

Project Description

File Name 10145.00 Lois32ndStormExisting.SPF

Project Options

Flow Units CFS
 Elevation Type Elevation
 Hydrology Method SCS TR-55
 Time of Concentration (TOC) Method SCS TR-55
 Link Routing Method Kinematic Wave
 Enable Overflow Ponding at Nodes YES
 Skip Steady State Analysis Time Periods NO

Analysis Options

Start Analysis On Apr 30, 2020 00:00:00
 End Analysis On May 01, 2020 00:00:00
 Start Reporting On Apr 30, 2020 00:00:00
 Antecedent Dry Days 0 days
 Runoff (Dry Weather) Time Step 0 01:00:00 days hh:mm:ss
 Runoff (Wet Weather) Time Step 0 00:05:00 days hh:mm:ss
 Reporting Time Step 0 00:05:00 days hh:mm:ss
 Routing Time Step 30 seconds

Number of Elements

	Qty
Rain Gages	1
Subbasins.....	5
Nodes.....	9
<i>Junctions</i>	7
<i>Outfalls</i>	2
<i>Flow Diversions</i>	0
<i>Inlets</i>	0
<i>Storage Nodes</i>	0
Links.....	7
<i>Channels</i>	0
<i>Pipes</i>	7
<i>Pumps</i>	0
<i>Orifices</i>	0
<i>Weirs</i>	0
<i>Outlets</i>	0
Pollutants	0
Land Uses	0

Rainfall Details

SN	Rain Gage ID	Data Source	Data Source ID	Rainfall Type	Rain Units	State	County	Return Period (years)	Rainfall Depth (inches)	Rainfall Distribution
1	Rain Gage-01	Time Series	10-year, 24-hour, Anchorage	Cumulative	inches				0.00	

Subbasin Summary

SN	Subbasin ID	Area (ac)	Weighted Curve Number	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
1	F-1.1	1.07	89.59	2.28	1.31	1.40	0.62	0 00:24:35
2	F-1.2	9.41	85.82	2.28	1.06	9.93	3.63	0 00:34:51
3	F-1.3	4.13	90.00	2.28	1.34	5.52	2.73	0 00:19:34
4	F-2.1	6.24	87.83	2.28	1.18	7.39	2.34	0 00:45:38
5	F-2.2	4.61	92.00	2.28	1.49	6.87	2.77	0 00:29:07

Subbasin Hydrology

Subbasin : F-1.1

Input Data

Area (ac) 1.07
Weighted Curve Number 89.59
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Paved roads with curbs & sewers	0.47	C	98.00
1/4 acre lots, 38% impervious	0.60	C	83.00
Composite Area & Weighted CN	1.07		89.59

Time of Concentration

TOC Method : SCS TR-55

Sheet Flow Equation :

$$T_c = (0.007 * ((n * L_f)^{0.8})) / ((P^{0.5}) * (S_f^{0.4}))$$

Where :

T_c = Time of Concentration (hr)
n = Manning's roughness
L_f = Flow Length (ft)
P = 2 yr, 24 hr Rainfall (inches)
S_f = Slope (ft/ft)

Shallow Concentrated Flow Equation :

V = 16.1345 * (S_f^{0.5}) (unpaved surface)
V = 20.3282 * (S_f^{0.5}) (paved surface)
V = 15.0 * (S_f^{0.5}) (grassed waterway surface)
V = 10.0 * (S_f^{0.5}) (nearly bare & untilled surface)
V = 9.0 * (S_f^{0.5}) (cultivated straight rows surface)
V = 7.0 * (S_f^{0.5}) (short grass pasture surface)
V = 5.0 * (S_f^{0.5}) (woodland surface)
V = 2.5 * (S_f^{0.5}) (forest w/heavy litter surface)
T_c = (L_f / V) / (3600 sec/hr)

Where:

T_c = Time of Concentration (hr)
L_f = Flow Length (ft)
V = Velocity (ft/sec)
S_f = Slope (ft/ft)

Channel Flow Equation :

V = (1.49 * (R^{2/3}) * (S_f^{0.5})) / n
R = A_q / W_p
T_c = (L_f / V) / (3600 sec/hr)

Where :

T_c = Time of Concentration (hr)
L_f = Flow Length (ft)
R = Hydraulic Radius (ft)
A_q = Flow Area (ft²)
W_p = Wetted Perimeter (ft)
V = Velocity (ft/sec)
S_f = Slope (ft/ft)
n = Manning's roughness

	Subarea	Subarea	Subarea
	A	B	C
Sheet Flow Computations			
Manning's Roughness :	.4	0.00	0.00
Flow Length (ft) :	38	0.00	0.00
Slope (%) :	2.63	0.00	0.00
2 yr, 24 hr Rainfall (in) :	1.50	0.00	0.00
Velocity (ft/sec) :	0.05	0.00	0.00
Computed Flow Time (min) :	12.96	0.00	0.00
Channel Flow Computations	Subarea	Subarea	Subarea
	A	B	C
Manning's Roughness :	0.019	0.00	0.00
Flow Length (ft) :	365	0.00	0.00
Channel Slope (%) :	.82	0.00	0.00
Cross Section Area (ft ²) :	0.08	0.00	0.00
Wetted Perimeter (ft) :	4	0.00	0.00
Velocity (ft/sec) :	0.52	0.00	0.00
Computed Flow Time (min) :	11.63	0.00	0.00
Total TOC (min)	24.59		

Subbasin Runoff Results

Total Rainfall (in)	2.28
Total Runoff (in)	1.31
Peak Runoff (cfs)	0.62
Weighted Curve Number	89.59
Time of Concentration (days hh:mm:ss)	0 00:24:35

Subbasin : F-1.2

Input Data

Area (ac) 9.41
 Weighted Curve Number 85.82
 Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Woods, Poor	1.74	C	77.00
> 75% grass cover, Good	1.68	C	74.00
1/8 acre lots, 65% impervious	3.44	C	90.00
Urban commercial, 85% imp	2.55	C	94.00
Composite Area & Weighted CN	9.41		85.82

Time of Concentration

Sheet Flow Computations	Subarea	Subarea	Subarea
	A	B	C
Manning's Roughness :	.15	0.00	0.00
Flow Length (ft) :	106	0.00	0.00
Slope (%) :	.94	0.00	0.00
2 yr, 24 hr Rainfall (in) :	1.50	0.00	0.00
Velocity (ft/sec) :	0.09	0.00	0.00
Computed Flow Time (min) :	20.28	0.00	0.00

Shallow Concentrated Flow Computations	Subarea	Subarea	Subarea
	A	B	C
Flow Length (ft) :	258	484	0.00
Slope (%) :	1.16	.83	0.00
Surface Type :	Paved	grass pasture	Unpaved
Velocity (ft/sec) :	2.19	0.64	0.00
Computed Flow Time (min) :	1.96	12.60	0.00
Total TOC (min)	34.85		

Subbasin Runoff Results

Total Rainfall (in) 2.28
 Total Runoff (in) 1.06
 Peak Runoff (cfs) 3.63
 Weighted Curve Number 85.82
 Time of Concentration (days hh:mm:ss) 0 00:34:51

Subbasin : F-1.3

Input Data

Area (ac) 4.13
 Weighted Curve Number 90.00
 Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
1/8 acre lots, 65% Impervious	4.55	C	90.00
Composite Area & Weighted CN	4.55		90.00

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
	Manning's Roughness :	.15	0.00
Flow Length (ft) :	44	0.00	0.00
Slope (%) :	2.27	0.00	0.00
2 yr, 24 hr Rainfall (in) :	1.50	0.00	0.00
Velocity (ft/sec) :	0.10	0.00	0.00
Computed Flow Time (min) :	7.05	0.00	0.00

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
	Flow Length (ft) :	276	0.00
Slope (%) :	.36	0.00	0.00
Surface Type :	Paved	Unpaved	Unpaved
Velocity (ft/sec) :	1.22	0.00	0.00
Computed Flow Time (min) :	3.77	0.00	0.00

Channel Flow Computations	Subarea A	Subarea B	Subarea C
	Manning's Roughness :	.013	.03
Flow Length (ft) :	410	147	0.00
Channel Slope (%) :	.49	.68	0.00
Cross Section Area (ft²) :	.33	.5	0.00
Wetted Perimeter (ft) :	8	2.24	0.00
Velocity (ft/sec) :	0.96	1.51	0.00
Computed Flow Time (min) :	7.13	1.63	0.00
Total TOC (min)	19.58		

Subbasin Runoff Results

Total Rainfall (in) 2.28
 Total Runoff (in) 1.34
 Peak Runoff (cfs) 2.73
 Weighted Curve Number 90.00
 Time of Concentration (days hh:mm:ss) 0 00:19:35

Subbasin : F-2.1

Input Data

Area (ac) 6.24
 Weighted Curve Number 87.83
 Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Urban commercial, 85% imp	2.74	C	94.00
1/4 acre lots, 38% impervious	3.50	C	83.00
Composite Area & Weighted CN	6.24		87.83

Time of Concentration

	Subarea	Subarea	Subarea
	A	B	C
Sheet Flow Computations			
Manning's Roughness :	.4	0.00	0.00
Flow Length (ft) :	48	0.00	0.00
Slope (%) :	2.08	0.00	0.00
2 yr, 24 hr Rainfall (in) :	1.50	0.00	0.00
Velocity (ft/sec) :	0.05	0.00	0.00
Computed Flow Time (min) :	17.16	0.00	0.00
Channel Flow Computations			
Manning's Roughness :	.023	0.00	0.00
Flow Length (ft) :	692	0.00	0.00
Channel Slope (%) :	.72	0.00	0.00
Cross Section Area (ft ²) :	.08	0.00	0.00
Wetted Perimeter (ft) :	4	0.00	0.00
Velocity (ft/sec) :	0.41	0.00	0.00
Computed Flow Time (min) :	28.48	0.00	0.00
Total TOC (min)	45.64		

Subbasin Runoff Results

Total Rainfall (in) 2.28
 Total Runoff (in) 1.18
 Peak Runoff (cfs) 2.34
 Weighted Curve Number 87.83
 Time of Concentration (days hh:mm:ss) 0 00:45:38

Subbasin : F-2.2

Input Data

Area (ac) 4.61
 Weighted Curve Number 92.00
 Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
1/8 acre lots, 65% impervious	2.30	C	90.00
Urban commercial, 85% imp	2.31	C	94.00
Composite Area & Weighted CN	4.61		92.00

Time of Concentration

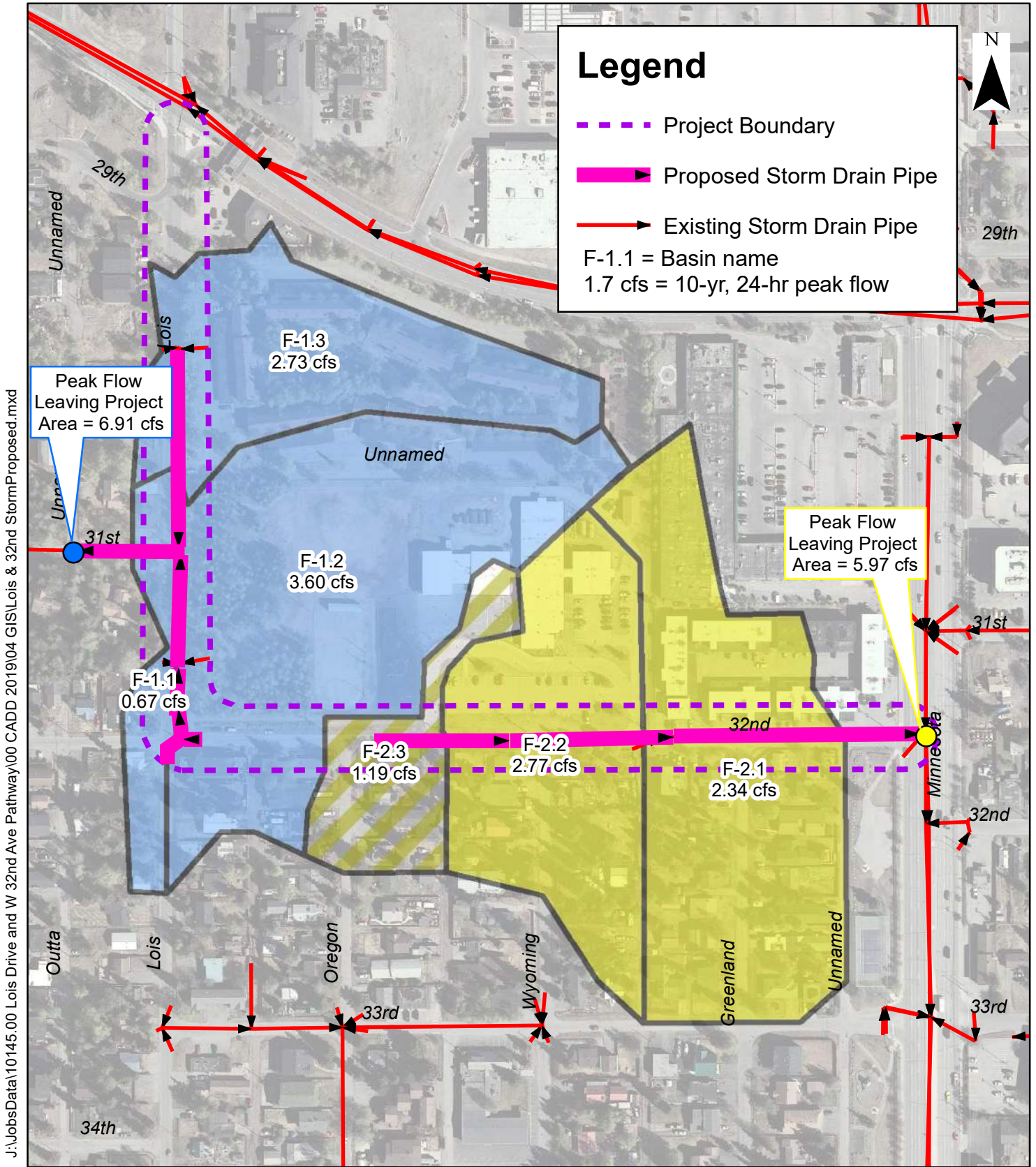
Sheet Flow Computations	Subarea	Subarea	Subarea
	A	B	C
Manning's Roughness :	.35	0.00	0.00
Flow Length (ft) :	60	0.00	0.00
Slope (%) :	1.67	0.00	0.00
2 yr, 24 hr Rainfall (in) :	1.50	0.00	0.00
Velocity (ft/sec) :	0.05	0.00	0.00
Computed Flow Time (min) :	20.13	0.00	0.00

Shallow Concentrated Flow Computations	Subarea	Subarea	Subarea
	A	B	C
Flow Length (ft) :	31	0.00	0.00
Slope (%) :	3.22	0.00	0.00
Surface Type :	Unpaved	Unpaved	Unpaved
Velocity (ft/sec) :	2.90	0.00	0.00
Computed Flow Time (min) :	0.18	0.00	0.00

Channel Flow Computations	Subarea	Subarea	Subarea
	A	B	C
Manning's Roughness :	.033	0.00	0.00
Flow Length (ft) :	349	0.00	0.00
Channel Slope (%) :	.29	0.00	0.00
Cross Section Area (ft ²) :	.167	0.00	0.00
Wetted Perimeter (ft) :	1.18	0.00	0.00
Velocity (ft/sec) :	0.66	0.00	0.00
Computed Flow Time (min) :	8.81	0.00	0.00
Total TOC (min)	29.12		

Subbasin Runoff Results

Total Rainfall (in) 2.28
 Total Runoff (in) 1.49
 Peak Runoff (cfs) 2.77
 Weighted Curve Number 92.00
 Time of Concentration (days hh:mm:ss) 0 00:29:07



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Figure 5
Proposed Stormwater System

Date: AUG 2020

Lois Drive & 32nd Avenue Pathway
Design Study Report



0 62.5 125 250 375 500 Feet

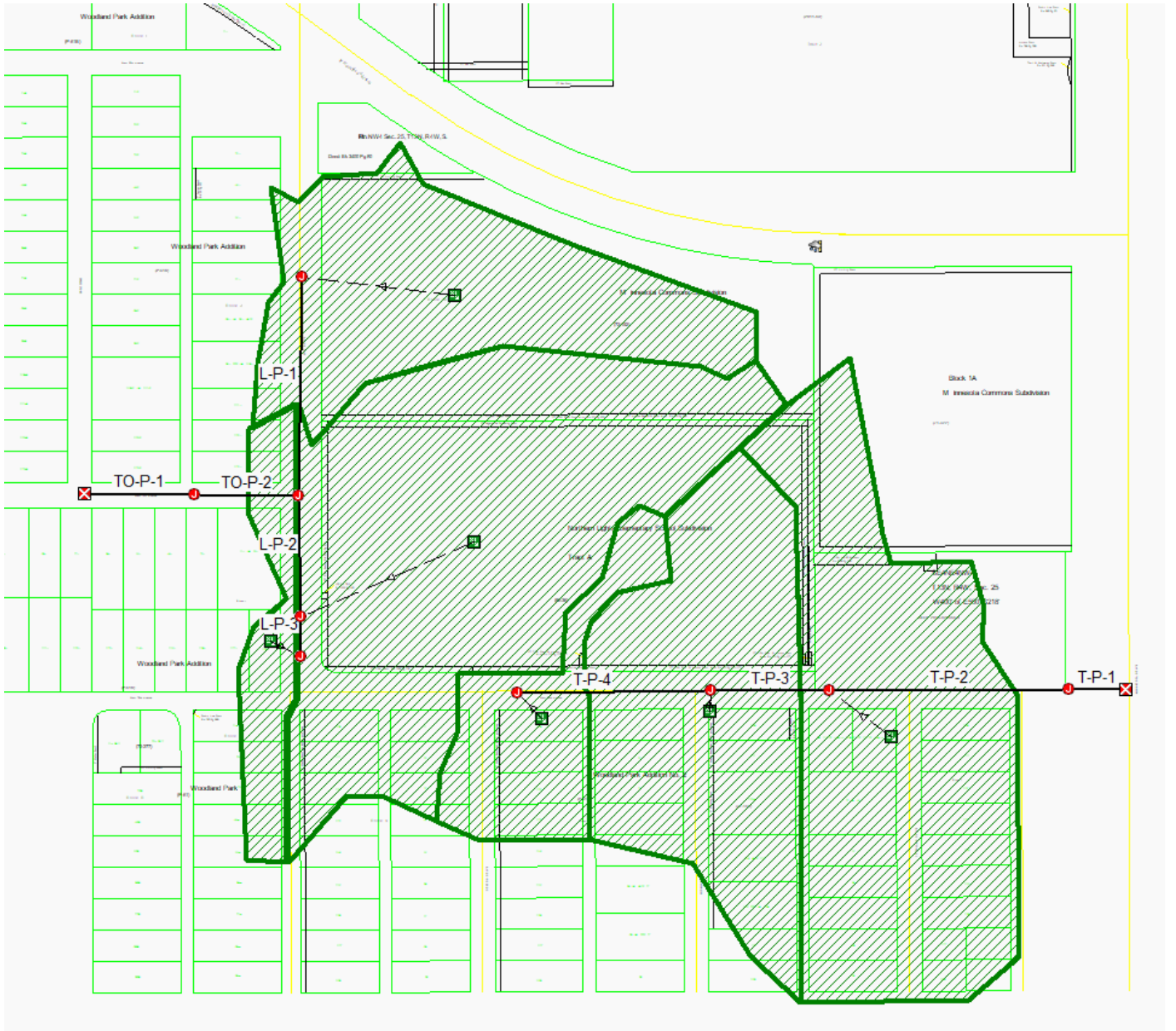


Figure 6: Proposed Model Pipe Layout

Project Description

File Name 10145.00 Lois32ndStormProposed.SPF

Project Options

Flow Units CFS
 Elevation Type Elevation
 Hydrology Method SCS TR-55
 Time of Concentration (TOC) Method SCS TR-55
 Link Routing Method Kinematic Wave
 Enable Overflow Ponding at Nodes YES
 Skip Steady State Analysis Time Periods NO

Analysis Options

Start Analysis On Apr 30, 2020 00:00:00
 End Analysis On May 01, 2020 00:00:00
 Start Reporting On Apr 30, 2020 00:00:00
 Antecedent Dry Days 0 days
 Runoff (Dry Weather) Time Step 0 01:00:00 days hh:mm:ss
 Runoff (Wet Weather) Time Step 0 00:05:00 days hh:mm:ss
 Reporting Time Step 0 00:05:00 days hh:mm:ss
 Routing Time Step 30 seconds

Number of Elements

	Qty
Rain Gages	1
Subbasins.....	6
Nodes.....	11
<i>Junctions</i>	9
<i>Outfalls</i>	2
<i>Flow Diversions</i>	0
<i>Inlets</i>	0
<i>Storage Nodes</i>	0
Links.....	9
<i>Channels</i>	0
<i>Pipes</i>	9
<i>Pumps</i>	0
<i>Orifices</i>	0
<i>Weirs</i>	0
<i>Outlets</i>	0
Pollutants	0
Land Uses	0

Rainfall Details

SN	Rain Gage ID	Data Source	Data Source ID	Rainfall Type	Rain Units	State	County	Return Period (years)	Rainfall Depth (inches)	Rainfall Distribution
1	Rain Gage-01	Time Series	10-year, 24-hour, Anchorage	Cumulative	inches				0.00	

Subbasin Summary

SN	Subbasin ID	Area (ac)	Weighted Curve Number	Total Rainfall (in)	Total Runoff (in)	Total Runoff Volume (ac-in)	Peak Runoff (cfs)	Time of Concentration (days hh:mm:ss)
1	F-1.1	1.07	89.59	2.28	1.31	1.40	0.67	0 00:20:38
2	F-1.2	7.69	84.44	2.28	0.97	7.48	3.60	0 00:20:16
3	F-1.3	4.13	90.00	2.28	1.34	5.52	2.73	0 00:19:34
4	F-2.1	6.24	87.83	2.28	1.18	7.39	2.34	0 00:45:38
5	F-2.2	4.61	92.00	2.28	1.49	6.87	2.77	0 00:29:07
6	F-2.3	1.72	94.00	2.28	1.66	2.86	1.19	0 00:26:39

Subbasin Hydrology

Subbasin : F-1.1

Input Data

Area (ac) 1.07
Weighted Curve Number 89.59
Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Paved roads with curbs & sewers	0.47	C	98.00
1/4 acre lots, 38% impervious	0.60	C	83.00
Composite Area & Weighted CN	1.07		89.59

Time of Concentration

TOC Method : SCS TR-55

Sheet Flow Equation :

$$T_c = (0.007 * ((n * L_f)^{0.8})) / ((P^{0.5}) * (S_f^{0.4}))$$

Where :

T_c = Time of Concentration (hr)
n = Manning's roughness
L_f = Flow Length (ft)
P = 2 yr, 24 hr Rainfall (inches)
S_f = Slope (ft/ft)

Shallow Concentrated Flow Equation :

V = 16.1345 * (S_f^{0.5}) (unpaved surface)
V = 20.3282 * (S_f^{0.5}) (paved surface)
V = 15.0 * (S_f^{0.5}) (grassed waterway surface)
V = 10.0 * (S_f^{0.5}) (nearly bare & untilled surface)
V = 9.0 * (S_f^{0.5}) (cultivated straight rows surface)
V = 7.0 * (S_f^{0.5}) (short grass pasture surface)
V = 5.0 * (S_f^{0.5}) (woodland surface)
V = 2.5 * (S_f^{0.5}) (forest w/heavy litter surface)
T_c = (L_f / V) / (3600 sec/hr)

Where:

T_c = Time of Concentration (hr)
L_f = Flow Length (ft)
V = Velocity (ft/sec)
S_f = Slope (ft/ft)

Channel Flow Equation :

V = (1.49 * (R^{2/3}) * (S_f^{0.5})) / n
R = A_q / W_p
T_c = (L_f / V) / (3600 sec/hr)

Where :

T_c = Time of Concentration (hr)
L_f = Flow Length (ft)
R = Hydraulic Radius (ft)
A_q = Flow Area (ft²)
W_p = Wetted Perimeter (ft)
V = Velocity (ft/sec)
S_f = Slope (ft/ft)
n = Manning's roughness

	Subarea	Subarea	Subarea
	A	B	C
Sheet Flow Computations			
Manning's Roughness :	.4	0.00	0.00
Flow Length (ft) :	38	0.00	0.00
Slope (%) :	2.63	0.00	0.00
2 yr, 24 hr Rainfall (in) :	1.50	0.00	0.00
Velocity (ft/sec) :	0.05	0.00	0.00
Computed Flow Time (min) :	12.96	0.00	0.00
Channel Flow Computations	Subarea	Subarea	Subarea
	A	B	C
Manning's Roughness :	0.019	0.00	0.00
Flow Length (ft) :	192	0.00	0.00
Channel Slope (%) :	.52	0.00	0.00
Cross Section Area (ft ²) :	0.08	0.00	0.00
Wetted Perimeter (ft) :	4	0.00	0.00
Velocity (ft/sec) :	0.42	0.00	0.00
Computed Flow Time (min) :	7.68	0.00	0.00
Total TOC (min)	20.64		

Subbasin Runoff Results

Total Rainfall (in)	2.28
Total Runoff (in)	1.31
Peak Runoff (cfs)	0.67
Weighted Curve Number	89.59
Time of Concentration (days hh:mm:ss)	0 00:20:38

Subbasin : F-1.2

Input Data

Area (ac) 7.69
 Weighted Curve Number 84.44
 Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Woods, Poor	1.74	C	77.00
> 75% grass cover, Good	1.68	C	74.00
1/8 acre lots, 65% impervious	2.58	C	90.00
Urban commercial, 85% imp	1.69	C	94.00
Composite Area & Weighted CN	7.69		84.44

Time of Concentration

Sheet Flow Computations	Subarea	Subarea	Subarea
	A	B	C
Manning's Roughness :	.15	0.00	0.00
Flow Length (ft) :	106	0.00	0.00
Slope (%) :	.94	0.00	0.00
2 yr, 24 hr Rainfall (in) :	1.50	0.00	0.00
Velocity (ft/sec) :	0.09	0.00	0.00
Computed Flow Time (min) :	20.28	0.00	0.00
Total TOC (min)20.28			

Subbasin Runoff Results

Total Rainfall (in) 2.28
 Total Runoff (in) 0.97
 Peak Runoff (cfs) 3.60
 Weighted Curve Number 84.44
 Time of Concentration (days hh:mm:ss) 0 00:20:17

Subbasin : F-1.3

Input Data

Area (ac) 4.13
 Weighted Curve Number 90.00
 Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
1/8 acre lots, 65% Impervious	4.55	C	90.00
Composite Area & Weighted CN	4.55		90.00

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
	Manning's Roughness :	.15	0.00
Flow Length (ft) :	44	0.00	0.00
Slope (%) :	2.27	0.00	0.00
2 yr, 24 hr Rainfall (in) :	1.50	0.00	0.00
Velocity (ft/sec) :	0.10	0.00	0.00
Computed Flow Time (min) :	7.05	0.00	0.00

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
	Flow Length (ft) :	276	0.00
Slope (%) :	.36	0.00	0.00
Surface Type :	Paved	Unpaved	Unpaved
Velocity (ft/sec) :	1.22	0.00	0.00
Computed Flow Time (min) :	3.77	0.00	0.00

Channel Flow Computations	Subarea A	Subarea B	Subarea C
	Manning's Roughness :	.013	.03
Flow Length (ft) :	410	147	0.00
Channel Slope (%) :	.49	.68	0.00
Cross Section Area (ft²) :	.33	.5	0.00
Wetted Perimeter (ft) :	8	2.24	0.00
Velocity (ft/sec) :	0.96	1.51	0.00
Computed Flow Time (min) :	7.13	1.63	0.00
Total TOC (min)	19.58		

Subbasin Runoff Results

Total Rainfall (in) 2.28
 Total Runoff (in) 1.34
 Peak Runoff (cfs) 2.73
 Weighted Curve Number 90.00
 Time of Concentration (days hh:mm:ss) 0 00:19:35

Subbasin : F-2.1

Input Data

Area (ac) 6.24
 Weighted Curve Number 87.83
 Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
Urban commercial, 85% imp	2.74	C	94.00
1/4 acre lots, 38% impervious	3.50	C	83.00
Composite Area & Weighted CN	6.24		87.83

Time of Concentration

	Subarea	Subarea	Subarea
	A	B	C
Sheet Flow Computations			
Manning's Roughness :	.4	0.00	0.00
Flow Length (ft) :	48	0.00	0.00
Slope (%) :	2.08	0.00	0.00
2 yr, 24 hr Rainfall (in) :	1.50	0.00	0.00
Velocity (ft/sec) :	0.05	0.00	0.00
Computed Flow Time (min) :	17.16	0.00	0.00
Channel Flow Computations			
Manning's Roughness :	.023	0.00	0.00
Flow Length (ft) :	692	0.00	0.00
Channel Slope (%) :	.72	0.00	0.00
Cross Section Area (ft ²) :	.08	0.00	0.00
Wetted Perimeter (ft) :	4	0.00	0.00
Velocity (ft/sec) :	0.41	0.00	0.00
Computed Flow Time (min) :	28.48	0.00	0.00
Total TOC (min)	45.64		

Subbasin Runoff Results

Total Rainfall (in) 2.28
 Total Runoff (in) 1.18
 Peak Runoff (cfs) 2.34
 Weighted Curve Number 87.83
 Time of Concentration (days hh:mm:ss) 0 00:45:38

Subbasin : F-2.2

Input Data

Area (ac) 4.61
 Weighted Curve Number 92.00
 Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
1/8 acre lots, 65% impervious	2.30	C	90.00
Urban commercial, 85% imp	2.31	C	94.00
Composite Area & Weighted CN	4.61		92.00

Time of Concentration

Sheet Flow Computations	Subarea	Subarea	Subarea
	A	B	C
Manning's Roughness :	.35	0.00	0.00
Flow Length (ft) :	60	0.00	0.00
Slope (%) :	1.67	0.00	0.00
2 yr, 24 hr Rainfall (in) :	1.50	0.00	0.00
Velocity (ft/sec) :	0.05	0.00	0.00
Computed Flow Time (min) :	20.13	0.00	0.00

Shallow Concentrated Flow Computations	Subarea	Subarea	Subarea
	A	B	C
Flow Length (ft) :	31	0.00	0.00
Slope (%) :	3.22	0.00	0.00
Surface Type :	Unpaved	Unpaved	Unpaved
Velocity (ft/sec) :	2.90	0.00	0.00
Computed Flow Time (min) :	0.18	0.00	0.00

Channel Flow Computations	Subarea	Subarea	Subarea
	A	B	C
Manning's Roughness :	.033	0.00	0.00
Flow Length (ft) :	349	0.00	0.00
Channel Slope (%) :	.29	0.00	0.00
Cross Section Area (ft ²) :	.167	0.00	0.00
Wetted Perimeter (ft) :	1.18	0.00	0.00
Velocity (ft/sec) :	0.66	0.00	0.00
Computed Flow Time (min) :	8.81	0.00	0.00
Total TOC (min)	29.12		

Subbasin Runoff Results

Total Rainfall (in) 2.28
 Total Runoff (in) 1.49
 Peak Runoff (cfs) 2.77
 Weighted Curve Number 92.00
 Time of Concentration (days hh:mm:ss) 0 00:29:07

Subbasin : F-2.3

Input Data

Area (ac) 1.72
 Weighted Curve Number 94.00
 Rain Gage ID Rain Gage-01

Composite Curve Number

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
1/8 acre lots, 65% impervious	0.86	C	90.00
Paved parking & roofs	0.86	C	98.00
Composite Area & Weighted CN	1.72		94.00

Time of Concentration

Sheet Flow Computations	Subarea	Subarea	Subarea
	A	B	C
Manning's Roughness :	.2	0.00	0.00
Flow Length (ft) :	98	0.00	0.00
Slope (%) :	1.02	0.00	0.00
2 yr, 24 hr Rainfall (in) :	1.50	0.00	0.00
Velocity (ft/sec) :	0.07	0.00	0.00
Computed Flow Time (min) :	23.20	0.00	0.00

Channel Flow Computations	Subarea	Subarea	Subarea
	A	B	C
Manning's Roughness :	.019	.013	0.00
Flow Length (ft) :	106	48	0.00
Channel Slope (%) :	.94	2.08	0.00
Cross Section Area (ft ²) :	.08	.08	0.00
Wetted Perimeter (ft) :	4	1.18	0.00
Velocity (ft/sec) :	0.56	2.75	0.00
Computed Flow Time (min) :	3.15	0.29	0.00
Total TOC (min)	26.65		

Subbasin Runoff Results

Total Rainfall (in) 2.28
 Total Runoff (in) 1.66
 Peak Runoff (cfs) 1.19
 Weighted Curve Number 94.00
 Time of Concentration (days hh:mm:ss) 0 00:26:39

Pipe Results

SN Element ID	Peak Flow	Time of Peak Flow Occurrence	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Travel Time	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Froude Number	Reported Condition
	(cfs)	(days hh:mm)	(cfs)		(ft/sec)	(min)	(ft)		(min)		
1 L-P-1	2.69	0 12:21	7.42	0.36	3.88	1.39	0.62	0.42	0.00		Calculated
2 L-P-2	4.24	0 12:20	7.43	0.57	4.35	0.66	0.81	0.54	0.00		Calculated
3 L-P-3	0.67	0 12:20	10.48	0.06	3.32	0.42	0.26	0.17	0.00		Calculated
4 TO-P-1	6.89	0 12:21	12.05	0.57	10.16	0.29	0.67	0.54	0.00		Calculated
5 TO-P-2	6.91	0 12:21	18.19	0.38	9.59	0.30	0.64	0.43	0.00		Calculated
6 T-P-1	5.97	0 12:29	12.45	0.48	3.92	0.28	0.98	0.49	0.00		Calculated
7 T-P-2	5.97	0 12:29	12.38	0.48	3.91	1.57	0.98	0.49	0.00		Calculated
8 T-P-3	3.92	0 12:25	5.78	0.68	3.52	0.77	0.91	0.60	0.00		Calculated
9 T-P-4	1.17	0 12:25	5.77	0.20	2.58	2.12	0.46	0.31	0.00		Calculated