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CSO Master Plan

Despins District Plan

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CSO Master Plan

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2	06/2019	Final Draft Submission	DT	MF	MF
3	08/18/2019	Final Submission For CSO Master Plan	MF	MF	SG

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1. Despins District

1.1 District Description

Despins district is located along the eastern edge of the Red River near the centre of the combined sewer (CS) area. Hamel Avenue and Despins Street form the northern boundary, Bertrand Street and Eugenie Street form the southern boundary, and the Red River forms the western boundary. The Seine River runs along the eastern boundary.

Taché Avenue is a regional street that runs parallel to the Red River and connects Marion Street to Provencher Boulevard, providing access to the St. Boniface Hospital. Des Meurons Street also runs parallel to Taché Avenue and extends north to south along the eastern side of the district. Marion Street and Goulet Street are regional roads that run east-west through the district. The Canadian National Railway Sprague rail line passes through the northeastern section of the district.

Despins district is primarily residential with a small section of industrial and commercial land use. The industrial and commercial areas are located along Des Meurons Street and consist of general manufacturing facilities and community-based businesses. The residential land use make-up is primarily classified as two-family dwellings, but the district also includes small areas of single and multi-family.

The major non-residential areas are greenspaces which include Taché Promenade and La Verendrye Park located near the Red River. Approximately 14 ha of the district is classified as greenspace.

1.2 Development

There is limited land area available for new development within Despins district due to its location and residential land use. Due to its location close to the downtown however, there is a high potential for further densification via infill in the district. Redevelopment within this area could impact the CS system and will be investigated on a case-by-case basis for potential impacts to the combined sewer overflow (CSO) Master Plan. All developments within the CS districts are mandated to offset any peak combined sewage discharge by adding localized storage and flow restrictions, in order to comply with Clause 8 of the Environment Act Licence 3042.

1.3 Existing Sewer System

Despins district encompasses an area of 99 hectares[1] based on the district boundary and includes primarily combined sewer (CS), wastewater sewer (WWS), and land drainage sewer (LDS) systems. As shown in Figure 12, there is approximately 41 percent (41 ha) separated and 7 percent (7 ha) separation-ready areas.

The Despins sewer system includes a flood pump station (FPS), CS lift station (LS), FPS outfall, and a CS outfall gate chamber located adjacent to the Red River at Tache Avenue and Despins Street. Sewage flows collected in Despins district converge to a 1200 mm CS trunk flowing west on Despins Street and a 600 mm CS trunk sewer flowing north on Taché Avenue and drain towards the outfall. The two CS trunks meet at the intersection of Taché Avenue and Despins Street.

During dry weather flow (DWF), the Despins primary weir diverts flow through a 450 mm off-take pipe approximately 20 m south to the CS LS. The Despins CS LS pumps the flow through a 300 mm force main north along Tache Avenue across the Red River into the Bannatyne district and on to the North End Sewage Treatment Plant (NEWPCC).

[1] City of Winnipeg GIS information relied upon for area statistics. The GIS records may vary slightly from the city representation in the InfoWorks sewer model. Therefore, minor discrepancies in the area values reported in Section 1.3 Existing Sewer System, and in Section 1.8 Performance Estimate may occur.

During wet weather flow (WWF) events, any flows that exceed the diversion capacity overtop the primary weir and are discharged to the Red River via the CS outfall structure. When river levels are high and gravity flow is not possible, the FPS pumps the flow into the Red River through the FPS outfall which contains an elevated discharge box and stop log weirs. A flap and sluice gate are in place on the CS outfall to prevent river water from flowing into the CS under high river level conditions.

LDSs service the eastern industrial and residential sections of Despins district and collect surface runoff and discharge through two LDS outfalls into the Seine River.

Three independent LDS systems with outfalls collect the surface runoff and discharge to the rivers. Runoff from the northeast portion of the district flows to a 600 mm LDS outfall on Bourgeault Street and discharges to the Seine River. A 1000 mm LDS along Bertrand Street collects runoff from the eastern extents of the Despins district and discharges to the Seine River. A 525 mm LDS collects runoff from the southeastern portion of the district before crossing into Marion district and discharging to the Seine River via a 900 mm LDS outfall. Each LDS outfall includes a sluice and flap gate to prevent river water from backing up into the system.

The CS and FPS outfalls to the Red River are as follows:

- ID13 (S-MA70087426) – Despins CS Outfall
- ID83 (S-MA70087428) – Despins FPS Outfall

1.3.1 District-to-District Interconnections

There are several district-to-district interconnections between Despins and the surrounding districts. Interconnection are shown on Figure 12 which identifies locations where gravity and pumped flow can cross from one district to another. Each interconnection is listed as follows:

1.3.1.1 Interceptor Connections

No interceptor connections are found in this district.

1.3.1.2 District Interconnections

Bannatyne

<u>WWS to WWS</u>

- A 300 mm force main carries flow from the Despins CS LS across the Red River to the Bannatyne district and on to the NEWPCC for treatment. There is a pipe and a valve that connects a parallel force main from Dumoulin district, but it is kept closed and only opened for maintenance.
  - Bannatyne district east of Main Street invert – 227.52 m (S-MH70021611)

Marion

<u>CS to CS</u>

- Common high point sewer manholes:
  - Horace Street invert at Marion invert – 226.85 m (S-MH50002230)
  - Goulet Street and Des Meurons Street invert – 227.34 m (S-MH50002282)
- A 250 mm CS pipe from Marion flows by gravity westbound into Despins CS system at the intersection of Taché Avenue and Thomas Berry Street:
  - Tache Avenue and Thomas Berry invert – 226.50 m (S-MH50002657)
- A 375 mm SRS overflow pipe from Marion flows by gravity westbound into Despins CS system during an overflow:

  - Tache Avenue and Rinella Place invert – 226.13 m (S-MH50002666)
- A 450 mm CS pipe from Marion flows by gravity eastbound into Despins CS system at the intersection of Enfield Crescent and Bertrand Street:
  - Enfield Crescent and Bertrand Street Invert – 224.56 m (S-MH50007262)
- A 1050 mm CS pipe from Despins flows by gravity westbound into Marion CS system at the intersection of Enfield Crescent and Bertrand Street:
  - Enfield Crescent and Bertrand Street Invert – 224.74 m (S-MH50002428)
- A 600 mm CS pipe from Marion flows by gravity eastbound into Despins district CS system at the intersection of Marion Street and Des Meurons Street:
  - Marion Street and Des Meurons Street Invert – 226.68 m (S-MH50002243)
- A 300 mm CS pipe from Despins flows by gravity westbound into Marion district CS system between Youville Street and Des Meurons Street:
  - Youville Street and Des Meurons Street Invert – 226.85 m (S-MH50002230)

WWS to WWS

- A 250 mm WWS and a 300 mm WWS flows southbound by gravity and converge at a manhole at the corner of Bertrand Street and Enfield Crescent and flow by gravity from Despins district into Marion district:
  - Bertrand Street and Enfield Crescent Invert – 223.00 m (S-MH70025546)

LDS to LDS

- A 300 mm LDS pipe from Marion flows eastbound by gravity into Despins on Horace Street, between Youville Street and Des Meurons Street:
  - Youville Street and Des Meurons Street Invert – 225.37 m (S-MH70007961)
- A 525 mm LDS pipe from Despins flows southbound along Youville Street by gravity into Marion district LDS system between Eugenie Street and Edgewood Street:
  - Invert at Marion district boundary – 224.34 m (S-MH70007984)

LDS to CS

- A 250 mm LDS short section of the LDS system extends from Marion and flows by gravity into Despins CS at Tache Avenue near the back alley of Thomas Berry Street:
  - Invert at Marion district boundary – 226.15 m (S-MH50002944)

Dumoulin

CS to CS

- Common high point sewer manholes:
  - Desautels Street and Des Meurons Street invert – 228.38 m (S-MH50008956)
  - Bourgeault Street and Desautels Street invert – 229.44 m (S-MH50008651)
  - Ritchot Avenue and Hamel Avenue invert – 228.85 m (S-MH50002546)
- A 750 mm by 1150 mm CS pipe from Despins CS system flows by gravity westbound on Hamel Avenue and connects to an overflow CS pipe that flows northbound on Langevin Street into the CS system in Dumoulin district:
  - Hamel Avenue and Lavgevin Street invert – 228.63 m (S-MH50002548)

- A 750 mm by 1150 mm CS pipe from Despins CS system flows westbound on Hamel Avenue and connects to an overflow CS pipe that flows northbound on St Jean Baptiste Street into the CS system in Dumoulin district:
  - Hamel Avenue and St. Jean Baptiste Street invert – 228.80 m (S-MH50002313
- A 750 mm CS pipe from the Dumoulin CS system flows by gravity southbound on De La Morenie Street and connects to the CS system in Despins district:
  - Cathedrale Street and De La Morenie Street Invert – 226.38 m (S-MH50008928)

LDS to LDS

- A 300 mm LDS pipe from Despins district LDS system flows by gravity northbound on Des Meurons Street and connects to the LDS system in Dumoulin district.
  - Desautels Street and Des Meurons Street invert into 375 LDS – 226.45 m (S-MH50008203)
- A 450 LDS pipe from Dumoulin district LDS system flows by gravity westbound on Desautels Street and connects to the LDS system Despins district where it flows back out into Dumoulin to be discharged into the Seine River.
  - Bourgeault Street and Desautels Street Invert (into Despins) – 225.73 m (S-MH70008209)
  - Bourgeault Street and Desautels Street Invert (into Dumoulin) – 225.70 m (S-MA70008215)

A district interconnection schematic is included as Figure 1-1. The drawing illustrates the collection areas, interconnections, pumping systems, and discharge points for the existing district.

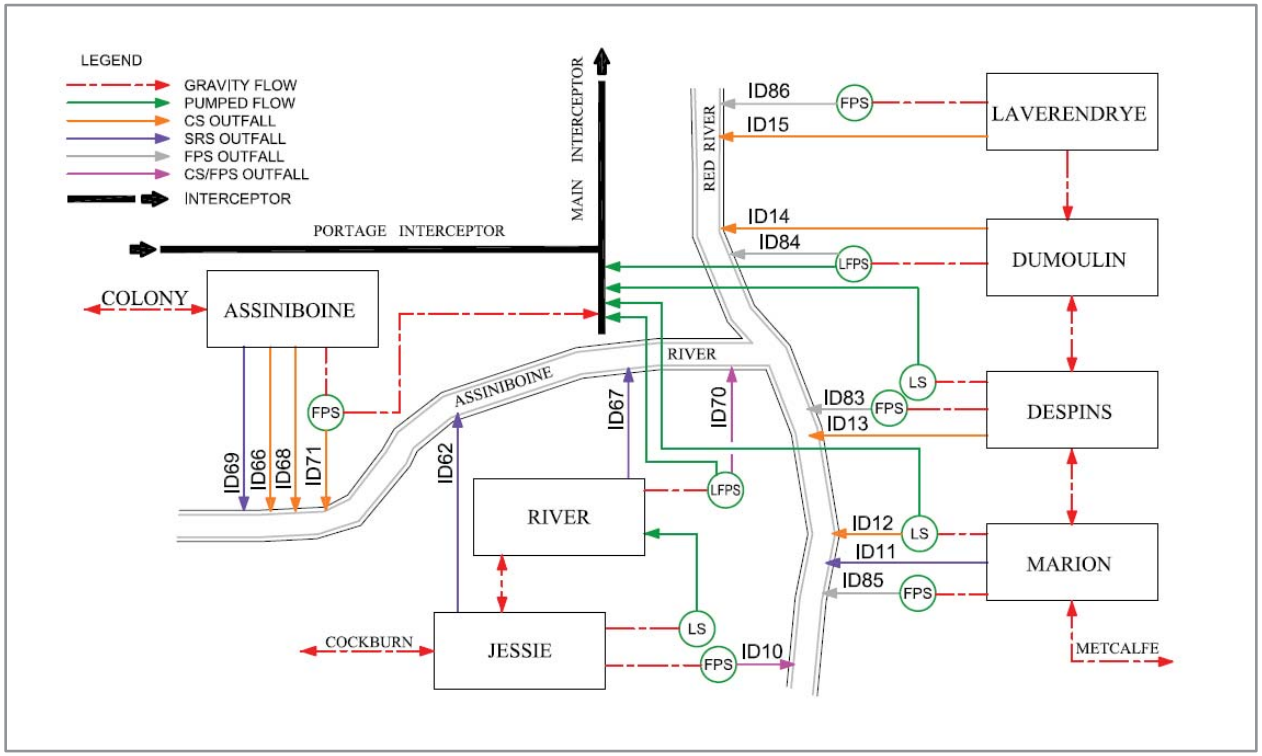


Figure 1-1. District Interconnection Schematic

1.3.2 Asset Information

The main sewer system features for the district are shown on Figure 12 and are listed in Table 1-1.

Table 1-1. Sewer District Existing Asset Information

Asset	Asset ID (Model)	Asset ID (GIS)	Characteristics	Comments
Combined Sewer Outfall (ID13)	S-MH70006397.1	S-MA70087426	1400 mm	Red River Invert: 222.51 m
Flood Pumping Station Outfall (ID83)	S-AC70008183.1	S-MA70087428	1200 mm	Red River Invert: 224.31 m
Other Overflows	N/A	N/A	N/A	
Main Trunk	N/A	S-MA70028366	1200 mm	Invert: 222.71 m
SRS Outfalls	N/A	N/A	N/A	No SRS Outfalls within the district.
SRS Interconnections	Not modelled	S-MA70026766	300 mm	Invert: 222.17 m
Main Trunk Flap Gate	S-AC70013556.1	S-CG00000784	1375 mm	Invert: 223.10 m
Main Trunk Sluice Gate	S-CG00000785.1	S-CG00000785	1375 x 1375 mm	Invert: 223.08 m
Off-Take	S-MH70010291.2	S-MA70017878	450 mm	Circular Invert: 222.72 m
Dry Well	N/A	N/A	N/A	No dry well in lift station arrangement.
Lift Station Total Capacity	N/A	N/A	0.114 m^3/s	1 x 0.062 m^3/s 1 x 0.052 m^3/s
Lift Station ADWF	N/A	N/A	0.0354 m^3/s	
Lift Station Force Main		S-MA70017878	300 mm	Invert: 225.70
Flood Pump Station Total Capacity	N/A	N/A	1.20 m^3/s	1 x 0.73 m^3/s 1 x 0.47 m^3/s
Pass Forward Flow – First Overflow	N/A	0.155 m^3/s	N/A	

Notes:

ADWF = average dry-weather flow
GIS = geographic information system
ID = identification
N/A = not applicable

The critical system elevations for the existing system relevant to the development of the CSO control options are listed in Table 1-2. Critical elevation reference points are identified on the district overview and detailed maps.

Table 1-2. Critical Elevations

Reference Point	Item	Elevation (m)[a]
1	Normal Summer River Level	Despins – 223.73
2	Trunk Invert at Off-Take	222.72
3	Top of Weir	223.25
4	Relief Outfall Invert at Flap Gate	N/A
5	Relief Interconnection	N/A
6	Sewer District Interconnection (Marion district boundary)	223.00
7	Low Basement (Metcalfe, Marion, Despins)	224.33
8	Flood Protection Level (Metcalfe, Marion, Despins)	229.95

[a] City of Winnipeg Data, 2013

1.4 Previous Investment Work

Table 1-3 provides a summary of the district status in terms of data capture and study. The most recent study completed in Despins district was the *Marion and Despins Sewer Relief Project Preliminary Design Report* (Wardrop, 2005). The Marion and Despins Combined Sewer Relief Project upgraded the capacity of the existing CS systems to alleviate basement flooding (Wardrop, 2005 The CS district relief, including the separate LDS and WWS installation, was completed between 2000 and 2003 and is aligned with the Wardrop Sewer Relief project. Note that the final draft of the report was issued in 2005 after the work was complete, but the original design report was prepared prior to the work taking place. No other relief or CSO-related sewer work has been completed since that time.

Between 2009 and 2015, the City invested $12 million in the CSO Outfall Monitoring Program. The program was initiated to permanently install instruments in the primary CSO outfalls. The outfall from the Despins Combined Sewer District was included as part of this program. Instruments installed at each of the 39 primary CSO outfall locations has a combination of inflow and overflow level meters and flap gate inclinometers if available.

Table 1-3. District Status

District	Most Recent Study	Flow Monitoring	Hydraulic Model	Status	Planned Completion
12 - Despins	2005 - Conceptual	Future Work	2013	Study Complete	N/A

1.5 Ongoing Investment Work

There is ongoing maintenance and calibration of permanent instruments installed within the primary outfall of the Despins district. This consists of monthly site visits in confined entry spaces to verify physical readings concur with displayed transmitted readings and replacing desiccants where necessary.

1.6 Control Option 1 Projects

1.6.1 Project Selection

The proposed projects selected to meet Control Option 1 – 85 Percent Capture in a Representative Year for the Despins sewer district are listed in Table 1-4. The proposed CSO control projects will include sewer separation. Program opportunities including green infrastructure (GI) and real time control (RTC) will also be included as applicable.

Table 1-4. District Control Option

Control Limit	Latent Storage	Flap Gate Control	Gravity Flow Control	Control Gate	In-line Storage	Off-line Storage Tank	Off-line Storage Tunnel	Sewer Separation	Green Infrastructure	Real Time Control	Floatable Management
85 Percent Capture in a Representative Year	-	-	-	-	-	-	-	✓	✓	✓	-

Notes:

- = not included
✓ = included

The existing CS system was originally reviewed for in-line storage as well as floatable management as part of the system-wide Preliminary Proposal options. However, it was noted that the existing CS system is not fully suitable for in-line storage as the relative low level of the CS LS and associated CS outfall results in the modelling NSWL level being able the level of the recommended control gate level during the 1992 representative year assessment.

The existing CS system was originally reviewed for in-line storage as well as floatable management. The marginal evaluation indicated that complete separation will be similar to the in-line/screening control option. The capital costs to separate a district are higher than implementing the equivalent in-line storage and screening. Consideration of the operation and maintenance (O&M) costs however showed that the reduction of the pass forward flow to the downstream interceptor sewer from complete sewer separation would reduce the reliance on the Despins FPS, possibly removing its operation altogether. In addition, the more detailed analysis indicated the Despins CS outfall would not generate the hydraulic head conditions necessary for screen operation. Overflows from the district would still occur with implementation of in-line storage, making this district at risk of not having appropriate floatables management provisions in place. Therefore, the recommendation of complete separation would provide the added benefit of removing the requirement for screening at this outfall location. The additional operations and maintenance costs required with the in-line and screening implementation were also taken into consideration, and this associated O&M cost confirmed the selection of complete sewer separation for this district. Complete separation was recommended as it was found to be the most cost-effective solution from a life cycle cost perspective.

GI and RTC will be applied within each district on a system wide basis with consideration of the entire CS area. The level of implementation for each district will be determined through evaluations completed through district level preliminary design.

1.6.2 Sewer Separation

The sewer separation project for Despins will provide immediate benefits to the CSO program when complete. The proposed work may include installation of a new LDS trunk sewer along Despins Street as well as new LDS collector sewers along Dollard Boulevard. Current LDS systems will be extended to collect road drainage along Hamel Avenue and Bertrand Street. Collected stormwater runoff will be routed to the new LDS trunk sewer on Despins Street and from there will flow through a new LDS outfall parallel to the CS outfall at the Red River. The approximate area of sewer separation for Despins district is shown on Figure 12.

The flows to be collected after Despins separation will be as follows:

- Dry weather flows will remain the same for Despins district.
- Despins weather flow (WWF) will consist of sanitary sewage combined with foundation drainage.

This will result in a significant reduction in combined sewage flow received at Despins CS LS after the separation project is complete. The separation project will provide a full reduction of overflows for the 1992 representative year.

In addition to reducing the CSO volume, the benefits of Despins sewer separation include a reduction of pumped flows entering the downstream interceptor sewer, as well as reducing the amount of flood pumping required at the Despins FPS.

It is proposed that future flow monitoring of the district be completed to verify that the sewer separation is fully compliant with the modelled simulated elimination of all CSO overflows. A static weir elevation increase may be necessary at the CS diversion to eliminate the occurrence of all CSOs. Any weir elevation raise will also be evaluated in terms of existing basement flood protection to ensure the existing level of basement flood protection remains.

1.6.3 Green Infrastructure

The approach to green infrastructure (GI) is described in Section 5.2.1 of Part 2 of the CSO Master Plan. Opportunities for the application of GI will be evaluated and applied with any projects completed in the district. Opportunistic GI will be evaluated for the entire district during any preliminary design completed. The land use, topography and soil classification for the district will be reviewed to identify applicable GI controls.

Despins has been classified as a medium GI potential district. Land use in Despins is primarily residential with a small section of industrial and commercial land uses. This district would be an ideal location for cisterns/rain barrels, and rain garden bioretention within the residential areas. There are a few commercial areas which may be suitable to green roofs and parking lot areas which would be ideal for paved porous pavement.

1.6.4 Real Time Control

The approach to RTC is described in Section 5.2.2 of Part 2 of the CSO Master Plan. The application of RTC will be evaluated and applied on a district by district basis through the CSO Master Plan projects with long term consideration for implementation on a system wide basis.

1.7 System Operations and Maintenance

System operations and maintenance (O&M) changes will be required to address the proposed control options. This section identifies general O&M requirements for each control option proposed for the district. More specific details on the assumptions used for quantifying the O&M requirements are described in Part 3C of the CSO Master Plan.

Sewer separation will include the installation of additional sewers that will require inspection, cleaning and rehabilitation. This will result in additional maintenance costs over the long term, but operational costs will be minimal. The existing larger CS pipes within the district may also receive insufficient flow with the separation work for proper scouring velocities in the sewer pipes. This could result in solids settling within the sewers and require more frequent cleaning operations. The impacts of the reduced flows in larger CS pipes will be evaluated as part of the sewer separation design for the district. There will also be a future reduction on FPS operational requirements, as the overflows in the district will be greatly reduced.

The reduction in storm flows entering the CS LS will reduce the requirement for operation of the flood pump within the FPS. It is recommended to continue to maintain and operate the flow monitoring instrumentation and assess the results after district separation work has been completed. This will allow the full understanding of the non-separated storm elements (foundation drain connections to the CS system) extent within the Despins district.

1.8 Performance Estimate

An InfoWorks CS hydraulic model was created as part of the CSO Master Plan development. Two versions of the sewer system model were created and used to measure system performance. The 2013 Baseline model represents the sewer system baseline in the year 2013 and the 2037 Master Plan – Control Option 1 model, which includes the proposed control options in the year 2037. A summary of relevant model data is provided in Table 1-5.

Table 1-5. InfoWorks CS District Model Data

Model Version	Total Area (ha)	Contributing Area (ha)	Population	% Impervious	Control Options Included in Model
2013 Baseline	96	96	3,621	62	N/A
2037 Master Plan – Control Option 1	96	39	3,621	16	SEP

Table 1-5. InfoWorks CS District Model Data

Model Version	Total Area (ha)	Contributing Area (ha)	Population	% Impervious	Control Options Included in Model

Notes:

SEP = Separation

No change to the future population was completed as from a wastewater generation perspective from the update to the 2013 Baseline Model to the 2037 Master Plan Model. The population generating all future wastewater will be the same due to Clause 8 of Environment Act Licence 3042 being in effect for the CS district. While this district is to be separated and as a result Clause 8 of Licence No. 3042 will not be in effect, the wet weather response of the district overall will still need to be assessed.

City of Winnipeg hydraulic model relied upon for area statistics. The hydraulic model representation may vary slightly from the City of Winnipeg GIS Records. Therefore, minor discrepancies in the area values reported in Section 1.3 Existing Sewer System, and in Section 1.8 Performance Estimate may occur.

The performance results listed in Table 1-6 are for the hydraulic model simulations using the year-round 1992 representative year. The table lists the results for the Baseline, for each individual control option and for the proposed CSO Master Plan - Control Option 1. The Baseline and Control Option 1 performance numbers represent the comparison between the existing system and the proposed control options. The table also includes overflow volumes specific to each individual control option; these are listed to provide an indication of benefit gained only and are independent volume reductions.

Table 1-6. District Performance Summary – Control Option 1

Control Option	Preliminary Proposal	Master Plan			
	Annual Overflow Volume (m^3)	Annual Overflow Volume (m^3)	Overflow Reduction (m^3)	Number of Overflows	Pass Forward Flow at First Overflow
Baseline (2013)	30,553	43,955	0	20	0.155 m^3/s [b]
In-Line Storage	30,545	N/A [c]	N/A	N/A	N/A
Separation	N/A [a]	0	43,955	0	0.113 m^3/s [d]
Control Option 1	**30,545**	**0**	**43,955**	**0**	**0.113 m^3/s [d]**

[a] Separation was not simulated during the Preliminary Proposal assessment.

[b] Pass forward flows assessed with the 1-year design rainfall event

[c] In-Line Storage was not simulated as sewer separation proposed for the Master Plan assessment

[d] Pass forward flows assessed with the 5-year design rainfall event.

The percent capture performance measure is not included in Table 1-6, as it is applicable to the entire CS system and not for each district individually. However, the elimination of the district overflows from complete sewer separation represents the 100 percent capture target at this district.

1.9 Cost Estimates

Cost estimates were prepared during the development of the Preliminary Proposal and have been updated for the CSO Master Plan. The CSO Master Plan cost estimates have been prepared for each control option, with overall program costs summarized and described in Section 3.4 of Part 3A. The cost estimate for each control option relevant to the district as determined in the Preliminary Proposal and updated for the CSO Master Plan are identified in Table 1-7. The cost estimates are Class 5 planning level estimates with a level of accuracy of minus 50 percent to plus 100 percent.

Table 1-7. District Cost Estimate – Control Option 1

Control Option	2014 Preliminary Proposal Capital Cost	2019 CSO Master Plan Capital Cost	2019 Annual Operations and Maintenance Cost	2019 Total Operations and Maintenance (Over 35-year period)
In-line Storage	- [a]	N/A [c]	N/A [c]	N/A [c]
Screening		N/A [c]	N/A [c]	N/A [c]
Separation	N/A [b]	$39,980,000	$24,000	$510,000
Subtotal	**$0**	**$39,980,000**	**$24,000**	**$510,000**
Opportunities	N/A	$4,000,000	$2,000	$50,000
District Total	**$0** [a]	**$43,980,000**	**$26,000**	**$560,000**

[a] In-line storage and Screening not costs in initial Preliminary Proposal costs. Solution developed as refinement to Preliminary Proposal work following submission of Preliminary Proposal costs. Costs for these items of work found to be $1,810,000 in 2014 dollars.

[b] Sewer separation not assessed in this district for the Preliminary Proposal

[c] In-line storage and screening not recommended as part of Master Plan assessment, in favour of complete separation.

The estimates include changes to the control option selection since the Preliminary Proposal, updated construction costs, and the addition of GI opportunities. The calculation of the cost estimate for the CSO Master Plan includes the following:

- Capital costs and O&M costs are reported in terms of present value.
- A fixed allowance of 10 percent has been included for GI, with no additional cost for RTC. This has been listed as part of the Opportunities costs.
- The Preliminary Proposal capital cost is in 2014-dollar values.
- The CSO Master Plan capital cost is based on the control options presented in this plan and in 2019-dollar values.
- The 2019 Total Annual Operations and Maintenance (over 35-year period) cost component is the present value costs of each annual O&M cost under the assumption that each control option was initiated in 2019.
- The 2019 Annual Operations and Maintenance Costs were based on the estimated additional O&M costs annually for each control option in 2019 dollars.
- Future costs will be inflated to the year of construction.

Cost estimates were prepared during the development of the Preliminary Proposal and updated for Phase 3 during the CSO Master Plan development. The differences identified between the Preliminary Proposal and the CSO Master Plan are accounting for the progression from an initial estimate used to compare a series of alternative plans for the entire system, to an estimate focusing on a specific level of control for each district. Any significant differences between the Preliminary Proposal and CSO Master Plan estimates are identified in Table 1-8.

Table 1-8. Cost Estimate Tracking Table

Changed Item	Change	Reason	Comments
Control Options	Separation	Separation was not included in the Preliminary Proposal.	The Master plan identified sewer separation as the control option.
	Removal of In-Line Storage	In-Line Storage was not included in the Master Plan.	The Master plan identified sewer separation as the most

Table 1-8. Cost Estimate Tracking Table

Changed Item	Change	Reason	Comments
			cost effective control option over in-line storage.
	Removal of Screening	Screening was not included in the Master Plan.	With sewer separation recommended all CSO events will be removed, and there will no longer be a requirement for screening.
Opportunities	A fixed allowance of 10 percent has been included for program opportunities	Preliminary Proposal estimate did not include a cost for GI opportunities	
Lifecycle Cost	The lifecycle costs have been adjusted to 35 years	City of Winnipeg Asset Management approach	
Cost escalation from 2014 to 2019	Capital Costs have been inflated to 2019 values based on an assumed value of 3 percent per for construction inflation	Preliminary estimates were based on 2014-dollar values	

1.10 Meeting Future Performance Targets

The proposed complete separation of the Despins district will achieve the 100 percent capture figure and no further work will be required to meet the future performance target.

1.11 Risks and Opportunities

The CSO Master Plan and implementation program are large and complex, with many risks having both negative and positive effects. The objective of this section is to identify significant risks and opportunities for each control option within a district.

The CSO Master Plan has considered risks and opportunities on a program and project delivery level, as described in Section 5 of Part 2 of the CSO Master Plan. A Risk And Opportunity Control Option Matrix covering the district control options has been developed and is included as Appendix D in Part 3B. The identification of the most significant risks and opportunities relevant to this district are provided in Table 1-9.

Table 1-9. Control Option 1 Significant Risks and Opportunities

ID Number	Component	Latent Storage / Flap Gate Control	In-line Storage / Control Gate	Off-line Storage Tank	Off-line Storage Tunnel	Sewer Separation	Green Infrastructure	Real Time Control	Floatable Management
1	Basement Flooding Protection	-	-	-	-	**O**	-	-	-
2	Existing Lift Station	-	-	-	-	-	-	**R**	-
3	Flood Pumping Station	-	-	-	-	**O**	-	-	-
4	Construction Disruption	-	-	-	-	**R**	-	-	-
5	Implementation Schedule	-	-	-	-	**R**	-	**R**	-
6	Sewer Condition	-	-	-	-	-	-	-	-

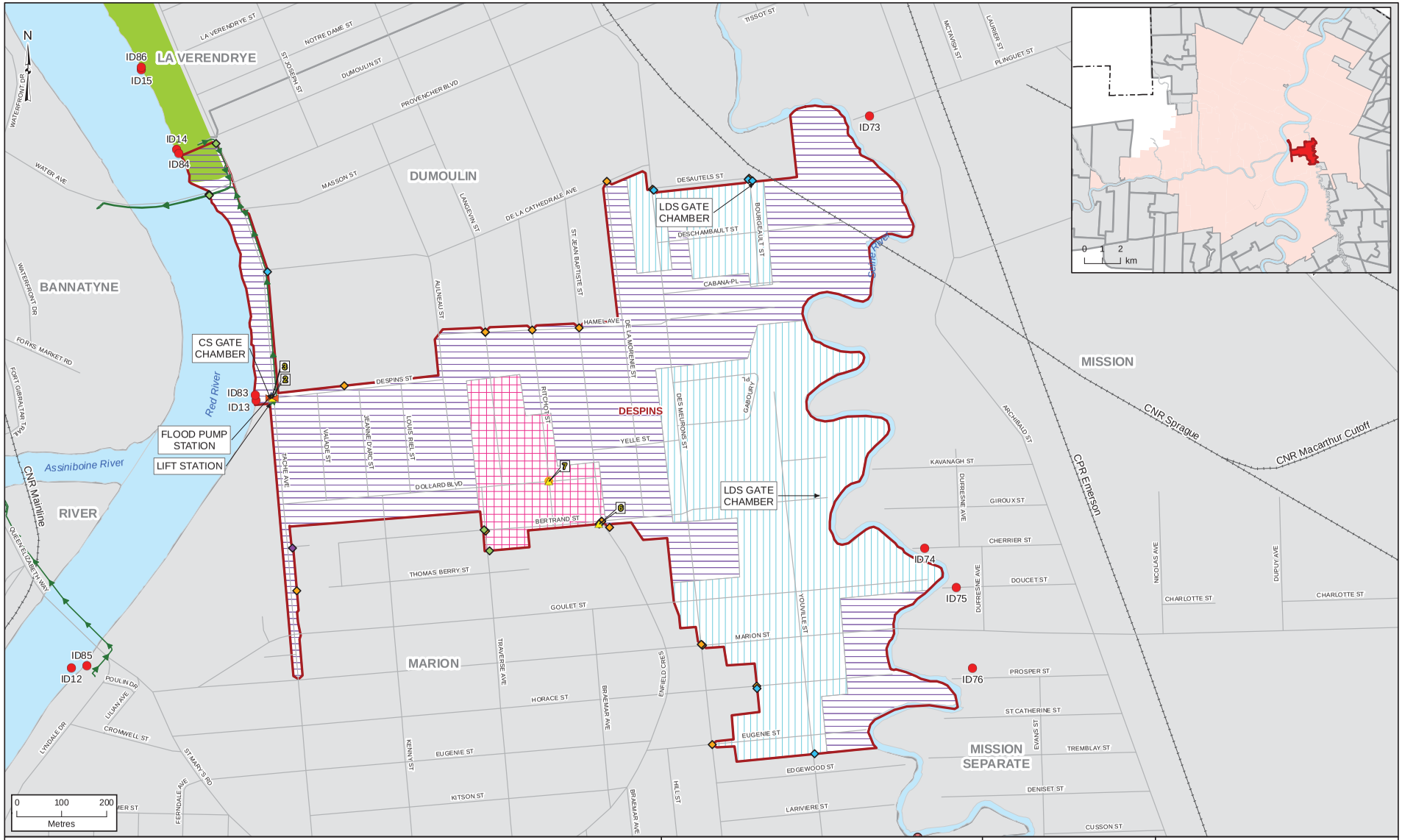
Table 1-9. Control Option 1 Significant Risks and Opportunities

ID Number	Component	Latent Storage / Flap Gate Control	In-line Storage / Control Gate	Off-line Storage Tank	Off-line Storage Tunnel	Sewer Separation	Green Infrastructure	Real Time Control	Floatable Management
7	Sewer Conflicts	-	-	-	-	**R**	-	-	-
8	Program Cost	-	-	-	-	**R**	-	-	-
9	Approvals and Permits	-	-	-	-	-	**R**	-	-
10	Land Acquisition	-	-	-	-	-	**R**	-	-
11	Technology Assumptions	-	-	-	-	**O**	**O**	**O**	-
12	Operations and Maintenance	-	-	-	-	**R / O**	**R**	**O**	-
13	Volume Capture Performance	-	-	-	-	-	**O**	**O**	-
14	Treatment	-	-	-	-	**O**	**O**	**O**	-

Risks and opportunities will require further review and actions at the time of project implementation.

1.12 References

Wardrop. 2005. *Marion and Despins Sewer Relief Project Preliminary Design Report*. Prepared for the City of Winnipeg Water and Waste Department. February.



LEGEND

- Primary Weir
- Critical Elevation
- Decommissioned Outfall
- CSO Outfall
- Low CS Manhole
- Inter-System Connection: CS - WWS
- District Boundary Crossing: CS, LDS, SRS, WWS
- Force Main
- Street
- Railway
- District Boundary
- Watercourse

CSO MASTER PLAN PROPOSED SOLUTIONS

- Sewer Separation - Planning
- Sewer Separation - Complete
- Sewer Separation - Ready

ALL PROPOSED SOLUTIONS SHOWN IN RED TEXT

JACOBS

Notes:
1. Map data source - City of Winnipeg, 2013

THE CITY OF WINNIPEG
WATER AND WASTE DEPARTMENT

FIGURE 12
District Overview Map
Sewer District: Despins
City of Winnipeg
Combined Sewer Overflow Master Plan

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