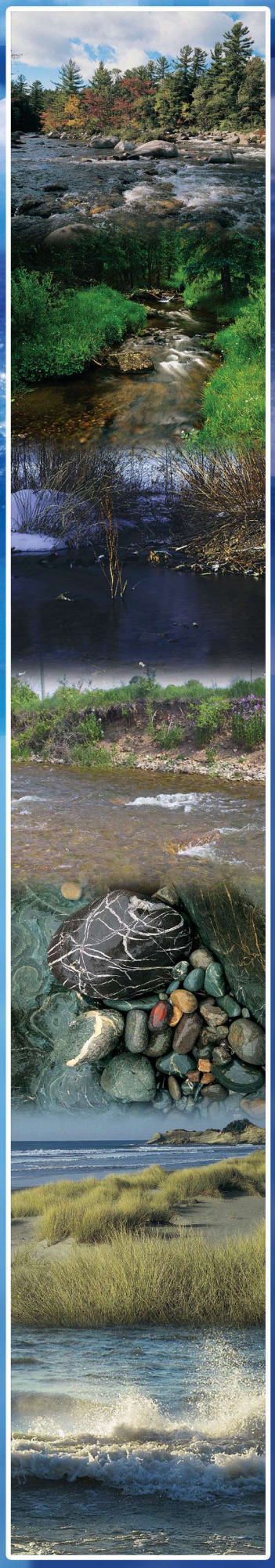

water's edge
ENVIRONMENTAL SOLUTIONS TEAM LTD.

Hydrologic Modelling Report

Parks and Jessups Creeks Floodplain Mapping Project

North Bay – Mattawa Conservation Authority

February 7, 2023

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February 7, 2023
WE 18045

Mr. Kurtis Romanchuk, P.Eng.
North Bay-Mattawa Conservation Authority
15 Janey Ave.
North Bay, Ontario
P1C 1N1

Dear Mr. Romanchuk:

RE: Parks and Jessups Creeks Hydrologic Modelling, North Bay-Mattawa Conservation Authority

1. INTRODUCTION

Water's Edge was authorized by the North Bay-Mattawa Conservation Authority (NBMCA) to develop a hydrologic model of the Parks and Jessups Creeks Watersheds following current design standards. HEC-HMS was used to develop the model. The model was run for the 2, 5, 10, 25, 50, and 100-year return period storms, as well as the Timmins Regional Storm. Model calibration was based on the parameter adjustments used in the Chippewa Creek Floodplain Mapping Project. For each return period, multiple storm distributions and durations were used to ensure that the flood risk was properly characterized.

This report includes background information of the watershed, detailed methodology for developing the model, followed by a summary of the results.

2. BACKGROUND REVIEW

We have completed our assessment of the creek in accordance with the approved project Terms of Reference. Data sources for the analysis include:

- Reports and Geospatial data from NBMCA;
- KBM Resources Group LiDAR data and report;
- Physiography of Southern Ontario by Chapman & Putnam (digital data from Ministry of Northern Development and Mines (MNDM));
- Ontario Flow Assessment Tool (OFAT);
- Ontario Base Mapping (OBM);
- Site Survey and Field Assessments (Water's Edge, 2018, 2019); and,
- Discussions with NBMCA and City of North Bay staff.

The Parks and Jessups Creek Watersheds are located south of the Chippewa Creek Watershed and covers a portion of the urban area of North Bay close to Lake Nipissing. The Parks Creek Watershed borders the Chippewa Creek Watershed from north of Circle Lake to the CN/ONR/OVR Rail Junction close to Main St. The Parks Creek Watershed is 16.4 km^2, and the Jessups Creek Watershed is 1.7 km^2 according to the delineation in HEC-GeoHMS.

The main channel of Parks Creek is about 6.3 km long with an average slope of 0.15 %. The main channel of Jessups Creek is about 1.5 km long with an average slope of 0.3%. Floodplain mapping will be conducted through both watersheds. The watersheds are shown in **Map 1** in **APPENDIX A**Error! Reference source not found.. Additional maps showing reach names and longest flowpaths are also included in **APPENDIX A.**

The land use in both watersheds is primarily wooded wetland areas in the headwaters with urban areas downstream towards Lake Nipissing. The average annual temperature in the region is 4.6 °C and the

average annual precipitation is 989 mm according to the Ontario Flow Assessment Tool (OFAT) (MNRF, 2020).

3. METHODOLOGY

A hydrologic model of the Parks and Jessups Creeks Watersheds was developed in HEC-HMS and run for the 2, 5, 10, 25, 50, and 100-year return period storms using SCS Type II and Chicago Storm rainfall distributions. The Timmins storm was used as the Regional Event. Areal reduction was not conducted as the watersheds are small enough that the Timmins Storm would likely affect the entire watershed. No flow gauges are present in the watersheds, so the flood frequency analysis could not be conducted directly. Instead, the results of the Chippewa Creek flood frequency analysis were pro-rated based on the watershed drainage area. Parks and Jessups Creeks lie within Zone 3 of the Flood Hazard Criteria defined by the MNRF, which means that the higher of the Timmins storm and the 100-year flood should be used for design purposes (MNRF, 2002).

The model parameters were adjusted based on the Chippewa Creek model calibration due to a flow gauge not being present within Parks or Jessups Creeks. The Chippewa Creek Watershed was calibrated using selected storms from the available hourly precipitation and flow data between 1974 and 1995. The calibrated model was then used to run the design storms and the Timmins storm. The storm return period and duration that produced flows closest to the flood frequency analysis were used for hydraulic modelling and floodplain mapping.

3.1 Frequency Analysis

A single-station flood frequency analysis was conducted to provide flood return period estimates for Chippewa Creek. The flood magnitudes are considered to be accurate if the period of record is at least half as long as the return period flow that is being calculated (MNRF, 2002). Since the period of record on Chippewa Creek is 41 years, the 50-year return period flow is the largest that can be considered accurate. The frequency analysis was conducted using the Consolidated Frequency Analysis (CFA) version 3.1 from Environment Canada. The program uses the hydraulic database from the ECCC Data Explorer as its data source.

The flows produced from each method were then adjusted based on drainage area for both watersheds. The calculated return period flows for Parks and Jessups Creeks are shown in **Table 1**, with flows that were not considered reliable due to the period of record highlighted.

Table 1: Flood Frequency Analysis pro-rated from Chippewa Creek

Return Period (years)	Parks Creek			Jessups Creek		
	Generalized Extreme Value (m^3/s)	3 Parameter Lognormal (m^3/s)	Log-Pearson Type 3 (m^3/s)	Generalized Extreme Value (m^3/s)	3 Parameter Lognormal (m^3/s)	Log-Pearson Type 3 (m^3/s)
1.003	1.8	2.4	2.4	0.2	0.2	0.2
1.05	2.5	2.7	2.7	0.3	0.3	0.3
1.25	3.2	3.2	3.2	0.3	0.3	0.3
2	4.1	4.0	4.0	0.4	0.4	0.4
5	5.5	5.4	5.4	0.6	0.6	0.6
10	6.4	6.5	6.5	0.7	0.7	0.7
20	7.3	7.7	7.7	0.8	0.8	0.8
50	8.6	9.3	9.6	0.9	1.0	1.0
100	9.5	10.7	11.2	1.0	1.1	1.2
200	10.5	12.2	13.0	1.1	1.3	1.3

500	11.9	14.4	15.8	1.2	1.5	1.6

The analysis of the Chippewa Creek flood frequency analysis determined that the single station flood frequency analysis likely underestimated peak flows, especially for large events due to its relatively short period of record. Since no escarpment is present in Parks or Jessups Creeks, the watershed travel time and peak flow attenuation are likely higher proportionally compared to Chippewa Creek. This suggests that the actual peak flows may be lower than what the frequency analysis suggests, especially for more frequent events.

It was found that the Ontario Flow Assessment Tool (OFAT) Primary Multiple Regression produced return period peak flows in Chippewa Creek that were supported by historical observations of large events and eliminated the influence of the short period of record.

To obtain more reliable estimates of the extreme events for Parks and Jessups Creeks, OFAT was used to conduct regional flood frequency analysis, which incorporates data from other stations to produce a more robust estimate. The results produced in OFAT are shown in **Table 2**. The drainage area delineated for both Parks and Jessups Creeks were significantly smaller in OFAT compared to the HEC-GeoHMS delineation, indicating that the results are likely underestimating the actual peak flows, and that the flows should be used as a lower bound for the selection of flows for the hydraulic model.

Table 2: OFAT Flood Frequency Analysis

Return Period (years)	Parks Creek Outlet		Jessups Creek Outlet	
	Index Flood Flow (m^3/s)	Primary Multiple Regression (m^3/s)	Index Flood Flow (m^3/s)	Primary Multiple Regression (m^3/s)
1.25	2.50		0.26	
2	2.63	2.92	0.27	0.40
5	3.24	4.45	0.33	0.67
10	3.77	5.57	0.39	0.87
20	4.38	6.76	0.45	1.10
50	5.22	7.67	0.54	1.29
100	5.87	8.81	0.6	1.53
200	6.57		0.68	
500	7.36		0.76	

3.2 Terrain Model Development

The digital terrain model (DTM) used for watershed delineation was developed based on LiDAR point cloud data produced by KBM Resources Group in the fall of 2018 during snow-free, leaf-off conditions, with minimal flow in the creek. Survey data collected by Water's Edge was used for data verification by KBM. The point cloud data included all surface features including vegetation and buildings. For watershed delineation, it was necessary to remove the vegetation and buildings to accurately represent the surface drainage properties. The necessary geospatial information was obtained from the KBM report prior to data manipulation (KBM Resources Group, 2018).

To process the raw LiDAR point cloud data into the surface raster needed for hydrologic and hydraulic modelling, Whitebox GAT 3.4 was used. Whitebox is an open source GIS software package developed at the University of Guelph that includes advanced tools for LiDAR processing and raster creation. The first processing step was to create a raster from the point cloud data. The LiDAR points were classified as first return, second return, etc. based on the order that the reflected laser was detected by the sensor on the plane. To get an accurate representation of the ground surface and to eliminate most of the vegetation, the last return was used to define the elevation of the raster cell in which it lies. A 1m grid was adopted since it

is computationally more difficult to process grids of finer resolutions over the relatively large scale of the watershed. The resulting raster had many gaps where there were not enough reflected LiDAR points to define a cell due to the refractive properties of the surface. Gaps were most common in open water areas. The fill tool was used in Whitebox to interpolate values for the missing data based on the surrounding areas. The final processing step was to remove off-terrain objects including buildings and vegetation. This tool analyzed the surface model to identify high slopes representative of the edges of buildings and trees and removed any object that was smaller than 30 m across and interpolated the resulting hole. The resulting surface was largely representative of the natural surface, but still included large buildings such as warehouses. Increasing the threshold size beyond 30 m tended to remove some natural drainage features, which was not desired. This DTM was used as the basis for further manipulations for the hydrologic and hydraulic models.

3.3 Terrain Pre-processing

Following the development of the DTM, additional manipulations were necessary to prepare the surface for use in the hydrologic model. HEC-GeoHMS version 10.1 was used for pre-processing and model development within ArcGIS. The first step was to ensure that flow paths were accurately represented in the DTM. This was accomplished using a shapefile of creek centerlines and burning-in a channel through apparent obstructions such as bridges. The next step was to fill in depressions without apparent outlets. This step ensures that every cell within the watershed contributes flow to the outlet and there is no depression storage to attenuate peak flows, resulting in a more conservative representation of surface conditions. Following the above steps, a linear workflow was followed that started with creating a flow direction raster that indicated which direction a given cell would drain to. Next, a flow accumulation raster was created that represented the number of upstream cells contributing to a given cell. A stream network was then defined based on a minimum number of contributing cells, in this case streams were defined if the upstream drainage area was greater than 50 ha. For Jessups Creek, this number was adjusted to 25 ha to provide additional discretization and ensure that more than one subcatchment was present. The subcatchments were delineated based on the flow change locations. The catchment grid was converted into a polygon shapefile and metadata was added providing information on the connectivity of adjacent catchments. The stream raster was also converted into a polyline shapefile. Shapefiles were necessary to allow modelling information to be represented spatially in the attribute tables.

DTMs are often corrected through a hydro-flattening procedure where breaklines are developed to represent the channel centerline and bottom on banks, which is then meshed into the terrain model to accurately represent the land surface and the channel bottom. This procedure was attempted, but due to the very low water levels in most of the watershed it appeared that the bottom of the channel had been captured. The LiDAR data was captured in the Fall of 2018 close to minimum flow conditions, so it is likely that outside storage areas that the flow depth was nearly zero. In some areas, the survey data points indicated a slightly higher elevation than the LiDAR. This error is likely because the surveyed water depth was smaller than the margin of error associated LiDAR data. The difference in channel elevations between the survey data and the LiDAR data are small and unlikely to cause a significant difference in flows or water surface elevations, especially for the most extreme events.

3.4 Model Preparation

Following the preprocessing steps, the automatically delineated catchments needed to be divided further based on critical locations, such as at the Fisher St. flow gauge. Once the subcatchments were satisfactory, several parameters were extracted based on the surface properties, listed below:

- River length
- River slope
- Basin slope
- Longest flowpath
- Basin centroid
- Centroid elevation
- Centroidal longest flowpath
- TR-55 Time of Concentration parameters

A plot of the channel elevation is shown in **APPENDIX A**. Model characteristics used in calculations are shown in **APPENDIX B.** The listed parameters, except for the TR-55 parameters were stored in the attribute tables of the shapefiles. The TR-55 parameters were exported in an excel table. The full table including all input parameters can be seen in **APPENDIX E**.

3.4.1 Curve Number Grid

A Curve Number grid was created to assign each raster cell a Curve Number based on the soil and landuse characteristics of that point. Curve Numbers were selected from the TR-55 document from the NRCS (NRCS, 1986). This ensures accurate geospatial representation of runoff characteristics. Ontario soil survey data was used to define soil characteristics. The landuse data was adapted from City of North Bay land use data, MNRF forest cover data, and review of aerial imagery to produce the most accurate representation of current landuse conditions in the watersheds. The City of North Bay data was not suitable on its own, as it included future land use classifications in the undeveloped parts of the watershed, with many forested areas identified as industrial or rural. The landuse categories were assigned based on the NRCS landuse classifications to facilitate the assignment of Curve Numbers. Some assumptions were made based on the landuse description and the information needed to assign a Curve Number in the NRCS document. All landuses were assumed to be in good condition. For residential districts, it was assumed that the average lot size was 1/4 of an acre based on lot measurements of several houses in the city from satellite imagery.

Following the preparation of the soil and landuse data, the layers were combined to create a layer that included both landuse and soil data. A lookup table was created to assign a Curve Number based on the landuse and the hydrologic soil group. The lookup table is shown in **Table 3**. The output yielded a Curve Number raster that was used to determine a weighted-average Curve Number for each subcatchment, which was then recorded in the attribute table of the subcatchment shapefile.

Table 3: Curve Number Lookup Table

Landuse	Hydrologic Soil Group			
	A	B	C	D
Commercial	89	92	94	95
Industrial/Institutional	81	88	91	93
Open Space/Park	39	61	74	80
Residential	61	75	83	87
Rural	67	78	85	89
Water	100	100	100	100
Forest	30	55	70	77
Brush	30	48	65	73

3.4.2 Impervious Areas

The percentage of impervious areas in each subcatchment were determined using a similar method to the Curve Number grid. The landuse data was combined with the subcatchment layer and a Percent Impervious was assigned to each land use type, according to the average Percent Impervious area in the TR-55 document (NRCS, 1986). The impervious areas associated with each landuse are shown in **Table 4**.

Table 4: Percent Impervious Areas based on Landuse

Landuse	Average % Impervious
Commercial	85
Industrial/Institutional	72
Open Space/Park	0

Residential	38
Rural	0
Water	100
Forest	0
Brush	0

3.5 HEC-HMS Model

Following the model preparation in HEC-GeoHMS, the basin model was exported and then imported into HEC-HMS 4.3. This step automatically assigned all data from the shapefile attribute tables to the appropriate locations in HEC-HMS. The main components of the hydrologic model are the loss method, the transform method, and the routing method. Each of these components are discussed below. Initial estimates of each parameter are shown in **APPENDIX B**.

3.5.1 Loss Method

The loss method selected was SCS Curve Number, due its relatively small data requirements and ease of calibration. The development of the Curve Number grid was described in section 3.4.1. In addition to the Curve Number and Percent Impervious determined previously, an Initial Abstraction was also calculated automatically in HEC-HMS. This calculation used the SCS method:

$$I_a = 0.2 * \frac{1000}{CN} - 10$$

3.5.2 Routing Method

The Muskingum-Cunge method for channel routing was selected because it is based on physical parameters and therefore do not require extensive calibration to use. According to the US Army Corps of Engineers, the Muskingum-Cunge routing method is applicable for use in large drainage networks with compound cross-sections (US Army Corps of Engineers, 1991). The Muskingum-Cunge method is a modification of the Muskingum method where the main channel and overbank flows are decoupled. The required data for Muskingum-Cunge includes the reach length, average slope, cross-section data, and Manning's roughness coefficients. The reach lengths and slopes were determined during preprocessing, and a representative cross-section was cut from the DTM for each reach. Manning's roughness coefficient (Manning's n) was assigned to the main channel as well as left- and right-overbank areas. Estimates of Manning's n were determined by analyzing the reach characteristics including riparian vegetation to determine the most appropriate roughness coefficient from Open Channel Hydraulics (Chow, 1959). The initial values of Manning's n were selected as 0.035 for the main channel and 0.08 for overbank areas, as almost all riparian areas included some forest or dense brush that would provide similar degrees of roughness.

3.5.3 Transform Method

The Clark Unit Hydrograph was used as the transform method in the model. This method uses linear reservoir storage calculations to determine how the input hydrograph is translated and attenuated through a subcatchment. The two input parameters needed for these calculations are the Time of Concentration and a Storage Coefficient. The initial estimate of the Time of Concentration in each subcatchment was determined using the TR-55 method in HEC-GeoHMS.

The Storage Coefficient is dependent on the Time of Concentration and was calculated following the method described by Sabol (1988):

$$\frac{T_c}{R} = 1.46 - 0.0867 \frac{L^2}{A}$$

Where, R is the Storage Coefficient (hr), L is the longest flow path (km) and A is the subcatchment area (km^2).

3.5.4 Detention Storage

Several storage areas are present in the Parks Creek Watershed, particularly behind the four highway and railroad embankments along the main channel. One potential storage area is present in Jessups Creek. Most of the detention storage areas were deemed to be of little significance due to their location in a wetlands and the lack of impacts to property. According to the MNRF Technical Guide on Flooding Hazard Limits, SWM ponds cannot be used to provide reduction in flood flows (MNRF, 2002). The guide also states that the unregulated flows should be used to determine the downstream flood hazard limit for minor reservoirs. Therefore, excluding these storage areas will not affect channel flows.

One detention storage area in Parks Creek was determined to be of particular importance, as two outlets to different subcatchments were present. The storage area is located east of Marshall Ave. E and Booth Rd. between two railway embankments. Inflows flow from the southeast and outflows are split up- and downstream of the railway embankments. An elevation-storage relationship was developed for the area based on the terrain data. The reservoir was added to HEC-HMS using the elevation-storage relationship and the two outlet structures. The main outflow of the reservoir is to the channel upstream of the railway embankment, while the secondary outflow had a higher invert elevation and flowed downstream of the embankment into Parks Creek. The reach downstream of the embankment flowing into Parks Creek was not delineated in HEC-GeoHMS, so a new reach was manually delineated based off the flow accumulation raster developed during the pre-processing procedures. The new reach was named Reach 2a in order to maintain the existing reach names in the rest of the watershed. Reach 2a is included in **Map 2**, Reach names. A portion of the subcatchment that crossed the railway embankments (Subcatchment 9) was also found to contribute to Reach 2a, as there was no drainage path across the embankments during high flows. The subcatchment was divided into Subcatchment 9 northeast of the embankment and Subcatchment 9a southwest of the embankment. The same modelling parameters were maintained for both new subcatchments.

3.5.5 Precipitation Data

Once the basin had been set up in the model, the precipitation data was entered. The Environment Canada precipitation gauge at the North Bay Airport was used to develop the design storms. An Intensity-Duration-Frequency curve was provided for the gauge, whose ordinates were used to determine rainfall volumes for the SCS and Chicago Storm distributions. For SCS design storms, the total rainfall volume was multiplied by the SCS Type II unit hyetograph of a specified duration to produce the hyetograph that was entered into the model. No areal reduction was performed for the return period events due to the small size of the watersheds.

The Chicago Storm distribution is more complicated and uses separate functions to define the rising and falling limbs of the hyetograph. Rather than a rainfall volume, the Chicago Storm distribution uses three dimensionless parameters, a, b, and c, that are derived from an IDF curve (Alegre, 2016). In addition to those parameters, the ratio of peak timing to the total storm duration is needed. This value is recommended to be 0.38 in Ontario, according to the MTO Drainage Design Manual (Ministry of Transportation Ontario, 1997). 4-hour duration Chicago Storm distributions for each return period were developed using this method. The Chicago Storm is useful for analysis as the return period for the precipitation event and the resulting flood event are usually similar. The Chicago Storm parameters are the same as those used in the Chippewa Creek hydrologic modelling, as both are based on the IDF Curve for the North Bay Airport. The Chicago Storm parameters for each return period are shown in **Table 5**, below.

Table 5: Chicago Storm Parameters

Return Period (years)	2	5	10	25	50	100
A	455.34	570.60	649.63	752.39	831.54	911.02
B	4.33	3.19	2.78	2.43	2.26	2.14
C	0.71	0.70	0.70	0.70	0.70	0.70

3.6 Sensitivity Analysis

A sensitivity analysis was conducted to determine the relative effect of important model parameters. The Curve Numbers, Manning's n, and Time of Concentration coupled with the Storage Coefficient were adjusted to determine their relative impact on the peak flows of the model. The parameters were multiplied by 0.9, 1, and 1.1. The Storage Coefficients were recalculated based on the adjusted Time of Concentrations. The 100-year, 24-hour SCS storm was used for all sensitivity analysis runs. The sensitivity analysis is only used to identify the most sensitive parameters for adjustment in the calibration process. The percentage of impervious areas in each subcatchment are also linked to the Curve Numbers, so they will have a similar effect on the model that is scaled based on the overall proportion of impervious areas in the watershed.

It was found that the model peak flows were more than three times as sensitive to changes in the Curve Numbers than Manning's n and Time of Concentration. The sensitivity analysis results for Parks and Jessups Creeks are shown in **Figure 2**, and **Figure 2**, respectively. The parameter value adjustments for each sensitivity analysis run are shown in **APPENDIX D**.

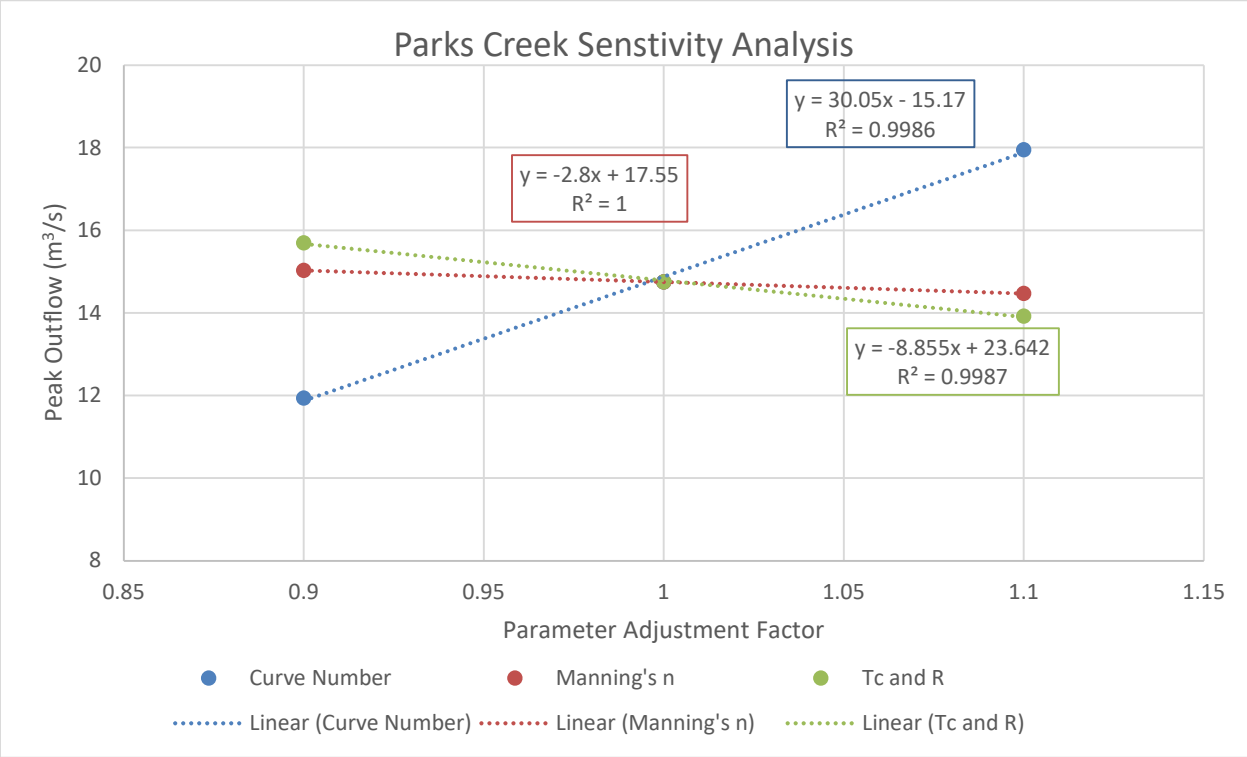

Figure 1: Parks Creek Sensitivity Analysis

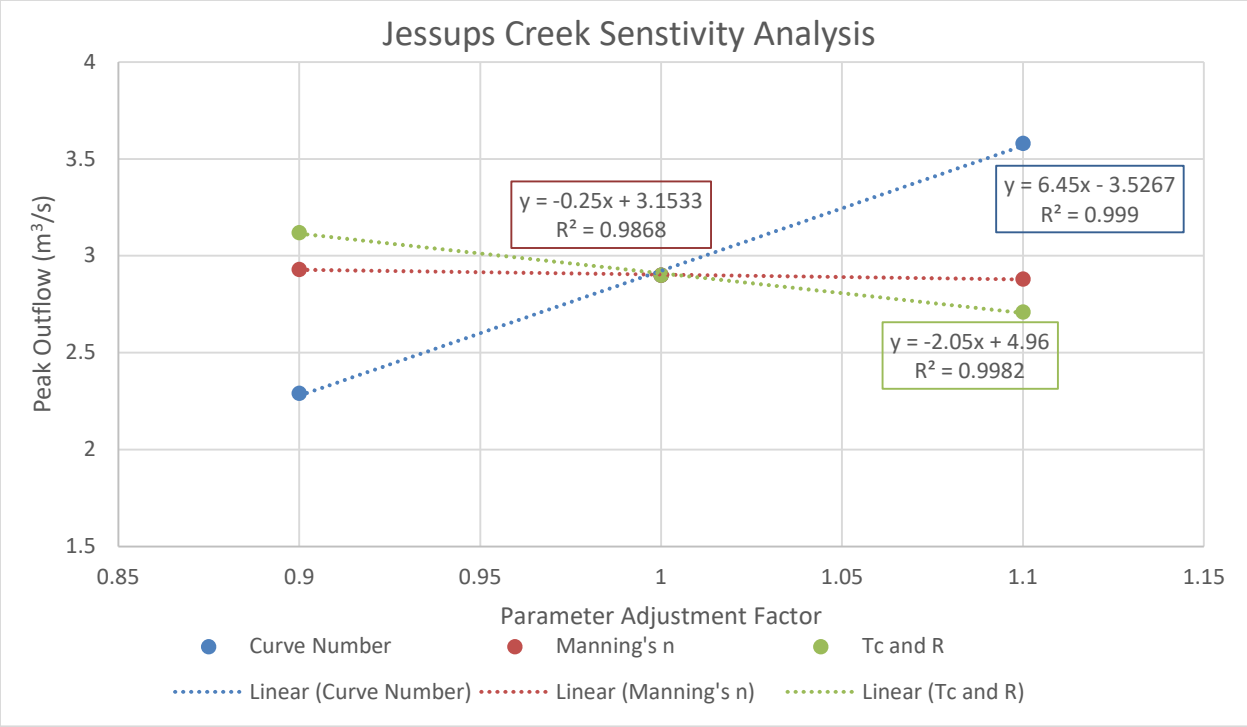

Figure 2: Jessups Creek Sensitivity Analysis

3.7 Calibration

No flow gauges were present in the study watersheds, so direct calibration was not possible. The return period flows produced from OFAT are also considered unreliable because of the large difference in watershed area. The best option to adjust the model peak flows was therefore to use the calibration data and parameter adjustments from the Chippewa Creek Calibrated model. Chippewa Creek was calibrated using six observed events and the Curve Numbers, Manning's Roughness Coefficients, Percent Impervious, Time of Concentration, and Storage Coefficients were adjusted to match the magnitude and timing of the observed peak flow.

For additional information on calibration parameters and results, please see **APPENDIX C**.

4. RESULTS

A summary of the HEC-HMS modelling results for the design storms is presented here. For detailed data on flows in each reach, junction, and subcatchment, please see **APPENDIX F**. Peak flows at the outlets of Parks and Jessups Creeks are shown for each design storm in **Table 6**.

Table 6: Peak Flow Summary Table

Return Period (years)	Rainfall Depth (mm)	Duration (hours)	Distribution	Outlet Flow (m^3/s)	
				Parks Creek	Jessups Creek
2	41.8	6	SCS Type II	1.79	0.46
2	51.4	12	SCS Type II	2.64	0.59
2	63.1	24	SCS Type II	3.79	0.72
2	37.0	4	Chicago	1.45	0.37
5	83.0	6	SCS Type II	3.04	0.74
5	67.4	12	SCS Type II	4.59	0.99
5	54.6	24	SCS Type II	6.38	1.25

5	48.3	4	Chicago	2.35	0.61
10	96.2	6	SCS Type II	4.08	0.99
10	78.0	12	SCS Type II	6.09	1.31
10	63.2	24	SCS Type II	8.33	1.63
10	55.7	4	Chicago	3.17	0.77
25	112.6	6	SCS Type II	5.53	1.34
25	91.2	12	SCS Type II	8.16	1.73
25	73.8	24	SCS Type II	10.87	2.13
25	65.1	4	Chicago	4.34	1.07
50	124.5	6	SCS Type II	6.69	1.61
50	100.9	12	SCS Type II	9.82	2.06
50	81.6	24	SCS Type II	12.74	2.51
50	72.0	4	Chicago	5.28	1.30
100	136.2	6	SCS Type II	7.93	1.89
100	110.4	12	SCS Type II	11.38	2.39
100	89.4	24	SCS Type II	14.75	2.90
100	78.9	4	Chicago	6.28	1.54
>100	193	12	Timmins	35.96	6.30

4.1 Discussion

For Parks Creek, each return period produced a range of flows that were larger or smaller than the frequency analysis depending on the distribution and duration. This shows that the model parameters are generally in the right range and provides some flexibility in choosing the storm that would best represent the return period flows from the frequency analysis. The SCS 12-hour distribution was found to most closely match the results of the frequency analysis, with peak flows that are slightly larger for the less frequent events that will be used for floodplain mapping.

For Jessups Creek, the modelled peak flows were almost all larger than the flood frequency analysis. The Chicago Storm distribution closely matched the frequent events but were moderately larger for the extreme events. The largest difference was for the 100-year storm, where the Chicago Storm yielded a peak flow of 1.5 m^3/s while the frequency analysis suggested that the peak flow was as high as 1.2 m^3/s. Additional uncertainty is introduced when pro-rating the Chippewa Creek frequency analysis results because Jessups Creek is only 5% of the size of Chippewa Creek, and the size of the watershed will have a significant impact on its hydrologic conditions and resulting peak flows.

For both Parks and Jessups Creeks, the storm distribution that produced flows that most closely matched the frequency analysis was the storm with a duration most similar to the watershed Time of Concentration. This means that the peak flow at the creek outlet occurs before the storm is over, and that all subcatchments will contribute to the outflow at the same time.

4.2 Selection of Design Storms for Hydraulic Modelling

The primary purpose of the hydrological model is to determine flow rates for use in hydraulic modelling. Based on the available data and comparisons between the frequency analysis and the modelling results from various distributions, the flows resulting from the 12-hour SCS Storm should be used for Parks Creek, and the flows resulting from the 4-hour Chicago Storm should be used for Jessups Creek. The use of these distributions will define the 100-year flow in Parks Creek as 11.4 m^3/s, compared to 11.2 m^3/s in the Log-Pearson Type 3 frequency analysis; the 100-year flow in Jessups Creek will be defined as 1.5 m^3/s, compared to 1.2 m^3/s in the Log-Pearson Type 3 frequency analysis. The Regulatory Floodplain in both watersheds is defined by the Timmins Storm, which has a peak flow of 36 m^3/s in Parks Creek and 6.3 m^3/s in Jessups Creek.

5. SUMMARY

In order to develop a HEC-HMS hydrologic model of the Parks and Jessups Creeks Watersheds, Water's Edge conducted a background review to characterize the watershed, reviewed data provided by NBMCA

and developed a methodology to create the model using the available resources. LiDAR data was captured, processed, and used to delineate the watershed, subcatchments, and drainage network. SCS Curve Numbers were assigned to subcatchments based on the landuse and soil characteristics. The Muskingum-Cunge method was used for channel routing, using reach and channel geometry information from the LiDAR data. The Clark Unit Hydrograph was used as the hydrograph transform method in the model based on the Time of Concentrations calculated using the TR-55 method in HEC-GeoHMS. Design storm distributions were developed using the Environment Canada IDF curve for the North Bay Airport. The model was calibrated using the calibration results from the Chippewa Creek Floodplain Mapping Study.

Based on our review and modelling, we conclude that:

1. In all cases the 24-hour SCS storm produced the largest peak flows;
2. The 12-hour SCS Storm distribution best represents the probable peak flows in Parks Creek and should be used to define the return period floods in the watershed; and,
3. The 4-hour Chicago Storm distribution best represents the probable peak flows in Jessups Creek and should be used to define the return period floods in the watershed.

Respectfully submitted,

Ed Gazendam, Ph.D., P. Eng.,
President, Sr. Water Resources Engineer

Tim Antonio, B.A.Sc., EIT,
Water Resources Scientist

Water's Edge Environmental Solutions Team Ltd.

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APPENDIX A:

Maps and Additional Figures

LEGEND

- Jessups Subcatchments
- ParksSubbasin
- River
- Waterbodies
- City of North Bay

21 20 17 16 15 13 18 14 12 19 8 10 9 11 7 6 7 4 9a 5 3 5 2 4 6 1 2 3 1

N

0 375 750 1,500
Meters

NORTH BAY-MATTAWA CONSERVATION AUTHORITY

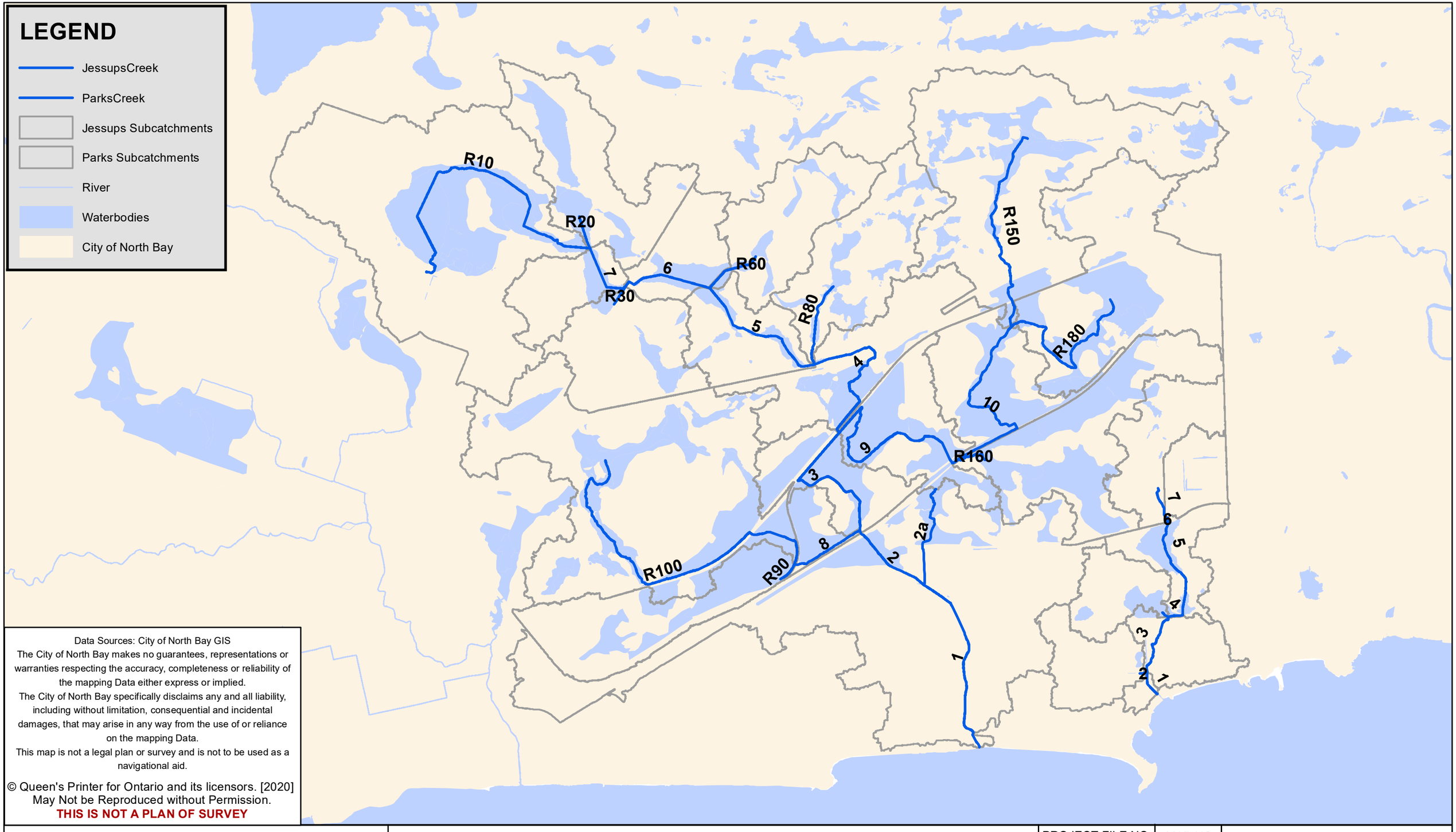
waters edge ENVIRONMENTAL SOLUTIONS TEAM LTD.

PROJECT FILE NO.	MAP NO.
19037	1

DATE
October 9, 2020

Parks and Jessups Creeks Floodplain Mapping Project North Bay, Ontario

Subcatchment Names



Data Sources: City of North Bay GIS

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This map is not a legal plan or survey and is not to be used as a navigational aid.

THIS IS NOT A PLAN OF SURVEY

0 375 750 1,500

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water's edge ENVIRONMENTAL SOLUTIONS TEAM LTD.

PROJECT FILE NO.	MAP NO.
19037	1

DATE

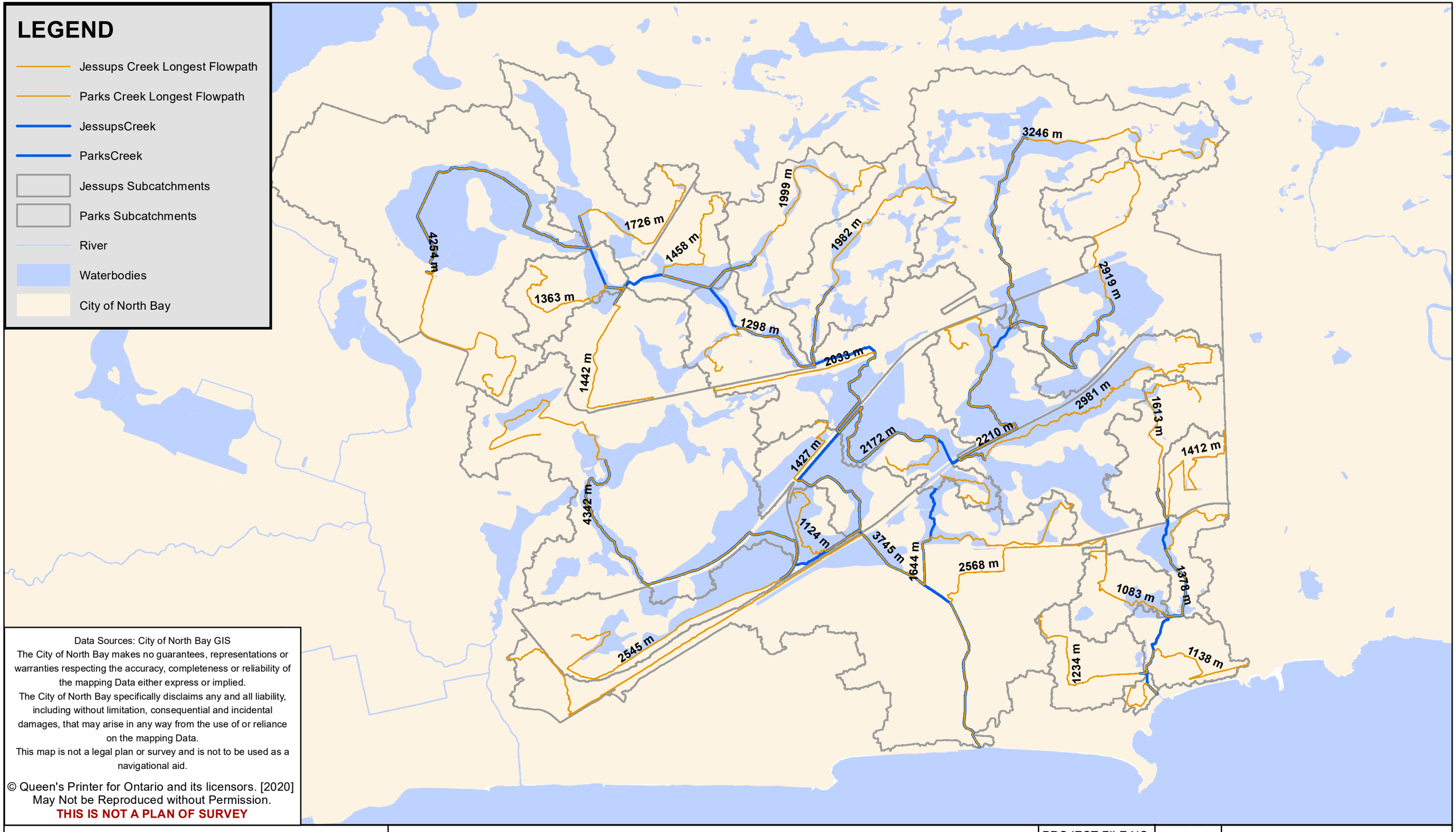
October 9, 2020

Parks and Jessups Creeks Floodplain Mapping Project North Bay, Ontario

Reach Names

LEGEND

- Jessups Creek Longest Flowpath
- Parks Creek Longest Flowpath
- JessupsCreek
- ParksCreek
- Jessups Subcatchments
- Parks Subcatchments
- River
- Waterbodies
- City of North Bay



0 375 750 1,500
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NORTH BAY-MATTAWA CONSERVATION AUTHORITY

water's edge ENVIRONMENTAL SOLUTIONS TEAM LTD.

PROJECT FILE NO.	MAP NO.
19037	1

DATE
October 9, 2020

Parks and Jessups Creeks Floodplain Mapping Project North Bay, Ontario

Longest Flowpaths

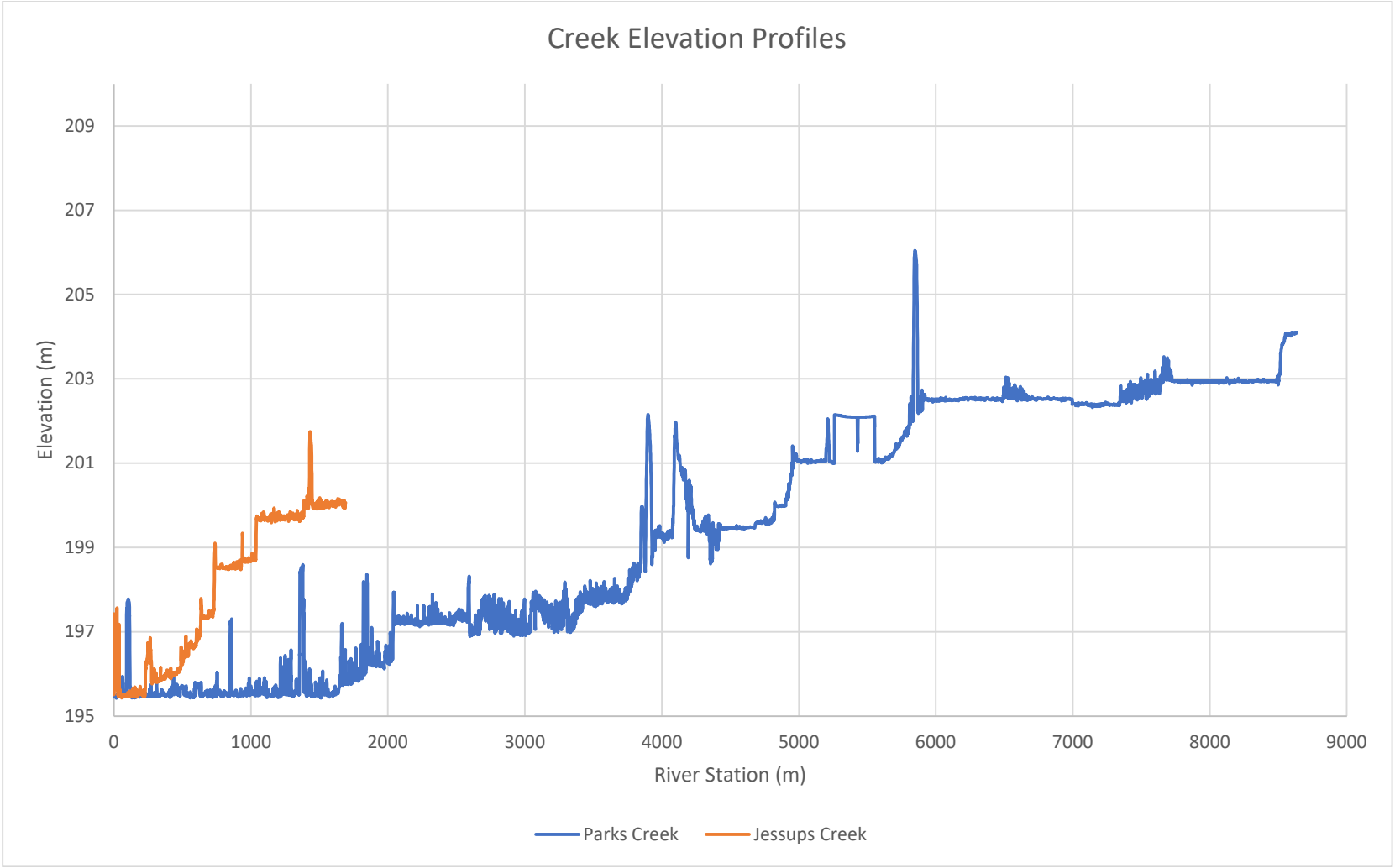

Figure 1: Creek Elevation Profiles

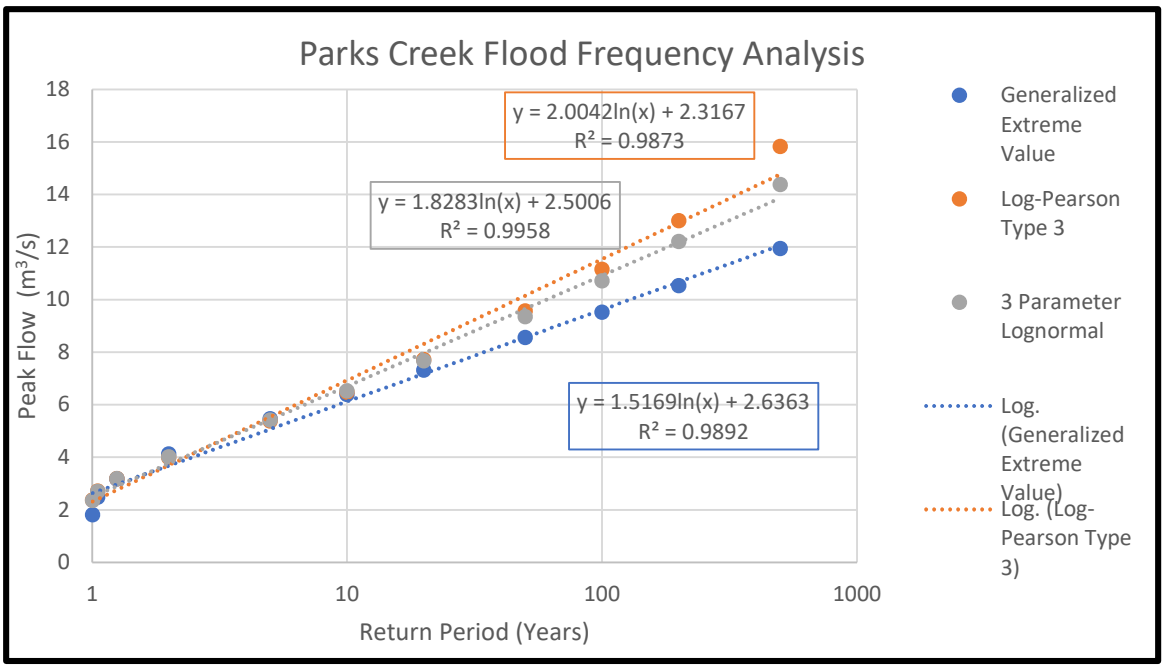

Figure 2: Parks Creek Flood Frequency Analysis Plot

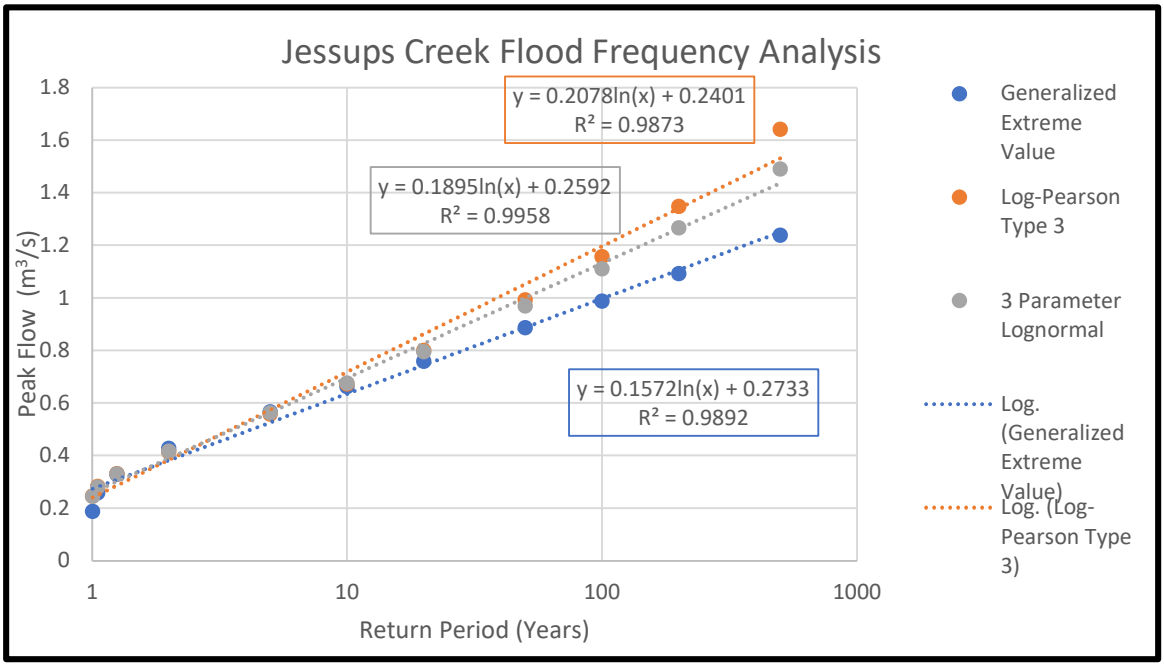

Figure 3: Jessups Creek Flood Frequency Analysis Plot

APPENDIX B:

Model Characteristics and Initial Parameter Estimates

water's edge
ENVIRONMENTAL SOLUTIONS TEAM LTD.

Table 1: Parks Creek Subbasin Characteristics

Subbasin	Area (km^2)	Basin Slope (m/m)	Longest Flowpath (m)
1	2.41	7.5	5023
2	0.38	9.8	1427
3	0.13	7.9	1124
4	1.99	11.5	4342
5	0.61	8.5	2545
6	0.50	8.4	2631
7	0.83	6.1	2981
8	0.51	7.4	2210
9	1.17	9.9	2919
10	1.70	10.3	3246
11	0.62	13.4	2033
12	0.67	10.8	1982
13	0.37	17.6	1298
14	0.56	11.4	1999
15	0.30	14.6	1458
16	0.55	14.5	1442
17	0.29	13.0	1363
18	0.69	13.3	1726
19	2.08	9.3	4254

Table 2: Jessups Creek Subbasin Parameters

Subbasin	Area (km^2)	Basin Slope (m/m)	Longest Flowpath (m)
1	0.03	5.6	557
2	0.29	6.5	1234
3	0.25	5.7	1138
4	0.25	7.3	1083
5	0.26	9.0	1378
6	0.19	6.8	1412
7	0.38	6.2	1613

Table 3: Parks Creek Reach Characteristics

Reach	Length (m)	Channel Slope (m/m)
1	1278.6	0.001
2	580.9	0.000877
3	1184.8	0.001106
4	1266.1	0.001501
5	981.5	0.002737
6	614.1	0.000622
7	410.6	0.00001
8	506.7	0.000633
9	1765.4	0.000629
10	1512.1	0.001858
R10	2315.5	0.000681
R100	2495.7	0.002781
R150	1504.6	0.004804
R160	225.3	0.002353
R1640	719.7	0.001
R180	1331.0	0.001022
R20	225.0	0.000258
R30	146.5	0.00097
R60	402.3	0.004027
R80	589.6	0.017229
R90	142.2	0.00183

Table 4: Jessups Creek Reach Characteristics

Reach	Length (m)	Channel Slope (m/m)
1	178.7	0.001
2	51.6	0.004069
3	452.6	0.003358
4	51.3	0.005649
5	829.1	0.003437
6	2.4	0.00414
7	230.1	0.001043

Table 5: Parks Creek Initial Subbasin Parameter Estimates

Subbasin	CN (AMC II)	Percent Impervious	Time of Concentration (hours)	Storage Coefficient (hours)
1	76.1	38.8	2.02	1.96
2	79.3	46.5	3.30	2.64
3	63.5	16.7	1.37	1.64
4	53.1	5.1	0.73	0.74
5	53.0	5.8	1.48	1.77
6	63.0	25.9	1.98	2.38
7	60.6	19.9	2.61	3.14
8	63.0	19.6	1.01	1.15
9	54.0	5.4	1.72	2.06
10	59.8	4.7	1.22	1.46
11	66.0	11.5	2.37	2.85
12	67.1	21.3	1.60	1.92
13	59.3	10.8	1.43	1.55
14	61.2	13.7	0.48	0.45
15	63.2	18.5	0.83	0.88
16	64.7	21.4	0.63	0.75
17	59.5	9.9	0.90	1.08
18	67.1	26.3	0.72	0.81
19	71.9	37.2	0.98	0.87
20	73.8	37.6	2.83	3.40
21	60.3	11.0	0.94	0.86

Table 6: Jessups Creek Initial Subbasin Parameter Estimates

Subbasin	CN (AMC II)	Percent Impervious	Time of Concentration (hours)	Storage Coefficient (hours)
1	79.4	49.7	0.44	0.53
2	71.0	27.8	0.88	1.01
3	66.6	24.4	1.66	1.92
4	64.3	18.2	0.89	1.06
5	61.6	9.8	0.78	0.93
6	73.1	5.1	1.42	1.71
7	68.8	12.9	1.40	1.68

Table 7: Parks Creek Initial Reach Parameter Estimates

Reach	Channel Manning's n	Floodplain Manning's n
Reach-1	0.035	0.08
Reach-10	0.035	0.08
Reach-2	0.035	0.08
Reach-3	0.035	0.08
Reach-4	0.035	0.08
Reach-5	0.035	0.08
Reach-6	0.035	0.08
Reach-7	0.035	0.08
Reach-8	0.035	0.08
Reach-9	0.035	0.08

Table 8: Jessups Creek Initial Reach Parameter Estimates

Reach	Channel Manning's n	Floodplain Manning's n
Reach-1	0.035	0.08
Reach-2	0.035	0.08
Reach-3	0.035	0.08

APPENDIX C:

Model Calibration

Table 9: Parks Creek Calibrated Subbasin Model Parameters

Subbasin	CN (AMC II)	CN (AMC I)	CN (AMC III)	Percent Impervious	Time of Concentration (hours)	Storage Coefficient (hours)
1	83.7	68.3	92.2	25.22	7.22	7.02
2	87.2	74.2	94.0	30.25	11.83	9.46
3	69.9	49.4	84.2	10.83	4.91	5.88
4	58.4	37.1	76.4	3.30	2.63	2.64
5	58.3	37.0	76.3	3.78	5.30	6.34
6	69.3	48.7	83.9	16.81	7.10	8.53
7	66.7	45.7	82.2	12.90	9.37	11.25
8	69.3	48.7	83.9	12.74	3.63	4.12
9	59.1	37.8	76.9	3.59	5.51	7.38
9a	61.4	40.1	78.5	2.84	2.01	2.40
10	65.8	44.7	81.6	3.05	4.36	5.23
11	72.6	52.7	85.9	7.47	8.50	10.21
12	73.8	54.2	86.6	13.82	5.74	6.88
13	65.3	44.1	81.2	7.02	5.12	5.56
14	67.3	46.3	82.5	8.89	1.71	1.60
15	69.5	48.9	84.0	12.02	2.98	3.15
16	71.1	50.9	85.0	13.91	2.26	2.69
17	65.4	44.3	81.3	6.45	3.24	3.87
18	73.8	54.2	86.6	17.08	2.60	2.90
19	79.1	61.4	89.7	24.20	3.51	3.10
20	81.1	64.4	90.8	24.45	10.14	12.18
21	66.3	45.2	81.9	7.17	3.37	3.10

Table 10: Jessups Creek Calibrated Subbasin Model Parameters

Subbasin	CN (AMC II)	CN (AMC I)	CN (AMC III)	Percent Impervious	Time of Concentration (hours)	Storage Coefficient (hours)
1	87.4	74.4	94.1	32.28	1.59	1.90
2	78.0	59.9	89.1	18.06	3.14	3.64
3	73.2	53.5	86.3	15.84	5.94	6.89
4	70.7	50.3	84.7	11.80	3.18	3.80
5	67.7	46.9	82.8	6.38	2.79	3.33
6	80.4	63.3	90.4	3.32	5.09	6.13
7	75.7	56.7	87.8	8.36	5.01	6.02

Table 11: Parks Creek Calibrated Reach Parameters

Reach	Channel Manning's n	Floodplain Manning's n
Reach-1	0.07	0.16
Reach-10	0.07	0.16
Reach-2	0.07	0.16
Reach-3	0.07	0.16
Reach-4	0.07	0.16
Reach-5	0.07	0.16
Reach-6	0.07	0.16
Reach-7	0.07	0.16
Reach-8	0.07	0.16
Reach-9	0.07	0.16

Table 12: Jessups Creek Calibrated Reach Parameters

Reach	Channel Manning's n	Floodplain Manning's n
Reach-1	0.07	0.16
Reach-2	0.07	0.16
Reach-3	0.07	0.16

APPENDIX D:

Sensitivity Analysis

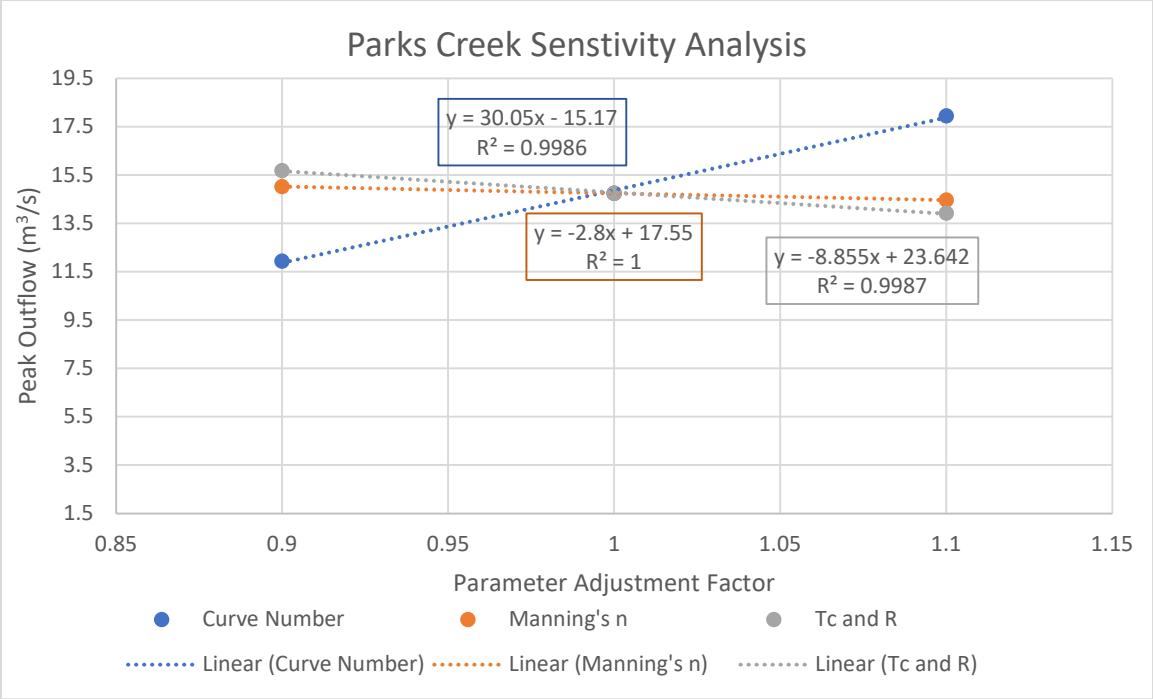

Figure 4: Parks Creek Sensitivity Analysis Plot

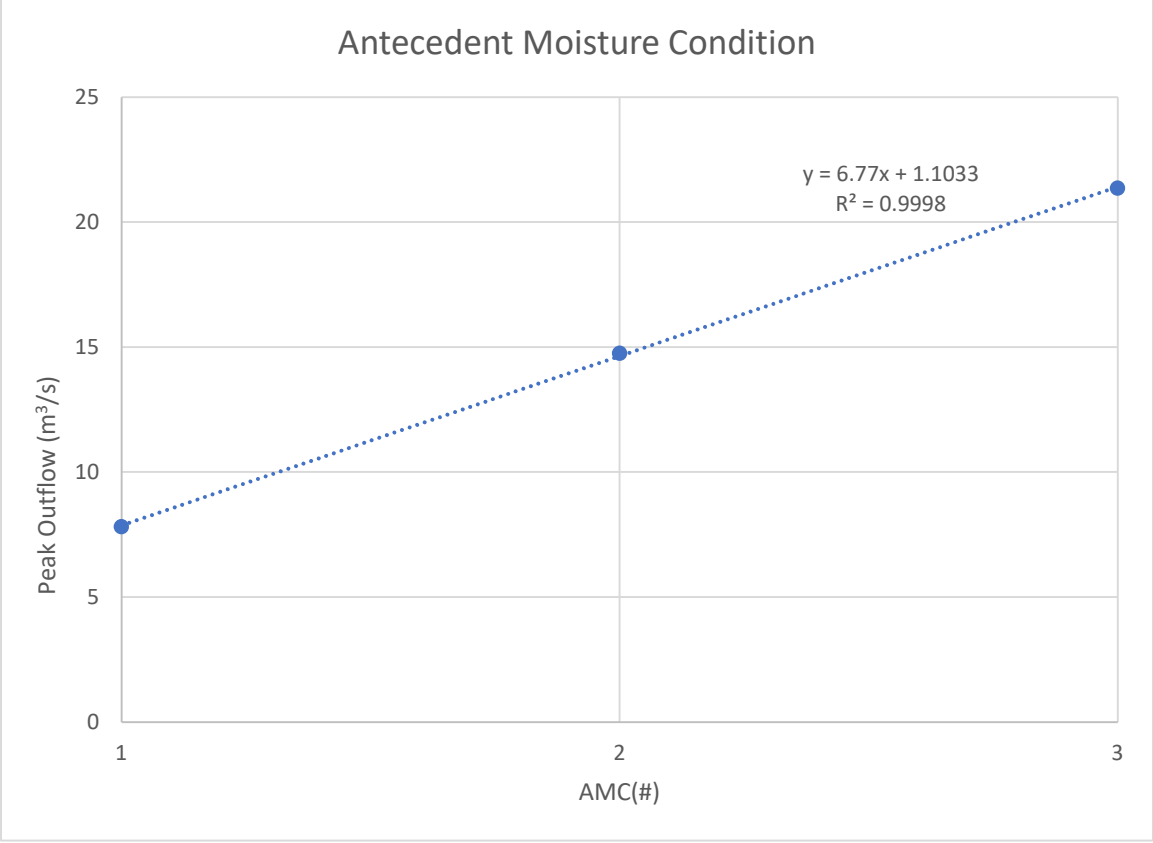

Figure 5: Parks Creek Sensitivity Analysis Plot - Antecedent Moisture Conditions

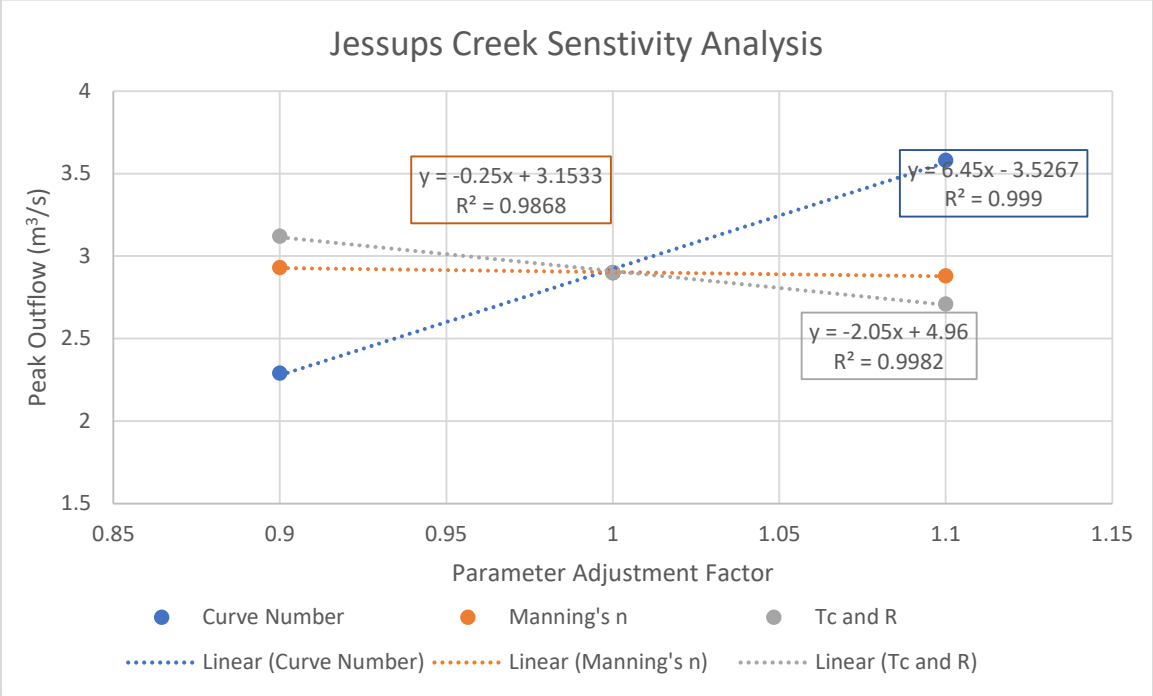

Figure 6: Jessups Creek Sensitivity Analysis Plot

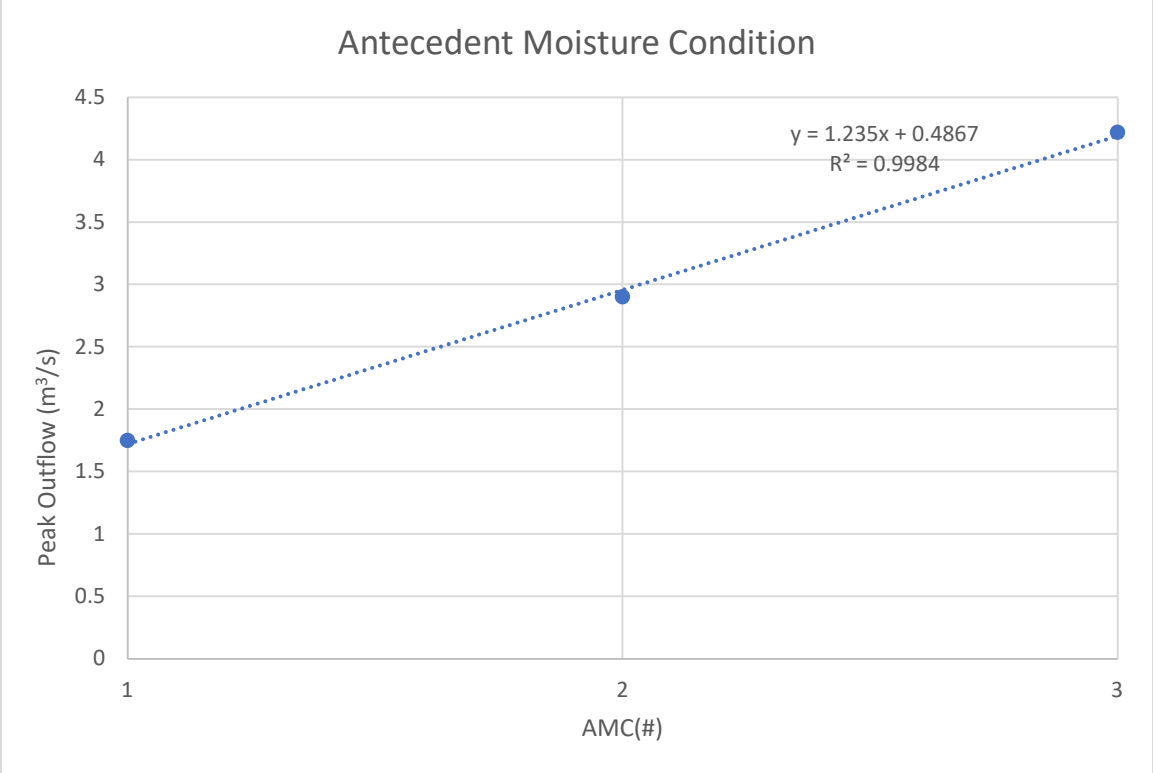

Figure 7: Jessups Creek Antecedent Moisture Condition Sensitivity Analysis

APPENDIX E:

TR-55 Parameters

Table 13: Parks Creek TR-55 Time of Concentration Parameters

Watershed Name	20	21	18	19	16	7	14	17	15	4	8	6	5	9	9a	13	10	11	12	1	2	3
Sheet Flow Characteristics																						
Manning's Roughness Coefficient	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Flow Length (ft)	100	100	100	100	100	100.0001	100	100	99.9999	100	99.9998	100.0002	99.9999	100.0001	100.0001	100.0002	100	99.9999	99.9999	100.0001	99.9998	100.0002
Two-Year 24-hour Rainfall (in)	55.7	55.7	55.7	55.7	55.7	55.7	55.7	55.7	55.7	55.7	55.7	55.7	55.7	55.7	55.7	55.7	55.7	55.7	55.7	55.7	55.7	55.7
Land Slope (ft/ft)	0.0459	0.0374	0.0157	0.0197	0.0958	0.2001	0.0456	0.0442	0.084	0.125	0.1614	0.0174	0.0036	0.0574	0.0489	0.0413	0.0276	0.0489	0.0456	0.0166	0.0256	0.0456
Sheet Flow Tt (hr)	0.04	0.05	0.06	0.06	0.03	0.02	0.04	0.04	0.03	0.03	0.03	0.06	0.12	0.04	0.04	0.04	0.05	0.04	0.04	0.06	0.05	0.04
Shallow Concentrated Flow Characteristics																						
Surface Description (1 - unpaved, 2 - paved)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Flow Length (ft)	6263	4829	3881	4153	3633	5957.9721	2010.3602	5141.5159	4468.3607	2156.6123	3860.1649	7787.5505	2714.4753	2018.16	2505.6428	5615.7888	2842.3014	8943.7019	5116.0504	4856.1543	10360.3128	5282.76
Watercourse Slope (ft/ft)	0.0083	0.0189	0.0136	0.0073	0.0228	0.0036	0.0313	0.0141	0.0115	0.0213	0.0096	0.0052	0.0015	0.008	0.0069	0.0096	0.0081	0.0049	0.0125	0.0039	0.0045	0.0047
Average Velocity - computed (ft/s)	1.47	2.22	1.88	1.38	2.44	0.97	2.85	1.92	1.73	2.35	1.58	1.16	0.62	1.44	1.34	1.58	1.45	1.13	1.80	1.01	1.08	1.11
Shallow Concentrated Flow Tt (hr)	1.18	0.60	0.57	0.84	0.41	1.71	0.20	0.75	0.72	0.25	0.68	1.86	1.21	0.39	0.52	0.99	0.54	2.20	0.79	1.34	2.66	1.33
Channel Flow Characterisitics																						
Cross-sectional Flow Area (ft2)	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Wetted Perimeter (ft)	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
Hydraulic Radius - computed (ft)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Channel Slope (ft/ft)	0.0007	0.0002	0.001	0.001	0.001	0.0027	0.0025	0.004	0.0172	0.0009	0.0024	0.0018	0.001	0.0008	0.001	0.0048	0.0015	0.001	0.001	0.001	0.0003	0.001
Manning's Roughness Coefficient	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Average Velocity - computed (ft/s)	1.31	0.70	1.57	1.57	1.57	2.58	2.48	3.14	6.51	1.49	2.43	2.11	1.57	1.40	1.57	3.44	1.92	1.57	1.57	1.57	0.86	1.57
Flow Length (ft)	7593	734	489	477	1049	8185.8097	2146.8799	1318.1412	1932.9008	2426.0512	2710.6581	462.0935	872.325	5613.9782	10	4934.6298	4307.5316	735.1627	4362.1166	3470.3061	1827.1995	9.5939
Channel Flow Tt (hr)	1.61	0.29	0.09	0.08	0.19	0.88	0.24	0.12	0.08	0.45	0.31	0.06	0.15	1.11	0.00	0.40	0.62	0.13	0.77	0.61	0.59	0.00
Watershed Time of travel (hr)	**2.83**	**0.94**	**0.72**	**0.98**	**0.63**	**2.61**	**0.48**	**0.90**	**0.83**	**0.73**	**1.01**	**1.98**	**1.48**	**1.54**	**0.56**	**1.43**	**1.22**	**2.37**	**1.60**	**2.02**	**3.30**	**1.37**
Longest Flowpath (km)	**4.25**	**1.73**	**1.36**	**1.44**	**1.46**	**4.34**	**1.30**	**2.00**	**1.98**	**1.43**	**2.03**	**2.55**	**1.12**	**2.63**	**0.79**	**3.25**	**2.21**	**2.98**	**2.92**	**2.568**	**3.75**	**1.64**
Watershed Area (km2)	**2.08**	**0.69**	**0.29**	**0.55**	**0.30**	**1.99**	**0.37**	**0.56**	**0.67**	**0.38**	**0.62**	**0.61**	**0.13**	**0.50**	**0.07**	**1.70**	**0.51**	**0.83**	**1.17**	**1.328**	**0.72**	**0.36**
Storage Coefficient (hr)	**3.40**	**0.86**	**0.81**	**0.87**	**0.75**	**3.14**	**0.45**	**1.08**	**0.88**	**0.74**	**1.15**	**2.38**	**1.77**	**2.06**	**0.67**	**1.55**	**1.46**	**2.85**	**1.92**	**1.96**	**2.64**	**1.64**

Table 14: Jessups Creek TR-55 Time of Concentration Parameters

Watershed Name	2	4	3	1	5	7	6
Sheet Flow Characteristics							
Manning's Roughness Coefficient	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Flow Length (ft)	100	100	100	100	100	100.0002	99.9998
Two-Year 24-hour Rainfall (in)	55.7	55.7	55.7	55.7	55.7	55.7	55.7
Land Slope (ft/ft)	0.0745	0.065	0.0141	0.0131	0.0262	0.0026	0.04
Sheet Flow Tt (hr)	0.03	0.04	0.07	0.07	0.05	0.13	0.04
Shallow Concentrated Flow Characteristics							
Surface Description (1 - unpaved, 2 - paved)	1	1	1	1	1	1	1
Flow Length (ft)	3783	3289	3103	1406	2462	4442.3453	4521.4288
Watercourse Slope (ft/ft)	0.0062	0.0046	0.0012	0.0073	0.0058	0.0049	0.0032
Average Velocity - computed (ft/s)	1.27	1.09	0.56	1.38	1.23	1.13	0.91
Shallow Concentrated Flow Tt (hr)	0.83	0.83	1.54	0.28	0.56	1.09	1.38
Channel Flow Characterisitics							
Cross-sectional Flow Area (ft2)	20	20	20	20	20	20	20
Wetted Perimeter (ft)	20	20	20	20	20	20	20
Hydraulic Radius - computed (ft)	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Channel Slope (ft/ft)	0.0041	0.0037	0.0038	0.0004	0.0042	0.0006	0.0034
Manning's Roughness Coefficient	0.03	0.03	0.03	0.03	0.03	0.03	0.03
Average Velocity - computed (ft/s)	3.18	3.02	3.06	0.99	3.22	1.22	2.90
Flow Length (ft)	166	164	530	323	1961	749.645	9.594
Channel Flow Tt (hr)	0.01	0.02	0.05	0.09	0.17	0.17	0.00
Watershed Time of travel (hr)	**0.88**	**0.89**	**1.66**	**0.44**	**0.78**	**1.40**	**1.42**
Longest Flowpath (km)	**1.41**	**1.71**	**1.32**	**0.56**	**2.01**	**3.07**	**2.87**
Watershed Area (km2)	**0.29**	**0.25**	**0.25**	**0.03**	**0.26**	**0.38**	**0.19**
Storage Coefficient (hr)	**1.01**	**1.06**	**1.92**	**0.53**	**0.93**	**1.68**	**1.71**

APPENDIX F:

HEC-HMS Simulation Run Summary Tables

Parks Creek 2-Year 6-Hour SCS Storm

Hydrologic Element	Drainage Area (km2)	Peak Discharge (cms)	Time of Peak	Volume (mm)
Junction-1	15.02472	2.3	01Jan2000, 11:45	8.35
Reach-7	2.77822	0.5	01Jan2000, 12:15	10.73
Reach-6	3.613784	0.8	01Jan2000, 08:15	11.62
Junction-4	5.509294	1.2	01Jan2000, 08:15	9.81
14	0.37471	0.1	01Jan2000, 04:45	5.62
Junction-6	3.613784	0.8	01Jan2000, 06:45	11.66
15	0.66612	0.2	01Jan2000, 06:00	7.59
16	0.29703	0.1	01Jan2000, 05:15	8.94
Junction-5	4.468464	1	01Jan2000, 07:45	10.5
17	0.55765	0.1	01Jan2000, 06:30	4.11
Reach-5	4.468464	1	01Jan2000, 08:45	10.49
Junction-7	2.77822	0.6	01Jan2000, 12:15	14.1
18	0.28555	0.2	01Jan2000, 05:30	11.29
19	0.550014	0.4	01Jan2000, 06:15	16.56
20	2.0835	0.6	01Jan2000, 12:30	17.26
21	0.69472	0.1	01Jan2000, 06:30	4.64
Reach-4	5.509294	1.1	01Jan2000, 09:30	9.78
11	0.8268	0.1	01Jan2000, 11:15	7.03
12	1.1653	0.3	01Jan2000, 08:30	10.09
13	1.697	0.2	01Jan2000, 08:00	4.3
Reach-10	2.8623	0.5	01Jan2000, 10:45	6.67
Junction-9	4.19915	0.7	01Jan2000, 10:45	6.27
Junction-10	2.8623	0.5	01Jan2000, 08:30	6.65
10	0.51005	0	01Jan2000, 07:45	2.84
Reservoir-1	4.19915	0.3	01Jan2000, 10:45	1.56
Reach-9	4.19915	0.2	01Jan2000, 22:30	1.51
9	0.43063	0	01Jan2000, 08:30	1.74
8	0.62	0.2	01Jan2000, 06:30	7.81
Junction-3	10.75907	1.3	01Jan2000, 09:30	6.12
Reach-3	10.75907	1.3	01Jan2000, 11:15	6.11
6	0.612232	0.1	01Jan2000, 09:45	9.37
Junction-8	2.606885	0.3	01Jan2000, 11:00	7.46
7	1.994653	0.2	01Jan2000, 11:45	6.88
Reach-8	2.606885	0.3	01Jan2000, 11:45	7.45
5	0.12843	0	01Jan2000, 08:00	1.74
4	0.38163	0	01Jan2000, 05:30	1.55
Junction-2	13.87602	1.6	01Jan2000, 11:15	6.19
Reach-2	13.87602	1.6	01Jan2000, 11:45	6.18
2	0.72098	0.3	01Jan2000, 13:30	23.9

3	0.36052	0.1	01Jan2000, 07:45	7.27
Reach-2a	0.0672	0.4	01Jan2000, 11:45	295.83
9a	0.0672	0	01Jan2000, 05:15	1.75
Junction-11	0.0672	0.4	01Jan2000, 10:45	296.18
Reach-1	15.02472	2.3	01Jan2000, 12:45	8.32
1	1.328	0.6	01Jan2000, 09:45	19.93
Outlet1	16.35272	2.8	01Jan2000, 12:30	9.26

Parks Creek 2-year 12-hour SCS Storm

Hydrologic Element	Drainage Area (km2)	Peak Discharge (cms)	Time of Peak	Volume (mm)
Junction-1	15.02472	3.1	01Jan2000, 14:45	12.49
Reach-7	2.77822	0.7	01Jan2000, 15:15	17.03
Reach-6	3.613784	1.1	01Jan2000, 11:15	17.74
Junction-4	5.509294	1.6	01Jan2000, 11:15	15.01
14	0.37471	0.2	01Jan2000, 07:30	8.91
Junction-6	3.613784	1.1	01Jan2000, 09:30	17.87
15	0.66612	0.3	01Jan2000, 08:45	11.48
16	0.29703	0.2	01Jan2000, 08:15	13.26
Junction-5	4.468464	1.3	01Jan2000, 10:45	16.09
17	0.55765	0.1	01Jan2000, 09:30	6.87
Reach-5	4.468464	1.3	01Jan2000, 11:45	16.04
Junction-7	2.77822	0.8	01Jan2000, 15:15	19.47
18	0.28555	0.2	01Jan2000, 08:30	16.29
19	0.550014	0.5	01Jan2000, 09:15	22.89
20	2.0835	0.7	01Jan2000, 15:45	23.43
21	0.69472	0.2	01Jan2000, 09:15	7.62
Reach-4	5.509294	1.6	01Jan2000, 12:30	14.94
11	0.8268	0.2	01Jan2000, 14:30	11.08
12	1.1653	0.4	01Jan2000, 11:45	14.91
13	1.697	0.3	01Jan2000, 11:15	7.07
Reach-10	2.8623	0.7	01Jan2000, 13:45	10.27
Junction-9	4.19915	0.9	01Jan2000, 13:45	9.84
Junction-10	2.8623	0.7	01Jan2000, 11:30	10.26
10	0.51005	0.1	01Jan2000, 11:30	5.44
Reservoir-1	4.19915	0.4	01Jan2000, 14:00	3.18
Reach-9	4.19915	0.3	02Jan2000, 00:30	3.08
9	0.43063	0	01Jan2000, 13:00	3.18
8	0.62	0.2	01Jan2000, 09:30	11.72
Junction-3	10.75907	1.8	01Jan2000, 12:30	9.65
Reach-3	10.75907	1.7	01Jan2000, 14:00	9.61

6	0.612232	0.2	01Jan2000, 13:00	13.48
Junction-8	2.606885	0.5	01Jan2000, 14:45	10.92
7	1.994653	0.3	01Jan2000, 15:15	10.14
Reach-8	2.606885	0.5	01Jan2000, 15:15	10.89
5	0.12843	0	01Jan2000, 12:15	3.06
4	0.38163	0	01Jan2000, 08:45	2.85
Junction-2	13.87602	2.2	01Jan2000, 14:00	9.6
Reach-2	13.87602	2.2	01Jan2000, 14:45	9.57
2	0.72098	0.4	01Jan2000, 16:45	31.56
3	0.36052	0.1	01Jan2000, 11:00	11.17
Reach-2a	0.0672	0.5	01Jan2000, 14:45	419.04
9a	0.0672	0	01Jan2000, 08:30	3.52
Junction-11	0.0672	0.5	01Jan2000, 14:00	419.77
Reach-1	15.02472	3.1	01Jan2000, 15:45	12.43
1	1.328	0.8	01Jan2000, 12:45	27.13
Outlet1	16.35272	3.8	01Jan2000, 15:30	13.62

Parks Creek 2-Year 24-Hour SCS Storm

Hydrologic Element	Drainage Area (km2)	Peak Discharge (cms)	Time of Peak	Volume (mm)
Junction-1	15.02472	3.9	01Jan2000, 20:30	17.77
Reach-7	2.77822	0.9	01Jan2000, 21:30	23.58
Reach-6	3.613784	1.3	01Jan2000, 17:00	24.42
Junction-4	5.509294	2	01Jan2000, 17:00	21.13
14	0.37471	0.3	01Jan2000, 13:30	13.9
Junction-6	3.613784	1.3	01Jan2000, 15:30	24.73
15	0.66612	0.4	01Jan2000, 14:45	17.18
16	0.29703	0.2	01Jan2000, 14:15	19.45
Junction-5	4.468464	1.6	01Jan2000, 16:30	22.45
17	0.55765	0.2	01Jan2000, 15:15	11.27
Reach-5	4.468464	1.6	01Jan2000, 17:30	22.33
Junction-7	2.77822	1	01Jan2000, 21:30	25.92
18	0.28555	0.2	01Jan2000, 14:30	23.24
19	0.550014	0.6	01Jan2000, 15:15	31.31
20	2.0835	0.9	01Jan2000, 21:45	30.47
21	0.69472	0.3	01Jan2000, 15:15	12.26
Reach-4	5.509294	2	01Jan2000, 18:00	20.97
11	0.8268	0.2	01Jan2000, 20:30	16.52
12	1.1653	0.5	01Jan2000, 17:30	21.52
13	1.697	0.4	01Jan2000, 17:15	11.46
Reach-10	2.8623	0.9	01Jan2000, 19:30	15.51

Junction-9	4.19915	1.2	01Jan2000, 19:30	14.99
Junction-10	2.8623	0.9	01Jan2000, 17:30	15.56
10	0.51005	0.1	01Jan2000, 16:45	9.65
Reservoir-1	4.19915	0.6	01Jan2000, 19:45	5.69
Reach-9	4.19915	0.5	02Jan2000, 05:30	5.55
9	0.43063	0	01Jan2000, 19:15	5.88
8	0.62	0.3	01Jan2000, 15:30	17.43
Junction-3	10.75907	2.2	01Jan2000, 18:00	14.14
Reach-3	10.75907	2.2	01Jan2000, 19:30	14.01
6	0.612232	0.2	01Jan2000, 19:00	19.09
Junction-8	2.606885	0.6	01Jan2000, 21:00	15.6
7	1.994653	0.4	01Jan2000, 21:15	14.53
Reach-8	2.606885	0.6	01Jan2000, 21:30	15.5
5	0.12843	0	01Jan2000, 18:30	5.66
4	0.38163	0.1	01Jan2000, 14:45	5.47
Junction-2	13.87602	2.8	01Jan2000, 19:30	13.98
Reach-2	13.87602	2.8	01Jan2000, 20:15	13.89
2	0.72098	0.4	01Jan2000, 23:00	40.36
3	0.36052	0.1	01Jan2000, 16:45	16.84
Reach-2a	0.0672	0.6	01Jan2000, 20:30	580.94
9a	0.0672	0	01Jan2000, 14:15	6.73
Junction-11	0.0672	0.6	01Jan2000, 19:45	584.92
Reach-1	15.02472	3.9	01Jan2000, 21:30	17.56
1	1.328	0.9	01Jan2000, 18:45	36.18
Outlet1	16.35272	4.7	01Jan2000, 21:15	19.07

Parks Creek 5-Year 6-Hour SCS Storm

Hydrologic Element	Drainage Area (km2)	Peak Discharge (cms)	Time of Peak	Volume (mm)
Junction-1	15.02472	3.8	01Jan2000, 11:00	13.87
Reach-7	2.77822	0.8	01Jan2000, 12:15	17.76
Reach-6	3.613784	1.3	01Jan2000, 08:00	18.82
Junction-4	5.509294	2	01Jan2000, 08:00	16.2
14	0.37471	0.3	01Jan2000, 04:45	10.18
Junction-6	3.613784	1.4	01Jan2000, 06:30	18.91
15	0.66612	0.4	01Jan2000, 06:00	12.96
16	0.29703	0.2	01Jan2000, 05:15	14.88
Junction-5	4.468464	1.7	01Jan2000, 07:30	17.2
17	0.55765	0.2	01Jan2000, 06:30	7.98
Reach-5	4.468464	1.7	01Jan2000, 08:15	17.19
Junction-7	2.77822	0.9	01Jan2000, 12:00	21.71

18	0.28555	0.3	01Jan2000, 05:30	18.12
19	0.550014	0.7	01Jan2000, 06:15	25.14
20	2.0835	0.9	01Jan2000, 12:30	26.02
21	0.69472	0.3	01Jan2000, 06:30	8.8
Reach-4	5.509294	2	01Jan2000, 09:00	16.16
11	0.8268	0.2	01Jan2000, 11:15	12.74
12	1.1653	0.5	01Jan2000, 08:30	16.69
13	1.697	0.4	01Jan2000, 08:00	8.18
Reach-10	2.8623	0.9	01Jan2000, 10:15	11.66
Junction-9	4.19915	1.2	01Jan2000, 10:15	11.25
Junction-10	2.8623	0.9	01Jan2000, 08:30	11.65
10	0.51005	0.1	01Jan2000, 07:45	6.49
Reservoir-1	4.19915	0.6	01Jan2000, 10:30	4
Reach-9	4.19915	0.4	01Jan2000, 20:00	3.84
9	0.43063	0	01Jan2000, 08:45	3.84
8	0.62	0.3	01Jan2000, 06:45	13.2
Junction-3	10.75907	2.3	01Jan2000, 08:45	10.69
Reach-3	10.75907	2.2	01Jan2000, 10:15	10.66
6	0.612232	0.2	01Jan2000, 09:45	15.09
Junction-8	2.606885	0.6	01Jan2000, 11:15	12.38
7	1.994653	0.4	01Jan2000, 12:00	11.54
Reach-8	2.606885	0.6	01Jan2000, 11:45	12.35
5	0.12843	0	01Jan2000, 08:30	3.68
4	0.38163	0.1	01Jan2000, 06:15	3.47
Junction-2	13.87602	2.8	01Jan2000, 10:30	10.72
Reach-2	13.87602	2.7	01Jan2000, 11:00	10.69
2	0.72098	0.4	01Jan2000, 13:30	34.52
3	0.36052	0.1	01Jan2000, 08:00	12.64
Reach-2a	0.0672	0.6	01Jan2000, 11:15	455.83
9a	0.0672	0	01Jan2000, 05:45	4.3
Junction-11	0.0672	0.6	01Jan2000, 10:30	456.47
Reach-1	15.02472	3.8	01Jan2000, 12:00	13.82
1	1.328	1	01Jan2000, 09:45	29.67
Outlet1	16.35272	4.6	01Jan2000, 11:45	15.1

Parks Creek 5-Year 12-Hour SCS Storm

Hydrologic Element	Drainage Area (km2)	Peak Discharge (cms)	Time of Peak	Volume (mm)
Junction-1	15.02472	5.1	01Jan2000, 14:15	20.55
Reach-7	2.77822	1.2	01Jan2000, 15:00	26.83
Reach-6	3.613784	1.7	01Jan2000, 10:45	27.75

Junction-4	5.509294	2.7	01Jan2000, 11:00	24.1
14	0.37471	0.4	01Jan2000, 07:30	15.98
Junction-6	3.613784	1.7	01Jan2000, 09:30	27.95
15	0.66612	0.5	01Jan2000, 08:45	19.51
16	0.29703	0.3	01Jan2000, 08:15	21.95
Junction-5	4.468464	2.1	01Jan2000, 10:30	25.54
17	0.55765	0.2	01Jan2000, 09:15	13.14
Reach-5	4.468464	2.1	01Jan2000, 11:15	25.47
Junction-7	2.77822	1.3	01Jan2000, 15:00	29.87
18	0.28555	0.3	01Jan2000, 08:30	26.02
19	0.550014	0.8	01Jan2000, 09:15	34.58
20	2.0835	1.1	01Jan2000, 15:45	35.09
21	0.69472	0.4	01Jan2000, 09:15	14.23
Reach-4	5.509294	2.7	01Jan2000, 11:45	24
11	0.8268	0.3	01Jan2000, 14:30	19.49
12	1.1653	0.7	01Jan2000, 11:45	24.39
13	1.697	0.6	01Jan2000, 11:15	13.35
Reach-10	2.8623	1.2	01Jan2000, 13:15	17.85
Junction-9	4.19915	1.6	01Jan2000, 13:30	17.4
Junction-10	2.8623	1.2	01Jan2000, 11:30	17.84
10	0.51005	0.2	01Jan2000, 10:45	11.47
Reservoir-1	4.19915	0.9	01Jan2000, 13:30	7.28
Reach-9	4.19915	0.7	01Jan2000, 22:00	7.02
9	0.43063	0.1	01Jan2000, 12:45	7.24
8	0.62	0.4	01Jan2000, 09:30	19.76
Junction-3	10.75907	3	01Jan2000, 11:45	16.46
Reach-3	10.75907	3	01Jan2000, 13:00	16.39
6	0.612232	0.3	01Jan2000, 13:00	21.84
Junction-8	2.606885	0.8	01Jan2000, 14:45	18.27
7	1.994653	0.5	01Jan2000, 15:15	17.18
Reach-8	2.606885	0.8	01Jan2000, 15:15	18.21
5	0.12843	0	01Jan2000, 12:30	6.92
4	0.38163	0.1	01Jan2000, 09:00	6.69
Junction-2	13.87602	3.8	01Jan2000, 13:15	16.38
Reach-2	13.87602	3.8	01Jan2000, 14:00	16.31
2	0.72098	0.5	01Jan2000, 16:45	45.29
3	0.36052	0.2	01Jan2000, 11:00	19.21
Reach-2a	0.0672	0.8	01Jan2000, 14:15	637.47
9a	0.0672	0	01Jan2000, 08:15	8.18
Junction-11	0.0672	0.8	01Jan2000, 13:30	638.89
Reach-1	15.02472	5.1	01Jan2000, 15:00	20.44

1	1.328	1.2	01Jan2000, 12:45	40.08
Outlet1	16.35272	6.1	01Jan2000, 14:45	22.04

Parks Creek 5-Year 24-Hour SCS Storm

Hydrologic Element	Drainage Area (km2)	Peak Discharge (cms)	Time of Peak	Volume (mm)
Junction-1	15.02472	6.4	01Jan2000, 20:00	28.89
Reach-7	2.77822	1.5	01Jan2000, 21:30	36.63
Reach-6	3.613784	2.1	01Jan2000, 16:30	37.75
Junction-4	5.509294	3.4	01Jan2000, 16:30	33.57
14	0.37471	0.5	01Jan2000, 13:30	24.41
Junction-6	3.613784	2.2	01Jan2000, 15:15	38.21
15	0.66612	0.7	01Jan2000, 14:45	28.78
16	0.29703	0.4	01Jan2000, 14:00	31.8
Junction-5	4.468464	2.7	01Jan2000, 16:15	35.24
17	0.55765	0.3	01Jan2000, 15:15	20.83
Reach-5	4.468464	2.7	01Jan2000, 17:00	35.05
Junction-7	2.77822	1.6	01Jan2000, 21:30	39.55
18	0.28555	0.4	01Jan2000, 14:30	36.76
19	0.550014	0.9	01Jan2000, 15:15	46.97
20	2.0835	1.3	01Jan2000, 21:45	45.32
21	0.69472	0.5	01Jan2000, 15:15	22.23
Reach-4	5.509294	3.4	01Jan2000, 17:30	33.32
11	0.8268	0.4	01Jan2000, 20:30	28.19
12	1.1653	0.8	01Jan2000, 17:30	34.7
13	1.697	0.8	01Jan2000, 17:00	21.02
Reach-10	2.8623	1.6	01Jan2000, 19:00	26.5
Junction-9	4.19915	2.1	01Jan2000, 19:00	25.92
Junction-10	2.8623	1.6	01Jan2000, 17:30	26.59
10	0.51005	0.2	01Jan2000, 16:30	18.98
Reservoir-1	4.19915	1.2	01Jan2000, 19:15	12.13
Reach-9	4.19915	1	02Jan2000, 03:00	11.66
9	0.43063	0.1	01Jan2000, 18:30	12.69
8	0.62	0.5	01Jan2000, 15:30	29.04
Junction-3	10.75907	3.9	01Jan2000, 17:30	23.79
Reach-3	10.75907	3.8	01Jan2000, 18:30	23.51
6	0.612232	0.3	01Jan2000, 19:00	30.79
Junction-8	2.606885	1	01Jan2000, 21:00	25.96
7	1.994653	0.7	01Jan2000, 21:15	24.48
Reach-8	2.606885	1	01Jan2000, 21:30	25.78
5	0.12843	0	01Jan2000, 18:00	12.26

4	0.38163	0.1	01Jan2000, 14:45	12.07
Junction-2	13.87602	4.8	01Jan2000, 18:45	23.52
Reach-2	13.87602	4.7	01Jan2000, 19:45	23.37
2	0.72098	0.6	01Jan2000, 23:00	57.61
3	0.36052	0.2	01Jan2000, 16:45	28.45
Reach-2a	0.0672	0.9	01Jan2000, 20:00	863.07
9a	0.0672	0	01Jan2000, 14:00	14.38
Junction-11	0.0672	0.9	01Jan2000, 19:15	869.23
Reach-1	15.02472	6.4	01Jan2000, 20:45	28.55
1	1.328	1.4	01Jan2000, 18:45	53.05
Outlet1	16.35272	7.6	01Jan2000, 20:30	30.53

Parks Creek 10-Year 6-Hour SCS Storm

Hydrologic Element	Drainage Area (km2)	Peak Discharge (cms)	Time of Peak	Volume (mm)
Junction-1	15.02472	5	01Jan2000, 10:45	18.26
Reach-7	2.77822	1	01Jan2000, 12:00	23.56
Reach-6	3.613784	1.8	01Jan2000, 07:45	24.59
Junction-4	5.509294	2.7	01Jan2000, 07:45	21.33
14	0.37471	0.4	01Jan2000, 04:45	13.94
Junction-6	3.613784	1.8	01Jan2000, 06:30	24.73
15	0.66612	0.5	01Jan2000, 06:00	17.23
16	0.29703	0.3	01Jan2000, 05:15	19.5
Junction-5	4.468464	2.2	01Jan2000, 07:30	22.59
17	0.55765	0.3	01Jan2000, 06:30	11.3
Reach-5	4.468464	2.2	01Jan2000, 08:15	22.56
Junction-7	2.77822	1.2	01Jan2000, 12:00	27.32
18	0.28555	0.3	01Jan2000, 05:30	23.3
19	0.550014	0.8	01Jan2000, 06:15	31.37
20	2.0835	1.1	01Jan2000, 12:30	32.32
21	0.69472	0.4	01Jan2000, 06:30	12.3
Reach-4	5.509294	2.7	01Jan2000, 08:45	21.25
11	0.8268	0.3	01Jan2000, 11:15	17.25
12	1.1653	0.7	01Jan2000, 08:30	21.74
13	1.697	0.6	01Jan2000, 08:00	11.51
Reach-10	2.8623	1.2	01Jan2000, 10:00	15.69
Junction-9	4.19915	1.6	01Jan2000, 10:00	15.27
Junction-10	2.8623	1.2	01Jan2000, 08:15	15.68
10	0.51005	0.2	01Jan2000, 07:30	9.69
Reservoir-1	4.19915	0.9	01Jan2000, 10:15	6.19
Reach-9	4.19915	0.7	01Jan2000, 18:45	5.93

9	0.43063	0.1	01Jan2000, 08:45	5.99
8	0.62	0.4	01Jan2000, 06:45	17.48
Junction-3	10.75907	3.1	01Jan2000, 08:30	14.44
Reach-3	10.75907	3	01Jan2000, 10:00	14.41
6	0.612232	0.3	01Jan2000, 09:45	19.56
Junction-8	2.606885	0.7	01Jan2000, 11:15	16.32
7	1.994653	0.5	01Jan2000, 12:00	15.33
Reach-8	2.606885	0.7	01Jan2000, 11:45	16.28
5	0.12843	0	01Jan2000, 08:30	5.72
4	0.38163	0.1	01Jan2000, 06:00	5.49
Junction-2	13.87602	3.8	01Jan2000, 10:00	14.43
Reach-2	13.87602	3.7	01Jan2000, 10:45	14.38
2	0.72098	0.5	01Jan2000, 13:30	41.91
3	0.36052	0.2	01Jan2000, 07:45	16.92
Reach-2a	0.0672	0.8	01Jan2000, 11:00	572
9a	0.0672	0	01Jan2000, 05:30	6.76
Junction-11	0.0672	0.8	01Jan2000, 10:15	572.84
Reach-1	15.02472	5	01Jan2000, 11:45	18.19
1	1.328	1.2	01Jan2000, 09:45	36.58
Outlet1	16.35272	6	01Jan2000, 11:30	19.68

Parks Creek 10-year 12-hour SCS Storm

Hydrologic Element	Drainage Area (km2)	Peak Discharge (cms)	Time of Peak	Volume (mm)
Junction-1	15.02472	6.7	01Jan2000, 13:45	26.67
Reach-7	2.77822	1.5	01Jan2000, 14:45	34.01
Reach-6	3.613784	2.2	01Jan2000, 10:45	35.05
Junction-4	5.509294	3.5	01Jan2000, 10:45	30.88
14	0.37471	0.5	01Jan2000, 07:30	21.58
Junction-6	3.613784	2.2	01Jan2000, 09:30	35.31
15	0.66612	0.7	01Jan2000, 08:45	25.69
16	0.29703	0.4	01Jan2000, 08:15	28.53
Junction-5	4.468464	2.8	01Jan2000, 10:15	32.52
17	0.55765	0.3	01Jan2000, 09:15	18.23
Reach-5	4.468464	2.8	01Jan2000, 11:00	32.43
Junction-7	2.77822	1.6	01Jan2000, 14:45	37.4
18	0.28555	0.4	01Jan2000, 08:30	33.22
19	0.550014	1	01Jan2000, 09:15	42.93
20	2.0835	1.4	01Jan2000, 15:45	43.35
21	0.69472	0.5	01Jan2000, 09:15	19.53
Reach-4	5.509294	3.5	01Jan2000, 11:30	30.74

11	0.8268	0.4	01Jan2000, 14:30	25.91
12	1.1653	0.8	01Jan2000, 11:45	31.46
13	1.697	0.8	01Jan2000, 11:15	18.44
Reach-10	2.8623	1.6	01Jan2000, 13:00	23.75
Junction-9	4.19915	2.2	01Jan2000, 13:15	23.28
Junction-10	2.8623	1.7	01Jan2000, 11:30	23.74
10	0.51005	0.2	01Jan2000, 10:45	16.44
Reservoir-1	4.19915	1.3	01Jan2000, 13:15	10.8
Reach-9	4.19915	1.1	01Jan2000, 20:45	10.39
9	0.43063	0.1	01Jan2000, 12:30	10.9
8	0.62	0.5	01Jan2000, 09:30	25.95
Junction-3	10.75907	4.1	01Jan2000, 11:30	21.73
Reach-3	10.75907	4	01Jan2000, 12:45	21.64
6	0.612232	0.3	01Jan2000, 13:00	28.19
Junction-8	2.606885	1	01Jan2000, 14:45	23.98
7	1.994653	0.7	01Jan2000, 15:15	22.68
Reach-8	2.606885	1	01Jan2000, 15:15	23.89
5	0.12843	0	01Jan2000, 12:15	10.44
4	0.38163	0.2	01Jan2000, 08:45	10.2
Junction-2	13.87602	5	01Jan2000, 13:00	21.64
Reach-2	13.87602	5	01Jan2000, 13:45	21.56
2	0.72098	0.7	01Jan2000, 16:45	54.75
3	0.36052	0.2	01Jan2000, 10:45	25.41
Reach-2a	0.0672	0.9	01Jan2000, 14:00	787.47
9a	0.0672	0	01Jan2000, 08:15	12.24
Junction-11	0.0672	1	01Jan2000, 13:15	789.93
Reach-1	15.02472	6.6	01Jan2000, 14:45	26.53
1	1.328	1.5	01Jan2000, 12:45	49.15
Outlet1	16.35272	7.9	01Jan2000, 14:30	28.37

Parks Creek 10-Year 24-Hour SCS Storm

Hydrologic Element	Drainage Area (km2)	Peak Discharge (cms)	Time of Peak	Volume (mm)
Junction-1	15.02472	8.3	01Jan2000, 19:30	37.15
Reach-7	2.77822	1.8	01Jan2000, 21:15	45.99
Reach-6	3.613784	2.7	01Jan2000, 16:15	47.29
Junction-4	5.509294	4.5	01Jan2000, 16:15	42.64
14	0.37471	0.7	01Jan2000, 13:30	32.44
Junction-6	3.613784	2.8	01Jan2000, 15:15	47.86
15	0.66612	0.9	01Jan2000, 14:45	37.47
16	0.29703	0.5	01Jan2000, 14:00	40.93

Junction-5	4.468464	3.5	01Jan2000, 16:00	44.49
17	0.55765	0.5	01Jan2000, 15:15	28.3
Reach-5	4.468464	3.5	01Jan2000, 16:45	44.27
Junction-7	2.77822	1.9	01Jan2000, 21:15	49.26
18	0.28555	0.5	01Jan2000, 14:30	46.57
19	0.550014	1.1	01Jan2000, 15:15	57.99
20	2.0835	1.7	01Jan2000, 21:45	55.7
21	0.69472	0.7	01Jan2000, 15:15	29.94
Reach-4	5.509294	4.4	01Jan2000, 17:15	42.34
11	0.8268	0.5	01Jan2000, 20:30	36.87
12	1.1653	1	01Jan2000, 17:30	44.32
13	1.697	1.1	01Jan2000, 17:00	28.47
Reach-10	2.8623	2.1	01Jan2000, 18:45	34.8
Junction-9	4.19915	2.8	01Jan2000, 19:00	34.18
Junction-10	2.8623	2.1	01Jan2000, 17:15	34.92
10	0.51005	0.3	01Jan2000, 16:30	26.32
Reservoir-1	4.19915	1.7	01Jan2000, 19:00	17.43
Reach-9	4.19915	1.5	02Jan2000, 02:00	16.55
9	0.43063	0.1	01Jan2000, 18:00	18.41
8	0.62	0.7	01Jan2000, 15:30	37.72
Junction-3	10.75907	5.1	01Jan2000, 17:15	31.05
Reach-3	10.75907	5.1	01Jan2000, 18:15	30.68
6	0.612232	0.4	01Jan2000, 19:00	39.48
Junction-8	2.606885	1.3	01Jan2000, 21:00	33.78
7	1.994653	0.9	01Jan2000, 21:15	32.04
Reach-8	2.606885	1.3	01Jan2000, 21:15	33.56
5	0.12843	0	01Jan2000, 17:45	17.84
4	0.38163	0.2	01Jan2000, 14:30	17.68
Junction-2	13.87602	6.4	01Jan2000, 18:30	30.74
Reach-2	13.87602	6.3	01Jan2000, 19:15	30.57
2	0.72098	0.8	01Jan2000, 22:45	69.37
3	0.36052	0.3	01Jan2000, 16:45	37.15
Reach-2a	0.0672	1.1	01Jan2000, 19:45	1050.61
9a	0.0672	0.1	01Jan2000, 14:00	20.66
Junction-11	0.0672	1.1	01Jan2000, 19:00	1058.15
Reach-1	15.02472	8.2	01Jan2000, 20:15	36.74
1	1.328	1.7	01Jan2000, 18:45	64.71
Outlet1	16.35272	9.8	01Jan2000, 20:00	39.01

Parks Creek 25-Year 6-Hour SCS Storm

Hydrologic Element	Drainage Area (km2)	Peak Discharge (cms)	Time of Peak	Volume (mm)
Junction-1	15.02472	6.6	01Jan2000, 10:30	24.16
Reach-7	2.77822	1.3	01Jan2000, 12:00	30.36
Reach-6	3.613784	2.3	01Jan2000, 07:30	31.58
Junction-4	5.509294	3.7	01Jan2000, 07:30	27.82
14	0.37471	0.5	01Jan2000, 04:45	19.3
Junction-6	3.613784	2.4	01Jan2000, 06:30	31.76
15	0.66612	0.7	01Jan2000, 06:00	23.18
16	0.29703	0.4	01Jan2000, 05:15	25.87
Junction-5	4.468464	2.9	01Jan2000, 07:15	29.27
17	0.55765	0.4	01Jan2000, 06:30	16.14
Reach-5	4.468464	2.9	01Jan2000, 08:00	29.23
Junction-7	2.77822	1.5	01Jan2000, 12:00	34.77
18	0.28555	0.4	01Jan2000, 05:30	30.32
19	0.550014	1	01Jan2000, 06:15	39.59
20	2.0835	1.3	01Jan2000, 12:30	40.58
21	0.69472	0.6	01Jan2000, 06:30	17.36
Reach-4	5.509294	3.6	01Jan2000, 08:30	27.73
11	0.8268	0.4	01Jan2000, 11:15	23.5
12	1.1653	0.9	01Jan2000, 08:30	28.61
13	1.697	0.8	01Jan2000, 08:00	16.36
Reach-10	2.8623	1.7	01Jan2000, 10:00	21.36
Junction-9	4.19915	2.2	01Jan2000, 10:00	20.94
Junction-10	2.8623	1.7	01Jan2000, 08:15	21.35
10	0.51005	0.2	01Jan2000, 07:30	14.4
Reservoir-1	4.19915	1.3	01Jan2000, 10:00	9.51
Reach-9	4.19915	1	01Jan2000, 17:30	9.08
9	0.43063	0.1	01Jan2000, 08:45	9.38
8	0.62	0.6	01Jan2000, 06:45	23.44
Junction-3	10.75907	4.2	01Jan2000, 08:15	19.47
Reach-3	10.75907	4.1	01Jan2000, 09:30	19.42
6	0.612232	0.3	01Jan2000, 09:45	25.72
Junction-8	2.606885	1	01Jan2000, 11:15	21.85
7	1.994653	0.7	01Jan2000, 12:00	20.67
Reach-8	2.606885	1	01Jan2000, 11:45	21.8
5	0.12843	0	01Jan2000, 08:30	8.96
4	0.38163	0.2	01Jan2000, 06:00	8.73
Junction-2	13.87602	5.1	01Jan2000, 09:30	19.48
Reach-2	13.87602	5	01Jan2000, 10:30	19.41
2	0.72098	0.6	01Jan2000, 13:30	51.37

3	0.36052	0.2	01Jan2000, 07:45	22.89
Reach-2a	0.0672	0.9	01Jan2000, 10:45	720.8
9a	0.0672	0	01Jan2000, 05:15	10.56
Junction-11	0.0672	1	01Jan2000, 10:00	722
Reach-1	15.02472	6.6	01Jan2000, 11:15	24.07
1	1.328	1.5	01Jan2000, 09:45	45.56
Outlet1	16.35272	7.9	01Jan2000, 11:15	25.81

Parks Creek 25-Year 12-Hour SCS Storm

Hydrologic Element	Drainage Area (km2)	Peak Discharge (cms)	Time of Peak	Volume (mm)
Junction-1	15.02472	8.7	01Jan2000, 13:30	34.94
Reach-7	2.77822	1.9	01Jan2000, 14:45	43.46
Reach-6	3.613784	2.9	01Jan2000, 10:30	44.65
Junction-4	5.509294	4.7	01Jan2000, 10:30	39.9
14	0.37471	0.7	01Jan2000, 07:30	29.32
Junction-6	3.613784	2.9	01Jan2000, 09:30	44.98
15	0.66612	0.9	01Jan2000, 08:45	34.11
16	0.29703	0.5	01Jan2000, 08:15	37.4
Junction-5	4.468464	3.7	01Jan2000, 10:15	41.76
17	0.55765	0.5	01Jan2000, 09:15	25.39
Reach-5	4.468464	3.7	01Jan2000, 10:45	41.65
Junction-7	2.77822	2	01Jan2000, 14:45	47.25
18	0.28555	0.5	01Jan2000, 08:30	42.8
19	0.550014	1.2	01Jan2000, 09:15	53.78
20	2.0835	1.7	01Jan2000, 15:45	54.03
21	0.69472	0.7	01Jan2000, 09:15	26.94
Reach-4	5.509294	4.7	01Jan2000, 11:15	39.72
11	0.8268	0.5	01Jan2000, 14:15	34.58
12	1.1653	1.1	01Jan2000, 11:30	40.9
13	1.697	1.1	01Jan2000, 11:00	25.6
Reach-10	2.8623	2.2	01Jan2000, 12:45	31.83
Junction-9	4.19915	3	01Jan2000, 13:00	31.35
Junction-10	2.8623	2.2	01Jan2000, 11:30	31.83
10	0.51005	0.3	01Jan2000, 10:30	23.47
Reservoir-1	4.19915	1.8	01Jan2000, 13:00	15.94
Reach-9	4.19915	1.5	01Jan2000, 19:45	15.31
9	0.43063	0.2	01Jan2000, 12:15	16.34
8	0.62	0.7	01Jan2000, 09:30	34.37
Junction-3	10.75907	5.5	01Jan2000, 11:15	28.95
Reach-3	10.75907	5.4	01Jan2000, 12:15	28.83

6	0.612232	0.4	01Jan2000, 13:00	36.77
Junction-8	2.606885	1.4	01Jan2000, 14:45	31.79
7	1.994653	1	01Jan2000, 15:15	30.26
Reach-8	2.606885	1.4	01Jan2000, 15:15	31.67
5	0.12843	0	01Jan2000, 12:00	15.71
4	0.38163	0.2	01Jan2000, 08:45	15.46
Junction-2	13.87602	6.7	01Jan2000, 12:30	28.88
Reach-2	13.87602	6.6	01Jan2000, 13:15	28.77
2	0.72098	0.8	01Jan2000, 16:45	66.74
3	0.36052	0.3	01Jan2000, 10:45	33.84
Reach-2a	0.0672	1.2	01Jan2000, 13:45	973.57
9a	0.0672	0.1	01Jan2000, 08:00	18.19
Junction-11	0.0672	1.2	01Jan2000, 13:00	976.88
Reach-1	15.02472	8.7	01Jan2000, 14:15	34.76
1	1.328	1.8	01Jan2000, 12:45	60.78
Outlet1	16.35272	10.4	01Jan2000, 14:00	36.87

Parks Creek 25-Year 24-Hour SCS Storm

Hydrologic Element	Drainage Area (km2)	Peak Discharge (cms)	Time of Peak	Volume (mm)
Junction-1	15.02472	10.7	01Jan2000, 19:00	48.13
Reach-7	2.77822	2.3	01Jan2000, 21:15	58.15
Reach-6	3.613784	3.6	01Jan2000, 16:15	59.66
Junction-4	5.509294	6	01Jan2000, 16:15	54.54
14	0.37471	0.9	01Jan2000, 13:30	43.3
Junction-6	3.613784	3.6	01Jan2000, 15:15	60.37
15	0.66612	1.2	01Jan2000, 14:45	49.05
16	0.29703	0.6	01Jan2000, 14:00	53
Junction-5	4.468464	4.6	01Jan2000, 16:00	56.58
17	0.55765	0.6	01Jan2000, 15:15	38.51
Reach-5	4.468464	4.6	01Jan2000, 16:30	56.3
Junction-7	2.77822	2.4	01Jan2000, 21:15	61.82
18	0.28555	0.7	01Jan2000, 14:15	59.41
19	0.550014	1.4	01Jan2000, 15:00	72.13
20	2.0835	2.1	01Jan2000, 21:45	68.96
21	0.69472	1	01Jan2000, 15:15	40.43
Reach-4	5.509294	5.9	01Jan2000, 17:00	54.16
11	0.8268	0.6	01Jan2000, 20:15	48.38
12	1.1653	1.4	01Jan2000, 17:30	56.93
13	1.697	1.5	01Jan2000, 17:00	38.67
Reach-10	2.8623	2.8	01Jan2000, 18:30	45.94

Junction-9	4.19915	3.8	01Jan2000, 18:45	45.26
Junction-10	2.8623	2.8	01Jan2000, 17:15	46.1
10	0.51005	0.4	01Jan2000, 16:15	36.41
Reservoir-1	4.19915	2.4	01Jan2000, 19:30	25.08
Reach-9	4.19915	2.1	02Jan2000, 01:15	23.63
9	0.43063	0.2	01Jan2000, 17:45	26.56
8	0.62	0.9	01Jan2000, 15:30	49.31
Junction-3	10.75907	6.9	01Jan2000, 17:00	40.86
Reach-3	10.75907	6.8	01Jan2000, 18:00	40.39
6	0.612232	0.5	01Jan2000, 19:00	51.01
Junction-8	2.606885	1.7	01Jan2000, 21:00	44.28
7	1.994653	1.2	01Jan2000, 21:15	42.21
Reach-8	2.606885	1.7	01Jan2000, 21:15	44
5	0.12843	0.1	01Jan2000, 17:30	25.85
4	0.38163	0.4	01Jan2000, 14:30	25.7
Junction-2	13.87602	8.4	01Jan2000, 18:00	40.53
Reach-2	13.87602	8.3	01Jan2000, 18:45	40.32
2	0.72098	0.9	01Jan2000, 22:45	84.17
3	0.36052	0.4	01Jan2000, 16:45	48.75
Reach-2a	0.0672	1.3	01Jan2000, 20:00	1269.74
9a	0.0672	0.1	01Jan2000, 14:00	29.5
Junction-11	0.0672	1.3	01Jan2000, 19:30	1278.74
Reach-1	15.02472	10.6	01Jan2000, 19:45	47.63
1	1.328	2.1	01Jan2000, 18:45	79.51
Outlet1	16.35272	12.6	01Jan2000, 19:30	50.22

Parks Creek 50-Year 6-Hour SCS Storm

Hydrologic Element	Drainage Area (km2)	Peak Discharge (cms)	Time of Peak	Volume (mm)
Junction-1	15.02472	7.9	01Jan2000, 10:15	28.97
Reach-7	2.77822	1.6	01Jan2000, 12:00	36.51
Reach-6	3.613784	2.8	01Jan2000, 07:30	37.64
Junction-4	5.509294	4.5	01Jan2000, 07:30	33.33
14	0.37471	0.7	01Jan2000, 04:45	23.62
Junction-6	3.613784	2.8	01Jan2000, 06:30	37.88
15	0.66612	0.9	01Jan2000, 06:00	27.93
16	0.29703	0.5	01Jan2000, 05:15	30.89
Junction-5	4.468464	3.5	01Jan2000, 07:15	35.01
17	0.55765	0.5	01Jan2000, 06:30	20.11
Reach-5	4.468464	3.5	01Jan2000, 07:45	34.94
Junction-7	2.77822	1.7	01Jan2000, 12:00	40.5

18	0.28555	0.5	01Jan2000, 05:30	35.79
19	0.550014	1.2	01Jan2000, 06:15	45.86
20	2.0835	1.6	01Jan2000, 12:30	46.84
21	0.69472	0.7	01Jan2000, 06:15	21.48
Reach-4	5.509294	4.4	01Jan2000, 08:15	33.2
11	0.8268	0.4	01Jan2000, 11:15	28.45
12	1.1653	1	01Jan2000, 08:30	33.99
13	1.697	1.1	01Jan2000, 08:00	20.32
Reach-10	2.8623	2.1	01Jan2000, 09:45	25.9
Junction-9	4.19915	2.7	01Jan2000, 09:45	25.48
Junction-10	2.8623	2.1	01Jan2000, 08:15	25.89
10	0.51005	0.3	01Jan2000, 07:30	18.28
Reservoir-1	4.19915	1.6	01Jan2000, 10:00	12.33
Reach-9	4.19915	1.3	01Jan2000, 17:00	11.75
9	0.43063	0.1	01Jan2000, 08:45	12.32
8	0.62	0.7	01Jan2000, 06:30	28.18
Junction-3	10.75907	5.1	01Jan2000, 08:15	23.7
Reach-3	10.75907	5	01Jan2000, 09:15	23.63
6	0.612232	0.4	01Jan2000, 09:45	30.6
Junction-8	2.606885	1.2	01Jan2000, 11:15	26.28
7	1.994653	0.8	01Jan2000, 12:00	24.96
Reach-8	2.606885	1.2	01Jan2000, 11:45	26.21
5	0.12843	0	01Jan2000, 08:30	11.79
4	0.38163	0.2	01Jan2000, 06:00	11.55
Junction-2	13.87602	6.2	01Jan2000, 09:30	23.67
Reach-2	13.87602	6	01Jan2000, 10:15	23.59
2	0.72098	0.7	01Jan2000, 13:30	58.44
3	0.36052	0.3	01Jan2000, 07:45	27.64
Reach-2a	0.0672	1.1	01Jan2000, 10:30	831.14
9a	0.0672	0.1	01Jan2000, 05:15	13.78
Junction-11	0.0672	1.1	01Jan2000, 09:45	832.58
Reach-1	15.02472	7.9	01Jan2000, 11:00	28.86
1	1.328	1.7	01Jan2000, 09:45	52.33
Outlet1	16.35272	9.4	01Jan2000, 10:45	30.76

Parks Creek 50-Year 12-Hour SCS Storm

Hydrologic Element	Drainage Area (km2)	Peak Discharge (cms)	Time of Peak	Volume (mm)
Junction-1	15.02472	10.3	01Jan2000, 13:15	41.36
Reach-7	2.77822	2.2	01Jan2000, 14:30	50.64
Reach-6	3.613784	3.4	01Jan2000, 10:15	51.95

Junction-4	5.509294	5.7	01Jan2000, 10:15	46.83
14	0.37471	0.9	01Jan2000, 07:30	35.43
Junction-6	3.613784	3.4	01Jan2000, 09:15	52.33
15	0.66612	1.1	01Jan2000, 08:45	40.67
16	0.29703	0.6	01Jan2000, 08:00	44.28
Junction-5	4.468464	4.4	01Jan2000, 10:00	48.83
17	0.55765	0.6	01Jan2000, 09:15	31.1
Reach-5	4.468464	4.4	01Jan2000, 10:30	48.7
Junction-7	2.77822	2.3	01Jan2000, 14:30	54.73
18	0.28555	0.6	01Jan2000, 08:30	50.15
19	0.550014	1.4	01Jan2000, 09:15	61.96
20	2.0835	2	01Jan2000, 15:45	62.04
21	0.69472	0.9	01Jan2000, 09:15	32.82
Reach-4	5.509294	5.6	01Jan2000, 11:00	46.62
11	0.8268	0.6	01Jan2000, 14:15	41.32
12	1.1653	1.3	01Jan2000, 11:30	48.15
13	1.697	1.4	01Jan2000, 11:00	31.31
Reach-10	2.8623	2.7	01Jan2000, 12:45	38.16
Junction-9	4.19915	3.6	01Jan2000, 12:45	37.68
Junction-10	2.8623	2.7	01Jan2000, 11:30	38.17
10	0.51005	0.4	01Jan2000, 10:30	29.11
Reservoir-1	4.19915	2.3	01Jan2000, 13:45	20.24
Reach-9	4.19915	2	01Jan2000, 19:15	19.43
9	0.43063	0.2	01Jan2000, 12:15	20.85
8	0.62	0.9	01Jan2000, 09:30	40.93
Junction-3	10.75907	6.6	01Jan2000, 11:00	34.65
Reach-3	10.75907	6.5	01Jan2000, 12:00	34.51
6	0.612232	0.5	01Jan2000, 13:00	43.43
Junction-8	2.606885	1.6	01Jan2000, 14:45	37.91
7	1.994653	1.2	01Jan2000, 15:15	36.22
Reach-8	2.606885	1.6	01Jan2000, 15:00	37.77
5	0.12843	0.1	01Jan2000, 11:45	20.1
4	0.38163	0.3	01Jan2000, 08:45	19.84
Junction-2	13.87602	8.1	01Jan2000, 12:15	34.58
Reach-2	13.87602	7.9	01Jan2000, 13:00	34.47
2	0.72098	0.9	01Jan2000, 16:45	75.62
3	0.36052	0.4	01Jan2000, 10:45	40.43
Reach-2a	0.0672	1.3	01Jan2000, 14:00	1103.11
9a	0.0672	0.1	01Jan2000, 08:00	23.06
Junction-11	0.0672	1.3	01Jan2000, 13:30	1107.05
Reach-1	15.02472	10.2	01Jan2000, 14:00	41.14

1	1.328	2.1	01Jan2000, 12:45	69.46
Outlet1	16.35272	12.2	01Jan2000, 13:45	43.44

Parks Creek 50-Year 24-Hour SCS Storm

Hydrologic Element	Drainage Area (km2)	Peak Discharge (cms)	Time of Peak	Volume (mm)
Junction-1	15.02472	12.5	01Jan2000, 18:45	56.54
Reach-7	2.77822	2.7	01Jan2000, 21:15	67.28
Reach-6	3.613784	4.2	01Jan2000, 16:15	68.97
Junction-4	5.509294	7.1	01Jan2000, 16:00	63.56
14	0.37471	1.1	01Jan2000, 13:30	51.69
Junction-6	3.613784	4.3	01Jan2000, 15:15	69.77
15	0.66612	1.4	01Jan2000, 14:45	57.93
16	0.29703	0.8	01Jan2000, 14:00	62.2
Junction-5	4.468464	5.5	01Jan2000, 15:45	65.71
17	0.55765	0.8	01Jan2000, 15:00	46.47
Reach-5	4.468464	5.5	01Jan2000, 16:15	65.39
Junction-7	2.77822	2.8	01Jan2000, 21:15	71.24
18	0.28555	0.8	01Jan2000, 14:15	69.1
19	0.550014	1.6	01Jan2000, 15:00	82.66
20	2.0835	2.4	01Jan2000, 21:45	78.8
21	0.69472	1.2	01Jan2000, 15:00	48.58
Reach-4	5.509294	7	01Jan2000, 16:45	63.14
11	0.8268	0.7	01Jan2000, 20:15	57.15
12	1.1653	1.6	01Jan2000, 17:30	66.47
13	1.697	1.8	01Jan2000, 17:00	46.61
Reach-10	2.8623	3.4	01Jan2000, 18:30	54.5
Junction-9	4.19915	4.5	01Jan2000, 18:30	53.79
Junction-10	2.8623	3.4	01Jan2000, 17:15	54.7
10	0.51005	0.5	01Jan2000, 16:15	44.3
Reservoir-1	4.19915	3	01Jan2000, 19:30	31.29
Reach-9	4.19915	2.7	02Jan2000, 00:45	29.42
9	0.43063	0.3	01Jan2000, 17:45	33.1
8	0.62	1.1	01Jan2000, 15:30	58.18
Junction-3	10.75907	8.2	01Jan2000, 16:45	48.49
Reach-3	10.75907	8.1	01Jan2000, 17:45	47.95
6	0.612232	0.6	01Jan2000, 18:45	59.81
Junction-8	2.606885	2.1	01Jan2000, 21:00	52.36
7	1.994653	1.5	01Jan2000, 21:15	50.07
Reach-8	2.606885	2	01Jan2000, 21:15	52.04
5	0.12843	0.1	01Jan2000, 17:15	32.29

4	0.38163	0.5	01Jan2000, 14:30	32.17
Junction-2	13.87602	10.1	01Jan2000, 18:00	48.14
Reach-2	13.87602	9.9	01Jan2000, 18:30	47.91
2	0.72098	1.1	01Jan2000, 22:45	95.04
3	0.36052	0.5	01Jan2000, 16:45	57.64
Reach-2a	0.0672	1.5	01Jan2000, 20:00	1419.99
9a	0.0672	0.1	01Jan2000, 14:00	36.53
Junction-11	0.0672	1.5	01Jan2000, 19:30	1429.8
Reach-1	15.02472	12.5	01Jan2000, 19:30	55.99
1	1.328	2.4	01Jan2000, 18:45	90.45
Outlet1	16.35272	14.8	01Jan2000, 19:15	58.79

Parks Creek 100-Year 6-Hour SCS Storm

Hydrologic Element	Drainage Area (km2)	Peak Discharge (cms)	Time of Peak	Volume (mm)
Junction-1	15.02472	9.3	01Jan2000, 10:00	33.86
Reach-7	2.77822	1.8	01Jan2000, 11:45	42.01
Reach-6	3.613784	3.2	01Jan2000, 07:30	43.25
Junction-4	5.509294	5.3	01Jan2000, 07:15	38.62
14	0.37471	0.8	01Jan2000, 04:45	28.19
Junction-6	3.613784	3.3	01Jan2000, 06:30	43.52
15	0.66612	1.1	01Jan2000, 06:00	32.89
16	0.29703	0.6	01Jan2000, 05:15	36.12
Junction-5	4.468464	4.1	01Jan2000, 07:15	40.42
17	0.55765	0.6	01Jan2000, 06:15	24.33
Reach-5	4.468464	4.1	01Jan2000, 07:45	40.34
Junction-7	2.77822	1.9	01Jan2000, 11:45	46.36
18	0.28555	0.6	01Jan2000, 05:30	41.42
19	0.550014	1.4	01Jan2000, 06:15	52.23
20	2.0835	1.8	01Jan2000, 12:30	53.19
21	0.69472	0.9	01Jan2000, 06:15	25.85
Reach-4	5.509294	5.2	01Jan2000, 08:15	38.48
11	0.8268	0.5	01Jan2000, 11:15	33.6
12	1.1653	1.2	01Jan2000, 08:30	39.55
13	1.697	1.3	01Jan2000, 08:00	24.55
Reach-10	2.8623	2.5	01Jan2000, 09:45	30.67
Junction-9	4.19915	3.2	01Jan2000, 09:45	30.25
Junction-10	2.8623	2.5	01Jan2000, 08:15	30.65
10	0.51005	0.4	01Jan2000, 07:30	22.44
Reservoir-1	4.19915	2	01Jan2000, 09:45	15.42
Reach-9	4.19915	1.6	01Jan2000, 16:15	14.68

9	0.43063	0.2	01Jan2000, 08:45	15.55
8	0.62	0.8	01Jan2000, 06:30	33.14
Junction-3	10.75907	6.1	01Jan2000, 08:00	27.96
Reach-3	10.75907	6	01Jan2000, 09:00	27.88
6	0.612232	0.5	01Jan2000, 09:45	35.67
Junction-8	2.606885	1.4	01Jan2000, 11:15	30.93
7	1.994653	1	01Jan2000, 12:00	29.48
Reach-8	2.606885	1.4	01Jan2000, 11:45	30.85
5	0.12843	0.1	01Jan2000, 08:30	14.92
4	0.38163	0.3	01Jan2000, 05:45	14.67
Junction-2	13.87602	7.3	01Jan2000, 09:15	27.95
Reach-2	13.87602	7.1	01Jan2000, 10:00	27.87
2	0.72098	0.8	01Jan2000, 13:30	65.53
3	0.36052	0.4	01Jan2000, 07:45	32.62
Reach-2a	0.0672	1.2	01Jan2000, 10:30	937.94
9a	0.0672	0.1	01Jan2000, 05:15	17.3
Junction-11	0.0672	1.2	01Jan2000, 09:45	939.67
Reach-1	15.02472	9.2	01Jan2000, 10:45	33.72
1	1.328	1.9	01Jan2000, 09:45	59.16
Outlet1	16.35272	11	01Jan2000, 10:45	35.79

Parks Creek 100-Year 12-Hour SCS Storm

Hydrologic Element	Drainage Area (km2)	Peak Discharge (cms)	Time of Peak	Volume (mm)
Junction-1	15.02472	11.9	01Jan2000, 13:00	47.98
Reach-7	2.77822	2.5	01Jan2000, 14:30	57.97
Reach-6	3.613784	3.9	01Jan2000, 10:15	59.37
Junction-4	5.509294	6.7	01Jan2000, 10:15	53.93
14	0.37471	1	01Jan2000, 07:30	41.79
Junction-6	3.613784	4	01Jan2000, 09:15	59.81
15	0.66612	1.3	01Jan2000, 08:45	47.45
16	0.29703	0.7	01Jan2000, 08:00	51.34
Junction-5	4.468464	5.1	01Jan2000, 10:00	56.06
17	0.55765	0.7	01Jan2000, 09:15	37.08
Reach-5	4.468464	5.1	01Jan2000, 10:30	55.91
Junction-7	2.77822	2.6	01Jan2000, 14:30	62.32
18	0.28555	0.7	01Jan2000, 08:30	57.65
19	0.550014	1.6	01Jan2000, 09:15	70.21
20	2.0835	2.3	01Jan2000, 15:45	70.1
21	0.69472	1.1	01Jan2000, 09:15	38.97
Reach-4	5.509294	6.6	01Jan2000, 11:00	53.67

11	0.8268	0.7	01Jan2000, 14:15	48.25
12	1.1653	1.5	01Jan2000, 11:30	55.57
13	1.697	1.7	01Jan2000, 11:00	37.29
Reach-10	2.8623	3.2	01Jan2000, 12:30	44.72
Junction-9	4.19915	4.2	01Jan2000, 12:45	44.24
Junction-10	2.8623	3.2	01Jan2000, 11:15	44.73
10	0.51005	0.5	01Jan2000, 10:15	35.02
Reservoir-1	4.19915	2.8	01Jan2000, 13:45	24.89
Reach-9	4.19915	2.5	01Jan2000, 19:00	23.91
9	0.43063	0.2	01Jan2000, 12:00	25.7
8	0.62	1	01Jan2000, 09:30	47.71
Junction-3	10.75907	7.7	01Jan2000, 11:00	40.6
Reach-3	10.75907	7.6	01Jan2000, 11:45	40.42
6	0.612232	0.6	01Jan2000, 13:00	50.29
Junction-8	2.606885	1.9	01Jan2000, 14:45	44.26
7	1.994653	1.4	01Jan2000, 15:15	42.41
Reach-8	2.606885	1.9	01Jan2000, 15:00	44.1
5	0.12843	0.1	01Jan2000, 11:30	24.82
4	0.38163	0.4	01Jan2000, 08:30	24.56
Junction-2	13.87602	9.5	01Jan2000, 12:00	40.53
Reach-2	13.87602	9.3	01Jan2000, 12:45	40.39
2	0.72098	1	01Jan2000, 16:45	84.48
3	0.36052	0.4	01Jan2000, 10:45	47.23
Reach-2a	0.0672	1.4	01Jan2000, 14:00	1226.63
9a	0.0672	0.1	01Jan2000, 08:00	28.25
Junction-11	0.0672	1.4	01Jan2000, 13:30	1231.11
Reach-1	15.02472	11.8	01Jan2000, 13:45	47.72
1	1.328	2.3	01Jan2000, 12:45	78.16
Outlet1	16.35272	14	01Jan2000, 13:30	50.19

Parks Creek 100-Year 24-Hour SCS Storm

Hydrologic Element	Drainage Area (km2)	Peak Discharge (cms)	Time of Peak	Volume (mm)
Junction-1	15.02472	14.4	01Jan2000, 18:30	65.14
Reach-7	2.77822	3.1	01Jan2000, 21:00	76.5
Reach-6	3.613784	4.8	01Jan2000, 16:00	78.35
Junction-4	5.509294	8.3	01Jan2000, 16:00	72.7
14	0.37471	1.3	01Jan2000, 13:30	60.32
Junction-6	3.613784	4.9	01Jan2000, 15:15	79.24
15	0.66612	1.6	01Jan2000, 14:45	67
16	0.29703	0.9	01Jan2000, 14:00	71.57

Junction-5	4.468464	6.3	01Jan2000, 15:45	74.95
17	0.55765	0.9	01Jan2000, 15:00	54.7
Reach-5	4.468464	6.3	01Jan2000, 16:15	74.59
Junction-7	2.77822	3.2	01Jan2000, 21:00	80.73
18	0.28555	0.9	01Jan2000, 14:15	78.91
19	0.550014	1.9	01Jan2000, 15:00	93.21
20	2.0835	2.7	01Jan2000, 21:45	88.64
21	0.69472	1.4	01Jan2000, 15:00	56.99
Reach-4	5.509294	8.2	01Jan2000, 16:45	72.25
11	0.8268	0.9	01Jan2000, 20:15	66.09
12	1.1653	1.8	01Jan2000, 17:30	76.15
13	1.697	2.2	01Jan2000, 17:00	54.83
Reach-10	2.8623	3.9	01Jan2000, 18:30	63.28
Junction-9	4.19915	5.3	01Jan2000, 18:30	62.52
Junction-10	2.8623	4	01Jan2000, 17:15	63.51
10	0.51005	0.7	01Jan2000, 16:15	52.47
Reservoir-1	4.19915	3.4	01Jan2000, 20:00	37.64
Reach-9	4.19915	3.2	02Jan2000, 00:45	35.4
9	0.43063	0.3	01Jan2000, 17:30	40
8	0.62	1.2	01Jan2000, 15:30	67.25
Junction-3	10.75907	9.6	01Jan2000, 16:30	56.29
Reach-3	10.75907	9.5	01Jan2000, 17:30	55.68
6	0.612232	0.7	01Jan2000, 18:45	68.79
Junction-8	2.606885	2.4	01Jan2000, 21:00	60.64
7	1.994653	1.7	01Jan2000, 21:15	58.14
Reach-8	2.606885	2.4	01Jan2000, 21:15	60.28
5	0.12843	0.1	01Jan2000, 17:15	39.1
4	0.38163	0.6	01Jan2000, 14:30	39
Junction-2	13.87602	11.7	01Jan2000, 17:45	55.93
Reach-2	13.87602	11.5	01Jan2000, 18:30	55.68
2	0.72098	1.2	01Jan2000, 22:45	105.83
3	0.36052	0.6	01Jan2000, 16:45	66.72
Reach-2a	0.0672	1.6	01Jan2000, 20:30	1574.76
9a	0.0672	0.1	01Jan2000, 14:00	43.91
Junction-11	0.0672	1.6	01Jan2000, 19:45	1585.3
Reach-1	15.02472	14.3	01Jan2000, 19:15	64.54
1	1.328	2.7	01Jan2000, 18:45	101.35
Outlet1	16.35272	17	01Jan2000, 19:15	67.53

Parks Creek 2-Year 4-Hour Chicago Storm

Hydrologic Element	Drainage Area (km2)	Peak Discharge (cms)	Time of Peak	Volume (mm)
Junction-1	15.02472	1.8	01Jan2000, 10:30	6.46
Reach-7	2.77822	0.4	01Jan2000, 11:00	7.36
Reach-6	3.613784	0.6	01Jan2000, 07:00	8.42
Junction-4	5.509294	0.9	01Jan2000, 07:15	7.23
14	0.37471	0.1	01Jan2000, 03:15	4.31
Junction-6	3.613784	0.6	01Jan2000, 05:15	8.45
15	0.66612	0.2	01Jan2000, 04:45	5.95
16	0.29703	0.1	01Jan2000, 04:00	7.09
Junction-5	4.468464	0.8	01Jan2000, 06:30	7.66
17	0.55765	0.1	01Jan2000, 05:00	3.05
Reach-5	4.468464	0.7	01Jan2000, 07:30	7.67
Junction-7	2.77822	0.5	01Jan2000, 11:00	11.59
18	0.28555	0.1	01Jan2000, 04:15	9.07
19	0.550014	0.4	01Jan2000, 05:00	13.62
20	2.0835	0.5	01Jan2000, 11:15	14.29
21	0.69472	0.1	01Jan2000, 05:00	3.48
Reach-4	5.509294	0.9	01Jan2000, 08:15	7.22
11	0.8268	0.1	01Jan2000, 09:45	5.28
12	1.1653	0.2	01Jan2000, 07:15	7.97
13	1.697	0.2	01Jan2000, 06:30	3.23
Reach-10	2.8623	0.4	01Jan2000, 09:15	5.18
Junction-9	4.19915	0.5	01Jan2000, 09:15	4.8
Junction-10	2.8623	0.4	01Jan2000, 07:00	5.16
10	0.51005	0	01Jan2000, 06:15	1.89
Reservoir-1	4.19915	0.2	01Jan2000, 09:30	0.94
Reach-9	4.19915	0.1	01Jan2000, 20:45	0.91
9	0.43063	0	01Jan2000, 06:45	1.35
8	0.62	0.2	01Jan2000, 05:15	6.16
Junction-3	10.75907	1	01Jan2000, 08:15	4.46
Reach-3	10.75907	1	01Jan2000, 10:00	4.46
6	0.612232	0.1	01Jan2000, 08:15	7.59
Junction-8	2.606885	0.3	01Jan2000, 09:45	6
7	1.994653	0.2	01Jan2000, 10:30	5.51
Reach-8	2.606885	0.3	01Jan2000, 10:15	5.99
5	0.12843	0	01Jan2000, 06:30	1.4
4	0.38163	0	01Jan2000, 04:00	1.23
Junction-2	13.87602	1.2	01Jan2000, 10:00	4.63
Reach-2	13.87602	1.2	01Jan2000, 10:30	4.63

2	0.72098	0.3	01Jan2000, 12:15	20.13
3	0.36052	0.1	01Jan2000, 06:30	5.64
Reach-2a	0.0672	0.3	01Jan2000, 10:15	241.98
9a	0.0672	0	01Jan2000, 03:30	1.2
Junction-11	0.0672	0.3	01Jan2000, 09:30	242.22
Reach-1	15.02472	1.8	01Jan2000, 11:45	6.44
1	1.328	0.5	01Jan2000, 08:15	16.51
Outlet1	16.35272	2.2	01Jan2000, 11:15	7.26

Parks Creek 5-Year 4-Hour Chicago Storm

Hydrologic Element	Drainage Area (km2)	Peak Discharge (cms)	Time of Peak	Volume (mm)
Junction-1	15.02472	3	01Jan2000, 10:00	10.84
Reach-7	2.77822	0.6	01Jan2000, 10:45	13.31
Reach-6	3.613784	1.1	01Jan2000, 06:45	14.49
Junction-4	5.509294	1.6	01Jan2000, 06:45	12.47
14	0.37471	0.2	01Jan2000, 03:30	7.73
Junction-6	3.613784	1.1	01Jan2000, 05:15	14.53
15	0.66612	0.3	01Jan2000, 04:45	10.1
16	0.29703	0.2	01Jan2000, 04:15	11.74
Junction-5	4.468464	1.3	01Jan2000, 06:15	13.23
17	0.55765	0.1	01Jan2000, 05:15	5.86
Reach-5	4.468464	1.3	01Jan2000, 07:15	13.23
Junction-7	2.77822	0.8	01Jan2000, 10:45	17.85
18	0.28555	0.2	01Jan2000, 04:15	14.55
19	0.550014	0.5	01Jan2000, 05:00	20.72
20	2.0835	0.7	01Jan2000, 11:15	21.62
21	0.69472	0.2	01Jan2000, 05:15	6.54
Reach-4	5.509294	1.5	01Jan2000, 08:00	12.45
11	0.8268	0.1	01Jan2000, 09:45	9.74
12	1.1653	0.4	01Jan2000, 07:15	13.23
13	1.697	0.3	01Jan2000, 06:45	6.06
Reach-10	2.8623	0.7	01Jan2000, 09:00	8.99
Junction-9	4.19915	0.9	01Jan2000, 09:00	8.59
Junction-10	2.8623	0.7	01Jan2000, 07:00	8.98
10	0.51005	0.1	01Jan2000, 06:30	4.48
Reservoir-1	4.19915	0.4	01Jan2000, 09:15	2.66
Reach-9	4.19915	0.3	01Jan2000, 19:45	2.56
9	0.43063	0	01Jan2000, 07:15	2.61
8	0.62	0.3	01Jan2000, 05:15	10.34
Junction-3	10.75907	1.7	01Jan2000, 07:45	8.07

Reach-3	10.75907	1.7	01Jan2000, 09:15	8.07
6	0.612232	0.2	01Jan2000, 08:30	12.09
Junction-8	2.606885	0.5	01Jan2000, 09:45	9.78
7	1.994653	0.3	01Jan2000, 10:30	9.08
Reach-8	2.606885	0.4	01Jan2000, 10:15	9.77
5	0.12843	0	01Jan2000, 07:00	2.53
4	0.38163	0	01Jan2000, 04:45	2.33
Junction-2	13.87602	2.2	01Jan2000, 09:30	8.18
Reach-2	13.87602	2.1	01Jan2000, 10:00	8.16
2	0.72098	0.4	01Jan2000, 12:15	29.2
3	0.36052	0.1	01Jan2000, 06:30	9.79
Reach-2a	0.0672	0.5	01Jan2000, 10:00	372.84
9a	0.0672	0	01Jan2000, 04:45	2.84
Junction-11	0.0672	0.5	01Jan2000, 09:15	373.3
Reach-1	15.02472	3	01Jan2000, 11:00	10.81
1	1.328	0.8	01Jan2000, 08:15	24.69
Outlet1	16.35272	3.6	01Jan2000, 10:45	11.94

Parks Creek 10-Year 4-Hour Chicago Storm

Hydrologic Element	Drainage Area (km2)	Peak Discharge (cms)	Time of Peak	Volume (mm)
Junction-1	15.02472	4	01Jan2000, 09:45	14.36
Reach-7	2.77822	0.8	01Jan2000, 10:45	17.99
Reach-6	3.613784	1.4	01Jan2000, 06:30	19.18
Junction-4	5.509294	2.1	01Jan2000, 06:30	16.61
14	0.37471	0.3	01Jan2000, 03:30	10.64
Junction-6	3.613784	1.4	01Jan2000, 05:15	19.26
15	0.66612	0.4	01Jan2000, 04:45	13.48
16	0.29703	0.2	01Jan2000, 04:15	15.45
Junction-5	4.468464	1.7	01Jan2000, 06:15	17.58
17	0.55765	0.2	01Jan2000, 05:15	8.38
Reach-5	4.468464	1.7	01Jan2000, 07:00	17.57
Junction-7	2.77822	1	01Jan2000, 10:45	22.51
18	0.28555	0.3	01Jan2000, 04:15	18.77
19	0.550014	0.7	01Jan2000, 05:00	25.93
20	2.0835	0.9	01Jan2000, 11:15	26.94
21	0.69472	0.3	01Jan2000, 05:15	9.22
Reach-4	5.509294	2.1	01Jan2000, 07:30	16.58
11	0.8268	0.2	01Jan2000, 09:45	13.33
12	1.1653	0.5	01Jan2000, 07:15	17.32
13	1.697	0.4	01Jan2000, 06:45	8.59

Reach-10	2.8623	1	01Jan2000, 09:00	12.16
Junction-9	4.19915	1.2	01Jan2000, 08:45	11.75
Junction-10	2.8623	1	01Jan2000, 07:00	12.14
10	0.51005	0.1	01Jan2000, 06:15	6.87
Reservoir-1	4.19915	0.6	01Jan2000, 09:00	4.27
Reach-9	4.19915	0.5	01Jan2000, 18:30	4.1
9	0.43063	0	01Jan2000, 07:30	4.09
8	0.62	0.3	01Jan2000, 05:15	13.72
Junction-3	10.75907	2.4	01Jan2000, 07:30	11.04
Reach-3	10.75907	2.3	01Jan2000, 08:45	11.03
6	0.612232	0.2	01Jan2000, 08:30	15.66
Junction-8	2.606885	0.6	01Jan2000, 09:45	12.9
7	1.994653	0.4	01Jan2000, 10:30	12.05
Reach-8	2.606885	0.6	01Jan2000, 10:15	12.87
5	0.12843	0	01Jan2000, 07:00	3.91
4	0.38163	0.1	01Jan2000, 05:00	3.7
Junction-2	13.87602	2.9	01Jan2000, 09:00	11.11
Reach-2	13.87602	2.9	01Jan2000, 09:30	11.08
2	0.72098	0.4	01Jan2000, 12:15	35.55
3	0.36052	0.1	01Jan2000, 06:30	13.17
Reach-2a	0.0672	0.6	01Jan2000, 09:45	469.96
9a	0.0672	0	01Jan2000, 04:30	4.59
Junction-11	0.0672	0.6	01Jan2000, 09:00	470.61
Reach-1	15.02472	4	01Jan2000, 10:30	14.31
1	1.328	1	01Jan2000, 08:15	30.55
Outlet1	16.35272	4.8	01Jan2000, 10:15	15.63

Parks Creek 25-Year 4-Hour Chicago Storm

Hydrologic Element	Drainage Area (km2)	Peak Discharge (cms)	Time of Peak	Volume (mm)
Junction-1	15.02472	5.3	01Jan2000, 09:15	19.27
Reach-7	2.77822	1.1	01Jan2000, 10:45	24.41
Reach-6	3.613784	1.9	01Jan2000, 06:15	25.58
Junction-4	5.509294	2.9	01Jan2000, 06:15	22.32
14	0.37471	0.4	01Jan2000, 03:30	14.87
Junction-6	3.613784	1.9	01Jan2000, 05:15	25.71
15	0.66612	0.6	01Jan2000, 04:45	18.28
16	0.29703	0.3	01Jan2000, 04:00	20.62
Junction-5	4.468464	2.4	01Jan2000, 06:00	23.57
17	0.55765	0.3	01Jan2000, 05:15	12.14
Reach-5	4.468464	2.4	01Jan2000, 06:45	23.55

Junction-7	2.77822	1.2	01Jan2000, 10:45	28.77
18	0.28555	0.4	01Jan2000, 04:15	24.55
19	0.550014	0.9	01Jan2000, 05:00	32.85
20	2.0835	1.1	01Jan2000, 11:15	33.96
21	0.69472	0.4	01Jan2000, 05:00	13.18
Reach-4	5.509294	2.9	01Jan2000, 07:15	22.26
11	0.8268	0.3	01Jan2000, 09:45	18.4
12	1.1653	0.7	01Jan2000, 07:15	22.96
13	1.697	0.6	01Jan2000, 06:45	12.35
Reach-10	2.8623	1.3	01Jan2000, 08:45	16.69
Junction-9	4.19915	1.7	01Jan2000, 08:45	16.27
Junction-10	2.8623	1.3	01Jan2000, 07:00	16.67
10	0.51005	0.2	01Jan2000, 06:15	10.5
Reservoir-1	4.19915	0.9	01Jan2000, 08:45	6.77
Reach-9	4.19915	0.7	01Jan2000, 17:15	6.47
9	0.43063	0.1	01Jan2000, 07:30	6.56
8	0.62	0.5	01Jan2000, 05:15	18.52
Junction-3	10.75907	3.3	01Jan2000, 07:00	15.25
Reach-3	10.75907	3.3	01Jan2000, 08:30	15.23
6	0.612232	0.3	01Jan2000, 08:30	20.67
Junction-8	2.606885	0.8	01Jan2000, 09:45	17.34
7	1.994653	0.6	01Jan2000, 10:30	16.32
Reach-8	2.606885	0.8	01Jan2000, 10:15	17.3
5	0.12843	0	01Jan2000, 07:00	6.26
4	0.38163	0.1	01Jan2000, 05:00	6.03
Junction-2	13.87602	4	01Jan2000, 08:30	15.28
Reach-2	13.87602	3.9	01Jan2000, 09:15	15.23
2	0.72098	0.5	01Jan2000, 12:15	43.73
3	0.36052	0.2	01Jan2000, 06:30	17.97
Reach-2a	0.0672	0.8	01Jan2000, 09:30	598.47
9a	0.0672	0	01Jan2000, 04:30	7.4
Junction-11	0.0672	0.8	01Jan2000, 08:45	599.35
Reach-1	15.02472	5.3	01Jan2000, 10:15	19.2
1	1.328	1.2	01Jan2000, 08:15	38.21
Outlet1	16.35272	6.3	01Jan2000, 10:00	20.75

Parks Creek 50-Year 4-Hour Chicago Storm

Hydrologic Element	Drainage Area (km2)	Peak Discharge (cms)	Time of Peak	Volume (mm)
Junction-1	15.02472	6.4	01Jan2000, 09:15	23.1
Reach-7	2.77822	1.3	01Jan2000, 10:30	28.8

Reach-6	3.613784	2.2	01Jan2000, 06:15	30.1
Junction-4	5.509294	3.6	01Jan2000, 06:15	26.53
14	0.37471	0.5	01Jan2000, 03:30	18.35
Junction-6	3.613784	2.3	01Jan2000, 05:15	30.25
15	0.66612	0.7	01Jan2000, 04:45	22.14
16	0.29703	0.4	01Jan2000, 04:00	24.76
Junction-5	4.468464	2.8	01Jan2000, 06:00	27.89
17	0.55765	0.4	01Jan2000, 05:15	15.28
Reach-5	4.468464	2.8	01Jan2000, 06:30	27.87
Junction-7	2.77822	1.4	01Jan2000, 10:30	33.62
18	0.28555	0.4	01Jan2000, 04:15	29.1
19	0.550014	1	01Jan2000, 05:00	38.18
20	2.0835	1.3	01Jan2000, 11:15	39.34
21	0.69472	0.5	01Jan2000, 05:00	16.47
Reach-4	5.509294	3.5	01Jan2000, 07:00	26.46
11	0.8268	0.3	01Jan2000, 09:45	22.47
12	1.1653	0.8	01Jan2000, 07:15	27.42
13	1.697	0.8	01Jan2000, 06:45	15.5
Reach-10	2.8623	1.6	01Jan2000, 08:30	20.37
Junction-9	4.19915	2.1	01Jan2000, 08:30	19.96
Junction-10	2.8623	1.6	01Jan2000, 07:00	20.35
10	0.51005	0.2	01Jan2000, 06:15	13.56
Reservoir-1	4.19915	1.2	01Jan2000, 08:45	8.93
Reach-9	4.19915	0.9	01Jan2000, 16:15	8.52
9	0.43063	0.1	01Jan2000, 07:15	8.76
8	0.62	0.6	01Jan2000, 05:15	22.39
Junction-3	10.75907	4.1	01Jan2000, 07:00	18.51
Reach-3	10.75907	4	01Jan2000, 08:15	18.48
6	0.612232	0.3	01Jan2000, 08:30	24.68
Junction-8	2.606885	1	01Jan2000, 10:00	20.94
7	1.994653	0.7	01Jan2000, 10:30	19.8
Reach-8	2.606885	1	01Jan2000, 10:15	20.89
5	0.12843	0	01Jan2000, 07:00	8.37
4	0.38163	0.2	01Jan2000, 04:45	8.13
Junction-2	13.87602	4.9	01Jan2000, 08:15	18.55
Reach-2	13.87602	4.8	01Jan2000, 09:00	18.49
2	0.72098	0.6	01Jan2000, 12:15	49.89
3	0.36052	0.2	01Jan2000, 06:30	21.84
Reach-2a	0.0672	0.9	01Jan2000, 09:15	695.31
9a	0.0672	0	01Jan2000, 04:30	9.87
Junction-11	0.0672	0.9	01Jan2000, 08:30	696.33

Reach-1	15.02472	6.3	01Jan2000, 10:00	23.02
1	1.328	1.4	01Jan2000, 08:15	44.03
Outlet1	16.35272	7.6	01Jan2000, 09:45	24.73

Parks Creek 100-Year 4-Hour Chicago Storm

Hydrologic Element	Drainage Area (km2)	Peak Discharge (cms)	Time of Peak	Volume (mm)
Junction-1	15.02472	7.5	01Jan2000, 09:00	27.31
Reach-7	2.77822	1.5	01Jan2000, 10:30	34.46
Reach-6	3.613784	2.6	01Jan2000, 06:15	35.6
Junction-4	5.509294	4.3	01Jan2000, 06:00	31.45
14	0.37471	0.6	01Jan2000, 03:30	22.06
Junction-6	3.613784	2.7	01Jan2000, 05:15	35.81
15	0.66612	0.9	01Jan2000, 04:45	26.22
16	0.29703	0.5	01Jan2000, 04:00	29.09
Junction-5	4.468464	3.4	01Jan2000, 05:45	33.06
17	0.55765	0.4	01Jan2000, 05:15	18.67
Reach-5	4.468464	3.4	01Jan2000, 06:30	33.01
Junction-7	2.77822	1.6	01Jan2000, 10:30	38.6
18	0.28555	0.5	01Jan2000, 04:15	33.83
19	0.550014	1.2	01Jan2000, 05:00	43.63
20	2.0835	1.5	01Jan2000, 11:15	44.81
21	0.69472	0.7	01Jan2000, 05:00	19.99
Reach-4	5.509294	4.2	01Jan2000, 07:00	31.33
11	0.8268	0.4	01Jan2000, 09:45	26.74
12	1.1653	1	01Jan2000, 07:15	32.06
13	1.697	1	01Jan2000, 06:45	18.89
Reach-10	2.8623	2	01Jan2000, 08:30	24.27
Junction-9	4.19915	2.6	01Jan2000, 08:30	23.86
Junction-10	2.8623	2	01Jan2000, 07:00	24.25
10	0.51005	0.3	01Jan2000, 06:15	16.87
Reservoir-1	4.19915	1.5	01Jan2000, 08:30	11.32
Reach-9	4.19915	1.2	01Jan2000, 15:45	10.78
9	0.43063	0.1	01Jan2000, 07:15	11.24
8	0.62	0.7	01Jan2000, 05:15	26.48
Junction-3	10.75907	4.9	01Jan2000, 06:45	22.23
Reach-3	10.75907	4.8	01Jan2000, 08:00	22.17
6	0.612232	0.4	01Jan2000, 08:30	28.88
Junction-8	2.606885	1.1	01Jan2000, 10:00	24.76
7	1.994653	0.8	01Jan2000, 10:30	23.5
Reach-8	2.606885	1.1	01Jan2000, 10:15	24.7

5	0.12843	0	01Jan2000, 07:00	10.75
4	0.38163	0.2	01Jan2000, 04:45	10.51
Junction-2	13.87602	5.9	01Jan2000, 08:00	22.22
Reach-2	13.87602	5.7	01Jan2000, 08:45	22.15
2	0.72098	0.7	01Jan2000, 12:15	56.07
3	0.36052	0.3	01Jan2000, 06:30	25.93
Reach-2a	0.0672	1	01Jan2000, 09:15	791.7
9a	0.0672	0	01Jan2000, 04:15	12.6
Junction-11	0.0672	1.1	01Jan2000, 08:30	792.95
Reach-1	15.02472	7.5	01Jan2000, 09:45	27.21
1	1.328	1.6	01Jan2000, 08:15	49.93
Outlet1	16.35272	8.9	01Jan2000, 09:30	29.05

Parks Creek Timmins Storm

Hydrologic Element	Drainage Area (km2)	Peak Discharge (cms)	Time of Peak	Volume (mm)
Junction-1	15.02472	40.8	01Jan2000, 14:15	146.53
Reach-7	2.77822	6.3	01Jan2000, 13:30	150.2
Reach-6	3.613784	10	01Jan2000, 12:30	152.99
Junction-4	5.509294	18	01Jan2000, 11:30	150.75
14	0.37471	2.2	01Jan2000, 08:30	145.42
Junction-6	3.613784	10	01Jan2000, 12:00	153.88
15	0.66612	3.1	01Jan2000, 10:30	150.72
16	0.29703	1.5	01Jan2000, 09:45	154.27
Junction-5	4.468464	13.5	01Jan2000, 11:45	151.55
17	0.55765	2.3	01Jan2000, 11:00	140.76
Reach-5	4.468464	13.5	01Jan2000, 12:15	151.2
Junction-7	2.77822	6.6	01Jan2000, 13:30	158.48
18	0.28555	1.5	01Jan2000, 10:00	159.71
19	0.550014	2.8	01Jan2000, 10:30	169.49
20	2.0835	4.9	01Jan2000, 16:30	163.72
21	0.69472	3.1	01Jan2000, 10:45	142.75
Reach-4	5.509294	17.9	01Jan2000, 12:00	150.28
11	0.8268	2	01Jan2000, 15:30	150.13
12	1.1653	3.9	01Jan2000, 13:15	158.36
13	1.697	5.7	01Jan2000, 12:45	140.78
Reach-10	2.8623	9.6	01Jan2000, 13:45	147.82
Junction-9	4.19915	13.1	01Jan2000, 13:45	147.28
Junction-10	2.8623	9.6	01Jan2000, 12:45	147.94
10	0.51005	1.8	01Jan2000, 12:15	139.59
Reservoir-1	4.19915	3.2	01Jan2000, 14:00	55.82

Reach-9	4.19915	3.2	01Jan2000, 18:30	54.06
9	0.43063	1.1	01Jan2000, 13:30	126.58
8	0.62	2.6	01Jan2000, 11:15	150.79
Junction-3	10.75907	21.8	01Jan2000, 13:15	111.81
Reach-3	10.75907	21.7	01Jan2000, 13:45	111.22
6	0.612232	1.7	01Jan2000, 14:15	151.54
Junction-8	2.606885	5.9	01Jan2000, 15:45	143.58
7	1.994653	4.3	01Jan2000, 16:15	141.13
Reach-8	2.606885	5.8	01Jan2000, 16:45	143.09
5	0.12843	0.4	01Jan2000, 13:00	125.25
4	0.38163	1.7	01Jan2000, 10:15	125.18
Junction-2	13.87602	28	01Jan2000, 14:00	117.72
Reach-2	13.87602	27.9	01Jan2000, 14:15	117.42
2	0.72098	2	01Jan2000, 17:15	176.68
3	0.36052	1.3	01Jan2000, 12:30	150.81
Reach-2a	0.0672	10	01Jan2000, 14:15	5809.2
9a	0.0672	0.3	01Jan2000, 09:45	130.91
Junction-11	0.0672	10.1	01Jan2000, 13:45	5823.78
Reach-1	15.02472	40.5	01Jan2000, 15:00	145.81
1	1.328	4.6	01Jan2000, 13:45	175.19
Outlet1	16.35272	45	01Jan2000, 14:45	148.2

Jessups Creek 2-Year 6-Hour SCS Storm

Hydrologic Element	Drainage Area (km2)	Peak Discharge (cms)	Time of Peak	Volume (mm)
Junction-2	1.082849	0.3	01Jan2000, 08:15	8.08
Junction-1	1.624569	0.4	01Jan2000, 07:45	9.49
2	0.29029	0.2	01Jan2000, 06:15	13.84
Junction-3	0.573289	0.2	01Jan2000, 08:00	9.59
3	0.25143	0.1	01Jan2000, 08:45	10.55
Reach-3	0.573289	0.2	01Jan2000, 09:15	9.61
4	0.25258	0.1	01Jan2000, 06:15	7.96
5	0.25698	0.1	01Jan2000, 06:00	4.77
Reach-2	1.082849	0.2	01Jan2000, 08:30	8.08
6	0.190689	0.1	01Jan2000, 08:00	10.58
7	0.3826	0.1	01Jan2000, 08:00	9.1
Reach-1	1.624569	0.4	01Jan2000, 08:00	9.47
1	0.034751	0.1	01Jan2000, 04:30	24.82
Outlet-1	1.65932	0.5	01Jan2000, 07:45	9.79

Jessups Creek 2-year 12-hour SCS Storm

Hydrologic Element	Drainage Area (km2)	Peak Discharge (cms)	Time of Peak	Volume (mm)
Junction-2	1.082849	0.3	01Jan2000, 11:45	12.54
Junction-1	1.624569	0.6	01Jan2000, 11:45	14.25
2	0.29029	0.2	01Jan2000, 09:00	19.7
Junction-3	0.573289	0.2	01Jan2000, 11:00	14.78
3	0.25143	0.1	01Jan2000, 11:45	15.36
Reach-3	0.573289	0.2	01Jan2000, 12:15	14.8
4	0.25258	0.1	01Jan2000, 09:00	12.06
5	0.25698	0.1	01Jan2000, 09:00	7.96
Reach-2	1.082849	0.3	01Jan2000, 12:30	12.53
6	0.190689	0.1	01Jan2000, 11:15	16.32
7	0.3826	0.1	01Jan2000, 11:00	14.02
Reach-1	1.624569	0.6	01Jan2000, 12:00	14.23
1	0.034751	0.1	01Jan2000, 07:30	32.89
Outlet-1	1.65932	0.6	01Jan2000, 12:00	14.62

Jessups Creek 2-Year 24-Hour SCS Storm

Hydrologic Element	Drainage Area (km2)	Peak Discharge (cms)	Time of Peak	Volume (mm)
Junction-2	1.082849	0.4	01Jan2000, 17:30	18.88
Junction-1	1.624569	0.7	01Jan2000, 17:30	20.88
2	0.29029	0.3	01Jan2000, 15:00	27.62
Junction-3	0.573289	0.3	01Jan2000, 17:00	21.96
3	0.25143	0.1	01Jan2000, 17:45	21.95
Reach-3	0.573289	0.3	01Jan2000, 18:00	21.95
4	0.25258	0.1	01Jan2000, 15:00	18.01
5	0.25698	0.1	01Jan2000, 14:45	12.87
Reach-2	1.082849	0.4	01Jan2000, 19:15	18.83
6	0.190689	0.1	01Jan2000, 17:00	24.11
7	0.3826	0.2	01Jan2000, 17:00	20.88
Reach-1	1.624569	0.7	01Jan2000, 17:45	20.85
1	0.034751	0.1	01Jan2000, 13:15	43.11
Outlet-1	1.65932	0.7	01Jan2000, 17:30	21.32

Jessups Creek 5-Year 6-Hour SCS Storm

Hydrologic Element	Drainage Area (km2)	Peak Discharge (cms)	Time of Peak	Volume (mm)
Junction-2	1.082849	0.4	01Jan2000, 08:15	14.21
Junction-1	1.624569	0.7	01Jan2000, 08:00	15.97
2	0.29029	0.3	01Jan2000, 06:00	21.8
Junction-3	0.573289	0.3	01Jan2000, 08:00	16.68
3	0.25143	0.1	01Jan2000, 08:45	17.14
Reach-3	0.573289	0.3	01Jan2000, 09:00	16.71
4	0.25258	0.1	01Jan2000, 06:15	13.61
5	0.25698	0.1	01Jan2000, 06:00	9.21
Reach-2	1.082849	0.4	01Jan2000, 09:45	14.13
6	0.190689	0.1	01Jan2000, 08:00	18.4
7	0.3826	0.2	01Jan2000, 08:00	15.83
Reach-1	1.624569	0.7	01Jan2000, 08:15	15.93
1	0.034751	0.1	01Jan2000, 04:30	35.67
Outlet-1	1.65932	0.7	01Jan2000, 08:00	16.34

Jessups Creek 5-Year 12-Hour SCS Storm

Hydrologic Element	Drainage Area (km2)	Peak Discharge (cms)	Time of Peak	Volume (mm)
Junction-2	1.082849	0.6	01Jan2000, 11:30	21.5
Junction-1	1.624569	1	01Jan2000, 11:45	23.66
2	0.29029	0.3	01Jan2000, 09:00	30.72
Junction-3	0.573289	0.4	01Jan2000, 11:00	24.89
3	0.25143	0.1	01Jan2000, 11:45	24.82
Reach-3	0.573289	0.4	01Jan2000, 12:00	24.91
4	0.25258	0.2	01Jan2000, 09:00	20.44
5	0.25698	0.1	01Jan2000, 08:45	14.93
Reach-2	1.082849	0.6	01Jan2000, 12:15	21.49
6	0.190689	0.1	01Jan2000, 11:00	27.27
7	0.3826	0.2	01Jan2000, 11:00	23.7
Reach-1	1.624569	1	01Jan2000, 12:00	23.62
1	0.034751	0.1	01Jan2000, 07:30	46.98
Outlet-1	1.65932	1	01Jan2000, 12:00	24.11

Jessups Creek 5-Year 24-Hour SCS Storm

Hydrologic Element	Drainage Area (km2)	Peak Discharge (cms)	Time of Peak	Volume (mm)
Junction-2	1.082849	0.8	01Jan2000, 17:30	31.55
Junction-1	1.624569	1.2	01Jan2000, 17:30	34.15
2	0.29029	0.4	01Jan2000, 15:00	42.58
Junction-3	0.573289	0.5	01Jan2000, 17:00	35.94
3	0.25143	0.2	01Jan2000, 17:45	35.08
Reach-3	0.573289	0.5	01Jan2000, 17:45	35.94
4	0.25258	0.2	01Jan2000, 15:00	30.02
5	0.25698	0.2	01Jan2000, 14:45	23.29
Reach-2	1.082849	0.8	01Jan2000, 18:00	31.68
6	0.190689	0.2	01Jan2000, 17:00	39.05
7	0.3826	0.3	01Jan2000, 16:45	34.4
Reach-1	1.624569	1.2	01Jan2000, 17:45	34.1
1	0.034751	0.1	01Jan2000, 13:15	61.27
Outlet-1	1.65932	1.2	01Jan2000, 17:30	34.67

Jessups Creek 10-Year 6-Hour SCS Storm

Hydrologic Element	Drainage Area (km2)	Peak Discharge (cms)	Time of Peak	Volume (mm)
Junction-2	1.082849	0.6	01Jan2000, 08:15	18.98
Junction-1	1.624569	1	01Jan2000, 08:15	21.02
2	0.29029	0.4	01Jan2000, 06:00	27.68
Junction-3	0.573289	0.4	01Jan2000, 08:00	22.07
3	0.25143	0.1	01Jan2000, 08:45	22.18
Reach-3	0.573289	0.4	01Jan2000, 09:00	22.1
4	0.25258	0.2	01Jan2000, 06:15	18.06
5	0.25698	0.2	01Jan2000, 06:00	12.92
Reach-2	1.082849	0.6	01Jan2000, 09:00	18.97
6	0.190689	0.1	01Jan2000, 08:00	24.24
7	0.3826	0.2	01Jan2000, 08:00	20.99
Reach-1	1.624569	1	01Jan2000, 08:30	20.98
1	0.034751	0.1	01Jan2000, 04:30	43.19
Outlet-1	1.65932	1	01Jan2000, 08:30	21.44

Jessups Creek 10-year 12-hour SCS Storm

Hydrologic Element	Drainage Area (km2)	Peak Discharge (cms)	Time of Peak	Volume (mm)
Junction-2	1.082849	0.8	01Jan2000, 11:30	28.27
Junction-1	1.624569	1.3	01Jan2000, 11:30	30.74
2	0.29029	0.4	01Jan2000, 09:00	38.7
Junction-3	0.573289	0.5	01Jan2000, 11:00	32.36
3	0.25143	0.2	01Jan2000, 11:45	31.86
Reach-3	0.573289	0.5	01Jan2000, 12:00	32.39
4	0.25258	0.2	01Jan2000, 09:00	26.83
5	0.25698	0.2	01Jan2000, 08:45	20.48
Reach-2	1.082849	0.8	01Jan2000, 12:00	28.35
6	0.190689	0.2	01Jan2000, 11:00	35.25
7	0.3826	0.3	01Jan2000, 11:00	30.92
Reach-1	1.624569	1.3	01Jan2000, 11:45	30.7
1	0.034751	0.1	01Jan2000, 07:30	56.67
Outlet-1	1.65932	1.3	01Jan2000, 11:45	31.24

Jessups Creek 10-Year 24-Hour SCS Storm

Hydrologic Element	Drainage Area (km2)	Peak Discharge (cms)	Time of Peak	Volume (mm)
Junction-2	1.082849	1	01Jan2000, 17:15	40.89
Junction-1	1.624569	1.6	01Jan2000, 17:15	43.78
2	0.29029	0.5	01Jan2000, 15:00	53.23
Junction-3	0.573289	0.6	01Jan2000, 16:45	46.06
3	0.25143	0.2	01Jan2000, 17:45	44.65
Reach-3	0.573289	0.6	01Jan2000, 17:45	46.05
4	0.25258	0.3	01Jan2000, 15:00	38.95
5	0.25698	0.3	01Jan2000, 14:45	31.28
Reach-2	1.082849	1	01Jan2000, 18:00	41.04
6	0.190689	0.2	01Jan2000, 17:00	49.71
7	0.3826	0.4	01Jan2000, 16:45	44.24
Reach-1	1.624569	1.6	01Jan2000, 17:30	43.71
1	0.034751	0.1	01Jan2000, 13:15	73.63
Outlet-1	1.65932	1.6	01Jan2000, 17:15	44.33

Jessups Creek 25-Year 6-Hour SCS Storm

Hydrologic Element	Drainage Area (km2)	Peak Discharge (cms)	Time of Peak	Volume (mm)
Junction-2	1.082849	0.8	01Jan2000, 08:00	25.54
Junction-1	1.624569	1.3	01Jan2000, 08:00	27.93
2	0.29029	0.5	01Jan2000, 06:00	35.5
Junction-3	0.573289	0.5	01Jan2000, 08:00	29.35
3	0.25143	0.2	01Jan2000, 08:45	29.03
Reach-3	0.573289	0.5	01Jan2000, 09:00	29.39
4	0.25258	0.3	01Jan2000, 06:15	24.24
5	0.25698	0.2	01Jan2000, 06:00	18.21
Reach-2	1.082849	0.8	01Jan2000, 08:45	25.64
6	0.190689	0.2	01Jan2000, 08:00	32.05
7	0.3826	0.3	01Jan2000, 08:00	28.01
Reach-1	1.624569	1.3	01Jan2000, 08:15	27.86
1	0.034751	0.1	01Jan2000, 04:30	52.82
Outlet-1	1.65932	1.3	01Jan2000, 08:15	28.39

Jessups Creek 25-Year 12-Hour SCS Storm

Hydrologic Element	Drainage Area (km2)	Peak Discharge (cms)	Time of Peak	Volume (mm)
Junction-2	1.082849	1.1	01Jan2000, 11:15	37.36
Junction-1	1.624569	1.7	01Jan2000, 11:15	40.13
2	0.29029	0.5	01Jan2000, 09:00	49.15
Junction-3	0.573289	0.6	01Jan2000, 11:00	42.27
3	0.25143	0.2	01Jan2000, 11:45	41.26
Reach-3	0.573289	0.6	01Jan2000, 11:45	42.3
4	0.25258	0.3	01Jan2000, 09:00	35.5
5	0.25698	0.3	01Jan2000, 08:45	28.18
Reach-2	1.082849	1.1	01Jan2000, 12:00	37.44
6	0.190689	0.2	01Jan2000, 11:00	45.74
7	0.3826	0.4	01Jan2000, 11:00	40.54
Reach-1	1.624569	1.7	01Jan2000, 11:45	40.06
1	0.034751	0.2	01Jan2000, 07:15	68.94
Outlet-1	1.65932	1.7	01Jan2000, 11:30	40.66

Jessups Creek 25-Year 24-Hour SCS Storm

Hydrologic Element	Drainage Area (km2)	Peak Discharge (cms)	Time of Peak	Volume (mm)
Junction-2	1.082849	1.3	01Jan2000, 17:00	53.2
Junction-1	1.624569	2.1	01Jan2000, 17:00	56.36
2	0.29029	0.7	01Jan2000, 15:00	66.97
Junction-3	0.573289	0.8	01Jan2000, 16:45	59.24
3	0.25143	0.3	01Jan2000, 17:45	57.21
Reach-3	0.573289	0.8	01Jan2000, 17:45	59.23
4	0.25258	0.4	01Jan2000, 15:00	50.82
5	0.25698	0.4	01Jan2000, 14:45	42.11
Reach-2	1.082849	1.3	01Jan2000, 17:30	53.32
6	0.190689	0.3	01Jan2000, 16:45	63.5
7	0.3826	0.5	01Jan2000, 16:45	57.12
Reach-1	1.624569	2.1	01Jan2000, 17:15	56.25
1	0.034751	0.2	01Jan2000, 13:15	89.17
Outlet-1	1.65932	2.1	01Jan2000, 17:15	56.94

Jessups Creek 50-Year 6-Hour SCS Storm

Hydrologic Element	Drainage Area (km2)	Peak Discharge (cms)	Time of Peak	Volume (mm)
Junction-2	1.082849	1	01Jan2000, 07:45	30.69
Junction-1	1.624569	1.6	01Jan2000, 08:00	33.28
2	0.29029	0.5	01Jan2000, 06:00	41.52
Junction-3	0.573289	0.6	01Jan2000, 08:00	35.02
3	0.25143	0.2	01Jan2000, 08:45	34.38
Reach-3	0.573289	0.6	01Jan2000, 09:00	35.05
4	0.25258	0.3	01Jan2000, 06:15	29.14
5	0.25698	0.3	01Jan2000, 06:00	22.51
Reach-2	1.082849	1	01Jan2000, 08:30	30.82
6	0.190689	0.2	01Jan2000, 08:00	38.07
7	0.3826	0.4	01Jan2000, 08:00	33.49
Reach-1	1.624569	1.6	01Jan2000, 08:15	33.21
1	0.034751	0.2	01Jan2000, 04:30	60.01
Outlet-1	1.65932	1.6	01Jan2000, 08:00	33.77

Jessups Creek 50-Year 12-Hour SCS Storm

Hydrologic Element	Drainage Area (km2)	Peak Discharge (cms)	Time of Peak	Volume (mm)
Junction-2	1.082849	1.3	01Jan2000, 11:15	44.39
Junction-1	1.624569	2	01Jan2000, 11:15	47.39
2	0.29029	0.6	01Jan2000, 09:00	57.08
Junction-3	0.573289	0.7	01Jan2000, 11:00	49.84
3	0.25143	0.3	01Jan2000, 11:45	48.49
Reach-3	0.573289	0.7	01Jan2000, 11:45	49.87
4	0.25258	0.4	01Jan2000, 09:00	42.24
5	0.25698	0.3	01Jan2000, 08:45	34.26
Reach-2	1.082849	1.3	01Jan2000, 11:45	44.53
6	0.190689	0.3	01Jan2000, 11:00	53.69
7	0.3826	0.5	01Jan2000, 10:45	47.93
Reach-1	1.624569	2	01Jan2000, 11:30	47.29
1	0.034751	0.2	01Jan2000, 07:15	78.02
Outlet-1	1.65932	2.1	01Jan2000, 11:15	47.94

Jessups Creek 50-Year 24-Hour SCS Storm

Hydrologic Element	Drainage Area (km2)	Peak Discharge (cms)	Time of Peak	Volume (mm)
Junction-2	1.082849	1.6	01Jan2000, 17:00	62.55
Junction-1	1.624569	2.5	01Jan2000, 17:00	65.95
2	0.29029	0.8	01Jan2000, 15:00	77.25
Junction-3	0.573289	0.9	01Jan2000, 16:45	69.17
3	0.25143	0.3	01Jan2000, 17:45	66.72
Reach-3	0.573289	0.9	01Jan2000, 17:45	69.14
4	0.25258	0.5	01Jan2000, 15:00	59.88
5	0.25698	0.5	01Jan2000, 14:45	50.48
Reach-2	1.082849	1.6	01Jan2000, 17:30	62.75
6	0.190689	0.3	01Jan2000, 16:45	73.81
7	0.3826	0.6	01Jan2000, 16:45	66.86
Reach-1	1.624569	2.5	01Jan2000, 17:15	65.75
1	0.034751	0.2	01Jan2000, 13:15	100.57
Outlet-1	1.65932	2.5	01Jan2000, 17:15	66.48

Jessups Creek 100-Year 6-Hour SCS Storm

Hydrologic Element	Drainage Area (km2)	Peak Discharge (cms)	Time of Peak	Volume (mm)
Junction-2	1.082849	1.2	01Jan2000, 08:00	36.05
Junction-1	1.624569	1.9	01Jan2000, 08:00	38.87
2	0.29029	0.6	01Jan2000, 06:00	47.66
Junction-3	0.573289	0.7	01Jan2000, 08:00	40.84
3	0.25143	0.3	01Jan2000, 08:45	39.92
Reach-3	0.573289	0.7	01Jan2000, 08:45	40.88
4	0.25258	0.4	01Jan2000, 06:15	34.24
5	0.25698	0.3	01Jan2000, 06:00	27.05
Reach-2	1.082849	1.2	01Jan2000, 08:45	36.28
6	0.190689	0.2	01Jan2000, 08:00	44.24
7	0.3826	0.4	01Jan2000, 08:00	39.15
Reach-1	1.624569	1.8	01Jan2000, 08:00	38.78
1	0.034751	0.2	01Jan2000, 04:30	67.21
Outlet-1	1.65932	1.9	01Jan2000, 08:00	39.38

Jessups Creek 100-Year 12-Hour SCS Storm

Hydrologic Element	Drainage Area (km2)	Peak Discharge (cms)	Time of Peak	Volume (mm)
Junction-2	1.082849	1.5	01Jan2000, 11:15	51.59
Junction-1	1.624569	2.4	01Jan2000, 11:00	54.79
2	0.29029	0.7	01Jan2000, 09:00	65.1
Junction-3	0.573289	0.9	01Jan2000, 10:45	57.56
3	0.25143	0.3	01Jan2000, 11:45	55.87
Reach-3	0.573289	0.9	01Jan2000, 11:45	57.59
4	0.25258	0.5	01Jan2000, 09:00	49.18
5	0.25698	0.4	01Jan2000, 08:45	40.6
Reach-2	1.082849	1.5	01Jan2000, 11:30	51.77
6	0.190689	0.3	01Jan2000, 11:00	61.75
7	0.3826	0.6	01Jan2000, 10:45	55.47
Reach-1	1.624569	2.3	01Jan2000, 11:30	54.61
1	0.034751	0.2	01Jan2000, 07:15	87.07
Outlet-1	1.65932	2.4	01Jan2000, 11:15	55.29

Jessups Creek 100-Year 24-Hour SCS Storm

Hydrologic Element	Drainage Area (km2)	Peak Discharge (cms)	Time of Peak	Volume (mm)
Junction-2	1.082849	1.8	01Jan2000, 17:00	72.06
Junction-1	1.624569	2.9	01Jan2000, 16:45	75.64
2	0.29029	0.9	01Jan2000, 14:45	87.59
Junction-3	0.573289	1	01Jan2000, 16:45	79.2
3	0.25143	0.4	01Jan2000, 17:45	76.35
Reach-3	0.573289	1	01Jan2000, 17:30	79.16
4	0.25258	0.6	01Jan2000, 15:00	69.12
5	0.25698	0.5	01Jan2000, 14:45	59.1
Reach-2	1.082849	1.8	01Jan2000, 17:15	72.27
6	0.190689	0.4	01Jan2000, 16:45	84.19
7	0.3826	0.7	01Jan2000, 16:45	76.71
Reach-1	1.624569	2.8	01Jan2000, 17:15	75.42
1	0.034751	0.2	01Jan2000, 13:15	111.88
Outlet-1	1.65932	2.9	01Jan2000, 17:00	76.19

Jessups Creek 2-Year 4-Hour Chicago Storm

Hydrologic Element	Drainage Area (km2)	Peak Discharge (cms)	Time of Peak	Volume (mm)
Junction-2	1.082849	0.2	01Jan2000, 07:00	6.16
Junction-1	1.624569	0.4	01Jan2000, 06:15	7.41
2	0.29029	0.1	01Jan2000, 04:45	11.18
Junction-3	0.573289	0.1	01Jan2000, 06:45	7.3
3	0.25143	0.1	01Jan2000, 07:15	8.43
Reach-3	0.573289	0.1	01Jan2000, 07:45	7.32
4	0.25258	0.1	01Jan2000, 05:00	6.22
5	0.25698	0	01Jan2000, 04:45	3.51
Reach-2	1.082849	0.2	01Jan2000, 07:15	6.16
6	0.190689	0	01Jan2000, 06:45	8.01
7	0.3826	0.1	01Jan2000, 06:45	6.95
Reach-1	1.624569	0.4	01Jan2000, 06:30	7.39
1	0.034751	0.1	01Jan2000, 03:15	20.92
Outlet-1	1.65932	0.4	01Jan2000, 06:15	7.67

Jessups Creek 5-Year 4-Hour Chicago Storm

Hydrologic Element	Drainage Area (km2)	Peak Discharge (cms)	Time of Peak	Volume (mm)
Junction-2	1.082849	0.3	01Jan2000, 06:45	10.97
Junction-1	1.624569	0.6	01Jan2000, 06:45	12.58
2	0.29029	0.2	01Jan2000, 04:45	17.68
Junction-3	0.573289	0.2	01Jan2000, 06:45	12.97
3	0.25143	0.1	01Jan2000, 07:15	13.69
Reach-3	0.573289	0.2	01Jan2000, 07:45	13
4	0.25258	0.1	01Jan2000, 05:00	10.61
5	0.25698	0.1	01Jan2000, 05:00	6.81
Reach-2	1.082849	0.3	01Jan2000, 07:45	10.95
6	0.190689	0.1	01Jan2000, 06:45	14.33
7	0.3826	0.1	01Jan2000, 06:30	12.3
Reach-1	1.624569	0.6	01Jan2000, 06:45	12.54
1	0.034751	0.1	01Jan2000, 03:00	30.17
Outlet-1	1.65932	0.6	01Jan2000, 06:45	12.91

Jessups Creek 10-Year 4-Hour Chicago Storm

Hydrologic Element	Drainage Area (km2)	Peak Discharge (cms)	Time of Peak	Volume (mm)
Junction-2	1.082849	0.5	01Jan2000, 06:45	14.8
Junction-1	1.624569	0.8	01Jan2000, 06:15	16.53
2	0.29029	0.3	01Jan2000, 04:45	22.54
Junction-3	0.573289	0.3	01Jan2000, 06:30	17.36
3	0.25143	0.1	01Jan2000, 07:15	17.77
Reach-3	0.573289	0.3	01Jan2000, 07:45	17.38
4	0.25258	0.2	01Jan2000, 05:00	14.16
5	0.25698	0.1	01Jan2000, 04:45	9.66
Reach-2	1.082849	0.4	01Jan2000, 08:30	14.63
6	0.190689	0.1	01Jan2000, 06:45	19.13
7	0.3826	0.2	01Jan2000, 06:30	16.47
Reach-1	1.624569	0.7	01Jan2000, 06:30	16.49
1	0.034751	0.1	01Jan2000, 03:00	36.63
Outlet-1	1.65932	0.8	01Jan2000, 06:15	16.91

Jessups Creek 25-Year 4-Hour Chicago Storm

Hydrologic Element	Drainage Area (km2)	Peak Discharge (cms)	Time of Peak	Volume (mm)
Junction-2	1.082849	0.6	01Jan2000, 06:45	20.14
Junction-1	1.624569	1.1	01Jan2000, 06:30	22.27
2	0.29029	0.4	01Jan2000, 04:45	29.08
Junction-3	0.573289	0.4	01Jan2000, 06:30	23.37
3	0.25143	0.2	01Jan2000, 07:15	23.39
Reach-3	0.573289	0.4	01Jan2000, 07:30	23.4
4	0.25258	0.2	01Jan2000, 05:00	19.15
5	0.25698	0.2	01Jan2000, 04:45	13.84
Reach-2	1.082849	0.6	01Jan2000, 07:15	20.18
6	0.190689	0.1	01Jan2000, 06:30	25.64
7	0.3826	0.3	01Jan2000, 06:30	22.23
Reach-1	1.624569	1	01Jan2000, 07:00	22.22
1	0.034751	0.1	01Jan2000, 03:00	44.95
Outlet-1	1.65932	1.1	01Jan2000, 06:45	22.69

Jessups Creek 50-Year 4-Hour Chicago Storm

Hydrologic Element	Drainage Area (km2)	Peak Discharge (cms)	Time of Peak	Volume (mm)
Junction-2	1.082849	0.8	01Jan2000, 06:30	24.39
Junction-1	1.624569	1.3	01Jan2000, 06:30	26.73
2	0.29029	0.4	01Jan2000, 04:45	34.16
Junction-3	0.573289	0.5	01Jan2000, 06:30	28.09
3	0.25143	0.2	01Jan2000, 07:15	27.84
Reach-3	0.573289	0.5	01Jan2000, 07:30	28.13
4	0.25258	0.3	01Jan2000, 05:00	23.16
5	0.25698	0.2	01Jan2000, 04:45	17.28
Reach-2	1.082849	0.8	01Jan2000, 07:15	24.48
6	0.190689	0.2	01Jan2000, 06:30	30.7
7	0.3826	0.3	01Jan2000, 06:30	26.79
Reach-1	1.624569	1.3	01Jan2000, 06:45	26.66
1	0.034751	0.1	01Jan2000, 03:00	51.19
Outlet-1	1.65932	1.3	01Jan2000, 06:45	27.18

Jessups Creek 100-Year 4-Hour Chicago Storm

Hydrologic Element	Drainage Area (km2)	Peak Discharge (cms)	Time of Peak	Volume (mm)
Junction-2	1.082849	0.9	01Jan2000, 06:30	28.84
Junction-1	1.624569	1.5	01Jan2000, 06:30	31.38
2	0.29029	0.5	01Jan2000, 04:45	39.37
Junction-3	0.573289	0.6	01Jan2000, 06:30	32.99
3	0.25143	0.2	01Jan2000, 07:15	32.46
Reach-3	0.573289	0.6	01Jan2000, 07:30	33.02
4	0.25258	0.3	01Jan2000, 05:00	27.38
5	0.25698	0.3	01Jan2000, 04:45	20.96
Reach-2	1.082849	0.9	01Jan2000, 07:15	28.99
6	0.190689	0.2	01Jan2000, 06:30	35.92
7	0.3826	0.4	01Jan2000, 06:30	31.53
Reach-1	1.624569	1.5	01Jan2000, 06:45	31.31
1	0.034751	0.1	01Jan2000, 03:00	57.46
Outlet-1	1.65932	1.5	01Jan2000, 06:30	31.86

Jessups Creek Timmins Storm

Hydrologic Element	Drainage Area (km2)	Peak Discharge (cms)	Time of Peak	Volume (mm)
Junction-2	1.082849	4.1	01Jan2000, 12:00	155.34
Junction-1	1.624569	6.2	01Jan2000, 12:15	157.79
2	0.29029	1.4	01Jan2000, 10:30	166.08
Junction-3	0.573289	2.1	01Jan2000, 12:30	161.19
3	0.25143	0.8	01Jan2000, 13:15	158.24
Reach-3	0.573289	2.1	01Jan2000, 13:15	161.22
4	0.25258	1.1	01Jan2000, 11:00	152.59
5	0.25698	1.2	01Jan2000, 10:30	144.91
Reach-2	1.082849	4.1	01Jan2000, 12:15	155.47
6	0.190689	0.7	01Jan2000, 12:30	165.05
7	0.3826	1.4	01Jan2000, 12:30	159.27
Reach-1	1.624569	6.2	01Jan2000, 12:15	157.58
1	0.034751	0.2	01Jan2000, 08:15	180.86
Outlet-1	1.65932	6.3	01Jan2000, 12:15	158.07