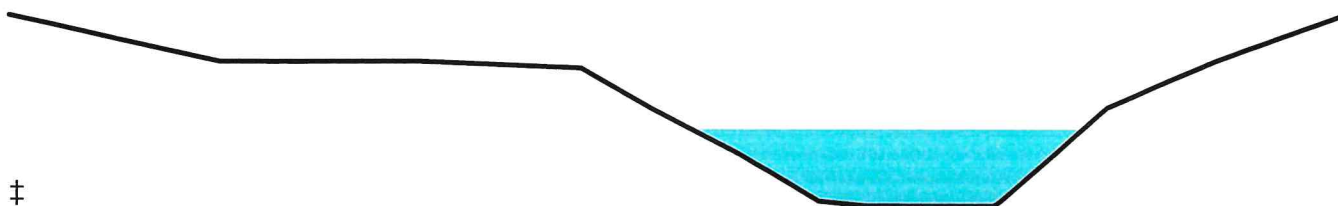
[62] Hint: Exceeded Reach 3R OUTLET depth by 0.03' @ 33.85 hrs

Inflow Area = 1,069.000 ac, 0.00% Impervious, Inflow Depth > 3.83" for 100-yr event
Inflow = 332.44 cfs @ 20.75 hrs, Volume= 341.404 af
Outflow = 332.44 cfs @ 20.75 hrs, Volume= 341.403 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-54.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.69 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.87 fps, Avg. Travel Time= 0.9 min

Peak Storage= 9,019 cf @ 20.75 hrs
Average Depth at Peak Storage= 3.28'
Bank-Full Depth= 8.20' Flow Area= 471.1 sf, Capacity= 2,325.52 cfs

Custom cross-section, Length= 100.0' Slope= 0.0010 '/' (104 Elevation Intervals)
Constant n= 0.022 Earth, clean & straight
Inlet Invert= 139.80', Outlet Invert= 139.70'



±

Offset (feet)	Elevation (feet)	Chan.Depth (feet)
0.00	148.00	0.00
20.90	146.00	2.00
40.70	146.00	2.00
56.80	145.70	2.30
63.60	144.00	4.00
72.50	142.00	6.00
80.30	140.00	8.00
85.10	139.80	8.20
97.70	139.80	8.20
98.40	140.00	8.00
103.70	142.00	6.00
108.90	144.00	4.00
119.50	146.00	2.00
132.20	148.00	0.00

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 CT_Lisbon 24-hr S1 100-yr Rainfall=7.65"

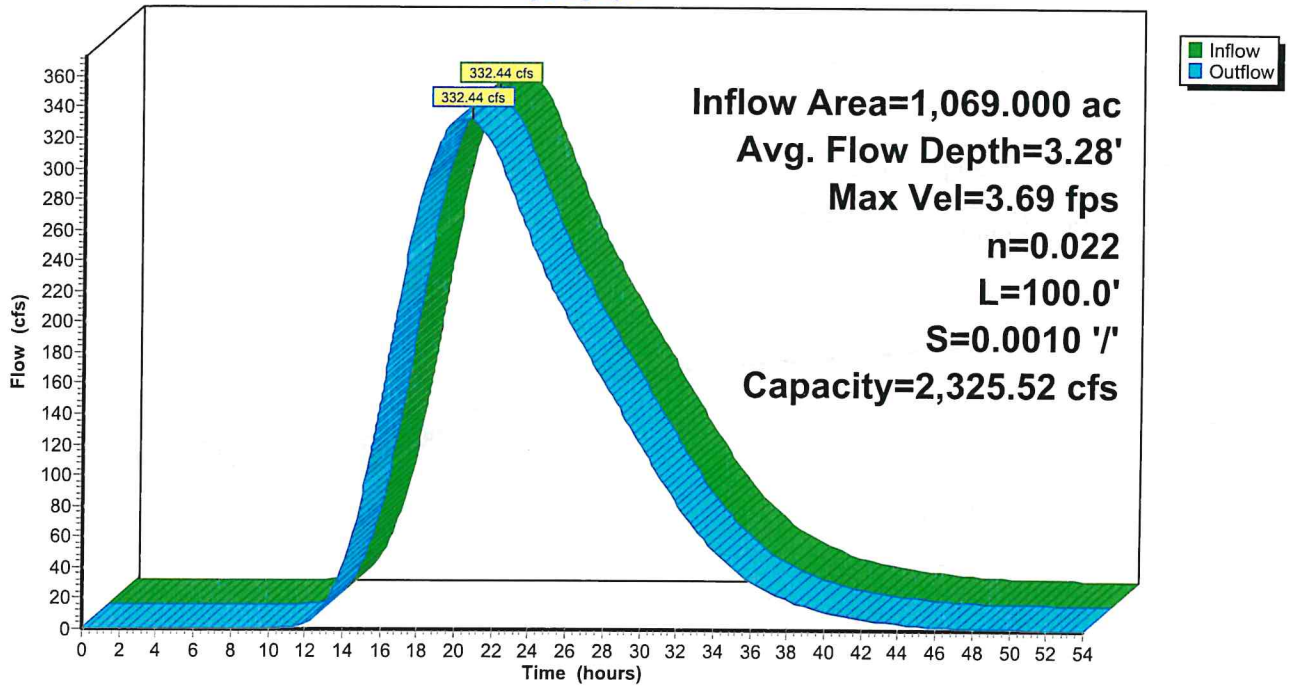
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Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	12.6	0	0.00
0.20	3.1	18.1	307	2.01
2.20	52.4	31.8	5,237	155.84
4.20	128.9	46.5	12,887	542.77
5.90	219.3	62.7	21,932	1,077.09
6.20	240.3	100.2	24,030	919.39
8.20	471.1	134.1	47,110	2,325.52

Reach 4R: D-D

Hydrograph



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Summary for Reach 5R: E-E

[90] Warning: $Q_{out} > Q_{in}$ may require smaller dt or Finer Routing

[61] Hint: Exceeded Reach 4R outlet invert by 3.02' @ 20.75 hrs

Inflow Area = 1,069.000 ac, 0.00% Impervious, Inflow Depth > 3.83" for 100-yr event
Inflow = 332.44 cfs @ 20.75 hrs, Volume= 341.403 af
Outflow = 332.45 cfs @ 20.73 hrs, Volume= 341.403 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-54.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.58 fps, Min. Travel Time= 0.5 min
Avg. Velocity = 1.82 fps, Avg. Travel Time= 0.9 min

Peak Storage= 9,291 cf @ 20.73 hrs
Average Depth at Peak Storage= 3.02'
Bank-Full Depth= 12.80' Flow Area= 1,301.7 sf, Capacity= 9,667.86 cfs

Custom cross-section, Length= 100.0' Slope= 0.0010 '/' (107 Elevation Intervals)
Constant n= 0.022 Earth, clean & straight
Inlet Invert= 139.70', Outlet Invert= 139.60'



Offset (feet)	Elevation (feet)	Chan.Depth (feet)
0.00	152.50	0.00
5.60	152.00	0.50
18.30	150.00	2.50
48.10	148.00	4.50
97.80	146.00	6.50
114.10	145.50	7.00
120.90	144.00	8.50
127.90	142.00	10.50
134.10	139.70	12.80
150.00	139.70	12.80
157.70	140.00	12.50
162.70	142.00	10.50
175.40	144.00	8.50
187.40	146.00	6.50
191.50	148.00	4.50
195.60	152.00	0.50
196.70	152.50	0.00

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Proposed Conditions
 CT_Lisbon 24-hr S1 100-yr Rainfall=7.65"

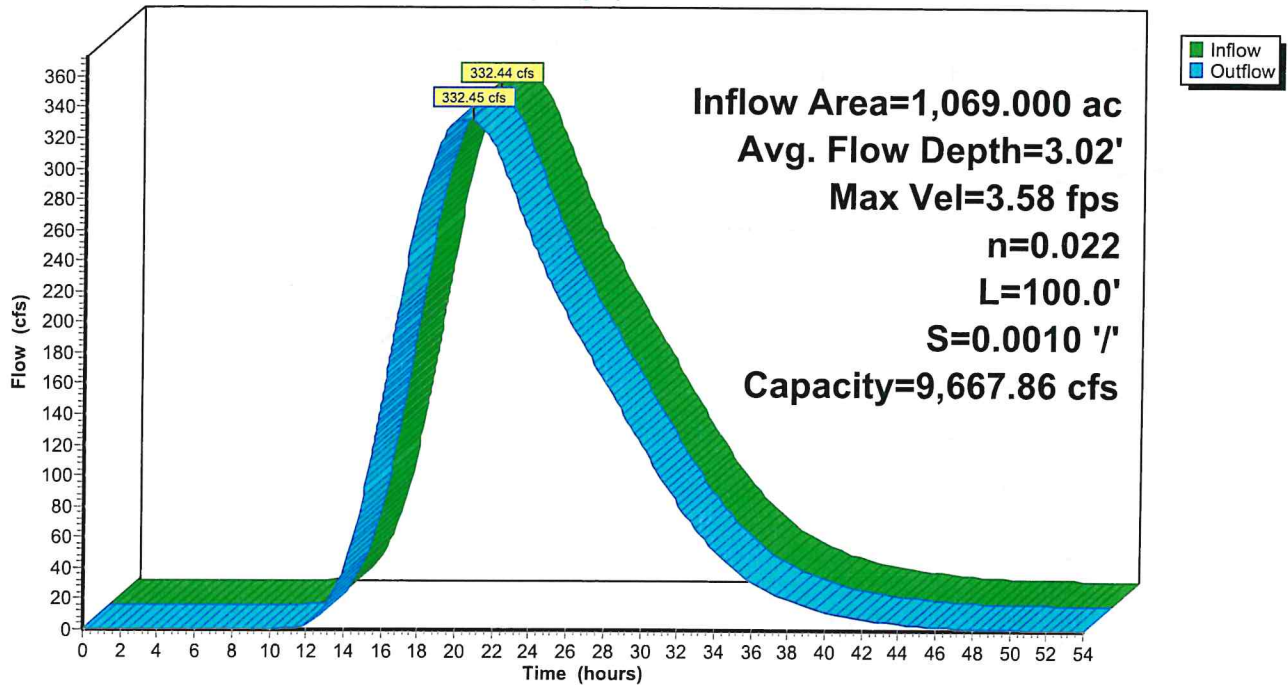
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Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	15.9	0	0.00
0.30	6.0	24.5	605	5.09
2.30	65.3	35.6	6,526	208.69
4.30	154.6	55.7	15,456	651.56
5.80	248.2	71.8	24,816	1,211.36
6.30	288.1	91.2	28,813	1,325.32
8.30	521.1	145.5	52,113	2,605.99
10.30	839.8	178.2	83,978	5,041.78
12.30	1,205.0	193.9	120,503	8,699.51
12.80	1,301.7	200.8	130,171	9,667.86

Reach 5R: E-E

Hydrograph



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Summary for Reach 6R: F-F

[63] Warning: Exceeded Reach 5R INLET depth by 0.23' @ 30.45 hrs

Inflow Area = 1,069.000 ac, 0.00% Impervious, Inflow Depth > 3.83" for 100-yr event

Inflow = 332.45 cfs @ 20.73 hrs, Volume= 341.403 af

Outflow = 332.45 cfs @ 20.73 hrs, Volume= 341.402 af, Atten= 0%, Lag= 0.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-54.00 hrs, dt= 0.05 hrs

Max. Velocity= 3.22 fps, Min. Travel Time= 0.5 min

Avg. Velocity = 1.75 fps, Avg. Travel Time= 1.0 min

Peak Storage= 10,324 cf @ 20.73 hrs

Average Depth at Peak Storage= 3.21'

Bank-Full Depth= 10.80' Flow Area= 1,753.2 sf, Capacity= 8,997.16 cfs

Custom cross-section, Length= 100.0' Slope= 0.0010 '/' (109 Elevation Intervals)

Constant n= 0.022 Earth, clean & straight

Inlet Invert= 139.60', Outlet Invert= 139.50'



Offset (feet)	Elevation (feet)	Chan.Depth (feet)
0.00	150.40	0.00
12.60	150.00	0.40
121.20	148.00	2.40
171.00	146.00	4.40
248.10	146.00	4.40
277.70	145.30	5.10
291.70	144.00	6.40
302.10	142.00	8.40
310.80	140.00	10.40
314.90	139.60	10.80
323.40	139.60	10.80
326.60	140.00	10.40
344.90	142.00	8.40
365.30	144.00	6.40
369.40	146.00	4.40
373.40	148.00	2.40
382.30	148.50	1.90
424.60	148.70	1.70
466.20	148.00	2.40
467.70	150.40	0.00

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Proposed Conditions
 CT_Lisbon 24-hr S1 100-yr Rainfall=7.65"

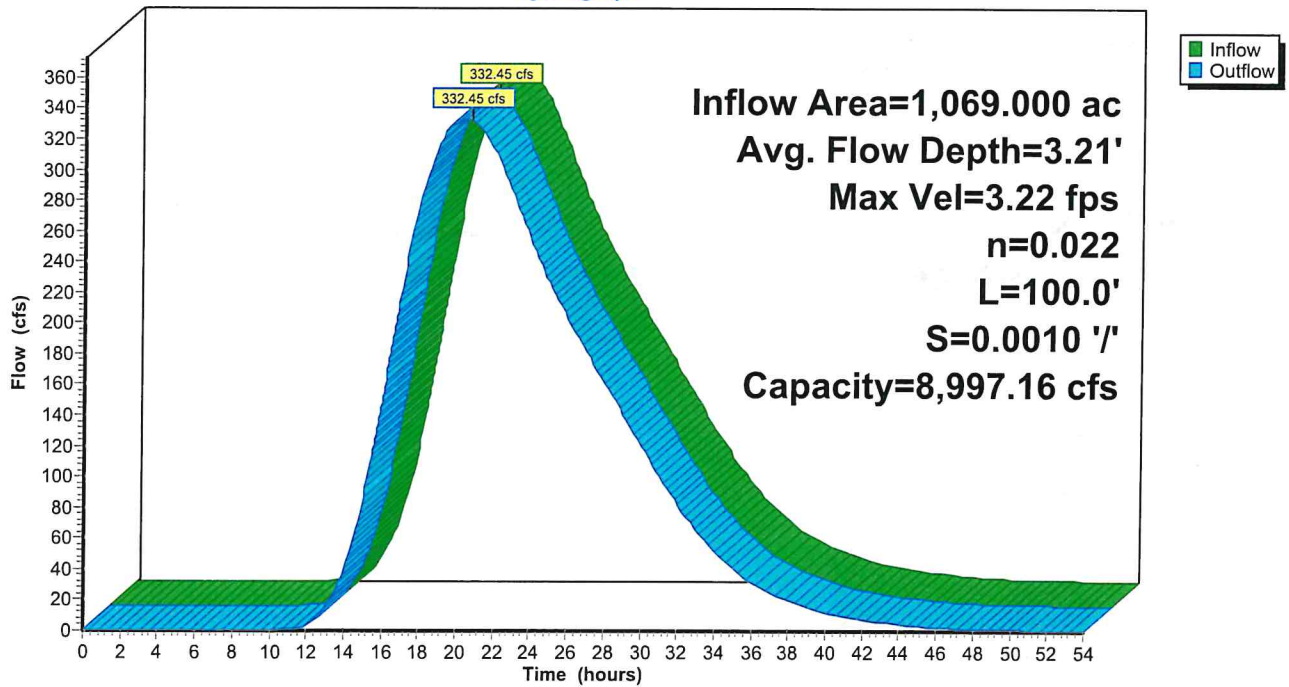
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Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	8.5	0	0.00
0.40	4.9	15.8	486	4.72
2.40	63.5	43.2	6,346	175.22
4.40	179.9	74.3	17,986	692.81
5.70	286.4	91.3	28,637	1,310.75
6.40	360.4	199.6	36,042	1,141.58
8.40	811.0	253.9	81,102	3,757.17
8.90	953.6	320.3	95,364	4,215.76
9.10	1,023.8	385.6	102,381	4,193.32
10.40	1,568.7	457.7	156,871	7,616.80
10.80	1,753.2	470.8	175,322	8,997.16

Reach 6R: F-F

Hydrograph



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Summary for Reach 7R: G-G

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=3)

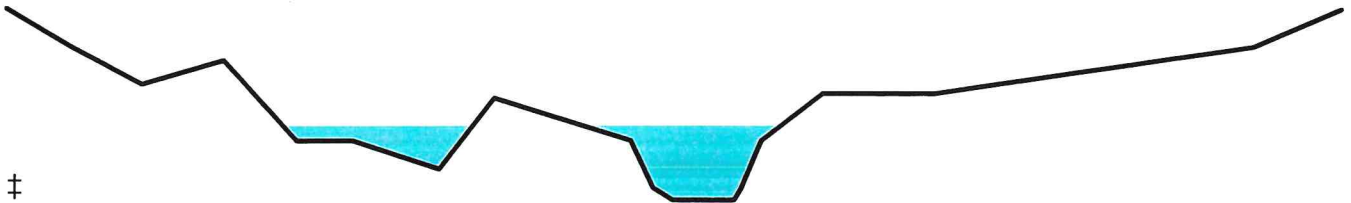
[63] Warning: Exceeded Reach 6R INLET depth by 0.05' @ 27.70 hrs

Inflow Area = 1,069.000 ac, 0.00% Impervious, Inflow Depth > 3.83" for 100-yr event
Inflow = 332.45 cfs @ 20.73 hrs, Volume= 341.402 af
Outflow = 332.44 cfs @ 20.73 hrs, Volume= 341.401 af, Atten= 0%, Lag= 0.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-54.00 hrs, dt= 0.05 hrs
Max. Velocity= 2.64 fps, Min. Travel Time= 0.6 min
Avg. Velocity = 1.58 fps, Avg. Travel Time= 1.1 min

Peak Storage= 12,609 cf @ 20.73 hrs
Average Depth at Peak Storage= 3.14'
Bank-Full Depth= 8.10' Flow Area= 1,185.2 sf, Capacity= 6,147.81 cfs

Custom cross-section, Length= 100.0' Slope= 0.0010 '/' (107 Elevation Intervals)
Constant n= 0.022 Earth, clean & straight
Inlet Invert= 139.50', Outlet Invert= 139.40'



Offset (feet)	Elevation (feet)	Chan.Depth (feet)
0.00	147.60	0.00
14.80	146.00	1.60
31.60	144.40	3.20
50.80	145.40	2.20
68.00	142.00	5.60
81.00	142.00	5.60
101.30	140.80	6.80
106.40	142.00	5.60
114.00	143.80	3.80
145.90	142.00	5.60
151.20	140.00	7.60
155.60	139.50	8.10
170.00	139.50	8.10
171.70	140.00	7.60
176.20	142.00	5.60
190.50	144.00	3.60
216.50	144.00	3.60
290.90	146.00	1.60
311.10	147.60	0.00

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Proposed Conditions
 CT_Lisbon 24-hr S1 100-yr Rainfall=7.65"

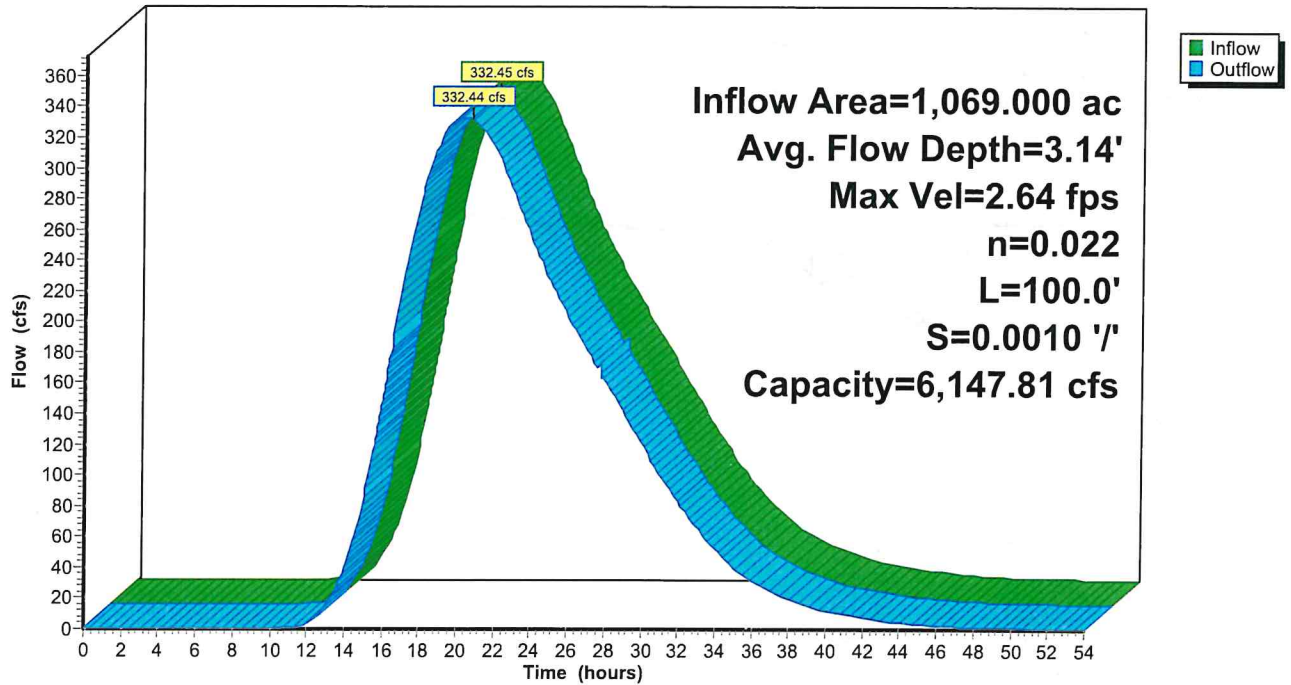
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Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	14.4	0	0.00
0.50	8.7	20.6	873	10.51
1.30	26.7	24.8	2,670	59.71
2.50	74.8	69.8	7,476	167.24
4.30	253.8	131.8	25,375	838.82
4.50	280.0	160.3	28,003	867.68
4.90	346.9	177.2	34,686	1,159.23
5.90	558.4	249.4	55,836	2,041.23
6.50	715.4	278.0	71,543	2,869.61
8.10	1,185.2	313.2	118,519	6,147.81

Reach 7R: G-G

Hydrograph



Summary for Reach 8R: H-H

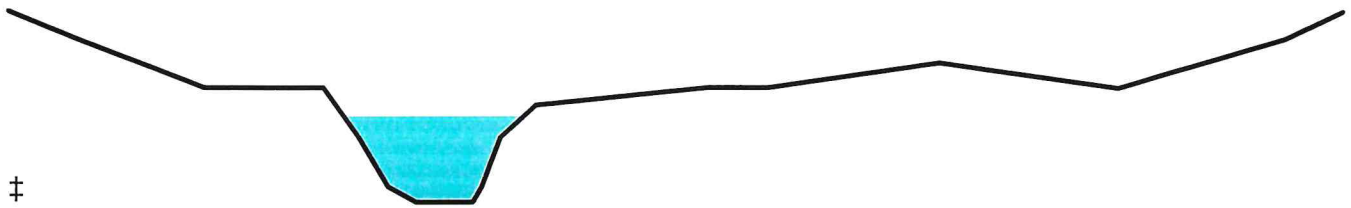
[63] Warning: Exceeded Reach 7R INLET depth by 0.21' @ 20.75 hrs

Inflow Area = 1,069.000 ac, 0.00% Impervious, Inflow Depth > 3.83" for 100-yr event
 Inflow = 332.44 cfs @ 20.73 hrs, Volume= 341.401 af
 Outflow = 332.44 cfs @ 20.73 hrs, Volume= 341.400 af, Atten= 0%, Lag= 0.1 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-54.00 hrs, dt= 0.05 hrs
 Max. Velocity= 3.67 fps, Min. Travel Time= 0.5 min
 Avg. Velocity = 1.90 fps, Avg. Travel Time= 0.9 min

Peak Storage= 9,063 cf @ 20.73 hrs
 Average Depth at Peak Storage= 3.45'
 Bank-Full Depth= 7.70' Flow Area= 883.7 sf, Capacity= 3,947.51 cfs

Custom cross-section, Length= 100.0' Slope= 0.0010 '/' (106 Elevation Intervals)
 Constant n= 0.022 Earth, clean & straight
 Inlet Invert= 139.40', Outlet Invert= 139.30'



‡

Offset (feet)	Elevation (feet)	Chan.Depth (feet)
0.00	147.10	0.00
14.60	146.00	1.10
42.90	144.00	3.10
69.00	144.00	3.10
76.80	142.00	5.10
83.20	140.00	7.10
89.20	139.40	7.70
101.60	139.40	7.70
103.50	140.00	7.10
107.60	142.00	5.10
115.40	143.30	3.80
152.80	144.00	3.10
165.80	144.00	3.10
203.00	145.00	2.10
242.00	144.00	3.10
278.40	146.00	1.10
290.70	147.10	0.00

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Proposed Conditions
 CT_Lisbon 24-hr S1 100-yr Rainfall=7.65"

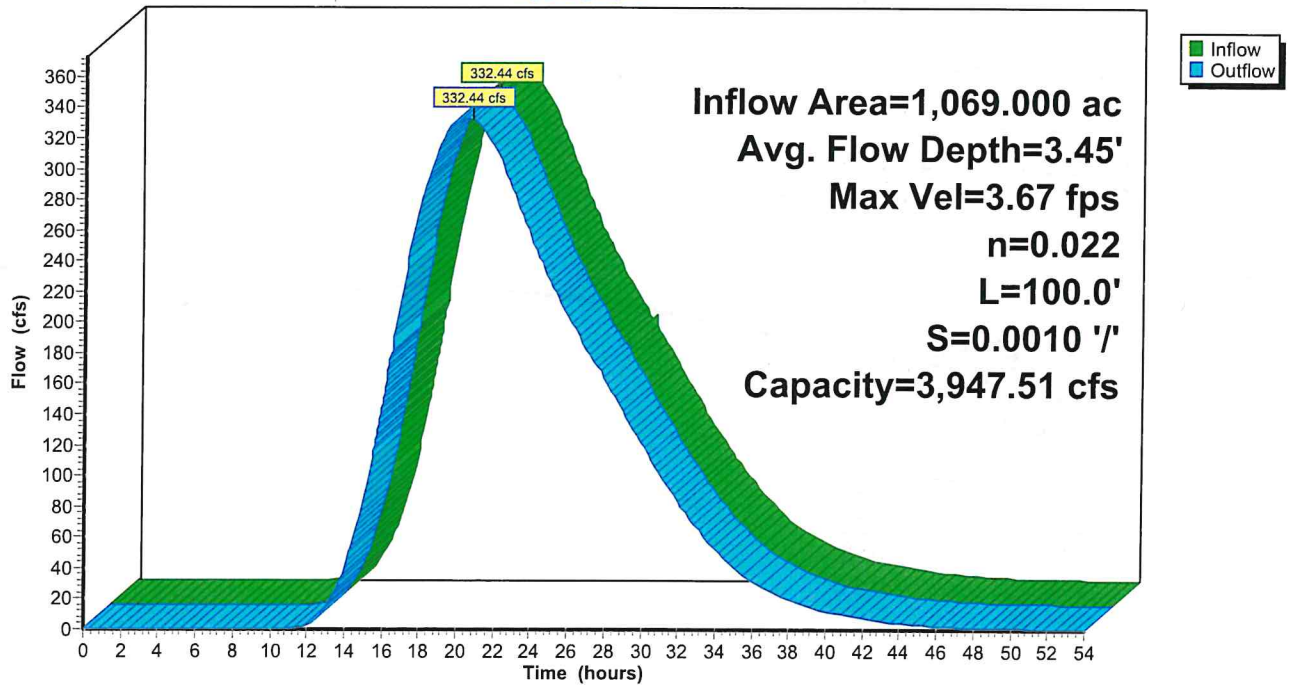
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Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	12.4	0	0.00
0.60	9.8	20.4	981	12.85
2.60	60.9	31.7	6,091	201.13
3.90	109.3	44.8	10,932	423.01
4.60	153.9	124.2	15,393	379.45
5.60	331.1	232.8	33,110	894.45
6.60	578.7	265.2	57,873	2,079.69
7.70	883.7	292.2	88,370	3,947.51

Reach 8R: H-H

Hydrograph



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Summary for Reach 9R: I-I

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=1)

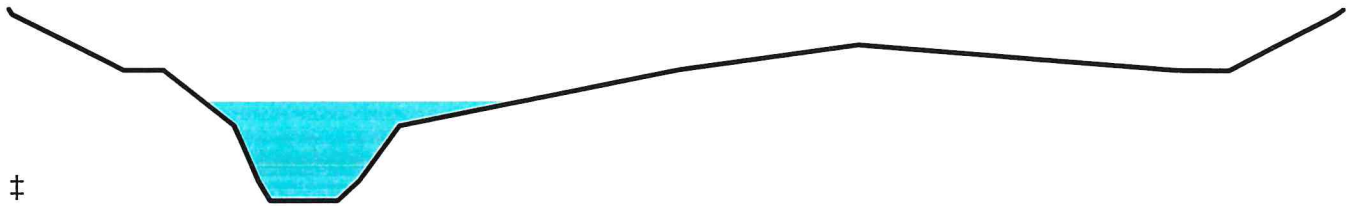
[63] Warning: Exceeded Reach 8R INLET depth by 0.03' @ 23.00 hrs

Inflow Area = 1,069.000 ac, 0.00% Impervious, Inflow Depth > 3.83" for 100-yr event
 Inflow = 332.44 cfs @ 20.73 hrs, Volume= 341.400 af
 Outflow = 332.43 cfs @ 20.74 hrs, Volume= 341.398 af, Atten= 0%, Lag= 0.2 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-54.00 hrs, dt= 0.05 hrs
 Max. Velocity= 3.30 fps, Min. Travel Time= 0.5 min
 Avg. Velocity = 1.79 fps, Avg. Travel Time= 0.9 min

Peak Storage= 11,073 cf @ 20.74 hrs
 Average Depth at Peak Storage= 3.57'
 Bank-Full Depth= 6.90' Flow Area= 718.0 sf, Capacity= 2,897.62 cfs

Custom cross-section, Length= 100.0' Slope= 0.0010 '/' (105 Elevation Intervals)
 Constant n= 0.022 Earth, clean & straight
 Inlet Invert= 139.30', Outlet Invert= 139.20'



Offset (feet)	Elevation (feet)	Chan.Depth (feet)
0.00	146.20	0.00
0.70	146.00	0.20
23.60	144.00	2.20
32.00	144.00	2.20
46.60	142.00	4.20
51.70	140.00	6.20
54.10	139.30	6.90
68.20	139.30	6.90
72.60	140.00	6.20
80.90	142.00	4.20
138.60	144.00	2.20
175.40	144.90	1.30
241.20	144.00	2.20
251.60	144.00	2.20
273.70	146.00	0.20
275.30	146.20	0.00

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 CT_Lisbon 24-hr S1 100-yr Rainfall=7.65"

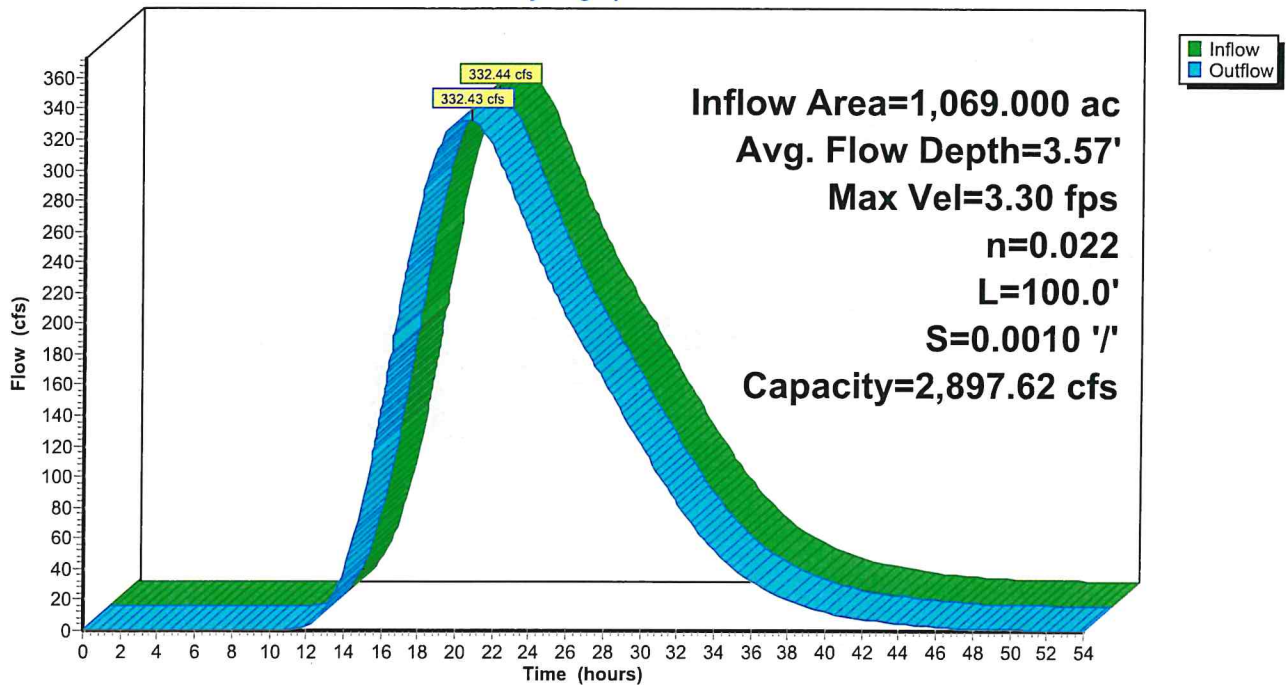
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Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	14.1	0	0.00
0.70	12.2	21.1	1,225	18.24
2.70	67.4	35.1	6,745	222.81
4.70	208.3	126.3	20,835	621.18
5.60	376.5	249.3	37,649	1,058.57
6.70	663.2	274.1	66,318	2,552.72
6.90	718.0	276.5	71,801	2,897.62

Reach 9R: I-I

Hydrograph



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Summary for Reach 10R: J-J

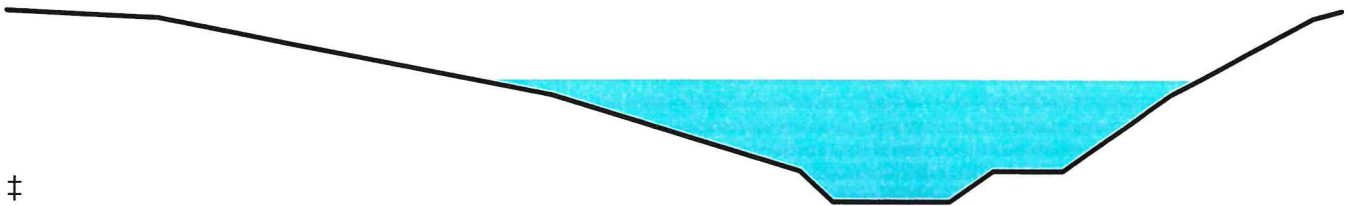
[63] Warning: Exceeded Reach 9R INLET depth by 0.11' @ 39.50 hrs

Inflow Area = 1,069.000 ac, 0.00% Impervious, Inflow Depth > 3.83" for 100-yr event
 Inflow = 332.43 cfs @ 20.74 hrs, Volume= 341.398 af
 Outflow = 332.43 cfs @ 20.74 hrs, Volume= 341.397 af, Atten= 0%, Lag= 0.3 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-54.00 hrs, dt= 0.05 hrs
 Max. Velocity= 3.09 fps, Min. Travel Time= 0.5 min
 Avg. Velocity = 1.71 fps, Avg. Travel Time= 1.0 min

Peak Storage= 10,770 cf @ 20.74 hrs
 Average Depth at Peak Storage= 3.19'
 Bank-Full Depth= 5.00' Flow Area= 257.6 sf, Capacity= 946.99 cfs

Custom cross-section, Length= 100.0' Slope= 0.0010 '/'
 Constant n= 0.022 Earth, clean & straight
 Inlet Invert= 139.20', Outlet Invert= 139.10'

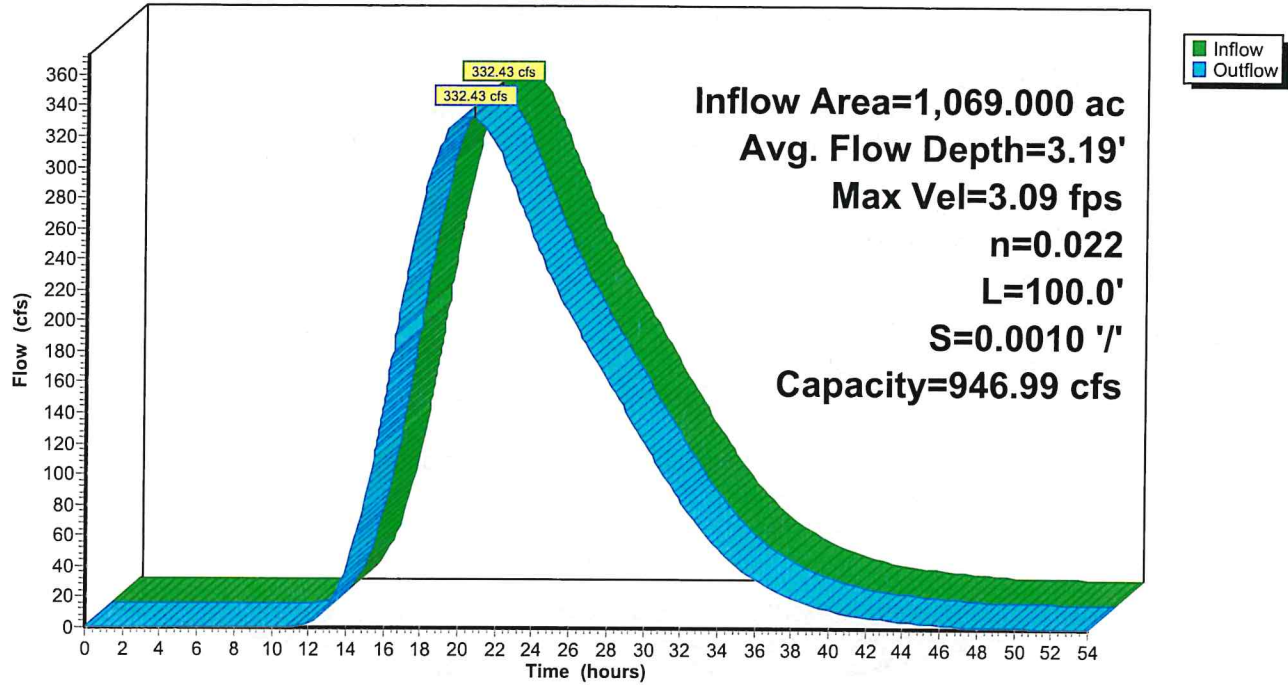


Offset (feet)	Elevation (feet)	Chan.Depth (feet)
0.00	144.20	0.00
12.90	144.00	0.20
46.30	142.00	2.20
67.50	140.00	4.20
70.30	139.20	5.00
80.30	139.20	5.00
84.00	140.00	4.20
89.90	140.00	4.20
99.00	142.00	2.20
111.00	144.00	0.20
113.40	144.20	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	10.0	0	0.00
0.80	10.6	22.6	1,060	13.67
2.80	85.7	53.2	8,570	251.52
4.80	236.5	98.8	23,650	903.74
5.00	257.6	114.1	25,765	946.99

Reach 10R: J-J

Hydrograph



Summary for Reach 11R: K-K

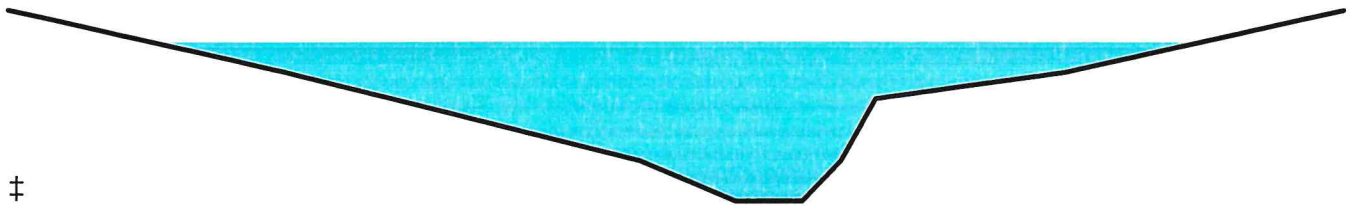
[63] Warning: Exceeded Reach 10R INLET depth by 0.39' @ 16.50 hrs

Inflow Area = 1,069.000 ac, 0.00% Impervious, Inflow Depth > 3.83" for 100-yr event
 Inflow = 332.43 cfs @ 20.74 hrs, Volume= 341.397 af
 Outflow = 332.42 cfs @ 20.75 hrs, Volume= 341.396 af, Atten= 0%, Lag= 0.3 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-54.00 hrs, dt= 0.05 hrs
 Max. Velocity= 2.81 fps, Min. Travel Time= 0.6 min
 Avg. Velocity = 1.70 fps, Avg. Travel Time= 1.0 min

Peak Storage= 11,821 cf @ 20.75 hrs
 Average Depth at Peak Storage= 3.58'
 Bank-Full Depth= 4.30' Flow Area= 181.8 sf, Capacity= 580.62 cfs

Custom cross-section, Length= 100.0' Slope= 0.0010 '/' (102 Elevation Intervals)
 Constant n= 0.022 Earth, clean & straight
 Inlet Invert= 139.10', Outlet Invert= 139.00'

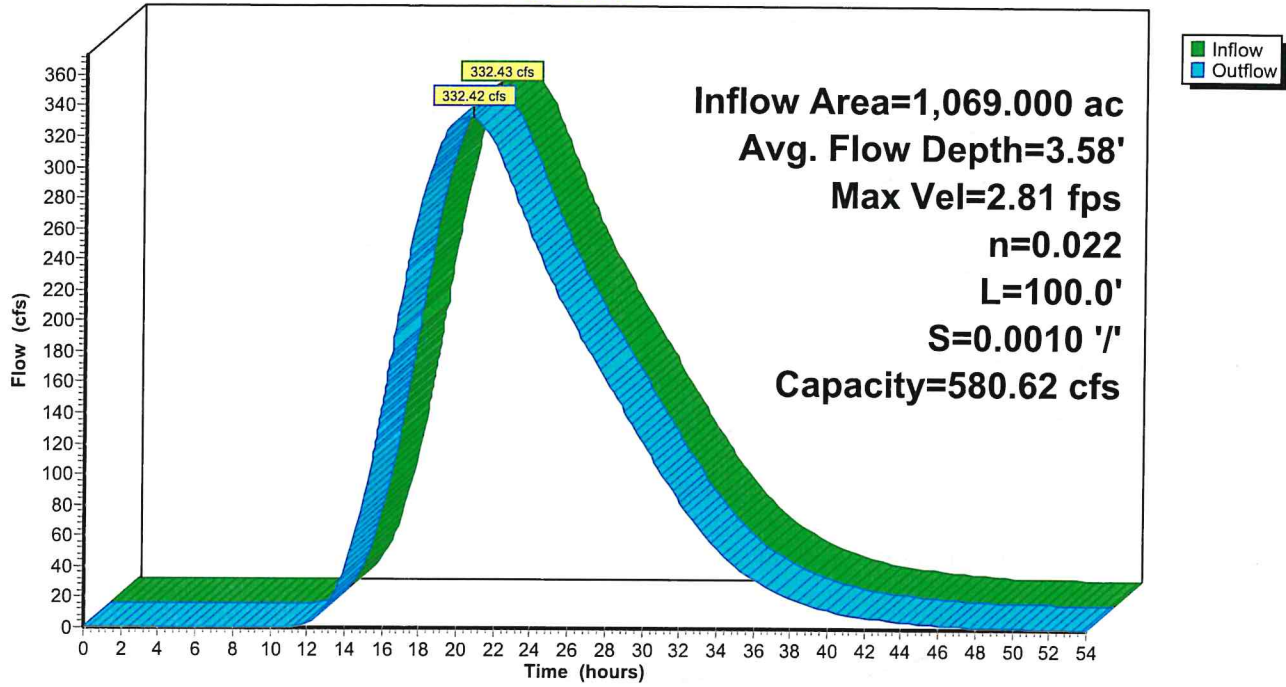


Offset (feet)	Elevation (feet)	Chan.Depth (feet)
0.00	143.40	0.00
20.60	142.00	1.40
46.80	140.00	3.40
53.80	139.10	4.30
58.80	139.10	4.30
61.60	140.00	3.40
64.20	141.40	2.00
78.30	142.00	1.40
98.70	143.40	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	5.0	0	0.00
0.90	8.9	15.0	891	13.44
2.30	44.3	36.3	4,429	107.92
2.90	72.3	58.3	7,232	178.26
4.30	181.8	99.4	18,180	580.62

Reach 11R: K-K

Hydrograph



Summary for Reach 12R: L-L

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=2)

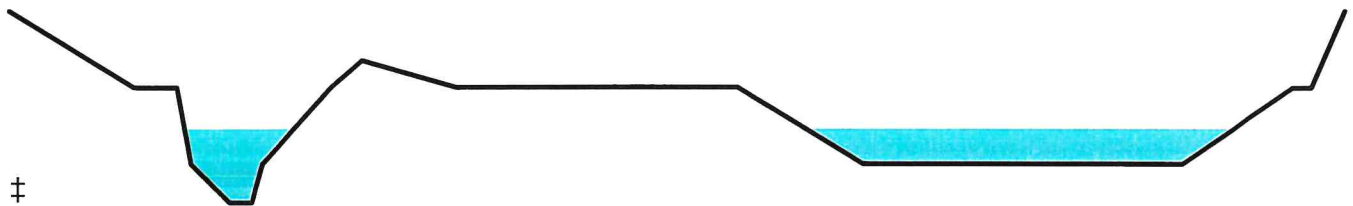
[63] Warning: Exceeded Reach 11R INLET depth by 0.17' @ 41.40 hrs

Inflow Area = 1,069.000 ac, 0.00% Impervious, Inflow Depth > 3.83" for 100-yr event
 Inflow = 332.42 cfs @ 20.75 hrs, Volume= 341.396 af
 Outflow = 332.42 cfs @ 20.76 hrs, Volume= 341.395 af, Atten= 0%, Lag= 0.5 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-54.00 hrs, dt= 0.05 hrs
 Max. Velocity= 1.97 fps, Min. Travel Time= 0.8 min
 Avg. Velocity = 1.10 fps, Avg. Travel Time= 1.5 min

Peak Storage= 16,902 cf @ 20.76 hrs
 Average Depth at Peak Storage= 1.92'
 Bank-Full Depth= 5.00' Flow Area= 1,282.8 sf, Capacity= 5,319.69 cfs

Custom cross-section, Length= 100.0' Slope= 0.0010 '/'
 Constant n= 0.022 Earth, clean & straight
 Inlet Invert= 139.00', Outlet Invert= 138.90'



Offset (feet)	Elevation (feet)	Chan.Depth (feet)
24.90	144.00	0.00
68.90	142.00	2.00
84.30	142.00	2.00
89.20	140.00	4.00
103.10	139.00	5.00
111.10	139.00	5.00
114.90	140.00	4.00
139.30	142.00	2.00
150.30	142.70	1.30
183.50	142.00	2.00
283.20	142.00	2.00
327.70	140.00	4.00
440.80	140.00	4.00
480.00	142.00	2.00
486.50	142.00	2.00
498.10	144.00	0.00

2019160 Sunfox_Pr

Prepared by CHA Companies, Inc.

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Proposed Conditions
 CT_Lisbon 24-hr S1 100-yr Rainfall=7.65"

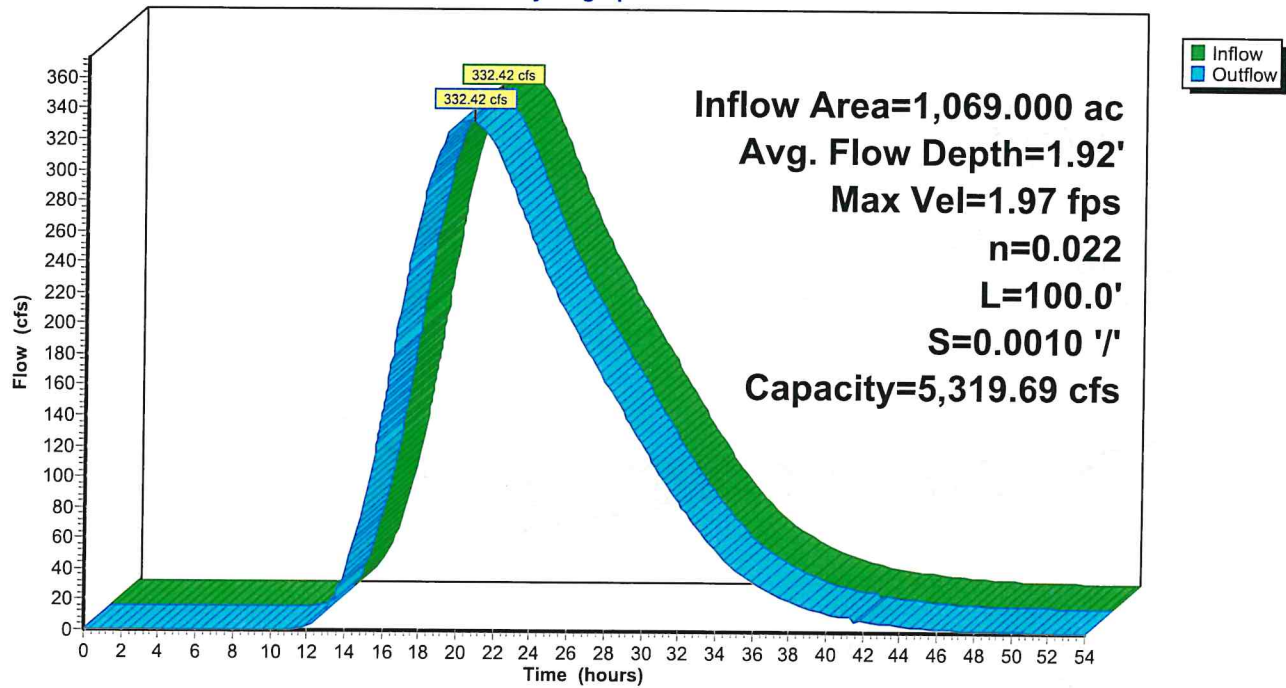
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Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	8.0	0	0.00
1.00	16.9	139.0	1,685	8.82
3.00	407.5	374.1	40,745	921.23
3.70	691.1	437.9	69,111	2,001.05
5.00	1,282.8	474.2	128,278	5,319.69

Reach 12R: L-L

Hydrograph



Summary for Reach 13R: M-M

[87] Warning: Oscillations may require smaller dt or Finer Routing (severity=3)

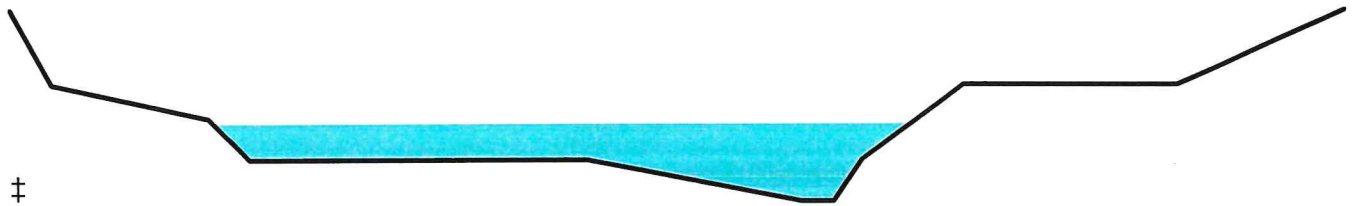
[63] Warning: Exceeded Reach 12R INLET depth by 0.04' @ 20.85 hrs

Inflow Area = 1,069.000 ac, 0.00% Impervious, Inflow Depth > 3.83" for 100-yr event
 Inflow = 332.42 cfs @ 20.76 hrs, Volume= 341.395 af
 Outflow = 332.42 cfs @ 20.77 hrs, Volume= 341.393 af, Atten= 0%, Lag= 0.6 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-54.00 hrs, dt= 0.05 hrs
 Max. Velocity= 2.33 fps, Min. Travel Time= 0.7 min
 Avg. Velocity = 1.26 fps, Avg. Travel Time= 1.3 min

Peak Storage= 14,236 cf @ 20.77 hrs
 Average Depth at Peak Storage= 2.06'
 Bank-Full Depth= 5.10' Flow Area= 728.6 sf, Capacity= 3,275.94 cfs

Custom cross-section, Length= 100.0' Slope= 0.0010 '/' (103 Elevation Intervals)
 Constant n= 0.022 Earth, clean & straight
 Inlet Invert= 138.90', Outlet Invert= 138.80'



Offset (feet)	Elevation (feet)	Chan.Depth (feet)
8.10	144.00	0.00
15.60	142.00	2.00
43.70	141.10	2.90
51.10	140.00	4.00
111.40	140.00	4.00
149.50	138.90	5.10
155.30	138.90	5.10
160.20	140.00	4.00
178.40	142.00	2.00
216.50	142.00	2.00
246.00	144.00	0.00

Depth (feet)	End Area (sq-ft)	Perim. (feet)	Storage (cubic-feet)	Discharge (cfs)
0.00	0.0	5.8	0	0.00
1.10	30.0	109.2	3,003	27.12
2.20	159.6	126.8	15,962	397.50
3.10	289.8	201.2	28,980	789.39
5.10	728.6	238.6	72,860	3,275.94

Reach 13R: M-M

Hydrograph

