



Watershed Transfer Memo

Date: Monday, May 13, 2024

Project: John Glenn Columbus International Airport New Midfield Terminal

To: Mr. Greg Fedner

Subject: Mason Run Watershed Transfer

Introduction

The current terminal at John Glenn International Airport (CMH) opened on September 21, 1958. The age of the existing facility and related infrastructure, combined with a current terminal capacity of 10 million annual passengers and the need to prepare for the future, necessitates construction of a new terminal at CMH.

Watershed Transfer Analysis

The new terminal location, which was analyzed and approved through an Environmental Assessment, will be located within the Mason Run and Turkey Run watersheds. It is not feasible to maintain the existing watershed boundaries because of the grading required for the New Midfield Terminal and the surrounding apron pavement. As a result of this, a portion of the Mason Run watershed will be transferred to the Turkey Run watershed. The impacted area is 106-acres.

New stormwater controls will be installed as a part of the overall project. These controls will reduce the flow rates of stormwater leaving the airport. As shown in Table 1, the estimated peak flow rates of rainwater runoff in both the Mason Run and Turkey Run watersheds will be reduced because of the new rainwater controls installed with the New Midfield Terminal. Both watersheds will have their 100-year storm event below the pre-development levels for a 10-year storm event at the downstream release point from the proposed stormwater management facilities.

Table 1: Estimated Peak flow due to 100-year and 10-year storm events

Storm Event	Turkey Run		Mason Run	
	Pre-construction	Post-construction	Pre-construction	Post-construction
	cubic feet per second	cubic feet per second	cubic feet per second	cubic feet per second
10-year	255	180	219	144
100-year	235	209	232	186



As part of the planning study for the new terminal, an Environmental Assessment was conducted in accordance with federal and state standards and regulations to determine the proposed location of the new passenger terminal.

The new terminal location that was determined by that study is located within the Mason Run and Turkey Run watersheds. It is not feasible to maintain the existing watershed boundaries because of the grading required for the New Midfield Terminal and surrounding apron pavement. As a result, a portion of the Mason Run watershed will be transferred to the Turkey Run watershed. The impacted area is 106 acres.

Table 2 lists pre- and post-tributary watersheds and corresponding impervious surfaces for each condition.

Table 2: Watershed Area Summary for Areas Affected by New Midfield Terminal Development

Impacted Watershed*	Pre-Construction area		Post-Construction area		Notes
	Total area	Pavement area	Total area	Pavement area	
	acres	acres	acres	acres	
Mason Run	142	90	36	33	Flow to be controlled by the proposed Midfield Terminal Mason Run Detention
Turkey Run	54	19	160	136	Flow controlled by the proposed Midfield Terminal Turkey Run Detention.
Total	196	144	196	174	

Stormwater Management Facilities

The City of Columbus has specific requirements that guide the impacts of stormwater drainage. The airport must comply with these requirements as it considers the design and infrastructure of the new passenger terminal.

The airport has a variety of control structures to manage stormwater drainage, including detention basins that provide long-term treatment of stormwater.

Table 3 lists pre- and post-detention basins and their corresponding sizes.



Table 3: Stormwater Management Basins serving Stormwater Drainage for CMH airport for Pre- and Post-Construction

Basin ID	Pre-Construction Volume (acre-feet)	Post-Construction Volume (acre-feet)	Notes
Turkey Run Detention Basin	107	107	Existing basin
*CONRAC facility Basin	9.7	9.7	Existing basin
Midfield Terminal Turkey Run Basin	Does not exist before construction	31.8	Proposed basin
Midfield Terminal Mason Run Basin	Does not exist before construction	8.4	Proposed basin
Big Walnut Basin	Does not exist before construction	6.8	Proposed basin
Red Lot Underground storage	14.5	14.5	Existing Basin

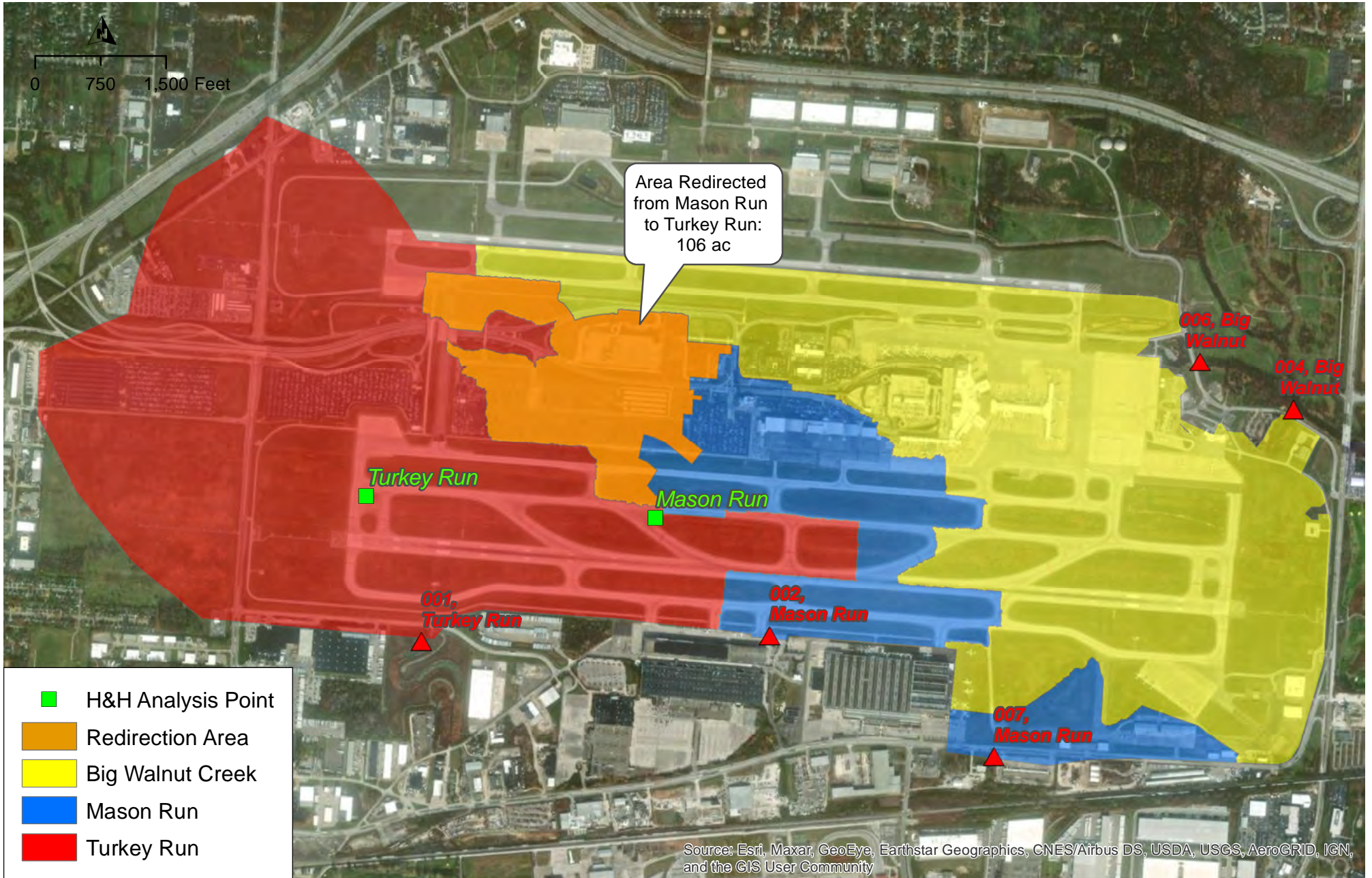
* CONRAC: Consolidated Rental Car Facility

Stormwater Management Benefits

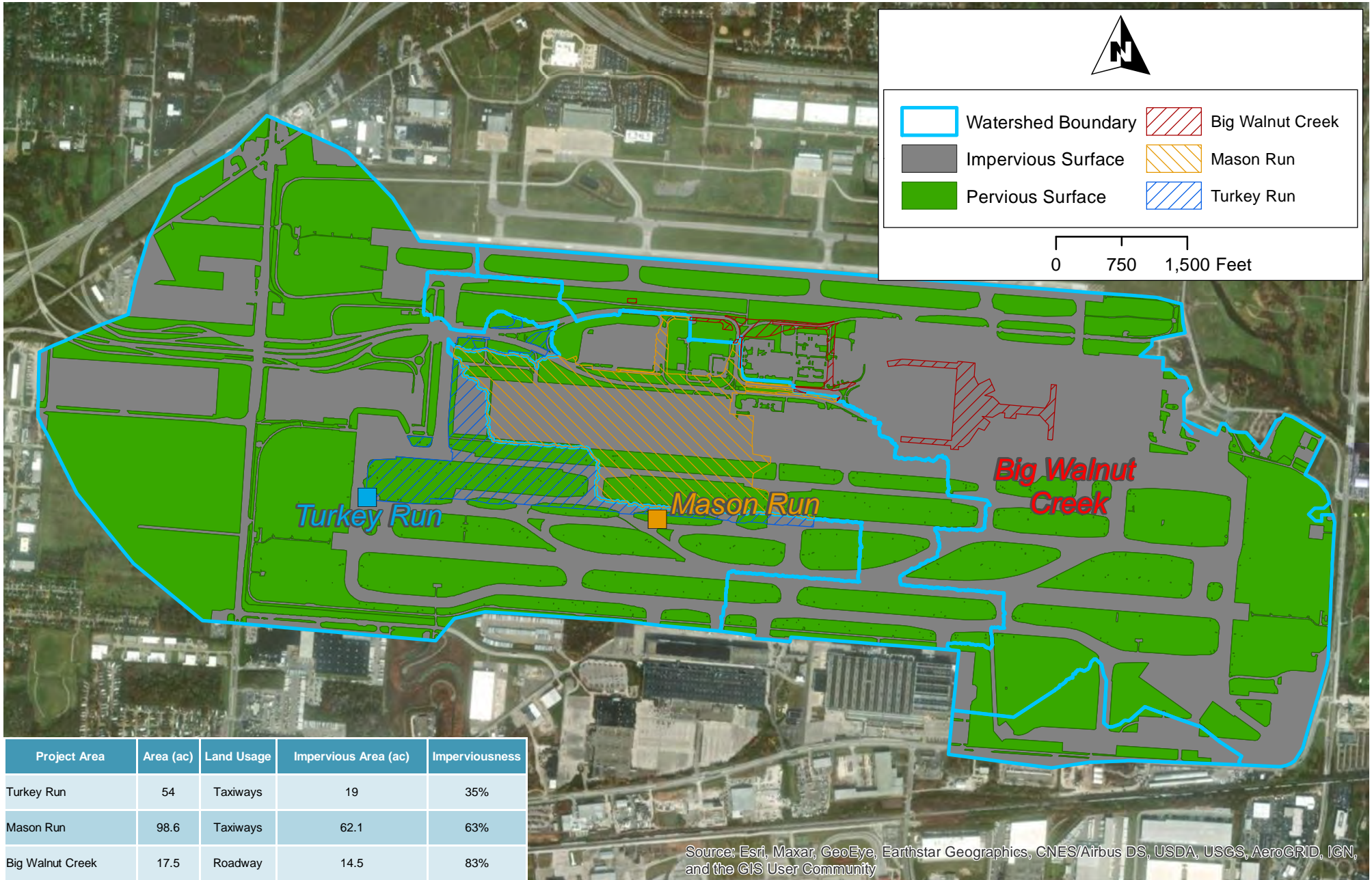
The relocation of the drainage pipe and the changes to the Mason Run and Turkey Run watersheds will provide multiple benefits to both watersheds, specifically:

- Reduced velocity of runoff in both watersheds;
- Reduced degradation of downstream channels in both watersheds;
- Reduced impervious surfaces in the Mason Run watershed;
- Reduced tributary flow in both watersheds;
- New stormwater detention basins to store more rainwater runoff on the airport; and
- Improved water quality in both watersheds.

Appendix A



**APPENDIX A-1 - PROPOSED WATERSHED REDIRECTION
60% DESIGN - DRAFT/REVIEW EXHIBIT**

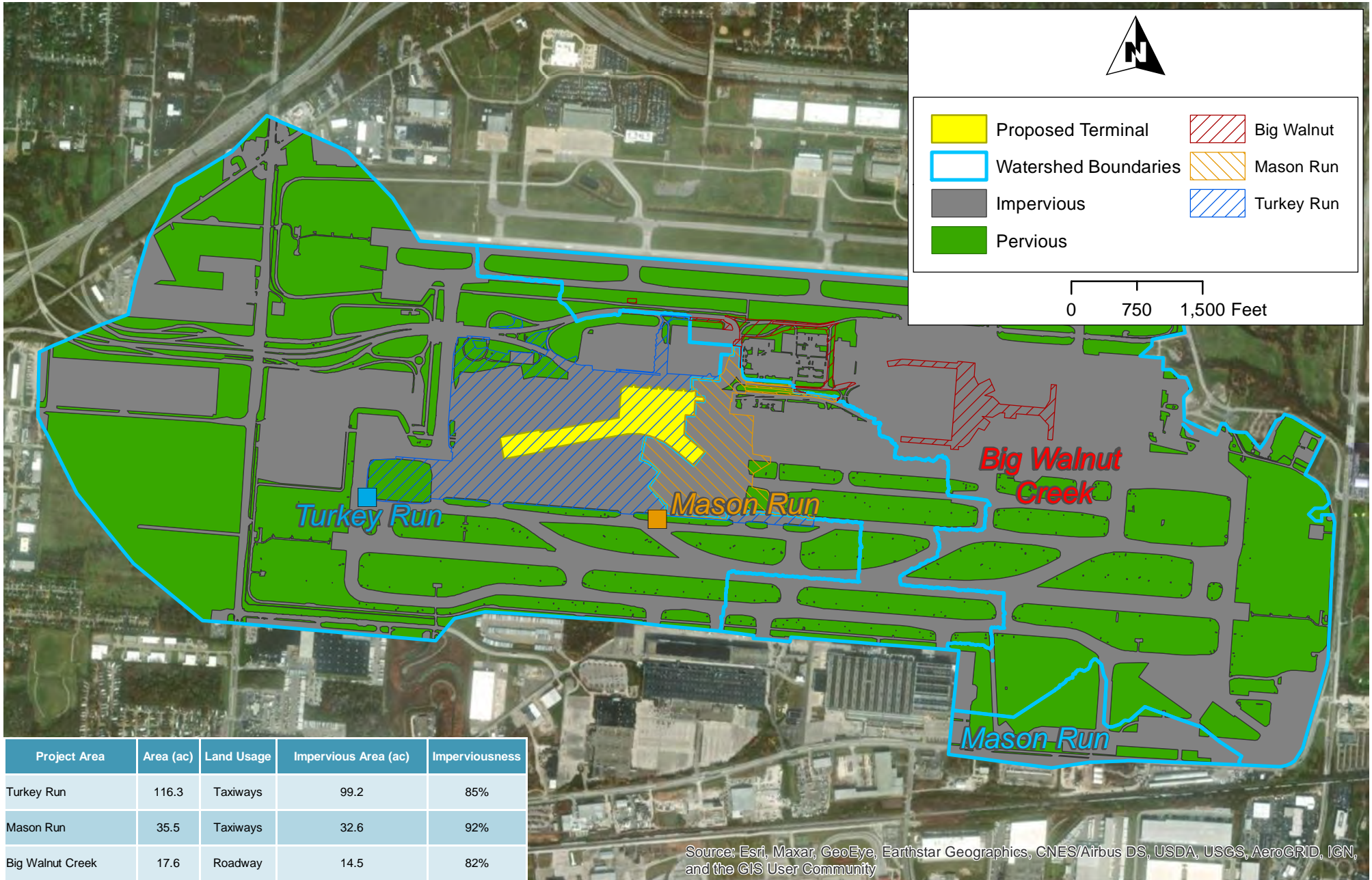


Project Area	Area (ac)	Land Usage	Impervious Area (ac)	Imperviousness
Turkey Run	54	Taxiways	19	35%
Mason Run	98.6	Taxiways	62.1	63%
Big Walnut Creek	17.5	Roadway	14.5	83%

Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



**APPENDIX A-2 - EXISTING IMPERVIOUS AREA
60% DESIGN - DRAFT/REVIEW EXHIBIT**

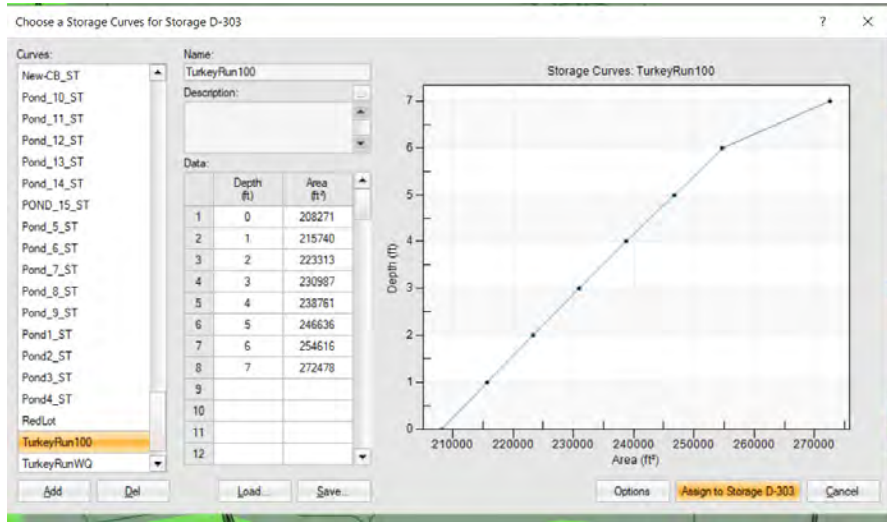


Project Area	Area (ac)	Land Usage	Impervious Area (ac)	Imperviousness
Turkey Run	116.3	Taxiways	99.2	85%
Mason Run	35.5	Taxiways	32.6	92%
Big Walnut Creek	17.6	Roadway	14.5	82%

Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

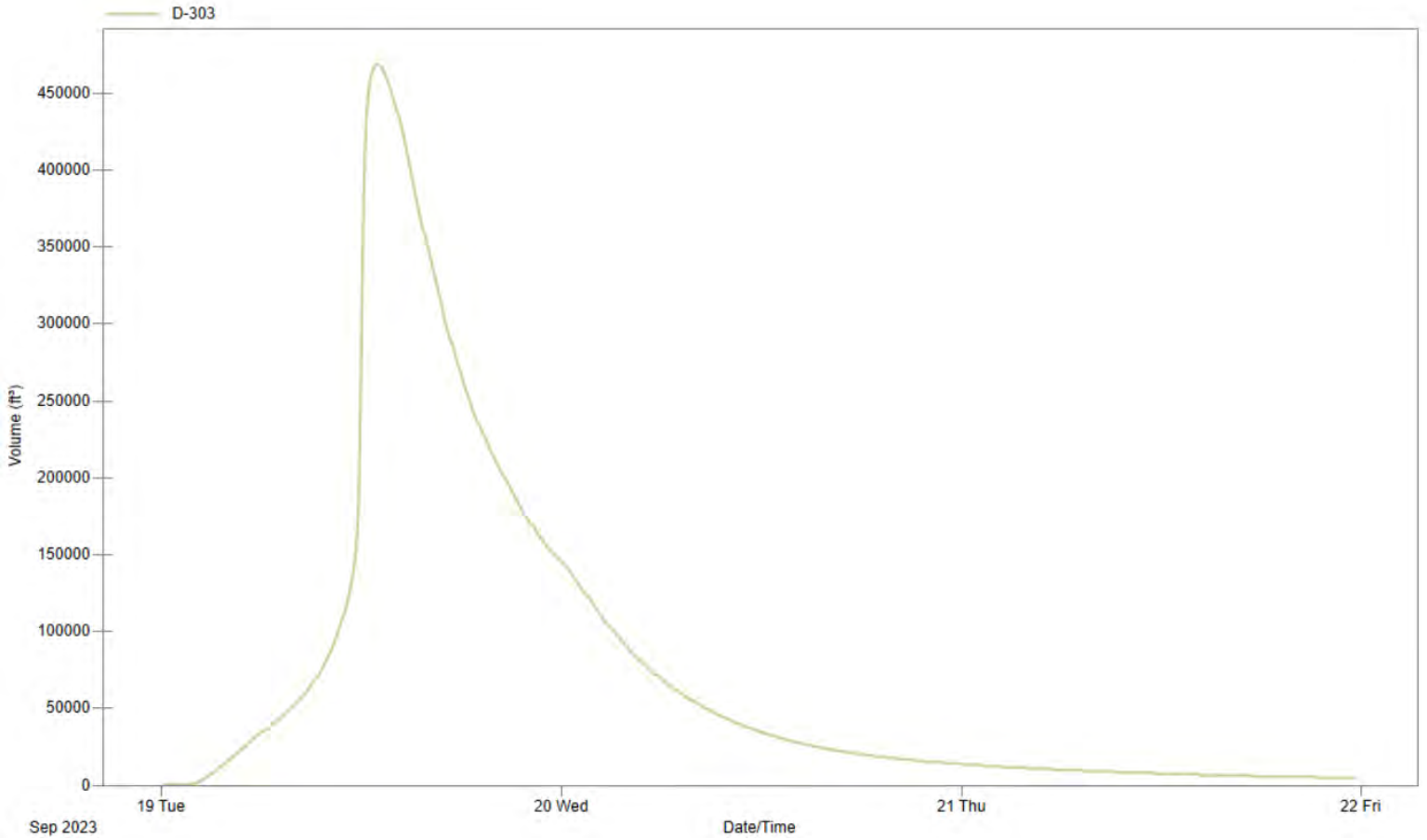


**APPENDIX A-3 - PROPOSED IMPERVIOUS AREA
60% DESIGN - DRAFT/REVIEW EXHIBIT**

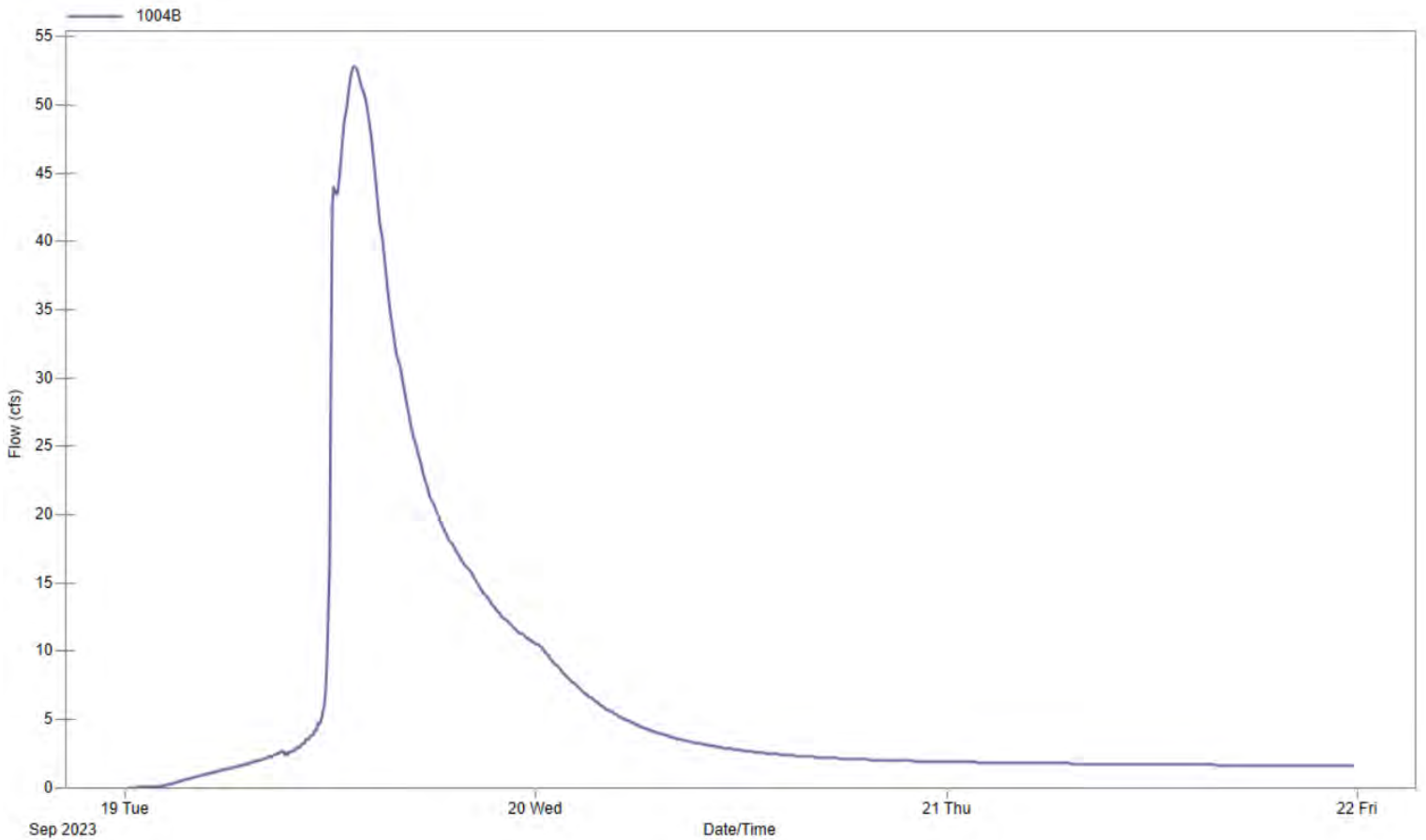


Midfield Turkey Run Storage Curve

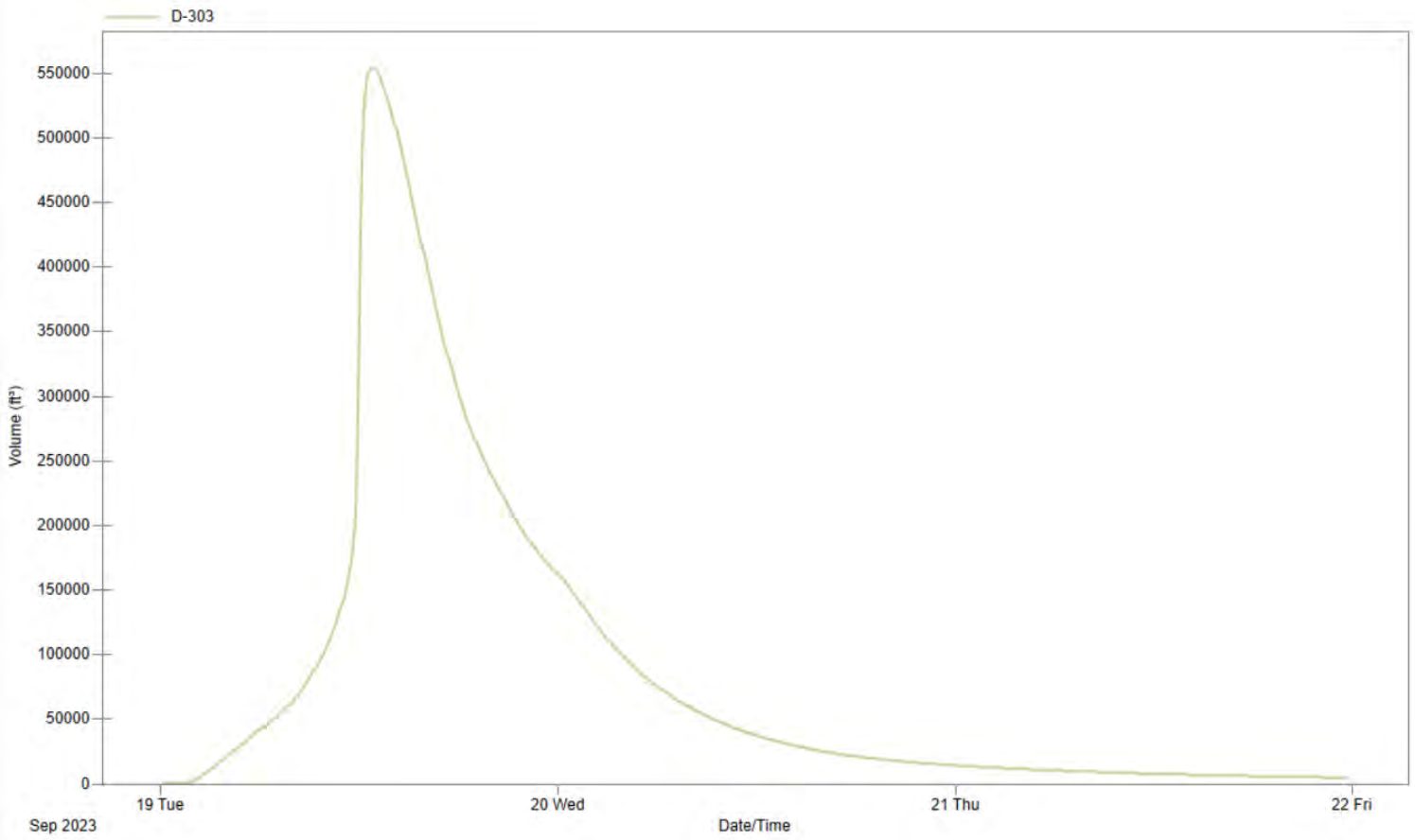
Turkey Run 1-year Stage-Storage



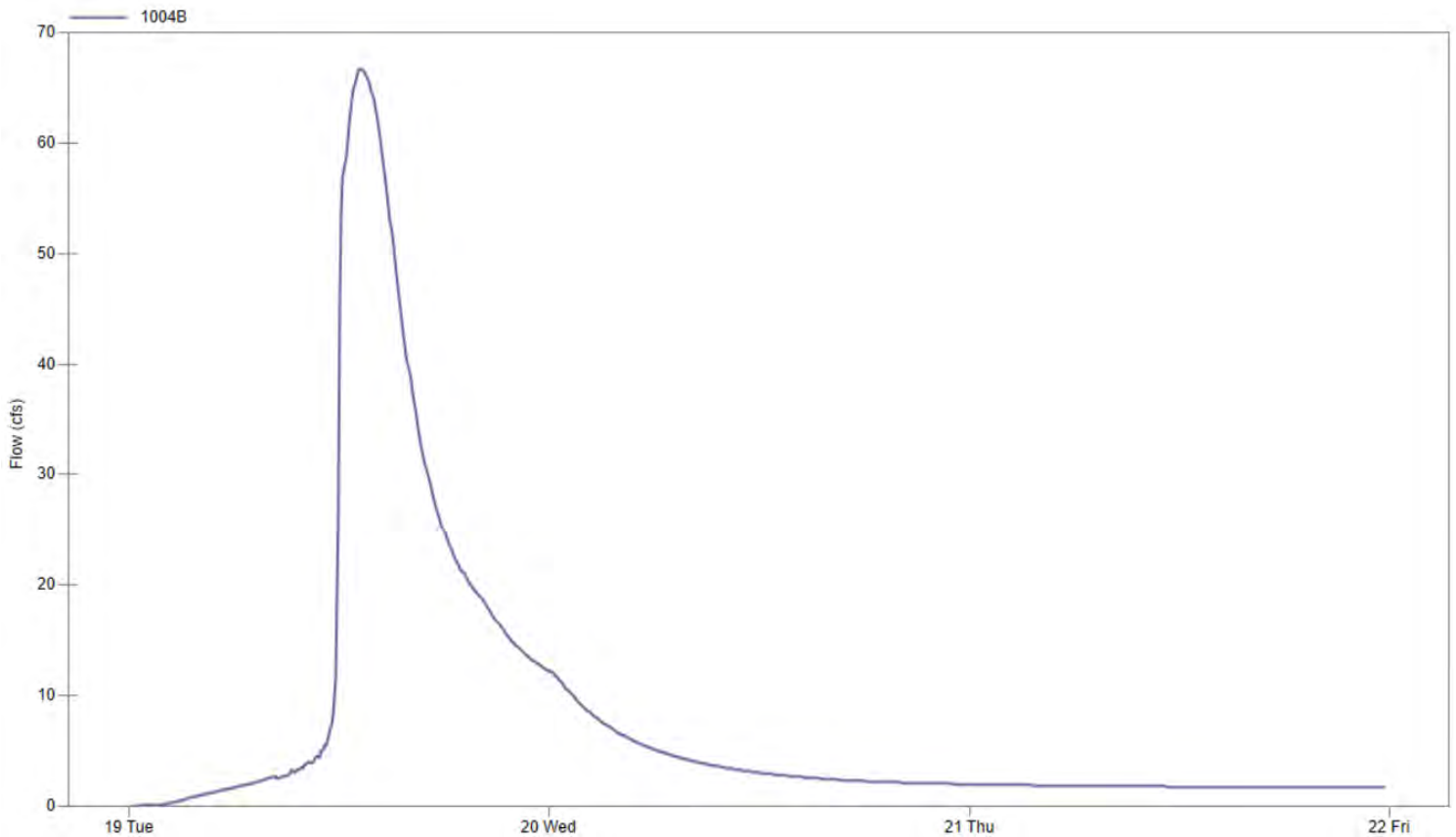
Turkey Run 1-year Release Rate at comparison point (double conduit)



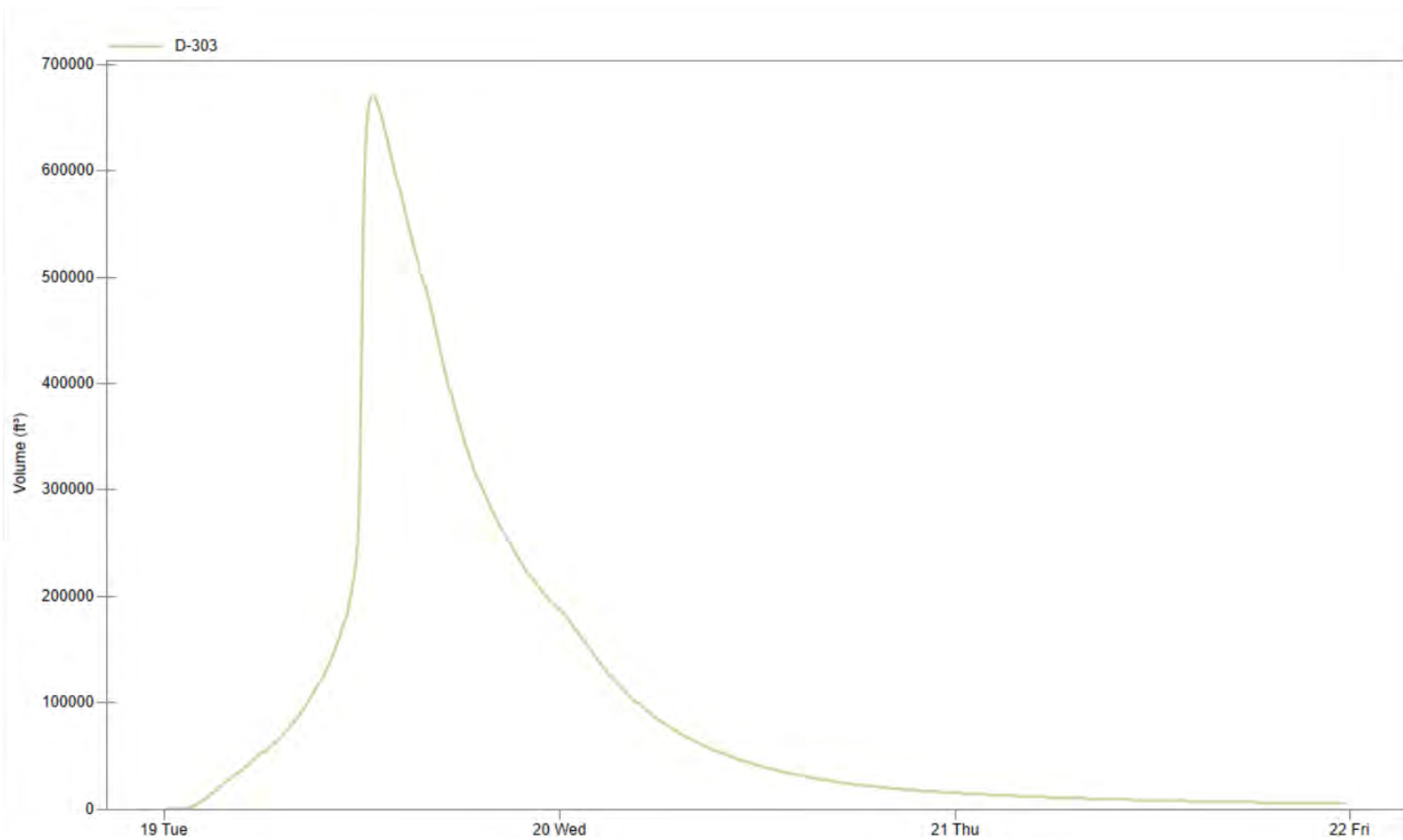
Turkey Run 2-year Stage-Storage



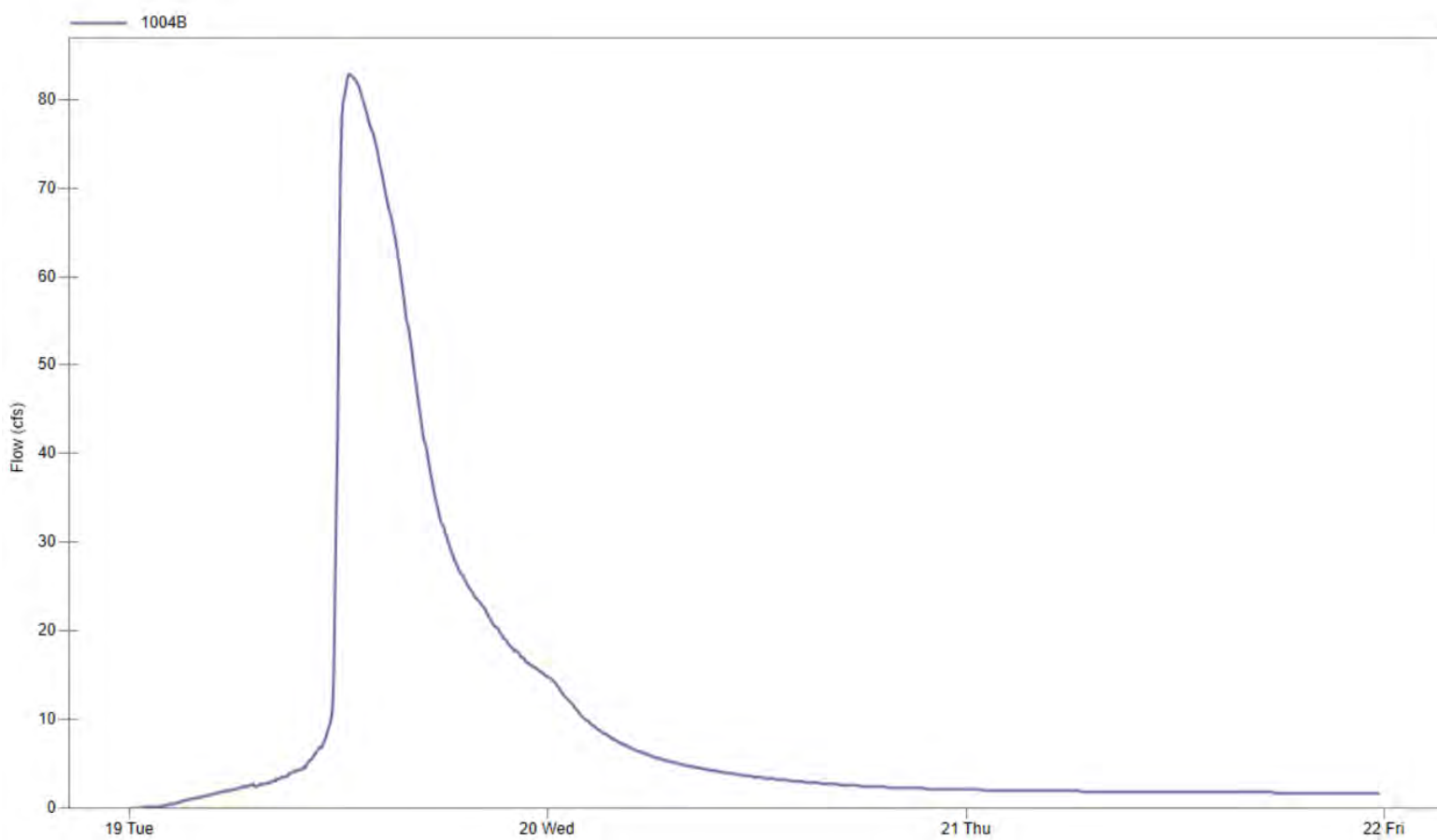
Turkey Run 2-year Release Rate at comparison point (double conduit)



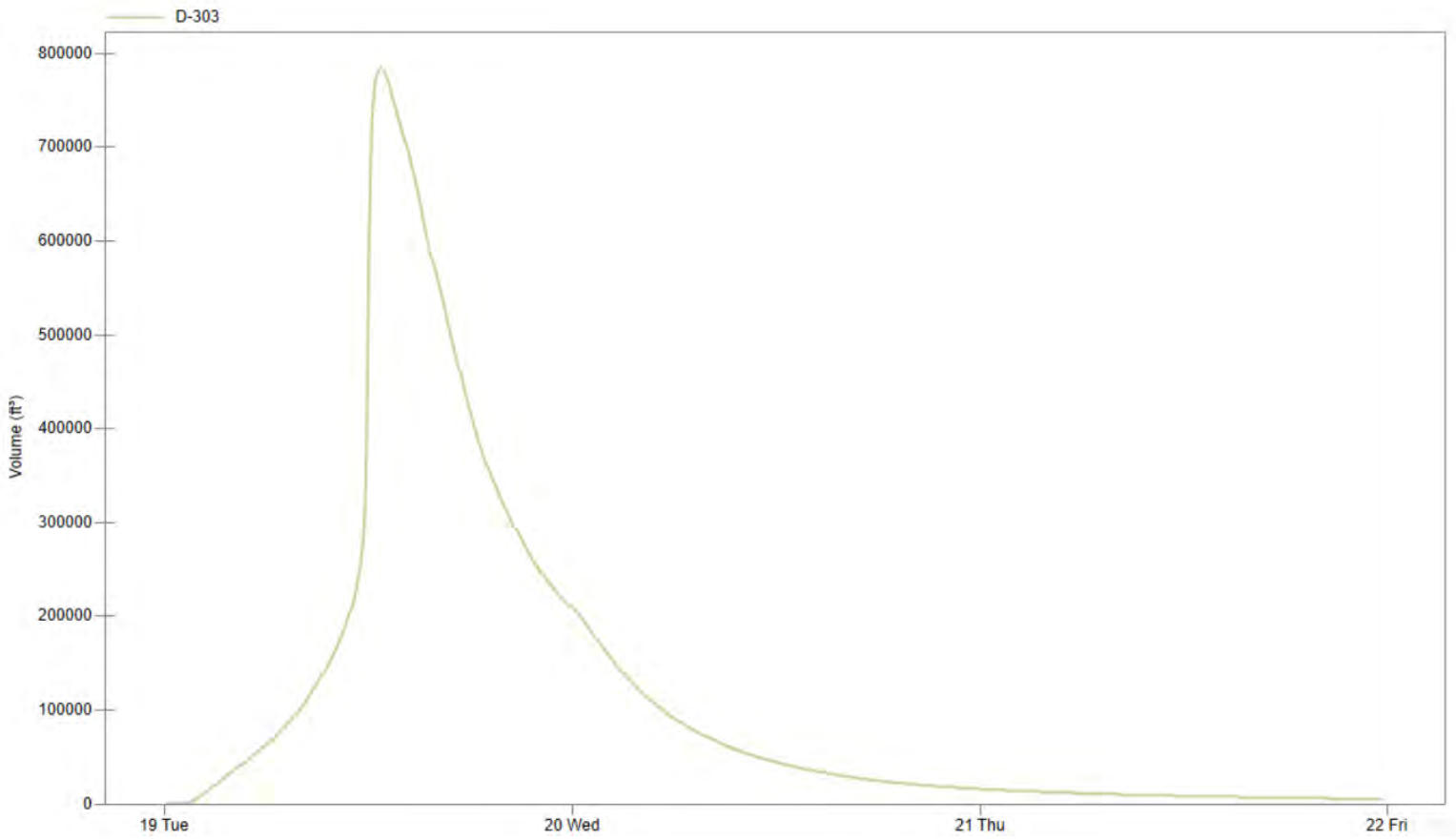
Turkey Run 5-year Stage-Storage



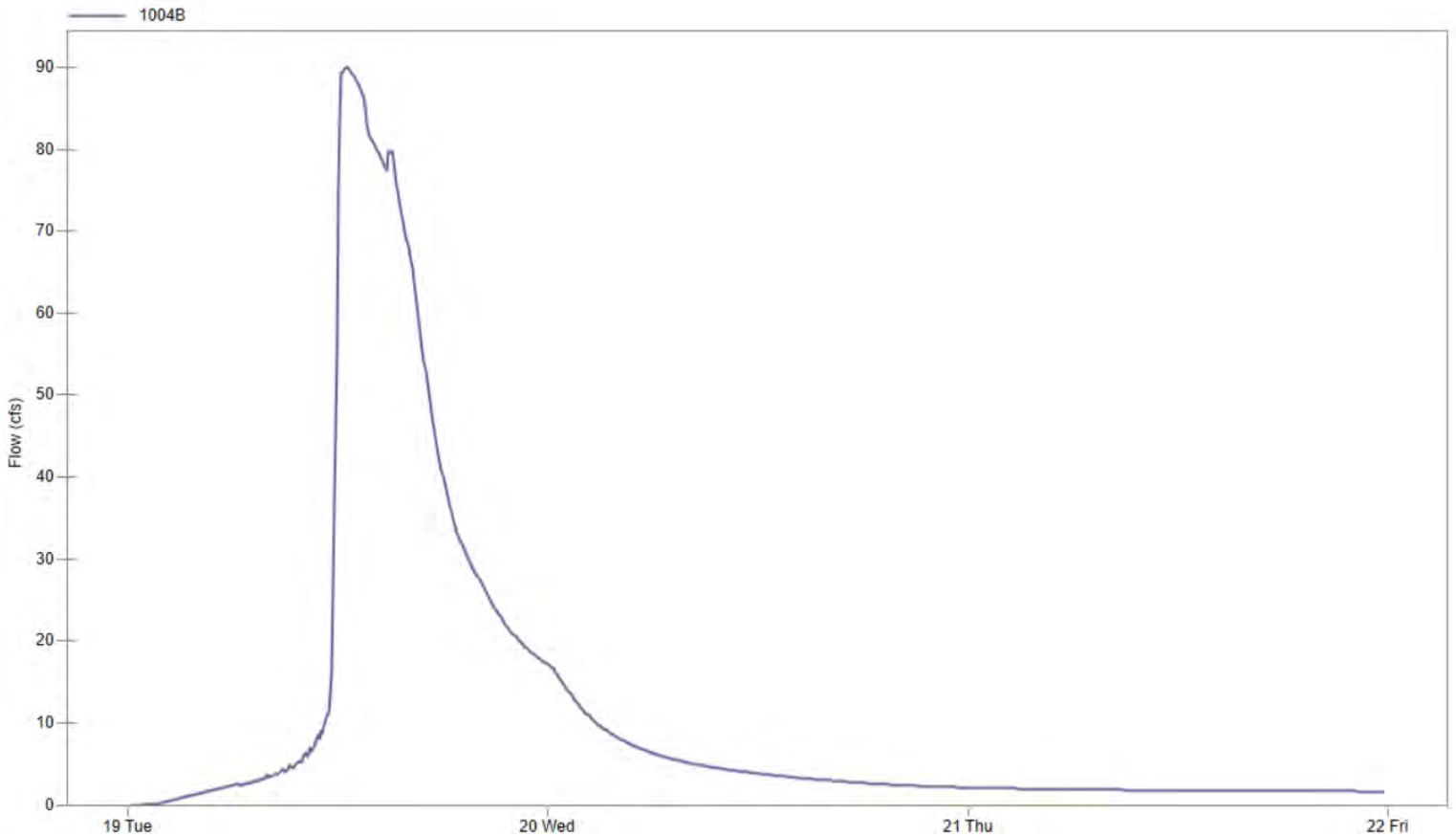
Turkey Run 5-year Release Rate at comparison point (double conduit)



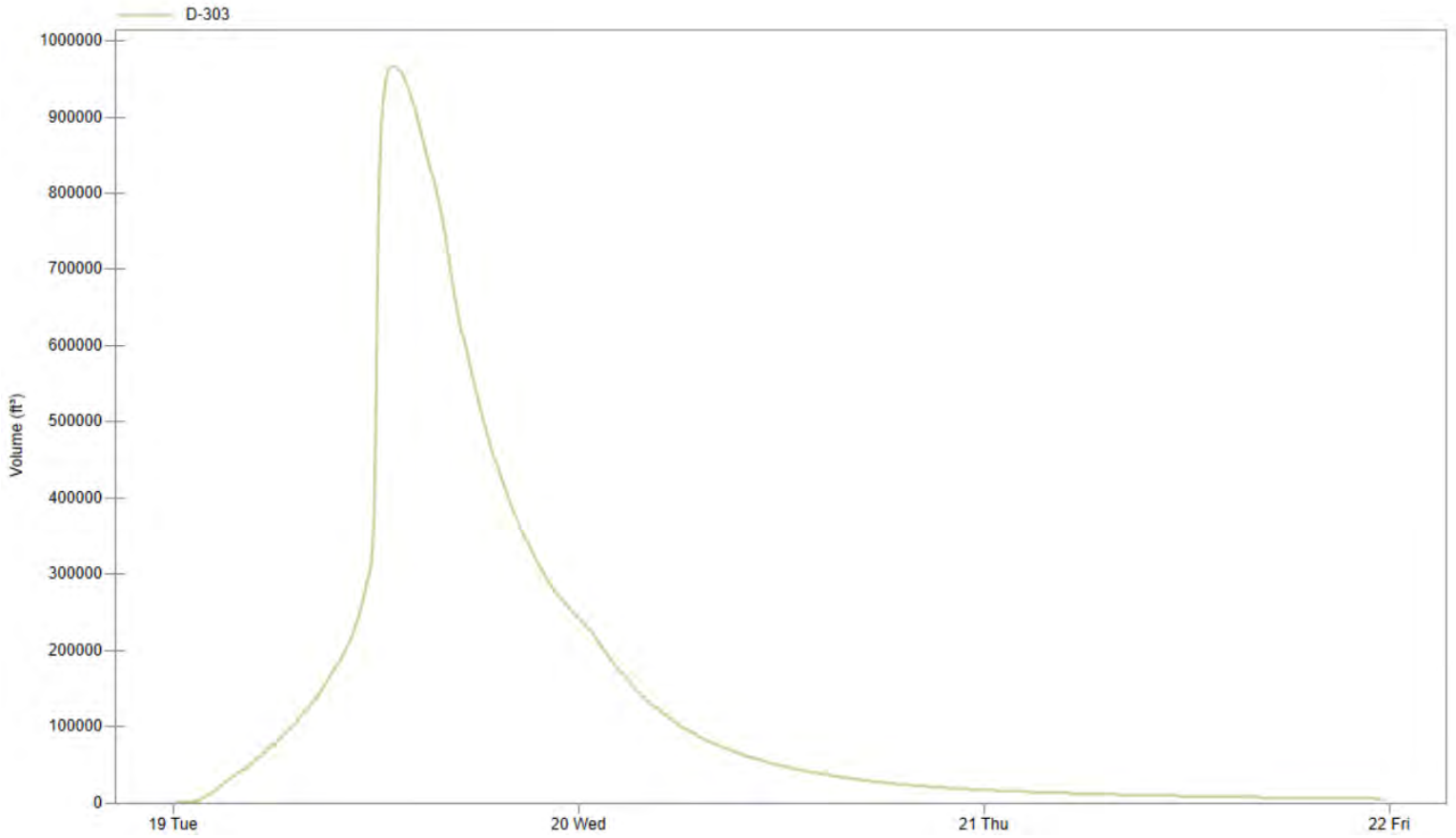
Turkey Run 10-year Stage-Storage



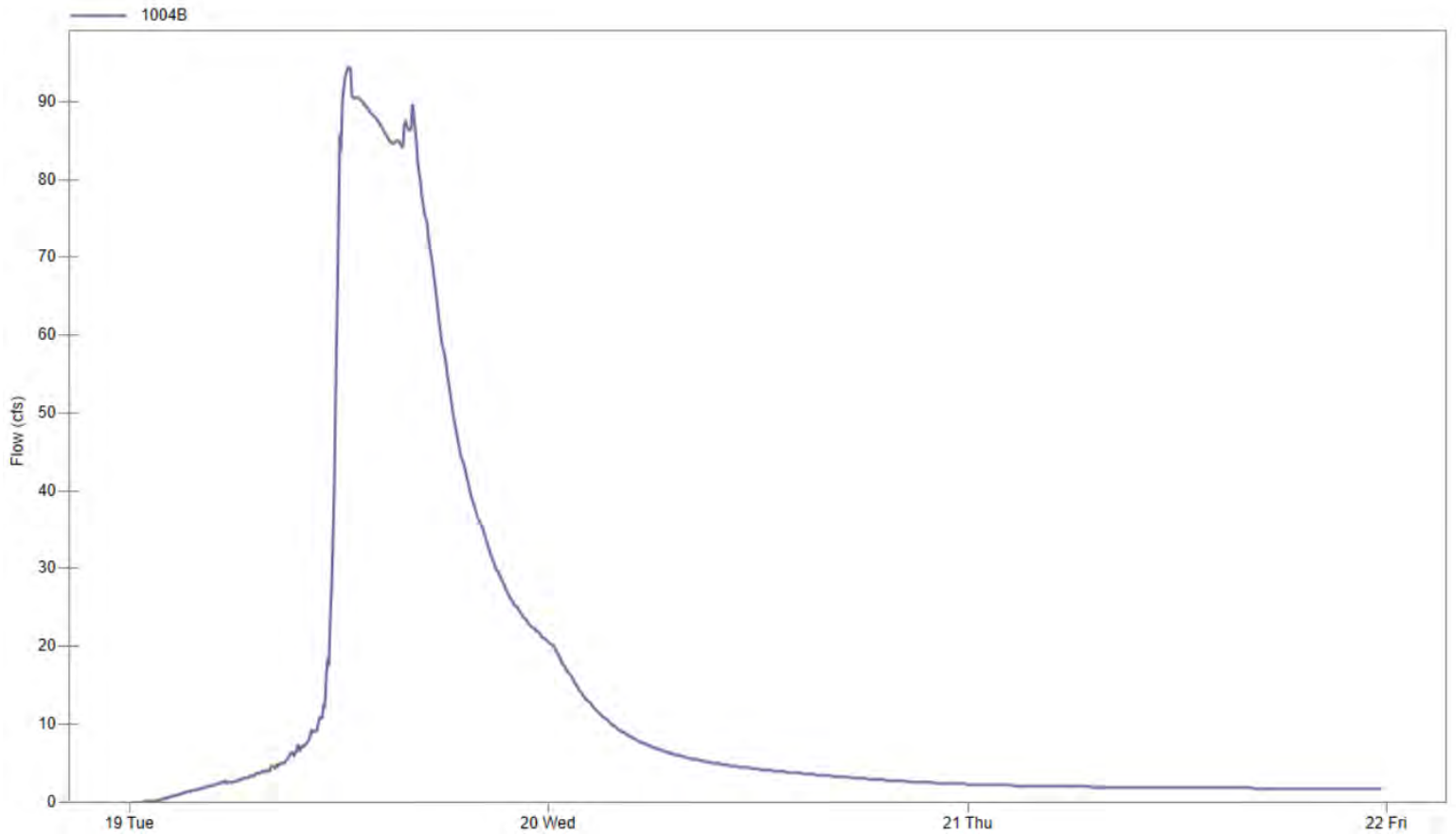
Turkey Run 10-year Release Rate at comparison point (double conduit)



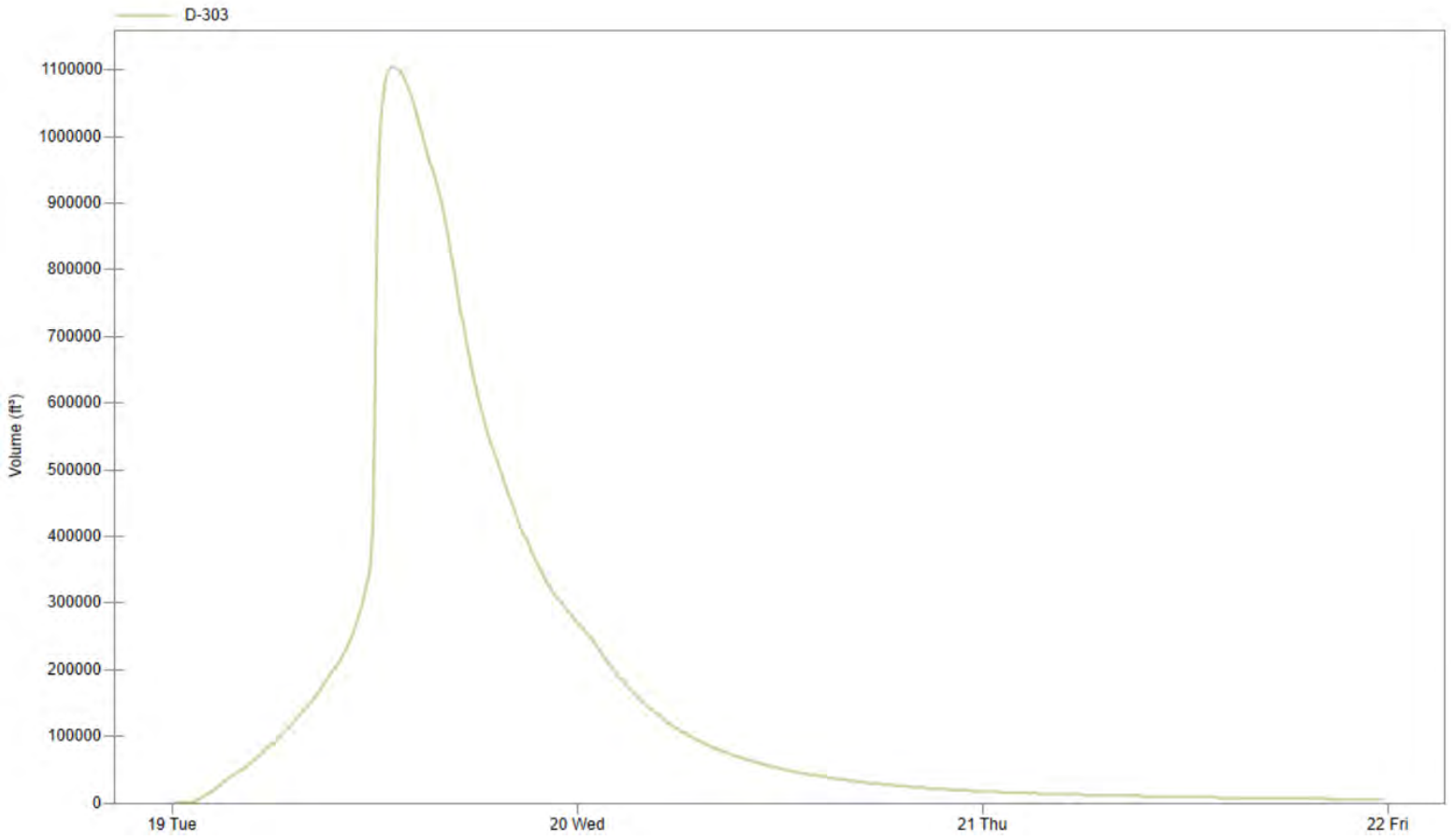
Turkey Run 25-year Stage-Storage



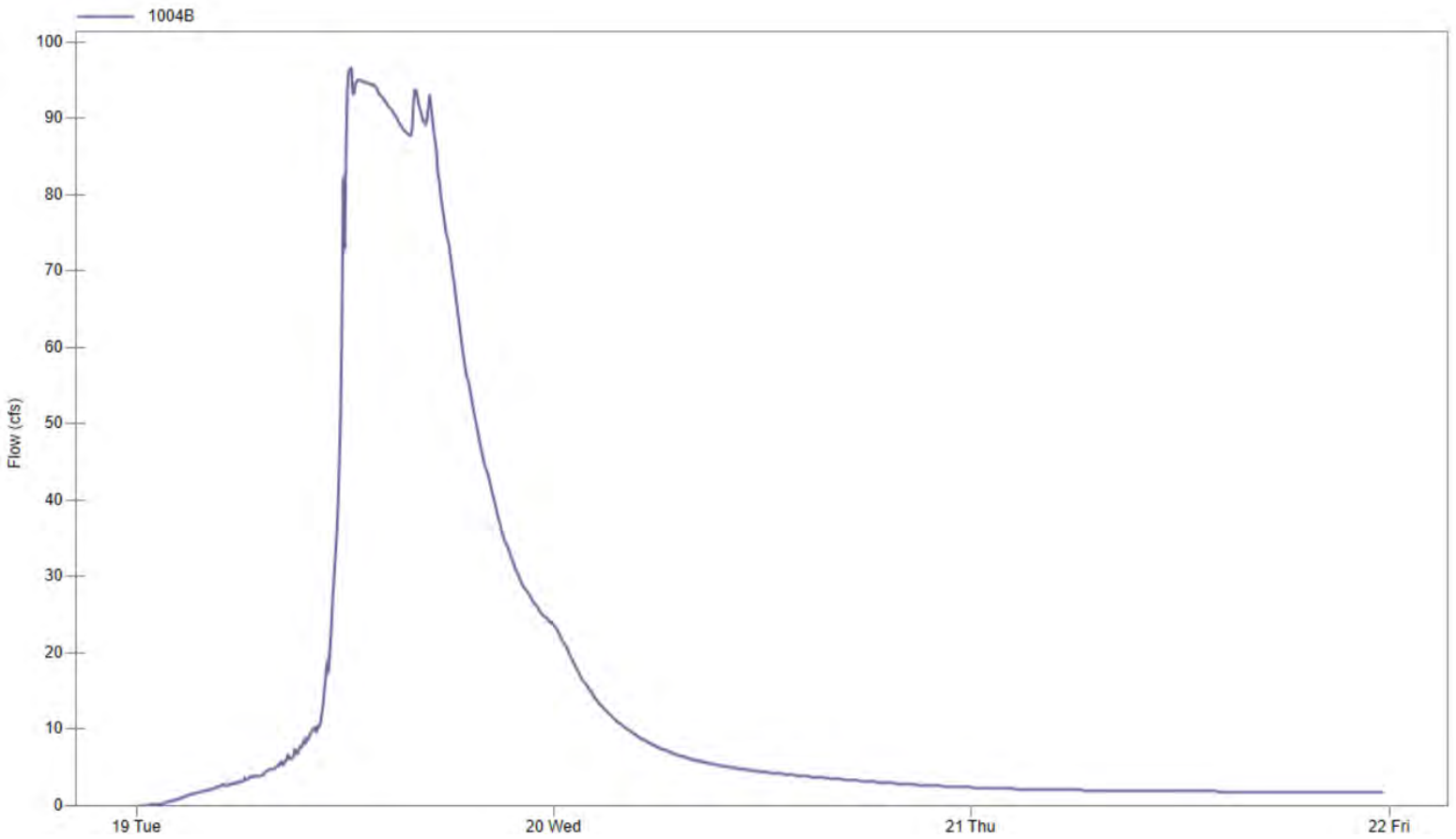
Turkey Run 25-year Release Rate at comparison point (double conduit)



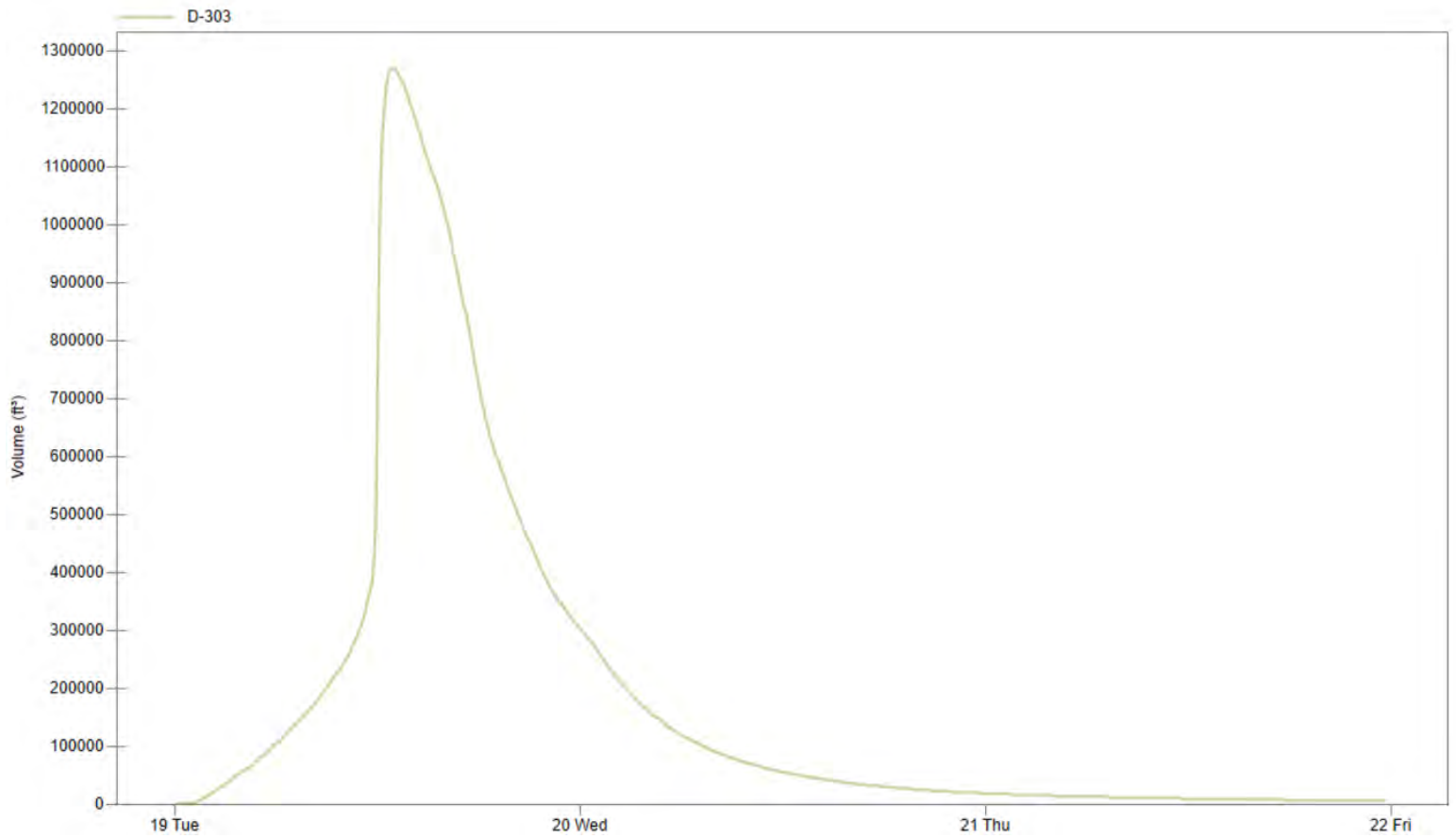
Turkey Run 50-year Stage-Storage



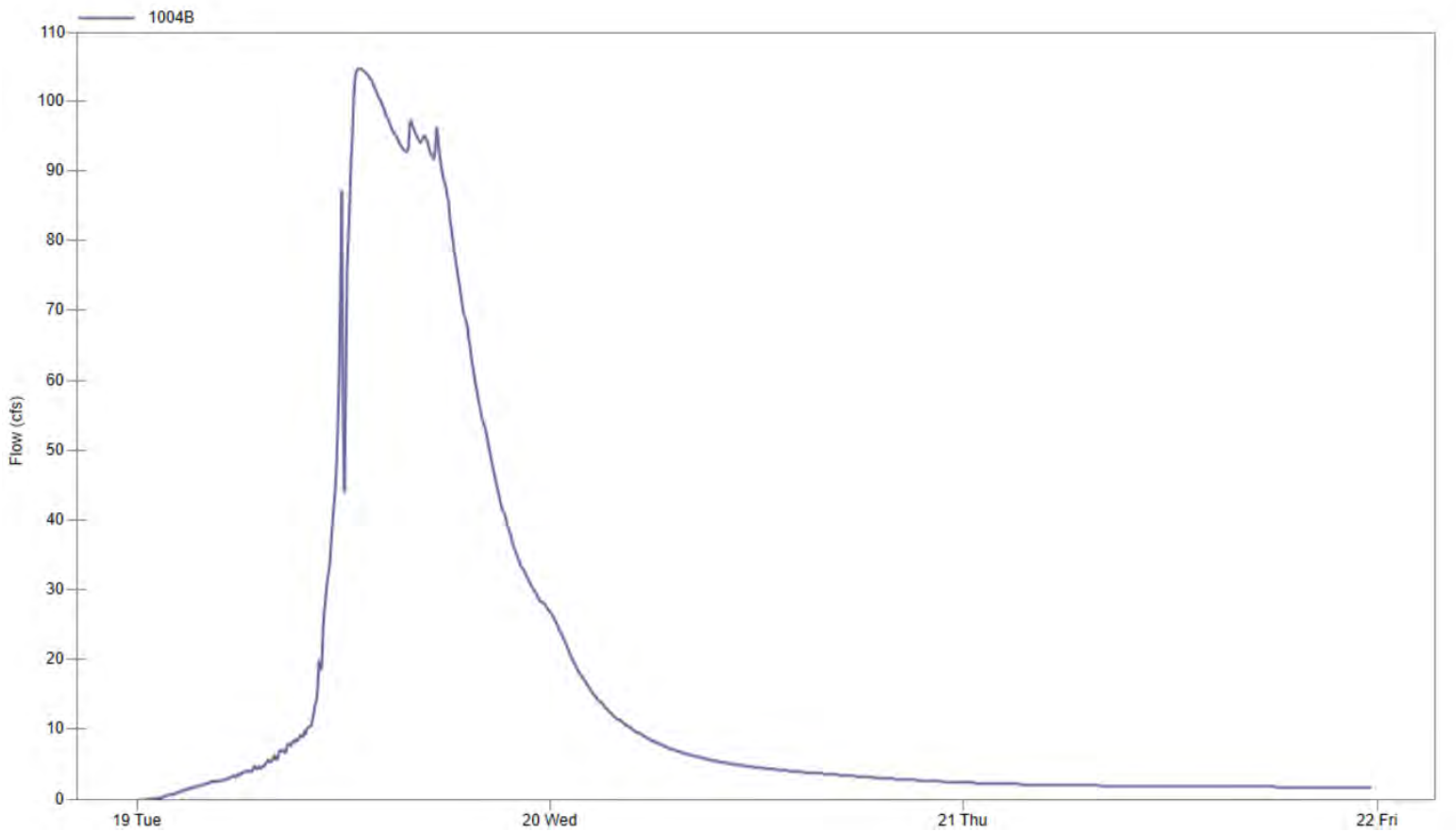
Turkey Run 50-year Release Rate at comparison point (double conduit)

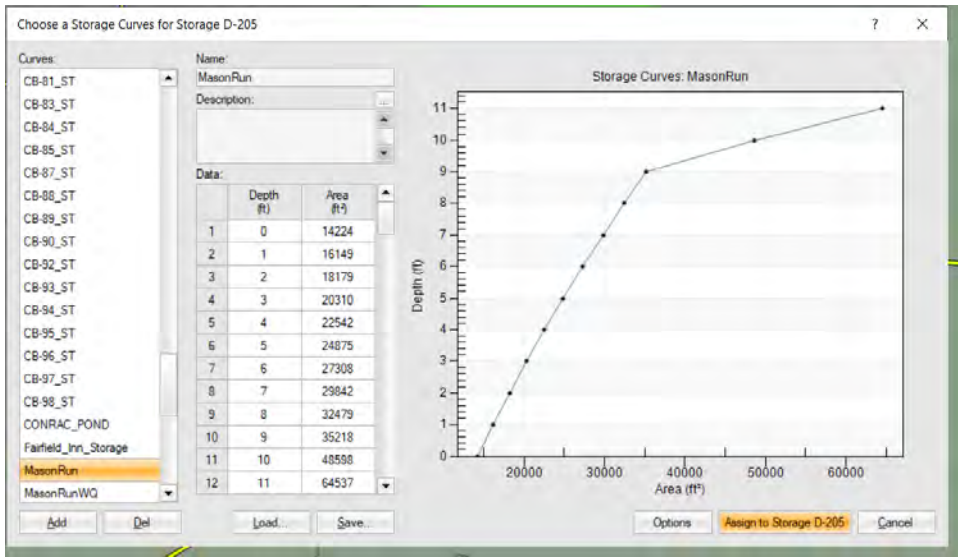


Turkey Run 100-year Stage-Storage



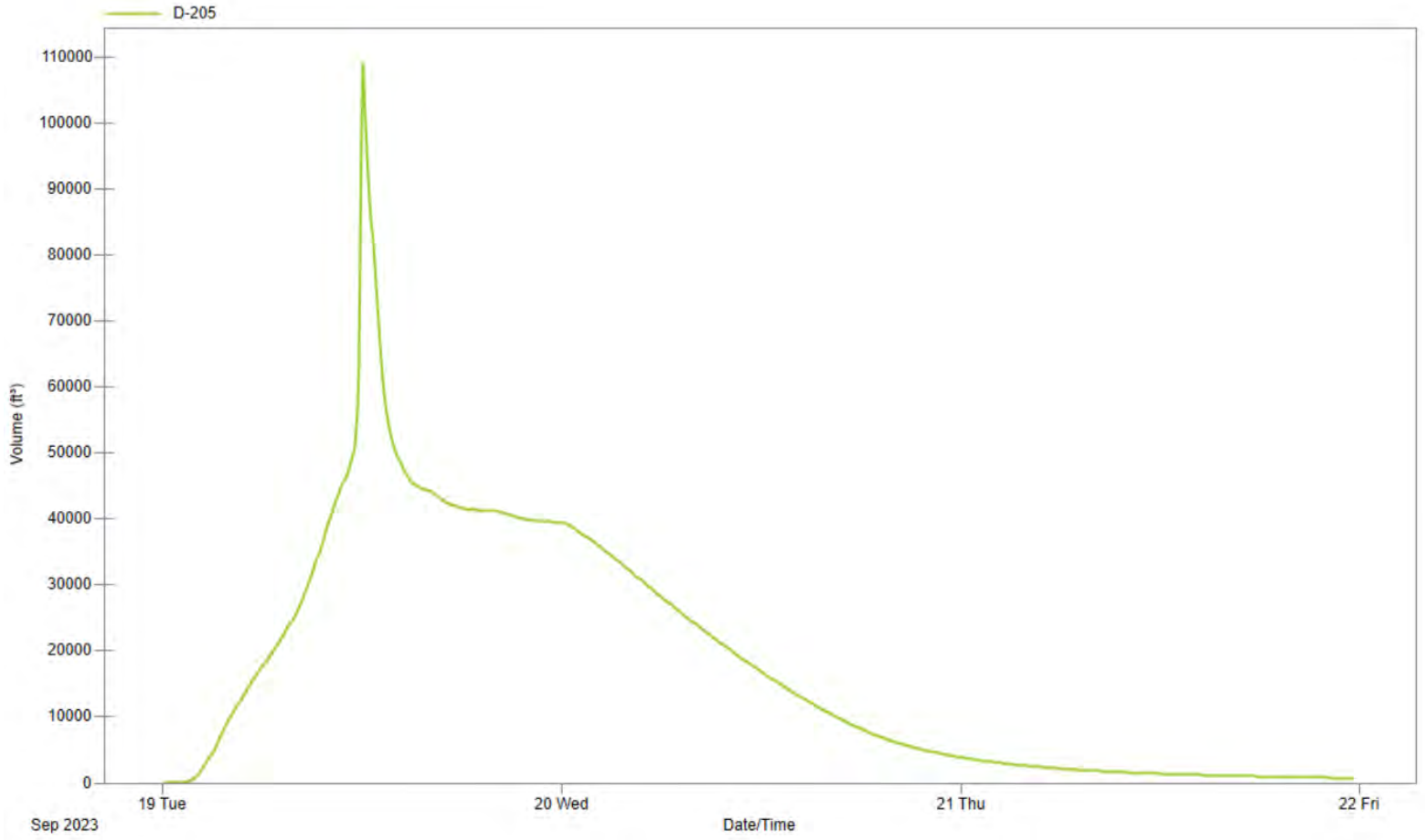
Turkey Run 100-year Release Rate at comparison point (double conduit)



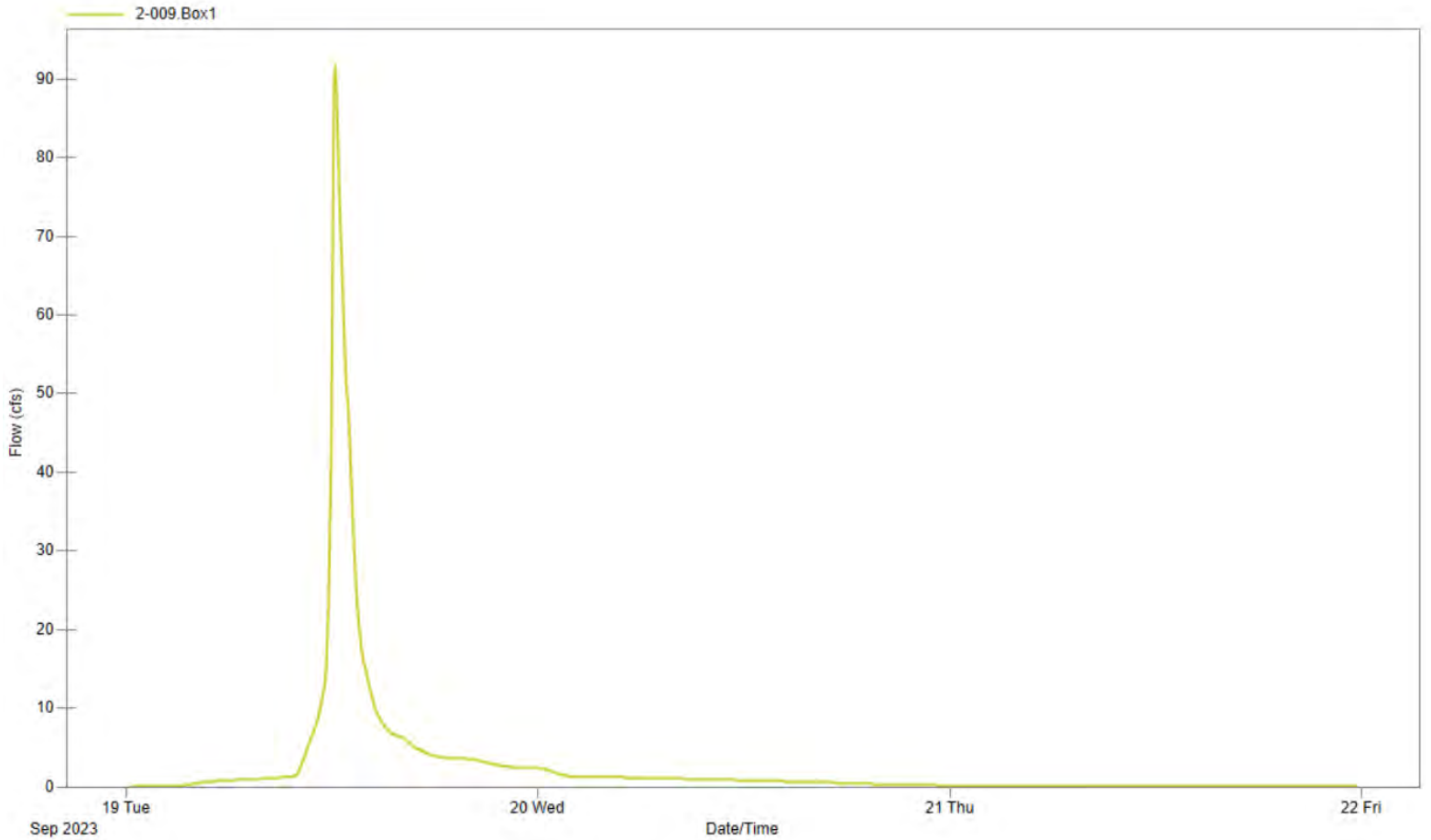


Mason Run Storage Curve

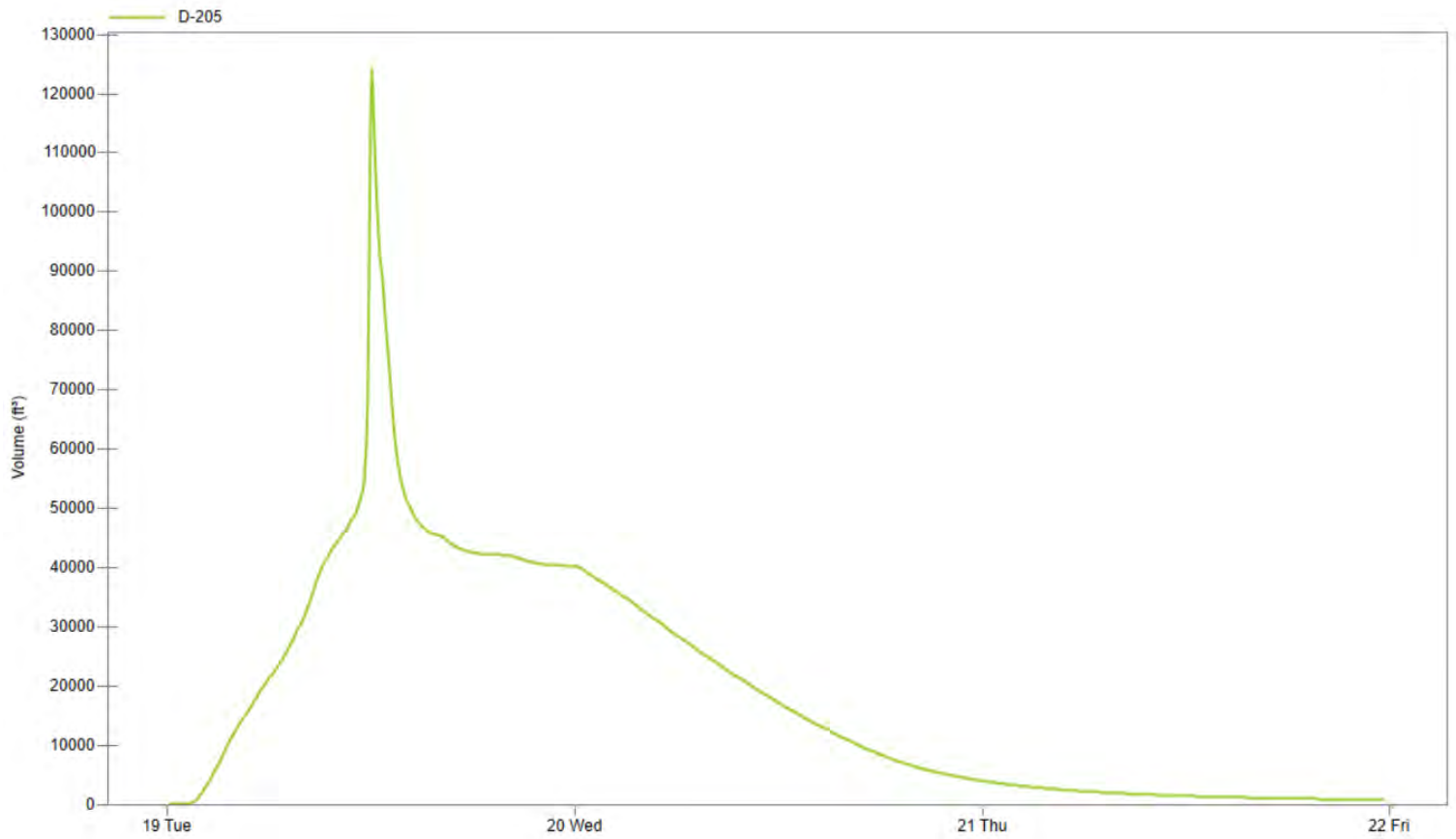
Mason Run 1-year Stage-Storage



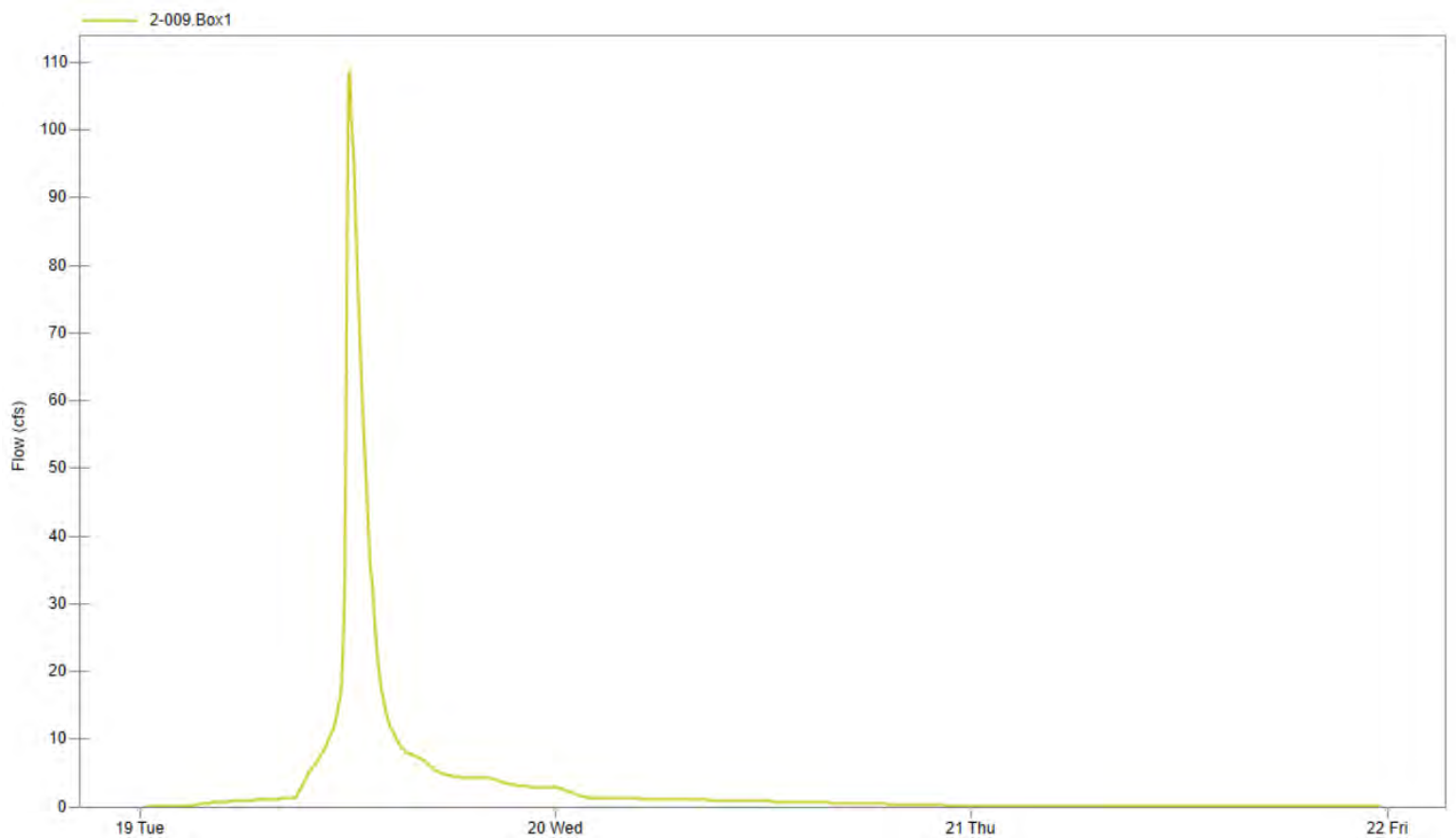
Mason Run 1-year Release Rate at comparison point



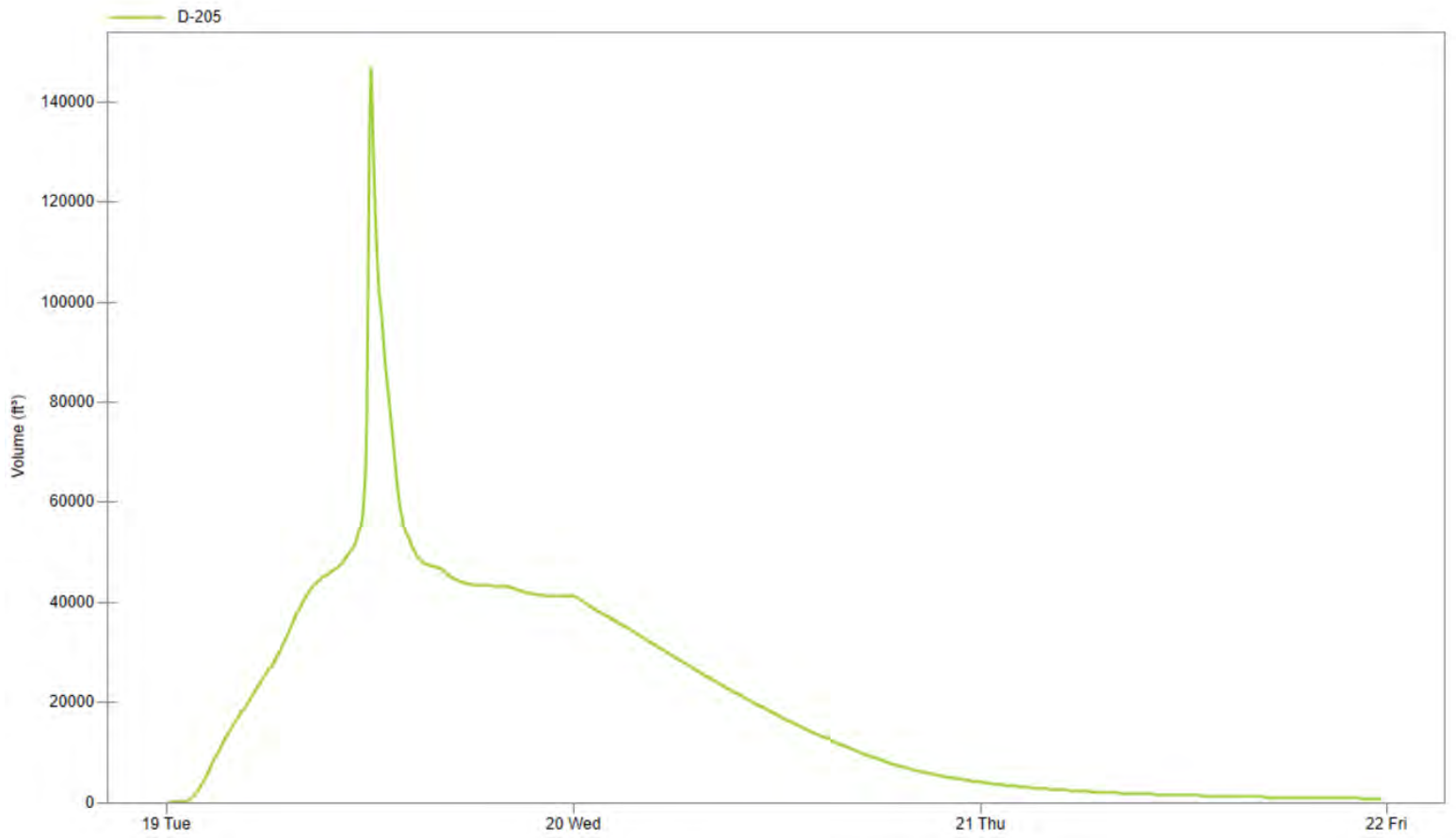
Mason Run 2-year Stage-Storage



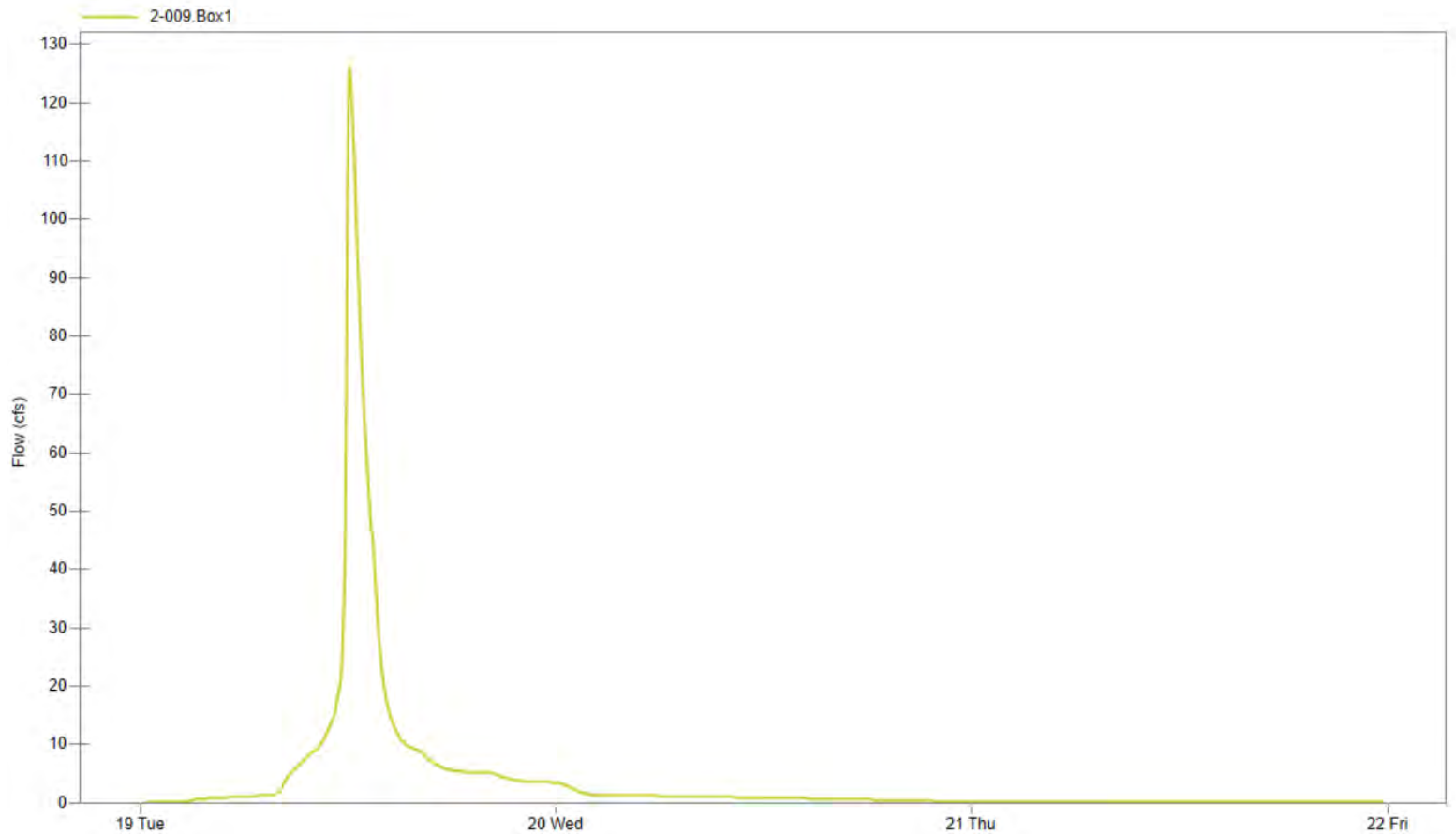
Mason Run 2-year Release Rate at comparison point



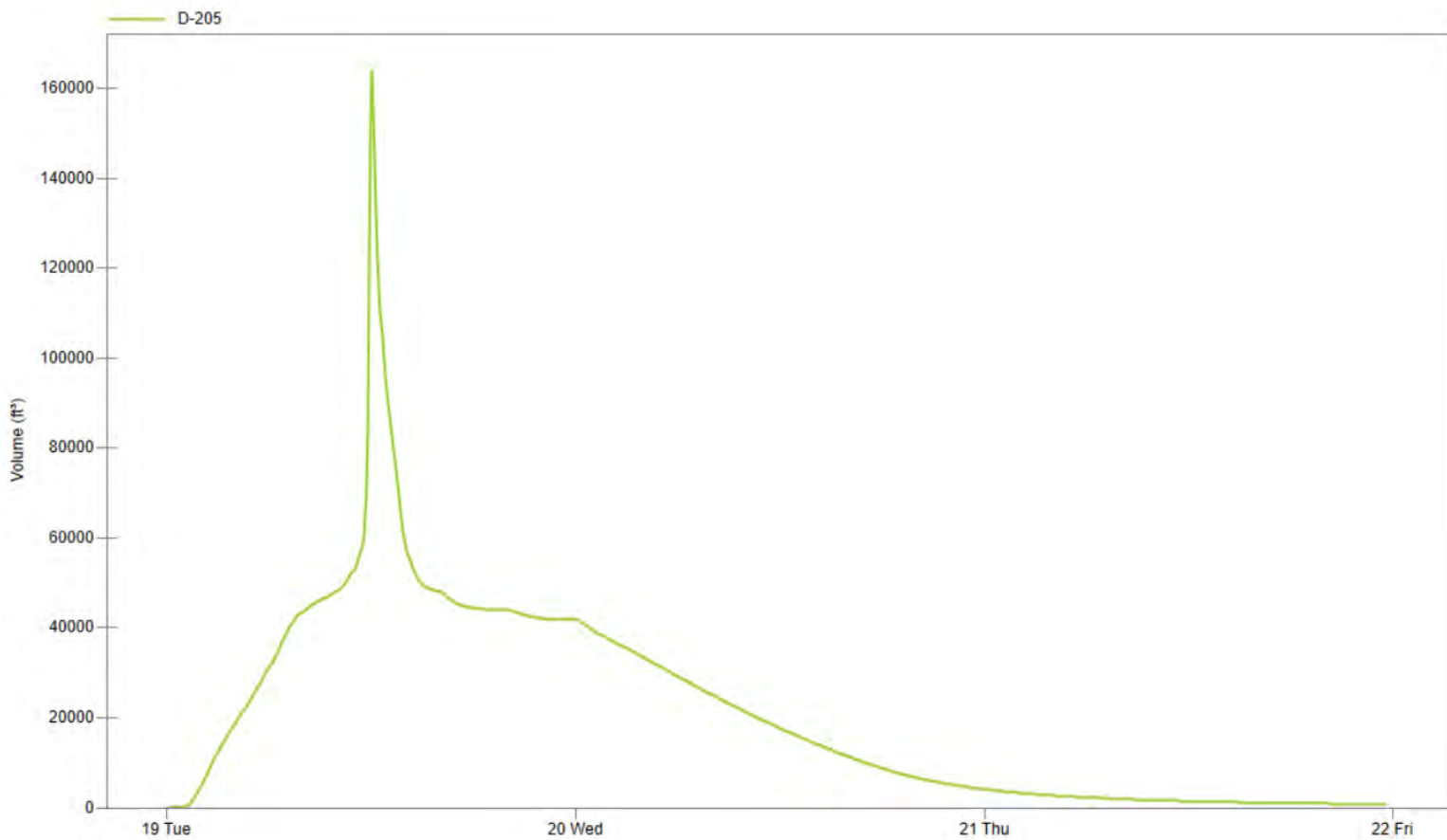
Mason Run 5-year Stage-Storage



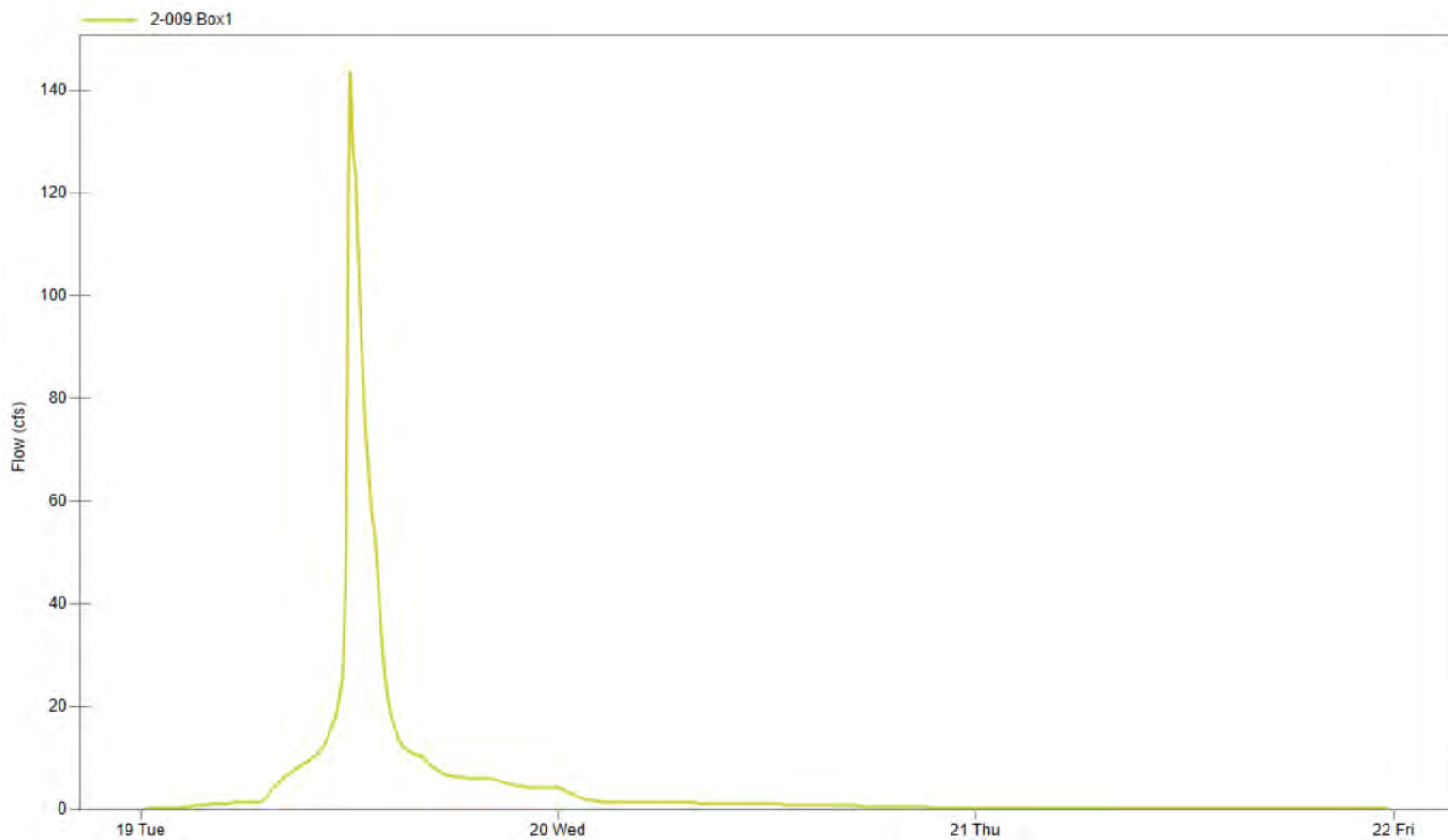
Mason Run 5-year Release Rate at comparison point



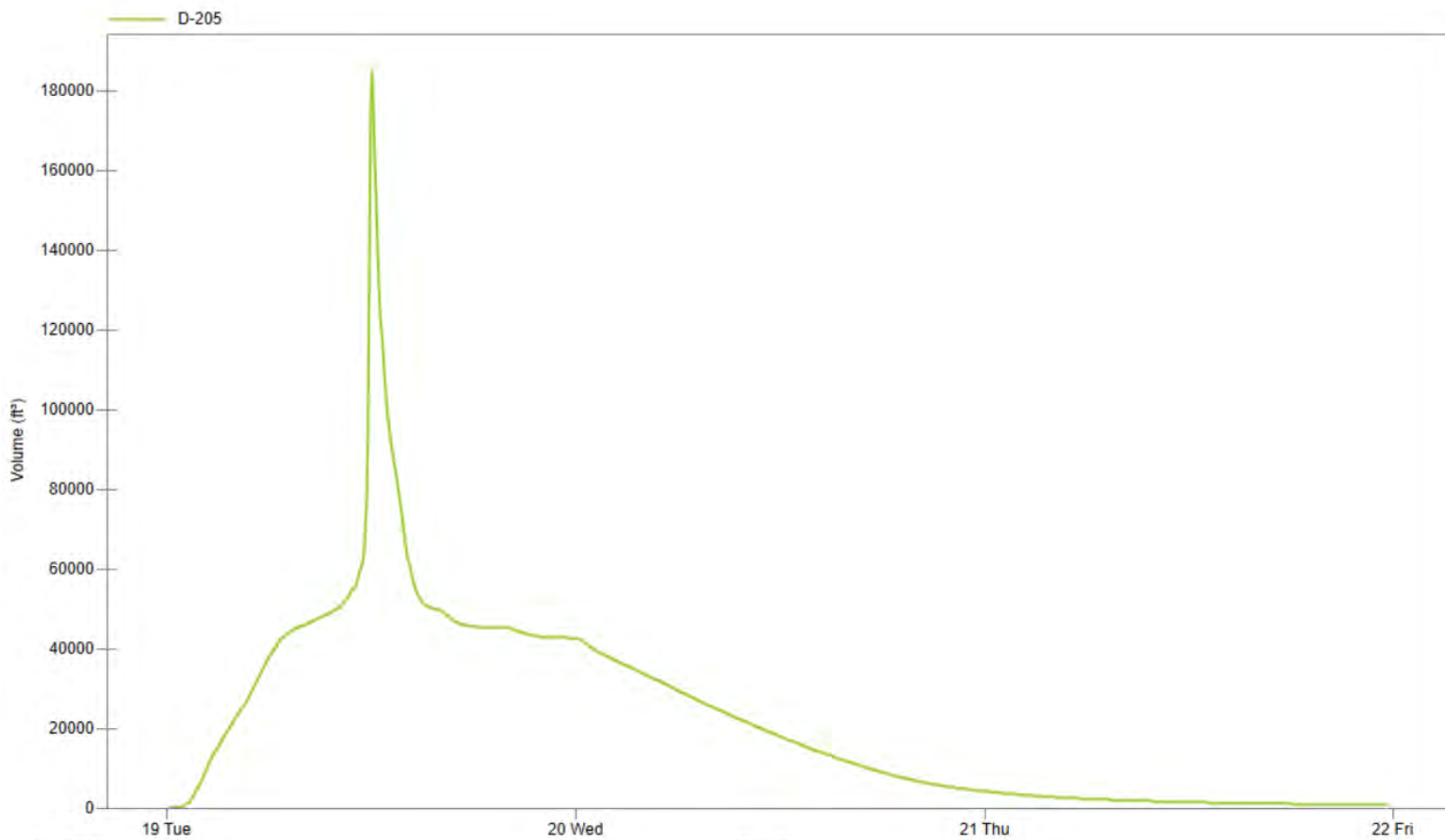
Mason Run 10-year Stage-Storage



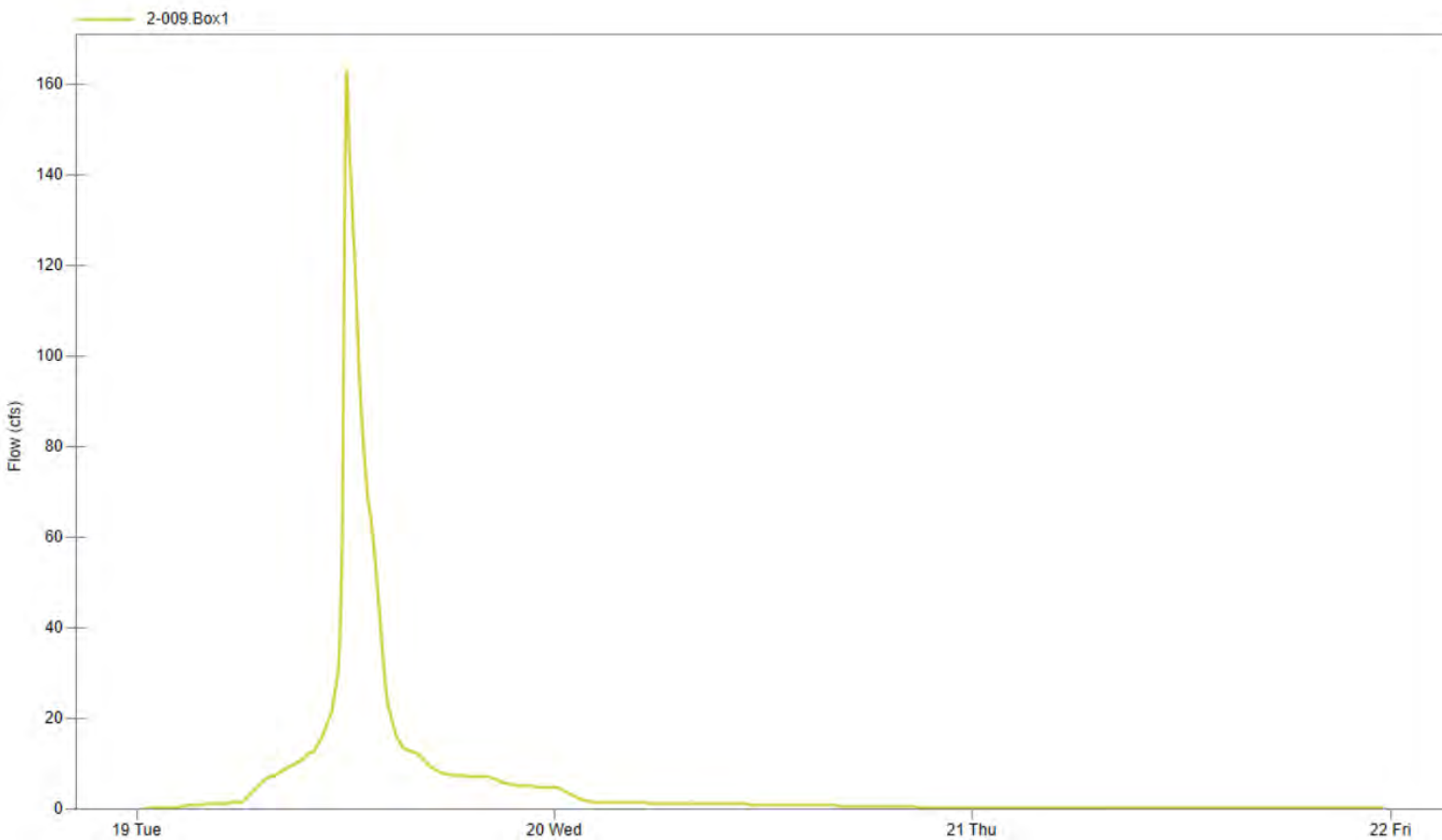
Mason Run 10-year Release Rate at comparison point



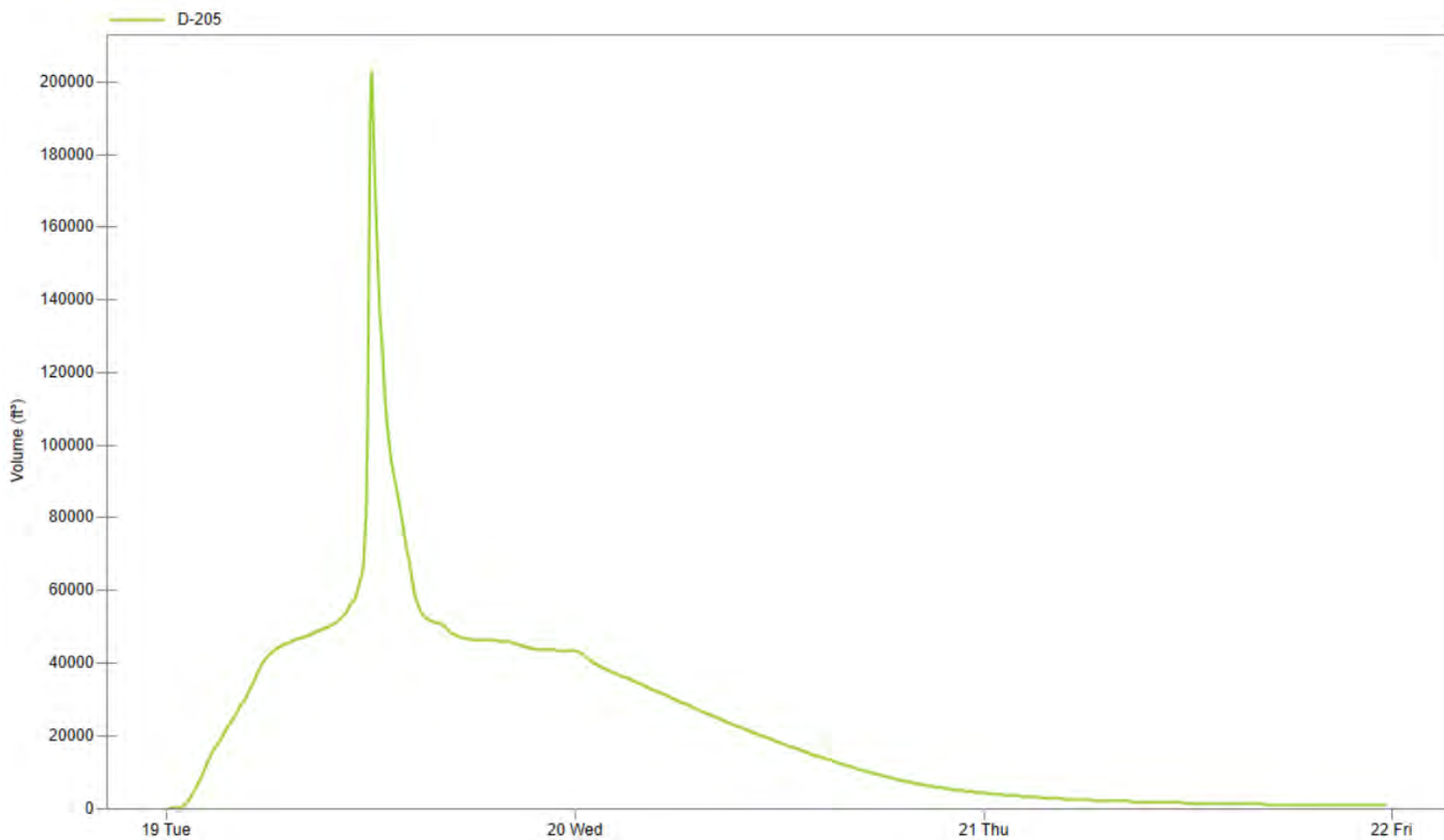
Mason Run 25-year Stage-Storage



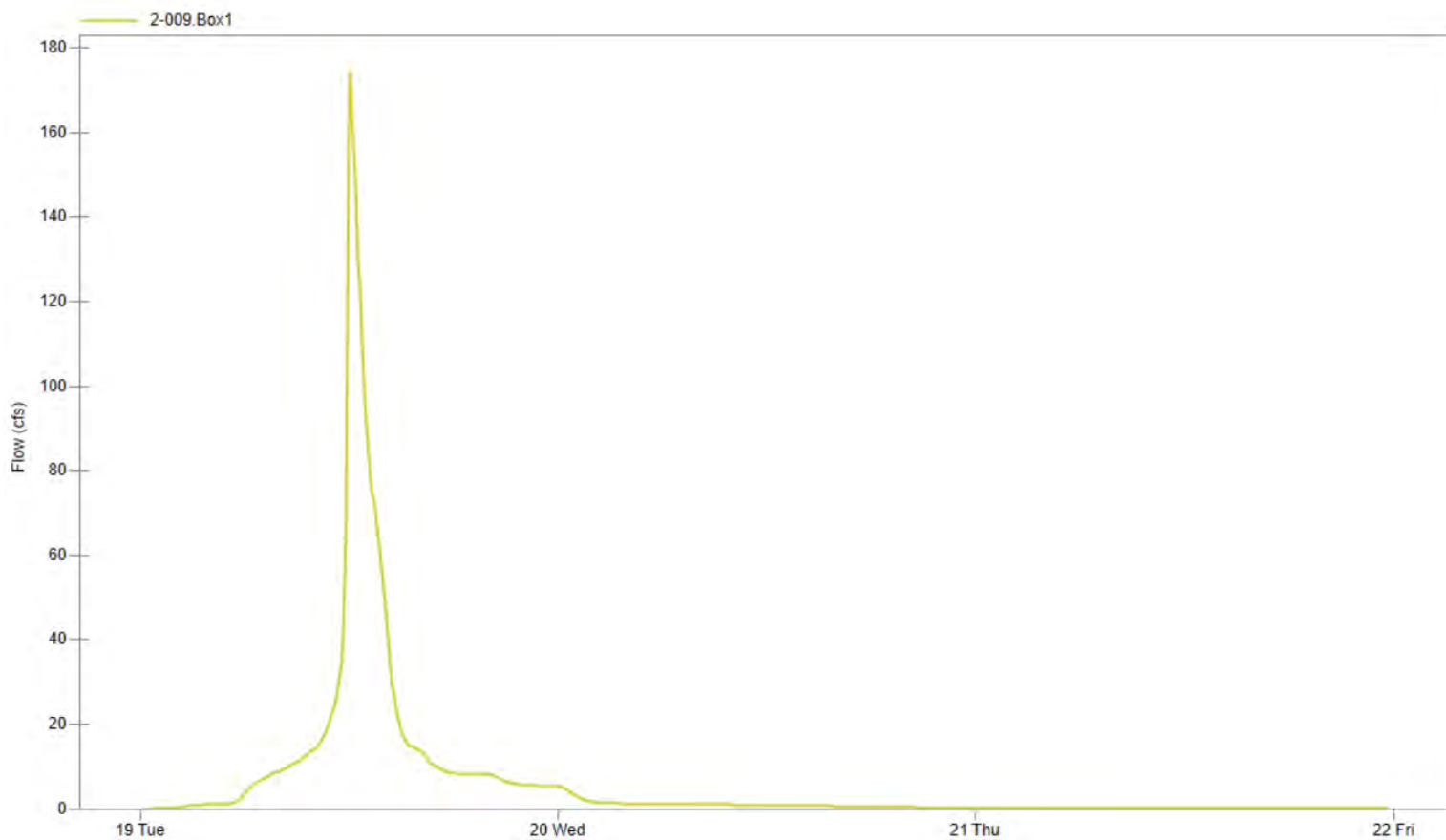
Mason Run 25-year Release Rate at comparison point



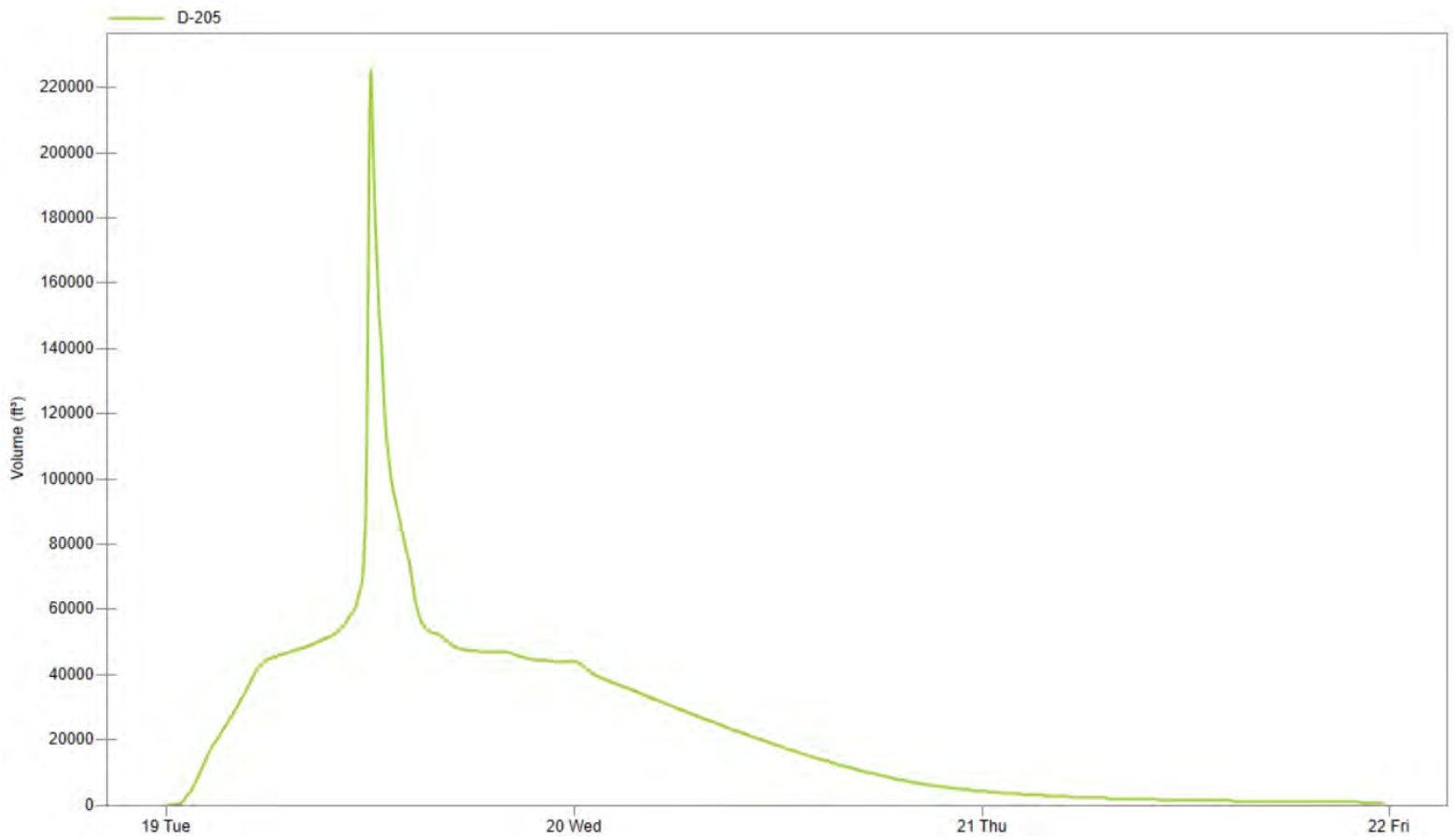
Mason Run 50-year Stage-Storage



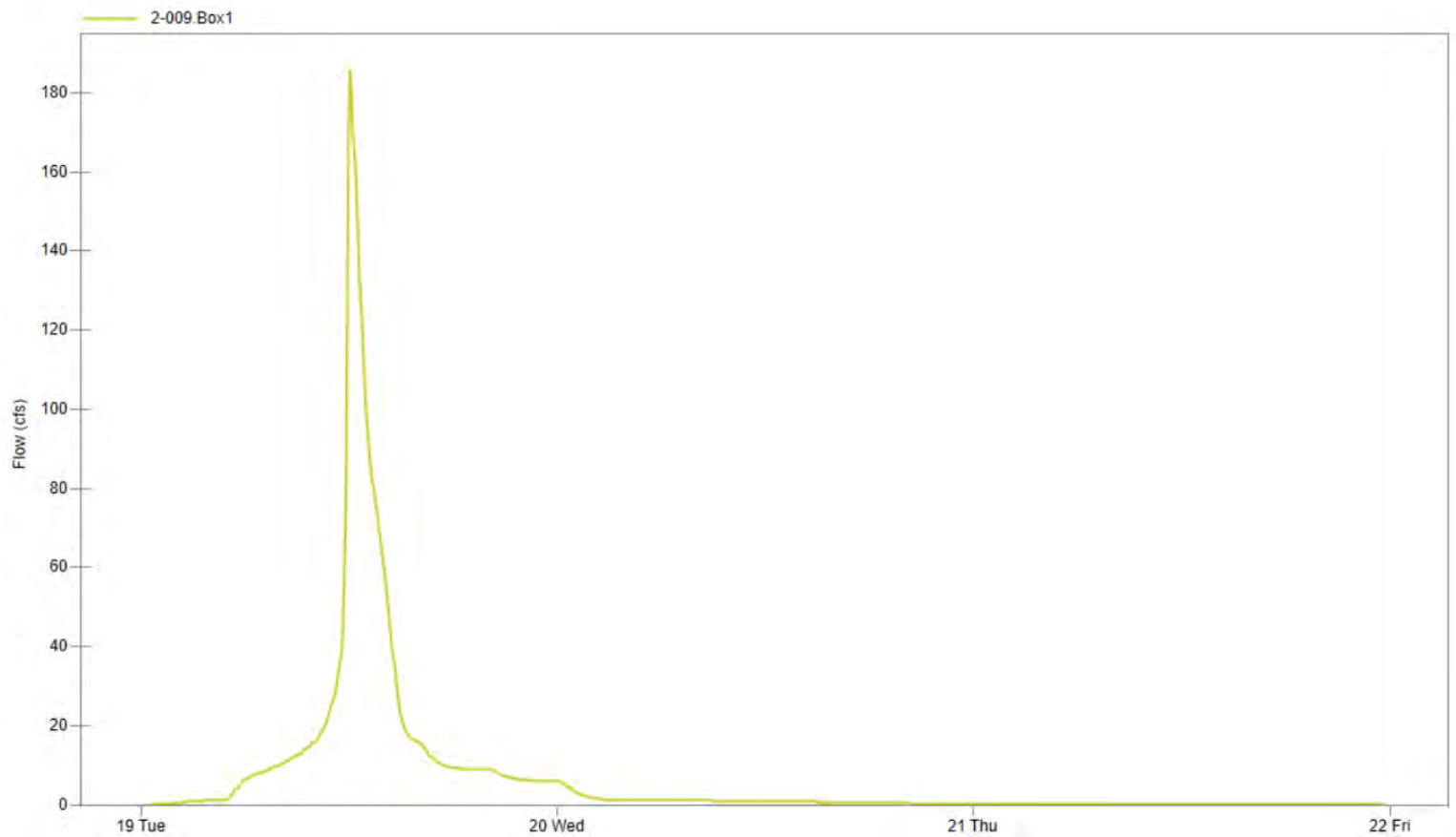
Mason Run 50-year Release Rate at comparison point



Mason Run 100-year Stage-Storage

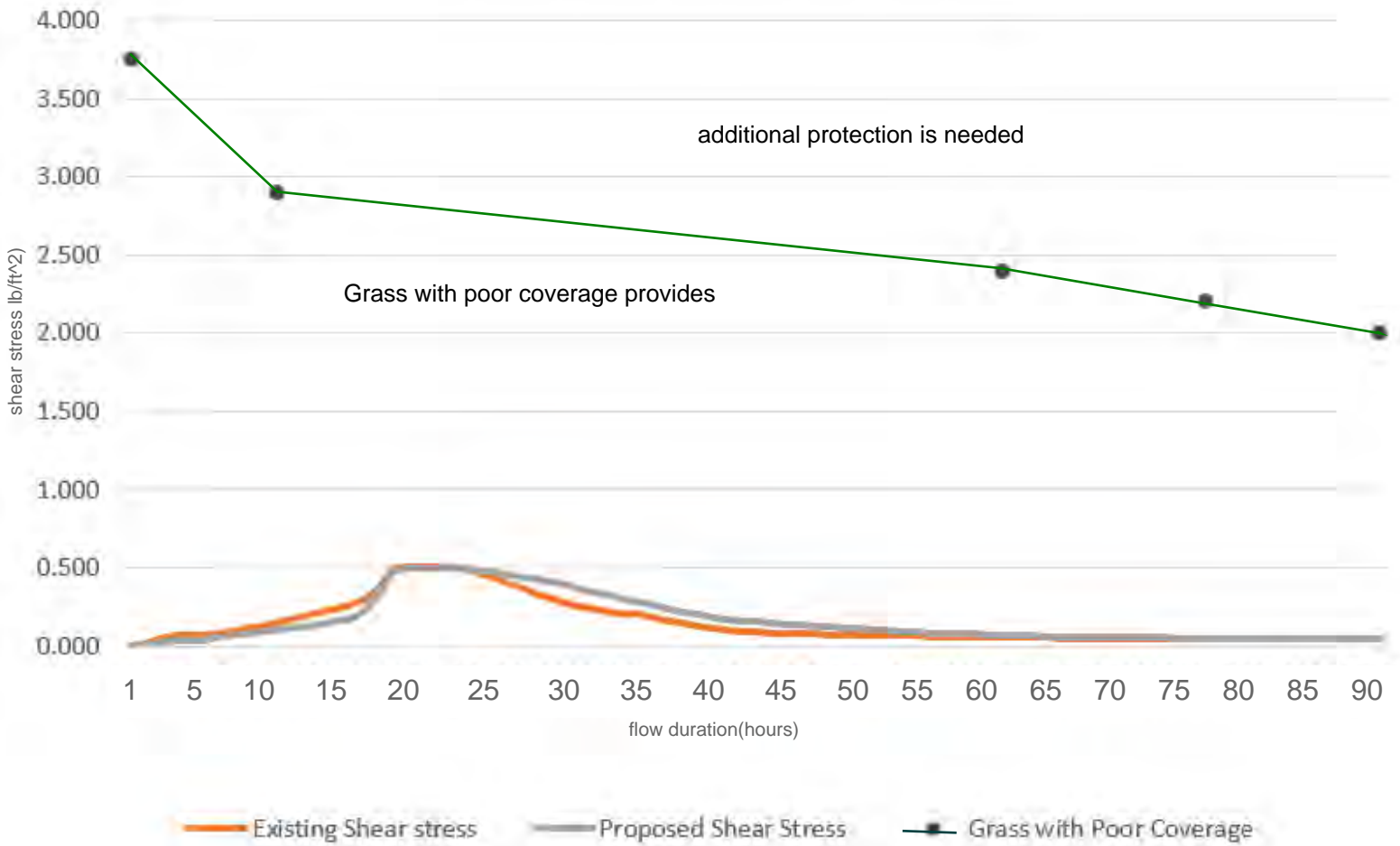


Mason Run 100-year Release Rate at comparison point



Appendix B

Extended Flow Erosion Analysis



The existing grass coverage provides the required protection for the duration of the extended flow pattern.

Time	Existing 100-year Outflow	Water Surface Depth (ft)	Existing Shear stress	Proposed 100-year Outflow	Water Surface Depth (ft)	Proposed Shear Stress
HOURS	cfs		(lbs/ft^2)	cfs		(lbs/ft^2)
0.33	0.001	0.005	0.000	0.000	0.003	0.000
1.08	0.194	0.136	0.008	0.049	0.059	0.004
1.83	3.448	0.743	0.046	0.931	0.345	0.022
2.42	6.272	1.046	0.065	2.131	0.562	0.035
2.50	6.657	1.082	0.068	2.346	0.594	0.037
2.58	7.040	1.117	0.070	2.565	0.626	0.039
3.17	9.588	1.327	0.083	4.097	0.820	0.051
4.00	12.497	1.537	0.096	6.147	1.034	0.065
4.75	15.668	1.739	0.108	8.214	1.218	0.076
5.58	20.831	2.027	0.126	10.876	1.424	0.089
6.50	27.514	2.348	0.147	14.072	1.640	0.102
7.25	34.182	2.630	0.164	16.943	1.814	0.113
8.33	46.446	3.077	0.192	21.721	2.072	0.129
8.92	54.913	3.349	0.209	24.823	2.225	0.139
9.75	70.254	3.786	0.236	29.681	2.444	0.152
10.42	85.606	4.172	0.260	38.215	2.786	0.174
11.00	104.883	4.603	0.287	56.194	3.388	0.211
11.83	173.990	5.850	0.365	123.646	4.980	0.311
12.67	345.966	8.006	0.500	322.206	7.755	0.484
13.94	361.522	8.165	0.510	343.977	7.986	0.498
13.33	361.630	8.167	0.510	344.822	7.995	0.499
13.42	361.481	8.165	0.509	345.378	8.000	0.499
14.08	352.002	8.069	0.503	342.676	7.972	0.497
14.67	330.098	7.840	0.489	333.090	7.871	0.491
15.42	289.857	7.394	0.461	318.901	7.719	0.482
16.00	256.167	6.990	0.436	303.537	7.549	0.471
16.75	209.868	6.380	0.398	277.245	7.246	0.452
17.42	175.887	5.879	0.367	260.196	7.040	0.439
18.25	138.757	5.260	0.328	241.128	6.800	0.424
19.00	113.600	4.783	0.298	220.539	6.528	0.407
19.75	95.994	4.410	0.275	199.399	6.232	0.389
21.50	79.402	4.021	0.251	171.535	5.811	0.363
22.33	68.239	3.732	0.233	151.398	5.481	0.342
23.33	59.479	3.486	0.218	131.802	5.134	0.320
24.17	53.232	3.297	0.206	112.525	4.761	0.297
25.08	50.264	3.203	0.200	99.399	4.485	0.280
25.75	41.677	2.912	0.182	83.567	4.123	0.257
26.58	33.664	2.609	0.163	71.946	3.831	0.239
27.42	26.105	2.284	0.143	59.243	3.479	0.217
28.17	20.786	2.024	0.126	49.016	3.163	0.197
20.17	17.293	1.834	0.114	41.795	2.916	0.182
29.00	14.472	1.665	0.104	35.692	2.689	0.168
29.83	12.451	1.534	0.096	31.469	2.519	0.157
30.58	11.107	1.440	0.090	29.594	2.440	0.152
31.42	9.976	1.357	0.085	27.574	2.351	0.147
32.33	9.032	1.284	0.080	25.192	2.242	0.140
33.08	8.434	1.236	0.077	23.173	2.145	0.134
33.92	7.904	1.192	0.074	20.941	2.032	0.127
34.75	7.479	1.155	0.072	18.821	1.920	0.120
35.42	7.194	1.130	0.071	17.233	1.831	0.114
36.17	6.915	1.105	0.069	15.600	1.735	0.108

Time	Existing 100-year Outflow	Water Surface Depth (ft)	Existing Shear stress	Proposed 100-year Outflow	Water Surface Depth (ft)	Proposed Shear Stress
37.00	6.643	1.081	0.067	13.979	1.634	0.102
37.83	6.397	1.058	0.066	12.576	1.542	0.096
38.58	6.189	1.038	0.065	11.494	1.468	0.092
39.50	5.947	1.015	0.063	10.380	1.387	0.087
40.33	5.730	0.994	0.062	9.521	1.322	0.083
41.08	5.527	0.974	0.061	8.849	1.269	0.079
41.92	5.288	0.949	0.059	8.200	1.216	0.076
42.67	5.075	0.927	0.058	7.874	1.189	0.074
43.42	4.871	0.906	0.057	7.306	1.140	0.071
44.33	4.638	0.881	0.055	6.748	1.090	0.068
45.17	4.447	0.860	0.054	6.332	1.052	0.066
46.17	4.247	0.838	0.052	5.914	1.012	0.063
47.08	4.090	0.820	0.051	5.588	0.980	0.061
48.08	3.946	0.803	0.050	5.283	0.949	0.059
48.92	3.845	0.791	0.049	5.062	0.926	0.058
50.00	3.739	0.778	0.049	4.815	0.900	0.056
51.00	3.666	0.770	0.048	4.622	0.879	0.055
52.08	3.606	0.762	0.048	4.444	0.860	0.054
53.25	3.555	0.756	0.047	4.285	0.842	0.053
54.08	3.523	0.752	0.047	4.187	0.831	0.052
55.00	3.491	0.748	0.047	4.093	0.820	0.051
56.17	3.455	0.744	0.046	3.989	0.808	0.050
57.17	3.430	0.741	0.046	3.912	0.799	0.050
58.25	3.407	0.738	0.046	3.839	0.790	0.049
59.50	3.384	0.735	0.046	3.767	0.782	0.049
60.75	3.363	0.732	0.046	3.704	0.774	0.048
62.00	3.342	0.730	0.046	3.647	0.767	0.048
63.00	3.326	0.728	0.045	3.609	0.763	0.048
64.33	3.308	0.725	0.045	3.566	0.757	0.047
65.33	3.293	0.723	0.045	3.534	0.754	0.047
66.50	3.276	0.721	0.045	3.501	0.749	0.047
67.50	3.262	0.719	0.045	3.474	0.746	0.047
69.00	3.241	0.717	0.045	3.437	0.741	0.046
70.00	3.227	0.715	0.045	3.412	0.738	0.046
71.00	3.216	0.714	0.045	3.394	0.736	0.046
72.00	3.206	0.712	0.044	3.376	0.734	0.046

Hydraulic Analysis Report

Project Data

Project Title: CMH Midfield Terminal: Turkey Run Analysis

Designer: ARG

Project Date: Wednesday, February 7, 2024

Project Units: U.S. Customary Units

Notes: Hydraulic Toolbox 5.2

Channel Analysis: 2 Yr Existing

Notes:

Input Parameters

Channel Type: Trapezoidal

Side Slope 1 (Z1): 2.0000 ft/ft

Side Slope 2 (Z2): 2.0000 ft/ft

Channel Width 8.00 ft

Longitudinal Slope: 0.0010 ft/ft

Manning's n: 0.0700

Flow 601.8000 cfs

Result Parameters

Depth 10.2224 ft

Area of Flow 290.7745 ft²

Wetted Perimeter 53.7160 ft

Hydraulic Radius 5.4132 ft

Average Velocity 2.0696 ft/s

Top Width 48.8896 ft

Froude Number: 0.1496

Critical Depth 4.0307 ft

Critical Velocity 9.2959 ft/s

Critical Slope: 0.0569 ft/ft

Critical Top Width 24.12 ft

Calculated Max Shear Stress 0.6379 lb/ft²

Calculated Avg Shear Stress 0.3378 lb/ft²

Channel Analysis: 2 Yr Existing Basin

Notes:

Input Parameters

Channel Type: Trapezoidal
Side Slope 1 (Z1): 2.0000 ft/ft
Side Slope 2 (Z2): 2.0000 ft/ft
Channel Width 8.00 ft
Longitudinal Slope: 0.0010 ft/ft
Manning's n: 0.0700
Flow 245.0000 cfs

Result Parameters

Depth 6.8498 ft
Area of Flow 148.6378 ft²
Wetted Perimeter 38.6332 ft
Hydraulic Radius 3.8474 ft
Average Velocity 1.6483 ft/s
Top Width 35.3992 ft
Froude Number: 0.1418
Critical Depth 2.4843 ft
Critical Velocity 7.6045 ft/s
Critical Slope: 0.0640 ft/ft
Critical Top Width 17.94 ft
Calculated Max Shear Stress 0.4274 lb/ft²
Calculated Avg Shear Stress 0.2401 lb/ft²

Channel Analysis: 2 Yr Proposed Basin

Notes:

Input Parameters

Channel Type: Trapezoidal
Side Slope 1 (Z1): 2.0000 ft/ft
Side Slope 2 (Z2): 2.0000 ft/ft
Channel Width 8.00 ft
Longitudinal Slope: 0.0010 ft/ft
Manning's n: 0.0700
Flow 183.8000 cfs

Result Parameters

Depth 6.0008 ft
Area of Flow 120.0240 ft²

Wetted Perimeter 34.8362 ft
Hydraulic Radius 3.4454 ft
Average Velocity 1.5314 ft/s
Top Width 32.0030 ft
Froude Number: 0.1394
Critical Depth 2.1138 ft
Critical Velocity 7.1112 ft/s
Critical Slope: 0.0665 ft/ft
Critical Top Width 16.46 ft
Calculated Max Shear Stress 0.3744 lb/ft²
Calculated Avg Shear Stress 0.2150 lb/ft²

Channel Analysis: 5 Yr Existing

Notes:

Input Parameters

Channel Type: Trapezoidal
Side Slope 1 (Z1): 2.0000 ft/ft
Side Slope 2 (Z2): 2.0000 ft/ft
Channel Width 8.00 ft
Longitudinal Slope: 0.0010 ft/ft
Manning's n: 0.0700
Flow 678.2000 cfs

Result Parameters

Depth 10.7668 ft
Area of Flow 317.9836 ft²
Wetted Perimeter 56.1507 ft
Hydraulic Radius 5.6630 ft
Average Velocity 2.1328 ft/s
Top Width 51.0673 ft
Froude Number: 0.1506
Critical Depth 4.2886 ft
Critical Velocity 9.5396 ft/s
Critical Slope: 0.0560 ft/ft
Critical Top Width 25.15 ft
Calculated Max Shear Stress 0.6718 lb/ft²
Calculated Avg Shear Stress 0.3534 lb/ft²

Channel Analysis: 5 Yr Existing Basin

Notes:

Input Parameters

Channel Type: Trapezoidal

Side Slope 1 (Z1): 2.0000 ft/ft

Side Slope 2 (Z2): 2.0000 ft/ft

Channel Width 8.00 ft

Longitudinal Slope: 0.0010 ft/ft

Manning's n: 0.0700

Flow 286.2000 cfs

Result Parameters

Depth 7.3513 ft

Area of Flow 166.8940 ft²

Wetted Perimeter 40.8761 ft

Hydraulic Radius 4.0829 ft

Average Velocity 1.7149 ft/s

Top Width 37.4052 ft

Froude Number: 0.1431

Critical Depth 2.7073 ft

Critical Velocity 7.8804 ft/s

Critical Slope: 0.0626 ft/ft

Critical Top Width 18.83 ft

Calculated Max Shear Stress 0.4587 lb/ft²

Calculated Avg Shear Stress 0.2548 lb/ft²

Channel Analysis: 5 Yr Proposed Basin

Notes:

Input Parameters

Channel Type: Trapezoidal

Side Slope 1 (Z1): 2.0000 ft/ft

Side Slope 2 (Z2): 2.0000 ft/ft

Channel Width 8.00 ft

Longitudinal Slope: 0.0010 ft/ft

Manning's n: 0.0700

Flow 236.1000 cfs

Result Parameters

Depth 6.7349 ft

Area of Flow 144.5973 ft²

Wetted Perimeter 38.1194 ft

Hydraulic Radius 3.7933 ft
Average Velocity 1.6328 ft/s
Top Width 34.9396 ft
Froude Number: 0.1414
Critical Depth 2.4336 ft
Critical Velocity 7.5398 ft/s
Critical Slope: 0.0643 ft/ft
Critical Top Width 17.73 ft
Calculated Max Shear Stress 0.4203 lb/ft²
Calculated Avg Shear Stress 0.2367 lb/ft²

Channel Analysis: 10 Yr Existing

Notes:

Input Parameters

Channel Type: Trapezoidal
Side Slope 1 (Z1): 2.0000 ft/ft
Side Slope 2 (Z2): 2.0000 ft/ft
Channel Width 8.00 ft
Longitudinal Slope: 0.0010 ft/ft
Manning's n: 0.0700
Flow 718.5000 cfs

Result Parameters

Depth 11.0388 ft
Area of Flow 332.0230 ft²
Wetted Perimeter 57.3672 ft
Hydraulic Radius 5.7877 ft
Average Velocity 2.1640 ft/s
Top Width 52.1554 ft
Froude Number: 0.1511
Critical Depth 4.4182 ft
Critical Velocity 9.6590 ft/s
Critical Slope: 0.0556 ft/ft
Critical Top Width 25.67 ft
Calculated Max Shear Stress 0.6888 lb/ft²
Calculated Avg Shear Stress 0.3612 lb/ft²

Channel Analysis: 10 Yr Existing Basin

Notes:

Input Parameters

Channel Type: Trapezoidal
Side Slope 1 (Z1): 2.0000 ft/ft
Side Slope 2 (Z2): 2.0000 ft/ft

Channel Width 8.00 ft
Longitudinal Slope: 0.0010 ft/ft
Manning's n: 0.0700
Flow 307.6000 cfs

Result Parameters

Depth 7.5947 ft
Area of Flow 176.1146 ft²
Wetted Perimeter 41.9643 ft
Hydraulic Radius 4.1968 ft
Average Velocity 1.7466 ft/s
Top Width 38.3786 ft
Froude Number: 0.1437
Critical Depth 2.8166 ft
Critical Velocity 8.0107 ft/s
Critical Slope: 0.0621 ft/ft
Critical Top Width 19.27 ft
Calculated Max Shear Stress 0.4739 lb/ft²
Calculated Avg Shear Stress 0.2619 lb/ft²

Channel Analysis: 10 Yr Proposed Basin

Notes:

Input Parameters

Channel Type: Trapezoidal
Side Slope 1 (Z1): 2.0000 ft/ft
Side Slope 2 (Z2): 2.0000 ft/ft
Channel Width 8.00 ft
Longitudinal Slope: 0.0010 ft/ft
Manning's n: 0.0700
Flow 260.8000 cfs

Result Parameters

Depth 7.0477 ft
Area of Flow 155.7221 ft²
Wetted Perimeter 39.5183 ft
Hydraulic Radius 3.9405 ft
Average Velocity 1.6748 ft/s
Top Width 36.1908 ft
Froude Number: 0.1423
Critical Depth 2.5720 ft
Critical Velocity 7.7147 ft/s
Critical Slope: 0.0634 ft/ft
Critical Top Width 18.29 ft
Calculated Max Shear Stress 0.4398 lb/ft²
Calculated Avg Shear Stress 0.2459 lb/ft²

Appendix C



PROJECT EDA

PROJECT EDA =	Big Walnut	6.1	161.90	Total Acres
	Turkey Run	118.0		
	Mason Run	37.8		

Surface Condition Calculation

$$Rv = 0.05 + 0.9i$$

where i = fraction of post-construction impervious surface

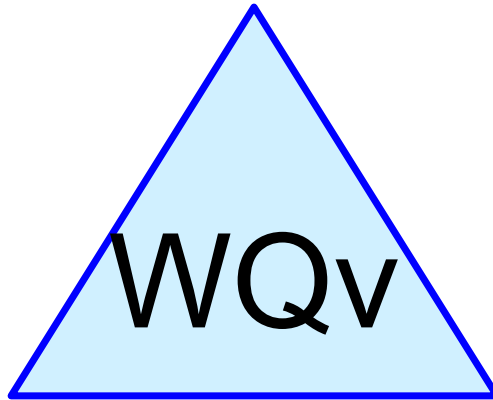
	Impervious acres	Total acres	i	Rv	
Big Walnut Creek					
Existing	2.11	6.10	0.35	0.36	Rv ₁
Proposed	1.87	6.10	0.31	0.33	Rv ₂
Turkey Run					
Existing	54.12	118.00	0.46	0.46	Rv ₁
Proposed	95.23	118.00	0.81	0.78	Rv ₂
Mason Run					
Existing	21.75	37.80	0.58	0.57	Rv ₁
Proposed	33.37	37.80	0.88	0.84	Rv ₂

Water Quality Volume Required (OHC00006)

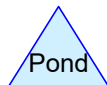
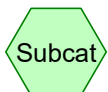
Big Walnut Creek	$0.9 * A * (Rv_1 * 0.2 + (Rv_2 - Rv_1))$	0.20	=	0.017	ac ft
	12	12.0			
Turkey Run	$0.9 * A * (Rv_1 * 0.2 + (Rv_2 - Rv_1))$	43.13	=	3.594	ac ft
	12	12.0			
Mason Run	$0.9 * A * (Rv_1 * 0.2 + (Rv_2 - Rv_1))$	13.27	=	1.106	ac ft
	12	12.0			

Previously Developed Areas - Ohio EPA encourages the redevelopment of previously graded, paved or built upon sites through a reduction of the WQv treatment requirement. For a previously developed area, one or a combination of the following two conditions shall be met:

- A 20 percent net reduction of the site's volumetric runoff coefficient through impervious area reduction with soil restoration or replacing impervious roof area with green roof area (for these purposes green roofs



Mason Run Detention WQv Drawdown



Routing Diagram for CRAA-HydroCAD_Mason Run Mid-Field Detention

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CRAA-HydroCAD_Mason Run Mid-Field Detention

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Project Notes

Defined 10 rainfall events from OH-Columbus IDF

Defined 7 rainfall events from OH-CRAA IDF

Defined 7 rainfall events from OH-TXC PH2 IDF

CRAA-HydroCAD_Mason Run Mid-Field Detention

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Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	1-yr	Type II 24-hr		Default	24.00	1	2.20	2

Summary for Pond WQv: Mason Run Detention WQv Drawdown

Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
 Outflow = 0.94 cfs @ 0.00 hrs, Volume= 37,956 cf, Atten= 0%, Lag= 0.0 min
 Primary = 0.94 cfs @ 0.00 hrs, Volume= 37,956 cf

Routing by Stor-Ind method, Time Span= 0.00-60.00 hrs, dt= 0.05 hrs
 Starting Elev= 800.48' Surf.Area= 0.441 ac Storage= 1.406 af
 Peak Elev= 800.48' @ 0.00 hrs Surf.Area= 0.441 ac Storage= 1.406 af

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= (not calculated: no inflow)

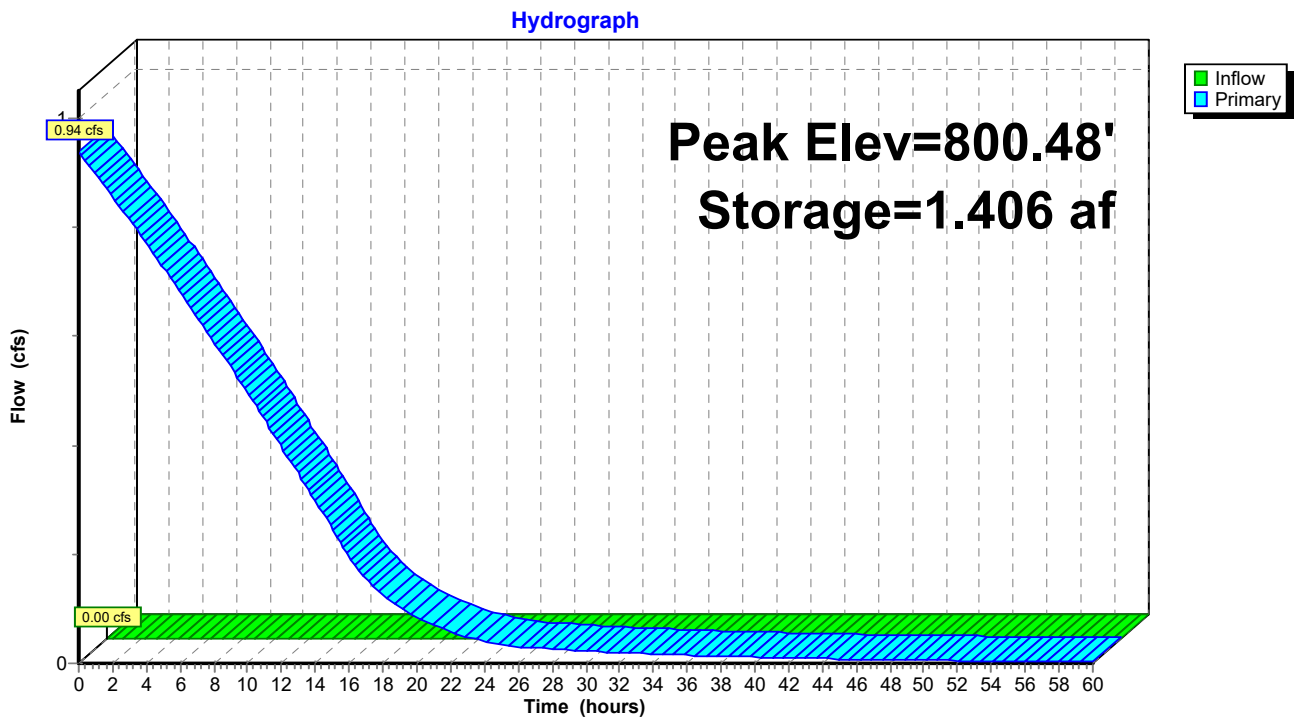
Volume	Invert	Avail.Storage	Storage Description
#1	796.00'	7.685 af	Custom Stage Data (Prismatic) Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Voids (%)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
796.00	0.325	0.0	0.000	0.000
797.00	0.326	40.0	0.130	0.130
798.00	0.327	100.0	0.326	0.457
799.00	0.371	100.0	0.349	0.806
800.00	0.417	100.0	0.394	1.200
801.00	0.466	100.0	0.442	1.641
802.00	0.517	100.0	0.492	2.133
803.00	0.571	100.0	0.544	2.677
804.00	0.627	100.0	0.599	3.276
805.00	0.685	100.0	0.656	3.932
806.00	0.746	100.0	0.715	4.647
807.00	0.808	100.0	0.777	5.424
808.00	1.116	100.0	0.962	6.386
809.00	1.482	100.0	1.299	7.685

Device	Routing	Invert	Outlet Devices
#1	Primary	798.23'	5.0" Vert. Orifice C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.94 cfs @ 0.00 hrs HW=800.48' (Free Discharge)
 ↑1=Orifice (Orifice Controls 0.94 cfs @ 6.88 fps)

Pond WQv: Mason Run Detention WQv Drawdown



Hydrograph for Pond WQv: Mason Run Detention WQv Drawdown

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	1.406	800.48	0.94
0.25	0.00	1.386	800.44	0.93
0.50	0.00	1.367	800.39	0.92
0.75	0.00	1.348	800.35	0.91
1.00	0.00	1.330	800.31	0.90
1.25	0.00	1.311	800.26	0.89
1.50	0.00	1.293	800.22	0.88
1.75	0.00	1.275	800.18	0.87
2.00	0.00	1.257	800.14	0.86
2.25	0.00	1.240	800.10	0.84
2.50	0.00	1.222	800.05	0.83
2.75	0.00	1.205	800.01	0.82
3.00	0.00	1.188	799.97	0.81
3.25	0.00	1.172	799.93	0.80
3.50	0.00	1.155	799.89	0.79
3.75	0.00	1.139	799.85	0.78
4.00	0.00	1.123	799.81	0.77
4.25	0.00	1.107	799.78	0.76
4.50	0.00	1.092	799.74	0.75
4.75	0.00	1.076	799.70	0.74
5.00	0.00	1.061	799.66	0.73
5.25	0.00	1.046	799.62	0.71
5.50	0.00	1.032	799.59	0.70
5.75	0.00	1.017	799.55	0.69
6.00	0.00	1.003	799.52	0.68
6.25	0.00	0.989	799.48	0.67
6.50	0.00	0.975	799.44	0.66
6.75	0.00	0.962	799.41	0.65
7.00	0.00	0.949	799.38	0.64
7.25	0.00	0.935	799.34	0.62
7.50	0.00	0.923	799.31	0.61
7.75	0.00	0.910	799.28	0.60
8.00	0.00	0.898	799.24	0.59
8.25	0.00	0.886	799.21	0.58
8.50	0.00	0.874	799.18	0.57
8.75	0.00	0.862	799.15	0.55
9.00	0.00	0.851	799.12	0.54
9.25	0.00	0.840	799.09	0.53
9.50	0.00	0.829	799.06	0.52
9.75	0.00	0.819	799.03	0.51
10.00	0.00	0.808	799.01	0.49
10.25	0.00	0.798	798.98	0.48
10.50	0.00	0.788	798.95	0.47
10.75	0.00	0.779	798.93	0.46
11.00	0.00	0.769	798.90	0.45
11.25	0.00	0.760	798.88	0.43
11.50	0.00	0.751	798.85	0.42
11.75	0.00	0.743	798.83	0.41
12.00	0.00	0.735	798.81	0.40
12.25	0.00	0.727	798.78	0.38
12.50	0.00	0.719	798.76	0.37
12.75	0.00	0.711	798.74	0.36

CRAA-HydroCAD_Mason Run Mid-Field Detention

Type II 24-hr 1-yr Rainfall=2.20"

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Hydrograph for Pond WQv: Mason Run Detention WQv Drawdown (continued)

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
13.00	0.00	0.704	798.72	0.35
13.25	0.00	0.697	798.70	0.33
13.50	0.00	0.690	798.68	0.32
13.75	0.00	0.683	798.66	0.31
14.00	0.00	0.677	798.65	0.30
14.25	0.00	0.671	798.63	0.29
14.50	0.00	0.665	798.61	0.27
14.75	0.00	0.660	798.60	0.26
15.00	0.00	0.655	798.58	0.25
15.25	0.00	0.650	798.57	0.23
15.50	0.00	0.645	798.55	0.22
15.75	0.00	0.641	798.54	0.21
16.00	0.00	0.636	798.53	0.20
16.25	0.00	0.632	798.52	0.18
16.50	0.00	0.629	798.51	0.17
16.75	0.00	0.625	798.50	0.16
17.00	0.00	0.622	798.49	0.15
17.25	0.00	0.619	798.48	0.15
17.50	0.00	0.616	798.47	0.14
17.75	0.00	0.613	798.46	0.13
18.00	0.00	0.611	798.46	0.12
18.25	0.00	0.608	798.45	0.12
18.50	0.00	0.606	798.44	0.11
18.75	0.00	0.603	798.44	0.11
19.00	0.00	0.601	798.43	0.10
19.25	0.00	0.599	798.42	0.10
19.50	0.00	0.597	798.42	0.09
19.75	0.00	0.595	798.41	0.09
20.00	0.00	0.593	798.41	0.09
20.25	0.00	0.592	798.40	0.08
20.50	0.00	0.590	798.40	0.08
20.75	0.00	0.588	798.39	0.07
21.00	0.00	0.587	798.39	0.07
21.25	0.00	0.586	798.38	0.07
21.50	0.00	0.584	798.38	0.06
21.75	0.00	0.583	798.38	0.06
22.00	0.00	0.582	798.37	0.06
22.25	0.00	0.580	798.37	0.06
22.50	0.00	0.579	798.37	0.05
22.75	0.00	0.578	798.36	0.05
23.00	0.00	0.577	798.36	0.05
23.25	0.00	0.576	798.36	0.05
23.50	0.00	0.575	798.35	0.04
23.75	0.00	0.574	798.35	0.04
24.00	0.00	0.574	798.35	0.04
24.25	0.00	0.573	798.35	0.04
24.50	0.00	0.572	798.34	0.04
24.75	0.00	0.571	798.34	0.03
25.00	0.00	0.571	798.34	0.03
25.25	0.00	0.570	798.34	0.03
25.50	0.00	0.569	798.34	0.03
25.75	0.00	0.569	798.33	0.03

CRAA-HydroCAD_Mason Run Mid-Field Detention

Type II 24-hr 1-yr Rainfall=2.20"

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Hydrograph for Pond WQv: Mason Run Detention WQv Drawdown (continued)

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
26.00	0.00	0.568	798.33	0.03
26.25	0.00	0.567	798.33	0.03
26.50	0.00	0.567	798.33	0.03
26.75	0.00	0.566	798.33	0.03
27.00	0.00	0.566	798.33	0.03
27.25	0.00	0.565	798.32	0.03
27.50	0.00	0.564	798.32	0.03
27.75	0.00	0.564	798.32	0.03
28.00	0.00	0.563	798.32	0.03
28.25	0.00	0.563	798.32	0.03
28.50	0.00	0.562	798.32	0.03
28.75	0.00	0.562	798.31	0.02
29.00	0.00	0.561	798.31	0.02
29.25	0.00	0.561	798.31	0.02
29.50	0.00	0.560	798.31	0.02
29.75	0.00	0.560	798.31	0.02
30.00	0.00	0.559	798.31	0.02
30.25	0.00	0.559	798.31	0.02
30.50	0.00	0.558	798.30	0.02
30.75	0.00	0.558	798.30	0.02
31.00	0.00	0.557	798.30	0.02
31.25	0.00	0.557	798.30	0.02
31.50	0.00	0.557	798.30	0.02
31.75	0.00	0.556	798.30	0.02
32.00	0.00	0.556	798.30	0.02
32.25	0.00	0.555	798.30	0.02
32.50	0.00	0.555	798.29	0.02
32.75	0.00	0.555	798.29	0.02
33.00	0.00	0.554	798.29	0.02
33.25	0.00	0.554	798.29	0.02
33.50	0.00	0.553	798.29	0.02
33.75	0.00	0.553	798.29	0.02
34.00	0.00	0.553	798.29	0.02
34.25	0.00	0.552	798.29	0.02
34.50	0.00	0.552	798.29	0.02
34.75	0.00	0.552	798.28	0.02
35.00	0.00	0.551	798.28	0.02
35.25	0.00	0.551	798.28	0.02
35.50	0.00	0.551	798.28	0.02
35.75	0.00	0.550	798.28	0.02
36.00	0.00	0.550	798.28	0.01
36.25	0.00	0.550	798.28	0.01
36.50	0.00	0.549	798.28	0.01
36.75	0.00	0.549	798.28	0.01
37.00	0.00	0.549	798.28	0.01
37.25	0.00	0.549	798.28	0.01
37.50	0.00	0.548	798.28	0.01
37.75	0.00	0.548	798.27	0.01
38.00	0.00	0.548	798.27	0.01
38.25	0.00	0.548	798.27	0.01
38.50	0.00	0.547	798.27	0.01
38.75	0.00	0.547	798.27	0.01

CRAA-HydroCAD_Mason Run Mid-Field Detention

Type II 24-hr 1-yr Rainfall=2.20"

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Hydrograph for Pond WQv: Mason Run Detention WQv Drawdown (continued)

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
39.00	0.00	0.547	798.27	0.01
39.25	0.00	0.547	798.27	0.01
39.50	0.00	0.546	798.27	0.01
39.75	0.00	0.546	798.27	0.01
40.00	0.00	0.546	798.27	0.01
40.25	0.00	0.546	798.27	0.01
40.50	0.00	0.545	798.27	0.01
40.75	0.00	0.545	798.27	0.01
41.00	0.00	0.545	798.26	0.01
41.25	0.00	0.545	798.26	0.01
41.50	0.00	0.545	798.26	0.01
41.75	0.00	0.544	798.26	0.01
42.00	0.00	0.544	798.26	0.01
42.25	0.00	0.544	798.26	0.01
42.50	0.00	0.544	798.26	0.01
42.75	0.00	0.544	798.26	0.01
43.00	0.00	0.543	798.26	0.01
43.25	0.00	0.543	798.26	0.01
43.50	0.00	0.543	798.26	0.01
43.75	0.00	0.543	798.26	0.01
44.00	0.00	0.543	798.26	0.01
44.25	0.00	0.542	798.26	0.01
44.50	0.00	0.542	798.26	0.01
44.75	0.00	0.542	798.26	0.01
45.00	0.00	0.542	798.26	0.01
45.25	0.00	0.542	798.26	0.01
45.50	0.00	0.542	798.26	0.01
45.75	0.00	0.542	798.25	0.01
46.00	0.00	0.541	798.25	0.01
46.25	0.00	0.541	798.25	0.01
46.50	0.00	0.541	798.25	0.01
46.75	0.00	0.541	798.25	0.01
47.00	0.00	0.541	798.25	0.01
47.25	0.00	0.541	798.25	0.01
47.50	0.00	0.541	798.25	0.01
47.75	0.00	0.540	798.25	0.01
48.00	0.00	0.540	798.25	0.01
48.25	0.00	0.540	798.25	0.01
48.50	0.00	0.540	798.25	0.01
48.75	0.00	0.540	798.25	0.01
49.00	0.00	0.540	798.25	0.01
49.25	0.00	0.540	798.25	0.01
49.50	0.00	0.540	798.25	0.01
49.75	0.00	0.539	798.25	0.01
50.00	0.00	0.539	798.25	0.01
50.25	0.00	0.539	798.25	0.01
50.50	0.00	0.539	798.25	0.01
50.75	0.00	0.539	798.25	0.01
51.00	0.00	0.539	798.25	0.01
51.25	0.00	0.539	798.25	0.00
51.50	0.00	0.539	798.25	0.00
51.75	0.00	0.539	798.25	0.00

Hydrograph for Pond WQv: Mason Run Detention WQv Drawdown (continued)

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
52.00	0.00	0.538	798.25	0.00
52.25	0.00	0.538	798.25	0.00
52.50	0.00	0.538	798.25	0.00
52.75	0.00	0.538	798.25	0.00
53.00	0.00	0.538	798.24	0.00
53.25	0.00	0.538	798.24	0.00
53.50	0.00	0.538	798.24	0.00
53.75	0.00	0.538	798.24	0.00
54.00	0.00	0.538	798.24	0.00
54.25	0.00	0.538	798.24	0.00
54.50	0.00	0.538	798.24	0.00
54.75	0.00	0.537	798.24	0.00
55.00	0.00	0.537	798.24	0.00
55.25	0.00	0.537	798.24	0.00
55.50	0.00	0.537	798.24	0.00
55.75	0.00	0.537	798.24	0.00
56.00	0.00	0.537	798.24	0.00
56.25	0.00	0.537	798.24	0.00
56.50	0.00	0.537	798.24	0.00
56.75	0.00	0.537	798.24	0.00
57.00	0.00	0.537	798.24	0.00
57.25	0.00	0.537	798.24	0.00
57.50	0.00	0.537	798.24	0.00
57.75	0.00	0.537	798.24	0.00
58.00	0.00	0.537	798.24	0.00
58.25	0.00	0.537	798.24	0.00
58.50	0.00	0.536	798.24	0.00
58.75	0.00	0.536	798.24	0.00
59.00	0.00	0.536	798.24	0.00
59.25	0.00	0.536	798.24	0.00
59.50	0.00	0.536	798.24	0.00
59.75	0.00	0.536	798.24	0.00
60.00	0.00	0.536	798.24	0.00