

MEMORANDUM

2707 Colby Avenue, Suite 900, Everett, WA 98201 | P 425.252.7700

To: Gina Hortillosa, PE, PMP

From: Darrell Smith, PE

Date: September 5, 2018

Re: City of Mill Creek – Storm Pipe Repair Program Prioritization

1.0 INTRODUCTION

The City of Mill Creek has obtained CCTV recordings of stormwater pipes in the City between 2012 and 2018. Perteet has reviewed the entirety of available video to assess the condition of those pipes 18-inch in diameter or larger. Large pipes were selected for review due to the increased damage potential of a pipe failure. Each pipe fault was graded for severity on an A through F scale. F grade faults are the most severe, recommended for repair within one (1) year. C- grade faults are recommended for repair within ten (10) years. Grade A faults are not expected to impact the longevity of the pipe. Perteet created planning level estimates of the costs associated with each repair totaling \$4,058,500, of which \$661,300 is for F grade faults. In cases where a pipe run has four (4) or more faults, replacement of the entire run has been recommended. Planning level estimates do not quantify all construction work items, but count only the core work elements and utilize contingencies to represent risk and unknowns. Important data, such as pipe depth, proximity to other structures, and quality of the soil will have a significant impact on costs, and will be available at later stages of design. Actual construction costs will vary, but the planning level estimates provide an order of magnitude cost for the work and a basis to compare recommended repairs.

There are twenty (20) F grade repairs and 137 C- grade repairs. Of the F level repairs, six (6) are assumed to be caused by another utility or to be the result of illicit discharge. For these six (6) pipes, cost recovery may be possible. This memo will recommend a repair program based on a series of criteria described in Section 2 below. A citywide map showing the locations of the F grade faults and the boundaries of Perteet's recommended surface water program is included in the Appendix.

MEMORANDUM

2.0 CRITERIA

2.1 Grade F Faults

F grade faults are recommended for repair within one (1) year. Perteet, in cooperation with City staff, selected a series of criteria with which to prioritize pipe repairs for the urgent F grade faults. The following criteria will be used to bundle pipe repair projects as part of a citywide stormwater refurbishment program. The maps used in this analysis can be found in the Appendix.

1. Catastrophic damage
 - Pipe is ruptured such that stormwater comes into direct contact with soil.
2. Fault in an easement adjacent to private property.
 - Pipe failure threatens resident safety and property.
3. Within one (1) quarter mile of a sensitive wetland or steep slope.
 - Seeks to avoid environmental damage.
 - Steep slope erosion could have severe impacts on safety and property.
4. Failure would obstruct access to critical infrastructure (ex. Fire, Police, School).
 - Seeks to maintain core City functions.
5. Failure would occur on an arterial or major collector.
 - Possibility of grant funding.
 - Failure could cause long term closure of key infrastructure.
6. Pipe size (prioritize larger pipes).
7. Date of discovery (prioritize faults discovered in past years).

2.2 Grade C- Faults

C- grade faults are recommended for repair within ten (10) years. These repairs will be bundled based on the year of discovery and the region of the city. The City of Mill Creek obtained pipe video data beginning in 2012 and continuing through 2018. In order to meet the ten-year recommendation, any pipes discovered to have a C- fault in 2012 need to be repaired by 2022. A fault discovered in 2014 would need to be repaired by 2024, and so on. Thus, repair packages will first consider the year of discovery.

To minimize neighborhood disturbance, bundles will attempt to encompass geographic regions of the city so repairs can take place within a limited timeframe. This type of bundling will also facilitate coordination with any pavement rehabilitation program that may exist. Bundles that match with a pavement repair program should be synchronized to avoid performing destructive pipe repairs in new pavement. At the time of this writing, CIP information is not available. It is recommended that these priorities be adjusted to match future pavement preservation programs.

3.0 METHODOLOGY

3.1 Grade F Faults

F grade faults are recommended for repair within one (1) year. These pipes were given priority over C- grade faults. Each criterion was applied to each F grade fault in sequence. The results can be found in the table in Section 4.0. A fault location that meets criterion number 1 will be prioritized above a fault location that meets criterions 2 through 5. A fault location may meet multiple criteria, in which case a fault location that meets the most criteria will be given priority. If two (2) or more faults meet the same criterion and meet the same total number of criteria, the faults will be compared by the second and successive criteria levels until they can be differentiated. If, after this process has been completed, two (2) or more faults are found to be equivalent, or meet none of the prioritization criteria, they will be ranked by pipe size and year of discovery.

Project costs come from Pertee's planning level estimates. See the Storm Drain Video Observations Memorandum (September 5, 2018) for detailed cost breakdowns.

3.2 Grade C- Faults

Pipe faults graded C- have been sorted by year of discovery, then grouped by neighborhood in Section 5.0. Neighborhoods were simplified to encompass regions of the city. To complete the repairs in the prescribed 10-year window, a yearly budget of between approximately \$500,000 and \$650,000 will be required in the next CIP. The bundling found in Section 6.0 divides the prioritized list into groups of geographically proximate locations with roughly similar budget amounts. See the Storm Drain Video Observations Memorandum (September 5, 2018) for detailed cost breakdowns. The costs found in Section 6.0 are escalated based on the recommended year of constructions.

MEMORANDUM

4.0 F-LEVEL FAULT PRIORITIZATION

The table below shows the prioritized list of critical repairs in Mill Creek. Note, some F faults fall outside the criteria areas and are prioritized only by pipe size and year of discovery. See the program map in the Appendix for locations.

Table 4.1. F-Level Fault Prioritization.

Fault ID* (in order of priority)	Catastrophic	Private Property	Critical Area	Critical Infrastructure	Arterial or Collector	Pipe Size (inches)	Year of Discovery
2332-01**	X	X				18	2014
2417-03**	X		X			30	2015
2215-02**	X					18	2015
2229-03**	X					18	2015
640-01		X	X			24	2015
3185-01		X				30	2014
3168-03**		X				24	2014
5270-01		X				24	2014
4859-04			X	X	X	42	2016
4655-01			X	X	X	42	2016
4847-03			X	X	X	36	2016
4408-01			X		X	18	2018
2412-01			X			18	2015
4853-01				X	X	42	2016
3693-02					X	24	2018
3205-03						24	2014
1565-01**						18	2012
2152-01						18	2015
3987-01						18	2018
3988-01						18	2018

* Refer to Perteet's Storm Drain Video Observations Memorandum (August 15, 2018) for more information about each Fault ID.

**Faults caused, in part, by conflicting utilities. Cost recovery may be possible.

MEMORANDUM

5.0 C- FAULT PRIORITIZATION AND BUNDLING

The table below shows the prioritized list of future targeted repairs in Mill Creek. Bold underlines indicate the limit of a bundle. Bundles are summarized in Section 6.0.

Table 5.1. C- Fault Prioritization and Bundling.

Fault ID*	Year of Discovery	Neighborhood	Fault ID*	Year of Discovery	Neighborhood
1562-02	2012	Heatherwood	2377-01	2015	Evergreen
302-01	2012	Heatherwood	2377-02	2015	Evergreen
3147-01	2014	Heatherstone	2383-01	2015	Evergreen
3147-02	2014	Heatherstone	2392-01	2015	Evergreen
2088-01	2014	Huckleberry	2394-01	2015	Evergreen
2140-01	2014	Huckleberry	2398-01	2015	Evergreen
2140-02	2014	Huckleberry	2417-01	2015	Evergreen
3168-01	2014	Springtree	2417-02	2015	Evergreen
3168-02	2014	Springtree	2448-01	2015	Evergreen
3171-01	2014	Springtree	2451-01	2015	Evergreen
3175-01	2014	Springtree	2454-01	2015	Evergreen
3180-01	2014	Springtree	2454-02	2015	Evergreen
3185-04	2014	Springtree	2486-01	2015	Evergreen
3189-01	2014	Springtree	2486-02	2015	Evergreen
3189-02	2014	Springtree	2188-01	2015	Vine Maple
3205-02	2014	Springtree	2188-02	2015	Vine Maple
3207-01	2014	Springtree	2188-03	2015	Vine Maple
5270-01	2014	Springtree	2194-01	2015	Vine Maple
5270-02	2014	Springtree	2200-01	2015	Vine Maple
6-01	2015	Douglas Fir	2202-01	2015	Vine Maple
6-02	2015	Douglas Fir	2202-02	2015	Vine Maple
11-01	2015	Douglas Fir	2203-01	2015	Vine Maple
12-01	2015	Douglas Fir	2203-02	2015	Vine Maple
13-01	2015	Douglas Fir	2208-01	2015	Vine Maple
13-02	2015	Douglas Fir	2208-02	2015	Vine Maple
13-03	2015	Douglas Fir	2217-01	2015	Vine Maple
15-01	2015	Douglas Fir	2217-02	2015	Vine Maple
16-01	2015	Douglas Fir	2219-01	2015	Vine Maple
17-01	2015	Douglas Fir	2219-02	2015	Vine Maple
21-01	2015	Douglas Fir	2220-01	2015	Vine Maple
36-01	2015	Douglas Fir	2230-01	2015	Vine Maple
38-01	2015	Douglas Fir	2231-01	2015	Vine Maple
38-02	2015	Douglas Fir	2232-01	2015	Vine Maple
40-01	2015	Douglas Fir			

MEMORANDUM

Fault ID*	Year of Discovery	Neighborhood
2232-02	2015	Vine Maple
2234-01	2015	Vine Maple
2236-01	2015	Vine Maple
2238-01	2015	Vine Maple
2240-01	2015	Vine Maple
2240-02	2015	Vine Maple
2252-01	2015	Vine Maple
4655-02	2016	Business District
4656-01	2016	Business District
4849-01	2016	Business District
4853-02	2016	Business District
4853-03	2016	Business District
4854-01	2016	Business District
4856-01	2016	Business District
4861-01	2016	Business District
4863-01	2016	Business District
4865-01	2016	Business District
4865-02	2016	Business District
4865-03	2016	Business District
4867-01	2016	Business District
4867-02	2016	Business District
4867-03	2016	Business District
4869-01	2016	Business District
4871-01	2016	Business District
4873-01	2016	Business District
4873-02	2016	Business District
4884-01	2016	Business District
4884-02	2016	Business District
4886-01	2016	Business District
4886-02	2016	Business District
3531-01	2018	Business District
3693-01	2018	Business District
4567-01	2018	Business District
4572-01	2018	Business District
3516-01	2018	Business District
3517-01	2018	Business District
3527-01	2018	Business District
4407-01	2018	Business District

Fault ID*	Year of Discovery	Neighborhood
4407-02	2018	Business District
4407-03	2018	Business District
3856-01	2018	Amberleigh
1773-01	2018	Brighton
2787-01	2018	Northeast
5126-01	2018	Northeast
21-01	2018	Trillium
92-01	2018	Trillium
93-01	2018	Trillium
95-01	2018	Trillium
96-01	2018	Trillium
99-01	2018	Trillium
100-01	2018	Trillium
102-03	2018	Trillium
104-01	2018	Trillium
114-01	2018	Northwest
146-01	2018	Northwest
146-02	2018	Northwest
147-01	2018	Northwest
147-02	2018	Northwest
164-01	2018	Northwest
165-01	2018	Northwest
167-03	2018	Northwest
167-06	2018	Northwest
168-01	2018	Northwest
169-01	2018	Northwest
171-01	2018	Northwest
172-01	2018	Northwest
173-01	2018	Northwest
1158-01	2018	River Crossing
1159-01	2018	River Crossing
3990-01	2018	Southeast
3992-01	2018	Southeast
4083-01	2018	Southeast
4139-01	2018	Southeast

* Refer to Perteet's Storm Drain Video Observations Memorandum (August 15, 2018) for more information about each Fault ID.

MEMORANDUM

6.0 BUNDLING

The bundling shown below reflects the grouping of prioritized repairs listed above. F grade repairs are grouped into preliminary bid packages. Note, it is recommended that the repairs be fully designed before final bid packages are established. The bundles for C- fault repairs are organized by neighborhood and have differing values, but average about \$600,000 per year. Neighborhood groupings were given precedence over equivalent dollar values.

Table 6.1. F Repair Bundling.

Description	Repairs	Bundle Total*
Mill Creek Boulevard and Spot Repairs	5270-01, 4655-01, 4853-01, 3693-02, 4859-04, 4847-03	\$240,500
Remaining Large Pipes	640-01, 3168-03, , 3205-03, 3987-01, 3988-01, 2332-01, 2215-02, 2229-09, 4408-01, 2412-01, 1565-01, 2152-01, 2417-03, 3185-01	\$420,800

*For a detailed breakdown of repairs and costs, see the Appendix.

Table 6.2. C- Repair Bundling.

Program Year	Neighborhoods Covered	Bundle Total*
2020	Heatherwood, Heatherstone, Huckleberry, Springtree, Douglas Fir	\$600,100
2021	Evergreen, Vine Maple (North of 142nd Street SE, East of 20th Drive SE)	\$496,600
2022	Vine Maple (South of 142nd Street SE, West of 20th Drive SE)	\$602,400
2023	Business District North and Outfalls	\$636,100
2024	Business District South, Brighton, Northeast, Amberleigh	\$585,800
2025	Trillium Boulevard	\$606,800
2026	Northwest, Southeast	\$608,100

*For a detailed breakdown of repairs and costs, see the Appendix.

7.0 RECOMMENDATIONS

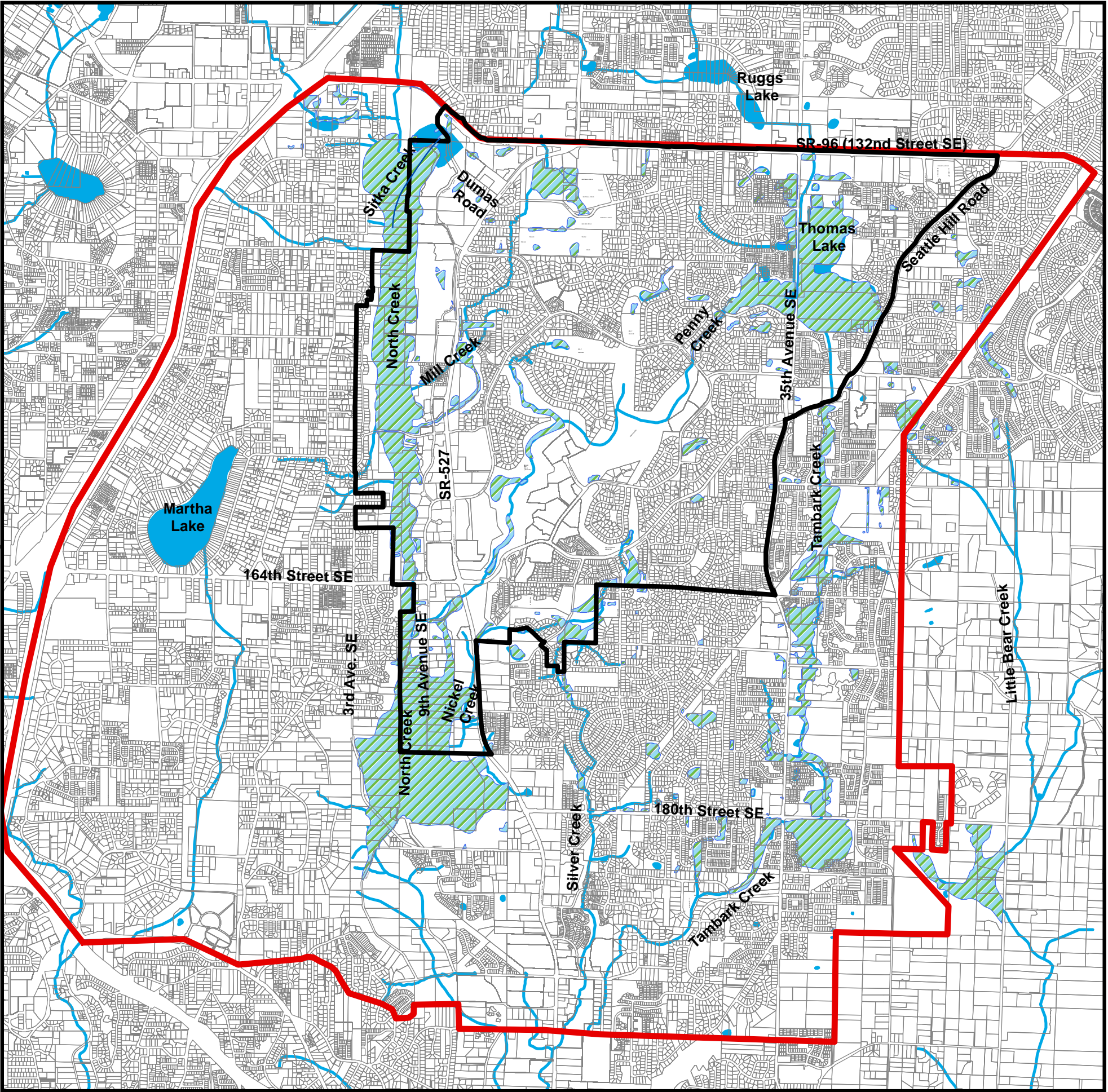
It is recommended that all grade F faults be repaired within one (1) year and that all grade C- faults be repaired within ten (10) years. This plan prioritizes pipe faults of most pressing concern and for which failure could result in risk to safety and property serious disruption to City functions.

For faults that should be repaired within ten (10) years, we have proposed a seven-year plan for future CIP's. A yearly allocation of \$600,000 is recommended for surface water infrastructure rehabilitation. These packages prioritize faults by date of discovery, then by region of the City. Adhering to this plan will result in all C- faults being repaired within ten (10) years of their discovery.

It should be further noted that only 18 inches and larger pipes were assessed for this analysis. The City manages approximately 264,000 linear feet (LF) of storm pipe, of which about 216,480 LF is pipes 15 inches and smaller in diameter. In a previous Perteet review of 12-inch stormwater pipes in the Wildflower and Mill Park Village neighborhoods, several faults were identified. While these pipes were not graded in the same way as the larger pipes, several faults that would qualify as F were observed. It is recommended that these pipes be assessed as well.

APPENDIX A
Criteria Maps

Wetlands & Water Features



- City Limits
- Municipal Urban Growth Area Boundary
- Wetland
- Waterbody
- Watercourse

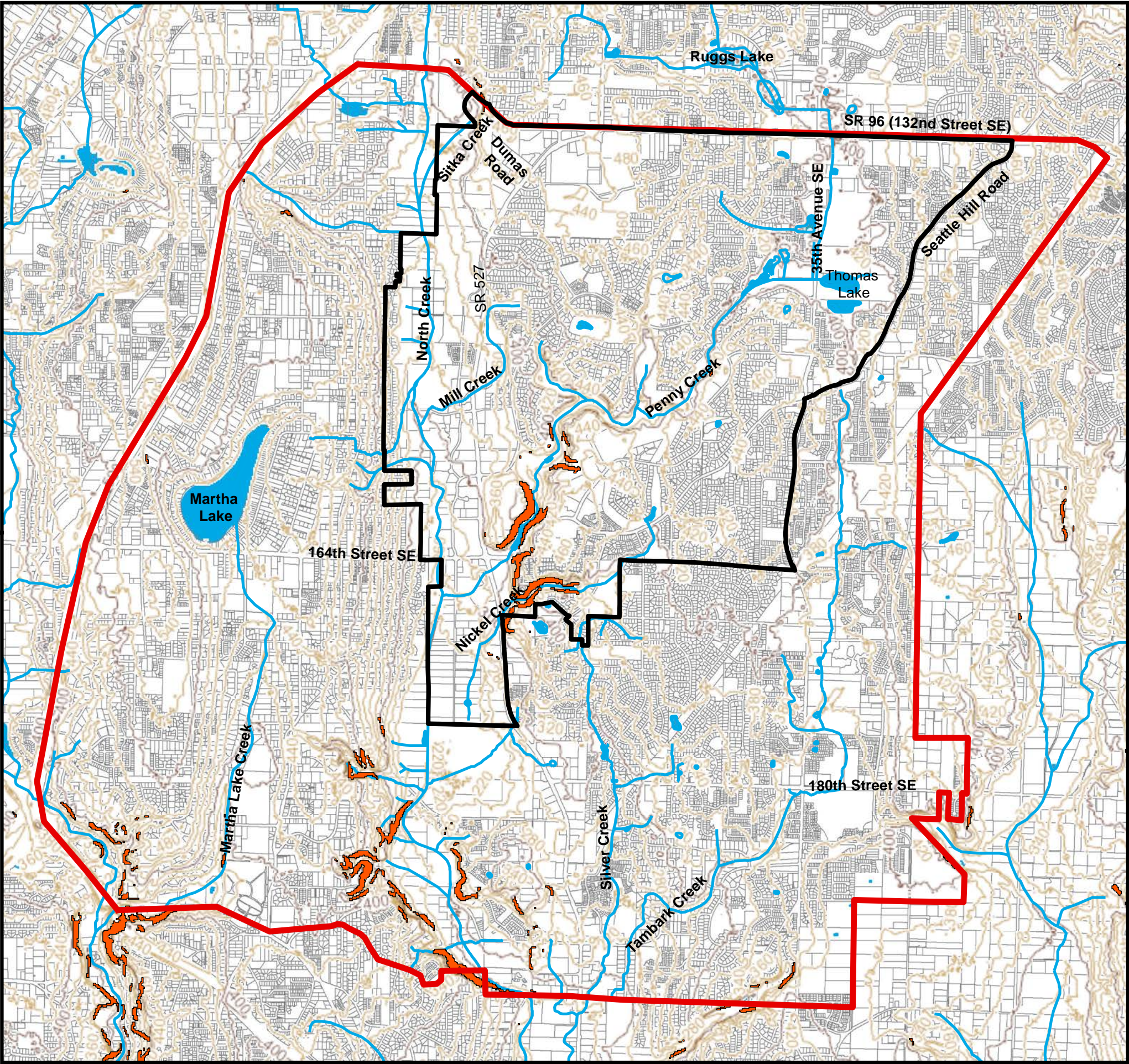
Council Ord. 2015-802
Effective December 18, 2015



Disclaimer: Wetlands shown are approximate in location and also shown for historical reference. A site specific wetland delineation is required prior to development per MCMC 18.06. GIS data (maps) are produced by the City of Mill Creek for general information purposes. No representation or guarantee is made concerning the accuracy, currency, or completeness of the information provided.



Steep Slopes



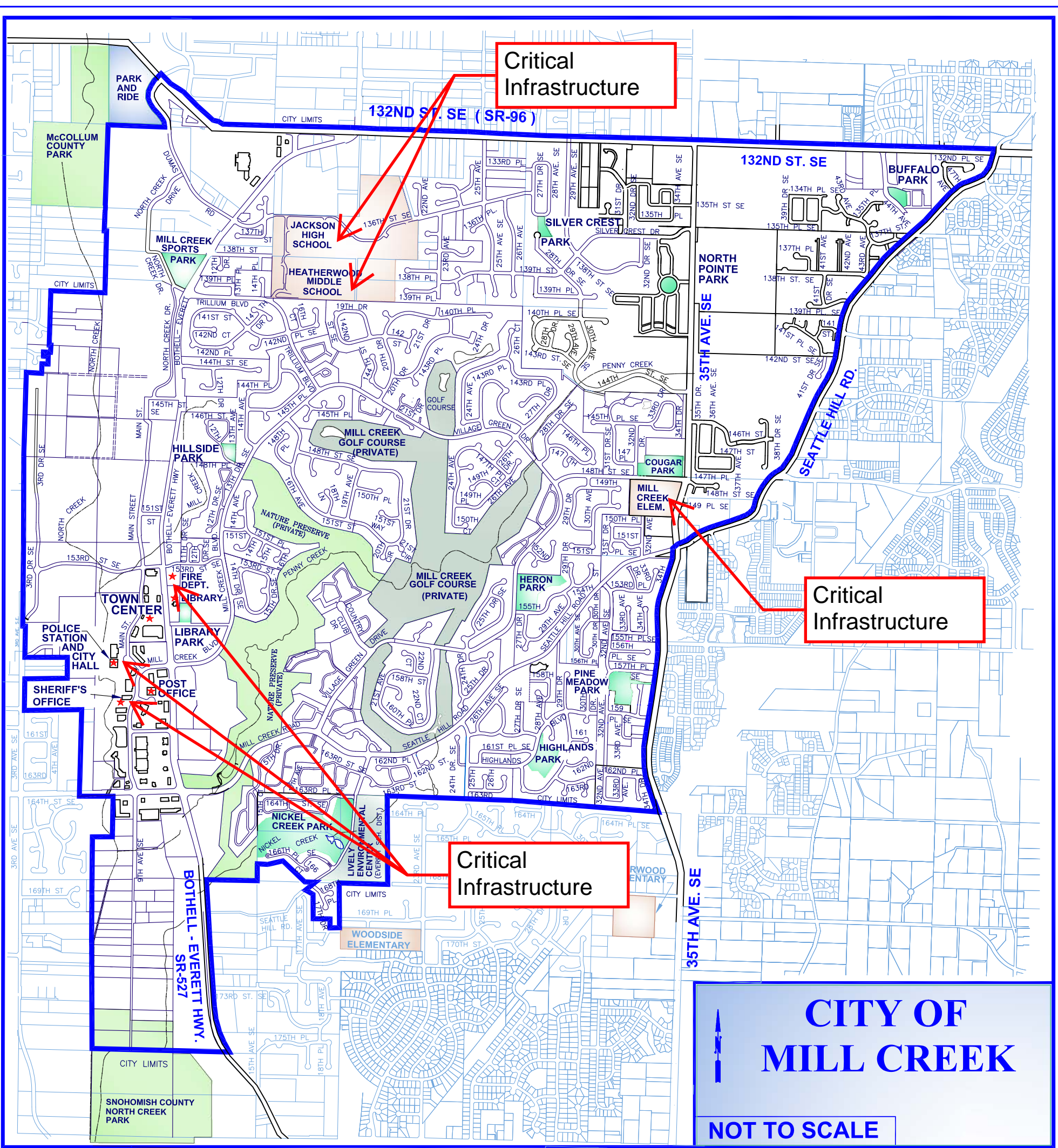
Council Ord. 2015-802
Effective December 18, 2015

- City Limits
- Municipal Urban Growth Area
- Steep Slopes
- 20 Foot Contour



Disclaimer: Steep slopes shown are approximate in location. A site specific geotechnical study is required prior to development per MCMC 18.06. Contour data is obtained from Snohomish County and derived from LiDAR-based elevation models. GIS data (maps) are produced by the City of Mill Creek for general information purposes. No representation or guarantee is made concerning the accuracy, currency, or completeness of the information provided.





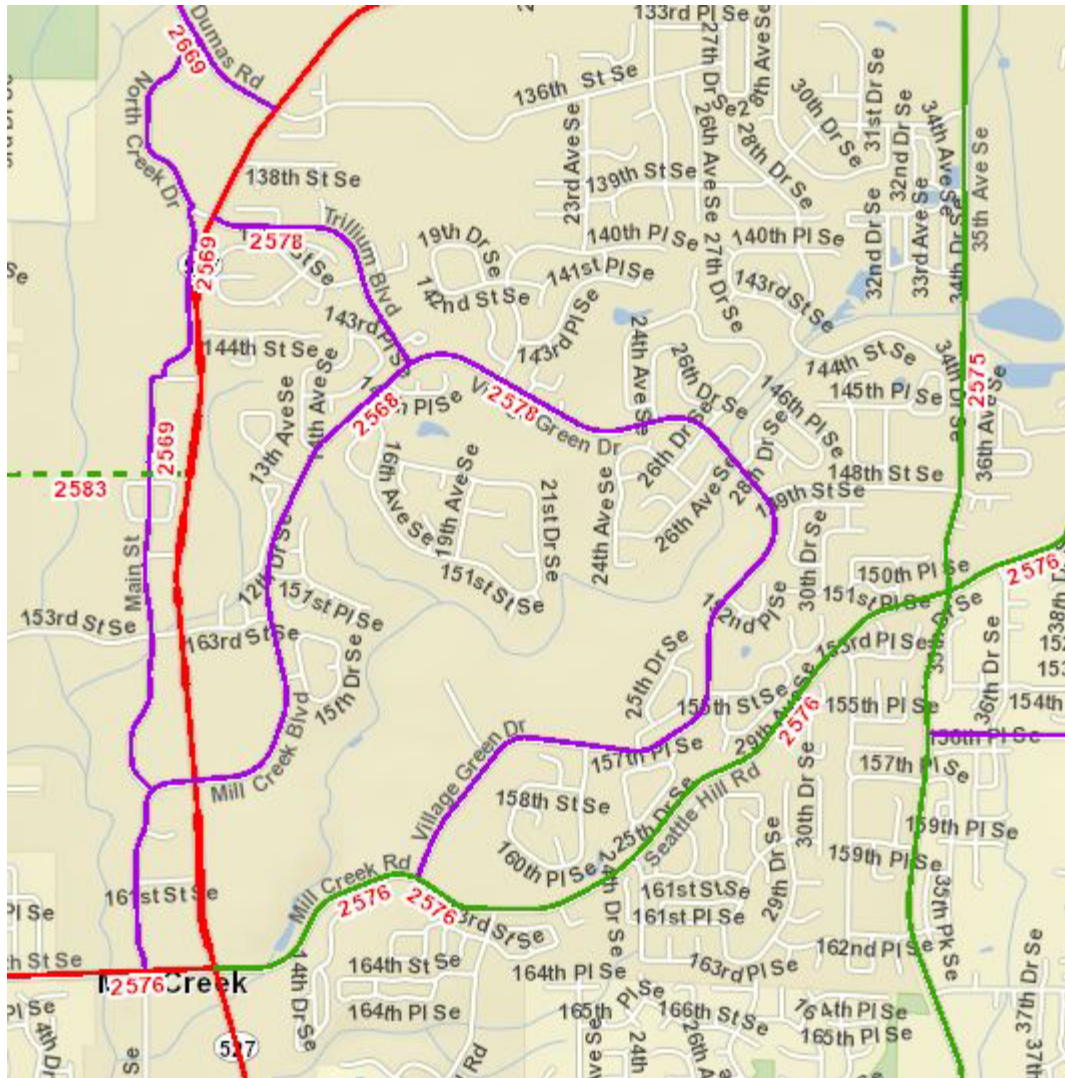
INCORPORATED: 1983

City Hall
15728 Main Street
Mill Creek, Washington 98012-1227
425-745-1891 General Offices (Hours: 9 am - 5 pm)
425-745-6175 Police Department (Hours: 9 am - 5 pm)



Population: 18,780 (April 2014 Estimate)
Size: 4.6817 Square Miles

Cityofmillcreek.com



- Functional Class
- Interstate
 - Other Fwy Expwy
 - Other Principal Arterial
 - Minor Arterial
 - Major Collector
 - Minor Collector

MILL CREEK STORM PIPE ASSESSMENT MILL CREEK FUNCTIONAL CLASSIFICATION

APPENDIX B

F Grade Cost Breakdown

Prioritization of F Grade Repairs (Color Coded by Work Package)

Project No. 20180015

Fault ID	Address	Catastrophic	Private Property	Critical Area	Critical Infrastructure	Arterial or Collector	Pipe Size (IN)	Year of Discovery	Cost Recovery	Cost	Cumulative
2332-01	14817 26th Ave SE	X	X				18	2014	X	\$ 11,300.00	\$ 11,300.00
2417-03	14623 16th Ave SE	X		X			30	2015	X	\$ 15,400.00	\$ 26,700.00
2215-02	14031 19th Dr SE	X					18	2015	X	\$ 73,600.00	\$ 100,300.00
2229-03	1906 142nd St SE	X					18	2015	Partial	\$ 54,800.00	\$ 155,100.00
640-01	14512 14th Ave SE		X	X			24	2015		\$ 16,400.00	\$ 171,500.00
3185-01	15924 23rd Ln SE		X				30	2014		\$ 15,400.00	\$ 186,900.00
3168-03	15808 21st Ave SE		X				24	2014	Partial	\$ 56,400.00	\$ 243,300.00
5270-01	2114 160th Pl SE		X				24	2014		\$ 3,100.00	\$ 246,400.00
4859-04	15928 Mill Creek Blvd			X	X	X	42	2016		\$ 117,100.00	\$ 363,500.00
4655-01	16018 Mill Creek Blvd			X	X	X	42	2016		\$ 3,100.00	\$ 366,600.00
4847-03	15711 Mill Creek Blvd			X	X	X	36	2016		\$ 97,100.00	\$ 463,700.00
4408-01	1500 Mill Creek Road			X		X	18	2018		\$ 29,000.00	\$ 492,700.00
2412-01	1629 148th St SE			X			18	2015		\$ 14,200.00	\$ 506,900.00
4853-01	15711 Mill Creek Blvd				X	X	42	2016		\$ 3,700.00	\$ 510,600.00
3693-02	1111 Mill Cr Blvd					X	24	2018		\$ 16,400.00	\$ 527,000.00
3205-03	15630 23rd Ln SE						24	2014		\$ 79,500.00	\$ 606,500.00
1565-01	13833 26th Ave SE						18	2012	X	\$ 14,200.00	\$ 620,700.00
2152-01	2440 141st Pl SE						18	2015		\$ 14,200.00	\$ 634,900.00
3987-01	2606 161st St SE						18	2018		\$ 14,200.00	\$ 649,100.00
3988-01	2527 161st St SE						18	2018		\$ 12,200.00	\$ 661,300.00

Work Packages

Mill Creek Boulevard and Spot Repairs
Remaining Large Pipes

\$ 661,300.00 Total

APPENDIX C

C- Grade Cost Breakdown

Prioritization of C- Grade Repairs

Project No. 20180015

Fault ID	Year of Discovery	Neighborhood	Cost (2018 \$)	Cost (Construction Year)	Cumulative	Bundle Total	Index Year 2018
1562-02	2012	Heatherwood	\$ 14,200.00	\$ 15,400.00	\$ 15,400.00		
302-01	2012	Heatherwood	\$ 12,200.00	\$ 13,200.00	\$ 28,600.00		
3147-01	2014	Heatherstone	\$ 3,100.00	\$ 3,400.00	\$ 32,000.00		
3147-02	2014	Heatherstone	\$ 3,100.00	\$ 3,400.00	\$ 35,400.00		
2088-01	2014	Huckleberry	\$ 14,200.00	\$ 15,400.00	\$ 50,800.00		
2140-01	2014	Huckleberry	\$ 12,200.00	\$ 13,200.00	\$ 64,000.00		
2140-02	2014	Huckleberry	\$ 12,200.00	\$ 13,200.00	\$ 77,200.00		
3171-01	2014	Springtree	\$ 16,400.00	\$ 17,800.00	\$ 95,000.00		
3175-01	2014	Springtree	\$ 3,100.00	\$ 3,400.00	\$ 98,400.00		
3180-01	2014	Springtree	\$ 3,100.00	\$ 3,400.00	\$ 101,800.00		
3185-04	2014	Springtree	\$ 3,100.00	\$ 3,400.00	\$ 105,200.00		
3189-01	2014	Springtree	\$ 3,100.00	\$ 3,400.00	\$ 108,600.00		
3189-02	2014	Springtree	\$ 3,100.00	\$ 3,400.00	\$ 112,000.00		
3207-01	2014	Springtree	\$ 3,100.00	\$ 3,400.00	\$ 115,400.00		
5270-01	2014	Springtree	\$ 3,100.00	\$ 3,400.00	\$ 118,800.00		
5270-02	2014	Springtree	\$ 3,100.00	\$ 3,400.00	\$ 122,200.00		
6-01	2015	Douglas Fir	\$ 3,100.00	\$ 3,400.00	\$ 125,600.00		
6-02	2015	Douglas Fir	\$ 3,100.00	\$ 3,400.00	\$ 129,000.00		
11-01	2015	Douglas Fir	\$ 3,100.00	\$ 3,400.00	\$ 132,400.00		
12-01	2015	Douglas Fir	\$ 3,100.00	\$ 3,400.00	\$ 135,800.00		
13-01	2015	Douglas Fir	\$ 3,100.00	\$ 3,400.00	\$ 139,200.00		
13-02	2015	Douglas Fir	\$ 3,100.00	\$ 3,400.00	\$ 142,600.00		
13-03	2015	Douglas Fir	\$ 3,100.00	\$ 3,400.00	\$ 146,000.00		
15-01	2015	Douglas Fir	\$ 63,700.00	\$ 68,900.00	\$ 214,900.00		
16-01	2015	Douglas Fir	\$ 3,100.00	\$ 3,400.00	\$ 218,300.00		
17-01	2015	Douglas Fir	\$ 81,900.00	\$ 88,600.00	\$ 306,900.00		
21-01	2015	Douglas Fir	\$ 84,100.00	\$ 91,000.00	\$ 397,900.00		
36-01	2015	Douglas Fir	\$ 73,600.00	\$ 79,700.00	\$ 477,600.00		
38-01	2015	Douglas Fir	\$ 3,100.00	\$ 3,400.00	\$ 481,000.00		
38-02	2015	Douglas Fir	\$ 3,100.00	\$ 3,400.00	\$ 484,400.00		
40-01	2015	Douglas Fir	\$ 106,900.00	\$ 115,700.00	\$ 600,100.00	\$ 600,100.00	2020
2377-01	2015	Evergreen	\$ 3,100.00	\$ 3,500.00	\$ 603,600.00		
2377-02	2015	Evergreen	\$ 3,100.00	\$ 3,500.00	\$ 607,100.00		
2383-01	2015	Evergreen	\$ 34,400.00	\$ 38,700.00	\$ 645,800.00		
2392-01	2015	Evergreen	\$ 76,100.00	\$ 85,700.00	\$ 731,500.00		
2394-01	2015	Evergreen	\$ 3,100.00	\$ 3,500.00	\$ 735,000.00		
2398-01	2015	Evergreen	\$ 52,500.00	\$ 59,100.00	\$ 794,100.00		
2417-01	2015	Evergreen	\$ 3,100.00	\$ 3,500.00	\$ 797,600.00		
2417-02	2015	Evergreen	\$ 3,100.00	\$ 3,500.00	\$ 801,100.00		
2448-01	2015	Evergreen	\$ 77,500.00	\$ 87,200.00	\$ 888,300.00		
2451-01	2015	Evergreen	\$ 3,100.00	\$ 3,500.00	\$ 891,800.00		
2454-01	2015	Evergreen	\$ 3,100.00	\$ 3,500.00	\$ 895,300.00		
2454-02	2015	Evergreen	\$ 3,100.00	\$ 3,500.00	\$ 898,800.00		
2486-01	2015	Evergreen	\$ 3,100.00	\$ 3,500.00	\$ 902,300.00		
2486-02	2015	Evergreen	\$ 3,100.00	\$ 3,500.00	\$ 905,800.00		
2188-01	2015	Vine Maple	\$ 3,100.00	\$ 3,500.00	\$ 909,300.00		
2188-02	2015	Vine Maple	\$ 3,100.00	\$ 3,500.00	\$ 912,800.00		
2188-03	2015	Vine Maple	\$ 3,100.00	\$ 3,500.00	\$ 916,300.00		
2194-01	2015	Vine Maple	\$ 3,100.00	\$ 3,500.00	\$ 919,800.00		
2200-01	2015	Vine Maple	\$ 126,100.00	\$ 141,900.00	\$ 1,061,700.00		
2202-01	2015	Vine Maple	\$ 3,100.00	\$ 3,500.00	\$ 1,065,200.00		
2202-02	2015	Vine Maple	\$ 3,100.00	\$ 3,500.00	\$ 1,068,700.00		
2203-01	2015	Vine Maple	\$ 3,100.00	\$ 3,500.00	\$ 1,072,200.00		
2203-02	2015	Vine Maple	\$ 3,100.00	\$ 3,500.00	\$ 1,075,700.00		
2208-01	2015	Vine Maple	\$ 3,100.00	\$ 3,500.00	\$ 1,079,200.00		

2208-02	2015	Vine Maple	\$ 3,100.00	\$ 3,500.00	\$ 1,082,700.00		
2217-01	2015	Vine Maple	\$ 3,100.00	\$ 3,500.00	\$ 1,086,200.00		
2217-02	2015	Vine Maple	\$ 3,100.00	\$ 3,500.00	\$ 1,089,700.00		
2219-01	2015	Vine Maple	\$ 3,100.00	\$ 3,500.00	\$ 1,093,200.00		
2219-02	2015	Vine Maple	\$ 3,100.00	\$ 3,500.00	\$ 1,096,700.00	\$ 496,600.00	2021
2220-01	2015	Vine Maple	\$ 76,500.00	\$ 89,500.00	\$ 1,186,200.00		
2230-01	2015	Vine Maple	\$ 53,900.00	\$ 63,100.00	\$ 1,249,300.00		
2231-01	2015	Vine Maple	\$ 110,200.00	\$ 129,000.00	\$ 1,378,300.00		
2232-01	2015	Vine Maple	\$ 3,100.00	\$ 3,700.00	\$ 1,382,000.00		
2232-02	2015	Vine Maple	\$ 3,100.00	\$ 3,700.00	\$ 1,385,700.00		
2234-01	2015	Vine Maple	\$ 76,500.00	\$ 89,500.00	\$ 1,475,200.00		
2236-01	2015	Vine Maple	\$ 102,900.00	\$ 120,400.00	\$ 1,595,600.00		
2238-01	2015	Vine Maple	\$ 66,600.00	\$ 78,000.00	\$ 1,673,600.00		
2240-01	2015	Vine Maple	\$ 3,100.00	\$ 3,700.00	\$ 1,677,300.00		
2240-02	2015	Vine Maple	\$ 3,100.00	\$ 3,700.00	\$ 1,681,000.00		
2252-01	2015	Vine Maple	\$ 15,400.00	\$ 18,100.00	\$ 1,699,100.00	\$ 602,400.00	2022
4655-02	2016	Business District	\$ 3,100.00	\$ 3,800.00	\$ 1,702,900.00		
4656-01	2016	Business District	\$ 25,400.00	\$ 31,000.00	\$ 1,733,900.00		
4849-01	2016	Business District	\$ 89,400.00	\$ 108,800.00	\$ 1,842,700.00		
4853-02	2016	Business District	\$ 3,100.00	\$ 3,800.00	\$ 1,846,500.00		
4853-03	2016	Business District	\$ 3,100.00	\$ 3,800.00	\$ 1,850,300.00		
4854-01	2016	Business District	\$ 90,200.00	\$ 109,800.00	\$ 1,960,100.00		
4856-01	2016	Business District	\$ 97,600.00	\$ 118,800.00	\$ 2,078,900.00		
4861-01	2016	Business District	\$ 109,300.00	\$ 133,000.00	\$ 2,211,900.00		
4863-01	2016	Business District	\$ 101,300.00	\$ 123,300.00	\$ 2,335,200.00	\$ 636,100.00	2023
4865-01	2016	Business District	\$ 3,100.00	\$ 4,000.00	\$ 2,339,200.00		
4865-02	2016	Business District	\$ 3,100.00	\$ 4,000.00	\$ 2,343,200.00		
4865-03	2016	Business District	\$ 3,100.00	\$ 4,000.00	\$ 2,347,200.00		
4867-01	2016	Business District	\$ 3,100.00	\$ 4,000.00	\$ 2,351,200.00		
4867-02	2016	Business District	\$ 3,100.00	\$ 4,000.00	\$ 2,355,200.00		
4867-03	2016	Business District	\$ 3,100.00	\$ 4,000.00	\$ 2,359,200.00		
4869-01	2016	Business District	\$ 78,800.00	\$ 99,800.00	\$ 2,459,000.00		
4871-01	2016	Business District	\$ 87,100.00	\$ 110,300.00	\$ 2,569,300.00		
4873-01	2016	Business District	\$ 3,100.00	\$ 4,000.00	\$ 2,573,300.00		
4873-02	2016	Business District	\$ 3,100.00	\$ 4,000.00	\$ 2,577,300.00		
4884-01	2016	Business District	\$ 3,100.00	\$ 4,000.00	\$ 2,581,300.00		
4884-02	2016	Business District	\$ 3,100.00	\$ 4,000.00	\$ 2,585,300.00		
4886-01	2016	Business District	\$ 3,100.00	\$ 4,000.00	\$ 2,589,300.00		
4886-02	2016	Business District	\$ 3,100.00	\$ 4,000.00	\$ 2,593,300.00		
3531-01	2018	Business District	\$ 3,700.00	\$ 4,700.00	\$ 2,598,000.00		
3693-01	2018	Business District	\$ 14,200.00	\$ 18,000.00	\$ 2,616,000.00		
4567-01	2018	Business District	\$ 27,800.00	\$ 35,200.00	\$ 2,651,200.00		
4572-01	2018	Business District	\$ 57,900.00	\$ 73,300.00	\$ 2,724,500.00		
3516-01	2018	Business District	\$ 3,100.00	\$ 4,000.00	\$ 2,728,500.00		
3517-01	2018	Business District	\$ 3,100.00	\$ 4,000.00	\$ 2,732,500.00		
3527-01	2018	Business District	\$ 3,100.00	\$ 4,000.00	\$ 2,736,500.00		
4407-01	2018	Business District	\$ 3,100.00	\$ 4,000.00	\$ 2,740,500.00		
4407-02	2018	Business District	\$ 3,100.00	\$ 4,000.00	\$ 2,744,500.00		
4407-03	2018	Business District	\$ 3,100.00	\$ 4,000.00	\$ 2,748,500.00		
3856-01	2018	Amberleigh	\$ 3,100.00	\$ 4,000.00	\$ 2,752,500.00		
1773-01	2018	Brighton	\$ 107,600.00	\$ 136,200.00	\$ 2,888,700.00		
2787-01	2018	Northeast	\$ 14,200.00	\$ 18,000.00	\$ 2,906,700.00		
5126-01	2018	Northeast	\$ 11,300.00	\$ 14,300.00	\$ 2,921,000.00	\$ 585,800.00	2024
21-01	2018	Trillium	\$ 62,700.00	\$ 82,600.00	\$ 3,003,600.00		
92-01	2018	Trillium	\$ 3,100.00	\$ 4,100.00	\$ 3,007,700.00		
93-01	2018	Trillium	\$ 20,000.00	\$ 26,400.00	\$ 3,034,100.00		
95-01	2018	Trillium	\$ 14,200.00	\$ 18,700.00	\$ 3,052,800.00		
96-01	2018	Trillium	\$ 15,400.00	\$ 20,300.00	\$ 3,073,100.00		
99-01	2018	Trillium	\$ 71,900.00	\$ 94,700.00	\$ 3,167,800.00		
100-01	2018	Trillium	\$ 65,000.00	\$ 85,600.00	\$ 3,253,400.00		
102-03	2018	Trillium	\$ 136,500.00	\$ 179,700.00	\$ 3,433,100.00		

104-01	2018	Trillium	\$ 71,900.00	\$ 94,700.00	\$ 3,527,800.00	\$ 606,800.00	2025
114-01	2018	Northwest	\$ 25,800.00	\$ 35,400.00	\$ 3,563,200.00		
146-01	2018	Northwest	\$ 3,100.00	\$ 4,300.00	\$ 3,567,500.00		
146-02	2018	Northwest	\$ 3,100.00	\$ 4,300.00	\$ 3,571,800.00		
147-01	2018	Northwest	\$ 3,100.00	\$ 4,300.00	\$ 3,576,100.00		
147-02	2018	Northwest	\$ 18,600.00	\$ 25,500.00	\$ 3,601,600.00		
164-01	2018	Northwest	\$ 3,100.00	\$ 4,300.00	\$ 3,605,900.00		
165-01	2018	Northwest	\$ 23,400.00	\$ 32,100.00	\$ 3,638,000.00		
167-03	2018	Northwest	\$ 3,100.00	\$ 4,300.00	\$ 3,642,300.00		
167-06	2018	Northwest	\$ 3,100.00	\$ 4,300.00	\$ 3,646,600.00		
168-01	2018	Northwest	\$ 16,900.00	\$ 23,200.00	\$ 3,669,800.00		
169-01	2018	Northwest	\$ 63,500.00	\$ 87,000.00	\$ 3,756,800.00		
171-01	2018	Northwest	\$ 50,800.00	\$ 69,600.00	\$ 3,826,400.00		
172-01	2018	Northwest	\$ 53,300.00	\$ 73,000.00	\$ 3,899,400.00		
173-01	2018	Northwest	\$ 12,200.00	\$ 16,700.00	\$ 3,916,100.00		
1158-01	2018	River Crossing	\$ 12,200.00	\$ 16,700.00	\$ 3,932,800.00		
1159-01	2018	River Crossing	\$ 12,200.00	\$ 16,700.00	\$ 3,949,500.00		
3990-01	2018	Southeast	\$ 14,200.00	\$ 19,500.00	\$ 3,969,000.00		
3992-01	2018	Southeast	\$ 14,200.00	\$ 19,500.00	\$ 3,988,500.00		
4083-01	2018	Southeast	\$ 3,400.00	\$ 4,700.00	\$ 3,993,200.00		
4139-01	2018	Southeast	\$ 104,200.00	\$ 142,700.00	\$ 4,135,900.00	\$ 608,100.00	2026
						\$ 4,135,900.00	Grand Total

APPENDIX D
Bundling Map

See accompanying map.