



Issue Date: April 2, 2020 File No.: 2019-4318-00

To: Ryan Nickel, RPP Previous Issue Date: March 5, 2020

From: Jeff O'Driscoll, P.Eng. Project No.: 2019-4318-00

Client: City of Brandon

Project Name: East Brandon Industrial Area Servicing Analysis

Subject: FS-B Area 13 Water and Sewer Servicing

1 BACKGROUND AND SCOPE

Associated Engineering was engaged by the City of Brandon to review the water and sewer servicing for a developer interested in Area 13 of FS-B as outlined in the East Brandon Industrial Secondary Plan. The proposed development is consistent with the long-term (11+ years) servicing concepts but must be revised to a short-term timeframe as not all supporting infrastructure conceptualised in the Secondary Plan will be available in this earlier timeframe.

In discussions with the City of Brandon, the following updated draft servicing concepts are proposed based on the available information from the developer.

2 EAST BRANDON INDUSTRIAL AREA - PROPOSED DEVELOPMENT

Displayed below is a concept plan for the proposed development in Area 13 of FS-B, which was provided to Associated Engineering from the City of Brandon.

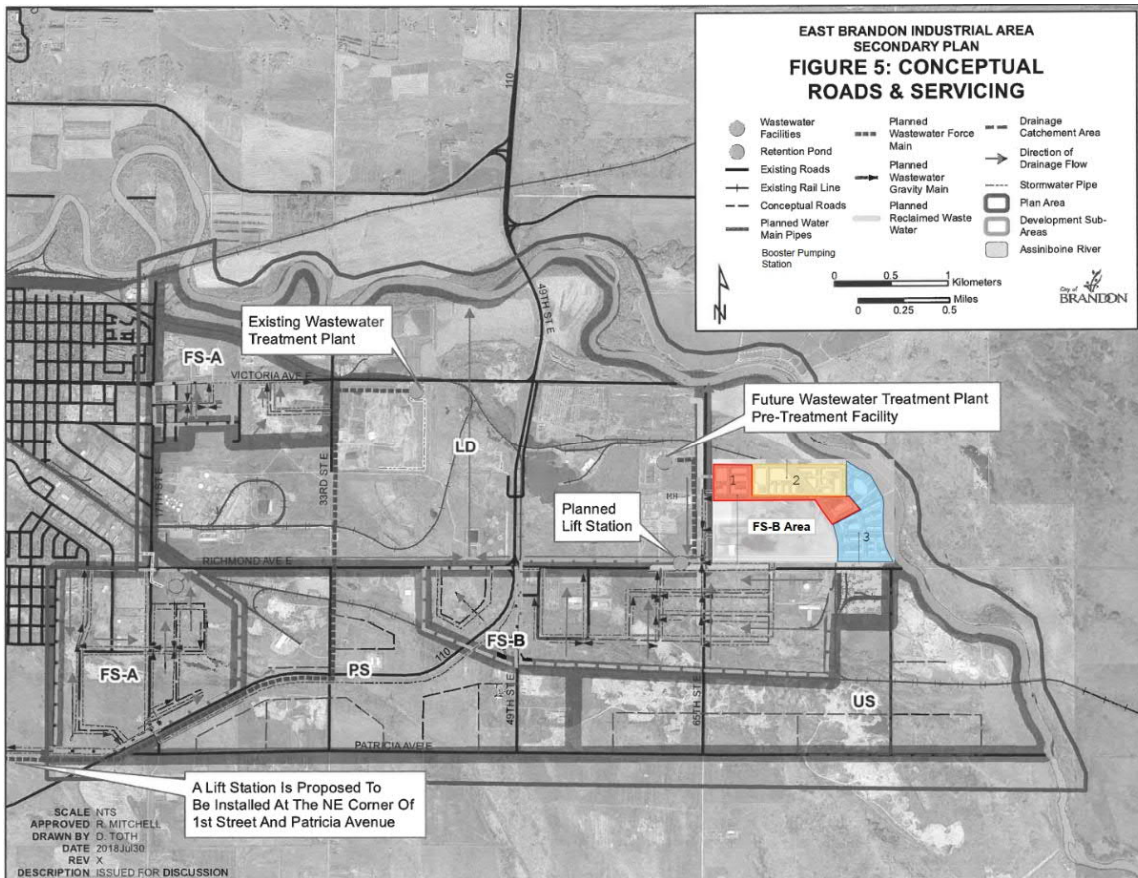


Carpere Brandon Fed-Coop Industrial Park Project Concept Planning PLK

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This development has been overlaid on the below Figure 5: Conceptual Roads & Servicing obtained from the from the East Brandon Industrial Secondary Plan.



To complete the analysis the following assumptions were made related to parcel areas for use in determining servicing demands.

- The development is classified as light industrial
- Phase 1 - FSB - Area 13 - Richmond East Industrial Note: ~ 20.2 Ha (50 Acres)
- Phase 2 - FSB - Area 13 - Richmond East Industrial Note: ~ 24.3 Ha (60 Acres)
- Phase 3 - FSB - Area 13 - Richmond East Industrial Note: ~ 36.4 Ha (90 Acres)

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### 3 WATER SERVICE

Water service demands have been projected using the water demand estimation and design guidelines used in the East Brandon Industrial Secondary Plan.

Water Demand	Average Day Water Demand (ADD) L/ha/day	Maximum Day Water Demand (MDD) L/ha/day	Peak Hour Water Demand (PHD) L/ha/day
	ADD	1.7 x ADD	3.4 x ADD
Light Industrial	22,500	38,250	76,500
	Required Fire Flow L/sec	Minimum Pressure at Fire Flow Conditions (kPa)	
Light Industrial / Industrial Park	290	140	

The following tables summarize the water service demand summaries for all areas of FS-B as well as for FS-B Area 13 (Phase 1, 2, 3) water demands. Maple Leaf Foods service demands are included to assist in assessing existing infrastructure that may service the FS-B areas.

**City of Brandon  
 East Industrial Area**
**Infrastructure Demand Summary  
 Water Service**

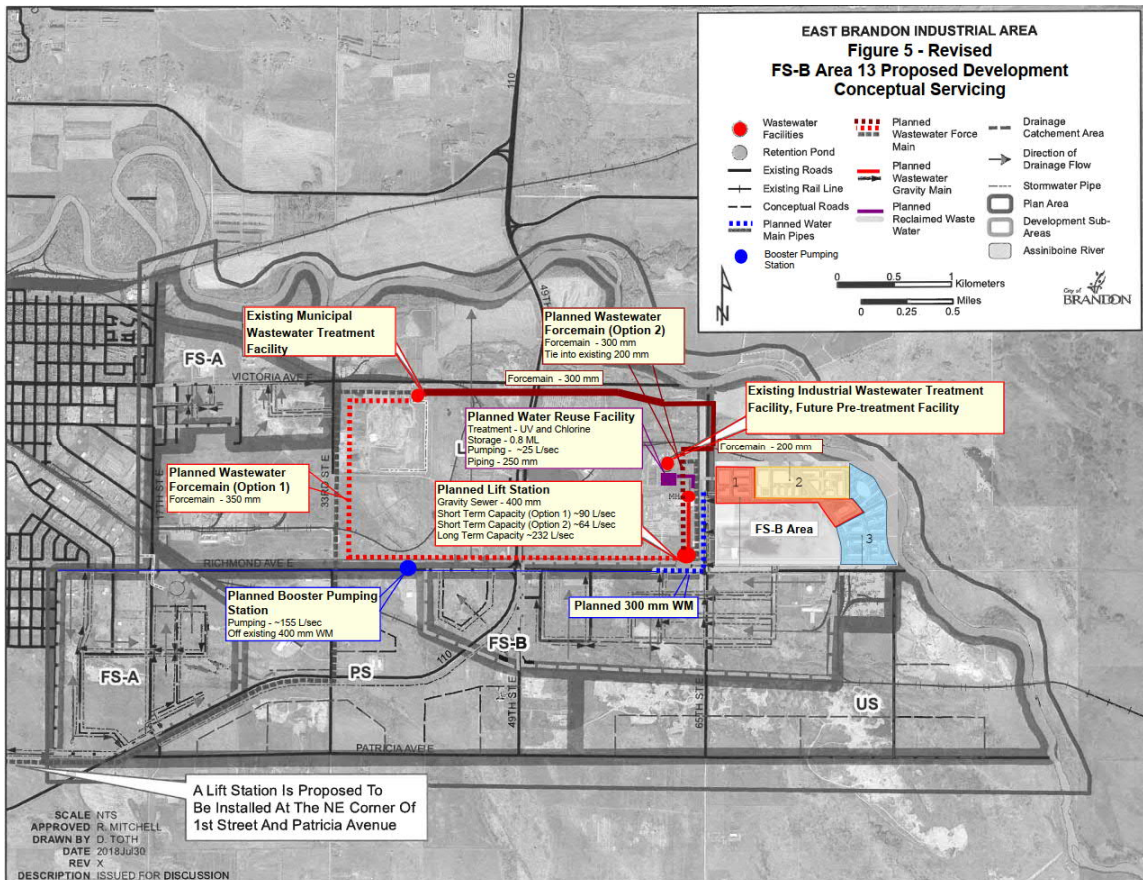
Area	Description	Designation	Acres	Ha	ADD	ADD	ADD	MDD	MDD	PDD	PHD	Min Pressure	Estimate of Developable Area	Factored MDD	Factored PHD	Fire Flow Type	Fire Flow	Min Fire Pressure	
					L/ha/day	L/day	L/s	L/ha/day	L/s	L/ha/day	L/s	kPa		L/s	L/s		kPa		
<b>Full Service (FS-B) - Long Term Demands</b>																			
9	FS-B – PTH #110 Industrial Node	FS-B	Light Industrial	98	39.7	22,500	892,333	10.33	1,516,965	17.56	3,033,931	35.11	241	100%	17.56	35.11	Industrial Park	290	140
10	FS-B – PTH #110 Industrial Node	FS-B	Light Industrial	89	36.0	22,500	810,384	9.38	1,377,652	15.95	2,755,305	31.89	241	75%	11.96	23.92	Industrial Park	290	140
11	FS-B – Richmond East Industrial Node	FS-B	Light Industrial	170	68.8	22,500	1,547,924	17.92	2,631,471	30.46	5,262,941	60.91	241	75%	22.84	45.69	Industrial Park	290	140
12	FS-B – Richmond East Industrial Node	FS-B	Light Industrial	178	72.0	22,500	1,620,767	18.76	2,755,305	31.89	5,510,609	63.78	241	75%	23.92	47.84	Industrial Park	290	140
13	FS-B – Richmond East Industrial Node (Phase 1)	FS-B	Light Industrial	50	20.2	22,500	455,272	5.27	773,962	8.96	1,547,924	17.92	241	100%	8.96	17.92	Industrial Park	290	140
13	FS-B – Richmond East Industrial Node (Phase 2)	FS-B	Light Industrial	60	24.3	22,500	546,326	6.32	928,754	10.75	1,857,509	21.50	241	100%	10.75	21.50	Industrial Park	290	140
13	FS-B – Richmond East Industrial Node (Phase 3)	FS-B	Light Industrial	90	36.4	22,500	819,489	9.48	1,393,132	16.12	2,786,263	32.25	241	100%	16.12	32.25	Industrial Park	290	140
13	FS-B – Richmond East Industrial Node (Remainder)	FS-B	Light Industrial	240	97.1	22,500	2,185,304	25.29	3,715,017	43.00	7,430,035	86.00	241	30%	12.90	25.80	Industrial Park	290	140
<b>Sub Total</b>								102.75		174.68		349			125	250			
<b>Full Service (FS-B) - Area 13 and Maple Leaf - Short Term Demands</b>																			
13	FS-B – Richmond East Industrial Node (Phase 1)	FS-B	Light Industrial	50	20.2	22,500	455,272	5.27	773,962	8.96	1,547,924	17.92	241	100%	8.96	17.92	Industrial Park	290	140
13	FS-B – Richmond East Industrial Node (Phase 2)	FS-B	Light Industrial	60	24.3	22,500	546,326	6.32	928,754	10.75	1,857,509	21.50	241	100%	10.75	21.50	Industrial Park	290	140
13	FS-B – Richmond East Industrial Node (Phase 3)	FS-B	Light Industrial	90	36.4	22,500	819,489	9.48	1,393,132	16.12	2,786,263	32.25	241	100%	16.12	32.25	Industrial Park	290	140
	<small>Estimated for Analysis and Discussion only</small> Maple Leaf Source - Water Utility Master Plan	FS-B					4,800,000	55.56	4,800,000	55.56	4,769,000	80.00	241	100%	55.56	80.00			
<b>Sub Total</b>								77		91		152			152				

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Based on the above, water demands for the three phases of FS-B 13 are estimated at ~72, L/sec (peak hour demand). In review of the existing water supply infrastructure, it is proposed to service this demand in the short-term off the existing 400 mm watermain along Richmond Avenue. This line is currently dedicated to Maple Leaf Foods who have an estimated demand of around 80 L/sec peak hourly flow. To service the FS-B 13 demands and maintain an equal level of service to the Maple Leaf site, a water booster pumping station (~155 L/sec capacity) located upstream of the Maple Leaf site on the 400 mm watermain is proposed. Water distribution modelling of this station will be required to confirm the specifications, location and upstream impacts on the distribution system and storage. Please reference Figure 5 - Revised for detail on the planned booster pumping station.

In terms of long-term FS- B demands, a future 300 mm watermain originating from Patricia Avenue will be required to meet FS-B demands for all the areas (9, 10, 11, 12 and 13). Water distribution modelling of this pipeline will be required to confirm the specifications and location.

It should be noted that the above water service concept will not ensure fire protection services to FS-B areas. Fire protection should be planned and implanted on each site by the property developer.



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#### 4 SEWER SERVICE

Sewer service demands have been projected using the sewer demand estimation and design guidelines used in the East Brandon Industrial Secondary Plan.

Wastewater	Average Day Demand (ADD) L/ha/day	Peak Dry Weather Flow (PDWF) L/ha/day	Inflow and Infiltration Allowance L/ha/day	Peak Wet Weather Flow (PWWF) L/ha/day
	Daily average wastewater flows (Non-Residential)	ADD x peaking factor (1.7)	Extraneous Flow	Peak Wet Weather Flow (PDWF + Extraneous Flow)
Light Industrial	22,500	38,250	24,000	62,250

The following table summarizes the sewer service demand summaries for all areas of FS-B as well as for FS-B Area 13 (Phase 1, 2, 3) sewer demands.

**City of Brandon  
 East Industrial Area**

**Infrastructure Demand Summary  
 Sewer Service**

Area	Description	Designation		Acres	Ha	ADD	ADWF	ADD	PDWF	PDWF	PHD	Extraneous Flow	PWWF	PWWF	PWWF	Estimate of Developable Area	Factored PWWF	RCW (10% of PWWF)	TOTAL Combined
						L/ha/day	L/day	L/s	L/ha/day	L/day	L/s		L/ha/day	L/day	L/s				
<b>Full Service (FS-B) - Long Term Demands</b>																			
9	FS-B - PTH #110 Industrial Node	FS-B	Light Industrial	98	39.7	22,500	892,333	10.33	38,250	1,516,965	17.56	24,000	62,250	2,468,787	28.57	100%	28.57	2.86	31.43
10	FS-B - PTH #110 Industrial Node	FS-B	Light Industrial	89	36.0	22,500	810,384	9.38	38,250	1,377,652	15.95	24,000	62,250	2,242,062	25.95	75%	19.46	2.59	22.06
11	FS-B - Richmond East Industrial Node	FS-B	Light Industrial	170	68.8	22,500	1,547,924	17.92	38,250	2,631,471	30.46	24,000	62,250	4,282,590	49.57	75%	37.18	4.96	42.13
12	FS-B - Richmond East Industrial Node	FS-B	Light Industrial	178	72.0	22,500	1,620,767	18.76	38,250	2,755,305	31.89	24,000	62,250	4,484,123	51.90	75%	38.92	5.19	44.11
13	FS-B - Richmond East Industrial Node (Phase 1)	FS-B	Light Industrial	50	20.2	22,500	455,272	5.27	38,250	773,962	8.96	24,000	62,250	1,259,585	14.58	100%	14.58	1.46	16.04
13	FS-B - Richmond East Industrial Node (Phase 2)	FS-B	Light Industrial	60	24.3	22,500	546,326	6.32	38,250	928,754	10.75	24,000	62,250	1,511,502	17.49	100%	17.49	1.75	19.24
13	FS-B - Richmond East Industrial Node (Phase 3)	FS-B	Light Industrial	90	36.4	22,500	819,489	9.48	38,250	1,393,132	16.12	24,000	62,250	2,267,253	26.24	100%	26.24	2.62	28.87
13	FS-B - Richmond East Industrial Node (Remainder)	FS-B	Light Industrial	240	97.1	22,500	2,185,304	25.29	38,250	3,715,017	43.00	24,000	62,250	6,046,009	69.98	30%	20.99	7.00	27.99
<b>Sub Total</b>								<b>102.75</b>			<b>174.68</b>				<b>284.28</b>		<b>203.44</b>	<b>28.43</b>	<b>231.87</b>
<b>Full Service (FS-B) Area 13 - Short Term Demands</b>																			
13	FS-B - Richmond East Industrial Node (Phase 1)	FS-B	Light Industrial	50	20.2	22,500	455,272	5.27	38,250	773,962	8.96	24,000	62,250	1,259,585	14.58	100%	14.58	1.46	16.04
13	FS-B - Richmond East Industrial Node (Phase 2)	FS-B	Light Industrial	60	24.3	22,500	546,326	6.32	38,250	928,754	10.75	24,000	62,250	1,511,502	17.49	100%	17.49	1.75	19.24
13	FS-B - Richmond East Industrial Node (Phase 3)	FS-B	Light Industrial	90	36.4	22,500	819,489	9.48	38,250	1,393,132	16.12	24,000	62,250	2,267,253	26.24	100%	26.24	2.62	28.87
<b>Sub Total</b>								<b>21.08</b>			<b>35.83</b>				<b>58.31</b>		<b>58.31</b>	<b>5.83</b>	<b>64.15</b>

Based on the above, sewer demands for the three phases of FS-B 13 are approximated at ~64, L/sec (~5.5 ML/day) and ~232 L/sec (~20 ML/day) for all FS-B areas.



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It should be noted that the future capacity of the existing Municipal Wastewater Treatment Facility is limited and will not likely accommodate all FS-B areas and other growth demands from other regions in the City. Future demands will require a new pre-treatment facility to be constructed at the Industrial Wastewater Treatment Facility. For the purposes of developing options, the FS-B Area 13, it is assumed that these demands can be accommodated at the existing Municipal Wastewater Treatment Facility. This assumes the FS-B Area 13 demands are realized in the short term while capacity at the Municipal Wastewater Treatment Facility is available.

To service FS-B Area 13, two concept options have been reviewed.

#### **Option #1 – Lift Station and Forcemain (Richmond / 33<sup>rd</sup> / Victoria)**

A new lift station will be located on Richmond Avenue near the 65<sup>th</sup> Street East. A gravity sewer from the FS-B Area 13 site to the station will be required. From the station, a planned 350 mm forcemain will run west along Richmond Avenue, north in the 33<sup>rd</sup> Street right-of-way and east along Victoria Avenue to the Municipal Wastewater Treatment Facility.

Short-term capacity of the lift station is estimated to be in the order of 90 L/sec to can accommodate the FS-B Area 13 three phases (64 L/sec) as well as some additional short-term demands from other areas. Long-term capacity (232 L/sec) to accommodate all FS-B areas, will require pumping upgrades in the station and a new forcemain to the proposed pre-treatment facility at the Industrial Wastewater Treatment Facility. Please reference Figure 5 – Revised for detail on the option 1, planned lift station and sewer forcemain.

#### **Option #2 – Lift Station and Forcemain (65<sup>th</sup> / Victoria)**

The lift station will be located on Richmond Avenue East near the 65<sup>th</sup> Street. A gravity sewer from the FS-B Area 13 site to the station will be required. From the station, a combination of new 300 mm and repurposed existing forcemain piping, will deliver wastewater to the Municipal Wastewater Treatment Facility (MWWTF). The new section of forcemain will running north along 65<sup>th</sup> Street and tie into an existing forcemain leaving at the Industrial Wastewater Treatment Facility (IWWTF). This existing forcemain runs along 65<sup>th</sup> Street and west along Victoria Avenue to the MWWTF. The initial portion quarter of the piping run is believed to be 200 mm in diameter with the remaining being 300 mm in diameter. The existing piping condition, location, size and appurtenances will need to be determined to verify the concept. The piping will also need to be interconnected at the outfall location.

Utilizing this existing piping will accommodate the FS-B three phases (64 L/sec) only. No additional demands for any other FS-B areas will be accommodated without additional upgrades.

Future upgrades to accommodate all FS-B areas, beyond the above, will require a new pre-treatment facility at the Industrial Wastewater Treatment Facility (IWWTF). As the new lift station and 300 mm forcemain will already be located in close proximity to this new facility only pumping upgrades, may be required. Please reference Figure 5 – Revised for detail on the option 2, planned lift station and sewer forcemain.

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## 5 RECLAIMED WASTEWATER

Reclaimed wastewater is available to service the FS-B areas from the existing wastewater facility. A planned water reuse facility will treat, store and pump high quality reuse water. Assuming a facility that can accommodate 10% of the water needs in the FS-B area, the facility would be sized for approximately 25 L/sec peak hour flow with 0.8 ml of storage. Piping to the FS-B area will allow for non-potable uses of the waste. Reference Figure 5 - Revised for detail on the planned Water Reuse Facility.

## 6 INFRASTRUCTURE COSTING

Based on the above concepts, the following high-level probable construction costing is presented for discussion.

	Item	Quantity		Unit Price*	Price
Booster Pumping Station	Pumping Station	1	Each	\$ 800,000.00	\$ 800,000.00
					\$ 800,000.00
	Contingency			30%	\$ 240,000.00
	Total				\$ 1,040,000.00
Watermain Extension to FS-B	300 dia	700	\$/m	\$ 650	\$ 455,000.00
	Hydrants	3	Each	\$ 9,000	\$ 27,000.00
	Valves	2	Each	\$ 7,000	\$ 14,000.00
	Tie-ins	1	Each	\$ 15,000	\$ 15,000.00
					\$ 511,000.00
	Contingency			30%	\$ 153,300.00
	Total				\$ 644,300.00
<b>Option 1</b>					
Lift Station and Forcemain	400 dia	700	\$/m	\$ 550	\$ 385,000.00
	MH	1	Each	\$ 11,700	\$ 11,700.00
	LS	1	Each	\$ 1,750,000	\$ 1,750,000.00
	350 dia FM	5600	\$/m	\$ 650	\$ 3,640,000.00
	Tie-ins	2	Each	\$ 20,000	\$ 40,000.00
	Xings	1	Each	\$ 250,000	\$ 250,000.00
	Sub total				\$ 6,076,700.00
	Contingency			30%	\$ 1,823,010.00
	Total				\$ 7,899,710.00



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	Item	Quantity		Unit Price*	Price
<b>Option 2</b>					
Lift Station and Forcemain	400 dia	700	\$/m	\$ 550	\$ 385,000.00
	MH	1	Each	\$ 11,700	\$ 11,700.00
	LS	1	Each	\$ 1,750,000	\$ 1,750,000.00
	300 dia FM	1100	\$/m	\$ 600	\$ 660,000.00
	Tie-ins	2	Each	\$ 20,000	\$ 40,000.00
	Existing Piping Upgrades / Verification	1	Each	\$ 75,000	\$ 75,000.00
	Sub total				<b>\$ 2,921,700.00</b>
	Contingency			30%	\$ 876,510.00
	Total				<b>\$ 3,798,210.00</b>
<b>Water Reuse Facility and Piping</b>					
	0.8 ML	1	Each	\$ 2,500,000.00	\$ 2,500,000.00
	300 dia	800	\$/m	\$ 650	\$ 520,000.00
	Valves	3	Each	\$ 7,000	\$ 21,000.00
	Xings	1	Each	\$ 150,000	\$ 150,000.00
	Tie-ins	1	Each	\$ 15,000	\$ 15,000.00
					<b>\$ 3,206,000.00</b>
	Contingency			30%	\$ 961,800.00
	Total				<b>\$ 4,167,800.00</b>
* Unit Prices to be reviewed and updated by the City as required. All costing is Class D level.					





**Associated  
Engineering**

*GLOBAL PERSPECTIVE.  
LOCAL FOCUS.*

# TECHNICAL MEMORANDUM

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**Prepared by:**

A handwritten signature in blue ink, appearing to read 'Jeff O'Driscoll'.

Jeff O'Driscoll, P.Eng.  
Division Manger, Infrastructure

**Reviewed by:**

A handwritten signature in blue ink, appearing to read 'Ken Anderson'.

Ken Anderson, P.Eng.  
Manager, Water Division

JPO/aqs

