Appendix A

Figures

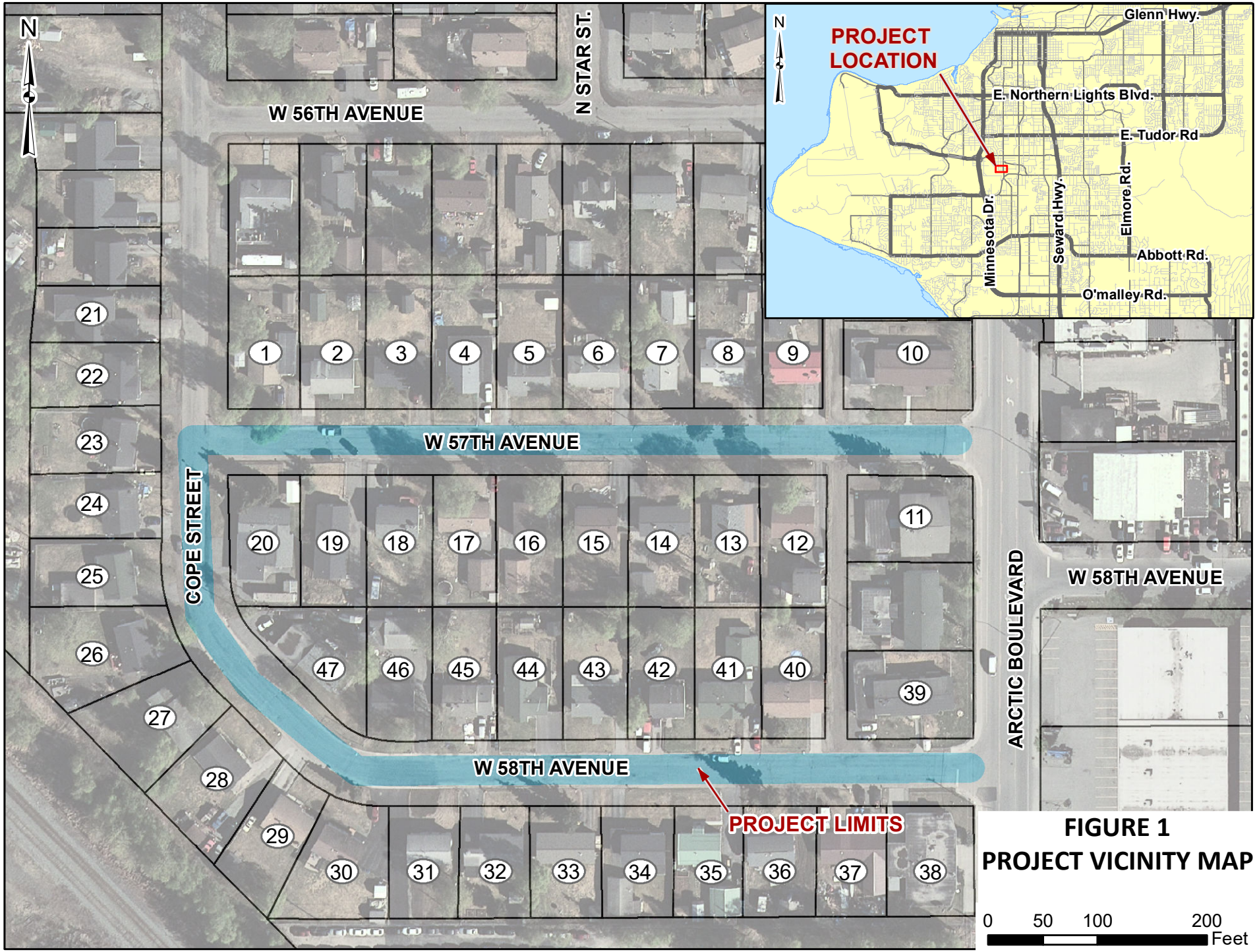


FIGURE 1
PROJECT VICINITY MAP

Legend

- Confined Space
- Manhole
- Catchbasin Manhole
- Clean-Out
- Catch Basin
- OGS
- Lift Station
- Diverter
- Drywell
- Weir
- Blind Connect
- Top Intake Manhole
- Roof Drain
- Bypass Outlet
- Curb Inlet
- End of Pipe
- Pipe Inlet
- Pipe Cap
- Inlet
- Pipe Outlet
- Control Inlet
- Control Outlet
- Other
- Outfall
- Outfall Major
- Outfall Minor
- Sink -(Closed Drainage Basin)
- Divide
- Feature Start
- Other

Storm Pipes

- ADOT
- ADOT-Airport
- Abandoned
- Fed_Military
- MOA-ASD
- MOA-Facility Maintenance
- MOA-Merrill Field
- MOA-Other
- MOA-Parks and Recreation
- MOA-Port of Anchorage
- MOA-M&O/CBERRRSA/LRSA/SA
- Private
- SOA-Alaska Railroad
- Unknown

Thaw Wire

- MOA-ASD
- MOA-Facility Maintenance
- MOA-M&O/CBERRRSA/LRSA/SA
- MOA-Parks and Recreation
- Private
- Bridge

Constructed Channels

- ADOT
- MOA-M&O/CBERRRSA/LRSA/SA
- MOA-Other
- Port of Alaska; MOA-Port of Alaska
- MOA-M&O/CBERRRSA/LRSA/SA
- Private
- SOA-Alaska Railroad
- Unknown

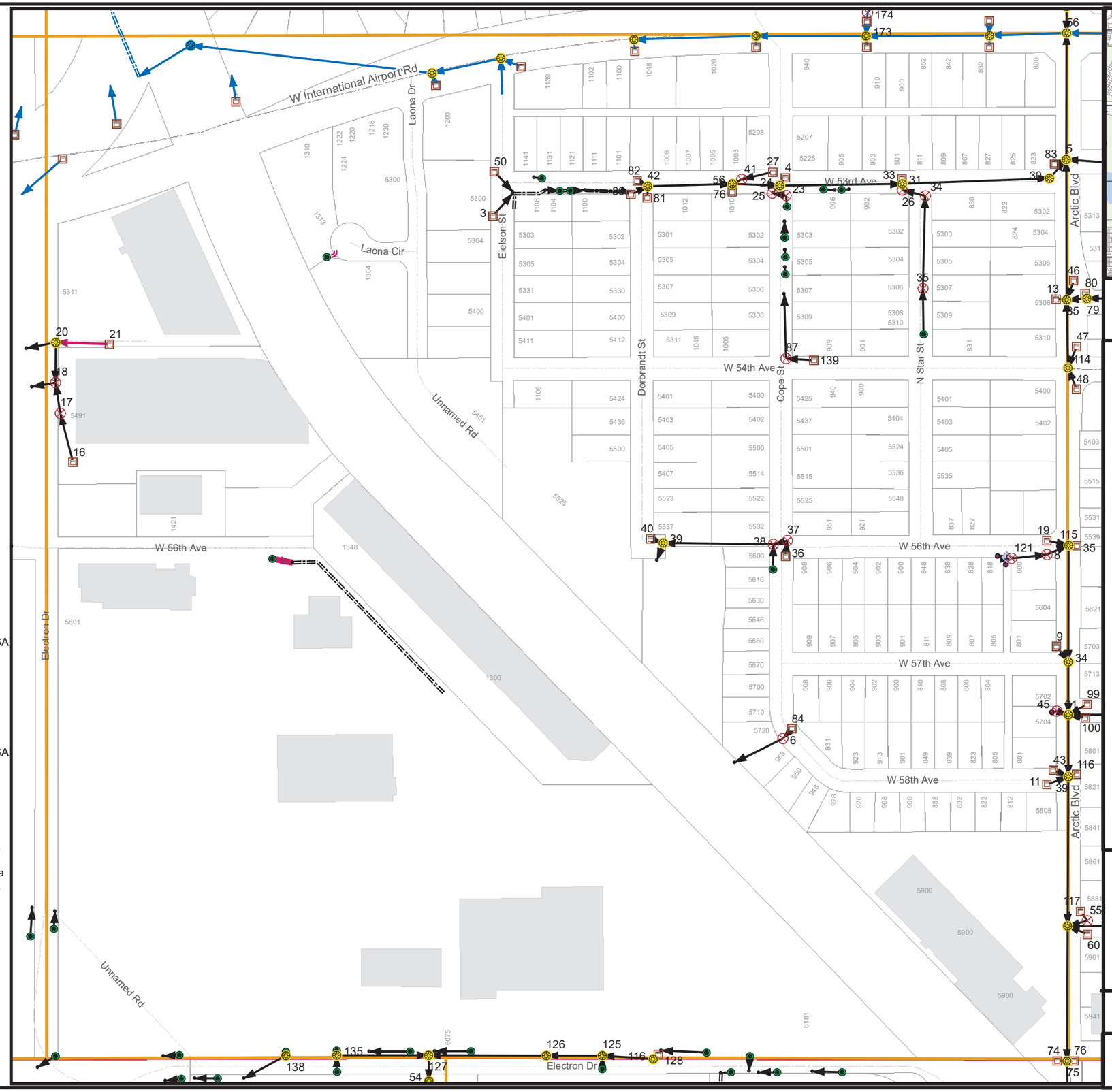
Other Drainageways

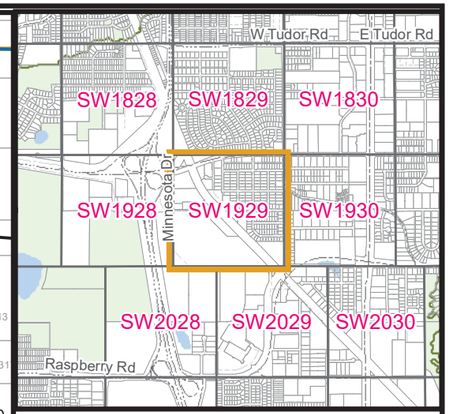
- Other Drainageways

N W E S

0 150 300 600

Feet





Anchorage Bowl
Legal: SE 1/4 Sec36 T13N R4W

Notes:

MOA Storm Drain and Drainage Atlas

Map Created: 5/30/2020

Grid Number

SW1929

Legend

- Confined Space
- Manhole
- Catchbasin Manhole
- Clean-Out
- Catch Basin
- OGS
- Lift Station
- Diverter
- Drywell
- Weir
- Blind Connect
- Top Intake Manhole
- Roof Drain
- Bypass Outlet
- Curb Inlet
- End of Pipe
- Pipe Inlet
- Pipe Cap
- Inlet
- Pipe Outlet
- Control Inlet
- Control Outlet
- Other
- Outfall
- Outfall Major
- Outfall Minor
- Sink -(Closed Drainage Basin)
- Divide
- Feature Start
- Other

Storm Pipes

- ADOT
- ADOT-Airport
- Abandoned
- Fed_Military
- MOA-ASD
- MOA-Facility Maintenance
- MOA-Merrill Field
- MOA-Other
- MOA-Parks and Recreation
- MOA-Port of Anchorage
- MOA-M&O/CBERRRSA/LRSA/SA
- Private
- SOA-Alaska Railroad
- Unknown

Thaw Wire

- MOA-ASD
- MOA-Facility Maintenance
- MOA-M&O/CBERRRSA/LRSA/SA
- MOA-Parks and Recreation
- Private
- Bridge

Constructed Channels

- ADOT
- MOA-M&O/CBERRRSA/LRSA/SA
- MOA-Other
- Port of Alaska; MOA-Port of Alaska
- MOA-M&O/CBERRRSA/LRSA/SA
- Private
- SOA-Alaska Railroad
- Unknown

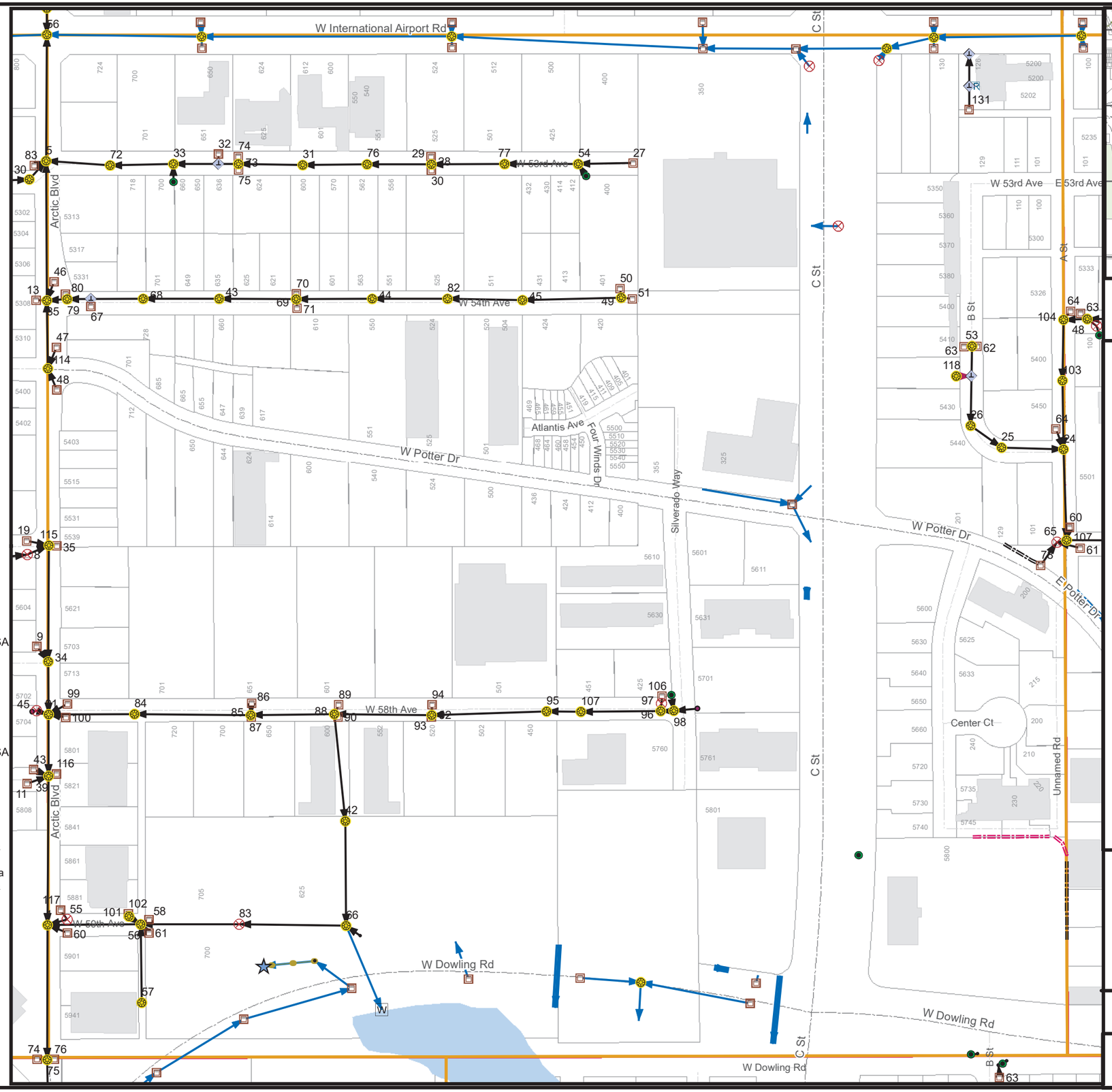
Other Drainageways

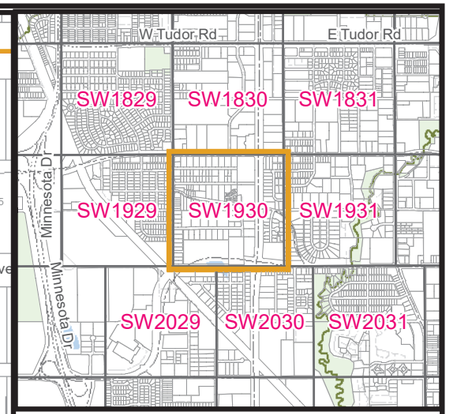
- Other Drainageways

N W E S

0 150 300 600

Feet





Anchorage Bowl
Legal: SW 1/4 Sec31 T13N R3W

Notes:

MOA Storm Drain and Drainage Atlas

Map Created: 7/31/2021

Grid Number

SW1930

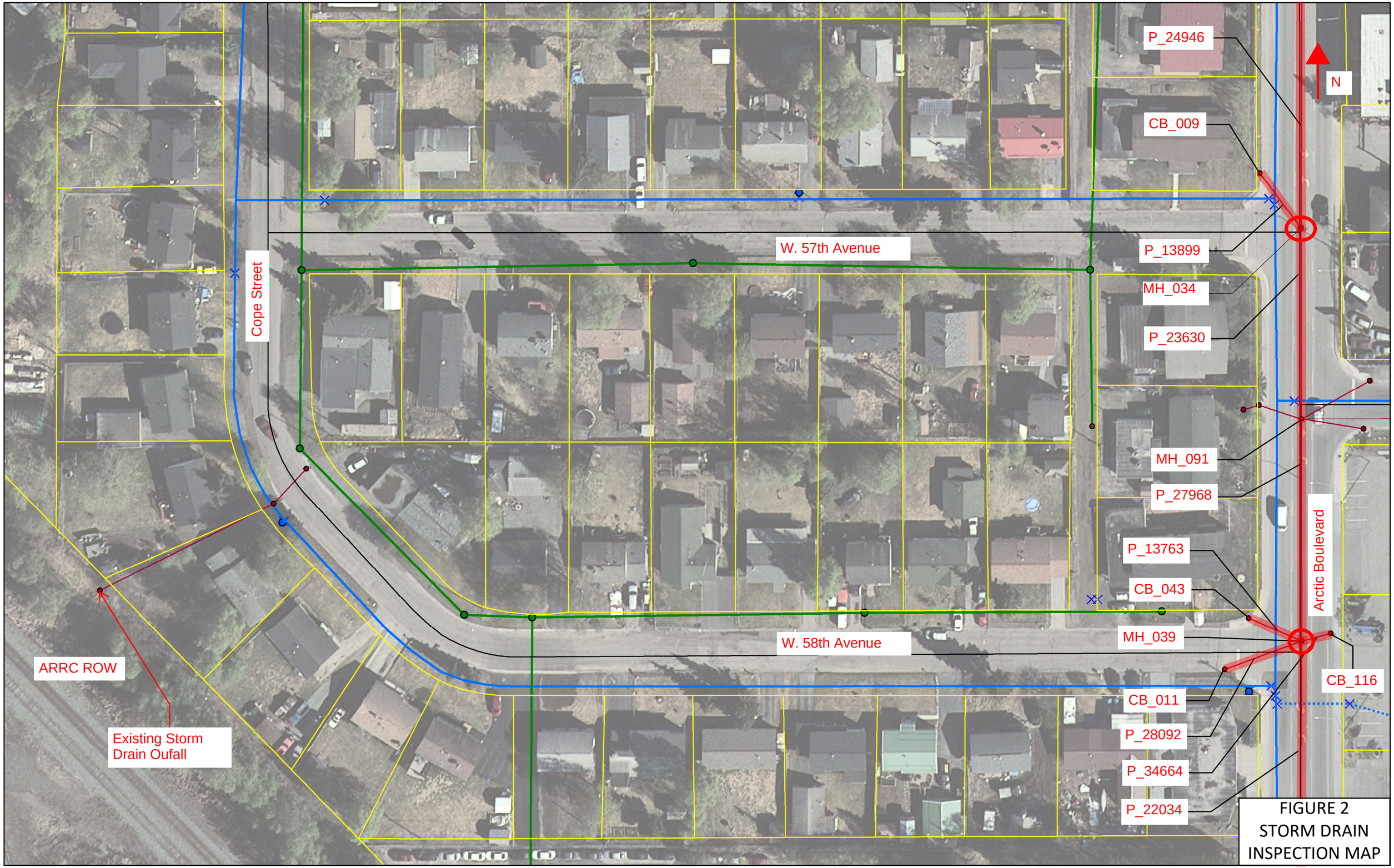


FIGURE 2
STORM DRAIN
INSPECTION MAP

Appendix B

Storm Drain Structure Inspection Forms

CRW ENGINEERING GROUP, LLC

STORM DRAIN STRUCTURE INSPECTION FORM

NORANN SUBDIVISION ROAD RECONSTRUCTION (PM&E No. 20-14)

INSPECTION DATE:	7/1/2021	INSPECTION TIME:	11:06 a.m.
WEATHER:	Sunny – 65°	INSPECTED BY:	Joey Hegna
STRUCTURE ID NUMBER:	31930034	STRUCTURE TYPE:	Manhole

APPROXIMATE LOCATION: Manhole located at the intersection of W. 57TH Ave. and Arctic Blvd. Cover located in turning lane.

CONDITION	POOR	←		→	GOOD
CONDITION OF FRAME & COVER/INLET	1	(2)	3		4
CONDITION OF GRADE RINGS	1	2	(3)		4
CONDITION OF CONE/REDUCING SLAB	1	2	(3)		4
CONDITION OF BARREL	1	2	(3)		4
CONDITION OF LADDER	1	2	(3)		4
CONDITION OF INLET & OUTLET PIPES	1	2	(3)		4
CONDITION OF SUMP	1	2	3		4
PRESENCE OF DEBRIS/SOLIDS		YES		(NO)	
PRESENCE OF INFILTRATION/INFLOW		YES		(NO)	

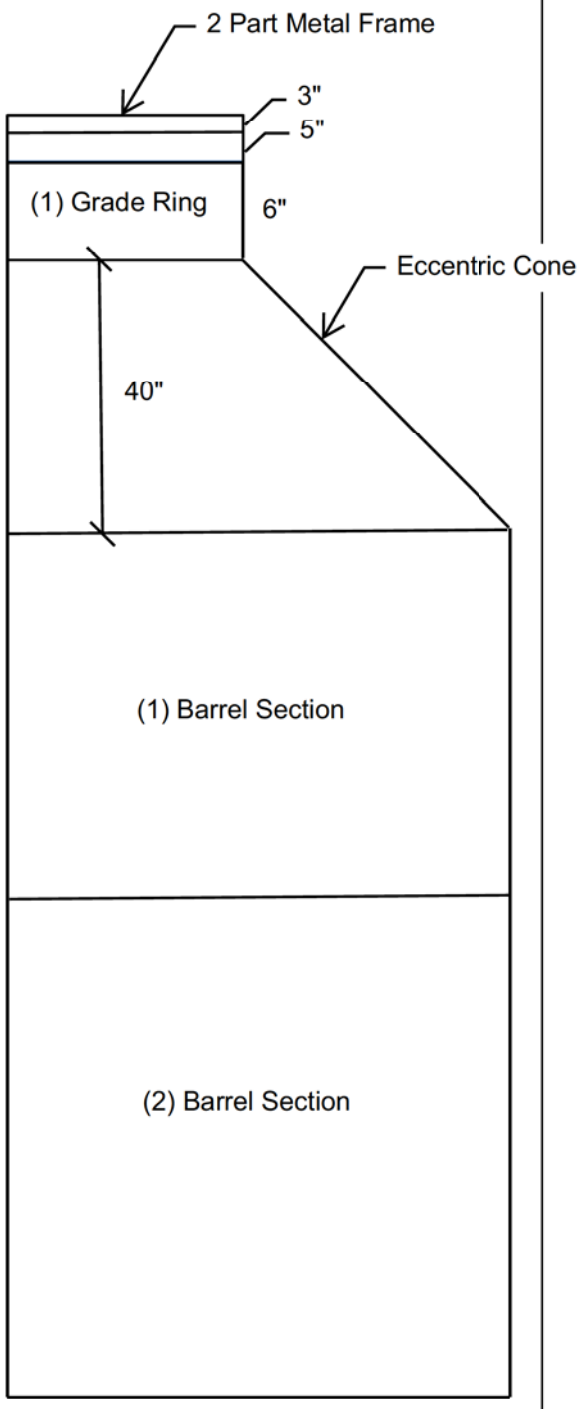
DEPTH/VOLUME OF FLOW: Approx. 6” of standing water

DIAMETER OF STRUCTURE: 4’ (Type I)

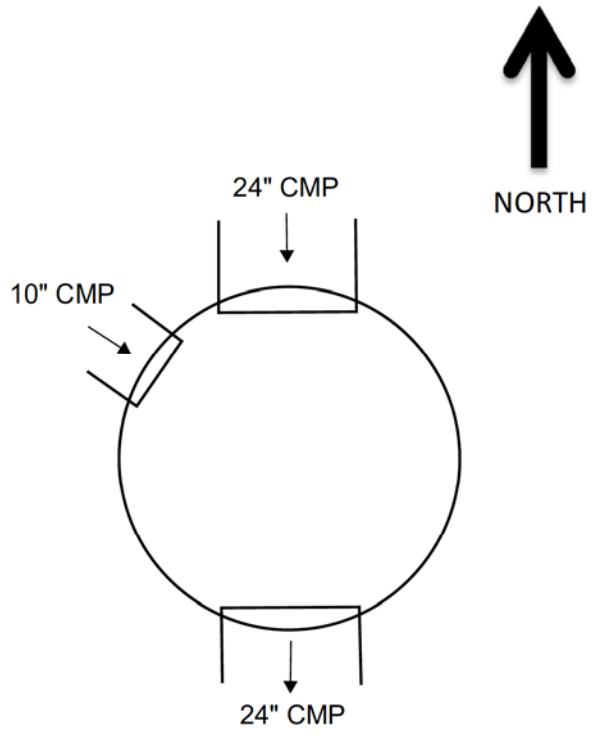
MISCELLANEOUS STRUCTURE ASSESSMENT/CONDITION NOTES:

- Eccentric Cone
- Standing water in sump – no apparent flow at time of inspection
- (9) Non- standard ladder rungs – constructed of metal
- No flow visible from catch basin lead
- Non-standard frame – 2 metal piece unit
- Frame offset from grade rings
- Sump full of water at time of inspection – unable to provide condition assessment
- Structure in overall good condition

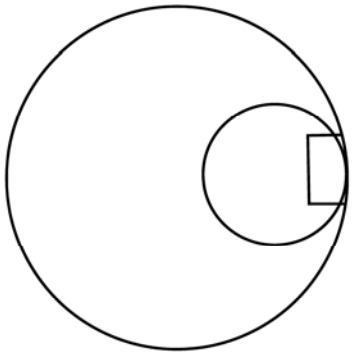
STRUCTURE SKETCH



PROFILE



INLET & OUTLET PIPE CONFIGURATION



COVER/INLET CONFIGURATION

PLAN

Structure 31930034

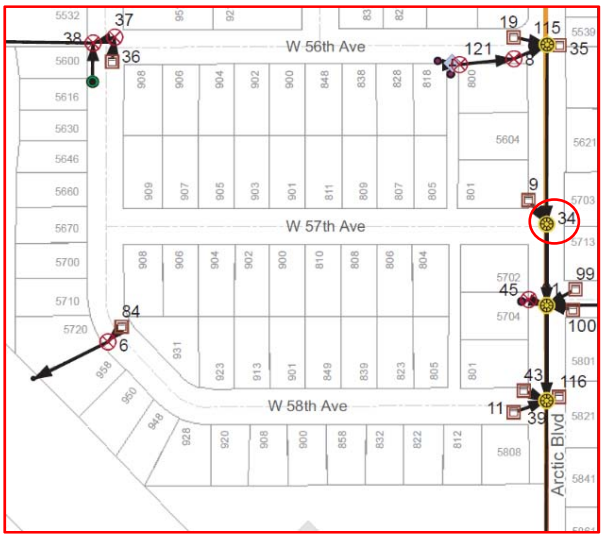


Photo 1 - Structure Location

Photo 2 - Surface View

Photo 3 - Manhole Cover

Photo 4 - Interior of Manhole

Photo 5 - Frame & Grade Rings

CRW ENGINEERING GROUP, LLC

STORM DRAIN STRUCTURE INSPECTION FORM

NORANN SUBDIVISION ROAD RECONSTRUCTION (PM&E No. 20-14)

INSPECTION DATE:	7/1/2021	INSPECTION TIME:	9:40 a.m.
WEATHER:	Sunny – 63°	INSPECTED BY:	Joey Hegna
STRUCTURE ID NUMBER:	31930039	STRUCTURE TYPE:	Manhole
APPROXIMATE LOCATION:	Manhole located at the intersection of W. 58TH Ave. and Arctic Blvd. Cover located in turning lane.		

CONDITION	POOR	←		→	GOOD
CONDITION OF FRAME & COVER/INLET	1	2	(3)		4
CONDITION OF GRADE RINGS	1	(2)	3		4
CONDITION OF CONE/REDUCING SLAB	1	2	3		(4)
CONDITION OF BARREL	1	2	(3)		4
CONDITION OF LADDER	1	2	(3)		4
CONDITION OF INLET & OUTLET PIPES	1	2	(3)		4
CONDITION OF SUMP	1	2	3		4
PRESENCE OF DEBRIS/SOLIDS		YES		(NO)	
PRESENCE OF INFILTRATION/INFLOW		YES		(NO)	

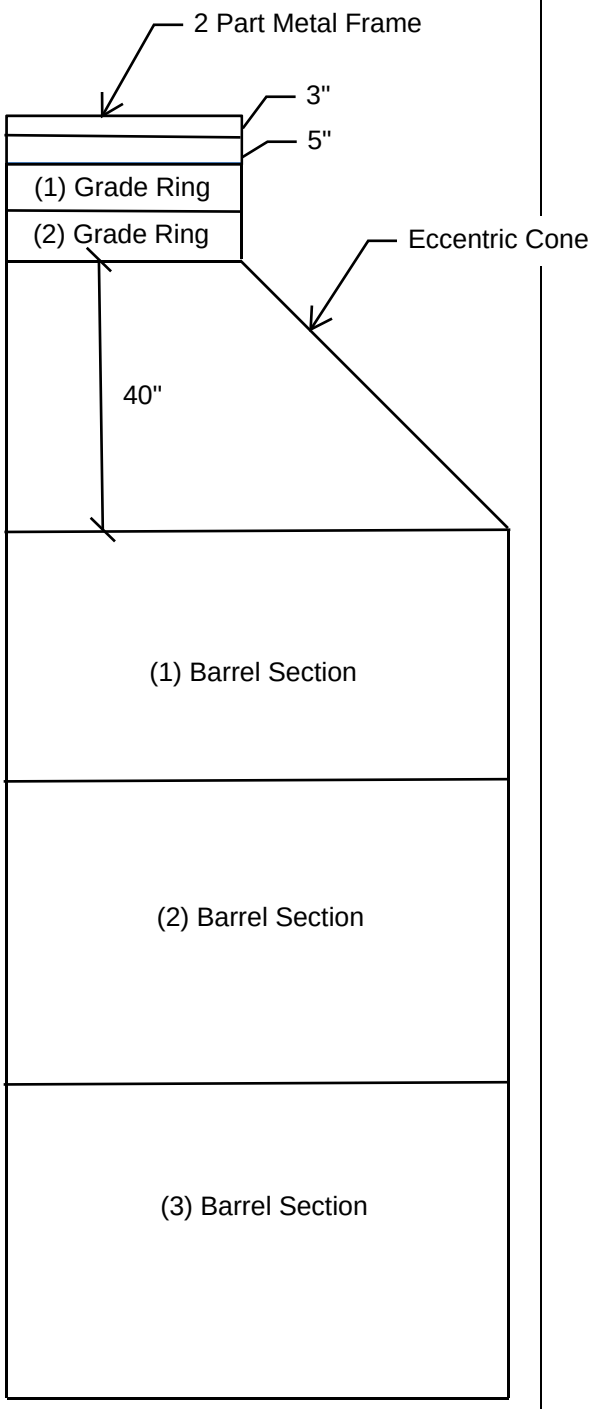
DEPTH/VOLUME OF FLOW: 3 - 4” of flow at time of inspection

DIAMETER OF STRUCTURE: 4’ (Type I)

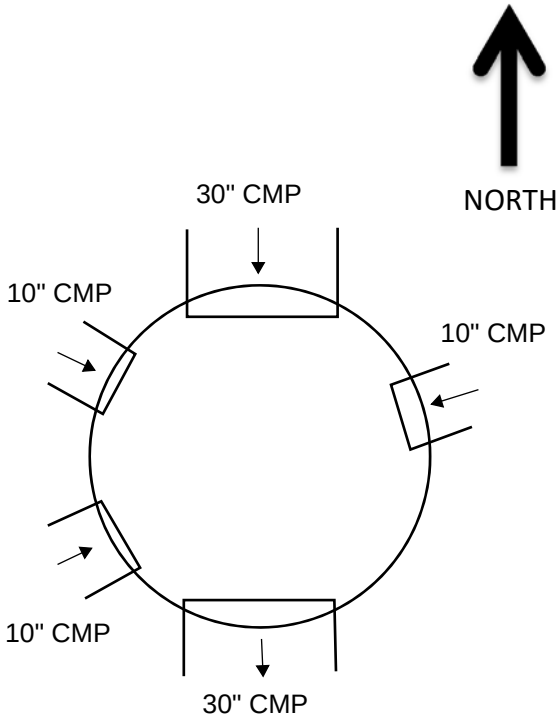
MISCELLANEOUS STRUCTURE ASSESSMENT/CONDITION NOTES:

- Eccentric Cone
- (11) Non-standard ladder rungs – constructed of metal
- (1) Rung cut off near east invert
- Vertical cracking in grade rings
- Non-standard frame – 2 metal piece unit
- Grade rings and frame offset from cone
- Bottom barrel section appears to have a pipe penetration grouted closed – below SW invert
- Sump appears to be full of sediment – unable to provide condition assessment
- No flow from leads at time of inspection
- Structure in overall good condition

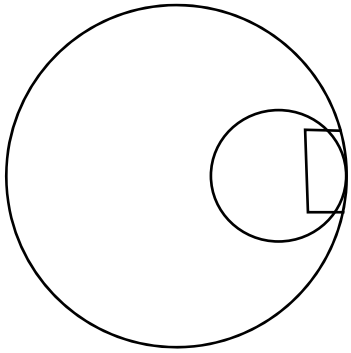
MANHOLE SKETCH



PROFILE



INLET & OUTLET PIPE CONFIGURATION



COVER/INLET CONFIGURATION

PLAN

Structure 31930039

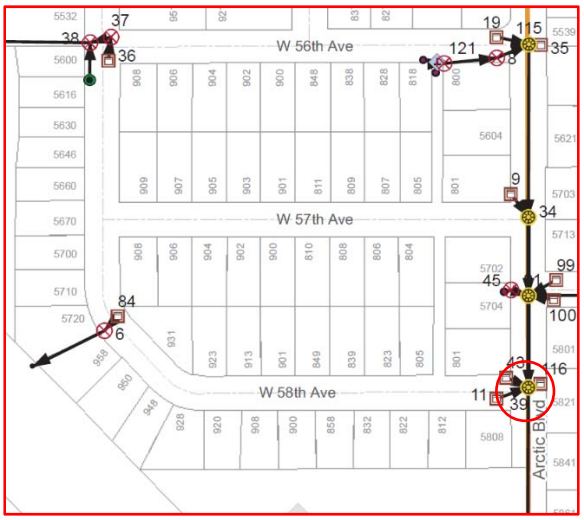


Photo 2 - Structure Location

Photo 1 - Surface View

Photo 3 - Manhole Cover

Photo 4 - Interior of Manhole

Photo 5 - Cracking in Grade Rings

Appendix C

Storm Drain Pipe Summary & Inspection Forms

Norann Subdivision Area Road Reconstruction (PM&E No. 20-14)
Storm Drain Pipe Inspection Summary Table

MOA Pipe Identification No.	Upstream Structure No.	Downstream Structure No.	Diameter (in)	Material	Install Date - Asbuilt No.	Inspection Date	Inspection Direction	Pipe Condition Observations & Comments
Arctic Boulevard & W. 57th Avenue								
24946	31930115	31930034	24	CMP	Unknown	7/1/2021	Upstream	Main line pipe. Potential grade issues along length of pipe - water appeared stagnant, not flowing at time of inspection. Sediment/mineralization blockage approx. 20' upstream from MH 034. Flow at time of inspection at historic flowline (approx. 1/3 of full flow capacity) - invert not visible for inspection. Yellow mineralization/discoloration at flowline on sidewall of pipe.
13899	31929009	31930034	10	CMP	Unknown	7/1/2021	Upstream	Catch basin lead. Up to 3-inches of sediment buildup in invert at two locations of pipe. Unable to inspect full length of pipe due to vertical deflections. No flow at time of inspection.
23630	31930034	31930091	24	CMP	Unknown	7/1/2021	Downstream	Main line pipe. Unable to inspect full length of pipe due to horizontal deflections in pipe. Joint offsets and minor sediment/mineralization present at north end of pipe. Flow at time of inspection at historic flowline (approx. 1/3 of full flow capacity) - invert not visible for inspection. Yellow mineralization/discoloration at flowline on sidewall of pipe. Based on inspection video of Pipe 27968, significant sediment/mineralization blockage is present at south end of this pipe that is not visible due to deflections.
Arctic Boulevard & W. 58th Avenue								
27968	31930091	31930039	30	CMP	Unknown	7/1/2021	Upstream	Main line pipe. Minor sediment/mineralization present along length of pipe. Damaged and possible root intrusion at joints in pipe. Flow at time of inspection lower than historic flowline (approx. 1/8 of full flow capacity) - invert not visible for inspection.
13763	31929043	31930039	10	CMP	Unknown	7/1/2021	Upstream	Catch basin lead. No sediment present in pipe. Unable to inspect full length of pipe due to vertical deflections. No flow at time of inspection.
34664	31930116	31930039	10	CMP	Unknown	7/1/2021	Upstream	Catch basin lead. Minor sediment in invert at east end (outlet) of pipe. No flow at time of inspection
28092	31929011	31930039	10	CMP	Unknown	7/1/2021	Upstream	Catch basin lead. Up to 4-inches of sediment buildup in invert of pipe with trash present. Unable to inspect full length of pipe due to horizontal deflections. No flow at time of inspection.
22034	31930039	31929001	30	CMP	Unknown	7/1/2021	Downstream	Main line pipe. Minor sediment buildup at joints along length of pipe. Flow at time of inspection lower than historic flowline (approx. 1/8 of full flow capacity) - invert not visible for inspection.

Norann Subdivision Area Road Reconstruction (PM&E No. 20-14)
MOA Pipe #24946 - Arctic Blvd & W. 57th Ave

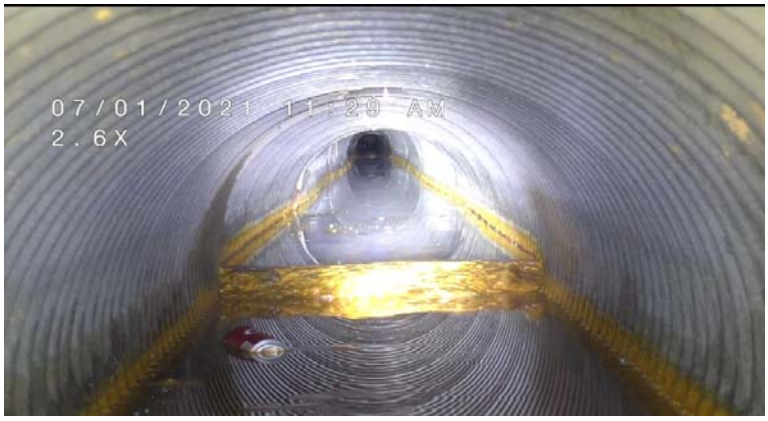
General Inspection Data:

Inspection Date: 7/1/2021
Inspection Completed by: CRW - Joey Hegna
Inspection Direction: Upstream

Pipe Data:

Diameter/Material: 24" CMP
Main or Lead: Main
Install Year: Unknown
Flow Depth: 1/3 of full flow capacity
Debris/Obstructions: Sediment/mineralization blockage approx. 20' upstream from MH 034.
Miscellaneous/Defect Notes: Potential grade issues along length of pipe - water appeared stagnant, not flowing at time of inspection. Flow at time of inspection at historic flowline (approx. 1/3 of full flow capacity) - invert not visible for inspection. Yellow mineralization/discoloration at flowline on sidewall of pipe.

Inspection Images:



Norann Subdivision Area Road Reconstruction (PM&E No. 20-14)
MOA Pipe #13899 - Arctic Blvd & W. 57th Ave

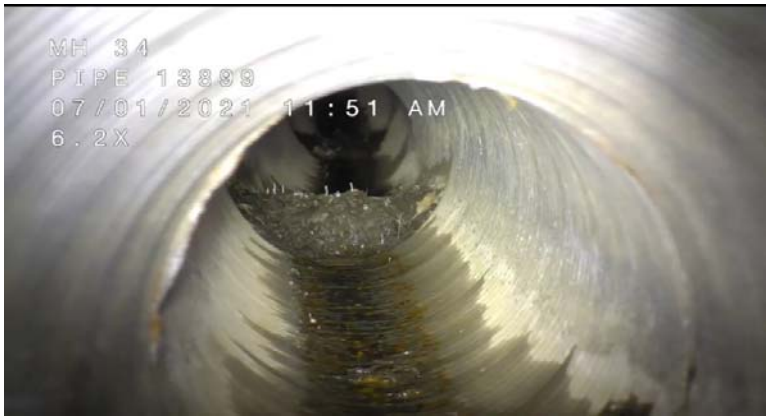
General Inspection Data:

Inspection Date: 7/1/2021
Inspection Completed by: CRW - Joey Hegna
Inspection Direction: Upstream

Pipe Data:

Diameter/Material: 10" CMP
Main or Lead: Lead
Install Year: Unknown
Flow Depth: No flow at time of inspection
Debris/Obstructions: Up to 3-inches of sediment buildup in invert at two locations of pipe.
Miscellaneous/Defect Notes: Unable to inspect full length of pipe due to vertical deflections.

Inspection Images:



Norann Subdivision Area Road Reconstruction (PM&E No. 20-14)
MOA Pipe #23630 - Arctic Blvd & W. 57th Ave

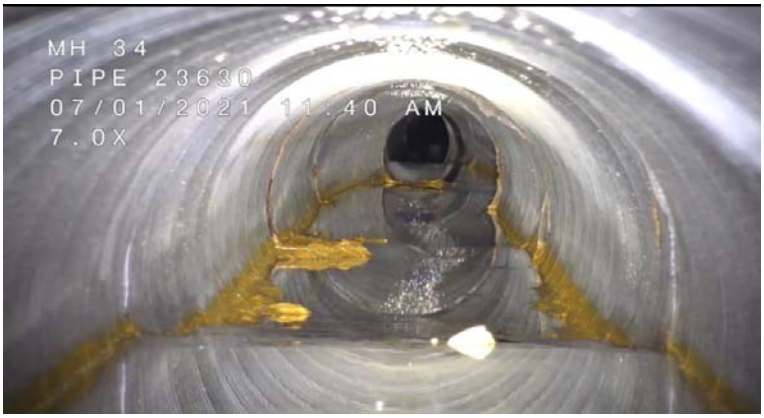
General Inspection Data:

Inspection Date: 7/1/2021
Inspection Completed by: CRW - Joey Hegna
Inspection Direction: Downstream

Pipe Data:

Diameter/Material: 24" CMP
Main or Lead: Main
Install Year: Unknown
Flow Depth: 1/3 of full flow capacity
Debris/Obstructions: Joint offsets and minor sediment/mineralization present at north end of pipe. Based on inspection video of Pipe 27968, significant sediment/mineralization blockage is present at south end of this pipe that is not visible due to deflections.
Miscellaneous/Defect Notes: Unable to inspect full length of pipe due to horizontal deflections in pipe. Flow at time of inspection at historic flowline (approx. 1/3 of full flow capacity) - invert not visible for inspection. Yellow mineralization/discoloration at flowline on sidewall of pipe.

Inspection Images:



Norann Subdivision Area Road Reconstruction (PM&E No. 20-14)
MOA Pipe #27968 - Arctic Blvd & W. 58th Ave

General Inspection Data:

Inspection Date: 7/1/2021
Inspection Completed by: CRW - Joey Hegna
Inspection Direction: Upstream

Pipe Data:

Diameter/Material: 30" CMP
Main or Lead: Main
Install Year: Unknown
Flow Depth: 1/8 of full flow capacity
Debris/Obstructions: Minor sediment/mineralization present along length of pipe. Damaged and possible root intrusion at joints in pipe.

Miscellaneous/Defect Notes: Flow at time of inspection lower than historic flowline (approx. 1/8 of full flow capacity) - invert not visible for inspection.

Inspection Images:

Norann Subdivision Area Road Reconstruction (PM&E No. 20-14)
MOA Pipe #13763 - Arctic Blvd & W. 58th Ave

General Inspection Data:

Inspection Date: 7/1/2021
Inspection Completed by: CRW - Joey Hegna
Inspection Direction: Upstream

Pipe Data:

Diameter/Material: 10" CMP
Main or Lead: Lead
Install Year: Unknown
Flow Depth: No flow at time of inspection
Debris/Obstructions: No sediment present in pipe.

Miscellaneous/Defect Notes: Unable to inspect full length of pipe due to vertical deflections.

Inspection Images:

Norann Subdivision Area Road Reconstruction (PM&E No. 20-14)
MOA Pipe #34664 - Arctic Blvd & W. 58th Ave

General Inspection Data:

Inspection Date: 7/1/2021
Inspection Completed by: CRW - Joey Hegna
Inspection Direction: Upstream

Pipe Data:

Diameter/Material: 10" CMP
Main or Lead: Lead
Install Year: Unknown
Flow Depth: No flow at time of inspection
Debris/Obstructions: Minor sediment in invert at east end (outlet) of pipe.

Miscellaneous/Defect Notes:

Inspection Images:

Norann Subdivision Area Road Reconstruction (PM&E No. 20-14)
MOA Pipe #28092 - Arctic Blvd & W. 58th Ave

General Inspection Data:

Inspection Date: 7/1/2021
Inspection Completed by: CRW - Joey Hegna
Inspection Direction: Upstream

Pipe Data:

Diameter/Material: 10" CMP
Main or Lead: Lead
Install Year: Unknown
Flow Depth: No flow at time of inspection
Debris/Obstructions: Up to 4-inches of sediment buildup in invert of pipe with trash present.

Miscellaneous/Defect Notes: Flow at time of inspection lower than historic flowline (approx. 1/8 of full flow capacity) - invert not visible for inspection.

Inspection Images:

Norann Subdivision Area Road Reconstruction (PM&E No. 20-14)
MOA Pipe #22034 - Arctic Blvd & W. 58th Ave

General Inspection Data:

Inspection Date: 7/1/2021
Inspection Completed by: CRW - Joey Hegna
Inspection Direction: Downstream

Pipe Data:

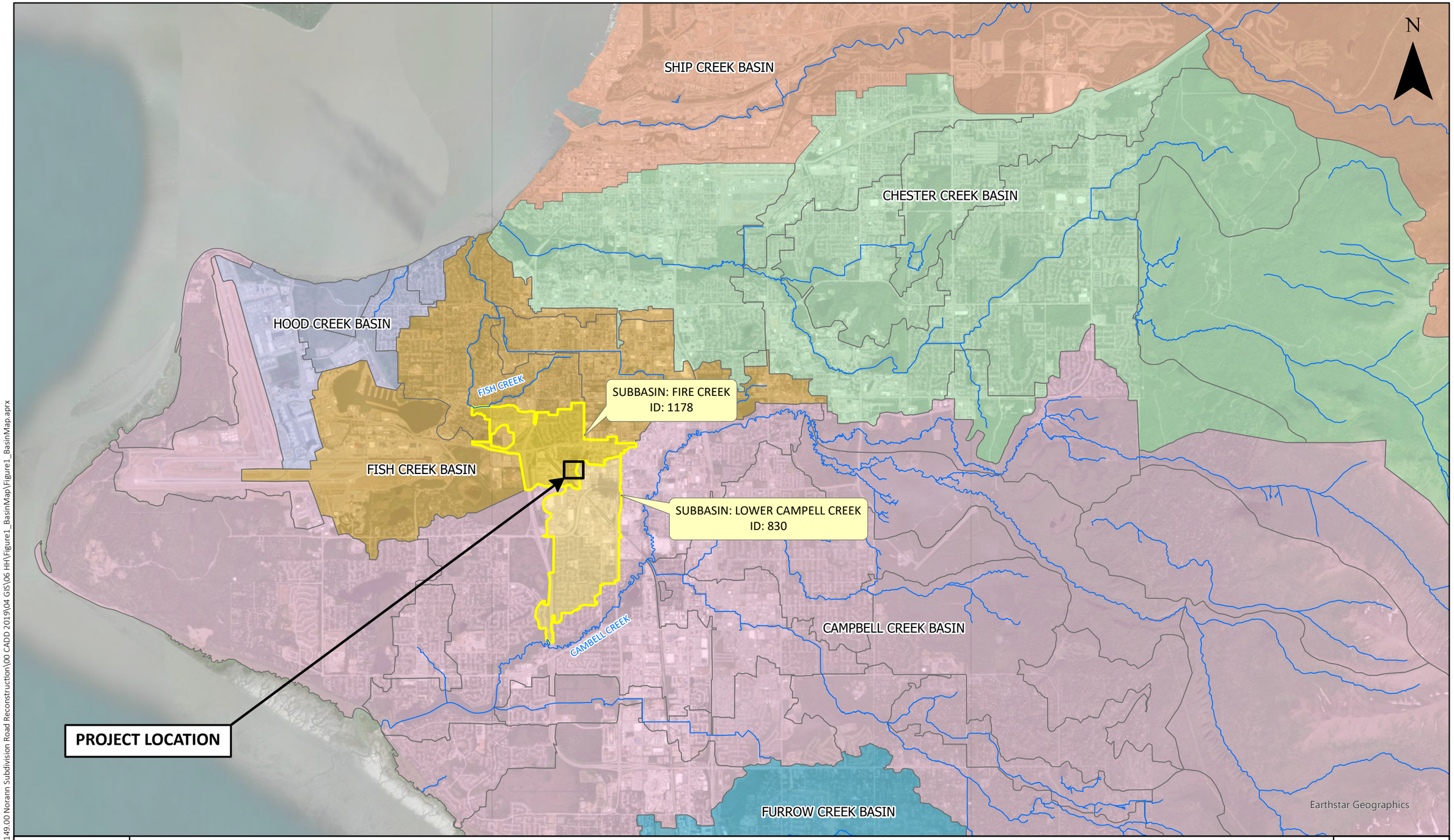
Diameter/Material: 30" CMP
Main or Lead: Main
Install Year: Unknown
Flow Depth: 1/8 of full flow capacity
Debris/Obstructions: Minor sediment buildup at joints along length of pipe.

Miscellaneous/Defect Notes: Flow at time of inspection lower than historic flowline (approx. 1/8 of full flow capacity) - invert not visible for inspection.

Inspection Images:

Hydrologic and Hydraulic Analysis

Appendix D



CRW ENGINEERING GROUP
3940 ARCTIC BLVD. SUITE 300
ANCHORAGE, ALASKA 99503
PHONE (907) 562-3252
#AECL882-AK

PROJECT LOCATION AND MOA WATERSHED BOUNDARIES MAP

NORANN SUBDIVISION AREA ROAD RECONSTRUCTION PROJECT
MOA PM&E PROJECT #20-14

ANCHORAGE, ALASKA

0 0.5 1 2 Miles

Project:	10149.00
Drawn By:	JNM
Scale:	GRAPHIC
Date:	DEC 2023
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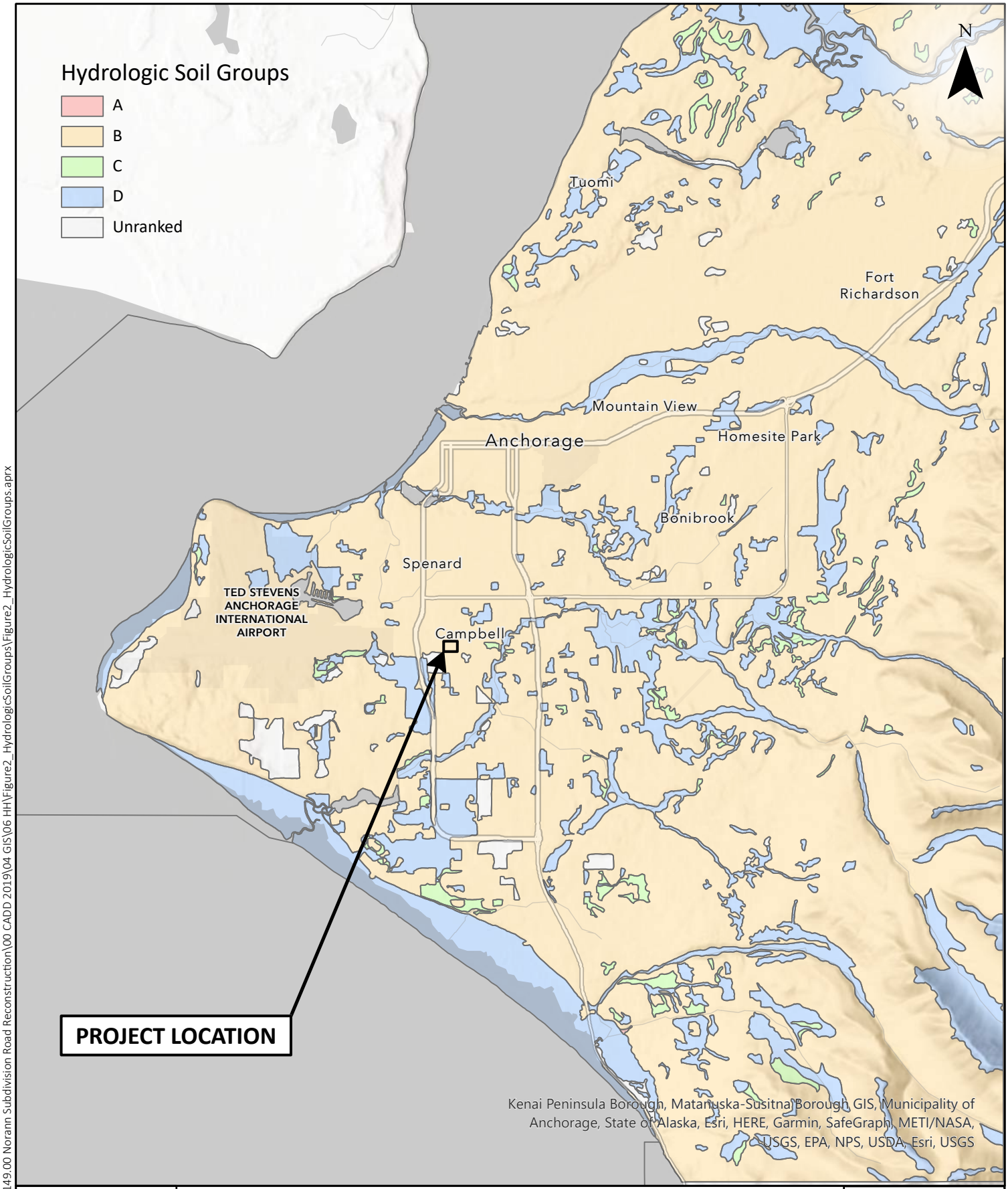

CRW ENGINEERING GROUP
3940 ARCTIC BLVD. SUITE 300
ANCHORAGE, ALASKA 99503
PHONE (907) 562-3252
#AECL882-AK

HYDROLOGIC SOIL GROUPS

NORANN SUBDIVISION AREA ROAD RECONSTRUCTION PROJECT
MOA PM&E PROJECT #20-14

ANCHORAGE, ALASKA

Project:	10149.00
Drawn By:	JNM
Scale:	NTS
Date:	DEC 2023
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Reference: Orthographic Factor Map, Anchorage Stormwater Manual (ASM), Page 4-6, December 2017

CRW ENGINEERING GROUP
3940 ARCTIC BLVD. SUITE 300
ANCHORAGE, ALASKA 99503
PHONE (907) 562-3252
#AECL882-AK

OROGRAPHIC FACTOR MAP (ANCHORAGE)

NORANN SUBDIVISION AREA ROAD RECONSTRUCTION PROJECT
MOA PM&E PROJECT #20-14

ANCHORAGE, ALASKA

Project:	10149.00
Drawn By:	JNM
Scale:	NTS
Date:	DEC 2023
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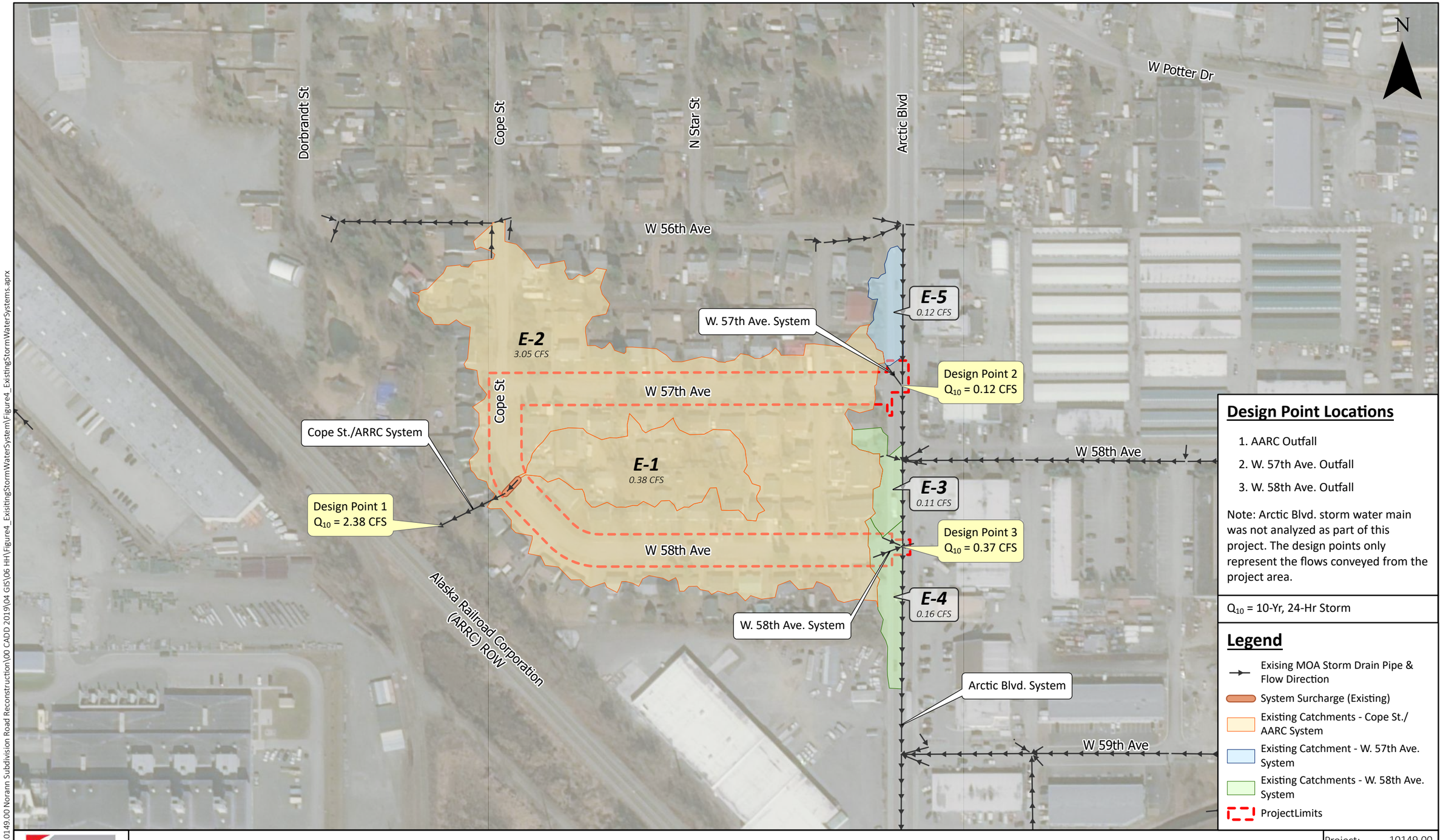

Design Point Locations

1. AARC Outfall
2. W. 57th Ave. Outfall
3. W. 58th Ave. Outfall

Note: Arctic Blvd. storm water main was not analyzed as part of this project. The design points only represent the flows conveyed from the project area.

Q_{10} = 10-Yr, 24-Hr Storm

Legend

- Exising MOA Storm Drain Pipe & Flow Direction
- System Surcharge (Existing)
- Existing Catchments - Cope St./ AARC System
- Existing Catchment - W. 57th Ave. System
- Existing Catchments - W. 58th Ave. System
- ProjectLimits

CRW ENGINEERING GROUP
3940 ARCTIC BLVD. SUITE 300
ANCHORAGE, ALASKA 99503
PHONE (907) 562-3252
#AECL882-AK

EXISTING STORMWATER SYSTEMS & CONTRIBUTING CATCHMENTS

NORANN SUBDIVISION AREA ROAD RECONSTRUCTION PROJECT
MOA PM&E PROJECT #20-14

ANCHORAGE, ALASKA

0 125 250 500 Feet

Project:	10149.00
Drawn By:	JNM
Scale:	Graphic
Date:	DEC 2023
Figure:	4

File Path: J:\JobsData\10149.00 Norann Subdivision Road Reconstruction\00 CADD 2019\04 GIS\06 HH\Figure4_ExisitingStormWaterSystem\Figure4_ExistingStormWaterSystems.aprx

N

Dorbrandt St
Cope St
N Star St
Arctic Blvd
W Potter Dr
W 56th Ave
W 57th Ave
W 58th Ave
W 59th Ave

P-1 1.17 CFS
P-2 1.66 CFS
P-3 0.16 CFS
P-4 0.20 CFS
P-5 0.17 CFS
P-6 0.16 CFS
P-7 0.04 CFS
P-8 0.30 CFS
P-9 0.10 CFS
P-10 0.13 CFS
P-11 0.12 CFS
P-12 0.37 CFS
P-13 0.10 CFS
P-14 0.28 CFS
P-15 0.30 CFS

W. 57th Ave. System

Design Point 2
Q_{10} = 0.94 CFS

Cope St./ARRC System

Design Point 1
Q_{10} = 2.19 CFS

Design Point 3
Q_{10} = 0.80 CFS

W. 58th Ave. System

Alaska Railroad Corporation (ARRC) ROW

Arctic Blvd. System

Design Point Locations

1. AARC Outfall
2. W. 57th Ave. Outfall
3. W. 58th Ave. Outfall

Note: Arctic Blvd. storm water main was not analyzed as part of this project. The design points only represent the flows conveyed from the project area.

Q_{10} = 10-Yr, 24-Hr Storm

Legend

- Existing MOA Storm Drain Pipe & Flow Direction
- Proposed Storm Drain Pipe & Flow Direction - Alt 1
- Proposed Catchments - Cope St./ AARC System
- Proposed Catchments - W. 57th Ave. System
- Proposed Catchments - W. 58th Ave. System
- ProjectLimits

CRW ENGINEERING GROUP
3940 ARCTIC BLVD. SUITE 300
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PROPOSED STORMWATER SYSTEMS & CONTRIBUTING CATCHMENTS- ALTERNATIVE 1

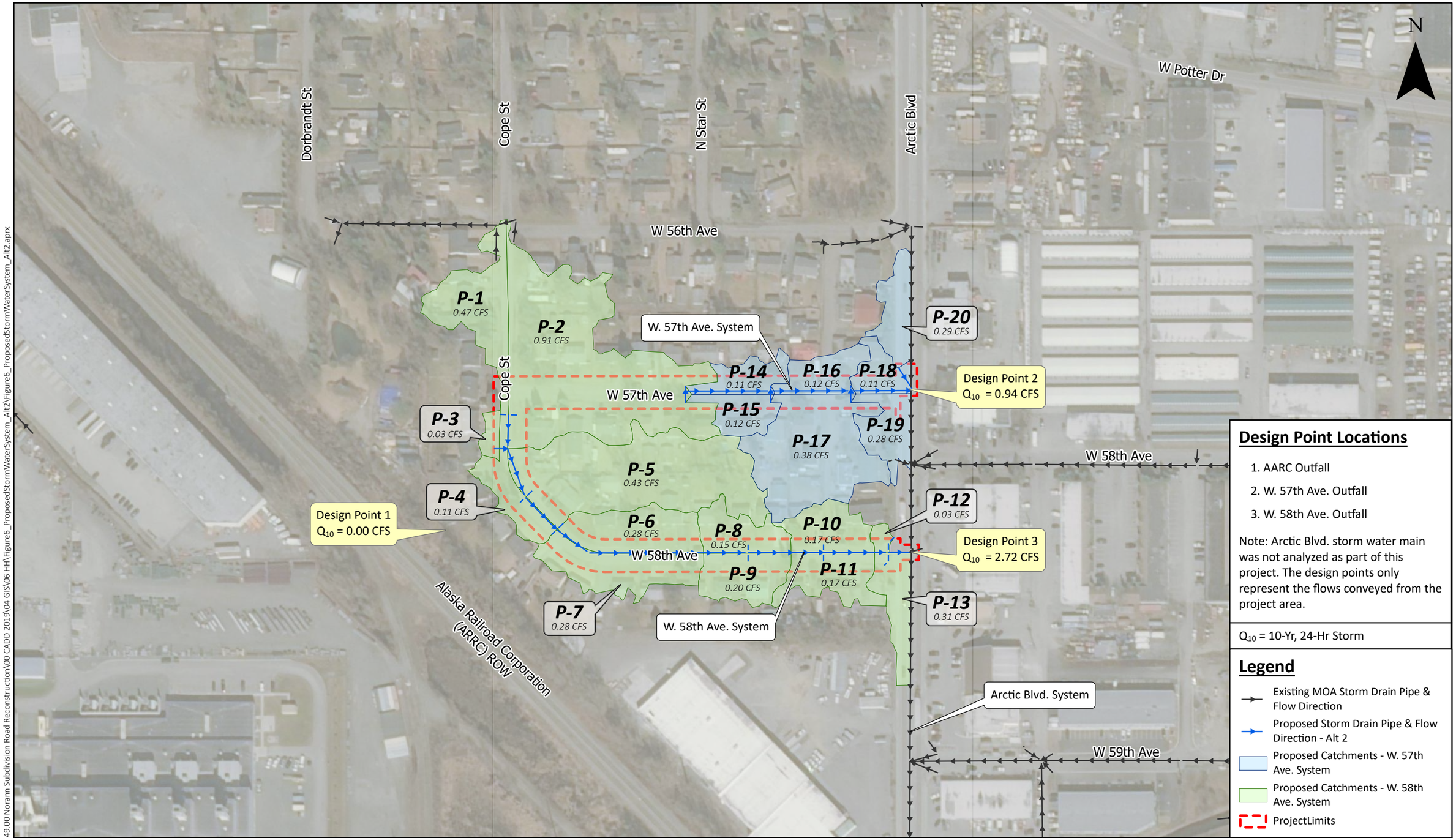
NORANN SUBDIVISION AREA ROAD RECONSTRUCTION PROJECT
MOA PM&E PROJECT #20-14

ANCHORAGE, ALASKA

0 125 250 500 Feet

Project:	10149.00
Drawn By:	JNM
Scale:	Graphic
Date:	DEC 2023
Figure:	5

File Path: J:\JobsData\10149.00 Norann Subdivision Road Reconstruction\00 CADD 2019\04 GIS\06 HH\Figure5_ProposedStormWaterSystem_Alt1.aprx



Design Point Locations

1. AARC Outfall
2. W. 57th Ave. Outfall
3. W. 58th Ave. Outfall

Note: Arctic Blvd. storm water main was not analyzed as part of this project. The design points only represent the flows conveyed from the project area.

Q_{10} = 10-Yr, 24-Hr Storm

Legend

- Existing MOA Storm Drain Pipe & Flow Direction
- Proposed Storm Drain Pipe & Flow Direction - Alt 2
- Proposed Catchments - W. 57th Ave. System
- Proposed Catchments - W. 58th Ave. System
- ProjectLimits

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PROPOSED STORMWATER SYSTEMS & CONTRIBUTING CATCHMENTS- ALTERNATIVE 2

NORANN SUBDIVISION AREA ROAD RECONSTRUCTION PROJECT
MOA PM&E PROJECT #20-14

ANCHORAGE, ALASKA

0 125 250 500 Feet

Project:	10149.00
Drawn By:	JNM
Scale:	Graphic
Date:	DEC 2023
Figure:	6

File Path: J:\Jobs\Data\10149.00 Norann Subdivision Road Reconstruction\00 CADD 2019\04 GIS\06 HH\Figure6_ProposedStormWaterSystem_Alt2.aprx

Existing Stormwater System
SSA Report & Results

Project Description

File Name	SSA_Norann_Exisiting.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	Hydrodynamic
Enable Overflow Ponding at Nodes	YES
Skip Steady State Analysis Time Periods	NO

Analysis Options

Start Analysis On	00:00:00	0:00:00
End Analysis On	00:00:00	0:00:00
Start Reporting On	00:00:00	0:00:00
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	10
Junctions	8
Outfalls	2
Flow Diversions	0
Inlets	0
Storage Nodes	0
Links	8
Channels	0
Pipes	8
Pumps	0
Orifices	0
Weirs	0
Outlets	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	Time Series	10yr	Cumulative	inches					User Defined

Subbasin Summary

SN	Subbasin ID	Area (ac)	Peak Rate Factor	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	E-1	1.18	484.00	85.00	2.28	1.01	1.18	0.38	0 00:43:52
2	E-2	7.01	484.00	91.50	2.28	1.45	10.16	3.05	0 00:50:05
3	E-3	0.23	484.00	91.50	2.28	1.45	0.33	0.11	0 00:38:13
4	E-4	0.29	484.00	94.75	2.28	1.73	0.51	0.16	0 00:44:41
5	E-5	0.24	484.00	91.50	2.28	1.45	0.35	0.12	0 00:40:33

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft^2)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	SD 1929-011	Junction	105.70	109.70	105.70	109.70	0.00	0.16	105.91	0.00	3.79	0 00:00	0.00	0.00
2	SD 1929-043	Junction	105.68	109.68	105.68	109.68	0.00	0.11	105.80	0.00	3.88	0 00:00	0.00	0.00
3	SD 1930-039	Junction	97.46	110.36	97.46	110.36	0.00	0.38	97.86	0.00	12.50	0 00:00	0.00	0.00
4	SD1929-006	Junction	104.15	106.66	104.15	106.66	0.00	3.40	106.66	0.00	0.00	0 12:39	0.40	37.00
5	SD1929-009	Junction	104.15	110.54	105.65	110.54	0.00	0.12	106.61	0.00	3.93	0 00:00	0.00	0.00
6	SD1929-084	Junction	104.20	108.20	104.20	108.20	0.00	0.38	106.70	0.00	1.50	0 00:00	0.00	0.00
7	SD1930-034	Junction	95.60	110.42	97.10	110.42	0.00	0.12	99.21	0.00	11.21	0 00:00	0.00	0.00
8	SD1930-091	Junction	96.43	109.89	97.93	109.89	0.00	0.11	98.27	0.00	11.62	0 00:00	0.00	0.00
9	OUT-ARCTIC	Outfall	96.34					0.38	96.54					
10	OUT-TRAIN	Outfall	99.81					2.38	100.50					

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length	Inlet Invert Elevation	Outlet Invert Elevation	Average Slope	Diameter or Height	Manning's Roughness	Peak Flow	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Reported Condition
					(ft)	(ft)	(ft)	(%)	(in)		(cfs)	(cfs)		(ft/sec)	(ft)		(min)	
1	PIPE 22034	Pipe	SD 1930-039	OUT-ARCTIC	379.97	97.46	96.34	0.2900	30.000	0.0250	0.38	11.58	0.03	1.12	0.30	0.12	0.00	Calculated
2	PIPE 32996	Pipe	SD1929-006	OUT-TRAIN	138.73	104.15	99.81	3.1300	10.000	0.0250	2.38	2.02	1.18	4.57	0.76	0.91	0.00	> CAPACITY
3	PIPE13763	Pipe	SD 1929-043	SD 1930-039	37.07	105.68	103.44	6.0400	10.000	0.0250	0.11	2.80	0.04	2.48	0.12	0.14	0.00	Calculated
4	PIPE13899	Pipe	SD1929-009	SD1930-034	44.82	106.48	104.55	4.3100	10.000	0.0250	0.12	2.36	0.05	2.21	0.13	0.15	0.00	Calculated
5	PIPE23630	Pipe	SD1930-034	SD1930-091	133.93	99.01	98.27	0.5500	24.000	0.0250	0.11	8.74	0.01	1.02	0.16	0.08	0.00	Calculated
6	PIPE27968	Pipe	SD1930-091	SD 1930-039	155.66	98.10	97.54	0.3600	30.000	0.0250	0.11	12.79	0.01	0.46	0.24	0.10	0.00	Calculated
7	PIPE28092	Pipe	SD 1929-011	SD 1930-039	55.91	105.70	104.95	1.3400	10.000	0.0250	0.16	1.32	0.12	1.70	0.19	0.23	0.00	Calculated
8	PIPE34663	Pipe	SD1929-084	SD1929-006	26.67	104.20	104.25	-0.1900	10.000	0.0250	0.38	0.51	0.75	0.70	0.83	1.00	47.00	SURCHARGED

Subbasin Hydrology

Subbasin : E-1

Input Data

Area (ac) 1.18
Peak Rate Factor 484
Weighted Curve Number 85
Rain Gage ID ..... Rain Gage

Composite Curve Number

32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
1/8 acre lots, 65% impervious	1.18	B	85
Composite Area & Weighted CN	1.18		85

Time of Concentration

TOC Method : SCS TR-55

Sheet Flow Equation :

Tc = (0.007 * ((n * Lf)^0.8)) / ((P^0.5) * (Sf^0.4))

Where :

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

Shallow Concentrated Flow Equation :

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

Where:

Tc = Time of Concentration (hr)
Lf = Flow Length (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)

Channel Flow Equation :

V = (1.49 * (R^(2/3)) * (Sf^0.5)) / n
R = Aq / Wp
Tc = (Lf / V) / (3600 sec/hr)

Where :

Tc = Time of Concentration (hr)
Lf = Flow Length (ft)
R = Hydraulic Radius (ft)
Aq = Flow Area (ft^2)
Wp = Wetted Perimeter (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)
n = Manning's roughness

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.2	0	0
Flow Length (ft) :	150	0	0
Slope (%) :	0.64	0	0
2 yr, 24 hr Rainfall (in) :	1.4	0	0
Velocity (ft/sec) :	0.06	0	0
Computed Flow Time (min) :	40.68	0	0

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	364.57	0	0
Slope (%) :	1.38	0	0
Surface Type :	Unpaved	Unpaved	Unpaved
Velocity (ft/sec) :	1.9	0	0
Computed Flow Time (min) :	3.2	0	0

Total TOC (min) 43.88

Subbasin Runoff Results

Total Rainfall (in)	2.28
Total Runoff (in)	1.01
Peak Runoff (cfs)	0.38
Weighted Curve Number	85
Time of Concentration (days hh:mm:ss)	0 00:43:53

Subbasin : E-2

Input Data

Area (ac)	7.01
Peak Rate Factor	484
Weighted Curve Number	91.5
Rain Gage ID	Rain Gage

Composite Curve Number

32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
1/8 acre lots, 65% impervious	3.5	B	85
Paved roads with curbs & sewers	3.5	B	98
Composite Area & Weighted CN	7		91.5

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.2	0	0
Flow Length (ft) :	150	0	0
Slope (%) :	0.7	0	0
2 yr, 24 hr Rainfall (in) :	1.4	0	0
Velocity (ft/sec) :	0.06	0	0
Computed Flow Time (min) :	39.25	0	0

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	962.73	0	0
Slope (%) :	0.53	0	0
Surface Type :	Paved	Unpaved	Unpaved
Velocity (ft/sec) :	1.48	0	0
Computed Flow Time (min) :	10.84	0	0

Total TOC (min) 50.09

Subbasin Runoff Results

Total Rainfall (in)	2.28
Total Runoff (in)	1.45
Peak Runoff (cfs)	3.05
Weighted Curve Number	91.5
Time of Concentration (days hh:mm:ss)	0 00:50:05

Subbasin : E-3

Input Data

Area (ac)	0.23
Peak Rate Factor	484
Weighted Curve Number	91.5
Rain Gage ID	Rain Gage

Composite Curve Number

32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
1/8 acre lots, 65% impervious	0.11	B	85
Paved roads with curbs & sewers	0.11	B	98
Composite Area & Weighted CN	0.22		91.5

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.2	0	0
Flow Length (ft) :	150	0	0
Slope (%) :	0.98	0	0
2 yr, 24 hr Rainfall (in) :	1.4	0	0
Velocity (ft/sec) :	0.07	0	0
Computed Flow Time (min) :	34.31	0	0

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	105.64	0	0
Slope (%) :	0.05	0	0
Surface Type :	Paved	Unpaved	Unpaved
Velocity (ft/sec) :	0.45	0	0
Computed Flow Time (min) :	3.91	0	0

Total TOC (min) 38.22

Subbasin Runoff Results

Total Rainfall (in)	2.28
Total Runoff (in)	1.45
Peak Runoff (cfs)	0.11
Weighted Curve Number	91.5
Time of Concentration (days hh:mm:ss)	0 00:38:13

Subbasin : E-4

Input Data

Area (ac)	0.29
Peak Rate Factor	484
Weighted Curve Number	94.75
Rain Gage ID	Rain Gage

Composite Curve Number

32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
1/8 acre lots, 65% impervious	0.07	B	85
Paved roads with curbs & sewers	0.22	B	98
Composite Area & Weighted CN	0.29		94.75

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.2	0	0
Flow Length (ft) :	150	0	0
Slope (%) :	0.55	0	0
2 yr, 24 hr Rainfall (in) :	1.4	0	0
Velocity (ft/sec) :	0.06	0	0
Computed Flow Time (min) :	43.23	0	0

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	110.16	0	0
Slope (%) :	0.38	0	0
Surface Type :	Paved	Unpaved	Unpaved
Velocity (ft/sec) :	1.25	0	0
Computed Flow Time (min) :	1.47	0	0

Total TOC (min) 44.69

Subbasin Runoff Results

Total Rainfall (in)	2.28
Total Runoff (in)	1.73
Peak Runoff (cfs)	0.16
Weighted Curve Number	94.75
Time of Concentration (days hh:mm:ss)	0 00:44:41

Subbasin : E-5

Input Data

Area (ac)	0.24
Peak Rate Factor	484
Weighted Curve Number	91.5
Rain Gage ID	Rain Gage

Composite Curve Number

32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
1/8 acre lots, 65% impervious	0.12	B	85
Paved roads with curbs & sewers	0.12	B	98
Composite Area & Weighted CN	0.24		91.5

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.2	0	0
Flow Length (ft) :	150	0	0
Slope (%) :	0.68	0	0
2 yr, 24 hr Rainfall (in) :	1.4	0	0
Velocity (ft/sec) :	0.06	0	0
Computed Flow Time (min) :	39.71	0	0

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	68.87	0	0
Slope (%) :	0.44	0	0
Surface Type :	Paved	Unpaved	Unpaved
Velocity (ft/sec) :	1.35	0	0
Computed Flow Time (min) :	0.85	0	0

Total TOC (min) 40.56

Subbasin Runoff Results

Total Rainfall (in)	2.28
Total Runoff (in)	1.45
Peak Runoff (cfs)	0.12
Weighted Curve Number	91.5
Time of Concentration (days hh:mm:ss)	0 00:40:34

Junction Input

SN	Element ID	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Ground/Rim (Max) Offset (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Surcharge Elevation (ft)	Surcharge Depth (ft)	Ponded Area (ft^2)	Minimum Pipe Cover (in)
1	SD 1929-011	105.70	109.70	4.00	105.70	0.00	109.70	0.00	0.00	0.00
2	SD 1929-043	105.68	109.68	4.00	105.68	0.00	109.68	0.00	0.00	0.00
3	SD 1930-039	97.46	110.36	12.90	97.46	0.00	110.36	0.00	0.00	0.00
4	SD1929-006	104.15	106.66	2.51	104.15	0.00	106.66	0.00	0.00	0.00
5	SD1929-009	104.15	110.54	6.39	105.65	1.50	110.54	0.00	0.00	0.00
6	SD1929-084	104.20	108.20	4.00	104.20	0.00	108.20	0.00	0.00	0.00
7	SD1930-034	95.60	110.42	14.82	97.10	1.50	110.42	0.00	0.00	0.00
8	SD1930-091	96.43	109.89	13.46	97.93	1.50	109.89	0.00	0.00	0.00

Junction Results

SN	Element ID	Peak Inflow (cfs)	Peak Lateral Inflow (cfs)	Max HGL Elevation Attained (ft)	Max HGL Depth Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Average HGL Elevation Attained (ft)	Average HGL Depth Attained (ft)	Time of Max HGL Occurrence (days hh:mm)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	SD 1929-011	0.16	0.16	105.91	0.21	0.00	3.79	105.78	0.08	0 12:35	0 00:00	0.00	0.00
2	SD 1929-043	0.11	0.11	105.80	0.12	0.00	3.88	105.72	0.04	0 12:30	0 00:00	0.00	0.00
3	SD 1930-039	0.38	0.00	97.86	0.40	0.00	12.50	97.64	0.18	0 12:37	0 00:00	0.00	0.00
4	SD1929-006	3.40	3.04	106.66	2.51	0.00	0.00	104.51	0.36	0 12:22	0 12:39	0.40	37.00
5	SD1929-009	0.12	0.12	106.61	2.46	0.00	3.93	106.46	2.31	0 12:30	0 00:00	0.00	0.00
6	SD1929-084	0.38	0.38	106.70	2.50	0.00	1.50	104.54	0.34	0 12:35	0 00:00	0.00	0.00
7	SD1930-034	0.12	0.00	99.21	3.61	0.00	11.21	98.92	3.32	0 12:35	0 00:00	0.00	0.00
8	SD1930-091	0.11	0.00	98.27	1.84	0.00	11.62	98.15	1.72	0 12:36	0 00:00	0.00	0.00

Pipe Input

SN	Element ID	Length (ft)	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Slope (%)	Pipe Shape	Pipe Diameter or Height (in)	Pipe Width (in)	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow (cfs)	Flap Gate	No. of Barrels
1	PIPE 22034	379.97	97.46	0.00	96.34	0.00	1.12	0.2900	CIRCULAR	30.000	30.000	0.0250	0.5000	1.0000	0.0000	0.00	No	1
2	PIPE 32996	138.73	104.15	0.00	99.81	0.00	4.34	3.1300	CIRCULAR	9.960	9.960	0.0250	0.5000	0.5000	0.0000	0.00	No	1
3	PIPE13763	37.07	105.68	0.00	103.44	5.98	2.24	6.0400	CIRCULAR	9.960	9.960	0.0250	0.5000	1.0000	0.0000	0.00	No	1
4	PIPE13899	44.82	106.48	2.33	104.55	8.95	1.93	4.3100	CIRCULAR	9.960	9.960	0.0250	0.5000	1.0000	0.0000	0.00	No	1
5	PIPE23630	133.93	99.01	3.41	98.27	1.84	0.74	0.5500	CIRCULAR	24.000	24.000	0.0250	0.5000	1.0000	0.0000	0.00	No	1
6	PIPE27968	155.66	98.10	1.67	97.54	0.08	0.56	0.3600	CIRCULAR	30.000	30.000	0.0250	0.5000	1.0000	0.0000	0.00	No	1
7	PIPE28092	55.91	105.70	0.00	104.95	7.49	0.75	1.3400	CIRCULAR	9.960	9.960	0.0250	0.5000	1.0000	0.0000	0.00	No	1
8	PIPE34663	26.67	104.20	0.00	104.25	0.10	-0.05	-0.1900	CIRCULAR	9.960	9.960	0.0250	0.5000	0.5000	0.0000	0.00	No	1

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	PIPE 22034	0.38	0 12:37	11.58	0.03	1.12	5.65	0.30	0.12	0.00		Calculated
2	PIPE 32996	2.38	0 12:24	2.02	1.18	4.57	0.51	0.76	0.91	0.00		> CAPACITY
3	PIPE13763	0.11	0 12:30	2.80	0.04	2.48	0.25	0.12	0.14	0.00		Calculated
4	PIPE13899	0.12	0 12:30	2.36	0.05	2.21	0.34	0.13	0.15	0.00		Calculated
5	PIPE23630	0.11	0 12:35	8.74	0.01	1.02	2.19	0.16	0.08	0.00		Calculated
6	PIPE27968	0.11	0 12:36	12.79	0.01	0.46	5.64	0.24	0.10	0.00		Calculated
7	PIPE28092	0.16	0 12:35	1.32	0.12	1.70	0.55	0.19	0.23	0.00		Calculated
8	PIPE34663	0.38	0 12:35	0.51	0.75	0.70	0.64	0.83	1.00	47.00		SURCHARGED

Proposed Stormwater System
SSA Report & Results – Alternative 1

Project Description

File Name ..... SSA_Norann_Proposed-Alt1.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 ..... Hydrodynamic
Enable Overflow Ponding at Nodes ..... YES
Skip Steady State Analysis Time Periods ..... NO

Analysis Options

Start Analysis On 00:00:00 0:00:00
End Analysis On 00:00:00 0:00:00
Start Reporting On 00:00:00 0:00:00
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	15
Nodes	25
Junctions	23
Outfalls	2
Flow Diversions	0
Inlets	0
Storage Nodes	0
Links	23
Channels	0
Pipes	23
Pumps	0
Orifices	0
Weirs	0
Outlets	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	10yr	Cumulative	inches	Alaska	Anchorage (B)	10.00	2.50	SCS Type I 24-hr

Subbasin Summary

SN	Subbasin ID	Area (ac)	Peak Rate Factor	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	P1	1.25	484.00	91.50	2.28	1.45	1.81	1.17	0 00:10:13
2	P10	0.21	484.00	91.50	2.28	1.45	0.30	0.13	0 00:25:23
3	P11	0.22	484.00	91.50	2.28	1.45	0.32	0.12	0 00:34:49
4	P12	0.96	484.00	86.30	2.28	1.09	1.05	0.37	0 00:36:46
5	P13	0.17	484.00	91.50	2.28	1.45	0.24	0.10	0 00:26:07
6	P14	0.27	484.00	91.50	2.28	1.45	0.39	0.28	0 00:07:09
7	P15	0.24	484.00	93.58	2.28	1.62	0.39	0.30	0 00:05:40
8	P2	3.79	484.00	87.60	2.28	1.17	4.43	1.66	0 00:33:34
9	P3	0.28	484.00	89.42	2.28	1.29	0.36	0.16	0 00:24:22
10	P4	0.30	484.00	89.42	2.28	1.29	0.38	0.20	0 00:18:04
11	P5	0.30	484.00	89.42	2.28	1.29	0.39	0.17	0 00:24:29
12	P6	0.30	484.00	89.42	2.28	1.29	0.39	0.16	0 00:27:03
13	P7	0.04	484.00	91.50	2.28	1.42	0.06	0.04	0 00:12:25
14	P8	0.25	484.00	93.58	2.28	1.62	0.41	0.30	0 00:06:13
15	P9	0.18	484.00	91.50	2.28	1.45	0.26	0.10	0 00:32:07

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft^2)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	ARCTIC-N	Junction	102.70	108.70	102.70	108.70	0.00	0.94	104.13	0.00	4.57	0 00:00	0.00	0.00
2	ARCTIC-S	Junction	103.51	109.51	103.51	109.51	0.00	1.70	103.96	0.00	5.55	0 00:00	0.00	0.00
3	I1-1	Junction	101.48	102.58	101.48	102.58	0.00	1.64	102.67	0.00	0.53	0 00:00	0.00	0.00
4	I2-1	Junction	104.73	105.83	104.73	105.83	0.00	0.15	105.38	0.00	0.78	0 00:00	0.00	0.00
5	I2-2	Junction	104.76	105.86	104.76	105.86	0.00	0.19	105.43	0.00	0.76	0 00:00	0.00	0.00
6	I2-3	Junction	104.34	105.44	104.34	105.44	0.00	0.17	105.34	0.00	0.84	0 00:00	0.00	0.00
7	I2-4	Junction	104.53	105.63	104.53	105.63	0.00	0.16	105.32	0.00	0.86	0 00:00	0.00	0.00
8	I2-5	Junction	103.93	106.33	103.93	106.33	0.00	0.04	105.48	0.00	0.93	0 00:00	0.00	0.00
9	I2-6	Junction	104.12	106.44	104.12	106.44	0.00	0.26	105.60	0.00	0.84	0 00:00	0.00	0.00
10	I3-1	Junction	104.65	105.75	104.65	105.75	0.00	0.10	105.32	0.00	0.83	0 00:00	0.00	0.00
11	I3-2	Junction	104.67	105.77	104.67	105.77	0.00	0.13	105.36	0.00	0.81	0 00:00	0.00	0.00
12	I4-1	Junction	104.12	105.22	104.12	105.22	0.00	0.12	104.54	0.00	0.89	0 00:00	0.00	0.00
13	I4-2	Junction	104.14	105.24	104.14	105.24	0.00	0.37	104.66	0.00	0.77	0 00:00	0.00	0.00
14	I4-3	Junction	103.54	109.37	103.54	109.37	0.00	0.16	105.03	0.00	4.33	0 00:00	0.00	0.00
15	I4-4	Junction	103.58	104.68	103.58	104.68	0.00	0.24	105.04	0.00	0.82	0 00:00	0.00	0.00
16	I4-5	Junction	102.85	109.00	102.85	109.00	0.00	0.27	106.17	0.00	2.83	0 00:00	0.00	0.00
17	S1-1	Junction	100.22	106.80	100.22	106.80	0.00	2.20	101.16	0.00	5.65	0 00:00	0.00	0.00
18	S2-1	Junction	104.61	109.15	104.61	109.15	0.00	0.35	105.32	0.00	3.83	0 00:00	0.00	0.00
19	S2-2	Junction	104.10	109.82	104.10	109.82	0.00	0.67	104.96	0.00	4.86	0 00:00	0.00	0.00
20	S2-3	Junction	103.69	110.30	103.69	110.30	0.00	0.80	104.59	0.00	5.72	0 00:00	0.00	0.00
21	S3-1	Junction	104.12	109.06	104.12	109.06	0.00	0.23	105.19	0.00	3.88	0 00:00	0.00	0.00
22	S4-1	Junction	103.59	109.13	103.59	109.13	0.00	0.70	104.45	0.00	4.68	0 00:00	0.00	0.00
23	S4-2	Junction	103.57	109.55	103.57	109.55	0.00	0.87	104.20	0.00	5.35	0 00:00	0.00	0.00
24	RAILROAD	Outfall	99.81					2.19	100.44					
25	SDMH1929-117	Outfall	96.34					1.70	96.79					

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length	Inlet Invert Elevation	Outlet Invert Elevation	Average Slope	Diameter or Height	Manning's Roughness	Peak Flow	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Reported Condition
					(ft)	(ft)	(ft)	(%)	(in)		(cfs)	(cfs)		(ft/sec)	(ft)		(min)	
1	ARCTIC-N	Pipe	ARCTIC-N	ARCTIC-S	293.58	99.01	97.54	0.5000	24.000	0.0300	0.94	5.15	0.18	0.65	0.94	0.47	0.00	Calculated
2	ARCTIC-S	Pipe	ARCTIC-S	SDMH1929-117	379.64	97.46	96.34	0.3000	30.000	0.0300	1.70	24.43	0.07	2.84	0.45	0.18	0.00	Calculated
3	P1-1	Pipe	I1-1	S1-1	26.95	102.20	101.66	2.0000	12.000	0.0120	1.64	5.46	0.30	5.17	0.43	0.43	0.00	Calculated
4	P1-2	Pipe	S1-1	RAILROAD	133.98	100.22	99.81	0.3100	12.000	0.0120	2.19	2.14	1.03	3.32	0.78	0.79	0.00	> CAPACITY
5	P2-1	Pipe	I2-1	S2-1	6.65	105.16	105.14	0.3000	12.000	0.0120	0.15	2.12	0.07	1.49	0.20	0.20	0.00	Calculated
6	P2-10	Pipe	S2-3	ARCTIC-S	44.52	104.08	103.94	0.3100	12.000	0.0120	0.80	2.16	0.37	2.40	0.44	0.44	0.00	Calculated
7	P2-2	Pipe	I2-2	S2-1	16.35	105.19	105.14	0.3100	12.000	0.0120	0.19	2.13	0.09	1.62	0.21	0.21	0.00	Calculated
8	P2-3	Pipe	S2-1	S2-2	134.66	105.04	104.63	0.3000	12.000	0.0120	0.35	2.13	0.16	1.78	0.30	0.30	0.00	Calculated
9	P2-4	Pipe	I2-3	S2-2	6.65	105.18	105.04	2.1100	12.000	0.0120	0.17	5.60	0.03	2.52	0.14	0.14	0.00	Calculated
10	P2-5	Pipe	I2-4	S2-2	16.35	105.18	104.85	2.0200	12.000	0.0120	0.16	5.48	0.03	2.75	0.13	0.13	0.00	Calculated
11	P2-6	Pipe	S2-2	S2-3	115.54	104.53	104.18	0.3000	12.000	0.0120	0.67	2.12	0.31	2.17	0.41	0.42	0.00	Calculated
12	P2-7	Pipe	I2-5	S2-3	8.71	105.41	105.23	2.0700	12.000	0.0120	0.04	5.55	0.01	1.84	0.06	0.06	0.00	Calculated
13	P2-8	Pipe	I2-6	S2-3	16.38	105.42	105.09	2.0100	12.000	0.0120	0.26	5.48	0.05	3.06	0.17	0.17	0.00	Calculated
14	P3-1	Pipe	I3-1	S3-1	9.29	105.15	105.12	0.3200	12.000	0.0120	0.10	2.19	0.04	1.35	0.15	0.15	0.00	Calculated
15	P3-2	Pipe	I3-2	S3-1	13.71	105.17	105.12	0.3600	12.000	0.0120	0.13	2.33	0.06	1.50	0.17	0.17	0.00	Calculated
16	P3-3	Pipe	S3-1	S4-1	143.29	105.02	104.16	0.6000	18.000	0.0120	0.23	8.82	0.03	1.45	0.23	0.15	0.00	Calculated
17	P4-1	Pipe	I4-1	S4-1	9.25	104.43	104.24	2.0500	12.000	0.0120	0.12	5.53	0.02	1.99	0.16	0.16	0.00	Calculated
18	P4-2	Pipe	I4-2	S4-1	13.75	104.43	104.16	1.9600	12.000	0.0120	0.37	5.41	0.07	2.39	0.26	0.26	0.00	Calculated
19	P4-3	Pipe	S4-1	S4-2	153.04	104.06	103.14	0.6000	12.000	0.0120	0.70	2.18	0.32	1.76	0.51	0.51	0.00	Calculated
20	P4-4	Pipe	S4-2	I4-3	9.16	104.86	104.67	2.0700	12.000	0.0120	0.27	5.56	0.05	3.99	0.22	0.22	0.00	Calculated
21	P4-5	Pipe	I4-4	S4-2	13.84	104.86	104.58	2.0200	12.000	0.0120	0.24	5.49	0.04	2.96	0.16	0.16	0.00	Calculated
22	P4-6	Pipe	S4-2	ARCTIC-N	110.93	103.04	102.70	0.3100	12.000	0.0120	0.87	3.42	0.25	1.26	0.81	0.82	0.00	Calculated
23	P4-7	Pipe	I4-5	ARCTIC-N	49.20	106.01	105.02	2.0100	12.000	0.0120	0.27	5.48	0.05	3.47	0.15	0.15	0.00	Calculated

Subbasin Hydrology

Subbasin : P1

Input Data

Area (ac)	1.25
Peak Rate Factor	484
Weighted Curve Number	91.5
Rain Gage ID	Rain Gage-01

Composite Curve Number

32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
1/8 acre lots, 65% impervious	0.63	B	85
Paved parking & roofs	0.63	B	98
Composite Area & Weighted CN	1.26		91.5

Time of Concentration

TOC Method : SCS TR-55

Sheet Flow Equation :

Tc = (0.007 * ((n * Lf)^0.8)) / ((P^0.5) * (Sf^0.4))

Where :

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

Shallow Concentrated Flow Equation :

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

Where:

Tc = Time of Concentration (hr)
Lf = Flow Length (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)

Channel Flow Equation :

V = (1.49 * (R^(2/3)) * (Sf^0.5)) / n
R = Aq / Wp
Tc = (Lf / V) / (3600 sec/hr)

Where :

Tc = Time of Concentration (hr)
Lf = Flow Length (ft)
R = Hydraulic Radius (ft)
Aq = Flow Area (ft^2)
Wp = Wetted Perimeter (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)
n = Manning's roughness

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.015	0	0
Flow Length (ft) :	150	0	0
Slope (%) :	0.5	0	0
2 yr, 24 hr Rainfall (in) :	1.4	0	0
Velocity (ft/sec) :	0.44	0	0
Computed Flow Time (min) :	5.65	0	0

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	369.82	0	0
Slope (%) :	0.44	0	0
Surface Type :	Paved	Unpaved	Unpaved
Velocity (ft/sec) :	1.35	0	0
Computed Flow Time (min) :	4.57	0	0

Total TOC (min) 10.22

Subbasin Runoff Results

Total Rainfall (in)	2.28
Total Runoff (in)	1.45
Peak Runoff (cfs)	1.17
Weighted Curve Number	91.5
Time of Concentration (days hh:mm:ss)	0 00:10:13

Subbasin : P10

Input Data

Area (ac)	0.21
Peak Rate Factor	484
Weighted Curve Number	91.5
Rain Gage ID	Rain Gage-01

Composite Curve Number

32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
1/8 acre lots, 65% impervious	0.11	B	85
Paved parking & roofs	0.11	B	98
Composite Area & Weighted CN	0.22		91.5

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.2	0	0
Flow Length (ft) :	150	0	0
Slope (%) :	2.18	0	0
2 yr, 24 hr Rainfall (in) :	1.4	0	0
Velocity (ft/sec) :	0.1	0	0
Computed Flow Time (min) :	24.92	0	0

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	46.68	0	0
Slope (%) :	0.67	0	0
Surface Type :	Paved	Unpaved	Unpaved
Velocity (ft/sec) :	1.66	0	0
Computed Flow Time (min) :	0.47	0	0

Total TOC (min) 25.39

Subbasin Runoff Results

Total Rainfall (in)	2.28
Total Runoff (in)	1.45
Peak Runoff (cfs)	0.13
Weighted Curve Number	91.5
Time of Concentration (days hh:mm:ss)	0 00:25:23

Subbasin : P11

Input Data

Area (ac)	0.22
Peak Rate Factor	484
Weighted Curve Number	91.5
Rain Gage ID	Rain Gage-01

Composite Curve Number

32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
1/8 acre lots, 65% impervious	0.11	B	85
Paved parking & roofs	0.11	B	98
Composite Area & Weighted CN	0.22		91.5

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.2	0	0
Flow Length (ft) :	150	0	0
Slope (%) :	1.01	0	0
2 yr, 24 hr Rainfall (in) :	1.4	0	0
Velocity (ft/sec) :	0.07	0	0
Computed Flow Time (min) :	33.9	0	0

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	103.51	0	0
Slope (%) :	0.85	0	0
Surface Type :	Paved	Unpaved	Unpaved
Velocity (ft/sec) :	1.87	0	0
Computed Flow Time (min) :	0.92	0	0

Total TOC (min) 34.82

Subbasin Runoff Results

Total Rainfall (in)	2.28
Total Runoff (in)	1.45
Peak Runoff (cfs)	0.12
Weighted Curve Number	91.5
Time of Concentration (days hh:mm:ss)	0 00:34:49

Subbasin : P12

Input Data

Area (ac)	0.96
Peak Rate Factor	484
Weighted Curve Number	86.3
Rain Gage ID	Rain Gage-01

Composite Curve Number

32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
1/8 acre lots, 65% impervious	0.87	B	85
Paved parking & roofs	0.1	B	98
Composite Area & Weighted CN	0.97		86.3

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.2	0	0
Flow Length (ft) :	150	0	0
Slope (%) :	1.09	0	0
2 yr, 24 hr Rainfall (in) :	1.4	0	0
Velocity (ft/sec) :	0.08	0	0
Computed Flow Time (min) :	32.88	0	0

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	350.44	0	0
Slope (%) :	0.86	0	0
Surface Type :	Unpaved	Unpaved	Unpaved
Velocity (ft/sec) :	1.5	0	0
Computed Flow Time (min) :	3.89	0	0

Total TOC (min) 36.77

Subbasin Runoff Results

Total Rainfall (in)	2.28
Total Runoff (in)	1.09
Peak Runoff (cfs)	0.37
Weighted Curve Number	86.3
Time of Concentration (days hh:mm:ss)	0 00:36:46

Subbasin : P13

Input Data

Area (ac)	0.17
Peak Rate Factor	484
Weighted Curve Number	91.5
Rain Gage ID	Rain Gage-01

Composite Curve Number

32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
1/8 acre lots, 65% impervious	0.08	B	85
Paved parking & roofs	0.08	B	98
Composite Area & Weighted CN	0.16		91.5

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.2	0	0
Flow Length (ft) :	136.74	0	0
Slope (%) :	1.61	0	0
2 yr, 24 hr Rainfall (in) :	1.4	0	0
Velocity (ft/sec) :	0.09	0	0
Computed Flow Time (min) :	26.12	0	0

Total TOC (min) 26.12

Subbasin Runoff Results

Total Rainfall (in)	2.28
Total Runoff (in)	1.45
Peak Runoff (cfs)	0.1
Weighted Curve Number	91.5
Time of Concentration (days hh:mm:ss)	0 00:26:07

Subbasin : P14

Input Data

Area (ac)	0.27
Peak Rate Factor	484
Weighted Curve Number	91.5
Rain Gage ID	Rain Gage-01

Composite Curve Number

32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
1/8 acre lots, 65% impervious	0.14	B	85
Paved parking & roofs	0.14	B	98
Composite Area & Weighted CN	0.28		91.5

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.015	0	0
Flow Length (ft) :	150	0	0
Slope (%) :	0.38	0	0
2 yr, 24 hr Rainfall (in) :	1.4	0	0
Velocity (ft/sec) :	0.4	0	0
Computed Flow Time (min) :	6.31	0	0

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	87.59	0	0
Slope (%) :	0.71	0	0
Surface Type :	Paved	Unpaved	Unpaved
Velocity (ft/sec) :	1.71	0	0
Computed Flow Time (min) :	0.85	0	0

Total TOC (min) 7.16

Subbasin Runoff Results

Total Rainfall (in)	2.28
Total Runoff (in)	1.45
Peak Runoff (cfs)	0.28
Weighted Curve Number	91.5
Time of Concentration (days hh:mm:ss)	0 00:07:10

Subbasin : P15

Input Data

Area (ac)	0.24
Peak Rate Factor	484
Weighted Curve Number	93.58
Rain Gage ID	Rain Gage-01

Composite Curve Number

32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
1/8 acre lots, 65% impervious	0.08	B	85
Paved parking & roofs	0.16	B	98
Composite Area & Weighted CN	0.24		93.58

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.015	0	0
Flow Length (ft) :	150	0	0
Slope (%) :	0.68	0	0
2 yr, 24 hr Rainfall (in) :	1.4	0	0
Velocity (ft/sec) :	0.5	0	0
Computed Flow Time (min) :	5	0	0

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	68.87	0	0
Slope (%) :	0.71	0	0
Surface Type :	Paved	Unpaved	Unpaved
Velocity (ft/sec) :	1.71	0	0
Computed Flow Time (min) :	0.67	0	0

Total TOC (min) 5.67

Subbasin Runoff Results

Total Rainfall (in)	2.28
Total Runoff (in)	1.62
Peak Runoff (cfs)	0.3
Weighted Curve Number	93.58
Time of Concentration (days hh:mm:ss)	0 00:05:40

Subbasin : P2

Input Data

Area (ac)	3.79
Peak Rate Factor	484
Weighted Curve Number	87.6
Rain Gage ID	Rain Gage-01

Composite Curve Number

32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
1/8 acre lots, 65% impervious	3.03	B	85
Paved parking & roofs	0.76	B	98
Composite Area & Weighted CN	3.79		87.6

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.2	0	0
Flow Length (ft) :	150	0	0
Slope (%) :	1.49	0	0
2 yr, 24 hr Rainfall (in) :	1.4	0	0
Velocity (ft/sec) :	0.09	0	0
Computed Flow Time (min) :	29.01	0	0

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	415.47	0	0
Slope (%) :	0.56	0	0
Surface Type :	Paved	Unpaved	Unpaved
Velocity (ft/sec) :	1.52	0	0
Computed Flow Time (min) :	4.56	0	0

Total TOC (min) 33.57

Subbasin Runoff Results

Total Rainfall (in)	2.28
Total Runoff (in)	1.17
Peak Runoff (cfs)	1.66
Weighted Curve Number	87.6
Time of Concentration (days hh:mm:ss)	0 00:33:34

Subbasin : P3

Input Data

Area (ac)	0.28
Peak Rate Factor	484
Weighted Curve Number	89.42
Rain Gage ID	Rain Gage-01

Composite Curve Number

32	Area	Soil	Curve
Soil/Surface Description	(acres)	Group	Number
1/8 acre lots, 65% impervious	0.18	B	85
Paved parking & roofs	0.09	B	98
Composite Area & Weighted CN	0.27		89.42

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.2	0	0
Flow Length (ft) :	150	0	0
Slope (%) :	2.33	0	0
2 yr, 24 hr Rainfall (in) :	1.4	0	0
Velocity (ft/sec) :	0.1	0	0
Computed Flow Time (min) :	24.26	0	0

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	5.9	0	0
Slope (%) :	0.29	0	0
Surface Type :	Unpaved	Unpaved	Unpaved
Velocity (ft/sec) :	0.87	0	0
Computed Flow Time (min) :	0.11	0	0

Total TOC (min) 24.38

Subbasin Runoff Results

Total Rainfall (in)	2.28
Total Runoff (in)	1.29
Peak Runoff (cfs)	0.16
Weighted Curve Number	89.42
Time of Concentration (days hh:mm:ss)	0 00:24:23

Subbasin : P4

Input Data

Area (ac)	0.3
Peak Rate Factor	484
Weighted Curve Number	89.42
Rain Gage ID	Rain Gage-01

Composite Curve Number

32	Area	Soil	Curve
Soil/Surface Description	(acres)	Group	Number
1/8 acre lots, 65% impervious	0.19	B	85
Paved parking & roofs	0.1	B	98
Composite Area & Weighted CN	0.29		89.42

Time of Concentration

	Subarea	Subarea	Subarea
Sheet Flow Computations	A	B	C
Manning's Roughness :	0.2	0	0
Flow Length (ft) :	120.95	0	0
Slope (%) :	3.16	0	0
2 yr, 24 hr Rainfall (in) :	1.4	0	0
Velocity (ft/sec) :	0.11	0	0
Computed Flow Time (min) :	18.08	0	0

Total TOC (min) 18.08

Subbasin Runoff Results

Total Rainfall (in)	2.28
Total Runoff (in)	1.29
Peak Runoff (cfs)	0.2
Weighted Curve Number	89.42
Time of Concentration (days hh:mm:ss)	0 00:18:05

Subbasin : P5

Input Data

Area (ac)	0.3
Peak Rate Factor	484
Weighted Curve Number	89.42
Rain Gage ID	Rain Gage-01

Composite Curve Number

32	Area	Soil	Curve
Soil/Surface Description	(acres)	Group	Number
1/8 acre lots, 65% impervious	0.2	B	85
Paved parking & roofs	0.1	B	98
Composite Area & Weighted CN	0.3		89.42

Time of Concentration

	Subarea	Subarea	Subarea
Sheet Flow Computations	A	B	C
Manning's Roughness :	0.2	0	0
Flow Length (ft) :	128.12	0	0
Slope (%) :	1.66	0	0
2 yr, 24 hr Rainfall (in) :	1.4	0	0
Velocity (ft/sec) :	0.09	0	0
Computed Flow Time (min) :	24.49	0	0

Total TOC (min) 24.49

Subbasin Runoff Results

Total Rainfall (in)	2.28
Total Runoff (in)	1.29
Peak Runoff (cfs)	0.17
Weighted Curve Number	89.42
Time of Concentration (days hh:mm:ss)	0 00:24:29

Subbasin : P6

Input Data

Area (ac)	0.3
Peak Rate Factor	484
Weighted Curve Number	89.42
Rain Gage ID	Rain Gage-01

Composite Curve Number

32	Area	Soil	Curve
Soil/Surface Description	(acres)	Group	Number
1/8 acre lots, 65% impervious	0.2	B	85
Paved parking & roofs	0.1	B	98
Composite Area & Weighted CN	0.3		89.42

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.2	0	0
Flow Length (ft) :	150	0	0
Slope (%) :	1.85	0	0
2 yr, 24 hr Rainfall (in) :	1.4	0	0
Velocity (ft/sec) :	0.09	0	0
Computed Flow Time (min) :	26.61	0	0

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	40.72	0	0
Slope (%) :	0.56	0	0
Surface Type :	Paved	Unpaved	Unpaved
Velocity (ft/sec) :	1.52	0	0
Computed Flow Time (min) :	0.45	0	0

Total TOC (min) 27.05

Subbasin Runoff Results

Total Rainfall (in)	2.28
Total Runoff (in)	1.29
Peak Runoff (cfs)	0.16
Weighted Curve Number	89.42
Time of Concentration (days hh:mm:ss)	0 00:27:03

Subbasin : P7

Input Data

Area (ac)	0.04
Peak Rate Factor	484
Weighted Curve Number	91.5
Rain Gage ID	Rain Gage-01

Composite Curve Number

32	Area	Soil	Curve
Soil/Surface Description	(acres)	Group	Number
1/8 acre lots, 65% impervious	0.02	B	85
Paved parking & roofs	0.02	B	98
Composite Area & Weighted CN	0.04		91.5

Time of Concentration

	Subarea	Subarea	Subarea
Sheet Flow Computations	A	B	C
Manning's Roughness :	0.2	0	0
Flow Length (ft) :	66.47	0	0
Slope (%) :	2.44	0	0
2 yr, 24 hr Rainfall (in) :	1.4	0	0
Velocity (ft/sec) :	0.09	0	0
Computed Flow Time (min) :	12.42	0	0

Total TOC (min) 12.42

Subbasin Runoff Results

Total Rainfall (in)	2.28
Total Runoff (in)	1.42
Peak Runoff (cfs)	0.04
Weighted Curve Number	91.5
Time of Concentration (days hh:mm:ss)	0 00:12:25

Subbasin : P8

Input Data

Area (ac)	0.25
Peak Rate Factor	484
Weighted Curve Number	93.58
Rain Gage ID	Rain Gage-01

Composite Curve Number

32	Area	Soil	Curve
Soil/Surface Description	(acres)	Group	Number
1/8 acre lots, 65% impervious	0.09	B	85
Paved parking & roofs	0.17	B	98
Composite Area & Weighted CN	0.26		93.58

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.015	0	0
Flow Length (ft) :	150	0	0
Slope (%) :	0.78	0	0
2 yr, 24 hr Rainfall (in) :	1.4	0	0
Velocity (ft/sec) :	0.53	0	0
Computed Flow Time (min) :	4.73	0	0

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	101.67	0	0
Slope (%) :	0.31	0	0
Surface Type :	Paved	Unpaved	Unpaved
Velocity (ft/sec) :	1.13	0	0
Computed Flow Time (min) :	1.5	0	0

Total TOC (min) 6.23

Subbasin Runoff Results

Total Rainfall (in)	2.28
Total Runoff (in)	1.62
Peak Runoff (cfs)	0.3
Weighted Curve Number	93.58
Time of Concentration (days hh:mm:ss)	0 00:06:14

Subbasin : P9

Input Data

Area (ac)	0.18
Peak Rate Factor	484
Weighted Curve Number	91.5
Rain Gage ID	Rain Gage-01

Composite Curve Number

32	Area	Soil	Curve
Soil/Surface Description	(acres)	Group	Number
1/8 acre lots, 65% impervious	0.09	B	85
Paved parking & roofs	0.09	B	98
Composite Area & Weighted CN	0.18		91.5

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.2	0	0
Flow Length (ft) :	150	0	0
Slope (%) :	1.24	0	0
2 yr, 24 hr Rainfall (in) :	1.4	0	0
Velocity (ft/sec) :	0.08	0	0
Computed Flow Time (min) :	31.23	0	0

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	82.33	0	0
Slope (%) :	0.56	0	0
Surface Type :	Paved	Unpaved	Unpaved
Velocity (ft/sec) :	1.52	0	0
Computed Flow Time (min) :	0.9	0	0

Total TOC (min) 32.13

Subbasin Runoff Results

Total Rainfall (in)	2.28
Total Runoff (in)	1.45
Peak Runoff (cfs)	0.1
Weighted Curve Number	91.5
Time of Concentration (days hh:mm:ss)	0 00:32:08

Junction Input

SN	Element ID	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Ground/Rim (Max) Offset (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Surcharge Elevation (ft)	Surcharge Depth (ft)	Ponded Area (ft^2)	Minimum Pipe Cover (in)
1	ARCTIC-N	102.70	108.70	6.00	102.70	0.00	108.70	0.00	0.00	0.00
2	ARCTIC-S	103.51	109.51	6.00	103.51	0.00	109.51	0.00	0.00	0.00
3	I1-1	101.48	102.58	1.10	101.48	0.00	102.58	0.00	0.00	0.00
4	I2-1	104.73	105.83	1.10	104.73	0.00	105.83	0.00	0.00	0.00
5	I2-2	104.76	105.86	1.10	104.76	0.00	105.86	0.00	0.00	0.00
6	I2-3	104.34	105.44	1.10	104.34	0.00	105.44	0.00	0.00	0.00
7	I2-4	104.53	105.63	1.10	104.53	0.00	105.63	0.00	0.00	0.00
8	I2-5	103.93	106.33	2.40	103.93	0.00	106.33	0.00	0.00	0.00
9	I2-6	104.12	106.44	2.32	104.12	0.00	106.44	0.00	0.00	0.00
10	I3-1	104.65	105.75	1.10	104.65	0.00	105.75	0.00	0.00	0.00
11	I3-2	104.67	105.77	1.10	104.67	0.00	105.77	0.00	0.00	0.00
12	I4-1	104.12	105.22	1.10	104.12	0.00	105.22	0.00	0.00	0.00
13	I4-2	104.14	105.24	1.10	104.14	0.00	105.24	0.00	0.00	0.00
14	I4-3	103.54	109.37	5.83	103.54	0.00	109.37	0.00	0.00	0.00
15	I4-4	103.58	104.68	1.10	103.58	0.00	104.68	0.00	0.00	0.00
16	I4-5	102.85	109.00	6.15	102.85	0.00	109.00	0.00	0.00	0.00
17	S1-1	100.22	106.80	6.58	100.22	0.00	106.80	0.00	0.00	0.00
18	S2-1	104.61	109.15	4.54	104.61	0.00	109.15	0.00	0.00	0.00
19	S2-2	104.10	109.82	5.72	104.10	0.00	109.82	0.00	0.00	0.00
20	S2-3	103.69	110.30	6.61	103.69	0.00	110.30	0.00	0.00	0.00
21	S3-1	104.12	109.06	4.94	104.12	0.00	109.06	0.00	0.00	0.00
22	S4-1	103.59	109.13	5.54	103.59	0.00	109.13	0.00	0.00	0.00
23	S4-2	103.57	109.55	5.98	103.57	0.00	109.55	0.00	0.00	0.00

Junction Results

SN	Element ID	Peak Inflow (cfs)	Peak Lateral Inflow (cfs)	Max HGL Elevation Attained (ft)	Max HGL Depth Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Average HGL Elevation Attained (ft)	Average HGL Depth Attained (ft)	Time of Max HGL Occurrence (days hh:mm)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	ARCTIC-N	0.94	0.00	104.13	1.43	0.00	4.57	103.69	0.99	0 12:27	0 00:00	0.00	0.00
2	ARCTIC-S	1.70	0.00	103.96	0.45	0.00	5.55	103.73	0.22	0 12:23	0 00:00	0.00	0.00
3	I1-1	1.64	1.64	102.67	1.19	0.00	0.53	102.33	0.85	0 12:30	0 00:00	0.00	0.00
4	I2-1	0.15	0.15	105.38	0.65	0.00	0.78	105.21	0.48	0 12:20	0 00:00	0.00	0.00
5	I2-2	0.19	0.19	105.43	0.67	0.00	0.76	105.24	0.48	0 12:20	0 00:00	0.00	0.00
6	I2-3	0.17	0.17	105.34	1.00	0.00	0.84	105.16	0.82	0 12:20	0 00:00	0.00	0.00
7	I2-4	0.16	0.16	105.32	0.79	0.00	0.86	105.18	0.65	0 12:25	0 00:00	0.00	0.00
8	I2-5	0.04	0.04	105.48	1.55	0.00	0.93	105.23	1.30	0 12:15	0 00:00	0.00	0.00
9	I2-6	0.26	0.26	105.60	1.48	0.00	0.84	105.39	1.27	0 12:10	0 00:00	0.00	0.00
10	I3-1	0.10	0.10	105.32	0.67	0.00	0.83	105.18	0.53	0 12:25	0 00:00	0.00	0.00
11	I3-2	0.13	0.13	105.36	0.69	0.00	0.81	105.21	0.54	0 12:25	0 00:00	0.00	0.00
12	I4-1	0.12	0.12	104.54	0.42	0.00	0.89	104.46	0.34	0 12:25	0 00:00	0.00	0.00
13	I4-2	0.37	0.37	104.66	0.52	0.00	0.77	104.50	0.36	0 12:30	0 00:00	0.00	0.00
14	I4-3	0.16	0.10	105.03	1.49	0.00	4.33	104.80	1.26	0 07:30	0 00:00	0.00	0.00
15	I4-4	0.24	0.24	105.04	1.46	0.00	0.82	104.81	1.23	0 12:15	0 00:00	0.00	0.00
16	I4-5	0.27	0.27	106.17	3.32	0.00	2.83	105.80	2.95	0 12:10	0 00:00	0.00	0.00
17	S1-1	2.20	1.15	101.16	0.94	0.00	5.65	100.60	0.38	0 12:15	0 00:00	0.00	0.00
18	S2-1	0.35	0.00	105.32	0.71	0.00	3.83	105.12	0.51	0 12:20	0 00:00	0.00	0.00
19	S2-2	0.67	0.00	104.96	0.86	0.00	4.86	104.66	0.56	0 12:21	0 00:00	0.00	0.00
20	S2-3	0.80	0.00	104.59	0.90	0.00	5.72	104.26	0.57	0 12:21	0 00:00	0.00	0.00
21	S3-1	0.23	0.00	105.19	1.07	0.00	3.88	105.01	0.89	0 12:25	0 00:00	0.00	0.00
22	S4-1	0.70	0.00	104.45	0.86	0.00	4.68	104.20	0.61	0 12:30	0 00:00	0.00	0.00
23	S4-2	0.87	0.00	104.20	0.63	0.00	5.35	103.81	0.24	0 12:26	0 00:00	0.00	0.00

Pipe Input

SN	Element ID	Length (ft)	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Slope (%)	Pipe Shape	Pipe Diameter or Height (in)	Pipe Width (in)	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow (cfs)	Flap Gate	No. of Barrels
1	ARCTIC-N	293.58	99.01	-3.69	97.54	-5.97	1.47	0.5000	CIRCULAR	24.000	24.000	0.0300	0.5000	1.0000	0.0000	0.00	No	1
2	ARCTIC-S	379.64	97.46	-6.05	96.34	0.00	1.12	0.3000	CIRCULAR	30.000	30.000	0.0300	0.5000	1.0000	0.0000	0.00	No	1
3	P1-1	26.95	102.20	0.72	101.66	1.44	0.54	2.0000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No	1
4	P1-2	133.98	100.22	0.00	99.81	0.00	0.41	0.3100	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No	1
5	P2-1	6.65	105.16	0.43	105.14	0.53	0.02	0.3000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.9000	0.0000	0.00	No	1
6	P2-10	44.52	104.08	0.39	103.94	0.43	0.14	0.3100	CIRCULAR	12.000	12.000	0.0120	0.5000	1.0000	0.0000	0.00	No	1
7	P2-2	16.35	105.19	0.43	105.14	0.53	0.05	0.3100	CIRCULAR	12.000	12.000	0.0120	0.5000	0.9000	0.0000	0.00	No	1
8	P2-3	134.66	105.04	0.43	104.63	0.53	0.41	0.3000	CIRCULAR	12.000	12.000	0.0120	0.5000	1.0000	0.0000	0.00	No	1
9	P2-4	6.65	105.18	0.84	105.04	0.94	0.14	2.1100	CIRCULAR	12.000	12.000	0.0120	0.5000	1.0000	0.0000	0.00	No	1
10	P2-5	16.35	105.18	0.65	104.85	0.75	0.33	2.0200	CIRCULAR	12.000	12.000	0.0120	0.5000	1.0000	0.0000	0.00	No	1
11	P2-6	115.54	104.53	0.43	104.18	0.49	0.35	0.3000	CIRCULAR	12.000	12.000	0.0120	0.5000	1.0000	0.0000	0.00	No	1
12	P2-7	8.71	105.41	1.48	105.23	1.54	0.18	2.0700	CIRCULAR	12.000	12.000	0.0120	0.5000	1.0000	0.0000	0.00	No	1
13	P2-8	16.38	105.42	1.30	105.09	1.40	0.33	2.0100	CIRCULAR	12.000	12.000	0.0120	0.5000	1.0000	0.0000	0.00	No	1
14	P3-1	9.29	105.15	0.50	105.12	1.00	0.03	0.3200	CIRCULAR	12.000	12.000	0.0120	0.5000	0.9000	0.0000	0.00	No	1
15	P3-2	13.71	105.17	0.50	105.12	1.00	0.05	0.3600	CIRCULAR	12.000	12.000	0.0120	0.5000	0.9000	0.0000	0.00	No	1
16	P3-3	143.29	105.02	0.90	104.16	0.57	0.86	0.6000	CIRCULAR	18.000	18.000	0.0120	0.5000	1.0000	0.0000	0.00	No	1
17	P4-1	9.25	104.43	0.31	104.24	0.65	0.19	2.0500	CIRCULAR	12.000	12.000	0.0120	0.5000	1.0000	0.0000	0.00	No	1
18	P4-2	13.75	104.43	0.29	104.16	0.57	0.27	1.9600	CIRCULAR	12.000	12.000	0.0120	0.5000	1.0000	0.0000	0.00	No	1
19	P4-3	153.04	104.06	0.47	103.14	-0.43	0.92	0.6000	CIRCULAR	12.000	12.000	0.0120	0.5000	1.0000	0.0000	0.00	No	1
20	P4-4	9.16	104.86	1.29	104.67	1.13	0.19	2.0700	CIRCULAR	12.000	12.000	0.0120	0.5000	1.0000	0.0000	0.00	No	1
21	P4-5	13.84	104.86	1.28	104.58	1.01	0.28	2.0200	CIRCULAR	12.000	12.000	0.0120	0.5000	1.0000	0.0000	0.00	No	1
22	P4-6	110.93	103.04	-0.53	102.70	0.00	0.34	0.3100	CIRCULAR	12.000	12.000	0.0120	0.5000	1.0000	0.0000	0.00	No	1
23	P4-7	49.20	106.01	3.16	105.02	2.32	0.99	2.0100	CIRCULAR	12.000	12.000	0.0120	0.5000	0.5000	0.0000	0.00	No	1

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	ARCTIC-N	0.94	0 12:28	5.15	0.18	0.65	7.53	0.94	0.47	0.00		Calculated
2	ARCTIC-S	1.70	0 12:23	24.43	0.07	2.84	2.23	0.45	0.18	0.00		Calculated
3	P1-1	1.64	0 12:30	5.46	0.30	5.17	0.09	0.43	0.43	0.00		Calculated
4	P1-2	2.19	0 12:15	2.14	1.03	3.32	0.67	0.78	0.79	0.00		> CAPACITY
5	P2-1	0.15	0 12:21	2.12	0.07	1.49	0.07	0.20	0.20	0.00		Calculated
6	P2-10	0.80	0 12:21	2.16	0.37	2.40	0.31	0.44	0.44	0.00		Calculated
7	P2-2	0.19	0 12:20	2.13	0.09	1.62	0.17	0.21	0.21	0.00		Calculated
8	P2-3	0.35	0 12:20	2.13	0.16	1.78	1.26	0.30	0.30	0.00		Calculated
9	P2-4	0.17	0 12:20	5.60	0.03	2.52	0.04	0.14	0.14	0.00		Calculated
10	P2-5	0.16	0 12:25	5.48	0.03	2.75	0.10	0.13	0.13	0.00		Calculated
11	P2-6	0.67	0 12:21	2.12	0.31	2.17	0.89	0.41	0.42	0.00		Calculated
12	P2-7	0.04	0 12:15	5.55	0.01	1.84	0.08	0.06	0.06	0.00		Calculated
13	P2-8	0.26	0 12:10	5.48	0.05	3.06	0.09	0.17	0.17	0.00		Calculated
14	P3-1	0.10	0 12:25	2.19	0.04	1.35	0.11	0.15	0.15	0.00		Calculated
15	P3-2	0.13	0 12:25	2.33	0.06	1.50	0.15	0.17	0.17	0.00		Calculated
16	P3-3	0.23	0 12:25	8.82	0.03	1.45	1.65	0.23	0.15	0.00		Calculated
17	P4-1	0.12	0 12:30	5.53	0.02	1.99	0.08	0.16	0.16	0.00		Calculated
18	P4-2	0.37	0 12:30	5.41	0.07	2.39	0.10	0.26	0.26	0.00		Calculated
19	P4-3	0.70	0 12:30	2.18	0.32	1.76	1.45	0.51	0.51	0.00		Calculated
20	P4-4	0.27	0 10:33	5.56	0.05	3.99	0.04	0.22	0.22	0.00		Calculated
21	P4-5	0.24	0 12:15	5.49	0.04	2.96	0.08	0.16	0.16	0.00		Calculated
22	P4-6	0.87	0 12:27	3.42	0.25	1.26	1.47	0.81	0.82	0.00		Calculated
23	P4-7	0.27	0 12:10	5.48	0.05	3.47	0.24	0.15	0.15	0.00		Calculated

Proposed Stormwater System
SSA Report & Results – Alternative 2

Project Description

File Name ..... SSA_Norann_Proposed-Alt2.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 ..... Hydrodynamic
Enable Overflow Ponding at Nodes ..... YES
Skip Steady State Analysis Time Periods ..... NO

Analysis Options

Start Analysis On	00:00:00	0:00:00
End Analysis On	00:00:00	0:00:00
Start Reporting On	00:00:00	0:00:00
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.....	20
Nodes.....	37
Junctions	36
Outfalls	1
Flow Diversions	0
Inlets	0
Storage Nodes	0
Links.....	36
Channels	0
Pipes	36
Pumps	0
Orifices	0
Weirs	0
Outlets	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-yr	Cumulative	inches					User Defined

Subbasin Summary

SN	Subbasin ID	Area (ac)	Peak Rate Factor	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	P-1	0.54	484.00	88.25	2.28	1.21	0.65	0.47	0 00:07:38
2	P-10	0.29	484.00	89.42	2.28	1.29	0.37	0.17	0 00:23:39
3	P-11	0.31	484.00	89.42	2.28	1.29	0.40	0.17	0 00:26:58
4	P-12	0.04	484.00	91.50	2.28	1.41	0.06	0.03	0 00:12:42
5	P-13	0.26	484.00	93.58	2.28	1.62	0.42	0.31	0 00:06:10
6	P-14	0.20	484.00	91.50	2.28	1.45	0.29	0.11	0 00:34:13
7	P-15	0.20	484.00	91.50	2.28	1.45	0.29	0.12	0 00:26:40
8	P-16	0.23	484.00	91.50	2.28	1.45	0.33	0.12	0 00:36:33
9	P-17	0.95	484.00	86.30	2.28	1.09	1.03	0.38	0 00:35:00
10	P-18	0.17	484.00	91.50	2.28	1.45	0.25	0.11	0 00:25:51
11	P-19	0.26	484.00	91.50	2.28	1.45	0.38	0.28	0 00:07:03
12	P-2	1.94	484.00	88.25	2.28	1.21	2.35	0.91	0 00:31:31
13	P-20	0.24	484.00	93.58	2.28	1.62	0.40	0.29	0 00:05:56
14	P-3	0.06	484.00	85.00	2.28	0.99	0.06	0.03	0 00:20:25
15	P-4	0.23	484.00	91.50	2.28	1.45	0.33	0.11	0 00:43:52
16	P-5	1.38	484.00	85.00	2.28	1.01	1.39	0.43	0 00:46:39
17	P-6	0.43	484.00	91.50	2.28	1.45	0.63	0.28	0 00:24:54
18	P-7	0.46	484.00	91.50	2.28	1.45	0.66	0.28	0 00:26:06
19	P-8	0.26	484.00	89.42	2.28	1.29	0.34	0.15	0 00:24:22
20	P-9	0.31	484.00	89.42	2.28	1.29	0.40	0.20	0 00:18:36

Node Summary

SN	Element ID	Element Type	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Initial Water Elevation (ft)	Surcharge Elevation (ft)	Ponded Area (ft^2)	Peak Inflow (cfs)	Max HGL Elevation Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	Footing Drain - Parcel 38	Junction	105.99	106.56	105.99	106.56	0.00	0.00	105.99	0.00	0.57	0 00:00	0.00	0.00
2	Footing Drain - Parcel 39	Junction	105.59	106.16	105.59	106.16	0.00	0.00	105.59	0.00	0.57	0 00:00	0.00	0.00
3	I1-1	Junction	102.16	107.36	103.66	107.36	0.00	0.91	104.25	0.00	3.10	0 00:00	0.00	0.00
4	I1-2	Junction	102.16	107.12	103.66	107.12	0.00	0.41	104.12	0.00	3.00	0 00:00	0.00	0.00
5	I1-3	Junction	101.91	107.32	103.41	107.32	0.00	0.03	103.85	0.00	3.46	0 00:00	0.00	0.00
6	I1-4	Junction	101.51	107.15	103.01	107.15	0.00	0.43	103.69	0.00	3.46	0 00:00	0.00	0.00
7	I1-5	Junction	101.49	106.91	102.99	106.91	0.00	0.11	103.68	0.00	3.24	0 00:00	0.00	0.00
8	I1-6	Junction	101.74	107.75	103.24	107.75	0.00	0.27	103.43	0.00	4.31	0 00:00	0.00	0.00
9	I1-7	Junction	101.51	107.51	103.01	107.51	0.00	0.28	103.44	0.00	4.07	0 00:00	0.00	0.00
10	I2-1	Junction	103.38	109.39	104.88	109.39	0.00	0.15	105.02	0.00	4.37	0 00:00	0.00	0.00
11	I2-2	Junction	103.38	109.39	104.88	109.39	0.00	0.20	105.04	0.00	4.35	0 00:00	0.00	0.00
12	I2-3	Junction	104.00	110.01	105.50	110.01	0.00	0.17	105.65	0.00	4.36	0 00:00	0.00	0.00
13	I2-4	Junction	104.00	110.01	105.50	110.01	0.00	0.17	105.65	0.00	4.36	0 00:00	0.00	0.00
14	I2-5	Junction	103.82	109.83	105.32	109.83	0.00	0.03	105.38	0.00	4.45	0 00:00	0.00	0.00
15	I2-6	Junction	103.96	109.96	105.46	109.96	0.00	0.27	105.65	0.00	4.31	0 00:00	0.00	0.00
16	I3-1	Junction	103.65	109.43	105.15	109.43	0.00	0.11	105.33	0.00	4.10	0 00:00	0.00	0.00
17	I3-2	Junction	103.69	109.43	105.19	109.43	0.00	0.12	105.37	0.00	4.05	0 00:00	0.00	0.00
18	I4-1	Junction	103.62	109.62	105.12	109.62	0.00	0.12	105.26	0.00	4.36	0 00:00	0.00	0.00
19	I4-2	Junction	103.62	109.62	105.12	109.62	0.00	0.37	105.34	0.00	4.28	0 00:00	0.00	0.00
20	I4-3	Junction	103.63	109.64	105.13	109.64	0.00	0.11	105.26	0.00	4.38	0 00:00	0.00	0.00
21	I4-4	Junction	103.63	109.64	105.13	109.64	0.00	0.24	105.30	0.00	4.34	0 00:00	0.00	0.00
22	I4-5	Junction	104.44	110.44	105.94	110.44	0.00	0.27	106.10	0.00	4.34	0 00:00	0.00	0.00
23	S1-1	Junction	102.02	107.13	103.52	107.13	0.00	1.05	104.11	0.00	3.02	0 00:00	0.00	0.00
24	S1-2	Junction	101.74	107.51	103.24	107.51	0.00	1.07	103.85	0.00	3.66	0 00:00	0.00	0.00
25	S1-3	Junction	101.36	106.86	102.86	106.86	0.00	1.54	103.68	0.00	3.18	0 00:00	0.00	0.00
26	S1-4	Junction	101.02	107.45	102.52	107.45	0.00	2.04	103.43	0.00	4.02	0 00:00	0.00	0.00
27	S1-5	Junction	100.71	108.00	102.21	108.00	0.00	2.04	103.05	0.00	4.95	0 00:00	0.00	0.00
28	S2-1	Junction	99.60	109.24	101.10	109.24	0.00	2.32	101.93	0.00	7.31	0 00:00	0.00	0.00
29	S2-2	Junction	99.09	109.86	100.59	109.86	0.00	2.64	101.52	0.00	8.33	0 00:00	0.00	0.00
30	S2-3	Junction	98.64	110.15	100.14	110.15	0.00	2.72	101.11	0.00	9.04	0 00:00	0.00	0.00
31	S3-1	Junction	103.53	109.17	105.03	109.17	0.00	0.23	105.22	0.00	3.96	0 00:00	0.00	0.00
32	S4-1	Junction	102.51	109.37	104.01	109.37	0.00	0.71	104.37	0.00	5.00	0 00:00	0.00	0.00
33	S4-2	Junction	101.54	109.38	103.04	109.38	0.00	0.87	103.24	0.00	6.14	0 00:00	0.00	0.00
34	SD1929-34	Junction	95.60	110.42	95.60	110.42	0.00	0.94	99.52	0.00	10.90	0 00:00	0.00	0.00
35	SD1930-039	Junction	95.79	110.36	95.79	110.36	0.00	3.65	98.64	0.00	11.72	0 00:00	0.00	0.00
36	SD1930-091	Junction	96.43	109.89	96.43	109.89	0.00	0.95	98.69	0.00	11.20	0 00:00	0.00	0.00
37	SD1929-117	Outfall	94.67					3.60	94.67					

Link Summary

SN	Element ID	Element Type	From (Inlet) Node	To (Outlet) Node	Length	Inlet Invert Elevation	Outlet Invert Elevation	Average Slope	Diameter or Height	Manning's Roughness	Peak Flow	Design Flow Capacity	Peak Flow/ Design Flow Ratio	Peak Flow Velocity	Peak Flow Depth	Peak Flow Depth/ Total Depth Ratio	Total Time Surcharged	Reported Condition
					(ft)	(ft)	(ft)	(%)	(in)		(cfs)	(cfs)		(ft/sec)	(ft)		(min)	
1	P1-1	Pipe	I1-1	S1-1	11.50	103.66	103.62	0.3500	12.000	0.0120	0.91	2.28	0.40	2.12	0.54	0.54	0.00	Calculated
2	P1-10	Pipe	I1-7	S1-4	9.50	103.01	102.82	2.0000	12.000	0.0120	0.28	5.46	0.05	2.09	0.52	0.52	0.00	Calculated
3	P1-11	Pipe	S1-4	S1-5	69.71	102.52	102.31	0.3000	12.000	0.0120	2.04	2.12	0.96	2.97	0.82	0.83	0.00	Calculated
4	P1-12	Pipe	S1-5	S2-1	288.00	102.21	101.20	0.3500	12.000	0.0120	2.03	2.29	0.89	3.10	0.78	0.78	0.00	Calculated
5	P1-2	Pipe	I1-2	S1-1	11.50	103.66	103.62	0.3500	12.000	0.0120	0.41	2.28	0.18	1.34	0.47	0.47	0.00	Calculated
6	P1-3	Pipe	S1-1	S1-2	58.57	103.52	103.34	0.3100	12.000	0.0120	1.05	2.14	0.49	2.46	0.55	0.55	0.00	Calculated
7	P1-4	Pipe	I1-3	S1-2	21.10	103.41	103.34	0.3300	12.000	0.0120	0.03	2.22	0.01	0.21	0.47	0.48	0.00	Calculated
8	P1-5	Pipe	S1-2	S1-3	91.29	103.24	102.96	0.3100	12.000	0.0120	1.07	2.14	0.50	2.20	0.66	0.66	0.00	Calculated
9	P1-6	Pipe	I1-4	S1-3	13.50	103.01	102.96	0.3700	12.000	0.0120	0.43	2.35	0.18	1.07	0.70	0.70	0.00	Calculated
10	P1-7	Pipe	I1-5	S1-3	9.50	102.99	102.96	0.3200	12.000	0.0120	0.11	2.17	0.05	0.76	0.70	0.70	0.00	Calculated
11	P1-8	Pipe	S1-3	S1-4	78.90	102.86	102.62	0.3000	12.000	0.0120	1.54	2.13	0.72	2.32	0.81	0.82	0.00	Calculated
12	P1-9	Pipe	I1-6	S1-4	13.63	103.24	102.96	2.0500	12.000	0.0120	0.27	5.53	0.05	2.51	0.33	0.33	0.00	Calculated
13	P2-1	Pipe	I2-1	S2-1	10.65	104.88	104.66	2.0700	12.000	0.0120	0.15	5.55	0.03	2.58	0.13	0.13	0.00	Calculated
14	P2-10	Pipe	S2-3	SD1930-039	44.52	100.14	100.00	0.3100	15.000	0.0120	2.72	3.92	0.69	3.22	0.81	0.65	0.00	Calculated
15	P2-11	Pipe	Footing Drain - Parcel 38	I2-6	8.97	105.99	105.96	0.3300	6.000	0.0120	0.00	0.35	0.00	0.00	0.00	0.00	0.00	Calculated
16	P2-2	Pipe	I2-2	S2-1	12.35	104.88	104.63	2.0200	12.000	0.0120	0.20	5.49	0.04	2.79	0.15	0.15	0.00	Calculated
17	P2-3	Pipe	S2-1	S2-2	134.66	101.10	100.69	0.3000	15.000	0.0120	2.32	3.86	0.60	2.68	0.83	0.67	0.00	Calculated
18	P2-4	Pipe	I2-3	S2-2	10.65	105.50	105.28	2.0700	12.000	0.0120	0.16	5.55	0.03	2.65	0.13	0.13	0.00	Calculated
19	P2-5	Pipe	I2-4	S2-2	12.35	105.50	105.25	2.0200	12.000	0.0120	0.17	5.49	0.03	2.70	0.13	0.13	0.00	Calculated
20	P2-6	Pipe	S2-2	S2-3	115.54	100.59	100.24	0.3000	15.000	0.0120	2.63	3.85	0.68	2.78	0.89	0.72	0.00	Calculated
21	P2-7	Pipe	I2-5	S2-3	12.71	105.32	105.06	2.0500	12.000	0.0120	0.03	5.52	0.01	1.80	0.06	0.06	0.00	Calculated
22	P2-8	Pipe	I2-6	S2-3	12.38	105.46	105.21	2.0200	12.000	0.0120	0.27	5.49	0.05	2.98	0.17	0.17	0.00	Calculated
23	P2-9	Pipe	Footing Drain - Parcel 39	I2-5	13.18	105.59	105.55	0.3000	6.000	0.0120	0.00	0.33	0.00	0.00	0.00	0.00	0.00	Calculated
24	P3-1	Pipe	I3-1	S3-1	5.29	105.15	105.13	0.3800	12.000	0.0120	0.11	2.37	0.04	1.38	0.15	0.15	0.00	Calculated
25	P3-2	Pipe	I3-2	S3-1	17.71	105.19	105.13	0.3400	12.000	0.0120	0.12	2.25	0.05	1.47	0.16	0.16	0.00	Calculated
26	P3-3	Pipe	S3-1	S4-1	152.79	105.03	104.11	0.6000	12.000	0.0120	0.22	3.00	0.07	1.86	0.22	0.22	0.00	Calculated
27	P4-1	Pipe	I4-1	S4-1	5.25	105.12	105.01	2.1000	12.000	0.0120	0.12	5.59	0.02	2.22	0.12	0.12	0.00	Calculated
28	P4-2	Pipe	I4-2	S4-1	17.75	105.12	104.76	2.0300	12.000	0.0120	0.37	5.50	0.07	3.34	0.20	0.20	0.00	Calculated
29	P4-3	Pipe	S4-1	S4-2	143.54	104.01	103.14	0.6100	12.000	0.0120	0.71	3.00	0.24	2.97	0.34	0.34	0.00	Calculated
30	P4-4	Pipe	I4-3	S4-2	5.16	105.13	105.02	2.1300	12.000	0.0120	0.11	5.63	0.02	2.18	0.11	0.11	0.00	Calculated
31	P4-5	Pipe	I4-4	S4-2	17.84	105.13	104.77	2.0200	12.000	0.0120	0.24	5.48	0.04	3.02	0.15	0.16	0.00	Calculated
32	P4-6	Pipe	S4-2	SD1929-34	110.93	103.04	95.60	6.7000	12.000	0.0120	0.87	9.99	0.09	1.78	0.60	0.60	0.00	Calculated
33	P4-7	Pipe	I4-5	SD1929-34	45.52	105.94	105.02	2.0200	12.000	0.0120	0.26	5.49	0.05	3.37	0.16	0.16	0.00	Calculated
34	PIPE22034	Pipe	SD1930-039	SD1929-117	379.97	97.46	96.34	0.2900	30.000	0.0250	3.60	11.58	0.31	2.25	0.90	0.36	0.00	Calculated
35	PIPE23630	Pipe	SD1929-34	SD1930-091	133.93	99.01	98.27	0.5500	24.000	0.0250	0.95	8.74	0.11	1.94	0.44	0.22	0.00	Calculated
36	PIPE27968	Pipe	SD1930-091	SD1930-039	155.66	98.10	97.54	0.3600	30.000	0.0250	0.94	12.79	0.07	0.87	0.85	0.34	0.00	Calculated

Subbasin Hydrology

Subbasin : P-1

Input Data

Area (ac) 0.54
Peak Rate Factor 484
Weighted Curve Number 88.25
Rain Gage ID ..... Rain Gage-01

Composite Curve Number

32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
1/8 acre lots, 65% impervious	0.4	B	85
Paved roads with curbs & sewers	0.13	B	98
Composite Area & Weighted CN	0.53		88.25

Time of Concentration

TOC Method : SCS TR-55

Sheet Flow Equation :

Tc = (0.007 * ((n * Lf)^0.8)) / ((P^0.5) * (Sf^0.4))

Where :

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

Shallow Concentrated Flow Equation :

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

Where:

Tc = Time of Concentration (hr)
Lf = Flow Length (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)

Channel Flow Equation :

V = (1.49 * (R^(2/3)) * (Sf^0.5)) / n
R = Aq / Wp
Tc = (Lf / V) / (3600 sec/hr)

Where :

Tc = Time of Concentration (hr)
Lf = Flow Length (ft)
R = Hydraulic Radius (ft)
Aq = Flow Area (ft^2)
Wp = Wetted Perimeter (ft)
V = Velocity (ft/sec)
Sf = Slope (ft/ft)
n = Manning's roughness

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.015	0	0
Flow Length (ft) :	150	0	0
Slope (%) :	0.5	0	0
2 yr, 24 hr Rainfall (in) :	1.4	0	0
Velocity (ft/sec) :	0.44	0	0
Computed Flow Time (min) :	5.65	0	0

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	209.32	0	0
Slope (%) :	0.75	0	0
Surface Type :	Paved	Unpaved	Unpaved
Velocity (ft/sec) :	1.76	0	0
Computed Flow Time (min) :	1.98	0	0

Total TOC (min) 7.64

Subbasin Runoff Results

Total Rainfall (in)	2.28
Total Runoff (in)	1.21
Peak Runoff (cfs)	0.47
Weighted Curve Number	88.25
Time of Concentration (days hh:mm:ss)	0 00:07:38

Subbasin : P-10

Input Data

Area (ac)	0.29
Peak Rate Factor	484
Weighted Curve Number	89.42
Rain Gage ID	Rain Gage-01

Composite Curve Number

32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
1/8 acre lots, 65% impervious	0.19	B	85
Paved roads with curbs & sewers	0.1	B	98
Composite Area & Weighted CN	0.29		89.42

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.2	0	0
Flow Length (ft) :	125.2	0	0
Slope (%) :	1.73	0	0
2 yr, 24 hr Rainfall (in) :	1.4	0	0
Velocity (ft/sec) :	0.09	0	0
Computed Flow Time (min) :	23.65	0	0

Total TOC (min) 23.65

Subbasin Runoff Results

Total Rainfall (in)	2.28
Total Runoff (in)	1.29
Peak Runoff (cfs)	0.17
Weighted Curve Number	89.42
Time of Concentration (days hh:mm:ss)	0 00:23:39

Subbasin : P-11

Input Data

Area (ac)	0.31
Peak Rate Factor	484
Weighted Curve Number	89.42
Rain Gage ID	Rain Gage-01

Composite Curve Number

32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
1/8 acre lots, 65% impervious	0.21	B	85
Paved roads with curbs & sewers	0.11	B	98
Composite Area & Weighted CN	0.32		89.42

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.2	0	0
Flow Length (ft) :	150	0	0
Slope (%) :	1.87	0	0
2 yr, 24 hr Rainfall (in) :	1.4	0	0
Velocity (ft/sec) :	0.09	0	0
Computed Flow Time (min) :	26.49	0	0

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	44.3	0	0
Slope (%) :	0.55	0	0
Surface Type :	Paved	Unpaved	Unpaved
Velocity (ft/sec) :	1.51	0	0
Computed Flow Time (min) :	0.49	0	0

Total TOC (min) 26.98

Subbasin Runoff Results

Total Rainfall (in)	2.28
Total Runoff (in)	1.29
Peak Runoff (cfs)	0.17
Weighted Curve Number	89.42
Time of Concentration (days hh:mm:ss)	0 00:26:59

Subbasin : P-12

Input Data

Area (ac)	0.04
Peak Rate Factor	484
Weighted Curve Number	91.5
Rain Gage ID	Rain Gage-01

Composite Curve Number

32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
1/8 acre lots, 65% impervious	0.02	B	85
Paved roads with curbs & sewers	0.02	B	98
Composite Area & Weighted CN	0.04		91.5

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.2	0	0
Flow Length (ft) :	59.8	0	0
Slope (%) :	1.87	0	0
2 yr, 24 hr Rainfall (in) :	1.4	0	0
Velocity (ft/sec) :	0.08	0	0
Computed Flow Time (min) :	12.7	0	0

Total TOC (min) 12.70

Subbasin Runoff Results

Total Rainfall (in)	2.28
Total Runoff (in)	1.41
Peak Runoff (cfs)	0.03
Weighted Curve Number	91.5
Time of Concentration (days hh:mm:ss)	0 00:12:42

Subbasin : P-13

Input Data

Area (ac)	0.26
Peak Rate Factor	484
Weighted Curve Number	93.58
Rain Gage ID	Rain Gage-01

Composite Curve Number

32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
1/8 acre lots, 65% impervious	0.09	B	85
Paved roads with curbs & sewers	0.17	B	98
Composite Area & Weighted CN	0.26		93.58

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.015	0	0
Flow Length (ft) :	150	0	0
Slope (%) :	0.78	0	0
2 yr, 24 hr Rainfall (in) :	1.4	0	0
Velocity (ft/sec) :	0.53	0	0
Computed Flow Time (min) :	4.73	0	0

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	104.21	0	0
Slope (%) :	0.35	0	0
Surface Type :	Paved	Unpaved	Unpaved
Velocity (ft/sec) :	1.2	0	0
Computed Flow Time (min) :	1.45	0	0

Total TOC (min) 6.18

Subbasin Runoff Results

Total Rainfall (in)	2.28
Total Runoff (in)	1.62
Peak Runoff (cfs)	0.31
Weighted Curve Number	93.58
Time of Concentration (days hh:mm:ss)	0 00:06:11

Subbasin : P-14

Input Data

Area (ac)	0.2
Peak Rate Factor	484
Weighted Curve Number	91.5
Rain Gage ID	Rain Gage-01

Composite Curve Number

32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
1/8 acre lots, 65% impervious	0.1	B	85
Paved roads with curbs & sewers	0.1	B	98
Composite Area & Weighted CN	0.2		91.5

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.2	0	0
Flow Length (ft) :	150	0	0
Slope (%) :	1.05	0	0
2 yr, 24 hr Rainfall (in) :	1.4	0	0
Velocity (ft/sec) :	0.07	0	0
Computed Flow Time (min) :	33.37	0	0

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	83.03	0	0
Slope (%) :	0.65	0	0
Surface Type :	Paved	Unpaved	Unpaved
Velocity (ft/sec) :	1.64	0	0
Computed Flow Time (min) :	0.84	0	0

Total TOC (min) 34.22

Subbasin Runoff Results

Total Rainfall (in)	2.28
Total Runoff (in)	1.45
Peak Runoff (cfs)	0.11
Weighted Curve Number	91.5
Time of Concentration (days hh:mm:ss)	0 00:34:13

Subbasin : P-15

Input Data

Area (ac)	0.2
Peak Rate Factor	484
Weighted Curve Number	91.5
Rain Gage ID	Rain Gage-01

Composite Curve Number

32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
1/8 acre lots, 65% impervious	0.1	B	85
Paved roads with curbs & sewers	0.1	B	98
Composite Area & Weighted CN	0.2		91.5

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.2	0	0
Flow Length (ft) :	150	0	0
Slope (%) :	1.9	0	0
2 yr, 24 hr Rainfall (in) :	1.4	0	0
Velocity (ft/sec) :	0.09	0	0
Computed Flow Time (min) :	26.33	0	0

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	45.52	0	0
Slope (%) :	1.19	0	0
Surface Type :	Paved	Unpaved	Unpaved
Velocity (ft/sec) :	2.22	0	0
Computed Flow Time (min) :	0.34	0	0

Total TOC (min) 26.67

Subbasin Runoff Results

Total Rainfall (in)	2.28
Total Runoff (in)	1.45
Peak Runoff (cfs)	0.12
Weighted Curve Number	91.5
Time of Concentration (days hh:mm:ss)	0 00:26:40

Subbasin : P-16

Input Data

Area (ac)	0.23
Peak Rate Factor	484
Weighted Curve Number	91.5
Rain Gage ID	Rain Gage-01

Composite Curve Number

32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
1/8 acre lots, 65% impervious	0.01	B	85
Paved roads with curbs & sewers	0.01	B	98
Composite Area & Weighted CN	0.02		91.5

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.2	0	0
Flow Length (ft) :	150	0	0
Slope (%) :	0.89	0	0
2 yr, 24 hr Rainfall (in) :	1.4	0	0
Velocity (ft/sec) :	0.07	0	0
Computed Flow Time (min) :	35.66	0	0

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	95.11	0	0
Slope (%) :	0.76	0	0
Surface Type :	Paved	Unpaved	Unpaved
Velocity (ft/sec) :	1.77	0	0
Computed Flow Time (min) :	0.9	0	0

Total TOC (min) 36.55

Subbasin Runoff Results

Total Rainfall (in)	2.28
Total Runoff (in)	1.45
Peak Runoff (cfs)	0.12
Weighted Curve Number	91.5
Time of Concentration (days hh:mm:ss)	0 00:36:33

Subbasin : P-17

Input Data

Area (ac)	0.95
Peak Rate Factor	484
Weighted Curve Number	86.3
Rain Gage ID	Rain Gage-01

Composite Curve Number

32 Soil/Surface Description	Area (acres)	Soil Group	Curve Number
1/8 acre lots, 65% impervious	0.85	B	85
Paved roads with curbs & sewers	0.09	B	98
Composite Area & Weighted CN	0.94		86.3

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.2	0	0
Flow Length (ft) :	150	0	0
Slope (%) :	1.25	0	0
2 yr, 24 hr Rainfall (in) :	1.4	0	0
Velocity (ft/sec) :	0.08	0	0
Computed Flow Time (min) :	31.13	0	0

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	335.66	0	0
Slope (%) :	0.8	0	0
Surface Type :	Unpaved	Unpaved	Unpaved
Velocity (ft/sec) :	1.44	0	0
Computed Flow Time (min) :	3.88	0	0

Total TOC (min) 35.01

Subbasin Runoff Results

Total Rainfall (in)	2.28
Total Runoff (in)	1.09
Peak Runoff (cfs)	0.38
Weighted Curve Number	86.3
Time of Concentration (days hh:mm:ss)	0 00:35:01

Subbasin : P-18

Input Data

Area (ac)	0.17
Peak Rate Factor	484
Weighted Curve Number	91.5
Rain Gage ID	Rain Gage-01

Composite Curve Number

32	Area	Soil	Curve
Soil/Surface Description	(acres)	Group	Number
1/8 acre lots, 65% impervious	0.09	B	85
Paved roads with curbs & sewers	0.09	B	98
Composite Area & Weighted CN	0.18		91.5

Time of Concentration

	Subarea	Subarea	Subarea
Sheet Flow Computations	A	B	C
Manning's Roughness :	0.2	0	0
Flow Length (ft) :	137.48	0	0
Slope (%) :	1.67	0	0
2 yr, 24 hr Rainfall (in) :	1.4	0	0
Velocity (ft/sec) :	0.09	0	0
Computed Flow Time (min) :	25.85	0	0

Total TOC (min) 25.85

Subbasin Runoff Results

Total Rainfall (in)	2.28
Total Runoff (in)	1.45
Peak Runoff (cfs)	0.11
Weighted Curve Number	91.5
Time of Concentration (days hh:mm:ss)	0 00:25:51

Subbasin : P-19

Input Data

Area (ac)	0.26
Peak Rate Factor	484
Weighted Curve Number	91.5
Rain Gage ID	Rain Gage-01

Composite Curve Number

32	Area	Soil	Curve
Soil/Surface Description	(acres)	Group	Number
1/8 acre lots, 65% impervious	0.13	B	85
Paved roads with curbs & sewers	0.13	B	98
Composite Area & Weighted CN	0.26		91.5

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.015	0	0
Flow Length (ft) :	150	0	0
Slope (%) :	0.38	0	0
2 yr, 24 hr Rainfall (in) :	1.4	0	0
Velocity (ft/sec) :	0.4	0	0
Computed Flow Time (min) :	6.31	0	0

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	84.14	0	0
Slope (%) :	0.85	0	0
Surface Type :	Paved	Unpaved	Unpaved
Velocity (ft/sec) :	1.87	0	0
Computed Flow Time (min) :	0.75	0	0

Total TOC (min) 7.06

Subbasin Runoff Results

Total Rainfall (in)	2.28
Total Runoff (in)	1.45
Peak Runoff (cfs)	0.28
Weighted Curve Number	91.5
Time of Concentration (days hh:mm:ss)	0 00:07:04

Subbasin : P-2

Input Data

Area (ac)	1.94
Peak Rate Factor	484
Weighted Curve Number	88.25
Rain Gage ID	Rain Gage-01

Composite Curve Number

32	Area	Soil	Curve
Soil/Surface Description	(acres)	Group	Number
1/8 acre lots, 65% impervious	1.46	B	85
Paved roads with curbs & sewers	0.49	B	98
Composite Area & Weighted CN	1.95		88.25

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.2	0	0
Flow Length (ft) :	150	0	0
Slope (%) :	1.49	0	0
2 yr, 24 hr Rainfall (in) :	1.4	0	0
Velocity (ft/sec) :	0.09	0	0
Computed Flow Time (min) :	29.01	0	0

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	268.52	0	0
Slope (%) :	0.77	0	0
Surface Type :	Paved	Unpaved	Unpaved
Velocity (ft/sec) :	1.78	0	0
Computed Flow Time (min) :	2.51	0	0

Total TOC (min) 31.53

Subbasin Runoff Results

Total Rainfall (in)	2.28
Total Runoff (in)	1.21
Peak Runoff (cfs)	0.91
Weighted Curve Number	88.25
Time of Concentration (days hh:mm:ss)	0 00:31:32

Subbasin : P-20

Input Data

Area (ac)	0.24
Peak Rate Factor	484
Weighted Curve Number	93.58
Rain Gage ID	Rain Gage-01

Composite Curve Number

32	Area	Soil	Curve
Soil/Surface Description	(acres)	Group	Number
1/8 acre lots, 65% impervious	0.08	B	85
Paved roads with curbs & sewers	0.16	B	98
Composite Area & Weighted CN	0.24		93.58

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.015	0	0
Flow Length (ft) :	150	0	0
Slope (%) :	0.65	0	0
2 yr, 24 hr Rainfall (in) :	1.4	0	0
Velocity (ft/sec) :	0.49	0	0
Computed Flow Time (min) :	5.09	0	0

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	73.74	0	0
Slope (%) :	0.51	0	0
Surface Type :	Paved	Unpaved	Unpaved
Velocity (ft/sec) :	1.45	0	0
Computed Flow Time (min) :	0.85	0	0

Total TOC (min) 5.94

Subbasin Runoff Results

Total Rainfall (in)	2.28
Total Runoff (in)	1.62
Peak Runoff (cfs)	0.29
Weighted Curve Number	93.58
Time of Concentration (days hh:mm:ss)	0 00:05:56

Subbasin : P-3

Input Data

Area (ac)	0.06
Peak Rate Factor	484
Weighted Curve Number	85
Rain Gage ID	Rain Gage-01

Composite Curve Number

32	Area	Soil	Curve
Soil/Surface Description	(acres)	Group	Number
1/8 acre lots, 65% impervious	0.06	B	85
Composite Area & Weighted CN	0.06		85

Time of Concentration

	Subarea	Subarea	Subarea
Sheet Flow Computations	A	B	C
Manning's Roughness :	0.2	0	0
Flow Length (ft) :	81.92	0	0
Slope (%) :	1.07	0	0
2 yr, 24 hr Rainfall (in) :	1.4	0	0
Velocity (ft/sec) :	0.07	0	0
Computed Flow Time (min) :	20.42	0	0

Total TOC (min) 20.42

Subbasin Runoff Results

Total Rainfall (in)	2.28
Total Runoff (in)	0.99
Peak Runoff (cfs)	0.03
Weighted Curve Number	85
Time of Concentration (days hh:mm:ss)	0 00:20:25

Subbasin : P-4

Input Data

Area (ac)	0.23
Peak Rate Factor	484
Weighted Curve Number	91.5
Rain Gage ID	Rain Gage-01

Composite Curve Number

32	Area	Soil	Curve
Soil/Surface Description	(acres)	Group	Number
1/8 acre lots, 65% impervious	0.12	B	85
Paved roads with curbs & sewers	0.12	B	98
Composite Area & Weighted CN	0.24		91.5

Time of Concentration

	Subarea	Subarea	Subarea
Sheet Flow Computations	A	B	C
Manning's Roughness :	0.2	0	0
Flow Length (ft) :	150	0	0
Slope (%) :	0.53	0	0
2 yr, 24 hr Rainfall (in) :	1.4	0	0
Velocity (ft/sec) :	0.06	0	0
Computed Flow Time (min) :	43.87	0	0

Total TOC (min) 43.87

Subbasin Runoff Results

Total Rainfall (in)	2.28
Total Runoff (in)	1.45
Peak Runoff (cfs)	0.11
Weighted Curve Number	91.5
Time of Concentration (days hh:mm:ss)	0 00:43:52

Subbasin : P-5

Input Data

Area (ac)	1.38
Peak Rate Factor	484
Weighted Curve Number	85
Rain Gage ID	Rain Gage-01

Composite Curve Number

32	Area	Soil	Curve
Soil/Surface Description	(acres)	Group	Number
1/8 acre lots, 65% impervious	1.38	B	85
Composite Area & Weighted CN	1.38		85

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.2	0	0
Flow Length (ft) :	150	0	0
Slope (%) :	0.56	0	0
2 yr, 24 hr Rainfall (in) :	1.4	0	0
Velocity (ft/sec) :	0.06	0	0
Computed Flow Time (min) :	42.91	0	0

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	408.06	0	0
Slope (%) :	1.27	0	0
Surface Type :	Unpaved	Unpaved	Unpaved
Velocity (ft/sec) :	1.82	0	0
Computed Flow Time (min) :	3.74	0	0

Total TOC (min) 46.65

Subbasin Runoff Results

Total Rainfall (in)	2.28
Total Runoff (in)	1.01
Peak Runoff (cfs)	0.43
Weighted Curve Number	85
Time of Concentration (days hh:mm:ss)	0 00:46:39

Subbasin : P-6

Input Data

Area (ac)	0.43
Peak Rate Factor	484
Weighted Curve Number	91.5
Rain Gage ID	Rain Gage-01

Composite Curve Number

32	Area	Soil	Curve
Soil/Surface Description	(acres)	Group	Number
1/8 acre lots, 65% impervious	0.22	B	85
Paved roads with curbs & sewers	0.22	B	98
Composite Area & Weighted CN	0.44		91.5

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.2	0	0
Flow Length (ft) :	150	0	0
Slope (%) :	2.54	0	0
2 yr, 24 hr Rainfall (in) :	1.4	0	0
Velocity (ft/sec) :	0.11	0	0
Computed Flow Time (min) :	23.44	0	0

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	160.8	0	0
Slope (%) :	0.8	0	0
Surface Type :	Paved	Unpaved	Unpaved
Velocity (ft/sec) :	1.82	0	0
Computed Flow Time (min) :	1.47	0	0

Total TOC (min) 24.91

Subbasin Runoff Results

Total Rainfall (in)	2.28
Total Runoff (in)	1.45
Peak Runoff (cfs)	0.28
Weighted Curve Number	91.5
Time of Concentration (days hh:mm:ss)	0 00:24:55

Subbasin : P-7

Input Data

Area (ac)	0.46
Peak Rate Factor	484
Weighted Curve Number	91.5
Rain Gage ID	Rain Gage-01

Composite Curve Number

32	Area	Soil	Curve
Soil/Surface Description	(acres)	Group	Number
1/8 acre lots, 65% impervious	0.23	B	85
Paved roads with curbs & sewers	0.23	B	98
Composite Area & Weighted CN	0.46		91.5

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.2	0	0
Flow Length (ft) :	150	0	0
Slope (%) :	2.26	0	0
2 yr, 24 hr Rainfall (in) :	1.4	0	0
Velocity (ft/sec) :	0.1	0	0
Computed Flow Time (min) :	24.56	0	0

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	169.74	0	0
Slope (%) :	0.82	0	0
Surface Type :	Paved	Unpaved	Unpaved
Velocity (ft/sec) :	1.84	0	0
Computed Flow Time (min) :	1.54	0	0

Total TOC (min) 26.10

Subbasin Runoff Results

Total Rainfall (in)	2.28
Total Runoff (in)	1.45
Peak Runoff (cfs)	0.28
Weighted Curve Number	91.5
Time of Concentration (days hh:mm:ss)	0 00:26:06

Subbasin : P-8

Input Data

Area (ac)	0.26
Peak Rate Factor	484
Weighted Curve Number	89.42
Rain Gage ID	Rain Gage-01

Composite Curve Number

32	Area	Soil	Curve
Soil/Surface Description	(acres)	Group	Number
1/8 acre lots, 65% impervious	0.17	B	85
Paved roads with curbs & sewers	0.09	B	98
Composite Area & Weighted CN	0.26		89.42

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.2	0	0
Flow Length (ft) :	150	0	0
Slope (%) :	2.32	0	0
2 yr, 24 hr Rainfall (in) :	1.4	0	0
Velocity (ft/sec) :	0.1	0	0
Computed Flow Time (min) :	24.3	0	0

Shallow Concentrated Flow Computations	Subarea A	Subarea B	Subarea C
Flow Length (ft) :	4.2195	0	0
Slope (%) :	0.26	0	0
Surface Type :	Paved	Unpaved	Unpaved
Velocity (ft/sec) :	1.04	0	0
Computed Flow Time (min) :	0.07	0	0

Total TOC (min) 24.37

Subbasin Runoff Results

Total Rainfall (in)	2.28
Total Runoff (in)	1.29
Peak Runoff (cfs)	0.15
Weighted Curve Number	89.42
Time of Concentration (days hh:mm:ss)	0 00:24:22

Subbasin : P-9

Input Data

Area (ac)	0.31
Peak Rate Factor	484
Weighted Curve Number	89.42
Rain Gage ID	Rain Gage-01

Composite Curve Number

32

Soil/Surface Description	Area (acres)	Soil Group	Curve Number
1/8 acre lots, 65% impervious	0.2	B	85
Paved roads with curbs & sewers	0.11	B	98
Composite Area & Weighted CN	0.31		89.42

Time of Concentration

Sheet Flow Computations	Subarea A	Subarea B	Subarea C
Manning's Roughness :	0.2	0	0
Flow Length (ft) :	123.57	0	0
Slope (%) :	3.07	0	0
2 yr, 24 hr Rainfall (in) :	1.4	0	0
Velocity (ft/sec) :	0.11	0	0
Computed Flow Time (min) :	18.61	0	0

Total TOC (min) 18.61

Subbasin Runoff Results

Total Rainfall (in)	2.28
Total Runoff (in)	1.29
Peak Runoff (cfs)	0.2
Weighted Curve Number	89.42
Time of Concentration (days hh:mm:ss)	0 00:18:37

Junction Input

SN	Element ID	Invert Elevation (ft)	Ground/Rim (Max) Elevation (ft)	Ground/Rim (Max) Offset (ft)	Initial Water Elevation (ft)	Initial Water Depth (ft)	Surcharge Elevation (ft)	Surcharge Depth (ft)	Ponded Area (ft^2)	Minimum Pipe Cover (in)
1	Footing Drain - Parcel 38	105.99	106.56	0.57	105.99	0.00	106.56	0.00	0.00	0.00
2	Footing Drain - Parcel 39	105.59	106.16	0.57	105.59	0.00	106.16	0.00	0.00	0.00
3	I1-1	102.16	107.36	5.20	103.66	1.50	107.36	0.00	0.00	0.00
4	I1-2	102.16	107.12	4.96	103.66	1.50	107.12	0.00	0.00	0.00
5	I1-3	101.91	107.32	5.41	103.41	1.50	107.32	0.00	0.00	0.00
6	I1-4	101.51	107.15	5.64	103.01	1.50	107.15	0.00	0.00	0.00
7	I1-5	101.49	106.91	5.42	102.99	1.50	106.91	0.00	0.00	0.00
8	I1-6	101.74	107.75	6.01	103.24	1.50	107.75	0.00	0.00	0.00
9	I1-7	101.51	107.51	6.00	103.01	1.50	107.51	0.00	0.00	0.00
10	I2-1	103.38	109.39	6.01	104.88	1.50	109.39	0.00	0.00	0.00
11	I2-2	103.38	109.39	6.01	104.88	1.50	109.39	0.00	0.00	0.00
12	I2-3	104.00	110.01	6.01	105.50	1.50	110.01	0.00	0.00	0.00
13	I2-4	104.00	110.01	6.01	105.50	1.50	110.01	0.00	0.00	0.00
14	I2-5	103.82	109.83	6.01	105.32	1.50	109.83	0.00	0.00	0.00
15	I2-6	103.96	109.96	6.00	105.46	1.50	109.96	0.00	0.00	0.00
16	I3-1	103.65	109.43	5.78	105.15	1.50	109.43	0.00	0.00	0.00
17	I3-2	103.69	109.43	5.74	105.19	1.50	109.43	0.00	0.00	0.00
18	I4-1	103.62	109.62	6.00	105.12	1.50	109.62	0.00	0.00	0.00
19	I4-2	103.62	109.62	6.00	105.12	1.50	109.62	0.00	0.00	0.00
20	I4-3	103.63	109.64	6.01	105.13	1.50	109.64	0.00	0.00	0.00
21	I4-4	103.63	109.64	6.01	105.13	1.50	109.64	0.00	0.00	0.00
22	I4-5	104.44	110.44	6.00	105.94	1.50	110.44	0.00	0.00	0.00
23	S1-1	102.02	107.13	5.11	103.52	1.50	107.13	0.00	0.00	0.00
24	S1-2	101.74	107.51	5.77	103.24	1.50	107.51	0.00	0.00	0.00
25	S1-3	101.36	106.86	5.50	102.86	1.50	106.86	0.00	0.00	0.00
26	S1-4	101.02	107.45	6.43	102.52	1.50	107.45	0.00	0.00	0.00
27	S1-5	100.71	108.00	7.29	102.21	1.50	108.00	0.00	0.00	0.00
28	S2-1	99.60	109.24	9.64	101.10	1.50	109.24	0.00	0.00	0.00
29	S2-2	99.09	109.86	10.77	100.59	1.50	109.86	0.00	0.00	0.00
30	S2-3	98.64	110.15	11.51	100.14	1.50	110.15	0.00	0.00	0.00
31	S3-1	103.53	109.17	5.64	105.03	1.50	109.17	0.00	0.00	0.00
32	S4-1	102.51	109.37	6.86	104.01	1.50	109.37	0.00	0.00	0.00
33	S4-2	101.54	109.38	7.84	103.04	1.50	109.38	0.00	0.00	0.00
34	SD1929-34	95.60	110.42	14.82	95.60	0.00	110.42	0.00	0.00	0.00
35	SD1930-039	95.79	110.36	14.57	95.79	0.00	110.36	0.00	0.00	0.00
36	SD1930-091	96.43	109.89	13.46	96.43	0.00	109.89	0.00	0.00	0.00

Junction Results

SN	Element ID	Peak Inflow (cfs)	Peak Lateral Inflow (cfs)	Max HGL Elevation Attained (ft)	Max HGL Depth Attained (ft)	Max Surcharge Depth Attained (ft)	Min Freeboard Attained (ft)	Average HGL Elevation Attained (ft)	Average HGL Depth Attained (ft)	Time of Max HGL Occurrence (days hh:mm)	Time of Peak Flooding Occurrence (days hh:mm)	Total Flooded Volume (ac-in)	Total Time Flooded (min)
1	Footing Drain - Parcel 38	0.00	0.00	105.99	0.00	0.00	0.57	105.99	0.00	0 00:00	0 00:00	0.00	0.00
2	Footing Drain - Parcel 39	0.00	0.00	105.59	0.00	0.00	0.57	105.59	0.00	0 00:00	0 00:00	0.00	0.00
3	I1-1	0.91	0.91	104.25	2.09	0.00	3.10	103.88	1.72	0 12:25	0 00:00	0.00	0.00
4	I1-2	0.41	0.41	104.12	1.96	0.00	3.00	103.79	1.63	0 12:15	0 00:00	0.00	0.00
5	I1-3	0.03	0.03	103.85	1.94	0.00	3.46	103.49	1.58	0 12:26	0 00:00	0.00	0.00
6	I1-4	0.43	0.43	103.69	2.18	0.00	3.46	103.21	1.70	0 12:29	0 00:00	0.00	0.00
7	I1-5	0.11	0.11	103.68	2.19	0.00	3.24	103.18	1.69	0 12:29	0 00:00	0.00	0.00
8	I1-6	0.27	0.27	103.43	1.69	0.00	4.31	103.31	1.57	0 12:27	0 00:00	0.00	0.00
9	I1-7	0.28	0.28	103.44	1.93	0.00	4.07	103.10	1.59	0 12:27	0 00:00	0.00	0.00
10	I2-1	0.15	0.15	105.02	1.64	0.00	4.37	104.93	1.55	0 12:20	0 00:00	0.00	0.00
11	I2-2	0.20	0.20	105.04	1.66	0.00	4.35	104.93	1.55	0 12:20	0 00:00	0.00	0.00
12	I2-3	0.17	0.17	105.65	1.65	0.00	4.36	105.55	1.55	0 12:20	0 00:00	0.00	0.00
13	I2-4	0.17	0.17	105.65	1.65	0.00	4.36	105.56	1.56	0 12:25	0 00:00	0.00	0.00
14	I2-5	0.03	0.03	105.38	1.56	0.00	4.45	105.34	1.52	0 12:15	0 00:00	0.00	0.00
15	I2-6	0.27	0.27	105.65	1.69	0.00	4.31	105.51	1.55	0 12:10	0 00:00	0.00	0.00
16	I3-1	0.11	0.11	105.33	1.68	0.00	4.10	105.22	1.57	0 12:30	0 00:00	0.00	0.00
17	I3-2	0.12	0.12	105.37	1.68	0.00	4.05	105.26	1.57	0 12:25	0 00:00	0.00	0.00
18	I4-1	0.12	0.12	105.26	1.64	0.00	4.36	105.17	1.55	0 12:30	0 00:00	0.00	0.00
19	I4-2	0.37	0.37	105.34	1.72	0.00	4.28	105.21	1.59	0 12:30	0 00:00	0.00	0.00
20	I4-3	0.11	0.11	105.26	1.63	0.00	4.38	105.18	1.55	0 12:25	0 00:00	0.00	0.00
21	I4-4	0.24	0.24	105.30	1.67	0.00	4.34	105.18	1.55	0 12:10	0 00:00	0.00	0.00
22	I4-5	0.27	0.27	106.10	1.66	0.00	4.34	105.99	1.55	0 12:10	0 00:00	0.00	0.00
23	S1-1	1.05	0.00	104.11	2.09	0.00	3.02	103.76	1.74	0 12:25	0 00:00	0.00	0.00
24	S1-2	1.07	0.00	103.85	2.11	0.00	3.66	103.48	1.74	0 12:26	0 00:00	0.00	0.00
25	S1-3	1.54	0.00	103.68	2.32	0.00	3.18	103.17	1.81	0 12:29	0 00:00	0.00	0.00
26	S1-4	2.04	0.00	103.43	2.41	0.00	4.02	102.86	1.84	0 12:27	0 00:00	0.00	0.00
27	S1-5	2.04	0.00	103.05	2.34	0.00	4.95	102.53	1.82	0 12:28	0 00:00	0.00	0.00
28	S2-1	2.32	0.00	101.93	2.33	0.00	7.31	101.43	1.83	0 12:26	0 00:00	0.00	0.00
29	S2-2	2.64	0.00	101.52	2.43	0.00	8.33	100.94	1.85	0 12:26	0 00:00	0.00	0.00
30	S2-3	2.72	0.00	101.11	2.47	0.00	9.04	100.52	1.88	0 12:26	0 00:00	0.00	0.00
31	S3-1	0.23	0.00	105.22	1.69	0.00	3.96	105.11	1.58	0 12:25	0 00:00	0.00	0.00
32	S4-1	0.71	0.00	104.37	1.86	0.00	5.00	104.16	1.65	0 12:30	0 00:00	0.00	0.00
33	S4-2	0.87	0.00	103.24	1.70	0.00	6.14	103.13	1.59	0 12:26	0 00:00	0.00	0.00
34	SD1929-34	0.94	0.00	99.52	3.92	0.00	10.90	99.10	3.50	0 12:16	0 00:00	0.00	0.00
35	SD1930-039	3.65	0.00	98.64	2.85	0.00	11.72	97.96	2.17	0 12:30	0 00:00	0.00	0.00
36	SD1930-091	0.95	0.00	98.69	2.26	0.00	11.20	98.23	1.80	0 12:29	0 00:00	0.00	0.00

Pipe Input

SN	Element ID	Length (ft)	Inlet Invert Elevation (ft)	Inlet Invert Offset (ft)	Outlet Invert Elevation (ft)	Outlet Invert Offset (ft)	Total Drop (ft)	Average Slope (%)	Pipe Shape	Pipe Diameter or Height (in)	Pipe Width (in)	Manning's Roughness	Entrance Losses	Exit/Bend Losses	Additional Losses	Initial Flow (cfs)	Flap Gate	No. of Barrels
1	P1-1	11.50	103.66	1.50	103.62	1.60	0.04	0.3500	CIRCULAR	12.000	12.000	0.0120	0.5000	0.9000	0.0000	0.00	No	1
2	P1-10	9.50	103.01	1.50	102.82	1.80	0.19	2.0000	CIRCULAR	12.000	12.000	0.0120	0.5000	1.0000	0.0000	0.00	No	1
3	P1-11	69.71	102.52	1.50	102.31	1.60	0.21	0.3000	CIRCULAR	12.000	12.000	0.0120	0.5000	0.6000	0.0000	0.00	No	1
4	P1-12	288.00	102.21	1.50	101.20	1.60	1.01	0.3500	CIRCULAR	12.000	12.000	0.0120	0.5000	1.0000	0.0000	0.00	No	1
5	P1-2	11.50	103.66	1.50	103.62	1.60	0.04	0.3500	CIRCULAR	12.000	12.000	0.0120	0.5000	0.9000	0.0000	0.00	No	1
6	P1-3	58.57	103.52	1.50	103.34	1.60	0.18	0.3100	CIRCULAR	12.000	12.000	0.0120	0.5000	0.8000	0.0000	0.00	No	1
7	P1-4	21.10	103.41	1.50	103.34	1.60	0.07	0.3300	CIRCULAR	12.000	12.000	0.0120	0.5000	0.8000	0.0000	0.00	No	1
8	P1-5	91.29	103.24	1.50	102.96	1.60	0.28	0.3100	CIRCULAR	12.000	12.000	0.0120	0.5000	1.0000	0.0000	0.00	No	1
9	P1-6	13.50	103.01	1.50	102.96	1.60	0.05	0.3700	CIRCULAR	12.000	12.000	0.0120	0.5000	1.0000	0.0000	0.00	No	1
10	P1-7	9.50	102.99	1.50	102.96	1.60	0.03	0.3200	CIRCULAR	12.000	12.000	0.0120	0.5000	1.0000	0.0000	0.00	No	1
11	P1-8	78.90	102.86	1.50	102.62	1.60	0.24	0.3000	CIRCULAR	12.000	12.000	0.0120	0.5000	1.0000	0.0000	0.00	No	1
12	P1-9	13.63	103.24	1.50	102.96	1.94	0.28	2.0500	CIRCULAR	12.000	12.000	0.0120	0.5000	1.0000	0.0000	0.00	No	1
13	P2-1	10.65	104.88	1.50	104.66	5.06	0.22	2.0700	CIRCULAR	12.000	12.000	0.0120	0.5000	1.0000	0.0000	0.00	No	1
14	P2-10	44.52	100.14	1.50	100.00	4.21	0.14	0.3100	CIRCULAR	15.000	15.000	0.0120	0.5000	1.0000	0.0000	0.00	No	1
15	P2-11	8.97	105.99	0.00	105.96	2.00	0.03	0.3300	CIRCULAR	6.000	6.000	0.0120	0.5000	0.6000	0.0000	0.00	No	1
16	P2-2	12.35	104.88	1.50	104.63	5.03	0.25	2.0200	CIRCULAR	12.000	12.000	0.0120	0.5000	1.0000	0.0000	0.00	No	1
17	P2-3	134.66	101.10	1.50	100.69	1.60	0.41	0.3000	CIRCULAR	15.000	15.000	0.0120	0.5000	1.0000	0.0000	0.00	No	1
18	P2-4	10.65	105.50	1.50	105.28	6.19	0.22	2.0700	CIRCULAR	12.000	12.000	0.0120	0.5000	1.0000	0.0000	0.00	No	1
19	P2-5	12.35	105.50	1.50	105.25	6.16	0.25	2.0200	CIRCULAR	12.000	12.000	0.0120	0.5000	1.0000	0.0000	0.00	No	1
20	P2-6	115.54	100.59	1.50	100.24	1.60	0.35	0.3000	CIRCULAR	15.000	15.000	0.0120	0.5000	1.0000	0.0000	0.00	No	1
21	P2-7	12.71	105.32	1.50	105.06	6.42	0.26	2.0500	CIRCULAR	12.000	12.000	0.0120	0.5000	1.0000	0.0000	0.00	No	1
22	P2-8	12.38	105.46	1.50	105.21	6.57	0.25	2.0200	CIRCULAR	12.000	12.000	0.0120	0.5000	1.0000	0.0000	0.00	No	1
23	P2-9	13.18	105.59	0.00	105.55	1.73	0.04	0.3000	CIRCULAR	6.000	6.000	0.0120	0.5000	0.6000	0.0000	0.00	No	1
24	P3-1	5.29	105.15	1.50	105.13	1.60	0.02	0.3800	CIRCULAR	12.000	12.000	0.0120	0.5000	0.9000	0.0000	0.00	No	1
25	P3-2	17.71	105.19	1.50	105.13	1.60	0.06	0.3400	CIRCULAR	12.000	12.000	0.0120	0.5000	0.9000	0.0000	0.00	No	1
26	P3-3	152.79	105.03	1.50	104.11	1.60	0.92	0.6000	CIRCULAR	12.000	12.000	0.0120	0.5000	1.0000	0.0000	0.00	No	1
27	P4-1	5.25	105.12	1.50	105.01	2.50	0.11	2.1000	CIRCULAR	12.000	12.000	0.0120	0.5000	1.0000	0.0000	0.00	No	1
28	P4-2	17.75	105.12	1.50	104.76	2.25	0.36	2.0300	CIRCULAR	12.000	12.000	0.0120	0.5000	1.0000	0.0000	0.00	No	1
29	P4-3	143.54	104.01	1.50	103.14	1.60	0.87	0.6100	CIRCULAR	12.000	12.000	0.0120	0.5000	1.0000	0.0000	0.00	No	1
30	P4-4	5.16	105.13	1.50	105.02	3.48	0.11	2.1300	CIRCULAR	12.000	12.000	0.0120	0.5000	1.0000	0.0000	0.00	No	1
31	P4-5	17.84	105.13	1.50	104.77	3.23	0.36	2.0200	CIRCULAR	12.000	12.000	0.0120	0.5000	1.0000	0.0000	0.00	No	1
32	P4-6	110.93	103.04	1.50	95.60	0.00	7.44	6.7000	CIRCULAR	12.000	12.000	0.0120	0.5000	1.0000	0.0000	0.00	No	1
33	P4-7	45.52	105.94	1.50	105.02	9.42	0.92	2.0200	CIRCULAR	12.000	12.000	0.0120	0.5000	1.0000	0.0000	0.00	No	1
34	PIPE22034	379.97	97.46	1.67	96.34	1.67	1.12	0.2900	CIRCULAR	30.000	30.000	0.0250	0.5000	1.0000	0.0000	0.00	No	1
35	PIPE23630	133.93	99.01	3.41	98.27	1.84	0.74	0.5500	CIRCULAR	24.000	24.000	0.0250	0.5000	1.0000	0.0000	0.00	No	1
36	PIPE27968	155.66	98.10	1.67	97.54	1.75	0.56	0.3600	CIRCULAR	30.000	30.000	0.0250	0.5000	1.0000	0.0000	0.00	No	1

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	P1-1	0.91	0 12:25	2.28	0.40	2.12	0.09	0.54	0.54	0.00		Calculated
2	P1-10	0.28	0 12:25	5.46	0.05	2.09	0.08	0.52	0.52	0.00		Calculated
3	P1-11	2.04	0 12:27	2.12	0.96	2.97	0.39	0.82	0.83	0.00		Calculated
4	P1-12	2.03	0 12:28	2.29	0.89	3.10	1.55	0.78	0.78	0.00		Calculated
5	P1-2	0.41	0 12:15	2.28	0.18	1.34	0.14	0.47	0.47	0.00		Calculated
6	P1-3	1.05	0 12:25	2.14	0.49	2.46	0.40	0.55	0.55	0.00		Calculated
7	P1-4	0.03	0 12:20	2.22	0.01	0.21	1.67	0.47	0.48	0.00		Calculated
8	P1-5	1.07	0 12:25	2.14	0.50	2.20	0.69	0.66	0.66	0.00		Calculated
9	P1-6	0.43	0 12:35	2.35	0.18	1.07	0.21	0.70	0.70	0.00		Calculated
10	P1-7	0.11	0 12:35	2.17	0.05	0.76	0.21	0.70	0.70	0.00		Calculated
11	P1-8	1.54	0 12:30	2.13	0.72	2.32	0.57	0.81	0.82	0.00		Calculated
12	P1-9	0.27	0 12:20	5.53	0.05	2.51	0.09	0.33	0.33	0.00		Calculated
13	P2-1	0.15	0 12:20	5.55	0.03	2.58	0.07	0.13	0.13	0.00		Calculated
14	P2-10	2.72	0 12:27	3.92	0.69	3.22	0.23	0.81	0.65	0.00		Calculated
15	P2-11	0.00	0 00:00	0.35	0.00	0.00		0.00	0.00	0.00		Calculated
16	P2-2	0.20	0 12:20	5.49	0.04	2.79	0.07	0.15	0.15	0.00		Calculated
17	P2-3	2.32	0 12:26	3.86	0.60	2.68	0.84	0.83	0.67	0.00		Calculated
18	P2-4	0.16	0 12:20	5.55	0.03	2.65	0.07	0.13	0.13	0.00		Calculated
19	P2-5	0.17	0 12:25	5.49	0.03	2.70	0.08	0.13	0.13	0.00		Calculated
20	P2-6	2.63	0 12:26	3.85	0.68	2.78	0.69	0.89	0.72	0.00		Calculated
21	P2-7	0.03	0 12:15	5.52	0.01	1.80	0.12	0.06	0.06	0.00		Calculated
22	P2-8	0.27	0 12:10	5.49	0.05	2.98	0.07	0.17	0.17	0.00		Calculated
23	P2-9	0.00	0 00:00	0.33	0.00	0.00		0.00	0.00	0.00		Calculated
24	P3-1	0.11	0 12:30	2.37	0.04	1.38	0.06	0.15	0.15	0.00		Calculated
25	P3-2	0.12	0 12:25	2.25	0.05	1.47	0.20	0.16	0.16	0.00		Calculated
26	P3-3	0.22	0 12:25	3.00	0.07	1.86	1.37	0.22	0.22	0.00		Calculated
27	P4-1	0.12	0 12:30	5.59	0.02	2.22	0.04	0.12	0.12	0.00		Calculated
28	P4-2	0.37	0 12:30	5.50	0.07	3.34	0.09	0.20	0.20	0.00		Calculated
29	P4-3	0.71	0 12:30	3.00	0.24	2.97	0.81	0.34	0.34	0.00		Calculated
30	P4-4	0.11	0 12:25	5.63	0.02	2.18	0.04	0.11	0.11	0.00		Calculated
31	P4-5	0.24	0 12:10	5.48	0.04	3.02	0.10	0.15	0.16	0.00		Calculated
32	P4-6	0.87	0 12:26	9.99	0.09	1.78	1.04	0.60	0.60	0.00		Calculated
33	P4-7	0.26	0 12:10	5.49	0.05	3.37	0.23	0.16	0.16	0.00		Calculated
34	PIPE22034	3.60	0 12:30	11.58	0.31	2.25	2.81	0.90	0.36	0.00		Calculated
35	PIPE23630	0.95	0 12:26	8.74	0.11	1.94	1.15	0.44	0.22	0.00		Calculated
36	PIPE27968	0.94	0 12:27	12.79	0.07	0.87	2.98	0.85	0.34	0.00		Calculated

Parking Study Memorandum

Appendix E

Memorandum

Date: June 3, 2021
To: Nichole Rehm, PE - PTS, Inc.
Through: Justin Keene, PE - CRW Engineering Group, LLC
From: Kelly Yanoshek, EIT - CRW Engineering Group, LLC
Project: Norann Subdivision Area Road Reconstruction
Project No: MOA PM&E#20-14 (CRW#10149.00)
Subject: Parking Study

Purpose and Background

The Municipality of Anchorage Project Management & Engineering Department (PM&E) plans to reconstruct the roadways within the Norann Subdivision area including West 57th Avenue (57th Avenue) and West 58th Avenue (58th Avenue) from Cope Street to Arctic Boulevard and Cope Street from 57th Avenue to 58th Avenue. To aid in the design of the improvements, an on-street parking study was completed for the project roadways noted above. The purpose of the study was to document the current use of on-street parking for consideration in the design of the proposed improvements.

57th Avenue is approximately 700 feet long and runs parallel and just north of 58th Avenue. 57th Avenue connects to Arctic Boulevard on the east side and Cope Street on the west side. 58th Avenue is south of 57th Avenue and is approximately 650 feet long and connects Arctic Boulevard to Cope Street. As 58th Avenue transitions to Cope Street it turns and runs north and is approximately 300 feet long within the project limits. The roadways currently do not have any on-street parking restrictions along the project corridor. There are only single family homes within the project area with the exception of the multi-family housing (three 4-plexes and one duplex) located between the alley and Arctic Boulevard.

The parking study was based on observations from four separate site visits, documenting parked vehicles located along the roadway. Site visits were completed on one weekday afternoon/evening and one weekend afternoon/evening.

Observations

The observations took place Saturday, May 15, 2021 and Wednesday, May 19, 2021. The weather on both days were sunny, with temperatures in the mid-60s. The following table summarizes the number and location of parked cars observed during the site visits:

	Saturday May 15, 2021				Wednesday, May 19, 2021			
	12:00-12:30 pm		8:00-8:30 pm		12:00-12:30 pm		8:00-8:30 pm	
Street	**North/ East**	**South/ West**	**North/ East**	**South/ West**	**North/ East**	**South/ West**	**North/ East**	**South/ West**
57th (Arctic Blvd. to Cope St.)	2	3[1]	3	2[1]	0	2[1]	1	3[1]
Cope St. (57th to 58th)	0	1[1]	0	1[1]	0	2[1]	1	1[1]
58th (Arctic Blvd. to Cope St.)	4[1]	1[1]	2[1]	3[1]	4[1]	1[1]	3[1]	2[1]
[1]Count includes 1 unmoved vehicle								

There were two vehicles on 58th Avenue that were unmoved through the weekday and weekend study along with one vehicle on Cope Street and one vehicle on 57th Avenue. The parking study showed that morning and evening times were comparable for on-street parking. There was typically available space for additional vehicles to park in nearly all the individual driveways during each site visit.

Conclusions

Off-street parking is provided generally by individual driveways. Some driveways that had more than two cars parked within the driveway correlated with cars being parked alongside the road in those areas.

The greatest demand for on-street parking is closer to Arctic Boulevard on the east side of 57th and 58th Avenue. These were the most popular areas for cars being parked or unmoved for multiple days. The results of the parking study can be seen on the attached figure. Based upon the study results there does not appear to be a need for a wider roadway to accommodate more on-street parking than currently exists.

Norann Subdivision Area Road Reconstruction: Parking Study

W 57th Avenue, Cope Street, & W 58th Avenue to Arctic Boulevard