

ENVIRONMENT COMMITTEE AGENDA

June 16, 2016 – North Conference Room

21630 11th Avenue South – Des Moines 98198

6:00P – 6:50P

1. Approve minutes of the 4.21.2016 meeting

2. Draft 2017-2022 SWM CIP Budget

(Discussion Item – 20 min)

Staff will present a draft SWM CIP for years 2017-2022. Council adoption of the overall 6-year CIP for the City is currently scheduled to begin in July.

3. NPDES Program Update

(Informational Item – 20 min)

This is an annual update to the Committee. Staff will brief the Committee of the various program activities and requirements associated with the City's municipal stormwater permit.

4. Project Updates

(Informational Item – 10 min)

Staff will brief the Committee on status of the Lower Massey Creek Improvements Project, the 251st Storm Outfall Project and the Barnes Creek/Kent-Des Moines Road Culvert Replacement Project.

MINUTES - ENVIRONMENTAL COUNCIL COMMITTEE MEETING 4.21.2016

The meeting was called to order @ 6:00 PM, Thursday, April 21, 2016, in the North Conference room @ 21630 11th Avenue South, Des Moines with the following in attendance:

Council Members

Robert Back, Chair

Melissa Musser

Matt Pina

City Staff

Tony Piasecki, City Manager

Dan Brewer, PBPW Director

Loren Reinhold, SWM Utility Manager

Tyler Beekley, Water Quality Specialist

Peggy Volin, Admin Asst II

Austin Fisher, Consultant

AGENDA:

1. Approve minutes of the 2.18.2016 meeting
2. LID Preliminary Assessment of Code and Policies
3. Update on CMP Pipe Replacement Inventory
4. Highline Water District Comprehensive Water Plan
5. WRIA 9 Update

MEETING:

1. Approve the minutes of the February 18, 2016 meeting: Unanimously approved.
2. LID Preliminary Assessment of Code and Policies: SWM Engineering Manager Loren Reinhold introduced Parametrix Consultant Austin Fisher who has been retained to help the City with the codes and policies relating to the required integration of Low Impact Development (LID). Austin briefed the Committee on the purpose of LID which relates to how the City is going to integrate low impact development into its local development-related codes, rules, standards, and other enforceable documents (collectively referred to as the "code policies") pursuant to the 2013-2018 Western Washington Phase II Municipal Stormwater Permit, Section S5.C4 (f). Revisions to the code and policies will be designated to minimize impervious surfaces, retain native vegetation and reduce stormwater runoff in all types of development situations.

3. Update on CMP Pipe Replacement Inventory: SWM Engineering Manager Loren Reinhold briefed the Committee on the steps that are being taken to physically inspect all City catch basins and camera the pipes to see what sort of repair or replacements need to be made City-wide.
4. Highline Water District Comprehensive Water Plan: SWM Engineering Manager Loren Reinhold provided the Committee with a copy of the Agency Review Draft of the Highline Water District Water System Plan which updates the 2008 HWD Comprehensive Water System Plan in accordance with the WAC 246-290-100 and the WA State Department of Health requirements. The plan proposes 2.60% rate increases for years 2017-2020 and a significant asbestos pipe replacement program of \$4.9M annually beginning in 2019 starting with the smaller 4-inch pipes that are more prone to breaking. A couple of small pipe upgrades were identified in Des Moines for improving fire flow and pressure and a study is recommended to look into operations changes in the vicinity of Interstate 5 and 216th Street to improve fire flow and pressure in that area and possibly creating a new pressure zone. The Committee directed staff to send the Final Plan to Council for adoption when ready.
5. WRIA 9 Update: SWM Engineering Manager Loren Reinhold briefed the Committee on the proposed Saltwater State Park Shoreline Habitat Restoration Project and let them know there might be some interest from the State in purchasing the properties on the bluff that are in danger of sliding and including it into the State Park. Also, a motion was made and passed to appoint Loren Reinhold as the second alternate to represent Des Moines at the WRIA 9 Watershed Ecosystem Forum. Councilmember Vic Pennington is the current representative for the City.

Meeting adjourned at 7:05 pm

Minutes respectfully Submitted by: Peggy Volin, Admin Asst II

CITY OF DES MOINES
CIP COSTS SUMMARY: 2017-2022
(Amounts in Thousands)

<i>Page #</i>	<i>Project Name</i>	<i>Total Budget</i>	<i>Project to Date 12/31/15</i>	<i>Sched Year 2016</i>	<i>Plan Year 2017</i>	<i>Plan Year 2018</i>	<i>Plan Year 2019</i>	<i>Plan Year 2020</i>	<i>Plan Year 2021</i>	<i>Plan Year 2022</i>
GENERAL MUNICIPAL IMPROVEMENTS										
<u><i>Economic Development & Tourism Projects</i></u>										
17	N. Lot Fishing Pier Paid Parking	400	-	400	-	-	-	-	-	-
19	I- 5 Signage	60	-	-	60	-	-	-	-	-
21	Redondo Paid Parking	200	-	-	200	-	-	-	-	-
	Total Econ Dev & Tourism	660	-	400	260	-	-	-	-	-
<u><i>Building Facility Projects</i></u>										
23	Field House Roof	120	-	120	-	-	-	-	-	-
25	Council Chambers Lighting	25	-	25	-	-	-	-	-	-
27	Beach Park Fiber Optic Cable	60	-	-	60	-	-	-	-	-
29	LED Exterior Lighting	34	-	-	34	-	-	-	-	-
31	Founders' Lodge Exterior Paint	90	-	-	-	90	-	-	-	-
33	Engineer Bldg Windows	25	-	-	-	-	25	-	-	-
35	City Hall Canopy Repairs	55	-	-	-	-	55	-	-	-
37	Activity Center Exterior Paint	30	-	-	-	-	-	30	-	-
39	PW Service Center Interior Painting	60	-	-	-	-	-	-	60	-
41	Field House Interior Paint	35	-	-	-	-	-	-	35	-
43	City Hall Generator	365	-	-	-	-	-	-	24	341
45	Police Dept Storage Building	445	-	-	-	-	-	-	-	445
47	Activity Center Irrigation/Landscape	65	-	-	-	-	-	-	-	65
49	City Hall Parking Lot	260	-	-	-	-	-	-	-	260
	Total Building Facilities	1,669	-	145	94	90	80	30	119	1,111
<u><i>Technology Projects</i></u>										
51	Financial System Replacement	252	-	101	151	-	-	-	-	-
	Total Technology	252	-	101	151	-	-	-	-	-

CITY OF DES MOINES
CIP COSTS SUMMARY: 2017-2022
 (Amounts in Thousands)

<i>Page #</i>	<i>Project Name</i>	<i>Total Budget</i>	<i>Project to Date 12/31/15</i>	<i>Sched Year 2016</i>	<i>Plan Year 2017</i>	<i>Plan Year 2018</i>	<i>Plan Year 2019</i>	<i>Plan Year 2020</i>	<i>Plan Year 2021</i>	<i>Plan Year 2022</i>
<u>Park Facility & Playground Projects</u>										
53	BP Picnic Shelter/Restrooms	623	7	616	-	-	-	-	-	-
55	Parkside Playground	441	19	422	-	-	-	-	-	-
57	Parkside Soil Remediation	121	-	121	-	-	-	-	-	-
59	Field House Tennis Court	25	-	25	-	-	-	-	-	-
61	Field House Skate Park	155	-	-	155	-	-	-	-	-
63	DMBP Sun Home Lodge Rehab	617	-	-	-	45	572	-	-	-
65	Wooton Park	234	-	-	-	-	-	234	-	-
67	Kiddy Park Play Equipment	210	-	-	-	-	-	-	210	-
69	Westwood Play Equipment	68	-	-	-	-	-	-	-	68
71	SJU Irrig and Landscape	205	-	-	-	-	-	-	-	205
	Total City Wide Park Facilities	2,699	26	1,184	155	45	572	234	210	273
<u>Waterfront Facility Projects</u>										
73	Redondo Floats	110	-	-	-	-	110	-	-	-
75	Redondo Fishing Pier Replace Decking	225	-	-	-	-	225	-	-	-
77	North Bulkhead	2,100	-	-	-	-	-	-	100	2,000
79	N Pier Restrooms	250	-	-	-	-	-	-	-	250
81	Redondo Restroom & Plaza	400	-	-	-	-	-	-	-	400
	Total Waterfront Facilities	3,085	-	-	-	-	335	-	100	2,650
<u>Transportation - Operating Projects</u>										
83	Arterial Street Pavement Preservation	2,500	-	20	700	20	860	20	860	20
85	Arterial Traffic Calming	75	-	15	15	-	-	15	15	15
87	Sidewalk Program	140	-	20	20	20	20	20	20	20
89	Guardrail Program	100	-	25	-	25	-	25	-	25
	Total Transport - O&M Projects	2,815	-	80	735	65	880	80	895	80
<u>Transportation - Capital Projects</u>										
91	SW Bridge Seismic Retrofit	4,412	4,367	45	-	-	-	-	-	-
93	Midway SRTS 24th Ave Sidewalk	395	28	38	329	-	-	-	-	-
95	24th Ave South Improvement	8,500	8,470	30	-	-	-	-	-	-
97	Gateway - S 216th Segment 1A	6,885	1,817	5,068	-	-	-	-	-	-
99	Barnes Creek Trail	4,869	540	524	50	2,253	1,502	-	-	-
101	Redondo Board Walk Replacement	4,695	458	4,237	-	-	-	-	-	-
103	South 268th Street Sidewalk	880	-	880	-	-	-	-	-	-
105	S 224th St Improvements	615	-	113	502	-	-	-	-	-
107	Adrianna Sidewalk Vacation Placeholder	106	-	-	106	-	-	-	-	-
109	16th Ave - Seg 5A	129	-	-	129	-	-	-	-	-
111	Downtown Alley Improvement	430	-	-	70	360	-	-	-	-
113	S 223rd Walkway Improvements	191	-	-	15	176	-	-	-	-
115	S 200th St Safe Routes to School	720	-	-	75	645	-	-	-	-
117	Marine View Dr Roundabout	2,072	-	-	160	812	1,100	-	-	-
119	South 216th - Segment 3	5,650	-	-	159	501	4,990	-	-	-
121	SeaTac Signal Improvements	350	-	-	-	-	150	200	-	-
123	South 236th Lane	2,191	-	-	-	-	200	200	1,791	-
125	Redondo Area Street Improvements	70	-	-	-	-	-	70	-	-
127	South 240th Street Improve - Seg 1	6,300	-	-	-	-	-	735	5,565	-
129	South 240th Street Improve - Seg 2	4,850	-	-	-	-	-	435	4,415	-
131	Kent-Des Moines Rd - Seg 2	7,200	-	-	-	-	-	-	985	6,215
	Total Transport - Capital Projects	61,510	15,680	10,935	1,595	4,747	7,942	1,640	12,756	6,215
Total General Municipal Improvements		72,690	15,706	12,845	2,990	4,947	9,809	1,984	14,080	10,329

CITY OF DES MOINES
CIP COSTS SUMMARY: 2017-2022
(Amounts in Thousands)

<i>Page #</i>	<i>Project Name</i>	<i>Total Budget</i>	<i>Project to Date 12/31/15</i>	<i>Sched Year 2016</i>	<i>Plan Year 2017</i>	<i>Plan Year 2018</i>	<i>Plan Year 2019</i>	<i>Plan Year 2020</i>	<i>Plan Year 2021</i>	<i>Plan Year 2022</i>
MARINA CAPITAL IMPROVEMENTS										
133	Marina Boat Building	300	-	300	-	-	-	-	-	-
135	Dock Electrical Replacements	360	-	60	60	-	60	60	60	60
137	Marina Gate Security	40	-	40	-	-	-	-	-	-
139	Marina Fiber Optic Cable	150	-	-	150	-	-	-	-	-
141	Fuel Dispenser	60	-	-	-	60	-	-	-	-
143	Marina Dock Replacement	1,200	-	-	-	-	-	-	-	1,200
	Total Marina	2,110	-	400	210	60	60	60	60	1,260
SURFACE WATER MANAGEMENT CAPITAL										
145	Barnes Crk/Kent-Des Moines Rd Culvert	1,878	320	225	178	1,155	-	-	-	-
147	Lower Massey Creek Channel Modification	1,908	366	1,542	-	-	-	-	-	-
149	S. 251st Street Storm Outfall	370	-	370	-	-	-	-	-	-
151	24th Ave Pipeline Replacement/Upgrade	263	-	-	263	-	-	-	-	-
153	Pipe Replacement Program	1,640	-	-	49	328	328	328	328	279
155	1st Ave Pond Expansion	385	-	-	-	60	325	-	-	-
157	5th Ave/212th Street Pipe Upgrade	815	-	-	-	-	815	-	-	-
159	N. Fork McSorley Ck Diversion	432	-	-	-	-	-	432	-	-
161	6th Ave/239th Pipe Replacement	191	-	-	-	-	-	191	-	-
163	14th Ave (268th to 272nd) Pipe Upgrade	478	-	-	-	-	-	478	-	-
165	216th Pl/ Marine View Dr. Pipe Upgrade	309	-	-	-	-	-	-	309	-
167	KDM /16th Avenue A Pipe Replacement	272	-	-	-	-	-	-	272	-
169	DMMD 208th to 212th Pipe Project	603	-	-	-	-	-	-	603	-
171	8th Ave (264th to 265th)	270	-	-	-	-	-	-	-	270
173	KDM/16th Ave B Pipe Replacement	880	-	-	-	-	-	-	-	880
	Total Surface Water Mgmt	10,694	686	2,137	490	1,543	1,468	1,429	1,512	1,429
TOTAL CITY WIDE		85,494	16,392	15,382	3,690	6,550	11,337	3,473	15,652	13,018

CITY OF DES MOINES
CIP REVENUE SOURCE SUMMARY: 2017-2022
(Amounts in Thousands)

Page #	Project Name	Total Budget	Project to Date 12/31/15	Sched Year 2016	Plan Year 2017	Plan Year 2018	Plan Year 2019	Plan Year 2020	Plan Year 2021	Plan Year 2022
GENERAL FUND										
17	N. Lot Fishing Pier Paid Parking	125	-	125	-	-	-	-	-	-
	Total General Fund	125	-	125	-	-	-	-	-	-
COMPUTER REPLACEMENT FUND										
51	Financial System Replacement	192	-	71	121	-	-	-	-	-
	Total Computer Replacement Fund	192	-	71	121	-	-	-	-	-
REDONDO ZONE										
21	Redondo Paid Parking	-	-	-	-	-	-	-	-	-
125	Redondo Area Street Improvements	70	-	-	-	-	-	70	-	-
	Total Redondo Zone Parking	70	-	-	-	-	-	70	-	-
AUTOMATED SPEED ENFORCE (ASE)										
93	Midway SRTS 24th Ave Sidewalk	268	207	-	61	-	-	-	-	-
103	South 268th Street Sidewalk	38	-	38	-	-	-	-	-	-
87	Sidewalk Program	140	-	20	20	20	20	20	20	20
85	Arterial Traffic Calming	75	-	15	15	-	-	15	15	15
115	S 200th St Safe Routes to School	75	-	-	25	50	-	-	-	-
113	S 223rd Walkway Improvements	30	-	-	-	30	-	-	-	-
	Total ASE	626	207	73	121	100	20	35	35	35
TRANSPORTATION BENEFIT DISTRICT										
83	Arterial Street Pavement Preservation	2,500	-	280	440	440	440	440	440	20
103	South 268th Street Sidewalk	50	-	50	-	-	-	-	-	-
	Total Transportation Benefit District	2,550	-	330	440	440	440	440	440	20
REET 1st QTR %										
99	Barnes Creek Trail	644	39	248	50	204	103	-	-	-
101	Redondo Board Walk Replacement	500	30	470	-	-	-	-	-	-
59	Field House Tennis Court	25	-	25	-	-	-	-	-	-
53	BP Picnic Shelter/Restrooms	41	-	171	(54)	(54)	(22)	-	-	-
21	Redondo Paid Parking	200	-	-	200	-	-	-	-	-
27	Beach Park Fiber Optic Cable	60	-	-	60	-	-	-	-	-
77	North Bulkhead	1,100	-	-	-	-	150	300	300	350
43	City Hall Generator	365	-	-	-	-	-	-	24	341
45	Police Dept Storage Building	445	-	-	-	-	-	-	-	445
49	City Hall Parking Lot	260	-	-	-	-	-	-	-	260
	Total REET 1st Qtr %	3,640	69	914	256	150	231	300	324	1,396
REET - 2nd QTR %										
55	Parkside Playground	10	8	2	-	-	-	-	-	-
57	Parkside Soil Remediation	1	-	1	-	-	-	-	-	-
17	N. Lot Fishing Pier Paid Parking	275	-	275	-	-	-	-	-	-
103	South 268th Street Sidewalk	94	-	94	-	-	-	-	-	-
89	Guardrail Program	100	-	25	-	25	-	25	-	25
61	Field House Skate Park	155	-	-	155	-	-	-	-	-
73	Redondo Floats	40	-	-	-	-	40	-	-	-
75	Redondo Fishing Pier Replace Decking	67	-	-	-	-	67	-	-	-
65	Wooton Park	234	-	-	-	-	-	234	-	-
67	Kiddy Park Play Equipment	210	-	-	-	-	-	-	210	-
69	Westwood Play Equipment	68	-	-	-	-	-	-	-	68
71	SJU Irrig and Landscape	145	-	-	-	-	-	-	-	145
81	Redondo Restroom & Plaza	200	-	-	-	-	-	-	-	200
79	N Pier Restrooms	250	-	-	-	-	-	-	-	250
	Total REET 2nd Qtr %	1,849	8	397	155	25	107	259	210	688

CITY OF DES MOINES
CIP REVENUE SOURCE SUMMARY: 2017-2022

(Amounts in Thousands)

Page #	Project Name	Total Budget	Project to Date 12/31/15	Sched Year 2016	Plan Year 2017	Plan Year 2018	Plan Year 2019	Plan Year 2020	Plan Year 2021	Plan Year 2022
KING COUNTY PARK LEVY										
99	Barnes Creek Trail	288	288	-	-	-	-	-	-	-
53	BP Picnic Shelter/Restrooms	289	107	52	54	54	22	-	-	-
	<i>Repay REET temp used for BP Picnic/Restroom</i>				(54)	(54)	(22)			
	Total King County Park Levy	577	395	52	-	-	-	-	-	-
PARK IN LIEU - Use as match after funds accumulate										
	Total Park in Lieu	-	-	-	-	-	-	-	-	-
ONE TIME REVENUE										
	Total One Time Revenue	-	-	-	-	-	-	-	-	-
TRAFFIC IN LIEU										
95	24th Ave South Improvement	4,166	4,166	-	-	-	-	-	-	-
109	16th Ave - Seg 5A	129	129	-	-	-	-	-	-	-
97	Gateway - S 216th Segment 1A	850	259	591	-	-	-	-	-	-
107	Adrianna Sidewalk Vacation Placeholder	106	106	-	-	-	-	-	-	-
111	Downtown Alley Improvement	330	-	-	70	260	-	-	-	-
123	South 236th Lane	1,091	-	-	517	-	574	-	-	-
117	Marine View Dr Roundabout	783	-	-	-	343	440	-	-	-
119	South 216th - Segment 3	1,300	-	-	-	-	1,300	-	-	-
129	South 240th Street Improve - Seg 2	2,900	-	-	-	-	-	235	2,665	-
131	Kent-Des Moines Rd - Seg 2	20	-	-	-	-	-	-	20	-
	Total Traffic in Lieu	11,675	4,660	591	587	603	2,314	235	2,685	-
TRANSPORTATION CIP										
91	SW Bridge Seismic Retrofit	528	528	-	-	-	-	-	-	-
99	Barnes Creek Trail	69	69	-	-	-	-	-	-	-
109	16th Ave - Seg 5A	-	-	-	-	-	-	-	-	-
97	Gateway - S 216th Segment 1A	894	688	206	-	-	-	-	-	-
105	S 224th St Improvements	615	606	9	-	-	-	-	-	-
	Total Transportation CIP Fund	2,288	1,891	397	-	-	-	-	-	-
TRAFFIC IMPACT CITY WIDE										
95	24th Ave South Improvement	181	181	-	-	-	-	-	-	-
97	Gateway - S 216th Segment 1A	366	50	316	-	-	-	-	-	-
93	Midway SRTS 24th Ave Sidewalk	127	-	-	127	-	-	-	-	-
119	South 216th - Segment 3	420	-	-	24	75	321	-	-	-
117	Marine View Dr Roundabout	160	-	-	160	-	-	-	-	-
99	Barnes Creek Trail	200	-	-	-	100	100	-	-	-
123	South 236th Lane	1,100	-	-	-	-	1,100	-	-	-
121	SeaTac Signal Improvements	350	-	-	-	-	150	200	-	-
131	Kent-Des Moines Rd - Seg 2	330	-	-	-	-	-	-	330	-
	Total Traffic Impact City Wide	3,234	231	316	311	175	1,671	200	330	-

CITY OF DES MOINES
CIP REVENUE SOURCE SUMMARY: 2017-2022

(Amounts in Thousands)

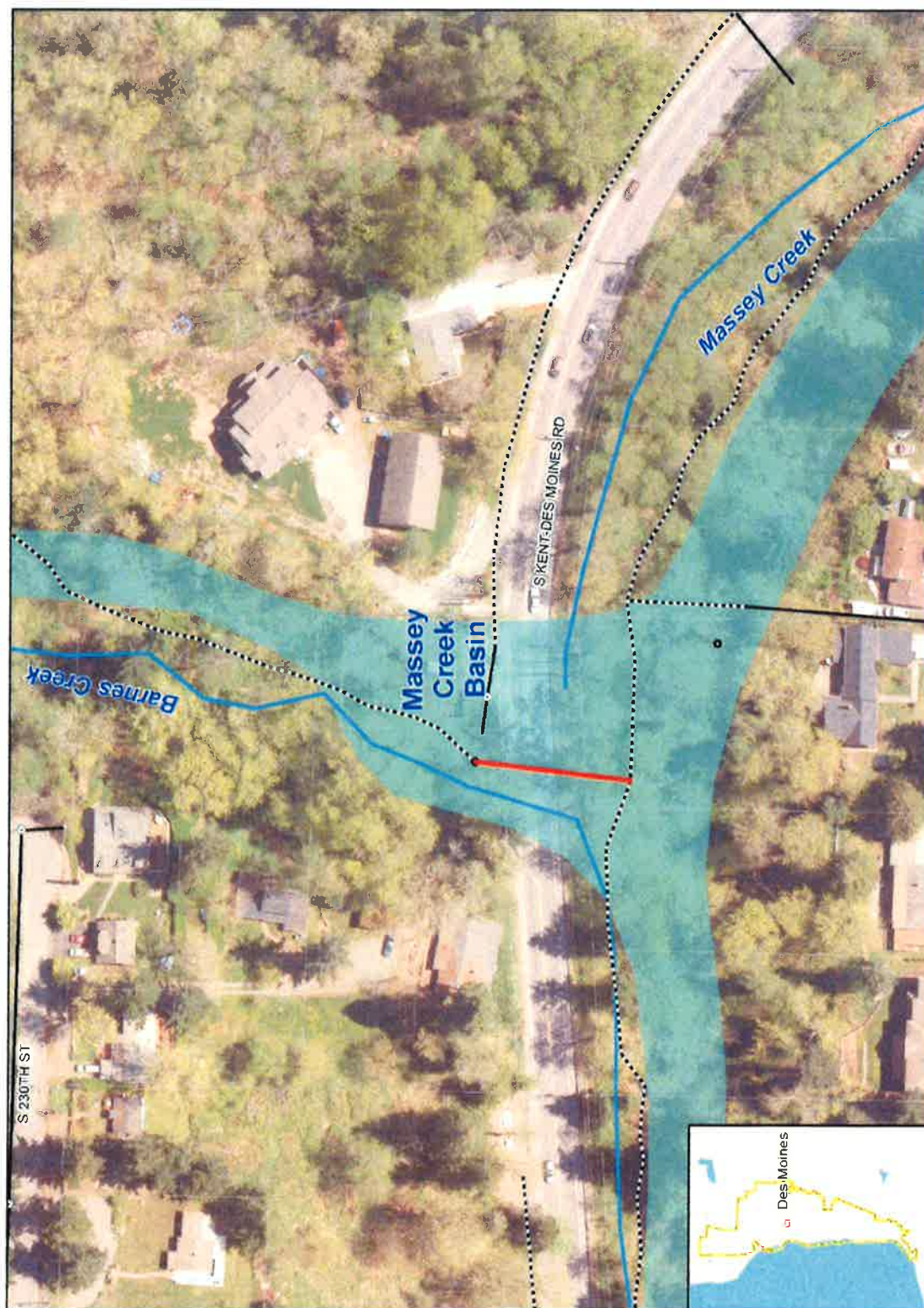
<i>Page #</i>	<i>Project Name</i>	<i>Total Budget</i>	<i>Project to Date 12/31/15</i>	<i>Sched Year 2016</i>	<i>Plan Year 2017</i>	<i>Plan Year 2018</i>	<i>Plan Year 2019</i>	<i>Plan Year 2020</i>	<i>Plan Year 2021</i>	<i>Plan Year 2022</i>
MARINA REVENUES										
51	Financial System Replacement	30	-	15	15	-	-	-	-	-
137	Marina Gate Security	40	-	40	-	-	-	-	-	-
143	Marina Dock Replacement	1,200	-	116	125	125	125	125	125	459
135	Dock Electrical Replacements	360	-	60	60	-	60	60	60	60
133	Marina Boat Building	300	-	300	-	-	-	-	-	-
139	Marina Fiber Optic Cable	150	-	-	150	-	-	-	-	-
141	Fuel Dispenser	60	-	-	-	60	-	-	-	-
	Total Marina Revenues	2,140	-	531	350	185	185	185	185	519
SURFACE WATER UTILITY										
147	Lower Massey Creek Channel Modification	1,512	335	1,177	-	-	-	-	-	-
145	Barnes Crk/Kent-Des Moines Rd Culvert	1,878	304	241	178	1,155	-	-	-	-
149	S. 251st Street Storm Outfall	370	-	370	-	-	-	-	-	-
51	Financial System Replacement	30	-	15	15	-	-	-	-	-
153	Pipe Replacement Program	1,640	-	-	49	328	328	328	328	279
151	24th Ave Pipeline Replacement/Upgrade	263	-	-	263	-	-	-	-	-
155	1st Ave Pond Expansion	150	-	-	-	30	120	-	-	-
157	5th Ave/212th Street Pipe Upgrade	815	-	-	-	-	815	-	-	-
159	N. Fork McSorley Ck Diversion	432	-	-	-	-	-	432	-	-
161	6th Ave/239th Pipe Replacement	191	-	-	-	-	-	191	-	-
163	14th Ave (268th to 272nd) Pipe Upgrade	478	-	-	-	-	-	478	-	-
165	216th Pl./ Marine View Dr. Pipe Upgrade	309	-	-	-	-	-	-	309	-
167	KDM /16th Avenue A Pipe Replacement	272	-	-	-	-	-	-	272	-
169	DMMD 208th to 212th Pipe Project	603	-	-	-	-	-	-	603	-
171	8th Ave (264th to 265th)	270	-	-	-	-	-	-	-	270
173	KDM/16th Ave B Pipe Replacement	880	-	-	-	-	-	-	-	880
	Total Surface Water Utility	10,093	639	1,803	505	1,513	1,263	1,429	1,512	1,429
FACILITY MAJOR MAINT/REPAIR										
25	Council Chambers Lighting	25	-	25	-	-	-	-	-	-
23	Field House Roof	120	-	120	-	-	-	-	-	-
29	LED Exterior Lighting	34	-	-	34	-	-	-	-	-
31	Founders' Lodge Exterior Paint	90	-	-	-	90	-	-	-	-
35	City Hall Canopy Repairs	55	-	-	-	-	55	-	-	-
33	Engineer Bldg Windows	25	-	-	-	-	25	-	-	-
37	Activity Center Exterior Paint	30	-	-	-	-	-	30	-	-
39	PW Service Center Interior Painting	60	-	-	-	-	-	-	60	-
41	Field House Interior Paint	35	-	-	-	-	-	-	35	-
47	Activity Center Irrigation/Landscape	65	-	-	-	-	-	-	-	65
	Total Facility Major Maint/Repair	539	-	145	34	90	80	30	95	65

CITY OF DES MOINES
CIP REVENUE SOURCE SUMMARY: 2017-2022

(Amounts in Thousands)

Page #	Project Name	Total Budget	Project to Date 12/31/15	Sched Year 2016	Plan Year 2017	Plan Year 2018	Plan Year 2019	Plan Year 2020	Plan Year 2021	Plan Year 2022
LOCAL GRANTS										
99	Barnes Creek Trail	44	44	-	-	-	-	-	-	-
97	Gateway - S 216th Segment 1A	30	7	23	-	-	-	-	-	-
53	Parkside Playground	36	11	25	-	-	-	-	-	-
147	Lower Massey Creek Channel Modification	396	-	396	-	-	-	-	-	-
63	DMBP Sun Home Lodge Rehab	45	-	-	-	45	-	-	-	-
155	1st Ave Pond Expansion	235	-	-	-	30	205	-	-	-
127	South 240th Street Improve - Seg 1	3,380	-	-	-	-	-	365	3,015	-
131	Kent-Des Moines Rd - Seg 2	3,600	-	-	-	-	-	-	635	2,965
Total Local Grants		7,766	62	444	-	75	205	365	3,650	2,965
STATE GRANTS (Includes: TIB, RCO, CTED, etc.)										
101	Redondo Board Walk Replacement	1,808	143	1,665	-	-	-	-	-	-
97	Gateway - S 216th Segment 1A	3,692	-	3,692	-	-	-	-	-	-
53	BP Picnic Shelter/Restrooms	293	-	293	-	-	-	-	-	-
57	Parkside Soil Remediation	120	-	120	-	-	-	-	-	-
119	South 216th - Segment 3	3,009	-	-	135	426	2,448	-	-	-
115	S 200th St Safe Routes to School	645	-	-	50	595	-	-	-	-
113	S 223rd Walkway Improvements	161	-	-	15	146	-	-	-	-
117	Marine View Dr Roundabout	1,129	-	-	-	469	660	-	-	-
63	DMBP Sun Home Lodge Rehab	572	-	-	-	-	572	-	-	-
73	Redondo Floats	70	-	-	-	-	70	-	-	-
75	Redondo Fishing Pier Replace Decking	158	-	-	-	-	158	-	-	-
129	South 240th Street Improve - Seg 2	1,750	-	-	-	-	-	200	1,550	-
127	South 240th Street Improve - Seg 1	2,670	-	-	-	-	-	370	2,300	-
71	SJU Irrig and Landscape	60	-	-	-	-	-	-	-	60
81	Redondo Restroom & Plaza	200	-	-	-	-	-	-	-	200
131	Kent-Des Moines Rd - Seg 2	3,000	-	-	-	-	-	-	-	3,000
165	North Bulkhead	1,000	-	-	-	-	-	-	-	1,000
Total State Grants		20,337	143	5,770	200	1,636	3,908	570	3,850	4,260
FEDERAL GRANTS (Includes: STP, FMSIB, etc.)										
95	24th Ave South Improvement	3,000	3,000	-	-	-	-	-	-	-
97	Gateway - S 216th Segment 1A	613	488	125	-	-	-	-	-	-
99	Barnes Creek Trail	3,624	274	102	-	1,949	1,299	-	-	-
101	Redondo Board Walk Replacement	2,387	285	2,102	-	-	-	-	-	-
91	SW Bridge Seismic Retrofit	3,884	3,839	45	-	-	-	-	-	-
55	Parkside Playground	395	-	395	-	-	-	-	-	-
103	South 268th Street Sidewalk	431	-	431	-	-	-	-	-	-
119	South 216th - Segment 3	921	-	-	-	-	921	-	-	-
Total Federal Grants		15,255	7,886	3,200	-	1,949	2,220	-	-	-
PRIVATE CONTRIBUTIONS										
95	24th Ave South Improvement	823	823	-	-	-	-	-	-	-
97	Gateway - S 216th Segment 1A	115	-	115	-	-	-	-	-	-
103	South 268th Street Sidewalk	85	-	85	-	-	-	-	-	-
19	I- 5 Signage	60	-	-	60	-	-	-	-	-
111	Downtown Alley Improvement	100	-	-	-	100	-	-	-	-
129	South 240th Street Improve - Seg 2	200	-	-	-	-	-	200	-	-
127	South 240th Street Improve - Seg 1	250	-	-	-	-	-	-	250	-
131	Kent-Des Moines Rd - Seg 2	250	-	-	-	-	-	-	-	250
Total Private Contributions		1,883	823	200	60	100	-	200	250	250
DEBT PROCEEDS										
97	Gateway - S 216th Segment 1A	325	325	-	-	-	-	-	-	-
95	24th Ave South Improvement	330	330	-	-	-	-	-	-	-
Total Debt Proceeds		655	655	-	-	-	-	-	-	-
TOTAL REVENUE SOURCES		85,494	17,669	15,359	3,140	7,041	12,644	4,318	13,566	11,627

Barnes Crk/Kent-Des Moines Rd Culvert



CITY OF DES MOINES
2017 -2022 CAPITAL IMPROVEMENT PLAN
 (Amount in Thousands)

Barnes Crk/Kent-Des Moines Rd Culvert	451	Summary Project Description:
CIP Category: Surface Water Mgmt		Project improvements will include the installation of 80 to 100 feet of 48-inch or 60-inch diameter culvert or possibly the construction of a box culvert, depending on the method of construction and current fisheries requirements. Due to the depth of culvert and the high traffic of Kent-Des Moines Road, use of boring or other trench-less technology will be explored. The dramatic elevation change from upstream to downstream and the need to moderate velocity for fish passage may require that a special energy dissipater and/or fish ladder be installed at the culvert outlet.
Managing Department: Plan, Build & PW Admin		

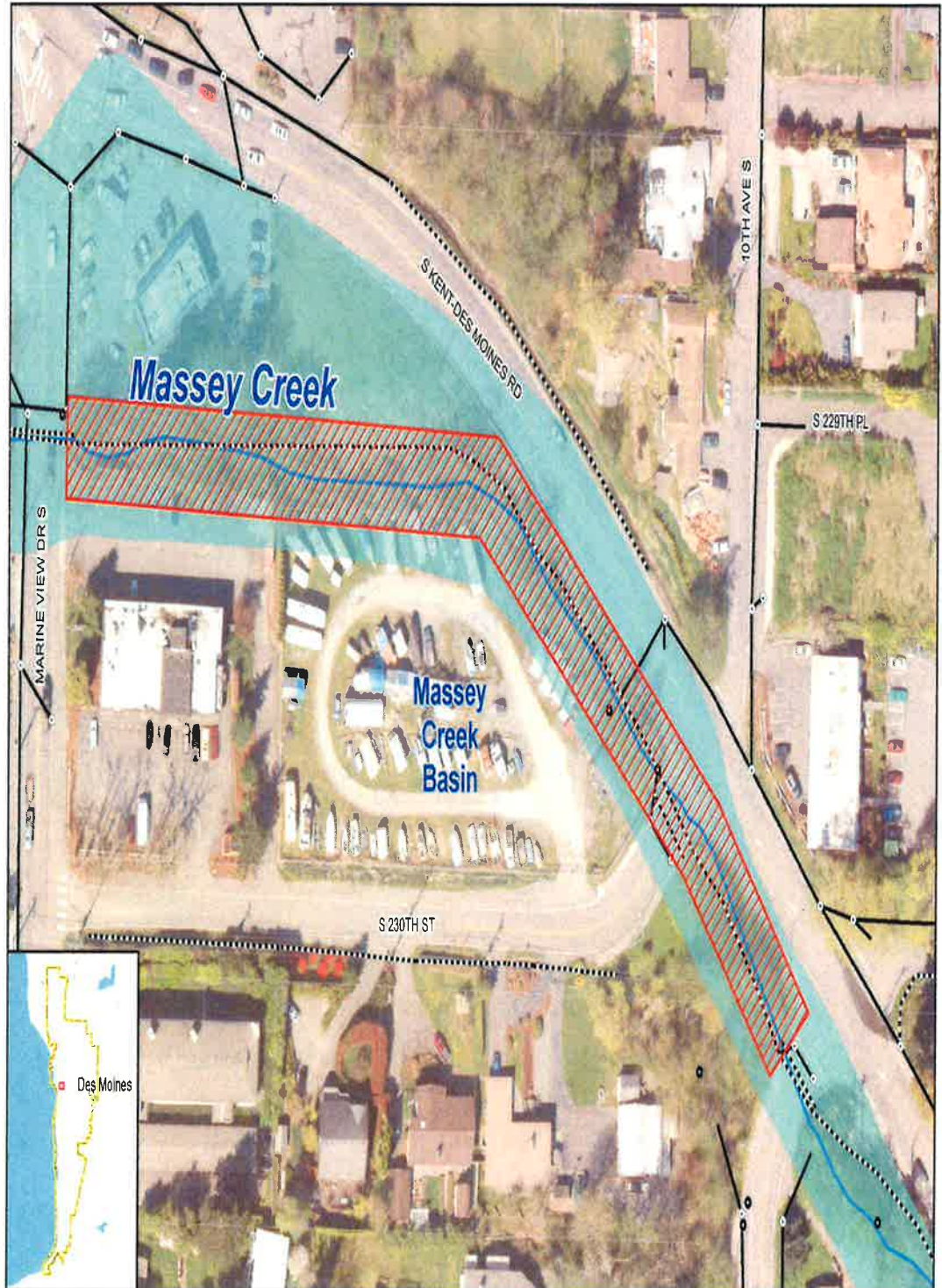
Justification/Benefits: This culvert replacement is needed to convey peak predicted flows without flooding Kent-Des Moines Road. At this point a new 42- to 48-inch reinforced concrete pipe culvert is planned to replace the existing undersized culvert. However, the new pipe size will need to be designed to meet current Hydraulic Code to allow both high- and low-flow fish passage. An energy dissipater will be included at the downstream end of the culvert (with a fish ladder). This project was identified in the Lower Massey Creek Basin Plan and Alternative Analysis. A culvert survey made in 2015 indicated the existing culvert is in poor condition.

PROJECT SCOPE		ANNUAL ALLOCATION							
Expenditures	Total Budget	Project to Date 12/31/15	Scheduled Year 2016	Plan Year 2017	Plan Year 2018	Plan Year 2019	Plan Year 2020	Plan Year 2021	Plan Year 2022
Design	423		225	178					
Land & Right of Way	-								
Construction	1,155				1,155				
Contingency	300								
Total Expenditures	1,878	320	225	178	1,155				

Funding Sources	Total Budget	Project to Date 12/31/15	Scheduled Year 2016	Plan Year 2017	Plan Year 2018	Plan Year 2019	Plan Year 2020	Plan Year 2021	Plan Year 2022
Surface Water Utility	1,878	304	241	178	1,155				
Total Funding	1,878	304	241	178	1,155				

OPERATING IMPACT		ANNUAL OPERATING IMPACT					
Operating Impact	6 Year Total	2016	2017	2018	2019	2020	2021
Revenue	-	-	-	-	-	-	-
Expenses	-	-	-	-	-	-	-
Net Impact	-	-	-	-	-	-	-

Lower Massey Creek Channel Modifications



CITY OF DES MOINES
2017 -2022 CAPITAL IMPROVEMENT PLAN
 (Amount in Thousands)

Lower Massey Creek Channel Modifications 451,821

CIP Category: Surface Water Mgmt

Managing Department: Plan, Build & PW Admin

Summary: Project Description:

This project involves widening the Massey Creek channel between 10th Avenue South and the Taco Time property east of Marine View Drive, berming the north side of the creek, constructing a sheetpile floodwall on the south side of the creek, installing a small pump station, installing native plantings along the stream, removing invasive species and installing stream fish habitat features such as woody debris, stream boulders and bank logs. External funding is provide from King County with two grants: \$200K Flood Reduction Grant and \$196 Regional Opportunity Grant.

Justification/Benefits: The purpose of the improvements is to enhance habitat along this portion of Massey Creek, improve flood capacity of the channel and reduce intersection flooding at Kent-Des Moines Road and Marine View Drive. Land for this project was purchased in 1998. This project is identified in the 1992 Massey Creek Basin Plan and the 1994 Lower Massey Creek Flood Alternative Analysis.

PROJECT SCOPE		ANNUAL ALLOCATION													
Expenditures	Total Budget	Project to Date 12/31/15	Scheduled Year 2016	Plan Year 2017	Plan Year 2018	Plan Year 2019	Plan Year 2020	Plan Year 2021	Plan Year 2022						
Design	371	364	7												
Land & Right of Way	1	1													
Construction	1,129	-	1,129												
Contingency	407	1	406												
Total Expenditures	1,908	366	1,542												

Funding Sources		Total Budget	ANNUAL ALLOCATION													
Funding Sources	Total Budget	Project to Date 12/31/15	Scheduled		2017		2018		2019		2020		2021		2022	
			Year	Plan	Year	Plan	Year	Plan	Year	Plan	Year	Plan	Year	Plan		
Surface Water Utility	1,512	335	1,177													
Local Grants (County, etc.)	396		396													
Total Funding	1,908	335	1,573													

OPERATING IMPACT		ANNUAL OPERATING IMPACT									
Operating Impact		6 Year Total	2017	2018	2019	2020	2021	2022			
Revenue	-	-	-	-	-	-	-	-			
Expenses	-	-	-	-	-	-	-	-			
Net Impact		-	-	-	-	-	-	-			

S. 251st Street Storm Outfall



CITY OF DES MOINES
2017-2022 CAPITAL IMPROVEMENT PLAN
 (Amount in Thousands)

S. 251st Street Storm Outfall	451
CIP Category: Surface Water Mgmt Managing Department: Public Works	<i>Summary Project Description:</i> This project proposes to extend the 24-inch outfall pipe downslope away from the existing MSE wall and install a dissipator at the terminus.

Justification/Benefits: This project is a retrofit to a storm outfall improvement made in 2014 which failed following heavy rains in October 2015.

PROJECT SCOPE			ANNUAL ALLOCATION								
Expenditures	Total Budget	Project to Date 12/31/15	Scheduled Year 2016	Plan Year 2017	Plan Year 2018	Plan Year 2019	Plan Year 2020	Plan Year 2021	Plan Year 2022		
Design	106		106								
Land & Right of Way	-										
Construction	200		200								
Contingency	64		64								
Total Expenditures	370	-	370	-	-	-	-	-	-		

PROJECT SCOPE			ANNUAL ALLOCATION								
Funding Sources	Total Budget	Project to Date 12/31/15	Scheduled Year 2016	Plan Year 2017	Plan Year 2018	Plan Year 2019	Plan Year 2020	Plan Year 2021	Plan Year 2022		
Surface Water Utility	370		370								
Total Funding	370	-	370	-	-	-	-	-	-		

OPERATING IMPACT			ANNUAL OPERATING IMPACT						
Operating Impact	6 Year Total	2016	2017	2018	2019	2020	2021	2022	
Revenue	-	-	-	-	-	-	-	-	
Expenses	-	-	-	-	-	-	-	-	
Net Impact	-	-	-	-	-	-	-	-	

24th Ave Pipeline Replacement/Upgrade



CITY OF DES MOINES
2017-2022 CAPITAL IMPROVEMENT PLAN
 (Amount in Thousands)

24th Ave Pipeline Replacement/Upgrade 451,606

CIP Category: Surface Water Mgmt

Managing Department: Plan, Build & PW Admin

Summary, Project Description:

Replacement of existing 12-inch storm drainage system on 24th Avenue from S. 224th to S. 227th Street with approximately 1100 feet of 36-inch pipe.

Justification/Benefits: During major storms the drainage system along the east side of 24th Avenue between S. 220th and S. 227th overflows to the pipe system on the west side. These overflows bypass the trunk system which conveys flows to the City Park detention facility and flood properties south of 227th south of Pacific Middle School. This project is recommended in the 1992 Massey Creek Basin Plan.

PROJECT SCOPE

<i>Expenditures</i>	<i>Total Budget</i>
Design	20
Land & Right of Way	-
Construction	192
Contingency	51
Total Expenditures	263

ANNUAL ALLOCATION

<i>Project to Date 12/31/15</i>	<i>Scheduled Year 2016</i>	<i>Plan Year 2017</i>	<i>Plan Year 2018</i>	<i>Plan Year 2019</i>	<i>Plan Year 2020</i>	<i>Plan Year 2021</i>	<i>Plan Year 2022</i>
-	-	20	-	-	-	-	-
-	-	-	192	-	-	-	-
-	-	-	51	-	-	-	-
-	-	-	263	-	-	-	-

Funding Sources

<i>Total Budget</i>
Surface Water Utility 263
Total Funding 263

<i>Project to Date 12/31/15</i>	<i>Scheduled Year 2016</i>	<i>Plan Year 2017</i>	<i>Plan Year 2018</i>	<i>Plan Year 2019</i>	<i>Plan Year 2020</i>	<i>Plan Year 2021</i>	<i>Plan Year 2022</i>
-	-	263	-	-	-	-	-
-	-	263	-	-	-	-	-

OPERATING IMPACT

<i>Operating Impact</i>	<i>6 Year Total</i>
Revenue	-
Expenses	-
Net Impact	-

ANNUAL OPERATING IMPACT

<i>2016</i>	<i>2017</i>	<i>2018</i>	<i>2019</i>	<i>2020</i>	<i>2021</i>	<i>2022</i>
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-

Pipe Replacement Program



CITY OF DES MOINES
2017 -2022 CAPITAL IMPROVEMENT PLAN
 (Amount in Thousands)

Pipe Replacement Program	451,826
CIP Category: Surface Water Mgmt	
Managing Department: Plan, Build & PW Admin	
Summary Project Description: Replacement of existing pipes based on customer request and video based condition assessment. This program is scheduled to be finished in 2022.	

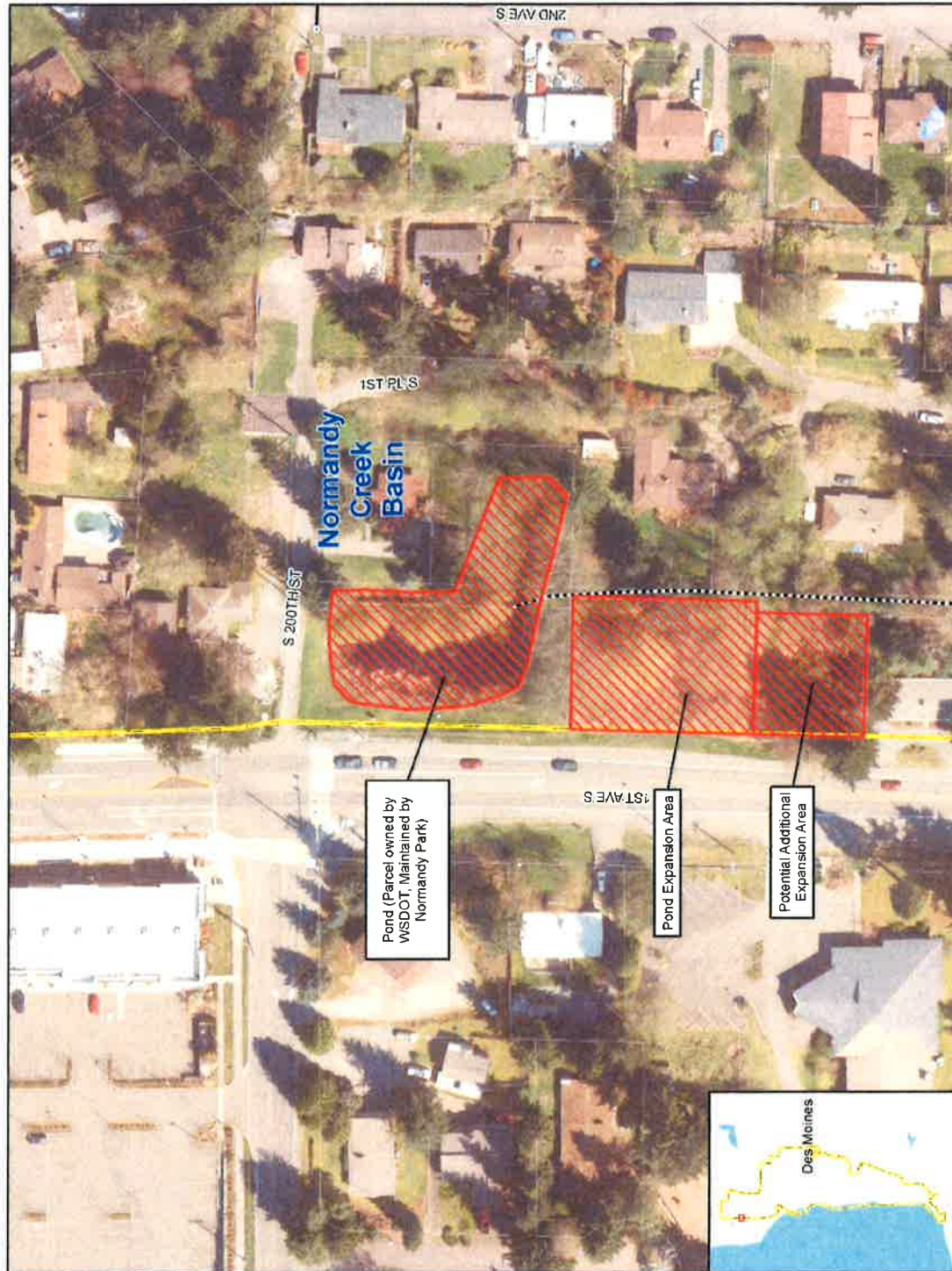
Justification/Benefits: A video assessment of existing storm drain pipes is scheduled to begin in 2016. From the assessment a prioritized list of pipes needing replacement will be developed along with estimated costs.

PROJECT SCOPE		ANNUAL ALLOCATION									
Expenditures	Total Budget	Project to Date 12/31/15	Scheduled Year 2016	Plan Year 2017	Plan Year 2018	Plan Year 2019	Plan Year 2020	Plan Year 2021	Plan Year 2022		
Design	227	-	-	38	38	38	38	38	38	37	
Land & Right of Way	-	-	-	-	-	-	-	-	-	-	
Construction	1,120	-	-	-	230	230	230	230	230	200	
Contingency	293	-	-	11	60	60	60	60	60	42	
Total Expenditures	1,640	-	-	49	328	328	328	328	328	279	

Funding Sources	Total Budget	Project to Date 12/31/15	Scheduled Year 2016	Plan Year 2017	Plan Year 2018	Plan Year 2019	Plan Year 2020	Plan Year 2021	Plan Year 2022
Surface Water Utility	1,640	-	-	49	328	328	328	328	279
Total Funding	1,640	-	-	49	328	328	328	328	279

OPERATING IMPACT		ANNUAL OPERATING IMPACT					
Operating Impact	6 Year Total	2016	2017	2018	2019	2020	2021
Revenue	-	-	-	-	-	-	-
Expenses	-	-	-	-	-	-	-
Net Impact	-	-	-	-	-	-	-

1st Ave Pond Expansion



CITY OF DES MOINES
2017 -2022 CAPITAL IMPROVEMENT PLAN
 (Amount in Thousands)

1st Ave Pond Expansion

451.823

CIP Category: Surface Water Mgmt

Managing Department: Plan, Build & PW Admin

Summary Project Description:

Expand existing pond at 1st Ave and 4th Ave S, North Hill Area by 1.9 acre feet.

Justification/Benefits: The existing 199th trunk line was reviewed for capacity in the Normandy Park Comprehensive Plan - Normandy Creek Upper Basin. The trunk line was found to be undersized (for most storms) for 200 feet, aged for the remaining sections and does not meet current design standards. The increased size will alleviate local flooding that occurs in the upper basin of Normandy Creek. In order to provide mitigation for downstream impacts, the 1st Avenue Pond that is currently owned by Normandy Park will need to be expanded. An interlocal agreement will need to be made with Normandy Park for the expansion project as well as for the long-term maintenance of the facility. Roughly 50% of the basin area is within Des Moines city limits. The cost for the land (\$42,500 purchased in 2000) has been deducted from Des Moines' share of the cost.

PROJECT SCOPE		ANNUAL ALLOCATION									
Expenditures	Total Budget	Project to Date 12/31/15	Scheduled Year 2016	Plan Year 2017	Plan Year 2018	Plan Year 2019	Plan Year 2020	Plan Year 2021	Plan Year 2022		
Design	47	-	-	-	-	47	-	-	-	-	-
Land & Right of Way	-	-	-	-	-	-	-	-	-	-	-
Construction	259	-	-	-	-	-	259	-	-	-	-
Contingency	79	-	-	-	-	13	66	-	-	-	-
Total Expenditures	385	-	-	-	-	60	325	-	-	-	-

Funding Sources	Total Budget	Project to Date 12/31/15	Scheduled Year 2016	Plan Year 2017	Plan Year 2018	Plan Year 2019	Plan Year 2020	Plan Year 2021	Plan Year 2022		
Surface Water Utility	150	-	-	-	-	30	120	-	-	-	-
Local Grants (County, etc.)	235	-	-	-	-	30	205	-	-	-	-
Total Funding	385	-	-	-	-	60	325	-	-	-	-

OPERATING IMPACT		ANNUAL OPERATING IMPACT					
Operating Impact	6 Year Total	2016	2017	2018	2019	2020	2021
Revenue	-	-	-	-	-	-	-
Expenses	-	-	-	-	-	-	-
Net Impact	-	-	-	-	-	-	-

5th Ave/212th Street Pipe Upgrade



CITY OF DES MOINES
2017-2022 CAPITAL IMPROVEMENT PLAN
 (Amount in Thousands)

5th Ave/212th Street Pipe Upgrade

451

CIP Category: Surface Water Mgmt

Managing Department: Plan, Build & PW Admin

Summary Project Description:

Replacement of approximately 2,630 feet of cnp pipe with new 1,700 feet of 12-inch pipe and 930 feet of 18-inch pipe in the North Hill area in the vicinity of 212th Street and 5th Avenue South.

Justification/Benefits: This project will replace over 2,000 feet of aged corrugated metal pipe and upgrade over 900 feet of pipe to 18-inch pipe that has inadequate capacity during major storms. During two major storm events in 2013 and 2014, the pipe system overflowed creating significant erosion near the stairway at 212th Street and Des Moines Memorial Drive. The project will connect to the DMMD pipe upgrade installed in 2014. This project is identified as a high-priority project (CIP-16) in the 2015 Stormwater Comprehensive Plan.

PROJECT SCOPE		ANNUAL ALLOCATION									
Expenditures	Total Budget	Project to Date 12/31/15	Scheduled Year 2016	Plan Year 2017	Plan Year 2018	Plan Year 2019	Plan Year 2020	Plan Year 2021	Plan Year 2022		
Design	161	-	-	-	-	161	-	-	-		
Land & Right of Way	-	-	-	-	-	-	-	-	-		
Construction	529	-	-	-	-	529	-	-	-		
Contingency	125	-	-	-	-	125	-	-	-		
Total Expenditures	815	-	-	-	-	815	-	-	-		

Design	161
Land & Right of Way	-
Construction	529
Contingency	125
Total Expenditures	815

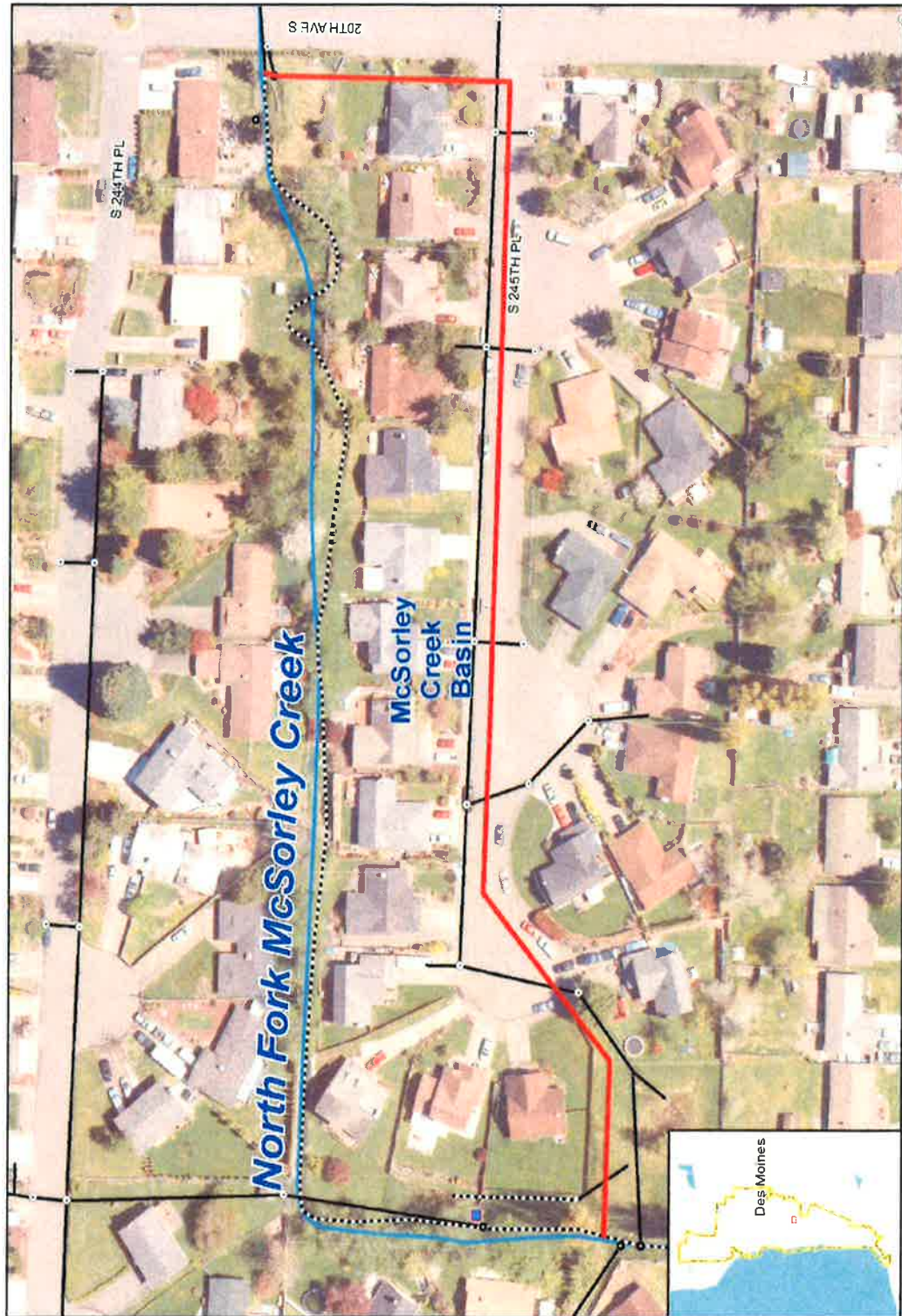
Funding Sources	Total Budget
Surface Water Utility	815
Total Funding	815

Surface Water Utility	815
Total Funding	815

ANNUAL OPERATING IMPACT											
Operating Impact	6 Year Total	2016	2017	2018	2019	2020	2021	2022			
Revenue	-	-	-	-	-	-	-	-	-	-	-
Expenses	-	-	-	-	-	-	-	-	-	-	-
Net Impact	-	-	-	-	-	-	-	-	-	-	-

Operating Impact	6 Year Total
Revenue	-
Expenses	-
Net Impact	-

N. Fork McSorley Ck Diversion



CITY OF DES MOINES
2017-2022 CAPITAL IMPROVEMENT PLAN
 (Amount in Thousands)

N. Fork McSorley Ck Diversion

451

CIP Category: Surface Water Mgmt

Managing Department: Plan, Build & PW Admin

Summary Project Description:

This project proposes to install a diversion structure on 20th Ave. S. between S. 244th Pl. and 245th Pl. From the diversion structure a new 24-in storm bypass pipe will be installed on the west side of 20th Avenue, turn west and follow the south side of 245th Pl and then to McSorley Creek. This project also includes pavement restoration, replacement of curb and gutter and minimal dredging of McSorley Creek and bank stabilization near the discharge point of the bypass pipe.

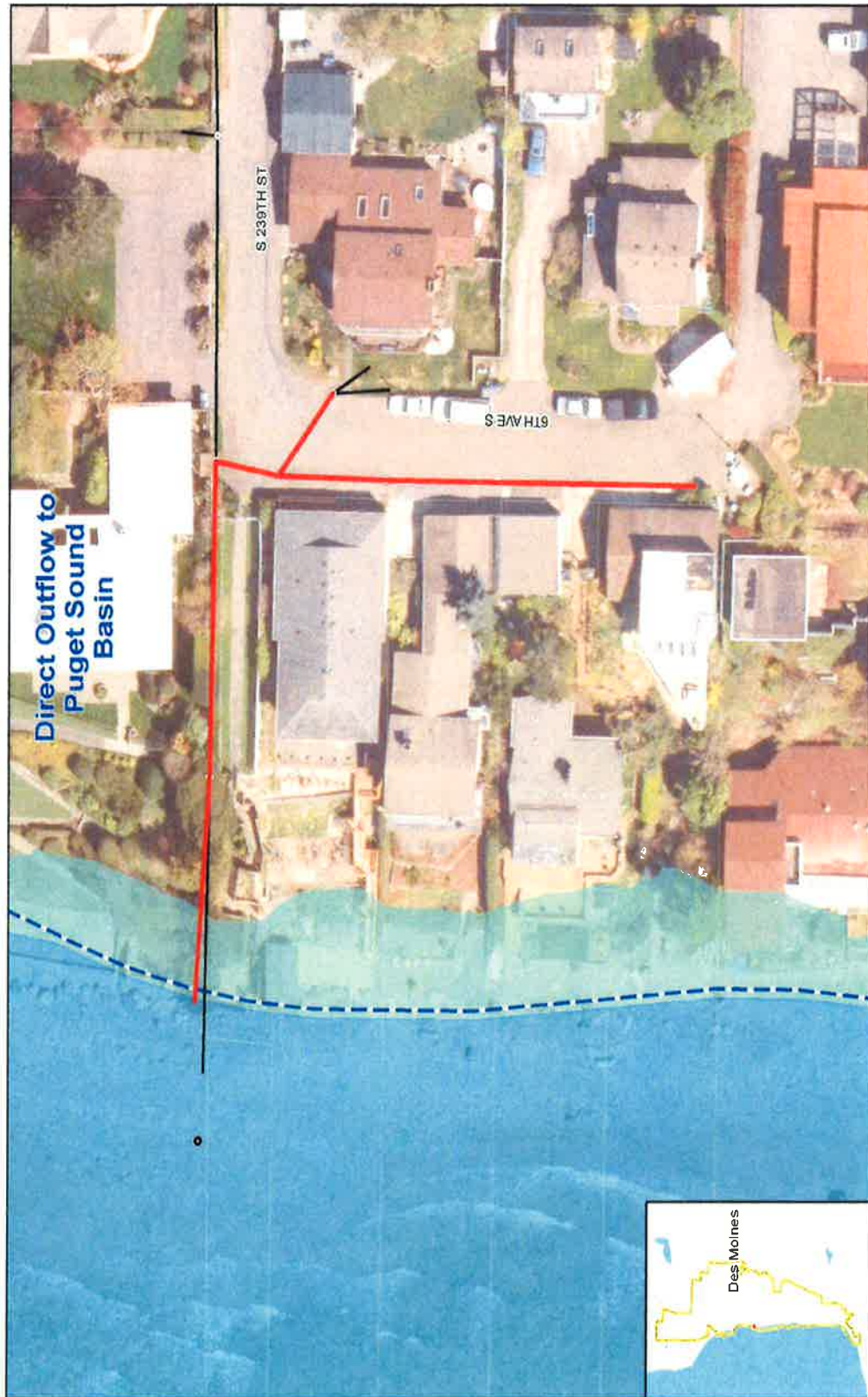
Justification/Benefits: When the Des Moines Trace Subdivision was developed in the early 1980's a segment of the north fork of McSorley Creek was relocated to a narrow rock lined channel within a 15-foot wide drainage easement along the north side of the subdivision (lots 14 through 25). Over time this channel has filled in with sediment and is overgrown with canary reed grass causing the channel to overtop and flood both the subdivision lots and the adjacent properties to the north. This project will provide a flow diversion whereby normal flows will continue into the creek section but high flows are bypassed to a lower point in the channel. As part of this project, the channel section across lots 17-25 will be dredged. This is a high-priority project (CIP-30) identified in the 2015 SWM Comprehensive Plan.

PROJECT SCOPE		ANNUAL ALLOCATION							
Expenditures	Total Budget	Project to Date 12/31/15	Scheduled Year 2016	Plan Year 2017	Plan Year 2018	Plan Year 2019	Plan Year 2020	Plan Year 2021	Plan Year 2022
Design	85	-	-	-	-	-	85	-	-
Land & Right of Way	-	-	-	-	-	-	-	-	-
Construction	281	-	-	-	-	-	281	-	-
Contingency	66	-	-	-	-	-	66	-	-
Total Expenditures	432	-	-	-	-	-	432	-	-

Funding Sources	Total Budget	Project to Date 12/31/15	Scheduled Year 2016	Plan Year 2017	Plan Year 2018	Plan Year 2019	Plan Year 2020	Plan Year 2021	Plan Year 2022
Surface Water Utility	432	-	-	-	-	-	432	-	-
Total Funding	432	-	-	-	-	-	432	-	-

OPERATING IMPACT		ANNUAL OPERATING IMPACT					
Operating Impact	6 Year Total	2016	2017	2018	2019	2020	2021
Revenue	-	-	-	-	-	-	-
Expenses	-	-	-	-	-	-	-
Net Impact	-	-	-	-	-	-	-

6th Ave/239th Pipe Replacement



6th Ave/239th Pipe Replacement	451	Summary Project Description:	This project proposes to replace the existing 8-inch drainage system on the west side of 6th Ave S. and connect to the drainage system on 239th Street. This project will also install a new 18-inch HDPE storm drain outfall from 239th St to Puget Sound. The stairway above the outfall pipe will be replaced as part of this project.
		CIP Category: Surface Water Mgmt	
		Managing Department: Plan, Build & PW Admin	

Justification/Benefits: During major storms the drainage system the small 8-inch conveyance system within 6th Avenue S. is overcome and overflows into the properties on the west side of the street. In addition, the outfall pipe from S. 239th is comprised of coated corrugated steel pipe that has separated in the lower section of the pipe that leads over the bank to the Sound. This project proposes to upgrade the 8-inch pipe on 6th Avenue to standard 12-inch and replace the corrugated steel outfall pipe with HDPE pipe. This project also proposes to replace the stairway that is located above the outfall pipe. This is a high-priority project (CIP-39) listed in the 2015 SWM Comprehensive Plan.

PROJECT SCOPE		ANNUAL ALLOCATION									
Expenditures	Total Budget	Project to Date	Scheduled Year	Plan Year	Plan Year	Plan Year	Plan Year	Plan Year	Plan Year	Plan Year	Plan Year
		12/31/15	2016	2017	2018	2019	2020	2021	2022		
Design	38	-					38				
Land & Right of Way	-	-									
Construction	124	-					124				
Contingency	29	-						29			
Total Expenditures	191	-					191				

[illegible]

OPERATING IMPACT		ANNUAL OPERATING IMPACT						
	Operating Impact	2016	2017	2018	2019	2020	2021	2022
Revenue		-	-	-	-	-	-	-
Expenses		-	-	-	-	-	-	-
	Net Impact	-	-	-	-	-	-	-

14th Ave (268th to 272nd) Pipe Upgrade



CITY OF DES MOINES
2017 -2022 CAPITAL IMPROVEMENT PLAN
 (Amount in Thousands)

14th Ave (268th to 272nd) Pipe Upgrade

451

CIP Category: Surface Water Mgmt

Managing Department: Plan, Build & PW Admin

Summary Project Description:

This project proposes to upgrade the ditch and driveway culvert system along the west side of 14th Avenue with a new storm pipe as well as replace the existing culverts below 272nd Street and 268th Street. This project includes 900 linear of 36-inch diameter pipe, 6 manhole structures, an outfall dissipator, and minimal road restoration.

Justification Benefits: The culvert below 272nd Street is not sufficiently sized and is too shallow. During major storms the pipe system leading from the Redondo

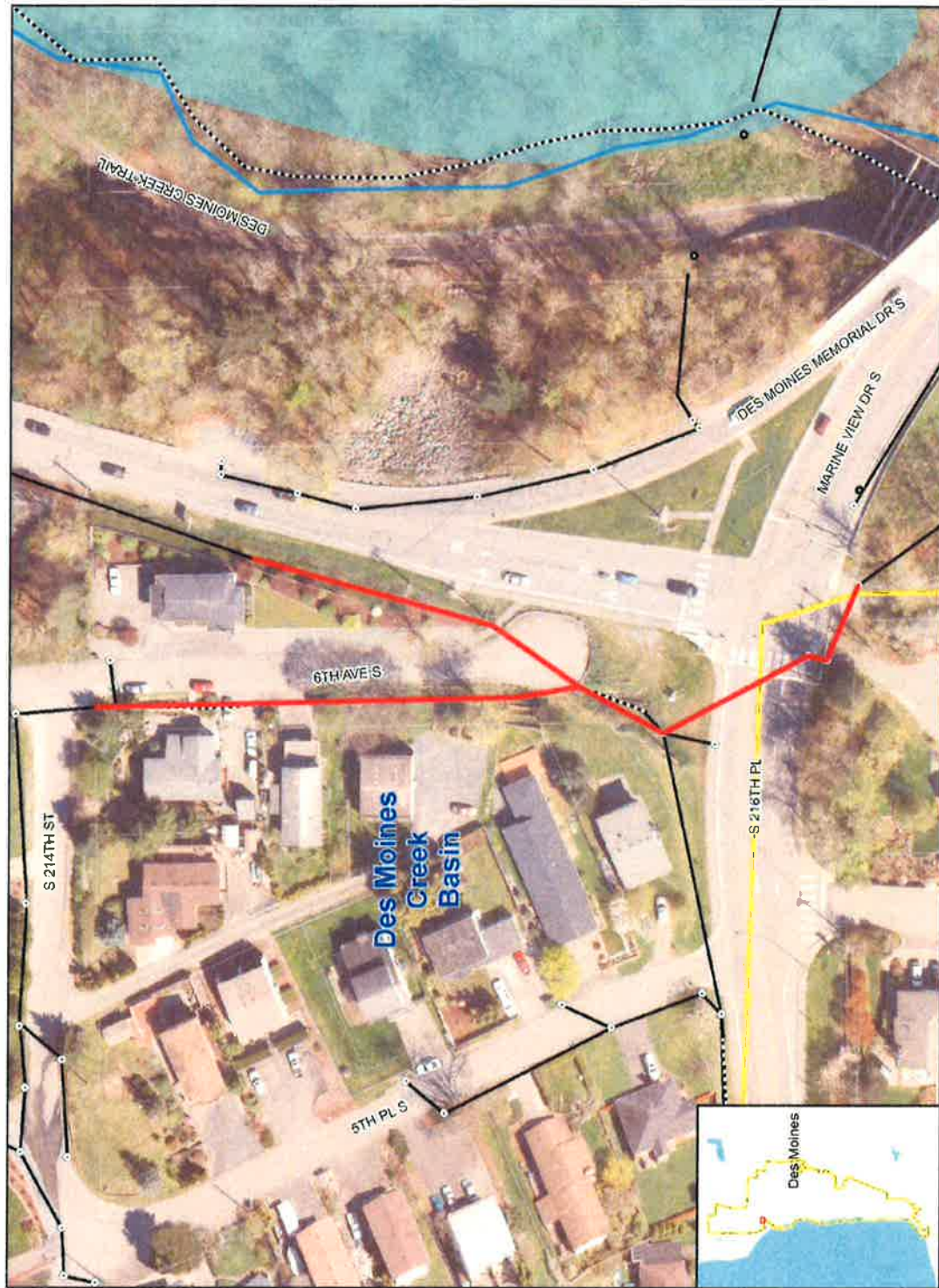
Riveria subdivision (south of 272nd) backs up creating significant flooding within the subdivision particularly in the vicinity of 275th Place and 15th Place. North of 272nd St., the drainage system on 14th Avenue is comprised of a shallow ditch system with driveway culverts that are easily blocked exacerbating the problem south of 272nd Street. There is also significant erosion due to a drop of grade at the downstream end of the culvert at S. 268th Street. This project proposes to replace the culverts at 272nd Street and 268th Street and install a new 36-inch pipe system on the west side of 14th Avenue from 272nd Street to 270th Street. This project is a high-priority project (CIP-36) listed in the 2015 SWM Comprehensive Plan.

PROJECT SCOPE		ANNUAL ALLOCATION									
Expenditures	Total Budget	Project to Date 12/31/15	Scheduled Year 2016	Plan Year 2017	Plan Year 2018	Plan Year 2019	Plan Year 2020	Plan Year 2021	Plan Year 2022		
Design	94	-	-	-	-	-	-	94	-	-	-
Land & Right of Way	-	-	-	-	-	-	-	-	-	-	-
Construction	310	-	-	-	-	-	-	310	-	-	-
Contingency	74	-	-	-	-	-	-	74	-	-	-
Total Expenditures	478	-	-	-	-	-	-	478	-	-	-

Funding Sources	Total Budget	Project to Date 12/31/15	Scheduled Year 2016	Plan Year 2017	Plan Year 2018	Plan Year 2019	Plan Year 2020	Plan Year 2021	Plan Year 2022		
Surface Water Utility	478	-	-	-	-	-	-	478	-	-	-
Total Funding	478	-	-	-	-	-	-	478	-	-	-

OPERATING IMPACT		ANNUAL OPERATING IMPACT					
Operating Impact	6 Year Total	2017	2018	2019	2020	2021	2022
Revenue	-	-	-	-	-	-	-
Expenses	-	-	-	-	-	-	-
Net Impact	-	-	-	-	-	-	-

216th Pl./ Marine View Dr. Pipe Upgrade



CITY OF DES MOINES
2017-2022 CAPITAL IMPROVEMENT PLAN
 (Amount in Thousands)

216th Pl./ Marine View Dr. Pipe Upgrade

451

CIP Category: Surface Water Mgmt

Managing Department: Plan, Build & PW Admin

Summary Project Description:

This project proposes to upgrade the ditch along Des Moines Memorial Drive with 300 linear feet of new 18-inch diameter pipe and connecting to 170 linear feet of new larger 24-inch diameter storm system crossing the intersection of MVD (216th Place). The project also proposes to pipe the ditches on the west side of 6th Avenue connecting to the new pipe system on DNMD.

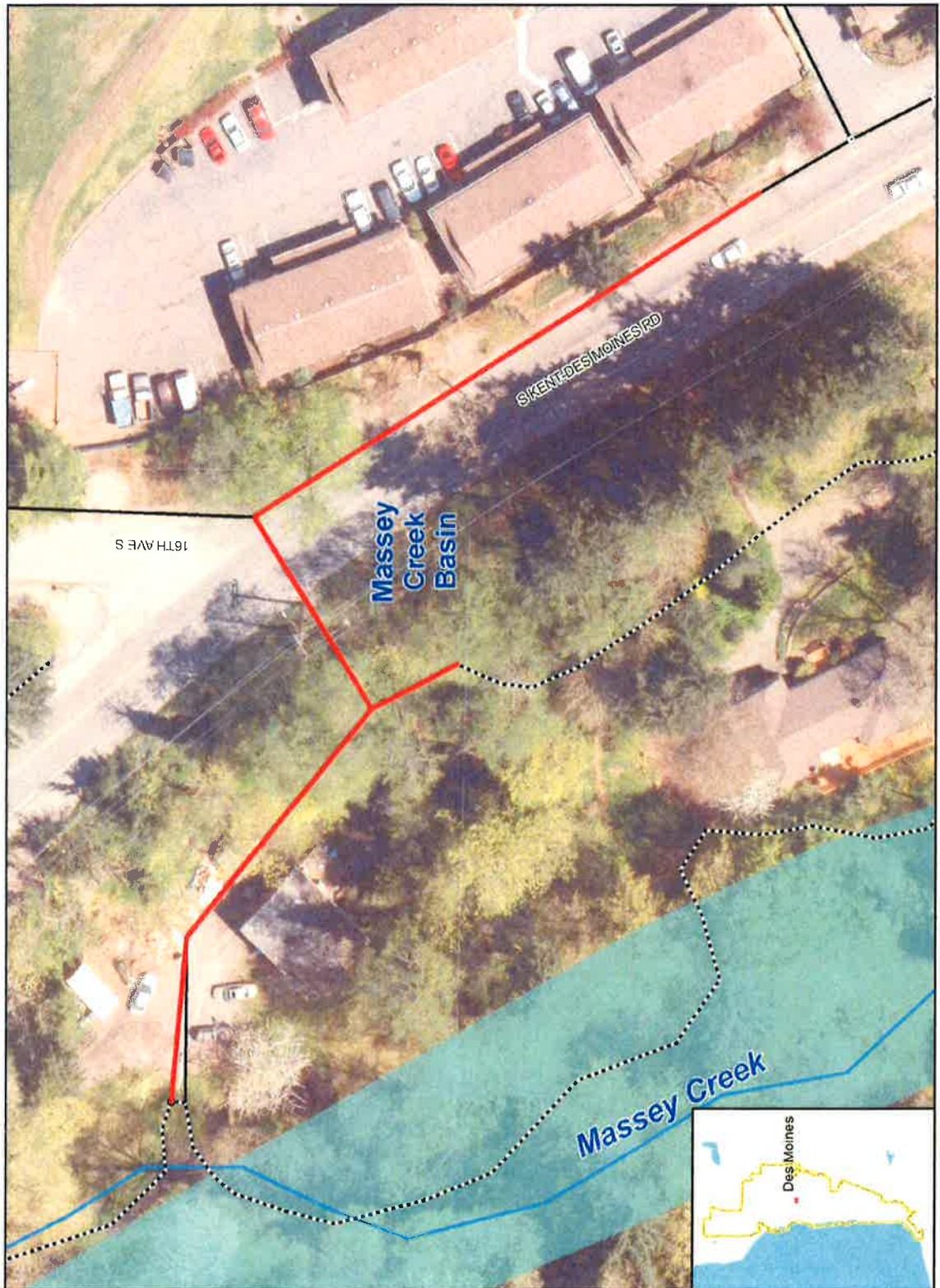
Justification Benefits: Previous upgrades have occurred within the storm system downstream of the project and west of the project along 216th Place. This project proposes to upsize the 18-inch crossing at Marine View Drive to 24-inch as well as pipe the ditch along Des Moines Memorial Drive. Along the storm segment below MVD near the border of Normandy Park and Des Moines is a buried inaccessible structure that may become blocked with debris and cause backup and flooding of the intersection and overflow to areas of recent landslide activity. This project will be coordinated with the City of Normandy Park (cost share for the portion of project within Normandy Park not shown). This is a high-priority project (CIP-17) listed in the 2015 SWM Comprehensive Plan.

PROJECT SCOPE		ANNUAL ALLOCATION									
Expenditures	Total Budget	Project to Date 12/31/15	Scheduled Year 2016	Plan Year 2017	Plan Year 2018	Plan Year 2019	Plan Year 2020	Plan Year 2021	Plan Year 2022		
Design	61	-							61		
Land & Right of Way	-	-									
Construction	200	-							200		
Contingency	48	-							48		
Total Expenditures	309								309		

Funding Sources	Total Budget	Project to Date 12/31/15	Scheduled Year 2016	Plan Year 2017	Plan Year 2018	Plan Year 2019	Plan Year 2020	Plan Year 2021	Plan Year 2022		
Surface Water Utility	309								309		
Total Funding	309								309		

OPERATING IMPACT		ANNUAL OPERATING IMPACT									
Operating Impact	6 Year Total	2016	2017	2018	2019	2020	2021	2022			
Revenue	-	-	-	-	-	-	-	-	-	-	-
Expenses	-	-	-	-	-	-	-	-	-	-	-
Net Impact	-										

KDM /16th Avenue Pipe Replacement



CITY OF DES MOINES
2017-2022 CAPITAL IMPROVEMENT PLAN
 (Amount in Thousands)

KDM /16th Avenue A Pipe Replacement	451	
CIP Category: Surface Water Mgmt		Replace approximately 300 feet of existing roadside ditch (east of 16th Avenue) along KDM Road with 24-inch storm pipe and connect to existing 18-inch culvert crossing KDM Rd at 16th Avenue. Install 50 feet new 24-inch storm drain southwest of KDM Road connecting to existing 18-inch culvert crossing and replace 350 feet of existing 24-inch corrugated metal pipe with larger 36-inch pipe downstream of the culvert crossing.
Managing Department: Plan, Build & PW Admin		

Justification Benefits: During major storm events the capacity of the existing drainage system along Kent-Des Moines Road and the highway crossing will be exceeded causing runoff to overflow across KDM and flood the property downstream. In addition, the system on that property (located within a public drainage easement) that intercepts flows is also insufficiently sized and is prone to overtopping. This project proposes to replace the undersized pipes with 24-inch and 36-inch diameter pipes. This is a high-priority project (CIP-25A) listed in the 2015 SWM Comprehensive Plan and to be coordinated with projects CIP-4 and CIP-25B that would take a portion of the flows west to a new outfall pipe at Barnes Creek (rather than upsizing the 18-inch corrugated aluminum crossing below KDM Road.)

PROJECT SCOPE		ANNUAL ALLOCATION						
Expenditures	Total Budget	Project to Date 12/31/15	Scheduled Year 2016	Plan Year 2017	Plan Year 2018	Plan Year 2019	Plan Year 2020	Plan Year 2021
Design	54	-	-	-	-	-	-	54
Land & Right of Way	-	-	-	-	-	-	-	-
Construction	176	-	-	-	-	-	-	176
Contingency	42	-	-	-	-	-	-	42
Total Expenditures	272	-	-	-	-	-	-	272

Funding Sources	Total Budget	Project to Date 12/31/15	Scheduled Year 2016	Plan Year 2017	Plan Year 2018	Plan Year 2019	Plan Year 2020	Plan Year 2021
Surface Water Utility	272	-	-	-	-	-	-	272
Total Funding	272	-	-	-	-	-	-	272

OPERATING IMPACT		ANNUAL OPERATING IMPACT					
Operating Impact	6 Year Total	2016	2017	2018	2019	2020	2021
Revenue	-	-	-	-	-	-	-
Expenses	-	-	-	-	-	-	-
Net Impact	-	-	-	-	-	-	-

DMMD 208th to 212th Pipe Project



CITY OF DES MOINES
2017 -2022 CAPITAL IMPROVEMENT PLAN
 (Amount in Thousands)

DAMMD 208th to 212th Pipe Project 451

CIP Category: Surface Water Mgmt

Managing Department: Plan, Build & PW Admin

Summary Project Description:

Replace approximately 1500 feet of existing roadside ditch and corrugated metal pipe along the west side of Des Moines Memorial Drive from 208th Street to 212th Street. Includes installation of 14 manhole structures and minimal road restoration.

Justification/Benefits: The ditch and culvert system along the west side of Des Moines Memorial Drive is insufficient to convey a 25-year storm causing water to pool in the south bound lane of Des Moines Memorial Drive. This project proposes to replace the existing corrugated metal pipe and ditch system with approximately 1500 feet of new 18-inch pipe that would connect to the pipe replacement work made on Des Moines Memorial Drive in 2014. This project is a high priority project (CIP-18) listed in the 2015 SWM Comprehensive Plan.

PROJECT SCOPE		ANNUAL ALLOCATION									
Expenditures	Total Budget	Project to Date 12/31/15	Scheduled Year 2016	Plan Year 2017	Plan Year 2018	Plan Year 2019	Plan Year 2020	Plan Year 2021	Plan Year 2022		
Design	119	-	-	-	-	-	-	-	119		
Land & Right of Way	-	-	-	-	-	-	-	-	-		
Construction	391	-	-	-	-	-	-	-	391		
Contingency	93	-	-	-	-	-	-	-	93		
Total Expenditures	603								603		
Funding Sources		Project to Date 12/31/15	Scheduled Year 2016	Plan Year 2017	Plan Year 2018	Plan Year 2019	Plan Year 2020	Plan Year 2021	Plan Year 2022		
Surface Water Utility	603	-	-	-	-	-	-	-	603		
Total Funding	603								603		
OPERATING IMPACT		ANNUAL OPERATING IMPACT									
Operating Impact	6 Year Total	2017	2018	2019	2020	2021	2022				
Revenue	-	-	-	-	-	-	-	-	-	-	-
Expenses	-	-	-	-	-	-	-	-	-	-	-
Net Impact	-										

8th Avenue (264th to 265th)



CITY OF DES MOINES
2017 -2022 CAPITAL IMPROVEMENT PLAN
 (Amount in Thousands)

8th Ave (264th to 265th)	451	Summary Project Description:
CIP Category: Surface Water Mgmt		This project proposes to install approximately 910 feet of 12 inch storm pipe, 9 catch basins along the west side of 8th Avenue and replace an existing manhole at the intersection of S 265th Place and 8th Avenue where the new storm drain system connects to the existing system.
Managing Department: Public Works		

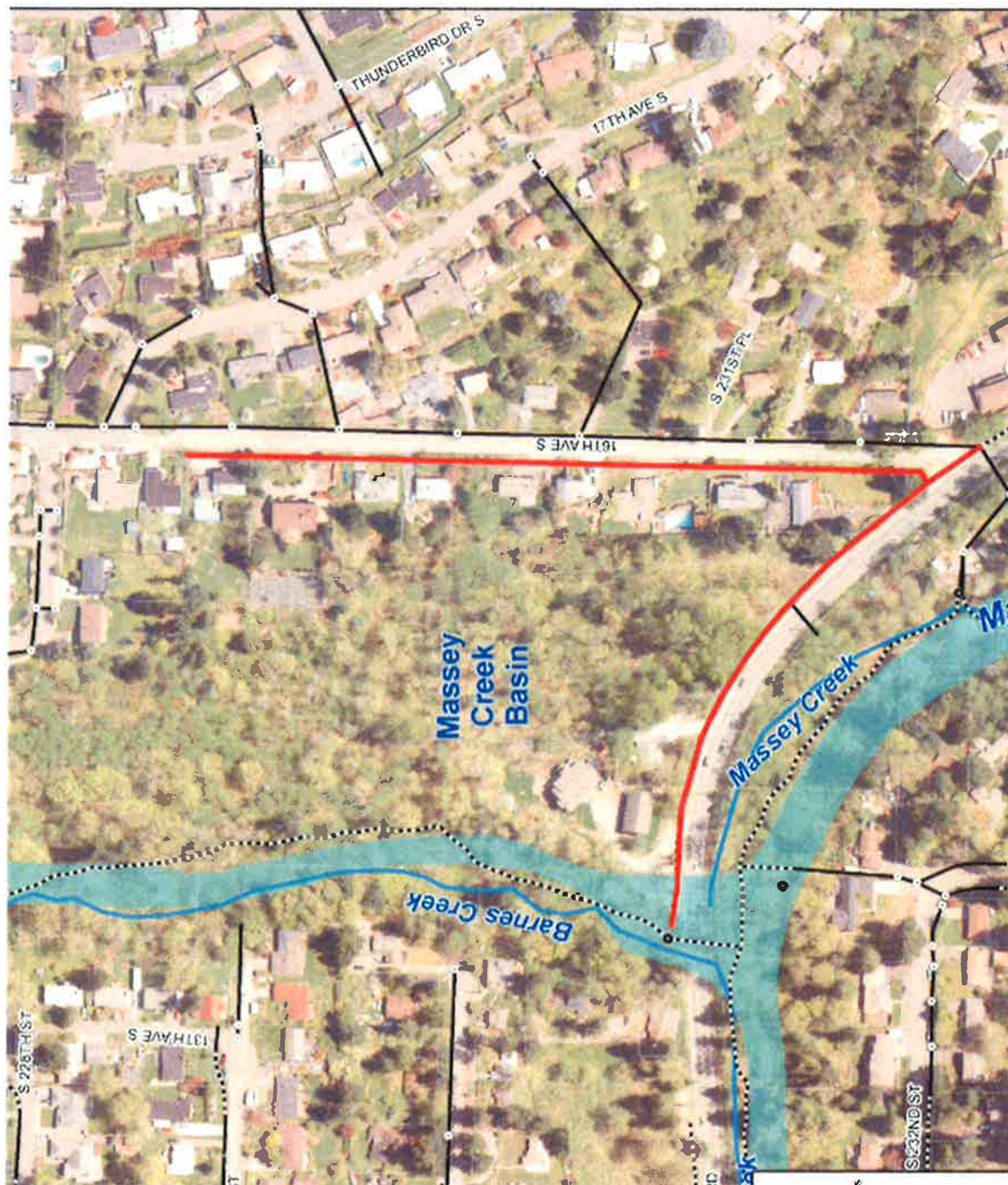
Justification/Benefits: Presently most of the runoff from 8th Avenue sheetflows on the properties west of 8th Avenue and is not collected into the existing system located on the east side of the road. The purpose of this project is to collect and prevent runoff from 8th Avenue from exacerbating a landslide hazard located west of the project. This is a high priority project listed in the 2015 SWM Comprehensive Plan.

PROJECT SCOPE		ANNUAL ALLOCATION								
Expenditures	Total Budget	Project to Date 12/31/15	Scheduled Year 2016	Plan Year 2017	Plan Year 2018	Plan Year 2019	Plan Year 2020	Plan Year 2021	Plan Year 2022	
Design	30								30	
Land & Right of Way	-									
Construction	210								210	
Contingency	30								30	
Total Expenditures									270	

Funding Sources	Total Budget	Project to Date 12/31/15	Scheduled Year 2016	Plan Year 2017	Plan Year 2018	Plan Year 2019	Plan Year 2020	Plan Year 2021	Plan Year 2022
Surface Water Utility	270								270
Total Funding	270								270

OPERATING IMPACT		ANNUAL OPERATING IMPACT							
	Operating Impact	6 Year Total	2016	2017	2018	2019	2020	2021	2022
	Revenue	-	-	-	-	-	-	-	-
	Expenses	-	-	-	-	-	-	-	-
	Net Impact	-	-	-	-	-	-	-	-

KDM/16th Ave B Pipe Replacement



CITY OF DES MOINES
2017 -2022 CAPITAL IMPROVEMENT PLAN
 (Amount in Thousands)

KDM/16th Ave B Pipe Replacement	451	Summary Project Description:
CIP Category: Surface Water Mgmt		Install a new stormwater conveyance system on the west side of 16th Avenue S consisting of approximately 1220 feet of 12 inch pipe and 6 catch basins. Replace the existing ditch along the north side of Kent-DesMoines Road (KDM) with approximately 935 feet of 36 inch pipe and 9 storm drain manholes. The new 16th Ave S storm system will connect to the new system on KDM and outfall to Barnes Creek.
Managing Department: Plan, Build & PW Admin		

Justification/Benefits: During periods of heavy rainfall, runoff from 16th Avenue will overtop Kent-Des Moines Road (KDM) and erode/flood the properties on the south side of the road. This project will better collect the runoff from the west side of 16th Avenue and the north side of KDM and allow the abandonment of at least one KDM storm crossing. The project will also enclose the existing ditch system along KDM for vehicle and pedestrian safety. This project is a high priority project (CIP-25B) listed in the 2015 SWM Comprehensive Plan.

PROJECT SCOPE		ANNUAL ALLOCATION							
Expenditures	Total Budget	Project to Date 12/31/15	Scheduled Year 2016	Plan Year 2017	Plan Year 2018	Plan Year 2019	Plan Year 2020	Plan Year 2021	Plan Year 2022
Design	176								176
Land & Right of Way	-								
Construction	572								572
Contingency	132								132
Total Expenditures	880								880

Funding Sources	Total Budget	Project to Date 12/31/15	Scheduled Year 2016	Plan Year 2017	Plan Year 2018	Plan Year 2019	Plan Year 2020	Plan Year 2021	Plan Year 2022
Surface Water Utility	880								880
Total Funding	880								880

OPERATING IMPACT		ANNUAL OPERATING IMPACT					
Operating Impact	6 Year Total	2016	2017	2018	2019	2020	2021
Revenue	-	-	-	-	-	-	-
Expenses	-	-	-	-	-	-	-
Net Impact	-	-	-	-	-	-	-



Introduction

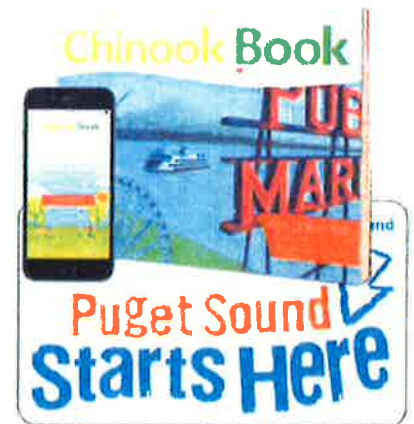
The Washington State Department of Ecology has issued an updated Western Washington Phase II Municipal Stormwater Permit to the City of Des Moines. This new permit went into effect on August 1st, 2013 and is in effect for 5 years. The permit identifies five major components in which compliance must be met:

- Public education/outreach
- Public involvement/participation
- Illicit Discharge Detection/Elimination
- Controlling runoff from construction sites
- Municipal Operations and Maintenance

The updated permit has presented additional requirements in each of these areas. The following provides a general description of how the City is meeting these requirements.

Public Education/Outreach

- ECOS Business Outreach
- Chinook Book – Educational Tool
- City Currents Articles
- Outreach Events
- Storm Drain Marker Program
- Carwash Kits
- Citywide Clean-up Event



Public Involvement/Participation

- Storm Water Management Program Update
- SWM Website Improvements

Illicit Discharge Detection/Elimination

- Citywide map updates/improvements
- Spill Response Tracking/Investigation
- Field Screening Process
- Staff Training



Controlling Runoff from Construction Sites

- Inspection process
- Inspection tracking
- Low Impact Development



PermitTrax by Bitco Software
"Doing it Different!"

Pollution Prevention for Operations and Maintenance for Municipal Operations

- SWPPP for City Maintenance/Storage Facilities
- Facility Inspections/Ipad Integration
- Cityworks Inspection Tracking





MEMO

To: Loren Reinhold
City of Des Moines Public Works

Cc:

From: Greg Gaasland
Merri Martz

Date: October 12, 2015

Subject: Barnes Creek Crossing of Kent-Des Moines Road Culvert Assessment

1.0 EXISTING CONDITIONS

Barnes Creek is a major tributary of the Massey Creek system located in the City of Des Moines. The creek as it passes below Kent-Des Moines Road collects drainage from about 355 acres of largely developed residential and commercial area. Kent-Des Moines Road is a major arterial serving Des Moines and is a major transportation corridor linking Pacific Highway South and Interstate 5 to downtown Des Moines.

The existing culvert is estimated as 80 to 90 feet long 24-inch diameter vitrified clay pipe with a 60-inch catch basin with a grated top and about 10 feet of 24-inch diameter corrugated metal pipe extension on the upstream end. The upstream end of the culvert is protected by a rebar cage to prevent large debris from entering/blocking the culvert entrance, see Photo 1.



Photo 1 – Existing Culvert Entrance

The culvert exit protrudes from the road embankment. The outlet is backwatered from a large downstream sediment bar that is at or a few inches higher than the top of the culvert at the downstream end. Photo 2 shows the outlet with the backwater and sediment accumulation of about one-half the culvert diameter (prior to cleaning).



Photo 2 – Existing Culvert Outlet

2.0 CULVERT CLEANING

In order to assess the interior condition of the culvert, the City of Des Moines commissioned to have the culvert interior cleaned and videoed. The culvert was cleaned and video inspected on September 22, 2015 by Bravo Environmental. The inspection reports are included in Appendix A.

There are numerous defects found within the existing culvert. These defects include:

- Separated joints (see Photo 3)
- Fractured pipe segments (see Photo 4)
- Displaced fractured pipe segments (see Photo 5)
- Missing pipe piece on invert (soil visible) (see Photo 6)
- Extensive root penetrations along pipe joints (see Photo 7)



Photo 3 – Separated Joints



Photo 4 – Fractured Pipe Segments

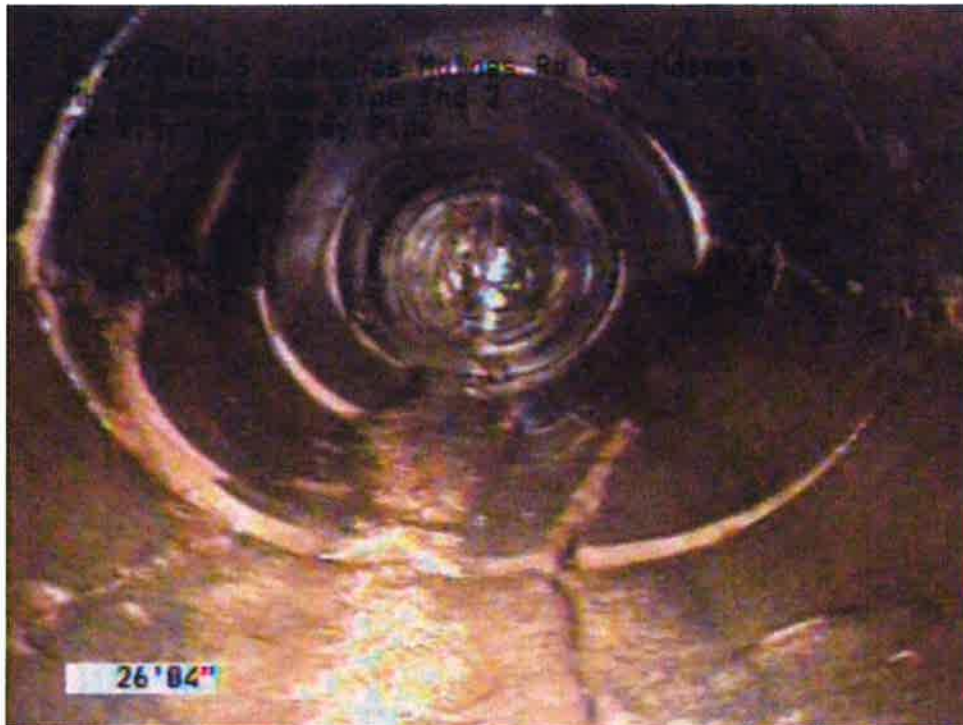


Photo 5 – Displaced Fractured Pipe Segments

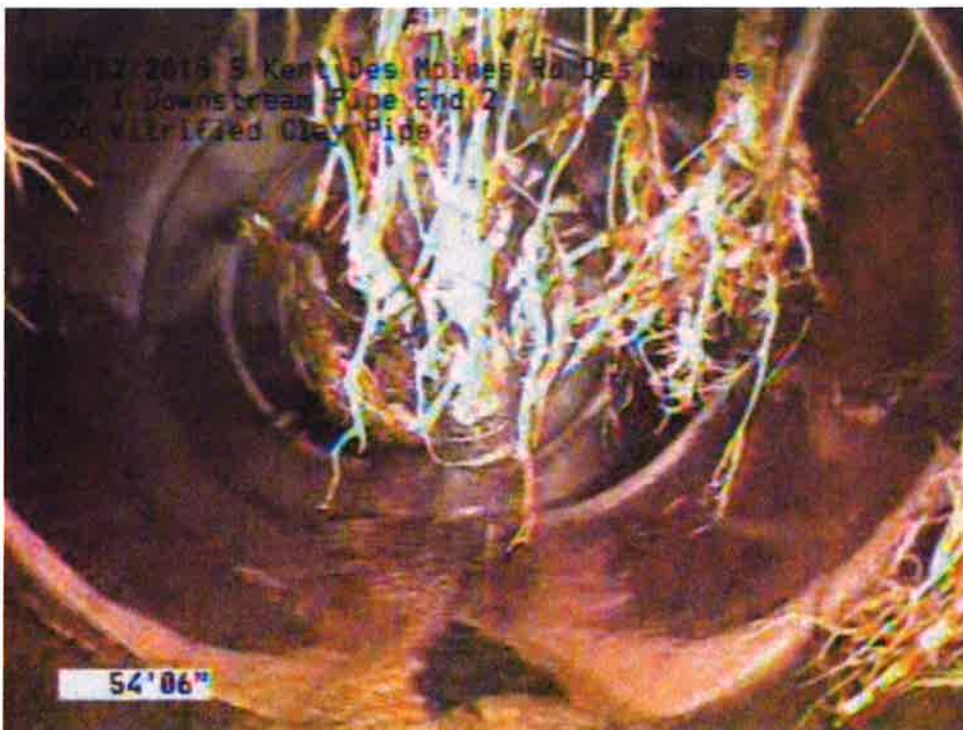


Photo 6 – Missing Segment of Pipe on Invert and Root Intrusion



Photo 7 – Extensive Root Penetrations (outlet of culvert visible in the background)

Videos of the culvert interior following its cleaning have been provided to the City of Des Moines.

3.0 ASSESSMENT OF CONDITION AND FISH PASSAGE

An assessment was made of the culvert from both its physical condition and fish barrier potential. The culvert assessment follows the Federal Highway Administration Publication No. FHWA-CFL/TD-10-005 entitled *Culvert Assessment and Decision-Making Procedures Manual* (2010). A Level 1 assessment was performed. The fish barrier assessment followed the procedure described in the Washington Department of Fish and Wildlife document entitled *Fish Passage and Surface Water Diversion Screening Assessment and Prioritization Manual* (2009). A Level A culvert evaluation and barrier analysis was performed. The on-site assessment of the culvert was performed on October 7, 2015.

3.1 CULVERT ASSESSMENT

The completed culvert assessment form is included in Appendix B. Note that the standard material types shown on the form do not contain a vitrified clay pipe. The unreinforced concrete pipe option was referenced to condition classifications in the Procedures Manual as its material properties would be most similar to vitrified clay. Vitrified clay is an unusual pipe material for storm drainage applications. Its common usage is for sanitary sewer system due to its resistance to corrosive environments.

The video inspection was used as part of the assessment of the culvert. The culvert cracking and deformation would not have been observed without that information since the culvert is too small for physical entry of personnel and the cracking/deformation occurs away from the culvert ends.

The structural integrity of the culvert has failed as seen by the cracked and displaced culvert barrel. The severity of the cracking created the "critical" classification. Had the cracking not caused displacement of pieces of the broken culvert and a missing piece from the culvert invert, a "poor" classification would have resulted. As there is no structural integrity in the cracked culvert material itself to maintain the round culvert opening, the surrounding backfill is maintaining the current shape. Should a large segment of broken culvert become dislodged to expose the backfill material, the backfill will likely fall into the culvert and either be washed downstream or block the culvert. Depending upon the rate of backfill falling into the culvert and the degree of blockage, a void above the culvert will occur. This will lead ultimately to caving from the surface and road failure.

3.2 FISH PASSAGE ASSESSMENT

The completed Level A culvert evaluation form is included in Appendix B. Measurements are reported below in metric (English) units as required by the form. Similar to the note in Section 3.1, vitrified clay pipe is not a standard culvert material type included on the form.

The key elements of the culvert evaluation and fish barrier analysis include evaluating the water depths in the culvert, if any hydraulic drops exist, culvert slope, and information on other obstructions. The water depth on the date of survey was 0.05 meters (2 inches) at the upstream end of the culvert and 0.61 meters (1.7 feet) on the downstream end of the culvert as a result of backwatering from a large bar located 3 meters (10 feet) downstream of the culvert outlet. A large pool (2.74 meters [9 feet] long by 3.7 meters [12 feet] wide with maximum depth of 0.61 meters [2 feet]) is located immediately downstream of the culvert outlet, although it has not been scoured below the invert of the culvert.

The slope of the culvert is 2.96% based on previous survey data for the culvert upstream and downstream invert (City of Des Moines Lower Massey Creek Alternative Analysis, KCM, Inc., August 1994). The average channel width, resulting from measurements of the channel width both upstream and downstream of the culvert, is 2.75 meters (9 feet) and the ratio of the culvert span to the channel width is 0.22.

The fish barrier analysis resulted in a determination that the culvert is a fish passage barrier, with the potential for 33% passability; in other words, the culvert is likely to be a barrier at least 2/3 of the time, but under certain flow conditions the culvert could be passable (i.e. when there is sufficient depth). The barrier results from the steep slope and the very shallow water depth. Due to the small size of the culvert compared to the channel width, there could also be a velocity barrier during higher flow conditions.

The creek has a gravel, cobble, and sand substrate, but appears to have experienced channel incision in recent years, likely due to stormwater runoff from upstream impervious surfaces. The channel is incised up to 1.2 meters (4 feet) upstream of the culvert and 0.3 to 0.6 meters (1-2 feet) downstream of the culvert. No barriers were observed in the 200 meters of channel upstream or downstream. The floodplains adjacent to the creek, both upstream and downstream of the culvert, had wetland species present and could contain wetlands. If the creek bed was stabilized and raised back up to connect frequently with its floodplain, the wetland quality and diversity would likely improve and also provide some storage of flood waters. Invasive plant species are dominant in the understory of the riparian zone, primarily Armenian blackberry (*Rubus armeniacus*) and ivy (*Hedera helix*). The ivy has grown up numerous trees and will likely kill the trees in the near future if no control measures are taken. A couple of large trees have fallen on the upstream side of the culvert. Many native riparian and wetland species are present, particularly on the downstream side of the culvert, including red alder (*Alnus rubra*), black cottonwood (*Populus balsamifera*), mountain ash (*Sorbus scopulina*), vine maple (*Acer circinatum*), salmonberry (*Rubus spectabilis*), lady fern (*Athyrium filix-femina*), and small-fruited bulrush (*Scirpus microcarpus*).

4.0 SUMMARY

The culvert is structurally inadequate, presents a fish barrier, and is in need of replacement. As the culvert lies below Kent-Des Moines Road, also classified as State Route 516, there may be potential funding available from WSDOT. Ownership and responsibility of the culvert needs clarification.

Potential remaining life span is purely conjecture. The remaining culvert life is likely less than 10 years. If there is a substantial earthquake, collapse and failure of the culvert is likely. A severe flooding event resulting in high velocity through the culvert and greater flow depths will expose the currently visible backfill material at the separated joints to increased scour potential which may also undermine the broken culvert pieces leading to failure.

Interim measures include removal of the intrusive roots to improve culvert capacity and reduce surcharge potential. The roots reduce the cross-sectional area, increase the culvert's effective roughness, and provide a location to impinge debris that may otherwise pass through the culvert. However, Bravo Environmental would require a liability release from their concern of the culvert fragility and the potential that during the root removal, a portion of the culvert would collapse. However, if the roots could be successfully removed, there are options to temporarily extend the culvert life. These options include slip-lining with a smaller diameter pipe and grouting the annular space, inserting a sleeve that expands and lines the existing culvert (preventing further backfill and root intrusion), and, less likely, pipe bursting. Another option includes an internal spiral created pipe, similar to slip-lining. Other more intensive methods include pipe ramming and tunneling. Each option that utilizes the existing culvert will reduce the culvert capacity because of reduced cross-sectional area and none of these approaches allow for fish passage. The pipe ramming, tunneling and, to a lesser extent, pipe bursting options will require significant site disturbance on both ends of the culvert to stage the required equipment.

When the culvert is ultimately replaced, it will be substantially larger to provide for fish passage. The construction of the replacement will also have to accommodate traffic during construction, address the relatively deep burial depth, and support or relocate the numerous utilities that are thought to cross over the culvert. An open-cut construction technique will most likely be ultimately used.

Appendix A

Bravo Environmental Inspection Reports



Bravo Environmental
 6437 S 144th
 Tukwila, WA 98168
 Tel: 425-424-9000
 Fax: 425-424-9002
 E-mail:

Inspection Report / Inspection: Barnes Creek Culvert

Date 9/22/2015	P/O. No.	Weather Dry	Surveyor's Name Dominick	Pipe Segment Reference	Section No. 1
Certificate No. U-513-18121	Survey Customer	System Owner	Date Cleaned	Pre-Cleaning Jetting	Sewer Category

Street123 City Loc. details Location Code	S Kent Des Moines Rd Des Moines	Use of Sewer Drainage Area Flow Control Length surveyed 61.95 ft	Stormwater	Upstream MH Dowstream MH Dir. of Survey Section Length	MH 1 Pipe End 2 Downstream 61.95 ft
--	--	--	-------------------	---	--

Purpose of Survey Year Laid Year Rehabilitated Tape / Media No.	Maintenance Related 9.22.2015	Joint Length Dia./Height Material Lining Method	 24 inch Vitrified Clay Pipe
--	--	--	--

Add. Information :

1:126	Position	Observation	Grade
	0.00	Water Level, 10 %of cross sectional area	
	0.00	Manhole / MH 1	
	4.00	Crack Longitudinal, at 10 o'clock, within 8 inches of joint: YES	S 2
	4.00	Crack Longitudinal, at 08 o'clock, within 8 inches of joint: YES	S 2
	13.60	Infiltration Dripper, at 11 o'clock, within 8 inches of joint: YES	M 3
	13.60	Fracture Longitudinal, at 11 o'clock, within 8 inches of joint: YES	S 3
	13.90	Deposits Settled Fine, 10 %of cross sectional area, from 05 to 07 o'clock, , within 8 inches of joint: YES	M 2
	16.45	S1 Fracture Longitudinal Hinge, 3, from 08 to 04 o'clock, within 8 inches of joint: YES, Start	S 5
	40.90	Roots Tap Joint, from 10 to 03 o'clock, 10 %, within 8 inches of joint: YESR	M 2
	43.75	Fracture Multiple, from 10 to 05 o'clock, within 8 inches of joint: YES	S 4
	46.95	Roots Tap Joint, at 11 o'clock, 5 %, within 8 inches of joint: YESR	M 2
	46.95	F1 Fracture Longitudinal Hinge, 3, from 08 to 04 o'clock, within 8 inches of joint: YES, Finish	S 5
	46.95	S2 Fracture Multiple, from 08 to 05 o'clock, within 8 inches of joint: YES, Start	S 4
	50.20	S3 Roots Tap Joint, from 10 to 02 o'clock, 20 %, within 8 inches of joint: YESR, Start	M 2



13.6 FT

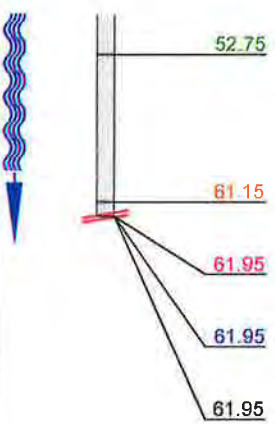


50.2 FT



Inspection Report / Inspection: Barnes Creek Culvert

Date :	Job number :	Weather : Dry	Operator : Dominick	Counter : 1	Section name :
Present :	Vehicle :	Camera :	Preset :	Cleaned : Jetting	Rate :

1:126	Position	Observation	Rate
	52.75	Roots Fine Joint, from 07 to 09 o'clock, within 8 inches of joint: YESR	M 1
	61.15	Deposits Settled Fine, 15 %of cross sectional area, from 04 to 08 o'clock, , within 8 inches of joint: YES	M 3
	61.95 F2	Fracture Multiple, from 08 to 05 o'clock, within 8 inches of joint: YES, Finish	S 4
	61.95 F3	Roots Tap Joint, from 10 to 02 o'clock, 20 %, within 8 inches of joint: YESR, Finish	M 2
	61.95	Survey Abandoned / Unable to pass roots	

QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
5644	3225	53	17	70	4.08	2.13	3.33

Inspection photos / Inspection: Barnes Creek Culvert

City : Des Moines	Street : S Kent Des Moines Rd	Date :	Pipe Segment Reference :	Section No : 1
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Photo: NA_MH 1_Pipe End 2_S Kent Des Moines Rd_22092015_130536_A.JPG, VCR No.: 9.22.2015
 13.6FT, Fracture Longitudinal, at 11 o'clock, within 8 inches of joint: YES



Photo: NA_MH 1_Pipe End 2_S Kent Des Moines Rd_22092015_131651_A.JPG, VCR No.: 9.22.2015
 50.2FT, Roots Tap Joint, from 10 to 02 o'clock, 20 %, within 8 inches of joint: YESR, Start



Bravo Environmental
 6437 S 144th
 Tukwila, WA 98168
 Tel: 425-424-9000
 Fax: 425-424-9002
 E-mail:

Inspection Report / Inspection: Barnes Creek Culvert

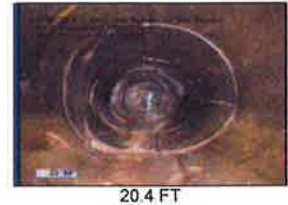
Date 9/22/2015	P/O. No.	Weather Dry	Surveyor's Name Dominick	Pipe Segment Reference	Section No. 2
Certificate No. U-513-18121	Survey Customer	System Owner	Date Cleaned	Pre-Cleaning Heavy Cleaning	Sewer Category

Street123 City Loc. details Location Code	S Kent Des Moines Rd Des Moines	Use of Sewer Drainage Area Flow Control Length surveyed	Stormwater 63.20 ft	Upstream MH Downstream MH Dir. of Survey Section Length	MH 1 Pipe End 2 Downstream 63.20 ft
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Purpose of Survey Year Laid Year Rehabilitated Tape / Media No.	Maintenance Related 9.22.2015	Joint Length Dia./Height Material Lining Method	24 inch Vitrified Clay Pipe
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Add. Information :

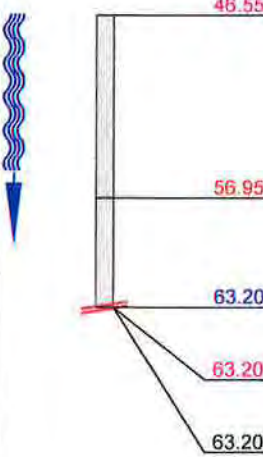
1:126	Position	Observation	Grade
	0.00	Manhole / MH 1	
	0.00	Water Level, 10 % of cross sectional area	
	4.00	Crack Longitudinal, at 10 o'clock, within 8 inches of joint: YES	S 2
	4.00	Crack Longitudinal, at 08 o'clock, within 8 inches of joint: YES	S 2
	12.10	Water Level, 15 % of cross sectional area	
	13.90	Infiltration Dropper, at 11 o'clock, within 8 inches of joint: YES	M 3
	13.90	Fracture Longitudinal, at 11 o'clock, within 8 inches of joint: YES	S 3
	15.05	Deposits Settled Fine, 15 % of cross sectional area, from 05 to 07 o'clock, , within 8 inches of joint: YES	M 3
	16.30	S1 Fracture Longitudinal Hinge, 3, from 07 to 05 o'clock, within 8 inches of joint: YES, Start	S 5
	20.40	F1 Fracture Longitudinal Hinge, 3, from 07 to 05 o'clock, within 8 inches of joint: YES, Finish	S 5
	20.40	S2 Fracture Longitudinal Hinge, 4, from 12 to 12 o'clock, within 8 inches of joint: YES, Start	S 5
	29.40	Infiltration Dropper, at 11 o'clock, within 8 inches of joint: YES	M 3
	41.25	S3 Roots Tap Joint, from 09 to 03 o'clock, 20 %, within 8 inches of joint: YESR, Start	M 2
	46.50	F2 Fracture Longitudinal Hinge, 4, from 12 to 12 o'clock, within 8 inches of joint: YES, Finish	S 5





Inspection Report / Inspection: Barnes Creek Culvert

Date :	Job number :	Weather : Dry	Operator : Dominick	Counter : 2	Section name :
Present :	Vehicle :	Camera :	Preset :	Cleaned : Heavy Cleaning	Rate :

1:126	Position	Observation	Rate				
	46.55	S4 Fracture Multiple, from 12 to 12 o'clock, within 8 inches of joint: YES, Start	S 4				
	56.95	Hole Soil Visible, from 05 to 06 o'clock, within 8 inches of joint: YES	S 5				
	63.20	F3 Roots Tap Joint, from 09 to 03 o'clock, 20 %, within 8 inches of joint: YESR, Finish	M 2				
	63.20	F4 Fracture Multiple, from 12 to 12 o'clock, within 8 inches of joint: YES, Finish	S 4				
	63.20	Survey Abandoned / Unable to pass roots					
QSR	QMR	SPR	MPR	OPR	SPRI	MPRI	OPRI
5843	3324	59	17	76	4.21	2.43	3.62

Inspection photos / Inspection: Barnes Creek Culvert

City : Des Moines	Street : S Kent Des Moines Rd	Date : 	Pipe Segment Reference : 	Section No : 2
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Photo: NA_MH 1_Pipe End 2_S Kent Des Moines Rd_22092015_145203_A.JPG, VCR
 No.: 9.22.2015
 20.4FT, Fracture Longitudinal Hinge, 4, from 12 to 12 o'clock, within 8 inches of joint:
 YES, Start



Photo: NA_MH 1_Pipe End 2_S Kent Des Moines Rd_22092015_145507_A.JPG, VCR
 No.: 9.22.2015
 56.95FT, Hole Soil Visible, from 05 to 06 o'clock, within 8 inches of joint: YES

Appendix B

Assessment Forms

FLH CULVERT ASSESSMENT FORM

Notes by: GAASLAND Date: 10/7/15 Project: 100-SGT-14-010E
 Measurements by: MARTZ/GAASLAND Time: 9AM

Site Information:

Facility Location: KENT-DES MOINES Rd Lat/Long: -
 Milepost: - Project Station: - GPS Road CL Waypoint No.: -
 Named waterway: BARNES CREEK Direction of Flow: SOUTH

Culvert Information:

No. of Barrels: 1 Barrel Length (approx): 80-90' Barrel Slope: Mild / Steep / ~ 3%
 Skew (0 degrees = perpendicular to road): 0-5° Approx Cover: Upstream 15' Downstream 15'

Barrel Shape (circle one) Circular Box Elliptical Pipe Arch Arch

Diameter: 24" / Span x Rise

Pipe Material (circle one): Metal - Concrete / RCP - Corrugated Plastic - Smooth Plastic - Timber - Masonry
VITRIFIED CLAY

Appurtenances (circle one):

Upstream Projecting / Mitered / Headwall / Headwall & Wingwalls / Flared End Section /

Downstream Projecting / Mitered / Headwall / Headwall & Wingwalls / Flared End Section /

Flowing or standing water? N / Y Depth: 0.2 (ft) Est. Flow Velocity: 4 (ft/s) Possible AOP/fish passage? Y / N

Utilities Present (list)? Y / N Possible historic features? Y / N Open Bottom? Y / N

Culvert Condition and Performance (circle / check all that apply and provide appropriate explanations below)

Category	Rating					
Invert deterioration	Good	<u>Fair</u>	Poor	Crit	Unk	N/A
Joints & Seams	Good	Fair	<u>Poor</u>	Crit	Unk	N/A
Corrosion / Chemical	Good	<u>Fair</u>	Poor	Crit	Unk	N/A
Cross-Section Deform	Good	Fair	<u>Poor</u>	Crit	Unk	N/A
Cracking	Good	Fair	Poor	<u>Crit</u>	Unk	N/A
Liner / Wall	Good	Fair	Poor	Crit	Unk	<u>N/A</u>
Mortar and Masonry	Good	Fair	Poor	Crit	Unk	<u>N/A</u>
Rot and Marine Borers	Good	Fair	Poor	Crit	Unk	<u>N/A</u>
Headwall/Wingwall	Good	Fair	Poor	Crit	Unk	<u>N/A</u>
Apron	Good	Fair	Poor	Crit	Unk	<u>N/A</u>
Flared End Section	Good	Fair	Poor	Crit	Unk	<u>N/A</u>
Pipe End	Good	Fair	<u>Poor</u>	Crit	Unk	N/A
Scour Protection	Good	Fair	Poor	Crit	Unk	<u>N/A</u>

Performance Problems Requiring Level 1 Action

- Debris/Veg Blockage > 1/3 of rise at inlet or outlet ☐
- Sediment Blockage 1/3 to 3/4 of rise at inlet/outlet ☐
- Buoyancy or Crushing-Related Inlet Failure ☐
- Poor Channel Alignment ☐
- Previous and/or Frequent Overtopping ☐
- Local Outlet Scour ☐

Performance Problems Requiring Level 2 Action

- Embankment Piping ☐
- Channel Degradation / Headcut (circle one) ☐
- Embankment Slope Instability ☐
- Sediment Blockage > 3/4 Rise at Inlet or Outlet ☐
- Sediment Blockage > 1/3 Rise Throughout Barrel ☐

Other Problems Requiring Level 2 Action

- No Access / Ends Totally Buried / Submerged ☐
- Aggressive Abrasion/Corrosion/Chemical (circle) ☐
- Exposed Footing (Open-Bottom Culvert Only) ☐

Photos (number): 1 Inlet 2 Outlet 3 Roadway (ahead) 4 Roadway (back) 5 View downstream
6 View upstream Others:

Notes / Recommendations:

Photo 1 - Inlet



Photo 2 - Outlet



Photo 3 - Roadway (Ahead)



Photo 4 - Roadway (Back)



Photo 5 - View Downstream



Photo 6 - View Upstream



CULVERT EVALUATION FIELD FORM (Level A) (1/15/09)

¹Site ID: Barnes - KDM

²Culvert Number: 915920 (WDFW)

³Field Review Crew

Crew: Martz / Gaaskind

Date: 10/7/15

CULVERT DESCRIPTION

⁴Shape: ☒ RND ☐ BOX ☐ ARCH ☐ SQSH
☐ ELL ☐ OTH

⁵Material: ☐ PCC ☐ CPC ☐ CST ☐ SST ☐ CAL ☐ SPS ☐ SPA
☐ PVC ☐ TMB ☐ MRY ☒ OTH CLAY PIPE

⁶Span/Dia: 0.61 ⁷Rise: 0.52 ⁸Water Depth in Culvert: 0.05 m upstream

⁹Hydraulic Drop: N/A ¹⁰Drop Location: N/A 0.5 m downstream

¹¹Length: 25.3 ¹²Culvert Slope: 2.96% ¹³Road Fill Depth: 4.5 m

¹⁴Countersunk: ☐ Yes ☒ No

¹⁵Apron: ☒ None ☐ US ☐ DS ☐ Both ¹⁶Tidegate: ☐ Yes ☒ No

¹⁷Number of Baffles: N/A ¹⁸Baffle Type: ☐ Concrete ☐ Metal ☐ Wood

☐ Rock ☐ Plastic ☐ Other

USIE = 43.93'
DSIE = 41.47'

PLUNGE POOL DESCRIPTION

¹⁹Length: 2.74 ²⁰Maximum Depth: 0.61

²¹Scour Line Width (SLW): 3.7

CHANNEL DESCRIPTION

²²Average Channel Width: 2.75 m

²³Culvert Span / Channel Width Ratio: 0.22

SUMMARY INFORMATION

²⁴Barrier: ☒ Yes ☐ No ☐ Unk ²⁵%Passability: ☒ 0 ☐ 33 ☐ 67 ☐ 100

²⁶Method: ☒ Level A ☐ Level B ☐ Oth ☐ FW ☐ Professional Judgment

²⁷Reason: ☐ WS Drop ☒ Slope ☐ Velocity ☒ Depth

☐ Tidegate ☐ Obstruction ☐ Other

²⁸Significant Reach: ☒ Yes ☐ No ☐ Unknown

²⁹Comments: Likely to also have a velocity barrier in high flow conditions due to very small size.