

## **APPENDIX B – 2005 OUTFALL INSPECTIONS CONDITION AND MAINTENANCE STUDY**

**THE CITY OF WINNIPEG  
WATER AND WASTE DEPARTMENT**

**2005 OUTFALL CONDITION AND  
MAINTENANCE STUDY**

D/190



KONTZAMANIS = GRAUMANN = SMITH = MACMILLAN INC.  
CONSULTING ENGINEERS & PROJECT MANAGERS

May 4, 2005

File No. 05-0107-01

The City of Winnipeg  
Water and Waste Department  
849 Ravelstone Avenue  
Winnipeg, Manitoba  
R3W 1S8

ATTENTION: Mr. Kas Zurek, P.Eng.  
Design and Construction Engineer

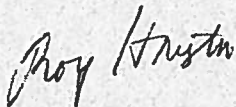
RE: City of Winnipeg, Outfall Condition and Maintenance Study  
2005 Update

Dear Mr. Zurek:

We are pleased to submit two copies of our Draft Report for the 2005 Update of the City of Winnipeg Outfall Condition and Maintenance Study. In the report we have summarized the findings of the initial 1998 report, reported on the current status of the Outfall Capital Upgrade Program and the Outfall Inspection Program, and made recommendations regarding the continuance of these programs.

We trust this meets your requirements at this time. We are available after your review of the report to discuss any comments or questions you may have and then to finalize the report. If you have any questions concerning this matter, please call me at 896-1209.

Regards,



Roy Houston, P.Eng.  
Manager, Civil / Municipal Services

SH/af  
Enclosure

cc: Darcy Strandberg, City of Winnipeg

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## 1.0 INTRODUCTION

In 1996, KGS Group was retained to perform a comprehensive assessment of the existing condition and the required maintenance for all the outfalls within the City of Winnipeg for which the City's Water and Waste Department had responsibility. The results of this study are contained in the Outfall Condition and Maintenance Study – Final Report, issued by KGS in August 1998. The report summarized the inspections and analyses of the outfalls and contained a number of recommendations regarding an immediate 5-year capital upgrade program and future operations and maintenance programs.

Since the 1998 Report, inspections, maintenance, and repairs to outfalls have diverged from the original recommendations. Very few inspections have been conducted since 1998 and approximately half of the original 5-year construction program has not yet been undertaken. In this follow-up report, we revisit the original construction and inspection programs, review the works that have been undertaken since 1998, and provide updates to the programs complete with new estimates for additional inspections. We also discuss the results of the recent inspection of 15 outfalls selected for potential inclusion in this year's phase of the Outfall Rehabilitation Construction Program.

## **2.0 1998 REPORT**

### **2.1 REPORT DESCRIPTION**

#### **2.1.1 Outfall Inventory**

As part of the 1998 report, an inventory of all existing outfalls in the City was first established. This inventory recorded basic information concerning each outfall (location, size), and established whether the outfalls were under the jurisdiction of the Water and Waste Department, or were instead "private outfalls". Private outfalls included outfalls under the responsibility of the Parks and Recreation Department, the University of Manitoba, the Manitoba Department of Highways as well as a small number of industrial, commercial and private interests.

A complete set of drawings showing all the outfalls in the inventory are included in Appendix A. Table 1 summarizes the inventory, providing the number of outfalls sorted by owner, size and receiving stream. These drawings and table are duplicated from the 1998 report.

A total of 387 outfalls were identified and included in the inventory. Based on direction from the City, 128 outfalls were excluded from 1996 study: 37 outfalls were "private outfalls", 16 were significant channels or ditches, and 75 were 300 mm or less or less. This left 259 outfalls to be inspected.

#### **2.1.2 Outfall Inspection**

Typically, the rivers and streams in Winnipeg experience low flows and water levels during the late fall and winter, particularly after the fall "drawdown" when the gates at Lockport are opened (usually mid-October). However early and record snowfalls in 1996 and high water and ice levels during the winter of 1996/97 hampered the inspections to the point where it was necessary to extend the inspection schedule into the fall of 1997.

The outfall inspection program was completed by December 1997. Inspections consisted of personal "walk-through" inspections for outfalls greater than 1200 mm in diameter, or CCTV inspection for outfalls between 300 and 1200 mm in diameter. Walk-through inspections

included deflection measurements within the CMP portions of the pipe at regular intervals and at locations of noticeable deflection. The vertical, horizontal, and two diagonal diameters were measured. In addition to the internal inspection, outfall inspections also included external inspections of the outfall structure itself, as well as the riverbank in the vicinity of the outfall.

As detailed in the 1998 report, 77 of the 259 outfalls could not be inspected for a variety of reasons (outfalls were submerged, filled with debris, or inaccessible for other reasons). Tables 2 and 3 list the number of outfalls inspected and not inspected respectively, and are duplicated from the 1998 report

### **2.1.3 Condition Assessments**

The 1998 assessments of outfalls were based on three conditions having the most impact on an outfall: the structural, hydraulic and geotechnical conditions. Each condition produced a rating on a scale of 1 (satisfactory) to 5 (failed). These individual ratings were then used to produce an overall condition rating for each outfall, also on a scale of 1 to 5.

Internally, the structural rating evaluated the physical condition of the outfall pipe, including: deformations, cracks, joint separations, mis-aligned pipe, deterioration of pipe material, etc. The internal deflection measurements on the larger diameter CMP outfalls were used to calculate the actual amount of deflection. Outfall pipes with a deflection of greater than 5% were deemed to have failed. Externally, the structural rating evaluated the physical condition of the outfall end-piece, including deformations, corrosion, and evidence of ice damage.

The hydraulic rating evaluated the hydraulic capacity of the outfall pipe, including: partial collapse of the pipe due to movement of the pipe or from impact from ice or debris, sediment and debris deposits within the pipe, and restrictions caused by roots intrusion in the pipe, or by vegetation growth downstream of the outlet.

The geotechnical rating evaluated the condition of the river bank at the outfall, including: erosion features such as toe scouring or undercutting of the bank, and any and all slope failure features such as active or inactive headscarps, tension cracking, and hummocky topography.



In addition to the structural, hydraulic, geotechnical and overall condition rating, three of the specific aspects making up these ratings were deemed important enough to address individually: outfalls requiring rip-rap repairs, outfalls affected by ice damage and outfalls with debris and sediment build-up.

#### **2.1.4 Inventory Database**

As part of the Study, a computerized information management system, or database, was developed for all known sewer outfalls within the City of Winnipeg. All information collected as part of the Study was incorporated into the database. This included all "statistical" information such as location, identification references, size, type of sewer, etc.; as well as all condition assessment information recorded during the inspections of the outfalls including both observed characteristics and calculated ratings. The database has the ability to serve many purposes, including:

- Storing and retrieving information concerning each outfall;
- Maintain inspection and maintenance schedules for each outfall;
- Evaluate the change in condition of each outfall over time and determine a schedule for outfall repair

The database has great potential as a tool for managing the outfall infrastructure of the City of Winnipeg. It is our understanding that the database has not been upgraded since 1998 to reflect the outfall construction since that date. By updating the database and embarking on a regular inspection schedule for the City's outfalls, the database will assist the City in providing timely maintenance and rehabilitation to the system in a cost effective manner.

## **2.2 REPORT FINDINGS AND RECOMMENDATIONS**

A total of 182 outfalls were inspected, 71 of which had a failure condition rating of 5 (failed). Of these, 47 had failed structurally, 13 had failed hydraulically, 2 had failed due to unstable riverbanks, and 9 had failed due to two or more of the above conditions.

Fifty-five outfalls were rated as requiring immediate rehabilitation and repair. The remaining outfalls were assessed with a time frame within which future monitoring and re-inspection to

periodically re-assess their condition would be undertaken. The future monitoring would determine when the outfalls deteriorate to the point where rehabilitation will be necessary. Programs for outfall maintenance, inspection, and rehabilitation were developed, consisting of a five year work schedule to repair the outfalls in the worst condition, and for the remaining outfalls a re-inspection schedule of two to ten years depending on the severity of their condition in 1996.

The original recommended 5-year Outfall Capital Upgrade Plan is shown in Figure 1. It consists of 55 outfalls, with a total estimated construction cost of \$2.7 Million in 1996 Dollars. The program was spread over a five year period, with yearly construction values ranging between \$510,000 to \$560,000.

The original recommended outfall re-inspection schedule is shown in Figure 2. This schedule extended over the same five year time frame as the Capital Upgrade Plans. Estimated cost for the reinspections was \$181,000. It was anticipated that these inspections would show deterioration in some outfalls requiring a continuation of both the Reinspection and Capital Upgrade Plans.

should be anticipated that roughly 30 to 40% of the outfalls will require some cleaning for an effective inspection. New environmental regulations will significantly increase the cost of outfall cleaning, thereby significantly increasing the cost of an effective outfall inspection program.

The City's recent approach to the outfall inspection program indicates that there are many other priorities that take precedence. With the added increase in costs for outfall cleaning and the demands on the City's overall maintenance budgets, a sustained outfall inspection program as recommended in the 1998 report, while costly, is still merited and recommended. At present, the scheduling of future outfall repairs is based on the condition assessment of the 1998 report. While this provides some basis to the selection, since 1998 it has been shown that a number of outfalls have deteriorated rapidly to catastrophic failure. A number of outfalls have been advanced in the repair schedule and others have required repair that were not included in the original 5-year plan. It is evident that the degree of deterioration is not uniform in all outfalls across the City. To identify those outfalls that are deteriorating rapidly and perform rehabilitative maintenance or repairs before they reach catastrophic failure requires adherence to the inspection schedule.

Since the original inspections of 1996/97, almost 10 years have passed. We recommend a complete reinspection of all outfalls be undertaken to update the condition assessment of the outfalls and to establish a new baseline from which to establish future inspection schedules. If the costs of the inspections and particularly the cleaning of the outfalls is prohibitive, the time interval between re-inspections can be adjusted. Originally, depending on the severity of the condition of the outfalls in 1996/97, reinspections were scheduled for 2, 5 or 10 year intervals. If necessary for financial reasons, these could be adjusted to say 4, 8 and 12 year intervals instead. While it is preferable to perform reinspections on the shorter time schedule, it is by far more preferable to perform the inspections according to the lengthier time schedule rather than perform no inspections at all. Without regular inspections of the outfalls, the maintenance program becomes one of reacting to emergency situations brought about by unexpected, catastrophic failures. With regular inspections of the outfalls, the maintenance program can be planned in an efficient and cost effective manner and greatly reduce the number of emergency situations. A secondary approach would be to forego a complete reinspection of all outfalls in the next year and instead adopt the originally recommended reinspection schedule. This will result in a complete reinspection of the system within 10 years.

In Table 5 we have listed all the outfalls proposed for reinspection. This table includes outfalls not originally inspected in 1996/97 due to access and dewatering requirements. We have not checked every outfall to determine a cost for inspection, rather we have used costs from the 2005 inspection program to derive an average cost of inspection for a typical outfall. We have discussed typical dewatering requirements for submerged outfalls with Uni-Jet Industrial Pipe Services to derive typical dewatering costs. We have also estimated that 40% of the outfalls will require cleaning (based on the 2005 inspection program) and applied an hourly clearing rate to derive anticipated cleaning costs.

Estimated costs for outfall re-inspections are as follows:

Typical outfall inspection: \$1500/outfall  
Typical outfall dewatering: \$30,000 / outfall (between 10-50,000 depending on size)  
Typical clearing: \$5,000 / outfall (10 hours @ \$500 / hr)

A.	Number of submerged outfalls:	77
B.	Number of uninspected outfalls 300 mm diameter or less:	75
C.	Number of outfalls inspected in 1996/97 and not in Capital Upgrade Plan:	163
D.	Number of unrepaired outfalls remaining in Capital Upgrade Plan:	19

Cost of A above = \$2,579,500 (77 x (1,500 + 30,000) + 40% x 77 x 5000)

Cost of B above = \$262,500 (75 x 1,500 + 40% x 75 x 5000)

Cost of C above = \$270,500 (163 x 1,500 + 40% x 163 x 5000)

Cost of D above = \$66,500 (19 x 1,500 + 40% x 19 x 5000)

The total cost to inspect all outfalls is \$3,479,000.00. Note that if the 77 submerged outfalls are excluded from the inspection program, the cost to inspect the remaining outfalls becomes \$899,500. We recommend that the outfall inspection program be undertaken but limited to the outfalls listed in items B, C and D above (i.e. exclude the submerged outfalls). For the submerged outfalls it may be more prudent to periodically inspect the river bank and the surface above the outfall pipe for evidence of bank failure or partial pipe collapse and respond to pipe failures.

Eventually the submerged outfalls will require replacement. Long range consideration should be given to either re-directing these systems to nearby lift stations or constructing new lift stations, thereby allowing the outfall pipe to be re-installed at a higher elevation. The alternative is to allow the submerged outfalls to live out their lives to failure, and then repair or replace them on an emergency basis.

### **5.3     OUTFALL MAINTENANCE PROGRAM**

In addition to the Outfall Upgrading Program and the Outfall Reinspection Program, the 1998 Report recommended upgrades for outfalls requiring rip rap repairs, repairs for damage due to ice, and outfalls with debris and sediment build-up. These programs essentially deal with outfalls where rehabilitation of the piping itself is not required, i.e. major excavation would not be required and so could be possibly be done by specialty contractors (rip rap hauling and placing, concrete and corrugated metal outfall abutment repairs, and pipe cleaning). No movement has yet been made by the City to address these particular outfalls. Tables 6 to 10 list these outfalls and provides updated construction costs.

### **5.4     OUTFALL DATABASE UPDATE**

If put to good use, the electronic outfall database can be an invaluable tool in the maintenance of the City's outfall infrastructure. In addition to recording the general, "permanent" information about an outfall (size, name, location, material type, etc.), the database can store all inspection data collected over time, analyze the long-term history of the outfall, monitor its gradual degradation, and schedule inspections, and maintenance to prolong outfall life, and schedule repair or replacement works before the outfall reaches a state of eminent catastrophic failure.

**TABLES**

**TABLE 1  
ORIGINAL OUTFALL INVENTORY SUMMARY  
1998 REPORT**

Stream	City Owned					Private	Totals
	≤300	> 300 and < 1200	≥1200	Channels	Ditches	All	
Red River	7	33	60	5	1	13	119
Assiniboine River	23	35	34	4	0	21	117
Seine River	18	31	12	2	1	3	67
Bunns Creek	2	13	9	0	2	0	26
Omand's Creek	21	3	1	1	0	0	26
Sturgeon Creek	2	18	6	0	0	0	26
La Salle River	2	2	0	0	0	0	4
Floodway	0	0	2	0	0	0	2
<b>Totals</b>	<b>75</b>	<b>135</b>	<b>124</b>	<b>12</b>	<b>4</b>	<b>37</b>	<b>387</b>

- Notes:
1. RR72 Syndicate is connected to RR71, RR72 was not counted as an outfall in this table, but is included in the database as a connector pipe.
  2. RR70.1, RR70.2 and RR70.3 are connected to RR70 - Watt Street. They are not counted as outfalls in this table, but are included in the database as connector pipes.
  3. RR56.2 - Pioneer Blvd. is not included because it's a new installation 1997-98.

**TABLE 2  
ORIGINAL SUMMARY OF OUTFALLS INSPECTED  
1998 REPORT**

Stream	City Owned			Private	Totals
	≤300	> 300 and < 1200	≥1200	All	
Red River	3	25	48	2	78
Assiniboine River	6	31	21	5	63
Seine River	0	19	3	0	22
Bunns Creek	0	7	4	0	11
Omand's Creek	0	3	0	0	3
Sturgeon Creek	0	14	3	0	17
La Salle River	0	2	0	0	2
Floodway	0	0	2	0	2
<b>Totals</b>	<b>9</b>	<b>101</b>	<b>81</b>	<b>7</b>	<b>198</b>

- Notes: 1. RR70.1, RR70.2 and RR70.3 are connected to RR70 - Watt St. All are recorded as one outfall in this table.  
2. RR72 is connected to RR71 - Syndicate. These pipes are recorded as one outfall in this table.



**TABLE 3  
ORIGINAL SUMMARY OF OUTFALLS NOT INSPECTED  
1998 REPORT**

Stream	Submerged		No Access		Sediment Build-Up		Totals
	> 300 and < 1200	≥1200	> 300 and < 1200	≥1200	> 300 and < 1200	≥1200	
Red River	3	9	4	2	1	1	20
Assiniboine River	2	12	2	1	0	0	17
Seine River	12	9	0	0	0	0	21
Bunns Creek	6	5	0	0	0	0	11
Omand's Creek	0	1	0	0	0	0	1
Sturgeon Creek	3	3	0	0	1	0	7
La Salle River	0	0	0	0	0	0	0
Floodway	0	0	0	0	0	0	0
Totals	26	39	6	3	2	1	77

**TABLE 4  
RECOMMENDED CONTINUATION OF OUTFALL CAPITAL UPGRADES PLAN**

Outfall ID#	Name	Stream	Pipe Size (mm)	Estimated Cost of Repair
AS-91	Kennedy Street ✓	Assiniboine	760	\$60,000
AS-93	Hargrave Street ✓	Assiniboine	700	\$75,000
RR-7	Cloutier Drive (Segment 1 & 2) ✓	Red	1800 /900	\$125,000
RR-28	Dowker Ave. Outfall ✓	Red	900	\$55,000
RR-52	Marion Street ✓	Red	1800	\$90,000
RR-54	Rue Despins ✓	Red	1400	\$80,000
RR-55	Rue Despins FPD ✓	Red	1200	\$25,000
RR-97	Kildonan Park ✓	Red	250	\$20,000
RR-108	Eastwood Drive	Red	525	\$20,000
AS-27	Ridgedale Cres	Assiniboine	450	1
AS-38	Vialoux Drive Cul-de-Sac	Assiniboine	750	1
AS-70	Empress Street	Assiniboine	300	1
BU-6	Delbrook Cres.	Bunn's	400	1
FL-2	Kildare at Floodway	Floodway	3000	1
OM-3	Empress Street 1	Omands	750	1
OM-4	Veledrome 1	Omands	380	1
RR-8	Stormont Drive	Red	400	1
RR-30	Lotus Lane	Red	600	1
RR-34	Oakcrest Place	Red	375	1
RR-41	Churchill Drive Undrepass	Red	525	1
RR-59	Rue La Verendrye	Red	1200	1
RR-104	Red River Blvd.	Red	750	1
SE-2	Rue Laverendrye	Seine	600	1
ST-12	Amarynth Cres. 2	Sturgeon	400	1
ST-17	Harvest Lane	Sturgeon	400	1
RR-31	Dunkirk Drive	Red	1400	2
RR-51	Marion Street FPD	Red	1600	2
RR-108	Eastwood Drive	Red	525	2
RR-3	St. Norbert X-Kalay Lift Station Overflow	Red	300	2
RR-26	Crane Ave.	Red		3
ST-3	Booth Drive	Sturgeon	1850	3
RR-98	Hawthorne Ave.	Red		4

- 1 cost to be determined after inspection of outfall
- 2 no immediate action necessary. Reinspect as per general reinspection plan
- 3 reinspect and evaluate in the fall of 2005
- 4 to be included with Hawthorne Flood Pumping Station Reconstruction

**TABLE 5  
OUTFALLS PROPOSED FOR INSPECTION**

Outfall ID	OutfallName	Sewer Type	Size	Material Type	Category
AS-1	WEWPCC Outfall	Treated Sewer	1500	Monolithic Concrete	not inspected in 1996/97
AS-24	Fairmont Rd.	LDS	2500	CMP	not inspected in 1996/97
AS-31	Oakdale Dr.	LDS	600	CMP	not inspected in 1996/97
AS-32	McQuaker Dr.	LDS	1050	CMP	not inspected in 1996/97
AS-34	Olive St. #2	LDS	2200	CMP	not inspected in 1996/97
AS-59	Ferry Rd.	Combined Sewer	1800	CMP	not inspected in 1996/97
AS-67	Wellington Cres. at CNR Bridge	LDS	450	CMP	not inspected in 1996/97
AS-72	Renfrew St.	LDS	2400	CMP	not inspected in 1996/97
AS-77	Ash St.	Combined Sewer	3480	CMP	not inspected in 1996/97
AS-79	Aubrey St.	Combined Sewer	2900	CMP	not inspected in 1996/97
AS-82	Ruby St. #2	Combined Sewer	2700	CMP	not inspected in 1996/97
AS-85	Canora St.	Combined Sewer	1975	CMP	not inspected in 1996/97
AS-86B	Maryland St.	Combined Sewer	600	CMP	not inspected in 1996/97
AS-89	Spence St.	Combined Sewer	2700	CMP	not inspected in 1996/97
AS-92	Fort Rouge Park	Combined Sewer	2400	CMP	not inspected in 1996/97
AS-97	The Forks E. of C.N.R. Bridge	LDS	1200	CMP	not inspected in 1996/97
AS-99	Mayfair Ave.	WWS Overflow	1200	CMP	not inspected in 1996/97
BU-16	Gateway Rd.	LDS	800	CMP	not inspected in 1996/97
BU-18	Jim Smith Dr.	LDS	1390	CMP	not inspected in 1996/97
BU-20	Sun Valley Dr.	LDS	1800	Precast Concrete	not inspected in 1996/97
BU-21	Sunny Hills Rd.	LDS	725	Precast Concrete	not inspected in 1996/97
BU-22	Wpg. Hydro Transmission Line	LDS	2125	Precast Concrete	not inspected in 1996/97
BU-23	Mallows Way	LDS	900	Precast Concrete	not inspected in 1996/97
BU-4	Rothsay St. N.	LDS	1200	CMP	not inspected in 1996/97
BU-5	Rothsay St. S.	LDS	1200	CMP	not inspected in 1996/97
BU-6.1	Delbrook Cres. #2	LDS	600	CMP	not inspected in 1996/97
BU-7	Bonner Ave. #2	LDS	400	CMP	not inspected in 1996/97
BU-8	Bonner Ave. #3	LDS	375	CMP	not inspected in 1996/97
OM-2	Clifton St. Overflow	Combined Sewer	2700	CMP	not inspected in 1996/97
RR-106	Summerview Lane	LDS	1800	CMP	not inspected in 1996/97
RR-11	Radcliffe Rd. #2	WWS Overflow	760	CMP	not inspected in 1996/97
RR-14	SEWPCC Outfall	Treated Sewer	1800	CMP	not inspected in 1996/97
RR-16	St. Mary's Rd.	LDS	2280	CMP	not inspected in 1996/97
RR-21.1	Bishop Grandin Blvd #4	LDS	750	CMP	not inspected in 1996/97
RR-29	Victoria Cres. #2	LDS	750	CMP	not inspected in 1996/97
RR-32.5	Fermor Ave	LDS	1950	CMP	not inspected in 1996/97
RR-39.7	St. Vital Bridge	LDS	1600	CMP	not inspected in 1996/97
RR-47	Eccles St.	Combined Sewer	750	CMP	not inspected in 1996/97
RR-47.1	Eccles St. at Churchill Dr.	LDS	1200	CMP	not inspected in 1996/97
RR-47.5	Churchill High School	LDS	1600	CMP	not inspected in 1996/97
RR-56	Water Ave. #1	Combined Sewer	457	CMP	not inspected in 1996/97
RR-56.1	Water Ave. #2	Combined Sewer	450	Precast Concrete	not inspected in 1996/97
RR-61	Lombard Ave.	Combined Sewer	900	Wood Stave	not inspected in 1996/97
RR-62	McDermot Ave.	Combined Sewer	2700	CMP	not inspected in 1996/97
RR-81	Elmwood Park	LDS	900	CMP	not inspected in 1996/97
RR-85	Inkster Blvd.	Combined Sewer	2900	CMP	not inspected in 1996/97
RR-93	Rossmere Cres.	LDS	2900	CMP	not inspected in 1996/97
RR-99	NEWPCC Outfall Kildonan Golf Course	Treated Sewer	3352	Monolithic Concrete	not inspected in 1996/97
SE-10	Rue Bourgeault	LDS	450	PVC	not inspected in 1996/97
SE-35	Avondale Rd.	LDS	750	CMP	not inspected in 1996/97
SE-40	Fernwood Ave.	LDS	750	CMP	not inspected in 1996/97
SE-41	Clayton Dr.	LDS	525	CMP	not inspected in 1996/97
SE-42	Berrydale Ave.	LDS	600	CMP	not inspected in 1996/97
SE-44	Sadler Ave.	LDS	1050	CMP	not inspected in 1996/97
SE-45	Hindley Ave.	LDS	530	CMP	not inspected in 1996/97

**TABLE 5  
OUTFALLS PROPOSED FOR INSPECTION**

Outfall ID	OutfallName	Sewer Type	Size	Material Type	Category
SE-46	Worthington Ave.	LDS	750	Precast Concrete	not inspected in 1996/97
SE-48	Willowlake Cres.	LDS	1525	CMP	not inspected in 1996/97
SE-49	Beliveau Rd.	LDS	1050	CMP	not inspected in 1996/97
SE-50	N. of Beaverhill Blvd.	LDS	900	CMP	not inspected in 1996/97
SE-51	Lavalee Rd.	LDS	1200	CMP	not inspected in 1996/97
SE-52	Bishop Grandin Blvd.	LDS	800	CMP	not inspected in 1996/97
SE-53	Richfield Ave.	LDS	1200	CMP	not inspected in 1996/97
SE-53.1	Royalwood Subdivision (Phase 1)	LDS	450	Precast Concrete	not inspected in 1996/97
SE-54	Public Lane E. of Meadowood Dr.	LDS	1200	CMP	not inspected in 1996/97
SE-55	N. of John Bruce Rd.	LDS	1200	CMP	not inspected in 1996/97
SE-56	Woodydell Ave.	LDS	1200	CMP	not inspected in 1996/97
SE-57	Compark Rd.	LDS	1400	CMP	not inspected in 1996/97
SE-58	Southglen Dr.	LDS	1600	CMP	not inspected in 1996/97
SE-58.1	St. Annes Rd.	LDS	1600	CMP	not inspected in 1996/97
ST-1	Old Mill Rd.	LDS	400	CMP	not inspected in 1996/97
ST-13	Alcott St.	WWS Overflow	600	CMP	not inspected in 1996/97
ST-14	Ness Ave.	LDS	1900	CMP	not inspected in 1996/97
ST-18.1	Hamilton Ave. #2	LDS	400	CMP	not inspected in 1996/97
ST-4	Sturgeon Rd. (north)	LDS	1500	CMP	not inspected in 1996/97
ST-5	Sturgeon Rd. (south)	LDS	1200	CMP	not inspected in 1996/97
ST-7.1	Greenway Cres. #2	LDS	750	CMP	not inspected in 1996/97

AS-11	Barker Blvd.	LDS	1075	CMP	not in capital upgrade plan
AS-13	Willow Ridge Rd.	LDS	1800	CMP	not in capital upgrade plan
AS-15	Paradise Bay	LDS	600	CMP	not in capital upgrade plan
AS-16.5	Orchard Park	LDS	600	CMP	not in capital upgrade plan
AS-2	P.T.H 100 W. Side #1	LDS	1400	CMP	not in capital upgrade plan
AS-20	Shelmardine Dr.	WWS Overflow	300	CMP	not in capital upgrade plan
AS-21.5	Lannoo Dr.	LDS	900	CMP	not in capital upgrade plan
AS-22	Harstone Rd.	LDS	450	PVC	not in capital upgrade plan
AS-23.1	Dieppe Rd. #2	WWS Overflow	900	CMP	not in capital upgrade plan
AS-28	Country Club Blvd.	LDS	900	CMP	not in capital upgrade plan
AS-3	P.T.H. 100 W. Side #2	LDS	1350	CMP	not in capital upgrade plan
AS-32.1	Assiniboine Cres.	LDS	300	CMP	not in capital upgrade plan
AS-32.2	Charleswood Bridge Drain - SW	LDS	250	PVC	not in capital upgrade plan
AS-32.3	Charleswood Bridge Drain - SE	LDS	250	PVC	not in capital upgrade plan
AS-32.4	Charleswood Bridge Drain - NW	LDS	250	PVC	not in capital upgrade plan
AS-32.5	Charleswood Bridge Drain - NE	LDS	250	PVC	not in capital upgrade plan
AS-33	Olive St. #1	Combined Sewer	750	Precast Concrete	not in capital upgrade plan
AS-35	Vialoux Dr.	LDS	1500	CMP	not in capital upgrade plan
AS-36	Wexford S.P.S.	WWS Overflow	250	Not Known	not in capital upgrade plan
AS-36A	Wexford Lift Station	WWS Overflow	250	CMP	not in capital upgrade plan
AS-37B	Strathmillan Gate Chamber	Combined Sewer	300	Not Known	not in capital upgrade plan
AS-39	Mount Royal Cres. #1	LDS	150	CMP	not in capital upgrade plan
AS-4	P.T.H 100 E. Side #1	LDS	800	CMP	not in capital upgrade plan
AS-40	Mount Royal Cres. #2	LDS	250	Not Known	not in capital upgrade plan
AS-42.5	Perimeter Drive - Assiniboine Park #2	Combined Sewer	300	CMP	not in capital upgrade plan
AS-43	N. Perimeter Dr. Pumping Station	LDS	300	CMP	not in capital upgrade plan
AS-43A	Assiniboine Park Ditch Drain		400	Not Known	not in capital upgrade plan
AS-44	N. Perimeter Drive - Assiniboine Park #1	LDS	300	CMP	not in capital upgrade plan
AS-45	N. Perimeter Drive - Assiniboine Park #2	LDS	450	CMP	not in capital upgrade plan
AS-46	Woodlawn St.	LDS	300	CMP	not in capital upgrade plan
AS-47	N. Perimeter Drive - Assiniboine Park #3	LDS	150	CMP	not in capital upgrade plan
AS-48	N. Perimeter Drive - Assiniboine Park #4	LDS	150	CMP	not in capital upgrade plan
AS-49	N. Perimeter Drive - Assiniboine Park #5	LDS	150	CMP	not in capital upgrade plan

**TABLE 5  
OUTFALLS PROPOSED FOR INSPECTION**

Outfall ID	OutfallName	Sewer Type	Size	Material Type	Category
AS-5	P.T.H. 100 E. Side #2	LDS	1200	CMP	not in capital upgrade plan
AS-5.1	P.T.H. 100 E. Side #3	LDS	1500	CMP	not in capital upgrade plan
AS-50	Assiniboine Park West of Foot Bridge	LDS	150	CMP	not in capital upgrade plan
AS-51	Overdale St.	LDS	400	CMP	not in capital upgrade plan
AS-52	Assiniboine Park #2	LDS	200	CMP	not in capital upgrade plan
AS-53	Deer Lodge Pl.	Combined Sewer	300	Precast Concrete	not in capital upgrade plan
AS-54	Assiniboine Park #3	LDS	150	CMP	not in capital upgrade plan
AS-56	Assiniboine Park #4	LDS		Ditch	not in capital upgrade plan
AS-57	Douglas Park Rd.	Combined Sewer	300	CMP	not in capital upgrade plan
AS-58	Park Blvd.	LDS	2400	CMP	not in capital upgrade plan
AS-58A	Assiniboine Park Ditch Drain #2	LDS		Ditch	not in capital upgrade plan
AS-6	Barker SPS	LDS	150	Not Known	not in capital upgrade plan
AS-60	Chataway Blvd.	Combined Sewer	900	CMP	not in capital upgrade plan
AS-60B	Chataway Blvd. #2	LDS	600	CMP	not in capital upgrade plan
AS-61A	Edgeland Blvd.	LDS	400	CMP	not in capital upgrade plan
AS-62	Parkside Dr.	Combined Sewer	750	Precast Concrete	not in capital upgrade plan
AS-63	Riverbend Cres.	Combined Sewer	2340	Precast Concrete	not in capital upgrade plan
AS-64	Wellington Cres. #1	LDS	300	Precast Concrete	not in capital upgrade plan
AS-65	St. James Underpass	LDS	900	CMP	not in capital upgrade plan
AS-65A	Route 90 Overpass	LDS	300	CMP	not in capital upgrade plan
AS-66	King Edward St.	LDS	650	CMP	not in capital upgrade plan
AS-66.8	Wellington Cres. #2	LDS	450	CMP	not in capital upgrade plan
AS-67A	Route 90 Bridge	LDS	450	CMP	not in capital upgrade plan
AS-68	Wellington Cres. #3	LDS	500	CMP	not in capital upgrade plan
AS-69	Tylehurst St.	Combined Sewer	2300	CMP	not in capital upgrade plan
AS-7	Caron Park	LDS	150	Not Known	not in capital upgrade plan
AS-71	Empress Street #2	LDS	300	CMP	not in capital upgrade plan
AS-75	Clifton St.	Combined Sewer	2300	CMP	not in capital upgrade plan
AS-76	Ash St FPS	Combined Sewer	2100	CMP	not in capital upgrade plan
AS-78	Elm St.	Combined Sewer	762	CMP	not in capital upgrade plan
AS-80	Aubrey St. FPS	Combined Sewer	2850	CMP	not in capital upgrade plan
AS-86	Cornish Ave FPS	Combined Sewer	1600	CMP	not in capital upgrade plan
AS-87	Arbuthnot St.	Combined Sewer	1400	CMP	not in capital upgrade plan
AS-88	Cornish Ave.	Combined Sewer	1500	CMP	not in capital upgrade plan
AS-9	St. Charles St. #2	LDS	900	CMP	not in capital upgrade plan
AS-94	Donald St.	Combined Sewer	1900	CMP	not in capital upgrade plan
AS-95	Assiniboine Ave. - FPD		1350	CMP	not in capital upgrade plan
BU-10	Uxbridge Rd. N.	LDS	1200	CMP	not in capital upgrade plan
BU-11	Uxbridge Rd. S.	LDS	900	CMP	not in capital upgrade plan
BU-12	McIvor Ave.	LDS	400	CMP	not in capital upgrade plan
BU-13	Raleigh St. #1	LDS	400	CMP	not in capital upgrade plan
BU-14	Raleigh St. #2	LDS	750	CMP	not in capital upgrade plan
BU-15	Raleigh St. #3	LDS	750	CMP	not in capital upgrade plan
BU-17	Regatta Rd. #1	LDS	300	Precast Concrete	not in capital upgrade plan
BU-19	Regatta Rd. #2	LDS	300	CMP	not in capital upgrade plan
BU-2	Henderson Hwy. #2	LDS	1200	CMP	not in capital upgrade plan
BU-3	Bonner Ave. #1	LDS	525	CMP	not in capital upgrade plan
BU-9	Pennefather St.	LDS	1350	CMP	not in capital upgrade plan
LS-1	Rue St. Pierre	LDS	300	Precast Concrete	not in capital upgrade plan
LS-1.1	Rue Campeau	LDS	300	Precast Concrete	not in capital upgrade plan
LS-2	Rue Des Trappistes	LDS	450	CMP	not in capital upgrade plan
LS-4	Rue La Maire	LDS	1000	Precast Concrete	not in capital upgrade plan
OM-1	Raglan Rd.	LDS	400	CMP	not in capital upgrade plan
OM-10	Velodrome Meter Pit	LDS	100	CMP	not in capital upgrade plan
OM-11	Velodrome #2	LDS	300	CMP	not in capital upgrade plan

**TABLE 5  
OUTFALLS PROPOSED FOR INSPECTION**

Outfall ID	OutfallName	Sewer Type	Size	Material Type	Category
OM-12	Empress St. #7	LDS	300	CMP	not in capital upgrade plan
OM-13	Empress St. #8	LDS	300	CMP	not in capital upgrade plan
OM-14	Empress St. #9	LDS	300	CMP	not in capital upgrade plan
OM-15	Empress St. #10	LDS	300	CMP	not in capital upgrade plan
OM-16	Empress St. #11	LDS	300	CMP	not in capital upgrade plan
OM-17	Empress St. #12	LDS	300	CMP	not in capital upgrade plan
OM-18	Empress St. #13	LDS	300	CMP	not in capital upgrade plan
OM-19	Empress St. #14	LDS	300	CMP	not in capital upgrade plan
OM-21	Empress St. #15	LDS	300	CMP	not in capital upgrade plan
OM-22	Empress St. #16	LDS	300	CMP	not in capital upgrade plan
OM-23	Empress St. #17	LDS	300	CMP	not in capital upgrade plan
OM-24	Empress St. #18	LDS	300	CMP	not in capital upgrade plan
OM-25	Empress St. #19	LDS	300	CMP	not in capital upgrade plan
OM-26	Empress St. #20	LDS	300	CMP	not in capital upgrade plan
OM-5	Empress St. #2	LDS	300	CMP	not in capital upgrade plan
OM-6	Empress St. #3	LDS	300	CMP	not in capital upgrade plan
OM-7	Empress St. #4	LDS	300	CMP	not in capital upgrade plan
OM-8	Empress St. #5	LDS	300	CMP	not in capital upgrade plan
OM-9	Empress St. #6	LDS	300	CMP	not in capital upgrade plan
RR-101	John Black Ave.	LDS	1800	CMP	not in capital upgrade plan
RR-105	Henderson Hwy. (private)	LDS	600	CMP	not in capital upgrade plan
RR-12	Kings Dr.	LDS	1500	CMP	not in capital upgrade plan
RR-14.1	Freedman Cres. #1	LDS		Not Known	not in capital upgrade plan
RR-14.2	Freedman Cres. #2	Combined Sewer		CMP	not in capital upgrade plan
RR-14.3	Saunderson St. #1	LDS		Not Known	not in capital upgrade plan
RR-14.4	Saunderson St. #2	LDS		Not Known	not in capital upgrade plan
RR-14.5	Saunderson St. #3	LDS		Not Known	not in capital upgrade plan
RR-14.6	Sifton Rd. #1	LDS		Not Known	not in capital upgrade plan
RR-14.7	Sifton Rd. #2	Combined Sewer		Not Known	not in capital upgrade plan
RR-14.8	Sifton Rd. #3	LDS		Not Known	not in capital upgrade plan
RR-14.9	Sifton Rd. #4	LDS		Not Known	not in capital upgrade plan
RR-18	River Pointe Pl.	LDS	1050	CMP	not in capital upgrade plan
RR-19	Banning Rd.	LDS	1370	CMP	not in capital upgrade plan
RR-2	Lemay Ave.	LDS	900	CMP	not in capital upgrade plan
RR-20	Darcy Dr.	Combined Sewer	2200	CMP	not in capital upgrade plan
RR-21	Bishop Grandin Blvd. #2	LDS	750	CMP	not in capital upgrade plan
RR-22	Plaza Dr.	LDS	2400	CMP	not in capital upgrade plan
RR-23	Riviera Cres. Outfall	LDS	2000	CMP	not in capital upgrade plan
RR-25	Moore Ave.	LDS	1100	CMP	not in capital upgrade plan
RR-32	Glenview Ave.	LDS	525	CMP	not in capital upgrade plan
RR-34.1	Kingston Row	LDS	300	PVC	not in capital upgrade plan
RR-34.8	Riverdale Ave.	LDS	600	CMP	not in capital upgrade plan
RR-36	Somerset Ave.	Combined Sewer	1800	CMP	not in capital upgrade plan
RR-37	Calrossie Blvd.	Combined Sewer	450	CMP	not in capital upgrade plan
RR-38	Cockburn St. FPS	Combined Sewer	1500	CMP	not in capital upgrade plan
RR-39	Cockburn St. Lift Station	Combined Sewer	1800	CMP	not in capital upgrade plan
RR-40	Kingston Row Underpass	LDS	750	CMP	not in capital upgrade plan
RR-42	Edinburgh St.	Combined Sewer	800	CMP	not in capital upgrade plan
RR-43	Killamey St.	LDS	1200	CMP	not in capital upgrade plan
RR-44	Mager Dr. FPS	LDS	1800	CMP	not in capital upgrade plan
RR-45	Baltimore St. FPS	Combined Sewer	1800	CMP	not in capital upgrade plan
RR-46	Metcalfe Pl.	Combined Sewer	2000	CMP	not in capital upgrade plan
RR-47.4	Open Culvert from Football Field	LDS	300	CMP	not in capital upgrade plan
RR-48	Glasgow Ave.	LDS	1200	CMP	not in capital upgrade plan
RR-49	Jessie Ave	Combined Sewer	1900	CMP	not in capital upgrade plan

**TABLE 5  
OUTFALLS PROPOSED FOR INSPECTION**

Outfall ID	OutfallName	Sewer Type	Size	Material Type	Category
RR-50.5	Park Dr.	LDS	1200	CMP	not in capital upgrade plan
RR-56.2	Pioneer Blvd.	LDS	1400	CMP	not in capital upgrade plan
RR-57	Rue Dumoulin FPD	Combined Sewer	1200	CMP	not in capital upgrade plan
RR-6	Grandmont Blvd.	WWS Overflow	750	CMP	not in capital upgrade plan
RR-66B	Gateway Industries Process Discharge	WWS Overflow	200	Not Known	not in capital upgrade plan
RR-70	Watt St.	Combined Sewer	3700	CMP	not in capital upgrade plan
RR-70.1	Watt St. #2 (connector pipe)	Combined Sewer	1500	CMP	not in capital upgrade plan
RR-70.2	Watt St. #3 (connector pipe)	Combined Sewer	1850	CMP	not in capital upgrade plan
RR-70.3	Watt St. #4 (connector pipe)	Combined Sewer	1250	Precast Concrete	not in capital upgrade plan
RR-71	Syndicate St. - FPD	Combined Sewer	1800	CMP	not in capital upgrade plan
RR-72	Syndicate St. (connector pipe)	Combined Sewer	1050	CMP	not in capital upgrade plan
RR-73	Disraeli Bridge	LDS	300	CMP	not in capital upgrade plan
RR-74	Selkirk Ave.	Combined Sewer	1800	CMP	not in capital upgrade plan
RR-75	Pritchard Ave.	Combined Sewer	250	CMP	not in capital upgrade plan
RR-76	Burrows Ave.	Combined Sewer	2400	CMP	not in capital upgrade plan
RR-76.5	Aberdeen Ave.	WWS Overflow	200	CMP	not in capital upgrade plan
RR-80	St. John's Park MH	Combined Sewer	3000	CMP	not in capital upgrade plan
RR-83	Polson Ave. FPS	Combined Sewer	1800	CMP	not in capital upgrade plan
RR-84	Munroe Ave. FPS	Combined Sewer	2500	CMP	not in capital upgrade plan
RR-87	Chelsea Pl.	LDS	2260	CMP	not in capital upgrade plan
RR-88	Jefferson Ave.	Combined Sewer	3300	CMP	not in capital upgrade plan
RR-9	Rice Place	LDS	1500	CMP	not in capital upgrade plan
RR-91	Linden Ave. - FPD	Combined Sewer	1675	CMP	not in capital upgrade plan
RR-94	Newton Ave.	Combined Sewer	1850	CMP	not in capital upgrade plan
RR-95	Armstrong Ave.	Combined Sewer	2700	CMP	not in capital upgrade plan
RR-97.2	Kildonan Park #2	WWS Overflow	250	CMP	not in capital upgrade plan
RR-9B	Kilkenny Lift Station	Combined Sewer	100	Not Known	not in capital upgrade plan
SE-1	Mission FPS	Combined Sewer	2600	CMP	not in capital upgrade plan
SE-10.1	Westeel # 1 (Private)	LDS	400	CMP	not in capital upgrade plan
SE-10.2	Westeel # 2 (Private)	LDS	450	CMP	not in capital upgrade plan
SE-10.3	Westeel # 3 (Private)	LDS	300	CMP	not in capital upgrade plan
SE-11	Rue Plinguet	Combined Sewer	300	CMP	not in capital upgrade plan
SE-12	Kavanagh St.	LDS	750	CMP	not in capital upgrade plan
SE-13	Giroux St.	WWS Overflow	300	CMP	not in capital upgrade plan
SE-14	Cherrier St.	Combined Sewer	300	CMP	not in capital upgrade plan
SE-15	Doucet St.	WWS Overflow	300	CMP	not in capital upgrade plan
SE-16	Marion St.	LDS	300	PVC	not in capital upgrade plan
SE-17	Marion St. Bridge Abutment	LDS	100	Not Known	not in capital upgrade plan
SE-19	Dugald Ditch S. #1	LDS	300	CMP	not in capital upgrade plan
SE-20	Dugald Ditch S. #2	WWS Overflow	300	CMP	not in capital upgrade plan
SE-21	St. Catherine St. #1	LDS	600	CMP	not in capital upgrade plan
SE-22	St. Catherine St. #2	WWS Overflow	300	CMP	not in capital upgrade plan
SE-23	Tremblay St.	WWS Overflow	300	CMP	not in capital upgrade plan
SE-24.1	Deniset St. #1	Combined Sewer	300	CMP	not in capital upgrade plan
SE-25	Dubuc St.	WWS Overflow	300	CMP	not in capital upgrade plan
SE-26	Deniset St. #2	WWS Overflow	300	CMP	not in capital upgrade plan
SE-27	Evans Ave.	LDS	1067	CMP	not in capital upgrade plan
SE-28	Cote St.	WWS Overflow	450	CMP	not in capital upgrade plan
SE-29	Gareau St.	LDS	800	CMP	not in capital upgrade plan
SE-3	Rue Notre Dame E.	WWS Overflow	300	CMP	not in capital upgrade plan
SE-30	Guay Ave.	LDS	750	CMP	not in capital upgrade plan
SE-30.1	Egerton Rd.	LDS	900	CMP	not in capital upgrade plan
SE-31	Blenheim Ave.	LDS	1060	CMP	not in capital upgrade plan
SE-32	Imperial Ave.	LDS	750	CMP	not in capital upgrade plan
SE-33	Humbolt Ave.	LDS	900	CMP	not in capital upgrade plan

**TABLE 5  
OUTFALLS PROPOSED FOR INSPECTION**

Outfall ID	OutfallName	Sewer Type	Size	Material Type	Category
SE-34	Rue Archibald	LDS	2700	CMP	not in capital upgrade plan
SE-36	Comanche Rd.	WWS Overflow	600	CMP	not in capital upgrade plan
SE-37	Femor Ave.	LDS	600	CMP	not in capital upgrade plan
SE-38	Niakwa Rd. #1	LDS	450	CMP	not in capital upgrade plan
SE-38.1	Niakwa Rd. #2	LDS	450	CMP	not in capital upgrade plan
SE-39	Morrow Ave.	LDS	750	CMP	not in capital upgrade plan
SE-4	Rue Notre Dame W.	LDS	1220	CMP	not in capital upgrade plan
SE-43	Southbridge Dr.	LDS	900	CMP	not in capital upgrade plan
SE-47	Marlene St.	LDS	530	CMP	not in capital upgrade plan
SE-5	Rue Dumoulin	WWS Overflow	600	CMP	not in capital upgrade plan
SE-6	Provencher Blvd. #1	WWS Overflow	300	CMP	not in capital upgrade plan
SE-7	Provencher Blvd. #2	LDS	300	CMP	not in capital upgrade plan
SE-8	Provencher Blvd. Bridge Drains	LDS	150	Not Known	not in capital upgrade plan
SE-9	Provencher Blvd. #3	LDS	300	CMP	not in capital upgrade plan
ST-10	Lonsdale Dr. #2	WWS Overflow	300	CMP	not in capital upgrade plan
ST-11	Kirby Dr.	LDS	600	Precast Concrete	not in capital upgrade plan
ST-15	Valleyview Dr. #1	WWS Overflow	600	CMP	not in capital upgrade plan
ST-16	Valleyview Dr. #2	LDS	1050	CMP	not in capital upgrade plan
ST-18	Hamilton Ave. #1	LDS	1500	CMP	not in capital upgrade plan
ST-19	Silver Ave.	WWS Overflow	525	CMP	not in capital upgrade plan
ST-2	Oakdean Cres.	LDS	300	CMP	not in capital upgrade plan
ST-20	Voyageur Ave.	WWS Overflow	600	CMP	not in capital upgrade plan
ST-21	Crestview Park Dr. (retention pond drainage)	LDS	1676	CMP	not in capital upgrade plan
ST-22	Crestview Park Dr.	LDS	762	CMP	not in capital upgrade plan
ST-23	Acheson Dr.	LDS	900	CMP	not in capital upgrade plan
ST-24	Saskatchewan Ave.	LDS	361	CMP	not in capital upgrade plan
ST-6	Setter St.	LDS	600	CMP	not in capital upgrade plan
ST-7	Greenway Cres. #1	LDS	600	CMP	not in capital upgrade plan
ST-8	Lonsdale Dr. #1	LDS	600	CMP	not in capital upgrade plan
ST-9	Amarynth Cres. #1	LDS	525	CMP	not in capital upgrade plan
AS-27	Ridgedale Cres.	LDS	450	CMP	included in Capital Upgrades
AS-38	Vialoux Dr. Cul-de-Sac	LDS	750	CMP	included in Capital Upgrades
AS-42	Conway CS	Combined Sewer	2500	CMP	included in Capital Upgrades
AS-70	Empress Street #1	LDS	300	CMP	included in Capital Upgrades
BU-6	Delbrook Cres. #1	LDS	400	CMP	included in Capital Upgrades
FL-2	Kildare at Floodway	LDS	3000	Precast Concrete	included in Capital Upgrades
OM-3	Empress St. #1	LDS	750	CMP	included in Capital Upgrades
OM-4	Velodrome #1	LDS	380	CMP	included in Capital Upgrades
RR-104	Red River Blvd.	LDS	750	CMP	included in Capital Upgrades
RR-26	Crane Ave. #1	Combined Sewer	600	CMP	included in Capital Upgrades
RR-27	Crane Ave. #2	Combined Sewer	900	Precast Concrete	included in Capital Upgrades
RR-30	Lotus Lane	LDS	600	CMP	included in Capital Upgrades
RR-34	Oakcrest Pl.	LDS	375	CMP	included in Capital Upgrades
RR-41	Churchill Dr. Underpass	LDS	800	CMP	included in Capital Upgrades
RR-59	Rue La Verendrye	Combined Sewer	1200	CMP	included in Capital Upgrades
RR-8	Stormont Dr.	LDS	400	CMP	included in Capital Upgrades
SE-2	Rue Laverendrye	LDS	600	CMP	included in Capital Upgrades
ST-12	Amarynth Cres. #2	LDS	400	CMP	included in Capital Upgrades
ST-17	Harvest Lane	LDS	400	Precast Concrete	included in Capital Upgrades



**TABLE 6  
COST ESTIMATE FOR OUTFALLS REQUIRING EROSION PROTECTION MAINTENANCE**

<b>Outfall ID</b>	<b>Name</b>	<b>Type</b>	<b>Size</b>	<b>Geotech CR</b>	<b>Struct CR</b>	<b>Cost Estimate <sup>1</sup> Erosion Protection</b>
RR-19	Banning Rd.	LDS	1370	1	1	12,000.00
RR-2	Lemay Ave.	LDS	900	2	1	12,000.00
RR-21	Bishop Grandin Blvd. 2	LDS	750	1	2	12,000.00
RR-22	Plaza Dr.	LDS	2400	1	2	12,000.00
RR-82	Bredin Dr.	LDS	450	5	4	12,000.00
ST-22	Crestview Park Dr.	LDS	762	2	1	6,000.00
ST-3	Booth Dr.	LDS	1850	4	5	6,000.00
ST-4	Sturgeon Rd. (north)	LDS	1500	4		15,000.00
ST-7	Greenway Cres.	LDS	600	3	3	6,000.00
ST-7.1	Greenway Cres. 2	LDS	750	3		6,000.00
ST-8	Lonsdale Dr.	LDS	600	1	3	6,000.00
BU-1	Henderson Hwy.	LDS	1375	1	1	3,000.00
BU-13	Raleigh St. 1	LDS	400	3	3	3,000.00
BU-2	Henderson Hwy. 2	LDS	1200	4	1	6,000.00
<b>Total</b>						<b>117,000.00</b>

Note: <sup>1</sup> Based on \$600 per lineal meter of rip rap or \$30/m<sup>3</sup> and reasonable site access.

**TABLE 7  
OUTFALLS WITH MAJOR ICE DAMAGE AT OUTLET**

Outfall ID No.	Name	Size	Comments	Overall CR	Repair Cost
AS-10	Pender St.	900	Outlet bent, opening reduced by 50 %.	5	\$1,200.00
AS-13	Willow Ridge Rd.	1800	Outlet bent inwards and torn. Outfall extends from bank and could be trimmed back.	3	\$1,200.00
AS-18	McCallum Cres.	1350	CMP bent closed at outlet. Opening reduced by 70%. Outfall extends from bank and could be trimmed back.	5	N/A <sup>1</sup>
AS-42	Conway CS	2500	Ice damage upstream side of outlet, top of CMP bent.	5	N/A <sup>1</sup>
AS-61	Doncaster St.	2250	CMP bent at outlet. Outfall extends from bank and could be trimmed back.	5	N/A <sup>1</sup>
AS-67	Wellington Cres. at CNR Bridge	450	Top of outlet is bent. Outfall extends from bank and could be trimmed back.	3	\$1,200.00
AS-78	Elm St.	750	CMP bent at outlet, opening reduced by 25 %.	4	\$1,200.00
AS-88	Cornish St. 2	1500	Grate is bent and twisted.	4	\$5,000.00
RR-100	Whellams Lane	1200	Top of outfall flattened at end.	5	N/A <sup>1</sup>
RR-59	Rue La Verendrye	1200	Upstream side of outlet pushed in.	5	N/A <sup>1</sup>
RR-60	Rue La Verendrye FPS	600	Appears to be bent out of alignment in downstream direction.	5	N/A <sup>1</sup>
RR-79	Hart Ave.	2850x2130	Outlet bent and torn open.	5	N/A <sup>1</sup>
RR-87	Chelsea PI	2275	First 1 m of pipe from outlet open and displaced from 3 to 9 o'clock due to ice damage.	4	\$2,000.00
ST-16	Valleyview Dr. 2	1050	Top of outlet bent, grating damaged and hanging open.	4	\$1,200.00
<b>TOTAL</b>					<b>\$13,000.00</b>

Notes: 1. Outfall is scheduled for capital upgrading which will account for costs of ice damage repairs.

TABLE 8  
OUTFALLS WITH MINOR ICE DAMAGE AT OUTLET

Outfall ID No.	Name	Size	Comments	Overall CR	Repair Cost
AS-15	Paradise Bay	600	Outlet was slightly bent at top and side of pipe. Outfall extends from bank and could be trimmed back.	3	\$1,000.00
AS-16.5	Orchard Park	600	Outlet is slightly bent. Outfall extends from bank and could be trimmed back.	3	\$1,000.00
AS-19	Carroll Rd.	1800	Minor ice damage to outlet.	5	N/A <sup>1</sup>
AS-24	Fairmont	2500	Small piece of CMP was missing at outlet.	2	\$6,000.00
AS-60	Chataway Blvd.	900	Outlet missing 250 mm piece between 3 and 5 o'clock.	4	\$1,500.00
AS-63	Riverbend Cres.	2250	Upstream side of outlet bent.	4	\$1,000.00
AS-67A	Route 90 Bridge	450	Top of pipe was bent. Opening reduced 10 - 20 %.	4	\$1,000.00
AS-69	Tylehurst St.	2250	Ice damage to protective railing around outlet structure.	2	\$1,000.00
AS-76	Ash St FPS	2100	Upstream portion of pipe is bent.	1	\$1,000.00
BU-2	Henderson Hwy. 2	1200	Outlet slightly bent.	5	N/A <sup>1</sup>
BU-6.1	Delbrook Cres. 2	600	Top of outlet bent.	4	\$1,000.00
FL-2	Kildare at Floodway	3000	Guard rail around outlet bent.	5	N/A <sup>1</sup>
LS-2	Rue Des Trappistes	450	Slight damage to top of pipe.	2	N/A <sup>1</sup>
OM-2	Clifton St. Overflow	2700	Chainlink fence on wingwall damaged.	2	\$1,500.00
RR-10	Radcliffe 1	1200	Minor denting from 9:00 to 11:00	4	N/A <sup>2</sup>
RR-2	Lemay Ave.	900	Outlet dented from 6:00 to 2:00.	5	N/A <sup>1</sup>
RR-35	Wildwood Golf Course	900	Small dent at top of outlet.	3	N/A <sup>2</sup>
RR-38	Cockburn St. FPS	1500	Outlet slightly bent.	1	\$1,000.00
RR-41	Churchill Dr. Underpass	800	Small dents at outlet from 9:00 to 12:00.	5	N/A <sup>2</sup>
RR-62	McDermot Ave.	2700	Tapered end of CMP slightly bent on upstream side.	4	\$1,000.00
RR-90	Linden Ave.	1800	Concrete at outlet in poor condition.	5	N/A <sup>1</sup>
SE-37	Fermor Ave.	600	Outlet slightly bent.	4	\$1,000.00
ST-1	Old Mill Rd.	400	40 mm dent at 9:00 upstream side.	3	N/A <sup>2</sup>
ST-22	Crestview Park Dr.	750	Small dents at 12:00 and 3:00.	5	N/A <sup>2</sup>
<b>TOTAL</b>					<b>\$19,000.00</b>

- Notes: 1. Outfall is scheduled for capital upgrading which will account for costs of ice damage repairs.  
2. Insignificant damage. Repair not necessary at this time. Monitor for increased damage in future.

**TABLE 9  
MAJOR SEDIMENT BUILD-UP IN OUTFALLS**

	Outfall Name	Outfall ID No.	Sewer Type	Size (mm)	Description of Sediment Build up	Condition Rating	Submerged	Difficult Access	Cost
1	Lombard Ave.	RR-61	CSO	900	100% of Pipe Area	3		✓	\$12,000
2	Water Ave.	RR-56	CSO	457	100% of Pipe Area	3			\$2,000
3	Rue Plinguet	SE-11	CSO	300	100% of Pipe Area	3			\$1,200
4	Niakwa Rd. 2	SE-38.1	LDS	450	100% of Pipe Area	1			N/A <sup>1</sup>
5	Elmwood Park	RR-81	LDS	900	95% of Pipe Area	4		✓	\$2,800
6	Lotus Lane	RR-30	LDS	600	95% of Pipe Area	5		✓	\$2,800
7	Setter St.	ST-6	LDS	600	Severe sediment and debris build up from 2.1m to 31.5m.	2			\$1,500
8	Wellington Cres.	AS-64	LDS	300	Severe.	4		✓	\$2,200
9	Whellams Lane	RR-100	WWSO	1200	75% of Pipe Area	5			\$2,400
10	Grandmont Blvd.	RR-6	WWSO	750	70% of Pipe Area	4			\$1,800
11	Cote St.	SE-28	WWSO	450	75% of Pipe Area	4		✓	\$2,200
12	Burrows Ave.	RR-76	CSO	2400	70% of Pipe Area	3			\$4,000
13	Eccles St.	RR-47	CSO	750	80% of Pipe Area	3	✓		\$7,800
14	Douglas Park Rd.	AS-57	CSO	300	75% of Pipe Area	2		✓	\$2,200
15	Rossmere Cres.	RR-93	LDS	2900	70% of Pipe Area	3	✓		\$13,500
16	St. Vital Bridge	RR-39.7	LDS	1600	80% of Pipe Area	2	✓		\$11,900
17	The Forks E. of CNR	AS-97	LDS	1200	75% of Pipe Area	2			\$2,500
18	Eccles St. 2	RR-47.1	LDS	1200	70% of Pipe Area	2			\$2,400
19	Vialoux Dr. Cul-de-Sac	AS-38	LDS	750	Major build up 13.5 m to 18 m. Minor build up 23 m to 33 m and 59.5 m to 64.2 m.	5		✓	\$3,000
20	Rue St. Pierre	LS-1	LDS	300	75% of Pipe Area	4		✓	\$3,000
21	Radcliffe	RR-11	WWSO	760	50% of Pipe Area	4		✓	\$2,500
22	Alcott	ST-13	WWSO	600	50% of Pipe Area	3			N/A <sup>1</sup>
23	Crane Ave. Outfall	RR-27	CSO	900	50% of Pipe Area	4			\$1,800
24	Fermor Ave	RR-32.5	LDS	1950	50% of Pipe Area	3	✓		\$13,400
25	Summerview Lane	RR-106	LDS	1800	50% of Pipe Area	3	✓		\$11,900
26	Churchill High School	RR-47.5	LDS	1600	50% of Pipe Area	2	✓		\$9,300
27	Raleigh St. 3	BU-15	LDS	750	50% of Pipe Area	3			\$1,500
28	Bonner Ave.	BU-3	LDS	525	50% of Pipe Area	2			\$1,200
29	Rue Bourgeault	SE-10	LDS	450	50% of Pipe Area	4			\$1,200
30	Amaranth Cres. 2	ST-12	LDS	400	50% of Pipe Area	5			N/A <sup>2</sup>
31	Ridgedale S.P.S.	AS-26	WWSO	250	Infilled at outlet.	5			N/A <sup>2</sup>
32	Chataway Blvd.	AS-60	CSO	900	Infilled from 8 to 11.5 m and 14.6 to 16.9 m.	4			\$1,800
33	Hargrave St.	AS-93	CSO	700	Infilled causing water backup at 10.6 m.	5			N/A <sup>2</sup>
34	Empress Street 2	AS-71	LDS	300	Infilled at 58.6 m.	3			\$1,200
<b>Total</b>									<b>\$127,000</b>

- Notes: 1. Outfall scheduled to be cleaned in 1998  
2. Outfall is scheduled for capital upgrading which will account for costs associated with sediment buildup

TABLE 10  
MINOR SEDIMENT BUILD-UP OUTFALLS

Outfall Name	Outfall ID No.	Sewer Type	Size (mm)	Description of Sediment Build up	Condition Rating	Submerged	Difficult Access	Cost
Valleyview Dr. 1	ST-15	WWSO	600	35% of Pipe Area	4			\$1,800
Selkirk Ave.	RR-74	CSO	1800	35% of Pipe Area	3			\$1,200
Killarney St.	RR-43	LDS	1200	40% of Pipe Area	2			\$1,200
Larchdale Cres. SPS	RR-96	LDS	1050	40% of Pipe Area	5			N/A <sup>2</sup>
Churchill Dr. Underpass	RR-41	LDS	800	35% of Pipe Area	5			N/A <sup>2</sup>
Silver Ave.	ST-19	WWSO	525	Moderate sediment build up from 0m to 5m and from 79m to 80m.	4			\$2,000
McDermot Ave.	RR-62	CSO	2700	25% of Pipe Area	4			\$1,800
Riverbend Cres.	AS-63	CSO	2300	Sediment is considerable towards end of pipe.	4			\$1,800
Colony St.	AS-90	CSO	1800	25% of Pipe Area	5			N/A <sup>2</sup>
Wildwood Golf Coarse	RR-35	CSO	900	Moderate throughout entire length.	3			\$1,500
Crane Ave.	RR-26	CSO	600	Moderate sediment build up in pipe from 55 m to 89 m.	4			\$1,200
Pritchard Ave.	RR-75	CSO	250	25% of Pipe Area	4			\$1,200
Chelsea Pl	RR-87	LDS	2260	Measurement L3 to water in pipe. Moderate sediment build up in pipe	4			\$1,800
John Black Ave.	RR-101	LDS	1800	30% of Pipe Area	2			\$1,800
Valleyview Dr. 2	ST-16	LDS	1050	Some moderate sediment build up in concrete portion of pipe and at pipe outlet.	4			\$1,200
La Maitre Ave.	LS-4	LDS	1000	25% of Pipe Area	2			\$1,200
Bishop Grandin Blvd. 2	RR-21	LDS	750	Moderate build up from 54 m to outlet.	5			N/A <sup>2</sup>
Victoria Cres. 2	RR-29	LDS	750	30% of Pipe Area	4	✓		\$6,800
Kingston Row Underpass	RR-40	LDS	750	30% of Pipe Area	4			\$1,200
Riverdale Ave.	RR-34.8	LDS	600	25% of Pipe Area	3			\$1,200
Delbrook Cres.	BU-6	LDS	400	25% of Pipe Area	5			N/A <sup>2</sup>
Metcalfe Pl.	RR-46	CSO	2000	15% of Pipe Area	4			\$1,800
Newton Ave.	RR-94	CSO	1850	20% of Pipe Area	2			\$1,800
Baltimore St. FPS	RR-45	CSO	1800	20% of Pipe Area	4			\$1,800
Linden Ave.	RR-90	CSO	1800	Up to 300 mm of sediment build up.	5			N/A <sup>2</sup>
Arbutnot	AS-87	CSO	1400	15% of Pipe Area	3			\$1,500
Park Blvd.	AS-58	LDS	2400	Some sediment at 13m from outlet.	3			\$1,800
Renfrew St.	AS-72	LDS	2400	20% of Pipe Area	2	✓		\$10,500
Dunham Rd. Outfall	RR-33	LDS	1200	20% of Pipe Area	3	✓		\$6,500
St. Charles St. 2	AS-9	LDS	900	Some debris in line from 27.2 m to 41.9 m and 49.3 m to 53.7 m.	3			\$1,200
Dowker Ave. Outfall	RR-28	LDS	900	15% of Pipe Area	5			N/A <sup>2</sup>
Guay Ave.	SE-30	LDS	750	Some debris in pipe and debris build up on grating.	4			\$1,200
Fermor Ave.	SE-37	LDS	600	Some debris build up in pipe.	4			\$1,200
Lonsdale Dr.	ST-8	LDS	600	Some sediment build up in concrete pipe.	5			N/A <sup>2</sup>
Bredin Dr.	RR-82	LDS	450	20% of Pipe Area	5			N/A <sup>2</sup>
Harvest Lane	ST-17	LDS	400	Some sediment build up from 16.6m to 18m.	5			N/A <sup>2</sup>
Hart Ave.	RR-79	CSO	2850	Minor sediment build up in pipe	5			N/A <sup>2</sup>
Clifton St. FPD	AS-74	CSO	2100	Sediment build up at outlet.	5			N/A <sup>2</sup>
Donald St.	AS-94	CSO	1900	10% of Pipe Area	3			\$1,800
Rue Despina	RR-54	CSO	1400	10% of Pipe Area	5			N/A <sup>2</sup>
Rue La Verendrye	RR-59	CSO	1200	Minor sediment build up in pipe.	5			N/A <sup>2</sup>
Strathmillan Rd.	AS-37	CSO	900	Minor vegetation and sedimentation	5	✓		N/A <sup>2</sup>
Maryland St.	AS-86B	CSO	600	Minor sediment build up in pipe	3	✓		\$5,200
Rue La Verendrye FPS	RR-60	CSO	600	Minor sediment from 3 m to 6.5 m. Moderate debris in pipe from 20.5 m to 34 m.	5			N/A <sup>2</sup>
Booth Dr.	ST-3	LDS	1850	Minor sediment build up in pipe	5			N/A <sup>2</sup>

TABLE 10  
MINOR SEDIMENT BUILD-UP OUTFALLS

Outfall Name	Outfall ID No.	Sewer Type	Size (mm)	Description of Sediment Build up	Condition Rating	Submerged	Difficult Access	Cost
Crestview Park Dr.	ST-21	LDS	1676	Minor sediment built up	4			\$1,500
Hamilton Ave.	ST-18	LDS	1500	Minor sediment build up in pipe	4			\$1,500
Radclyffe 1	RR-10	LDS	1200	10% of Pipe Area	4			\$1,500
Southbridge Dr.	SE-43	LDS	900	Some minor sediment build up in conc. portion of pipe.	1		✓	\$2,200
Archibald Underpass	RR-68	LDS	750	Debris in pipe at 4.6 m	5	✓		N/A <sup>2</sup>
Niakwa Rd. 1	SE-38	LDS	450	Minor sediment and debris build up in pipe.	1			\$1,200
Ash St FPS	AS-76	CSO	2100	> 5% of Pipe Area	1			\$1,800
Rue Dumoulin 3	RR-58	CSO	1060	> 5% of Pipe Area	5			N/A <sup>2</sup>
Plaza Dr.	RR-22	LDS	2400	> 5% of Pipe Area	5			N/A <sup>2</sup>
Glasgow Ave.	RR-48	LDS	1200	5% of Pipe Area	4			\$1,500
Ruby St. 1	AS-81	CSO	2100	Sediment build up from outlet to 10 m in pipe.	5			N/A <sup>2</sup>
Polson Ave. FPS	RR-83	CSO	1800	Measurement L3 affected by ice in pipe.	3			N/A <sup>1</sup>
Linden Ave. - Flood Pump	RR-91	CSO	1675	Sediment and debris build up in pipe.	3			\$1,500
Kennedy St.	AS-91	CSO	760	From 85m to 92 m.	5			N/A <sup>2</sup>
Park Dr.	RR-50.5	LDS	1200	Sediment and debris build up throughout length of pipe.	3			N/A <sup>1</sup>
River Pointe Pl.	RR-18	LDS	1050	Stone in end of outfall	4			\$1,200
Lanoo Dr.	AS-21.5	LDS	900	Sediment and debris from 7.4 m to 31.1 m.	3	✓		\$7,500
Wellington Cres. 2	AS-66.8	LDS	450	Debris in pipe 1.5 m to 3.8 m.	2			\$1,200
Empress Street	AS-70	LDS	300	Sediment build up at outlet.	5			N/A <sup>2</sup>
<b>Subtotal</b>								<b>\$87,200</b>
<b>Total (rounded to nearest \$1000)</b>								<b>\$87,000</b>

Notes: 1. Outfall scheduled to be cleaned in 1998

2. Outfall is scheduled for capital upgrading which will account for costs associated with sediment buildup

**FIGURES**

**FIGURE 1  
ORIGINAL RECOMMENDED 5 YEAR OUTFALL CAPITAL UPGRADES PLAN  
1998 REPORT**

Outfall ID#	NAME	Stream	Pipe size (mm)	Total Estimated Cost For Pipe Repairs	Total Estimated Cost For Erosion Protection	Total Estimated Cost	Year of Repair
AS 74	Clifton Street FPD	Assiniboine	2100	\$ 62,000	\$ 10,000	\$ 72,000	1
RR 60	Rue La Verendrye	Red	600	\$ 10,000	\$ 25,000	\$ 35,000	1
RR 100	Whellams Lane	Red	1200	\$ 10,000	\$ 10,000	\$ 20,000	1
AS 23	Dieppe Road	Assiniboine	650	\$ 7,000	\$ 5,000	\$ 12,000	1
RR 3	St. Norbert X-Kalay Lift Station Overflow	Red	300	\$ 15,000	\$ 10,000	\$ 25,000	1
AS 9.9	Sheir Dr.	Assiniboine	250	\$ 7,000		\$ 7,000	1
AS 26	Ridgedale S.P.S.	Assiniboine	250	\$ 11,000		\$ 11,000	1
RR 79	Hart Ave	Red	2850	\$ 78,000	\$ 25,000	\$ 103,000	1
AS 61	Doncastor Street	Assiniboine	2250	\$ 145,000	\$ 25,000	\$ 170,000	1
AS 81	Ruby St. #1	Assiniboine	2100	\$ 51,000	\$ 10,000	\$ 61,000	1
RR 90	Linden Ave	Red	1800	\$ 30,000	\$ 5,000	\$ 35,000	1
	<b>Subtotal</b>			<b>\$ 426,000</b>	<b>\$ 125,000</b>	<b>\$ 551,000</b>	
RR 51	Marion Street FPD <sup>1</sup>	Red	1600	\$ 47,000	\$ 10,000	\$ 57,000	2
AS 42	Conway CS	Assiniboine	2500	\$ 282,000	\$ 50,000	\$ 332,000	2
RR 52	Marion Street <sup>1</sup>	Red	1800	\$ 60,000	\$ 10,000	\$ 70,000	2
AS 90	Colony Street	Assiniboine	1800	\$ 76,000	\$ 25,000	\$ 101,000	2
	<b>Subtotal</b>			<b>\$ 465,000</b>	<b>\$ 95,000</b>	<b>\$ 560,000</b>	
AS 8	St. Charles Street #1	Assiniboine	250	\$ 8,000		\$ 8,000	3
RR 55	Rue Despins FPD <sup>1</sup>	Red	1200	\$ 37,000	\$ 10,000	\$ 47,000	3
RR 96	Larchdale Cres. SPS	Red	1050	\$ 19,000	\$ 10,000	\$ 29,000	3
AS 37	Strathmillan Road	Assiniboine	900	\$ 23,000	\$ 25,000	\$ 48,000	3
AS 91	Kennedy Street	Assiniboine	760	\$ 36,000		\$ 36,000	3
AS 93	Hargrave Street	Assiniboine	700	\$ 24,000		\$ 24,000	3
AS 29	Woodhaven Blvd.	Assiniboine	450	\$ 38,000	\$ 5,000	\$ 43,000	3
RR 37	Calrossie Blvd	Red	450	\$ 14,000	\$ 10,000	\$ 24,000	3
AS 83	Arlington Street 1	Assiniboine	375	\$ 12,000		\$ 12,000	3
ST 3	Booth Drive	Sturgeon	1850	\$ 28,000	\$ 5,000	\$ 33,000	3
AS 16.1	Raquette street 2	Assiniboine	1800	\$ 51,000	\$ 5,000	\$ 56,000	3
AS 19	Carroll Road	Assiniboine	1800	\$ 105,000	\$ 30,000	\$ 135,000	3
FL 1	Deacon Reservoir	Floodway	1500	\$ 29,000		\$ 29,000	3
AS 18	McCallum Cres.	Assiniboine	1350	\$ 12,000		\$ 12,000	3
AS 10	Pender Street	Assiniboine	900	\$ 12,000		\$ 12,000	3
	<b>Subtotal</b>			<b>\$ 448,000</b>	<b>\$ 100,000</b>	<b>\$ 548,000</b>	
RR 54	Rue Despins <sup>1</sup>	Red	1400	\$ 41,000	\$ 5,000	\$ 46,000	4
FL 2	Kildare at Floodway	Floodway	3000	\$ 257,000	\$ 25,000	\$ 282,000	4
RR 7	Cloutier Drive (Segment 1 & 2)	Red	1800/900	\$ 48,000	\$ 10,000	\$ 58,000	4
RR 103	Valhalla Drive	Red	1675	\$ 50,000	\$ 10,000	\$ 60,000	4
RR 31	Dunkirk Drive	Red	1400	\$ 23,000	\$ 20,000	\$ 43,000	4
RR 28	Dowker Ave. Outfall	Red	900	\$ 13,000	\$ 10,000	\$ 23,000	4
RR 68	Archibald Underpass	Red	750	\$ 23,000		\$ 23,000	4
	<b>Subtotal</b>			<b>\$ 455,000</b>	<b>\$ 80,000</b>	<b>\$ 535,000</b>	
RR 58	Rue Doumoutin <sup>1</sup>	Red	1060	\$ 29,000	\$ 5,000	\$ 34,000	5
RR 59	Rue La Verendrye	Red	1200	\$ 35,000	\$ 25,000	\$ 60,000	5
AS 38	Vialoux Drive Cui-de-Sac	Assiniboine	750	\$ 28,000		\$ 28,000	5
OM 3	Empress Street 1	Omands	750	\$ 24,000		\$ 24,000	5
RR 104	Red River Blvd.	Red	750	\$ 34,000		\$ 34,000	5
RR 30	Lotus lane	Red	600	\$ 10,000	\$ 10,000	\$ 20,000	5
SE 2	Rue Laverendrye	Seine	600	\$ 9,000		\$ 9,000	5
RR 41	Churchill Drive Underpass	Red	525	\$ 14,000	\$ 5,000	\$ 19,000	5
RR 108	Eastwood Drive	Red	525	\$ 28,000	\$ 25,000	\$ 53,000	5
AS 25	Shenfield Road	Assiniboine	450	\$ 28,000	\$ 5,000	\$ 33,000	5
AS 27	Ridgedale Cres	Assiniboine	450	\$ 12,000		\$ 12,000	5
BU 6	Delbrook Cres.	Bunn's	400	\$ 11,000		\$ 11,000	5
RR 8	Stormont Drive	Red	400	\$ 9,000	\$ 10,000	\$ 19,000	5
ST 12	Amarynth Cres. 2	Sturgeon	400	\$ 13,000		\$ 13,000	5
ST 17	Harvest Lane	Sturgeon	400	\$ 17,000	\$ 5,000	\$ 22,000	5
OM 4	Veledrome 1	Omands	380	\$ 8,000	\$ 25,000	\$ 33,000	5
RR 34	Oakcrest Place	Red	375	\$ 19,000	\$ 50,000	\$ 69,000	5
AS 70	Empress Street	Assiniboine	300	\$ 16,000		\$ 16,000	5
	<b>Subtotal</b>			<b>\$ 344,000</b>	<b>\$ 165,000</b>	<b>\$ 509,000</b>	
	<b>TOTAL</b>			<b>\$ 2,138,000</b>	<b>\$ 565,000</b>	<b>\$ 2,703,000</b>	



**FIGURE 2  
ORIGINAL FIVE YEAR PLAN FOR FUTURE INSPECTIONS  
1998 REPORT**

Description	Number of Inspections Required		Estimated Cost
	Televised	"Walk-Through"	
<b>Year 1 (1999)</b>			
Overall Condition Rating of 4 from 96-97	31	21	\$28,000
Not Inspected 96-97 (approx. ½) <sup>1</sup>	17	21	\$23,000
Outfall not inspected < 300 mm dia. (approx. ½)	28	0	\$10,000
<i>Subtotal</i>	76	42	\$61,000
<b>Year 2 (2000)</b>			
Not Inspected 96-97 (approx. ½) <sup>1</sup>	17	22	\$24,000
Outfall not inspected < 300 mm dia. (approx. ½)	28	0	\$10,000
<i>Subtotal</i>	45	22	\$34,000
<b>Year 3 (2001)</b>			
Overall Condition Rating of 4, Last inspection dated earlier than Year 1 <sup>2</sup>	40	25	\$30,000
<i>Subtotal</i>	40	25	\$30,000
<b>Year 4 (2002)</b>			
Overall Condition Rating of 4, Last inspection dated earlier than Year 2 <sup>2</sup>	9	4	\$7,000
<i>Subtotal</i>	9	4	\$7,000
<b>Year 5 (2003)</b>			
Overall Condition Rating of 3 from 96-97	16	17	\$19,000
Overall Condition Rating of 4, Last inspection dated earlier than Year 3 <sup>2</sup>	35	22	\$30,000
<i>Subtotal</i>	51	39	\$49,000
<b>Total<sup>3</sup></b>			<b>\$181,000</b>

Notes:

1. Estimate does not include costs to dewater those outfalls which are submerged
2. Estimate only based upon previous number of outfalls with an overall rating of 4 or 3, and a 20% chance that outfalls not inspected would be rated 4 or 3
3. Rounded to the nearest \$1000

**FIGURE 3**  
**STATUS OF RECOMMENDED 5 YEAR OUTFALL CAPITAL UPGRADES PLAN, 1998 REPORT**

Outfall ID#	Name	Stream	Pipe Size (mm)	Year of Repair
AS-12	Galsworthy Place	Assiniboine	450	1998
RR-17	Minnetonka	Red	2100	1998
RR-24	Falconer Bay	Red	1200	1998
AS-9.9	Sheir Dr.	Assiniboine	250	1999
AS-10	Pender Street	Assiniboine	900	1999
AS-14	Coleridge Park Drive	Assiniboine	450	1999
AS-23	Dieppe Road	Assiniboine	650	1999
AS-26	Ridgedale S.P.S.	Assiniboine	250	1999
AS-61	Doncastor Street	Assiniboine	2250	1999
AS-74	Clifton Street FPD	Assiniboine	2100	1999
RR-60	Rue La Verendrye	Red	600	1999
RR-79	Hart Ave	Red	2850	1999
RR-100	Whellams Lane	Red	1200	1999
AS-21	Carroll Road #2	Assiniboine	300	2000
AS-18	McCallum Cres.	Assiniboine	1350	2000
AS-19	Carroll Road	Assiniboine	1800	2000
AS-81	Ruby St #1	Assiniboine	2100	2000
RR-64	Galt Avenue FPS	Red	1500	2001
AS-8	St. Charles Street #1	Assiniboine	250	2002
AS-29	Woodhaven Blvd.	Assiniboine	450	2002
AS-83	Arlington Street 1	Assiniboine	375	2002
AS-90	Colony Street	Assiniboine	1800	2002
RR-15	Rivergate Drive	Red	1350	2002
RR-35	Wildwood Golf Course	Red	900	2002
RR-37	Calrossie Blvd	Red	450	2002
RR-63	Bannatyne Avenue	Red	1500	2002
RR-82	Bredin Drive	Red	450	2002
RR-90	Linden Ave.	Red	1800	2002
AS-25	Shenfield Road	Assiniboine	450	2003
RR-10	Radcliffe Road	Red	1200	2003
RR-58	Rue Doumoulin <sup>1</sup>	Red	1060	2003
AS-16.1	Raquette Street 2	Assiniboine	1800	2004
RR-68	Archibald Underpass	Red	750	2004/05
RR-96	Larchdale Cres. SPS	Red	1050	2004/05
RR-103	Valhalla Drive	Red	1675	2004/05
AS-37	Strathmillan Road	Assiniboine	900	uma
FL-1	Deacon Reservoir	Floodway	1500	uma
AS-91	Kennedy Street	Assiniboine	760	inspected 2005
AS-93	Hargrave Street	Assiniboine	700	inspected 2005
RR-3	St. Norbert X-Kalay Lift Station Overflow	Red	300	inspected 2005
RR-7	Cloutier Drive (Segment 1 & 2)	Red	1800 /900	inspected 2005
RR-26	Crane Ave.	Red		inspected 2005
RR-28	Dowker Ave. Outfall	Red	900	inspected 2005
RR-31	Dunkirk Drive	Red	1400	inspected 2005
RR-51	Marion Street FPD	Red	1600	inspected 2005
RR-52	Marion Street <sup>1</sup>	Red	1800	inspected 2005
RR-54	Rue Despins <sup>1</sup>	Red	1400	inspected 2005
RR-55	Rue Despins FPD <sup>1</sup>	Red	1200	inspected 2005
RR-97	Kildonan Park	Red		inspected 2005
RR-98	Hawthorne Ave.	Red		inspected 2005
RR-108	Eastwood Drive	Red	525	inspected 2005
ST-3	Booth Drive	Sturgeon	1850	inspected 2005
AS-27	Ridgedale Cres	Assiniboine	450	unconstructed
AS-38	Vialoux Drive Cul-de-Sac	Assiniboine	750	unconstructed
AS-42	Conway CS	Assiniboine	2500	unconstructed
AS-70	Empress Street	Assiniboine	300	unconstructed
BU-6	Delbrook Cres.	Bunn's	400	unconstructed
FL-2	Kildare at Floodway	Floodway	3000	unconstructed

**FIGURE 3  
STATUS OF RECOMMENDED 5 YEAR OUTFALL CAPITAL UPGRADES PLAN, 1998 REPORT**

Outfall ID#	Name	Stream	Pipe Size (mm)	Year of Repair
OM-3	Empress Street 1	Omands	750	unconstructed
OM-4	Veledrome 1	Omands	380	unconstructed
RR-104	Red River Blvd.	Red	750	unconstructed
RR-30	Lotus Lane	Red	600	unconstructed
RR-34	Oakcrest Place	Red	375	unconstructed
RR-41	Churchill Drive Undrepass	Red	525	unconstructed
RR-59	Rue La Verendrye	Red	1200	unconstructed
RR-8	Stormont Drive	Red	400	unconstructed
SE-2	Rue Laverendrye	Seine	600	unconstructed
ST-12	Amarynth Cres. 2	Sturgeon	400	unconstructed
ST-17	Harvest Lane	Sturgeon	400	unconstructed

ID# on left = part of original 5-year capital upgrade plan  
 ID# on right = not part of original 5-year capital upgrade plan

**APPENDIX A**



**INDUSTRIAL PIPE SERVICES LTD.**

**KGS GROUP**

**2005 OUTFALL PROGRAM**

**TAPE # KGS-05-01 &  
KGS-05-02**

# Sewer Inspection Report

Sewer ID: RR-26

Date: Feb. 2~~4~~ 2005

Video Tape No: KGS-05-01

Customer: KGS Group

P.O. #

Counter No: 0:00 - 15:10

Street Location: Crane Avenue

Direction of Flow: Downstream

Type of Sewer:

Line Size: 600mm

Material: VC

Start Manhole: MH-01

End Manhole: Outfall

Video Tape distance: 50.0

Location Description: 2nd MH E of S. Dr-Outfall @ Red River

0 Meters M.H. #01

0.3 - 50.0 Calcite

1.8 - 50.0 Debris - River mud)

10.9 - 21.6 Roots at joint

16.9 Crack @ T

18.1 - 20.6 Crack @ T

20.0 Crack @ L

26.2 Crack @ L

27.0 Crack @ T

27.9 Crack @ R

27.8 Crack @ L

29.1 Crack @ T

31.2 Crack @ T

31.5 Crack @ T

31.5 Crack @ L

31.5 Crack @ R

32.0 Broken T  
32.6 Crack @ T  
32.8 - 40.4 Crack @ T  
41.3 Roots @ joint  
43.4 - 50.0 Crack @ T  
46.4 Broken bottom  
46.7 Crack @ L  
47.1 Broken @ R  
50.0 Debris (River mud), camera - cannot pass  
50.0 M.H. # Outfall

# **Sewer Inspection Report**

**Sewer ID:** RR-3

**Date:** Feb. 24, 2005

**Video Tape No:** KGS-05-01

**Customer:** KGS Group

**P.O. #**

**Counter No:** 15:11 - 24:56

**Street Location:** St. Norbert

**Direction of Flow:** Downstream

**Type of Sewer:**

**Line Size:** 300mm

**Material:** Co. Comp.

**Start Manhole:** MH-02

**Video Tape Distance:** 44.1

**End Manhole:** Outfall

**Location Description:** MH @ X-Kalay

Note: Camera under water & dirty @ 44.1  
Material is corrugated metal pipe

## **0 Meters M.H. #02**

0.3 - 20.1 Calcite

3.6 - 18.0 Debris (River mud)

18.8 - 25.2 Debris (River mud)

21.7 - 33.3 Calcite

28.2 - 29.2 Debris (River mud)

34.3 Calcite

34.9 - 36.1 Camera into water

36.2 - 44.1 Camera under water

37.3 Calcite

38.1 Calcite

39.2 - 44.1 Calcite

42.3 - 44.1 Debris (River mud)



# **Sewer Inspection Report**

**Sewer ID:** A5-92

**Date:** Feb. 24, 2005

**Video Tape No:** KGS-05-01

**Customer:** KGS Group

**P.O. #**

**Counter No:** 24:57 - 38:24

**Street Location:** Kennedy Street

**Direction of Flow:** Downstream

**Type of Sewer:**

**Line Size:** 600mm

**Material:** VC

**Start Manhole:** MH - 03

**Video tape distance:** 66.6

**End Manhole:** Outfall

**Location Description:** 1st MH S of Assiniboine Ave-Outfall @ Assiniboine River

Note: Video reads: MH @ Assiniboine Avenue

0 Meters M.H. #MH-03

0.4 - 61.9 Light calcite

13.6 Crack @ T

53.1 Crack @ T

55.4 Repaired hole @ L

56.8 Crack @ R

60.4 Hole @ Bottom

60.9 Roots

62.8 Hole @ Bottom

64.6 - 66.6 Hole @ Bottom

66.6 Hole @ Bottom, camera cannot pass

66.6 Outfall

# **Sewer Inspection Report**

**Sewer ID:** RR-28

**Date:** Feb. 25, 2005

**Video Tape No:** KGS-05-01

**Customer:** KGS Group

**P.O. #**

**Counter No:** 38:25 - 53:03

**Street Location:** Dowker Avenue

**Direction of Flow:** Downstream

**Type of Sewer:**

**Line Size:** 900mm

**Material:** Co.

**Start Manhole:** MH # 04

**Video tape distance:** 105.0

**End Manhole:** 5

**Location Description:** MH @ S. Drive-1st MH E of South Drive

Note: Video description reads "Red River" & End node reads "OUTFALL"

**0 Meters M.H. #04**

2.4 Service @ L

2.4 Calcite

2.4 Line turns L

2.9 Lift holes @ T in each pipe section

21.6 Roots @ joint

25.3 Calcite @ joint

27.2 Calcite @ joint

29.1 Roots @ joint

31.1 Roots @ joint

46.8 Service @ T

77.1 Calcite @ light  
79.9 Calcite @ light  
83.6 Calcite @ light  
85.5 Calcite @ light  
87.1 Calcite @ light  
101.1 Calcite @ light  
105.0 M.H. # 05

# **Sewer Inspection Report**

**Sewer ID:** RR-28-2

**Date:** Feb. 25, 2005

**Video Tape No:** KGS-05-01

**Customer:** KGS Group

**P.O. #**

**Counter No:** 53:04 - 56:04

**Street Location:** Dowker Avenue

**Direction of Flow:** Downstream

**Type of Sewer:**

**Line Size:** 900mm

**Material:** CMP

**Start Manhole:** MH #05

**Video Tape Distance:** 1.8

**End Manhole:** Outfall

**Location Description:** 1st MH E of S. Dr - Outfall @ Red River

Note: Material is corrugated metal pipe

**0 Meters M.H. #MH #05**

0.3 Hole @ bottom

1.8 Hole @ bottom, camera cannot pass

1.8 Outfall

# **Sewer Inspection Report**

**Sewer ID:** A5-93

**Date:** Feb. 25, 2005

**Video Tape No:** KGS-05-01

**Customer:** KGS Group

**P.O. #**

**Counter No:** 56:05 - 1:06:13

**Street Location:** Hargrave Street

**Direction of Flow:** Downstream

**Type of Sewer:**

**Line Size:** 900mm

**Material:** CO

**Start Manhole:** MH # 06

**Video Tape Distance:** 46.0

**End Manhole:** Outfall

**Location Description:** 1st MH S of Assiniboine Ave - Outfall @ Assiniboine River

Note: Line size reads 700mm on video  
CMP rotten - no invert

**0 Meters M.H. # 06**

0.3 - 1.4 Calcite

4.1 - 11.4 Calcite

16.1 Calcite

18.2 Calcite

21.1 Calcite

23.5 Calcite

25.3 Calcite

28.4 Calcite

32.1 Calcite

36.4 - 44.1 Calcite

46.0 Hole @ bottom - camera cannot pass

46.0 Outfall

# **Sewer Inspection Report**

**Sewer ID:** RR-51

**Date:** Feb. 28, 2005

**Video Tape No:** KGS-05-01

**Customer:** KGS Group

**P.O. #**

**Counter No:** 1:06:14-1:10:57

**Street Location:** Marion Pl.

**Direction of Flow:** Downstream

**Type of Sewer:**

**Line Size:** 1600mm

**Material:** CMP

**Start Manhole:** G.C - 01

**Video tape distance:** 13.7

**End Manhole:** Outfall

**Location Description:** Gate Chamber @ Lyndale Drive to Red River

Note: Survey abandoned @ 13.7

**0 Meters** M.H. # Gate Chamber 01

5.0 - 13.7 Debris (River mud)

13.7 Debris, camera cannot pass

13.7 Outfall

# **Sewer Inspection Report**

**Sewer ID:** RR-52

**Date:** Feb. 28, 2005

**Video Tape No:** KGS-05-01

**Customer:** KGS Group

**P.O. #**

**Counter No:** 1:10:58-1:16:55

**Street Location:** Marion Place

**Direction of Flow:** Downstream

**Type of Sewer:**

**Line Size:** 1800mm

**Material:** CMP

**Start Manhole:** P.H. #01

**Video tape distance:** 38.6

**End Manhole:** Outfall

**Location Description:** Pump house @ Lyndale Dr. -Outfall @ Red River

**0 Meters** M.H. P.H. #01

4.8 - 23.6 Pipe deformed

5.6 Service @ T

24.0 Roots

38.1 Sticks/roots/snow at outfall

38.6 Outfall

# **Sewer Inspection Report**

**Sewer ID:** RR - 54

**Date:** Feb. 28, 2005

**Video Tape No:** KGS-05-01

**Customer:** KGS Group

**P.O. #**

**Counter No:** 1:16:56-1:20:59

**Street Location:** Rue Despins

**Direction of Flow:** Downstream

**Type of Sewer:**

**Line Size:** 1400mm

**Material:** CO

**Start Manhole:** MH - 07

**Video tape distance:** 11.3

**End Manhole:** Outfall

**Location Description:** 1st MH W of Tache Ave. - Outfall @ Red River

**0 Meters M.H. # 07**

1.5 Calcite light

4.3 Line turns R

11.3 Camera into water, cannot pass

11.3 Outfall



# **Sewer Inspection Report**

**Sewer ID:** RR-55

**Date:** Feb. 28, 2005

**Video Tape No:** KGS-05-01

**Customer:** KGS Group

**P.O. #**

**Counter No:** 1:21:00-1:27:24

**Street Location:** Rue Despins

**Direction of Flow:** Downstream

**Type of Sewer:**

**Line Size:** 1200mm

**Material:** CMP

**Start Manhole:** PH

**Video tape distance** 24.4

**End Manhole:** Outfall

**Location Description:** Pump House @ Tache Avenue - Outfall @ Red River

**0 Meters M.H. #PH**

3.7 Calcite

5.6 Calcite

8.4 Calcite

11.3 Line turns down

16 - 24.4 Ice

24.4 Outfall

# **Sewer Inspection Report**

**Sewer ID:** RR-98

**Date:** Mar. 1, 2005

**Video Tape No:** KGS-05-01

**Customer:** KGS Group

**P.O. #**

**Counter No:** 44.2

**Street Location:** Hawthorne Avenue

**Direction of Flow:** Downstream

**Type of Sewer:**

**Line Size:** 2200mm

**Material:** C.M.P.

**Start Manhole:** G.C.

**Video tape distance:** 44,2

**End Manhole:** Outfall

**Location Description:** Gate Chamber @ Kildonan Drive-Outfall @ Red River

**0 Meters** Gate Chamber

26.5 - 44.2 Debris (River mud)

44.2 Debris (River mud), camera cannot pass

44.2 Outfall

# **Sewer Inspection Report**

**Sewer ID:** RR-108

**Date:** Mar. 1, 2005

**Video Tape No:** KGS-05-01

**Customer:** KGS Group

**P.O. #**

**Counter No:** 1:34:00-1:44:59

**Street Location:** Eastwood Drive

**Direction of Flow:** Downstream

**Type of Sewer:**

**Line Size:** 525mm

**Material:** CO

**Start Manhole:** MH #08

**Measured Length:** 86.3

**End Manhole:** Outfall

**Location Description:** MH @ Glenway Avenue - Outfall @ Red River

**0 Meters M.H. #08**

2.1 Broken Top @ joint

2.1 - 11.3 Calcite light

3.6 Crack @ T

4.0 Broken Top to R @ joint

12.8 Calcite

14.9 Crack @ R

15.3 Crack @ L

26.1 Chipped @ joint

26.4 Crack @ T & R

33.7 Crack @ L

36.8 Crack @ R

46.8 - 48.3 Cacite Light

50.5 - 52.0 Cacite L

54.0 Calcite L

55.2 Calcite L

55.6 Calcite L

56.0 Crack @ T

57.4 - 59.5 Calcite L

57.7 Chip at joint Left

62.6 Calcite L

67.6 Calcite L

68.0 Calcite L

74.0 Tree branch in line

81.9 Calcite L

85.0 - 86.3 Ice

86.3 Ice, camera cannot pass

86.3 Outfall

# **Sewer Inspection Report**

**Sewer ID:** RR-97

**Date:** Mar. 1, 2005

**Video Tape No:** KGS-05-02

**Customer:** KGS Group

**P.O. #**

**Counter No:** 01:26 - 07:00

**Street Location:** Kildonan Park

**Direction of Flow:** Downstream

**Type of Sewer:**

**Line Size:** 250mm

**Material:** VC

**Start Manhole:** MH #09

**End Manhole:** Outfall

**Video Tape distance:** 19.7

**Location Description:** MH @ Park Rd - Outfall @ Red River

Note: Video reads CO but should read VC

## **0 Meters M.H. #09**

1.3 Joint shifted - Large

1.3 Roots @ joint

2.0 - 8.2 Camera into water

3.7 Roots @ joint

5.0 Roots @ joint

5.5 Roots @ joint

6.6 Roots @ joint

7.6 Roots @ joint

7.6 Crack @ T @ joint

9.1 Crack @ T @ joint

9.7 Debris

10.3 Roots @ joint  
11.7 - 14.0 Debris  
12.9 Roots @ joint  
13.4 Roots @ joint  
14.7 Roots @ joint  
15.0 - 19.6 Debris  
16.0 Roots @ joint  
16.0 Calcite @ joint  
16.5 Roots @ joint  
17.2 Roots @ joint  
18.5 - 19.6 Roots @ joint  
19.6 Debris, camera cannot pass  
19.7 Outfall

# **Sewer Inspection Report**

**Sewer ID:** RR-7-B

**Date:** Mar. 2, 2005

**Video Tape No:** KGS-05-02

**Customer:** KGS Group

**P.O. #**

**Counter No:** 07:01 - 16:24

**Street Location:** Cloutier Drive

**Direction of Flow:** Downstream

**Type of Sewer:**

**Line Size:** 1800mm

**Material:** CMP

**Start Manhole:** MH # 10

**Video Tape Distance:** 79.8

**End Manhole:** Outfall

**Location Description:** 1st MH S of Cloutier Dr - Outfall @ Red River

**0 Meters M.H. #10**

**0.1 - 79.8 Ice**

**3.0 Wooden bracing**

**6.0 Service Right with ice**

**79.8 Ice,-camera cannot pass**

**79.8 Outfall**

# **Sewer Inspection Report**

**Sewer ID:** RR-7-A

**Date:** Mar. 2, 2005

**Video Tape No:** KGS-05-02

**Customer:** KGS Group

**P.O. #**

**Counter No:** 16:25 - 29:55

**Street Location:** Cloutier Drive

**Direction of Flow:** Upstream

**Type of Sewer:**

**Line Size:** 1800mm

**Material:** CMP

**Start Manhole:** M.H. #10

**Video tape distance:** 73.0

**End Manhole:** Inlet

**Location Description:** 1st MH S of Cloutier Dr - Inlet N of Cloutier Drive

0 Meters M.H. #10

0.3 - 73.0 Ice

3.5 Wooden bracing

8.3 Wooden bracing

11.4 Service @ L with ice

12.5 Wooden bracing

14.9 - 24.9 Wooden bracing

18.7 - 26.8 Pipe deformed

26.8 Ice Left @ Joint

35.5 Line turns Right

40.7 Line turns Right

73.0 Inlet



# **Sewer Inspection Report**

**Sewer ID:** RR-31

**Date:** Mar. 1, 2005

**Video Tape No:** KGS-05-02

**Customer:** KGS Group

**P.O. #**

**Counter No:** 29:56 - 36:06

**Street Location:** Dunkirk Drive

**Direction of Flow:** Downstream

**Type of Sewer:**

**Line Size:** 1400mm

**Material:** Co.

**Start Manhole:** M.H. #11

**Video tape distance:** 27.0

**End Manhole:** Outfall

**Location Description:** 2nd M.H. N of St Vital Rd to Outfall @ Red River

**0 Meters** M.H. #11

18.0 Roots

24.7 - 27.0 Camera into water

27.0 Outfall

# **Sewer Inspection Report**

**Sewer ID:** ST. #3

**Date:** Mar. 3, 2005

**Video Tape No:** KGS-05-02

**Customer:** KGS Group

**Counter No:** 36:07 - 50:08

**P.O. #**

**Street Location:** Booth Drive

**Direction of Flow:** Downstream

**Type of Sewer:**

**Line Size:** 1850mm

**Material:** CO

**Start Manhole:** M.H. #12

**Video Tape Distance:** 78.7

**End Manhole:** Outfall

**Location Description:** MH @ Lodge Avenue to Outfall @ Sturgeon Creek

**0 Meters** M.H. #12

0.3 - 78.7 Ice

3.4 - 68.8 Calcite light

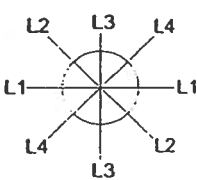
5.6 Partially capped service @ Right

6.6 Service @ L

78.7 Hole in ice, camera cannot pass

78.7 Outfall

**Water and Waste Department  
Outfall Condition and Maintenance Study  
INSPECTION FORM<sup>1</sup>**

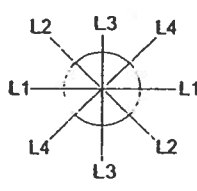
Inspector:				Date: <u>02/28/05</u>			
Party Members:							
Temp. <u>-21</u>		Weather: <u>CLEAR.</u>					
Outfall ID No: <u>RR-52</u>		Location: <u>MARION PL-</u>			Owner:		
Type: <u>LDS</u> <u>CS</u> <u>SO</u> <u>TS</u>		Stream:					
Segment No.	LBIS No.	Shape	D <sub>1</sub> or W	D <sub>2</sub> or H	Length	Material	
1		<u>C</u>				<u>CMP.</u>	
2							
3							
Invert of outfall (m):		Sag depth (m):		Grates:      Y      N			
		Sta. <u>5.0</u>	Sta. <u>6.0</u>	Sta. <u>8.5</u>	Sta. <u>13.7</u>		
		L1	<u>1860</u>	<u>2030</u>	<u>2010</u>	<u>2170</u>	
		L2	<u>1730</u>	<u>1810</u>	<u>1870</u>	<u>1790</u>	
		L3	<u>1500</u>	<u>1470</u>	<u>1520</u>	<u>1340</u>	
		L4	<u>1700</u>	<u>1700</u>	<u>1740</u>	<u>1930</u>	
Ice Damage:    Y    N		Description:					
Hydraulic restrictions:		1. - <i>partial collapse of the pipe</i>					
		2. - <i>sediment built up in the pipe</i>					
		3. - <i>severe restriction - vegetation</i>					
Geotechnical Features							
Bank Height	River Section	Slope	Slump	Erosion	Vegetation	Instrumentation	
	Straight Outside Bend Inside Bend	1V:2H 1V:3H 1V:4H 1V:5H	Deep Seated Active Inactive Shallow Hummocky Stable Retrogressive	Toe Scour Undercutting Slope Rills	Mature Trees Scrub Brush Grass	Inclinometer Piezometer	
COMMENTS OR DESCRIPTION:							
Structure CR		Geotechnical CR		Stream CR			

**LEGEND:**

LDS    Land Drainage Sewer	Conc    Concrete Pipe
CS    Combined Sewer	CMP    Corrugated Metal Pipe
SO    Sanitary Overflow	Comp    Composite (Concrete & CMP)
TS    Treated Sewage	WS    Wood Stave Pipe

<sup>1</sup> For larger outfalls where significant deterioration is noted, a detailed inspection will required to document the pipe distress related to station and circumferential location.

**Water and Waste Department  
Outfall Condition and Maintenance Study  
INSPECTION FORM<sup>1</sup>**

Inspector:				Date: <u>03/01/05</u>			
Party Members:							
Temp: <u>-15</u>		Weather: <u>CLEAR</u>					
Outfall ID No: <u>RL-98</u>		Location:			Owner:		
Type: <u>LDS CS SO TS</u>		Stream:					
Segment No.	LBIS No.	Shape	D <sub>1</sub> or W	D <sub>2</sub> or H	Length	Material	
1							
2							
3							
Invert of outfall (m):		Sag depth (m):		Grates: Y N			
Deformation (mm) 		Sta. <u>15.0</u>	Sta. <u>30.0</u>	Sta. <u>45.0</u>	Sta. <u>53.0</u>		
		L1	<u>2300</u>	<u>2370</u>			
		L2	<u>2100</u>	<u>2150</u>			
		L3	<u>2000</u>	<u>1940</u>			
		L4	<u>2150</u>	<u>2080</u>			
Ice Damage: Y N		Description:					
Hydraulic restrictions:		1. - <i>partial collapse of the pipe</i>					
		2. - <i>sediment built up in the pipe</i>					
		3. - <i>severe restriction - vegetation</i>					
Geotechnical Features							
Bank Height	River Section	Slope	Slump	Erosion	Vegetation	Instrumentation	
	Straight Outside Bend Inside Bend	1V:2H 1V:3H 1V:4H 1V:5H	Deep Seated Active Inactive Shallow Hummocky Stable Retrogressive	Toe Scour Undercutting Slope Rills	Mature Trees Scrub Brush Grass	Inclinometer Piezometer	
COMMENTS OR DESCRIPTION:							
Structure CR		Geotechnical CR		Stream CR			

LDS Land Drainage Sewer  
 CS Combined Sewer  
 SO Sanitary Overflow  
 TS Treated Sewage

LEGEND:

Conc Concrete Pipe  
 CMP Corrugated Metal Pipe  
 Comp Composite (Concrete & CMP)  
 WS Wood Stave Pipe

<sup>1</sup> For larger outfalls where significant deterioration is noted, a detailed inspection will be required to document the pipe distress related to station and circumferential location.



