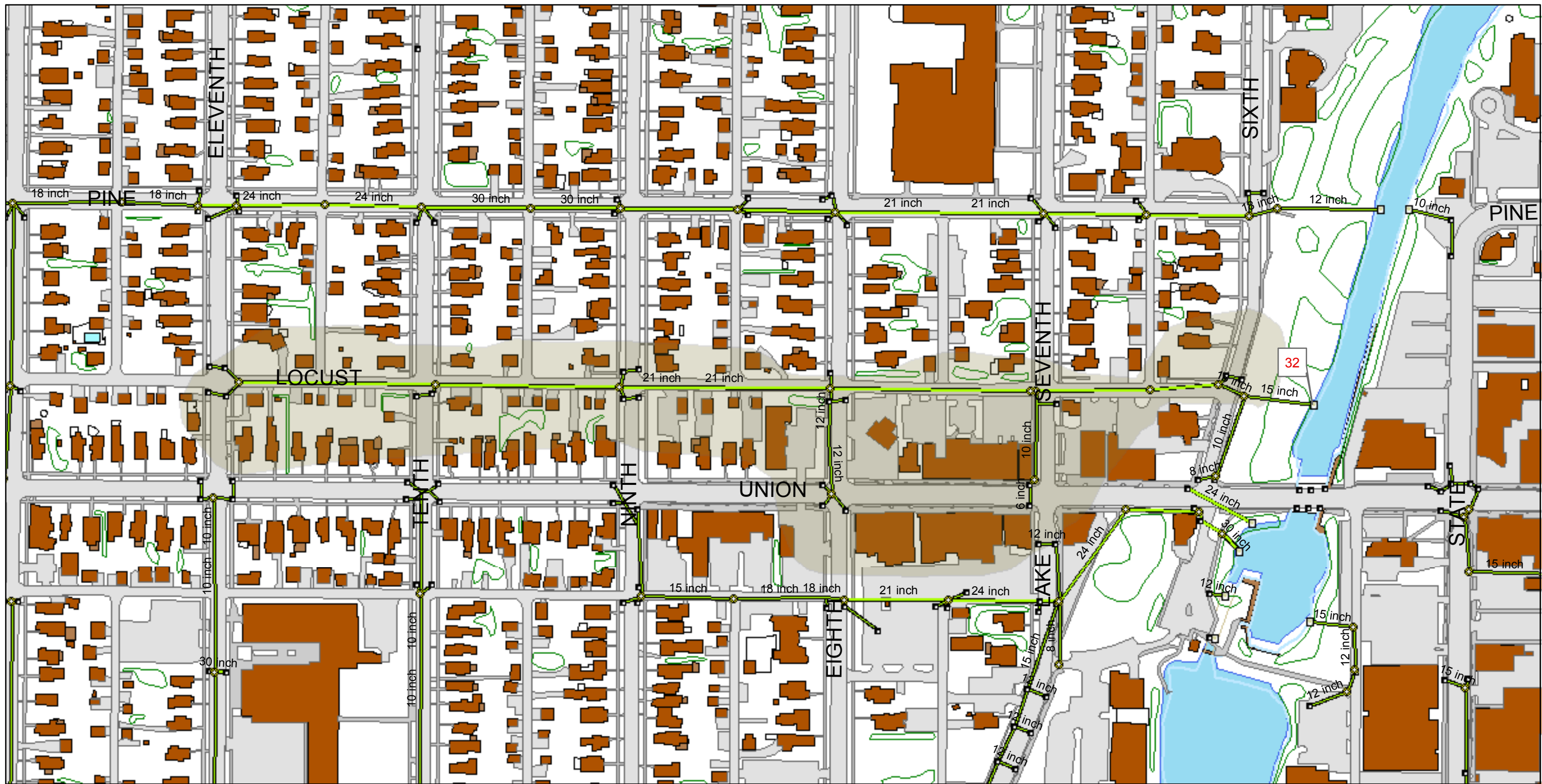
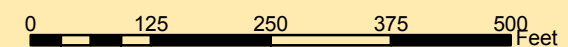
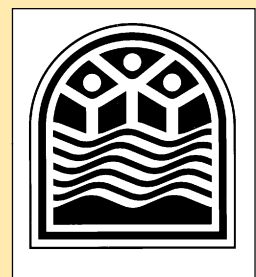


1 inch equals 200 feet



City of Traverse City Engineering Department
2007 Storm Water Management Report



Boundary B Outfall #32

- Legend**
- Storm Manholes
 - Catchbasins
 - Outfalls
 - Storm Reach

Stormwater System: 32

<i>FromMH</i>	<i>From Elev. (FT)</i>	<i>ToMH</i>	<i>To Elevation (FT)</i>	<i>SLOPE (%)</i>	<i>Length (FT)</i>	<i>Material</i>	<i>Diameter (IN)</i>	<i>Max Flow (CFS)</i>
032001	609.39	032002	608.11	0.31	408.98	CONCRETE	21 inch	8.86
032002	608.11	032003	606.71	0.37	380.19	CONCRETE	21 inch	9.61
032003	606.71	032004	605.30	0.32	436.91	CONCRETE	21 inch	9.00
032004	605.30	032005	604.06	0.30	416.91	CONCRETE	21 inch	8.64
032005	604.06	032006	604.02	0.34	11.92	CONCRETE	18 inch	6.09
032005	604.06	032006	604.02	0.34	11.88	CONCRETE	18 inch	6.10
032006	604.00	032007	599.60	1.87	234.74	CONCRETE	21 inch	21.68
032007	599.60	032008	596.49	2.18	142.98	CONCRETE	21 inch	23.36
032008	596.49	032009	601.25	-8.03	59.29	VC	18 inch	#Error
032009	596.25	032013	595.12	11.32	10.00	VC	18 inch	35.32

Stormwater System: 32

<i>FromMH</i>	<i>From Elev. (FT)</i>	<i>ToMH</i>	<i>To Elevation (FT)</i>	<i>SLOPE (%)</i>	<i>Length (FT)</i>	<i>Material</i>	<i>Diameter (IN)</i>	<i>Max Flow (CFS)</i>
032013	595.12	Junction	0.00	39.00	4.98	ADS	12 inch	22.24
032013	595.09	032014	593.77	16.50	8.00	ADS	18 inch	42.65
Junction	0.00	032014	593.60	39.00	5.96	ADS	12 inch	22.24
032014	596.25	Outfall 32	580.00	11.32	125.58	VC	15 inch	21.72



The City of Traverse City Storm Outlet Evaluation

Page 1 of 1

Project No. _____ File: _____
Description: _____ Field Work by: LARRY L. + CBTJL Date: 4-26-06
Drainage Systems: #32 LOCUST B Checked by: _____ Date: _____

Available Information: #32 (LOCUST)

Plans: ☐ Yes ☒ No

Year Built: _____

Plan Reference #: _____

Year Modified: _____

Easement: ☒ Yes Hannah ☐ No

Outlet Water Course: Boardman River

Field Investigation:

Outlet Pipe Size: 24"

Pipe Type:

☐ Concrete

not coated

☒ CMP

☐ Plastic

☐ Other: _____

Outlet Submerged: ☒ Yes fully ☐ No

☐ Partial

Depth: _____

End Treatment: ☐ Yes Type: _____

☒ No

Sediment: 3/4 of pipe

Slope Protection: ☐ Yes Type: _____

☐ Rip Rap

☐ Pave Spillway

☒ No

☐ Armor Stone

☐ Cobble

☐ Other: _____

(4 bin) riverbed does have smaller native stones

Scour: ☒ Yes stable through 1 flow line from pipe ☐ No

High Water Mark: _____

Depth from Invert: _____

Evidence of Flooding: ☐ Yes ☒ No

Photographs: ☒ Yes ☐ No

5/11/06 #4 4/26/06 #1-4

Comments: Salt deposit on pipe (road salts).

whole bottom of pipe gone, big hole in top (submerged)

from shoreline 12'

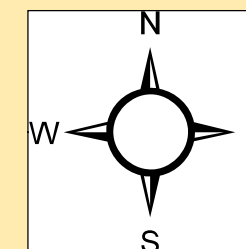
lots of green algae

5/11/06 storm event -> milky brown water flow, outlet submerged

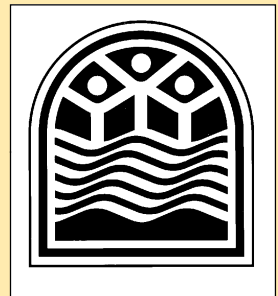
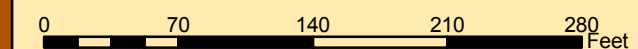


Boundary BA Outfall #68

- Legend**
- Storm Manholes
 - Catchbasins
 - Outfalls
 - Storm Reach



1 inch equals 100 feet



City of Traverse City Engineering Department
2007 Storm Water Management Report

Stormwater System: 68

<i>FromMH</i>	<i>From Elev. (FT)</i>	<i>ToMH</i>	<i>To Elevation (FT)</i>	<i>SLOPE (%)</i>	<i>Length (FT)</i>	<i>Material</i>	<i>Diameter (IN)</i>	<i>Max Flow (CFS)</i>
068001	0.00	Junction	0.00	0.00	14.12	CONCRETE	8 inch	0.00
Junction	0.00	068002	0.00	0.00	13.08	CONCRETE	8 inch	0.00
068002	599.71	068003	594.57	3.39	151.75	VC	8 inch	1.56
068003	594.57	Catchbasin 1991	594.40	0.36	45.30	CONCRETE	8 inch	0.50
Catchbasin 1991	594.57	Outfall 68	590.34	12.07	55.47	CONCRETE	8 inch	2.94



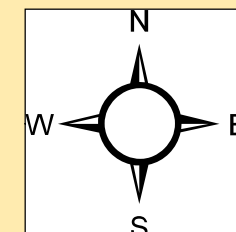
K:\CITYENG\Projects\2005\Storm Grants
1319\05-04-06\05-04-06007.jpg



Boundary BB Outfall #135

Legend

- Storm Manholes
- Catchbasins
- Outfalls
- Storm Reach



1 inch equals 100 feet

0 70 140 210 280 Feet



City of Traverse City Engineering Department
2007 Storm Water Management Report

Stormwater System: 135

<i>FromMH</i>	<i>From Elev. (FT)</i>	<i>ToMH</i>	<i>To Elevation (FT)</i>	<i>SLOPE (%)</i>	<i>Length (FT)</i>	<i>Material</i>	<i>Diameter (IN)</i>	<i>Max Flow (CFS)</i>
Catchbasin 744	0.00	Catchbasin 743	0.00	0.00	42.92	CONCRETE	12 inch	0.00
Catchbasin 743	0.00	Junction	0.00	0.00	50.48	CONCRETE	Unknown	0.00
Junction	0.00	Catchbasin 741	0.00	0.00	5.00	CONCRETE	12 inch	0.00
Catchbasin 741	0.00	Junction	0.00	0.00	5.00	CONCRETE	12 inch	0.00
Junction	0.00	Outfall 135	0.00	0.00	43.98	CONCRETE	Unknown	0.00



The City of Traverse City Storm Outlet Evaluation

Page 1 of 1

Project No. _____ File: _____
Description: _____ Field Work by: LL + CB Date: 5/4/06
Drainage Systems: BB Checked by: _____ Date: _____

Available Information:

#135
Plans: ☐ Yes ☐ No Year Built: _____
Plan Reference #: _____ Year Modified: _____
Easement: ☒ Yes Oak St. ☐ No Pipe Size: _____
Outlet Water Course: Tributary A of Kids Creek

Field Investigation: #135 Oak + Front

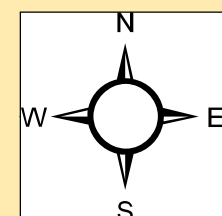
Outlet Pipe Size: 10" unable to measure Pipe Type: ☒ Concrete ☐ CMP ☐ Plastic
☐ Other: _____
Outlet Submerged: ☐ Yes ☐ No ☒ Partial Depth: 5"
Sediment Depth: 0
Deposits: ☐ Yes Type: _____ ☒ No
End Treatment: ☐ Yes Type: _____ ☒ No
Amount of Pipe Exposed: _____
Slope Protection: ☒ Yes Type: ☐ Rip Rap ☐ Pave Spillway ☐ No
☐ Armor Stone ☐ Cobble
☒ Other: concrete wall
Scour: ☒ Yes Depth: 2" ☐ No
High Water Mark/Watercourse: 12"
Depth from Invert: 6" High Watermark Pipe: 8"

Evidence of Flooding: ☐ Yes ☒ No
Photographs: ☐ Yes ☒ No Numbers: 7
Comments: _____



Boundary BE Outfall #66

- Legend**
- Storm Manholes
 - Catchbasins
 - Outfalls
 - Storm Reach



1 inch equals 100 feet

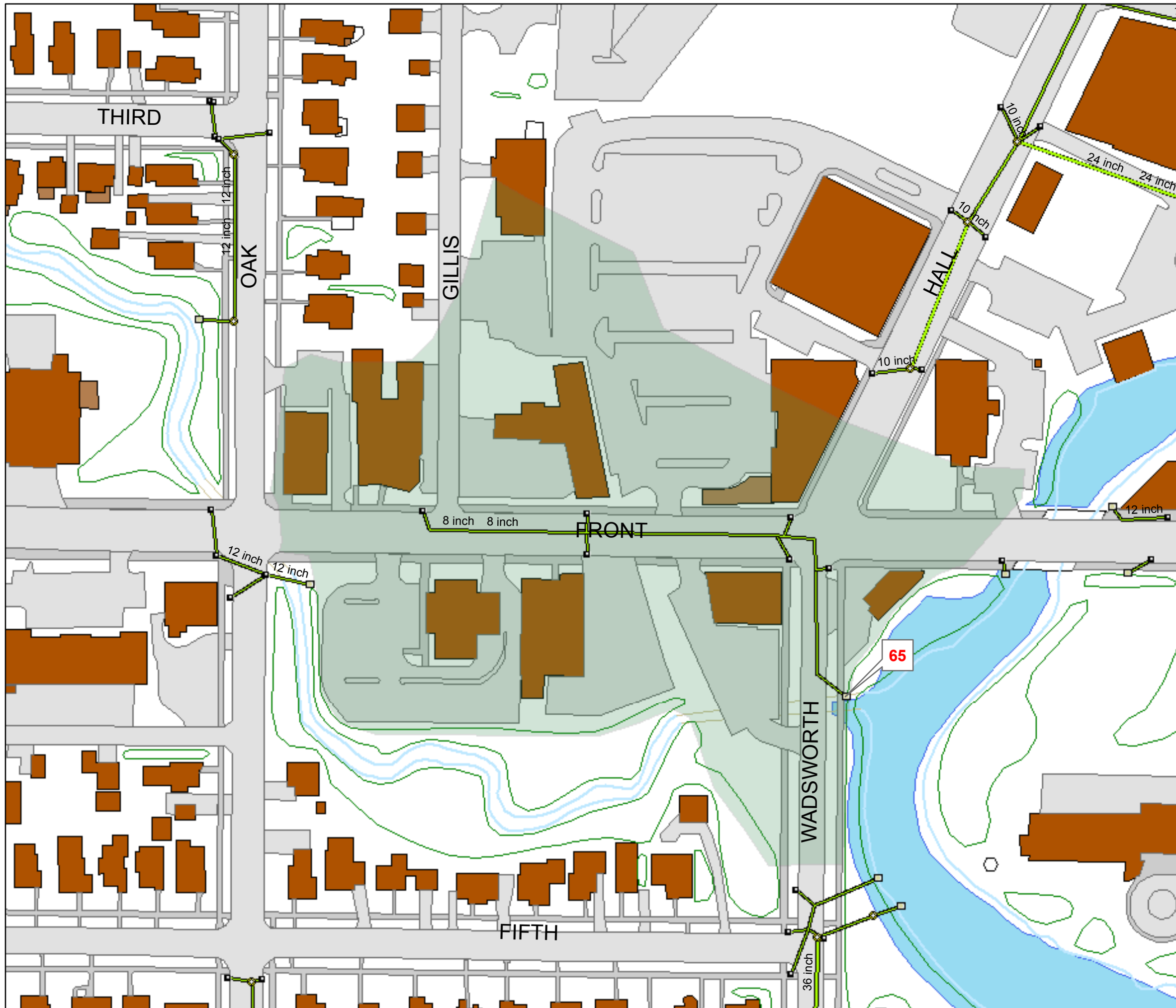
0 70 140 210 280 Feet



City of Traverse City Engineering Department
2007 Storm Water Management Report

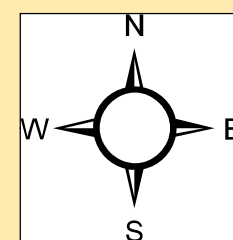
Stormwater System: 66

<i>FromMH</i>	<i>From Elev. (FT)</i>	<i>ToMH</i>	<i>To Elevation (FT)</i>	<i>SLOPE (%)</i>	<i>Length (FT)</i>	<i>Material</i>	<i>Diameter (IN)</i>	<i>Max Flow (CFS)</i>
066001	588.00	066002	587.65	0.20	174.56	CONCRETE	12 inch	1.59
066002	587.65	Outfall 66	587.60	0.13	37.73	CONCRETE	12 inch	1.30



Boundary BF Outfall #65

- Legend**
- Storm Manholes
 - Catchbasins
 - Outfalls
 - Storm Reach



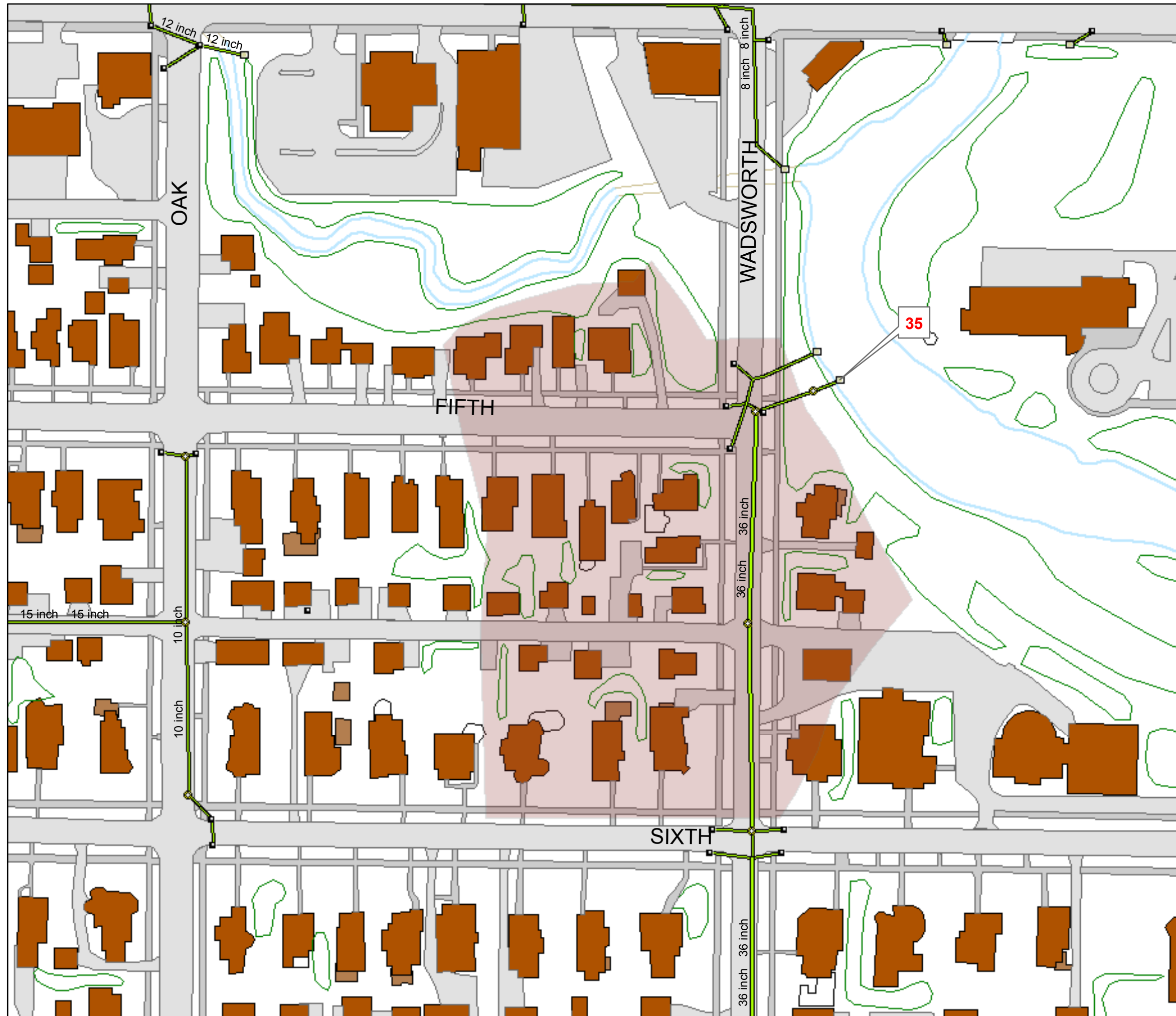
1 inch equals 100 feet



City of Traverse City Engineering Department
2007 Storm Water Management Report

Stormwater System: 65

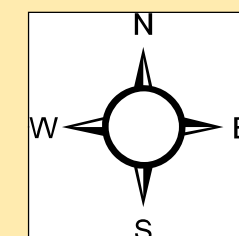
<i>FromMH</i>	<i>From Elev. (FT)</i>	<i>ToMH</i>	<i>To Elevation (FT)</i>	<i>SLOPE (%)</i>	<i>Length (FT)</i>	<i>Material</i>	<i>Diameter (IN)</i>	<i>Max Flow (CFS)</i>
Junction	0.00	Junction	0.00	0.00	163.40	CONCRETE	8 inch	0.00
Junction	0.00	Junction	0.00	0.00	198.23	CONCRETE	8 inch	0.00
Junction	0.00	Junction	0.00	0.00	8.24	CONCRETE	8 inch	0.00
Junction	0.00	Junction	0.00	0.00	64.78	CONCRETE	8 inch	0.00
Junction	0.00	Outfall 65	0.00	0.00	148.07	CONCRETE	8 inch	0.00



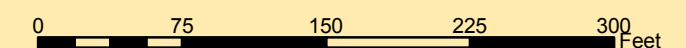
Boundary BG Outfall #35

Legend

-  Storm Manholes
-  Catchbasins
-  Outfalls
-  Storm Reach



1 inch equals 100 feet



City of Traverse City Engineering Department
2007 Storm Water Management Report

Stormwater System: 35

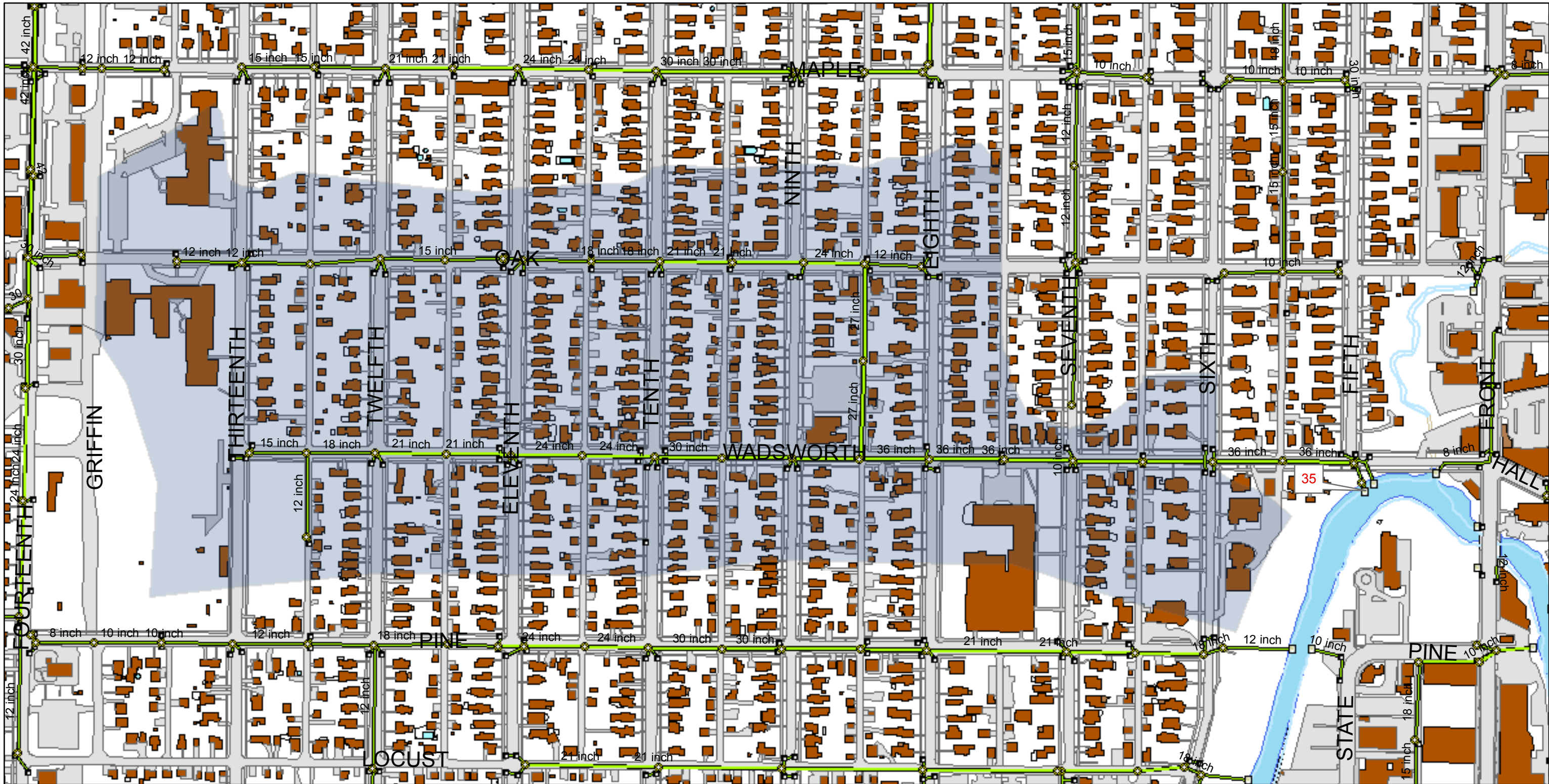
<i>FromMH</i>	<i>From Elev. (FT)</i>	<i>ToMH</i>	<i>To Elevation (FT)</i>	<i>SLOPE (%)</i>	<i>Length (FT)</i>	<i>Material</i>	<i>Diameter (IN)</i>	<i>Max Flow (CFS)</i>
035001	607.95	035002	607.52	0.22	179.45	CONCRETE	12 inch	1.67
035002	607.52	035003	607.02	0.23	208.81	CONCRETE	12 inch	1.72
035003	607.02	035004	606.47	0.25	229.54	CONCRETE	12 inch	1.79
035004	606.47	035005	605.99	0.24	199.32	CONCRETE	15 inch	3.17
035005	605.99	035006	605.43	0.31	180.70	CONCRETE	15 inch	3.59
035006	605.43	035007	605.29	0.24	57.27	CONCRETE	15 inch	3.19
035007	605.29	035008	604.83	0.22	213.66	CONCRETE	18 inch	4.87
035008	604.83	035009	604.37	0.22	212.79	CONCRETE	18 inch	4.88
035009	604.37	035010	603.88	0.22	222.32	CONCRETE	21 inch	7.44
035010	603.88	035011	603.45	0.19	221.74	CONCRETE	21 inch	6.97

Stormwater System: 35

<i>FromMH</i>	<i>From Elev. (FT)</i>	<i>ToMH</i>	<i>To Elevation (FT)</i>	<i>SLOPE (%)</i>	<i>Length (FT)</i>	<i>Material</i>	<i>Diameter (IN)</i>	<i>Max Flow (CFS)</i>
035011	603.45	035012	605.47	-1.09	184.83	CONCRETE	24 inch	#Error
035012	603.08	035013	602.60	0.16	300.42	CONCRETE	27 inch	12.37
035013	602.60	035014	602.12	0.16	303.22	CONCRETE	27 inch	12.32
035014	601.88	Junction	601.07	0.40	200.70	CONCRETE	36 inch	42.35
Junction	601.88	035015	601.07	5.63	14.38	CONCRETE	Unknown	0.00
035015	601.07	035016	600.30	0.34	229.33	CONCRETE	36 inch	38.63
035016	600.30	035017	599.62	0.32	212.26	CONCRETE	36 inch	37.73
035017	599.62	035018	598.75	0.40	217.69	CONCRETE	36 inch	42.14
035018	598.75	Junction	597.95	0.43	187.17	CONCRETE	36 inch	43.58
Junction	598.75	035019	597.95	2.80	28.61	CONCRETE	Unknown	0.00
035019	597.95	035022	597.03	0.43	215.26	CONCRETE	36 inch	43.58

Stormwater System: 35

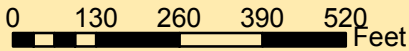
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035022	597.03	035023	591.00	2.73	220.56	CONCRETE	36 inch	110.23
035023	589.95	035024	587.95	3.16	63.26	CONCRETE	Unknown	0.00
035024	587.95	Outfall 35	580.03	27.14	29.20	CONCRETE	Unknown	0.00



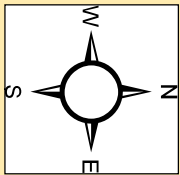
Legend

- Storm Manholes
- Catchbasins
- Outfalls
- Storm Reach

Boundary BH Outfall #35



City of Traverse City Engineering Department
2007 Storm Water Management Report



1 inch equals 300 feet



Stormwater System: 35

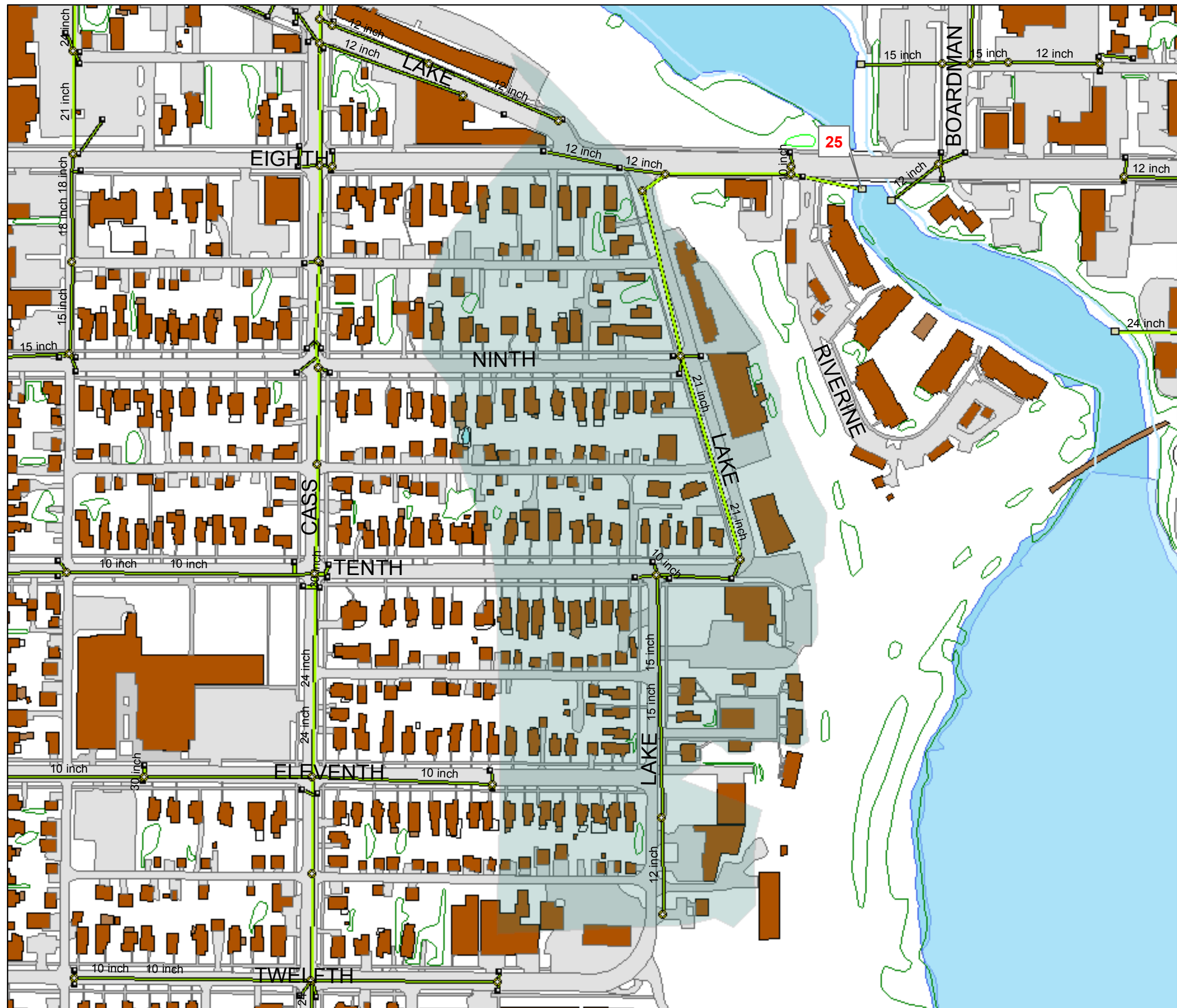
<i>FromMH</i>	<i>From Elev. (FT)</i>	<i>ToMH</i>	<i>To Elevation (FT)</i>	<i>SLOPE (%)</i>	<i>Length (FT)</i>	<i>Material</i>	<i>Diameter (IN)</i>	<i>Max Flow (CFS)</i>
035001	607.95	035002	607.52	0.22	179.45	CONCRETE	12 inch	1.67
035002	607.52	035003	607.02	0.23	208.81	CONCRETE	12 inch	1.72
035003	607.02	035004	606.47	0.25	229.54	CONCRETE	12 inch	1.79
035004	606.47	035005	605.99	0.24	199.32	CONCRETE	15 inch	3.17
035005	605.99	035006	605.43	0.31	180.70	CONCRETE	15 inch	3.59
035006	605.43	035007	605.29	0.24	57.27	CONCRETE	15 inch	3.19
035007	605.29	035008	604.83	0.22	213.66	CONCRETE	18 inch	4.87
035008	604.83	035009	604.37	0.22	212.79	CONCRETE	18 inch	4.88
035009	604.37	035010	603.88	0.22	222.32	CONCRETE	21 inch	7.44
035010	603.88	035011	603.45	0.19	221.74	CONCRETE	21 inch	6.97

Stormwater System: 35

<i>FromMH</i>	<i>From Elev. (FT)</i>	<i>ToMH</i>	<i>To Elevation (FT)</i>	<i>SLOPE (%)</i>	<i>Length (FT)</i>	<i>Material</i>	<i>Diameter (IN)</i>	<i>Max Flow (CFS)</i>
035011	603.45	035012	605.47	-1.09	184.83	CONCRETE	24 inch	#Error
035012	603.08	035013	602.60	0.16	300.42	CONCRETE	27 inch	12.37
035013	602.60	035014	602.12	0.16	303.22	CONCRETE	27 inch	12.32
035014	601.88	Junction	601.07	0.40	200.70	CONCRETE	36 inch	42.35
Junction	601.88	035015	601.07	5.63	14.38	CONCRETE	Unknown	0.00
035015	601.07	035016	600.30	0.34	229.33	CONCRETE	36 inch	38.63
035016	600.30	035017	599.62	0.32	212.26	CONCRETE	36 inch	37.73
035017	599.62	035018	598.75	0.40	217.69	CONCRETE	36 inch	42.14
035018	598.75	Junction	597.95	0.43	187.17	CONCRETE	36 inch	43.58
Junction	598.75	035019	597.95	2.80	28.61	CONCRETE	Unknown	0.00
035019	597.95	035022	597.03	0.43	215.26	CONCRETE	36 inch	43.58

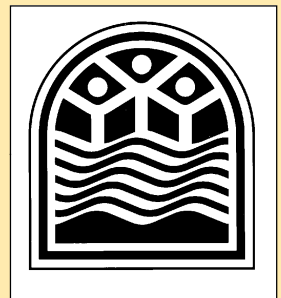
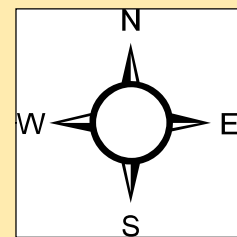
Stormwater System: 35

<i>FromMH</i>	<i>From Elev. (FT)</i>	<i>ToMH</i>	<i>To Elevation (FT)</i>	<i>SLOPE (%)</i>	<i>Length (FT)</i>	<i>Material</i>	<i>Diameter (IN)</i>	<i>Max Flow (CFS)</i>
035022	597.03	035023	591.00	2.73	220.56	CONCRETE	36 inch	110.23
035023	589.95	035024	587.95	3.16	63.26	CONCRETE	Unknown	0.00
035024	587.95	Outfall 35	580.03	27.14	29.20	CONCRETE	Unknown	0.00

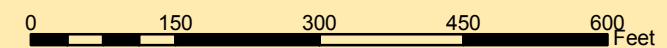


Boundary BI Outfall #25

- Legend**
- Storm Manholes
 - Catchbasins
 - Outfalls
 - Storm Reach



1 inch equals 200 feet



City of Traverse City Engineering Department
2007 Storm Water Management Report

Stormwater System: 25

<i>FromMH</i>	<i>From Elev. (FT)</i>	<i>ToMH</i>	<i>To Elevation (FT)</i>	<i>SLOPE (%)</i>	<i>Length (FT)</i>	<i>Material</i>	<i>Diameter (IN)</i>	<i>Max Flow (CFS)</i>
025001	610.83	025002	609.33	0.74	203.74	CONCRETE	12 inch	3.06
025002	609.00	025003	607.95	0.21	509.79	CONCRETE	15 inch	2.93
025003	0.00	Catchbasin 2085	0.00	0.00	157.08	CONCRETE	15 inch	0.00
Catchbasin 2085	0.00	025004	0.00	0.00	45.39	CONCRETE	15 inch	0.00
025004	0.00	025005	0.00	0.00	445.36	CONCRETE	21 inch	0.00
025005	605.68	025006	602.73	0.83	354.78	CONCRETE	21 inch	14.44
025006	602.73	025007	602.00	1.26	57.74	CONCRETE	21 inch	17.81
025007	602.08	025008	597.26	1.83	264.01	CONCRETE	21 inch	21.40
025008	597.26	Catchbasin 948	0.00	0.00	25.29	CONCRETE	21 inch	0.00
Catchbasin 948	597.70	Outfall 25	592.20	4.41	124.75	CONCRETE	21 inch	33.25

Stormwater System: 25

<i>FromMH</i>	<i>From Elev. (FT)</i>	<i>ToMH</i>	<i>To Elevation (FT)</i>	<i>SLOPE (%)</i>	<i>Length (FT)</i>	<i>Material</i>	<i>Diameter (IN)</i>	<i>Max Flow (CFS)</i>
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The City of Traverse City

Storm Outlet Evaluation

Page 1 of 1

Project No. _____ File: _____
Description: _____ Field Work by: LL + CB Date: 5/16/06
Drainage Systems: BI Checked by: _____ Date: _____

Available Information:

25

Plans: ☒ Yes ☐ No

Year Built: 1954

Plan Reference #: Storm 27-2

Year Modified: _____

Easement: ☐ Yes ☐ No

Pipe Size: 18"

Outlet Water Course: Bridgman River

Field Investigation:

25

Outlet Pipe Size: 18"

Pipe Type: ☒ Concrete ☐ CMP ☐ Plastic

☐ Other: _____

Outlet Submerged: ☐ Yes ☐ No

☒ Partial Depth: 17"

Sediment Depth: _____

Deposits: ☒ Yes Type: algae on outside ☐ No

End Treatment: ☐ Yes Type: _____ ☒ No

Amount of Pipe Exposed: 10"

Slope Protection: ☒ Yes Type: ☐ Rip Rap ☐ Pave Spillway ☐ No

☐ Armor Stone ☐ Cobble

☒ Other: metal retaining wall

Scour: ☐ Yes Depth: _____ ☒ No

High Water Mark/Watercourse: 6"

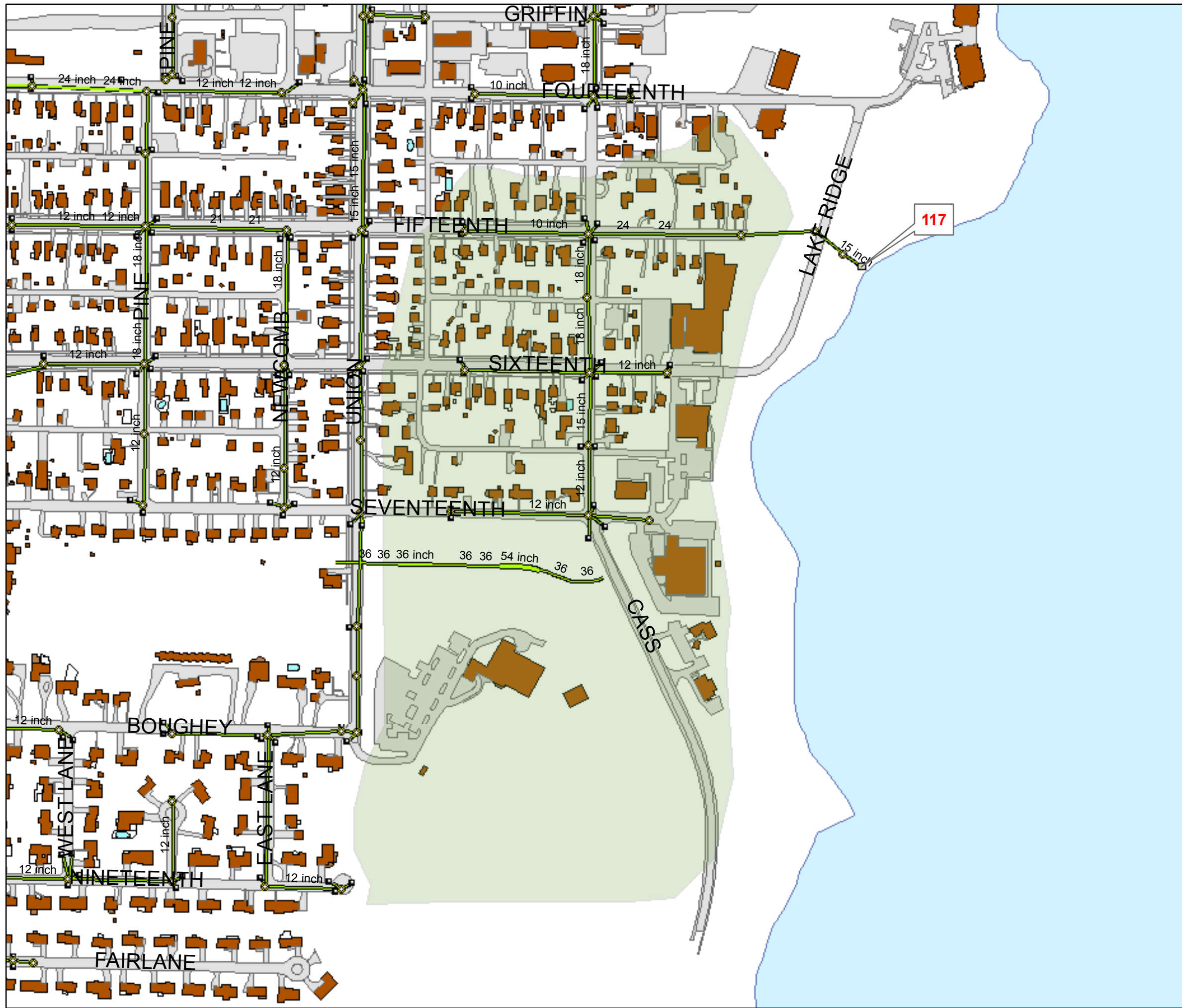
Depth from Invert: 18"

High Watermark Pipe: 18"

Evidence of Flooding: ☐ Yes ☒ No

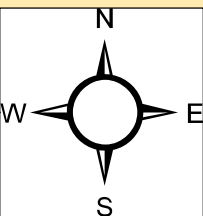
Photographs: ☒ Yes ☐ No Numbers: 100-2433

Comments: _____

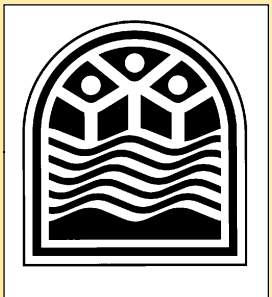
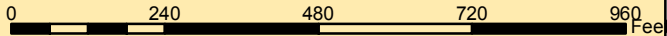


Boundary BK Outfall #117

- Legend**
- Storm Manholes
 - Catchbasins
 - Outfalls
 - Storm Reach



1 inch equals 300 feet



Stormwater System: 117

<i>FromMH</i>	<i>From Elev. (FT)</i>	<i>ToMH</i>	<i>To Elevation (FT)</i>	<i>SLOPE (%)</i>	<i>Length (FT)</i>	<i>Material</i>	<i>Diameter (IN)</i>	<i>Max Flow (CFS)</i>
117001	621.47	117002	620.13	0.31	433.38	CONCRETE	12 inch	1.98
117002	620.11	117003	615.33	2.19	218.72	CONCRETE	12 inch	5.26
117003	615.33	117004	613.03	1.01	227.67	CONCRETE	15 inch	6.49
117004	612.44	117005	610.84	0.68	233.94	CONCRETE	18 inch	8.68
117005	610.84	117006	609.81	0.51	201.36	CONCRETE	18 inch	7.51
117006	609.41	117007	607.32	0.43	482.72	CONCRETE	24 inch	14.88
117007	607.32	117008	606.14	0.51	231.70	CONCRETE	24 inch	16.14
117008	606.14	117009	605.67	0.41	114.61	CONCRETE	24 inch	14.48
117009	605.67	Outfall 117	590.65	21.46	69.98	CONCRETE	15 inch	29.91



The City of Traverse City Storm Outlet Evaluation

Page 1 of 1

Project No. _____ File: _____
Description: _____ Field Work by: LL + CB Date: 5/5/06
Drainage Systems: BK Checked by: _____ Date: _____

Available Information:

Plans: ☒ Yes ☐ No

Year Built: 1957

Plan Reference #: Storm #710

Year Modified: _____

Easement: ☒ Yes 23D ☐ No

Pipe Size: 15" at 17.3%

Outlet Water Course: Boardman Lake

Field Investigation:

Outlet Pipe Size: 15"

Pipe Type: ☒ Concrete ☐ CMP ☐ Plastic

☐ Other: _____

Outlet Submerged: ☐ Yes ☒ No

☐ Partial Depth: _____

Sediment Depth: _____

Deposits: ☐ Yes Type: _____ ☒ No

End Treatment: ☒ Yes Type: bulkhead ☐ No

Amount of Pipe Exposed: 5'

Slope Protection: ☐ Yes Type: ☐ Rip Rap ☐ Pave Spillway ☒ No

☐ Armor Stone ☐ Cobble

☐ Other: _____

Scour: ☒ Yes Depth: 12" ☐ No

High Water Mark/Watercourse: 2"

Depth from Invert: 6" High Watermark Pipe: 7"

Evidence of Flooding: ☐ Yes ☒ No

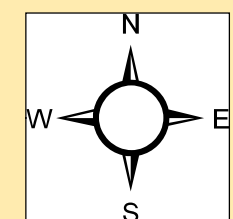
Photographs: ☒ Yes ☐ No Numbers: 19

Comments: end broken off, major slope erosion

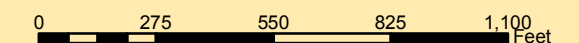


Boundary BM Outfall #115

- Legend**
- Storm Manholes
 - Catchbasins
 - Outfalls
 - Storm Reach



1 inch equals 450 feet



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Stormwater System: 115

<i>FromMH</i>	<i>From Elev. (FT)</i>	<i>ToMH</i>	<i>To Elevation (FT)</i>	<i>SLOPE (%)</i>	<i>Length (FT)</i>	<i>Material</i>	<i>Diameter (IN)</i>	<i>Max Flow (CFS)</i>
115001	694.01	115002	693.54	0.19	251.15	CONCRETE	12 inch	1.54
115002	693.54	115003	691.93	0.50	324.62	CONCRETE	12 inch	2.51
115003	691.93	115004	688.97	1.00	295.03	CONCRETE	12 inch	3.57
115004	688.97	115005	687.21	0.59	296.03	CONCRETE	12 inch	2.75
115005	687.21	115006	674.51	10.39	122.20	CONCRETE	12 inch	11.48
115006	672.84	115007	651.33	12.58	171.00	CONCRETE	15 inch	22.90
115007	651.33	115008	635.75	12.48	124.80	CONCRETE	15 inch	22.81
115008	635.75	115009	635.23	0.57	91.99	CONCRETE	21 inch	11.91
115009	635.23	Catchbasin 503	634.93	0.29	103.34	CONCRETE	21 inch	8.53
Catchbasin 503	634.93	115010	620.26	3.92	374.54	CONCRETE	21 inch	31.34

Stormwater System: 115

<i>FromMH</i>	<i>From Elev. (FT)</i>	<i>ToMH</i>	<i>To Elevation (FT)</i>	<i>SLOPE (%)</i>	<i>Length (FT)</i>	<i>Material</i>	<i>Diameter (IN)</i>	<i>Max Flow (CFS)</i>
115010	620.26	Catchbasin 202	615.91	1.67	260.39	CONCRETE	21 inch	20.47
Catchbasin 202	615.91	Catchbasin 2130	612.31	2.56	140.47	CONCRETE	21 inch	25.35
Catchbasin 2130	612.31	115011	608.58	11.90	31.35	CONCRETE	21 inch	54.62
115011	608.58	Junction	607.36	0.67	182.20	CONCRETE	24 inch	18.50
Junction	608.58	115012	607.36	1.05	115.95	CONCRETE	24 inch	23.19
115012	607.10	Junction	605.94	0.62	186.10	CONCRETE	24 inch	17.85
Junction	607.10	Junction	605.94	0.52	223.13	CONCRETE	24 inch	16.30
Junction	607.10	115013	605.94	4.73	24.55	CONCRETE	24 inch	49.15
115013	605.94	115014	605.45	0.20	241.60	CONCRETE	30 inch	18.46
115014	605.45	115015	605.22	0.17	135.53	CONCRETE	30 inch	16.89
115015	605.22	115016	608.08	-4.37	65.47	CONCRETE	30 inch	#Error

Stormwater System: 115

<i>FromMH</i>	<i>From Elev. (FT)</i>	<i>ToMH</i>	<i>To Elevation (FT)</i>	<i>SLOPE (%)</i>	<i>Length (FT)</i>	<i>Material</i>	<i>Diameter (IN)</i>	<i>Max Flow (CFS)</i>
115016	605.08	115017	604.72	0.27	131.40	CONCRETE	36 inch	34.89
115017	604.72	115018	604.25	0.17	271.16	CONCRETE	42 inch	41.87
115018	604.25	115019	603.77	0.15	313.70	CONCRETE	42 inch	39.34
115019	603.77	115020	603.46	0.16	189.92	CONCRETE	42 inch	40.63
115020	603.46	115021	603.13	0.17	191.83	CONCRETE	42 inch	41.71
115021	603.13	115022	603.05	0.14	56.19	CONCRETE	42 inch	37.94
115022	603.05	115023	602.83	0.25	87.48	CONCRETE	42 inch	50.43
115023	602.83	115024	601.55	5.49	23.33	CONCRETE	48 inch	336.27
115024	601.55	115025	601.32	0.28	81.21	CONCRETE	48 inch	76.41
115025	601.32	Outfall 115	601.20	0.12	101.12	CONCRETE	48 inch	49.46

Stormwater System: 115

<i>FromMH</i>	<i>From Elev. (FT)</i>	<i>ToMH</i>	<i>To Elevation (FT)</i>	<i>SLOPE (%)</i>	<i>Length (FT)</i>	<i>Material</i>	<i>Diameter (IN)</i>	<i>Max Flow (CFS)</i>
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The City of Traverse City

Storm Outlet Evaluation

Page 1 of 1

Project No. _____ File: _____
Description: _____ Field Work by: LL + CB Date: 5/5/06
Drainage Systems: Bm Checked by: _____ Date: _____

Available Information:

#115
Plans: ☒ Yes ☐ No Year Built: _____
Plan Reference #: Storm #37 Year Modified: _____
Easement: ☒ Yes 51B ☐ No Pipe Size: 48"
Outlet Water Course: Kid's Creek

Field Investigation:

#115
Outlet Pipe Size: 48" Pipe Type: ☒ Concrete ☐ CMP ☐ Plastic
☐ Other: _____
Outlet Submerged: ☐ Yes ☐ No ☒ Partial Depth: 30"
Sediment Depth: 4"
Deposits: ☒ Yes Type: sediment ☐ No
End Treatment: ☐ Yes Type: _____ ☒ No
Amount of Pipe Exposed: 4'
Slope Protection: ☐ Yes Type: ☐ Rip Rap ☐ Pave Spillway ☒ No
☐ Armor Stone ☐ Cobble
☐ Other: _____
Scour: ☒ Yes water cloudy Depth: 2' ☐ No
High Water Mark/Watercourse: 1'
Depth from Invert: 30" High Watermark Pipe: 30"

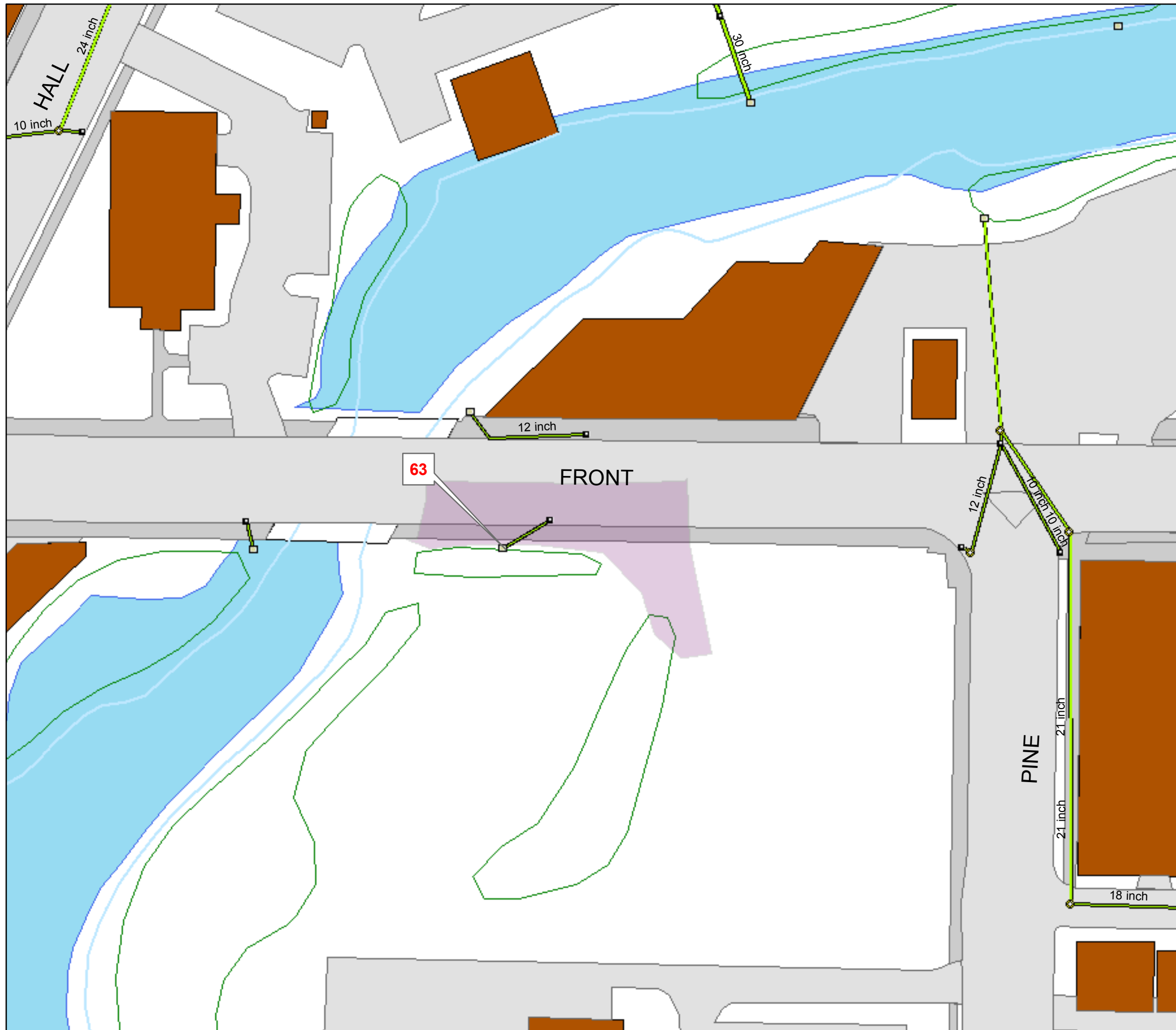
Evidence of Flooding: ☐ Yes ☒ No

Photographs: ☒ Yes ☐ No Numbers: 28 5/11/06 #13

Comments: some algae + oil not a lot

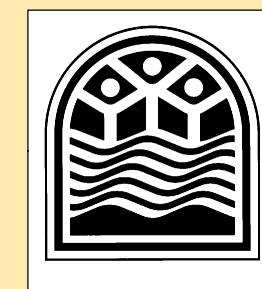
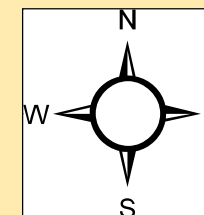
Sediment bar/deposit

5/11/06 Storm event - flooded 2" over pipe water very brown

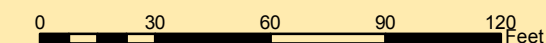


Boundary BN Outfall #63

- Legend**
- Storm Manholes
 - Catchbasins
 - Outfalls
 - Storm Reach



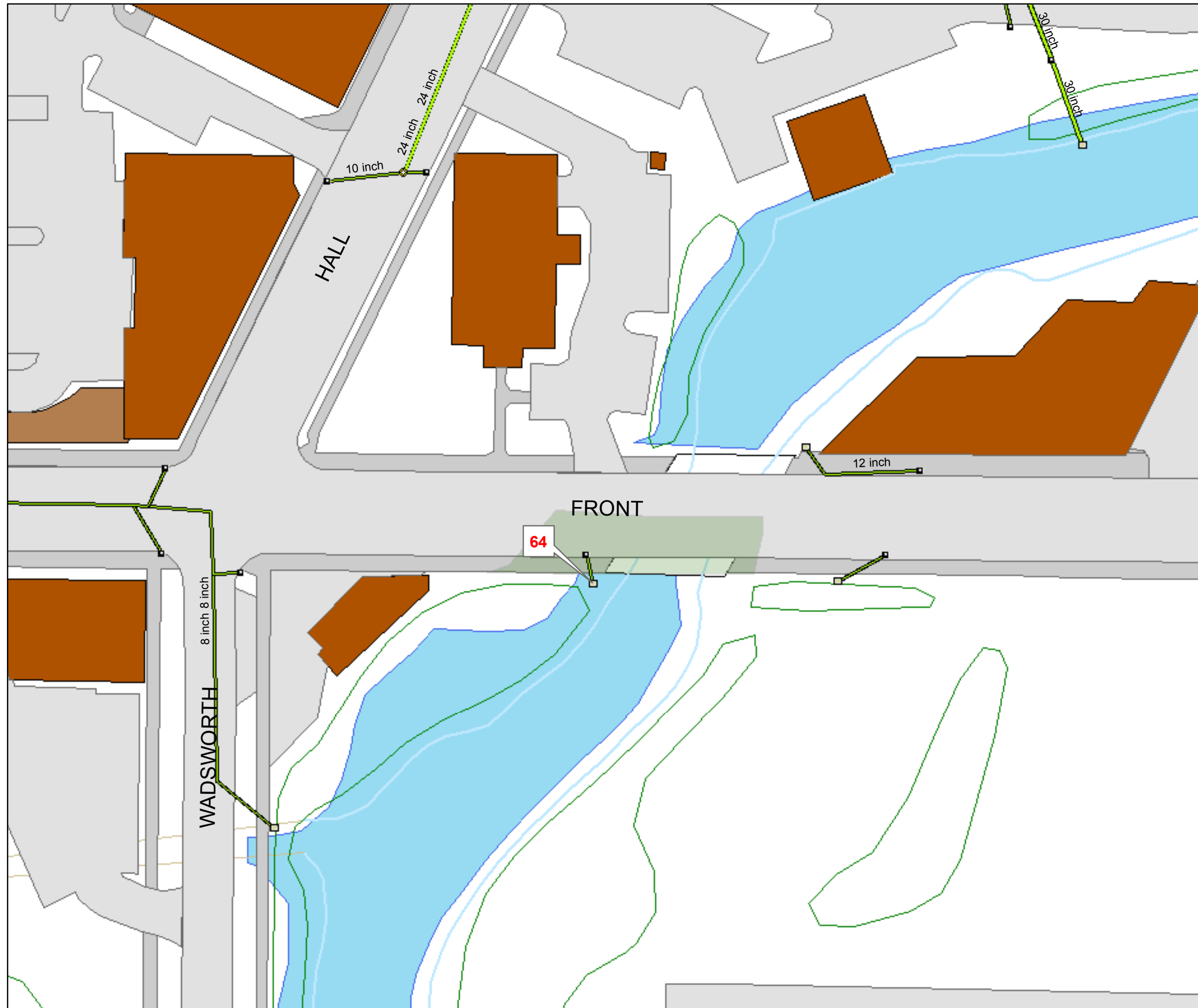
1 inch equals 50 feet



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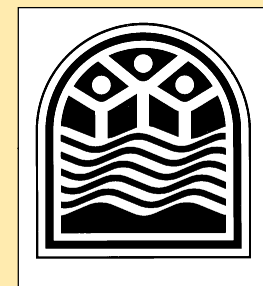
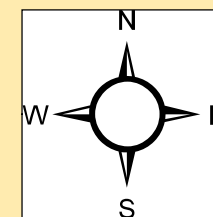
Stormwater System: 63

<i>FromMH</i>	<i>From Elev. (FT)</i>	<i>ToMH</i>	<i>To Elevation (FT)</i>	<i>SLOPE (%)</i>	<i>Length (FT)</i>	<i>Material</i>	<i>Diameter (IN)</i>	<i>Max Flow (CFS)</i>
Catchbasin 748	0.00	Outfall 63	0.00	0.00	28.79	CONCRETE	Unknown	0.00

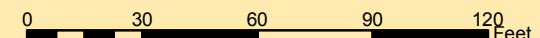


Boundary BO Outfall #64

- Legend**
- Storm Manholes
 - Catchbasins
 - Outfalls
 - Storm Reach



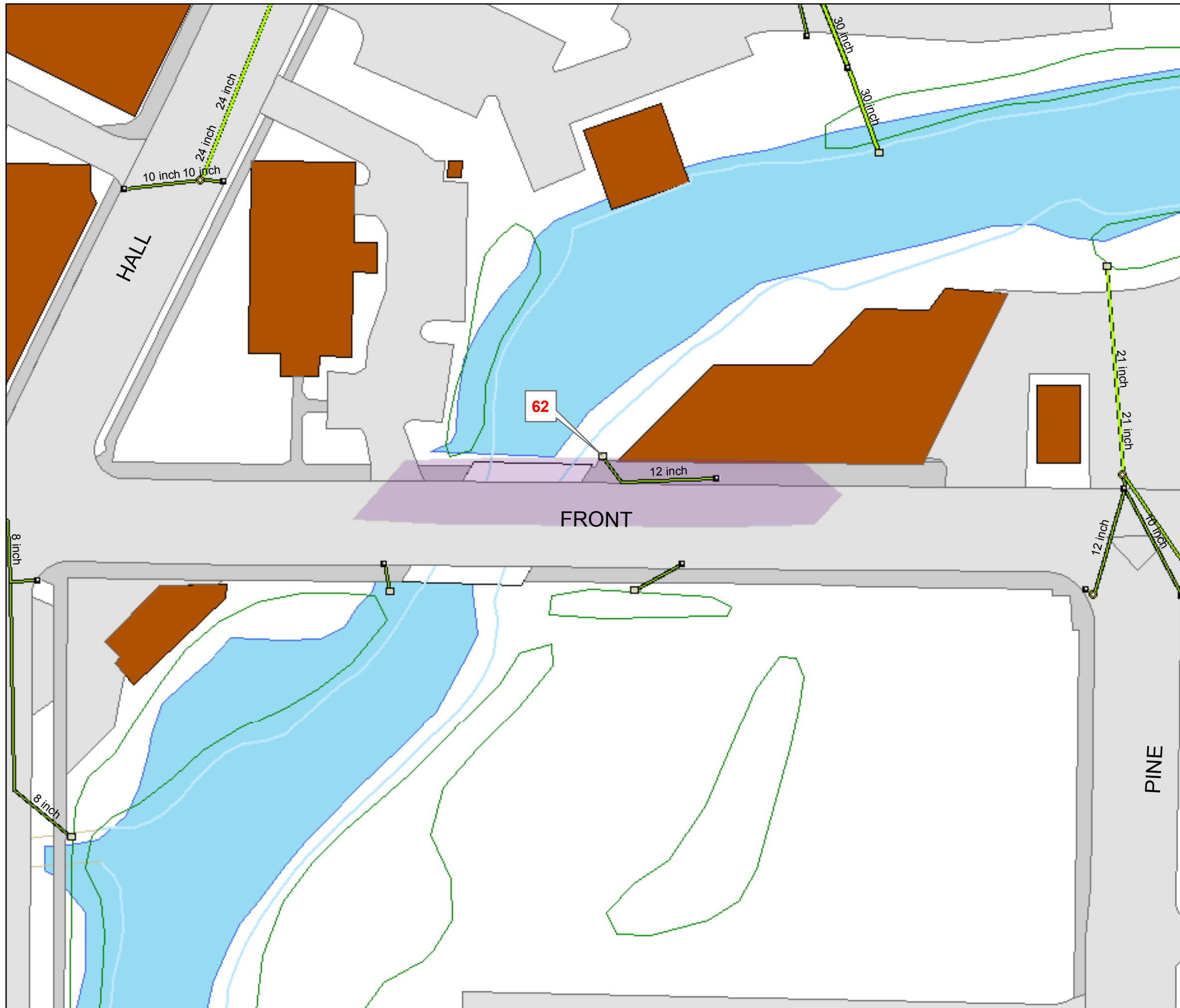
1 inch equals 50 feet



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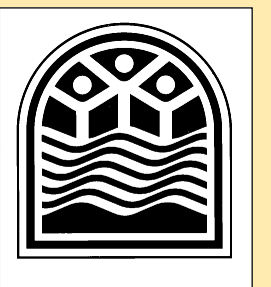
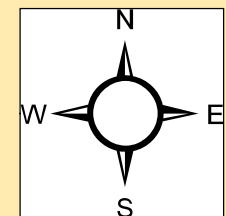
Stormwater System: 64

<i>FromMH</i>	<i>From Elev. (FT)</i>	<i>ToMH</i>	<i>To Elevation (FT)</i>	<i>SLOPE (%)</i>	<i>Length (FT)</i>	<i>Material</i>	<i>Diameter (IN)</i>	<i>Max Flow (CFS)</i>
Catchbasin 681	0.00	Outfall 64	0.00	0.00	15.12	CONCRETE	Unknown	0.00

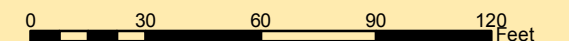


Boundary BP Outfall #62

- Legend**
- Storm Manholes
 - Catchbasins
 - Outfalls
 - Storm Reach



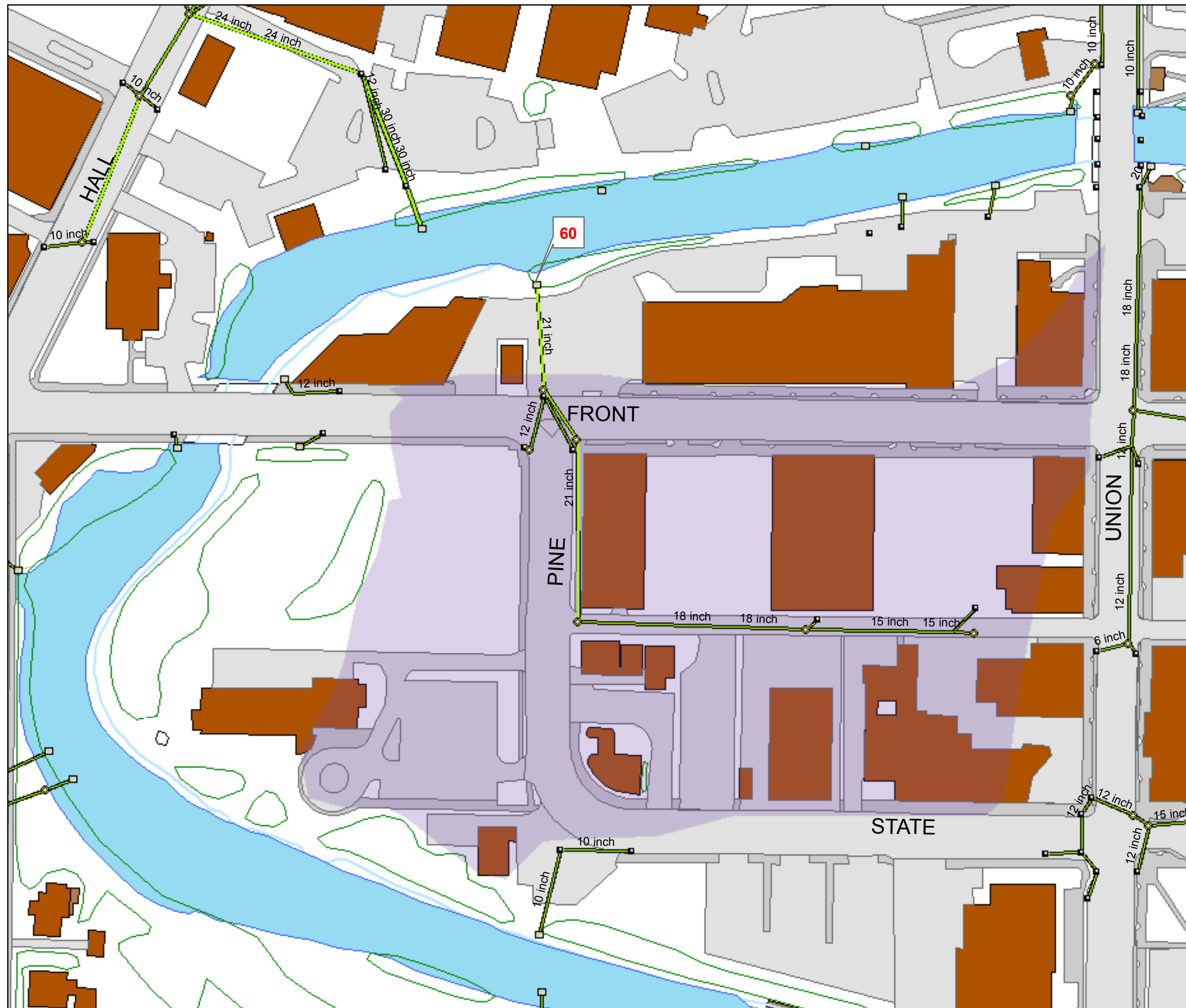
1 inch equals 50 feet



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Stormwater System: 62

<i>FromMH</i>	<i>From Elev. (FT)</i>	<i>ToMH</i>	<i>To Elevation (FT)</i>	<i>SLOPE (%)</i>	<i>Length (FT)</i>	<i>Material</i>	<i>Diameter (IN)</i>	<i>Max Flow (CFS)</i>
Catchbasin 749	0.00	Outfall 62	0.00	0.00	66.69	HD POLY	12 inch	0.00



K:\CITYENG\Projects\2005\Storm Grants
 \319\05-05-06\05-05-06001.jpg



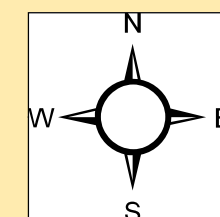
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\319\05-05-06\05-05-06002.jpg



Boundary BQ Outfall #60

Legend

-  Storm Manholes
-  Catchbasins
-  Outfalls
-  Storm Reach



1 inch equals 100 feet



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Stormwater System: 60

<i>FromMH</i>	<i>From Elev. (FT)</i>	<i>ToMH</i>	<i>To Elevation (FT)</i>	<i>SLOPE (%)</i>	<i>Length (FT)</i>	<i>Material</i>	<i>Diameter (IN)</i>	<i>Max Flow (CFS)</i>
060001	591.22	Junction	590.50	3.20	22.52	CONCRETE	15 inch	11.54
Junction	591.22	060002	590.50	0.47	152.94	CONCRETE	15 inch	4.43
060002	590.50	060003	589.78	0.30	239.19	CONCRETE	18 inch	5.76
060003	589.78	060004	588.50	0.67	191.20	CONCRETE	21 inch	12.96
060004	588.50	060005	585.24	5.21	62.54	CONCRETE	21 inch	36.16
060005	585.24	Outfall 60	584.50	0.68	109.43	CONCRETE	21 inch	13.02



The City of Traverse City Storm Outlet Evaluation

Page 1 of 1

Project No. _____ File: _____
Description: _____ Field Work by: LL + CB Date: 5/5/06
Drainage Systems: BQ Checked by: _____ Date: _____

Available Information:

Plans: ☒ Yes ☐ No Year Built: 1953
Plan Reference #: Storm #4-1 Year Modified: _____
Easement: ☒ Yes ☐ No Pipe Size: 21"
Outlet Water Course: Boardman River

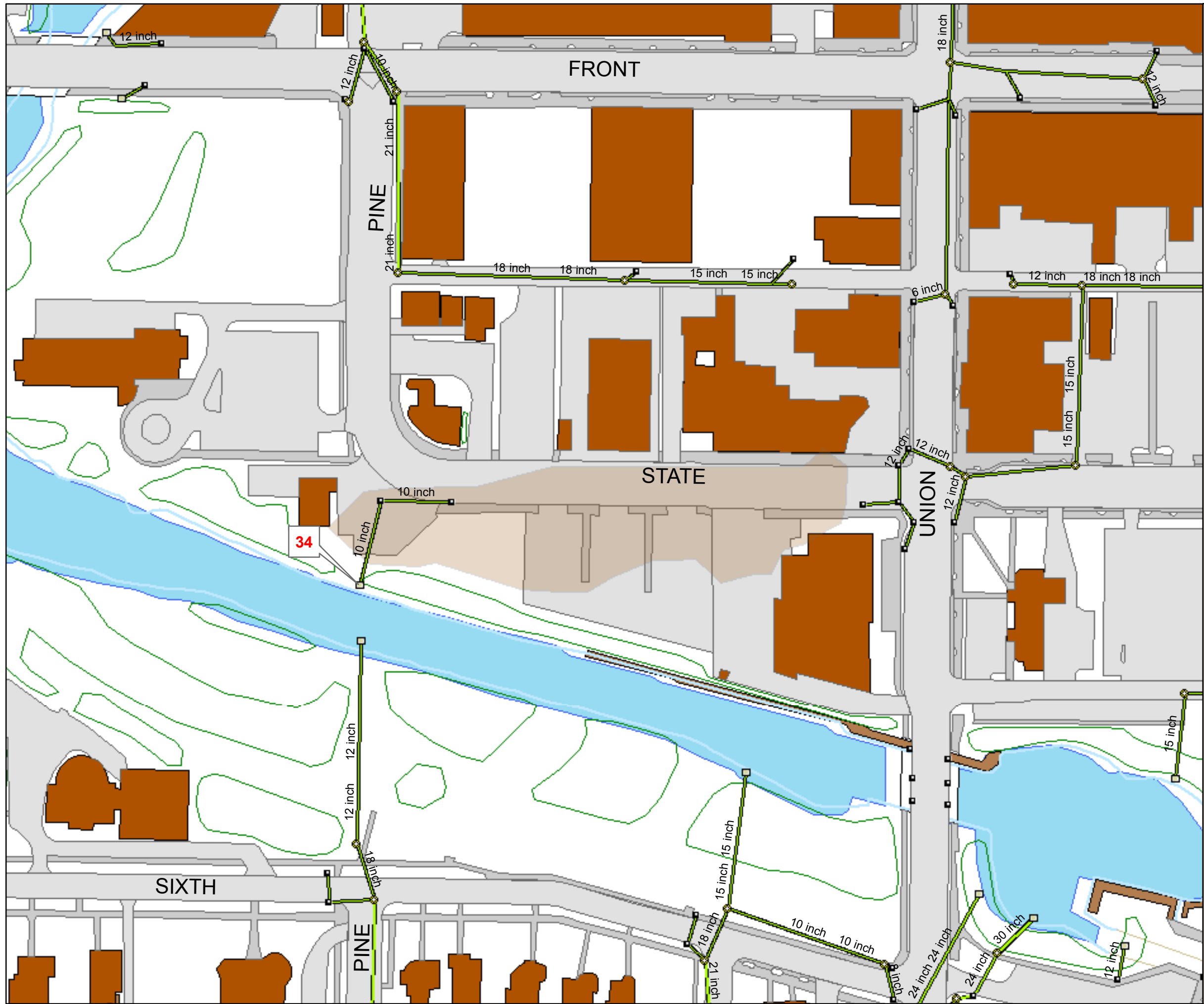
Field Investigation:

Outlet Pipe Size: 21" Pipe Type: ☒ Concrete ☐ CMP ☐ Plastic
☐ Other: _____
Outlet Submerged: ☐ Yes ☒ No ☐ Partial Depth: _____
Sediment Depth: _____
Deposits: ☐ Yes Type: _____ ☒ No
End Treatment: ☒ Yes Type: bulkhead ☐ No
Amount of Pipe Exposed: 0
Slope Protection: ☒ Yes Type: ☒ Rip Rap ☐ Pave Spillway ☐ No
Some ☐ Armor Stone ☐ Cobble
☒ Other: Concrete wall/bulkhead
Scour: ☒ Yes Depth: 2' ☐ No
on bank not in river
High Water Mark/Watercourse: 1'
Depth from Invert: 10" High Watermark Pipe: 2"

Evidence of Flooding: ☐ Yes ☒ No

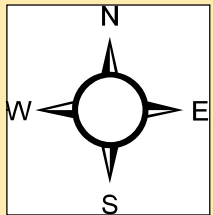
Photographs: ☒ Yes ☐ No Numbers: 1, 2

Comments: lots of debris/sediment on bank

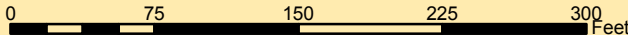


Boundary BR Outfall #34

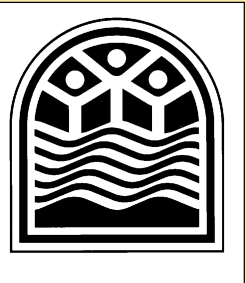
- Legend**
- Storm Manholes
 - Catchbasins
 - Outfalls
 - Storm Reach



1 inch equals 100 feet

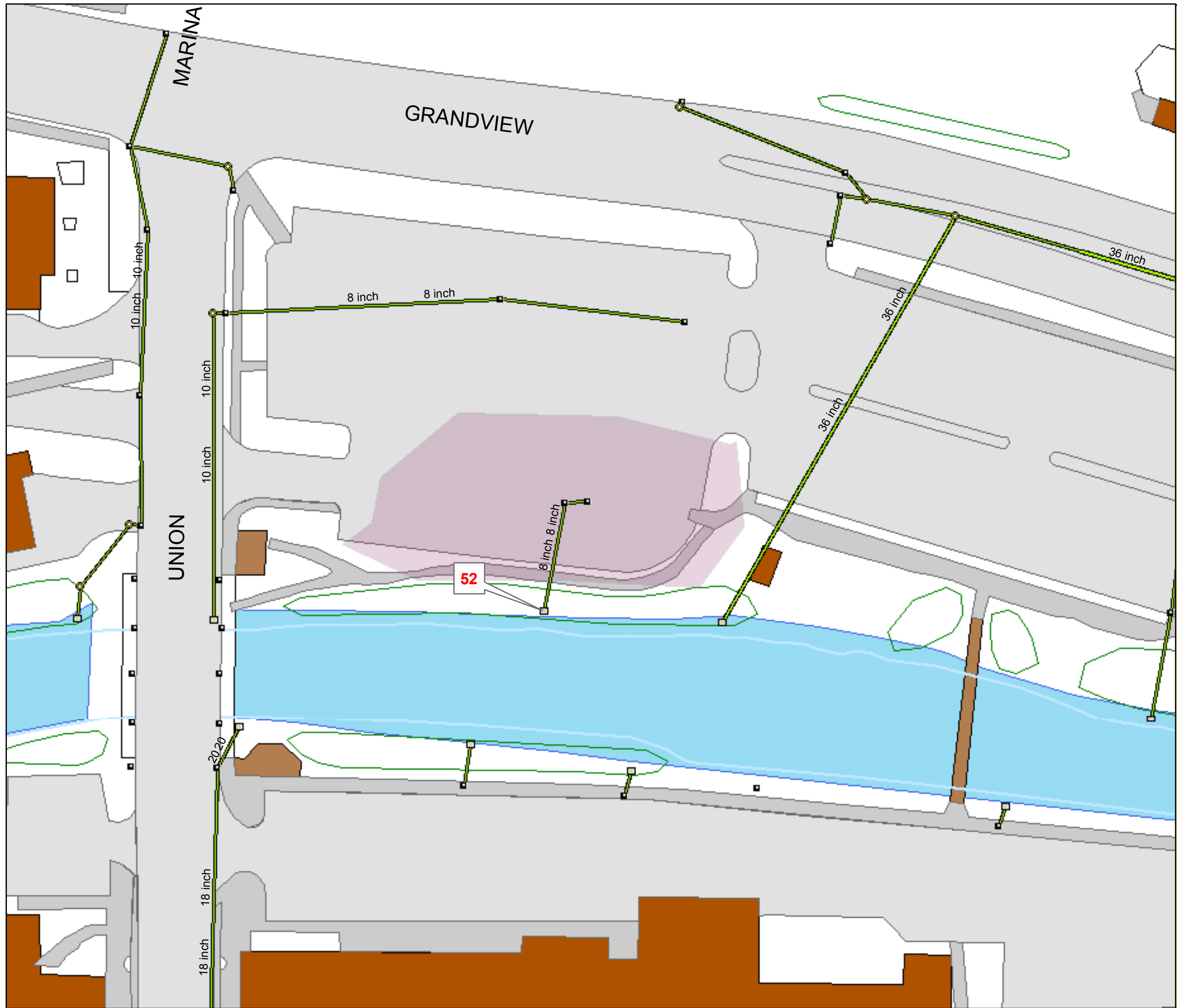


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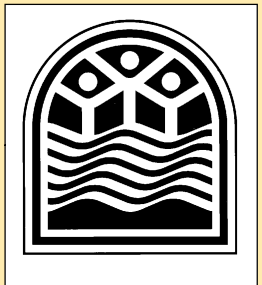
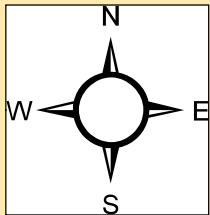
Stormwater System: 34

<i>FromMH</i>	<i>From Elev. (FT)</i>	<i>ToMH</i>	<i>To Elevation (FT)</i>	<i>SLOPE (%)</i>	<i>Length (FT)</i>	<i>Material</i>	<i>Diameter (IN)</i>	<i>Max Flow (CFS)</i>
Catchbasin 683	0.00	Outfall 34	0.00	0.00	84.99	VC	10 inch	0.00

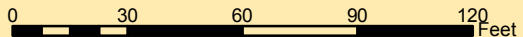


Boundary BS Outfall #52

- Legend**
- Storm Manholes
 - Catchbasins
 - Outfalls
 - Storm Reach



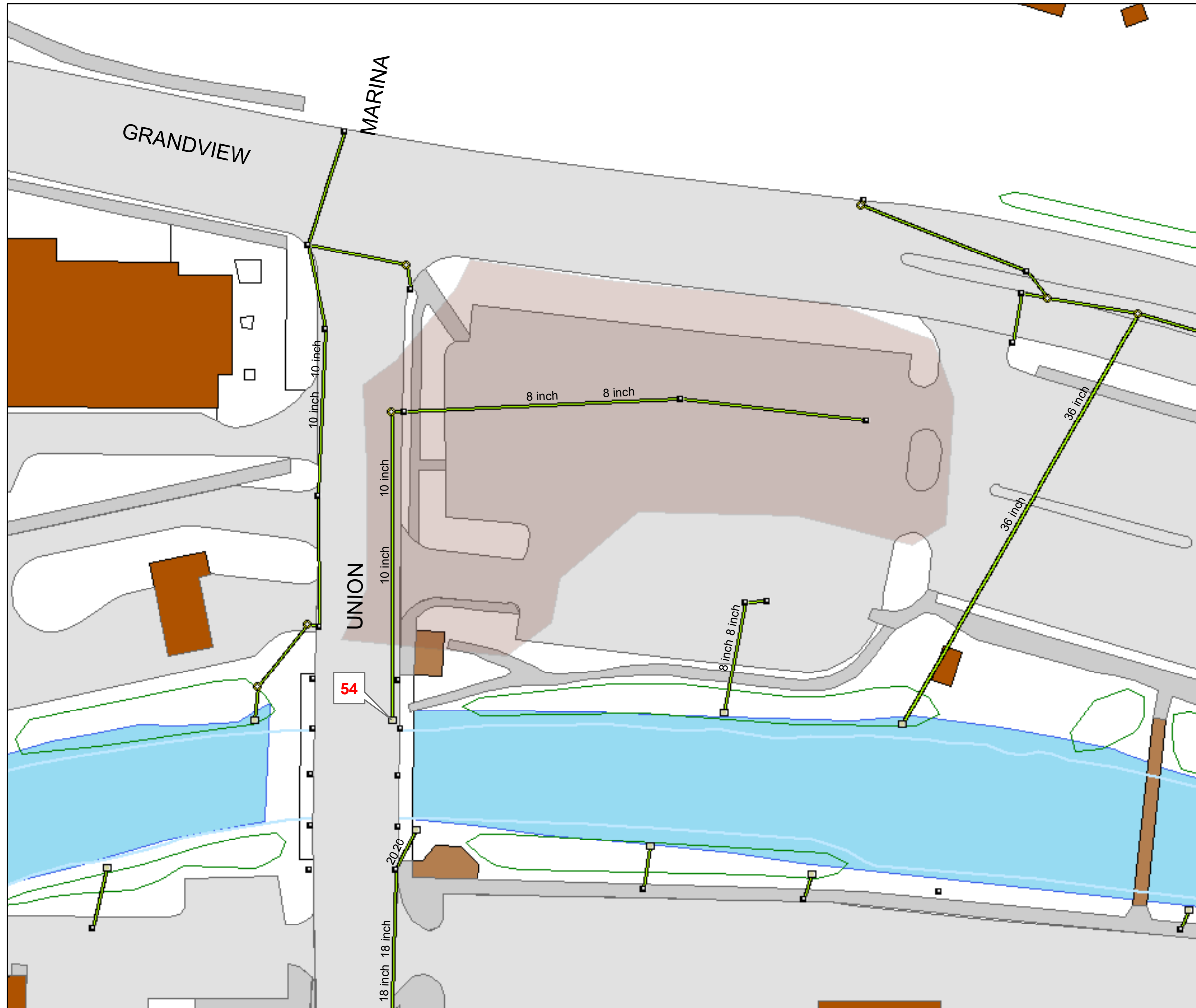
1 inch equals 50 feet



City of Traverse City Engineering Department
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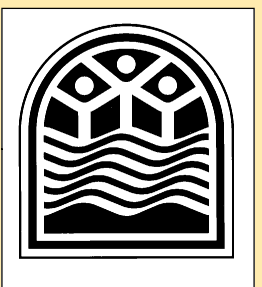
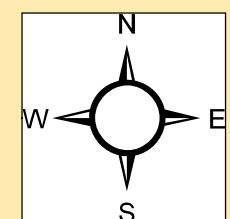
Stormwater System: 52

<i>FromMH</i>	<i>From Elev. (FT)</i>	<i>ToMH</i>	<i>To Elevation (FT)</i>	<i>SLOPE (%)</i>	<i>Length (FT)</i>	<i>Material</i>	<i>Diameter (IN)</i>	<i>Max Flow (CFS)</i>
Catchbasin 1785	584.30	Outfall 52	581.30	5.12	58.59	CM	8 inch	1.91

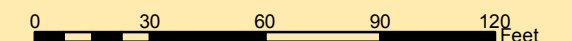


Boundary BT Outfall #54

- Legend**
- Storm Manholes
 - Catchbasins
 - Outfalls
 - Storm Reach



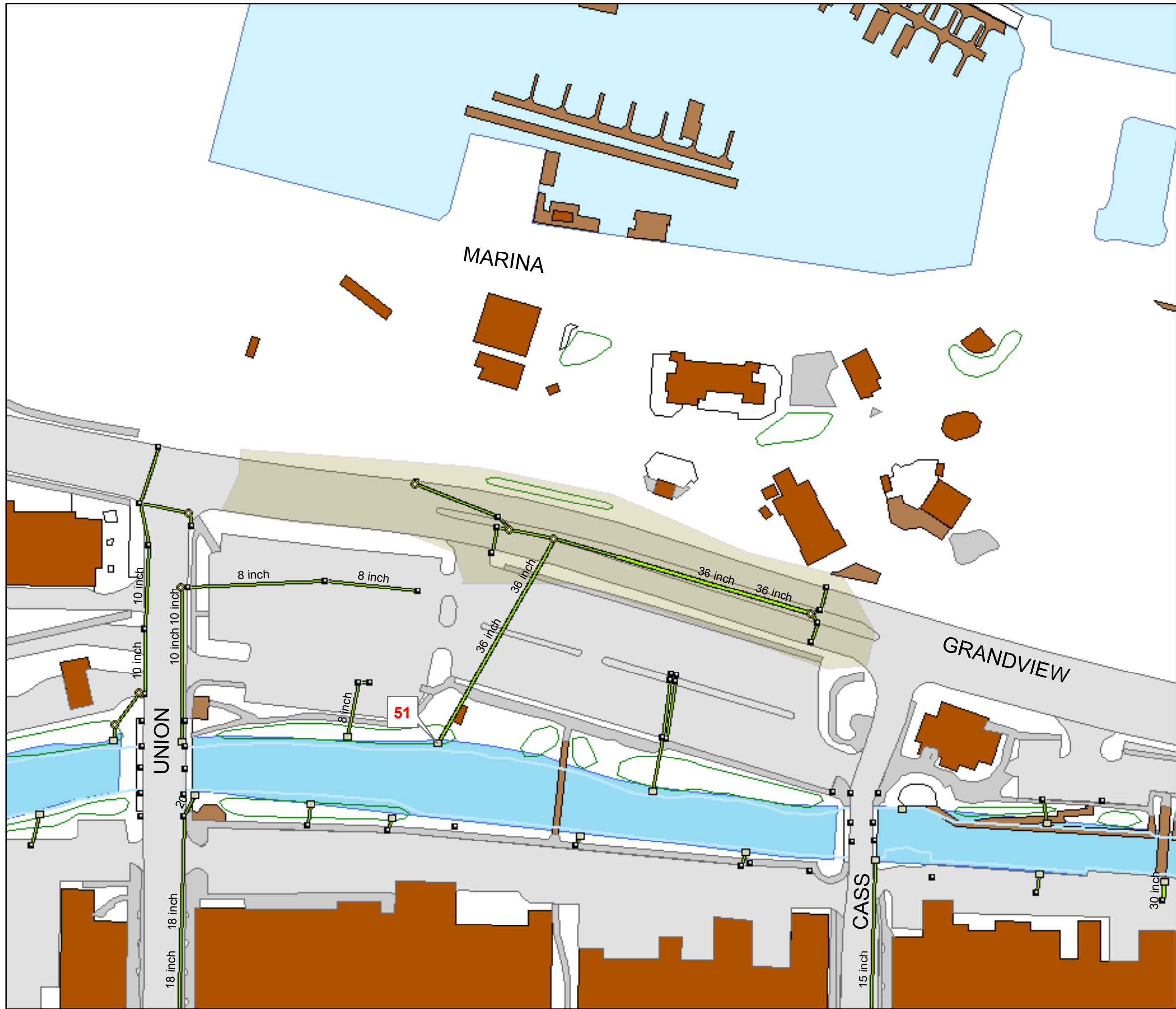
1 inch equals 50 feet



City of Traverse City Engineering Department
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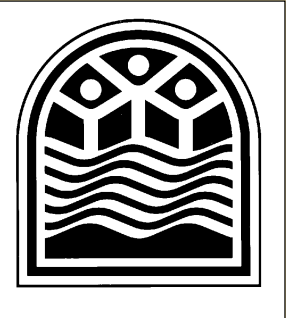
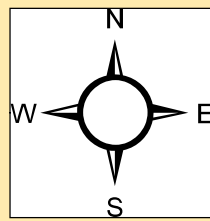
Stormwater System: 54

<i>FromMH</i>	<i>From Elev. (FT)</i>	<i>ToMH</i>	<i>To Elevation (FT)</i>	<i>SLOPE (%)</i>	<i>Length (FT)</i>	<i>Material</i>	<i>Diameter (IN)</i>	<i>Max Flow (CFS)</i>
054001	587.00	Outfall 54	0.00	3.76	162.27	VC	10 inch	4.24

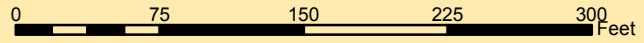


Boundary BU Outfall #51

- Legend**
- Storm Manholes
 - Catchbasins
 - Outfalls
 - Storm Reach

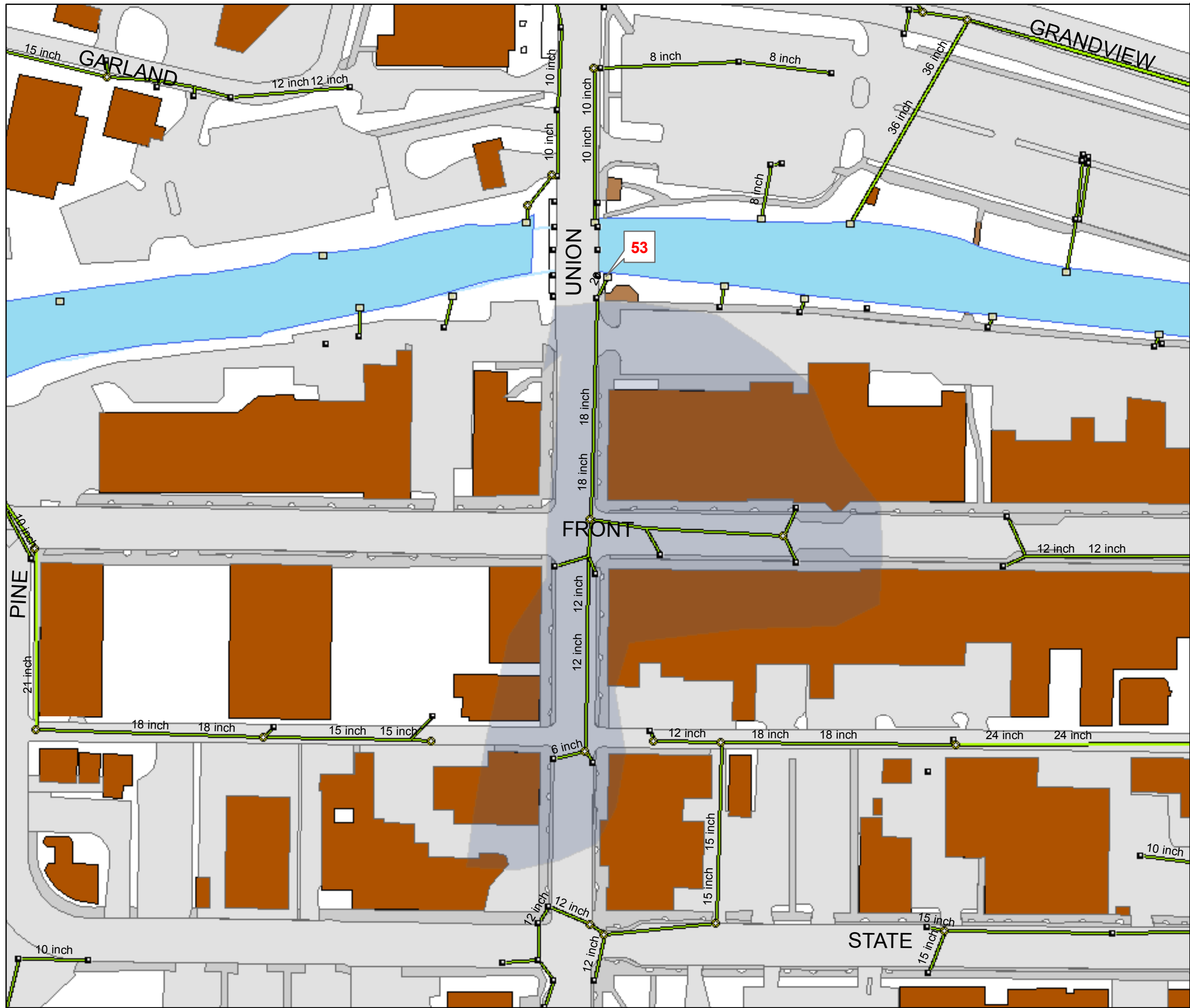


1 inch equals 100 feet



Stormwater System: 51

<i>FromMH</i>	<i>From Elev. (FT)</i>	<i>ToMH</i>	<i>To Elevation (FT)</i>	<i>SLOPE (%)</i>	<i>Length (FT)</i>	<i>Material</i>	<i>Diameter (IN)</i>	<i>Max Flow (CFS)</i>
051001	584.30	Junction	583.19	0.53	212.05	CONCRETE	36 inch	48.34
Junction	583.19	051002	582.85	0.49	67.89	CONCRETE	Unknown	0.00
051002	582.85	Outfall 51	0.00	0.00	248.07	CONCRETE	36 inch	0.00



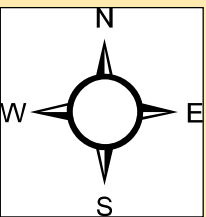
K:\CITYENG\Projects\2005\Storm Grants
1319\05-05-06\05-05-06005.jpg



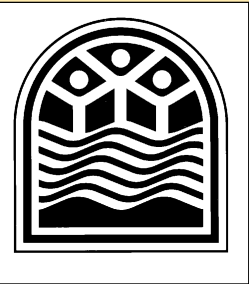
Southerly

Boundary BV Outfall #53

- Legend**
- Storm Manholes
 - Catchbasins
 - Outfalls
 - Storm Reach



1 inch equals 100 feet



0 70 140 210 280 Feet

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Stormwater System: 53

<i>FromMH</i>	<i>From Elev. (FT)</i>	<i>ToMH</i>	<i>To Elevation (FT)</i>	<i>SLOPE (%)</i>	<i>Length (FT)</i>	<i>Material</i>	<i>Diameter (IN)</i>	<i>Max Flow (CFS)</i>
053001	591.50	Junction	588.63	1.39	205.95	VC	12 inch	4.20
Junction	591.50	053002	588.63	7.55	38.02	CONCRETE	12 inch	9.78
053002	588.63	Catchbasin 725	585.87	1.19	232.88	CONCRETE	18 inch	11.43
Catchbasin 725	585.87	Outfall 53	579.62	26.19	23.87	CONCRETE	18 inch	53.73



The City of Traverse City Storm Outlet Evaluation

Page 1 of 1

Project No. _____ File: _____
Description: _____ Field Work by: LL + CB Date: 5/5/06
Drainage Systems: BV Checked by: _____ Date: _____

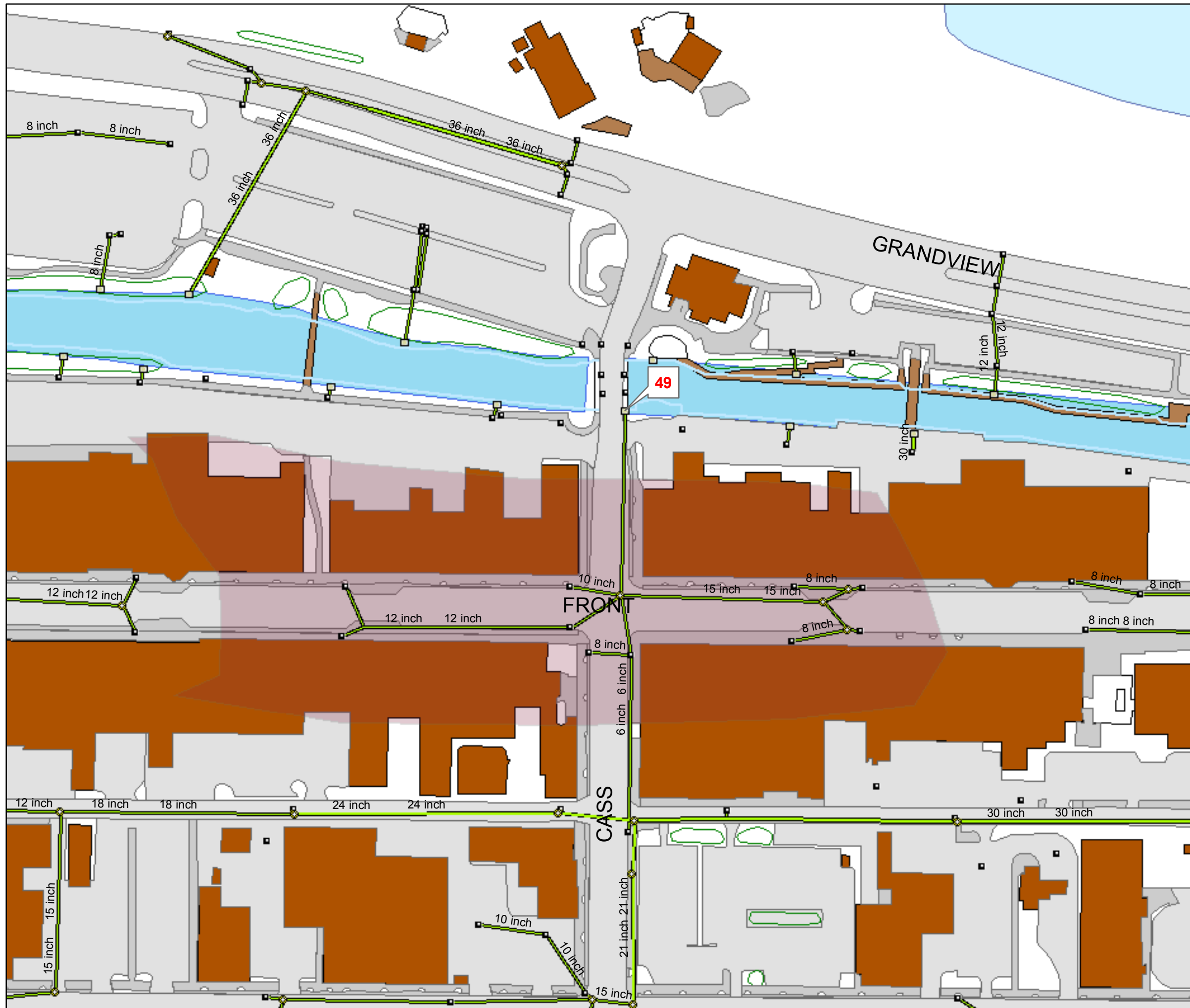
Available Information:

#53
Plans: ☒ Yes ☐ No Year Built: 1943
Plan Reference #: Storm #104 Year Modified: _____
Easement: ☒ Yes Union St + 26 C-E ☐ No Pipe Size: 10"
Outlet Water Course: Boardman River

Field Investigation:

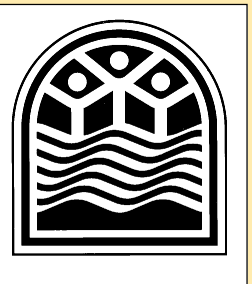
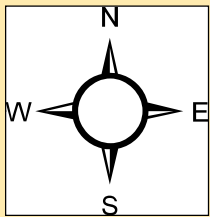
#53
Outlet Pipe Size: 15" Pipe Type: ☒ Concrete ☐ CMP ☐ Plastic
☐ Other: _____
Outlet Submerged: ☐ Yes ☒ No ☐ Partial Depth: _____
Sediment Depth: _____
Deposits: ☒ Yes Type: something black iron? chunky? ☐ No
End Treatment: ☐ Yes Type: _____ ☒ No
Amount of Pipe Exposed: 1' hanging 6' above river
Slope Protection: ☒ Yes Type: ☐ Rip Rap ☐ Pave Spillway ☐ No
☐ Armor Stone ☐ Cobble
☐ Other: _____
Scour: ☐ Yes Depth: _____ ☒ No
High Water Mark/Watercourse: 4'
Depth from Invert: 2" High Watermark Pipe: Ø

Evidence of Flooding: ☐ Yes ☒ No
Photographs: ☒ Yes ☐ No Numbers: 5
Comments: _____

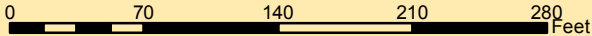


Boundary BW Outfall #49

- Legend**
- Storm Manholes
 - Catchbasins
 - Outfalls
 - Storm Reach



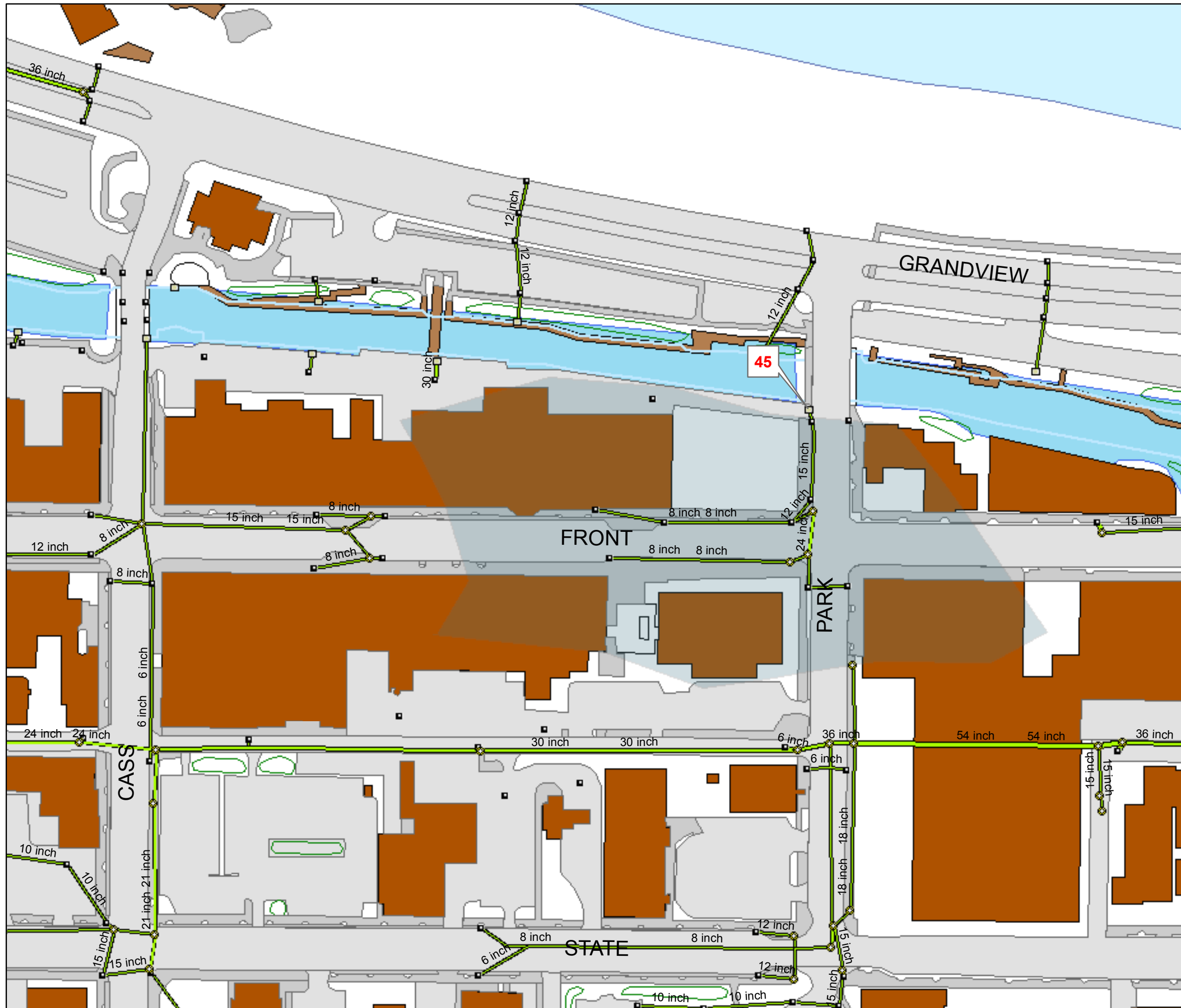
1 inch equals 100 feet



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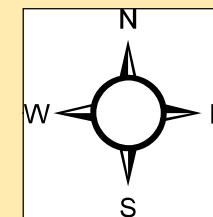
Stormwater System: 49

<i>FromMH</i>	<i>From Elev. (FT)</i>	<i>ToMH</i>	<i>To Elevation (FT)</i>	<i>SLOPE (%)</i>	<i>Length (FT)</i>	<i>Material</i>	<i>Diameter (IN)</i>	<i>Max Flow (CFS)</i>
049001	590.05	049002	0.00	0.00	38.13	CONCRETE	15 inch	0.00
049002	0.00	049003	585.48	0.00	213.67	CONCRETE	15 inch	0.00
049003	585.52	Outfall 49	0.00	1.60	192.18	CONCRETE	15 inch	8.17

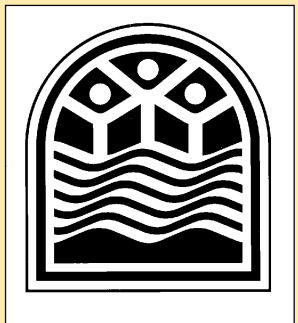
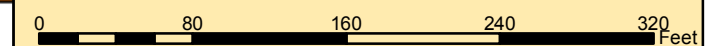


Boundary BX Outfall #45

- Legend**
- Storm Manholes
 - Catchbasins
 - Outfalls
 - Storm Reach



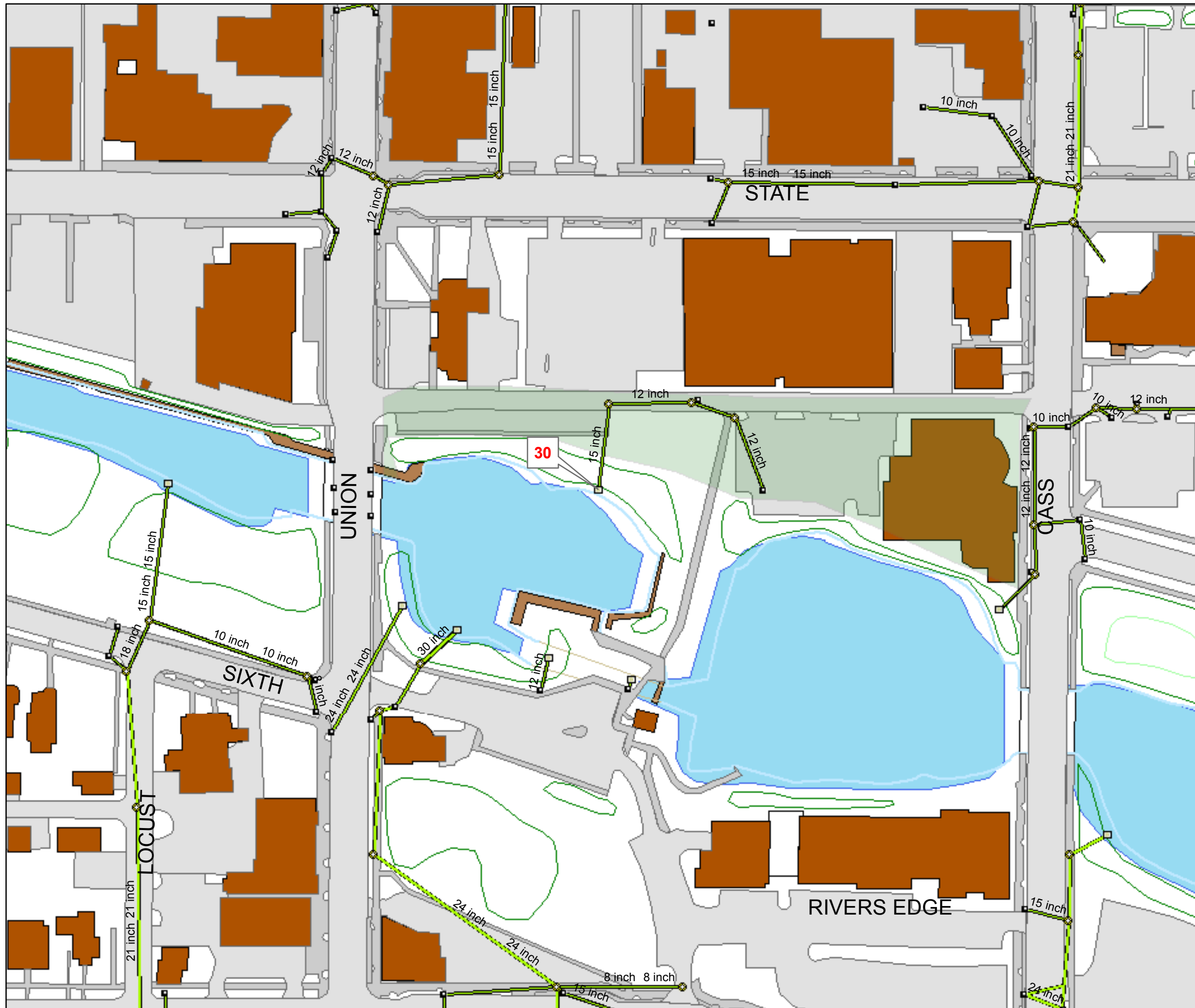
1 inch equals 100 feet



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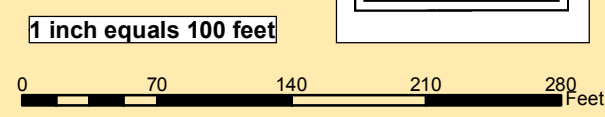
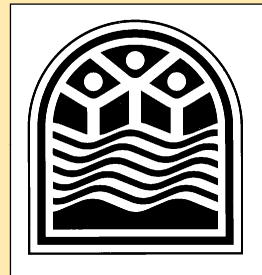
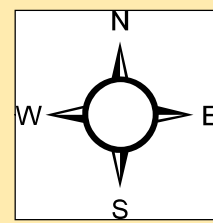
Stormwater System: 45

<i>FromMH</i>	<i>From Elev. (FT)</i>	<i>ToMH</i>	<i>To Elevation (FT)</i>	<i>SLOPE (%)</i>	<i>Length (FT)</i>	<i>Material</i>	<i>Diameter (IN)</i>	<i>Max Flow (CFS)</i>
Catchbasin 1732	0.00	Catchbasin 1733	585.60	0.00	30.48	CONCRETE	12 inch	0.00
Catchbasin 1733	584.28	Junction	583.67	0.94	65.24	CONCRETE	15 inch	6.24
Junction	0.00	Catchbasin 2035	0.00	0.00	16.93	CONCRETE	15 inch	0.00
Catchbasin 2035	583.67	Outfall 45	583.30	3.03	12.20	CONCRETE	15 inch	11.25



Boundary BY Outfall #30

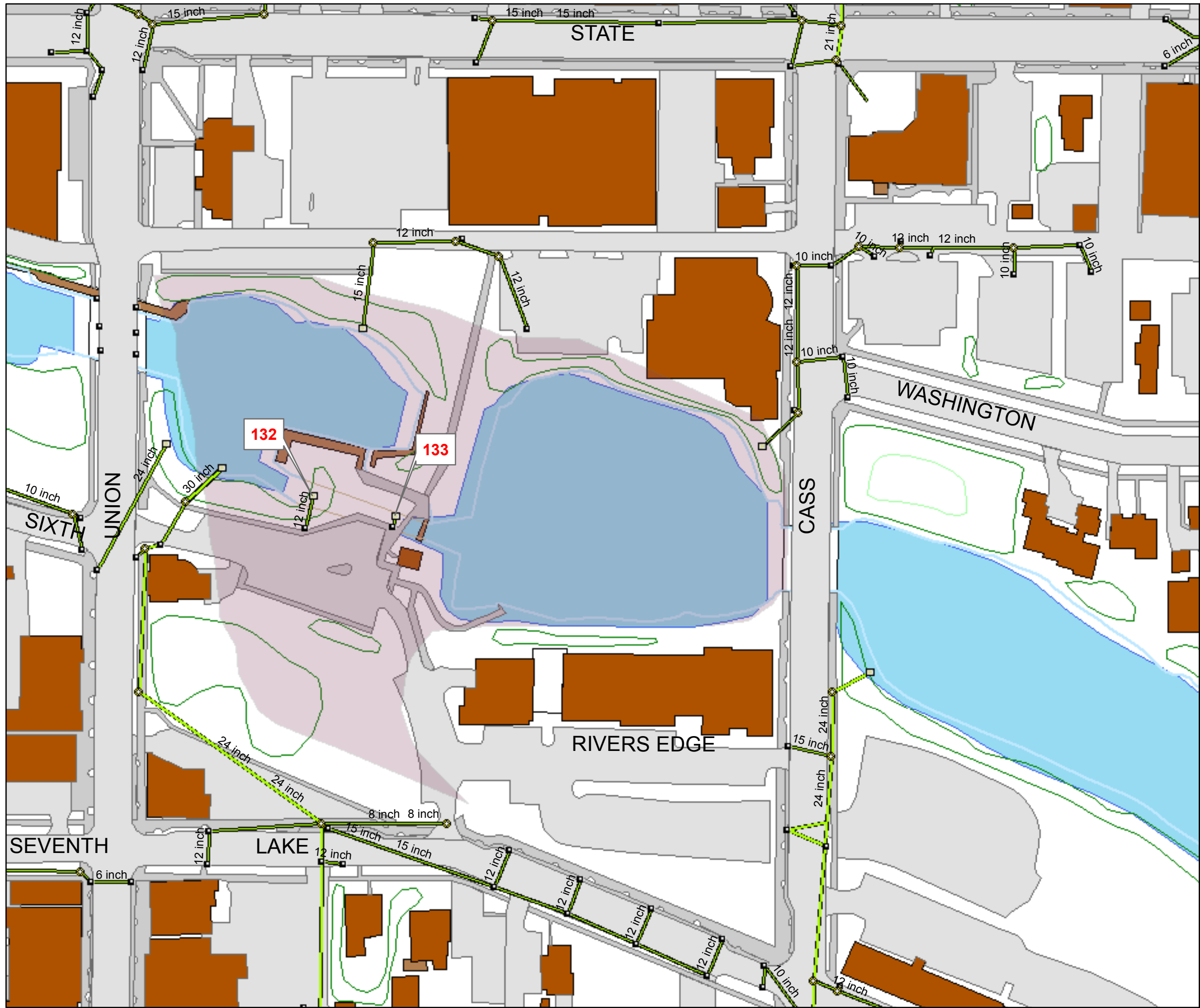
- Legend**
- Storm Manholes
 - Catchbasins
 - Outfalls
 - Storm Reach



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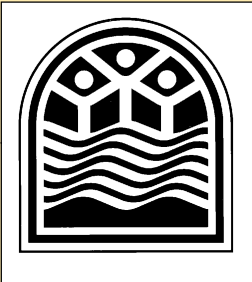
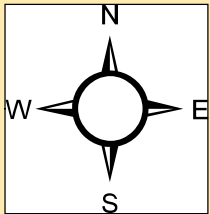
Stormwater System: 30

<i>FromMH</i>	<i>From Elev. (FT)</i>	<i>ToMH</i>	<i>To Elevation (FT)</i>	<i>SLOPE (%)</i>	<i>Length (FT)</i>	<i>Material</i>	<i>Diameter (IN)</i>	<i>Max Flow (CFS)</i>
030001	0.00	030002	0.00	0.00	47.90	CONCRETE	12 inch	0.00
030002	594.00	030003	593.66	0.39	87.46	CONCRETE	12 inch	2.22
030003	0.00	Outfall 30	0.00	0.00	91.33	CONCRETE	15 inch	0.00

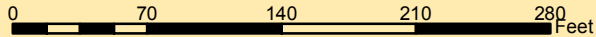


Boundary BZ Outfall #132 & 133

- Legend**
- Storm Manholes
 - Catchbasins
 - Outfalls
 - Storm Reach



1 inch equals 100 feet



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Stormwater System: 132

<i>FromMH</i>	<i>From Elev. (FT)</i>	<i>ToMH</i>	<i>To Elevation (FT)</i>	<i>SLOPE (%)</i>	<i>Length (FT)</i>	<i>Material</i>	<i>Diameter (IN)</i>	<i>Max Flow (CFS)</i>
Catchbasin 1922	0.00	Outfall 132	0.00	0.00	34.77	UNKNOWN	12 inch	0.00

Stormwater System: 133

<i>FromMH</i>	<i>From Elev. (FT)</i>	<i>ToMH</i>	<i>To Elevation (FT)</i>	<i>SLOPE (%)</i>	<i>Length (FT)</i>	<i>Material</i>	<i>Diameter (IN)</i>	<i>Max Flow (CFS)</i>
Catchbasin	0.00	Outfall 133	0.00	0.00	9.96	UNKNOWN	6 inch	0.00